M00146.AR.004985
MCAS CHERRY POINT
5090.3a

Final

Remedial Investigation (RI) Report
Operable Unit 6, Site 12
Crash Crew Training Area

Marine Corps Air Station
Cherry Point, North Carolina

Contract Task Order 0064

December 2005

Prepared for

Department of the Navy
Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia

Under the:

NAVFAC Atlantic CLEAN Program
Contract N62470-95-D-6007

Prepared by

CH2MHILL

Contents

Acronyms and Abbreviations ..... **vii**

1 Introduction **1-1**
- 1.1 Site 12 (Crash Crew Training Area) 1-1
- 1.2 Site 35 (Former MAG 14 Accumulation Area) 1-1
- 1.3 Site 35a 1-1
- 1.4 RI Objectives and Approach 1-2
- 1.5 RI Report Organization 1-2
- 1.6 Supplemental Remedial Investigation (SRI) 1-2

2 Background **2-1**
- 2.1 Site Description and History 2-1
  - 2.1.1 MCAS Cherry Point 2-1
  - 2.1.2 OU6, Site 12: Crash Crew Training Area 2-1
- 2.2 Summary of Previous Investigations and Remedial Actions 2-4
  - 2.2.1 Soil Sampling 2-4
  - 2.2.2 Sediment Sampling 2-5
  - 2.2.3 Surface Water Sampling 2-6
  - 2.2.4 Monitoring Well Installation and Groundwater Sampling 2-6
  - 2.2.5 Summary of the Results of Previous Investigations 2-7

3 RI Field Investigation Activities **3-1**
- 3.1 Data Gaps and Specific Objectives of the RI 3-1
- 3.2 Field Investigation of Site 12—Crash-Crew Training Area 3-1
  - 3.2.1 Sampling Approach 3-2
  - 3.2.2 Surface Soil Sampling 3-3
  - 3.2.3 Subsurface Soil Sampling 3-3
  - 3.2.4 DPT Groundwater Sampling 3-4
  - 3.2.5 Temporary Monitoring Well Installation 3-5
  - 3.2.6 Monitoring Well Sampling and Water Level Survey 3-5
  - 3.2.7 Sediment and Surface Water Sampling 3-6
  - 3.2.8 Ecological Survey 3-6
- 3.3 Quality Assurance and Quality Control 3-6
- 3.4 Field Screening and Monitoring 3-7
- 3.5 Decontamination Procedures 3-7
- 3.6 Investigation-Derived Waste (IDW) Handling 3-8

4 Physical Characteristics **4-1**
- 4.1 Regional Physiography, Climate, and Surface Water Hydrology 4-1
- 4.2 Site Topography and Drainage 4-2
- 4.3 Geology and Hydrogeology 4-2
  - 4.3.1 General Regional Geologic and Hydrogeologic Framework 4-2
  - 4.3.2 Regional Geologic and Hydrostratigraphic Unit Description 4-4
  - 4.3.3 Regional Water Usage 4-8

4.3.4 Site Specific Geology and Hydrogeology 4-9
4.4 Site Ecology 4-13

5 Nature and Extent of Contamination 5-1
5.1 Data Management and Evaluation 5-1
5.1.1 Data Tracking and Validation 5-1
5.1.2 Data Qualifiers 5-2
5.1.3 Evaluation of Non-Site-Related Analytical Results 5-2
5.1.4 Regulatory and Risk-Based Standards and Screening Criteria 5-3
5.1.5 Data Presentation 5-4
5.2 Analytical Results 5-4
5.2.1 Onsite Screening Sample Results 5-4
5.2.2 Offsite Laboratory Results 5-7

6 Contaminant Fate and Transport 6-1
6.1 Contaminant Mobility and Persistence 6-1
6.1.1 Contaminant Groups 6-1
6.1.2 Physical and Chemical Properties 6-1
6.1.3 Representative Chemicals 6-5
6.1.4 Aquifer Properties 6-7
6.2 Contaminant Migration for Site 12 6-8
6.2.1 Source Areas 6-8
6.2.2 Releases from Soil to the Atmosphere 6-8
6.2.3 Releases from Soil to Surface Water and Sediment 6-9
6.2.4 Releases from Soil to Groundwater 6-10
6.2.5 Migration of Contaminants in Groundwater 6-11
6.3 Summary of Fate and Transport Conclusions 6-13

7 Human Health Risk Assessment 7-1
7.1 Introduction 7-1
7.1.1 Site Overview 7-1
7.1.2 Conceptual Model 7-2
7.1.3 Scope of Human Health Risk Assessment 7-2
7.2 Identification of COPCs 7-3
7.2.1 Data Summary 7-3
7.2.2 Selection of COPCs 7-6
7.2.3 Summary of COPCs 7-8
7.3 Exposure Assessment 7-8
7.3.1 Characterization of Exposure Setting 7-8
7.3.2 Identification of Exposure Pathways 7-11
7.3.3 Quantification of Exposure 7-14
7.4 Toxicity Assessment 7-18
7.4.1 Toxicity Information for Non-carcinogenic Effects 7-19
7.4.2 Toxicity Information for Carcinogenic Effects 7-20
7.4.3 Derivation of Dermal RfDs and Slope Factors 7-21
7.4.4 Toxicity Profiles for Selected Constituents 7-21
7.5 Risk Characterization 7-24
7.5.1 Methods for Evaluating Risk and Hazard 7-24
7.5.2 Soil 7-26

7.5.3 Surface Water 7-27
7.5.4 Sediment 7-28
7.5.5 Groundwater 7-28
7.5.6 Summary of Total Risks Across Pathways and Media 7-29
7.6 Summary of Human Health Risk Assessment 7-31
7.6.1 Qualitative Uncertainty Assessment 7-31
7.6.2 Quantitative Uncertainty Assessment 7-33
7.6.3 Summary 7-36
7.7 Remedial Goal Options 7-36

8 Screening-Level Ecological Risk Assessment 8-1
8.1 Introduction 8-1
8.2 Screening-Level Problem Formulation 8-2
8.2.1 Environmental Setting 8-2
8.2.2 Chemicals at the Site and Their Fate and Transport 8-4
8.2.3 Ecotoxicity and Potential Receptors 8-5
8.2.4 Complete Exposure Pathways 8-6
8.2.5 Preliminary Conceptual Model 8-7
8.2.6 Assessment and Measurement Endpoints 8-7
8.3 Screening-Level Ecological Effects Evaluation 8-9
8.4 Screening-Level Exposure Estimate 8-9
8.5 Screening-Level Risk Characterization and Uncertainty 8-11
8.5.1 Screening-Level Risk Characterization 8-11
8.5.2 Screening-Level Uncertainty 8-12
8.6 Step 3A – Refinement of Conservative Exposure Assumptions 8-14
8.6.1 Exposure Assumption Refinements 8-14
8.6.2 Final Risk Characterization 8-16
8.6.3 Step 3A Uncertainty 8-18
8.7 Conclusions 8-19

9 Conclusions and Recommendations 9-1
9.1 Conclusions 9-1
9.1.1 Surface Soil 9-1
9.1.2 Subsurface Soil 9-1
9.1.3 Groundwater 9-2
9.1.4 Surface Water and Sediment 9-2
9.1.5 Contaminant Fate and Transport 9-3
9.1.6 Ecological Risk 9-3
9.2 Recommendations 9-3

10 References 10-1

Attachments

1 Site 35 No Further Action (NFA) Letter
2 Supplemental Remedial Investigation Report

Appendixes

A Soil Boring Logs
B Well Construction Diagrams
C RI Field Sampling Parameters
D Onsite Laboratory Data
E Offsite Laboratory Data
F Data Validation Reports
G Human Health Risk Assessment Tables
  G.1 Summary of Potential Exposure Pathways and Risk Scenarios
  G.2 Uncertainty Evaluation
  G.3 Generation of Fugitive Dust During Construction Activities
  G.4 Lead Model Results

Tables

2-1 Summary of 1991 Analytical Results – Soil
2-2 Summary of 1993 Analytical Results – Soil
2-3 Summary of 1996 Analytical Results – Soil
2-4 Summary of 1991 and 1993 Analytical Results – Sediment
2-5 Summary of 1993 Analytical Results – Groundwater
2-6 Summary of 1996 Analytical Results – Groundwater

3-1 Summary of Data Gaps and Investigation Objectives
3-2 Onsite Laboratory Analytical Methods
3-3 Fixed Laboratory Analytical Methods
3-4 Attainable Method Detection Limits (MDLs) for Onsite Laboratory Analyses
3-5 Analytical Parameters, CRQL/CRDLs, and MDL/IDLs – Fixed Laboratory Analyses for TCL Organics, TAL Metals, and Dioxins and Furans
3-6 Summary of Surface Soil Samples Collected at Site 12
3-7 Summary of Subsurface Soil Samples Collected at Site 12
3-8 Summary of Direct Push Groundwater Samples – Onsite Laboratory Analysis
3-9 Summary of Temporary and Permanent Monitoring Well Groundwater Samples
3-10 Summary of Sediment and Surface Water Samples Collected at Site 12
3-11 Screening Phase Action Concentrations for Samples Analyzed by the Onsite Laboratory
3-12 Numbers and Types of Field QA/QC Samples

4-1 Summary of Water Usage in Capacity Use Area #1
4-2 Site 12 Groundwater Level Measurements – March 16, 1999

5-1 Summary of Background Analytical Data for Soil – Inorganic Constituents
5-2 Surface Soil Sampling Screening Criteria Comparison – March 1999 Sampling Event
5-3 Surface Soil Detected Metals/Cyanide and 2X Average Background Comparison
5-4 Surface Soil Sampling Screening Criteria Comparison – Dioxins/Furans

5-5 Surface Soil Sampling Results—Oil & Grease
5-6 Surface Soil Sampling Results—Total Organic Carbon
5-7 Subsurface Soil Sampling Screening Criteria Comparison
5-8 Subsurface Soil Detected Metals/Cyanide and 2X Average Background Comparison
5-9 Groundwater Sampling Screening Criteria Comparison
5-10 Groundwater Sampling Results—Nitrate and Sulfate
5-11 Surface Water Sampling Screening Criteria Comparison
5-12 Surface Water Sampling Results—Nitrate and Sulfate
5-13 Sediment Sampling Screening Criteria Comparison
5-14 Sediment Sampling Results—Oil & Grease

6-1 Physical, Chemical, and Half-Life Data of Representative Chemicals
6-2 Retardation Coefficients for Representative Chemicals

7-1 Samples Evaluated in Risk Assessment
7-2 2,3,7,8-TCDD Toxicity Equivalency Factors
7-3 Chemicals of Potential Concern
7-4 Exposure Pathways
7-5 RME Exposure Parameters for Human Health Risk Assessment
7-6 CT Exposure Parameters for Human Health Risk Assessment
7-7 Chemical-Specific Dermal Absorption Factors for Soil and Sediment
7-8 Chemical-Specific Dermal Permeability Constants for Surface Water and Groundwater
7-9 Summary of Factors Contributing to Uncertainty in Human Health Risk Assessment
7-10 Summary of RME Cancer Risks and Hazard Indices
7-11 Summary of CT Cancer Risks and Hazard Indices
7-12 Calculation of RGOs

8-1 Assessment and Measurement Endpoints
8-2 Media-Specific Screening for Soil
8-3 Media-Specific Screening for Sediment
8-4 Media-Specific Screening for Surface Water
8-5 Reference Toxicity Values for Mammals
8-6 Reference Toxicity Values for Birds
8-7a Summary of Life History Information for Receptor Species - Part 1
8-7b Summary of Life History Information for Receptor Species - Part 2
8-8 Bioaccumulation Factors for Food Chain Exposure Modeling
8-9 Screening-Level Exposure Doses, NOAELs, and HQs for Mourning Dove
8-10 Screening-Level Exposure Doses, NOAELs, and HQs for Killdeer
8-11 Screening-Level Exposure Doses, NOAELs, and HQs for American Kestrel
8-12 Screening-Level Exposure Doses NOAELs, and HQs for Eastern Harvest Mouse
8-13 Screening-Level Exposure Doses, NOAELs, and HQs for Gray Fox
8-14 Baseline Media-Specific Screening for Soil
8-15 Baseline Media-Specific Screening for Sediment
8-16 Baseline Media-Specific Screening for Surface Water
8-17 Calculation of 2,3,7,8-TCDD Equivalents
8-18 Baseline Exposure Doses, NOAELs, and HQs for Mourning Dove
8-19 Baseline Exposure Doses, NOAELs, and HQs for Killdeer
8-20 Baseline Exposure Doses, NOAELs, and HQs for American Kestrel
8-21 Baseline Exposure Doses, NOAELs, and HQs for Eastern Harvest Mouse

8-22 Baseline Exposure Doses, NOAELs, and HQs for Gray Fox

Figures

2-1 OU6 Location Map
2-2 Site 12—Crash Crew Training Area
2-3 1970 Aerial Photograph
2-4 1978 Aerial Photograph
2-5 1991 Soil Sampling Analytical Results
2-6 1993 Soil Sampling Analytical Results
2-7 1996 UST Removal Soil Sampling Analytical Results
2-8 1991 and 1993 Sediment Sampling Analytical Results
2-9 1991 Surface Water Analytical Results
2-10 Groundwater Sampling Analytical Results

3-1 Surface Soil Sampling Locations
3-2 Subsurface Soil Sampling Locations
3-3 Groundwater Sampling Locations
3-4 Surface Water/Sediment Sampling Locations

4-1 Location of MCAS Cherry Point
4-2 MCAS Cherry Point Boundaries
4-3 Generalized Stratigraphic Column at MCAS Cherry Point
4-4 Regional Hydrogeologic Cross Section
4-5 Location of MCAS Cherry Point Cross Section
4-6 Hydrogeologic Cross Section of MCAS Cherry Point
4-7 Monitoring Well Locations/Direction of Groundwater Flow

5-1 Subsurface Soil Analytical Results, Onsite Laboratory
5-2 Direct-Push Groundwater Analytical Results, Onsite Laboratory
5-3 Surface Water and Sediment Analytical Results, Onsite Laboratory
5-4 Surface Soil Samples Exceeding Screening Criteria—Organics
5-5 Surface Soil Samples Exceeding Screening Criteria—Inorganics
5-6 Subsurface Soil Samples Exceeding Screening Criteria
5-7 Groundwater Samples Exceeding Screening Criteria
5-8 Surface Water Samples Exceeding Screening Criteria
5-9 Sediment Samples Exceeding Screening Criteria

7-1 Conceptual Site Model

8-1 OU6 Location Map
8-2 Site 12—Crash Crew Training Area
8-3 Screening-Level Conceptual Model
8-4 Sampling Locations, OU6, Site 12

Acronyms and Abbreviations

ACOE	Army Corps of Engineers
amsl	above mean sea level
AST	above-ground storage tank
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	Ambient Water Quality Criteria
BAF	bioaccumulation factor
BCF	bioconcentration factor
bgs	below ground surface
BHC	benzene hexachloride
BTAG	Biological Technical Advisory Group
BTEX	benzene, toluene, ethylbenzene, xylenes
cfs	cubic feet per second
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
CNO	Chief of Naval Operations
COC	chemicals of concern
COPC	chemicals of potential concern
CRDL	contract-required detection limit
CRQL	contract-required quantitation limit
CSF	cancer slope factor
CSM	conceptual site model
CT	central tendency
CTO	Contract Task Order
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DO	dissolved oxygen
DPT	direct-push technology
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
ELCR	excess lifetime carcinogenic risk
EMPC	estimated maximum possible concentration
ERA	ecological risk assessment
ERL	effects range-low
FCV	final chronic value
FFS	Focused Feasibility Study
FMF	Fleet Marine Force
f_{oc}	fraction of organic carbon
FRV	final residue value

FSP	Field Sampling Plan
2nd FSSG	Second Force Service Support Group
ft/d	feet per day
FTEL	Florida Department of Environmental Protection Threshold Effect Level
GI	gastrointestinal
GRO	gasoline range organics
HEAST	Health Effects Assessment Summary Tables
HI	hazard index
HPLC	high performance liquid chromatography
HQ	hazard quotient
IAS	Initial Assessment Study
ID	identifier
IDL	instrument detection limit
IDW	investigation-derived waste
IEUBK	Integrated Exposure-Uptake Biokinetic
IRIS	Integrated Risk Information System
IWTP	Industrial Wastewater Treatment Plant
K_d	distribution coefficient
K_h	Henry's Law constant
K_{oc}	partition coefficient
K_{ow}	octanol-water partition coefficient
LD_{50}	lethal dose at which there is 50-percent mortality
LNAPL	light non-aqueous phase liquid
LEL	lowest effect level
LOAEL	lowest observed adverse effect level
2nd MAW	Second Marine Aircraft Wing
MCAS	Marine Corps Air Station
MCL	maximum contaminant level
MDL	method detection limit
MF	modification factor
MGD	million gallons per day
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MS/MSD	matrix spike/matrix spike duplicate
MTBE	methyl tert butyl ether
NADEP	Naval Aviation Depot
NAVFAC	Naval Facilities Engineering Command
NC	North Carolina
NCDENR	North Carolina Department of Environment and Natural Resources
NC WQS	North Carolina Water Quality Standards
NC SSL	North Carolina Soil Screening Level
NCEA	National Center for Environmental Assessment

NEESA	Naval Energy and Environmental Support Activity
NFA	No Further Action
NISC	National Information Services Corporation
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no observed adverse effect level
NPDES	National Pollutant Discharge Elimination System
NTP	National Toxicology Program
O&G	oil and grease
OMEE	Ontario Ministry of Environment and Energy
OU	Operable Unit
OVM	organic vapor monitor
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
pg/g	picogram per gram
PID	photo-ionization detector
POL	petroleum, oil, and lubricants
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RAGS	Risk Assessment Guidance for Superfund
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RfD	reference dose
RFI	RCRA Facility Investigation
RGO	remedial goal options
RI	Remedial Investigation
RME	reasonable maximum exposure
SOP	standard operating procedure
SOW	statement of work
SQL	sample quantitation limit
SSL	soil screening level
SUF	site use factor
SVOC	semi-volatile organic compound
SWMU	Solid Waste Management Unit
TAL	target analyte list
TCDD	tetrachlorodibenzodioxin
TCL	target compound list
TEF	toxicity equivalency factor
TOC	total organic carbon
TPH	total petroleum hydrocarbons
UCL	upper confidence limit
UF	uncertainty factor

USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank
VOC	volatile organic compound
WQS	Water Quality Standards
μg/dl	micrograms per deciliter
μg/kg	micrograms per kilogram
μg/L	micrograms per liter

1 Introduction

This report presents the results of the Remedial Investigation (RI) for Site 12 of Operable Unit (OU) 6 at Marine Corps Air Station (MCAS) Cherry Point, North Carolina. OU6 includes one investigation area, Site 12. Two additional areas (Site 35 and Site 35a), are located within the boundary of OU6, but have been previously addressed under separate programs. A brief description of each of these three areas is provided below.

1.1 Site 12 (Crash Crew Training Area)

Site 12 currently consists of a fire-fighting-training burn pit and an oil/water separator. The site has been used for crash-crew training over the last several decades, and five historical burn pit locations have been identified in aerial photographs of Site 12. The site is identified as Solid Waste Management Unit (SWMU) 12 in the Resource Conservation and Recovery Act (RCRA) Consent Order between MCAS Cherry Point and the U.S. Environmental Protection Agency (USEPA), signed in December 1989. Site 12 is the subject of this RI report.

1.2 Site 35 (Former MAG 14 Accumulation Area)

Site 35 refers to a former container storage area located along the north side of Runway 28 near its northeast corner. This container storage area was previously referred to as the MAG 32 Accumulation Area in the Interim RCRA Facility Assessment (RFA) Report (A.T. Kearney, Inc., 1988) and as the MAG 14 Accumulation Area in subsequent reports. The former container storage area reportedly consisted of an uncovered asphalt pad formed into two compartments by a low wall of sandbags. Within the compartments, drums of waste JP-5 and empty hydraulic fluid cans were placed on pallets. The remedial action for this area along with the no further action (NFA) determination was completed under the RCRA program with State approval (Attachment 1). Therefore, Site 35 was removed from OU6. Site 35 was erroneously included in the OU6 RI Workplan (CH2M HILL, 1998).

1.3 Site 35a

The eastern portion of Runway 28 was assigned the designation Site 35a following a site visit in 1997 in which the area was determined to be a potential contaminant source area. Limited investigation activities were conducted at Site 35a concurrently with an investigation at Site 12 to determine whether Site 35a warranted further consideration. No contamination warranting further investigation or remedial activity was identified in the area, and a decision document declaring NFA for this Point of Environmental Interest (POEI) was signed in 2004 (CH2M HILL, 2004). Site 35a was erroneously included in the OU6 RI Workplan.

1.4 RI Objectives and Approach

This RI report is prepared by CH2M HILL under the Naval Facilities Engineering Command, Atlantic Division (NAVFAC Atlantic), Comprehensive Long-term Environmental Action Navy (CLEAN) II Contract N62470-95-D-6007, Contract Task Order (CTO) 0064. This RI report is prepared for submittal to NAVFAC Atlantic, MCAS Cherry Point, USEPA, and the North Carolina Department of Environment and Natural Resources (NCDENR).

The purpose of the RI is to fill information gaps from previous investigations through the collection of additional site-specific data and to assess risks to human health and the environment from site contaminants. The specific objectives are to:

- Evaluate the nature and extent of site-related contaminants in onsite soil, groundwater, sediment, and surface water.
- Assess potential current and future threats to human health caused by the release of site-related contaminants to soil, groundwater, sediment, and surface water.
- Assess potential current and future threats to the environment caused by the release of site-related contaminants to soil, groundwater, sediment, and surface water.
- Collect site data to be used in evaluating remedial action alternatives to mitigate any excessive human health or environmental risks.

1.5 RI Report Organization

This RI Report is comprised of the following sections:

- Section 1—Introduction
- Section 2—Background
- Section 3—RI Field Investigation Activities
- Section 4—Physical Characteristics
- Section 5—Nature and Extent of Contamination
- Section 6—Contaminant Fate and Transport
- Section 7—Human Health Risk Assessment (HHRA)
- Section 8—Screening-Level Ecological Risk Assessment (ERA)
- Section 9—Conclusions and Recommendations
- Section 10—References

Figures and tables referenced within the text are provided at the end of each section. Appendices referenced in the text are provided at the end of the report.

1.6 Supplemental Remedial Investigation (SRI)

During the regulatory review of the Draft Final version of this RI report, data gaps were identified, and a Supplemental RI (SRI) was planned to evaluate soil and groundwater quality at the two westernmost historic burn pit locations. SRI field activities were conducted in October 2003 and February 2004. Results of the SRI are presented in the

Supplemental Remedial Investigation Report, Operable Unit 6, Site 12 (CH2M HILL, 2005), attached to this document as Attachment 2. Recommendations made in the SRI Report were considered during development of the recommendations presented in Section 9 of this RI report.

2 Background

This section presents the site description and history of OU6, Site 12 as well as a summary of the results of previous environmental investigations at the site.

2.1 Site Description and History

The information in this section was obtained from a review of the reports from previous environmental investigations, a review of historical aerial photographs, and from two site visits to OU6 by CH2M HILL in March and April 1998.

2.1.1 MCAS Cherry Point

MCAS Cherry Point is a 13,164-acre military reservation located north of the town of Havelock in southeastern Craven County, North Carolina. Commissioned in 1942, MCAS Cherry Point provides support facilities and services for the Second Marine Aircraft Wing (2nd MAW), the Naval Aviation Depot (NADEP), Service Support Detachment 21 of the Second Force Service Support Group (2nd FSSG), the Naval Air Maintenance Training Group Detachment, and the Defense Reutilization and Marketing Office (DRMO). MCAS Cherry Point maintains facilities for training and support of the Atlantic Fleet Marine Force (FMF) aviation units and is designated as a primary aviation supply point.

The boundaries of MCAS Cherry Point include the Neuse River to the north, Hancock Creek to the east, North Carolina Highway 101 to the south, and a boundary approximately ¾-mile west of Slocum Creek. Figure 2-1 shows the general layout of MCAS Cherry Point.

2.1.2 OU6, Site 12: Crash Crew Training Area

OU6 consists of the eastern portion of Runway 28, located in the northeastern portion of MCAS Cherry Point (see Figure 2-1). Based on an inspection of historical aerial photographs, Runway 28 does not appear to have been used as an active runway for aircraft takeoffs and landings since the late 1950s. Since that time, portions of the eastern section of Runway 28 have been used for crash-crew training (fire fighting), engine run-up activities, and aircraft long-term storage experimentation.

Site 12 is located along the south side of Runway 28 at approximately the midpoint of the runway's length (see Figure 2-2). The area is currently used for the training of crash-crew fire-and-rescue personnel.

The principal features of Site 12 include:

- **Crash-Crew Burn Pit**: A circular concrete pad used to burn waste jet fuel (JP-5) to train crash-crews to extinguish fires. The concrete burn pit was reportedly constructed in 1985, and is approximately 100 feet (ft) in diameter with a 5-inch curb around the circumference (Halliburton NUS, June 1993). The burn pit itself is drained through subsurface piping to a nearby oil/water separator. A circular trench drain surrounds the burn pit approximately 10 ft beyond the concrete curb to capture runoff outside the pad.

Runoff in the trench drain is also directed to the oil/water separator. Runoff outside of the trench drain flows southward across the asphalt into the grassy area south of the runway. An east-west trending drainage swale south of the runway eventually receives runoff entering the grassy area. A significant portion of this runoff flows into the grassy area and the drainage swale through a small runoff channel located southwest of the burn pit, immediately east of the oil/water separator. During site visits by CH2M HILL, it was observed that crash-crew personnel had placed rocks and petroleum-absorbent socks in the runoff channel in an attempt to minimize erosion and capture any petroleum in runoff. It was also observed that the soils were stained in this area.

- **Oil/Water Separator** is an in-ground, rectangular concrete and steel oil/water separator constructed with the top surface at grade. The separator receives fire water contained within the burn pit, runoff captured in the trench drain, and runoff contained within a concrete pad beneath the waste JP-5 fuel tank (described below). The separator is approximately 5 ft wide, 10 ft long and 8 ft deep. The oil/water separator reportedly operated from 1985 to 1990, when effluent was discharged through a National Pollutant Discharge Elimination System (NPDES)-permitted outfall to a drainage swale located approximately 50 ft south of the oil/water separator (Halliburton NUS, June 1993). The separator's effluent pipe has been welded shut, and facilities maintenance personnel currently pump all liquids from the oil/water separator after training exercises or heavy rainfall and transport them to the Industrial Wastewater Treatment Plant (IWTP).

- **Drainage Swale** is a shallow earthen swale trending east to west located approximately 75 ft south of Runway 28. In general, flow moves to the west, where it meets a more substantial drainage ditch flowing in the opposite direction approximately 300 ft west of the oil/water separator. Flow in the larger drainage ditch is directed immediately to the south and later to the east, eventually discharging into Hancock Creek, located approximately 700 ft east of Runway 28. It was observed during site visits that the drainage swale in the vicinity of Site 12 is typically dry from adjacent to the oil/water separator west to the larger drainage ditch when precipitation is not occurring. However, the portion of the drainage swale to the east of the separator was wet and somewhat marshy, indicating that the portion of the swale with the lowest surface elevation is located east of the separator. There is no outlet for the drainage swale to the east.

- **Former Waste Fuel Underground Storage Tank (UST):** A 6,000-gallon UST (No. 4182) was formerly located approximately 20 ft south of the oil/water separator. The UST apparently served as a holding tank for waste oil. Base personnel reported that the tank's contents were used in the past to fuel the burn pit. The UST was removed in November 1995, with no visual evidence of leaks or holes in the UST or related piping observed during closure (R.E. Wright Environmental, Inc., 1996). Additional information concerning the UST closure can be found in Section 2.2.1.

- **Fuel Above-Ground Storage Tank (AST)**: An approximately 8,000-gallon AST located approximately 200 ft west of the burn pit, is currently used to store waste JP-5 prior to use in the burn pit. Fuel is pumped from the tank to the burn pit through subsurface piping. The tank was reportedly installed in the early 1990s to replace the UST described above. The tank sits on top of a concrete pad surrounded by a 2-ft concrete berm. A

separate concrete truck pad with a 6-inch curb is located just north of the tank, to contain any spills from filling the tank. Both of the concrete pads associated with the tank drain through subsurface piping to the oil/water separator.

Historical activities at Site 12 are described in the Initial Assessment Study (IAS) of MCAS Cherry Point (Water and Air Research, Inc., 1983). The IAS reported that Site 12 has been used for crash-crew training activities since the mid-1960s. According to the IAS, waste petroleum, oil, and lubricants (POL) and "waste burnable (i.e., probably non-chlorinated) solvents" were formerly burned in "one of two circular bermed areas" on Runway 28, but only "contaminated fuel" was burned at the time the report was written. The IAS also indicated that "spills and leaks" from the burn pits were evident at the time of the report and that stained and oily soil was present in the drainage swale south of Runway 28. A 152-ft potable water well located near Building 1776 (several hundred ft east of the burn pit; see Figure 2-2) was reportedly sampled in 1981 and 1982, and no fuel contamination was detected. The well could not be located during the site visits conducted by CH2M HILL, and the Environmental Affairs Department at MCAS Cherry Point was not able to confirm the existence of a well near Building 1776 during an internal investigation.

During a CH2M HILL site visit, some clarification was obtained regarding the nature of the historical burn pits that predated the current concrete burn pit constructed in 1985. According to crash-crew personnel, the former burn pits were constructed of dirt placed on top of the asphalt runway surface and shaped into circular berms. The crash-crew personnel recalled the existence of two dirt burn pits of this type, and indicated that fuels (including gas and diesel) and magnesium aircraft parts were formerly burned in the pits.

The Interim RFA Report (A.T. Kearney, Inc., 1988) reported that the current concrete burn pit and oil/water separator were constructed in 1985 in the same area as the former dirt burn pits.

CH2M HILL examined historical aerial photographs of MCAS Cherry Point in order to gain additional information concerning historical activities at Site 12. The photographs that were examined were taken in 1939, 1949, 1955, 1958, 1964, 1970, 1978, 1981, 1988, and 1997. The photographs generally confirmed the accounts of historical activities at Site 12 reported in the IAS and Interim RCRA Facility Investigation (RFI), except for the number of burn pits. The aerial photograph from 1939 was taken prior to the construction of the airfield, and shows lightly forested, undeveloped land where Site 12 is now located. The aerial photographs from 1949, 1955, and 1958 indicate no activity on Runway 28 in the vicinity of Site 12. The 1964 aerial photograph shows a single burn pit located approximately 100 ft east of the present location of the concrete burn pit. The 1970 aerial photograph indicates two burn pits, including the one seen in the 1964 photograph and another approximately 100 ft west of the present location of the concrete burn pit. Apparent stains on the asphalt surface emanate from both burn pits and extend southward to the edge of the runway as shown on the 1970 aerial photograph (Figure 2-3). In the 1978 and 1981 photographs, the burn pits seen in earlier photographs are gone and three others are present. Again, what appear to be stains on the asphalt surface emanate from the burn pits and extend southward to the edge of the runway. A close-up from the 1978 aerial photograph showing these three different burn pits is presented in Figure 2-4. The former locations of the burn pits seen in the 1964, 1970, 1978, and 1981 aerial photographs are shown in Figure 2-2. Finally, the 1988 and 1997 aerial photographs depict the present configuration of Site 12.

2.2 Summary of Previous Investigations and Remedial Actions

Several environmental investigations have been conducted at Site 12, beginning in 1991. The reports containing the detailed results of these investigations include:

- *RCRA Facilities Investigation – 21 Units* presents the results of soil, sediment, surface water, and groundwater sampling conducted in 1991 (Halliburton NUS, June 1993).
- *Technical Direction Memorandum – 10 Units* (addendum to RCRA Facility Investigation) presents the results of soil, surface water, and groundwater sampling conducted in 1993 (Halliburton NUS, August 1993).
- *Geoprobe Site Check, Former UST Location 4182* presents the results of soil and groundwater sampling conducted in 1996 (R.E. Wright Environmental, Inc., September 1996).

The findings of each of these investigations are briefly summarized in the following subsections, organized by media. The data and information provided in this section were obtained from the references cited above.

2.2.1 Soil Sampling

2.2.1.1 1991 Investigation

During the 1991 field investigation activities related to the RFI, a total of 5 soil samples were collected in and around the current burn pit area. Sampling locations are shown on Figure 2-5. These included three near-surface samples (12SO01 to 12SO03, depth 0.5 to 1 ft) collected a short distance south of the asphalt pad surrounding the burn pit, in the likely direction of surface runoff toward the drainage swale. A fourth near-surface sample (12SO05, depth 0.5 to 1 ft) was collected in the wooded area south of the drainage swale. The final sample (12SO04) was collected at a depth of 2 to 3 ft in a boring drilled for a monitoring well east of the burn pit. All soil samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by Method SW8240, oil and grease (O&G) by Method SW9071, and total petroleum hydrocarbons (TPH) by Method 418.1.

No BTEX compounds were detected in any of the samples. O&G and TPH were detected in each of the three surface samples along the south edge of the asphalt pad. Neither of these parameters was detected in the surface sample south of the drainage swale or in the subsurface sample east of the burn pit. The O&G and TPH analytical results for each of the samples are summarized in Table 2-1. The analytical results for detected parameters are also shown in Figure 2-5.

The report describing the results of the 1991 field investigation activities (Halliburton NUS, June 1993) recommended that additional soil sampling to the depth of the water table be conducted where relatively high concentrations of TPH were encountered.

2.2.1.2 1993 Investigation

During the 1993 RFI-related field investigation activities, 10 soil samples were collected south of Runway 28 near the burn pit (Figure 2-6). These included seven surface samples (12SO06 through 12SO12) collected at a depth of 0 to 3 inches and three surface/near-surface samples (12SB01 through 12SB03) collected at a depth of 0 to 1 ft. All of the soil

samples were analyzed for BTEX by Method SW8240 and TPH by Method 418.1 (with individual reported concentrations of diesel, gasoline, kerosene, and #4 fuel oil components).

The analytical results for these samples are summarized in Table 2-2 and shown on Figure 2-6. Low levels of benzene (0.96 to 32 micrograms per kilogram [μg/kg]) were detected in five samples. TPH as diesel was detected in four samples at estimated concentrations ranging from 20 to 40 mg/kg.

The report describing the results of the 1993 field investigation activities (Halliburton NUS, August 1993) recommended that additional soil sampling be conducted to the depth of the water table, with a portion of the samples to be analyzed for the full target compound list/target analyte list (TCL/TAL) suite of analytes.

2.2.1.3 1996 Investigation

In 1995, a 6,000-gallon UST located southwest of the burn pit and associated piping was removed from the location shown on Figure 2-7. Piping reportedly connected the UST to the nearby oil/water separator. The bottom of the UST was at approximately 9.5 ft and the excavation was extended as deep as 13 ft during UST removal. During the UST removal, there was reportedly no visual evidence of leaks or holes in the UST or related piping, nor any evidence of soil staining or petroleum odors. However, based on TPH contamination up to 97 mg/kg detected in soil samples from the excavation, a total of approximately 350 cubic yards of soil were reportedly excavated and disposed of offsite (R.E. Wright Environmental, Inc., 1996).

In 1996, R.E. Wright Environmental, Inc. conducted a follow-up investigation related to the UST removal. Six subsurface soil samples (P-1 through P-6) were collected around all sides of the UST excavation area at depths ranging from 5 to 7 ft using direct-push sampling equipment (Figure 2-7). The sample depths were determined based on the highest observed organic-vapor readings measured in the field. Each soil sample was analyzed for TPH by USEPA Methods 3550/8015 (modified) and 5030/8015 (modified), O&G by USEPA Method 9071, and halogenated volatile organic compounds (VOCs) by USEPA Method 8021.

No halogenated VOCs or TPH by USEPA Method 5030/8015 (modified) were detected in any of the samples. TPH by USEPA Method 3550/8015 (modified) and O&G were detected in several samples. The analytical results are summarized in Table 2-3 and Figure 2-7.

2.2.2 Sediment Sampling

Sediment samples were collected from two locations along the drainage swale south of the burn pit during both the 1991 and 1993 RFI field investigation activities (see Figure 2-8 for sampling locations). The two sediment samples collected in 1991 were analyzed for O&G by Method SW9071; 1,330 mg/kg was detected in the upstream sample location (12SD01) and no O&G were detected in the downstream sample (12SD02).

Because TPH was inadvertently omitted from the analyte list for the 1991 sampling event, samples were collected from the same locations in 1993 and analyzed for BTEX by Method SW8240 and TPH by Method 418.1 (with individual reported concentrations of diesel, gasoline, kerosene, and #4 fuel oil components). A trace of benzene (0.42 μg/kg) and an

estimated concentration of 150 mg/kg of TPH as diesel were detected in the upstream sample (12SD01); no compounds were detected in downstream sample 12SD02.

The analytical results for both the 1991 and 1993 sampling events are summarized in Table 2-4 and Figure 2-8.

2.2.3 Surface Water Sampling

One drainage swale surface water sample (12SW02) was collected during the 1991 RFI field investigation activities at the location of the downstream sediment sample (12SD02) previously discussed (see Figure 2-9 for sampling location). A surface water sample could not be collected at the upstream location, 12SD01, as the drainage swale was dry at this location.

Surface water sample, 12SW02, was analyzed for BTEX by Method SW8240 and TPH by Method 418.1. No BTEX was detected in the sample. TPH was detected in the sample at a concentration of 0.35 milligrams per liter (mg/L).

2.2.4 Monitoring Well Installation and Groundwater Sampling

2.2.4.1 1991 Investigation

Four shallow monitoring wells were installed around the burn pit area during the 1991 RFI field investigation activities. The monitoring wells, designated 12GW01 through 12GW04, are screened across the water table and range in depth from 15 to 17 ft below ground surface (bgs). Monitoring well 12GW01 was installed several hundred ft northwest of the burn pit in the assumed upgradient direction, and the other three wells were installed to surround the pit on the north, east, and south sides. The monitoring well locations are depicted in Figure 2-10.

A groundwater sample was collected from each well and analyzed for VOCs by Method Contract Laboratory Program (CLP) statement of work (SOW) 1/87, SVOCs by Method CLP SOW 10/89, O&G by Method 9071, and total metals. No VOCs or SVOCs were detected in any of the groundwater samples. O&G were detected in samples from monitoring wells 12GW02 and 12GW03 at concentrations of 6.5 and 3.8 mg/L, respectively (see Figure 2-10).

The results of the total metals analyses indicated concentrations of several metals (including arsenic, chromium, copper, and zinc) that exceeded MCAS Cherry Point background concentrations in all monitoring wells. However, the four monitoring wells were re-sampled in 1993 for total and dissolved metals using the low-flow purging technique. Since the 1993 samples were collected using a superior sampling technique, they are considered more representative of actual groundwater conditions than the 1991 samples.

2.2.4.2 1993 Investigation

Monitoring wells 12GW01 through 12GW04 were re-sampled during the 1993 RFI field investigation activities for both total and dissolved metals using the low-flow sampling technique. As a result of the superior sampling technique, which significantly reduced the amount of suspended solids in the samples, the concentrations of most metals in the 1993 total metals samples were significantly lower than those for 1991. The analytical results for

total and dissolved metals, which were detected in one or more samples, are summarized in Table 2-5.

In general, the results show higher concentrations of both total and dissolved metals in the downgradient samples, indicating that the site is likely having an impact on groundwater quality. The concentrations of arsenic, iron, manganese, and mercury in one or more samples exceeded a risk-based or regulatory standard.

2.2.4.3 1996 Investigation

During the 1996 field investigation related to the 6,000-gallon waste-oil UST removal previously described in the soil sampling discussion, a groundwater sample was collected beneath three of the six subsurface soil sampling locations (P-2, P-3, and P-6) using direct-push technology (DPT) sampling equipment (see Figure 2-10 for sampling locations). Each groundwater sample was analyzed for VOCs by USEPA Method 601, BTEX with methyl tert butyl ether (MTBE) by USEPA Method 602, SVOCs by USEPA Method 625, and lead by USEPA Method 200.7.

No VOCs, BTEX, MTBE, or SVOCs were detected in any of the groundwater samples. Lead was detected in all three samples, at 9 micrograms per liter (μg/L) in P-2, 8 μg/L in P-3, and 82 μg/L in P-6. The lead concentration of 82 μg/L in sample P-6 exceeds one or more risk-based or regulatory standards. The analytical results are summarized in Table 2-6.

2.2.5 Summary of the Results of Previous Investigations

A summary of the results of previous investigations is provided below, organized by media.

- **Surface and Subsurface Soil**
  - TPH contamination above 10 mg/kg (as high as 1,220 mg/kg) was detected in near-surface soils (depths of 0.5 to 1 ft) near the south edge of the runway. The source of this contamination is assumed to be surface runoff from the crash-crew training area.
  - TPH contamination greater than 10 mg/kg (as high as 410 mg/kg) was detected in subsurface soils at depths of 5 to 6 ft near the oil/water separator and former UST location. This may have resulted from downward migration of the near-surface TPH contamination documented in this same area, or possibly from a release from the oil/water separator and/or the former UST.
  - One surface soil sample (12SO11, depth 0 to 3 inches) containing TPH contamination above 10 mg/kg (24 mg/kg) was obtained near a drainage swale sediment-sampling location (12SD01) that contained relatively high TPH levels. The sample more likely reflects sediment than soil contamination.
  - Little or no contamination was detected in surface soils (0 to 0.25 ft) at most locations away from the south edge of the runway, indicating that the lateral extent of surface soil contamination from runoff is limited.
  - No TPH contamination was detected in subsurface soil beneath the runway at monitoring well location 12GW04. This monitoring well appears to be located directly beneath one of the former burn pits documented from historical aerial photographs.

- Apparent staining of surface soil was observed during recent site visits in a runoff channel near the oil/water separator. This runoff channel is directed toward the drainage swale south of the runway.

- **Sediment and Surface Water**
  - TPH contamination above 10 mg/kg (as high as 150 mg/kg) and O&G contamination as high as 1,330 mg/kg were detected in drainage swale sediments southwest of the burn pit. The source of this contamination is assumed to be surface runoff from the crash-crew training area or previous discharges from the former oil/water separator outfall.
  - No contamination was detected in drainage swale sediments downstream (west) from the above locations.
  - TPH contamination was detected in one surface water sample (12SW02) downstream from the Site 12 drainage swale, but the site visits conducted by CH2M HILL indicated that surface water flow at this location is primarily from offsite, except during and shortly after precipitation events.

- **Groundwater**
  - Low concentrations of O&G were detected in two monitoring wells north and south of the burn pit at a maximum concentration of 6.5 mg/L. No VOCs, SVOCs, or other petroleum hydrocarbon contamination was detected in groundwater samples from a number of locations. If significant petroleum hydrocarbon groundwater contamination exists at the site, it is likely to be localized in extent.
  - Concentrations of metals were higher in downgradient wells 12GW02 through 12GW04 than in upgradient well 12GW01, suggesting that the downgradient wells have been affected by the site.
  - Arsenic, iron, manganese, and mercury were detected in unfiltered samples from one or more monitoring wells at concentrations that exceeded MCAS Cherry Point background concentrations and one or more regulatory standards or screening criteria. Similar concentrations of arsenic, iron, and manganese were also found in filtered samples, but no mercury was detected in the filtered samples.

Based on the previous investigations, the conditions at Site 12 indicated that surface and subsurface soil, sediment, surface water, and groundwater have been contaminated by site activities. Although the contamination appeared to be fairly localized, concentrations in soil and groundwater exceed regulatory standards or screening criteria at multiple locations.

Table 2-1
Summary of 1991 Analytical Results – Soil (mg/kg)
Site 12 Remedial Investigation
MCAS Cherry Point

Analyte	12SO01 (0.5-1 ft)	12SO02 (0.5-1 ft)	12SO03 (0.5-1 ft)	12SO03 (Duplicate)	12SO04 (2-3 ft)	12SO05 (0.5-1 ft)
Oil and Grease – SW9071	717	901	1,110	915	< 250	< 250
Total Petroleum Hydrocarbons (TPH) – EPA 418.1	810	681	855	1,220	< 11.3	< 11.2

Table 2-2
Summary of 1993 Analytical Results – Soil
Site 12 Remedial Investigation
MCAS Cherry Point

Sampling Location	Analytes	
	Benzene – SW8240 (µg/kg)	TPH (as Diesel) – EPA 418.1 (mg/kg)
12SB01	2	20
12SB02	0.96	40
12SB03	2.6	< 10
12SO06	32	< 10
12SO06	6.6	< 10
12SO07	< 0.2	< 10
12SO08	1.3	< 10
12SO09	< 0.2	< 10
12SO10	< 0.2	< 10
12SO11	< 0.2	20
12SO11	< 0.2	24
12SO12	< 0.2	< 10

Table 2-3 Summary of 1996 Analytical Results – Soil (mg/kg) Site 12 Remedial Investigation MCAS Cherry Point		
Sampling Location	**TPH - EPA Method 3550/8015M**	**Oil and Grease – Method 9071**
P-1 (6-7 ft)	< 5.5	< 78
P-2 (5-6 ft)	< 6.0	< 84
P-3 (5-6 ft)	< 5.8	97
P-3 (5-6 ft) - Duplicate	< 5.8	< 84
P-4 (5-6 ft)	410	210
P-5 (5-6 ft)	290	740
P-6 (5-6 ft)	< 6.3	< 89

Table 2-4
Summary of 1991 and 1993 Analytical Results – Sediment
Site 12 Remedial Investigation
MCAS Cherry Point

Analyte	12SD01	12SD02
Oil and Grease – SW9071 (1991)	1,330 mg/kg	< 316 mg/kg
Benzene – SW8240 (1993)	0.42 μg/kg	< 0.2 μg/kg
TPH (as diesel) – EPA 418.1 (1993)	150 J mg/kg	< 10 J mg/kg

NOTES:

J = Estimated concentration or detection limit.

Table 2-5
Summary of 1993 Analytical Results – Groundwater (µg/L)
Site 12 Remedial Investigation
MCAS Cherry Point

Analyte		12GW01	12GW02	12GW03	12GW04
Aluminum	Total	202	< 132	< 28.8	< 36.4
	Dissolved	< 83.7	< 77.2	< 25.5	< 19.0
Arsenic	Total	< 1.0 J	< 1.0 J	9.9 J	< 1.0 J
	Dissolved	< 1.0 J	< 1.0 J	10.0 J	< 1.0 J
Barium	Total	9.9	12.7	8.9	19.4
	Dissolved	8.6	12.1	8.7	18.6
Calcium	Total	4,800 J	18,300 J	38,100 J	28,000 J
	Dissolved	4,910 J	17,700 J	38,800 J	28,400 J
Iron	Total	64.9 J	4,960 J	7,110 J	12,300 J
	Dissolved	< 7.5	5,260 J	7,020 J	12,200 J
Lead	Total	< 1.0 J	< 1.0 J	< 1.0 J	< 1.0 J
	Dissolved	< 1.0 J	1.4 J	< 1.0 J	< 1.0 J
Magnesium	Total	1,480	2,020	4,220	1,890
	Dissolved	1,510	2,060	4,290	1,930
Manganese	Total	10.8 J	72.0 J	84.5 J	79.9 J
	Dissolved	12.8 J	73.8 J	86.1 J	82.5 J
Mercury	Total	< 0.1	< 0.1	< 0.1	0.19
	Dissolved	< 0.1	< 0.1	< 0.1	< 0.1
Potassium	Total	< 1,380	1,530	2,930	< 1,380
	Dissolved	< 1,380	< 1,380	2,720	< 1,380
Sodium	Total	2,360 J	4,540 J	2,690 J	5,030 J
	Dissolved	2,510 J	4,690 J	2,800 J	5,120 J
Zinc	Total	< 2.0	< 2.0	6.3	2.0
	Dissolved	< 2.0	< 2.0	< 3.7	< 2.0

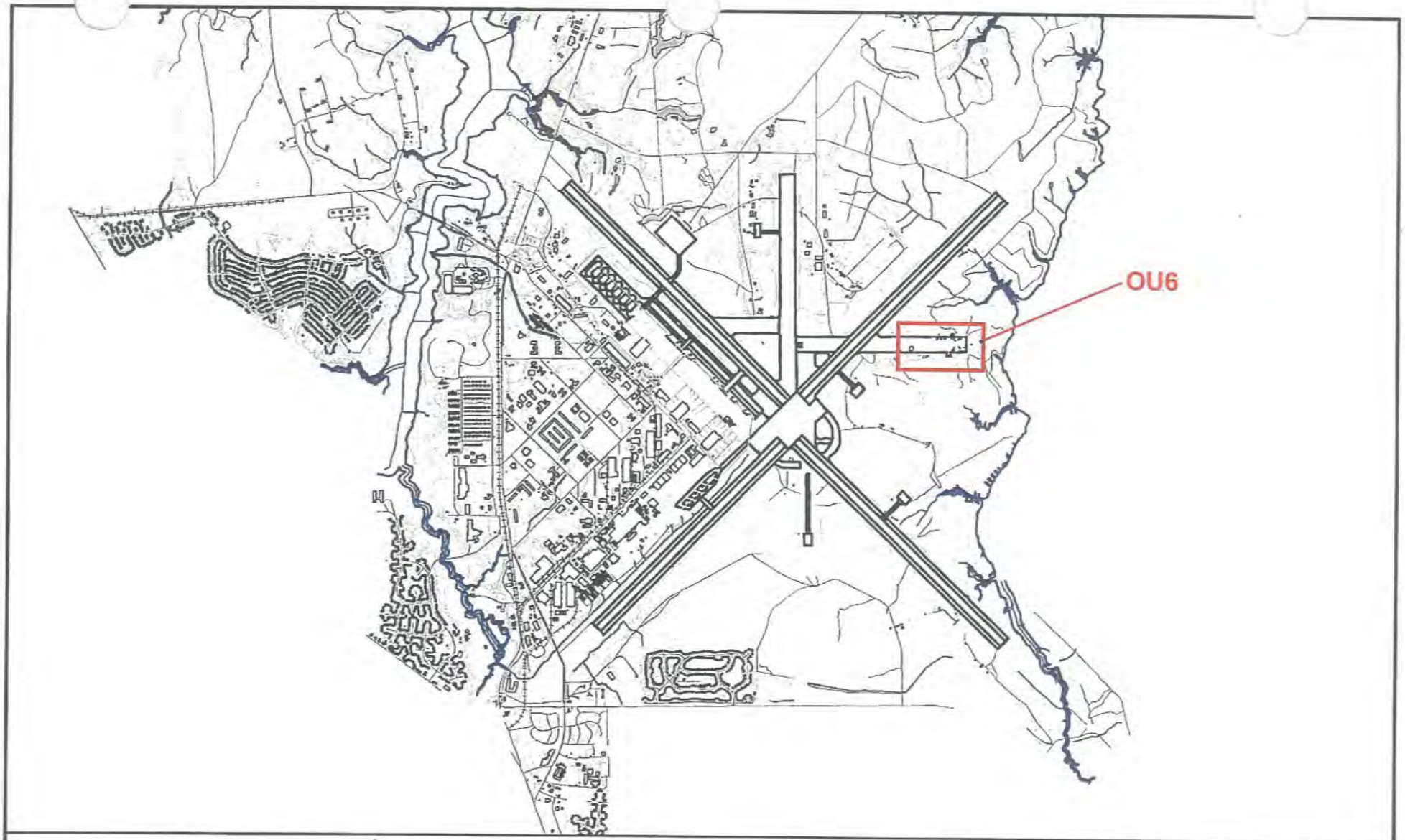
NOTES:

J = Estimated concentration or detection limit.

Table 2-6
Summary of 1996 Analytical Results – Groundwater
Site 12 Remedial Investigation
MCAS Cherry Point

Analyte	P-2	P-3	P-6
Total Lead (mg/L)	0.009	0.008	0.082

Notes
Results for the other parameters (VOCs, BTEX, MTBE, and SVOCs) were non-detect.
Data are taken from a report prepared by R.E. Wright Environmental, Inc., 1996



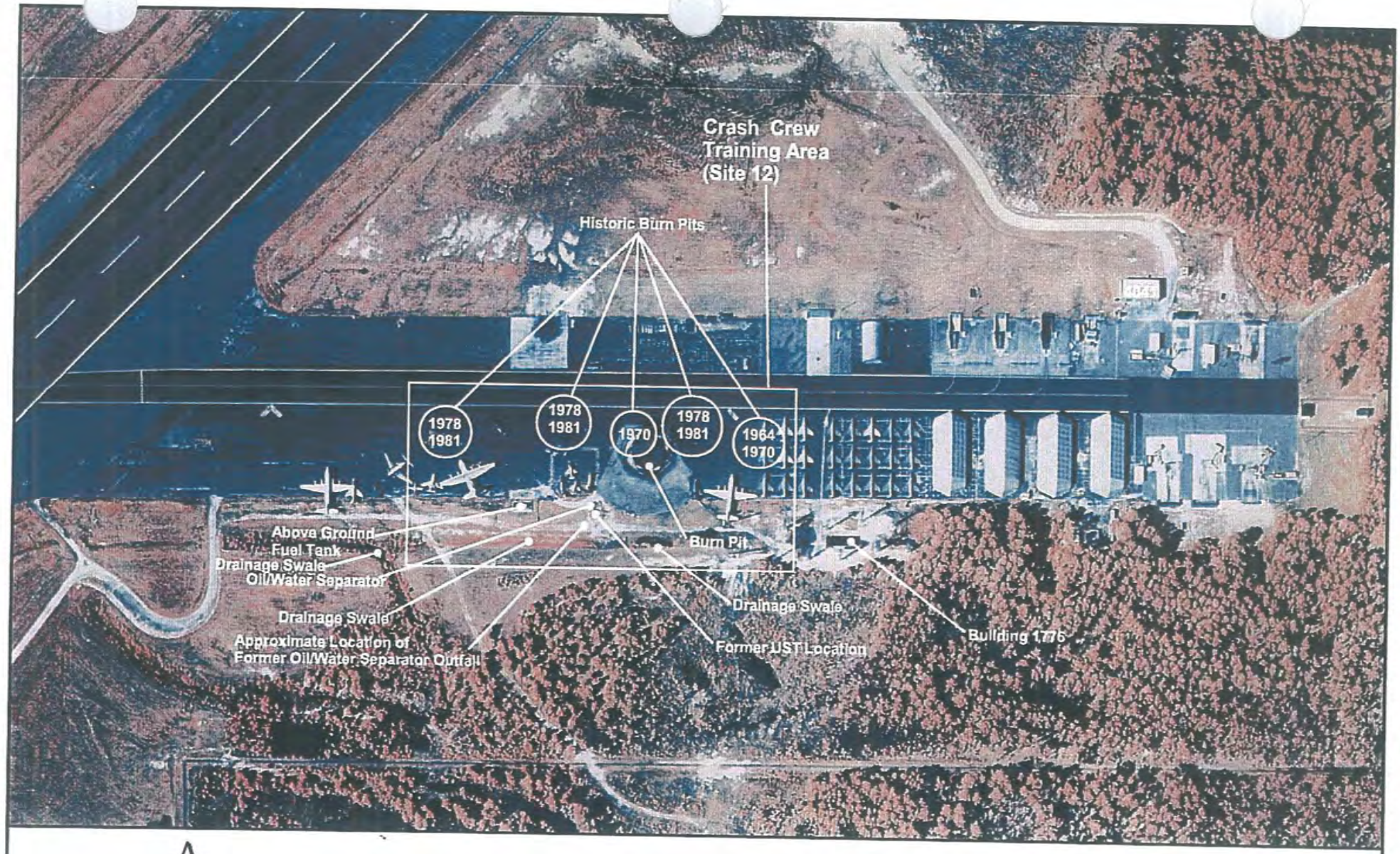
N

2000 0 2000 4000 Feet

Figure 2-1
OU6 Location Map
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

WDCGIS\\CherryPoint\OU6\Site12RI\site12-ri.apr



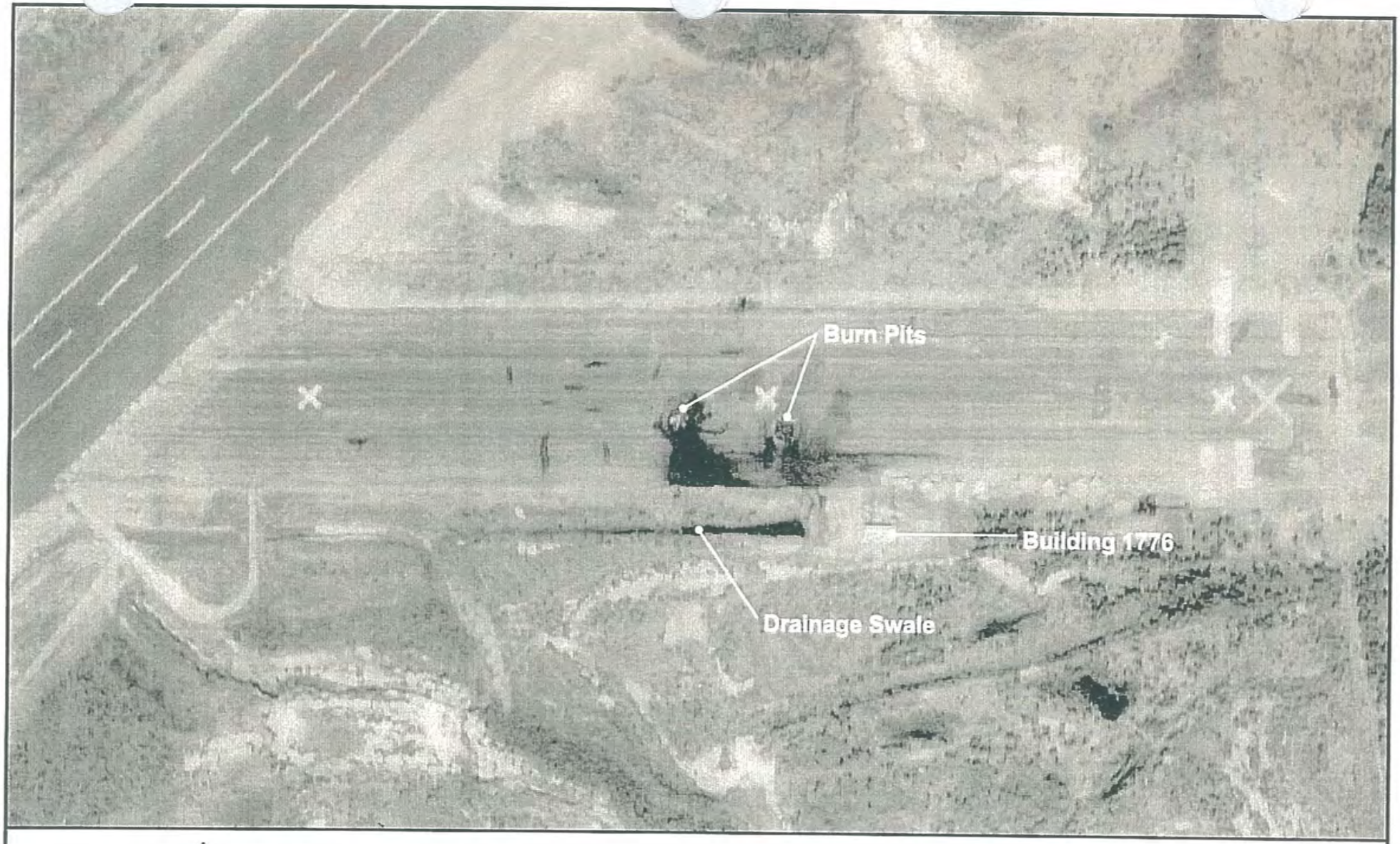
N

200 0 200 400 Feet

Figure 2-2
Site 12 - Crash Crew
Training Area
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

WDCGIS\\CherryPoint\OU6\Site12RI\site12-ri.apr



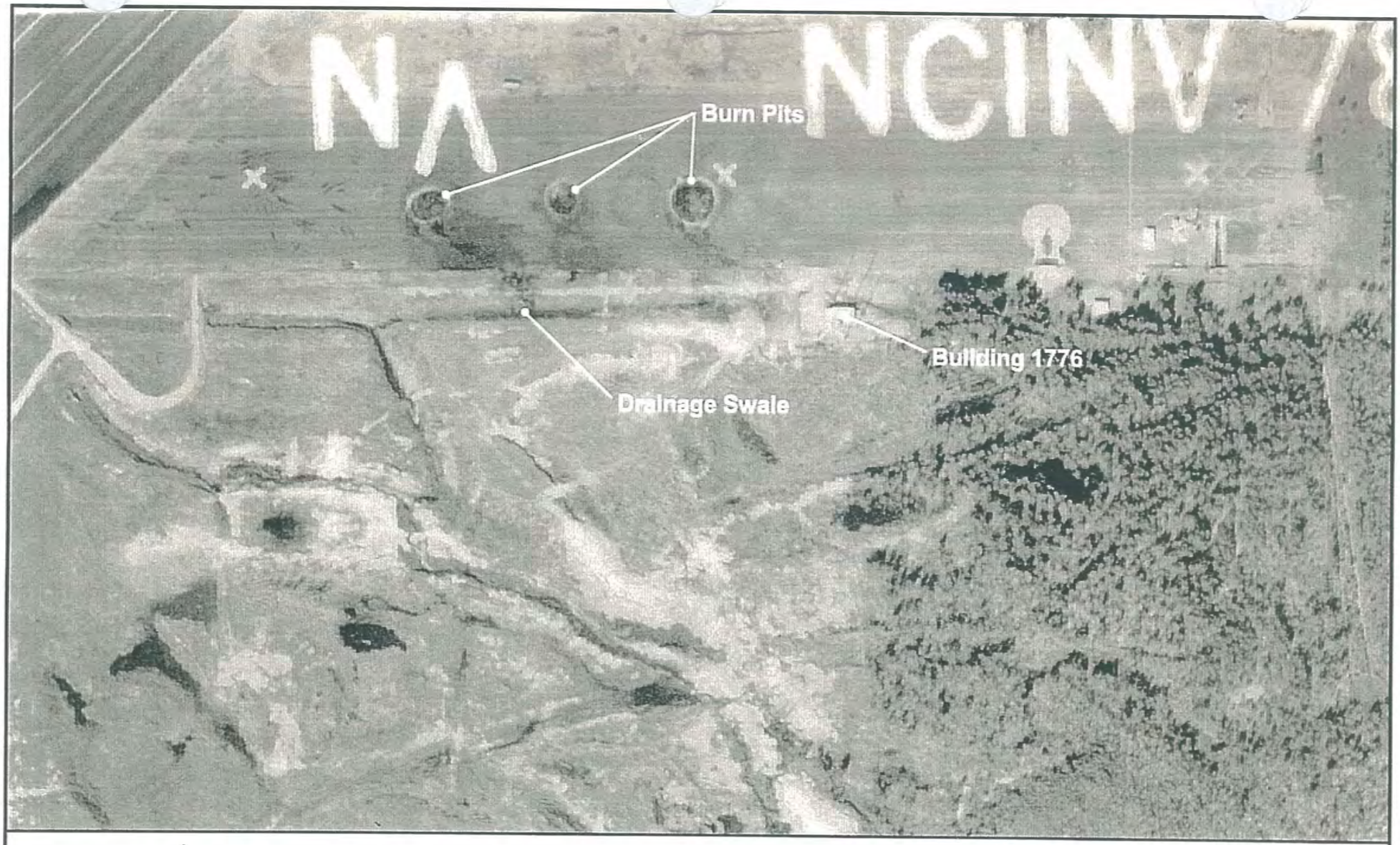
N

200 0 200 400 600 Feet

Figure 2-3
1970 Aerial Photograph
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

WDCGIS\\CherryPoint\OU6\Site12RI\site12-ri.apr



N

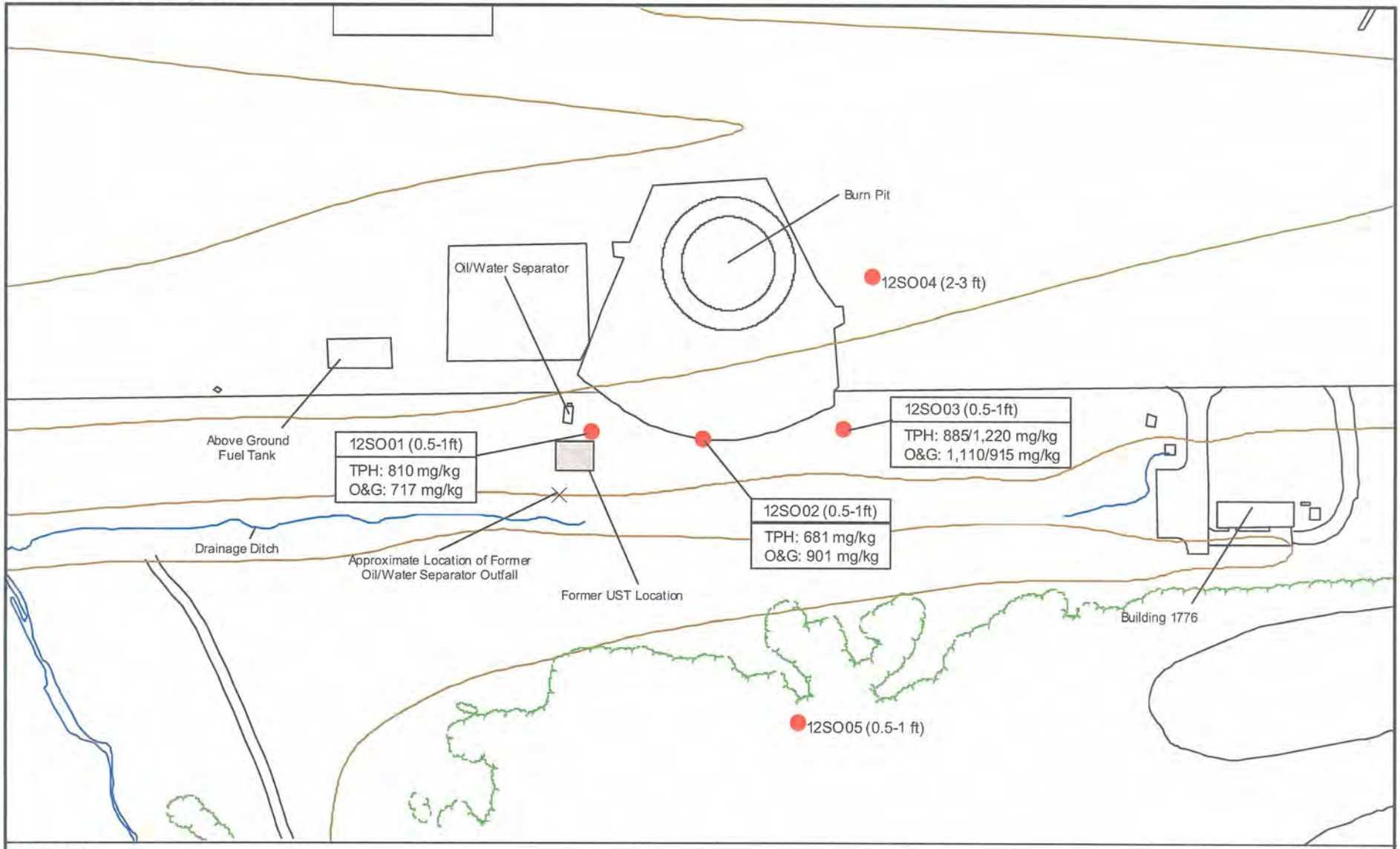
200 0 200 400 Feet

Figure 2-4
1978 Aerial Photograph
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

WDCGIS\\CherryPoint\OU6\Site12RI\site12-ri.apr

File Path: v:\18gis\mcas_cherrypoint\figures\site12ri_wdc_new.apr



LEGEND

- 1991 Soil Sampling Locations
- Tree Line
- Site Drainage Features
- Ground Surface Contours
- Base Map

Analyses: BTEX - Method SW8240
O&G - Method SW9071
TPH - Method 418.1

N

0 60 120 Feet

Figure 2-5
1991 Soil Sampling Analytical Results
Site 12 - Crash Crew Training Area
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\site12ri_wdc_new.apr

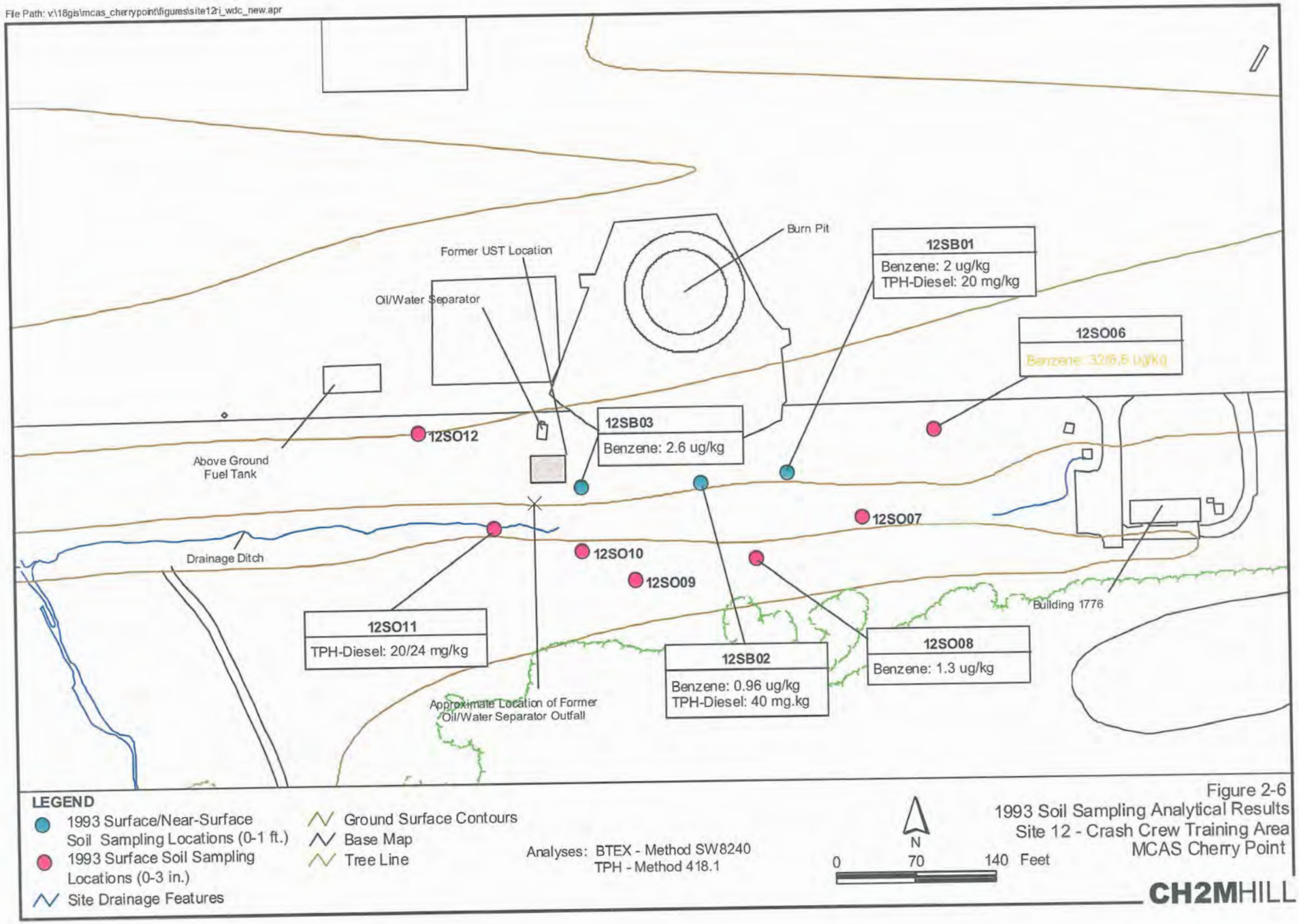
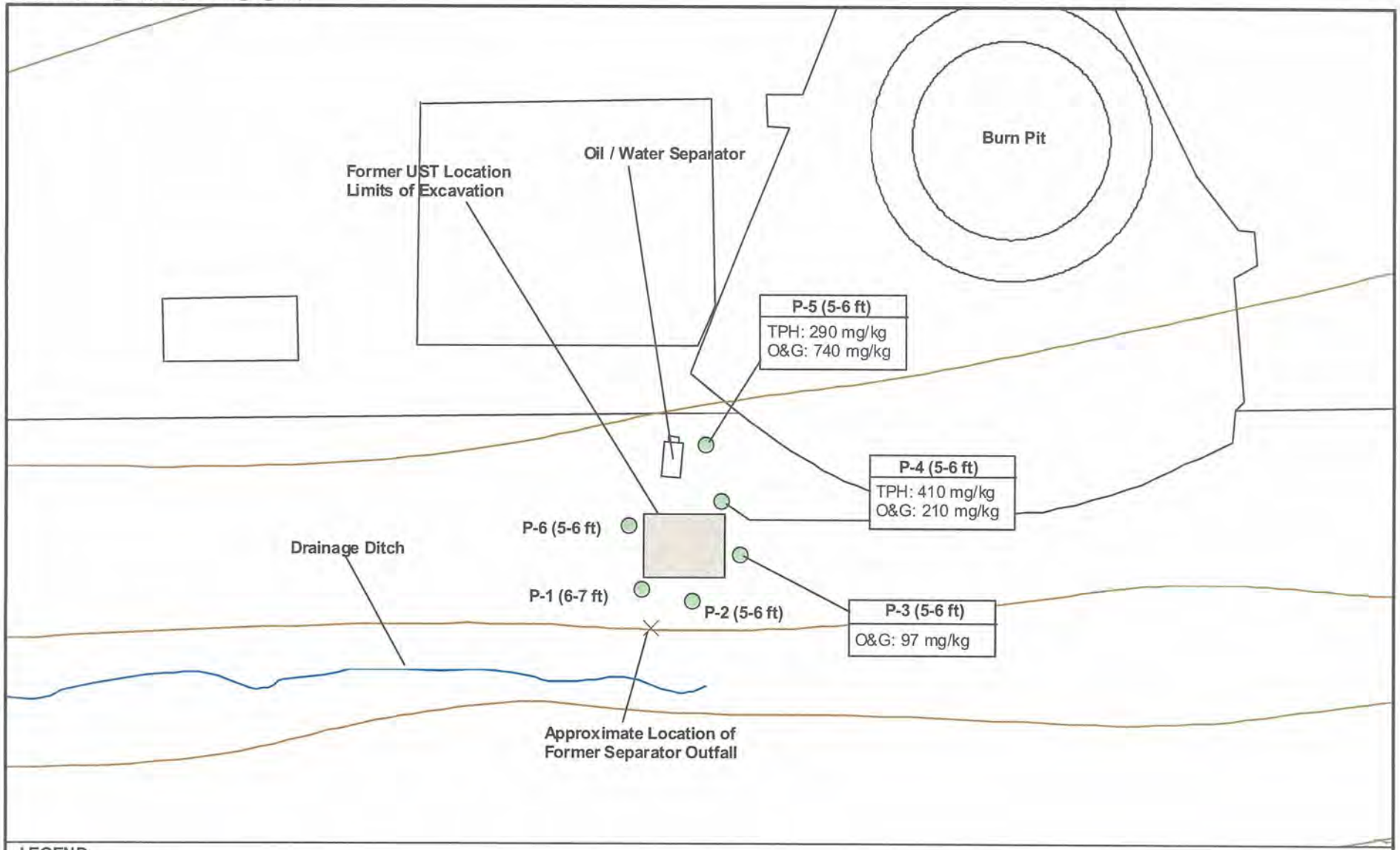


Figure 2-6
1993 Soil Sampling Analytical Results
Site 12 - Crash Crew Training Area
MCAS Cherry Point

File Path: v:\18gis\mcas_cherrypoint\figures\site12ri_wdc_new.apr



LEGEND

- 1996 UST Removal Soil Sampling Locations
- Ground Surface Contours
- Site Drainage Features
- Base Map

Analyses: TPH - Methods 3550/8015 (modified) and 5030/8015 (modified)
O&G - Method 9071
Halogenated VOCs - Method 8021

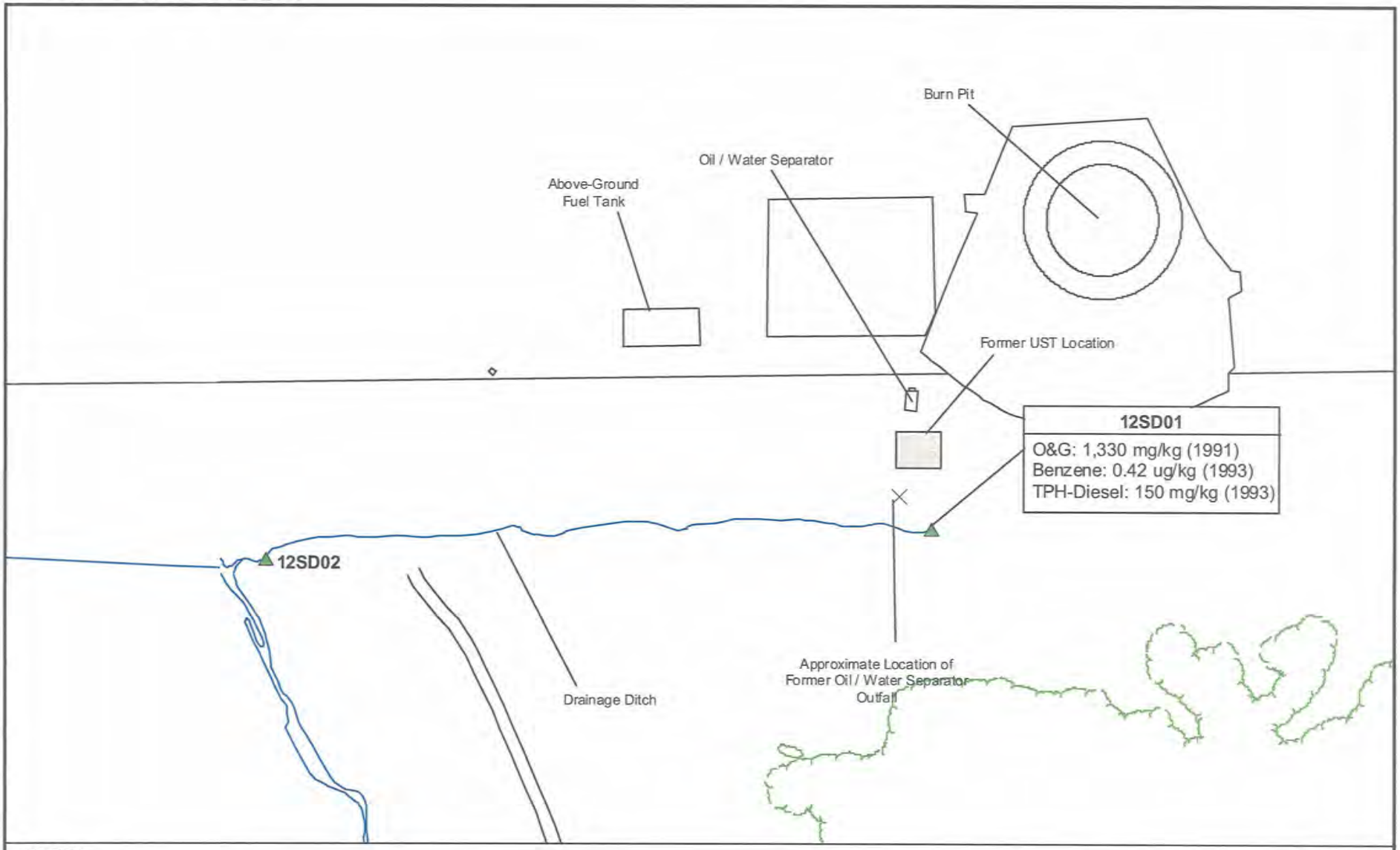
N

0 30 60 Feet

Figure 2-7
1996 UST Removal Soil Sampling
Analytical Results
Site 12 - Crash Crew Training Area
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\site12ri_wdc_new.apr



LEGEND

- ▲ 1991 and 1993 Sediment Sampling Location
- Tree Line
- Site Drainage Features
- Base Map

Analyses: O&G - Method SW9071
BTEX - Method SW8240
TPH - Method 418.1

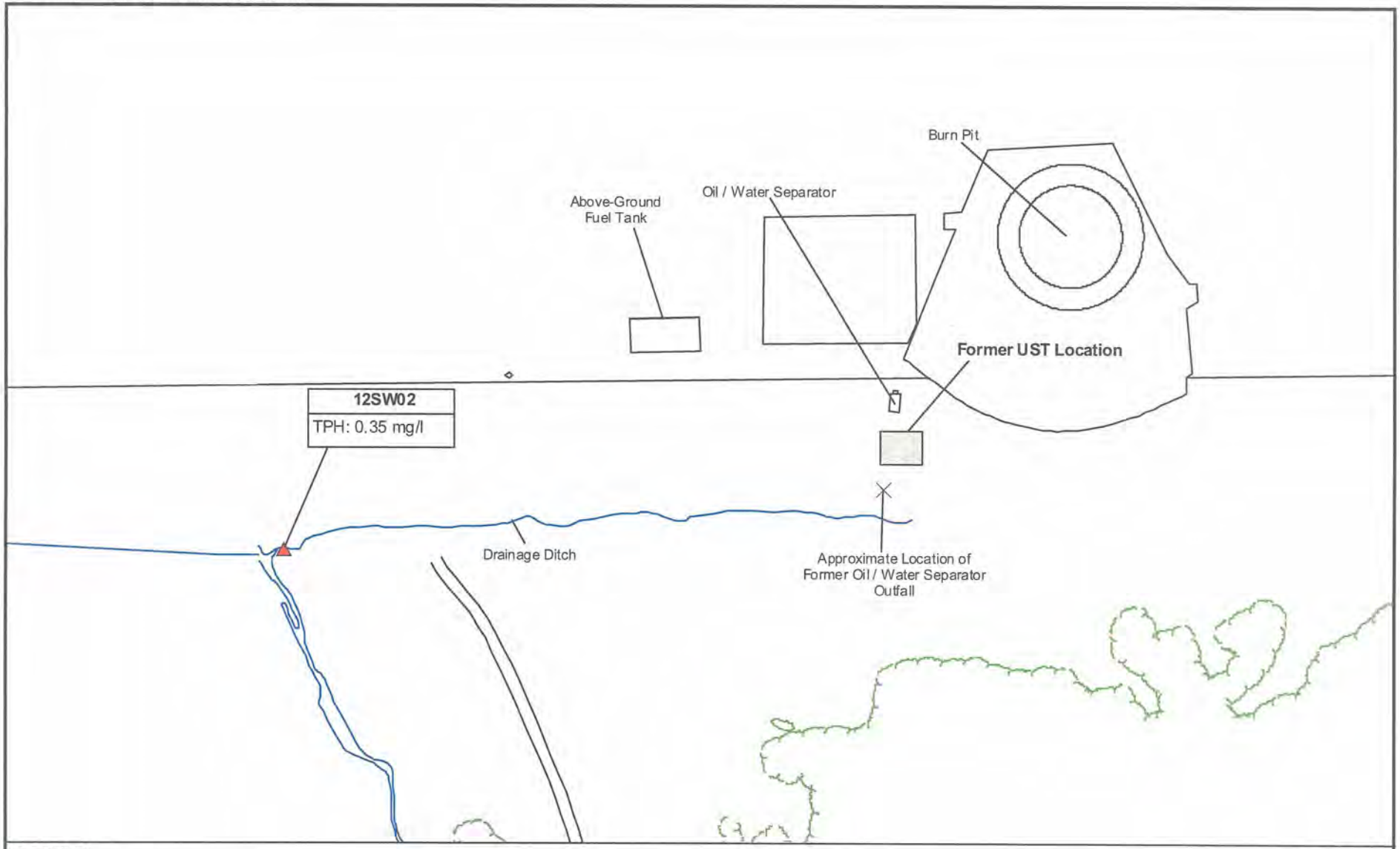
N

0 70 140 Feet

Figure 2-8
1991 and 1993 Sediment Sampling
Analytical Results
Site 12 - Crash Crew Training Area
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\site12ri_wdc_new.apr



LEGEND

- 1991 Surface Water Sampling Location
- Tree Line
- Site Drainage Features
- Base Map

Analyses: BTEX - Method SW8240
TPH - Method 418.1

N

0 60 120 Feet

Figure 2-9
1991 Surface Water Analytical Results
Site 12 - Crash Crew Training Area
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\site12ri_wdc_new.apr

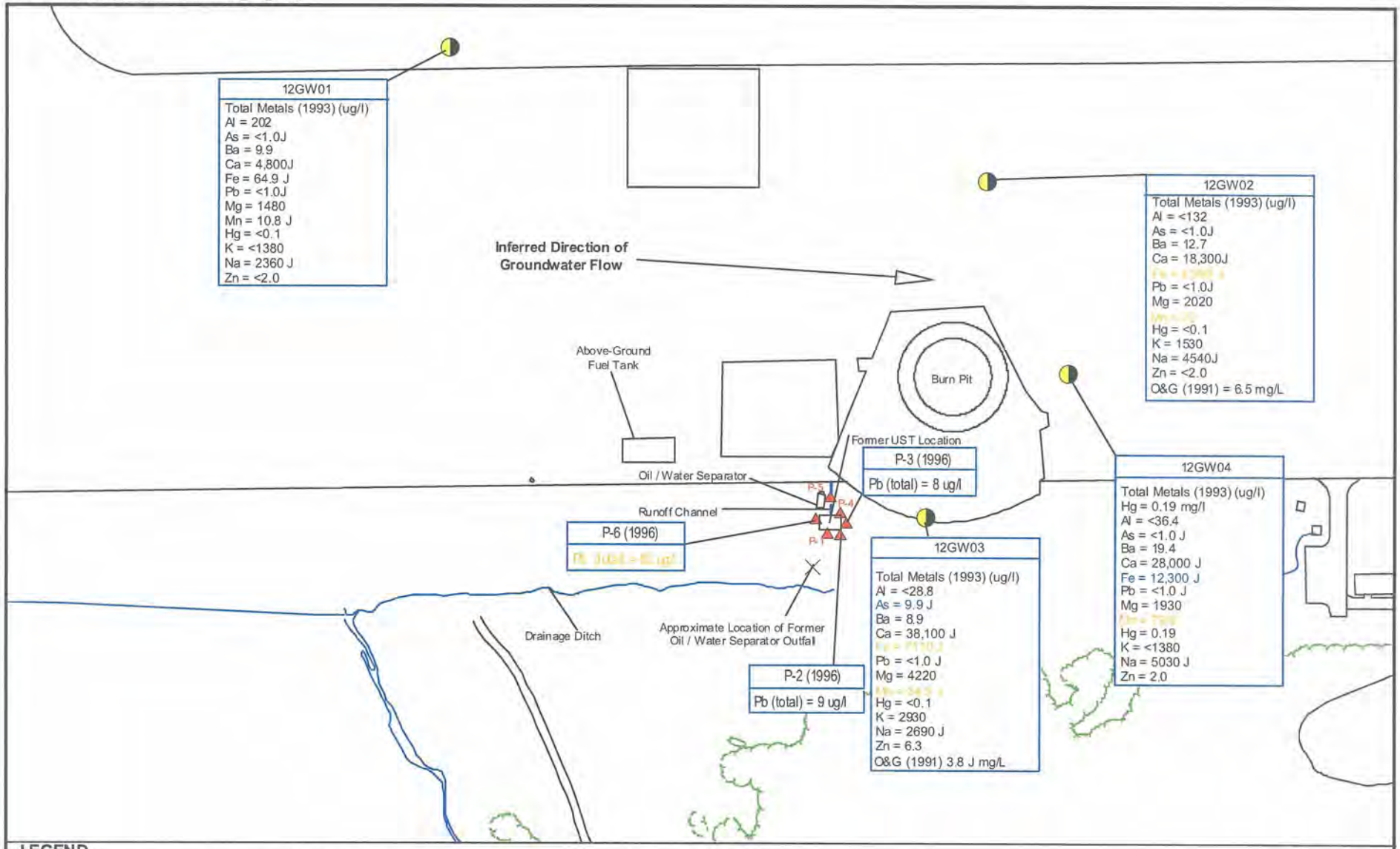


Figure 2-10
Groundwater Sampling Analytical Results
Site 12 - Crash Crew Training Area
MCAS Cherry Point

3 RI Field Investigation Activities

This section outlines the scope and rationale for the field activities conducted to collect data for Site 12 in support of an RI. These data were required to characterize site conditions, determine the nature and extent of contamination, and to assess risks to human health and the environment. The RI field activities described below were conducted between March 8 and March 19, 1999. The activities are discussed according to the type of field sampling conducted for the various media, which included soil, sediment, groundwater, and surface water.

Detailed field procedures employed during the RI are outlined in the Field Sampling Plan (FSP) section of the *Work Plan for Operable Unit 6* by CH2M HILL dated October 1998 and in the Master Field Sampling Plan for MCAS Cherry Point by Brown & Root Environmental (April 1988a).

3.1 Data Gaps and Specific Objectives of the RI

Based on the review of previous data, a number of data gaps and investigation objectives were identified for Site 12 that needed to be addressed in order to characterize the nature and extent of contamination in the various media to the degree necessary to conduct complete risk assessments and a feasibility study. The purpose of the RI field activities was to address these data gaps and investigation objectives as well as possible, which determined the scope of the field activities. Table 3-1 presents a summary of the data gaps and investigation objectives that were identified after a review of the results of previous investigations. The table also outlines the RI field activities conducted to address these issues, the specific sampling locations ultimately selected to address each item, and the types of analyses conducted on the collected samples.

During the regulatory review of the Draft Final version of this RI report, additional data gaps were identified. An SRI was planned to evaluate soil and groundwater quality at the two westernmost historic burn pit locations. The SRI field activities were conducted in October 2003 and February 2004. Results of the SRI are presented in the *Supplemental Remedial Investigation Report, Operable Unit 6, Site 12* (CH2M HILL, 2005), attached to this RI Report as Attachment 2.

3.2 Field Investigation of Site 12—Crash-Crew Training Area

The investigation activities conducted at Site 12 consisted of:

- Collecting and analyzing surface soil samples
- Installing soil borings and collecting and analyzing subsurface soil samples
- Collecting groundwater samples using DPT for onsite analysis
- Installing a temporary monitoring well using DPT

- Collecting and analyzing groundwater samples from both existing and new temporary wells
- Collecting and analyzing surface water and sediment samples
- Gauging groundwater levels in monitoring wells

Tables 3-2 and 3-3 identify the various laboratory analytical methods used during the investigation. Tables 3-4 and 3-5 list the compounds and analytes analyzed under each test method and the associated typical detection limits. Actual detection limits will vary for soil samples due to corrections for moisture content, and may have varied for soil and aqueous samples due to dilutions and interferences. Actual detection limits for each sample and compound are listed in the analytical-result summary tables in Appendices D and E.

Tables 3-6 through 3-10 summarize the samples collected during the RI and identify the analyses conducted on each sample. Figures 3-1 through 3-4 show the RI sampling locations for surface soil, subsurface soil, groundwater, and surface water/sediment, respectively.

3.2.1 Sampling Approach

A two-phase sampling approach was employed for the Site 12 RI field activities, with the second phase immediately following the first. The first phase consisted of the field screening of samples of soil, groundwater, sediment, and surface water for indicators of gross contamination. The second phase consisted of the collection of selected samples for offsite, fixed laboratory analyses for a comprehensive suite of constituents.

For the screening phase, samples were analyzed by an onsite mobile laboratory so that the results were almost immediately available to guide further investigation. The intent of this approach was to fully delineate the nature and extent of contaminated areas during one field effort, rather than through multiple iterations and re-mobilizations.

The screening phase included onsite laboratory analyses for TPH, (both diesel and gasoline ranges) as well as BTEX. TPH and BTEX were used as screening-level indicators of gross contamination for soils and sediment, while BTEX was used as the screening-level indicator of gross contamination for groundwater and surface water. Action concentrations were established in the RI Work Plan for each media to determine the significance of detected contamination in a particular sample. If an action concentration was exceeded in a particular sample, one or more additional samples were collected until the contamination was delineated vertically and horizontally to within the action concentrations. The action concentrations used in the screening phase are summarized in Table 3-11.

The onsite mobile laboratory analyzed screening samples for TPH and BTEX according to the analytical methods set out for the project, with the exception of samples collected for TPH-gasoline range organics (GRO) and BTEX from March 10 to 12, 1999. Due to instrumentation problems, these samples were shipped to the onsite laboratory contractor's facility in Kennesaw, Georgia, for analysis. The analyses performed at the contractor's facility were completed with similar instrumentation and identical methods as those performed onsite. Therefore, there are no material differences between the analyses performed at the contractor's facility and onsite. Onsite TPH-diesel range organics (DRO)

analysis was maintained using the onsite lab during this period and for the remainder of the field effort.

3.2.2 Surface Soil Sampling

Surface soil samples were collected with a hand trowel and were analyzed for TPH and BTEX by the onsite laboratory, and for the full TCL/TAL suite by the offsite, fixed-base laboratory. Where TPH or BTEX compounds were detected by the onsite laboratory in a surface sample above action concentrations, subsurface sampling was performed at that location as described below and additional surface samples were collected as necessary to assess the nature and extent of contamination. All surface soil samples were collected from a depth interval of 0 to 1 ft bgs.

Sixteen surface soil samples were collected at Site 12 as shown in Figure 3-1 and listed in Table 3-6. The initial surface soil sampling locations included stations 012SS01 through 012SS11. Based on the onsite analytical results of *subsurface* soil samples collected at the locations of stations 012SS01 and 012SS02, stations 012SS14 through 012SS18 were added for contaminant delineation purposes. Stations 012SS12 and 012SS13 were used to identify blind duplicate samples for stations 012SS07 and 012SS01, respectively, for samples sent to the fixed-base laboratory.

Table 3-6 lists the identifier (ID) given to each sample, the general sampling location, and the corresponding analysis performed. The analytical results obtained for these samples are discussed in Section 5 (Nature and Extent of Contamination).

3.2.3 Subsurface Soil Sampling

Subsurface soil samples were collected using an Advance 6600-type continuous push unit operated by the direct-push and onsite laboratory contractor, TEG, of Kennesaw, Georgia. This drilling unit was operated in the direct-push mode with a 4-ft long sampling device. At each subsurface sampling location, continuous 4-ft sample cores were collected from the ground surface to the water table and classified for distinguishing soil characteristics, including texture, color, structure, and degree of moisture. From the continuous sample cores, soil samples were collected for chemical analysis at 3-ft intervals, beginning at a depth of 1 ft, and continuing until the water table was encountered. Logs for each of the subsurface soil borings are presented in Appendix A.

TEG analyzed the subsurface soil samples for TPH and BTEX in consecutive sample order, beginning from the top of each borehole and continuing downward. Where no TPH and BTEX were detected in a particular sample above their respective action concentrations, the samples collected below that sample depth were typically not analyzed, except where professional judgment, site conditions, or other observations warranted confirmatory sampling. For example, downgradient of the oil/water separator and in the vicinity of the former UST location, all of the subsurface samples at this location were analyzed by the mobile laboratory down to the water table to assess a known historical environmental concern. Also, in some instances, subsurface samples below those where no action concentrations were exceeded or where no contamination was detected were analyzed for some or all of the screening parameters anyway. This was accomplished where the onsite laboratory was able to handle the volume of samples without delaying the field effort.

Except where no TPH or BTEX was detected in any subsurface samples at a particular borehole, at least one subsurface soil sample from each borehole was submitted to the fixed-base laboratory (Quanterra) for full TCL/TAL analyses. Samples for TCL/TAL analyses were selected based on the highest level of contamination detected by the onsite laboratory or other criteria, such as elevated photo-ionization detector (PID) readings, visible evidence of contamination, and site conditions. The fixed-base laboratory samples were collected from a second direct-push soil core sample, collected within 1 ft of the boring from which the onsite laboratory sample was obtained, to minimize potential analyte losses. Additional details concerning the sampling methods employed to collect subsurface samples during the RI are found in Section 6.3 (Soil Sampling) of the Project Work Plan (CH2M HILL, 1998).

Initially, five soil borings were completed with the continuous-push drill rig at the locations defined in the Project Work Plan (CH2M HILL, 1998). These included stations 012SB01 through 012SB05. Based on the results of TPH-DRO analyses performed on samples from stations 012SB01 and 012SB02, an additional five borings (012SB14 through 012SB18) were completed to delineate soil contamination. A total of 10 soil boring locations were therefore used to delineate subsurface conditions at Site 12. Each of the soil boring stations were identified using the corresponding surface soil sample location number (i.e., 012SS01 and 012SB01 were collected at the same location). The subsurface soil sampling locations are shown in Figure 3-2.

Table 3-7 lists the subsurface soil samples that were obtained from each boring, and the corresponding laboratory analyses that were performed. Fixed-base laboratory analyses were conducted for samples obtained from borings 012SB01 and 012SB02, which were the only soil borings in which any screening samples exceeded the action concentrations. The analytical results obtained for these samples are discussed in Section 5 (Nature and Extent of Contamination).

3.2.4 DPT Groundwater Sampling

Screening-level data quality groundwater samples were also collected using the direct-push method during the first investigation phase. The Work Plan called for DPT groundwater samples to be collected at two locations downgradient of the former UST location, as well as anywhere a subsurface soil sample within 5 ft of the water table exceeded the TPH or BTEX action concentrations. Since no action concentrations were exceeded in any subsurface soil samples within 5 ft of the water table, only the two Work Plan specified locations were sampled. The locations of these samples are shown in Figure 3-3. Table 3-8 indicates the sample locations, depths, and analytical parameters.

All direct-push groundwater samples were collected by TEG personnel using typical DPT sampling methods. A stainless steel direct-push drill casing was advanced to just below the overburden water table (i.e. approximately 1 to 1.5 ft below, or just enough to allow sufficient inflow of groundwater), at which point the drill casing was pulled upwards to expose an approximately 1 ft long stainless steel drive-point well screen. Dedicated Tygon tubing was then inserted into the drill casing and into the drive-point well screen. Using a peristaltic pump, the well screen and casing were then purged until the groundwater became less turbid. To collect the groundwater sample for analysis, the tubing was inserted into the drill casing and the drive-point well screen. While holding a gloved thumb over the

hole at the top of the tubing, the tubing was withdrawn from the casing and the sample directly transferred from the dedicated tubing to sample vials by releasing the thumb.

The DPT groundwater samples were analyzed by the TEG onsite laboratory for TPH-DRO, and for TPH-GRO and BTEX at TEG's laboratory in Kennesaw, Georgia. No DPT groundwater samples were submitted for TCL/TAL analysis by the fixed-base laboratory.

3.2.5 Temporary Monitoring Well Installation

Following the field-screening phase of the investigation, one temporary monitoring well was installed at Site 12 near the oil/water separator and former UST locations. The temporary well was installed to fulfill a Work Plan requirement for a temporary well at that location, and to sample groundwater directly beneath the elevated TPH-DRO concentrations found in soil boring 012SB01. This temporary well was identified as 012TW01, and was drilled to a depth of approximately 16 ft bgs using the direct push drill rig. The well was constructed using 1-inch-diameter polyvinyl chloride (PVC) riser pipe and 0.01-inch-wide machine slotted well screen. The screened interval was 10-ft long and fitted with a "Pre-Pak" sand pack sleeve before installation. The top of the well screen and sand pack was set at approximately 6 ft bgs, and at the time of the investigation the water table was estimated to be approximately 10 ft bgs at this location. Figure 3-3 depicts the location of temporary well 012TW01. A soil boring log for the temporary monitoring-well boring is presented in Appendix A and the well construction diagram is presented in Appendix B.

Immediately following installation, the temporary well was thoroughly developed by TEG using a peristaltic pump and dedicated Tygon tubing. The well was subsequently checked for the presence of light non-aqueous phase liquids (LNAPL), and sampled for the full suite of TCL/TAL constituents for fixed-base laboratory analysis. The sampling procedures employed for the temporary well, and other field and laboratory analysis details, were identical for both permanent and temporary well sampling, as discussed in the next subsection.

3.2.6 Monitoring Well Sampling and Water Level Survey

The four existing monitoring wells at the Site 12 (012MW01 through 012MW04) and temporary well 012TW01 were sampled using a low flow purging method see Figure 3-3 for all well locations). Prior to sampling, a round of water levels was collected from the permanent monitoring wells using an electronic water-level indicator. Each well was purged with a peristaltic pump in combination with a vacuum jug at a discharge rate of approximately 0.1 to 0.5 liters per minute. At the onset of purging, dedicated tubing was lowered to the bottom of the well screens (while pumping) to remove any formation material in the well screen. When the turbidity of the discharge cleared, the tubing was slowly raised to near the top of the water column and an attempt was made to match pump speed to well recovery to maintain a stable drawdown. During well purging, field-indicator parameters were monitored regularly (temperature, conductivity, pH, Eh, dissolved oxygen [DO], etc.). Appendix C presents the field-indicator parameters. Purging was considered complete when all parameters had stabilized (variations within 10 percent, pH +/- 0.2 units) for three consecutive readings taken at 3- to 5-minute intervals.

Groundwater samples were collected directly from the vacuum jug, with the exception of VOC samples, which were collected by slowly lowering the dedicated tubing into the well while holding a gloved thumb over the tubing opening. The tubing was then withdrawn from the well and allowed to drain into VOC sample vials. Of the samples collected from the vacuum jug, metals samples were the last to allow maximum purging and a corresponding reduction in turbidity. The Teflon transfer cap on the vacuum jug was decontaminated between sampling locations and all other equipment that came in contact with groundwater was either dedicated and/or disposable (i.e. Teflon tubing, vacuum jug).

Table 3-9 summarizes the analytical protocol for the permanent and temporary monitoring-well samples. The analytical results obtained for these samples are discussed in Section 5 (Nature and Extent of Contamination).

3.2.7 Sediment and Surface Water Sampling

A total of 3 sediment samples (012SD01 through 012SD03) and 3 surface-water samples (012SW01 through 012SW03) were collected at corresponding locations along the drainage swale south of the runway at Site 12 (see Figure 3-4 for sample locations). The sediment samples were collected from a depth of 0 to 0.5 ft below the sediment surface using disposable stainless steel trowels. The surface-water samples were collected as grab samples directly into the appropriate sample containers.

Following collection, both sediment and surface water samples were analyzed by the onsite laboratory for TPH and BTEX and for the full TCL/TAL suite by the fixed-base laboratory. Table 3-10 summarizes the analytical protocol for the surface water/sediment samples. The analytical results obtained for these samples are discussed in Section 5 (Nature and Extent of Contamination).

3.2.8 Ecological Survey

CH2M HILL performed a site visit in May 1999 to survey Site 12 from an ecological perspective. The purpose was to describe the ecological setting of the site, including the types of plants and animal species present. The different species of wildlife that frequent the site were documented through direct observation or indirect evidence (e.g., scat, tracks, etc.). Based on the ecological survey, a list of potential ecological receptors was compiled.

The information obtained from the ecological survey is presented in Section 4 (Physical Characteristics) and Section 8 (Screening-Level ERA).

3.3 Quality Assurance and Quality Control

Field Quality Assurance and Quality Control (QA/QC) samples were collected during the RI field activities in order to: (1) ensure that decontamination procedures were properly implemented (e.g., equipment rinsate samples); (2) evaluate field methodologies (e.g., field duplicates); (3) establish field ambient conditions (e.g., field blanks); and (4) evaluate whether cross-contamination occurred during sampling and/or shipping (e.g., trip blanks). The field QA/QC samples were collected in accordance with USEPA Region IV guidance, specifically "Environmental Investigations Standard Operating Procedures and Quality Assurance Manual," USEPA Region IV, May 1996.

The number of field duplicate samples and other QA/QC samples collected during the field investigation are described in Table 3-12.

Four types of field QA/QC samples were collected and analyzed, including: duplicate samples; equipment rinsate samples; field blanks; and trip blanks. Definitions of the different field QA/QC samples are provided below:

- **Field Duplicate Sample:** Two or more samples collected simultaneously into separate containers from the same source under identical conditions. Field duplicate samples were collected at a frequency of 10 percent of the environmental samples.
- **Equipment Blanks:** Equipment rinsate blanks (or rinsate blanks) are defined as samples obtained by running high performance liquid chromatography (HPLC) water over/through sample collection equipment after it has been cleaned. These samples were used to determine if decontamination procedures were adequate. Equipment blanks were collected daily.
- **Field Blanks:** These QA/QC samples were collected from the water source used during decontamination procedures for heavy equipment and sample-collection equipment. These were collected from each water source for each field event.
- **Trip Blanks:** Trip blanks were prepared prior to the sampling event in the actual sample container and kept with the investigative samples throughout the sampling event. They were then packaged for shipment with the other samples and sent for analysis. At no time after their preparation were the sample containers opened before they returned to the laboratory. Field-sampling teams utilized VOC trip blanks to determine if samples were contaminated during storage and transportation back to the laboratory. If samples were shipped, trip blanks were provided for each shipment, but not necessarily for each cooler (i.e., coolers with samples for VOC analysis only). One set of trip blanks accompanied each cooler that contained samples with requested VOC analysis.

3.4 Field Screening and Monitoring

Air-monitoring and field-screening procedures were implemented during drilling and sampling activities for health and safety reasons, and initial contaminant monitoring. During drilling, ambient air monitoring near the borehole was performed with a Mini Rae Organic Vapor Monitor (OVM) to monitor for airborne contaminants. Moreover, samples (i.e., surface and subsurface soil samples) were screened with an OVM to measure for volatile organic vapor. Vapor readings were also taken when the monitoring-well caps were initially removed during groundwater-sampling activities. Readings obtained in the field were recorded in a field logbook and later transposed onto the boring logs, which are provided in Appendix A. Prior to daily monitoring, the field instrument was calibrated and documentation was recorded in a field logbook.

3.5 Decontamination Procedures

Decontamination procedures performed in the field were initiated in accordance with USEPA Region IV Standard Operating Procedures (SOPs) (USEPA, 1996). Sampling and

drilling equipment was divided into two decontamination groups: heavy equipment and routine sample-collection equipment. Heavy equipment includes drill rigs, hollow-stem augers, and drill and sampling rods. Routine sample collection equipment included split and stainless steel spoons, spatulas, trowels, and bowls.

For heavy equipment, the following procedures were implemented:

- Removal of caked-on soil with a brush
- Wash with high-pressure hot-water washer
- Air dry

For routine sample-collection equipment, the following procedures were implemented:

- Clean with tap water and laboratory detergent (Alconox soap)
- Rinse thoroughly with deionized water
- Rinse with methanol solution
- Rinse thoroughly with deionized water

Air dry

A temporary decontamination pad was used to contain decontamination liquids during cleaning. Decontamination fluids generated during the field investigation were containerized and handled according to the procedures outlined in Section 3.5.

3.6 Investigation-Derived Waste (IDW) Handling

RI field investigation activities at Site 12 resulted in the generation of IDW. This IDW included well-development and purge water, rinsate from decontamination procedures, used personal-protective equipment (mostly latex or vinyl gloves), and disposable sampling equipment (dedicated tubing, etc.). No soil IDW was generated from the DPT soil-sampling activities. Excess soil cores were returned to the boreholes from which they were extracted.

The fluids generated from sampling and decontamination activities were containerized and transported to the MCAS Cherry Point IWTP for disposal. Used personal-protective equipment and disposable sampling equipment were disposed of as regular trash.

Table 3-1
Summary of Data Gaps and Investigation Objectives
Site 12 Remedial Investigation
MCAS Cherry Point

Data Gaps/Investigation Objectives	Proposed Sampling Activity	Related Sampling Locations	Analyses to be Performed (Offsite Laboratory)
Surface and Subsurface Soil			
Determine the nature and extent of potential contamination in subsurface soil south of the runway at locations where high levels of TPH or benzene were previously detected in near-surface soils.	Obtain samples of surface and subsurface soil near the south edge of the runway at the four locations where relatively high levels of TPH or benzene were previously detected in near-surface soils. Obtain still deeper samples if contamination is encountered.	012SS01 012SB01 012SS02 012SB02 012SS03 012SB03 012SS04 012SB04 012SS17 012SB17 012SS18 012SB18	TCL Volatiles TCL Semi-volatiles TCL Pesticides/PCBs TAL Metals and Cyanide Total Organic Carbon Oil & Grease
Determine if contaminants from the former earthen burn pits have migrated downward and potentially contaminated soils beneath the asphalt runway surface.	Obtain two samples of surface soil (directly beneath the asphalt runway surface) at the approximate centers of the two former burn pits seen in the 1964 and/or the 1970 aerial photographs. These samples are intended to indicate whether contamination from former burn pits may have penetrated the asphalt runway to the soil beneath. Obtain subsurface soil samples if contamination is encountered.	012SS06 012SS07	TCL Volatiles TCL Semi-volatiles TCL Pesticides/PCBs TAL Metals and Cyanide Total Organic Carbon Oil & Grease Dioxins/Furans
Determine the nature and extent of potential contamination in surface and subsurface soil in the runoff channel near the oil/water separator where stained soil was observed, and where subsurface samples collected during the closure of the nearby UST indicated TPH contamination.	Obtain samples of surface and subsurface soils at a location in the runoff channel. Subsurface soils will be collected and analyzed by the onsite laboratory down to the depth of the water table, as described in Section 4.2.2.	012SS01 012SB01 012SS14 012SB14 012SS15 012SB15 012SS16 012SB16	TCL Volatiles TCL Semi-volatiles TCL Pesticides/PCBs TAL Metals and Cyanide Total Organic Carbon Oil & Grease

Table 3-1
Summary of Data Gaps and Investigation Objectives
Site 12 Remedial Investigation
MCAS Cherry Point

Data Gaps/Investigation Objectives	Proposed Sampling Activity	Related Sampling Locations	Analyses to be Performed (Offsite Laboratory)
Determine the nature and extent of potential contamination in surface and subsurface soil south of the runway but west of the current burn pit, where surface runoff from earlier burn pits seen in historical aerial photographs may have impacted soil south of the runway.	Obtain two samples of surface soil near the south edge of the runway but west of the current burn pit. Obtain subsurface soil samples if contamination is encountered.	012SS08 012SS09	TCL Volatiles TCL Semi-volatiles TCL Pesticides/PCBs TAL Metals and Cyanide Total Organic Carbon Oil & Grease
Determine the nature and extent of potential contamination in surface and subsurface soil at the former discharge location of the Site 12 oil/water separator.	Obtain a sample of surface soil at the former discharge location of the Site 12 oil/water separator. Obtain subsurface soil samples if contamination is encountered.	012SS11	TCL Volatiles TCL Semi-volatiles TCL Pesticides/PCBs TAL Metals and Cyanide Total Organic Carbon Oil & Grease
Determine the nature and extent of potential contamination in surface and subsurface soil in the central portion of the drainage swale south of the runway, including the location where a previous sediment sample indicated TPH contamination. Note: This could also be considered sediment-related, but it was observed during site visits that the western portion of the drainage swale is typically dry.	Obtain samples of surface soil at two locations in the central portion of the drainage swale south of the runway. Obtain still deeper samples if contamination is encountered.	012SS05 012SB05 012SS10	TCL Volatiles TCL Semi-volatiles TCL Pesticides/PCBs TAL Metals and Cyanide Total Organic Carbon Oil & Grease
Surface Water and Sediment			
Determine the nature and extent of potential contamination in surface water and sediments in the drainage swale south of the runway.	Obtain two samples of surface water and sediment in the eastern portion of the drainage swale. This portion of the drainage swale has not previously been sampled, and may be the first part of the swale to receive runoff from the runway due to its lower elevation. In addition, surface runoff from former burn pits located east of the current burn pit (identified from historical aerial photographs) would most likely have flowed into this portion of the swale.	012SW01 012SD01 012SW03 012SD03	TCL Volatiles TCL Semi-volatiles TCL Pesticides/PCBs TAL Metals and Cyanide Total Organic Carbon (Sediment Only) Oil & Grease (sediment Only) Nitrate and Sulfate (SW only)

Table 3-1 Summary of Data Gaps and Investigation Objectives Site 12 Remedial Investigation MCAS Cherry Point			
Data Gaps/Investigation Objectives	**Proposed Sampling Activity**	**Related Sampling Locations**	**Analyses to be Performed (Offsite Laboratory)**
	Obtain surface water and sediment samples from previous sampling location 12SW02/12SD02, where TPH contamination was previously found.	012SW02 012SD02	TCL Volatiles TCL Semi-volatiles TCL Pesticides/PCBs TAL Metals and Cyanide Total Organic Carbon (Sediment Only) Oil & Grease (sediment Only) Nitrate and Sulfate (SW only)
Groundwater			
Determine the nature and extent of potential groundwater contamination that may be associated with elevated TPH concentrations in soil.	Resample the four existing monitoring wells at Site 12 for the full TCL/TAL suite of analytes.	012MW01 012MW02 012MW03 012MW04	TCL Volatiles TCL Semi-volatiles TCL Pesticides/PCBs TAL Metals and Cyanide Nitrate and Sulfate
	Obtain direct-push groundwater samples at soil-sampling locations at which TPH or BTEX contamination was detected in subsurface soils within 5 feet of the water table. If significant groundwater contamination is found and delineated in a particular area using direct-push sampling, install one or more temporary wells in that area to allow more complete characterization with fixed laboratory sample analysis.	012GW01 012GW02 012TW01	TCL Volatiles TCL Semi-volatiles TCL Pesticides/PCBs TAL Metals and Cyanide Nitrate and Sulfate

Table 3-2
Onsite Laboratory Analytical Methods
Site 12 Remedial Investigation
MCAS Cherry Point

Matrix	Parameter	Analytical Method
Aqueous (Groundwater and Surface Water)	TPH-GRO and DRO	SW-846/8015B
	BTEX	SW-846/8021B
Soil and Sediment	TPH-GRO and DRO	SW-846/8015B
	BTEX	SW-846/8021B

Table 3-3
Fixed Laboratory Analytical Methods
Site 12 Remedial Investigation
MCAS Cherry Point

Matrix	Parameter	Analytical Method
Aqueous (Groundwater and Surface Water)	TCL Volatile Organic Compounds	CLP Low Level OLC02.1
	TCL Semi-volatile Organic Compounds (SVOCs)	CLP Low Level OLC02.1
	TCL Pesticides/PCBs	CLP Low Level OLC02.1
	TAL Metals	CLP ILM04.0 via Trace ICP
	Cyanide and Mercury	CLP ILM04.0
	Nitrate and Sulfate	E300.0 and E375.4
Soil and Sediment	TCL Volatile Organic Compounds	CLP OLM03.2
	TCL Semi-volatile Organic Compounds (SVOCs)	CLP OLM03.2
	TCL Pesticides/PCBs	CLP OLM03.2
	TAL Metals	CLP ILM04.0 via Trace ICP
	Cyanide and Mercury	CLP ILM04.0
	Dioxins/Furans	SW-846/8290
	Oil & Grease	EPA Method 9071
	TOC	Lloyd-Kahn

Table 3-4 Attainable Method Detection Limits (MDLs) for Onsite Laboratory Analyses Site 12 Remedial Investigation, MCAS Cherry Point		
Analytical Parameter	**Soil and Sediment MDL (mg/kg)**	**Groundwater and Surface Water MDL (mg/L)**
Benzene	0.005	0.002
Toluene	0.005	0.002
Ethylbenzene	0.005	0.002
M&P-Xylene	0.005	0.002
O-Xylene	0.005	0.002
TPH-DRO (3550/8015B)	10	0.5
TPH-GRO (5030/8015B)	2	0.5

Table 3-5
Analytical Parameters, Contract-Required Quantitation/Detection Limits (CRQL/CRDLs), and Method/Instrument Detection Limits (MDL/IDLs)
Fixed Laboratory Analyses for TCL Organics, TAL Metals, and Dioxins and Furans
Site 12 Remedial Investigation
MCAS Cherry Point

	Aqueous		Soil	
	CRQL/CRDL	IDL/MDL	CRQL/CRDL	IDL/MDL
Analytical Parameter	µg/L	µg/L	mg/kg	mg/kg
TCL VOCs (Low Concentration) CLP SOW OLC02.1 (Aqueous), CLP SOW OLM03.2 (Soil)				
1,1,1-TRICHLOROETHANE	1	0.1	0.01	0.001
1,1,2,2-TETRACHLOROETHANE	1	0.1	0.01	0.001
1,1,2-TRICHLOROETHANE	1	0.1	0.01	0.001
1,1-DICHLOROETHANE	1	0.1	0.01	0.001
1,1-DICHLOROETHENE	1	0.1	0.01	0.001
1,2-DIBROMOETHANE (EDB)	1	0.1	0.01	0.001
1,2-DICHLOROETHANE	1	0.1	0.01	0.001
1,2-DICHLOROETHENE (TOTAL)	1	0.1	0.01	0.001
1,2-DICHLOROPROPANE	1	0.1	0.01	0.001
2-BUTANONE (MEK)	5	0.5	0.01	0.001
2-HEXANONE	5	0.5	0.01	0.001
4-METHYL-2-PENTANONE (MIBK)	5	0.5	0.01	0.001
ACETONE	5	0.5	0.01	0.001
BENZENE	1	0.1	0.01	0.001
BROMODICHLOROMETHANE	1	0.1	0.01	0.001
BROMOFORM	1	0.1	0.01	0.001
BROMOMETHANE	1	0.1	0.01	0.001
CARBON DISULFIDE	1	0.1	0.01	0.001
CARBON TETRACHLORIDE	1	0.1	0.01	0.001
CHLOROBENZENE	1	0.1	0.01	0.001
CHLOROETHANE	1	0.1	0.01	0.001
CHLOROFORM	1	0.1	0.01	0.001
CHLOROMETHANE	1	0.1	0.01	0.001
CIS-1,3-DICHLOROPROPENE	1	0.1	0.01	0.001
DIBROMOCHLOROMETHANE	1	0.1	0.01	0.001
ETHYLBENZENE	1	0.1	0.01	0.001

Table 3-5
Analytical Parameters, Contract-Required Quantitation/Detection Limits (CRQL/CRDLs), and Method/Instrument Detection Limits (MDL/IDLs)
Fixed Laboratory Analyses for TCL Organics, TAL Metals, and Dioxins and Furans
Site 12 Remedial Investigation
MCAS Cherry Point

	Aqueous		Soil	
	CRQL/CRDL	IDL/MDL	CRQL/CRDL	IDL/MDL
Analytical Parameter	µg/L	µg/L	mg/kg	mg/kg
METHYLENE CHLORIDE	2	0.2	0.01	0.001
STYRENE	1	0.1	0.01	0.001
TETRACHLOROETHENE	1	0.1	0.01	0.001
TOLUENE	1	0.1	0.01	0.001
TRANS-1,3-DICHLOROPROPENE	1	0.1	0.01	0.001
TRICHLOROETHENE	1	0.1	0.01	0.001
VINYL CHLORIDE	1	0.1	0.01	0.001
XYLENES, TOTAL	1	0.1	0.01	0.001
TCL SVOCs (Low Concentration) CLP SOW OLC02.1 (Aqueous), CLP SOW OLM03.2 (Soil)				
1,2,4-TRICHLOROBENZENE	10	0.5	0.33	0.033
1,2-DICHLOROBENZENE (o-)	10	0.5	0.33	0.033
1,3-DICHLOROBENZENE (m-)	10	0.5	0.33	0.033
1,4-DICHLOROBENZENE (p-)	10	0.5	0.33	0.033
2,2'-OXYBIS(1-CHLOROPROPANE)	10	0.5	0.33	0.033
2,4,5-TRICHLOROPHENOL	25	2	0.83	0.083
2,4,6-TRICHLOROPHENOL	10	0.5	0.33	0.033
2,4-DICHLOROPHENOL	10	0.5	0.33	0.033
2,4-DIMETHYLPHENOL	10	0.5	0.33	0.033
2,4-DINITROPHENOL	25	2	0.83	0.083
2,4-DINITROTOLUENE	10	0.5	0.33	0.033
2,6-DINITROTOLUENE	10	0.5	0.33	0.033
2-CHLORONAPHTHALENE ("BETA")	10	0.5	0.33	0.033
2-CHLOROPHENOL	10	0.5	0.33	0.033
2-METHYLNAPHTHALENE	10	0.5	0.33	0.033
2-METHYLPHENOL	10	0.5	0.33	0.033
2-NITROANILINE	25	2	0.83	0.083
2-NITROPHENOL	10	0.5	0.33	0.033

Table 3-5
Analytical Parameters, Contract-Required Quantitation/Detection Limits (CRQL/CRDLs), and Method/Instrument Detection Limits (MDL/IDLs)
Fixed Laboratory Analyses for TCL Organics, TAL Metals, and Dioxins and Furans
Site 12 Remedial Investigation
MCAS Cherry Point

	Aqueous		Soil	
	CRQL/CRDL	IDL/MDL	CRQL/CRDL	IDL/MDL
Analytical Parameter	µg/L	µg/L	mg/kg	mg/kg
3,3'-DICHLOROBENZIDINE	10	0.5	0.33	0.033
3-NITROANILINE	25	2	0.83	0.083
4,6-DINITRO-2-METHYLPHENOL	25	2	0.83	0.083
4-BROMOPHENYL PHENYL ETHER	10	0.5	0.33	0.033
4-CHLORO-3-METHYLPHENOL	10	0.5	0.33	0.033
4-CHLOROANILINE	10	0.5	0.33	0.033
4-CHLOROPHENYL PHENYL ETHER	10	0.5	0.33	0.033
4-METHYLPHENOL	10	0.5	0.33	0.033
4-NITROANILINE	25	2	0.83	0.083
4-NITROPHENOL	25	2	0.83	0.083
ACENAPHTHENE	10	0.5	0.33	0.033
ACENAPHTHYLENE	10	0.5	0.33	0.033
ANTHRACENE	10	0.5	0.33	0.033
BENZO(A)ANTHRACENE	10	0.5	0.33	0.033
BENZO(A)PYRENE	10	0.5	0.33	0.033
BENZO(B)FLUORANTHENE	10	0.5	0.33	0.033
BENZO(G,H,I)PERYLENE	10	0.5	0.33	0.033
BENZO(K)FLUORANTHENE	10	0.5	0.33	0.033
BIS(2-CHLOROETHOXY)METHANE	10	0.5	0.33	0.033
BIS(2-CHLOROETHYL)ETHER	10	0.5	0.33	0.033
BIS(2-ETHYLHEXYL)PHTHALATE	10	0.5	0.33	0.033
BUTYLBENZYL PHTHALATE	10	0.5	0.33	0.033
CARBAZOLE	10	0.5	0.33	0.033
CHRYSENE	10	0.5	0.33	0.033
DI-N-BUTYL PHTHALATE ("DIBUTYL")	10	0.5	0.33	0.033
DI-N-OCTYL PHTHALATE	10	1	0.33	0.033
DIBENZO(A,H)ANTHRACENE	10	0.5	0.33	0.033

Table 3-5
Analytical Parameters, Contract-Required Quantitation/Detection Limits (CRQL/CRDLs), and Method/Instrument Detection Limits (MDL/IDLs)
Fixed Laboratory Analyses for TCL Organics, TAL Metals, and Dioxins and Furans
Site 12 Remedial Investigation
MCAS Cherry Point

	Aqueous		Soil	
	CRQL/CRDL	IDL/MDL	CRQL/CRDL	IDL/MDL
Analytical Parameter	µg/L	µg/L	mg/kg	mg/kg
DIBENZOFURAN	10	0.5	0.33	0.033
DIETHYL PHTHALATE	10	0.5	0.33	0.033
DIMETHYL PHTHALATE	10	0.5	0.33	0.033
FLUORANTHENE	10	0.5	0.33	0.033
FLUORENE	10	0.5	0.33	0.033
HEXACHLOROBENZENE	10	0.5	0.33	0.033
HEXACHLOROBUTADIENE	10	0.5	0.33	0.033
HEXACHLOROCYCLOPENTADIENE	10	0.5	0.33	0.033
HEXACHLOROETHANE	10	0.5	0.33	0.033
INDENO(1,2,3-CD)PYRENE	10	0.5	0.33	0.033
ISOPHORONE	10	0.5	0.33	0.033
N-NITROSO DI-N-PROPYLAMINE	10	0.5	0.33	0.033
N-NITROSODIPHENYLAMINE	10	0.5	0.33	0.033
NAPHTHALENE	10	0.5	0.33	0.033
NITROBENZENE	10	0.5	0.33	0.033
PENTACHLOROPHENOL	25	2	0.83	0.083
PHENANTHRENE	10	0.5	0.33	0.033
PHENOL	10	0.5	0.33	0.033
PYRENE	10	0.5	0.33	0.033
TCL Pesticides/PCBs (Low Concentration) CLP SOW OLC02.1 (Aqueous), CLP SOW OLM03.2 (Soil)				
4,4'-DDD	0.1	0.004	0.0033	0.00165
4,4'-DDE	0.1	0.004	0.0033	0.00165
4,4'-DDT	0.1	0.004	0.0033	0.00165
ALDRIN	0.05	0.002	0.0017	0.00085
ALPHA-BHC (ALPHA-HCH)	0.05	0.002	0.0017	0.00085
ALPHA-CHLORDANE	0.05	0.002	0.0017	0.00085
AROCLOR-1016	1	0.04	0.033	0.0165

Table 3-5
Analytical Parameters, Contract-Required Quantitation/Detection Limits (CRQL/CRDLs), and Method/Instrument Detection Limits (MDL/IDLs)
Fixed Laboratory Analyses for TCL Organics, TAL Metals, and Dioxins and Furans
Site 12 Remedial Investigation
MCAS Cherry Point

	Aqueous		Soil	
	CRQL/CRDL	IDL/MDL	CRQL/CRDL	IDL/MDL
Analytical Parameter	µg/L	µg/L	mg/kg	mg/kg
AROCLOR-1221	2	0.08	0.067	0.0335
AROCLOR-1232	1	0.04	0.033	0.0165
AROCLOR-1242	1	0.04	0.033	0.0165
AROCLOR-1248	1	0.04	0.033	0.0165
AROCLOR-1254	1	0.04	0.033	0.0165
AROCLOR-1260	1	0.04	0.033	0.0165
BETA-BHC (BETA-HCH)	0.05	0.002	0.0017	0.00085
DELTA-BHC (DELTA-HCH)	0.05	0.002	0.0017	0.00085
DIELDRIN	0.1	0.002	0.033	0.00165
ENDOSULFAN I	0.05	0.004	0.0017	0.00085
ENDOSULFAN II	0.1	0.004	0.0033	0.00165
ENDOSULFAN SULFATE	0.1	0.004	0.0033	0.00165
ENDRIN	0.1	0.004	0.0033	0.00165
ENDRIN ALDEHYDE	0.1	0.004	0.0033	0.00165
ENDRIN KETONE	0.1	0.004	0.0033	0.00165
GAMMA-BHC (LINDANE)	0.05	0.002	0.0017	0.00085
GAMMA-CHLORDANE	0.05	0.002	0.0017	0.00085
HEPTACHLOR	0.05	0.002	0.0017	0.00085
HEPTACHLOR EPOXIDE	0.05	0.002	0.0017	0.00085
METHOXYCHLOR	0.5	0.02	0.017	0.0085
TOXAPHENE	5	0.2	0.17	0.085
TAL Metals CLP SOW ILM04.0 (Trace ICP, except *)				
ALUMINUM	200	16	40	3.2
ANTIMONY	60	2.6	12	0.52
ARSENIC	10	2.6	2	0.52
BARIUM	200	0.3	40	0.06
BERYLLIUM	5	0.1	1	0.02

Table 3-5
Analytical Parameters, Contract-Required Quantitation/Detection Limits (CRQL/CRDLs), and Method/Instrument Detection Limits (MDL/IDLs)
Fixed Laboratory Analyses for TCL Organics, TAL Metals, and Dioxins and Furans
Site 12 Remedial Investigation
MCAS Cherry Point

	Aqueous		Soil	
	CRQL/CRDL	IDL/MDL	CRQL/CRDL	IDL/MDL
Analytical Parameter	µg/L	µg/L	mg/kg	mg/kg
CADMIUM	5	0.2	1	0.04
CALCIUM	5000	19.4	1000	3.88
CHROMIUM	10	0.7	2	0.14
COBALT	50	0.6	10	0.12
COPPER	25	1	5	0.2
CYANIDE	10	2.4*	5	2.4*
IRON	100	14.2	20	2.84
LEAD	3	1.3	0.6	0.26
MAGNESIUM	5000	12	1000	2.4
MANGANESE	15	0.3	3	0.06
MERCURY (INORGANIC)	0.2	0.065*	0.1	
NICKEL	40	1	8	0.2
POTASSIUM	5000	22.9	1000	4.58
SELENIUM	5	3.8	1	0.76
SILVER	10	1	2	0.2
SODIUM	5000	196	1000	39.2
THALLIUM	10	3.4	2	0.68
VANADIUM	50	0.8	10	0.16
ZINC	20	1.4	4	0.28

Table 3-5
Analytical Parameters, Contract-Required Quantitation/Detection Limits (CRQL/CRDLs), and Method/Instrument Detection Limits (MDL/IDLs)
Fixed Laboratory Analyses for TCL Organics, TAL Metals, and Dioxins and Furans
Site 12 Remedial Investigation
MCAS Cherry Point

	Aqueous		Soil	
	CRQL/CRDL	IDL/MDL	CRQL/CRDL	IDL/MDL
Analytical Parameter	µg/L	µg/L	mg/kg	pg/g
Dioxins and Furans				
2,3,7,8-TCDD	NA	NA	NA	0.23
Total TCDD	NA	NA	NA	0.69
1,2,3,7,8,-PeCDD	NA	NA	NA	0.29
Total PeCDD	NA	NA	NA	0.33
1,2,3,4,7,8-HxCDD	NA	NA	NA	0.23
1,2,3,6,7,8-HxCDD	NA	NA	NA	0.26
1,2,3,7,8,9-HxCDD*	NA	NA	NA	0.27
Total HxCDD*	NA	NA	NA	2.2
1,2,3,4,6,7,8-HpCDD*	NA	NA	NA	5.9
Total HpCDD*	NA	NA	NA	14
OCDD*	NA	NA	NA	340
2,3,7,8-TCDF	NA	NA	NA	0.43
Total TCDF	NA	NA	NA	0.96
1,2,3,7,8-PeCDF	NA	NA	NA	0.26
2,3,4,7,8-PeCDF	NA	NA	NA	0.20
Total PeCDF	NA	NA	NA	0.28
1,2,3,4,7,8-HxCDF	NA	NA	NA	0.20
1,2,3,6,7,8,-HxCDF	NA	NA	NA	0.20
2,3,4,6,7,8,-HxCDF	NA	NA	NA	0.23
1,2,3,7,8,9-HxCDF	NA	NA	NA	0.26
Total HxCDF	NA	NA	NA	0.22
1,2,3,4,6,7,8-HpCDF	NA	NA	NA	0.22
1,2,3,4,7,8,9-HpCDF	NA	NA	NA	0.30

Table 3-5
Analytical Parameters, Contract-Required Quantitation/Detection Limits (CRQL/CRDLs), and Method/Instrument Detection Limits (MDL/IDLs)
Fixed Laboratory Analyses for TCL Organics, TAL Metals, and Dioxins and Furans
Site 12 Remedial Investigation
MCAS Cherry Point

	Aqueous		Soil	
	CRQL/CRDL	IDL/MDL	CRQL/CRDL	IDL/MDL
Analytical Parameter	µg/L	µg/L	mg/kg	pg/g
Total HpCDF	NA	NA	NA	0.25
OCDF	NA	NA	NA	0.42

NOTES:

Data source for all parameters except dioxins/furans is Tetra Tech NUS (August 1998).

Data Source for dioxins/furans is laboratory analytical results of soil samples collected in 1999.

For dioxins/furans, the lowest MDL for each analyte is shown. The actual MDL for each sample is dependent on the moisture content of the sample. Only soil samples were analyzed for dioxins/furans.

* Compound was detected in all samples and the lowest detected concentration is shown.

NA = Not available.

Table 3-6
Summary of Surface Soil Samples Collected at Site 12
Site 12 Remedial Investigation
MCAS Cherry Point

	Onsite Laboratory			Offsite, Fixed Base Laboratory							
Sample ID	BTEX	TPH (GRO)	TPH (DRO)	TCL VOCs	TCL SVOCs	TCL Pesticides/PCBs	TAL Metals + CN	TOC	Oil & Grease	Dioxins/ Furans	Comments
012SS01	X	X	X	X	X	X	X	X	X		Blind duplicate sample sent for offsite analysis, labeled 012SS13
012SS02	X	X	X	X	X	X	X	X	X		
012SS03	X	X	X	X	X	X	X	X	X		
012SS04	X	X	X	X	X	X	X	X	X		
012SS05	X	X	X	X	X	X	X	X	X		
012SS06	X	X	X	X	X	X	X	X	X	X	
012SS07	X	X	X	X	X	X	X	X	X	X	Blind duplicate sample sent for offsite analysis, labeled 012SS12
012SS08	X	X	X	X	X	X	X	X	X		
012SS09	X	X	X	X	X	X	X	X	X		
012SS10	X	X	X	X	X	X	X	X	X		
012SS11	X	X	X	X	X	X	X	X	X		
012SS14	X		X	X	X	X	X	X	X		Onsite lab problems prevented TPH-GRO analysis
012SS15	X		X	X			X	X	X	X	Onsite lab problems prevented TPH-GRO analysis. SVOC and Pest./PCB analyses inadvertently not performed. Dioxin analysis inadvertently performed.
012SS16	X		X	X	X	X	X	X	X		Onsite lab problems prevented TPH-GRO analysis
012SS17	X		X	X	X	X	X	X	X		Onsite lab problems prevented TPH-GRO analysis
012SS18	X		X	X	X	X	X	X	X		Onsite lab problems prevented TPH-GRO analysis

Table 3-7
Summary of Subsurface Soil Samples Collected at Site 12
Site 12 Remedial Investigation
MCAS Cherry Point

Sample ID	Sample Depth (ft. BGS)	Onsite Laboratory			Offsite, Fixed Base Laboratory						Comments
		BTEX	TPH (GRO)	TPH (DRO)	TCL VOCs	TCL SVOCs	TCL Pesticides/PCBs	TAL Metals + CN	TOC	Oil & Grease	
012SB01-01	1-2	X		X	X	X	X	X	X	X	Onsite lab problems prevented TPH-GRO analysis.
012SB01-04	4-5	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB01-07	7-8	X	X	X							Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB02-01	1-2	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB02-04	4-5	X		X	X	X	X	X	X	X	Onsite lab problems prevented TPH-GRO analysis.
012SB02-07	7-8	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB02-10	10-11	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB03-01	1-2	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB03-04	4-5	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB03-07	7-8	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB04-01	1-2	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB04-04	4-5	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB04-07	7-8	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.

Table 3-7
Summary of Subsurface Soil Samples Collected at Site 12
Site 12 Remedial Investigation
MCAS Cherry Point

Sample ID	Sample Depth (ft. BGS)	Onsite Laboratory			Offsite, Fixed Base Laboratory						Comments
		BTEX	TPH (GRO)	TPH (DRO)	TCL VOCs	TCL SVOCs	TCL Pesticides/PCBs	TAL Metals + CN	TOC	Oil & Grease	
012SB05-01	1-2	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB05-04	4-5	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB05-07	7-8	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB14-01	1-2	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB14-04	4-5	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB14-07	7-8	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB15-01	1-2	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB15-04	4-5	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB15-07	7-8	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB16-01	1-2	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB16-04	4-5	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB16-07	7-8	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.

Table 3-7
Summary of Subsurface Soil Samples Collected at Site 12
Site 12 Remedial Investigation
MCAS Cherry Point

Sample ID	Sample Depth (ft. BGS)	Onsite Laboratory			Offsite, Fixed Base Laboratory						Comments
		BTEX	TPH (GRO)	TPH (DRO)	TCL VOCs	TCL SVOCs	TCL Pesticides/PCBs	TAL Metals + CN	TOC	Oil & Grease	
012SB16-09	9-10	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB17-01	1-2	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB17-04	4-5	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB17-07	7-8	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB18-01	1-2	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB18-04	4-5	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.
012SB18-07	7-8	X		X							Onsite lab problems prevented TPH-GRO analysis. Sample not sent for offsite anal. because no compounds detected by onsite lab above action concs.

Table 3-8
Summary of Direct Push Groundwater Samples - Onsite Laboratory Analysis
Site 12 Remedial Investigation
MCAS Cherry Point

Sample ID	Approx. Depth Interval of Drive Point Well Screen (ft bgd)	Approximate Water Table Depth Range (ft bgd)*	BTEX	TPH (GRO)	TPH (DRO)	Comments
012GW01-10	10-11	9-10	X	X	X	
012GW02-10	10-11	9-10	X	X	X	Blind duplicate sample analyzed, labeled 012GW22-10.

*Estimate of water table depth interval based on the degree of saturation observed in recovered direct-push soil samples.

Table 3-9
Summary of Temporary and Permanent Monitoring Well Groundwater Samples
Site 12 Remedial Investigation
MCAS Cherry Point

Sample ID	TCL VOCs	TCL SVOCs	TCL Pesticides/PCBs	TAL Metals + CN	Nitrate	Sulfate	Comments
012TW01	X	X	X	X	X	X	
012MW01	X	X	X	X	X	X	Blind duplicate sample collected and analyzed labeled 012MW05.
012MW02	X	X	X	X	X	X	
012MW03	X	X	X	X	X	X	
012MW04	X	X	X	X	X	X	

All analyses performed by offsite, fixed-base laboratory.

Table 3-10
Summary of Sediment and Surface Water Samples Collected at Site 12
Site 12 Remedial Investigation
MCAS Cherry Point

	Onsite Laboratory			Offsite, Fixed Base Laboratory							
Sample ID	BTEX	TPH (GRO)	TPH (DRO)	TCL VOCs	TCL SVOCs	TCL Pesticides/PCBs	TAL Metals + CN	Nitrate	Sulfate	Oil & Grease	Comments
Sediment Samples											
012SD01	X		X	X	X	X	X			X	Blind duplicate sample collected and analyzed, labeled 012SD04. Onsite lab problems prevented TPH-GRO analysis.
012SD02	X		X	X	X	X	X			X	Onsite lab problems prevented TPH-GRO analysis.
012SD03	X		X	X	X	X	X			X	Onsite lab problems prevented TPH-GRO analysis.
Surface Water Samples											
012SW01	X		X	X	X	X	X	X	X		Blind duplicate sample collected and analyzed, labeled 012SW04.
012SW02	X		X	X	X	X	X	X	X		
012SW03	X		X	X	X	X	X	X	X		

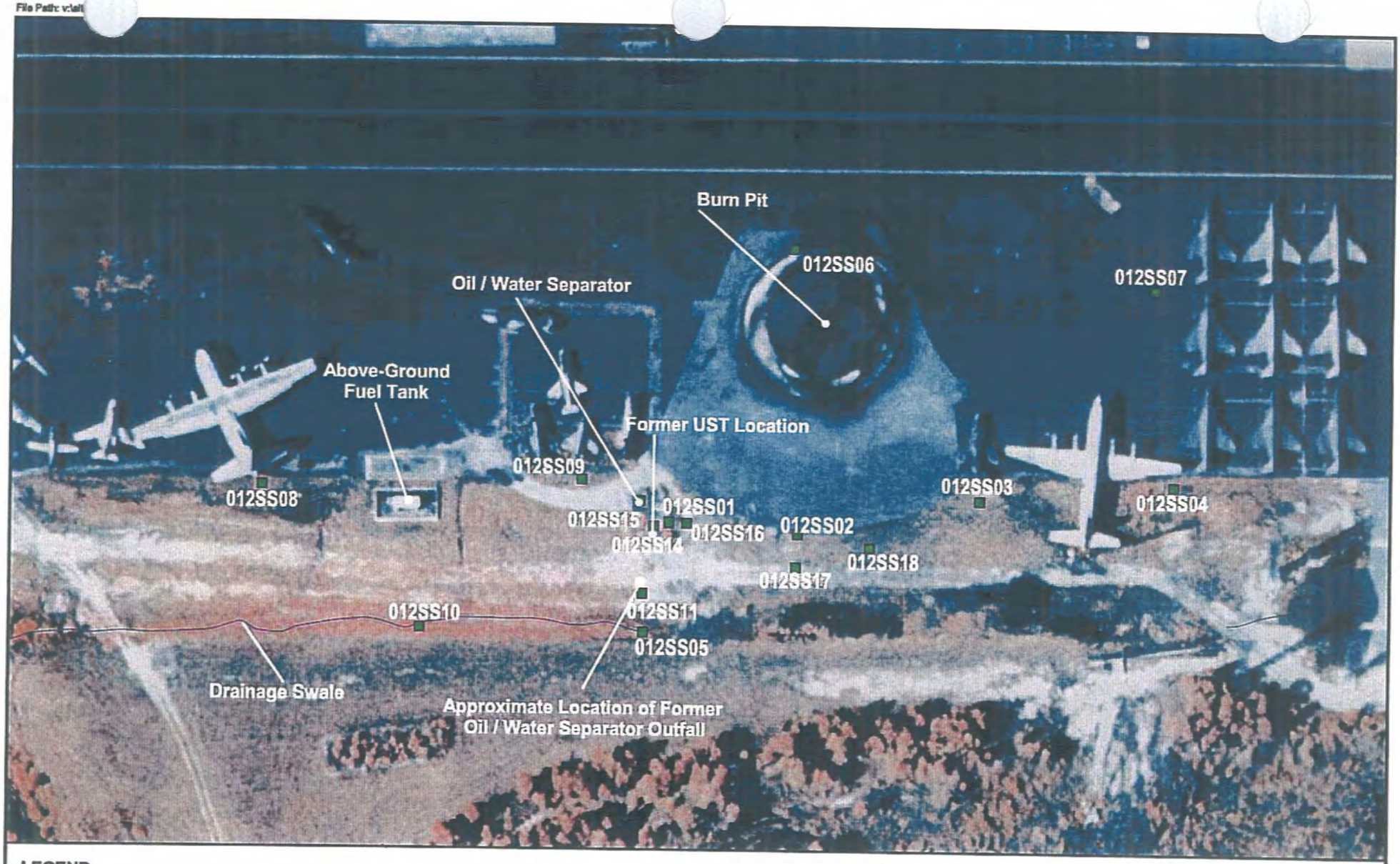
Table 3-11 Screening Phase Action Concentrations for Samples Analyzed by the Onsite Laboratory Site 12 RI, MCAS Cherry Point		
Analyte	**Action Concentrations for Soils and Sediment (mg/kg)**	**Action Concentrations for Groundwater and Surface Water (mg/L)**
Benzene	0.0056	0.001
Toluene	7.275	1
Ethylbenzene	5.83	0.029
Xylenes (total)	4.958	0.53
TPH-GRO (5030/8015B)	10	N/A
TPH-DRO (3550/8015B)	40	N/A

Table 3-12
Numbers and Types of Field QA/QC Samples
Site 12 Remedial Investigation
MCAS Cherry Point

Sample Type (1)	No. of Samples	Sample IDs (2)	Analyses Performed
Field Duplicate	6	012SS12 (012SS07), 012SS13 (012SS01), 012GW22-10 (012GW02-10), 012MW05 (012MW01), 012SD04 (012SD01), 012SW04 (012SW01)	VOCs, SVOCs, Pesticides/PCBs, Metals + CN, Oil & Grease (soils, sediments), TOC (soil), nitrate/sulfate (aqueous)
Equipment Rinsate Blank	2	012RB01, 012RB02	VOCs, SVOCs, Pesticides/PCBs, Metals + CN, Oil & Grease
Field Blanks	1	012FB01	VOCs
Trip Blanks	4	012TB01, 012TB02, 012TB03, 012TB04	VOCs

NOTES:
The QA/QC samples were collected in accordance with EPA Region IV guidance, specifically "Environmental Investigations Standard Operating Procedures and Quality Assurance Manual", EPA Region IV, May 1996.
(1) See Section 3.3 for definitions of the various QA/QC samples.
(2) Sample ID in parentheses indicates which regular sample was duplicated.

File Path: v:\all



LEGEND

■ Surface Soil Sampling Stations

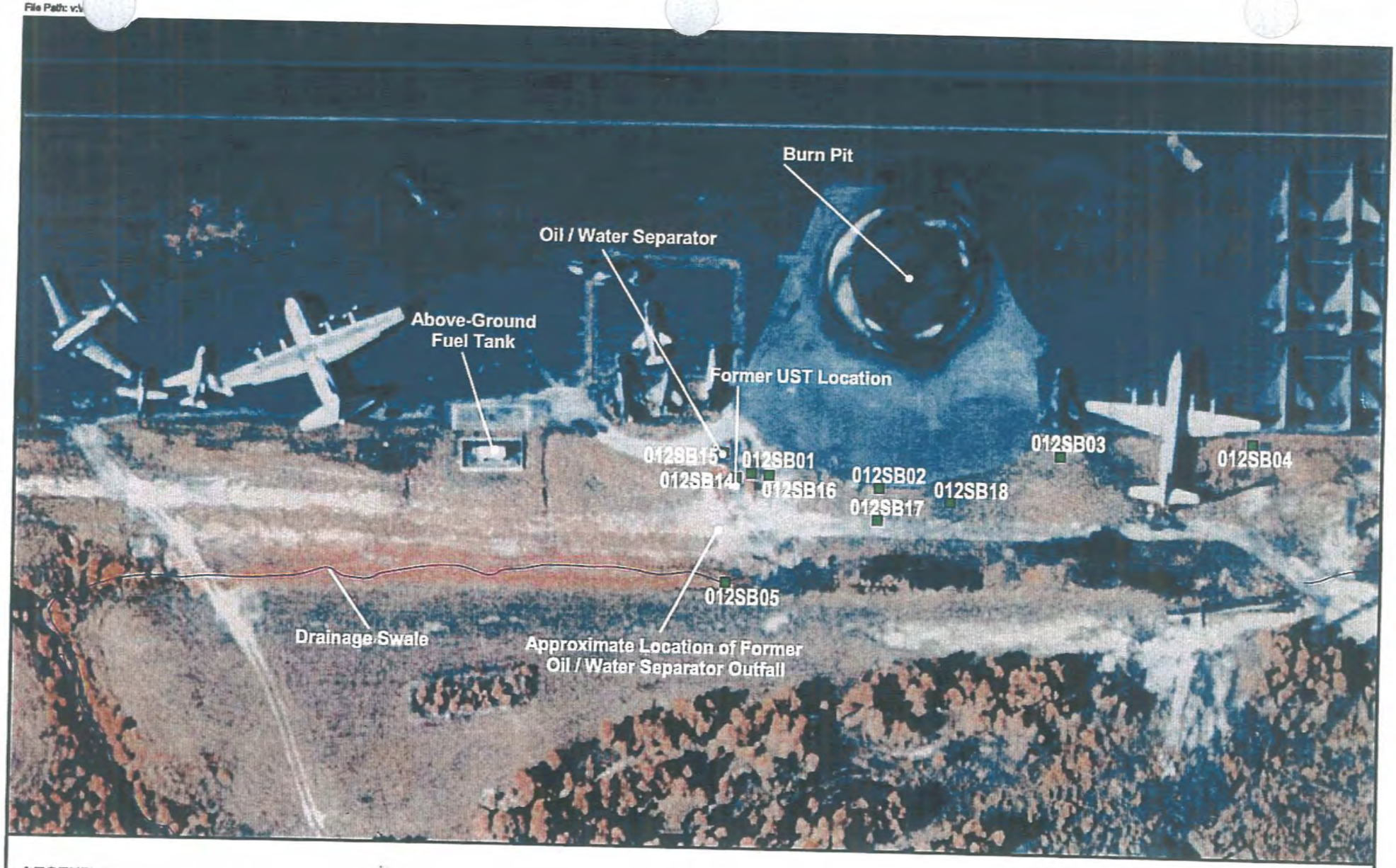
N

0 60 120 180 Feet

Figure 3-1
Surface Soil
Sampling Locations
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

File Path: v:\



LEGEND

Subsurface Soil Sampling Stations

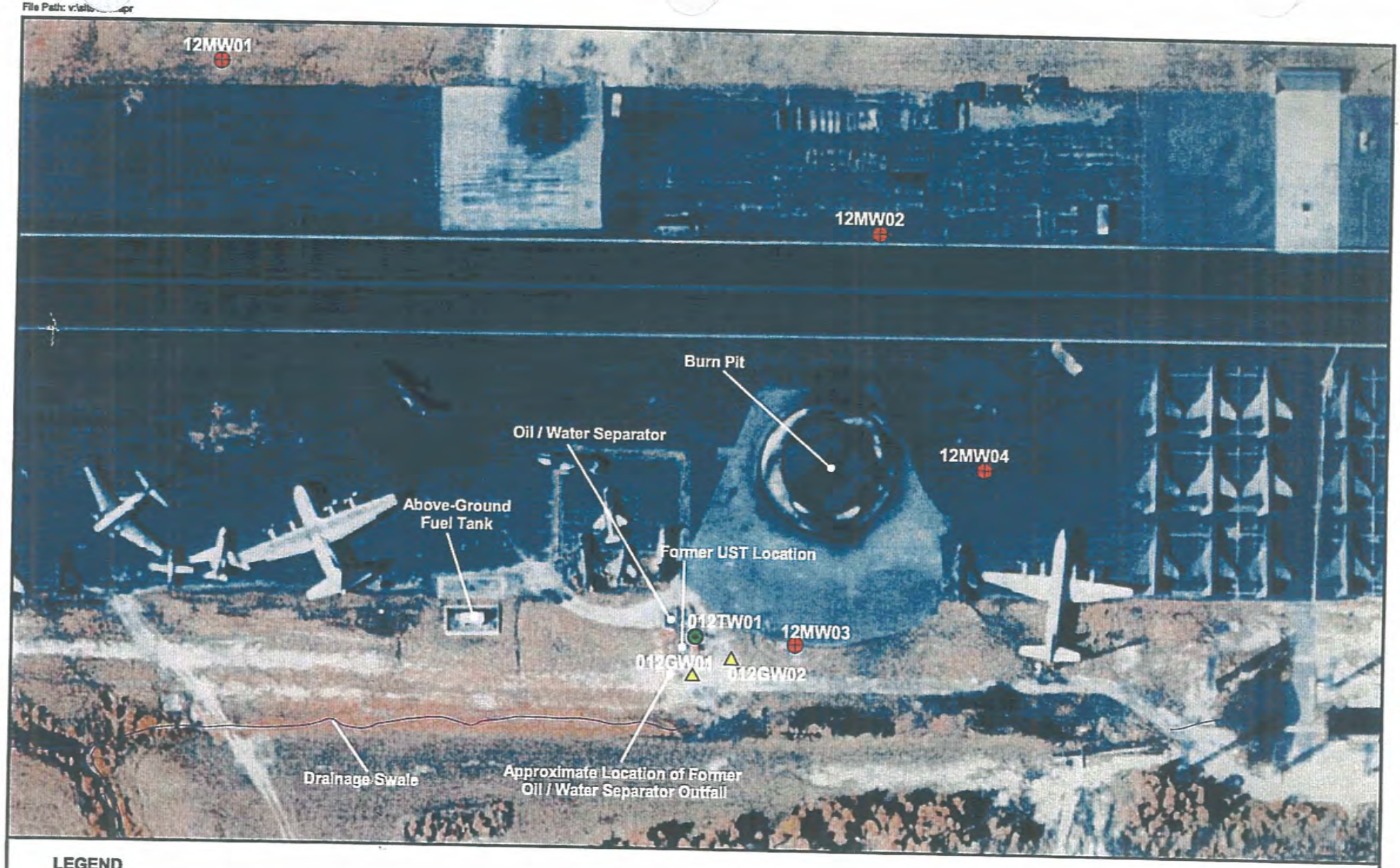
N

0 60 120 180 Feet

Figure 3-2
Subsurface Soil
Sampling Locations
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

File Path: v:\alb...apr



LEGEND

- Permanent Monitoring Well
- Temporary Monitoring Well
- Direct-Push Sampling Location

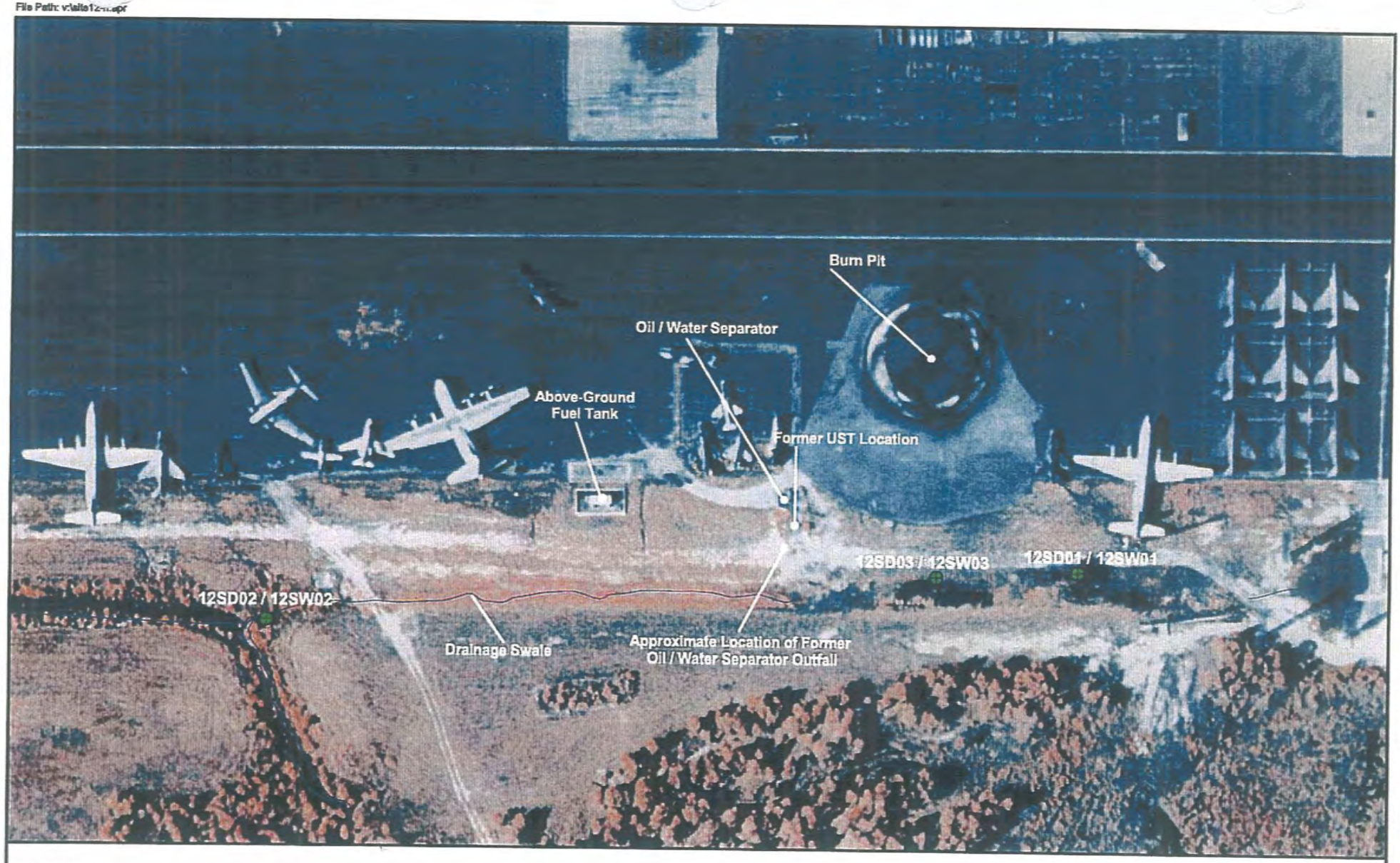
N

0 50 100 150 200 Feet

Figure 3-3
Groundwater Sampling Locations
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

File Path: v:\site12-ri.apr



LEGEND

● Surface Water \ Sediment Sampling Stations

N

0 60 120 180 Feet

Figure 3-4
Surface Water \ Sediment
Sampling Locations
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

4 Physical Characteristics

This section describes the physical characteristics of both the regional and the site-specific setting of Site 12. Respectively, Sections 4.1 through 4.4 below discuss regional physiography, climate, and surface-water hydrology (4.1); site topography and drainage (4.2); geology and hydrogeology (4.3); and site ecology (4.4).

4.1 Regional Physiography, Climate, and Surface Water Hydrology

MCAS Cherry Point is located in the Tidewater region of the Atlantic Coastal Plain Physiographic Province, just north of the town of Havelock, North Carolina, in southeastern Craven County (Figure 4-1). The topography of this portion of the Coastal Plain Province is relatively flat. Surface elevations range from sea level to about 50 ft above mean sea level (amsl) with an average elevation of 20 ft amsl. Coastal areas are of generally low relief and swampy, and characterized by large tidal streams and their tributaries. The area encompassing MCAS Cherry Point lies in the Neuse River drainage basin, which is one of two major river basins that flow into Pamlico Sound. Average inflow into the Neuse River estuary is about 6,100 cubic ft per second (cfs).

MCAS Cherry Point is bounded on the north by the Neuse River; on the west by a boundary line approximately ¾-mile west of Slocum Creek, on the east by Hancock Creek, and on the south by North Carolina Highway 101 (Figure 4-2). Drainage across the air station is directed to one of the surface-water bodies by a series of storm sewers, drainage ditches, and tributaries. Some tidal influences are likely in Slocum Creek and Hancock Creek. Slocum Creek and Hancock Creek are classified as Class SC estuarine water by the NCDENR. These waters are suitable for fish and wildlife, and secondary recreation (i.e., no swimming).

The area's climate is warm and humid with short, mild winters and long, hot summers. Winter temperatures average 46°F and those in summer average 77°F. Precipitation is not evenly distributed, with the greatest monthly precipitation occurring during July, August, and September. In the other months, rainfall averages 3 to 4 inches per month. Recharge to the surficial aquifer system is from precipitation. Average precipitation for the Coastal Plain is approximately 50 inches per year (Giese, Eimers, and Coble, 1997). The generalized water budget for the coastal plain includes evapotranspiration of about 33 inches/year, recharge to the water table aquifer of about 12 inches/year, and overland runoff to streams of about 5 inches/year. Of the 12 inches/year of recharge to the water table aquifer, approximately 11 inches/year moves laterally and discharges to streams; the remaining 1 inch/year or less moves vertically downward through confining units into deeper confined aquifers (Giese, Eimers, and Coble, 1997).

4.2 Site Topography and Drainage

The topography at MCAS Cherry Point is relatively flat. The land surface across the facility slopes generally east to west toward Slocum Creek. Land-surface elevations range from 25 ft amsl near Roosevelt Boulevard to approximately 1 ft amsl at Slocum Creek. Typical elevations are generally between 20 and 25 ft amsl, with a few topographic highs between 25 and 29 ft amsl. Elevations along the surface water drainage features that border much of the Air Station are generally between 1 and 5 ft amsl.

Site 12 is located along the south-central portion of Runway 28, an east-west trending runway along the eastern edge of the air station. The runway is bordered by grassy areas to the north, south, and east, with dense woods beyond the grass. The runway represents a topographic high in the immediate area, with the ground surface sloping away gently to the north and east, and more rapidly to the south. Hancock Creek is located approximately 700 ft east of the eastern edge of Runway 28. At Site 12, ground surface elevations range from about 20 to 24 ft amsl.

With the exception of runoff captured by the trench drain surrounding the concrete burn pit at Site 12, the majority of surface runoff flows southward across the asphalt runway into a mowed grassy area south of the runway that includes a broad swale (see Figure 2-2). The swale forms a drainage way oriented east to west paralleling the runway about 75 ft south of the runway edge. This swale is broad and shallow and receives any runoff entering the grassy area. The swale drains to the west, where it eventually becomes a well-defined ditch and joins a more substantial drainage ditch approximately 300 ft west of the oil/water separator. Flow in this larger ditch, which receives drainage from other runway areas, is in an easterly direction until it is joined by the smaller drainage ditch coming from Site 12. The larger drainage ditch typically carries water and flows south and east through a series of ponds in a swampy area, ultimately discharging into Hancock Creek. Hancock Creek flows north to the Neuse River.

Much of the swale at the site is typically dry, although a lower portion near its eastern extent contains water for longer periods of time, likely due to ponding of runoff. The wetter area near the eastern portion of the swale is about 40 by 75 ft. The mowed grass slope on the south side of the swale initially increases in elevation to a pine-tree line and then drops in elevation down to a forested swampy area.

4.3 Geology and Hydrogeology

4.3.1 General Regional Geologic and Hydrogeologic Framework

The regional geologic and hydrogeologic framework for North Carolina presented here is based principally on information compiled and developed as part of the United States Geological Survey (USGS)'s Regional Aquifer-System Analysis. The Tidewater region of the Coastal Plain Physiographic Province of North Carolina is underlain by an eastward thickening wedge of unconsolidated gravel, sand, silt, and clay with scattered beds of shells and loosely consolidated beds of limestone, sandy limestone, and shell limestone (Winner and Coble, 1996). The sedimentary sequence ranges in age from Quaternary to Cretaceous, and reaches 10,000 ft in thickness at the Atlantic coast. The lower sedimentary sequence is

predominantly non-marine deltaic and consists of discontinuous and heterogeneous sand and clay sequences. The upper sequences are predominantly marine in origin and include nearshore and estuarine deposits. The sedimentary deposits overlay pre-Cretaceous crystalline basement rock. Historical Coastal Plain sedimentation and deposition were controlled by fluctuations in sea level on a subsiding continental margin.

The North Carolina Coastal Plain sediment wedge generally dips gently to the southeast and is undeformed for the most part. The average structural dip of the oldest and deepest deposits is approximately 40 ft/mile whereas the youngest and shallowest deposits have an average structural dip of less than 3 ft/mile (Meng and Harsh, 1988). Differential subsidence produced a series of gently dipping regional structural highs and lows, known as arches and embayments (or basins). The axes of these structures trend easterly or southeasterly and include the Cape Fear Arch in southern North Carolina, an unnamed positive structure near MCAS Cherry Point parallel to the Neuse River, the Albermarle Embayment north of Albermarle Sound, and the Norfolk Arch in southeastern Virginia (Winner and Coble, 1996).

Near MCAS Cherry Point, the Coastal Plain sediments are estimated to be approximately 2,500 ft thick (Lloyd and Daniel, 1988). The eastward dipping sediments consist of unconsolidated marine, alluvial, and lagoonal deposits of sand, silt, clay, shell, and limestone. A generalized stratigraphic column for the North Carolina Coastal Plain is presented in Figure 4-3. Both geologic (i.e., time-stratigraphic) units and corresponding hydrostratigraphic units are presented. A regional hydrogeologic cross-section of the North Carolina Coastal plain is shown as Figure 4-4.

Based on the generalized regional stratigraphic column (Eimers, Daniel, and Coble, 1994), geologic units present beneath MCAS Cherry Point, from youngest to oldest, include:

- Holocene (Recent) and Pleistocene undifferentiated deposits
- Pliocene Yorktown Formation
- Miocene Pungo River Formation
- Oligocene River Bend Formation
- Eocene Castle Hayne Limestone
- Paleocene Beaufort Formation
- Upper Cretaceous Peedee Formation, Black Creek/Middendorf Formation, and Cape Fear Formation

Corresponding to the regional geologic formations are 17 hydrostratigraphic units present beneath the Air Station: nine aquifers separated by eight confining units (Eimers, Daniel, and Coble, 1994). Of these regional hydrostratigraphic units, the youngest five aquifers are most relevant to RI activities at MCAS Cherry Point, as the shallower aquifers are more likely to be potentially affected by historical operations and the confined Castle Hayne aquifer is used as a water supply source. The hydrostratigraphic units, from youngest to oldest, include:

- Holocene to Pleistocene Surficial Aquifer
- Late Pliocene Yorktown Confining Unit
- Pliocene Yorktown Aquifer
- Late Miocene Pungo River Confining Unit
- Miocene Pungo River Aquifer

- Early Miocene Upper Castle Hayne Confining Unit
- Oligocene to Miocene Upper Castle Hayne Confining Aquifer
- Eocene to Oligocene Lower Castle Hayne Confining Unit
- Eocene Lower Castle Hayne Aquifer
- Paleocene Beaufort Confining Unit
- Paleocene Beaufort Aquifer
- Late Upper Cretaceous Peedee Confining Unit
- Late Upper Cretaceous Peedee Aquifer
- Upper Cretaceous Black Creek Confining Unit
- Upper Cretaceous Black Creek Aquifer
- Upper Cretaceous Upper Cape Fear Confining Unit
- Upper Cretaceous Upper Cape Fear Aquifer
- Cretaceous Lower Cape Fear Confining Unit
- Cretaceous Lower Cape Fear Aquifer

4.3.2 Regional Geologic and Hydrostratigraphic Unit Description

This section describes the regional geologic and hydrostratigraphic units beneath the Tidewater Region of the North Carolina Coastal Plain. A greater emphasis is placed on the uppermost (i.e., youngest) hydrostratigraphic units (Surficial Aquifer through the Castle Hayne Aquifer) and their corresponding geologic units. These units make up the uppermost 400 to 500 ft beneath MCAS Cherry Point and are the units most likely impacted by site operations. Although some of the deeper aquifers are much more transmissive than the upper aquifers, they are generally brackish and require treatment prior to potable or industrial use. It is unlikely for the area's deeper aquifers to be indiscriminately used as a water supply. Additionally, these deeper aquifers are separated from potential contaminant sources by a substantial cumulative thickness of aquifers and confining units.

4.3.2.1 Surficial Aquifer

The surficial aquifer consists primarily of Quaternary-age post-Yorktown Formation deposits. In the Tidewater Region of the Coastal Plain, these sediments were deposited under shallow marine or estuarine conditions. These sediments consist of fine sand, silt, clay, shell, and peat beds, with scattered deposits of coarser-grained material of relic beach ridges and floodplain alluvium. Post-Pliocene sediments in Craven County have been identified by the USGS to include the Pleistocene Flanner Beach and James City Formations (Winner and Coble, 1996).

The surficial aquifer is recharged from rainfall, and is the source of recharge to the underlying confined aquifers as well as base flow to streams. Recharge to the surficial aquifer is largely dependent on soil infiltration rates. In Craven County, soils are generally moderately poor to poorly drained clay, clay loam, and sandy clay with soil permeability of 0.06 to 2 inches per hour. Recharge rates for the surficial aquifer range from 12 to 20 inches/year (Giese, Eimers, and Coble, 1997). The average recharge rate for the Coastal Plain of North Carolina used in the USGS groundwater flow model is 12 inches/year (Winner and Coble, 1996).

The distribution of permeable material is dependent on the percentage of sand in the surficial aquifer. In eastern Craven County, the percentage of sand in the surficial aquifer is

generally between 70 and 90. The estimated average horizontal hydraulic conductivity of the surficial aquifer is 29 feet per day (ft/d) (Winner and Coble, 1996).

4.3.2.2 Yorktown Confining Unit

The Yorktown confining unit underlies the surficial aquifer and serves as a hydrogeologic barrier to the underlying Yorktown Aquifer. The confining unit consists largely of clay and sandy clay that locally includes beds of fine sand or shells. These confining sediments comprise the youngest beds of the Yorktown Formation. The average thickness of the Yorktown confining unit is about 22 ft (Winner and Coble, 1996).

4.3.2.3 Yorktown Aquifer

The Yorktown Aquifer is comprised of sediments of the Pliocene Yorktown Formation. The Yorktown Aquifer and Yorktown Confining Unit pinch out in western Craven County. This hydrostratigraphic unit is present under MCAS Cherry Point, but thins westward and is absent in most of the southern half of the coastal plain. Composed predominantly of fine sand, silty/clayey sand, and clay, the Yorktown Aquifer is characterized by shells and shell beds throughout, reflective of marine and near-marine depositional environments. The fine sand is the dominant aquifer material, comprising generally between 70 and 80 percent of the Yorktown Aquifer in Craven County. The average estimated hydraulic conductivity of the aquifer is approximately 22 ft/day. The USGS estimated the transmissivity of the aquifer in Craven County to be approximately 500 ft^2/day. In Craven County, the aquifer is fresh, with chloride concentrations less than 250 mg/L.

4.3.2.4 Pungo River Confining Unit

The upper clay beds of the Pungo River Formation and lowermost clays of the Yorktown Formation comprise the Pungo River Confining Unit. These sediments overlay the Pungo River Aquifer. The confining unit contains less than 10 percent sand with an average thickness of 55 ft (Winner and Coble, 1996).

4.3.2.5 Pungo River Aquifer

The permeable sediments of the upper and middle Miocene Pungo River Formation comprise the Pungo River Aquifer. The aquifer consists of fine- to medium-grained marine sand with considerable phosphate content. Based on fossil content, these sediments were deposited in an offshore setting, with some coarse sand beds representative of nearshore or estuarine environments. In eastern Craven County, the aquifer is about 90 percent sand. The western extent of the aquifer lies about 10 miles west of MCAS Cherry Point, and averages about 15 ft in thickness near its western limits. In the western portions of Craven County, where the Yorktown aquifer is absent, the Pungo River aquifer is directly overlain by the surficial aquifer. The average estimated hydraulic conductivity of the Pungo River aquifer is 32 ft/day (Winner and Coble, 1996). Recharge to the aquifer is through leakage through the upper confining unit from the Yorktown Aquifer, with upward discharge to major stream valleys. Near the western limits of the aquifer, the Neuse River may cut into the Pungo River Aquifer.

4.3.2.6 Castle Hayne Confining Unit

Regionally, the Castle Hayne confining unit and Aquifer are considered one hydrostratigraphic unit. In the vicinity of the MCAS Cherry Point, the USGS has subdivided this unit into an upper and lower Castle Hayne confining unit and upper and lower Castle Hayne Aquifer. For the purpose of this regional description of the hydrostratographic units of the North Carolina Coastal Plain, the Castle Hayne is not subdivided.

The Castle Hayne confining unit consists of clay, sandy clay, and clay with sandy streaks. The average thickness of the confining clays is 14 ft. In some areas, the confining unit contains sufficient sand to allow significant leakage between the Castle Hayne and the overlying aquifers (Winner and Coble, 1996).

4.3.2.7 Castle Hayne Aquifer

The Castle Hayne Aquifer consists of the Eocene Castle Hayne Limestone and rocks of the Oligocene River Bend Formation. The aquifer is predominantly limestone and sand with minor amounts of clay. These sediments were deposited under marine conditions and include shell, dolomitic, and sandy limestones. The limestone varies from loosely consolidated to hard and recrystallized. The fine- to coarse-grained sand beds vary in carbonate content. Clay marl beds, when present, are generally less than 10 ft thick. Clay is also present as matrix material in sand and limestone beds. The aquifer typically consists of alternating beds of limestone, sandy limestone, and sand. In the lower part of the aquifer, sand is the dominant aquifer material. The average thickness of the Castle Hayne Aquifer is 178 ft (Winner and Coble, 1996).

The Castle Hayne Aquifer is the most productive aquifer in this area of the North Carolina Coastal Plain, with permeable material generally greater than 80 to 90 percent of the total aquifer thickness. Chloride concentrations greater than 250 mg/L occur in groundwater of the Castle Hayne Aquifer east of Cherry Point. The hydraulic conductivity of the aquifer varies significantly, with a range from 15 ft/d where the aquifer is relatively thin and sandy to 200 ft/day where the aquifer is thick and composed of permeable limestone. The average hydraulic conductivity estimated for the entire aquifer is 65 ft/day (Winner and Coble, 1996).

4.3.2.8 Beaufort Confining Unit

Underlying the Castle Hayne Aquifer, the Beaufort Confining Unit consists of clay, silt, and sandy clay of the uppermost Beaufort Formation. In some areas the confining unit contains distinct clay with interlayered bed of fine sand or silt. The average thickness of the confining unit is 24 ft.

4.3.2.9 Beaufort Aquifer

The Beaufort Aquifer consists of dark green and gray, fine- to medium-grained glauconitic sand, clayey sand, and clay beds of the Paleocene Beaufort Formation. The sediments are marine in origin with some shell and limestone beds. The Formation lies unconformably on Cretaceous beds and is also unconformably overlain by the younger sediments. The average thickness of the aquifer is 60 ft (Winner and Coble, 1996). The estimated average hydraulic conductivity for the aquifer is about 35 ft/day. Groundwater in the Beaufort Aquifer is brackish (chloride concentrations greater than 250 mg/L) underneath most of Craven County.

4.3.2.10 Peedee Confining Unit

The Peedee confining unit underlying the Beaufort Aquifer consists of clay, silty clay, and sandy clay of late Cretaceous and early Tertiary age. The identification of the confining unit is based largely on head differences across the clay layer and on chloride concentrations that differed by several milligrams per liter above and below the clays. The average thickness of the confining unit is 25 ft.

4.3.2.11 Peedee Aquifer

The Peedee Aquifer consists of fine- to medium-grained sand interbedded with gray to black marine clay and silt. Shells are common and the sand beds contain glauconite and are typically greenish gray. Interbeds of consolidated calcareous sandstone and limestone are present in some areas. The average aquifer thickness is 146 ft (Winner and Coble, 1996).

4.3.2.12 Black Creek Confining Unit

The Black Creek confining unit is composed of clay, silty clay, and sandy clay of the upper Black Creek Formation. The average thickness of the confining unit is 45 ft (Winner and Coble, 1996).

4.3.2.13 Black Creek Aquifer

The late Cretaceous sediments of the Black Creek Formation comprise the Black Creek Aquifer. These lagoonal to marine sediments consist of thinly laminated gray to black clay interlayered with gray to tan sands. The Black Creek sediments are characteristically organic-rich, and contain shell material and glauconite. The Black Creek Aquifer also includes sediments of the underlying and inter-fingering Middendorf Formation. The Middendorf Formation consists of fluvial fine- to medium-grained, sand and silty clay beds, coarse channel sand, and thin laminated beds of sand and clay. The light tan, white, and red sands with kaolinitic clay fragments scattered throughout exhibit crossbedding, pinchouts, and lenses. In central Craven County, the Black Creek Aquifer is as much as 400 ft thick and is brackish in eastern Craven County. The aquifer contains as much as 60 percent sand with an average hydraulic conductivity of 28 ft/day (Winner and Coble, 1996).

4.3.2.14 Upper Cape Fear Confining Unit

The Upper Cape Fear Confining Unit consists of sediments of the Middendorf Formation and uppermost Cape Fear Formation. These sediments include a continuous sequence of clay, silty clay, and sandy clay. The average thickness of the confining unit is 48 ft (Winner and Coble, 1996).

4.3.2.15 Upper Cape Fear Aquifer

Permeable zones of the upper Cape Fear Formation comprise the Upper Cape Fear Aquifer. Based on hydraulic head differences, two hydrologic units have been identified in the Cape Fear Formation: the Upper Cape Fear Aquifer and the Lower Cape Fear Aquifer. The Upper Cape Fear Aquifer consists of alternating beds of sand and clay. Some of these nearshore marine sediments are gradational from sand to clay and other beds contain thin conglomerates of quartz pebbles or mudstone fragments. The sands of the upper Cape Fear Formation comprise about 60 percent of the sediments, are poorly sorted, and range from very fine sand to gravel. The hydraulic conductivity of the aquifer ranges from about

25 ft/day to 50 ft/day, and averages 30 ft/day. The average thickness of the Upper Cape Fear Aquifer is 100 ft/d (Winner and Coble, 1996). Freshwater is not present in the Cape Fear Aquifer underlying Craven County. The 10,000-mg/L chloride isochlor lies just southeast of Craven County near the coast.

4.3.2.16 Lower Cape Fear Confining Unit

Clay and sandy clay beds of the Cape Fear Formation form the Lower Cape Fear confining unit. With the exception of the extreme western limits of the formation near the Fall Line, these clay beds are continuous and contribute to hydraulic head differences between the Upper and Lower Cape Fear Aquifers. This confining unit is more than 75 ft thick throughout the eastern quarter of the Coastal Plain (Winner and Coble, 1996).

4.3.2.17 Lower Cape Fear Aquifer

Lower sand beds of the Cape Fear Formation comprise the Lower Cape Fear Aquifer. These sand beds pinch out against bedrock to the west near the Fall Line. The grain size of the sand beds ranges from fine to coarse. The thickness of the aquifer ranges from a few ft near the Fall Line to 400 ft downdip at the coast. The average thickness for the aquifer is 175 ft. Sand averages about 58 percent of the aquifer material. In western Craven County, clay dominates the Lower Cape Fear Formation. Hydraulic conductivity estimates for the aquifer range from 20 to 75 ft/day and averages 34 ft/day. The Lower Cape Fear Aquifer contains freshwater only at its westernmost extent. In Craven County, chloride concentrations are generally greater than 10,000 mg/L.

4.3.3 Regional Water Usage

The primary source of water for municipal, residential, and agricultural use in the vicinity of MCAS Cherry Point is from the aquifers of the Coastal Plain of North Carolina. Total groundwater withdrawals from the Coastal Plain aquifers in North Carolina are estimated to be more than 250 million gallons per day (MGD) (Giese, Eimers, and Coble, 1997). As a result of the extensive use of groundwater and the potential impacts from overpumping of the aquifers, the North Carolina Division of Water Resources has established Capacity Use Area #1 under the Water Use Act of 1967. Capacity Use Area #1 encompasses portions of seven counties in the central North Carolina Coastal Plain. The Cherry Point area of Craven County is within the southern limits of Capacity Use Area #1. The Capacity Use Program requires permits for water users in excess of 100,000 gallons per day within Capacity Use Area #1 to ensure protection of water resources through the monitoring and reporting of pumping rates and water levels, as well as the evaluation of groundwater withdrawal impacts. The North Carolina Division of Water Resources has recently proposed revision of the Capacity Use Area #1 to include the Central Coastal Plain Capacity Use Area. This proposed revision would significantly enlarge Capacity Use Area #1 to encompass 15 North Carolina counties.

The most important aquifer in the vicinity of MCAS Cherry Point in Capacity Use Area #1 is the Castle Hayne Aquifer, which can yield very large quantities of potable water. Within Capacity Use Area #1, greater than 50 percent of the groundwater use is for mining, followed by use for public supplies. The majority of surface water use is for industrial purposes. Table 4-1 summarizes water usage in Capacity Use Area #1.

Based on water use summary tables published in the annual report for Capacity Use Area #1 (May 1998 to May 1999), total permitted water use in Craven County was 68.276 MGD with actual use reported at 19.205 MGD. Permitted groundwater use in Craven County is 17.758 MGD, with actual withdrawals reported to be 4.552 MGD. Permitted surface water use in Craven County is 52 MGD, with actual withdrawals reported at 14.652 MGD.

The largest permitted groundwater users in Craven County include MCAS Cherry Point (8 MGD), City of Havelock (2 MGD), Vanguard Farms Inc. (2 MGD), CWS Systems Inc. (1 MGD), and First Craven Sanitary District (0.8 MGD). All of these withdrawals are from supply wells screened in the Castle Hayne Aquifer. The single largest surface-water user in Craven County is Weyerhaeuser Company with withdrawals of 50 MGD for industrial use.

4.3.4 Site Specific Geology and Hydrogeology

The nature of the subsurface at MCAS Cherry Point is based on investigations conducted by the USGS, previous installation restoration program studies, and from site soil borings and monitoring wells. The subsurface described in this section is focused on hydrostratigraphic units (i.e., aquifers and confining units) since the critical considerations in characterizing environmental impacts from site operations are the identification of individual units of similar hydraulic properties and the demonstrated degree of confinement of the defined aquifers. Although aquifer or confining unit boundaries may or may not coincide with stratigraphic (geologic time) unit boundaries, stratigraphic time boundaries are generally not critical in RIs. The intent of the RI, with respect to hydrogeologic conditions, is to determine the transport mechanisms, fate, and risk of contaminants in the subsurface, which requires determining the hydraulic characteristics of the subsurface material.

The aquifers beneath MCAS Cherry Point are made up of imperfectly connected sand bodies or lenses. Any one of the sand bodies may have only localized extent and, for short periods of time, may act under stress (i.e., pumping) as a distinct hydraulic unit or may exhibit static potentiometric surfaces that vary from other sand bodies or lenses. On a facility-wide scale, however, these sand units may be linked together to form aquifers, which may be distinguished from one another based on several factors:

1. Significant differences in static potentiometric surfaces across the confining units that separate the aquifers;
2. Evidence of transmission of drawdown effects (under pumping conditions) indicating lateral or vertical connection;
3. Evidence of a lack of transmission of drawdown effects across units separated vertically by confining units; and
4. Water quality similarities within an aquifer and potential water quality differences across confining units.

The confining units separating the site-wide aquifers consist of clay and silt layers containing varying amounts of sand. The layers may be thin and/or interlayered throughout the unit. In some cases the confining units may be considered leaky confining units and/or may not be laterally continuous across all of MCAS Cherry Point.

Appendix A contains lithologic descriptions from monitoring-well borings drilled and logged during the 1991 field investigation as well as the lithologic descriptions from the Site 12 RI soil borings. Appendix B contains well-construction diagrams for monitoring wells installed during the 1991 field investigation and the well-construction diagram for the temporary well installed as part of the RI at Site 12.

4.3.4.1 Site 12 Geology and Hydrogeology

The USGS has conducted several studies of the hydrogeology at MCAS Cherry Point. A description of MCAS Cherry Point geology and hydrogeology as described by the USGS is presented to provide an overview of available information and characteristics of the hydrostratigraphic units at the MCAS.

While developing a quasi three-dimensional finite-difference groundwater-flow model and while analyzing the hydrogeologic framework of MCAS Cherry Point, the USGS evaluated geophysical and lithologic well log data from 30 wells and water-level data from oil test wells, water supply wells, and observation wells. The subsurface materials evaluated by the USGS investigations and supported by site borings are separated into the following aquifers and respective confining units: Surficial Aquifer, Yorktown Aquifer, Pungo River Aquifer, upper Castle Hayne Aquifer, and lower Castle Hayne Aquifer. Deeper aquifers are not addressed in this site-specific discussion because the depth and separation of these aquifers from contaminant sources by a series of confining units, as well as the brackish water quality of the deeper aquifers, preclude the potential for significant impacts to these deeper aquifers.

A cross-section of the hydrostratigraphic units is presented to illustrate the hydrogeologic framework underlying MCAS Cherry Point. The cross-section location is illustrated in Figure 4-5 and the cross-section is presented in Figure 4-6. A description for each of the hydrostratigraphic units is presented below.

Surficial Aquifer. The USGS identified the surficial aquifer materials at MCAS Cherry Point as the Flanner Beach Formation (Murray and Keoughan, 1990). The surficial aquifer consists of unconsolidated and interfingering beds of fine sand, silt, clay, shell and peat beds, with scattered coarse-grained sands.

The direct-push soil boring activities performed as part of the RI allowed a more-specific examination of the shallow sediments at Site 12. The following general observations were compiled from an examination of the lithologic logs from the 10 soil borings completed during the RI:

- At each drilling location, a topsoil layer was noted within a range of 0 to 1-ft bgs. This topsoil layer was dark brown to black in color and consisted of organic-rich matter that included plant rootlets and decaying grass. This layer was typically soft and moist.
- A silty sand unit was encountered from approximately 1 to 4 ft bgs on average. This silty sand was light brown in color and at some locations included a minor amount of clay or very fine silt component. These silty sands were primarily in a loose state of compactness.

- A layer of medium sand was observed below the silty sand unit across the entire site to the maximum depth of drilling (greater than 12 ft). This medium sand included varying amounts of coarse and fine sand grains depending on the location of each boring. The medium sand layer was light brown to beige in color and exhibited a faint yellowish tinge in direct sunlight. The material was loose to compact above the water table and loose in the saturated groundwater zone. Below the water table, the sand color transitioned to a grayish brown. The medium sand was interpreted to represent a marine sand deposit.
- The water table was encountered at a depth of approximately 11 ft bgs in the direct-push soil borings, with the upper limit of the transition zone occurring near 10 ft bgs.

The thickness of the Surficial Aquifer at the air station ranges from 31 to 68 ft (Eimers, Daniel, and Coble, 1994). In the vicinity of Runway 28 and Site 12, the thickness of the surficial aquifer is about 35 ft. Throughout the air station, surficial aquifer sediments are estimated to be 70-to 90-percent sand, although the sand is mostly fine grained with silt and clay. Consequently, the hydraulic conductivity of the surficial aquifer at MCAS Cherry Point is estimated to be about 10 ft/day. The results of rising-head slug tests conducted in numerous monitoring wells at the air station indicate that the horizontal hydraulic conductivity of the surficial aquifer ranges between 1 and 118 ft/day, and averaged 14 ft/day. Based on data from the four monitoring wells at Site 12, a hydraulic gradient of 0.0033 and an average groundwater flow velocity of 56 ft/year was determined for Site 12 in 1991 (Halliburton NUS, June 1993).

Groundwater levels in wells screened within the surficial aquifer at Site 12 were measured during the RI field investigation and are summarized in Table 4-2. Groundwater flow generally mimics topography and flows east towards Hancock Creek. A technical problem prevented an accurate measurement of the water level in one of the monitoring wells during the RI, so the groundwater elevation contours for the surficial aquifer at Site 12 are illustrated in Figure 4-7 based on water level measurements from the 1991 investigation. The RI water-level measurements that were successfully collected were consistent with the earlier results.

Yorktown Confining Unit. The Yorktown confining unit underlying MCAS Cherry Point reportedly consists of clay and sandy clay with discontinuous thin beds of fine sand or shells in some areas of the air station. Winner and Coble (USGS, 1996) correlated these sediments with the uppermost Yorktown Formation, whereas Murray and Keoughan (USGS, 1990) identified these sediments as the Pleistocene James City Formation. Regardless, the confining unit thickens to the southeast across MCAS Cherry Point, and is thin to absent in the southwest portion of the air station near Sandy Branch. The southern limits of the Yorktown Aquifer and confining unit are about 7 miles east of the air station (Eimers, Daniel, and Coble, 1994). At Site 12, the confining unit is present at a thickness of about 30 to 35 ft. The vertical hydraulic conductivity of the confining sediments is estimated to be less than 0.05 ft/day (Eimers, Daniel, and Coble, 1994).

No Site 12 RI field activities reached the depth of the Yorktown Confining Unit.

Yorktown Aquifer. The elevation of the top of the Yorktown Aquifer at MCAS Cherry Point ranges from about -35 to -50 ft amsl. Based on USGS well # 62 at the eastern end of Runway

28, the top of the aquifer is at -41 ft amsl. The sediments comprising the aquifer consist of fine sand, silty and clayey sand, and clay, with some shell beds, indicating a marine depositional environment. A hydraulic conductivity of 30 ft/day was determined from an aquifer test conducted on wells screened in the Yorktown Aquifer just west of Roosevelt Road and south of Slocum Road. Given the presence of variable amounts of fine sands, silty sands, and clay, the average horizontal hydraulic conductivity in the Yorktown Aquifer at MCAS Cherry Point is estimated to be between 10 and 20 ft/d (Eimers, Daniel, and Coble, 1994).

Pungo River Confining Unit. The Pungo River Confining Unit at MCAS Cherry Point is predominantly clay, in some areas containing phosphatic sand. In the vicinity of Runway 28, the confining unit thickness is about 25 ft, while the confining unit is thin to absent in the southwest portion of the air station near Sandy Branch (Eimers, Daniel, and Coble, 1994). This is the same area where the Yorktown confining unit is also reported to be very thin to absent. According to the USGS, the absence of these confining clay beds may be reflective of a paleochannel. The vertical hydraulic conductivity of the confining unit was estimated to be about 0.0001 ft/d (Eimers, Daniel, and Coble, 1994).

Pungo River Aquifer. The Pungo River Aquifer consists of fine- to medium-grained sand with some beds of silt, clay, and phosphatic sand. The aquifer is present throughout MCAS Cherry Point. The elevation of the top of the aquifer at Site 12 is approximately -100 ft amsl, and ranges from -80 ft amsl at the western boundary of the air station to -110 ft amsl at the end of Runway 28 adjacent to Hancock Creek. The thickness of the Pungo River Aquifer at Site 12 is between 25 and 30 ft. The horizontal hydraulic conductivity of the aquifer at the air station is estimated to be about 15 ft/d (Eimers, Daniel, and Coble, 1994).

Upper Castle Hayne Confining Unit. The upper Castle Hayne Confining Unit at MCAS Cherry Point consists of clay and sandy clay. The clay beds are thickest in the northeastern portion of the air station in the vicinity of Runway 28. The confining unit thickness in this area is about 40 ft. The vertical hydraulic conductivity is estimated to be about 0.0001 ft/d (Eimers, Daniel, and Coble, 1994).

Upper Castle Hayne Aquifer. The upper Castle Hayne Aquifer consists of porous limestone, sandy limestone, and medium to fine sand. This unit is the principal source of water to the air station. The aquifer is approximately 30 ft thick near the western boundary of MCAS Cherry Point and 85 ft thick near Hancock Creek to the east. The elevation of the top of the upper Castle Hayne Aquifer at Site 12 is about -175 ft amsl. A horizontal hydraulic conductivity of 300 ft/d was determined from an aquifer test in the upper Castle Hayne Aquifer at the NCDENR research station in the north-central part of the air station (Eimers, Daniel, and Coble, 1994).

A zone of lower permeability in the Castle Hayne Aquifer was identified by the USGS at MCAS Cherry Point. The aquifer was divided into upper and lower units for the purpose of simulating groundwater flow underlying the air station.

Lower Castle Hayne Confining Unit. The lower Castle Hayne Confining Unit consists of clay, sandy clay, and sand. The clay beds are thickest (about 50 ft) in the northern portion of the air station. In the vicinity of Site 12 and Runway 28, the confining unit is about 30 ft thick.

Based on USGS model calibrations, the vertical hydraulic conductivity of the confining unit is estimated to be about 0.01 ft/d (Eimers, Daniel, and Coble, 1994).

Lower Castle Hayne Aquifer. The lower Castle Hayne Aquifer is composed of limestone, calcareous sand, and clay beds. The aquifer grades to fine sand and silt in the lower portions of the unit. Based on four wells drilled into the lower Castle Hayne Aquifer at MCAS Cherry Point, aquifer thickness ranges from about 464 to 500 ft. The elevation of the top of the aquifer in the vicinity of Site 12 is approximately -298 ft amsl. The higher silt and clay content in the lower Castle Hayne Aquifer reduces hydraulic conductivity to an estimated 65 ft/d. At depths of about 650 ft, groundwater is brackish with chloride levels greater than 250 mg/L (Eimers, Daniel, and Coble, 1994).

4.4 Site Ecology

The ecology of Site 12 was surveyed during a site visit by CH2M HILL personnel in May 1999.

As previously stated, MCAS Cherry Point is located on a peninsula between the Neuse River to the north and Core and Bogue Sounds to the south. The major portion of MCAS Cherry Point is located between Hancock and Slocum Creeks. Loblolly pine (*Pinus taeda*) dominates much of the forested land on the broad interstream area at MCAS Cherry Point. These forests are managed for loblolly pine timber production. The lower slope forests contain a mesic mixed hardwood community. Important canopy components of this community include sweetgum (*Liquidambar styraciflua*), white oak (*Quercus alba*), pignut hickory (*Carya glabra*), and beech (*Fagus grandifolia*). The major understory trees found in the mixed hardwood forest are American holly (*Ilex opaca*) and flowering dogwood (*Cornus florida*). The inland floodplains of the tributary streams are dominated by the blackwater-swamp-community type. Important components of this community include swamp tupelo (*Nyssa biflora*), bald cypress (*Taxodium distichum*), red maple (*Acer rubrum*), sweetgum, and a variety of oaks. The mid-canopy of the swamp forest is dominated by ironwood (*Carpinus carolinana*) (Geo-Marine, 1998).

According to the Draft Threatened and Endangered Species Management Plan (Appendix C in Geo-Marine, Inc. 1998), there are no federally endangered species found on MCAS Cherry Point. MCAS Cherry Point supports animal species, bridle shiner (*Notropis bifrenatus*), and two plant species, *Carex chapmannii* and *Solidago verna*, that are state listed. There have been no documented occurrences of any of these species near Site 12. The bridle shiner is believed extirpated from North Carolina (Geo-Marine, Inc. 1998).

The runway surface at Site 12 is mostly asphalt, with a number of relatively small concrete pads located in the eastern portion of the runway. Grassy areas to the north, south, and east border the runway, with dense woods beyond the grass. The runway represents a topographic high in the area, with the ground surface sloping away gently to the north and east, and more rapidly to the south. Hancock Creek is located approximately 700 ft east of the eastern edge of Runway 28.

Runoff outside the trench drain of the burn pit flows southward across the asphalt into a mowed grassy area south of the runway that includes a broad swale. The swale forms a drainage way oriented east to west paralleling the runway about 75 ft south of the runway edge. This swale is broad and shallow and receives any runoff entering the grassy area. The

swale drains to the west, where it eventually becomes a well-defined ditch and joins a more substantial drainage ditch approximately 300 ft west of the oil/water separator. Flow in this larger ditch, which drains a larger portion of the runway, is in an easterly direction until it is joined by the smaller drainage ditch coming from Site 12. The larger drainage ditch, which typically carries water, flows south and east, ultimately discharging into Hancock Creek.

Much of the swale at the site is typically dry, although a lower portion near its eastern extent contains water for longer periods of time, likely due to ponding of runoff. The drier portions of the swale are dominated by dewberry (*Rubus* sp.). The wetter area near the eastern portion of the swale is about 40 by 75 ft in size and is dominated by clumps of rush. Tadpoles were observed in 3-inch deep water during a site visit by a CH2M HILL ecologist in May 1999. The mowed grass slope on the south side of the swale initially increases in elevation to a pine tree line and then drops in elevation down to forested swampy area. The woods in the vicinity of Site 12 are dominated by loblolly pine (*Pinus taeda*).

The confluence of the drainage ditch leading from Site 12 and the larger drainage ditch to the west is surrounded by brush, including willow (*Salix* sp.) and sweet gum (*Liquidambar styraciflua*). At the confluence, both ditches likely contain water for significant portions of the year. During the May 1999 site visit, water occupied about 2 ft of the drainage ditch channel width and was about 4 inches in depth. The larger drainage ditch contained water 2 ft or more in depth and supported emergent vegetation such as cattails (*Typha* sp.). During the May site visit, small fish and tadpoles were observed in the smaller drainage ditch near the confluence and in the larger drainage ditch. Beyond the confluence, the larger drainage ditch flows southeast through the nearby pine forest. It eventually travels through a series of ponds before flowing into Hancock Creek.

Wildlife observed directly or by sign during the May 1999 site visit included the previously mentioned tadpoles and small fish, white-tailed deer (*Odocoileus virginianus*), Eastern cottontail (*Sylvilagus floridanus*), coyote (*Canus latrans*), fish crow (*Corvus ossifragus*), barn swallow (*Hirundo rustica*), European starling (*Sturnus vulgaris*), Eastern kingbird (*Tyrannus tyrannus*), mourning dove (*Zenaida macroura*), and Northern mockingbird (*Mimus polyglottos*).

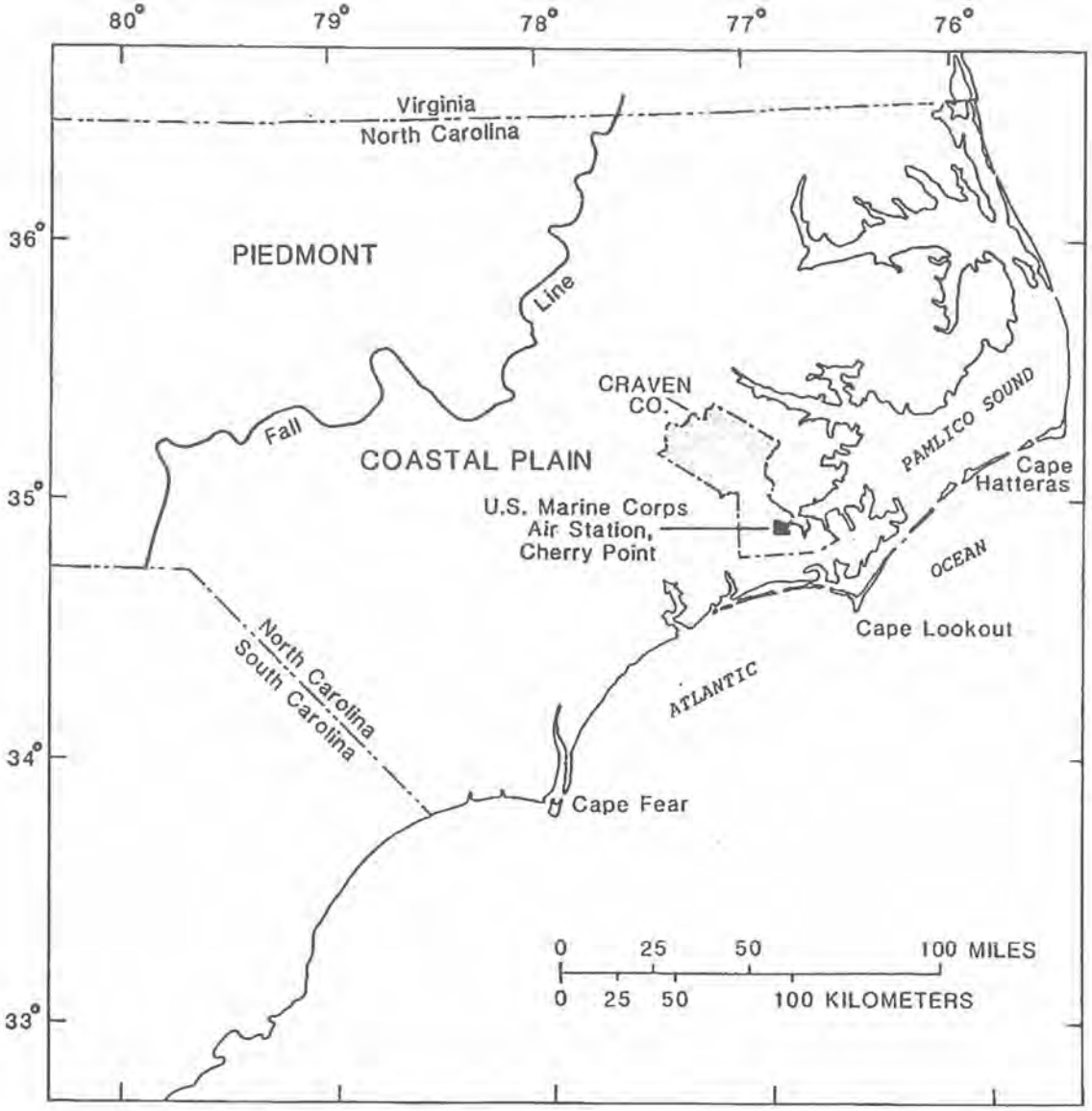
Table 4-1
Summary of Water Usage in Capacity Use Area #1
Site 12 Remedial Investigation, MCAS Cherry Point

Type of Use	Permitted Groundwater Withdrawals	Actual Groundwater Withdrawals	Permitted Surface Water Withdrawals	Actual Surface Water Withdrawals
Industrial	6.3	1.9	147.6	75.5
Irrigation Agriculture	14.6	0.45	1.2	-
Mine Dewatering	86	11.8	-	-
Public Supply	28.5	10.5	0.36	-
Aquaculture	22.7	0.7	0.9	0.1

Source: Capacity Use Area #1 Annual Report, 1999. Values in millions of gallons per day.

Table 4-2
Site 12 Groundwater Level Measurements - March 16, 1999
Site 12 Remedial Investigation, MCAS Cherry Point

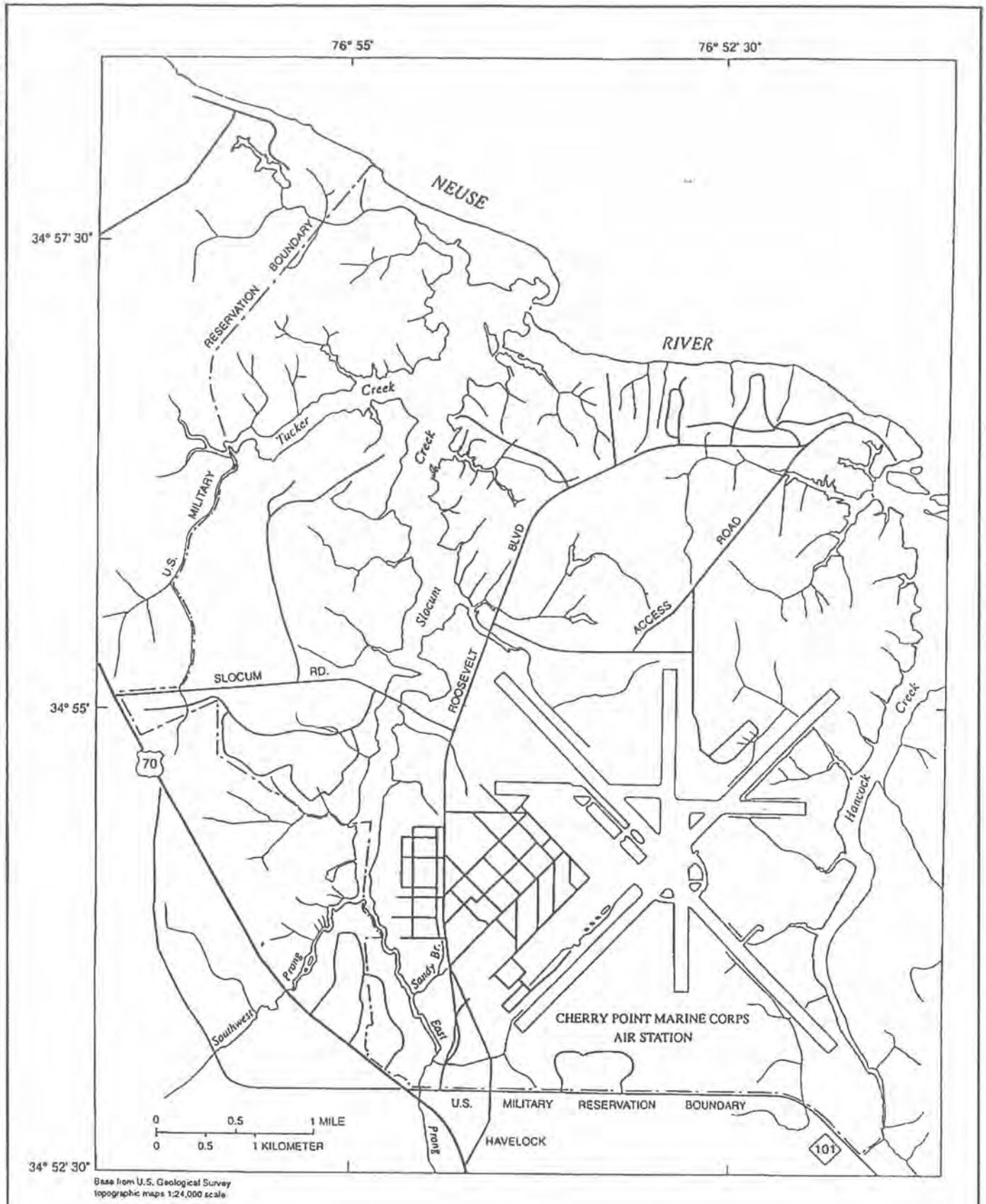
Monitoring Well	Screen Depth Interval (feet)	Top of Casing Elevtion (feet MSL)	Depth to Water (feet)	Groundwater Elevation (feet MSL)
012TW01	N/A	N/A	9.58	N/A
012MW01	5 -15	21.94	N/A	N/A
012MW02	7 - 17	22.67	11.1	11.57
012MW03	6 - 16	24.18	12.16	12.02
012MW04	7 - 17	22.82	11.44	11.38



Source: Murray and Keoughan, 1990.

Figure 4-1
Location of MCAS Cherry Point
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL



Source: Eimers, Daniel, and Coble, 1994.

Figure 4-2
MCAS Cherry Point Boundaries
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

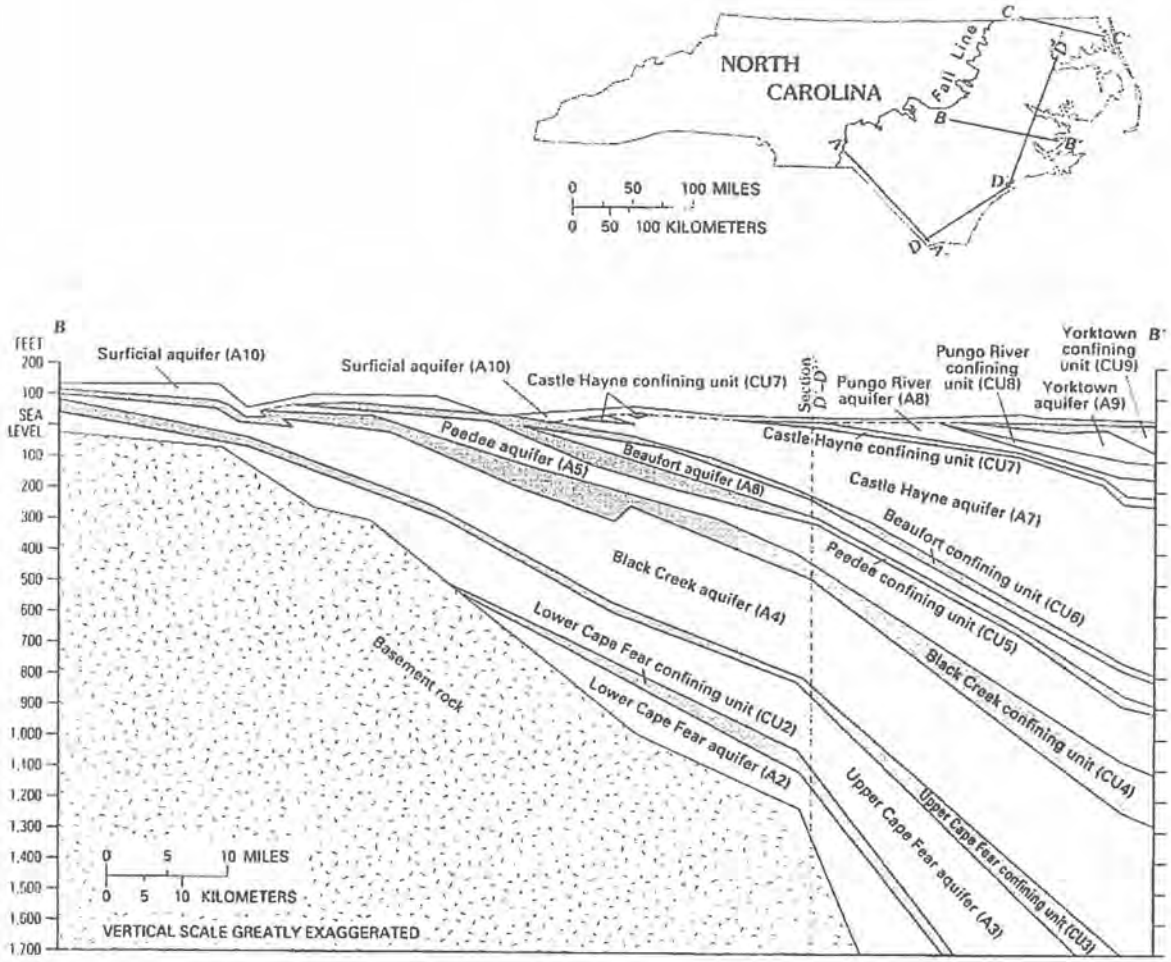
Geologic units			Hydrogeologic units
System	Series	Formation	Aquifer and confining unit
Quarternary	Holocene Pleistocene	Undifferentiated	Surficial aquifer
Tertiary	Pliocene	Yorktown Formation	Yorktown confining unit Yorktown aquifer
	Miocene	Eastover Formation[1] Pungo River Formation	Pungo River confining unit Pungo River aquifer
		Belgrade Formation[1]	Upper Castle Hayne confining unit Upper Castle Hayne aquifer
	Oligocene	River Bend Formation	
	Eocene	Castle Hayne Limestone	Lower Castle Hayne confining unit Lower Castle Hayne aquifer
	Paleocene	Beaufort Formation	Beaufort confining unit Beaufort aquifer
Cretaceous	Upper Cretaceous	Peedee Formation	Peedee confining unit Peedee aquifer
		Black Creek and Middendorf Formations	Black Creek confining unit Black Creek aquifer
		Cape Fear Formation	Upper Cape Fear confining unit Upper Cape Fear aquifer
			Lower Cape Fear confining unit Lower Cape Fear aquifer
	Lower Cretaceous[1]	Unnamed deposits[1]	Lower Cretaceous confining unit[1] Lower Cretaceous aquifer[1]
Pre-Cretaceous crystalline basement rocks			

[1]Geologic and hydrogeologic units not identified beneath the Air Station.

Source: Eimers, Daniel, and Coble, 1994.

Figure 4-3
Generalized Stratigraphic Column at MCAS Cherry Point
Site 12 Remedial Investigation
MCAS Cherry Point

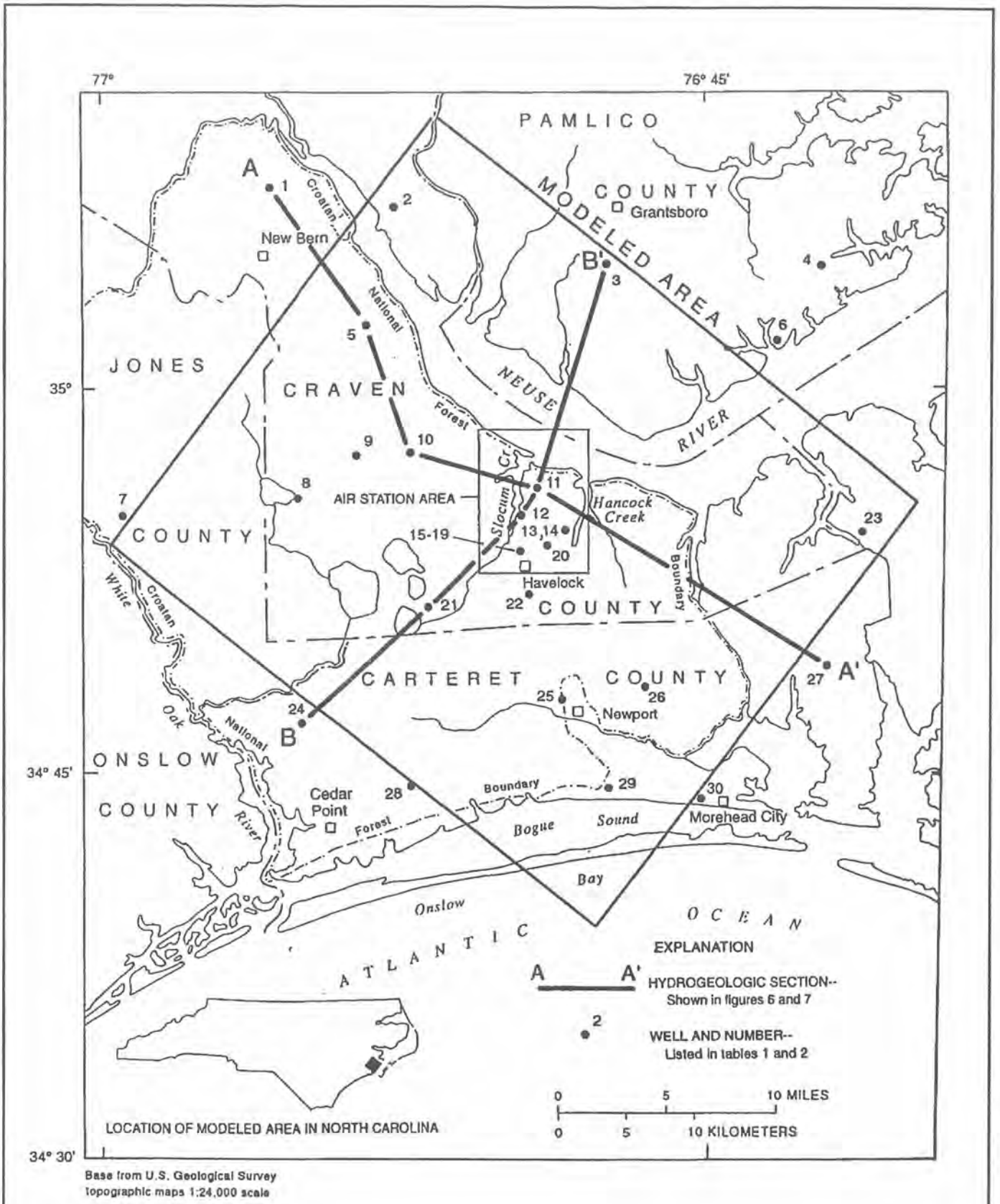
CH2MHILL



Source: Giese, Eimers, and Coble, 1997.

Figure 4-4
Regional Hydrogeologic Cross Section
Site 12 Remedial Investigation
MCAS Cherry Point

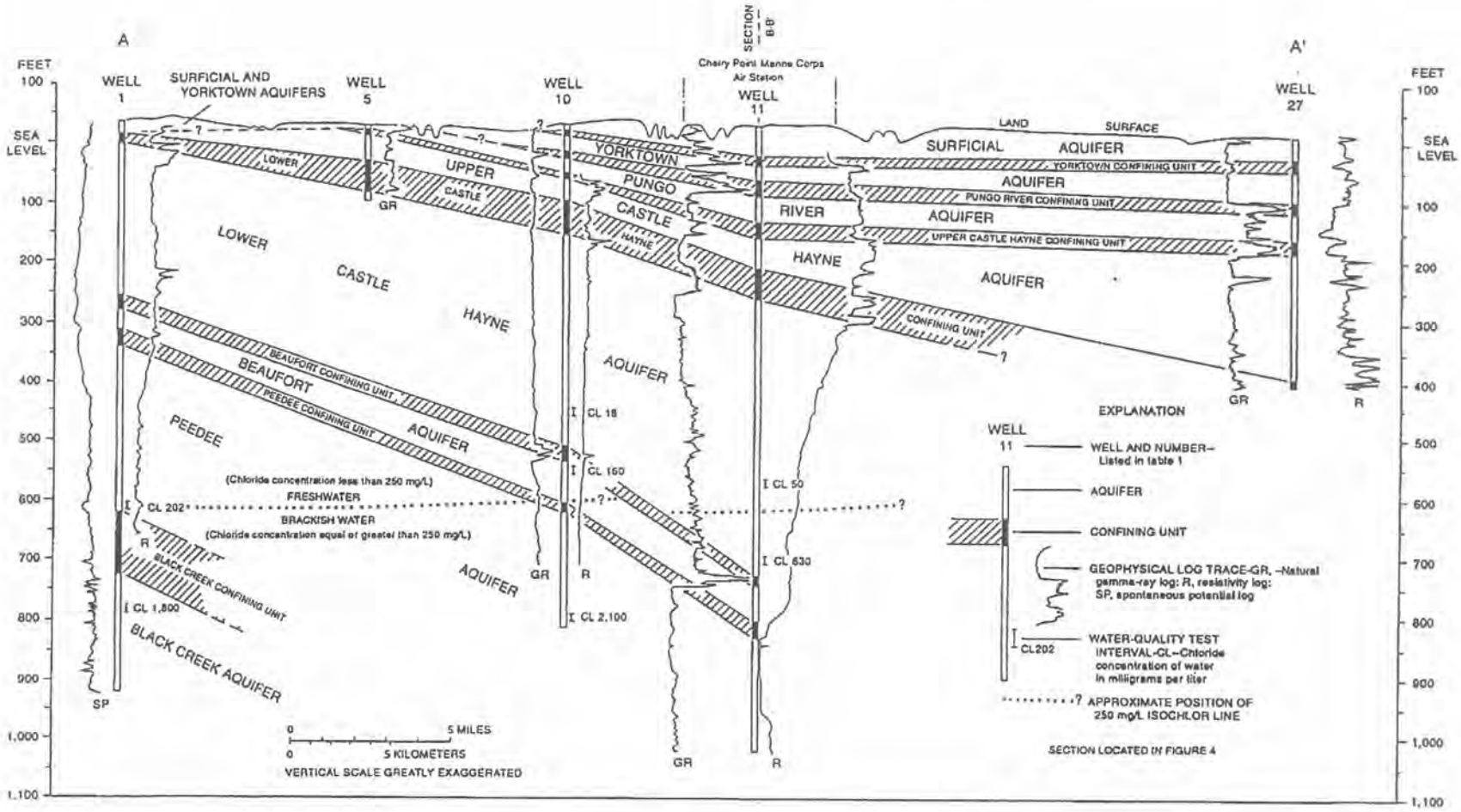
CH2MHILL



Source: Eimers, Daniel, and Coble, 1994.

Figure 4-5
Location of MCAS Cherry Point Cross Section
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

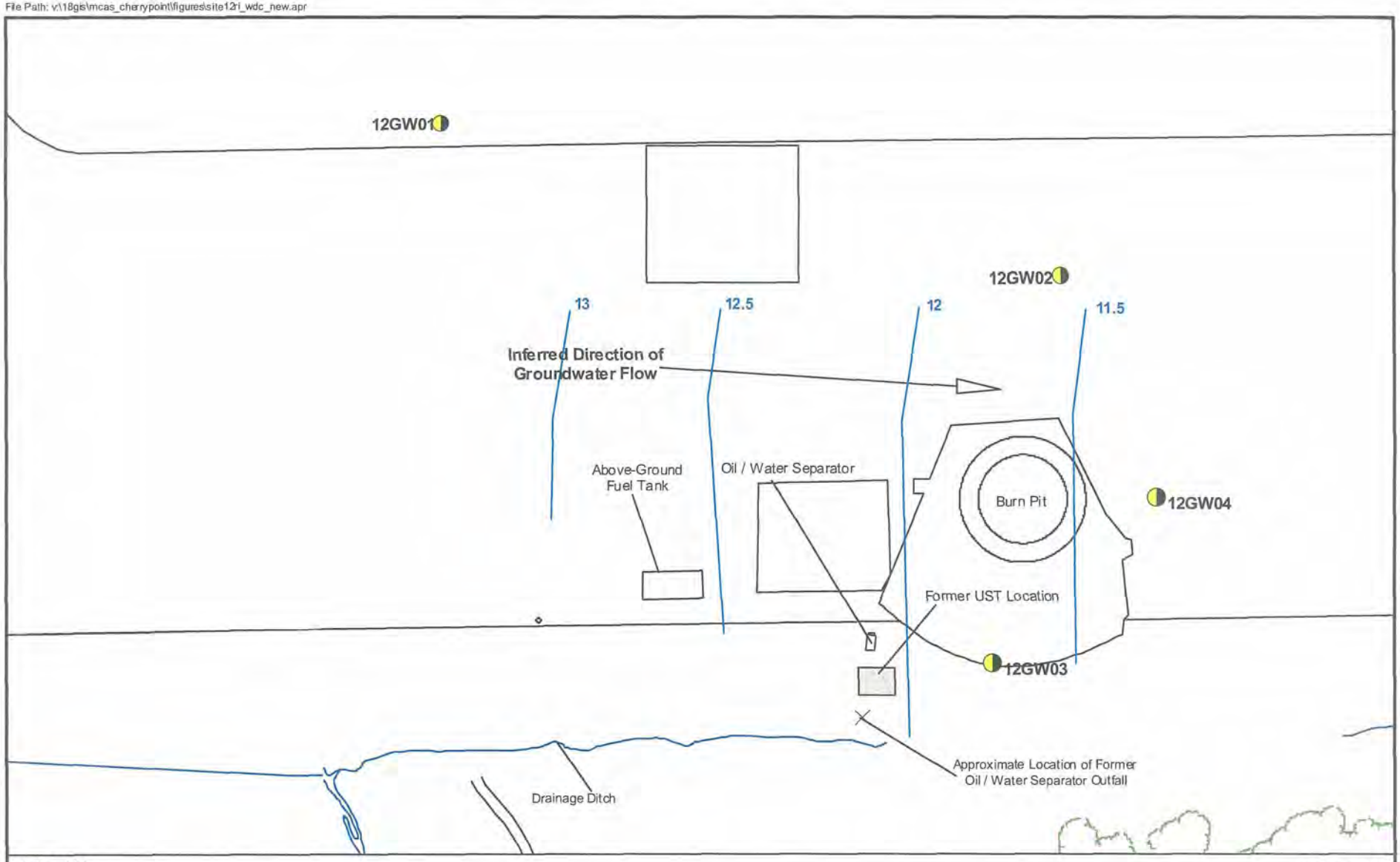


Source: Eimers, Daniel, and Coble, 1994.

Figure 4-6
Hydrogeologic Cross Section of MCAS Cherry Point
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\site12ri_wdc_new.apr



LEGEND

- Monitoring Wells
- Tree Line
- Site Drainage Features
- Base Map
- Groundwater Contours

Water Level Measurements were recorded in 1991 (Halliburton NUS, June 1993)

N

0 70 140 Feet

Figure 4-7
Monitoring Well Locations
Direction of Groundwater Flow
Site 12 - Crash Crew Training Area
MCAS Cherry Point

CH2MHILL

5 Nature and Extent of Contamination

This section discusses the nature and extent of contamination found in the sampled media at Site 12. The discussion is divided into two parts. First, Section 5.1 summarizes the management and evaluation of laboratory analytical data for all media sampled during the RI (surface soil, subsurface soil, shallow groundwater [upper surficial aquifer], sediment and surface water). Section 5.2 presents the results of the sampling activities by media. It is divided into subsections that present by media the onsite laboratory results followed by the offsite laboratory results. A detailed discussion of sampling procedures and RI field activities is presented in Section 3 of this document.

During the regulatory review of the Draft Final version of this RI report, additional data gaps were identified. An SRI was planned to evaluate soil and groundwater quality at the two westernmost historic burn pit locations. The SRI field activities were conducted in October 2003 and February 2004. The nature and extent of contamination identified during the SRI is presented in the *Supplemental Remedial Investigation Report, Operable Unit 6, Site 12* (CH2M HILL, 2005), attached to this RI Report as Attachment 2. These data are summarized in Section 5.2.2 of this RI Report.

5.1 Data Management and Evaluation

This section presents information on the management and evaluation of analytical data collected during the RI, including data tracking and validation, non-site-related analytical results with respect to laboratory contaminants and naturally occurring elements, and the Federal and State standards and criteria used to evaluate the analytical results.

5.1.1 Data Tracking and Validation

The management and tracking of data from the time of field collection to receipt of validated electronic analytical results is of primary importance and reflects the overall quality of the analytical results. Field samples and their corresponding analytical tests were recorded on chain-of-custody forms for submission to the laboratory. Chain-of-custody entries were checked against the SAP to determine if all designated samples were collected and submitted for the appropriate analyses. Upon receipt of the samples by the laboratory, a comparison to the field information was made to determine if each sample was analyzed for the correct parameters. In addition, a check was made to ensure that the proper number of QA/QC samples was collected for each media and for each sampling episode. QA/QC samples include field blanks, equipment blanks, trip blanks, duplicates, matrix spike/matrix spike duplicate (MS/MSD) samples, and laboratory blanks.

A complete set of the analytical data are provided in Appendix E, along with a series of summary tables that list only the constituents detected in each sample. Analytical data reports for the RI were submitted to Environmental Data Quality, Inc. for third-party validation. Data reports were submitted in hard copy and electronic versions. Electronic versions were specifically formatted for the capability of automatically downloading data

into the CH2M HILL master Oracle database. Validation procedures established by the National Functional Guidelines for Organic (USEPA, 1994) and Inorganic Analyses (USEPA, 1993), as modified by Region III were adhered to during the validation process. These steps (third party validation and electronic data handling) serve to reduce inherent uncertainties associated with data authenticity and usability. Data validation reports are provided as Appendix F.

5.1.2 Data Qualifiers

Data qualified by the laboratory with a "J" indicate that the values are estimated. Data may be estimated for several reasons, including exceedance of holding times, intra-sample variability, tentatively identified compounds, or if the reported value is below the Contract Required Detection Limit (CRDL) or the Contract Required Quantitation Limit (CRQL).

Data qualified by the laboratory with a "B" indicate that the values have also been detected in a field, equipment, or trip blank, or in a laboratory QA/QC sample. The concentration of a "B"-qualified result is less than ten times the concentration of the associated QA/QC result. If the sample concentration is less than ten times the associated blank concentration, the conclusion is that the parameter was not detected. Further discussion of potential sources of blank contamination is provided in Section 5.1.3 below.

Additional data qualifiers employed during the data validation process are U, UJ, and R. A discussion of the specific qualifiers applied during the data validation process is presented in the data validations reports in Appendix F. A general interpretation for these data validation flags is presented below:

- Data qualified with a "U" indicate that the analyte was not detected and the associated number indicates the approximate sample concentration necessary to be detected.
- Data qualified with a "UJ" indicate that the analyte was not detected and the quantitation limit may be inaccurate or imprecise.
- Data qualified with an "R" indicate an unusable result. The analyte may or may not be present in the sample. Data can be rejected because of matrix interference, dilution of the sample, and other reasons.
- Data qualified with a "Q" for dioxin/furan analytical results indicate an estimated maximum possible concentration (EMPC).

5.1.3 Evaluation of Non-Site-Related Analytical Results

Many of the organic and inorganic constituents detected in soil and groundwater at Site 12 may be attributed to non-site-related conditions or activities. Non-site-related results include laboratory contaminants and naturally occurring (background) concentrations of inorganic constituents. A discussion of non-site-related analytical results is provided in the following subsections.

5.1.3.1 Laboratory and Sampling Blank Contamination

Some chemical compounds detected in field samples may have been introduced during field sampling, transportation to the analytical laboratory, or during laboratory procedures. A

variety of blank samples containing pure water are used in the QA process to determine which of the contaminants may not be attributable to the field sample. A field blank is collected to account for ambient conditions during sample collection. A rinsate blank will determine if the equipment used to collect the samples (e.g., augers, bailers, sample containers) was adequately clean. A trip blank is used to ascertain if volatile compounds were introduced during packing or shipping.

Common laboratory contaminants that can be introduced during the analytical process are acetone, 2-butanone, methylene chloride, and common phthalate contaminants. The laboratory includes a method blank in each batch of 20 samples analyzed to verify instrument cleanliness and function.

When sampling or laboratory blank samples are found to contain contaminants, each of the field samples that are associated with that blank and that contain similar concentrations are qualified during data validation with a "B" for that compound. A "B" qualifier means that the compound may not be attributed to the site at that sample location. For example, if acetone is found in a field blank at a concentration of 5 μg/L, an acetone concentration of 50 μg/L or less in any sample from the group associated with that blank would be given a "B" flag. The evaluation of sampling blanks (trip blanks, rinsate blanks, field blanks) and laboratory blanks, are presented in Appendix F.

5.1.3.2 Background Data

A background data set for inorganic constituents in soils has been compiled for MCAS Cherry Point (TetraTech NUS, 1999). The data set consists of inorganic constituent analyses of 21 background soil samples collected at the air station between November 1991 and April 1996. These data have been used to calculate average background concentrations for a number of inorganic constituents in soils at MCAS Cherry Point. The concentrations of inorganic constituents detected in these samples were found to be within the range of typical soils in the eastern United States (TetraTech NUS, 1999).

Table 5-1 summarizes the background data for inorganic constituents in soil at MCAS Cherry Point.

5.1.4 Regulatory and Risk-Based Standards and Screening Criteria

Analytical results for all media were compared against a variety of regulatory and risk-based standards and criteria. The screening levels are identified below, according to each media.

- *Surface Soil*
  - USEPA Region III Risk-Based Concentrations (RBCs) for residential and industrial soils
  - North Carolina Soil Screening Levels (NC SSLs)
  - USEPA Region IV Ecological Screening Values
  - USEPA Region III Biological Technical Advisory Group (BTAG) Flora and Fauna Criteria
  - USEPA Region IV Soil Screening Levels (SSLs) for Inhalation

- *Subsurface Soil*
  - USEPA Region III RBCs for industrial soils
  - NC SSLs
- *Groundwater*
  - Federal Maximum Contaminant Levels (MCLs) and secondary guidelines
  - North Carolina 2L Groundwater Standards
  - USEPA Region III RBCs—Tap water
- *Surface Water*
  - North Carolina Water Quality Standards (NC WQS)—Human Health
  - NC WQS—Aquatic Life
  - USEPA Region III RBCs—Tap water
  - USEPA Region IV Freshwater Chronic Values
  - USEPA Region III Freshwater BTAG Criteria

If NC WQS for human health and aquatic life were unavailable for a particular constituent, a 304(a) criterion was sought. If no 304(a) criterion existed for that constituent, the North Carolina State toxicologist was contacted for a calculated criterion.

- *Sediment*
  - USEPA Region III RBCs—residential
  - USEPA Region IV Ecological Screening Values
  - USEPA Region III BTAG Criteria

5.1.5 Data Presentation

Within the RI text, data are summarized and presented by groups of samples that represent the various media (surface soil, subsurface soil, groundwater, surface water, and sediment) at Site 12. The tables and figures presented in the RI text are generally focused on contaminants of concern (i.e., results that exceed one or more regulatory screening criteria). Complete analytical results for all media are presented in Appendices D and E. The data validation reports are included in Appendix F. Data for sampling and analyses conducted during the SRI are presented in the Attachment 2, the SRI report.

5.2 Analytical Results

5.2.1 Onsite Screening Sample Results

The investigation approach at OU6 Site 12 included the screening-level delineation of the horizontal and vertical extent of contamination using indicator parameters of gross contamination. Analyses for these indicators of gross contamination were performed on site using a mobile close support laboratory. The indicator parameters used included TPH-GRO (USEPA Method 5030/8015), TPH-DRO (USEPA Method 3510/8015), and BTEX (USEPA Method 8021/8021B).

This section presents and evaluates the results of the onsite analysis of soil, groundwater, surface water, and sediment samples collected during the March 1999 sampling event. These data were used as a screening tool only and were not compared with any regulatory screening criteria. The complete onsite laboratory analytical reports are presented in Appendix D.

5.2.1.1 Surface Soil

Surface soil samples were collected from 16 locations at Site 12, as shown in Figure 3-1. No TPH-GRO, TPH-DRO, or BTEX was detected in any of the surface soil samples. Samples from all 16 surface sampling locations were also submitted for offsite laboratory analysis for the full suite of TCL/TAL compounds. Three samples were also analyzed for dioxins and furans. The offsite laboratory results are presented in Section 5.2.2, Surface Soil.

5.2.1.2 Subsurface Soil

Subsurface soil samples were collected at 10 locations at Site 12 as shown in Figure 5-1. At each sampling location, samples were collected at 3-ft intervals beginning at a depth of 1 ft and extending to the water table. As a result, between three and four subsurface soil samples were collected at each location. The onsite laboratory analyzed a total of 32 subsurface soil samples.

No TPH-GRO or BTEX were detected in any subsurface soil samples. The only parameter detected in any sample was TPH-DRO, which was detected at three locations in a total of four samples. Figure 5-1 presents the analytical results for the subsurface soil samples analyzed by the onsite laboratory.

The most contaminated sampling location was 012SB01, located in the center of a small runoff channel leading from the asphalt runway southwest of the burn pit and immediately east of the oil/water separator. During site visits conducted by CH2M HILL, it was apparent that a substantial portion of surface runoff near the burn pit was directed to the grassy area south of the runway through this small runoff channel. Crash-crew personnel had placed rocks and petroleum-absorbent socks at the head of this runoff channel in an attempt to minimize erosion and capture any petroleum in runoff. It was also observed that the surface soils appeared to be stained in this area. The subsurface soil sample collected at 1 to2 ft bgs at 012SB01 contained 3,536 mg/kg of TPH-DRO and the sample collected at 4 to 5 ft bgs contained 896 mg/kg of TPH-DRO. No TPH-DRO or any analytical parameter was detected by the onsite laboratory in the sample collected at 7 to 8 ft bgs.

Sample location 012SB01 turned out to contain the most soil contamination detected during the screening phase of the Site 12 RI. A temporary well (012TW01) was later installed to assess potential groundwater contamination beneath this location.

Due to the detection of significant concentrations of TPH-DRO at location 012SB01, samples were collected at three other surrounding locations. These included locations 012SB14, 012SB15, and 012SB16 (three to four samples at each location). No TPH-DRO or any analytical parameter was detected by the onsite laboratory in these samples.

TPH-DRO was also detected at a concentration of 316 mg/kg at a depth of 4-5 ft bgs at sample location 012SB02, just off the edge of the runway due south of the burn pit (see

Figure 5-1). No TPH-DRO or any analytical parameter was detected by the onsite laboratory in the samples collected above (1 to 2 ft) and below (7 to 8 and 10 to 11 ft).

Due to the detection of TPH-DRO at 012SB02, two additional locations were sampled south and east of 012SB02. These included sampling locations 012SB17 and 012SB18. TPH-DRO was detected at 30.3 mg/kg at a depth of 1-2 ft bgs at 012SB17 (see Figure 5-1), but no analytical parameters were detected below that depth. No analytical parameters were detected in samples at location 012SB18. Since the TPH-DRO detected at 012SB17 was below the action concentration of 40 mg/kg, no additional samples were collected.

Two subsurface soil samples were also submitted for offsite laboratory analysis for the full suite of TCL/TAL compounds from the two locations where the greatest concentrations of TPH-DRO were detected. These included the 1-to-2-ft sample from 012SB01 and the 4-to-5 ft sample from 012SB02. The offsite laboratory results for these samples are presented in Section 5.2.2, Subsurface Soil.

5.2.1.3 Groundwater

Direct-push groundwater samples were collected from two locations (see Figure 5-2) at Site 12 and analyzed by the onsite laboratory. The samples were collected just below the water table at a depth of approximately 10 to 11 ft bgs. The Work Plan called for these samples to be analyzed only for BTEX, but TPH-DRO and TPH-GRO analyses were performed as well for screening purposes.

No BTEX or TPH-DRO was detected in either sample. At sample location 012GW02, no TPH-GRO was detected in the regular sample (quantitation limit 0.5 mg/L), but a blind duplicate of the sample (designated 012GW22) contained 0.74 mg/L of TPH-GRO.

5.2.1.4 Surface Water and Sediment

Surface water and sediment samples were collected from 3 locations (see Figure 5-3) at Site 12 and analyzed by the onsite laboratory. The Work Plan called for these samples to be analyzed only for BTEX, but TPH-DRO analyses were performed as well for screening purposes.

No BTEX or TPH-DRO was detected in surface water at any of the three sample locations.

In sediment, no TPH-DRO was detected at any of the three sample locations. Toluene was detected in sediments at two of the three sampling locations. The samples where toluene was detected were located in the eastern portion of the drainage swale, where water ponds following precipitation events. Sediment sample 012SD01 contained 0.009 mg/kg of toluene (0.010 mg/kg was found in the blind duplicate of this sample, designated 012SD04) and sample 012SD03 contained 0.014 mg/kg of toluene. No other BTEX compounds were detected in any of the samples. No BTEX or TPH-DRO was detected at sample location 012SD02, located "downstream" of Site 12.

All of the surface water and sediment samples were also submitted for offsite laboratory analysis for the full suite of TCL/TAL compounds. The offsite laboratory results for these samples are presented in Sections 5.2.2.

5.2.2 Offsite Laboratory Results

The sampling activities conducted at Site 12 during the RI field work in March 1999 consisted of surface soil, subsurface soil, groundwater, sediment, and surface water sampling. The results of these sampling activities and the nature and extent of contamination in the soil, groundwater, surface water, and sediment are discussed in this section. Tables containing the complete offsite laboratory analytical results of the RI are presented in Appendix E.

Additional soil and groundwater sampling activities were conducted as part of the SRI. Results are summarized in the following subsections. Complete data for the SRI and a more thorough discussion of the results are presented in Attachment 2, the SRI Report.

5.2.2.1 Surface Soil

Surface soil samples from 16 locations were sent for offsite laboratory analysis (Figure 3-1). Duplicate samples were collected at 2 of these locations. All samples were analyzed[1] for TCL VOCs, TCL SVOCs, TCL Pesticides and polychlorinated biphenyls (PCBs), TAL Metals and cyanide, O&G, and Total Organic Carbon (TOC). Three of the samples were also analyzed for dioxins and furans in addition to the other parameters.

Table 5-2 lists all TCL/TAL constituents in surface soil samples exceeding regulatory screening criteria for human health. Table 5-3 shows the exceedances of the detected constituents compared to 2 times the average background concentrations. Table 5-4 lists all detected dioxin and furan compounds. Surface soil sampling data exceeding one or more human health screening criteria are also depicted in Figures 5-4 (organic constituents) and 5-5 (inorganic constituents). Tables E-1 and E-2 in Appendix E list all detected constituents in surface soil samples.

During the SRI, a surface soil sample was collected from the center of Burn Pit D and Burn Pit E. The samples were analyzed for VOCs, SVOCs, and PCBs.

Volatile Organic Compounds. VOCs were detected at only 4 of the 16 sampling locations. At location 012SS01, located in the small runoff channel southwest of the burn pit where the highest concentrations of TPH-DRO were detected in *subsurface* soils, toluene and xylenes were detected at concentrations of 7.2 µg/kg and 12 µg/kg, respectively (7.6 µg/kg and 6.7 µg/kg, respectively in a duplicate sample). The only other VOC detected in any sample in 1999 was methylene chloride, which was detected in samples at locations 012SS03, 012SS05, and 012SS14 at concentrations of 310, 1.7, and 1.5 µg/kg, respectively.

All VOCs detected in the two surface soil samples collected during the SRI were present at low, estimated ("J"-qualified) concentrations.

Semi-volatile Organic Compounds. One or more SVOCs were detected in all but one surface soil sample (012SS18)[2]. Bis(2-ethylhexyl)phthalate (BEHP) was the most commonly detected compound, found in 11 of 15 samples at concentrations ranging from 46 to 470 µg/kg. BEHP was also detected in at least one laboratory method blank, as this compound is a common laboratory contaminant.

[1] Analyses for SVOCs and pesticides/PCBs were inadvertently omitted for surface soil sample 012SS15.

Only one other SVOC was detected in more than one sample. Di-n-butylphthalate was detected in two samples (012SS14 and 012SS16) at concentrations ranging from 41 to 43 µg/kg. Other SVOCs found at low concentrations in only one sample included 2-methylnaphthalene, benzo(b)fluoranthene, benzo(g,h,i)perylene, butylbenzylphthalate, chrysene, fluoranthene, phenanthrene, and pyrene. With the exception of 2-methylnaphthalene (012SS01) and butylbenzylphthalate (012SS17), all of these one-time-detected SVOCs were found in the sample collected at 012SS02.

All SVOCs detected in the two surface soil samples collected during the SRI were present at low, estimated ("J"-qualified) concentrations.

Pesticides. Low concentrations of one or more pesticides were detected in all but one surface soil sample (012SS06)[3]. A total of 16 different pesticides were detected. The most commonly detected pesticides included alpha-chlordane, endosulfan sulfate, and gamma-chlordane, which were detected at 11, 12, and 13 of 15 sampling locations, respectively.

The two sampling locations directly beneath the asphalt runway surface (012SS06 and 012SS07) contained the least number of pesticides. The sample collected at 012SS06 contained no pesticides and the 012SS07 sample contained only one pesticide (alpha-benzene hexachloride [BHC]) at an estimated concentration of 0.062 µg/kg. The duplicate sample from location 012SS07 contained no alpha-BHC but low concentrations of alpha-chlordane and heptachlor.

There also does not appear to be any pattern in the detections of pesticides at Site 12. The fairly random distribution and low concentrations indicate that, they are likely the result of widespread pesticide applications in the past rather than the result of site-specific activities.

PCBs. Only one PCB, Aroclor-1260, was detected in the surface soil samples. Aroclor-1260 was detected in samples from 6 locations, at concentrations ranging from 14 to 450 µg/kg. All but one of the samples where Aroclor-1260 was detected were collected in and around the runoff channel southwest of the burn pit and in areas where runoff from the channel would be directed. PCBs were not detected in either surface soil sample during the SRI.

Inorganic Constituents. Inorganic constituents were detected at all 16 sample locations. A total of 22 different inorganic constituents were detected in one or more samples.

A comparison of the inorganic data to MCAS Cherry Point background data (twice the average background concentration) presented in Table 5-1 reveals several inorganic constituents typically found at high concentrations relative to background levels. The detected concentrations of cadmium, copper, lead, and zinc exceeded twice the average background concentrations at most sample locations (Table 5-3).

The sample with the highest concentrations of most inorganic constituents was 012SS17, followed closely by the sample collected at 012SS18. These sample locations are in the grassy area 20 to 40 ft south of the runway edge, due south of the current burn pit location. Of the inorganic constituents detected well above twice the average background concentrations, aluminum, cadmium, chromium, copper, manganese, nickel, and zinc were detected at their

[2] Analysis for SVOCs was inadvertently omitted for surface soil sample 012SS15.

[3] Analysis for Pesticides/PCBs was inadvertently omitted for surface soil sample 012SS15.

maximum concentrations in either 012SS17 or 012SS18. The concentrations of these constituents in 012SS17 and 012SS18 were typically of the same general magnitude, and noticeably higher than other sample locations.

The highest concentration of lead (705 mg/kg) was found at 012SS16, located near the runoff channel southwest of the burn pit.

Dioxins/Furans. Samples analyzed for dioxins/furans were collected at three locations, including 012SS06, 012SS07, and 012SS15. Samples from locations 012SS06 and 012SS07 were collected from soils immediately beneath the asphalt runway where earthen burn pits had been located historically. Sample location 012SS15 is south of the runway edge, just west of the oil/water separator.

A summary of all detected dioxin/furan compounds is presented in Table 5-4. The sample from location 012SS15 contained the most dioxin/furan contamination, registering detections of all dioxin and furan compounds for which analyses were performed. The samples from 012SS06 and 012SS07 contained relatively low concentrations of several constituents, primarily hexachlorodibenzo-p-dioxin congeners.

Oil and Grease (O&G). O&G was detected at 14 of 16 surface soil sampling locations at concentrations ranging from 300 to 5,030 mg/kg (see Table 5-5). The two highest detected concentrations (3,830 and 5,030 mg/kg) were found at locations 012SS08 and 012SS10, respectively, which are located near the western perimeter of Site 12. No O&G was detected in the two samples collected beneath the asphalt at historic earthen burn pit locations (012SS06 and 012SS07).

Total Organic Carbon. TOC measured in all surface-soil samples ranged in value from a low of 250 mg/kg in sample 012SS07 to a high of 15,000 mg/kg in sample 012SS01 (see Table 5-6).

Comparison of Data to Human Health Screening Criteria. Tables 5-2 and 5-4 compare the surface-soil sampling data from 1999 to human health regulatory-screening criteria. Surface soil sampling data exceeding one or more screening criterion are also depicted in Figures 5-4 (organic constituents) and 5-5 (inorganic constituents).

No VOCs, SVOCs, or pesticides detected in surface soil samples exceeded any human health regulatory screening criteria.

The PCB Aroclor-1260 exceeded the USEPA Region III Residential RBC of 320 μg/kg at 2 locations, 012SS01 and 012SS11.

The USEPA Region III Residential RBCs for at least 1 of 7 inorganic constituents were exceeded at 2 or more of the 16 sampling locations, including aluminum (7 locations), antimony (2 locations), arsenic (14 locations), cadmium (8 locations), chromium (3 locations), copper (2 locations), and iron (13 locations). None of the detected inorganic constituents exceeded USEPA Region III Industrial RBCs. Figure 5-5 shows the spatial distribution of all inorganic constituents that exceed one or more screening criteria.

Only one dioxin or furan compound exceeded any human health regulatory screening criteria. The 4,300 picogram per gram (pg/g) USEPA Region III Residential RBC[4] for total octachlorodibenzo-p-dioxin was exceeded at location 012SS15 (4,900 pg/g). The industrial RBC was not exceeded.

Evaluations of data collected during the SRI are presented in Attachment 2, the SRI Report.

Comparison of Data to Protection of Groundwater Screening Criteria (NC SSLs). Tables 5-2 and 5-4 compare the surface soil sampling data from 1999 to NC SSLs for protection of groundwater.

Only one VOC detected in surface soils exceeded a NC SSL. The 310 µg/kg of methylene chloride found at sampling location 012SS03 exceeded the NC SSL of 22 µg/kg.

No SVOCs detected in surface soil samples exceeded any NC SSLs.

One or more of the NC SSLs for pesticides/PCBs were exceeded at 6 of the 16 surface soil-sampling locations. The compounds exceeding the SSLs included alpha- and gamma-chlordane, dieldrin, and heptachlor epoxide.

At least one of the NC SSLs for inorganic constituents was exceeded in every surface soil sample. The constituents exceeding the SSLs included antimony, cadmium, chromium, iron, lead, manganese, mercury, and silver.

No detected dioxin or furan compound exceeded a NC SSL.

All constituents detected in the two surface soil samples from the SRI were below screening criteria.

5.2.2.2 Subsurface Soil

Subsurface soil samples from two locations in 1999 were sent off for offsite laboratory analysis (Figure 3-2). The samples were collected from the locations and depth intervals where sample analyses by the onsite laboratory during the screening phase of the investigation indicated TPH-DRO contamination (012SB01 [1-2 ft.] and 012SB02 [4-5 ft.]). All subsurface soil samples were analyzed for TCL VOCs, TCL SVOCs, TCL Pesticides and PCBs, TAL Metals and cyanide, O&G, and TOC.

Table 5-7 lists all TCL/TAL constituents in the 1999 subsurface-soil samples that exceeded human health regulatory-screening criteria. Subsurface soil sampling data exceeding one or more screening criteria are also depicted in Figure 5-6.

Additional subsurface soil sampling was conducted during the SRI. A subsurface soil sample was collected from the center of Burn Pit D and Burn Pit E. These samples were analyzed for VOCs, SVOCs, and PCBs. Twenty-seven additional samples were collected at Burn Pit E and sent offsite for SVOC analysis. Results are summarized in the following subsections, and detailed information is provided in Attachment 2, the SRI Report.

Volatile Organic Compounds. No VOCs were detected in either of the subsurface soil samples during the RI. Some VOCs were detected in the one subsurface sample from Burn Pit E that

[4] RBC calculated based on the 2,3,7,8-TCDD toxicity equivalency factors provided in EPA (1989).

was analyzed for VOCs during the SRI. Additional information is provided in Attachment 2, the SRI report.

Semi-volatile Organic Compounds. SVOCs were detected in only one of the two subsurface soil samples during the 1999 RI: 012SB01, collected at a depth interval of 1 to 2 ft. This sample contained 4 SVOCs, including 2-methylnaphthalene (1,300 μg/kg), di-n-butylphthalate (550 μg/kg), fluorene (410 μg/kg), and phenanthrene (560 μg/kg).

One or more of eight SVOCs (naphthalene, 2-methylnaphthalene, dibenzofuran, fluorine, bis[2-ethylhexyl]phthalate, acenapthene, caprolactum, and 4,6-dinitro-2-methylphenol) were detected in 20 of the 28 subsurface soil samples collected from Burn Pit E during the SRI. Details are provided in Attachment 2, the SRI Report.

Pesticides. One or more pesticides were detected at low concentrations in both samples. Sample 012SB01 (1 to 2 ft.) contained seven pesticides, including aldrin, alpha-BHC, alpha- and gamma-chlordane, endosulfan II, gamma-BHC (lindane), and heptachlor epoxide, at concentrations ranging from 0.3 to 11 μg/kg. Sample 012SB02 (4-5 ft.) contained only a trace concentration (0.072 μg/kg) of gamma-chlordane. Samples collected during the SRI were not analyzed for pesticides.

Polychlorinated Biphenyls. No PCBs were detected in either 1999 subsurface soil sample. Samples collected during the SRI were not analyzed for PCBs.

Inorganic Analytes. Inorganic constituents were detected in both 1999 subsurface soil samples. A total of 17 different inorganic constituents were detected in one or both samples.

A comparison of the inorganic data to MCAS Cherry Point background data (twice the average background concentration) presented in Table 5-1 reveals that the inorganic constituents found in sample 012SB02 (4 to 5 ft.) were consistent with background concentrations. On the other hand, the concentrations of four inorganic constituents were high relative to background concentrations in sample 012SB01 (1 to 2 ft.). These included cadmium at 3.1 mg/kg, copper at 70.9 mg/kg, lead at 25.4 mg/kg, and zinc at 182 mg/kg Table 5-8).

Samples collected during the SRI were not analyzed for inorganics.

Oil and Grease. O&G was only detected in sample 012SB01 (1 to 2 ft.), where it was found at a concentration of 5,720 mg/kg. Samples collected during the SRI were not analyzed for O&G.

Total Organic Carbon. TOC measured in both subsurface soil samples ranged in value from 400 mg/kg in sample 012SB02 (4 to 5 ft.) to 5,600 mg/kg in sample 012SB01 (1 to 2 ft.). Samples collected during the SRI were not analyzed for TOC.

Comparison of Data to Human Health Screening Criteria. Table 5-6 compares the subsurface soil sampling data from 1999 to regulatory screening criteria. The only human health screening criteria employed for subsurface soil samples were the USEPA Region III Industrial RBCs. No VOCs, SVOCs, pesticides/PCBs, or inorganic constituents exceeded USEPA Region III Industrial RBCs.

Evaluations of data collected during the SRI are presented in Attachment 2, the SRI Report.

Comparison of Data to Protection of Groundwater Screening Criteria (NC SSLs). Three inorganic constituents were present at concentrations exceeding NC SSLs in one or more samples. The concentrations of iron and mercury in both samples exceeded SSLs, although the levels of these constituents were less than twice the average background concentrations in all cases. The cadmium concentration of 3.2 mg/kg in sample 012SB01 (1 to 2 ft.) slightly exceeded the NC SSL for cadmium of 2.72 mg/kg.

Subsurface soil sampling data from 1999 exceeding NC SSLs are also depicted in Figure 5-6. Subsurface soil results from the SRI exceeding NC SSLs are described in the SRI Report (Attachment 2).

5.2.2.3 Groundwater

For offsite laboratory analysis, groundwater samples were collected from four permanent monitoring wells across Site 12 (012MW01 through 012MW04) and one temporary monitoring well installed at the location where the greatest concentrations of TPH-DRO were found by the onsite laboratory in subsurface soil samples (012TW01). These groundwater-sampling locations are depicted in Figure 3-3. All samples were analyzed for TCL VOCs, TCL SVOCs, TCL Pesticides and PCBs, TAL Metals and cyanide (total-unfiltered), sulfate, and nitrate.

Table 5-9 lists all TCL/TAL constituents in groundwater samples that exceeded human health regulatory screening criteria. Groundwater sampling data exceeding one or more human health screening criteria are also depicted in Figure 5-7.

Monitoring well location 012MW01 is located upgradient of Site 12 and can be evaluated as a "background" well with respect to groundwater contamination originating from Site 12. The field parameter measurements (pH, Eh, specific conductance, temperature, DO, and turbidity) collected during well sampling are provided in Appendix C.

Additional groundwater sampling was conducted during the SRI. Sixteen groundwater samples were collected during the SRI. Three samples were collected and sent offsite for VOC, SVOC, and PCB analyses during the first sampling round. A second groundwater sampling round included the collection of 13 samples in the vicinity of Burn Pit E for SVOC analyses. Results are summarized in the following subsections, and detailed information is provided in Attachment 2, the SRI Report.

Volatile Organic Compounds. Only 2 VOCs, bromomethane and toluene, were detected at low concentrations in several of the permanent monitoring wells. The highest concentration of either of these constituents was 0.5 μg/L (toluene in 012MW03). Toluene was also detected in upgradient monitoring well 012MW01 at 0.1 μg/L.

No VOCs were detected in temporary well 012TW01, located directly beneath the area where the most significant TPH soil contamination was found in the screening portion of the investigation.

One VOC, ethylbenzene, was detected in monitoring well 012GW05 during the SRI. However, the concentration detected (1 J μg/L) is below screening criteria.

Semi-volatile Organic Compounds. No SVOCs were detected in any of the permanent or temporary monitoring well samples during the RI. During the SRI, SVOCs were detected in

4 of the 16 groundwater samples during SRI. Three constituents (2-methylnaphthalene, naphthalene, and BEHP) were detected at concentrations exceeding screening criteria. Additional information is provided in Attachment 2, the SRI Report.

Pesticides. Very low concentrations of at least two pesticides were reported in the analyses for each of the sampled monitoring wells from 1999. Detections of a total of 12 different pesticides were reported.

It should be pointed out that the reliability of the reported pesticide detections in groundwater is very poor. Every pesticide detection is qualified with a "J" flag, indicating that the reported concentration is estimated. For the majority of detections, the reported concentrations are well below quantitation limits. All detections are also qualified because the dual column precision criterion was exceeded for the chromatographic columns used in the laboratory analyses (i.e., the percentage concentration differences between the dual column analyses exceeded 25 percent). In some cases, the percentage differences were as high as 1,000. As required by CLP protocols, the highest results for the columns were selected for reporting purposes.

The detections of a total of eight different pesticide compounds were reported in the sample from temporary monitoring well 012TW01. However, the highest reported concentration of any single pesticide in this well was 0.18 μg/L (alpha-chlordane). Of the eight pesticides detected in 012TW01, five were also detected in the surface and/or subsurface soil samples collected above this location (alpha- and gamma-chlordane, dieldrin, endosulfan II, and heptachlor epoxide). The three remaining pesticides detected in the groundwater sample were not detected in the surface or subsurface soil samples from above this location (4,4'-dichlorodiphenyldichloroethylene [DDE], delta-BHC, and endrin).

Of the permanent monitoring well samples, 012MW03 had the highest number of reported pesticides, with 8 different compounds detected. The highest reported concentration of any single pesticide was 0.066 μg/L (alpha-chlordane). Of the eight pesticides detected in 012MW03, only 3 were also detected in the nearby surface or subsurface soil samples collected at 012SS02/012SB02 (4,4'-DDE, alpha-chlordane, and gamma-chlordane). The five remaining pesticides detected in the groundwater sample were not detected in the nearby soil samples (aldrin, beta-BHC, dieldrin, endosulfan I, and gamma-BHC [lindane]).

The sample from upgradient monitoring well 012MW01 had reported concentrations of the pesticides alpha-chlordane and gamma-BHC (lindane).

Due to the poor reliability of the groundwater pesticide data as described above, each of the 4 permanent monitoring wells at Site 12 was re-sampled for pesticides on June 27, 2000. The samples were analyzed for pesticides by USEPA SW-846 Method 8081A. The raw data are provided in Table E-7 in Appendix E. The results were non-detect for all constituents in all samples. The quantitation limits were the same as the CLP method used in the analyses of the original samples described above. In general, the results were either 0.05 U or 0.1 U (concentrations in μg/L).

Samples collected as part of the SRI were not analyzed for pesticides.

PCBs. One PCB, Aroclor-1248, was detected in one monitoring well—temporary well 012TW01 at 0.890 μg/L. No Aroclor-1248 was detected in the surface or subsurface soil

samples collected above this location or in any soil sample collected at Site 12. However, a different PCB, Aroclor-*1260*, was detected in the surface soil sample collected at the location of 012TW01.

The reliability of the single PCB detection in groundwater is poor for the same reasons as described above for the reported pesticide detections. The reported concentration of Aroclor-1248 was below the quantitation limit and the dual column precision criterion (25-or-less-percent concentration difference) was exceeded.

PCBs were not detected in groundwater during the SRI.

Inorganic Constituents. Inorganic constituents were detected in all 5 sampled monitoring wells. A total of 17 different inorganic constituents were detected in one or more samples.

Temporary monitoring well, 012TW01, which is located beneath where soil samples 012SS01 and 012SB01 were collected, contained several of the inorganic constituents that were found in the soil samples there above twice average background concentrations. These included copper (16.2 μg/L), lead (3.4 μg/L), and zinc (28 μg/L). These constituents were not found in the upgradient monitoring well 012MW01.

The monitoring well closest to surface soil sample locations 012SS17 and 012SS18, where the most significant detections of inorganic constituents occurred in surface soils, is 012MW03. Of the inorganic constituents detected in these soil samples well above twice the average background concentrations, only two were found in the groundwater at 012MW03 (aluminum and manganese). Of these two, only manganese was found in 012MW03 at a concentration higher than that in upgradient monitoring well 012MW01.

As reported in previous sections, the inorganic constituents that exceeded the protection of groundwater screening criteria (NC SSLs) in any samples of either surface or subsurface soils included antimony, cadmium, chromium, iron, lead, manganese, mercury, and silver. No antimony, cadmium, or silver were detected in any groundwater samples. Of the remaining constituents, only iron and manganese were detected in the majority of monitoring well samples. The concentrations of both iron and manganese were higher in downgradient monitoring wells compared to upgradient well 012MW01.

Samples collected during the SRI were not analyzed for inorganics.

Sulfate and Nitrate. Table 5-10 summarizes the sulfate and nitrate groundwater data.

Sulfate was detected in all 5 monitoring well samples, at concentrations ranging from 17 to 43 mg/L.

Nitrate was detected in monitoring wells 012MW02 and 012TW01 at concentrations of 0.3 and 0.5 mg/L, respectively.

Samples collected during the SRI were not analyzed for sulfate or nitrate.

Comparison of Data to Human Health Regulatory Screening Criteria. Table 5-9 compares the groundwater sampling data from 1999 to human health regulatory screening criteria. Groundwater sampling data exceeding one or more screening criteria are also depicted in Figure 5-7.

No VOCs or SVOCs exceeded any regulatory screening criteria in 1999 (no SVOCs detected).

Setting aside the poor reliability of the pesticide/PCB data, 3 groundwater samples had reported concentrations of pesticides or PCBs that exceeded one or more screening criteria. These included monitoring wells 012MW03, 012MW04, and 012TW01. Most of the exceedances occurred with respect to the sample from temporary monitoring well 012TW01. The only federal MCL that was exceeded was for Aroclor-1248, which was found in 012TW01 in excess of the MCL[5] and USEPA Region III Tap Water RBC. Alpha-chlordane exceeded the NC 2L groundwater standard in monitoring wells 012MW03 and 012TW01. Dieldrin exceeded the NC 2L groundwater standard and USEPA Region III RBC in monitoring wells 012MW03 and 012TW01. Gamma-chlordane exceeded the NC 2L groundwater standard in monitoring well 012TW01. Finally, heptachlor epoxide exceeded the NC 2L groundwater standard and USEPA Region III RBC in monitoring wells 012MW04 and 012TW01.

Five inorganic constituents exceeded one or more screening criteria for groundwater. Iron exceeded the NC 2L groundwater standard and secondary MCL (both are 300 µg/L) in all groundwater samples, and exceeded the USEPA Region III Tap Water RBC in all wells but 012MW01. The secondary MCL for aluminum (50 µg/L) was exceeded in all samples, but the USEPA Region III Tap Water RBC of 3,700 µg/L was exceeded only at 012TW01. The USEPA Region III Tap Water RBC for arsenic of 0.045 µg/L was exceeded at 012MW03, 012MW04, and 012TW01. The USEPA Region III Tap Water RBC for chromium of 11 µg/L was exceeded only at 012TW01. Finally, manganese exceeded the NC 2L groundwater standard and secondary MCL (both are 50 µg/L) in all wells except 012MW01 and 012MW02. The concentration of manganese in 012TW01 also exceeded the USEPA Region III Tap Water RBC of 73 µg/L.

SVOCs detected during the SRI above the NC 2L standards in groundwater are described in detail in the SRI Report (Attachment 2).

5.2.2.4 Surface Water

Surface water samples collected in 1999 from 3 locations were sent for offsite laboratory analysis (Figure 3-4). A duplicate sample was collected at sample location 012SW01. All samples were analyzed for TCL VOCs, TCL SVOCs, TCL Pesticides and PCBs, TAL Metals and cyanide (total-unfiltered), sulfate, and nitrate. No surface water samples were collected during the SRI.

Table 5-11 lists all TCL/TAL constituents in surface water samples that exceeded human health regulatory screening criteria. Surface water-sampling data exceeding one or more screening criteria are also depicted in Figure 5-8.

Volatile Organic Compounds. No VOCs were detected in any of the surface water samples.

Semi-volatile Organic Compounds. No SVOCs were detected in any of the surface water samples.

[5] MCL for total PCBs.

Pesticides. Very low concentrations of pesticides were reported in samples from 2 of the 3 surface water-sampling locations. A total of 6 different pesticides were detected. At the two surface water sampling locations within the drainage swale at Site 12, 012SW01 and 012SW03, no pesticides were detected in the regular samples. However, the duplicate sample collected at 012SW01 contained low concentrations of 4,4'-DDE, dieldrin, and gamma-BHC (lindane).

At the surface water sampling location downstream of Site 12, 012SW02, none of the pesticides detected in the upstream duplicate sample were found. However, low levels of three different pesticides were detected, including 4,4'-dichlorodiphenyldichloroethane (DDD), 4,4'-dichlorodiphenyltrichloroethane (DDT), and aldrin.

Similar to the pesticide results in groundwater, the reliability of the surface water pesticide data is very poor for the same reasons. The reported concentrations are all below the quantitation limits and the dual column precision criterion (25-or-less-percent concentration difference) was exceeded in every case. This poor reliability likely explains the disparity between the regular and duplicate sample results.

PCBs. One PCB, Aroclor-1248, was detected at location 012SW01 at a reported concentration of 1.6 μg/L in the duplicate sample only. The regular sample contained no Aroclor-1248 with a detection limit of 1 μg/L. Aroclor-1248 is the same PCB compound reported in one groundwater sample at Site 12 (012TW01), but no soil samples at Site 12 contained Aroclor-1248. No other surface water samples contained detectable PCBs.

The significant disparity between the regular sample and duplicate results casts doubt on the reliability of the reported PCB detection.

Inorganic Constituents. Inorganic constituents were detected at all three surface water sampling locations. A total of 13 different inorganic constituents were detected in one or more samples.

Of the inorganic constituents found well above background concentrations in soil samples, only aluminum was detected in all of the surface water samples. Manganese and zinc were detected at two of the three sampling locations while copper and lead were detected at only one of the three locations. Cadmium, chromium, and nickel were not detected in any surface water samples.

Cyanide was detected at 1.2 μg/L in one surface water sample (012SW03). Cyanide was not detected in any other medium during the Site 12 RI.

Sulfate and Nitrate. Table 5-12 summarizes the sulfate and nitrate surface water data.

Sulfate was detected at the two surface water sampling locations within Site 12 (012SW01 and 012SW03), at concentrations ranging from 10 to 13 mg/L. No sulfate was detected at 012SW02.

Nitrate was detected only at sampling location 012SW01 at a concentration of 0.1 mg/L.

Comparison of Data to Human Health Regulatory Screening Criteria. Table 5-11 compares the surface water sampling data to human health regulatory screening criteria. Surface water-sampling data exceeding one or more screening criteria are also depicted in Figure 5-8.

No VOCs or SVOCs exceeded any regulatory screening criteria (No VOCs or SVOCs detected).

With respect to pesticides and PCBs, only the duplicate of sample 012SW01 and sample 012SW02 had reported concentrations. Setting aside the poor reliability of the pesticide/PCB data, most reported detections resulted in one or more exceedances, with the exception of gamma-BHC (lindane). All detections of 4,4'-DDT, aldrin, dieldrin, and Aroclor-1248 exceeded their respective NC WQS (Freshwater) for both human health and aquatic life. The detection of 4,4-DDE in duplicate sample 012SW01 exceeded the USEPA National Recommended Water Quality 304(a) criterion. The reported concentrations of Aroclor-1248 and dieldrin in the duplicate of sample 012SW01 also exceeded USEPA Region III Tap Water RBCs.

Mercury was the only inorganic constituent to exceed a NC WQS (Freshwater). Calcium and magnesium exceed the NCDENR-provided freshwater values. None of the inorganic constituents exceeded any USEPA Region III Tap Water RBCs.

5.2.2.5 Sediment

Sediment samples were collected at the same three locations as the surface water samples, and were sent for offsite laboratory analysis (Figure 3-4). A duplicate sample was collected at sample location 012SD01. All samples were analyzed for TCL VOCs, TCL SVOCs, TCL Pesticides and PCBs, TAL Metals and cyanide, and O&G. No sediment samples were collected during the SRI.

Table 5-13 lists TCL/TAL constituents in sediment samples that exceeded human health regulatory screening criteria. Sediment sampling data exceeding one or more screening criteria are also depicted in Figure 5-9.

Volatile Organic Compounds. No VOCs were detected in any of the sediment samples. Despite similar detection limits, the low levels of toluene found in two of the sediment samples analyzed by the onsite laboratory (see Section 5.2.1) were not found in the samples analyzed by the offsite laboratory.

Semi-volatile Organic Compounds. One SVOC was detected in one sediment sample. Di-n-butylphthalate was detected at 50 μg/kg in sample 012SD03.

Pesticides. Low concentrations of pesticides were detected in all three sediment samples. A total of eight different pesticides were detected. The results were not consistent with the detections of pesticides in corresponding surface water samples, creating additional doubt about the reliability of the pesticide results. The pesticides 4,4'-DDE, 4,4'-DDT, gamma-chlordane, and heptachlor epoxide were found at low concentrations in all three sediment samples. Alpha-chlordane and endosulfan sulfate were each found in two of the three samples, but in different pairs. The remaining pesticides, 4,4'-DDD and dieldrin, were each found in only one sediment sample.

PCBs. No PCBs were detected in any of the sediment samples.

Inorganic Constituents. Inorganic constituents were detected at all three sample locations. A total of 20 different inorganic constituents were detected in one or more samples.

Of the inorganic constituents found well above background concentrations in soil samples, aluminum, chromium, lead, manganese, nickel, and zinc were detected at all three sediment sampling locations. Mercury was also detected in all sediment samples. Copper was detected at two of the three sampling locations while silver was at only one of the three locations.

Oil and Grease. Table 5-14 summarizes the O&G sediment sampling results.

O&G was detected at all three sediment sample locations. The concentrations ranged from 293 to 531 mg/kg.

Comparison of Data to Human Health Regulatory Screening Criteria. Table 5-11 compares the sediment sampling data to human health regulatory screening criteria. Sediment sampling data exceeding one or more screening criteria are also depicted in Figure 5-9.

No VOCs, SVOCs, pesticides, or PCBs exceeded any human health regulatory screening criteria (No VOCs or PCBs were detected).

Of the inorganic constituents, the USEPA Region III Residential RBCs for three metals were exceeded in one or more samples. This included aluminum and arsenic in sample 012SD03, and iron in 012SD01 and 012SD03.

Table 5-1
Summary of Background Analytical Data for Soil
Inorganic Constituents
Site 12 Remedial Investigation
MCAS Cherry Point

Constituent	Frequency of Detection	Minimum Detection (mg/kg)	Maximum Detection (mg/kg)	Arithmetic Mean (mg/kg)	2X Average Background (mg/kg)
Aluminum	21/21	488	16900	5081.62	10163.24
Arsenic	13/21	0.43	13.7	1.95	3.9
Barium	20/21	1	30.9	11.5	23
Beryllium	2/21	0.24	0.59	0.22	0.44
Boron	2/4	1.6	3.1	1.45	2.9
Cadmium	1/21	1.35	1.35	0.56	1.12
Calcium	18/21	15.5	1750	255.66	511.32
Chromium	20/21	2.7	26.35	8.48	16.96
Cobalt	3/21	0.88	6.05	1.19	2.38
Copper	12/21	0.82	8.15	1.88	3.76
Cyanide	1/15	0.57	0.57	0.31	0.62
Iron	21/21	573	9055	2979.38	5958.76
Lead	20/21	0.93	14.9	5.26	10.52
Magnesium	20/21	27.1	871	210.87	421.74
Manganese	20/21	2.5	39.35	8.36	16.72
Mercury	2/17	0.15	0.235	0.06	0.12
Nickel	3/21	4.7	10.2	3.45	6.9
Potassium	16/17	41.4	957.5	240.67	481.34
Selenium	7/21	0.24	1.1	0.28	0.56
Silver	1/21	1.685	1.685	0.41	0.82
Sodium	10/17	7.3	72.3	25.53	51.06
Strontium	4/4	1.4	7.7	3.18	6.36
Thallium	1/21	0.48	0.48	0.48[a]	0.96
Vanadium	21/21	1.2	30.45	9.58	19.16
Zinc	18/21	1.3	34.65	5.66	11.32

NOTES:
Source for all data: TetraTech NUS, Inc. (1999a).
[a] The maximum detected concentration is used because the calculated arithmetic mean is greater than the maximum detected concentration.

Table 5-2
Surface Soil Sampling Screening Criteria Comparison
March 1999 Sampling Event
Constituents Exceeding at Least One Screening Criterion
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria				012SS01	012SS01 (Duplicate)	012SS02	012SS03	012SS04	012SS05
		EPA Region III RBC - Residential (1)	EPA Region III RBC - Industrial (2)	NC Soil Screening Levels (SSLs) (3)	EPA Region IV SSLs - Inhalation (4)						
TCL Volatiles											
Methylene chloride (MC)	ug/kg	85,000.00	7,600,000.00	22.00	13,000.00	11 U	11 U	21 U	310 J (3)	12 U	**1.7 J**
TCL Semivolatiles											
No compounds exceeded screening criteria											
TCL Pesticides/PCBs											
alpha-Chlordane (a-C)	ug/kg	1,800.00[4]	16,000.00[4]	27.8[4]	20,000.00[4]	**11 J**	**9.3 J**	**2 J**	**4 J**	51 J (3)	**5.6 J**
Aroclor-1260 (PCB-1260)	ug/kg	320.00	2,900.00	--	--	**400 J** (1)	**140 J**	38 U	39 U	210 U	**15 J**
Dieldrin	ug/kg	40.00	360.00	1.13	1,000.00	**6.6 J** (3)	**1.4 J** (3)	3.8 U	3.9 U	21 U	**2.2 J** (3)
gamma-Chlordane (g-C)	ug/kg	1,800.00[4]	16,000.00[4]	27.8[4]	20,000.00[4]	**9.8**	**7.7**	**1.6 J**	**3.6**	43 (3)	**5.3**
Heptachlor epoxide (HE)	ug/kg	70.00	630.00	6.67	5,000.00	**0.14 J**	**0.2 J**	1.9 U	**0.098 J**	12 (3)	**0.62 J**
TAL Metals/Cyanide											
Aluminum (Al)	mg/kg	7,800.00	200,000.00	--	--	**7290**	**9210** (1)	**8580** (1)	**10400** (1)	**4880**	**3350**
Antimony (Sb)	mg/kg	3.10	82.00	5.42	--	**0.82 J**	0.7 UJ	**0.59 J**	**1.6 J**	0.55 UJ	0.48 UJ
Arsenic (As)	mg/kg	0.43	3.80	26.20	750.00	**1.9 J** (1)	**1.9 J** (1)	1.5 U	1.7 U	**1.3 J** (1)	**0.7 J** (1)
Cadmium (Cd)	mg/kg	3.90	100.00	2.72	1,800.00	**9.7** (1) (3)	**8.3** (1) (3)	**5.4** (1) (3)	**8.8** (1) (3)	**6.1** (1) (3)	**1.7**
Chromium (Cr)	mg/kg	23.00	610.00	27.20	270.00	**17.8**	**22.1**	**19.6**	**22.1**	**17.9**	**6.3**
Copper (Cu)	mg/kg	310.00	8,200.00	704.00	--	**156**	**104**	**138**	**282**	**78.2**	**12.7**
Iron (Fe)	mg/kg	2,300.00	61,000.00	151.00	--	**2860** (1) (3)	**3540** (1) (3)	**2650** (1) (3)	**2860** (1) (3)	**2190** (3)	**1600** (3)
Lead (Pb)	mg/kg	--	--	270.00	--	**66.3**	**74.3**	**44.3**	**56.3**	**70.6**	**12.5**
Manganese (Mn)	mg/kg	160.00	4,100.00	65.20	--	**24.6 J**	**22.8 J**	**33.2 J**	**49 J**	**25.8 J**	**14.5 J**
Mercury (Hg)	mg/kg	2.30[8]	61.00[8]	0.0154	10.00	**0.06 J** (3)	**0.05 J** (3)	**0.04 J** (3)	**0.05 J** (3)	**0.06 J** (3)	**0.05 J** (3)
Silver (Ag)	mg/kg	39.00	1,000.00	0.223	--	**0.36 J** (3)	**0.39 J** (3)	**0.46 J** (3)	**0.52 J** (3)	**0.87 J** (3)	0.15 U

Notes:

Detections of a chemical are indicated in bold font. Detected concentrations that exceed one or more screening criteria are shaded.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit; B = Compound also detected in a QA/QC blank
-- = No screening criterion available.

Table 5-2
Surface Soil Sampling Screening Criteria Comparison
March 1999 Sampling Event
Constituents Exceeding at Least One Screening Criterion
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria: EPA Region III RBC - Residential (1)	EPA Region III RBC - Industrial (2)	NC Soil Screening Levels (SSLs) (3)	EPA Region IV SSLs - Inhalation (4)	012SS06	012SS07	012SS07 (Duplicate)[2]	012SS08	012SS09	012SS10
TCL Volatiles											
Methylene chloride (MC)	ug/kg	85,000.00	7,600,000.00	22.00	13,000.00	11 U	100 R	**78 B**	47 U	10 U	13 U
TCL Semivolatiles											
No compounds exceeded screening criteria											
TCL Pesticides/PCBs											
alpha-Chlordane (a-C)	ug/kg	1,800.00[4]	16,000.00[4]	27.8[4]	20,000.00[4]	1.9 U	1.8 U	**0.24 J**	1.8 U	**17 J**	**18 J**
Aroclor-1260 (PCB-1260)	ug/kg	320.00	2,900.00	--	--	38 U	36 U	36 U	36 U	39 U	41 U
Dieldrin	ug/kg	40.00	360.00	1.13	1,000.00	3.8 U	3.6 U	3.6 U	3.6 U	**0.53 J**	1.6 J (3)
gamma-Chlordane (g-C)	ug/kg	1,800.00[4]	16,000.00[4]	27.8[4]	20,000.00[4]	1.9 U	1.8 U	1.8 U	**1.3 J**	**17**	**14**
Heptachlor epoxide (HE)	ug/kg	70.00	630.00	6.67	5,000.00	1.9 U	1.8 U	1.8 U	1.8 U	**6**	**0.39 J**
TAL Metals/Cyanide											
Aluminum (Al)	mg/kg	7,800.00	200,000.00	--	--	**4560**	**4020**	**2940**	**2840**	**6320**	11600 (1)
Antimony (Sb)	mg/kg	3.10	82.00	5.42	--	0.5 UJ	0.48 UJ	0.48 UJ	0.48 UJ	**1.3 J**	0.55 UJ
Arsenic (As)	mg/kg	0.43	3.80	26.20	750.00	2 J (1)	1.2 J (1)	1.6 J (1)	1.3 J (1)	1.4 J (1)	2.1 J (1)
Cadmium (Cd)	mg/kg	3.90	100.00	2.72	1,800.00	0.05 U	0.04 U	0.04 U	**1.5**	**2.7**	4.9 (1) (3)
Chromium (Cr)	mg/kg	23.00	610.00	27.20	270.00	**5.9**	**4.4**	**3.2**	**21.2**	**16.5**	25.2 (1)
Copper (Cu)	mg/kg	310.00	8,200.00	704.00	--	0.8 U	0.66 U	0.23 U	**15.2**	**50.8**	**84.1**
Iron (Fe)	mg/kg	2,300.00	61,000.00	151.00	--	2670 (1) (3)	1840 (3)	1420 (3)	3860 (1) (3)	2730 (1) (3)	4560 (1) (3)
Lead (Pb)	mg/kg	--	--	270.00	--	**2.4**	**2.4**	**1.9**	**55.3**	**36.7**	**79.1**
Manganese (Mn)	mg/kg	160.00	4,100.00	65.20	--	**7.4 J**	**5.8 J**	**3.7 J**	**24.8 J**	**14.9 J**	**34.8 J**
Mercury (Hg)	mg/kg	2.30[8]	61.00[8]	0.0154	10.00	0.04 U	0.04 U	0.04 J (3)	0.05 J (3)	0.05 J (3)	0.09 J (3)
Silver (Ag)	mg/kg	39.00	1,000.00	0.223	--	0.16 U	0.15 U	0.15 U	**0.18 J**	**0.17 J**	**0.18 J**

Notes:

Detections of a chemical are indicated in bold font. Detected concentrations that exceed one or more screening criteria are shaded.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit; B = Compound also detected in a QA/QC blank

-- = No screening criterion available.

Table 5-2
Surface Soil Sampling Screening Criteria Comparison
March 1999 Sampling Event
Constituents Exceeding at Least One Screening Criterion
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria: EPA Region III RBC - Residential (1)	EPA Region III RBC - Industrial (2)	NC Soil Screening Levels (SSLs) (3)	EPA Region IV SSLs - Inhalation (4)	012SS11	012SS14	012SS15	012SS16	012SS17	012SS18
TCL Volatiles											
Methylene chloride (MC)	ug/kg	85,000.00	7,600,000.00	22.00	13,000.00	11 U	**1.5 J**	9.5 U	10 U	10 U	10 U
TCL Semivolatiles											
No compounds exceeded screening criteria											
TCL Pesticides/PCBs											
alpha-Chlordane (a-C)	ug/kg	1,800.00[4]	16,000.00[4]	27.8[4]	20,000.00[4]	**6 J**	2.3 U		**15 J**	**5.7 J**	3.7 U
Aroclor-1260 (PCB-1260)	ug/kg	320.00	2,900.00	--	--	**450 J** (1)	**19 J**		**76**	38 U	**14 J**
Dieldrin	ug/kg	40.00	360.00	1.13	1,000.00	18 U	**1.1 J**		**16** (3)	3.8 U	3.7 U
gamma-Chlordane (g-C)	ug/kg	1,800.00[4]	16,000.00[4]	27.8[4]	20,000.00[4]	**53** (3)	**1.6 J**		**14**	**6**	**1.6 J**
Heptachlor epoxide (HE)	ug/kg	70.00	630.00	6.67	5,000.00	9 U	**0.29 J**		**0.66 J**	**0.28 J**	1.8 U
TAL Metals/Cyanide											
Aluminum (Al)	mg/kg	7,800.00	200,000.00	--	--	**6080**	**4470 J**	**5640 J**	**11600 J** (1)	**21600 J** (1)	**21000 J** (1)
Antimony (Sb)	mg/kg	3.10	82.00	5.42	--	0.54 U	0.49 UJ	**0.59 J**	**3.6 J** (1)	**14.5 J** (1) (3)	**2 J**
Arsenic (As)	mg/kg	0.43	3.80	26.20	750.00	**1.3 J** (1)	**0.84 J** (1)	**1.1 J** (1)	**1.6 J** (1)	**2.3 J** (1)	**2 J** (1)
Cadmium (Cd)	mg/kg	3.90	100.00	2.72	1,800.00	**1.1**	**0.92 J**	**1.7**	**4.9** (1) (3)	**12.1** (1) (3)	**8.6** (1) (3)
Chromium (Cr)	mg/kg	23.00	610.00	27.20	270.00	**8.7**	**6.8**	**11.2**	**18.1**	**40.9** (1) (3)	**29.7** (1) (3)
Copper (Cu)	mg/kg	310.00	8,200.00	704.00	--	**22.8**	**37.1 J**	**40.5 J**	**78 J**	**663 J** (1)	**667 J** (1)
Iron (Fe)	mg/kg	2,300.00	61,000.00	151.00	--	**3190** (1) (3)	**2400** (1) (3)	**3970** (1) (3)	**6920** (1) (3)	**3540** (1) (3)	**3760** (1) (3)
Lead (Pb)	mg/kg	--	--	270.00	--	**14.2**	**11.7**	**17.7**	**705** (3)	**78**	**78.5**
Manganese (Mn)	mg/kg	160.00	4,100.00	65.20	--	**16.8 J**	**11 J**	**17.1 J**	**50.5 J**	**81.2 J** (3)	**97.7 J** (3)
Mercury (Hg)	mg/kg	2.30[8]	61.00[8]	0.0154	10.00	**0.05 J** (3)	**0.06 J** (3)	**0.05 J** (3)	**0.08 J** (3)	**0.07 J** (3)	**0.3** (3)
Silver (Ag)	mg/kg	39.00	1,000.00	0.223	--	0.15 U	0.15 U	0.16 U	0.39 U	1.1 U	0.65 U

Notes:

Detections of a chemical are indicated in bold font. Detected concentrations that exceed one or more screening criteria are shaded.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit; B = Compound also detected in a QA/QC blank

-- = No screening criterion available.

Table 5-3
Surface Soil Detected Metals/Cyanide and 2X Average Background Comparison
March 1999 Sampling Event
Site 12 Remedial Investigation
MCAS Cherry Point

TAL Metals/Cyanide	Units	2X Average Background	Frequency of Detection	Maximum Detected Concentration	Sample Location Corresponding to Max. Concentration
Aluminum	mg/kg	10,163.24	16/16	21600	012SS17
Antimony	mg/kg	--	8/16	14.5 J	012SS17
Arsenic	mg/kg	3.90	14/16	2.3 J	012SS17
Barium	mg/kg	23.00	16/16	49.4 J	012SS17
Beryllium	mg/kg	0.44	2/16	0.08 J	012SS10
Cadmium	mg/kg	1.12	14/16	12.1	012SS17
Calcium	mg/kg	511.32	16/16	85800	012SS15
Chromium	mg/kg	16.96	16/16	40.9	012SS17
Cobalt	mg/kg	2.38	1/16	0.5 J	012SS01
Copper	mg/kg	3.76	14/16	667 J	012SS18
Iron	mg/kg	5,958.76	16/16	6920	012SS16
Lead	mg/kg	10.52	16/16	705	012SS16
Magnesium	mg/kg	421.74	16/16	1810	012SS18
Manganese	mg/kg	16.72	16/16	97.7 J	012SS18
Mercury	mg/kg	0.12	15/16	0.3	012SS18
Nickel	mg/kg	6.90	16/16	21.6	012SS17
Potassium	mg/kg	481.34	16/16	370 J	012SS16
Selenium	mg/kg	0.56	2/16	1 J	012SS10
Silver	mg/kg	0.82	7/16	0.87 J	012SS04
Sodium	mg/kg	51.06	8/16	93.9 J	012SS15
Vanadium	mg/kg	19.16	16/16	20.8	012SS10
Zinc	mg/kg	11.32	16/16	569	012SS17

NOTES:
Parameters listed are those that were detected in one or more samples during the RI.
The concentration of each chemical for each sample is compared to 2X average background concentration.
Data entries consist of the concentration followed by the data qualifier, if any.
J = Estimated concentration below the quantitation limit.
"--" = No background value available.

Table 5-4
Surface Soil Sampling Screening Criteria Comparison - Dioxins/Furans
March 1999 Sampling Event
Constituents Exceeding at Least One Screening Criterion
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria				012SS06	012SS07	012SS07 (Duplicate)[1]	012SS15
		EPA Region III RBC - Residential (1)	EPA Region III RBC - Industrial (2)	NC Soil Screening Levels (SSLs) (3)	EPA Region IV SSLs - Inhalation (4)				
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	430.00[2]	3,800.00[2]	--	--	**6.8 B**	**27 B**	**5.9 B**	**210**
1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	430.00[2]	3,800.00[2]	--	--	0.56 U	0.28 U	0.22 U	**5.2 J**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	430.00[2]	3,800.00[2]	--	--	0.76 U	0.38 U	0.3 U	**0.7 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	43.00[2]	380.00[2]	--	--	0.95 U	0.46 U	0.23 U	**3.5 J**
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	43.00[2]	380.00[2]	--	--	0.55 U	0.21 U	0.2 U	**1.1 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	43.00[2]	380.00[2]	--	--	1 U	**0.31 J**	0.26 U	**7.3 J**
1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	43.00[2]	380.00[2]	--	--	0.54 U	0.2 U	0.2 U	**0.85 J**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	43.00[2]	380.00[2]	--	--	**0.72 J Q**	**0.58 J Q**	**0.27 J Q**	**9.3**
1,2,3,7,8-Pentachlorodebenzo-p-dioxin	pg/g	8.60[2]	76.00[2]	--	--	0.29 U	0.33 U	0.4 U	**1.3 J**
2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	43.00[2]	380.00[2]	--	--	0.61 U	0.23 U	0.23 U	**0.53 J**
2,3,4,7,8-Pentachlorodibenzofuran	pg/g	8.60[2]	76.00[2]	--	--	0.2 U	0.43 U	0.28 U	**0.33 J**
2,3,7,8-TCDD (dioxin)	pg/g	4.30	38.00	14.50	--	0.23 U	0.33 U	0.44 U	**0.43 J**
Total Heptachlorodibenzo-p-dioxin	pg/g	--	--	--	--	**20 B**	**57 B Q**	**14 B**	**420**
Total Heptachlorodibenzofuran	pg/g	--	--	--	--	0.65 U	0.32 U	0.25 U	**11 J**
Total Hexachlorodibenzo-p-dioxin	pg/g	--	--	--	--	**8.4 J Q**	**3.8 J Q**	**2.2 J Q**	**75**
Total Hexachlorodibenzofuran	pg/g	--	--	--	--	0.59 U	0.22 U	0.22 U	**22**
Total Octachlorodibenzo-p-dioxin (OCDD)	pg/g	4,300.00[2]	38,000.00[2]	--	--	**820 B**	**2000 B**	**340 B**	**4900 J (1)**
Total Octachlorodibenzofuran	pg/g	4,300.00[2]	38,000.00[2]	--	--	0.96 U	0.78 U	0.42 U	**5.4 J**
Total Pentachlorodibenzo-p-dioxin	pg/g	--	--	--	--	**0.6 J**	0.33 U	0.4 U	**12 J**
Total Pentachlorodibenzofuran	pg/g	--	--	--	--	**1.8 J Q**	0.43 U	0.28 U	**15 J**
Total Tetrachlorodibenzo-p-dioxin	pg/g	--	--	--	--	0.72 U	0.92 U	0.69 U	**1.5 J**
Total Tetrachlorodibenzofuran	pg/g	--	--	--	--	**3 Q**	1 U	0.96 U	**6.4**

NOTES:

Detections of a chemical are indicated in bold font. Detected concentrations that exceed one or more screening criteria are shaded.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify specific criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit; B = Compound also detected in a QA/QC blank; Q = Estimated maximum possible concentration (EMPC).

"--" = No screening criterion available.

[1] A blind duplicate sample labeled 012SS12.

[2] RBC based on the 2,3,7,8-TCDD toxicity equivalency factors provided in EPA (1989).

Table 5-5
Surface Soil Sampling Results - Oil & Grease
March 1999 Sampling Event
Site 12 Remedial Investigation
MCAS Cherry Point

Sample Location	Oil & Grease (mg/kg)
012SS01	1,050
012SS01 (Duplicate)*	996
012SS02	1,580
012SS03	1,070
012SS04	1,550
012SS05	661
012SS06	229 U
012SS07	217 U
012SS07 (Duplicate)**	220 U
012SS08	3,830
012SS09	484
012SS10	5,030
012SS11	614
012SS14	300
012SS15	374
012SS16	664
012SS17	865
012SS18	1,420

NOTES:
*A blind duplicate sample labeled 012SS13.
**A blind duplicate sample labeled 012SS12.
U = Compound not detected above the indicated concentration.

Table 5-6
Surface Soil Sampling Results - Total Organic Carbon (TOC)
March 1999 Sampling Event
Site 12 Remedial Investigation
MCAS Cherry Point

Sample Location	Oil & Grease (mg/kg)
012SS01	15,000
012SS01 (Duplicate)*	6,500
012SS02	5,600
012SS03	4,700
012SS04	8,600
012SS05	2,900
012SS06	430
012SS07	250
012SS07 (Duplicate)**	500
012SS08	3,700
012SS09	6,200
012SS10	4,200
012SS11	12,000
012SS14	7,800
012SS15	10,000
012SS16	12,000
012SS17	7,000
012SS18	8,500

NOTES:
*A blind duplicate sample labeled 012SS13.
**A blind duplicate sample labeled 012SS12.

Table 5-7
Subsurface Soil Sampling Screening Criteria Comparison
March 1999 Sampling Event
Constituents Exceeding at Least One Screening Criterion
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria		012SB01 (1-2 ft.)	012SB02 (4-5 ft.)
		EPA Region III RBC - Industrial (1)	NC Soil Screening Levels (SSLs) (2)		
TCL Volatiles					
No detected compounds					
TCL Semivolatiles					
No compounds exceeded screening criteria					
TCL Pesticides/PCBs					
No compounds exceeded screening criteria					
TAL Metals/Cyanide					
Cadmium (Cd)	mg/kg	100.00	2.72	3.1 (2)	0.04 U
Iron (Fe)	mg/kg	61,000.00	151.00	2500 (2)	2010 (2)
Mercury (Hg)	mg/kg	61.00[1]	0.0154	0.05 J (2)	0.05 J (2)

NOTES:

Detections of a chemical are indicated in bold font. Detected concentrations that exceed one or more screening criteria are shaded.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify specific criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit.

[1] RBC for mercuric chloride

Table 5-8
Subsurface Soil Detected Metals/Cyanide and 2X Average Background Comparison
March 1999 Sampling Event
Site 12 Remedial Investigation
MCAS Cherry Point

TAL Metals/Cyanide	Units	2X Average Background	Frequency of Detection	Maximum Detected Concentration	Sample Location Corresponding to Max. Concentration
Aluminum	mg/kg	10,163.24	2/2	8510 J	012SB01
Arsenic	mg/kg	3.90	1/2	1.5 J	012SB01
Barium	mg/kg	23.00	2/2	20 J	012SB01
Cadmium	mg/kg	1.12	1/2	3.1	012SB01
Calcium	mg/kg	511.32	2/2	3140	012SB01
Chromium	mg/kg	16.96	2/2	15	012SB01
Copper	mg/kg	3.76	1/2	70.9 J	012SB01
Iron	mg/kg	5,958.76	2/2	2500	012SB01
Lead	mg/kg	10.52	2/2	25.4	012SB01
Magnesium	mg/kg	421.74	2/2	364 J	012SB01
Manganese	mg/kg	16.72	2/2	8.9 J	012SB01
Mercury	mg/kg	0.12	2/2	0.05 J	012SB01
Nickel	mg/kg	6.90	2/2	2.2 J	012SB01
Potassium	mg/kg	481.34	2/2	223 J	012SB01
Sodium	mg/kg	51.06	2/2	47.9 J	012SB01
Vanadium	mg/kg	19.16	2/2	8.4 J	012SB01
Zinc	mg/kg	11.32	2/2	182	012SB01

NOTES:

Parameters listed are those that were detected in one or more samples during the RI.

The concentration of each chemical for each sample is compared to 2X average background concentration.

Detected concentrations that exceed 2X average background concentration are indicated in bold red font.

Data entries consist of the concentration followed by the data qualifier, if any.

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit.

Table 5-9
Groundwater Sampling Screening Criteria Comparison
March 1999 Sampling Event
Constituents Exceeding at Least One Screening Criterion
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria			012MW01	012MW01 (Duplicate)[1]	012MW02	012MW03	012MW04	012TW01
		Federal MCLs/SMCLs (1)	NC 2L GW Standards (2)	EPA Region III Tapwater RBCs (3)						
TCL Volatiles										
No compounds exceeded screening criteria										
TCL Semivolatiles										
No detected compounds										
TCL Pesticides/PCBs										
alpha-Chlordane (a-C)	ug/L	2.00[2]	0.027[2]	0.19[2]	**0.0071 J**	0.05 U	**0.0042 J**	0.066 J (2)	0.05 U	0.16 J (2)
Aroclor-1248 (PCB-1248)	ug/L	0.50[4]	--	0.033	1 U	1 U	1 U	1 U	1 U	0.89 J (1) (3)
Dieldrin	ug/L	--	0.0022	0.0042	0.1 U	0.1 U	0.1 U	0.011 J (2) (3)	0.1 U	0.0045 J (2) (3)
gamma-Chlordane (g-C)	ug/L	2.00[2]	0.027[2]	0.19[2]	0.05 U	0.05 U	0.05 U	**0.015 J**	0.05 U	0.064 J (2)
Heptachlor epoxide (HE)	ug/L	0.20	0.004	0.0074	0.05 U	0.05 U	0.05 U	0.05 U	0.0045 J (2)	0.13 J (2) (3)
TAL Metals/Cyanide										
Aluminum (Al)	ug/L	50.00[3]	--	3,700.00	730 (1)	678 (1)	583 (1)	442 (1)	770 (1)	8510 (1) (3)
Arsenic (As)	ug/L	50.00	50.00	0.045	3 U	3 U	3 U	30.2 (3)	8 J (3)	4.6 J (3)
Chromium (Cr)	ug/L	100.00	50.00	11.00	1.3 U	0.97 U	0.6 U	0.6 U	0.6 U	25.5 (3)
Iron (Fe)	ug/L	300.00[3]	300.00	1,100.00	484 J (1) (2)	456 J (1) (2)	7060 J (1) (3)	12200 J (1) (3)	51200 J (1) (3)	6210 (1) (3)
Manganese (Mn)	ug/L	50.00[3]	50.00	73.00	8.6 U	**8.8 J**	**44.7**	61.7 (1) (2)	56.9 (1) (2)	93 (1) (3)

NOTES:

Detections of a chemical are indicated in bold font. Detected concentrations that exceed one or more screening criteria are shaded.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify specific criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit; B = Compound also detected in a QA/QC blank.

"--" = No screening criterion available.

[1] A blind duplicate sample labeled 012MW05

[2] Chlordane (total)

[3] Secondary Maximum Contaminant Level (SMCL)

[4] PCBs (total)

Table 5-10
Groundwater Sampling Results - Nitrate and Sulfate
March 1999 Sampling Event
Site 12 Remedial Investigation
MCAS Cherry Point

Sample Location	Nitrate (mg/L)	Sulfate (mg/L)
012MW01	0.1 U	17
012MW01 (Duplicate)*	0.1 U	24
012MW02	0.3	29
012MW03	0.1 U	43
012MW04	0.1 U	28
012TW01	0.5	28 J

NOTES:
*A blind duplicate sample labeled 012MW05.
U = Compound not detected above the indicated concentration.
J = Estimated concentration below the quantitation limit.

Table 5-11
Surface Water Sampling Screening Criteria Comparison
March 1999 Sampling Event
Constituents Exceeding at Least One Screening Criterion
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria: NC Water Quality Standards - FW, Human Health (1)	NC Water Quality Standards - FW, Aquatic Life (2)	EPA Region III Tapwater RBCs (3)	EPA Region IV Freshwater Chronic Screening Values (4)	EPA Region III Freshwater BTAG - Flora (5)	EPA Region III Freshwater BTAG - Fauna (6)	EPA National Recommended Water Quality 304(a) Criteria (7)	NCDENR Freshwater Standard[7] (8)	012SW01	012SW02	012SW03
TCL Volatiles												
No detected compounds												
TCL Semivolatiles												
No detected compounds												
TCL Pesticides/PCBs												
4,4'-DDD	ug/L	–	–	0.28	0.0064	0.60	0.60	0.00084	–	0.1 U	0.0066 J 4,7	0.1 U
4,4'-DDE	ug/L	–	–	0.20	10.50	1,050.00	1,050.00	0.00059	–	0.027 J 7	0.1 U	0.1 U
4,4'-DDT	ug/L	0.000591	0.001	0.20	0.001	5,000.00	0.001	–	–	0.1 U	0.011 J 1,2,4,6	0.1 U
Aldrin	ug/L	0.000136	0.002	0.0039	0.30	3.00	3.00	–	–	0.05 U	0.003 J 1,2	0.05 U
Aroclor-1248	ug/L	0.000079[2]	0.001[2]	0.033	0.014	0.10[2]	0.014[2]	–	–	1.6 1-6	1 U	1 U
Dieldrin	ug/L	0.000144	0.002	0.0042	0.0019	0.0019	0.0019	–	–	0.015 J 1-6	0.1 U	0.1 U
TAL Metals/Cyanide												
Aluminum	ug/L	–	–	3,700.00	87.00	460.00	25.00	–	87.00	386 4,6,8	781 4,5,6,8	174 J 4,6,8
Calcium	ug/L	–	–	–	–	–	–	–	7,300.00	7760 8	8220 8	7800 8
Copper	ug/L	–	7.00	150.00	3.30[3]	–	6.50	–	–	6.6 J 4,6	3.3 U	5.7 U
Lead	ug/L	–	25.00	–	0.48[4]	–	3.20	–	–	1.7 J 4	1.3 U	1.3 U
Magnesium	ug/L	–	–	–	–	–	–	–	200.00	746 J 8	846 U	751 U
Mercury	ug/L	–	0.012	1.10[5]	0.012	0.012	0.012	0.051	–	0.12 J 2,4-6, 7	0.1 U	0.08 J 2,4-6, 7
Zinc	ug/L	–	50.00	1,100.00	28.95 to 30.04[6]	30.00	110.00	69,000.00	–	**20.5 J**	4.1 U	34.2 J 4,5

NOTES:

Detections of a chemical are indicated in bold font.

Detected concentrations that exceed one or more screening criteria are shaded. Screening criteria exceeded at least once are also indicated in shaded.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify specific criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit; B = Compound also detected in a QA/QC blank.

"–" = No screening criterion available.

[1]A blind duplicate sample labeled 012SW04.

[2]PCBs (total).

[3]Screening value is hardness-dependent and calculated for sample 012SW01 (only sample where copper was detected) using the following formula:

Copper screening value = $e^{(0.8545(\ln(2.5*Ca+4.1*Mg))-1.465)}$

[4]Screening value is hardness-dependent and calculated for sample 012SW01 (only sample where lead was detected) using the following formula:

Lead screening value = $e^{(1.273(\ln(2.5*Ca+4.1*Mg))-4.705)}$

[5]RBC for mercuric chloride.

[6]Screening value is hardness-dependent and calculated for samples 012SW03 and 012SW04 (only samples where zinc was detected) using the following formula:

Zinc screening value = $e^{(0.8473(\ln(2.5*Ca+4.1*Mg))+0.7614)}$, Result was 28.95 for 012SW04 and 30.04 for 12SW03.

[7] Criteria were provided by Mr. Jason Wynn of NCDENR in an e-mail correspondence on July 2, 2001.

A duplicate sample was also collected from 012SW01. The maximum concentration of the two measurements is presented in the table.

Table 5-12
Surface Water Sampling Results - Nitrate and Sulfate
March 1999 Sampling Event
Site 12 Remedial Investigation
MCAS Cherry Point

Sample Location	Nitrate (mg/L)	Sulfate (mg/L)
012SW01	0.1	10 J
012SW01 (Duplicate)*	0.1 U	10 J
012SW02	0.1 U	5 U
012SW03	0.1 U	13 J

NOTES:
*A blind duplicate sample labeled 012SW04.
U = Compound not detected above the indicated concentration.
J = Estimated concentration below the quantitation limit.

Table 5-13
Sediment Sampling Screening Criteria Comparison
March 1999 Sampling Event
Constituents Exceeding at Least One Screening Criterion
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criterion EPA Region III RBC - Residential (1)	012SD01	012SD01 (Duplicate)[1]	012SD02	012SD03
TCL Volatiles						
No detected compounds						
TCL Semivolatiles						
No compounds exceeded screening criteria						
TCL Pesticides/PCBs						
No compounds exceeded screening criteria						
TAL Metals/Cyanide						
Aluminum (Al)	mg/kg	7,800.00	**5610**	**5550**	**1790**	**8640** 1
Arsenic (As)	mg/kg	0.43	0.85 U	0.88 U	0.78 U	**1.1 J** 1
Iron (Fe)	mg/kg	2,300.00	**2370 J** 1	**2570 J** 1	**1520 J**	**3340 J** 1

NOTES:

Detections of a chemical are indicated in bold font. Detected concentrations that exceed one or more screening criteria are shaded.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify specific criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit; B = Compound also detected in a QA/QC blank.

"--" = No screening criterion available.

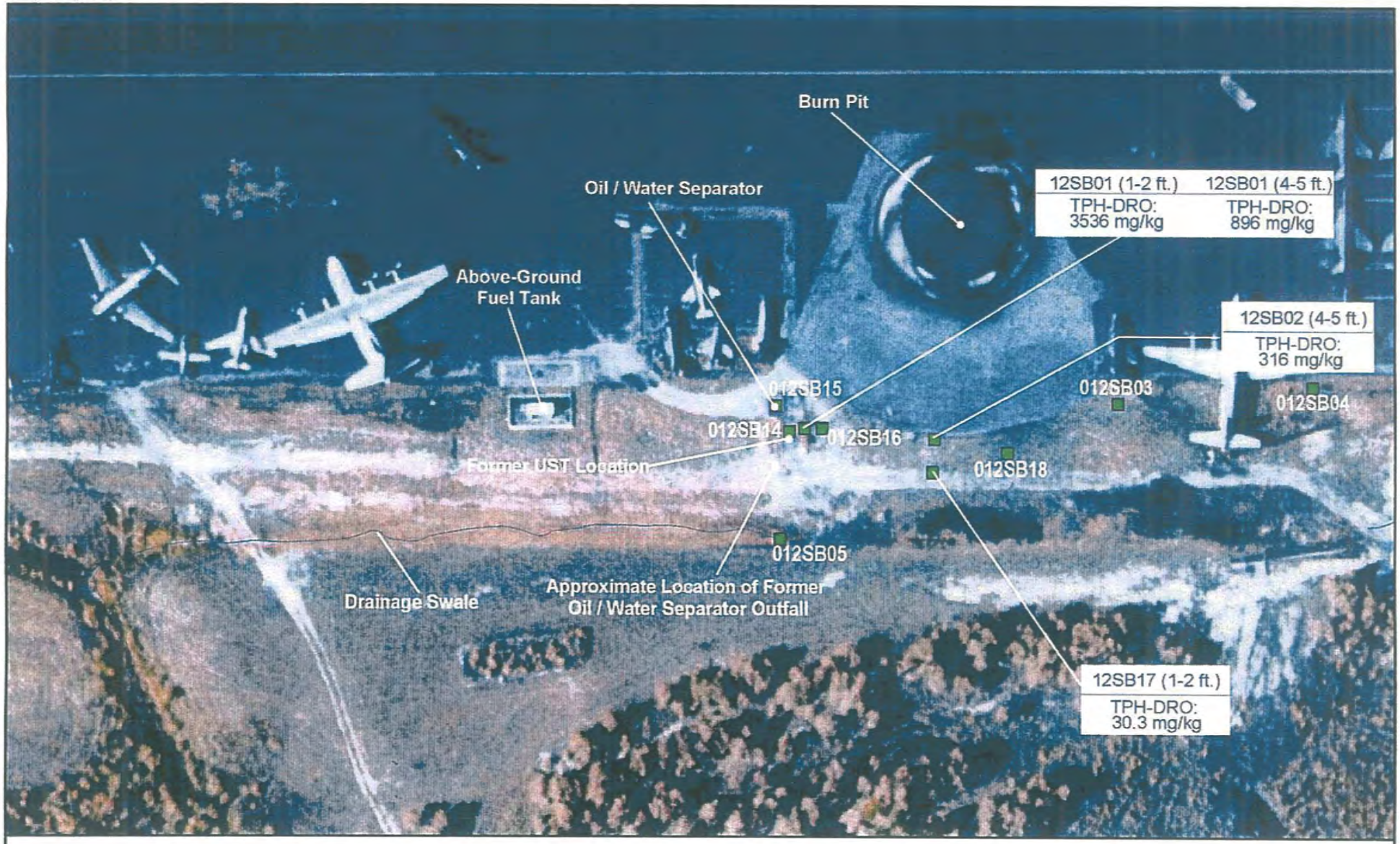
[1]A blind duplicate sample labeled 012SD04.

Table 5-14
Sediment Sampling Results - Oil & Grease
March 1999 Sampling Event
Site 12 Remedial Investigation
MCAS Cherry Point

Sample Location	Oil & Grease (mg/kg)
012SD01	478
012SD01 (Duplicate)*	531
012SD02	389
012SD03	293

NOTES:
*A blind duplicate sample labeled 012SD04.

File Path: v:\site12-ri.apr



LEGEND

Subsurface Soil Sampling Stations

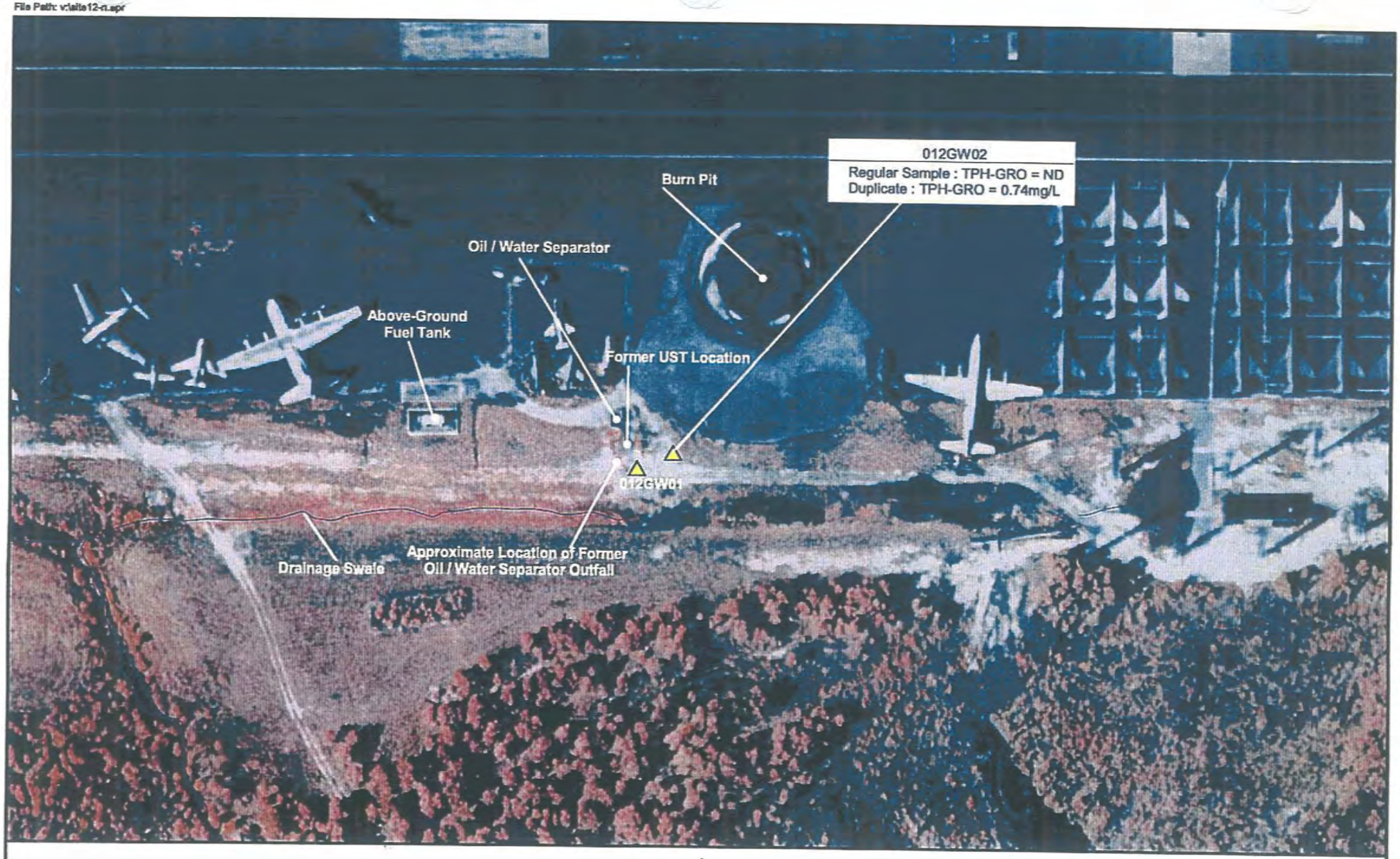
N

0 40 80 120 160 Feet

Figure 5-1
Subsurface Soil Analytical Results, Onsite Laboratory
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

File Path: v:\site12-ri.apr



LEGEND

△ Direct-Push Sampling Stations

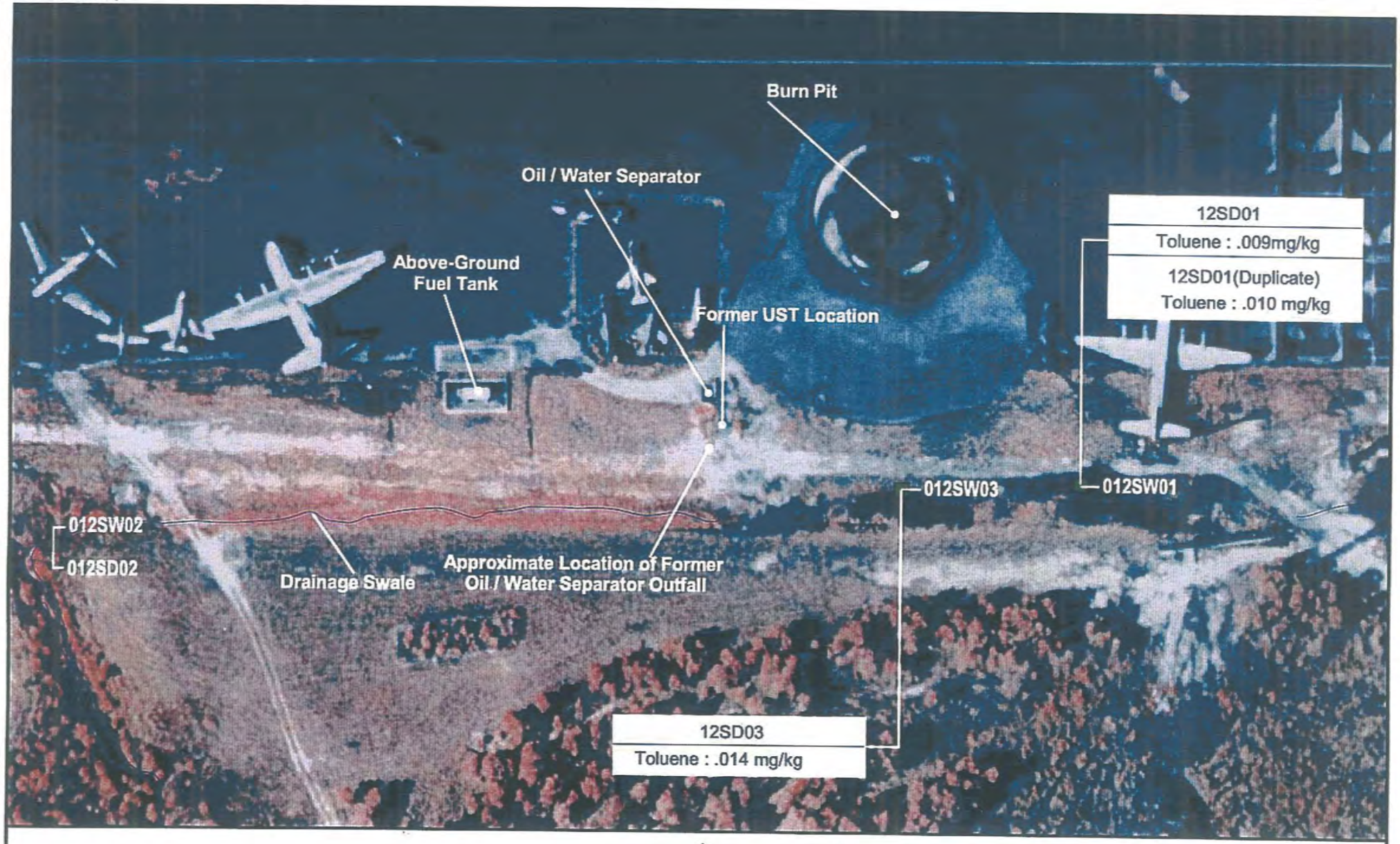
N

0 60 120 180 240 Feet

Figure 5-2
Direct-Push Groundwater Analytical Results, Onsite Laboratory
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

File Path: v:\site12-ri.apr



LEGEND

Surface Water / Sediment Sampling Stations

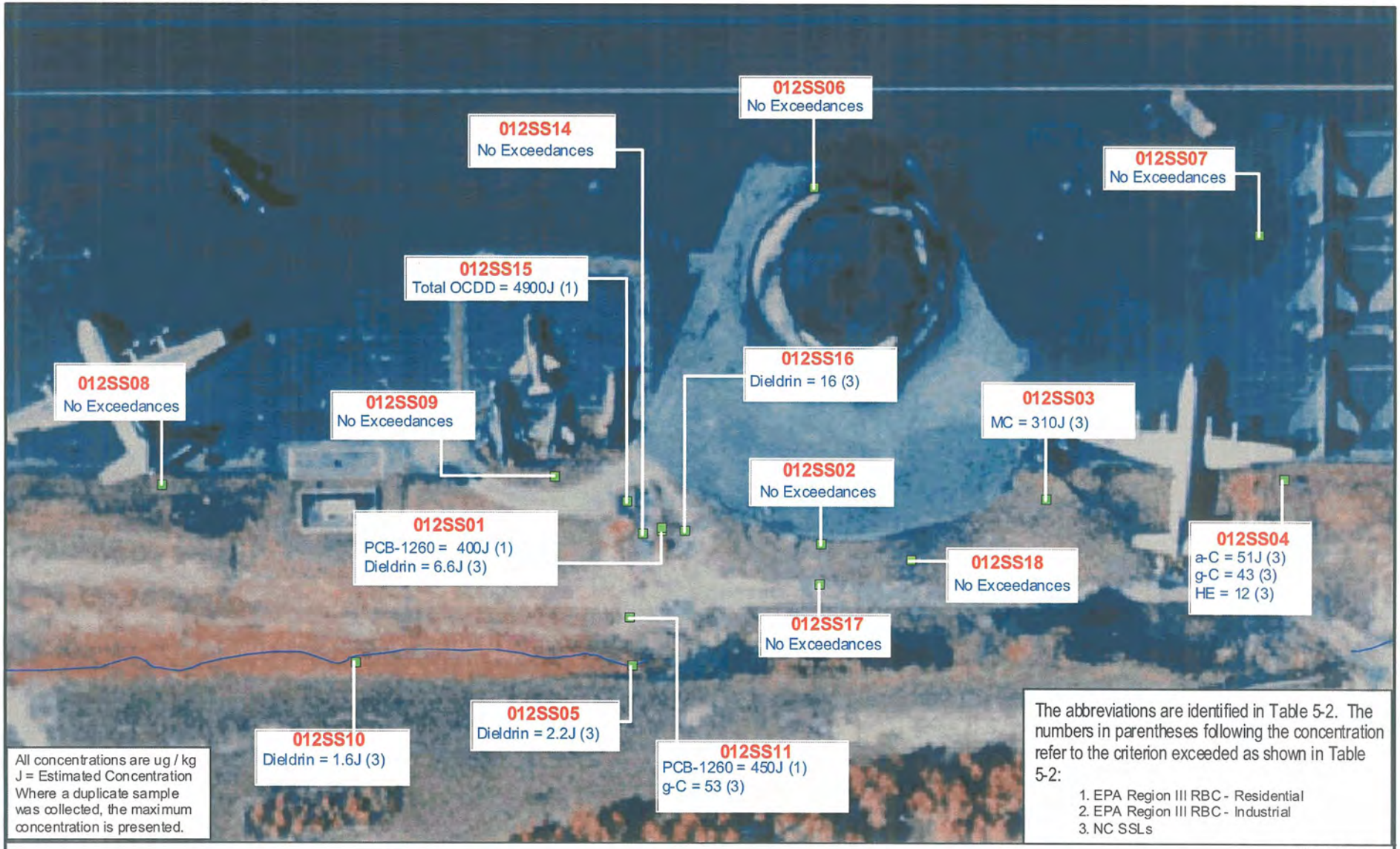
N

0 60 120 180 240 Feet

Figure 5-3
Surface Water and Sediment
Analytical Results, Onsite Laboratory
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\MCAS - Cherry Point\Figures\site12-ri_wdc.new.apr



All concentrations are ug / kg
J = Estimated Concentration
Where a duplicate sample was collected, the maximum concentration is presented.

The abbreviations are identified in Table 5-2. The numbers in parentheses following the concentration refer to the criterion exceeded as shown in Table 5-2:

1. EPA Region III RBC - Residential
2. EPA Region III RBC - Industrial
3. NC SSLs

LEGEND

Surface Soil Sampling Stations

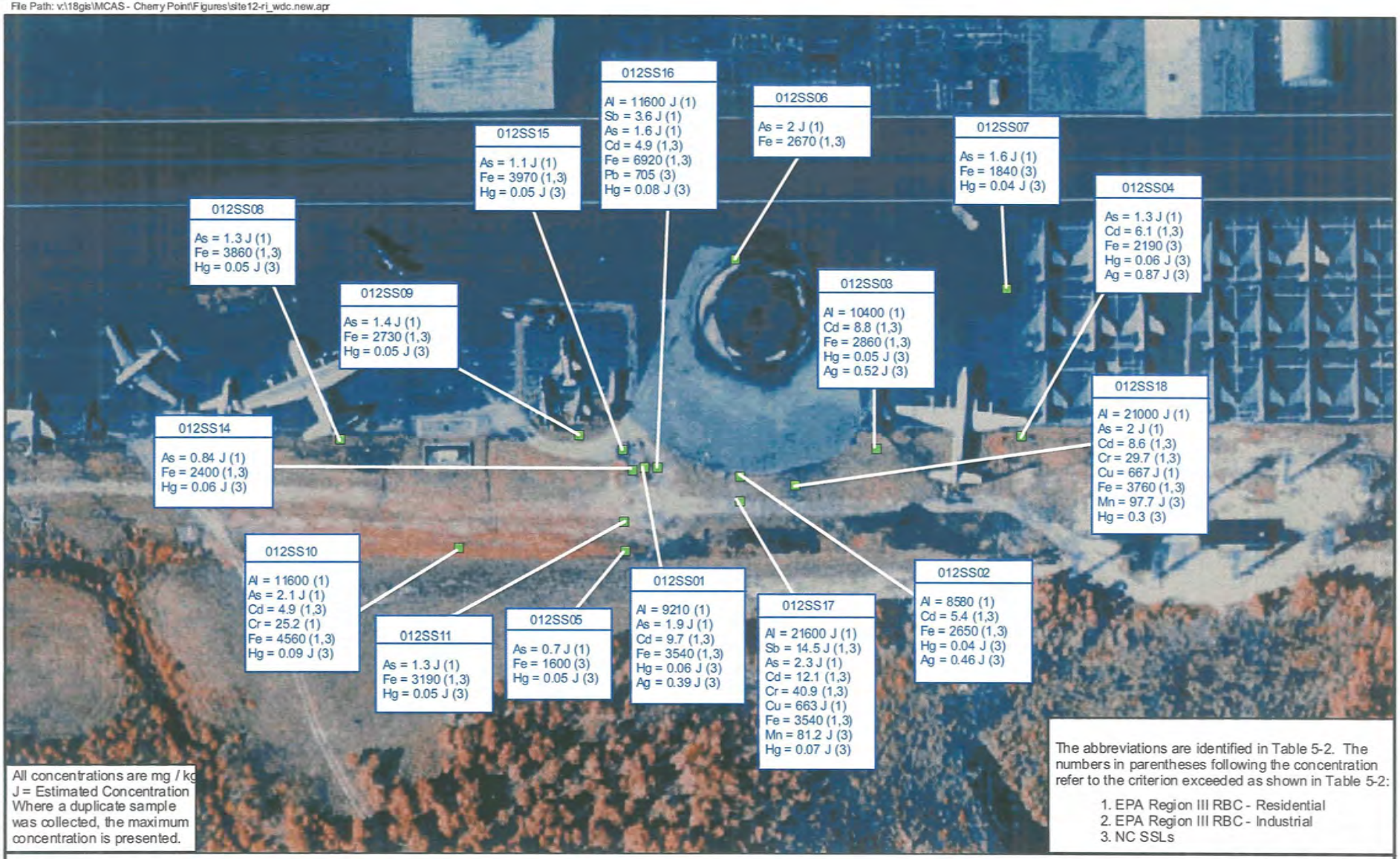
N

0 50 100 150 Feet

Figure 5-4
Surface Soil Samples
Exceeding Screening Criteria - Organics
Offsite Laboratory
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\MCAS - Cherry Point\Figures\site12-ri_wdc.new.apr



LEGEND

- Surface Soil Sampling Stations

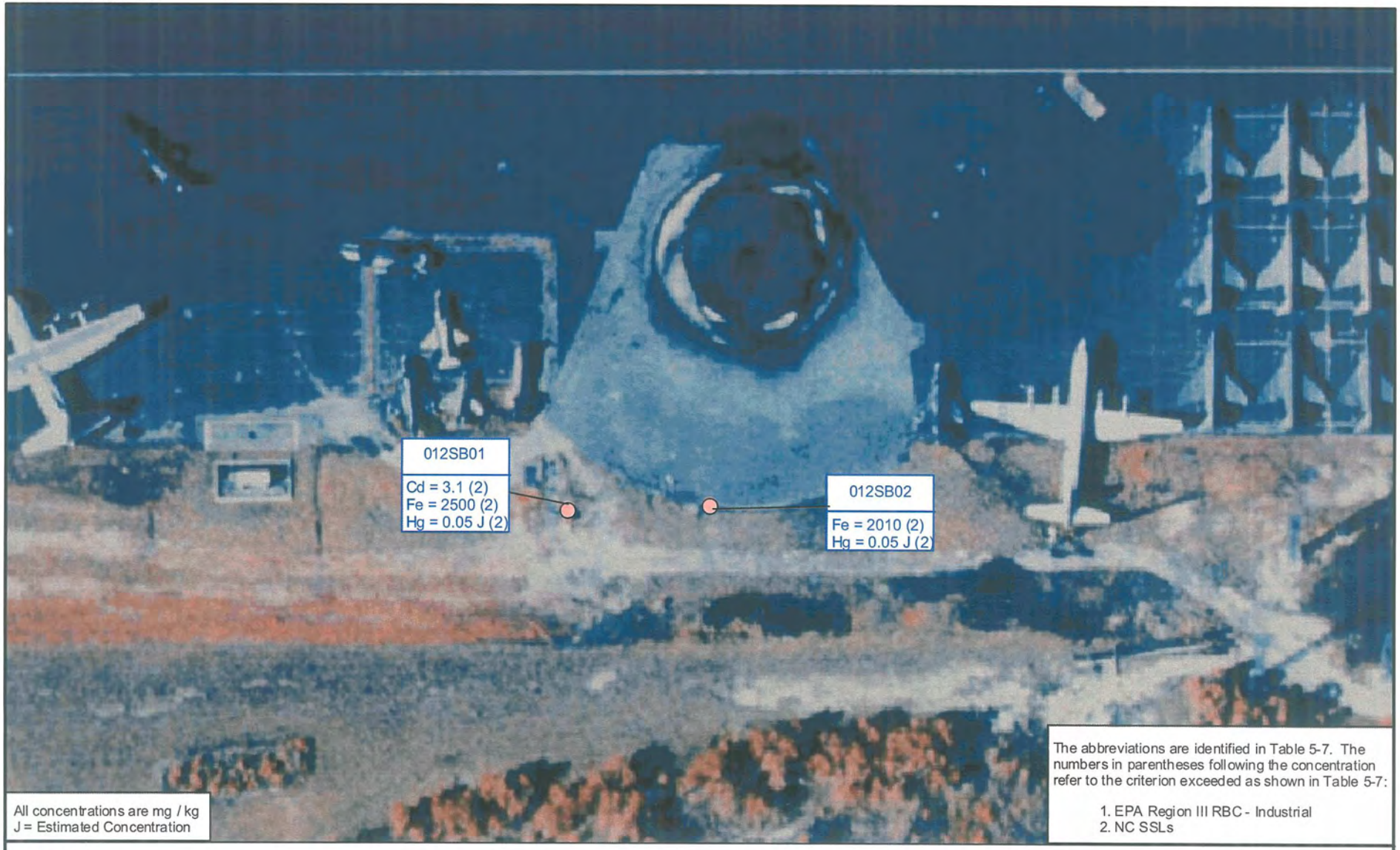
N

0 40 80 120 Feet

Figure 5-5
Surface Soil Samples Exceeding Screening Criteria - Inorganics
Offsite Laboratory
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

File Path: v:\site12ri_wdc_new.apr



All concentrations are mg / kg
J = Estimated Concentration

The abbreviations are identified in Table 5-7. The numbers in parentheses following the concentration refer to the criterion exceeded as shown in Table 5-7:

1. EPA Region III RBC - Industrial
2. NC SSLs

LEGEND

Subsurface Soil Sampling Stations

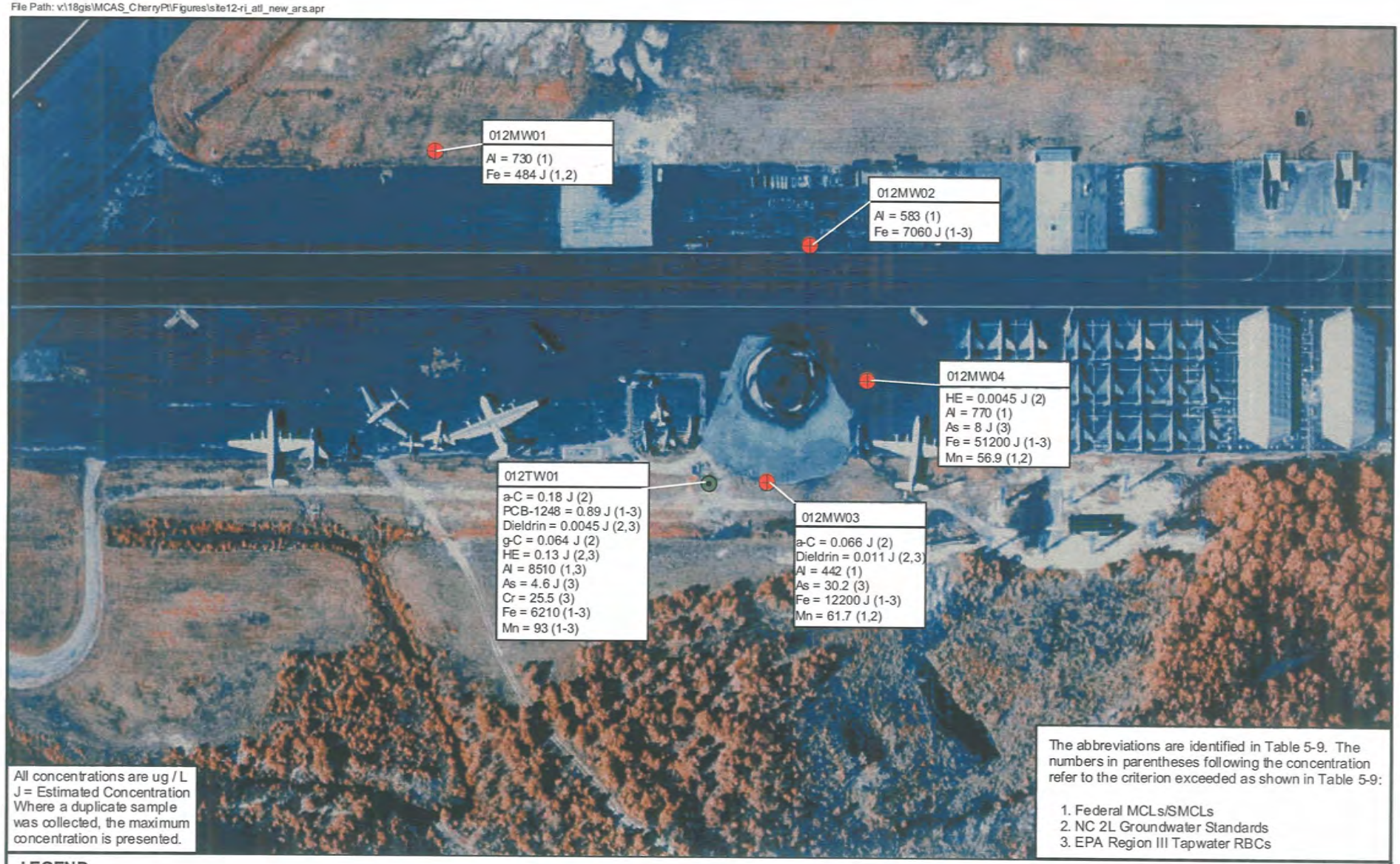
N

0 50 100 Feet

Figure 5-6
Subsurface Soil Samples Exceeding Screening Criteria
Offsite Laboratory
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\MCAS_CherryPt\Figures\site12-ri_atl_new_ars.apr



All concentrations are ug / L
J = Estimated Concentration
Where a duplicate sample was collected, the maximum concentration is presented.

The abbreviations are identified in Table 5-9. The numbers in parentheses following the concentration refer to the criterion exceeded as shown in Table 5-9:

1. Federal MCLs/SMCLs
2. NC 2L Groundwater Standards
3. EPA Region III Tapwater RBCs

LEGEND

- Permanent Monitoring Well
- Temporary Monitoring Well

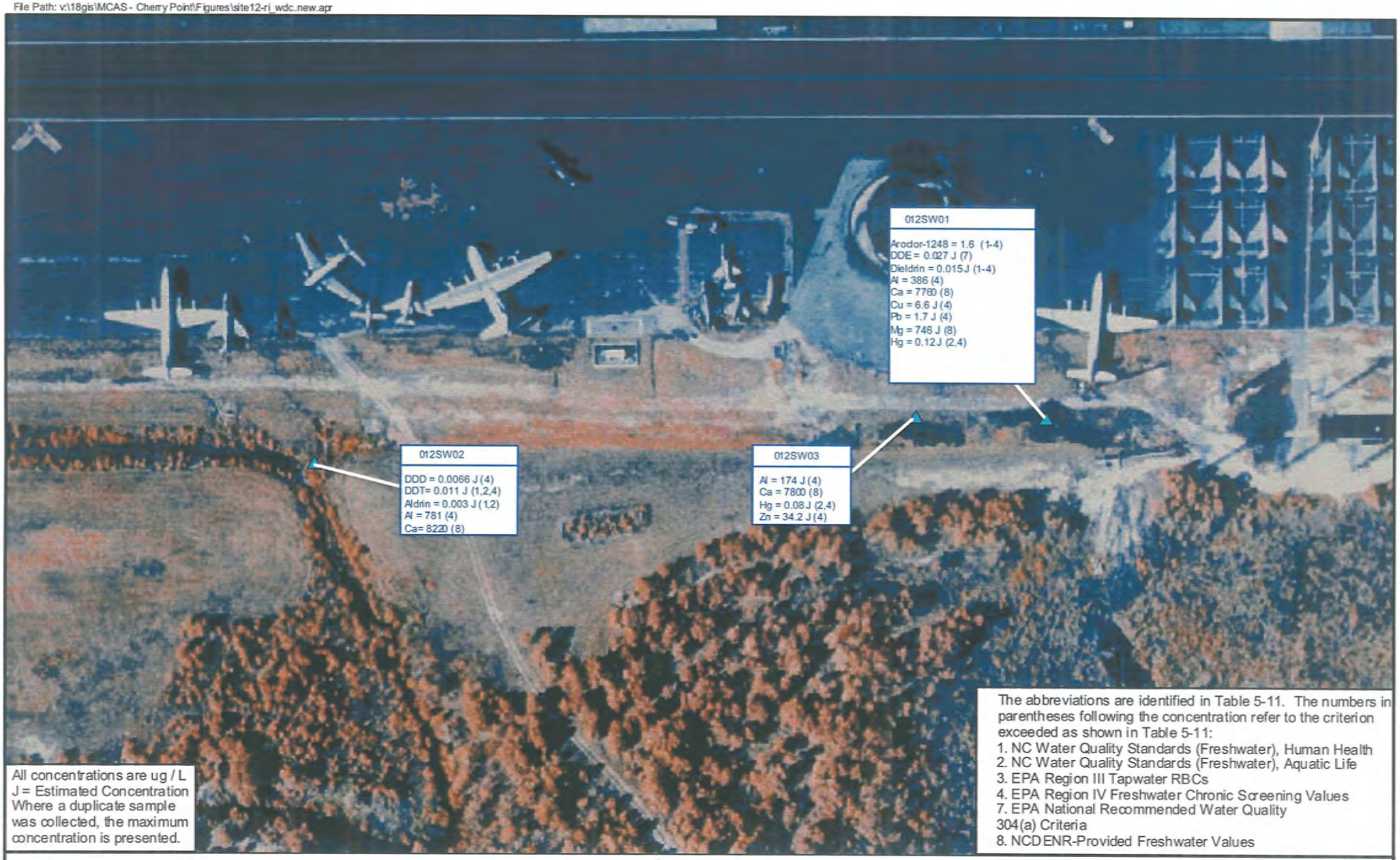
N

0 100 200 Feet

Figure 5-7
Groundwater Samples Exceeding Screening Criteria
Offsite Laboratory
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\MCAS - Cherry Point\Figures\site12-ri_wdc.new.apr



All concentrations are ug / L
J = Estimated Concentration
Where a duplicate sample was collected, the maximum concentration is presented.

The abbreviations are identified in Table 5-11. The numbers in parentheses following the concentration refer to the criterion exceeded as shown in Table 5-11:
1. NC Water Quality Standards (Freshwater), Human Health
2. NC Water Quality Standards (Freshwater), Aquatic Life
3. EPA Region III Tapwater RBCs
4. EPA Region IV Freshwater Chronic Screening Values
7. EPA National Recommended Water Quality 304(a) Criteria
8. NCDENR-Provided Freshwater Values

LEGEND

▲ Surface Water Sampling Locations

N

0 90 180 Feet

Figure 5-8
Surface Water Samples Exceeding Screening Criteria
Offsite Laboratory
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

File Path: v:\18gis\MCAS - Cherry Point\Figures\site12-ri wdc.new.apr

All concentrations are in mg/kg.
J = Estimated Concentration
Where a duplicate sample was collected, the maximum concentration is presented.

The abbreviations are identified in Table 5-13. The numbers in parentheses following the concentration refer to the criterion exceeded as shown in Table 5-13:

1. EPA Region III RBC - Residential

LEGEND

Sediment Sampling Locations

N

0 50 100 Feet

Figure 5-9
Sediment Samples Exceeding Screening Criteria
Offsite Laboratory
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

6 Contaminant Fate and Transport

This section discusses the fate and transport of chemicals in soil, groundwater, surface water, and sediment at Site 12 and their possible interrelation. The fate and transport are described to support the HHRA and ERA and to aid in defining remedial alternatives.

6.1 Contaminant Mobility and Persistence

The probable behavior of potential site contaminants is determined by their physical, chemical, and biological interaction with the environment. The mobility and persistence of the chemicals in the environment are two key characteristics in determining probable behavior. Mobility is the potential for a chemical to migrate from a site, and persistence is a measure of how long a chemical will remain in the environment. Environmental factors that affect the mobility and persistence of the contaminants include: pH, concentration of other chemicals in the media, soil moisture, oxidation-reduction potential (measured as Eh), water chemistry, organic-matter content, and the presence of microorganisms.

The behavior is also determined by the physical and hydraulic properties of the water-bearing units through which the contaminants are being transported. These properties control the advection and dispersion of the contaminants.

6.1.1 Contaminant Groups

Both organic and inorganic constituents were detected in environmental media at Site 12. The nature and extent of these chemicals are discussed in detail for the different media in Section 5. Discussing the fate and transport of all of these chemicals would be infeasible. Instead, the chemicals are discussed as groups (i.e., VOCs, SVOCs, pesticides, PCBs, and inorganics), with only occasional reference to particular chemicals.

Certain chemicals were selected to represent the range of chemicals associated with Site 12. The representative chemicals were selected on the basis of high concentrations, frequency of occurrence, occurrence in several media, variable migration potential, and likely contribution to overall risk to human health and the environment. The frequency of detection of each constituent in all media is provided in Appendix E (Tables E-1 through E-6). The chemicals discussed in this section are listed in Table 6-1 and their specific fate and transport properties are described in the next section. These properties provide a range of the properties characteristic of each of the chemical groups.

Note that the potential of a contaminant to contribute to human health or ecological risk was evaluated in the screening process summarized in Sections 7 and 8, respectively.

6.1.2 Physical and Chemical Properties

Various basic physical and chemical properties affect the transport of chemicals in the environment at the site. The following are considered to be the most important properties:

- Sorption
- Volatilization
- Degradation
- Transformation
- Bioaccumulation

Table 6-1 contains data for the representative chemicals on the physical and chemical properties relevant to fate and transport. Table C-1 in Appendix C contains data on pH, Eh, conductivity, turbidity, temperature, and DO in groundwater obtained during groundwater sampling at Site 12. Similar surface water data are presented in Table C-2. The properties themselves are briefly described below.

6.1.2.1 Sorption

Sorption is the tendency for chemicals to adsorb to and desorb from materials in the media through which the contaminants are being transported. The subsurface materials likely to sorb chemicals typically are clays and organic material, both found at the site. The organic and clay materials are generally limited to within the first feet of the soil horizon. In addition, inorganic chemicals adsorb onto iron, manganese, and aluminum oxyhydroxide or oxide coatings on soil and sediment grains. Adsorption of metals can be irreversible because of the process of fixation.

The conventional measure of sorption is the distribution coefficient (K_d) of soil and geologic material for the chemical. The K_d for organic chemicals is the product of a partition coefficient (K_{oc}) and the fraction of organic carbon (f_{oc}). In general, chemicals with a K_{oc} greater than 10,000 ml/g (e.g., many SVOCs) have high degrees of adsorption and consequentially low mobility, whereas chemicals with a K_{oc} lower than 1,000 ml/g (e.g., many VOCs) have lower degrees of adsorption and consequentially higher mobility. A higher K_{oc} also contributes to greater bioaccumulation. The K_d for inorganic chemicals is a complex function of pH, organic content, oxide coatings, and other factors; therefore, K_d is not easily estimated by methods other than site-specific testing.

The migration rates of dissolved contaminants range widely between different chemicals because of their degree of adsorption. As a first estimate, they will move at the rate of groundwater flow, or by advection. The rate of groundwater flow is estimated using Darcy's Law and dividing it by the effective porosity:

$$v = K \times \nabla h / n_e$$

where v = Groundwater-flow velocity (ft/day)

K = Hydraulic conductivity (ft/day)

∇h = Hydraulic gradient (dimensionless)

n_e = Effective porosity (dimensionless)

Typically, contaminants will not move as rapidly as the groundwater because of adsorption of the contaminant on the geologic media. For each contaminant detected at the site, it is theoretically possible to calculate a retardation coefficient, which is an estimate of the degree

to which the contaminant is slowed by adsorption in relation to the groundwater-flow velocity. The retardation coefficient is calculated according to the following equation:

$$R = 1 + p_b \times K_d / ne$$

where R = Retardation coefficient (dimensionless)

p_b = Bulk density (gm/cm^3)

K_d = Distribution coefficient (ml/gm)

The effect of retardation is estimated by dividing the groundwater-flow velocity by R, which provides a value of migration that is either equal to (in the case of no retardation) or less than the flow rate (in the presence of retardation).

In order to estimate the K_d of the soil for a particular organic chemical, it is necessary to have an estimate of the TOC in the soil. Site-specific measurements of TOC are available from surface and subsurface soils at Site 12.

The values of TOC in soil at Site 12, which are provided in Table 5-6, ranged from 250 to 15,000 mg/kg, with a geometric mean of 6,961 mg/kg. The geometric mean value was converted to an f_{oc} by dividing by 1,000,000, yielding a value of 0.007. The K_d was then estimated by multiplying the f_{oc} by the K_{oc} (from Table 6-1) for the particular organic chemical. These results are listed in Table 6-2. For inorganics, this simple relationship is not applicable, and site-specific data were not used to calculate distribution coefficients. Therefore, estimates obtained from the literature and provided in Table 6-1 were used; these values are also listed in Table 6-2.

Retardation coefficients for each of the major chemical groups were estimated and are provided in Table 6-2. A bulk density of 1.85 grams per cubic centimeter (typical of silty sand) and an effective porosity of 0.25 were assumed. A range of values was calculated to show the effects of the variability in the K_d. Both the range in lower values and the range in upper values of K_d for metals were used because many metals, such as arsenic and chromium, vary widely in their mobility depending upon their valence state.

The estimates of retardation provided in Table 6-2 indicate a wide range. Pesticides and PCBs show the largest range in retardation, which would produce migration rates as low as 1.1×10^{-6} for some pesticides and as low as 6.8×10^{-5} for Aroclor-1260 with a groundwater flowrate of 0.1533 ft/day.

It is noted that the TOC values used in the calculations of retardation coefficients for organic compounds in Table 6-2 were mostly obtained from samples of surface soil. Typically, subsurface soil has lower values of TOC than surface soil because of the lower amounts of vegetative material with depth. Therefore, the retardation coefficients estimated using the TOC values from the surface soil may overstate the degree of retardation because the adsorption would be overestimated. Therefore, the values of retardation of organic compounds should be considered high-end estimates, and the degree of retardation of organic compounds may be lower.

The distribution coefficients of the contaminants associated with the site vary widely between the organic and inorganic analytes. The distribution coefficients of the inorganic

analytes also vary widely depending on the valence state of some of the analytes and the pH and other conditions encountered in the subsurface. The data provided in Table 6-2 are from various reports and documents in the literature, not from the site. Therefore, the estimates of R have an even greater level of uncertainty than do the estimates of the rates of groundwater flow. As a result, the estimates of the rates of contaminant migration are very approximate.

6.1.2.2 Volatilization

Volatilization is the tendency for some chemicals, particularly VOCs, to change from a liquid or adsorbed state to a gas. A conventional measure of volatility is Henry's Law constant (K_h). Values of K_h for the representative chemicals are provided in Table 6-1.

Compounds with K_h values higher than 10^{-3} atmosphere-cubic meter per mole (atm-m^3/M) are expected to volatilize readily from water to air, whereas those with K_h values lower than 10^{-5} atm-m^3/M are relatively non-volatile. Most inorganic chemicals are not volatile under normal temperature and pressure conditions.

6.1.2.3 Degradation

Degradation is the transformation of one chemical to another by such processes as hydrolysis, photolysis, and biodegradation. Hydrolysis is the reaction of a chemical with water and photolysis is the result of exposing the chemical to light.

Degradation is commonly expressed as a half life that composites the degradation by whatever processes may be operating. Estimates of half lives for the representative chemicals are provided in Table 6-1.

6.1.2.4 Transformation

Transformation occurs when metals are increased or reduced in valence state by oxidation or reduction, respectively. Transformation may have a significant effect on the mobility of a metal, either increasing or decreasing it. Transformation can be caused by Eh and pH changes and by microbial or non-microbial (abiotic) processes.

6.1.2.5 Bioaccumulation

Bioaccumulation is the extent to which a chemical will partition from water into the lipophilic parts (e.g., fat) of an organism. Bioaccumulation commonly is estimated by the octanol-water partition coefficient (K_{ow}). Chemicals with high values of K_{ow} tend to avoid the aqueous phase and remain in soil longer or bioaccumulate in the lipid tissue of exposed organisms. Accumulation of a chemical in the tissue of the organism can be quantified by a bioconcentration factor (BCF), which is the ratio of the concentration of the chemical in the tissue to the concentration in the water. BCFs are both contaminant-specific and species-specific.

Estimates of the values of K_{ow} and BCF for the representative chemicals are provided in Table 6-1. Inorganic chemicals and SVOCs tend to have higher K_{ow} values, so they bioaccumulate more extensively than VOCs.

6.1.3 Representative Chemicals

The following chemical-specific profiles briefly describe how the chemical and physical properties of the representative chemicals (Table 6-1) affect their mobility and persistence in the environment.

6.1.3.1 Pesticides: 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT

These pesticides were detected above human health screening criteria in surface water and above ecological criteria in surface soil. 4,4'-DDD and 4,4'-DDT were detected above ecological criteria in sediment samples collected in the drainage swale south of Runway 28.

4,4'-DDD and 4,4'-DDE are impurities in 4,4'-DDT as well as biodegradation products of 4,4'-DDT. Therefore, they may occur in the environment as a result of the use of 4,4'-DDT as an insecticide.

If released to soil, they will adsorb very strongly to the soil and will not be expected to leach through soil to groundwater. With the exception of 4,4'-DDE, they were not detected in groundwater at Site 12. They will not hydrolyze under normal environmental conditions and are not subject to significant biodegradation. Evaporation from the surface of soils with low organic content (such as sandy soils) may be significant, but adsorption of them to soil may reduce the rate of evaporation. If released to water, they will adsorb very strongly to sediment and bioconcentrate in aquatic organisms.

6.1.3.2 PCBs: Aroclors 1248 and 1260

These PCBs were detected above human health criteria in surface soil, surface water, and groundwater at Site 12.

PCBs such as these Aroclors are characterized by low water solubility, low volatility, high affinity for organic matter, and high resistance to chemical or biological degradation. Aroclors are mixtures of different congeners of chlorobiphenyl and the relative importance of the environmental-fate mechanisms generally depends on the degree of chlorination. In general, the persistence of the PCB congeners increases with an increase in the degree of chlorination. Screening studies have shown that Aroclors generally are resistant to biodegradation. It has also been shown that the higher chlorinated congeners in PCBs are susceptible to reductive dechlorination by anaerobic microorganisms found in aquatic sediments.

The PCB congeners present in Aroclors will become tightly adsorbed to the soil particles if they are released to soil. Due to their low solubility and tendency to adsorb to soil, PCBs in the soil generally do not cause significant groundwater contamination and do not do so at Site 12. The affinity for Aroclors to adsorb generally increases as the degree of chlorination of the individual congeners increases.

PCBs may migrate off the sites with erosion by surface water and by entrainment in the air. They then may be deposited in sediments in surface water bodies. Adsorption to sediment and suspended matter will be an important fate process if released to water. Although adsorption can immobilize Aroclors for relatively long periods of time, eventual re-solution into the water column has been shown to occur. The PCB composition in water will be

enriched in the lower chlorinated PCBs because of their greater water solubility, and the least water-soluble PCBs (i.e., highest chlorine content) will remain adsorbed.

Aroclors have been shown to bioconcentrate significantly in aquatic organisms.

6.1.3.3 SVOCs: Naphthalene and 2-Methylnaphthalene

These SVOCs were detected above North Carolina screening levels in soil and groundwater at Burn Pit E.

Light polynuclear aromatic hydrocarbons (PAHs) such as these naphthalene compounds are characterized by relatively low water solubility, high volatility, and weak affinity for soil particles. When present in surface soil, naphthalene can evaporate easily and is broken down by sunlight in the air within a few days. In healthy aerobic soil, naphthalene can be broken down by microorganisms within a few months, although the process can take much longer at sites where high concentrations of naphthalene, the presence of other contaminants, or other unfavorable conditions slow the degradation process. When released to soil, naphthalene binds weakly to soil particles. It can migrate easily through permeable soils and reach groundwater. Naphthalene can migrate offsite in groundwater through dilution and dispersion.

In surface water, naphthalene has a half-life of a few days to a few weeks, with most losses due to volatilization. Naphthalene remains primarily in solution, although smaller amounts can sorb to suspended particulates or sediment. Naphthalene has not been found to significantly bioaccumulate in aquatic organisms.

6.1.3.4 Metals: Arsenic, Chromium, and Zinc

Arsenic. Arsenic exceeded human health screening criteria in surface soil, groundwater, and sediment at Site 12.

The predominant form of arsenic in oxidizing environments is arsenate (As[+5]). Under slightly reducing and acidic conditions, such as temporary flooding, the more toxic and mobile arsenite (As[+3]) form dominates. Arsenite and methylated arsine predominate in moderately reducing soil, such as tidal marshes and consistently flooded soil. In natural environments, arsenic also may exist in the As(-3) and As(0) states, but only under highly reducing conditions.

Transport and partitioning of arsenic (and all other metals) in water depend on the oxidation state of the arsenic and on interactions with other materials present. Organic matter, divalent metals, and dissolved sulfide enhance the reduction of the arsenic valence state to a more mobile form. Soluble forms move with water, but arsenic may be adsorbed from water onto sediment or soil, especially clays, iron oxyhydroxides and oxides, aluminum hydroxides, manganese compounds, and organic material. Adsorption to oxyhydroxides is the most important natural adsorption process.

Microbes are capable of methylating arsenic to trimethylarsine gas, which is a more-volatile and more-mobile form than inorganic arsenic.

Bioaccumulation of arsenic occurs in aquatic organisms, particularly algae and lower invertebrates. Although some fish and invertebrates may contain high levels of arsenic

compounds, the predominant arsenic form, arsenobetaine, is relatively inert. Biomagnification in aquatic food chains does not appear to be significant.

Chromium. Chromium exceeded human health criteria for surface soil and groundwater, and ecological criteria for sediment at Site 12.

Chromium forms a number of compounds in various oxidation states. Those of Cr(+2) (chromous), Cr(+3) (chromic), and Cr(+6) (chromates) are most important. Cr(+3) is the dominant species under pH and redox conditions generally present in the subsurface. Cr(+3) may be converted to highly mobile and more toxic Cr(+6) under oxidizing conditions. Cr(+3) is readily adsorbed in the subsurface while Cr(+6) is not. Cr(+6) is a moderately strong oxidizing agent and reacts with organic and other oxidizable material to form Cr(+3).

Most of the chromium in surface water may be present in particulate form as sediment. Some of the particulate chromium would remain as suspended matter and ultimately be deposited in sediments. Cr(+3) can combine with aqueous hydroxide ions to form insoluble chromium hydroxide ($Cr(OH)_3$). Precipitation of this material may be a dominant transport pathway for chromium in natural waters. Although most of the soluble chromium in surface water may be present as Cr(+6), a small amount may be present as Cr(+3) organic complexes. Cr(+6) may be reduced to Cr(+3) by organic matter present in the water and may eventually deposit in sediments.

Chromium is bioaccumulated by aquatic organisms and its passage through the food chain has been documented.

Zinc. Zinc exceeded ecological screening criteria in surface soil and surface water at Site 12.

In the environment, zinc occurs primarily in the Zn(+2) oxidation state and has the tendency to strongly sorb to such substrates as hydrous metal oxides, clays, and organic matter. Free Zn(+2) in the aquatic environment tends to be adsorbed by suspended solids, such as humic and fulvic acids. In this way, zinc's mobilization can be increased.

Zinc has been shown to bioaccumulate in aquatic organisms, where concentrations can be as much as 1,000 times that found in water.

6.1.4 Aquifer Properties

The following physical mechanisms control the fate and transport of contaminants dissolved in groundwater during migration:

- Advection, the transport of dissolved contaminants by the bulk motion of flowing groundwater, is the primary transport mechanism for dissolved contamination along the hydraulic gradient. Advection controls the rate and direction of contaminant migration.
- Dispersion, the spreading of dissolved contaminants from the path they would be expected to follow during advection, results from the spatial variation in aquifer permeability, fluid mixing, and molecular diffusion. Dispersion primarily controls the concentration of the contaminant at any point in the flow system.

Dispersion occurs in moving groundwater because of local variations in flow velocities caused by the variability of the hydraulic conductivity of the porous media. Typically, the

degree of dispersion is greater in the direction of water flow than in directions perpendicular to it. The concentrations of the chemicals at the center of the contaminant plume will decrease as dispersion dilutes the contaminant mass. Some contaminants will migrate more rapidly than the center of mass of the concentration and some will migrate more slowly. The center of mass would move at the rate estimated by dividing the groundwater-flow velocity by the retardation coefficient of the migrating chemical, as described earlier in this section.

6.2 Contaminant Migration for Site 12

This section discusses the site-specific source areas and potential mechanisms for contaminant release and migration from source areas at Site 12. The discussion is organized by media within the site that may experience contaminant transport.

Fundamental to describing fate and transport at the site is the conceptual site model (CSM), which is described in this section. The CSM qualitatively defines the various contaminant sources, release mechanisms, relative rates of migration and persistence of contaminants, and migration pathways for contaminants at the site.

6.2.1 Source Areas

Based on the previous investigations and the chemical and physical data gathered for the sites, the following potential contaminant source areas have been identified at Site 12:

- The Crash-crew Burn Pit (and historical burn pits) and runoff coming into contact with burn pit contaminants. Runoff is expected to flow southward across the asphalt runway surface into the grassy area south of the runway. Runoff carrying burn pit contamination would primarily deposit this contamination in surface soils south of the runway and to some degree in site surface water and sediments in the drainage swale.
- The oil/water separator and associated piping which receives fire-fighting water captured in the burn pit trench drain and runoff contained within a concrete pad beneath the above-grade waste JP-5 fuel tank.
- A former 6,000-gallon UST formerly located approximately 20 ft south of the oil/water separator.

The primary mechanisms for contaminant transport from the source areas at the site are believed to be:

- Leaching of contaminants from the soil by infiltrating precipitation and transport by surface runoff or flow through the soil to groundwater
- Entrainment of contaminated surface soil into the air by wind erosion
- Erosion of surface soil from the site and deposition in surface water and creek sediments

6.2.2 Releases from Soil to the Atmosphere

Wind erosion and vehicular traffic are considered to be the primary mechanisms for releases of site contaminants to the atmosphere from soil because inorganics constitute the majority

of contaminants identified at the sites. Inorganics and many SVOCs tend to bind to the soil and can be released to the atmosphere as dust during windy conditions or site activities. However, the potential for release of site contaminants to the atmosphere is considered to be minimal because most of the site is covered with asphalt or grass.

Volatilization, which is the primary mechanism for releasing volatile contaminants from soil to the atmosphere, is not considered to be a significant part of potential contaminant release at the sites. Few VOCs were detected in surface soil and subsurface soil at the site and their concentrations are very low.

6.2.3 Releases from Soil to Surface Water and Sediment

Contamination in surface soil at the site to the drainage swale is moderately restricted because most of the site is covered with grass. The contaminated soil transport can be by wind erosion and by surface water flow erosion because surface drainage at the site is southward toward the drainage swale. Contaminants may be transported by surface runoff either in the dissolved phase or as suspended particulates. The load carried by surface water usually is deposited under oxidizing conditions and, therefore, transported chemicals may be oxidized if the transport times are long enough. This may enhance the transport of some metals such as chromium and reduce the potential for others, such as arsenic.

Surface water is a potential source of contaminants to sediment. Contaminants in the site soil may be transported by surface runoff as suspended particulates to the drainage swale, which then settle out into the sediment.

6.2.3.1 Potential Releases to Surface Water

This section discusses the potential for releases to surface water at Site 12 based on the contaminants found in surface and subsurface soil at the site as well as direct evidence of impacts on Site 12 surface water (i.e., analytical results from surface water). It is important to note that surface water at Site 12 is temporary in nature—most of the drainage swale at Site 12 is nearly always dry, with the exception of the eastern portion where precipitation and runoff sometimes pond after rain events and during the wetter times of the year.

There were virtually no VOCs detected in surface soil and none in subsurface soil. In addition, no VOCs were detected in Site 12 surface water samples. Therefore, soil at Site 12 does not represent a source of VOCs in surface water.

Several SVOCs were found at low concentrations in surface and subsurface soils, but no SVOCs were detected in Site 12 surface water. Therefore, soil at Site 12 does not represent a source of SVOCs in surface water.

Low concentrations of a number of pesticides were found in surface and subsurface soils. In addition, one PCB (Aroclor-1260) was detected in surface soil. Very low concentrations of several of the pesticides detected in soils were also found in Site 12 surface water. The PCB Aroclor-1248 was found in one surface water sample, but is a different compound than the PCB found in surface soil at Site 12. Site 12 soil appears to be a potential source of pesticides to surface water, although the pesticides found in Site 12 soils are not likely related to site activities.

There are a number of metals, including the representative chemicals arsenic, chromium, copper, lead, and zinc, which were detected in surface and subsurface soils, predominantly in surface soils south of the runway. The surface soil containing these metals is subject to erosion into the drainage swale. Most of the metals detected above background concentrations in soils were also found in one or more surface water samples. Therefore, Site 12 soil appears to be a potential source of metals to surface water.

6.2.3.2 Potential Releases to Sediment

This section discusses the potential for releases to the sediments at Site 12 from contaminants found in surface and subsurface soil as well as direct evidence of impacts on Site 12 sediment (i.e., analytical results from sediment).

There were virtually no VOCs detected in surface soil and none in subsurface soil. In addition, no VOCs were detected in Site 12 sediment samples. Therefore, soil at Site 12 does not represent a source of VOCs in sediment.

Several SVOCs were found at low concentrations in surface and subsurface soils, but only one SVOC (di-n-butylphthalate) was detected at a very low concentration in Site 12 sediment. Therefore, soil at Site 12 does not represent a source of SVOCs in sediment.

Low concentrations of a number of pesticides were found in surface and subsurface soils. In addition, one PCB (Aroclor-1260) was detected in surface soil. Very low concentrations of several of the pesticides detected in soils were also found in Site 12 sediment. No PCBs were found in Site 12 sediment samples. Site 12 soil appears to be a potential source of pesticides to sediment, although the pesticides found in Site 12 soils are not likely related to site activities.

There are a number of metals, including the representative chemicals arsenic, chromium, copper, lead, and zinc that were detected in surface and subsurface soils, predominantly in surface soils south of the runway. The surface soil containing these metals is subject to erosion into the drainage swale. Most of the metals detected above background concentrations in soils were also found in one or more sediment samples. Therefore, Site 12 soil appears to be a potential source of metals to sediment.

6.2.4 Releases from Soil to Groundwater

Percolation of precipitation, both rainfall and snowmelt, through the unsaturated soil can dissolve contaminants and transport them to the underlying groundwater. Thus, surface and subsurface soil can serve as a source of contaminants to groundwater.

There were virtually no VOCs detected in surface soil with the exception of low concentrations of toluene and xylenes at one surface soil sampling location. No VOCs were detected in subsurface soil at this same location, or any other location. Site 12 groundwater samples contained very little VOC contamination other than very low concentrations of toluene at most wells. However, the monitoring well located upgradient of Site 12 contained similar concentrations as the downgradient samples. Therefore, soil at Site 12 does not represent a source of significant levels of VOCs in groundwater.

Several SVOCs were found in surface and subsurface soils during the RI, and the extent of contamination was delineated during the SRI. In addition, the SRI identified SVOCs in

groundwater at Site 12. Therefore, soil at Site 12 appears to be a source of SVOCs to groundwater.

Low concentrations of a number of pesticides were found in surface and subsurface soils. In addition, one PCB (Aroclor-1260) was detected in surface soil. Pesticides and PCBs have low solubilities and relatively high K_{oc} values, and as a result are not typically found in groundwater. However, very low concentrations of some of the pesticides detected in soils were also reported in one or more Site 12 groundwater samples. Pesticides were also detected in the upgradient monitoring well sample (012MW01). It is important to note, however, that the reliability of the pesticide data for groundwater is very poor. The reported concentrations are all below the quantitation limits and the dual column precision criterion (25-or-less-percent concentration difference) was exceeded in every case. Based on the data, Site 12 soil appears to be a potential source of pesticides to groundwater, although the pesticides found in Site 12 soils are not likely related to site activities and there is considerable doubt regarding the reliability of the groundwater pesticide data.

The PCB Aroclor-1248 was found in one groundwater sample, but is a different compound than the PCB found in surface soil at Site 12. In addition, the reliability of the PCB data in groundwater is questionable, as the dual column precision criterion (25-or-less-percent concentration difference) was exceeded.

There are a number of metals, including the representative chemicals arsenic, chromium, copper, lead, and zinc, detected in surface and subsurface soils, predominantly in surface soils south of the runway. The metals detected above background concentrations in soils were also found in one or more groundwater samples, although there did not appear to be good correlation between locations with relatively high metals concentrations in soils versus groundwater. Nevertheless, Site 12 soil appears to be a potential source of metals to groundwater.

6.2.5 Migration of Contaminants in Groundwater

6.2.5.1 General Conceptual Model of Groundwater Flow

Recharge to the Groundwater System. At Site 12, precipitation that does not run off of the surface of the ground toward the drainage swale south of Runway 28 or is evaporated or transpired into the air, infiltrates the surface of the ground. Most infiltration occurs in areas of the site where there is grass cover and the ground is flat or has only a low slope.

The infiltrating water moves by gravity downward through the unsaturated soil. At some depth (generally on the order of 10 to 13 ft bgs) the infiltrating water reaches the water table and enters the shallow groundwater system.

Recharge to the groundwater system underlying the site also occurs via movement of upgradient groundwater through the site area.

Hydrogeology of Individual Units. The surficial aquifer (water table) at the site is relatively flat and slopes to the east toward Hancock Creek, located ¾ mile east of the site.

Underlying the surficial aquifer at the site is the Yorktown Confining Unit, a clay unit that separates the overlying water table from the underlying Yorktown Aquifer. There is no site-specific data to determine the differences in hydraulic head between the surficial and

Yorktown Aquifers which would indicate the potential for vertical migration between the two aquifers. Based on regional data on the thickness (regionally 22 ft) and the composition (clayey to sandy clay) of the Yorktown Confining Unit at Site 12, it is unlikely that contaminants from Site 12 are migrating downward to the Yorktown Aquifer.

Discharge from the Groundwater System. The assumption is that the surficial aquifer discharges directly into Hancock Creek and eventually into the Neuse River.

6.2.5.2 Conceptual Model of Contaminant Transport

Previous sections have described how contamination in soil could be transported to the groundwater and how groundwater moves at the site. In this section, the migration of contaminants in groundwater at Site 12 is described. First, the upgradient contamination conditions are discussed. These conditions provide a background against which possible effects of the site on the groundwater can be evaluated. Then the migration of contamination through the groundwater underlying the site and the likely effects of the site on the groundwater are discussed. Finally, the potential for discharge of contaminated groundwater to surface water is discussed.

Upgradient Groundwater. As described earlier in this section, groundwater in the surficial aquifer at Site 12 generally flows to the east beneath the site. Well 012MW01, located on the northern side of the runway and west of the burn pit and oil water separator, is considered to be the background well for the site. The well contained only three organic compounds: alpha-chlordane, gamma-BHC, and toluene, none of which were detected above any screening criteria. Two inorganic constituents were detected in the background well above screening criteria in unfiltered samples: aluminum at 730 μg/L and iron at 484 μg/L. Several metals such as arsenic, and chromium were not detected in the background well and they exceeded screening criteria elsewhere on the site. Barium was detected in the background well below groundwater screening criteria and remained below screening criteria elsewhere on the site. The metals iron and manganese, along with sodium, are common chemicals found in natural systems, and may not be site-related.

Onsite Groundwater—General. As discussed earlier, groundwater in the water table moves eastward across the site. The rates of horizontal advective flow in the groundwater system underlying the site were estimated, using data from previous investigations:

- Surficial Aquifer
  - ***K = Geometric mean of 13.92 ft/day***
  - $\nabla h = 0.0033$
  - $n_e = 0.25$
  - v = Approximately 0.1533 ft/day

It should be stressed that this value is an approximation of the likely groundwater flow velocity in the groundwater system at the site. The uncertainty in the hydraulic conductivity and the variability make dependable and representative values difficult to estimate.

As described in Section 6.1.2, the actual migration rates of contaminants can be estimated using the rates of groundwater flow and estimates of the retardation coefficient for each chemical. The rates of migration are discussed for each chemical group below.

Earlier in this section, background groundwater quality was discussed. The assumption is that the analytical results from well 012MW01, located on the northwest side of the site, provide the best indication of background quality for the water table.

Downgradient Groundwater. As described in the conceptual hydrogeologic model, groundwater in the surficial aquifer is assumed to discharge to Hancock Creek. VOCs and SVOCs will not be sources of contamination to surface water. Other than 2 VOCs detected at trace levels (less than 0.5 μg/L), no VOCs or SVOCs were detected in groundwater.

The inorganics detected above screening criteria in the groundwater were aluminum, arsenic, chromium, iron, and manganese. The mobility of these compounds is low. Groundwater flow across the site is relatively slow (approximately 56 ft per year) and is not expected to be a significant source of metals to Hancock Creek.

6.3 Summary of Fate and Transport Conclusions

The following bullets summarize the potential migration pathways that appear to be present at the site and also indicate whether the data show that migration is confirmed, likely, unlikely, or nonexistent for the major classifications of contaminants found at Site 12.

- Site 12 soil to surface water:

  VOCs – no migration
  SVOCs – no migration
  Pesticides and PCBs – likely migration
  Metals – likely migration

- Site 12 soil to sediment:

  VOCs – no migration
  SVOCs – no migration
  Pesticides and PCBs – likely migration
  Metals – likely migration

- Site 12 soil to groundwater:

  VOCs – no migration
  SVOCs – confirmed migration[6]
  Pesticides and PCBs – likely migration[7]
  Metals – likely migration

[6] Migration is considered confirmed based on exceedances of NC 2L standards in groundwater, as documented in the SRI Report (Attachment 2).

[7] Migration is likely if data reliability issues are overlooked. However, the reliability of the groundwater pesticide and PCB data is considered very poor. For pesticides and PCBs, the reported concentrations were below quantitation limits and the dual column precision criterion (25 percent or less percent concentration difference) was exceeded in every case. In addition, the PCB reported in groundwater was a different compound than detected in overlying soils.

Table 6-1
Physical, Chemical, and Half-Life Data of Representative Chemicals
Site 12 Remedial Investigation
MCAS Cherry Point, North Carolina

Chemical	Molecular Weight (g/mole)	Specific Gravity (unitless)	Water Solubility (mg/L)	Vapor Pressure (mm Hg)	Henry's Law Constant (atm-m^3/mole)	K_d or Log K_{oc}[1] (mg/g)	Log K_{ow} (ml/g)	Fish BCF (unitless)	Half-Life Range (days)			
									Soil		Groundwater	
									Low	High	Low	High
Pesticides and PCBs												
4,4'-DDD	320.05 (1)	1.48 (1)	0.050 (1)	1.02E-06 (1)	2.16E-05 (1)	4.64 (1)	6.02 (1)	6,210 - 52,500 (3)	730 (2)	5,700 (2)	16 (2)	11,400 (2)
4,4'-DDE	319.03 (1)	NA	0.055 (1)	6.49E-06 (1)	2.34E-05 (1)	5.39 (1)	5.83 (1)	10,000 - 81,000 (3)	731 (2)	5,700 (2)	70 (2)	11,400 (2)
4,4'-DDT	354.49 (1)	1.56 (1)	0.017 (1)	1.9E-07 (1)	1.03E-04 (1)	5.14 (1)	6.44 (1)	21,580 - 690,000 (3)	732 (2)	5,700 (2)	71 (2)	11,400 (2)
Aroclor-1248	288 (avg) (1)	1.41 (1)	0.050 (1)	4.94E-04 (1)	0.0035 (1)	5.64 (1)	6.11 (1)	270,000 - 340,000 (3)	NA	NA	NA	NA
Aroclor-1260	370 (avg) (1)	1.57 (1)	0.080 (1)	4.05E-05 (1)	0.0071 (1)	6.42 (1)	6.91 (1)	270,000 - 340,000 (3)	NA	NA	NA	NA
VOCs and SVOCs												
Naphthalene	128.19 (4)	1.15 (4)	31.70 (4)	0.087 (4)	0.00046 (4)	2.97 (4)	3.29 (4)	3 (3)	0.12 (5)	125 (5)	258 (5)	2166 (5)
2-Methylnaphthalene	142.20 (4)	1.01 (4)	24.60 (4)	0.068 (4)	0.00050 (4)	3.39 (4)	3.86 (4)	NA	NA	NA	NA	NA
Inorganics												
Arsenic	U	U	U	U	U	20 - 70 (4)	U	3 - 4 (3)	U	U	U	U
Chromium	U	U	U	U	U	250 - 500 (4)	U	3.4 - 192 (3)	U	U	U	U
Copper	U	U	U	U	U	100 - 200 (4)	U	0 - 51.2 (3)	U	U	U	U
Lead	U	U	U	U	U	300 - 1100 (4)	U	17.5 - 726 (3)	U	U	U	U
Nickel	U	U	U	U	U	9 - 90 (4)	U	100 - 40,000 (3)	U	U	U	U
Zinc	U	U	U	U	U	8 - 200 (4)	U	2,000 - 100,000 (3)	U	U	U	U

[1] K_d for inorganics and log K_{oc} for organics K_d = Distribution coefficient K_{oc} = Organic carbon partition coefficient K_{ow} = Octanol-water partition coefficient

BCF = Bioconcentration factor

U = No value is provided because of the uncertainty in the form of these chemicals in the environment.

NA = Indicates data not available

Data sources:

(1) Montgomery and Welkom. 1989. Groundwater Chemicals Desk Reference. Volume 1.

(2) Howard, Ph. H. et al. 1991. *Handbook of Environmental Degradation Rates.*

(3) Region III BTAG Screening Levels. Interim Draft, 1/19/95

(4) Dragun, James. 1998. The Soil Chemistry of Hazardous Materials2nd Edition. Kd estimates, not Koc

(5) CH2M HILL. 1997. *Proposed Degradation Rates for Feasibility Study, Stockton Former MGP Site.*

Table 6-2
Retardation Coefficients for Representative Chemicals
Site 12 Remedial Investigation
MCAS Cherry Point
Cherry Point, NC

Chemical Group	Low Log K_{oc}	High Log K_{oc}	Low K_d	High K_d	Low R	High R
Pesticides and PCBs	4.64	6.42	305.56	18,412	2,262	136,248
SVOCs	2.97	3.39	6.53	17.18	49	128
Metals (Low range)	NA	NA	8	300	60	2,221
Metals (High range)	NA	NA	70	1,110	519	8,141

K_{oc} = Organic Carbon Partition Coefficient

K_d = Distribution Coefficient

R = Retardation Coefficient = $1 + K_d \times p_b/n_e$

p_b = Soil Bulk Density = 1.85 grams per cubic centimeter

n_e = Effective Porosity = 0.25

NA = Not Applicable; Kd provided

For organics, $K_d = K_{oc}$ x Fraction of organic carbon, estimated to be 0.007 based on site measurements.

7 Human Health Risk Assessment

7.1 Introduction

Section 7 presents the baseline HHRA for OU6, Site 12, MCAS Cherry Point that was conducted as part of the RI. It includes the objectives for this work, the approach used, assumptions made, findings, and conclusions reached. Supplemental information is presented in appendices; Appendix E includes the data evaluated in the risk assessment, and Appendix G includes the interim deliverable tables required for *Risk Assessment Guidance for Superfund (RAGS), Volume 1, Human Health Evaluation Manual, Part D* (USEPA, January 1998) and supporting tables. Additional guidance documents used for preparing the risk assessment included *RAGS Part A* (USEPA, December 1989) and USEPA Region IV *Supplemental Guidance to RAGS: Region 4 Bulletins* (USEPA, October 1996).

The objective of this baseline risk assessment was to determine the magnitude and probability of actual or potential harm to public health, safety, and welfare posed by the threatened or actual release of hazardous substances at or from the site in the absence of additional remedial action. The results of this risk assessment will be useful in determining whether a current or potential future risk to human health warrants remedial action at the site.

Additional HHRA work was performed using the data collected during the SRI. Subsurface soil was evaluated for human health risks to construction workers as a result of non-carcinogenic SVOCs detected above screening criteria. The assessment concluded that the subsurface soil does not pose a non-cancer hazard. The assessment is summarized in Attachment 2.

7.1.1 Site Overview

A summary of the site history and setting presented in Section 2.1 is included here. MCAS Cherry Point is part of a military installation in southeastern Craven County, North Carolina, just north of the town of Havelock. The Air Station encompasses approximately 13,164 acres. MCAS Cherry Point is bordered on the north by the Neuse River, on the east by Hancock Creek, on the south by North Carolina Highway 101, and on the west by an irregular boundary line, approximately three-quarters of a mile west of Slocum Creek (Figure 4-2). The facility is situated on a peninsula north of Core and Bogue Sounds and south of the Neuse River.

The Air Station was commissioned in 1942 to maintain and support facilities, services, and materiel of a Marine Aircraft Wing, and other activities and units as designated by the Commandant of the Marine Corps. Occupants of the Air Station include the 2nd MAW, the NADEP, the combat Service Support Detachment 21 of the 2nd FSSG, the Naval Hospital, the Dental Clinic, the Naval Air Maintenance Training Group Detachment, and the DRMO. The Air Station has facilities for training and support of the FMF Atlantic aviation units and is also designated as a primary aviation supply point.

OU6 is located in the northeastern portion of MCAS Cherry Point and consists of the eastern portion of Runway 28 (Figure 2-1). Runway 28 does not appear to have been used as an active runway for aircraft since the late 1950s. Since that time, portions of the eastern section of Runway 28 have been used for crash-crew training (fire fighting), engine run-up activities, and aircraft long-term storage experimentation. Site 12, the crash-crew training area, is located along the south side of Runway 28, at approximately the midpoint of the runway's length (Figure 2-2). Site 12 is currently used for training crash-crew fire-and-rescue personnel and consists of a firefighting burn pit, an oil/water separator, and an AST. There are no known plans to change the future use of Site 12.

7.1.2 Conceptual Model

The CSM presents an overview of site conditions, potential contaminant migration pathways, and exposure pathways to potential receptors. Figure 7-1 presents the CSM for Site 12. Table 1 in Appendix G.1 summarizes the potential exposure pathways and scenarios considered for Site 12. As shown on Figure 7-1, the main source of contamination at Site 12 is the fire fighting burn pit (and the historical burn pits used prior to the construction of the current burn pit). The contamination from this source may have been transported across the runway with water sprayed during training activities to the soil and drainage swale south of the runway, and then may have leached into and through the soil to the surficial aquifer groundwater. Potential current and future receptors, including crash-crew fire and rescue personnel, industrial site workers, trespassers, construction workers, and residents, may contact residual contamination in soil, groundwater, surface water, and/or sediment through ingestion, dermal absorption, and/or inhalation. Although unlikely based on expected and planned future use of the site and base, future residents were considered as a worst case hypothetical receptor.

A detailed discussion of the nature and extent of contamination is presented in Section 5 and summarized in Section 7.2.1. A detailed discussion of the potential contaminant migration pathways is presented in Section 6. A discussion of potential human receptors and exposure pathways is presented in Section 7.3.

7.1.3 Scope of Human Health Risk Assessment

The primary objective of the HHRA was to assess the health risks to potential current and future human receptors from contamination present at and migrating from Site 12, under current site conditions. The risk assessment is comprised of the following components:

- **Identification of Chemicals of Potential Concern**—Identification of the contaminants found onsite and selection of the chemicals of potential concern (COPCs). COPCs represent the subset of all chemicals detected at the site that provides the largest contribution to total site risks.
- **Exposure Assessment**—Identification of the potential pathways of human exposure, and estimation of the magnitude, frequency, and duration of these exposures.
- **Toxicity Assessment**—Assessment of the potential adverse effects of the COPCs and compilation of the toxicity values used for developing numerical risk estimates.

- **Risk Characterization**—Integration of the results of the exposure and toxicity assessments to develop numerical estimates of health risks, and characterization of the potential health risks associated with potential exposure to site-related contamination.
- **Uncertainty Assessment**—Identification and discussion of sources of uncertainty in the risk assessment.
- **Remedial Goal Options**—Development of numerical remedial goal options for chemicals of concern (COC).

The risk assessment was based on the following major assumptions:

- No remediation is implemented at the site.
- Concentrations remain constant over the exposure periods.
- Although unlikely, future use of the site could include residential use, including potable use of site groundwater.

7.2 Identification of COPCs

The identification of COPCs includes data collection, data evaluation, and data screening. The data collection and evaluation involve gathering and reviewing the available site information and developing a set of data that is of acceptable quality for risk assessment. Once the data collection and evaluation are completed, the data are further evaluated to focus on those contaminants that need to be evaluated quantitatively in the risk assessment (data screening).

Subsection 7.2.1 identifies the data used for the risk assessment. Subsection 7.2.2 discusses the screening methodology used to reduce the risk assessment data set to the constituents and media that are of primary concern to human health. Subsection 7.2.3 identifies the COPCs that were quantitatively assessed in the risk assessment.

7.2.1 Data Summary

The data collected during this RI were quantitatively evaluated in the risk assessment. Data collected during previous investigations were used to select the sample locations for the RI and determine the constituents the samples were analyzed for by the laboratory. The RI data were validated in accordance with USEPA QA/QC requirements prior to evaluation in the risk assessment. Validation procedures established by the National Functional Guidelines for Organic (USEPA, 1994) and Inorganic Analyses (USEPA, 1993), as modified by Region III were adhered to during the validation process.

Table 7-1 lists the samples that were evaluated in the risk assessment. These data are discussed in the following paragraphs.

Surface Soil. Surface soil samples were collected from 16 locations south of the runway and two locations just beneath the surface of the runway during the RI (Figure 3-1). The samples were analyzed for TCL organic constituents and TAL inorganic constituents. Three VOCs were detected in the surface soil. Toluene and xylene were both detected in one sample, sample 012SS01, collected east of the oil/water separator. Methylene chloride was detected in three surface soil samples, samples 012SS03, 012SS05, and 012SS14, with the highest

detection in sample 012SS03. It should be noted that methylene chloride is a common laboratory contaminant and was detected in all of the field quality control samples (trip blanks and rinsate blanks) at low concentrations.

A few PAHs and phthalates were detected in one or two of the surface soil samples at low concentrations. The majority of the PAHs were detected in sample 012SS02, however PAHs were also detected in a few additional samples. Bis(2-Ethylhexyl)phthalate was detected in 11 of 15 samples, which is a much greater frequency of detection than that of the other phthalates that were detected. Bis(2-Ethylhexyl)phthalate is a common laboratory contaminant, however it was not detected in any of the trip or rinsate blanks.

A number of pesticides were detected in all of the surface soil samples, except samples 012SS06 and 012SS07, the samples collected from just beneath the runway surface. One PCB, Aroclor-1260, was detected in the surface soil samples collected near the oil/water separator.

Three surface soil samples (012SS15, 012SS06, and 012SS07) were analyzed for dioxins. All of the detected dioxin congeners were detected in sample 012SS15, the sample collected adjacent to the oil/water separator. Additionally, one dioxin congener was detected in sample 012SS06, and two dioxin congeners were detected in 012SS07, but at much lower concentrations than they were found in sample 012SS15.

Inorganic constituents were detected in all of the surface soil samples. While there was no clear pattern of contamination, the highest concentrations were generally detected in sample 012SS017.

The full set of surface soil data evaluated in the risk assessment is included in Appendix E. The minimum and maximum detected concentrations and the locations of the maximum detected concentrations are shown in Tables 2.1, 2.2, 2.9 and 2.10 in Appendix G.1.

Subsurface Soil. Two subsurface soil samples were collected at Site 12 and sent to the offsite laboratory for analysis (Figure 3-2). The samples were analyzed for full TCL/TAL compounds. Additional subsurface soil samples were collected and evaluated by the onsite laboratory for total petroleum hydrocarbons (TPH) and BTEX. The samples analyzed by the onsite laboratory were not evaluated in the risk assessment. VOCs were not detected in either of the samples analyzed by the offsite laboratory, nor were any VOCs detected in any of the samples analyzed by the onsite laboratory. Four SVOCs and six pesticides were detected in sample 012SB01 at low concentrations. A number of inorganic constituents were detected in both of the subsurface soil samples, with the maximum detected concentrations occurring in sample 012SB01. Sample 012SB01 was collected from a depth of one to two ft bgs about 20 ft southeast of the oil/water separator. Sample 012SB02 was collected from a depth of four to five ft bgs, about 100 ft southeast of the oil/water separator, directly south of the fire training burn pit.

The full set of subsurface soil data evaluated in the risk assessment is included in Appendix E. The minimum and maximum detected concentrations and the locations of the maximum detected concentrations are shown in Tables 2.11 and 2.12 in Appendix G.1.

Surface Water. Three surface water samples were collected from the drainage swale south of the runway and analyzed for full TCL/TAL compounds. Figure 3-4 identifies the locations of these samples. There were no VOCs or SVOCs detected in any of the surface water

samples. Pesticides were detected in samples 012SW01 and 012SW02, but not in 012SW03. However, the constituents that were detected at location 012SW01 were only detected in the duplicate sample from this location, not in the primary sample. The detected concentrations of the pesticides were typically below the sample quantitation limit, and the reliability of these data is questionable because the dual column precision criterion (25-or-less-percent concentration difference) was exceeded in every case. Aroclor-1248 was also detected in the duplicate of 12SW01, but was not detected in the regular sample or any of the other samples. Inorganics were detected in all of the samples with no clear contaminant pattern.

The full set of surface water data evaluated in the risk assessment is included in Appendix E. The minimum and maximum detected concentrations and the locations of the maximum detected concentrations are shown in Tables 2.3 and 2.13 in Appendix G.1.

Sediment. Sediment samples were collected from the drainage swale south of the runway from the same locations as the surface water samples (Figure 3-4). The samples were analyzed for full TCL/TAL compounds. There were no VOCs detected in the sediment. One SVOC, di-n-butylphthalate, was detected in one of the samples, sample 012SD03. A number of pesticides were detected in all of the sediment samples, with the maximum concentration generally occurring in sample 012SD03. Inorganics were detected in all of the samples, and again, the maximum concentrations appeared to be detected in sample 012SD03.

The full set of sediment data evaluated in the risk assessment is included in Appendix E. The minimum and maximum detected concentrations and the locations of the maximum detected concentrations are shown in Tables 2.4 and 2.14 in Appendix G.1.

Groundwater. Groundwater samples were collected from five monitoring wells during the RI (Figure 3-3). The samples were analyzed for full TCL/TAL compounds. Two VOCs, bromomethane and toluene, were detected in groundwater. Bromomethane was detected in one sample (012MW03) and toluene was detected in four samples, with the maximum detected in sample 012MW03. There were no SVOCs detected in any of the groundwater samples. A number of pesticide detections were reported in groundwater with the greatest number and highest concentrations reported in samples 012MW03 and 012TW01. One PCB, Aroclor-1248, was also detected in the groundwater, in the sample collected from 012TW01. The reliability of the pesticide/PCB data for groundwater is questionable, however. A number of inorganic constituents were detected in the groundwater samples, with the maximum concentrations generally occurring in sample 012TW01.

Groundwater samples were also collected during the RI using direct-push sampling techniques. The analytical results from the groundwater samples collected using the direct-push sampling techniques were not evaluated in the risk assessment. Direct-push groundwater samples are not considered useable for risk assessment due to the high turbidity generally found in these samples.

The full set of groundwater data evaluated in the risk assessment is included in Appendix E. The minimum and maximum detected concentrations and the locations of the maximum detected concentrations are shown in Tables 2.5 through 2.8 in Appendix G.1. Only unfiltered groundwater samples were analyzed in the risk assessment, following USEPA Region IV guidance (USEPA, October 1996).

7.2.2 Selection of COPCs

The following bullets discuss the methodology used to select the COPCs for quantitative evaluation in the HHRA.

- Surface soil data were compared to the USEPA Region III RBCs for residential soil (USEPA, September 2001). RBCs based on non-carcinogenic effects were divided by 10 to account for exposure to multiple constituents. RBCs based on carcinogenic effects were used as presented in the RBC table. For constituents with both carcinogenic and non-carcinogenic effects, the RBC for the more conservative of the two effects was used as the screening value. Constituents whose maximum detected concentration is below the RBC were not retained as COPCs.
- Subsurface soil data were compared to the USEPA Region III RBCs for industrial soil (USEPA, September 2001). RBCs based on non-carcinogenic effects were divided by 10 to account for exposure to multiple constituents. RBCs based on carcinogenic effects were used as presented in the RBC table. For constituents with both carcinogenic and non-carcinogenic effects, the RBC for the more conservative of the two effects was used as the screening value. Constituents whose maximum detected concentration is below the RBC were not retained as COPCs.
- Surface soil and subsurface soil data were compared to the USEPA Soil Screening Guidance (USEPA, April 1996) SSLs for inhalation of volatiles or fugitive particulates to select the COPCS for the soil to air exposure pathway. SSLs based on non-carcinogenic effects were divided by 10 to account for exposure to multiple constituents. Constituents whose maximum detected concentration is below the SSL were not retained as COPCs. Constituents without SSLs published in the guidance were not retained as COPCs since these constituents either do not have toxicity values for this pathway (inhalation) or they are not expected to be a concern through this pathway.
- The soil data were also compared to the NC RCRA SSLs for soil to groundwater (North Carolina, September 1999). If an NC SSL was not available, the soil data were compared to the USEPA SSLs for the protection of groundwater based on a dilution-attenuation factor (DAF) of 20 (USEPA, April 1996). This comparison was not used to select COPCs for direct contact with soil, but was used to indicate if the concentrations in soil may be a continuing source to groundwater contamination.
- Groundwater data were compared to the USEPA Region III RBCs for tap water (USEPA, September 2001). RBCs based on non-carcinogenic effects were divided by 10 to account for exposure to multiple constituents. RBCs based on carcinogenic effects were used as presented in the RBC table. For constituents with both carcinogenic and non-carcinogenic effects, the RBC for the more conservative of the two effects was used as the screening value. Groundwater data were also compared to the Federal Maximum MCLs and the North Carolina Maximum Allowable Concentrations or Interim Maximum Allowable Concentrations. Constituents whose maximum detected concentration is below the RBC, Federal MCL, and North Carolina standards were not retained as COPCs.
- Sediment data were compared to the USEPA Region III residential soil RBCs (USEPA, September 2001). RBCs based on non-carcinogenic effects were divided by 10 to account

for exposure to multiple constituents. RBCs based on carcinogenic effects were used as presented in the RBC table. For constituents with both carcinogenic and non-carcinogenic effects, the RBC for the more conservative of the two effects was used as the screening value. Constituents whose maximum detected concentration is below the RBC were not retained as COPCs.

- Surface water data were compared to the NC WQS for fresh water [listed in the State 2B Regulations (0208)] and Federal Ambient Water Quality Criteria (AWQC) for human health for freshwater ingestion of organisms and water (Federal 304a standards). For constituents without NC WQS or Federal AWQC, the USEPA Region III tap water RBCs were used as the screening criteria. RBCs based on non-carcinogenic effects were divided by 10 to account for exposure to multiple constituents. RBCs based on carcinogenic effects were used as presented in the RBC table. For constituents with both carcinogenic and non-carcinogenic effects, the RBC for the more conservative of the two effects was used as the screening value. Constituents whose maximum detected concentration is below the NC WQS (or AWQC, or RBC) were not retained as COPCs.
- Essential human nutrients (calcium, magnesium, potassium, and sodium) were not retained as COPCs if they were present at low concentrations (only slightly elevated above naturally occurring levels) and toxic only at very high doses (much higher than those that could be associated with contact at the site).
- The concentrations of inorganic constituents detected in site-related media were compared with two times the average site background concentration (*Background Evaluation Report*, Tetra Tech NUS, October 1999). If the maximum detected site-related inorganic constituent concentration is below two times the average site background concentration, the inorganic constituent was not retained as a COPC.
- The maximum sample quantitation limit (SQL) was used as the maximum detected concentration for the selection of COPCs for cases where no detectable quantities of a contaminant were found in any of the samples within a media. If the maximum SQL was greater than the screening criteria discussed in the preceding bullets, and there was no justification for not retaining the constituent as a COPC (i.e. site history, chemical properties), the constituent was retained as a COPC. However, the quantitative and/or qualitative evaluation of these non-detected constituents was included in the uncertainty section. These constituents are indicated as Group 2 COPCs in Table 7-3.
- If a constituent was retained as a COPC in one media it was retained as a COPC for all media (even if it was not detected in the other media), unless there was justification for not retaining it as a COPC (i.e. site history, chemical properties). However, the quantitative and/or qualitative evaluation of these constituents was included in the uncertainty section. These constituents are indicated as Group 3 COPCs in Table 7-3.
- There are no published dose-response values for assessing the risks associated with exposure to lead. USEPA has presented guidance on evaluating lead concentrations in both soil and water. Lead concentrations less than 0.015 mg/L in groundwater (the Safe Drinking Water Act action level for lead in potable water) and less than 400 mg/kg in soil (USEPA, July 1994) are considered adequately protective of human health under residential land-use conditions. Exceeding these values prompts further evaluation to assess the potential for human health impacts. The lead SSL of 400 mg/kg was used to

screen the soil and sediment data, and the lead groundwater screening level of 0.15 mg/L was used to screen the groundwater and surface water data.

- Dioxin congener concentrations were converted to 2,3,7,8-tetrachlorodibenzodioxin (2,3,7,8-TCDD) equivalent concentrations by multiplying by the toxicity equivalency factor (TEF). These concentrations were then compared to the screening values for 2,3,7,8-TCDD. The TEFs are presented in Table 7-2.

7.2.3 Summary of COPCs

Table 7-3 identifies the chemicals that were selected as COPCs based on the screening methodology in Section 7.2.2 for each of the media. The COPCs are grouped based on the reason they were selected. Only Group 1 COPCs are evaluated in the main body and main tables of the risk assessment. The Group 2 and 3 COPCs are evaluated quantitatively in the uncertainty section, as directed by USEPA Region IV and NCDENR. These are the constituents that were retained as COPCs, even though they may not have been detected in a given medium, if their maximum SQL exceeded the screening value or they were retained as a COPC for another medium. The Group 1 list of COPCs is significantly shorter than the combined Group 2 and 3 lists. There are no Group 1 COPCs for subsurface soil, for the surface soil to air, and for the subsurface soil to air media.

7.3 Exposure Assessment

Exposure assessment is the estimation of the likelihood, magnitude, frequency, duration, and routes of exposure to a chemical. Exposure refers to the potential contact of an individual (or receptor) with a chemical. Exposure can occur when contaminants migrate from a source to an exposure point, or when a receptor comes into direct contact with contaminated media.

The three components of exposure assessment include:

- Characterization of exposure setting
- Identification of exposure pathways
- Quantification of exposure

7.3.1 Characterization of Exposure Setting

Characterization of exposure setting consists of two parts: (1) characterization of the site with respect to the physical characteristics, and (2) characterization of the site with respect to human populations at or near the site.

7.3.1.1 Physical Setting

MCAS Cherry Point is part of a military installation just north of the town of Havelock in Craven County, North Carolina. The Air Station encompasses approximately 13,164 acres. Site 12 is located in the eastern portion of MCAS Cherry Point and consists of the south side of the eastern portion of Runway 28. Since the late 1950s, Site 12 has been used for training crash-crew fire-and-rescue personnel. The surface of the eastern portion of Runway 28 runway is mostly asphalt, with a number of small concrete pads. Grassy areas border the runway, with dense woods beyond the grass. The runway represents a topographic high in

the immediate area, and the ground surface slopes to the south at Site 12. There is a shallow earthen drainage swale about 75 ft south of the runway, and Hancock Creek is about 700 ft east of the runway. Access to Site 12 is via a gravel road that joins the northeast corner of Runway 28, or by crossing active runways from the west.

Flow in the earthen drainage swale is generally to the west, where it meets a more substantial drainage ditch that flows in the opposite direction about 300 ft west of the oil/water separator. At the junction of these two drainages, the combined flow is directed to the south and then the east, eventually discharging into Hancock Creek. The drainage swale in the vicinity of Site 12 is typically dry from the oil/water separator west to the where it meets the more substantial drainage ditch when precipitation is not occurring. The drainage swale is wet and marshy to the east of the oil/water separator. There is no outlet from the drainage swale to the east.

Site 12 consists of a fire burn pit on the runway, an oil/water separator at the southern edge of the runway, and an AST on the runway west of the burn pit. The burn pit is a circular concrete pad used to burn waste jet fuel (JP-5) to train crash crews to extinguish fires. It was reportedly constructed in 1985 and is about 100 ft in diameter with a 5-in. concrete curb around the circumference (Halliburton NUS, June 1993). The burn pit drains through subsurface piping to the oil/water separator. A circular trench drain surrounds the burn pad about 10 ft beyond the curb. Runoff captured by the drain is directed to the oil/water separator. Runoff outside the trench drain flows southward across the asphalt into the grassy area south of the runway. The drainage swale south of the runway eventually receives the runoff entering the grassy area. A significant portion of the runoff flows into the grassy area and the drainage swale through a small runoff channel located southwest of the burn pit, immediately east of the oil/water separator. It was observed that the soils were stained in this area.

The concrete and steel oil/water separator is in-ground with the top surface at grade. From 1985 to 1990 effluent from the oil/water separator was discharged through a NPDES-permitted outfall to the drainage swale. The effluent pipe has since been welded shut, and facilities maintenance personnel pump all liquids from the separator after training exercises or heavy rainfall and transport them to the IWTP.

There was a 6,000-gallon UST located about 20 ft south of the oil/water separator. The UST was the holding tank for JP-5 waste oil. The UST was removed in 1995, and no visible leaks or holes in the tank or related piping was noted (R.E. Wright Environmental, Inc., 1996). The UST was replaced in the early 1990s with an 8,000-gallon AST about 200 ft west of the burn pit. Fuel is pumped from the tank into the burn pit through subsurface piping. The tank is on a concrete pad surrounded by a 2-ft-high concrete berm. The concrete pad drains through subsurface piping to the oil/water separator.

A discussion of the regional physiography, climate, and surface water hydrology is included in Section 4.1. A discussion of the geology and hydrogeology is included in Section 4.3. Site-specific geology and hydrogeology are summarized in this section as they pertain to the risk assessment.

The aquifer beneath Site 12 that could be potentially affected by site-related contamination is the surficial aquifer. Deeper aquifers are not considered because of depth and separation

from contaminant sources by confining units. The thickness of the surficial aquifer in the vicinity of Site 12 is about 35 ft. Precipitation that does not run off of the surface or is not evaporated or transpired into the air, infiltrates the surface of the ground. The infiltrating water moves by gravity downward through the unsaturated soil where the infiltrating water reaches the water table and enters the shallow groundwater system. Depth to groundwater ranges from about 9.5 to 12 ft bgs. Groundwater flow generally mimics topography and flows east towards Hancock Creek.

Beneath the surficial aquifer lies the Yorktown confining unit. At Site 12, the confining unit is about 30 ft thick. The Yorktown confining unit separates the surficial aquifer from the Yorktown Aquifer. Groundwater from the Yorktown aquifer, and aquifers underlying the Yorktown aquifer were not evaluated in the risk assessment. Groundwater samples have not been collected from these aquifers because the impact from Site 12 on these aquifers is expected to be negligible.

Section 4.3.3 discusses the regional water usage. The primary source of water for municipal, residential, industrial, and agricultural use is from the aquifers of the Coastal Plain of North Carolina. The most important aquifer in the vicinity of the MCAS Cherry Point is the Castle Hayne Aquifer, which can yield very large quantities of usable water. The largest permitted groundwater users in Craven all have supply wells screened in the Castle Hayne Aquifer.

7.3.1.2 Potentially Exposed Populations

According to its website, MCAS Cherry Point employs about 13,000 personnel under full operation. About 7,500 military personnel and their families are stationed at the air station. In addition, about 5,700 civilians are employed at MCAS Cherry Point.

Site 12 currently serves as the fire training area for military crash crews. Current exposed populations include the crash-crew fire-and-rescue personnel who use the site for training and the facilities maintenance personnel who empty the oil/water separator and perform other site maintenance activities. The air station and surrounding areas are used for residential, recreational, industrial, and commercial purposes. The air station is not fully fenced, therefore, there is the opportunity for trespassers/visitors to access the site and be exposed to site media.

Although not likely, site use may change in the future. Potential future site use could be industrial or residential, resulting in greater future exposure to site media. Future exposed populations may include construction workers, full-time industrial workers, and/or residents.

The groundwater in the vicinity of MCAS Cherry Point is classified by the state of North Carolina as Class GA. Class GA groundwater is considered to be an existing or potential source of drinking water. Groundwater is a major source of potable water at MCAS Cherry Point and the City of Havelock. The majority of the groundwater used in the area is from the Castle Hayne Aquifer.

Currently, groundwater beneath Site 12 is not used as a water supply. Additionally, surficial aquifer groundwater is not used as a water supply anywhere on MCAS Cherry Point and is not likely to be used as a water supply in the future. This is due to low potential yield as much as any water quality issues. Groundwater from deeper aquifers (primarily the Castle

Hayne Aquifer) is used as a potable groundwater supply downgradient of Site 12 and the air station.

7.3.2 Identification of Exposure Pathways

An exposure pathway may be described as the physical course that a COPC takes from the point of release to a receptor. To be complete, an exposure pathway must have all of the following components present:

- A source
- A mechanism of a chemical release and transport
- An environmental transport medium
- An exposure point (receptor location)
- An exposure route (inhalation, dermal absorption, ingestion)
- A receptor or exposed population

In the absence of any one of these components, an exposure pathway is considered incomplete and, by definition, there is no risk or hazard. In some cases, a receptor may contact a source directly, eliminating the release and transport pathways.

The potential exposure pathways for Site 12 were identified in the CSM (Figure 7-1) and are shown in Table 7-4 and Appendix G.1, Table 1.

7.3.2.1 Contaminant Sources

The main source of contamination at Site 12 is the current fire fighting training burn pit and the burn pits used prior to the construction of the current burn pit. The current burn pit was constructed in 1985 within the general area of the former burn pits. According to interviewed crash-crew personnel, the former burn pits were constructed of dirt placed on top of the asphalt runway surface and shaped into circular berms. Fuels (primarily jet fuel) and magnesium aircraft parts were burned in the pits. According to the IAS (Water and Air Research, Inc., March 1983), waste petroleum, oil, and lubricants and waste burnable (i.e., probably non-chlorinated) solvents were formerly burned on Runway 28, but only contaminated fuel was burned at the time the report was written.

The main classes of constituents detected in the Site 12 media are inorganics and pesticides. The pesticides do not appear to be associated with use of Site 12 for fire fighting training. Additionally, a few SVOCs were detected in the surface and subsurface soil. These constituents may be associated with use of the site for fire fighting training. A number of dioxin congeners were detected in the sample collected at the oil/water separator, and are probably associated with the use of the site as a fire training area.

7.3.2.2 Release and Transport Mechanisms

Contaminant fate and transport, including contaminant mobility and persistence, and the potential contaminant migration pathways and release mechanisms at the site, are discussed in Section 6. The primary contaminant release and transport mechanism at Site 12 appears to be surface runoff from the burn area to the surface soil in the grassy area and the surface water and sediment in the drainage swale. Some of the contamination that has reached the surface soil may have leached through the soil in the unsaturated zone into the shallow

groundwater. However, based on the constituents detected in the groundwater, surface water, and sediment, these transport pathways do not appear to be significant.

7.3.2.3 Exposure Points and Exposure Routes

Exposure points are the locations where humans could contact site-related contamination. Exposure points onsite include the surface and subsurface soil south of the runway, the groundwater beneath the site, and the surface water and sediment in the drainage swale south of the runway. The offsite exposure point is groundwater downgradient of the site. There do not appear to be any offsite exposure points related to surface water because the drainage swale is often dry and not likely to transport site-related contaminants to Hancock Creek.

Table 7-4 lists the exposure routes that were evaluated in the risk assessment. Table 1, Appendix G.1, includes all of the exposure pathways that were considered, and presents the rational for either quantitative evaluation of the pathway, qualitative evaluation of the pathway, or not evaluating the exposure pathway. As shown in Table 1, Appendix G.1, and discussed above, surficial aquifer (upper aquifer) groundwater is not currently used as a potable water supply either onsite or downgradient of the site. However, upper aquifer groundwater was conservatively evaluated as a potential future potable water supply, even though this scenario is unlikely. It is assumed that future adult residents would be exposed to the groundwater through ingestion and showering (inhalation and dermal contact). Child residents could be exposed through ingestion and bathing (dermal contact). Exposure to upper aquifer groundwater was also evaluated for a future construction worker, who may have dermal contact with the groundwater and inhale volatiles from the groundwater during excavation activities. None of the groundwater Group 1 COPCs are VOCs, therefore, the inhalation pathway was not evaluated as an exposure pathway for groundwater.

Crash-crew training personnel (the "other worker" in Table 7-4 and Table 1, Appendix G.1) may be exposed to surface soil through incidental ingestion, dermal contact, and inhalation of volatile and fugitive emissions. However, crash-crew training personnel would be exposed to the soil on an infrequent basis, less frequent than an industrial worker. Although, there are currently no industrial workers who are at the site on a daily basis, it was conservatively assumed that an industrial worker could be at the site on a daily basis. Since this potential industrial worker is assumed to have a greater exposure frequency than the crash-crew training personnel, evaluation of an industrial worker is protective of the crash-crew training personnel, and any future industrial workers at the site. Additionally, evaluation of the potential industrial worker is protective of the facilities maintenance personnel who perform maintenance activities such as landscaping and emptying the oil water separator. Additional current/future surface soil receptors include adolescent trespassers/visitors. It was also conservatively assumed that the site could be used for residential development in the future, which would result in adult and child residents as potential receptors to soil contamination. The adult industrial workers, adolescent trespassers/visitors, and adult and child residents could be exposed to surface soil through incidental ingestion, dermal contact, and inhalation of VOCs and fugitive dust emissions from the soil. Inhalation of VOCs and fugitive dust emissions from surface soil was only evaluated for the uncertainty assessment since there were no Group 1 COPCs retained for this pathway.

In addition to exposure to groundwater, future construction workers may be exposed to subsurface soil during future excavation activities. Exposure routes would include incidental ingestion, dermal contact, and inhalation of VOCs and fugitive emissions from the soil. There were no Group 1 COPCs retained for subsurface soil, however there were Group 2 and 3 COPCs retained for subsurface soil and it was evaluated in the uncertainty section.

Site industrial workers, trespassers/visitors, and construction workers may be exposed to contaminants in the surface water and sediment in the drainage swale south of the site through incidental ingestion and dermal absorption. The drainage swale in the vicinity of Site 12 is typically dry from the oil/water separator west to the combined drainage ditch when precipitation is not occurring. Therefore, the drainage swale does not support a fish population and ingestion of fish was not evaluated. Additionally, due to the shallow depth of the drainage swale, exposure to surface water and sediment would occur through wading and not swimming.

In summary, the current land use exposure pathways include:

- Adult Industrial Worker: incidental ingestion, dermal absorption, and inhalation of VOCs and fugitive emissions from surface soil. Inhalation of VOCs and fugitive emissions from surface soil are only evaluated in the uncertainty assessment.
- Adolescent Trespasser/Visitor: incidental ingestion, dermal absorption, and inhalation of VOCs and fugitive emissions from surface soil. Inhalation of VOCs and fugitive emissions from surface soil are only evaluated in the uncertainty assessment.
- Adult Industrial Worker: incidental ingestion and dermal absorption of surface water and sediment while wading in the drainage swale.
- Adolescent Trespasser/Visitor: incidental ingestion and dermal absorption of surface water and sediment while wading in the drainage swale.

Future land-use exposure pathways include the current exposure pathways and the following additional pathways:

- Adult and Child Residents: incidental ingestion, dermal absorption, and inhalation of VOCs and fugitive emissions from surface soil. Inhalation of VOCs and fugitive emissions from surface soil are only evaluated in the uncertainty assessment.
- Adult Construction Worker: incidental ingestion, dermal absorption, and inhalation of VOCs and fugitive emissions from subsurface soil. Exposure to subsurface soil is only evaluated in the uncertainty assessment.
- Adult Resident: ingestion of groundwater and inhalation and dermal absorption while showering. Inhalation of VOCs from groundwater is only evaluated in the uncertainty assessment.
- Child Residents: ingestion of groundwater and dermal absorption while bathing.
- Adult Construction Worker: dermal absorption and inhalation of VOCs from groundwater. Inhalation of VOCs from groundwater is only evaluated in the uncertainty assessment.

- Adult Construction Worker: incidental ingestion and dermal absorption of surface water and sediment while wading in the drainage swale (only for uncertainty analysis).

7.3.3 Quantification of Exposure

Quantification of exposure involves estimating the exposure point concentration and chemical intake.

7.3.3.1 Exposure Concentrations

The exposure point concentration is the concentration at the point of contact. Exposure point concentrations may be measured directly (i.e., surface soil concentration) or calculated using fate and transport models. Fate and transport modeling conducted for the Site 12 risk assessment included estimating fugitive dust and volatile emissions from soil to air. Fugitive dust and volatile emissions from soil were estimated for baseline conditions and during construction activities. Baseline fugitive and volatile emissions from soil were estimated following USEPA's Soil Screening Guidance (USEPA, April 1996). Fugitive and volatile emissions from soil during construction activities were estimated using USEPA's Air Superfund National Technical Guidance Study Series Volume III (USEPA, January 1989). A modified near field box model was then used to determine the air concentration based on the fugitive and volatile emissions (Horst, 1979). The equations used for estimating fugitive and volatile emissions, and the subsequent air concentrations, during construction are included in Appendix G.3. Fugitive dust and volatile emissions from surface soil and subsurface soil were only estimated for the uncertainty assessment, since there were no Group 1 COPCs retained for the soil-to-air exposure pathways for either surface or subsurface soil.

Both reasonable maximum exposure (RME) and central tendency (CT) exposure point concentrations were determined for all media. Tables 3.1 through 3.10 in Appendix G.1 list the exposure point concentrations for the COPCs. Tables 3.1.UA through 3.14.UA in Appendix G.2 list the exposure point concentrations for the constituents included in the uncertainty evaluation.

For media that had less than 10 samples (surface water, sediment, and subsurface soil), the maximum concentrations were selected as the RME exposure point concentrations and the average concentrations were selected as the CT exposure point concentrations. For surface soil, the RME exposure point concentrations were calculated as the 95-percent upper confidence limit (95-percent UCL) of the arithmetic mean concentration and the average concentrations were selected as the CT exposure point concentrations. The maximum detected concentration was used in place of the 95-percent UCL when the calculated 95-percent UCL was greater than the maximum detected value. The Shapiro-Wilk W-test was used to determine if the data fit a lognormal or normal distribution. If the W-test was inconclusive, it was assumed that the data fit a lognormal distribution. The 95-percent UCL for a lognormal distribution was calculated as follows:

$$\text{95-percent UCL} = \exp(TM + 0.5*s^2 + (s*H/(n-1)^{0.5}))$$

Where:

exp = natural log
TM = transformed mean

s = standard deviation of the transformed data
H = H-statistic
n = sample size

The 95-percent UCL for a normal distribution was calculated as follows:

95-percent UCL = $NM+(t^*s/(n)^{0.5})$

Where:

NM = normal arithmetic mean
t = t-statistic
s = standard deviation
n = sample size

The groundwater exposure point concentrations were determined following USEPA Region IV guidance (USEPA, October 1996). The groundwater RME and CT exposure point concentrations were calculated as the arithmetic average of wells in the highly concentrated area of the plume. Since there is no discernable plume at Site 12, the arithmetic average of all of the groundwater samples was used as the RME and CT exposure point concentrations for groundwater.

In calculating the exposure point concentrations, the qualified data were used as follows:

- Estimated values flagged with a J qualifier were treated as unqualified detected concentrations.
- Data qualified with an "R" (rejected) were not used in the risk assessment. For the cases where a sample had a whole analyte group qualified with an "R", there was a duplicate or diluted sample available for evaluation in the risk assessment. This sample was used in place of the "R" qualified sample. Acetone was qualified with an "R" in a few of the surface water and groundwater samples. The "R" qualified concentrations were below the screening level.
- RAGS Part A guidance (USEPA, December 1989) was followed for "B" qualified data. If the blank contained detectable levels of common laboratory contaminants (acetone, 2-butanone, methylene chloride, toluene, and phthalate esters), the site sample results were considered as positive results only if the concentrations in the sample exceeded ten times the maximum amount detected in any blank. If the blank contained detectable levels of constituents that are not considered to be common laboratory contaminants, the site sample results were considered as positive results only if the concentrations in the sample exceeded five times the maximum amount detected in any blank. If the sample results were not considered as positive results, the sample quantification limit was used as the sample chemical concentration.
- For duplicate samples, the higher of the two concentrations was used as the sample concentration.
- One-half the SQL was used as the sample concentration for calculating the exposure point concentration for cases where no detectable contaminant quantities were found in the sample.

The exposure point concentration for the dioxins was calculated as a 2,3,7,8- TCDD equivalent concentration. The concentrations of the individual dioxin congeners were multiplied by the TEF to calculate the toxicity equivalent concentration to 2,3,7,8-TCDD. The toxicity equivalent concentration for each of the congeners was summed to calculate the total 2,3,7,8-TCDD equivalent concentration in each sample. Because there were less than 10 samples, the maximum calculated 2,3,7,8-TCDD equivalent concentration was selected as the RME exposure point concentration and the average concentration was selected as the CT exposure point concentration. Table 7-2 presents the TEF factors used to calculate the toxicity equivalent concentrations.

7.3.3.2 Estimation of Chemical Intakes

The quantification of exposure is based on an estimate of the average daily intake, the average amount of the chemical contaminant entering the receptor's body per day. Chemical intakes are generally expressed as follows:

$$ADI = \frac{C \times CR \times EF \times ED}{BW \times AT}$$

Where:

ADI = average daily intake (mg/kg-day)
C = chemical concentration (mg/L, mg/kg)
CR = contact rate (L/day, mg/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time (days)

The intake equation requires exposure parameters that are specific to each exposure pathway. Many of the exposure parameters have default values, which were used for this assessment. These assumptions, based on estimates of body weights, media intake levels, and exposure frequencies and duration, are provided in USEPA guidance. Other assumptions (e.g., for the trespasser/visitor scenarios) required consideration of location-specific information and were determined using professional judgment. Both RME and CT exposure parameters were compiled. CT risks were only calculated for scenarios where the RME risk was greater than USEPA's non-carcinogenic hazard or carcinogenic risk target levels). Table 7-5 summarizes the RME exposure parameters used to evaluate the different scenarios at Site 12 and Table 7-6 summarizes the CT exposure parameters. Tables 4.1 through 4.21 in Appendix G.1 identify the exposure parameters and intake equations for each of the scenarios evaluated in the risk assessment.

A dermal absorption factor was required for the dermal contact with soil and sediment exposure routes. The chemical specific dermal absorption factors used for this evaluation are included in Table 7-7. Dermal absorption factors were obtained from *RAGS Supplemental Guidance, Dermal Risk Assessment Interim Guidance* (USEPA, November 1998).

The methods presented in the USEPA Dermal Exposure Assessment Guidance (USEPA, January 1992) for estimating dermal exposure to water were used to evaluate dermal exposure to groundwater. For dermal exposure to groundwater during construction and bathing, the non-steady state model or pseudo steady-state model was used to estimate the

dermally absorbed dose per event for organic constituents (USEPA, January 1992). If the exposure time (or event time, t event) was shorter than the time to reach steady state (t*), the non-steady state model was used. If t event was greater than t*, the pseudo-steady state model was used. For inorganics, the absorbed dose was calculated using a steady-state approach. These models are shown here and in Tables 4.10 and 4.11 in Appendix G.1.

For organics, the following equations were used to calculate the dermally absorbed dose per event:

If t event < t*, then $$DAevent = 2 \times Kp \times Cw \times CF \times \sqrt{\frac{6 \times \tau \times tevent}{\pi}}$$

If t event > t*, then $$DAevent = Kp \times Cw \times CF \times \left[\frac{tevent}{1+B} + 2 \times \tau \times \left(\frac{1+3B}{1+B}\right)\right]$$

Where,

t event = duration of event (hr/event)
t* = time it takes to reach steady-state conditions (hr)
Kp = permeability coefficient from water through skin (cm/hr)
Cw = concentration of chemical in water (mg/L)
τ = lag time (hr)
π = constant (dimensionless, equal = 3.14159)
CF = conversion factor (0.001 L/cm^3)
B = partitioning constant derived by Bunge Model (dimensionless)

Values for the chemical-specific parameters (t event, t* , Kp, τ , and B) were obtained from the USEPA's dermal assessment guidance (USEPA, January 1992, Table 5-8) and are presented in Table 7-8.

The following steady-state equation was used to estimate DA event for inorganics:

$$DAevent = Kp \times Cw \times tevent \times CF$$

The maximum detected concentration of lead in the surface soil exceeds the residential lead SSL of 400 mg/kg, and therefore, lead was retained as a COPC for surface soil. In all other media, the maximum detected concentration of lead was below the applicable screening level. Only one of the surface soil samples had a lead concentration above the screening level, all of the other detected concentrations were at least a quarter of the screening value. Additionally, the mean lead surface soil concentration is below the residential lead SSL. However, because of the one exceedance, risks associated with lead in surface soil were evaluated using USEPA's Integrated Exposure-Uptake Biokinetic (IEUBK) Model.

The principal assumption associated with the use of the IEUBK model is that a child from age 0 to 6 is the receptor for potential exposure to lead in surface soil. The results of the IEUBK are shown in Appendix G.4. The IEUBK evaluation resulted in a geometric mean

blood concentration of 2.9 micrograms per deciliter of blood (µg/dl) for children 0 to 84 months old, which is below USEPA's recommended level of 10 µg/dl. Approximately 99.6 percent of this population had a blood lead level below USEPA's recommended level of 10 µg/dl. With the exception of the lead surface soil and groundwater concentrations (which were set equal to the average site lead concentrations in each of the media), the default parameters associated with the IEUBK model were used in this evaluation (as shown in Appendix G.4). The site-specific lead surface soil and groundwater concentrations are below the default lead concentrations normally used in the model. Potential exposure to children by lead in the surface soil (and groundwater) is not expected to result in blood-lead concentrations above USEPA's recommended levels.

Following USEPA Region 4 guidance (USEPA, October 1996), the adult resident exposure to groundwater while showering was assumed to equal the exposure from ingestion of VOCs in tap water. There were no VOCs retained as Group 1 COPCs, therefore, this evaluation was only included in the uncertainty risk evaluation. Since it is assumed that children take baths instead of showers, this assumption was not used for children. When children bathe they are immersed in the water, and therefore, dermal absorption may be more important for the child than for the adult. Additionally, if the water is running when the children are in the bath it is usually flowing from the faucet and not the showerhead, resulting in less volatilization during a bath then during a shower. Therefore, exposure to groundwater during bathing through dermal contact, and not through inhalation, is evaluated for a child resident.

It was necessary to calculate the air concentration that a construction worker would be exposed to due to volatilization from groundwater in an open excavation for the uncertainty assessment risk calculations only since the only VOCs retained as COPCs were Group 2 and Group 3 COPCs. The air concentration was modeled using a two film volatilization model and USEPA's SCREEN3 air model. These calculations are shown in Table 7.13.RME UA Supplement in Appendix G.2. The calculations are not provided here since they were only performed for the uncertainty analysis.

7.4 Toxicity Assessment

The toxicity assessment weighs the available evidence regarding the potential for a particular chemical to cause adverse effects in exposed individuals and provides a numerical estimate of the relationship between the extent of exposure and possible severity of adverse effects. The toxicity assessment consists of two steps: hazard identification and dose-response assessment. Hazard identification is the process of determining the potential adverse effects from exposure to a chemical. Dose-response assessment is the process of quantitatively evaluating the toxicity information and characterizing the relationship between the dose of the contaminant administered or received and the incidence of adverse health effects in the exposed population. From this quantitative dose-response relationship, toxicity values (e.g., reference doses [RfDs] and cancer slope factors [CSFs]) are derived.

USEPA has assessed the toxicity of many chemicals and has published the resulting toxicity information and toxicity values in the Integrated Risk Information System (IRIS) and Health Effects Assessment Summary Tables (HEAST) databases. IRIS includes only those non-carcinogenic RfDs and CSFs that have been verified by USEPA workgroups. IRIS is USEPA's

preferred source of toxicity information. HEAST, which is issued by USEPA's Office of Research and Development, was consulted when data were not available in IRIS. If data were not available from either of these sources, USEPA's National Center for Environmental Assessment (NCEA) data were used.

Health effects are divided into two broad groups: non-carcinogenic and carcinogenic effects. This division is based on the different mechanisms of action currently associated with each category. Chemicals causing non-carcinogenic health effects were evaluated independently from those having carcinogenic effects. Some chemicals may produce both non-carcinogenic and carcinogenic effects, and were evaluated in both groups. This section discusses both non-carcinogenic and carcinogenic effects separately, and concludes with a brief discussion of the toxicological properties of selected COPCs.

7.4.1 Toxicity Information for Non-carcinogenic Effects

Non-carcinogenic health effects include a variety of toxic effects on body systems, ranging from renal toxicity (toxicity to the kidneys) to central nervous system disorders. Non-carcinogenic health effects are grouped into two basic categories: acute toxicity and chronic toxicity. Acute toxicity can occur after a single exposure (usually at high doses), and the effect is most often seen immediately. Chronic toxicity describes effects that occur after repeated exposure (usually at low doses) and is seen weeks, months, or years after the initial exposure. The toxicity of a chemical is assessed through a review of toxic effects noted in short-term (acute) animal studies, long-term (chronic) animal studies, and epidemiological investigations.

USEPA (USEPA, December 1989) defines the chronic RfD as an estimate of a daily exposure to the human population, including sensitive subpopulations, which is likely to be without appreciable risk of deleterious effects during a lifetime. Chronic RfDs are developed to be protective for long-term exposure to a compound (7 years to a lifetime). Chronic RfDs may be overly protective if used to evaluate the potential for adverse health effects resulting from short-term exposure. NCEA develops subchronic RfDs for short-term exposure (2 weeks to 7 years). Subchronic RfDs have been peer-reviewed by Agency and outside reviewers, but they have not undergone verification by an intra-Agency workgroup, and as a result are considered interim rather than verified toxicity values. Chronic and subchronic RfDs are developed for both inhalation and oral exposures. Chronic RfDs were used to evaluate the non-carcinogenic risks to all potential receptors for the Site 12 except the construction worker. Subchronic RfDs were used to evaluate the non-carcinogenic risks to the construction worker. If a subchronic RfD was not available, the chronic RfD was used.

In the development of RfDs, all available studies examining the toxicity of a chemical following exposure are considered based on their scientific merit. The lowest dose level at which a toxic effect is observed is identified as the "lowest-observed-adverse-effect-level" (LOAEL) and the dose at which no effect is observed is identified as the "no-observed-adverse-effect-level" (NOAEL). Several uncertainty factors (UFs) are applied to the LOAEL or NOAEL to extrapolate these dose points to humans. These UFs range between 10 and 10,000. Additional modification factors (MFs) also are used based on the professional judgment of USEPA.

USEPA-derived oral and inhalation chronic and subchronic RfDs, and associated UFs and MFs, for the COPCs (and the constituents included in the uncertainty evaluation) are listed in Tables 5.1 and 5.2 in Appendix G.1.

7.4.2 Toxicity Information for Carcinogenic Effects

Potential carcinogenic effects from human exposure to chemicals are estimated quantitatively using oral and inhalation CSFs. CSFs may be derived from the results of chronic animal bioassays, human epidemiological studies, or both. Animal bioassays are usually conducted at dose levels that are much higher than levels likely to be produced by human exposure to environmental media. This extrapolation detects possible adverse effects in the relatively small test populations used in the studies. These high dose levels must be extrapolated to lower doses. A number of mathematical models and procedures have been developed to extrapolate from the high doses used in the studies to the low doses typically associated with environmental exposures.

The USEPA-preferred linearized multistage model is usually used to estimate the largest linear slope (within the 95-percent UCL) at low extrapolated doses that is consistent with the data. The 95-percent UCL slope of the dose-response curve is subjected to various adjustments, including an inter-species scaling factor, to derive a CSF. It is assumed that if a cancer response occurs at the dose level in the study, there is some probability that a response will occur at all lower exposure levels (i.e., a dose-response relationship with no threshold is assumed). Conservative (e.g., health protective) assumptions are applied and the models are believed to provide rough estimates of the upper limits on potential lifetime risk. The actual risks associated with exposure to a potential carcinogen that are quantitatively evaluated using the CSF are not likely to exceed the estimated risks, and are probably much lower or even zero.

In addition to deriving a quantitative estimate of carcinogenic potency, also assigns weight-of-evidence classifications to potential carcinogens. Chemicals are classified as Group A, Group B1, Group B2, Group C, Group D, or Group E carcinogens. The classifications are described as follows:

- Group A chemicals (known human carcinogens) are agents for which there is sufficient evidence to support the causal association between exposure to the agents in humans and cancer.
- Group B1 chemicals (probable human carcinogens) are agents for which there is limited evidence of possible carcinogenicity in humans.
- Group B2 chemicals (probable human carcinogens) are agents for which there is sufficient evidence of carcinogenicity in animals but inadequate or a lack of evidence in humans.
- Group C chemicals (possible human carcinogens) are agents for which there is limited evidence of carcinogenicity in animals and inadequate or a lack of human data.
- Group D chemicals (not classifiable as to human carcinogenicity) are agents with inadequate human and animal evidence of carcinogenicity or for which no data are available.

- Group E chemicals (evidence of non-carcinogenicity in humans) are agents for which there is no evidence of carcinogenicity from human or animal studies, or both.

USEPA-derived oral and inhalation CSFs and weight-of-evidence classifications for the COPCs (and the constituents included in the uncertainty evaluation) at Site 12 are listed in Tables 6.1 and 6.2 included in Appendix G.1.

7.4.3 Derivation of Dermal RfDs and Slope Factors

Oral RfDs and CSFs were converted to dermal RfDs and CSFs using an oral to dermal adjustment factor. This factor was designed to convert the orally administered dose toxicity factors to dermally absorbed dose toxicity factors. The values used for this conversion were obtained from a report by C.B. Bast and H.T. Borges (Bast, C.G and H.T. Borges, March 1996). The oral RfDs were converted to dermal RfDs by multiplying by the oral to dermal adjustment factor (gastrointestinal absorption factor) and the oral CSFs were converted to dermal CSFs by dividing by the gastrointestinal (GI) absorption factor. If a chemical-specific GI absorption factor was not available, a GI absorption factor of 80 percent was assumed for VOCs, 50 percent was assumed for SVOCs and pesticides, and 20 percent was assumed for inorganics.

7.4.4 Toxicity Profiles for Selected Constituents

Below are brief toxicological profiles for selected COPCs (the main risk drivers at the site, as identified in Section 7.5); Aroclor-1248, antimony, arsenic, chromium, and iron. More detailed toxicity information can be found in IRIS, Agency for Toxic Substances and Disease Registry (ATSDR) toxicological profiles, and other published literature.

7.4.4.1 Antimony

Many antimony compounds irritate the GI tract. Antimony tartar has been used as an emetic, and intoxication results in severe vomiting and diarrhea. Trivalent antimony compounds also were used for treatment of intestinal parasites. With occupational inhalation exposures, rhinitis and acute pulmonary edema may occur. Chronic exposure by inhalation of some antimony compounds can produce rhinitis, pharyngitis, tracheitis, bronchitis, and pneumoconiosis with obstructive lung disease and emphysema. Transient spots on skin have been reported in workers. Under specific conditions, antimony may form stibine gas, which causes hemolysis. Antimony forms trivalent and pentavalent compounds. In mutation tests, some antimony compounds were positive in human lymphocytes and Syrian hamster embryo cells.

7.4.4.2 Aroclor-1248

Aroclor-1248 is a PCB. Evaluation of the toxicity of PCBs is complicated because PCBs are mixtures of a variety of different congeners and impurities, each with its own characteristics.

Greater than 90 percent of the PCBs ingested are absorbed through the GI tract. There is limited data concerning absorption following inhalation and dermal exposure, however, the available data indicate PCBs are absorbed via these exposure routes also. The liver and muscle tissues are the main organs were Aroclors accumulate during the first day of

exposure. After that, the Aroclors are redistributed to the fat, skin, and other fat-containing organs. Higher chlorinated PCBs persist in the body longer than the lower chlorinated PCBs.

Studies indicate that PCBs can cross the placenta to the fetus. PCBs will also concentrate in mother's milk. Higher levels of PCBs reach offspring through nursing than through placental transfer. Effects such as decreased birth weight, shortened gestation age, and neonatal behavioral alterations have been associated with PCB exposure in humans.

PCBs do not appear to have high acute lethality. PCBs are more lethal when exposed subchronically or chronically, indicating that PCBs bioaccumulate to toxic levels.

The liver and cutaneous tissues are the major target organs for Aroclors. Exposure to Aroclors has also produced stomach and thyroid alterations, immunosuppressive effects, and porphyria in animals. Gross toxic effects other than reversible skin lesions have not been associated with occupational exposure to Aroclors in humans. Biochemical effects, such as increased liver enzyme levels, have been seen in workers and the general population exposed to Aroclors.

PCBs are classified as a B2 carcinogen. Animal studies have shown that some PCBs (Aroclor-1260) are carcinogenic (liver) through ingestion and inhalation.

7.4.4.3 Arsenic

Inorganic arsenic has been recognized as a human poison since ancient times, and large oral doses (above 60,000 ppb in food or water) can produce death. If lower levels of inorganic arsenic are ingested (ranging from about 300 to 30,000 ppb in food or water), irritation of the stomach and intestines may be experienced, with symptoms such as pain, nausea, vomiting, and diarrhea. Other effects experienced from ingesting arsenic include decreased production of red and white blood cells, abnormal heart rhythm, blood-vessel damage, and impaired nerve function causing a "pins and needles" sensation in the hands and feet. Ingesting arsenic has also been reported to increase the risk of cancer in the liver, bladder, kidney, and lung. Although there is no good evidence that arsenic can harm pregnant women or their fetuses, studies in animals show that doses of arsenic that are large enough to cause illness in pregnant females (23-68 mg As/kg/day of sodium arsenite) may cause low birth weight, fetal malformations, or even fetal death.

Perhaps the single most characteristic effect of long-term oral exposure to inorganic arsenic is a pattern of skin changes (0.01-0.1 mg/kg/day for months to years). This includes a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso. While these skin changes are not considered to be a health concern, a small number of the corns may ultimately develop into skin cancer. Direct skin contact with inorganic arsenic compounds may result in irritation with some redness and swelling. However, it does not appear that skin contact is likely to lead to any serious internal effects.

If high levels of inorganic arsenic are inhaled, some of the short-term effects from exposure include a sore throat, irritated lungs or some of the skin effects described above, however these effects are typically not serious. The exposure level that produces these health effects is uncertain, however it is likely to be above 100 micrograms per cubic meter ($\mu g/m^3$). Inhalation of inorganic arsenic is also known to increase the risk of lung cancer. An increase of lung cancer is primarily observed in humans exposed to arsenic in or around smelters. In

addition, humans living near chemical factories or waste sites with arsenic may have also have an increased risk of lung cancer.

Despite all the adverse health effects associated with inorganic arsenic exposure, there is some evidence that the small amounts of arsenic in the normal diet (10-50 ppb) may be essential in animal nutrition. For example, animals fed an arsenic-free diet did not gain weight normally. They also became pregnant less frequently than animals fed a diet containing a normal amount of arsenic. Further, the offspring from these animals tended to be smaller than normal, and some died at an early age. However, no cases of arsenic deficiency in humans have ever been reported.

Almost no information is available on the effects of organic arsenic compounds in humans. Studies in animals show that most organic arsenic compounds are less toxic than the inorganic forms. However, high doses can produce some of the same effects as inorganic arsenic.

7.4.4.4 Chromium

The health effects resulting from exposure to chromium (III) and chromium (VI) are fairly well described in the literature. Inhalation of small amounts of chromium (VI) (0.001-0.61 mg/m^3 for months to years) for short or long periods is not known to cause health problems in most people. Inhalation of high levels (greater than 2 mg/m^3) of chromium (VI) for long periods (months to years) can cause a runny nose, sneezing, itching, nosebleeds, ulcers, and holes in the nasal septum. Inhalation of chromium (III) is not known to cause irritation to the nose or mouth in most people. High levels of chromium in the workplace are also known to cause asthma attacks in people who are allergic to chromium. Long-term exposure to chromium in air at levels that were 100 to 1,000 times higher than those found in the environment has been associated with lung cancer in workers; however it is not clear which form(s) of chromium is capable of causing lung cancer. Chromium (VI) is believed to be primarily responsible for an increased lung cancer rate observed in workers exposed to high levels of chromium in workroom air.

Workers handling liquids or solids containing chromium (VI) have developed skin ulcers. Some people have been found to be extremely sensitive to chromium (VI) or chromium (III). Allergic reactions consisting of severe redness and swelling of the skin have been noted. Exposure to chromium (III) is less likely to cause skin rashes in chromium-sensitive people than chromium (VI). Exposure to chromium (0) is less common, and little is known about possible health effects.

There is no reliable information that any form of chromium has harmful effects on reproduction or causes birth defects in humans.

Chromium (III) is an essential nutrient with a recommended intake of 50 to 200 mg of chromium (III) per day for adults. Ingestion of small amounts of chromium (VI) is not known to cause health effects, however, accidental or intentional swallowing of larger amounts (4.1 mg/kg to 29 mg/kg) have caused stomach upsets and ulcers, convulsions, kidney and liver damage, and even death. Although chromium (III) in small amounts is an important nutrient, ingesting large amounts of chromium (III) may cause health problems.

7.4.4.5 Iron

Iron is an essential human nutrient with a recommended daily dose of 18 mg/day for females. Oral intakes ranging between 20 mg/kg-60 mg/kg are potentially toxic. Toxicity is likely following an ingestion of 60 mg/kg or greater. Symptoms of acute oral exposure include: vomiting, diarrhea, mild lethargy stupor, shock, acidosis, hematemesis, bloody diarrhea, or coma. With less serious overdoses, the initial GI symptoms may be the only findings to develop even without treatment. Although serious iron poisoning in adults is rare, deaths have been reported. Effects from chronic over-exposure to iron include disturbances in liver function, diabetes, mettitus, possible endocrine disturbances, and cardiovascular effects. These health effects occur when body iron content reaches 20-40 g.

Inhalation of iron oxide fumes or dust by workers in metal industries may result in deposition of iron particles in lungs, producing an X-ray appearance resembling silicosis. Inhalation of some iron dusts and fumes can cause siderosis, a type of benign pneumoconiosis. Levels of iron among ironworkers developing pneumoconiosis have been reported to exceed 10-mg iron/m^3. Exposure to aerosols and mists of soluble iron salts may produce respiratory and skin irritation.

7.5 Risk Characterization

Risk characterization combines the results of the previous elements of the risk assessment to evaluate the potential health risks associated with exposure to COPCs. The risk characterization is used as an integral component in remedial decision making and selection of potential remedies or actions.

7.5.1 Methods for Evaluating Risk and Hazard

Potential human health risks are discussed independently for carcinogenic and non-carcinogenic contaminants because of the different toxicological endpoints, relevant exposure durations, and methods used to characterize risk. Some chemicals may produce both non-carcinogenic and carcinogenic effects, and were evaluated in both groups. The methodology used to estimate non-carcinogenic hazards and carcinogenic risks are described below. Following the description of the methodology, the non-carcinogenic hazards and carcinogenic risks for Site 12 are discussed by medium.

7.5.1.1 Non-carcinogenic Hazard Estimation

Non-carcinogenic health risks are estimated by comparing the calculated intake to the RfD. The calculated intake divided by the RfD is equal to the hazard quotient (HQ):

$$HQ = Intake / RfD$$

The intake and RfD are expressed in the same units (mg/kg-day) and represent the same exposure period (i.e., chronic or subchronic). The intake and RfD also represent the same exposure route (i.e., oral, dermal, or inhalation). A HQ that exceeds one (i.e., the intake exceeds the RfD) indicates that there is a potential for adverse health effects associated with exposure to that chemical. To assess the potential for non-carcinogenic health effects posed by exposure to multiple chemicals a "hazard index" (HI) approach is used (USEPA, September 1986). This approach assumes that non-carcinogenic hazards associated with

exposure to more than one chemical are additive. Synergistic or antagonistic interactions between chemicals are not accounted for. The HI may exceed one even if all of the individual HQs are less than one. HIs are also added across exposure routes and media if an individual may be exposed through more than one route and media. A HI greater than one indicates that there is some potential for adverse non-carcinogenic health effects associated with exposure to the contaminants of concern, possibly warranting remedial action (USEPA, December 1991).

HQs can also be summed by the resulting health effect or target organ. For example, all HQs associated with effects on the liver are added to determine the HI for the liver. This is done for all of the different health effects or target organs.

7.5.1.2 Carcinogenic Risk Estimation

The potential for carcinogenic effects due to exposure to site-related contamination is evaluated by estimating the excess lifetime carcinogenic risk (ELCR). The ELCR is the incremental increase in the probability of developing cancer during one's lifetime in addition to the background probability of developing cancer. For example, a $2x10^{-6}$ ELCR means that for every one million people exposed to the carcinogen throughout their lifetimes, the incidence of cancer may increase by two cases. The background probability of developing cancer, from all known causes, is about one in four (American Cancer Society, 1993).

The carcinogenic risk is calculated by multiplying the intake by the CSF.

$$\text{Risk} = \text{Intake} \times \text{CSF}$$

When the carcinogenic risk is greater than 0.01, the exponential form of the equation is used to calculate the risk.

$$\text{Risk} = 1 - \exp(\text{-Intake x CSF})$$

The combined risk from exposure to multiple chemicals was evaluated by adding the risks from different chemicals. Risks were also added across the exposure routes and media if an individual would be exposed through multiple routes and media. For example, a person contacting soil could be exposed by both oral and dermal exposure routes and could also be exposed to groundwater through oral and dermal routes.

Potential carcinogenic risks associated with residential exposure to vinyl chloride (in groundwater and surface soil) are handled in a different manner than indicated above due to the separate CSFs for vinyl chloride for adult exposure and exposure including early life. The following general equation was used to calculate the carcinogenic risks associated with exposure to vinyl chloride for the age-adjusted resident.

$$Risk = \frac{C\ x\ IRc\ x\ EF\ x\ EDc\ x\ CSF}{BWc\ x\ AT} + \frac{C\ x\ IRc\ x\ CSF}{BWc} + \frac{C\ x\ IRa\ x\ EF\ x\ EDa\ x\ CSF}{BWa\ x\ AT}$$

Where:

C = chemical concentration in groundwater (mg/L) or soil (mg/kg)
IR = intake rate, c-child, a-adult (L/day or mg/day))
CSF = cancer slope factor (0.72 $(mg/kg\text{-}day)^{-1}$)

EF= exposure frequency (days/year)
ED= exposure duration, c-child, a-adult (years)
BW= body weight of exposed individual, c-child, a-adult (kg)
AT= averaging time, or period over which exposure is averaged (70 years x 365 days/year)

The first two segments of the risk calculation equation are included on the child risk calculation spreadsheets and the third segment is included on the adult risk calculation spreadsheets (the Standard Table 8's in Appendix G).

The USEPA considers action to be warranted at a site when cancer risks exceed 10^{-4}. Action is generally not required for risks falling within 10^{-4} to 10^{-6}; however, this is judged on a case-by-case basis. Risks less than 10^{-6} generally are not of concern to regulatory agencies.

7.5.1.3 Evaluation of Numerical Results

RME risks were evaluated for all media and exposure scenarios. RME risks were evaluated using upper bound estimates of the exposure parameters (Table 7-5) and the RME concentrations. CT risks were calculated for those scenarios that had risks exceeding USEPA target levels (HI of 1.0 and carcinogenic risk of 10^{-4}). CT risks were evaluated using median estimates of the exposure parameters (Table 7-6) and the CT concentrations.

7.5.2 Soil

Risks were evaluated for exposure to surface soil and subsurface soil.

7.5.2.1 Surface Soil

RME risk estimates for exposure to surface soil were calculated for an industrial worker and an adolescent trespasser/visitor under current and future site use and for an adult and child resident under future site use. The risk calculations are included in Appendix G.1, Tables 7.1.RME, 7.2.RME, 7.10.RME, 7.11.RME, 8.1.RME, 8.2.RME, 8.10.RME, and 8.11.RME. Exposure to surface soil via incidental ingestion and dermal absorption was evaluated.

The RME non-carcinogenic hazard associated with exposure to surface soil by industrial workers (0.66) is below USEPA's target HI of 1.0. The RME carcinogenic risk associated with exposure to surface soil by an industrial worker ($1x10^{-6}$) is within USEPA's target risk of 10^{-6} to 10^{-4}.

The RME non-carcinogenic hazard associated with exposure to surface soil by adolescent trespassers (0.16) is below USEPA's target HI of 1.0. The RME carcinogenic risk associated with exposure to surface soil by adolescent trespassers ($1x10^{-7}$) is below EPA's target carcinogenic risk of 10^{-6} to 10^{-4}.

The RME non-carcinogenic hazards associated with exposure to surface soil by adult and child residents (1.1 and 3.3) are above USEPA's target HI of 1.0. For the adult, none of the individual constituents contribute a HQ greater than 1 to the total HI. For the child, antimony and chromium both have HIs greater than 1. The dermal pathway contributes more than 75 percent of the HI. The RME carcinogenic risks associated with exposure to surface soil by adult and child residents ($2x10^{-6}$ and $1x10^{-6}$) are within USEPA's target risk range of 10^{-6} to 10^{-4}.

CT carcinogenic risk estimates were not calculated for any of the receptors because the RME carcinogenic risk estimates were all within or below USEPA's target risk range. CT HIs for exposure to surface soil by industrial workers and adolescent trespassers/visitors were not calculated since the RME HIs were below USEPA's target levels. CT HIs were calculated for exposure to surface soil for child and adult residents (Appendix G.1, Tables 7.3.CT and 7.4.CT). The CT non-carcinogenic hazards for adult and child residents (0.06 and 0.12) are below USEPA's target HI.

The maximum detected concentrations of methylene chloride, alpha-chlordane, dieldrin, gamma-chlordane, heptachlor epoxide, antimony, cadmium, chromium, lead, manganese, mercury, silver, and thallium exceed the soil to groundwater pathway screening value. This indicates these constituents may be continuing to leach to groundwater at concentrations greater than levels protective of human health in groundwater. However, methylene chloride, antimony, cadmium, silver, and thallium were not detected in any of the groundwater samples evaluated in the risk assessment. This comparison is extremely conservative since the maximum detected concentration was compared with the screening value. Additionally, the inorganic constituents are not necessarily related to the use of the site as a crash-crew fire fighting training facility.

7.5.2.2 Subsurface Soil

There were no Group 1 COPCs retained for subsurface soil. Therefore, risks associated with exposure to subsurface soil were not calculated.

The maximum detected concentrations of methylene chloride and alpha-BHC exceed the soil to groundwater pathway screening value. This indicates these constituents may be continuing to leach to groundwater at concentrations greater than levels protective of human health in groundwater. However, methylene chloride and alpha-BHC were not detected in any of the groundwater samples evaluated in the risk assessment. This comparison is extremely conservative since the maximum detected concentration was compared with the screening value.

7.5.3 Surface Water

Exposure to surface water in the drainage swale south of the runway was evaluated for industrial site workers, adolescent trespassers/visitors, and future construction workers who could be exposed to surface water through incidental ingestion and dermal contact while wading (Appendix G.1, Tables 7.3.RME, 7.4.RME, 7.12.RME, 8.3.RME, 8.4.RME, and 8.12.RME).

The RME non-carcinogenic hazard to an industrial worker exposed to surface water (0.003) is much less than USEPA's target HI of 1.0. The RME carcinogenic risk (9×10^{-5}) is within USEPA's target risk range of 10^{-6} to 10^{-4}.

The RME non-carcinogenic hazard to an adolescent trespasser/visitor exposed to surface water (0.006) is below USEPA's target HI of 1.0. The carcinogenic risk associated with exposure to the surface water by an adolescent trespasser/visitor (9×10^{-5}) is within USEPA's target risk of 10^{-6} to 10^{-4}.

The RME non-carcinogenic hazard to a construction worker exposed to surface water (0.007) is below USEPA's target HI of 1.0. The carcinogenic risk associated with exposure to the surface water by construction worker ($1x10^{-5}$) is within USEPA's target risk of 10^{-6} to 10^{-4}.

None of the non-carcinogenic hazards or carcinogenic risks to any of the potential receptors exceeds USEPA's target levels. Therefore, CT hazards and risks were not calculated for surface water.

7.5.4 Sediment

Exposure to sediment in the drainage canal south of the runway was evaluated for industrial site workers, adolescent trespassers/visitors, and future construction workers (Appendix G.1, Tables 7.5.RME, 7.6.RME, 7.13.RME, 8.5.RME, 8.6.RME, and 8.13.RME). These receptors may be exposed to sediment through incidental ingestion and dermal contact while wading.

The RME HI to industrial site workers exposed to sediment (0.004) is below USEPA's target HI of 1.0. The carcinogenic risk associated with exposure to the sediment by industrial site workers ($2x10^{-7}$) is below USEPA's target risk of 10^{-6} to 10^{-4}.

The RME HI to adolescent trespassers/visitors exposed to sediment (0.02) is below USEPA's target HI of 1.0. The carcinogenic risk associated with exposure to the sediment by adolescent trespassers/visitors ($3x10^{-7}$) is below USEPA's target risk of 10^{-6} to 10^{-4}.

The RME HI to a construction worker exposed to sediment (0.02) is below USEPA's target HI of 1.0. The carcinogenic risk associated with exposure to the surface water by construction worker ($3x10^{-8}$) is less than USEPA's target risk of 10^{-6} to 10^{-4}.

None of the non-carcinogenic hazards or carcinogenic risks to any of the potential receptors exceeds USEPA's target levels. Therefore, CT hazards and risks were not calculated for sediment.

7.5.5 Groundwater

Upper aquifer groundwater beneath the site is not currently used as a potable water supply and will not likely be used as a potable water supply in the future. However, upper aquifer groundwater beneath the site was evaluated as a worst-case risk estimate for potable groundwater use. Risk estimates for exposure to groundwater were calculated for child and adult residents and construction workers under potential future site use (Appendix G.1, Tables 7.7.RME through 7.9.RME and Tables 8.7.RME through 8.9.RME).

It was assumed that a resident would drink the groundwater, an adult resident would shower with the groundwater, and a child resident would bathe with the groundwater. Following USEPA Region 4 guidance, exposure to groundwater by the adult resident while showering was assumed equivalent to exposure from ingestion of VOCs in groundwater. Therefore, the ingested dose for the VOCs was either divided by the inhalation RfD or multiplied by the inhalation CSF to estimate the risks associated with showering. USEPA Region IV assumes that the exposure from showering is mainly associated with inhalation of VOCs, and that dermal absorption is negligible compared with inhalation. However, since there were no VOCs retained as Group 1 COPCs for groundwater, exposure to groundwater while showering was not quantified. For the child, dermal exposure to water

while bathing was evaluated since it was assumed that inhalation of VOCs during bathing would be much less than dermal absorption.

The RME non-carcinogenic risks associated with use of the groundwater as a potable residential water supply (1.8 and 4.6 for the adult and child, respectively) are above USEPA's benchmark HI of 1.0. For the adult resident, none of the individual constituents pose a hazard greater than 1. For the child resident, both iron and arsenic pose hazards greater than 1.0.

The RME carcinogenic risks associated with use of the groundwater as a potable residential water supply exceed USEPA's benchmark of 10^{-4} for the adult and child resident ($1x10^{-4}$ and $4x10^{-4}$). For the adult, arsenic is the main risk driver and poses a risk equal to 10^{-4}. For the child, Aroclor-1248 is the main risk driver. The risk associated with dermal contact with Aroclor-1248 during bathing is $3x10^{-4}$.

It is assumed that a construction worker may be exposed to the upper aquifer groundwater during excavation activities. The upper aquifer groundwater is about 9 to 12 ft below ground surface, and may be exposed in an open excavation. It was assumed a construction worker would be exposed through dermal contact and inhalation of VOCs. Because no VOCs were retained as Group 1 COPCs, the only applicable exposure route is dermal contact. The RME HI to a construction worker is 0.06, which is below USEPA's benchmark HI of 1.0. The RME carcinogenic risk ($4x10^{-6}$) is within EPA's target risk range of 10^{-4} to 10^{-6}.

Because the RME HIs and carcinogenic risks exceed benchmark levels for adult and child residents, CT risk estimates were calculated (Appendix G.1, Tables 7.1.CT, 7.2.CT, 8.1.CT, and 8.2.CT). The CT non-carcinogenic hazard for the adult resident (0.82) is below USEPA's target HI. The CT non-carcinogenic hazard for the child resident (3) exceeds USEPA's target HI of 1. The risk drivers are the same as for the RME evaluation, iron and arsenic. The CT carcinogenic risk for the adult resident ($3x10^{-5}$) is within USEPA's target risk range. The CT carcinogenic risks for the child and lifetime residents ($2x10^{-4}$ and $2x10^{-4}$) are above USEPA's target risk range. This risk is mainly associated with dermal contact with Aroclor-1248.

7.5.6 Summary of Total Risks Across Pathways and Media

Appendix G.1, Tables 9.1.RME through 9.6.RME summarize the RME total potential risks to each receptor quantitatively evaluated in the risk assessment. Appendix G.1, Tables 9.1.CT through 9.3.CT, summarize the CT total potential risks to each receptor that has risks that exceed USEPA's benchmark levels. Total potential risks were quantified for a current/future industrial worker, current/future adolescent trespasser/visitor, future adult resident, future child resident, future construction worker, and future lifetime resident. Appendix G.1, Tables 10.1.RME through 10.3.RME and Tables 10.1.CT and 10.2.CT show only the chemicals that contribute a hazard greater than 0.1 or a carcinogenic risk greater than 10^{-6} to receptors with carcinogenic risks or non-carcinogenic hazards greater than USEPA's benchmark levels in a given medium.

7.5.6.1 Current/Future Industrial Worker

The risk assessment assumed that a current/future industrial worker may be exposed to site surface soil, surface water, and sediment. The total RME non-carcinogenic hazard and carcinogenic risk to an adult industrial worker exposed to all of these media does not exceed

a USEPA target level or non-carcinogenic hazard level (Appendix G.1, Table 9.1.RME). The total HI is 0.67 and the total carcinogenic risk is $9x10^{-5}$.

7.5.6.2 Current/Future Crash Crew Personnel

The current/future crash-crew training personnel are the "other worker" listed in Appendix G.1, Table 1. This receptor is qualitatively evaluated in the risk assessment by comparison to the more conservative industrial worker receptor. Crash-crew training personnel would be exposed to site media on an infrequent, intermittent basis, only during training activities. This exposure would be much less than that of an industrial worker who may be exposed to the site media daily. Therefore, evaluation of an industrial worker is protective of the crash-crew training personnel (and the facilities maintenance personnel who perform maintenance activities such as landscaping and emptying the oil/water separator).

As discussed above, the total RME non-carcinogenic hazard and carcinogenic risk to an adult industrial worker exposed to surface soil, surface water, and sediment, does not exceed USEPA's target risk levels. Therefore, since the risks to crash crew-training personnel would be lower than those to an industrial worker, there are no unacceptable risks to crash crew-training personnel.

7.5.6.3 Current/Future Adolescent Trespasser/Visitor

The risk assessment assumed that a current/future adolescent trespasser may be exposed to surface soil south of the runway, and surface water and sediment in the drainage swale south of the runway. The total RME non-carcinogenic hazard and carcinogenic risk to an adolescent trespasser/visitor exposed to these media does not exceed a USEPA target level (Appendix G.1, Table 9.2.RME). The total calculated RME HI is 0.19 and the total RME carcinogenic risk is $9x10^{-5}$.

7.5.6.4 Future Resident

It was assumed future adult and child residents may be exposed to upper aquifer groundwater from beneath the site and surface soil south of the runway. Exposure to groundwater would occur from ingestion, and while showering (adult) or bathing (child). Since there were no VOCs retained as Group 1 groundwater COPCs, exposure during showing was considered insignificant (following USEPA Region IV methodology for evaluation of exposure during showering—assuming all exposure during showering is from inhalation). Exposure to a child while bathing was evaluated, since it is based on dermal contact and not inhalation.

Exposure to groundwater and surface soil would result in a hazard greater than USEPA's benchmark level to an adult and child resident (Appendix G.1, Tables 9.3.RME and 9.4.RME). Both the groundwater and surface soil contribute to an unacceptable hazard to both the child and adult. Each of these media contributes a HI greater than 1. For groundwater, the main risk driver is ingestion of arsenic and iron. For soil, the main risk driver is dermal contact with antimony and chromium.

Carcinogenic risks associated with exposure to groundwater and surface soil were estimated for an adult and child resident, and summed for a lifetime resident (Appendix G.1, Tables 9.3.RME, 9.4.RME, and 9.6.RME). Exposure to groundwater and surface soil would result in a carcinogenic risk greater than USEPA's target risk range to the adult, child, and lifetime

resident. The risks associated with exposure to soil are within USEPA's target risk range, however the risks associated with exposure to groundwater slightly exceed USEPA's target range. The risk to the adult is mainly associated with ingestion of arsenic in the groundwater. The risk to the child is mainly associated with dermal contact with Aroclor-1248 while bathing in the groundwater. The risk to the lifetime resident is associated with both the Aroclor-1248 and the arsenic detected in the groundwater. Aroclor-1248 was only detected in one sample, the sample from well 012TW01. Additionally, there were no other PCBs detected in any of the groundwater samples.

CT non-carcinogenic risks were calculated for both soil and groundwater, and CT carcinogenic risks were calculated for groundwater (Appendix G.1, Tables 9.2.CT through 9.4.CT). The total CT non-carcinogenic risk to the adult resident is below USEPA's target, however the total CT non-carcinogenic risk to the child resident exceeds USEPA's target HI of 1.0. This exceedance is associated with the exposure to groundwater, in particular, ingestion of arsenic and iron in the groundwater. The CT carcinogenic risk for the adult resident falls within USEPA's target range, however the risk for the child and lifetime resident slightly exceed the target range. As with the RME risk, this risk is associated with dermal exposure to Aroclor-1248 by a child bathing with the groundwater.

7.5.6.5 Future Construction Worker

Exposure to surface water and sediment through incidental ingestion and dermal contact, and groundwater through dermal contact was evaluated for a future construction worker. There were no Group 1 COPCs retained for subsurface soil, therefore, risks associated with exposure to subsurface soil were not calculated. The total potential future RME risk and hazard to a construction worker exposed to these media does not exceed USEPA's target carcinogenic risk or non-carcinogenic hazard levels (Appendix G.1, Table 9.5.RME).

7.6 Summary of Human Health Risk Assessment

This section discusses the uncertainty associated with the HHRA and summarizes the conclusions from the risk assessment.

7.6.1 Qualitative Uncertainty Assessment

The risk measures used in Superfund risk assessments are not fully probabilistic estimates of risk but are conditional estimates given that a set of assumptions about exposure and toxicity are realized. Thus, it is important to specify the assumptions and uncertainties inherent in the risk assessment to place the risk estimates in proper perspective (USEPA, December 1989).

Due to uncertainties associated with the ability of the laboratory to detect constituents at levels of potential concern to human health, risks were quantified for constituents with SQLs above screening values or constituents that were retained as COPCs for other media. These are the constituents listed as Group 2 and Group 3 COPCs on Table 7-3. This analysis is presented as a separate uncertainty section, Section 7.6.2.

Table 7-9 presents the potential uncertainties inherent in the risk assessment process. A site-specific discussion on these individual components is presented in the following sections.

7.6.1.1 Uncertainty in COPC Selection

The sampling conducted at Site 12 focused on areas of known or suspected contamination. Samples were collected from locations identified from information collected during previous investigations. Therefore, the uncertainty associated with sampling and the possibility of missing a contaminated location is expected to be minimal.

The uncertainty associated with the data analysis is minimal because the data were fully validated prior to use in the risk assessment. However, the data validation and critical evaluation of the data did reveal that the reliability of certain data were particularly poor, most notably the aqueous pesticide and PCB data (groundwater and surface water). Pesticides and PCBs are not typically found in groundwater, due to the tendency of these compounds to sorb to soils and because of their low solubilities. The reported concentrations of pesticides in groundwater and surface water were qualified as estimates because they were below quantitation limits and because in all cases the dual column precision criterion (25-or-less-percent concentration difference) was exceeded. The PCB groundwater data were not consistent, as Aroclor-1248 was detected in the duplicate sample at one well but not in the regular sample. Also, Aroclor-1248 was not detected in any site soil samples.

The general assumptions used in the COPC selection process were conservative to ensure that true COPCs were not eliminated from the quantitative risk assessment and that the highest possible risk was estimated.

7.6.1.2 Uncertainty Associated with Exposure Assessment

Most of the exposure pathways evaluated at the site were assumed and are not currently occurring. A full-time industrial worker was conservatively evaluated to represent the crash-crew training and maintenance personnel who are currently at the site intermittently. An adolescent trespasser was also evaluated. Additionally, it was assumed that the site may be used for residential development in the future. Based on the nature of MCAS Cherry Point and the area of OU6, this is not a likely scenario. Additionally, it is not likely that the upper groundwater aquifer would ever be used as a potable or industrial water supply, due to the ready availability of better water supplies.

The exposure factors used for the quantitation of exposure were conservative and reflect worst-case or upper-bound assumptions on the exposure. The reliability of the values chosen for the exposure factors also contributes substantially to the uncertainty of the resulting risk estimates. Because most of the exposure factors are worst-case or upper-bound assumptions, the resulting risks are worst-case and likely overestimate the actual risk.

Site-related contamination would be expected to decrease with time. The risk assessment assumed concentrations would remain constant throughout the exposure period. This will result in an over-estimation of risk.

7.6.1.3 Uncertainty Associated with Toxicity Assessment

Uncertainties associated with the non-carcinogenic toxicity factors are included in Appendix G.1, Tables 5.1 and 5.2. Several UFs are applied by USEPA to extrapolate dose points from animal studies to humans. These UFs range between 10 and 10,000. Additional MFs are also used based on the professional judgment of the USEPA. Therefore, there is a high degree of uncertainty in the non-carcinogenic toxicity criteria, based on the available scientific data for

each compound. The non-carcinogenic toxicity factors are most likely an overestimate of actual toxicity.

The uncertainty associated with CSFs is mostly associated with the low dose extrapolation where carcinogenicity at low doses is assumed to be straight-line responses. This is a conservative assumption, which introduces a high uncertainty into slope factors extrapolated from this area of the dose-response curve. The CSFs are based on the assumption that there is no threshold level for carcinogenicity; however, most of the experimental studies indicate the existence of a threshold level. Therefore, CSFs developed by USEPA represent upper-bound estimates. Carcinogenic risks generated in this assessment should be regarded as an upper bound estimate on the potential carcinogenic risks rather than an accurate representation of carcinogenic risk. The true carcinogenic risk is likely to be less than predicted (USEPA, December 1989).

There is a large degree of uncertainty associated with the oral to dermal adjustment factors (based on chemical-specific GI absorption factors) used to transform the oral RfDs and CSFs based on administered doses to dermal RfDs and CSFs based on absorbed doses. It is not known if the adjustment factor results in an under- or over-estimate of the actual toxicity associated with dermal exposure.

7.6.1.4 Uncertainty in Risk Characterization

The uncertainties identified in each component of risk assessment ultimately contribute to uncertainty in risk characterization. The addition of risks and HIs across pathways and chemicals contributes to uncertainty based on the interaction of chemicals, such as additivity, synergism, potentiation, and susceptibility of exposed receptors. The simple assumption of additivity used for this site may or may not be accurate and may over- or under-estimate risk; however, a better alternative is not available at this time.

7.6.2 Quantitative Uncertainty Assessment

Due to uncertainty associated with the ability of the laboratory to detect constituents at levels of potential concern to human health, risks were quantified for constituents with SQLs above screening values or constituents retained as COPCs for other media. These are the constituents listed as Group 2 and Group 3 COPCs on Table 7-3.

A quantitative evaluation of risks for the Group 1, 2, and 3 COPCs is presented in this section. The methodology used to select the COPCs and perform the risk assessment is the same as the methodology presented in the main body of the report. The exposure pathways evaluated in this assessment are those presented in Table 7-3 and Appendix G.1, Table 1. The exposure parameters and toxicity values used to quantify risk are presented in Table 7-5 and Appendix G.1 Tables 4.1 through 4.21, and Tables 5.1, 5.2, 6.1, and 6.2. The risk calculations for this quantitative uncertainty evaluation are presented in Tables 7.1.RME.UA through 7.21.RME.UA and 8.1.RME.UA through 8.21.RME.UA, Appendix G.2. Only RME risk estimates were calculated, CT risk estimates were not calculated.

Appendix G.2, Tables 9.1.RME.UA through 9.6.RME.UA summarize the RME total risks to each receptor quantitatively evaluated in the risk assessment. Appendix G.2, Tables 10.1.RME.UA through 10.6.RME.UA show only the chemicals that contributed a hazard greater than 0.1 or a carcinogenic risk greater than 10^{-6} to receptors with carcinogenic risks

or non-carcinogenic hazards greater than USEPA's benchmark levels. The results are discussed in the following sections, by receptor.

7.6.2.1 Current/Future Industrial Worker

The risk assessment assumed that a current/future industrial worker may be exposed to site surface soil, surface water, and sediment. The total RME non-carcinogenic hazard to an adult industrial worker exposed to all of these media exceeds USEPA's target hazard level (Appendix G.2, Table 9.1.RME.UA). The only individual medium that exceeds the target level is surface water (6.4). The only constituents with individual HQs greater than 1.0 for the surface water are Aroclor-1016 and Aroclor-1254, and only for the dermal exposure pathway. Hexachlorobenzene and hexachlorobutadiene also contribute to this HI. All four of these constituents were not detected in the surface water, but their SQLs were greater than the screening level.

The total current RME carcinogenic risk exceeds USEPA's carcinogenic target risk range, due to surface soil ($1x10^{-4}$) and surface water ($2x10^{-2}$). The carcinogenic risk associated with exposure to surface soil by an industrial worker is primarily associated with the PAHs analyzed for in the surface soil. The carcinogenic risk associated with exposure to surface water is also mainly due to the PAHs analyzed for in the surface water. The PAHs were retained as Group 2 COPCs. PAHs were not detected in the surface soil or surface water, however their SQLs were greater than the applicable screening level.

7.6.2.2 Current/Future Adolescent Trespasser/Visitor

The risk assessment assumed that a current trespasser may be exposed to surface soil south of the runway, and surface water and sediment in the drainage swale south of the runway. The total current RME non-carcinogenic hazard and carcinogenic risk to an adolescent trespasser/visitor exposed to these media exceeds USEPA target levels (Appendix G.2, Table 9.2.RME.UA). The only medium contributing to this exceedance is surface water.

The total HI for exposure to surface water is 16. The only constituents with individual HQs greater than 1.0 for the surface water are hexachlorobutadiene, Aroclor-1016, and Aroclor-1254, and only for the dermal exposure pathway. Hexachlorobenzene also contributes to this HI. None of these constituents were detected in the surface water, but all four of their SQLs were greater than the screening level. The carcinogenic risk associated with exposure to the surface water by an adolescent trespasser/visitor ($2x10^{-2}$) exceeds USEPA's target risk of 10^{-6} to 10^{-4}. The carcinogenic risk associated with exposure to surface water is mainly due to the PAHs analyzed for in the surface water. The PAHs were retained as Group 2 COPCs, they were not detected in the surface soil but their SQLs were greater than the screening level.

7.6.2.3 Future Resident

It was assumed a future child and adult resident may be exposed to upper aquifer groundwater from beneath the site and surface soil south of the runway. Exposure to groundwater would occur from ingestion and exposure during showering (adult) or bathing (child).

Exposure to groundwater and surface soil would result in a hazard greater than USEPA's benchmark level to an adult and child resident (Appendix G.2, Tables 9.3.RME.UA and 9.4.RME.UA). Both the groundwater (9.2 and 140) and surface soil (1.4 and 4.1) contribute to

an unacceptable hazard to both the adult and child. The hazards due to exposure to surface soil are only slightly higher than those calculated for the Group 1 COPCs alone. For the adult, none of the individual constituents contribute a HQ greater than 1 to the total HI. For the child, antimony and chromium each have a HQ greater than 1. These are both Group 1 COPCs.

For the adult resident, 4,6-dintro-2-methylphenol is the only constituent that poses a HQ greater than 1 due to exposure to groundwater. For a child, arsenic, iron, 4,6-dintro-2-methylphenol, hexachlorobenzene, hexachlorobutadiene, hexachloroethane, Aroclor-1016, Aroclor-1254, heptachlor, and thallium pose hazards greater than 1.0. Arsenic and iron are the only risk drivers that were detected in the groundwater, the other constituents were retained as COPCs because their SQL exceeded the screening level.

Carcinogenic risks associated with exposure to groundwater and surface soil were estimated for an adult and child resident, and summed for a lifetime resident (Appendix G.2, Tables 9.3.RME.UA, 9.4.RME.UA, and 9.6.RME.UA). Exposure to groundwater ($2x10^{-3}$, $9x10^{-2}$, and $9x10^{-2}$) and surface soil residents ($2x10^{-4}$, $1x10^{-4}$, and $3x10^{-4}$) would result in a carcinogenic risk greater than USEPA's target risk range to the adult, child, and lifetime resident.

For the adult, arsenic, 1,2-dibromomethane, n-nitroso-di-propylamine, and the PAHs are the main risk contributors for exposure to groundwater. For the child, the PCBs and PAHs are the main risk drivers, and primarily through dermal contact. For the lifetime resident, the main contributors are those for the adult and child resident. Arsenic and Aroclor-1248 (a PCB) are the only constituents detected in the groundwater.

The risks from exposure to surface soil are mainly associated with the Group 2 and 3 COPCs. The primary risk driver is dermal contact with PAHs and n-nitroso-di-n-propylamine. The risks associated with exposure to the detected COPCs alone do not exceed USEPA's target risk range.

7.6.2.4 Future Construction Worker

Exposure to subsurface soil, surface water, and sediment through incidental ingestion and dermal contact, and groundwater through dermal contact and inhalation of VOCs was evaluated for a future construction worker. The total potential future RME risk to a construction worker exposed to these media exceeds USEPA's target carcinogenic risk and non-carcinogenic hazard level (Appendix G.2, Table 9.5.RME.UA). This exceedance is associated with the groundwater and surface water.

It is assumed that a construction worker may be exposed to the upper aquifer groundwater through dermal contact and inhalation of VOCs during excavation activities. The RME non-carcinogenic hazard to a construction worker is 5.4, which is above USEPA's benchmark non-carcinogenic HI of 1.0. The PCBs are the main contributor to this risk. Although the Group 1 COPCs contribute to hazards above USEPA target levels, the Group 2 and Group 3 COPCs contribute a greater portion of the hazard and the Group 1 COPCs do not result in an unacceptable hazard alone. The RME non-carcinogenic hazard to a construction worker exposed to surface water (17) exceeds USEPA's target HI of 1.0. This risk is mainly associated with the PCBs analyzed in the surface water.

The RME carcinogenic risk due to exposure to groundwater ($1x10^{-3}$) is greater than USEPA's target risk range of 10^{-4} to 10^{-6}. The carcinogenic risk associated with exposure to the surface

water by construction worker ($2x10^{-3}$) exceeds USEPA's target risk of 10^{-6} to 10^{-4}. The carcinogenic risk associated with exposure to groundwater and surface water is mainly due to the PAHs analyzed for in the groundwater and surface water samples. The PAHs were retained as Group 2 COPCs, and were not detected in the groundwater or surface water, but their SQLs were greater than the screening level.

7.6.3 Summary

Risks were evaluated for exposure to:

- Surface soil for current/future industrial workers and adolescent trespassers/visitors, and future adult and child residents
- Surface water and sediment for current/future industrial workers and adolescent trespassers/visitors, and future construction workers
- Upper aquifer groundwater for future adult and child residents and construction workers
- Subsurface soil for future construction workers

Tables 7-10 and 7-11 summarize the cancer risks and hazard indices calculated for the OU6, Site 12 HHRA for RME and CT, respectively.

There are no risks or hazards greater then USEPA target levels under current site use for exposure to any media. However, future residential use of the site may result in carcinogenic risks and non-carcinogenic hazards greater than USEPA's target levels.

Potable use of upper aquifer groundwater would result in HIs greater than 1.0 to the child and adult resident, mainly due to arsenic and iron detected in the groundwater, with a smaller contribution from heptachlor epoxide. Potable use of groundwater would result in carcinogenic risks greater than 10^{-4} for all residents (adult, child, and lifetime residents). This carcinogenic risk is mainly associated with Aroclor-1248 (dermal exposure to the child) and arsenic (ingestion by both child and adult).

Contact with surface soil by a future adult and child resident would result in HIs greater than 1.0, associated with the antimony and chromium detected in the soil. The CT estimates for exposure to surface soil by a future resident were below USEPA target levels. However, this is not the case for the CT estimates for exposure to upper aquifer groundwater.

HHRA work was performed as part of the SRI included an evaluation of subsurface soil for human health risks to construction workers. The assessment concluded that the non-carcinogenic SVOCs detected in subsurface soil do not pose a non-cancer hazard. This assessment is included in Attachment 2.

7.7 Remedial Goal Options

Remedial goal options (RGOs) were calculated for media with total carcinogenic risks greater than 10^{-4} or non-carcinogenic hazards greater than 1.0. Under current site conditions and use, Site 12 was determined in the RI and SRI to not present any human health risks

above target USEPA levels. However, conservatively assuming the site is used for residential development in the future results in a risk in excess of USEPA target levels.

RGOs were calculated for surface soil and groundwater, the only media that indicated risks above USEPA target levels. The RGOs were calculated based on future residential use of the site, the only scenario resulting in risks above USEPA target levels. RGOs were calculated following the method in the USEPA Region IV risk guidance (USEPA, October 1996), as shown in Table 7-12. RGOs for non-carcinogenic effects were calculated based on a child resident, and RGOs for carcinogenic responses were calculated based on a lifetime resident. RGOs based on carcinogenic responses were not calculated for surface soil since the carcinogenic risk for surface soil is below 10^{-4}.

Table 7-1
Samples Evaluated in Risk Assessment
Cherry Point OU6, Site 12

Surface Soil	Subsurface Soil	Groundwater	Surface Water	Sediment
012SS01	012SB01	012MW01	012SW01	012SD01
012SS02	012SB02	012MW02	012SW02	012SD02
012SS03		012MW03	012SW03	012SD03
012SS04		012MW04	012SW04[4]	012SD04[5]
012SS05		012MW05[3]		
012SS06		012TW01		
012SS07				
012SS08				
012SS09				
012SS10				
012SS11				
012SS12[1]				
012SS13[2]				
012SS14				
012SS15-00				
012SS16				
012SS17				
012SS18				

[1] duplicate of 12SS07
[2] duplicate of 12SS01
[3] duplicate of 12MW01
[4] duplicate of 12SW01
[5] duplicate of 12SD01

Table 7-2
2,3,7,8-TCDD Toxicity Equivalency Factors
Cherry Point OU6, Site 12

Chemical	Toxicity Equivalency Factors
2,3,7,8-TCDD	1
Other TCDDs	0
2,3,7,8-PeCDD	0.5
Other PeCDDs	0
2,3,7,8-HxCDD	0.1
Other HxCDDs	0
2,3,7,8-HpCDD	0.01
Other HpCDDs	0
OCDD	0.001
2,3,7,8-TCDF	0.1
Other TCDFs	0
1,2,3,7,8-PeCDF	0.05
2,3,4,7,8-PeCDF	0.5
Other PeCDFs	0
2,3,7,8-HxCDF	0.1
Other HxCDFs	0
2,3,7,8-HpCDF	0.01
Other HpCDFs	0
OCDF	0.001

Table 7-3
Chemicals of Potential Concern
Cherry Point OU6, Site 12

Reason Retained as COPC	Surface Soil	Surface Soil to Air	Surface Water	Sediment	Groundwater	Subsurface Soil	Subsurface Soil to Air
Group 1 - Detected and Maximum Concentration Greater than Screening Value	Aroclor-1260 2,3,7,8-TCDD Aluminum Antimony Cadmium Chromium Copper Iron Lead		4,4'-DDD 4,4'-DDE 4,4'-DDT Aldrin Aroclor-1248 Dieldrin Mercury	Aluminum Arsenic	alpha-Chlordane Aroclor-1248 Dieldrin Heptachlor epoxide gamma-Chlordane Aluminum Arsenic Chromium Iron		
Group 2- Not Detected but Maximum Detection Limit Greater than Screening Level	1,2-Dibromoethane 3,3'-Dichlorobenzidine 4,6-Dinitro-2-methylphenol Benzo(a)anthracene Benzo(a)pyrene bis(2-Chloroethyl)ether Dibenz(a,h)anthracene Hexachlorobenzene Hexachlorobutadiene Indeno(1,2,3-cd)pyrene n-Nitroso-di-n-propylamine Nitrobenzene Pentachlorophenol Aroclor-1221 Toxaphene	bis(2-Chloroethyl)ether Hexachlorobenzene Hexachlorocyclopentadiene	1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane 1,1-Dichloroethene 1,2-Dibromoethane 1,2-Dichloroethane 1,2-Dichloropropane Bromodichloromethane Carbon tetrachloride Dibromochloromethane Tetrachloroethene trans-1,3-Dichloropropene 2,4,6-Trichlorophenol 2,4-Dinitrotoluene 2,6-Dinitrotoluene 2-Chlorophenol 3,3'-Dichlorobenzidine 4,6-Dinitro-2-methylphenol Acenaphthylene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene bis(2-Chloroethyl)ether bis(2-Ethylhexyl)phthalate Carbazole Chrysene Dibenz(a,h)anthracene	1,2-Dibromoethane Benzo(a)pyrene Dibenz(a,h)anthracene Hexachlorobenzene n-Nitroso-di-n-propylamine	1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane 1,1-Dichloroethene 1,2-Dibromoethane 1,2-Dichloroethane 1,2-Dichloropropane Benzene Bromodichloromethane Bromoform Carbon tetrachloride Chloroform cis-1,3-Dichloropropene Dibromochloromethane Tetrachloroethene trans-1,3-Dichloropropene Vinyl chloride 1,4-Dichlorobenzene 2,4,6-Trichlorophenol 2,4-Dinitrophenol 2,4-Dinitrotoluene 2,6-Dinitrotoluene 2-Chlorophenol 3,3'-Dichlorobenzidine 4,6-Dinitro-2-methylphenol 4-Methylphenol Acenaphthylene Benzo(a)anthracene	1,2-Dibromoethane Benzo(a)pyrene Dibenz(a,h)anthracene Hexachlorobenzene n-Nitroso-di-n-propylamine	Carbon tetrachloride Chloroform cis-1,3-Dichloropropene trans-1,3-Dichloropropene Vinyl chloride bis(2-Chloroethyl)ether Hexachlorobenzene Hexachlorocyclopentadiene n-Nitroso-di-n-propylamine

Table 7-3
Chemicals of Potential Concern
Cherry Point OU6, Site 12

Reason Retained as COPC	Surface Soil	Surface Soil to Air	Surface Water	Sediment	Groundwater	Subsurface Soil	Subsurface Soil to Air
Group 2 continued			Dibenzofuran		Benzo(a)pyrene		
			Hexachlorobenzene		Benzo(b)fluoranthene		
			Hexachlorobutadiene		Benzo(k)fluoranthene		
			Hexachloroethane		bis(2-Chloroethyl)ether		
			Indeno(1,2,3-cd)pyrene		bis(2-Ethylhexyl)phthalate		
			n-Nitroso-di-n-propylamine		Carbazole		
			n-Nitrosodiphenylamine		Chrysene		
			Naphthalene		Dibenz(a,h)anthracene		
			Pentachlorophenol		Dibenzofuran		
			alpha-BHC		Hexachlorobenzene		
			alpha-Chlordane		Hexachlorobutadiene		
			Aroclor-1016		Hexachloroethane		
			Aroclor-1221		Indeno(1,2,3-cd)pyrene		
			Aroclor-1232		n-Nitroso-di-n-propylamine		
			Aroclor-1242		Naphthalene		
			Aroclor-1254		Nitrobenzene		
			Aroclor-1260		Pentachlorophenol		
			beta-BHC		4,4'-DDT		
			delta-BHC		alpha-BHC		
			gamma-Chlordane		Aroclor-1016		
			Heptachlor		Aroclor-1221		
			Heptachlor epoxide		Aroclor-1232		
			Toxaphene		Aroclor-1242		
			Arsenic		Aroclor-1254		
			Cadmium		Aroclor-1260		
			Thallium		Aroclor-1262		
					Aroclor-1268		
					Heptachlor		
					Toxaphene		
					Thallium		

Table 7-3
Chemicals of Potential Concern
Cherry Point OU6, Site 12

Reason Retained as COPC	Surface Soil	Surface Soil to Air	Surface Water	Sediment	Groundwater	Subsurface Soil	Subsurface Soil to Air
Group 3- Retained as a Group 1 COPC in Other Media	4,4'-DDD 4,4'-DDE 4,4'-DDT Aldrin alpha-Chlordane Aroclor-1248 Dieldrin gamma-Chlordane Heptachlor epoxide Arsenic Mercury	2,3,7,8-TCDD 4,4'-DDD 4,4'-DDE 4,4'-DDT Aldrin alpha-Chlordane Aroclor-1248 Aroclor-1260 Dieldrin gamma-Chlordane Heptachlor epoxide Aluminum Antimony Arsenic Cadmium Chromium Copper Iron Lead Mercury	alpha-Chlordane Aroclor-1260 gamma-Chlordane Heptachlor epoxide Aluminum Antimony Arsenic Cadmium Chromium Copper Iron Lead	4,4'-DDD 4,4'-DDE 4,4'-DDT Aldrin alpha-Chlordane Aroclor-1248 Aroclor-1260 Dieldrin gamma-Chlordane Heptachlor epoxide Antimony Cadmium Chromium Copper Iron Lead Mercury	4,4'-DDD 4,4'-DDE 4,4'-DDT Aldrin Aroclor-1260 Antimony Cadmium Copper Lead Mercury	4,4'-DDD 4,4'-DDE 4,4'-DDT Aldrin alpha-Chlordane Aroclor-1248 Aroclor-1260 Dieldrin gamma-Chlordane Heptachlor epoxide Aluminum Antimony Arsenic Cadmium Chromium Copper Iron Lead Mercury	4,4'-DDD 4,4'-DDE 4,4'-DDT Aldrin alpha-Chlordane Aroclor-1248 Aroclor-1260 Dieldrin gamma-Chlordane Heptachlor epoxide Aluminum Antimony Arsenic Cadmium Chromium Copper Iron Lead Mercury

Table 7-4
Exposure Pathways
Cherry Point OU6, Site 12

Media	Exposure Route	Current/Future			Future		
		Industrial Worker	Other Worker*	Trespasser/Visitor Adolescent	Resident Adult	Resident Child	Construction Worker
Surface Soil							
	Ingestion	X	XQ	X	X	X	
	Dermal	X	XQ	X	X	X	
	Inhalation	X	XQ	X	X	X	
Surface Water							
	Ingestion	X	XQ	X			X
	Dermal	X	XQ	X			X
	Inhalation						
Sediment							
	Ingestion	X	XQ	X			X
	Dermal	X	XQ	X			X
	Inhalation						
Groundwater							
	Ingestion				X	X	
	Dermal				X	X	X
	Inhalation				X		X
Subsurface Soil							
	Ingestion						X
	Dermal						X
	Inhalation						X

X Quantitative evaluation.

XQ Qualitative evaluation.

* Crash crew training personnel.

Table 7-5
RME Exposure Parameters for Human Health Risk Assessment
Cherry Point OU6, Site 12

	Industrial		Residential		Trespasser/Visitor
	Industrial Worker	Construction Worker	Child (age 1-6)	Adult	Adolescent
General Receptor Factors					
Body Weight (kg)	70[a]	70[a]	15[a]	70[a]	45[g]
Media-Specific Factors					
Soil					
Ingestion Rate (mg/day)	100[a]	480[a]	200[a]	100[a]	100[a]
Inhalation Rate (m^3/hour)	0.83[a]	1.7[d]	0.5[d]	0.83[a]	0.83[a]
Skin Surface Area[1] (cm^2)	5,300[c]	5,300[c]	3,400[m]	6,600[m]	4,600[d]
Soil Adherence Factor (mg/cm^2-day)	1[d]	1[d]	1[d]	1[d]	1[d]
Dermal Absorption Factor Solids[2]	Table 7-6		Table 7-6		Table 7-6
Exposure Time (hours/day)	8[e]	8[e]	24	24	2[j]
Exposure Frequency (days/year)	250[a]	40[k]	350[a]	350[a]	45[h]
Exposure Duration (years)	25[a]	1[a]	6[a]	24[a]	10[g]
Particulate Emission Factor (m^3/kg)	1.32E+09[f]	1.62E+06[o]	1.32E+09[f]	1.32E+09[f]	1.32E+09[f]
Groundwater					
Ingestion Rate (L/day)			1[d]	2[d]	
Inhalation Rate (m^3/day)		1.7[d]			
Skin Surface Area[2] (cm^2)		6,000[d]	10,000[m]		
Permeability Constant (cm/hour)		Table 7-7	Table 7-7		
Exposure Time (hours/day)		8[e]	0.33[c]		
Exposure Frequency (days/year)		40[k]	350[a]	350[a]	
Exposure Duration (years)		1[a]	6[a]	24[a]	
Surface Water - wading					
Ingestion Rate (liters/hour)	0.01[g]	0.01[g]			0.01[g]
Skin Surface Area[3] (cm^2)	6,000[d]	6,000[d]			5,500[d]
Permeability Constant (cm/hour)	Table 7-7				Table 7-7
Exposure Time (hours/day)	8[e]	8[e]			2.6[l]
Exposure Frequency (days/year)	15[n]	40[k]			45[h]
Exposure Duration (years)	25[a]	1[a]			10[g]
Sediment-wading					
Ingestion Rate (mg/day)	100[a]	480[a]			100[a]
Skin Surface Area[4] (cm^2)	5,300[c]	5,300[c]			5,500[d]
Soil Adherence Factor (mg/cm^2-day)	1[d]	1[d]			1[d]
Dermal Absorption Factor Solids	Table 7-6				Table 7-6
Exposure Frequency (days/year)	15[n]	40[k]			45[h]
Exposure Duration (years)	25[a]	1[a]			10[g]

Notes:

1. Worker skin surface area includes head, hands, forearms, and lower legs.
   Resident wearing shorts, short sleeve shirt, and shoes (95th percentile value). Childern assumed not to wear shoes.
   Adolescent trespasser/visitor skin surface area is 25% of total skin surface area.
2. For construction worker skin surface are includes hands, forearms, lower legs, and feet (30% of total surface area).
   For child resident skin surface area is total body skin surface area.
3. Skin surface area based on contact while wadding includes hands, forearms, lower legs, and feet (30% of total surface area).
4. Skin surface area based on wading includes hands, forearms and lower legs for worker. For trespasser/visitor see note 3.

Sources:

a. USEPA, 1991. *Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors*.
b. USEPA, 1993. *Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.*
c. USEPA, 1992. *Dermal Exposure Assessment: Principles and Applications*. Office of Research and Development EPA/600/8-91/011B. January 1992.
d. USEPA, 1997. *Exposure Factors Handbook*. EPA/600/P-95/002Fa.
e. Professional judgment, assuming worker would work at site 8 hours per day.
f. USEPA, 1996. *Soil Screening Guidance: User's Guide.* EPA/540/R-96/018.
g. USEPA, 1996. *Supplemental Guidance to RAGS: Region 4 Bulletins.*
h. Professional judgment, assuming 3 days per week during the summer months when off from school and 1 day per week during late spring and early fall.
j. Professional judgement, assuming trespasser/visitor would spend a maximim of 2 hours contacting site soil while passing through site
k. Professional judgement, assuming excavation open for 40 days.
l. USEPA, 1989. *Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Part A). EPA/540/1-89/002.*
m. EPA, 1997: Risk Assessment Guidance for Superfund. Vol.1: Supplemental guidance, Dermal Risk Assessment Guidance. Interim Guidance. NCEA-W-0364.
n. Professional judgement.
o. Calculatated, see Appendix G.

Table 7-6
CT Exposure Parameters for Human Health Risk Assessment
Cherry Point OU6, Site 12

	Industrial		Residential		Trespasser/Visitor
	Industrial Worker	Construction Worker	Child (age 1-6)	Adult	Adolescent
General Receptor Factors					
Body Weight (kg)	70[a]	70[a]	15[a]	70[a]	45[g]
Media-Specific Factors					
Soil					
Ingestion Rate (mg/day)	50[b]	480[a]	100[b]	50[b]	50[b]
Inhalation Rate (m^3/day)	0.83[a]	1.7[d]	0.5[d]	0.83[a]	0.83[a]
Skin Surface Area[1] (cm^2)	2,000[c]	2,000[c]	2,900[m]	5,700[m]	3,700[d]
Soil Adherence Factor (mg/cm^2-day)	0.2[c]	0.2[c]	0.2[c]	0.2[c]	0.2[c]
Dermal Absorption Factor Solids[2]	Table 7-6		Table 7-6		Table 7-6
Exposure Frequency (days/year)	219[b]	40[k]	234[b]	234[b]	23[h]
Exposure Time (hours/day)	4[e]	4[e]	24	24	2[j]
Exposure Duration (years)	5[b]	1[a]	6[a]	9[b]	10[g]
Particulate Emission Factor (m^3/kg)	1.32E+09[f]	1.62E+06[o]	1.32E+09[f]	1.32E+09[f]	1.32E+09[f]
Groundwater					
Ingestion Rate (L/day)			1[d]	1.4[b]	
Inhalation Rate (m^3/day)		1.7[d]			
Skin Surface Area[4] (cm^2)		5,400[d]	7,500[m]		
Permeability Constant (cm/hour)		Table 7-7	Table 7-7		
Exposure Time (hours/day)		4[e]	0.33[c]		
Exposure Frequency (days/year)		40[k]	234[b]	234[b]	
Exposure Duration (years)		1[a]	6[a]	9[b]	
Surface Water - wading					
Ingestion Rate (liters/hour)	0.01[g]	0.01[g]			0.01[g]
Skin Surface Area[3] (cm^2)	5,400[d]	5,400[d]			4,500[d]
Permeability Constant (cm/hour)	Table 7-7				Table 7-7
Exposure Time (hours)	4[e]	4[e]			2.6[j]
Exposure Frequency (days/year)	15[n]	40[k]			23[h]
Exposure Duration (years)	5[b]	1[a]			10[g]
Sediment-wading					
Ingestion Rate (mg/day)	50[b]	240[h]			50[b]
Skin Surface Area[4] (cm^2)	2,000[c]	2,000[c]			4,500[d]
Soil Adherence Factor (mg/cm^2-day)	0.2[c]	0.2[c]			0.2[c]
Dermal Absorption Factor Solids	Table 7-6				Table 7-6
Exposure Frequency (days/year)	15[n]	40[k]			23[h]
Exposure Duration (years)	5[b]	1[a]			10[g]

Notes:

1. Worker skin surface area includes head and hands.
   Resident wearing shorts, short sleeve shirt, and shoes (50th percentile value). Childern assumed not to wear shoes.
   Adolescent trespasser/visitor skin surface area is 25% of total skin surface area.
2. For construction worker skin surface are includes hands, forearms, lower legs, and feet (30% of total surface area).
   For child resident skin surface area is total body skin surface area.
3. Skin surface area based on contact while wadding includes hands, forearms, lower legs, and feet (30% of total surface area).
4. Skin surface area based on wading includes hands, forearms and lower legs for worker. For trespasser/visitor see note 3.

Sources:

a. USEPA, 1991. *Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors*.
b. USEPA, 1993. *Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.*
c. USEPA, 1992. *Dermal Exposure Assessment: Principles and Applications*. Office of Research and Development EPA/600/8-91/011B. January 1992.
d. USEPA, 1997. *Exposure Factors Handbook*. EPA/600/P-95/002Fa.
e. Professional judgment, assuming 1/2 the RME value.
f. USEPA, 1996. *Soil Screening Guidance: User's Guide*. EPA/540/R-96/018.
g. USEPA, 1996. *Supplemental Guidance to RAGS: Region 4 Bulletins.*
h. Professional judgment, assuming 1/2 the RME value.
j. Professional judgement, assuming trespasser/visitor would spend a maximim of 2 hours contacting site soil while passing through site.
k. Professional judgement, assuming excavation open for 40 days.
l. USEPA, 1989. *Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Part A). EPA/540/1-89/002.*
m. EPA, 1997: Risk Assessment Guidance for Superfund. Vol.1: Supplemental guidance, Dermal Risk Assessment Guidance. Interim Guidance. NCEA-W-0364.
n. Professional judgement.
o. Calculatated, see Appendix G.

Table 7-7
Chemical Specific Dermal Absorption Factors for Soil and Sediment
Cherry Point OU6, Site 12

Chemical	Dermal Absorption Factor
1,2-Dibromoethane[1]	0.03
3,3'-Dichlorobenzidine	0.1
4,6-Dinitro-2-methylphenol	0.1
Benzo(a)anthracene	0.13
Benzo(a)pyrene	0.13
bis(2-Chloroethyl)ether	0.1
Dibenz(a,h)anthracene	0.13
Hexachlorobenzene	0.1
Hexachlorobutadiene	0.1
Indeno(1,2,3-cd)pyrene	0.13
n-Nitroso-di-n-propylamine	0.1
Nitrobenzene	0.1
Pentachlorophenol	0.25
4,4'-DDD[2]	0.03
4,4'-DDE[2]	0.03
4,4'-DDT	0.03
Aldrin	0.1
alpha-Chlordane	0.04
Aroclor-1221	0.14
Aroclor-1248	0.14
Aroclor-1260	0.14
Dieldrin	0.1
gamma-Chlordane	0.04
Heptachlor epoxide	0.1
Toxaphene	0.1
2,3,7,8-TCDD[3]	0.03
Aluminum[4]	0.01
Antimony[4]	0.01
Arsenic	0.03
Cadmium	0.001
Chromium[4]	0.01
Copper[4]	0.01
Iron[4]	0.01
Lead[4]	0.01
Mercury[4]	0.01
Thallium[4]	0.01

Source: USEPA's *Risk Assessment Guidance for Superfund Vol. I: Human Health Evaluation Manual Supplemental Guidance, Dermal Risk Assessment Interim Guidance*, November 6, 1998

Notes:

1. Dermal absorption factor for 1,2-Dibromoethane is default value for organics from *Assessing Dermal Exposure from Soil*. USEPA Region III. EPA/903-K-95-003, December 1995.
2. Value for 4,4'-DDT
3. Based on an organic soil content of less than 10 percent.
4. Default value of 0.01 used for inorganics.

Table 7-8
Chemical Specific Dermal Exposure Parameters for Surface Water and Groundwater
Cherry Point OU6, Site 12

Chemical	Permeability Coefficient Kp (cm/hour)	Lag Time (hours) τ (hours)	Time to reach steady-state t* (hours)	Partitioning Constant B
1,1,2,2-Tetrachloroethane	0.009	0.92	2.2	0.025
1,1,2-Trichloroethane	0.0084	0.57	1.4	0.011
1,1-Dichloroethene	0.016	0.34	0.82	0.013
1,2-Dibromoethane	0.0002	1.3	3	0.00013
1,2-Dichloroethane	0.0053	0.35	0.84	0.003
1,2-Dichloropropane	0.01	0.43	1	0.01
Benzene	0.021	0.26	0.63	0.013
Bromodichloromethane	0.0058	0.87	2.1	0.012
Bromoform	0.0026	3	7.3	0.023
Carbon tetrachloride	0.022	0.76	1.8	0.068
Chloroform	0.0089	0.47	1.1	0.0093
cis-1,3-Dichloropropene	0.0055	0.42	1	0.004
Dibromochloromethane	0.0039	1.6	3.9	0.017
Tetrachloroethene	0.048	0.9	4.3	0.25
trans-1,3-Dichloropropene	0.0055	0.42	1	0.004
Vinyl chloride	0.0073	0.21	0.51	0.0023
1,4-Dichlorobenzene	0.062	0.69	3.3	0.25
2,4,6-Trichlorophenol	0.05	1.4	9.2	0.49
2,4-Dinitrophenol	0.0018	1.2	2.8	0.0035
2,4-Dinitrotoluene	0.0038	1.1	2.7	0.0095
2,6-Dinitrotoluene	0.0025	1.1	2.7	0.0052
2-Chlorophenol	0.011	0.53	1.3	0.014
3,3'-Dichlorobenzidine	0.017	3.1	17	NA
4,6-Dinitro-2-methylphenol	0.0098	1.4	3.4	0.05
4-Methylphenol	0.01	0.4	0.96	0.0087
Acenaphthylene	0.13	0.74	5.8	0.79
Benzo(a)anthracene	0.81	2.2	10	46
Benzo(a)pyrene	1.2	2.9	14	130
Benzo(b)fluoranthene	1.2	3	14	130
Benzo(k)fluoranthene	2.8	3.013	14	115
bis(2-Chloroethyl)ether	0.0021	0.65	1.6	0.0019
bis(2-Ethylhexyl)phthalate	0.033	21	100	13
Carbazole	0.08	0.92	6.2	0.52
Chrysene	0.81	2.2	10	46
Dibenz(a,h)anthracene	2.7	4.4	21	690
Dibenzofuran	0.11	0.93	7.3	0.81
Hexachlorobenzene	0.21	4.8	23	20
Hexachlorobutadiene	0.12	3.4	17	6
Hexachloroethane	0.042	2.4	19	0.85
Indeno(1,2,3-cd)pyrene	1.9	4.2	20	380
Isophorone	0.0042	0.61	1.5	0.0047
n-Nitroso-di-n-propylamine	0.00031	0.54	0.0001	1.3
n-Nitrosodiphenylamine	0.036	0.53	7.6	0.32
Naphthalene	0.069	0.53	2.2	0.2
Nitrobenzene	0.007	0.49	1.2	0.0071

Table 7-8
Chemical Specific Dermal Exposure Parameters for Surface Water and Groundwater
Cherry Point OU6, Site 12

Chemical	Permeability Coefficient Kp (cm/hour)	Lag Time (hours) τ (hours)	Time to reach steady-state t* (hours)	Partitioning Constant B
Pentachlorophenol	0.65	3.7	17	72
4,4'-DDD	0.28	7.8	37	63
4,4'-DDE	0.24	7.6	36	49
4,4'-DDT	0.43	13	60	230
Aldrin	0.0016	15	36	0.1
alpha-BHC[3]	0.014	5.2	35	0.52
alpha-Chlordane[1]	0.052	28	130	35
Aroclor-1016[2]	0.71	14	66	520
Aroclor-1221[2]	0.71	14	66	520
Aroclor-1232[2]	0.71	14	66	520
Aroclor-1242[2]	0.71	14	66	520
Aroclor-1248[2]	0.71	14	66	520
Aroclor-1254[2]	0.71	14	66	520
Aroclor-1260[2]	0.71	14	66	520
Aroclor-1262[2]	0.71	14	66	520
Aroclor-1268[2]	0.71	14	66	520
beta-BHC[3]	0.014	5.2	35	0.52
delta-BHC[3]	0.014	5.2	35	0.52
Dieldrin	0.016	18	94	3.6
gamma-Chlordane[1]	0.052	28	130	35
Heptachlor	0.011	17	94	1.9
Heptachlor epoxide[4]	0.011	17	94	1.9
Toxaphene	0.015	29	140	6.6
Aluminum	0.001	NA	NA	NA
Antimony	0.001	NA	NA	NA
Arsenic	0.001	NA	NA	NA
Cadmium	0.001	NA	NA	NA
Chromium	0.001	NA	NA	NA
Copper	0.001	NA	NA	NA
Iron	0.001	NA	NA	NA
Lead	0.000004	NA	NA	NA
Mercury	0.001	NA	NA	NA
Thallium	0.001	NA	NA	NA

Source: USEPA's *Dermal Exposure Assessment: Principals and Applications*, January 1992.
If value not in this document, used equations in document to calculate values.

Notes:
NA - not applicable
1. Value for chlordane
2. Value for PCB-hexachlorobiphenyl
3. Value for Lindane
4. Value for heptachlor

Table 7-9 Summary of Factors Contributing to Uncertainty in Human Health Risk Assessment Cherry Point OU6, Site 12	
Risk Assessment Component	**Potential for Uncertainty**
Hazard Identification	• Initial selection of COPCs • Chemical monitoring data
Toxicity Assessment	• Selection of toxicity values • Factors used in the derivation of toxicity values, including inter-species differences extrapolation • Weight of evidence for human toxicity • Derivation of carcinogenic slope factors • Extrapolation of less-than-lifetime exposure to lifetime cancer risks • Interaction of multiple substances
Exposure Assessment	• Selection of site-specific exposure pathways • Estimation of exposure concentrations • Estimation of exposure to multiple substances • Estimation of intake parameters
Risk Characterization	• Addition of risks across multiple exposure pathways • Addition of risks from multiple substances

Table 7-10
Summary of RME Cancer Risks and Hazard Indices
Cherry Point OU6, Site 12

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks $>10^{-4}$	Chemicals with Cancer Risks $>10^{-5}$ and $<10^{-4}$	Chemicals with Cancer Risks $>10^{-6}$ and $<10^{-5}$	Hazard Index	Chemicals with HI>1
Adult Industrial Worker	Surface Soil	Ingestion	1.2E-07				0.06	
		Dermal Contact	1.0E-06				0.61	
		Total	1.1E-06				0.66	
	Surface Water	Ingestion	5.9E-08				0.00008	
		Dermal Contact	9.2E-05		Aroclor-1248		0.003	
		Total	9.3E-05		Aroclor-1248		0.003	
	Sediment	Ingestion	3.5E-08				0.0007	
		Dermal Contact	1.4E-07				0.004	
		Total	1.7E-07				0.004	
		Total all Media	9.4E-05				0.67	
Adolescent Trespasser/ Visitor	Surface Soil	Ingestion	1.4E-08				0.02	
		Dermal Contact	9.7E-08				0.15	
		Total	1.1E-07				0.16	
	Surface Water	Ingestion	3.6E-08				0.0001	
		Dermal Contact	9.0E-05		Aroclor-1248		0.006	
		Total	9.0E-05		Aroclor-1248		0.006	
	Sediment	Ingestion	6.5E-08				0.006	
		Dermal Contact	2.6E-07				0.03	
		Total	3.3E-07				0.03	
		Total all Media	9.1E-05				0.20	
Adult Resident	Groundwater	Ingestion	1.5E-04	Arsenic	Aroclor-1248	Dieldrin, Heptachlor Epoxide	1.8	
		Total	1.5E-04	Arsenic	Aroclor-1248	Dieldrin, Heptachlor Epoxide	1.8	
	Surface Soil	Ingestion	1.6E-07				0.08	
		Dermal Contact	1.7E-06			Aroclor-1260	1.1	
		Total	1.8E-06			Aroclor-1260	1.1	
	All Media	Total all Media	1.5E-04				2.9	

Table 7-10
Summary of RME Cancer Risks and Hazard Indices
Cherry Point OU6, Site 12

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks $>10^{-4}$	Chemicals with Cancer Risks $>10^{-5}$ and $<10^{-4}$	Chemicals with Cancer Risks $>10^{-6}$ and $<10^{-5}$	Hazard Index	Chemicals with HI>1
Child Resident	Groundwater	Ingestion	8.7E-05		Arsenic	Aroclor 1248, Dieldrin, Heptachlor Epoxide	4.1	Arsenic, Iron
		Dermal Contact	3.0E-04	Aroclor 1248		Dieldrin, Heptachlor Epoxide	0.47	
		Total	3.9E-04	Aroclor 1248	Arsenic	α-Chlordane, Dieldrin, Heptachlor Epoxide	4.6	Arsenic, Iron
	Surface Soil	Ingestion	3.8E-07				0.75	
		Dermal Contact	1.0E-06				2.5	
		Total	1.4E-06			Aroclor-1260	3.3	Antimony, Chromium
	All Media	Total all Media	3.9E-04				7.9	
Life-Time Resident	Groundwater	Ingestion	2.4E-04	Arsenic	Aroclor 1248	Dieldrin, Heptachlor Epoxide		
		Dermal Contact	3.0E-04	Aroclor 1248		Dieldrin, Heptachlor Epoxide		
		Total	5.4E-04	Aroclor 1248, Arsenic	Dieldrin	α-Chlordane, Heptachlor Epoxide		
	Surface Soil	Ingestion	5.5E-07					
		Dermal Contact	2.7E-06			Aroclor-1260		
		Total	3.2E-06			Aroclor-1260		
	All Media	Total all Media	5.4E-04					
Adult Construction Worker	Groundwater	Dermal Contact	3.7E-06			Aroclor-1248	0.06	
		Total	3.7E-06			Aroclor-1248	0.06	
	Surface Water	Ingestion	6.3E-09				0.0002	
		Dermal Contact	9.9E-06			Aroclor-1248	0.007	
		Total	9.9E-06			Aroclor-1248	0.007	
	Sediment	Ingestion	1.8E-08				0.009	
		Dermal Contact	1.4E-08				0.009	
		Total	3.2E-08				0.02	
	All Media	Total all Media	1.4E-05				0.08	

Table 7-11
Summary of CT Cancer Risks and Hazard Indices
Cherry Point OU6, Site 12

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks $>10^{-4}$	Chemicals with Cancer Risks $>10^{-5}$ and $<10^{-4}$	Chemicals with Cancer Risks $>10^{-6}$ and $<10^{-5}$	Hazard Index	Chemicals with HI>1
Adult Resident	Groundwater	Ingestion	2.6E-05		Arsenic	Aroclor-1248	0.82	
		Total	2.6E-05		Arsenic	Aroclor-1248	0.82	
	Surface Soil	Ingestion	NA				0.01	
		Dermal Contact	NA				0.05	
		Total					0.06	
Child Resident	Groundwater	Ingestion	5.8E-05		Arsenic	Aroclor 1248, Dieldrin, Heptachlor Epoxide	2.7	Arsenic, Iron
		Dermal Contact	1.5E-04	Aroclor 1248		Dieldrin, Heptachlor Epoxide	0.24	
		Total	2.1E-04	Aroclor 1248	Arsenic	Dieldrin, Heptachlor Epoxide	3.0	Arsenic, Iron
	Surface Soil	Ingestion	NA				0.0001	
		Dermal Contact	NA				0.12	
		Total					0.12	
Life-Time Resident	Groundwater	Ingestion	8.4E-05		Arsenic	Aroclor 1248, Dieldrin, Heptachlor Epoxide		
		Dermal Contact	1.5E-04	Aroclor 1248		Dieldrin, Heptachlor Epoxide		
		Total	2.4E-04	Aroclor 1248	Arsenic	Dieldrin, Heptachlor Epoxide		

NA - Pathway not evaluated, RME risk within USEPA's acceptable risk range.

Table 7-12
Calculation of RGOs
Cherry Point OU6, Site 12

Groundwater

Residential Child

Chemical	Exposure Point Concentration (µg/L)	Hazard Quotient				RGO - 0.1 (µg/L)	RGO - 1.0 (µg/L)	RGO - 3.0 (µg/L)
		Inh	Ing	Der	Total			
Dieldrin	3.3E-02	--	4.2E-02	9.1E-02	1.3E-01	2.5E-02	2.5E-01	7.4E-01
Heptachlor epoxide	4.2E-02	--	2.1E-01	2.1E-01	4.1E-01	1.0E-02	1.0E-01	3.1E-01
Aluminum	2.2E+03	--	1.4E-01	4.7E-03	1.5E-01	1.5E+03	1.5E+04	4.5E+04
Arsenic	9.2E+00	--	2.0E+00	1.6E-02	2.0E+00	4.7E-01	4.7E+00	1.4E+01
Chromium	5.4E+00	--	1.2E-01	1.9E-02	1.3E-01	4.0E+00	4.0E+01	1.2E+02
Iron	1.5E+04	--	1.6E+00	3.6E-02	1.7E+00	9.2E+02	9.2E+03	2.8E+04

Lifetime Resident

Chemical	Exposure Point Concentration (µg/L)	Cancer Risk				RGO - $1x10^{-6}$ (µg/L)	RGO - $1x10^{-5}$ (µg/L)	RGO - $1x10^{-4}$ (µg/L)
		Inh	Ing	Der	Total			
alpha-Chlordane	5.6E-02	--	2.9E-07	9.5E-07	1.2E-06	4.6E-02	4.6E-01	4.6E+00
Aroclor-1248	5.8E-01	--	1.7E-05	2.9E-04	3.1E-04	1.9E-03	1.9E-02	1.9E-01
Dieldrin	3.3E-02	--	7.9E-06	6.3E-06	1.4E-05	2.3E-03	2.3E-02	2.3E-01
Heptachlor epoxide	4.2E-02	--	5.7E-06	2.1E-06	7.8E-06	5.4E-03	5.4E-02	5.4E-01
Arsenic	9.2E+00	--	2.0E-04	6.1E-07	2.0E-04	4.5E-02	4.5E-01	4.5E+00

Surface Soil

Residential Child

Chemical	Exposure Point Concentration (mg/kg)	Hazard Quotient				RGO - 0.1 (mg/kg)	RGO - 1.0 (mg/kg)	RGO - 3.0 (mg/kg)
		Inh	Ing	Der	Total			
Aluminum	1.2E+04	--	1.5E-01	2.6E-01	4.1E-01	2.9E+03	2.9E+04	8.7E+04
Antimony	3.6E+00	--	1.2E-01	9.9E-01	1.1E+00	3.3E-01	3.3E+00	9.9E+00
Cadmium	6.0E+00	--	7.7E-02	1.3E-01	2.1E-01	2.9E+00	2.9E+01	8.7E+01
Chromium	2.6E+01	--	1.1E-01	9.4E-01	1.1E+00	2.5E+00	2.5E+01	7.4E+01
Copper	6.7E+02	--	2.1E-01	1.2E-01	3.3E-01	2.0E+02	2.0E+03	6.0E+03
Iron	3.9E+03	--	8.3E-02	9.5E-02	1.8E-01	2.2E+03	2.2E+04	6.6E+04

For carcinogens: RGO = (Exposure Point Concentration x Target Risk)/ Total Cancer Risk
For noncarcinogens: RGO = (Exposure Point Concentration x Target Hazard Quotient)/ Total Hazard Quotient

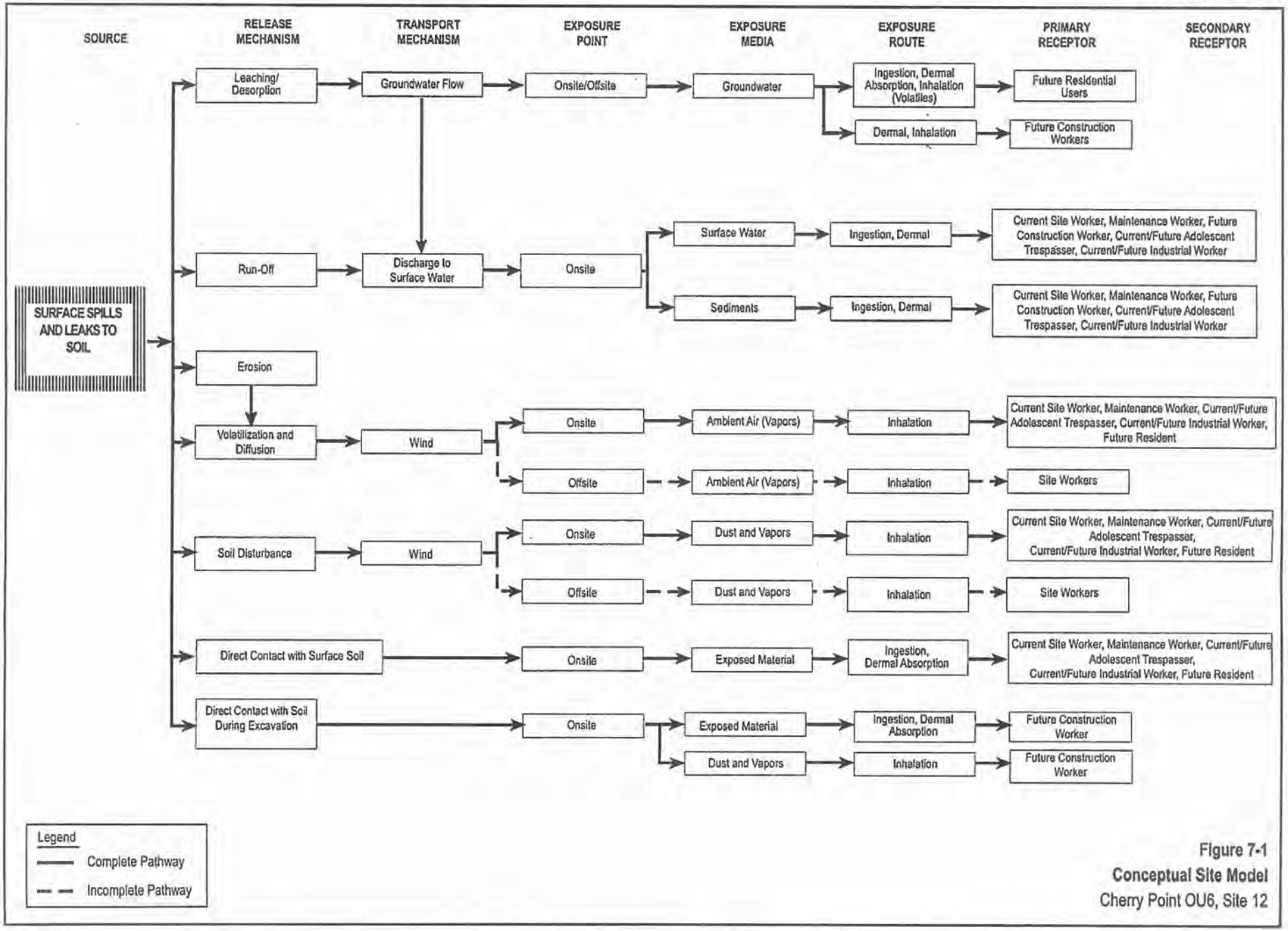


Figure 7-1
Conceptual Site Model
Cherry Point OU6, Site 12

8 Screening-Level Ecological Risk Assessment

8.1 Introduction

This section presents the results of a screening-level ERA and Step 3A of the baseline ERA for OU6, Site 12, MCAS Cherry Point. Site 12 is identified as SWMU 12 in the RCRA Consent Order between MCAS Cherry Point and the USEPA, which was signed in December 1989. The screening-level ERA was conducted to determine if the chemicals detected at Site 12 are present at concentrations that may pose a risk to ecological receptors.

OU6 consists of the eastern part of Runway 28, which is located in the northeastern portion of MCAS Cherry Point (Figure 8-1). Portions of the eastern section of Runway 28 have been used for crash-crew training, engine run-up activities, and aircraft long-term storage experimentation since the late 1950s. OU6 currently includes one investigation area: Site 12, which consists of a crash-crew burn pit, an oil-water separator, a former waste-fuel UST, an AST, and a nearby swale that receives site drainage (Figure 8-2). It is located along the south side of Runway 28, at approximately the midpoint of the runway's length. The site is currently used for the training of crash-crew fire-and-rescue personnel.

The crash-crew burn pit is a circular concrete pad approximately 100 ft in diameter with a 5-in.-high curb around the circumference. The burn pit was constructed in 1985 and is used to burn waste jet fuel (JP-5) for crash-crew fire training exercises. The burn pit is drained through subsurface piping to an oil/water separator. A circular trench drain surrounds the burn pit approximately 10 ft beyond the concrete curb to capture runoff outside the pad and direct it to the oil/water separator. The oil/water separator near the burn pit is still used, although the effluent outfall pipe has been welded shut and has no effluent from the separator has been discharged onsite since approximately 1990. Liquids currently collected from the oil/water separator during training activities and periods of heavy rainfall are pumped out and transported to the Industrial Wastewater Treatment Plant. The 8,000-gallon AST that currently exists west of the burn pit stores waste JP-5 fuel for use in the burn pit. The AST was installed to replace the UST that used to be located immediately south of the oil/water separator.

Historical activities at Site 12 are described in the IAS of MCAS Cherry Point (Water and Air Research, Inc., 1983). The IAS reported that Site 12 has been used for crash-crew training activities since the mid-1960s. According to the IAS, waste POL and "waste burnable (i.e., probably non-chlorinated) solvents" were formerly burned in "one of two circular bermed areas" on Runway 28, but only "contaminated fuel" was burned at the time the report was written. The IAS also indicated that "spills and leaks" from the burn pits were evident at the time of the report and that stained and oily soil was present in the drainage swale south of Runway 28.

During a site visit conducted by CH2M HILL in April 1998, some clarification was obtained regarding the nature of the burn pits that pre-dated the current concrete burn pit

constructed in 1985. According to interviewed crash-crew personnel, the former burn pits were constructed of dirt placed on top of the asphalt runway surface and shaped into circular berms. The crash-crew personnel recalled the existence of two dirt burn pits of this type, and indicated that fuels (including gas and diesel) and magnesium aircraft parts were formerly burned in the pits.

The Interim RFA Report (A.T. Kearney, Inc., 1988) reported that the currently-existing concrete burn pit and oil/water separator were constructed in 1985 in the same area as the former dirt burn pits.

CH2M HILL examined historical aerial photographs of MCAS Cherry Point from 1939 to 1997 in order to gain additional information concerning historical activities at Site 12. The photographs generally confirmed the accounts of historical activities at Site 12 reported in the IAS and Interim RFA, except for the number of burn pits. The aerial photographs indicate that dirt burn pits existed historically at as many as five separate locations between the early 1960s and the early 1980s. These former burn pit locations are indicated in Figure 8-2.

This screening-level ERA was conducted in accordance with Appendix C (ERA Methodology) of the "Decision Process Document for Marine Corps Air Station, Cherry Point, North Carolina" (Brown & Root Environmental, 1998), Superfund ERA guidance (USEPA, 1997), Navy policy for conducting ERAs (Chief of Naval Operations [CNO], 1999), and the most recent Region 4 ERA Bulletin (USEPA, 1999a). The assessment includes Steps 1, 2 and 3A of the 8-step process described in these guidance documents. Steps 1 and 2 constitute the "screening-level assessment." Navy guidance (CNO, 1999) defines the same Steps 1 and 2 (presented in Section 1-5 of this document) as Tier 1. Step 3A, the first portion of the baseline ERA under Navy guidance, involves reconsideration of the conservative exposure assumptions used in the screening-level ERA (Steps 1 and 2), as well as a refinement of the list of COPCs. Step 3A is presented in Section 6.

8.2 Screening-Level Problem Formulation

The screening-level problem formulation, Step 1 of the USEPA 8-step process, addresses environmental setting, constituent fate and transport, ecotoxicity and potential receptors, and complete exposure pathways. The two major products of screening-level problem formulation are the preliminary site conceptual model and assessment and measurement endpoints. The preliminary conceptual model provides the basic framework for the screening assessment and will be revised, as appropriate, during any of the subsequent steps that are deemed necessary at Site 12 (e.g., Steps 3B or 7).

8.2.1 Environmental Setting

MCAS Cherry Point is located near Havelock, Craven County, North Carolina. The air station covers 13,164 acres and is located on a peninsula between the Neuse River to the north and Core and Bogue Sounds to the south (Figure 8-1). MCAS Cherry Point is located between Hancock and Slocum Creeks in Cherry Point, North Carolina.

Loblolly pine (*Pinus taeda*) dominates much of the forested land on the broad interstream area at MCAS Cherry Point. These forests are managed for loblolly pine timber production.

The lower slope forests contain a mesic mixed hardwood community. Important canopy components of this community include sweetgum (*Liquidambar styraciflua*), white oak (*Quercus alba*), pignut hickory (*Carya glabra*), and beech (*Fagus grandifolia*). The major understory trees found in the mixed hardwood forest are American holly (*Ilex opaca*) and flowering dogwood (*Cornus florida*). The inland floodplains of the tributary streams are dominated by the blackwater swamp community type. Important components of this community include swamp tupelo (*Nyssa biflora*), bald cypress (*Taxodium distichum*), red maple (*Acer rubrum*), sweetgum, and a variety of oaks. The mid-canopy of the swamp forest is dominated by ironwood (*Carpinus carolinana*) (Geo-Marine, 1998).

According to the Draft Threatened and Endangered Species Management Plan (Appendix C in Geo-Marine, Inc. 1998), there are no federally endangered species found on MCAS Cherry Point. MCAS Cherry Point supports one animal species, bridle shiner (*Notropis bifrenatus*), and two plant species, *Carex chapmannii* and *Solidago verna*, that are state listed. There have been no documented occurrences of any of these species near OU6. The bridle shiner is believed extirpated from North Carolina (Geo-Marine, Inc. 1998).

The runway surface at OU6 is mostly asphalt, with a number of relatively small concrete pads located in the eastern portion of the runway. Grassy areas to the north, south, and east border the runway, with dense woods beyond the grass. The runway represents a topographic high in the area, with the ground surface sloping away gently to the north and east, and more rapidly to the south. Hancock Creek is located approximately 700 ft east of the eastern edge of Runway 28.

Runoff outside the trench drain of the burn pit flows southward across the asphalt into a mowed grassy area south of the runway that includes a broad swale (see Figure 8-2). The swale forms a drainage way oriented east to west paralleling the runway about 75 ft south of the runway edge. This swale is broad and shallow and receives any runoff entering the grassy area. The swale drains to the west, where it eventually becomes a well-defined ditch and joins a more substantial drainage ditch approximately 300 ft west of the oil/water separator. Flow in this larger ditch, which drains a larger portion of the runway, is in an easterly direction until it is joined by the smaller drainage ditch coming from Site 12. The larger drainage ditch, which typically carries water, then flows south and east, ultimately discharging into Hancock Creek.

Much of the swale at the site is typically dry, although a lower portion near its eastern extent contains water for longer periods of time, likely due to ponding of runoff. The drier portions of the swale are dominated by dewberry (*Rubus* sp.). The wetter area near the eastern portion of the swale is about 40 by 75 ft in size and is dominated by clumps of rush. Tadpoles were observed in 3-in. deep water during a site visit by a CH2M HILL ecologist in May 1999. The mowed grass slope on the south side of the swale initially increases in elevation to a pine tree line and then drops in elevation down to forested swampy area. The woods in the vicinity of Site 12 are dominated by loblolly pine (*Pinus taeda*).

The confluence of the drainage ditch leading from Site 12 and the larger drainage ditch to the west is surrounded by brush, including willow (*Salix* sp.) and sweet gum (*Liquidambar styraciflua*). At the confluence, both ditches likely contain water for significant portions of the year. During the May 1999 site visit, water occupied about 2 ft of the drainage ditch channel width and was about 4 in. in depth. The larger drainage ditch contained water 2 ft

or more in depth and supported emergent vegetation such as cattails (*Typha* sp.). During the May site visit, small fish and tadpoles were observed in the smaller drainage ditch near the confluence and in the larger drainage ditch. Beyond the confluence, the larger drainage ditch flows southeast through the nearby pine forest. It eventually travels through a series of ponds before flowing into Hancock Creek.

Wildlife observed directly or by sign during the May 1999 site visit included the previously mentioned tadpoles and small fish, white-tailed deer (*Odocoileus virginianus*), Eastern cottontail (*Sylvilagus floridanus*), coyote (*Canus latrans*), fish crow (*Corvus ossifragus*), barn swallow (*Hirundo rustica*), European starling *(Sturnus vulgaris)*, Eastern kingbird (*Tyrannus tyrannus*), mourning dove (*Zenaida macroura*), and Northern mockingbird (*Mimus polyglottos*).

8.2.2 Chemicals at the Site and Their Fate and Transport

Media of concern at the site include soil, surface water, sediment, and groundwater (Figure 8-3). Site-related chemicals may have been transported to the swale via groundwater migration and surface runoff. They might also have accumulated in low velocity, depositional areas in the swale or downstream drainage ditch system. In the past, effluent from the oil/water separator was discharged directly into the swale. Current and past fire fighting activities likely have assisted the transport of chemicals away from the burn pit area though the use of large volumes of water. The RI sampling program was designed to delineate the portion of the swale potentially affected by onsite sources. Chemicals released into the environment may be taken up and accumulated by organisms using the site.

Soil, sediment and surface water data were collected in March 1999 in accordance with the *Draft Work Plan for Operable Unit 6* (December 1998 as revised January 20, 1998; CH2M HILL 1998). Soil, sediment, and surface water were analyzed for VOCs, SVOCs, pesticides/PCBs, and inorganic compounds (total metals, not dissolved). Hardness data for surface water and total organic carbon data for sediment were not collected. A subset of soil samples was also analyzed for dioxins and furans (012SS06, 012SS07, 012SS15). Site data were validated in accordance with USEPA Region 4 Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services, Revision 2.1 (USEPA 1999b). Unvalidated data collected in 1991 and 1993 were used qualitatively in the screening ERA, but they were not used in the development of quantitative estimates of risk. Unvalidated data collected in 1996 as part of the a UST removal (R.E. Wright Environmental, Inc. 1996) were not used because soil samples were collected below the surface, within the excavation.

In March 1999, surface soil (0-1 ft in depth) was sampled at 16 locations (Figure 8-4). Duplicate samples were taken at sample locations 1 and 7 (duplicates designated as 012SS12 and 012SS13, respectively) for QC purposes. Two of the 16 surface soil samples (012SS06 and 012SS07) were collected from underneath the asphalt runway surface. Due to the asphalt runway, it was assumed that ecological receptors would not be exposed to these soils now or in the future. Therefore, these two samples were not evaluated in the screening-level ERA. Four of the 16 samples were collected adjacent to the asphalt runway (012SS08, 012SS09, 012SS03, and 012SS04 from west to east, respectively). One sample was collected adjacent to the oil/water separator (012SS15) and another near the former outfall of the separator (012SS11). Two samples (012SS05 and 012SS10) were collected in the portion of the swale that was dry at the time of sampling. Three samples were collected immediately south

of the asphalt pad surrounding the burn pit area (012SS16, 012SS02, and 012SS18, from west to east, respectively). Two samples (012SS14 and 012SS01) were collected in a short erosional runoff drainage channel running from the edge of the runway toward the swale. The remaining sample (012SS17) was collected in the grassy area between the southern edge of the asphalt pad and the northern edge of the swale.

Three surface sediment (0-1 ft in depth) samples were also collected from the swale in March 1999 (Figure 8-4). Samples 012SD01 and 012SD03 were collected south of the asphalt pad surrounding the burn pit area in a portion of the swale that typically ponds during and immediately after heavy rain events. This portion of the swale is dry throughout much of the year, but was wet during the sampling event. The third sample, 012SD02, was collected in the western portion of the swale near (but just east of) the confluence with the larger drainage ditch offsite to the west. A duplicate sample (012SD04) was collected at 012SD01.

Three surface water samples (co-located with the sediment samples discussed above) were also collected in March 1999 (Figure 8-4). Two were collected in the swale immediately south of the asphalt pad surrounding the burn pit area while the third was collected just east of the confluence with the larger drainage ditch.

8.2.3 Ecotoxicity and Potential Receptors

Based on a review of the Site 12 sampling data (see Appendix E), inorganics, pesticide/PCBs and dioxins/furans were the chemicals that were most frequently detected. As such, these chemical classes are likely of most concern. In contrast, only a few volatile and semi-volatile compounds were detected in soil, and none were detected in sediment or surface water.

The majority of the pesticides detected at Site 12 are organochlorine compounds. The most serious environmental effects associated with exposure to organochlorine pesticides have occurred in birds. These effects include mortality, eggshell thinning, reduced reproductive success, population decline, and, in some cases, extirpation (Blus et al., 1996). Organochlorine pesticides are accumulated in lipids and biomagnify through the food chain. At Site 12, receptors for which PCB exposure might be of most concern include raptors and larger carnivorous mammals.

PCBs tend to concentrate in animal tissue (Aulerich and Ringer, 1980). PCBs may affect the reproduction, immune status, hormonal homeostasis, and behavior of wildlife (O'Hara and Rice, 1996). PCBs are a particularly important reproductive toxin in mammals (Eisler, 1986) and in avian piscivores (O'Hara and Rice, 1996). Because PCBs bioaccumulate and biomagnify throughout the food chain, higher trophic level predators are generally of most concern. As for the organochlorine pesticides, receptors for which PCB exposure may be a concern at Site 12 include raptors and large carnivorous mammals. Primarily piscivorous wildlife are not of concern because the larger swale does not support a fishery.

Several inorganics were detected in soil, sediment, and surface water at Site 12. Of these, mercury is the only inorganic compound that both bioaccumulates and biomagnifies through the food chain. Mercury exposure could be important for the higher order predators at Site 12. The biological transformation of a variety of forms of mercury to methylmercury (the most toxic form) can take place in both terrestrial and aquatic environments (Olson and Cooper, 1977 and Rogers, 1976 *cited in* Heinz, 1996). Other inorganic compounds detected at the site that will bioaccumulate include copper, cadmium,

and zinc. There are a variety of toxic mechanisms associated with metals. Potential receptors include organisms that have significant direct contact with affected media. At Site 12, these could include plants, soil invertebrates, benthic invertebrates, or amphibians in the ditch, and animals that forage in soil or sediment or on organisms with high levels of contact with these media.

In addition to accumulating in animal tissue, some of the chemicals detected at the site will accumulate in plant tissues as well. Potential receptors for this pathway include birds and mammals that primarily feed on seeds or other plant parts.

Dioxins and furans were detected in the one soil sample collected off the runway that was analyzed for these chemicals. These compounds are persistent, hydrophobic, non-polar organic chemicals that partition into organic matter in water and sediment and into lipids in biota. TCDD is the most potent member of this class of compounds (Poland and Knutson, 1982; Safe, 1990; Whitlock, 1990 *cited in* Bradbury, 1996). Effects of TCDD exposure may include weight loss, decreased immunocompetence, subcutaneous edema, reproductive effects (fetotoxicity, teratogenesis); alterations in lipid metabolism and gluconeogenesis; thymic atrophy, and induction of cyrtochrome P4501A1 (Poland and Knutson, 1982 and Safe, 1990 *cited in* Bradbury, 1996). Studies have shown that both mammalian and avian wildlife species are sensitive to TCDD (Bradbury, 1996). At Site 12, receptors that have significant direct contact with soil or consume prey with dioxin and furan body burdens may be potentially impacted by this class of compounds.

8.2.4 Complete Exposure Pathways

Complete exposure pathways exist at the site. Chemicals from fire fighting activities and support facilities have been released into the surrounding environment. Chemicals have been transported via runoff, and possibly groundwater discharge from the burn pit area into the adjacent grassy area and the swale that carries water away from the site. Plants and animals using these areas might be exposed via several exposure routes (Figure 8-3).

Plants are directly exposed to chemicals by root contact with soil, sediment, and water. Chemicals absorbed by plants can be sequestered in the roots, stems, and leaves. Plants that bioaccumulate chemicals can also serve as a source of exposure to herbivorous or omnivorous animals.

Soil and benthic invertebrates might be exposed to chemicals in soil, sediment, or surface water through dermal contact and direct ingestion. Because these organisms form the prey base for other animals, they can also serve as an exposure source for higher trophic levels.

Mammals and birds can be exposed to chemicals through the consumption of affected media or food items. Incidental ingestion of soil, sediment, or surface water can occur in association with grooming, burrowing, or foraging. Some animals deliberately ingest soil as a source of grit or minerals. Water may also be directly consumed to meet metabolic needs. However, dermal contact and inhalation are expected to contribute minimally to total exposure at Site 12. Dermal contact and inhalation can be important exposure routes for furless neonates in a confined area (i.e., burrow or lodge). As cover is limited at Site 12, the area is most likely used for foraging rather than nesting, minimizing the likely significance of these exposure routes.

Aquatic vertebrates might be exposed to chemicals through dermal contact, ingestion of affected media while foraging, or the consumption of affected plants or animals. At Site 12, larval amphibians are in constant contact with surface water until metamorphosis.

Although there are likely no direct exposure pathways to groundwater, the groundwater could discharge to the swale where ecological receptors are present. This potential exposure pathway will be evaluated directly at the swale ditch. For chemicals in soil at Site 12 that are located beneath asphalt, there are no complete exposure pathways to ecological receptors.

8.2.5 Preliminary Conceptual Model

Sections 2.1 (environmental setting), 2.2 (chemicals at the site and their fate and transport), 2.3 (ecotoxicity and potential receptors), and 2.4 (complete exposure pathways) provide descriptions of the important components of the site conceptual model (Figure 8-3). The conceptual model shows the pathways and routes by which receptors are exposed to site-related chemicals. The major source of chemicals at Site 12 is the surface soil in and around the burn pit area where fire-fighting activities take place. Chemicals in surface soil leach into subsurface soil and groundwater or are transported away from the site via surface runoff. Chemicals in surface runoff and groundwater may be transported into the surface water and sediment of the swale. These chemicals may be taken up and accumulated in biota. Receptors may be exposed to chemicals via four exposure routes: direct contact with abiotic media; root uptake; ingestion of abiotic media; and/or ingestion of biota that contain chemical body burdens. Receptors at the site include invertebrates, plants, amphibians/reptiles, birds and mammals.

8.2.6 Assessment and Measurement Endpoints

The conclusion of the screening-level problem formulation includes the selection of assessment and measurement endpoints, based on the site conceptual model (Figure 8-3). Endpoints in the screening-level ERA define ecological attributes that are to be protected (assessment endpoints) and a measurable characteristic of those attributes (measurement endpoints) that can be used to gauge the degree of impact that has occurred or may occur. Assessment endpoints most often relate to attributes of biological populations or communities, and are intended to focus the risk assessment on particular components of the ecosystem that could be adversely affected by chemicals from the site (USEPA, 1997). Assessment endpoints contain an entity (e.g., herbivorous, small mammals) and an attribute of that entity (e.g., survival rate).

Based on the habitat and types of chemicals present, several assessment endpoints were selected to evaluate risks associated with chemicals in the soil, sediment, and surface water at Site 12 (Table 8-1). They include soil invertebrates, sediment invertebrates, aquatic receptors, herbivorous birds, avian insectivores, avian carnivores, mammalian omnivores, and mammalian carnivores. Surrogate species used to represent upper-trophic-level groups in the measurement endpoints were mourning dove, killdeer, American kestrel, Eastern harvest mouse, and gray fox, respectively (Table 8-1). Life history information for these surrogate species is provided below.

Mourning dove (*Zenaida macroura*). The mourning dove is common in open grassland and disturbed habitats. It feeds almost exclusively on cereal grains, forbs, and grasses. It also

ingests grit (small grain-sized stones) as a digestive aid. It is a year-round resident in North Carolina and also breeds year-round, typically producing two eggs per clutch. Although the mourning dove typically nests in trees, it uses grass in nest building and might use grass from Site 12 for this purpose. Some mourning doves are known to be associated with loblolly pine forests, which are in the vicinity of Site 12. Generally, the mourning dove feeds within 1 mile of the nest site; therefore, the home range is approximately 10 square kilometers (4 square miles) (Zeiner et al., 1990). The mourning dove was selected to represent herbivorous birds that may forage at the site.

Killdeer (*Charadrius vociferous*). Killdeer generally inhabit open country, including plowed or maintained fields, short-grass prairies, golf courses, and vacant lots. They nest on open ground covered in gravel or short grass similar to that found at Site 12. Killdeer primarily eat insects (Terres, 1980). The killdeer was selected to represent bird species that would primarily consume soil and sediment invertebrates.

American kestrel (*Falco sparverius*). American kestrel inhabit open and semi-open areas such as woodland or grassland openings (USEPA, 1993). Kestrels feed on terrestrial invertebrates such as spiders, worms, and grasshoppers as well as amphibians, reptiles, and small birds and mammals. Kestrels often cache their bird and mammal prey for retrieval later. Kestrels forage in three different ways: using open perches to spot and attack ground prey, hovering in the air to spot ground prey, and catching insects on the wing. The kestrel is a year-round resident in most locations of the United States, but is migratory after the breeding season is complete in the northernmost portions of their range. Kestrels are solitary and defend territories except during the breeding season. Winter foraging territories range from 9.7 to 14.8 hectares for males and 18.7 to 42 hectares for females in open areas and woods of California (Meyer and Balgooyen, 1987). Kestrel breeding population densities are relatively low, at around 0.0003 to 0.004 nests per hectare. The kestrel was selected to represent raptors that may utilize the Site 12 area for foraging.

Eastern harvest mouse (*Reithrodontomys humilis*). The Eastern harvest mouse was chosen to represent small, herbivorous mammals that might be present at Site 12. The harvest mouse is found mainly in habitats dominated by grasses and other herbaceous plants that are characteristic of early succession, including places such as abandoned fields, weed-filled ditches, and briar thickets (TXPW, 1994). It eats mainly seeds, grain, and young sprouts, but insects may also be a component of the diet. Reported adult weights vary from 6 to 15 grams (TXPW, 1994; Jones and Birney, 1988; Whitaker, 1980; Burt and Grossendheider, 1976). The harvest mouse constructs nests of shredded grass and plant fibers that are placed on the ground in tangled vegetation or above the ground in a clump of grass (TXPW, 1994). The Eastern harvest mouse is thought not to burrow (Jones and Birney, 1988).

Gray fox (*Urocyon cinereoargenteus*). The gray fox was selected to represent mammals with diets that include a high percentage of small mammals. Gray fox are widely distributed and have recently expanded their range. The gray fox now inhabits wooded, brushy, and rocky habitats from extreme southern Canada to Venezuela and Colombia, excluding portions of mountainous northwestern United States, the Great Plains, and eastern Central America (Fritzell and Haroldson, 1982). The gray fox prefers forests interspersed with fields and brushy fencerows (Sealander, 1979), with dens usually located in brushy or wooded areas in hollow logs, stumps, or trees or in cavities among rocks (Fritzell and Haroldson, 1982; Jackson, 1961). They generally den within a quarter mile of a permanent stream. Their diet

preference varies with season, habitat type, and prey availability. Its normal territory and home range is generally greater than 100 acres, which is large in comparison to the size of Site 12.

At different times of the year, gray fox might consume fruit and seeds (especially corn), insects, eggs, small reptiles such as lizards and snakes, and some amphibians and small birds. The largest percentage of their diet includes small mammals such as the cottontail rabbit, voles, and mice. The percentage of mammals in the diet is generally more in winter and spring and less in fall when corn and other seeds and fruit are available. In Georgia, mammals comprised 63 percent of the diet by volume during winter and only 36 percent during summer (Wood et al., 1958).

The plant community at the site consists primarily of mowed grass. Because the vegetative community is maintained, there were no signs of stressed vegetation during the May 1999 site visit, and the evaluation of animal species included receptors with significant direct contact with soil and sediment, no assessment endpoint was developed for plants.

8.3 Screening-Level Ecological Effects Evaluation

The purpose of the screening-level effects evaluation is to establish chemical exposure levels that represent conservative thresholds for adverse ecological effects that are related to the assessment endpoints. For soil, sediment, and surface water, Region 4 BTAG screening values were used (USEPA, 1999a) (Tables 8-2 through 8-4, respectively). Region 3 BTAG screening values were used for those chemicals with no Region 4 value (USEPA, 1995a).

Screening ecotoxicity values for receptor species evaluated via food chain modeling were obtained from the literature (Tables 8-5 and 8-6). For each chemical (including those analyzed for but not detected) and each receptor, the literature was reviewed for an NOAEL. Toxicity studies involving long-term exposure and the ingestion route were used preferentially. In the event that only a LOAEL was available, a NOAEL was calculated by dividing the LOAEL by a factor of 10. This approach is recommended by USEPA (USEPA 1997). When an LD_{50} (lethal dose at which there is 50-percent mortality) was the only available endpoint, it was divided by an uncertainty factor of 100 to obtain the NOAEL. No body weight adjustments were made for receptors.

VOCs were not included in the food chain modeling. USEPA (1985), as cited in USEPA/ Army Corps of Engineers (ACOE), 1998, recommends that only chemicals with log K_{ow}s greater than 3.5 be considered for further evaluation of bioaccumulation potential. None of the VOCs analyzed at Site 12 have a CT log K_{ow} in excess of 3.5 (USEPA 1995b; SRC 1995).

8.4 Screening-Level Exposure Estimate

Maximum detected concentrations in surface water, soil, and sediment were used as the basis for estimating the chemical exposure to receptor communities and species. The maximum detection limit for contaminants that were analyzed for but not detected were also compared to media-specific screening values and used for trophic modeling. This was done to ensure that detection limits were similar to chemical levels not expected to be associated with an impact to ecological receptors. For samples with duplicate analyses, the

higher concentration was used in the screening (i.e., when both values were detects or both values were non-detects). In cases where one result was a detection and the other a non-detect, the detected value was used in the assessment.

VOCs were not evaluated in the food chain models. Most of the volatiles have low octanol-water partitioning coefficients, and as such, are not expected to accumulate in tissue to any significant degree.

For receptor species used in food chain modeling, the dose of each chemical (in mg chemical per kg of body weight per day) was calculated using species-specific life history information, where available (Table 8-7). Minimum body weights, and maximum ingestion rates for food, water, and soil/sediment were used to develop exposure estimates. Average bioaccumulation factors (BAFs) presented in Sample et al. (1998) and Bechtel Jacobs Company, Inc. (1998a;b) were used to estimate the concentration of chemicals in receptor prey items (i.e., small mammals, invertebrates, and plants, respectively) (Table 8-8). Maximum chemical concentrations in soil and sediment were multiplied by BAFs for each prey type to determine the concentration of the chemical in the prey (on a dry weight basis). A BAF of 1 was assumed when no literature value was available.

Chemical contributions from the consumption of prey items were estimated using the following equation:

$$Dose_{food} = FCR * C_{food} * SUF$$

where,

$Dose_{food}$ = chemical ingested per day via food (mg chemical/kg body weight [dry]-day);
FCR = food consumption rate (kg food [dry]/kg body weight [wet]-day);
C_{food} = maximum COPC concentration in food (mg chemical/kg food [dry]); and
SUF = site use factor (unitless).

In addition to the ingestion of chemicals accumulated in food items, receptors may also be exposed to chemicals through the ingestion of surface water. The following equation was used to calculate the dose of each chemical that each receptor species would be expected to obtain from the ingestion of surface water:

$$Dose_{water} = WCR * C_{water} * SUF$$

where,

$Dose_{water}$ = chemical ingested per day via water (mg chemical/kg body weight [wet]-day);
WCR = surface water consumption rate (L of water/kg body weight [wet]-day);
C_{water} = maximum chemical concentration in surface water (mg chemical/L of water); and
SUF = site use factor (unitless).

Receptors may also be exposed to chemicals through the ingestion of soil and/or sediment while foraging. The following equation was used to estimate the dose of each chemical that each receptor species would be expected to obtain from the ingestion of soil and/or sediment (expressed as sediment below):

$$Dose_{sediment} = SCR * C_{sediment} * SUF$$

where,

$Dose_{sediment}$ = chemical ingested per day via sediment (mg chemical/kg body weight [wet]-day);
SCR = sediment consumption rate (kg sediment [dry]/kg body weight [wet]-day);
$C_{sediment}$ = maximum chemical concentration in sediment (mg chemical/kg sediment [dry]); and

SUF = site use factor (unitless).

The same equation was used for soil to calculate the dose attributable to soil ingestion. Soil and sediment ingestion rates were calculated by multiplying estimates of soil and sediment ingestion found in the literature (expressed as a percentage of total food intake) by the food consumption rate. In cases where a species-specific sediment ingestion value was not available in the literature, a value from a species with similar foraging habits was used or a conservative value was assumed. In estimating chemical exposure via direct ingestion of soil and/or sediment and prey, it was assumed that the killdeer is exposed to sediment, mourning dove and kestrel are exposed to soil, and gray fox and Eastern harvest mouse are exposed to soil and sediment in equal proportions. Food ingestion rates were adjusted downward to account for soil/sediment ingestion.

Total chemical doses were calculated by summing doses via the ingestion of food, water, and soil and/or sediment with the following equation:

$$Dose_{total} = Dose_{food} + Dose_{water} + Dose_{soil/sediment}$$

where,

$Dose_{total}$ = the total amount of chemical ingested per day per kg body weight (mg chemical/kg body weight [wet] – day).

In addition to the other assumptions already discussed, exposure estimates (Tables 8-9 through 8-13) were calculated assuming the site use factor is 1 (i.e., the receptor forages exclusively at the site), the bioavailability of ingested chemicals is 100 percent, and that 100 percent of the diet is contaminated.

8.5 Screening-Level Risk Characterization and Uncertainty

Section 8.5 represents the conclusion of Step 2. Risk estimates (HQs) are reported and the uncertainty associated with those estimates is discussed. At the conclusion of Step 2, a determination is made that either the screening-level ERA is adequate to determine that ecological risks are negligible, or that the process should continue to a more detailed ERA.

8.5.1 Screening-Level Risk Characterization

HQs for soil invertebrates, sediment invertebrates and aquatic receptors were calculated as,

HQ = Maximum Concentration / Screening Value.

For receptor species used in trophic modeling, HQs were calculated as follows:

HQ = $Dose_{total}$ / NOAEL.

An HQ of 10 would indicate that a receptor is exposed to a concentration that is 10 times greater than a concentration known not to cause an effect, while an HQ of 1 would indicate that a receptor is exposed to a concentration that is known not to cause an effect. An HQ less than 1 indicates that the constituent is unlikely to cause adverse ecological effects (USEPA 1997) and thus does not warrant further evaluation. Chemicals with HQs in excess of 1 were selected as COPCs (Tables 8-2 through 8-4; 8-9 through 8-13). This group included chemicals which were not detected but still had maximum detection limits in excess of screening values, or estimated exposure doses in excess of NOAELs. Chemicals that could not be evaluated due to lack of a media-specific screening value or appropriate NOAEL were also selected as COPCs and carried through to Step 3A. Many of these chemicals were never detected at the site.

The assessment endpoints for the site were not met (i.e., the screening-level ERA indicates site-related chemical may impact the survival and/or reproduction of the receptor species and receptor communities). As such, the results of the screening-level ERA are not sufficient to show that risks to ecological receptor populations at Site 12 are negligible. For all the receptor communities and species, there were multiple chemicals that were associated with HQs in excess of 1 (Tables 8-2 through 8-4; 8-9 through 8-13). In addition, there were chemicals, which could not be fully evaluated due to the lack of a media-specific screening value and/or reference toxicity value.

There were several patterns in the screening-level HQs for chemicals that had screening values and reference toxicity values. The majority of media-specific HQ exceedances were for inorganics, pesticide/PCBs, and SVOCs; there were only two exceedances for VOCs (Tables 8-2 through 8-4). For the food chain models, HQs for several inorganics were greater than 1 for each receptor species, and for two semivolatiles in the models run for Eastern harvest mouse and gray fox (Tables 8-9 through 8-13). Food chain HQs for pesticide/PCBs and dioxin/furans were all less than 1, within the exception of one PCB for the mouse.

8.5.2 Screening-Level Uncertainty

The development of these measures of risk is based on a variety of assumptions regarding levels of exposure and toxicity. However, the screening-level assessment is designed to counter some of the associated uncertainty through the use of very conservative assumptions. Sources of exposure uncertainty include the representativeness of the analytical data collected for the assessment, the use of literature values to develop exposure estimates rather than site-specific information, and the assumption that all areas of the site are equally used by receptors.

The representativeness of data used in the assessment can be evaluated, in part, by comparing those data to historical sampling results. Limited, unvalidated data are available from 1991 and 1993 investigations at Site 12 (Halliburton NUS, 1993). Most of the historical data is for VOCs. Due to the volatile nature of these compounds, the results of a representativeness evaluation such as this must be viewed with some caution.

Five soil samples were collected in and around the current burn pit area during the 1991 RCRA Facilities Investigation. Three of these samples were collected in surficial soils a short distance south of the asphalt pad surrounding the burn pit. The fourth surficial soil sample was collected in the wooded area south of the drainage ditch, and the fifth sample was

collected at a depth of 2 to 3 ft in a boring east of the burn pit. Chemicals that were analyzed for in 1991 as well as 1999, and included in the screening-level ERA, were BTEX. No BTEX was detected in any of the 1991 samples. Results for 1999 were similar with toluene and xylene detected in only 1 of 14 soil samples and at concentrations, which were below soil screening values.

In 1993, 10 additional soil samples (7 surficial and 3 at a depth of 0-1 ft) were collected south of Runway 28 in the vicinity of the burn pit as part of an addendum to the RCRA Facilities Investigation (Halliburton NUS, 1993). Low levels of benzene (0.96 to 32 μg/kg) were detected in five samples. Benzene was not detected in any of the samples collected in 1999.

Sediment samples were collected from two locations in the drainage ditch south of the burn pit during 1991 and 1993 field investigation activities. Although the 1991 samples were not analyzed for any chemicals that were evaluated in the screening-level ERA, the 1993 samples were collected from the same locations and analyzed for BTEX. Benzene was detected in the sample collected closest to the burn pit, but no BTEX was detected in the downstream sample. No BTEX compounds were detected in the 1999 sediment samples.

One surface water sample was collected from the drainage ditch at the downstream sampling location in 1991, but no BTEX was detected. Likewise, BTEX was not detected in surface water samples collected in 1999. In general, the results from 1991 and 1993 support the representativeness of the 1999 BTEX data.

Another source of exposure uncertainty is the use of literature values or default assumptions for exposure parameters rather than site-specific information. BAFs provide an example. Although BAFs for bioaccumulative metals were readily available and incorporated into the assessment, the use of a default BAF of 1 to estimate the concentration of other chemicals in receptor prey item is a source of uncertainty. However, for most of the chemicals analyzed for at the site, the assumption that the chemical body burden in the prey item is the same as the concentration in soil or sediment is conservative, particularly when many of the chemicals are known not to accumulate to any significant degree.

Another exposure assumption made in the assessment was that the VOCs are not likely to bioaccumulate. The potential for organic chemicals to accumulate in organisms has been shown to correlate well with K_{ow}. USEPA (1985) recommends that only chemicals for which the log K_{ow} is greater than 3.5 be considered for further evaluation of bioaccumulation potential since chemicals with log K_{ow} values less than 3.5 are not likely to bioaccumulate to a significant degree. Toluene, xylene, and methylene chloride were detected in Site 12 soils. USEPA (1995) reports log K_{ow} values of less than 3.5 for each of these compounds.

There is also uncertainty regarding the effects of site chemicals on receptor communities and species. Reference toxicity values for receptor species and communities were based on literature values for, in most cases, other species. The sensitivity of receptors at the site may be different than the sensitivity of species used in tests reported in the literature. In the absence of speciation analyses, assumptions must also be made about the quality of chemical form between laboratory tests and site conditions. This is a source of uncertainty since toxicity may vary with the form of the toxicant in the environment.

Another source of uncertainty is the extrapolation of NOAELs to LOAELs using an uncertainty factor of 10. However, this approach is likely conservative. Dourson and Stara

(1983 *cited in* USEPA, 1997) determined that 96 percent of the chemicals included in a data review had LOAEL/NOAEL ratios of five or less. The use of an uncertainty factor of 10, although potentially conservative, also serves to counter some of the uncertainty associated with interspecies extrapolations, for which a specific uncertainty factor was not used.

8.6 Step 3A—Refinement of Conservative Exposure Assumptions

In Step 3A, exposure assumptions are refined and risk estimates (i.e., HQs) are recalculated. Risk is again characterized and uncertainties associated with conclusions are described. If re-evaluation of the conservative exposure assumptions supports an acceptable risk determination then the site may exit the ERA process (CNO, 1999).

8.6.1 Exposure Assumption Refinements

The results of Steps 1 and 2 (i.e., the Tier 1 screening-level ERA) indicated that, based on a set of conservative assumptions, there are multiple chemicals that may pose a risk to each of the receptor communities/species used in the screening assessment. These chemicals are shown in Tables 8-2 to 8-4 and Tables 8-9 to 8-13. The set of preliminary COPCs includes chemicals with HQs in excess of 1 and chemicals for which assessment data were unavailable.

According to Superfund guidance (USEPA, 1997), Step 3 initiates the problem formulation phase of the baseline ERA. Under Navy guidance (CNO, 1999), the baseline ERA is defined as Tier 2, and the first activity under Tier 2 is Step 3A. In Step 3A, the conservative assumptions employed in Tier 1 are refined and risk estimates are recalculated using the same conceptual model for the site. The re-evaluation may also include consideration of background data and the frequency at which chemicals were detected.

Assumptions and methods that were modified for the calculation of media-specific and food chain HQs are listed below.

- Maximum chemical concentrations were replaced by average chemical concentrations. For individual mammalian and avian receptors, average chemical concentrations provide a better estimate of the likely level of chemical exposure because each of the receptors would be expected to forage in several different areas of the site, and, in many cases, off site. The average concentrations at this site are also appropriate for evaluating impacts to populations of soil invertebrates, sediment invertebrates, and aquatic receptors. Because some of these receptors are relatively immobile, *individuals* are more likely to be impacted by locations of maximum concentration. However, evaluation of the average exposure case is more instructive with regard to the level of impact that might be expected at the *population* level.

- For sediment, supplemental screening values were used for chemicals that had no Region 4 or Region 3 screening values. For soil and surface water, there was little potential to supplement the Region 4 and Region 3 benchmark sets. Three sets of sediment screening values were searched for supplemental values in the following order of preference, Ontario Ministry of Environment and Energy (OMEE) Lowest Effect

Levels (LELs) (Persaud et al. 1993), Florida Department of Environmental Protection Threshold Effect Levels (FTELs; MacDonald, 1994), and National Oceanic and Atmospheric Administration (NOAA) Effects Range-Low (ERL) values (Long and Morgan, 1991; Long et al., 1995). Several supplemental OMEE LELs were available, but no supplemental values were found in the other two screening value sets. OMEE LELs were used preferentially because they are for freshwater sediments.

- The maximum concentration of inorganic COPCs in soil and sediment were compared to twice the average background concentration determined for MCAS Cherry Point (Tetra Tech NUS, 1999a). This approach, relative to soil, is recommended in the document entitled, *Approach for Using Screening Criteria, MCAS Cherry Point, North Carolina* (Tetra Tech NUS, 1999b). The comparison of soil background concentrations to Site 12 sediment data was done to provide a reference point for gauging the level of sediment contamination. In addition, the comparison was warranted because the swale at Site 12 is often dry.

- Midpoints of the body weight and ingestion rate ranges presented in Table 8-7 were used to develop exposure estimates, rather than minimum body weights and maximum ingestion rates. The use of midpoint exposure parameters is more relevant because they represent the characteristics of a greater proportion of the individuals in the population.

- SUFs, which were assumed to be 1 in the screening-level assessment, were incorporated into the estimates of chemical exposure. For each species, SUFs were derived by dividing the area of the site by the home range/territory size. The size of the site was defined as 1,000 ft by 500 ft or 500,000 square ft (11.5 acres). Home range/territory values were obtained from the literature. Due to the large variation in reported areas, minimum values were conservatively used in the assessment when more than one value was available. By receptor species, home range/territory sizes were selected as follows:

Mourning Dove—Zeiner et al. (1990) reported the mourning dove feeds within 1 mile of the nest site. As such, home range was set at 2,011 acres for Site 12.

Killdeer—Mace (1971 *cited in* NISC, 1996) reported feeding home ranges of 8 to 40 hectares. The minimum of this range, 8 hectares (19.8 acres) was used for Site 12.

American Kestrel—Of the sources summarized in USEPA (1993), the minimum territory size was 9.7 hectares (24 acres).

Eastern Harvest Mouse—No species-specific home range data were available. Home range size was assumed to be smaller than the Site 12 area (i.e., an SUF of 1 was used).

Gray Fox—Of the sources summarized in Samuel and Nelson (1987), the minimum home range size was 75 hectares (185 acres).

Total exposure doses were multiplied by SUFs to reflect the fact that a percentage of each receptor species time (with the exception of the Eastern harvest mouse) is spent off site in unimpacted areas or areas where the level of chemical contamination is expected to be significantly lower.

- The model parameters for dioxin/furans were also modified for Step 3A. In Step 2, reference toxicity values were available for only a few of the dioxin/furan compounds.

Although the compounds with reference toxicity values had HQs of less than 1, all of the dioxin/furan compounds were retained for Step 3A to ensure that the assessment was conservative. In Step 3A, the concentrations of dioxins and furans were expressed as 2,3,7,8-TCDD equivalents using toxicity equivalence factors presented in USEPA (1989) (Table 8-17). BAFs of 1 were replaced with TCDD-specific BAFs for plants, invertebrate, and invertebrate food items. A BCF for plants and a BAF for earthworms were obtained from Travis and Arms (1988) and Reinecke and Nash (1984), respectively. The earthworm BAF was used to estimate the concentration of dioxin in invertebrate prey items consumed by receptor species. A TCDD BAF for small mammals was obtained from Sample et al. (1998).

8.6.2 Final Risk Characterization

Refined media-specific screenings for soil, sediment and surface water are presented in Tables 8-14 through 8-16. HQs are presented for soil along with ratios of the maximum site soil concentration to twice the MCAS Cherry Point background value (Table 8-14). These two set of numbers are also provided for sediment (Table 8-15), along with an additional set showing the HQs associated with the supplemental OMEE LEL screening values. For surface water, HQs for the comparison of average site concentrations to ecological screening values are presented (Table 8-16). Receptor species HQs associated with Step 3A food chain modeling are provided in Tables 8-18 through 8-22. Results of the recalculation of risk estimates are discussed by chemical class below.

Inorganics. HQs for mourning dove were all less than 1. Inorganics with food chain HQs in excess of 1 included aluminum and mercury for killdeer; aluminum, chromium, lead and zinc for American kestrel; aluminum, antimony, barium, iron, thallium and vanadium for Eastern harvest mouse; and aluminum and iron for gray fox. The highest HQs were associated with aluminum, iron and vanadium, although the concentration of each in sediment and soil was similar to background over the majority of the site. The remaining HQs ranged from 1.0 to 2.5, with a maximum mercury HQ of only 1.2 for the killdeer. There were relatively few inorganics for which a toxicity reference value was unavailable. Three of the inorganics with no reference value (calcium, potassium, and sodium) are macronutrients (Robbins, 1983) and not considered to be very toxic. In addition, beryllium, cyanide, and thallium were not detected in sediment and cyanide was not detected in soil. These are also inorganics for which a reference toxicity value for birds and/or mammals was not available.

The concentrations of nine inorganics exceeded screening values in soil. For five (cadmium, copper, lead, manganese, and zinc) of the nine inorganics, HQs were low, ranging from 1.7 to 4.2. HQs were highest for aluminum, chromium, iron, and vanadium (167, 48, 17, and 6, respectively). Ratios of maximum concentrations to twice the MCAS average background were far less at 2.1, 2.4, 1.2, and 1.1, respectively. While the comparison of screening values to average site concentrations suggests these inorganics may pose a risk, the comparison to background shows concentrations were similar to background levels. For aluminum, only 2 of the 14 sample results were greater than the maximum concentration in the background data set. For chromium, 3 of the 14 sample results were greater than the maximum background concentration. For both aluminum and chromium, the two highest concentrations were detected just south of the burn pit, in samples 012SS17 and 012SS18. As

indicated by the ratios of 1.2 and 1.1 for iron and vanadium, the maximum site concentrations were very close to twice the MCAS average background.

In sediment, the only inorganics that exceeded screening values were cadmium and iron, with HQs of 1.3 and 1.2, respectively. In surface water, aluminum, mercury, and silver HQs were calculated at 5.1, 6.9, and 29.2, respectively. Silver was not detected and mercury was detected in only two of the three samples. The screening value for mercury (0.012 μg/L) is a final residue value (FRV). Using a water-to-fish BCF, it is back-calculated from a fish tissue concentration that may be of concern to human health. The average mercury concentration in the water at Site 12 was 0.083 μg/L, approximately an order of magnitude less than the final chronic value (FCV) (0.77 μg/L) for ecological receptors presented in USEPA (1999c). In addition, surface water samples were not filtered. USEPA water quality criteria are currently expressed as dissolved concentrations. It is likely that the dissolved (i.e., filtered) concentration would have been lower than the total concentration.

Pesticides/PCBs. For receptor species used in food chain modeling, there were no HQs greater than 1. For soil, there were 15 compounds with HQs in excess of 1. However, 7 of the 15 were not detected at the site and 2 were detected in only 1 of the 13 samples. HQs for the remaining 6 compounds ranged from 1.1 to 8.8. Screening values were not available for four pesticides in soil, but 2 of these were not detected.

In sediment, there were 15 compounds with HQs in excess of 1. Eleven of these were never detected. HQs for the remaining four ranged from 1.4 to 8.1. Screening values were unavailable for 4 compounds. However, none of the four were detected at the site.

Of the 19 compounds with HQs in excess of 1 in surface water, only 4 were detected. Each of the four was detected in only one of three samples. HQs for the four ranged from 5.5 to 61.9. The HQ of 61.9 was for Aroclor-1248, which was detected at 1.6 μg/L in sample 012SD04, the field duplicate for sample 012SD01. PCBs were not detected in any of the other surface-water samples, including 012SD01. Although the detection limits for sediment are higher, PCBs were not detected in co-located sediment samples. Due to the shallow water in the swale, it is possible that a trace amount of sediment was in the surface water sample. This could account for detection of Aroclor-1248 in surface water sample 012SD04.

Semivolatiles. For receptor species used in food chain modeling, there were no HQs over 1. For soil, there were 21 SVOCs with HQs in excess of 1, but only 1 of the 21 was detected. The HQ for bis(2-ethylhexyl)phthalate was 2.4. There were 22 SVOCs with no screening benchmark. Of those, only 1 was detected. In sediment, there were 13 HQs that were greater than 1, but none of the compounds were detected. Likewise, none of the 29 SVOCs without screening values were detected. There were 10 compounds in surface water with an HQ greater than 1. None of these compounds were detected. Likewise, none of the SVOCs without screening values (24) were detected.

Volatiles. With one exception, there were no VOCs in soil with an HQ over 1. Trichloroethene had an HQ of 5.2, but was not detected. None of the 15 compounds without screening criteria were detected. In sediment, there were no VOCs with HQs in excess of 1, and there were no detections of the 31 VOCs with no screening benchmark. Likewise, there were no HQs greater than 1 for surface water VOCs and the 10 VOCs without screening values were not detected.

Dioxin/Furans. Risk estimates for receptor species used in food chain modeling were re-calculated based on 2,3,7,8-TCDD toxicity equivalents. Food chain HQs for kestrel, dove and fox were less than 1. The HQ for the mouse slightly exceeded 1 (HQ=1.34). The concentration of 2,3,7,8-TCDD did not exceed the soil benchmark.

Overall, the weight of evidence associated with the re-calculation of risk estimates in Step 3A suggests that inorganics, pesticides/PCBs, SVOCs, VOCs and dioxins/furans pose little risk to ecological receptor populations at Site 12. The relatively few HQs greater than 1 and associated with a detected chemical were usually less than 10. In addition, the majority of those exceedances occurred in the very conservative media-specific screening value comparisons, and not for receptors used in food chain modeling. Although there is uncertainty associated with the conclusion that there is little risk at Site 12, it was arrived at by using lowest effect level media-specific screening values and NOAELs (rather than moderate effect levels and LOAELs, respectively) throughout Steps 1, 2 and 3a. Dourson and Stara (1983 *cited in* USEPA, 1997) determined that 96 percent of the chemicals included in a data review had LOAEL/NOAEL ratios of five or less. This suggests that if LOAELs had been used as toxicity reference values, HQs of 5 in the assessment would have been 1 and HQs of 10 in the assessment would have been 2. In many cases, NOAELs were unavailable. In those cases, LOAELs were divided by a factor of 10 to obtain a NOAEL, when the review of Dourson and State (1983 *cited in* USEPA, 1997) would indicate that a factor of 5 would be more appropriate. This approach provided an added level of conservatism to the assessment.

8.6.3 Step 3A Uncertainty

In Step 3A, there are two primary sources of uncertainty which have a bearing on the conclusion that there is little ecological risk at Site 12. The first involves whether or not the extent of contamination has been fully characterized. The furthest downgradient sediment sample was collected upgradient of the confluence of the onsite swale and the large offsite ditch. Of the three sediment samples, this sample had the lowest concentrations of every inorganic, with exception of the nutrients (potassium, magnesium, sodium, and calcium), suggesting that concentrations decrease with distance from the site and that the areas of significant contamination associated with Site 12 have been characterized. Although this comparison was attempted for the other chemical classes, no conclusions could be drawn due to the large number of non-detects and variation in detection limits.

The second source of uncertainty involves the use of SUFs and the assumption that offsite foraging is done in areas that are unimpacted or significantly less impacted by chemical contamination. There are upland areas in the immediate vicinity of Site 12 that have been left in a natural state for a relatively long time. It is likely that these areas are less contaminated than areas in the immediate vicinity of the burn pit. Watercourse and wetland in the vicinity of the site, however, could be contaminated via transport of chemicals from other areas of the air station. Some the uncertainty involved with this approach was countered by the fact that the minimum home range/territory size was used to develop the SUF. In general, the habitat is of poor quality. It is mowed and there is substantial human activity which occurs in close proximity. In many cases, smaller home ranges correspond to higher quality habitat (i.e., less area is required to support the needs of an individual). For Site 12, the use of minimum home ranges sizes to develop SUFs was very conservative.

8.7 Conclusions

Receptor species/communities evaluated in the assessment included soil invertebrates, sediment invertebrates, aquatic receptors, mourning dove, killdeer, American kestrel, Eastern harvest mouse, and gray fox. Based on the pattern in Step 3A HQ results, the relatively few exceedances of a reference HQ of 1 for detected compounds, and data on the background concentration of inorganics, the conclusion of the assessment is that the levels of inorganics, pesticides/PCBs, SVOCs, VOCs and dioxins/furans pose little risk to ecological receptor populations at Site 12. Although there is some uncertainty associated with this conclusion, the scope and conservativeness of the assessment provide additional support that the risk evaluation has been protective. Based on the results of the assessment, no further evaluation of ecological risk is recommended for Site 12.

Table 8-1
Assessment and Measurement Endpoints
OU6, Site 12, MCAS Cherry Point, North Carolina

Assessment Endpoints		Measurement Endpoints
Survival and reproduction of soil invertebrates	⇨	Comparison of exposure case hazard quotients (HQs) to a target HQ of 1. Media-specific HQs are calculated for individual chemicals by dividing the maximum soil concentration by a conservative soil screening value.
Survival and reproduction of sediment invertebrates	⇨	Comparison of exposure case HQs, to a target HQ of 1. Media-specific HQs are calculated by dividing the maximum sediment concentration by a conservative sediment screening value.
Survival and reproduction of aquatic receptors, including amphibians	⇨	Comparison of exposure case HQs, based on maximum surface water concentrations and conservative surface water screening values, to a target HQ of 1.
Survival and reproduction of herbivorous birds	⇨	Comparison of exposure case HQs for mourning dove to a target HQ of 1. Food chain HQs are calculated for individual chemicals by dividing an estimated level of exposure by a screening ecotoxicity value that is associated with no adverse effects. Exposure estimates will include contributions from the consumption of plants, soil, and water.
Survival and reproduction of avian insectivores	⇨	Comparison of exposure case HQs for killdeer to a target HQ of 1. Exposure estimates will include contributions from the consumption of invertebrates, sediment, and water.
Survival and reproduction of avian carnivores	⇨	Comparison of exposure case HQs for American kestrel to a target HQ of 1. Exposure estimates will include contributions from the consumption of animal prey (soil invertebrates and small mammals), soil, and water.
Survival and reproduction of mammalian omnivores	⇨	Comparison of exposure case HQs for Eastern harvest mouse to a target HQ of 1. Exposure estimates will include contributions from the consumption of plants, invertebrates, soil, sediment, and water.
Survival and reproduction of mammalian carnivores	⇨	Comparison of exposure case HQs for gray fox to a target HQ of 1. Exposure estimates will include contributions from the consumption of plants, animal prey, soil, sediment, and water.

Note: For each of the individual receptor species, the assessment endpoint references an impact on survival or reproduction. Some chemical exposures may be associated with sub-lethal effects that do not directly influence mortality or reproductive success. However, these sub-lethal effects may increase the probability of death or negatively influence reproduction by enhancing susceptibility to predation or parasitism, or weakening competitive ability. For this screening-level ERA, it is assumed that screening ecotoxicity values based on sub-lethal and non-reproductive endpoints are indicative of effects on survival and/or reproduction.

Table 8-2
Media-Specific Screening for Soil
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/kg)			Frequency of Detection	Maximum Concentration (ug/kg) [a]	Screening Concentration (ug/kg)	Screening Concentration Reference	Screening HQ (maximum)
TAL Metals/Cyanide								
Aluminum	4100	-	4800	14/14	21600000	50000	1	432.0
Antimony	470	-	550	8/14	14500	3500	1	4.1
Arsenic	640	-	750	12/14	2300	10000	1	0.2
Barium	40	-	50	14/14	49400	165000	1	0.3
Beryllium	20	-	20	2/14	80	1100	1	0.1
Cadmium	40	-	50	14/14	12100	1600	1	7.6
Calcium	2000	-	2300	14/14	85800000	NA	NA	NA
Chromium	130	-	150	14/14	40900	400	1	102.3
Cobalt	110	-	130	1/14	500	20000	1	0.0
Copper	130	-	150	14/14	667000	40000	1	16.7
Cyanide	2100	-	2500	0/14	2500	900	1	2.8
Iron	2200	-	2600	14/14	6920000	200000	1	34.6
Lead	280	-	330	14/14	705000	50000	1	14.1
Magnesium	2000	-	2400	14/14	1810000	4400000	2	0.4
Manganese	40	-	50	14/14	97700	100000	1	1.0
Mercury (inorganic)	40	-	40	14/14	300	100	1	3.0
Nickel	280	-	330	14/14	21600	30000	1	0.7
Potassium	7200	-	8400	14/14	370000	NA	NA	NA
Selenium	670	-	780	2/14	1000	810	1	1.2
Silver	150	-	180	7/14	870	2000	1	0.4
Sodium	19100	-	22400	8/14	93900	NA	NA	NA
Thallium	750	-	880	0/14	880	1000	1	0.9
Vanadium	110	-	130	14/14	20800	2000	1	10.4
Zinc	880	-	1000	14/14	569000	50000	1	11.4
TCL Pesticides/PCBs								
4,4'-DDD	3.6	-	21	6/13	6.1	2.5	1	2.4
4,4'-DDE	3.6	-	20	10/13	3.7	2.5	1	1.5
4,4'-DDT	3.6	-	20	7/13	13	2.5	1	5.2
Aldrin	1.8	-	10	0/13	10	2.5	1	4.0
alpha-BHC	1.8	-	10	4/13	0.33	2.5	1	0.1
alpha-Chlordane [b]	1.8	-	10	10/13	51	100	2	0.5
Aroclor-1016 [c]	36	-	210	0/13	210	20	1	10.5
Aroclor-1221 [c]	73	-	420	0/13	420	20	1	21.0
Aroclor-1232 [c]	36	-	210	0/13	210	20	1	10.5
Aroclor-1242 [c]	36	-	210	0/13	210	20	1	10.5
Aroclor-1248 [c]	36	-	210	0/13	210	20	1	10.5
Aroclor-1254 [c]	36	-	210	0/13	210	20	1	10.5
Aroclor-1260 [c]	36	-	210	6/13	450	20	1	22.5
beta-BHC	1.8	-	10	0/13	10	1	1	10.0
delta-BHC	1.8	-	10	3/13	0.18	100000	2	0.0
Dieldrin	3.6	-	21	5/13	16	0.5	1	32.0
Endosulfan I	1.8	-	10	1/13	1.5	NA	NA	NA
Endosulfan II	3.6	-	21	0/13	21	NA	NA	NA
Endosulfan sulfate	3.6	-	18	12/13	15	NA	NA	NA
Endrin	3.6	-	21	6/13	4.8	1	1	4.8
Endrin aldehyde [d]	3.6	-	21	2/13	3.7	1	1	3.7
Endrin ketone [d]	3.6	-	21	1/13	3.5	1	1	3.5
gamma-BHC (Lindane)	1.8	-	10	1/13	0.15	0.05	1	3.0
gamma-Chlordane [b]	1.8	-	10	13/13	53	100	2	0.5
Heptachlor	1.8	-	10	4/13	0.53	100	2	0.0
Heptachlor epoxide	1.8	-	10	9/13	12	100	2	0.1
Methoxychlor	18	-	100	0/13	100	100	2	1.0
Toxaphene	180	-	1000	0/13	1000	NA	NA	NA
TCL Semivolatiles								
1,2,4-Trichlorobenzene [e]	360	-	4100	0/13	4100	10	1	410.0
1,2-Dichlorobenzene [f]	360	-	4100	0/13	4100	10	1	410.0
1,3-Dichlorobenzene [f]	360	-	4100	0/13	4100	10	1	410.0
1,4-Dichlorobenzene [f]	360	-	4100	0/13	4100	10	1	410.0
2,2'-Oxybis(1-chloropropane)	360	-	4100	0/13	4100	NA	NA	NA
2,4,5-Trichlorophenol	870	-	9900	0/13	9900	4000	1	2.5
2,4,6-Trichlorophenol	360	-	4100	0/13	4100	10000	1	0.4
2,4-Dichlorophenol [g]	360	-	4100	0/13	4100	20000	1	0.2
2,4-Dimethylphenol [h]	360	-	4100	0/13	4100	100	2	41.0
2,4-Dinitrophenol	870	-	9900	0/13	9900	20000	1	0.5
2,4-Dinitrotoluene	360	-	4100	0/13	4100	NA	NA	NA
2,6-Dinitrotoluene	360	-	4100	0/13	4100	NA	NA	NA
2-Chloronaphthalene [i]	360	-	4100	0/13	4100	1000	1	4.1
2-Chlorophenol	360	-	4100	0/13	4100	10	1	410.0

Table 8-2
Media-Specific Screening for Soil
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/kg)			Frequency of Detection	Maximum Concentration (ug/kg) [a]	Screening Concentration (ug/kg)	Screening Concentration Reference	Screening HQ (maximum)
2-Methylnaphthalene	360	-	4100	1/13	44	NA	NA	NA
2-Methylphenol	360	-	4100	0/13	4100	100	2	41.0
2-Nitroaniline	870	-	9900	0/13	9900	NA	NA	NA
2-Nitrophenol [l]	360	-	4100	0/13	4100	7000	1	0.6
3,3'-Dichlorobenzidine	360	-	4100	0/13	4100	NA	NA	NA
3-Nitroaniline	870	-	9900	0/13	9900	NA	NA	NA
4,6-Dinitro-2-methylphenol	870	-	9900	0/13	9900	NA	NA	NA
4-Bromophenyl-phenylether	360	-	4100	0/13	4100	NA	NA	NA
4-Chloro-3-methylphenol	360	-	4100	0/13	4100	NA	NA	NA
4-Chloroaniline	360	-	4100	0/13	4100	NA	NA	NA
4-Chlorophenyl-phenylether	360	-	4100	0/13	4100	NA	NA	NA
4-Methylphenol	360	-	4100	0/13	4100	100	2	41.0
4-Nitroaniline	870	-	9900	0/13	9900	NA	NA	NA
4-Nitrophenol	870	-	9900	0/13	9900	7000	1	1.4
Acenaphthene	360	-	4100	0/13	4100	20000	1	0.2
Acenaphthylene	360	-	4100	0/13	4100	100	2	41.0
Anthracene	360	-	4100	0/13	4100	100	1	41.0
Benzo(a)anthracene [k]	360	-	4100	0/13	4100	100	1	41.0
Benzo(a)pyrene	360	-	4100	0/13	4100	100	1	41.0
Benzo(b)fluoranthene [k]	360	-	4100	1/13	47	100	1	0.5
Benzo(g,h,i)perylene [k]	360	-	4100	1/13	47	100	1	0.5
Benzo(k)fluoranthene [k]	360	-	4100	0/13	4100	100	1	41.0
bis(2-Chloroethoxy)methane	360	-	4100	0/13	4100	NA	NA	NA
bis(2-Chloroethyl)ether	360	-	4100	0/13	4100	NA	NA	NA
bis(2-Ethylhexyl)phthalate [l]	360	-	4100	10/13	470	100	1	4.7
Butylbenzylphthalate [l]	360	-	4100	1/13	49	100	1	0.5
Carbazole	360	-	4100	0/13	4100	NA	NA	NA
Chrysene [k]	360	-	4100	1/13	39	100	1	0.4
Di-n-butylphthalate	360	-	4100	2/13	43	200000	1	0.0
Di-n-octyl phthalate	360	-	4100	0/13	4100	NA	NA	NA
Dibenz(a,h)anthracene	360	-	4100	0/13	4100	100	1	41.0
Dibenzofuran	360	-	4100	0/13	4100	NA	NA	NA
Diethylphthalate	360	-	4100	0/13	4100	100000	1	0.0
Dimethyl phthalate	360	-	4100	0/13	4100	200000	1	0.0
Fluoranthene	360	-	4100	1/13	53	100	1	0.5
Fluorene [k]	360	-	4100	0/13	4100	100	1	41.0
Hexachlorobenzene	360	-	4100	0/13	4100	2.5	1	1640.0
Hexachlorobutadiene	360	-	4100	0/13	4100	NA	NA	NA
Hexachlorocyclopentadiene	360	-	4100	0/13	4100	10000	1	0.4
Hexachloroethane	360	-	4100	0/13	4100	NA	NA	NA
Indeno(1,2,3-cd)pyrene [k]	360	-	4100	0/13	4100	100	NA	41.0
Isophorone	360	-	4100	0/13	4100	NA	NA	NA
n-Nitroso-di-n-propylamine	360	-	4100	0/13	4100	NA	NA	NA
n-Nitrosodiphenylamine	360	-	4100	0/13	4100	20000	1	0.2
Naphthalene	360	-	4100	0/13	4100	100	1	41.0
Nitrobenzene	360	-	4100	0/13	4100	40000	1	0.1
Pentachlorophenol	870	-	9900	0/13	9900	2	1	4950.0
Phenanthrene	360	-	4100	1/13	44	100	1	0.4
Phenol	360	-	4100	0/13	4100	50	1	82.0
Pyrene	360	-	4100	1/13	53	100	1	0.5
TCL Volatiles								
1,1,1-Trichloroethane [m]	9.5	-	13	0/14	13	300	2	0.0
1,1,2,2-Tetrachloroethane	9.5	-	13	0/14	13	NA	NA	NA
1,1,2-Trichloroethane [m]	9.5	-	13	0/14	13	300	2	0.0
1,1-Dichloroethane	9.5	-	13	0/14	13	300	2	0.0
1,1-Dichloroethene	9.5	-	13	0/14	13	NA	NA	NA
1,2-Dibromoethane	9.5	-	13	0/14	13	5000	2	0.0
1,2-Dichloroethane	9.5	-	13	0/14	13	400	1	0.0
1,2-Dichloroethene (total)	9.5	-	13	0/14	13	NA	NA	NA
1,2-Dichloropropane	9.5	-	13	0/14	13	700000	1	0.0
2-Butanone	9.5	-	13	0/14	13	NA	NA	NA
2-Hexanone	9.5	-	13	0/14	13	NA	NA	NA
4-Methyl-2-pentanone	9.5	-	13	0/14	13	NA	NA	NA
Acetone	9.5	-	13	0/14	13	NA	NA	NA
Benzene	9.5	-	13	0/14	13	50	1	0.3
Bromodichloromethane	9.5	-	13	0/14	13	450000	2	0.0
Bromoform	9.5	-	13	0/14	13	NA	NA	NA
Bromomethane	9.5	-	13	0/14	13	NA	NA	NA
Carbon disulfide	9.5	-	13	0/14	13	NA	NA	NA

Table 8-2
Media-Specific Screening for Soil
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/kg)			Frequency of Detection	Maximum Concentration (ug/kg) [a]	Screening Concentration (ug/kg)	Screening Concentration Reference	Screening HQ (maximum)
Carbon tetrachloride	9.5	-	13	0/14	13	1000000	1	0.0
Chlorobenzene	9.5	-	13	0/14	13	50	1	0.3
Chloroethane	9.5	-	13	0/14	13	NA	NA	NA
Chloroform	9.5	-	13	0/14	13	1	1	13.0
Chloromethane	9.5	-	13	0/14	13	NA	NA	NA
cis-1,2-Dichloroethene	2.6	-	2.6	0/1	2.6	300	2	0.0
cis-1,3-Dichloropropene	9.5	-	13	0/14	13	NA	NA	NA
Dibromochloromethane	9.5	-	13	0/14	13	NA	NA	NA
Ethylbenzene	9.5	-	13	0/14	13	50	1	0.3
Methylene chloride	9.5	-	13	3/14	310	2000	1	0.2
Styrene	9.5	-	13	0/14	13	100	1	0.1
Tetrachloroethene	9.5	-	13	0/14	13	10	1	1.3
Toluene	9.5	-	13	1/14	7.6	50	1	0.2
trans-1,2-Dichloroethene	2.6	-	2.6	0/1	2.6	300	2	0.0
trans-1,3-Dichloropropene	9.5	-	13	0/14	13	NA	NA	NA
Trichloroethene	9.5	-	13	0/14	13	1	1	13.0
Vinyl chloride	9.5	-	13	0/14	13	10	1	1.3
Xylene, total	9.5	-	13	1/14	12	50	1	0.2
Dioxins/Furans			**pg/g**		**pg/g**	**pg/g**		
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	5.7		5.7	1/1	210	NA	NA	NA
1,2,3,4,6,7,8-Heptachlorodibenzofuran	5.7	-	5.7	1/1	5.2	NA	NA	NA
1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.7	-	5.7	1/1	0.7	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	3.5	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	5.7	-	5.7	1/1	1.1	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	7.3	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	5.7	-	5.7	1/1	0.85	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	9.3	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzofuran	0.5	-	0.5	0/1	0.5	NA	NA	NA
1,2,3,7,8-Pentachlorodebenzo-p-dioxin	5.7	-	5.7	1/1	1.3	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzo furan	0.56	-	0.56	0/1	0.56	NA	NA	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	5.7	-	5.7	1/1	0.53	NA	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran	5.7	-	5.7	1/1	0.33	NA	NA	NA
2,3,7,8-TCDD (dioxin)	1.1	-	1.1	1/1	0.43	10000	2	0.0
2,3,7,8-Tetrachlorodibenzofuran	1.1	-	1.1	0/1	1.1	NA	NA	NA
Total Heptachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	420	NA	NA	NA
Total Heptachlorodibenzofuran	5.7	-	5.7	1/1	11	NA	NA	NA
Total Hexachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	75	NA	NA	NA
Total Hexachlorodibenzofuran	5.7	-	5.7	1/1	22	NA	NA	NA
Total Octachlorodibenzo-p-dioxin	11	-	11	1/1	4900	NA	NA	NA
Total Octachlorodibenzofuran	11	-	11	1/1	5.4	NA	NA	NA
Total Pentachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	12	NA	NA	NA
Total Pentachlorodibenzofuran	5.7	-	5.7	1/1	15	NA	NA	NA
Total Tetrachlorodibenzo-p-dioxin	1.1	-	1.1	1/1	1.5	NA	NA	NA
Total Tetrachlorodibenzofuran	1.1	-	1.1	1/1	6.4	NA	NA	NA

HQ - hazard quotient
NA - not applicable/not available

a. If the contaminant was not detected, value is the maximum detection limit.
b. Screening value for chlordane.
c. Screening value for total PCBs.
d. Screening value for endrin.
e. Screening value for trichlorobenzene.
f. Screening value for dichlorobenzene.
g. Screening value for dichlorophenols (total).
h. Screening value for 2-methylphenol and and 4-methylphenol.
i. Screening value for chloronaphthalene.
j. Screening value for 4-nitrophenol.
k. Screening value for benzo(a)pyrene.
l. Screening value for phthalates (total).
m. Screening value for trichloroethane.

1. Region 4 screening values (USEPA, 1999)
2. Region 3 BTAG screening levels (USEPA, 1995)

Table 8-3
Media-Specific Screening for Sediment
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/kg)			Frequency of Detection	Maximum Concentration (ug/kg) [a]	Screening Concentration (ug/kg)	Screening Concentration Reference	Screening HQ (maximum)
TAL Metals/Cyanide								
Aluminum	5000	–	5700	3/3	8640000	NA	NA	NA
Antimony	570	–	650	2/3	1300	12000	1	0.1
Arsenic	780	–	880	1/3	1100	7240	1	0.2
Barium	50	–	60	3/3	31000	NA	NA	NA
Beryllium	20	–	30	0/3	30	NA	NA	NA
Cadmium	50	–	60	2/3	2800	1000	1	2.8
Calcium	2400	–	2700	3/3	76700000	NA	NA	NA
Chromium	160	–	180	3/3	11600	52300	1	0.2
Cobalt	130	–	150	1/3	580	NA	NA	NA
Copper	160	–	180	2/3	12600	18700	1	0.7
Cyanide	2.6	–	2.9	0/3	2900	NA	NA	NA
Iron	2700	–	3100	3/3	3340000	NA	NA	NA
Lead	340	–	380	3/3	32600	30200	1	1.1
Magnesium	2400	–	2800	3/3	1050000	NA	NA	NA
Manganese	50	–	60	3/3	16400	NA	NA	NA
Mercury	50	–	50	3/3	70	130	1	0.5
Nickel	340	–	380	3/3	3600	15900	1	0.2
Potassium	8700	–	9900	3/3	160000	NA	NA	NA
Selenium	840	–	910	0/3	910	NA	NA	NA
Silver	180	–	210	1/3	200	2000	1	0.1
Sodium	23100	–	26300	2/3	59700	NA	NA	NA
Thallium	910	–	1000	0/3	1000	NA	NA	NA
Vanadium	130	–	150	3/3	12400	NA	NA	NA
Zinc	1100	–	1200	3/3	70400	124000	1	0.6
TCL Pesticides/PCBs								
4,4'-DDD	4.3	–	9.1	1/3	6.2	3.3	1	1.9
4,4'-DDE	4.3	–	9	3/3	1.6	3.3	1	0.5
4,4'-DDT	4.3	–	9	3/3	11	3.3	1	3.3
Aldrin	2.2	–	4.5	0/3	4.5	NA	NA	NA
alpha-BHC	2.2	–	4.5	0/3	4.5	NA	NA	NA
alpha-Chlordane [b]	2.2	–	4.6	2/3	36	1.7	1	21.2
Aroclor-1016 [c]	43	–	91	0/3	91	33	1	2.8
Aroclor-1221	86	–	180	0/3	180	67	1	2.7
Aroclor-1232 [c]	43	–	91	0/3	91	33	1	2.8
Aroclor-1242 [c]	43	–	91	0/3	91	33	1	2.8
Aroclor-1248 [c]	43	–	91	0/3	91	33	1	2.8
Aroclor-1254 [c]	43	–	91	0/3	91	33	1	2.8
Aroclor-1260 [c]	43	–	91	0/3	91	33	1	2.8
beta-BHC	2.2	–	4.5	0/3	4.5	NA	NA	NA
delta-BHC	2.2	–	4.5	0/3	4.5	NA	NA	NA
Dieldrin	4.3	–	9	1/3	0.7	3.3	1	0.2
Endosulfan I	2.2	–	4.5	0/3	4.5	NA	NA	NA
Endosulfan II	4.3	–	9.1	0/3	9.1	NA	NA	NA
Endosulfan sulfate	4.3	–	9	2/3	1.2	5.5	6	0.2
Endrin	4.3	–	9.1	0/3	9.1	3.3	1	2.8
Endrin aldehyde [d]	4.3	–	9.1	0/3	9.1	3.3	1	2.8
Endrin ketone [d]	4.3	–	9.1	0/3	9.1	3.3	1	2.8
gamma-BHC (Lindane)	2.2	–	4.5	0/3	4.5	3.3	1	1.4
gamma-Chlordane [b]	2.2	–	4.6	3/3	31	1.7	1	18.2
Heptachlor	2.2	–	4.5	0/3	4.5	NA	NA	NA
Heptachlor epoxide	2.2	–	4.6	3/3	2.6	5	5	0.5
Methoxychlor	22	–	45	0/3	45	NA	NA	NA
Toxaphene	220	–	450	0/3	450	NA	NA	NA
TCL Semivolatiles								
1,2,4-Trichlorobenzene	430	–	490	0/3	490	40	2	12.3
1,2-Dichlorobenzene	430	–	490	0/3	490	35	2	14.0
1,3-Dichlorobenzene	430	–	490	0/3	490	NA	NA	NA
1,4-Dichlorobenzene	430	–	490	0/3	490	110	2	4.5

Table 8-3
Media-Specific Screening for Sediment
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/kg)			Frequency of Detection	Maximum Concentration (ug/kg) [a]	Screening Concentration (ug/kg)	Screening Concentration Reference	Screening HQ (maximum)
2,2'-Oxybis(1-chloropropane)	430	–	490	0/3	490	NA	NA	NA
2,4,5-Trichlorophenol	1000	–	1200	0/3	1200	NA	NA	NA
2,4,6-Trichlorophenol	430	–	490	0/3	490	NA	NA	NA
2,4-Dichlorophenol	430	–	490	0/3	490	NA	NA	NA
2,4-Dimethylphenol	430	–	490	0/3	490	29	2	16.9
2,4-Dinitrophenol	1000	–	1200	0/3	1200	NA	NA	NA
2,4-Dinitrotoluene	430	–	490	0/3	490	NA	NA	NA
2,6-Dinitrotoluene	430	–	490	0/3	490	NA	NA	NA
2-Chloronaphthalene	430	–	490	0/3	490	NA	NA	NA
2-Chlorophenol	430	–	490	0/3	490	NA	NA	NA
2-Methylnaphthalene	430	–	490	0/3	490	330	1	1.5
2-Methylphenol	430	–	490	0/3	490	63	2	7.8
2-Nitroaniline	1000	–	1200	0/3	1200	NA	NA	NA
2-Nitrophenol	430	–	490	0/3	490	NA	NA	NA
3,3'-Dichlorobenzidine	430	–	490	0/3	490	NA	NA	NA
3-Nitroaniline	1000	–	1200	0/3	1200	NA	NA	NA
4,6-Dinitro-2-methylphenol	1000	–	1200	0/3	1200	NA	NA	NA
4-Bromophenyl-phenylether	430	–	490	0/3	490	NA	NA	NA
4-Chloro-3-methylphenol	430	–	490	0/3	490	NA	NA	NA
4-Chloroaniline	430	–	490	0/3	490	NA	NA	NA
4-Chlorophenyl-phenylether	430	–	490	0/3	490	NA	NA	NA
4-Methylphenol	430	–	490	0/3	490	670	2	0.7
4-Nitroaniline	1000	–	1200	0/3	1200	NA	NA	NA
4-Nitrophenol	1000	–	1200	0/3	1200	NA	NA	NA
Acenaphthene	430	–	490	0/3	490	330	1	1.5
Acenaphthylene	430	–	490	0/3	490	330	1	1.5
Anthracene	430	–	490	0/3	490	330	1	1.5
Benzo(a)anthracene	430	–	490	0/3	490	330	1	1.5
Benzo(a)pyrene	430	–	490	0/3	490	330	1	1.5
Benzo(b)fluoranthene [e]	430	–	490	0/3	490	655	1	0.7
Benzo(g,h,i)perylene [e]	430	–	490	0/3	490	655	1	0.7
Benzo(k)fluoranthene [e]	430	–	490	0/3	490	655	1	0.7
bis(2-Chloroethoxy)methane	430	–	490	0/3	490	NA	NA	NA
bis(2-Chloroethyl)ether	430	–	490	0/3	490	NA	NA	NA
bis(2-Ethylhexyl)phthalate	430	–	1100	0/3	1100	182	1	6.0
Butylbenzylphthalate	430	–	490	0/3	490	63	2	7.8
Carbazole	430	–	490	0/3	490	NA	NA	NA
Chrysene	430	–	490	0/3	490	330	1	1.5
Di-n-butylphthalate	430	–	490	1/3	50	1400	2	0.0
Di-n-octyl phthalate	430	–	490	0/3	490	6200	2	0.1
Dibenz(a,h)anthracene	430	–	490	0/3	490	330	1	1.5
Dibenzofuran	430	–	490	0/3	490	540	2	0.9
Diethylphthalate	430	–	490	0/3	490	200	2	2.5
Dimethyl phthalate	430	–	490	0/3	490	71	2	6.9
Fluoranthene	430	–	490	0/3	490	330	1	1.5
Fluorene	430	–	490	0/3	490	330	1	1.5
Hexachlorobenzene	430	–	490	0/3	490	22	2	22.3
Hexachlorobutadiene	430	–	490	0/3	490	11	2	44.5
Hexachlorocyclopentadiene	430	–	490	0/3	490	NA	NA	NA
Hexachloroethane	430	–	490	0/3	490	NA	NA	NA
Indeno(1,2,3-cd)pyrene [e]	430	–	490	0/3	490	655	1	0.7
Isophorone	430	–	490	0/3	490	NA	NA	NA
n-Nitroso-di-n-propylamine	430	–	490	0/3	490	NA	NA	NA
n-Nitrosodiphenylamine	430	–	490	0/3	490	28	2	17.5
Naphthalene	430	–	490	0/3	490	330	1	1.5
Nitrobenzene	430	–	490	0/3	490	NA	NA	NA
Pentachlorophenol	1000	–	1200	0/3	1200	360	2	3.3
Phenanthrene	430	–	490	0/3	490	330	1	1.5
Phenol	430	–	490	0/3	490	420	2	1.2

Table 8-3
Media-Specific Screening for Sediment
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/kg)			Frequency of Detection	Maximum Concentration (ug/kg) [a]	Screening Concentration (ug/kg)	Screening Concentration Reference	Screening HQ (maximum)
Pyrene	430	–	490	0/3	490	330	1	1.5
TCL Volatiles								
1,1,1-Trichloroethane [f]	13	–	13	0/3	13	31	2	0.4
1,1,2,2-Tetrachloroethane	13	–	13	0/3	13	NA	NA	NA
1,1,2-Trichloroethane [f]	13	–	13	0/3	13	31	2	0.4
1,1-Dichloroethane	13	–	13	0/3	13	NA	NA	NA
1,1-Dichloroethene	13	–	13	0/3	13	NA	NA	NA
1,2-Dibromoethane	13	–	13	0/3	13	NA	NA	NA
1,2-Dichloroethane	13	–	13	0/3	13	NA	NA	NA
1,2-Dichloroethene (total)	13	–	13	0/3	13	NA	NA	NA
1,2-Dichloropropane	13	–	13	0/3	13	NA	NA	NA
2-Butanone	13	–	13	0/3	13	NA	NA	NA
2-Hexanone	13	–	13	0/3	13	NA	NA	NA
4-Methyl-2-pentanone	13	–	13	0/3	13	NA	NA	NA
Acetone	13	–	13	0/3	13	NA	NA	NA
Benzene	13	–	13	0/3	13	NA	NA	NA
Bromodichloromethane	13	–	13	0/3	13	NA	NA	NA
Bromoform	13	–	13	0/3	13	NA	NA	NA
Bromomethane	13	–	13	0/3	13	NA	NA	NA
Carbon disulfide	13	–	13	0/3	13	NA	NA	NA
Carbon tetrachloride	13	–	13	0/3	13	NA	NA	NA
Chlorobenzene	13	–	13	0/3	13	NA	NA	NA
Chloroethane	13	–	13	0/3	13	NA	NA	NA
Chloroform	13	–	13	0/3	13	NA	NA	NA
Chloromethane	13	–	13	0/3	13	NA	NA	NA
cis-1,2-Dichloroethene	3.2	–	3.2	0/1	3.2	NA	NA	NA
cis-1,3-Dichloropropene	13	–	13	0/3	13	NA	NA	NA
Dibromochloromethane	13	–	13	0/3	13	NA	NA	NA
Ethylbenzene	13	–	13	0/3	13	10	2	1.3
Methylene chloride	13	–	13	0/3	13	NA	NA	NA
Styrene	13	–	13	0/3	13	NA	NA	NA
Tetrachloroethene	13	–	13	0/3	13	57	2	0.2
Toluene	13	–	13	0/3	13	NA	NA	NA
trans-1,2-Dichloroethene	3.2	–	3.2	0/1	3.2	NA	NA	NA
trans-1,3-Dichloropropene	13	–	13	0/3	13	NA	NA	NA
Trichloroethene	13	–	13	0/3	13	NA	NA	NA
Vinyl chloride	13	–	13	0/3	13	NA	NA	NA
Xylene, total	13	–	13	0/3	13	40	2	0.3

HQ - hazard quotient
NA - not applicable/not available

a. If the contaminant was not detected, value is the maximum detection limit.
b. Screening value for chlordane.
c. Screening value for total PCBs.
d. Screening value for endrin.
e. Screening value for high molecular weight PAHs.
f. Screening value for trichloroethane.

1. Region 4 screening values (USEPA, 1999)
2. Region 3 BTAG screening levels (USEPA, 1995)

Table 8-4
Media-Specific Screening for Surface Water
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/L)			Frequency of Detection	Maximum Concentration (ug/L) [a]	Screening Concentration (ug/L)	Screening Concentration Reference	Screening HQ (maximum)
TAL Metals/Cyanide								
Aluminum	19.2	--	19.2	3/3	781	87	1	9.0
Antimony	2.2	--	4.9	0/3	4.9	160	1	0.0
Arsenic	3	--	3	0/3	3	190	1	0.0
Barium	0.2	--	6.7	1/3	7	10000	2	0.0
Beryllium	0.1	--	0.1	0/3	0.1	0.53	1	0.2
Cadmium	0.2	--	1.3	0/3	1.3	0.66	1	2.0
Calcium	13.3	--	13.3	3/3	8220	NA	NA	NA
Chromium	0.6	--	1.2	0/3	1.2	11	1	0.1
Cobalt	0.5	--	0.74	0/3	0.74	35000	2	0.0
Copper	0.6	--	7.6	1/3	6.6	6.54	1	1.0
Cyanide	10	--	10	1/3	1.2	5.2	1	0.2
Iron	6.8	--	6.8	3/3	242	1000	1	0.2
Lead	1.3	--	1.3	1/3	1.7	1.32	1	1.3
Magnesium	9.4	--	846	1/3	746	NA	NA	NA
Manganese	0.2	--	7.1	3/3	38.3	14500	2	0.0
Mercury	0.1	--	0.1	2/3	0.12	0.012	1	10.0
Nickel	1.3	--	2.1	0/3	2.1	87.71	1	0.0
Potassium	33.5	--	33.5	3/3	1560	NA	NA	NA
Selenium	3.1	--	3.1	0/3	3.1	5	1	0.6
Silver	0.7	--	0.7	0/3	0.7	0.012	1	58.3
Sodium	89.1	--	89.1	3/3	5630	NA	NA	NA
Thallium	3.5	--	3.5	0/3	3.5	4	1	0.9
Vanadium	0.5	--	2.6	0/3	2.6	10000	2	0.0
Zinc	4.1	--	4.1	2/3	34.2	58.91	1	0.6
TCL Pesticides/PCBs								
4,4'-DDD	0.1	--	0.1	1/3	0.0066	0.0064	1	1.0
4,4'-DDE	0.1	--	0.5	1/3	0.027	10.5	1	0.0
4,4'-DDT	0.1	--	0.1	1/3	0.011	0.001	1	11.0
Aldrin	0.05	--	0.05	1/3	0.003	0.3	1	0.0
alpha-BHC	0.05	--	0.052	0/3	0.052	500	1	0.0
alpha-Chlordane	0.05	--	0.052	0/3	0.052	0.0043	1	12.1
Aroclor-1016	1	--	1	0/3	1	0.014	1	71.4
Aroclor-1221	2	--	2.1	0/3	2.1	0.014	1	150.0
Aroclor-1232	1	--	1	0/3	1	0.014	1	71.4
Aroclor-1242	1	--	1	0/3	1	0.014	1	71.4
Aroclor-1248	1	--	1	1/3	1.6	0.014	1	114.3
Aroclor-1254	1	--	1	0/3	1	0.014	1	71.4
Aroclor-1260	1	--	1	0/3	1	0.014	1	71.4
beta-BHC	0.05	--	0.052	0/3	0.052	5000	1	0.0
delta-BHC	0.05	--	0.052	0/3	0.052	100	2	0.0
Dieldrin	0.1	--	0.1	1/3	0.015	0.0019	1	7.9
Endosulfan I	0.05	--	0.052	0/3	0.052	0.056	1	0.9
Endosulfan II	0.1	--	0.1	0/3	0.1	0.056	1	1.8
Endosulfan sulfate[b]	0.1	--	0.1	0/3	0.1	0.056	1	1.8
Endrin	0.1	--	0.1	0/3	0.1	0.0023	1	43.5
Endrin aldehyde[c]	0.1	--	0.1	0/3	0.1	0.0023	1	43.5
Endrin ketone[c]	0.1	--	0.1	0/3	0.1	0.0023	1	43.5
gamma-BHC (Lindane)	0.05	--	0.052	1/3	0.0029	0.08	1	0.0
gamma-Chlordane[d]	0.05	--	0.052	0/3	0.052	0.0043	1	12.1
Heptachlor	0.05	--	0.05	0/3	0.05	0.0038	1	13.2
Heptachlor epoxide	0.05	--	0.052	0/3	0.052	0.0038	1	13.7
Methoxychlor	0.5	--	0.52	0/3	0.52	0.03	1	17.3
Toxaphene	5	--	5.2	0/3	5.2	0.0002	1	26000.0
TCL Semivolatiles								
1,2,4-Trichlorobenzene	10	--	10	0/3	10	44.9	1	0.2
1,2-Dichlorobenzene	10	--	10	0/3	10	15.8	1	0.6
1,3-Dichlorobenzene	10	--	10	0/3	10	50.2	1	0.2
1,4-Dichlorobenzene	10	--	10	0/3	10	11.2	1	0.9
2,2'-Oxybis(1-chloropropane)	10	--	10	0/3	10	NA	NA	NA

Table 8-4
Media-Specific Screening for Surface Water
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/L)			Frequency of Detection	Maximum Concentration (ug/L) [a]	Screening Concentration (ug/L)	Screening Concentration Reference	Screening HQ (maximum)
2,4,5-Trichlorophenol	25	--	25	0/3	25	63	2	0.4
2,4,6-Trichlorophenol	10	--	10	0/3	10	970	2	0.0
2,4-Dichlorophenol	10	--	10	0/3	10	365	2	0.0
2,4-Dimethylphenol	10	--	10	0/3	10	21.2	1	0.5
2,4-Dinitrophenol	25	--	25	0/3	25	6.2	1	4.0
2,4-Dinitrotoluene	10	--	10	0/3	10	230	2	0.0
2,6-Dinitrotoluene	10	--	10	0/3	10	NA	NA	NA
2-Chloronaphthalene	10	--	10	0/3	10	620	2	0.0
2-Chlorophenol	10	--	10	0/3	10	43.8	1	0.2
2-Methylnaphthalene	10	--	10	0/3	10	NA	NA	NA
2-Methylphenol	10	--	10	0/3	10	NA	NA	NA
2-Nitroaniline	25	--	25	0/3	25	NA	NA	NA
2-Nitrophenol	10	--	10	0/3	10	3500	1	0.0
3,3'-Dichlorobenzidine	10	--	10	0/3	10	NA	NA	NA
3-Nitroaniline	25	--	25	0/3	25	NA	NA	NA
4,6-Dinitro-2-methylphenol	25	--	25	0/3	25	2.3	1	10.9
4-Bromophenyl-phenylether	10	--	10	0/3	10	12.2	1	0.8
4-Chloro-3-methylphenol	10	--	10	0/3	10	0.3	1	33.3
4-Chloroaniline	10	--	10	0/3	10	NA	NA	NA
4-Chlorophenyl-phenylether	10	--	10	0/3	10	NA	NA	NA
4-Methylphenol	10	--	10	0/3	10	NA	NA	NA
4-Nitroaniline	25	--	25	0/3	25	NA	NA	NA
4-Nitrophenol	25	--	25	0/3	25	82.8	1	0.3
Acenaphthene	10	--	10	0/3	10	17	1	0.6
Acenaphthylene	10	--	10	0/3	10	NA	NA	NA
Anthracene	10	--	10	0/3	10	0.1	2	100.0
Benzo(a)anthracene	10	--	10	0/3	10	6.3	2	1.6
Benzo(a)pyrene	10	--	10	0/3	10	NA	NA	NA
Benzo(b)fluoranthene	10	--	10	0/3	10	NA	NA	NA
Benzo(g,h,i)perylene	10	--	10	0/3	10	NA	NA	NA
Benzo(k)fluoranthene	10	--	10	0/3	10	NA	NA	NA
bis(2-Chloroethoxy)methane	10	--	10	0/3	10	NA	NA	NA
bis(2-Chloroethyl)ether	10	--	10	0/3	10	2380	1	0.0
bis(2-Ethylhexyl)phthalate	10	--	10	0/3	10	0.3	1	33.3
Butylbenzylphthalate	10	--	10	0/3	10	22	1	0.5
Carbazole	10	--	10	0/3	10	NA	NA	NA
Chrysene	10	--	10	0/3	10	NA	NA	NA
Di-n-butylphthalate	10	--	10	0/3	10	9.4	1	1.1
Di-n-octyl phthalate	10	--	10	0/3	10	0.3	2	33.3
Dibenz(a,h)anthracene	10	--	10	0/3	10	NA	NA	NA
Dibenzofuran	10	--	10	0/3	10	NA	NA	NA
Diethylphthalate	10	--	10	0/3	10	521	1	0.0
Dimethyl phthalate	10	--	10	0/3	10	330	1	0.0
Fluoranthene	10	--	10	0/3	10	39.8	1	0.3
Fluorene	10	--	10	0/3	10	430	2	0.0
Hexachlorobenzene	10	--	10	0/3	10	3.68	2	2.7
Hexachlorobutadiene	10	--	10	0/3	10	0.93	1	10.8
Hexachlorocyclopentadiene	10	--	10	0/3	10	0.07	1	142.9
Hexachloroethane	10	--	10	0/3	10	9.8	1	1.0
Indeno(1,2,3-cd)pyrene	10	--	10	0/3	10	NA	NA	NA
Isophorone	10	--	10	0/3	10	1170	1	0.0
n-Nitroso-di-n-propylamine	10	--	10	0/3	10	NA	NA	NA
n-Nitrosodiphenylamine	10	--	10	0/3	10	58.5	1	0.2
Naphthalene	10	--	10	0/3	10	62	1	0.2
Nitrobenzene	10	--	10	0/3	10	270	1	0.0
Pentachlorophenol	25	--	25	0/3	25	13	1	1.9
Phenanthrene	10	--	10	0/3	10	6.3	2	1.6
Phenol	10	--	10	0/3	10	256	1	0.0
Pyrene	10	--	10	0/3	10	NA	NA	NA

Table 8-4
Media-Specific Screening for Surface Water
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/L)			Frequency of Detection	Maximum Concentration (ug/L) [a]	Screening Concentration (ug/L)	Screening Concentration Reference	Screening HQ (maximum)
TCL Volatiles								
1,1,1-Trichloroethane	1	--	1	0/3	1	528	1	0.0
1,1,2,2-Tetrachloroethane	1	--	1	0/3	1	240	1	0.0
1,1,2-Trichloroethane	1	--	1	0/3	1	940	1	0.0
1,1-Dichloroethane[e]	1	--	1	0/3	1	2000	1	0.0
1,1-Dichloroethene	1	--	1	0/3	1	303	1	0.0
1,2-Dibromoethane	1	--	1	0/3	1	18000	2	0.0
1,2-Dichloroethane	1	--	1	0/3	1	2000	1	0.0
1,2-Dichloropropane	1	--	1	0/3	1	525	1	0.0
2-Butanone	5	--	5	0/3	5	NA	NA	NA
2-Hexanone	5	--	5	0/3	5	NA	NA	NA
4-Methyl-2-pentanone	5	--	5	0/3	5	NA	NA	NA
Acetone[f]	NA	--	NA	NA	NA	NA	NA	NA
Benzene	1	--	1	0/3	1	53	1	0.0
Bromodichloromethane	1	--	1	0/3	1	NA	NA	NA
Bromoform	1	--	1	0/3	1	293	1	0.0
Bromomethane	1	--	1	0/3	1	NA	NA	NA
Carbon disulfide	1	--	1	0/3	1	2	2	0.5
Carbon tetrachloride	1	--	1	0/3	1	352	1	0.0
Chlorobenzene	1	--	1	0/3	1	195	1	0.0
Chloroethane	1	--	1	0/3	1	NA	NA	NA
Chloroform	1	--	1	0/3	1	289	1	0.0
Chloromethane	1	--	1	0/3	1	NA	NA	NA
cis-1,2-Dichloroethene[g]	1	--	1	0/3	1	303	1	0.0
cis-1,3-Dichloropropene	1	--	1	0/3	1	24.4	1	0.0
Dibromochloromethane	1	--	1	0/3	1	NA	NA	NA
Ethylbenzene	1	--	1	0/3	1	453	1	0.0
Methylene chloride	2	--	2	0/3	2	1930	1	0.0
Styrene	1	--	1	0/3	1	NA	NA	NA
Tetrachloroethene	1	--	1	0/3	1	84	1	0.0
Toluene	1	--	1	0/3	1	175	1	0.0
trans-1,2-Dichloroethene[g]	1	--	1	0/3	1	303	1	0.0
trans-1,3-Dichloropropene	1	--	1	0/3	1	24.4	NA	0.0
Trichloroethene	1	--	1	0/3	1	21900	2	0.0
Vinyl chloride	1	--	1	0/3	1	11600	2	0.0
Xylene, total	1	--	1	0/3	1	6000	2	0.0

HQ - hazard quotient
NA - not applicable/not available

a. If the contaminant was not detected, value is the maximum detection limit.
b. Screening value for endosulfan I and II.
c. Screening value for endrin.
d. Screening value for chlordane.
e. Screening value for 1,2-dichloroethane.
f. All data for acetone were rejected during validation.
g. Screening value for 1,1-dichloroethene.

1. Region 4 chronic screening values for freshwater (USEPA, 1999)
2. Region 3 BTAG screening levels (USEPA, 1995)

Table 8-5
Reference Toxicity Values for Mammals
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical [1]	Test Species	Exposure Route and Duration Class	Duration	System	Test RTV (mg/kg bw-d) [4]	Test RTV Type	NOAEL [5] (mg/kg bw-d)	Source [6]
TAL Metals/Cyanide								
Aluminum (Aluminum chloride)	mouse	oral in water (chronic)	3 gen	reproductive	19.3	LOAEL	1.93	Sample et al., 1996
Antimony (Antimony potassium tartrate)	mouse	oral in water (chronic)	lifetime, >1 year	lifespan	1.25	LOAEL	0.125	Sample et al., 1996
Arsenic (Arsenite)	mouse	oral in water (chronic)	3 gen	reproductive	1.26	LOAEL	0.126	Sample et al., 1996
Barium (Barium chloride)	rat	oral in water (chronic)	16 months	growth	5.1	NOAEL	5.1	Sample et al., 1996
Beryllium (Beryllium sulfate)	rat	oral in water (chronic)	lifetime, >1 year	longevity	0.66	NOAEL	0.66	Sample et al., 1996
Cadmium (Cadmium chloride)	rat	oral gavage (chronic)	6 wk	reproductive	1.0	NOAEL	1.0	Sample et al., 1996
Calcium					NA		NA	
Chromium (Cr VI)	rat	oral in water (subchronic)	3 months	mortality	131.4	LOAEL	13.1	Sample et al., 1996
Cobalt	rat	oral in food (intermediate)	69 d	reproductive	5	NOAEL	5	ATSDR, 1992c
Copper (Copper sulfate)	mink	oral in diet (chronic)	357 d	reproductive	11.7	NOAEL	11.7	Sample et al., 1996
Cyanide (Potasium cyanide)	rat	oral in diet (chronic)	gestation	reproductive	68.7	NOAEL	68.7	Sample et al., 1996
Iron (Ferrous sulfate)	rat	oral (acute)	1 time	mortality	319	LD50	3.19	USEPA, 1984
Lead (Lead acetate)	rat	oral in diet (chronic)	3 gen	reproductive	8.0	NOAEL	8.0	Sample et al., 1996
Magnesium					NA		NA	
Manganese (Manganese oxide)	rat	oral in diet (chronic)	224 d	reproductive	88	NOAEL	88	Sample et al., 1996
Mercury (Methyl mercury chloride)	rat	oral in diet (chronic)	3 gen	reproductive	0.032	NOAEL	0.032	Sample et al., 1996
Nickel (Nickel sulfate hexahydrate)	rat	oral in diet (chronic)	3 gen	reproductive	40	NOAEL	40	Sample et al., 1996
Potasium					NA		NA	
Selenium (Selanate)	rat	oral in water (chronic)	1 year	reproductive	0.2	NOAEL	0.2	Sample et al., 1996
Silver	rat	oral in water (acute)	2 wk	mortality	181.2	NOAEL	181.2	ATSDR, 1990
Sodium					NA		NA	
Thallium (Thallium sulfate)	rat	oral in water (subchronic)	60 d	reproductive	0.74	LOAEL	0.074	Sample et al., 1996
Vanadium (Sodium metavanadate)	rat	oral intubation (chronic)	60 d +	reproductive	2.1	LOAEL	0.21	Sample et al., 1996
Zinc (Zinc oxide)	rat	oral in diet (chronic)	d 1-16 of gestation	reproductive	160	NOAEL	160	Sample et al., 1996
TCL Pesticides/PCBs								
4,4'-DDD	rat	oral in food (chronic)	78 wk	cancer	85	LOAEL	9	ATSDR, 1994c
4,4'-DDE	mouse	oral in food (chronic)	78 wk	cancer	19	LOAEL	1.9	ATSDR, 1994c
4,4'-DDT	rat	oral in diet (chronic)	2 years	reproductive	0.80	NOAEL	0.80	Sample et al., 1996
Aldrin	rat	oral in diet (chronic)	3 gen	reproductive	0.2	NOAEL	0.2	Sample et al., 1996
alpha-BHC (mixed isomers)	rat	oral in diet (chronic)	4 gen	reproductive	1.6	NOAEL	1.6	Sample et al., 1996
alpha-Chlordane	mouse	oral in diet (chronic)	6 gen	reproductive	4.58	NOAEL	4.58	Sample et al., 1996
Aroclor-1016	mink	oral in diet (chronic)	18 months	reproductive	1.37	NOAEL	1.37	Sample et al., 1996
Aroclor-1221					NA		NA	
Aroclor-1232					NA		NA	
Aroclor-1242	mink	oral in diet	7 months	reproductive	0.685	LOAEL	0.0685	Sample et al., 1996
Aroclor-1248	mouse	oral in food (intermediate)	5 wk	immunological	13.0	LOAEL	1.3	ATSDR, 1995c
Aroclor-1254	mink	oral in diet (chronic)	4.5 months	reproductive	0.137	NOAEL	0.137	Sample et al., 1996
Aroclor-1260	rat	oral in food (chronic)	24 months	cancer	3.45	LOAEL	0.35	ATSDR, 1995c
beta-BHC	rat	oral in diet (subchronic)	13 wk	systemic; hematological	4	NOAEL	4	Sample et al., 1996
delta-BHC (mixed isomers)	rat	oral in diet (chronic)	4 gen	reproductive	1.6	NOAEL	1.6	Sample et al., 1996
Dieldrin	rat	oral in diet (chronic)	3 gen	reproductive	0.2	LOAEL	0.02	Sample et al., 1996
Endosulfan I (endosulfan)	rat	oral intubation (subchronic)	30 d	reproductive	1.50	NOAEL	1.5	Sample et al., 1996
Endosulfan II (endosulfan)	rat	oral intubation (subchronic)	30 d	reproductive	1.50	NOAEL	1.5	Sample et al., 1996
Endosulfan sulfate (endosulfan)	rat	oral (subchronic)	30 d	reproductive	1.50	NOAEL	1.5	Sample et al., 1996
Endrin	mouse	oral in diet (chronic)	120 d	reproductive	0.92	LOAEL	0.09	Sample et al., 1996
Endrin aldehyde (endrin)	mouse	oral in diet (chronic)	120 d	reproductive	0.92	LOAEL	0.09	Sample et al., 1996
Endrin ketone (endrin)	mouse	oral in diet (chronic)	120 d	reproductive	0.92	LOAEL	0.09	Sample et al., 1996
gamma-BHC (Lindane)	rat	oral in diet (chronic)	3 gen	reproductive	8	NOAEL	8	Sample et al., 1996
gamma-Chlordane	mouse	oral in diet (chronic)	6 gen	reproductive	4.60	NOAEL	4.58	Sample et al., 1996
Heptachlor	mink	oral in diet (chronic)	181 d	reproductive	1	LOAEL	0.1	Sample et al., 1996
Heptachlor epoxide (heptachlor)	mink	oral in diet (chronic)	181 d	reproductive	1	LOAEL	0.1	Sample et al., 1996
Methoxychlor	rat	oral in diet (chronic)	11 months	reproductive	4	NOAEL	4	Sample et al., 1996
Toxaphene	rat	oral in diet (chronic)	3 gen	reproductive	8	NOAEL	8	Sample et al., 1996
TCL Semivolatiles								
1,2,4-Trichlorobenzene [7]	rat	oral in water (chronic)	3 gen	weight	8	NOAEL	8	Robinson et al., 1981
1,2-Dichlorobenzene					NA		NA	
1,3-Dichlorobenzene					NA		NA	
1,4-Dichlorobenzene	rat	NA	NA	NA	250.0	NOAEL	250.0	Giavini et al., 1986
2,2'-oxybis(1-Chloropropane)					NA		NA	
2,4,5-Trichlorophenol [8]	rat	oral in food (chronic)	98 d	hepatic and renal	80	NOAEL	80	McCollister et al., 1961
2,4,6-Trichlorophenol [8]	rat	oral in food (chronic)	98 d	hepatic and renal	80	NOAEL	80	McCollister et al., 1961
2,4-Dichlorophenol	rat	oral in diet (chronic)	103 wk	reproductive	440.0	NOAEL	440.0	NTP, 1989
2,4-Dimethylphenol	mouse	oral gavage (chronic)	90 d	CNS and blood	50.0	NOAEL	50.0	HEAST, 1995
2,4-Dinitrophenol	rat	oral in diet (chronic)	26 wk	reproductive	50.0	NOAEL	50.0	Sample et al., 1996
2,4-Dinitrotoluene	rat	oral in diet (chronic)	104 wk	reproductive	3.9	NOAEL	3.9	Sample et al., 1996
2,6-Dinitrotoluene	rat	oral in diet (chronic)	13 wk	reproductive	7.0	NOAEL	7.0	Sample et al., 1996
2-Chloronaphthalene					NA		NA	

Table 8-5
Reference Toxicity Values for Mammals
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical [1]	Test Species	Exposure Route and Duration Class	Duration	System	Test RTV (mg/kg bw-d) [4]	Test RTV Type	NOAEL [5] (mg/kg bw-d)	Source [6]
2-Chlorophenol [10]	rat	oral in water (chronic)	10 wk	reproductive	4.0	NOAEL	4.0	Exon and Keller, 1982
2-Methylnaphthalene	mouse	oral in food (chronic)	81 wk	systemic	143.7	NOAEL	143.7	ATSDR, 1995a
2-Methylphenol					NA		NA	
2-Nitroaniline					NA		NA	
2-Nitrophenol					NA		NA	
3,3'-Dichlorobenzidine					NA		NA	
3-Nitroaniline					NA		NA	
4,6-Dinitro-2-methylphenol					NA		NA	
4-Bromophenyl-phenylether					NA		NA	
4-Chloro-3-methylphenol					NA		NA	
4-Chloroaniline					NA		NA	
4-Chlorophenyl-phenylether					NA		NA	
4-Methylphenol					NA		NA	
4-Nitroaniline					NA		NA	
4-Nitrophenol	mouse	oral gavage (acute)	3 d	mortality	1250	LD50	13	Schafer and Bowles, 1985
Acenaphthene	mouse	oral gavage (intermediate)	13 wk	reproductive	350	NOAEL	350	ATSDR, 1995b
Acenaphthylene [3]	mouse	oral in food (intermediate)	19-29 d	reproductive	133.3	NOAEL	133.3	ATSDR, 1995b
Anthracene	mouse	oral gavage (intermediate)	13 wk	reproductive	1000	NOAEL	1000	ATSDR, 1995b
Benzo(a)anthracene [2]	mouse	oral in food (intermediate)	30-197 d	cancer	1.30	NOAEL	1.30	ATSDR, 1995b
Benzo(a)pyrene	mouse	oral in food (intermediate)	30-197 d	cancer	1.30	NOAEL	1.30	ATSDR, 1995b
Benzo(b)fluoranthene [2]	mouse	oral in food (intermediate)	30-197 d	cancer	1.30	NOAEL	1.30	ATSDR, 1995b
Benzo(g,h,i)perylene [3]	mouse	oral in food (intermediate)	19-29 d	reproductive	133.3	NOAEL	133.3	ATSDR, 1995b
Benzo(k)fluoranthene [2]	mouse	oral in food (intermediate)	30-197 d	cancer	1.30	NOAEL	1.30	ATSDR, 1995b
bis(2-Chloroethoxy)methane					NA		NA	
bis(2-Chloroethyl)ether	rat	oral in diet (chronic)	78 wk	body weight	25.0	LOAEL	2.5	Sample et al., 1996
bis-(2-Ethylhexyl)phthalate	mouse	oral in diet (chronic)	105 d	reproductive	18.3	NOAEL	18.3	Sample et al., 1996
Butylbenzylphthalate	rat	oral in diet (chronic)	2 years	hepatic	240.0	NOAEL	240.0	NTP, 1997
Carbazole [3]	mouse	oral in food (intermediate)	19-29 d	reproductive	133.3	NOAEL	133.3	ATSDR, 1995b
Chrysene [2]	mouse	oral in food (intermediate)	30-197 d	cancer	1.3	NOAEL	1.3	ATSDR, 1995b
Di-n-butylphthalate	mouse	oral in food (chronic)	105 d	reproductive	550.0	NOAEL	550.0	Sample et al., 1996
Di-n-octyl phthalate	mouse	oral in food (chronic)	105 d	reproductive	550.0	LOAEL	55.0	Sample et al., 1996
Dibenz(a,h)anthracene [2]	mouse	oral in food (intermediate)	30-197 d	cancer	1.3	NOAEL	1.3	ATSDR, 1995b
Dibenzofuran [3]	mouse	oral in food (intermediate)	19-29 d	reproductive	133.3	NOAEL	133.3	ATSDR, 1995b
Diethylphthalate	mouse	oral in food (chronic)	105 d	reproductive	4583	NOAEL	4583	Sample et al., 1996
Dimethyl phthalate					NA		NA	
Fluoranthene	mouse	oral gavage (intermediate)	13 wk	hepatic	125.0	NOAEL	125.0	ATSDR, 1995b
Fluorene	mouse	oral gavage (intermediate)	13 wk	hematological	125.0	NOAEL	125.0	ATSDR, 1995b
Hexachlorobenzene					NA		NA	
Hexachlorobutadiene	mouse	oral in diet (chronic)	13 wk	reproductive	19.0	NOAEL	19.0	Sample et al., 1996
Hexachlorocyclopentadiene					NA		NA	
Hexachloroethane					NA		NA	
Indeno(1,2,3-cd)pyrene [2]	mouse	oral in food (intermediate)	30-197 d	cancer	1.3	NOAEL	1.3	ATSDR, 1995b
Isophorone	rat	oral gavage (intermediate)	103 wk	renal	250.0	LOAEL	25.0	Sample et al., 1996
N-Nitroso-di-n-propylamine	rat	oral in diet (chronic)	30 wk	hepatic	0.630	LOAEL	0.063	Sample et al., 1996
N-nitrosodiphenylamine	rat	oral in food (intermediate)	8-11 wk	systemic	150.0	NOAEL	150.0	ATSDR, 1993
Naphthalene	mouse	oral gavage (intermediate)	13 wk	reproductive	140.0	NOAEL	140.0	ATSDR, 1995a
Nitrobenzene					NA		NA	
Pentachlorophenol	rat	oral in diet (chronic)	77 d	reproductive	0.24	NOAEL	0.24	Sample et al., 1996
Phenanthrene [3]	mouse	oral in food (intermediate)	19-29 d	reproductive	133.3	NOAEL	133.3	ATSDR, 1995b
Phenol	mouse	oral in water gavage (chronic)	d 6-15 gestation	reproductive	60.0	NOAEL	60.0	NTP, 1983
Pyrene [3]	mouse	oral in food (intermediate)	19-29 d	reproductive	133.3	NOAEL	133.3	ATSDR, 1995b
Dioxin/Furans								
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin					NA		NA	
1,2,3,4,6,7,8-Heptachlorodibenzofuran					NA		NA	
1,2,3,4,7,8,9-Heptachlorodibenzofuran					NA		NA	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin					NA		NA	
1,2,3,4,7,8-Hexachlorodibenzofuran					NA		NA	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin					NA		NA	
1,2,3,6,7,8-Hexachlorodibenzofuran	rat	oral in diet (subchronic)	13 wk	body and organ weight	0.0016	NOAEL	0.0016	Sample et al., 1996
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin					NA		NA	
1,2,3,7,8,9-Hexachlorodibenzofuran					NA		NA	
1,2,3,7,8-Pentachlorodebenzo-p-dioxin					NA		NA	
1,2,3,7,8-Pentachlorodibenzo furan	rat	oral in diet (subchronic)	13 wk	body and organ weight	0.0016	NOAEL	0.0016	Sample et al., 1996
2,3,4,6,7,8-Hexachlorodibenzofuran					NA		NA	
2,3,4,7,8-Pentachlorodibenzofuran	rat	oral in diet (subchronic)	13 wk	body and organ weight	0.00016	NOAEL	0.00016	Sample et al., 1996
2,3,7,8-TCDD (dioxin)	rat	oral in diet (chronic)	3 gen	reproduction	0.000001	NOAEL	0.000001	Sample et al., 1996
2,3,7,8-Tetrachlorodibenzofuran					NA		NA	
Total Heptachlorodibenzo-p-dioxin					NA		NA	

Table 8-5
Reference Toxicity Values for Mammals
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical [1]	Test Species	Exposure Route and Duration Class	Duration	System	Test RTV (mg/kg bw-d) [4]	Test RTV Type	NOAEL [5] (mg/kg bw-d)	Source [6]
Total Heptachlorodibenzofuran					NA		NA	
Total Hexachlorodibenzo-p-dioxin					NA		NA	
Total Hexachlorodibenzofuran					NA		NA	
Total Octachlorodibenzo-p-dioxin					NA		NA	
Total Octachlorodibenzofuran					NA		NA	
Total Pentachlorodibenzo-p-dioxin					NA		NA	
Total Pentachlorodibenzofuran					NA		NA	
Total Tetrachlorodibenzo-p-dioxin					NA		NA	
Total Tetrachlorodibenzofuran					NA		NA	

d - day
wk - week
gen - generations
UF - Uncertainty Factor
RTV - Reference Toxicity Value
NOAEL - No Observed Adverse Effect Level
LOAEL - Lowest Observed Adverse Effect Level
LC/LD50 - concentration/dose that is lethal to 50% of the test population
[1] Chemical included in the chemical analysis program for the site and, if applicable, the compound used in toxicological testing.
[2] Lowest carcinogenic LOAEL from PAH toxicological data summarized in ATSDR, 1995b; test used benzo(a)pyrene. USEPA has classified benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, chrysene, and indeno(1,2,3-cd)pyrene as carcinogens (ATSDR, 1995b).
[3] Lowest non-carcinogenic NOAEL from PAH toxicological data summarized in ATSDR (1995b); test used benzo(a)pyrene. USEPA has indicated that acenaphthylene, anthracene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene and pyrene are not classifiable as carcinogens (ATSDR, 1995b). Carbazole and dibenzofuran were included in this group for the development of HQs.
[4] RTVs for studies in which dose was administered five times per week were multiplied for a factor of 0.7.
[5] LOAELs were divided by a UF of 10 to obtain NOAELs. LD_{50}s were divided by a UF of 100 to obtain NOAELs.
[6] Some documents cited are review documents (i.e., secondary sources). Citations for primary sources may be obtained from these documents.
[7] Test RTV based on food concentration of 100 mg/kg. Food ingestion rate of 0.08 kg/kg-day used to convert the food concentration to dose (mg/kg bw - day).
[8] Test RTV based on food concentration of 1,000 mg/kg. Food ingestion rate fo 0.08 kg/kg-day used to convert to dose (mg/kg bw-day).
[9] Data for 2,4,5-trichlorophenol used for 2,4,6-trichlorophenol.
[10] Test RTV based on food concentration of 50 mg/kg. Food ingestion rate of 0.08 kg/kg-day used to convert to dose (mg/kg bw-day).

Table 8-6
Reference Toxicity Values for Birds
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical [1]	Test Species	Body Weight (kg)	Exposure Route and Duration Class	Duration	System	Test RTV (mg/kg bw-d)	Test RTV Type	NOAEL [2] (mg/kg bw-d)	Source [3]
TAL Metals/Cyanide									
Aluminum (Aluminum sulfate)	ringed dove	0.16	oral in diet (chronic)	4 months	reproductive	109.7	NOAEL	109.7	Sample et al., 1996
Antimony						NA		NA	
Arsenic (Sodium arsenite)	mallard	1.00	oral in diet (chronic)	128 d	mortality	5.14	NOAEL	5.14	Sample et al., 1996
Barium (Barium hydroxide)	1-day old chickens	0.121	oral in diet (subchronic)	4 wk	mortality	208	NOAEL	208	Sample et al., 1996
Beryllium						NA		NA	
Cadmium (Cadmium chloride)	mallard	1.15	oral in diet (chronic)	90 d	reproductive	1.5	NOAEL	1.5	Sample et al., 1996
Calcium						NA		NA	
Chromium (3+ as Chromic potassium sulfate)	black duck	1.25	oral in diet (chronic)	10 months	reproductive	1.0	NOAEL	1.0	Sample et al., 1996
Cobalt	broiler chicken	1.80	oral in food (subacute)	14 d	weight gain (grc	1.47	NOAEL	1.47	Diaz et al., 1994
Copper (Copper oxide)	1-day old chickens	0.5	oral in diet (chronic)	10 wk	mortality	47.0	NOAEL	47.0	Sample et al., 1996
Cyanide						NA		NA	
Iron						NA		NA	
Lead (Lead acetate)	Japanese quail	0.15	oral in diet (chronic)	12 wk	reproductive	1.1	NOAEL	1.1	Sample et al., 1996
Magnesium						NA		NA	
Manganese (Manganese oxide)	1-day old J. quail	0.072	oral in diet (chronic)	75 d	growth	977	NOAEL	977	Sample et al., 1996
Mercury (Methyl mercury dicyandiamide)	mallard	1	oral in diet (chronic)	3 gen	reproductive	0.064	LOAEL	0.0064	Sample et al., 1996
Nickel (Nickel sulfate)	mallard	0.782	oral in diet (chronic)	90 d	mortality	77.4	NOAEL	77.4	Sample et al., 1996
Potassium						NA		NA	
Selenium (Selanomethionine)	mallard	1	oral in diet (chronic)	100 d	reproductive	0.4	NOAEL	0.4	Sample et al., 1996
Silver						NA		NA	
Sodium						NA		NA	
Thallium						NA		NA	
Vanadium (Vanadyl sulfate)	mallard	1.17	oral in diet (chronic)	12 wk	mortality	11.4	NOAEL	11.4	Sample et al., 1996
Zinc (Zinc sulfate)	white leg-horn	1.935	oral in diet (chronic)	44 wk	reproductive	14.5	NOAEL	14.5	Sample et al., 1996
TCL Pesticides/PCBs									
4,4'-DDD	mallard	1.134	(chronic)		reproductive	0.52	NOAEL	0.52	Heath et al., 1969 in Stickel, 1973
4,4'-DDE	brown pelican	3.5	(chronic)		reproductive	0.131	NOAEL	0.131	Beyer et al., 1996; EPA, April 1993
4,4'-DDT	mallard	1.134	(chronic)		reproductive, weight gain (growth)	0.104	NOAEL	0.104	Davison and Sell, 1974
Aldrin	mallard	1.134	(chronic)		mortality	5	LOAEL	0.5	Tucker and Crabtree, 1970
alpha-BHC (BHC mixed isomers)	japanese quail	0.15	oral in diet (chronic)	90 d	reproductive	0.563	NOAEL	0.563	Vos et al., 1971 in Sample et al., 1996
alpha-Chlordane (chlordane)	red-winged blackbird	0.064	oral in diet (chronic)	84 d	mortality	2.14	NOAEL	2.14	Stickel et al., 1983 in Sample et al., 1996
Aroclor-1016						NA		NA	
Aroclor-1221	coturnix quail	0.191	oral in diet (subacute)	5 d	mortality	972	NOAEL	972	Hill et al., 1975
Aroclor-1232	coturnix quail	0.191	oral in diet (subacute)	5 d	mortality	405	NOAEL	405	Hill et al., 1975
Aroclor-1242	screech owl	0.181	oral in diet (chronic)	2 gen	reproduction	0.41	NOAEL	0.41	McLane and Hughes, 1980
Aroclor-1248	coturnix quail	0.191	oral in food (subacute)	5 d	mortality	390	LC50	390	Hill and Camardese, 1986
Aroclor-1254	ring-necked pheasant	1	oral by capsule (chronic)	17 wk	reproductive	1.8	LOAEL	0.18	Dahlgren et al., 1972 in Sample et al., 1996
Aroclor-1260	coturnix quail	0.191	oral in food (subacute)	5 d	mortality	177.8	LC50	1.778	Hill and Camardese, 1986
beta-BHC (mixed isomers)	japanese quail	0.15	oral in diet (chronic)	90 d	reproductive	0.563	NOAEL	0.563	Vos et al., 1971 in Sample et al., 1997
delta-BHC (mixed isomers)	japanese quail	0.15	oral in diet (chronic)	90 d	reproductive	0.563	NOAEL	0.563	Vos et al., 1971 in Sample et al., 1998
Dieldrin	barn owl	0.466	oral in diet (chronic)	2 y	reproductive	0.077	NOAEL	0.077	Mendenhall et al., 1983 in Sample et al., 1996
Endosulfan I (endosulfan)	gray partridge	0.4	oral in deit (chronic)	4 wk	reproductive	10	NOAEL	10	Abiola, 1992 in Sample et al., 1996
Endosulfan II (endosulfan)	gray partridge	0.4	oral in deit (chronic)	4 wk	reproductive	10	NOAEL	10	Abiola, 1992 in Sample et al., 1996
Endosulfan sulfate (endosulfan)	gray partridge	0.4	oral in deit (chronic)	4 wk	reproductive	10	NOAEL	10	Abiola, 1992 in Sample et al., 1996
Endrin	mallard	1.15	oral in diet (chronic)	200+ d	reproductive	0.3	NOAEL	0.3	Spann et al., 1986 in Sample et al., 1996

Table 8-6
Reference Toxicity Values for Birds
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical [1]	Test Species	Body Weight (kg)	Exposure Route and Duration Class	Duration	System	Test RTV (mg/kg bw-d)	Test RTV Type	NOAEL [2] (mg/kg bw-d)	Source [3]
Endrin aldehyde (endrin)	mallard	1.15	oral in diet (chronic)	200+ d	reproductive	0.3	NOAEL	0.3	Spann et al., 1986 in Sample et al., 1997
Endrin ketone (endrin)	mallard	1.15	oral in diet (chronic)	200+ d	reproductive	0.3	NOAEL	0.3	Spann et al., 1986 in Sample et al., 1997
gamma-BHC (Lindane)	mallard	1	oral intubation (chronic)	8 wk	reproductive	20	LOAEL	2	Chakravarty and Lahiri, 1986 in Sample et al., 1996
gamma-Chlordane (chlordane)	red-winged blackbird	0.064	oral in diet (chronic)	84 d	mortality	2.14	NOAEL	2.14	Stickel et al., 1983 in Sample et al., 1996
Heptachlor	coturnix quail	0.191	oral in diet (subacute)	5 d	mortality	4.05	LOAEL	0.405	Hill et al., 1975
Heptachlor epoxide	woodcock	0.197	lethal		mortality	0.23		0.23	Beyer and Gish, 1980
Methoxychlor	coturnix quail	0.191	oral in diet (subacute)	5 d	mortality	405	NOAEL	405	Hill and Camardese, 1986
Toxaphene	mallard	1.043	oral in diet (acute)	5 d	mortality	30.7	LC50	0.307	Hill and Camardese, 1986
TCL Semivolatiles									
1,2,4-Trichlorobenzene						NA		NA	
1,2-Dichlorobenzene [5]	northern bobwhite	0.157	oral gavage (sub-acute)	14 d	mortality and growth	250	NOAEL	250	Grimes and Jaber, 1989
1,3-Dichlorobenzene [5]	northern bobwhite	0.157	oral gavage (sub-acute)	14 d	mortality and growth	250	NOAEL	250	Grimes and Jaber, 1989
1,4-Dichlorobenzene	northern bobwhite	0.157	oral gavage (sub-acute)	14 d	mortality and growth	250	NOAEL	250	Grimes and Jaber, 1989
2,2'-oxybis(1-Chloropropane)						NA		NA	
2,4,5-Trichlorophenol						NA		NA	
2,4,6-Trichlorophenol						NA		NA	
2,4-Dichlorophenol						NA		NA	
2,4-Dimethylphenol						NA		NA	
2,4-Dinitrophenol						NA		NA	
2,4-Dinitrotoluene						NA		NA	
2,6-Dinitrotoluene						NA		NA	
2-Chloronaphthalene						NA		NA	
2-Chlorophenol						NA		NA	
2-Methylnaphthalene						NA		NA	
2-Methylphenol						NA		NA	
2-Nitroaniline						NA		NA	
2-Nitrophenol						NA		NA	
3,3'-Dichlorobenzidine						NA		NA	
3-Nitroaniline						NA		NA	
4,6-Dinitro-2-methylphenol						NA		NA	
4-Bromophenyl-phenylether						NA		NA	
4-Chloro-3-methylphenol						NA		NA	
4-Chloroaniline						NA		NA	
4-Chlorophenyl-phenylether						NA		NA	
4-Methylphenol						NA		NA	
4-Nitroaniline						NA		NA	
4-Nitrophenol	northern bobwhite	0.157	oral gavage (sub-acute)	14 d	mortality	577	LD50	5.77	EPA TERRETOX, 1998 - accession #1040269
Acenaphthene [6]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Acenaphthylene [6]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Anthracene	mallard	1.043	oral in diet (chronic)	7 months	hepatic	228	LOAEL	22.8	Patton and Dieter, 1980
Benzo(a)anthracene [6]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Benzo(a)pyrene	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Benzo(b)fluoranthene [6]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Benzo(g,h,i)perylene [6]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Benzo(k)fluoranthene [6]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
bis(2-Chloroethoxy)methane						NA		NA	

Table 8-6
Reference Toxicity Values for Birds
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical [1]	Test Species	Body Weight (kg)	Exposure Route and Duration Class	Duration	System	Test RTV (mg/kg bw-d)	Test RTV Type	NOAEL [2] (mg/kg bw-d)	Source [3]
bis(2-Chloroethyl)ether						NA		NA	
bis-(2-Ethylhexyl)phthalate	ringed dove	0.16	oral in diet (chronic)	4 wk	reproductive	10.0	NOAEL	10.0	Sample et al., 1996
Butylbenzylphthalate						NA		NA	
Carbazole						NA		NA	
Chrysene [5]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Di-n-butylphthalate	ringed dove	0.16	oral in diet (chronic)	4 wk	reproductive	1.1	LOAEL	0.11	Sample et al., 1996
Di-n-octyl phthalate	ring-necked pheasant	1	oral in diet (subacute)	8 d	mortality	290	NOAEL	290	Hill et al., 1975
Dibenz(a,h)anthracene [5]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Dibenzofuran						NA		NA	
Diethylphthalate						NA		NA	
Dimethylphthalate						NA		NA	
Fluoranthene [5]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Fluorene [5]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Hexachlorobenzene						NA		NA	
Hexachlorobutadiene						NA		NA	
Hexachlorocyclopentadiene						NA		NA	
Hexachloroethane						NA		NA	
Indeno(1,2,3-cd)pyrene [5]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Isophorone						NA		NA	
N-Nitroso-di-n-propylamine						NA		NA	
N-nitrosodiphenylamine						NA		NA	
Naphthalene	mallard	1.04	oral in diet (chronic)	7 months	hepatic	228	LOAEL	22.8	Patton and Dieter, 1980
Nitrobenzene						NA		NA	
Pentachlorophenol	northern bobwhite	0.16	oral in geletin capsule (subacute)	14 d	mortality, growth, and feed consumption	175	NOAEL	175	Campbell and Jaber, 1993
Phenanthrene [5]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Phenol						NA		NA	
Pyrene [5]	white leghorn chicken	1.5	oral in diet (subchronic)	34 d	reproductive	39.5	NOAEL	39.5	Rigdon and Neal, 1963
Dioxin/Furans									
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin						NA		NA	
1,2,3,4,6,7,8-Heptachlorodibenzofuran						NA		NA	
1,2,3,4,7,8,9-Heptachlorodibenzofuran						NA		NA	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin						NA		NA	
1,2,3,4,7,8-Hexachlorodibenzofuran						NA		NA	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin						NA		NA	
1,2,3,6,7,8-Hexachlorodibenzofuran						NA		NA	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin						NA		NA	
1,2,3,7,8,9-Hexachlorodibenzofuran						NA		NA	
1,2,3,7,8-Pentachlorodebenzo-p-dioxin						NA		NA	
1,2,3,7,8-Pentachlorodibenzo furan						NA		NA	
2,3,4,6,7,8-Hexachlorodibenzofuran						NA		NA	
2,3,4,7,8-Pentachlorodibenzofuran						NA		NA	
2,3,7,8-TCDD (dioxin)	ring-necked pheasant	1	intraperitoneal injection (chronic)	10 wk	reproduction	0.000014	NOAEL	0.000014	Sample et al., 1996
2,3,7,8-Tetrachlorodibenzofuran	chicks	0.121	oral in diet (subchronic)	21 d	mortality, weight gain (growth)	0.0001	LOAEL	0.00001	Sample et al., 1996
Total Heptachlorodibenzo-p-dioxin						NA		NA	
Total Heptachlorodibenzofuran						NA		NA	
Total Hexachlorodibenzo-p-dioxin						NA		NA	
Total Hexachlorodibenzofuran						NA		NA	
Total Octachlorodibenzo-p-dioxin						NA		NA	
Total Octachlorodibenzofuran						NA		NA	
Total Pentachlorodibenzo-p-dioxin						NA		NA	
Total Pentachlorodibenzofuran						NA		NA	

Table 8-6
Reference Toxicity Values for Birds
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical [1]	Test Species	Body Weight (kg)	Exposure Route and Duration Class	Duration	System	Test RTV (mg/kg bw-d)	Test RTV Type	NOAEL [2] (mg/kg bw-d)	Source [3]
Total Tetrachlorodibenzo-p-dioxin						NA		NA	
Total Tetrachlorodibenzofuran						NA		NA	

d - day; wk - week; gen - generations

UF - Uncertainty Factor

RTV - Reference Toxicity Value

NOAEL - No Observed Adverse Effect Level

LOAEL - Lowest Observed Adverse Effect Level

LC/LD50 - concentration/dose that is lethal to 50% of the test population

1 Chemical included in the chemical analysis program for the site and, if applicable, the compound used in toxicological testing.

2 LOAELs were divided by a UF of 10 to obtain NOAELs. LD_{50} values were divided by a UF of 100 to obtain NOAELs.

3 Some documents cited are review documents (i.e., secondary sources). Citations for primary sources may be obtained from these documents.

4 Data for 1,2-dichloroethane used for 1,1-dichloroethane.

5 Data for 1,4-dichlorobenzene used for 1,2- and 1,3-dichlorobenzene.

6. Data for benzo(a)pyrene.

Table 8-7a
Summary of Life History Information for Indicator Species [a]
Part 1: Maximum Case Exposure Scanrio
OU6, Site 12, MCAS Cherry Point, North Carolina

Common Name	Body Weight Range	Food Ingestion Rate Range	Maximum Food Ingestion Rate	Food Moisture Content	Maximum Food Ingestion Rate	Soil / Sediment in Diet [c]	Maximum Soil / Sediment Ingestion Rate	Adjusted Maximum Food Ingestion Rate [l]	Maximum Surface Water Ingestion Rate [k]	Composition of Food in Diet [p]
	kg wet	*kg food wet / kg bw wet*	*kg wet / day*	*%*	*kg dry / day*	*% dry*	*kg dry / day*	*kg dry / day*	*L/day*	*%*
Mourning Dove	0.100 - 0.170 [e]	NA	NA	NA	0.018 [h]	5.0 [d]	0.00092	0.0171	0.0180	100% plants
Killdeer	0.088 [f]	NA	NA	NA	0.0138 [h]	18	0.00249	0.0113	0.0134	100% invertebrates
American Kestrel	0.103 - 0.138	0.29 - 0.31	0.032 [o]	68	0.0102	2.8	0.00029	0.0100	0.0157	47% invertebrates, 53% vertebrates [m]
Eastern Harvest Mouse	0.006 - 0.015 [g]	NA	NA	NA	0.00286 [j]	2.4	0.00007	0.00279	0.0023	95% plants, 5% invertebrates
Gray Fox	2.5 - 5 [i]	NA	NA	NA	0.258 [b]	2.8	0.00722	0.251	0.4214	32% plants, 6% invertebrates, 62% vertebrates [n]

NA - not available/not applicable

a. Unless note otherwise, information was obtained from USEPA (1993).

b. Calculated using food ingestion rate equation for mammals of rate = 0.0687(bw)^0.822 (Nagy 1987) and the maximum body weight in kg.

c. Percentage from Beyer et al. (1994), unless otherwise noted. Average value for four sandpiper species used for killdeer.
Value for red fox used for gray fox and conservatively for kestrel. Value for meadow vole used for Eastern harvest mouse.

d. Five percent conservatively assumed.

e. Mirarchi and Baskett (1994)

f. Single body weight taken from Terres (1980); no body weight range available. Maximum body weight was assumed to be 125% of the value in Terres (1980).

g. Jones and Birney (1988); TXPW (1994); Whitaker (1980); and Burt and Grossenheider (1976).

h. Calculated using food ingestion rate equation for all birds of rate = 0.0582(bw)^0.651 (Nagy 1987) and the maximum body weight in kg, except for killdeer, see footnote f.

i. Minimum based on the minimum of both males and females in Arkansas (Silva and Downing 1995). Maximum taken from Samuel and Nelson (1987).

j. Calculated using maximum body weight in g and resulting in an ingestion rate in kg dry/day. All rodents, rate = 0.621(bw)^0.564/1000 (Nagy 1987).

k. Calculated using maximum body weight in kg (Calder and Braun 1983 in USEPA 1993). All birds rate = 0.059*(bw)^0.67; all mammals rate = 0.099*(bw)^0.90.
For killdeer, maximum body weight was assumed to be 125% of the value in Terres (1980).

l. Calculated by subtracting the maximum soil/sediment ingestion rate from the maximum food ingestion rate.

m. Percent wet weight prey captured converted to percent dry weight for Florida/dry pine-oak woodlands (Bohall-Wood and Collopy 1987 in USEPA 1993), assuming 71% moisture for invertebrates and 68% moisture for vertebrates (USEPA 1993).

n. Percent of stomach contents by volume (wet weight) in the winter (Wood et al. 1958 in NISC 1996) converted to percent dry weight assuming 43% moisture for plants, 71% moisture for invertebrates, and 68% moisture for vertebrates (USEPA 1993).

o. Calculated by multiplying the minimum of the body weight range by the maximum of the food ingestion rate range.

p. Unless otherwise noted, composition of food in diet is based on general and life history information from primary and secondary sources.

Table 8-7b
Summary of Life History Information for Indicator Species [a]
Part 2: Average Case Exposure Scenario
Site 12 of OU6, MCAS Cherry Point, North Carolina

Common Name	Area/ Site Use Factor[q]	Body Weight Range	Food Ingestion Rate Range	Food Ingestion Rate	Food Moisture Content	Food Ingestion Rate	Soil / Sediment in Diet [c]	Soil / Sediment Ingestion Rate	Adjusted Food Ingestion Rate [l]	Surface Water Ingestion Rate [k]	Composition of Food in Diet [p]
		kg wet	*kg food wet / kg bw wet*	*kg wet / day*	*%*	*kg dry / day*	*% dry*	*kg dry / day*	*kg dry / day*	*(L/day)*	*%*
Mourning Dove	0.0057	0.100 - 0.170 [e]	NA	NA	NA	0.0158 [h]	5.0 [d]	7.90E-04	0.015	0.0158	100% plants
Killdeer	0.58	0.088 [f]	NA	NA	NA	0.0138 [h]	18	2.49E-03	0.0113	0.0134	100% invertebrates
American Kestrel	0.48	0.103 - 0.138	0.29 - 0.31	0.036 [o]	68	0.0115	2.8	0.00032	0.0112	0.0143	47% invertebrates, 53% vertebrates [m]
Eastern Harvest Mouse	1.00	0.006 - 0.015 [g]	NA	NA	NA	0.00234 [j]	2.4	5.61E-05	0.00228	0.0016	95% plants, 5% invertebrates
Gray Fox	0.06	2.5 - 5 [i]	NA	NA	NA	0.204 [b]	2.8	5.70E-03	0.198	0.3253	32% plants, 6% invertebrates, 62% vertebrates [n]

NA - not available/not applicable

a. Unless note otherwise, information was obtained from USEPA (1993).

b. Calculated using food ingestion rate equation for mammals of rate = 0.0687(bw)^0.822 (Nagy 1987) and the midpoint body weight in kg.

c. Percentage from Beyer et al. (1994), unless otherwise noted. Average value for four sandpiper species used for killdeer. Value for red fox used for gray fox and conservatively for kestrel. Value for meadow vole used for Eastern harvest mouse.

d. Five percent conservatively assumed.

e. Mirarchi and Baskett (1994)

f. Single body weight taken from Terres (1980); no body weight range availble.

g. Jones and Birney (1988); TXPW (1994); Whitaker (1980); and Burt and Grossenheider (1976).

h. Calculated using food ingestion rate equation for all birds of rate = 0.0582(bw)^0.651 (Nagy 1987) and the midpoint body weight in kg for mourning dove and the only available body weight for killdeer.

i. Minimum based on the minimum of both males and females in Arkansas (Silva and Downing 1995). Maximum taken from Samuel and Nelson (1987).

j. Calculated using midpoint body weight in g and resulting in an ingestion rate in kg dry/day. All rodents, rate = 0.621(bw)^0.564/1000 (Nagy 1987).

k. Calculated using midpoint body weight in kg (Calder and Braun 1983 in USEPA 1993). All birds rate = 0.059*(bw)^0.67; all mammals rate = 0.099*(bw)^0.90. For killdeer, only available body weight was used (Terres 1980).

l. Calculated by subtracting the soil/sediment ingestion rate from the food ingestion rate.

m. Percent wet weight prey captured converted to percent dry weight for Florida/dry pine-oak woodlands (Bohall-Wood and Collopy 1987 in USEPA 1993), assuming 71% moisture for invertebrates and 68% moisture for vertebrates (USEPA 1993).

n. Percent of stomach contents by volume (wet weight) in the winter (Wood et al. 1958 in NISC 1996) converted to percent dry weight assuming assuming 43% moisture for plants, 71% moisture for invertebrates, and 68% moisture for vertebrates (USEPA 1993).

o. Calculated by multiplying the midpoint of the body weight range by the midpoint of the food ingestion rate range.

p. Unless otherwise noted, composition of food in diet is based on general and life history information from primary and secondary sources.

q. Area/Site Use is based on quotient of site area and species home range area, which are defined in text of Section 8.6.2

Table 8-8 Bioaccumulation Factors for Foodchain Exposure Modeling OU6, Site 12, MCAS Cherry Point, North Carolina			
Chemical	**Terrestrial Plants** (1)	**Invertebrates** (2)	**Vertebrates** (3,4)
TAL Metals/Cyanide			
Aluminum	1	1	1
Antimony	1	1	1
Arsenic	0.454	0.329	0.0063
Barium	1	1	0.0696
Beryllium	1	1	1
Cadmium	1.359	2.822	1.9902
Calcium	1	1	1
Chromium	1	1.15	0.1382
Cobalt	1	1	0.0371
Copper	0.341	2.424	0.42
Cyanide	1	1	1
Iron	1	1	0.0137
Lead	0.245	0.276	0.1615
Magnesium	1	1	1
Manganese	1	1	1
Mercury	1.481	1.422	0.1244
Nickel	0.75	0.857	0.2799
Potassium	1	1	1
Selenium	1	1	1
Silver	1	1	1
Sodium	1	1	1
Thallium	1	1	0.1124
Vanadium	1	1	1
Zinc	1.021	3.092	1.3352
TCL Pesticides/PCBs			
4,4'-DDD	1	1	1
4,4'-DDE	1	1	1
4,4'-DDT	1	1	1
Aldrin	1	1	1
alpha-BHC	1	1	1
alpha-Chlordane	1	1	1
Aroclor-1016	1	1	1
Aroclor-1221	1	1	1
Aroclor-1232	1	1	1
Aroclor-1242	1	1	1
Aroclor-1248	1	1	1
Aroclor-1254	1	1	1
Aroclor-1260	1	1	1
beta-BHC	1	1	1
delta-BHC	1	1	1
Dieldrin	1	1	1
Endosulfan I	1	1	1
Endosulfan II	1	1	1
Endosulfan sulfate	1	1	1
Endrin	1	1	1
Endrin aldehyde	1	1	1

Table 8-8 Bioaccumulation Factors for Foodchain Exposure Modeling OU6, Site 12, MCAS Cherry Point, North Carolina			
Chemical	**Terrestrial Plants** (1)	**Invertebrates** (2)	**Vertebrates** (3,4)
Endrin ketone	1	1	1
gamma-BHC (Lindane)	1	1	1
gamma-Chlordane	1	1	1
Heptachlor	1	1	1
Heptachlor epoxide	1	1	1
Methoxychlor	1	1	1
Toxaphene	1	1	1
TCL Semivolatiles			
1,2,4-Trichlorobenzene	1	1	1
1,2-Dichlorobenzene	1	1	1
1,3-Dichlorobenzene	1	1	1
1,4-Dichlorobenzene	1	1	1
2,2'-oxybis(1-Chloropropane)	1	1	1
2,4,5-Trichlorophenol	1	1	1
2,4,6-Trichlorophenol	1	1	1
2,4-Dichlorophenol	1	1	1
2,4-Dimethylphenol	1	1	1
2,4-Dinitrophenol	1	1	1
2,4-Dinitrotoluene	1	1	1
2,6-Dinitrotoluene	1	1	1
2-Chloronaphthalene	1	1	1
2-Chlorophenol	1	1	1
2-Methylnaphthalene	1	1	1
2-Methylphenol	1	1	1
2-Nitroaniline	1	1	1
2-Nitrophenol	1	1	1
3,3'-Dichlorobenzidine	1	1	1
3-Nitroaniline	1	1	1
4,6-Dinitro-2-methylphenol	1	1	1
4-Bromophenyl-phenylether	1	1	1
4-Chloro-3-methylphenol	1	1	1
4-Chloroaniline	1	1	1
4-Chlorophenyl-phenylether	1	1	1
4-Methylphenol	1	1	1
4-Nitroaniline	1	1	1
4-Nitrophenol	1	1	1
Acenaphthene	1	1	1
Acenaphthylene	1	1	1
Anthracene	1	1	1
Benzo(a)anthracene	1	1	1
Benzo(a)pyrene	1	1	1
Benzo(b)fluoranthene	1	1	1
Benzo(g,h,i)perylene	1	1	1
Benzo(k)fluoranthene	1	1	1
bis(2-Chloroethoxy)methane	1	1	1
bis(2-Chloroethyl)ether	1	1	1

Table 8-8 Bioaccumulation Factors for Foodchain Exposure Modeling OU6, Site 12, MCAS Cherry Point, North Carolina			
Chemical	**Terrestrial Plants** (1)	**Invertebrates** (2)	**Vertebrates** (3,4)
bis-(2-Ethylhexyl)phthalate	1	1	1
Butylbenzylphthalate	1	1	1
Carbazole	1	1	1
Chrysene	1	1	1
Di-n-butylphthalate	1	1	1
Di-n-octyl phthalate	1	1	1
Dibenz(a,h)anthracene	1	1	1
Dibenzofuran	1	1	1
Diethylphthalate	1	1	1
Dimethyl phthalate	1	1	1
Fluoranthene	1	1	1
Fluorene	1	1	1
Hexachlorobenzene	1	1	1
Hexachlorobutadiene	1	1	1
Hexachlorocyclopentadiene	1	1	1
Hexachloroethane	1	1	1
Indeno(1,2,3-cd)pyrene	1	1	1
Isophorone	1	1	1
N-Nitroso-di-n-propylamine	1	1	1
N-Nitrosodiphenylamine	1	1	1
Naphthalene	1	1	1
Nitrobenzene	1	1	1
Pentachlorophenol	1	1	1
Phenanthrene	1	1	1
Phenol	1	1	1
Pyrene	1	1	1
Dioxins/Furans			
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1	1	1
1,2,3,4,6,7,8-Heptachlorodibenzofuran	1	1	1
1,2,3,4,7,8,9-Heptachlorodibenzofuran	1	1	1
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	1	1	1
1,2,3,4,7,8-Hexachlorodibenzofuran	1	1	1
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	1	1	1
1,2,3,6,7,8-Hexachlorodibenzofuran	1	1	1
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	1	1	1
1,2,3,7,8,9-Hexachlorodibenzofuran	1	1	1
1,2,3,7,8-Pentachlorodebenzo-p-dioxin	1	1	1
1,2,3,7,8-Pentachlorodibenzo furan	1	1	1
2,3,4,6,7,8-Hexachlorodibenzofuran	1	1	1
2,3,4,7,8-Pentachlorodibenzofuran	1	1	1
2,3,7,8-TCDD (dioxin)	1	1	1
2,3,7,8-Tetrachlorodibenzofuran	1	1	1
Total Heptachlorodibenzo-p-dioxin	1	1	1
Total Heptachlorodibenzofuran	1	1	1
Total Hexachlorodibenzo-p-dioxin	1	1	1
Total Hexachlorodibenzofuran	1	1	1
Total Octachlorodibenzo-p-dioxin	1	1	1

Table 8-8
Bioaccumulation Factors for Foodchain Exposure Modeling
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Terrestrial Plants (1)	Invertebrates (2)	Vertebrates (3,4)
Total Octachlorodibenzofuran	1	1	1
Total Pentachlorodibenzo-p-dioxin	1	1	1
Total Pentachlorodibenzofuran	1	1	1
Total Tetrachlorodibenzo-p-dioxin	1	1	1
Total Tetrachlorodibenzofuran	1	1	1

NA = Not Available
Bioaccumulation Factor of 1.0 used when no value available
1. BAFs other than 1 taken from Bechtel Jacobs Company, Inc. (1998b)
2. BAFs other than 1 taken from Bechtel Jacobs Company, Inc. (1998a)
3. BAFs other than 1 taken from Sample et al. (1998)
4. BAF values for small mammals were used to conservatively represent all vertebrates.

Table 8-9
Screening Level Exposure Doses, NOAELs, and HQs for Mourning Dove
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.100 kg
Adjusted Food Ingestion Rate	0.0171 kg-dry/day
Soil Ingestion Rate	0.00092 kg-dry/day
Surface Water Ingestion Rate	0.0180 L/day

Maximum Concentrations

Chemical	Soil Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Dose (mg/kg bw-d)	NOAEL (mg/kg bw-d)	NOAEL HQ_n
TAL Metals/Cyanide							
Aluminum	21600.0	0.781	1	21600.0	3892.0	109.7	35.48
Antimony	14.5	0.0049	1	14.5	2.6	NA	--
Arsenic	2.3	0.003	0.454	1.0	0.2	5.14	0.04
Barium	49.4	0.007	1	49.4	8.9	208	0.04
Beryllium	0.1	0.0001	1	0.1	0.0	NA	--
Cadmium	12.1	0.0013	1.359	16.4	2.9	1.45	2.02
Calcium	85800.0	8.22	1	85800.0	15460.9	NA	--
Chromium	40.9	0.0012	1	40.9	7.4	1	7.37
Cobalt	0.5	0.00074	1	0.5	0.1	1.4664	0.06
Copper	667.0	0.0066	0.341	227.4	45.0	47	0.96
Cyanide	2.5	0.0012	1	2.5	0.5	NA	--
Iron	6920.0	0.242	1	6920.0	1246.9	NA	--
Lead	705.0	0.0017	0.245	172.7	36.0	1.13	31.87
Magnesium	1810.0	0.746	1	1810.0	326.3	NA	--
Manganese	97.7	0.0383	1	97.7	17.6	977	0.02
Mercury	0.3	0.00012	1.481	0.4	0.1	0.0064	12.30
Nickel	21.6	0.0021	0.75	16.2	3.0	77.4	0.04
Potassium	370.0	1.56	1	370.0	66.9	NA	--
Selenium	1.0	0.0031	1	1.0	0.2	0.4	0.45
Silver	0.9	0.0007	1	0.9	0.2	NA	--
Sodium	93.9	5.63	1	93.9	17.9	NA	--
Thallium	0.9	0.0035	1	0.9	0.2	NA	--
Vanadium	20.8	0.0026	1	20.8	3.7	11.4	0.33
Zinc	569.0	0.0342	1.021	580.9	104.6	14.5	7.21
TCL Pesticides/PCBs							
4,4'-DDD	0.0061	0.0000066	1	0.0061	0.0011	0.52	0.00
4,4'-DDE	0.0037	0.000027	1	0.0037	0.0007	0.131	0.01
4,4'-DDT	0.013	0.000011	1	0.013	0.0023	0.104	0.02
Aldrin	0.01	0.000003	1	0.01	0.0018	0.5	0.00
alpha-BHC	0.00033	0.000052	1	0.00033	0.0001	0.563	0.00
alpha-Chlordane	0.051	0.000052	1	0.051	0.0092	2.14	0.00
Aroclor-1016	0.21	0.001	1	0.21	0.0380	NA	--
Aroclor-1221	0.42	0.0021	1	0.42	0.0761	972	0.00
Aroclor-1232	0.21	0.001	1	0.21	0.0380	405	0.00
Aroclor-1242	0.21	0.001	1	0.21	0.0380	0.41	0.09
Aroclor-1248	0.21	0.0016	1	0.21	0.0381	390	0.00
Aroclor-1254	0.21	0.001	1	0.21	0.0380	0.18	0.21
Aroclor-1260	0.45	0.001	1	0.45	0.0813	1.778	0.05
beta-BHC	0.01	0.000052	1	0.01	0.0018	0.563	0.00
delta-BHC	0.00018	0.000052	1	0.00018	0.0000	0.563	0.00
Dieldrin	0.016	0.000015	1	0.016	0.0029	0.077	0.04
Endosulfan I	0.0015	0.000052	1	0.0015	0.0003	10	0.00
Endosulfan II	0.021	0.0001	1	0.021	0.0038	10	0.00
Endosulfan sulfate	0.015	0.0001	1	0.015	0.0027	10	0.00
Endrin	0.0048	0.0001	1	0.0048	0.0009	0.3	0.00
Endrin aldehyde	0.0037	0.0001	1	0.0037	0.0007	0.3	0.00
Endrin ketone	0.0035	0.0001	1	0.0035	0.0006	0.3	0.00
gamma-BHC (Lindane)	0.00015	0.0000029	1	0.00015	0.0000	2	0.00
gamma-Chlordane	0.053	0.000052	1	0.053	0.0096	2.14	0.00
Heptachlor	0.00053	0.00005	1	0.00053	0.0001	0.405	0.00
Heptachlor epoxide	0.012	0.000052	1	0.012	0.0022	0.23	0.01
Methoxychlor	0.1	0.00052	1	0.1	0.0181	405	0.00
Toxaphene	1	0.0052	0	0	0.0101	0.307	0.03
TCL Semivolatiles							
1,2,4-Trichlorobenzene	4.1	0.01	1	4.1	0.7405	NA	--
1,2-Dichlorobenzene	4.1	0.01	1	4.1	0.7405	250	0.003
1,3-Dichlorobenzene	4.1	0.01	1	4.1	0.7405	250	0.003
1,4-Dichlorobenzene	4.1	0.01	1	4.1	0.7405	250	0.003
2,2'-oxybis(1-Chloropropane)	4.1	0.01	1	4.1	0.7405	NA	--
2,4,5-Trichlorophenol	9.9	0.025	1	9.9	1.7883	NA	--
2,4,6-Trichlorophenol	4.1	0.01	1	4.1	0.7405	NA	--
2,4-Dichlorophenol	4.1	0.01	1	4.1	0.7405	NA	--
2,4-Dimethylphenol	4.1	0.01	1	4.1	0.7405	NA	--
2,4-Dinitrophenol	9.9	0.025	1	9.9	1.7883	NA	--
2,4-Dinitrotoluene	4.1	0.01	1	4.1	0.7405	NA	--
2,6-Dinitrotoluene	4.1	0.01	1	4.1	0.7405	NA	--
2-Chloronaphthalene	4.1	0.01	1	4.1	0.7405	NA	--
2-Chlorophenol	4.1	0.01	1	4.1	0.7405	NA	--

Table 8-9
Screening Level Exposure Doses, NOAELs, and HQs for Mourning Dove
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.100 kg
Adjusted Food Ingestion Rate	0.0171 kg-dry/day
Soil Ingestion Rate	0.00092 kg-dry/day
Surface Water Ingestion Rate	0.0180 L/day

Maximum Concentrations

Chemical	Soil Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Dose (mg/kg bw-d)	NOAEL (mg/kg bw-d)	NOAEL HQ_n
2-Methylnaphthalene	0.044	0.01	1	0.044	0.0097	NA	--
2-Methylphenol	4.1	0.01	1	4.1	0.7405	NA	--
2-Nitroaniline	9.9	0.025	1	9.9	1.7883	NA	--
2-Nitrophenol	4.1	0.01	1	4.1	0.7405	NA	--
3,3'-Dichlorobenzidine	4.1	0.01	1	4.1	0.7405	NA	--
3-Nitroaniline	9.9	0.025	1	9.9	1.7883	NA	--
4,6-Dinitro-2-methylphenol	9.9	0.025	1	9.9	1.7883	NA	--
4-Bromophenyl-phenylether	4.1	0.01	1	4.1	0.7405	NA	--
4-Chloro-3-methylphenol	4.1	0.01	1	4.1	0.7405	NA	--
4-Chloroaniline	4.1	0.01	1	4.1	0.7405	NA	--
4-Chlorophenyl-phenylether	4.1	0.01	1	4.1	0.7405	NA	--
4-Methylphenol	4.1	0.01	1	4.1	0.7405	NA	--
4-Nitroaniline	9.9	0.025	1	9.9	1.7883	NA	--
4-Nitrophenol	9.9	0.025	1	9.9	1.7883	5.77	0.310
Acenaphthene	4.1	0.01	1	4.1	0.7405	39.5	0.019
Acenaphthylene	4.1	0.01	1	4.1	0.7405	39.5	0.019
Anthracene	4.1	0.01	1	4.1	0.7405	22.8	0.032
Benzo(a)anthracene	4.1	0.01	1	4.1	0.7405	39.5	0.019
Benzo(a)pyrene	4.1	0.01	1	4.1	0.7405	39.5	0.019
Benzo(b)fluoranthene	0.047	0.01	1	0.047	0.0103	39.5	0.000
Benzo(g,h,i)perylene	0.047	0.01	1	0.047	0.0103	39.5	0.000
Benzo(k)fluoranthene	4.1	0.01	1	4.1	0.7405	39.5	0.019
bis(2-Chloroethoxy)methane	4.1	0.01	1	4.1	0.7405	NA	--
bis(2-Chloroethyl)ether	4.1	0.01	1	4.1	0.7405	NA	--
bis-(2-Ethylhexyl)phthalate	0.47	0.01	1	0.47	0.0865	10	0.009
Butylbenzylphthalate	0.049	0.01	1	0.049	0.0106	NA	--
Carbazole	4.1	0.01	1	4.1	0.7405	NA	--
Chrysene	0.039	0.01	1	0.039	0.0088	39.5	0.000
Di-n-butylphthalate	0.043	0.01	1	0.043	0.0095	0.11	0.087
Di-n-octyl phthalate	4.1	0.01	1	4.1	0.7405	290	0.003
Dibenz(a,h)anthracene	4.1	0.01	1	4.1	0.7405	39.5	0.019
Dibenzofuran	4.1	0.01	1	4.1	0.7405	NA	--
Diethylphthalate	4.1	0.01	1	4.1	0.7405	NA	--
Dimethyl phthalate	4.1	0.01	1	4.1	0.7405	NA	--
Fluoranthene	0.053	0.01	1	0.053	0.0113	39.5	0.000
Fluorene	4.1	0.01	1	4.1	0.7405	39.5	0.019
Hexachlorobenzene	4.1	0.01	1	4.1	0.7405	NA	--
Hexachlorobutadiene	4.1	0.01	1	4.1	0.7405	NA	--
Hexachlorocyclopentadiene	4.1	0.01	1	4.1	0.7405	NA	--
Hexachloroethane	4.1	0.01	1	4.1	0.7405	NA	--
Indeno(1,2,3-cd)pyrene	4.1	0.01	1	4.1	0.7405	39.5	0.019
Isophorone	4.1	0.01	1	4.1	0.7405	NA	--
N-Nitroso-di-n-propylamine	4.1	0.01	1	4.1	0.7405	NA	--
N-Nitrosodiphenylamine	4.1	0.01	1	4.1	0.7405	NA	--
Naphthalene	4.1	0.01	1	4.1	0.7405	22.8	0.032
Nitrobenzene	4.1	0.01	1	4.1	0.7405	NA	--
Pentachlorophenol	9.9	0.025	1	9.9	1.7883	175	0.010
Phenanthrene	0.044	0.01	1	0.044	0.0097	39.5	0.000
Phenol	4.1	0.01	0	0	0.0394	NA	--
Pyrene	0.053	0.01	1	0.053	0.0113	39.5	0.000
Dioxins/Furans							
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.00021		1	0.00021	0.0000	NA	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0000052		1	0.0000052	0.0000	NA	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0000007		1	0.0000007	0.0000	NA	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0000035		1	0.0000035	0.0000	NA	--
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0000011		1	0.0000011	0.0000	NA	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0000073		1	0.0000073	0.0000	NA	--
1,2,3,6,7,8-Hexachlorodibenzofuran	0.00000085		1	0.00000085	0.0000	NA	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0000093		1	0.0000093	0.0000	NA	--
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0000005		1	0.0000005	0.0000	NA	--
1,2,3,7,8-Pentachlorodebenzo-p-dioxin	0.0000013		1	0.0000013	0.0000	NA	--
1,2,3,7,8-Pentachlorodibenzo furan	0.00000056		1	0.00000056	0.0000	NA	--
2,3,4,6,7,8-Hexachlorodibenzofuran	0.00000053		1	0.00000053	0.0000	NA	--
2,3,4,7,8-Pentachlorodibenzofuran	0.00000033		1	0.00000033	0.0000	NA	--
2,3,7,8-TCDD (dioxin)	0.00000043		1	0.00000043	0.0000	0.000014	0.006
2,3,7,8-Tetrachlorodibenzofuran	0.0000011		1	0.0000011	0.0000	0.00001	0.020
Total Heptachlorodibenzo-p-dioxin	0.00042		1	0.00042	0.0001	NA	--
Total Heptachlorodibenzofuran	0.000011		1	0.000011	0.0000	NA	--
Total Hexachlorodibenzo-p-dioxin	0.000075		1	0.000075	0.0000	NA	--

Table 8-9
Screening Level Exposure Doses, NOAELs, and HQs for Mourning Dove
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.100 kg
Adjusted Food Ingestion Rate	0.0171 kg-dry/day
Soil Ingestion Rate	0.00092 kg-dry/day
Surface Water Ingestion Rate	0.0180 L/day

Maximum Concentrations

Chemical	Soil Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Dose (mg/kg bw-d)	NOAEL (mg/kg bw-d)	NOAEL HQ_n
Total Hexachlorodibenzofuran	0.000022		1	0.000022	0.0000	NA	--
Total Octachlorodibenzo-p-dioxin	0.0049		1	0.0049	0.0009	NA	--
Total Octachlorodibenzofuran	0.0000054		1	0.0000054	0.0000	NA	--
Total Pentachlorodibenzo-p-dioxin	0.000012		1	0.000012	0.0000	NA	--
Total Pentachlorodibenzofuran	0.000015		0	0	0.0000	NA	--
Total Tetrachlorodibenzo-p-dioxin	0.0000015		0	0	0.0000	NA	--
Total Tetrachlorodibenzofuran	0.0000064		0	0	0.0000	NA	--

NA- not available
BAF - Bioaccumulation Factor
Shaded cells indicate that the chemical is considered a COPC

Table 8-10
Screening Level Exposure Doses, NOAELs, and HQs for Killdeer
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.0880 kg
Adjusted Food Ingestion Rate	0.0113 kg-dry/day
Sediment Ingestion Rate	0.0024900 kg-dry/day
Surface Water Ingestion Rate	0.0134 L/day

Maximum Concentrations

Chemical	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	NOAEL (mg/kg bw-d)	NOAEL HQ_n
TAL Metals/Cyanide							
Aluminum	8640	0.781	1	8640.0	1358.2	109.7	12.38
Antimony	1.3	0.0049	1	1.3	0.2	NA	--
Arsenic	1.1	0.003	0.329	0.4	0.1	5.14	0.02
Barium	31	0.007	1	31.0	4.9	208	0.02
Beryllium	0.03	0.0001	1	0.0	0.0	NA	--
Cadmium	2.8	0.0013	2.822	7.9	1.1	1.45	0.76
Calcium	76700	8.22	1	76700.0	12057.0	NA	--
Chromium	11.6	0.0012	1.15	13.3	2.0	1	2.05
Cobalt	0.58	0.00074	1	0.6	0.1	1.4664	0.06
Copper	12.6	0.0066	2.424	30.5	4.3	47	0.09
Cyanide	2.9	0.0012	1	2.9	0.5	NA	--
Iron	3340	0.242	1	3340.0	525.0	NA	--
Lead	32.6	0.0017	0.276	9.0	2.1	1.13	1.84
Magnesium	1050	0.746	1	1050.0	165.2	NA	--
Manganese	16.4	0.0383	1	16.4	2.6	977	0.00
Mercury	0.07	0.00012	1.422	0.1	0.0	0.0064	2.32
Nickel	3.6	0.0021	0.857	3.1	0.5	77.4	0.01
Potassium	160	1.56	1	160.0	25.4	NA	--
Selenium	0.91	0.0031	1	0.9	0.1	0.4	0.36
Silver	0.2	0.0007	1	0.2	0.0	NA	--
Sodium	59.7	5.63	1	59.7	10.2	NA	--
Thallium	1	0.0035	1	1.0	0.2	NA	--
Vanadium	12.4	0.0026	1	12.4	1.9	11.4	0.17
Zinc	70.4	0.0342	3.092	217.7	30.1	14.5	2.07
TCL Pesticides/PCBs							
4,4'-DDD	0.0062	0.0000066	1	0.0062	0.0010	0.52	0.00
4,4'-DDE	0.0016	0.000027	1	0.0016	0.0003	0.131	0.00
4,4'-DDT	0.011	0.000011	1	0.011	0.0017	0.104	0.02
Aldrin	0.0045	0.000003	1	0.0045	0.0007	0.5	0.00
alpha-BHC	0.0045	0.000052	1	0.0045	0.0007	0.563	0.00
alpha-Chlordane	0.036	0.000052	1	0.036	0.0057	2.14	0.00
Aroclor-1016	0.091	0.001	1	0.091	0.0145	NA	--
Aroclor-1221	0.18	0.0021	1	0.18	0.0286	972	0.00
Aroclor-1232	0.091	0.001	1	0.091	0.0145	405	0.00
Aroclor-1242	0.091	0.001	1	0.091	0.0145	0.41	0.04
Aroclor-1248	0.091	0.0016	1	0.091	0.0145	390	0.00
Aroclor-1254	0.091	0.001	1	0.091	0.0145	0.18	0.08
Aroclor-1260	0.091	0.001	1	0.091	0.0145	1.778	0.01
beta-BHC	0.0045	0.000052	1	0.0045	0.0007	0.563	0.00
delta-BHC	0.0045	0.000052	1	0.0045	0.0007	0.563	0.00
Dieldrin	0.0007	0.000015	1	0.0007	0.0001	0.077	0.00
Endosulfan I	0.0045	0.000052	1	0.0045	0.0007	10	0.00
Endosulfan II	0.0091	0.0001	1	0.0091	0.0014	10	0.00
Endosulfan sulfate	0.0012	0.0001	1	0.0012	0.0002	10	0.00
Endrin	0.0091	0.0001	1	0.0091	0.0014	0.3	0.00
Endrin aldehyde	0.0091	0.0001	1	0.0091	0.0014	0.3	0.00
Endrin ketone	0.0091	0.0001	1	0.0091	0.0014	0.3	0.00
gamma-BHC (Lindane)	0.0045	0.0000029	1	0.0045	0.0007	2	0.00
gamma-Chlordane	0.031	0.000052	1	0.031	0.0049	2.14	0.00
Heptachlor	0.0045	0.00005	1	0.0045	0.0007	0.405	0.00
Heptachlor epoxide	0.0026	0.000052	1	0.0026	0.0004	0.23	0.00
Methoxychlor	0.045	0.00052	1	0.045	0.0072	405	0.00
Toxaphene	0.45	0.0052	0	0	0.0135	0.307	0.04
TCL Semivolatiles							
1,2,4-Trichlorobenzene	0.49	0.01	1	0.49	0.0785	NA	--
1,2-Dichlorobenzene	0.49	0.01	1	0.49	0.0785	250	0.000
1,3-Dichlorobenzene	0.49	0.01	1	0.49	0.0785	250	0.000
1,4-Dichlorobenzene	0.49	0.01	1	0.49	0.0785	250	0.000
2,2'-oxybis(1-Chloropropane)	0.49	0.01	1	0.49	0.0785	NA	--
2,4,5-Trichlorophenol	1.2	0.025	1	1.2	0.1924	NA	--
2,4,6-Trichlorophenol	0.49	0.01	1	0.49	0.0785	NA	--
2,4-Dichlorophenol	0.49	0.01	1	0.49	0.0785	NA	--
2,4-Dimethylphenol	0.49	0.01	1	0.49	0.0785	NA	--
2,4-Dinitrophenol	1.2	0.025	1	1.2	0.1924	NA	--
2,4-Dinitrotoluene	0.49	0.01	1	0.49	0.0785	NA	--
2,6-Dinitrotoluene	0.49	0.01	1	0.49	0.0785	NA	--
2-Chloronaphthalene	0.49	0.01	1	0.49	0.0785	NA	--
2-Chlorophenol	0.49	0.01	1	0.49	0.0785	NA	--
2-Methylnaphthalene	0.49	0.01	1	0.49	0.0785	NA	--
2-Methylphenol	0.49	0.01	1	0.49	0.0785	NA	--
2-Nitroaniline	1.2	0.025	1	1.2	0.1924	NA	--

Table 8-10
Screening Level Exposure Doses, NOAELs, and HQs for Killdeer
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.0880 kg
Adjusted Food Ingestion Rate	0.0113 kg-dry/day
Sediment Ingestion Rate	0.0024900 kg-dry/day
Surface Water Ingestion Rate	0.0134 L/day

Maximum Concentrations

Chemical	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	NOAEL (mg/kg bw-d)	NOAEL HQ_n
2-Nitrophenol	0.49	0.01	1	0.49	0.0785	NA	--
3,3'-Dichlorobenzidine	0.49	0.01	1	0.49	0.0785	NA	--
3-Nitroaniline	1.2	0.025	1	1.2	0.1924	NA	--
4,6-Dinitro-2-methylphenol	1.2	0.025	1	1.2	0.1924	NA	--
4-Bromophenyl-phenylether	0.49	0.01	1	0.49	0.0785	NA	--
4-Chloro-3-methylphenol	0.49	0.01	1	0.49	0.0785	NA	--
4-Chloroaniline	0.49	0.01	1	0.49	0.0785	NA	--
4-Chlorophenyl-phenylether	0.49	0.01	1	0.49	0.0785	NA	--
4-Methylphenol	0.49	0.01	1	0.49	0.0785	NA	--
4-Nitroaniline	1.2	0.025	1	1.2	0.1924	NA	--
4-Nitrophenol	1.2	0.025	1	1.2	0.1924	5.77	0.033
Acenaphthene	0.49	0.01	1	0.49	0.0785	39.5	0.002
Acenaphthylene	0.49	0.01	1	0.49	0.0785	39.5	0.002
Anthracene	0.49	0.01	1	0.49	0.0785	22.8	0.003
Benzo(a)anthracene	0.49	0.01	1	0.49	0.0785	39.5	0.002
Benzo(a)pyrene	0.49	0.01	1	0.49	0.0785	39.5	0.002
Benzo(b)fluoranthene	0.49	0.01	1	0.49	0.0785	39.5	0.002
Benzo(g,h,i)perylene	0.49	0.01	1	0.49	0.0785	39.5	0.002
Benzo(k)fluoranthene	0.49	0.01	1	0.49	0.0785	39.5	0.002
bis(2-Chloroethoxy)methane	0.49	0.01	1	0.49	0.0785	NA	--
bis(2-Chloroethyl)ether	0.49	0.01	1	0.49	0.0785	NA	--
bis-(2-Ethylhexyl)phthalate	1.1	0.01	1	1.1	0.1744	10	0.017
Butylbenzylphthalate	0.49	0.01	1	0.49	0.0785	NA	--
Carbazole	0.49	0.01	1	0.49	0.0785	NA	--
Chrysene	0.49	0.01	1	0.49	0.0785	39.5	0.002
Di-n-butylphthalate	0.05	0.01	1	0.05	0.0094	0.11	0.085
Di-n-octyl phthalate	0.49	0.01	1	0.49	0.0785	290	0.000
Dibenz(a,h)anthracene	0.49	0.01	1	0.49	0.0785	39.5	0.002
Dibenzofuran	0.49	0.01	1	0.49	0.0785	NA	--
Diethylphthalate	0.49	0.01	1	0.49	0.0785	NA	--
Dimethyl phthalate	0.49	0.01	1	0.49	0.0785	NA	--
Fluoranthene	0.49	0.01	1	0.49	0.0785	39.5	0.002
Fluorene	0.49	0.01	1	0.49	0.0785	39.5	0.002
Hexachlorobenzene	0.49	0.01	1	0.49	0.0785	NA	--
Hexachlorobutadiene	0.49	0.01	1	0.49	0.0785	NA	--
Hexachlorocyclopentadiene	0.49	0.01	1	0.49	0.0785	NA	--
Hexachloroethane	0.49	0.01	1	0.49	0.0785	NA	--
Indeno(1,2,3-cd)pyrene	0.49	0.01	1	0.49	0.0785	39.5	0.002
Isophorone	0.49	0.01	1	0.49	0.0785	NA	--
N-Nitroso-di-n-propylamine	0.49	0.01	1	0.49	0.0785	NA	--
N-Nitrosodiphenylamine	0.49	0.01	1	0.49	0.0785	NA	--
Naphthalene	0.49	0.01	1	0.49	0.0785	22.8	0.003
Nitrobenzene	0.49	0.01	1	0.49	0.0785	NA	--
Pentachlorophenol	1.2	0.025	1	1.2	0.1924	175	0.001
Phenanthrene	0.49	0.01	1	0.49	0.0785	39.5	0.002
Phenol	0.49	0.01	0	0	0.0154	NA	--
Pyrene	0.49	0.01	1	0.49	0.0785	39.5	0.002

NA- not available
BAF - Bioaccumulation Factor
Shaded cells indicate that the chemical is considered a COPC

Table 8-11
Screening Level Exposure Doses, NOAELs, and HQs for American Kestrel
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.103 kg
Adjusted Food Ingestion Rate	0.010 kg-dry/day
Soil Ingestion Rate	0.00029 kg-dry/day
Surface Water Ingestion Rate	0.0157 L/day

Maximum Concentrations

Chemical	Soil Concentration (mg/kg)	Surface Water Concentration (mg/L)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Vertebrate BAF	Vertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	NOAEL (mg/kg bw-d)	NOAEL HQ_n
TAL Metals/Cyanide									
Aluminum	21600	0.781	1	21600.0	1	21600.000	2157	109.7	19.67
Antimony	14.5	0.0049	1	14.5	1	14.500	1.449	NA	--
Arsenic	2.3	0.003	0.329	0.8	0.0063	0.014	0.042	5.1	0.01
Barium	49.4	0.007	1	49.4	0.0696	3.438	2.570	208.0	0.01
Beryllium	0.08	0.0001	1	0.1	1	0.080	0.008	NA	--
Cadmium	12.1	0.0013	2.822	34.1	1.9902	24.081	2.831	1.5	1.95
Calcium	85800	8.22	1	85800.0	1	85800.000	8570	NA	--
Chromium	40.9	0.0012	1.15	47.0	0.1382	5.652	2.551	1.0	2.55
Cobalt	0.5	0.00074	1	0.5	0.0371	0.019	0.025	1.5	0.02
Copper	667	0.0066	2.424	1616.8	0.42	280.140	90.051	47.0	1.92
Cyanide	2.5	0.0012	1	2.5	1	2.500	0.250	NA	--
Iron	6920	0.242	1	6920.0	0.0137	94.804	339.964	NA	--
Lead	705	0.0017	0.276	194.6	0.1615	113.858	16.702	1.1	14.78
Magnesium	1810	0.746	1	1810.0	1	1810.000	180.885	NA	--
Manganese	97.7	0.0383	1	97.7	1	97.700	9.764	977.0	0.01
Mercury	0.3	0.00012	1.422	0.4	0.1244	0.037	0.022	0.0	8.46
Nickel	21.6	0.0021	0.857	18.5	0.2799	6.046	1.216	77.4	0.02
Potassium	370	1.56	1	370.0	1	370.000	37.191	NA	--
Selenium	1	0.0031	1	1.0	1	1.000	0.100	0.4	0.25
Silver	0.87	0.0007	1	0.9	1	0.870	0.087	NA	--
Sodium	93.9	5.63	1	93.9	1	93.900	10.236	NA	--
Thallium	0.88	0.0035	1	0.9	0.1124	0.099	0.048	NA	--
Vanadium	20.8	0.0026	1	20.8	1	20.800	2.078	11.4	0.18
Zinc	569	0.0342	3.092	1759.3	1.3352	759.729	120.964	14.5	8.34
TCL Pesticides/PCBs									
4,4'-DDD	0.0061	0.0000066	1	0.0061	1	0.0061	0.0006	0.5	0.00
4,4'-DDE	0.0037	0.000027	1	0.0037	1	0.0037	0.0004	0.1	0.00
4,4'-DDT	0.013	0.000011	1	0.013	1	0.013	0.0013	0.1	0.01
Aldrin	0.01	0.000003	1	0.01	1	0.01	0.0010	0.5	0.00
alpha-BHC	0.00033	0.000052	1	0.00033	1	0.00033	0.0000	0.6	0.00
alpha-Chlordane	0.051	0.000052	1	0.051	1	0.051	0.0051	2.1	0.00
Aroclor-1016	0.21	0.001	1	0.21	1	0.21	0.0211	NA	--
Aroclor-1221	0.42	0.0021	1	0.42	1	0.42	0.0423	972.0	0.00
Aroclor-1232	0.21	0.001	1	0.21	1	0.21	0.0211	405.0	0.00
Aroclor-1242	0.21	0.001	1	0.21	1	0.21	0.0211	0.4	0.05
Aroclor-1248	0.21	0.0016	1	0.21	1	0.21	0.0212	390.0	0.00
Aroclor-1254	0.21	0.001	1	0.21	1	0.21	0.0211	0.2	0.12
Aroclor-1260	0.45	0.001	1	0.45	1	0.45	0.0451	1.8	0.03
beta-BHC	0.01	0.000052	1	0.01	1	0.01	0.0010	0.6	0.00

Table 8-11
Screening Level Exposure Doses, NOAELs, and HQs for American Kestrel
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.103 kg
Adjusted Food Ingestion Rate	0.010 kg-dry/day
Soil Ingestion Rate	0.00029 kg-dry/day
Surface Water Ingestion Rate	0.0157 L/day

Maximum Concentrations

	Soil Concentration	Surface Water Concentration	Invertebrate BAF	Invertebrate Concentration	Vertebrate BAF	Vertebrate Concentration	Dose	NOAEL	NOAEL
delta-BHC	0.00018	0.000052	1	0.00018	1	0.00018	0.0000	0.6	0.00
Dieldrin	0.016	0.000015	1	0.016	1	0.016	0.0016	0.1	0.02
Endosulfan I	0.0015	0.000052	1	0.0015	1	0.0015	0.0002	10.0	0.00
Endosulfan II	0.021	0.0001	1	0.021	1	0.021	0.0021	10.0	0.00
Endosulfan sulfate	0.015	0.0001	1	0.015	1	0.015	0.0015	10.0	0.00
Endrin	0.0048	0.0001	1	0.0048	1	0.0048	0.0005	0.3	0.00
Endrin aldehyde	0.0037	0.0001	1	0.0037	1	0.0037	0.0004	0.3	0.00
Endrin ketone	0.0035	0.0001	1	0.0035	1	0.0035	0.0004	0.3	0.00
gamma-BHC (Lindane)	0.00015	0.0000029	1	0.00015	1	0.00015	0.0000	2.0	0.00
gamma-Chlordane	0.053	0.000052	1	0.053	1	0.053	0.0053	2.1	0.00
Heptachlor	0.00053	0.00005	1	0.00053	1	0.00053	0.0001	0.4	0.00
Heptachlor epoxide	0.012	0.000052	1	0.012	1	0.012	0.0012	0.2	0.01
Methoxychlor	0.1	0.00052	1	0.1	1	0.1	0.0101	405.0	0.00
Toxaphene	1	0.0052	0	0	0	0	0.0036	0.3	0.01
TCL Semivolatiles									
1,2,4-Trichlorobenzene	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
1,2-Dichlorobenzene	4.1	0.01	1	4.1	1	4.1	0.4110	250.0	0.00
1,3-Dichlorobenzene	4.1	0.01	1	4.1	1	4.1	0.4110	250.0	0.00
1,4-Dichlorobenzene	4.1	0.01	1	4.1	1	4.1	0.4110	250.0	0.00
2,2'-oxybis(1-Chloropropane)	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
2,4,5-Trichlorophenol	9.9	0.025	1	9.9	1	9.9	0.9926	NA	--
2,4,6-Trichlorophenol	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
2,4-Dichlorophenol	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
2,4-Dimethylphenol	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
2,4-Dinitrophenol	9.9	0.025	1	9.9	1	9.9	0.9926	NA	--
2,4-Dinitrotoluene	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
2,6-Dinitrotoluene	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
2-Chloronaphthalene	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
2-Chlorophenol	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
2-Methylnaphthalene	0.044	0.01	1	0.044	1	0.044	0.0059	NA	--
2-Methylphenol	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
2-Nitroaniline	9.9	0.025	1	9.9	1	9.9	0.9926	NA	--
2-Nitrophenol	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
3,3'-Dichlorobenzidine	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
3-Nitroaniline	9.9	0.025	1	9.9	1	9.9	0.9926	NA	--
4,6-Dinitro-2-methylphenol	9.9	0.025	1	9.9	1	9.9	0.9926	NA	--
4-Bromophenyl-phenylether	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
4-Chloro-3-methylphenol	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
4-Chloroaniline	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
4-Chlorophenyl-phenylether	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
4-Methylphenol	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--

Table 8-11
Screening Level Exposure Doses, NOAELs, and HQs for American Kestrel
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.103 kg
Adjusted Food Ingestion Rate	0.010 kg-dry/day
Soil Ingestion Rate	0.00029 kg-dry/day
Surface Water Ingestion Rate	0.0157 L/day

Maximum Concentrations

	Soil Concentration	Surface Water Concentration	Invertebrate BAF	Invertebrate Concentration	Vertebrate BAF	Vertebrate Concentration	Dose	NOAEL	NOAEL
4-Nitroaniline	9.9	0.025	1	9.9	1	9.9	0.9926	NA	--
4-Nitrophenol	9.9	0.025	1	9.9	1	9.9	0.9926	5.8	0.17
Acenaphthene	4.1	0.01	1	4.1	1	4.1	0.4110	39.5	0.01
Acenaphthylene	4.1	0.01	1	4.1	1	4.1	0.4110	39.5	0.01
Anthracene	4.1	0.01	1	4.1	1	4.1	0.4110	22.8	0.02
Benzo(a)anthracene	4.1	0.01	1	4.1	1	4.1	0.4110	39.5	0.01
Benzo(a)pyrene	4.1	0.01	1	4.1	1	4.1	0.4110	39.5	0.01
Benzo(b)fluoranthene	0.047	0.01	1	0.047	1	0.047	0.0062	39.5	0.00
Benzo(g,h,i)perylene	0.047	0.01	1	0.047	1	0.047	0.0062	39.5	0.00
Benzo(k)fluoranthene	4.1	0.01	1	4.1	1	4.1	0.4110	39.5	0.01
bis(2-Chloroethoxy)methane	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
bis(2-Chloroethyl)ether	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
bis-(2-Ethylhexyl)phthalate	0.47	0.01	1	0.47	1	0.47	0.0485	10.0	0.00
Butylbenzylphthalate	0.049	0.01	1	0.049	1	0.049	0.0064	NA	--
Carbazole	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
Chrysene	0.039	0.01	1	0.039	1	0.039	0.0054	39.5	0.00
Di-n-butylphthalate	0.043	0.01	1	0.043	1	0.043	0.0058	0.1	0.05
Di-n-octyl phthalate	4.1	0.01	1	4.1	1	4.1	0.4110	290.0	0.00
Dibenz(a,h)anthracene	4.1	0.01	1	4.1	1	4.1	0.4110	39.5	0.01
Dibenzofuran	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
Diethylphthalate	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
Dimethyl phthalate	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
Fluoranthene	0.053	0.01	1	0.053	1	0.053	0.0068	39.5	0.00
Fluorene	4.1	0.01	1	4.1	1	4.1	0.4110	39.5	0.01
Hexachlorobenzene	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
Hexachlorobutadiene	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
Hexachlorocyclopentadiene	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
Hexachloroethane	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
Indeno(1,2,3-cd)pyrene	4.1	0.01	1	4.1	1	4.1	0.4110	39.5	0.01
Isophorone	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
N-Nitroso-di-n-propylamine	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
N-Nitrosodiphenylamine	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
Naphthalene	4.1	0.01	1	4.1	1	4.1	0.4110	22.8	0.02
Nitrobenzene	4.1	0.01	1	4.1	1	4.1	0.4110	NA	--
Pentachlorophenol	9.9	0.025	1	9.9	1	9.9	0.9926	175.0	0.01
Phenanthrene	0.044	0.01	1	0.044	1	0.044	0.0059	39.5	0.00
Phenol	4.1	0.01	1	4.1	0	0	0.2000	NA	--
Pyrene	0.053	0.01	0	0	1	0.053	0.0044	39.5	0.00
Dioxins/Furans									
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.00021		1	0.00021	1	0.00021	0.0000	NA	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0000052		1	0.0000052	1	0.0000052	0.0000	NA	--

Table 8-11
Screening Level Exposure Doses, NOAELs, and HQs for American Kestrel
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.103 kg
Adjusted Food Ingestion Rate	0.010 kg-dry/day
Soil Ingestion Rate	0.00029 kg-dry/day
Surface Water Ingestion Rate	0.0157 L/day

Maximum Concentrations

	Soil Concentration	Surface Water Concentration	Invertebrate BAF	Invertebrate Concentration	Vertebrate BAF	Vertebrate Concentration	Dose	NOAEL	NOAEL
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0000007		1	0.0000007	1	0.0000007	0.0000	NA	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0000035		1	0.0000035	1	0.0000035	0.0000	NA	--
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0000011		1	0.0000011	1	0.0000011	0.0000	NA	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0000073		1	0.0000073	1	0.0000073	0.0000	NA	--
1,2,3,6,7,8-Hexachlorodibenzofuran	0.00000085		1	0.00000085	1	0.00000085	0.0000	NA	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0000093		1	0.0000093	1	0.0000093	0.0000	NA	--
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0000005		1	0.0000005	1	0.0000005	0.0000	NA	--
1,2,3,7,8-Pentachlorodebenzo-p-dioxin	0.0000013		1	0.0000013	1	0.0000013	0.0000	NA	--
1,2,3,7,8-Pentachlorodibenzo furan	0.00000056		1	0.00000056	1	0.00000056	0.0000	NA	--
2,3,4,6,7,8-Hexachlorodibenzofuran	0.00000053		1	0.00000053	1	0.00000053	0.0000	NA	--
2,3,4,7,8-Pentachlorodibenzofuran	0.00000033		1	0.00000033	1	0.00000033	0.0000	NA	--
2,3,7,8-TCDD (dioxin)	0.00000043		1	0.00000043	1	0.00000043	0.0000	0.0	0.00
2,3,7,8-Tetrachlorodibenzofuran	0.0000011		1	0.0000011	1	0.0000011	0.0000	0.0	0.01
Total Heptachlorodibenzo-p-dioxin	0.00042		1	0.00042	1	0.00042	0.0000	NA	--
Total Heptachlorodibenzofuran	0.000011		1	0.000011	1	0.000011	0.0000	NA	--
Total Hexachlorodibenzo-p-dioxin	0.000075		1	0.000075	1	0.000075	0.0000	NA	--
Total Hexachlorodibenzofuran	0.000022		1	0.000022	1	0.000022	0.0000	NA	--
Total Octachlorodibenzo-p-dioxin	0.0049		1	0.0049	1	0.0049	0.0005	NA	--
Total Octachlorodibenzofuran	0.0000054		1	0.0000054	1	0.0000054	0.0000	NA	--
Total Pentachlorodibenzo-p-dioxin	0.000012		1	0.000012	1	0.000012	0.0000	NA	--
Total Pentachlorodibenzofuran	0.000015		0	0	0	0	0.0000	NA	--
Total Tetrachlorodibenzo-p-dioxin	0.0000015		0	0	0	0	0.0000	NA	--
Total Tetrachlorodibenzofuran	0.0000064		0	0.000	0	0	0.0000	NA	--

NA- not available
BAF - Bioaccumulation Factor
Shaded cells indicate that the chemical is considered a COPC

Table 8-12
Screening Level Exposure Doses, NOAELs, and HQs for Eastern Harvest Mouse
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.006 kg
Adjusted Food Ingestion Rate	0.00279 kg-dry/day
Soil/Sediment Ingestion Rate	0.000068600 kg-dry/day
Surface Water Ingestion Rate	0.0023 L/day

Maximum Concentrations

Chemical	Soil Concentration (mg/kg)	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	RTV (NOAEL) (mg/kg bw-d)	NOAEL HQ_n
TAL Metals/Cyanide										
Aluminum	21600	8640	0.781	1	15120.0	1	15120.0	7208.1	1.9	3734.75
Antimony	14.5	1.3	0.0049	1	7.9	1	7.9	3.8	0.1	30.14
Arsenic	2.3	1.1	0.003	0.454	0.8	0.329	0.6	0.4	0.1	2.97
Barium	49.4	31	0.007	1	40.2	1	40.2	19.2	5.1	3.76
Beryllium	0.08	0.03	0.0001	1	0.1	1	0.1	0.0	0.7	0.04
Cadmium	12.1	2.8	0.0013	1.359	10.1	2.822	21.0	5.0	1.0	5.05
Calcium	85800	76700	8.22	1	81250.0	1	81250.0	38735.3	NA	--
Chromium	40.9	11.6	0.0012	1	26.3	1.15	30.2	12.6	13.1	0.96
Cobalt	0.5	0.58	0.00074	1	0.5	1	0.5	0.3	5.0	0.05
Copper	667	12.6	0.0066	0.341	115.9	2.424	823.7	74.3	11.7	6.35
Cyanide	2.5	2.9	0.0012	1	2.7	1	2.7	1.3	68.7	0.02
Iron	6920	3340	0.242	1	5130.0	1	5130.0	2445.6	3.2	766.64
Lead	705	32.6	0.0017	0.245	90.4	0.276	101.8	46.5	8.0	5.82
Magnesium	1810	1050	0.746	1	1430.0	1	1430.0	682.0	NA	--
Manganese	97.7	16.4	0.0383	1	57.1	1	57.1	27.2	88.0	0.31
Mercury	0.3	0.07	0.00012	1.481	0.3	1.422	0.3	0.1	0.0	4.04
Nickel	21.6	3.6	0.0021	0.75	9.5	0.857	10.8	4.6	40.0	0.11
Potassium	370	160	1.56	1	265.0	1	265.0	126.9	NA	--
Selenium	1	0.91	0.0031	1	1.0	1	1.0	0.5	0.2	2.28
Silver	0.87	0.2	0.0007	1	0.5	1	0.5	0.3	181.2	0.00
Sodium	93.9	59.7	5.63	1	76.8	1	76.8	38.8	NA	--
Thallium	0.88	1	0.0035	1	0.9	1	0.9	0.4	0.1	6.07
Vanadium	20.8	12.4	0.0026	1	16.6	1	16.6	7.9	0.2	37.69
Zinc	569	70.4	0.0342	1.021	326.4	3.092	988.5	170.9	160.0	1.07
TCL Pesticides/PCBs										
4,4'-DDD	0.0061	0.0062	0.0000066	1	0.00615	1	0.00615	0.0029	8.5	0.00
4,4'-DDE	0.0037	0.0016	0.000027	1	0.00265	1	0.00265	0.0013	1.9	0.00
4,4'-DDT	0.013	0.011	0.000011	1	0.012	1	0.012	0.0057	0.8	0.01
Aldrin	0.01	0.0045	0.000003	1	0.00725	1	0.00725	0.0035	0.2	0.02
alpha-BHC	0.00033	0.0045	0.000052	1	0.002415	1	0.002415	0.0012	1.6	0.00
alpha-Chlordane	0.051	0.036	0.000052	1	0.0435	1	0.0435	0.0208	4.6	0.00
Aroclor-1016	0.21	0.091	0.001	1	0.1505	1	0.1505	0.0721	1.4	0.05
Aroclor-1221	0.42	0.18	0.0021	1	0.3	1	0.3	0.1438	NA	--
Aroclor-1232	0.21	0.091	0.001	1	0.1505	1	0.1505	0.0721	NA	--
Aroclor-1242	0.21	0.091	0.001	1	0.1505	1	0.1505	0.0721	0.1	1.05
Aroclor-1248	0.21	0.091	0.0016	1	0.1505	1	0.1505	0.0724	1.3	0.06
Aroclor-1254	0.21	0.091	0.001	1	0.1505	1	0.1505	0.0721	0.1	0.53
Aroclor-1260	0.45	0.091	0.001	1	0.2705	1	0.2705	0.1293	0.3	0.37
beta-BHC	0.01	0.0045	0.000052	1	0.00725	1	0.00725	0.0035	4.0	0.00
delta-BHC	0.00018	0.0045	0.000052	1	0.00234	1	0.00234	0.0011	1.6	0.00

Table 8-12
Screening Level Exposure Doses, NOAELs, and HQs for Eastern Harvest Mouse
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.006 kg
Adjusted Food Ingestion Rate	0.00279 kg-dry/day
Soil/Sediment Ingestion Rate	0.000068600 kg-dry/day
Surface Water Ingestion Rate	0.0023 L/day

Maximum Concentrations

Chemical	Soil Concentration (mg/kg)	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	RTV (NOAEL) (mg/kg bw-d)	NOAEL HQ_n
Dieldrin	0.016	0.0007	0.000015	1	0.00835	1	0.00835	0.0040	0.0	0.20
Endosulfan I	0.0015	0.0045	0.000052	1	0.003	1	0.003	0.0015	1.5	0.00
Endosulfan II	0.021	0.0091	0.0001	1	0.01505	1	0.01505	0.0072	1.5	0.00
Endosulfan sulfate	0.015	0.0012	0.0001	1	0.0081	1	0.0081	0.0039	0.1	0.04
Endrin	0.0048	0.0091	0.0001	1	0.00695	1	0.00695	0.0034	0.1	0.04
Endrin aldehyde	0.0037	0.0091	0.0001	1	0.0064	1	0.0064	0.0031	0.1	0.03
Endrin ketone	0.0035	0.0091	0.0001	1	0.0063	1	0.0063	0.0030	0.1	0.03
gamma-BHC (Lindane)	0.00015	0.0045	0.0000029	1	0.002325	1	0.002325	0.0011	8.0	0.00
gamma-Chlordane	0.053	0.031	0.000052	1	0.042	1	0.042	0.0200	4.6	0.00
Heptachlor	0.00053	0.0045	0.00005	1	0.002515	1	0.002515	0.0012	0.1	0.01
Heptachlor epoxide	0.012	0.0026	0.000052	1	0.0073	1	0.0073	0.0035	0.1	0.03
Methoxychlor	0.1	0.045	0.00052	1	0.0725	1	0.0725	0.0348	4.0	0.01
Toxaphene	1	0.45	0.0052	0	0	0	0	0.0103	8.0	0.00
TCL Semivolatiles										
1,2,4-Trichlorobenzene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	8.0	0.14
1,2-Dichlorobenzene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
1,3-Dichlorobenzene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
1,4-Dichlorobenzene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	250.0	0.00
2,2'-oxybis(1-Chloropropane)	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
2,4,5-Trichlorophenol	9.9	1.2	0.025	1	5.55	1	5.55	2.6553	80.0	0.03
2,4,6-Trichlorophenol	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	80.0	0.01
2,4-Dichlorophenol	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	440.0	0.00
2,4-Dimethylphenol	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	50.0	0.02
2,4-Dinitrophenol	9.9	1.2	0.025	1	5.55	1	5.55	2.6553	50.0	0.05
2,4-Dinitrotoluene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	3.9	0.28
2,6-Dinitrotoluene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	7.0	0.16
2-Chloronaphthalene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
2-Chlorophenol	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	4.0	0.27
2-Methylnaphthalene	0.044	0.49	0.01	1	0.267	1	0.267	0.1311	143.7	0.00
2-Methylphenol	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
2-Nitroaniline	9.9	1.2	0.025	1	5.55	1	5.55	2.6553	NA	--
2-Nitrophenol	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
3,3'-Dichlorobenzidine	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
3-Nitroaniline	9.9	1.2	0.025	1	5.55	1	5.55	2.6553	NA	--
4,6-Dinitro-2-methylphenol	9.9	1.2	0.025	1	5.55	1	5.55	2.6553	NA	--
4-Bromophenyl-phenylether	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
4-Chloro-3-methylphenol	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
4-Chloroaniline	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
4-Chlorophenyl-phenylether	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
4-Methylphenol	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
4-Nitroaniline	9.9	1.2	0.025	1	5.55	1	5.55	2.6553	NA	--

Table 8-12
Screening Level Exposure Doses, NOAELs, and HQs for Eastern Harvest Mouse
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.006 kg
Adjusted Food Ingestion Rate	0.00279 kg-dry/day
Soil/Sediment Ingestion Rate	0.000068600 kg-dry/day
Surface Water Ingestion Rate	0.0023 L/day

Maximum Concentrations

Chemical	Soil Concentration (mg/kg)	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	RTV (NOAEL) (mg/kg bw-d)	NOAEL HQ_n
4-Nitrophenol	9.9	1.2	0.025	1	5.55	1	5.55	2.6553	12.5	0.21
Acenaphthene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	350.0	0.00
Acenaphthylene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	133.3	0.01
Anthracene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	1000.0	0.00
Benzo(a)anthracene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	1.3	0.84
Benzo(a)pyrene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	1.3	0.84
Benzo(b)fluoranthene	0.047	0.49	0.01	1	0.2685	1	0.2685	0.1318	1.3	0.10
Benzo(g,h,i)perylene	0.047	0.49	0.01	1	0.2685	1	0.2685	0.1318	133.3	0.00
Benzo(k)fluoranthene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	1.3	0.84
bis(2-Chloroethoxy)methane	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
bis(2-Chloroethyl)ether	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	2.5	0.44
bis-(2-Ethylhexyl)phthalate	0.47	1.1	0.01	1	0.785	1	0.785	0.3780	18.3	0.02
Butylbenzylphthalate	0.049	0.49	0.01	1	0.2695	1	0.2695	0.1323	240.0	0.00
Carbazole	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	133.3	0.01
Chrysene	0.039	0.49	0.01	1	0.2645	1	0.2645	0.1299	1.3	0.10
Di-n-butylphthalate	0.043	0.05	0.01	1	0.0465	1	0.0465	0.0260	550.0	0.00
Di-n-octyl phthalate	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	55.0	0.02
Dibenz(a,h)anthracene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	1.3	0.84
Dibenzofuran	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	133.3	0.01
Diethylphthalate	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	4583.0	0.00
Dimethyl phthalate	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
Fluoranthene	0.053	0.49	0.01	1	0.2715	1	0.2715	0.1333	125.0	0.00
Fluorene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	125.0	0.01
Hexachlorobenzene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
Hexachlorobutadiene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	19.0	0.06
Hexachlorocyclopentadiene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
Hexachloroethane	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
Indeno(1,2,3-cd)pyrene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	1.3	0.84
Isophorone	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	25.0	0.04
N-Nitroso-di-n-propylamine	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	0.1	17.43
N-Nitrosodiphenylamine	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	150.0	0.01
Naphthalene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	140.0	0.01
Nitrobenzene	4.1	0.49	0.01	1	2.295	1	2.295	1.0979	NA	--
Pentachlorophenol	9.9	1.2	0.025	1	5.55	1	5.55	2.6553	0.2	11.06
Phenanthrene	0.044	0.49	0.01	1	0.267	1	0.267	0.1311	133.3	0.00
Phenol	4.1	0.49	0.01	0	0	0	0	0.0301	60.0	0.00
Pyrene	0.053	0.49	0.01	1	0.2715	1	0.2715	0.1333	133.3	0.00
Dioxin/Furans										
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.00021			1	0.00021	1	0.00021	0.0001	NA	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0000052			1	0.0000052	1	0.0000052	0.0000	NA	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0000007			1	0.0000007	1	0.0000007	0.0000	NA	--

Table 8-12
Screening Level Exposure Doses, NOAELs, and HQs for Eastern Harvest Mouse
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.006 kg
Adjusted Food Ingestion Rate	0.00279 kg-dry/day
Soil/Sediment Ingestion Rate	0.000068600 kg-dry/day
Surface Water Ingestion Rate	0.0023 L/day

Maximum Concentrations

Chemical	Soil Concentration (mg/kg)	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	RTV (NOAEL) (mg/kg bw-d)	NOAEL HQ_n
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0000035			1	0.0000035	1	0.0000035	0.0000	NA	--
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0000011			1	0.0000011	1	0.0000011	0.0000	NA	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0000073			1	0.0000073	1	0.0000073	0.0000	NA	--
1,2,3,6,7,8-Hexachlorodibenzofuran	0.00000085			1	0.00000085	1	0.00000085	0.0000	0.001600	0.00
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0000093			1	0.0000093	1	0.0000093	0.0000	NA	--
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0000005			1	0.0000005	1	0.0000005	0.0000	NA	--
1,2,3,7,8-Pentachlorodebenzo-p-dioxin	0.0000013			1	0.0000013	1	0.0000013	0.0000	NA	--
1,2,3,7,8-Pentachlorodibenzo furan	0.00000056			1	0.00000056	1	0.00000056	0.0000	0.001600	0.00
2,3,4,6,7,8-Hexachlorodibenzofuran	0.00000053			1	0.00000053	1	0.00000053	0.0000	NA	--
2,3,4,7,8-Pentachlorodibenzofuran	0.00000033			1	0.00000033	1	0.00000033	0.0000	0.000160	0.00
2,3,7,8-TCDD (dioxin)	0.00000043			1	0.00000043	1	0.00000043	0.0000	0.000001	0.20
2,3,7,8-Tetrachlorodibenzofuran	0.0000011			1	0.0000011	1	0.0000011	0.0000	NA	--
Total Heptachlorodibenzo-p-dioxin	0.00042			1	0.00042	1	0.00042	0.0002	NA	--
Total Heptachlorodibenzofuran	0.000011			1	0.000011	1	0.000011	0.0000	NA	--
Total Hexachlorodibenzo-p-dioxin	0.000075			1	0.000075	1	0.000075	0.0000	NA	--
Total Hexachlorodibenzofuran	0.000022			1	0.000022	1	0.000022	0.0000	NA	--
Total Octachlorodibenzo-p-dioxin	0.0049			1	0.0049	1	0.0049	0.0023	NA	--
Total Octachlorodibenzofuran	0.0000054			1	0.0000054	1	0.0000054	0.0000	NA	--
Total Pentachlorodibenzo-p-dioxin	0.000012			1	0.000012	1	0.000012	0.0000	NA	--
Total Pentachlorodibenzofuran	0.000015			0	0	0	0	0.0000	NA	--
Total Tetrachlorodibenzo-p-dioxin	0.0000015			0	0	0	0	0.0000	NA	--
Total Tetrachlorodibenzofuran	0.0000064			0	0	0	0	0.0000	NA	--

NA- not available
BAF - Bioaccumulation Factor
Shaded cells indicate that the chemical is considered a COPC

Table 8-13
Screening Level Exposure Doses, NOAELs, and HQs for Gray Fox
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	2.500 kg
Adjusted Food Ingestion Rate	0.251 kg-dry/day
Soil/Sediment Ingestion Rate	0.00722 kg-dry/day
Surface Water Ingestion Rate	0.4214 L/day

Maximum Concentrations

Chemical	Soil Concentration (mg/kg)	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Vertebrate BAF	Vertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	RTV (NOAEL) (mg/kg bw-d)	NOAEL HQ_n
TAL Metals/Cyanide												
Aluminum	21600	8640	0.781	1	15120.0	1	15120.0	1	15120.0	1591.3	1.9	824.51
Antimony	14.5	1.3	0.0049	1	7.9	1	7.9	1	14.5	1.2	0.1	9.98
Arsenic	2.3	1.1	0.003	0.454	0.8	0.329	0.6	0.0063	0.0	0.0	0.1	0.30
Barium	49.4	31	0.007	1	40.2	1	40.2	0.0696	3.4	1.9	5.1	0.38
Beryllium	0.08	0.03	0.0001	1	0.1	1	0.1	1	0.1	0.0	0.7	0.01
Cadmium	12.1	2.8	0.0013	1.359	10.1	2.822	21.0	1.9902	24.1	2.0	1.0	1.99
Calcium	85800	76700	8.22	1	81250.0	1	81250.0	1	85800.0	8791.0	NA	--
Chromium	40.9	11.6	0.0012	1	26.3	1.15	30.2	0.1382	5.7	1.5	13.1	0.11
Cobalt	0.5	0.58	0.00074	1	0.5	1	0.5	0.0371	0.0	0.0	5.0	0.00
Copper	667	12.6	0.0066	0.341	115.9	2.424	823.7	0.42	280.1	28.0	11.7	2.40
Cyanide	2.5	2.9	0.0012	1	2.7	1	2.7	1	2.5	0.3	68.7	0.00
Iron	6920	3340	0.242	1	5130.0	1	5130.0	0.0137	94.8	226.2	3.2	70.92
Lead	705	32.6	0.0017	0.245	90.4	0.276	101.8	0.1615	113.9	12.7	8.0	1.58
Magnesium	1810	1050	0.746	1	1430.0	1	1430.0	1	1810.0	173.9	NA	--
Manganese	97.7	16.4	0.0383	1	57.1	1	57.1	1	97.7	8.6	88.0	0.10
Mercury	0.3	0.07	0.00012	1.481	0.3	1.422	0.3	0.1244	0.0	0.0	0.0	0.43
Nickel	21.6	3.6	0.0021	0.75	9.5	0.857	10.8	0.2799	6.0	0.8	40.0	0.02
Potassium	370	160	1.56	1	265.0	1	265.0	1	370.0	34.7	NA	--
Selenium	1	0.91	0.0031	1	1.0	1	1.0	1	1.0	0.1	0.2	0.52
Silver	0.87	0.2	0.0007	1	0.5	1	0.5	1	0.9	0.1	181.2	0.00
Sodium	93.9	59.7	5.63	1	76.8	1	76.8	1	93.9	10.1	NA	--
Thallium	0.88	1	0.0035	1	0.9	1	0.9	0.1124	0.1	0.0	0.1	0.63
Vanadium	20.8	12.4	0.0026	1	16.6	1	16.6	1	20.8	2.0	0.2	9.54
Zinc	569	70.4	0.0342	1.021	326.4	3.092	988.5	1.3352	759.7	65.4	160.0	0.41
TCL Pesticides/PCBs												
4,4'-DDD	0.0061	0.0062	0.0000066	1	0.00615	1	0.00615	1	0.0061	0.0006	8.5	0.00
4,4'-DDE	0.0037	0.0016	0.000027	1	0.00265	1	0.00265	1	0.0037	0.0003	1.9	0.00
4,4'-DDT	0.013	0.011	0.000011	1	0.012	1	0.012	1	0.013	0.0013	0.8	0.00
Aldrin	0.01	0.0045	0.000003	1	0.00725	1	0.00725	1	0.01	0.0009	0.2	0.00
alpha-BHC	0.00033	0.0045	0.000052	1	0.002415	1	0.002415	1	0.00033	0.0001	1.6	0.00
alpha-Chlordane	0.051	0.036	0.000052	1	0.0435	1	0.0435	1	0.051	0.0050	4.6	0.00
Aroclor-1016	0.21	0.091	0.001	1	0.1505	1	0.1505	1	0.21	0.0197	1.4	0.01
Aroclor-1221	0.42	0.18	0.0021	1	0.3	1	0.3	1	0.42	0.0394	NA	--
Aroclor-1232	0.21	0.091	0.001	1	0.1505	1	0.1505	1	0.21	0.0197	NA	--
Aroclor-1242	0.21	0.091	0.001	1	0.1505	1	0.1505	1	0.21	0.0197	0.1	0.29
Aroclor-1248	0.21	0.091	0.0016	1	0.1505	1	0.1505	1	0.21	0.0198	1.3	0.02
Aroclor-1254	0.21	0.091	0.001	1	0.1505	1	0.1505	1	0.21	0.0197	0.1	0.14
Aroclor-1260	0.45	0.091	0.001	1	0.2705	1	0.2705	1	0.45	0.0399	0.3	0.12
beta-BHC	0.01	0.0045	0.000052	1	0.00725	1	0.00725	1	0.01	0.0009	4.0	0.00
delta-BHC	0.00018	0.0045	0.000052	1	0.00234	1	0.00234	1	0.00018	0.0001	1.6	0.00

Table 8-13
Screening Level Exposure Doses, NOAELs, and HQs for Gray Fox
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	2.500 kg
Adjusted Food Ingestion Rate	0.251 kg-dry/day
Soil/Sediment Ingestion Rate	0.00722 kg-dry/day
Surface Water Ingestion Rate	0.4214 L/day

Maximum Concentrations

Chemical	Soil Concentration (mg/kg)	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Vertebrate BAF	Vertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	RTV (NOAEL) (mg/kg bw-d)	NOAEL HQ_n
Dieldrin	0.016	0.0007	0.000015	1	0.00835	1	0.00835	1	0.016	0.0014	0.0	0.07
Endosulfan I	0.0015	0.0045	0.000052	1	0.003	1	0.003	1	0.0015	0.0002	1.5	0.00
Endosulfan II	0.021	0.0091	0.0001	1	0.01505	1	0.01505	1	0.021	0.0020	1.5	0.00
Endosulfan sulfate	0.015	0.0012	0.0001	1	0.0081	1	0.0081	1	0.015	0.0013	0.1	0.01
Endrin	0.0048	0.0091	0.0001	1	0.00695	1	0.00695	1	0.0048	0.0006	0.1	0.01
Endrin aldehyde	0.0037	0.0091	0.0001	1	0.0064	1	0.0064	1	0.0037	0.0005	0.1	0.01
Endrin ketone	0.0035	0.0091	0.0001	1	0.0063	1	0.0063	1	0.0035	0.0005	0.1	0.01
gamma-BHC (Lindane)	0.00015	0.0045	0.0000029	1	0.002325	1	0.002325	1	0.00015	0.0001	8.0	0.00
gamma-Chlordane	0.053	0.031	0.000052	1	0.042	1	0.042	1	0.053	0.0051	4.6	0.00
Heptachlor	0.00053	0.0045	0.00005	1	0.002515	1	0.002515	1	0.00053	0.0001	0.1	0.00
Heptachlor epoxide	0.012	0.0026	0.000052	1	0.0073	1	0.0073	1	0.012	0.0011	0.1	0.01
Methoxychlor	0.1	0.045	0.00052	1	0.0725	1	0.0725	1	0.1	0.0094	4.0	0.00
Toxaphene	1	0.45	0.0052	0	0	0	0	0	0	0.0044	8.0	0.00
TCL Semivolatiles												
1,2,4-Trichlorobenzene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	8.0	0.04
1,2-Dichlorobenzene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
1,3-Dichlorobenzene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
1,4-Dichlorobenzene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	250.0	0.00
2,2'-oxybis(1-Chloropropane)	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
2,4,5-Trichlorophenol	9.9	1.2	0.025	1	5.55	1	5.55	1	9.9	0.8616	80.0	0.01
2,4,6-Trichlorophenol	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	80.0	0.00
2,4-Dichlorophenol	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	440.0	0.00
2,4-Dimethylphenol	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	50.0	0.01
2,4-Dinitrophenol	9.9	1.2	0.025	1	5.55	1	5.55	1	9.9	0.8616	50.0	0.02
2,4-Dinitrotoluene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	3.9	0.09
2,6-Dinitrotoluene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	7.0	0.05
2-Chloronaphthalene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
2-Chlorophenol	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	4.0	0.09
2-Methylnaphthalene	0.044	0.49	0.01	1	0.267	1	0.267	1	0.044	0.0154	143.7	0.00
2-Methylphenol	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
2-Nitroaniline	9.9	1.2	0.025	1	5.55	1	5.55	1	9.9	0.8616	NA	--
2-Nitrophenol	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
3,3'-Dichlorobenzidine	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
3-Nitroaniline	9.9	1.2	0.025	1	5.55	1	5.55	1	9.9	0.8616	NA	--
4,6-Dinitro-2-methylphenol	9.9	1.2	0.025	1	5.55	1	5.55	1	9.9	0.8616	NA	--
4-Bromophenyl-phenylether	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
4-Chloro-3-methylphenol	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
4-Chloroaniline	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
4-Chlorophenyl-phenylether	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
4-Methylphenol	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
4-Nitroaniline	9.9	1.2	0.025	1	5.55	1	5.55	1	9.9	0.8616	NA	--

Table 8-13
Screening Level Exposure Doses, NOAELs, and HQs for Gray Fox
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	2.500 kg
Adjusted Food Ingestion Rate	0.251 kg-dry/day
Soil/Sediment Ingestion Rate	0.00722 kg-dry/day
Surface Water Ingestion Rate	0.4214 L/day

Maximum Concentrations

Chemical	Soil Concentration (mg/kg)	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Vertebrate BAF	Vertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	RTV (NOAEL) (mg/kg bw-d)	NOAEL HQ_n
4-Nitrophenol	9.9	1.2	0.025	1	5.55	1	5.55	1	9.9	0.8616	12.5	0.07
Acenaphthene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	350.0	0.00
Acenaphthylene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	133.3	0.00
Anthracene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	1000.0	0.00
Benzo(a)anthracene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	1.3	0.27
Benzo(a)pyrene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	1.3	0.27
Benzo(b)fluoranthene	0.047	0.49	0.01	1	0.2685	1	0.2685	1	0.047	0.0157	1.3	0.01
Benzo(g,h,i)perylene	0.047	0.49	0.01	1	0.2685	1	0.2685	1	0.047	0.0157	133.3	0.00
Benzo(k)fluoranthene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	1.3	0.27
bis(2-Chloroethoxy)methane	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
bis(2-Chloroethyl)ether	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	2.5	0.14
bis-(2-Ethylhexyl)phthalate	0.47	1.1	0.01	1	0.785	1	0.785	1	0.47	0.0638	18.3	0.00
Butylbenzylphthalate	0.049	0.49	0.01	1	0.2695	1	0.2695	1	0.049	0.0159	240.0	0.00
Carbazole	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	133.3	0.00
Chrysene	0.039	0.49	0.01	1	0.2645	1	0.2645	1	0.039	0.0150	1.3	0.01
Di-n-butylphthalate	0.043	0.05	0.01	1	0.0465	1	0.0465	1	0.043	0.0063	550.0	0.00
Di-n-octyl phthalate	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	55.0	0.01
Dibenz(a,h)anthracene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	1.3	0.27
Dibenzofuran	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	133.3	0.00
Diethylphthalate	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	4583.0	0.00
Dimethyl phthalate	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
Fluoranthene	0.053	0.49	0.01	1	0.2715	1	0.2715	1	0.053	0.0162	125.0	0.00
Fluorene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	125.0	0.00
Hexachlorobenzene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
Hexachlorobutadiene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	19.0	0.02
Hexachlorocyclopentadiene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
Hexachloroethane	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
Indeno(1,2,3-cd)pyrene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	1.3	0.27
Isophorone	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	25.0	0.01
N-Nitroso-di-n-propylamine	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	0.1	5.66
N-Nitrosodiphenylamine	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	150.0	0.00
Naphthalene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	140.0	0.00
Nitrobenzene	4.1	0.49	0.01	1	2.295	1	2.295	1	4.1	0.3566	NA	--
Pentachlorophenol	9.9	1.2	0.025	1	5.55	1	5.55	1	9.9	0.8616	0.2	3.59
Phenanthrene	0.044	0.49	0.01	1	0.267	1	0.267	1	0.044	0.0154	133.3	0.00
Phenol	4.1	0.49	0.01	0	0	0	0	0	0	0.0142	60.0	0.00
Pyrene	0.053	0.49	0.01	1	0.2715	1	0.2715	1	0.053	0.0162	133.3	0.00
Dioxins/Furans												
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxir	0.00021			1	0.00021	1	0.00021	1	0.00021	0.0000	NA	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0000052			1	0.0000052	1	0.0000052	1	0.0000052	0.0000	NA	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0000007			1	0.0000007	1	0.0000007	1	0.0000007	0.0000	NA	--

Table 8-13
Screening Level Exposure Doses, NOAELs, and HQs for Gray Fox
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	2.500 kg
Adjusted Food Ingestion Rate	0.251 kg-dry/day
Soil/Sediment Ingestion Rate	0.00722 kg-dry/day
Surface Water Ingestion Rate	0.4214 L/day

Maximum Concentrations

Chemical	Soil Concentration (mg/kg)	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Vertebrate BAF	Vertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	RTV (NOAEL) (mg/kg bw-d)	NOAEL HQ_n
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0000035			1	0.0000035	1	0.0000035	1	0.0000035	0.0000	NA	--
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0000011			1	0.0000011	1	0.0000011	1	0.0000011	0.0000	NA	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0000073			1	0.0000073	1	0.0000073	1	0.0000073	0.0000	NA	--
1,2,3,6,7,8-Hexachlorodibenzofuran	0.00000085			1	0.00000085	1	0.00000085	1	0.00000085	0.0000	0.001600	0.00
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0000093			1	0.0000093	1	0.0000093	1	0.0000093	0.0000	NA	--
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0000005			1	0.0000005	1	0.0000005	1	0.0000005	0.0000	NA	--
1,2,3,7,8-Pentachlorodebenzo-p-dioxin	0.0000013			1	0.0000013	1	0.0000013	1	0.0000013	0.0000	NA	--
1,2,3,7,8-Pentachlorodibenzo furan	0.00000056			1	0.00000056	1	0.00000056	1	0.00000056	0.0000	0.001600	0.00
2,3,4,6,7,8-Hexachlorodibenzofuran	0.00000053			1	0.00000053	1	0.00000053	1	0.00000053	0.0000	NA	--
2,3,4,7,8-Pentachlorodibenzofuran	0.00000033			1	0.00000033	1	0.00000033	1	0.00000033	0.0000	0.000160	0.00
2,3,7,8-TCDD (dioxin)	0.00000043			1	0.00000043	1	0.00000043	1	0.00000043	0.0000	0.000001	0.04
2,3,7,8-Tetrachlorodibenzofuran	0.0000011			1	0.0000011	1	0.0000011	1	0.0000011	0.0000	NA	--
Total Heptachlorodibenzo-p-dioxin	0.00042			1	0.00042	1	0.00042	1	0.00042	0.0000	NA	--
Total Heptachlorodibenzofuran	0.000011			1	0.000011	1	0.000011	1	0.000011	0.0000	NA	--
Total Hexachlorodibenzo-p-dioxin	0.000075			1	0.000075	1	0.000075	1	0.000075	0.0000	NA	--
Total Hexachlorodibenzofuran	0.000022			1	0.000022	1	0.000022	1	0.000022	0.0000	NA	--
Total Octachlorodibenzo-p-dioxin	0.0049			1	0.0049	1	0.0049	1	0.0049	0.0005	NA	--
Total Octachlorodibenzofuran	0.0000054			1	0.0000054	1	0.0000054	1	0.0000054	0.0000	NA	--
Total Pentachlorodibenzo-p-dioxin	0.000012			1	0.000012	1	0.000012	1	0.000012	0.0000	NA	--
Total Pentachlorodibenzofuran	0.000015			0	0	0	0	0	0	0.0000	NA	--
Total Tetrachlorodibenzo-p-dioxin	0.0000015			0	0	0	0	0	0	0.0000	NA	--
Total Tetrachlorodibenzofuran	0.0000064			0	0	0	0	0	0	0.0000	NA	--

NA- not available
BAF - Bioaccumulation Factor
Shaded cells indicate that the chemical is considered a COPC.

Table 8-14
Baseline Media-Specific Screening for Soil
OU5, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/kg)			Frequency of Detection	Average Concentration (ug/kg)[a]	Screening Concentration (ug/kg)	Screening Concentration Reference	Screening HQ (average)	Maximum Concentration (ug/kg)[a]	Soil Background Concentration (ug/kg)[b]	Ratio of Maximum Concentration to Background[b]
TAL Metals/Cyanide											
Aluminum	4100	-	4800	14/14	8366400	50000	1	167.3	21600000	10160000	2.1
Antimony	470	-	550	8/14	1896	3500	1	0.5	14500	NA	NA
Cadmium	40	-	50	14/14	4662	1600	1	2.9	12100	1120	10.8
Calcium	2000	-	2300	14/14		NA	NA	NA	85800000		
Chromium	130	-	150	14/14	19020.0	400	1	47.6	40900	16960	2.4
Copper	130	-	150	14/14	166100.0	40000	1	4.2	667000	3760	177.4
Cyanide	2100	-	2500	0/14	385.7	900	1	0.4	2500	620	4.0
Iron	2200	-	2600	14/14	3412400	200000	1	17.1	6920000	5960000	1.2
Lead	280	-	330	14/14	95300	50000	1	1.9	705000	10520	67.0
Manganese	40	-	50	14/14	165300	100000	1	1.7	97700	16720	5.8
Mercury (inorganic)	40	-	40	14/14	71.4	100	1	0.7	300	128	2.3
Potassium	7200	-	8400	14/14		NA	NA	NA	370000		
Selenium	670	-	780	2/14	455.7	810	1	0.6	1000	560	1.8
Sodium	19100	-	22400	8/14		NA	NA	NA	93900		
Vanadium	110	-	130	14/14	12836	2000	1	6.4	20800	19160	1.1
Zinc	880	-	1000	14/14	170850.0	50000	1	3.4	569000	11320	50.3
TCL Pesticides/PCBs											
4,4'-DDD	3.6	-	21	6/13	2.8585	2.5	1	1.1	6.1		
4,4'-DDE	3.6	-	20	10/13	1.3269	2.5	1	0.5	3.7		
4,4'-DDT	3.6	-	20	7/13	3.3808	2.5	1	1.4	13		
Aldrin	1.8	-	10	0/13	1.5692	2.5	1	0.6	10		
Aroclor-1016[c]	36	-	210	0/13	32.423	20	1	1.6	210		
Aroclor-1221[c]	73	-	420	0/13	64.3075	20	1	3.2	420		
Aroclor-1232[c]	36	-	210	0/13	32.423	20	1	1.6	210		
Aroclor-1242[c]	36	-	210	0/13	32.423	20	1	1.6	210		
Aroclor-1248[c]	36	-	210	0/13	32.423	20	1	1.6	210		
Aroclor-1254[c]	36	-	210	0/13	32.423	20	1	1.6	210		
Aroclor-1260[c]	36	-	210	6/13	91.88	20	1	4.6	450		
beta-BHC	1.8	-	10	0/13	1.5923	1	1	1.6	10		
Dieldrin	3.6	-	21	5/13	4.375	0.5	1	8.8	16		
Endosulfan I	1.8	-	10	1/13		NA	NA	NA	1.5		
Endosulfan II	3.6	-	21	0/13		NA	NA	NA	21		
Endosulfan sulfate	3.6	-	18	12/13		NA	NA	NA	15		
Endrin	3.6	-	21	6/13	3.155	1	1	3.2	4.8		
Endrin aldehyde[d]	3.6	-	21	2/13	2.8308	1	1	2.8	3.7		
Endrin ketone[d]	3.6	-	21	1/13	2.8308	1	1	2.8	3.5		
gamma-BHC (Lindane)	1.8	-	10	1/13	1.438	0.05	1	28.8	0.15		
Methoxychlor	18	-	100	0/13	15.192	100	2	0.2	100		
Toxaphene	180	-	1000	0/13		NA	NA	NA	1000		
TCL Semivolatiles											
1,2,4-Trichlorobenzene[e]	360	-	4100	0/13	393.08	10	1	39.3	4100		
1,2-Dichlorobenzene[f]	360	-	4100	0/13	393.08	10	1	39.3	4100		
1,3-Dichlorobenzene[f]	360	-	4100	0/13	393.08	10	1	39.3	4100		
1,4-Dichlorobenzene[f]	360	-	4100	0/13	393.08	10	1	39.3	4100		
2,2'-Oxybis(1-chloropropane)	360	-	4100	0/13		NA	NA	NA	4100		
2,4,5-Trichlorophenol	870	-	9900	0/13	948.46	4000	1	0.2	9900		
2,4-Dimethylphenol[h]	360	-	4100	0/13	393.08	100	2	3.9	4100		
2,4-Dinitrophenol	870	-	9900	0/13		20000	1	0.0	9900		
2,4-Dinitrotoluene	360	-	4100	0/13		NA	NA	NA	4100		
2,6-Dinitrotoluene	360	-	4100	0/13		NA	NA	NA	4100		
2-Chloronaphthalene[f]	360	-	4100	0/13	393.08	1000	1	0.4	4100		
2-Chlorophenol	360	-	4100	0/13	393.08	10	1	39.3	4100		
2-Methylnaphthalene	360	-	4100	1/13		NA	NA	NA	44		
2-Methylphenol	360	-	4100	0/13	393.08	100	2	3.9	4100		
2-Nitroaniline	870	-	9900	0/13		NA	NA	NA	9900		
3,3'-Dichlorobenzidine	360	-	4100	0/13		NA	NA	NA	4100		
3-Nitroaniline	870	-	9900	0/13		NA	NA	NA	9900		
4,6-Dinitro-2-methylphenol	870	-	9900	0/13		NA	NA	NA	9900		
4-Bromophenyl-phenylether	360	-	4100	0/13		NA	NA	NA	4100		
4-Chloro-3-methylphenol	360	-	4100	0/13		NA	NA	NA	4100		
4-Chloroaniline	360	-	4100	0/13		NA	NA	NA	4100		
4-Chlorophenyl-phenylether	360	-	4100	0/13		NA	NA	NA	4100		
4-Methylphenol	360	-	4100	0/13	393.08	100	2	3.9	4100		
4-Nitroaniline	870	-	9900	0/13		NA	NA	NA	9900		
Acenaphthylene	360	-	4100	0/13	393.08	100	2	3.9	4100		
Anthracene	360	-	4100	0/13	393.08	100	1	3.9	4100		
Benzo(a)anthracene[h]	360	-	4100	0/13	393.08	100	1	3.9	4100		
Benzo(a)pyrene	360	-	4100	0/13	393.08	100	1	3.9	4100		
Benzo(k)fluoranthene[h]	360	-	4100	0/13	393.08	100	1	3.9	4100		
bis(2-Chloroethoxy)methane	360	-	4100	0/13		NA	NA	NA	4100		
bis(2-Chloroethyl)ether	360	-	4100	0/13		NA	NA	NA	4100		
bis(2-Ethylhexyl)phthalate[f]	360	-	4100	10/13	238.46	100	1	2.4	470		
Carbazole	360	-	4100	0/13		NA	NA	NA	4100		
Di-n-octyl phthalate	360	-	4100	0/13		NA	NA	NA	4100		
Dibenz(a,h)anthracene	360	-	4100	0/13	393.08	100	1	3.9	4100		
Dibenzofuran	360	-	4100	0/13		NA	NA	NA	4100		
Fluorene[h]	360	-	4100	0/13	393.08	100	1	3.9	4100		

Table 8-14
Baseline Media-Specific Screening for Soil
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/kg)			Frequency of Detection	Average Concentration (ug/kg)[a]	Screening Concentration (ug/kg)	Screening Concentration Reference	Screening HQ (average)	Maximum Concentration (ug/kg)[o]	Soil Background Concentration (ug/kg)[n]	Ratio of Maximum Concentration to Background[n]
Hexachlorobenzene	360	-	4100	0/13	393.08	2.5	1	157.2	4100		
Hexachlorobutadiene	360	-	4100	0/13		NA	NA	NA	4100		
Hexachloroethane	360	-	4100	0/13		NA	NA	NA	4100		
Indeno(1,2,3-cd)pyrene[k]	360	-	4100	0/13	393.08	100	NA	3.9	4100		
Isophorone	360	-	4100	0/13		NA	NA	NA	4100		
n-Nitroso-di-n-propylamine	360	-	4100	0/13		NA	NA	NA	4100		
Naphthalene	360	-	4100	0/13	393.08	100	1	3.9	4100		
Pentachlorophenol	870	-	9900	0/13	393.08	2	1	196.5	9900		
Phenol	360	-	4100	0/13	393.08	50	1	7.9	4100		
TCL Volatiles											
1,1,2,2-Tetrachloroethane	9.5	-	13	0/14		NA	NA	NA	13		
1,1-Dichloroethene	9.5	-	13	0/14		NA	NA	NA	13		
1,2-Dichloroethene (total)	9.5	-	13	0/14		NA	NA	NA	13		
2-Butanone	9.5	-	13	0/14		NA	NA	NA	13		
2-Hexanone	9.5	-	13	0/14		NA	NA	NA	13		
4-Methyl-2-pentanone	9.5	-	13	0/14		NA	NA	NA	13		
Acetone	9.5	-	13	0/14		NA	NA	NA	13		
Bromoform	9.5	-	13	0/14		NA	NA	NA	13		
Bromomethane	9.5	-	13	0/14		NA	NA	NA	13		
Carbon disulfide	9.5	-	13	0/14		NA	NA	NA	13		
Chloroethane	9.5	-	13	0/14		NA	NA	NA	13		
Chloromethane	9.5	-	13	0/14		NA	NA	NA	13		
cis-1,3-Dichloropropene	9.5	-	13	0/14		NA	NA	NA	13		
Dibromochloromethane	9.5	-	13	0/14		NA	NA	NA	13		
trans-1,3-Dichloropropene	9.5	-	13	0/14		NA	NA	NA	13		
Trichloroethene	9.5	-	13	0/14	5.225	1	1	5.2	13		
Dioxin/Furans			pg/g		pg/g	pg/g			pg/g		
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	5.7	-	5.7	1/1		NA	NA	NA	210		
1,2,3,4,6,7,8-Heptachlorodibenzofuran	5.7	-	5.7	1/1		NA	NA	NA	5.2		
1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.7	-	5.7	1/1		NA	NA	NA	0.7		
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	5.7	-	5.7	1/1		NA	NA	NA	3.5		
1,2,3,4,7,8-Hexachlorodibenzofuran	5.7	-	5.7	1/1		NA	NA	NA	1.1		
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	5.7	-	5.7	1/1		NA	NA	NA	7.3		
1,2,3,6,7,8-Hexachlorodibenzofuran	5.7	-	5.7	1/1		NA	NA	NA	0.85		
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	5.7	-	5.7	1/1		NA	NA	NA	9.3		
1,2,3,7,8,9-Hexachlorodibenzofuran	0.5	-	0.5	0/1		NA	NA	NA	0.5		
1,2,3,7,8-Pentachlorodebenzo-p-dioxin	5.7	-	5.7	1/1		NA	NA	NA	1.3		
1,2,3,7,8-Pentachlorodibenzo furan	0.56	-	0.56	0/1		NA	NA	NA	0.56		
2,3,4,6,7,8-Hexachlorodibenzofuran	5.7	-	5.7	1/1		NA	NA	NA	0.53		
2,3,4,7,8-Pentachlorodibenzofuran	5.7	-	5.7	1/1		NA	NA	NA	0.33		
2,3,7,8-Tetrachlorodibenzofuran	1.1	-	1.1	0/1		NA	NA	NA	1.1		
Total Heptachlorodibenzo-p-dioxin	5.7	-	5.7	1/1		NA	NA	NA	420		
Total Heptachlorodibenzofuran	5.7	-	5.7	1/1		NA	NA	NA	11		
Total Hexachlorodibenzo-p-dioxin	5.7	-	5.7	1/1		NA	NA	NA	75		
Total Hexachlorodibenzofuran	5.7	-	5.7	1/1		NA	NA	NA	22		
Total Octachlorodibenzo-p-dioxin	11	-	11	1/1		NA	NA	NA	4900		
Total Octachlorodibenzofuran	11	-	11	1/1		NA	NA	NA	5.4		
Total Pentachlorodibenzo-p-dioxin	5.7	-	5.7	1/1		NA	NA	NA	12		
Total Pentachlorodibenzofuran	5.7	-	5.7	1/1		NA	NA	NA	15		
Total Tetrachlorodibenzo-p-dioxin	1.1	-	1.1	1/1		NA	NA	NA	1.5		
Total Tetrachlorodibenzofuran	1.1	-	1.1	1/1		NA	NA	NA	6.4		

HQ - hazard quotient
NA - not applicable/not available
Shaded cells contain HQs in excess of 1.
a. If the contaminant was not detected, value is the average of 1/2 the detection limit.
b. Screening value for chlordane.
c. Screening value for total PCBs.
d. Screening value for endrin.
e. Screening value for trichlorobenzene.
f. Screening value for dichlorobenzene.
g. Screening value for dichlorophenols (total).
h. Screening value for 2-methylphenol and 4-methylphenol.
i. Screening value for chloronaphthalene.
j. Screening value for 4-nitrophenol.
k. Screening value for benzo(a)pyrene.
l. Screening value phthalates (total).
m. Screening value for trichloroethane.
n. Twice the average background soil concentration for MCAS Cherry Point (Tetra Tech/NUS 1999).
o. If the contaminant was not detected, value is the maximum detection limit.

1. Region 4 screening values (USEPA, 1999)
2. Region 3 BTAG screening levels (USEPA, 1995)

Table 8-15
Baseline Media-Specific Screening for Sediment
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/kg)			Frequency of Detection	Average Concentration (ug/kg) [a]	Screening Concentration (ug/kg)	Screening Concentration Reference	Screening HQ (average)	Supplemental Screening Concentration (ug/kg)[g]	Supplemental Screening HQ (average)	Maximum Concentration (ug/kg)[i]	Soil Background Concentration (ug/kg)[h]	Ratio of Maximum Concentration to Background[h]
TAL Metals/Cyanide													
Aluminum	5000	–	5700	3/3	5346667	NA	NA	NA	NA	NA	8640000	10160000	0.9
Barium	50	–	60	3/3		NA	NA	NA			31000		
Beryllium	20	–	30	0/3		NA	NA	NA			30		
Cadmium	50	–	60	2/3	1330	1000	1	1.3	NA	NA	2800	1120	2.5
Calcium	2400	–	2700	3/3		NA	NA	NA			76700000		
Cobalt	130	–	150	1/3		NA	NA	NA			580		
Cyanide	2.6	–	2.9	0/3	1367	NA	NA	NA			2900	620	4.7
Iron	2700	–	3100	3/3	2476670	NA	NA	NA	2000000	1.2	3340000	5960000	0.6
Magnesium	2400	–	2800	3/3	123770	NA	NA	NA			1050000	42200	24.9
Manganese	50	–	60	3/3	11500	NA	NA	NA	460000	0.0	16400	16720	1.0
Potassium	8700	–	9900	3/3		NA	NA	NA			160000		
Selenium	840	–	910	0/3	425	NA	NA	NA	NA	NA	910	560	1.6
Sodium	23100	–	26300	2/3		NA	NA	NA			59700		
Thallium	910	–	1000	0/3	477	NA	NA	NA	NA	NA	1000	960	1.0
Vanadium	130	–	150	3/3	8367	NA	NA	NA	NA	NA	12400	19160	0.6
Zinc	1100	–	1200	3/3	38983	124000	1	0.3	NA	NA	70400	11320	6.2
TCL Pesticides/PCBs													
4,4'-DDD	4.3	–	9.1	1/3	4.567	3.3	1	1.4			6.2		
4,4'-DDT	4.3	–	9	3/3	4.667	3.3	1	1.4			11		
Aldrin	2.2	–	4.5	0/3	1.517	NA	NA	NA	2	0.8	4.5		
alpha-BHC	2.2	–	4.5	0/3	1.517	NA	NA	NA	6	0.3	4.5		
alpha-Chlordane [b]	2.2	–	4.6	2/3	13.717	1.7	1	8.1			36		
Aroclor-1016 [c]	43	–	91	0/3	33.833	33	1	1.0			91		
Aroclor-1221	86	–	180	0/3	60.667	67	1	0.9			180		
Aroclor-1232 [c]	43	–	91	0/3	33.833	33	1	1.0			91		
Aroclor-1242 [c]	43	–	91	0/3	33.833	33	1	1.0			91		
Aroclor-1248 [c]	43	–	91	0/3	33.833	33	1	1.0			91		
Aroclor-1254 [c]	43	–	91	0/3	33.833	33	1	1.0			91		
Aroclor-1260 [c]	43	–	91	0/3	33.833	33	1	1.0			91		
beta-BHC	2.2	–	4.5	0/3	1.517	NA	NA	NA	5	0.3	4.5	NA	NA
delta-BHC	2.2	–	4.5	0/3	1.517	NA	NA	NA	3	0.5	4.5	NA	NA
Endosulfan I	2.2	–	4.5	0/3		NA	NA	NA			4.5		
Endosulfan II	4.3	–	9.1	0/3		NA	NA	NA			9.1		
Endrin	4.3	–	9.1	0/3	3.3833	3.3	1	1.0			9.1		
Endrin aldehyde [d]	4.3	–	9.1	0/3	3.3833	3.3	1	1.0			9.1		
Endrin ketone [d]	4.3	–	9.1	0/3	3.3833	3.3	1	1.0			9.1		
gamma-BHC (Lindane)	2.2	–	4.5	0/3	1.6833	3.3	1	0.5			4.5		
gamma-Chlordane [b]	2.2	–	4.6	3/3	11.14	1.7	1	6.6			31		
Heptachlor	2.2	–	4.5	0/3	1.517	NA	NA	NA	0.3	5.1	4.5	NA	NA
Methoxychlor	22	–	45	0/3		NA	NA	NA			45		
Toxaphene	220	–	450	0/3		NA	NA	NA			450		
TCL Semivolatiles													
1,2,4-Trichlorobenzene	430	–	490	0/3	228.33	40	2	5.7			490		
1,2-Dichlorobenzene	430	–	490	0/3	228.33	35	2	6.5			490		
1,3-Dichlorobenzene	430	–	490	0/3		NA	NA	NA			490		
1,4-Dichlorobenzene	430	–	490	0/3	228.33	110	2	2.1			490		
2,2'-Oxybis(1-chloropropane)	430	–	490	0/3		NA	NA	NA			490		
2,4,5-Trichlorophenol	1000	–	1200	0/3		NA	NA	NA			1200		
2,4,6-Trichlorophenol	430	–	490	0/3		NA	NA	NA			490		

Table 8-15
Baseline Media-Specific Screening for Sediment
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/kg)			Frequency of Detection	Average Concentration (ug/kg)[a]	Screening Concentration (ug/kg)	Screening Concentration Reference	Screening HQ (average)	Supplemental Screening Concentration (ug/kg)[g]	Supplemental Screening HQ (average)	Maximum Concentration (ug/kg)[i]	Soil Background Concentration (ug/kg)[h]	Ratio of Maximum Concentration to Background[h]
2,4-Dichlorophenol	430	–	490	0/3		NA	NA	NA			490		
2,4-Dimethylphenol	430	–	490	0/3	228.33	29	2	7.8			490		
2,4-Dinitrophenol	1000	–	1200	0/3		NA	NA	NA			1200		
2,4-Dinitrotoluene	430	–	490	0/3		NA	NA	NA			490		
2,6-Dinitrotoluene	430	–	490	0/3		NA	NA	NA			490		
2-Chloronaphthalene	430	–	490	0/3		NA	NA	NA			490		
2-Chlorophenol	430	–	490	0/3		NA	NA	NA			490		
2-Methylnaphthalene	430	–	490	0/3	228.33	330	1	0.7			490		
2-Methylphenol	430	–	490	0/3	228.33	63	2	3.6			490		
2-Nitroaniline	1000	–	1200	0/3		NA	NA	NA			1200		
2-Nitrophenol	430	–	490	0/3		NA	NA	NA			490		
3,3'-Dichlorobenzidine	430	–	490	0/3		NA	NA	NA			490		
3-Nitroaniline	1000	–	1200	0/3		NA	NA	NA			1200		
4,6-Dinitro-2-methylphenol	1000	–	1200	0/3		NA	NA	NA			1200		
4-Bromophenyl-phenylether	430	–	490	0/3		NA	NA	NA			490		
4-Chloro-3-methylphenol	430	–	490	0/3		NA	NA	NA			490		
4-Chloroaniline	430	–	490	0/3		NA	NA	NA			490		
4-Chlorophenyl-phenylether	430	–	490	0/3		NA	NA	NA			490		
4-Nitroaniline	1000	–	1200	0/3		NA	NA	NA			1200		
4-Nitrophenol	1000	–	1200	0/3		NA	NA	NA			1200		
Acenaphthene	430	–	490	0/3	228.33	330	1	0.7			490		
Acenaphthylene	430	–	490	0/3	228.33	330	1	0.7			490		
Anthracene	430	–	490	0/3	228.33	330	1	0.7			490		
Benzo(a)anthracene	430	–	490	0/3	228.33	330	1	0.7			490		
Benzo(a)pyrene	430	–	490	0/3	228.33	330	1	0.7			490		
bis(2-Chloroethoxy)methane	430	–	490	0/3		NA	NA	NA			490		
bis(2-Chloroethyl)ether	430	–	490	0/3		NA	NA	NA			490		
bis(2-Ethylhexyl)phthalate	430	–	1100	0/3	360	182	1	2.0			1100		
Butylbenzylphthalate	430	–	490	0/3	228.33	63	2	3.6			490		
Carbazole	430	–	490	0/3		NA	NA	NA			490		
Chrysene	430	–	490	0/3	228.33	330	1	0.7			490		
Dibenz(a,h)anthracene	430	–	490	0/3	228.33	330	1	0.7			490		
Diethylphthalate	430	–	490	0/3	228.33	200	2	1.1			490		
Dimethyl phthalate	430	–	490	0/3	228.33	71	2	3.2			490		
Fluoranthene	430	–	490	0/3	228.33	330	1	0.7			490		
Fluorene	430	–	490	0/3	228.33	330	1	0.7			490		
Hexachlorobenzene	430	–	490	0/3	228.33	22	2	10.4			490		
Hexachlorobutadiene	430	–	490	0/3	228.33	11	2	20.6			490		
Hexachlorocyclopentadiene	430	–	490	0/3		NA	NA	NA			490		
Hexachloroethane	430	–	490	0/3		NA	NA	NA			490		
Isophorone	430	–	490	0/3		NA	NA	NA			490		
n-Nitroso-di-n-propylamine	430	–	490	0/3		NA	NA	NA			490		
n-Nitrosodiphenylamine	430	–	490	0/3	228.33	28	2	8.2			490		
Naphthalene	430	–	490	0/3	228.33	330	1	0.7			490		
Nitrobenzene	430	–	490	0/3		NA	NA	NA			490		
Pentachlorophenol	1000	–	1200	0/3	550	360	2	1.5			1200		
Phenanthrene	430	–	490	0/3	228.33	330	1	0.7			490		
Phenol	430	–	490	0/3	228.33	420	2	0.5			490		
Pyrene	430	–	490	0/3	228.33	330	1	0.7			490		

Table 8-15
Baseline Media-Specific Screening for Sediment
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/kg)			Frequency of Detection	Average Concentration (ug/kg)[a]	Screening Concentration (ug/kg)	Screening Concentration Reference	Screening HQ (average)	Supplemental Screening Concentration (ug/kg)[g]	Supplemental Screening HQ (average)	Maximum Concentration (ug/kg)[i]	Soil Background Concentration (ug/kg)[h]	Ratio of Maximum Concentration to Background[h]
TCL Volatiles													
1,1,2,2-Tetrachloroethane	13	–	13	0/3		NA	NA	NA			13		
1,1-Dichloroethane	13	–	13	0/3		NA	NA	NA			13		
1,1-Dichloroethene	13	–	13	0/3		NA	NA	NA			13		
1,2-Dibromoethane	13	–	13	0/3		NA	NA	NA			13		
1,2-Dichloroethane	13	–	13	0/3		NA	NA	NA			13		
1,2-Dichloroethene (total)	13	–	13	0/3		NA	NA	NA			13		
1,2-Dichloropropane	13	–	13	0/3		NA	NA	NA			13		
2-Butanone	13	–	13	0/3		NA	NA	NA			13		
2-Hexanone	13	–	13	0/3		NA	NA	NA			13		
4-Methyl-2-pentanone	13	–	13	0/3		NA	NA	NA			13		
Acetone	13	–	13	0/3		NA	NA	NA			13		
Benzene	13	–	13	0/3		NA	NA	NA			13		
Bromodichloromethane	13	–	13	0/3		NA	NA	NA			13		
Bromoform	13	–	13	0/3		NA	NA	NA			13		
Bromomethane	13	–	13	0/3		NA	NA	NA			13		
Carbon disulfide	13	–	13	0/3		NA	NA	NA			13		
Carbon tetrachloride	13	–	13	0/3		NA	NA	NA			13		
Chlorobenzene	13	–	13	0/3		NA	NA	NA			13		
Chloroethane	13	–	13	0/3		NA	NA	NA			13		
Chloroform	13	–	13	0/3		NA	NA	NA			13		
Chloromethane	13	–	13	0/3		NA	NA	NA			13		
cis-1,2-Dichloroethene	3.2	–	3.2	0/1		NA	NA	NA			3.2		
cis-1,3-Dichloropropene	13	–	13	0/3		NA	NA	NA			13		
Dibromochloromethane	13	–	13	0/3		NA	NA	NA			13		
Ethylbenzene	13	–	13	0/3	6.5	10	2	0.7			13		
Methylene chloride	13	–	13	0/3		NA	NA	NA			13		
Styrene	13	–	13	0/3		NA	NA	NA			13		
Toluene	13	–	13	0/3		NA	NA	NA			13		
trans-1,2-Dichloroethene	3.2	–	3.2	0/1		NA	NA	NA			3.2		
trans-1,3-Dichloropropene	13	–	13	0/3		NA	NA	NA			13		
Trichloroethene	13	–	13	0/3		NA	NA	NA			13		
Vinyl chloride	13	–	13	0/3		NA	NA	NA			13		

HQ - hazard quotient
NA - not applicable/not available
Shaded cells contain HQs in excess of 1.

a. If the contaminant was not detected, value is the average of 1/2 the detection limit.
b. Screening value for chlordane.
c. Screening value for total PCBs.
d. Screening value for endrin.
e. Screening value for high molecular weight PAHs.
f. Screening value for trichloroethane.
g. From Ontario Ministry of the Environment and Energy Lowest Effect Levels, except heptachlor is a No Effects Level (Persaud et al. 1993).
h. Twice the average background soil concentration for MCAS Cherry Point (Tetra Tech/NUS 1999).
i. If the contaminant was not detected, value is the maximum detection limit

1. Region 4 screening values (USEPA, 1999)
2. Region 3 BTAG screening levels (USEPA, 1995)

Table 8-16
Baseline Media-Specific Screening for Surface Water
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/L)			Frequency of Detection	Maximum Concentration (ug/L) [a]	Average Concentration (ug/L) [a]	Screening Concentration (ug/L)	Screening Concentration Reference	Screening HQ (average)
TAL Metals/Cyanide									
Aluminum	19.2	--	19.2	3/4	781	447	87	1	5.1
Cadmium	0.2	--	1.3	0/3	1.3	0.362	0.66	1	0.5
Calcium	13.3	--	13.3	3/3	8220		NA	NA	NA
Copper	0.6	--	7.6	1/3	6.6	3.1	6.54	1	0.5
Lead	1.3	--	1.3	1/3	1.7	1	1.32	1	0.8
Magnesium	9.4	--	846	1/3	746		NA	NA	NA
Mercury	0.1	--	0.1	2/3	0.12	0.083	0.012	1	6.9
Potassium	33.5	--	33.5	3/3	1560		NA	NA	NA
Silver	0.7	--	0.7	0/3	0.7	0.35	0.012	1	29.2
Sodium	89.1	--	89.1	3/3	5630		NA	NA	NA
TCL Pesticides/PCBs									
4,4'-DDD	0.1	--	0.1	1/3	0.0066	0.0355	0.0064	1	5.5
4,4'-DDT	0.1	--	0.1	1/3	0.011	0.037	0.001	1	37.0
alpha-Chlordane	0.05	--	0.052	0/3	0.052	0.0253	0.0043	1	5.9
Aroclor-1016	1	--	1	0/3	1	0.5	0.014	1	35.7
Aroclor-1221	2	--	2.1	0/3	2.1	1.0167	0.014	1	72.6
Aroclor-1232	1	--	1	0/3	1	0.5	0.014	1	35.7
Aroclor-1242	1	--	1	0/3	1	0.5	0.014	1	35.7
Aroclor-1248	1	--	1	1/3	1.6	0.867	0.014	1	61.9
Aroclor-1254	1	--	1	0/3	1	0.5	0.014	1	35.7
Aroclor-1260	1	--	1	0/3	1	0.5	0.014	1	35.7
Dieldrin	0.1	--	0.1	1/3	0.015	0.0383	0.0019	1	20.2
Endosulfan II	0.1	--	0.1	0/3	0.1	0.05	0.056	1	0.9
Endosulfan sulfate[b]	0.1	--	0.1	0/3	0.1	0.05	0.056	1	0.9
Endrin	0.1	--	0.1	0/3	0.1	0.05	0.0023	1	21.7
Endrin aldehyde[c]	0.1	--	0.1	0/3	0.1	0.05	0.0023	1	21.7
Endrin ketone[c]	0.1	--	0.1	0/3	0.1	0.05	0.0023	1	21.7
gamma-Chlordane[d]	0.05	--	0.052	0/3	0.052	0.0253	0.0043	1	5.9
Heptachlor	0.05	--	0.05	0/3	0.05	0.025	0.0038	1	6.6
Heptachlor epoxide	0.05	--	0.052	0/3	0.052	0.0253	0.0038	1	6.7
Methoxychlor	0.5	--	0.52	0/3	0.52	0.253	0.03	1	8.4
Toxaphene	5	--	5.2	0/3	5.2	0.253	0.0002	1	1265.0
TCL Semivolatiles									
2,2'-Oxybis(1-chloropropane)	10	--	10	0/3	10		NA	NA	NA
2,4-Dinitrophenol	25	--	25	0/3	25	12.5	6.2	1	2.0
2,6-Dinitrotoluene	10	--	10	0/3	10		NA	NA	NA
2-Methylnaphthalene	10	--	10	0/3	10		NA	NA	NA
2-Methylphenol	10	--	10	0/3	10		NA	NA	NA
2-Nitroaniline	25	--	25	0/3	25		NA	NA	NA
3,3'-Dichlorobenzidine	10	--	10	0/3	10		NA	NA	NA
3-Nitroaniline	25	--	25	0/3	25		NA	NA	NA
4,6-Dinitro-2-methylphenol	25	--	25	0/3	25	12.5	2.3	1	5.4
4-Chloro-3-methylphenol	10	--	10	0/3	10	5	0.3	1	16.7
4-Chloroaniline	10	--	10	0/3	10		NA	NA	NA
4-Chlorophenyl-phenylether	10	--	10	0/3	10		NA	NA	NA
4-Methylphenol	10	--	10	0/3	10		NA	NA	NA
4-Nitroaniline	25	--	25	0/3	25		NA	NA	NA
Acenaphthylene	10	--	10	0/3	10		NA	NA	NA
Anthracene	10	--	10	0/3	10	5	0.1	2	50.0
Benzo(a)anthracene	10	--	10	0/3	10	5	6.3	2	0.8
Benzo(a)pyrene	10	--	10	0/3	10		NA	NA	NA
Benzo(b)fluoranthene	10	--	10	0/3	10		NA	NA	NA
Benzo(g,h,i)perylene	10	--	10	0/3	10		NA	NA	NA
Benzo(k)fluoranthene	10	--	10	0/3	10		NA	NA	NA
bis(2-Chloroethoxy)methane	10	--	10	0/3	10		NA	NA	NA
bis(2-Ethylhexyl)phthalate	10	--	10	0/3	10	5	0.3	1	16.7
Carbazole	10	--	10	0/3	10		NA	NA	NA

Table 8-16
Baseline Media-Specific Screening for Surface Water
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits (ug/L)			Frequency of Detection	Maximum Concentration (ug/L) [a]	Average Concentration (ug/L) [a]	Screening Concentration (ug/L)	Screening Concentration Reference	Screening HQ (average)
Chrysene	10	--	10	0/3	10		NA	NA	NA
Di-n-butylphthalate	10	--	10	0/3	10	5	9.4	1	0.5
Di-n-octyl phthalate	10	--	10	0/3	10	5	0.3	2	16.7
Dibenz(a,h)anthracene	10	--	10	0/3	10		NA	NA	NA
Dibenzofuran	10	--	10	0/3	10		NA	NA	NA
Hexachlorobenzene	10	--	10	0/3	10	5	3.68	2	1.4
Hexachlorobutadiene	10	--	10	0/3	10	5	0.93	1	5.4
Hexachlorocyclopentadiene	10	--	10	0/3	10	5	0.07	1	71.4
Hexachloroethane	10	--	10	0/3	10	5	9.8	1	0.5
Indeno(1,2,3-cd)pyrene	10	--	10	0/3	10		NA	NA	NA
n-Nitroso-di-n-propylamine	10	--	10	0/3	10		NA	NA	NA
Pentachlorophenol	25	--	25	0/3	25	125	13	1	9.6
Phenanthrene	10	--	10	0/3	10	5	6.3	2	0.8
Pyrene	10	--	10	0/3	10		NA	NA	NA
TCL Volatiles									
2-Butanone	5	--	5	0/3	5		NA	NA	NA
2-Hexanone	5	--	5	0/3	5		NA	NA	NA
4-Methyl-2-pentanone	5	--	5	0/3	5		NA	NA	NA
Acetone [f]	NA	--	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	1	--	1	0/3	1		NA	NA	NA
Bromomethane	1	--	1	0/3	1		NA	NA	NA
Chloroethane	1	--	1	0/3	1		NA	NA	NA
Chloromethane	1	--	1	0/3	1		NA	NA	NA
Dibromochloromethane	1	--	1	0/3	1		NA	NA	NA
Styrene	1	--	1	0/3	1		NA	NA	NA

HQ - hazard quotient
NA - not applicable/not available
Shaded cells contain HQs in excess of 1.

a. If the contaminant was not detected, value is the average of 1/2 the detection limit.
b. Screening value for endosulfan I and II.
c. Screening value for endrin.
d. Screening value for chlordane.
e. Screening value for 1,2-dichloroethane.
f. All data for acetone were rejected during validation.
g. Screening value for 1,1-dichloroethene.

1. Region 4 chronic screening values for freshwater (USEPA, 1999)
2. Region 3 BTAG screening levels (USEPA, 1995)

Table 8-17
Calculation of 2,3,7,8-TCDD Equivalents
OU6, Site 12, MCAS Cherry Point, North Carolina

Chemical	Range of Detection Limits			Frequency of Detection	Concentration[a]	Toxicity Equivalents Factor[b]	2,3,7,8-TCDD Equivalent
Dioxin/Furans			pg/g		pg/g		pg/g
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	5.7		5.7	1/1	210 (included in total)		
1,2,3,4,6,7,8-Heptachlorodibenzofuran	5.7	-	5.7	1/1	5.2 (included in total)		
1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.7	-	5.7	1/1	0.7 (included in total)		
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	3.5 (included in total)		
1,2,3,4,7,8-Hexachlorodibenzofuran	5.7	-	5.7	1/1	1.1 (included in total)		
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	7.3 (included in total)		
1,2,3,6,7,8-Hexachlorodibenzofuran	5.7	-	5.7	1/1	0.85 (included in total)		
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	9.3 (included in total)		
1,2,3,7,8,9-Hexachlorodibenzofuran	0.5	-	0.5	0/1	0.25 (included in total)		
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	1.3 (included in total)		
1,2,3,7,8-Pentachlorodibenzofuran	0.56	-	0.56	0/1	0.28 (included in total)		
2,3,4,6,7,8-Hexachlorodibenzofuran	5.7	-	5.7	1/1	0.53 (included in total)		
2,3,4,7,8-Pentachlorodibenzofuran	5.7	-	5.7	1/1	0.33 (included in total)		
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1.1	-	1.1	1/1	0.43 (included in total)		
2,3,7,8-Tetrachlorodibenzofuran	1.1	-	1.1	0/1	0.55 (included in total)		
Total Heptachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	420	0.01	4.2
Total Heptachlorodibenzofuran	5.7	-	5.7	1/1	11	0.01	0.11
Total Hexachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	75	0.1	7.5
Total Hexachlorodibenzofuran	5.7	-	5.7	1/1	22	0.1	2.2
Total Octachlorodibenzo-p-dioxin	11	-	11	1/1	4900	0.001	4.9
Total Octachlorodibenzofuran	11	-	11	1/1	5.4	0.001	0.0054
Total Pentachlorodibenzo-p-dioxin	5.7	-	5.7	1/1	12	0.5	6
Total Pentachlorodibenzofuran	5.7	-	5.7	1/1	15	0.05	0.75
Total Tetrachlorodibenzo-p-dioxin (TCDD)	1.1	-	1.1	1/1	1.5	1	1.5
Total Tetrachlorodibenzofuran	1.1	-	1.1	1/1	6.4	0.1	0.64
						SUM	**27.8**

a. 1/2 the detection limit was used for non-detects
b. TEFs taken from USEPA (1989)

Table 8-18
Baseline Exposure Doses, NOAELs, and HQs for Mourning Dove
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.140 kg
Adjusted Food Ingestion Rate	0.0150 kg-dry/day
Soil Ingestion Rate	7.90E-04 kg-dry/day
Surface Water Ingestion Rate	0.0158 L/day
Area/Site Use Factor	0.0057 unitless

Average Concentrations [a]

Chemical	Soil Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Dose (mg/kg bw-d)	NOAEL (mg/kg bw-d)	NOAEL HQ_n
TAL Metals/Cyanide							
Aluminum	8366.4	0.447	1	8366.4	5.4	109.7	0.05
Antimony			1	0.0	0.0	NA	--
Beryllium			1	0.0	0.0	NA	--
Cadmium	4.662	0.000362	1.359	6.3	0.0	1.45	0.00
Calcium			1	0.0	0.0	NA	--
Chromium	19.02	0.0004	1	19.0	0.0	1	0.01
Copper	166	0.0031	0.341	56.6	0.04	47	0.00
Cyanide			1	0.0	0.0	NA	--
Iron			1	0.0	0.0	NA	--
Lead	95.3	0.001	0.245	23.3	0.0	1.13	0.02
Magnesium			1	0.0	0.0	NA	--
Mercury	0.0714	0.000083	1.481	0.1	0.0	0.0064	0.01
Potassium			1	0.0	0.0	NA	--
Silver			1	0.0	0.0	NA	--
Sodium			1	0.0	0.0	NA	--
Thallium			1	0.0	0.0	NA	--
Zinc	170.85	0.01892	1.021	174.4	0.1	14.5	0.01
TCL Pesticides/PCBs							
Aroclor-1016			1	0	0.0000	NA	--
TCL Semivolatiles							
1,2,4-Trichlorobenzene			1	0	0.0000	NA	--
2,2'-oxybis(1-Chloropropane)			1	0	0.0000	NA	--
2,4,5-Trichlorophenol			1	0	0.0000	NA	--
2,4,6-Trichlorophenol			1	0	0.0000	NA	--
2,4-Dichlorophenol			1	0	0.0000	NA	--
2,4-Dimethylphenol			1	0	0.0000	NA	--
2,4-Dinitrophenol			1	0	0.0000	NA	--
2,4-Dinitrotoluene			1	0	0.0000	NA	--
2,6-Dinitrotoluene			1	0	0.0000	NA	--
2-Chloronaphthalene			1	0	0.0000	NA	--
2-Chlorophenol			1	0	0.0000	NA	--
2-Methylnaphthalene			1	0	0.0000	NA	--
2-Methylphenol			1	0	0.0000	NA	--
2-Nitroaniline			1	0	0.0000	NA	--
2-Nitrophenol			1	0	0.0000	NA	--
3,3'-Dichlorobenzidine			1	0	0.0000	NA	--
3-Nitroaniline			1	0	0.0000	NA	--
4,6-Dinitro-2-methylphenol			1	0	0.0000	NA	--
4-Bromophenyl-phenylether			1	0	0.0000	NA	--
4-Chloro-3-methylphenol			1	0	0.0000	NA	--
4-Chloroaniline			1	0	0.0000	NA	--
4-Chlorophenyl-phenylether			1	0	0.0000	NA	--
4-Methylphenol			1	0	0.0000	NA	--
4-Nitroaniline			1	0	0.0000	NA	--
bis(2-Chloroethoxy)methane			1	0	0.0000	NA	--
bis(2-Chloroethyl)ether			1	0	0.0000	NA	--
Butylbenzylphthalate			1	0	0.0000	NA	--
Carbazole			1	0	0.0000	NA	--
Dibenzofuran			1	0	0.0000	NA	--
Diethylphthalate			1	0	0.0000	NA	--
Dimethyl phthalate			1	0	0.0000	NA	--
Hexachlorobenzene			1	0	0.0000	NA	--
Hexachlorobutadiene			1	0	0.0000	NA	--
Hexachlorocyclopentadiene			1	0	0.0000	NA	--
Hexachloroethane			1	0	0.0000	NA	--
Isophorone			1	0	0.0000	NA	--
N-Nitroso-di-n-propylamine			1	0	0.0000	NA	--
N-Nitrosodiphenylamine			1	0	0.0000	NA	--
Nitrobenzene			1	0	0.0000	NA	--
Phenol			1	0	0.0000	NA	--
Dioxins/Furans							
2,3,7,8-TCDD (dioxin) equivalents[b]	0.0000278		0.002	5.56E-08	0.0000	0.000014	0.000

NA- not available
BAF - Bioaccumulation Factor
Shaded cells indicate that the chemical is considered a COPC
[a] Averages were calculated using 1/2 the detection limit for non-detects.
[b] Concentration of dioxin/furan expressed in 2,3,7,8-TCDD equivalents (see derivation in Table 6-4). 2,3,7,8-TCDD BAF for plants from Travis and Arms (1988). A log Kow of 6.43 was assumed for 2,3,7,8-TCDD (USEPA 1994).

Table 8-19
Baseline Exposure Doses, NOAELs, and HQs for Killdeer
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.0880	kg
Adjusted Food Ingestion Rate	0.0113	kg-dry/day
Sediment Ingestion Rate	2.49E-03	kg-dry/day
Surface Water Ingestion Rate	0.0134	L/day
Area/Site Use Factor	0.58	unitless

Average Concentrations [a]

Chemical	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	NOAEL (mg/kg bw-d)	NOAEL HQ_n
TAL Metals/Cyanide							
Aluminum	5346.7	0.447	1	5346.7	487.5	109.7	4.44
Antimony			1	0.0	0.0	NA	--
Beryllium			1	0.0	0.0	NA	--
Calcium			1	0.0	0.0	NA	--
Chromium	8.067	0.0004	1.15	9.3	0.8	1	0.83
Cyanide			1	0.0	0.0	NA	--
Iron			1	0.0	0.0	NA	--
Lead	21.6	0.001	0.276	6.0	0.8	1.13	0.71
Magnesium			1	0.0	0.0	NA	--
Mercury	0.063	0.000083	1.422	0.1	0.0	0.0064	1.21
Potassium			1	0.0	0.0	NA	--
Silver			1	0.0	0.0	NA	--
Sodium			1	0.0	0.0	NA	--
Thallium			1	0.0	0.0	NA	--
Zinc	41	0.01892	3.092	126.8	10.2	14.5	0.70
TCL Pesticides/PCBs							
Aroclor-1016			1	0	0.0000	NA	--
TCL Semivolatiles							
1,2,4-Trichlorobenzene			1	0	0.0000	NA	--
2,2'-oxybis(1-Chloropropane)			1	0	0.0000	NA	--
2,4,5-Trichlorophenol			1	0	0.0000	NA	--
2,4,6-Trichlorophenol			1	0	0.0000	NA	--
2,4-Dichlorophenol			1	0	0.0000	NA	--
2,4-Dimethylphenol			1	0	0.0000	NA	--
2,4-Dinitrophenol			1	0	0.0000	NA	--
2,4-Dinitrotoluene			1	0	0.0000	NA	--
2,6-Dinitrotoluene			1	0	0.0000	NA	--
2-Chloronaphthalene			1	0	0.0000	NA	--
2-Chlorophenol			1	0	0.0000	NA	--
2-Methylnaphthalene			1	0	0.0000	NA	--
2-Methylphenol			1	0	0.0000	NA	--
2-Nitroaniline			1	0	0.0000	NA	--
2-Nitrophenol			1	0	0.0000	NA	--
3,3'-Dichlorobenzidine			1	0	0.0000	NA	--
3-Nitroaniline			1	0	0.0000	NA	--
4,6-Dinitro-2-methylphenol			1	0	0.0000	NA	--
4-Bromophenyl-phenylether			1	0	0.0000	NA	--
4-Chloro-3-methylphenol			1	0	0.0000	NA	--
4-Chloroaniline			1	0	0.0000	NA	--
4-Chlorophenyl-phenylether			1	0	0.0000	NA	--
4-Methylphenol			1	0	0.0000	NA	--
4-Nitroaniline			1	0	0.0000	NA	--
bis(2-Chloroethoxy)methane			1	0	0.0000	NA	--
bis(2-Chloroethyl)ether			1	0	0.0000	NA	--
Butylbenzylphthalate			1	0	0.0000	NA	--
Carbazole			1	0	0.0000	NA	--
Dibenzofuran			1	0	0.0000	NA	--
Diethylphthalate			1	0	0.0000	NA	--
Dimethyl phthalate			1	0	0.0000	NA	--
Hexachlorobenzene			1	0	0.0000	NA	--
Hexachlorobutadiene			1	0	0.0000	NA	--
Hexachlorocyclopentadiene			1	0	0.0000	NA	--
Hexachloroethane			1	0	0.0000	NA	--
Isophorone			1	0	0.0000	NA	--
N-Nitroso-di-n-propylamine			1	0	0.0000	NA	--
N-Nitrosodiphenylamine			1	0	0.0000	NA	--
Nitrobenzene			1	0	0.0000	NA	--
Phenol			1	0	0.0000	NA	--

NA- not available
BAF - Bioaccumulation Factor
Shaded cells indicate that the chemical is considered a COPC
[a] Averages were calculated using 1/2 the detection limit for non-detects.

Table 8-20
Baseline Exposure Doses, NOAELs, and HQs for American Kestrel
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.121 kg
Adjusted Food Ingestion Rate	0.011 kg-dry/day
Soil Ingestion Rate	3.22E-04 kg-dry/day
Surface Water Ingestion Rate	0.0143 L/day
Area/Site Use Factor	0.48 unitless

Average Concentrations [a]

Chemical	Soil Concentration (mg/kg)	Surface Water Concentration (mg/L)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Vertebrate BAF	Vertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	NOAEL (mg/kg bw-d)	NOAEL HQ_n
TAL Metals/Cyanide									
Aluminum	8366.4	0.447	1	8366.4	1.000	8366.400	757.275603	109.7000	6.90
Antimony			1	0.0	1.000	0.000	0.000000	NA	--
Beryllium			1	0.0	1.000	0.000	0.000000	NA	--
Cadmium	4.7	0.00362	2.822	13.2	1.990	9.278	1.007080	1.4500	0.69
Calcium			1	0.0	1.000	0.000	0.000000	NA	--
Chromium	19.0	0.0004	1.15	21.9	0.138	2.629	1.117534	1.0000	1.12
Copper	166.1	0.0031	2.424	402.6	0.420	69.762	21.288413	47.0000	0.45
Cyanide			1	0.0	1.000	0.000	0.000000	NA	--
Iron			1	0.0	0.014	0.000	0.000000	NA	--
Lead	95.3	0.001	0.276	26.3	0.162	15.391	1.982423	1.1300	1.75
Magnesium			1	0.0	1.000	0.000	0.000000	NA	--
Mercury	0.1	0.000083	1.422	0.1	0.124	0.009	0.005022	0.0064	0.78
Potassium			1	0.0	1.000	0.000	0.000000	NA	--
Silver			1	0.0	1.000	0.000	0.000000	NA	--
Sodium			1	0.0	1.000	0.000	0.000000	NA	--
Thallium			1	0.0	0.112	0.000	0.000000	NA	--
Zinc	170.9	0.01892	3.092	528.3	1.335	228.119	33.965755	14.5000	2.34
TCL Pesticides/PCBs									
Aroclor-1016			1	0	1	0	0.000000	NA	--
TCL Semivolatiles									
1,2,4-Trichlorobenzene			1	0	1	0	0.000000	NA	--
2,2'-oxybis(1-Chloropropane)			1	0	1	0	0.000000	NA	--
2,4,5-Trichlorophenol			1	0	1	0	0.000000	NA	--
2,4,6-Trichlorophenol			1	0	1	0	0.000000	NA	--
2,4-Dichlorophenol			1	0	1	0	0.000000	NA	--
2,4-Dimethylphenol			1	0	1	0	0.000000	NA	--
2,4-Dinitrophenol			1	0	1	0	0.000000	NA	--
2,4-Dinitrotoluene			1	0	1	0	0.000000	NA	--
2,6-Dinitrotoluene			1	0	1	0	0.000000	NA	--
2-Chloronaphthalene			1	0	1	0	0.000000	NA	--
2-Chlorophenol			1	0	1	0	0.000000	NA	--
2-Methylnaphthalene			1	0	1	0	0.000000	NA	--
2-Methylphenol			1	0	1	0	0.000000	NA	--
2-Nitroaniline			1	0	1	0	0.000000	NA	--
2-Nitrophenol			1	0	1	0	0.000000	NA	--
3,3'-Dichlorobenzidine			1	0	1	0	0.000000	NA	--
3-Nitroaniline			1	0	1	0	0.000000	NA	--
4,6-Dinitro-2-methylphenol			1	0	1	0	0.000000	NA	--
4-Bromophenyl-phenylether			1	0	1	0	0.000000	NA	--

Table 8-20
Baseline Exposure Doses, NOAELs, and HQs for American Kestrel
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.121 kg
Adjusted Food Ingestion Rate	0.011 kg-dry/day
Soil Ingestion Rate	3.22E-04 kg-dry/day
Surface Water Ingestion Rate	0.0143 L/day
Area/Site Use Factor	0.48 unitless

Average Concentrations [a]

Chemical	Soil Concentration (mg/kg)	Surface Water Concentration (mg/L)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Vertebrate BAF	Vertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	NOAEL (mg/kg bw-d)	NOAEL HQ_n
4-Chloro-3-methylphenol			1	0	1	0	0.000000	NA	--
4-Chloroaniline			1	0	1	0	0.000000	NA	--
4-Chlorophenyl-phenylether			1	0	1	0	0.000000	NA	--
4-Methylphenol			1	0	1	0	0.000000	NA	--
4-Nitroaniline			1	0	1	0	0.000000	NA	--
bis(2-Chloroethoxy)methane			1	0	1	0	0.000000	NA	--
bis(2-Chloroethyl)ether			1	0	1	0	0.000000	NA	--
Butylbenzylphthalate			1	0	1	0	0.000000	NA	--
Carbazole			1	0	1	0	0.000000	NA	--
Dibenzofuran			1	0	1	0	0.000000	NA	--
Diethylphthalate			1	0	1	0	0.000000	NA	--
Dimethyl phthalate			1	0	1	0	0.000000	NA	--
Hexachlorobenzene			1	0	1	0	0.000000	NA	--
Hexachlorobutadiene			1	0	1	0	0.000000	NA	--
Hexachlorocyclopentadiene			1	0	1	0	0.000000	NA	--
Hexachloroethane			1	0	1	0	0.000000	NA	--
Isophorone			1	0	1	0	0.000000	NA	--
N-Nitroso-di-n-propylamine			1	0	1	0	0.000000	NA	--
N-Nitrosodiphenylamine			1	0	1	0	0.000000	NA	--
Nitrobenzene			1	0	1	0	0.000000	NA	--
Phenol			1	0	1	0	0.000000	NA	--
Dioxins/Furans									
2,3,7,8-TCDD (dioxin) equivalents [b]	0.0000278		4	0.0001112	1.0552	2.93346E-05	6.305482E-06	1.4000E-05	0.45

NA- not available
BAF - Bioaccumulation Factor
Shaded cells indicate that the chemical is considered a COPC
[a] Averages were calculated using 1/2 the detection limit for non-detects.
[b] Concentration of dioxin/furan expressed in 2,3,7,8-TCDD equivalents (see derivation in Table 6-4). 2,3,7,8-TCDD BAF for invertebrates is a value for earthworms from Reinecke and Nash (1984). BAF for vertebrates is average small mammal BAF for TCDD in Sample et al. (1998b).

Table 8-21
Baseline Exposure Doses, NOAELs, and HQs for Eastern Harvest Mouse
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.011 kg
Adjusted Food Ingestion Rate	0.00228 kg-dry/day
Soil/Sediment Ingestion Rate	5.61E-05 kg-dry/day
Surface Water Ingestion Rate	0.0016 L/day
Area/Site Use Factor	1.00 unitless

Average Concentrations [a]

Chemical	Soil Concentration (mg/kg)	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	RTV (NOAEL) (mg/kg bw-d)	NOAEL HQ_n
TAL Metals/Cyanide										
Aluminum	8366.4	5346.7	0.447	1	6856.6	1.00	6856.6	1549.9	1.9	803.03
Antimony	1.896	0.862	0.00465	1	1.4	1.00	1.4	0.3	0.1	2.50
Arsenic	1.359	0.645	0.0015	0.454	0.5	0.33	0.3	0.1	0.1	0.85
Barium	26.62	18.8	0.00438	1	22.7	1.00	22.7	5.1	5.1	1.01
Cadmium	4.662	1.33	0.000362	1.359	4.1	2.82	8.5	1.0	1.0	0.96
Calcium				1	0.0	1.00	0.0	0.0	NA	--
Copper	166.1	7.42	0.0031	0.341	29.6	2.42	210.3	9.3	11.7	0.80
Iron	3412.4	2476.7	0.162	1	2944.6	1.00	2944.6	665.1	3.2	208.50
Lead	95.3	21.6	0.001	0.245	14.3	0.28	16.1	3.7	8.0	0.46
Magnesium				1	0.0	1.00	0.0	0.0	NA	--
Mercury	0.0714	0.063	0.000083	1.481	0.1	1.42	0.1	0.0	0.0	0.69
Potassium				1	0.0	1.00	0.0	0.0	NA	--
Selenium	0.4557	0.425	0.00155	1	0.4	1.00	0.4	0.1	0.2	0.50
Sodium				1	0.0	1.00	0.0	0.0	NA	--
Thallium	0.4032	0.477	0.00175	1	0.4	1.00	0.4	0.1	0.1	1.34
Vanadium	12.836	8.367	0.0082	1	10.6	1.00	10.6	2.4	0.2	11.42
Zinc	170.85	38.983	0.0189	1.021	107.1	3.09	324.4	26.7	384.4	0.07
TCL Pesticides/PCBs										
Aroclor-1221				1	0	1	0	0.0000	NA	--
Aroclor-1232				1	0	1	0	0.0000	NA	--
Aroclor-1242	0.032423	0.033833	0.0005	1	0.033128	1	0.033128	0.0075	0.2	0.04
TCL Semivolatiles										
1,2-Dichlorobenzene				1	0	1	0	0.0000	NA	--
1,3-Dichlorobenzene				1	0	1	0	0.0000	NA	--
2,2'-oxybis(1-Chloropropane)				1	0	1	0	0.0000	NA	--
2-Chloronaphthalene				1	0	1	0	0.0000	NA	--
2-Methylphenol				1	0	1	0	0.0000	NA	--
2-Nitroaniline				1	0	1	0	0.0000	NA	--
2-Nitrophenol				1	0	1	0	0.0000	NA	--
3,3'-Dichlorobenzidine				1	0	1	0	0.0000	NA	--
3-Nitroaniline				1	0	1	0	0.0000	NA	--
4,6-Dinitro-2-methylphenol				1	0	1	0	0.0000	NA	--
4-Bromophenyl-phenylether				1	0	1	0	0.0000	NA	--
4-Chloro-3-methylphenol				1	0	1	0	0.0000	NA	--
4-Chloroaniline				1	0	1	0	0.0000	NA	--
4-Chlorophenyl-phenylether				1	0	1	0	0.0000	NA	--
4-Methylphenol				1	0	1	0	0.0000	NA	--
4-Nitroaniline				1	0	1	0	0.0000	NA	--
bis(2-Chloroethoxy)methane				1	0	1	0	0.0000	NA	--

Table 8-21
Baseline Exposure Doses, NOAELs, and HQs for Eastern Harvest Mouse
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	0.011 kg
Adjusted Food Ingestion Rate	0.00228 kg-dry/day
Soil/Sediment Ingestion Rate	5.61E-05 kg-dry/day
Surface Water Ingestion Rate	0.0016 L/day
Area/Site Use Factor	1.00 unitless

Average Concentrations [a]

Chemical	Soil Concentration (mg/kg)	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	RTV (NOAEL) (mg/kg bw-d)	NOAEL HQ_n
Dimethyl phthalate				1	0	1	0	0.0000	NA	--
Hexachlorobenzene				1	0	1	0	0.0000	NA	--
Hexachlorocyclopentadiene				1	0	1	0	0.0000	NA	--
Hexachloroethane				1	0	1	0	0.0000	NA	--
N-Nitroso-di-n-propylamine	0.39308	0.2283	0.005	1	0.31069	1	0.31069	0.0710	0.1	1.13
Nitrobenzene				1	0	1	0	0.0000	NA	--
Pentachlorophenol	0.9869	0.55	0.0125	1	0.76845	1	0.76845	0.1758	0.2	0.73
Dioxin/Furans										
2,3,7,8-TCDD (dioxin) equivalents[b]	0.0000278			0.002	5.56E-08	4	0.0001112	0.0000	0.000001	1.37

NA- not available
BAF - Bioaccumulation Factor
Shaded cells indicate that the chemical is considered a COPC
[a] Averages were calculated using 1/2 the detection limit for non-detects.
[b] Concentration of dioxin/furan expressed in 2,3,7,8-TCDD equivalents (see derivation in Table 6-4). 2,3,7,8-TCDD BAF for plants from Reinecke and Nash (1984).
A log Kow of 6.43 was assumed for 2,3,7,8-TCDD (USEPA 1994). 2,3,7,8-TCDD BAF for invertebrates is a value for earthworms from Travis and Arms (1988)

Table 8-22
Baseline Exposure Doses, NOAELs, and HQs for Gray Fox
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	3.750	kg
Adjusted Food Ingestion Rate	0.198	kg-dry/day
Soil/Sediment Ingestion Rate	0.00570	kg-dry/day
Surface Water Ingestion Rate	0.3253	L/day
Area/Site Use Factor	0.06	unitless

Average Concentrations [a]

Chemical	Soil Concentration (mg/kg)	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Vertebrate BAF	Vertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	RTV (NOAEL) (mg/kg bw-d)	NOAEL HQ_n
TAL Metals/Cyanide												
Aluminum	8366.4	5346.7	0.447	1	6856.6	1	6856.6	1	6856.6	22.7	1.9	11.77
Antimony	1.896	0.862	0.00465	1	1.4	1	1.4	1	1.9	0.0	0.1	0.04
Cadmium	4.662	1.33	0.000362	1.359	4.1	2.822	8.5	1.9902	9.3	0.0	1.0	0.02
Calcium				1	0.0	1	0.0	1	0.0	0.0	NA	--
Copper	166.1	7.42	0.0031	0.341	29.6	2.424	210.3	0.42	69.8	0.2	11.7	0.02
Iron	3412.4	2476.7	0.162	1	2944.6	1	2944.6	0.0137	46.7	4.1	3.2	1.27
Lead	95.3	21.6	0.001	0.245	14.3	0.276	16.1	0.1615	15.4	0.1	8.0	0.01
Magnesium				1	0.0	1	0.0	1	0.0	0.0	NA	--
Potassium				1	0.0	1	0.0	1	0.0	0.0	NA	--
Sodium				1	0.0	1	0.0	1	0.0	0.0	NA	--
Vanadium	12.836	8.367	0.0082	1	10.6	1	10.6	1	12.8	0.0	0.2	0.19
TCL Pesticides/PCBs												
Aroclor-1221				1	0	1	0	1	0	0.0000	NA	--
Aroclor-1232				1	0	1	0	1	0	0.0000	NA	--
TCL Semivolatiles												
1,2-Dichlorobenzene				1	0	1	0	1	0	0.0000	NA	--
1,3-Dichlorobenzene				1	0	1	0	1	0	0.0000	NA	--
2,2'-oxybis(1-Chloropropane)				1	0	1	0	1	0	0.0000	NA	--
2-Chloronaphthalene				1	0	1	0	1	0	0.0000	NA	--
2-Methylphenol				1	0	1	0	1	0	0.0000	NA	--
2-Nitroaniline				1	0	1	0	1	0	0.0000	NA	--
2-Nitrophenol				1	0	1	0	1	0	0.0000	NA	--
3,3'-Dichlorobenzidine				1	0	1	0	1	0	0.0000	NA	--
3-Nitroaniline				1	0	1	0	1	0	0.0000	NA	--
4,6-Dinitro-2-methylphenol				1	0	1	0	1	0	0.0000	NA	--
4-Bromophenyl-phenylether				1	0	1	0	1	0	0.0000	NA	--
4-Chloro-3-methylphenol				1	0	1	0	1	0	0.0000	NA	--
4-Chloroaniline				1	0	1	0	1	0	0.0000	NA	--
4-Chlorophenyl-phenylether				1	0	1	0	1	0	0.0000	NA	--
4-Methylphenol				1	0	1	0	1	0	0.0000	NA	--
4-Nitroaniline				1	0	1	0	1	0	0.0000	NA	--
bis(2-Chloroethoxy)methane				1	0	1	0	1	0	0.0000	NA	--
Dimethyl phthalate				1	0	1	0	1	0	0.0000	NA	--
Hexachlorobenzene				1	0	1	0	1	0	0.0000	NA	--
Hexachlorocyclopentadiene				1	0	1	0	1	0	0.0000	NA	--
Hexachloroethane				1	0	1	0	1	0	0.0000	NA	--
N-Nitroso-di-n-propylamine	0.39308	0.2283	0.005	1	0.31069	1	0.31069	1	0.39308	0.0012	0.1	0.02
Nitrobenzene				1	0	1	0	1	0	0.0000	NA	--
Pentachlorophenol	0.39308	0.55	0.0125	1	0.47154	1	0.47154	1	0.39308	0.0015	0.2	0.01
Dioxin/Furans												

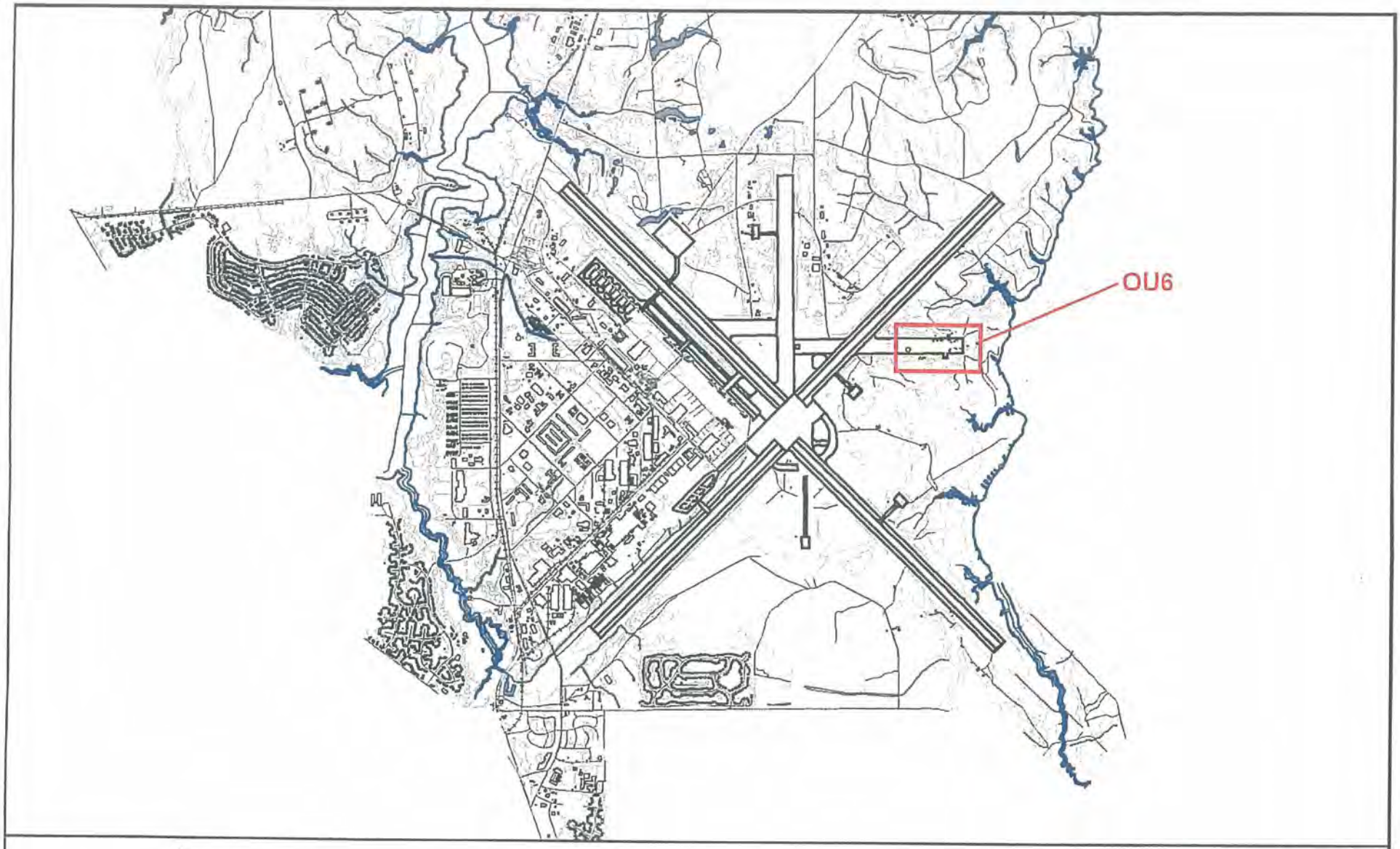
Table 8-22
Baseline Exposure Doses, NOAELs, and HQs for Gray Fox
OU6, Site 12, MCAS Cherry Point, North Carolina

Body Weight	3.750	kg
Adjusted Food Ingestion Rate	0.198	kg-dry/day
Soil/Sediment Ingestion Rate	0.00570	kg-dry/day
Surface Water Ingestion Rate	0.3253	L/day
Area/Site Use Factor	0.06	unitless

Average Concentrations [a]

Chemical	Soil Concentration (mg/kg)	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	Plant BAF	Plant Concentration (mg/kg)	Invertebrate BAF	Invertebrate Concentration (mg/kg)	Vertebrate BAF	Vertebrate Concentration (mg/kg)	Dose (mg/kg bw-d)	RTV (NOAEL) (mg/kg bw-d)	NOAEL HQ_n
2,3,7,8-TCDD (dioxin) equivalents [b]	0.0000278			0.002	5.56E-08	4	0.0001112	1.0552	2.93346E-05	0.0000	0.000001	0.08

NA- not available
BAF - Bioaccumulation Factor
Shaded cells indicate that the chemical is considered a COPC
[a] Averages were calculated using 1/2 the detection limit for non-detects.
[b] Concentration of dioxin/furan expressed in 2,3,7,8-TCDD equivalents (see derivation in Table 6-4). 2,3,7,8-TCDD BAF for plants from Travis and Arms (1988).
A log Kow of 6.43 was assumed for 2,3,7,8-TCDD (USEPA 1994). 2,3,7,8-TCDD BAF for invertebrates is a value for earthworms from Reinecke and Nash (1984).
BAF for vertebrates is average small mammal BAF for TCDD in Sample et al. (1998b).



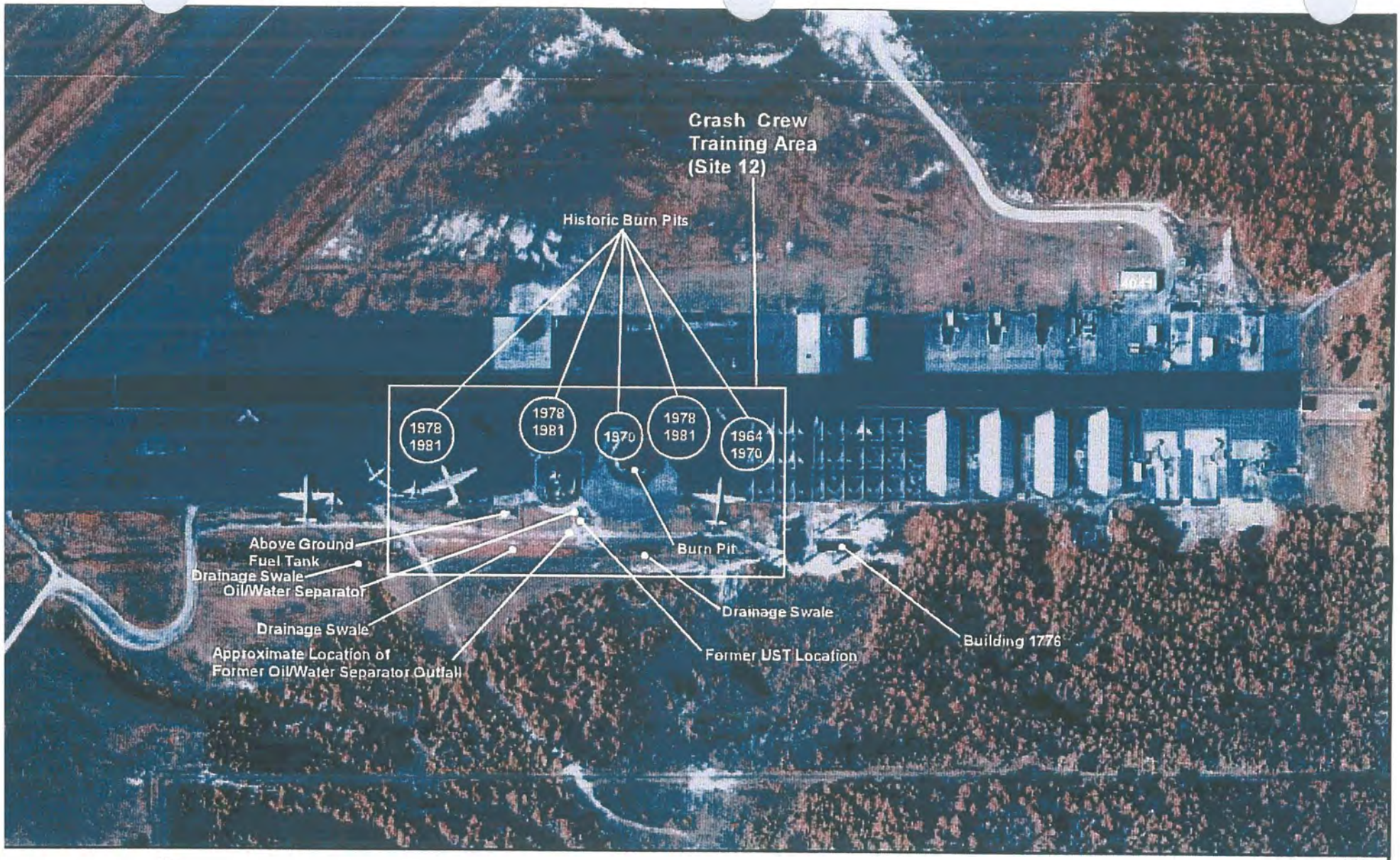
N

2000 0 2000 4000 Feet

Figure 8-1
OU6 Location Map
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

WDCGIS\CherryPoint\OU6\Site12RI\site12-ri.apr



N

200 0 200 400 Feet

Figure 8-2
Site 12 - Crash Crew
Training Area
Site 12 Remedial Investigation
MCAS Cherry Point

CH2MHILL

CGIS\\CherryPoint\OU6\Site12RI\site12-ri.apr

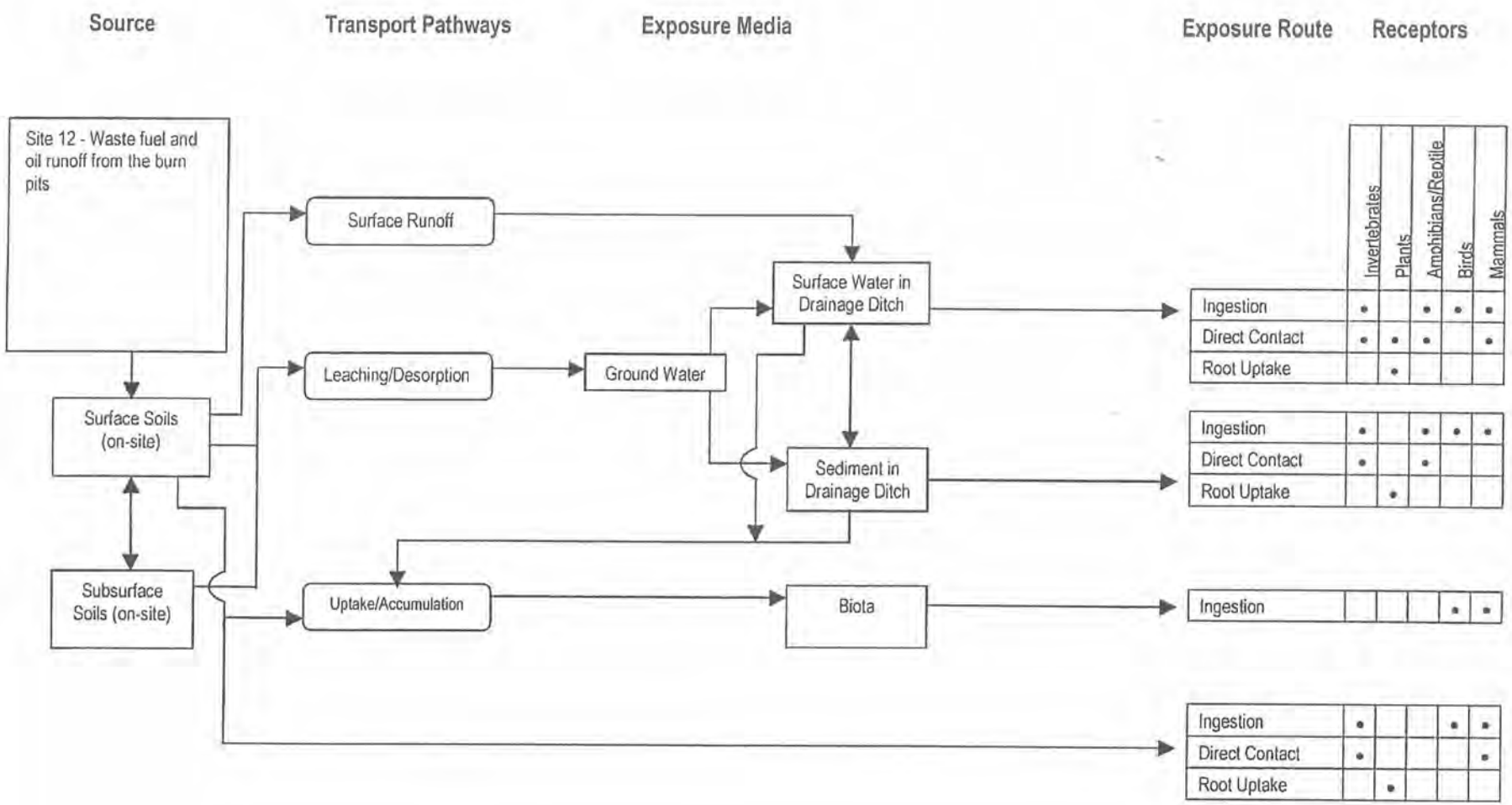


Figure 8-3. Screening-Level Conceptual Model
MCAS Cherry Point, OU6, Site 12

LEGEND

- Surface Water and Sediment Samples
- Groundwater Samples
- Groundwater and Surface/Subsurface Soil Sample
- Surface and Subsurface Soil Samples
- Surface Soil Samples

N

50 0 50 100 Feet

Figure 8-4
SAMPLING LOCATIONS
OU6, SITE 12

CH2MHILL

9 Conclusions and Recommendations

This section summarizes the findings of the RI and SRI, and recommends a path forward for OU6 Site 12 with regard to development of a Feasibility Study (FS). These conclusions are based on field sampling results collected during the RI and SRI, as well as the findings of the human health and ecological risk assessments.

9.1 Conclusions

The conclusions of the RI and SRI efforts are provided below for surface and subsurface soil, groundwater, sediment, and surface water at OU6 Site 12. Recommendations based on these conclusions are provided in Section 9.2.

9.1.1 Surface Soil

VOCs, SVOCs, oil and grease, pesticides, one PCB, and one dioxin/furan compound were detected in surface soil at Site 12. Most constituents did not exceed human health screening criteria, however several inorganic constituents, one PCB, and one dioxin compound exceeded USEPA Region III Residential RBCs.

One VOC (methylene chloride), 4 pesticides, and 8 metals were detected at concentrations that exceeded NC SSLs. As discussed previously (Section 5.2.2), the pesticide results are unreliable because the reported detections are qualified as estimates and the dual column precision criterion was exceeded in every case. Methylene chloride was detected infrequently, is a common laboratory contaminant, and was detected in all of the field QC samples. Therefore, methylene chloride is not considered a site-related contaminant. Although the metals were detected more frequently, few exceeded either two times the MCAS Cherry Point background concentrations or the SSL. Only cadmium was detected at levels consistently above the SSL and twice the background concentration. However, cadmium has not been detected in groundwater, and may naturally occur at these concentrations in the vicinity of OU6. Cadmium was detected at consistent concentrations across the site (i.e., no source area or "hot spot") and is not expected to be a site-related contaminant based on the site history.

Human health risk was assessed for exposure to surface soil by current/future industrial workers and adolescent trespassers/visitors, and future adult and child residents. All current and reasonably foreseeable future exposure scenarios resulted in risks below USEPA target levels. All estimated carcinogenic risks were below or within the USEPA target risk range of 10^{-4} and 10^{-6}. However, contact with surface soil by a hypothetical future adult or child resident would result in unacceptable non-carcinogenic risk, as a result of exposure to antimony, cadmium, and chromium.

9.1.2 Subsurface Soil

Three inorganic constituents (cadmium, iron, and mercury) were present at concentrations exceeding NC SSLs for protection of groundwater in one or more samples. However, iron

and mercury concentrations were less than twice the average background concentrations for the Air Station. Cadmium was detected in groundwater, and may naturally occur at these concentrations in the vicinity of OU6. Cadmium was detected at consistent concentrations across the site (i.e., no source area or "hot spot") and is not expected to be a site-related contaminant based on the site history.

One VOC (ethylbenzene) and two SVOCs (naphthalene and 2-methylnaphthalene) exceeded NC SSLs for the protection of groundwater at Burn Pit E. Ethylbenzene was detected sporadically in soil and does not appear to have significantly impacted groundwater. The two SVOCs were detected over an approximately 6,000 square-foot area, and appear to have resulted in groundwater contamination exceeding NC 2L standards.

Human health risk was assessed during the RI and SRI for exposure to subsurface soil by construction workers. The results indicated that there are no unacceptable human health risks posed by constituents detected in subsurface soil.

9.1.3 Groundwater

The NC 2L groundwater standards were exceeded at Site 12 for four pesticides, iron, manganese, naphthalene, and 2-methylnaphthalene. As discussed for surface soil, the pesticide results are not considered reliable and do not appear to pose a threat to human health or the environment. Iron and manganese are generally considered secondary pollutants that do not pose a health threat at the concentrations detected at OU6, but can potentially impact the taste of groundwater (an aesthetic quality). In addition, the concentrations of iron and manganese found in groundwater at OU6 appear to be typical of surficial aquifer concentrations at the Air Station. Naphthalene and 2-methylnaphthalene contamination appears to be site-related.

Human health risk as a resulting from the use of groundwater was evaluated for future adult and child residents and construction workers. Potable use of surficial aquifer groundwater would result in HIs greater than 1.0 to the child and adult resident, mainly as a result of exposure to arsenic and iron. In addition, potable use would result in carcinogenic risks greater than 10^{-4} for all residents (adult, child, and lifetime residents). The carcinogenic risk is mainly associated with Aroclor-1248 (dermal exposure to the child) and arsenic (ingestion by children or adults).

9.1.4 Surface Water and Sediment

Constituents detected in sediment did not exceed human health regulatory screening criteria, with the exception of three metals (aluminum, arsenic, and iron) detected above USEPA Region III RBCs. Several pesticides, a few inorganic constituents, and one PCB exceeded regulatory screening criteria in surface water.

Human health risk was evaluated for exposure to surface water and sediment for current/future industrial workers and adolescent trespassers/visitors, and future construction workers. No current or future human health risks exceeded USEPA target levels.

9.1.5 Contaminant Fate and Transport

Site 12 soil appears to be a potential source of metals and pesticides to groundwater, surface water, and sediment. However, most metals are present at concentrations below MCAS Cherry Point background concentrations, and pesticides found in Site 12 soils are not likely related to site activities. Groundwater in the vicinity of the westernmost former burn pit (Burn Pit E) appears to have been impacted as a result of overlying soil contamination.

9.1.6 Ecological Risk

The screening level ecological risk assessment performed during the RI concluded that based the relatively few exceedances of a reference HQ of 1 for detected compounds and data on the background concentration of inorganics, the constituents detected at Site 12 pose little risk to local ecological receptors. Although there is some uncertainty associated with this conclusion, the scope and conservative nature of the assessment provide additional support that the risk evaluation has been protective.

9.2 Recommendations

The information presented in Section 9.1 summarizes the conclusions of the RI and SRI as they relate to development of an FS for OU6 Site 12. In general, the organic constituents in exceedance of RBCs, NC 2L standards, or SSLs were detected at low frequencies and at isolated points across OU6. In the case of pesticides, the concentrations detected in surface soil and groundwater are considered to be attributable to basewide application and not related to the site-specific activities at OU6. In addition to the pesticides not being a CERCLA waste, the reported concentrations in the groundwater have also been shown to be unreliable. The risk assessments identified only one compound in groundwater (Aroclor-1248) as posing unacceptable risk. However, Aroclor-1248 was not detected in soil and the single detection in groundwater is potentially an anomaly. Surficial groundwater and soil at OU6 do not appear to pose unacceptable risk to human health and the environment as a result of organic constituents. Two organic compounds, naphthalene and 2-methylnaphthalene, exceeded the SSL and appear to have impacted groundwater beneath the Burn Pit E. These two compounds warrant further consideration in an FS.

Five inorganic constituents were identified as potentially posing unacceptable risk associated with potable use of the surficial aquifer at OU6. Risk calculations, however, are very conservative and are based on a hypothetical future resident scenario, which is unrealistic based on the expected and planned future use of the Site 12 and the Air Station as a whole. In addition, actual use of the surficial aquifer as a drinking water supply is infeasible, due to both inadequate supply and poor water quality from naturally occurring inorganic constituents, including iron and manganese. Since the only exposure scenario potentially posing human health risk is not realistic, no further action with regard to inorganic constituents is warranted.

Apart from the discussions regarding the frequency and magnitude of the constituents detected in surficial groundwater and surface soil, there does not appear to be a definitive connection between Site 12 activities and the COPCs identified during the RI, except at Burn Pit E. Naphthalene and 2-methylnaphthalene would be expected in an environment where weathered fuels may be present, such as the former burn pits. The remaining COPCs do not

reflect the expected contaminants as a result of runoff from crash crew training activities. The low concentrations of pesticides detected at Site 12 are more likely the result of base-wide pesticide applications rather than site activities. The elevated metals concentrations detected in surface soil are scattered throughout the site, indicating they may be naturally-occurring as opposed to the result of past practices at OU6.

Based on the infrequent detections of constituents exceeding NC standards, the minimal extent of groundwater contamination, and lack of human health or ecological risk for realistic exposure pathways, an FS addressing all exceedences of NC standards does not appear to be warranted. Rather, it is recommended that a Focused Feasibility Study (FFS) be prepared for Site 12, addressing only the delineated areas of naphthalene and 2-methylnaphthalene in subsurface soil and groundwater at Burn Pit E. The following recommendations should be considered in the FFS:

- Monitoring of groundwater upgradient and downgradient of Burn Pit E.
- Evaluation of alternatives for the potential remediation of the soils beneath Burn Pit E (e.g., removal, in-situ treatment, etc.).

10 References

Agency for Toxic Substances and Disease Registry (ATSDR). *Toxicological Profile for Arsenic.* U.S. Department of Health and Human Services, Public Health Service and ATSDR. 1987.

ATSDR. *Toxicological Profile for Chromium.* U.S. Department of Health and Human Services, Public Health Service, and ATSDR. 1988.

ATSDR. *Toxicological Profile for Selected PCBs (Aroclor-1260, -1254, -1248, -1242, -1232, -1221, and -1016).* U.S. Department of Health and Human Services, Public Health Service, and ATSDR. 1988.

American Cancer Society (ACS). *Cancer Facts and Figures – '93.* American Cancer Society, Atlanta, Georgia. 1993.

ATSDR. *Toxicological Profile for Silver.* U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. December 1990.

ATSDR. *Toxicological Profile for Cobalt.* U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. July 1992.

ATSDR. *Toxicological Profile for N-nitrosdiphenylamine.* U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA.

ATSDR. *Toxicological Profile for 4,4'-DDT, 4,4'-DDE, and 4,4-DDD.* U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. May 1994.

ATSDR. *Toxicological Profile for Polychlorinated Biphenyls.* U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. August 1995a.

ATSDR. *Toxicological Profile for Naphthalene.* U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. August 1995b.

ATSDR. *Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs).* U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. August 1995c.

A.T. Kearney, Inc. *Interim RCRA Facility Assessment Report,* U.S. Marine Corps Air Station, Cherry Point, North Carolina. June 1988.

Aulerich, R.J. and R.K. Ringer. *Toxicity of the Polychlorinated Biphenyl Aroclor 1016 to Mink.* Environmental Research Laboratory – Duluth, MN, Office of Research and Development, USEPA. February 1980.

Bast, C.B., and H.T. Borges. 1996. "Derivation of Toxicity Values for Dermal Exposure." *The Toxicologist.* Volume 30, No. 1, Part 2, March 1996.

Bechtel Jacobs Company. *Biota Sediment Accumulation Factors for Invertebrates: Review and Recommendations for Oak Ridge Reservation.* Prepared for US Department of Energy. BJC/OR-112. August 1998a.

Bechtel Jacobs Company. *Empirical Models for the Uptake of Inorganic Chemicals from Soil by Plants*. Prepared for US Department of Energy. BJC/OR-133. September 1998b.

Beyer, W.N. "Accumulation of Chlorinated Benzenes in Earthworms." *Bulletin of Environmental Contamination and Toxicology*. 57:729-736. 1996.

Beyer, W.N., and C.D. Gish. "Persistence in Earthworms and Potential Health Hazards to Birds of Soil-Applied DDT, Dieldrin, and Heptachlor." *Journal of Applied Ecology* 17:295-307. 1980.

Beyer, W.N., E.E. Connor, and S. Gerould. "Estimates of Soil Ingestion by Wildlife." *Journal of Wildlife Management*. 58(2), pp. 375-382. 1994.

Blus, L.J., S.N. Wiemeyer, and C.J. Henny. (A. Fairbrother, L.N. Locke, and G.L. Hoff, eds.,)Organochlorine Pesticides. Chapter 6 in *Non-Infectious Diseases of Wildlife, Second Edition*. Iowa State University Press, Ames, Iowa. 1996.

Ibid. Tetrachlorodibenzo-p-dioxin. Chapter 8

Brown & Root Environmental. *Decision Process Document for Marine Corps Air Station, Cherry Point, North Carolina*, Contract Number N62472-90-D-1298, Contract Task Order 266, February 1998.

Brown & Root Environmental, *Master Field Sampling Plan for Marine Corps Air Station Cherry Point, North Carolina*, Contract Number N62472-90-D-1298, Contract Task Order 0266. April 1998a.

Brown & Root Environmental, *Master Quality Assurance Plan for Marine Corps Air Station Cherry Point, North Carolina*, Contract Number N62472-90-D-1298, Contract Task Order 0266. April 1998b.

Burt, W.H. and R.P. Grossenheider. *A Field Guide to the Mammals, Third Edition*. Houghton Mifflin Company, Boston. 1976.

Campbell, S.M. and M. Jaber. *Pentachlorophenol: An Acute Oral Toxicity Study with the Northern Bobwhite*. Prepared by Wildlife International Ltd., Easton, MD under project No. 345-103 and submitted to Pentachloropheol Task Force, SRA International, Inc., Washington, DC. January 19, 1993.

CH2M HILL, *Draft Work Plan for Operable Unit 6, Marine Corps Air Station Cherry Point, North Carolina*, Contract Number N62470-95-D-6007, Contract Task Order 0064. October 1998.

CH2M HILL, *Site 35a Site Investigation Report*, 2001.

CH2M HILL, *Point of Environmental Interest (POEI) Decision Document for Site 35a High Power Engine Run-Up Area and Test Cells, Marine Corps Air Station Cherry Point, North Carolina*, Contract Number N62470-02-D-3052, Contract Task Order 0035. June 2004.

CH2M HILL, *Supplemental Remedial Investigation (SRI) Report, Operable Unit 6, Site 12, Marine Corps Air Station Cherry Point, North Carolina*, Contract Number N62470-02-D-3052, Contract Task Order 0052. May 2005.

Chief of Naval Operations (CNO). *Navy Policy for Conducting Ecological Risk Assessments. Memorandum* from Chief of Naval Operations to Commander, Naval Facilities Engineering Command. Ser N453E/9U595355. April 5, 1999.

Diaz, G.J., R.J. Julian and E.J. Squires. "Lesions in Broiler Chickens following Experimental Intoxication with Cobalt." *Avian Diseases* 38:308-316. 1994.

Division of Water Resources, North Carolina Department of Environment and Natural Resources. *Annual Report Capacity Use Area # 1.* 1999.

Dragun, James. *The Soil Chemistry of Hazardous Materials. Second Edition.* Amherst Scientific Publishers. Amherst, Massachusetts. 1998.

Eimers, J.L., Daniel, C.C., and Coble, R.W. *Hydrogeology and Simulation of Ground-Water Flow at U.S. Marine Corps Air Station Cherry Point, North Carolina,* U.S.G.S. Water Resources Investigations Report 1987-90. 1994.

Eisler, R. 1986. "Polychlorinated Biphenyl Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review." *US Fish and Wildlife Service Biological Report* 85:72.

Exon, J.H. and L.D. Keller. "Effects of Transplanted Exposure to Chlorinated Phenols." *Environmental Health Perspective* 46:137-140. 1982.

Fritzell, E.K. and Haroldson, K.J. *Urocyon cinereoargenteus,* The American Society of Mammalogists. Mammalian Species. 1982.

Giavini, E., C. Vismara, and M.L. Broccia. "Teratogenesis Study of Dioxane in Rats." *Toxicology Letters* 26:85-88. 1985.

Geo-Marine. *Draft Integrated Natural Resources Management Plan: Marine Corps Air Station Cherry Point, North Carolina.* 1998.

Giese, G.L., Eimers, J.L., and Coble, R.W. *Simulation of Ground-Water Flow in the Coastal Plain Aquifer System of North Carolina,* U.S.G.S. Professional Paper 1404-M. 1997.

Grimes, J. and M. Jaber. *Para-dichlorobenzene: An Acute Oral Toxicity Study with the Bobwhite, Final Report.* Prepared by Wildlife International Ltd., Easton, MD, under project No. 264-101 and submitted to Chemical Manufacturers Association, Washington, DC, July 19, 1989.

Halliburton NUS *Final RCRA Facilities Investigation, 21 Units, Marine Corps Air Station Cherry Point, North Carolina,* Contract Numbers N62470-90-C-7670 and N62470-90-C-7635, R-49-2-92-7, Halliburton NUS Project Numbers 3F25 and 8K39. June 1993.

Halliburton NUS Final Technical Direction Memorandum, *10 Units, Marine Corps Air Station Cherry Point, North Carolina,* Contract Numbers N62470-90-C-7670 and N62470-90-C-7635, R-05-93-7, Halliburton NUS Project Number 9P60. August 1993.

Health Effects Assessment Summary Tables, FY-1997 Annual. (HEAST) Office of Research and Development, US Environmental Protection Agency, Washington D.C. 1997.

Heinz, G.H. "Mercury Poisoning in Wildlife." Chapter 11 in *Non-Infectious Diseases of Wildlife, Second Edition* (eds., A. Fairbrother, L.N. Locke, and G.L. Hoff). Iowa State University Press, Ames, Iowa. 1996.

Hill, E.F., R.G. Heath, J.W. Spann, and J.D. Williams. *Lethal Dietary Toxicities of Environmental Pollutants to Birds.* U.S. Fish and Wildlife Service Special Scientific Report-Wildlife No. 191, Washington D.C. 1975.

Hill, E.F. and M.B. Camardese. *Lethal Dietary Toxicities of Environmental Contaminants and Pesticides to Coturnix.* U.S. Fish and Wildlife Service Technical Report 2. 1986.

Horst, T.W. Lagrangian. "Similarity Modeling of Vertical Diffusion from a Ground-Level Source." *Journal of Applied Meteorology,* 18:733-740. 1979

Howard, P.H. *Environmental Degradation Rates.* Lewis Publishers. Chelsea, Michigan. 1991.

Jackson, H.H.T. *Mammals of Wisconsin.* University of Wisconsin Press, Madison, WI. 1961.

Jones, J. K, Jr., and E. C. Birney. *Handbook of Mammals of the North-Central States.* University of Minnesota Press, Minneapolis. 1988.

Lloyd, Jr., O.B. and C.C. Daniel, III. "Hydrogeologic Setting, Water Levels, and Quality of Water From Supply Wells at the U.S. Marine Corps Air Station Cherry Point, North Carolina." *U.S.G.S. Water Resources Investigations Report* 88-4034. 1988.

Long, E.R. and L.G. Morgan. *The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program.* NOAA Technical Memorandum NOS MOA 52. National Oceanic and Atmospheric Administration. 1991.

Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments. *Environmental Management.* 19(1), 81-97. 1995.

MacDonald, D. D. *Approach to the Assessment of Sediment Quality in Florida Coastal Water.* Florida Department of Environmental Protection, Tallahassee, Florida. 1994.

McCollister, D.D., P.T. Lockwood, and V.K. Rowe. "Toxicologic information on 2,4,5-trichlorophenol." *Toxicology and Applied Pharmacology* 3:63-70. 1961.

Meyer, R.L. and T.G. Balgooyen. A Study and Implications of Habitat Separation by Sex of Wintering of American Kestrels (Falco sparverius L.). Raptor Res. 6:107-123. 1987.

Mirachi, R.E. and T.S. Baskett. *Mourning Dove.* The Birds of North America. No. 117. 1994.

Montgomery, J.H., and L.M. Welkom. *Groundwater Chemicals Desk Reference.* Lewis Publishers. Chelsea, Michigan. 1990.

Murray, Jr., L.C. and K.M. Keoughan. "Hydrogeologic, Water-Level, and Water-Quality Data from Monitoring Wells at the Marine Corps Air Station Cherry Point, North Carolina," *U.S.G.S. Water Resources Investigations Report* 89-4200. 1990.

Nagy, K.A. Field metabolic rate and food requirement scaling in mammals and birds. Ecol. Mono. 57:111-128. 1987.

National Academy of Sciences. RDAs. 1989

National Information Services Corporation (NISC). *The Species Information Library.* Baltimore, MD. 1996.

Naval Energy and Environmental Support Activity (NEESA), U.S. Navy. *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program*, prepared by Martin Marietta Energy Systems, Inc. for the U.S. Department of Energy, Contract No. DE-AC05-840R21400, NEESA 20.2-047B. 1988.

North Carolina. North Carolina Soil Screening Levels Table. September 13, 1999.

North Carolina. *Maximum Allowable Concentrations as defined in North Carolina Administrative Code*, 15A NCAC 2L.0200. 1993.

North Carolina Department of Environment and Natural Resources (NCDENR). *Solid Waste Management Unit (SWMU) Mangement Plan for Marine Corps Air Station Cherry Point*. Letter from George Lane of NCDENR to G. W. Radford of MCAS Cherry Point. January 28, 2002.

National Toxicology Program (NTP). *Teratologic Evaluation of Phenol in CD Rats*. Prepared by C.N. Joexes-Price, Research Triangle Institute, Research Triangle Park, N.C. NTIS PB83247726. Government Rep. Announce Index 83(25):6247. 1983.

NTP. *Toxicology and Carcinogenesis Studies of 24-dichlorophenol in F344/N Rats and B6C3F1 Mice (Feed Studies)*. Technical report series no. 353. Research Triangle Park, NC. U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health. 1989.

NTP. Technical Report Series No. 458, NTP TR458. Prepared by U.S. Department of Health and Human Services. 1997.

O'Hara, T.M. and C.D. Rice. "Polychlorinated biphenyls." Chapter 7 in *Non-infectious Diseases of Wildlife, Second Edition* (eds., A. Fairbrother, L.N. Locke, and G.L. Hoff). Iowa State University Press, Ames, Iowa. 1996.

Patton, J.F. and M.P. Dieter. *Effects of Petroleum Hydrocarbons on Hepatic Function in the Duck*. Comp. Biochem. Physiol. 65C:33-36. 1980.

Persaud, D., R. Jaagumagi, and A. Hayton. *Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario*. Ontario Ministry of Environment and Energy. 1993.

Reinecke, A.J. and R.G. Nash. Toxicity of 2,3,7,8-TCDD and Short-Term Bioaccumulation by Earthworms (Oligochaeta). *Soil Biology and Biochemistry*. 16:45-49. 1984.

R.E. Wright Environmental, Inc. *Geoprobe® Site Check, Former UST Location 4182*, Marine Corps Air Station Cherry Point, North Carolina, Contract Number N62470-93-D-4035, Delivery Order No. 0053, Project Number 97221. 1996.

Rigdon, R.H. and J. Neal. "Fluorescence of Chickens and Eggs Following the Feeding of Benzpyrene Crystals." *Texas Reports on Biology and Medicine* 21(4):558-566. 1963.

Rigdon, R.H., and J. Neal. "Absorption and Excretion of Benzpyrene Observation in the Duck, Chicken, Mouse, and Dog." *Texas Reports on Biology and Medicine* 21(2):247-261. 1963.

Robbins, C.T. *Wildlife Feeding and Nutrition*. Academic Press. New York. 1983.

Robinson K.S., R.J. Kavlock, N. Chernoff, and L.E. Gray. "Multigeneration Study of 1,2,4-Trichlorobenzene in Rats." *Journal of Toxicology and Environmental Health* 8:489-500. 1981.

Sample, B.E., D.M. Opresko, and G.W. Suter, II. 1996. *Toxicological Benchmarks for Wildlife: 1996 Revision.* Oak Ridge National Laboratory, Oak Ridge, TN. ES/ER/TM-86/R3.

Sample, B.E., J.J. Beauchamp, R.A. Efroymson, and G.W. Suter, II. *Development and Validation of Bioaccumulation Models for Small Mammals.* Prepared by Lockheed Martin Energy Systems, Inc. for US Department of Energy. ES/ER/TM-219. 1998.

Samuel, D.E. and B.B. Nelson. "Foxes (Vulpes vulpes and Allies)." Chapter 22 in *Wild Mammals of North America – Biology, Management, and Economics* (eds., J.A. Chapman and G.A. Feldhammer). The Johns Hopkins University Press, Baltimore. 1987

Schafer, E.W. and W.A. Bowles. *Acute Oral Toxicity and Repellency of 933 Chemicals to House and Deer Mice.* Arch. Envir. Cont. Toxicol. (111-129) 1985.

Sealander, J.A. *A Guide to Arkansas Mammals.* River Road Press Conway, Arkansas. 1979.

Silva, M. and J.A. Downing (ed.). *CRC Handbook of Mammalian Body Masses.* CRC Press, NY. 1995.

Syracuse Research Corporation (SRC). *Experimental octanol/water partition coefficient (Log P) database.* http://esc.syrres.com/~esc1/srckowdb.htm. 1998.

Terres, J.K. The Audubon Society Encyclopedia of North American Birds. Alfred A. Knopf. 1980.

Tetra Tech NUS, 1994 sampling data and other investigation information not published in a formal report, provided to D. Bitterman of CH2M HILL by Tetra Tech NUS via correspondence dated April 1, 1998.

Tetra Tech NUS, *Background Evaluation Report for Marine Corps Air Station, Cherry Point, North Carolina,* Contract No. N62472-90-D-1298, Contract Task Order 0244, October 1999.

Tetra Tech NUS, *Approach for Using Screening Criteria Marine Corps Air Station Cherry Point, North Carolina.* November 10, 1999.

Texas Department of Parks (TXPW). *The Mammals of Texas, Online Edition.* Page maintenance by the Texas Cooperative Research Unit at Texas Tech University. Last updated on 24 December 1997. (http://www.nsrl.ttu.edu/tmot/reithumu.htm). 1994.

Travis, C.C. and A.D. Arms. "Bioconcentration of Organics in Beef, Milk, and Vegetation." *Environmental Science and Technology.* 22:271-274. 1988.

Tucker, R.K. and D.G. Crabtree. *Handbook of Toxicity of Pesticides to Wildlife.* U.S. Fish and Wildlife Service., Bur. Sprot Fish. Wild. Resource Publ. No. 84. 1970.

USEPA. *Health Effects Assessment for Iron (and Compounds).* Environmental Criteria and Assessment Office and Office of Solid Waste and Emergency Response. Washington, D.C. EPA/540/1-86/054. September 1984.

USEPA. *Technical Support Document for Water Quality-Based Toxics Control.* EPA/440/4-85/032. 1985.

USEPA. *Guidelines for Health Risk Assessment of Chemical Mixtures.* Federal Register Vol. 51 34014-34041. September 24, 1986.

USEPA. *Air Superfund National Technical Guidance Study Series Volume III – Estimation of Air Emissions from Cleanup Activities at Superfund Sites. Interim Final.* Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. EPA-450/1-89-003. January 1989.

USEPA. *Interim Procedures for Estimating Risk Associated With Exposures to Mixtures of Chlorinated Dibenzo-p-dioxins and -dibenzofurans and 1989 Update,* Document No. EPA/625/3-89/016. March 1989.

USEPA. *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual, Part A, Interim Final.* Office of Solid Waste and Emergency Response. EPA/540/1-89/002. December 1989.

USEPA. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors" OSWER Directive 9285.6-03. March 25, 1991.

USEPA. *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual, Part B: "Development of Risk-based Preliminary Remedial Goals."* Office of Solid Waste and Emergency Response. OSWER Directive 9285.7-01B. December 13, 1991.

USEPA. *Dermal Exposure Assessment: Principles and Applications.* Interim Report. Office of Research and Development. EPA/600/8-91/011B. January 1992.

USEPA, *Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses,* January 1993.

USEPA, *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses,* April 1993.

USEPA. *Wildlife Exposure Factors Handbook.* Vol. I and II. Office of Research and Development. EPA/600/R-93/187a. December 1993.

USEPA. *Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.* November 1993.

USEPA. *Estimating Exposure to Dioxin-like Compounds.* Volumes I-III. Review Draft. Office of Research and Development, Washington D.C. EPA/600/6-88/005Ca,b,c. 1994.

USEPA. *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities.* OSWER Directive #9355.4-12. July 14, 1994.

USEPA, *Region III Modifications to National Functional Guidelines for Organic Data Review, Multi-Media, Multi-Concentration,* September 1994.

USEPA. Revised Region III BTAG Screening Levels. Memorandum from Robert S. Davis of the USEPA Region III Technical Support Section, Philadelphia, Pennsylvania, dated August 9, 1995.

USEPA. *Internal Report on Summary of Measured, Calculated and Recommended Kow Values.* Environmental Research Laboratory, Athens, GA. 10 April 1995.

USEPA. *Assessing Dermal Exposure from Soil. Region III Technical Guidance Manual, Risk Assessment. Hazardous Waste Management Division, Office of Superfund Programs.* EPA/903-K-003. December 1995.

USEPA. *Soil Screening Guidance: User's Guide.* Office of Solid Waste and Emergency Response, Washington, D.C. EPA/540/R-96/018. April 1996.

USEPA, *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*, EPA Region IV, May 1996.

USEPA. *Supplemental Guidance to RAGS: Region 4 Bulletins.* Office of Technical Services, USEPA Region 4. October 1996.

USEPA. *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. Interim Final.* EPA/540/R-97/006. 1997.

USEPA. *Exposure Factors Handbook.* EPA/600/P-95/002Fa. 1997

USEPA. *Terrestrial Toxicity Database (TERRETOX).* Environmental Research Laboratory. U.S. Environmental Protection Agency, Duluth, Minnesota. 1998.

USEPA. *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments.* Office of Solid Waste and Emergency Response. EPA 540-R-97-033. OSWER 9285.7-01D. January 1998.

USEPA. *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual Supplemental Guidance, Dermal Risk Assessment Interim Guidance*, November 6, 1998.

USEPA. *Region 4 Ecological Risk Assessment Bulletin – Supplement to RAGS.* August 11, 1999.

USEPA. *Data Validation Standard Operating Procedures For Contract Laboratory Program Routine Analytical Services, Revision 2.1. Region IV Science and Ecosystem Support Division Office Of Quality Assurance*, Athens, Georgia, May, 1999.

USEPA. *National Recommended Water Quality Criteria – Correction. USEPA Office of Water.* EPA 822-Z-99-001. April 1999.

USEPA. EPA Region III Risk-Based Concentration Table. September 25, 2001.

USEPA. *Integrated Risk Information System Database.* 2002.

USEPA/ACOE. 1998. *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual* (inland testing manual). EPA/823/B-98/004.

Water and Air Research, Inc. *Initial Assessment Study of Marine Corps Air Station Cherry Point, North Carolina*, Naval Energy and Environmental Support Activity, Port Hueneme, California. March 1983.

Whitaker, J.O., Jr. *The Audubon Society Field Guide to North American Mammals.* Alfred A. Knopf, NewYork. 1980.

Winner, Jr., M.D. and R.W. Coble. *Hydrogeologic Framework of the North Carolina Coastal Plain*, U.S.G.S. Professional Paper 1404-I. 1996.

Wood, J.E., Davis, D.E., Komerek, and E.V. "The Distribution of Fox Populations in Relation to Vegetation in Southern Georgia." *Ecology*. 39:160-162. 1958.

Zeiner, D. C., W. F. Laudenslayer, Jr., K. Mayer, and M. White. *California's Wildlife, Volumes I, II, and III*. California Statewide Wildlife Habitat Relationships System. Department of Fish and Game. 1990.

Attachments

Attachment 1
Site 35 No Further Action (NFA) Letter

North Carolina
Department of Environment and Natural Resources

Division of Waste Management

Michael F. Easley, Governor
William G. Ross Jr., Secretary
Dexter R. Matthews, Director

28 January, 2002

Mr. G. W. Radford
Environmental Affairs Department
Marine Corps Air Station
PSC Box 8006
Cherry Point, NC 28533-0000

RE: SOLID WASTE MANAGEMENT UNIT (SWMU) MANAGEMENT PLAN FOR MARINE CORPS AIR STATION CHERRY POINT.

Dear Mr. Radford:

The North Carolina Division of Waste Management Superfund Section has completed the review of the aforementioned plan and provides the following comments:

1. NCDENR have no problem with moving SWMUs 35 and 99 to no further action, or the IWTP structures and the S-2 Boat Docks.
2. Also, we agree you can check the oil water separators as you close them.
3. As far as what can be dismissed as a nutrient, EPA region IV guidance does not allow aluminum, manganese and iron to be dismissed as nutrients. Potassium, magnesium and sodium are ok though.
4. For background samples you can use 2x the mean to determine background.
5. SWMU 17, 44A, and 44B should be switched to the IR program but not made NFA.

If you have any questions, please contact me at 919-733-2801 ext. 340.

Sincerely,

George Lane
Environmental Engineer II
SF Federal Remediation Branch

CC: Beth Hartzell, DENR
Ken Cobb, USMC

Attachment 2
Supplemental Remedial Investigation Report

Supplemental Remedial Investigation (SRI) Report

Operable Unit 6, Site 12
Marine Corps Air Station Cherry Point
North Carolina

Prepared for:

Navy CLEAN III Program

Contract No. N62470-02-D-3052
Contract Task Order – 0052

May 2005

Prepared by:

CH2MHILL

Contents

Acronyms and Abbreviations v

1. Introduction 1-1

2. Site Description and History 2-1
- 2.1 Operable Unit 6 Description 2-1
- 2.2 Site 12 - Crash-Crew Training Area 2-1
- 2.3 Summary of Previous Investigations 2-3

3. Field Investigation 3-1
- 3.1 Mobilization 1 3-1
  - 3.1.1 Soil Sampling 3-1
  - 3.1.2 Groundwater Sampling 3-2
- 3.2 Mobilization 2 3-2
  - 3.2.1 Soil Sampling 3-2
  - 3.2.2 Groundwater Sampling 3-3
- 3.3 Field Sampling Protocols, Laboratory Protocols, and Data Management 3-3
  - 3.3.1 Decontamination Sampling Equipment 3-4
  - 3.3.2 Utility Clearance 3-4
  - 3.3.3 Sample Handling 3-4
  - 3.3.4 Investigation-Derived Waste (IDW) Handling 3-4
  - 3.3.5 Surveying 3-4
  - 3.3.6 Sample Analysis 3-4

4. Summary of Results 4-1
- 4.1 Data Management and Evaluation 4-1
  - 4.1.1 Data Tracking and Validation 4-1
  - 4.1.2 Data Qualifiers 4-1
  - 4.1.3 Evaluation of Non-Site-Related Analytical Results 4-2
  - 4.1.4 Regulatory and Risk-Based Standards and Screening Criteria 4-2
- 4.2 Summary of Analytical Results 4-3
  - 4.2.1 Soil 4-3
  - 4.2.2 Groundwater 4-3
- 4.3 Hot Spot/Plume Delineation 4-4
  - 4.3.1 Soil 4-4
  - 4.3.2 Groundwater 4-5
- 4.4 Human Health Risk Assessment 4-5

5. Conclusions and Recommendations 5-1
- 5.1 Conclusions 5-1
  - 5.1.1 Burn Pit E Soil 5-1
  - 5.1.2 Burn Pit E Groundwater 5-1
- 5.2 Recommendations 5-2

6. References 6-1

Tables

1 Soil Sampling Summary
2 Surface and Subsurface Soil Detects and Exceedances of Screening Criteria
3 Groundwater Detects and Exceedances of Screening Criteria
4 Selection of Exposure Pathways
5 Occurrence, Distribution, and Selection of Chemicals of Potential Concern
6 Medium-Specific Exposure Point Concentration Summary
7.1 Values Used for Daily Intake Calculations (Exposure Medium: Subsurface Soil)
7.2 Values Used for Daily Intake Calculations (Exposure Medium: Air)
8.1 Non-Cancer Toxicity Data-Oral/Dermal
8.2 Non-Cancer Toxicity Data-Inhalation
9.1 Cancer Toxicity Data-Oral/Dermal
9.2 Cancer Toxicity Data-Inhalation
10.1 Calculation of Non-Cancer Hazards, RME for Subsurface Soil
10.2 Calculation of Non-Cancer Hazards, RME for Air
11 Summary of Receptor Risks and Hazards for COPCs

Figures

1 Base Location Map
2 OU6 Location Map
3 Site Location Map
4 1978 Aerial Photograph with Supplemental Investigation Locations
5 Supplemental Remedial Investigation Sample Results, Mobilization 1
6 Horizontal Extent of Soil Contamination Exceeding SSLs
7 Groundwater Detections and Exceedances

Appendices

A Raw Analytical Results and Statistical Data
B MOB 1 Validation Report

Acronyms and Abbreviations

AST	aboveground storage tank
BEHP	bis(2-ethylhexyl)phthalate
bgs	below ground surface
CLEAN	Comprehensive Long-term Environmental Action Navy
CLP	Contract Laboratory Program
COPC	chemical of potential concern
CTO	Contract Task Order
DAF	Dilution Attenuation Factor
DPT	Direct Push Technology
DQO	Data Quality Objective
EPC	Exposure Point Concentration
ft bgs	feet below ground surface
FS	Feasibility Study
FSP	Field Sampling Plan
GPS	Geographical Positioning System
HI	hazard index
HHRA	Human Health Risk Assessment
IDW	investigation-derived waste
IRIS	Integrated Risk Information Systems
IWTP	Industrial Wastewater Treatment Plant
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MCAS	Marine Corps Air Station
MCL	Maximum Contaminant Level
MOB	mobilization
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NAVFAC	Naval Facilities Engineering Command
NC 2L	North Carolina 2L groundwater standard
NC DENR	North Carolina Department of Environment and Natural Resources
NC SSL	North Carolina Soil Screening Level
NFESC	Naval Facilities Engineering Service Center
NPDES	National Pollution Discharge Elimination System
NPDWR	National Primary Drinking Water Regulations
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit

PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
PPRTV	Provisional Peer-Reviewed Toxicity Values
PRG	Preliminary Remediation Goal
QA	quality assurance
QC	quality control
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
SMCL	Secondary Maximum Contaminant Level
SRI	Supplemental Remedial Investigation
SVOC	semi-volatile organic compound
TPH	total petroleum hydrocarbons
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
µg/kg	micrograms per kilogram
µg/L	micrograms per liter

1. Introduction

This report presents the results of the Supplemental Remedial Investigation (SRI) activities at Operable Unit (OU) 6, Site 12, Marine Corps Air Station (MCAS) Cherry Point, North Carolina. It has been prepared in accordance with the scope of work provided by Naval Facilities Engineering Command (NAVFAC) Atlantic, as a part of Navy Comprehensive Long-term Environmental Action Navy (CLEAN) III Contract N62470-02-D-3052, Contract Task Order (CTO) 0052.

Site investigation activities were conducted to provide supplemental data addressing data gaps identified during review of the *Draft Final Remedial Investigation (RI) Report for Operable Unit 6, Site 12, Marine Corps Air Station, Cherry Point, North Carolina* (CH2M HILL, 2002). Concerns were raised by U.S. Environmental Protection Agency (USEPA) and North Carolina Department of Environment and Natural Resources (NC DENR) regarding the extent of sampling beneath historic burn pit locations during the initial RI activities. The data collected during SRI activities will be used in conjunction with the data presented in the Draft Final RI Report to further evaluate the nature and extent of contamination at OU6, Site 12. Any identified potential risks to human health and the environment, based on the additional data, will be used to support risk conclusions in the Final RI Report. This document will be presented as an appendix in the Final RI Report for OU6, Site 12, and will be delivered in final form as part of that report.

The contents of this report include a site description, a summary of field investigation activities, a summary of analytical results, and the conclusions and recommendations of the SRI.

2. Site Description and History

This section provides the site description and history of OU6, Site 12 as well as a brief summary of the results of previous investigations at the site. A more detailed account of previous investigations at OU6, Site 12 can be found in the *Final Remedial Investigation (RI) Report for Operable Unit 6, Site 12, Marine Corps Air Station, Cherry Point, North Carolina*, CH2M HILL, 2005.

2.1 Operable Unit 6 Description

OU6 consists of the eastern portion of Runway 28, which is located in the northeastern portion of MCAS Cherry Point (Figure 1 and Figure 2). Based on an inspection of historical aerial photographs, Runway 28 does not appear to have been used as an active runway for aircraft takeoffs and landings since the late 1950s. Since that time, portions of the eastern section of Runway 28 have been used for crash-crew training (fire-fighting), engine run-up (maintenance and testing) activities, and aircraft long-term storage experimentation (CH2M HILL, January 1999).

The runway surface at OU6 is mostly asphalt, with a number of relatively small concrete pads located in the eastern portion of the runway. The runway is bordered by grassy areas to the north, south, and east, with dense woods beyond the grass. The runway represents a topographic high in the immediate area, with the ground surface sloping away gently to the north and east, and more rapidly to the south. Hancock Creek is located approximately 700 feet east of the eastern edge of Runway 28. Access to OU6 is via a gravel road joining the northeast corner of Runway 28, or by crossing active runways from the west (CH2M HILL, January 1999).

2.2 Site 12 – Crash-Crew Training Area

Site 12 is located along the south side of Runway 28 at approximately the midpoint of the runway's length (Figure 3). The area is currently used for the training of the crash-crew fire and rescue personnel (CH2M HILL, January 1999).

The current principal features of Site 12 include:

- **Crash-Crew Burn Pit**: A circular concrete pad used to burn waste jet fuel (JP-5) to train crash-crews to extinguish fires. The concrete burn pit was reportedly constructed in 1985, and is approximately 100 ft in diameter with a 5-inch curb around the circumference (Halliburton NUS, June 1993). The burn pit itself is drained through subsurface piping to a nearby oil/water separator. A circular trench drain surrounds the burn pit approximately 10 ft beyond the concrete curb to capture runoff outside the pad. Runoff in the trench drain is also directed to the oil/water separator. Runoff outside of the trench drain flows southward across the asphalt into the grassy area south of the runway. An east-west trending drainage swale south of the runway eventually receives runoff entering the grassy area. A significant portion of this runoff flows into the grassy

area and the drainage swale through a small runoff channel located southwest of the burn pit, immediately east of the oil/water separator. During site visits by CH2M HILL, it was observed that crash-crew personnel had placed rocks and petroleum-absorbent socks in the runoff channel in an attempt to minimize erosion and capture any petroleum in runoff. It was also observed that the soils were stained in this area.

- **Oil/Water Separator:** An in-ground, rectangular concrete and steel oil/water separator constructed with the top surface at grade. The separator receives fire water contained within the burn pit, runoff captured in the trench drain, and runoff contained within a concrete pad beneath the waste JP-5 fuel tank (described below). The separator is approximately 5 ft wide, 10 ft long and 8 ft deep. The oil/water separator reportedly operated from 1985 to 1990, when effluent was discharged through a National Pollutant Discharge Elimination System (NPDES)-permitted outfall to a drainage swale located approximately 50 ft south of the oil/water separator (Halliburton NUS, June 1993). The separator's effluent pipe has been welded shut, and facilities maintenance personnel currently pump all liquids from the oil/water separator after training exercises or heavy rainfall and transport them to the Industrial Wastewater Treatment Plant (IWTP).

- **Drainage Swale:** A shallow earthen swale trending east to west located approximately 75 ft south of Runway 28. In general, flow in the drainage swale is westerly, where it meets a more substantial drainage ditch that flows in the opposite direction approximately 300 ft west of the oil/water separator. Flow in the larger drainage ditch is directed immediately to the south and later to the east, eventually discharging into Hancock Creek, located approximately 700 ft east of Runway 28. It was observed during site visits that the drainage swale in the vicinity of Site 12 is typically dry from adjacent to the oil/water separator west to the larger drainage ditch when precipitation is not occurring. However, the portion of the drainage swale to the east of the separator was wet and somewhat marshy, indicating that the portion of the swale with the lowest surface elevation is located east of the separator. There is no outlet for the drainage swale to the east.

- **Fuel Aboveground Storage Tank (AST)**: An approximately 8,000-gallon AST located approximately 200 ft west of the burn pit, is currently used to store waste JP-5 prior to use in the burn pit. Fuel is pumped from the tank to the burn pit through subsurface piping. The tank was reportedly installed in the early 1990s to replace an underground storage tank (UST). The AST sits on top of a concrete pad surrounded by a 2-ft concrete berm. A separate concrete truck pad with a 6-inch curb is located just north of the tank, to contain any spills from filling the tank. Both of the concrete pads associated with the tank drain through subsurface piping to the oil/water separator.

The five historical burn pits are shown on Figure 4 and are described below. The historical burn pits are labeled as A, B, C, D, and E on Figure 4 for reference.

- **Burn Pit A.** This burn pit is located furthest east of the five historical burn pits. Records indicate that the pit was used from 1964 to 1970 for fire fighting/crash-crew training. During the 1999 RI field activities a surface soil sample was collected at the approximate center of this former burn pit. Results showed no organic constituents exceeding screening criteria; however, iron and mercury were detected at concentrations greater than the North Carolina Soil Screening Levels (NC SSLs) and arsenic was detected at a

concentration greater than the USEPA Region III residential Risk-Based Concentration (RBC).

- **Burn Pit B.** This burn pit is located approximately 100 feet west of Burn Pit A (center of A to center of B). This burn pit was used for fire fighting/crash-crew training from 1978 to 1981. During the 1999 RI field activities a groundwater sample was collected from a permanent monitoring well located just south (less than 40 feet) of the approximate center of the burn pit. Results showed one detected organic compound (heptachlor epoxide) exceeding the Federal Maximum Contaminant Level (MCL). The results showed the inorganics aluminum, arsenic, iron, and manganese exceeding screening criteria. Of the inorganics exceeding screening criteria, aluminum, iron, and manganese exceeded the North Carolina 2L (NC 2L) groundwater standard.
- **Burn Pit C.** This burn pit is located approximately 100 feet west of the center of Burn Pit B and was utilized for fire fighting/crash-crew training during 1970. One surface soil sample was collected during the 1999 RI field activities. No organics exceeded screening criteria, although two inorganics (arsenic and iron) exceeded screening criteria.
- **Burn Pit D.** This burn pit is located approximately 200 feet west of the center of Burn Pit C and was in operation from 1978 to 1981 for fire fighting/crash-crew training. No previous sampling of soil or groundwater was conducted at the location of this former burn pit during the RI or previous investigations. This burn pit was the subject of the supplemental investigation activities described in this report.
- **Burn Pit E.** This burn pit is the most westerly of the historical burn pits and was operated from 1978 to 1981 for fire fighting/crash-crew training. No previous sampling of soil or groundwater was conducted at the location of this former burn pit during the RI or previous investigations. This burn pit was the subject of the SRI activities described in this report.

2.3 Summary of Previous Investigations

Several environmental investigations have been conducted at Site 12, beginning in 1991. The reports containing the detailed results of these investigations include:

- *Resource Conservation and Recovery Act (RCRA) Facilities Investigation – 21 Units.* Presents the results of soil, sediment, surface water, and groundwater sampling conducted in 1991 (Halliburton NUS, June 1993).
- *Technical Direction Memorandum – 10 Units,* (addendum to RCRA Facility Investigation). Presents the results of soil, surface water, and groundwater sampling conducted in 1993 (Halliburton NUS, August 1993).
- *Geoprobe Site Check, Former UST Location 4182.* Presents the results of soil and groundwater sampling conducted in 1996 (R.E. Wright Environmental, Inc., September 1996).
- *Final Remedial Investigation (RI) Report for Operable Unit 6, Site 12.* Presents the results of soil, sediment, surface water, and groundwater sampling conducted in 1999 (CH2M HILL, June 2005).

A summary of previous investigation results is provided below, organized by media. All sample locations and results are given in the Final RI Report. The sample locations are shown on Figures 5-1 through 5-9 of that report and the sampling results are shown on Tables 5-1 through 5-14 of the Final RI Report.

- **Surface and Subsurface Soil**
  - Antimony, cadmium, and chromium were detected in surface soil during the 1999 RI field activities at concentrations posing a potential risk to future residential receptors. Cadmium was also detected at concentrations in soil greater than the NC SSL, but it was not detected in groundwater.
  - Total petroleum hydrocarbon (TPH) contamination up to 1,220 milligrams per kilogram (mg/kg) was detected in near-surface soils (depths of 0.5 to 1 ft bgs) near the south edge of the runway. The source of this contamination is assumed to be surface runoff from the crash-crew training area.
  - TPH contamination up to 410 mg/kg was detected in subsurface soils at depths of 5 to 6 feet near the oil/water separator and former UST location. This may have resulted from downward migration of the near-surface TPH contamination documented in this same area, or possibly from a release from the oil/water separator and/or the former UST.
  - One surface soil sample (012SO11) was collected from 0 to 3 inches below ground surface (bgs) and contained 24 mg/kg of TPH. The sample was obtained near a drainage swale sediment sampling location (012SD01) that contained relatively high levels of TPH. The sample more likely reflects sediment than soil contamination.
  - Little or no contamination was detected in surface soils (0 to 3 inches bgs) at most locations away from the south edge of the runway, indicating that the lateral extent of surface soil contamination from runoff is limited.
  - No TPH contamination was detected in subsurface soil beneath the runway at monitoring well location 012GW04. This monitoring well appears to be located directly beneath Burn Pit D, as identified on historical aerial photographs.
  - Apparent staining of surface soil was observed during recent site visits in a runoff channel near the oil/water separator. This runoff channel is directed toward the drainage swale south of the runway.
- **Sediment and Surface Water**
  - No further evaluation of surface water and sediment was recommended by the 2002 Draft Final RI based on the results of the field investigation.
  - TPH contamination up to 150 mg/kg and oil and grease contamination as high as 1,330 mg/kg were detected in drainage swale sediments southwest of the former burn pit. The source of this contamination is assumed to be surface runoff from the crash-crew training area or previous discharges from the former oil/water separator outfall.

- No contamination was detected in drainage swale sediments downstream (west) of the above locations.
- TPH contamination was detected in one surface water sample (012SW02) downstream from the Site 12 drainage swale. However, site visits conducted by CH2M HILL indicated that surface water flow at this location is primarily from offsite, except during and shortly after precipitation events.

- **Groundwater**
  - The 2002 Draft Final RI (CH2M HILL) concluded that arsenic, Aroclor 1248, iron, and heptachlor epoxide were the only constituents in groundwater that were identified as posing a potential risk to human health or the environment. The results of the pesticide detection were determined to be unreliable due to the low-level detections. Iron was present at levels that will affect only the aesthetic quality of the groundwater, but not pose a human health risk.
  - Low concentrations of oil and grease were detected in two monitoring wells north and south of the former burn pit at a maximum concentration of 6.5 milligrams per liter (mg/L). No volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), or other petroleum hydrocarbon contamination was detected in groundwater samples. If significant petroleum hydrocarbon groundwater contamination exists at the site, it is likely to be localized in extent.
  - Concentrations of metals were higher in downgradient wells (012GW02 through 012GW04) than in upgradient well 012GW01, suggesting that the downgradient wells have been affected by the site.
  - Arsenic, iron, manganese, and mercury were detected in unfiltered samples from one or more monitoring wells at concentrations exceeding MCAS Cherry Point background concentrations and one or more regulatory standards or screening criteria. Similar concentrations of arsenic, iron, and manganese were also found in filtered samples, but mercury was not detected in the filtered samples.
  - A number of pesticides and one polychlorinated biphenyl (PCB), Aroclor 1248, were detected at the temporary monitoring well location (012TW01) during the 1999 RI field activities. All of the results at this location were low-level detections at estimated concentrations.

3. Field Investigation

The SRI activities for Site 12 included soil and groundwater sampling beneath the former burn pit areas D and E that were not sampled during earlier RI field activities. All field investigation activities were performed in accordance with the Work Plan for OU6 (CH2M HILL, January 1999) as well as the *Master Field Sampling Plan for MCAS Cherry Point, North Carolina* (Brown and Root Environmental, Inc., April 1998), except where indicated in this report.

This field investigation was completed utilizing two separate mobilizations. Mobilization (MOB) 1 in October 2003 involved the collection of two subsurface soil samples beneath the two western-most former burn pits (Burn Pit D and Burn Pit E) at Site 12 and three Direct Push Technology (DPT) grab groundwater samples taken from beneath Burn Pits D and E and the former location of temporary monitoring well 012TW01 (Figures 4 and 5). This mobilization was completed to satisfy the scope outlined in the *Draft Supplemental Site Investigation Plan for OU6, Site 12, MCAS Cherry Point* (AGVIQ/CH2MHILL JV I, July 2003). Upon receipt of the analytical results from MOB 1, it was determined by the Cherry Point Tier 1 Partnering Team that mobilization for an additional sampling event would be necessary to delineate the horizontal and vertical extent of SVOC contamination beneath the Burn Pit E (Figure 5). MOB 2 was completed in February 2004, and involved the collection of subsurface soil and groundwater beneath Burn Pit E at Site 12 (Figures 4 and 5).

3.1 Mobilization 1

3.1.1 Soil Sampling

A surface soil sample (just beneath the asphalt runway surface) was collected at the approximate center of each of the two former burn pits. The sample locations were based on historical aerial photographs that showed the former burn pit locations (Figures 4 and 5). In addition, a subsurface soil sample was collected from 5 to 6 feet below ground surface (ft bgs) at Burn Pit E due to odor and staining observed during screening of soil cores. Each surface soil sample was collected from the upper 12-inch interval just below the bottom of any surface cover material (i.e., concrete/asphalt runway surface). Table 1 lists the sample name, depth interval, evidence of contamination, and general soil type for samples collected.

The soil samples were collected by advancing an acetate-lined DPT sampling tool to the desired depth. After the tool was removed from the subsurface, the acetate sleeve was opened and the VOC sample was collected from the soil core using an Encore® sampling device. The lithology was visually characterized and the remaining sample interval material was homogenized and placed in the appropriate laboratory-provided sample container(s) for the analysis of SVOCs and PCBs.

One subsurface soil sample was collected at Burn Pit E because a black staining and what appeared to be a weathered petroleum-like substance was present in the bottom

1 to 2 inches of soils located at this sample interval. The black stained soils were accompanied by a "petroleum-like" odor observed when inspecting the soil cores. The predominately sandy soils located at the 5 to 6 ft bgs interval are underlain by a fine sandy/silty clay layer less than approximately 4 inches in thickness at the sample location. The subsurface sample was collected in the same manner as the surface soil samples.

All soil samples were analyzed for VOCs by USEPA Method 8260, SVOCs by USEPA Method 8270, and PCBs by USEPA Method 8082. Analytical soil sampling results are presented in Section 4. Raw analytical data and statistical results are included in Appendix A of this report.

3.1.2 Groundwater Sampling

Three groundwater samples were collected at Site 12 during MOB 1. One sample was collected in the same location as the former temporary well 012TW01 (Figure 4). In addition, groundwater samples were collected beneath the approximate center of Burn Pit D and Burn Pit E, at the same locations as the soil samples described above (Figure 5).

All groundwater samples were collected from a depth of approximately 10 ft bgs, which is the middle of the screened depth interval for former temporary monitoring well 012TW01. DPT methods were used to perform the groundwater sampling by advancing a stainless steel groundwater sampling tool to the desired depth, followed by thorough purging, collection of groundwater quality parameters, and sample collection from within the DPT groundwater sampling tool using a low-flow sampling technique and disposable sampling equipment. The VOC samples were collected first, using the "straw method," followed by the collection of the sample for analysis of SVOCs using a peristaltic pump.

The samples were analyzed for VOCs by USEPA Method 8260, SVOCs by USEPA Method 8270, and PCBs by USEPA Method 8082. Analytical groundwater sampling results exceeding screening criteria are presented in Section 4. Raw analytical and statistical results are included in Appendix A of this report.

3.2 Mobilization 2

Based on the results of MOB 1 it was determined that a second sampling phase would be necessary to define the extent of SVOC contamination in the vicinity of Burn Pit E. The first phase of sampling showed a visually identifiable material at approximately 5 to 6 ft bgs that could be a potential source of SVOCs detected in groundwater.

The goals of the second mobilization were to thoroughly define the extent of soil contamination both vertically and horizontally using visual identification and chemical results and to determine the extent of impacts to groundwater. In addition, a better understanding of geologic conditions at the site needed to be obtained to determine if the clay layer, located just below the potential contaminant source layer, was continuous or intermittent beneath Burn Pit E.

3.2.1 Soil Sampling

Twenty-nine subsurface soil cores in the vicinity of the Burn Pit E were collected and screened during MOB 2 (Figure 6). Twenty-seven samples for laboratory analysis of SVOCs

were collected from those cores. The samples were collected between 1 and 8 ft bgs depending on visual and/or photoionization detector (PID) reading. Three cores (SB22, SB23, and SB24) were sampled at two different depth intervals. In general, visual evidence of contamination was observed above a silty-to-sandy clay layer varying in depth from 4 to 6 ft bgs. Table 1 lists the sample names, depth interval, evidence of contamination, and general soil type of each sample.

The soil samples were obtained by advancing an acetate-lined DPT sampling tool to the desired depth. After the tool was removed, the acetate sleeve was split open. The lithology was visually characterized, and the sample interval material was homogenized and placed in the appropriate laboratory-provided sample container(s).

One-foot sample cores for homogenization and analysis were selected by first collecting continuous soil cores from the ground surface below the surface cover material (asphalt/concrete) to the water table. The continuous cores were then screened visually and with a PID every 6 to 12 inches, and a 1-foot section was selected for analysis. If no obvious signs of contamination (visual, odor, PID) were present, the investigation focused on the soil directly above the clay layer, which was typically located between 5 to 6 ft bgs.

All soil samples were analyzed for SVOCs by USEPA Method 8270. Results are presented in Section 4, and raw laboratory results and statistics are included in Appendix A of this report.

3.2.2 Groundwater Sampling

A total of 13 grab groundwater samples were collected during MOB 2 to delineate the horizontal extent of SVOC constituents in the groundwater beneath Burn Pit E. Figure 7 shows the MOB 2 groundwater sampling locations, in addition to the location of the MOB 1 groundwater sample (012GW05-1216). The samples were collected from 12 to 16 ft bgs at all locations except GW06. The sample at GW06 was collected from the 10 to 14 ft bgs interval. The water table was typically encountered between 8 to 11 ft bgs.

DPT methods were used to perform the groundwater sampling by advancing a stainless steel groundwater sampling tool to the desired depth, followed by thorough purging, collection of groundwater quality parameters, and sample collection from within the DPT groundwater sampling tool using a low-flow sampling technique and disposable sampling equipment.

The samples were analyzed for SVOCs by USEPA Method 8270. Analytical groundwater sampling results that exceeded screening criteria are presented in Section 4 and are shown on Figure 7. Raw analytical and statistical results are included in Appendix A of this report.

3.3 Field Sampling Protocols, Laboratory Protocols, and Data Management

Standard operating procedures for various field activities are described in the *Master Field Sampling Plan (FSP) for MCAS Cherry Point, North Carolina* (Brown and Root Environmental, Inc., April 1998) which is referred to in the following paragraphs as the Master FSP.

3.3.1 Decontamination Sampling Equipment

All equipment involved in field investigation activities was decontaminated upon arrival to the site, between sampling or borehole locations, and at the conclusion of investigation activities. Details on procedures for decontamination can be found in Section 2.14 of the Master FSP.

3.3.2 Utility Clearance

All proposed subsurface sampling points were cleared for subsurface utilities by a utility locating subcontractor.

3.3.3 Sample Handling

Sample handling includes the field-related considerations regarding field sample documentation, nomenclature, packaging, shipping and custody. Sample handling and custody procedures are described in Sections 2.10 and 2.11 respectively, of the Master FSP and Section 4.0 of the *Master Quality Assurance Plan for MCAS Cherry Point, North Carolina* (Brown and Root Environmental, Inc., April 1998).

3.3.4 Investigation-Derived Waste (IDW) Handling

Four types of potentially contaminated wastes were generated during the investigation: (1) personal protective equipment (PPE) and acetate liners from the soil cores; (2) fluids from the decontamination of the direct-push equipment and sampling tools and equipment; (3) purge water from the well development and groundwater sampling; and (4) incidental soils remaining from DPT soil cores. PPE, acetate liners, and other disposable material from soil and groundwater sampling were disposed of as ordinary trash. All fluids from decontamination, well development, and groundwater purging/sampling were contained and disposed of at the Air Station IWTP. Any incidental soil remaining from sampling activities was returned to the borehole from which it was obtained. Further details on procedures for the handling and disposal of these materials can be found in Section 2.15 of the Master FSP.

3.3.5 Surveying

The locations of direct-push soil and groundwater samples collected as part of this field investigation were surveyed for horizontal control using a Trimble Pro-XRS Geographical Positioning System (GPS) unit.

3.3.6 Sample Analysis

CH2M HILL was responsible for tracking samples and obtaining analytical results from the laboratory. The samples were analyzed by an offsite laboratory with full documentation using USEPA-approved SW-846 methods. Analyses included the proper ratio of field quality control (QC) samples recommended by Naval Facilities Engineering Service Center (NFESC) guidance for the data quality objectives (DQOs).

All analyses of soil and groundwater samples were conducted at a subcontracted laboratory that fulfills all requirements of the U.S. Navy's quality assurance/quality control (QA/QC) program manual and USEPA's contract laboratory program (CLP). A signed certificate of

analysis was provided with each laboratory report, along with a certificate of compliance certifying that all work was performed in accordance with the applicable Federal, State, and local regulations. All analyses were performed following the highest level of Navy guidance.

In addition to regular calibration of field equipment and appropriate documentation, QC samples were collected or generated during environmental sampling activities. These QC samples include field duplicates, trip blanks, equipment rinseate blanks, matrix spike/matrix spike duplicates (MS/MSD), and field blanks. QC samples were collected for all analytes and media that were submitted to the analytical laboratory.

4. Summary of Results

This section discusses the analytical results of the sampled soil and groundwater at OU6, Site 12. The discussion summarizes the management and evaluation of laboratory analytical data for all media sampled during the investigation and presents the results of the sampling activities. A detailed discussion of the sampling procedures and field activities is presented in Section 3 of this document.

4.1 Data Management and Evaluation

This section presents information on the management and evaluation of analytical data collected during the investigation, including data tracking and validation, non-site-related analytical results with respect to laboratory contaminants, and the Federal and State standards and criteria used to evaluate the analytical results.

4.1.1 Data Tracking and Validation

The management and tracking of data from the time of field collection to receipt of validated electronic analytical results is of primary importance, and reflects the overall quality of the analytical results. Field samples and their corresponding analytical tests were recorded on chain-of-custody forms for submission to the laboratory. Upon receipt of the samples by the laboratory, a comparison to the field information was made to determine if each sample was analyzed for the correct parameters. In addition, a check was made to ensure that the proper number of QA/QC samples was collected for each media and for each sampling episode. QA/QC samples include field blanks, equipment blanks, trip blanks, duplicates, MS/MSD samples, and laboratory blanks.

A complete set of the raw analytical data and statistical results are provided in Appendix A of this report. Analytical data reports for the MOB 1 were submitted to an independent data validation subcontractor for third-party data validation. Data reports were submitted in hard copy and electronic versions. Electronic versions were specifically formatted for download into the CH2M HILL master environmental database. Validation procedures established by the *National Functional Guidelines for Organic* (USEPA, 1994) and *Inorganic Analyses* (USEPA, 1993), as modified by USEPA Region III, were used during the validation process. These steps (third party validation and electronic data handling) serve to reduce inherent uncertainties associated with data authenticity and usability. Appendix B of this report contains the data validation reports.

4.1.2 Data Qualifiers

- Data qualified with a "J" flag indicate that the values were estimated.
- Data qualified with a "K" indicate that the analyte is present. The reported value may be biased high and the actual value is expected to be low.
- Data qualified with an "R" indicate the result is unreliable.

- Data qualified with a "U" indicate that the analyte was not detected and the associated number indicates the approximate sample concentration necessary to be detected.
- Data qualified with a "UJ" indicate that the analyte was not detected and the quantitation limit may be inaccurate or imprecise.

4.1.3 Evaluation of Non-Site-Related Analytical Results

Some of the organic constituents detected in groundwater at Site 12 may be attributed to non-site-related conditions or activities, such as laboratory contaminants. A discussion of non-site-related analytical results is provided in the following subsections.

4.1.3.1 Laboratory and Sampling Blank Contamination

Some chemical compounds detected in field samples may have been introduced during field sampling, transportation to the analytical laboratory, or during laboratory procedures. A variety of blank samples containing pure water is used in the QA process to determine which of the contaminants may not be attributable to the field sample. A field blank is collected to account for ambient conditions during sample collection. A rinseate blank is used to determine if the equipment used to collect the samples (e.g., groundwater sampling tools, acetate sleeves, and sample containers) was adequately cleaned. A trip blank is used to ascertain if volatile compounds were introduced during packing or shipping.

Common laboratory contaminants that can be introduced during the analytical process are acetone, 2-butanone, methylene chloride, and common phthalate contaminants. The laboratory includes a method blank in each batch of twenty samples analyzed to verify instrument cleanliness and function.

When sampling or laboratory blank samples are found to contain contaminants, each of the field samples that are associated with that blank and that contain similar concentrations are qualified during data validation with a "B" for that compound. A "B" qualifier means that the compound may not be attributed to the site at that sample location. For example, if acetone is found in a field blank at a concentration of 5 micrograms per liter (μg/L), an acetone concentration of 50 μg/L or less in any sample from the group associated with that blank would be given a "B" flag.

4.1.4 Regulatory and Risk-Based Standards and Screening Criteria

Analytical results for all media were compared against a variety of regulatory and risk-based standards or criteria. The screening criteria are identified below, according to each media.

- *Soil*
  - USEPA Region IX Preliminary Remediation Goals (PRGs) for industrial soils
  - NC SSLs for the protection of groundwater
- *Groundwater*
  - National Primary Drinking Water Regulations (NPDWR): MCLs and Secondary Maximum Contaminant Levels (SMCLs)
  - NC 2L Groundwater Standards
  - USEPA Region IX PRGs for tap water

4.2 Summary of Analytical Results

Within the investigation report text, data are summarized and presented by groups of samples that represent the soil and groundwater concentrations in OU6 samples. The tables and figures presented in this section are generally focused on results exceeding one or more regulatory screening criteria. Raw analytical and statistical results for all media are presented in Appendix A of this report.

4.2.1 Soil

Table 2 presents surface and subsurface soil detected analytes and screening criteria exceedances. Analyses for VOCs, SVOCs, and PCBs were performed on soil samples collected at the Burn Pits D and E during MOB 1 to fill data gaps identified from the earlier OU6, Site 12 RI fieldwork.

All VOCs and SVOCs detected in the surface soil samples were present at low concentrations (qualified with a 'J' as estimated concentrations below the quantitation or reporting limit) and none of the detected analytes exceeded screening criteria. PCBs were not detected in any soil samples.

VOC detections in subsurface sample 012SB20-0506, collected at a depth of 5 to 6 feet beneath Burn Pit E during MOB 1, were generally below screening criteria. Only ethylbenzene was detected at a concentration above the NC SSL, although the quantitation was estimated (J-flagged). Since only one VOC was detected above screening criteria in soil, and since no VOCs were detected above screening criteria in groundwater, MOB 2 samples were not analyzed for VOCs. Rather, MOB 2 focused on the nature and extent of SVOC contamination at Site 12.

SVOCs were detected in 19 of the 27 subsurface samples collected beneath Burn Pit E during MOB 2, as well as the single subsurface sample collected during MOB 1. Although a total of eight SVOCs were detected, naphthalene and 2-methylnaphthalene were the only compounds to exceed screening criteria. The NC SSL for naphthalene was exceeded in 14 samples (12 sample locations), including both depths at two of the three multi-depth sample locations (012SB23 and 012SB24). 2-methylnaphthalene exceeded the NC SSL in 12 samples (11 sample locations) including both depths at 012SB24. The highest naphthalene concentration (10,800 μg/kg) was detected at 012SB28-0304 from 3 to 4 feet bgs. Other SVOC compounds detected in at least one sample included dibenzofuran, fluorene, bis(2-ethylhexyl)phthalate (BEHP), acenapthene, caprolactum, and 4,6-dinitro-2-methylphenol, although none of these concentrations exceeded screening criteria.

SVOC results were used to delineate the horizontal and vertical extent of soil contamination in the vicinity of Burn Pit E. The results of the delineation are shown on Figure 6.

4.2.2 Groundwater

Table 3 presents detected groundwater analytes and screening criteria exceedances. Analyses for VOCs, SVOCs, and PCBs were performed on groundwater samples collected at OU6, Site 12 to fill data gaps identified from the initial RI investigation. During MOB 1, one VOC (ethylbenzene) was detected at one location (012GW05) at a concentration (1 J μg/L) that was below screening criteria. The SVOCs naphthalene and 2-

methylnaphthalene were also detected below screening criteria in the groundwater sample collected beneath Burn Pit E (012GW05). No PCBs were detected in any groundwater samples.

Samples were not analyzed for VOCs during the MOB 2, because of the limited number of VOCs detected during MOB 1 in either soil or groundwater, and because no VOCs in groundwater exceeded screening criteria. MOB 2 focused on the nature and extent of SVOC contamination beneath Burn Pit E. One or more SVOCs were detected in 3 of the 13 groundwater samples collected in the vicinity of Burn Pit E during MOB 2, as well as in the MOB 1 sample (012GW05). Three SVOCs were detected in exceedance of one or more screening criteria: 2-methylnaphthalene, naphthalene, and BEHP. The highest concentration of naphthalene (87.7 μg/L) was detected at 012GW10; this concentration exceeds the NC 2L groundwater standard and the Region IX tap water PRG. The maximum concentrations of 2-methylnaphthalene (42 μg/L at 012GW18), and BEHP (3.8 μg/L at 012GW06) also exceeded their respective NC 2L screening criteria. The groundwater sample locations and results shown in relation to the delineated area of SVOC soil contamination beneath Burn Pit E are presented in Figure 7.

The results from the sampling of former temporary monitoring well 012TW01 (from the earlier 1999 RI sampling) are included in Table 5-9 of the Final RI Report. Temporary monitoring well 012TW01 had been installed and sampled during the initial RI at OU6, Site 12 (Figure 4). A low level detection of Aroclor 1248 exceeding regulatory criteria was found in the groundwater sample collected at this location. During the SRI, an in-situ groundwater sample (012GW03) was collected at the same location (temporary monitoring well 012TW01 had been abandoned) for analysis of VOCs, SVOCs, and PCBs to confirm previous results. No VOCs, SVOCs, or PCBs were detected in the confirmation sample.

4.3 Hot Spot/Plume Delineation

4.3.1 Soil

Visual observations, PID field screening results, and analytical laboratory results were used to delineate the extent of SVOC contamination at Burn Pit E. Figure 6 shows the results of the horizontal delineation, which includes sample locations and results. Analytical samples were collected and the results evaluated against the NC SSLs to determine the maximum extent of SVOC contamination. Samples were collected in a pattern radiating outward from the center of the former burn pit, and the "no exceedance" boundary was determined. This boundary was based on analytical results showing concentrations less than NC SSLs, and extends approximately 15 feet north, 25 feet east, 50 feet south, and 50 feet west of the center of the former burn pit. The boundary is elongated on the southeast side, likely due to horizontal (downgradient) migration. The majority of the contamination was detected analytically and observed visually at various depths between 2 and 6 ft bgs and appears to be situated in the vadose zone above a low permeability (silty to sandy clay) layer. At two locations near the center of the defined contaminant area, the naphthalene SSL was exceeded at two different sample intervals (covering approximately 2 vertical feet). The vertical (downward) migration of contaminants seems to have been impeded by the low permeability layer. The total horizontal area of the soil contamination is less than 6,000 square feet.

4.3.2 Groundwater

Groundwater analytical results do not show a defined groundwater plume or hot spot in the vicinity of Burn Pit E (see Figure 7). Groundwater samples were collected across the area beneath the former burn pit, including upgradient, downgradient, and lateral to the soil contaminant boundary. Of the 14 locations sampled at Burn Pit E, 3 locations showed SVOC exceedances of NC 2L groundwater standards, one location had two SVOCs at concentrations less than the screening criteria, and the remaining 10 samples contained no SVOCs. The 3 locations with SVOCs above screening criteria form a line trending east to west across the former burn pit location. The western-most groundwater sample had a BEHP detection exceeding the NC 2L standard, although this constituent does not appear to be a result of activities at Site 12. No BEHP was detected in overlying soil samples at this location, and this compound is a common laboratory contaminant at concentrations comparable to this result. The two eastern-most samples had exceedances of naphthalene and 2-methylnaphthalene, which are likely associated with overlying soil contamination. SVOCs were not detected in groundwater samples collected downgradient of these two samples, indicated that impact to the groundwater from Burn Pit E is limited in extent.

4.4 Human Health Risk Assessment

The following is a summary of the Human Health Risk Assessment (HHRA) conducted using the data from the SRI. As stated earlier, subsurface soil samples and groundwater samples were collected at Burn Pit E to fill data gaps that were identified following initial RI activities.

Subsurface soil results were evaluated to identify potential risks to the future construction worker coming in contact with contaminants in soil during excavation activities. However, the groundwater samples could not be evaluated quantitatively, as the samples were collected using DPT. USEPA guidance does not allow the quantitative use of DPT groundwater sample results in risk assessments due to the potential for suspended solids to cause data quality concerns. DPT groundwater samples are considered "screening" level samples in terms of data quality.

The subsurface soil samples from this investigation were analyzed for SVOCs because compounds from this analyte class were identified as having concentrations in exceedance of NC SSLs during the supplemental investigation.

Chemicals of potential concern (COPCs) were selected for direct contact with soil by screening the maximum detected concentrations against the USEPA Region IX Residential Soil PRGs (USEPA, 2002). COPCs were selected for inhalation of volatiles/fugitive emissions from soil by screening the maximum detected concentrations against USEPA Region IX Residential Soil (inhalation) PRGs (USEPA, 2002). PRGs have not yet been developed for two of the SVOCs detected at the site (2-methylnaphthalene and 4,6-dinitro-2-methylphenol), although toxicity values for these chemicals are available through USEPA's Integrated Risk Information Systems (IRIS) and Provisional Peer-Reviewed Toxicity Values (PPRTV), respectively. As such, PRGs were developed for these constituents using the equations specified in the Region IX PRG *User's Guide, Technical Background Document* (USEPA, 2002).

The rationale for selection of potential receptors coming in contact with contaminants and the various pathways of exposure are described in Table 4. Two constituents, 2-methylnaphthalene and naphthalene exceeded 1/10 the value of the USEPA Region IX PRG in the initial screening of detected constituents against PRGs, and were carried forward through the remainder of the risk assessment process. The other site constituents were all detected at less than 1/10 the value of the USEPA Region IX PRG for residential soil, and were therefore screened from the risk assessment (Table 5).

Exposure point concentrations (EPCs) for the COPCs were calculated according to guidelines specified in USEPA's Risk Assessment Guidance for Superfund (RAGS), Volume 1, Human Health Evaluation Manual (Part A) (USEPA, 1989) and are summarized in Table 6. In calculating risks to the construction worker potentially coming in contact with COPCs in subsurface soils at the site, exposures through incidental ingestion, dermal contact, and inhalation routes were considered. Exposure assumptions (Tables 7.1 and 7.2), contaminant intake rates and toxicity values recommended by USEPA (Tables 8.1 and 8.2), and cancer toxicity data (Tables 9.1 and 9.2) were evaluated and used to calculate non-cancer hazards (Tables 10.1 and 10.2). Estimation of cancer risks to construction workers potentially exposed to subsurface soil at the hotspot was unnecessary because none of the COPCs were carcinogenic in nature.

The analysis indicated that the cumulative non-cancer risk (0.005) to the construction worker (Table 11) through the ingestion, dermal, and inhalation pathways is below USEPA's acceptable non-cancer Hazard Index (HI) of 1. Therefore, the subsurface soil beneath the historic burn pits does not pose a non-cancer hazard to construction workers that may be exposed to contaminants in this area.

5. Conclusions and Recommendations

5.1 Conclusions

The confirmation groundwater sample collected at former temporary monitoring well location 012TW01 showed no impacts from VOC, SVOC, or PCB contaminants. Soil and groundwater samples collected beneath the eastern of the two former burn pits (Burn Pit D) addressed in this SRI showed no impacts from VOC, SVOC, or PCB contaminants.

Soil and groundwater contamination was identified beneath Burn Pit E, the western of the two former burn pits addressed in this SRI. The conclusions drawn from these findings are summarized below.

5.1.1 Burn Pit E Soil

Surface soils at Burn Pit E showed no significant contaminant impacts. However, the subsurface soil in this area has been impacted by VOCs and SVOCs. One VOC was detected at an estimated concentration above NC SSLs in one sample, indicating a very limited extent of VOC impact. SVOCs in soil were detected over a larger area, delineated during MOB 2. The area of SVOCs exceeding SSLs extends approximately 15 feet north, 25 feet east, 50 feet south, and 50 feet west of the center of the former burn pit, identified by sample 012SB20. The majority of the contamination was detected analytically and visually in a depth interval from 2 to 6 ft bgs and appears to be situated in the vadose zone above a low permeability (silty to sandy clay) layer. The vertical (downward) migration of contaminants seems to have been slowed by this layer. The water table was observed between 8 to 11 ft bgs. The total area of impacted soil is approximately 6,000 square feet in size.

Naphthalene and 2-methylnaphthalene constitute the majority of SVOC subsurface soil contamination beneath Burn Pit E, and are the only SVOCs exceeding NC SSLs. The presence of these compounds in the subsurface appears to be consistent with what would be expected from a highly weathered fuel product associated with historical burn pit/fire-fighting activities in this area.

5.1.2 Burn Pit E Groundwater

Groundwater analytical results do not indicate a defined groundwater plume or hot spot in the vicinity of Burn Pit E, although groundwater has been impacted by the soil contamination described above. Fourteen locations were sampled, and three locations showed SVOC exceedances of NC 2L groundwater standards while the other 11 locations had no SVOC detections. The three exceedance locations trend east to west across the former burn pit. The western-most groundwater sample had a BEHP detection exceeding the NC 2L standard; however, this common laboratory contaminant does not appear to be associated with soil contamination in the area. The concentrations of naphthalene and 2-methylnaphthalene in the two eastern samples exceeded NC 2L standards, and are consistent with the overlying soil contamination. Groundwater samples collected downgradient of the soil hotspot showed no SVOC contamination.

5.2 Recommendations

Based on the conclusions outlined above, the following recommendations are presented:

- No further investigation is necessary to characterize the impacted area beneath Burn Pit E or to allow completion of the RI Report for OU6, Site 12.
- This SRI should be included in the OU6, Site 12 RI Report as an Appendix. Preparation of a Feasibility Study (FS) Report addressing Burn Pit E should commence and the following should be considered:
  - Monitoring of groundwater upgradient and downgradient of Burn Pit E.
  - Development of potential site-specific SSLs based on actual soil physical and chemical properties to see if soil remediation is warranted and if so, to determine the horizontal and vertical extent of soil to be remediated.
  - Evaluation of alternatives for the potential remediation of the soils beneath Burn Pit E (e.g., removal, in-situ treatment, etc.).

6. References

AGVIQ/CH2M Hill JV1, July 2003. *Draft Supplemental Site Investigation Plan for Operable Unit 6, Site 12, Marine Corps Air Station, Cherry Point, North Carolina.*

Brown and Root Environmental, Inc., April 1998. *Master Field Sampling Plan for Marine Corps Air Station Cherry Point, North Carolina.*

Brown and Root Environmental, Inc., April 1998. *Master Quality Assurance Plan for Marine Corps Air Station Cherry Point, North Carolina.*

CH2M HILL, January 1999. *Final Work Plan for Operable Unit 6, Crash Crew Training and Engine High-Power Run-Up Areas, Marine Corps Air Station, Cherry Point, North Carolina.*

CH2M HILL, 2005. *Final Remedial Investigation (RI) Report for Operable Unit 6, Site 12, Marine Corps Air Station, Cherry Point, North Carolina.*

Haliburton NUS, June 1993. *Final RCRA Facilities Investigation, 21 Units, Marine Corps Air Station Cherry Point, North Carolina.*

Halliburton NUS, August 1993. *Final Technical Direction Memorandum, 10 Units, Marine Corps Air Station Cherry Point, North Carolina,* Contract Numbers N62470-90-C-7670 and N62470-90-C-7635, R-05-93-7, Halliburton NUS Project Number 9P60.

North Carolina Department of Environment and Natural Resources, created July 2002, last updated December 2003. *Guidance for Establishing Remediation Goals at RCRA Hazardous Waste Sites.* Division of Waste Management, Hazardous Waste Section. Raleigh, North Carolina.

R.E. Wright Environmental, Inc, 1996. *Geoprobe® Site Check, Former UST Location 4182, Marine Corps Air Station Cherry Point, North Carolina,* Contract Number N62470-93-D-4035, Delivery Order No. 0053, Project Number 97221.

USEPA, 1989. *Risk Assessment Guidance for Superfund, Vol. 1, Human Health Evaluation Manual (Part A).* Interim Final. EPA/540/1-89/002. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C.

USEPA, April 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses.*

USEPA, September 1994. *Region III Modifications to National Functional Guidelines for Organic Data Review, Multi-Media, Multi-Concentration.*

USEPA, 2002. *Region IX Preliminary Remediation Goals. USEPA Region IX, San Francisco, California.*

USEPA, 2003. *Human Health Toxicity Values in Superfund Risk Assessments.* Office of Solid Waste and Emergency Reponses (OSWER) Directive 9285.7-53.

USEPA, 2004a. *2-Methylnaphthalene (CASRN 91-57-6)*. Integrated Risk Information System. Washington, D.C.

USEPA, 2004b. *Provisional Toxicity Value Summary For Dinitro-o-cresel, 4,6 – CAS: 000534-52-1*. Provisional Peer-Reviewed Toxicity Values (PPTRV) Database. Office of Superfund Remediation and Technology Innovation. Washington, D.C.

Tables

Table 1
Soil Sampling Summary
OU 6, Site 12
MCAS Cherry Point, NC

	Sample Name	Depth Interval (feet bgs)	Evidence of Contamination	Depth of Observed Contamination (feet bgs)	USCS Soil Type
MOB 1	012SS19-0001	0-1	Appears Clean	-	SW
	012SS20-0001	0-1	Appears Clean	-	SW
	012SB20-0506	5-6	Odor/Staining	4.0 - 6.0	SP
MOB 2	012SB21-0203	2-3	Odor/Staining	2.5 - 2.7 7.3 - 7.8	SC
	012SB22-0203	2-3	Odor/Staining	2.5 - 3.2	SP
	012SB22-0405	4-5	Charred Material	4.0 - 5.0	ML
	012SB23-0203	2-3	Odor/Staining	2.5 - 2.7 7.0 - 8.0	SW
	012SB23-0304	3-4	Charred Material	3.5	SW
	012SB24-0304	3-4	Odor/Staining	3.3 - 4.0	SP
	012SB24-0405	4-5	Odor/Staining	4.0 - 5.0	ML
	012SB25-0304	3-4	Appears Clean	-	SW
	012SB26-0304	3-4	Odor/Staining	3.0 - 4.0	SP
	012SB27-0203	2-3	Odor/Staining	2.7 - 3.0	CL
	012SB28-0304	3-4	Odor/Staining	3.3 - 4.4	SP
	012SB29-0304	3-4	Odor/Staining	4.0	SM
	012SB30-0203	2-3	Odor/Staining	1.9 - 2.4 9.0 - 10.0	SM
	012SB31-0304	3-4	Appears Clean	-	SM
	012SB32-0304	3-4	Black Residue, No Odor	3.0 - 3.4	SW
	012SB33-0304	3-4	Appears Clean	-	SW
	012SB34-0203	2-3	Black Residue, No Odor	2.0 - 2.4	SP
	012SB35-0102	1-2	Odor/Staining	1.0	SP
	012SB37-0304	3-4	Appears Clean	-	SP
	012SB38-0102	1-2	Appears Clean	-	CL
	012SB39-0203	2-3	Odor/Staining	2.5 - 3.5	CL
	012SB40-0203	2-3	Appears Clean	-	CL
	012SB41-0102	1-2	Odor/Staining	0.8 -2.3	SM
	012SB46-0405	4-5	Odor/Staining	4.4 - 4.6	SM
	012SB48-0304	3-4	Odor/Staining	3.3	SM
	012SB49-0304	3-4	Odor/Staining	3.0 - 4.0	SM
	012SB50-0304	3-4	Odor/Staining	3.0 - 4.0	CL

Notes:
All samples from Burn Pit E except 012SS19-0001
bgs - below ground surface
MOB 1 - First mobilization, October 2003
MOB 2 - Second mobilization, February 2004
USCS - Unified Soil Classification System
USCS Prefix: G = Gravel, S = Sand, M = Silt, C = Clay, O = Organic
USCS Suffix: W = Well Graded, P = Poorly Graded, M = Silty, L = Clay, LL < 50%, H = Clay, LL > 50%

Table 2
Surface and Subsurface Soil Detects and Exceedances of Screening Criteria
OU6 Site 12
MCAS Cherry Point, NC

Station ID	Screening Criteria		012SO19	012SO20			012SO21	012SB22		012SB23	
Sample ID	Region IX PRGs - Industrial Soil (1)	NC SSLs (2)	012SS19-0001	012SS20-0001	012SS20P-0001	012SB20-0506	012SB21-0203	012SB22-0203	012SB22-0405	012SB23-0304	012SB23-0203
Sample Date			10/21/03	10/21/03	10/21/03	10/21/03	2/10/2004	02/10/04	02/10/04	02/10/04	02/10/04
Chemical Name											
Volatile Organic Compounds (µg/kg)											
2-Butanone	27,000,000	692	**2 J**	32 U	13 U	12 U	NA	NA	NA	NA	NA
Acetone	6,000,000	2,810	**10 J**	**14 J**	**8 J**	**140**	NA	NA	NA	NA	NA
Benzene	1,300	5.62	6 U	13 U	5 U	**3 J**	NA	NA	NA	NA	NA
Bromomethane	13,000	--	**5 J**	13 U	**6**	5 U	NA	NA	NA	NA	NA
Carbon disulfide	720,000	4,940	6 U	13 U	5 U	**0.8 J**	NA	NA	NA	NA	NA
Chloromethane	2,600	--	**0.5 J**	13 U	**0.4 J**	5 U	NA	NA	NA	NA	NA
Cumene	2,000,000	--	6 U	13 U	5 U	**110**	NA	NA	NA	NA	NA
Cyclohexane	140,000	--	6 U	13 U	5 U	**65**	NA	NA	NA	NA	NA
Ethylbenzene	20,000	241	**5 J**	13 U	5 U	**560 J (2)**	NA	NA	NA	NA	NA
Methylcyclohexane	8,700,000	--	6 U	13 U	5 U	**140 J**	NA	NA	NA	NA	NA
Toluene	520,000	7,270	**2 J**	**2 J**	**0.6 J**	5 U	NA	NA	NA	NA	NA
Trichloroethene	110	18.3	**0.6 J**	13 U	5 U	5 U	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds (µg/kg)											
2-Methylnaphthalene	--	1,720	370 U	360 U	380 U	**5,400 (2)**	**15,100 (2)**	341 U	**446**	**937**	**1,910 (2)**
4,6-Dinitro-2-methylphenol	--	--	740 U	730 U	750 U	740 U	1,730 U	1,700 U	1,700 U	1,660 U	1,590 U
Acenaphthene	29,000,000	8,160	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U
Caprolactam	100,000,000	--	370 U	360 U	380 U	**5,100**	NA	NA	NA	NA	NA
Dibenzofuran	3,100,000	--	370 U	360 U	380 U	**140 J**	400 U	341 U	340 U	331 U	318 U
Fluorene	26,000,000	44,300	370 U	360 U	380 U	**96 J**	**269 J**	341 U	340 U	331 U	318 U
Naphthalene	190,000	585	370 U	360 U	380 U	**2,700 (2)**	**9,380 (2)**	341 U	**1,040 (2)**	**877 (2)**	**996 (2)**
bis(2-Ethylhexyl)phthalate	120,000	6,670	**120 J**	**37 J**	**58 J**	370 U	345 U	341 U	340 U	**139 J**	318 U

Notes:
All samples were collected at Burn Pit E with the exception of 012SS19-0001.
Detections of a chemical are indicated in bold font.
Detected concentrations that exceed one or more screening criteria are shaded.
Sample 012SS20P-0001 is a duplicate sample for 012SS20-0001.
(1) Indicates sample has exceeded the EPA Region IX PRGs for Industrial Soil
(2) Indicates sample has exceeded the North Carolina SSL
µg/kg - micrograms per kilogram
U - Compound not detected
J - Analyte present, reported value is estimated
NA - Not analyzed
SSL - Soil Screening Level
PRG - Preliminary Remediation Goal
"--" = No screening criterion available.

Table 2
Surface and Subsurface Soil Detects and Exceedances of Screening Criteria
OU6 Site 12
MCAS Cherry Point, NC

Station ID Sample ID Sample Date	Screening Criteria		012SB24		012SB25	012SB26	012SB27	012SB28	012SB29	012SB30	012SB31	012SB32	012SB33
	Region IX PRGs - Industrial Soil (1)	NC SSLs (2)	012SB24-0304 02/10/04	012SB24-0405 02/10/04	012SB25-0304 02/10/04	012SB26-0304 02/10/04	012SB27-0203 02/10/04	012SB28-0304 02/10/04	012SB29-0304 02/10/04	012SB30-0203 02/10/04	012SB31-0304 02/10/04	012SB32-0304 02/10/04	012SB33-0304 02/11/04
Chemical Name													
Volatile Organic Compounds (µg/kg)													
2-Butanone	27,000,000	692	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	6,000,000	2,810	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	1,300	5.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	13,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	720,000	4,940	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	2,600	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cumene	2,000,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	140,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	20,000	241	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	8,700,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	520,000	7,270	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	110	18.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds (µg/kg)													
2-Methylnaphthalene	--	1,720	**17,100 (2)**	**2,310 (2)**	348 U	350 U	**13,000 (2)**	**15,900 (2)**	467 U	357 U	368 U	355 U	367 U
4,6-Dinitro-2-methylphenol	--	--	16,600 U	1,780 U	1,740 U	1,750 U	18,100 U	1,710 U	2,340 U	1,780 U	1,840 U	1,770 U	1,830 U
Acenaphthene	29,000,000	8,160	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U	357 U	368 U	355 U	367 U
Caprolactam	100,000,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	3,100,000	--	3,320 U	357 U	348 U	350 U	3,620 U	**578**	467 U	357 U	368 U	355 U	367 U
Fluorene	26,000,000	44,300	3,320 U	357 U	348 U	350 U	3,620 U	**373**	467 U	357 U	368 U	355 U	367 U
Naphthalene	190,000	585	**9,650 (2)**	**1,500 (2)**	348 U	350 U	**6,510 (2)**	**10,800 (2)**	**164 J**	357 U	368 U	**255 J**	367 U
bis(2-Ethylhexyl)phthalate	120,000	6,670	3,320 U	357 U	348 U	350 U	3,620 U	342 U	**168 J**	357 U	**129 J**	**135 J**	**132 J**

Notes:
All samples were collected at Burn Pit E with the exception of 012SS19-0001.
Detections of a chemical are indicated in bold font.
Detected concentrations that exceed one or more screening criteria are shaded.
Sample 012SS20P-0001 is a duplicate sample for 012SS20-0001.
(1) Indicates sample has exceeded the EPA Region IX PRGs for Industrial Soil
(2) Indicates sample has exceeded the North Carolina SSL
µg/kg - micrograms per kilogram
U - Compound not detected
J - Analyte present, reported value is estimated
NA - Not analyzed
SSL - Soil Screening Level
PRG - Preliminary Remediation Goal
"--" = No screening criterion available.

Table 2
Surface and Subsurface Soil Detects and Exceedances of Screening Criteria
OU6 Site 12
MCAS Cherry Point, NC

Station ID Sample ID Sample Date	Screening Criteria Region IX PRGs - Industrial Soil (1)	 NC SSLs (2)	012SB34 012SB34-0203 02/11/04	012SB35 012SB35-0102 02/11/04	012SB37 012SB37-0304 02/11/04	012SB38 012SB38-0102 02/11/04	012SB39 012SB39-0203 02/11/04	012SB40 012SB40-0203 02/11/04	012SB41 012SB41-0102 02/11/04	012SB46 012SB46-0405 02/11/04	012SB48 012SB48-0304 02/11/04	012SB49 012SB49-0304 02/13/04	012SB50 012SB50-0304 02/13/04
Chemical Name													
Volatile Organic Compounds (µg/kg)													
2-Butanone	27,000,000	692	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	6,000,000	2,810	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	1,300	5.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	13,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	720,000	4,940	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	2,600	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cumene	2,000,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	140,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	20,000	241	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	8,700,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	520,000	7,270	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	110	18.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds (µg/kg)													
2-Methylnaphthalene	--	1,720	**6,540 (2)**	**4,540 (2)**	358 U	332 U	**4,890 (2)**	367 U	340 U	382 U	**2,730 (2)**	**4,010 (2)**	**283 J**
4,6-Dinitro-2-methylphenol	--	--	1,840 U	1,790 U	1,790 U	1,660 U	**429 J**	1,830 U	1,700 U	1,910 U	1,760 U	1,770 U	1,770 U
Acenaphthene	29,000,000	8,160	**129 J**	**71.5 J**	358 U	332 U	**81.5 J**	367 U	340 U	382 U	351 U	353 U	353 U
Caprolactam	100,000,000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	3,100,000	--	**147 J**	**211 J**	358 U	332 U	**156 J**	367 U	340 U	382 U	351 U	**113 J**	353 U
Fluorene	26,000,000	44,300	**77.2 J**	**92.9 J**	358 U	332 U	**95.7 J**	367 U	340 U	382 U	351 U	353 U	353 U
Naphthalene	190,000	585	**2,720 (2)**	**1,420 (2)**	358 U	332 U	**2,240 (2)**	**136 J**	340 U	382 U	**1,150 (2)**	**2,270 (2)**	353 U
bis(2-Ethylhexyl)phthalate	120,000	6,670	**143 J**	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U

Notes:
All samples were collected at Burn Pit E with the exception of 012SS19-0001.
Detections of a chemical are indicated in bold font.
Detected concentrations that exceed one or more screening criteria are shaded.
Sample 012SS20P-0001 is a duplicate sample for 012SS20-0001.
(1) Indicates sample has exceeded the EPA Region IX PRGs for Industrial Soil
(2) Indicates sample has exceeded the North Carolina SSL
µg/kg - micrograms per kilogram
U - Compound not detected
J - Analyte present, reported value is estimated
NA - Not analyzed
SSL - Soil Screening Level
PRG - Preliminary Remediation Goal
"--" = No screening criterion available.

Table 3
Groundwater Detects and Exceedances of Screening Criteria
OU6 Site 12
MCAS Cherry Point, NC

Station ID	Screening Criteria			012GW03	012GW03P	012GW04	012GW05	012GW06	012GW07	012GW08	012GW09	012GW10	012GW11
Sample ID	Region IX PRGs - Tap Water (1)	Groundwater MCLs (2)	NC 2L Groundwater Standards (3)	012GW03-0812	012GW03P-0812	012GW04-1014	012GW05-1216	012GW06-1014	012GW07-1216	012GW08-1216	012GW09-1216	012GW10-1216	012GW11-1216
Chemical Name													
Volatile Organic Compounds (µg/L)													
Ethylbenzene	2.9	700	29	5 U	5 U	5 U	**1 J**	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds (µg/L)													
2-Methylnaphthalene	--	--	14	10 U	10 U	10 U	**2 J**	10 U	10 U	10 U	10 U	**34 (3)**	10 U
Naphthalene	6.2	--	21	10 U	10 U	10 U	**2 J**	10 U	10 U	10 U	10 U	**87.7 (1,3)**	10 U
bis(2-Ethylhexyl)phthalate	4.8	6	3	10 U	10 U	10 U	10 U	**3.8 J (3)**	10 U	10 U	10 U	10 U	10 U
Pesticide/Polychlorinated Biphenyls													
No Detections													

Notes:
Detections of a chemical are indicated in bold font.
Detected concentrations that exceed one or more screening criteria are shaded.
(1) Indicates sample has exceeded the EPA Region IX PRGs for Tap Water
(2) Indicates sample has exceeded the Groundwater MCLs
(3) Indicates sample has exceeded the NC 2L Groundwater Standards
µg/L - micrograms per liter
U - Compound not detected
J - Analyte present, reported value is estimated
MCL - Maximum Contaminant Level
NA - Not analyzed
PRG - Preliminary Remediation Goal
SSL - Soil Screening Level
-- = No screening criterion available.

Table 3
Groundwater Detects and Exceedances of Screening Criteria
OU6 Site 12
MCAS Cherry Point, NC

Station ID	Screening Criteria			012GW12	012GW12P	012GW13	012GW14	012GW15	012GW16	012GW17	012GW18
Sample ID	Region IX PRGs - Tap Water (1)	Groundwater MCLs (2)	NC 2L Groundwater Standards (3)	012GW12-1216	012GW12P-1216	012GW13-1216	012GW14-1216	012GW15-1216	012GW16-1216	012GW17-1216	012GW18-1216
Chemical Name											
Volatile Organic Compounds (µg/L)											
Ethylbenzene	2.9	700	29	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds (µg/L)											
2-Methylnaphthalene	--	--	14	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**42 (3)**
Naphthalene	6.2	--	21	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**72.5 (1,3)**
bis(2-Ethylhexyl)phthalate	4.8	6	3	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pesticide/Polychlorinated Biphenyls											
No Detections											

Notes:
Detections of a chemical are indicated in bold font.
Detected concentrations that exceed one or more screening criteria are shaded.
(1) Indicates sample has exceeded the EPA Region IX PRGs for Tap Water
(2) Indicates sample has exceeded the Groundwater MCLs
(3) Indicates sample has exceeded the NC 2L Groundwater Standards
µg/L - micrograms per liter
U - Compound not detected
J - Analyte present, reported value is estimated
MCL - Maximum Contaminant Level
NA - Not analyzed
PRG - Preliminary Remediation Goal
SSL - Soil Screening Level
-- = No screening criterion available.

TABLE 4

SELECTION OF EXPOSURE PATHWAYS

MCAS Cherry Point OU6, Site 12, Hotspot

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Groundwater	Groundwater	Construction Worker	Adult	Dermal Absorption	On-site	None	Groundwater samples were not evaluated quantitatively because they were collected using direct push techniques and might be of poor quality due to the presence of suspended solids
						Ingestion	On-site	None	Groundwater samples were not evaluated quantitatively because they were collected using direct push techniques and might be of poor quality due to the presence of suspended solids
			Air	Construction Worker	Adult	Inhalation	On-site	None	Groundwater samples were not evaluated quantitatively because they were collected using direct push techniques and might be of poor quality due to the presence of suspended solids
Future	Subsurface soil	Subsurface Soil	Subsurface Soil	Construction Worker	Adult	Dermal Absorption	On-site	Quant	Exposure to soil during construction activities
						Ingestion	On-site	Quant	Exposure to soil during construction activities
			Air	Construction Worker	Adult	Inhalation	On-site	Quant	Exposure to soil during construction activities

TABLE 5

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Cherry Point, Site 12 (Hotspot in western portion of the site)

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil

CAS Number	Chemical *	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Screening (2) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (3) Contaminant Deletion or Selection
VOCs																
67641	Acetone	140		140		µg/kg	012SB20-0506	1 / 1	5-13	140	1,400,000	N	2,810	NC SSL	NO	
71432	Benzene	3	J	3	J	µg/kg	012SB20-0506	1 / 1	5-13	3	64	C	5.62	NC SSL	NO	
75150	Carbon disulfide	0.8	J	0.8	J	µg/kg	012SB20-0506	1 / 1	5-13	0.8	36,000	N	4,940	NC SSL	NO	
98828	Cumene	110		110		µg/kg	012SB20-0506	1 / 1	5-13	110	57,000	N	NA		NO	
110827	Cyclohexane	65		65		µg/kg	012SB20-0506	1 / 1	5-13	65	14,000	N	NA		NO	
100414	Ethylbenzene	560	J	560	J	µg/kg	012SB20-0506	1 / 1	5-13	560	40,000	N	241	NC SSL	NO	BSL (4)
108872	Methylcyclohexane	140	J	140	J	µg/kg	012SB20-0506	1 / 1	5-13	140	260,000	N	NA		NO	
SVOCs																
91576	2-Methylnaphthalene	283	J	17100		µg/kg	012SB24-0304	14 / 27	10-3620	17100	14,000	N	1,720	NC SSL	YES	ASL
534521	4,6-Dinitro-2-methylphenol	429	J	429	J	µg/kg	012SB39-0203	1 / 27	50-18100	429	611	N	NA		NO	BSL (4)
83329	Acenaphthene	71.5	J	129	J	µg/kg	012SB34-0203	3 / 27	10-3620	129	370,000	N	8,160	NC SSL	NO	DLBSL
117817	bis(2-Ethylhexyl)phthalate	129	J	168	J	µg/kg	012SB29-0304	6 / 27	10-3620	168	3,500	C	NA		NO	DLBSL
132649	Dibenzofuran	113	J	578		µg/kg	012SB28-0304	6 / 27	10-3620	578	29,000	N	NA		NO	DLBSL
86737	Fluorene	77.2	J	373	J	µg/kg	012SB28-0304	5 / 27	10-3620	373	270,000	N	44,300	NC SSL	NO	DLBSL
91203	Naphthalene	136	J	10800		µg/kg	012SB28-0304	16 / 27	10-3620	10800	5,600	N	585	NC SSL	YES	ASL

Notes:

*VOC data from MOB 1. SVOC results from MOB 2 SVOC delineation effort.

(1) Minimum/maximum detected concentration.

(2) EPA Region IX Preliminary Remediation Goals Table, October 2004, Residential Soil RBC
PRG for Naphthalene used as a surrogate for 2-methylnaphthalene

(3) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)
Detection Limit Below Screening Levels (DLBSL)

(4) PRG developed based on toxicity value published in EPA's Integrated Risk Information System (IRIS) for 2-methylnaphthalene, Provisional Peer Reviewed Toxicity Values (PPTRV) for 4,6-dinitro-2-methylphenol, and exposure assumptions specified in Region IX PRG Table User's Guide (equation 4-2).

Definitions:
NA = Not Available
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Co
NC SSL = Soil Screening Level, Migration to Groundwater
North Carolina Hazardous Waste Section (HWS) Soil Screening
Protective of Groundwater used for Drinking, 2003.
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
ND = Not Detected

TABLE 6
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12 (Hotspot in Western Portion of the Site)

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Subsurface soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
2-Methylnaphthalene	ug/kg	3.8E+03	9.9E+03	1.7E+04		ug/kg	9.9E+03	97.5%UCL-T	W-Test (3)	3.4E+03	Mean-N	W-Test (3)
Naphthalene	ug/kg	2.2E+03	5.8E+03	1.1E+04		ug/kg	5.8E+03	97.5%UCL-T	W-Test (3)	2.0E+03	Mean-N	W-Test (3)

For duplicate results, the higher value was used in the calculations.

Full statistics for data included in Appendix A.
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.

ProUCL, Version 2.1 used to determine distribution of data using the Shapiro-Wilk W Test. ProUCL used to calculate RME EPC, following recommendations based on distribution and standard deviation in users guide (USEPA. April 2002. ProUCL, Version 2.1. Prepared by Lockheed Martin Environmental Services).

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data, H-Statistic (95% UCL-T); 95% Chebyshev (MVUE) UCL (95% Cheb); 99% Chebyshev (MVUE) UCL (99% Cheb); 95% Chebyshev (mean,std) UCL (95% Cheb-m); 97.5% Chebyshev (mean,std) UCL (97.5% Cheb-m); 99% Chebyshev (mean,std) UCL (99% Cheb-m); Mean of Log-transformed Data (Mean-T).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed.

(2) Shapiro-Wilk W Test indicates data are normally distributed.

(3) Shapiro-Wilk W Test indicates data neither log-normally or normally distributed. Use non-parametric RME EPC.

(4) Shapiro-Wilk W Test indicates data fit both log-normal and normal distribution. Select distribution with higher W Test result.

(5) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(6) Max value used because sample size is less than 5.

N = Normal
T = Log-Transformed
NP = Non-Parametric

J - Analyte present. Reported value may or may not be accurate or precise.
K = Biased High
L = Biased Low
MG/KG - micrograms per kilogram

TABLE 7.1

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12 (Hotspot in Western Portion of the Site)

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table 6		see Table 6	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	480	EPA, 1991	480	EPA, 1991	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	40	(1)	40	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table 6		see Table 6	- -	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992	2,000	EPA, 1992	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	1	EPA, 1997	0.2	EPA, 1992	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	—	chem specific	EPA, 2001	chem specific	EPA, 2001	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	40	(1)	40	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	

(1) Professional Judgement based on construction activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT. Assumed exposure to open excavation would be 40 days

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 2001: Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim Guidance)

For constituents with no specific values, used default volatile organics value of 20%, semi-volatile organics value of 10%, and Inorganics value of 1%.

TABLE 7.2

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Emissions from exposed soil, OU6
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	see Table 6	- -	see Table 6	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	modeled	- -	modeled	- -	CA x IN x ET x EF x ED x 1/BW x 1/AT
	FDC	Fugivite Dust Concentration in Air	m^3/kg	1.67E+06	(2)	1.62E+06	(2)	
	VF	Volatilization Factor for volatile constituents	m^3/kg	calc	EPA, 1996	calc	EPA, 1996	
	IN	Inhalation Rate	$m^3/hour$	1.7	EPA, 1997	1.7	EPA, 1997	
	ET	Exposure Time	hr/day	8	(1)	4	(1)	CA (mg/m^3) = CS (1/FDC + 1/VF)
	EF	Exposure Frequency	days/year	40	(3)	40	(3)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	NA	- -	

(1) Professional Judgement based on construction activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT.

(2) Calculated in Appendix G.3 section Generation of Fugitive Dust During Construction Activities.

(3) Professional Judgement based on construction activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT. Assumed exposure to open excavation would be 40 days.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1996: Soil Screening Guidance: User's Guide. OSWER. EPA/540/R-96/018.

TABLE 8.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Cherry Point, Site 12 (Hotspot in Western Portion of Site)

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
Naphthalene	Chronic	2.0E-02	mg/kg-day	58%-89%	2.0E-02	mg/kg-day	Body Weight	3000	IRIS	5/7/2004
2-Methylnaphthalene	Chronic	4.0E-03	mg/kg-day	58%-89%	4.0E-03	mg/kg-day	Pulmonary	1000	IRIS	5/7/2004

(1) USEPA (2000). Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim Guidance.

(2) Followed methodology discussed in USEPA (2000).

(3) For IRIS values, provided the date IRIS was searched.

IRIS = Integrated Risk Information System

TABLE 8.2

NON-CANCER TOXICITY DATA -- INHALATION

Cherry Point, Site 12 (Hotspot in Western Portion of the Site)

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (2) (MM/DD/YY)
Naphthalene	Chronic	3.0E-03	mg/m^3	9.0E-04	mg/kg-day	Nasal	3000	IRIS	5/7/2004
2-Methylnaphthalene	NA	NA	NA	NA	N/A	N/A	N/A	N/A	N/A

N/A = Not Applicable

IRIS = Integrated Risk Information System

(1) Inalation RfD =- Inhalation RfD X 20 m^2/day x 1/70 kg

(2) For IRIS values, provide the date IRIS was searched.

TABLE 9.1

CANCER TOXICITY DATA -- ORAL/DERMAL

Cherry Point, Site 12

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (3) (MM/DD/YY)
Naphthalene	N/A	N/A	N/A	N/A	C	IRIS	05/07/04
2-Methylnaphthalene	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A - Not Available

IRIS = Integrated Risk Information System

(1) USEPA (2000). Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim Guidance.

(2) Followed methodology discussed in USEPA (2000).

(3) For IRIS values, provided the date IRIS was searched.

Weight of Evidence:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

TABLE 9.2

CANCER TOXICITY DATA -- INHALATION

Cherry Point, Site 12

Chemical of Potential Concern	Unit Risk	Units	Adjustment (1)	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (2) (MM/DD/YY)
Naphthalene	N/A	N/A	N/A	N/A	N/A	C	IRIS	05/07/04
2-Methylnaphthalene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

IRIS = Integrated Risk Information System

(1) Adjustment Factor applied to Unit Risk to calculate Inhalation Slope Factor = 70kg x 1/20m3/day x 1000ug/mg

(2) For IRIS values, provide the date IRIS was searched.

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

TABLE 10.1
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE FROM SUBSURFACE SOIL
MCAS Cherry Point, OU6 Site 12 (Hotspot in Western Portion of the Site)

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Subsurface soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Methylnaphthalene	9.86E+03	ug/kg	9.86E+03	ug/kg	M	7.4E-06	mg/kg-day	4.0E-03	mg/kg-day	N/A	N/A	1.9E-03
	Naphthalene	5.78E+03	ug/kg	5.78E+03	ug/kg	M	4.3E-06	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	2.2E-04
	(Total)												2.1E-03
Dermal	2-Methylnaphthalene	9.86E+03	ug/kg	9.86E+03	ug/kg	M	1.1E-05	mg/kg-day	4.0E-03	mg/kg-day	N/A	N/A	2.7E-03
	Naphthalene	5.78E+03	ug/kg	5.78E+03	ug/kg	M	6.2E-06	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	3.1E-04
	(Total)												3.0E-03
												Total Hazard Index Across All Exposure Routes/Pathways	5.0E-03

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 10.2
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE FROM AIR
MCAS Cherry Point, OU6 Site 12 (Hotspot in Western Portion of the Site)

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Emissions from exposed soils, OU6
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	2-Methylnaphthalene	9.86E+03	ug/kg	9.86E+03	ug/kg	M	1.3E-07	mg/kg-day	NA	mg/kg-day	N/A	mg/m3	0.0E+00
	Naphthalene	5.78E+03	ug/kg	5.78E+03	ug/kg	M	7.4E-08	mg/kg-day	9.0E-04	mg/kg-day	3.00E-03	mg/m3	8.2E-05
	(Total)												8.2E-05
												Total Hazard Index Across All Exposure Routes/Pathways	8.2E-05

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 11

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Site Subsurface Soil	2-Methylnaphthalene	N/A	N/A	N/A	N/A	2-Methylnaphthalene	Pulmonary	1.9E-03		2.7E-03	4.5E-03
			Naphthalene	N/A	N/A	N/A	N/A	Naphthalene	Body Weight	2.2E-04		3.1E-04	5.3E-04
			(Total)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	(Total)		2.1E-03		3.0E-03	5.0E-03
Subsurface Soil	Air	Emissions from Cherry Point, OU6	2-Methylnaphthalene	N/A	N/A	N/A	N/A	2-Methylnaphthalene	N/A		0.0E+00		0.0E+00
			Naphthalene	N/A	N/A	N/A	N/A	Naphthalene	Nasal		8.2E-05		8.2E-05
			(Total)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	(Total)		0.0E+00	8.2E-05	0.0E+00	8.2E-05
						Total Risk Across Subsurface Soil	0.0E+00					Total Hazard Index Across All Media and All Exposure Routes	5.1E-03

Total Pulmonary HI =	4.5E-03
Total Body Weight HI =	5.3E-04
Total Nasal HI =	8.2E-05

Figures

File Path: v:\18gis\MCAS_CherryPoint\bfriedman_cherrypoint_figs_0500.apr

LEGEND

- Streams and Rivers
- Roads
- Military Reservation
- County Boundary

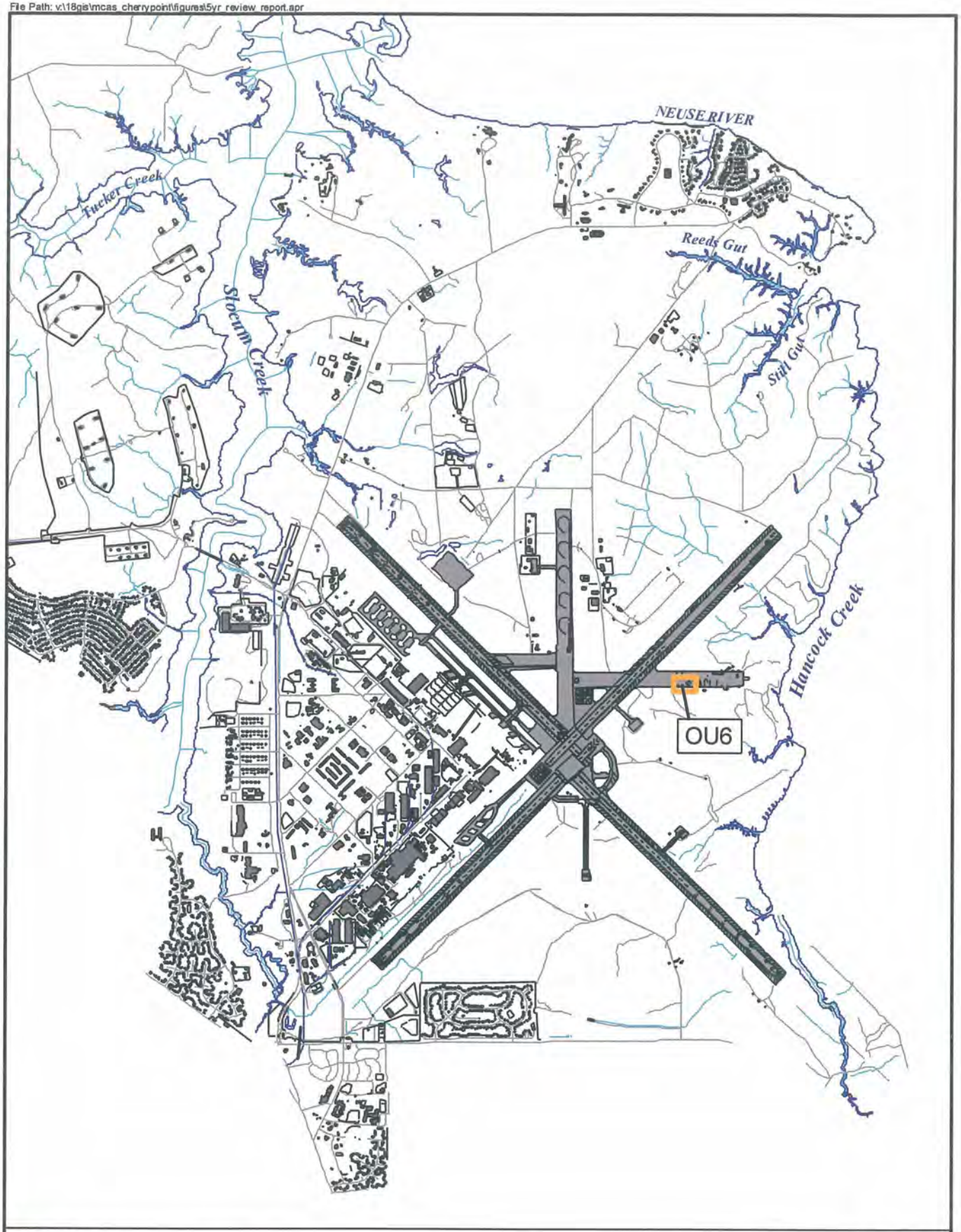
N

0 6 12 Miles

Figure 1
Base Location Map
OU6, Site 12
MCAS Cherry Point, North Carolina

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\5yr_review_report.apr



LEGEND

- Operable Unit Boundary
- Buildings & Structures
- Airfield Pavement
- Road Centerline
- Water Bodies
- Shorelines
- Water Courses

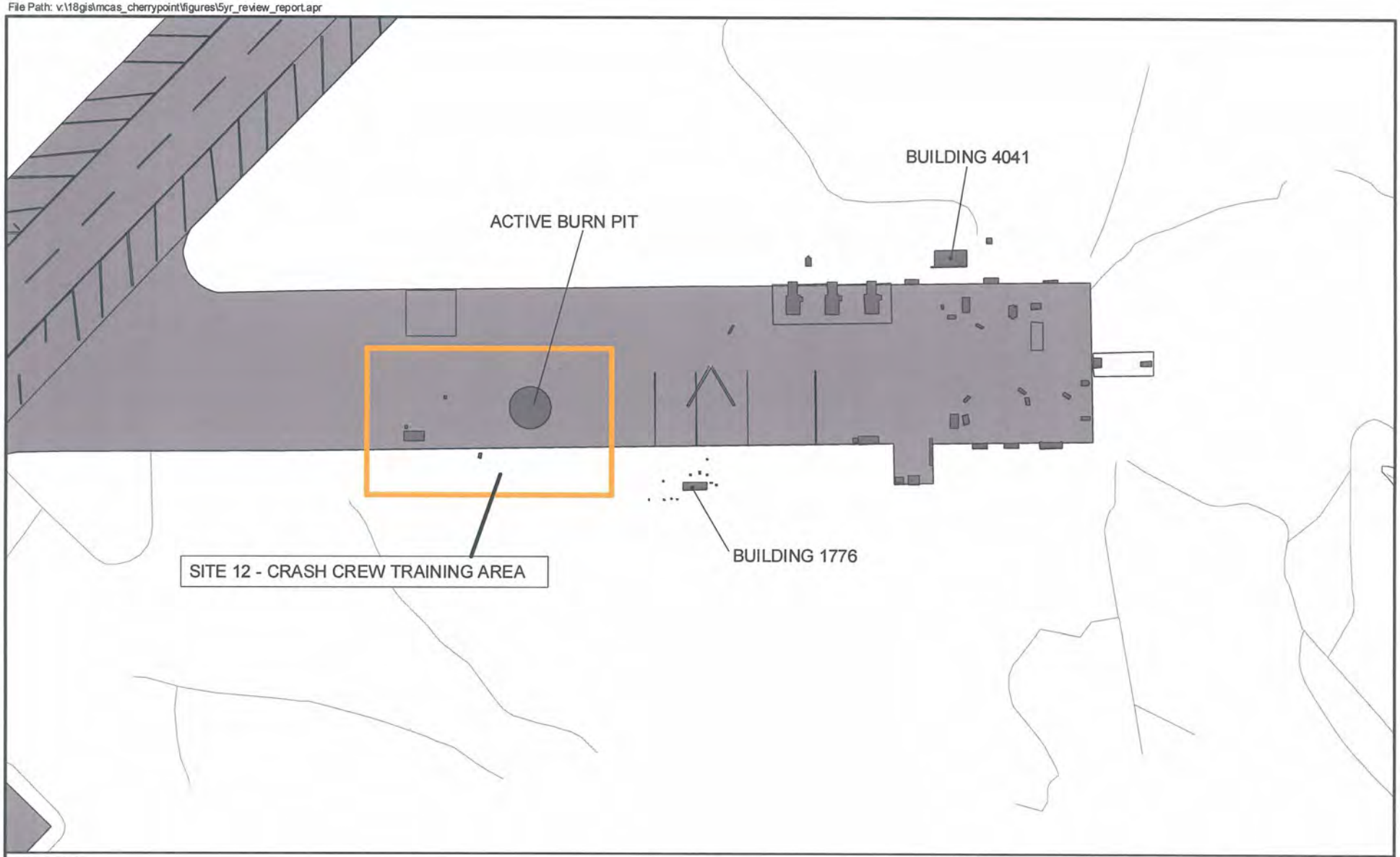
N

0 1500 3000 4500 Feet

Figure 2
OU6 Location Map
OU6, Site 12
MCAS Cherry Point, North Carolina

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\5yr_review_report.apr



LEGEND
- Buildings & Structures
- Airfield Pavement
- Road Centerline
- Site Boundary

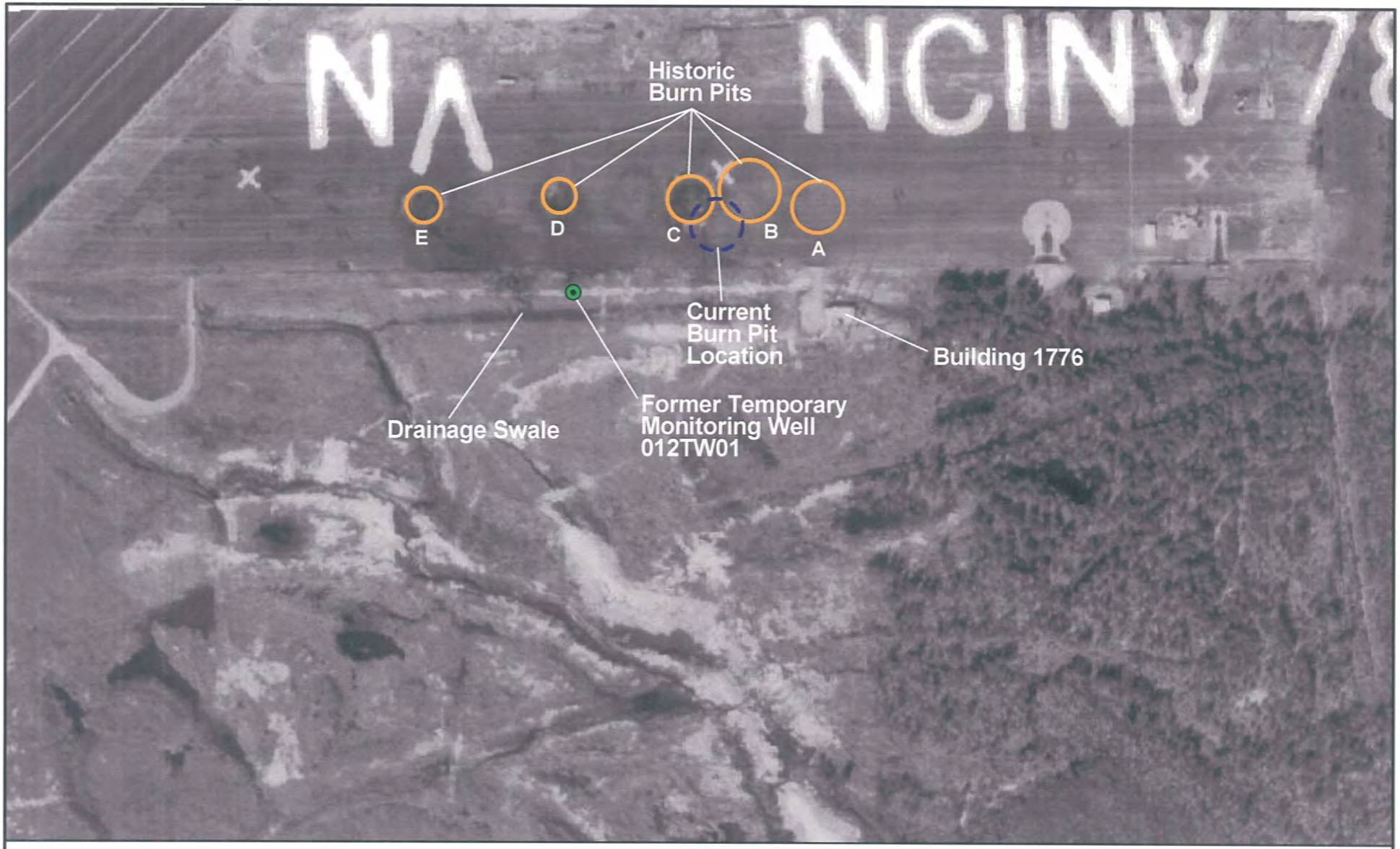
N

0 300 600 Feet

Figure 3
Site Location Map
OU6, Site 12
MCAS Cherry Point, North Carolina

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\site12_wdc.apr



Legend

- Groundwater Sampling Location
- Supplemental Investigation Areas
- Current Burn Pit Location

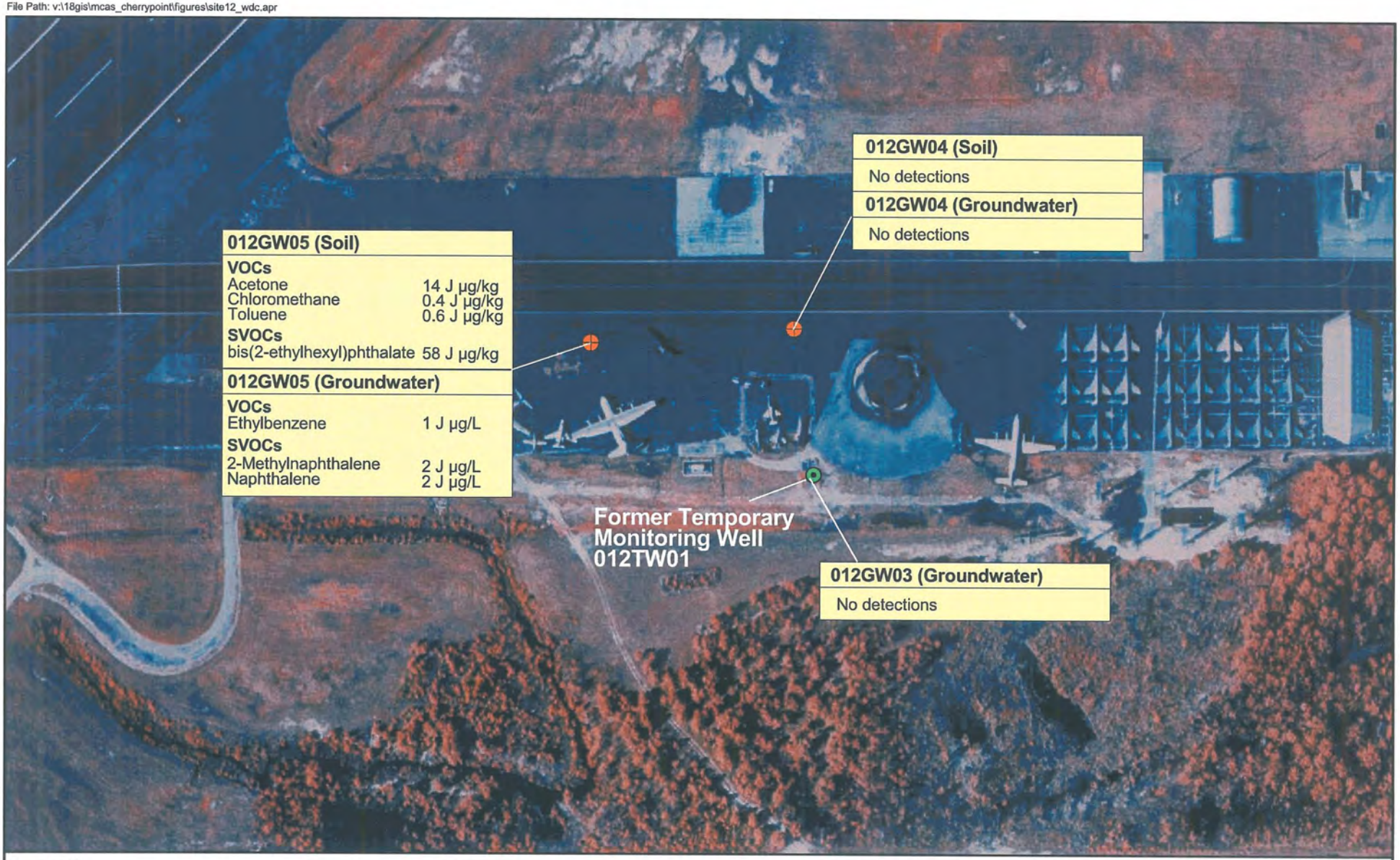
N

0 150 300 450 Feet

Figure 4
1978 Aerial Photograph with Supplemental Investigation Locations
OU6, Site 12
MCAS Cherry Point, North Carolina

CH2MHILL

File Path: v:\18gis\mcas_cherrypoint\figures\site12_wdc.apr



Legend

- Soil and Groundwater Sampling Location
- Groundwater Sampling Location

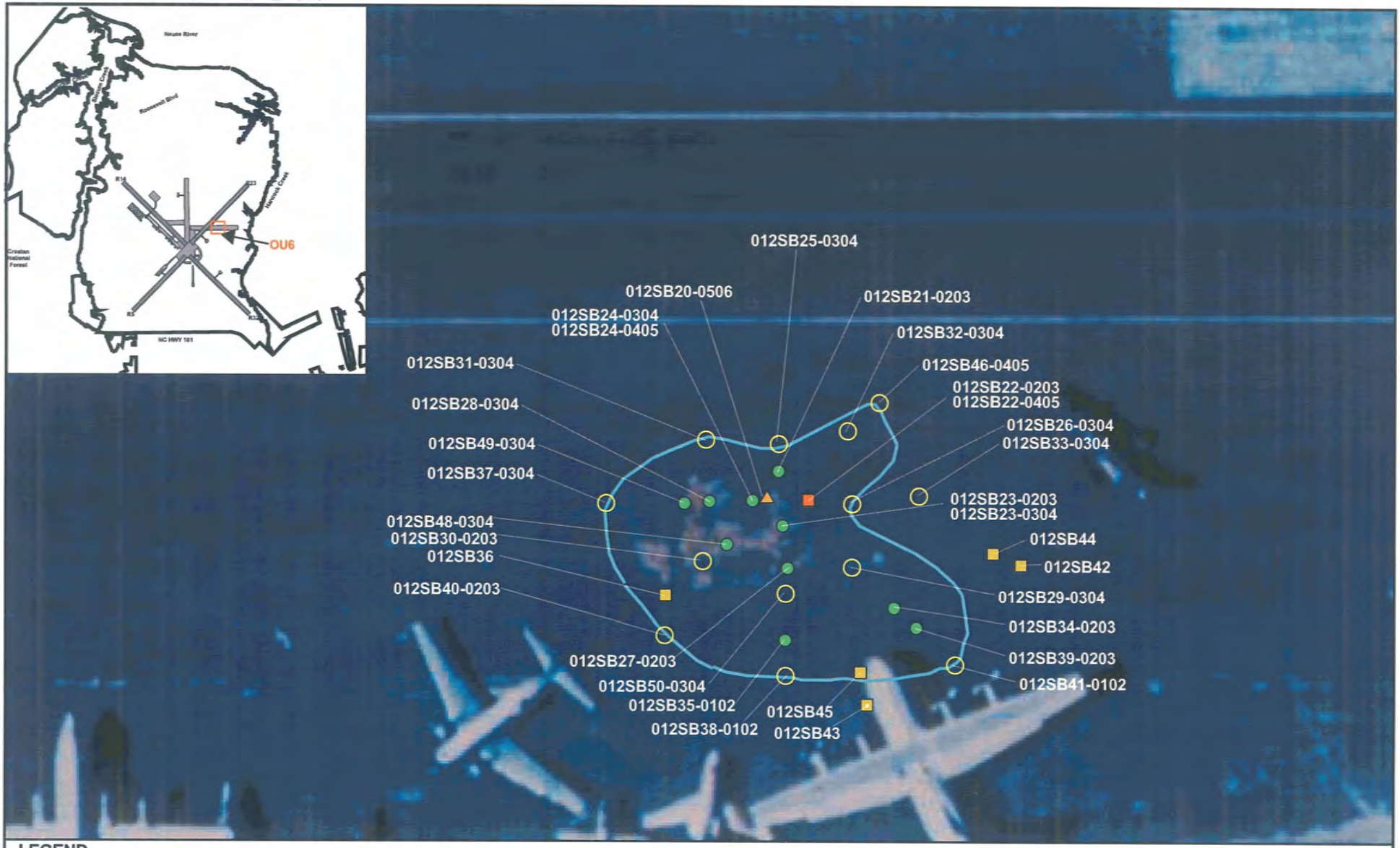
N

0 100 200 300 Feet

Figure 5
Supplemental Remedial Investigation Sample Results
Mobilization 1, Operable Unit 6, Site 12
MCAS Cherry Point, North Carolina

CH2MHILL

File Path: V:\18gis\MCAS_CherryPoint\Figures\cherrypoint_group6.apr



LEGEND

- No NC SSL Exceedances
- No Visual/PID contamination
- Exceeds Naphthalene and 2-Methylnaphthalene NC SSLs
- Exceeds Naphthalene NC SSL
- Exceeds Ethylbenzene NC SSL
- Visual/No Exceedance Boundary

N

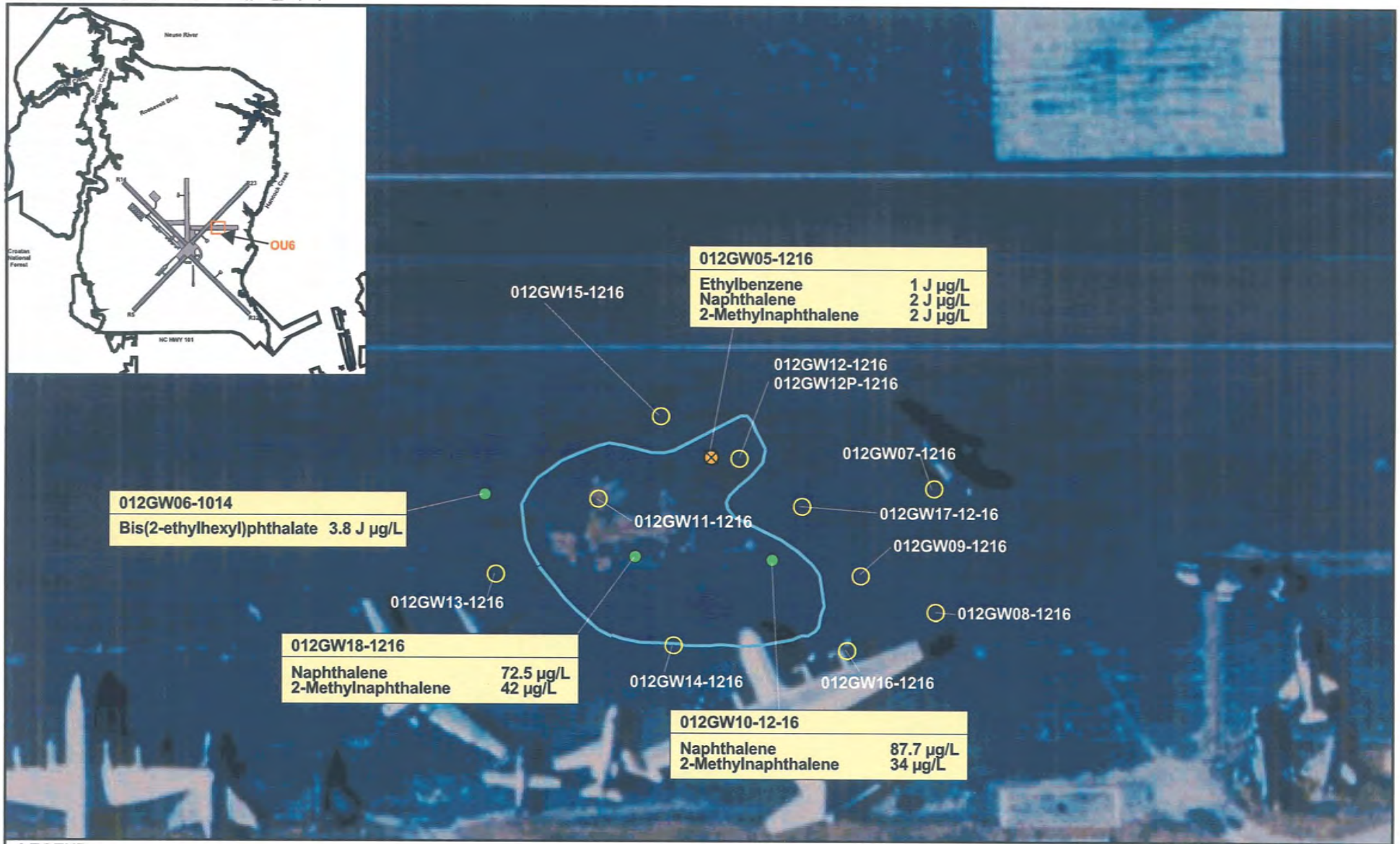
0 25 50 75 Feet

Note: 12/2003 North Carolina Soil Screening Levels used.

Figure 6
Horizontal Extent of Soil Contamination Exceeding SSLs
Operable Unit 6, Site 12
MCAS Cherry Point, North Carolina

CH2MHILL

File Path: V:\18gis\MCAS_CherryPoint\Figures\cherrypoint_group6.apr



LEGEND

- Non-Detect
- Exceedances of NC 2L groundwater standards
- Analytes detected, no exceedances
- Soil Visual/No Exceedance Boundary

N

0 35 70 Feet

Note: 12/2003 North Carolina 2L groundwater standards used.

Figure 7
Groundwater Detections and Exceedances
Operable Unit 6, Site 12
MCAS Cherry Point, North Carolina

CH2MHILL

Appendix A
Raw Analytical Results and Statistical Data

Table A-1
Subsurface Soil Statistics - Burn Pit E
OU6, Site 12 Supplemental Remedial Investigation
MCAS Cherry Point

AnalyteName	Detection Frequency	Minimum Detected Concentration	Maximum Detected Concentration	SampleID of Maximum Detected Value	Mean Value (Norm)	Mean Value (Ln)	Standard Deviation (Norm)	Standard Deviation (Ln)
Volatile Organic Compounds (µg/kg)								
Acetone	1 - 1	140	140	012SB20-0506	140	4.9416	N/A	N/A
Benzene	1 - 1	3	3	012SB20-0506	3	1.0986	N/A	N/A
Carbon disulfide	1 - 1	0.8	0.8	012SB20-0506	0.8	-0.2231	N/A	N/A
Cumene	1 - 1	110	110	012SB20-0506	110	4.7005	N/A	N/A
Cyclohexane	1 - 1	65	65	012SB20-0506	65	4.1744	N/A	N/A
Ethylbenzene	1 - 1	560	560	012SB20-0506	560	6.3279	N/A	N/A
Methylcyclohexane	1 - 1	140	140	012SB20-0506	140	4.9416	N/A	N/A
Semi-Volatile Organic Compounds (µg/kg)								
2-Methylnaphthalene	15 - 28	283	17100	012SB24-0304	3480.79	6.8041	5282.92	1.77
4,6-Dinitro-2-methylphenol	1 - 28	429	429	012SB39-0203	1411.39	6.8946	2059.07	0.65
Acenaphthene	3 - 28	71.5	129	012SB34-0203	280.29	5.2706	412.50	0.66
Caprolactam	1 - 1	5100	5100	012SB20-0506	5100.00	8.5370	N/A	N/A
Dibenzofuran	7 - 28	113	578	012SB28-0304	307.36	5.3848	413.34	0.66
Fluorene	6 - 28	77.2	373	012SB28-0304	287.19	5.2876	413.09	0.69
Naphthalene	17 - 28	136	10800	012SB28-0304	1991.29	6.5134	3120.11	1.50
bis(2-Ethylhexyl)phthalate	6 - 28	129	168	012SB29-0304	279.41	5.2824	411.95	0.62

Table A-2
Raw Soil Analytical Results
OU6, Site 12 Supplemental Remedial Investigation
MCAS Cherry Point

Station ID	012SO19	012SO20			012SB21	012SB22		012SB23		012SB24		012SB25	012SB26	012SB27	012SB28	012SB29
Sample ID	012SS19-0001	012SS20-0001	012SS20P-0001	012SB20-0506	012SB21-0203	012SB22-0203	012SB22-0405	012SB23-0304	012SB23-0203	012SB24-0304	012SB24-0405	012SB25-0304	012SB26-0304	012SB27-0203	012SB28-0304	012SB29-0304
Sample Date	10/21/03	10/21/03	10/21/03	10/21/03	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04
Chemical Name																
Volatile Organic Compounds (µg/kg)																
1,1,1-Trichloroethane	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	2 J	32 U	13 U	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	14 U	32 U	13 U	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	14 U	32 U	13 U	12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	10 J	14 J	8 J	140	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	6 U	13 U	5 U	3 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	5 J	13 U	6	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	6 U	13 U	5 U	0.8 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	0.5 J	13 U	0.4 J	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cumene	6 U	13 U	5 U	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	6 U	13 U	5 U	65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane(Freon-12)	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	5 J	13 U	5 U	560 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl-tert-butyl ether (MTBE)	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	6 U	13 U	5 U	140 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	2 J	2 J	0.6 J	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.6 J	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane(Freon-11)	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene, total	17 U	38 U	16 U	15 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	6 U	13 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed
J - Reported value is estimated
U - Analyte not detected

Table A-2
Raw Soil Analytical Results
OU6, Site 12 Supplemental Remedial Investigation
MCAS Cherry Point

Station ID	012SO19	012SO20			012SB21	012SB22		012SB23		012SB24		012SB25	012SB26	012SB27	012SB28	012SB29
Sample ID	012SS19-0001	012SS20-0001	012SS20P-0001	012SB20-0506	012SB21-0203	012SB22-0203	012SB22-0405	012SB23-0304	012SB23-0203	012SB24-0304	012SB24-0405	012SB25-0304	012SB26-0304	012SB27-0203	012SB28-0304	012SB29-0304
Sample Date	10/21/03	10/21/03	10/21/03	10/21/03	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04
Chemical Name																
Semi-Volatile Organic Compounds (µg/kg)																
1,1-Biphenyl	370 U	360 U	380 U	370 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
1,2-Dichlorobenzene	NA	NA	NA	NA	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
1,3-Dichlorobenzene	NA	NA	NA	NA	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
1,4-Dichlorobenzene	NA	NA	NA	NA	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
2,4,5-Trichlorophenol	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
2,4,6-Trichlorophenol	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
2,4-Dichlorophenol	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
2,4-Dimethylphenol	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
2,4-Dinitrophenol	740 U	730 U	750 U	740 U	1,730 U	1,700 U	1,700 U	1,660 U	1,590 U	16,600 U	1,780 U	1,740 U	1,750 U	18,100 U	1,710 U	2,340 U
2,4-Dinitrotoluene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
2,6-Dinitrotoluene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
2-Chloronaphthalene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
2-Chlorophenol	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
2-Methylnaphthalene	370 U	360 U	380 U	5,400	15,100	341 U	446	937	1,910	17,100	2,310	348 U	350 U	13,000	15,900	467 U
2-Methylphenol	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
2-Nitroaniline	740 U	730 U	750 U	740 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
2-Nitrophenol	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
3,3'-Dichlorobenzidine	370 U	360 U	380 U	370 U	690 U	682 U	681 U	662 U	636 U	6,630 U	713 U	696 U	701 U	7,230 U	684 U	935 U
3-Methylphenol	NA	NA	NA	NA	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
3-Nitroaniline	740 U	730 U	750 U	740 U	1,730 U	1,700 U	1,700 U	1,660 U	1,590 U	16,600 U	1,780 U	1,740 U	1,750 U	18,100 U	1,710 U	2,340 U
4,6-Dinitro-2-methylphenol	740 U	730 U	750 U	740 U	1,730 U	1,700 U	1,700 U	1,660 U	1,590 U	16,600 U	1,780 U	1,740 U	1,750 U	18,100 U	1,710 U	2,340 U
4-Bromophenyl-phenylether	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
4-Chloro-3-methylphenol	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
4-Chloroaniline	370 U	360 U	380 U	370 U	1,730 U	1,700 U	1,700 U	1,660 U	1,590 U	16,600 U	1,780 U	1,740 U	1,750 U	18,100 U	1,710 U	2,340 U
4-Chlorophenyl-phenylether	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
4-Methylphenol	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
4-Nitroaniline	740 U	730 U	750 U	740 U	1,730 U	1,700 U	1,700 U	1,660 U	1,590 U	16,600 U	1,780 U	1,740 U	1,750 U	18,100 U	1,710 U	2,340 U
4-Nitrophenol	740 U	730 U	750 U	740 U	1,730 U	1,700 U	1,700 U	1,660 U	1,590 U	16,600 U	1,780 U	1,740 U	1,750 U	18,100 U	1,710 U	2,340 U
Acenaphthene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Acenaphthylene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Acetophenone	370 U	360 U	380 U	370 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Atrazine	370 U	360 U	380 U	370 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	370 U	360 U	380 U	370 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Benzo(a)pyrene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Benzo(b)fluoranthene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Benzo(g,h,i)perylene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Benzo(k)fluoranthene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Benzoic acid	NA	NA	NA	NA	690 U	682 U	681 U	662 U	636 U	6,630 U	713 U	348 U	350 U	7,230 U	684 U	467 U
Bis(2-chloro-1-methylethyl) ether	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Butylbenzylphthalate	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Caprolactam	370 U	360 U	380 U	5,100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	370 U	360 U	380 U	370 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed
J - Reported value is estimated
U - Analyte not detected

Table A-2
Raw Soil Analytical Results
OU6, Site 12 Supplemental Remedial Investigation
MCAS Cherry Point

Station ID	012SO19	012SO20			012SB21	012SB22		012SB23		012SB24		012SB25	012SB26	012SB27	012SB28	012SB29
Sample ID	012SS19-0001	012SS20-0001	012SS20P-0001	012SB20-0506	012SB21-0203	012SB22-0203	012SB22-0405	012SB23-0304	012SB23-0203	012SB24-0304	012SB24-0405	012SB25-0304	012SB26-0304	012SB27-0203	012SB28-0304	012SB29-0304
Sample Date	10/21/03	10/21/03	10/21/03	10/21/03	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04
Chemical Name																
Chrysene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Di-n-butylphthalate	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Di-n-octylphthalate	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Dibenz(a,h)anthracene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Dibenzofuran	370 U	360 U	380 U	140 J	400	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	578	467 U
Diethylphthalate	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Dimethyl phthalate	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Fluoranthene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Fluorene	370 U	360 U	380 U	96 J	269 J	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	373	467 U
Hexachlorobenzene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Hexachlorobutadiene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Hexachlorocyclopentadiene	370 U	360 U	380 U	370 U	690 U	682 U	681 U	662 U	636 U	6,630 U	713 U	696 U	701 U	7,230 U	684 U	935 U
Hexachloroethane	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Indeno(1,2,3-cd)pyrene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Isophorone	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Naphthalene	370 U	360 U	380 U	2,700	9,380	341 U	1,040	877	996	9,850	1,500	348 U	350 U	6,510	10,800	164 J
Nitrobenzene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Pentachlorophenol	740 U	730 U	750 U	740 U	1,730 U	1,700 U	1,700 U	1,660 U	1,590 U	16,600 U	1,780 U	1,740 U	1,750 U	18,100 U	1,710 U	2,340 U
Phenanthrene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Phenol	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Pyrene	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
bis(2-Chloroethoxy)methane	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	696 U	701 U	3,620 U	342 U	935 U
bis(2-Chloroethyl)ether	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
bis(2-Ethylhexyl)phthalate	120 J	37 J	58 J	370 U	345 U	341 U	340 U	139 J	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	168 J
n-Nitroso-di-n-propylamine	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
n-Nitrosodiphenylamine	370 U	360 U	380 U	370 U	345 U	341 U	340 U	331 U	318 U	3,320 U	357 U	348 U	350 U	3,620 U	342 U	467 U
Pesticide/Polychlorinated Biphenyls (µg/kg)																
Aroclor-1016	37 U	37 U	38 U	37 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	47 U	46 U	48 U	47 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	37 U	37 U	38 U	37 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	24 U	23 U	24 U	24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	24 U	23 U	24 U	24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	24 U	23 U	24 U	24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	37 U	37 U	38 U	37 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed
J - Reported value is estimated
U - Analyte not detected

Table A-2
Raw Soil Analytical Results
OU6, Site 12 Supplemental Remedial Investigation
MCAS Cherry Point

Station ID	012SB30	012SB31	012SB32	012SB33	012SB34	012SB35	012SB37	012SB38	012SB39	012SB40	012SB41	012SB46	012SB48	012SB49	012SB50
Sample ID	012SB30-0203	012SB31-0304	012SB32-0304	012SB33-0304	012SB34-0203	012SB35-0102	012SB37-0304	012SB38-0102	012SB39-0203	012SB40-0203	012SB41-0102	012SB46-0405	012SB48-0304	012SB49-0304	012SB50-0304
Sample Date	02/10/04	02/10/04	02/10/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/13/04	02/13/04
Chemical Name															
Volatile Organic Compounds (µg/kg)															
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cumene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane(Freon-12)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane(Freon-11)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed
J - Reported value is estimated
U - Analyte not detected

Table A-2
Raw Soil Analytical Results
OU6, Site 12 Supplemental Remedial Investigation
MCAS Cherry Point

Station ID	012SB30	012SB31	012SB32	012SB33	012SB34	012SB35	012SB37	012SB38	012SB39	012SB40	012SB41	012SB46	012SB48	012SB49	012SB50
Sample ID	012SB30-0203	012SB31-0304	012SB32-0304	012SB33-0304	012SB34-0203	012SB35-0102	012SB37-0304	012SB38-0102	012SB39-0203	012SB40-0203	012SB41-0102	012SB46-0405	012SB48-0304	012SB49-0304	012SB50-0304
Sample Date	02/10/04	02/10/04	02/10/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/13/04	02/13/04
Chemical Name															
Semi-Volatile Organic Compounds (µg/kg)															
1,1-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
1,2-Dichlorobenzene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
1,3-Dichlorobenzene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
1,4-Dichlorobenzene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
2,4,5-Trichlorophenol	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
2,4,6-Trichlorophenol	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
2,4-Dichlorophenol	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
2,4-Dimethylphenol	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
2,4-Dinitrophenol	1,780 U	1,840 U	1,770 U	1,830 U	1,840 U	1,790 U	1,790 U	1,660 U	1,770 U	1,830 U	1,700 U	1,910 U	1,760 U	1,770 U	1,770 U
2,4-Dinitrotoluene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
2,6-Dinitrotoluene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
2-Chloronaphthalene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
2-Chlorophenol	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
2-Methylnaphthalene	357 U	368 U	355 U	367 U	6,540	4,540	358 U	332 U	4,890	367 U	340 U	382 U	2,730	4,010	283 J
2-Methylphenol	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
2-Nitroaniline	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
2-Nitrophenol	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
3,3'-Dichlorobenzidine	714 U	736 U	709 U	734 U	735 U	715 U	716 U	663 U	709 U	734 U	680 U	764 U	703 U	706 U	706 U
3-Methylphenol	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
3-Nitroaniline	1,780 U	1,840 U	1,770 U	1,830 U	1,840 U	1,790 U	1,790 U	1,660 U	1,770 U	1,830 U	1,700 U	1,910 U	1,760 U	1,770 U	1,770 U
4,6-Dinitro-2-methylphenol	1,780 U	1,840 U	1,770 U	1,830 U	1,840 U	1,790 U	1,790 U	1,660 U	429 J	1,830 U	1,700 U	1,910 U	1,760 U	1,770 U	1,770 U
4-Bromophenyl-phenylether	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
4-Chloro-3-methylphenol	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
4-Chloroaniline	1,780 U	1,840 U	1,770 U	1,830 U	1,840 U	1,790 U	1,790 U	1,660 U	1,770 U	1,830 U	1,700 U	1,910 U	1,760 U	1,770 U	1,770 U
4-Chlorophenyl-phenylether	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
4-Methylphenol	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
4-Nitroaniline	1,780 U	1,840 U	1,770 U	1,830 U	1,840 U	1,790 U	1,790 U	1,660 U	1,770 U	1,830 U	1,700 U	1,910 U	1,760 U	1,770 U	1,770 U
4-Nitrophenol	1,780 U	1,840 U	1,770 U	1,830 U	1,840 U	1,790 U	1,790 U	1,660 U	1,770 U	1,830 U	1,700 U	1,910 U	1,760 U	1,770 U	1,770 U
Acenaphthene	357 U	368 U	355 U	367 U	129 J	71.5 J	358 U	332 U	81.5 J	367 U	340 U	382 U	351 U	353 U	353 U
Acenaphthylene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Benzo(a)pyrene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Benzo(b)fluoranthene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Benzo(g,h,i)perylene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Benzo(k)fluoranthene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Benzoic acid	357 U	368 U	355 U	734 U	735 U	715 U	716 U	663 U	709 U	734 U	680 U	764 U	703 U	706 U	706 U
Bis(2-chloro-1-methylethyl) ether	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Butylbenzylphthalate	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed
J - Reported value is estimated
U - Analyte not detected

Table A-2
Raw Soil Analytical Results
OU6, Site 12 Supplemental Remedial Investigation
MCAS Cherry Point

Station ID	012SB30	012SB31	012SB32	012SB33	012SB34	012SB35	012SB37	012SB38	012SB39	012SB40	012SB41	012SB46	012SB48	012SB49	012SB50
Sample ID	012SB30-0203	012SB31-0304	012SB32-0304	012SB33-0304	012SB34-0203	012SB35-0102	012SB37-0304	012SB38-0102	012SB39-0203	012SB40-0203	012SB41-0102	012SB46-0405	012SB48-0304	012SB49-0304	012SB50-0304
Sample Date	02/10/04	02/10/04	02/10/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/11/04	02/13/04	02/13/04
Chemical Name															
Chrysene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Di-n-butylphthalate	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Di-n-octylphthalate	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Dibenz(a,h)anthracene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Dibenzofuran	357 U	368 U	355 U	367 U	147 J	211 J	358 U	332 U	156 J	367 U	340 U	382 U	351 U	113 J	353 U
Diethylphthalate	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Dimethyl phthalate	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Fluoranthene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Fluorene	357 U	368 U	355 U	367 U	77.2 J	92.9 J	358 U	332 U	95.7 J	367 U	340 U	382 U	351 U	353 U	353 U
Hexachlorobenzene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Hexachlorobutadiene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Hexachlorocyclopentadiene	714 U	736 U	709 U	734 U	735 U	715 U	716 U	663 U	709 U	734 U	680 U	764 U	703 U	706 U	706 U
Hexachloroethane	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Indeno(1,2,3-cd)pyrene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Isophorone	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Naphthalene	357 U	368 U	255 J	367 U	2,720	1,420	358 U	332 U	2,240	138 J	340 U	382 U	1,150	2,270	353 U
Nitrobenzene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Pentachlorophenol	1,780 U	1,840 U	1,770 U	1,830 U	1,840 U	1,790 U	1,790 U	1,660 U	1,770 U	1,830 U	1,700 U	1,910 U	1,760 U	1,770 U	1,770 U
Phenanthrene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Phenol	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Pyrene	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
bis(2-Chloroethoxy)methane	714 U	736 U	709 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
bis(2-Chloroethyl)ether	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
bis(2-Ethylhexyl)phthalate	357 U	129 J	135 J	132 J	143 J	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
n-Nitroso-di-n-propylamine	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
n-Nitrosodiphenylamine	357 U	368 U	355 U	367 U	367 U	357 U	358 U	332 U	354 U	367 U	340 U	382 U	351 U	353 U	353 U
Pesticide/Polychlorinated Biphenyls (µg/kg)															
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed
J - Reported value is estimated
U - Analyte not detected

Table A-3
Groundwater Statistics
OU6, Site 12 Supplemental Remedial Investigation
MCAS Cherry Point

AnalyteName	Detection Frequency	Minimum Detected Concentration	Maximum Detected Concentration	SampleID of Maximum Detected Value	Mean Value (Norm)	Mean Value (Ln)	Standard Deviation (Norm)	Standard Deviation (Ln)
Volatile Organic Compounds (µg/L)								
Ethylbenzene	1 - 3	1	1	012GW05-1216	2	0.610860	0.866025	0.529021
Semi-Volatile Organic Compounds (µg/L)								
2-Methylnaphthalene	3 - 16	2	42	012GW18-1216	8.9375	1.804992	11.462802	0.749742
Naphthalene	3 - 16	2	87.7	012GW10-1216	14.2	1.898334	25.884745	0.995341
bis(2-Ethylhexyl)phthalate	1 - 16	3.8	3.8	012GW06-1014	4.925	1.592286	0.300000	0.068609

µg/L - micrograms per liter

Table A-4
Groundwater Raw Analytical Results
OU6, Site 12 Supplemental Remedial Investigation
MCAS Cherry Point

Sample Date	012GW06-1014 2/12/04	012GW07-1216 2/12/04	012GW08-1216 2/12/04	012GW09-1216 2/12/04	012GW10-1216 2/12/04	012GW11-1216 2/12/04	012GW12-1216 2/12/04	012GW12P-1216 2/12/04	012GW13-1216 2/12/04	012GW14-1216 2/12/04	012GW15-1216 2/12/04	012GW16-1216 2/12/04	012GW17-1216 2/12/04	012GW18-1216 2/12/04
Chemical Name														
Semivolatile Organic Compounds (µg/L)														
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	34	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	42
2-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
3-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
4,6-Dinitro-2-methylphenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
4-Nitrophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo[a]anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo[a]pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo[b]fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo[g,h,i]perylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo[k]fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic Acid	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
bis(2-Chloroethoxy)methane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	3.8 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzo[a,h]anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dimethyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-octylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

J - Value is estimated
U - Not detected
NA - Not analyzed

Table A-4
Groundwater Raw Analytical Results
OU6, Site 12 Supplemental Remedial Investigation
MCAS Cherry Point

Sample Date	012GW06-1014 2/12/04	012GW07-1216 2/12/04	012GW08-1216 2/12/04	012GW09-1216 2/12/04	012GW10-1216 2/12/04	012GW11-1216 2/12/04	012GW12-1216 2/12/04	012GW12P-1216 2/12/04	012GW13-1216 2/12/04	012GW14-1216 2/12/04	012GW15-1216 2/12/04	012GW16-1216 2/12/04	012GW17-1216 2/12/04	012GW18-1216 2/12/04
Chemical Name														
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	87.7	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	72.5
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
n-Nitroso-di-n-propylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
n-Nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

J - Value is estimated
U - Not detected
NA - Not analyzed

Appendix B
Mobilization 1 Validation Report

e*data, inc.
Environmental Data Management
& Chemistry Consulting Services

December 12, 2003

Adrienne Jones
CH2M HILL, Inc.
5700 Thurston Ave, Suite 120
Virginia Beach, VA 23455

Subject: Data Validation Services for the MCAS Cherry Point-OU6 (Site 12) Samples. Contract No. N62470-02-D-3052; TO#0007.

Dear Ms. Jones,

Enclosed please find the data validation package for TO #0007 – MCAS Cherry Point-OU6 (Site 12) samples. A copy of the validated database file in MS-Excel file format has been e-mailed to your attention. The data field [DV_Qual] and [DV_Qual_Code] has been updated with the validation qualifiers.

This report includes Sample Delivery Group (SDG) 1172 and includes data from Compuchem Laboratory work group number 1172 and 1177.

Please call me at (414) 475-5503 if you have any questions or need additional information.

Sincerely,

Christopher M. Ohland

Christopher Ohland
Senior Environmental Chemist

Enclosures
CMO/kk

edata:20031212LTR.doc

2262 N 71 ST, STE 100
Wauwatosa, WI 53208

Tel: (414) 475-5503
Fax: (603) 947-6251
cjohland@myexcel.com

Data Validation Report
MCAS Cherry Point-OU6 (Site 12) Sampling

December 12, 2003

Revision 0

Prepared For CH2MHILL
Navy Clean Prime Contract No.
Aqviq/CH2M HILL JV 1 Contract, TO#0007

Prepared by E-Data, Inc.
101 North Street, 2nd Floor
Ocean City, NJ 08226

Data Validation Reference Package

Acronyms and Abbreviations

AA	Atomic Absorption
AOB	Analytical Operations Branch
APO	Administrative Project Officer
BFB	Bromofluorobenzene
BNA	Base-neutral/acid
CADRE	Computer Aided Data Review and Evaluation
CARD	CLP Analytical results database
CCB	Continuing Calibration Blank
CCV	Continuing Calibration Verification
CF	Calibration Factor
CLP	Contract Laboratory Program
COC	Chain-of-Custody
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
CV	Coefficient of Variation
%D	Percent Difference
DFTPP	Decafluorotriphenylphosphine
DQO	Data Quality Objective
DV	Data Validation
DUP	Duplicate
ECD	Electron Capture Detector
EICP	Extracted Ion Current Profile
EPA	Environmental Protection Agency
GC	Gas Chromatography
GS/MS	Gas Chromatography/Mass Spectroscopy
GPC	Gel Permeation Chromatography
ICB	Initial Calibration Blank
ICP	Inductively Coupled Plasma
ICS	Inter-element Check Sample

ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
IS	Internal Standard
LCS	Laboratory Control Sample
MDL	Method Detection Limit
mL	Milliliter
MS / MSD	Matrix Spike / Matrix Spike Duplicate
MSA	Method of Standard Addition
m/z	the ration of mass (m) to charge (z) of ions measured by GC/MS
NFG	Nation Functional Guidelines
PB	Preparation Blank
PCB	Polychlorinated Biphenyl
PEST	Pesticides
QA	Quality Assurance
QAPP	Quality Assurance Program Project (or Project) Plan
QC	Quality Control
%R	Percent Recovery of Spiked Amounts of Analytes
RIC	Reconstructed Ion Chromatogram
RL	Reporting Limits
RPD	Relative Percent Difference
RRF	Relative Response Factor
RSD	Relative Standard Deviation
RT	Retention Time
SDG	Sample Delivery Group
SMC	System Monitoring Compound
SOW	Scope of Work
SVOC	Semi Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
TIC	Tentatively Identified Compound
VOC	Volatile Organic Compound

Overview

The U.S Department of the Navy - Atlantic Division of the Naval Facilities Engineering Command requested CH2M HILL Inc. to conduct sampling and analysis activities at the MCAS Cherry Point-OU6 (Site 12) under TO-0007 of the Navy Agviq/CH2M HILL JV 1 contract . This report describes the validation of analytical data generated under this scope of work. E-Data Inc., located in Ocean City, NJ provided the data validation services.

CH2MHILL collected soil and aqueous environmental samples and associated field quality control samples on October 21, 2003. Environmental samples were taken at 3 soil and 3 groundwater field locations. A summary of the samples collected is shown in Table 1. Field quality control samples including 2 field duplicate sample, 1 field blank, and 1 trip blank were also submitted to the laboratory. The laboratory prepared project-specific samples for matrix spike/matrix spike duplicate (MS/MSD) analyses of TPH.

TABLE 1
Sample Cross-Reference Summary
(MCAS Cherry Point-OU6 (Site 12); TO#0007)

Lab ID No.	Field Sample ID No.	Type of Sample	Sampled	Received
117201	012FB102103	Field Blank	10/21/2003 11:10	10/22/2003
117202	012GW03-0812	Normal	10/21/2003 11:55	10/22/2003
117203	012GW03P-0812	Field Duplicate	10/21/2003 11:55	10/22/2003
117204	012GW05-1216	Normal	10/21/2003 16:15	10/22/2003
117205	012GW04-1014	Normal	10/21/2003 13:35	10/22/2003
117206	012TB102103	Trip Blank	10/21/2003 0:00	10/22/2003
117701	012SS19-0001	Normal	10/21/2003 12:55	10/22/2003
117702	012SS20-0001	Normal	10/21/2003 15:15	10/22/2003
117703	012SS20P-0001	Field Duplicate	10/21/2003 15:15	10/22/2003
117704	012SB20-0506	Normal	10/21/2003 15:25	10/22/2003

Samples were delivered to Compuchem Laboratory located in Cary, North Caroline for analytical testing. Compuchem performed analytical tests for this scope of work including trace level volatile organic analyses, semivolatile organic analyses, and polychlorinated biphenyls (PCBs). All analyses were conducted at the Cary facility.

After laboratory analyses were completed and reviewed, Compuchem assembled a hardcopy data package and electronic data deliverable (EDD), which was delivered to CH2MHILL's Virginia Beach, VA office and forwarded to E-Data. Compuchem provided a two data packages and EDDs, which included work group ID No. 1172 and 1177.

Data validation was conducted as described in the EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review and EPA Region III Modifications to the Functional Guidelines. A copy of the project chain-of-custody forms and laboratory reports with data qualifiers applied as a result of data validation are provided in Appendix A. Appendix B contains results of all tentatively identified compounds. Appendix C contains copies of the completed checklists used to document the data validation effort.

Summary of Sample Analyses

Hardcopy Data Packages

Project completeness is calculated at 100 percent (1240 valid results of 1240 total results) of the laboratory data undergoing data validation. No major issues were identified as a result of data validation. Minor issues are described below. Project data qualifiers are added to the laboratory Form 1 reports. A list of project data qualifiers is shown in Table 2.

TABLE 2
List of Project Qualifiers
(MCAS Cherry Point-OU6 (Site 12); TO#0007)

Qualifier	Description
[*none*]	The analyte was positively identified.
J	The analyte was positively identified; however, the concentration value is an estimate. Also used if a result was measured at a concentration below the Contract Required Quantification Limit (CRQL) or Contract Required Detection Limit (CRDL).
R	The sample result was rejected in preference for an alternative analysis of the sample.
U	The analyte was analyzed for, but not detected.

Field samples are qualified for the introduction of contaminants resulting from laboratory and field activities as measured in the laboratory method blank, equipment rinse blank, field blank, and trip blank audit samples. Equipment rinse blank, field blank, and trip blank audit samples are not qualified.

A summary of all qualified results is shown on Table D-1 (Appendix D).

Electronic Data Deliverable

The sample results were verified by comparing the results to the validated laboratory Form 1's. Table E-1 (Appendix E) summarizes the 1176 sample results that were verified.

Major Technical Issues

No major technical issues were identified.

Minor Technical Issues

Volatile Organic Analysis by GC\MS

Holding Time
A diluted aliquot of sample 117704 (1:5) was prepared and analyzed after the EPA recommended holding time to properly quantify ethylbenzene and methylcyclohexane. These results are qualified as estimates and flagged "J."

Surrogate Recovery
One of four surrogates were outside the laboratory established control limits for sample 117704. No action was taken to qualify the sample results based on this deficiency.

Blank Contaminants
Trace levels of methylene chloride was present in at least one or more method blank, equipment rinse blank, or trip blank analyses. Action levels were determined using the 5/10x rule. Sample results less than the action levels are qualified as non-detected and flagged "U." The following action levels were applied. Methylene Chloride (20).

Matrix Spike
A matrix spike and matrix spike duplicate analysis was performed using samples 117205 (water) and 117701 (soil). Acceptable accuracy and precision objectives were met.

Field Duplicate
Field duplicate samples were collected and analyzed using field pairs 117702\177703 and 177202/177203 during this sampling effort. All results were below the reporting limit and acceptable project precision objectives were met.

Calibrations
In some instances, the ICAL and CCAL QC limits were exceeded. Of those deficiencies, none of the compounds were present in an associated field samples, except methylcyclohexane. This compound was previously qualified as an estimate and flagged "J," for holding time deficiencies.

Semivolatile Organic Analysis by GC\MS

Matrix Spike
A matrix spike and matrix spike duplicate analysis was performed using samples 117205 (water) and 117701 (soil). Acceptable accuracy and precision objectives were met except sample 1117701 where both phenol (50% RPD) and 2-Chlorophenol (53% RPD) precision objectives were not met. No action was taken to qualify the non-detected sample results.

LCS Recovery
LCS sample SLCSJL (water) was above the upper control limit for acenaphthene (112% REC) and pyrene (119% REC). These compounds were not detected in the associated field samples. No action was taken to qualify the sample results.

Field Duplicate
Field duplicate samples were collected and analyzed with field pairs 117702\117203 and 117702\117203 during the sampling effort. All results were less than the reporting limit and acceptable field precision objectives were met.

Calibrations
In some instances, the ICAL and CCAL QC limits were exceeded. Of those deficiencies, none of the analytes were present in an associated field sample at a concentration greater than the reporting limit. No action was taken to qualify the sample results.

Polychlorinated Biphenyls (PCBs) by GC\ECD

Surrogate Recovery
Sample 117704 has one of two surrogate recoveries at the lower control limit (43%) on the primary detector. PCBs were not detected in this sample. No action was taken to qualify the sample results.

Matrix Spike
A matrix spike and matrix spike duplicate analysis was performed using samples 117205 (water) and 117701 (soil). Acceptable accuracy and precision objectives were met except sample 1117701 where the aroclor-1016 (24% RPD) precision objective was not met. No action was taken to qualify the non-detected sample results.

Field Duplicate
Field duplicate samples were collected and analyzed with field pairs 117702\117203 and 117702\117203 during the sampling effort. All results were less than the reporting limit and acceptable field precision objectives were met.

Appendix A
Soil Boring Logs

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
146532.FI	12SB01	SHEET 1 OF 1

DPT SOIL BORING LOG

PROJECT : Marine Corp Air Station - Cherry Point LOCATION : OU6 - Site 12

TOC ELEVATION : N/A DRILLING CONTRACTOR : Parratt-Wolff, Hillsborough, NC

DRILLING METHOD AND EQUIPMENT USED : DPT Rig

WATER LEVELS : N/A START : 03/08/99 END : 03/08/99 LOGGER : Ron Ormson

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm):
1, 2, 3, 4	0-4'	24"	S-1	N/A	top 3": original topsoil last 21": course sand and gravel fill, loose, moist	bottom 3": petroleum odor collected soil sample from 1' to 2' N/A
5, 6, 7, 8	4-8'		S-2	N/A	coarse sand with some clay lenses, moist to wet	strong petroleum odor. N/A collected soil sample from 7' to 8'
9, 10, 11, 12	8-12'		S-3	N/A	light brown, coarse to medium sand, saturated, very loose.	faint petroleum odor. N/A no soil sample collected.
					END OF BORING	

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
146532.FI	12SB02	SHEET 1 OF 1

DPT SOIL BORING LOG

PROJECT : Marine Corp Air Station - Cherry Point LOCATION : OU6 - Site 12

TOC ELEVATION : N/A DRILLING CONTRACTOR : Parratt-Wolff, Hillsborough, NC

DRILLING METHOD AND EQUIPMENT USED : DPT Rig

WATER LEVELS : N/A START : 03/08/99 END : 03/08/99 LOGGER : Ron Ormson

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm):	
1, 2, 3, 4	0-4'	48"	S-1	N/A	top 36": black, organic rich topsoil last 12": brown-grey to slightly oxidized silty sand with traces of clay, moist, firm	0	collected soil sample from 1' to 2'
5, 6, 7, 8	4-8'		S-2	N/A	top 12": same as last 36" last 36": ligth brown to yellow medium sand with trace of fine, moist, very loose.	0	collected soil sample from 4' to 5'
9, 10, 11	8-11'		S-3	N/A		0	collected soil sample from 9' to 10' sample saturated between 10' to 11'
					END OF BORING		
15, 20, 25							

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
146532.FI	12SB03	SHEET 1 OF 1

DPT SOIL BORING LOG

PROJECT : Marine Corp Air Station - Cherry Point LOCATION : OU6 - Site 12

TOC ELEVATION : N/A DRILLING CONTRACTOR : Parratt-Wolff, Hillsborough, NC

DRILLING METHOD AND EQUIPMENT USED : DPT Rig

WATER LEVELS : N/A START : 03/08/99 END : 03/08/99 LOGGER : Ron Ormson

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm):
1, 2, 3, 4	0-4'	48"	S-1	N/A	light brown, silty sand with a trace of clay, soft, to firm, moist.	0 collected soil sample from 1' to 2'
5, 6, 7, 8	4-8'	48"	S-2	N/A	top 24": same as above. bottom 24": light brown to light yellow medium sand, loose, moist.	0 collected soil sample from 4' to 5'; collected soil sample from 7' to 8'
9, 10, 11, 12	8-12'	48"	S-3	N/A	same as above.	sample saturated at 10.5'; no sample collected
					END OF BORING	
15, 20, 25						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
146532.FI	12SB04	SHEET 1 OF 1

DPT SOIL BORING LOG

PROJECT : Marine Corp Air Station - Cherry Point LOCATION : OU6 - Site 12

TOC ELEVATION : N/A DRILLING CONTRACTOR : Parratt-Wolff, Hillsborough, NC

DRILLING METHOD AND EQUIPMENT USED : DPT Rig

WATER LEVELS : N/A START : 03/08/99 END : 03/08/99 LOGGER : Ron Ormson

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm):	
1 2 3 4	0-4'		S-1	N/A	medium to light brown silty sand with some clay, moist to wet, soft.	0	collected soil sample from 1' to 2'
5 6 7 8	4-8'		S-2	N/A	top 12": same as above. bottom 36": light brown to light yellowish white medium sand, loose, moist. ligth brownish yellow medium sand, same as above	0 0	collected soil sample from 4' to 5' collected soil sample from 7' to 8'
9 10 11	8-11'	36"	S-3	N/A	light brown to yellow medium sand, wet.	0	sample saturated at 10'
					END OF BORING		no sample collected
15							
20							
25							

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
146532.FI	12SB05	SHEET 1 OF 1

DPT SOIL BORING LOG

PROJECT : Marine Corp Air Station - Cherry Point LOCATION : OU6 - Site 12

TOC ELEVATION : N/A DRILLING CONTRACTOR : Parratt-Wolff, Hillsborough, NC

DRILLING METHOD AND EQUIPMENT USED : DPT Rig

WATER LEVELS : N/A START : 03/09/99 END : 03/09/99 LOGGER : Ron Ormson

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	OVM (ppm):	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
1	0-4'		S-1	N/A	top 12": black organic topsoil with roots. bottom 36": medium to light brown silty sand with trace of clay, soft, moist to wet.	0	faint petroleum odor collected soil sample from 1' to 2'
2							
3							
4							
5	4-8'		S-2	N/A	medium textured brown sand with some coarse sand, loose, to very loose, wet.	0	collected soil sample from 4' to 5'
6							
7					brown medium to coarse sand, loose to compact, saturated at 8'.	0	collected soil sample from 7' to 8'
8							sample saturated at 8'
					END OF BORING		
10							
15							
20							
25							

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
146532.FI	12SB14	SHEET 1 OF 1

DPT SOIL BORING LOG

PROJECT : Marine Corp Air Station - Cherry Point LOCATION : OU6 - Site 12

TOC ELEVATION : N/A DRILLING CONTRACTOR : Parratt-Wolff, Hillsborough, NC

DRILLING METHOD AND EQUIPMENT USED : DPT Rig

WATER LEVELS : N/A START : 03/09/99 END : 03/09/99 LOGGER : Ron Ormson

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm):
1, 2, 3, 4	0-4'		S-1	N/A	top 6": black organic rich topsoil, moist, soft, roots. remainder: brown silty sand (fill), moist, soft	0 collected soil sample from 1' to 2'
5, 6, 7, 8	4-8'		S-2	N/A	light brown to gold-yellow medium sand with some coarse sand, moist, very loose.	0 collected soil sample from 4' to 5'
					same as above, increasing moisture.	0 collected soil sample from 7' to 8'
9, 10, 11, 12	8-12'	36"	S-3	N/A	same as above, with 1" orgainc clay lense at 8.5 to 9.5'	sample saturated at 10'
						no sample collected
					END OF BORING	
15, 20, 25						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
146532.FI	12SB15	SHEET 1 OF 1

DPT SOIL BORING LOG

PROJECT : Marine Corp Air Station - Cherry Point LOCATION : OU6 - Site 12

TOC ELEVATION : N/A DRILLING CONTRACTOR : Parratt-Wolff, Hillsborough, NC

DRILLING METHOD AND EQUIPMENT USED : DPT Rig

WATER LEVELS : N/A START : 03/10/99 END : 03/10/99 LOGGER : Ron Ormson

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm):	
1, 2, 3, 4	0-4'		S-1	N/A	top 6": light brown sand and gravel fill, moist, loose, then 3" thin, black, organic topsoil layer remainder: brown silty sand with some clay, loose.	0	collected soil sample from 1' to 2'
5, 6, 7, 8	4-8'		S-2	N/A	brown, silty sand with some clay, moist, soft. abrupt change to light brown to brownish yellow, medium sand with some fine sand seams, loose, moist.	0 0	collected soil sample from 4' to 5' collected soil sample from 7' to 8'
9, 10, 11, 12	8-12'	36"	S-3	N/A	brownish yellow medium to fine sand, very loose, moist to saturated.	NA	collected soil sample from 10' to 11'
					END OF BORING		
15, 20, 25							

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
146532.FI	12SB16	SHEET 1 OF 1

DPT SOIL BORING LOG

PROJECT : Marine Corp Air Station - Cherry Point LOCATION : OU6 - Site 12
TOC ELEVATION : N/A DRILLING CONTRACTOR : Parratt-Wolff, Hillsborough, NC
DRILLING METHOD AND EQUIPMENT USED : DPT Rig
WATER LEVELS : N/A START : 03/09/99 END : 03/09/99 LOGGER : Ron Ormson

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm):
1, 2, 3, 4	0-4'		S-1	N/A	top 6": black organic topsoil, moist, soft, roots. remainder: brown silty sand, moist, loose to firm.	0 collected soil sample from 1' to 2'
5, 6, 7, 8	4-8'		S-2	N/A	light brown to gold-yellow medium sand with some coarse sand, moist, very loose.	0 collected soil sample from 4' to 5'
					same as above, increasing moisture.	0 collected soil sample from 7' to 8'
9, 10, 11, 12	8-12'	36"	S-3	N/A	same as above, with 1" orgainc clay lense at 8.5 to 9.5'	0 collected soil sample from 9' to 10' sample saturated at 10'
						no sample collected
					END OF BORING	
15, 20, 25						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
146532.FI	12SB17	SHEET 1 OF 1

DPT SOIL BORING LOG

PROJECT : Marine Corp Air Station - Cherry Point
LOCATION : OU6 - Site 12
TOC ELEVATION : N/A
DRILLING CONTRACTOR : Parratt-Wolff, Hillsborough, NC
DRILLING METHOD AND EQUIPMENT USED : DPT Rig
WATER LEVELS : N/A
START : 03/10/99
END : 03/10/99
LOGGER : Ron Ormson

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	OVM (ppm):	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
1, 2, 3, 4	0-4'		S-1	N/A	top 6": black organic topsoil, moist, soft, some rocks. remainder: brown silty sand with some clay, soft moist.	0	faint petroleum odor collected soil sample from 1' to 2' black staining from 1.5' to 2'
5, 6, 7, 8	4-8'		S-2	N/A	silty sand changing to light brown to yellow medium medium to coarse sand, loose, moist. same as above, increasing moisture.	0	collected soil sample from 4' to 5' collected soil sample from 7' to 8'
9, 10, 11, 12	8-12'	36"	S-3	N/A	light brown to yellowish brown medium sand with some fine and coarse sand stringers, loose, saturated	0	sample saturated at 10' collected soil sample from 10' to 11'
					END OF BORING		
15, 20, 25							

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
146532.FI	12SB18	SHEET 1 OF 1

DPT SOIL BORING LOG

PROJECT : Marine Corp Air Station - Cherry Point LOCATION : OU6 - Site 12

TOC ELEVATION : N/A DRILLING CONTRACTOR : Parratt-Wolff, Hillsborough, NC

DRILLING METHOD AND EQUIPMENT USED : DPT Rig

WATER LEVELS : N/A START : 03/10/99 END : 03/10/99 LOGGER : Ron Ormson

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm):
1 2 3 4	0-4'		S-1	N/A	top 6": black to dark brown organic topsoil, moist, soft, abundant grass and roots remainder: brown silty sand with some clay, soft, moist.	0 collected soil sample from 1' to 2'
5 6 7 8	4-8'		S-2	N/A	medium brown to yellow medium sand with some fine sand lenses, very loose, moist. same as above.	0 collected soil sample from 4' to 5' 0 collected soil sample from 7' to 8'
9 10 11 12	8-12'	36"	S-3	N/A	brownish yellow medium to fine sand, very loose, moist to saturated.	sample saturated at 10' 0 collected soil sample from 10' to 11'
					END OF BORING	
15 20 25						

BORING LOG — **NUS CORPORATION**

PROJECT: MCAS CHERRY POINT — BORING NO.: 12GW01

PROJECT NO.: 3F25 — DATE: 10-29-91 — DRILLER: ATEC

ELEVATION: — FIELD GEOLOGIST: S CONTI

WATER LEVEL DATA: (Date, Time & Conditions)

SAMPLE NO. & TYPE	DEPTH (Ft) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, Ft)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR OR USCS	REMARKS (HNU)
S-1	0.0	3 3	2.9/2.0		LOOSE	BRN	SILTY SAND - TR ROOTS	SM	MOIST 0PPM
0843	2.0	3 2							
	4.0								
S-2		3 4	1.8/2.0		MDENSE	BRN	SILTY SAND	SM	MOIST 0PPM
0846	6.0	4 7							
									WATER @ 7.5/18.0
	9.0								
3		4 6	1.8/2.0		MDENSE	YELLOW BRN	FINE SAND - SILTY	SM	WET 0PPM
0850	11.0	7 8					TR CLAY SEAM		V. THIN CLAY
	14.0								
S-4		4 6	1.7/2.0		MDENSE	YELLOW BRN	SILTY SAND/ FINE SAND	SM	WET 0PPM
0900	16.0	5 12		15.5					
									WELL SCR 5-15
							BOTTOM 15.5		SAND 15.5 → 4.0
									PELLETS 2 → 4.0

REMARKS: MOBILE B61 4¼" ID HSA.

(12MW01)

BORING 12GW01

PAGE 1 OF 1

* See Legend on Back

BORING LOG — NUS CORPORATION

PROJECT: MCAS CHERRY POINT — BORING NO.: 12GW02
PROJECT NO.: 3F25 — DATE: 10-29-91 — DRILLER: ATEC
ELEVATION: — FIELD GEOLOGIST: CONTI
WATER LEVEL DATA: —
(Date, Time & Conditions) —

SAMPLE NO. & TYPE	DEPTH (Ft.) OR RUN NO.	BLOWS 6" OR RQD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, Ft.)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS
S-1	0.0				LOOSE	YELLOW BRN	SILTY SAND	SM	0-6" ASPHALT MOIST 0PPM
0945	2.0								NO SPLIT SPOON TAKEN
									@ 0-2. WENT TO 4'
	4.0								
S-2		3/3	1.7/2.0		MDENSE	BRN	SILTY SAND - TR CLAY	SM	MOIST 0PPM
0952	6.0	4/5							CLAY IN UPPER 1' OF SAMPLE.
	9.0								
S-3		6/5	2.0/2.0		MDENSE	YELLOW BRN	SILTY SAND	SM	MOIST → WET 0 PPM
1000	11.0	7/8							WATER ≈ 10'±
	14.0								
S-4		6/10	2.0/2.0		MDENSE	ORANG TAN BRN	SILTY SAND - TR CLAY	SM	WET 0 PPM
1005	16.0	12/14					LENS		
	17.5			17.5					
							BOTTOM 17.5		SCREEN 7-17
									SAND 17.5 → 5.0
									PELLETS 5.0 → 3.0

REMARKS: MOBILE B-61 4¼" ID HSA
THIS AREA COVERED W/ ASPHALT - OLD RUNWAY/TAXIWAY
MAY AFFECT SWL

(12MW02)
BORING 12GW
PAGE 1 OF 1

* See Legend on Back

BORING LOG — **NUS CORPORATION**

PROJECT: MCAS CHERRY POINT — BORING NO.: 12 GW03

PROJECT NO.: 3F25 — DATE: 10-29-91 — DRILLER: ATEC

ELEVATION: — FIELD GEOLOGIST: CONTI

WATER LEVEL DATA:

(Date, Time & Conditions)

SAMPLE NO. & TYPE	DEPTH (FT) OR RUN NO.	BLOWS 6" OR ROD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth, Ft.)	MATERIAL DESCRIPTION* SOIL DENSITY/CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS
S-1	0.0	3 6	1.8/2.0	1.0	M DENSE	BLK TO	SILTY SAND-TR ROOTS	SM	0 PPM 0-1 COULD BE FILL
1053	2.0	11 13				BRN			SL ODOR, BUT NO HNU RDG. MOIST
	4.0								
S-2		4 6	2.0/2.0		LOOSE	TAN BRN	SILTY SAND	SM	0PPM-MOIST
1101	6.0	4 5							LOOKS NATURAL.
	9.0					ORANG TAN BRN			
3		4 4	1.7/2.0		M DENSE		SILTY SAND	SM	0-1 PPM-MOIST → WET
1106	11.0	8 11							WATER: 9 FT ±
	14.0								
S-4		5 9	1.3/2.0		M DENSE	TAN BRN	SILTY SAND	SM	WET
1115	16.0	13 13							
	16.5			16.5					
									SCL 6-16
									SAND 6-16.5
							BOTM @ 16.5		PELLETS 5 TO 3

REMARKS: MOBILE B-61 4¼" Φ HSA
BOOM UP @ 1050 HRS.

(12MWΦ3)

BORING 12GW03

PAGE 1 OF 1

* See Legend on Back

BORING LOG — NUS CORPORATION

PROJECT: MCAS CHERRY POINT — BORING NO.: 12GW04
PROJECT NO.: 3F25 — DATE: 10-29-91 — DRILLER: ATEC
ELEVATION: — FIELD GEOLOGIST: CONTI
WATER LEVEL DATA: —
(Date, Time & Conditions)

SAMPLE NO. & TYPE	DEPTH (Ft.) OR RUN NO.	BLOWS 6" OR ROD (%)	SAMPLE RECOVERY SAMPLE LENGTH	LITHOLOGY CHANGE (Depth Ft.)	MATERIAL DESCRIPTION* SOIL DENSITY CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	ROCK BR. OR USCS	REMARKS
							6" ASPHALT - THEN SILTY SAND		
	2.0								
S-1		4 7	1.9/2.0		LOOSE	TAN BRN	SILTY SAND	SM	MOIST OPPM
1240	4.0	3 4							TOOK 125004-0203 1-40% - 1-90%
S-2		5 5	2.4/2.0		LOOSE	TAN BRN	SILTY SAND	SM	MOIST OPPM
1245	6.0	9 8							
	9.0								
S-3		4 5	2.0/2.0		MDENSE	YELLOW BRN	SILTY SAND	SM	MOIST → WET OPPM
1251	11.0	5 7							WATER @ 10'±
	14.0								
S-4		9 6	1.9/2.0		MDENSE	YELLOW BRN	SILTY SAND	SM	WET OPPM
1255	16.0	8 8							
									SCR 7-17
	17.5			17.5			BOTM @ 17.5		SAND 5-17.5
									PELLETS 5 TO 3

REMARKS: MOBILE B61 RIG - 4¼" ID HSA
BOON UP 1230 HRS

(12MW04)
BORING 12 A
PAGE 1 OF 1

* See Legend on Back

Appendix B
Well Construction Diagrams

PROJECT NUMBER	WELL NUMBER
146532.FI	012TW01 · SHEET 1 OF 1

CH2MHILL

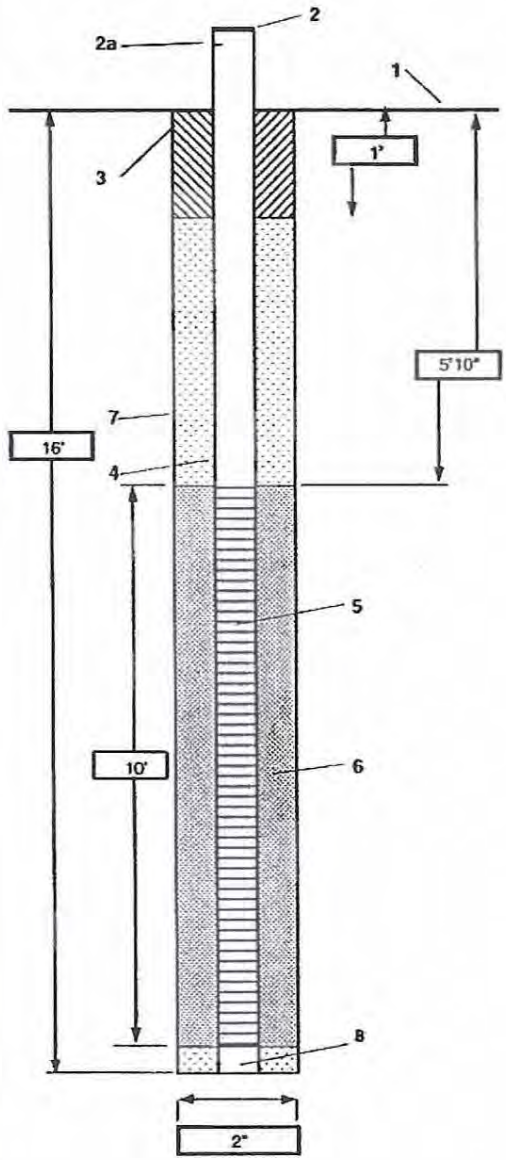
WELL COMPLETION DIAGRAM

PROJECT : Marine Corp Air Station - Cherry Point LOCATION : OU6 - Site 12

DRILLING CONTRACTOR : Parratt-Wolff, Hillsborough, NC

DRILLING METHOD AND EQUIPMENT USED : DPT Rig

WATER LEVELS : N/A START : 03/10/99 END : 03/10/99 LOGGER : Ron Ormson



1- Ground elevation at well	N/A
2- Top of casing elevation	N/A
a) vent hole?	
3- concrete pad dimensions	N/A
4- Dia./type of well casing	3/4" PVC
5- Type/slot size of screen	
6- Type screen filter	Pre-packed filter
a) Quantity used	
7- Type of seal	Bentonite chips
a) Quantity used	1'
Development method	Peristaltic Pump
Development time	15 minutes
Estimated purge volume	
8- Type/size of end cap	3/4" x 2", threaded PVC

Comments Purge water had faint hydrocarbon odor.
PID reading on purge water; 0.0 ppm.
Groundwater at approximately 10' below ground.

HALLIBURTON NUS
Environmental Corporation

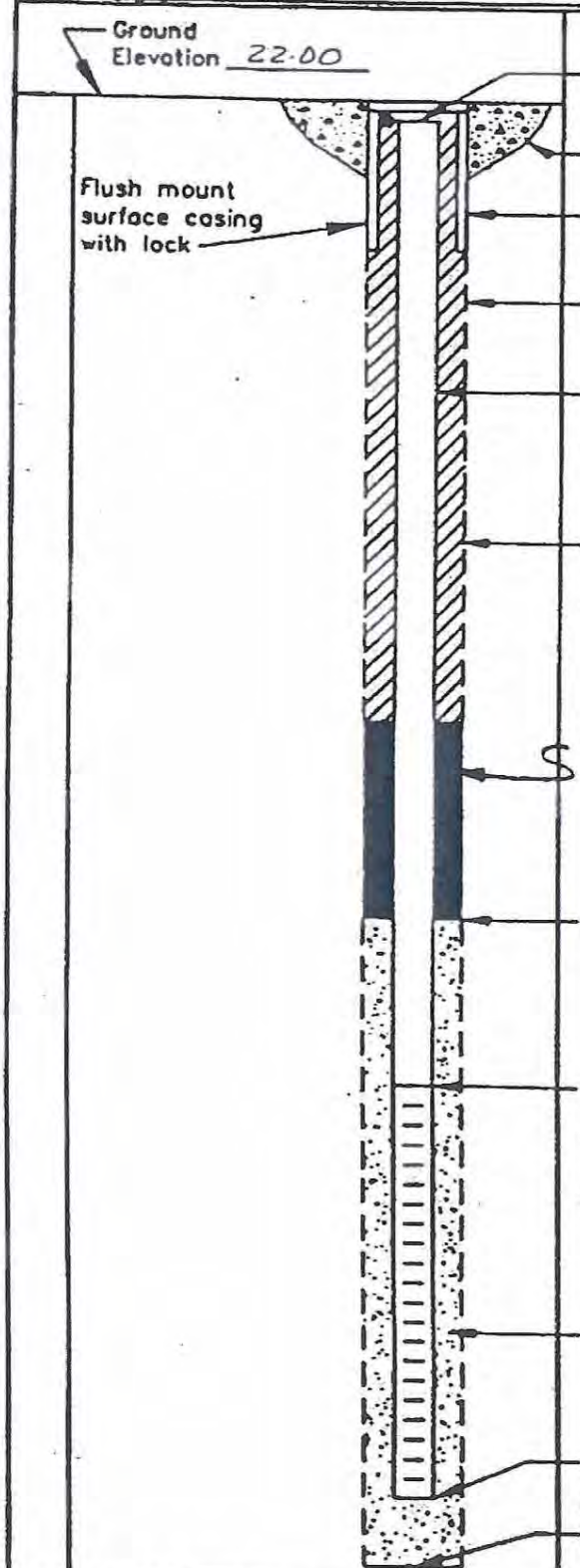
WELL NO.: 12GW01
(12MW01)

MONITORING WELL SHEET

PROJECT: MCAS
PROJECT NO.: 3F25
ELEVATION:
FIELD GEOLOGIST: S CONTI

LOCATION: CHERRY POINT
BORING: 12GW01
DATE: 10-29-91

DRILLER: ATEC
DRILLING METHOD: HSA
DEVELOPMENT METHOD: PUMP



ELEVATION TOP OF RISER: 21.94

TYPE OF SURFACE SEAL: FLUSH MOUNT

TYPE OF PROTECTIVE CASING: STEEL

I.D. OF PROTECTIVE CASING: 6"

BOREHOLE DIAMETER: 8"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: CEMENT GROUT

BENTONITE PELLETS TO 2.0

DEPTH/ELEVATION TOP OF SAND: 18.00 / 4'

DEPTH/ELEVATION TOP OF SCREEN: 17.00 / 5'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 SL x 10'

TYPE OF SAND PACK: #20-30 SAND

DEPTH/ELEVATION BOTTOM OF SCREEN: 7.00 / 15'

DEPTH/ELEVATION BOTTOM OF SAND: 6.50 / 15.5

DEPTH/ELEVATION BOTTOM OF HOLE: 6.50 / 15.5

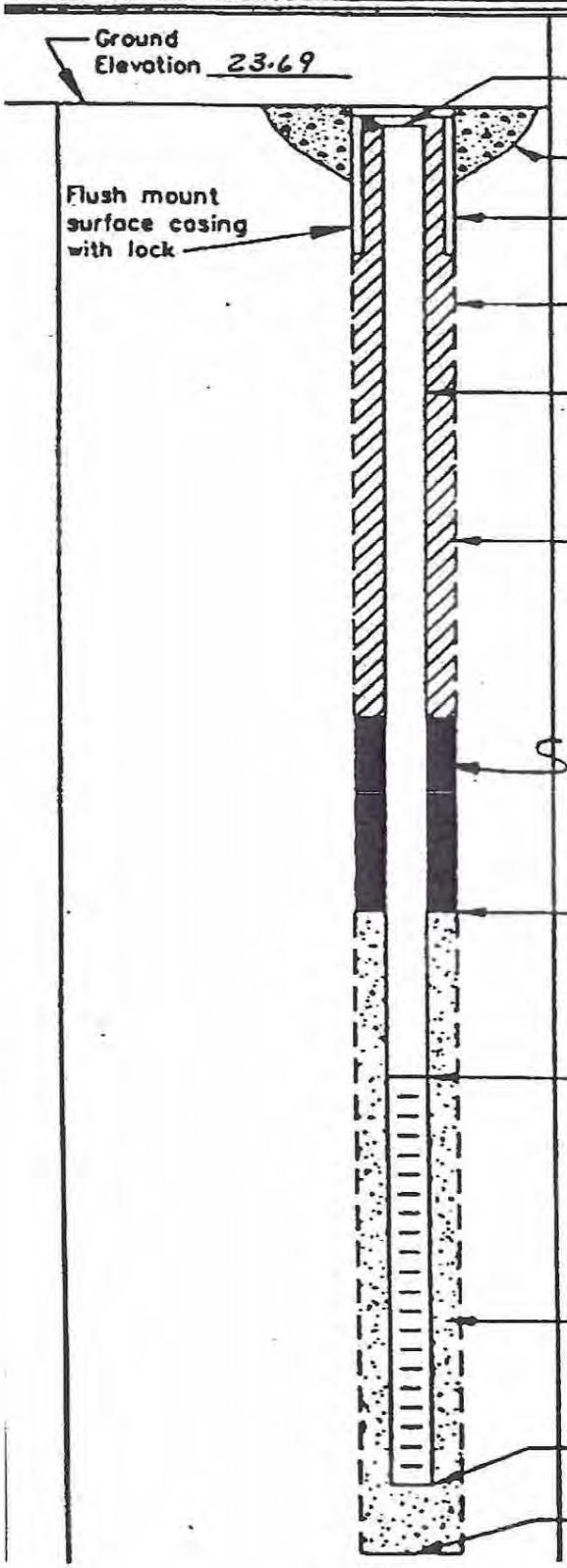
BACKFILL MATERIAL BELOW SAND: NA

HALLIBURTON NUS
Environmental Corporation

WELL NO.: 12GW02
(12MWØ2)

MONITORING WELL SHEET

PROJECT: MCAS
LOCATION: CHERRY POINT
DRILLER: ATEC
PROJECT NO.: 3F25
BORING: 12GW02
DRILLING METHOD: HSA
ELEVATION:
DATE: 10-29-91
DEVELOPMENT METHOD: PUMP
FIELD GEOLOGIST: S CONTI



ELEVATION TOP OF RISER: 22.67

TYPE OF SURFACE SEAL: FLUSH-MOUNT

TYPE OF PROTECTIVE CASING: STEEL

I.D. OF PROTECTIVE CASING: 6"

BOREHOLE DIAMETER: 8"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: CEMENT GROUT

BENTONITE PELLETS TO 3'

DEPTH/ELEVATION TOP OF SAND: 18.69 / 5'

DEPTH/ELEVATION TOP OF SCREEN: 16.69 / 7'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 SL x 10'

TYPE OF SAND PACK: # 20-30 SAND

DEPTH/ELEVATION BOTTOM OF SCREEN: 6.69 / 17'

DEPTH/ELEVATION BOTTOM OF SAND: 6.19 / 17.5'

DEPTH/ELEVATION BOTTOM OF HOLE: 6.19 / 17.5'

BACKFILL MATERIAL BELOW SAND: N/A

HALLIBURTON NUS
Environmental Corporation

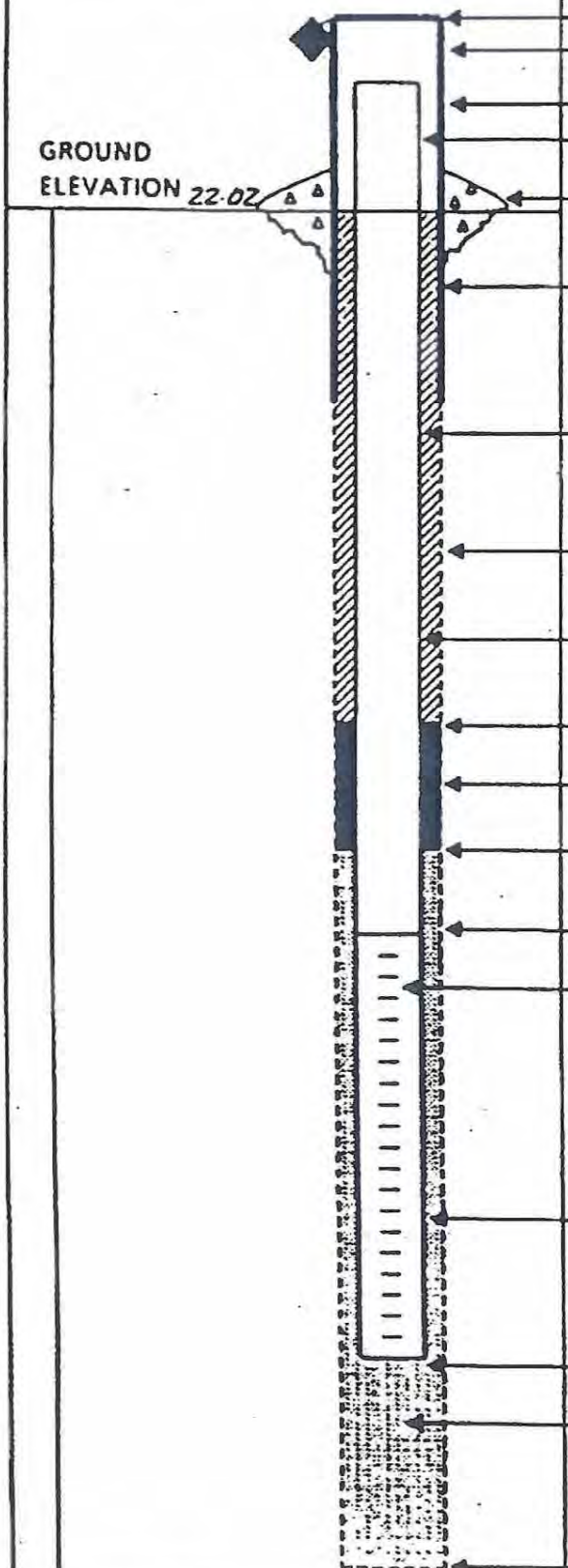
(12MW03

MONITORING WELL SHEET

PROJECT MCAS
PROJECT NO. 3F25
ELEVATION
FIELD GEOLOGIST: S CONTI

LOCATION CHERRY POINT
BORING 12GW03
DATE 10-29-91

DRILLER ATEC
DRILLING METHOD HSA
DEVELOPMENT METHOD PUMP



ELEVATION OF TOP OF SURFACE CASING: 24.98
ELEVATION OF TOP OF RISER PIPE: 24.18

STICK - UP TOP OF SURFACE CASING: 2.96
STICK - UP RISER PIPE: 2.16

TYPE OF SURFACE SEAL: 5'x5'x 6" CONCRETE PAD

I.D. OF SURFACE CASING: 2"
TYPE OF SURFACE CASING: PVC

RISER PIPE I.D. 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8"

TYPE OF BACKFILL: CEMENT GROUT

ELEVATION / DEPTH TOP OF SEAL: 19.02 / 3'

TYPE OF SEAL: BENTONITE PELLETS

DEPTH TOP OF SAND PACK: 17.02 / 5'

ELEVATION / DEPTH TOP OF SCREEN: 16.02 / 6'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 SL x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #20-30 SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 6.02 / 16'

ELEVATION / DEPTH BOTTOM OF SAND PACK: 5.52 / 16.5'

TYPE OF BACKFILL BELOW OBSERVATION WELL: N/A

ELEVATION / DEPTH OF HOLE: 5.52 / 16.5'

HALLIBURTON NUS
Environmental Corporation

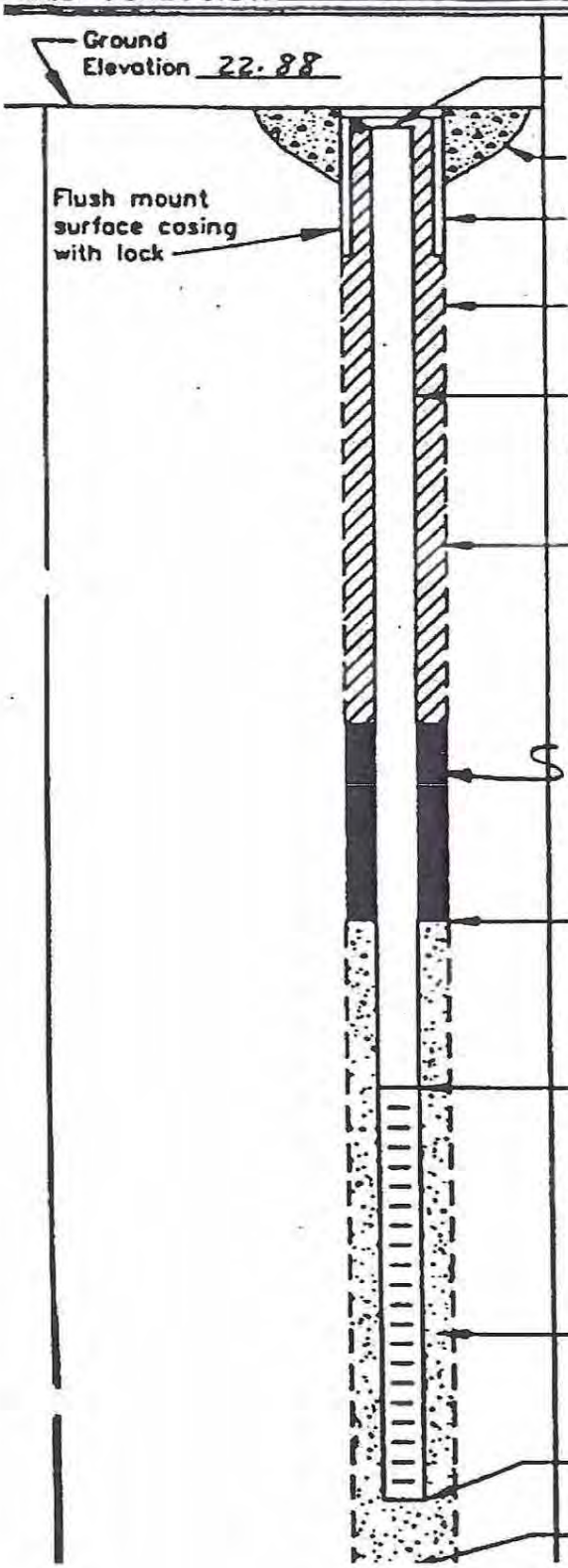
WELL NO.: 12GW04
(12MWØ4)

MONITORING WELL SHEET

PROJECT: MCAS
PROJECT NO.: 3F25
ELEVATION:
FIELD GEOLOGIST: S CONTI

LOCATION: CHERRY POINT
BORING: 12GW04
DATE: 10-29-91

DRILLER: ATEC
DRILLING METHOD: HSA
DEVELOPMENT METHOD: PUMP



ELEVATION TOP OF RISER: 22.82

TYPE OF SURFACE SEAL: FLUSH MOUNT

TYPE OF PROTECTIVE CASING: STEEL

I.D. OF PROTECTIVE CASING: 6"

BOREHOLE DIAMETER: 8"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: CEMENT GROUT

BENTONITE PELLETS TO 3'

DEPTH/ELEVATION TOP OF SAND: 17.88 / 5'

DEPTH/ELEVATION TOP OF SCREEN: 15.88 / 7'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 SL x 10'

TYPE OF SAND PACK: # 20-30 SAND

DEPTH/ELEVATION BOTTOM OF SCREEN: 5.88 / 17'

DEPTH/ELEVATION BOTTOM OF SAND: 5.38 / 17.5'

DEPTH/ELEVATION BOTTOM OF HOLE: 5.38 / 17.5'

Appendix C
RI Field Sampling Parameters

Table C-1 Field Parameters - Groundwater Sampling Site 12 RI, MCAS Cherry Point							
Sample ID	Date	pH (S.U.)	Eh	Specific Conductance (mS/cm)	D.O. (mg/L)	Turbidity (NTU)	Temperature (°C)
012-TW01	03/17/1999	5.87	80	0.311	11.89	197	17.7
012-MW01	03/18/1999	5.14	NA	0.84	11.69	68	17
012-MW02	03/18/1999	5.15	NA	0.163	8.33	68	20.8
012-MW03	03/18/1999	5.97	95	0.31	9.19	92	16.5
012-MW04	03/18/1999	5.41	135	0.19	8.3	561	19.6

Table C-2 Field Parameters - Surface Water Sampling Site 12 RI, MCAS Cherry Point				
Sample ID	Date	pH (S.U.)	Specific Conductance (mS/cm)	Temperature (°C)
012SW01	03/10/1999	N/A	0.111	5.1
012SW02	03/10/1999	N/A	0.041	9.3
012SW03	03/10/1999	N/A	0.063	5.8
012SW04*	03/10/1999	N/A	0.111	5.1

N/A - pH meter malfunctioning.
*Sample 012SW04 is the duplicate sample of 012SW01.

Appendix D
Onsite Laboratory Data

FINAL DATA REPORT

CH2M Hill
13921 Park Center Rd.
Herndon, VA 20171

MCAS Cherry Point, Havelock NC

TEG PROJECT # 3-99094-A1

TPH-DRO ANALYSIS OF SOIL (EPA METHOD 3550/8015)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	TPH-DRO (mg/kg)	Surrogate Recovery (%)	Data Qualifiers	PQL
METHOD BLANK	-----	3/8/99	ND	78.2		10
012 SS 06-00	3/8/99	3/8/99	ND	88.2		10
012 SS 07-00	3/8/99	3/8/99	ND	85.4		10
012 SB01-01	3/8/99	3/8/99	3536	MI	D	50
012 SB01-04	3/8/99	3/8/99	896	MI		10
012 SB01-07	3/8/99	3/8/99	ND	82.8		10
012 SS02-00	3/8/99	3/8/99	ND	91.8		10
012 SS03-00	3/8/99	3/8/99	ND	78.4	D	20
SB 02-01	3/8/99	3/8/99	ND	89.4		10
2 SB 02-04	3/8/99	3/8/99	316	109.2		10
012 SB 02-07	3/8/99	3/8/99	ND	88.2		10
012 SB 02-10	3/8/99	3/8/99	ND	97.0		10
012 SS 08-00	3/8/99	3/8/99	ND	79.6		10
012 SS 10-00	3/8/99	3/8/99	ND	86.0		10
012 SS 09-00	3/8/99	3/8/99	ND	92.2		10
012 SS 11-00	3/8/99	3/8/99	ND	90.8		10
012 SB 03-01	3/8/99	3/8/99	ND	72.4		10
012 SB 03-04	3/8/99	3/8/99	ND	100.4		10
012 SB 03-07	3/8/99	3/8/99	ND	86.6		10
012 SS 01-00	3/8/99	3/8/99	ND	104.8		10
012 SS 13-00	3/8/99	3/8/99	ND	90.0		10
012 SS 05-00	3/8/99	3/8/99	ND	95.0		10
012 SS 04-00	3/8/99	3/8/99	ND	93.8		10

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:SCOTT DIXON
DATA REVIEWED BY: Billy W. Hathcock

DATA QUALIFIERS

MI = MATRIX INTERFERENCE
DO = SURROGATE SPIKE DILUTED OUT
D = ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
INDIVIDUAL VALUE OBTAINED BY DILUTION
· = ESTIMATED CONCENTRATION(S)

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

FINAL DATA REPORT

CH2M Hill
13921 Park Center Rd.
Herndon, VA 20171

MCAS Cherry Point, Havelock NC

TEG PROJECT # 3-99094-A1

TPH-DRO ANALYSIS OF SOIL (EPA METHOD 3550/8015)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	TPH-DRO (mg/kg)	Surrogate Recovery (%)	Data Qualifiers	PQL
012 SB 04-01	3/8/99	3/8/99	ND	97.8		10
012 SB 04-04	3/8/99	3/9/99	ND	85.6		10
012 SB 07-07	3/8/99	3/9/99	ND	96.4		10
METHOD BLANK	-------	3/9/99	ND	89.0		10
012 SB 05-01	3/9/99	3/9/99	ND	76.8		10
012 SB 05-04	3/9/99	3/9/99	ND	100.2		10
012 SB 05-07	3/9/99	3/10/99	ND	85.0		10
35A SS 01-00	3/9/99	3/9/99	ND	82.4		10
35A SS 02-00	3/9/99	3/9/99	ND	94.0		10
35A SS 03-00	3/9/99	3/9/99	ND	87.2		10
35A SS 04-00	3/9/99	3/9/99	ND	94.8		10
35A SS 05-00	3/9/99	3/9/99	ND	84.2		10
35A SB 01-01	3/9/99	3/9/99	ND	90.6		10
35A SB 01-04	3/9/99	3/9/99	ND	93.8		10
35A SB 01-07	3/9/99	3/9/99	ND	109.2		10
012 SS 16-00	3/9/99	3/9/99	ND	85.2		10
012 SB 16-01	3/9/99	3/9/99	ND	97.6		10
012 SB 16-04	3/9/99	3/9/99	ND	83.6		10
012 SB 16-07	3/9/99	3/9/99	ND	99.6		10
012 SB 16-09	3/9/99	3/9/99	ND	86.4		10
012 SS 14-00	3/9/99	3/9/99	ND	108.2		10
012 SB 14-01	3/9/99	3/9/99	ND	92.4		10
012 SB 14-04	3/9/99	3/9/99	ND	99.8		10
012 SB 14-07	3/9/99	3/9/99	ND	96		10

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:SCOTT DIXON
DATA REVIEWED BY: Philip W. Hatfield

DATA QUALIFIERS

MI = MATRIX INTERFERENCE
DO = SURROGATE SPIKE DILUTED OUT
D = ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
d = INDIVIDUAL VALUE OBTAINED BY DILUTION
E = ESTIMATED CONCENTRATION(S)

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

FINAL DATA REPORT

CH2M Hill
13921 Park Center Rd.
Herndon, VA 20171

MCAS Cherry Point, Havelock NC

TEG PROJECT # 3-99094-A1

TPH-DRO ANALYSIS OF SOIL (EPA METHOD 3550/8015)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	TPH-DRO (mg/kg)	Surrogate Recovery (%)	Data Qualifiers	PQL
METHOD BLANK	------	3/10/99	ND	82.4		10
012 SS 15-00	3/10/99	3/10/99	ND	98.8		10
012 SS 17-00	3/10/99	3/10/99	ND	87.4		10
012 SB 17-01	36229	3/10/99	30.3	94.4		10
012 SB 17-04	3/10/99	3/10/99	ND	91.0		10
012 SB 17-07	3/10/99	3/10/99	ND	88.8		10
012 SS 18-00	3/10/99	3/10/99	NA	102.4		10
012 SB 18-01	3/10/99	3/10/99	ND	107.6		10
012 SB 18-04	3/10/99	3/10/99	ND	103.8		10
2 SB 18-07	3/10/99	3/10/99	ND	107.4		10
2 SB 15-01	3/10/99	3/10/99	ND	97.6		10
012 SB-15-04	3/10/99	3/10/99	ND	115.2		10
012 SB-15-07	3/10/99	3/10/99	ND	89.4		10
METHOD BLANK	------	3/11/99	ND	80.0		10
35A SD 02	3/11/99	3/11/99	ND	107.0		10
35A SD 01	3/11/99	3/11/99	ND	112.8		10
35A SD 03	3/11/99	3/11/99	ND	98.0		10
012 SD 01	3/11/99	3/11/99	ND	120.4		10
012 SD 04	3/11/99	3/11/99	ND	135.0		10
012 SD 02	3/11/99	3/11/99	ND	108.0		10
~~35A~~ 012 SD 03	3/11/99	3/11/99	ND	110.0		10

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:SCOTT DIXON
DATA REVIEWED BY: Phillip W. Hathcock

DATA QUALIFIERS

MI = MATRIX INTERFERENCE
DO = SURROGATE SPIKE DILUTED OUT
D = ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
d = INDIVIDUAL VALUE OBTAINED BY DILUTION
E = ESTIMATED CONCENTRATION(S)

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

FINAL DATA REPORT

CH2M Hill
13921 Park Center Rd.
Herndon, VA 20171

MCAS Cherry Point, Havelock NC

EG PROJECT # 3-99094-A1

PH-DRO ANALYSIS OF WATER (EPA METHOD 3510/8015)

ATA REPORTED IN MILLIGRAMS PER LITER (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	TPH-DRO (mg/L)	Surrogate Recovery (%)	Data Qualifiers	PQL
ETHOD BLANK	-----	3/9/99	ND	89.0		0.50
12 GW 01-10	3/9/99	3/9/99	ND	117.4		0.50
12 GW 01-10 DUP	3/9/99	3/9/99	ND	119.0		0.50
12 GW 02-10	3/9/99	3/9/99	ND	107.8		0.50
12 GW 22-10	3/9/99	3/9/99	ND	93.2		0.50
ETHOD BLANK	-----	3/10/99	ND	82.4		0.50
12 SW01	3/10/99	3/10/99	ND	87.6		0.50
12 SW04	3/10/99	3/10/99	ND	67.4		0.50
12 SW03	3/10/99	3/10/99	ND	97.6		0.50
12 SW 02	3/10/99	3/10/99	ND	74.8		0.50
12 TW 01-06	3/10/99	3/10/99	ND	54.8		0.50
ETHOD BLANK	-----	3/11/99	ND	91.6		0.50
5A TW 02-7	3/11/99	3/11/99	ND	102.0		0.50
5A TW 01-08	3/11/99	3/11/99	ND	94.4		0.50
5A TW 03-14	3/11/99	3/11/99	ND	70.6		0.50
5A TW 0~~2~~4-08	3/11/99	3/11/99	ND	94.4		0.50
5A TW 05-08	3/11/99	3/11/99	ND	112.2		0.50

ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
NALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
NALYSIS PERFORMED BY:Scott Dixon
ATA REVIEWED BY Philly W. Hatchel

ATA QUALIFIERS

II = MATRIX INTERFERENCE
O = SURROGATE SPIKE DILUTED OUT
= ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
= INDIVIDUAL VALUE OBTAINED BY DILUTION
= ESTIMATED CONCENTRATION(S)

399094 DRO W

Printed: 3/18/99

FINAL DATA REPORT

CH2M Hill
13921 Park Center Rd.
Herndon, VA 20171

MCAS Cherry Point, Havelock NC

TEG PROJECT # 3-99094-A1

TPH-GRO ANALYSIS OF SOIL (EPA METHOD 5030/8015)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	TPH-GRO (mg/kg)	Surrogate Recovery (%)	Data Qualifiers	PQL
METHOD BLANK	-----	3/8/99	ND	90.6		2.0
012 SS 06-00	3/8/99	3/8/99	ND	102.9		2.0
012 SS 07-00	3/8/99	3/8/99	ND	101.5		2.0
012 SB01-07	3/8/99	3/8/99	ND	100.7		2.0
012 SS02-00	3/8/99	3/8/99	ND	72.6		2.0
012 SS03-00	3/8/99	3/9/99	ND	83.4		2.0
0[illegible] 08-00	3/8/99	3/8/99	ND	76.7		2.0
0[illegible] 10-00	3/8/99	3/8/99	ND	MI		2.0
0[illegible] 09-00	3/8/99	3/8/99	ND	90.1		2.0
012 SS 11-00	3/8/99	3/8/99	ND	73.1		2.0
012 SS 01-00	3/8/99	3/9/99	ND	98.6		2.0
012 SS 05-00	3/8/99	3/9/99	ND	51.1		2.0
012 SS 04-00	3/8/99	3/9/99	ND	95.0		2.0

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)

ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY

ANALYSIS PERFORMED BY: SD

DATA REVIEWED BY: Phillip W. Hatfield

DATA QUALIFIERS

MI = MATRIX INTERFERENCE

DO = SURROGATE SPIKE DILUTED OUT

D = ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY

d = INDIVIDUAL VALUE OBTAINED BY DILUTION

E = ESTIMATED CONCENTRATION(S)

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

FINAL DATA REPORT

CH2M Hill
13921 Park Center Rd.
Herndon, VA 20171

MCAS Cherry Point, Havelock NC

TEG PROJECT # 3-99094-A1

TPH-GRO ANALYSIS OF WATER (EPA METHOD 5030/8015)

DATA REPORTED IN MILLIGRAMS PER LITER (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	TPH-GRO (mg/L)	Surrogate Recovery (%)	Data Qualifiers	PQL
METHOD BLANK	-----	3/9/99	ND	87.7		0.50
012 GW 01-10	3/9/99	3/9/99	ND	82.4		0.50
012 GW 02-10	3/9/99	3/9/99	ND	70.8		0.50
012 GW 22-10	3/9/99	3/9/99	0.74	94.4		0.50

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:Scott Dixon
DATA REVIEWED BY: Phillip W. Hatheel

DATA QUALIFIERS

MI = MATRIX INTERFERENCE
DO = SURROGATE SPIKE DILUTED OUT
D = ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
d = INDIVIDUAL VALUE OBTAINED BY DILUTION
E = ESTIMATED CONCENTRATION(S)

399094 GRO W

Printed: 3/18/99

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

QA/QC DATA REPORT

CH2M Hill
13921 Park Center Rd.
Herndon, VA 20171

MCAS Cherry Point, Havelock NC

TEG PROJECT # 3-99094-A1

BTEX ANALYSIS OF SOIL (EPA METHOD 8021B)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

DATE ANALYZED: 2/25/99
SAMPLE SPIKED: Waste Oil East

	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZ (mg/kg)	XYLENES (mg/kg)
MATRIX SPIKE				
SPIKED CONC.	0.0100	0.0100	0.0100	0.0300
MEASURED CONC.	0.0107	0.0087	0.0103	0.0291
% RECOVERY	106.6%	87.4%	103.4%	96.9%
ATRIX SPIKE DUPLICATE				
SPIKED CONC.	0.0100	0.0100	0.0100	0.0300
MEASURED CONC.	0.0104	0.0084	0.0104	0.0279
% RECOVERY	104.1%	83.8%	104.0%	93.1%
RELATIVE PERCENT DIFFERENCE (RPD)	2.4%	4.2%	0.6%	4.0%

ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:SCOTT DIXON
DATA REVIEWED BY: Philip W. Hathcock

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

FINAL DATA REPORT

CH2M Hill
13921 Park Center Rd.
Herndon, VA 20171

MCAS Cherry Point, Havelock NC

'EG PROJECT # 3-99094-A1

3TEX ANALYSIS OF SOIL (EPA METHOD 8021B)

ATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZ (mg/kg)	XYLENES (mg/kg)	TOT. BTEX (mg/kg)	Surrogate Recovery (	PQL
IETHOD BLANK	-----	3/8/99	ND	ND	ND	ND	ND	90.6	0.005
12 SS 06-00	3/8/99	3/8/99	ND	ND	ND	ND	ND	102.9	0.005
12 SS 07-00	3/8/99	3/8/99	ND	ND	ND	ND	ND	101.5	0.005
12 SB01-07	3/8/99	3/8/99	ND	ND	ND	ND	ND	100.7	0.005
12 SS02-00	3/8/99	3/8/99	ND	ND	ND	ND	ND	72.6	0.005
12 SS03-00	3/8/99	3/9/99	ND	ND	ND	ND	ND	83.4	0.005
12 SS 08-00	3/8/99	3/8/99	ND	ND	ND	ND	ND	76.7	0.005
12 SS 10-00	3/8/99	3/8/99	ND	ND	ND	ND	ND	MI	0.005
12 SS 09-00	3/8/99	3/8/99	ND	ND	ND	ND	ND	90.1	0.005
12 SS 11-00	3/8/99	3/8/99	ND	ND	ND	ND	ND	73.1	0.005
12 SS 01-00	3/8/99	3/9/99	ND	ND	ND	ND	ND	98.6	0.005
12 SS 05-00	3/8/99	3/9/99	ND	ND	ND	ND	ND	51.1	0.005
12 SS 04-00	3/8/99	3/9/99	ND	ND	ND	ND	ND	95.0	0.005

ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
NALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
NALYSIS PERFORMED BY:SCOTT DIXON
ATA REVIEWED BY: Philip W. Hathcock

ATA QUALIFIERS

II = MATRIX INTERFERENCE
O = SURROGATE SPIKE DILUTED OUT
= ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
= INDIVIDUAL VALUE OBTAINED BY DILUTION
= ESTIMATED CONCENTRATION(S)

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

FINAL DATA REPORT

CH2M Hill
13921 Park Center Rd.
Herndon, VA 20171

MCAS Cherry Point, Havelock NC

TEG PROJECT # 3-99094-A1

BTEX ANALYSIS OF WATER (EPA METHOD 8021)

DATA REPORTED IN MICROGRAMS PER LITER (PPB)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYLBENZ (ug/L)	XYLENES (ug/L)	TOT. BTEX (ug/L)	Surrogate Recovery (%)	PQL
METHOD BLANK	-----	3/9/99	ND	ND	ND	ND	**ND**	87.7	2.0
012 GW 01-10	3/9/99	3/9/99	ND	ND	ND	ND	**ND**	82.4	2.0
012 GW 02-10	3/9/99	3/9/99	ND	ND	ND	ND	**ND**	70.8	2.0
012GW-22-10	3/9/99	3/9/99	ND	ND	ND	ND	**ND**	94.4	2.0

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:Scott Dixon
DATA REVIEWED BY: Phil Hatchcock

D' QUALIFIERS
M. MATRIX INTERFERENCE
SURROGATE SPIKE DILUTED OUT
D = ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
d = INDIVIDUAL VALUE OBTAINED BY DILUTION
E = ESTIMATED CONCENTRATION(S)

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

FINAL DATA REPORT

CH2MHILL
Suite 600, 13921 Park Center Rd.
Herndon,VA 20171

TEG PROJECT # 1-99103 FB.

BTEX ANALYSIS OF SOIL (EPA METHOD 8021B)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZ (mg/kg)	XYLENES (mg/kg)	TOT. BTEX (mg/kg)	Surrogate Recovery (%)	Data Qualifiers	PQL
METHOD BLANK	-----	3/11/99	ND	ND	ND	ND	ND	101		0.005
012SB01-01 1-2'	3/8/99	3/12/99	ND	ND	ND	ND	ND	79		0.005
012SB01-04 4-5'	3/8/99	3/12/99	ND	ND	ND	ND	ND	97		0.005
012SB02-01 1-2'	3/8/99	3/11/99	ND	ND	ND	ND	ND	95		0.005
012SB02-04 4-5'	3/8/99	3/11/99	ND	ND	ND	ND	ND	93		0.005
012SB02-07 7-8'	3/8/99	3/12/99	ND	ND	ND	ND	ND	94		0.005
012SB02-10 9-10'	3/8/99	3/12/99	ND	ND	ND	ND	ND	100		0.005
012SB03-01 1-2'	3/8/99	3/12/99	ND	ND	ND	ND	ND	105		0.005
012SB03-04 4-5'	3/8/99	3/12/99	ND	ND	ND	ND	ND	117		0.005
012SB03-07 7-8'	3/8/99	3/12/99	ND	ND	ND	ND	ND	99		0.005
012SS13-00	3/8/99	3/12/99	ND	ND	ND	ND	ND	81		0.005
012SB04-01 1-2'	3/8/99	3/12/99	ND	ND	ND	ND	ND	102		0.005
012SB04-04 4-5'	3/8/99	3/13/99	ND	ND	ND	ND	ND	94		0.005
012SB04-07 7-8'	3/8/99	3/13/99	ND	ND	ND	ND	ND	100		0.005
012SB05-01 1-2'	3/9/99	3/12/99	ND	ND	ND	ND	ND	105		0.005
012SB05-04 4-5'	3/9/99	3/13/99	ND	ND	ND	ND	ND	106		0.005
012SB05-07 7-8'	3/9/99	3/13/99	ND	ND	ND	ND	ND	100		0.005
35ASS01-00	3/9/99	3/12/99	ND	ND	ND	ND	ND	91		0.005
35ASS02-00	3/9/99	3/11/99	ND	ND	ND	ND	ND	88		0.005
35ASS03-00	3/9/99	3/11/99	ND	ND	ND	ND	ND	91		0.005
35ASS04-00	3/9/99	3/11/99	ND	ND	ND	ND	ND	77		0.005
35ASS05-00	3/9/99	3/12/99	ND	ND	ND	ND	ND	88		0.005
35ASB01-01 1-2'	3/9/99	3/11/99	ND	ND	ND	ND	ND	101		0.005

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:MP
DATA REVIEWED BY: Philip W. Hathcock

DATA QUALIFIERS

MI = MATRIX INTERFERENCE
DO = SURROGATE SPIKE DILUTED OUT
D = ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
d = INDIVIDUAL VALUE OBTAINED BY DILUTION
E = ESTIMATED CONCENTRATION(S)

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

FINAL DATA REPORT

CH2MHILL
Suite 600, 13921 Park Center Rd.
Herndon,VA 20171

TEG PROJECT # 1-99103 FB.

BTEX ANALYSIS OF SOIL (EPA METHOD 8021B)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZ (mg/kg)	XYLENES (mg/kg)	TOT. BTEX (mg/kg)	Surrogate Recovery (%)	Data Qualifiers	PQL
METHOD BLANK	----	3/12/99	ND	ND	ND	ND	ND	100		0.005
35ASB01-04 4-5'	3/9/99	3/11/99	ND	ND	ND	ND	ND	100		0.005
35ASB01-07 7-8'	3/9/99	3/11/99	ND	ND	ND	ND	ND	96		0.005
35ASB01-10 10-11'	3/9/99	3/11/99	ND	ND	ND	ND	ND	96		0.005
35ASB01-44	3/9/99	3/11/99	ND	ND	ND	ND	ND	100		0.005
012SS16-00	3/9/99	3/12/99	ND	ND	ND	ND	ND	92		0.005
012SB16-01 1-2'	3/9/99	3/11/99	ND	ND	ND	ND	ND	99		0.005
012SB16-04 4-5'	3/9/99	3/12/99	ND	ND	ND	ND	ND	96		0.005
012SB16-07 7-8'	3/9/99	3/12/99	ND	ND	ND	ND	ND	100		0.005
012SB16-09 9-10'	3/9/99	3/12/99	ND	ND	ND	ND	ND	99		0.005
012SS14-00	3/9/99	3/13/99	ND	ND	ND	ND	ND	86		0.005
012SB14-01 1-2'	3/9/99	3/13/99	ND	ND	ND	ND	ND	86		0.005
012SB14-04 4-5'	3/9/99	3/13/99	ND	ND	ND	ND	ND	105		0.005
012SB14-07 7-8'	3/9/99	3/12/99	ND	ND	ND	ND	ND	98		0.005
012SS15-00	3/10/99	3/12/99	ND	ND	ND	ND	ND	83		0.005
012SS17-00	3/10/99	3/12/99	ND	ND	ND	ND	ND	82		0.005
012SB17-01 1-2'	3/10/99	3/12/99	ND	ND	ND	ND	ND	93		0.005
012SB17-04 4-5'	3/10/99	3/12/99	ND	ND	ND	ND	ND	102		0.005
012SB17-07 7-8'	3/10/99	3/12/99	ND	ND	ND	ND	ND	99		0.005
012SS18-00	3/10/99	3/12/99	ND	ND	ND	ND	ND	93		0.005
012SB18-01 1-2'	3/10/99	3/14/99	ND	ND	ND	ND	ND	103		0.005
012SB18-04 4-5'	3/10/99	3/14/99	ND	ND	ND	ND	ND	104		0.005
012SB18-07 7-8'	3/10/99	3/13/99	ND	ND	ND	ND	ND	100		0.005

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:MP
DATA REVIEWED BY Philip W. Hathcock

DATA QUALIFIERS

MI = MATRIX INTERFERENCE
DO = SURROGATE SPIKE DILUTED OUT
D = ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
d = INDIVIDUAL VALUE OBTAINED BY DILUTION
= ESTIMATED CONCENTRATION(S)

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

FINAL DATA REPORT

CH2MHILL
Suite 600,13921 Park Center Rd.
Herndon, VA 20171

TEG PROJECT # 1-99103FB.

BTEX ANALYSIS OF WATER (EPA METHOD 8021B)

DATA REPORTED IN MICROGRAMS PER LITER (PPB)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYLBENZ (ug/L)	XYLENES (ug/L)	TOT. BTEX (ug/L)	Surrogate Recovery (%)	Data Qualifiers	PQL
METHOD BLANK	----	3/11/99	ND	ND	ND	ND	ND	101		5.0
012SW01	3/10/99	3/11/99	ND	ND	ND	ND	ND	101		5.0
012SW02	3/10/99	3/11/99	ND	ND	ND	ND	ND	100		5.0
012SW03	3/10/99	3/11/99	ND	ND	ND	ND	ND	103		5.0
012SW04	3/10/99	3/11/99	ND	ND	ND	ND	ND	100		5.0
METHOD BLANK	-----	3/13/99	ND	ND	ND	ND	ND	98		5.0
35ATW01-8	3/11/99	3/13/99	ND	ND	ND	ND	ND	101		5.0
35ATW02-7	3/11/99	3/13/99	ND	ND	ND	ND	ND	103		5.0
35ATW03-14	3/11/99	3/13/99	ND	ND	ND	ND	ND	102		5.0
35ATW04-8	3/11/99	3/13/99	ND	ND	ND	ND	ND	99		5.0
35ATW05-8	3/11/99	3/13/99	ND	ND	ND	ND	ND	101		5.0
METHOD BLANK	----	3/14/99	ND	ND	ND	ND	ND	102		5.0
012SW03 Dup.	3/10/99	3/14/99	ND	ND	ND	ND	ND	104		5.0

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:MP
DATA REVIEWED BY: Philip W. Hathcock

DATA QUALIFIERS

MI = MATRIX INTERFERENCE
DO = SURROGATE SPIKE DILUTED OUT
D = ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
d = INDIVIDUAL VALUE OBTAINED BY DILUTION
E = ESTIMATED CONCENTRATION(S)

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

FINAL DATA REPORT

CH2MHILL
Suite 600, 13921 Park Center Rd.
Herndon,VA 20171

TEG PROJECT # 1-99103 FB.

BTEX ANALYSIS OF SOIL (EPA METHOD 8021B)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZ (mg/kg)	XYLENES (mg/kg)	TOT. BTEX (mg/kg)	Surrogate Recovery (%)	Data Qualifiers	PQL
METHOD BLANK	----	3/13/99	ND	ND	ND	ND	ND	98		0.005
012SB15-01 1-2'	3/10/99	3/13/99	ND	ND	ND	ND	ND	87		0.005
012SB15-04 4-5'	3/10/99	3/14/99	ND	ND	ND	ND	ND	90		0.005
012SB15-07 7-8'	3/10/99	3/14/99	ND	ND	ND	ND	ND	98		0.005
012SD01	3/11/99	3/13/99	ND	0.009	ND	ND	0.009	93		0.005
012SD02	3/11/99	3/13/99	ND	ND	ND	ND	ND	97		0.005
012SD03	3/11/99	3/13/99	ND	0.014	ND	ND	0.014	84		0.005
012SD04	3/11/99	3/13/99	ND	0.010	ND	ND	0.010	91		0.005
35ASD01	3/11/99	3/13/99	ND	0.011	ND	ND	0.011	84		0.005
35ASD02	3/11/99	3/13/99	ND	ND	ND	ND	ND	93		0.005
35ASD03	3/11/99	3/13/99	ND	ND	ND	ND	ND	127		0.005
METHOD BLANK	-----	3/14/99	ND	ND	ND	ND	ND	102		0.005
35ASB01-07 7-8' Dup.	3/9/99	3/14/99	ND	ND	ND	ND	ND	103		0.005
012SB03-07 7-8' Dup.	3/8/99	3/14/99	ND	ND	ND	ND	ND	100		0.005
012SB18-04 4-5'Dup.	3/10/99	3/14/99	ND	ND	ND	ND	ND	104		0.005
012SB05-07 7-8'Dup.	3/9/99	3/14/99	ND	ND	ND	ND	ND	101		0.005

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:MP
DATA REVIEWED BY: Philly W. Hethcol

DATA QUALIFIERS

MI = MATRIX INTERFERENCE
DO = SURROGATE SPIKE DILUTED OUT
D = ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
d = INDIVIDUAL VALUE OBTAINED BY DILUTION
= ESTIMATED CONCENTRATION(S)

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

QA/QC DATA REPORT

CH2MHILL
Suite 600, 13921 Park Center Rd.
Herndon,VA 20171

TEG PROJECT # 1-99103 FB.

BTEX ANALYSIS OF SOIL (EPA METHOD 8021B)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

DATE ANALYZED: 3/14/99
SAMPLE SPIKED: 35ASB01-07 7-8'

	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZ (mg/kg)	XYLENES (mg/kg)
MATRIX SPIKE				
SPIKED CONC.	0.05	0.05	0.05	0.15
MEASURED CONC.	0.05	0.05	0.05	0.15
% RECOVERY	99%	96%	97%	101%
MATRIX SPIKE DUPLICATE				
SPIKED CONC.	0.05	0.05	0.05	0.15
MEASURED CONC.	0.05	0.04	0.05	0.15
% RECOVERY	95%	90%	93%	97%
RELATIVE PERCENT DIFFERENCE (RPD)	4.8%	7.0%	4.8%	4.1%

ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:MP
DATA REVIEWED BY: Philip W. Hatfield

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

QA/QC DATA REPORT

CH2MHILL
Suite 600, 13921 Park Center Rd.
Herndon,VA 20171

TEG PROJECT # 1-99103 FB.

BTEX ANALYSIS OF SOIL (EPA METHOD 8021B)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

DATE ANALYZED: 3/14/99
SAMPLE SPIKED: 012SB03-07 7-8'

	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZ (mg/kg)	XYLENES (mg/kg)
MATRIX SPIKE				
SPIKED CONC.	0.05	0.05	0.05	0.15
MEASURED CONC.	0.04	0.05	0.05	0.15
% RECOVERY	90%	94%	94%	100%
MATRIX SPIKE DUPLICATE				
SPIKED CONC.	0.05	0.05	0.05	0.15
MEASURED CONC.	0.04	0.05	0.05	0.15
% RECOVERY	83%	93%	97%	101%
RELATIVE PERCENT DIFFERENCE (RPD)	7.0%	1.7%	2.2%	1.6%

ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:MP
DATA REVIEWED BY Philly W. Hethcoat

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

QA/QC DATA REPORT

CH2MHILL
Suite 600, 13921 Park Center Rd.
Herndon,VA 20171

TEG PROJECT # 1-99103 FB.

BTEX ANALYSIS OF SOIL (EPA METHOD 8021B)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

DATE ANALYZED: 3/15/99
SAMPLE SPIKED: 012SB18-04 4-5'

	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZ (mg/kg)	XYLENES (mg/kg)
MATRIX SPIKE				
SPIKED CONC.	0.05	0.05	0.05	0.15
MEASURED CONC.	0.05	0.05	0.05	0.15
% RECOVERY	92%	96%	97%	99%
MATRIX SPIKE DUPLICATE				
SPIKED CONC.	0.05	0.05	0.05	0.15
MEASURED CONC.	0.04	0.05	0.05	0.15
% RECOVERY	89%	98%	90%	97%
RELATIVE PERCENT DIFFERENCE (RPD)	3.4%	1.5%	6.6%	2.1%

ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:MP
DATA REVIEWED BY: Philly W. Hathcock

3600-C KENNESAW N. IND. PKWY KENNESAW. GA 30144 770-919-0805 FAX 770-919-0806

QA/QC DATA REPORT

CH2MHILL
Suite 600, 13921 Park Center Rd.
Herndon,VA 20171

TEG PROJECT # 1-99103 FB.

BTEX ANALYSIS OF SOIL (EPA METHOD 8021B)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

DATE ANALYZED: 3/14/99
SAMPLE SPIKED: 012SB05-07 7-8'

	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZ (mg/kg)	XYLENES (mg/kg)
MATRIX SPIKE				
SPIKED CONC.	0.05	0.05	0.05	0.15
MEASURED CONC.	0.04	0.05	0.05	0.15
% RECOVERY	89%	97%	101%	102%
MATRIX SPIKE DUPLICATE				
SPIKED CONC.	0.05	0.05	0.05	0.15
MEASURED CONC.	0.04	0.05	0.05	0.15
% RECOVERY	88%	91%	97%	101%
RELATIVE PERCENT DIFFERENCE (RPD)	1.0%	6.6%	4.5%	0.5%

ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:MP
DATA REVIEWED BY: Philly W. Hathcock

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

QA/QC DATA REPORT

CH2MHILL
Suite 600,13921 Park Center Rd.
Herndon, VA 20171

TEG PROJECT # 1-99103FB.

BTEX ANALYSIS OF WATER (EPA METHOD 8021B)

DATA REPORTED IN MICROGRAMS PER LITER (PPB)

DATE ANALYZED: 3/14/99
SAMPLE SPIKED: 012SW03

	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYLBENZ (ug/L)	XYLENES (ug/L)
MATRIX SPIKE				
SPIKED CONC.	50.0	50.0	50.0	150.0
MEASURED CONC.	43.6	45.4	47.9	150.4
% RECOVERY	87%	91%	96%	100%
MATRIX SPIKE DUPLICATE				
SPIKED CONC.	50.0	50.0	50.0	150.0
MEASURED CONC.	45.6	48.4	50.2	150.7
% RECOVERY	91%	97%	100%	100%
RELATIVE PERCENT DIFFERENCE (RPD)	4.4%	6.5%	4.5%	0.2%

ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY:MP
DATA REVIEWED BY Philip W. Hatfield

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY, INC.

CHAIN-OF-CUSTODY RECORD

CLIENT: CH2MHILL
ADDRESS: Suite 600 13921 PARK CENTER RD
CITY: HERNDON STATE: VA ZIP: 20171
PHONE: FAX:
CLIENT PROJECT #: PROJECT MANAGER:

DATE: 3/8/99 PAGE 1 OF 2
TEG PROJECT #:
LOCATION:
COLLECTOR: DATE OF COLLECTION:

Sample Number	Depth	Time	Date	Sample Type	Container	BTEX 8021B	VOA 8021B	VOA 624/8260B	Semi Vol 625/8270C	TPH 418.1	TPH 8015B (gasoline)	TPH 8015B (diesel)	TPH 8015B (g & d)	PAH 610/8100	PEST/PCBs8081	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
12SS06-00	0-6"	1100	3-8-99	Soil	4-oz	X							X					
12SS07-00	0-6"	1145	3-8-99	Soil	4-oz	X							X					
12SB01-01	1-2'	2:10	"	"	4-oz	X							X					
-04	4'-5'	2:15	"	"	4-oz	X							X					
-07	7'-8'	2:30	"	"	4-oz	X							X					
12SS02-00	0-6"	2:35	"	"	4-oz	X							X					
12SS03-00	0-6"	1450	"	"	4-oz	X							X					
12SB02-01	1-2'	3:00	"	"	4-oz	X							X					
-04	4'-5'	3:15	"	"	4-oz	X							X					
-07	7'-8'	3:25	"	"	4-oz	X							X					
-10	9-10'	3:30	"	"	"	X							X					
12SS08-00	0-6"	1525	"	"	"	X							X					
12SS10-00	"	1540	"	"	"	X							X					
12SS09-00	"	1555	"	"	"	X							X					
12SS11-00	"	1605	"	"	"	X							X					
12SB03-01	1-2'	4:15	"	"	"	X							X					
~~12SB03-04~~	~~4'-5'~~	~~4:25~~																
12SB03-07	7'-8'	4:30	"	"	"	X							X					

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
[signature]	3-8-99 1645	[signature]	3/8/99 1645
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ TEG DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD CON./COLD	
NOTES:	

LABORATORY NOTES:
17 8021B
17 8015B
g+d

teg

TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY, INC.

CHAIN-OF-CUSTODY RECORD

LIENT:
DDRESS:
ITY: STATE: ZIP:
HONE: FAX:
LIENT PROJECT #: PROJECT MANAGER:

DATE: 3/8/99 PAGE 2 OF 2
TEG PROJECT #:
LOCATION:
COLLECTOR: DATE OF COLLECTION:

nple Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020 8021B	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
125501-00	0-6"	1635	Soil	4-oz	X						X											
125513-00	"	1640	"	"	X						X											
125505-00	"	1650	"	"	X						X											
25504-00	0-1'	1640	"	"	X						X											
5B04-01	1'-2'	1645	"	"	X						X											
5B04-04	4'-5'	1685	"	"	X						X											
5B07-07	7'-8'	1700	"	"	X						X											

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
[signature]	3-9-99 1700	[signature]	3/9/99 1700
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ TEG DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:
7 - 8021B
7 - 8015 good

teg TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY, INC.

CHAIN-OF-CUSTODY RECORD

CLIENT: CH2MHILL
ADDRESS: Suite 600 13921 Park Center Rd.
CITY: Herndon STATE: VA ZIP: 20171
PHONE: FAX:
CLIENT PROJECT #: PROJECT MANAGER: Bobbi

DATE: PAGE 1 OF 3
TEG PROJECT #:
LOCATION:
COLLECTOR: DATE OF COLLECTION:

Sample Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020	VOA 624/8240/8260	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
25B01-01			S	4oz			✓													3/8/99 - X VOA 8021B		
25B01-04							✓													Applies to		
25B02-01							✓													All coc.		
-04							✓															
-07							✓															
-10							✓															
25B03-01							✓															
-04							✓															
-07							✓															
25S13-00							✓															
25B04-01							✓															
-04							✓															
-07							✓															
25B05-01							✓													3/9/99		
-04							✓															
-07							✓															
25A55D1-00							✓															

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ TEG DISPOSAL @ 60.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS
CHAIN OF CUSTODY SEALS Y/N/NA
SEALS INTACT? Y/N/NA
RECEIVED GOOD COND./COLD
NOTES:

LABORATORY NOTES:
3/8 13 - 8021
3/9 4 - 8021

teg TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY, INC.

CHAIN-OF-CUSTODY RECORD

CLIENT: CH2MHILL
ADDRESS:
CITY: STATE: ZIP:
PHONE: FAX:
CLIENT PROJECT #: PROJECT MANAGER:

DATE: PAGE 2 OF 3
TEG PROJECT #:
LOCATION:
COLLECTOR: DATE OF COLLECTION:

Sample Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020	VOA 624/8240/8260	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
A5S02-00			S	4oz			✓													3/9/91		
A5S03-00							✓															
A5S04-00							✓															
A5S05-00							✓															
A5B01-01							✓															
-04							✓															
-07							✓															
-10							✓															
-44							✓															
2S16-00							✓															
2B16-01							✓															
-04							✓															
-07							✓															
-09							✓															
2S14-00							✓															
2B14-01							✓															
-04							✓															
-07							✓															

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ TEG DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:
17 - 80

teg TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY, INC.

CHAIN-OF-CUSTODY RECORD

CLIENT: CH2MHILL
ADDRESS:
CITY: STATE: ZIP:
PHONE: FAX:
CLIENT PROJECT #: PROJECT MANAGER:

DATE: PAGE 3 OF 3
TEG PROJECT #:
LOCATION:
COLLECTOR: DATE OF COLLECTION:

Sample Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi-Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	BTEX	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
012SS15-00			S	4oz			✓														3/10/99		
012SS17-00							✓																
012SB17-01							✓																
-04							✓																
-07							✓																
012SS18-00							✓																
012SB18-01							✓																
-04							✓																
-07							✓																
012SB15-01							✓																
-04							✓																
-07			✓				✓																
012SW01			W	40ml VOA															✓				
012SW02			W																✓				
012SW03			W																✓				
012SW04			W																✓				

Samples Soil + 5 Samples WATER - from Scott

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ TEG DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT
TOTAL NUMBER OF CONTAINERS
CHAIN OF CUSTODY SEALS Y/N/NA
SEALS INTACT? Y/N/NA
RECEIVED GOOD COND./COLD
NOTES:

LABORATORY NOTES:

teg ENVIRONMENTAL GEOCHEMISTRY, INC.

CHAIN-OF-CUSTODY RECORD

LIENT: _____
DDRESS: _____
TY: _____ STATE: _____ ZIP: _____
HONE: _____ FAX: _____
LIENT PROJECT #: _____ PROJECT MANAGER: _____

DATE: 11 Mar 99 PAGE 1 OF ____
TEG PROJECT #: _____
LOCATION: _____
COLLECTOR: _____ DATE OF COLLECTION: _____

ple Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
SD02	0-6"	0930	Sediment	4oz. glass					X	X	X											
SD01	"	9:00	"	"						X												
TW02-07	7'	9:05	Grd. H_2O	VOC vial						X												
SD01	0-6"	1010	sediment	4oz. glass						X												
SD04	"	1015	sediment	"						X												
SD03	"	1045	"	"						X												
TW01-08	8'	1130	Grd. H_2O	VOC vial						X												
SD02	0-6"	1430	Sediment	4oz glass						X												
TW03-14	14'	14:35	Grd. H_2O	VOC vial						X												
SD03	0-6"	1510	Sediment	4oz. glass						X												
TW04-8	8'	15:55	Grd. H_2O	VOC vial						X												
TW05-8	8'	17:00	" "	"						X												

LINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

LINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ TEG DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

teg TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY, INC.

CHAIN-OF-CUSTODY RECORD

CLIENT: CH2M HILL / WOC
ADDRESS:
CITY: STATE: ZIP:
PHONE: FAX:
CLIENT PROJECT #: PROJECT MANAGER: 8260 (BRX) D. BITTERMAN

DATE: 99.03.12 PAGE 1 OF 1
TEG PROJECT #:
LOCATION: CHERRY PT. NC, MCAS -OU6 -SITE 35A
COLLECTOR: RON ARMSON DATE OF COLLECTION: 99.03.12

Sample Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 6080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
SATW01-8	8'	GRD. H2O	08:30			X			X													
SATW02-7	7'	"	08:45			X			X													
SATW03-14	14'	"	08:55			X			X													
SATW04-8	8'	"	09:00			X			X													
SATW05-8	8'	"	09:30			X			X													

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
[signature]	99.03.12		
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS
☐ TEG DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

teg TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY, INC.

Cherry Point OU6

CHAIN-OF-CUSTODY RECORD

LIENT: Cham Hill
DDRESS:
ITY: STATE: ZIP:
HONE: FAX:
LIENT PROJECT #: PROJECT MANAGER:

DATE: 3-9-99 PAGE 1 OF 2
TEG PROJECT #:
LOCATION:
COLLECTOR: DATE OF COLLECTION:

mple Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020/8021B	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
SB05-01	1'-2'	8:20	SOIL	4 oz	X						X											
SB05-04	4'-5'	8:28	"	"	X						X											
SB05-07	7'-8'	8:35	"	"	X						X									HOLD		
GW01-10	10'-11'	~9:00	DIRECT PUSH GW	VOC VIAL	X															2 VIALS FOR SAME SAMPLE	2	
GW02-10	"	~9:40	"	"	X															"	2	
GW22-10	"	~9:40	"	"	X															"	2	
ASS01-00	0-6"	0935	soil	4 oz	X						X											
ASS02-00	"	0950	"	"	X						X											
ASS03-00	"	1000	"	"	X						X											
ASS04-00	"	1025	"	"	X						X											
ASS05-00	"	1000	"	"	X						X											
ASB01-01	1'-2'	10:40	SOIL	"	X						X											
ASB01-04	4'-5'	10:50	SOIL	"	X						X											
ASB01-07	7'-8'	11:00	SOIL	"	X						X											
ASB01-10	10'-11'	11:05	SOIL	"	X						X									HOLD		
ASB01-44	4'-5'	11:15	SOIL	"	X						X									HOLD		

LINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME
LINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

SAMPLE RECEIPT
TOTAL NUMBER OF CONTAINERS
CHAIN OF CUSTODY SEALS Y/N/NA
SEALS INTACT? Y/N/NA
RECEIVED GOOD COND./COLD
NOTES:

LABORATORY NOTES:

SAMPLE DISPOSAL INSTRUCTIONS
☐ TEG DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

teg TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY, INC.

Cherry Point - U

CHAIN-OF-CUSTODY RECORD

CLIENT: CH2M HILL

ADDRESS:

CITY: STATE: ZIP:

PHONE: FAX:

CLIENT PROJECT #: PROJECT MANAGER:

DATE: 3-9-99 PAGE 2 OF 2

TEG PROJECT #:

LOCATION:

COLLECTOR: DATE OF COLLECTION:

Sample Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol. 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
12SS16-00	0"-6"	3:15	SOIL	4 oz		X						X										
12SB16-01	1'-2'	3:20	"	"		X						X										
12SB16-04	4'-5'	3:30	"	"		X						X										
12SB16-07	7'-8'	3:35	"	"		X						X										
12SB16-09	9'-10'	3:40	"	"		X						X										
12SS14-00	0"-6"	3:50	"	"		X						X										
12SB14-01	1'-2'	3:55	"	"		X						X										
12SB14-04	4'-5'	4:10	"	"		X						X										
12SB14-07	7'-8'	4:15	"	"		X						X										

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ TEG DISPOSAL @ $9.00 each ☐ Return ☐ Dispose

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

ceg ENVIRONMENTAL GEOCHEMISTRY, INC.

CHAIN-OF-CUSTODY RECORD

IENT: CH2M HILL Cherry Point OU6
DRESS:
TY: STATE: ZIP:
ONE: FAX:
IENT PROJECT #: PROJECT MANAGER:

DATE: 3-10-99 PAGE 1 OF 2
TEG PROJECT #:
LOCATION:
COLLECTOR: DATE OF COLLECTION:

ple Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
2SS15-00	6"	0810	Soil	4 oz		X						X										
SS17-00	6"	08:15	"	"		X						X										
SB17-01	1'-2'	08:20	"	"		X						X										
SB17-04	4'-5'	08:25	"	"		X						X										
SB17-07	7'-8'	08:30	"	"		X						X										
SS18-00	6"	08:40	"	"		X						X										
SB18-01	1'-2'	08:45	"	"		X						X										
SB18-04	4'-5'	08:50	"	"		X						X										
SB18-07	7'-8'	09:00	"	"		X						X										
2SW01	—	0910	AQ	VOA 40 ml		X						X										
2SW04	—	0910	"	"		X						X										
~~SS15-00~~	~~6"~~	~~08:06~~	~~SOIL~~	~~4 OZ~~		~~X~~						~~X~~										
SB15-01	1'-2'	10:05	SOIL	"		X						X										
SB15-04	4'-5'	10:05	SOIL	"		X						X										
SB15-07	7-8'	10:10	SOIL	"		X						X										
2SW03	—	0945	AQ	VOA 40 ml		X						X										
2SW02	—	1115	"	" "		X						X										

DO NOT REPEAT ANALYSIS OF 012SS15-00. THIS EXTRA SAMPLE NOT REQUIRED
99-0310

LINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

LINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature) DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ .EG DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

teg

TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY, INC.

CHAIN-OF-CUSTODY RECORD

CLIENT: CH2M Hill
ADDRESS:
CITY: STATE: ZIP:
PHONE: FAX:
CLIENT PROJECT #: PROJECT MANAGER:

DATE: 10 Mar 99 PAGE 2 OF 2
TEG PROJECT #:
LOCATION:
COLLECTOR: DATE OF COLLECTION:

Sample Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
SASW02	—	1615	AQ	40ml. VOA		X					X									NOT SEM YET		
2TW01-06	6'	16:20	GROUNDWATER	"		■				X										NO GRO REQ'D.		

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ TEG DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

Appendix E
Offsite Laboratory Data

Table E-5
Surface Water Detected Compounds and Screening Criteria Comparison
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria: NC Water Quality Standards - FW, Human Health (1)	NC Water Quality Standards - FW, Aquatic Life (2)	EPA Region III Tapwater RBCs (3)	EPA Region IV Freshwater Chronic Screening Values (4)	EPA Region III Freshwater BTAG - Flora (5)	EPA Region III Freshwater BTAG - Fauna (6)	EPA National Recommended Water Quality 304(a) Criteria (7)	NCDENR Freshwater Standard[7] (8)	Frequency of Detection	012SW01	012SW02	012SW03
TCL Volatiles													
No detected compounds													
TCL Semivolatiles													
No detected compounds													
TCL Pesticides/PCBs													
4,4'-DDD	UG/L	--	--	0.28	0.0064	0.60	0.60	0.00084	--	1/3	0.1 U	0.0066 J 4, 7	0.1 U
4,4'-DDE	UG/L	--	--	0.20	10.50	1,050.00	1,050.00	0.00059	--	1/3	0.027 J 7	0.1 U	0.1 U
4,4'-DDT	UG/L	0.000591	0.001	0.20	0.001	5,000.00	0.001	--	--	1/3	0.1 U	0.011 J 1,2,4,6	0.1 U
Aldrin	UG/L	0.000136	0.002	0.0039	0.30	3.00	3.00	--	--	1/3	0.05 U	0.003 J 1,2	0.05 U
Aroclor-1248	UG/L	0.000079[2]	0.001[2]	0.033	0.014	0.10[2]	0.014[2]	--	--	1/3	1.6 1-6	1 U	1 U
Dieldrin	UG/L	0.000144	0.002	0.0042	0.0019	0.0019	0.0019	--	--	1/3	0.015 J 1-6	0.1 U	0.1 U
gamma-BHC (Lindane)	UG/L	--	0.01	0.052	0.08	--	0.08	0.063	--	1/3	0.0029 J	0.052 U	0.05 U
TAL Metals/Cyanide													
Aluminum	UG/L	--	--	3,700.00	87.00	460.00	25.00	--	87.00	3/3	386 4,6,8	761 4,5,6,8	174 J 4,6,8
Barium	UG/L	--	--	260.00	--	10,000.00	10,000.00	--	1,400.00	1/3	6.7 U	5.6 U	7 J
Calcium	UG/L	--	--	--	--	--	--	--	7,300.00	3/3	7760 8	8220 8	7800 8
Copper	UG/L	--	7.00	150.00	3.30[3]	--	6.50	--	--	1/3	6.6 J 4,6	3.3 U	5.7 U
Iron	UG/L	--	1,000.00	1,100.00	1,000.00	--	320.00	--	--	3/3	130	242	114
Lead	UG/L	--	25.00	--	0.48[4]	--	3.20	--	--	1/3	1.7 J 4	1.3 U	1.3 U
Magnesium	UG/L	--	--	--	--	--	--	--	200.00	1/3	746 J 8	846 U	751 U
Manganese	UG/L	--	--	73.00	--	--	14,500.00	--	--	2/3	12.4 J	7.1 U	38.3
Mercury	UG/L	--	0.012	1.10[5]	0.012	0.012	0.012	0.051	--	2/3	0.12 J 2,4-6, 7	0.1 U	0.08 J 2,4-6, 7
Potassium	UG/L	--	--	--	--	--	--	--	30,000.00	3/3	1560 J	491 J	1560 J
Sodium	UG/L	--	--	--	--	--	--	--	400,000.00	3/3	5630	3160 J	5170
Zinc	UG/L	--	50.00	1,100.00	28.95 to 30.04[6]	30.00	110.00	69,000.00	--	2/3	20.5 J	4.1 U	34.2 J 4,5
Cyanide	UG/L	--	5.00	73.00	5.20	5.20	5.20	220,000.00	--	1/3	10 U	10 U	1.2 J

NOTES:

Detections of a chemical are indicated in bold font.

Detected concentrations that exceed one or more screening criteria are indicated in bold red font. Screening criteria exceeded at least once are also indicated in bold red font.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify specific criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit; B = Compound also detected in a QA/QC blank.

"--" = No screening criterion available.

[1]A blind duplicate sample labeled 012SW04.

[2]PCBs (total).

[3]Screening value is hardness-dependent and calculated for sample 012SW01 (only sample where copper was detected) using the following formula:

Copper screening value = $e^{(0.8545(\ln(2.5*Ca+4.1*Mg))+1.465)}$

[4]Screening value is hardness-dependent and calculated for sample 012SW01 (only sample where lead was detected) using the following formula:

Lead screening value = $e^{(1.273(\ln(2.5*Ca+4.1*Mg))-4.705)}$

[5]RBC for mercuric chloride.

[6]Screening value is hardness-dependent and calculated for samples 012SW03 and 012SW04 (only samples where zinc was detected) using the following formula:

Zinc screening value = $e^{(0.8473(\ln(2.5*Ca+4.1*Mg))+0.7614)}$. Result was 28.95 for 012SW04 and 30.04 for 12SW03.

Table E-6

Sediment Detected Compounds and Screening Criteria Comparison

Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria: EPA Region III RBC - Residential (1)	Screening Criteria: EPA Region IV Ecological Screening Values (2)	Screening Criteria: EPA Region III BTAG - Flora (3)	Screening Criteria: EPA Region III BTAG - Fauna (4)	Frequency of Detection	012SD01	012SD02	012SD03
TCL Volatiles									
No detected compounds									
TCL Semivolatiles									
Di-n-butylphthalate	UG/KG	780,000.00	--	--	1,400.00	1/3	490 U	430 U	**50 J**
TCL Pesticides/PCBs									
4,4'-DDD	UG/KG	2,700.00	3.30	--	16.00	1/3	4.9 U	6.2 2	9.1 U
4,4'-DDE	UG/KG	1,900.00	3.30	2.20	2.20	3/3	0.24 J	1.4 J	1.6 J
4,4'-DDT	UG/KG	1,900.00	3.30	1.58	1.58	3/3	0.9 J	11 2-4	2.1 J 3,4
alpha-Chlordane	UG/KG	1,800.00[2]	1.70[2]	--	--	2/3	4.7 U	2.3 J 2	36 J 2
Dieldrin	UG/KG	40.00	3.30	--	--	1/3	4.9 U	4.3 U	**0.7 J**
Endosulfan sulfate	UG/KG	--	--	--	--	2/3	0.67 J	4.3 U	**1.2 J**
gamma-Chlordane	UG/KG	1,800.00[2]	1.70[2]	--	--	3/3	0.82 J	1.6 J	**31** 2
Heptachlor epoxide	UG/KG	70.00	--	--	--	3/3	**0.35 J**	0.084 J	**2.6 J**
TAL Metals/Cyanide									
Aluminum	MG/KG	7,800.00	--	--	--	3/3	5610	1790	8640 1
Antimony	MG/KG	3.10	12.00	--	150.00	2/3	1.3 J	0.57 U	1 J
Arsenic	MG/KG	0.43	7.24	8.20	8.20	1/3	0.88 U	0.78 U	1.1 J 1
Barium	MG/KG	550.00	--	--	--	3/3	19.7 J	5.7 J	31 J
Cadmium	MG/KG	3.90	1.00	5.10	1.20	2/3	2.8 2,4	0.18 U	1.1 J 2
Calcium	MG/KG	--	--	--	--	3/3	786 J	76700 J	2710 J
Chromium	MG/KG	23.00	52.30	0.005	260.00	3/3	8.4 3	4.2 3	11.6 3
Cobalt	MG/KG	470.00	--	--	--	1/3	0.58 J	0.24 U	0.56 U
Copper	MG/KG	310.00	18.70	--	34.00	2/3	**9.6**	1.1 U	**12.6**
Iron	MG/KG	2,300.00	--	--	--	3/3	2570 J 1	1520 J	3340 J 1
Lead	MG/KG	--	30.20	--	46.70	3/3	32.6 2	1.9	30.3 2
Magnesium	MG/KG	--	--	--	--	3/3	**241 J**	1050 J	318 J
Manganese	MG/KG	160.00	--	--	--	3/3	**11.1**	7	**16.4**
Mercury	MG/KG	2.30[3]	0.13	0.15	0.15	3/3	**0.07 J**	0.05 J	**0.07 J**
Nickel	MG/KG	160.00	15.90	20.90	20.90	2/3	2.7 U	1.1 J	**3.6 J**
Potassium	MG/KG	--	--	--	--	3/3	**138 J**	160 J	**136 J**
Silver	MG/KG	39.00	2.00	--	1.00	0/3	0.21 U	0.18 U	0.19 U
Sodium	MG/KG	--	--	--	--	2/3	26.3 U	59.7 J	**25.1 J**
Vanadium	MG/KG	55.00	--	--	--	3/3	**8.5 J**	**4.2 J**	**12.4 J**
Zinc	MG/KG	2,300.00	124.00	--	150.00	3/3	**45.4**	**7.2**	**70.4**

NOTES:

Detections of a chemical are indicated in bold font. Detected concentrations that exceed one or more screening criteria are indicated in red font.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify specific criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit; B = Compound also detected in a

"--" = No screening criterion available.

[1]A blind duplicate sample labeled 012SD04.

[2]Chlordane (total).

[3]RBC for mercuric chloride.

A duplicate sample was also collected from 012SD01. The maximum concentration of the two measurements is presented in the table.

Table E-7
Raw Pesticide and PCB Analytical Results for Monitoring Well Groundwater Samples
June 27, 2000 Sampling Event
Site 12 Remedial Investigation, MCAS Cherry Point

Sample Date	CHPT-OU6-12GW01 7/13/2000	CHPT-OU6-12GW02 7/13/2000	CHPT-OU6-12GW03 7/13/2000	CHPT-OU6-12GW03P* 7/13/2000	CHPT-OU6-12GW04 7/13/2000
Chemical Name					
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Aldrin	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
alpha-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
beta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chlordane (technical)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
delta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan II	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methoxychlor	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toxaphene	5 U	5 U	5 U	5 U	5 U

Notes:
Unit is μg/l.
U - Analyte not detected
* This sample is a duplicate of CHPT-OU6-12GW03.

Appendix F
Data Validation Reports

Analytical Data Validation Report
Samples Collected March 1999
Cherry Point
(CTO-64)
Quanterra Sample Delivery Group C10101

8 July 1999

Shawne M. Rodgers
President

Environmental Data Quality, Inc.
967 East Swedesford Road Suite 401
Exton, Pennsylvania 19341

File No.: 601.70.01

EXECUTIVE SUMMARY *III*

1.0 INTRODUCTION *1*

2.0 DATA DELIVERABLE COMPLETENESS AND METHOD COMPLIANCE *2*

2.1 DATA DELIVERABLE COMPLETENESS *2*
2.1.1 Organic Analyses *2*
2.1.2 Inorganic Analyses *2*

2.2 METHOD COMPLIANCE *2*
2.2.1 Organic Analyses *2*
2.2.2 Inorganic Analyses *2*

3.0 ORGANIC DATA *3*

3.1 DATA QUALIFIERS *3*

4.0 INORGANIC DATA *6*

4.1 DATA QUALIFIERS *6*

5.0 SUMMARY *8*

ATTACHMENT 1 ANALYSIS RESULTS FORMS

ATTACHMENT 2 METHODOLOGY REFERENCES

List of Tables *Following Page*

Table 1-1 Summary of Sample Data Reviewed *1*
Table 3-1 Unacceptable Internal Standard Area Counts *4*

EXECUTIVE SUMMARY

This analytical data validation report is based on the review of data generated for soil samples. The sample locations, laboratory identification numbers, sample collection dates, sample matrix, and analyses performed are presented in Table 1-1. The samples are presented in order of collection date.

The samples were analyzed for volatile organic compounds, semivolatile organic compounds, pesticide/PCB constituents, dioxin, total metals, cyanide, oil and grease, and total organic carbon, as specified in Table 1-1. Quanttera Incorporated, North Canton, Ohio, performed all analyses.

The sample analyses were performed in accordance with the procedures outlined in the OLM03 (and ILM04) USEPA Contract Laboratory Program (CLP) Statement of Work for Organic (and Inorganic) Analysis, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" SW-846, Third Edition, Final (Promulgated) Updates II, IIA, and III June 1997, and "Methods for Chemical Analysis of Water and Wastes", USEPA 600/4-79-020. Results have been validated or qualified according to general guidance provided in the Region IV modifications to "Laboratory Data Validation Functional Guidelines for Validating Organic (and Inorganic) Analyses", USEPA 9/94 (and 4/93). These documents specify procedures for validating data generated for CLP analyses. The requirements specified in the method were also used to evaluate the non-CLP data.

The organic and inorganic analyses were performed acceptably, but required qualifying statements. The aspects of the data, which required qualification, are identified in this report.

Results for methylene chloride and various metals in some of the samples were qualified due to the presence of these analytes in associated laboratory method and/or field blanks. Other qualifications to the sample data were due primarily to the presence of matrix interferences, as evidenced by surrogate, laboratory duplicate, and matrix spike results.

Analysis results forms presenting the validated and qualified results for the samples are included in Attachment 1.

1.0 *INTRODUCTION*

This analytical data validation report is based on the review of data generated for soil samples. The sample locations, laboratory identification numbers, sample collection dates, sample matrix, and analyses performed are presented in Table 1-1. The samples are presented in order of collection date.

The samples were analyzed for volatile organic compounds, semivolatile organic compounds, pesticide/PCB constituents, dioxin, total metals, cyanide, oil and grease, and total organic carbon, as specified in Table 1-1. Quanttera Incorporated, North Canton, Ohio, performed all analyses.

The sample analyses were performed in accordance with the procedures outlined in the OLM03 (and ILM04) USEPA Contract Laboratory Program (CLP) Statement of Work for Organic (and Inorganic) Analysis, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" SW-846, Third Edition, Final (Promulgated) Updates II, IIA, and III June 1997, and "Methods for Chemical Analysis of Water and Wastes", USEPA 600/4-79-020. Results have been validated or qualified according to general guidance provided in the Region IV modifications to "Laboratory Data Validation Functional Guidelines for Validating Organic (and Inorganic) Analyses", USEPA 9/94 (and 4/93). These documents specify procedures for validating data generated for CLP analyses. The requirements specified in the method were also used to evaluate the non-CLP data.

Completeness of data deliverables for all samples and method compliance is discussed in Section 2.0. Analysis results forms presenting the validated and qualified results for the samples are included in Attachment 1.

Table 1-1 Samples For Data Validation Review
Cherry Point
CTO-64
March 1999 Sampling
Quanterra Sample Delivery Group C10101

SAMPLE I.D.	LAB I.D.	DATE COLLECTED	MATRIX	VCTCL	SVTCL	PSPCB	DIOX	MCYAN	O/G	TOC
012SS01	A9C100101001	3/8/99	Soil	X	X	X		X	X	X
012SS02	A9C100101002	3/8/99	Soil	X	X	X		X	X	X
012SS03	A9C100101003	3/8/99	Soil	X	X	X		X	X	X
012SS04	A9C100101004	3/8/99	Soil	X	X	X		X	X	X
012SS05	A9C100101005	3/8/99	Soil	X	X	X		X	X	X
012SS06	A9C100101006	3/8/99	Soil	X	X	X	X	X	X	X
012SS07	A9C100101007	3/8/99	Soil	X	X	X	X	X	X	X
012SS08	A9C100101008	3/8/99	Soil	X	X	X		X	X	X
012SS09	A9C100101009	3/8/99	Soil	X	X	X		X	X	X
012SS10	A9C100101010	3/8/99	Soil	X	X	X		X	X	X
012SS11	A9C100101011	3/8/99	Soil	X	X	X		X	X	X
012SS12	A9C100101012	3/8/99	Soil	X	X	X	X	X	X	X
012SS13	A9C100101013	3/8/99	Soil	X	X	X		X	X	X
012TB01	A9C100101014	3/8/99	Trip Blank	X						
35ASS01	A9C100171001	3/9/99	Soil	X	X	X		X	X	X
35ASS02	A9C100171002	3/9/99	Soil	X	X	X		X	X	X
35ASS03	A9C100171003	3/9/99	Soil	X	X	X		X	X	X
35ASS04	A9C100171004	3/9/99	Soil	X	X	X		X	X	X
35ASS05	A9C100171005	3/9/99	Soil	X	X	X		X	X	X

VCTCL TCL VOLATILE ORGANIC COMPOUNDS
SVTCL TCL SEMIVOLATILE ORGANIC COMPOUNDS
PSPCB TCL PESTICIDE/PCBS
MCYAN TAL METALS AND CYANIDE
O/G OIL AND GREASE
TOC TOTAL ORGANIC CARBON

2.0 *DATA DELIVERABLE COMPLETENESS AND METHOD COMPLIANCE*

During the course of the quality assurance data validation review, an evaluation of the completeness of the data deliverables provided by the laboratory and conformance to the specified methods was performed. Data deliverables that were determined to be either incomplete or incorrect were required to be resubmitted by the laboratory. Deviations from the protocols in the required analysis methods were evaluated to determine the impact, if any on the analysis results reported by the laboratory. Qualifications to the data resulting from method deviations are discussed fully for the samples receiving the validation review in Sections 3.0 and 4.0.

2.1 *DATA DELIVERABLE COMPLETENESS*

The following deliverables issues were identified during the data validation review.

2.1.1 *Organic Analyses*

- The data deliverables were complete.

2.1.2 *Inorganic Analyses*

- The data deliverables were complete.

2.2 *METHOD COMPLIANCE*

The following are considered to be deviations from the specified methods. Qualifications to affected samples are discussed in Section 3.0 and 4.0.

2.2.1 *Organic Analyses*

- Based on the deliverables reviewed, there were no deviations to the organic methodologies used for analysis.

2.2.2 *Inorganic Analyses*

- Based on the deliverables reviewed, there were no deviations to the inorganic methodologies used for analysis.

3.0 *ORGANIC DATA*

The samples were analyzed for volatile organic compounds, semivolatile organic compounds, and pesticide/PCB constituents, as indicated in Table 1-1.

For the semivolatile fraction determined by Gas Chromatography/Mass Spectrometry, library searches were performed to "tentatively identify" chromatographic peaks whose characteristics did not match those of targeted compounds. Library searches were performed for up to twenty semivolatile extraneous peaks.

The findings offered in this report are based on a review of the analytical data reported according to a CLP-equivalent deliverable format.

The data validation included an assessment of the following items: chain of custody documentation, holding times, laboratory method, field, and trip blank results, surrogate recoveries, MS/MSD analysis results, field duplicate results, bromofluorobenzene (BFB) and decafluorotriphenylphosphine (DFTPP) mass tuning results, initial and continuing calibrations, internal standard performance, endrin/DDT breakdown, retention time shifts for pesticide/PCB surrogate compounds, retention time windows for pesticide/PCB constituents, pesticide cleanup check sample results, qualitative identification, and quantitation of results.

The organic analyses were performed acceptably, but require qualifying statements. It is recommended that the data only be used with the qualifying statements presented below. Any data that are not discussed in this report should be considered qualitatively and quantitatively valid, based on the items evaluated. Validated and/or qualified results for the samples are provided in Attachment 1.

3.1 *DATA QUALIFIERS*

- The positive results samples 012SS01, 012SS02, 012SS04, 012SS05, 012SS06, 012SS08, 012SS10, 012SS11, and 012SS13, presented below reported for methylene chloride for the samples are qualitatively invalid due to the presence of this compound in associated laboratory method and/or field blanks. USEPA protocol requires positive results for common contaminants, such as methylene chloride, that are less than or equal to ten times the associated blank contamination level, to be considered qualitatively invalid. Replacing results that are less than the quantitation limit with the quantitation limit has

Table E-1
Surface Soil Detected Compounds and Screening Criteria Comparison - TCL/TAL
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria: EPA Region III RBC - Residential (1)	EPA Region III RBC - Industrial (2)	NC Soil Screening Levels (SSLs) (3)	EPA Region IV Ecological Screening Values (4)	EPA Region III BTAG Flora (5)	EPA Region III BTAG Fauna (6)	EPA Region IV SSLs - Inhalation (7)	Frequency of Detection	012SS01	012SS02	012SS03	012SS04	012SS05	012SS06	012SS07
TCL Volatiles																
Methylene chloride	UG/KG	85,000.00	7,600,000.00	22.00	–	300.00	300.00	13,000.00	3/16	11 U	21 U	310 J 3,5,6	12 U	**1.7 J**	11 U	**78 B**
Toluene	UG/KG	1,600,000.00	41,000,000.00	7,270.00	50.00	100.00	100.00	650,000.00	1/16	**7.6 J**	9.9 UJ	10 UJ	12 U	11 U	11 U	9.8 U
Xylenes, total	UG/KG	16,000,000.00	410,000,000.00	4,960.00	50.00	100.00	100.00	410,000.00	1/16	**12**	9.9 UJ	10 UJ	12 U	11 U	11 U	9.8 U
TCL Semivolatiles																
2-Methylnaphthalene	UG/KG	160,000.00	4,100,000.00	–	–	–	–	–	1/16	**44 J**	380 U	380 U	420 U	360 U	380 U	360 U
Benzo(b)fluoranthene	UG/KG	870.00	7,800.00	–	–	100.00	100.00	–	1/16	380 U	**47 J**	380 U	420 U	360 U	380 U	360 U
Benzo(g,h,i)perylene	UG/KG	–	–	6,720,000.00	–	100.00	100.00	–	1/16	380 U	**47 J**	380 U	420 U	360 U	380 U	360 U
bis(2-Ethylhexyl)phthalate	UG/KG	46,000.00	410,000.00	6,670.00	–	–	–	31,000,000.00	12/16	**310 J**	**130 J**	**250 J**	**160 J**	**160 J**	**46 J**	**380**
Butylbenzylphthalate	UG/KG	1,600,000.00	41,000,000.00	27,800.00	–	–	–	930,000.00	1/16	380 U	380 U	380 U	420 U	360 U	380 U	360 U
Chrysene	UG/KG	87,000.00	780,000.00	39,800.00	–	100.00	100.00	–	1/16	380 U	**39 J**	380 U	420 U	360 U	380 U	360 U
Di-n-butylphthalate	UG/KG	780,000.00	20,000,000.00	24,800.00	200,000.00	–	–	2,300,000.00	2/16	380 U	380 U	380 U	420 U	360 U	380 U	360 U
Fluoranthene	UG/KG	310,000.00	8,200,000.00	276,000.00	100.00	100.00	100.00	–	1/16	380 U	**53 J**	380 U	420 U	360 U	380 U	360 U
Phenanthrene	UG/KG	–	–	59,600.00	100.00	100.00	100.00	–	1/16	380 U	**44 J**	380 U	420 U	360 U	380 U	360 U
Pyrene	UG/KG	230,000.00	6,100,000.00	286,000.00	100.00	100.00	100.00	–	1/16	380 U	**53 J**	380 U	420 U	360 U	380 U	360 U
TCL Pesticides/PCBs																
4,4'-DDD	UG/KG	2,700.00	24,000.00	129.00	2.50[3]	100.00	100.00	–	6/16	3.8 U	**1.1 J**	**0.86 J**	21 U	7.2 U	3.8 U	3.6 U
4,4'-DDE	UG/KG	1,900.00	17,000.00	–	2.50[3]	100.00	100.00	–	10/16	3.8 U	**0.61 J**	**2 J**	3.7 J 4	**0.45 J**	3.8 U	3.6 U
4,4'-DDT	UG/KG	1,900.00	17,000.00	1,360.00	2.50[3]	100.00	100.00	–	7/16	3.8 U	**1.5 J**	**2 J**	13 J 4	7.2 U	3.8 U	3.6 U
alpha-BHC	UG/KG	100.00	910.00	–	2.50	–	100,000.00[6]	800.00	5/16	**0.034 J**	1.9 U	1.9 U	10 U	3.6 U	1.9 U	**0.062 J**
alpha-Chlordane	UG/KG	1,800.00[4]	16,000.00[4]	27.8[4]	–	100.00[4]	100.00[4]	20,000.00[4]	11/16	**11 J**	**2 J**	**4 J**	51 J 3	**5.6 J**	1.9 U	**0.24 J**
Aroclor-1260	UG/KG	320.00	2,900.00	–	20.00[5]	100.00[5]	100.00[5]	–	6/16	**400 J 1,4-6**	38 U	39 U	210 U	**15 J**	38 U	36 U
delta-BHC	UG/KG	350.00[7]	3,200.00[7]	–	–	–	100,000.00[6]	–	3/16	1.9 U	1.9 U	**0.099 J**	10 U	3.6 U	1.9 U	1.8 U
Dieldrin	UG/KG	40.00	360.00	1.13	0.50	100.00	100.00	1,000.00	6/16	6.6 J 3,4	3.8 U	3.9 U	21 U	2.2 J 3,4	3.8 U	3.6 U
Endosulfan I	UG/KG	47,000.00	1,200,000.00	–	–	–	–	–	1/16	1.9 U	1.9 U	1.9 U	10 U	3.6 U	1.9 U	1.8 U
Endosulfan sulfate	UG/KG	–	–	–	–	–	–	–	12/16	**4.4 J**	**0.82 J**	**0.95 J**	**2.3 J**	**1.8 J**	3.8 U	3.6 U
Endrin	UG/KG	2,300.00	61,000.00	440.00	1.00	100.00	100.00	–	6/16	3.8 U	**0.64 J**	**0.68 J**	21 U	7.2 U	3.8 U	3.6 U
Endrin-aldehyde	UG/KG	–	–	–	–	–	–	–	2/16	**1.9 J**	3.8 U	3.9 U	21 U	7.2 U	3.8 U	3.6 U
Endrin ketone	UG/KG	–	–	–	–	–	–	–	1/16	3.8 U	3.8 U	3.9 U	21 U	7.2 U	3.8 U	3.6 U
gamma-BHC (Lindane)	UG/KG	490.00	4,400.00	6.20	0.05	100.00	100.00	–	1/16	1.9 U	1.9 U	1.9 U	10 U	3.6 U	1.9 U	1.8 U
gamma-Chlordane	UG/KG	1,800.00[4]	16,000.00[4]	27.8[4]	–	100.00[4]	100.00[4]	20,000.00[4]	13/16	**9.8**	**1.6 J**	**3.6**	43 3	**5.3**	1.9 U	1.8 U
Heptachlor	UG/KG	140.00	1,300.00	2.40	–	–	–	100.00	5/16	**0.074 J**	1.9 U	1.9 U	**0.53 J**	3.6 U	1.9 U	**0.14 J**
Heptachlor epoxide	UG/KG	70.00	630.00	6.67	–	100.00	100.00	5,000.00	9/16	**0.2 J**	1.9 U	**0.098 J**	12 3	**0.62 J**	1.9 U	1.8 U
TAL Metals/Cyanide																
Aluminum	MG/KG	7,800.00	200,000.00	–	50.00	1.00	–	–	16/16	9210 1,4,5	8580 1,4,5	10400 1,4,5	4880 4,5	3350 4,5	4560 4,5	4020 4,5
Antimony	MG/KG	3.10	82.00	5.42	3.50	0.48	–	–	8/16	0.82 J 5	0.59 J 5	1.6 J 5	0.55 UJ	0.48 UJ	0.5 UJ	0.48 UJ
Arsenic	MG/KG	0.43	3.80	26.20	10.00	328.00	–	750.00	14/16	1.9 J 1	1.5 U	1.7 U	1.3 J 1	0.7 J 1	2 J 1	1.6 J 1
Barium	MG/KG	550.00	14,000.00	848.00	165.00	440.00	440.00	690,000.00	16/16	**30.1 J**	**28.3 J**	**23.2 J**	**29 J**	**11 J**	**7.9 J**	**7.3 J**
Beryllium	MG/KG	16.00	410.00	3.38	1.10	0.02	–	1,300.00	2/16	0.05 J 5	0.03 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Cadmium	MG/KG	3.90	100.00	2.72	1.60	2.50	–	1,800.00	14/16	9.7 1,3-5	5.4 1,3-5	8.8 1,3-5	6.1 1,3-5	1.7 4	0.05 U	0.04 U
Calcium	MG/KG	–	–	–	–	–	–	–	16/16	**9560 J**	**45600 J**	**32800 J**	**15300 J**	**18500 J**	**4320 J**	**1570 J**
Chromium	MG/KG	23.00	610.00	27.20	0.40	0.02	0.0075	270.00	16/16	22.1 4-6	19.6 4-6	22.1 4-6	17.9 4-6	6.3 4-6	5.9 4-6	4.4 4-6
Cobalt	MG/KG	470.00	12,000.00	–	20.00	100.00	200.00	–	1/16	**0.5 J**	0.66 U	0.49 U	0.32 U	0.35 U	0.43 U	0.4 U
Copper	MG/KG	310.00	8,200.00	704.00	40.00	15.00	–	–	14/16	156 4,5	138 4,5	282 4,5	78.2 4,5	**12.7**	0.8 U	0.66 U
Iron	MG/KG	2,300.00	61,000.00	151.00	200.00	3,260.00	12.00	–	16/16	3540 1,3-6	2650 1,3,4,6	2860 1,3,4,6	2190 3,4,6	1600 3,4,6	2670 1,3,4,6	1840 3,4,6
Lead	MG/KG	–	–	270.00	50.00	2.00	0.01	–	16/16	74.3 4-6	44.3 5,6	56.3 4-6	70.6 4-6	12.5 5,6	2.4 5,6	2.4 5,6
Magnesium	MG/KG	–	–	–	–	4,400.00	4,400.00	–	16/16	**833 J**	**1300**	**1220**	**782 J**	**634 J**	**266 J**	**202 J**
Manganese	MG/KG	160.00	4,100.00	65.20	100.00	330.00	330.00	–	16/16	**24.6 J**	**33.2 J**	**49 J**	**25.8 J**	**14.5 J**	**7.4 J**	**5.8 J**
Mercury	MG/KG	2.30[8]	61.00[8]	0.0154	0.10	0.058	0.058	10.00	15/16	0.06 J 3,5,6	0.04 J 3	0.05 J 3	0.06 J 3-6	0.05 J 3	0.04 U	0.04 J 3
Nickel	MG/KG	160.00	4,100.00	56.40	30.00	2.00	–	13,000.00	16/16	5.5 J 5	6 J 5	6.2 J 5	3.8 J 5	**1.6 J**	**1.3 J**	**1.1 J**
Potassium	MG/KG	–	–	–	–	–	–	–	16/16	**333 J**	**227 J**	**232 J**	**205 J**	**84.7 J**	**210 J**	**176 J**
Selenium	MG/KG	39.00	1,000.00	12.20	0.81	1.80	1.80	–	2/16	0.71 U	0.71 U	0.72 U	0.78 U	0.67 U	0.71 U	0.68 U
Silver	MG/KG	39.00	1,000.00	0.223	2.00	0.0000098	–	–	7/16	0.39 J 3,5	0.46 J 3,5	0.52 J 3,5	0.87 J 3,5	0.15 U	0.16 U	0.15 U
Sodium	MG/KG	–	–	–	–	–	–	–	8/16	**25.7 J**	**30 J**	**56.6 J**	22.4 U	19.4 U	20.4 U	19.6 U
Vanadium	MG/KG	55.00	1,400.00	–	2.00	0.50	58.00	–	16/16	14.2 J 4,5	16.5 4,5	11.2 J 4,5	12.5 J 4,5	7.5 J 4,5	7 J 4,5	5.6 J 4,5
Zinc	MG/KG	2,300.00	61,000.00	1,100.00	50.00	10.00	–	–	16/16	250 4,5	221 4,5	230 4,5	91.3 4,5	33.1 5	4.8	3.7 J

NOTES:
Detections of a chemical are indicated in bold font. Detected concentrations that exceed one or more screening criteria are indicated in red font.
Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify specific criteria exceeded in a particular sample.
Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).
U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit; B = Compound also detected in a QA/QC blank; R = Result was considered suspect by the data validator.
"–" = No screening criterion available.
[1]A blind duplicate sample labeled 012SS13.
[2]A blind duplicate sample labeled 012SS12.
[3]DDT/DDE/DDD (total).
[4]Chlordane (total).
[5]PCBs (total).
[6]BHC (total).
[7]RBC for technical HCH.
[8]RBC for mercuric chloride.
A duplicate sample was collected from 012SS01 and 012SS07. For each sample with its duplicate, the maximum concentration is presented in the table.

Table E-1
Surface Soil Detected Compounds and Screening Criteria Comparison - TCL/TAL
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	012SS08	012SS09	012SS10	012SS11	012SS14	012SS15	012SS16	012SS17	012SS18
TCL Volatiles										
Methylene chloride	UG/KG	47 U	10 U	13 U	11 U	**1.5 J**	9.5 U	10 U	10 U	10 U
Toluene	UG/KG	11 UJ	10 U	13 U	11 U	9.9 U	9.5 U	10 U	10 U	10 U
Xylenes, total	UG/KG	11 UJ	10 U	13 U	11 U	9.9 U	9.5 U	10 U	10 U	10 U
TCL Semivolatiles										
2-Methylnaphthalene	UG/KG	1400 U	380 U	4100 U	880 U	360 U		380 U	370 U	370 U
Benzo(b)fluoranthene	UG/KG	1400 U	380 U	4100 U	880 U	360 U		380 U	370 U	370 U
Benzo(g,h,i)perylene	UG/KG	1400 U	380 U	4100 U	880 U	360 U		380 U	370 U	370 U
bis(2-Ethylhexyl)phthalate	UG/KG	**180 J**	**470**	**470 J**	**170 J**	200 U		**330 JB**	370 U	370 U
Butylbenzylphthalate	UG/KG	1400 U	380 U	4100 U	880 U	360 U		380 U	**49 J**	370 U
Chrysene	UG/KG	1400 U	380 U	4100 U	880 U	360 U		380 U	370 U	370 U
Di-n-butylphthalate	UG/KG	1400 U	380 U	4100 U	880 U	**41 J**		**43 J**	370 U	370 U
Fluoranthene	UG/KG	1400 U	380 U	4100 U	880 U	360 U		380 U	370 U	370 U
Phenanthrene	UG/KG	1400 U	380 U	4100 U	880 U	360 U		380 U	370 U	370 U
Pyrene	UG/KG	1400 U	380 U	4100 U	880 U	360 U		380 U	370 U	370 U
TCL Pesticides/PCBs										
4,4'-DDD	UG/KG	**6.1 J** 4	**1.1 J**	4.1 U	3.3 J 4	3.7 U		3.8 U	3.8 U	**1 J**
4,4'-DDE	UG/KG	3.6 U	**0.46 J**	**0.7 J**	**0.59 J**	3.7 U		**1.9 J**	**0.83 J**	**0.46 J**
4,4'-DDT	UG/KG	3.6 U	3.9 U	4.1 U	5.6 J 4	3.7 U		**4.6 J** 4	**1.6 J**	2.5 J 4
alpha-BHC	UG/KG	**0.2 J**	1.9 U	2 U	9 U	1.8 U		**0.19 J**	**0.33 J**	1.8 U
alpha-Chlordane	UG/KG	1.8 U	**17 J**	**18 J**	**6 J**	2.3 U		**15 J**	**5.7 J**	3.7 U
Aroclor-1260	UG/KG	36 U	39 U	41 U	450 J 1,4-6	**19 J**		76 4	38 U	**14 J**
delta-BHC	UG/KG	1.8 U	1.9 U	2 U	9 U	1.8 U		**0.18 J**	1.9 U	**0.094 J**
Dieldrin	UG/KG	3.6 U	0.53 J 4	1.6 J 3,4	18 U	1.1 J 4		16 3,4	3.8 U	3.7 U
Endosulfan I	UG/KG	**1.5 J**	1.9 U	2 U	9 U	1.8 U		1.9 U	1.9 U	1.8 U
Endosulfan sulfate	UG/KG	**2.7 J**	**1 J**	**15**	18 U	**0.17 J**		**6.4**	**1.5 J**	**0.97 J**
Endrin	UG/KG	4.8 4	3.9 U	2.6 J 4	18 U	3.7 U		3.8 U	**0.89 J**	**0.71 J**
Endrin aldehyde	UG/KG	3.6 U	3.9 U	4.1 U	**3.7 J**	3.7 U		3.8 U	3.8 U	3.7 U
Endrin ketone	UG/KG	3.6 U	3.9 U	4.1 U	**3.5 J**	3.7 U		3.8 U	3.8 U	3.7 U
gamma-BHC (Lindane)	UG/KG	1.8 U	1.9 U	0.15 J 4	9 U	1.8 U		1.9 U	1.9 U	1.8 U
gamma-Chlordane	UG/KG	**1.3 J**	**17**	**14**	53 3	**1.6 J**		**14**	**6**	**1.6 J**
Heptachlor	UG/KG	1.8 U	1.9 U	**0.16 J**	**0.46 J**	1.8 U		1.9 U	1.9 U	1.8 U
Heptachlor epoxide	UG/KG	1.8 U	**6**	**0.39 J**	9 U	**0.29 J**		**0.66 J**	**0.28 J**	1.8 U
TAL Metals/Cyanide										
Aluminum	MG/KG	2840 4,5	6320 4,5	11600 1,4,5	6080 4,5	4470 J 4,5	5640 J 4,5	11600 J 1,4,5	21600 J 1,4,5	21000 J 1,4,5
Antimony	MG/KG	0.48 UJ	1.3 J 5	0.55 UJ	0.54 U	0.49 UJ	0.59 J 5	3.6 J 1,4,5	14.5 J 1,3-5	2 J 5
Arsenic	MG/KG	1.3 J 1	1.4 J 1	2.1 J 1	1.3 J 1	0.84 J 1	1.1 J 1	1.6 J 1	2.3 J 1	2 J 1
Barium	MG/KG	**38.4 J**	**23.8 J**	**49.4 J**	**16 J**	**17.2 J**	**17.9 J**	**37.1 J**	**24.3 J**	**27 J**
Beryllium	MG/KG	0.03 U	0.03 U	0.08 J 5	0.18 U	0.02 U	0.02 U	0.02 U	0.12 U	0.02 U
Cadmium	MG/KG	**1.5**	2.7 4,5	4.9 1,3-5	**1.1**	**0.92 J**	1.7 4	4.9 1,3-5	12.1 1,3-5	8.6 1,3-5
Calcium	MG/KG	**19900 J**	**13800 J**	**3370 J**	**13100 J**	**4560**	**85800**	**2850**	**12900**	**9470**
Chromium	MG/KG	21.2 4-6	16.5 4-6	25.2 1,4-6	8.7 4-6	6.8 4-6	11.2 4-6	18.1 4-6	40.9 1,3-6	29.7 1,3-6
Cobalt	MG/KG	0.47 U	0.46 U	0.75 U	0.64 U	0.33 U	0.55 U	0.9 U	0.92 U	0.64 U
Copper	MG/KG	15.2 5	50.8 4,5	84.1 4,5	22.8 5	37.1 J 5	40.5 J 4,5	78 J 4,5	663 J 1,4,5	667 J 1,4,5
Iron	MG/KG	3860 1,3-6	2730 1,3,4,6	4560 1,3-6	3190 1,3,4,6	2400 1,3,4,6	3970 1,3-6	6920 1,3-6	3540 1,3-6	3760 1,3-6
Lead	MG/KG	55.3 4-6	36.7 5,6	79.1 4-6	14.2 5,6	11.7 5,6	17.7 5,6	705 3-6	78 4-6	78.5 4-6
Magnesium	MG/KG	**1090 J**	**595 J**	**373 J**	**511 J**	**233 J**	**1040 J**	**550 J**	**892 J**	**1810**
Manganese	MG/KG	**24.8 J**	**14.9 J**	**34.8 J**	**16.8 J**	**11 J**	**17.1 J**	**50.5 J**	81.2 J 3	97.7 J 3
Mercury	MG/KG	0.05 J 3	0.05 J 3	0.09 J 3,5,6	0.05 J 3	0.06 J 3,5,6	0.05 J 3	0.08 J 3,5,6	0.07 J 3,5,6	0.3 3-6
Nickel	MG/KG	8.7 J 5	3.1 J 5	5.4 J 5	3.3 J 5	2.1 J 5	5.2 J 5	5 J 5	21.6 5	10.6 5
Potassium	MG/KG	**213 J**	**206 J**	**341 J**	**244 J**	**215 J**	**310 J**	**370 J**	**301 J**	**283 J**
Selenium	MG/KG	0.68 U	0.72 U	1 J 4	0.67 U	0.69 U	0.7 U	0.96 J 4	0.7 U	0.69 U
Silver	MG/KG	0.18 J 5	0.17 J 5	0.18 J 5	0.15 U	0.15 U	0.16 U	0.39 U	1.1 U	0.65 U
Sodium	MG/KG	19.5 U	20.8 U	22.1 U	19.1 U	**40.7 J**	**93.9 J**	**24.5 J**	**27.8 J**	**20.6 J**
Vanadium	MG/KG	19 4,5	9.9 J 4,5	20.8 4,5	9.1 J 4,5	6.6 J 4,5	9.2 J 4,5	19.1 4,5	11.4 4,5	12.7 4,5
Zinc	MG/KG	95.1 4,5	82.8 4,5	156 4,5	98.1 4,5	28.5 5	69 4,5	105 4,5	569 4,5	363 4,5

NOTES:
Detections of a chemical are indicated in bolc
Each screening criterion has been assigned a
Data entries consist of the concentration follo
U = Compound not detected above the indica
"--" = No screening criterion available.
[1]A blind duplicate sample labeled 012SS13.
[2]A blind duplicate sample labeled 012SS12.
[3]DDT/DDE/DDD (total).
[4]Chlordane (total).
[5]PCBs (total).
[6]BHC (total).
[7]RBC for technical HCH.
[8]RBC for mercuric chloride.
A duplicate sample was collected from 012SS

Table E-2
Surface Soil Detected Compounds and Screening Criteria Comparison - Dioxins/Furans
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria							Frequency of Detection	012SS06	012SS07	012SS15
		EPA Region III RBC - Residential (1)	EPA Region III RBC - Industrial (2)	NC Soil Screening Levels (SSLs) (3)	EPA Region IV Ecological Screening Values (4)	EPA Region III BTAG Flora (5)	EPA Region III BTAG Fauna (6)	EPA Region IV SSLs - Inhalation (7)				
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	PG/G	430.00[2]	3,800.00[2]	--	--	--	--	--	3/3	**6.8 B**	**27 B**	**210**
1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	430.00[2]	3,800.00[2]	--	--	--	--	--	1/3	0.56 U	0.28 U	**5.2 J**
1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	430.00[2]	3,800.00[2]	--	--	--	--	--	1/3	0.76 U	0.38 U	**0.7 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	PG/G	43.00[2]	380.00[2]	--	--	--	--	--	1/3	0.95 U	0.46 U	**3.5 J**
1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	43.00[2]	380.00[2]	--	--	--	--	--	1/3	0.55 U	0.21 U	**1.1 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	PG/G	43.00[2]	380.00[2]	--	--	--	--	--	2/3	1 U	**0.31 J**	**7.3 J**
1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	43.00[2]	380.00[2]	--	--	--	--	--	1/3	0.54 U	0.2 U	**0.85 J**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	PG/G	43.00[2]	380.00[2]	--	--	--	--	--	3/3	**0.72 J Q**	**0.58 J Q**	**9.3**
1,2,3,7,8-Pentachlorodebenzo-p-dioxin	PG/G	8.60[2]	76.00[2]	--	--	--	--	--	1/3	0.29 U	0.4 U	**1.3 J**
2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	43.00[2]	380.00[2]	--	--	--	--	--	1/3	0.61 U	0.23 U	**0.53 J**
2,3,4,7,8-Pentachlorodibenzofuran	PG/G	8.60[2]	76.00[2]	--	--	--	--	--	1/3	0.2 U	0.43 U	**0.33 J**
2,3,7,8-TCDD (dioxin)	PG/G	4.30	38.00	14.50	--	--	10,000.00	--	1/3	0.23 U	0.44 U	**0.43 J**
Total Heptachlorodibenzo-p-dioxin	PG/G	--	--	--	--	--	--	--	3/3	**20 B**	**57 B Q**	**420**
Total Heptachlorodibenzofuran	PG/G	--	--	--	--	--	--	--	1/3	0.65 U	0.32 U	**11 J**
Total Hexachlorodibenzo-p-dioxin	PG/G	--	--	--	--	--	--	--	3/3	**8.4 J Q**	**3.8 J Q**	**75**
Total Hexachlorodibenzofuran	PG/G	--	--	--	--	--	--	--	1/3	0.59 U	0.22 U	**22**
Total Octachlorodibenzo-p-dioxin	PG/G	4,300.00[2]	38,000.00[2]	--	--	--	--	--	3/3	**820 B**	**2000 B**	4900 J 1
Total Octachlorodibenzofuran	PG/G	4,300.00[2]	38,000.00[2]	--	--	--	--	--	1/3	0.96 U	0.78 U	**5.4 J**
Total Pentachlorodibenzo-p-dioxin	PG/G	--	--	--	--	--	--	--	2/3	**0.6 J**	0.4 U	**12 J**
Total Pentachlorodibenzofuran	PG/G	--	--	--	--	--	--	--	2/3	**1.8 J Q**	0.43 U	**15 J**
Total Tetrachlorodibenzo-p-dioxin	PG/G	--	--	--	--	--	--	--	1/3	0.72 U	0.92 U	**1.5 J**
Total Tetrachlorodibenzofuran	PG/G	--	--	--	--	--	--	--	2/3	**3 Q**	1 U	**6.4**

NOTES:

Detections of a chemical are indicated in bold font. Detected concentrations that exceed one or more screening criteria are indicated in red font.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify specific criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit; B = Compound also detected in a QA/QC blank; Q = Estimated maximum possible concentration (EMPC).

"--" = No screening criterion available.

[1]A blind duplicate sample labeled 012SS12.

[2]RBC based on the 2,3,7,8-TCDD toxicity equivalency factors provided in EPA (1989).

Table E-3
Subsurface Soil Detected Compounds and Screening Criteria Comparison
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria: EPA Region III RBC - Industrial (1)	Screening Criteria: NC Soil Screening Levels (SSLs) (2)	Frequency of Detection	012SB01 (1-2 ft.)	012SB02 (4-5 ft.)
TCL Volatiles						
No detected compounds						
TCL Semivolatiles						
2-Methylnaphthalene	UG/KG	4,100,000.00	--	1/2	**1300 J**	360 UJ
Di-n-butylphthalate	UG/KG	20,000,000.00	24,800.00	1/2	**550 J**	360 UJ
Fluorene	UG/KG	8,200,000.00	44,300.00	1/2	**410 J**	360 UJ
Phenanthrene	UG/KG	--	59,600.00	1/2	**560 J**	360 UJ
TCL Pesticides/PCBs						
Aldrin	UG/KG	38.00	--	1/2	**0.3 J**	1.8 U
alpha-BHC	UG/KG	910.00	--	1/2	**10**	1.8 U
alpha-Chlordane	UG/KG	16,000.00[1]	27.8[1]	1/2	**11 J**	1.8 U
Endosulfan II	UG/KG	1,200,000.00	--	1/2	**8.8**	3.6 U
gamma-BHC (Lindane)	UG/KG	4,400.00	6.20	1/2	**0.7 J**	1.8 U
gamma-Chlordane	UG/KG	16,000.00[1]	27.8[1]	2/2	**7.9 J**	**0.072 J**
Heptachlor epoxide	UG/KG	630.00	6.67	1/2	**2.4 J**	1.8 U
TAL Metals/Cyanide						
Aluminum	MG/KG	200,000.00	--	2/2	**8510 J**	**5080 J**
Arsenic	MG/KG	3.80	26.20	1/2	**1.5 J**	0.65 U
Barium	MG/KG	14,000.00	848.00	2/2	**20 J**	**8.8 J**
Cadmium	MG/KG	100.00	2.72	1/2	**3.1 2**	0.04 U
Calcium	MG/KG	--	--	2/2	**3140**	**98 J**
Chromium	MG/KG	610.00	27.20	2/2	**15**	**5.4**
Copper	MG/KG	8,200.00	704.00	1/2	**70.9 J**	0.94 U
Iron	MG/KG	61,000.00	151.00	2/2	**2500 2**	**2010 2**
Lead	MG/KG	--	270.00	2/2	**25.4**	**3.1**
Magnesium	MG/KG	--	--	2/2	**364 J**	**255 J**
Manganese	MG/KG	4,100.00	65.20	2/2	**8.9 J**	**7.9 J**
Mercury	MG/KG	61.00[2]	0.0154	2/2	**0.05 J 2**	**0.05 J 2**
Nickel	MG/KG	4,100.00	56.40	2/2	**2.2 J**	**1.6 J**
Potassium	MG/KG	--	--	2/2	**223 J**	**174 J**
Sodium	MG/KG	--	--	2/2	**47.9 J**	**29.8 J**
Vanadium	MG/KG	1,400.00	--	2/2	**8.4 J**	**6.5 J**
Zinc	MG/KG	61,000.00	1,100.00	2/2	**182**	**5.2**

NOTES:

Detections of a chemical are indicated in bold font. Detected concentrations that exceed one or more screening criteria are indicated in red font.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify specific criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit.

"--" = No screening criterion available.

[1]Chlordane (total).

[2]RBC for mercuric chloride.

Table E-4
Groundwater Detected Compounds and Screening Criteria Comparison
Site 12 Remedial Investigation, MCAS Cherry Point

Chemical	Units	Screening Criteria: Federal MCLs/SMCLs (1)	Screening Criteria: NC 2L GW Standards (2)	Screening Criteria: EPA Region III Tapwater RBCs (3)	Frequency of Detection	012MW01	012MW02	012MW03	012MW04	012TW01
TCL Volatiles										
Bromomethane	UG/L	--	--	0.85	1/5	1 U	**0.3 J**	1 U	1 U	1 U
Toluene	UG/L	1,000.00	1,000.00	75.00	4/5	**0.2 J**	**0.1 J**	**0.5 J**	**0.09 J**	1 U
TCL Semivolatiles										
No detected compounds										
TCL Pesticides/PCBs										
4,4'-DDE	UG/L	--	--	0.20	2/5	0.1 U	0.1 U	**0.0032 J**	0.1 U	**0.035 J**
Aldrin	UG/L	--	--	0.0039	2/5	0.05 U	0.05 U	**0.0018 J**	**0.0012 J**	0.055 UJ
alpha-Chlordane	UG/L	2.00[2]	0.027[2]	0.19[2]	4/5	**0.0071 J**	**0.0042 J**	0.066 J 2	0.05 U	0.18 J 2
Aroclor-1248	UG/L	0.50[6]	--	0.033	1/5	1 U	1 U	1 U	1 U	**0.89 J** 1,3
beta-BHC	UG/L	--	--	0.037	1/5	0.05 U	0.05 U	**0.0015 J**	0.05 U	0.055 UJ
delta-BHC	UG/L	--	--	0.037[3]	2/5	0.05 U	**0.00032 J**	0.05 U	0.05 U	**0.0064 J**
Dieldrin	UG/L	--	0.0022	0.0042	2/5	0.1 U	0.1 U	**0.011 J** 2,3	0.1 U	0.0045 J 2,3
Endosulfan I	UG/L	--	--	22.00	1/5	0.05 U	0.05 U	**0.0034 J**	0.05 U	0.055 UJ
Endosulfan II	UG/L	--	42.00	--	1/5	0.1 U	0.1 U	**0.1 U**	**0.1 U**	**0.018 J**
Endrin	UG/L	2.00	2.00	1.10	1/5	0.1 U	0.1 U	0.1 U	0.1 U	**0.014 J**
gamma-BHC (Lindane)	UG/L	0.20	0.20	0.052	2/5	**0.0039 J**	0.05 U	**0.0076 J**	0.05 U	0.055 UJ
gamma-Chlordane	UG/L	2.00[2]	0.027[2]	0.19[2]	2/5	0.05 U	0.05 U	**0.015 J**	0.05 U	0.064 J 2
Heptachlor epoxide	UG/L	0.20	0.004	0.0074	2/5	0.05 U	0.05 U	0.05 U	**0.0045 J** 2	0.13 J 2,3
TAL Metals/Cyanide										
Aluminum	UG/L	50.00[4]	--	3,700.00	5/5	730 1	583 1	442 1	770 1	8510 1,3
Arsenic	UG/L	50.00	50.00	0.045	3/5	3 U	3 U	30.2 3	8 J 3	4.6 J 3
Barium	UG/L	2,000.00	2,000.00	260.00	5/5	**8.6 J**	**9.9 J**	**10.3 J**	**13.9 J**	**38 J**
Calcium	UG/L	--	--	--	5/5	**12100**	**16900**	**60900**	**16000**	**36000**
Chromium	UG/L	100.00	50.00	11.00	1/5	1.3 U	0.6 U	0.6 U	0.6 U	25.5 3
Copper	UG/L	1,300.00	1,000.00	150.00	1/5	0.6 U	0.6 U	1.3 U	1.4 U	**16.2 J**
Iron	UG/L	300.00[4]	300.00	1,100.00	5/5	484 J 1,2	7060 J 1-3	12200 J 1-3	51200 J 1-3	6210 1-3
Lead	UG/L	15.00	15.00	--	1/5	1.3 U	1.3 U	1.3 U	1.3 U	**3.4**
Magnesium	UG/L	--	--	--	5/5	**1450 J**	**1250 J**	**2730 J**	**1010 J**	**6430**
Manganese	UG/L	50.00[4]	50.00	73.00	5/5	**8.8 J**	**44.7**	61.7 1,2	56.9 1,2	93 1-3
Mercury	UG/L	2.00	1.10	1.10[5]	2/5	0.1 U	**0.1 J**	0.1 U	**0.09 J**	0.1 U
Nickel	UG/L	100.00	100.00	73.00	1/5	1.4 U	1.3 U	1.3 U	1.3 U	**11.1 J**
Potassium	UG/L	--	--	--	5/5	**232 J**	**507 J**	**1290 J**	**467 J**	**3010 J**
Selenium	UG/L	50.00	50.00	18.00	1/5	3.1 U	3.1 U	3.1 U	**5.3**	3.1 U
Sodium	UG/L	--	--	--	5/5	**2770 J**	**4080 J**	**6140**	**5590**	**8530**
Vanadium	UG/L	--	--	26.00	1/5	1.9 U	0.76 U	2.2 U	1 U	**13.7 J**
Zinc	UG/L	5,000.00[4]	2,100.00	1,100.00	1/5	4.1 U	4.1 U	4.1 U	4.1 U	**28 J**

NOTES:

Detections of a chemical are indicated in bold font. Detected concentrations that exceed one or more screening criteria are indicated in red font.

Each screening criterion has been assigned a reference number listed in parentheses in the column header. The reference number is used to identify specific criteria exceeded in a particular sample.

Data entries consist of the concentration followed by the data qualifier (if any) followed by the reference number(s) of any exceeded screening criteria (if any).

U = Compound not detected above the indicated concentration; J = Estimated concentration below the quantitation limit; B = Compound also detected in a QA/QC blank.

"--" = No screening criterion available.

[1]A blind duplicate sample labeled 012MW05.

[2]Chlordane (total).

[3]RBC for technical HCH.

[4]Secondary Maximum Contaminant Level (SMCL).

[5]RBC for mercuric chloride.

[6]PCBs (total).

A duplicate sample was also collected from 012MW01. The maximum concentration of the two measurements is presented in the table.

indicated this. Results that are greater than the quantitation limits are marked "U".

- The quantitation limits for 4,6-dinitro-2-methylphenol for the samples have been rejected and should be considered suspect. The initial calibration average relative response factor (RRF) was less than 0.05 for these compounds. This indicates a lack of instrument stability for these compounds. The quantitation limits have been marked with "R" qualifiers to indicate that they are suspect.
- The methylene chloride results for samples 012SS03 and 012SS07 should be considered quantitative estimates. The response for this compound exceeded the linear range of the GC/MS instrument. The laboratory did not re-analyze these samples at dilutions. The results have been marked with "J" qualifiers indicating that they are estimates.
- Quantitation limits for volatile organic compounds for the samples presented in Table 3-1 should be considered estimates. Low area counts were obtained for the internal standard compounds associated with these compounds. The laboratory did not reanalyze the samples to confirm matrix interference. The quantitation limits have been marked "UJ" to indicate that they are estimates.
- Results for pesticide/PCB constituents for the samples presented on page 5 should be considered quantitative estimates. The dual column precision criterion has been exceeded for these compounds for the chromatographic columns used for analysis. This indicates interferences in the retention time range for the affected compounds. As required by CLP protocols, the highest results for the columns have been selected for reporting purposes. The results have been marked with "J" qualifiers to indicate that they are quantitative estimates.

Table 3-1 Unacceptable Internal Standard Area Counts

Sample	Unacceptable Internal Standard	Qualified Compounds
012SS02	Chlorobenzene-d5, 1,4-Dichlorobenzene-d4	Chlorobenzene, Ethylbenzene, Styrene, 1,1,2,2-Tetrachloroethane, Tetrachloroethene, Toluene, 1,2,3-Trichloropropane, Xylenes, Dibromochloromethane, 4-Methyl-2-pentanone, 2-Hexanone, 1,2-Dibromoethane, Benzene, Bromodichloromethane, Bromoform, Carbon tetrachloride, Dibromomethane, 1,2-Dichloropropane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene 1,1,1-Trichloroethene, 1,1,2-Trichloroethane
012SS03	Chlorobenzene-d5, 1,4-Dichlorobenzene-d4	Chlorobenzene, Ethylbenzene, Styrene, 1,1,2,2-Tetrachloroethane, Tetrachloroethene, Toluene, 1,2,3-Trichloropropane, Xylenes, Dibromochloromethane, 4-Methyl-2-pentanone, 2-Hexanone, 1,2-Dibromoethane, Benzene, Bromodichloromethane, Bromoform, Carbon tetrachloride, Dibromomethane, 1,2-Dichloropropane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene 1,1,1-Trichloroethene, 1,1,2-Trichloroethane
012SS04	Chlorobenzene-d5, 1,4-Dichlorobenzene-d4	Chlorobenzene, Ethylbenzene, Styrene, 1,1,2,2-Tetrachloroethane, Tetrachloroethene, Toluene, 1,2,3-Trichloropropane, Xylenes, Dibromochloromethane, 4-Methyl-2-pentanone, 2-Hexanone, 1,2-Dibromoethane, Benzene, Bromodichloromethane, Bromoform, Carbon tetrachloride, Dibromomethane, 1,2-Dichloropropane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene 1,1,1-Trichloroethene, 1,1,2-Trichloroethane
012SS05	1,4-Dichlorobenzene-d4	Benzene, Bromodichloromethane, Bromoform, Carbon tetrachloride, Dibromomethane, Dibromochloromethane, 4-Methyl-2-pentanone, 2-Hexanone, 1,2-Dichloropropane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene 1,1,1-Trichloroethene, 1,1,2-Trichloroethane

Table 3-1 Cont'd

Sample	Unacceptable Internal Standard	Qualified Compounds
012SS08	Chlorobenzene-d5, 1,4-Dichlorobenzene-d4	Chlorobenzene, Ethylbenzene, Styrene, 1,1,2,2-Tetrachloroethane, Tetrachloroethene, Toluene, 1,2,3-Trichloropropane, Xylenes, Dibromochloromethane, 4-Methyl-2-pentanone, 2-Hexanone, 1,2-Dibromoethane, Benzene, Bromodichloromethane, Bromoform, Carbon tetrachloride, Dibromomethane, 1,2-Dichloropropane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene 1,1,1-Trichloroethene, 1,1,2-Trichloroethane
012SS09	Chlorobenzene-d5, 1,4-Dichlorobenzene-d4	Chlorobenzene, Ethylbenzene, Styrene, 1,1,2,2-Tetrachloroethane, Tetrachloroethene, Toluene, 1,2,3-Trichloropropane, Xylenes, Dibromochloromethane, 4-Methyl-2-pentanone, 2-Hexanone, 1,2-Dibromoethane, Benzene, Bromodichloromethane, Bromoform, Carbon tetrachloride, Dibromomethane, 1,2-Dichloropropane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene 1,1,1-Trichloroethene, 1,1,2-Trichloroethane
012SS10	Chlorobenzene-d5, 1,4-Dichlorobenzene-d4	Chlorobenzene, Ethylbenzene, Styrene, 1,1,2,2-Tetrachloroethane, Tetrachloroethene, Toluene, 1,2,3-Trichloropropane, Xylenes, Dibromochloromethane, 4-Methyl-2-pentanone, 2-Hexanone, 1,2-Dibromoethane, Benzene, Bromodichloromethane, Bromoform, Carbon tetrachloride, Dibromomethane, 1,2-Dichloropropane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene 1,1,1-Trichloroethene, 1,1,2-Trichloroethane
012SS11	1,4-Dichlorobenzene-d4	Benzene, Bromodichloromethane, Bromoform, Carbon tetrachloride, Dibromomethane, Dibromochloromethane, 4-Methyl-2-pentanone, 2-Hexanone, 1,2-Dichloropropane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene 1,1,1-Trichloroethene, 1,1,2-Trichloroethane
012SS13	1,4-Dichlorobenzene-d4	Benzene, Bromodichloromethane, Bromoform, Carbon tetrachloride, Dibromomethane, Dibromochloromethane, 4-Methyl-2-pentanone, 2-Hexanone, 1,2-Dichloropropane, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene 1,1,1-

Sample	Qualified Results
012SS01	Dieldrin, Endosulfan sulfate, alpha-Chlordane, Aroclor 1260
012SS02	alpha-Chlordane
012SS03	alpha-Chlordane
012SS04	alpha-Chlordane
012SS05	alpha-Chlordane
012SS08	4,4'-DDD
012SS09	alpha-Chlordane
012SS10	alpha-Chlordane
012SS11	Aroclor 1260
012SS13	alpha-Chlordane, Aroclor 1260
35ASS01	alpha-Chlordane, gamma-Chlordane
35ASS02	alpha-Chlordane
35ASS04	Heptachlor epoxide, alpha-Chlordane, gamma-Chlordane

- As required by CLP protocol, all volatile and semivolatile TICs have been reported with "J" qualifiers to indicate that they are quantitative estimates. EDQ has reported only those TIC results which have not been determined to be laboratory or field artifacts, and where possible has grouped TIC of similar classification.
- As required by CLP protocol, all compounds which were qualitatively identified at concentrations below their respective Contract Required Quantitation Limits (CRQLs) have been marked with "J" qualifiers to indicate that they are quantitative estimates.

4.0 *INORGANIC DATA*

The samples were analyzed for total metals and miscellaneous parameters: cyanide, nitrate and sulfate, as indicated in Table 1-1.

The data validation included an assessment of the following items: chain of custody documentation, holding times, equipment, field, and laboratory method blank results, initial and continuing calibrations, matrix spike analysis results, laboratory and field duplicate analysis results, Inductively Coupled Plasma (ICP) Emission Spectroscopy interference check sample results, ICP serial dilution results, laboratory control sample results, quantitation limit standard analysis results, qualitative identification, and quantitation of results.

The inorganic analyses were performed acceptably, but require qualifying statements. It is recommended that the data only be used with the qualifying statements presented below. Any data which are not discussed in this report should be considered qualitatively and quantitatively valid, based on the items evaluated. Validated and/or qualified results for the samples are provided in Attachment 1.

4.1 *DATA QUALIFIERS*

- Positive results reported for the metals in the samples presented on page 7 are qualitatively invalid due to their presence in the associated field and laboratory method blanks. USEPA protocol requires positive results for elemental contaminants, that are less than or equal to five times the blank contamination level, to be considered qualitatively invalid. This has been indicated by placing "B" qualifiers next to the quantitative results for these metals in the samples.

Analyte	Affected Samples
Antimony	012SS01, 012SS11
Arsenic	012SS02, 012SS03
Beryllium	012SS01, 012SS02, 012SS08, 012SS09, 012SS11, 012SS13, 35ASS03, 35ASS04
Cadmium	35ASS01, 35ASS03, 35ASS05
Cobalt	012SS02, 012SS03, 012SS04, 012SS05, 012SS06, 012SS07, 012SS08, 012SS09, 012SS10, 012SS11, 012SS12, 012SS13, 35ASS01, 35ASS02, 35ASS03, 35ASS04, 35ASS05
Copper	012SS06, 012SS07, 012SS12, 35ASS01

- Antimony results for the samples should be considered biased low quantitative estimates, and may be higher than reported. The associated matrix spike recoveries were below acceptance limits for this analyte. The low recoveries indicate the presence of interferences for this analyte for samples of similar matrix. Positive antimony results have been marked with "J" qualifiers to indicate that they are biased low. Nondetected results are marked "UJ".
- Calcium and manganese positive results for the samples should be considered quantitative estimates. The laboratory duplicate precision criterion of 20 percent for values greater than five times the CRDL (or ± the CRDL for results less than five times the CRDL) was exceeded for these analytes. The lack of precision may be due to heterogeneity of samples of similar matrix. These results have been marked "J" to indicate that they are quantitative estimates.
- The laboratory reported results for metals and cyanide detected in samples at concentrations greater than the instrument detection limit, but less than the CRDL with "B" flags. EDQ has flagged results for metals and cyanide below the CRDL with "J" qualifiers to indicate that they are quantitative estimates.

5.0 *SUMMARY*

The organic and inorganic analyses described in this analytical data validation report were performed acceptably, but required qualifying statements. The aspects of the data, which required qualification, are identified in this report.

Analytical Data Validation Report
Samples Collected March 1999
Cherry Point
(CTO-64)
Quanterra Sample Delivery Group C10183

8 July 1999

Shawne M. Rodgers
President

Environmental Data Quality, Inc.
967 East Swedesford Road Suite 401
Exton, Pennsylvania 19341

File No.: 601.70.01

EXECUTIVE SUMMARY *III*

1.0 INTRODUCTION *1*

2.0 DATA DELIVERABLE COMPLETENESS AND METHOD COMPLIANCE *2*

2.1 DATA DELIVERABLE COMPLETENESS *2*
2.1.1 Organic Analyses *2*
2.1.2 Inorganic Analyses *2*

2.2 METHOD COMPLIANCE *2*
2.2.1 Organic Analyses *2*
2.2.2 Inorganic Analyses *2*

3.0 ORGANIC DATA *3*

3.1 DATA QUALIFIERS *3*

4.0 INORGANIC DATA *6*

4.1 DATA QUALIFIERS *6*

5.0 SUMMARY *9*

ATTACHMENT 1 ANALYSIS RESULTS FORMS

ATTACHMENT 2 METHODOLOGY REFERENCES

List of Tables *Following Page*
Table 1-1 Summary of Sample Data Reviewed *1*

This analytical data validation report is based on the review of data generated for soil and sediment samples. The sample locations, laboratory identification numbers, sample collection dates, sample matrix, and analyses performed are presented in Table 1-1. The samples are presented in order of collection date.

The samples were analyzed for volatile organic compounds, semivolatile organic compounds, pesticide/PCB constituents, dioxin, total metals, cyanide, oil and grease, and total organic carbon, as specified in Table 1-1. Quanttera Incorporated, North Canton, Ohio, performed all analyses.

The sample analyses were performed in accordance with the procedures outlined in the OLM03 (and ILM04) USEPA Contract Laboratory Program (CLP) Statement of Work for Organic (and Inorganic) Analysis, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" SW-846, Third Edition, Final (Promulgated) Updates II, IIA, and III June 1997, and "Methods for Chemical Analysis of Water and Wastes", USEPA 600/4-79-020. Results have been validated or qualified according to general guidance provided in the Region IV modifications to "Laboratory Data Validation Functional Guidelines for Validating Organic (and Inorganic) Analyses", USEPA 9/94 (and 4/93). These documents specify procedures for validating data generated for CLP analyses. The requirements specified in the method were also used to evaluate the non-CLP data.

The organic and inorganic analyses were performed acceptably, but required qualifying statements. The aspects of the data, which required qualification, are identified in this report.

Results for organic compounds and various metals in some of the samples were qualified due to the presence of these analytes in associated laboratory method and/or field blanks. Acetone and chlorethane results were qualified due to imprecision of calibration standards. Other qualifications to the sample data were due primarily to the presence of matrix interferences, as evidenced by surrogate, laboratory duplicate, and matrix spike results.

Analysis results forms presenting the validated and qualified results for the samples are included in Attachment 1.

1.0 INTRODUCTION

This analytical data validation report is based on the review of data generated for soil and sediment samples. The sample locations, laboratory identification numbers, sample collection dates, sample matrix, and analyses performed are presented in Table 1-1. The samples are presented in order of collection date.

The samples were analyzed for volatile organic compounds, semivolatile organic compounds, pesticide/PCB constituents, dioxin, total metals, cyanide, oil and grease, and total organic carbon, as specified in Table 1-1. Quanttera Incorporated, North Canton, Ohio, performed all analyses.

The sample analyses were performed in accordance with the procedures outlined in the OLM03 (and ILM04) USEPA Contract Laboratory Program (CLP) Statement of Work for Organic (and Inorganic) Analysis, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" SW-846, Third Edition, Final (Promulgated) Updates II, IIA, and III June 1997, and "Methods for Chemical Analysis of Water and Wastes", USEPA 600/4-79-020. Results have been validated or qualified according to general guidance provided in the Region IV modifications to "Laboratory Data Validation Functional Guidelines for Validating Organic (and Inorganic) Analyses", USEPA 9/94 (and 4/93). These documents specify procedures for validating data generated for CLP analyses. The requirements specified in the method were also used to evaluate the non-CLP data.

Completeness of data deliverables for all samples and method compliance is discussed in Section 2.0. Analysis results forms presenting the validated and qualified results for the samples are included in Attachment 1.

Table 1-1 Samples For Data Validation Review
Cherry Point
CTO-64
March 1999 Sampling
Quanterra Sample Delivery Group C10183

SAMPLE I.D.	LAB I.D.	DATE COLLECTED	MATRIX	VCTCL	SVTCL	PSPCB	DIOXI	MCYAN	TOC	O/G
012SB01	A9C100183001	3/9/99	Soil	X	X	X		X	X	X
012SB02	A9C100183002	3/9/99	Soil	X	X	X		X	X	X
012SD01	A9C120165004	3/11/99	Sediment	X	X	X		X	X	X
012SD02	A9C120165007	3/11/99	Sediment	X	X	X		X	X	X
012SD03	A9C120165006	3/11/99	Sediment	X	X	X		X	X	X
012SD04	A9C120165005	3/11/99	Sediment	X	X	X		X	X	X
012SS14	A9C100183003	3/9/99	Soil	X	X	X		X	X	X
012SS15-00	A9C120165001	3/10/99	Soil	X			X	X	X	X
012SS16	A9C100183004	3/9/99	Soil	X	X	X		X	X	X
012SS17	A9C100183005	3/9/99	Soil	X	X	X		X	X	X
012SS18	A9C100183006	3/9/99	Soil	X	X	X		X	X	X
012TB02	A9C100183007	3/9/99	Trip Blank	X						
35AFB01	A9C120165009	3/11/99	Field Blank	X						
35ARB01	A9C120165011	3/11/99	Rinsate Blank	X	X	X		X	X	X
35ASD01	A9C120165003	3/11/99	Sediment	X	X	X		X	X	X
35ASD02	A9C120165002	3/11/99	Sediment	X	X	X		X	X	X
35ASD03	A9C120165008	3/11/99	Sediment	X	X	X		X	X	X
35ATB02	A9C120165010	3/11/99		X						

VCTCL TCL VOLATILE ORGANIC COMPOUNDS
SVTCL TCL SEMIVOLATILE ORGANIC COMPOUNDS
PSPCB TCL PESTICIDE/PCBS
DIOX POLYCHLORINATED DIBENZODIOXINS/POLYCHLORINATED DIBENZOFURANS
MCYAN TAL METALS AND CYANIDE
TOC TOTAL ORGANIC CARBON
O/G OIL AND GREASE

3.0 ORGANIC DATA

The samples were analyzed for volatile organic compounds, semivolatile organic compounds, and pesticide/PCB constituents, as indicated in Table 1-1.

For the semivolatile fraction determined by Gas Chromatography/Mass Spectrometry, library searches were performed to "tentatively identify" chromatographic peaks whose characteristics did not match those of targeted compounds. Library searches were performed for up to twenty semivolatile extraneous peaks.

The findings offered in this report are based on a review of the analytical data reported according to a CLP-equivalent deliverable format.

The data validation included an assessment of the following items: chain of custody documentation, holding times, laboratory method, field, and trip blank results, surrogate recoveries, MS/MSD analysis results, field duplicate results, bromofluorobenzene (BFB) and decafluorotriphenylphosphine (DFTPP) mass tuning results, initial and continuing calibrations, internal standard performance, endrin/DDT breakdown, retention time shifts for pesticide/PCB surrogate compounds, retention time windows for pesticide/PCB constituents, pesticide cleanup check sample results, qualitative identification, and quantitation of results.

The organic analyses were performed acceptably, but require qualifying statements. It is recommended that the data only be used with the qualifying statements presented below. Any data that are not discussed in this report should be considered qualitatively and quantitatively valid, based on the items evaluated. Validated and/or qualified results for the samples are provided in Attachment 1.

3.1 DATA QUALIFIERS

- Positive results reported for compounds for the samples presented on page 4 are qualitatively invalid due to the presence of this compound in associated laboratory method and/or field blanks. USEPA protocol requires positive results for common contaminants, such as methylene chloride and bis-(2-ethylhexyl)phthalate, that are less than or equal to ten times the associated blank contamination level, to be considered qualitatively invalid. Results for uncommon contaminants, such as heptachlor and alpha-chlordane that are less than five times the level detected in a blank, are also invalid. Replacing results that are less than the quantitation limit with the

linear range of the GC/MS instrument. The laboratory did not re-analyze the sample at a dilution. The result has been marked with a "J" qualifier to indicate that it is an estimate.

- As required by CLP protocol, all semivolatile TICs have been reported with "J" qualifiers to indicate that they are quantitative estimates. EDQ has reported only those TIC results which have not been determined to be laboratory or field artifacts, and where possible has grouped TIC of similar classification.
- As required by CLP protocol, all compounds which were qualitatively identified at concentrations below their respective Contract Required Quantitation Limits (CRQLs) have been marked with "J" qualifiers to indicate that they are quantitative estimates.

4.0 *INORGANIC DATA*

The samples were analyzed for total metals and miscellaneous parameters: cyanide, oil and grease, and total organic carbon, as indicated in Table 1-1.

The data validation included an assessment of the following items: chain of custody documentation, holding times, equipment, field, and laboratory method blank results, initial and continuing calibrations, matrix spike analysis results, laboratory and field duplicate analysis results, Inductively Coupled Plasma (ICP) Emission Spectroscopy interference check sample results, ICP serial dilution results, laboratory control sample results, quantitation limit standard analysis results, qualitative identification, and quantitation of results.

The inorganic analyses were performed acceptably, but require qualifying statements. It is recommended that the data only be used with the qualifying statements presented below. Any data which are not discussed in this report should be considered qualitatively and quantitatively valid, based on the items evaluated. Validated and/or qualified results for the samples are provided in Attachment 1.

4.1 *DATA QUALIFIERS*

4.1.1 *Soil Samples*

- Positive results reported for the metals in the samples presented on page 7 are qualitatively invalid due to their presence in the associated field and laboratory method blanks. USEPA protocol requires positive results for elemental contaminants, that are less than or equal to five times the blank contamination level, to be considered qualitatively invalid. This has been indicated by placing "U" qualifiers next to the quantitative results for these metals in the samples.

Analyte	Affected Samples
Antimony	012SB01, 012SB02
Beryllium	012SB01, 012SS17
Cobalt	012SB01, 012SB02, 012SS14, 012SS15-00, 012SS16, 012SS17, 012SS18
Copper	012SB02
Silver	012SS16, 012SS17, 012SS18

- Antimony results for the samples should be considered biased low quantitative estimates, and may be higher than reported. The associated matrix spike recoveries were below acceptance limits for this analyte. The low recoveries indicate the presence of interferences for this analyte for samples of similar matrix. Positive antimony results have been marked with "J" qualifiers to indicate that they are biased low. Nondetected results are marked "UJ".
- Aluminum, copper and manganese positive results for the samples should be considered quantitative estimates. The laboratory duplicate precision criterion of 35 percent for values greater than five times the CRDL (or ± two times the CRDL for results less than five times the CRDL) was exceeded for these analytes. The lack of precision may be due to heterogeneity of samples of similar matrix. These results have been marked "J" to indicate that they are quantitative estimates.

4.1.2 *Sediment Samples*

- Positive results reported for the metals in the samples presented on page 8 are qualitatively invalid due to their presence in the associated field and laboratory method blanks. USEPA protocol requires positive results for elemental contaminants, that are less than or equal to five times the blank contamination level, to be considered qualitatively invalid. This has been indicated by placing "U" qualifiers next to the quantitative results for these metals in the samples.

Analyte	Affected Samples
Antimony	35ASD01
Cadmium	012SD02
Cobalt	012SD02, 012SD03, 012SD04, 35ASD01, 35ASD02, 35ASD03
Copper	012SD02, 35ASD02
Nickel	012SD04, 35ASD02
Silver	012SD03, 35ASD01, 35ASD03

- Calcium and iron positive results for the samples should be considered quantitative estimates. The laboratory duplicate precision criterion of 35 percent for values greater than five times the CRDL (or ± two times the CRDL for results less than five times the CRDL) was exceeded for these analytes. The lack of precision may be due to heterogeneity of samples of similar matrix. These results have been marked "J" to indicate that they are quantitative estimates.

4.1.3 *General Data Qualifiers*

- The laboratory reported results for metals and cyanide detected in samples at concentrations greater than the instrument detection limit, but less than the CRDL with "B" flags. EDQ has flagged results for metals and cyanide below the CRDL with "J" qualifiers to indicate that they are quantitative estimates.

5.0 *SUMMARY*

The organic and inorganic analyses described in this analytical data validation report were performed acceptably, but required qualifying statements. The aspects of the data, which required qualification, are identified in this report.

Analytical Data Validation Report
Samples Collected March 1999
Cherry Point
(CTO-64)
Quanterra Sample Delivery Group C12160

8 July 1999

Shawne M. Rodgers
President

Environmental Data Quality, Inc.
967 East Swedesford Road Suite 401
Exton, Pennsylvania 19341

File No.: 601.70.01

EXECUTIVE SUMMARY *III*

1.0 INTRODUCTION *1*

2.0 DATA DELIVERABLE COMPLETENESS AND METHOD COMPLIANCE *2*

2.1 DATA DELIVERABLE COMPLETENESS *2*
2.1.1 Organic Analyses *2*
2.1.2 Inorganic Analyses *2*

2.2 METHOD COMPLIANCE *2*
2.2.1 Organic Analyses *2*
2.2.2 Inorganic Analyses *3*

3.0 ORGANIC DATA *4*

3.1 DATA QUALIFIERS *4*

4.0 INORGANIC DATA *7*

4.1 DATA QUALIFIERS *7*

5.0 SUMMARY *9*

ATTACHMENT 1 ANALYSIS RESULTS FORMS

ATTACHMENT 2 METHODOLOGY REFERENCES

List of Tables *Following Page*

Table 1-1 Summary of Sample Data Reviewed *1*

1.0 *INTRODUCTION*

This analytical data validation report is based on the review of data generated for surface water samples. The sample locations, laboratory identification numbers, sample collection dates, sample matrix, and analyses performed are presented in Table 1-1. The samples are presented in order of collection date.

The samples were analyzed for volatile organic compounds, semivolatile organic compounds, pesticide/PCB constituents, total metals, and miscellaneous parameters: cyanide, nitrate, oil and grease, and sulfate, as specified in Table 1-1. Quanttera Incorporated, North Canton, Ohio, performed all analyses.

The sample analyses were performed in accordance with the procedures outlined in the OLC02 and OLM03 (and ILM04) USEPA Contract Laboratory Program (CLP) Statement of Work for Organic (and Inorganic) Analysis, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" SW-846, Third Edition, Final (Promulgated) Updates II, IIA, and III June 1997, and "Methods for Chemical Analysis of Water and Wastes", USEPA 600/4-79-020. Results have been validated or qualified according to general guidance provided in the Region IV modifications to "Laboratory Data Validation Functional Guidelines for Validating Organic (and Inorganic) Analyses", USEPA 9/94 (and 4/93). These documents specify procedures for validating data generated for CLP analyses. The requirements specified in the method were also used to evaluate the non-CLP data.

Completeness of data deliverables for all samples and method compliance is discussed in Section 2.0. Analysis results forms presenting the validated and qualified results for the samples are included in Attachment 1.

Table 1-1 Samples For Data Validation Review
Cherry Point
CTO-64
March 1999 Sampling
Quanterra Sample Delivery Group C12160

SAMPLE I.D.	LAB I.D.	DATE COLLECTED	MATRIX	VCTCL	VCLOW	SVTCL	PSPCB	MCYAN	NO3	SO4	O/G
012FB01	A9C120160009	3/10/99	Field Blank		X						
012RB01	A9C120160006	3/10/99	Rinsate Blank		X	X	X	X	X	X	
012RB02	A9C120160007	3/10/99	Rinsate Blank		X	X	X	X	X	X	
012SW01	A9C120160001	3/10/99	Surface Water		X	X	X	X	X	X	X
012SW02	A9C120160005	3/10/99	Surface Water		X	X	X	X	X	X	X
012TB03	A9C120160008	3/10/99	Trip Blank		X						
012TW01	A9C180135001	3/17/99	Surface Water		X	X	X	X	X	X	X
12SW03	A9C120160003	3/10/99	Surface Water		X	X	X	X	X	X	X
12SW04	A9C120160004	3/10/99	Surface Water		X	X	X	X	X	X	X
35ASW02	A9C120160002	3/10/99	Surface Water		X	X	X	X	X	X	X
35ATB03	A9C180135007	3/17/99	Trip Blank		X						
35ATW01	A9C180135002	3/17/99	Surface Water		X	X	X	X	X	X	X
35ATW02	A9C180135003	3/17/99	Surface Water		X	X	X	X	X	X	X
35ATW03	A9C180135004	3/17/99	Surface Water		X	X	X	X	X	X	X
35ATW04	A9C180135005	3/17/99	Surface Water		X	X	X	X	X	X	X
35ATW05	A9C180135006	3/17/99	Surface Water		X	X	X	X	X	X	X

VCTCL TCL VOLATILE ORGANIC COMPOUNDS
VCLOW LOW CONCENTRATION VOLATILES BY CLP
SVTCL TCL SEMIVOLATILE ORGANIC COMPOUNDS
SVLOW LOW CONCENTRATION SEMIVOLATILES BY CLP
PSPCB TCL PESTICIDE/PCBS
PSLOW LOW CONCENTRATION PESTICIDES/PCBS BY CLP
MCYAN TAL METALS AND CYANIDE
NO3 NITRATE
SO4 SULFATE
O/G OIL AND GREASE

2.0 *DATA DELIVERABLE COMPLETENESS AND METHOD COMPLIANCE*

During the course of the quality assurance data validation review, an evaluation of the completeness of the data deliverables provided by the laboratory and conformance to the specified methods was performed. Data deliverables that were determined to be either incomplete or incorrect were required to be resubmitted by the laboratory. Deviations from the protocols in the required analysis methods were evaluated to determine the impact, if any on the analysis results reported by the laboratory. Qualifications to the data resulting from method deviations are discussed fully for the samples receiving the validation review in Sections 3.0 and 4.0.

2.1 *DATA DELIVERABLE COMPLETENESS*

The following deliverables issues were identified during the data validation review.

2.1.1 *Organic Analyses*

- The data deliverables were complete.

2.1.2 *Inorganic Analyses*

- The laboratory inadvertently mislabelled the metals analysis result form for sample 35ATW05 as 35ATW04. The laboratory was contacted and provided a revised analysis result form for this sample.

2.2 *METHOD COMPLIANCE*

The following are considered to be deviations from the specified methods. Qualifications to affected samples are discussed in Section 3.0 and 4.0.

2.2.1 *Organic Analyses*

- Based on the deliverables reviewed, there were no deviations to the organic methodologies used for analysis.

2.2.2 *Inorganic Analyses*

- Based on the deliverables reviewed, there were no deviations to the inorganic methodologies used for analysis.

3.0 *ORGANIC DATA*

The samples were analyzed for volatile organic compounds, semivolatile organic compounds, and pesticide/PCB constituents, as indicated in Table 1-1.

For the semivolatile fraction determined by Gas Chromatography/Mass Spectrometry, library searches were performed to "tentatively identify" chromatographic peaks whose characteristics did not match those of targeted compounds. Library searches were performed for up to twenty semivolatile extraneous peaks.

The findings offered in this report are based on a review of the analytical data reported according to a CLP-equivalent deliverable format.

The data validation included an assessment of the following items: chain of custody documentation, holding times, laboratory method, field, and trip blank results, surrogate recoveries, MS/MSD analysis results, field duplicate results, bromofluorobenzene (BFB) and decafluorotriphenylphosphine (DFTPP) mass tuning results, initial and continuing calibrations, internal standard performance, endrin/DDT breakdown, retention time shifts for pesticide/PCB surrogate compounds, retention time windows for pesticide/PCB constituents, pesticide cleanup check sample results, qualitative identification, and quantitation of results.

The organic analyses were performed acceptably, but require qualifying statements. It is recommended that the data only be used with the qualifying statements presented below. Any data that are not discussed in this report should be considered qualitatively and quantitatively valid, based on the items evaluated. Validated and/or qualified results for the samples are provided in Attachment 1.

3.1 *DATA QUALIFIERS*

- The positive volatiles results the samples presented below are qualitatively invalid due to the presence of this compound in associated laboratory method and/or field blanks. USEPA protocol requires positive results for common contaminants, such as methylene chloride, that are less than or equal to ten times the associated blank contamination level, to be considered qualitatively invalid. Results for uncommon contaminants, such as trichloroethene, toluene, alpha-chlordane, and heptachlor, that are less than five times their blank level are also considered invalid. This has been indicated by replacing results that are less than the

quantitation limit with the quantitation limit. Results that are greater than the quantitation limits are marked "U".

Compound	Qualified Results
Methylene Chloride	012SW01, 012SW02, 012SW03, 012SW04, 012TW01, 35ASW02, 35ATW02, 35ATW03, 35ATW04
Trichloroethene	35ATW04
Toluene	35ATW03
Alpha-Chlordane	35ATW01
Heptachlor	012SW02, 012SW03, 012SW04, 012TW01, 35ASW02, 35ATW01, 35ATW03, 35ATW04, 35ATW05

- The quantitation limits for 2-butanone for the samples have been rejected and should be considered suspect. The initial calibration average relative response factor (RRF) was less than 0.05 for these compounds. This indicates a lack of instrument stability for these compounds. The quantitation limits have been marked with "R" qualifiers to indicate that they are suspect.
- The results for pesticide/PCB constituents for sample 012TW01 should be considered quantitative estimates. Low recoveries were obtained for surrogate compound decachlorobiphenyl for both chromatographic columns used for analysis. The low recoveries may be the result of matrix interferences and/or laboratory inefficiencies for this sample. Positive results have been marked with "J" qualifiers to indicate that they are quantitative estimates. Nondetected results have been marked "UJ".
- The positive results for heptachlor epoxide for samples 35ATW03 and 35ATW04 should be considered quantitative estimates. The dual column precision criterion has been exceeded for this compound for the chromatographic columns used for analysis. This indicates interferences in the retention time range for the affected compounds. As required by CLP protocols, the highest results for the columns have been selected for reporting purposes. The results have been marked with "J" qualifiers to indicate that they are quantitative estimates.
- As required by CLP protocol, all volatile and semivolatile TICs have been reported with "J" qualifiers to indicate that they are quantitative estimates. EDQ has reported only those TIC results which have not been determined to be laboratory or field artifacts, and where possible has grouped TIC of similar classification.
- As required by CLP protocol, all compounds which were qualitatively identified at concentrations below their respective

Contract Required Quantitation Limits (CRQLs) have been marked with "J" qualifiers to indicate that they are quantitative estimates.

Analyte	Affected Samples
Antimony	012SW01, 012TW01, 35ASW02, 35ATW01, 35ATW02, 35ATW05
Barium	012SW01, 012SW02, 012SW04
Beryllium	35ATW03
Cadmium	012SW01, 012SW03, 012SW04, 012TW01, 35ASW02
Chromium	012SW03, 35ATW03, 35ATW04
Cobalt	012SW01, 012SW02, 012SW03, 012SW04, 012TW01, 35ASW02, 35ATW01, 35ATW02, 35ATW03, 35ATW04, 35ATW05
Copper	012SW02, 012SW03, 012SW04, 35ASW02
Magnesium	012SW02, 012SW03, 012SW04
Manganese	012SW02
Nickel	012SW03, 35ASW02, 35ATW01, 35ATW02, 35ATW04, 35ATW05
Vanadium	012SW01, 012SW02, 012SW03, 012SW04, 35ATW03, 35ATW04

- Positive sulfate results for the samples are biased high quantitative estimates, and may be lower than reported. The associated matrix spike recoveries were above acceptance limits for this analyte. The high recoveries indicate the presence of interferences for these analytes for samples of similar matrix. Positive sulfate results have been marked with "J" qualifiers to indicate that they are biased high.
- Zinc positive results for the samples should be considered quantitative estimates. The laboratory duplicate precision criterion of 20 percent for values greater than five times the CRDL (or ± the CRDL for results less than five times the CRDL) was exceeded for these analytes. The lack of precision may be due to heterogeneity of samples of similar matrix. These results have been marked "J" to indicate that they are quantitative estimates.
- The laboratory reported results for metals and cyanide detected in samples at concentrations greater than the instrument detection limit, but less than the CRDL with "B" flags. EDQ has flagged results for metals and cyanide below the CRDL with "J" qualifiers to indicate that they are quantitative estimates.

5.0 *SUMMARY*

The organic and inorganic analyses described in this analytical data validation report were performed acceptably, but required qualifying statements. The aspects of the data, which required qualification, are identified in this report.

Attachment 2
Methodology References

METHODOLOGY REFERENCES

Analysis	Reference
Low Concentration Volatile Organic Compounds	USEPA Contract Laboratory Program, Statement of Work for Organics Analysis, Multi-media, Multi-concentration, OLC02.
Semivolatile Organic Compounds	USEPA Contract Laboratory Program, Statement of Work for Organics Analysis, Multi-media, Multi-concentration, OLM03.
Pesticide/PCB Constituents	USEPA Contract Laboratory Program, Statement of Work for Organics Analysis, Multi-media, Multi-concentration, OLM03.
TAL Metals and Cyanide	USEPA Contract Laboratory Program, Statement of Work for Inorganics Analysis, Multi-media, Multi-concentration, ILM04.
Oil and Grease	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), Third Edition, Final (Promulgated) Updates II, IIA, and III June 1997, Method 9070
Nitrate	Method 353.2, "Methods for Chemical Analysis of Water and Wastes", USEPA 600/4-79-020
Sulfate	Method 375.4, "Methods for Chemical Analysis of Water and Wastes", USEPA 600/4-79-020

Analytical Data Validation Report
Samples Collected March 1999
Cherry Point
(CTO-64)
Quanterra Sample Delivery Group C19120

8 July 1999

Shawne M. Rodgers
President

Environmental Data Quality, Inc.
967 East Swedesford Road Suite 401
Exton, Pennsylvania 19341

File No.: 601.70.01

List of Tables *Following Page*

Table 1-1 Summary of Sample Data Reviewed *1*

EXECUTIVE SUMMARY III

1.0 INTRODUCTION 1

2.0 DATA DELIVERABLE COMPLETENESS AND METHOD COMPLIANCE 2

2.1 DATA DELIVERABLE COMPLETENESS 2
2.1.1 Organic Analyses 2
2.1.2 Inorganic Analyses 2

2.2 METHOD COMPLIANCE 2
2.2.1 Organic Analyses 2
2.2.2 Inorganic Analyses 2

3.0 ORGANIC DATA 3

3.1 DATA QUALIFIERS 3

4.0 INORGANIC DATA 5

4.1 DATA QUALIFIERS 5

5.0 SUMMARY 7

ATTACHMENT 1 ANALYSIS RESULTS FORMS

ATTACHMENT 2 METHODOLOGY REFERENCES

EXECUTIVE SUMMARY

This analytical data validation report is based on the review of data generated for ground water samples. The sample locations, laboratory identification numbers, sample collection dates, sample matrix, and analyses performed are presented in Table 1-1. The samples are presented in order of collection date.

The samples were analyzed for volatile organic compounds, semivolatile organic compounds, pesticide/PCB constituents, total metals, and miscellaneous parameters: cyanide, nitrate, and sulfate, as specified in Table 1-1. Quanttera Incorporated, North Canton, Ohio, performed all analyses.

The sample analyses were performed in accordance with the procedures outlined in the OLC02 and OLM03 (and ILM04) USEPA Contract Laboratory Program (CLP) Statement of Work for Organic (and Inorganic) Analysis. Results have been validated or qualified according to general guidance provided in the Region IV modifications to "Laboratory Data Validation Functional Guidelines for Validating Organic (and Inorganic) Analyses", USEPA 9/94 (and 4/93). These documents specify procedures for validating data generated for CLP analyses. The requirements specified in the method were also used to evaluate the non-CLP data.

The organic and inorganic analyses were performed acceptably, but required qualifying statements. The aspects of the data, which required qualification, are identified in this report.

Results for methylene chloride, heptachlor, and various metals in some of the samples were qualified due to the presence of these analytes in associated laboratory method and/or field blanks. Other qualifications to the sample data were due primarily to the presence of matrix interferences, as evidenced by serial dilution results.

Analysis results forms presenting the validated and qualified results for the samples are included in Attachment 1.

Table 1-1 Samples For Data Validation Review
Cherry Point
CTO-64
March 1999 Sampling
Quanterra Sample Delivery Group C19120

SAMPLE I.D.	LAB I.D.	DATE COLLECTED	MATRIX	VCTCL	VCLOW	SVTCL	PSPCB	MCYAN	NO3	SO4
012MW01	A9C190120001	3/18/99	Ground Water		X	X	X	X	X	X
012MW02	A9C190120002	3/18/99	Ground Water		X	X	X	X	X	X
012MW03	A9C190120003	3/18/99	Ground Water		X	X	X	X	X	X
012MW04	A9C190120004	3/18/99	Ground Water		X	X	X	X	X	X
012MW05	A9C190120005	3/18/99	Ground Water		X	X	X	X	X	X
012TB03	A9C190120006	3/18/99	Trip Blank		X					

VCTCL TCL VOLATILE ORGANIC COMPOUNDS
VCLOW LOW CONCENTRATION VOLATILES BY CLP
SVTCL TCL SEMIVOLATILE ORGANIC COMPOUNDS
SVLOW LOW CONCENTRATION SEMIVOLATILES BY CLP
PSPCB TCL PESTICIDE/PCBS
PSLOW LOW CONCENTRATION PESTICIDES/PCBS BY CLP
MCYAN TAL METALS AND CYANIDE
NO3 NITRATE
SO4 SULFATE

2.0 *DATA DELIVERABLE COMPLETENESS AND METHOD COMPLIANCE*

During the course of the quality assurance data validation review, an evaluation of the completeness of the data deliverables provided by the laboratory and conformance to the specified methods was performed. Data deliverables that were determined to be either incomplete or incorrect were required to be resubmitted by the laboratory. Deviations from the protocols in the required analysis methods were evaluated to determine the impact, if any on the analysis results reported by the laboratory. Qualifications to the data resulting from method deviations are discussed fully for the samples receiving the validation review in Sections 3.0 and 4.0.

2.1 *DATA DELIVERABLE COMPLETENESS*

The following deliverables issues were identified during the data validation review.

2.1.1 *Organic Analyses*

- The data deliverables were complete.

2.1.2 *Inorganic Analyses*

- The data deliverables were complete.

2.2 *METHOD COMPLIANCE*

The following are considered to be deviations from the specified methods. Qualifications to affected samples are discussed in Section 3.0 and 4.0.

2.2.1 *Organic Analyses*

- Based on the deliverables reviewed, there were no deviations to the organic methodologies used for analysis.

2.2.2 *Inorganic Analyses*

- Based on the deliverables reviewed, there were no deviations to the inorganic methodologies used for analysis.

3.0 ORGANIC DATA

The samples were analyzed for volatile organic compounds, semivolatile organic compounds, and pesticide/PCB constituents, as indicated in Table 1-1.

For the semivolatile fraction determined by Gas Chromatography/Mass Spectrometry, library searches were performed to "tentatively identify" chromatographic peaks whose characteristics did not match those of targeted compounds. Library searches were performed for up to twenty semivolatile extraneous peaks.

The findings offered in this report are based on a review of the analytical data reported according to a CLP-equivalent deliverable format.

The data validation included an assessment of the following items: chain of custody documentation, holding times, laboratory method, field, and trip blank results, surrogate recoveries, MS/MSD analysis results, field duplicate results, bromofluorobenzene (BFB) and decafluorotriphenylphosphine (DFTPP) mass tuning results, initial and continuing calibrations, internal standard performance, endrin/DDT breakdown, retention time shifts for pesticide/PCB surrogate compounds, retention time windows for pesticide/PCB constituents, pesticide cleanup check sample results, qualitative identification, and quantitation of results.

The organic analyses were performed acceptably, but require qualifying statements. It is recommended that the data only be used with the qualifying statements presented below. Any data that are not discussed in this report should be considered qualitatively and quantitatively valid, based on the items evaluated. Validated and/or qualified results for the samples are provided in Attachment 1.

3.1 DATA QUALIFIERS

- The positive results reported for methylene chloride for samples 012MW02 and 012MW03, and heptachlor for all samples except 012MW04 are qualitatively invalid due to the presence of this compound in associated laboratory method and/or field blanks. USEPA protocol requires positive results for common contaminants, such as methylene chloride, that are less than or equal to ten times the associated blank contamination level, to be considered qualitatively invalid. Results for uncommon contaminants, such as heptachlor, that are less than five times their blank level are also considered invalid. This has been indicated by replacing results that

are less than the quantitation limit with the quantitation limit. Results that are greater than the quantitation limits are marked "U".

- As required by CLP protocol, all volatile and semivolatile TICs have been reported with "J" qualifiers to indicate that they are quantitative estimates. EDQ has reported only those TIC results which have not been determined to be laboratory or field artifacts, and where possible has grouped TIC of similar classification.
- As required by CLP protocol, all compounds which were qualitatively identified at concentrations below their respective Contract Required Quantitation Limits (CRQLs) have been marked with "J" qualifiers to indicate that they are quantitative estimates.

4.0 *INORGANIC DATA*

The samples were analyzed for total metals, and miscellaneous paramters: cyanide, nitrate and sulfate, as indicated in Table 1-1.

The data validation included an assessment of the following items: chain of custody documentation, holding times, equipment, field, and laboratory method blank results, initial and continuing calibrations, matrix spike analysis results, laboratory and field duplicate analysis results, Inductively Coupled Plasma (ICP) Emission Spectroscopy interference check sample results, ICP serial dilution results, laboratory control sample results, quantitation limit standard analysis results, qualitative identification, and quantitation of results.

The inorganic analyses were performed acceptably, but require qualifying statements. It is recommended that the data only be used with the qualifying statements presented below. Any data which are not discussed in this report should be considered qualitatively and quantitatively valid, based on the items evaluated. Validated and/or qualified results for the samples are provided in Attachment 1.

4.1 *DATA QUALIFIERS*

- Positive results reported for the metals in the samples presented on page 6 are qualitatively invalid due to their presence in the associated field and laboratory method blanks. USEPA protocol requires positive results for elemental contaminants, that are less than or equal to five times the blank contamination level, to be considered qualitatively invalid. This has been indicated by placing "B" qualifiers next to the quantitative results for these metals in the samples.

Analyte	Affected Samples
Antimony	012MW01, 012MW02, 012MW03, 012MW04, 012MW05
Cadmium	012MW01, 012MW02, 012MW05
Chromium	012MW01, 012MW05
Cobalt	012MW01, 012MW02, 012MW03, 012MW04, 012MW05
Copper	012MW03, 012MW04
Manganese	012MW01
Nickel	012MW05
Vanadium	012MW01, 012MW02, 012MW03, 012MW04, 012MW05

- Positive iron results for the samples should be considered quantitative estimates. The ICP serial dilution criterion was exceeded for this analyte. The lack of precision may be due to the presence of interferences for samples of similar matrix. The iron results have been marked with "J" qualifiers to indicate that they are quantitative estimates.
- The laboratory reported results for metals and cyanide detected in samples at concentrations greater than the instrument detection limit, but less than the CRDL with "B" flags. EDQ has flagged results for metals and cyanide below the CRDL with "J" qualifiers to indicate that they are quantitative estimates.

5.0 SUMMARY

The organic and inorganic analyses described in this analytical data validation report were performed acceptably, but required qualifying statements. The aspects of the data, which required qualification, are identified in this report.

Appendix G
Human Health Risk Assessment Tables

Appendix G.1
Summary of Potential Exposure Pathways and Risk Scenarios

TABLE 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	2,200,000	N	1,670	NCSSL	NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	3,200	C	0.953	NCSSL	NO	DLBSL
79005	1,1,2-Trichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	11,000	C	3.34	NCSSL	NO	DLBSL
75343	1,1-Dichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	780,000	N	3,820	NCSSL	NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,100	C	44.5	NCSSL	NO	DLBSL
106934	1,2-Dibromoethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	7.5	C	0.00197	NCSSL	YES	DLASL
107062	1,2-Dichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	7,000	C	1.84	NCSSL	NO	DLBSL
540590	1,2-Dichloroethene (total)	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	70,000	N	380	NCSSL	NO	DLBSL
78875	1,2-Dichloropropane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	9,400	C	2.88	NCSSL	NO	DLBSL
78933	2-Butanone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	4,700,000	N	692	NCSSL	NO	DLBSL
591786	2-Hexanone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	310,000	N			NO	DLBSL
108101	4-Methyl-2-pentanone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	630,000	N			NO	DLBSL
67641	Acetone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	780,000	N	2,810	NCSSL	NO	DLBSL
71432	Benzene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	12,000	C	5.62	NCSSL	NO	DLBSL
75274	Bromodichloromethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	10,000	C	3.13	NCSSL	NO	DLBSL
75252	Bromoform	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	81,000	C	1.25	NCSSL	NO	DLBSL
74839	Bromomethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	11,000	N			NO	DLBSL
75150	Carbon disulfide	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	780,000	N	4,940	NCSSL	NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	4,900	C	2.74	NCSSL	NO	DLBSL
108907	Chlorobenzene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	160,000	N	438	NCSSL	NO	DLBSL
75003	Chloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	220,000	C	13,600	NCSSL	NO	DLBSL
67663	Chloroform	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	78,000	N	1.01	NCSSL	NO	DLBSL
74873	Chloromethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	49,000	C			NO	DLBSL
156592	cis-1,2-Dichloroethene	ND		ND		µg/kg		0/2	9.5 - 13	13	N/A	78,000	N	350	NCSSL	NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	6,400	N	0.958	NCSSL	NO	DLBSL
124481	Dibromochloromethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	7,600	C	1.71	NCSSL	NO	DLBSL
100414	Ethylbenzene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	780,000	N	241	NCSSL	NO	DLBSL
75092	Methylene chloride	1.5	J	310	J	µg/kg	012SS03	3/16	9.5 - 13	310	N/A	85,000	C	22	NCSSL	NO	BSL
100425	Styrene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,600,000	N	2,240	NCSSL	NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	12,000	C	7.42	NCSSL	NO	DLBSL
108883	Toluene	7.6	J	7.6	J	µg/kg	012SS01	1/16	9.5 - 13	8	N/A	1,600,000	N	7,270	NCSSL	NO	BSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/kg		0/2	9.5 - 13	13	N/A	160,000	N	380	NCSSL	NO	DLBSL
542756	trans-1,3-Dichloropropene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	6,400	N	0.958	NCSSL	NO	DLBSL
79016	Trichloroethene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	47,000	N	18.3	NCSSL	NO	DLBSL

TABLE 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
75014	Vinyl chloride	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	90 C	0.0952	NCSSL	NO	DLBSL
1330207	Xylene, total	12		12		µg/kg	012SS01	1/16	9.5 - 13	12	N/A	16,000,000 N	4,690	NCSSL	NO	BSL
120821	1,2,4-Trichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		78,000 N	2,610	NCSSL	NO	DLBSL
95501	1,2-Dichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		700,000 N	7,270	NCSSL	NO	DLBSL
541731	1,3-Dichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		230,000 N	23,700	NCSSL	NO	DLBSL
106467	1,4-Dichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		27,000 C	1,240	NCSSL	NO	DLBSL
108601	2,2'-Oxybis(1-chloropropane)	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A	N/A		NO	NTX
95954	2,4,5-Trichlorophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		780,000 N	3,940	NCSSL	NO	DLBSL
88062	2,4,6-Trichlorophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		58,000 C	200	SSL	NO	DLBSL
120832	2,4-Dichlorophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		23,000 N	1,000	SSL	NO	DLBSL
105679	2,4-Dimethylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		160,000 N	1,150	NCSSL	NO	DLBSL
51285	2,4-Dinitrophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		16,000 N	300	SSL	NO	DLBSL
121142	2,4-Dinitrotoluene	ND		ND		µg/kg		0/15	360 - 4100	4,100		16,000 N	0.8	SSL	NO	DLBSL
606202	2,6-Dinitrotoluene	ND		ND		µg/kg		0/15	360 - 4100	4,100		7,800 N	0.7	SSL	NO	DLBSL
91587	2-Chloronaphthalene	ND		ND		µg/kg		0/15	360 - 4100	4,100		630,000 N			NO	DLBSL
95578	2-Chlorophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		39,000 N	1.2	NCSSL	NO	DLBSL
91576	2-Methylnaphthalene	44	J	44	J	µg/kg	012SS01	1/15	360 - 4100	44		160,000 N	585	NCSSL	NO	BSL
95487	2-Methylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		390,000 N	204	NCSSL	NO	DLBSL
88744	2-Nitroaniline	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A	N/A		NO	NTX
88755	2-Nitrophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		63,000 N			NO	DLBSL
91941	3,3'-Dichlorobenzidine	ND		ND		µg/kg		0/15	360 - 4100	4,100		1,400 C	7	SSL	YES	DLASL
99092	3-Nitroaniline	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A	N/A		NO	NTX
534521	4,6-Dinitro-2-methylphenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		7,800 N			YES	DLASL
101553	4-Bromophenyl-phenylether	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A	N/A		NO	NTX
59507	4-Chloro-3-methylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		390,000 N			NO	DLBSL
106478	4-Chloroaniline	ND		ND		µg/kg		0/15	360 - 4100	4,100		31,000 N	700	SSL	NO	DLBSL
7005723	4-Chlorophenyl-phenylether	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A	N/A		NO	NTX
106445	4-Methylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		39,000 N	17.4	NCSSL	NO	DLBSL
100016	4-Nitroaniline	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A	N/A		NO	NTX
100027	4-Nitrophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		63,000 N			NO	DLBSL
83329	Acenaphthene	ND		ND		µg/kg		0/15	360 - 4100	4,100		470,000 N	8,160	NCSSL	NO	DLBSL
208968	Acenaphthylene	ND		ND		µg/kg		0/15	360 - 4100	4,100		160,000 N	11,400	NCSSL	NO	DLBSL
120127	Anthracene	ND		ND		µg/kg		0/15	360 - 4100	4,100		2,300,000 N	995,000	NCSSL	NO	DLBSL

TABLE 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
56553	Benzo(a)anthracene	ND		ND		µg/kg		0/15	360 - 4100	4,100		870	C	358	NCSSL	YES	DLASL
50328	Benzo(a)pyrene	ND		ND		µg/kg		0/15	360 - 4100	4,100		87	C	91.1	NCSSL	YES	DLASL
205992	Benzo(b)fluoranthene	47	J	47	J	µg/kg	012SS02	1/15	360 - 4100	47		870	C	585	NCSSL	NO	BSL
191242	Benzo(g,h,i)perylene	47	J	47	J	µg/kg	012SS02	1/15	360 - 4100	47		230,000	N	6,720,000	NCSSL	NO	BSL
207089	Benzo(k)fluoranthene	ND		ND		µg/kg		0/15	360 - 4100	4,100		8,700	C	585	NCSSL	NO	DLBSL
111911	bis(2-Chloroethoxy)methane	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A		N/A		NO	NTX
111444	bis(2-Chloroethyl)ether	ND		ND		µg/kg		0/15	360 - 4100	4,100		580	C	0.171	NCSSL	YES	DLASL
117817	bis(2-Ethylhexyl)phthalate	46	J	470		µg/kg	012SS09 012SS10	11/15	360 - 4100	470		46,000	C	6,670	NCSSL	NO	BSL
85687	Butylbenzylphthalate	49	J	49	J	µg/kg	012SS17	1/15	360 - 4100	49		1,600,000	N	27,800	NCSSL	NO	BSL
86748	Carbazole	ND		ND		µg/kg		0/15	360 - 4100	4,100		32,000	C	585	NCSSL	NO	DLBSL
218019	Chrysene	39	J	39	J	µg/kg	012SS02	1/15	360 - 4100	39		87,000	C	39,800	NCSSL	NO	BSL
84742	Di-n-butylphthalate	41	J	43	J	µg/kg	012SS16	2/15	360 - 4100	43		780,000	N	24,800	NCSSL	NO	BSL
117840	Di-n-octyl phthalate	ND		ND		µg/kg		0/15	360 - 4100	4,100		160,000	N	233,000,000	NCSSL	NO	DLBSL
53703	Dibenz(a,h)anthracene	ND		ND		µg/kg		0/15	360 - 4100	4,100		87	C	168	NCSSL	YES	DLASL
132649	Dibenzofuran	ND		ND		µg/kg		0/15	360 - 4100	4,100		31,000	N			NO	DLBSL
84662	Diethylphthalate	ND		ND		µg/kg		0/15	360 - 4100	4,100		6,300,000	N	28,200	NCSSL	NO	DLBSL
131113	Dimethyl phthalate	ND		ND		µg/kg		0/15	360 - 4100	4,100		78,000,000	N			NO	DLBSL
206440	Fluoranthene	53	J	53	J	µg/kg	012SS02	1/15	360 - 4100	53		310,000	N	276,000	NCSSL	NO	BSL
86737	Fluorene	ND		ND		µg/kg		0/15	360 - 4100	4,100		310,000	N	44,300	NCSSL	NO	DLBSL
118741	Hexachlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		400	C	32.1	NCSSL	YES	DLASL
87683	Hexachlorobutadiene	ND		ND		µg/kg		0/15	360 - 4100	4,100		1,600	N	2,000	SSL	YES	DLASL
77474	Hexachlorocyclopentadiene	ND		ND		µg/kg		0/15	360 - 4100	4,100		47,000	N	200,000	NCSSL	NO	DLBSL
67721	Hexachloroethane	ND		ND		µg/kg		0/15	360 - 4100	4,100		7,800	N	500	SSL	NO	DLBSL
193395	Indeno(1,2,3-cd)pyrene	ND		ND		µg/kg		0/15	360 - 4100	4,100		870	C	3,260	NCSSL	YES	DLASL
78591	Isophorone	ND		ND		µg/kg		0/15	360 - 4100	4,100		670,000	C	182	NCSSL	NO	DLBSL
621647	n-Nitroso-di-n-propylamine	ND		ND		µg/kg		0/15	360 - 4100	4,100		91	C	0.05	SSL	YES	DLASL
86306	n-Nitrosodiphenylamine	ND		ND		µg/kg		0/15	360 - 4100	4,100		130,000	C	1,000	SSL	NO	DLBSL
91203	Naphthalene	ND		ND		µg/kg		0/15	360 - 4100	4,100		160,000	N	585	NCSSL	NO	DLBSL
98953	Nitrobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		3,900	N	100	SSL	YES	DLASL
87865	Pentachlorophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		5,300	C	23.1	NCSSL	YES	DLASL
85018	Phenanthrene	44	J	44	J	µg/kg	012SS02	1/15	360 - 4100	44		230,000	N	59,600	NCSSL	NO	BSL
108952	Phenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		4,700,000	N	1,750	NCSSL	NO	DLBSL
129000	Pyrene	53	J	53	J	µg/kg	012SS02	1/15	360 - 4100	53		230,000	N	286,000	NCSSL	NO	BSL

TABLE 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
72548	4,4'-DDD	0.86	J	6.1	J	µg/kg	012SS08	6/15	3.6 - 21	6.1		2,700	C	129	NCSSL	NO	BSL
72559	4,4'-DDE	0.45	J	3.7	J	µg/kg	012SS04	10/15	3.6 - 20	3.7		1,900	C	129	NCSSL	NO	BSL
50293	4,4'-DDT	1.5	J	13	J	µg/kg	012SS04	7/15	3.6 - 20	13		1,900	C	1,360	NCSSL	NO	BSL
309002	Aldrin	ND		ND		µg/kg		0/15	1.8 - 10	10		38	C	500	SSL	NO	DLBSL
319846	alpha-BHC	0.034	J	0.33	J	µg/kg	012SS17	5/15	1.8 - 10	0.33		100	C	0.5	SSL	NO	BSL
57749	alpha-Chlordane	0.24	J	51	J	µg/kg	012SS04	11/15	1.8 - 10	51		1,800	C	27.8	NCSSL	NO	BSL
12674112	Aroclor-1016	ND		ND		µg/kg		0/15	36 - 210	210		5,500	C			NO	DLBSL
11104282	Aroclor-1221	ND		ND		µg/kg		0/15	72 - 420	420		320	C			YES	DLASL
11141165	Aroclor-1232	ND		ND		µg/kg		0/15	36 - 210	210		320	C			NO	DLBSL
53469219	Aroclor-1242	ND		ND		µg/kg		0/15	36 - 210	210		320	C			NO	DLBSL
12672296	Aroclor-1248	ND		ND		µg/kg		0/15	36 - 210	210		320	C			NO	DLBSL
11097691	Aroclor-1254	ND		ND		µg/kg		0/15	36 - 210	210		156	C			NO	DLBSL
11096825	Aroclor-1260	14	J	450	J	µg/kg	012SS11	6/15	36 - 210	450		320	C			YES	ASL
319857	beta-BHC	ND		ND		µg/kg		0/15	1.8 - 10	10		350	C	3	SSL	NO	DLBSL
319868	delta-BHC	0.094	J	0.18	J	µg/kg	012SS16	3/15	1.8 - 10	0.18		350	C			NO	BSL
60571	Dieldrin	0.53	J	16		µg/kg	012SS16	6/15	3.6 - 21	16		40	C	1.13	NCSSL	NO	BSL
959988	Endosulfan I	1.5	J	1.5	J	µg/kg	012SS08	1/15	1.8 - 10	1.5		47,000	N	18,000	SSL	NO	BSL
33213659	Endosulfan II	ND		ND		µg/kg		0/15	3.6 - 21	21		47,000	N	18,000	SSL	NO	DLBSL
1031078	Endosulfan sulfate	0.17	J	15		µg/kg	012SS10	12/15	3.6 - 21	15		47,000	N			NO	BSL
72208	Endrin	0.64	J	4.8		µg/kg	012SS08	6/15	3.6 - 21	4.8		2,300	N	440	NCSSL	NO	BSL
7421934	Endrin aldehyde	1.9	J	3.7	J	µg/kg	012SS11	2/15	3.6 - 21	3.7		2,300	N	440	NCSSL	NO	BSL
53494705	Endrin ketone	3.5	J	3.5	J	µg/kg	012SS11	1/15	3.6 - 21	3.5		2,300	N	440	NCSSL	NO	BSL
58899	gamma-BHC (Lindane)	0.15	J	0.15	J	µg/kg	012SS10	1/15	1.8 - 10	0.15		490	C	6.2	NCSSL	NO	BSL
12789036	gamma-Chlordane	1.3	J	53		µg/kg	012SS11	13/15	1.8 - 10	53		1,800	C	27.8	NCSSL	NO	BSL
76448	Heptachlor	0.074	J	0.53	J	µg/kg	012SS04	5/15	1.8 - 10	0.53		140	C	2.4	NCSSL	NO	BSL
1024573	Heptachlor epoxide	0.098	J	12		µg/kg	012SS04	9/15	1.8 - 10	12		70	C	6.67	NCSSL	NO	BSL
72435	Methoxychlor	ND		ND		µg/kg		0/15	18 - 100	100		39,000	N	56,100	NCSSL	NO	DLBSL
8001352	Toxaphene	ND		ND		µg/kg		0/15	180 - 1000	1,000		580	C	59.5	NCSSL	YES	DLASL

TABLE 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
35822469	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	210		210		pg/g	012S15	1/3	5.4 - 5.7	2.1			1.45	NCSSL		
55673897	1,2,3,4,6,7,8-Heptachlorodibenzofuran	5.2	J	5.2	J	pg/g	012S15	1/3	0.22 - 5.7	0.052			1.45	NCSSL		
55976897	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.7	J	0.7	J	pg/g	012S15	1/3	0.3 - 5.7	0.007			1.45	NCSSL		
39227286	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	3.5	J	3.5	J	pg/g	012S15	1/3	0.23 - 5.7	0.35			0.145	NCSSL		
70648269	1,2,3,4,7,8-Hexachlorodibenzofuran	1.1	J	1.1	J	pg/g	012S15	1/3	0.2 - 5.7	0.11			0.145	NCSSL		
57653857	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.31	J	7.3	J	pg/g	012S15	2/3	0.26 - 5.7	0.73			0.145	NCSSL		
57117449	1,2,3,6,7,8-Hexachlorodibenzofuran	0.85	J	0.85	J	pg/g	012S15	1/3	0.2 - 5.7	0.085			0.145	NCSSL		
19408743	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.27	JQ	9.3	J	pg/g	012S15	3/3	5.4 - 5.7	0.93			0.145	NCSSL		
72918219	1,2,3,7,8,9-Hexachlorodibenzofuran	ND		0.5	U	pg/g		0/3	0.26 - 0.69	0.05			0.29	NCSSL		
40321764	1,2,3,7,8-Pentachlorodebenzo-p-dioxin	1.3	J	1.3	J	pg/g	012S15	1/3	0.29 - 5.7	0.65			0.029	NCSSL		
57117416	1,2,3,7,8-Pentachlorodibenzo furan	ND		0.56	U	pg/g		0/3	0.26 - 0.56	0.03			0.29	NCSSL		
60851345	2,3,4,6,7,8-Hexachlorodibenzofuran	0.53	J	0.53	J	pg/g	012S15	1/3	0.23 - 5.7	0.053			0.145	NCSSL		
57117314	2,3,4,7,8-Pentachlorodibenzofuran	0.33	J	0.33	J	pg/g	012S15	1/3	0.2 - 5.7	0.165			0.029	NCSSL		
1746016	2,3,7,8-TCDD (dioxin)	0.43	J	0.43	J	pg/g	012S15	1/3	0.23 - 1.1	0.43			0.0145	NCSSL		
51207319	2,3,7,8-Tetrachlorodibenzofuran	ND		1.1	U	pg/g		0/3	0.43 - 1.1	0.1			0.145	NCSSL		
1746016	2,3,7,8-TCDD (dioxin) total equivalents					pg/g				5.85		4.3	0.0145	NCSSL	YES	ASL
7429905	Aluminum	2,840		21,600	J	mg/kg	012S17	16/16	4.1 -4.8	21,600	10,162	7,800 N			YES	ASL
7440360	Antimony	0.59	J	14.5	J	mg/kg	012S17	8/16	0.47 - 0.7	14.5		3.1 N	5.42	NCSSL	YES	ASL
7440382	Arsenic	0.7	J	2.3	J	mg/kg	012S17	14/16	0.64 - 1.7	2.3	3.9	0.43 C	26.2	NCSSL	NO	BKG
7440393	Barium	7.3	J	49.4	J	mg/kg	012S10	16/16	0.04 - 28.5	49.4	23.0	550 N	848	NCSSL	NO	BSL
7440417	Beryllium	0.05	J	0.08	J	mg/kg	012S10	2/16	0.02 - 0.12	0.08	0.44	16 N	8.8	NCSSL	NO	BSL
7440439	Cadmium	0.92	J	12.1		mg/kg	012S17	14/16	0.04 - 0.05	12.1	1.12	7.8 N	2.7	NCSSL	YES	ASL
7440702	Calcium	1,570	J	85,800		mg/kg	012S15	16/16	2 - 2.3	85,800	512	N/A			NO	NUT
18540299	Chromium (assumed VI)	4.4		40.9		mg/kg	012S17	16/16	0.13 - 0.15	40.9	17.0	23 N	27.2	NCSSL	YES	ASL
7440484	Cobalt	0.5	J	0.5	J	mg/kg	012S01	1/16	0.31 - 0.92	0.5	2.38	160 N			NO	BSL
7440508	Copper	12.7		667	J	mg/kg	012S18	14/16	0.13 - 0.8	667	3.76	310 N	704	NCSSL	YES	ASL
7439896	Iron	1,600		6,920		mg/kg	012S16	16/16	2.2 - 2.6	6,920	5,960	4,700 N			YES	ASL
7439921	Lead	2.4		705		mg/kg	012S16	16/16	0.28 - 0.33	705	10.5	400	270	NCSSL	YES	ASL
7439954	Magnesium	202	J	1,810		mg/kg	012S18	16/16	2 - 2.4	1,810	422	N/A			NO	NUT
7439965	Manganese	5.8	J	97.7	J	mg/kg	012S18	16/16	0.04 - 0.05	97.7	16.7	160 N	65.2	NCSSL	NO	BSL
7439976	Mercury	0.04	J	0.3		mg/kg	012S18	15/16	0.04	0.3	0.13	2.3 N	0.0154	NCSSL	NO	BSL
7440020	Nickel	1.1	J	21.6		mg/kg	012S17	16/16	0.28 - 0.33	21.6	6.90	160 N	56.4	NCSSL	NO	BSL
7440097	Potassium	84.7	J	370	J	mg/kg	012S16	16/16	7.2 - 8.4	370	482	N/A	151	NCSSL	NO	NUT

TABLE 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7782492	Selenium	0.96	J	1	J	mg/kg	012S10	2/16	0.67 - 0.78	1	0.56	39	N	12.2	NCSSL	NO	BSL
7440224	Silver	0.17	J	0.87	J	mg/kg	012SS04	7/16	0.15 - 1.1	0.87	0.82	39	N	0.223	NCSSL	NO	BSL
7440235	Sodium	20.6	J	93.9	J	mg/kg	012S15	8/16	19.1 - 22.4	93.9	51.0	N/A				NO	NUT
7440280	Thallium	ND		ND				0/16	0.75 - 0.88	0.88	0.96	0.55	N	0.512	NCSSL	NO	DLBKG
7440622	Vanadium	5.6	J	20.8		mg/kg	012S10	16/16	0.11 - 0.13	20.8	19.2	55	N	6,000	SSL	NO	BSL
7440666	Zinc	3.7	J	569		mg/kg	012S17	16/16	0.88 - 1	569	11.3	2,300	N	1,100	NCSSL	NO	BSL

(1) Minimum/maximum detected concentration. For dioxins, sample quantitation limit (SQL) is given in maximum detected concentration column for dioxin congeners which were not detected. SQL is from only sample in which dioxins were detected.
(2) Background values derived from statistical analysis. Two times arithmetic mean site-wide background, Appendix B.1 of RI/FS guidance.
(3) EPA Region III RBC Table 9/25/01, Residential Soil RBC
used RBC for pyrene as surrogate for benzo(g,h,i)pyrene and phenanthrene.
used RBC for napthalene as surrogate for acenapthylene.
used RBC for chlordane as surrogate for alpha-chlordane and gamma-chlodane
used RBC for endosulfan as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
used RBC for endrin as surrogate for endrin aldehyde and endrin ketone.
used RBC for 4-nitrophenol as surrogate for 2-nitrophenol.
used RBC for 3-methylphenol as surrogate for 4-chloro-3-methylphenol.
used RBC for 1,3-dichloropropene for cis-1,3-dichloropropene and trans-1,3-dichloropropene
used RBC for mercuric chloride for mercury
The sum of the 2,3,7,8-TCDD equivelant concentrations (shown in conc. used for screening column) compared to screening value.
Residential Soil Screening Level for lead.
(4) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Levels (BSL)
Below Background (BKG)
Detection Limit Below Screening Levels (DLBSL)
Detection Limit Below Background (DLBKG)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
NCSSL = North Carolina Soil Screening Concentration Level Rev. 9/13/1999.
SSL = Soil Screening Level, Migration to Groundwater, DAF of 20, EPA Soil Screening Guidance, 1996.
J = Estimated Value
U = Not Detected, value given is detection limit
C = Carcinogenic
N = Non-Carcinogenic
ND = Not Detected

TABLE 2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,200,000 S			NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	600 C			NO	DLBSL
79005	1,1,2-Trichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,000 C			NO	DLBSL
75343	1,1-Dichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	130,000 N			NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	70 C			NO	DLBSL
106934	1,2-Dibromoethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	N/A			NO	NTX
107062	1,2-Dichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	400 C			NO	DLBSL
540590	1,2-Dichloroethene (total)	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,200,000 S			NO	DLBSL
78875	1,2-Dichloropropane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,500 C			NO	DLBSL
78933	2-Butanone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	N/A			NO	NTX
591786	2-Hexanone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	N/A			NO	NTX
108101	4-Methyl-2-pentanone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	N/A			NO	NTX
67641	Acetone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	100,000,000 S			NO	DLBSL
71432	Benzene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	800 C			NO	DLBSL
75274	Bromodichloromethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	3,000,000 S			NO	DLBSL
75252	Bromoform	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	53,000 C			NO	DLBSL
74839	Bromomethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,000 N			NO	DLBSL
75150	Carbon disulfide	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	720,000 S			NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	300 C			NO	DLBSL
108907	Chlorobenzene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	13,000 N			NO	DLBSL
75003	Chloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	N/A			NO	NTX
67663	Chloroform	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	300 C			NO	DLBSL
74873	Chloromethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	N/A			NO	NTX
156592	cis-1,2-Dichloroethene	ND		ND		µg/kg		0/2	9.5 - 13	13	N/A	1,200,000 S			NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	100 C			NO	DLBSL
124481	Dibromochloromethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,300,000 S			NO	DLBSL
100414	Ethylbenzene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	400,000 S			NO	DLBSL
75092	Methylene chloride	1.5	J	310	J	µg/kg	012SS03	3/16	9.5 - 13	310	N/A	13,000 C			NO	BSL
100425	Styrene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,500,000 S			NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	11,000 C			NO	DLBSL
108883	Toluene	7.6	J	7.6	J	µg/kg	012SS01	1/16	9.5 - 13	8	N/A	650,000 N			NO	BSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/kg		0/2	9.5 - 13	13	N/A	3,100,000 S			NO	DLBSL
542756	trans-1,3-Dichloropropene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	100 C			NO	DLBSL
79016	Trichloroethene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	5,000 C			NO	DLBSL

TABLE 2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
75014	Vinyl chloride	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	30 C			NO	DLBSL
1330207	Xylene, total	12		12		µg/kg	012SS01	1/16	9.5 - 13	12	N/A	410,000 S			NO	BSL
120821	1,2,4-Trichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		3,200,000 S			NO	DLBSL
95501	1,2-Dichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		560,000 S			NO	DLBSL
541731	1,3-Dichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
106467	1,4-Dichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
108601	2,2'-Oxybis(1-chloropropane)	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
95954	2,4,5-Trichlorophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
88062	2,4,6-Trichlorophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		200,000 C			NO	DLBSL
120832	2,4-Dichlorophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
105679	2,4-Dimethylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
51285	2,4-Dinitrophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
121142	2,4-Dinitrotoluene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
606202	2,6-Dinitrotoluene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
91587	2-Chloronaphthalene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
95578	2-Chlorophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		53,000,000 S			NO	DLBSL
91576	2-Methylnaphthalene	44	J	44	J	µg/kg	012SS01	1/15	360 - 4100	44		N/A			NO	NTX
95487	2-Methylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
88744	2-Nitroaniline	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
88755	2-Nitrophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
91941	3,3'-Dichlorobenzidine	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
99092	3-Nitroaniline	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
534521	4,6-Dinitro-2-methylphenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
101553	4-Bromophenyl-phenylether	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
59507	4-Chloro-3-methylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
106478	4-Chloroaniline	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
7005723	4-Chlorophenyl-phenylether	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
106445	4-Methylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
100016	4-Nitroaniline	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
100027	4-Nitrophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
83329	Acenaphthene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
208968	Acenaphthylene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
120127	Anthracene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX

TABLE 2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
56553	Benzo(a)anthracene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
50328	Benzo(a)pyrene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
205992	Benzo(b)fluoranthene	47	J	47	J	µg/kg	012SS02	1/15	360 - 4100	47		N/A			NO	NTX
191242	Benzo(g,h,i)perylene	47	J	47	J	µg/kg	012SS02	1/15	360 - 4100	47		N/A			NO	NTX
207089	Benzo(k)fluoranthene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
111911	bis(2-Chloroethoxy)methane	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
111444	bis(2-Chloroethyl)ether	ND		ND		µg/kg		0/15	360 - 4100	4,100		200 C			YES	DLASL
117817	bis(2-Ethylhexyl)phthalate	46	J	470		µg/kg	012SS09 012SS10	11/15	360 - 4100	470		31,000,000 S			NO	BSL
85687	Butylbenzylphthalate	49	J	49	J	µg/kg	012SS17	1/15	360 - 4100	49		930,000 S			NO	BSL
86748	Carbazole	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
218019	Chrysene	39	J	39	J	µg/kg	012SS02	1/15	360 - 4100	39		N/A			NO	NTX
84742	Di-n-butylphthalate	41	J	43	J	µg/kg	012SS16	2/15	360 - 4100	43		2,300,000 S			NO	BSL
117840	Di-n-octyl phthalate	ND		ND		µg/kg		0/15	360 - 4100	4,100		10,000,000 S			NO	DLBSL
53703	Dibenz(a,h)anthracene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
132649	Dibenzofuran	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
84662	Diethylphthalate	ND		ND		µg/kg		0/15	360 - 4100	4,100		2,000,000 S			NO	DLBSL
131113	Dimethyl phthalate	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
206440	Fluoranthene	53	J	53	J	µg/kg	012SS02	1/15	360 - 4100	53		N/A			NO	NTX
86737	Fluorene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
118741	Hexachlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		1,000 C			YES	DLASL
87683	Hexachlorobutadiene	ND		ND		µg/kg		0/15	360 - 4100	4,100		8,000 N			NO	DLBSL
77474	Hexachlorocyclopentadiene	ND		ND		µg/kg		0/15	360 - 4100	4,100		1,000 N			YES	DLASL
67721	Hexachloroethane	ND		ND		µg/kg		0/15	360 - 4100	4,100		55,000 N			NO	DLBSL
193395	Indeno(1,2,3-cd)pyrene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
78591	Isophorone	ND		ND		µg/kg		0/15	360 - 4100	4,100		4,600,000 S			NO	DLBSL
621647	n-Nitroso-di-n-propylamine	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
86306	n-Nitrosodiphenylamine	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
91203	Naphthalene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
98953	Nitrobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		9,200 N			NO	DLBSL
87865	Pentachlorophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
85018	Phenanthrene	44	J	44	J	µg/kg	012SS02	1/15	360 - 4100	44		N/A			NO	NTX
108952	Phenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
129000	Pyrene	53	J	53	J	µg/kg	012SS02	1/15	360 - 4100	53		N/A			NO	NTX

TABLE 2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
72548	4,4'-DDD	0.86	J	6.1	J	µg/kg	012SS08	6/15	3.6 - 21	6.1		N/A			NO	NTX
72559	4,4'-DDE	0.45	J	3.7	J	µg/kg	012SS04	10/15	3.6 - 20	3.7		N/A			NO	NTX
50293	4,4'-DDT	1.5	J	13	J	µg/kg	012SS04	7/15	3.6 - 20	13		N/A			NO	NTX
309002	Aldrin	ND		ND		µg/kg		0/15	1.8 - 10	10		3,000 C			NO	DLBSL
319846	alpha-BHC	0.034	J	0.33	J	µg/kg	012SS17	5/15	1.8 - 10	0.33		800 C			NO	BSL
57749	alpha-Chlordane	0.24	J	51	J	µg/kg	012SS04	11/15	1.8 - 10	51		20,000 C			NO	BSL
12674112	Aroclor-1016	ND		ND		µg/kg		0/15	36 - 210	210		N/A			NO	NTX
11104282	Aroclor-1221	ND		ND		µg/kg		0/15	72 - 420	420		N/A			NO	NTX
11141165	Aroclor-1232	ND		ND		µg/kg		0/15	36 - 210	210		N/A			NO	NTX
53469219	Aroclor-1242	ND		ND		µg/kg		0/15	36 - 210	210		N/A			NO	NTX
12672296	Aroclor-1248	ND		ND		µg/kg		0/15	36 - 210	210		N/A			NO	NTX
11097691	Aroclor-1254	ND		ND		µg/kg		0/15	36 - 210	210		N/A			NO	NTX
11096825	Aroclor-1260	14	J	450	J	µg/kg	012SS11	6/15	36 - 210	450		N/A			NO	NTX
319857	beta-BHC	ND		ND		µg/kg		0/15	1.8 - 10	10		N/A			NO	NTX
319868	delta-BHC	0.094	J	0.18	J	µg/kg	012SS16	3/15	1.8 - 10	0.18		N/A			NO	NTX
60571	Dieldrin	0.53	J	16		µg/kg	012SS16	6/15	3.6 - 21	16		1,000 C			NO	BSL
959988	Endosulfan I	1.5	J	1.5	J	µg/kg	012SS08	1/15	1.8 - 10	1.5		N/A			NO	NTX
33213659	Endosulfan II	ND		ND		µg/kg		0/15	3.6 - 21	21		N/A			NO	NTX
1031078	Endosulfan sulfate	0.17	J	15		µg/kg	012SS10	12/15	3.6 - 21	15		N/A			NO	NTX
72208	Endrin	0.64	J	4.8		µg/kg	012SS08	6/15	3.6 - 21	4.8		N/A			NO	NTX
7421934	Endrin aldehyde	1.9	J	3.7	J	µg/kg	012SS11	2/15	3.6 - 21	3.7		N/A			NO	NTX
53494705	Endrin ketone	3.5	J	3.5	J	µg/kg	012SS11	1/15	3.6 - 21	3.5		N/A			NO	NTX
58899	gamma-BHC (Lindane)	0.15	J	0.15	J	µg/kg	012SS10	1/15	1.8 - 10	0.15		N/A			NO	NTX
12789036	gamma-Chlordane	1.3	J	53		µg/kg	012SS11	13/15	1.8 - 10	53		20,000 C			NO	BSL
76448	Heptachlor	0.074	J	0.53	J	µg/kg	012SS04	5/15	1.8 - 10	0.53		100 C			NO	BSL
1024573	Heptachlor epoxide	0.098	J	12		µg/kg	012SS04	9/15	1.8 - 10	12		5,000 C			NO	BSL
72435	Methoxychlor	ND		ND		µg/kg		0/15	18 - 100	100		N/A			NO	NTX
8001352	Toxaphene	ND		ND		µg/kg		0/15	180 - 1000	1,000		89,000 C			NO	DLBSL

TABLE 2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
35822469	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	210		210		pg/g	012S15	1/3	5.4 - 5.7	2.1						
55673897	1,2,3,4,6,7,8-Heptachlorodibenzofuran	5.2	J	5.2	J	pg/g	012S15	1/3	0.22 - 5.7	0.052						
55976897	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.7	J	0.7	J	pg/g	012S15	1/3	0.3 - 5.7	0.007						
39227286	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	3.5	J	3.5	J	pg/g	012S15	1/3	0.23 - 5.7	0.35						
70648269	1,2,3,4,7,8-Hexachlorodibenzofuran	1.1	J	1.1	J	pg/g	012S15	1/3	0.2 - 5.7	0.11						
57653857	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.31	J	7.3	J	pg/g	012S15	2/3	0.26 - 5.7	0.73						
57117449	1,2,3,6,7,8-Hexachlorodibenzofuran	0.85	J	0.85	J	pg/g	012S15	1/3	0.2 - 5.7	0.085						
19408743	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.27	JQ	9.3	J	pg/g	012S15	3/3	5.4 - 5.7	0.93						
72918219	1,2,3,7,8,9-Hexachlorodibenzofuran	ND		0.5	U	pg/g		0/3	0.26 - 0.69	0.05						
40321764	1,2,3,7,8-Pentachlorodebenzo-p-dioxin	1.3	J	1.3	J	pg/g	012S15	1/3	0.29 - 5.7	0.65						
57117416	1,2,3,7,8-Pentachlorodibenzo furan	ND		0.56	U	pg/g		0/3	0.26 - 0.56	0.03						
60851345	2,3,4,6,7,8-Hexachlorodibenzofuran	0.53	J	0.53	J	pg/g	012S15	1/3	0.23 - 5.7	0.053						
57117314	2,3,4,7,8-Pentachlorodibenzofuran	0.33	J	0.33	J	pg/g	012S15	1/3	0.2 - 5.7	0.165						
1746016	2,3,7,8-TCDD (dioxin)	0.43	J	0.43	J	pg/g	012S15	1/3	0.23 - 1.1	0.43						
51207319	2,3,7,8-Tetrachlorodibenzofuran	ND		1.1	U	pg/g		0/3	0.43 - 1.1	0.1						
1746016	2,3,7,8-TCDD (dioxin) total equivalents					pg/g				5.85		N/A			NO	NTX
7429905	Aluminum	2,840		21,600	J	mg/kg	012S17	16/16	4.1 -4.8	21,600	10,162	N/A			NO	NTX
7440360	Antimony	0.59	J	14.5	J	mg/kg	012S17	8/16	0.47 - 0.7	14.5		N/A			NO	NTX
7440382	Arsenic	0.7	J	2.3	J	mg/kg	012S17	14/16	0.64 - 1.7	2.3	3.9	750 C			NO	BSL
7440393	Barium	7.3	J	49.4	J	mg/kg	012S10	16/16	0.04 - 28.5	49.4	23.0	69,000 N			NO	BSL
7440417	Beryllium	0.05	J	0.08	J	mg/kg	012S10	2/16	0.02 - 0.12	0.08	0.44	1,300 N			NO	BSL
7440439	Cadmium	0.92	J	12.1		mg/kg	012S17	14/16	0.04 - 0.05	12.1	1.12	1,800 N			NO	BSL
7440702	Calcium	1,570	J	85,800		mg/kg	012S15	16/16	2 - 2.3	85,800	512	N/A			NO	NUT
18540299	Chromium (assumed VI)	4.4		40.9		mg/kg	012S17	16/16	0.13 - 0.15	40.9	17.0	270 N			NO	BSL
7440484	Cobalt	0.5	J	0.5	J	mg/kg	012S01	1/16	0.31 - 0.92	0.5	2.38	N/A			NO	BKG
7440508	Copper	12.7		667	J	mg/kg	012S18	14/16	0.13 - 0.8	667	3.76	N/A			NO	NTX
7439896	Iron	1,600		6,920		mg/kg	012S16	16/16	2.2 - 2.6	6,920	5,960	N/A			NO	NTX
7439921	Lead	2.4		705		mg/kg	012S16	16/16	0.28 - 0.33	705	10.5	N/A			NO	NTX
7439954	Magnesium	202	J	1,810		mg/kg	012S18	16/16	2 - 2.4	1,810	422	N/A			NO	NUT
7439965	Manganese	5.8	J	97.7	J	mg/kg	012S18	16/16	0.04 - 0.05	97.7	16.7	N/A			NO	NTX
7439976	Mercury	0.04	J	0.3		mg/kg	012S18	15/16	0.04	0.3	0.13	N/A			NO	NTX
7440020	Nickel	1.1	J	21.6		mg/kg	012S17	16/16	0.28 - 0.33	21.6	6.90	13000 N			NO	BSL
7440097	Potassium	84.7	J	370	J	mg/kg	012S16	16/16	7.2 - 8.4	370	482	N/A			NO	NUT

TABLE 2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7782492	Selenium	0.96	J	1	J	mg/kg	012S10	2/16	0.67 - 0.78	1	0.56	N/A			NO	NTX
7440224	Silver	0.17	J	0.87	J	mg/kg	012SS04	7/16	0.15 - 1.1	0.87	0.82	N/A			NO	NTX
7440235	Sodium	20.6	J	93.9	J	mg/kg	012S15	8/16	19.1 - 22.4	93.9	51.0	N/A			NO	NUT
7440280	Thallium	ND		ND				0/16	0.75 - 0.88	0.88	0.96	N/A			NO	BKG
7440622	Vanadium	5.6	J	20.8		mg/kg	012S10	16/16	0.11 - 0.13	20.8	19.2	N/A			NO	NTX
7440666	Zinc	3.7	J	569		mg/kg	012S17	16/16	0.88 - 1	569	11.3	N/A			NO	NTX

(1) Minimum/maximum detected concentration. For dioxins, sample quantitation limit (SQL) is given in maximum detected concentration column for dioxin congeners which were not detected. SQL is from only sample in which dioxins were detected.
(2) Background values derived from statistical analysis. Two times arithmetic mean site-wide background, Appendix B.1 of RI/FS guidance.
(3) EPA Soil Screening Guidance, 5/96, Soil Screening Levels for Inhalation of Volatiles/Fugitive Particulates.
used SSL for chlordane as surrogate for alpha-chlordane and gamma-chlodane
used SSL for 1,3-dichloropropene for cis-1,3-dichloropropene and trans-1,3-dichloropropene
The sum of the 2,3,7,8-TCDD equivelant concentrations (shown in conc. used for screening column) compared to screening value.
(4) Rationale Codes Selection Reason:
Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Deletion Reason:
No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Levels (BSL)
Below Background (BKG)
Detection Limit Below Screening Levels (DLBSL)
Detection Limit Below Background (DLBKG)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
NCSSL = North Carolina Soil Screening Concentration Level Rev. 9/13/1999.
J = Estimated Value
U = Not Detected, value given is detection limit
C = Carcinogenic
N = Non-Carcinogenic
S = Soil Saturation Concentration
ND = Not Detected

TABLE 2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/L		0/3	1	1		1 W	1	WQS	NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/L		0/3	1	1		0.17 W	0.17	AWQC	YES	DLASL
79005	1,1,2-Trichloroethane	ND		ND		µg/L		0/3	1	1		0.6 W	0.6	AWQC	YES	DLASL
75343	1,1-Dichloroethane	ND		ND		µg/L		0/3	1	1		80 N	N/A		NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/L		0/3	1	1		0.057 W	0.057	AWQC	YES	DLASL
106934	1,2-Dibromoethane	ND		ND		µg/L		0/3	1	1		0.00075 C	N/A		YES	DLASL
107062	1,2-Dichloroethane	ND		ND		µg/L		0/3	1	1		0.38 W	0.38	AWQC	YES	DLASL
78875	1,2-Dichloropropane	ND		ND		µg/L		0/3	1	1		0.52 W	0.52	WQS	YES	DLASL
78933	2-Butanone	ND		ND		µg/L		0/3	5	5		190 N	N/A		NO	DLBSL
591786	2-Hexanone	ND		ND		µg/L		0/3	5	5		150 N	N/A		NO	DLBSL
108101	4-Methyl-2-pentanone	ND		ND		µg/L		0/3	5	5		14 N	N/A		NO	DLBSL
71432	Benzene	ND		ND		µg/L		0/3	1	1		1.2 W	1.2	AWQC	NO	DLBSL
75274	Bromodichloromethane	ND		ND		µg/L		0/3	1	1		0.56 W	0.27	AWQC	YES	DLASL
75252	Bromoform	ND		ND		µg/L		0/3	1	1		4.3 W	4.3	AWQC	NO	DLBSL
74839	Bromomethane	ND		ND		µg/L		0/3	1	1		48 W	48	AWQC	NO	DLBSL
75150	Carbon disulfide	ND		ND		µg/L		0/3	1	1		100 N	N/A		NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/L		0/3	1	1		0.25 W	0.25	AWQC	YES	DLASL
108907	Chlorobenzene	ND		ND		µg/L		0/3	1	1		680 W	680	AWQC	NO	DLBSL
75003	Chloroethane	ND		ND		µg/L		0/3	1	1		3.6 C	N/A		NO	DLBSL
67663	Chloroform	ND		ND		µg/L		0/3	1	1		5.7 W	5.7	AWQC	NO	DLBSL
74873	Chloromethane	ND		ND		µg/L		0/3	1	1		2.1 C	N/A		NO	DLBSL
156592	cis-1,2-Dichloroethene	ND		ND		µg/L		0/3	1	1		6.1 N	N/A		NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/L		0/3	1	1		10 W	10	AWQC	NO	DLBSL
124481	Dibromochloromethane	ND		ND		µg/L		0/3	1	1		0.41 W	0.41	AWQC	YES	DLASL
100414	Ethylbenzene	ND		ND		µg/L		0/3	1	1		3,100 W	3,100	AWQC	NO	DLBSL
75092	Methylene chloride	ND		ND		µg/L		0/3	2	2		4.7 W	4.7	AWQC	NO	DLBSL
100425	Styrene	ND		ND		µg/L		0/3	1	1		160 N	N/A		NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/L		0/3	1	1		0.8 W	0.8	AWQC	YES	DLASL
108883	Toluene	ND		ND		µg/L		0/3	1	1		6,800 W	6,800	AWQC	NO	DLBSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/L		0/3	1	1		700 W	700	WQS	NO	DLBSL

TABLE 2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
542756	trans-1,3-Dichloropropene	ND		ND		µg/L		0/3	1	1		0.41 W	0.41	AWQC	YES	DLASL
79016	Trichloroethene	ND		ND		µg/L		0/3	1	1		2.7 W	2.7	AWQC	NO	DLBSL
75014	Vinyl chloride	ND		ND		µg/L		0/3	1	1		2.0 W	2.0	AWQC	NO	DLBSL
1330207	Xylene, total	ND		ND		µg/L		0/3	1	1		1,200 N	N/A		NO	DLBSL
120821	1,2,4-Trichlorobenzene	ND		ND		µg/L		0/3	10	10		260 W	260	WQS	NO	DLBSL
95501	1,2-Dichlorobenzene	ND		ND		µg/L		0/3	10	10		2,700 W	2,700	AWQC	NO	DLBSL
541731	1,3-Dichlorobenzene	ND		ND		µg/L		0/3	10	10		400 W	400	AWQC	NO	DLBSL
106467	1,4-Dichlorobenzene	ND		ND		µg/L		0/3	10	10		400 W	400	AWQC	NO	DLBSL
108601	2,2'-Oxybis(1-chloropropane)	ND		ND		µg/L		0/3	10	10		N/A	N/A		NO	NTX
95954	2,4,5-Trichlorophenol	ND		ND		µg/L		0/3	25	25		370 N	N/A		NO	DLBSL
88062	2,4,6-Trichlorophenol	ND		ND		µg/L		0/3	10	10		6.1 C	N/A		YES	DLASL
120832	2,4-Dichlorophenol	ND		ND		µg/L		0/3	10	10		11 N	N/A		NO	DLBSL
105679	2,4-Dimethylphenol	ND		ND		µg/L		0/3	10	10		73 N	N/A		NO	DLBSL
51285	2,4-Dinitrophenol	ND		ND		µg/L		0/3	25	25		70 A	N/A		NO	DLBSL
121142	2,4-Dinitrotoluene	ND		ND		µg/L		0/3	10	10		0.11 W	0.11	AWQC	YES	DLASL
606202	2,6-Dinitrotoluene	ND		ND		µg/L		0/3	10	10		3.7 N	N/A		YES	DLASL
91587	2-Chloronaphthalene	ND		ND		µg/L		0/3	10	10		1,700 W	1,700	WQS	NO	DLBSL
95578	2-Chlorophenol	ND		ND		µg/L		0/3	10	10		3 N	N/A		YES	DLASL
91576	2-Methylnaphthalene	ND		ND		µg/L		0/3	10	10		12 N	N/A		NO	DLBSL
95487	2-Methylphenol	ND		ND		µg/L		0/3	10	10		180 N	N/A		NO	DLBSL
88744	2-Nitroaniline	ND		ND		µg/L		0/3	25	25		N/A	N/A		NO	NTX
88755	2-Nitrophenol	ND		ND		µg/L		0/3	10	10		N/A	N/A		NO	NTX
91941	3,3'-Dichlorobenzidine	ND		ND		µg/L		0/3	10	10		0.04 W	0.04	AWQC	YES	DLASL
99092	3-Nitroaniline	ND		ND		µg/L		0/3	25	25		N/A	N/A		NO	NTX
534521	4,6-Dinitro-2-methylphenol	ND		ND		µg/L		0/3	25	25		13.4 W	13.4	AWQC	YES	DLASL
101553	4-Bromophenyl-phenylether	ND		ND		µg/L		0/3	10	10		N/A	N/A		NO	NTX
59507	4-Chloro-3-methylphenol	ND		ND		µg/L		0/3	10	10		N/A	N/A		NO	NTX
106478	4-Chloroaniline	ND		ND		µg/L		0/3	10	10		15 N	N/A		NO	DLBSL
7005723	4-Chlorophenyl-phenylether	ND		ND		µg/L		0/3	10	10		N/A	N/A		NO	NTX
106445	4-Methylphenol	ND		ND		µg/L		0/3	10	10		18 N	N/A		NO	DLBSL
100016	4-Nitroaniline	ND		ND		µg/L		0/3	25	25		N/A	N/A		NO	NTX
100027	4-Nitrophenol	ND		ND		µg/L		0/3	25	25		29 N	N/A		NO	DLBSL
83329	Acenaphthene	ND		ND		µg/L		0/3	10	10		1,200 W	1,200	WQS	NO	DLBSL
208968	Acenaphthylene	ND		ND		µg/L		0/3	10	10		0.65 N	N/A		YES	DLASL

TABLE 2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
120127	Anthracene	ND		ND		µg/L		0/3	10	10		9,600 W	9,600	AWQC	NO	DLBSL
56553	Benzo(a)anthracene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
50328	Benzo(a)pyrene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
205992	Benzo(b)fluoranthene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
191242	Benzo(g,h,i)perylene	ND		ND		µg/L		0/3	10	10		960 W	960	AWQC	NO	DLBSL
207089	Benzo(k)fluoranthene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
111911	bis(2-Chloroethoxy)methane	ND		ND		µg/L		0/3	10	10		N/A	N/A		NO	NTX
111444	bis(2-Chloroethyl)ether	ND		ND		µg/L		0/3	10	10		0.031 W	0.031	AWQC	YES	DLASL
117817	bis(2-Ethylhexyl)phthalate	ND		ND		µg/L		0/3	10	10		1.8 W	1.8	AWQC	YES	DLASL
85687	Butylbenzylphthalate	ND		ND		µg/L		0/3	10	10		3,000 W	3,000	WQS	NO	DLBSL
86748	Carbazole	ND		ND		µg/L		0/3	10	10		3.3 C	N/A		YES	DLASL
218019	Chrysene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
84742	Di-n-butylphthalate	ND		ND		µg/L		0/3	10	10		2,700 W	2,700	AWQC	NO	DLBSL
117840	Di-n-octyl phthalate	ND		ND		µg/L		0/3	10	10		73 N	N/A		NO	DLBSL
53703	Dibenz(a,h)anthracene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
132649	Dibenzofuran	ND		ND		µg/L		0/3	10	10		2.4 N	N/A		YES	DLASL
84662	Diethylphthalate	ND		ND		µg/L		0/3	10	10		23,000 W	23,000	AWQC	NO	DLBSL
131113	Dimethyl phthalate	ND		ND		µg/L		0/3	10	10		313,000 W	313,000	AWQC	NO	DLBSL
206440	Fluoranthene	ND		ND		µg/L		0/3	10	10		300 W	300	AWQC	NO	DLBSL
86737	Fluorene	ND		ND		µg/L		0/3	10	10		1,300 W	1,300	AWQC	NO	DLBSL
118741	Hexachlorobenzene	ND		ND		µg/L		0/3	10	10		0.00075 W	0.00075	AWQC	YES	DLASL
87683	Hexachlorobutadiene	ND		ND		µg/L		0/3	10	10		0.44 W	0.44	AWQC	YES	DLASL
77474	Hexachlorocyclopentadiene	ND		ND		µg/L		0/3	10	10		240 W	240	AWQC	NO	DLBSL
67721	Hexachloroethane	ND		ND		µg/L		0/3	10	10		1.9 W	1.9	AWQC	YES	DLASL
193395	Indeno(1,2,3-cd)pyrene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
78591	Isophorone	ND		ND		µg/L		0/3	10	10		36 W	8.4	AWQC	NO	DLAWQC
621647	n-Nitroso-di-n-propylamine	ND		ND		µg/L		0/3	10	10		0.005 W	0.005	WQS	YES	DLASL
86306	n-Nitrosodiphenylamine	ND		ND		µg/L		0/3	10	10		5 W	5	AWQC	YES	DLASL
91203	Naphthalene	ND		ND		µg/L		0/3	10	10		0.65 N	N/A		YES	DLASL
98953	Nitrobenzene	ND		ND		µg/L		0/3	10	10		17 W	17	AWQC	NO	DLBSL
87865	Pentachlorophenol	ND		ND		µg/L		0/3	25	25		0.56 C	N/A		YES	DLASL
85018	Phenanthrene	ND		ND		µg/L		0/3	10	10		960 W	960	AWQC	NO	DLBSL
108952	Phenol	ND		ND		µg/L		0/3	10	10		2,200 N	N/A		NO	DLBSL
129000	Pyrene	ND		ND		µg/L		0/3	10	10		960 W	960	AWQC	NO	DLBSL

TABLE 2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
72548	4,4'-DDD	0.0066	J	0.0066	J	µg/L	012SW02	1/3	0.1	0.0066		0.00083 W	0.00083	AWQC	YES	ASL
72559	4,4'-DDE	0.027	J	0.027	J	µg/L	012SW01	1/3	0.1 - 0.5	0.027		0.00059 W	0.00059	AWQC	YES	ASL
50293	4,4'-DDT	0.011	J	0.011	J	µg/L	012SW02	1/3	0.1	0.011		0.00059 W	0.00059	AWQC	YES	ASL
309002	Aldrin	0.003	J	0.003	J	µg/L	012SW02	1/3	0.05	0.003		0.00013 W	0.00013	AWQC	YES	ASL
319846	alpha-BHC	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.0039 W	0.0039	AWQC	YES	DLASL
57749?	alpha-Chlordane	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.00057 W	0.00057	AWQC	YES	DLASL
12674112	Aroclor-1016	ND		ND		µg/L		0/3	1	1		0.000044 W	0.000044	AWQC	YES	DLASL
11104282	Aroclor-1221	ND		ND		µg/L		0/3	2 - 2.1	2.1		0.000044 W	0.000044	AWQC	YES	DLASL
11141165	Aroclor-1232	ND		ND		µg/L		0/3	1	1		0.000044 W	0.000044	AWQC	YES	DLASL
53469219	Aroclor-1242	ND		ND		µg/L		0/3	1	1		0.000044 W	0.000044	AWQC	YES	DLASL
12672296	Aroclor-1248	1.6		1.6		µg/L	012SW01	1/3	1	1.6		0.000044 W	0.000044	AWQC	YES	ASL
11097691	Aroclor-1254	ND		ND		µg/L		0/3	1	1		0.000044 W	0.000044	AWQC	YES	DLASL
11096825	Aroclor-1260	ND		ND		µg/L		0/3	1	1		0.000044 W	0.000044	AWQC	YES	DLASL
319857	beta-BHC	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.014 W	0.014	AWQC	YES	DLASL
319868	delta-BHC	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.037 C	N/A		YES	DLASL
60571	Dieldrin	0.015	J	0.015	J	µg/L	012SW01	1/3	0.1	0.015		0.00014 W	0.00014	AWQC	YES	ASL
959988	Endosulfan I	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.93 W	0.93	AWQC	NO	DLBSL
33213659	Endosulfan II	ND		ND		µg/L		0/3	0.1	0.1		0.93 W	0.93	AWQC	NO	DLBSL
1031078	Endosulfan sulfate	ND		ND		µg/L		0/3	0.1	0.1		0.93 W	0.93	AWQC	NO	DLBSL
72208	Endrin	ND		ND		µg/L		0/3	0.1	0.1		0.76 W	0.76	AWQC	NO	DLBSL
7421934	Endrin aldehyde	ND		ND		µg/L		0/3	0.1	0.1		0.76 W	0.76	AWQC	NO	DLBSL
53494705	Endrin ketone	ND		ND		µg/L		0/3	0.1	0.1		0.76 W	0.76	AWQC	NO	DLBSL
58899	gamma-BHC (Lindane)	0.0029	J	0.0029	J	µg/L	012SW01	1/3	0.05 - 0.052	0.0029		0.019 W	0.019	AWQC	NO	BSL
12789036	gamma-Chlordane	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.00057 W	0.00057	AWQC	YES	DLASL
76448	Heptachlor	ND		ND		µg/L		0/3	0.05	0.05		0.00021 W	0.00021	AWQC	YES	DLASL
1024573	Heptachlor epoxide	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.0001 W	0.0001	AWQC	YES	DLASL
72435	Methoxychlor	ND		ND		µg/L		0/3	0.5 - 0.52	0.52		40 W	40	WQS	NO	DLBSL
8001352	Toxaphene	ND		ND		µg/L		0/3	5 - 5.2	5.2		0.00073 W	0.00073	AWQC	YES	DLASL
7429905	Aluminum	174	J	781		µg/L	012SW02	3/3	19.2	781		3,700 N	N/A		NO	BSL
7440360	Antimony	ND		ND		µg/L		0/3	2.2 - 4.9	4.9		14 W	14	AWQC	NO	DLBSL
7440382	Arsenic	ND		ND		µg/L		0/3	3	3		0.018 W	0.018	AWQC	YES	DLASL
7440393	Barium	7	J	7	J	µg/L	012SW03	1/3	0.2 - 6.7	7.0		2000 W	2,000	WQS	NO	BSL
7440417	Beryllium	ND		ND		µg/L		0/3	0.1	0.1		7.3 N	N/A		NO	DLBSL
7440439	Cadmium	ND		ND		µg/L		0/3	0.2 - 1.3	1.3		1.13 W	1.13	WQS	YES	DLASL

TABLE 2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7440702	Calcium	7,760		8,220		µg/L	012SW02	3/3	13.3	8,220		N/A	N/A		NO	NUT
18540299	Chromium	ND		ND		µg/L		0/3	0.6 - 1.2	1.2		207 W	207	WQS	NO	DLBSL
7440484	Cobalt	ND		ND		µg/L		0/3	0.56 - 0.74	0.74		73 N	N/A		NO	DLBSL
7440508	Copper	6.6	J	6.6	J	µg/L	012SW01	1/3	0.6 - 7.6	6.6		11.82 W	11.82	WQS	NO	BSL
7439896	Iron	114		242		µg/L	012SW02	3/3	6.8	242		300 W	300	WQS	NO	BSL
7439921	Lead	1.7	J	1.7	J	µg/L	012SW01	1/3	1.3	2		3.18 W	3.18	WQS	NO	BSL
7439954	Magnesium	746	J	746	J	µg/L	012SW01	1/3	9.4 - 846	746		N/A			NO	NUT
7439965	Manganese	12.2	J	38.3		µg/L	012SW03	2/3	0.2 - 7.1	38.3		50 W	50	WQS	NO	BSL
7439976	Mercury	0.08	J	0.12	J	µg/L	012SW01	2/3	0.1	0.12		0.05 W	0.14	AWQC	YES	ASL
7440020	Nickel	ND		ND		µg/L		0/3	1.3 - 2.1	2.1		157.67 W	610	AWQC	NO	DLBSL
7440097	Potassium	491	J	1,560	J	µg/L	012SW01	3/3	33.5	1,560		N/A			NO	NUT
7782492	Selenium	ND		ND		µg/L		0/3	3.1	3.1		50 W	50	WQS	NO	DLBSL
7440224	Silver	ND		ND		µg/L		0/3	0.7	0.7		4.06 W	4.06	WQS	NO	DLBSL
7440235	Sodium	3,160	J	5,630		µg/L	012SW01	3/3	89.1	5,630.0		N/A			NO	NUT
7440280	Thallium	ND		ND		µg/L		0/3	3.5	3.5		1.7 W	1.7	AWQC	YES	DLASL
7440622	Vanadium	ND		ND		µg/L		0/3	1.1 - 2.6	2.6		26 N	N/A		NO	DLBSL
7440666	Zinc	20.5	J	34.2	J	µg/L	012SW03	2/3	4.1	34		106 W	106	WQS	NO	BSL

(1) Minimum/maximum detected concentration.
(2) Background data not available.
(3) North Carolinia WQS for consumption of fish and organisms. If not available, used Tap Water RBC from EPA Region III RBC Table 9/25/01.
Used WQS for endosulfan as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
Safe Drinking Water Act Action Level for Lead as screening level for lead.
Used napthalene as surrogate for acenapthylene.
Used pyrene as surrogate for benzo(g,h,i)pyrene and phenanthrene.
Used endrin as surrogate for endrin ketone.
(4) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Above State WQS (AWQS)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Detection Limit Above AWQC (DLAWQC) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)
Detection Limit Below Screening Levels (DLBSL)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
AWQC = Federal Ambient Water Quality Criteria, Consumption of Water and Organisms
WQS = North Carolina Water Quality Standard, Consumption of Water and Organisms
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
A = Federal AWQC
W = North Carolinia WQS
ND = Not Detected

TABLE 2.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/kg		0/3	13	13		2,200,000	N	N/A		NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/kg		0/3	13	13		3,200	C	N/A		NO	DLBSL
79005	1,1,2-Trichloroethane	ND		ND		µg/kg		0/3	13	13		11,000	C	N/A		NO	DLBSL
75343	1,1-Dichloroethane	ND		ND		µg/kg		0/3	13	13		780,000	N	N/A		NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/kg		0/3	13	13		1,100	C	N/A		NO	DLBSL
106934	1,2-Dibromoethane	ND		ND		µg/kg		0/3	13	13		7.5	C	N/A		YES	DLASL
107062	1,2-Dichloroethane	ND		ND		µg/kg		0/3	13	13		7,000	C	N/A		NO	DLBSL
540590	1,2-Dichloroethene (total)	ND		ND		µg/kg		0/3	13	13		70,000	N	N/A		NO	DLBSL
78875	1,2-Dichloropropane	ND		ND		µg/kg		0/3	13	13		9,400	C	N/A		NO	DLBSL
78933	2-Butanone	ND		ND		µg/kg		0/3	13	13		4,700,000	N	N/A		NO	DLBSL
591786	2-Hexanone	ND		ND		µg/kg		0/3	13	13		310,000	N	N/A		NO	DLBSL
108101	4-Methyl-2-pentanone	ND		ND		µg/kg		0/3	13	13		630,000	N	N/A		NO	DLBSL
67641	Acetone	ND		ND		µg/kg		0/3	13	13		780,000	N	N/A		NO	DLBSL
71432	Benzene	ND		ND		µg/kg		0/3	13	13		12,000	C	N/A		NO	DLBSL
75274	Bromodichloromethane	ND		ND		µg/kg		0/3	13	13		10,000	C	N/A		NO	DLBSL
75252	Bromoform	ND		ND		µg/kg		0/3	13	13		81,000	C	N/A		NO	DLBSL
74839	Bromomethane	ND		ND		µg/kg		0/3	13	13		11,000	N	N/A		NO	DLBSL
75150	Carbon disulfide	ND		ND		µg/kg		0/3	13	13		780,000	N	N/A		NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/kg		0/3	13	13		4,900	C	N/A		NO	DLBSL
108907	Chlorobenzene	ND		ND		µg/kg		0/3	13	13		160,000	N	N/A		NO	DLBSL
75003	Chloroethane	ND		ND		µg/kg		0/3	13	13		22,000	C	N/A		NO	DLBSL
67663	Chloroform	ND		ND		µg/kg		0/3	13	13		78,000	N	N/A		NO	DLBSL
74873	Chloromethane	ND		ND		µg/kg		0/3	13	13		49,000	C	N/A		NO	DLBSL
156592	cis-1,2-Dichloroethene	ND		ND		µg/kg		0/1	3.2	3.2		78,000	N	N/A		NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/kg		0/3	13	13		6,400	N	N/A		NO	DLBSL
124481	Dibromochloromethane	ND		ND		µg/kg		0/3	13	13		7,600	C	N/A		NO	DLBSL
100414	Ethylbenzene	ND		ND		µg/kg		0/3	13	13		780,000	N	N/A		NO	DLBSL
75092	Methylene chloride	ND		ND		µg/kg		0/3	13	13		85,000	C	N/A		NO	DLBSL
100425	Styrene	ND		ND		µg/kg		0/3	13	13		1,600,000	N	N/A		NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/kg		0/3	13	13		12,000	C	N/A		NO	DLBSL
108883	Toluene	ND		ND		µg/kg		0/3	13	13		1,600,000	N	N/A		NO	DLBSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/kg		0/1	3.2	3.2		160,000	N	N/A		NO	DLBSL
542756	trans-1,3-Dichloropropene	ND		ND		µg/kg		0/3	13	13		6,400	N	N/A		NO	DLBSL
79016	Trichloroethene	ND		ND		µg/kg		0/3	13	13		47,000	N	N/A		NO	DLBSL
75014	Vinyl chloride	ND		ND		µg/kg		0/3	13	13		90	C	N/A		NO	DLBSL
1330207	Xylene, total	ND		ND		µg/kg		0/3	13	13		16,000,000	N	N/A		NO	DLBSL

TABLE 2.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
120821	1,2,4-Trichlorobenzene	ND		ND		µg/kg		0/3	430 - 490	490		78,000	N	N/A		NO	DLBSL
95501	1,2-Dichlorobenzene	ND		ND		µg/kg		0/3	430 - 490	490		700,000	N	N/A		NO	DLBSL
541731	1,3-Dichlorobenzene	ND		ND		µg/kg		0/3	430 - 490	490		230,000	N	N/A		NO	DLBSL
106467	1,4-Dichlorobenzene	ND		ND		µg/kg		0/3	430 - 490	490		27,000	C	N/A		NO	DLBSL
108601	2,2'-Oxybis(1-chloropropane)	ND		ND		µg/kg		0/3	430 - 490	490		N/A		N/A		NO	NTX
95954	2,4,5-Trichlorophenol	ND		ND		µg/kg		0/3	1000 - 1200	1200		780,000	N	N/A		NO	DLBSL
88062	2,4,6-Trichlorophenol	ND		ND		µg/kg		0/3	430 - 490	490		58,000	C	N/A		NO	DLBSL
120832	2,4-Dichlorophenol	ND		ND		µg/kg		0/3	430 - 490	490		23,000	N	N/A		NO	DLBSL
105679	2,4-Dimethylphenol	ND		ND		µg/kg		0/3	430 - 490	490		160,000	N	N/A		NO	DLBSL
51285	2,4-Dinitrophenol	ND		ND		µg/kg		0/3	1000 - 1200	1200		16,000	N	N/A		NO	DLBSL
121142	2,4-Dinitrotoluene	ND		ND		µg/kg		0/3	430 - 490	490		16,000	N	N/A		NO	DLBSL
606202	2,6-Dinitrotoluene	ND		ND		µg/kg		0/3	430 - 490	490		7,800	N	N/A		NO	DLBSL
91587	2-Chloronaphthalene	ND		ND		µg/kg		0/3	430 - 490	490		630,000	N	N/A		NO	DLBSL
95578	2-Chlorophenol	ND		ND		µg/kg		0/3	430 - 490	490		39,000	N	N/A		NO	DLBSL
91576	2-Methylnaphthalene	ND		ND		µg/kg		0/3	430 - 490	490		160,000	N	N/A		NO	DLBSL
95487	2-Methylphenol	ND		ND		µg/kg		0/3	430 - 490	490		390,000	N	N/A		NO	DLBSL
88744	2-Nitroaniline	ND		ND		µg/kg		0/3	1000 - 1200	1200		N/A		N/A		NO	NTX
88755	2-Nitrophenol	ND		ND		µg/kg		0/3	430 - 490	490		63,000	N	N/A		NO	DLBSL
91941	3,3'-Dichlorobenzidine	ND		ND		µg/kg		0/3	430 - 490	490		1,400	C	N/A		NO	DLBSL
99092	3-Nitroaniline	ND		ND		µg/kg		0/3	1000 - 1200	1200		N/A		N/A		NO	NTX
534521	4,6-Dinitro-2-methylphenol	ND		ND		µg/kg		0/3	1000 - 1200	1200		7,800	N	N/A		NO	DLBSL
101553	4-Bromophenyl-phenylether	ND		ND		µg/kg		0/3	430 - 490	490		N/A		N/A		NO	NTX
59507	4-Chloro-3-methylphenol	ND		ND		µg/kg		0/3	430 - 490	490		390,000	N	N/A		NO	DLBSL
106478	4-Chloroaniline	ND		ND		µg/kg		0/3	430 - 490	490		31,000	N	N/A		NO	DLBSL
7005723	4-Chlorophenyl-phenylether	ND		ND		µg/kg		0/3	430 - 490	490		N/A		N/A		NO	NTX
106445	4-Methylphenol	ND		ND		µg/kg		0/3	430 - 490	490		39,000	N	N/A		NO	DLBSL
100016	4-Nitroaniline	ND		ND		µg/kg		0/3	1000 - 1200	1200		N/A		N/A		NO	NTX
100027	4-Nitrophenol	ND		ND		µg/kg		0/3	1000 - 1200	1200		63,000	N	N/A		NO	DLBSL
83329	Acenaphthene	ND		ND		µg/kg		0/3	430 - 490	490		470,000	N	N/A		NO	DLBSL
208968	Acenaphthylene	ND		ND		µg/kg		0/3	430 - 490	490		160,000	N	N/A		NO	DLBSL
120127	Anthracene	ND		ND		µg/kg		0/3	430 - 490	490		2,300,000	N	N/A		NO	DLBSL
56553	Benzo(a)anthracene	ND		ND		µg/kg		0/3	430 - 490	490		870	C	N/A		NO	DLBSL
50328	Benzo(a)pyrene	ND		ND		µg/kg		0/3	430 - 490	490		87	C	N/A		YES	DLASL
205992	Benzo(b)fluoranthene	ND		ND		µg/kg		0/3	430 - 490	490		870	C	N/A		NO	DLBSL
191242	Benzo(g,h,i)perylene	ND		ND		µg/kg		0/3	430 - 490	490		230,000	N	N/A		NO	DLBSL
207089	Benzo(k)fluoranthene	ND		ND		µg/kg		0/3	430 - 490	490		8,700	C	N/A		NO	DLBSL

TABLE 2.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
111911	bis(2-Chloroethoxy)methane	ND		ND		µg/kg		0/3	430 - 490	490		N/A	N/A		NO	NTX
111444	bis(2-Chloroethyl)ether	ND		ND		µg/kg		0/3	430 - 490	490		580 C	N/A		NO	DLBSL
117817	bis(2-Ethylhexyl)phthalate	ND		ND		µg/kg		0/3	430 - 490	490		46,000 C	N/A		NO	DLBSL
85687	Butylbenzylphthalate	ND		ND		µg/kg		0/3	430 - 490	490		160,000 N	N/A		NO	DLBSL
86748	Carbazole	ND		ND		µg/kg		0/3	430 - 490	490		32,000 C	N/A		NO	DLBSL
218019	Chrysene	ND		ND		µg/kg		0/3	430 - 490	490		87,000 C	N/A		NO	DLBSL
84742	Di-n-butylphthalate	50	J	50	J	µg/kg	012SD03	1/3	430 - 490	50		780,000 N	N/A		NO	DLBSL
117840	Di-n-octyl phthalate	ND		ND		µg/kg		0/3	430 - 490	490		160,000 N	N/A		NO	DLBSL
53703	Dibenz(a,h)anthracene	ND		ND		µg/kg		0/3	430 - 490	490		87 C	N/A		YES	DLASL
132649	Dibenzofuran	ND		ND		µg/kg		0/3	430 - 490	490		31,000 N	N/A		NO	DLBSL
84662	Diethylphthalate	ND		ND		µg/kg		0/3	430 - 490	490		6,300,000 N	N/A		NO	DLBSL
131113	Dimethyl phthalate	ND		ND		µg/kg		0/3	430 - 490	490		78,000,000 N	N/A		NO	DLBSL
206440	Fluoranthene	ND		ND		µg/kg		0/3	430 - 490	490		310,000 N	N/A		NO	DLBSL
86737	Fluorene	ND		ND		µg/kg		0/3	430 - 490	490		310,000 N	N/A		NO	DLBSL
118741	Hexachlorobenzene	ND		ND		µg/kg		0/3	430 - 490	490		400 C	N/A		YES	DLASL
87683	Hexachlorobutadiene	ND		ND		µg/kg		0/3	430 - 490	490		1,600 N	N/A		NO	DLBSL
77474	Hexachlorocyclopentadiene	ND		ND		µg/kg		0/3	430 - 490	490		47,000 N	N/A		NO	DLBSL
67721	Hexachloroethane	ND		ND		µg/kg		0/3	430 - 490	490		7,800 N	N/A		NO	DLBSL
193395	Indeno(1,2,3-cd)pyrene	ND		ND		µg/kg		0/3	430 - 490	490		870 C	N/A		NO	DLBSL
78591	Isophorone	ND		ND		µg/kg		0/3	430 - 490	490		670,000 C	N/A		NO	DLBSL
621647	n-Nitroso-di-n-propylamine	ND		ND		µg/kg		0/3	430 - 490	490		91 C	N/A		YES	DLASL
86306	n-Nitrosodiphenylamine	ND		ND		µg/kg		0/3	430 - 490	490		130,000 C	N/A		NO	DLBSL
91203	Naphthalene	ND		ND		µg/kg		0/3	430 - 490	490		160,000 N	N/A		NO	DLBSL
98953	Nitrobenzene	ND		ND		µg/kg		0/3	430 - 490	490		3,900 N	N/A		NO	DLBSL
87865	Pentachlorophenol	ND		ND		µg/kg		0/3	1000 - 1200	1200		5,300 C	N/A		NO	DLBSL
85018	Phenanthrene	ND		ND		µg/kg		0/3	430 - 490	490		230,000 N	N/A		NO	DLBSL
108952	Phenol	ND		ND		µg/kg		0/3	430 - 490	490		4,700,000 N	N/A		NO	DLBSL
129000	Pyrene	ND		ND		µg/kg		0/3	430 - 490	490		230,000 N	N/A		NO	DLBSL
72548	4,4'-DDD	6.2		6.2		µg/kg	012SD02	1/3	4.3 - 9.1	6.2		2,700 C	N/A		NO	BSL
72559	4,4'-DDE	0.24	J	1.6	J	µg/kg	012SD03	3/3	4.3 - 9	1.6		1,900 C	N/A		NO	BSL
50293	4,4'-DDT	0.9	J	11		µg/kg	012SD02	3/3	4.3 - 9	11		1,900 C	N/A		NO	BSL
309002	Aldrin	ND		ND		µg/kg		0/3	2.2 - 4.5	4.5		38 C	N/A		NO	DLBSL
319846	alpha-BHC	ND		ND		µg/kg		0/3	2.2 - 4.5	4.5		100 C	N/A		NO	DLBSL
577497	alpha-Chlordane	2.3	J	36	J	µg/kg	012SD03	2/3	2.2 - 4.6	36		1,800 C	N/A		NO	BSL
12674112	Aroclor-1016	ND		ND		µg/kg		0/3	43 - 91	91		5,500 C	N/A		NO	DLBSL
11104282	Aroclor-1221	ND		ND		µg/kg		0/3	86 - 180	180		320 C	N/A		NO	DLBSL

TABLE 2.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
11141165	Aroclor-1232	ND		ND		µg/kg		0/3	43 - 91	91		320	C	N/A		NO	DLBSL
53469219	Aroclor-1242	ND		ND		µg/kg		0/3	43 - 91	91		320	C	N/A		NO	DLBSL
12672296	Aroclor-1248	ND		ND		µg/kg		0/3	43 - 91	91		320	C	N/A		NO	DLBSL
11097691	Aroclor-1254	ND		ND		µg/kg		0/3	43 - 91	91		156	C	N/A		NO	DLBSL
11096825	Aroclor-1260	ND		ND		µg/kg		0/3	43 - 91	91		320	C	N/A		NO	DLBSL
319857	beta-BHC	ND		ND		µg/kg		0/3	2.2 - 4.5	5		350	C	N/A		NO	DLBSL
319868	delta-BHC	ND		ND		µg/kg		0/3	2.2 - 4.5	5		350	C	N/A		NO	DLBSL
60571	Dieldrin	0.7	J	0.7	J	µg/kg	012SD03	1/3	4.3 - 9	0.7		40	C	N/A		NO	BSL
959988	Endosulfan I	ND		ND		µg/kg		0/3	2.2 - 4.5	4.5		47,000	N	N/A		NO	DLBSL
33213659	Endosulfan II	ND		ND		µg/kg		0/3	4.3 - 9.1	9.1		47,000	N	N/A		NO	DLBSL
1031078	Endosulfan sulfate	0.67	J	1.2	J	µg/kg	012SD03	2/3	4.3 - 9	1.2		47,000	N	N/A		NO	BSL
72208	Endrin	ND		ND		µg/kg		0/3	4.3 - 9.1	9.1		2,300	N	N/A		NO	DLBSL
7421934	Endrin aldehyde	ND		ND		µg/kg		0/3	4.3 - 9.1	9.1		2,300	N	N/A		NO	DLBSL
53494705	Endrin ketone	ND		ND		µg/kg		0/3	4.3 - 9.1	9.1		2,300	N	N/A		NO	DLBSL
58899	gamma-BHC (Lindane)	ND		ND		µg/kg		0/3	2.2 - 4.5	4.5		490	C	N/A		NO	DLBSL
12789036	gamma-Chlordane	0.82	J	31		µg/kg	012SD03	3/3	2.2 - 4.6	31		1,800	C	N/A		NO	BSL
76448	Heptachlor	ND		ND		µg/kg		0/3	2.2 - 4.5	5		1,400	C	N/A		NO	DLBSL
1024573	Heptachlor epoxide	0.084	J	2.6	J	µg/kg	012SD03	3/3	2.2 - 4.6	2.6		70	C	N/A		NO	BSL
72435	Methoxychlor	ND		ND		µg/kg		0/3	22 - 45	45		39,000	N	N/A		NO	DLBSL
8001352	Toxaphene	ND		ND		µg/kg		0/3	220 - 450	450		580	C	N/A		NO	DLBSL
7429905	Aluminum	1,790		8,640		mg/kg	012SD03	3/3	5 - 5.7	8,640		7,800	N	N/A		YES	ASL
7440360	Antimony	1	J	1.3	J	mg/kg	012SD01	2/3	0.57 - 0.65	1.3		3.1	N	N/A		NO	BSL
7440382	Arsenic	1.1	J	1.1	J	mg/kg	012SD03	1/3	0.78 - 0.88	1.1		0.43	C	N/A		YES	ASL
7440393	Barium	5.7	J	31	J	mg/kg	012SD03	3/3	0.05 - 0.06	31		550	N	N/A		NO	BSL
7440417	Beryllium	ND		ND		mg/kg		0/4	0.02 - 0.03	0.03		16	N	N/A		NO	DLBSL
7440439	Cadmium	1.1	J	2.8		mg/kg	012SD04	2/3	0.05 - 0.06	2.8		7.8	N	N/A		NO	BSL
7440702	Calcium	786	J	76,700	J	mg/kg	012SD02	3/3	2.4 - 2.7	76,700		N/A		N/A		NO	NUT
18540299	Chromium	4.2		11.6		mg/kg	012SD03	3/3	0.16 - 0.18	11.6		23	N	N/A		NO	BSL
7440484	Cobalt	0.58	J	0.58	J	mg/kg	012SD01	1/3	0.13 - 0.15	0.58		160	N	N/A		NO	BSL
7440508	Copper	9.6		12.6		mg/kg	012SD03	2/3	0.16 - 0.18	13		310	N	N/A		NO	BSL
7439896	Iron	1,520		3,340		mg/kg	012SD03	3/3	2.7 - 3.1	3,340		4,700	N	N/A		NO	BSL
7439921	Lead	1.9		32.6		mg/kg	012SD01	3/3	0.34 - 0.38	32.6		400		N/A		NO	BSL
7439954	Magnesium	241	J	1,050	J	mg/kg	012SD02	3/3	2.4 - 2.8	1,050		N/A		N/A		NO	NUT
7439965	Manganese	7		16.4		mg/kg	012SD03	3/3	0.05 - 0.06	16.4		160	N	N/A		NO	BSL
7439976	Mercury	0.05	J	0.07	J	mg/kg	012SD01,03	3/3	0.05	0.07		2.3	N	N/A		NO	BSL
7440020	Nickel	1.1	J	3.6	J	mg/kg	012SD03	3/3	0.34 - 0.38	3.6		160	N	N/A		NO	BSL

TABLE 2.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7440097	Potassium	136	J	160	J	mg/kg	012SD02	3/3	8.7 - 9.9	160		N/A		N/A		NO	NUT
7782492	Selenium	ND		ND		mg/kg		0/3	0.8 - 0.91	0.91		39	N	N/A		NO	DLBSL
7440224	Silver	0.2	J	0.2	J	mg/kg	012SD01	1/3	0.18 - 0.21	0.2		39	N	N/A		NO	BSL
7440235	Sodium	25.1	J	59.7	J	mg/kg	012SD02	2/3	23.1 - 26.3	59.7		N/A		N/A		NO	NUT
7440280	Thallium	ND		ND		mg/kg		0/3	0.91 - 1	1.0		5.5	N	N/A		NO	DLBSL
7440622	Vanadium	4.2	J	12.4	J	mg/kg	012SD03	3/3	0.13 - 0.15	12.4		55	N	N/A		NO	BSL
7440666	Zinc	7.2		70.4		mg/kg	012SD03	3/3	1.1 - 1.2	70.4		2,300	N	N/A		NO	BSL

(1) Minimum/maximum detected concentration.
(2) Background data not available.
(3) EPA Region III RBC Table 9/25/01, Residential Soil RBC
used RBC for pyrene as surrogate for benzo(g,h,i)pyrene and phenanthrene.
used RBC for napthalene as surrogate for acenapthylene.
used RBC for chlordane as surrogate for alpha-chlordane and gamma-chlodane
used RBC for endosulfan as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
used RBC for endrin as surrogate for endrin aldehyde and endrin ketone.
used RBC for 4-nitrophenol as surrogate for 2-nitrophenol.
used RBC for 3-methylphenol as surrogate for 4-chloro-3-methylphenol.
used RBC for mercuric chloride for mercury
Residential Soil Screening Level for lead.
(4) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)
Detection Limit Below Screening Levels (DLBSL)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
ND = Not Detected

TABLE 2.5
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/L		0/5	1	1	N/A	320 N	200	MCL/MAC	NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/L		0/5	1	1	N/A	0.053 C	0.17	IntMAC	YES	DLASL
79005	1,1,2-Trichloroethane	ND		ND		µg/L		0/5	1	1	N/A	0.19 C	5	MCL	YES	DLASL
75343	1,1-Dichloroethane	ND		ND		µg/L		0/5	1	1	N/A	80 N	700	MAC	NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/L		0/5	1	1	N/A	0.044 C	7	MCL/MAC	YES	DLASL
106934	1,2-Dibromoethane	ND		ND		µg/L		0/5	1	1	N/A	0.00075 C	0.05 / 0.0004	MCL/MAC	YES	DLASL
107062	1,2-Dichloroethane	ND		ND		µg/L		0/5	1	1	N/A	0.12 C	5 / 0.38	MCL/MAC	YES	DLASL
78875	1,2-Dichloropropane	ND		ND		µg/L		0/5	1	1	N/A	0.16 C	5 / 0.56	MCL/MAC	YES	DLASL
78933	2-Butanone	ND		ND		µg/L		0/5	5	5	N/A	190 N	170	MAC	NO	DLBSL
591786	2-Hexanone	ND		ND		µg/L		0/5	5	5	N/A	150 N	280	IntMAC	NO	DLBSL
108101	4-Methyl-2-pentanone	ND		ND		µg/L		0/5	5	5	N/A	14 N	560	R2L	NO	DLBSL
67641	Acetone	ND		ND		µg/L		0/5	5	5	N/A	61 N	700	MAC	NO	DLBSL
71432	Benzene	ND		ND		µg/L		0/5	1	1	N/A	0.32 C	5 / 1	MCL/MAC	YES	DLASL
75274	Bromodichloromethane	ND		ND		µg/L		0/5	1	1	N/A	0.17 C	100 / 0.6	MCL/IntMAC	YES	DLASL
75252	Bromoform	ND		ND		µg/L		0/5	1	1	N/A	8.5 C	100 / 0.19	MCL/MAC	YES	DLMAC
74839	Bromomethane	0.3	J	0.3	J	µg/L	012MW02	1/5	1	0.3	N/A	8.5 N	N/A		NO	BSL
75150	Carbon disulfide	ND		ND		µg/L		0/5	1	1	N/A	100 N	700	IntMAC	NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/L		0/5	1	1	N/A	0.16 C	5 / 0.3	MCL/MAC	YES	DLASL
108907	Chlorobenzene	ND		ND		µg/L		0/5	1	1	N/A	11 N	100 / 50	MCL/MAC	NO	DLBSL
75003	Chloroethane	ND		ND		µg/L		0/5	1	1	N/A	3.6 C	2,800	IntMAC	NO	DLBSL
67663	Chloroform	ND		ND		µg/L		0/5	1	1	N/A	0.063 N	100 / 0.19	MCL/MAC	YES	DLASL
74873	Chloromethane	ND		ND		µg/L		0/5	1	1	N/A	2.1 C	2.6	IntMAC	NO	DLBSL
156592	cis-1,2-Dichloroethene	ND		ND		µg/L		0/5	1	1	N/A	6.1 N	70	MCL/MAC	NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/L		0/5	1	1	N/A	0.44 C	0.2	IntMAC	YES	DLASL
124481	Dibromochloromethane	ND		ND		µg/L		0/5	1	1	N/A	0.13 C	100 / 0.41	MCL/IntMAC	YES	DLASL
100414	Ethylbenzene	ND		ND		µg/L		0/5	1	1	N/A	130 N	700 / 29	MCL/MAC	NO	DLBSL
75092	Methylene chloride	ND		ND		µg/L		0/5	2	2	N/A	4.1 C	5	MCL/MAC	NO	DLBSL
100425	Styrene	ND		ND		µg/L		0/5	1	1	N/A	160 N	100	MCL/MAC	NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/L		0/5	1	1	N/A	1.1 C	5 / 0.7	MCL/MAC	YES	DLMAC
108883	Toluene	0.09	J	0.5	J	µg/L	012MW03	4/5	1	0.5	N/A	75 N	1,000	MCL/MAC	NO	BSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/L		0/5	1	1	N/A	12 N	100 / 70	MCL/MAC	NO	DLBSL
542756	trans-1,3-Dichloropropene	ND		ND		µg/L		0/5	1	1	N/A	0.44 C	0.2	IntMAC	YES	DLASL
79016	Trichloroethene	ND		ND		µg/L		0/5	1	1	N/A	1.6 C	5 / 2.8	MCL/MAC	NO	DLBSL
75014	Vinyl chloride	ND		ND		µg/L		0/5	1	1	N/A	0.015 C	2 / 0.015	MCL/MAC	YES	DLASL
1330207	Xylene, total	ND		ND		µg/L		0/5	1	1	N/A	1,200 N	10000 / 530	MCL/MAC	NO	DLBSL

TABLE 2.5
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
120821	1,2,4-Trichlorobenzene	ND		ND		µg/L		0/5	10 - 11	11	N/A	19 N	70	MCL/IntMAC	NO	DLBSL
95501	1,2-Dichlorobenzene	ND		ND		µg/L		0/5	10 - 11	11	N/A	27 N	600 / 620	MCL/MAC	NO	DLBSL
541731	1,3-Dichlorobenzene	ND		ND		µg/L		0/5	10 - 11	11	N/A	18 N	600 / 620	MCL/MAC	NO	DLBSL
106467	1,4-Dichlorobenzene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.47 C	75	MCL/MAC	YES	DLASL
108601	2,2'-Oxybis(1-chloropropane)	ND		ND		µg/L		0/5	10 - 11	11	N/A	N/A	N/A		NO	NTX
95954	2,4,5-Trichlorophenol	ND		ND		µg/L		0/5	25 - 27	27	N/A	370 N	350	R2L	NO	DLBSL
88062	2,4,6-Trichlorophenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	6.1 C	N/A		YES	DLASL
120832	2,4-Dichlorophenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	11 N	N/A		NO	DLBSL
105679	2,4-Dimethylphenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	73 N	140	IntMAC	NO	DLBSL
51285	2,4-Dinitrophenol	ND		ND		µg/L		0/5	25 - 27	27	N/A	7.3 N	N/A		YES	DLASL
121142	2,4-Dinitrotoluene	ND		ND		µg/L		0/5	10 - 11	11	N/A	7.3 N	N/A		YES	DLASL
606202	2,6-Dinitrotoluene	ND		ND		µg/L		0/5	10 - 11	11	N/A	3.7 N	N/A		YES	DLASL
91587	2-Chloronaphthalene	ND		ND		µg/L		0/5	10 - 11	11	N/A	49 N	N/A		NO	DLBSL
95578	2-Chlorophenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	3 N	1	MAC	YES	DLASL
91576	2-Methylnaphthalene	ND		ND		µg/L		0/5	10 - 11	11	N/A	12 N	28	IntMAC	NO	DLBSL
95487	2-Methylphenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	180 N	N/A		NO	DLBSL
88744	2-Nitroaniline	ND		ND		µg/L		0/5	25 - 27	27	N/A	N/A	N/A		NO	NTX
88755	2-Nitrophenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	N/A	N/A		NO	NTX
91941	3,3'-Dichlorobenzidine	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.15 C	N/A		YES	DLASL
99092	3-Nitroaniline	ND		ND		µg/L		0/5	25 - 27	27	N/A	N/A	N/A		NO	NTX
534521	4,6-Dinitro-2-methylphenol	ND		ND		µg/L		0/5	25 - 27	27	N/A	3.7 N	N/A		YES	DLASL
101553	4-Bromophenyl-phenylether	ND		ND		µg/L		0/5	10 - 11	11	N/A	N/A	N/A		NO	NTX
59507	4-Chloro-3-methylphenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	N/A	N/A		NO	NTX
106478	4-Chloroaniline	ND		ND		µg/L		0/5	10 - 11	11	N/A	15 N	N/A		NO	DLBSL
7005723	4-Chlorophenyl-phenylether	ND		ND		µg/L		0/5	10 - 11	11	N/A	N/A	N/A		NO	NTX
106445	4-Methylphenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	18 N	3.5	IntMAC	YES	DLIntMAC
100016	4-Nitroaniline	ND		ND		µg/L		0/5	25 - 27	27	N/A	N/A	N/A		NO	NTX
100027	4-Nitrophenol	ND		ND		µg/L		0/5	25 - 27	27	N/A	29 N	N/A		NO	DLBSL
83329	Acenaphthene	ND		ND		µg/L		0/5	10 - 11	11	N/A	37 N	80	IntMAC	NO	DLBSL
208968	Acenaphthylene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.65 N	210	IntMAC	YES	DLASL
120127	Anthracene	ND		ND		µg/L		0/5	10 - 11	11	N/A	180 N	2,100	IntMAC	NO	DLBSL
56553	Benzo(a)anthracene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.092 C	0.05	IntMAC	YES	DLASL
50328	Benzo(a)pyrene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.0092 C	0.2 / 0.0047	MCL/IntMAC	YES	DLASL
205992	Benzo(b)fluoranthene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.092 C	0.047	IntMAL	YES	DLASL
191242	Benzo(g,h,i)perylene	ND		ND		µg/L		0/5	10 - 11	11	N/A	18 N	210	IntMAC	NO	DLBSL

TABLE 2...
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
207089	Benzo(k)fluoranthene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.92 C	0.47	IntMAC	YES	DLASL
111911	bis(2-Chloroethoxy)methane	ND		ND		µg/L		0/5	10 - 11	11	N/A	N/A	N/A		NO	NTX
111444	bis(2-Chloroethyl)ether	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.0096 C	0.031	IntMAC	YES	DLASL
117817	bis(2-Ethylhexyl)phthalate	ND		ND		µg/L		0/5	10 - 11	11	N/A	4.8 C	6 / 3	MCL/MAC	YES	DLASL
85687	Butylbenzylphthalate	ND		ND		µg/L		0/5	10 - 11	11	N/A	730 N	100	MAC	NO	DLBSL
86748	Carbazole	ND		ND		µg/L		0/5	10 - 11	11	N/A	3.3 C	N/A		YES	DLASL
218019	Chrysene	ND		ND		µg/L		0/5	10 - 11	11	N/A	9.2 C	5	IntMAC	YES	DLASL
84742	Di-n-butylphthalate	ND		ND		µg/L		0/5	10 - 11	11	N/A	370 N	700	MAC	NO	DLBSL
117840	Di-n-octyl phthalate	ND		ND		µg/L		0/5	10 - 11	11	N/A	73 N	140	MAC	NO	DLBSL
53703	Dibenz(a,h)anthracene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.0092 C	0.0047	IntMAC	YES	DLASL
132649	Dibenzofuran	ND		ND		µg/L		0/5	10 - 11	11	N/A	2.4 N	28	IntMAC	YES	DLASL
84662	Diethylphthalate	ND		ND		µg/L		0/5	10 - 11	11	N/A	2,900 N	5,000	MAC	NO	DLBSL
131113	Dimethyl phthalate	ND		ND		µg/L		0/5	10 - 11	11	N/A	37,000 N	N/A		NO	DLBSL
206440	Fluoranthene	ND		ND		µg/L		0/5	10 - 11	11	N/A	150 N	280	IntMAC	NO	DLBSL
86737	Fluorene	ND		ND		µg/L		0/5	10 - 11	11	N/A	24 N	280	MAC	NO	DLBSL
118741	Hexachlorobenzene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.042 C	1 / 0.02	MCL/MAC	YES	DLASL
87683	Hexachlorobutadiene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.73 N	0.44	IntMAC	YES	DLASL
77474	Hexachlorocyclopentadiene	ND		ND		µg/L		0/5	10 - 11	11	N/A	22 N	50	MCL	NO	DLBSL
67721	Hexachloroethane	ND		ND		µg/L		0/5	10 - 11	11	N/A	3.65 N	N/A		YES	DLASL
193395	Indeno(1,2,3-cd)pyrene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.092 C	0.047	IntMAC	YES	DLASL
78591	Isophorone	ND		ND		µg/L		0/5	10 - 11	11	N/A	70 C	36.8	IntMAC	NO	DLBSL
621647	n-Nitroso-di-n-propylamine	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.0096 C	N/A		YES	DLASL
86306	n-Nitrosodiphenylamine	ND		ND		µg/L		0/5	10 - 11	11	N/A	14 C	N/A		NO	DLBSL
91203	Naphthalene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.65 N	21	MAC	YES	DLASL
98953	Nitrobenzene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.35 N	N/A		YES	DLASL
87865	Pentachlorophenol	ND		ND		µg/L		0/5	25 - 27	27	N/A	0.56 C	1 / 0.3	MCL/MAC	YES	DLASL
85018	Phenanthrene	ND		ND		µg/L		0/5	10 - 11	11	N/A	18 N	210	MAC	NO	DLBSL
108952	Phenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	2,200 N	300	MAC	NO	DLBSL
129000	Pyrene	ND		ND		µg/L		0/5	10 - 11	11	N/A	18 N	210	IntMAC	NO	DLBSL
72548	4,4'-DDD	ND		ND		µg/L		0/5	0.1 - 0.11	0.11	N/A	0.28 C	0.14	IntMAC	NO	DLBSL
72559	4,4'-DDE	0.0032	J	0.035	J	µg/L	012TW01	2/5	0.1	0.035	N/A	0.2 C	N/A		NO	BSL
50293	4,4'-DDT	ND		ND		µg/L		0/5	0.1 - 0.11	0.11	N/A	0.2 C	0.1	IntMAC	YES	DLIntMAL
309002	Aldrin	0.0012	J	0.0018	J	µg/L	012MW03	2/5	0.05 - 0.055	0.0018	N/A	0.0039 C	N/A		NO	BSL
319846	alpha-BHC	ND		ND		µg/L		0/5	0.05 - 0.055	0.055	N/A	0.011 C	0.019	IntMAC	YES	DLASL
57749	alpha-Chlordane	0.0042	J	0.18	J	µg/L	012TW01	4/5	0.05	0.18	N/A	0.19 C	2 / 0.027	MCL/MAC	YES	ASL

TABLE 2.5
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
12674112	Aroclor-1016	ND		ND		µg/L		0/5	1 - 1.1	1.1	N/A	0.26 N	0.5	MCL	YES	DLASL
11104282	Aroclor-1221	ND		ND		µg/L		0/5	2 - 2.2	2.2	N/A	0.033 C	0.5	MCL	YES	DLASL
11141165	Aroclor-1232	ND		ND		µg/L		0/5	1 - 1.1	1.1	N/A	0.033 C	0.5	MCL	YES	DLASL
53469219	Aroclor-1242	ND		ND		µg/L		0/5	1 - 1.1	1.1	N/A	0.033 C	0.5	MCL	YES	DLASL
12672296	Aroclor-1248	0.89	J	0.89	J	µg/L	012TW01	1/5	1	0.89	N/A	0.033 C	0.5	MCL	YES	ASL
11097691	Aroclor-1254	ND		ND		µg/L		0/5	1 - 1.1	1.1	N/A	0.033 C	0.5	MCL	YES	DLASL
11096825	Aroclor-1260	ND		ND		µg/L		0/5	1 - 1.1	1.1	N/A	0.033 C	0.5	MCL	YES	DLASL
37384235	Aroclor-1262							0/1	1 - 1.1	1.1	N/A	0.033 C	0.5	MCL	YES	DLASL
11100144	Aroclor-1268							0/1	1 - 1.1	1.1	N/A	0.033 C	0.5	MCL	YES	DLASL
319857	beta-BHC	0.0015	J	0.0015	J	µg/L	012MW03	1/5	0.05 - 0.1	0.0015	N/A	0.037 C	0.019	IntMAC	NO	BSL
319868	delta-BHC	0.00032	J	0.0064	J	µg/L	012TW01	2/5	0.05	0.0064	N/A	0.037 C	0.019	IntMAC	NO	BSL
60571	Dieldrin	0.0045	J	0.011	J	µg/L	012MW03	2/5	0.05 - 0.1	0.011	N/A	0.0042 C	0.0022	IntMAC	YES	ASL
959988	Endosulfan I	0.0034	J	0.0034	J	µg/L	012MW03	1/5	0.05 - 0.055	0.0034	N/A	22 N	N/A		NO	BSL
33213659	Endosulfan II	0.018	J	0.018	J	µg/L	012TW01	1/5	0.1	0.018	N/A	22 N	42	IntMAC	NO	BSL
1031078	Endosulfan sulfate	ND		ND		µg/L		0/5	0.1 - 0.11	0.11	N/A	22 N	N/A		NO	DLBSL
72208	Endrin	0.014	J	0.014	J	µg/L	012TW01	1/5	0.1	0.014	N/A	1.1 N	2/2.1	MCL/IntMAC	NO	BSL
7421934	Endrin aldehyde	ND		ND		µg/L		0/5	0.1 - 0.11	0.11	N/A	1.1 N	2.1	IntMAC	NO	DLBSL
53494705	Endrin ketone	ND		ND		µg/L		0/5	0.1 - 0.11	0.11	N/A	1.1 N	2.1	IntMAC	NO	DLBSL
58899	gamma-BHC (Lindane)	0.0039	J	0.0076	J	µg/L	012MW03	2/5	0.05 - 0.055	0.0076	N/A	0.052 C	0.2/0.2	MCL/MAC	NO	BSL
12789036	gamma-Chlordane	0.015	J	0.064	J	µg/L	012TW01	2/5	0.05	0.064	N/A	0.19 C	2 / 0.027	MCL/MAC	YES	AMAC
76448	Heptachlor	ND		ND		µg/L		0/5	0.05	0.05	N/A	0.015 C	0.4 / 0.008	MCL/MAC	YES	DLASL
1024573	Heptachlor epoxide	0.0045	J	0.13	J	µg/L	012TW01	2/5	0.05	0.13	N/A	0.0074 C	0.2 / 0.004	MCL/MAC	YES	ASL
72435	Methoxychlor	ND		ND		µg/L		0/5	0.5 - 0.55	0.55	N/A	18 N	40 / 35	MCL/MAC	NO	DLBSL
8001352	Toxaphene	ND		ND		µg/L		0/5	5 - 5.5	5.5	N/A	0.061 C	3 / 0.031	MCL/MAC	YES	DLASL
7429905	Aluminum	442		8,510		µg/L	012TW01	5/5	19.2	8,510	592	3,700 N	50	SMCL	YES	ASL
7440360	Antimony	ND		ND		µg/L		0/5	2.3 - 3.8	3.8	12.2	1.5 N	6	MCL	NO	DLBKG
7440382	Arsenic	4.6	J	30.2		µg/L	012MW03	3/5	3	30.2	6.16	0.045 C	50	MCL/MAC	YES	ASL
7440393	Barium	8.6	J	38	J	µg/L	012TW01	5/5	0.2	38	80.6	260 N	2,000	MCL/MAC	NO	BSL
7440417	Beryllium	ND		ND		µg/L		0/5	0.1	0.1	ND	7.3 N	4	MCL	NO	DLBSL
7440439	Cadmium	ND		ND		µg/L		0/5	0.2	0.2	ND	1.8 N	5	MCL/MAC	NO	DLBSL
7440702	Calcium	12,100		60,900		µg/L	012MW03	5/5	9.2 - 13.3	60,900	70,100	N/A	N/A		NO	NUT
18540299	Chromium (assumed VI)	25.5		25.5		µg/L	012TW01	1/5	0.6 - 1.3	25.5	8.38	11 N	100 / 50	MCL/MAC	YES	ASL
7440484	Cobalt	ND		ND		µg/L		0/5	0.65 - 2	2	8.34	73 N	N/A		NO	DLBSL
7440508	Copper	16.2	J	16.2	J	µg/L	012TW01	1/5	0.6 - 1.4	16.2	3.58	150 N	1300 / 1000	MCL/MAC	NO	BSL
7439896	Iron	484	J	51,200	J	µg/L	012MW04	5/5	6.8	51,200	4,740	2,200 N	300	SMCL/MAC	YES	ASL

TABLE 2.0
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7439921	Lead	3.4		3.4		µg/L	012TW01	1/5	1.3	3.4	1.72	15	15	MCL/MAC	NO	BSL
7439954	Magnesium	1,010	J	6,430		µg/L	012TW01	5/5	9.4	6,430	5,960	N/A	N/A		NO	NUT
7439965	Manganese	8.8	J	93		µg/L	012TW01	4/5	0.2 - 8.6	93	93.4	73 N	50	SMCL/MAC	NO	BKG
7439976	Mercury	0.09	J	0.1	J	µg/L	012MW02	2/5	0.1	0.1	ND	1.1 N	2 / 1.1	MCL/MAC	NO	BSL
7440020	Nickel	11.1	J	11.1	J	µg/L	012TW01	1/5	1.3 - 1.4	11.1	20.5	73 N	100	MCL/MAC	NO	BSL
7440097	Potassium	232	J	3,010	J	µg/L	012TW01	5/5	33.5	3,010	6,760	N/A	N/A		NO	NUT
7782492	Selenium	5.3		5.3		µg/L	012MW04	1/5	3.1	5.3	1.38	18 N	50	MCL/MAC	NO	BSL
7440224	Silver	ND		ND		µg/L		0/5	0.7	0.7	ND	18 N	100	SMCL/MAC	NO	DLBSL
7440235	Sodium	2,770	J	8,530		µg/L	012TW01	5/5	89.1	8,530	22,800	N/A	N/A		NO	NUT
7440280	Thallium	ND		ND		µg/L		0/5	3.5	3.5	ND	0.26 N	2	MCL	YES	DLASL
7440622	Vanadium	13.7	J	13.7	J	µg/L	012TW01	1/5	0.5 - 2.2	13.7	3.7	26 N	N/A		NO	BSL
7440666	Zinc	28	J	28	J	µg/L	012TW01	1/5	4.1	28	12.3	1,100 N	5000 / 2100	SMCL/MAC	NO	BSL

(1) Minimum/maximum detected concentration. Metals data is from unfiltered samples.
(2) N/A - Refer to supporting information for background discussion. Background values derived from statistical analysis.
Two times arithmetic mean site-wide background, Appendix B.1 of RI/FS guidance. Includes wells HP-1, HP-2, HP-3, and HP-4 sampled on 3/12/93.
(3) EPA Region III RBC Table 9/25/01, Tap Water RBC
Safe Drinking Water Act Action Level for Lead as screening level for lead.
Used napthalene as surrogate for acenapthylene.
Used pyrene as surrogate for benzo(g,h,i)pyrene and phenanthrene.
Used endrin as surrogate for endrin ketone.
Used chlordane as surrogate for alpha-chlordane and gamma-chlordane.
Used tehnical BHC as surrogate for delta-BHC.
Used endosulfan as surrogate for endosulfan I and endosulfan II.
Used PCBs as surrogate for Aroclor 1262 and Aroclor 1268.
Used mercuric chloride as surrogate for mercury.
(4) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Detection Limit Above State MAC (DLMAC) - evaluated quantitatively in uncertainty analysis
Detection Limit Above State Interim MAC (DLIntMAC) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)
Below Background (BKG)
Detection Limit Below Screening Levels (DLBSL)
Detection Limit Below Background (DLBKG)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
MCL = Federal Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
MAC = North Carolina Maximum Allowable Concentration (15A NCAC 2L.0200)
IntMAC - North Carolina Intermim Maximum Allowable Concentration (15A NCAC 2L.0202.)
R2L = North Carolina Target Remediation Guidelines and Treatment Standards, Recommended 2L, Rev. 9/3/99.
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic

TABLE 2.6
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
71556	1,1,1-Trichloroethane	ND		ND		µg/L		0/5	1	1	N/A	320 N	200	MCL/MAC	NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/L		0/5	1	1	N/A	0.053 C	0.17	IntMAC	YES	DLASL
79005	1,1,2-Trichloroethane	ND		ND		µg/L		0/5	1	1	N/A	0.19 C	5	MCL	YES	DLASL
75343	1,1-Dichloroethane	ND		ND		µg/L		0/5	1	1	N/A	80 N	700	MAC	NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/L		0/5	1	1	N/A	0.044 C	7	MCL/MAC	YES	DLASL
106934	1,2-Dibromoethane	ND		ND		µg/L		0/5	1	1	N/A	0.00075 C	0.05 / 0.0004	MCL/MAC	YES	DLASL
107062	1,2-Dichloroethane	ND		ND		µg/L		0/5	1	1	N/A	0.12 C	5 / 0.38	MCL/MAC	YES	DLASL
78875	1,2-Dichloropropane	ND		ND		µg/L		0/5	1	1	N/A	0.16 C	5 / 0.56	MCL/MAC	YES	DLASL
78933	2-Butanone	ND		ND		µg/L		0/5	5	5	N/A	190 N	170	MAC	NO	DLBSL
591786	2-Hexanone	ND		ND		µg/L		0/5	5	5	N/A	150 N	280	IntMAC	NO	DLBSL
108101	4-Methyl-2-pentanone	ND		ND		µg/L		0/5	5	5	N/A	14 N	560	R2L	NO	DLBSL
67641	Acetone	ND		ND		µg/L		0/5	5	5	N/A	61 N	700	MAC	NO	DLBSL
71432	Benzene	ND		ND		µg/L		0/5	1	1	N/A	0.32 C	5 / 1	MCL/MAC	YES	DLASL
75274	Bromodichloromethane	ND		ND		µg/L		0/5	1	1	N/A	0.17 C	100 / 0.6	MCL/IntMAC	YES	DLASL
75252	Bromoform	ND		ND		µg/L		0/5	1	1	N/A	8.5 C	100 / 0.19	MCL/MAC	YES	DLMAC
74839	Bromomethane	0.3	J	0.3	J	µg/L	012MW02	1/5	1	0.3	N/A	8.5 N	N/A		NO	BSL
75150	Carbon disulfide	ND		ND		µg/L		0/5	1	1	N/A	100 N	700	IntMAC	NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/L		0/5	1	1	N/A	0.16 C	5 / 0.3	MCL/MAC	YES	DLASL
108907	Chlorobenzene	ND		ND		µg/L		0/5	1	1	N/A	11 N	100 / 50	MCL/MAC	NO	DLBSL
75003	Chloroethane	ND		ND		µg/L		0/5	1	1	N/A	3.6 C	2,800	IntMAC	NO	DLBSL
67663	Chloroform	ND		ND		µg/L		0/5	1	1	N/A	0.063 N	100 / 0.19	MCL/MAC	YES	DLASL
74873	Chloromethane	ND		ND		µg/L		0/5	1	1	N/A	2.1 C	2.6	IntMAC	NO	DLBSL
156592	cis-1,2-Dichloroethene	ND		ND		µg/L		0/5	1	1	N/A	6.1 N	70	MCL/MAC	NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/L		0/5	1	1	N/A	0.44 C	0.2	IntMAC	YES	DLASL
124481	Dibromochloromethane	ND		ND		µg/L		0/5	1	1	N/A	0.13 C	100 / 0.41	MCL/IntMAC	YES	DLASL
100414	Ethylbenzene	ND		ND		µg/L		0/5	1	1	N/A	130 N	700 / 29	MCL/MAC	NO	DLBSL
75092	Methylene chloride	ND		ND		µg/L		0/5	2	2	N/A	4.1 C	5	MCL/MAC	NO	DLBSL
100425	Styrene	ND		ND		µg/L		0/5	1	1	N/A	160 N	100	MCL/MAC	NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/L		0/5	1	1	N/A	1.1 C	5 / 0.7	MCL/MAC	YES	DLMAC
108883	Toluene	0.09	J	0.5	J	µg/L	012MW03	4/5	1	0.5	N/A	75 N	1,000	MCL/MAC	NO	BSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/L		0/5	1	1	N/A	12 N	100 / 70	MCL/MAC	NO	DLBSL
542756	trans-1,3-Dichloropropene	ND		ND		µg/L		0/5	1	1	N/A	0.44 C	0.2	IntMAC	YES	DLASL
79016	Trichloroethene	ND		ND		µg/L		0/5	1	1	N/A	1.6 C	5 / 2.8	MCL/MAC	NO	DLBSL
75014	Vinyl chloride	ND		ND		µg/L		0/5	1	1	N/A	0.015 C	2 / 0.015	MCL/MAC	YES	DLASL
1330207	Xylene, total	ND		ND		µg/L		0/5	1	1	N/A	1,200 N	10000 / 530	MCL/MAC	NO	DLBSL

TABLE 2.6
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
120821	1,2,4-Trichlorobenzene	ND		ND		µg/L		0/5	10 - 11	11	N/A	19 N	70	MCL/IntMAC	NO	DLBSL
95501	1,2-Dichlorobenzene	ND		ND		µg/L		0/5	10 - 11	11	N/A	27 N	600 / 620	MCL/MAC	NO	DLBSL
541731	1,3-Dichlorobenzene	ND		ND		µg/L		0/5	10 - 11	11	N/A	18 N	600 / 620	MCL/MAC	NO	DLBSL
106467	1,4-Dichlorobenzene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.47 C	75	MCL/MAC	YES	DLASL
108601	2,2'-Oxybis(1-chloropropane)	ND		ND		µg/L		0/5	10 - 11	11	N/A	N/A	N/A		NO	NTX
95954	2,4,5-Trichlorophenol	ND		ND		µg/L		0/5	25 - 27	27	N/A	370 N	350	R2L	NO	DLBSL
88062	2,4,6-Trichlorophenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	6.1 C	N/A		YES	DLASL
120832	2,4-Dichlorophenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	11 N	N/A		NO	DLBSL
105679	2,4-Dimethylphenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	73 N	140	IntMAC	NO	DLBSL
51285	2,4-Dinitrophenol	ND		ND		µg/L		0/5	25 - 27	27	N/A	7.3 N	N/A		YES	DLASL
121142	2,4-Dinitrotoluene	ND		ND		µg/L		0/5	10 - 11	11	N/A	7.3 N	N/A		YES	DLASL
606202	2,6-Dinitrotoluene	ND		ND		µg/L		0/5	10 - 11	11	N/A	3.7 N	N/A		YES	DLASL
91587	2-Chloronaphthalene	ND		ND		µg/L		0/5	10 - 11	11	N/A	49 N	N/A		NO	DLBSL
95578	2-Chlorophenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	3 N	1	MAC	YES	DLASL
91576	2-Methylnaphthalene	ND		ND		µg/L		0/5	10 - 11	11	N/A	12 N	28	IntMAC	NO	DLBSL
95487	2-Methylphenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	180 N	N/A		NO	DLBSL
88744	2-Nitroaniline	ND		ND		µg/L		0/5	25 - 27	27	N/A	N/A	N/A		NO	NTX
88755	2-Nitrophenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	N/A	N/A		NO	NTX
91941	3,3'-Dichlorobenzidine	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.15 C	N/A		YES	DLASL
99092	3-Nitroaniline	ND		ND		µg/L		0/5	25 - 27	27	N/A	N/A	N/A		NO	NTX
534521	4,6-Dinitro-2-methylphenol	ND		ND		µg/L		0/5	25 - 27	27	N/A	3.7 N	N/A		YES	DLASL
101553	4-Bromophenyl-phenylether	ND		ND		µg/L		0/5	10 - 11	11	N/A	N/A	N/A		NO	NTX
59507	4-Chloro-3-methylphenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	N/A	N/A		NO	NTX
106478	4-Chloroaniline	ND		ND		µg/L		0/5	10 - 11	11	N/A	15 N	N/A		NO	DLBSL
7005723	4-Chlorophenyl-phenylether	ND		ND		µg/L		0/5	10 - 11	11	N/A	N/A	N/A		NO	NTX
106445	4-Methylphenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	18 N	3.5	IntMAC	YES	DLIntMAC
100016	4-Nitroaniline	ND		ND		µg/L		0/5	25 - 27	27	N/A	N/A	N/A		NO	NTX
100027	4-Nitrophenol	ND		ND		µg/L		0/5	25 - 27	27	N/A	29 N	N/A		NO	DLBSL
83329	Acenaphthene	ND		ND		µg/L		0/5	10 - 11	11	N/A	37 N	80	IntMAC	NO	DLBSL
208968	Acenaphthylene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.65 N	210	IntMAC	YES	DLASL
120127	Anthracene	ND		ND		µg/L		0/5	10 - 11	11	N/A	180 N	2,100	IntMAC	NO	DLBSL
56553	Benzo(a)anthracene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.092 C	0.05	IntMAC	YES	DLASL
50328	Benzo(a)pyrene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.0092 C	0.2 / 0.0047	MCL/IntMAC	YES	DLASL
205992	Benzo(b)fluoranthene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.092 C	0.047	IntMAL	YES	DLASL
191242	Benzo(g,h,i)perylene	ND		ND		µg/L		0/5	10 - 11	11	N/A	18 N	210	IntMAC	NO	DLBSL

TABLE 2.6
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
207089	Benzo(k)fluoranthene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.92 C	0.47	IntMAC	YES	DLASL
111911	bis(2-Chloroethoxy)methane	ND		ND		µg/L		0/5	10 - 11	11	N/A	N/A	N/A		NO	NTX
111444	bis(2-Chloroethyl)ether	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.0096 C	0.031	IntMAC	YES	DLASL
117817	bis(2-Ethylhexyl)phthalate	ND		ND		µg/L		0/5	10 - 11	11	N/A	4.8 C	6 / 3	MCL/MAC	YES	DLASL
85687	Butylbenzylphthalate	ND		ND		µg/L		0/5	10 - 11	11	N/A	730 N	100	MAC	NO	DLBSL
86748	Carbazole	ND		ND		µg/L		0/5	10 - 11	11	N/A	3.3 C	N/A		YES	DLASL
218019	Chrysene	ND		ND		µg/L		0/5	10 - 11	11	N/A	9.2 C	5	IntMAC	YES	DLASL
84742	Di-n-butylphthalate	ND		ND		µg/L		0/5	10 - 11	11	N/A	370 N	700	MAC	NO	DLBSL
117840	Di-n-octyl phthalate	ND		ND		µg/L		0/5	10 - 11	11	N/A	73 N	140	MAC	NO	DLBSL
53703	Dibenz(a,h)anthracene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.0092 C	0.0047	IntMAC	YES	DLASL
132649	Dibenzofuran	ND		ND		µg/L		0/5	10 - 11	11	N/A	2.4 N	28	IntMAC	YES	DLASL
84662	Diethylphthalate	ND		ND		µg/L		0/5	10 - 11	11	N/A	2,900 N	5,000	MAC	NO	DLBSL
131113	Dimethyl phthalate	ND		ND		µg/L		0/5	10 - 11	11	N/A	37,000 N	N/A		NO	DLBSL
206440	Fluoranthene	ND		ND		µg/L		0/5	10 - 11	11	N/A	150 N	280	IntMAC	NO	DLBSL
86737	Fluorene	ND		ND		µg/L		0/5	10 - 11	11	N/A	24 N	280	MAC	NO	DLBSL
118741	Hexachlorobenzene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.042 C	1 / 0.02	MCL/MAC	YES	DLASL
87683	Hexachlorobutadiene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.73 N	0.44	IntMAC	YES	DLASL
77474	Hexachlorocyclopentadiene	ND		ND		µg/L		0/5	10 - 11	11	N/A	22 N	50	MCL	NO	DLBSL
67721	Hexachloroethane	ND		ND		µg/L		0/5	10 - 11	11	N/A	3.65 N	N/A		YES	DLASL
193395	Indeno(1,2,3-cd)pyrene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.092 C	0.047	IntMAC	YES	DLASL
78591	Isophorone	ND		ND		µg/L		0/5	10 - 11	11	N/A	70 C	36.8	IntMAC	NO	DLBSL
621647	n-Nitroso-di-n-propylamine	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.0096 C	N/A		YES	DLASL
86306	n-Nitrosodiphenylamine	ND		ND		µg/L		0/5	10 - 11	11	N/A	14 C	N/A		NO	DLBSL
91203	Naphthalene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.65 N	21	MAC	YES	DLASL
98953	Nitrobenzene	ND		ND		µg/L		0/5	10 - 11	11	N/A	0.35 N	N/A		YES	DLASL
87865	Pentachlorophenol	ND		ND		µg/L		0/5	25 - 27	27	N/A	0.56 C	1 / 0.3	MCL/MAC	YES	DLASL
85018	Phenanthrene	ND		ND		µg/L		0/5	10 - 11	11	N/A	18 N	210	MAC	NO	DLBSL
108952	Phenol	ND		ND		µg/L		0/5	10 - 11	11	N/A	2,200 N	300	MAC	NO	DLBSL
129000	Pyrene	ND		ND		µg/L		0/5	10 - 11	11	N/A	18 N	210	IntMAC	NO	DLBSL
72548	4,4'-DDD	ND		ND		µg/L		0/5	0.1 - 0.11	0.11	N/A	0.28 C	0.14	IntMAC	NO	DLBSL
72559	4,4'-DDE	0.0032	J	0.035	J	µg/L	012TW01	2/5	0.1	0.035	N/A	0.2 C	N/A		NO	BSL
50293	4,4'-DDT	ND		ND		µg/L		0/5	0.1 - 0.11	0.11	N/A	0.2 C	0.1	IntMAC	YES	DLIntMAL
309002	Aldrin	0.0012	J	0.0018	J	µg/L	012MW03	2/5	0.05 - 0.055	0.0018	N/A	0.0039 C	N/A		NO	BSL
319846	alpha-BHC	ND		ND		µg/L		0/5	0.05 - 0.055	0.055	N/A	0.011 C	0.019	IntMAC	YES	DLASL
57749	alpha-Chlordane	0.0042	J	0.18	J	µg/L	012TW01	4/5	0.05	0.18	N/A	0.19 C	2 / 0.027	MCL/MAC	YES	ASL

TABLE 2.6
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
12674112	Aroclor-1016	ND		ND		µg/L		0/5	1 - 1.1	1.1	N/A	0.26 N	0.5	MCL	YES	DLASL
11104282	Aroclor-1221	ND		ND		µg/L		0/5	2 - 2.2	2.2	N/A	0.033 C	0.5	MCL	YES	DLASL
11141165	Aroclor-1232	ND		ND		µg/L		0/5	1 - 1.1	1.1	N/A	0.033 C	0.5	MCL	YES	DLASL
53469219	Aroclor-1242	ND		ND		µg/L		0/5	1 - 1.1	1.1	N/A	0.033 C	0.5	MCL	YES	DLASL
12672296	Aroclor-1248	0.89	J	0.89	J	µg/L	012TW01	1/5	1	0.89	N/A	0.033 C	0.5	MCL	YES	ASL
11097691	Aroclor-1254	ND		ND		µg/L		0/5	1 - 1.1	1.1	N/A	0.033 C	0.5	MCL	YES	DLASL
11096825	Aroclor-1260	ND		ND		µg/L		0/5	1 - 1.1	1.1	N/A	0.033 C	0.5	MCL	YES	DLASL
37384235	Aroclor-1262							0/1	1 - 1.1	1.1	N/A	0.033 C	0.5	MCL	YES	DLASL
11100144	Aroclor-1268							0/1	1 - 1.1	1.1	N/A	0.033 C	0.5	MCL	YES	DLASL
319857	beta-BHC	0.0015	J	0.0015	J	µg/L	012MW03	1/5	0.05 - 0.1	0.0015	N/A	0.037 C	0.019	IntMAC	NO	BSL
319868	delta-BHC	0.00032	J	0.0064	J	µg/L	012TW01	2/5	0.05	0.0064	N/A	0.037 C	0.019	IntMAC	NO	BSL
60571	Dieldrin	0.0045	J	0.011	J	µg/L	012MW03	2/5	0.05 - 0.1	0.011	N/A	0.0042 C	0.0022	IntMAC	YES	ASL
959988	Endosulfan I	0.0034	J	0.0034	J	µg/L	012MW03	1/5	0.05 - 0.055	0.0034	N/A	22 N	N/A		NO	BSL
33213659	Endosulfan II	0.018	J	0.018	J	µg/L	012TW01	1/5	0.1	0.018	N/A	22 N	42	IntMAC	NO	BSL
1031078	Endosulfan sulfate	ND		ND		µg/L		0/5	0.1 - 0.11	0.11	N/A	22 N	N/A		NO	DLBSL
72208	Endrin	0.014	J	0.014	J	µg/L	012TW01	1/5	0.1	0.014	N/A	1.1 N	2/2.1	MCL/IntMAC	NO	BSL
7421934	Endrin aldehyde	ND		ND		µg/L		0/5	0.1 - 0.11	0.11	N/A	1.1 N	2.1	IntMAC	NO	DLBSL
53494705	Endrin ketone	ND		ND		µg/L		0/5	0.1 - 0.11	0.11	N/A	1.1 N	2.1	IntMAC	NO	DLBSL
58899	gamma-BHC (Lindane)	0.0039	J	0.0076	J	µg/L	012MW03	2/5	0.05 - 0.055	0.0076	N/A	0.052 C	0.2/0.2	MCL/MAC	NO	BSL
12789036	gamma-Chlordane	0.015	J	0.064	J	µg/L	012TW01	2/5	0.05	0.064	N/A	0.19 C	2 / 0.027	MCL/MAC	YES	AMAC
76448	Heptachlor	ND		ND		µg/L		0/5	0.05	0.05	N/A	0.015 C	0.4 / 0.008	MCL/MAC	YES	DLASL
1024573	Heptachlor epoxide	0.0045	J	0.13	J	µg/L	012TW01	2/5	0.05	0.13	N/A	0.0074 C	0.2 / 0.004	MCL/MAC	YES	ASL
72435	Methoxychlor	ND		ND		µg/L		0/5	0.5 - 0.55	0.55	N/A	18 N	40 / 35	MCL/MAC	NO	DLBSL
8001352	Toxaphene	ND		ND		µg/L		0/5	5 - 5.5	5.5	N/A	0.061 C	3 / 0.031	MCL/MAC	YES	DLASL
7429905	Aluminum	442		8,510		µg/L	012TW01	5/5	19.2	8,510	592	3,700 N	50	SMCL	YES	ASL
7440360	Antimony	ND		ND		µg/L		0/5	2.3 - 3.8	3.8	12.2	1.5 N	6	MCL	NO	DLBKG
7440382	Arsenic	4.6	J	30.2		µg/L	012MW03	3/5	3	30.2	6.16	0.045 C	50	MCL/MAC	YES	ASL
7440393	Barium	8.6	J	38	J	µg/L	012TW01	5/5	0.2	38	80.6	260 N	2,000	MCL/MAC	NO	BSL
7440417	Beryllium	ND		ND		µg/L		0/5	0.1	0.1	ND	7.3 N	4	MCL	NO	DLBSL
7440439	Cadmium	ND		ND		µg/L		0/5	0.2	0.2	ND	1.8 N	5	MCL/MAC	NO	DLBSL
7440702	Calcium	12,100		60,900		µg/L	012MW03	5/5	9.2 - 13.3	60,900	70,100	N/A	N/A		NO	NUT
18540299	Chromium (assumed VI)	25.5		25.5		µg/L	012TW01	1/5	0.6 - 1.3	25.5	8.38	11 N	100 / 50	MCL/MAC	YES	ASL
7440484	Cobalt	ND		ND		µg/L		0/5	0.65 - 2	2	8.34	73 N	N/A		NO	DLBSL
7440508	Copper	16.2	J	16.2	J	µg/L	012TW01	1/5	0.6 - 1.4	16.2	3.58	150 N	1300 / 1000	MCL/MAC	NO	BSL
7439896	Iron	484	J	51,200	J	µg/L	012MW04	5/5	6.8	51,200	4,740	2,200 N	300	SMCL/MAC	YES	ASL

TABLE 2.6
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7439921	Lead	3.4		3.4		µg/L	012TW01	1/5	1.3	3.4	1.72	15	15	MCL/MAC	NO	BSL
7439954	Magnesium	1,010	J	6,430		µg/L	012TW01	5/5	9.4	6,430	5,960	N/A	N/A		NO	NUT
7439965	Manganese	8.8	J	93		µg/L	012TW01	4/5	0.2 - 8.6	93	93.4	73 N	50	SMCL/MAC	NO	BKG
7439976	Mercury	0.09	J	0.1	J	µg/L	012MW02	2/5	0.1	0.1	ND	1.1 N	2 / 1.1	MCL/MAC	NO	BSL
7440020	Nickel	11.1	J	11.1	J	µg/L	012TW01	1/5	1.3 - 1.4	11.1	20.5	73 N	100	MCL/MAC	NO	BSL
7440097	Potassium	232	J	3,010	J	µg/L	012TW01	5/5	33.5	3,010	6,760	N/A	N/A		NO	NUT
7782492	Selenium	5.3		5.3		µg/L	012MW04	1/5	3.1	5.3	1.38	18 N	50	MCL/MAC	NO	BSL
7440224	Silver	ND		ND		µg/L		0/5	0.7	0.7	ND	18 N	100	SMCL/MAC	NO	DLBSL
7440235	Sodium	2,770	J	8,530		µg/L	012TW01	5/5	89.1	8,530	22,800	N/A	N/A		NO	NUT
7440280	Thallium							0/5	3.5	3.5	ND	0.26 N	2	MCL	YES	DLASL
7440622	Vanadium	13.7	J	13.7	J	µg/L	012TW01	1/5	0.5 - 2.2	13.7	3.7	26 N	N/A		NO	BSL
7440666	Zinc	28	J	28	J	µg/L	012TW01	1/5	4.1	28	12.3	1,100 N	5000 / 2100	SMCL/MAC	NO	BSL

(1) Minimum/maximum detected concentration. Metals data is from unfiltered samples.
(2) N/A - Refer to supporting information for background discussion. Background values derived from statistical analysis.
Two times arithmetic mean site-wide background, Appendix B.1 of RI/FS guidance. Includes wells HP-1, HP-2, HP-3, and HP-4 sampled on 3/12/93.
(3) EPA Region III RBC Table 9/25/01, Tap Water RBC
Safe Drinking Water Act Action Level for Lead as screening level for lead.
Used napthalene as surrogate for acenapthylene.
Used pyrene as surrogate for benzo(g,h,i)pyrene and phenanthrene.
Used endrin as surrogate for endrin ketone.
Used chlordane as surrogate for alpha-chlordane and gamma-chlordane.
Used tehnical BHC as surrogate for delta-BHC.
Used endosulfan as surrogate for endosulfan I and endosulfan II.
Used PCBs as surrogate for Aroclor 1262 and Aroclor 1268.
Used mercuric chloride as surrogate for mercury.
(4) Rationale Codes Selection Reason:
Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Detection Limit Above State MAC (DLMAC) - evaluated quantitatively in uncertainty analysis
Detection Limit Above State Interim MAC (DLIntMAC) - evaluated quantitatively in uncertainty analysis
Deletion Reason:
No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)
Below Background (BKG)
Detection Limit Below Screening Levels (DLBSL)
Detection Limit Below Background (DLBKG)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
MCL = Federal Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
MAC = North Carolina Maximum Allowable Concentration (15A NCAC 2L.0200)
IntMAC - North Carolina Intermim Maximum Allowable Concentration (15A NCAC 2L.0202.)
R2L = North Carolina Target Remediation Guidelines and Treatment Standards, Recommended 2L, Rev. 9/3/99.
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic

TABLE 2.7
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Upper Aquifer - Water Vapors at Showerhead

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/L		0/5	1	1	N/A	320 N	200	MCL/MAC	NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/L		0/5	1	1	N/A	0.053 C	0.17	IntMAC	YES	DLASL
79005	1,1,2-Trichloroethane	ND		ND		µg/L		0/5	1	1	N/A	0.19 C	5	MCL	YES	DLASL
75343	1,1-Dichloroethane	ND		ND		µg/L		0/5	1	1	N/A	80 N	700	MAC	NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/L		0/5	1	1	N/A	0.044 C	7	MCL/MAC	YES	DLASL
106934	1,2-Dibromoethane	ND		ND		µg/L		0/5	1	1	N/A	0.00075 C	0.05 / 0.0004	MCL/MAC	YES	DLASL
107062	1,2-Dichloroethane	ND		ND		µg/L		0/5	1	1	N/A	0.12 C	5 / 0.38	MCL/MAC	YES	DLASL
78875	1,2-Dichloropropane	ND		ND		µg/L		0/5	1	1	N/A	0.16 C	5 / 0.56	MCL/MAC	YES	DLASL
78933	2-Butanone	ND		ND		µg/L		0/5	5	5	N/A	190 N	170	MAC	NO	DLBSL
591786	2-Hexanone	ND		ND		µg/L		0/5	5	5	N/A	150 N	280	IntMAC	NO	DLBSL
108101	4-Methyl-2-pentanone	ND		ND		µg/L		0/5	5	5	N/A	14 N	N/A		NO	DLBSL
67641	Acetone	ND		ND		µg/L		0/5	5	5	N/A	61 N	700	MAC	NO	DLBSL
71432	Benzene	ND		ND		µg/L		0/5	1	1	N/A	0.32 C	5 / 1	MCL/MAC	YES	DLASL
75274	Bromodichloromethane	ND		ND		µg/L		0/5	1	1	N/A	0.17 C	100 / 0.6	MCL/IntMAC	YES	DLASL
75252	Bromoform	ND		ND		µg/L		0/5	1	1	N/A	8.5 C	100 / 0.19	MCL/MAC	YES	DLMAC
74839	Bromomethane	0.3	J	0.3	J	µg/L	012MW02	1/5	1	0.3	N/A	8.5 N	N/A		NO	BSL
75150	Carbon disulfide	ND		ND		µg/L		0/5	1	1	N/A	100 N	700	IntMAC	NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/L		0/5	1	1	N/A	0.16 C	5 / 3	MCL/MAC	YES	DLASL
108907	Chlorobenzene	ND		ND		µg/L		0/5	1	1	N/A	11 N	100 / 50	MCL/MAC	NO	DLBSL
75003	Chloroethane	ND		ND		µg/L		0/5	1	1	N/A	3.6 C	2,800	IntMAC	NO	DLBSL
67663	Chloroform	ND		ND		µg/L		0/5	1	1	N/A	0.063 N	100 / 0.19	MCL/MAC	YES	DLASL
74873	Chloromethane	ND		ND		µg/L		0/5	1	1	N/A	2.1 C	2.6	IntMAC	NO	DLBSL
156592	cis-1,2-Dichloroethene	ND		ND		µg/L		0/5	1	1	N/A	6.1 N	70	MCL/MAC	NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/L		0/5	1	1	N/A	0.44 C	0.2	IntMAC	YES	DLASL
124481	Dibromochloromethane	ND		ND		µg/L		0/5	1	1	N/A	0.13 C	100 / 0.41	MCL/IntMAC	YES	DLASL
100414	Ethylbenzene	ND		ND		µg/L		0/5	1	1	N/A	130 N	700 / 29	MCL/MAC	NO	DLBSL
75092	Methylene chloride	ND		ND		µg/L		0/5	2	2	N/A	4.1 C	5	MCL/MAC	NO	DLBSL
100425	Styrene	ND		ND		µg/L		0/5	1	1	N/A	160 N	100	MCL/MAC	NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/L		0/5	1	1	N/A	1.1 C	5 / 0.7	MCL/MAC	YES	DLMAC
108883	Toluene	0.09	J	0.5	J	µg/L	012MW03	4/5	1	0.5	N/A	75 N	1,000	MCL/MAC	NO	BSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/L		0/5	1	1	N/A	12 N	100 / 70	MCL/MAC	NO	DLBSL

TABLE 2.7
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Upper Aquifer - Water Vapors at Showerhead

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
542756	trans-1,3-Dichloropropene	ND		ND		µg/L		0/5	1	1	N/A	0.44 C	0.2	IntMAC	YES	DLASL
79016	Trichloroethene	ND		ND		µg/L		0/5	1	1	N/A	1.6 C	5 / 2.8	MCL/MAC	NO	DLBSL
75014	Vinyl chloride	ND		ND		µg/L		0/5	1	1	N/A	0.015 C	2 / 0.015	MCL/MAC	YES	DLASL
1330207	Xylene, total	ND		ND		µg/L		0/5	1	1	N/A	1,200 N	10000 / 530	MCL/MAC	NO	DLBSL

(1) Minimum/maximum detected groundwater concentration since inhalation exposure equal to ingestion exposure for VOCs.
(2) N/A - No background data for VOCs.
(3) EPA Region III RBC Table 9/25/01, Tap Water RBC
(4) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Detection Limit Above State MAC (DLMAC) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Below Screening Level (BSL)
Detection Limit Below Screening Levels (DLBSL)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
MCL = Federal Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
MAC = North Carolina Maximum Allowable Concentration (15A NCAC 2L.0200)
IntMAC - North Carolina Intermim Maximum Allowable Concentration (15A NCAC 2L.0202.)
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic

TABLE 2.8
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Upper Aquifer - Water Vapors at Excavation Pit

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/L		0/5	1	1	N/A	320 N	200	MCL/MAC	NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/L		0/5	1	1	N/A	0.053 C	0.17	IntMAC	YES	DLASL
79005	1,1,2-Trichloroethane	ND		ND		µg/L		0/5	1	1	N/A	0.19 C	5	MCL	YES	DLASL
75343	1,1-Dichloroethane	ND		ND		µg/L		0/5	1	1	N/A	80 N	700	MAC	NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/L		0/5	1	1	N/A	0.044 C	7	MCL/MAC	YES	DLASL
106934	1,2-Dibromoethane	ND		ND		µg/L		0/5	1	1	N/A	0.00075 C	0.05 / 0.0004	MCL/MAC	YES	DLASL
107062	1,2-Dichloroethane	ND		ND		µg/L		0/5	1	1	N/A	0.12 C	5 / 0.38	MCL/MAC	YES	DLASL
78875	1,2-Dichloropropane	ND		ND		µg/L		0/5	1	1	N/A	0.16 C	5 / 0.56	MCL/MAC	YES	DLASL
78933	2-Butanone	ND		ND		µg/L		0/5	5	5	N/A	190 N	170	MAC	NO	DLBSL
591786	2-Hexanone	ND		ND		µg/L		0/5	5	5	N/A	150 N	280	IntMAC	NO	DLBSL
108101	4-Methyl-2-pentanone	ND		ND		µg/L		0/5	5	5	N/A	14 N	N/A		NO	DLBSL
67641	Acetone	ND		ND		µg/L		0/5	5	5	N/A	61 N	700	MAC	NO	DLBSL
71432	Benzene	ND		ND		µg/L		0/5	1	1	N/A	0.32 C	5 / 1	MCL/MAC	YES	DLASL
75274	Bromodichloromethane	ND		ND		µg/L		0/5	1	1	N/A	0.17 C	100 / 0.6	MCL/IntMAC	YES	DLASL
75252	Bromoform	ND		ND		µg/L		0/5	1	1	N/A	8.5 C	100 / 0.19	MCL/MAC	YES	DLMAC
74839	Bromomethane	0.3	J	0.3	J	µg/L	012MW02	1/5	1	0.3	N/A	8.5 N	N/A		NO	BSL
75150	Carbon disulfide	ND		ND		µg/L		0/5	1	1	N/A	100 N	700	IntMAC	NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/L		0/5	1	1	N/A	0.16 C	5 / 3	MCL/MAC	YES	DLASL
108907	Chlorobenzene	ND		ND		µg/L		0/5	1	1	N/A	11 N	100 / 50	MCL/MAC	NO	DLBSL
75003	Chloroethane	ND		ND		µg/L		0/5	1	1	N/A	3.6 C	2,800	IntMAC	NO	DLBSL
67663	Chloroform	ND		ND		µg/L		0/5	1	1	N/A	0.063 N	100 / 0.19	MCL/MAC	YES	DLASL
74873	Chloromethane	ND		ND		µg/L		0/5	1	1	N/A	2.1 C	2.6	IntMAC	NO	DLBSL
156592	cis-1,2-Dichloroethene	ND		ND		µg/L		0/5	1	1	N/A	6.1 N	70	MCL/MAC	NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/L		0/5	1	1	N/A	0.44 C	0.2	IntMAC	YES	DLASL
124481	Dibromochloromethane	ND		ND		µg/L		0/5	1	1	N/A	0.13 C	100 / 0.41	MCL/IntMAC	YES	DLASL
100414	Ethylbenzene	ND		ND		µg/L		0/5	1	1	N/A	130 N	700 / 29	MCL/MAC	NO	DLBSL
75092	Methylene chloride	ND		ND		µg/L		0/5	2	2	N/A	4.1 C	5	MCL/MAC	NO	DLBSL
100425	Styrene	ND		ND		µg/L		0/5	1	1	N/A	160 N	100	MCL/MAC	NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/L		0/5	1	1	N/A	1.1 C	5 / 0.7	MCL/MAC	YES	DLMAC
108883	Toluene	0.09	J	0.5	J	µg/L	012MW03	4/5	1	0.5	N/A	75 N	1,000	MCL/MAC	NO	BSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/L		0/5	1	1	N/A	12 N	100 / 70	MCL/MAC	NO	DLBSL

TABLE 2.8
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Upper Aquifer - Water Vapors at Excavation Pit

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
542756	trans-1,3-Dichloropropene	ND		ND		µg/L		0/5	1	1	N/A	0.44 C	0.2	intMAC	YES	DLASL
79016	Trichloroethene	ND		ND		µg/L		0/5	1	1	N/A	1.6 C	5 / 2.8	MCL/MAC	NO	DLBSL
75014	Vinyl chloride	ND		ND		µg/L		0/5	1	1	N/A	0.015 C	2 / 0.015	MCL/MAC	YES	DLASL
1330207	Xylene, total	ND		ND		µg/L		0/5	1	1	N/A	1,200 N	10000 / 530	MCL/MAC	NO	DLBSL

(1) Minimum/maximum detected groundwater concentration since this concentration used to determine concentration of VOCs in air.
(2) N/A - No background data for VOCs.
(3) EPA Region III RBC Table 9/25/01, Tap Water RBC
(4) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Detection Limit Above State MAC (DLMAC) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Below Screening Level (BSL)
Detection Limit Below Screening Levels (DLBSL)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
MCL = Federal Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
MAC = North Carolina Maximum Allowable Concentration (15A NCAC 2L.0200)
IntMAC - North Carolina Intermim Maximum Allowable Concentration (15A NCAC 2L.0202.)
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic

TABLE 2.9
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	2,200,000	N	1,670	NCSSL	NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	3,200	C	0.953	NCSSL	NO	DLBSL
79005	1,1,2-Trichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	11,000	C	3.34	NCSSL	NO	DLBSL
75343	1,1-Dichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	780,000	N	3,820	NCSSL	NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,100	C	44.5	NCSSL	NO	DLBSL
106934	1,2-Dibromoethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	7.5	C	0.00197	NCSSL	YES	DLASL
107062	1,2-Dichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	7,000	C	1.84	NCSSL	NO	DLBSL
540590	1,2-Dichloroethene (total)	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	70,000	N	380	NCSSL	NO	DLBSL
78875	1,2-Dichloropropane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	9,400	C	2.88	NCSSL	NO	DLBSL
78933	2-Butanone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	4,700,000	N	692	NCSSL	NO	DLBSL
591786	2-Hexanone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	310,000	N			NO	DLBSL
108101	4-Methyl-2-pentanone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	630,000	N			NO	DLBSL
67641	Acetone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	780,000	N	2,810	NCSSL	NO	DLBSL
71432	Benzene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	12,000	C	5.62	NCSSL	NO	DLBSL
75274	Bromodichloromethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	10,000	C	3.13	NCSSL	NO	DLBSL
75252	Bromoform	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	81,000	C	1.25	NCSSL	NO	DLBSL
74839	Bromomethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	11,000	N			NO	DLBSL
75150	Carbon disulfide	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	780,000	N	4,940	NCSSL	NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	4,900	C	2.74	NCSSL	NO	DLBSL
108907	Chlorobenzene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	160,000	N	438	NCSSL	NO	DLBSL
75003	Chloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	220,000	C	13,600	NCSSL	NO	DLBSL
67663	Chloroform	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	78,000	N	1.01	NCSSL	NO	DLBSL
74873	Chloromethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	49,000	C			NO	DLBSL
156592	cis-1,2-Dichloroethene	ND		ND		µg/kg		0/2	9.5 - 13	13	N/A	78,000	N	350	NCSSL	NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	6,400	N	0.958	NCSSL	NO	DLBSL
124481	Dibromochloromethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	7,600	C	1.71	NCSSL	NO	DLBSL
100414	Ethylbenzene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	780,000	N	241	NCSSL	NO	DLBSL
75092	Methylene chloride	1.5	J	310	J	µg/kg	012SS03	3/16	9.5 - 13	310	N/A	85,000	C	22	NCSSL	NO	BSL
100425	Styrene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,600,000	N	2,240	NCSSL	NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	12,000	C	7.42	NCSSL	NO	DLBSL
108883	Toluene	7.6	J	7.6	J	µg/kg	012SS01	1/16	9.5 - 13	8	N/A	1,600,000	N	7,270	NCSSL	NO	BSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/kg		0/2	9.5 - 13	13	N/A	160,000	N	380	NCSSL	NO	DLBSL
542756	trans-1,3-Dichloropropene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	6,400	N	0.958	NCSSL	NO	DLBSL
79016	Trichloroethene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	47,000	N	18.3	NCSSL	NO	DLBSL

TABLE 2.9
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
75014	Vinyl chloride	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	90	C	0.0952	NCSSL	NO	DLBSL
1330207	Xylene, total	12		12		µg/kg	012SS01	1/16	9.5 - 13	12	N/A	16,000,000	N	4,690	NCSSL	NO	BSL
120821	1,2,4-Trichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		78,000	N	2,610	NCSSL	NO	DLBSL
95501	1,2-Dichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		700,000	N	7,270	NCSSL	NO	DLBSL
541731	1,3-Dichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		7,000	N	23,700	NCSSL	NO	DLBSL
106467	1,4-Dichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		27,000	C	1,240	NCSSL	NO	DLBSL
108601	2,2'-Oxybis(1-chloropropane)	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A		N/A		NO	NTX
95954	2,4,5-Trichlorophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		780,000	N	3,940	NCSSL	NO	DLBSL
88062	2,4,6-Trichlorophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		58,000	C	200	SSL	NO	DLBSL
120832	2,4-Dichlorophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		23,000	N	1,000	SSL	NO	DLBSL
105679	2,4-Dimethylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		160,000	N	1,150	NCSSL	NO	DLBSL
51285	2,4-Dinitrophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		16,000	N	300	SSL	NO	DLBSL
121142	2,4-Dinitrotoluene	ND		ND		µg/kg		0/15	360 - 4100	4,100		16,000	N	0.8	SSL	NO	DLBSL
606202	2,6-Dinitrotoluene	ND		ND		µg/kg		0/15	360 - 4100	4,100		7,800	N	0.7	SSL	NO	DLBSL
91587	2-Chloronaphthalene	ND		ND		µg/kg		0/15	360 - 4100	4,100		630,000	N			NO	DLBSL
95578	2-Chlorophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		39,000	N	1.2	NCSSL	NO	DLBSL
91576	2-Methylnaphthalene	44	J	44	J	µg/kg	012SS01	1/15	360 - 4100	44		160,000	N	585	NCSSL	NO	BSL
95487	2-Methylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		390,000	N	204	NCSSL	NO	DLBSL
88744	2-Nitroaniline	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A		N/A		NO	NTX
88755	2-Nitrophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		63,000	N			NO	DLBSL
91941	3,3'-Dichlorobenzidine	ND		ND		µg/kg		0/15	360 - 4100	4,100		1,400	C	7	SSL	YES	DLASL
99092	3-Nitroaniline	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A		N/A		NO	NTX
534521	4,6-Dinitro-2-methylphenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		7,800	N			YES	DLASL
101553	4-Bromophenyl-phenylether	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A		N/A		NO	NTX
59507	4-Chloro-3-methylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		390,000	N			NO	DLBSL
106478	4-Chloroaniline	ND		ND		µg/kg		0/15	360 - 4100	4,100		31,000	N	700	SSL	NO	DLBSL
7005723	4-Chlorophenyl-phenylether	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A		N/A		NO	NTX
106445	4-Methylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		39,000	N	17.4	NCSSL	NO	DLBSL
100016	4-Nitroaniline	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A		N/A		NO	NTX
100027	4-Nitrophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		63,000	N			NO	DLBSL
83329	Acenaphthene	ND		ND		µg/kg		0/15	360 - 4100	4,100		470,000	N	8,160	NCSSL	NO	DLBSL
208968	Acenaphthylene	ND		ND		µg/kg		0/15	360 - 4100	4,100		160,000	N	11,400	NCSSL	NO	DLBSL
120127	Anthracene	ND		ND		µg/kg		0/15	360 - 4100	4,100		2,300,000	N	995,000	NCSSL	NO	DLBSL

TABLE 2.9
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
56553	Benzo(a)anthracene	ND		ND		µg/kg		0/15	360 - 4100	4,100		870	C	358	NCSSL	YES	DLASL
50328	Benzo(a)pyrene	ND		ND		µg/kg		0/15	360 - 4100	4,100		87	C	91.1	NCSSL	YES	DLASL
205992	Benzo(b)fluoranthene	47	J	47	J	µg/kg	012SS02	1/15	360 - 4100	47		870	C	585	NCSSL	NO	BSL
191242	Benzo(g,h,i)perylene	47	J	47	J	µg/kg	012SS02	1/15	360 - 4100	47		230,000	N	6,720,000	NCSSL	NO	BSL
207089	Benzo(k)fluoranthene	ND		ND		µg/kg		0/15	360 - 4100	4,100		8,700	C	585	NCSSL	NO	DLBSL
111911	bis(2-Chloroethoxy)methane	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A		N/A		NO	NTX
111444	bis(2-Chloroethyl)ether	ND		ND		µg/kg		0/15	360 - 4100	4,100		580	C	0.171	NCSSL	YES	DLASL
117817	bis(2-Ethylhexyl)phthalate	46	J	470		µg/kg	012SS09 012SS10	11/15	360 - 4100	470		46,000	C	6,670	NCSSL	NO	BSL
85687	Butylbenzylphthalate	49	J	49	J	µg/kg	012SS17	1/15	360 - 4100	49		1,600,000	N	27,800	NCSSL	NO	BSL
86748	Carbazole	ND		ND		µg/kg		0/15	360 - 4100	4,100		32,000	C	585	NCSSL	NO	DLBSL
218019	Chrysene	39	J	39	J	µg/kg	012SS02	1/15	360 - 4100	39		87,000	C	39,800	NCSSL	NO	BSL
84742	Di-n-butylphthalate	41	J	43	J	µg/kg	012SS16	2/15	360 - 4100	43		780,000	N	24,800	NCSSL	NO	BSL
117840	Di-n-octyl phthalate	ND		ND		µg/kg		0/15	360 - 4100	4,100		160,000	N	233,000,000	NCSSL	NO	DLBSL
53703	Dibenz(a,h)anthracene	ND		ND		µg/kg		0/15	360 - 4100	4,100		87	C	168	NCSSL	YES	DLASL
132649	Dibenzofuran	ND		ND		µg/kg		0/15	360 - 4100	4,100		31,000	N			NO	DLBSL
84662	Diethylphthalate	ND		ND		µg/kg		0/15	360 - 4100	4,100		6,300,000	N	28,200	NCSSL	NO	DLBSL
131113	Dimethyl phthalate	ND		ND		µg/kg		0/15	360 - 4100	4,100		78,000,000	N			NO	DLBSL
206440	Fluoranthene	53	J	53	J	µg/kg	012SS02	1/15	360 - 4100	53		310,000	N	276,000	NCSSL	NO	BSL
86737	Fluorene	ND		ND		µg/kg		0/15	360 - 4100	4,100		310,000	N	44,300	NCSSL	NO	DLBSL
118741	Hexachlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		400	C	32.1	NCSSL	YES	DLASL
87683	Hexachlorobutadiene	ND		ND		µg/kg		0/15	360 - 4100	4,100		1,600	N	2,000	SSL	YES	DLASL
77474	Hexachlorocyclopentadiene	ND		ND		µg/kg		0/15	360 - 4100	4,100		47,000	N	200,000	NCSSL	NO	DLBSL
67721	Hexachloroethane	ND		ND		µg/kg		0/15	360 - 4100	4,100		7,800	N	500	SSL	NO	DLBSL
193395	Indeno(1,2,3-cd)pyrene	ND		ND		µg/kg		0/15	360 - 4100	4,100		870	C	3,260	NCSSL	YES	DLASL
78591	Isophorone	ND		ND		µg/kg		0/15	360 - 4100	4,100		670,000	C	182	NCSSL	NO	DLBSL
621647	n-Nitroso-di-n-propylamine	ND		ND		µg/kg		0/15	360 - 4100	4,100		91	C	0.05	SSL	YES	DLASL
86306	n-Nitrosodiphenylamine	ND		ND		µg/kg		0/15	360 - 4100	4,100		130,000	C	1,000	SSL	NO	DLBSL
91203	Naphthalene	ND		ND		µg/kg		0/15	360 - 4100	4,100		160,000	N	585	NCSSL	NO	DLBSL
98953	Nitrobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		3,900	N	100	SSL	YES	DLASL
87865	Pentachlorophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		5,300	C	23.1	NCSSL	YES	DLASL
85018	Phenanthrene	44	J	44	J	µg/kg	012SS02	1/15	360 - 4100	44		230,000	N	59,600	NCSSL	NO	BSL
108952	Phenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		4,700,000	N	1,750	NCSSL	NO	DLBSL
129000	Pyrene	53	J	53	J	µg/kg	012SS02	1/15	360 - 4100	53		230,000	N	286,000	NCSSL	NO	BSL

TABLE 2.9
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
72548	4,4'-DDD	0.86	J	6.1	J	µg/kg	012SS08	6/15	3.6 - 21	6.1		2,700	C	129	NCSSL	NO	BSL
72559	4,4'-DDE	0.45	J	3.7	J	µg/kg	012SS04	10/15	3.6 - 20	3.7		1,900	C	129	NCSSL	NO	BSL
50293	4,4'-DDT	1.5	J	13	J	µg/kg	012SS04	7/15	3.6 - 20	13		1,900	C	1,360	NCSSL	NO	BSL
309002	Aldrin	ND		ND		µg/kg		0/15	1.8 - 10	10		38	C	500	SSL	NO	DLBSL
319846	alpha-BHC	0.034	J	0.33	J	µg/kg	012SS17	5/15	1.8 - 10	0.33		100	C	0.5	SSL	NO	BSL
57749	alpha-Chlordane	0.24	J	51	J	µg/kg	012SS04	11/15	1.8 - 10	51		1,800	C	27.8	NCSSL	NO	BSL
12674112	Aroclor-1016	ND		ND		µg/kg		0/15	36 - 210	210		5,500	C			NO	DLBSL
11104282	Aroclor-1221	ND		ND		µg/kg		0/15	72 - 420	420		320	C			YES	DLASL
11141165	Aroclor-1232	ND		ND		µg/kg		0/15	36 - 210	210		320	C			NO	DLBSL
53469219	Aroclor-1242	ND		ND		µg/kg		0/15	36 - 210	210		320	C			NO	DLBSL
12672296	Aroclor-1248	ND		ND		µg/kg		0/15	36 - 210	210		320	C			NO	DLBSL
11097691	Aroclor-1254	ND		ND		µg/kg		0/15	36 - 210	210		156	C			NO	DLBSL
11096825	Aroclor-1260	14	J	450	J	µg/kg	012SS11	6/15	36 - 210	450		320	C			YES	ASL
319857	beta-BHC	ND		ND		µg/kg		0/15	1.8 - 10	10		350	C	3	SSL	NO	DLBSL
319868	delta-BHC	0.094	J	0.18	J	µg/kg	012SS16	3/15	1.8 - 10	0.18		350	C			NO	BSL
60571	Dieldrin	0.53	J	16		µg/kg	012SS16	6/15	3.6 - 21	16		40	C	1.13	NCSSL	NO	BSL
959988	Endosulfan I	1.5	J	1.5	J	µg/kg	012SS08	1/15	1.8 - 10	1.5		47,000	N	18,000	SSL	NO	BSL
33213659	Endosulfan II	ND		ND		µg/kg		0/15	3.6 - 21	21		47,000	N	18,000	SSL	NO	DLBSL
1031078	Endosulfan sulfate	0.17	J	15		µg/kg	012SS10	12/15	3.6 - 21	15		47,000	N			NO	BSL
72208	Endrin	0.64	J	4.8		µg/kg	012SS08	6/15	3.6 - 21	4.8		2,300	N	440	NCSSL	NO	BSL
7421934	Endrin aldehyde	1.9	J	3.7	J	µg/kg	012SS11	2/15	3.6 - 21	3.7		2,300	N	440	NCSSL	NO	BSL
53494705	Endrin ketone	3.5	J	3.5	J	µg/kg	012SS11	1/15	3.6 - 21	3.5		2,300	N	440	NCSSL	NO	BSL
58899	gamma-BHC (Lindane)	0.15	J	0.15	J	µg/kg	012SS10	1/15	1.8 - 10	0.15		490	C	6.2	NCSSL	NO	BSL
12789036	gamma-Chlordane	1.3	J	53		µg/kg	012SS11	13/15	1.8 - 10	53		1,800	C	27.8	NCSSL	NO	BSL
76448	Heptachlor	0.074	J	0.53	J	µg/kg	012SS04	5/15	1.8 - 10	0.53		140	C	2.4	NCSSL	NO	BSL
1024573	Heptachlor epoxide	0.098	J	12		µg/kg	012SS04	9/15	1.8 - 10	12		70	C	6.67	NCSSL	NO	BSL
72435	Methoxychlor	ND		ND		µg/kg		0/15	18 - 100	100		39,000	N	56,100	NCSSL	NO	DLBSL
8001352	Toxaphene	ND		ND		µg/kg		0/15	180 - 1000	1,000		580	C	59.5	NCSSL	YES	DLASL

TABLE 2.9
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
35822469	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	210		210		pg/g	012S15	1/3	5.4 - 5.7	2.1				1.45	NCSSL		
55673897	1,2,3,4,6,7,8-Heptachlorodibenzofuran	5.2	J	5.2	J	pg/g	012S15	1/3	0.22 - 5.7	0.052				1.45	NCSSL		
55976897	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.7	J	0.7	J	pg/g	012S15	1/3	0.3 - 5.7	0.007				1.45	NCSSL		
39227286	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	3.5	J	3.5	J	pg/g	012S15	1/3	0.23 - 5.7	0.35				0.145	NCSSL		
70648269	1,2,3,4,7,8-Hexachlorodibenzofuran	1.1	J	1.1	J	pg/g	012S15	1/3	0.2 - 5.7	0.11				0.145	NCSSL		
57653857	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.31	J	7.3	J	pg/g	012S15	2/3	0.26 - 5.7	0.73				0.145	NCSSL		
57117449	1,2,3,6,7,8-Hexachlorodibenzofuran	0.85	J	0.85	J	pg/g	012S15	1/3	0.2 - 5.7	0.085				0.145	NCSSL		
19408743	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.27	JQ	9.3	J	pg/g	012S15	3/3	5.4 - 5.7	0.93				0.145	NCSSL		
72918219	1,2,3,7,8,9-Hexachlorodibenzofuran	ND		0.5	U	pg/g		0/3	0.26 - 0.69	0.05				0.29	NCSSL		
40321764	1,2,3,7,8-Pentachlorodebenzo-p-dioxin	1.3	J	1.3	J	pg/g	012S15	1/3	0.29 - 5.7	0.65				0.029	NCSSL		
57117416	1,2,3,7,8-Pentachlorodibenzo furan	ND		0.56	U	pg/g		0/3	0.26 - 0.56	0.03				0.29	NCSSL		
60851345	2,3,4,6,7,8-Hexachlorodibenzofuran	0.53	J	0.53	J	pg/g	012S15	1/3	0.23 - 5.7	0.053				0.145	NCSSL		
57117314	2,3,4,7,8-Pentachlorodibenzofuran	0.33	J	0.33	J	pg/g	012S15	1/3	0.2 - 5.7	0.165				0.029	NCSSL		
1746016	2,3,7,8-TCDD (dioxin)	0.43	J	0.43	J	pg/g	012S15	1/3	0.23 - 1.1	0.43				0.0145	NCSSL		
51207319	2,3,7,8-Tetrachlorodibenzofuran	ND		1.1	U	pg/g		0/3	0.43 - 1.1	0.1				0.145	NCSSL		
1746016	2,3,7,8-TCDD (dioxin) total equivalents					pg/g				5.85		4.3		0.0145	NCSSL	YES	ASL
7429905	Aluminum	2,840		21,600	J	mg/kg	012S17	16/16	4.1 -4.8	21,600	10,162	7,800	N			YES	ASL
7440360	Antimony	0.59	J	14.5	J	mg/kg	012S17	8/16	0.47 - 0.7	14.5		3.1	N	5.42	NCSSL	YES	ASL
7440382	Arsenic	0.7	J	2.3	J	mg/kg	012S17	14/16	0.64 - 1.7	2.3	3.9	0.43	C	26.2	NCSSL	NO	BKG
7440393	Barium	7.3	J	49.4	J	mg/kg	012S10	16/16	0.04 - 28.5	49.4	23.0	550	N	848	NCSSL	NO	BSL
7440417	Beryllium	0.05	J	0.08	J	mg/kg	012S10	2/16	0.02 - 0.12	0.08	0.44	16	N	8.8	NCSSL	NO	BSL
7440439	Cadmium	0.92	J	12.1		mg/kg	012S17	14/16	0.04 - 0.05	12.1	1.12	7.8	N	2.7	NCSSL	YES	ASL
7440702	Calcium	1,570	J	85,800		mg/kg	012S15	16/16	2 - 2.3	85,800	512	N/A				NO	NUT
18540299	Chromium (assumed VI)	4.4		40.9		mg/kg	012S17	16/16	0.13 - 0.15	40.9	17.0	23	N	27.2	NCSSL	YES	ASL
7440484	Cobalt	0.5	J	0.5	J	mg/kg	012S01	1/16	0.31 - 0.92	0.5	2.38	160	N			NO	BSL
7440508	Copper	12.7		667	J	mg/kg	012S18	14/16	0.13 - 0.8	667	3.76	310	N	704	NCSSL	YES	ASL
7439896	Iron	1,600		6,920		mg/kg	012S16	16/16	2.2 - 2.6	6,920	5,960	4,700	N			YES	ASL
7439921	Lead	2.4		705		mg/kg	012S16	16/16	0.28 - 0.33	705	10.5	400		270	NCSSL	YES	ASL
7439954	Magnesium	202	J	1,810		mg/kg	012S18	16/16	2 - 2.4	1,810	422	N/A				NO	NUT
7439965	Manganese	5.8	J	97.7	J	mg/kg	012S18	16/16	0.04 - 0.05	97.7	16.7	160	N	65.2	NCSSL	NO	BSL
7439976	Mercury	0.04	J	0.3		mg/kg	012S18	15/16	0.04	0.3	0.13	2.1	N	0.0154	NCSSL	NO	BSL
7440020	Nickel	1.1	J	21.6		mg/kg	012S17	16/16	0.28 - 0.33	21.6	6.90	160	N	56.4	NCSSL	NO	BSL
7440097	Potassium	84.7	J	370	J	mg/kg	012S16	16/16	7.2 - 8.4	370	482	N/A		151	NCSSL	NO	NUT

TABLE 2.9
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7782492	Selenium	0.96	J	1	J	mg/kg	012S10	2/16	0.67 - 0.78	1	0.56	39	N	12.2	NCSSL	NO	BSL
7440224	Silver	0.17	J	0.87	J	mg/kg	012SS04	7/16	0.15 - 1.1	0.87	0.82	39	N	0.223	NCSSL	NO	BSL
7440235	Sodium	20.6	J	93.9	J	mg/kg	012S15	8/16	19.1 - 22.4	93.9	51.0	N/A				NO	NUT
7440280	Thallium	ND		ND				0/16	0.75 - 0.88	0.88	0.96	0.55	N	0.512	NCSSL	NO	DLBKG
7440622	Vanadium	5.6	J	20.8		mg/kg	012S10	16/16	0.11 - 0.13	20.8	19.2	55	N	6,000	SSL	NO	BSL
7440666	Zinc	3.7	J	569		mg/kg	012S17	16/16	0.88 - 1	569	11.3	2,300	N	1,100	NCSSL	NO	BSL

(1) Minimum/maximum detected concentration. For dioxins, sample quantitation limit (SQL) is given in maximum detected concentration column for dioxin congeners which were not detected. SQL is from only sample in which dioxins were detected.

(2) Background values derived from statistical analysis. Two times arithmetic mean site-wide background, Appendix B.1 of RI/FS guidance.

(3) EPA Region III RBC Table 9/25/01, Residential Soil RBC
used RBC for pyrene as surrogate for benzo(g,h,i)pyrene and phenanthrene.
used RBC for napthalene as surrogate for acenapthylene.
used RBC for chlordane as surrogate for alpha-chlordane and gamma-chlodane
used RBC for endosulfan as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
used RBC for endrin as surrogate for endrin aldehyde and endrin ketone.
used RBC for 4-nitrophenol as surrogate for 2-nitrophenol.
used RBC for 3-methylphenol as surrogate for 4-chloro-3-methylphenol.
used RBC for 1,3-dichloropropene for cis-1,3-dichloropropene and trans-1,3-dichloropropene
used RBC for mercuric chloride for mercury
The sum of the 2,3,7,8-TCDD equivelant concentrations (shown in conc. used for screening column) compared to screening value.
Residential Soil Screening Level for lead.

(4) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Levels (BSL)
Below Background (BKG)
Detection Limit Below Screening Levels (DLBSL)
Detection Limit Below Background (DLBKG)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
NCSSL = North Carolina Soil Screening Concentration Level Rev. 9/13/1999.
SSL = Soil Screening Level, Migration to Groundwater, DAF of 20, EPA Soil Screening Guidance, 1996.
J = Estimated Value
U = Not Detected, value given is detection limit
C = Carcinogenic
N = Non-Carcinogenic
ND = Not Detected

TABLE 2.10
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,200,000 S			NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	600 C			NO	DLBSL
79005	1,1,2-Trichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,000 C			NO	DLBSL
75343	1,1-Dichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	130,000 N			NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	70 C			NO	DLBSL
106934	1,2-Dibromoethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	N/A			NO	NTX
107062	1,2-Dichloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	400 C			NO	DLBSL
540590	1,2-Dichloroethene (total)	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,200,000 S			NO	DLBSL
78875	1,2-Dichloropropane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,500 C			NO	DLBSL
78933	2-Butanone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	N/A			NO	NTX
591786	2-Hexanone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	N/A			NO	NTX
108101	4-Methyl-2-pentanone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	N/A			NO	NTX
67641	Acetone	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	100,000,000 S			NO	DLBSL
71432	Benzene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	800 C			NO	DLBSL
75274	Bromodichloromethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	3,000,000 S			NO	DLBSL
75252	Bromoform	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	53,000 C			NO	DLBSL
74839	Bromomethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,000 N			NO	DLBSL
75150	Carbon disulfide	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	720,000 S			NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	300 C			NO	DLBSL
108907	Chlorobenzene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	13,000 N			NO	DLBSL
75003	Chloroethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	N/A			NO	NTX
67663	Chloroform	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	300 C			NO	DLBSL
74873	Chloromethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	N/A			NO	NTX
156592	cis-1,2-Dichloroethene	ND		ND		µg/kg		0/2	9.5 - 13	13	N/A	1,200,000 S			NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	100 C			NO	DLBSL
124481	Dibromochloromethane	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,300,000 S			NO	DLBSL
100414	Ethylbenzene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	400,000 S			NO	DLBSL
75092	Methylene chloride	1.5	J	310	J	µg/kg	012SS03	3/16	9.5 - 13	310	N/A	13,000 C			NO	BSL
100425	Styrene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	1,500,000 S			NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	11,000 C			NO	DLBSL
108883	Toluene	7.6	J	7.6	J	µg/kg	012SS01	1/16	9.5 - 13	8	N/A	650,000 N			NO	BSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/kg		0/2	9.5 - 13	13	N/A	3,100,000 S			NO	DLBSL
542756	trans-1,3-Dichloropropene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	100 C			NO	DLBSL
79016	Trichloroethene	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	5,000 C			NO	DLBSL

TABLE 2.10
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
75014	Vinyl chloride	ND		ND		µg/kg		0/16	9.5 - 13	13	N/A	30 C			NO	DLBSL
1330207	Xylene, total	12		12		µg/kg	012SS01	1/16	9.5 - 13	12	N/A	410,000 S			NO	BSL
120821	1,2,4-Trichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		3,200,000 S			NO	DLBSL
95501	1,2-Dichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		560,000 S			NO	DLBSL
541731	1,3-Dichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
106467	1,4-Dichlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
108601	2,2'-Oxybis(1-chloropropane)	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
95954	2,4,5-Trichlorophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
88062	2,4,6-Trichlorophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		200,000 C			NO	DLBSL
120832	2,4-Dichlorophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
105679	2,4-Dimethylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
51285	2,4-Dinitrophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
121142	2,4-Dinitrotoluene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
606202	2,6-Dinitrotoluene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
91587	2-Chloronaphthalene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
95578	2-Chlorophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		53,000,000 S			NO	DLBSL
91576	2-Methylnaphthalene	44	J	44	J	µg/kg	012SS01	1/15	360 - 4100	44		N/A			NO	NTX
95487	2-Methylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
88744	2-Nitroaniline	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
88755	2-Nitrophenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
91941	3,3'-Dichlorobenzidine	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
99092	3-Nitroaniline	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
534521	4,6-Dinitro-2-methylphenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
101553	4-Bromophenyl-phenylether	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
59507	4-Chloro-3-methylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
106478	4-Chloroaniline	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
7005723	4-Chlorophenyl-phenylether	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
106445	4-Methylphenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
100016	4-Nitroaniline	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
100027	4-Nitrophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
83329	Acenaphthene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
208968	Acenaphthylene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
120127	Anthracene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX

TABLE 2.10
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
56553	Benzo(a)anthracene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
50328	Benzo(a)pyrene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
205992	Benzo(b)fluoranthene	47	J	47	J	µg/kg	012SS02	1/15	360 - 4100	47		N/A			NO	NTX
191242	Benzo(g,h,i)perylene	47	J	47	J	µg/kg	012SS02	1/15	360 - 4100	47		N/A			NO	NTX
207089	Benzo(k)fluoranthene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
111911	bis(2-Chloroethoxy)methane	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
111444	bis(2-Chloroethyl)ether	ND		ND		µg/kg		0/15	360 - 4100	4,100		200 C			YES	DLASL
117817	bis(2-Ethylhexyl)phthalate	46	J	470		µg/kg	012SS09 012SS10	11/15	360 - 4100	470		31,000,000 S			NO	BSL
85687	Butylbenzylphthalate	49	J	49	J	µg/kg	012SS17	1/15	360 - 4100	49		930,000 S			NO	BSL
86748	Carbazole	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
218019	Chrysene	39	J	39	J	µg/kg	012SS02	1/15	360 - 4100	39		N/A			NO	NTX
84742	Di-n-butylphthalate	41	J	43	J	µg/kg	012SS16	2/15	360 - 4100	43		2,300,000 S			NO	BSL
117840	Di-n-octyl phthalate	ND		ND		µg/kg		0/15	360 - 4100	4,100		10,000,000 S			NO	DLBSL
53703	Dibenz(a,h)anthracene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
132649	Dibenzofuran	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
84662	Diethylphthalate	ND		ND		µg/kg		0/15	360 - 4100	4,100		2,000,000 S			NO	DLBSL
131113	Dimethyl phthalate	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
206440	Fluoranthene	53	J	53	J	µg/kg	012SS02	1/15	360 - 4100	53		N/A			NO	NTX
86737	Fluorene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
118741	Hexachlorobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		1,000 C			YES	DLASL
87683	Hexachlorobutadiene	ND		ND		µg/kg		0/15	360 - 4100	4,100		8,000 N			NO	DLBSL
77474	Hexachlorocyclopentadiene	ND		ND		µg/kg		0/15	360 - 4100	4,100		1,000 N			YES	DLASL
67721	Hexachloroethane	ND		ND		µg/kg		0/15	360 - 4100	4,100		55,000 N			NO	DLBSL
193395	Indeno(1,2,3-cd)pyrene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
78591	Isophorone	ND		ND		µg/kg		0/15	360 - 4100	4,100		4,600,000 S			NO	DLBSL
621647	n-Nitroso-di-n-propylamine	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
86306	n-Nitrosodiphenylamine	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
91203	Naphthalene	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
98953	Nitrobenzene	ND		ND		µg/kg		0/15	360 - 4100	4,100		9,200 N			NO	DLBSL
87865	Pentachlorophenol	ND		ND		µg/kg		0/15	870 - 9900	9,900		N/A			NO	NTX
85018	Phenanthrene	44	J	44	J	µg/kg	012SS02	1/15	360 - 4100	44		N/A			NO	NTX
108952	Phenol	ND		ND		µg/kg		0/15	360 - 4100	4,100		N/A			NO	NTX
129000	Pyrene	53	J	53	J	µg/kg	012SS02	1/15	360 - 4100	53		N/A			NO	NTX

TABLE 2.10
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
72548	4,4'-DDD	0.86	J	6.1	J	µg/kg	012SS08	6/15	3.6 - 21	6.1		N/A			NO	NTX
72559	4,4'-DDE	0.45	J	3.7	J	µg/kg	012SS04	10/15	3.6 - 20	3.7		N/A			NO	NTX
50293	4,4'-DDT	1.5	J	13	J	µg/kg	012SS04	7/15	3.6 - 20	13		N/A			NO	NTX
309002	Aldrin	ND		ND		µg/kg		0/15	1.8 - 10	10		3,000 C			NO	DLBSL
319846	alpha-BHC	0.034	J	0.33	J	µg/kg	012SS17	5/15	1.8 - 10	0.33		800 C			NO	BSL
57749	alpha-Chlordane	0.24	J	51	J	µg/kg	012SS04	11/15	1.8 - 10	51		20,000 C			NO	BSL
12674112	Aroclor-1016	ND		ND		µg/kg		0/15	36 - 210	210		N/A			NO	NTX
11104282	Aroclor-1221	ND		ND		µg/kg		0/15	72 - 420	420		N/A			NO	NTX
11141165	Aroclor-1232	ND		ND		µg/kg		0/15	36 - 210	210		N/A			NO	NTX
53469219	Aroclor-1242	ND		ND		µg/kg		0/15	36 - 210	210		N/A			NO	NTX
12672296	Aroclor-1248	ND		ND		µg/kg		0/15	36 - 210	210		N/A			NO	NTX
11097691	Aroclor-1254	ND		ND		µg/kg		0/15	36 - 210	210		N/A			NO	NTX
11096825	Aroclor-1260	14	J	450	J	µg/kg	012SS11	6/15	36 - 210	450		N/A			NO	NTX
319857	beta-BHC	ND		ND		µg/kg		0/15	1.8 - 10	10		N/A			NO	NTX
319868	delta-BHC	0.094	J	0.18	J	µg/kg	012SS16	3/15	1.8 - 10	0.18		N/A			NO	NTX
60571	Dieldrin	0.53	J	16		µg/kg	012SS16	6/15	3.6 - 21	16		1,000 C			NO	BSL
959988	Endosulfan I	1.5	J	1.5	J	µg/kg	012SS08	1/15	1.8 - 10	1.5		N/A			NO	NTX
33213659	Endosulfan II	ND		ND		µg/kg		0/15	3.6 - 21	21		N/A			NO	NTX
1031078	Endosulfan sulfate	0.17	J	15		µg/kg	012SS10	12/15	3.6 - 21	15		N/A			NO	NTX
72208	Endrin	0.64	J	4.8		µg/kg	012SS08	6/15	3.6 - 21	4.8		N/A			NO	NTX
7421934	Endrin aldehyde	1.9	J	3.7	J	µg/kg	012SS11	2/15	3.6 - 21	3.7		N/A			NO	NTX
53494705	Endrin ketone	3.5	J	3.5	J	µg/kg	012SS11	1/15	3.6 - 21	3.5		N/A			NO	NTX
58899	gamma-BHC (Lindane)	0.15	J	0.15	J	µg/kg	012SS10	1/15	1.8 - 10	0.15		N/A			NO	NTX
12789036	gamma-Chlordane	1.3	J	53		µg/kg	012SS11	13/15	1.8 - 10	53		20,000 C			NO	BSL
76448	Heptachlor	0.074	J	0.53	J	µg/kg	012SS04	5/15	1.8 - 10	0.53		100 C			NO	BSL
1024573	Heptachlor epoxide	0.098	J	12		µg/kg	012SS04	9/15	1.8 - 10	12		5,000 C			NO	BSL
72435	Methoxychlor	ND		ND		µg/kg		0/15	18 - 100	100		N/A			NO	NTX
8001352	Toxaphene	ND		ND		µg/kg		0/15	180 - 1000	1,000		89,000 C			NO	DLBSL

TABLE 2.10
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
35822469	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	210		210		pg/g	012S15	1/3	5.4 - 5.7	2.1						
55673897	1,2,3,4,6,7,8-Heptachlorodibenzofuran	5.2	J	5.2	J	pg/g	012S15	1/3	0.22 - 5.7	0.052						
55976897	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.7	J	0.7	J	pg/g	012S15	1/3	0.3 - 5.7	0.007						
39227286	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	3.5	J	3.5	J	pg/g	012S15	1/3	0.23 - 5.7	0.35						
70648269	1,2,3,4,7,8-Hexachlorodibenzofuran	1.1	J	1.1	J	pg/g	012S15	1/3	0.2 - 5.7	0.11						
57653857	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.31	J	7.3	J	pg/g	012S15	2/3	0.26 - 5.7	0.73						
57117449	1,2,3,6,7,8-Hexachlorodibenzofuran	0.85	J	0.85	J	pg/g	012S15	1/3	0.2 - 5.7	0.085						
19408743	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.27	JQ	9.3	J	pg/g	012S15	3/3	5.4 - 5.7	0.93						
72918219	1,2,3,7,8,9-Hexachlorodibenzofuran	ND		0.5	U	pg/g		0/3	0.26 - 0.69	0.05						
40321764	1,2,3,7,8-Pentachlorodebenzo-p-dioxin	1.3	J	1.3	J	pg/g	012S15	1/3	0.29 - 5.7	0.65						
57117416	1,2,3,7,8-Pentachlorodibenzo furan	ND		0.56	U	pg/g		0/3	0.26 - 0.56	0.03						
60851345	2,3,4,6,7,8-Hexachlorodibenzofuran	0.53	J	0.53	J	pg/g	012S15	1/3	0.23 - 5.7	0.053						
57117314	2,3,4,7,8-Pentachlorodibenzofuran	0.33	J	0.33	J	pg/g	012S15	1/3	0.2 - 5.7	0.165						
1746016	2,3,7,8-TCDD (dioxin)	0.43	J	0.43	J	pg/g	012S15	1/3	0.23 - 1.1	0.43						
51207319	2,3,7,8-Tetrachlorodibenzofuran	ND		1.1	U	pg/g		0/3	0.43 - 1.1	0.1						
1746016	2,3,7,8-TCDD (dioxin) total equivalents					pg/g				5.85		N/A			NO	NTX
7429905	Aluminum	2,840		21,600	J	mg/kg	012S17	16/16	4.1 -4.8	21,600	10,162	N/A			NO	NTX
7440360	Antimony	0.59	J	14.5	J	mg/kg	012S17	8/16	0.47 - 0.7	14.5		N/A			NO	NTX
7440382	Arsenic	0.7	J	2.3	J	mg/kg	012S17	14/16	0.64 - 1.7	2.3	3.9	750 C			NO	BSL
7440393	Barium	7.3	J	49.4	J	mg/kg	012S10	16/16	0.04 - 28.5	49.4	23.0	69,000 N			NO	BSL
7440417	Beryllium	0.05	J	0.08	J	mg/kg	012S10	2/16	0.02 - 0.12	0.08	0.44	1,300 N			NO	BSL
7440439	Cadmium	0.92	J	12.1		mg/kg	012S17	14/16	0.04 - 0.05	12.1	1.12	1,800 N			NO	BSL
7440702	Calcium	1,570	J	85,800		mg/kg	012S15	16/16	2 - 2.3	85,800	512	N/A			NO	NUT
18540299	Chromium (assumed VI)	4.4		40.9		mg/kg	012S17	16/16	0.13 - 0.15	40.9	17.0	270 N			NO	BSL
7440484	Cobalt	0.5	J	0.5	J	mg/kg	012S01	1/16	0.31 - 0.92	0.5	2.38	N/A			NO	BKG
7440508	Copper	12.7		667	J	mg/kg	012S18	14/16	0.13 - 0.8	667	3.76	N/A			NO	NTX
7439896	Iron	1,600		6,920		mg/kg	012S16	16/16	2.2 - 2.6	6,920	5,960	N/A			NO	NTX
7439921	Lead	2.4		705		mg/kg	012S16	16/16	0.28 - 0.33	705	10.5	N/A			NO	NTX
7439954	Magnesium	202	J	1,810		mg/kg	012S18	16/16	2 - 2.4	1,810	422	N/A			NO	NUT
7439965	Manganese	5.8	J	97.7	J	mg/kg	012S18	16/16	0.04 - 0.05	97.7	16.7	N/A			NO	NTX
7439976	Mercury	0.04	J	0.3		mg/kg	012S18	15/16	0.04	0.3	0.13	N/A			NO	NTX
7440020	Nickel	1.1	J	21.6		mg/kg	012S17	16/16	0.28 - 0.33	21.6	6.90	13000 N			NO	BSL
7440097	Potassium	84.7	J	370	J	mg/kg	012S16	16/16	7.2 - 8.4	370	482	N/A			NO	NUT

TABLE 2.10
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7782492	Selenium	0.96	J	1	J	mg/kg	012S10	2/16	0.67 - 0.78	1	0.56	N/A			NO	NTX
7440224	Silver	0.17	J	0.87	J	mg/kg	012SS04	7/16	0.15 - 1.1	0.87	0.82	N/A			NO	NTX
7440235	Sodium	20.6	J	93.9	J	mg/kg	012S15	8/16	19.1 - 22.4	93.9	51.0	N/A			NO	NUT
7440280	Thallium	ND		ND				0/16	0.75 - 0.88	0.88	0.96	N/A			NO	BKG
7440622	Vanadium	5.6	J	20.8		mg/kg	012S10	16/16	0.11 - 0.13	20.8	19.2	N/A			NO	NTX
7440666	Zinc	3.7	J	569		mg/kg	012S17	16/16	0.88 - 1	569	11.3	N/A			NO	NTX

(1) Minimum/maximum detected concentration. For dioxins, sample quantitation limit (SQL) is given in maximum detected concentration column for dioxin congeners which were not detected. SQL is from only sample in which dioxins were detected.
(2) Background values derived from statistical analysis. Two times arithmetic mean site-wide background, Appendix B.1 of RI/FS guidance.
(3) EPA Soil Screening Guidance, 5/96, Soil Screening Levels for Inhalation of Volatiles/Fugitive Particulates.
used SSL for chlordane as surrogate for alpha-chlordane and gamma-chlodane
used SSL for 1,3-dichloropropene for cis-1,3-dichloropropene and trans-1,3-dichloropropene
The sum of the 2,3,7,8-TCDD equivelant concentrations (shown in conc. used for screening column) compared to screening value.
(4) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Levels (BSL)
Below Background (BKG)
Detection Limit Below Screening Levels (DLBSL)
Detection Limit Below Background (DLBKG)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
NCSSL = North Carolina Soil Screening Concentration Level Rev. 9/13/1999.
J = Estimated Value
U = Not Detected, value given is detection limit
C = Carcinogenic
N = Non-Carcinogenic
S = Soil Saturation Concentration
ND = Not Detected

TABLE 2.11
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	57,000,000	N	2,000	SSL	NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	29,000	C	3	SSL	NO	DLBSL
79005	1,1,2-Trichloroethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	100,000	C	20	SSL	NO	DLBSL
75343	1,1-Dichloroethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	20,000,000	N	23,000	SSL	NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	9,500	C	60	SSL	NO	DLBSL
106934	1,2-Dibromoethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	67	C			YES	DLASL
107062	1,2-Dichloroethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	63,000	C	20	SSL	NO	DLBSL
540590	1,2-Dichloroethene (total)	ND		ND		µg/kg		0/2	12 - 520	520	N/A	1,800,000	N	400	SSL	NO	DLBSL
78875	1,2-Dichloropropane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	84,000	C	30	SSL	NO	DLBSL
78933	2-Butanone	ND		ND		µg/kg		0/2	12 - 520	520	N/A	120,000,000	N			NO	DLBSL
591786	2-Hexanone	ND		ND		µg/kg		0/2	12 - 520	520	N/A	8,200,000	N			NO	DLBSL
108101	4-Methyl-2-pentanone	ND		ND		µg/kg		0/2	12 - 520	520	N/A	16,000,000	N			NO	DLBSL
67641	Acetone	ND		ND		µg/kg		0/2	12 - 520	520	N/A	20,000,000	N	16,000	SSL	NO	DLBSL
71432	Benzene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	100,000	C	30	SSL	NO	DLBSL
75274	Bromodichloromethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	92,000	C	600	SSL	NO	DLBSL
75252	Bromoform	ND		ND		µg/kg		0/2	12 - 520	520	N/A	720,000	C	800	SSL	NO	DLBSL
74839	Bromomethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	290,000	N			NO	DLBSL
75150	Carbon disulfide	ND		ND		µg/kg		0/2	12 - 520	520	N/A	20,000,000	N	32,000	SSL	NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/kg		0/2	12 - 520	520	N/A	44,000	C	70	SSL	NO	DLBSL
108907	Chlorobenzene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	4,100,000	N	1,000	SSL	NO	DLBSL
75003	Chloroethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	2,000,000	C			NO	DLBSL
67663	Chloroform	ND		ND		µg/kg		0/2	12 - 520	520	N/A	940,000	N	600	SSL	NO	DLBSL
74873	Chloromethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	440,000	C			NO	DLBSL
156592	cis-1,2-Dichloroethene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	2,000,000	N	400	SSL	NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	57,000	N	4	SSL	NO	DLBSL
124481	Dibromochloromethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	68,000	C			NO	DLBSL
100414	Ethylbenzene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	20,000,000	N	13,000	SSL	NO	DLBSL
75092	Methylene chloride	ND		ND		µg/kg		0/2	12 - 520	520	N/A	760,000	C	20	SSL	NO	BSL
100425	Styrene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	41,000,000	N	4,000	SSL	NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	110,000	C	60	SSL	NO	DLBSL
108883	Toluene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	41,000,000	N	12,000	SSL	NO	BSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	4,100,000	N	700	SSL	NO	DLBSL
542756	trans-1,3-Dichloropropene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	57,000	N	4	SSL	NO	DLBSL
79016	Trichloroethene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	520,000	C	60	SSL	NO	DLBSL
75014	Vinyl chloride	ND		ND		µg/kg		0/2	12 - 520	520	N/A	7,900	C	10	SSL	NO	DLBSL
1330207	Xylene, total	ND		ND		µg/kg		0/2	12 - 520	520	N/A	410,000,000	N	190,000	SSL	NO	BSL

TABLE 2.11
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
120821	1,2,4-Trichlorobenzene	ND		ND		µg/kg		0/2	360 - 3700	3,700		2,000,000	N	5,000	SSL	NO	DLBSL
95501	1,2-Dichlorobenzene	ND		ND		µg/kg		0/2	360 - 3700	3,700		18,000,000	N	17,000	SSL	NO	DLBSL
541731	1,3-Dichlorobenzene	ND		ND		µg/kg		0/2	360 - 3700	3,700		180,000	N			NO	DLBSL
106467	1,4-Dichlorobenzene	ND		ND		µg/kg		0/2	360 - 3700	3,700		240,000	C	2,000	SSL	NO	DLBSL
108601	2,2'-Oxybis(1-chloropropane)	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A				NO	NTX
95954	2,4,5-Trichlorophenol	ND		ND		µg/kg		0/2	860 - 8900	8,900		20,000,000	N	270,000	SSL	NO	DLBSL
88062	2,4,6-Trichlorophenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		520,000	C	200	SSL	NO	DLBSL
120832	2,4-Dichlorophenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		610,000	N	1,000	SSL	NO	DLBSL
105679	2,4-Dimethylphenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		4,100,000	N	9,000	SSL	NO	DLBSL
51285	2,4-Dinitrophenol	ND		ND		µg/kg		0/2	860 - 8900	8,900		410,000	N	300	SSL	NO	DLBSL
121142	2,4-Dinitrotoluene	ND		ND		µg/kg		0/2	360 - 3700	3,700		410,000	N	0.8	SSL	NO	DLBSL
606202	2,6-Dinitrotoluene	ND		ND		µg/kg		0/2	360 - 3700	3,700		200,000	N	0.7	SSL	NO	DLBSL
91587	2-Chloronaphthalene	ND		ND		µg/kg		0/2	360 - 3700	3,700		16,000,000	N			NO	DLBSL
95578	2-Chlorophenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		1,000,000	N	4,000	SSL	NO	DLBSL
91576	2-Methylnaphthalene	1300	J	1300	J	µg/kg	012SB01	1/2	360 - 3700	3,700		4,100,000	N			NO	BSL
95487	2-Methylphenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		10,000,000	N	15,000	SSL	NO	DLBSL
88744	2-Nitroaniline	ND		ND		µg/kg		0/2	860 - 8900	8,900		N/A				NO	NTX
88755	2-Nitrophenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		1,600,000	N			NO	DLBSL
91941	3,3'-Dichlorobenzidine	ND		ND		µg/kg		0/2	360 - 3700	3,700		13,000	C	7	SSL	NO	DLBSL
99092	3-Nitroaniline	ND		ND		µg/kg		0/2	860 - 8900	8,900		N/A				NO	NTX
534521	4,6-Dinitro-2-methylphenol	ND		ND		µg/kg		0/2	860 - 8900	8,900		200,000	N			NO	DLBSL
101553	4-Bromophenyl-phenylether	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A				NO	NTX
59507	4-Chloro-3-methylphenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		10,000,000	N			NO	DLBSL
106478	4-Chloroaniline	ND		ND		µg/kg		0/2	360 - 3700	3,700		820,000	N	700	SSL	NO	DLBSL
7005723	4-Chlorophenyl-phenylether	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A				NO	NTX
106445	4-Methylphenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		1,000,000	N			NO	DLBSL
100016	4-Nitroaniline	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A				NO	NTX
100027	4-Nitrophenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		1,600,000	N			NO	DLBSL
83329	Acenaphthene	ND		ND		µg/kg		0/2	360 - 3700	3,700		12,000,000	N	570,000	SSL	NO	DLBSL
208968	Acenaphthylene	ND		ND		µg/kg		0/2	360 - 3700	3,700		4,100,000	N			NO	DLBSL
120127	Anthracene	ND		ND		µg/kg		0/2	360 - 3700	3,700		61,000,000	N	12,000,000	SSL	NO	DLBSL
56553	Benzo(a)anthracene	ND		ND		µg/kg		0/2	360 - 3700	3,700		7,800	C	2,000	SSL	NO	DLBSL
50328	Benzo(a)pyrene	ND		ND		µg/kg		0/2	360 - 3700	3,700		780	C	8,000	SSL	YES	DLASL
205992	Benzo(b)fluoranthene	ND		ND		µg/kg		0/2	360 - 3700	3,700		7,800	C	5,000	SSL	NO	BSL
191242	Benzo(g,h,i)perylene	ND		ND		µg/kg		0/2	360 - 3700	3,700		6,100,000	N			NO	BSL
207089	Benzo(k)fluoranthene	ND		ND		µg/kg		0/2	360 - 3700	3,700		78,000	C	49,000	SSL	NO	DLBSL

TABLE 2.11
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
111911	bis(2-Chloroethoxy)methane	ND		ND		µg/kg		0/2	360 - 3700	3,700						NO	NTX
111444	bis(2-Chloroethyl)ether	ND		ND		µg/kg		0/2	360 - 3700	3,700		5,200	C	0.4	SSL	NO	DLBSL
117817	bis(2-Ethylhexyl)phthalate	400	B	400	B	µg/kg	012SB02	0/2	400 - 7000	7,000		410,000	C	3,600,000	SSL	NO	BSL
85687	Butylbenzylphthalate	ND		ND		µg/kg		0/2	360 - 3700	3,700		41,000,000	N	930,000	SSL	NO	BSL
86748	Carbazole	ND		ND		µg/kg		0/2	360 - 3700	3,700		290,000	C	600	SSL	NO	DLBSL
218019	Chrysene	ND		ND		µg/kg		0/2	360 - 3700	3,700		780,000	C	160,000	SSL	NO	BSL
84742	Di-n-butylphthalate	550	J	550	J	µg/kg	012SB01	1/2	360 - 3700	550		20,000,000	N	2,300,000	SSL	NO	BSL
117840	Di-n-octyl phthalate	ND		ND		µg/kg		0/2	360 - 3700	3,700		4,100,000	N	10,000	SSL	NO	DLBSL
53703	Dibenz(a,h)anthracene	ND		ND		µg/kg		0/2	360 - 3700	3,700		780	C	2,000	SSL	YES	DLASL
132649	Dibenzofuran	ND		ND		µg/kg		0/2	360 - 3700	3,700		820,000	N			NO	DLBSL
84662	Diethylphthalate	ND		ND		µg/kg		0/2	360 - 3700	3,700		160,000,000	N	470,000	SSL	NO	DLBSL
131113	Dimethyl phthalate	ND		ND		µg/kg		0/2	360 - 3700	3,700		2,000,000,000	N			NO	DLBSL
206440	Fluoranthene	ND		ND		µg/kg		0/2	360 - 3700	3,700		8,200,000	N	4,300,000	SSL	NO	BSL
86737	Fluorene	410	J	410	J	µg/kg	012SB01	1/2	360 - 3700	410		8,200,000	N	560,000	SSL	NO	DLBSL
118741	Hexachlorobenzene	ND		ND		µg/kg		0/2	360 - 3700	3,700		3,600	C	2,000	SSL	YES	DLASL
87683	Hexachlorobutadiene	ND		ND		µg/kg		0/2	360 - 3700	3,700		40,880	N	2,000	SSL	NO	DLBSL
77474	Hexachlorocyclopentadiene	ND		ND		µg/kg		0/2	360 - 3700	3,700		1,200,000	N	400,000	SSL	NO	DLBSL
67721	Hexachloroethane	ND		ND		µg/kg		0/2	360 - 3700	3,700		204,000	N	500	SSL	NO	DLBSL
193395	Indeno(1,2,3-cd)pyrene	ND		ND		µg/kg		0/2	360 - 3700	3,700		7,800	C	14,000	SSL	NO	DLBSL
78591	Isophorone	ND		ND		µg/kg		0/2	360 - 3700	3,700		6,000,000	C	500	SSL	NO	DLBSL
621647	n-Nitroso-di-n-propylamine	ND		ND		µg/kg		0/2	360 - 3700	3,700		820	C	0.05	SSL	YES	DLASL
86306	n-Nitrosodiphenylamine	ND		ND		µg/kg		0/2	360 - 3700	3,700		1,200,000	C	1,000	SSL	NO	DLBSL
91203	Naphthalene	ND		ND		µg/kg		0/2	360 - 3700	3,700		4,100,000	N	84,000	SSL	NO	DLBSL
98953	Nitrobenzene	ND		ND		µg/kg		0/2	360 - 3700	3,700		100,000	N	100	SSL	NO	DLBSL
87865	Pentachlorophenol	ND		ND		µg/kg		0/2	860 - 8900	8,900		22,000	C	30	SSL	NO	DLBSL
85018	Phenanthrene	560	J	560	J	µg/kg	012SB01	1/2	360 - 3700	560		6,100,000	N			NO	BSL
108952	Phenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		120,000,000	N	100,000	SSL	NO	DLBSL
129000	Pyrene	ND		ND		µg/kg		0/2	360 - 3700	3,700		6,100,000	N	4,200,000	SSL	NO	BSL
72548	4,4'-DDD	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		24,000	C	160,000	SSL	NO	BSL
72559	4,4'-DDE	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		17,000	C	16,000	SSL	NO	BSL
50293	4,4'-DDT	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		17,000	C	54,000	SSL	NO	BSL
309002	Aldrin	0.3	J	0.3	J	µg/kg	012SB01	1/2	1.8 - 1.9	0.3		340	C	500	SSL	NO	DLBSL
319846	alpha-BHC	10		10		µg/kg	012SB01	1/2	1.8 - 1.9	10		910	C	0.5	SSL	NO	BSL
57749	alpha-Chlordane	11	J	11	J	µg/kg	012SB01	1/2	1.8 - 1.9	11		16,000	C	10,000	SSL	NO	BSL
12674112	Aroclor-1016	ND		ND		µg/kg		0/2	36 - 37	37		14,300	C			NO	DLBSL
11104282	Aroclor-1221	ND		ND		µg/kg		0/2	72 - 74	74		2,900	C			NO	DLBSL

TABLE 2.11
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
11141165	Aroclor-1232	ND		ND		µg/kg		0/2	36 - 37	37		2,900	C			NO	DLBSL
53469219	Aroclor-1242	ND		ND		µg/kg		0/2	36 - 37	37		2,900	C			NO	DLBSL
12672296	Aroclor-1248	ND		ND		µg/kg		0/2	36 - 37	37		2,900	C			NO	DLBSL
11097691	Aroclor-1254	ND		ND		µg/kg		0/2	36 - 37	37		2,900	C			NO	DLBSL
11096825	Aroclor-1260	ND		ND		µg/kg		0/2	36 - 37	37		2,900	C			NO	BSL
319857	beta-BHC	ND		ND		µg/kg		0/2	1.8	1.8		3,200	C	3	SSL	NO	DLBSL
319868	delta-BHC	ND		ND		µg/kg		0/2	1.8	1.8		3,200	C			NO	BSL
60571	Dieldrin	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		40	C	4	SSL	NO	BSL
959988	Endosulfan I	ND		ND		µg/kg		0/2	1.8	1.8		47,000	N	18,000	SSL	NO	BSL
33213659	Endosulfan II	8.8		8.8		µg/kg	012SB01	1/2	3.6 - 3.7	8.8		47,000	N	18,000	SSL	NO	DLBSL
1031078	Endosulfan sulfate	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		47,000	N			NO	BSL
72208	Endrin	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		2,300	N	1,000	SSL	NO	BSL
7421934	Endrin aldehyde	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		2,300	N			NO	BSL
53494705	Endrin ketone	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		2,300	N			NO	BSL
58899	gamma-BHC (Lindane)	0.7	J	0.7	J	µg/kg	012SB01	1/2	1.8 - 1.9	0.7		4,400	C	9	SSL	NO	BSL
12789036	gamma-Chlordane	0.072	J	7.9	J	µg/kg	012SB01	2/2	1.8 - 1.9	7.9		16,000	C	10,000	SSL	NO	BSL
76448	Heptachlor	ND		ND		µg/kg		0/2	1.8 - 2.3	2.30		1,300	C	23,000	SSL	NO	BSL
1024573	Heptachlor epoxide	2.4	J	2.4	J	µg/kg	012SB01	1/2	1.8 - 1.9	2.4		610	C	700	SSL	NO	BSL
72435	Methoxychlor	ND		ND		µg/kg		0/2	18	18		1,000,000	N	160	SSL	NO	DLBSL
8001352	Toxaphene	ND		ND		µg/kg		0/2	180	180		5,200	C	31,000	SSL	NO	DLBSL
7429905	Aluminum	5,080	J	8,510	J	mg/kg	012SB01	2/2	4.1 -4.3	8,510	10,162	200,000	N			NO	BSL
7440360	Antimony	ND		ND		mg/kg		0/2	0.59 - 0.72	0.72		82	N	5	SSL	NO	BSL
7440382	Arsenic	1.5	J	1.5	J	mg/kg	012SB01	1/2	0.65 - 0.67	1.5	3.9	3.8	C	29	SSL	NO	BSL
7440393	Barium	8.8	J	20	J	mg/kg	012SB01	2/2	0.04	20.0	23.0	14000	N	1,600	SSL	NO	BSL
7440417	Beryllium	ND		ND		mg/kg		0/2	0.02 - 0.08	0.08	0.44	410	N	63	SSL	NO	BSL
7440439	Cadmium	3.1		3.1		mg/kg	012SB01	1/2	0.04	3.1	1.12	200	N	8	SSL	NO	BSL
7440702	Calcium	98	J	3,140		mg/kg	012SB01	2/2	2 - 2.1	3,140	512	N/A				NO	NUT
18540299	Chromium (assumed VI)	5.4		15		mg/kg	012SB01	2/2	0.13	15.0	17.0	610	N	38	SSL	NO	BSL
7440484	Cobalt	ND		ND		mg/kg		0/2	0.46 - 0.58	0.58	2.38	4100	N			NO	BSL
7440508	Copper	70.9	J	70.9	J	mg/kg	012SB01	1/2	0.13 - 0.94	70.9	3.76	8200	N			NO	BSL
7439896	Iron	2,010		2,500		mg/kg	012SB01	2/2	2.2 - 2.3	2,500	5,960	120,000	N			NO	BSL
7439921	Lead	3.1		25.4		mg/kg	012SB01	2/2	0.28 - 0.29	25	10.5	400	(7)			NO	BSL
7439954	Magnesium	255	J	364	J	mg/kg	012SB01	2/2	2 - 2.1	364	422	N/A				NO	NUT
7439965	Manganese	7.9	J	8.9	J	mg/kg	012SB01	2/2	0.04	8.9	16.7	4100	N			NO	BSL
7439976	Mercury	0.05	J	0.05	J	mg/kg	012SB01	2/2	0.04	0.1	0.13	61	N			NO	BSL
7440020	Nickel	1.6	J	2.2	J	mg/kg	012SB01	2/2	0.28 - 0.29	2.2	6.90	4100	N	130	SSL	NO	BSL

TABLE 2.11
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7440097	Potassium	174	J	223	J	mg/kg	012SB01	2/2	7.2 - 7.5	223	482	N/A				NO	NUT
7782492	Selenium	ND		ND		mg/kg		0/2	0.67 - 0.69	0.69	0.56	1000	N	5	SSL	NO	BSL
7440224	Silver	ND		ND		mg/kg		0/2	0.15 - 0.16	0.16	0.82	1000	N	34	SSL	NO	BSL
7440235	Sodium	29.8	J	47.9	J	mg/kg	012SB01	2/2	19.2 - 19.9	47.9	51.0	N/A				NO	NUT
7440280	Thallium	ND		ND					0.76 - 0.78	0.78	0.96	14	N	0.7	SSL	NO	BSL
7440622	Vanadium	6.5	J	8.4	J	mg/kg	012SB01	2/2	0.11	8.4	19.2	1400	N	6,000	SSL	NO	BSL
7440666	Zinc	5.2		182		mg/kg	012SB01	2/2	0.88 - 0.92	182	11.3	61,000	N	12,000	SSL	NO	BSL

(1) Minimum/maximum detected concentration.
(2) N/A - Refer to supporting information for background discussion.
Background values derived from statistical analysis. Two times arithmetic mean site-wide background, Appendix B.1 of RI/FS guidance.
(3) EPA Region III RBC Table 9/25/01, Residential Soil RBC
used RBC for pyrene as surrogate for benzo(g,h,i)pyrene and phenanthrene.
used RBC for napthalene as surrogate for acenapthylene.
used RBC for chlordane as surrogate for alpha-chlordane and gamma-chlodane
used RBC for endosulfan as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
used RBC for endrin as surrogate for endrin aldehyde and endrin ketone.
used RBC for 4-nitrophenol as surrogate for 2-nitrophenol.
used RBC for 3-methylphenol as surrogate for 4-chloro-3-methylphenol.
used RBC for mercuric chloride as surrogate for mercury.
Residential Soil Screening Level for lead.
(4) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)
Detection Limit Below Screening Levels (DLBSL)

Definitions: N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
SSL = Soil Screening Level, Migration to Groundwater, DAF of 20,
EPA Soil Screening Guidance, 1996.
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
ND = Not Detected

TABLE 2.12
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Emissions from exposed soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	1,200,000 S			NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	600 C			NO	DLBSL
79005	1,1,2-Trichloroethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	1,000 C			NO	DLBSL
75343	1,1-Dichloroethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	130,000 N			NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	70 C			NO	DLBSL
106934	1,2-Dibromoethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	N/A			NO	NTX
107062	1,2-Dichloroethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	400 C			NO	DLBSL
540590	1,2-Dichloroethene (total)	ND		ND		µg/kg		0/2	12 - 520	520	N/A	1,200,000 S			NO	DLBSL
78875	1,2-Dichloropropane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	1,500 C			NO	DLBSL
78933	2-Butanone	ND		ND		µg/kg		0/2	12 - 520	520	N/A	N/A			NO	NTX
591786	2-Hexanone	ND		ND		µg/kg		0/2	12 - 520	520	N/A	N/A			NO	NTX
108101	4-Methyl-2-pentanone	ND		ND		µg/kg		0/2	12 - 520	520	N/A	N/A			NO	NTX
67641	Acetone	ND		ND		µg/kg		0/2	12 - 520	520	N/A	100,000,000 S			NO	DLBSL
71432	Benzene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	800 C			NO	DLBSL
75274	Bromodichloromethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	3,000,000 S			NO	DLBSL
75252	Bromoform	ND		ND		µg/kg		0/2	12 - 520	520	N/A	53,000 C			NO	DLBSL
74839	Bromomethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	1,000 N			NO	DLBSL
75150	Carbon disulfide	ND		ND		µg/kg		0/2	12 - 520	520	N/A	720,000 S			NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/kg		0/2	12 - 520	520	N/A	300 C			YES	DLASL
108907	Chlorobenzene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	13,000 N			NO	DLBSL
75003	Chloroethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	N/A			NO	DLBSL
67663	Chloroform	ND		ND		µg/kg		0/2	12 - 520	520	N/A	300 C			YES	DLASL
74873	Chloromethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	N/A			NO	NTX
156592	cis-1,2-Dichloroethene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	1,200,000 S			NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	100 C			YES	DLASL
124481	Dibromochloromethane	ND		ND		µg/kg		0/2	12 - 520	520	N/A	1,300,000 S			NO	DLBSL
100414	Ethylbenzene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	400,000 S			NO	DLBSL
75092	Methylene chloride	ND		ND		µg/kg		0/2	12 - 520	520	N/A	13,000 C			NO	DLBSL
100425	Styrene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	1,500,000 S			NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	11,000 C			NO	DLBSL
108883	Toluene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	650,000 N			NO	DLBSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	3,100,000 S			NO	DLBSL
542756	trans-1,3-Dichloropropene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	100 C			YES	DLASL
79016	Trichloroethene	ND		ND		µg/kg		0/2	12 - 520	520	N/A	5,000 C			NO	DLBSL
75014	Vinyl chloride	ND		ND		µg/kg		0/2	12 - 520	520	N/A	30 C			YES	DLASL
1330207	Xylene, total	ND		ND		µg/kg		0/2	12 - 520	520	N/A	410,000 S			NO	BSL

TABLE 2.12
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Emissions from exposed soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
120821	1,2,4-Trichlorobenzene	ND		ND		µg/kg		0/2	360 - 3700	3,700		3,200,000 S			NO	DLBSL
95501	1,2-Dichlorobenzene	ND		ND		µg/kg		0/2	360 - 3700	3,700		560,000 S			NO	DLBSL
541731	1,3-Dichlorobenzene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
106467	1,4-Dichlorobenzene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
108601	2,2'-Oxybis(1-chloropropane)	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
95954	2,4,5-Trichlorophenol	ND		ND		µg/kg		0/2	860 - 8900	8,900		N/A			NO	NTX
88062	2,4,6-Trichlorophenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		200,000 C			NO	DLBSL
120832	2,4-Dichlorophenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
105679	2,4-Dimethylphenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
51285	2,4-Dinitrophenol	ND		ND		µg/kg		0/2	860 - 8900	8,900		N/A			NO	NTX
121142	2,4-Dinitrotoluene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
606202	2,6-Dinitrotoluene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
91587	2-Chloronaphthalene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
95578	2-Chlorophenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		53,000,000 S			NO	DLBSL
91576	2-Methylnaphthalene	1300	J	1300	J	µg/kg	012SB01	1/2	360 - 3700	3,700		N/A			NO	NTX
95487	2-Methylphenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
88744	2-Nitroaniline	ND		ND		µg/kg		0/2	860 - 8900	8,900		N/A			NO	NTX
88755	2-Nitrophenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
91941	3,3'-Dichlorobenzidine	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
99092	3-Nitroaniline	ND		ND		µg/kg		0/2	860 - 8900	8,900		N/A			NO	NTX
534521	4,6-Dinitro-2-methylphenol	ND		ND		µg/kg		0/2	860 - 8900	8,900		N/A			NO	NTX
101553	4-Bromophenyl-phenylether	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
59507	4-Chloro-3-methylphenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
106478	4-Chloroaniline	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
7005723	4-Chlorophenyl-phenylether	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
106445	4-Methylphenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
100016	4-Nitroaniline	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
100027	4-Nitrophenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
83329	Acenaphthene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
208968	Acenaphthylene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
120127	Anthracene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
56553	Benzo(a)anthracene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
50328	Benzo(a)pyrene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
205992	Benzo(b)fluoranthene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
191242	Benzo(g,h,i)perylene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
207089	Benzo(k)fluoranthene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX

TABLE 2.12
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Emissions from exposed soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
111911	bis(2-Chloroethoxy)methane	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
111444	bis(2-Chloroethyl)ether	ND		ND		µg/kg		0/2	360 - 3700	3,700		200 C			YES	DLASL
117817	bis(2-Ethylhexyl)phthalate	400	B	400	B	µg/kg	012SB02	0/2	400 - 7000	7,000		31,000,000 S			NO	BSL
85687	Butylbenzylphthalate	ND		ND		µg/kg		0/2	360 - 3700	3,700		930,000 S			NO	BSL
86748	Carbazole	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
218019	Chrysene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
84742	Di-n-butylphthalate	550	J	550	J	µg/kg	012SB01	1/2	360 - 3700	550		2,300,000 S			NO	BSL
117840	Di-n-octyl phthalate	ND		ND		µg/kg		0/2	360 - 3700	3,700		10,000,000 S			NO	DLBSL
53703	Dibenz(a,h)anthracene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
132649	Dibenzofuran	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
84662	Diethylphthalate	ND		ND		µg/kg		0/2	360 - 3700	3,700		2,000,000 S			NO	DLBSL
131113	Dimethyl phthalate	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
206440	Fluoranthene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
86737	Fluorene	410	J	410	J	µg/kg	012SB01	1/2	360 - 3700	410		N/A			NO	NTX
118741	Hexachlorobenzene	ND		ND		µg/kg		0/2	360 - 3700	3,700		1,000 C			YES	DLASL
87683	Hexachlorobutadiene	ND		ND		µg/kg		0/2	360 - 3700	3,700		8,000 N			NO	DLBSL
77474	Hexachlorocyclopentadiene	ND		ND		µg/kg		0/2	360 - 3700	3,700		1,000 N			YES	DLASL
67721	Hexachloroethane	ND		ND		µg/kg		0/2	360 - 3700	3,700		55,000 N			NO	DLBSL
193395	Indeno(1,2,3-cd)pyrene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
78591	Isophorone	ND		ND		µg/kg		0/2	360 - 3700	3,700		4,600,000 S			NO	DLBSL
621647	n-Nitroso-di-n-propylamine	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			YES	NTX
86306	n-Nitrosodiphenylamine	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
91203	Naphthalene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
98953	Nitrobenzene	ND		ND		µg/kg		0/2	360 - 3700	3,700		9,200 N			NO	DLBSL
87865	Pentachlorophenol	ND		ND		µg/kg		0/2	860 - 8900	8,900		N/A			NO	NTX
85018	Phenanthrene	560	J	560	J	µg/kg	012SB01	1/2	360 - 3700	560		N/A			NO	NTX
108952	Phenol	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
129000	Pyrene	ND		ND		µg/kg		0/2	360 - 3700	3,700		N/A			NO	NTX
72548	4,4'-DDD	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		N/A			NO	NTX
72559	4,4'-DDE	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		N/A			NO	NTX
50293	4,4'-DDT	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		N/A			NO	NTX
309002	Aldrin	0.3	J	0.3	J	µg/kg	012SB01	1/2	1.8 - 1.9	0.3		3,000 C			NO	DLBSL
319846	alpha-BHC	10		10		µg/kg	012SB01	1/2	1.8 - 1.9	10		800 C			NO	BSL
57749	alpha-Chlordane	11	J	11	J	µg/kg	012SB01	1/2	1.8 - 1.9	11		20,000 C			NO	BSL
12674112	Aroclor-1016	ND		ND		µg/kg		0/2	36 - 37	37		N/A			NO	NTX
11104282	Aroclor-1221	ND		ND		µg/kg		0/2	72 - 74	74		N/A			NO	NTX

TABLE 2.12
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Emissions from exposed soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
11141165	Aroclor-1232	ND		ND		µg/kg		0/2	36 - 37	37		N/A			NO	NTX
53469219	Aroclor-1242	ND		ND		µg/kg		0/2	36 - 37	37		N/A			NO	NTX
12672296	Aroclor-1248	ND		ND		µg/kg		0/2	36 - 37	37		N/A			NO	NTX
11097691	Aroclor-1254	ND		ND		µg/kg		0/2	36 - 37	37		N/A			NO	NTX
11096825	Aroclor-1260	ND		ND		µg/kg		0/2	36 - 37	37		N/A			NO	NTX
319857	beta-BHC	ND		ND		µg/kg		0/2	1.8	1.8		N/A			NO	NTX
319868	delta-BHC	ND		ND		µg/kg		0/2	1.8	1.8		N/A			NO	NTX
60571	Dieldrin	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		1,000 C			NO	BSL
959988	Endosulfan I	ND		ND		µg/kg		0/2	1.8	1.8		N/A			NO	NTX
33213659	Endosulfan II	8.8		8.8		µg/kg	012SB01	1/2	3.6 - 3.7	8.8		N/A			NO	NTX
1031078	Endosulfan sulfate	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		N/A			NO	NTX
72208	Endrin	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		N/A			NO	NTX
7421934	Endrin aldehyde	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		N/A			NO	NTX
53494705	Endrin ketone	ND		ND		µg/kg		0/2	3.6 - 3.7	3.7		N/A			NO	NTX
58899	gamma-BHC (Lindane)	0.7	J	0.7	J	µg/kg	012SB01	1/2	1.8 - 1.9	0.7		N/A			NO	NTX
12789036	gamma-Chlordane	0.072	J	7.9	J	µg/kg	012SB01	2/2	1.8 - 1.9	7.9		20,000 C			NO	BSL
76448	Heptachlor	ND		ND		µg/kg		0/2	1.8 - 2.3	2.30		100 C			NO	BSL
1024573	Heptachlor epoxide	2.4	J	2.4	J	µg/kg	012SB01	1/2	1.8 - 1.9	2.4		5,000 C			NO	BSL
72435	Methoxychlor	ND		ND		µg/kg		0/2	18	18		N/A			NO	NTX
8001352	Toxaphene	ND		ND		µg/kg		0/2	180	180		89,000 C			NO	DLBSL
7429905	Aluminum	5,080	J	8,510	J	mg/kg	012SB01	2/2	4.1 -4.3	8,510	10,162	N/A			NO	NTX
7440360	Antimony	ND		ND		mg/kg		0/2	0.59 - 0.72	0.7		N/A			NO	NTX
7440382	Arsenic	1.5	J	1.5	J	mg/kg	012SB01	1/2	0.65 - 0.67	1.5	3.9	750 C			NO	BSL
7440393	Barium	8.8	J	20	J	mg/kg	012SB01	2/2	0.04	20.0	23.0	69000 N			NO	BSL
7440417	Beryllium	ND		ND		mg/kg		0/2	0.02 - 0.08	0.08	0.44	1300 N			NO	BSL
7440439	Cadmium	3.1		3.1		mg/kg	012SB01	1/2	0.04	3.1	1.12	1800 N			NO	BSL
7440702	Calcium	98	J	3,140		mg/kg	012SB01	2/2	2 - 2.1	3,140	512	N/A			NO	NUT
18540299	Chromium (assumed VI)	5.4		15		mg/kg	012SB01	2/2	0.13	15.0	17.0	270 N			NO	BSL
7440484	Cobalt	ND		ND		mg/kg		0/2	0.46 - 0.58	0.58	2.38	N/A			NO	NTX
7440508	Copper	70.9	J	70.9	J	mg/kg	012SB01	1/2	0.13 - 0.94	70.9	3.76	N/A			NO	NTX
7439896	Iron	2,010		2,500		mg/kg	012SB01	2/2	2.2 - 2.3	2,500	5,960	N/A			NO	NTX
7439921	Lead	3.1		25.4		mg/kg	012SB01	2/2	0.28 - 0.29	25	10.5	N/A			NO	NTX
7439954	Magnesium	255	J	364	J	mg/kg	012SB01	2/2	2 - 2.1	364	422	N/A			NO	NTX
7439965	Manganese	7.9	J	8.9	J	mg/kg	012SB01	2/2	0.04	8.9	16.7	N/A			NO	NTX
7439976	Mercury	0.05	J	0.05	J	mg/kg	012SB01	2/2	0.04	0.1	0.13	N/A			NO	NTX
7440020	Nickel	1.6	J	2.2	J	mg/kg	012SB01	2/2	0.28 - 0.29	2.2	6.90	13000 N			NO	BSL

TABLE 2.12
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Emissions from exposed soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7440097	Potassium	174	J	223	J	mg/kg	012SB01	2/2	7.2 - 7.5	223	482	N/A			NO	NUT
7782492	Selenium	ND		ND		mg/kg		0/2	0.67 - 0.69	0.69	0.56	N/A			NO	NTX
7440224	Silver	ND		ND		mg/kg		0/2	0.15 - 0.16	0.16	0.82	N/A			NO	NTX
7440235	Sodium	29.8	J	47.9	J	mg/kg	012SB01	2/2	19.2 - 19.9	47.9	51.0	N/A			NO	NUT
7440280	Thallium	ND		ND					0.76 - 0.78	0.78	0.96	N/A			NO	NTX
7440622	Vanadium	6.5	J	8.4	J	mg/kg	012SB01	2/2	0.11	8.4	19.2	N/A			NO	NTX
7440666	Zinc	5.2		182		mg/kg	012SB01	2/2	0.88 - 0.92	182	11.3	N/A			NO	NTX

(1) Minimum/maximum detected concentration.
(2) N/A - Refer to supporting information for background discussion.
Background values derived from statistical analysis. Two times arithmetic mean site-wide background, Appendix B.1 of RI/FS guidance.
(3) EPA Soil Screening Guidance, 5/96, Soil Screening Levels for Inhalation of Volatiles/Fugitive Particulates.
used SSL for chlordane as surrogate for alpha-chlordane and gamma-chlodane
(4) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)
Detection Limit Below Screening Levels (DLBSL)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
S = Soil Saturation Concentration
ND = Not Detected

TABLE 2.13
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/L		0/3	1	1		1 W	1	WQS	NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/L		0/3	1	1		0.17 W	0.17	AWQC	YES	DLASL
79005	1,1,2-Trichloroethane	ND		ND		µg/L		0/3	1	1		0.6 W	0.6	AWQC	YES	DLASL
75343	1,1-Dichloroethane	ND		ND		µg/L		0/3	1	1		80 N	N/A		NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/L		0/3	1	1		0.057 W	0.057	AWQC	YES	DLASL
106934	1,2-Dibromoethane	ND		ND		µg/L		0/3	1	1		0.00075 C	N/A		YES	DLASL
107062	1,2-Dichloroethane	ND		ND		µg/L		0/3	1	1		0.38 W	0.38	AWQC	YES	DLASL
78875	1,2-Dichloropropane	ND		ND		µg/L		0/3	1	1		0.52 W	0.52	WQS	YES	DLASL
78933	2-Butanone	ND		ND		µg/L		0/3	5	5		190 N	N/A		NO	DLBSL
591786	2-Hexanone	ND		ND		µg/L		0/3	5	5		150 N	N/A		NO	DLBSL
108101	4-Methyl-2-pentanone	ND		ND		µg/L		0/3	5	5		14 N	N/A		NO	DLBSL
71432	Benzene	ND		ND		µg/L		0/3	1	1		1.2 W	1.2	AWQC	NO	DLBSL
75274	Bromodichloromethane	ND		ND		µg/L		0/3	1	1		0.56 W	0.27	AWQC	YES	DLASL
75252	Bromoform	ND		ND		µg/L		0/3	1	1		4.3 W	4.3	AWQC	NO	DLBSL
74839	Bromomethane	ND		ND		µg/L		0/3	1	1		48 W	48	AWQC	NO	DLBSL
75150	Carbon disulfide	ND		ND		µg/L		0/3	1	1		100 N	N/A		NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/L		0/3	1	1		0.25 W	0.25	AWQC	YES	DLASL
108907	Chlorobenzene	ND		ND		µg/L		0/3	1	1		680 W	680	AWQC	NO	DLBSL
75003	Chloroethane	ND		ND		µg/L		0/3	1	1		3.6 C	N/A		NO	DLBSL
67663	Chloroform	ND		ND		µg/L		0/3	1	1		5.7 W	5.7	AWQC	NO	DLBSL
74873	Chloromethane	ND		ND		µg/L		0/3	1	1		2.1 C	N/A		NO	DLBSL
156592	cis-1,2-Dichloroethene	ND		ND		µg/L		0/3	1	1		6.1 N	N/A		NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/L		0/3	1	1		10 W	10	AWQC	NO	DLBSL
124481	Dibromochloromethane	ND		ND		µg/L		0/3	1	1		0.41 W	0.41	AWQC	YES	DLASL
100414	Ethylbenzene	ND		ND		µg/L		0/3	1	1		3,100 W	3,100	AWQC	NO	DLBSL
75092	Methylene chloride	ND		ND		µg/L		0/3	2	2		4.7 W	4.7	AWQC	NO	DLBSL
100425	Styrene	ND		ND		µg/L		0/3	1	1		160 N	N/A		NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/L		0/3	1	1		0.8 W	0.8	AWQC	YES	DLASL
108883	Toluene	ND		ND		µg/L		0/3	1	1		6,800 W	6,800	AWQC	NO	DLBSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/L		0/3	1	1		700 W	700	WQS	NO	DLBSL

TABLE 2.13
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
542756	trans-1,3-Dichloropropene	ND		ND		µg/L		0/3	1	1		0.41 W	0.41	AWQC	YES	DLASL
79016	Trichloroethene	ND		ND		µg/L		0/3	1	1		2.7 W	2.7	AWQC	NO	DLBSL
75014	Vinyl chloride	ND		ND		µg/L		0/3	1	1		2.0 W	2.0	AWQC	NO	DLBSL
1330207	Xylene, total	ND		ND		µg/L		0/3	1	1		1,200 N	N/A		NO	DLBSL
120821	1,2,4-Trichlorobenzene	ND		ND		µg/L		0/3	10	10		260 W	260	WQS	NO	DLBSL
95501	1,2-Dichlorobenzene	ND		ND		µg/L		0/3	10	10		2,700 W	2,700	AWQC	NO	DLBSL
541731	1,3-Dichlorobenzene	ND		ND		µg/L		0/3	10	10		400 W	400	AWQC	NO	DLBSL
106467	1,4-Dichlorobenzene	ND		ND		µg/L		0/3	10	10		400 W	400	AWQC	NO	DLBSL
108601	2,2'-Oxybis(1-chloropropane)	ND		ND		µg/L		0/3	10	10		N/A	N/A		NO	NTX
95954	2,4,5-Trichlorophenol	ND		ND		µg/L		0/3	25	25		370 N	N/A		NO	DLBSL
88062	2,4,6-Trichlorophenol	ND		ND		µg/L		0/3	10	10		6.1 C	N/A		YES	DLASL
120832	2,4-Dichlorophenol	ND		ND		µg/L		0/3	10	10		11 N	N/A		NO	DLBSL
105679	2,4-Dimethylphenol	ND		ND		µg/L		0/3	10	10		73 N	N/A		NO	DLBSL
51285	2,4-Dinitrophenol	ND		ND		µg/L		0/3	25	25		70 A	N/A		NO	DLBSL
121142	2,4-Dinitrotoluene	ND		ND		µg/L		0/3	10	10		0.11 W	0.11	AWQC	YES	DLASL
606202	2,6-Dinitrotoluene	ND		ND		µg/L		0/3	10	10		3.7 N	N/A		YES	DLASL
91587	2-Chloronaphthalene	ND		ND		µg/L		0/3	10	10		1,700 W	1,700	WQS	NO	DLBSL
95578	2-Chlorophenol	ND		ND		µg/L		0/3	10	10		3 N	N/A		YES	DLASL
91576	2-Methylnaphthalene	ND		ND		µg/L		0/3	10	10		12 N	N/A		NO	DLBSL
95487	2-Methylphenol	ND		ND		µg/L		0/3	10	10		180 N	N/A		NO	DLBSL
88744	2-Nitroaniline	ND		ND		µg/L		0/3	25	25		N/A	N/A		NO	NTX
88755	2-Nitrophenol	ND		ND		µg/L		0/3	10	10		N/A	N/A		NO	NTX
91941	3,3'-Dichlorobenzidine	ND		ND		µg/L		0/3	10	10		0.04 W	0.04	AWQC	YES	DLASL
99092	3-Nitroaniline	ND		ND		µg/L		0/3	25	25		N/A	N/A		NO	NTX
534521	4,6-Dinitro-2-methylphenol	ND		ND		µg/L		0/3	25	25		13.4 W	13.4	AWQC	YES	DLASL
101553	4-Bromophenyl-phenylether	ND		ND		µg/L		0/3	10	10		N/A	N/A		NO	NTX
59507	4-Chloro-3-methylphenol	ND		ND		µg/L		0/3	10	10		N/A	N/A		NO	NTX
106478	4-Chloroaniline	ND		ND		µg/L		0/3	10	10		15 N	N/A		NO	DLBSL
7005723	4-Chlorophenyl-phenylether	ND		ND		µg/L		0/3	10	10		N/A	N/A		NO	NTX
106445	4-Methylphenol	ND		ND		µg/L		0/3	10	10		18 N	N/A		NO	DLBSL
100016	4-Nitroaniline	ND		ND		µg/L		0/3	25	25		N/A	N/A		NO	NTX
100027	4-Nitrophenol	ND		ND		µg/L		0/3	25	25		29 N	N/A		NO	DLBSL
83329	Acenaphthene	ND		ND		µg/L		0/3	10	10		1,200 W	1,200	WQS	NO	DLBSL
208968	Acenaphthylene	ND		ND		µg/L		0/3	10	10		0.65 N	N/A		YES	DLASL

TABLE 2.13
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
120127	Anthracene	ND		ND		µg/L		0/3	10	10		9,600 W	9,600	AWQC	NO	DLBSL
56553	Benzo(a)anthracene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
50328	Benzo(a)pyrene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
205992	Benzo(b)fluoranthene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
191242	Benzo(g,h,i)perylene	ND		ND		µg/L		0/3	10	10		960 W	960	AWQC	NO	DLBSL
207089	Benzo(k)fluoranthene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
111911	bis(2-Chloroethoxy)methane	ND		ND		µg/L		0/3	10	10		N/A	N/A		NO	NTX
111444	bis(2-Chloroethyl)ether	ND		ND		µg/L		0/3	10	10		0.031 W	0.031	AWQC	YES	DLASL
117817	bis(2-Ethylhexyl)phthalate	ND		ND		µg/L		0/3	10	10		1.8 W	1.8	AWQC	YES	DLASL
85687	Butylbenzylphthalate	ND		ND		µg/L		0/3	10	10		3,000 W	3,000	WQS	NO	DLBSL
86748	Carbazole	ND		ND		µg/L		0/3	10	10		3.3 C	N/A		YES	DLASL
218019	Chrysene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
84742	Di-n-butylphthalate	ND		ND		µg/L		0/3	10	10		2,700 W	2,700	AWQC	NO	DLBSL
117840	Di-n-octyl phthalate	ND		ND		µg/L		0/3	10	10		73 N	N/A		NO	DLBSL
53703	Dibenz(a,h)anthracene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
132649	Dibenzofuran	ND		ND		µg/L		0/3	10	10		2.4 N	N/A		YES	DLASL
84662	Diethylphthalate	ND		ND		µg/L		0/3	10	10		23,000 W	23,000	AWQC	NO	DLBSL
131113	Dimethyl phthalate	ND		ND		µg/L		0/3	10	10		313,000 W	313,000	AWQC	NO	DLBSL
206440	Fluoranthene	ND		ND		µg/L		0/3	10	10		300 W	300	AWQC	NO	DLBSL
86737	Fluorene	ND		ND		µg/L		0/3	10	10		1,300 W	1,300	AWQC	NO	DLBSL
118741	Hexachlorobenzene	ND		ND		µg/L		0/3	10	10		0.00075 W	0.00075	AWQC	YES	DLASL
87683	Hexachlorobutadiene	ND		ND		µg/L		0/3	10	10		0.44 W	0.44	AWQC	YES	DLASL
77474	Hexachlorocyclopentadiene	ND		ND		µg/L		0/3	10	10		240 W	240	AWQC	NO	DLBSL
67721	Hexachloroethane	ND		ND		µg/L		0/3	10	10		1.9 W	1.9	AWQC	YES	DLASL
193395	Indeno(1,2,3-cd)pyrene	ND		ND		µg/L		0/3	10	10		0.0044 W	0.0028	AWQC	YES	DLASL
78591	Isophorone	ND		ND		µg/L		0/3	10	10		36 W	8.4	AWQC	NO	DLAWQC
621647	n-Nitroso-di-n-propylamine	ND		ND		µg/L		0/3	10	10		0.005 W	0.005	WQS	YES	DLASL
86306	n-Nitrosodiphenylamine	ND		ND		µg/L		0/3	10	10		5 W	5	AWQC	YES	DLASL
91203	Naphthalene	ND		ND		µg/L		0/3	10	10		0.65 N	N/A		YES	DLASL
98953	Nitrobenzene	ND		ND		µg/L		0/3	10	10		17 W	17	AWQC	NO	DLBSL
87865	Pentachlorophenol	ND		ND		µg/L		0/3	25	25		0.56 C	N/A		YES	DLASL
85018	Phenanthrene	ND		ND		µg/L		0/3	10	10		960 W	960	AWQC	NO	DLBSL
108952	Phenol	ND		ND		µg/L		0/3	10	10		2,200 N	N/A		NO	DLBSL
129000	Pyrene	ND		ND		µg/L		0/3	10	10		960 W	960	AWQC	NO	DLBSL

TABLE 2.13
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
72548	4,4'-DDD	0.0066	J	0.0066	J	µg/L	012SW02	1/3	0.1	0.0066		0.00083 W	0.00083	AWQC	YES	ASL
72559	4,4'-DDE	0.027	J	0.027	J	µg/L	012SW01	1/3	0.1 - 0.5	0.027		0.00059 W	0.00059	AWQC	YES	ASL
50293	4,4'-DDT	0.011	J	0.011	J	µg/L	012SW02	1/3	0.1	0.011		0.00059 W	0.00059	AWQC	YES	ASL
309002	Aldrin	0.003	J	0.003	J	µg/L	012SW02	1/3	0.05	0.003		0.00013 W	0.00013	AWQC	YES	ASL
319846	alpha-BHC	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.0039 W	0.0039	AWQC	YES	DLASL
57749?	alpha-Chlordane	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.00057 W	0.00057	AWQC	YES	DLASL
12674112	Aroclor-1016	ND		ND		µg/L		0/3	1	1		0.000044 W	0.000044	AWQC	YES	DLASL
11104282	Aroclor-1221	ND		ND		µg/L		0/3	2 - 2.1	2.1		0.000044 W	0.000044	AWQC	YES	DLASL
11141165	Aroclor-1232	ND		ND		µg/L		0/3	1	1		0.000044 W	0.000044	AWQC	YES	DLASL
53469219	Aroclor-1242	ND		ND		µg/L		0/3	1	1		0.000044 W	0.000044	AWQC	YES	DLASL
12672296	Aroclor-1248	1.6		1.6		µg/L	012SW01	1/3	1	1.6		0.000044 W	0.000044	AWQC	YES	ASL
11097691	Aroclor-1254	ND		ND		µg/L		0/3	1	1		0.000044 W	0.000044	AWQC	YES	DLASL
11096825	Aroclor-1260	ND		ND		µg/L		0/3	1	1		0.000044 W	0.000044	AWQC	YES	DLASL
319857	beta-BHC	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.014 W	0.014	AWQC	YES	DLASL
319868	delta-BHC	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.037 C	N/A		YES	DLASL
60571	Dieldrin	0.015	J	0.015	J	µg/L	012SW01	1/3	0.1	0.015		0.00014 W	0.00014	AWQC	YES	ASL
959988	Endosulfan I	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.93 W	0.93	AWQC	NO	DLBSL
33213659	Endosulfan II	ND		ND		µg/L		0/3	0.1	0.1		0.93 W	0.93	AWQC	NO	DLBSL
1031078	Endosulfan sulfate	ND		ND		µg/L		0/3	0.1	0.1		0.93 W	0.93	AWQC	NO	DLBSL
72208	Endrin	ND		ND		µg/L		0/3	0.1	0.1		0.76 W	0.76	AWQC	NO	DLBSL
7421934	Endrin aldehyde	ND		ND		µg/L		0/3	0.1	0.1		0.76 W	0.76	AWQC	NO	DLBSL
53494705	Endrin ketone	ND		ND		µg/L		0/3	0.1	0.1		0.76 W	0.76	AWQC	NO	DLBSL
58899	gamma-BHC (Lindane)	0.0029	J	0.0029	J	µg/L	012SW01	1/3	0.05 - 0.052	0.0029		0.019 W	0.019	AWQC	NO	BSL
12789036	gamma-Chlordane	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.00057 W	0.00057	AWQC	YES	DLASL
76448	Heptachlor	ND		ND		µg/L		0/3	0.05	0.05		0.00021 W	0.00021	AWQC	YES	DLASL
1024573	Heptachlor epoxide	ND		ND		µg/L		0/3	0.05 - 0.052	0.052		0.0001 W	0.0001	AWQC	YES	DLASL
72435	Methoxychlor	ND		ND		µg/L		0/3	0.5 - 0.52	0.52		40 W	40	WQS	NO	DLBSL
8001352	Toxaphene	ND		ND		µg/L		0/3	5 - 5.2	5.2		0.00073 W	0.00073	AWQC	YES	DLASL
7429905	Aluminum	174	J	781		µg/L	012SW02	3/3	19.2	781		3,700 N	N/A		NO	BSL
7440360	Antimony	ND		ND		µg/L		0/3	2.2 - 4.9	4.9		14 W	14	AWQC	NO	DLBSL
7440382	Arsenic	ND		ND		µg/L		0/3	3	3		0.018 W	0.018	AWQC	YES	DLASL
7440393	Barium	7	J	7	J	µg/L	012SW03	1/3	0.2 - 6.7	7.0		2000 W	2,000	WQS	NO	BSL
7440417	Beryllium	ND		ND		µg/L		0/3	0.1	0.1		7.3 N	N/A		NO	DLBSL
7440439	Cadmium	ND		ND		µg/L		0/3	0.2 - 1.3	1.3		1.13 W	1.13	WQS	YES	DLASL

TABLE 2.13
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
7440702	Calcium	7,760		8,220		µg/L	012SW02	3/3	13.3	8,220		N/A	N/A		NO	NUT
18540299	Chromium	ND		ND		µg/L		0/3	0.6 - 1.2	1.2		207 W	207	WQS	NO	DLBSL
7440484	Cobalt	ND		ND		µg/L		0/3	0.56 - 0.74	0.74		73 N	N/A		NO	DLBSL
7440508	Copper	6.6	J	6.6	J	µg/L	012SW01	1/3	0.6 - 7.6	6.6		11.82 W	11.82	WQS	NO	BSL
7439896	Iron	114		242		µg/L	012SW02	3/3	6.8	242		300 W	300	WQS	NO	BSL
7439921	Lead	1.7	J	1.7	J	µg/L	012SW01	1/3	1.3	2		3.18 W	3.18	WQS	NO	BSL
7439954	Magnesium	746	J	746	J	µg/L	012SW01	1/3	9.4 - 846	746		N/A			NO	NUT
7439965	Manganese	12.2	J	38.3		µg/L	012SW03	2/3	0.2 - 7.1	38.3		50 W	50	WQS	NO	BSL
7439976	Mercury	0.08	J	0.12	J	µg/L	012SW01	2/3	0.1	0.12		0.05 W	0.14	AWQC	YES	ASL
7440020	Nickel	ND		ND		µg/L		0/3	1.3 - 2.1	2.1		157.67 W	610	AWQC	NO	DLBSL
7440097	Potassium	491	J	1,560	J	µg/L	012SW01	3/3	33.5	1,560		N/A			NO	NUT
7782492	Selenium	ND		ND		µg/L		0/3	3.1	3.1		50 W	50	WQS	NO	DLBSL
7440224	Silver	ND		ND		µg/L		0/3	0.7	0.7		4.06 W	4.06	WQS	NO	DLBSL
7440235	Sodium	3,160	J	5,630		µg/L	012SW01	3/3	89.1	5,630.0		N/A			NO	NUT
7440280	Thallium	ND		ND		µg/L		0/3	3.5	3.5		1.7 W	1.7	AWQC	YES	DLASL
7440622	Vanadium	ND		ND		µg/L		0/3	1.1 - 2.6	2.6		26 N	N/A		NO	DLBSL
7440666	Zinc	20.5	J	34.2	J	µg/L	012SW03	2/3	4.1	34		106 W	106	WQS	NO	BSL

(1) Minimum/maximum detected concentration.
(2) Background data not available.
(3) North Carolinia WQS for consumption of fish and organisms. If not available, used Tap Water RBC from EPA Region III RBC Table 9/25/01.
Used WQS for endosulfan as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
Safe Drinking Water Act Action Level for Lead as screening level for lead.
Used napthalene as surrogate for acenapthylene.
Used pyrene as surrogate for benzo(g,h,i)pyrene and phenanthrene.
Used endrin as surrogate for endrin ketone.
(4) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Above State WQS (AWQS)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Detection Limit Above AWQC (DLAWQC) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)
Detection Limit Below Screening Levels (DLBSL)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
AWQC = Federal Ambient Water Quality Criteria, Consumption of Water and Organisms
WQS = North Carolina Water Quality Standard, Consumption of Water and Organisms
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
A = Federal AWQC
W = North Carolinia WQS
ND = Not Detected

TABLE 2.14
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
71556	1,1,1-Trichloroethane	ND		ND		µg/kg		0/3	13	13		2,200,000	N	N/A		NO	DLBSL
79345	1,1,2,2-Tetrachloroethane	ND		ND		µg/kg		0/3	13	13		3,200	C	N/A		NO	DLBSL
79005	1,1,2-Trichloroethane	ND		ND		µg/kg		0/3	13	13		11,000	C	N/A		NO	DLBSL
75343	1,1-Dichloroethane	ND		ND		µg/kg		0/3	13	13		780,000	N	N/A		NO	DLBSL
75354	1,1-Dichloroethene	ND		ND		µg/kg		0/3	13	13		1,100	C	N/A		NO	DLBSL
106934	1,2-Dibromoethane	ND		ND		µg/kg		0/3	13	13		7.5	C	N/A		YES	DLASL
107062	1,2-Dichloroethane	ND		ND		µg/kg		0/3	13	13		7,000	C	N/A		NO	DLBSL
540590	1,2-Dichloroethene (total)	ND		ND		µg/kg		0/3	13	13		70,000	N	N/A		NO	DLBSL
78875	1,2-Dichloropropane	ND		ND		µg/kg		0/3	13	13		9,400	C	N/A		NO	DLBSL
78933	2-Butanone	ND		ND		µg/kg		0/3	13	13		4,700,000	N	N/A		NO	DLBSL
591786	2-Hexanone	ND		ND		µg/kg		0/3	13	13		310,000	N	N/A		NO	DLBSL
108101	4-Methyl-2-pentanone	ND		ND		µg/kg		0/3	13	13		630,000	N	N/A		NO	DLBSL
67641	Acetone	ND		ND		µg/kg		0/3	13	13		780,000	N	N/A		NO	DLBSL
71432	Benzene	ND		ND		µg/kg		0/3	13	13		12,000	C	N/A		NO	DLBSL
75274	Bromodichloromethane	ND		ND		µg/kg		0/3	13	13		10,000	C	N/A		NO	DLBSL
75252	Bromoform	ND		ND		µg/kg		0/3	13	13		81,000	C	N/A		NO	DLBSL
74839	Bromomethane	ND		ND		µg/kg		0/3	13	13		11,000	N	N/A		NO	DLBSL
75150	Carbon disulfide	ND		ND		µg/kg		0/3	13	13		780,000	N	N/A		NO	DLBSL
56235	Carbon tetrachloride	ND		ND		µg/kg		0/3	13	13		4,900	C	N/A		NO	DLBSL
108907	Chlorobenzene	ND		ND		µg/kg		0/3	13	13		160,000	N	N/A		NO	DLBSL
75003	Chloroethane	ND		ND		µg/kg		0/3	13	13		22,000	C	N/A		NO	DLBSL
67663	Chloroform	ND		ND		µg/kg		0/3	13	13		78,000	N	N/A		NO	DLBSL
74873	Chloromethane	ND		ND		µg/kg		0/3	13	13		49,000	C	N/A		NO	DLBSL
156592	cis-1,2-Dichloroethene	ND		ND		µg/kg		0/1	3.2	3.2		78,000	N	N/A		NO	DLBSL
542756	cis-1,3-Dichloropropene	ND		ND		µg/kg		0/3	13	13		6,400	N	N/A		NO	DLBSL
124481	Dibromochloromethane	ND		ND		µg/kg		0/3	13	13		7,600	C	N/A		NO	DLBSL
100414	Ethylbenzene	ND		ND		µg/kg		0/3	13	13		780,000	N	N/A		NO	DLBSL
75092	Methylene chloride	ND		ND		µg/kg		0/3	13	13		85,000	C	N/A		NO	DLBSL
100425	Styrene	ND		ND		µg/kg		0/3	13	13		1,600,000	N	N/A		NO	DLBSL
127184	Tetrachloroethene	ND		ND		µg/kg		0/3	13	13		12,000	C	N/A		NO	DLBSL
108883	Toluene	ND		ND		µg/kg		0/3	13	13		1,600,000	N	N/A		NO	DLBSL
156605	trans-1,2-Dichloroethene	ND		ND		µg/kg		0/1	3.2	3.2		160,000	N	N/A		NO	DLBSL
542756	trans-1,3-Dichloropropene	ND		ND		µg/kg		0/3	13	13		6,400	N	N/A		NO	DLBSL
79016	Trichloroethene	ND		ND		µg/kg		0/3	13	13		47,000	N	N/A		NO	DLBSL
75014	Vinyl chloride	ND		ND		µg/kg		0/3	13	13		90	C	N/A		NO	DLBSL
1330207	Xylene, total	ND		ND		µg/kg		0/3	13	13		16,000,000	N	N/A		NO	DLBSL

TABLE 2.14
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
120821	1,2,4-Trichlorobenzene	ND		ND		µg/kg		0/3	430 - 490	490		78,000	N	N/A		NO	DLBSL
95501	1,2-Dichlorobenzene	ND		ND		µg/kg		0/3	430 - 490	490		700,000	N	N/A		NO	DLBSL
541731	1,3-Dichlorobenzene	ND		ND		µg/kg		0/3	430 - 490	490		7,000	N	N/A		NO	DLBSL
106467	1,4-Dichlorobenzene	ND		ND		µg/kg		0/3	430 - 490	490		27,000	C	N/A		NO	DLBSL
108601	2,2'-Oxybis(1-chloropropane)	ND		ND		µg/kg		0/3	430 - 490	490		N/A		N/A		NO	NTX
95954	2,4,5-Trichlorophenol	ND		ND		µg/kg		0/3	1000 - 1200	1200		780,000	N	N/A		NO	DLBSL
88062	2,4,6-Trichlorophenol	ND		ND		µg/kg		0/3	430 - 490	490		58,000	C	N/A		NO	DLBSL
120832	2,4-Dichlorophenol	ND		ND		µg/kg		0/3	430 - 490	490		23,000	N	N/A		NO	DLBSL
105679	2,4-Dimethylphenol	ND		ND		µg/kg		0/3	430 - 490	490		160,000	N	N/A		NO	DLBSL
51285	2,4-Dinitrophenol	ND		ND		µg/kg		0/3	1000 - 1200	1200		16,000	N	N/A		NO	DLBSL
121142	2,4-Dinitrotoluene	ND		ND		µg/kg		0/3	430 - 490	490		16,000	N	N/A		NO	DLBSL
606202	2,6-Dinitrotoluene	ND		ND		µg/kg		0/3	430 - 490	490		7,800	N	N/A		NO	DLBSL
91587	2-Chloronaphthalene	ND		ND		µg/kg		0/3	430 - 490	490		630,000	N	N/A		NO	DLBSL
95578	2-Chlorophenol	ND		ND		µg/kg		0/3	430 - 490	490		39,000	N	N/A		NO	DLBSL
91576	2-Methylnaphthalene	ND		ND		µg/kg		0/3	430 - 490	490		160,000	N	N/A		NO	DLBSL
95487	2-Methylphenol	ND		ND		µg/kg		0/3	430 - 490	490		390,000	N	N/A		NO	DLBSL
88744	2-Nitroaniline	ND		ND		µg/kg		0/3	1000 - 1200	1200		N/A		N/A		NO	NTX
88755	2-Nitrophenol	ND		ND		µg/kg		0/3	430 - 490	490		63,000	N	N/A		NO	DLBSL
91941	3,3'-Dichlorobenzidine	ND		ND		µg/kg		0/3	430 - 490	490		1,400	C	N/A		NO	DLBSL
99092	3-Nitroaniline	ND		ND		µg/kg		0/3	1000 - 1200	1200		N/A		N/A		NO	NTX
534521	4,6-Dinitro-2-methylphenol	ND		ND		µg/kg		0/3	1000 - 1200	1200		7,800	N	N/A		NO	DLBSL
101553	4-Bromophenyl-phenylether	ND		ND		µg/kg		0/3	430 - 490	490		N/A		N/A		NO	NTX
59507	4-Chloro-3-methylphenol	ND		ND		µg/kg		0/3	430 - 490	490		390,000	N	N/A		NO	DLBSL
106478	4-Chloroaniline	ND		ND		µg/kg		0/3	430 - 490	490		31,000	N	N/A		NO	DLBSL
7005723	4-Chlorophenyl-phenylether	ND		ND		µg/kg		0/3	430 - 490	490		N/A		N/A		NO	NTX
106445	4-Methylphenol	ND		ND		µg/kg		0/3	430 - 490	490		39,000	N	N/A		NO	DLBSL
100016	4-Nitroaniline	ND		ND		µg/kg		0/3	1000 - 1200	1200		N/A		N/A		NO	NTX
100027	4-Nitrophenol	ND		ND		µg/kg		0/3	1000 - 1200	1200		63,000	N	N/A		NO	DLBSL
83329	Acenaphthene	ND		ND		µg/kg		0/3	430 - 490	490		470,000	N	N/A		NO	DLBSL
208968	Acenaphthylene	ND		ND		µg/kg		0/3	430 - 490	490		160,000	N	N/A		NO	DLBSL
120127	Anthracene	ND		ND		µg/kg		0/3	430 - 490	490		2,300,000	N	N/A		NO	DLBSL
56553	Benzo(a)anthracene	ND		ND		µg/kg		0/3	430 - 490	490		870	C	N/A		NO	DLBSL
50328	Benzo(a)pyrene	ND		ND		µg/kg		0/3	430 - 490	490		87	C	N/A		YES	DLASL
205992	Benzo(b)fluoranthene	ND		ND		µg/kg		0/3	430 - 490	490		870	C	N/A		NO	DLBSL
191242	Benzo(g,h,i)perylene	ND		ND		µg/kg		0/3	430 - 490	490		230,000	N	N/A		NO	DLBSL

TABLE 2.14
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
207089	Benzo(k)fluoranthene	ND		ND		µg/kg		0/3	430 - 490	490		8,700	C	N/A		NO	DLBSL
111911	bis(2-Chloroethoxy)methane	ND		ND		µg/kg		0/3	430 - 490	490		N/A		N/A		NO	NTX
111444	bis(2-Chloroethyl)ether	ND		ND		µg/kg		0/3	430 - 490	490		580	C	N/A		NO	DLBSL
117817	bis(2-Ethylhexyl)phthalate	ND		ND		µg/kg		0/3	430 - 490	490		46,000	C	N/A		NO	DLBSL
85687	Butylbenzylphthalate	ND		ND		µg/kg		0/3	430 - 490	490		160,000	N	N/A		NO	DLBSL
86748	Carbazole	ND		ND		µg/kg		0/3	430 - 490	490		32,000	C	N/A		NO	DLBSL
218019	Chrysene	ND		ND		µg/kg		0/3	430 - 490	490		87,000	C	N/A		NO	DLBSL
84742	Di-n-butylphthalate	50	J	50	J	µg/kg	012SD03	1/3	430 - 490	50		780,000	N	N/A		NO	DLBSL
117840	Di-n-octyl phthalate	ND		ND		µg/kg		0/3	430 - 490	490		160,000	N	N/A		NO	DLBSL
53703	Dibenz(a,h)anthracene	ND		ND		µg/kg		0/3	430 - 490	490		87	C	N/A		YES	DLASL
132649	Dibenzofuran	ND		ND		µg/kg		0/3	430 - 490	490		31,000	N	N/A		NO	DLBSL
84662	Diethylphthalate	ND		ND		µg/kg		0/3	430 - 490	490		6,300,000	N	N/A		NO	DLBSL
131113	Dimethyl phthalate	ND		ND		µg/kg		0/3	430 - 490	490		78,000,000	N	N/A		NO	DLBSL
206440	Fluoranthene	ND		ND		µg/kg		0/3	430 - 490	490		310,000	N	N/A		NO	DLBSL
86737	Fluorene	ND		ND		µg/kg		0/3	430 - 490	490		310,000	N	N/A		NO	DLBSL
118741	Hexachlorobenzene	ND		ND		µg/kg		0/3	430 - 490	490		400	C	N/A		YES	DLASL
87683	Hexachlorobutadiene	ND		ND		µg/kg		0/3	430 - 490	490		1,600	N	N/A		NO	DLBSL
77474	Hexachlorocyclopentadiene	ND		ND		µg/kg		0/3	430 - 490	490		55,000	N	N/A		NO	DLBSL
67721	Hexachloroethane	ND		ND		µg/kg		0/3	430 - 490	490		7,800	N	N/A		NO	DLBSL
193395	Indeno(1,2,3-cd)pyrene	ND		ND		µg/kg		0/3	430 - 490	490		870	C	N/A		NO	DLBSL
78591	Isophorone	ND		ND		µg/kg		0/3	430 - 490	490		670,000	C	N/A		NO	DLBSL
621647	n-Nitroso-di-n-propylamine	ND		ND		µg/kg		0/3	430 - 490	490		91	C	N/A		YES	DLASL
86306	n-Nitrosodiphenylamine	ND		ND		µg/kg		0/3	430 - 490	490		130,000	C	N/A		NO	DLBSL
91203	Naphthalene	ND		ND		µg/kg		0/3	430 - 490	490		160,000	N	N/A		NO	DLBSL
98953	Nitrobenzene	ND		ND		µg/kg		0/3	430 - 490	490		3,900	N	N/A		NO	DLBSL
87865	Pentachlorophenol	ND		ND		µg/kg		0/3	1000 - 1200	1200		5,300	C	N/A		NO	DLBSL
85018	Phenanthrene	ND		ND		µg/kg		0/3	430 - 490	490		230,000	N	N/A		NO	DLBSL
108952	Phenol	ND		ND		µg/kg		0/3	430 - 490	490		4,700,000	N	N/A		NO	DLBSL
129000	Pyrene	ND		ND		µg/kg		0/3	430 - 490	490		230,000	N	N/A		NO	DLBSL
72548	4,4'-DDD	6.2		6.2		µg/kg	012SD02	1/3	4.3 - 9.1	6.2		2,700	C	N/A		NO	BSL
72559	4,4'-DDE	0.24	J	1.6	J	µg/kg	012SD03	3/3	4.3 - 9	1.6		1,900	C	N/A		NO	BSL
50293	4,4'-DDT	0.9	J	11		µg/kg	012SD02	3/3	4.3 - 9	11		1,900	C	N/A		NO	BSL
309002	Aldrin	ND		ND		µg/kg		0/3	2.2 - 4.5	4.5		38	C	N/A		NO	DLBSL
319846	alpha-BHC	ND		ND		µg/kg		0/3	2.2 - 4.5	4.5		100	C	N/A		NO	DLBSL
577497	alpha-Chlordane	2.3	J	36	J	µg/kg	012SD03	2/3	2.2 - 4.6	36		1,800	C	N/A		NO	BSL

TABLE 2.14
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
12674112	Aroclor-1016	ND		ND		µg/kg		0/3	43 - 91	91		5,500	C	N/A		NO	DLBSL
11104282	Aroclor-1221	ND		ND		µg/kg		0/3	86 - 180	180		320	C	N/A		NO	DLBSL
11141165	Aroclor-1232	ND		ND		µg/kg		0/3	43 - 91	91		320	C	N/A		NO	DLBSL
53469219	Aroclor-1242	ND		ND		µg/kg		0/3	43 - 91	91		320	C	N/A		NO	DLBSL
12672296	Aroclor-1248	ND		ND		µg/kg		0/3	43 - 91	91		320	C	N/A		NO	DLBSL
11097691	Aroclor-1254	ND		ND		µg/kg		0/3	43 - 91	91		156	C	N/A		NO	DLBSL
11096825	Aroclor-1260	ND		ND		µg/kg		0/3	43 - 91	91		320	C	N/A		NO	DLBSL
319857	beta-BHC	ND		ND		µg/kg		0/3	2.2 - 4.5	5		350	C	N/A		NO	DLBSL
319868	delta-BHC	ND		ND		µg/kg		0/3	2.2 - 4.5	5		350	C	N/A		NO	DLBSL
60571	Dieldrin	0.7	J	0.7	J	µg/kg	012SD03	1/3	4.3 - 9	0.7		40	C	N/A		NO	BSL
959988	Endosulfan I	ND		ND		µg/kg		0/3	2.2 - 4.5	4.5		47,000	N	N/A		NO	DLBSL
33213659	Endosulfan II	ND		ND		µg/kg		0/3	4.3 - 9.1	9.1		47,000	N	N/A		NO	DLBSL
1031078	Endosulfan sulfate	0.67	J	1.2	J	µg/kg	012SD03	2/3	4.3 - 9	1.2		47,000	N	N/A		NO	BSL
72208	Endrin	ND		ND		µg/kg		0/3	4.3 - 9.1	9.1		2,300	N	N/A		NO	DLBSL
7421934	Endrin aldehyde	ND		ND		µg/kg		0/3	4.3 - 9.1	9.1		2,300	N	N/A		NO	DLBSL
53494705	Endrin ketone	ND		ND		µg/kg		0/3	4.3 - 9.1	9.1		2,300	N	N/A		NO	DLBSL
58899	gamma-BHC (Lindane)	ND		ND		µg/kg		0/3	2.2 - 4.5	4.5		490	C	N/A		NO	DLBSL
12789036	gamma-Chlordane	0.82	J	31		µg/kg	012SD03	3/3	2.2 - 4.6	31		1,800	C	N/A		NO	BSL
76448	Heptachlor	ND		ND		µg/kg		0/3	2.2 - 4.5	5		1,400	C	N/A		NO	DLBSL
1024573	Heptachlor epoxide	0.084	J	2.6	J	µg/kg	012SD03	3/3	2.2 - 4.6	2.6		70	C	N/A		NO	BSL
72435	Methoxychlor	ND		ND		µg/kg		0/3	22 - 45	45		39,000	N	N/A		NO	DLBSL
8001352	Toxaphene	ND		ND		µg/kg		0/3	220 - 450	450		580	C	N/A		NO	DLBSL
7429905	Aluminum	1,790		8,640		mg/kg	012SD03	3/3	5 - 5.7	8,640		7,800	N	N/A		YES	ASL
7440360	Antimony	1	J	1.3	J	mg/kg	012SD01	2/3	0.57 - 0.65	1.3		3.1	N	N/A		NO	BSL
7440382	Arsenic	1.1	J	1.1	J	mg/kg	012SD03	1/3	0.78 - 0.88	1.1		0.43	C	N/A		YES	ASL
7440393	Barium	5.7	J	31	J	mg/kg	012SD03	3/3	0.05 - 0.06	31		550	N	N/A		NO	BSL
7440417	Beryllium	ND		ND		mg/kg		0/4	0.02 - 0.03	0.03		16	N	N/A		NO	DLBSL
7440439	Cadmium	1.1	J	2.8		mg/kg	012SD04	2/3	0.05 - 0.06	2.8		7.8	N	N/A		NO	BSL
7440702	Calcium	786	J	76,700	J	mg/kg	012SD02	3/3	2.4 - 2.7	76,700		N/A		N/A		NO	NUT
18540299	Chromium	4.2		11.6		mg/kg	012SD03	3/3	0.16 - 0.18	11.6		23	N	N/A		NO	BSL
7440484	Cobalt	0.58	J	0.58	J	mg/kg	012SD01	1/3	0.13 - 0.15	0.58		160	N	N/A		NO	BSL
7440508	Copper	9.6		12.6		mg/kg	012SD03	2/3	0.16 - 0.18	13		310	N	N/A		NO	BSL
7439896	Iron	1,520		3,340		mg/kg	012SD03	3/3	2.7 - 3.1	3,340		4,700	N	N/A		NO	BSL
7439921	Lead	1.9		32.6		mg/kg	012SD01	3/3	0.34 - 0.38	32.6		400		N/A		NO	BSL
7439954	Magnesium	241	J	1,050	J	mg/kg	012SD02	3/3	2.4 - 2.8	1,050		N/A		N/A		NO	NUT

TABLE 2.14
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7439965	Manganese	7		16.4		mg/kg	012SD03	3/3	0.05 - 0.06	16.4		160	N	N/A		NO	BSL
7439976	Mercury	0.05	J	0.07	J	mg/kg	012SD01,03	3/3	0.05	0.07		2.3	N	N/A		NO	BSL
7440020	Nickel	1.1	J	3.6	J	mg/kg	012SD03	3/3	0.34 - 0.38	3.6		160	N	N/A		NO	BSL
7440097	Potassium	136	J	160	J	mg/kg	012SD02	3/3	8.7 - 9.9	160		N/A		N/A		NO	NUT
7782492	Selenium	ND		ND		mg/kg		0/3	0.8 - 0.91	0.91		39	N	N/A		NO	DLBSL
7440224	Silver	0.2	J	0.2	J	mg/kg	012SD01	1/3	0.18 - 0.21	0.2		39	N	N/A		NO	BSL
7440235	Sodium	25.1	J	59.7	J	mg/kg	012SD02	2/3	23.1 - 26.3	59.7		N/A		N/A		NO	NUT
7440280	Thallium	ND		ND		mg/kg		0/3	0.91 - 1	1.0		5.5	N	N/A		NO	DLBSL
7440622	Vanadium	4.2	J	12.4	J	mg/kg	012SD03	3/3	0.13 - 0.15	12.4		55	N	N/A		NO	BSL
7440666	Zinc	7.2		70.4		mg/kg	012SD03	3/3	1.1 - 1.2	70.4		2,300	N	N/A		NO	BSL

(1) Minimum/maximum detected concentration.
(2) N/A - Refer to supporting information for background discussion.
Background values derived from statistical analysis. Follow Regional guidance and provide supporting information.
(3) EPA Region III RBC Table 9/25/01, Residential Soil RBC
used RBC for pyrene as surrogate for benzo(g,h,i)pyrene and phenanthrene.
used RBC for napthalene as surrogate for acenapthylene.
used RBC for chlordane as surrogate for alpha-chlordane and gamma-chlodane
used RBC for endosulfan as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
used RBC for endrin as surrogate for endrin aldehyde and endrin ketone.
used RBC for 4-nitrophenol as surrogate for 2-nitrophenol.
used RBC for 3-methylphenol as surrogate for 4-chloro-3-methylphenol.
used RBC for mercuric chloride as surrogate for mercury.
Residential Soil Screening Level for lead.
(4) Rationale Codes Selection Reason: Above Screening Levels (ASL)
Detection Limit Above Screening Levels (DLASL) - evaluated quantitatively in uncertainty analysis
Deletion Reason: No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)
Detection Limit Below Screening Levels (DLBSL)

Definitions:
N/A = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
ND = Not Detected

TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	ug/kg	8.2E+01	1.5E+02	4.5E+02	J	ug/kg	1.7E+02	95%UCL-T	W-Test (3)	3.4E+01	Mean-T	W-Test (3)
2,3,7,8-TCDD (dioxin) total equivalents	pg/g	2.4E+00	7.3E+00	5.8E+00		pg/g	5.8E+00	Max	W-Test (5)	2.4E+00	Mean-N	W-Test (5)
Aluminum	mg/kg	8.5E+03	1.1E+04	2.2E+04	J	mg/kg	1.2E+04	95%UCL-T	W-Test (1)	7.1E+03	Mean-T	W-Test (1)
Antimony	mg/kg	1.7E+00	3.2E+00	1.5E+01	J	mg/kg	3.6E+00	95%UCL-T	W-Test (3)	6.5E-01	Mean-T	W-Test (3)
Cadmium	mg/kg	4.4E+00	6.0E+00	1.2E+01		mg/kg	6.0E+00	95%UCL-N	W-Test (2)	4.4E+00	Mean-N	W-Test (2)
Chromium	mg/kg	1.7E+01	2.2E+01	4.1E+01		mg/kg	2.6E+01	95%UCL-T	W-Test (3)	1.4E+01	Mean-T	W-Test (3)
Copper	mg/kg	1.5E+02	2.4E+02	6.7E+02	J	mg/kg	6.7E+02	Max	W-Test (4)	4.1E+01	Mean-T	W-Test (3)
Iron	mg/kg	3.3E+03	3.8E+03	6.9E+03		mg/kg	3.9E+03	95%UCL-T	W-Test (1)	3.1E+03	Mean-T	W-Test (1)
Lead	mg/kg	8.4E+01	1.6E+02	7.1E+02		mg/kg	3.2E+02	95%UCL-T	W-Test (1)	3.3E+01	Mean-T	W-Test (1)

For duplicate results, the higher value was used in the calculations.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are lognormally distirbuted.
(2) Shapiro-Wilk W-Test indicates data are normally distributed.
(3) Shapiro-Wilk W-Test inonclusive, assumed data are lognormally distributed.
(4) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(5) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
4,4'-DDD	µg/L	3.6E-02	N/A	6.6E-03	J	µg/L	6.6E-03	Max	(1)	3.6E-02	Mean-N	(1)
4,4'-DDE	µg/L	4.2E-02	N/A	2.7E-02	J	µg/L	2.7E-02	Max	(1)	4.2E-02	Mean-N	(1)
4,4'-DDT	µg/L	3.7E-02	N/A	1.1E-02	J	µg/L	1.1E-02	Max	(1)	3.7E-02	Mean-N	(1)
Aldrin	µg/L	1.8E-02	N/A	3.0E-03	J	µg/L	3.0E-03	Max	(1)	1.8E-02	Mean-N	(1)
Aroclor-1248	µg/L	8.7E-01	N/A	1.6E+00		µg/L	1.6E+00	Max	(1)	8.7E-01	Mean-N	(1)
Dieldrin	µg/L	3.8E-02	N/A	1.5E-02	J	µg/L	1.5E-02	Max	(1)	3.8E-02	Mean-N	(1)
Mercury	µg/L	8.3E-02	N/A	1.2E-01	J	µg/L	1.2E-01	Max	(1)	8.3E-02	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quatitation limit was used as the sample concentration

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aluminum	mg/kg	5.35E+03	N/A	8.64E+03		mg/kg	8.64E+03	Max	(1)	5.35E+03	Mean-N	(1)
Arsenic	mg/kg	6.43E-01	N/A	1.10E+00	J	mg/kg	1.10E+00	Max	(1)	6.43E-01	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quantitation limit was used as the sample concentration

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
alpha-Chlordane	µg/L	5.6E-02	N/A	1.8E-01	J	µg/L	5.6E-02	Mean-N	(1)	5.6E-02	Mean-N	(1)
Aroclor-1248	µg/L	5.8E-01	N/A	8.9E-01	J	µg/L	5.8E-01	Mean-N	(1)	5.8E-01	Mean-N	(1)
Dieldrin	µg/L	3.3E-02	N/A	1.1E-02	J	µg/L	3.3E-02	Mean-N	(1)	3.3E-02	Mean-N	(1)
gamma-Chlordane	µg/L	3.1E-02	N/A	6.4E-02	J	µg/L	3.1E-02	Mean-N	(1)	3.1E-02	Mean-N	(1)
Heptachlor epoxide	µg/L	4.2E-02	N/A	1.3E-01	J	µg/L	4.2E-02	Mean-N	(1)	4.2E-02	Mean-N	(1)
Aluminum	µg/L	2.2E+03	N/A	8.5E+03		µg/L	2.2E+03	Mean-N	(1)	2.2E+03	Mean-N	(1)
Arsenic	µg/L	9.2E+00	N/A	3.0E+01		µg/L	9.2E+00	Mean-N	(1)	9.2E+00	Mean-N	(1)
Chromium	µg/L	5.4E+00	N/A	2.6E+01		µg/L	5.4E+00	Mean-N	(1)	5.4E+00	Mean-N	(1)
Iron	µg/L	1.5E+04	N/A	5.1E+04	J	µg/L	1.5E+04	Mean-N	(1)	1.5E+04	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quatitation limit was used as the sample concentration.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Following EPA Region IV guidance, the arithmetic average used as the RME and CT concentration.

TABLE 3.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
alpha-Chlordane	µg/L	5.65E-02	1.3E-01	1.80E-01	J	µg/L	5.6E-02	Mean-N	(1)	5.6E-02	Mean-N	(1)
Aroclor-1248	µg/L	4.87E-01	6.7E-01	8.90E-01	J	µg/L	4.9E-01	Mean-N	(1)	4.9E-01	Mean-N	(1)
Dieldrin	µg/L	3.31E-02	5.8E-02	1.10E-02	J	µg/L	3.3E-02	Mean-N	(1)	3.3E-02	Mean-N	(1)
gamma-Chlordane	µg/L	3.08E-02	5.1E-02	6.40E-02	J	µg/L	3.1E-02	Mean-N	(1)	3.1E-02	Mean-N	(1)
Heptachlor epoxide	µg/L	3.74E-02	9.1E-02	1.30E-01	J	µg/L	3.7E-02	Mean-N	(1)	3.7E-02	Mean-N	(1)
Aluminum	µg/L	2.21E+03	6.0E+03	8.51E+03		µg/L	2.2E+03	Mean-N	(1)	2.2E+03	Mean-N	(1)
Arsenic	µg/L	9.16E+00	2.2E+01	3.02E+01		µg/L	9.2E+00	Mean-N	(1)	9.2E+00	Mean-N	(1)
Chromium	µg/L	5.41E+00	1.7E+01	2.55E+01		µg/L	5.4E+00	Mean-N	(1)	5.4E+00	Mean-N	(1)
Iron	µg/L	1.54E+04	3.7E+04	5.12E+04	J	µg/L	1.5E+04	Mean-N	(1)	1.5E+04	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quatitation limit was used as the sample concentration.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Following EPA Region IV guidance, the arithmetic average used as the RME and CT concentration.

TABLE 3.6
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	ug/kg	8.2E+01	1.5E+02	4.5E+02	J	ug/kg	1.7E+02	95%UCL-T	W-Test (3)	3.4E+01	Mean-T	W-Test (3)
2,3,7,8-TCDD (dioxin) total equivalents	pg/g	2.4E+00	7.3E+00	5.8E+00		pg/g	5.8E+00	Max	W-Test (5)	2.4E+00	Mean-N	W-Test (5)
Aluminum	mg/kg	8.5E+03	1.1E+04	2.2E+04	J	mg/kg	1.2E+04	95%UCL-T	W-Test (1)	7.1E+03	Mean-T	W-Test (1)
Antimony	mg/kg	1.7E+00	3.2E+00	1.5E+01	J	mg/kg	3.6E+00	95%UCL-T	W-Test (3)	6.5E-01	Mean-T	W-Test (3)
Cadmium	mg/kg	4.4E+00	6.0E+00	1.2E+01		mg/kg	6.0E+00	95%UCL-N	W-Test (2)	4.4E+00	Mean-N	W-Test (2)
Chromium	mg/kg	1.7E+01	2.2E+01	4.1E+01		mg/kg	2.6E+01	95%UCL-T	W-Test (3)	1.4E+01	Mean-T	W-Test (3)
Copper	mg/kg	1.5E+02	2.4E+02	6.7E+02	J	mg/kg	6.7E+02	Max	W-Test (4)	**4.1E+01**	Mean-T	W-Test (3)
Iron	mg/kg	3.3E+03	3.8E+03	6.9E+03		mg/kg	3.9E+03	95%UCL-T	W-Test (1)	3.1E+03	Mean-T	W-Test (1)
Lead	mg/kg	8.4E+01	1.6E+02	7.1E+02		mg/kg	3.2E+02	95%UCL-T	W-Test (1)	3.3E+01	Mean-T	W-Test (1)

For duplicate results, the higher value was used in the calculations.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are lognormally distirbuted.
(2) Shapiro-Wilk W-Test indicates data are normally distributed.
(3) Shapiro-Wilk W-Test inonclusive, assumed data are lognormally distributed.
(4) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(5) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.7
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
4,4'-DDD	µg/L	3.55E-02	7.78E-02	6.60E-03	J	µg/L	6.60E-03	Max	(1)	3.55E-02	Mean-N	(1)
4,4'-DDE	µg/L	4.23E-02	6.47E-02	2.70E-02	J	µg/L	2.70E-02	Max	(1)	4.23E-02	Mean-N	(1)
4,4'-DDT	µg/L	3.70E-02	7.50E-02	1.10E-02	J	µg/L	1.10E-02	Max	(1)	3.70E-02	Mean-N	(1)
Aldrin	µg/L	1.77E-02	3.91E-02	3.00E-03	J	µg/L	3.00E-03	Max	(1)	1.77E-02	Mean-N	(1)
Aroclor-1248	µg/L	8.67E-01	1.94E+00	1.60E+00		µg/L	1.60E+00	Max	(1)	8.67E-01	Mean-N	(1)
Dieldrin	µg/L	3.83E-02	7.24E-02	1.50E-02	J	µg/L	1.50E-02	Max	(1)	3.83E-02	Mean-N	(1)
Mercury	µg/L	8.33E-02	1.43E-01	1.20E-01	J	µg/L	1.20E-01	Max	(1)	8.33E-02	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quatitation limit was used as the sample concentration.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.8
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aluminum	mg/kg	5.35E+03	1.48E+04	8.64E+03		mg/kg	8.64E+03	Max	(1)	5.35E+03	Mean-N	(1)
Arsenic	mg/kg	6.43E-01	1.73E+00	1.10E+00	J	mg/kg	1.10E+00	Max	(1)	6.43E-01	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table ----		see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table ----		see Table ----	- -	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992	2,000	EPA, 1992	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	1	EPA, 1997	0.2	EPA, 1992	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 1995	chem specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

DABS: Based on EPA's Risk Assessment Guidance for Superfund Vol. 1: Human Health Evaluation Manual Supplemental Guidance Dermal Risk Assessment Interim Guidance, November 1998.

For constituents with no specific values, used default volatile organics value of 20%, semi-volatile organics value of 10%, and Inorganics value of 1%.

TABLE 4.2

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table ----		see Table ----		Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	45	(1)	23	(1)	
	ED	Exposure Duration	years	10	EPA, 1996	10	EPA, 1996	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	45	EPA, 1996	45	EPA, 1996	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,650	EPA, 1989	3,650	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table ----		see Table ----		CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	4,600	EPA, 1997	3,700	EPA, 1997	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	1	EPA, 1997	0.2	EPA, 1992	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 1995	chem specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	45	(1)	23	(1)	
	ED	Exposure Duration	years	10	EPA, 1996	10	EPA, 1996	
	BW	Body Weight	kg	45	EPA, 1996	45	EPA, 1996	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,650	EPA, 1989	3,650	EPA, 1989	

(1) Professional judgement assuming 3 days per week during the summer months (when off from school) and 1 day per week during late spring and early fall for the RME and 1/2 the RME value for the CT.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1996: Supplemental Guidance to RAGS: Region 4 Bulletins

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

DABS: Based on EPA's Risk Assessment Guidance for Superfund Vol. 1: Human Health Evaluation Manual Supplemental Guidance Dermal Risk Assessment Interim Guidance, November 1998.

For constituents with no specific values, used default volatile organics value of 20%, semi-volatile organics value of 10%, and Inorganics value of 1%.

Assumed skin surface area in contact with surface soil is 25% of total skin surface area. Used total skin surface area of 12-15 year male (1.49 m^2 for 50th percentile and 1.85m^2 for 95th percentile).

TABLE 4.3

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	see Table ----	- -	see Table ---	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	see Table ----	- -	see Table ---	- -	CA x IN x ET x EF x ED x 1/BW x 1/AT
	FDC	Fugivite Dust Concentration in Air	m^3/kg	1.32E+09	EPA, 1996	1.32E+09	EPA, 1996	
	VF	Volatilization Factor for volatile constituents	m^3/kg	calc	EPA, 1996	calc	EPA, 1996	
	IN	Inhalation Rate	$m^3/hour$	0.83	EPA, 1991	0.83	EPA, 1991	
	ET	Exposure Time	hr/day	8	(1)	4	(1)	CA (mg/m^3) = CS (1/FDC + 1/VF)
	EF	Exposure Frequency	days/year	250	EPA,1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA., 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	

(1) Professional judgement based on maintenance activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1996: Soil Screening Guidance: User's Guide. OSWER. EPA/540/R-96/018.

TABLE 4.4

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	see Table ----	- -	see Table ---	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	see Table ----	- -	see Table ---	- -	CA x IN x ET x EF x ED x 1/BW x 1/AT
	FDC	Fugivite Dust Concentration in Air	m^3/kg	1.32E+09	EPA, 1996a	1.32E+09	EPA, 1996a	
	VF	Volatilization Factor for volatile constituents	m^3/kg	calc	EPA, 1996a	calc	EPA, 1996a	
	IN	Inhalation Rate	$m^3/hour$	0.83	EPA, 1991	0.83	EPA, 1991	
	ET	Exposure Time	hr/day	2	(1)	2	(1)	CA (mg/m^3) = CS (1/FDC + 1/VF)
	EF	Exposure Frequency	days/year	45	(2)	23	(2)	
	ED	Exposure Duration	years	10	EPA, 1996b	10	EPA, 1996b	
	BW	Body Weight	kg	45	EPA, 1996b	45	EPA, 1996b	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,650	EPA, 1989	3,650	EPA, 1989	

(1) Professional judgement assuming trespasser would spend a maximum of 2 hours at the site.

(2) Professional judgement assuming 3 days per week during the summer months (when off from school) and 1 day per week during late spring and early fall for the RME and 1/2 the RME value for the CT.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1996a: Soil Screening Guidance: User's Guide. OSWER. EPA/540/R-96/018.

EPA, 1996b: Supplemental Guidance to RAGS: Region 4 Bulletins

TABLE

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSW	Chemical Concentration in Surface Water	µg/l	see Table ---	- -	see Table ---	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-SW	Ingestion Rate of Surface Water	l/hour	0.01	EPA, 1996	0.01	EPA, 1996	CSW x IR-SW x ET x EF x ED x CF1 x
	ET	Exposure Time	hr/day	8	(1)	4	(1)	1/BW x 1/AT
	EF	Exposure Frequency	days/year	15	(1)	15	(1)	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	
Dermal Absorption	CSW	Chemical Concentration in Surface Water	µg/l	see Table ---	- -	see Table ---	- -	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	Kp	Permeability Coefficient	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	Inorganics: DAevent (mg/cm^2-event) =
	τ	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	Kp x CSW x t_{event} x CF1 x CF2
	t^*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	t_{event}	Event Time	hr/day	8	EPA, 1992	8	EPA, 1992	$t_{event}<t^*$: DAevent (mg/cm^2-event) =
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	2 x Kp x CSW x (sqrt((6 x τ x t_{event})/π))
	SA	Skin Surface Area Available for Contact	cm^2	6,000	EPA, 1997	5,400	EPA, 1997	x CF1 x CF2
	EF	Exposure Frequency	days/year	15	(1)	15	(1)	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	$t_{event}>t^*$: DAevent (mg/cm^2-event) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	Kp x CSW x (t_{event}/(1+B) + 2 x τ x ((1 + 3B)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	- -	

(1): Professional judgement assuming 15 days per year exposure frequency for the RME and CT and 8 hours exposure time for RME and 1/2 the RME value for the CT.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1995: Exposure Factors Handbook. USEPA/600/8-89-043.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1996: Supplemental Guidance to RAGS: Region 4 Bulletins

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

Skin surface area in contact with surface water based on contact while wading. Assumed 30 percent of total surface area (hands, forearms, lower legs, and feet).

TABLE 4.6

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-SW	Ingestion Rate of Surface Water	l/hour	0.01	EPA, 1996	0.01	EPA, 1996	CSW x IR-SW x ET x EF x ED x CF1 x
	ET	Exposure Time	hr/day	2.6	EPA, 1989	2.6	EPA, 1989	1/BW x 1/AT
	EF	Exposure Frequency	days/year	45	(1)	23	(1)	
	ED	Exposure Duration	years	10	EPA, 1996	10	EPA, 1996	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	45	EPA, 1996	45	EPA, 1996	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,650	EPA, 1989	3,650	EPA, 1989	
Dermal Absorption	CSW	Chemical Concentration in Surface Water	µg/l	see Table ----	- -	see Table ----	- -	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	Kp	Permeability Coefficient	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	Inorganics: DAevent (mg/cm^2-event) =
	τ	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	Kp x CSW x t_{event} x CF1 x CF2
	t^*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	t_{event}	Event Time	hr/day	2.6	EPA, 1989	2.6	EPA, 1989	$t_{event}<t^*$: DAevent (mg/cm^2-event) =
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	2 x Kp x CSW x (sqrt((6 x τ x t_{event})/π))
	SA	Skin Surface Area Available for Contact	cm^2	5,500	EPA, 1997	4,500	EPA, 1997	x CF1 x CF2
	EF	Exposure Frequency	days/year	45	(1)	23	(1)	
	ED	Exposure Duration	years	10	EPA, 1996	10	EPA, 1996	$t_{event}>t^*$: DAevent (mg/cm^2-event) =
	BW	Body Weight	kg	45	EPA, 1996	45	EPA, 1996	Kp x CSW x (t_{event}/(1+B) + 2 x τ x ((1 + 3B)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	3,650	EPA, 1989	3,650	EPA, 1989	

(1) Professional judgement assuming 3 days per week during the summer months (when off from school) and 1 day per week during late spring and early fall for the RME and 1/2 the RME value for the CT.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1996: Guidance to RAGS: Region IV Bulletins

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

TABLE 4.7

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSed	Chemical Concentration in Sediment	mg/kg	see Table ----		see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-Sed	Ingestion Rate of Sediment	mg/day	100	EPA, 1993	50	EPA, 1993	CSed x IR-Sed x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	15	(1)	15	(1)	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	EPA, 1989	
Dermal Absorption	CSed	Chemical Concentration in Sediment	mg/kg	see Table ----		see Table ----		CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992	2,000	EPA, 1992	CSed x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	1.0	EPA, 1992	0.2	EPA, 1992	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 1995	chem specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	15	(1)	15	(1)	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	1,825	EPA, 1989	

(1): Professional judgement assuming 15 days per year exposure frequency for the RME and CT and 8 hours exposure time for RME and 1/2 the RME value for the CT.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

DABS: Based on EPA's Risk Assessment Guidance for Superfund Vol. 1: Human Health Evaluation Manual Supplemental Guidance Dermal Risk Assessment Interim Guidance, November 1998.

For constituents with no specific values, used default volatile organics value of 20%, semi-volatile organics value of 10%, and Inorganics value of 1%.

TABLE 4.8

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSed	Chemical Concentration in Sediment	mg/kg	see Table ----		see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-Sed	Ingestion Rate of Sediment	mg/day	100	EPA, 1993	50	EPA, 1993	CSed x IR-Sed x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	45	(1)	23	(1)	
	ED	Exposure Duration	years	10	EPA, 1996	10	EPA, 1996	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	45	EPA, 1996	45	EPA, 1996	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,650	EPA, 1989	3,650	EPA, 1989	
Dermal Absorption	CSed	Chemical Concentration in Sediment	mg/kg	see Table ----		see Table ----		CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,500	EPA, 1997	4,500	EPA, 1997	CSed x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	1.0	EPA, 1992	0.2	EPA, 1992	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 1995	chem specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	45	(1)	23	(1)	
	ED	Exposure Duration	years	10	EPA, 1996	10	EPA, 1996	
	BW	Body Weight	kg	45	EPA, 1996	45	EPA, 1996	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,650	EPA, 1989	3,650	EPA, 1989	

(1) Professional judgement assuming 3 days per week during the summer months (when off from school) and 1 day per week during late spring and early fall for the RME and 1/2 the RME value for the CT.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1996: Guidance to RAGS: Region IV Bulletins

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

DABS: Based on EPA's Risk Assessment Guidance for Superfund Vol. 1: Human Health Evaluation Manual Supplemental Guidance Dermal Risk Assessment Interim Guidance, November 1998.

For constituents with no specific values, used default volatile organics value of 20%, semi-volatile organics value of 10%, and Inorganics value of 1%.

TABLE 4.9

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	µg/l	see Table ----		see Table ----		Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-W	Ingestion Rate of Water	liters/day	2	EPA, 1997	1.4	EPA, 1993	CW x IR-W x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3285	EPA, 1989	

(1) Not available, used RME value.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

Skin surface area in contact with groundwater are based on ranges. For total adult male surface area ranges from 17,000 to 23,000 cm^2, with a mean of 20,000 cm^2..

TABLE 4.10

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	µg/l	see Table ---		see Table ---		Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-W	Ingestion Rate of Water	liters/day	1	EPA, 1997a	1	EPA, 1997a	CW x IR-W x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal Absorption	CW	Chemical Concentration in Water	µg/l	see Table ---		see Table ---	chem specific	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	Kp	Permeability Coefficient	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	Inorganics: DAevent (mg/cm^2-event) =
	τ	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	Kp x CW x t_{event} x CF1 x CF2
	t^*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	t_{event}	Event Time	hr/day	0.33	EPA, 1992	0.33	EPA, 1992	$t_{event}<t^*$: DAevent (mg/cm^2-event) =
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	2 x Kp x CW x (sqrt((6 x τ x t_{event})/π))
	SA	Skin Surface Area Available for Contact	cm^2	10,000	EPA, 1997b	7,500	EPA, 1997b	x CF1 x CF2
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	$t_{event}>t^*$: DAevent (mg/cm^2-event) =
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	Kp x CW x (t_{event}/(1+B) + 2 x τ x ((1 + 3B)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997a: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 1997b: Risk Assessment Guidance for Superfund. Vol.1: Supplemental guidance, Dermal Risk Assessment Guidance. Interim Guidance. NCEA-W-0364.

TABLE 4.11

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal Absorption	CW	Chemical Concentration in Water	µg/l	see Table ----		see Table ----	chem specific	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	- -	0.001	- -	
	Kp	Permeability Coefficient	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	Inorganics: DAevent (mg/cm2-event) =
	τ	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	Kp x CW x t_{event} x CF1 x CF2
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	t_{event}	Event Time	hr/day	8	(1)	4	(1)	t_{event}<t*: DAevent (mg/cm^2-event) =
	CF2	Conversion Factor 2	l/cm^3	0.001	- -	0.001	- -	2 x Kp x CW x (sqrt((6 x τ x t_{event})/π))
	SA	Skin Surface Area Available for Contact	cm^2	6,000	EPA, 1997	5,400	EPA, 1997	x CF1 x CF2
	EF	Exposure Frequency	days/year	40	(1)	40	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	t_{event}>t*: DAevent (mg/cm^2-event) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	Kp x CW x (t_{event}/(1+B) + 2 x τ x ((1 + 3B)/(1+B))
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	x CF1 x CF2
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	

(1) Professional Judgement based on construction activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT. Assumed exposure to open excavation would be 40 days

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

Skin surface area in contact with groundwater based on contact during construction activities. Assumed 30 percent of total surface area (hands, forearms, lower legs, and feet).

TABLE 4.12

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Upper Aquifer - Shower
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	SExp	Exposure per Shower	mg/kg-day	see Table 4.9 (same as ing exp)		see Table 4.9 (same as ing exp)	- -	InhExp equals ingestion of VOCs CDI

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

TABLE 4.13

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Upper Aquifer - Water Vapors at Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CA	Air Concentration	mg/m^3	see Table 7.13.RME UA Supplement		see Table 7.13.RME UA Supplement		Two-Film Volatilization Model and
	IN	Inhalation Rate	m^3/hour	1.7	EPA, 1997	1.7	EPA, 1997	USEPA's SCREEN3 Model for CA
	ET	Exposure Time	hr/day	8	(1)	4	(1)	
	EF	Exposure Frequency	days/year	40	(1)	40	(1)	Chronic Daily Intake (CDI) (mg/kg-day) =
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1993	CA x IN x ET x EF x ED x 1/BW x 1/AT
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA. 1989	365	EPA. 1989	

(1) Professional Judgement based on construction activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT. Assumed exposure to open excavation would be 40 days

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

TABLE 4.14

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table ----		see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1993	50	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table ----		see Table ----	- -	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	6,600	EPA, 1997b	5,700	EPA, 1997b	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	1	EPA, 1997a	0.2	EPA, 1992	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 1995	chem specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997a: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 1997b: Risk Assessment Guidance for Superfund. Vol.1: Supplemental guidance, Dermal Risk Assessment Guidance. Interim Guidance. NCEA-W-0364.

DABS: Based on Region III Technical Guidance "Assessing Dermal Exposure from Soil, December 1995", for constituents not listed used volatile organics value of 20%, semi-volatile organics value of 10%, and Inorganics value of 1%.

Skin surface area for adult resident wearing a short-sleeved shirt, shorts, and shoes. Exposed area includes head, hands, forearms, and lower legs.

TABLE 4.15

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table ----		see Table ----		Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	200	EPA, 1991	100	EPA, 1993	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table ----		see Table ----		CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	3,400	EPA, 1997b	2,900	EPA, 1997b	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	1	EPA, 1997a	0.2	EPA, 1992	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 1995	chem specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997a: Exposure Factors Handbook. EPA/600/P-95/002Fa.

EPA, 1997b: Risk Assessment Guidance for Superfund. Vol.1: Supplemental guidance. Dermal Risk Assessment Guidance. Interim Guidance. NCEA-W-0364.

DABS: Based on Region III Technical Guidance "Assessing Dermal Exposure from Soil, December 1995", for constituents not listed used volatile organics value of 20%, semi-volatile organics value of 10%, and Inorganics value of 1%.

Skin surface area for child resident wearing a short-sleeved shirt and shorts (no shoes). Exposed area includes head, hands, forearms, lower legs, and feet.

TABLE 4.16

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	see Table ----	- -	see Table ---	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	see Table ----	- -	see Table ---	- -	CA x IN x ET x EF x ED x 1/BW x 1/AT
	FDC	Fugivite Dust Concentration in Air	m^3/kg	1.32E+09	EPA, 1996	1.32E+09	EPA, 1996	
	VF	Volatilization Factor for volatile constituents	m^3/kg	calc	EPA, 1996	calc	EPA, 1996	
	IN	Inhalation Rate	$m^3/hour$	0.83	EPA, 1991	0.83	EPA, 1991	
	ET	Exposure Time	hr/day	24	- -	24	- -	CA (mg/m^3) = CS (1/FDC + 1/VF)
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA,1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989	3,285	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1996: Soil Screening Guidance: User's Guide. OSWER. EPA/540/R-96/018.

TABLE 4.17

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	see Table ----	- -	see Table ---	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	see Table ----	- -	see Table ---	- -	CA x IN x ET x EF x ED x 1/BW x 1/AT
	FDC	Fugivite Dust Concentration in Air	m^3/kg	1.32E+09	EPA, 1996	1.32E+09	EPA, 1996	
	VF	Volatilization Factor for volatile constituents	m^3/kg	calc	EPA, 1996	calc	EPA, 1996	
	IN	Inhalation Rate	$m^3/hour$	0.5	EPA, 1997	0.5	EPA, 1997	
	ET	Exposure Time	hr/day	24	- -	24	- -	CA (mg/m^3) = CS (1/FDC + 1/VF)
	EF	Exposure Frequency	days/year	350	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1996: Soil Screening Guidance: User's Guide. OSWER. EPA/540/R-96/018.

EPA, 1997: Region III, Risk-based Concentration Table.

TABLE 4.18

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	see Table ----		see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	480	EPA, 1991	480	EPA, 1991	CS x IR-S x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	40	(1)	40	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	see Table ----		see Table ----	- -	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1992	2,000	EPA, 1992	CS x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	1	EPA, 1997	0.2	EPA, 1992	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 1995	chem specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	40	(1)	40	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	

(1) Professional Judgement based on construction activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT. Assumed exposure to open excavation would be 40 days

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

DABS: Based on EPA's Risk Assessment Guidance for Superfund Vol. 1: Human Health Evaluation Manual Supplemental Guidance Dermal Risk Assessment Interim Guidance, November 1998.

For constituents with no specific values, used default volatile organics value of 20%, semi-volatile organics value of 10%, and Inorganics value of 1%.

TABLE 4.19

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Emissions from exposed soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	see Table ----	- -	see Table ---	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	see Table ----	- -	see Table ---	- -	CA x IN x ET x EF x ED x 1/BW x 1/AT
	FDC	Fugivite Dust Concentration in Air	m^3/kg	1.67E+06	(2)	1.62E+06	(2)	
	VF	Volatilization Factor for volatile constituents	m^3/kg	calc	EPA, 1996	calc	EPA, 1996	
	IN	Inhalation Rate	$m^3/hour$	1.7	EPA, 1997	1.7	EPA, 1997	
	ET	Exposure Time	hr/day	8	(1)	4	(1)	CA (mg/m^3) = CS (1/FDC + 1/VF)
	EF	Exposure Frequency	days/year	40	(3)	40	(3)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	NA	- -	

(1) Professional Judgement based on construction activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT.

(2) Calculated in Appendix G.3 section Generation of Fugitive Dust During Construction Activities.

(3) Professional Judgement based on construction activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT. Assumed exposure to open excavation would be 40 days

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1996: Soil Screening Guidance: User's Guide. OSWER. EPA/540/R-96/018.

TABLE 4.20

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSW	Chemical Concentration in Surface Water	µg/l	see Table ---	--	see Table ---	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-SW	Ingestion Rate of Surface Water	l/hour	0.01	EPA, 1996	0.01	EPA, 1996	CSW x IR-SW x ET x EF x ED x CF1 x
	ET	Exposure Time	hr/day	8	(1)	4	(1)	1/BW x 1/AT
	EF	Exposure Frequency	days/year	40	(1)	40	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	CF1	Conversion Factor 1	mg/µg	0.001	--	0.001	--	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	--	
Dermal Absorption	CSW	Chemical Concentration in Surface Water	µg/l	see Table ---	--	see Table ---	--	CDI (mg/kg-day) =
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 1992	calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	CF1	Conversion Factor 1	mg/µg	0.001	--	0.001	--	
	Kp	Permeability Coefficient	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	Inorganics: DAevent (mg/cm^2-event) =
	τ	Lag Time	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	Kp x CSW x t_{event} x CF1 x CF2
	t*	Time to Reach Steady-state	hours	chem specific	EPA, 1992	chem specific	EPA, 1992	
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	chem specific	EPA, 1992	chem specific	EPA, 1992	Organics :
	t_{event}	Event Time	hr/day	8	(1)	4	(1)	t_{event}<t*: DAevent (mg/cm^2-event) =
	CF2	Conversion Factor 2	l/cm^3	0.001	--	0.001	--	2 x Kp x CSW x (sqrt((6 x τ x t_{event})/π))
	SA	Skin Surface Area Available for Contact	cm^2	6,000	EPA, 1997	5,400	EPA, 1997	x CF1 x CF2
	PC	Permeability Constant	cm/hr	chem specific	EPA, 1992	chem specific	EPA, 1992	
	EF	Exposure Frequency	days/year	40	(1)	40	(1)	t_{event}>t*: DAevent (mg/cm^2-event) =
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	Kp x CW x (t_{event}/(1+B) + 2 x τ x ((1 + 3B)/(1+B))
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	x CF1 x CF2
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	--	

(1) Professional Judgement based on construction activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT. Assumed exposure to surface water would be 40 days.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1996: Supplemental Guidance to RAGS: Region 4 Bulletins

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

Skin surface area in contact with surface water based on contact while wading. Assumed 30 percent of total surface area (hands, forearms, lower legs, and feet).

TABLE 4.21

VALUES USED FOR DAILY INTAKE CALCULATIONS

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CSed	Chemical Concentration in Sediment	mg/kg	see Table ----		see Table ----	- -	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-Sed	Ingestion Rate of Sediment	mg/day	480	EPA, 1991	240	(1)	CSed x IR-Sed x EF x ED x CF3 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	40	(1)	40	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	
Dermal Absorption	CSed	Chemical Concentration in Sediment	mg/kg	see Table ----		see Table ----		CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,300	EPA, 1997	2,000	EPA, 1997	CSed x SA x SSAF x DABS x CF3 x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	1.0	EPA, 1992	0.2	EPA, 1992	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem specific	EPA, 1995	chem specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	- -	0.000001	- -	
	EF	Exposure Frequency	days/year	40	(1)	40	(1)	
	ED	Exposure Duration	years	1	EPA, 1991	1	EPA, 1991	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	365	EPA, 1989	

(1) Professional Judgement based on construction activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT. Assumed exposure to sediment would be 40 days.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.

DABS: Based on EPA's Risk Assessment Guidance for Superfund Vol. 1: Human Health Evaluation Manual Supplemental Guidance Dermal Risk Assessment Interim Guidance, November 1998.

For constituents with no specific values, used default volatile organics value of 20%, semi-volatile organics value of 10%, and Inorganics value of 1%.

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Cherry Point, Site 12

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
1,1,2,2-Tetrachloroethane	Chronic	6.0E-02	mg/kg-day	70%	4.2E-02	mg/kg-day			NCEA	
1,1,2-Trichloroethane	Chronic	4.0E-03	mg/kg-day	81%	3.2E-03	mg/kg-day	Blood	1000	IRIS	02/13/2002
	Subchronic	4.0E-02	mg/kg-day	81%	3.2E-02	mg/kg-day	Blood	100	HEAST	07/97
1,1-Dichloroethene	Chronic	9.0E-03	mg/kg-day	100%	9.0E-03	mg/kg-day	Liver	1000	IRIS	02/13/2002
	Subchronic	9.0E-03	mg/kg-day	100%	9.0E-03	mg/kg-day	Liver	1000	HEAST	07/97
1,2-Dibromoethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloroethane	Chronic	3.0E-02	mg/kg-day	100%	3.0E-02	mg/kg-day			NCEA	
1,2-Dichloropropane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	Chronic	3.0E-03	mg/kg-day	97%	2.9E-03	mg/kg-day		3000	NCEA	
	Subchronic	3.0E-03	mg/kg-day	97%	2.9E-03	mg/kg-day		3000	NCEA	
Bromodichloromethane	Chronic	2.0E-02	mg/kg-day	98%	2.0E-02	mg/kg-day	Kidney	1000	IRIS	02/13/2002
	Subchronic	2.0E-02	mg/kg-day	98%	2.0E-02	mg/kg-day	Kidney	1000	HEAST	07/97
Bromoform	Chronic	2.0E-02	mg/kg-day	60%	1.2E-02	mg/kg-day	Liver	1000	IRIS	02/13/2002
	Subchronic	2.0E-01	mg/kg-day	60%	1.2E-01	mg/kg-day	Liver	100	HEAST	07/97
Carbon tetrachloride	Chronic	7.0E-04	mg/kg-day	65%	4.6E-04	mg/kg-day	Liver	1000	IRIS	02/13/2002
	Subchronic	7.0E-03	mg/kg-day	65%	4.6E-03	mg/kg-day	Liver		HEAST	07/97
Chloroform	Chronic	1.0E-02	mg/kg-day	20%	2.0E-03	mg/kg-day	Liver	100	IRIS	02/13/2002
	Subchronic	1.0E-02	mg/kg-day	20%	2.0E-03	mg/kg-day	Liver	100	HEAST	07/97
cis-1,3-Dichloropropene	Chronic	3.0E-02	mg/kg-day	55%	1.7E-02	mg/kg-day	Organs	100	IRIS	02/13/2002
Dibromochloromethane	Chronic	2.0E-02	mg/kg-day	60%	1.2E-02	mg/kg-day	Liver	1000	IRIS	02/13/2002
	Subchronic	2.0E-01	mg/kg-day	60%	1.2E-01	mg/kg-day	Liver	100	HEAST	07/97
Tetrachloroethene	Chronic	1.0E-02	mg/kg-day	100%	1.0E-02	mg/kg-day	Liver	1000	IRIS	02/13/2002
	Subchronic	1.0E-01	mg/kg-day	100%	1.0E-01	mg/kg-day	Liver	100	HEAST	07/97
trans-1,3-Dichloropropene	Chronic	3.0E-02	mg/kg-day	55%	1.7E-02	mg/kg-day	Organs	100	IRIS	02/13/2002
Vinyl chloride	Chronic	3.0E-03	mg/kg-day	100%	3.0E-03	mg/kg-day	Liver	30	IRIS	02/13/2002
1,2-Dichlorobenzene	Chronic	9.0E-02	mg/kg-day	50%	4.5E-02	mg/kg-day	NOAEL	1000	IRIS	02/13/2002
1,3-Dichlorobenzene	Chronic	3.0E-03	mg/kg-day	50%	1.5E-03	mg/kg-day	NOAEL	1000	NCEA	3/7/1996
1,4-Dichlorobenzene	Chronic	3.0E-02	mg/kg-day	90%	2.7E-02	mg/kg-day	Liver	1000	NCEA	4/29/1997

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Cherry Point, Site 12

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
2,4,6-Trichlorophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dinitrophenol	Chronic	2.0E-03	mg/kg-day	100%	2.0E-03	mg/kg-day	Eyes	1000	IRIS	02/13/2002
	Subchronic	2.0E-03	mg/kg-day	100%	2.0E-03	mg/kg-day	Eyes	1000	HEAST	07/97
2,4-Dinitrotoluene	Chronic	2.0E-03	mg/kg-day	85%	1.7E-03	mg/kg-day	CNS	100	IRIS	02/13/2002
	Subchronic	2.0E-03	mg/kg-day	85%	1.7E-03	mg/kg-day	CNS	100	HEAST	07/97
2,6-Dinitrotoluene	Chronic	1.0E-03	mg/kg-day	85%	8.5E-04	mg/kg-day	WB	3000	HEAST	07/97
	Subchronic	1.0E-02	mg/kg-day	85%	8.5E-03	mg/kg-day	WB	300	HEAST	07/97
2-Chlorophenol	Chronic	5.0E-03	mg/kg-day	50%	2.5E-03	mg/kg-day	Reproductive	1000	IRIS	02/13/2002
	Subchronic	5.0E-02	mg/kg-day	50%	2.5E-02	mg/kg-day	Reproductive	100	HEAST	07/97
3,3'-Dichlorobenzidine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,6-Dinitro-2-methylphenol	Chronic	1.0E-04	mg/kg-day	100%	1.0E-04	mg/kg-day			NCEA	
4-Methylphenol	Chronic	5.0E-03	mg/kg-day	65%	3.3E-03	mg/kg-day	CNS, Lungs	1000	HEAST	07/97
	Subchronic	5.0E-03	mg/kg-day	65%	3.3E-03	mg/kg-day	CNS, Lungs	1000	HEAST	07/97
Acenaphthylene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
bis(2-Chloroethyl)ether	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
bis(2-Ethylhexyl)phthalate	Chronic	2.0E-02	mg/kg-day	19%	3.8E-03	mg/kg-day	Liver	1000	IRIS	02/13/2002
	Subchronic	2.0E-02	mg/kg-day	19%	3.8E-03	mg/kg-day	Liver	1000	HEAST	07/97
Carbazole	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chrysene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenzofuran	Chronic	4.0E-03	mg/kg-day	50%	2.0E-03	mg/kg-day	Kidney	3000	NCEA	8/29/1994
Hexachlorobenzene	Chronic	8.0E-04	mg/kg-day	50%	4.0E-04	mg/kg-day	Liver	100	IRIS	02/13/2002
Hexachlorobutadiene	Chronic	2.0E-04	mg/kg-day	50%	1.0E-04	mg/kg-day	Renal	1000	HEAST	07/97
Hexachloroethane	Chronic	1.0E-03	mg/kg-day	50%	5.0E-04	mg/kg-day	Kidney	1000	IRIS	02/13/2002
	Subchronic	1.0E-02	mg/kg-day	50%	5.0E-03	mg/kg-day	Kidney	100	HEAST	07/97
Hexachlorocyclopentadiene	Chronic	6.0E-03	mg/kg-day		0.0E+00	mg/kg-day	Chronic Irritation	1000	IRIS	02/13/2002

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Cherry Point, Site 12

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
Indeno(1,2,3-cd)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Isophorone	Chronic	2.0E-01	mg/kg-day	50%	1.0E-01	mg/kg-day	NOAEL	1000	IRIS	02/13/2002
	Subchronic	2.0E+00	mg/kg-day	50%	1.0E+00	mg/kg-day	Kidney	100	HEAST	07/97
n-Nitroso-di-n-propylamine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
n-Nitrosodiphenylamine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	Chronic	2.0E-02	mg/kg-day	80%	1.6E-02	mg/kg-day	Body Weight	3000	IRIS	02/13/2002
Nitrobenzene	Chronic	5.0E-04	mg/kg-day	97%	4.9E-04	mg/kg-day	WB	10000	IRIS	02/13/2002
	Subchronic	5.0E-03	mg/kg-day	97%	4.9E-03	mg/kg-day	WB	1000	HEAST	07/97
Pentachlorophenol	Chronic	3.0E-02	mg/kg-day	100%	3.0E-02	mg/kg-day	Liver and Kidney	100	IRIS	02/13/2002
	Subchronic	3.0E-02	mg/kg-day	100%	3.0E-02	mg/kg-day	Fetus	100	HEAST	07/97
4,4'-DDD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDT	Chronic	5.0E-04	mg/kg-day	70%	3.5E-04	mg/kg-day	Liver	100	IRIS	02/13/2002
	Subchronic	5.0E-04	mg/kg-day	70%	3.5E-04	mg/kg-day	Liver	100	HEAST	07/97
Aldrin	Chronic	3.0E-05	mg/kg-day	50%	1.5E-05	mg/kg-day	Liver	1000	IRIS	02/13/2002
	Subchronic	3.0E-05	mg/kg-day	50%	1.5E-05	mg/kg-day	Liver	1000	HEAST	07/97
alpha-BHC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
alpha-Chlordane	Chronic	5.0E-04	mg/kg-day	50%	2.5E-04	mg/kg-day	Liver	100	IRIS	02/13/2002
Aroclor-1016	Chronic	7.0E-05	mg/kg-day	90%	6.3E-05	mg/kg-day	Birth Weight	300	IRIS	02/13/2002
Aroclor-1221	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1232	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1242	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1248	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1254	Chronic	2.0E-05	mg/kg-day	90%	1.8E-05	mg/kg-day	Immune System	300	IRIS	02/13/2002
	Subchronic	5.0E-05	mg/kg-day	90%	4.5E-05	mg/kg-day	Immune System	100	HEAST	07/97
Aroclor-1260	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1262	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NA
Aroclor-1268	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NA
beta-BHC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
delta-BHC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Cherry Point, Site 12

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
Dieldrin	Chronic	5.0E-05	mg/kg-day	50%	2.5E-05	mg/kg-day	Liver	100	IRIS	02/13/2002
		5.0E-05	mg/kg-day	50%	2.5E-05	mg/kg-day	Liver	100	HEAST	07/97
gamma-Chlordane	Chronic	5.0E-04	mg/kg-day	50%	2.5E-04	mg/kg-day	Liver	300	IRIS	02/13/2002
Heptachlor	Chronic	5.0E-04	mg/kg-day	72%	3.6E-04	mg/kg-day	Liver	300	IRIS	02/13/2002
	Subchronic	5.0E-04	mg/kg-day	72%	3.6E-04	mg/kg-day	Liver	300	HEAST	07/97
Heptachlor epoxide	Chronic	1.3E-05	mg/kg-day	72%	9.4E-06	mg/kg-day	Liver	1000	IRIS	02/13/2002
	Subchronic	1.3E-05	mg/kg-day	72%	9.4E-06	mg/kg-day	Liver	1000	HEAST	07/97
Toxaphene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,3,7,8-TCDD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aluminum	Chronic	1.0E+00	mg/kg-day	10%	1.0E-01	mg/kg-day	CNS	100	NCEA	8/26/1996
Antimony	Chronic	4.0E-04	mg/kg-day	2%	8.0E-06	mg/kg-day	Blood/WB	1000	IRIS	02/13/2002
	Subchronic	4.0E-04	mg/kg-day	2%	8.0E-06	mg/kg-day	Blood/WB	1000	HEAST	07/97
Arsenic	Chronic	3.0E-04	mg/kg-day	41%	1.2E-04	mg/kg-day	Skin	3	IRIS	02/13/2002
	Subchronic	3.0E-04	mg/kg-day	41%	1.2E-04	mg/kg-day	Skin	3	HEAST	07/97
Cadmium - food	Chronic	1.0E-03	mg/kg-day	1%	1.0E-05	mg/kg-day	Kidney	10	IRIS	02/13/2002
Cadmium - water	Chronic	5.0E-04	mg/kg-day	1%	5.0E-06	mg/kg-day	Kidney	10	IRIS	02/13/2002
Chromium (VI)	Chronic	3.0E-03	mg/kg-day	2%	6.0E-05	mg/kg-day	NOAEL	900	IRIS	02/13/2002
	Subchronic	2.0E-02	mg/kg-day	2%	4.0E-04	mg/kg-day	NOAEL	100	HEAST	07/97
Copper	Chronic	4.0E-02	mg/kg-day	30%	1.2E-02	mg/kg-day	Gatrointestinal	N/A	HEAST	07/97
	Subchronic	4.0E-02	mg/kg-day	30%	1.2E-02	mg/kg-day	Gastrointestinal	N/A	HEAST	07/97
Iron	Chronic	6.0E-01	mg/kg-day	15%	9.0E-02	mg/kg-day	Gastrointestinal	1	NCEA	1/5/1999
Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manganese (nonfood)	Chronic	2.0E-02	mg/kg-day	4%	8.0E-04	mg/kg-day	CNS	1	IRIS	02/13/2002
Mercury	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Methylmercury	Chronic	1E-04	mg/kg-day	90%	9.0E-05	mg/kg-day	CNS	10	IRIS	02/13/2002
	Subchronic	1E-04	mg/kg-day	90%	9.0E-05	mg/kg-day	CNS	10	HEAST	07/97
Thallium	Chronic	7E-05	mg/kg-day	15%	1.1E-05	mg/kg-day	Liver			

N/A = Not Applicable

(1) Bast, C.B., and H.T. Borges. 1996. "Derivation of Toxicity Values for Dermal Exposure"' published in The Toxicologist. Volume 30, No. 1, Part 2, March 1996.

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = National Center for Environmental Assessment

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Cherry Point, Site 12

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)

(2) Adjusted Dermal RfD = Oral RfD x Oral to Dermal Adjustment Factor

(3) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of the article provided by NCEA.

CNS = Central nervous system
NOAEL = No adverse effect level
WB = Whole body

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

Cherry Point, Site 12

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (2) (MM/DD/YY)
1,1,2,2-Tetrachloroethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1,2-Trichloroethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1-Dichloroethene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dibromoethane	Chronic	2.0E-04	mg/m^3	5.7E-05	mg/kg-day	Sperm	1000	HEAST	07/97
	Subchronic	2.0E-03	mg/m^3	5.7E-04	mg/kg-day	Sperm	100	HEAST	07/97
1,2-Dichloroethane	Chronic	4.9E-03	mg/m^3	1.4E-03	mg/kg-day	Gastrointestinal	3000	NCEA	4/5/1993
1,2-Dichloropropane	Chronic	4.0E-03	mg/m^3	1.1E-03	mg/kg-day	Nasal	300	IRIS	2/13/2002
	Subchronic	1.3E-02	mg/m^3	3.7E-03	mg/kg-day	Nasal	100	HEAST	07/97
Benzene	Chronic	6.0E-03	mg/m^3	1.7E-03	mg/kg-day	Liver	10	NCEA	7/2/1996
	Subchronic	6.0E-02	mg/m^3	1.7E-02	mg/kg-day	Liver	100	NCEA	7/2/1996
Bromodichloromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bromoform	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Carbon tetrachloride	Chronic	2.0E-03	mg/m^3	5.7E-04	mg/kg-day	NOAEL	3000	NCEA	6/20/1996
	Subchronic	2.0E-02	mg/m^3	5.7E-03	mg/kg-day	NOAEL	300	NCEA	6/20/1996
Chloroform	Chronic	3.0E-04	mg/m^3	8.6E-05	mg/kg-day	Nasal	1000	NCEA	12/1/1997
	Subchronic	3.0E-03	mg/m^3	8.6E-04	mg/kg-day	Nasal	100	NCEA	12/1/1997
cis-1,3-Dichloropropene	Chronic	2.0E-02	mg/m^3	5.7E-03	mg/kg-day	Nasal	30	IRIS	2/13/2002
	Subchronic	2.0E-02	mg/m^3	5.7E-03	mg/kg-day	Nasal	30	HEAST	07/97
Dibromochloromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tetrachloroethene	Chronic	4.9E-01	mg/m^3	1.4E-01	mg/kg-day	Liver and Kidney	30	NCEA	6/20/1997
trans-1,3-Dichloropropene	Chronic	2.0E-02	mg/m^3	5.7E-03	mg/kg-day	Nasal	30	IRIS	10/28/1999
	Subchronic	2.0E-02	mg/m^3	5.7E-03	mg/kg-day	Nasal	30	HEAST	07/97
Vinyl chloride	Chronic	1.0E-01	mg/m^3	2.8E-02	mg/kg-day	Liver	30	IRIS	2/13/2002
1,2-Dichlorobenzene	Chronic	3.0E-02	mg/m^3	9.0E-03	mg/kg-day	Liver	3000	NCEA	4/29/1997
	Subchronic	2.0E+00	mg/m^3	5.7E-01	mg/kg-day	WB	100	HEAST	07/97
1,3-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,4-Dichlorobenzene	Chronic	8.0E-01	mg/m^3	2.3E-01	mg/kg-day	Liver	100	IRIS	2/13/2002
	Subchronic	2.5E+00				Liver	30	HEAST	07/97
2,4,6-Trichlorophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dinitrophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

Cherry Point, Site 12

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (2) (MM/DD/YY)
2,4-Dinitrotoluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-Chlorophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3,3'-Dichlorobenzidine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,6-Dinitro-2-methylphenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Acenaphthylene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
bis(2-Chloroethyl)ether	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
bis(2-Ethylhexyl)phthalate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Carbazole	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chrysene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenzofuran	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hexachlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hexachlorobutadiene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hexachloroethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hexachlorocyclopentadiene	Chronic	2.0E-04	mg/m^3	5.7E-05	mg/kg-day	Nasal	100	IRIS	2/13/2002
Indeno(1,2,3-cd)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Isophorone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
n-Nitroso-di-n-propylamine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
n-Nitrosodiphenylamine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	Chronic	3.0E-03	mg/m^3	9.0E-04	mg/kg-day	Nasal	3000	IRIS	2/13/2002
Nitrobenzene	Chronic	2.0E-03	mg/m^3	6.0E-04	mg/kg-day	Blood/Kidney/Liver	10000	HEAST	07/97
	Subchronic	2.0E-02	mg/m^3	6.0E-03	mg/kg-day	Blood/Kidney/Liver	1000	HEAST	07/97
Pentachlorophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

Cherry Point, Site 12

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (2) (MM/DD/YY)
4,4'-DDT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aldrin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
alpha-BHC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
alpha-Chlordane	Chronic	7.0E-04	mg/m^3	2.0E-04	mg/kg-day	Liver	1000	IRIS	2/13/2002
Aroclor-1016	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1221	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1232	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1242	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1248	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1254	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1260	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1262	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor-1268	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
beta-BHC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
delta-BHC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dieldrin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gamma-Chlordane	Chronic	7.0E-04	mg/m^3	2.0E-04	mg/kg-day	Liver	1000	IRIS	2/13/2002
Heptachlor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Heptachlor epoxide	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Toxaphene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,3,7,8-TCDD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aluminum	Chronic	5.0E-03	mg/m^3	1.0E-03	mg/kg-day	CNS	300	NCEA	6/20/1997
Antimony	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium (VI)	Chronic	1.0E-04	mg/m^3	3.0E-05	mg/kg-day	Respiratory	300	IRIS	2/13/2002
	Subchronic	1.0E-03	mg/m^3	3.0E-04	mg/kg-day	Respiratory	100	NCEA	11/18/1997
Copper	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

Cherry Point, Site 12

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (2) (MM/DD/YY)
Manganese (non-food)	Chronic	5.0E-05	mg/m^3	1.4E-05	mg/kg-day	CNS	1000	IRIS	2/13/2002
	Subchronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercury	Chronic	3.0E-04	mg/m^3	8.6E-05	mg/kg-day	CNS	30	IRIS	2/13/2002
Thallium	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A = Not Applicable

(1) Inalation RfD =- Inhalation RfD X 20 m^2/day x 1/70 kg

(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of the article provided by NCEA.

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = National Center for Environmental Assessment

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

Cherry Point, Site 12

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (3) (MM/DD/YY)
1,1,2,2-Tetrachloroethane	2.0E-01	70%	2.9E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
Trichloroethene	1.1E-02	80%	1.4E-02	$(mg/kg\text{-}day)^{-1}$	C-B2	NCEA	6/8/1993
1,1,2-Trichloroethane	5.7E-02	81%	7.0E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
1,1-Dichloroethene	6.0E-01	100%	6.0E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
1,2-Dibromoethane	8.5E+01	80%	1.1E+02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
1,2-Dichloroethane	9.1E-02	100%	9.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
1,2-Dichloropropane	6.8E-02	74%	9.2E-02	$(mg/kg\text{-}day)^{-1}$	B2	HEAST	07/97
Benzene	5.5E-02	97%	5.7E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2/13/2002
Bromomdichloromethane	6.2E-02	98%	6.3E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Bromoform	7.9E-03	60%	1.3E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Carbon Tetrachloride	1.3E-01	65%	2.0E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Chloroform	6.1E-03	20%	3.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
cis-1,3-Dichloropropene	1.0E-01	55%	1.8E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Dibromochloromethane	8.4E-02	60%	1.4E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
Tetrachloroethene	5.2E-02	100%	5.2E-02	$(mg/kg\text{-}day)^{-1}$	C-B2	NCEA	6/8/1997
trans-1,3-Dichloropropene	1.0E-01	55%	1.8E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Vinyl chloride (inc early life)	1.5E+00	100%	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2/13/2002
Vinyl chloride (adult)	7.2E-01	100%	7.2E-01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2/13/2002
1,2-Dichlorobenzene	N/A	N/A	N/A	N/A	D	N/A	N/A
1,3-Dichlorobenzene	N/A	N/A	N/A	N/A	D	N/A	N/A
1,4-Dichlorobenzene	2.4E-02	90%	2.7E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
2,4,6-Trichlorophenol	1.1E-02	50%	2.2E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
2,4-Dinitrophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dinitrotoluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-Chlorophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3,3'-Dichlorobenzidine	4.5E-01	50%	9.0E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
4,6-Dinitro-2-methylphenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4-Methylphenol	N/A	N/A	N/A	N/A	C	N/A	N/A
Acenaphthylene	N/A	N/A	N/A	N/A	D	N/A	N/A
Benzo(a)anthracene	7.3E-01	31%	2.4E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/1/1993
Benzo(a)pyrene	7.3E+00	31%	2.4E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Benzo(b)fluoranthene	7.3E-01	31%	2.4E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/1/1993

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

Cherry Point, Site 12

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (3) (MM/DD/YY)
Benzo(k)fluoranthene	7.3E-02	31%	2.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/1/1993
bis(2-Chloroethyl)ether	1.1E+00	50%	2.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
bis(2-Ethylhexyl)phthalate	1.4E-02	19%	7.4E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Carbazole	2.0E-02	70%	2.9E-02	$(mg/kg\text{-}day)^{-1}$	B2	HEAST	07/97
Chrysene	7.3E-03	31%	2.4E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/1/1993
Dibenz(a,h)anthracene	7.3E+00	31%	2.4E+01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/1/1993
Dibenzofuran	N/A	N/A	N/A	N/A	D	N/A	N/A
Hexachlorobenzene	1.6E+00	50%	3.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Hexachlorobutadiene	7.8E-02	50%	1.6E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
Hexachloroethane	1.4E-02	50%	2.8E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
Indeno(1,2,3-cd)pyrene	7.3E-01	31%	2.4E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/1/1993
Isophorone	9.5E-04	50%	1.9E-03	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
n-Nitroso-di-n-propylamine	7.0E+00	25%	2.8E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
n-Nitrosodiphenylamine	4.9E-03	25%	2.0E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Naphthalene	N/A	N/A	N/A	N/A	C	N/A	N/A
Nitrobenzene	N/A	N/A	N/A	N/A	D	N/A	N/A
Pentachlorophenol	1.2E-01	100%	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
4,4'-DDD	2.4E-01	70%	3.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
4,4'-DDE	3.4E-01	70%	4.9E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
4,4'-DDT	3.4E-01	70%	4.9E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aldrin	1.7E+01	50%	3.4E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
alpha-BHC	6.3E+00	97%	6.5E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
alpha-Chlordane	3.5E-01	50%	7.0E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1016	7.0E-02	90%	7.8E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1221	2.0E+00	90%	2.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1232	2.0E+00	90%	2.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1242	2.0E+00	90%	2.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1248	2.0E+00	90%	2.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1254	2.0E+00	90%	2.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1260	2.0E+00	90%	2.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1262	2.0E+00	90%	2.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1268	2.0E+00	90%	2.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
beta-BHC	1.8E+00	91%	2.0E+00	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

Cherry Point, Site 12

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (3) (MM/DD/YY)
delta-BHC	N/A	N/A	N/A	N/A	D	N/A	N/A
Dieldrin	1.6E+01	50%	3.2E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
gamma-Chlordane	3.5E-01	50%	7.0E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Heptachlor	4.5E+00	72%	6.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Heptachlor epoxide	9.1E+00	72%	1.3E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Toxaphene	1.1E+00	50%	2.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
2,3,7,8-TCDD	1.5E+05	50%	3.0E+05	$(mg/kg\text{-}day)^{-1}$	B2	HEAST	07/97
Aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony	N/A	N/A	N/A	N/A	D	N/A	N/A
Arsenic	1.5E+00	41%	3.7E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2/13/2002
Cadmium	N/A	N/A	N/A	N/A	D	N/A	N/A
Chromium	N/A	N/A	N/A	N/A	D	N/A	N/A
Copper	N/A	N/A	N/A	N/A	D	N/A	N/A
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead	N/A	N/A	N/A	N/A	B2	N/A	N/A
Manganese	N/A	N/A	N/A	N/A	D	N/A	N/A
Mercury	N/A	N/A	N/A	N/A	D	N/A	N/A
Thallium	N/A	N/A	N/A	N/A	D	N/A	N/A

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = National Center for Environmental Assessment

(1) Bast, C.B., and H.T. Borges. 1996. "Derivation of Toxicity Values for Dermal Expos published in The Toxicologist. Volume 30, No. 1, Part 2, March 1996.

(2) Adjusted Dermal CSF = Oral CSF / Oral to Dermal Adjustment Factor

(3) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of article provided by NCEA.

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

TABLE 6.2

CANCER TOXICITY DATA -- INHALATION

Cherry Point, Site 12

Chemical of Potential Concern	Unit Risk	Units	Adjustment (1)	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (2) (MM/DD/YY)
1,1,2,2-Tetrachloroethane	5.8E-05	$(ug/m^3)^{-1}$	3,500	2.0E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
1,1,2-Trichloroethane	1.6E-05	$(ug/m^3)^{-1}$	3,500	5.6E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
1,1-Dichloroethene	5.0E-05	$(ug/m^3)^{-1}$	3,500	1.8E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
1,2-Dibromoethane	2.2E-04	$(ug/m^3)^{-1}$	3,500	7.6E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
1,2-Dichloroethane	2.6E-05	$(ug/m^3)^{-1}$	3,500	9.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
1,2-Dichloropropane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	8.3E-06	$(ug/m^3)^{-1}$	3,500	2.9E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2/13/2002
Bromodichloromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bromoform	1.1E-06	$(ug/m^3)^{-1}$	3,500	3.9E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Carbon Tetrachloride	1.5E-05	$(ug/m^3)^{-1}$	3,500	5.3E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Chloroform	2.3E-05	$(ug/m^3)^{-1}$	3,500	8.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
cis-1,3-Dichloropropene	4.0E-06	$(ug/m^3)^{-1}$	3,500	1.4E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Dibromochloromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tetrachloroethene	5.8E-07	$(ug/m^3)^{-1}$	3,500	2.0E-03	$(mg/kg\text{-}day)^{-1}$	C-B2	NCEA	6/8/1997
trans-1,3-Dichloropropene	4.0E-06	$(ug/m^3)^{-1}$	3,500	1.4E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Vinyl chloride (inc early life)	8.8E-06	$(ug/m^3)^{-1}$	3,500	3.1E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2/13/2002
Vinyl chloride (adult)	4.4E-06	$(ug/m^3)^{-1}$	3,500	1.5E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2/13/2002
1,2-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A	D	N/A	N/A
1,3-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A	D	N/A	N/A
1,4-Dichlorobenzene	6.3E-06	$(ug/m^3)^{-1}$	3,500	2.2E-02	$(mg/kg\text{-}day)^{-1}$	C	NCEA	
2,4,6-Trichlorophenol	3.1E-06	$(ug/m^3)^{-1}$	3,500	1.0E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
2,4-Dinitrophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dinitrotoluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-Chlorophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3,3'-Dichlorobenzidine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,6-Dinitro-2-methylphenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Acenaphthylene	N/A	N/A	N/A	N/A	N/A	D	N/A	N/A
Benzo(a)anthracene	8.9E-05	$(ug/m^3)^{-1}$	3,500	3.1E-01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/1/1993
Benzo(a)pyrene	8.9E-04	$(ug/m^3)^{-1}$	3,500	3.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/8/1993
Benzo(b)fluoranthene	8.9E-05	$(ug/m^3)^{-1}$	3,500	3.1E-01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/1/1993
Benzo(k)fluoranthene	8.9E-06	$(ug/m^3)^{-1}$	3,500	3.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/1/1993
bis(2-Chloroethyl)ether	3.3E-04	$(ug/m^3)^{-1}$	3,500	1.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002

TABLE 6.2

CANCER TOXICITY DATA -- INHALATION

Cherry Point, Site 12

Chemical of Potential Concern	Unit Risk	Units	Adjustment (1)	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (2) (MM/DD/YY)
Bis(2-Ethylhexyl)phthalate	4.0E-06	$(ug/m^3)^{-1}$	3,500	1.4E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/8/1993
Carbazole	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chrysene	8.9E-07	$(ug/m^3)^{-1}$	3,500	3.1E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/1/1993
Dibenz(a,h)anthracene	8.9E-04	$(ug/m^3)^{-1}$	3,500	3.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/1/1993
Dibenzofuran	N/A	N/A	N/A	N/A	N/A	D	N/A	N/A
Hexachlorobenzene	4.6E-04	$(ug/m^3)^{-1}$	3,500	1.6E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Hexachlorobutadiene	2.2E-05	$(ug/m^3)^{-1}$	3,500	7.8E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
Hexachloroethane	4.0E-06	$(ug/m^3)^{-1}$	3,500	1.4E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
Indeno(1,2,3-cd)pyrene	8.9E-05	$(ug/m^3)^{-1}$	3,500	3.1E-01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	7/1/1993
Isophorone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
n-Nitroso-di-n-propylamine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
n-Nitrosodiphenylamine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nitrobenzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pentachlorophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDT	9.7E-05	$(ug/m^3)^{-1}$	3,500	3.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aldrin	4.9E-03	$(ug/m^3)^{-1}$	3,500	1.7E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
alpha-BHC	1.8E-03	$(ug/m^3)^{-1}$	3,500	6.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
alpha-Chlordane	1.0E-04	$(ug/m^3)^{-1}$	3,500	3.5E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1016	2.0E-05	$(ug/m^3)^{-1}$	3,500	7.0E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1221	5.7E-04	$(ug/m^3)^{-1}$	3,500	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1232	5.7E-04	$(ug/m^3)^{-1}$	3,500	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1248	5.7E-04	$(ug/m^3)^{-1}$	3,500	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1254	5.7E-04	$(ug/m^3)^{-1}$	3,500	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1260	5.7E-04	$(ug/m^3)^{-1}$	3,500	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1262	5.7E-04	$(ug/m^3)^{-1}$	3,500	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Aroclor-1268	5.7E-04	$(ug/m^3)^{-1}$	3,500	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
beta-BHC	5.3E-04	$(ug/m^3)^{-1}$	3,500	1.8E+00	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/13/2002
delta-BHC	N/A	N/A	N/A	N/A	N/A	D	N/A	N/A
Dieldrin	4.6E-03	$(ug/m^3)^{-1}$	3,500	1.6E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
gamma-Chlordane	1.0E-04	$(ug/m^3)^{-1}$	3,500	3.5E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002

TABLE 6.2

CANCER TOXICITY DATA -- INHALATION

Cherry Point, Site 12

Chemical of Potential Concern	Unit Risk	Units	Adjustment (1)	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (2) (MM/DD/YY)
Heptachlor	1.3E-03	$(ug/m^3)^{-1}$	3,500	4.5E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Heptachlor epoxide	2.6E-03	$(ug/m^3)^{-1}$	3,500	9.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
Toxaphene	3.2E-04	$(ug/m^3)^{-1}$	3,500	1.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2/13/2002
2,3,7,8-TCDD	4.3E+01	$(ug/m^3)^{-1}$	3,500	1.5E+05	$(mg/kg\text{-}day)^{-1}$	B2	HEAST	07/97
Aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Antimony	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	4.3E-03	$(ug/m^3)^{-1}$	3,500	1.5E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2/13/2002
Cadmium	1.8E-03	$(ug/m^3)^{-1}$	3,500	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	2/13/2002
Chromium	1.2E-02	$(ug/m^3)^{-1}$	3,500	4.10E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2/13/2002
Copper	N/A	N/A	N/A	N/A	N/A	D	N/A	N/A
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lead	N/A	N/A	N/A	N/A	N/A	B2	N/A	N/A
Manganese	N/A	N/A	N/A	N/A	N/A	D	N/A	N/A
Mercury	N/A	N/A	N/A	N/A	N/A	D	N/A	N/A
Thallium	N/A	N/A	N/A	N/A	N/A	D	N/A	N/A

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = National Center for Environmental Assessment

(1) Adjustment Factor applied to Unit Risk to calculate Inhalation Slope Factor = 70kg x 1/20m3/day x 1000ug/mg

(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of the article provided by NCEA.

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

TABLE 7.1.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	1.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	5.6E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	1.2E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	1.2E-02
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	3.6E-06	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	8.9E-03
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	5.9E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	5.9E-03
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	2.5E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	8.5E-03
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	6.5E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.6E-02
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	3.8E-03	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	6.4E-03
	(Total)												5.8E-02
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	9.0E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	6.2E-03	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	6.2E-02
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	1.9E-06	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	2.4E-01
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	3.1E-07	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	3.1E-02
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	1.4E-05	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	2.3E-01
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	3.5E-04	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	2.9E-02
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	2.0E-03	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	2.3E-02
	(Total)												6.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	6.6E-01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.2.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	4.8E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	1.6E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	3.3E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	3.3E-03
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	1.0E-06	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	2.5E-03
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	1.7E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	1.7E-03
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	7.1E-06	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	2.4E-03
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	1.8E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	4.6E-03
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	1.1E-03	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	1.8E-03
	(Total)												1.6E-02
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	3.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	2.2E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	1.5E-03	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	1.5E-02
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	4.6E-07	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	5.7E-02
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	7.6E-08	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	7.6E-03
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	3.3E-06	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	5.5E-02
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	8.4E-05	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	7.0E-03
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	4.9E-04	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	5.5E-03
	(Total)												1.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.6E-01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.3.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	3.1E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.3E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	5.2E-10	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.0E-06
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	1.4E-10	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	4.7E-06
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	7.5E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	7.0E-10	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	1.4E-05
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	5.6E-09	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	5.6E-05
	(Total)												7.6E-05
Dermal	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	1.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	4.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	4.7E-07	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	1.3E-03
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	5.1E-10	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	3.4E-05
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	1.2E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	2.8E-08	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	1.1E-03
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	3.4E-09	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	3.8E-05
	(Total)												2.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	2.6E-03

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

Table 7.3.RME Supplement
Calculation of DAevent
Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
4,4'-DDD	6.60E-03	2.8E-01	7.8E+00	3.7E+01	6.3E+01	8	4.0E-08	2
4,4'-DDE	2.70E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	8	1.4E-07	2
4,4'-DDT	1.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	8	1.3E-07	2
Aldrin	3.00E-03	1.6E-03	1.5E+01	3.6E+01	1.0E-01	8	1.5E-10	2
Aroclor-1248	1.60E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	3.3E-05	2
Dieldrin	1.50E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	8	8.0E-09	2
Mercury	1.20E-01	1.0E-03	N/A	N/A	N/A	8	9.6E-10	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CSW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CSW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CSW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

TABLE 7.4.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	4.7E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.9E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	7.8E-10	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.6E-06
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	2.1E-10	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	7.1E-06
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	1.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	1.1E-09	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	2.1E-05
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	8.5E-09	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	8.5E-05
	(Total)												1.2E-04
Dermal	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	3.5E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.2E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.1E-06	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	3.3E-03
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	1.2E-09	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	8.3E-05
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	2.9E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	6.8E-08	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	2.7E-03
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	4.7E-09	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	5.2E-05
	(Total)												6.1E-03
												Total Hazard Index Across All Exposure Routes/Pathways	6.3E-03

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

Table 7.4.RME Supplement
Calculation of DAevent
Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
4,4'-DDD	6.60E-03	2.8E-01	7.8E+00	3.7E+01	6.3E+01	2.6	2.3E-08	2
4,4'-DDE	2.70E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	2.6	8.0E-08	2
4,4'-DDT	1.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	2.6	7.6E-08	2
Aldrin	3.00E-03	1.6E-03	1.5E+01	3.6E+01	1.0E-01	2.6	8.3E-11	2
Aroclor-1248	1.60E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.9E-05	2
Dieldrin	1.50E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	2.6	4.5E-09	2
Mercury	1.20E-01	1.0E-03	N/A	N/A	N/A	2.6	3.1E-10	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CSW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CSW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CSW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

TABLE 7.5.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake Non-Cancer	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	5.1E-04	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	5.1E-04
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	6.5E-08	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.2E-04
	(Total)												7.2E-04
Dermal	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	2.7E-04	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	2.7E-03
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.0E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	8.6E-04
	(Total)												3.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	4.3E-03

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.6.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake Non-Cancer	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	2.4E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	2.4E-03
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	3.0E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.0E-03
	(Total)												3.4E-03
Dermal	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	1.3E-03	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	1.3E-02
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	5.0E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	4.1E-03
	(Total)												1.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.1E-02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.7.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	1.5E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	3.1E-03
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	1.6E-05	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	9.1E-07	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	1.8E-02
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	8.4E-07	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.7E-03
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	1.1E-06	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	8.8E-02
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	6.0E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	6.0E-02
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	2.5E-04	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	8.4E-01
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	1.5E-04	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	4.9E-02
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	4.2E-01	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	7.0E-01
	(Total)												1.8E+00
												Total Hazard Index Across All Exposure Routes/Pathways	1.8E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.8.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	3.6E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	7.2E-03
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	3.7E-05	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	2.1E-06	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	4.2E-02
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	2.0E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	3.9E-03
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	2.7E-06	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	2.1E-01
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	1.4E-01	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	1.4E-01
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	5.9E-04	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.0E+00
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	3.5E-04	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	1.2E-01
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	9.9E-01	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	1.6E+00
	(Total)												4.1E+00
Dermal	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	1.6E-05	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	6.3E-02
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	1.6E-03	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	2.3E-06	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	9.1E-02
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	8.6E-06	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	3.4E-02
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	1.9E-06	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	2.1E-01
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	4.7E-04	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	4.7E-03
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	1.9E-06	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	1.6E-02
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	1.1E-06	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	1.9E-02
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	3.3E-03	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	3.6E-02
	(Total)												4.7E-01
												Total Hazard Index Across All Exposure Routes/Pathways	4.6E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

Table 7.8.RME Supplement
Calculation of DAevent
Child Resident, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
alpha-Chlordane	5.65E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	0.33	2.5E-08	2
Aroclor-1248	5.78E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.4E-06	2
Dieldrin	3.31E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	0.33	3.6E-09	2
gamma-Chlordane	3.08E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	0.33	1.3E-08	2
Heptachlor epoxide	4.19E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	0.33	3.0E-09	2
Aluminum	2.21E+03	1.0E-03	NA	NA	NA	0.33	7.3E-07	1
Arsenic	9.16E+00	1.0E-03	NA	NA	NA	0.33	3.0E-09	1
Chromium	5.41E+00	1.0E-03	NA	NA	NA	0.33	1.8E-09	1
Iron	1.54E+04	1.0E-03	NA	NA	NA	0.33	5.1E-06	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.

TABLE 7.9.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	1.1E-06	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	4.6E-03
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	1.1E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	1.7E-07	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	6.6E-03
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	6.2E-07	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	2.5E-03
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	1.4E-07	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	1.5E-02
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	1.7E-04	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	1.7E-03
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	6.9E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	5.7E-03
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	4.1E-07	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	6.8E-03
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	1.2E-03	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	1.3E-02
	(Total)												5.6E-02
												Total Hazard Index Across All Exposure Routes/Pathways	5.6E-02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Subchronic, if available, else chronic.

Table 7.9.RME Supplement
Calculation of DAevent
Construction Worker, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
alpha-Chlordane	5.65E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	1.2E-07	2
Aroclor-1248	5.78E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.2E-05	2
Dieldrin	3.31E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	8	1.8E-08	2
gamma-Chlordane	3.08E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	6.6E-08	2
Heptachlor epoxide	4.19E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	1.5E-08	2
Aluminum	2.21E+03	1.0E-03	NA	NA	NA	8	1.8E-05	1
Arsenic	9.16E+00	1.0E-03	NA	NA	NA	8	7.3E-08	1
Chromium	5.41E+00	1.0E-03	NA	NA	NA	8	4.3E-08	1
Iron	1.54E+04	1.0E-03	NA	NA	NA	8	1.2E-04	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.

TABLE 7.10.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	2.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	7.9E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	1.6E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	1.6E-02
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	5.0E-06	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.2E-02
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	8.3E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	8.3E-03
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	3.6E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	1.2E-02
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	9.1E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	2.3E-02
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	5.4E-03	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	8.9E-03
	(Total)												8.1E-02
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	2.2E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	1.6E-14	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	1.1E-02	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	1.1E-01
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	3.3E-06	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	4.1E-01
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	5.5E-07	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	5.5E-02
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	2.4E-05	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	3.9E-01
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	6.0E-04	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	5.0E-02
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	3.5E-03	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	3.9E-02
	(Total)												1.1E+00
												Total Hazard Index Across All Exposure Routes/Pathways	1.1E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.11.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	2.2E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	7.4E-14	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	1.5E-01	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	1.5E-01
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	4.7E-05	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.2E-01
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	7.7E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	7.7E-02
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	3.3E-04	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	1.1E-01
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	8.5E-03	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	2.1E-01
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	5.0E-02	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	8.3E-02
	(Total)												7.5E-01
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	5.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	3.8E-14	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	2.6E-02	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	2.6E-01
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	7.9E-06	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	9.9E-01
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	1.3E-06	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	1.3E-01
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	5.7E-05	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	9.4E-01
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	1.4E-03	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	1.2E-01
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	8.5E-03	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	9.5E-02
	(Total)												2.5E+00
												Total Hazard Index Across All Exposure Routes/Pathways	3.3E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.12.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	8.3E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	3.4E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.4E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	2.8E-06
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	3.8E-10	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	1.3E-05
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	2.0E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	1.9E-09	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	3.8E-05
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	1.5E-08	mg/kg-day	1.00E-04	mg/kg-day	N/A	N/A	1.5E-04
	(Total)												2.0E-04
Dermal	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	3.8E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.3E-06	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	3.6E-03
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	1.4E-09	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	9.1E-05
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	3.1E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	7.5E-08	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	3.0E-03
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	9.0E-09	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	1.0E-04
	(Total)												6.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	7.0E-03

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Subchronic.

Table 7.12.RME Supplement
Calculation of Daevent
Construction Worker, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
4,4'-DDD	6.60E-03	2.8E-01	7.8E+00	3.7E+01	6.3E+01	8	4.0E-08	2
4,4'-DDE	2.70E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	8	1.4E-07	2
4,4'-DDT	1.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	8	1.3E-07	2
Aldrin	3.00E-03	1.6E-03	1.5E+01	3.6E+01	1.0E-01	8	1.5E-10	2
Aroclor-1248	1.60E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	3.3E-05	2
Dieldrin	1.50E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	8	8.0E-09	2
Mercury	1.20E-01	1.0E-03	N/A	N/A	N/A	8	9.6E-10	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CSW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CSW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CSW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

TABLE 7.13.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	6.5E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	6.5E-03
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	8.3E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.8E-03
	(Total)												9.2E-03
Dermal	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	7.2E-04	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	7.2E-03
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.7E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	2.3E-03
	(Total)												9.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	1.9E-02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Subchronic.

TABLE 7.1.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	7.2E-07	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.4E-03
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	7.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	4.2E-07	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	8.5E-03
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	3.9E-07	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	7.9E-04
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	5.4E-07	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	4.1E-02
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	2.8E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	2.8E-02
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	1.2E-04	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.9E-01
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	6.9E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	2.3E-02
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	2.0E-01	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	3.3E-01
	(Total)												8.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	8.2E-01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.2.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	2.4E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	4.8E-03
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	2.5E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	1.4E-06	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	2.8E-02
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	1.3E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	2.6E-03
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	1.8E-06	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	1.4E-01
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	9.4E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	9.4E-02
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	3.9E-04	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.3E+00
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	2.3E-04	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	7.7E-02
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	6.6E-01	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	1.1E+00
	(Total)												2.7E+00
Dermal	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	7.9E-06	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	3.2E-02
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	7.8E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	1.1E-06	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	4.6E-02
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	4.3E-06	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	1.7E-02
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	9.7E-07	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	1.0E-01
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	2.3E-04	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	2.3E-03
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	9.7E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	8.1E-03
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	5.7E-07	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	9.5E-03
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	1.6E-03	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	1.8E-02
	(Total)												2.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	3.0E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

Table 7.2.CT Supplement
Calculation of DAevent
Child Resident, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
alpha-Chlordane	5.65E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	0.33	2.5E-08	2
Aroclor-1248	5.78E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.4E-06	2
Dieldrin	3.31E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	0.33	3.6E-09	2
gamma-Chlordane	3.08E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	0.33	1.3E-08	2
Heptachlor epoxide	4.19E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	0.33	3.0E-09	2
Aluminum	2.21E+03	1.0E-03	NA	NA	NA	0.33	7.3E-07	1
Arsenic	9.16E+00	1.0E-03	NA	NA	NA	0.33	3.0E-09	1
Chromium	5.41E+00	1.0E-03	NA	NA	NA	0.33	1.8E-09	1
Iron	1.54E+04	1.0E-03	NA	NA	NA	0.33	5.1E-06	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.

TABLE 7.3.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	3.41E+01	ug/kg	3.41E+01	ug/kg	M	1.6E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	2.35E+00	pg/g	2.35E+00	pg/g	M	1.1E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	7.10E+03	mg/kg	7.10E+03	mg/kg	M	3.2E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	3.2E-03
	Antimony	6.52E-01	mg/kg	6.52E-01	mg/kg	M	3.0E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	7.5E-04
	Cadmium	4.39E+00	mg/kg	4.39E+00	mg/kg	M	2.0E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	2.0E-03
	Chromium	1.44E+01	mg/kg	1.44E+01	mg/kg	M	6.6E-06	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	2.2E-03
	Copper	4.09E+01	mg/kg	4.09E+01	mg/kg	M	1.9E-05	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	4.7E-04
	Iron	3.07E+03	mg/kg	3.07E+03	mg/kg	M	1.4E-03	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	2.3E-03
	(Total)												1.1E-02
Dermal	Aroclor-1260	3.41E+01	ug/kg	3.41E+01	ug/kg	M	5.0E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	2.35E+00	pg/g	2.35E+00	pg/g	M	7.4E-16	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	7.10E+03	mg/kg	7.10E+03	mg/kg	M	7.4E-04	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	7.4E-03
	Antimony	6.52E-01	mg/kg	6.52E-01	mg/kg	M	6.8E-08	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	8.5E-03
	Cadmium	4.39E+00	mg/kg	4.39E+00	mg/kg	M	4.6E-08	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	4.6E-03
	Chromium	1.44E+01	mg/kg	1.44E+01	mg/kg	M	1.5E-06	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	2.5E-02
	Copper	4.09E+01	mg/kg	4.09E+01	mg/kg	M	4.3E-06	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	3.6E-04
	Iron	3.07E+03	mg/kg	3.07E+03	mg/kg	M	3.2E-04	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	3.6E-03
	(Total)												5.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	6.1E-02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.4.CT
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
Ingestion	Aroclor-1260	3.41E+01	ug/kg	3.41E+01	ug/kg	M	1.5E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	2.35E+00	pg/g	2.35E+00	pg/g	M	1.0E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	7.10E+03	mg/kg	7.10E+03	mg/kg	M	3.0E-05	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	3.0E-05
	Antimony	6.52E-01	mg/kg	6.52E-01	mg/kg	M	2.8E-09	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	7.0E-06
	Cadmium	4.39E+00	mg/kg	4.39E+00	mg/kg	M	1.9E-08	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	1.9E-05
	Chromium	1.44E+01	mg/kg	1.44E+01	mg/kg	M	6.2E-08	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	2.1E-05
	Copper	4.09E+01	mg/kg	4.09E+01	mg/kg	M	1.7E-07	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	4.4E-06
	Iron	3.07E+03	mg/kg	3.07E+03	mg/kg	M	1.3E-05	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	2.2E-05
	(Total)												1.0E-04
Dermal	Aroclor-1260	3.41E+01	ug/kg	3.41E+01	ug/kg	M	1.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	2.35E+00	pg/g	2.35E+00	pg/g	M	1.7E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	7.10E+03	mg/kg	7.10E+03	mg/kg	M	1.8E-03	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	1.8E-02
	Antimony	6.52E-01	mg/kg	6.52E-01	mg/kg	M	1.6E-07	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	2.0E-02
	Cadmium	4.39E+00	mg/kg	4.39E+00	mg/kg	M	1.1E-07	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	1.1E-02
	Chromium	1.44E+01	mg/kg	1.44E+01	mg/kg	M	3.6E-06	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	6.0E-02
	Copper	4.09E+01	mg/kg	4.09E+01	mg/kg	M	1.0E-05	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	8.4E-04
	Iron	3.07E+03	mg/kg	3.07E+03	mg/kg	M	7.6E-04	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	8.5E-03
	(Total)												1.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.2E-01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 8.1.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	6.1E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.2E-07
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	2.0E-15	mg/kg-day	1.5E+05	(mg/kg-day) $^{-1}$	3.0E-10
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	4.2E-03	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	1.3E-06	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	2.1E-06	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	9.1E-06	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	2.3E-04	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	1.4E-03	mg/kg-day	N/A	N/A	
	(Total)										1.2E-07
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	4.5E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.0E-06
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	3.2E-15	mg/kg-day	3.0E+05	(mg/kg-day) $^{-1}$	9.6E-10
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	2.2E-03	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	6.8E-07	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	1.1E-07	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	4.8E-06	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	1.2E-04	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	7.3E-04	mg/kg-day	N/A	N/A	
	(Total)										1.0E-06
										Total Risk Across All Exposure Routes/Pathways	1.1E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.2.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	6.8E-09	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.4E-08
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	2.3E-16	mg/kg-day	1.5E+05	(mg/kg-day) $^{-1}$	3.4E-11
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	4.7E-04	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	1.4E-07	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	2.4E-07	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	1.0E-06	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	2.6E-05	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	1.5E-04	mg/kg-day	N/A	N/A	
	(Total)										1.4E-08
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	4.4E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	9.7E-08
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	3.1E-16	mg/kg-day	3.0E+05	(mg/kg-day) $^{-1}$	9.3E-11
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	2.2E-04	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	6.6E-08	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	1.1E-08	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	4.7E-07	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	1.2E-05	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	7.0E-05	mg/kg-day	N/A	N/A	
	(Total)										9.7E-08
										Total Risk Across All Exposure Routes/Pathways	1.1E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.3.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	1.1E-10	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	2.7E-11
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	4.5E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.5E-10
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.8E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	6.3E-11
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	5.0E-11	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	8.6E-10
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	2.7E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	5.4E-08
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	2.5E-10	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	4.0E-09
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	2.0E-09	mg/kg-day	N/A	N/A	
	(Total)										5.9E-08
Dermal	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	5.1E-08	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.7E-08
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.8E-07	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	8.5E-08
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.7E-07	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	8.1E-08
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	1.8E-10	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	6.2E-09
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	4.2E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	9.2E-05
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	1.0E-08	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	3.2E-07
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	1.2E-09	mg/kg-day	N/A	N/A	
	(Total)										9.2E-05
										Total Risk Across All Exposure Routes/Pathways	9.3E-05

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Table 8.3.RME Supplement
Calculation of DAevent
Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
4,4'-DDD	6.60E-03	2.8E-01	7.8E+00	3.7E+01	6.3E+01	8	4.0E-08	2
4,4'-DDE	2.70E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	8	1.4E-07	2
4,4'-DDT	1.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	8	1.3E-07	2
Aldrin	3.00E-03	1.6E-03	1.5E+01	3.6E+01	1.0E-01	8	1.5E-10	2
Aroclor-1248	1.60E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	3.3E-05	2
Dieldrin	1.50E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	8	8.0E-09	2
Mercury	1.20E-01	1.0E-03	N/A	N/A	N/A	8	9.6E-10	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CSW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CSW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CSW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

TABLE 8.4.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	6.7E-11	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	1.6E-11
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	2.7E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	9.3E-11
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.1E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	3.8E-11
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	3.1E-11	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	5.2E-10
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	1.6E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.3E-08
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	1.5E-10	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	2.4E-09
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	1.2E-09	mg/kg-day	N/A	N/A	
	(Total)										3.6E-08
Dermal	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	5.0E-08	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.7E-08
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.7E-07	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	8.3E-08
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.6E-07	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	7.9E-08
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	1.8E-10	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	6.1E-09
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	4.1E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	9.0E-05
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	9.8E-09	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	3.1E-07
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	6.7E-10	mg/kg-day	N/A	N/A	
	(Total)										9.0E-05
										Total Risk Across All Exposure Routes/Pathways	9.0E-05

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Table 8.4.RME Supplement
Calculation of DAevent
Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
4,4'-DDD	6.60E-03	2.8E-01	7.8E+00	3.7E+01	6.3E+01	2.6	2.3E-08	2
4,4'-DDE	2.70E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	2.6	8.0E-08	2
4,4'-DDT	1.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	2.6	7.6E-08	2
Aldrin	3.00E-03	1.6E-03	1.5E+01	3.6E+01	1.0E-01	2.6	8.3E-11	2
Aroclor-1248	1.60E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.9E-05	2
Dieldrin	1.50E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	2.6	4.5E-09	2
Mercury	1.20E-01	1.0E-03	N/A	N/A	N/A	2.6	3.1E-10	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CSW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CSW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CSW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

TABLE 8.5.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	1.8E-04	mg/kg-day	N/A	N/A	
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.3E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-08
	(Total)										3.5E-08
Dermal	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	9.60E-05	mg/kg-day	N/A	N/A	
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	3.67E-08	mg/kg-day	3.7E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
											1.4E-07
										Total Risk Across All Exposure Routes/Pathways	1.7E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.6.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	3.4E-04	mg/kg-day	N/A	N/A	
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	4.3E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	6.5E-08
	(Total)										6.5E-08
Dermal	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	1.86E-04	mg/kg-day	N/A	N/A	
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	7.10E-08	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	2.6E-07
											2.6E-07
										Total Risk Across All Exposure Routes/Pathways	3.3E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.7.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	5.3E-07	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	1.9E-07
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	5.4E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.1E-05
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	3.1E-07	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	5.0E-06
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	2.9E-07	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	1.0E-07
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	3.9E-07	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	3.6E-06
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	2.1E-02	mg/kg-day	N/A	N/A	
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	8.6E-05	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.3E-04
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	5.1E-05	mg/kg-day	N/A	N/A	
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	1.4E-01	mg/kg-day	N/A	N/A	
	(Total)										1.5E-04
										Total Risk Across All Exposure Routes/Pathways	1.5E-04

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.8.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	3.1E-07	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	1.1E-07
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	3.2E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	6.3E-06
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	1.8E-07	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	2.9E-06
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	1.7E-07	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	5.9E-08
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	2.3E-07	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	2.1E-06
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	1.2E-02	mg/kg-day	N/A	N/A	
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	5.0E-05	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	7.5E-05
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	3.0E-05	mg/kg-day	N/A	N/A	
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	8.5E-02	mg/kg-day	N/A	N/A	
	(Total)										8.7E-05
Dermal	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	1.4E-06	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	9.5E-07
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	1.3E-04	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.9E-04
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	2.0E-07	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	6.3E-06
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	7.4E-07	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	5.2E-07
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	1.7E-07	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	2.1E-06
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	4.0E-05	mg/kg-day	N/A	N/A	
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	1.7E-07	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	6.1E-07
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	9.8E-08	mg/kg-day	N/A	N/A	
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	2.8E-04	mg/kg-day	N/A	N/A	
	(Total)										3.0E-04
										Total Risk Across All Exposure Routes/Pathways	3.9E-04

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Table 8.8.RME Supplement
Calculation of DAevent
Child Resident, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
alpha-Chlordane	5.65E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	0.33	2.5E-08	2
Aroclor-1248	5.78E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.4E-06	2
Dieldrin	3.31E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	0.33	3.6E-09	2
gamma-Chlordane	3.08E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	0.33	1.3E-08	2
Heptachlor epoxide	4.19E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	0.33	3.0E-09	2
Aluminum	2.21E+03	1.0E-03	NA	NA	NA	0.33	7.3E-07	1
Arsenic	9.16E+00	1.0E-03	NA	NA	NA	0.33	3.0E-09	1
Chromium	5.41E+00	1.0E-03	NA	NA	NA	0.33	1.8E-09	1
Iron	1.54E+04	1.0E-03	NA	NA	NA	0.33	5.1E-06	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.

TABLE 8.9.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	1.6E-08	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	1.1E-08
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	1.6E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.5E-06
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	2.4E-09	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	7.5E-08
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	8.9E-09	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	6.2E-09
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	2.0E-09	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	2.6E-08
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	2.4E-06	mg/kg-day	N/A	(mg/kg-day) $^{-1}$	
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	9.8E-09	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	3.6E-08
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	5.8E-09	mg/kg-day	N/A	N/A	
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	1.7E-05	mg/kg-day	N/A	(mg/kg-day) $^{-1}$	
	(Total)										3.7E-06
										Total Risk Across All Exposure Routes/Pathways	3.7E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Table 8.9.RME Supplement
Calculation of DAevent
Construction Worker, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (μg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
alpha-Chlordane	5.65E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	1.2E-07	2
Aroclor-1248	5.78E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.2E-05	2
Dieldrin	3.31E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	8	1.8E-08	2
gamma-Chlordane	3.08E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	6.6E-08	2
Heptachlor epoxide	4.19E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	1.5E-08	2
Aluminum	2.21E+03	1.0E-03	NA	NA	NA	8	1.8E-05	1
Arsenic	9.16E+00	1.0E-03	NA	NA	NA	8	7.3E-08	1
Chromium	5.41E+00	1.0E-03	NA	NA	NA	8	4.3E-08	1
Iron	1.54E+04	1.0E-03	NA	NA	NA	8	1.2E-04	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.

TABLE 8.10.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	8.2E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.6E-07
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	2.7E-15	mg/kg-day	1.5E+05	(mg/kg-day) $^{-1}$	4.1E-10
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	5.6E-03	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	1.7E-06	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	2.8E-06	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	1.2E-05	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	3.1E-04	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	1.8E-03	mg/kg-day	N/A	N/A	
	(Total)										1.6E-07
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	7.6E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.7E-06
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	5.4E-15	mg/kg-day	3.0E+05	(mg/kg-day) $^{-1}$	1.6E-09
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	3.7E-03	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	1.1E-06	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	1.9E-07	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	8.1E-06	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	2.1E-04	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	1.2E-03	mg/kg-day	N/A	N/A	
	(Total)										1.7E-06
										Total Risk Across All Exposure Routes/Pathways	1.8E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.2.CT
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	2.1E-07	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	7.2E-08
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	2.1E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	4.2E-06
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	1.2E-07	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	1.9E-06
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	1.1E-07	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	3.9E-08
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	1.5E-07	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	1.4E-06
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	8.1E-03	mg/kg-day	N/A	N/A	
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	3.4E-05	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	5.0E-05
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	2.0E-05	mg/kg-day	N/A	N/A	
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	5.7E-02	mg/kg-day	N/A	N/A	
	(Total)										5.8E-05
Dermal	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	6.8E-07	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	4.7E-07
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	6.7E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.5E-04
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	9.8E-08	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	3.1E-06
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	3.7E-07	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	2.6E-07
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	8.3E-08	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	1.1E-06
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	2.0E-05	mg/kg-day	N/A	N/A	
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	8.3E-08	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	3.1E-07
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	4.9E-08	mg/kg-day	N/A	N/A	
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	
	(Total)										1.5E-04
										Total Risk Across All Exposure Routes/Pathways	2.1E-04

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	1.2E-07		1.0E-06	1.1E-06	Aluminum	CNS	1.2E-02		6.2E-02	7.4E-02
			2,3,7,8-TCDD TEQs	3.0E-10		9.6E-10	1.3E-09	Antimony	Blood/WB	8.9E-03		2.4E-01	2.5E-01
			(Total)	1.2E-07		1.0E-06	1.1E-06	Cadmium	Kidney	5.9E-03		3.1E-02	3.7E-02
								Chromium	NOAEL	8.5E-03		2.3E-01	2.3E-01
								Copper	GI	1.6E-02		2.9E-02	4.5E-02
								Iron	GI	6.4E-03		2.3E-02	2.9E-02
								(Total)		5.8E-02		6.1E-01	6.6E-01
Surface Water	Surface Water	Drainage ditch south of runway	4,4'-DDD	2.7E-11		1.7E-08	1.7E-08	4,4'-DDT	Liver	1.0E-06		1.3E-03	1.3E-03
			4,4'-DDE	1.5E-10		8.5E-08	8.5E-08	Aldrin	Liver	4.7E-06		3.4E-05	3.9E-05
			4,4'-DDT	6.3E-11		8.1E-08	8.2E-08	Dieldrin	Liver	1.4E-05		1.1E-03	1.1E-03
			Aldrin	8.6E-10		6.2E-09	7.1E-09	Mercury	CNS	5.6E-05		3.8E-05	9.4E-05
			Aroclor-1248	5.4E-08		9.2E-05	9.2E-05	(Total)		7.6E-05		2.5E-03	2.6E-03
			Dieldrin	4.0E-09		3.2E-07	3.2E-07						
			(Total)	5.9E-08		9.2E-05	9.3E-05						
Sediment	Sediment	Drainage ditch south of runway	Arsenic	3.5E-08		1.4E-07	1.7E-07	Aluminum	CNS	5.1E-04		2.7E-03	3.2E-03
			(Total)	3.5E-08		1.4E-07	1.7E-07	Arsenic	Skin	2.2E-04		8.6E-04	1.1E-03
								(Total)		7.2E-04		3.5E-03	4.3E-03

Total Risk Across Soil	1.1E-06
Total Risk Across Surface Water	9.3E-05
Total Risk Across Sediment	1.7E-07
Total Risk Across All Media and All Exposure Routes	9.4E-05

Total Hazard Index Across All Media and All Exposure Routes	6.7E-01
Total CNS HI =	7.7E-02
Total Blood HI =	2.5E-01
Total Whole Body HI =	2.5E-01
Total Skin HI =	1.1E-03
Total Kidney HI =	3.7E-02
Total NOAEL HI =	2.3E-01
Total GI HI =	7.4E-02
Total Liver HI =	2.5E-03

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	1.4E-08		9.7E-08	1.1E-07	Aluminum	CNS	3.3E-03		1.5E-02	1.8E-02
			2,3,7,8-TCDD TEQs	3.4E-11		9.3E-11	1.3E-10	Antimony	Blood/WB	2.5E-03		5.7E-02	6.0E-02
			(Total)	1.4E-08		9.7E-08	1.1E-07	Cadmium	Kidney	1.7E-03		7.6E-03	9.3E-03
								Chromium	NOAEL	2.4E-03		5.5E-02	5.7E-02
								Copper	GI	4.6E-03		7.0E-03	1.2E-02
								Iron	GI	1.8E-03		5.5E-03	7.3E-03
								(Total)		1.6E-02		1.5E-01	1.6E-01
Surface Water	Surface Water	Drainage ditch south of runway	4,4'-DDD	1.6E-11		1.7E-08	1.7E-08	4,4'-DDT	Liver	1.6E-06		3.3E-03	3.3E-03
			4,4'-DDE	9.3E-11		8.3E-08	8.3E-08	Aldrin	Liver	7.1E-06		8.3E-05	9.0E-05
			4,4'-DDT	3.8E-11		7.9E-08	8.0E-08	Dieldrin	Liver	2.1E-05		2.7E-03	2.8E-03
			Aldrin	5.2E-10		6.1E-09	6.6E-09	Mercury	CNS	8.5E-05		5.2E-05	1.4E-04
			Aroclor-1248	3.3E-08		9.0E-05	9.0E-05	(Total)		1.2E-04		6.1E-03	6.3E-03
			Dieldrin	2.4E-09		3.1E-07	3.2E-07						
			(Total)	3.6E-08		9.0E-05	9.0E-05						
Sediment	Sediment	Drainage ditch south of runway	Arsenic	6.5E-08		2.6E-07	3.3E-07	Aluminum	CNS	2.4E-03		1.3E-02	1.5E-02
			(Total)	6.5E-08		2.6E-07	3.3E-07	Arsenic	Skin	1.0E-03		4.1E-03	5.1E-03
								(Total)		3.4E-03		1.7E-02	2.1E-02

Total Risk Across Surface Soil	1.1E-07
Total Risk Across Surface Water	9.0E-05
Total Risk Across Sediment	3.3E-07
Total Risk Across All Media and All Exposure Routes	9.1E-05

Total Hazard Index Across All Media and All Exposure Routes	1.9E-01
Total CNS HI =	3.4E-02
Total Blood HI =	6.0E-02
Total Whole Body HI =	6.0E-02
Total Skin HI =	5.1E-03
Total Kidney HI =	9.3E-03
Total NOAEL HI =	5.7E-02
Total GI HI =	1.9E-02
Total Liver HI =	6.1E-03

TABLE 9.3.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	alpha-Chlordane	1.9E-07			1.9E-07	alpha-Chlordane	Liver	3.1E-03			3.1E-03
			Aroclor-1248	1.1E-05			1.1E-05	Dieldrin	Liver	1.8E-02			1.8E-02
			Dieldrin	5.0E-06			5.0E-06	gamma-Chlordane	Liver	1.7E-03			1.7E-03
			gamma-Chlordane	1.0E-07			1.0E-07	Heptachlor epoxide	Liver	8.8E-02			8.8E-02
			Heptachlor epoxide	3.6E-06			3.6E-06	Aluminum	CNS	6.0E-02			6.0E-02
			Arsenic	1.3E-04			1.3E-04	Arsenic	Skin	8.4E-01			8.4E-01
			(Total)	1.5E-04			1.5E-04	Chromium	NOAEL	4.9E-02			4.9E-02
								Iron	GI	7.0E-01			7.0E-01
								(Total)		1.8E+00			1.8E+00
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	1.6E-07		1.7E-06	1.8E-06	Aluminum	CNS	1.6E-02		1.1E-01	1.2E-01
			2,3,7,8-TCDD TEQs	4.1E-10		1.6E-09	2.0E-09	Antimony	Blood/WB	1.2E-02		4.1E-01	4.2E-01
			(Total)	1.6E-07		1.7E-06	1.8E-06	Cadmium	Kidney	8.3E-03		5.5E-02	6.3E-02
								Chromium	NOAEL	1.2E-02		3.9E-01	4.0E-01
								Copper	GI	2.3E-02		5.0E-02	7.3E-02
								Iron	GI	8.9E-03		3.9E-02	4.8E-02
								(Total)		8.1E-02		1.1E+00	1.1E+00

Total Risk Across Groundwater	1.5E-04
Total Risk Across Surface Soil	1.8E-06
Total Risk Across All Media and All Exposure Routes	1.5E-04

Total Hazard Index Across All Media and All Exposure Routes	2.9E+00
Total Liver HI =	1.1E-01
Total CNS HI =	1.9E-01
Total Skin HI =	8.4E-01
Total NOAEL HI =	4.5E-01
Total GI HI =	8.3E-01
Total Blood HI =	4.2E-01
Total WB HI =	4.2E-01
Total Kidney HI =	6.3E-02

TABLE 9.4.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	alpha-Chlordane	1.1E-07		9.5E-07	1.1E-06	alpha-Chlordane	Liver	7.2E-03		6.3E-02	7.0E-02
			Aroclor-1248	6.3E-06		2.9E-04	3.0E-04	Dieldrin	Liver	4.2E-02		9.1E-02	1.3E-01
			Dieldrin	2.9E-06		6.3E-06	9.2E-06	gamma-Chlordane	Liver	3.9E-03		3.4E-02	3.8E-02
			gamma-Chlordane	5.9E-08		5.2E-07	5.8E-07	Heptachlor epoxide	Liver	2.1E-01		2.1E-01	4.1E-01
			Heptachlor epoxide	2.1E-06		2.1E-06	4.2E-06	Aluminum	CNS	1.4E-01		4.7E-03	1.5E-01
			Arsenic	7.5E-05		6.1E-07	7.6E-05	Arsenic	Skin	2.0E+00		1.6E-02	2.0E+00
			(Total)	8.7E-05		3.0E-04	3.9E-04	Chromium	NOAEL	1.2E-01		1.9E-02	1.3E-01
								Iron	GI	1.6E+00		3.6E-02	1.7E+00
								(Total)		4.1E+00		4.7E-01	4.6E+00
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	3.8E-07		1.0E-06	1.4E-06	Aluminum	CNS	1.5E-01		2.6E-01	4.1E-01
			2,3,7,8-TCDD TEQs	9.5E-10		9.7E-10	1.9E-09	Antimony	Blood/WB	1.2E-01		9.9E-01	1.1E+00
			(Total)	3.8E-07		1.0E-06	1.4E-06	Cadmium	Kidney	7.7E-02		1.3E-01	2.1E-01
								Chromium	NOAEL	1.1E-01		9.4E-01	1.1E+00
								Copper	GI	2.1E-01		1.2E-01	3.3E-01
								Iron	GI	8.3E-02		9.5E-02	1.8E-01
								(Total)		7.5E-01		2.5E+00	3.3E+00

Total Risk Across Groundwater	3.9E-04
Total Risk Across Surface Soil	1.4E-06
Total Risk Across All Media and All Exposure Routes	3.9E-04
Total Hazard Index Across All Media and All Exposure Routes	7.9E+00

Total Liver HI =	6.5E-01
Total CNS HI =	5.6E-01
Total Skin HI =	2.0E+00
Total NOAEL HI =	1.2E+00
Total GI HI =	2.2E+00
Total Blood HI =	1.1E+00
Total WB HI =	1.1E+00
Total Kidney HI =	2.1E-01

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Excavation Pit	alpha-Chlordane			1.1E-08	1.1E-08	alpha-Chlordane	Liver			4.6E-03	4.6E-03
			Aroclor-1248			3.5E-06	3.5E-06	Dieldrin	Liver			6.6E-03	6.6E-03
			Dieldrin			7.5E-08	7.5E-08	gamma-Chlordane	Liver			2.5E-03	2.5E-03
			gamma-Chlordane			6.2E-09	6.2E-09	Heptachlor epoxide	Liver			1.5E-02	1.5E-02
			Heptachlor epoxide			2.6E-08	2.6E-08	Aluminum	CNS			1.7E-03	1.7E-03
			Arsenic			3.6E-08	3.6E-08	Arsenic	Skin			5.7E-03	5.7E-03
			(Total)			3.7E-06	3.7E-06	Chromium	NOAEL			6.8E-03	6.8E-03
								Iron	GI			1.3E-02	1.3E-02
								(Total)				5.6E-02	5.6E-02
Surface Water	Surface Water	Drainage ditch south of runway	4,4'-DDD	2.8E-12		1.9E-09	1.9E-09	4,4'-DDT	Liver	2.8E-06		3.6E-03	3.6E-03
			4,4'-DDE	1.6E-11		9.1E-09	9.1E-09	Aldrin	Liver	1.3E-05		9.1E-05	1.0E-04
			4,4'-DDT	6.7E-12		8.7E-09	8.7E-09	Dieldrin	Liver	3.8E-05		3.0E-03	3.0E-03
			Aldrin	9.1E-11		6.6E-10	7.5E-10	Mercury	CNS	1.5E-04		1.0E-04	2.5E-04
			Aroclor-1248	5.7E-09		9.8E-06	9.8E-06	(Total)		2.0E-04		6.8E-03	7.0E-03
			Dieldrin	4.3E-10		3.4E-08	3.5E-08						
			(Total)	6.3E-09		9.9E-06	9.9E-06						
Sediment	Sediment	Drainage ditch south of runway	Arsenic	1.8E-08		1.4E-08	3.2E-08	Aluminum	CNS	6.5E-03		7.2E-03	1.4E-02
			(Total)	1.8E-08		1.4E-08	3.2E-08	Arsenic	Skin	2.8E-03		2.3E-03	5.0E-03
								(Total)		9.2E-03		9.5E-03	1.9E-02

Total Risk Across Groundwater	3.7E-06
Total Risk Across Surface Water	9.9E-06
Total Risk Across Sediment	3.2E-08
Total Risk Across All Media and All Exposure Routes	1.4E-05

Total Hazard Index Across All Media and All Exposure Routes	8.1E-02
Total Liver HI =	3.5E-02
Total CNS HI =	1.6E-02
Total Skin HI =	1.1E-02
Total NOAEL HI =	6.8E-03
Total GI HI =	1.3E-02

TABLE 9.6.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	alpha-Chlordane	2.9E-07		9.5E-07	1.2E-06						
			Aroclor-1248	1.7E-05		2.9E-04	3.1E-04						
			Dieldrin	7.9E-06		6.3E-06	1.4E-05						
			gamma-Chlordane	1.6E-07		5.2E-07	6.8E-07						
			Heptachlor epoxide	5.7E-06		2.1E-06	7.8E-06						
			Arsenic	2.0E-04		6.1E-07	2.0E-04						
			(Total)	2.4E-04		3.0E-04	5.4E-04						
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	5.5E-07		2.7E-06	3.2E-06						
			2,3,7,8-TCDD TEQs	1.4E-09		2.6E-09	3.9E-09						
			(Total)	5.5E-07		2.7E-06	3.2E-06						

Total Risk Across Groundwater	5.4E-04
Total Risk Across Surface Soil	3.2E-06
Total Risk Across All Media and All Exposure Routes	5.4E-04

Total Hazard Index Across All Media and All Exposure Routes	N/A

Note: Risk equals sum of carcinogenic risks from Table 9.3.RME and Table 9.4.RME, adult and child carcinogenic risks.

However, dermal risk associated with groundwater is due to child exposure only, and inhalation risk associated with groundwater is due to adult exposure only.

TABLE 9.1.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	alpha-Chlordane	3.3E-08			3.3E-08	alpha-Chlordane	Liver	1.4E-03			1.4E-03
			Aroclor-1248	1.9E-06			1.9E-06	Dieldrin	Liver	8.5E-03			8.5E-03
			Dieldrin	8.7E-07			8.7E-07	gamma-Chlordane	Liver	7.9E-04			7.9E-04
			gamma-Chlordane	1.8E-08			1.8E-08	Heptachlor epoxide	Liver	4.1E-02			4.1E-02
			Heptachlor epoxide	6.3E-07			6.3E-07	Aluminum	CNS	2.8E-02			2.8E-02
			Arsenic	2.3E-05			2.3E-05	Arsenic	Skin	3.9E-01			3.9E-01
			(Total)	2.6E-05			2.6E-05	Chromium	NOAEL	2.3E-02			2.3E-02
								Iron	GI	3.3E-01			3.3E-01
								(Total)		8.2E-01			8.2E-01
Surface Soil	Surface Soil	Surface soil south of runway						Aluminum	CNS	3.2E-03		7.4E-03	1.1E-02
								Antimony	Blood/WB	7.5E-04		8.5E-03	9.3E-03
								Cadmium	Kidney	2.0E-03		4.6E-03	6.6E-03
								Chromium	NOAEL	2.2E-03		2.5E-02	2.7E-02
								Copper	GI	4.7E-04		3.6E-04	8.2E-04
								Iron	GI	2.3E-03		3.6E-03	5.9E-03
								(Total)		1.1E-02		5.0E-02	6.1E-02

Total Risk Across Groundwater: 2.6E-05

Total Risk Across All Media and All Exposure Routes: 2.6E-05

Total Hazard Index Across All Media and All Exposure Routes: 8.9E-01

Total Liver HI =	5.2E-02
Total CNS HI =	3.9E-02
Total Skin HI =	3.9E-01
Total NOAEL HI =	5.0E-02
Total GI HI =	3.4E-01
Total Blood HI =	9.3E-03
Total WB HI =	9.3E-03
Total Kidney HI =	6.6E-03

TABLE 9.2.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	alpha-Chlordane	7.2E-08		4.7E-07	5.5E-07	alpha-Chlordane	Liver	4.8E-03		3.2E-02	3.6E-02
			Aroclor-1248	4.2E-06		1.5E-04	1.5E-04	Dieldrin	Liver	2.8E-02		4.6E-02	7.4E-02
			Dieldrin	1.9E-06		3.1E-06	5.1E-06	gamma-Chlordane	Liver	2.6E-03		1.7E-02	2.0E-02
			gamma-Chlordane	3.9E-08		2.6E-07	3.0E-07	Heptachlor epoxide	Liver	1.4E-01		1.0E-01	2.4E-01
			Heptachlor epoxide	1.4E-06		1.1E-06	2.5E-06	Aluminum	CNS	9.4E-02		2.3E-03	9.7E-02
			Arsenic	5.0E-05		3.1E-07	5.1E-05	Arsenic	Skin	1.3E+00		8.1E-03	1.3E+00
			(Total)	5.8E-05		1.5E-04	2.1E-04	Chromium	NOAEL	7.7E-02		9.5E-03	8.7E-02
								Iron	GI	1.1E+00		1.8E-02	1.1E+00
								(Total)		2.7E+00		2.4E-01	3.0E+00
Surface Soil	Surface Soil	Surface soil south of runway						Aluminum	CNS	3.0E-05		1.8E-02	1.8E-02
								Antimony	Blood/WB	7.0E-06		2.0E-02	2.0E-02
								Cadmium	Kidney	1.9E-05		1.1E-02	1.1E-02
								Chromium	NOAEL	2.1E-05		6.0E-02	6.0E-02
								Copper	GI	4.4E-06		8.4E-04	8.5E-04
								Iron	GI	2.2E-05		8.5E-03	8.5E-03
								(Total)		1.0E-04		1.2E-01	1.2E-01

Total Risk Across Groundwater	2.1E-04
Total Risk Across All Media and All Exposure Routes	2.1E-04
Total Hazard Index Across All Media and All Exposure Routes	3.1E+00

Total Liver HI =	3.7E-01
Total CNS HI =	1.1E-01
Total Skin HI =	1.3E+00
Total NOAEL HI =	1.5E-01
Total GI HI =	1.1E+00
Total Blood HI =	2.0E-02
Total WB HI =	2.0E-02
Total Kidney HI =	1.1E-02

TABLE 9.3.CT

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	alpha-Chlordane	1.0E-07		4.7E-07	5.8E-07						
			Aroclor-1248	6.1E-06		1.5E-04	1.5E-04						
			Dieldrin	2.8E-06		3.1E-06	5.9E-06						
			gamma-Chlordane	5.7E-08		2.6E-07	3.2E-07						
			Heptachlor epoxide	2.0E-06		1.1E-06	3.1E-06						
			Arsenic	7.3E-05		3.1E-07	7.3E-05						
			(Total)	8.4E-05		1.5E-04	2.4E-04						
				Total Risk Across Groundwater			2.4E-04		Total Hazard Index Across All Media and All Exposure Routes				N/A

Note: Risk equals sum of carcinogenic risks from Table 9.1.CT and Table 9.2.CT, adult and child carcinogenic risks.

However, dermal risk associated with groundwater is due to child exposure only, and inhalation risk associated with groundwater is due to adult exposure only.

TABLE 10.1.RME
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	Aroclor-1248	1.1E-05			1.1E-05	Arsenic	Skin	8.4E-01			8.4E-01
			Dieldrin	5.0E-06			5.0E-06	Iron	GI	7.0E-01			7.0E-01
			Heptachlor epoxide	3.6E-06			3.6E-06	(Total)		1.5E+00			1.5E+00
			Arsenic	1.3E-04			1.3E-04						
			(Total)	1.5E-04			1.5E-04						
Surface Soil	Surface Soil	Surface soil south of runway						Aluminum	CNS	1.6E-02		1.1E-01	1.2E-01
								Antimony	Blood/WB	1.2E-02		4.1E-01	4.2E-01
								Chromium	NOAEL	1.2E-02		3.9E-01	4.0E-01
								(Total)		4.1E-02		9.1E-01	9.5E-01

Total Risk Across Groundwater	1.5E-04
Total Risk Across All Media and All Exposure Routes	1.5E-04
Total Hazard Index Across All Media and All Exposure Routes	2.5E+00

Total CNS HI =	1.2E-01
Total Skin HI =	8.4E-01
Total NOAEL HI =	4.0E-01
Total GI HI =	7.0E-01
Total Blood HI =	4.2E-01
Total WB HI =	4.2E-01

TABLE 10.2.RME
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	alpha-Chlordane	1.1E-07		9.5E-07	1.1E-06	Dieldrin	Liver	4.2E-02		9.1E-02	1.3E-01
			Aroclor-1248	6.3E-06		2.9E-04	3.0E-04	Heptachlor epoxide	Liver	2.1E-01		2.1E-01	4.1E-01
			Dieldrin	2.9E-06		6.3E-06	9.2E-06	Aluminum	CNS	1.4E-01		4.7E-03	1.5E-01
			Heptachlor epoxide	2.1E-06		2.1E-06	4.2E-06	Arsenic	Skin	2.0E+00		1.6E-02	2.0E+00
			Arsenic	7.5E-05		6.1E-07	7.6E-05	Chromium	NOAEL	1.2E-01		1.9E-02	1.3E-01
			(Total)	8.7E-05		3.0E-04	3.9E-04	Iron	GI	1.6E+00		3.6E-02	1.7E+00
								(Total)		4.1E+00		3.7E-01	4.5E+00
Surface Soil	Surface Soil	Surface soil south of runway						Aluminum	CNS	1.5E-01		2.6E-01	4.1E-01
								Antimony	Blood/WB	1.2E-01		9.9E-01	1.1E+00
								Cadmium	Kidney	7.7E-02		1.3E-01	2.1E-01
								Chromium	NOAEL	1.1E-01		9.4E-01	1.1E+00
								Copper	GI	2.1E-01		1.2E-01	3.3E-01
								Iron	GI	8.3E-02		9.5E-02	1.8E-01
								(Total)		7.5E-01		2.5E+00	3.3E+00

Total Risk Across Groundwater	3.9E-04
Total Risk Across All Media and All Exposure Routes	3.9E-04
Total Hazard Index Across All Media and All Exposure Routes	7.8E+00

Total Liver HI =	5.4E-01
Total CNS HI =	5.6E-01
Total Skin HI =	2.0E+00
Total NOAEL HI =	1.2E+00
Total GI HI =	2.2E+00
Total Blood HI =	1.1E+00
Total WB HI =	1.1E+00
Total Kidney HI =	2.1E-01

TABLE 10.3.RME
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	alpha-Chlordane	1.1E-07		9.5E-07	1.1E-06						
			Aroclor-1248	1.7E-05		2.9E-04	3.1E-04						
			Dieldrin	7.9E-06		6.3E-06	1.4E-05						
			Heptachlor epoxide	5.7E-06		2.1E-06	7.8E-06						
			Arsenic	2.0E-04		6.1E-07	2.0E-04						
			(Total)	2.4E-04		3.0E-04	5.4E-04						
						Total Risk Across Groundwater	5.4E-04					Total Hazard Index Across All Media and All Exposure Routes	N/A
						Total Risk Across All Media and All Exposure Routes	5.4E-04						

Note: Risk equals sum of carcinogenic risks from Table 10.1.RME and Table 10.1.RME, adult and child carcinogenic risks.
However, dermal risk associated with groundwater is due to child exposure only, and inhalation risk associated with groundwater is due to adult exposure only.

TABLE 10.1.CT
RISK ASSESSMENT SUMMARY
CENTRAL TENDENCY EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	Aroclor-1248	4.2E-06		1.5E-04	1.5E-04	Heptachlor epoxide	Liver	1.4E-01		1.0E-01	2.4E-01
			Dieldrin	1.9E-06		3.1E-06	5.1E-06	Arsenic	Skin	1.3E+00		8.1E-03	1.3E+00
			Heptachlor epoxide	1.4E-06		1.1E-06	2.5E-06	Iron	GI	1.1E+00		1.8E-02	1.1E+00
			Arsenic	5.0E-05		3.1E-07	5.1E-05	(Total)		2.5E+00		1.3E-01	2.7E+00
			(Total)	5.8E-05		1.5E-04	2.1E-04						
							Total Risk Across Groundwater 2.1E-04						Total Hazard Index Across All Media and All Exposure Routes 2.7E+00
							Total Risk Across All Media and All Exposure Routes 2.1E-04						

Total Liver HI =	2.4E-01
Total Skin HI =	1.3E+00
Total GI HI =	1.1E+00

TABLE 10.2.CT
RISK ASSESSMENT SUMMARY
CENTRAL TENDENCY EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	Aroclor-1248	4.2E-06		1.5E-04	1.5E-04						
			Dieldrin	1.9E-06		3.1E-06	5.1E-06						
			Heptachlor epoxide	1.4E-06		1.1E-06	2.5E-06						
			Arsenic	5.0E-05		3.1E-07	5.1E-05						
			(Total)	5.8E-05		1.5E-04	2.1E-04						
				Total Risk Across Groundwater			2.1E-04		Total Hazard Index Across All Media and All Exposure Routes				N/A

Note: Risk equals sum of carcinogenic risks from Table 9.1.CT and Table 9.2.CT, adult and child carcinogenic risks.
However, dermal risk associated with groundwater is due to child exposure only, and inhalation risk associated with groundwater is due to adult exposure only.

TABLE 3.1.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	ug/kg	8.2E+01	1.5E+02	4.5E+02	J	ug/kg	1.7E+02	95%UCL-T	W-Test (3)	3.4E+01	Mean-T	W-Test (3)
2,3,7,8-TCDD (dioxin) total equivalents	pg/g	2.4E+00	7.3E+00	5.8E+00		pg/g	5.8E+00	Max	W-Test (5)	2.4E+00	Mean-N	W-Test (5)
Aluminum	mg/kg	8.5E+03	1.1E+04	2.2E+04	J	mg/kg	1.2E+04	95%UCL-T	W-Test (1)	7.1E+03	Mean-T	W-Test (1)
Antimony	mg/kg	1.7E+00	3.2E+00	1.5E+01	J	mg/kg	3.6E+00	95%UCL-T	W-Test (3)	6.5E-01	Mean-T	W-Test (3)
Cadmium	mg/kg	4.4E+00	6.0E+00	1.2E+01		mg/kg	6.0E+00	95%UCL-N	W-Test (2)	4.4E+00	Mean-N	W-Test (2)
Chromium	mg/kg	1.7E+01	2.2E+01	4.1E+01		mg/kg	2.6E+01	95%UCL-T	W-Test (3)	1.4E+01	Mean-T	W-Test (3)
Copper	mg/kg	1.5E+02	2.4E+02	6.7E+02	J	mg/kg	6.7E+02	Max	W-Test (4)	4.1E+01	Mean-T	W-Test (3)
Iron	mg/kg	3.3E+03	3.8E+03	6.9E+03		mg/kg	3.9E+03	95%UCL-T	W-Test (1)	3.1E+03	Mean-T	W-Test (1)
Lead	mg/kg	8.4E+01	1.6E+02	7.1E+02		mg/kg	3.2E+02	95%UCL-T	W-Test (1)	3.3E+01	Mean-T	W-Test (1)
4,4'-DDD	ug/kg	2.7E+00	3.9E+00	6.1E+00	J	ug/kg	4.0E+00	95%UCL-T	W-Test (1)	2.1E+00	Mean-T	W-Test (1)
4,4'-DDE	ug/kg	1.4E+00	1.8E+00	3.7E+00	J	ug/kg	2.2E+00	95%UCL-T	W-Test (3)	1.1E+00	Mean-T	W-Test (3)
4,4'-DDT	ug/kg	3.2E+00	4.5E+00	1.3E+01	J	ug/kg	4.3E+00	95%UCL-T	W-Test (3)	2.5E+00	Mean-T	W-Test (3)
Aldrin	ug/kg	1.5E+00	2.1E+00	ND		ug/kg	2.0E+00	95%UCL-T	W-Test (3)	1.2E+00	Mean-T	W-Test (3)
alpha-Chlordane	ug/kg	9.3E+00	1.5E+01	5.1E+01	J	ug/kg	4.5E+01	95%UCL-T	W-Test (1)	4.1E+00	Mean-T	W-Test (1)
Aroclor-1248	ug/kg	3.1E+01	4.3E+01	ND		ug/kg	4.1E+01	95%UCL-T	W-Test (3)	1.8E+00	Mean-T	W-Test (3)
Dieldrin	ug/kg	4.0E+00	6.9E-01	1.6E+01		ug/kg	7.6E+00	95%UCL-T	W-Test (3)	2.6E+00	Mean-T	W-Test (3)
gamma-Chlordane	ug/kg	1.2E+01	1.9E+01	5.3E+01		ug/kg	4.3E+01	95%UCL-T	W-Test (1)	5.1E+00	Mean-T	W-Test (1)
Heptachlor epoxide	ug/kg	2.0E+00	3.4E+00	1.2E+01		ug/kg	5.9E+00	95%UCL-T	W-Test (1)	8.2E-01	Mean-T	W-Test (1)
Arsenic	mg/kg	1.4E+00	1.6E+00	2.3E+00	J	mg/kg	1.6E+00	95%UCL-N	W-Test (2)	1.4E+00	Mean-N	W-Test (2)
Mercury	mg/kg	7.0E-02	9.8E-02	3.0E-01		mg/kg	9.1E-02	95%UCL-T	W-Test (3)	5.8E-02	Mean-T	W-Test (3)
1,2-Dibromoethane	ug/kg	5.3E+00	5.5E+00	ND		ug/kg	5.5E+00	95%UCL-T	W-Test (3)	5.3E+00	Mean-T	W-Test (3)
3,3'-Dichlorobenzidine	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
4,6-Dinitro-2-methylphenol	ug/kg	8.8E+02	1.4E+03	ND		ug/kg	1.2E+03	95%UCL-T	W-Test (3)	6.2E+02	Mean-T	W-Test (3)
Benzo(a)anthracene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Benzo(a)pyrene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
bis(2-Chloroethyl)ether	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Dibenz(a,h)anthracene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Hexachlorobenzene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Hexachlorobutadiene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Indeno(1,2,3-cd)pyrene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)

TABLE 3.1.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
n-Nitroso-di-n-propylamine	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Nitrobenzene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Pentachlorophenol	ug/kg	8.8E+02	1.4E+03	ND		ug/kg	1.2E+03	95%UCL-T	W-Test (3)	6.2E+02	Mean-T	W-Test (3)
Aroclor-1221	ug/kg	6.1E+01	8.6E+01	ND		ug/kg	8.1E+01	95%UCL-T	W-Test (3)	4.9E+01	Mean-T	W-Test (3)
Toxaphene	ug/kg	1.5E+02	2.1E+02	ND		ug/kg	2.0E+02	95%UCL-T	W-Test (3)	1.2E+02	Mean-T	W-Test (3)

For duplicate results, the higher value was used in the calculations.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T) Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are lognormally distirbuted.
(2) Shapiro-Wilk W-Test indicates data are normally distributed.
(3) Shapiro-Wilk W-Test inonclusive, assumed data are lognormally distributed.
(4) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(5) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.2.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
2,3,7,8-TCDD (dioxin) total equivalents	pg/g	2.4E+00	7.3E+00	5.8E+00		pg/g	5.8E+00	Max	W-Test (5)	2.4E+00	Mean-N	W-Test (5)
4,4'-DDD	ug/kg	2.7E+00	3.9E+00	6.1E+00	J	ug/kg	4.0E+00	95%UCL-T	W-Test (1)	2.1E+00	Mean-T	W-Test (1)
4,4'-DDE	ug/kg	1.4E+00	1.8E+00	3.7E+00	J	ug/kg	2.2E+00	95%UCL-T	W-Test (3)	1.1E+00	Mean-T	W-Test (3)
4,4'-DDT	ug/kg	3.2E+00	4.5E+00	1.3E+01	J	ug/kg	4.3E+00	95%UCL-T	W-Test (3)	2.5E+00	Mean-T	W-Test (3)
Aldrin	ug/kg	1.5E+00	2.1E+00	ND		ug/kg	2.0E+00	95%UCL-T	W-Test (3)	1.2E+00	Mean-T	W-Test (3)
alpha-Chlordane	ug/kg	9.3E+00	1.5E+01	5.1E+01	J	ug/kg	4.5E+01	95%UCL-T	W-Test (1)	4.1E+00	Mean-T	W-Test (1)
Aroclor-1248	ug/kg	3.1E+01	4.3E+01	ND		ug/kg	4.1E+01	95%UCL-T	W-Test (3)	1.8E+00	Mean-T	W-Test (3)
Aroclor-1260	ug/kg	8.2E+01	1.5E+02	4.5E+02	J	ug/kg	1.7E+02	95%UCL-T	W-Test (3)	3.4E+01	Mean-T	W-Test (3)
Dieldrin	ug/kg	4.0E+00	6.9E-01	1.6E+01		ug/kg	7.6E+00	95%UCL-T	W-Test (3)	2.6E+00	Mean-T	W-Test (3)
gamma-Chlordane	ug/kg	1.2E+01	1.9E+01	5.3E+01		ug/kg	4.3E+01	95%UCL-T	W-Test (1)	5.1E+00	Mean-T	W-Test (1)
Heptachlor epoxide	ug/kg	2.0E+00	3.4E+00	1.2E+01		ug/kg	5.9E+00	95%UCL-T	W-Test (1)	8.2E-01	Mean-T	W-Test (1)
Aluminum	mg/kg	8.5E+03	1.1E+04	2.2E+04	J	mg/kg	1.2E+04	95%UCL-T	W-Test (1)	7.1E+03	Mean-T	W-Test (1)
Antimony	mg/kg	1.7E+00	3.2E+00	1.5E+01	J	mg/kg	3.6E+00	95%UCL-T	W-Test (3)	6.5E-01	Mean-T	W-Test (3)
Arsenic	mg/kg	1.4E+00	1.6E+00	2.3E+00	J	mg/kg	1.6E+00	95%UCL-N	W-Test (2)	1.4E+00	Mean-N	W-Test (2)
Cadmium	mg/kg	4.4E+00	6.0E+00	1.2E+01		mg/kg	6.0E+00	95%UCL-N	W-Test (2)	4.4E+00	Mean-N	W-Test (2)
Chromium	mg/kg	1.7E+01	2.2E+01	4.1E+01		mg/kg	2.6E+01	95%UCL-T	W-Test (3)	1.4E+01	Mean-T	W-Test (3)
Copper	mg/kg	1.5E+02	2.4E+02	6.7E+02	J	mg/kg	6.7E+02	Max	W-Test (4)	**4.1E+01**	Mean-T	W-Test (3)
Iron	mg/kg	3.3E+03	3.8E+03	6.9E+03		mg/kg	3.9E+03	95%UCL-T	W-Test (1)	3.1E+03	Mean-T	W-Test (1)
Lead	mg/kg	8.4E+01	1.6E+02	7.1E+02		mg/kg	3.2E+02	95%UCL-T	W-Test (1)	3.3E+01	Mean-T	W-Test (1)
Mercury	mg/kg	7.0E-02	9.8E-02	3.0E-01		mg/kg	9.1E-02	95%UCL-T	W-Test (3)	5.8E-02	Mean-T	W-Test (3)
bis(2-Chloroethyl)ether	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Hexachlorobenzene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Hexachlorocyclopentadiene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)

For duplicate results, the higher value was used in the calculations.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are lognormally distirbuted.
(2) Shapiro-Wilk W-Test indicates data are normally distributed.
(3) Shapiro-Wilk W-Test inonclusive, assumed data are lognormally distributed.
(4) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(5) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.3.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
4,4'-DDD	µg/L	3.6E-02	N/A	6.6E-03	J	µg/L	6.6E-03	Max	(1)	3.6E-02	Mean-N	(1)
4,4'-DDE	µg/L	4.2E-02	N/A	2.7E-02	J	µg/L	2.7E-02	Max	(1)	4.2E-02	Mean-N	(1)
4,4'-DDT	µg/L	3.7E-02	N/A	1.1E-02	J	µg/L	1.1E-02	Max	(1)	3.7E-02	Mean-N	(1)
Aldrin	µg/L	1.8E-02	N/A	3.0E-03	J	µg/L	3.0E-03	Max	(1)	1.8E-02	Mean-N	(1)
Aroclor-1248	µg/L	8.7E-01	N/A	1.6E+00		µg/L	1.6E+00	Max	(1)	8.7E-01	Mean-N	(1)
Dieldrin	µg/L	3.8E-02	N/A	1.5E-02	J	µg/L	1.5E-02	Max	(1)	3.8E-02	Mean-N	(1)
Mercury	µg/L	8.3E-02	N/A	1.2E-01	J	µg/L	1.2E-01	Max	(1)	8.3E-02	Mean-N	(1)
alpha-Chlordane	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)
Aroclor-1260	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
gamma-Chlordane	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)
Heptachlor epoxide	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)
Aluminum	µg/L	4.5E+02	N/A	7.8E+02		µg/L	7.8E+02	Max	(1)	4.5E+02	Mean-N	(1)
Antimony	µg/L	1.1E+00	N/A	4.9E+00	U	µg/L	4.9E+00	Max	(1)	1.1E+00	Mean-N	(1)
Arsenic	µg/L	1.5E+00	N/A	3.0E+00	U	µg/L	3.0E+00	Max	(1)	1.5E+00	Mean-N	(1)
Cadmium	µg/L	1.0E-01	N/A	1.3E+00	U	µg/L	1.3E+00	Max	(1)	1.0E-01	Mean-N	(1)
Chromium	µg/L	3.0E-01	N/A	1.2E+00	U	µg/L	1.2E+00	Max	(1)	3.0E-01	Mean-N	(1)
Copper	µg/L	2.4E+00	N/A	6.6E+00	J	µg/L	6.6E+00	Max	(1)	2.4E+00	Mean-N	(1)
Iron	µg/L	1.6E+02	N/A	2.4E+02		µg/L	2.4E+02	Max	(1)	1.6E+02	Mean-N	(1)
Lead	µg/L	1.0E+00	N/A	1.7E+00	J	µg/L	1.7E+00	Max	(1)	1.0E+00	Mean-N	(1)
1,1,2,2-Tetrachloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
1,1,2-Trichloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
1,1-Dichloroethene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
1,2-Dibromoethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
1,2-Dichloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
1,2-Dichloropropane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Bromodichloromethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Carbon tetrachloride	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Dibromochloromethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Tetrachloroethene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
trans-1,3-Dichloropropene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)

TABLE 3.3.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
2,4,6-Trichlorophenol	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
2,4-Dinitrotoluene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
2,6-Dinitrotoluene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
2-Chlorophenol	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
3,3'-Dichlorobenzidine	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
4,6-Dinitro-2-methylphenol	µg/L	1.3E+01	N/A	2.5E+01	U	µg/L	2.5E+01	Max	(1)	1.3E+01	Mean-N	(1)
Acenaphthylene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Benzo(a)anthracene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Benzo(a)pyrene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Benzo(b)fluoranthene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Benzo(k)fluoranthene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
bis(2-Chloroethyl)ether	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
bis(2-Ethylhexyl)phthalate	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Carbazole	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Chrysene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Dibenz(a,h)anthracene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Dibenzofuran	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Hexachlorobenzene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Hexachlorobutadiene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Hexachloroethane	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Indeno(1,2,3-cd)pyrene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
n-Nitroso-di-n-propylamine	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
n-Nitrosodiphenylamine	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Naphthalene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Pentachlorophenol	µg/L	1.3E+01	N/A	2.5E+01	U	µg/L	2.5E+01	Max	(1)	1.3E+01	Mean-N	(1)
alpha-BHC	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)
Aroclor-1016	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Aroclor-1221	µg/L	1.0E+00	N/A	2.1E+00	U	µg/L	2.1E+00	Max	(1)	1.0E+00	Mean-N	(1)
Aroclor-1232	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Aroclor-1242	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Aroclor-1254	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
beta-BHC	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)
delta-BHC	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)

TABLE 3.3.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Heptachlor	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)
Toxaphene	µg/L	2.5E+00	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E+00	Mean-N	(1)
Thallium	µg/L	1.8E+00	N/A	3.5E+00	U	µg/L	3.5E+00	Max	(1)	1.8E+00	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quantitation limit was used as the sample concentration

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration

TABLE 3.4.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aluminum	mg/kg	5.3E+03	N/A	8.6E+03		mg/kg	8.6E+03	Max	(1)	5.3E+03	Mean-N	(1)
Arsenic	mg/kg	6.4E-01	N/A	1.1E+00	J	mg/kg	1.1E+00	Max	(1)	6.4E-01	Mean-N	(1)
4,4'-DDD	ug/kg	4.4E+00	N/A	6.2E+00		ug/kg	6.2E+00	Max	(1)	4.4E+00	Mean-N	(1)
4,4'-DDE	ug/kg	1.1E+00	N/A	1.6E+00	J	ug/kg	1.6E+00	Max	(1)	1.1E+00	Mean-N	(1)
4,4'-DDT	ug/kg	4.7E+00	N/A	1.1E+01		ug/kg	1.1E+01	Max	(1)	4.7E+00	Mean-N	(1)
Aldrin	ug/kg	1.5E+00	N/A	4.5E+00	U	ug/kg	4.5E+00	Max	(1)	1.5E+00	Mean-N	(1)
alpha-Chlordane	ug/kg	1.3E+01	N/A	3.6E+01	J	ug/kg	3.6E+01	Max	(1)	1.3E+01	Mean-N	(1)
Aroclor-1248	ug/kg	3.1E+01	N/A	9.1E+01	U	ug/kg	9.1E+01	Max	(1)	3.1E+01	Mean-N	(1)
Aroclor-1260	ug/kg	3.1E+01	N/A	9.1E+01	U	ug/kg	9.1E+01	Max	(1)	3.1E+01	Mean-N	(1)
Dieldrin	ug/kg	1.8E+00	N/A	7.0E-01	J	ug/kg	7.0E-01	Max	(1)	1.8E+00	Mean-N	(1)
gamma-Chlordane	ug/kg	1.5E+00	N/A	3.1E+01		ug/kg	3.1E+01	Max	(1)	1.5E+00	Mean-N	(1)
Heptachlor epoxide	ug/kg	1.0E+00	N/A	2.6E+00	J	ug/kg	2.6E+00	Max	(1)	1.0E+00	Mean-N	(1)
Antimony	mg/kg	8.6E-01	N/A	1.3E+00	J	mg/kg	1.3E+00	Max	(1)	8.6E-01	Mean-N	(1)
Cadmium	mg/kg	1.3E+00	N/A	2.8E+00		mg/kg	2.8E+00	Max	(1)	1.3E+00	Mean-N	(1)
Chromium	mg/kg	8.1E+00	N/A	1.2E+01		mg/kg	1.2E+01	Max	(1)	8.1E+00	Mean-N	(1)
Copper	mg/kg	7.4E+00	N/A	1.3E+01		mg/kg	1.3E+01	Max	(1)	7.4E+00	Mean-N	(1)
Iron	mg/kg	2.5E+03	N/A	3.3E+03	J	mg/kg	3.3E+03	Max	(1)	2.5E+03	Mean-N	(1)
Lead	mg/kg	2.2E+01	N/A	3.3E+01		mg/kg	3.3E+01	Max	(1)	2.2E+01	Mean-N	(1)
Mercury	mg/kg	6.3E-02	N/A	7.0E-02	J	mg/kg	7.0E-02	Max	(1)	6.3E-02	Mean-N	(1)
1,2-Dibromoethane	ug/kg	6.5E+00	N/A	1.3E+01	U	ug/kg	1.3E+01	Max	(1)	6.5E+00	Mean-N	(1)
Benzo(a)pyrene	ug/kg	2.3E+02	N/A	4.9E+02	U	ug/kg	4.9E+02	Max	(1)	2.3E+02	Mean-N	(1)
Dibenz(a,h)anthracene	ug/kg	2.3E+02	N/A	4.9E+02	U	ug/kg	4.9E+02	Max	(1)	2.3E+02	Mean-N	(1)
Hexachlorobenzene	ug/kg	2.3E+02	N/A	4.9E+02	U	ug/kg	4.9E+02	Max	(1)	2.3E+02	Mean-N	(1)
n-Nitroso-di-n-propylamine	ug/kg	2.3E+02	N/A	4.9E+02	U	ug/kg	4.9E+02	Max	(1)	2.3E+02	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quantitation limit was used as the sample concentration

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.5.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
alpha-Chlordane	µg/L	5.6E-02	N/A	1.8E-01	J	µg/L	5.6E-02	Mean-N	(1)	5.6E-02	Mean-N	(1)
Aroclor-1248	µg/L	5.8E-01	N/A	8.9E-01	J	µg/L	5.8E-01	Mean-N	(1)	5.8E-01	Mean-N	(1)
Dieldrin	µg/L	3.3E-02	N/A	1.1E-02	J	µg/L	3.3E-02	Mean-N	(1)	3.3E-02	Mean-N	(1)
gamma-Chlordane	µg/L	3.1E-02	N/A	6.4E-02	J	µg/L	3.1E-02	Mean-N	(1)	3.1E-02	Mean-N	(1)
Heptachlor epoxide	µg/L	4.2E-02	N/A	1.3E-01	J	µg/L	4.2E-02	Mean-N	(1)	4.2E-02	Mean-N	(1)
Aluminum	µg/L	2.2E+03	N/A	8.5E+03		µg/L	2.2E+03	Mean-N	(1)	2.2E+03	Mean-N	(1)
Arsenic	µg/L	9.2E+00	N/A	3.0E+01		µg/L	9.2E+00	Mean-N	(1)	9.2E+00	Mean-N	(1)
Chromium	µg/L	5.4E+00	N/A	2.6E+01		µg/L	5.4E+00	Mean-N	(1)	5.4E+00	Mean-N	(1)
Iron	µg/L	1.5E+04	N/A	5.1E+04	J	µg/L	1.5E+04	Mean-N	(1)	1.5E+04	Mean-N	(1)
4,4'-DDD	µg/L	5.1E-02	N/A	1.1E-01	U	µg/L	5.1E-02	Mean-N	(1)	5.1E-02	Mean-N	(1)
4,4'-DDE	µg/L	3.8E-02	N/A	3.5E-02	J	µg/L	3.8E-02	Mean-N	(1)	3.8E-02	Mean-N	(1)
4,4'-DDT	µg/L	5.1E-02	N/A	1.1E-01	U	µg/L	5.1E-02	Mean-N	(1)	5.1E-02	Mean-N	(1)
Aldrin	µg/L	1.6E-02	N/A	1.8E-03	J	µg/L	1.6E-02	Mean-N	(1)	1.6E-02	Mean-N	(1)
Aroclor-1260	µg/L	5.1E-01	N/A	1.1E+00	U	µg/L	5.1E-01	Mean-N	(1)	5.1E-01	Mean-N	(1)
Antimony	µg/L	1.1E+00	N/A	3.8E+00	U	µg/L	1.1E+00	Mean-N	(1)	1.1E+00	Mean-N	(1)
Cadmium	µg/L	1.0E-01	N/A	2.0E-01	U	µg/L	1.0E-01	Mean-N	(1)	1.0E-01	Mean-N	(1)
Copper	µg/L	3.5E+00	N/A	1.6E+01	J	µg/L	3.5E+00	Mean-N	(1)	3.5E+00	Mean-N	(1)
Lead	µg/L	1.2E+00	N/A	3.4E+00		µg/L	1.2E+00	Mean-N	(1)	1.2E+00	Mean-N	(1)
Mercury	µg/L	6.8E-02	N/A	1.0E-01	J	µg/L	6.8E-02	Mean-N	(1)	6.8E-02	Mean-N	(1)
1,1,2,2-Tetrachloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,1,2-Trichloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,1-Dichloroethene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,2-Dibromoethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,2-Dichloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,2-Dichloropropane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Benzene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Bromodichloromethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Bromoform	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Carbon tetrachloride	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)

TABLE 3.5.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Chloroform	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
cis-1,3-Dichloropropene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Dibromochloromethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Tetrachloroethene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
trans-1,3-Dichloropropene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Vinyl chloride	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,4-Dichlorobenzene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
2,4,6-Trichlorophenol	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
2,4-Dinitrophenol	µg/L	1.3E+01	N/A	2.7E+01	U	µg/L	1.3E+01	Mean-N	(1)	1.3E+01	Mean-N	(1)
2,4-Dinitrotoluene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
2,6-Dinitrotoluene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
2-Chlorophenol	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
3,3'-Dichlorobenzidine	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
4,6-Dinitro-2-methylphenol	µg/L	1.3E+01	N/A	2.7E+01	U	µg/L	1.3E+01	Mean-N	(1)	1.3E+01	Mean-N	(1)
4-Methylphenol	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Acenaphthylene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Benzo(a)anthracene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Benzo(a)pyrene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Benzo(b)fluoranthene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Benzo(k)fluoranthene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
bis(2-Chloroethyl)ether	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
bis(2-Ethylhexyl)phthalate	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Carbazole	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Chrysene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Dibenz(a,h)anthracene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Dibenzofuran	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Hexachlorobenzene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Hexachlorobutadiene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Hexachloroethane	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Indeno(1,2,3-cd)pyrene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
n-Nitroso-di-n-propylamine	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Naphthalene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)

TABLE 3.5.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Nitrobenzene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Pentachlorophenol	µg/L	1.3E+01	N/A	2.7E+01	U	µg/L	1.3E+01	Mean-N	(1)	1.3E+01	Mean-N	(1)
alpha-BHC	µg/L	2.6E-02	N/A	5.5E-02	U	µg/L	2.6E-02	Mean-N	(1)	2.6E-02	Mean-N	(1)
Aroclor-1016	µg/L	5.1E-01	N/A	1.1E+00	U	µg/L	5.1E-01	Mean-N	(1)	5.1E-01	Mean-N	(1)
Aroclor-1221	µg/L	1.0E+00	N/A	2.2E+00	U	µg/L	1.0E+00	Mean-N	(1)	1.0E+00	Mean-N	(1)
Aroclor-1232	µg/L	5.1E-01	N/A	1.1E+00	U	µg/L	5.1E-01	Mean-N	(1)	5.1E-01	Mean-N	(1)
Aroclor-1242	µg/L	5.1E-01	N/A	1.1E+00	U	µg/L	5.1E-01	Mean-N	(1)	5.1E-01	Mean-N	(1)
Aroclor-1254	µg/L	5.1E-01	N/A	1.1E+00	U	µg/L	5.1E-01	Mean-N	(1)	5.1E-01	Mean-N	(1)
Aroclor-1262	µg/L	5.5E-01	N/A	1.1E+00	U	µg/L	5.5E-01	Mean-N	(1)	5.5E-01	Mean-N	(1)
Aroclor-1268	µg/L	5.5E-01	N/A	1.1E+00	U	µg/L	5.5E-01	Mean-N	(1)	5.5E-01	Mean-N	(1)
Heptachlor	µg/L	2.5E-02	N/A	5.0E-02	U	µg/L	2.5E-02	Mean-N	(1)	2.5E-02	Mean-N	(1)
Toxaphene	µg/L	2.6E+00	N/A	5.5E+00	U	µg/L	2.6E+00	Mean-N	(1)	2.6E+00	Mean-N	(1)
Thallium	µg/L	1.8E+00	N/A	3.5E+00	U	µg/L	1.8E+00	Mean-N	(1)	1.8E+00	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quatitation limit was used as the sample concentration.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Following EPA Region IV guidance, the arithmetic average used as the RME and CT concentration

TABLE 3.6.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
alpha-Chlordane	µg/L	5.6E-02	N/A	1.8E-01	J	µg/L	5.6E-02	Mean-N	(1)	5.6E-02	Mean-N	(1)
Aroclor-1248	µg/L	5.8E-01	N/A	8.9E-01	J	µg/L	5.8E-01	Mean-N	(1)	5.8E-01	Mean-N	(1)
Dieldrin	µg/L	3.3E-02	N/A	1.1E-02	J	µg/L	3.3E-02	Mean-N	(1)	3.3E-02	Mean-N	(1)
gamma-Chlordane	µg/L	3.1E-02	N/A	6.4E-02	J	µg/L	3.1E-02	Mean-N	(1)	3.1E-02	Mean-N	(1)
Heptachlor epoxide	µg/L	4.2E-02	N/A	1.3E-01	J	µg/L	4.2E-02	Mean-N	(1)	4.2E-02	Mean-N	(1)
Aluminum	µg/L	2.2E+03	N/A	8.5E+03		µg/L	2.2E+03	Mean-N	(1)	2.2E+03	Mean-N	(1)
Arsenic	µg/L	9.2E+00	N/A	3.0E+01		µg/L	9.2E+00	Mean-N	(1)	9.2E+00	Mean-N	(1)
Chromium	µg/L	5.4E+00	N/A	2.6E+01		µg/L	5.4E+00	Mean-N	(1)	5.4E+00	Mean-N	(1)
Iron	µg/L	1.5E+04	N/A	5.1E+04	J	µg/L	1.5E+04	Mean-N	(1)	1.5E+04	Mean-N	(1)
4,4'-DDD	µg/L	5.1E-02	N/A	1.1E-01	U	µg/L	5.1E-02	Mean-N	(1)	5.1E-02	Mean-N	(1)
4,4'-DDE	µg/L	3.8E-02	N/A	3.5E-02	J	µg/L	3.8E-02	Mean-N	(1)	3.8E-02	Mean-N	(1)
4,4'-DDT	µg/L	5.1E-02	N/A	1.1E-01	U	µg/L	5.1E-02	Mean-N	(1)	5.1E-02	Mean-N	(1)
Aldrin	µg/L	1.6E-02	N/A	1.8E-03	J	µg/L	1.6E-02	Mean-N	(1)	1.6E-02	Mean-N	(1)
Aroclor-1260	µg/L	5.1E-01	N/A	1.1E+00	U	µg/L	5.1E-01	Mean-N	(1)	5.1E-01	Mean-N	(1)
Antimony	µg/L	1.1E+00	N/A	3.8E+00	U	µg/L	1.1E+00	Mean-N	(1)	1.1E+00	Mean-N	(1)
Cadmium	µg/L	1.0E-01	N/A	2.0E-01	U	µg/L	1.0E-01	Mean-N	(1)	1.0E-01	Mean-N	(1)
Copper	µg/L	3.5E+00	N/A	1.6E+01	J	µg/L	3.5E+00	Mean-N	(1)	3.5E+00	Mean-N	(1)
Lead	µg/L	1.2E+00	N/A	3.4E+00		µg/L	1.2E+00	Mean-N	(1)	1.2E+00	Mean-N	(1)
Mercury	µg/L	6.8E-02	N/A	1.0E-01	J	µg/L	6.8E-02	Mean-N	(1)	6.8E-02	Mean-N	(1)
1,1,2,2-Tetrachloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,1,2-Trichloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,1-Dichloroethene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,2-Dibromoethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,2-Dichloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,2-Dichloropropane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Benzene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Bromodichloromethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Bromoform	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Carbon tetrachloride	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)

TABLE 3.6.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Chloroform	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
cis-1,3-Dichloropropene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Dibromochloromethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Tetrachloroethene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
trans-1,3-Dichloropropene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Vinyl chloride	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,4-Dichlorobenzene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
2,4,6-Trichlorophenol	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
2,4-Dinitrophenol	µg/L	1.3E+01	N/A	2.7E+01	U	µg/L	1.3E+01	Mean-N	(1)	1.3E+01	Mean-N	(1)
2,4-Dinitrotoluene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
2,6-Dinitrotoluene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
2-Chlorophenol	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
3,3'-Dichlorobenzidine	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
4,6-Dinitro-2-methylphenol	µg/L	1.3E+01	N/A	2.7E+01	U	µg/L	1.3E+01	Mean-N	(1)	1.3E+01	Mean-N	(1)
4-Methylphenol	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Acenaphthylene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Benzo(a)anthracene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Benzo(a)pyrene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Benzo(b)fluoranthene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Benzo(k)fluoranthene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
bis(2-Chloroethyl)ether	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
bis(2-Ethylhexyl)phthalate	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Carbazole	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Chrysene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Dibenz(a,h)anthracene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Dibenzofuran	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Hexachlorobenzene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Hexachlorobutadiene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Hexachloroethane	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Indeno(1,2,3-cd)pyrene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
n-Nitroso-di-n-propylamine	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Naphthalene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)

TABLE 3.6.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Nitrobenzene	µg/L	5.1E+00	N/A	1.1E+01	U	µg/L	5.1E+00	Mean-N	(1)	5.1E+00	Mean-N	(1)
Pentachlorophenol	µg/L	1.3E+01	N/A	2.7E+01	U	µg/L	1.3E+01	Mean-N	(1)	1.3E+01	Mean-N	(1)
alpha-BHC	µg/L	2.6E-02	N/A	5.5E-02	U	µg/L	2.6E-02	Mean-N	(1)	2.6E-02	Mean-N	(1)
Aroclor-1016	µg/L	5.1E-01	N/A	1.1E+00	U	µg/L	5.1E-01	Mean-N	(1)	5.1E-01	Mean-N	(1)
Aroclor-1221	µg/L	1.0E+00	N/A	2.2E+00	U	µg/L	1.0E+00	Mean-N	(1)	1.0E+00	Mean-N	(1)
Aroclor-1232	µg/L	5.1E-01	N/A	1.1E+00	U	µg/L	5.1E-01	Mean-N	(1)	5.1E-01	Mean-N	(1)
Aroclor-1242	µg/L	5.1E-01	N/A	1.1E+00	U	µg/L	5.1E-01	Mean-N	(1)	5.1E-01	Mean-N	(1)
Aroclor-1254	µg/L	5.1E-01	N/A	1.1E+00	U	µg/L	5.1E-01	Mean-N	(1)	5.1E-01	Mean-N	(1)
Aroclor-1262	µg/L	5.5E-01	N/A	1.1E+00	U	µg/L	5.5E-01	Mean-N	(1)	5.5E-01	Mean-N	(1)
Aroclor-1268	µg/L	5.5E-01	N/A	1.1E+00	U	µg/L	5.5E-01	Mean-N	(1)	5.5E-01	Mean-N	(1)
Heptachlor	µg/L	2.5E-02	N/A	5.0E-02	U	µg/L	2.5E-02	Mean-N	(1)	2.5E-02	Mean-N	(1)
Toxaphene	µg/L	2.6E+00	N/A	5.5E+00	U	µg/L	2.6E+00	Mean-N	(1)	2.6E+00	Mean-N	(1)
Thallium	µg/L	1.8E+00	N/A	3.5E+00	U	µg/L	1.8E+00	Mean-N	(1)	1.8E+00	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quatitation limit was used as the sample concentration.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Following EPA Region IV guidance, the arithmetic average used as the RME and CT concentration.

TABLE 3.7.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Upper Aquifer - Water Vapors at Showerhead

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1,2,2-Tetrachloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,1,2-Trichloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,1-Dichloroethene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,2-Dibromoethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,2-Dichloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,2-Dichloropropane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Benzene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Bromodichloromethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Bromoform	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Carbon tetrachloride	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Chloroform	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
cis-1,3-Dichloropropene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Dibromochloromethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Tetrachloroethene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
trans-1,3-Dichloropropene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Vinyl chloride	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quatitation limit was used as the sample concentration.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Following EPA Region IV guidance, the arithmetic average used as the RME and CT concentration.

TABLE 3.8.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Upper Aquifer - Water Vapors at Excavation Pit

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1,2,2-Tetrachloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,1,2-Trichloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,1-Dichloroethene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,2-Dibromoethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,2-Dichloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
1,2-Dichloropropane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Benzene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Bromodichloromethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Bromoform	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Carbon tetrachloride	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Chloroform	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
cis-1,3-Dichloropropene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Dibromochloromethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Tetrachloroethene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
trans-1,3-Dichloropropene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)
Vinyl chloride	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	5.0E-01	Mean-N	(1)	5.0E-01	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quatitation limit was used as the sample concentration.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Following EPA Region IV guidance, the arithmetic average used as the RME and CT concentration.

TABLE 3.9.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	ug/kg	8.2E+01	1.5E+02	4.5E+02	J	ug/kg	1.7E+02	95%UCL-T	W-Test (3)	3.4E+01	Mean-T	W-Test (3)
2,3,7,8-TCDD (dioxin) total equivalents	pg/g	2.4E+00	7.3E+00	5.8E+00		pg/g	5.8E+00	Max	W-Test (5)	2.4E+00	Mean-N	W-Test (5)
Aluminum	mg/kg	8.5E+03	1.1E+04	2.2E+04	J	mg/kg	1.2E+04	95%UCL-T	W-Test (1)	7.1E+03	Mean-T	W-Test (1)
Antimony	mg/kg	1.7E+00	3.2E+00	1.5E+01	J	mg/kg	3.6E+00	95%UCL-T	W-Test (3)	6.5E-01	Mean-T	W-Test (3)
Cadmium	mg/kg	4.4E+00	6.0E+00	1.2E+01		mg/kg	6.0E+00	95%UCL-N	W-Test (2)	4.4E+00	Mean-N	W-Test (2)
Chromium	mg/kg	1.7E+01	2.2E+01	4.1E+01		mg/kg	2.6E+01	95%UCL-T	W-Test (3)	1.4E+01	Mean-T	W-Test (3)
Copper	mg/kg	1.5E+02	2.4E+02	6.7E+02	J	mg/kg	6.7E+02	Max	W-Test (4)	4.1E+01	Mean-T	W-Test (3)
Iron	mg/kg	3.3E+03	3.8E+03	6.9E+03		mg/kg	3.9E+03	95%UCL-T	W-Test (1)	3.1E+03	Mean-T	W-Test (1)
Lead	mg/kg	8.4E+01	1.6E+02	7.1E+02		mg/kg	3.2E+02	95%UCL-T	W-Test (1)	3.3E+01	Mean-T	W-Test (1)
4,4'-DDD	ug/kg	2.7E+00	3.9E+00	6.1E+00	J	ug/kg	4.0E+00	95%UCL-T	W-Test (1)	2.1E+00	Mean-T	W-Test (1)
4,4'-DDE	ug/kg	1.4E+00	1.8E+00	3.7E+00	J	ug/kg	2.2E+00	95%UCL-T	W-Test (3)	1.1E+00	Mean-T	W-Test (3)
4,4'-DDT	ug/kg	3.2E+00	4.5E+00	1.3E+01	J	ug/kg	4.3E+00	95%UCL-T	W-Test (3)	2.5E+00	Mean-T	W-Test (3)
Aldrin	ug/kg	1.5E+00	2.1E+00	ND		ug/kg	2.0E+00	95%UCL-T	W-Test (3)	1.2E+00	Mean-T	W-Test (3)
alpha-Chlordane	ug/kg	9.3E+00	1.5E+01	5.1E+01	J	ug/kg	4.5E+01	95%UCL-T	W-Test (1)	4.1E+00	Mean-T	W-Test (1)
Aroclor-1248	ug/kg	3.1E+01	4.3E+01	ND		ug/kg	4.1E+01	95%UCL-T	W-Test (3)	1.8E+00	Mean-T	W-Test (3)
Dieldrin	ug/kg	4.0E+00	6.9E-01	1.6E+01		ug/kg	7.6E+00	95%UCL-T	W-Test (3)	2.6E+00	Mean-T	W-Test (3)
gamma-Chlordane	ug/kg	1.2E+01	1.9E+01	5.3E+01		ug/kg	4.3E+01	95%UCL-T	W-Test (1)	5.1E+00	Mean-T	W-Test (1)
Heptachlor epoxide	ug/kg	2.0E+00	3.4E+00	1.2E+01		ug/kg	5.9E+00	95%UCL-T	W-Test (1)	8.2E-01	Mean-T	W-Test (1)
Arsenic	mg/kg	1.4E+00	1.6E+00	2.3E+00	J	mg/kg	1.6E+00	95%UCL-N	W-Test (2)	1.4E+00	Mean-N	W-Test (2)
Mercury	mg/kg	7.0E-02	9.8E-02	3.0E-01		mg/kg	9.1E-02	95%UCL-T	W-Test (3)	5.8E-02	Mean-T	W-Test (3)
1,2-Dibromoethane	ug/kg	5.3E+00	5.5E+00	ND		ug/kg	5.5E+00	95%UCL-T	W-Test (3)	5.3E+00	Mean-T	W-Test (3)
3,3'-Dichlorobenzidine	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
4,6-Dinitro-2-methylphenol	ug/kg	8.8E+02	1.4E+03	ND		ug/kg	1.2E+03	95%UCL-T	W-Test (3)	6.2E+02	Mean-T	W-Test (3)
Benzo(a)anthracene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Benzo(a)pyrene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
bis(2-Chloroethyl)ether	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Dibenz(a,h)anthracene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Hexachlorobenzene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Hexachlorobutadiene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Indeno(1,2,3-cd)pyrene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)

TABLE 3.9.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
n-Nitroso-di-n-propylamine	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Nitrobenzene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Pentachlorophenol	ug/kg	8.8E+02	1.4E+03	ND		ug/kg	1.2E+03	95%UCL-T	W-Test (3)	6.2E+02	Mean-T	W-Test (3)
Aroclor-1221	ug/kg	6.1E+01	8.6E+01	ND		ug/kg	8.1E+01	95%UCL-T	W-Test (3)	4.9E+01	Mean-T	W-Test (3)
Toxaphene	ug/kg	1.5E+02	2.1E+02	ND		ug/kg	2.0E+02	95%UCL-T	W-Test (3)	1.2E+02	Mean-T	W-Test (3)

For duplicate results, the higher value was used in the calculations.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are lognormally distirbuted.
(2) Shapiro-Wilk W-Test indicates data are normally distributed.
(3) Shapiro-Wilk W-Test inonclusive, assumed data are lognormally distributed.
(4) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(5) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.10.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
2,3,7,8-TCDD (dioxin) total equivalents	pg/g	2.4E+00	7.3E+00	5.8E+00		pg/g	5.8E+00	Max	W-Test (5)	2.4E+00	Mean-N	W-Test (5)
4,4'-DDD	ug/kg	2.7E+00	3.9E+00	6.1E+00	J	ug/kg	4.0E+00	95%UCL-T	W-Test (1)	2.1E+00	Mean-T	W-Test (1)
4,4'-DDE	ug/kg	1.4E+00	1.8E+00	3.7E+00	J	ug/kg	2.2E+00	95%UCL-T	W-Test (3)	1.1E+00	Mean-T	W-Test (3)
4,4'-DDT	ug/kg	3.2E+00	4.5E+00	1.3E+01	J	ug/kg	4.3E+00	95%UCL-T	W-Test (3)	2.5E+00	Mean-T	W-Test (3)
Aldrin	ug/kg	1.5E+00	2.1E+00	ND		ug/kg	2.0E+00	95%UCL-T	W-Test (3)	1.2E+00	Mean-T	W-Test (3)
alpha-Chlordane	ug/kg	9.3E+00	1.5E+01	5.1E+01	J	ug/kg	4.5E+01	95%UCL-T	W-Test (1)	4.1E+00	Mean-T	W-Test (1)
Aroclor-1248	ug/kg	3.1E+01	4.3E+01	ND		ug/kg	4.1E+01	95%UCL-T	W-Test (3)	1.8E+00	Mean-T	W-Test (3)
Aroclor-1260	ug/kg	8.2E+01	1.5E+02	4.5E+02	J	ug/kg	1.7E+02	95%UCL-T	W-Test (3)	3.4E+01	Mean-T	W-Test (3)
Dieldrin	ug/kg	4.0E+00	6.9E-01	1.6E+01		ug/kg	7.6E+00	95%UCL-T	W-Test (3)	2.6E+00	Mean-T	W-Test (3)
gamma-Chlordane	ug/kg	1.2E+01	1.9E+01	5.3E+01		ug/kg	4.3E+01	95%UCL-T	W-Test (1)	5.1E+00	Mean-T	W-Test (1)
Heptachlor epoxide	ug/kg	2.0E+00	3.4E+00	1.2E+01		ug/kg	5.9E+00	95%UCL-T	W-Test (1)	8.2E-01	Mean-T	W-Test (1)
Aluminum	mg/kg	8.5E+03	1.1E+04	2.2E+04	J	mg/kg	1.2E+04	95%UCL-T	W-Test (1)	7.1E+03	Mean-T	W-Test (1)
Antimony	mg/kg	1.7E+00	3.2E+00	1.5E+01	J	mg/kg	3.6E+00	95%UCL-T	W-Test (3)	6.5E-01	Mean-T	W-Test (3)
Arsenic	mg/kg	1.4E+00	1.6E+00	2.3E+00	J	mg/kg	1.6E+00	95%UCL-N	W-Test (2)	1.4E+00	Mean-N	W-Test (2)
Cadmium	mg/kg	4.4E+00	6.0E+00	1.2E+01		mg/kg	6.0E+00	95%UCL-N	W-Test (2)	4.4E+00	Mean-N	W-Test (2)
Chromium	mg/kg	1.7E+01	2.2E+01	4.1E+01		mg/kg	2.6E+01	95%UCL-T	W-Test (3)	1.4E+01	Mean-T	W-Test (3)
Copper	mg/kg	1.5E+02	2.4E+02	6.7E+02	J	mg/kg	6.7E+02	Max	W-Test (4)	4.1E+01	Mean-T	W-Test (3)
Iron	mg/kg	3.3E+03	3.8E+03	6.9E+03		mg/kg	3.9E+03	95%UCL-T	W-Test (1)	3.1E+03	Mean-T	W-Test (1)
Lead	mg/kg	8.4E+01	1.6E+02	7.1E+02		mg/kg	3.2E+02	95%UCL-T	W-Test (1)	3.3E+01	Mean-T	W-Test (1)
Mercury	mg/kg	7.0E-02	9.8E-02	3.0E-01		mg/kg	9.1E-02	95%UCL-T	W-Test (3)	5.8E-02	Mean-T	W-Test (3)
bis(2-Chloroethyl)ether	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Hexachlorobenzene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)
Hexachlorocyclopentadiene	ug/kg	3.6E+02	5.9E+02	ND		ug/kg	5.0E+02	95%UCL-T	W-Test (3)	2.5E+02	Mean-T	W-Test (3)

For duplicate results, the higher value was used in the calculations.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are lognormally distirbuted.
(2) Shapiro-Wilk W-Test indicates data are normally distributed.
(3) Shapiro-Wilk W-Test inonclusive, assumed data are lognormally distributed.
(4) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(5) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.11.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
4,4'-DDD	ug/kg	1.8E+00	N/A	3.7E+00	U	ug/kg	3.7E+00	Max	(1)	1.8E+00	Mean-N	(1)
4,4'-DDE	ug/kg	1.8E+00	N/A	3.7E+00	U	ug/kg	3.7E+00	Max	(1)	1.8E+00	Mean-N	(1)
4,4'-DDT	ug/kg	1.8E+00	N/A	3.7E+00	U	ug/kg	3.7E+00	Max	(1)	1.8E+00	Mean-N	(1)
Aldrin	ug/kg	6.0E-01	N/A	3.0E-01	J	ug/kg	3.0E-01	Max	(1)	6.0E-01	Mean-N	(1)
alpha-Chlordane	ug/kg	6.0E+00	N/A	1.1E+01	J	ug/kg	1.1E+01	Max	(1)	6.0E+00	Mean-N	(1)
Aroclor-1248	ug/kg	1.8E+01	N/A	3.7E+01	U	ug/kg	3.7E+01	Max	(1)	1.8E+01	Mean-N	(1)
Aroclor-1260	ug/kg	1.8E+01	N/A	3.7E+01	U	ug/kg	3.7E+01	Max	(1)	1.8E+01	Mean-N	(1)
Dieldrin	ug/kg	1.8E+00	N/A	3.7E+00	U	ug/kg	3.7E+00	Max	(1)	1.8E+00	Mean-N	(1)
gamma-Chlordane	ug/kg	4.0E+00	N/A	7.9E+00	J	ug/kg	7.9E+00	Max	(1)	4.0E+00	Mean-N	(1)
Heptachlor epoxide	ug/kg	1.7E+00	N/A	2.4E+00	J	ug/kg	2.4E+00	Max	(1)	1.7E+00	Mean-N	(1)
Aluminum	mg/kg	6.8E+03	N/A	8.5E+03	J	mg/kg	8.5E+03	Max	(1)	6.8E+03	Mean-N	(1)
Antimony	mg/kg	2.4E-01	N/A	7.2E-01	U	mg/kg	7.2E-01	Max	(1)	2.4E-01	Mean-N	(1)
Arsenic	mg/kg	9.1E-01	N/A	1.5E+00	J	mg/kg	1.5E+00	Max	(1)	9.1E-01	Mean-N	(1)
Cadmium	mg/kg	1.6E+00	N/A	3.1E+00		mg/kg	3.1E+00	Max	(1)	1.6E+00	Mean-N	(1)
Chromium	mg/kg	1.0E+01	N/A	1.5E+01		mg/kg	1.5E+01	Max	(1)	1.0E+01	Mean-N	(1)
Copper	mg/kg	3.5E+01	N/A	7.1E+01	J	mg/kg	7.1E+01	Max	(1)	3.5E+01	Mean-N	(1)
Iron	mg/kg	2.3E+03	N/A	2.5E+03		mg/kg	2.5E+03	Max	(1)	2.3E+03	Mean-N	(1)
Lead	mg/kg	1.4E+01	N/A	2.5E+01		mg/kg	2.5E+01	Max	(1)	1.4E+01	Mean-N	(1)
Mercury	mg/kg	5.0E-02	N/A	5.0E-02	J	mg/kg	5.0E-02	Max	(1)	5.0E-02	Mean-N	(1)
1,2-Dibromoethane	ug/kg	1.3E+02	N/A	5.2E+02	U	ug/kg	5.2E+02	Max	(1)	1.3E+02	Mean-N	(1)
Benzo(a)pyrene	ug/kg	1.0E+03	N/A	3.7E+03	U	ug/kg	3.7E+03	Max	(1)	1.0E+03	Mean-N	(1)
Dibenz(a,h)anthracene	ug/kg	1.0E+03	N/A	3.7E+03	U	ug/kg	3.7E+03	Max	(1)	1.0E+03	Mean-N	(1)
Hexachlorobenzene	ug/kg	1.0E+03	N/A	3.7E+03	U	ug/kg	3.7E+03	Max	(1)	1.0E+03	Mean-N	(1)
n-Nitroso-di-n-propylamine	ug/kg	1.0E+03	N/A	3.7E+03	U	ug/kg	3.7E+03	Max	(1)	1.0E+03	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-
Mean of Normal Data (Mean-N).

(1) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.12.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Emissions from exposed soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
4,4'-DDD	ug/kg	1.8E+00	N/A	3.7E+00	U	ug/kg	3.7E+00	Max	(1)	1.8E+00	Mean-N	(1)
4,4'-DDE	ug/kg	1.8E+00	N/A	3.7E+00	U	ug/kg	3.7E+00	Max	(1)	1.8E+00	Mean-N	(1)
4,4'-DDT	ug/kg	1.8E+00	N/A	3.7E+00	U	ug/kg	3.7E+00	Max	(1)	1.8E+00	Mean-N	(1)
Aldrin	ug/kg	6.0E-01	N/A	3.0E-01	J	ug/kg	3.0E-01	Max	(1)	6.0E-01	Mean-N	(1)
alpha-Chlordane	ug/kg	6.0E+00	N/A	1.1E+01	J	ug/kg	1.1E+01	Max	(1)	6.0E+00	Mean-N	(1)
Aroclor-1248	ug/kg	1.8E+01	N/A	3.7E+01	U	ug/kg	3.7E+01	Max	(1)	1.8E+01	Mean-N	(1)
Aroclor-1260	ug/kg	1.8E+01	N/A	3.7E+01	U	ug/kg	3.7E+01	Max	(1)	1.8E+01	Mean-N	(1)
Dieldrin	ug/kg	1.8E+00	N/A	3.7E+00	U	ug/kg	3.7E+00	Max	(1)	1.8E+00	Mean-N	(1)
gamma-Chlordane	ug/kg	4.0E+00	N/A	7.9E+00	J	ug/kg	7.9E+00	Max	(1)	4.0E+00	Mean-N	(1)
Heptachlor epoxide	ug/kg	1.7E+00	N/A	2.4E+00	J	ug/kg	2.4E+00	Max	(1)	1.7E+00	Mean-N	(1)
Aluminum	mg/kg	6.8E+03	N/A	8.5E+03	J	mg/kg	8.5E+03	Max	(1)	6.8E+03	Mean-N	(1)
Antimony	mg/kg	2.4E-01	N/A	7.2E-01	U	mg/kg	7.2E-01	Max	(1)	2.4E-01	Mean-N	(1)
Arsenic	mg/kg	9.1E-01	N/A	1.5E+00	J	mg/kg	1.5E+00	Max	(1)	9.1E-01	Mean-N	(1)
Cadmium	mg/kg	1.6E+00	N/A	3.1E+00		mg/kg	3.1E+00	Max	(1)	1.6E+00	Mean-N	(1)
Chromium	mg/kg	1.0E+01	N/A	1.5E+01		mg/kg	1.5E+01	Max	(1)	1.0E+01	Mean-N	(1)
Copper	mg/kg	3.5E+01	N/A	7.1E+01	J	mg/kg	7.1E+01	Max	(1)	3.5E+01	Mean-N	(1)
Iron	mg/kg	2.3E+03	N/A	2.5E+03		mg/kg	2.5E+03	Max	(1)	2.3E+03	Mean-N	(1)
Lead	mg/kg	1.4E+01	N/A	2.5E+01		mg/kg	2.5E+01	Max	(1)	1.4E+01	Mean-N	(1)
Mercury	mg/kg	5.0E-02	N/A	5.0E-02	J	mg/kg	5.0E-02	Max	(1)	5.0E-02	Mean-N	(1)
Carbon tetrachloride	ug/kg	1.3E+02	N/A	5.2E+02	U	ug/kg	5.2E+02	Max	(1)	1.3E+02	Mean-N	(1)
Chloroform	ug/kg	1.3E+02	N/A	5.2E+02	U	ug/kg	5.2E+02	Max	(1)	1.3E+02	Mean-N	(1)
cis-1,3-Dichloropropene	ug/kg	1.3E+02	N/A	5.2E+02	U	ug/kg	5.2E+02	Max	(1)	1.3E+02	Mean-N	(1)
trans-1,3-Dichloropropene	ug/kg	1.3E+02	N/A	5.2E+02	U	ug/kg	5.2E+02	Max	(1)	1.3E+02	Mean-N	(1)
Vinyl chloride	ug/kg	1.3E+02	N/A	5.2E+02	U	ug/kg	5.2E+02	Max	(1)	1.3E+02	Mean-N	(1)
bis(2-Chloroethyl)ether	ug/kg	1.0E+03	N/A	3.7E+03	U	ug/kg	3.7E+03	Max	(1)	1.0E+03	Mean-N	(1)
Hexachlorobenzene	ug/kg	1.0E+03	N/A	3.7E+03	U	ug/kg	3.7E+03	Max	(1)	1.0E+03	Mean-N	(1)
Hexachlorocyclopentadiene	ug/kg	1.0E+03	N/A	3.7E+03	U	ug/kg	3.7E+03	Max	(1)	1.0E+03	Mean-N	(1)
n-Nitroso-di-n-propylamine	ug/kg	1.0E+03	N/A	3.7E+03	U	ug/kg	3.7E+03	Max	(1)	1.0E+03	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean
Mean of Normal Data (Mean-N).

(1) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.13.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
4,4'-DDD	µg/L	3.6E-02	N/A	6.6E-03	J	µg/L	6.6E-03	Max	(1)	3.6E-02	Mean-N	(1)
4,4'-DDE	µg/L	4.2E-02	N/A	2.7E-02	J	µg/L	2.7E-02	Max	(1)	4.2E-02	Mean-N	(1)
4,4'-DDT	µg/L	3.7E-02	N/A	1.1E-02	J	µg/L	1.1E-02	Max	(1)	3.7E-02	Mean-N	(1)
Aldrin	µg/L	1.8E-02	N/A	3.0E-03	J	µg/L	3.0E-03	Max	(1)	1.8E-02	Mean-N	(1)
Aroclor-1248	µg/L	8.7E-01	N/A	1.6E+00		µg/L	1.6E+00	Max	(1)	8.7E-01	Mean-N	(1)
Dieldrin	µg/L	3.8E-02	N/A	1.5E-02	J	µg/L	1.5E-02	Max	(1)	3.8E-02	Mean-N	(1)
Mercury	µg/L	8.3E-02	N/A	1.2E-01	J	µg/L	1.2E-01	Max	(1)	8.3E-02	Mean-N	(1)
alpha-Chlordane	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)
Aroclor-1260	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
gamma-Chlordane	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)
Heptachlor epoxide	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)
Aluminum	µg/L	4.5E+02	N/A	7.8E+02		µg/L	7.8E+02	Max	(1)	4.5E+02	Mean-N	(1)
Antimony	µg/L	1.1E+00	N/A	4.9E+00	U	µg/L	4.9E+00	Max	(1)	1.1E+00	Mean-N	(1)
Arsenic	µg/L	1.5E+00	N/A	3.0E+00	U	µg/L	3.0E+00	Max	(1)	1.5E+00	Mean-N	(1)
Cadmium	µg/L	1.0E-01	N/A	1.3E+00	U	µg/L	1.3E+00	Max	(1)	1.0E-01	Mean-N	(1)
Chromium (assumed VI)	µg/L	3.0E-01	N/A	1.2E+00	U	µg/L	1.2E+00	Max	(1)	3.0E-01	Mean-N	(1)
Copper	µg/L	2.4E+00	N/A	6.6E+00	J	µg/L	6.6E+00	Max	(1)	2.4E+00	Mean-N	(1)
Iron	µg/L	1.6E+02	N/A	2.4E+02		µg/L	2.4E+02	Max	(1)	1.6E+02	Mean-N	(1)
Lead	µg/L	1.0E+00	N/A	1.7E+00	J	µg/L	1.7E+00	Max	(1)	1.0E+00	Mean-N	(1)
1,1,2,2-Tetrachloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
1,1,2-Trichloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
1,1-Dichloroethene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
1,2-Dibromoethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
1,2-Dichloroethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
1,2-Dichloropropane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Bromodichloromethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Carbon tetrachloride	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Dibromochloromethane	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Tetrachloroethene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
trans-1,3-Dichloropropene	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)

TABLE 3.13.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
2,4,6-Trichlorophenol	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
2,4-Dinitrotoluene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
2,6-Dinitrotoluene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
2-Chlorophenol	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
3,3'-Dichlorobenzidine	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
4,6-Dinitro-2-methylphenol	µg/L	1.3E+01	N/A	2.5E+01	U	µg/L	2.5E+01	Max	(1)	1.3E+01	Mean-N	(1)
Acenaphthylene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Benzo(a)anthracene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Benzo(a)pyrene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Benzo(b)fluoranthene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Benzo(k)fluoranthene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
bis(2-Chloroethyl)ether	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
bis(2-Ethylhexyl)phthalate	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Carbazole	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Chrysene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Dibenz(a,h)anthracene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Dibenzofuran	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Hexachlorobenzene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Hexachlorobutadiene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Hexachloroethane	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Indeno(1,2,3-cd)pyrene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
n-Nitroso-di-n-propylamine	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
n-Nitrosodiphenylamine	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Naphthalene	µg/L	5.0E+00	N/A	1.0E+01	U	µg/L	1.0E+01	Max	(1)	5.0E+00	Mean-N	(1)
Pentachlorophenol	µg/L	1.3E+01	N/A	2.5E+01	U	µg/L	2.5E+01	Max	(1)	1.3E+01	Mean-N	(1)
alpha-BHC	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)
Aroclor-1016	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Aroclor-1221	µg/L	1.0E+00	N/A	2.1E+00	U	µg/L	2.1E+00	Max	(1)	1.0E+00	Mean-N	(1)
Aroclor-1232	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Aroclor-1242	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
Aroclor-1254	µg/L	5.0E-01	N/A	1.0E+00	U	µg/L	1.0E+00	Max	(1)	5.0E-01	Mean-N	(1)
beta-BHC	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)
delta-BHC	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)

TABLE 3.13.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Heptachlor	µg/L	2.5E-02	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E-02	Mean-N	(1)
Toxaphene	µg/L	2.5E+00	N/A	5.2E-02	U	µg/L	5.2E-02	Max	(1)	2.5E+00	Mean-N	(1)
Thallium	µg/L	1.8E+00	N/A	3.5E+00	U	µg/L	3.5E+00	Max	(1)	1.8E+00	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quatitation limit was used as the sample concentration.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 3.14.UA
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Cherry Point, Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aluminum	mg/kg	5.3E+03	N/A	8.6E+03		mg/kg	8.6E+03	Max	(1)	5.3E+03	Mean-N	(1)
Arsenic	mg/kg	6.4E-01	N/A	1.1E+00	J	mg/kg	1.1E+00	Max	(1)	6.4E-01	Mean-N	(1)
4,4'-DDD	ug/kg	4.4E+00	N/A	6.2E+00		ug/kg	6.2E+00	Max	(1)	4.4E+00	Mean-N	(1)
4,4'-DDE	ug/kg	1.1E+00	N/A	1.6E+00	J	ug/kg	1.6E+00	Max	(1)	1.1E+00	Mean-N	(1)
4,4'-DDT	ug/kg	4.7E+00	N/A	1.1E+01		ug/kg	1.1E+01	Max	(1)	4.7E+00	Mean-N	(1)
Aldrin	ug/kg	1.5E+00	N/A	4.5E+00	U	ug/kg	4.5E+00	Max	(1)	1.5E+00	Mean-N	(1)
alpha-Chlordane	ug/kg	1.3E+01	N/A	3.6E+01	J	ug/kg	3.6E+01	Max	(1)	1.3E+01	Mean-N	(1)
Aroclor-1248	ug/kg	3.1E+01	N/A	9.1E+01	U	ug/kg	9.1E+01	Max	(1)	3.1E+01	Mean-N	(1)
Aroclor-1260	ug/kg	3.1E+01	N/A	9.1E+01	U	ug/kg	9.1E+01	Max	(1)	3.1E+01	Mean-N	(1)
Dieldrin	ug/kg	1.8E+00	N/A	7.0E-01	J	ug/kg	7.0E-01	Max	(1)	1.8E+00	Mean-N	(1)
gamma-Chlordane	ug/kg	1.5E+00	N/A	3.1E+01		ug/kg	3.1E+01	Max	(1)	1.5E+00	Mean-N	(1)
Heptachlor epoxide	ug/kg	1.0E+00	N/A	2.6E+00	J	ug/kg	2.6E+00	Max	(1)	1.0E+00	Mean-N	(1)
Antimony	mg/kg	8.6E-01	N/A	1.3E+00	J	mg/kg	1.3E+00	Max	(1)	8.6E-01	Mean-N	(1)
Cadmium	mg/kg	1.3E+00	N/A	2.8E+00		mg/kg	2.8E+00	Max	(1)	1.3E+00	Mean-N	(1)
Chromium	mg/kg	8.1E+00	N/A	1.2E+01		mg/kg	1.2E+01	Max	(1)	8.1E+00	Mean-N	(1)
Copper	mg/kg	7.4E+00	N/A	1.3E+01		mg/kg	1.3E+01	Max	(1)	7.4E+00	Mean-N	(1)
Iron	mg/kg	2.5E+03	N/A	3.3E+03	J	mg/kg	3.3E+03	Max	(1)	2.5E+03	Mean-N	(1)
Lead	mg/kg	2.2E+01	N/A	3.3E+01		mg/kg	3.3E+01	Max	(1)	2.2E+01	Mean-N	(1)
Mercury	mg/kg	6.3E-02	N/A	7.0E-02	J	mg/kg	7.0E-02	Max	(1)	6.3E-02	Mean-N	(1)
1,2-Dibromoethane	ug/kg	6.5E+00	N/A	1.3E+01	U	ug/kg	1.3E+01	Max	(1)	6.5E+00	Mean-N	(1)
Benzo(a)pyrene	ug/kg	2.3E+02	N/A	4.9E+02	U	ug/kg	4.9E+02	Max	(1)	2.3E+02	Mean-N	(1)
Dibenz(a,h)anthracene	ug/kg	2.3E+02	N/A	4.9E+02	U	ug/kg	4.9E+02	Max	(1)	2.3E+02	Mean-N	(1)
Hexachlorobenzene	ug/kg	2.3E+02	N/A	4.9E+02	U	ug/kg	4.9E+02	Max	(1)	2.3E+02	Mean-N	(1)
n-Nitroso-di-n-propylamine	ug/kg	2.3E+02	N/A	4.9E+02	U	ug/kg	4.9E+02	Max	(1)	2.3E+02	Mean-N	(1)

For duplicate results, the higher value was used in the calculations.
For non-detects, one-half the sample quatitation limit was used as the sample concentration.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Fewer than 10 samples. Therefore, used maximum concentration as RME concentration and arithmetic average as CT concentration.

TABLE 7.1.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	1.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	5.6E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	1.2E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	1.2E-02
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	3.6E-06	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	8.9E-03
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	5.9E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	5.9E-03
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	2.5E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	8.5E-03
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	6.5E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.6E-02
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	3.8E-03	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	6.4E-03
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	3.9E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	2.2E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	4.2E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	8.4E-06
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	2.0E-09	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	6.5E-05
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	4.4E-08	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	8.9E-05
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	4.0E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	7.4E-09	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	1.5E-04
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	4.2E-08	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	8.5E-05
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	5.8E-09	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	4.4E-04
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	5.4E-03
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	8.9E-08	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	8.9E-04

TABLE 7.1.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	5.4E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	1.2E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.2E-02
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.9E-07	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	6.1E-04
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.9E-07	mg/kg-day	2.0E-04	mg/kg-day	N/A	N/A	2.4E-03
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.9E-07	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	9.8E-04
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	1.2E-06	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	4.0E-05
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	8.0E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	2.0E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												8.1E-02

TABLE 7.1.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	9.0E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	6.2E-03	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	6.2E-02
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	1.9E-06	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	2.4E-01
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	3.1E-07	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	3.1E-02
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	1.4E-05	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	2.3E-01
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	3.5E-04	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	2.9E-02
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	2.0E-03	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	2.3E-02
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	6.3E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	3.4E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	6.7E-09	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	1.9E-05
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	1.0E-08	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	6.9E-04
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	9.4E-08	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	3.8E-04
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	3.0E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	3.9E-08	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	1.6E-03
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	9.0E-08	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	3.6E-04
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	3.1E-08	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	3.3E-03
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	2.6E-06	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	2.1E-02
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	4.7E-08	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	5.3E-04

TABLE 7.1.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	8.5E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.6E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	6.3E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	6.3E-02
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	3.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	3.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.6E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	3.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.6E-06	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	6.5E-03
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.6E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	2.6E-02
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	3.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.6E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.6E-06	mg/kg-day	4.9E-04	mg/kg-day	N/A	N/A	5.3E-03
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	1.6E-05	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	5.2E-04
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	5.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	1.0E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												7.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	8.2E-01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.2.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	4.8E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	1.6E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	3.3E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	3.3E-03
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	1.0E-06	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	2.5E-03
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	1.7E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	1.7E-03
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	7.1E-06	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	2.4E-03
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	1.8E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	4.6E-03
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	1.1E-03	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	1.8E-03
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	1.1E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	6.1E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	1.2E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	2.4E-06
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	5.5E-10	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	1.8E-05
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	1.2E-08	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	2.5E-05
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	1.1E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	2.1E-09	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	4.2E-05
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	1.2E-08	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	2.4E-05
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	1.6E-09	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	1.2E-04
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	4.5E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.5E-03
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	2.5E-08	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	2.5E-04

TABLE 7.2.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	1.5E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	3.3E-07	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	3.3E-03
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-07	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	1.7E-04
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-07	mg/kg-day	2.0E-04	mg/kg-day	N/A	N/A	6.8E-04
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-07	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	2.7E-04
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	3.3E-07	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	1.1E-05
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	2.2E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	5.5E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												2.3E-02

TABLE 7.2.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	3.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	2.2E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	1.5E-03	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	1.5E-02
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	4.6E-07	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	5.7E-02
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	7.6E-08	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	7.6E-03
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	3.3E-06	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	5.5E-02
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	8.4E-05	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	7.0E-03
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	4.9E-04	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	5.5E-03
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	1.5E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	8.4E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	1.6E-09	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	4.6E-06
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	2.5E-09	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	1.7E-04
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	2.3E-08	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	9.2E-05
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	7.2E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	9.6E-09	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	3.8E-04
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	2.2E-08	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	8.7E-05
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	7.4E-09	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	7.9E-04
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	6.2E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	5.2E-03
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	1.2E-08	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	1.3E-04

TABLE 7.2.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	2.1E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	1.5E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.5E-02
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	8.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	8.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	8.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.3E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.6E-03
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.3E-07	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	6.3E-03
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	8.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.3E-07	mg/kg-day	4.9E-04	mg/kg-day	N/A	N/A	1.3E-03
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	3.7E-06	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	1.2E-04
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	1.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	2.5E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												1.8E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.0E-01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.3.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	4.36E-18	mg/m^3	R	2.8E-19	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDD	4.02E+00	ug/kg	3.04E-12	mg/m^3	R	2.0E-13	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	1.67E-12	mg/m^3	R	1.1E-13	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	3.25E-12	mg/m^3	R	2.1E-13	mg/kg-day	N/A	N/A	N/A	N/A	
	Aldrin	2.01E+00	ug/kg	1.52E-12	mg/m^3	R	9.9E-14	mg/kg-day	N/A	N/A	N/A	N/A	
	alpha-Chlordane	4.54E+01	ug/kg	3.44E-11	mg/m^3	R	2.2E-12	mg/kg-day	2.0E-04	mg/kg-day	7.0E-04	mg/m^3	1.1E-08
	Aroclor-1248	4.08E+01	ug/kg	3.09E-11	mg/m^3	R	2.0E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	1.74E+02	ug/kg	1.32E-10	mg/m^3	R	8.6E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.60E+00	ug/kg	5.76E-12	mg/m^3	R	3.7E-13	mg/kg-day	N/A	N/A	N/A	N/A	
	gamma-Chlordane	4.33E+01	ug/kg	3.28E-11	mg/m^3	R	2.1E-12	mg/kg-day	2.0E-04	mg/kg-day	7.0E-04	mg/m^3	1.1E-08
	Heptachlor epoxide	5.89E+00	ug/kg	4.47E-12	mg/m^3	R	2.9E-13	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	9.08E-06	mg/m^3	R	5.9E-07	mg/kg-day	1.0E-03	mg/kg-day	5.0E-03	mg/m^3	5.9E-04
	Antimony	3.65E+00	mg/kg	2.76E-09	mg/m^3	R	1.8E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	Arsenic	1.65E+00	mg/kg	1.25E-09	mg/m^3	R	8.1E-11	mg/kg-day	N/A	N/A	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	4.58E-09	mg/m^3	R	3.0E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	Chromium	2.61E+01	mg/kg	1.97E-08	mg/m^3	R	1.3E-09	mg/kg-day	3.0E-05	mg/kg-day	1.0E-04	mg/m^3	4.3E-05
	Copper	6.67E+02	mg/kg	5.05E-07	mg/m^3	R	3.3E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Iron	3.92E+03	mg/kg	2.97E-06	mg/m^3	R	1.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	9.13E-02	mg/kg	6.91E-11	mg/m^3	R	4.5E-12	mg/kg-day	8.6E-05	mg/kg-day	3.0E-04	mg/m^3	5.2E-08
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	2.5E-11	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	2.5E-11	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorocyclopentadiene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	2.5E-11	mg/kg-day	5.7E-05	mg/kg-day	2.0E-04	mg/m^3	4.3E-07
	(Total)												6.3E-04
												Total Hazard Index Across All Exposure Routes/Pathways	6.3E-04

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.4.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	4.36E-18	mg/m^3	R	2.0E-20	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDD	4.02E+00	ug/kg	3.04E-12	mg/m^3	R	1.4E-14	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	1.67E-12	mg/m^3	R	7.6E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	3.25E-12	mg/m^3	R	1.5E-14	mg/kg-day	N/A	N/A	N/A	N/A	
	Aldrin	2.01E+00	ug/kg	1.52E-12	mg/m^3	R	6.9E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	alpha-Chlordane	4.54E+01	ug/kg	3.44E-11	mg/m^3	R	1.6E-13	mg/kg-day	2.0E-04	mg/kg-day	7.0E-04	mg/m^3	7.8E-10
	Aroclor-1248	4.08E+01	ug/kg	3.09E-11	mg/m^3	R	1.4E-13	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	1.74E+02	ug/kg	1.32E-10	mg/m^3	R	6.0E-13	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.60E+00	ug/kg	5.76E-12	mg/m^3	R	2.6E-14	mg/kg-day	N/A	N/A	N/A	N/A	
	gamma-Chlordane	4.33E+01	ug/kg	3.28E-11	mg/m^3	R	1.5E-13	mg/kg-day	2.0E-04	mg/kg-day	7.0E-04	mg/m^3	7.5E-10
	Heptachlor epoxide	5.89E+00	ug/kg	4.47E-12	mg/m^3	R	2.0E-14	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	9.08E-06	mg/m^3	R	4.1E-08	mg/kg-day	1.0E-03	mg/kg-day	5.0E-03	mg/m^3	4.1E-05
	Antimony	3.65E+00	mg/kg	2.76E-09	mg/m^3	R	1.3E-11	mg/kg-day	N/A	N/A	N/A	N/A	
	Arsenic	1.65E+00	mg/kg	1.25E-09	mg/m^3	R	5.7E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	4.58E-09	mg/m^3	R	2.1E-11	mg/kg-day	N/A	N/A	N/A	N/A	
	Chromium	2.61E+01	mg/kg	1.97E-08	mg/m^3	R	9.0E-11	mg/kg-day	3.0E-05	mg/kg-day	1.0E-04	mg/m^3	3.0E-06
	Copper	6.67E+02	mg/kg	5.05E-07	mg/m^3	R	2.3E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Iron	3.92E+03	mg/kg	2.97E-06	mg/m^3	R	1.3E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	9.13E-02	mg/kg	6.91E-11	mg/m^3	R	3.1E-13	mg/kg-day	8.6E-05	mg/kg-day	3.0E-04	mg/m^3	3.7E-09
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	1.7E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	1.7E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorocyclopentadiene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	1.7E-12	mg/kg-day	5.7E-05	mg/kg-day	2.0E-04	mg/m^3	3.0E-08
	(Total)												4.4E-05
												Total Hazard Index Across All Exposure Routes/Pathways	4.4E-05

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.5.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	3.1E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.3E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	5.2E-10	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.0E-06
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	1.4E-10	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	4.7E-06
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	7.5E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	7.0E-10	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	1.4E-05
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	5.6E-09	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	5.6E-05
	alpha-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	2.4E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	4.9E-06
	Aroclor-1260	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	gamma-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	2.4E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	4.9E-06
	Heptachlor epoxide	5.20E-02	µg/L	5.20E-02	µg/L	M	2.4E-09	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	1.9E-04
	Aluminum	7.81E+02	µg/L	7.81E+02	µg/L	M	3.7E-05	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	3.7E-05
	Antimony	4.90E+00	µg/L	4.90E+00	µg/L	M	2.3E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	5.8E-04
	Arsenic	3.00E+00	µg/L	3.00E+00	µg/L	M	1.4E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	4.7E-04
	Cadmium	1.30E+00	µg/L	1.30E+00	µg/L	M	6.1E-08	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.2E-04
	Chromium	1.20E+00	µg/L	1.20E+00	µg/L	M	5.6E-08	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	1.9E-05
	Copper	6.60E+00	µg/L	6.60E+00	µg/L	M	3.1E-07	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	7.7E-06
	Iron	2.42E+02	µg/L	2.42E+02	µg/L	M	1.1E-05	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	1.9E-05
	Lead	1.70E+00	µg/L	1.70E+00	µg/L	M	8.0E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	6.0E-02	mg/kg-day	N/A	N/A	7.8E-07
	1,1,2-Trichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	4.0E-03	mg/kg-day	N/A	N/A	1.2E-05
	1,1-Dichloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	9.0E-03	mg/kg-day	N/A	N/A	5.2E-06

TABLE 7.5.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,2-Dibromoethane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	1,2-Dichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	1.6E-06
	1,2-Dichloropropane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Bromodichloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	2.3E-06
	Carbon tetrachloride	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	7.0E-04	mg/kg-day	N/A	N/A	6.7E-05
	Dibromochloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	2.3E-06
	Tetrachloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	4.7E-06
	trans-1,3-Dichloropropene	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	1.6E-06
	2,4,6-Trichlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	2,4-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	2.3E-04
	2,6-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	4.7E-04
	2-Chlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	5.0E-03	mg/kg-day	N/A	N/A	9.4E-05
	3,3'-Dichlorobenzidine	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	2.50E+01	µg/L	2.50E+01	µg/L	M	1.2E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.2E-02
	Acenaphthylene[3]	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	2.3E-05
	Benzo(a)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(b)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(k)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Ethylhexyl)phthalate	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	2.3E-05
	Carbazole	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Chrysene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenzofuran	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	4.0E-03	mg/kg-day	N/A	N/A	1.2E-04

TABLE 7.5.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Hexachlorobenzene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	5.9E-04
	Hexachlorobutadiene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	2.0E-04	mg/kg-day	N/A	N/A	2.3E-03
	Hexachloroethane	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	4.7E-04
	Indeno(1,2,3-cd)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitrosodiphenylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Naphthalene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	2.3E-05
	Pentachlorophenol	2.50E+01	µg/L	2.50E+01	µg/L	M	1.2E-06	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	3.9E-05
	alpha-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	2.4E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1016	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	6.7E-04
	Aroclor-1221	2.10E+00	µg/L	2.10E+00	µg/L	M	9.9E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1232	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1242	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1254	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	2.0E-05	mg/kg-day	N/A	N/A	2.3E-03
	beta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	2.4E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	delta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	2.4E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Heptachlor	5.20E-02	µg/L	5.20E-02	µg/L	M	2.4E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	4.9E-06
	Toxaphene	5.20E-02	µg/L	5.20E-02	µg/L	M	2.4E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Thallium	3.50E+00	µg/L	3.50E+00	µg/L	M	1.6E-07	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	2.3E-03
	(Total)												2.3E-02

TABLE 7.5.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	1.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	4.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	4.7E-07	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	1.3E-03
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	5.1E-10	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	3.4E-05
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	1.2E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	2.8E-08	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	1.1E-03
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	3.4E-09	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	3.8E-05
	alpha-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	3.9E-07	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	1.6E-03
	Aroclor-1260	1.00E+00	µg/L	1.00E+00	µg/L	M	7.3E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	gamma-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	3.9E-07	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	1.6E-03
	Heptachlor epoxide	5.20E-02	µg/L	5.20E-02	µg/L	M	6.5E-08	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	6.9E-03
	Aluminum	7.81E+02	µg/L	7.81E+02	µg/L	M	2.2E-05	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	2.2E-04
	Antimony	4.90E+00	µg/L	4.90E+00	µg/L	M	1.4E-07	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	1.7E-02
	Arsenic	3.00E+00	µg/L	3.00E+00	µg/L	M	8.5E-08	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	7.0E-04
	Cadmium	1.30E+00	µg/L	1.30E+00	µg/L	M	3.7E-08	mg/kg-day	5.0E-06	mg/kg-day	N/A	N/A	7.3E-03
	Chromium	1.20E+00	µg/L	1.20E+00	µg/L	M	3.4E-08	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	5.6E-04
	Copper	6.60E+00	µg/L	6.60E+00	µg/L	M	1.9E-07	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	1.5E-05
	Iron	2.42E+02	µg/L	2.42E+02	µg/L	M	6.8E-06	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	7.6E-05
	Lead	1.70E+00	µg/L	1.70E+00	µg/L	M	1.9E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	3.1E-07	mg/kg-day	4.2E-02	mg/kg-day	N/A	N/A	7.3E-06
	1,1,2-Trichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	2.7E-07	mg/kg-day	3.2E-03	mg/kg-day	N/A	N/A	8.4E-05
	1,1-Dichloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	4.8E-07	mg/kg-day	9.0E-03	mg/kg-day	N/A	N/A	5.4E-05

TABLE 7.5.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,2-Dibromoethane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.5E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	1,2-Dichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.6E-07	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	5.4E-06
	1,2-Dichloropropane	1.00E+00	µg/L	1.00E+00	µg/L	M	3.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Bromodichloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	2.0E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	9.9E-06
	Carbon tetrachloride	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-07	mg/kg-day	4.6E-04	mg/kg-day	N/A	N/A	1.6E-03
	Dibromochloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.5E-07	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	1.3E-05
	Tetrachloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.5E-06	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	1.5E-04
	trans-1,3-Dichloropropene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-07	mg/kg-day	1.7E-02	mg/kg-day	N/A	N/A	1.0E-05
	2,4,6-Trichlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	1.6E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	2,4-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.4E-06	mg/kg-day	1.7E-03	mg/kg-day	N/A	N/A	8.0E-04
	2,6-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	9.0E-07	mg/kg-day	8.5E-04	mg/kg-day	N/A	N/A	1.1E-03
	2-Chlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	3.5E-06	mg/kg-day	2.5E-03	mg/kg-day	N/A	N/A	1.4E-03
	3,3'-Dichlorobenzidine	1.00E+01	µg/L	1.00E+01	µg/L	M	8.2E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	2.50E+01	µg/L	2.50E+01	µg/L	M	9.2E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	9.2E-02
	Acenaphthylene[3]	1.00E+01	µg/L	1.00E+01	µg/L	M	3.3E-05	mg/kg-day	1.6E-02	mg/kg-day	N/A	N/A	2.1E-03
	Benzo(a)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	5.6E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(b)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	5.7E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(k)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	1.00E+01	µg/L	1.00E+01	µg/L	M	6.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Ethylhexyl)phthalate	1.00E+01	µg/L	1.00E+01	µg/L	M	4.2E-05	mg/kg-day	3.8E-03	mg/kg-day	N/A	N/A	1.1E-02
	Carbazole	1.00E+01	µg/L	1.00E+01	µg/L	M	2.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Chrysene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.6E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenzofuran	1.00E+01	µg/L	1.00E+01	µg/L	M	3.1E-05	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	1.5E-02

TABLE 7.5.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Hexachlorobenzene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-04	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	3.2E-01
	Hexachlorobutadiene	1.00E+01	µg/L	1.00E+01	µg/L	M	6.1E-05	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	6.1E-01
	Hexachloroethane	1.00E+01	µg/L	1.00E+01	µg/L	M	1.8E-05	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	3.6E-02
	Indeno(1,2,3-cd)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.1E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	6.3E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitrosodiphenylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	9.7E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Naphthalene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.0E-05	mg/kg-day	1.6E-02	mg/kg-day	N/A	N/A	1.2E-03
	Pentachlorophenol	2.50E+01	µg/L	2.50E+01	µg/L	M	8.6E-04	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	2.9E-02
	alpha-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	4.6E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1016	1.00E+00	µg/L	1.00E+00	µg/L	M	7.3E-05	mg/kg-day	6.3E-05	mg/kg-day	N/A	N/A	1.2E+00
	Aroclor-1221	2.10E+00	µg/L	2.10E+00	µg/L	M	1.5E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1232	1.00E+00	µg/L	1.00E+00	µg/L	M	7.3E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1242	1.00E+00	µg/L	1.00E+00	µg/L	M	7.3E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1254	1.00E+00	µg/L	1.00E+00	µg/L	M	7.3E-05	mg/kg-day	1.8E-05	mg/kg-day	N/A	N/A	4.1E+00
	beta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	4.6E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	delta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	4.6E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Heptachlor	5.20E-02	µg/L	5.20E-02	µg/L	M	6.5E-08	mg/kg-day	3.6E-04	mg/kg-day	N/A	N/A	1.8E-04
	Toxaphene	5.20E-02	µg/L	5.20E-02	µg/L	M	1.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Thallium	3.50E+00	µg/L	3.50E+00	µg/L	M	9.9E-08	mg/kg-day	1.1E-05	mg/kg-day	N/A	N/A	9.0E-03
	(Total)												6.4E+00
												Total Hazard Index Across All Exposure Routes/Pathways	6.4E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.
(3) RfD for napthalene used as surrogate RfD for acenaphthylene.

Table 7.5.RME.UA Supplement
Calculation of Daevent
Industrial Worker, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
4,4'-DDD	6.60E-03	2.8E-01	7.8E+00	3.7E+01	6.3E+01	8	4.0E-08	2
4,4'-DDE	2.70E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	8	1.4E-07	2
4,4'-DDT	1.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	8	1.3E-07	2
Aldrin	3.00E-03	1.6E-03	1.5E+01	3.6E+01	1.0E-01	8	1.5E-10	2
Aroclor-1248	1.60E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	3.3E-05	2
Dieldrin	1.50E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	8	8.0E-09	2
Mercury	1.20E-01	1.0E-03	N/A	N/A	N/A	8	9.6E-10	1
alpha-Chlordane	5.20E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	1.1E-07	2
Aroclor-1260	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
gamma-Chlordane	5.20E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	1.1E-07	2
Heptachlor epoxide	5.20E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	1.8E-08	2
Aluminum	7.81E+02	1.0E-03	NA	NA	NA	8	6.2E-06	1
Antimony	4.90E+00	1.0E-03	NA	NA	NA	8	3.9E-08	1
Arsenic	3.00E+00	1.0E-03	NA	NA	NA	8	2.4E-08	1
Cadmium	1.30E+00	1.0E-03	NA	NA	NA	8	1.0E-08	1
Chromium	1.20E+00	1.0E-03	NA	NA	NA	8	9.6E-09	1
Copper	6.60E+00	1.0E-03	NA	NA	NA	8	5.3E-08	1
Iron	2.42E+02	1.0E-03	NA	NA	NA	8	1.9E-06	1
Lead	1.70E+00	4.0E-06	N/A	N/A	N/A	8	5.4E-11	1
1,1,2,2-Tetrachloroethane	1.00E+00	9.0E-03	9.2E-01	2.2E+00	2.5E-02	8	8.8E-08	3
1,1,2-Trichloroethane	1.00E+00	8.4E-03	5.7E-01	1.4E+00	1.1E-02	8	7.6E-08	3
1,1-Dichloroethene	1.00E+00	1.6E-02	3.4E-01	8.2E-01	1.3E-02	8	1.4E-07	3
1,2-Dibromoethane	1.00E+00	2.0E-04	1.3E+00	3.0E+00	1.3E-04	8	2.1E-09	3
1,2-Dichloroethane	1.00E+00	5.3E-03	3.5E-01	8.4E-01	3.0E-03	8	4.6E-08	3
1,2-Dichloropropane	1.00E+00	1.0E-02	4.3E-01	1.0E+00	1.0E-02	8	8.8E-08	3
Bromodichloromethane	1.00E+00	5.8E-03	8.7E-01	2.1E+00	1.2E-02	8	5.6E-08	3
Carbon tetrachloride	1.00E+00	2.2E-02	7.6E-01	1.8E+00	6.8E-02	8	2.0E-07	3
Dibromochloromethane	1.00E+00	3.9E-03	1.6E+00	3.9E+00	1.7E-02	8	4.4E-08	3
Tetrachloroethene	1.00E+00	4.8E-02	9.0E-01	4.3E+00	2.5E-01	8	4.3E-07	3
trans-1,3-Dichloropropene	1.00E+00	5.5E-03	4.2E-01	1.0E+00	4.0E-03	8	4.8E-08	3
2,4,6-Trichlorophenol	1.00E+01	5.0E-02	1.4E+00	9.2E+00	4.9E-01	8	4.6E-06	2
2,4-Dinitrotoluene	1.00E+01	3.8E-03	1.1E+00	2.7E+00	9.5E-03	8	3.9E-07	3
2,6-Dinitrotoluene	1.00E+01	2.5E-03	1.1E+00	2.7E+00	5.2E-03	8	2.5E-07	3
2-Chlorophenol	1.00E+01	1.1E-02	5.3E-01	1.3E+00	1.4E-02	8	9.9E-07	3
3,3'-Dichlorobenzidine	1.00E+01	1.7E-02	3.1E+00	1.7E+01	NA	8	2.3E-06	2
4,6-Dinitro-2-methylphenol	2.50E+01	9.8E-03	1.4E+00	3.4E+00	5.0E-02	8	2.6E-06	3
Acenaphthylene	1.00E+01	1.3E-01	7.4E-01	5.8E+00	7.9E-01	8	9.4E-06	3
Benzo(a)anthracene	1.00E+01	8.1E-01	2.2E+00	1.0E+01	4.6E+01	8	9.4E-05	2
Benzo(a)pyrene	1.00E+01	1.2E+00	2.9E+00	1.4E+01	1.3E+02	8	1.6E-04	2
Benzo(b)fluoranthene	1.00E+01	1.2E+00	3.0E+00	1.4E+01	1.3E+02	8	1.6E-04	2
Benzo(k)fluoranthene	1.00E+01	2.8E+00	3.0E+00	1.4E+01	1.2E+02	8	3.8E-04	2
bis(2-Chloroethyl)ether	1.00E+01	2.1E-03	6.5E-01	1.6E+00	1.9E-03	8	2.0E-07	3
bis(2-Ethylhexyl)phthalate	1.00E+01	3.3E-02	2.1E+01	1.0E+02	1.3E+01	8	1.2E-05	2
Carbazole	1.00E+01	8.0E-02	9.2E-01	6.2E+00	5.2E-01	8	6.7E-06	3
Chrysene	1.00E+01	8.1E-01	2.2E+00	1.0E+01	4.6E+01	8	9.4E-05	2
Dibenz(a,h)anthracene	1.00E+01	2.7E+00	4.4E+00	2.1E+01	6.9E+02	8	4.4E-04	2
Dibenzofuran	1.00E+01	1.1E-01	9.3E-01	7.3E+00	8.1E-01	8	8.7E-06	3

Table 7.5.RME.UA Supplement
Calculation of Daevent
Industrial Worker, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm²-event)	Eq
Hexachlorobenzene	1.00E+01	2.1E-01	4.8E+00	2.3E+01	2.0E+01	8	3.6E-05	2
Hexachlorobutadiene	1.00E+01	1.2E-01	3.4E+00	1.7E+01	6.0E+00	8	1.7E-05	2
Hexachloroethane	1.00E+01	4.2E-02	2.4E+00	1.9E+01	8.5E-01	8	5.1E-06	2
Indeno(1,2,3-cd)pyrene	1.00E+01	1.9E+00	4.2E+00	2.0E+01	3.8E+02	8	3.0E-04	2
n-Nitroso-di-n-propylamine	1.00E+01	3.1E-04	5.4E-01	1.0E-04	1.3E+00	8	1.8E-08	3
n-Nitrosodiphenylamine	1.00E+01	3.6E-02	5.3E-01	7.6E+00	3.2E-01	8	2.7E-06	3
Naphthalene	1.00E+01	6.9E-02	5.3E-01	2.2E+00	2.0E-01	8	5.6E-06	3
Pentachlorophenol	2.50E+01	6.5E-01	3.7E+00	1.7E+01	7.2E+01	8	2.4E-04	2
alpha-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	1.3E-08	2
Aroclor-1016	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1221	2.10E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	4.4E-05	2
Aroclor-1232	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1242	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1254	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
beta-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	1.3E-08	2
delta-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	1.3E-08	2
Heptachlor	5.20E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	1.8E-08	2
Toxaphene	5.20E-02	1.5E-02	2.9E+01	1.4E+02	6.6E+00	8	3.3E-08	2
Thallium	3.50E+00	1.0E-03	NA	NA	NA	8	2.8E-08	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CSW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CSW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CSW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

TABLE 7.6.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	4.7E-10	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.9E-09	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	7.8E-10	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.6E-06
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	2.1E-10	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	7.1E-06
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	1.1E-07	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	1.1E-09	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	2.1E-05
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	8.5E-09	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	8.5E-05
	alpha-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	3.7E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	7.4E-06
	Aroclor-1260	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	gamma-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	3.7E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	7.4E-06
	Heptachlor epoxide	5.20E-02	µg/L	5.20E-02	µg/L	M	3.7E-09	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	2.8E-04
	Aluminum	7.81E+02	µg/L	7.81E+02	µg/L	M	5.6E-05	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	5.6E-05
	Antimony	4.90E+00	µg/L	4.90E+00	µg/L	M	3.5E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	8.7E-04
	Arsenic	3.00E+00	µg/L	3.00E+00	µg/L	M	2.1E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	7.1E-04
	Cadmium	1.30E+00	µg/L	1.30E+00	µg/L	M	9.3E-08	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.9E-04
	Chromium	1.20E+00	µg/L	1.20E+00	µg/L	M	8.5E-08	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	2.8E-05
	Copper	6.60E+00	µg/L	6.60E+00	µg/L	M	4.7E-07	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.2E-05
	Iron	2.42E+02	µg/L	2.42E+02	µg/L	M	1.7E-05	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	2.9E-05
	Lead	1.70E+00	µg/L	1.70E+00	µg/L	M	1.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	6.0E-02	mg/kg-day	N/A	N/A	1.2E-06
	1,1,2-Trichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	4.0E-03	mg/kg-day	N/A	N/A	1.8E-05
	1,1-Dichloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	9.0E-03	mg/kg-day	N/A	N/A	7.9E-06

TABLE 7.6.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,2-Dibromoethane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	1,2-Dichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	2.4E-06
	1,2-Dichloropropane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Bromodichloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	3.6E-06
	Carbon tetrachloride	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	7.0E-04	mg/kg-day	N/A	N/A	1.0E-04
	Dibromochloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	3.6E-06
	Tetrachloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	7.1E-06
	trans-1,3-Dichloropropene	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	2.4E-06
	2,4,6-Trichlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	2,4-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	3.6E-04
	2,6-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	7.1E-04
	2-Chlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	5.0E-03	mg/kg-day	N/A	N/A	1.4E-04
	3,3'-Dichlorobenzidine	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	2.50E+01	µg/L	2.50E+01	µg/L	M	1.8E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.8E-02
	Acenaphthylene[3]	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	3.6E-05
	Benzo(a)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(b)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(k)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Ethylhexyl)phthalate	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	3.6E-05
	Carbazole	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Chrysene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenzofuran	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	4.0E-03	mg/kg-day	N/A	N/A	1.8E-04

TABLE 7.6.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Hexachlorobenzene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	8.9E-04
	Hexachlorobutadiene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	2.0E-04	mg/kg-day	N/A	N/A	3.6E-03
	Hexachloroethane	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	7.1E-04
	Indeno(1,2,3-cd)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitrosodiphenylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Naphthalene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	3.6E-05
	Pentachlorophenol	2.50E+01	µg/L	2.50E+01	µg/L	M	1.8E-06	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	5.9E-05
	alpha-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	3.7E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1016	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	1.0E-03
	Aroclor-1221	2.10E+00	µg/L	2.10E+00	µg/L	M	1.5E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1232	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1242	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1254	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	2.0E-05	mg/kg-day	N/A	N/A	3.6E-03
	beta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	3.7E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	delta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	3.7E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Heptachlor	5.20E-02	µg/L	5.20E-02	µg/L	M	3.7E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	7.4E-06
	Toxaphene	5.20E-02	µg/L	5.20E-02	µg/L	M	3.7E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Thallium	3.50E+00	µg/L	3.50E+00	µg/L	M	2.5E-07	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	3.6E-03
	(Total)												3.5E-02

TABLE 7.6.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	3.5E-07	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.2E-06	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.1E-06	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	3.3E-03
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	1.2E-09	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	8.3E-05
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	2.9E-04	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	6.8E-08	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	2.7E-03
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	4.7E-09	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	5.2E-05
	alpha-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	9.6E-07	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	3.8E-03
	Aroclor-1260	1.00E+00	µg/L	1.00E+00	µg/L	M	1.8E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	gamma-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	9.6E-07	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	3.8E-03
	Heptachlor epoxide	5.20E-02	µg/L	5.20E-02	µg/L	M	1.6E-07	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	1.7E-02
	Aluminum	7.81E+02	µg/L	7.81E+02	µg/L	M	3.1E-05	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	3.1E-04
	Antimony	4.90E+00	µg/L	4.90E+00	µg/L	M	1.9E-07	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	2.4E-02
	Arsenic	3.00E+00	µg/L	3.00E+00	µg/L	M	1.2E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	9.8E-04
	Cadmium	1.30E+00	µg/L	1.30E+00	µg/L	M	5.1E-08	mg/kg-day	5.0E-06	mg/kg-day	N/A	N/A	1.0E-02
	Chromium	1.20E+00	µg/L	1.20E+00	µg/L	M	4.7E-08	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	7.8E-04
	Copper	6.60E+00	µg/L	6.60E+00	µg/L	M	2.6E-07	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	2.2E-05
	Iron	2.42E+02	µg/L	2.42E+02	µg/L	M	9.5E-06	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	1.1E-04
	Lead	1.70E+00	µg/L	1.70E+00	µg/L	M	2.7E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	6.1E-07	mg/kg-day	4.2E-02	mg/kg-day	N/A	N/A	1.4E-05
	1,1,2-Trichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-07	mg/kg-day	3.2E-03	mg/kg-day	N/A	N/A	1.5E-04

TABLE 7.6.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,1-Dichloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	7.9E-07	mg/kg-day	9.0E-03	mg/kg-day	N/A	N/A	8.7E-05
	1,2-Dibromoethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.5E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	1,2-Dichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	2.6E-07	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	8.8E-06
	1,2-Dichloropropane	1.00E+00	µg/L	1.00E+00	µg/L	M	5.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Bromodichloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	3.8E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.9E-05
	Carbon tetrachloride	1.00E+00	µg/L	1.00E+00	µg/L	M	1.4E-06	mg/kg-day	4.6E-04	mg/kg-day	N/A	N/A	3.0E-03
	Dibromochloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	3.3E-07	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	2.8E-05
	Tetrachloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	3.1E-06	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	3.1E-04
	trans-1,3-Dichloropropene	1.00E+00	µg/L	1.00E+00	µg/L	M	2.8E-07	mg/kg-day	1.7E-02	mg/kg-day	N/A	N/A	1.7E-05
	2,4,6-Trichlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	4.0E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	2,4-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.7E-06	mg/kg-day	1.7E-03	mg/kg-day	N/A	N/A	1.6E-03
	2,6-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.8E-06	mg/kg-day	8.5E-04	mg/kg-day	N/A	N/A	2.1E-03
	2-Chlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	6.1E-06	mg/kg-day	2.5E-03	mg/kg-day	N/A	N/A	2.4E-03
	3,3'-Dichlorobenzidine	1.00E+01	µg/L	1.00E+01	µg/L	M	2.0E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	2.50E+01	µg/L	2.50E+01	µg/L	M	1.9E-05	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.9E-01
	Acenaphthylene[3]	1.00E+01	µg/L	1.00E+01	µg/L	M	7.5E-05	mg/kg-day	1.6E-02	mg/kg-day	N/A	N/A	4.7E-03
	Benzo(a)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	8.1E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.4E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(b)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.4E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(k)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.3E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	1.00E+01	µg/L	1.00E+01	µg/L	M	1.2E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Ethylhexyl)phthalate	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-04	mg/kg-day	3.8E-03	mg/kg-day	N/A	N/A	2.7E-02
	Carbazole	1.00E+01	µg/L	1.00E+01	µg/L	M	5.2E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Chrysene	1.00E+01	µg/L	1.00E+01	µg/L	M	8.1E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.8E-03	mg/kg-day	N/A	N/A	N/A	N/A	

TABLE 7.6.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Dibenzofuran	1.00E+01	µg/L	1.00E+01	µg/L	M	7.1E-05	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	3.6E-02
	Hexachlorobenzene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.1E-04	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	7.7E-01
	Hexachlorobutadiene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.5E-04	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.5E+00
	Hexachloroethane	1.00E+01	µg/L	1.00E+01	µg/L	M	4.4E-05	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	8.7E-02
	Indeno(1,2,3-cd)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.6E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.6E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitrosodiphenylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.8E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Naphthalene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.7E-05	mg/kg-day	1.6E-02	mg/kg-day	N/A	N/A	2.3E-03
	Pentachlorophenol	2.50E+01	µg/L	2.50E+01	µg/L	M	2.1E-03	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	7.0E-02
	alpha-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1016	1.00E+00	µg/L	1.00E+00	µg/L	M	1.8E-04	mg/kg-day	6.3E-05	mg/kg-day	N/A	N/A	2.8E+00
	Aroclor-1221	2.10E+00	µg/L	2.10E+00	µg/L	M	3.7E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1232	1.00E+00	µg/L	1.00E+00	µg/L	M	1.8E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1242	1.00E+00	µg/L	1.00E+00	µg/L	M	1.8E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1254	1.00E+00	µg/L	1.00E+00	µg/L	M	1.8E-04	mg/kg-day	1.8E-05	mg/kg-day	N/A	N/A	9.9E+00
	beta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	delta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Heptachlor	5.20E-02	µg/L	5.20E-02	µg/L	M	1.6E-07	mg/kg-day	3.6E-04	mg/kg-day	N/A	N/A	4.4E-04
	Toxaphene	5.20E-02	µg/L	5.20E-02	µg/L	M	2.8E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Thallium	3.50E+00	µg/L	3.50E+00	µg/L	M	1.4E-07	mg/kg-day	1.1E-05	mg/kg-day	N/A	N/A	1.2E-02
	(Total)												1.6E+01
												Total Hazard Index Across All Exposure Routes/Pathways	1.6E+01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.
(3) RfD for napthalene used as surrogate RfD for acenaphthylene.

Table 7.6.RME.UA Supplement
Calculation of DAevent
Trespasser/Visitor, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
4,4'-DDD	6.60E-03	2.8E-01	7.8E+00	3.7E+01	6.3E+01	2.6	2.3E-08	2
4,4'-DDE	2.70E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	2.6	8.0E-08	2
4,4'-DDT	1.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	2.6	7.6E-08	2
Aldrin	3.00E-03	1.6E-03	1.5E+01	3.6E+01	1.0E-01	2.6	8.3E-11	2
Aroclor-1248	1.60E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.9E-05	2
Dieldrin	1.50E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	2.6	4.5E-09	2
Mercury	1.20E-01	1.0E-03	N/A	N/A	N/A	2.6	3.1E-10	1
alpha-Chlordane	5.20E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	2.6	6.4E-08	2
Aroclor-1260	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.2E-05	2
gamma-Chlordane	5.20E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	2.6	6.4E-08	2
Heptachlor epoxide	5.20E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	2.6	1.1E-08	2
Aluminum	7.81E+02	1.0E-03	NA	NA	NA	2.6	2.0E-06	1
Antimony	4.90E+00	1.0E-03	NA	NA	NA	2.6	1.3E-08	1
Arsenic	3.00E+00	1.0E-03	NA	NA	NA	2.6	7.8E-09	1
Cadmium	1.30E+00	1.0E-03	NA	NA	NA	2.6	3.4E-09	1
Chromium	1.20E+00	1.0E-03	NA	NA	NA	2.6	3.1E-09	1
Copper	6.60E+00	1.0E-03	NA	NA	NA	2.6	1.7E-08	1
Iron	2.42E+02	1.0E-03	NA	NA	NA	2.6	6.3E-07	1
Lead	1.70E+00	4.0E-06	N/A	N/A	N/A	2.6	1.8E-11	1
1,1,2,2-Tetrachloroethane	1.00E+00	9.0E-03	9.2E-01	2.2E+00	2.5E-02	2.6	4.0E-08	3
1,1,2-Trichloroethane	1.00E+00	8.4E-03	5.7E-01	1.4E+00	1.1E-02	2.6	3.1E-08	3
1,1-Dichloroethene	1.00E+00	1.6E-02	3.4E-01	8.2E-01	1.3E-02	2.6	5.2E-08	3
1,2-Dibromoethane	1.00E+00	2.0E-04	1.3E+00	3.0E+00	1.3E-04	2.6	1.0E-09	2
1,2-Dichloroethane	1.00E+00	5.3E-03	3.5E-01	8.4E-01	3.0E-03	2.6	1.7E-08	3
1,2-Dichloropropane	1.00E+00	1.0E-02	4.3E-01	1.0E+00	1.0E-02	2.6	3.5E-08	3
Bromodichloromethane	1.00E+00	5.8E-03	8.7E-01	2.1E+00	1.2E-02	2.6	2.5E-08	3
Carbon tetrachloride	1.00E+00	2.2E-02	7.6E-01	1.8E+00	6.8E-02	2.6	9.1E-08	3
Dibromochloromethane	1.00E+00	3.9E-03	1.6E+00	3.9E+00	1.7E-02	2.6	2.2E-08	2
Tetrachloroethene	1.00E+00	4.8E-02	9.0E-01	4.3E+00	2.5E-01	2.6	2.0E-07	2
trans-1,3-Dichloropropene	1.00E+00	5.5E-03	4.2E-01	1.0E+00	4.0E-03	2.6	1.9E-08	3
2,4,6-Trichlorophenol	1.00E+01	5.0E-02	1.4E+00	9.2E+00	4.9E-01	2.6	2.6E-06	2
2,4-Dinitrotoluene	1.00E+01	3.8E-03	1.1E+00	2.7E+00	9.5E-03	2.6	1.8E-07	2
2,6-Dinitrotoluene	1.00E+01	2.5E-03	1.1E+00	2.7E+00	5.2E-03	2.6	1.2E-07	2
2-Chlorophenol	1.00E+01	1.1E-02	5.3E-01	1.3E+00	1.4E-02	2.6	4.0E-07	3
3,3'-Dichlorobenzidine	1.00E+01	1.7E-02	3.1E+00	1.7E+01	NA	2.6	1.3E-06	2
4,6-Dinitro-2-methylphenol	2.50E+01	9.8E-03	1.4E+00	3.4E+00	5.0E-02	2.6	1.3E-06	2
Acenaphthylene	1.00E+01	1.3E-01	7.4E-01	5.8E+00	7.9E-01	2.6	5.0E-06	2
Benzo(a)anthracene	1.00E+01	8.1E-01	2.2E+00	1.0E+01	4.6E+01	2.6	5.4E-05	2
Benzo(a)pyrene	1.00E+01	1.2E+00	2.9E+00	1.4E+01	1.3E+02	2.6	9.1E-05	2
Benzo(b)fluoranthene	1.00E+01	1.2E+00	3.0E+00	1.4E+01	1.3E+02	2.6	9.3E-05	2
Benzo(k)fluoranthene	1.00E+01	2.8E+00	3.0E+00	1.4E+01	1.2E+02	2.6	2.2E-04	2
bis(2-Chloroethyl)ether	1.00E+01	2.1E-03	6.5E-01	1.6E+00	1.9E-03	2.6	8.2E-08	3
bis(2-Ethylhexyl)phthalate	1.00E+01	3.3E-02	2.1E+01	1.0E+02	1.3E+01	2.6	6.7E-06	2
Carbazole	1.00E+01	8.0E-02	9.2E-01	6.2E+00	5.2E-01	2.6	3.4E-06	2
Chrysene	1.00E+01	8.1E-01	2.2E+00	1.0E+01	4.6E+01	2.6	5.4E-05	2
Dibenz(a,h)anthracene	1.00E+01	2.7E+00	4.4E+00	2.1E+01	6.9E+02	2.6	2.5E-04	2
Dibenzofuran	1.00E+01	1.1E-01	9.3E-01	7.3E+00	8.1E-01	2.6	4.7E-06	2
Hexachlorobenzene	1.00E+01	2.1E-01	4.8E+00	2.3E+01	2.0E+01	2.6	2.1E-05	2

Table 7.6.RME.UA Supplement
Calculation of DAevent
Trespasser/Visitor, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
Hexachlorobutadiene	1.00E+01	1.2E-01	3.4E+00	1.7E+01	6.0E+00	2.6	9.9E-06	2
Hexachloroethane	1.00E+01	4.2E-02	2.4E+00	1.9E+01	8.5E-01	2.6	2.9E-06	2
Indeno(1,2,3-cd)pyrene	1.00E+01	1.9E+00	4.2E+00	2.0E+01	3.8E+02	2.6	1.7E-04	2
n-Nitroso-di-n-propylamine	1.00E+01	3.1E-04	5.4E-01	1.0E-04	1.3E+00	2.6	1.1E-08	3
n-Nitrosodiphenylamine	1.00E+01	3.6E-02	5.3E-01	7.6E+00	3.2E-01	2.6	1.2E-06	2
Naphthalene	1.00E+01	6.9E-02	5.3E-01	2.2E+00	2.0E-01	2.6	2.5E-06	3
Pentachlorophenol	2.50E+01	6.5E-01	3.7E+00	1.7E+01	7.2E+01	2.6	1.4E-04	2
alpha-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	2.6	7.4E-09	2
Aroclor-1016	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.2E-05	2
Aroclor-1221	2.10E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	2.5E-05	2
Aroclor-1232	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.2E-05	2
Aroclor-1242	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.2E-05	2
Aroclor-1254	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.2E-05	2
beta-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	2.6	7.4E-09	2
delta-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	2.6	7.4E-09	2
Heptachlor	5.20E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	2.6	1.1E-08	2
Toxaphene	5.20E-02	1.5E-02	2.9E+01	1.4E+02	6.6E+00	2.6	1.9E-08	2
Thallium	3.50E+00	1.0E-03	NA	NA	NA	2.6	9.1E-09	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CSW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CSW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CSW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

TABLE 7.7.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake Non-Cancer	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	5.1E-04	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	5.1E-04
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	6.5E-08	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.2E-04
	4,4'-DDD	6.20E+00	ug/kg	6.20E+00	ug/kg	M	3.6E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	1.60E+00	ug/kg	1.60E+00	ug/kg	M	9.4E-11	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E+01	ug/kg	1.10E+01	ug/kg	M	6.5E-10	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.3E-06
	Aldrin	4.50E+00	ug/kg	4.50E+00	ug/kg	M	2.6E-10	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	8.8E-06
	alpha-Chlordane	3.60E+01	ug/kg	3.60E+01	ug/kg	M	2.1E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	4.2E-06
	Aroclor-1248	9.10E+01	ug/kg	9.10E+01	ug/kg	M	5.3E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	9.10E+01	ug/kg	9.10E+01	ug/kg	M	5.3E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.00E-01	ug/kg	7.00E-01	ug/kg	M	4.1E-11	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	8.2E-07
	gamma-Chlordane	3.10E+01	ug/kg	3.10E+01	ug/kg	M	1.8E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	3.6E-06
	Heptachlor epoxide	2.60E+00	ug/kg	2.60E+00	ug/kg	M	1.5E-10	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	1.2E-05
	Antimony	1.30E+00	mg/kg	1.30E+00	mg/kg	M	7.6E-08	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.9E-04
	Cadmium	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.6E-07	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	1.6E-04
	Chromium	1.16E+01	mg/kg	1.16E+01	mg/kg	M	6.8E-07	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	2.3E-04
	Copper	1.26E+01	mg/kg	1.26E+01	mg/kg	M	7.4E-07	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.8E-05
	Iron	3.34E+03	mg/kg	3.34E+03	mg/kg	M	2.0E-04	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	3.3E-04
	Lead	3.26E+01	mg/kg	3.26E+01	mg/kg	M	1.9E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	7.00E-02	mg/kg	7.00E-02	mg/kg	M	4.1E-09	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	4.1E-05

TABLE 7.7.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake Non-Cancer	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,2-Dibromoethane	1.30E+01	ug/kg	1.30E+01	ug/kg	M	7.6E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	2.9E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	2.9E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	2.9E-08	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	3.6E-05
	n-Nitroso-di-n-propylamine	4.90E+02	ug/kg	4.90E+02	ug/kg	M	2.9E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												1.8E-03
Dermal	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	2.7E-04	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	2.7E-03
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.0E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	8.6E-04
	4,4'-DDD	6.20E+00	ug/kg	6.20E+00	ug/kg	M	5.8E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	1.60E+00	ug/kg	1.60E+00	ug/kg	M	1.5E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E+01	ug/kg	1.10E+01	ug/kg	M	1.0E-09	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	2.9E-06
	Aldrin	4.50E+00	ug/kg	4.50E+00	ug/kg	M	1.4E-09	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	9.3E-05
	alpha-Chlordane	3.60E+01	ug/kg	3.60E+01	ug/kg	M	4.5E-09	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	1.8E-05
	Aroclor-1248	9.10E+01	ug/kg	9.10E+01	ug/kg	M	4.0E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	9.10E+01	ug/kg	9.10E+01	ug/kg	M	4.0E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.00E-01	ug/kg	7.00E-01	ug/kg	M	2.2E-10	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	8.7E-06
	gamma-Chlordane	3.10E+01	ug/kg	3.10E+01	ug/kg	M	3.9E-09	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	1.5E-05
	Heptachlor epoxide	2.60E+00	ug/kg	2.60E+00	ug/kg	M	8.1E-10	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	8.6E-05

TABLE 7.7.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake Non-Cancer	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Antimony	1.30E+00	mg/kg	1.30E+00	mg/kg	M	4.0E-08	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	5.1E-03
	Cadmium	2.80E+00	mg/kg	2.80E+00	mg/kg	M	8.7E-09	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	8.7E-04
	Chromium	1.16E+01	mg/kg	1.16E+01	mg/kg	M	3.6E-07	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	6.0E-03
	Copper	1.26E+01	mg/kg	1.26E+01	mg/kg	M	3.9E-07	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	3.3E-05
	Iron	3.34E+03	mg/kg	3.34E+03	mg/kg	M	1.0E-04	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	1.2E-03
	Lead	3.26E+01	mg/kg	3.26E+01	mg/kg	M	1.0E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	7.00E-02	mg/kg	7.00E-02	mg/kg	M	2.2E-09	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	2.4E-05
	1,2-Dibromoethane	1.30E+01	ug/kg	1.30E+01	ug/kg	M	1.2E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	2.0E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	2.0E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.5E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	3.8E-04
	n-Nitroso-di-n-propylamine	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.5E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												1.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.9E-02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.8.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake Non-Cancer	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	2.4E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	2.4E-03
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	3.0E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.0E-03
	4,4'-DDD	6.20E+00	ug/kg	6.20E+00	ug/kg	M	1.7E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	1.60E+00	ug/kg	1.60E+00	ug/kg	M	4.4E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E+01	ug/kg	1.10E+01	ug/kg	M	3.0E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	6.0E-06
	Aldrin	4.50E+00	ug/kg	4.50E+00	ug/kg	M	1.2E-09	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	4.1E-05
	alpha-Chlordane	3.60E+01	ug/kg	3.60E+01	ug/kg	M	9.9E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	2.0E-05
	Aroclor-1248	9.10E+01	ug/kg	9.10E+01	ug/kg	M	2.5E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	9.10E+01	ug/kg	9.10E+01	ug/kg	M	2.5E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.00E-01	ug/kg	7.00E-01	ug/kg	M	1.9E-10	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	3.8E-06
	gamma-Chlordane	3.10E+01	ug/kg	3.10E+01	ug/kg	M	8.5E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.7E-05
	Heptachlor epoxide	2.60E+00	ug/kg	2.60E+00	ug/kg	M	7.1E-10	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	5.5E-05
	Antimony	1.30E+00	mg/kg	1.30E+00	mg/kg	M	3.6E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	8.9E-04
	Cadmium	2.80E+00	mg/kg	2.80E+00	mg/kg	M	7.7E-07	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	7.7E-04
	Chromium	1.16E+01	mg/kg	1.16E+01	mg/kg	M	3.2E-06	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	1.1E-03
	Copper	1.26E+01	mg/kg	1.26E+01	mg/kg	M	3.5E-06	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	8.6E-05
	Iron	3.34E+03	mg/kg	3.34E+03	mg/kg	M	9.2E-04	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	1.5E-03
	Lead	3.26E+01	mg/kg	3.26E+01	mg/kg	M	8.9E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	7.00E-02	mg/kg	7.00E-02	mg/kg	M	1.9E-08	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.9E-04

TABLE 7.8.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake Non-Cancer	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,2-Dibromoethane	1.30E+01	ug/kg	1.30E+01	ug/kg	M	3.6E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.3E-07	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	1.7E-04
	n-Nitroso-di-n-propylamine	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												8.2E-03
Dermal	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	1.3E-03	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	1.3E-02
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	5.0E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	4.1E-03
	4,4'-DDD	6.20E+00	ug/kg	6.20E+00	ug/kg	M	2.8E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	1.60E+00	ug/kg	1.60E+00	ug/kg	M	7.2E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E+01	ug/kg	1.10E+01	ug/kg	M	5.0E-09	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	1.4E-05
	Aldrin	4.50E+00	ug/kg	4.50E+00	ug/kg	M	6.8E-09	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	4.5E-04
	alpha-Chlordane	3.60E+01	ug/kg	3.60E+01	ug/kg	M	2.2E-08	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	8.7E-05
	Aroclor-1248	9.10E+01	ug/kg	9.10E+01	ug/kg	M	1.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	9.10E+01	ug/kg	9.10E+01	ug/kg	M	1.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.00E-01	ug/kg	7.00E-01	ug/kg	M	1.1E-09	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	4.2E-05
	gamma-Chlordane	3.10E+01	ug/kg	3.10E+01	ug/kg	M	1.9E-08	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	7.5E-05
	Heptachlor epoxide	2.60E+00	ug/kg	2.60E+00	ug/kg	M	3.9E-09	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	4.2E-04

TABLE 7.8.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake Non-Cancer	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Antimony	1.30E+00	mg/kg	1.30E+00	mg/kg	M	2.0E-07	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	2.4E-02
	Cadmium	2.80E+00	mg/kg	2.80E+00	mg/kg	M	4.2E-08	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	4.2E-03
	Chromium	1.16E+01	mg/kg	1.16E+01	mg/kg	M	1.7E-06	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	2.9E-02
	Copper	1.26E+01	mg/kg	1.26E+01	mg/kg	M	1.9E-06	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	1.6E-04
	Iron	3.34E+03	mg/kg	3.34E+03	mg/kg	M	5.0E-04	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	5.6E-03
	Lead	3.26E+01	mg/kg	3.26E+01	mg/kg	M	4.9E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	7.00E-02	mg/kg	7.00E-02	mg/kg	M	1.1E-08	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	1.2E-04
	1,2-Dibromoethane	1.30E+01	ug/kg	1.30E+01	ug/kg	M	5.9E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	9.6E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	9.6E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	7.4E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.8E-03
	n-Nitroso-di-n-propylamine	4.90E+02	ug/kg	4.90E+02	ug/kg	M	7.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												8.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	9.2E-02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.9.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	1.5E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	3.1E-03
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	1.6E-05	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	9.1E-07	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	1.8E-02
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	8.4E-07	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.7E-03
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	1.1E-06	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	8.8E-02
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	6.0E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	6.0E-02
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	2.5E-04	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	8.4E-01
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	1.5E-04	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	4.9E-02
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	4.2E-01	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	7.0E-01
	4,4'-DDD	5.10E-02	µg/L	5.10E-02	µg/L	M	1.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	3.76E-02	µg/L	3.76E-02	µg/L	M	1.0E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	5.10E-02	µg/L	5.10E-02	µg/L	M	1.4E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	2.8E-03
	Aldrin	1.61E-02	µg/L	1.61E-02	µg/L	M	4.4E-07	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	1.5E-02
	Aroclor-1260	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Antimony	1.10E+00	µg/L	1.10E+00	µg/L	M	3.0E-05	mg/kg-day	4.0E-04	N/A	N/A	N/A	7.5E-02
	Cadmium	1.00E-01	µg/L	1.00E-01	µg/L	M	2.7E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	5.5E-03
	Copper	3.48E+00	µg/L	3.48E+00	µg/L	M	9.5E-05	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	2.4E-03
	Lead	1.20E+00	µg/L	1.20E+00	µg/L	M	3.3E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	6.80E-02	µg/L	6.80E-02	µg/L	M	1.9E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.9E-02
	1,1,2,2-Tetrachloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	6.0E-02	mg/kg-day	N/A	N/A	2.3E-04
	1,1,2-Trichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	4.0E-03	mg/kg-day	N/A	N/A	3.4E-03

TABLE 7.9.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,1-Dichloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	9.0E-03	mg/kg-day	N/A	N/A	1.5E-03
	1,2-Dibromoethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	1,2-Dichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	4.6E-04
	1,2-Dichloropropane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	4.6E-03
	Bromodichloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	6.8E-04
	Bromoform	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	6.8E-04
	Carbon tetrachloride	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	7.0E-04	mg/kg-day	N/A	N/A	2.0E-02
	Chloroform	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	1.4E-03
	cis-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	4.6E-04
	Dibromochloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	6.8E-04
	Tetrachloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	1.4E-03
	trans-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	4.6E-04
	Vinyl chloride	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	4.6E-03
	1,4-Dichlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	4.7E-03
	2,4,6-Trichlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	2,4-Dinitrophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	3.5E-04	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	1.7E-01
	2,4-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	7.0E-02
	2,6-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	1.4E-01
	2-Chlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	5.0E-03	mg/kg-day	N/A	N/A	2.8E-02
	3,3'-Dichlorobenzidine	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	1.27E+01	µg/L	1.27E+01	µg/L	M	3.5E-04	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	3.5E+00

TABLE 7.9.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	4-Methylphenol	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	5.0E-03	mg/kg-day	N/A	N/A	2.8E-02
	Acenaphthylene[3]	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	7.0E-03
	Benzo(a)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(b)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(k)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Ethylhexyl)phthalate	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	7.0E-03
	Carbazole	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Chrysene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenzofuran	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	4.0E-03	mg/kg-day	N/A	N/A	3.5E-02
	Hexachlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	1.7E-01
	Hexachlorobutadiene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	2.0E-04	mg/kg-day	N/A	N/A	7.0E-01
	Hexachloroethane	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	1.4E-01
	Indeno(1,2,3-cd)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Naphthalene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	7.0E-03
	Nitrobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-04	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	2.8E-01
	Pentachlorophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	3.5E-04	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	1.2E-02
	alpha-BHC	2.55E-02	µg/L	2.55E-02	µg/L	M	7.0E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1016	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-05	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	2.0E-01
	Aroclor-1221	1.02E+00	µg/L	1.02E+00	µg/L	M	2.8E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1232	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	

TABLE 7.9.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
• MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Aroclor-1242	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1254	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-05	mg/kg-day	2.0E-05	mg/kg-day	N/A	N/A	7.0E-01
	Aroclor-1262	5.50E-01	µg/L	5.50E-01	µg/L	M	1.5E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1268	5.50E-01	µg/L	5.50E-01	µg/L	M	1.5E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Heptachlor	2.50E-02	µg/L	2.50E-02	µg/L	M	6.8E-07	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.4E-03
	Toxaphene	2.55E+00	µg/L	2.55E+00	µg/L	M	7.0E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Thallium	1.75E+00	µg/L	1.75E+00	µg/L	M	4.8E-05	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	6.8E-01
	(Total)												8.8E+00
												Total Hazard Index Across All Exposure Routes/Pathways	8.8E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.
(3) RfD for napthalene used as surrogate RfD for acenaphthylene.

TABLE 7.10.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	3.6E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	7.2E-03
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	3.7E-05	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	2.1E-06	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	4.2E-02
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	2.0E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	3.9E-03
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	2.7E-06	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	2.1E-01
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	1.4E-01	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	1.4E-01
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	5.9E-04	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.0E+00
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	3.5E-04	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	1.2E-01
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	9.9E-01	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	1.6E+00
	4,4'-DDD	5.10E-02	µg/L	5.10E-02	µg/L	M	3.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	3.76E-02	µg/L	3.76E-02	µg/L	M	2.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	5.10E-02	µg/L	5.10E-02	µg/L	M	3.3E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	6.5E-03
	Aldrin	1.61E-02	µg/L	1.61E-02	µg/L	M	1.0E-06	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	3.4E-02
	Aroclor-1260	5.10E-01	µg/L	5.10E-01	µg/L	M	3.3E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Antimony	1.10E+00	µg/L	1.10E+00	µg/L	M	7.0E-05	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.8E-01
	Cadmium	1.00E-01	µg/L	1.00E-01	µg/L	M	6.4E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.3E-02
	Copper	3.48E+00	µg/L	3.48E+00	µg/L	M	2.2E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	5.6E-03
	Lead	1.20E+00	µg/L	1.20E+00	µg/L	M	7.7E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	6.80E-02	µg/L	6.80E-02	µg/L	M	4.3E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	4.3E-02
	1,1,2,2-Tetrachloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	6.0E-02	mg/kg-day	N/A	N/A	5.3E-04
	1,1,2-Trichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	4.0E-03	mg/kg-day	N/A	N/A	8.0E-03
	1,1-Dichloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	9.0E-03	mg/kg-day	N/A	N/A	3.6E-03
	1,2-Dibromoethane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	N/A	N/A	N/A	N/A	

TABLE 7.10.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,2-Dichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	1.1E-03
	1,2-Dichloropropane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzene	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	1.1E-02
	Bromodichloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.6E-03
	Bromoform	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.6E-03
	Carbon tetrachloride	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	7.0E-04	mg/kg-day	N/A	N/A	4.6E-02
	Chloroform	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	3.2E-03
	cis-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	1.1E-03
	Dibromochloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.6E-03
	Tetrachloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	3.2E-03
	trans-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	1.1E-03
	Vinyl chloride	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	1.1E-02
	1,4-Dichlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	1.1E-02
	2,4,6-Trichlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	2,4-Dinitrophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	8.1E-04	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	4.1E-01
	2,4-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	1.6E-01
	2,6-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	3.3E-01
	2-Chlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	5.0E-03	mg/kg-day	N/A	N/A	6.5E-02
	3,3'-Dichlorobenzidine	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	1.27E+01	µg/L	1.27E+01	µg/L	M	8.1E-04	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	8.1E+00
	4-Methylphenol	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	5.0E-03	mg/kg-day	N/A	N/A	6.5E-02
	Acenaphthylene[3]	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.6E-02
	Benzo(a)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(b)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(k)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Ethylhexyl)phthalate	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.6E-02
	Carbazole	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	

TABLE 7.10.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Chrysene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenzofuran	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	4.0E-03	mg/kg-day	N/A	N/A	8.2E-02
	Hexachlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	4.1E-01
	Hexachlorobutadiene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	2.0E-04	mg/kg-day	N/A	N/A	1.6E+00
	Hexachloroethane	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	3.3E-01
	Indeno(1,2,3-cd)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Naphthalene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.6E-02
	Nitrobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-04	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	6.5E-01
	Pentachlorophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	8.1E-04	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	2.7E-02
	alpha-BHC	2.55E-02	µg/L	2.55E-02	µg/L	M	1.6E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1016	5.10E-01	µg/L	5.10E-01	µg/L	M	3.3E-05	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	4.7E-01
	Aroclor-1221	1.02E+00	µg/L	1.02E+00	µg/L	M	6.5E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1232	5.10E-01	µg/L	5.10E-01	µg/L	M	3.3E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1242	5.10E-01	µg/L	5.10E-01	µg/L	M	3.3E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1254	5.10E-01	µg/L	5.10E-01	µg/L	M	3.3E-05	mg/kg-day	2.0E-05	mg/kg-day	N/A	N/A	1.6E+00
	Aroclor-1262	5.50E-01	µg/L	5.50E-01	µg/L	M	3.5E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1268	5.50E-01	µg/L	5.50E-01	µg/L	M	3.5E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Heptachlor	2.50E-02	µg/L	2.50E-02	µg/L	M	1.6E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	3.2E-03
	Toxaphene	2.55E+00	µg/L	2.55E+00	µg/L	M	1.6E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Thallium	1.75E+00	µg/L	1.75E+00	µg/L	M	1.1E-04	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	1.6E+00
	(Total)												2.1E+01

TABLE 7.10.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	1.6E-05	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	6.3E-02
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	1.6E-03	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	2.3E-06	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	9.1E-02
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	8.6E-06	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	3.4E-02
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	1.9E-06	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	2.1E-01
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	4.7E-04	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	4.7E-03
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	1.9E-06	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	1.6E-02
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	1.1E-06	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	1.9E-02
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	3.3E-03	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	3.6E-02
	4,4'-DDD	5.10E-02	µg/L	5.10E-02	µg/L	M	4.0E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	3.76E-02	µg/L	3.76E-02	µg/L	M	2.5E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	5.10E-02	µg/L	5.10E-02	µg/L	M	8.0E-05	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	2.3E-01
	Aldrin	1.61E-02	µg/L	1.61E-02	µg/L	M	1.0E-07	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	6.8E-03
	Aroclor-1260	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Antimony	1.10E+00	µg/L	1.10E+00	µg/L	M	2.3E-07	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	2.9E-02
	Cadmium	1.00E-01	µg/L	1.00E-01	µg/L	M	2.1E-08	mg/kg-day	5.0E-06	mg/kg-day	N/A	N/A	4.2E-03
	Copper	3.48E+00	µg/L	3.48E+00	µg/L	M	7.3E-07	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	6.1E-05
	Lead	1.20E+00	µg/L	1.20E+00	µg/L	M	1.0E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	6.80E-02	µg/L	6.80E-02	µg/L	M	1.4E-08	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	1.6E-04
	1,1,2,2-Tetrachloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.4E-06	mg/kg-day	4.2E-02	mg/kg-day	N/A	N/A	1.0E-04
	1,1,2-Trichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.2E-06	mg/kg-day	3.2E-03	mg/kg-day	N/A	N/A	1.0E-03
	1,1-Dichloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	9.0E-03	mg/kg-day	N/A	N/A	5.3E-04
	1,2-Dibromoethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	1,2-Dichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.6E-06	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	5.3E-05
	1,2-Dichloropropane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzene	5.00E-01	µg/L	5.00E-01	µg/L	M	5.4E-06	mg/kg-day	2.9E-03	mg/kg-day	N/A	N/A	1.9E-03

TABLE 7.10.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Bromodichloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.4E-04
	Bromoform	5.00E-01	µg/L	5.00E-01	µg/L	M	2.3E-06	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	1.9E-04
	Carbon tetrachloride	5.00E-01	µg/L	5.00E-01	µg/L	M	9.7E-06	mg/kg-day	4.6E-04	mg/kg-day	N/A	N/A	2.1E-02
	Chloroform	5.00E-01	µg/L	5.00E-01	µg/L	M	3.1E-06	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	1.5E-03
	cis-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.8E-06	mg/kg-day	1.7E-02	mg/kg-day	N/A	N/A	1.1E-04
	Dibromochloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.5E-06	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	2.1E-04
	Tetrachloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	2.3E-05	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	2.3E-03
	trans-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.8E-06	mg/kg-day	1.7E-02	mg/kg-day	N/A	N/A	1.1E-04
	Vinyl chloride	5.00E-01	µg/L	5.00E-01	µg/L	M	1.7E-06	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	5.7E-04
	1,4-Dichlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.7E-04	mg/kg-day	2.7E-02	mg/kg-day	N/A	N/A	9.9E-03
	2,4,6-Trichlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	3.1E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	2,4-Dinitrophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	2.5E-05	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	1.3E-02
	2,4-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.1E-05	mg/kg-day	1.7E-03	mg/kg-day	N/A	N/A	1.2E-02
	2,6-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.4E-05	mg/kg-day	8.5E-04	mg/kg-day	N/A	N/A	1.6E-02
	2-Chlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	4.1E-05	mg/kg-day	2.5E-03	mg/kg-day	N/A	N/A	1.7E-02
	3,3'-Dichlorobenzidine	5.10E+00	µg/L	5.10E+00	µg/L	M	1.5E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	1.27E+01	µg/L	1.27E+01	µg/L	M	1.5E-04	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.5E+00
	4-Methylphenol	5.10E+00	µg/L	5.10E+00	µg/L	M	3.3E-05	mg/kg-day	3.3E-03	mg/kg-day	N/A	N/A	9.9E-03
	Acenaphthylene[3]	5.10E+00	µg/L	5.10E+00	µg/L	M	5.8E-04	mg/kg-day	1.6E-02	mg/kg-day	N/A	N/A	3.6E-02
	Benzo(a)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	6.2E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.1E-02	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(b)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.1E-02	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(k)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.5E-02	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	5.10E+00	µg/L	5.10E+00	µg/L	M	8.8E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Ethylhexyl)phthalate	5.10E+00	µg/L	5.10E+00	µg/L	M	7.8E-04	mg/kg-day	3.8E-03	mg/kg-day	N/A	N/A	2.1E-01
	Carbazole	5.10E+00	µg/L	5.10E+00	µg/L	M	4.0E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Chrysene	5.10E+00	µg/L	5.10E+00	µg/L	M	6.2E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.9E-02	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenzofuran	5.10E+00	µg/L	5.10E+00	µg/L	M	5.5E-04	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	2.7E-01

TABLE 7.10.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Hexachlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.4E-03	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	6.0E+00
	Hexachlorobutadiene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.1E-03	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.1E+01
	Hexachloroethane	5.10E+00	µg/L	5.10E+00	µg/L	M	3.4E-04	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	6.7E-01
	Indeno(1,2,3-cd)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.0E-02	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	5.10E+00	µg/L	5.10E+00	µg/L	M	2.5E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Naphthalene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.6E-04	mg/kg-day	1.6E-02	mg/kg-day	N/A	N/A	1.6E-02
	Nitrobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.5E-05	mg/kg-day	4.9E-04	mg/kg-day	N/A	N/A	5.2E-02
	Pentachlorophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	1.6E-02	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	5.4E-01
	alpha-BHC	2.55E-02	µg/L	2.55E-02	µg/L	M	8.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1016	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-03	mg/kg-day	6.3E-05	mg/kg-day	N/A	N/A	2.2E+01
	Aroclor-1221	1.02E+00	µg/L	1.02E+00	µg/L	M	2.8E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1232	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1242	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1254	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-03	mg/kg-day	1.8E-05	mg/kg-day	N/A	N/A	7.6E+01
	Aroclor-1262	5.50E-01	µg/L	5.50E-01	µg/L	M	1.5E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1268	5.50E-01	µg/L	5.50E-01	µg/L	M	1.5E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Heptachlor	2.50E-02	µg/L	2.50E-02	µg/L	M	1.2E-06	mg/kg-day	3.6E-04	mg/kg-day	N/A	N/A	3.2E-03
	Toxaphene	2.55E+00	µg/L	2.55E+00	µg/L	M	2.1E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Thallium	1.75E+00	µg/L	1.75E+00	µg/L	M	3.7E-07	mg/kg-day	1.1E-05	mg/kg-day	N/A	N/A	3.4E-02
	(Total)												1.2E+02
												Total Hazard Index Across All Exposure Routes/Pathways	1.4E+02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.
(3) RfD for napthalene used as surrogate RfD for acenaphthylene.

Table 7.10.RME.UA Supplement
Calculation of DAevent
Child Resident, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
alpha-Chlordane	5.65E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	0.33	2.5E-08	2
Aroclor-1248	5.78E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.4E-06	2
Dieldrin	3.31E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	0.33	3.6E-09	2
gamma-Chlordane	3.08E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	0.33	1.3E-08	2
Heptachlor epoxide	4.19E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	0.33	3.0E-09	2
Aluminum	2.21E+03	1.0E-03	NA	NA	NA	0.33	7.3E-07	1
Arsenic	9.16E+00	1.0E-03	NA	NA	NA	0.33	3.0E-09	1
Chromium	5.41E+00	1.0E-03	NA	NA	NA	0.33	1.8E-09	1
Iron	1.54E+04	1.0E-03	NA	NA	NA	0.33	5.1E-06	1
4,4'-DDD	5.10E-02	2.8E-01	7.8E+00	3.7E+01	6.3E+01	0.33	6.3E-08	2
4,4'-DDE	3.76E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	0.33	4.0E-08	2
4,4'-DDT	5.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	0.33	1.3E-07	2
Aldrin	1.61E-02	1.6E-03	1.5E+01	3.6E+01	1.0E-01	0.33	1.6E-10	2
Aroclor-1260	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.2E-06	2
Antimony	1.10E+00	1.0E-03	NA	NA	NA	0.33	3.6E-10	1
Cadmium	1.00E-01	1.0E-03	NA	NA	NA	0.33	3.3E-11	1
Copper	3.48E+00	1.0E-03	NA	NA	NA	0.33	1.1E-09	1
Lead	1.20E+00	4.0E-06	N/A	N/A	N/A	0.33	1.6E-12	1
Mercury	6.80E-02	1.0E-03	N/A	N/A	N/A	0.33	2.2E-11	1
1,1,2,2-Tetrachloroethane	5.00E-01	9.0E-03	9.2E-01	2.2E+00	2.5E-02	0.33	6.9E-09	2
1,1,2-Trichloroethane	5.00E-01	8.4E-03	5.7E-01	1.4E+00	1.1E-02	0.33	5.0E-09	2
1,1-Dichloroethene	5.00E-01	1.6E-02	3.4E-01	8.2E-01	1.3E-02	0.33	7.4E-09	2
1,2-Dibromoethane	5.00E-01	2.0E-04	1.3E+00	3.0E+00	1.3E-04	0.33	1.8E-10	2
1,2-Dichloroethane	5.00E-01	5.3E-03	3.5E-01	8.4E-01	3.0E-03	0.33	2.5E-09	2
1,2-Dichloropropane	5.00E-01	1.0E-02	4.3E-01	1.0E+00	1.0E-02	0.33	5.2E-09	2
Benzene	5.00E-01	2.1E-02	2.6E-01	6.3E-01	1.3E-02	0.33	8.5E-09	2
Bromodichloromethane	5.00E-01	5.8E-03	8.7E-01	2.1E+00	1.2E-02	0.33	4.3E-09	2
Bromoform	5.00E-01	2.6E-03	3.0E+00	7.3E+00	2.3E-02	0.33	3.6E-09	2
Carbon tetrachloride	5.00E-01	2.2E-02	7.6E-01	1.8E+00	6.8E-02	0.33	1.5E-08	2
Chloroform	5.00E-01	8.9E-03	4.7E-01	1.1E+00	9.3E-03	0.33	4.8E-09	2
cis-1,3-Dichloropropene	5.00E-01	5.5E-03	4.2E-01	1.0E+00	4.0E-03	0.33	2.8E-09	2
Dibromochloromethane	5.00E-01	3.9E-03	1.6E+00	3.9E+00	1.7E-02	0.33	3.9E-09	2
Tetrachloroethene	5.00E-01	4.8E-02	9.0E-01	4.3E+00	2.5E-01	0.33	3.6E-08	2
trans-1,3-Dichloropropene	5.00E-01	5.5E-03	4.2E-01	1.0E+00	4.0E-03	0.33	2.8E-09	2
Vinyl chloride	5.00E-01	7.3E-03	2.1E-01	5.1E-01	2.3E-03	0.33	2.7E-09	2
1,4-Dichlorobenzene	5.10E+00	6.2E-02	6.9E-01	3.3E+00	2.5E-01	0.33	4.2E-07	2
2,4,6-Trichlorophenol	5.10E+00	5.0E-02	1.4E+00	9.2E+00	4.9E-01	0.33	4.8E-07	2
2,4-Dinitrophenol	1.27E+01	1.8E-03	1.2E+00	2.8E+00	3.5E-03	0.33	4.0E-08	2
2,4-Dinitrotoluene	5.10E+00	3.8E-03	1.1E+00	2.7E+00	9.5E-03	0.33	3.2E-08	2
2,6-Dinitrotoluene	5.10E+00	2.5E-03	1.1E+00	2.7E+00	5.2E-03	0.33	2.1E-08	2
2-Chlorophenol	5.10E+00	1.1E-02	5.3E-01	1.3E+00	1.4E-02	0.33	6.5E-08	2
3,3'-Dichlorobenzidine	5.10E+00	1.7E-02	3.1E+00	1.7E+01	NA	0.33	2.4E-07	2
4,6-Dinitro-2-methylphenol	1.27E+01	9.8E-03	1.4E+00	3.4E+00	5.0E-02	0.33	2.3E-07	2
4-Methylphenol	5.10E+00	1.0E-02	4.0E-01	9.6E-01	8.7E-03	0.33	5.1E-08	2
Acenaphthylene	5.10E+00	1.3E-01	7.4E-01	5.8E+00	7.9E-01	0.33	9.1E-07	2
Benzo(a)anthracene	5.10E+00	8.1E-01	2.2E+00	1.0E+01	4.6E+01	0.33	9.7E-06	2
Benzo(a)pyrene	5.10E+00	1.2E+00	2.9E+00	1.4E+01	1.3E+02	0.33	1.7E-05	2
Benzo(b)fluoranthene	5.10E+00	1.2E+00	3.0E+00	1.4E+01	1.3E+02	0.33	1.7E-05	2

Table 7.10.RME.UA Supplement
Calculation of DAevent
Child Resident, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm²-event)	Eq
Benzo(k)fluoranthene	5.10E+00	2.8E+00	3.0E+00	1.4E+01	1.2E+02	0.33	3.9E-05	2
bis(2-Chloroethyl)ether	5.10E+00	2.1E-03	6.5E-01	1.6E+00	1.9E-03	0.33	1.4E-08	2
bis(2-Ethylhexyl)phthalate	5.10E+00	3.3E-02	2.1E+01	1.0E+02	1.3E+01	0.33	1.2E-06	2
Carbazole	5.10E+00	8.0E-02	9.2E-01	6.2E+00	5.2E-01	0.33	6.2E-07	2
Chrysene	5.10E+00	8.1E-01	2.2E+00	1.0E+01	4.6E+01	0.33	9.7E-06	2
Dibenz(a,h)anthracene	5.10E+00	2.7E+00	4.4E+00	2.1E+01	6.9E+02	0.33	4.6E-05	2
Dibenzofuran	5.10E+00	1.1E-01	9.3E-01	7.3E+00	8.1E-01	0.33	8.6E-07	2
Hexachlorobenzene	5.10E+00	2.1E-01	4.8E+00	2.3E+01	2.0E+01	0.33	3.7E-06	2
Hexachlorobutadiene	5.10E+00	1.2E-01	3.4E+00	1.7E+01	6.0E+00	0.33	1.8E-06	2
Hexachloroethane	5.10E+00	4.2E-02	2.4E+00	1.9E+01	8.5E-01	0.33	5.3E-07	2
Indeno(1,2,3-cd)pyrene	5.10E+00	1.9E+00	4.2E+00	2.0E+01	3.8E+02	0.33	3.2E-05	2
n-Nitroso-di-n-propylamine	5.10E+00	3.1E-04	5.4E-01	1.0E-04	1.3E+00	0.33	3.9E-09	3
Naphthalene	5.10E+00	6.9E-02	5.3E-01	2.2E+00	2.0E-01	0.33	4.1E-07	2
Nitrobenzene	5.10E+00	7.0E-03	4.9E-01	1.2E+00	7.1E-03	0.33	4.0E-08	2
Pentachlorophenol	1.27E+01	6.5E-01	3.7E+00	1.7E+01	7.2E+01	0.33	2.5E-05	2
alpha-BHC	2.55E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	0.33	1.3E-09	2
Aroclor-1016	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.2E-06	2
Aroclor-1221	1.02E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	4.3E-06	2
Aroclor-1232	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.2E-06	2
Aroclor-1242	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.2E-06	2
Aroclor-1254	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.2E-06	2
Aroclor-1262	5.50E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.3E-06	2
Aroclor-1268	5.50E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.3E-06	2
Heptachlor	2.50E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	0.33	1.8E-09	2
Toxaphene	2.55E+00	1.5E-02	2.9E+01	1.4E+02	6.6E+00	0.33	3.3E-07	2
Thallium	1.75E+00	1.0E-03	NA	NA	NA	0.33	5.8E-10	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.

TABLE 7.11.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	1.1E-06	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	4.6E-03
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	1.1E-04	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	1.7E-07	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	6.6E-03
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	6.2E-07	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	2.5E-03
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	1.4E-07	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	1.5E-02
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	1.7E-04	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	1.7E-03
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	6.9E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	5.7E-03
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	4.1E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.0E-03
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	1.2E-03	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	1.3E-02
	4,4'-DDD	5.10E-02	µg/L	5.10E-02	µg/L	M	2.9E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	3.76E-02	µg/L	3.76E-02	µg/L	M	1.8E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	5.10E-02	µg/L	5.10E-02	µg/L	M	5.8E-06	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	1.7E-02
	Aldrin	1.61E-02	µg/L	1.61E-02	µg/L	M	7.3E-09	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	4.9E-04
	Aroclor-1260	5.10E-01	µg/L	5.10E-01	µg/L	M	9.9E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Antimony	1.10E+00	µg/L	1.10E+00	µg/L	M	8.3E-08	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	1.0E-02
	Cadmium	1.00E-01	µg/L	1.00E-01	µg/L	M	7.5E-09	mg/kg-day	5.0E-06	mg/kg-day	N/A	N/A	1.5E-03
	Copper	3.48E+00	µg/L	3.48E+00	µg/L	M	2.6E-07	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	2.2E-05
	Lead	1.20E+00	µg/L	1.20E+00	µg/L	M	3.6E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	6.80E-02	µg/L	6.80E-02	µg/L	M	5.1E-09	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	5.7E-05

TABLE 7.11.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,1,2,2-Tetrachloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.1E-07	mg/kg-day	4.2E-02	mg/kg-day	N/A	N/A	9.8E-06
	1,1,2-Trichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.6E-07	mg/kg-day	3.2E-02	mg/kg-day	N/A	N/A	1.1E-05
	1,1-Dichloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	6.5E-07	mg/kg-day	9.0E-03	mg/kg-day	N/A	N/A	7.2E-05
	1,2-Dibromoethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.0E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	1,2-Dichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.2E-07	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	7.2E-06
	1,2-Dichloropropane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzene	5.00E-01	µg/L	5.00E-01	µg/L	M	8.3E-07	mg/kg-day	2.9E-03	mg/kg-day	N/A	N/A	2.9E-04
	Bromodichloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.6E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	1.3E-05
	Bromoform	5.00E-01	µg/L	5.00E-01	µg/L	M	1.7E-07	mg/kg-day	1.2E-01	mg/kg-day	N/A	N/A	1.4E-06
	Carbon tetrachloride	5.00E-01	µg/L	5.00E-01	µg/L	M	9.5E-07	mg/kg-day	4.6E-03	mg/kg-day	N/A	N/A	2.1E-04
	Chloroform	5.00E-01	µg/L	5.00E-01	µg/L	M	3.7E-07	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	1.9E-04
	cis-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	2.3E-07	mg/kg-day	1.7E-02	mg/kg-day	N/A	N/A	1.3E-05
	Dibromochloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.0E-07	mg/kg-day	1.2E-01	mg/kg-day	N/A	N/A	1.7E-06
	Tetrachloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	2.0E-06	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	2.0E-05
	trans-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	2.3E-07	mg/kg-day	1.7E-02	mg/kg-day	N/A	N/A	1.3E-05
	Vinyl chloride	5.00E-01	µg/L	5.00E-01	µg/L	M	2.9E-07	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	9.6E-05
	1,4-Dichlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.5E-05	mg/kg-day	2.7E-02	mg/kg-day	N/A	N/A	9.2E-04
	2,4,6-Trichlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	2.2E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	2,4-Dinitrophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	2.2E-06	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	1.1E-03

TABLE 7.11.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	2,4-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.9E-06	mg/kg-day	1.7E-03	mg/kg-day	N/A	N/A	1.1E-03
	2,6-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.2E-06	mg/kg-day	8.5E-03	mg/kg-day	N/A	N/A	1.4E-04
	2-Chlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	4.7E-06	mg/kg-day	2.5E-02	mg/kg-day	N/A	N/A	1.9E-04
	3,3'-Dichlorobenzidine	5.10E+00	µg/L	5.10E+00	µg/L	M	1.1E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	1.27E+01	µg/L	1.27E+01	µg/L	M	1.2E-05	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.2E-01
	4-Methylphenol	5.10E+00	µg/L	5.10E+00	µg/L	M	4.2E-06	mg/kg-day	3.3E-03	mg/kg-day	N/A	N/A	1.3E-03
	Acenaphthylene[3]	5.10E+00	µg/L	5.10E+00	µg/L	M	4.5E-05	mg/kg-day	1.6E-02	mg/kg-day	N/A	N/A	2.8E-03
	Benzo(a)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.5E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	7.7E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(b)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	7.8E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(k)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.8E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	5.10E+00	µg/L	5.10E+00	µg/L	M	9.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Ethylhexyl)phthalate	5.10E+00	µg/L	5.10E+00	µg/L	M	5.7E-05	mg/kg-day	3.8E-03	mg/kg-day	N/A	N/A	1.5E-02
	Carbazole	5.10E+00	µg/L	5.10E+00	µg/L	M	3.2E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Chrysene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.5E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.1E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenzofuran	5.10E+00	µg/L	5.10E+00	µg/L	M	4.2E-05	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	2.1E-02
	Hexachlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.7E-04	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	4.3E-01
	Hexachlorobutadiene	5.10E+00	µg/L	5.10E+00	µg/L	M	8.3E-05	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	8.3E-01
	Hexachloroethane	5.10E+00	µg/L	5.10E+00	µg/L	M	2.4E-05	mg/kg-day	5.0E-03	mg/kg-day	N/A	N/A	4.9E-03
	Indeno(1,2,3-cd)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.5E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	5.10E+00	µg/L	5.10E+00	µg/L	M	8.6E-08	mg/kg-day	N/A	N/A	N/A	N/A	

TABLE 7.11.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Naphthalene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.7E-05	mg/kg-day	1.6E-02	mg/kg-day	N/A	N/A	1.7E-03
	Nitrobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.0E-06	mg/kg-day	4.9E-03	mg/kg-day	N/A	N/A	6.1E-04
	Pentachlorophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	1.2E-03	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	3.9E-02
	alpha-BHC	2.55E-02	µg/L	2.55E-02	µg/L	M	6.0E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1016	5.10E-01	µg/L	5.10E-01	µg/L	M	9.9E-05	mg/kg-day	6.3E-05	mg/kg-day	N/A	N/A	1.6E+00
	Aroclor-1221	1.02E+00	µg/L	1.02E+00	µg/L	M	2.0E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1232	5.10E-01	µg/L	5.10E-01	µg/L	M	9.9E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1242	5.10E-01	µg/L	5.10E-01	µg/L	M	9.9E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1254	5.10E-01	µg/L	5.10E-01	µg/L	M	9.9E-05	mg/kg-day	4.5E-05	mg/kg-day	N/A	N/A	2.2E+00
	Aroclor-1262	5.50E-01	µg/L	5.50E-01	µg/L	M	1.1E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1268	5.50E-01	µg/L	5.50E-01	µg/L	M	1.1E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Heptachlor	2.50E-02	µg/L	2.50E-02	µg/L	M	8.3E-08	mg/kg-day	3.6E-04	mg/kg-day	N/A	N/A	2.3E-04
	Toxaphene	2.55E+00	µg/L	2.55E+00	µg/L	M	1.5E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Thallium	1.75E+00	µg/L	1.75E+00	µg/L	M	1.3E-07	mg/kg-day	1.1E-05	mg/kg-day	N/A	N/A	1.2E-02
	(Total)												5.4E+00
												Total Hazard Index Across All Exposure Routes/Pathways	5.4E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Subchronic, if available, else chronic.

Table 7.11.RME.UA Supplement
Calculation of DAevent
Construction Worker, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
alpha-Chlordane	5.65E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	1.2E-07	2
Aroclor-1248	5.78E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.2E-05	2
Dieldrin	3.31E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	8	1.8E-08	2
gamma-Chlordane	3.08E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	6.6E-08	2
Heptachlor epoxide	4.19E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	1.5E-08	2
Aluminum	2.21E+03	1.0E-03	NA	NA	NA	8	1.8E-05	1
Arsenic	9.16E+00	1.0E-03	NA	NA	NA	8	7.3E-08	1
Chromium	5.41E+00	1.0E-03	NA	NA	NA	8	4.3E-08	1
Iron	1.54E+04	1.0E-03	NA	NA	NA	8	1.2E-04	1
4,4'-DDD	5.10E-02	2.8E-01	7.8E+00	3.7E+01	6.3E+01	8	3.1E-07	2
4,4'-DDE	3.76E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	8	1.9E-07	2
4,4'-DDT	5.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	8	6.2E-07	2
Aldrin	1.61E-02	1.6E-03	1.5E+01	3.6E+01	1.0E-01	8	7.8E-10	2
Aroclor-1260	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Antimony	1.10E+00	1.0E-03	NA	NA	NA	8	8.8E-09	1
Cadmium	1.00E-01	1.0E-03	NA	NA	NA	8	8.0E-10	1
Copper	3.48E+00	1.0E-03	NA	NA	NA	8	2.8E-08	1
Lead	1.20E+00	4.0E-06	N/A	N/A	N/A	8	3.8E-11	1
Mercury	6.80E-02	1.0E-03	N/A	N/A	N/A	8	5.4E-10	1
1,1,2,2-Tetrachloroethane	5.00E-01	9.0E-03	9.2E-01	2.2E+00	2.5E-02	8	4.4E-08	3
1,1,2-Trichloroethane	5.00E-01	8.4E-03	5.7E-01	1.4E+00	1.1E-02	8	3.8E-08	3
1,1-Dichloroethene	5.00E-01	1.6E-02	3.4E-01	8.2E-01	1.3E-02	8	6.9E-08	3
1,2-Dibromoethane	5.00E-01	2.0E-04	1.3E+00	3.0E+00	1.3E-04	8	1.1E-09	3
1,2-Dichloroethane	5.00E-01	5.3E-03	3.5E-01	8.4E-01	3.0E-03	8	2.3E-08	3
1,2-Dichloropropane	5.00E-01	1.0E-02	4.3E-01	1.0E+00	1.0E-02	8	4.4E-08	3
Benzene	5.00E-01	2.1E-02	2.6E-01	6.3E-01	1.3E-02	8	8.9E-08	3
Bromodichloromethane	5.00E-01	5.8E-03	8.7E-01	2.1E+00	1.2E-02	8	2.8E-08	3
Bromoform	5.00E-01	2.6E-03	3.0E+00	7.3E+00	2.3E-02	8	1.8E-08	3
Carbon tetrachloride	5.00E-01	2.2E-02	7.6E-01	1.8E+00	6.8E-02	8	1.0E-07	3
Chloroform	5.00E-01	8.9E-03	4.7E-01	1.1E+00	9.3E-03	8	4.0E-08	3
cis-1,3-Dichloropropene	5.00E-01	5.5E-03	4.2E-01	1.0E+00	4.0E-03	8	2.4E-08	3
Dibromochloromethane	5.00E-01	3.9E-03	1.6E+00	3.9E+00	1.7E-02	8	2.2E-08	3
Tetrachloroethene	5.00E-01	4.8E-02	9.0E-01	4.3E+00	2.5E-01	8	2.1E-07	3
trans-1,3-Dichloropropene	5.00E-01	5.5E-03	4.2E-01	1.0E+00	4.0E-03	8	2.4E-08	3
Vinyl chloride	5.00E-01	7.3E-03	2.1E-01	5.1E-01	2.3E-03	8	3.1E-08	3
1,4-Dichlorobenzene	5.10E+00	6.2E-02	6.9E-01	3.3E+00	2.5E-01	8	2.6E-06	3
2,4,6-Trichlorophenol	5.10E+00	5.0E-02	1.4E+00	9.2E+00	4.9E-01	8	2.4E-06	2
2,4-Dinitrophenol	1.27E+01	1.8E-03	1.2E+00	2.8E+00	3.5E-03	8	2.4E-07	3
2,4-Dinitrotoluene	5.10E+00	3.8E-03	1.1E+00	2.7E+00	9.5E-03	8	2.0E-07	3
2,6-Dinitrotoluene	5.10E+00	2.5E-03	1.1E+00	2.7E+00	5.2E-03	8	1.3E-07	3
2-Chlorophenol	5.10E+00	1.1E-02	5.3E-01	1.3E+00	1.4E-02	8	5.0E-07	3
3,3'-Dichlorobenzidine	5.10E+00	1.7E-02	3.1E+00	1.7E+01	NA	8	1.2E-06	2
4,6-Dinitro-2-methylphenol	1.27E+01	9.8E-03	1.4E+00	3.4E+00	5.0E-02	8	1.3E-06	3
4-Methylphenol	5.10E+00	1.0E-02	4.0E-01	9.6E-01	8.7E-03	8	4.5E-07	3
Acenaphthylene	5.10E+00	1.3E-01	7.4E-01	5.8E+00	7.9E-01	8	4.8E-06	3
Benzo(a)anthracene	5.10E+00	8.1E-01	2.2E+00	1.0E+01	4.6E+01	8	4.8E-05	2
Benzo(a)pyrene	5.10E+00	1.2E+00	2.9E+00	1.4E+01	1.3E+02	8	8.1E-05	2
Benzo(b)fluoranthene	5.10E+00	1.2E+00	3.0E+00	1.4E+01	1.3E+02	8	8.3E-05	2

Table 7.11.RME.UA Supplement
Calculation of DAevent
Construction Worker, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm²-event)	Eq
Benzo(k)fluoranthene	5.10E+00	2.8E+00	3.0E+00	1.4E+01	1.2E+02	8	1.9E-04	2
bis(2-Chloroethyl)ether	5.10E+00	2.1E-03	6.5E-01	1.6E+00	1.9E-03	8	9.9E-08	3
bis(2-Ethylhexyl)phthalate	5.10E+00	3.3E-02	2.1E+01	1.0E+02	1.3E+01	8	6.0E-06	2
Carbazole	5.10E+00	8.0E-02	9.2E-01	6.2E+00	5.2E-01	8	3.4E-06	3
Chrysene	5.10E+00	8.1E-01	2.2E+00	1.0E+01	4.6E+01	8	4.8E-05	2
Dibenz(a,h)anthracene	5.10E+00	2.7E+00	4.4E+00	2.1E+01	6.9E+02	8	2.3E-04	2
Dibenzofuran	5.10E+00	1.1E-01	9.3E-01	7.3E+00	8.1E-01	8	4.5E-06	3
Hexachlorobenzene	5.10E+00	2.1E-01	4.8E+00	2.3E+01	2.0E+01	8	1.8E-05	2
Hexachlorobutadiene	5.10E+00	1.2E-01	3.4E+00	1.7E+01	6.0E+00	8	8.8E-06	2
Hexachloroethane	5.10E+00	4.2E-02	2.4E+00	1.9E+01	8.5E-01	8	2.6E-06	2
Indeno(1,2,3-cd)pyrene	5.10E+00	1.9E+00	4.2E+00	2.0E+01	3.8E+02	8	1.6E-04	2
n-Nitroso-di-n-propylamine	5.10E+00	3.1E-04	5.4E-01	1.0E-04	1.3E+00	8	9.1E-09	3
Naphthalene	5.10E+00	6.9E-02	5.3E-01	2.2E+00	2.0E-01	8	2.8E-06	3
Nitrobenzene	5.10E+00	7.0E-03	4.9E-01	1.2E+00	7.1E-03	8	3.2E-07	3
Pentachlorophenol	1.27E+01	6.5E-01	3.7E+00	1.7E+01	7.2E+01	8	1.2E-04	2
alpha-BHC	2.55E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	6.4E-09	2
Aroclor-1016	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Aroclor-1221	1.02E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1232	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Aroclor-1242	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Aroclor-1254	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Aroclor-1262	5.50E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Aroclor-1268	5.50E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Heptachlor	2.50E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	8.9E-09	2
Toxaphene	2.55E+00	1.5E-02	2.9E+01	1.4E+02	6.6E+00	8	1.6E-06	2
Thallium	1.75E+00	1.0E-03	NA	NA	NA	8	1.4E-08	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.

TABLE 7.12.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Upper Aquifer - Shower
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	1,1,2-Trichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	1,1-Dichloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	1,2-Dibromoethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	5.7E-05	mg/kg-day	2.0E-04	mg/m^3	2.4E-01
	1,2-Dichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	1.4E-03	mg/kg-day	4.9E-03	mg/m^3	9.8E-03
	1,2-Dichloropropane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	1.1E-03	mg/kg-day	4.0E-03	mg/m^3	1.2E-02
	Benzene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	1.7E-03	mg/kg-day	6.0E-03	mg/m^3	8.1E-03
	Bromodichloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Bromoform	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Carbon tetrachloride	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	5.7E-04	mg/kg-day	2.0E-03	mg/m^3	2.4E-02
	Chloroform	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	8.6E-05	mg/kg-day	3.0E-04	mg/m^3	1.6E-01
	cis-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	5.7E-03	mg/kg-day	2.0E-02	N/A	2.4E-03
	Dibromochloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Tetrachloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	1.4E-01	mg/kg-day	4.9E-01	mg/m^3	9.8E-05
	trans-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	5.7E-03	mg/kg-day	2.0E-02	mg/m^3	2.4E-03
	Vinyl chloride	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-05	mg/kg-day	1.0E-01	mg/kg-day	2.8E-02	mg/m^3	1.4E-04
	(Total)												4.6E-01
												Total Hazard Index Across All Exposure Routes/Pathways	4.6E-01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic inhalation.

TABLE 7.13.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Upper Aquifer - Water Vapors at Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	5.00E-01	µg/L	8.86E-08	mg/m^3	R	1.9E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	1,1,2-Trichloroethane	5.00E-01	µg/L	9.39E-08	mg/m^3	R	2.0E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	1,1-Dichloroethene	5.00E-01	µg/L	1.02E-07	mg/m^3	R	2.2E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	1,2-Dibromoethane	5.00E-01	µg/L	8.56E-08	mg/m^3	R	1.8E-09	mg/kg-day	5.7E-04	mg/kg-day	2.0E-03	mg/m^3	3.2E-06
	1,2-Dichloroethane	5.00E-01	µg/L	1.02E-07	mg/m^3	R	2.2E-09	mg/kg-day	1.4E-03	mg/kg-day	4.9E-03	mg/m^3	1.5E-06
	1,2-Dichloropropane	5.00E-01	µg/L	9.78E-08	mg/m^3	R	2.1E-09	mg/kg-day	3.7E-03	mg/kg-day	1.3E-02	mg/m^3	5.6E-07
	Benzene	5.00E-01	µg/L	1.08E-07	mg/m^3	R	2.3E-09	mg/kg-day	1.7E-02	mg/kg-day	6.0E-02	mg/m^3	1.3E-07
	Bromodichloromethane	5.00E-01	µg/L	8.94E-08	mg/m^3	R	1.9E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Bromoform	5.00E-01	µg/L	8.02E-08	mg/m^3	R	1.7E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Carbon tetrachloride	5.00E-01	µg/L	9.09E-08	mg/m^3	R	1.9E-09	mg/kg-day	5.7E-03	mg/kg-day	2.0E-02	mg/m^3	3.4E-07
	Chloroform	5.00E-01	µg/L	9.70E-08	mg/m^3	R	2.1E-09	mg/kg-day	8.6E-04	mg/kg-day	3.0E-03	mg/m^3	2.4E-06
	cis-1,3-Dichloropropene	5.00E-01	µg/L	9.85E-08	mg/m^3	R	2.1E-09	mg/kg-day	5.7E-03	mg/kg-day	2.0E-02	mg/m^3	3.7E-07
	Dibromochloromethane	5.00E-01	µg/L	8.40E-08	mg/m^3	R	1.8E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Tetrachloroethene	5.00E-01	µg/L	8.94E-08	mg/m^3	R	1.9E-09	mg/kg-day	1.4E-01	mg/kg-day	4.9E-01	mg/m^3	1.4E-08
	trans-1,3-Dichloropropene	5.00E-01	µg/L	9.85E-08	mg/m^3	R	2.1E-09	mg/kg-day	5.7E-03	mg/kg-day	2.0E-02	mg/m^3	3.7E-07
	Vinyl chloride	5.00E-01	µg/L	1.13E-07	mg/m^3	R	2.4E-09	mg/kg-day	1.0E-01	mg/kg-day	2.8E-02	mg/m^3	2.4E-08
	(Total)												8.9E-06
												Total Hazard Index Across All Exposure Routes/Pathways	8.9E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Subchronic, if available, else chronic.

Table 7.13.RME.UA Supplement
Inhalation of Volatiles from Groundwater During Construction
Inhalation Exposure Concentrations Calculated Using a Two-Film Volatilization Model
Future Construction Worker Senario
MCAS Cherry Point, OU6 Site 12

Chemical	Cw (µg/L)	MW (mol/gram)	K_H (unitless)	k_l (cm/hr)	k_g (cm/hr)	K_v (cm/hr)	ER (mg/hr-cm^2)	ERa (g/sec-m^2)	Ca (µg/m^3)
1,1,2,2-Tetrachloroethane	5.00E-01	168	1.41E-02	4.18E-02	1.76E+03	4.17E-02	2.09E-08	5.80E-11	8.86E-05
1,1,2-Trichloroethane	5.00E-01	133	3.74E-02	4.43E-02	1.87E+03	4.43E-02	2.22E-08	6.15E-11	9.39E-05
1,1-Dichloroethene	5.00E-01	97	1.07E+00	4.80E-02	2.02E+03	4.80E-02	2.40E-08	6.66E-11	1.02E-04
1,2-Dibromoethane	5.00E-01	190	1.33E-02	4.06E-02	1.71E+03	4.05E-02	2.02E-08	5.62E-11	8.56E-05
1,2-Dichloroethane	5.00E-01	99	4.10E-02	4.77E-02	2.01E+03	4.77E-02	2.39E-08	6.63E-11	1.02E-04
1,2-Dichloropropane	5.00E-01	113	1.15E-01	4.62E-02	1.95E+03	4.62E-02	2.31E-08	6.41E-11	9.78E-05
Benzene	5.00E-01	78	2.28E-01	5.07E-02	2.13E+03	5.07E-02	2.53E-08	7.04E-11	1.08E-04
Bromodichloromethane	5.00E-01	164	6.56E-02	4.21E-02	1.77E+03	4.21E-02	2.10E-08	5.84E-11	8.94E-05
Bromoform	5.00E-01	253	2.19E-02	3.77E-02	1.59E+03	3.77E-02	1.89E-08	5.24E-11	8.02E-05
Carbon tetrachloride	5.00E-01	154	1.25E+00	4.27E-02	1.80E+03	4.27E-02	2.14E-08	5.94E-11	9.09E-05
Chloroform	5.00E-01	119	1.50E-01	4.56E-02	1.92E+03	4.56E-02	2.28E-08	6.33E-11	9.70E-05
cis-1,3-Dichloropropene	5.00E-01	111	7.26E-01	4.64E-02	1.95E+03	4.64E-02	2.32E-08	6.44E-11	9.85E-05
Dibromochloromethane	5.00E-01	208	3.21E-02	3.96E-02	1.67E+03	3.96E-02	1.98E-08	5.50E-11	8.40E-05
Tetrachloroethene	5.00E-01	166	7.54E-01	4.19E-02	1.77E+03	4.19E-02	2.10E-08	5.83E-11	8.94E-05
trans-1,3-Dichloropropene	5.00E-01	111	7.26E-01	4.64E-02	1.95E+03	4.64E-02	2.32E-08	6.44E-11	9.85E-05
Vinyl chloride	5.00E-01	63	1.11E+00	5.34E-02	2.25E+03	5.34E-02	2.67E-08	7.42E-11	1.13E-04

Equations

Equation 1 $Kv = 1/(1/k_l + 1/K_H{*}K_g)$

Equation 2 $k_g = 700(18/MW)^{1/4}V$

Equation 3 $k_l = (32/MW)^{1/4}Ka'$

Equation 4 $ER = Kv * Cw * L/1000\ cm^3 * mg/1000\ \mu g$

Equation 5 $ERa = ER * g/1000\ mg * 10000 cm^2/m^2 * hr/60\ min * min/60\ sec$

Variables	Units	Exposure Assumptions
Cw = groundwater concentration	(mg/L)	chem-specific
MW = molecular weight	(mol/gram)	chem-specific
K_H - Henry's Law Constant	(unitless)	chem-specific
Kv = volatilization rate	(cm/hr)	Solved by Eq 1
k_g = gas phase transfer coefficient	(cm/hr)	Solved by Eq 2
k_l = liquid phase transfer coefficient	(cm/hr)	Solved by Eq 3
V = wind speed	(m/s)	4.4
Ka' = aeration rate	(cm/hr)	0.0633
ER = emission rate	(mg/hr)	Solved by Eq 4
A = area of excavation (utility ditch) Length = 18 m, width = 2 m	(m^2)	36
Era = area emission rate	(g/sec-m^2)	Solved by Eq 5
Ca = air concentration	(mg/m^3)	Solved using SCREEN3 mode

Note: aeration rate based on aeration rate for small pond (0.1/day) multiplied by depth of water in excavation (1/2 ft)

TABLE 7.14.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	2.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	7.9E-15	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	1.6E-02	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	1.6E-02
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	5.0E-06	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.2E-02
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	8.3E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	8.3E-03
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	3.6E-05	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	1.2E-02
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	9.1E-04	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	2.3E-02
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	5.4E-03	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	8.9E-03
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	5.5E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	3.0E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	5.9E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.2E-05
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	2.7E-09	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	9.2E-05
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	6.2E-08	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.2E-04
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	5.6E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	1.0E-08	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	2.1E-04
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	5.9E-08	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.2E-04
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	8.1E-09	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	6.2E-04
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	2.3E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	7.5E-03
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	1.3E-07	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.3E-03

TABLE 7.14.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	7.5E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.8E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	1.7E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.7E-02
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.8E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.8E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.8E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.8E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.8E-07	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	8.5E-04
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.8E-07	mg/kg-day	2.0E-04	mg/kg-day	N/A	N/A	3.4E-03
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.8E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.8E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.8E-07	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.4E-03
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	1.7E-06	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	5.5E-05
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	1.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	2.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												1.1E-01

TABLE 7.14.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	2.2E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	1.6E-14	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	1.1E-02	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	1.1E-01
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	3.3E-06	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	4.1E-01
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	5.5E-07	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	5.5E-02
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	2.4E-05	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	3.9E-01
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	6.0E-04	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	5.0E-02
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	3.5E-03	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	3.9E-02
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	1.1E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	6.0E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	1.2E-08	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	3.3E-05
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	1.8E-08	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	1.2E-03
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	1.6E-07	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	6.6E-04
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	5.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	6.9E-08	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	2.7E-03
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	1.6E-07	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	6.3E-04
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	5.3E-08	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	5.7E-03
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	4.5E-06	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	3.7E-02
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	8.3E-08	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	9.2E-04

TABLE 7.14.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	1.5E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.5E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	1.1E-05	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.1E-01
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.9E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.9E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.5E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.9E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.5E-06	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.1E-02
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.5E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	4.5E-02
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.9E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.5E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	4.5E-06	mg/kg-day	4.9E-04	mg/kg-day	N/A	N/A	9.2E-03
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	2.7E-05	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	9.1E-04
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	1.0E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	1.8E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												1.3E+00
												Total Hazard Index Across All Exposure Routes/Pathways	1.4E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.15.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	2.2E-06	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	7.4E-14	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	1.5E-01	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	1.5E-01
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	4.7E-05	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.2E-01
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	7.7E-05	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	7.7E-02
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	3.3E-04	mg/kg-day	3.0E-03	mg/kg-day	N/A	N/A	1.1E-01
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	8.5E-03	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	2.1E-01
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	5.0E-02	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	8.3E-02
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	5.1E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	2.8E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	5.5E-08	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.1E-04
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	2.6E-08	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	8.5E-04
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	5.8E-07	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.2E-03
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	5.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	9.7E-08	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	1.9E-03
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	5.5E-07	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.1E-03
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	7.5E-08	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	5.8E-03
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	2.1E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	7.0E-02
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	1.2E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.2E-02

TABLE 7.15.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	7.0E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	1.6E-05	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.6E-01
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.4E-06	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	8.0E-03
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.4E-06	mg/kg-day	2.0E-04	mg/kg-day	N/A	N/A	3.2E-02
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	6.4E-06	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.3E-02
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	1.6E-05	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	5.2E-04
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	1.0E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	2.6E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												1.1E+00
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	5.3E-06	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	3.8E-14	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	2.6E-02	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	2.6E-01
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	7.9E-06	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	9.9E-01

TABLE 7.15.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	1.3E-06	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	1.3E-01
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	5.7E-05	mg/kg-day	6.0E-05	mg/kg-day	N/A	N/A	9.4E-01
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	1.4E-03	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	1.2E-01
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	8.5E-03	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	9.5E-02
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	2.6E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	1.4E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	2.8E-08	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	8.0E-05
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	4.4E-08	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	2.9E-03
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	4.0E-07	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	1.6E-03
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	1.2E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	1.7E-07	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	6.6E-03
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	3.8E-07	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	1.5E-03
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	1.3E-07	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	1.4E-02
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	1.1E-05	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	9.0E-02
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	2.0E-07	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	2.2E-03
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	3.6E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.1E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	2.6E-05	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	2.6E-01
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	

TABLE 7.15.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentratio Units	Hazard Quotient
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.1E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.1E-05	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	2.7E-02
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.1E-05	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.1E-01
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.1E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.1E-05	mg/kg-day	4.9E-04	mg/kg-day	N/A	N/A	2.2E-02
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	6.6E-05	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	2.2E-03
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	2.5E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	4.4E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												3.1E+00
												Total Hazard Index Across All Exposure Routes/Pathways	4.1E+00

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.16.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	4.36E-18	mg/m^3	R	1.2E-18	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	4,4'-DDD	4.02E+00	ug/kg	3.04E-12	mg/m^3	R	8.3E-13	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	1.67E-12	mg/m^3	R	4.6E-13	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	3.25E-12	mg/m^3	R	8.9E-13	mg/kg-day	N/A	N/A	N/A	N/A	
	Aldrin	2.01E+00	ug/kg	1.52E-12	mg/m^3	R	4.1E-13	mg/kg-day	N/A	N/A	N/A	N/A	
	alpha-Chlordane	4.54E+01	ug/kg	3.44E-11	mg/m^3	R	9.4E-12	mg/kg-day	2.0E-04	mg/kg-day	7.0E-04	mg/m^3	4.7E-08
	Aroclor-1248	4.08E+01	ug/kg	3.09E-11	mg/m^3	R	8.4E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	1.74E+02	ug/kg	1.32E-10	mg/m^3	R	3.6E-11	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Dieldrin	7.60E+00	ug/kg	5.76E-12	mg/m^3	R	1.6E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	gamma-Chlordane	4.33E+01	ug/kg	3.28E-11	mg/m^3	R	8.9E-12	mg/kg-day	2.0E-04	mg/kg-day	7.0E-04	mg/m^3	4.5E-08
	Heptachlor epoxide	5.89E+00	ug/kg	4.47E-12	mg/m^3	R	1.2E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	9.08E-06	mg/m^3	R	2.5E-06	mg/kg-day	1.0E-03	mg/kg-day	5.0E-03	mg/m^3	2.5E-03
	Antimony	3.65E+00	mg/kg	2.76E-09	mg/m^3	R	7.5E-10	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Arsenic	1.65E+00	mg/kg	1.25E-09	mg/m^3	R	3.4E-10	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	4.58E-09	mg/m^3	R	1.3E-09	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	1.97E-08	mg/m^3	R	5.4E-09	mg/kg-day	3.0E-05	mg/kg-day	1.0E-04	mg/m^3	1.8E-04
	Copper	6.67E+02	mg/kg	5.05E-07	mg/m^3	R	1.4E-07	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	2.97E-06	mg/m^3	R	8.1E-07	mg/kg-day	N/A	mg/kg-day	N/A	N/A	
	Mercury	9.13E-02	mg/kg	6.91E-11	mg/m^3	R	1.9E-11	mg/kg-day	8.6E-05	mg/kg-day	3.0E-04	mg/m^3	2.2E-07
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	1.0E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	1.0E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorocyclopentadiene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	1.0E-10	mg/kg-day	5.7E-05	mg/kg-day	2.0E-04	mg/m^3	1.8E-06
	(Total)												2.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	2.7E-03

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.17.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	4.36E-18	mg/m^3	R	3.3E-18	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDD	4.02E+00	ug/kg	3.04E-12	mg/m^3	R	2.3E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	1.67E-12	mg/m^3	R	1.3E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	3.25E-12	mg/m^3	R	2.5E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	Aldrin	2.01E+00	ug/kg	1.52E-12	mg/m^3	R	1.2E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	alpha-Chlordane	4.54E+01	ug/kg	3.44E-11	mg/m^3	R	2.6E-11	mg/kg-day	2.0E-04	mg/kg-day	7.0E-04	mg/m^3	1.3E-07
	Aroclor-1248	4.08E+01	ug/kg	3.09E-11	mg/m^3	R	2.4E-11	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	1.74E+02	ug/kg	1.32E-10	mg/m^3	R	1.0E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.60E+00	ug/kg	5.76E-12	mg/m^3	R	4.4E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	gamma-Chlordane	4.33E+01	ug/kg	3.28E-11	mg/m^3	R	2.5E-11	mg/kg-day	2.0E-04	mg/kg-day	7.0E-04	mg/m^3	1.3E-07
	Heptachlor epoxide	5.89E+00	ug/kg	4.47E-12	mg/m^3	R	3.4E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	1.20E+04	mg/kg	9.08E-06	mg/m^3	R	7.0E-06	mg/kg-day	1.0E-03	mg/kg-day	5.0E-03	mg/m^3	7.0E-03
	Antimony	3.65E+00	mg/kg	2.76E-09	mg/m^3	R	2.1E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Arsenic	1.65E+00	mg/kg	1.25E-09	mg/m^3	R	9.6E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	4.58E-09	mg/m^3	R	3.5E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Chromium	2.61E+01	mg/kg	1.97E-08	mg/m^3	R	1.5E-08	mg/kg-day	3.0E-05	N/A	1.0E-04	mg/m^3	5.0E-04
	Copper	6.67E+02	mg/kg	5.05E-07	mg/m^3	R	3.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Iron	3.92E+03	mg/kg	2.97E-06	mg/m^3	R	2.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	9.13E-02	mg/kg	6.91E-11	mg/m^3	R	5.3E-11	mg/kg-day	8.6E-05	mg/kg-day	3.0E-04	mg/m^3	6.2E-07
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	2.9E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	2.9E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorocyclopentadiene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	2.9E-10	mg/kg-day	5.7E-05	mg/kg-day	2.0E-04	mg/m^3	5.1E-06
	(Total)												7.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	7.5E-03

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic.

TABLE 7.18.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	4,4'-DDD	3.70E+00	ug/kg	3.70E+00	ug/kg	M	2.8E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	3.70E+00	ug/kg	3.70E+00	ug/kg	M	2.8E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	3.70E+00	ug/kg	3.70E+00	ug/kg	M	2.8E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	5.6E-06
	Aldrin	3.00E-01	ug/kg	3.00E-01	ug/kg	M	2.3E-10	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	7.5E-06
	alpha-Chlordane	1.10E+01	ug/kg	1.10E+01	ug/kg	M	8.3E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.7E-05
	Aroclor-1248	3.70E+01	ug/kg	3.70E+01	ug/kg	M	2.8E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	3.70E+01	ug/kg	3.70E+01	ug/kg	M	2.8E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	3.70E+00	ug/kg	3.70E+00	ug/kg	M	2.8E-09	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	5.6E-05
	gamma-Chlordane	7.90E+00	ug/kg	7.90E+00	ug/kg	M	5.9E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.2E-05
	Heptachlor epoxide	2.40E+00	ug/kg	2.40E+00	ug/kg	M	1.8E-09	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	1.4E-04
	Aluminum	8.51E+03	mg/kg	8.51E+03	mg/kg	M	6.4E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	6.4E-03
	Antimony	7.20E-01	mg/kg	7.20E-01	mg/kg	M	5.4E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.4E-03
	Arsenic	1.50E+00	mg/kg	1.50E+00	mg/kg	M	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.8E-03
	Cadmium	3.10E+00	mg/kg	3.10E+00	mg/kg	M	2.3E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	2.3E-03
	Chromium	1.50E+01	mg/kg	1.50E+01	mg/kg	M	1.1E-05	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	5.6E-04
	Copper	7.09E+01	mg/kg	7.09E+01	mg/kg	M	5.3E-05	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	1.3E-03
	Iron	2.50E+03	mg/kg	2.50E+03	mg/kg	M	1.9E-03	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	3.1E-03
	Lead	2.54E+01	mg/kg	2.54E+01	mg/kg	M	1.9E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	5.00E-02	mg/kg	5.00E-02	mg/kg	M	3.8E-08	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	3.8E-04
	1,2-Dibromoethane	5.20E+02	ug/kg	5.20E+02	ug/kg	M	3.9E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	3.70E+03	ug/kg	3.70E+03	ug/kg	M	2.8E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	3.70E+03	ug/kg	3.70E+03	ug/kg	M	2.8E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	3.70E+03	ug/kg	3.70E+03	ug/kg	M	2.8E-06	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	3.5E-03
	n-Nitroso-di-n-propylamine	3.70E+03	ug/kg	3.70E+03	ug/kg	M	2.8E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												2.3E-02

TABLE 7.18.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	4,4'-DDD	3.70E+00	ug/kg	3.70E+00	ug/kg	M	9.2E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	3.70E+00	ug/kg	3.70E+00	ug/kg	M	9.2E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	3.70E+00	ug/kg	3.70E+00	ug/kg	M	9.2E-10	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	2.6E-06
	Aldrin	3.00E-01	ug/kg	3.00E-01	ug/kg	M	2.5E-10	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	1.7E-05
	alpha-Chlordane	1.10E+01	ug/kg	1.10E+01	ug/kg	M	3.7E-09	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	1.5E-05
	Aroclor-1248	3.70E+01	ug/kg	3.70E+01	ug/kg	M	4.3E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	3.70E+01	ug/kg	3.70E+01	ug/kg	M	4.3E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	3.70E+00	ug/kg	3.70E+00	ug/kg	M	3.1E-09	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	1.2E-04
	gamma-Chlordane	7.90E+00	ug/kg	7.90E+00	ug/kg	M	2.6E-09	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	1.0E-05
	Heptachlor epoxide	2.40E+00	ug/kg	2.40E+00	ug/kg	M	2.0E-09	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	2.1E-04
	Aluminum	8.51E+03	mg/kg	8.51E+03	mg/kg	M	7.1E-04	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	7.1E-03
	Antimony	7.20E-01	mg/kg	7.20E-01	mg/kg	M	6.0E-08	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	7.5E-03
	Arsenic	1.50E+00	mg/kg	1.50E+00	mg/kg	M	3.7E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	3.0E-03
	Cadmium	3.10E+00	mg/kg	3.10E+00	mg/kg	M	2.6E-08	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	2.6E-03
	Chromium	1.50E+01	mg/kg	1.50E+01	mg/kg	M	1.2E-06	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	3.1E-03
	Copper	7.09E+01	mg/kg	7.09E+01	mg/kg	M	5.9E-06	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	4.9E-04
	Iron	2.50E+03	mg/kg	2.50E+03	mg/kg	M	2.1E-04	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	2.3E-03
	Lead	2.54E+01	mg/kg	2.54E+01	mg/kg	M	2.1E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	5.00E-02	mg/kg	5.00E-02	mg/kg	M	4.1E-09	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	4.6E-05
	1,2-Dibromoethane	5.20E+02	ug/kg	5.20E+02	ug/kg	M	1.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	3.70E+03	ug/kg	3.70E+03	ug/kg	M	4.0E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	3.70E+03	ug/kg	3.70E+03	ug/kg	M	4.0E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	3.70E+03	ug/kg	3.70E+03	ug/kg	M	3.1E-06	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	7.7E-03
	n-Nitroso-di-n-propylamine	3.70E+03	ug/kg	3.70E+03	ug/kg	M	3.1E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												3.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	5.7E-02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Subchronic, if available. If subchronic value not available, chronic value used.

TABLE 7.19.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Emissions from exposed soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	4,4'-DDD	3.70E+00	ug/kg	2.31E-09	mg/m^3	R	4.9E-11	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	3.70E+00	ug/kg	2.31E-09	mg/m^3	R	4.9E-11	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	3.70E+00	ug/kg	2.31E-09	mg/m^3	R	4.9E-11	mg/kg-day	N/A	N/A	N/A	N/A	
	Aldrin	3.00E-01	ug/kg	1.88E-10	mg/m^3	R	4.0E-12	mg/kg-day	N/A	N/A	N/A	N/A	
	alpha-Chlordane	1.10E+01	ug/kg	6.88E-09	mg/m^3	R	1.5E-10	mg/kg-day	2.0E-04	mg/kg-day	7.0E-04	mg/m^3	7.3E-07
	Aroclor-1248	3.70E+01	ug/kg	2.31E-08	mg/m^3	R	4.9E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	3.70E+01	ug/kg	2.31E-08	mg/m^3	R	4.9E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	3.70E+00	ug/kg	2.31E-09	mg/m^3	R	4.9E-11	mg/kg-day	N/A	N/A	N/A	N/A	
	gamma-Chlordane	7.90E+00	ug/kg	4.94E-09	mg/m^3	R	1.1E-10	mg/kg-day	2.0E-04	mg/kg-day	7.0E-04	mg/m^3	5.3E-07
	Heptachlor epoxide	2.40E+00	ug/kg	1.50E-09	mg/m^3	R	3.2E-11	mg/kg-day	N/A	N/A	N/A	N/A	
	Aluminum	8.51E+03	mg/kg	5.32E-03	mg/m^3	R	1.1E-04	mg/kg-day	1.0E-03	mg/kg-day	5.0E-03	mg/m^3	1.1E-01
	Antimony	7.20E-01	mg/kg	4.50E-07	mg/m^3	R	9.6E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Arsenic	1.50E+00	mg/kg	9.38E-07	mg/m^3	R	2.0E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Cadmium	3.10E+00	mg/kg	1.94E-06	mg/m^3	R	4.1E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Chromium	1.50E+01	mg/kg	9.38E-06	mg/m^3	R	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	1.0E-03	mg/m^3	6.7E-04
	Copper	7.09E+01	mg/kg	4.43E-05	mg/m^3	R	9.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Iron	2.50E+03	mg/kg	1.56E-03	mg/m^3	R	3.3E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Lead	2.54E+01	mg/kg	1.59E-05	mg/m^3	R	3.4E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	5.00E-02	mg/kg	3.13E-08	mg/m^3	R	6.7E-10	mg/kg-day	8.6E-05	mg/kg-day	3.0E-04	mg/m^3	7.7E-06
	Carbon tetrachloride	5.20E+02	ug/kg	2.92E-04	mg/m^3	R	6.2E-06	mg/kg-day	5.7E-03	mg/kg-day	2.0E-02	mg/m^3	1.1E-03
	Chloroform	5.20E+02	ug/kg	2.27E-04	mg/m^3	R	4.8E-06	mg/kg-day	8.6E-04	mg/kg-day	3.0E-03	mg/m^3	5.6E-03
	cis-1,3-Dichloropropene	5.20E+02	ug/kg	3.28E-04	mg/m^3	R	7.0E-06	mg/kg-day	5.7E-03	mg/kg-day	2.0E-02	mg/m^3	1.2E-03
	trans-1,3-Dichloropropene	5.20E+02	ug/kg	3.28E-04	mg/m^3	R	7.0E-06	mg/kg-day	5.7E-03	mg/kg-day	2.0E-02	mg/m^3	1.2E-03
	Vinyl chloride	5.20E+02	ug/kg	5.81E-04	mg/m^3	R	1.2E-05	mg/kg-day	2.8E-02	mg/kg-day	1.0E-01	mg/m^3	4.3E-04
	bis(2-Chloroethyl)ether	3.70E+03	ug/kg	2.31E-06	mg/m^3	R	4.9E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	3.70E+03	ug/kg	2.31E-06	mg/m^3	R	4.9E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorocyclopentadiene	3.70E+03	ug/kg	2.31E-06	mg/m^3	R	4.9E-08	mg/kg-day	5.7E-05	mg/kg-day	2.0E-04	mg/m^3	8.6E-04
	n-Nitroso-di-n-propylamine	3.70E+03	ug/kg	2.31E-06	mg/m^3	R	4.9E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												1.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.2E-01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Subchronic, if available. If subchronic value not available, chronic value used.

Table 7.19.RME.UA Supplement
Calculations of Volatilization Factor and Soil Saturation Concentrations
MCAS Cherry Point, OU6 Site 12

Chemical	Diffusivity in Air (D_I) (cm^2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (D_W) (cm^2/s)	Soil Organic Carbon Partition Coeff. (K_{oc}) (cm^3/g)	Soil Water Partition Coeff. ($K_d = K_{oc} \times F_{oc}$) ($g/cm^3$)	Solubility in Water (S) (mg/L)	Apparent Diffusivity (D_A) (cm^2/s)	Volatilization Factor (VF) (m^3/kg)
Carbon tetrachloride	7.80E-02	1.25E+00	8.80E-06	1.74E+02	1.04E+00	7.93E+02	3.76E-03	1.78E+03
Chloroform	1.04E-01	1.50E-01	1.00E-05	3.98E+01	2.39E-01	7.92E+03	2.26E-03	2.30E+03
cis-1,3-Dichloropropene	6.26E-02	7.26E-01	1.00E-05	4.57E+01	2.74E-01	2.80E+03	4.73E-03	1.59E+03
trans-1,3-Dichloropropene	6.26E-02	7.26E-01	1.00E-05	4.57E+01	2.74E-01	2.80E+03	4.73E-03	1.59E+03
Vinyl chloride	1.06E-01	1.11E+00	1.23E-06	1.86E+01	1.12E-01	2.76E+03	1.49E-02	8.96E+02

Volatilization factor (VF) = (m^3/kg)

$$\frac{Q/C * (3.14 * D_A * T)^{1/2} * 10^{-4}\ m^2/cm^2}{2 * r_b * D_A}$$

Apparent Diffusivity (D_A) = (cm^2/s)

$$\frac{[(Q_a^{10/3} * D_I * H' + Q_w^{10/3} * D_W)/n^2]}{(r_b * K_d + Q_w + Q_a * H')}$$

Soil Saturation Concentration (C_{sat}) = (mg/kg)

$$S/r_b * (K_d * r_b + Q_w + H' * Q_a)$$

Parameters	Values
Q/C - Inverse of the mean concentration at the center of a 0.5-acre-square source (g/m^2-s per kg/m^3)	60.01
T - Exposure interval(s)	9.5E+08
r_b - Soil bulk density (g/cm^3)	1.5
Q_a - Air-filled soil porosity (L_{air}/L_{water}) = n - Q_w	0.28
n - Total soil porosity (Lpore/Lsoil) = 1 - (r_b/r_s)	0.43
Q_w - Water-filled soil porosity (Lwater/Lsoil)	0.15
r_s - Soil particle density (g/cm^3)	2.65
f_{oc} - fraction organic carbon in soil (g/g)	0.006

Q/C value for 2 acre source area in Raleigh-Durham from USEPA 1996, *Soil Screening Guidance: User's Guide, EPA/540/R-96/018.*

TABLE 7.20.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	8.3E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	3.4E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.4E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	2.8E-06
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	3.8E-10	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	1.3E-05
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	2.0E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	1.9E-09	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	3.8E-05
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	1.5E-08	mg/kg-day	1.00E-04	mg/kg-day	N/A	N/A	1.5E-04
	alpha-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	6.5E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.3E-05
	Aroclor-1260	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	gamma-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	6.5E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.3E-05
	Heptachlor epoxide	5.20E-02	µg/L	5.20E-02	µg/L	M	6.5E-09	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	5.0E-04
	Aluminum	7.81E+02	µg/L	7.81E+02	µg/L	M	9.8E-05	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	9.8E-05
	Antimony	4.90E+00	µg/L	4.90E+00	µg/L	M	6.1E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.5E-03
	Arsenic	3.00E+00	µg/L	3.00E+00	µg/L	M	3.8E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	1.3E-03
	Cadmium	1.30E+00	µg/L	1.30E+00	µg/L	M	1.6E-07	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	3.3E-04
	Chromium	1.20E+00	µg/L	1.20E+00	µg/L	M	1.5E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	7.5E-06
	Copper	6.60E+00	µg/L	6.60E+00	µg/L	M	8.3E-07	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	2.1E-05
	Iron	2.42E+02	µg/L	2.42E+02	µg/L	M	3.0E-05	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	5.1E-05
	Lead	1.70E+00	µg/L	1.70E+00	µg/L	M	2.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	6.0E-02	mg/kg-day	N/A	N/A	2.1E-06
	1,1,2-Trichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	3.1E-06

TABLE 7.20.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,1-Dichloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	9.0E-03	mg/kg-day	N/A	N/A	1.4E-05
	1,2-Dibromoethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	1,2-Dichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	4.2E-06
	1,2-Dichloropropane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Bromodichloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	6.3E-06
	Carbon tetrachloride	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	7.0E-03	mg/kg-day	N/A	N/A	1.8E-05
	Dibromochloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	2.0E-01	mg/kg-day	N/A	N/A	6.3E-07
	Tetrachloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	1.3E-06
	trans-1,3-Dichloropropene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	4.2E-06
	2,4,6-Trichlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	2,4-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	6.3E-04
	2,6-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	1.3E-04
	2-Chlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	5.0E-02	mg/kg-day	N/A	N/A	2.5E-05
	3,3'-Dichlorobenzidine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	2.50E+01	µg/L	2.50E+01	µg/L	M	3.1E-06	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	3.1E-02
	Acenaphthylene[3]	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	6.3E-05
	Benzo(a)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(b)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(k)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Ethylhexyl)phthalate	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	6.3E-05
	Carbazole	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Chrysene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	

TABLE 7.20.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Dibenz(a,h)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenzofuran	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	4.0E-03	mg/kg-day	N/A	N/A	3.1E-04
	Hexachlorobenzene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	1.6E-03
	Hexachlorobutadiene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	2.0E-04	mg/kg-day	N/A	N/A	6.3E-03
	Hexachloroethane	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	1.0E-02	mg/kg-day	N/A	N/A	1.3E-04
	Indeno(1,2,3-cd)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitrosodiphenylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Naphthalene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	6.3E-05
	Pentachlorophenol	2.50E+01	µg/L	2.50E+01	µg/L	M	3.1E-06	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	1.0E-04
	alpha-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	6.5E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1016	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	1.8E-03
	Aroclor-1221	2.10E+00	µg/L	2.10E+00	µg/L	M	2.6E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1232	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1242	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1254	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-07	mg/kg-day	2.0E-05	mg/kg-day	N/A	N/A	6.3E-03
	beta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	6.5E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	delta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	6.5E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Heptachlor	5.20E-02	µg/L	5.20E-02	µg/L	M	6.5E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.3E-05
	Toxaphene	5.20E-02	µg/L	5.20E-02	µg/L	M	6.5E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Thallium	3.50E+00	µg/L	3.50E+00	µg/L	M	4.4E-07	mg/kg-day	7.0E-05	mg/kg-day	N/A	N/A	6.3E-03
	(Total)												5.9E-02

TABLE 7.20.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	3.8E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.3E-06	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	3.6E-03
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	1.4E-09	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	9.1E-05
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	3.1E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	7.5E-08	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	3.0E-03
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	9.0E-09	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	1.0E-04
	alpha-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	1.1E-06	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	4.2E-03
	Aroclor-1260	1.00E+00	µg/L	1.00E+00	µg/L	M	2.0E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	gamma-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	1.1E-06	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	4.2E-03
	Heptachlor epoxide	5.20E-02	µg/L	5.20E-02	µg/L	M	1.7E-07	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	1.8E-02
	Aluminum	7.81E+02	µg/L	7.81E+02	µg/L	M	5.9E-05	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	5.9E-04
	Antimony	4.90E+00	µg/L	4.90E+00	µg/L	M	3.7E-07	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	4.6E-02
	Arsenic	3.00E+00	µg/L	3.00E+00	µg/L	M	2.3E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	1.9E-03
	Cadmium	1.30E+00	µg/L	1.30E+00	µg/L	M	9.8E-08	mg/kg-day	5.0E-06	mg/kg-day	N/A	N/A	2.0E-02
	Chromium	1.20E+00	µg/L	1.20E+00	µg/L	M	9.0E-08	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	2.3E-04
	Copper	6.60E+00	µg/L	6.60E+00	µg/L	M	5.0E-07	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	4.1E-05
	Iron	2.42E+02	µg/L	2.42E+02	µg/L	M	1.8E-05	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	2.0E-04
	Lead	1.70E+00	µg/L	1.70E+00	µg/L	M	5.1E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	8.2E-07	mg/kg-day	4.2E-02	mg/kg-day	N/A	N/A	2.0E-05

TABLE 7.20.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,1,2-Trichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.2E-07	mg/kg-day	3.2E-02	mg/kg-day	N/A	N/A	2.2E-05
	1,1-Dichloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.3E-06	mg/kg-day	9.0E-03	mg/kg-day	N/A	N/A	1.4E-04
	1,2-Dibromoethane	1.00E+00	µg/L	1.00E+00	µg/L	M	2.0E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	1,2-Dichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.3E-07	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	1.4E-05
	1,2-Dichloropropane	1.00E+00	µg/L	1.00E+00	µg/L	M	8.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Bromodichloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	5.3E-07	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	2.6E-05
	Carbon tetrachloride	1.00E+00	µg/L	1.00E+00	µg/L	M	1.9E-06	mg/kg-day	4.6E-03	mg/kg-day	N/A	N/A	4.1E-04
	Dibromochloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.1E-07	mg/kg-day	1.2E-01	mg/kg-day	N/A	N/A	3.4E-06
	Tetrachloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	4.0E-06	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	4.0E-05
	trans-1,3-Dichloropropene	1.00E+00	µg/L	1.00E+00	µg/L	M	4.6E-07	mg/kg-day	1.7E-02	mg/kg-day	N/A	N/A	2.7E-05
	2,4,6-Trichlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	4.3E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	2,4-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.6E-06	mg/kg-day	1.7E-03	mg/kg-day	N/A	N/A	2.1E-03
	2,6-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.4E-06	mg/kg-day	8.5E-03	mg/kg-day	N/A	N/A	2.8E-04
	2-Chlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	9.3E-06	mg/kg-day	2.5E-02	mg/kg-day	N/A	N/A	3.7E-04
	3,3'-Dichlorobenzidine	1.00E+01	µg/L	1.00E+01	µg/L	M	2.2E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	4,6-Dinitro-2-methylphenol	2.50E+01	µg/L	2.50E+01	µg/L	M	2.5E-05	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	2.5E-01
	Acenaphthylene[3]	1.00E+01	µg/L	1.00E+01	µg/L	M	8.9E-05	mg/kg-day	1.6E-02	mg/kg-day	N/A	N/A	5.5E-03
	Benzo(a)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	8.8E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.5E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(b)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.5E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(k)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.6E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Chloroethyl)ether	1.00E+01	µg/L	1.00E+01	µg/L	M	1.8E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	bis(2-Ethylhexyl)phthalate	1.00E+01	µg/L	1.00E+01	µg/L	M	1.1E-04	mg/kg-day	3.8E-03	mg/kg-day	N/A	N/A	2.9E-02
	Carbazole	1.00E+01	µg/L	1.00E+01	µg/L	M	6.3E-05	mg/kg-day	N/A	N/A	N/A	N/A	

TABLE 7.20.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Chrysene	1.00E+01	µg/L	1.00E+01	µg/L	M	8.8E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.2E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenzofuran	1.00E+01	µg/L	1.00E+01	µg/L	M	8.2E-05	mg/kg-day	2.0E-03	mg/kg-day	N/A	N/A	4.1E-02
	Hexachlorobenzene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.4E-04	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	8.4E-01
	Hexachlorobutadiene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.6E-04	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	1.6E+00
	Hexachloroethane	1.00E+01	µg/L	1.00E+01	µg/L	M	4.8E-05	mg/kg-day	5.0E-03	mg/kg-day	N/A	N/A	9.6E-03
	Indeno(1,2,3-cd)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.9E-03	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitroso-di-n-propylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	n-Nitrosodiphenylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	2.6E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Naphthalene	1.00E+01	µg/L	1.00E+01	µg/L	M	5.2E-05	mg/kg-day	1.6E-02	mg/kg-day	N/A	N/A	3.3E-03
	Pentachlorophenol	2.50E+01	µg/L	2.50E+01	µg/L	M	2.3E-03	mg/kg-day	3.0E-02	mg/kg-day	N/A	N/A	7.7E-02
	alpha-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1016	1.00E+00	µg/L	1.00E+00	µg/L	M	2.0E-04	mg/kg-day	6.3E-05	mg/kg-day	N/A	N/A	3.1E+00
	Aroclor-1221	2.10E+00	µg/L	2.10E+00	µg/L	M	4.1E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1232	1.00E+00	µg/L	1.00E+00	µg/L	M	2.0E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1242	1.00E+00	µg/L	1.00E+00	µg/L	M	2.0E-04	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1254	1.00E+00	µg/L	1.00E+00	µg/L	M	2.0E-04	mg/kg-day	1.8E-05	mg/kg-day	N/A	N/A	1.1E+01
	beta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	delta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.2E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Heptachlor	5.20E-02	µg/L	5.20E-02	µg/L	M	1.7E-07	mg/kg-day	3.6E-04	mg/kg-day	N/A	N/A	4.8E-04
	Toxaphene	5.20E-02	µg/L	5.20E-02	µg/L	M	3.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Thallium	3.50E+00	µg/L	3.50E+00	µg/L	M	2.6E-07	mg/kg-day	1.1E-05	mg/kg-day	N/A	N/A	2.4E-02
	(Total)												1.7E+01
												Total Hazard Index Across All Exposure Routes/Pathways	1.7E+01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Subchronic, if available. If subchronic value not available, chronic value used.

Table 7.20.RME.UA Supplement
Calculation of Daevent
Construction Worker, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm²-event)	Eq
4,4'-DDD	6.60E-03	2.8E-01	7.8E+00	3.7E+01	6.3E+01	8	4.0E-08	2
4,4'-DDE	2.70E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	8	1.4E-07	2
4,4'-DDT	1.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	8	1.3E-07	2
Aldrin	3.00E-03	1.6E-03	1.5E+01	3.6E+01	1.0E-01	8	1.5E-10	2
Aroclor-1248	1.60E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	3.3E-05	2
Dieldrin	1.50E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	8	8.0E-09	2
Mercury	1.20E-01	1.0E-03	N/A	N/A	N/A	8	9.6E-10	1
alpha-Chlordane	5.20E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	1.1E-07	2
Aroclor-1260	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
gamma-Chlordane	5.20E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	1.1E-07	2
Heptachlor epoxide	5.20E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	1.8E-08	2
Aluminum	7.81E+02	1.0E-03	NA	NA	NA	8	6.2E-06	1
Antimony	4.90E+00	1.0E-03	NA	NA	NA	8	3.9E-08	1
Arsenic	3.00E+00	1.0E-03	NA	NA	NA	8	2.4E-08	1
Cadmium	1.30E+00	1.0E-03	NA	NA	NA	8	1.0E-08	1
Chromium	1.20E+00	1.0E-03	NA	NA	NA	8	9.6E-09	1
Copper	6.60E+00	1.0E-03	NA	NA	NA	8	5.3E-08	1
Iron	2.42E+02	1.0E-03	NA	NA	NA	8	1.9E-06	1
Lead	1.70E+00	4.0E-06	N/A	N/A	N/A	8	5.4E-11	1
1,1,2,2-Tetrachloroethane	1.00E+00	9.0E-03	9.2E-01	2.2E+00	2.5E-02	8	8.8E-08	3
1,1,2-Trichloroethane	1.00E+00	8.4E-03	5.7E-01	1.4E+00	1.1E-02	8	7.6E-08	3
1,1-Dichloroethene	1.00E+00	1.6E-02	3.4E-01	8.2E-01	1.3E-02	8	1.4E-07	3
1,2-Dibromoethane	1.00E+00	2.0E-04	1.3E+00	3.0E+00	1.3E-04	8	2.1E-09	3
1,2-Dichloroethane	1.00E+00	5.3E-03	3.5E-01	8.4E-01	3.0E-03	8	4.6E-08	3
1,2-Dichloropropane	1.00E+00	1.0E-02	4.3E-01	1.0E+00	1.0E-02	8	8.8E-08	3
Bromodichloromethane	1.00E+00	5.8E-03	8.7E-01	2.1E+00	1.2E-02	8	5.6E-08	3
Carbon tetrachloride	1.00E+00	2.2E-02	7.6E-01	1.8E+00	6.8E-02	8	2.0E-07	3
Dibromochloromethane	1.00E+00	3.9E-03	1.6E+00	3.9E+00	1.7E-02	8	4.4E-08	3
Tetrachloroethene	1.00E+00	4.8E-02	9.0E-01	4.3E+00	2.5E-01	8	4.3E-07	3
trans-1,3-Dichloropropene	1.00E+00	5.5E-03	4.2E-01	1.0E+00	4.0E-03	8	4.8E-08	3
2,4,6-Trichlorophenol	1.00E+01	5.0E-02	1.4E+00	9.2E+00	4.9E-01	8	4.6E-06	2
2,4-Dinitrotoluene	1.00E+01	3.8E-03	1.1E+00	2.7E+00	9.5E-03	8	3.9E-07	3
2,6-Dinitrotoluene	1.00E+01	2.5E-03	1.1E+00	2.7E+00	5.2E-03	8	2.5E-07	3
2-Chlorophenol	1.00E+01	1.1E-02	5.3E-01	1.3E+00	1.4E-02	8	9.9E-07	3
3,3'-Dichlorobenzidine	1.00E+01	1.7E-02	3.1E+00	1.7E+01	NA	8	2.3E-06	2
4,6-Dinitro-2-methylphenol	2.50E+01	9.8E-03	1.4E+00	3.4E+00	5.0E-02	8	2.6E-06	3
Acenaphthylene	1.00E+01	1.3E-01	7.4E-01	5.8E+00	7.9E-01	8	9.4E-06	3
Benzo(a)anthracene	1.00E+01	8.1E-01	2.2E+00	1.0E+01	4.6E+01	8	9.4E-05	2
Benzo(a)pyrene	1.00E+01	1.2E+00	2.9E+00	1.4E+01	1.3E+02	8	1.6E-04	2
Benzo(b)fluoranthene	1.00E+01	1.2E+00	3.0E+00	1.4E+01	1.3E+02	8	1.6E-04	2
Benzo(k)fluoranthene	1.00E+01	2.8E+00	3.0E+00	1.4E+01	1.2E+02	8	3.8E-04	2
bis(2-Chloroethyl)ether	1.00E+01	2.1E-03	6.5E-01	1.6E+00	1.9E-03	8	2.0E-07	3
bis(2-Ethylhexyl)phthalate	1.00E+01	3.3E-02	2.1E+01	1.0E+02	1.3E+01	8	1.2E-05	2
Carbazole	1.00E+01	8.0E-02	9.2E-01	6.2E+00	5.2E-01	8	6.7E-06	3
Chrysene	1.00E+01	8.1E-01	2.2E+00	1.0E+01	4.6E+01	8	9.4E-05	2
Dibenz(a,h)anthracene	1.00E+01	2.7E+00	4.4E+00	2.1E+01	6.9E+02	8	4.4E-04	2
Dibenzofuran	1.00E+01	1.1E-01	9.3E-01	7.3E+00	8.1E-01	8	8.7E-06	3

Table 7.20.RME.UA Supplement
Calculation of Daevent
Construction Worker, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm²-event)	Eq
Hexachlorobenzene	1.00E+01	2.1E-01	4.8E+00	2.3E+01	2.0E+01	8	3.6E-05	2
Hexachlorobutadiene	1.00E+01	1.2E-01	3.4E+00	1.7E+01	6.0E+00	8	1.7E-05	2
Hexachloroethane	1.00E+01	4.2E-02	2.4E+00	1.9E+01	8.5E-01	8	5.1E-06	2
Indeno(1,2,3-cd)pyrene	1.00E+01	1.9E+00	4.2E+00	2.0E+01	3.8E+02	8	3.0E-04	2
n-Nitroso-di-n-propylamine	1.00E+01	3.1E-04	5.4E-01	1.0E-04	1.3E+00	8	1.8E-08	3
n-Nitrosodiphenylamine	1.00E+01	3.6E-02	5.3E-01	7.6E+00	3.2E-01	8	2.7E-06	3
Naphthalene	1.00E+01	6.9E-02	5.3E-01	2.2E+00	2.0E-01	8	5.6E-06	3
Pentachlorophenol	2.50E+01	6.5E-01	3.7E+00	1.7E+01	7.2E+01	8	2.4E-04	2
alpha-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	1.3E-08	2
Aroclor-1016	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1221	2.10E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	4.4E-05	2
Aroclor-1232	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1242	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1254	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
beta-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	1.3E-08	2
delta-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	1.3E-08	2
Heptachlor	5.20E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	1.8E-08	2
Toxaphene	5.20E-02	1.5E-02	2.9E+01	1.4E+02	6.6E+00	8	3.3E-08	2
Thallium	3.50E+00	1.0E-03	NA	NA	NA	8	2.8E-08	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CSW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CSW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CSW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

TABLE 7.21.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake Non-Cancer	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	6.5E-03	mg/kg-day	1.0E+00	mg/kg-day	N/A	N/A	6.5E-03
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	8.3E-07	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	2.8E-03
	4,4'-DDD	6.20E+00	ug/kg	6.20E+00	ug/kg	M	4.7E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	1.60E+00	ug/kg	1.60E+00	ug/kg	M	1.2E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E+01	ug/kg	1.10E+01	ug/kg	M	8.3E-09	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	1.7E-05
	Aldrin	4.50E+00	ug/kg	4.50E+00	ug/kg	M	3.4E-09	mg/kg-day	3.0E-05	mg/kg-day	N/A	N/A	1.1E-04
	alpha-Chlordane	3.60E+01	ug/kg	3.60E+01	ug/kg	M	2.7E-08	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	5.4E-05
	Aroclor-1248	9.10E+01	ug/kg	9.10E+01	ug/kg	M	6.8E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	9.10E+01	ug/kg	9.10E+01	ug/kg	M	6.8E-08	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.00E-01	ug/kg	7.00E-01	ug/kg	M	5.3E-10	mg/kg-day	5.0E-05	mg/kg-day	N/A	N/A	1.1E-05
	gamma-Chlordane	3.10E+01	ug/kg	3.10E+01	ug/kg	M	2.3E-08	mg/kg-day	5.0E-04	mg/kg-day	N/A	N/A	4.7E-05
	Heptachlor epoxide	2.60E+00	ug/kg	2.60E+00	ug/kg	M	2.0E-09	mg/kg-day	1.3E-05	mg/kg-day	N/A	N/A	1.5E-04
	Antimony	1.30E+00	mg/kg	1.30E+00	mg/kg	M	9.8E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	2.4E-03
	Cadmium	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.1E-06	mg/kg-day	1.0E-03	mg/kg-day	N/A	N/A	2.1E-03
	Chromium	1.16E+01	mg/kg	1.16E+01	mg/kg	M	8.7E-06	mg/kg-day	2.0E-02	mg/kg-day	N/A	N/A	4.4E-04
	Copper	1.26E+01	mg/kg	1.26E+01	mg/kg	M	9.5E-06	mg/kg-day	4.0E-02	mg/kg-day	N/A	N/A	2.4E-04
	Iron	3.34E+03	mg/kg	3.34E+03	mg/kg	M	2.5E-03	mg/kg-day	6.0E-01	mg/kg-day	N/A	N/A	4.2E-03
	Lead	3.26E+01	mg/kg	3.26E+01	mg/kg	M	2.4E-05	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	7.00E-02	mg/kg	7.00E-02	mg/kg	M	5.3E-08	mg/kg-day	1.0E-04	mg/kg-day	N/A	N/A	5.3E-04

TABLE 7.21.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake Non-Cancer	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	1,2-Dibromoethane	1.30E+01	ug/kg	1.30E+01	ug/kg	M	9.8E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	3.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	3.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	3.7E-07	mg/kg-day	8.0E-04	mg/kg-day	N/A	N/A	4.6E-04
	n-Nitroso-di-n-propylamine	4.90E+02	ug/kg	4.90E+02	ug/kg	M	3.7E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												2.0E-02
Dermal	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	7.2E-04	mg/kg-day	1.0E-01	mg/kg-day	N/A	N/A	7.2E-03
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.7E-07	mg/kg-day	1.2E-04	mg/kg-day	N/A	N/A	2.2E-03
	4,4'-DDD	6.20E+00	ug/kg	6.20E+00	ug/kg	M	1.5E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDE	1.60E+00	ug/kg	1.60E+00	ug/kg	M	4.0E-10	mg/kg-day	N/A	N/A	N/A	N/A	
	4,4'-DDT	1.10E+01	ug/kg	1.10E+01	ug/kg	M	2.7E-09	mg/kg-day	3.5E-04	mg/kg-day	N/A	N/A	7.8E-06
	Aldrin	4.50E+00	ug/kg	4.50E+00	ug/kg	M	3.7E-09	mg/kg-day	1.5E-05	mg/kg-day	N/A	N/A	2.5E-04
	alpha-Chlordane	3.60E+01	ug/kg	3.60E+01	ug/kg	M	1.2E-08	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	4.8E-05
	Aroclor-1248	9.10E+01	ug/kg	9.10E+01	ug/kg	M	1.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Aroclor-1260	9.10E+01	ug/kg	9.10E+01	ug/kg	M	1.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dieldrin	7.00E-01	ug/kg	7.00E-01	ug/kg	M	5.8E-10	mg/kg-day	2.5E-05	mg/kg-day	N/A	N/A	2.3E-05
	gamma-Chlordane	3.10E+01	ug/kg	3.10E+01	ug/kg	M	1.0E-08	mg/kg-day	2.5E-04	mg/kg-day	N/A	N/A	4.1E-05
	Heptachlor epoxide	2.60E+00	ug/kg	2.60E+00	ug/kg	M	2.2E-09	mg/kg-day	9.4E-06	mg/kg-day	N/A	N/A	2.3E-04
	Antimony	1.30E+00	mg/kg	1.30E+00	mg/kg	M	1.1E-07	mg/kg-day	8.0E-06	mg/kg-day	N/A	N/A	1.3E-02

TABLE 7.21.RME.UA
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake Non-Cancer	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Cadmium	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.3E-08	mg/kg-day	1.0E-05	mg/kg-day	N/A	N/A	2.3E-03
	Chromium	1.16E+01	mg/kg	1.16E+01	mg/kg	M	9.6E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	2.4E-03
	Copper	1.26E+01	mg/kg	1.26E+01	mg/kg	M	1.0E-06	mg/kg-day	1.2E-02	mg/kg-day	N/A	N/A	8.7E-05
	Iron	3.34E+03	mg/kg	3.34E+03	mg/kg	M	2.8E-04	mg/kg-day	9.0E-02	mg/kg-day	N/A	N/A	3.1E-03
	Lead	3.26E+01	mg/kg	3.26E+01	mg/kg	M	2.7E-06	mg/kg-day	N/A	N/A	N/A	N/A	
	Mercury	7.00E-02	mg/kg	7.00E-02	mg/kg	M	5.8E-09	mg/kg-day	9.0E-05	mg/kg-day	N/A	N/A	6.5E-05
	1,2-Dibromoethane	1.30E+01	ug/kg	1.30E+01	ug/kg	M	3.2E-09	mg/kg-day	N/A	N/A	N/A	N/A	
	Benzo(a)pyrene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	5.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Dibenz(a,h)anthracene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	5.3E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	Hexachlorobenzene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	4.1E-07	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.0E-03
	n-Nitroso-di-n-propylamine	4.90E+02	ug/kg	4.90E+02	ug/kg	M	4.1E-07	mg/kg-day	N/A	N/A	N/A	N/A	
	(Total)												3.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	5.2E-02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Subchronic, if available. If subchronic value not available, chronic value used.

TABLE 8.1.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	6.1E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.2E-07
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	2.0E-15	mg/kg-day	1.5E+05	(mg/kg-day) $^{-1}$	3.0E-10
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	4.2E-03	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	1.3E-06	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	2.1E-06	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	9.1E-06	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	2.3E-04	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	1.4E-03	mg/kg-day	N/A	N/A	
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	1.4E-09	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	3.4E-10
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	7.7E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	2.6E-10
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	1.5E-09	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	5.1E-10
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	7.0E-10	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	1.2E-08
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	1.6E-08	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	5.6E-09
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	1.4E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	2.9E-08
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	2.7E-09	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	4.2E-08
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	1.5E-08	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	5.3E-09
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	2.1E-09	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	1.9E-08
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	5.8E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	8.6E-07
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	3.2E-08	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	1.9E-09	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	1.6E-07
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.7E-07	mg/kg-day	4.5E-01	(mg/kg-day) $^{-1}$	7.8E-08

TABLE 8.1.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	4.2E-07	mg/kg-day	N/A		
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.7E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	1.3E-07
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.7E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.3E-06
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.7E-07	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	1.9E-07
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.7E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.3E-06
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.7E-07	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	2.8E-07
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.7E-07	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	1.4E-08
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.7E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	1.3E-07
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.7E-07	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	1.2E-06
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.7E-07	mg/kg-day	N/A	N/A	
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	4.2E-07	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	5.1E-08
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	2.8E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	5.7E-08
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	7.0E-08	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	7.7E-08
	(Total)										6.0E-06
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	4.5E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.0E-06
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	3.2E-15	mg/kg-day	3.0E+05	(mg/kg-day) $^{-1}$	9.6E-10
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	2.2E-03	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	6.8E-07	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	1.1E-07	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	4.8E-06	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	1.2E-04	mg/kg-day	N/A	N/A	

TABLE 8.1.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	7.3E-04	mg/kg-day	N/A	N/A	
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	2.2E-09	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	7.7E-10
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	1.2E-09	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	6.0E-10
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	2.4E-09	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	1.2E-09
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	3.7E-09	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	1.3E-07
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	3.4E-08	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	2.4E-08
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	1.1E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.4E-07
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	1.4E-08	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	4.5E-07
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	3.2E-08	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	2.2E-08
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	1.1E-08	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	1.4E-07
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	9.2E-07	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	3.4E-06
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	1.7E-08	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	3.1E-09	mg/kg-day	1.1E+02	(mg/kg-day) $^{-1}$	3.2E-07
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.2E-07	mg/kg-day	9.0E-01	(mg/kg-day) $^{-1}$	8.3E-07
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	2.2E-06	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.2E-06	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	2.8E-06
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.2E-06	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	2.8E-05
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.2E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.0E-06
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.2E-06	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	2.8E-05
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.2E-07	mg/kg-day	3.2E+00	(mg/kg-day) $^{-1}$	3.0E-06
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.2E-07	mg/kg-day	1.6E-01	(mg/kg-day) $^{-1}$	1.4E-07
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.2E-06	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	2.8E-06

TABLE 8.1.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.2E-07	mg/kg-day	2.8E+01	(mg/kg-day) $^{-1}$	2.6E-05
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.2E-07	mg/kg-day	N/A	N/A	
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	5.6E-06	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	6.7E-07
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	2.1E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	4.7E-07
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	3.7E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	8.2E-07
	(Total)										1.0E-04
										Total Risk Across All Exposure Routes/Pathways	1.1E-04

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.2.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	6.8E-09	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.4E-08
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	2.3E-16	mg/kg-day	1.5E+05	(mg/kg-day) $^{-1}$	3.4E-11
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	4.7E-04	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	1.4E-07	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	2.4E-07	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	1.0E-06	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	2.6E-05	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	1.5E-04	mg/kg-day	N/A	N/A	
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	1.6E-10	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	3.8E-11
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	8.7E-11	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	2.9E-11
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	1.7E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	5.7E-11
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	7.9E-11	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	1.3E-09
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	1.8E-09	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	6.2E-10
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	1.6E-09	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.2E-09
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	3.0E-10	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	4.8E-09
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	1.7E-09	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	5.9E-10
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	2.3E-10	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	2.1E-09
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	6.5E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	9.7E-08
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	3.6E-09	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	2.1E-10	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	1.8E-08
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-08	mg/kg-day	4.5E-01	(mg/kg-day) $^{-1}$	8.8E-09
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	4.7E-08	mg/kg-day	N/A	N/A	

TABLE 8.2.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-08	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	1.4E-08
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-08	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.4E-07
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-08	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	2.1E-08
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-08	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.4E-07
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-08	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	3.1E-08
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-08	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	1.5E-09
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-08	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	1.4E-08
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-08	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	1.4E-07
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-08	mg/kg-day	N/A	N/A	
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	4.7E-08	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	5.7E-09
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	3.2E-09	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	6.4E-09
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	7.9E-09	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	8.6E-09
	(Total)										6.8E-07
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	4.4E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	9.7E-08
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	3.1E-16	mg/kg-day	3.0E+05	(mg/kg-day) $^{-1}$	9.3E-11
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	2.2E-04	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	6.6E-08	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	1.1E-08	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	4.7E-07	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	1.2E-05	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	7.0E-05	mg/kg-day	N/A	N/A	

TABLE 8.2.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	2.2E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	7.4E-11
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	1.2E-10	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	5.8E-11
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	2.3E-10	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	1.1E-10
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	3.6E-10	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	1.2E-08
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	3.3E-09	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	2.3E-09
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	1.0E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.3E-08
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	1.4E-09	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	4.4E-08
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	3.1E-09	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	2.2E-09
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	1.1E-09	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	1.3E-08
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	8.9E-08	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	3.3E-07
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	1.6E-09	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	3.0E-10	mg/kg-day	1.1E+02	(mg/kg-day) $^{-1}$	3.2E-08
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.0E-08	mg/kg-day	9.0E-01	(mg/kg-day) $^{-1}$	8.1E-08
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	2.2E-07	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.2E-07	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	2.7E-07
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.2E-07	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	2.7E-06
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.0E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.0E-07
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.2E-07	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	2.7E-06
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.0E-08	mg/kg-day	3.2E+00	(mg/kg-day) $^{-1}$	2.9E-07
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.0E-08	mg/kg-day	1.6E-01	(mg/kg-day) $^{-1}$	1.4E-08
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.2E-07	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	2.7E-07
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.0E-08	mg/kg-day	2.8E+01	(mg/kg-day) $^{-1}$	2.5E-06
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.0E-08	mg/kg-day	N/A	N/A	

TABLE 8.2.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	5.5E-07	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	6.5E-08
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	2.0E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	4.6E-08
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	3.6E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	7.9E-08
	(Total)										9.9E-06
										Total Risk Across All Exposure Routes/Pathways	1.1E-05

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.3.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	4.36E-18	mg/m^3	R	1.0E-19	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	1.5E-14
	4,4'-DDD	4.02E+00	ug/kg	3.04E-12	mg/m^3	R	7.1E-14	mg/kg-day	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	1.67E-12	mg/m^3	R	3.9E-14	mg/kg-day	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	3.25E-12	mg/m^3	R	7.5E-14	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	2.6E-14
	Aldrin	2.01E+00	ug/kg	1.52E-12	mg/m^3	R	3.5E-14	mg/kg-day	1.7E+01	$(mg/kg\text{-}day)^{-1}$	6.0E-13
	alpha-Chlordane	4.54E+01	ug/kg	3.44E-11	mg/m^3	R	8.0E-13	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	2.8E-13
	Aroclor-1248	4.08E+01	ug/kg	3.09E-11	mg/m^3	R	7.2E-13	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-12
	Aroclor-1260	1.74E+02	ug/kg	1.32E-10	mg/m^3	R	3.1E-12	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	6.1E-12
	Dieldrin	7.60E+00	ug/kg	5.76E-12	mg/m^3	R	1.3E-13	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	2.1E-12
	gamma-Chlordane	4.33E+01	ug/kg	3.28E-11	mg/m^3	R	7.6E-13	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-13
	Heptachlor epoxide	5.89E+00	ug/kg	4.47E-12	mg/m^3	R	1.0E-13	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	9.4E-13
	Aluminum	1.20E+04	mg/kg	9.08E-06	mg/m^3	R	2.1E-07	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	2.76E-09	mg/m^3	R	6.4E-11	mg/kg-day	N/A	N/A	
	Arsenic	1.65E+00	mg/kg	1.25E-09	mg/m^3	R	2.9E-11	mg/kg-day	1.5E+01	$(mg/kg\text{-}day)^{-1}$	4.3E-10
	Cadmium	6.05E+00	mg/kg	4.58E-09	mg/m^3	R	1.1E-10	mg/kg-day	6.3E+00	$(mg/kg\text{-}day)^{-1}$	6.7E-10
	Chromium	2.61E+01	mg/kg	1.97E-08	mg/m^3	R	4.6E-10	mg/kg-day	4.1E+01	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	Copper	6.67E+02	mg/kg	5.05E-07	mg/m^3	R	1.2E-08	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	2.97E-06	mg/m^3	R	6.9E-08	mg/kg-day	N/A	N/A	
	Mercury	9.13E-02	mg/kg	6.91E-11	mg/m^3	R	1.6E-12	mg/kg-day	N/A	N/A	
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	8.8E-12	mg/kg-day	1.1E+00	$(mg/kg\text{-}day)^{-1}$	9.6E-12
	Hexachlorobenzene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	8.8E-12	mg/kg-day	1.6E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-11
	Hexachlorocyclopentadiene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	8.8E-12	mg/kg-day	N/A	N/A	
											2.0E-08
										Total Risk Across All Exposure Routes/Pathways	2.0E-08

TABLE 8.3.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.4.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	4.36E-18	mg/m^3	R	2.8E-21	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	4.2E-16
	4,4'-DDD	4.02E+00	ug/kg	3.04E-12	mg/m^3	R	2.0E-15	mg/kg-day	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	1.67E-12	mg/m^3	R	1.1E-15	mg/kg-day	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	3.25E-12	mg/m^3	R	2.1E-15	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	7.2E-16
	Aldrin	2.01E+00	ug/kg	1.52E-12	mg/m^3	R	9.9E-16	mg/kg-day	1.7E+01	$(mg/kg\text{-}day)^{-1}$	1.7E-14
	alpha-Chlordane	4.54E+01	ug/kg	3.44E-11	mg/m^3	R	2.2E-14	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	7.8E-15
	Aroclor-1248	4.08E+01	ug/kg	3.09E-11	mg/m^3	R	2.0E-14	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-14
	Aroclor-1260	1.74E+02	ug/kg	1.32E-10	mg/m^3	R	8.6E-14	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-13
	Dieldrin	7.60E+00	ug/kg	5.76E-12	mg/m^3	R	3.7E-15	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	6.0E-14
	gamma-Chlordane	4.33E+01	ug/kg	3.28E-11	mg/m^3	R	2.1E-14	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	7.5E-15
	Heptachlor epoxide	5.89E+00	ug/kg	4.47E-12	mg/m^3	R	2.9E-15	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-14
	Aluminum	1.20E+04	mg/kg	9.08E-06	mg/m^3	R	5.9E-09	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	2.76E-09	mg/m^3	R	1.8E-12	mg/kg-day	N/A	N/A	
	Arsenic	1.65E+00	mg/kg	1.25E-09	mg/m^3	R	8.1E-13	mg/kg-day	1.5E+01	$(mg/kg\text{-}day)^{-1}$	1.2E-11
	Cadmium	6.05E+00	mg/kg	4.58E-09	mg/m^3	R	3.0E-12	mg/kg-day	6.3E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-11
	Chromium	2.61E+01	mg/kg	1.97E-08	mg/m^3	R	1.3E-11	mg/kg-day	4.1E+01	$(mg/kg\text{-}day)^{-1}$	5.3E-10
	Copper	6.67E+02	mg/kg	5.05E-07	mg/m^3	R	3.3E-10	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	2.97E-06	mg/m^3	R	1.9E-09	mg/kg-day	N/A	N/A	
	Mercury	9.13E-02	mg/kg	6.91E-11	mg/m^3	R	4.5E-14	mg/kg-day	N/A	N/A	
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	2.5E-13	mg/kg-day	1.1E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-13
	Hexachlorobenzene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	2.5E-13	mg/kg-day	1.6E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-13
	Hexachlorocyclopentadiene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	2.5E-13	mg/kg-day	N/A	N/A	
	(Total)										5.6E-10
										Total Risk Across All Exposure Routes/Pathways	5.6E-10

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.5.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	1.1E-10	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	2.7E-11
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	4.5E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.5E-10
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.8E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	6.3E-11
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	5.0E-11	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	8.6E-10
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	2.7E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	5.4E-08
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	2.5E-10	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	4.0E-09
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	2.0E-09	mg/kg-day	N/A	N/A	
	alpha-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	3.1E-10
	Aroclor-1260	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.4E-08
	gamma-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	3.1E-10
	Heptachlor epoxide	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	7.9E-09
	Aluminum	7.81E+02	µg/L	7.81E+02	µg/L	M	1.3E-05	mg/kg-day	N/A	N/A	
	Antimony	4.90E+00	µg/L	4.90E+00	µg/L	M	8.2E-08	mg/kg-day	N/A	N/A	
	Arsenic	3.00E+00	µg/L	3.00E+00	µg/L	M	5.0E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	7.5E-08
	Cadmium	1.30E+00	µg/L	1.30E+00	µg/L	M	2.2E-08	mg/kg-day	N/A	N/A	
	Chromium	1.20E+00	µg/L	1.20E+00	µg/L	M	2.0E-08	mg/kg-day	N/A	N/A	
	Copper	6.60E+00	µg/L	6.60E+00	µg/L	M	1.1E-07	mg/kg-day	N/A	N/A	
	Iron	2.42E+02	µg/L	2.42E+02	µg/L	M	4.1E-06	mg/kg-day	N/A	N/A	
	Lead	1.70E+00	µg/L	1.70E+00	µg/L	M	2.9E-08	mg/kg-day	N/A	N/A	
	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	3.4E-09
	1,1,2-Trichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	5.7E-02	(mg/kg-day) $^{-1}$	9.6E-10
	1,1-Dichloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	6.0E-01	(mg/kg-day) $^{-1}$	1.0E-08

TABLE 8.5.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	1,2-Dibromoethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	1.4E-06
	1,2-Dichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	1.5E-09
	1,2-Dichloropropane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	6.8E-02	(mg/kg-day) $^{-1}$	1.1E-09
	Bromodichloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	6.2E-02	(mg/kg-day) $^{-1}$	1.0E-09
	Carbon tetrachloride	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	1.3E-01	(mg/kg-day) $^{-1}$	2.2E-09
	Dibromochloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	8.4E-02	(mg/kg-day) $^{-1}$	1.4E-09
	Tetrachloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	5.2E-02	(mg/kg-day) $^{-1}$	8.7E-10
	trans-1,3-Dichloropropene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	1.7E-09
	2,4,6-Trichlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	1.1E-02	(mg/kg-day) $^{-1}$	1.8E-09
	2,4-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	
	2,6-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	
	2-Chlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	
	3,3'-Dichlorobenzidine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	4.5E-01	(mg/kg-day) $^{-1}$	7.5E-08
	4,6-Dinitro-2-methylphenol	2.50E+01	µg/L	2.50E+01	µg/L	M	4.2E-07	mg/kg-day	N/A	N/A	
	Acenaphthylene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	1.2E-07
	Benzo(a)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.2E-06
	Benzo(b)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	1.2E-07
	Benzo(k)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E-02	(mg/kg-day) $^{-1}$	1.2E-08
	bis(2-Chloroethyl)ether	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	1.8E-07
	bis(2-Ethylhexyl)phthalate	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	1.4E-02	(mg/kg-day) $^{-1}$	2.3E-09
	Carbazole	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	2.0E-02	(mg/kg-day) $^{-1}$	3.4E-09
	Chrysene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E-03	(mg/kg-day) $^{-1}$	1.2E-09
	Dibenz(a,h)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.2E-06
	Dibenzofuran	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	

TABLE 8.5.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Hexachlorobenzene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	2.7E-07
	Hexachlorobutadiene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	1.3E-08
	Hexachloroethane	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	1.4E-02	(mg/kg-day) $^{-1}$	2.3E-09
	Indeno(1,2,3-cd)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	1.2E-07
	n-Nitroso-di-n-propylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	1.2E-06
	n-Nitrosodiphenylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	4.9E-03	(mg/kg-day) $^{-1}$	8.2E-10
	Naphthalene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	
	Pentachlorophenol	2.50E+01	µg/L	2.50E+01	µg/L	M	4.2E-07	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	5.0E-08
	alpha-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	6.3E+00	(mg/kg-day) $^{-1}$	5.5E-09
	Aroclor-1016	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	7.0E-02	(mg/kg-day) $^{-1}$	1.2E-09
	Aroclor-1221	2.10E+00	µg/L	2.10E+00	µg/L	M	3.5E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	7.0E-08
	Aroclor-1232	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.4E-08
	Aroclor-1242	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.4E-08
	Aroclor-1254	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.4E-08
	beta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	1.8E+00	(mg/kg-day) $^{-1}$	1.6E-09
	delta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	N/A	N/A	
	Heptachlor	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	4.5E+00	(mg/kg-day) $^{-1}$	3.9E-09
	Toxaphene	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	9.6E-10
	Thallium	3.50E+00	µg/L	3.50E+00	µg/L	M	5.9E-08	mg/kg-day	N/A	N/A	
	(Total)										6.4E-06
Dermal	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	5.1E-08	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.7E-08
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.8E-07	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	8.5E-08
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.7E-07	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	8.1E-08

TABLE 8.5.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	1.8E-10	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	6.2E-09
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	4.2E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	9.2E-05
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	1.0E-08	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	3.2E-07
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	1.2E-09	mg/kg-day	N/A	N/A	
	alpha-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	1.4E-07	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	9.9E-08
	Aroclor-1260	1.00E+00	µg/L	1.00E+00	µg/L	M	2.6E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	5.8E-05
	gamma-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	1.4E-07	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	9.9E-08
	Heptachlor epoxide	5.20E-02	µg/L	5.20E-02	µg/L	M	2.3E-08	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	2.9E-07
	Aluminum	7.81E+02	µg/L	7.81E+02	µg/L	M	7.9E-06	mg/kg-day	N/A	N/A	
	Antimony	4.90E+00	µg/L	4.90E+00	µg/L	M	4.9E-08	mg/kg-day	N/A	N/A	
	Arsenic	3.00E+00	µg/L	3.00E+00	µg/L	M	3.0E-08	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	1.1E-07
	Cadmium	1.30E+00	µg/L	1.30E+00	µg/L	M	1.3E-08	mg/kg-day	N/A	N/A	
	Chromium	1.20E+00	µg/L	1.20E+00	µg/L	M	1.2E-08	mg/kg-day	N/A	N/A	
	Copper	6.60E+00	µg/L	6.60E+00	µg/L	M	6.6E-08	mg/kg-day	N/A	N/A	
	Iron	2.42E+02	µg/L	2.42E+02	µg/L	M	2.4E-06	mg/kg-day	N/A	N/A	
	Lead	1.70E+00	µg/L	1.70E+00	µg/L	M	6.8E-11	mg/kg-day	N/A	N/A	
	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.1E-07	mg/kg-day	2.9E-01	(mg/kg-day) $^{-1}$	3.1E-08
	1,1,2-Trichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	9.6E-08	mg/kg-day	7.0E-02	(mg/kg-day) $^{-1}$	6.8E-09
	1,1-Dichloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-07	mg/kg-day	6.0E-01	(mg/kg-day) $^{-1}$	1.0E-07
	1,2-Dibromoethane	1.00E+00	µg/L	1.00E+00	µg/L	M	2.7E-09	mg/kg-day	1.1E+02	(mg/kg-day) $^{-1}$	2.8E-07
	1,2-Dichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	5.8E-08	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	5.3E-09
	1,2-Dichloropropane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.1E-07	mg/kg-day	9.2E-02	(mg/kg-day) $^{-1}$	1.0E-08

TABLE 8.5.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Bromodichloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.1E-08	mg/kg-day	6.3E-02	(mg/kg-day) $^{-1}$	4.5E-09
	Carbon tetrachloride	1.00E+00	µg/L	1.00E+00	µg/L	M	2.5E-07	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	5.1E-08
	Dibromochloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	5.5E-08	mg/kg-day	1.4E-01	(mg/kg-day) $^{-1}$	7.7E-09
	Tetrachloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	5.4E-07	mg/kg-day	5.2E-02	(mg/kg-day) $^{-1}$	2.8E-08
	trans-1,3-Dichloropropene	1.00E+00	µg/L	1.00E+00	µg/L	M	6.1E-08	mg/kg-day	1.8E-01	(mg/kg-day) $^{-1}$	1.1E-08
	2,4,6-Trichlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	5.8E-06	mg/kg-day	2.2E-02	(mg/kg-day) $^{-1}$	1.3E-07
	2,4-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.9E-07	mg/kg-day	N/A	N/A	
	2,6-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.2E-07	mg/kg-day	N/A	N/A	
	2-Chlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	1.2E-06	mg/kg-day	N/A	N/A	
	3,3'-Dichlorobenzidine	1.00E+01	µg/L	1.00E+01	µg/L	M	2.9E-06	mg/kg-day	9.0E-01	(mg/kg-day) $^{-1}$	2.6E-06
	4,6-Dinitro-2-methylphenol	2.50E+01	µg/L	2.50E+01	µg/L	M	3.3E-06	mg/kg-day	N/A	N/A	
	Acenaphthylene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.2E-05	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.2E-04	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	2.8E-04
	Benzo(a)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.0E-04	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	4.7E-03
	Benzo(b)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.0E-04	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	4.8E-04
	Benzo(k)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.8E-04	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	1.1E-04
	bis(2-Chloroethyl)ether	1.00E+01	µg/L	1.00E+01	µg/L	M	2.5E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	5.4E-07
	bis(2-Ethylhexyl)phthalate	1.00E+01	µg/L	1.00E+01	µg/L	M	1.5E-05	mg/kg-day	7.4E-02	(mg/kg-day) $^{-1}$	1.1E-06
	Carbazole	1.00E+01	µg/L	1.00E+01	µg/L	M	8.4E-06	mg/kg-day	2.9E-02	(mg/kg-day) $^{-1}$	2.4E-07
	Chrysene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.2E-04	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	2.8E-06
	Dibenz(a,h)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	5.6E-04	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	1.3E-02
	Dibenzofuran	1.00E+01	µg/L	1.00E+01	µg/L	M	1.1E-05	mg/kg-day	N/A	N/A	
	Hexachlorobenzene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.5E-05	mg/kg-day	3.2E+00	(mg/kg-day) $^{-1}$	1.4E-04
	Hexachlorobutadiene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.2E-05	mg/kg-day	1.6E-01	(mg/kg-day) $^{-1}$	3.4E-06
	Hexachloroethane	1.00E+01	µg/L	1.00E+01	µg/L	M	6.4E-06	mg/kg-day	2.8E-02	(mg/kg-day) $^{-1}$	1.8E-07

TABLE 8.5.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Indeno(1,2,3-cd)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.8E-04	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	9.0E-04
	n-Nitroso-di-n-propylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	2.3E-08	mg/kg-day	2.8E+01	(mg/kg-day) $^{-1}$	6.3E-07
	n-Nitrosodiphenylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	3.5E-06	mg/kg-day	2.0E-02	(mg/kg-day) $^{-1}$	6.8E-08
	Naphthalene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.0E-06	mg/kg-day	N/A	N/A	
	Pentachlorophenol	2.50E+01	µg/L	2.50E+01	µg/L	M	3.1E-04	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	3.7E-05
	alpha-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.6E-08	mg/kg-day	6.5E+00	(mg/kg-day) $^{-1}$	1.1E-07
	Aroclor-1016	1.00E+00	µg/L	1.00E+00	µg/L	M	2.6E-05	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	2.0E-06
	Aroclor-1221	2.10E+00	µg/L	2.10E+00	µg/L	M	5.5E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.2E-04
	Aroclor-1232	1.00E+00	µg/L	1.00E+00	µg/L	M	2.6E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	5.8E-05
	Aroclor-1242	1.00E+00	µg/L	1.00E+00	µg/L	M	2.6E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	5.8E-05
	Aroclor-1254	1.00E+00	µg/L	1.00E+00	µg/L	M	2.6E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	5.8E-05
	beta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.6E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.2E-08
	delta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.6E-08	mg/kg-day	N/A	N/A	
	Heptachlor	5.20E-02	µg/L	5.20E-02	µg/L	M	2.3E-08	mg/kg-day	6.3E+00	(mg/kg-day) $^{-1}$	1.4E-07
	Toxaphene	5.20E-02	µg/L	5.20E-02	µg/L	M	4.1E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	9.1E-08
	Thallium	3.50E+00	µg/L	3.50E+00	µg/L	M	3.5E-08	mg/kg-day	N/A	N/A	
	(Total)										2.0E-02
										Total Risk Across All Exposure Routes/Pathways	2.0E-02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Table 8.5.RME.UA Supplement
Calculation of Daevent
Industrial Worker, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
4,4'-DDD	6.60E-03	2.8E-01	7.8E+00	3.7E+01	6.3E+01	8	4.0E-08	2
4,4'-DDE	2.70E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	8	1.4E-07	2
4,4'-DDT	1.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	8	1.3E-07	2
Aldrin	3.00E-03	1.6E-03	1.5E+01	3.6E+01	1.0E-01	8	1.5E-10	2
Aroclor-1248	1.60E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	3.3E-05	2
Dieldrin	1.50E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	8	8.0E-09	2
Mercury	1.20E-01	1.0E-03	N/A	N/A	N/A	8	9.6E-10	1
alpha-Chlordane	5.20E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	1.1E-07	2
Aroclor-1260	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
gamma-Chlordane	5.20E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	1.1E-07	2
Heptachlor epoxide	5.20E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	1.8E-08	2
Aluminum	7.81E+02	1.0E-03	NA	NA	NA	8	6.2E-06	1
Antimony	4.90E+00	1.0E-03	NA	NA	NA	8	3.9E-08	1
Arsenic	3.00E+00	1.0E-03	NA	NA	NA	8	2.4E-08	1
Cadmium	1.30E+00	1.0E-03	NA	NA	NA	8	1.0E-08	1
Chromium	1.20E+00	1.0E-03	NA	NA	NA	8	9.6E-09	1
Copper	6.60E+00	1.0E-03	NA	NA	NA	8	5.3E-08	1
Iron	2.42E+02	1.0E-03	NA	NA	NA	8	1.9E-06	1
Lead	1.70E+00	4.0E-06	N/A	N/A	N/A	8	5.4E-11	1
1,1,2,2-Tetrachloroethane	1.00E+00	9.0E-03	9.2E-01	2.2E+00	2.5E-02	8	8.8E-08	3
1,1,2-Trichloroethane	1.00E+00	8.4E-03	5.7E-01	1.4E+00	1.1E-02	8	7.6E-08	3
1,1-Dichloroethene	1.00E+00	1.6E-02	3.4E-01	8.2E-01	1.3E-02	8	1.4E-07	3
1,2-Dibromoethane	1.00E+00	2.0E-04	1.3E+00	3.0E+00	1.3E-04	8	2.1E-09	3
1,2-Dichloroethane	1.00E+00	5.3E-03	3.5E-01	8.4E-01	3.0E-03	8	4.6E-08	3
1,2-Dichloropropane	1.00E+00	1.0E-02	4.3E-01	1.0E+00	1.0E-02	8	8.8E-08	3
Bromodichloromethane	1.00E+00	5.8E-03	8.7E-01	2.1E+00	1.2E-02	8	5.6E-08	3
Carbon tetrachloride	1.00E+00	2.2E-02	7.6E-01	1.8E+00	6.8E-02	8	2.0E-07	3
Dibromochloromethane	1.00E+00	3.9E-03	1.6E+00	3.9E+00	1.7E-02	8	4.4E-08	3
Tetrachloroethene	1.00E+00	4.8E-02	9.0E-01	4.3E+00	2.5E-01	8	4.3E-07	3
trans-1,3-Dichloropropene	1.00E+00	5.5E-03	4.2E-01	1.0E+00	4.0E-03	8	4.8E-08	3
2,4,6-Trichlorophenol	1.00E+01	5.0E-02	1.4E+00	9.2E+00	4.9E-01	8	4.6E-06	2
2,4-Dinitrotoluene	1.00E+01	3.8E-03	1.1E+00	2.7E+00	9.5E-03	8	3.9E-07	3
2,6-Dinitrotoluene	1.00E+01	2.5E-03	1.1E+00	2.7E+00	5.2E-03	8	2.5E-07	3
2-Chlorophenol	1.00E+01	1.1E-02	5.3E-01	1.3E+00	1.4E-02	8	9.9E-07	3
3,3'-Dichlorobenzidine	1.00E+01	1.7E-02	3.1E+00	1.7E+01	NA	8	2.3E-06	2
4,6-Dinitro-2-methylphenol	2.50E+01	9.8E-03	1.4E+00	3.4E+00	5.0E-02	8	2.6E-06	3
Acenaphthylene	1.00E+01	1.3E-01	7.4E-01	5.8E+00	7.9E-01	8	9.4E-06	3
Benzo(a)anthracene	1.00E+01	8.1E-01	2.2E+00	1.0E+01	4.6E+01	8	9.4E-05	2
Benzo(a)pyrene	1.00E+01	1.2E+00	2.9E+00	1.4E+01	1.3E+02	8	1.6E-04	2
Benzo(b)fluoranthene	1.00E+01	1.2E+00	3.0E+00	1.4E+01	1.3E+02	8	1.6E-04	2
Benzo(k)fluoranthene	1.00E+01	2.8E+00	3.0E+00	1.4E+01	1.2E+02	8	3.8E-04	2
bis(2-Chloroethyl)ether	1.00E+01	2.1E-03	6.5E-01	1.6E+00	1.9E-03	8	2.0E-07	3
bis(2-Ethylhexyl)phthalate	1.00E+01	3.3E-02	2.1E+01	1.0E+02	1.3E+01	8	1.2E-05	2
Carbazole	1.00E+01	8.0E-02	9.2E-01	6.2E+00	5.2E-01	8	6.7E-06	3
Chrysene	1.00E+01	8.1E-01	2.2E+00	1.0E+01	4.6E+01	8	9.4E-05	2
Dibenz(a,h)anthracene	1.00E+01	2.7E+00	4.4E+00	2.1E+01	6.9E+02	8	4.4E-04	2
Dibenzofuran	1.00E+01	1.1E-01	9.3E-01	7.3E+00	8.1E-01	8	8.7E-06	3

Table 8.5.RME.UA Supplement
Calculation of Daevent
Industrial Worker, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm²-event)	Eq
Hexachlorobenzene	1.00E+01	2.1E-01	4.8E+00	2.3E+01	2.0E+01	8	3.6E-05	2
Hexachlorobutadiene	1.00E+01	1.2E-01	3.4E+00	1.7E+01	6.0E+00	8	1.7E-05	2
Hexachloroethane	1.00E+01	4.2E-02	2.4E+00	1.9E+01	8.5E-01	8	5.1E-06	2
Indeno(1,2,3-cd)pyrene	1.00E+01	1.9E+00	4.2E+00	2.0E+01	3.8E+02	8	3.0E-04	2
n-Nitroso-di-n-propylamine	1.00E+01	3.1E-04	5.4E-01	1.0E-04	1.3E+00	8	1.8E-08	3
n-Nitrosodiphenylamine	1.00E+01	3.6E-02	5.3E-01	7.6E+00	3.2E-01	8	2.7E-06	3
Naphthalene	1.00E+01	6.9E-02	5.3E-01	2.2E+00	2.0E-01	8	5.6E-06	3
Pentachlorophenol	2.50E+01	6.5E-01	3.7E+00	1.7E+01	7.2E+01	8	2.4E-04	2
alpha-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	1.3E-08	2
Aroclor-1016	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1221	2.10E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	4.4E-05	2
Aroclor-1232	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1242	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1254	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
beta-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	1.3E-08	2
delta-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	1.3E-08	2
Heptachlor	5.20E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	1.8E-08	2
Toxaphene	5.20E-02	1.5E-02	2.9E+01	1.4E+02	6.6E+00	8	3.3E-08	2
Thallium	3.50E+00	1.0E-03	NA	NA	NA	8	2.8E-08	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CSW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CSW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CSW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

TABLE 8.6.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	6.7E-11	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	1.6E-11
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	2.7E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	9.3E-11
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.1E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	3.8E-11
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	3.1E-11	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	5.2E-10
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	1.6E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.3E-08
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	1.5E-10	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	2.4E-09
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	1.2E-09	mg/kg-day	N/A	N/A	
	alpha-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	5.3E-10	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	1.9E-10
	Aroclor-1260	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	2.0E-08
	gamma-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	5.3E-10	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	1.9E-10
	Heptachlor epoxide	5.20E-02	µg/L	5.20E-02	µg/L	M	5.3E-10	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	4.8E-09
	Aluminum	7.81E+02	µg/L	7.81E+02	µg/L	M	7.9E-06	mg/kg-day	N/A	N/A	
	Antimony	4.90E+00	µg/L	4.90E+00	µg/L	M	5.0E-08	mg/kg-day	N/A	N/A	
	Arsenic	3.00E+00	µg/L	3.00E+00	µg/L	M	3.1E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	4.6E-08
	Cadmium	1.30E+00	µg/L	1.30E+00	µg/L	M	1.3E-08	mg/kg-day	N/A	N/A	
	Chromium	1.20E+00	µg/L	1.20E+00	µg/L	M	1.2E-08	mg/kg-day	N/A	N/A	
	Copper	6.60E+00	µg/L	6.60E+00	µg/L	M	6.7E-08	mg/kg-day	N/A	N/A	
	Iron	2.42E+02	µg/L	2.42E+02	µg/L	M	2.5E-06	mg/kg-day	N/A	N/A	
	Lead	1.70E+00	µg/L	1.70E+00	µg/L	M	1.7E-08	mg/kg-day	N/A	N/A	
	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	2.0E-09
	1,1,2-Trichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	5.7E-02	(mg/kg-day) $^{-1}$	5.8E-10

TABLE 8.6.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	1,1-Dichloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	6.0E-01	(mg/kg-day) $^{-1}$	6.1E-09
	1,2-Dibromoethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	8.6E-07
	1,2-Dichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	9.3E-10
	1,2-Dichloropropane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	6.8E-02	(mg/kg-day) $^{-1}$	6.9E-10
	Bromodichloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	6.2E-02	(mg/kg-day) $^{-1}$	6.3E-10
	Carbon tetrachloride	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	1.3E-01	(mg/kg-day) $^{-1}$	1.3E-09
	Dibromochloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	8.4E-02	(mg/kg-day) $^{-1}$	8.5E-10
	Tetrachloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	5.2E-02	(mg/kg-day) $^{-1}$	5.3E-10
	trans-1,3-Dichloropropene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	1.0E-09
	2,4,6-Trichlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	1.1E-02	(mg/kg-day) $^{-1}$	1.1E-09
	2,4-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	N/A	N/A	
	2,6-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	N/A	N/A	
	2-Chlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	N/A	N/A	
	3,3'-Dichlorobenzidine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	4.5E-01	(mg/kg-day) $^{-1}$	4.6E-08
	4,6-Dinitro-2-methylphenol	2.50E+01	µg/L	2.50E+01	µg/L	M	2.5E-07	mg/kg-day	N/A	N/A	
	Acenaphthylene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	7.4E-08
	Benzo(a)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	7.4E-07
	Benzo(b)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	7.4E-08
	Benzo(k)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	7.3E-02	(mg/kg-day) $^{-1}$	7.4E-09
	bis(2-Chloroethyl)ether	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	1.1E-07
	bis(2-Ethylhexyl)phthalate	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	1.4E-02	(mg/kg-day) $^{-1}$	1.4E-09
	Carbazole	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	2.0E-02	(mg/kg-day) $^{-1}$	2.0E-09
	Chrysene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	7.3E-03	(mg/kg-day) $^{-1}$	7.4E-10

TABLE 8.6.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Dibenz(a,h)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	7.4E-07
	Dibenzofuran	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	N/A		
	Hexachlorobenzene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	1.6E-07
	Hexachlorobutadiene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	7.9E-09
	Hexachloroethane	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	1.4E-02	(mg/kg-day) $^{-1}$	1.4E-09
	Indeno(1,2,3-cd)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	7.4E-08
	n-Nitroso-di-n-propylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	7.1E-07
	n-Nitrosodiphenylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	4.9E-03	(mg/kg-day) $^{-1}$	5.0E-10
	Naphthalene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-07	mg/kg-day	N/A	N/A	
	Pentachlorophenol	2.50E+01	µg/L	2.50E+01	µg/L	M	2.5E-07	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	3.1E-08
	alpha-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	5.3E-10	mg/kg-day	6.3E+00	(mg/kg-day) $^{-1}$	3.3E-09
	Aroclor-1016	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	7.0E-02	(mg/kg-day) $^{-1}$	7.1E-10
	Aroclor-1221	2.10E+00	µg/L	2.10E+00	µg/L	M	2.1E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	4.3E-08
	Aroclor-1232	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	2.0E-08
	Aroclor-1242	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	2.0E-08
	Aroclor-1254	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	2.0E-08
	beta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	5.3E-10	mg/kg-day	1.8E+00	(mg/kg-day) $^{-1}$	9.5E-10
	delta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	5.3E-10	mg/kg-day	N/A	N/A	
	Heptachlor	5.20E-02	µg/L	5.20E-02	µg/L	M	5.3E-10	mg/kg-day	4.5E+00	(mg/kg-day) $^{-1}$	2.4E-09
	Toxaphene	5.20E-02	µg/L	5.20E-02	µg/L	M	5.3E-10	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	5.8E-10
	Thallium	3.50E+00	µg/L	3.50E+00	µg/L	M	3.6E-08	mg/kg-day	N/A	N/A	
	(Total)										3.9E-06

TABLE 8.6.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	5.0E-08	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.7E-08
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.7E-07	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	8.3E-08
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.6E-07	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	7.9E-08
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	1.8E-10	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	6.1E-09
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	4.1E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	9.0E-05
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	9.8E-09	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	3.1E-07
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	6.7E-10	mg/kg-day	N/A	N/A	
	alpha-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	1.4E-07	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	9.6E-08
	Aroclor-1260	1.00E+00	µg/L	1.00E+00	µg/L	M	2.5E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	5.7E-05
	gamma-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	1.4E-07	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	9.6E-08
	Heptachlor epoxide	5.20E-02	µg/L	5.20E-02	µg/L	M	2.3E-08	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	2.9E-07
	Aluminum	7.81E+02	µg/L	7.81E+02	µg/L	M	4.4E-06	mg/kg-day	N/A	N/A	
	Antimony	4.90E+00	µg/L	4.90E+00	µg/L	M	2.7E-08	mg/kg-day	N/A	N/A	
	Arsenic	3.00E+00	µg/L	3.00E+00	µg/L	M	1.7E-08	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	6.1E-08
	Cadmium	1.30E+00	µg/L	1.30E+00	µg/L	M	7.3E-09	mg/kg-day	N/A	N/A	
	Chromium	1.20E+00	µg/L	1.20E+00	µg/L	M	6.7E-09	mg/kg-day	N/A	N/A	
	Copper	6.60E+00	µg/L	6.60E+00	µg/L	M	3.7E-08	mg/kg-day	N/A	N/A	
	Iron	2.42E+02	µg/L	2.42E+02	µg/L	M	1.4E-06	mg/kg-day	N/A	N/A	
	Lead	1.70E+00	µg/L	1.70E+00	µg/L	M	3.8E-11	mg/kg-day	N/A	N/A	
	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	8.7E-08	mg/kg-day	2.9E-01	(mg/kg-day) $^{-1}$	2.5E-08

TABLE 8.6.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	1,1,2-Trichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	6.8E-08	mg/kg-day	7.0E-02	(mg/kg-day) $^{-1}$	4.8E-09
	1,1-Dichloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.1E-07	mg/kg-day	6.0E-01	(mg/kg-day) $^{-1}$	6.7E-08
	1,2-Dibromoethane	1.00E+00	µg/L	1.00E+00	µg/L	M	2.2E-09	mg/kg-day	1.1E+02	(mg/kg-day) $^{-1}$	2.3E-07
	1,2-Dichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	3.8E-08	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	3.4E-09
	1,2-Dichloropropane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.4E-08	mg/kg-day	9.2E-02	(mg/kg-day) $^{-1}$	6.8E-09
	Bromodichloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	5.4E-08	mg/kg-day	6.3E-02	(mg/kg-day) $^{-1}$	3.4E-09
	Carbon tetrachloride	1.00E+00	µg/L	1.00E+00	µg/L	M	2.0E-07	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	3.9E-08
	Dibromochloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	4.7E-08	mg/kg-day	1.4E-01	(mg/kg-day) $^{-1}$	6.6E-09
	Tetrachloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	4.4E-07	mg/kg-day	5.2E-02	(mg/kg-day) $^{-1}$	2.3E-08
	trans-1,3-Dichloropropene	1.00E+00	µg/L	1.00E+00	µg/L	M	4.1E-08	mg/kg-day	1.8E-01	(mg/kg-day) $^{-1}$	7.3E-09
	2,4,6-Trichlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	5.7E-06	mg/kg-day	2.2E-02	(mg/kg-day) $^{-1}$	1.2E-07
	2,4-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.8E-07	mg/kg-day	N/A	N/A	
	2,6-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.5E-07	mg/kg-day	N/A	N/A	
	2-Chlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	8.7E-07	mg/kg-day	N/A	N/A	
	3,3'-Dichlorobenzidine	1.00E+01	µg/L	1.00E+01	µg/L	M	2.9E-06	mg/kg-day	9.0E-01	(mg/kg-day) $^{-1}$	2.6E-06
	4,6-Dinitro-2-methylphenol	2.50E+01	µg/L	2.50E+01	µg/L	M	2.8E-06	mg/kg-day	N/A	N/A	
	Acenaphthylene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.1E-05	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.2E-04	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	2.7E-04
	Benzo(a)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.0E-04	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	4.6E-03
	Benzo(b)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.0E-04	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	4.7E-04
	Benzo(k)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.7E-04	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	1.1E-04
	bis(2-Chloroethyl)ether	1.00E+01	µg/L	1.00E+01	µg/L	M	1.8E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.9E-07
	bis(2-Ethylhexyl)phthalate	1.00E+01	µg/L	1.00E+01	µg/L	M	1.5E-05	mg/kg-day	7.4E-02	(mg/kg-day) $^{-1}$	1.1E-06
	Carbazole	1.00E+01	µg/L	1.00E+01	µg/L	M	7.4E-06	mg/kg-day	2.9E-02	(mg/kg-day) $^{-1}$	2.1E-07

TABLE 8.6.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Chrysene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.2E-04	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	2.7E-06
	Dibenz(a,h)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	5.4E-04	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	1.3E-02
	Dibenzofuran	1.00E+01	µg/L	1.00E+01	µg/L	M	1.0E-05	mg/kg-day	N/A	N/A	
	Hexachlorobenzene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.4E-05	mg/kg-day	3.2E+00	(mg/kg-day) $^{-1}$	1.4E-04
	Hexachlorobutadiene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.1E-05	mg/kg-day	1.6E-01	(mg/kg-day) $^{-1}$	3.3E-06
	Hexachloroethane	1.00E+01	µg/L	1.00E+01	µg/L	M	6.2E-06	mg/kg-day	2.8E-02	(mg/kg-day) $^{-1}$	1.7E-07
	Indeno(1,2,3-cd)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.7E-04	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	8.8E-04
	n-Nitroso-di-n-propylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	2.3E-08	mg/kg-day	2.8E+01	(mg/kg-day) $^{-1}$	6.4E-07
	n-Nitrosodiphenylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	2.5E-06	mg/kg-day	2.0E-02	(mg/kg-day) $^{-1}$	4.9E-08
	Naphthalene	1.00E+01	µg/L	1.00E+01	µg/L	M	5.3E-06	mg/kg-day	N/A	N/A	
	Pentachlorophenol	2.50E+01	µg/L	2.50E+01	µg/L	M	3.0E-04	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	3.6E-05
	alpha-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.6E-08	mg/kg-day	6.5E+00	(mg/kg-day) $^{-1}$	1.0E-07
	Aroclor-1016	1.00E+00	µg/L	1.00E+00	µg/L	M	2.5E-05	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	2.0E-06
	Aroclor-1221	2.10E+00	µg/L	2.10E+00	µg/L	M	5.4E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.2E-04
	Aroclor-1232	1.00E+00	µg/L	1.00E+00	µg/L	M	2.5E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	5.7E-05
	Aroclor-1242	1.00E+00	µg/L	1.00E+00	µg/L	M	2.5E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	5.7E-05
	Aroclor-1254	1.00E+00	µg/L	1.00E+00	µg/L	M	2.5E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	5.7E-05
	beta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.6E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.2E-08
	delta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.6E-08	mg/kg-day	N/A	N/A	
	Heptachlor	5.20E-02	µg/L	5.20E-02	µg/L	M	2.3E-08	mg/kg-day	6.3E+00	(mg/kg-day) $^{-1}$	1.4E-07
	Toxaphene	5.20E-02	µg/L	5.20E-02	µg/L	M	4.0E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	8.9E-08
	Thallium	3.50E+00	µg/L	3.50E+00	µg/L	M	2.0E-08	mg/kg-day	N/A	N/A	
	(Total)										2.0E-02
										Total Risk Across All Exposure Routes/Pathways	2.0E-02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Table 8.6.RME.UA Supplement
Calculation of DAevent
Trespasser/Visitor, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
4,4'-DDD	6.60E-03	2.8E-01	7.8E+00	3.7E+01	6.3E+01	2.6	2.3E-08	2
4,4'-DDE	2.70E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	2.6	8.0E-08	2
4,4'-DDT	1.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	2.6	7.6E-08	2
Aldrin	3.00E-03	1.6E-03	1.5E+01	3.6E+01	1.0E-01	2.6	8.3E-11	2
Aroclor-1248	1.60E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.9E-05	2
Dieldrin	1.50E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	2.6	4.5E-09	2
Mercury	1.20E-01	1.0E-03	N/A	N/A	N/A	2.6	3.1E-10	1
alpha-Chlordane	5.20E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	2.6	6.4E-08	2
Aroclor-1260	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.2E-05	2
gamma-Chlordane	5.20E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	2.6	6.4E-08	2
Heptachlor epoxide	5.20E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	2.6	1.1E-08	2
Aluminum	7.81E+02	1.0E-03	NA	NA	NA	2.6	2.0E-06	1
Antimony	4.90E+00	1.0E-03	NA	NA	NA	2.6	1.3E-08	1
Arsenic	3.00E+00	1.0E-03	NA	NA	NA	2.6	7.8E-09	1
Cadmium	1.30E+00	1.0E-03	NA	NA	NA	2.6	3.4E-09	1
Chromium	1.20E+00	1.0E-03	NA	NA	NA	2.6	3.1E-09	1
Copper	6.60E+00	1.0E-03	NA	NA	NA	2.6	1.7E-08	1
Iron	2.42E+02	1.0E-03	NA	NA	NA	2.6	6.3E-07	1
Lead	1.70E+00	4.0E-06	N/A	N/A	N/A	2.6	1.8E-11	1
1,1,2,2-Tetrachloroethane	1.00E+00	9.0E-03	9.2E-01	2.2E+00	2.5E-02	2.6	4.0E-08	3
1,1,2-Trichloroethane	1.00E+00	8.4E-03	5.7E-01	1.4E+00	1.1E-02	2.6	3.1E-08	3
1,1-Dichloroethene	1.00E+00	1.6E-02	3.4E-01	8.2E-01	1.3E-02	2.6	5.2E-08	3
1,2-Dibromoethane	1.00E+00	2.0E-04	1.3E+00	3.0E+00	1.3E-04	2.6	1.0E-09	2
1,2-Dichloroethane	1.00E+00	5.3E-03	3.5E-01	8.4E-01	3.0E-03	2.6	1.7E-08	3
1,2-Dichloropropane	1.00E+00	1.0E-02	4.3E-01	1.0E+00	1.0E-02	2.6	3.5E-08	3
Bromodichloromethane	1.00E+00	5.8E-03	8.7E-01	2.1E+00	1.2E-02	2.6	2.5E-08	3
Carbon tetrachloride	1.00E+00	2.2E-02	7.6E-01	1.8E+00	6.8E-02	2.6	9.1E-08	3
Dibromochloromethane	1.00E+00	3.9E-03	1.6E+00	3.9E+00	1.7E-02	2.6	2.2E-08	2
Tetrachloroethene	1.00E+00	4.8E-02	9.0E-01	4.3E+00	2.5E-01	2.6	2.0E-07	2
trans-1,3-Dichloropropene	1.00E+00	5.5E-03	4.2E-01	1.0E+00	4.0E-03	2.6	1.9E-08	3
2,4,6-Trichlorophenol	1.00E+01	5.0E-02	1.4E+00	9.2E+00	4.9E-01	2.6	2.6E-06	2
2,4-Dinitrotoluene	1.00E+01	3.8E-03	1.1E+00	2.7E+00	9.5E-03	2.6	1.8E-07	2
2,6-Dinitrotoluene	1.00E+01	2.5E-03	1.1E+00	2.7E+00	5.2E-03	2.6	1.2E-07	2
2-Chlorophenol	1.00E+01	1.1E-02	5.3E-01	1.3E+00	1.4E-02	2.6	4.0E-07	3
3,3'-Dichlorobenzidine	1.00E+01	1.7E-02	3.1E+00	1.7E+01	NA	2.6	1.3E-06	2
4,6-Dinitro-2-methylphenol	2.50E+01	9.8E-03	1.4E+00	3.4E+00	5.0E-02	2.6	1.3E-06	2
Acenaphthylene	1.00E+01	1.3E-01	7.4E-01	5.8E+00	7.9E-01	2.6	5.0E-06	2
Benzo(a)anthracene	1.00E+01	8.1E-01	2.2E+00	1.0E+01	4.6E+01	2.6	5.4E-05	2
Benzo(a)pyrene	1.00E+01	1.2E+00	2.9E+00	1.4E+01	1.3E+02	2.6	9.1E-05	2
Benzo(b)fluoranthene	1.00E+01	1.2E+00	3.0E+00	1.4E+01	1.3E+02	2.6	9.3E-05	2
Benzo(k)fluoranthene	1.00E+01	2.8E+00	3.0E+00	1.4E+01	1.2E+02	2.6	2.2E-04	2
bis(2-Chloroethyl)ether	1.00E+01	2.1E-03	6.5E-01	1.6E+00	1.9E-03	2.6	8.2E-08	3
bis(2-Ethylhexyl)phthalate	1.00E+01	3.3E-02	2.1E+01	1.0E+02	1.3E+01	2.6	6.7E-06	2
Carbazole	1.00E+01	8.0E-02	9.2E-01	6.2E+00	5.2E-01	2.6	3.4E-06	2
Chrysene	1.00E+01	8.1E-01	2.2E+00	1.0E+01	4.6E+01	2.6	5.4E-05	2
Dibenz(a,h)anthracene	1.00E+01	2.7E+00	4.4E+00	2.1E+01	6.9E+02	2.6	2.5E-04	2
Dibenzofuran	1.00E+01	1.1E-01	9.3E-01	7.3E+00	8.1E-01	2.6	4.7E-06	2
Hexachlorobenzene	1.00E+01	2.1E-01	4.8E+00	2.3E+01	2.0E+01	2.6	2.1E-05	2

Table 8.6.RME.UA Supplement
Calculation of DAevent
Trespasser/Visitor, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
Hexachlorobutadiene	1.00E+01	1.2E-01	3.4E+00	1.7E+01	6.0E+00	2.6	9.9E-06	2
Hexachloroethane	1.00E+01	4.2E-02	2.4E+00	1.9E+01	8.5E-01	2.6	2.9E-06	2
Indeno(1,2,3-cd)pyrene	1.00E+01	1.9E+00	4.2E+00	2.0E+01	3.8E+02	2.6	1.7E-04	2
n-Nitroso-di-n-propylamine	1.00E+01	3.1E-04	5.4E-01	1.0E-04	1.3E+00	2.6	1.1E-08	3
n-Nitrosodiphenylamine	1.00E+01	3.6E-02	5.3E-01	7.6E+00	3.2E-01	2.6	1.2E-06	2
Naphthalene	1.00E+01	6.9E-02	5.3E-01	2.2E+00	2.0E-01	2.6	2.5E-06	3
Pentachlorophenol	2.50E+01	6.5E-01	3.7E+00	1.7E+01	7.2E+01	2.6	1.4E-04	2
alpha-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	2.6	7.4E-09	2
Aroclor-1016	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.2E-05	2
Aroclor-1221	2.10E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	2.5E-05	2
Aroclor-1232	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.2E-05	2
Aroclor-1242	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.2E-05	2
Aroclor-1254	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	2.6	1.2E-05	2
beta-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	2.6	7.4E-09	2
delta-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	2.6	7.4E-09	2
Heptachlor	5.20E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	2.6	1.1E-08	2
Toxaphene	5.20E-02	1.5E-02	2.9E+01	1.4E+02	6.6E+00	2.6	1.9E-08	2
Thallium	3.50E+00	1.0E-03	NA	NA	NA	2.6	9.1E-09	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CSW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CSW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CSW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

TABLE 8.7.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	1.8E-04	mg/kg-day	N/A	N/A	
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	2.3E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	3.5E-08
	4,4'-DDD	6.20E+00	ug/kg	6.20E+00	ug/kg	M	1.3E-10	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	3.1E-11
	4,4'-DDE	1.60E+00	ug/kg	1.60E+00	ug/kg	M	3.4E-11	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.1E-11
	4,4'-DDT	1.10E+01	ug/kg	1.10E+01	ug/kg	M	2.3E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	7.8E-11
	Aldrin	4.50E+00	ug/kg	4.50E+00	ug/kg	M	9.4E-11	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	1.6E-09
	alpha-Chlordane	3.60E+01	ug/kg	3.60E+01	ug/kg	M	7.5E-10	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	2.6E-10
	Aroclor-1248	9.10E+01	ug/kg	9.10E+01	ug/kg	M	1.9E-09	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.8E-09
	Aroclor-1260	9.10E+01	ug/kg	9.10E+01	ug/kg	M	1.9E-09	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.8E-09
	Dieldrin	7.00E-01	ug/kg	7.00E-01	ug/kg	M	1.5E-11	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	2.3E-10
	gamma-Chlordane	3.10E+01	ug/kg	3.10E+01	ug/kg	M	6.5E-10	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	2.3E-10
	Heptachlor epoxide	2.60E+00	ug/kg	2.60E+00	ug/kg	M	5.5E-11	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	5.0E-10
	Antimony	1.30E+00	mg/kg	1.30E+00	mg/kg	M	2.7E-08	mg/kg-day	N/A	N/A	
	Cadmium	2.80E+00	mg/kg	2.80E+00	mg/kg	M	5.9E-08	mg/kg-day	N/A	N/A	
	Chromium	1.16E+01	mg/kg	1.16E+01	mg/kg	M	2.4E-07	mg/kg-day	N/A	N/A	
	Copper	1.26E+01	mg/kg	1.26E+01	mg/kg	M	2.6E-07	mg/kg-day	N/A	N/A	
	Iron	3.34E+03	mg/kg	3.34E+03	mg/kg	M	7.0E-05	mg/kg-day	N/A	N/A	
	Lead	3.26E+01	mg/kg	3.26E+01	mg/kg	M	6.8E-07	mg/kg-day	N/A	N/A	
	Mercury	7.00E-02	mg/kg	7.00E-02	mg/kg	M	1.5E-09	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	1.30E+01	ug/kg	1.30E+01	ug/kg	M	2.7E-10	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	2.3E-08

TABLE 8.7.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Benzo(a)pyrene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.0E-08	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	7.5E-08
	Dibenz(a,h)anthracene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.0E-08	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	7.5E-08
	Hexachlorobenzene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.0E-08	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	1.6E-08
	n-Nitroso-di-n-propylamine	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.0E-08	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	7.2E-08
	(Total)										3.1E-07
Dermal	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	9.6E-05	mg/kg-day	N/A	N/A	
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	3.7E-08	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	1.4E-07
	4,4'-DDD	6.20E+00	ug/kg	6.20E+00	ug/kg	M	2.1E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	7.1E-11
	4,4'-DDE	1.60E+00	ug/kg	1.60E+00	ug/kg	M	5.3E-11	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	2.6E-11
	4,4'-DDT	1.10E+01	ug/kg	1.10E+01	ug/kg	M	3.7E-10	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	1.8E-10
	Aldrin	4.50E+00	ug/kg	4.50E+00	ug/kg	M	5.0E-10	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	1.7E-08
	alpha-Chlordane	3.60E+01	ug/kg	3.60E+01	ug/kg	M	1.6E-09	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	1.1E-09
	Aroclor-1248	9.10E+01	ug/kg	9.10E+01	ug/kg	M	1.4E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.1E-08
	Aroclor-1260	9.10E+01	ug/kg	9.10E+01	ug/kg	M	1.4E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.1E-08
	Dieldrin	7.00E-01	ug/kg	7.00E-01	ug/kg	M	7.8E-11	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	2.5E-09
	gamma-Chlordane	3.10E+01	ug/kg	3.10E+01	ug/kg	M	1.4E-09	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	9.6E-10
	Heptachlor epoxide	2.60E+00	ug/kg	2.60E+00	ug/kg	M	2.9E-10	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	3.7E-09
	Antimony	1.30E+00	mg/kg	1.30E+00	mg/kg	M	1.4E-08	mg/kg-day	N/A	N/A	
	Cadmium	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.1E-09	mg/kg-day	N/A	N/A	
	Chromium	1.16E+01	mg/kg	1.16E+01	mg/kg	M	1.3E-07	mg/kg-day	N/A	N/A	

TABLE 8.7.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Copper	1.26E+01	mg/kg	1.26E+01	mg/kg	M	1.4E-07	mg/kg-day	N/A	N/A	
	Iron	3.34E+03	mg/kg	3.34E+03	mg/kg	M	3.7E-05	mg/kg-day	N/A	N/A	
	Lead	3.26E+01	mg/kg	3.26E+01	mg/kg	M	3.6E-07	mg/kg-day	N/A	N/A	
	Mercury	7.00E-02	mg/kg	7.00E-02	mg/kg	M	7.8E-10	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	1.30E+01	ug/kg	1.30E+01	ug/kg	M	4.3E-10	mg/kg-day	1.1E+02	$(mg/kg\text{-}day)^{-1}$	4.6E-08
	Benzo(a)pyrene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	7.1E-08	mg/kg-day	2.4E+01	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	Dibenz(a,h)anthracene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	7.1E-08	mg/kg-day	2.4E+01	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	Hexachlorobenzene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	5.4E-08	mg/kg-day	3.2E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	n-Nitroso-di-n-propylamine	4.90E+02	ug/kg	4.90E+02	ug/kg	M	5.4E-08	mg/kg-day	2.8E+01	$(mg/kg\text{-}day)^{-1}$	1.5E-06
											5.3E-06
										Total Risk Across All Exposure Routes/Pathways	5.6E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.8.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	3.4E-04	mg/kg-day	N/A	N/A	
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	4.3E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	6.5E-08
	4,4'-DDD	6.20E+00	ug/kg	6.20E+00	ug/kg	M	2.4E-10	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	5.8E-11
	4,4'-DDE	1.60E+00	ug/kg	1.60E+00	ug/kg	M	6.3E-11	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	2.1E-11
	4,4'-DDT	1.10E+01	ug/kg	1.10E+01	ug/kg	M	4.3E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.5E-10
	Aldrin	4.50E+00	ug/kg	4.50E+00	ug/kg	M	1.8E-10	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	3.0E-09
	alpha-Chlordane	3.60E+01	ug/kg	3.60E+01	ug/kg	M	1.4E-09	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	4.9E-10
	Aroclor-1248	9.10E+01	ug/kg	9.10E+01	ug/kg	M	3.6E-09	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	7.1E-09
	Aroclor-1260	9.10E+01	ug/kg	9.10E+01	ug/kg	M	3.6E-09	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	7.1E-09
	Dieldrin	7.00E-01	ug/kg	7.00E-01	ug/kg	M	2.7E-11	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	4.4E-10
	gamma-Chlordane	3.10E+01	ug/kg	3.10E+01	ug/kg	M	1.2E-09	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	4.2E-10
	Heptachlor epoxide	2.60E+00	ug/kg	2.60E+00	ug/kg	M	1.0E-10	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	9.3E-10
	Antimony	1.30E+00	mg/kg	1.30E+00	mg/kg	M	5.1E-08	mg/kg-day	N/A	N/A	
	Cadmium	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.1E-07	mg/kg-day	N/A	N/A	
	Chromium	1.16E+01	mg/kg	1.16E+01	mg/kg	M	4.5E-07	mg/kg-day	N/A	N/A	
	Copper	1.26E+01	mg/kg	1.26E+01	mg/kg	M	4.9E-07	mg/kg-day	N/A	N/A	
	Iron	3.34E+03	mg/kg	3.34E+03	mg/kg	M	1.3E-04	mg/kg-day	N/A	N/A	
	Lead	3.26E+01	mg/kg	3.26E+01	mg/kg	M	1.3E-06	mg/kg-day	N/A	N/A	
	Mercury	7.00E-02	mg/kg	7.00E-02	mg/kg	M	2.7E-09	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	1.30E+01	ug/kg	1.30E+01	ug/kg	M	2.7E-10	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	2.3E-08

TABLE 8.8.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Benzo(a)pyrene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.0E-08	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	7.5E-08
	Dibenz(a,h)anthracene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.0E-08	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	7.5E-08
	Hexachlorobenzene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.0E-08	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	1.6E-08
	n-Nitroso-di-n-propylamine	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.0E-08	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	7.2E-08
	(Total)										3.5E-07
Dermal	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	1.9E-04	mg/kg-day	N/A	N/A	
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	7.1E-08	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	2.6E-07
	4,4'-DDD	6.20E+00	ug/kg	6.20E+00	ug/kg	M	4.0E-10	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.4E-10
	4,4'-DDE	1.60E+00	ug/kg	1.60E+00	ug/kg	M	1.0E-10	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	5.0E-11
	4,4'-DDT	1.10E+01	ug/kg	1.10E+01	ug/kg	M	7.1E-10	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	3.5E-10
	Aldrin	4.50E+00	ug/kg	4.50E+00	ug/kg	M	9.7E-10	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	3.3E-08
	alpha-Chlordane	3.60E+01	ug/kg	3.60E+01	ug/kg	M	3.1E-09	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	2.2E-09
	Aroclor-1248	9.10E+01	ug/kg	9.10E+01	ug/kg	M	2.7E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	6.1E-08
	Aroclor-1260	9.10E+01	ug/kg	9.10E+01	ug/kg	M	2.7E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	6.1E-08
	Dieldrin	7.00E-01	ug/kg	7.00E-01	ug/kg	M	1.5E-10	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	4.8E-09
	gamma-Chlordane	3.10E+01	ug/kg	3.10E+01	ug/kg	M	2.7E-09	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	1.9E-09
	Heptachlor epoxide	2.60E+00	ug/kg	2.60E+00	ug/kg	M	5.6E-10	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	7.1E-09
	Antimony	1.30E+00	mg/kg	1.30E+00	mg/kg	M	2.8E-08	mg/kg-day	N/A	N/A	
	Cadmium	2.80E+00	mg/kg	2.80E+00	mg/kg	M	6.0E-09	mg/kg-day	N/A	N/A	
	Chromium	1.16E+01	mg/kg	1.16E+01	mg/kg	M	2.5E-07	mg/kg-day	N/A	N/A	
	Copper	1.26E+01	mg/kg	1.26E+01	mg/kg	M	2.7E-07	mg/kg-day	N/A	N/A	

TABLE 8.8.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Iron	3.34E+03	mg/kg	3.34E+03	mg/kg	M	7.2E-05	mg/kg-day	N/A	N/A	
	Lead	3.26E+01	mg/kg	3.26E+01	mg/kg	M	7.0E-07	mg/kg-day	N/A	N/A	
	Mercury	7.00E-02	mg/kg	7.00E-02	mg/kg	M	1.5E-09	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	1.30E+01	ug/kg	1.30E+01	ug/kg	M	8.4E-10	mg/kg-day	1.1E+02	$(mg/kg\text{-}day)^{-1}$	8.9E-08
	Benzo(a)pyrene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.4E-07	mg/kg-day	2.4E+01	$(mg/kg\text{-}day)^{-1}$	3.2E-06
	Dibenz(a,h)anthracene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.4E-07	mg/kg-day	2.4E+01	$(mg/kg\text{-}day)^{-1}$	3.2E-06
	Hexachlorobenzene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.1E-07	mg/kg-day	3.2E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-07
	n-Nitroso-di-n-propylamine	4.90E+02	ug/kg	4.90E+02	ug/kg	M	1.1E-07	mg/kg-day	2.8E+01	$(mg/kg\text{-}day)^{-1}$	3.0E-06
											1.0E-05
										Total Risk Across All Exposure Routes/Pathways	1.1E-05

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.9.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	5.3E-07	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	1.9E-07
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	5.4E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.1E-05
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	3.1E-07	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	5.0E-06
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	2.9E-07	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	1.0E-07
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	3.9E-07	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	3.6E-06
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	2.1E-02	mg/kg-day	N/A	N/A	
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	8.6E-05	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.3E-04
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	5.1E-05	mg/kg-day	N/A	N/A	
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	1.4E-01	mg/kg-day	N/A	N/A	
	4,4'-DDD	5.10E-02	µg/L	5.10E-02	µg/L	M	4.8E-07	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	1.1E-07
	4,4'-DDE	3.76E-02	µg/L	3.76E-02	µg/L	M	3.5E-07	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.2E-07
	4,4'-DDT	5.10E-02	µg/L	5.10E-02	µg/L	M	4.8E-07	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.6E-07
	Aldrin	1.61E-02	µg/L	1.61E-02	µg/L	M	1.5E-07	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	2.6E-06
	Aroclor-1260	5.10E-01	µg/L	5.10E-01	µg/L	M	4.8E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	9.6E-06
	Antimony	1.10E+00	µg/L	1.10E+00	µg/L	M	1.0E-05	mg/kg-day	N/A	N/A	
	Cadmium	1.00E-01	µg/L	1.00E-01	µg/L	M	9.4E-07	mg/kg-day	N/A	N/A	
	Copper	3.48E+00	µg/L	3.48E+00	µg/L	M	3.3E-05	mg/kg-day	N/A	N/A	
	Lead	1.20E+00	µg/L	1.20E+00	µg/L	M	1.1E-05	mg/kg-day	N/A	N/A	
	Mercury	6.80E-02	µg/L	6.80E-02	µg/L	M	6.4E-07	mg/kg-day	N/A	N/A	
	1,1,2,2-Tetrachloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	9.4E-07

TABLE 8.9.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	1,1,2-Trichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	5.7E-02	(mg/kg-day) $^{-1}$	2.7E-07
	1,1-Dichloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	6.0E-01	(mg/kg-day) $^{-1}$	2.8E-06
	1,2-Dibromoethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	4.0E-04
	1,2-Dichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	4.3E-07
	1,2-Dichloropropane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	6.8E-02	(mg/kg-day) $^{-1}$	3.2E-07
	Benzene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	5.5E-02	(mg/kg-day) $^{-1}$	2.6E-07
	Bromodichloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	6.2E-02	(mg/kg-day) $^{-1}$	2.9E-07
	Bromoform	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	7.9E-03	(mg/kg-day) $^{-1}$	3.7E-08
	Carbon tetrachloride	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	1.3E-01	(mg/kg-day) $^{-1}$	6.1E-07
	Chloroform	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	6.1E-03	(mg/kg-day) $^{-1}$	2.9E-08
	cis-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	4.7E-07
	Dibromochloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	8.4E-02	(mg/kg-day) $^{-1}$	3.9E-07
	Tetrachloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	5.2E-02	(mg/kg-day) $^{-1}$	2.4E-07
	trans-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	4.7E-07
	Vinyl chloride	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	7.2E-01	(mg/kg-day) $^{-1}$	3.4E-06
	1,4-Dichlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	1.1E-06
	2,4,6-Trichlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	1.1E-02	(mg/kg-day) $^{-1}$	5.3E-07
	2,4-Dinitrophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	1.2E-04	mg/kg-day	N/A	N/A	
	2,4-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	N/A	N/A	
	2,6-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	N/A	N/A	
	2-Chlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	N/A	N/A	
	3,3'-Dichlorobenzidine	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	4.5E-01	(mg/kg-day) $^{-1}$	2.2E-05

TABLE 8.9.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	4,6-Dinitro-2-methylphenol	1.27E+01	µg/L	1.27E+01	µg/L	M	1.2E-04	mg/kg-day	N/A	N/A	
	4-Methylphenol	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	N/A	N/A	
	Acenaphthylene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	3.5E-05
	Benzo(a)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	3.5E-04
	Benzo(b)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	3.5E-05
	Benzo(k)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	7.3E-02	(mg/kg-day) $^{-1}$	3.5E-06
	bis(2-Chloroethyl)ether	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	5.3E-05
	bis(2-Ethylhexyl)phthalate	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	1.4E-02	(mg/kg-day) $^{-1}$	6.7E-07
	Carbazole	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	2.0E-02	(mg/kg-day) $^{-1}$	9.6E-07
	Chrysene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	7.3E-03	(mg/kg-day) $^{-1}$	3.5E-07
	Dibenz(a,h)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	3.5E-04
	Dibenzofuran	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	N/A	N/A	
	Hexachlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	7.7E-05
	Hexachlorobutadiene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	3.7E-06
	Hexachloroethane	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	1.4E-02	(mg/kg-day) $^{-1}$	6.7E-07
	Indeno(1,2,3-cd)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	3.5E-05
	n-Nitroso-di-n-propylamine	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	3.4E-04
	Naphthalene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	N/A	N/A	
	Nitrobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.8E-05	mg/kg-day	N/A	N/A	
	Pentachlorophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	1.2E-04	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	1.4E-05
	alpha-BHC	2.55E-02	µg/L	2.55E-02	µg/L	M	2.4E-07	mg/kg-day	6.3E+00	(mg/kg-day) $^{-1}$	1.5E-06
	Aroclor-1016	5.10E-01	µg/L	5.10E-01	µg/L	M	4.8E-06	mg/kg-day	7.0E-02	(mg/kg-day) $^{-1}$	3.4E-07
	Aroclor-1221	1.02E+00	µg/L	1.02E+00	µg/L	M	9.6E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.9E-05

TABLE 8.9.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Aroclor-1232	5.10E-01	µg/L	5.10E-01	µg/L	M	4.8E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	9.6E-06
	Aroclor-1242	5.10E-01	µg/L	5.10E-01	µg/L	M	4.8E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	9.6E-06
	Aroclor-1254	5.10E-01	µg/L	5.10E-01	µg/L	M	4.8E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	9.6E-06
	Aroclor-1262	5.50E-01	µg/L	5.50E-01	µg/L	M	5.2E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.0E-05
	Aroclor-1268	5.50E-01	µg/L	5.50E-01	µg/L	M	5.2E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.0E-05
	Heptachlor	2.50E-02	µg/L	2.50E-02	µg/L	M	2.3E-07	mg/kg-day	4.5E+00	(mg/kg-day) $^{-1}$	1.1E-06
	Toxaphene	2.55E+00	µg/L	2.55E+00	µg/L	M	2.4E-05	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	2.6E-05
	Thallium	1.75E+00	µg/L	1.75E+00	µg/L	M	1.6E-05	mg/kg-day	N/A	N/A	
	(Total)										2.0E-03
										Total Risk Across All Exposure Routes/Pathways	2.0E-03

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.10.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	3.1E-07	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	1.1E-07
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	3.2E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	6.3E-06
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	1.8E-07	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	2.9E-06
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	1.7E-07	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	5.9E-08
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	2.3E-07	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	2.1E-06
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	1.2E-02	mg/kg-day	N/A	N/A	
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	5.0E-05	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	7.5E-05
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	3.0E-05	mg/kg-day	N/A	N/A	
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	8.5E-02	mg/kg-day	N/A	N/A	
	4,4'-DDD	5.10E-02	µg/L	5.10E-02	µg/L	M	2.8E-07	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	6.7E-08
	4,4'-DDE	3.76E-02	µg/L	3.76E-02	µg/L	M	2.1E-07	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	7.0E-08
	4,4'-DDT	5.10E-02	µg/L	5.10E-02	µg/L	M	2.8E-07	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	9.5E-08
	Aldrin	1.61E-02	µg/L	1.61E-02	µg/L	M	8.8E-08	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	1.5E-06
	Aroclor-1260	5.10E-01	µg/L	5.10E-01	µg/L	M	2.8E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	5.6E-06
	Antimony	1.10E+00	µg/L	1.10E+00	µg/L	M	6.0E-06	mg/kg-day	N/A	N/A	
	Cadmium	1.00E-01	µg/L	1.00E-01	µg/L	M	5.5E-07	mg/kg-day	N/A	N/A	
	Copper	3.48E+00	µg/L	3.48E+00	µg/L	M	1.9E-05	mg/kg-day	N/A	N/A	
	Lead	1.20E+00	µg/L	1.20E+00	µg/L	M	6.6E-06	mg/kg-day	N/A	N/A	
	Mercury	6.80E-02	µg/L	6.80E-02	µg/L	M	3.7E-07	mg/kg-day	N/A	N/A	
	1,1,2,2-Tetrachloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	5.5E-07

TABLE 8.10.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	1,1,2-Trichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	5.7E-02	(mg/kg-day) $^{-1}$	1.6E-07
	1,1-Dichloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	6.0E-01	(mg/kg-day) $^{-1}$	1.6E-06
	1,2-Dibromoethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	2.3E-04
	1,2-Dichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	2.5E-07
	1,2-Dichloropropane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	6.8E-02	(mg/kg-day) $^{-1}$	1.9E-07
	Benzene	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	5.5E-02	(mg/kg-day) $^{-1}$	1.5E-07
	Bromodichloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	6.2E-02	(mg/kg-day) $^{-1}$	1.7E-07
	Bromoform	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	7.9E-03	(mg/kg-day) $^{-1}$	2.2E-08
	Carbon tetrachloride	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	1.3E-01	(mg/kg-day) $^{-1}$	3.6E-07
	Chloroform	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	6.1E-03	(mg/kg-day) $^{-1}$	1.7E-08
	cis-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	2.7E-07
	Dibromochloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	8.4E-02	(mg/kg-day) $^{-1}$	2.3E-07
	Tetrachloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	5.2E-02	(mg/kg-day) $^{-1}$	1.4E-07
	trans-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-06	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	2.7E-07
	Vinyl chloride	5.00E-01	µg/L	5.00E-01	µg/L	M	3.6E-05	mg/kg-day	7.2E-01	(mg/kg-day) $^{-1}$	2.6E-05
	1,4-Dichlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	6.7E-07
	2,4,6-Trichlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	1.1E-02	(mg/kg-day) $^{-1}$	3.1E-07
	2,4-Dinitrophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	7.0E-05	mg/kg-day	N/A	N/A	
	2,4-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	N/A	N/A	
	2,6-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	N/A	N/A	
	2-Chlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	N/A	N/A	
	3,3'-Dichlorobenzidine	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	4.5E-01	(mg/kg-day) $^{-1}$	1.3E-05

TABLE 8.10.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	4,6-Dinitro-2-methylphenol	1.27E+01	µg/L	1.27E+01	µg/L	M	7.0E-05	mg/kg-day	N/A	N/A	
	4-Methylphenol	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	N/A	N/A	
	Acenaphthylene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	2.0E-05
	Benzo(a)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	2.0E-04
	Benzo(b)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	2.0E-05
	Benzo(k)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	7.3E-02	(mg/kg-day) $^{-1}$	2.0E-06
	bis(2-Chloroethyl)ether	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	3.1E-05
	bis(2-Ethylhexyl)phthalate	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	1.4E-02	(mg/kg-day) $^{-1}$	3.9E-07
	Carbazole	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	2.0E-02	(mg/kg-day) $^{-1}$	5.6E-07
	Chrysene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	7.3E-03	(mg/kg-day) $^{-1}$	2.0E-07
	Dibenz(a,h)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	2.0E-04
	Dibenzofuran	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	N/A	N/A	
	Hexachlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	4.5E-05
	Hexachlorobutadiene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	2.2E-06
	Hexachloroethane	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	1.4E-02	(mg/kg-day) $^{-1}$	3.9E-07
	Indeno(1,2,3-cd)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	2.0E-05
	n-Nitroso-di-n-propylamine	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	2.0E-04
	Naphthalene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	N/A	N/A	
	Nitrobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-05	mg/kg-day	N/A	N/A	
	Pentachlorophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	7.0E-05	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	8.4E-06
	alpha-BHC	2.55E-02	µg/L	2.55E-02	µg/L	M	1.4E-07	mg/kg-day	6.3E+00	(mg/kg-day) $^{-1}$	8.8E-07
	Aroclor-1016	5.10E-01	µg/L	5.10E-01	µg/L	M	2.8E-06	mg/kg-day	7.0E-02	(mg/kg-day) $^{-1}$	2.0E-07
	Aroclor-1221	1.02E+00	µg/L	1.02E+00	µg/L	M	5.6E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.1E-05

TABLE 8.10.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Aroclor-1232	5.10E-01	µg/L	5.10E-01	µg/L	M	2.8E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	5.6E-06
	Aroclor-1242	5.10E-01	µg/L	5.10E-01	µg/L	M	2.8E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	5.6E-06
	Aroclor-1254	5.10E-01	µg/L	5.10E-01	µg/L	M	2.8E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	5.6E-06
	Aroclor-1262	5.50E-01	µg/L	5.50E-01	µg/L	M	3.0E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	6.0E-06
	Aroclor-1268	5.50E-01	µg/L	5.50E-01	µg/L	M	3.0E-06	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	6.0E-06
	Heptachlor	2.50E-02	µg/L	2.50E-02	µg/L	M	1.4E-07	mg/kg-day	4.5E+00	(mg/kg-day) $^{-1}$	6.2E-07
	Toxaphene	2.55E+00	µg/L	2.55E+00	µg/L	M	1.4E-05	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	1.5E-05
	Thallium	1.75E+00	µg/L	1.75E+00	µg/L	M	9.6E-06	mg/kg-day	N/A	N/A	
	(Total)										1.2E-03
Dermal	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	1.4E-06	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	9.5E-07
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	1.3E-04	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.9E-04
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	2.0E-07	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	6.3E-06
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	7.4E-07	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	5.2E-07
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	1.7E-07	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	2.1E-06
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	4.0E-05	mg/kg-day	N/A	N/A	
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	1.7E-07	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	6.1E-07
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	9.8E-08	mg/kg-day	N/A	N/A	
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	2.8E-04	mg/kg-day	N/A	N/A	
	4,4'-DDD	5.10E-02	µg/L	5.10E-02	µg/L	M	3.5E-06	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.2E-06
	4,4'-DDE	3.76E-02	µg/L	3.76E-02	µg/L	M	2.2E-06	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	1.1E-06
	4,4'-DDT	5.10E-02	µg/L	5.10E-02	µg/L	M	6.9E-06	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	3.3E-06

TABLE 8.10.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Aldrin	1.61E-02	µg/L	1.61E-02	µg/L	M	8.7E-09	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	3.0E-07
	Aroclor-1260	5.10E-01	µg/L	5.10E-01	µg/L	M	1.2E-04	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.6E-04
	Antimony	1.10E+00	µg/L	1.10E+00	µg/L	M	2.0E-08	mg/kg-day	N/A	N/A	
	Cadmium	1.00E-01	µg/L	1.00E-01	µg/L	M	1.8E-09	mg/kg-day	N/A	N/A	
	Copper	3.48E+00	µg/L	3.48E+00	µg/L	M	6.3E-08	mg/kg-day	N/A	N/A	
	Lead	1.20E+00	µg/L	1.20E+00	µg/L	M	8.7E-11	mg/kg-day	N/A	N/A	
	Mercury	6.80E-02	µg/L	6.80E-02	µg/L	M	1.2E-09	mg/kg-day	N/A	N/A	
	1,1,2,2-Tetrachloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.8E-07	mg/kg-day	2.9E-01	(mg/kg-day) $^{-1}$	1.1E-07
	1,1,2-Trichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.8E-07	mg/kg-day	7.0E-02	(mg/kg-day) $^{-1}$	1.9E-08
	1,1-Dichloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.1E-07	mg/kg-day	6.0E-01	(mg/kg-day) $^{-1}$	2.4E-07
	1,2-Dibromoethane	5.00E-01	µg/L	5.00E-01	µg/L	M	9.9E-09	mg/kg-day	1.1E+02	(mg/kg-day) $^{-1}$	1.1E-06
	1,2-Dichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-07	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	1.2E-08
	1,2-Dichloropropane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.9E-07	mg/kg-day	9.2E-02	(mg/kg-day) $^{-1}$	2.6E-08
	Benzene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-07	mg/kg-day	5.7E-02	(mg/kg-day) $^{-1}$	2.6E-08
	Bromodichloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.4E-07	mg/kg-day	6.3E-02	(mg/kg-day) $^{-1}$	1.5E-08
	Bromoform	5.00E-01	µg/L	5.00E-01	µg/L	M	2.0E-07	mg/kg-day	1.3E-02	(mg/kg-day) $^{-1}$	2.6E-09
	Carbon tetrachloride	5.00E-01	µg/L	5.00E-01	µg/L	M	8.3E-07	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	1.7E-07
	Chloroform	5.00E-01	µg/L	5.00E-01	µg/L	M	2.7E-07	mg/kg-day	3.1E-02	(mg/kg-day) $^{-1}$	8.1E-09
	cis-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.6E-07	mg/kg-day	1.8E-01	(mg/kg-day) $^{-1}$	2.8E-08
	Dibromochloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.1E-07	mg/kg-day	1.4E-01	(mg/kg-day) $^{-1}$	3.0E-08
	Tetrachloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	2.0E-06	mg/kg-day	5.2E-02	(mg/kg-day) $^{-1}$	1.0E-07
	trans-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.6E-07	mg/kg-day	1.8E-01	(mg/kg-day) $^{-1}$	2.8E-08
	Vinyl chloride	5.00E-01	µg/L	5.00E-01	µg/L	M	1.5E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.2E-07
	1,4-Dichlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.3E-05	mg/kg-day	2.7E-02	(mg/kg-day) $^{-1}$	6.1E-07
	2,4,6-Trichlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	2.6E-05	mg/kg-day	2.2E-02	(mg/kg-day) $^{-1}$	5.8E-07
	2,4-Dinitrophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	2.2E-06	mg/kg-day	N/A	N/A	

TABLE 8.10.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	2,4-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.8E-06	mg/kg-day	N/A	N/A	
	2,6-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.2E-06	mg/kg-day	N/A	N/A	
	2-Chlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	3.6E-06	mg/kg-day	N/A	N/A	
	3,3'-Dichlorobenzidine	5.10E+00	µg/L	5.10E+00	µg/L	M	1.3E-05	mg/kg-day	9.0E-01	(mg/kg-day) $^{-1}$	1.2E-05
	4,6-Dinitro-2-methylphenol	1.27E+01	µg/L	1.27E+01	µg/L	M	1.3E-05	mg/kg-day	N/A	N/A	
	4-Methylphenol	5.10E+00	µg/L	5.10E+00	µg/L	M	2.8E-06	mg/kg-day	N/A	N/A	
	Acenaphthylene	5.10E+00	µg/L	5.10E+00	µg/L	M	5.0E-05	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	5.3E-04	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	1.3E-03
	Benzo(a)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	9.1E-04	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	2.1E-02
	Benzo(b)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	9.2E-04	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	2.2E-03
	Benzo(k)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.2E-03	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	5.1E-04
	bis(2-Chloroethyl)ether	5.10E+00	µg/L	5.10E+00	µg/L	M	7.5E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.7E-06
	bis(2-Ethylhexyl)phthalate	5.10E+00	µg/L	5.10E+00	µg/L	M	6.7E-05	mg/kg-day	7.4E-02	(mg/kg-day) $^{-1}$	4.9E-06
	Carbazole	5.10E+00	µg/L	5.10E+00	µg/L	M	3.4E-05	mg/kg-day	2.9E-02	(mg/kg-day) $^{-1}$	9.7E-07
	Chrysene	5.10E+00	µg/L	5.10E+00	µg/L	M	5.3E-04	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	1.3E-05
	Dibenz(a,h)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.5E-03	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	5.7E-02
	Dibenzofuran	5.10E+00	µg/L	5.10E+00	µg/L	M	4.7E-05	mg/kg-day	N/A	N/A	
	Hexachlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.0E-04	mg/kg-day	3.2E+00	(mg/kg-day) $^{-1}$	6.5E-04
	Hexachlorobutadiene	5.10E+00	µg/L	5.10E+00	µg/L	M	9.8E-05	mg/kg-day	1.6E-01	(mg/kg-day) $^{-1}$	1.5E-05

TABLE 8.10.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Hexachloroethane	5.10E+00	µg/L	5.10E+00	µg/L	M	2.9E-05	mg/kg-day	2.8E-02	(mg/kg-day) $^{-1}$	8.1E-07
	Indeno(1,2,3-cd)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.7E-03	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	4.1E-03
	n-Nitroso-di-n-propylamine	5.10E+00	µg/L	5.10E+00	µg/L	M	2.1E-07	mg/kg-day	2.8E+01	(mg/kg-day) $^{-1}$	5.9E-06
	Naphthalene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.2E-05	mg/kg-day	N/A	N/A	
	Nitrobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.2E-06	mg/kg-day	N/A	N/A	
	Pentachlorophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	1.4E-03	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	1.7E-04
	alpha-BHC	2.55E-02	µg/L	2.55E-02	µg/L	M	7.1E-08	mg/kg-day	6.5E+00	(mg/kg-day) $^{-1}$	4.6E-07
	Aroclor-1016	5.10E-01	µg/L	5.10E-01	µg/L	M	1.2E-04	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	9.2E-06
	Aroclor-1221	1.02E+00	µg/L	1.02E+00	µg/L	M	2.4E-04	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	5.2E-04
	Aroclor-1232	5.10E-01	µg/L	5.10E-01	µg/L	M	1.2E-04	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.6E-04
	Aroclor-1242	5.10E-01	µg/L	5.10E-01	µg/L	M	1.2E-04	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.6E-04
	Aroclor-1254	5.10E-01	µg/L	5.10E-01	µg/L	M	1.2E-04	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.6E-04
	Aroclor-1262	5.50E-01	µg/L	5.50E-01	µg/L	M	1.3E-04	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.8E-04
	Aroclor-1268	5.50E-01	µg/L	5.50E-01	µg/L	M	1.3E-04	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.8E-04
	Heptachlor	2.50E-02	µg/L	2.50E-02	µg/L	M	9.9E-08	mg/kg-day	6.3E+00	(mg/kg-day) $^{-1}$	6.2E-07
	Toxaphene	2.55E+00	µg/L	2.55E+00	µg/L	M	1.8E-05	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.9E-05
	Thallium	1.75E+00	µg/L	1.75E+00	µg/L	M	3.2E-08	mg/kg-day	N/A	N/A	
	(Total)										9.0E-02
										Total Risk Across All Exposure Routes/Pathways	9.1E-02

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Table 8.10.RME.UA Supplement
Calculation of DAevent
Child Resident, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm²-event)	Eq
alpha-Chlordane	5.65E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	0.33	2.5E-08	2
Aroclor-1248	5.78E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.4E-06	2
Dieldrin	3.31E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	0.33	3.6E-09	2
gamma-Chlordane	3.08E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	0.33	1.3E-08	2
Heptachlor epoxide	4.19E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	0.33	3.0E-09	2
Aluminum	2.21E+03	1.0E-03	NA	NA	NA	0.33	7.3E-07	1
Arsenic	9.16E+00	1.0E-03	NA	NA	NA	0.33	3.0E-09	1
Chromium	5.41E+00	1.0E-03	NA	NA	NA	0.33	1.8E-09	1
Iron	1.54E+04	1.0E-03	NA	NA	NA	0.33	5.1E-06	1
4,4'-DDD	5.10E-02	2.8E-01	7.8E+00	3.7E+01	6.3E+01	0.33	6.3E-08	2
4,4'-DDE	3.76E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	0.33	4.0E-08	2
4,4'-DDT	5.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	0.33	1.3E-07	2
Aldrin	1.61E-02	1.6E-03	1.5E+01	3.6E+01	1.0E-01	0.33	1.6E-10	2
Aroclor-1260	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.2E-06	2
Antimony	1.10E+00	1.0E-03	NA	NA	NA	0.33	3.6E-10	1
Cadmium	1.00E-01	1.0E-03	NA	NA	NA	0.33	3.3E-11	1
Copper	3.48E+00	1.0E-03	NA	NA	NA	0.33	1.1E-09	1
Lead	1.20E+00	4.0E-06	N/A	N/A	N/A	0.33	1.6E-12	1
Mercury	6.80E-02	1.0E-03	N/A	N/A	N/A	0.33	2.2E-11	1
1,1,2,2-Tetrachloroethane	5.00E-01	9.0E-03	9.2E-01	2.2E+00	2.5E-02	0.33	6.9E-09	2
1,1,2-Trichloroethane	5.00E-01	8.4E-03	5.7E-01	1.4E+00	1.1E-02	0.33	5.0E-09	2
1,1-Dichloroethene	5.00E-01	1.6E-02	3.4E-01	8.2E-01	1.3E-02	0.33	7.4E-09	2
1,2-Dibromoethane	5.00E-01	2.0E-04	1.3E+00	3.0E+00	1.3E-04	0.33	1.8E-10	2
1,2-Dichloroethane	5.00E-01	5.3E-03	3.5E-01	8.4E-01	3.0E-03	0.33	2.5E-09	2
1,2-Dichloropropane	5.00E-01	1.0E-02	4.3E-01	1.0E+00	1.0E-02	0.33	5.2E-09	2
Benzene	5.00E-01	2.1E-02	2.6E-01	6.3E-01	1.3E-02	0.33	8.5E-09	2
Bromodichloromethane	5.00E-01	5.8E-03	8.7E-01	2.1E+00	1.2E-02	0.33	4.3E-09	2
Bromoform	5.00E-01	2.6E-03	3.0E+00	7.3E+00	2.3E-02	0.33	3.6E-09	2
Carbon tetrachloride	5.00E-01	2.2E-02	7.6E-01	1.8E+00	6.8E-02	0.33	1.5E-08	2
Chloroform	5.00E-01	8.9E-03	4.7E-01	1.1E+00	9.3E-03	0.33	4.8E-09	2
cis-1,3-Dichloropropene	5.00E-01	5.5E-03	4.2E-01	1.0E+00	4.0E-03	0.33	2.8E-09	2
Dibromochloromethane	5.00E-01	3.9E-03	1.6E+00	3.9E+00	1.7E-02	0.33	3.9E-09	2
Tetrachloroethene	5.00E-01	4.8E-02	9.0E-01	4.3E+00	2.5E-01	0.33	3.6E-08	2
trans-1,3-Dichloropropene	5.00E-01	5.5E-03	4.2E-01	1.0E+00	4.0E-03	0.33	2.8E-09	2
Vinyl chloride	5.00E-01	7.3E-03	2.1E-01	5.1E-01	2.3E-03	0.33	2.7E-09	2
1,4-Dichlorobenzene	5.10E+00	6.2E-02	6.9E-01	3.3E+00	2.5E-01	0.33	4.2E-07	2
2,4,6-Trichlorophenol	5.10E+00	5.0E-02	1.4E+00	9.2E+00	4.9E-01	0.33	4.8E-07	2
2,4-Dinitrophenol	1.27E+01	1.8E-03	1.2E+00	2.8E+00	3.5E-03	0.33	4.0E-08	2
2,4-Dinitrotoluene	5.10E+00	3.8E-03	1.1E+00	2.7E+00	9.5E-03	0.33	3.2E-08	2
2,6-Dinitrotoluene	5.10E+00	2.5E-03	1.1E+00	2.7E+00	5.2E-03	0.33	2.1E-08	2
2-Chlorophenol	5.10E+00	1.1E-02	5.3E-01	1.3E+00	1.4E-02	0.33	6.5E-08	2
3,3'-Dichlorobenzidine	5.10E+00	1.7E-02	3.1E+00	1.7E+01	NA	0.33	2.4E-07	2
4,6-Dinitro-2-methylphenol	1.27E+01	9.8E-03	1.4E+00	3.4E+00	5.0E-02	0.33	2.3E-07	2
4-Methylphenol	5.10E+00	1.0E-02	4.0E-01	9.6E-01	8.7E-03	0.33	5.1E-08	2
Acenaphthylene	5.10E+00	1.3E-01	7.4E-01	5.8E+00	7.9E-01	0.33	9.1E-07	2
Benzo(a)anthracene	5.10E+00	8.1E-01	2.2E+00	1.0E+01	4.6E+01	0.33	9.7E-06	2
Benzo(a)pyrene	5.10E+00	1.2E+00	2.9E+00	1.4E+01	1.3E+02	0.33	1.7E-05	2
Benzo(b)fluoranthene	5.10E+00	1.2E+00	3.0E+00	1.4E+01	1.3E+02	0.33	1.7E-05	2

Table 8.10.RME.UA Supplement
Calculation of DAevent
Child Resident, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm²-event)	Eq
Benzo(k)fluoranthene	5.10E+00	2.8E+00	3.0E+00	1.4E+01	1.2E+02	0.33	3.9E-05	2
bis(2-Chloroethyl)ether	5.10E+00	2.1E-03	6.5E-01	1.6E+00	1.9E-03	0.33	1.4E-08	2
bis(2-Ethylhexyl)phthalate	5.10E+00	3.3E-02	2.1E+01	1.0E+02	1.3E+01	0.33	1.2E-06	2
Carbazole	5.10E+00	8.0E-02	9.2E-01	6.2E+00	5.2E-01	0.33	6.2E-07	2
Chrysene	5.10E+00	8.1E-01	2.2E+00	1.0E+01	4.6E+01	0.33	9.7E-06	2
Dibenz(a,h)anthracene	5.10E+00	2.7E+00	4.4E+00	2.1E+01	6.9E+02	0.33	4.6E-05	2
Dibenzofuran	5.10E+00	1.1E-01	9.3E-01	7.3E+00	8.1E-01	0.33	8.6E-07	2
Hexachlorobenzene	5.10E+00	2.1E-01	4.8E+00	2.3E+01	2.0E+01	0.33	3.7E-06	2
Hexachlorobutadiene	5.10E+00	1.2E-01	3.4E+00	1.7E+01	6.0E+00	0.33	1.8E-06	2
Hexachloroethane	5.10E+00	4.2E-02	2.4E+00	1.9E+01	8.5E-01	0.33	5.3E-07	2
Indeno(1,2,3-cd)pyrene	5.10E+00	1.9E+00	4.2E+00	2.0E+01	3.8E+02	0.33	3.2E-05	2
n-Nitroso-di-n-propylamine	5.10E+00	3.1E-04	5.4E-01	1.0E-04	1.3E+00	0.33	3.9E-09	3
Naphthalene	5.10E+00	6.9E-02	5.3E-01	2.2E+00	2.0E-01	0.33	4.1E-07	2
Nitrobenzene	5.10E+00	7.0E-03	4.9E-01	1.2E+00	7.1E-03	0.33	4.0E-08	2
Pentachlorophenol	1.27E+01	6.5E-01	3.7E+00	1.7E+01	7.2E+01	0.33	2.5E-05	2
alpha-BHC	2.55E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	0.33	1.3E-09	2
Aroclor-1016	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.2E-06	2
Aroclor-1221	1.02E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	4.3E-06	2
Aroclor-1232	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.2E-06	2
Aroclor-1242	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.2E-06	2
Aroclor-1254	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.2E-06	2
Aroclor-1262	5.50E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.3E-06	2
Aroclor-1268	5.50E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	0.33	2.3E-06	2
Heptachlor	2.50E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	0.33	1.8E-09	2
Toxaphene	2.55E+00	1.5E-02	2.9E+01	1.4E+02	6.6E+00	0.33	3.3E-07	2
Thallium	1.75E+00	1.0E-03	NA	NA	NA	0.33	5.8E-10	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.

TABLE 8.11.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	alpha-Chlordane	5.65E-02	µg/L	5.65E-02	µg/L	M	1.6E-08	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	1.1E-08
	Aroclor-1248	5.78E-01	µg/L	5.78E-01	µg/L	M	1.6E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.5E-06
	Dieldrin	3.31E-02	µg/L	3.31E-02	µg/L	M	2.4E-09	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	7.5E-08
	gamma-Chlordane	3.08E-02	µg/L	3.08E-02	µg/L	M	8.9E-09	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	6.2E-09
	Heptachlor epoxide	4.19E-02	µg/L	4.19E-02	µg/L	M	2.0E-09	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	2.6E-08
	Aluminum	2.21E+03	µg/L	2.21E+03	µg/L	M	2.4E-06	mg/kg-day	N/A	(mg/kg-day) $^{-1}$	
	Arsenic	9.16E+00	µg/L	9.16E+00	µg/L	M	9.8E-09	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	3.6E-08
	Chromium	5.41E+00	µg/L	5.41E+00	µg/L	M	5.8E-09	mg/kg-day	N/A	N/A	
	Iron	1.54E+04	µg/L	1.54E+04	µg/L	M	1.7E-05	mg/kg-day	N/A	(mg/kg-day) $^{-1}$	
	4,4'-DDD	5.10E-02	µg/L	5.10E-02	µg/L	M	4.2E-08	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.4E-08
	4,4'-DDE	3.76E-02	µg/L	3.76E-02	µg/L	M	2.6E-08	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	1.3E-08
	4,4'-DDT	5.10E-02	µg/L	5.10E-02	µg/L	M	8.3E-08	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	4.0E-08
	Aldrin	1.61E-02	µg/L	1.61E-02	µg/L	M	1.0E-10	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	3.6E-09
	Aroclor-1260	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.2E-06
	Antimony	1.10E+00	µg/L	1.10E+00	µg/L	M	1.2E-09	mg/kg-day	N/A	N/A	
	Cadmium	1.00E-01	µg/L	1.00E-01	µg/L	M	1.1E-10	mg/kg-day	N/A	N/A	
	Copper	3.48E+00	µg/L	3.48E+00	µg/L	M	3.7E-09	mg/kg-day	N/A	N/A	
	Lead	1.20E+00	µg/L	1.20E+00	µg/L	M	5.2E-12	mg/kg-day	N/A	N/A	
	Mercury	6.80E-02	µg/L	6.80E-02	µg/L	M	7.3E-11	mg/kg-day	N/A	N/A	
	1,1,2,2-Tetrachloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	5.9E-09	mg/kg-day	2.9E-01	(mg/kg-day) $^{-1}$	1.7E-09
	1,1,2-Trichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	5.1E-09	mg/kg-day	7.0E-02	(mg/kg-day) $^{-1}$	3.6E-10
	1,1-Dichloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	9.2E-09	mg/kg-day	6.0E-01	(mg/kg-day) $^{-1}$	5.5E-09
	1,2-Dibromoethane	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-10	mg/kg-day	1.1E+02	(mg/kg-day) $^{-1}$	1.5E-08
	1,2-Dichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.1E-09	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	2.8E-10

TABLE 8.11.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	1,2-Dichloropropane	5.00E-01	µg/L	5.00E-01	µg/L	M	5.9E-09	mg/kg-day	9.2E-02	(mg/kg-day) $^{-1}$	5.4E-10
	Benzene	5.00E-01	µg/L	5.00E-01	µg/L	M	1.2E-08	mg/kg-day	5.7E-02	(mg/kg-day) $^{-1}$	6.7E-10
	Bromodichloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	3.8E-09	mg/kg-day	6.3E-02	(mg/kg-day) $^{-1}$	2.4E-10
	Bromoform	5.00E-01	µg/L	5.00E-01	µg/L	M	2.5E-09	mg/kg-day	1.3E-02	(mg/kg-day) $^{-1}$	3.2E-11
	Carbon tetrachloride	5.00E-01	µg/L	5.00E-01	µg/L	M	1.4E-08	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	2.7E-09
	Chloroform	5.00E-01	µg/L	5.00E-01	µg/L	M	5.3E-09	mg/kg-day	3.1E-02	(mg/kg-day) $^{-1}$	1.6E-10
	cis-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	3.3E-09	mg/kg-day	1.8E-01	(mg/kg-day) $^{-1}$	5.9E-10
	Dibromochloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	2.9E-09	mg/kg-day	1.4E-01	(mg/kg-day) $^{-1}$	4.1E-10
	Tetrachloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	2.9E-08	mg/kg-day	5.2E-02	(mg/kg-day) $^{-1}$	1.5E-09
	trans-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	3.3E-09	mg/kg-day	1.8E-01	(mg/kg-day) $^{-1}$	5.9E-10
	Vinyl chloride	5.00E-01	µg/L	5.00E-01	µg/L	M	4.1E-09	mg/kg-day	7.2E-01	(mg/kg-day) $^{-1}$	3.0E-09
	1,4-Dichlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.5E-07	mg/kg-day	2.7E-02	(mg/kg-day) $^{-1}$	9.4E-09
	2,4,6-Trichlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	3.2E-07	mg/kg-day	2.2E-02	(mg/kg-day) $^{-1}$	7.0E-09
	2,4-Dinitrophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	3.2E-08	mg/kg-day	N/A	N/A	
	2,4-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.6E-08	mg/kg-day	N/A	N/A	
	2,6-Dinitrotoluene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.7E-08	mg/kg-day	N/A	N/A	
	2-Chlorophenol	5.10E+00	µg/L	5.10E+00	µg/L	M	6.8E-08	mg/kg-day	N/A	N/A	
	3,3'-Dichlorobenzidine	5.10E+00	µg/L	5.10E+00	µg/L	M	1.6E-07	mg/kg-day	9.0E-01	(mg/kg-day) $^{-1}$	1.4E-07
	4,6-Dinitro-2-methylphenol	1.27E+01	µg/L	1.27E+01	µg/L	M	1.8E-07	mg/kg-day	N/A	N/A	
	4-Methylphenol	5.10E+00	µg/L	5.10E+00	µg/L	M	6.0E-08	mg/kg-day	N/A	N/A	
	Acenaphthylene	5.10E+00	µg/L	5.10E+00	µg/L	M	6.5E-07	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	6.4E-06	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	1.5E-05
	Benzo(a)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.1E-05	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	2.6E-04
	Benzo(b)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.1E-05	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	2.6E-05
	Benzo(k)fluoranthene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.6E-05	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	6.1E-06
	bis(2-Chloroethyl)ether	5.10E+00	µg/L	5.10E+00	µg/L	M	1.3E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.9E-08

TABLE 8.11.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	bis(2-Ethylhexyl)phthalate	5.10E+00	µg/L	5.10E+00	µg/L	M	8.1E-07	mg/kg-day	7.4E-02	(mg/kg-day) $^{-1}$	6.0E-08
	Carbazole	5.10E+00	µg/L	5.10E+00	µg/L	M	4.6E-07	mg/kg-day	2.9E-02	(mg/kg-day) $^{-1}$	1.3E-08
	Chrysene	5.10E+00	µg/L	5.10E+00	µg/L	M	6.4E-06	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	1.5E-07
	Dibenz(a,h)anthracene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.0E-05	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	7.1E-04
	Dibenzofuran	5.10E+00	µg/L	5.10E+00	µg/L	M	6.0E-07	mg/kg-day	N/A	N/A	
	Hexachlorobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.5E-06	mg/kg-day	3.2E+00	(mg/kg-day) $^{-1}$	7.9E-06
	Hexachlorobutadiene	5.10E+00	µg/L	5.10E+00	µg/L	M	1.2E-06	mg/kg-day	1.6E-01	(mg/kg-day) $^{-1}$	1.8E-07
	Hexachloroethane	5.10E+00	µg/L	5.10E+00	µg/L	M	3.5E-07	mg/kg-day	2.8E-02	(mg/kg-day) $^{-1}$	9.7E-09
	Indeno(1,2,3-cd)pyrene	5.10E+00	µg/L	5.10E+00	µg/L	M	2.1E-05	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	4.9E-05
	n-Nitroso-di-n-propylamine	5.10E+00	µg/L	5.10E+00	µg/L	M	1.2E-09	mg/kg-day	2.8E+01	(mg/kg-day) $^{-1}$	3.4E-08
	Naphthalene	5.10E+00	µg/L	5.10E+00	µg/L	M	3.8E-07	mg/kg-day	N/A	N/A	
	Nitrobenzene	5.10E+00	µg/L	5.10E+00	µg/L	M	4.3E-08	mg/kg-day	N/A	N/A	
	Pentachlorophenol	1.27E+01	µg/L	1.27E+01	µg/L	M	1.7E-05	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	2.0E-06
	alpha-BHC	2.55E-02	µg/L	2.55E-02	µg/L	M	8.5E-10	mg/kg-day	6.5E+00	(mg/kg-day) $^{-1}$	5.5E-09
	Aroclor-1016	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-06	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	1.1E-07
	Aroclor-1221	1.02E+00	µg/L	1.02E+00	µg/L	M	2.8E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	6.3E-06
	Aroclor-1232	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.2E-06
	Aroclor-1242	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.2E-06
	Aroclor-1254	5.10E-01	µg/L	5.10E-01	µg/L	M	1.4E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.2E-06
	Aroclor-1262	5.50E-01	µg/L	5.50E-01	µg/L	M	1.5E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.4E-06
	Aroclor-1268	5.50E-01	µg/L	5.50E-01	µg/L	M	1.5E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.4E-06
	Heptachlor	2.50E-02	µg/L	2.50E-02	µg/L	M	1.2E-09	mg/kg-day	6.3E+00	(mg/kg-day) $^{-1}$	7.4E-09
	Toxaphene	2.55E+00	µg/L	2.55E+00	µg/L	M	2.2E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	4.8E-07
	Thallium	1.75E+00	µg/L	1.75E+00	µg/L	M	1.9E-09	mg/kg-day	N/A	N/A	
	(Total)										1.1E-03
										Total Risk Across All Exposure Routes/Pathways	1.1E-03

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Table 8.11.RME.UA Supplement
Calculation of DAevent
Construction Worker, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
alpha-Chlordane	5.65E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	1.2E-07	2
Aroclor-1248	5.78E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.2E-05	2
Dieldrin	3.31E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	8	1.8E-08	2
gamma-Chlordane	3.08E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	6.6E-08	2
Heptachlor epoxide	4.19E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	1.5E-08	2
Aluminum	2.21E+03	1.0E-03	NA	NA	NA	8	1.8E-05	1
Arsenic	9.16E+00	1.0E-03	NA	NA	NA	8	7.3E-08	1
Chromium	5.41E+00	1.0E-03	NA	NA	NA	8	4.3E-08	1
Iron	1.54E+04	1.0E-03	NA	NA	NA	8	1.2E-04	1
4,4'-DDD	5.10E-02	2.8E-01	7.8E+00	3.7E+01	6.3E+01	8	3.1E-07	2
4,4'-DDE	3.76E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	8	1.9E-07	2
4,4'-DDT	5.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	8	6.2E-07	2
Aldrin	1.61E-02	1.6E-03	1.5E+01	3.6E+01	1.0E-01	8	7.8E-10	2
Aroclor-1260	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Antimony	1.10E+00	1.0E-03	NA	NA	NA	8	8.8E-09	1
Cadmium	1.00E-01	1.0E-03	NA	NA	NA	8	8.0E-10	1
Copper	3.48E+00	1.0E-03	NA	NA	NA	8	2.8E-08	1
Lead	1.20E+00	4.0E-06	N/A	N/A	N/A	8	3.8E-11	1
Mercury	6.80E-02	1.0E-03	N/A	N/A	N/A	8	5.4E-10	1
	0.00E+00							
1,1,2,2-Tetrachloroethane	5.00E-01	9.0E-03	9.2E-01	2.2E+00	2.5E-02	8	4.4E-08	3
1,1,2-Trichloroethane	5.00E-01	8.4E-03	5.7E-01	1.4E+00	1.1E-02	8	3.8E-08	3
1,1-Dichloroethene	5.00E-01	1.6E-02	3.4E-01	8.2E-01	1.3E-02	8	6.9E-08	3
1,2-Dibromoethane	5.00E-01	2.0E-04	1.3E+00	3.0E+00	1.3E-04	8	1.1E-09	3
1,2-Dichloroethane	5.00E-01	5.3E-03	3.5E-01	8.4E-01	3.0E-03	8	2.3E-08	3
1,2-Dichloropropane	5.00E-01	1.0E-02	4.3E-01	1.0E+00	1.0E-02	8	4.4E-08	3
Benzene	5.00E-01	2.1E-02	2.6E-01	6.3E-01	1.3E-02	8	8.9E-08	3
Bromodichloromethane	5.00E-01	5.8E-03	8.7E-01	2.1E+00	1.2E-02	8	2.8E-08	3
Bromoform	5.00E-01	2.6E-03	3.0E+00	7.3E+00	2.3E-02	8	1.8E-08	3
Carbon tetrachloride	5.00E-01	2.2E-02	7.6E-01	1.8E+00	6.8E-02	8	1.0E-07	3
Chloroform	5.00E-01	8.9E-03	4.7E-01	1.1E+00	9.3E-03	8	4.0E-08	3
cis-1,3-Dichloropropene	5.00E-01	5.5E-03	4.2E-01	1.0E+00	4.0E-03	8	2.4E-08	3
Dibromochloromethane	5.00E-01	3.9E-03	1.6E+00	3.9E+00	1.7E-02	8	2.2E-08	3
Tetrachloroethene	5.00E-01	4.8E-02	9.0E-01	4.3E+00	2.5E-01	8	2.1E-07	3
trans-1,3-Dichloropropene	5.00E-01	5.5E-03	4.2E-01	1.0E+00	4.0E-03	8	2.4E-08	3
Vinyl chloride	5.00E-01	7.3E-03	2.1E-01	5.1E-01	2.3E-03	8	3.1E-08	3
1,4-Dichlorobenzene	5.10E+00	6.2E-02	6.9E-01	3.3E+00	2.5E-01	8	2.6E-06	3
2,4,6-Trichlorophenol	5.10E+00	5.0E-02	1.4E+00	9.2E+00	4.9E-01	8	2.4E-06	2
2,4-Dinitrophenol	1.27E+01	1.8E-03	1.2E+00	2.8E+00	3.5E-03	8	2.4E-07	3
2,4-Dinitrotoluene	5.10E+00	3.8E-03	1.1E+00	2.7E+00	9.5E-03	8	2.0E-07	3
2,6-Dinitrotoluene	5.10E+00	2.5E-03	1.1E+00	2.7E+00	5.2E-03	8	1.3E-07	3
2-Chlorophenol	5.10E+00	1.1E-02	5.3E-01	1.3E+00	1.4E-02	8	5.0E-07	3
3,3'-Dichlorobenzidine	5.10E+00	1.7E-02	3.1E+00	1.7E+01	NA	8	1.2E-06	2
4,6-Dinitro-2-methylphenol	1.27E+01	9.8E-03	1.4E+00	3.4E+00	5.0E-02	8	1.3E-06	3
4-Methylphenol	5.10E+00	1.0E-02	4.0E-01	9.6E-01	8.7E-03	8	4.5E-07	3
Acenaphthylene	5.10E+00	1.3E-01	7.4E-01	5.8E+00	7.9E-01	8	4.8E-06	3
Benzo(a)anthracene	5.10E+00	8.1E-01	2.2E+00	1.0E+01	4.6E+01	8	4.8E-05	2
Benzo(a)pyrene	5.10E+00	1.2E+00	2.9E+00	1.4E+01	1.3E+02	8	8.1E-05	2
Benzo(b)fluoranthene	5.10E+00	1.2E+00	3.0E+00	1.4E+01	1.3E+02	8	8.3E-05	2

Table 8.11.RME.UA Supplement
Calculation of DAevent
Construction Worker, Groundwater
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Groundwater Water Concentration (CW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm²-event)	Eq
Benzo(k)fluoranthene	5.10E+00	2.8E+00	3.0E+00	1.4E+01	1.2E+02	8	1.9E-04	2
bis(2-Chloroethyl)ether	5.10E+00	2.1E-03	6.5E-01	1.6E+00	1.9E-03	8	9.9E-08	3
bis(2-Ethylhexyl)phthalate	5.10E+00	3.3E-02	2.1E+01	1.0E+02	1.3E+01	8	6.0E-06	2
Carbazole	5.10E+00	8.0E-02	9.2E-01	6.2E+00	5.2E-01	8	3.4E-06	3
Chrysene	5.10E+00	8.1E-01	2.2E+00	1.0E+01	4.6E+01	8	4.8E-05	2
Dibenz(a,h)anthracene	5.10E+00	2.7E+00	4.4E+00	2.1E+01	6.9E+02	8	2.3E-04	2
Dibenzofuran	5.10E+00	1.1E-01	9.3E-01	7.3E+00	8.1E-01	8	4.5E-06	3
Hexachlorobenzene	5.10E+00	2.1E-01	4.8E+00	2.3E+01	2.0E+01	8	1.8E-05	2
Hexachlorobutadiene	5.10E+00	1.2E-01	3.4E+00	1.7E+01	6.0E+00	8	8.8E-06	2
Hexachloroethane	5.10E+00	4.2E-02	2.4E+00	1.9E+01	8.5E-01	8	2.6E-06	2
Indeno(1,2,3-cd)pyrene	5.10E+00	1.9E+00	4.2E+00	2.0E+01	3.8E+02	8	1.6E-04	2
n-Nitroso-di-n-propylamine	5.10E+00	3.1E-04	5.4E-01	1.0E-04	1.3E+00	8	9.1E-09	3
Naphthalene	5.10E+00	6.9E-02	5.3E-01	2.2E+00	2.0E-01	8	2.8E-06	3
Nitrobenzene	5.10E+00	7.0E-03	4.9E-01	1.2E+00	7.1E-03	8	3.2E-07	3
Pentachlorophenol	1.27E+01	6.5E-01	3.7E+00	1.7E+01	7.2E+01	8	1.2E-04	2
alpha-BHC	2.55E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	6.4E-09	2
Aroclor-1016	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Aroclor-1221	1.02E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1232	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Aroclor-1242	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Aroclor-1254	5.10E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Aroclor-1262	5.50E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Aroclor-1268	5.50E-01	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	1.1E-05	2
Heptachlor	2.50E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	8.9E-09	2
Toxaphene	2.55E+00	1.5E-02	2.9E+01	1.4E+02	6.6E+00	8	1.6E-06	2
Thallium	1.75E+00	1.0E-03	NA	NA	NA	8	1.4E-08	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.

TABLE 8.12.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Upper Aquifer - Shower
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	9.4E-07
	1,1,2-Trichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	5.6E-02	(mg/kg-day) $^{-1}$	2.6E-07
	1,1-Dichloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	1.8E-01	(mg/kg-day) $^{-1}$	8.2E-07
	1,2-Dibromoethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	7.6E-01	(mg/kg-day) $^{-1}$	3.6E-06
	1,2-Dichloroethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	4.3E-07
	1,2-Dichloropropane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	N/A	N/A	
	Benzene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	2.9E-02	(mg/kg-day) $^{-1}$	1.4E-07
	Bromodichloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	N/A	N/A	
	Bromoform	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	3.9E-03	(mg/kg-day) $^{-1}$	1.8E-08
	Carbon tetrachloride	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	5.3E-02	(mg/kg-day) $^{-1}$	2.5E-07
	Chloroform	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	8.1E-02	(mg/kg-day) $^{-1}$	3.8E-07
	cis-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	1.4E-02	(mg/kg-day) $^{-1}$	6.6E-08
	Dibromochloromethane	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	N/A	N/A	
	Tetrachloroethene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	2.0E-03	(mg/kg-day) $^{-1}$	9.5E-09
	trans-1,3-Dichloropropene	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	1.4E-02	(mg/kg-day) $^{-1}$	6.6E-08
	Vinyl chloride	5.00E-01	µg/L	5.00E-01	µg/L	M	4.7E-06	mg/kg-day	1.5E-02	(mg/kg-day) $^{-1}$	7.2E-08
	(Total)										7.0E-06
										Total Risk Across All Exposure Routes/Pathways	7.0E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.13.RME.OA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Upper Aquifer - Water Vapors at Excavation Pit
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	5.00E-01	µg/L	8.86E-08	mg/m^3	R	2.7E-11	mg/kg-day	2.0E-01	$(mg/kg\text{-}day)^{-1}$	5.4E-12
	1,1,2-Trichloroethane	5.00E-01	µg/L	9.39E-08	mg/m^3	R	2.9E-11	mg/kg-day	5.6E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-12
	1,1-Dichloroethene	5.00E-01	µg/L	1.02E-07	mg/m^3	R	3.1E-11	mg/kg-day	1.8E-01	$(mg/kg\text{-}day)^{-1}$	5.4E-12
	1,2-Dibromoethane	5.00E-01	µg/L	8.56E-08	mg/m^3	R	2.6E-11	mg/kg-day	7.6E-01	$(mg/kg\text{-}day)^{-1}$	2.0E-11
	1,2-Dichloroethane	5.00E-01	µg/L	1.02E-07	mg/m^3	R	3.1E-11	mg/kg-day	9.1E-02	$(mg/kg\text{-}day)^{-1}$	2.8E-12
	1,2-Dichloropropane	5.00E-01	µg/L	9.78E-08	mg/m^3	R	3.0E-11	mg/kg-day	N/A	N/A	
	Benzene	5.00E-01	µg/L	1.08E-07	mg/m^3	R	3.3E-11	mg/kg-day	2.9E-02	$(mg/kg\text{-}day)^{-1}$	9.5E-13
	Bromodichloromethane	5.00E-01	µg/L	8.94E-08	mg/m^3	R	2.7E-11	mg/kg-day	N/A	N/A	
	Bromoform	5.00E-01	µg/L	8.02E-08	mg/m^3	R	2.4E-11	mg/kg-day	3.9E-03	$(mg/kg\text{-}day)^{-1}$	9.5E-14
	Carbon tetrachloride	5.00E-01	µg/L	9.09E-08	mg/m^3	R	2.8E-11	mg/kg-day	5.3E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-12
	Chloroform	5.00E-01	µg/L	9.70E-08	mg/m^3	R	3.0E-11	mg/kg-day	8.1E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-12
	cis-1,3-Dichloropropene	5.00E-01	µg/L	9.85E-08	mg/m^3	R	3.0E-11	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	4.2E-13
	Dibromochloromethane	5.00E-01	µg/L	8.40E-08	mg/m^3	R	2.6E-11	mg/kg-day	N/A	N/A	
	Tetrachloroethene	5.00E-01	µg/L	8.94E-08	mg/m^3	R	2.7E-11	mg/kg-day	2.0E-03	$(mg/kg\text{-}day)^{-1}$	5.5E-14
	trans-1,3-Dichloropropene	5.00E-01	µg/L	9.85E-08	mg/m^3	R	3.0E-11	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	4.2E-13
	Vinyl chloride	5.00E-01	µg/L	1.13E-07	mg/m^3	R	3.4E-11	mg/kg-day	1.5E-02	$(mg/kg\text{-}day)^{-1}$	5.3E-13
	(Total)										4.1E-11
										Total Risk Across All Exposure Routes/Pathways	4.1E-11

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Table 8.13.RME.UA Supplement
Inhalation of Volatiles from Groundwater During Construction
Inhalation Exposure Concentrations Calculated Using a Two-Film Volatilization Model
Future Construction Worker Senario
MCAS Cherry Point, OU6 Site 12

Chemical	Cw (µg/L)	MW (mol/gram)	K_H (unitless)	k_l (cm/hr)	k_g (cm/hr)	K_v (cm/hr)	ER (mg/hr)	ERa (g/sec-m^2)	Ca (µg/m^3)
1,1,2,2-Tetrachloroethane	5.00E-01	168	1.41E-02	4.18E-02	1.76E+03	4.17E-02	2.09E-08	5.80E-11	8.86E-05
1,1,2-Trichloroethane	5.00E-01	133	3.74E-02	4.43E-02	1.87E+03	4.43E-02	2.22E-08	6.15E-11	9.39E-05
1,1-Dichloroethene	5.00E-01	97	1.07E+00	4.80E-02	2.02E+03	4.80E-02	2.40E-08	6.66E-11	1.02E-04
1,2-Dibromoethane	5.00E-01	190	1.33E-02	4.06E-02	1.71E+03	4.05E-02	2.02E-08	5.62E-11	8.56E-05
1,2-Dichloroethane	5.00E-01	99	4.10E-02	4.77E-02	2.01E+03	4.77E-02	2.39E-08	6.63E-11	1.02E-04
1,2-Dichloropropane	5.00E-01	113	1.15E-01	4.62E-02	1.95E+03	4.62E-02	2.31E-08	6.41E-11	9.78E-05
Benzene	5.00E-01	78	2.28E-01	5.07E-02	2.13E+03	5.07E-02	2.53E-08	7.04E-11	1.08E-04
Bromodichloromethane	5.00E-01	164	6.56E-02	4.21E-02	1.77E+03	4.21E-02	2.10E-08	5.84E-11	8.94E-05
Bromoform	5.00E-01	253	2.19E-02	3.77E-02	1.59E+03	3.77E-02	1.89E-08	5.24E-11	8.02E-05
Carbon tetrachloride	5.00E-01	154	1.25E+00	4.27E-02	1.80E+03	4.27E-02	2.14E-08	5.94E-11	9.09E-05
Chloroform	5.00E-01	119	1.50E-01	4.56E-02	1.92E+03	4.56E-02	2.28E-08	6.33E-11	9.70E-05
cis-1,3-Dichloropropene	5.00E-01	111	7.26E-01	4.64E-02	1.95E+03	4.64E-02	2.32E-08	6.44E-11	9.85E-05
Dibromochloromethane	5.00E-01	208	3.21E-02	3.96E-02	1.67E+03	3.96E-02	1.98E-08	5.50E-11	8.40E-05
Tetrachloroethene	5.00E-01	166	7.54E-01	4.19E-02	1.77E+03	4.19E-02	2.10E-08	5.83E-11	8.94E-05
trans-1,3-Dichloropropene	5.00E-01	111	7.26E-01	4.64E-02	1.95E+03	4.64E-02	2.32E-08	6.44E-11	9.85E-05
Vinyl chloride	5.00E-01	63	1.11E+00	5.34E-02	2.25E+03	5.34E-02	2.67E-08	7.42E-11	1.13E-04

Equations

Equation 1 $Kv = 1/(1/k_l + 1/K_H{*}K_g)$

Equation 2 $k_g = 700(18/MW)^{1/4}V$

Equation 3 $k_l = (32/MW)^{1/4}Ka'$

Equation 4 $ER = Kv * Cw * L/1000\ cm^3 * mg/1000\ \mu g$

Equation 5 $ERa = ER * g/1000\ mg * 10000 cm^2/m^2 * hr/60\ min * min/60\ sec$

Variables	Units	Exposure Assumptions
Cw = groundwater concentration	(mg/L)	chem-specific
MW = molecular weight	(mol/gram)	chem-specific
K_H - Henry's Law Constant	(unitless)	chem-specific
Kv = volatilization rate	(cm/hr)	Solved by Eq 1
k_g = gas phase transfer coefficient	(cm/hr)	Solved by Eq 2
k_l = liquid phase transfer coefficient	(cm/hr)	Solved by Eq 3
V = wind speed	(m/s)	4.4
Ka' = aeration rate	(cm/hr)	0.0633
ER = emission rate	(mg/hr)	Solved by Eq 4
A = area of excavation (utility ditch) Length = 18 m, width = 2 m	(m^2)	36
Era = area emission rate	(g/sec-m^2)	Solved by Eq 5
Ca = air concentration	(mg/m^3)	Solved using SCREEN3 mode

Note: aeration rate based on aeration rate for small pond (0.1/day) multiplied by depth of water in excavation (1/2 ft)

TABLE 8.14.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	8.2E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.6E-07
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	2.7E-15	mg/kg-day	1.5E+05	(mg/kg-day) $^{-1}$	4.1E-10
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	5.6E-03	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	1.7E-06	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	2.8E-06	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	1.2E-05	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	3.1E-04	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	1.8E-03	mg/kg-day	N/A	N/A	
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	1.9E-09	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	4.5E-10
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	1.0E-09	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	3.5E-10
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	2.0E-09	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	6.9E-10
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	9.4E-10	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	1.6E-08
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	2.1E-08	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	7.5E-09
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	1.9E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.8E-08
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	3.6E-09	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	5.7E-08
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	2.0E-08	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	7.1E-09
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	2.8E-09	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	2.5E-08
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	7.7E-07	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	1.2E-06
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	4.3E-08	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	2.6E-09	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	2.2E-07
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.3E-07	mg/kg-day	4.5E-01	(mg/kg-day) $^{-1}$	1.1E-07

TABLE 8.14.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	5.7E-07	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.3E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	1.7E-07
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.3E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.7E-06
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.3E-07	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	2.6E-07
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.3E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.7E-06
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.3E-07	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	3.7E-07
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.3E-07	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	1.8E-08
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.3E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	1.7E-07
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.3E-07	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	1.6E-06
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.3E-07	mg/kg-day	N/A	N/A	
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	5.7E-07	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	6.8E-08
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	3.8E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	7.6E-08
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	9.4E-08	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	1.0E-07
	(Total)										8.1E-06
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	7.6E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.7E-06
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	5.4E-15	mg/kg-day	3.0E+05	(mg/kg-day) $^{-1}$	1.6E-09
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	3.7E-03	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	1.1E-06	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	1.9E-07	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	8.1E-06	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	2.1E-04	mg/kg-day	N/A	N/A	

TABLE 8.14.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	1.2E-03	mg/kg-day	N/A	N/A	
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	3.7E-09	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.3E-09
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	2.1E-09	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	1.0E-09
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	4.0E-09	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	1.9E-09
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	6.2E-09	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	2.1E-07
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	5.6E-08	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	3.9E-08
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	1.8E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.9E-07
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	2.4E-08	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	7.5E-07
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	5.4E-08	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	3.8E-08
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	1.8E-08	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	2.4E-07
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	1.5E-06	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	5.6E-06
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	2.8E-08	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	5.1E-09	mg/kg-day	1.1E+02	(mg/kg-day) $^{-1}$	5.4E-07
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.5E-06	mg/kg-day	9.0E-01	(mg/kg-day) $^{-1}$	1.4E-06
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	3.8E-06	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-06	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	4.7E-06
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-06	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	4.7E-05
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.5E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.4E-06
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-06	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	4.7E-05
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.5E-06	mg/kg-day	3.2E+00	(mg/kg-day) $^{-1}$	4.9E-06
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.5E-06	mg/kg-day	1.6E-01	(mg/kg-day) $^{-1}$	2.4E-07
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	2.0E-06	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	4.7E-06

TABLE 8.14.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.5E-06	mg/kg-day	2.8E+01	(mg/kg-day) $^{-1}$	4.3E-05
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.5E-06	mg/kg-day	N/A	N/A	
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	9.4E-06	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	1.1E-06
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	3.5E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	7.8E-07
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	6.2E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.4E-06
	(Total)										1.7E-04
										Total Risk Across All Exposure Routes/Pathways	1.8E-04

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.15.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	1.9E-07	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.8E-07
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	6.3E-15	mg/kg-day	1.5E+05	(mg/kg-day) $^{-1}$	9.5E-10
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	1.3E-02	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	4.0E-06	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	6.6E-06	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	2.9E-05	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	7.3E-04	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	4.3E-03	mg/kg-day	N/A	N/A	
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	4.4E-09	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	1.1E-09
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	2.4E-09	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	8.2E-10
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	4.7E-09	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.6E-09
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	2.2E-09	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	3.7E-08
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	5.0E-08	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	1.7E-08
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	4.5E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	8.9E-08
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	8.3E-09	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	1.3E-07
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	4.7E-08	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	1.7E-08
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	6.5E-09	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	5.9E-08
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	1.8E-06	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.7E-06
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	1.0E-07	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	6.0E-09	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	5.1E-07
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.5E-07	mg/kg-day	4.5E-01	(mg/kg-day) $^{-1}$	2.5E-07

TABLE 8.15.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	1.3E-06	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.5E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	4.0E-07
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.5E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	4.0E-06
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.5E-07	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	6.0E-07
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.5E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	4.0E-06
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.5E-07	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	8.7E-07
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.5E-07	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	4.3E-08
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.5E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	4.0E-07
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.5E-07	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	3.8E-06
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	5.5E-07	mg/kg-day	N/A	N/A	
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	1.3E-06	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	1.6E-07
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	8.9E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	1.8E-07
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	2.2E-07	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	2.4E-07
	(Total)										1.9E-05
Dermal	Aroclor-1260	1.74E+02	ug/kg	1.74E+02	ug/kg	M	4.5E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.0E-06
	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	5.76E+00	pg/g	M	3.2E-15	mg/kg-day	3.0E+05	(mg/kg-day) $^{-1}$	9.7E-10
	Aluminum	1.20E+04	mg/kg	1.20E+04	mg/kg	M	2.2E-03	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	3.65E+00	mg/kg	M	6.8E-07	mg/kg-day	N/A	N/A	
	Cadmium	6.05E+00	mg/kg	6.05E+00	mg/kg	M	1.1E-07	mg/kg-day	N/A	N/A	
	Chromium	2.61E+01	mg/kg	2.61E+01	mg/kg	M	4.9E-06	mg/kg-day	N/A	N/A	
	Copper	6.67E+02	mg/kg	6.67E+02	mg/kg	M	1.2E-04	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	3.92E+03	mg/kg	M	7.3E-04	mg/kg-day	N/A	N/A	

TABLE 8.15.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	4,4'-DDD	4.02E+00	ug/kg	4.02E+00	ug/kg	M	2.2E-09	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	7.7E-10
	4,4'-DDE	2.21E+00	ug/kg	2.21E+00	ug/kg	M	1.2E-09	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	6.0E-10
	4,4'-DDT	4.29E+00	ug/kg	4.29E+00	ug/kg	M	2.4E-09	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	1.2E-09
	Aldrin	2.01E+00	ug/kg	2.01E+00	ug/kg	M	3.7E-09	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	1.3E-07
	alpha-Chlordane	4.54E+01	ug/kg	4.54E+01	ug/kg	M	3.4E-08	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	2.4E-08
	Aroclor-1248	4.08E+01	ug/kg	4.08E+01	ug/kg	M	1.1E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.4E-07
	Dieldrin	7.60E+00	ug/kg	7.60E+00	ug/kg	M	1.4E-08	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	4.5E-07
	gamma-Chlordane	4.33E+01	ug/kg	4.33E+01	ug/kg	M	3.2E-08	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	2.3E-08
	Heptachlor epoxide	5.89E+00	ug/kg	5.89E+00	ug/kg	M	1.1E-08	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	1.4E-07
	Arsenic	1.65E+00	mg/kg	1.65E+00	mg/kg	M	9.2E-07	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	3.4E-06
	Mercury	9.13E-02	mg/kg	9.13E-02	mg/kg	M	1.7E-08	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	5.49E+00	ug/kg	5.49E+00	ug/kg	M	3.1E-09	mg/kg-day	1.1E+02	(mg/kg-day) $^{-1}$	3.3E-07
	3,3'-Dichlorobenzidine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.3E-07	mg/kg-day	9.0E-01	(mg/kg-day) $^{-1}$	8.4E-07
	4,6-Dinitro-2-methylphenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	2.3E-06	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.2E-06	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	2.8E-06
	Benzo(a)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.2E-06	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	2.8E-05
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.3E-07	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	2.0E-06
	Dibenz(a,h)anthracene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.2E-06	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	2.8E-05
	Hexachlorobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.3E-07	mg/kg-day	3.2E+00	(mg/kg-day) $^{-1}$	3.0E-06
	Hexachlorobutadiene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.3E-07	mg/kg-day	1.6E-01	(mg/kg-day) $^{-1}$	1.5E-07
	Indeno(1,2,3-cd)pyrene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	1.2E-06	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	2.8E-06
	n-Nitroso-di-n-propylamine	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.3E-07	mg/kg-day	2.8E+01	(mg/kg-day) $^{-1}$	2.6E-05

TABLE 8.15.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Nitrobenzene	4.99E+02	ug/kg	4.99E+02	ug/kg	M	9.3E-07	mg/kg-day	N/A	N/A	
	Pentachlorophenol	1.21E+03	ug/kg	1.21E+03	ug/kg	M	5.6E-06	mg/kg-day	1.2E-01	$(mg/kg\text{-}day)^{-1}$	6.8E-07
	Aroclor-1221	8.13E+01	ug/kg	8.13E+01	ug/kg	M	2.1E-07	mg/kg-day	2.2E+00	$(mg/kg\text{-}day)^{-1}$	4.7E-07
	Toxaphene	2.01E+02	ug/kg	2.01E+02	ug/kg	M	3.7E-07	mg/kg-day	2.2E+00	$(mg/kg\text{-}day)^{-1}$	8.2E-07
	(Total)										1.0E-04
										Total Risk Across All Exposure Routes/Pathways	1.2E-04

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.16.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	4.36E-18	mg/m^3	R	4.1E-19	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	6.1E-14
	4,4'-DDD	4.02E+00	ug/kg	3.04E-12	mg/m^3	R	2.8E-13	mg/kg-day	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	1.67E-12	mg/m^3	R	1.6E-13	mg/kg-day	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	3.25E-12	mg/m^3	R	3.0E-13	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-13
	Aldrin	2.01E+00	ug/kg	1.52E-12	mg/m^3	R	1.4E-13	mg/kg-day	1.7E+01	$(mg/kg\text{-}day)^{-1}$	2.4E-12
	alpha-Chlordane	4.54E+01	ug/kg	3.44E-11	mg/m^3	R	3.2E-12	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-12
	Aroclor-1248	4.08E+01	ug/kg	3.09E-11	mg/m^3	R	2.9E-12	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.8E-12
	Aroclor-1260	1.74E+02	ug/kg	1.32E-10	mg/m^3	R	1.2E-11	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-11
	Dieldrin	7.60E+00	ug/kg	5.76E-12	mg/m^3	R	5.4E-13	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	8.6E-12
	gamma-Chlordane	4.33E+01	ug/kg	3.28E-11	mg/m^3	R	3.1E-12	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-12
	Heptachlor epoxide	5.89E+00	ug/kg	4.47E-12	mg/m^3	R	4.2E-13	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-12
	Aluminum	1.20E+04	mg/kg	9.08E-06	mg/m^3	R	8.5E-07	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	2.76E-09	mg/m^3	R	2.6E-10	mg/kg-day	N/A	N/A	
	Arsenic	1.65E+00	mg/kg	1.25E-09	mg/m^3	R	1.2E-10	mg/kg-day	1.5E+01	$(mg/kg\text{-}day)^{-1}$	1.8E-09
	Cadmium	6.05E+00	mg/kg	4.58E-09	mg/m^3	R	4.3E-10	mg/kg-day	6.3E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	Chromium	2.61E+01	mg/kg	1.97E-08	mg/m^3	R	1.8E-09	mg/kg-day	4.1E+01	$(mg/kg\text{-}day)^{-1}$	7.6E-08
	Copper	6.67E+02	mg/kg	5.05E-07	mg/m^3	R	4.7E-08	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	2.97E-06	mg/m^3	R	2.8E-07	mg/kg-day	N/A	N/A	
	Mercury	9.13E-02	mg/kg	6.91E-11	mg/m^3	R	6.5E-12	mg/kg-day	N/A	N/A	
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	3.5E-11	mg/kg-day	1.1E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-11
	Hexachlorobenzene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	3.5E-11	mg/kg-day	1.6E+00	$(mg/kg\text{-}day)^{-1}$	5.7E-11
	Hexachlorocyclopentadiene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	3.5E-11	mg/kg-day	N/A	N/A	
	(Total)										8.0E-08
										Total Risk Across All Exposure Routes/Pathways	8.0E-08

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.17.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from soil south of runway
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	2,3,7,8-TCDD TEQs	5.76E+00	pg/g	4.36E-18	mg/m^3	R	2.9E-19	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	4.3E-14
	4,4'-DDD	4.02E+00	ug/kg	3.04E-12	mg/m^3	R	2.0E-13	mg/kg-day	N/A	N/A	
	4,4'-DDE	2.21E+00	ug/kg	1.67E-12	mg/m^3	R	1.1E-13	mg/kg-day	N/A	N/A	
	4,4'-DDT	4.29E+00	ug/kg	3.25E-12	mg/m^3	R	2.1E-13	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	7.3E-14
	Aldrin	2.01E+00	ug/kg	1.52E-12	mg/m^3	R	1.0E-13	mg/kg-day	1.7E+01	$(mg/kg\text{-}day)^{-1}$	1.7E-12
	alpha-Chlordane	4.54E+01	ug/kg	3.44E-11	mg/m^3	R	2.3E-12	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	7.9E-13
	Aroclor-1248	4.08E+01	ug/kg	3.09E-11	mg/m^3	R	2.0E-12	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-12
	Aroclor-1260	1.74E+02	ug/kg	1.32E-10	mg/m^3	R	8.7E-12	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-11
	Dieldrin	7.60E+00	ug/kg	5.76E-12	mg/m^3	R	3.8E-13	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	6.1E-12
	gamma-Chlordane	4.33E+01	ug/kg	3.28E-11	mg/m^3	R	2.2E-12	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	7.5E-13
	Heptachlor epoxide	5.89E+00	ug/kg	4.47E-12	mg/m^3	R	2.9E-13	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-12
	Aluminum	1.20E+04	mg/kg	9.08E-06	mg/m^3	R	6.0E-07	mg/kg-day	N/A	N/A	
	Antimony	3.65E+00	mg/kg	2.76E-09	mg/m^3	R	1.8E-10	mg/kg-day	N/A	N/A	
	Arsenic	1.65E+00	mg/kg	1.25E-09	mg/m^3	R	8.2E-11	mg/kg-day	1.5E+01	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	Cadmium	6.05E+00	mg/kg	4.58E-09	mg/m^3	R	3.0E-10	mg/kg-day	6.3E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	Chromium	2.61E+01	mg/kg	1.97E-08	mg/m^3	R	1.3E-09	mg/kg-day	4.1E+01	$(mg/kg\text{-}day)^{-1}$	5.3E-08
	Copper	6.67E+02	mg/kg	5.05E-07	mg/m^3	R	3.3E-08	mg/kg-day	N/A	N/A	
	Iron	3.92E+03	mg/kg	2.97E-06	mg/m^3	R	2.0E-07	mg/kg-day	N/A	N/A	
	Mercury	9.13E-02	mg/kg	6.91E-11	mg/m^3	R	4.5E-12	mg/kg-day	N/A	N/A	
	bis(2-Chloroethyl)ether	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	2.5E-11	mg/kg-day	1.1E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-11
	Hexachlorobenzene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	2.5E-11	mg/kg-day	1.6E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-11
	Hexachlorocyclopentadiene	4.99E+02	ug/kg	3.78E-10	mg/m^3	R	2.5E-11	mg/kg-day	N/A	N/A	
	(Total)										5.6E-08
										Total Risk Across All Exposure Routes/Pathways	5.6E-08

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.18.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	4,4'-DDD	3.70E+00	ug/kg	3.70E+00	ug/kg	M	4.0E-11	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	9.5E-12
	4,4'-DDE	3.70E+00	ug/kg	3.70E+00	ug/kg	M	4.0E-11	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.4E-11
	4,4'-DDT	3.70E+00	ug/kg	3.70E+00	ug/kg	M	4.0E-11	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.4E-11
	Aldrin	3.00E-01	ug/kg	3.00E-01	ug/kg	M	3.2E-12	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	5.5E-11
	alpha-Chlordane	1.10E+01	ug/kg	1.10E+01	ug/kg	M	1.2E-10	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	4.1E-11
	Aroclor-1248	3.70E+01	ug/kg	3.70E+01	ug/kg	M	4.0E-10	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	7.9E-10
	Aroclor-1260	3.70E+01	ug/kg	3.70E+01	ug/kg	M	4.0E-10	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	7.9E-10
	Dieldrin	3.70E+00	ug/kg	3.70E+00	ug/kg	M	4.0E-11	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	6.4E-10
	gamma-Chlordane	7.90E+00	ug/kg	7.90E+00	ug/kg	M	8.5E-11	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	3.0E-11
	Heptachlor epoxide	2.40E+00	ug/kg	2.40E+00	ug/kg	M	2.6E-11	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	2.3E-10
	Aluminum	8.51E+03	mg/kg	8.51E+03	mg/kg	M	9.1E-05	mg/kg-day	N/A	N/A	
	Antimony	7.20E-01	mg/kg	7.20E-01	mg/kg	M	7.7E-09	mg/kg-day	N/A	N/A	
	Arsenic	1.50E+00	mg/kg	1.50E+00	mg/kg	M	1.6E-08	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	2.4E-08
	Cadmium	3.10E+00	mg/kg	3.10E+00	mg/kg	M	3.3E-08	mg/kg-day	N/A	N/A	
	Chromium	1.50E+01	mg/kg	1.50E+01	mg/kg	M	1.6E-07	mg/kg-day	N/A	N/A	
	Copper	7.09E+01	mg/kg	7.09E+01	mg/kg	M	7.6E-07	mg/kg-day	N/A	N/A	
	Iron	2.50E+03	mg/kg	2.50E+03	mg/kg	M	2.7E-05	mg/kg-day	N/A	N/A	
	Lead	2.54E+01	mg/kg	2.54E+01	mg/kg	M	2.7E-07	mg/kg-day	N/A	N/A	
	Mercury	5.00E-02	mg/kg	5.00E-02	mg/kg	M	5.4E-10	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	5.20E+02	ug/kg	5.20E+02	ug/kg	M	5.6E-09	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	4.7E-07
	Benzo(a)pyrene	3.70E+03	ug/kg	3.70E+03	ug/kg	M	4.0E-08	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	2.9E-07
	Dibenz(a,h)anthracene	3.70E+03	ug/kg	3.70E+03	ug/kg	M	4.0E-08	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	2.9E-07

TABLE 8.18.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Hexachlorobenzene	3.70E+03	ug/kg	3.70E+03	ug/kg	M	4.0E-08	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	6.4E-08
	n-Nitroso-di-n-propylamine	3.70E+03	ug/kg	3.70E+03	ug/kg	M	4.0E-08	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	2.8E-07
	(Total)										1.4E-06
Dermal	4,4'-DDD	3.70E+00	ug/kg	3.70E+00	ug/kg	M	1.3E-11	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	4.5E-12
	4,4'-DDE	3.70E+00	ug/kg	3.70E+00	ug/kg	M	1.32E-11	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	6.4E-12
	4,4'-DDT	3.70E+00	ug/kg	3.70E+00	ug/kg	M	1.3E-11	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	6.4E-12
	Aldrin	3.00E-01	ug/kg	3.00E-01	ug/kg	M	3.6E-12	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	1.2E-10
	alpha-Chlordane	1.10E+01	ug/kg	1.10E+01	ug/kg	M	5.22E-11	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	3.7E-11
	Aroclor-1248	3.70E+01	ug/kg	3.70E+01	ug/kg	M	6.14E-10	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.4E-09
	Aroclor-1260	3.70E+01	ug/kg	3.70E+01	ug/kg	M	6.14E-10	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.4E-09
	Dieldrin	3.70E+00	ug/kg	3.70E+00	ug/kg	M	4.39E-11	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	1.4E-09
	gamma-Chlordane	7.90E+00	ug/kg	7.90E+00	ug/kg	M	3.75E-11	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	2.6E-11
	Heptachlor epoxide	2.40E+00	ug/kg	2.40E+00	ug/kg	M	2.84E-11	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	3.7E-10
	Aluminum	8.51E+03	mg/kg	8.51E+03	mg/kg	M	1.01E-05	mg/kg-day	N/A	N/A	
	Antimony	7.20E-01	mg/kg	7.20E-01	mg/kg	M	8.53E-10	mg/kg-day	N/A	N/A	
	Arsenic	1.50E+00	mg/kg	1.50E+00	mg/kg	M	5.33E-09	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	2.0E-08
	Cadmium	3.10E+00	mg/kg	3.10E+00	mg/kg	M	3.67E-10	mg/kg-day	N/A	N/A	
	Chromium	1.50E+01	mg/kg	1.50E+01	mg/kg	M	1.78E-08	mg/kg-day	N/A	N/A	
	Copper	7.09E+01	mg/kg	7.09E+01	mg/kg	M	8.40E-08	mg/kg-day	N/A	N/A	
	Iron	2.50E+03	mg/kg	2.50E+03	mg/kg	M	2.96E-06	mg/kg-day	N/A	N/A	
	Lead	2.54E+01	mg/kg	2.54E+01	mg/kg	M	3.01E-08	mg/kg-day	N/A	N/A	
	Mercury	5.00E-02	mg/kg	5.00E-02	mg/kg	M	5.93E-11	mg/kg-day			

TABLE 8.18.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	1,2-Dibromoethane	5.20E+02	ug/kg	5.20E+02	ug/kg	M	1.85E-09	mg/kg-day	1.1E+02	(mg/kg-day) $^{-1}$	2.0E-07
	Benzo(a)pyrene	3.70E+03	ug/kg	3.70E+03	ug/kg	M	5.70E-08	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	1.3E-06
	Dibenz(a,h)anthracene	3.70E+03	ug/kg	3.70E+03	ug/kg	M	5.70E-08	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	1.3E-06
	Hexachlorobenzene	3.70E+03	ug/kg	3.70E+03	ug/kg	M	4.39E-08	mg/kg-day	3.2E+00	(mg/kg-day) $^{-1}$	1.4E-07
	n-Nitroso-di-n-propylamine	3.70E+03	ug/kg	3.70E+03	ug/kg	M	4.39E-08	mg/kg-day	2.8E+01	(mg/kg-day) $^{-1}$	1.2E-06
	(Total)										4.3E-06
										Total Risk Across All Exposure Routes/Pathways	5.7E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.19.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Emissions from exposed soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	4,4'-DDD	3.70E+00	ug/kg	2.28E-09	mg/m^3	R	6.9E-13	mg/kg-day	N/A	N/A	
	4,4'-DDE	3.70E+00	ug/kg	2.28E-09	mg/m^3	R	6.9E-13	mg/kg-day	N/A	N/A	
	4,4'-DDT	3.70E+00	ug/kg	2.28E-09	mg/m^3	R	6.9E-13	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-13
	Aldrin	3.00E-01	ug/kg	1.85E-10	mg/m^3	R	5.6E-14	mg/kg-day	1.7E+01	$(mg/kg\text{-}day)^{-1}$	9.6E-13
	alpha-Chlordane	1.10E+01	ug/kg	6.79E-09	mg/m^3	R	2.1E-12	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	7.2E-13
	Aroclor-1248	3.70E+01	ug/kg	2.28E-08	mg/m^3	R	6.9E-12	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-11
	Aroclor-1260	3.70E+01	ug/kg	2.28E-08	mg/m^3	R	6.9E-12	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-11
	Dieldrin	3.70E+00	ug/kg	2.28E-09	mg/m^3	R	6.9E-13	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	1.1E-11
	gamma-Chlordane	7.90E+00	ug/kg	4.88E-09	mg/m^3	R	1.5E-12	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	5.2E-13
	Heptachlor epoxide	2.40E+00	ug/kg	1.48E-09	mg/m^3	R	4.5E-13	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-12
	Aluminum	8.51E+03	mg/kg	5.25E-03	mg/m^3	R	1.6E-06	mg/kg-day	N/A	N/A	
	Antimony	7.20E-01	mg/kg	4.44E-07	mg/m^3	R	1.4E-10	mg/kg-day	N/A	N/A	
	Arsenic	1.50E+00	mg/kg	9.26E-07	mg/m^3	R	2.8E-10	mg/kg-day	1.5E+01	$(mg/kg\text{-}day)^{-1}$	4.2E-09
	Cadmium	3.10E+00	mg/kg	1.91E-06	mg/m^3	R	5.8E-10	mg/kg-day	6.3E+00	$(mg/kg\text{-}day)^{-1}$	3.7E-09
	Chromium	1.50E+01	mg/kg	9.26E-06	mg/m^3	R	2.8E-09	mg/kg-day	4.1E+01	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Copper	7.09E+01	mg/kg	4.38E-05	mg/m^3	R	1.3E-08	mg/kg-day	N/A	N/A	
	Iron	2.50E+03	mg/kg	1.54E-03	mg/m^3	R	4.7E-07	mg/kg-day	N/A	N/A	
	Lead	2.54E+01	mg/kg	1.57E-05	mg/m^3	R	4.8E-09	mg/kg-day	N/A	N/A	
	Mercury	5.00E-02	mg/kg	3.09E-08	mg/m^3	R	9.4E-12	mg/kg-day	N/A	N/A	

TABLE 8.19.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Emissions from exposed soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Carbon tetrachloride	5.20E+02	ug/kg	2.92E-04	mg/m^3	R	8.9E-08	mg/kg-day	5.3E-02	$(mg/kg\text{-}day)^{-1}$	4.7E-09
	Chloroform	5.20E+02	ug/kg	2.27E-04	mg/m^3	R	6.9E-08	mg/kg-day	8.1E-02	$(mg/kg\text{-}day)^{-1}$	5.6E-09
	cis-1,3-Dichloropropene	5.20E+02	ug/kg	3.28E-04	mg/m^3	R	1.0E-07	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	trans-1,3-Dichloropropene	5.20E+02	ug/kg	3.28E-04	mg/m^3	R	1.0E-07	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	Vinyl chloride	5.20E+02	ug/kg	5.81E-04	mg/m^3	R	1.8E-07	mg/kg-day	1.5E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	bis(2-Chloroethyl)ether	3.70E+03	ug/kg	2.28E-06	mg/m^3	R	6.9E-10	mg/kg-day	1.1E+00	$(mg/kg\text{-}day)^{-1}$	7.6E-10
	Hexachlorobenzene	3.70E+03	ug/kg	2.28E-06	mg/m^3	R	6.9E-10	mg/kg-day	1.6E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Hexachlorocyclopentadiene	3.70E+03	ug/kg	2.28E-06	mg/m^3	R	6.9E-10	mg/kg-day	N/A		
	n-Nitroso-di-n-propylamine	3.70E+03	ug/kg	2.28E-06	mg/m^3	R	6.9E-10	mg/kg-day	N/A	N/A	
	(Total)										1.4E-07
										Total Risk Across All Exposure Routes/Pathways	1.4E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Table 8.19.RME.UA Supplement
Calculations of Volatilization Factor and Soil Saturation Concentrations
MCAS Cherry Point, OU6 Site 12

Chemical	Diffusivity in Air (D_i) (cm^2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (D_w) (cm^2/s)	Soil Organic Carbon Partition Coeff. (K_{oc}) (cm^3/g)	Soil Water Partition Coeff. ($K_d = K_{oc} \times F_{oc}$) ($g/cm^3$)	Solubility in Water (S) (mg/L)	Apparent Diffusivity (D_A) (cm^2/s)	Volatilization Factor (VF) (m^3/kg)
Carbon tetrachloride	7.80E-02	1.25E+00	8.80E-06	1.74E+02	1.04E+00	7.93E+02	3.76E-03	1.78E+03
Chloroform	1.04E-01	1.50E-01	1.00E-05	3.98E+01	2.39E-01	7.92E+03	2.26E-03	2.30E+03
cis-1,3-Dichloropropene	6.26E-02	7.26E-01	1.00E-05	4.57E+01	2.74E-01	2.80E+03	4.73E-03	1.59E+03
trans-1,3-Dichloropropene	6.26E-02	7.26E-01	1.00E-05	4.57E+01	2.74E-01	2.80E+03	4.73E-03	1.59E+03
Vinyl chloride	1.06E-01	1.11E+00	1.23E-06	1.86E+01	1.12E-01	2.76E+03	1.49E-02	8.96E+02

Volatilization factor (VF) = (m^3/kg)

$$\frac{Q/C * (3.14 * D_A * T)^{1/2} * 10^{-4}\ m^2/cm^2}{2 * r_b * D_A}$$

Apparent Diffusivity (D_A) = (cm^2/s)

$$\frac{[(Q_a^{10/3} * D_i * H' + Q_w^{10/3} * D_w)/n^2]}{(r_b * K_d + Q_w + Q_a * H')}$$

Soil Saturation Concentration (C_{sat}) = (mg/kg)

$$S/r_b * (K_d * r_b + Q_w + H' * Q_a)$$

Parameters	Values
Q/C - Inverse of the mean concentration at the center of a 0.5-acre-square source (g/m^2-s per kg/m^3)	60.01
T - Exposure interval(s)	9.5E+08
r_b - Soil bulk density (g/cm^3)	1.5
Q_a - Air-filled soil porosity (L_{air}/L_{water}) = n - Q_w	0.28
n - Total soil porosity (Lpore/Lsoil) = 1 - (r_b/r_s)	0.43
Q_w - Water-filled soil porosity (Lwater/Lsoil)	0.15
r_s - Soil particle density (g/cm^3)	2.65
f_{oc} - fraction organic carbon in soil (g/g)	0.006

Q/C value for 2 acre source area in Raleigh-Durham from USEPA 1996, *Soil Screening Guidance: User's Guide, EPA/540/R-96/018.*

TABLE 8.20.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	1.2E-11	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	2.8E-12
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	4.8E-11	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.6E-11
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	2.0E-11	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	6.7E-12
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	5.4E-12	mg/kg-day	1.7E+01	(mg/kg-day) $^{-1}$	9.1E-11
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	2.9E-09	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	5.7E-09
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	2.7E-11	mg/kg-day	1.6E+01	(mg/kg-day) $^{-1}$	4.3E-10
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	2.1E-10	mg/kg-day	N/A	N/A	
	alpha-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	9.3E-11	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	3.3E-11
	Aroclor-1260	1.00E+00	µg/L	1.00E+00	µg/L	M	1.8E-09	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.6E-09
	gamma-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	9.3E-11	mg/kg-day	3.5E-01	(mg/kg-day) $^{-1}$	3.3E-11
	Heptachlor epoxide	5.20E-02	µg/L	5.20E-02	µg/L	M	9.3E-11	mg/kg-day	9.1E+00	(mg/kg-day) $^{-1}$	8.5E-10
	Aluminum	7.81E+02	µg/L	7.81E+02	µg/L	M	1.4E-06	mg/kg-day	N/A	N/A	
	Antimony	4.90E+00	µg/L	4.90E+00	µg/L	M	8.8E-09	mg/kg-day	N/A	N/A	
	Arsenic	3.00E+00	µg/L	3.00E+00	µg/L	M	5.4E-09	mg/kg-day	1.5E+00	(mg/kg-day) $^{-1}$	8.1E-09
	Cadmium	1.30E+00	µg/L	1.30E+00	µg/L	M	2.3E-09	mg/kg-day	N/A	N/A	
	Chromium	1.20E+00	µg/L	1.20E+00	µg/L	M	2.1E-09	mg/kg-day	N/A	N/A	
	Copper	6.60E+00	µg/L	6.60E+00	µg/L	M	1.2E-08	mg/kg-day	N/A	N/A	
	Iron	2.42E+02	µg/L	2.42E+02	µg/L	M	4.3E-07	mg/kg-day	N/A	N/A	
	Lead	1.70E+00	µg/L	1.70E+00	µg/L	M	3.0E-09	mg/kg-day	N/A	N/A	
	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	3.4E-09
	1,1,2-Trichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	5.7E-02	(mg/kg-day) $^{-1}$	9.6E-10

TABLE 8.20.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	1,1-Dichloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	6.0E-01	(mg/kg-day) $^{-1}$	1.0E-08
	1,2-Dibromoethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	1.4E-06
	1,2-Dichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	1.5E-09
	1,2-Dichloropropane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	6.8E-02	(mg/kg-day) $^{-1}$	1.1E-09
	Bromodichloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	6.2E-02	(mg/kg-day) $^{-1}$	1.0E-09
	Carbon tetrachloride	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	1.3E-01	(mg/kg-day) $^{-1}$	2.2E-09
	Dibromochloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	8.4E-02	(mg/kg-day) $^{-1}$	1.4E-09
	Tetrachloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	5.2E-02	(mg/kg-day) $^{-1}$	8.7E-10
	trans-1,3-Dichloropropene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	1.0E-01	(mg/kg-day) $^{-1}$	1.7E-09
	2,4,6-Trichlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	1.1E-02	(mg/kg-day) $^{-1}$	1.8E-09
	2,4-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	
	2,6-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	
	2-Chlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	
	3,3'-Dichlorobenzidine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	4.5E-01	(mg/kg-day) $^{-1}$	7.5E-08
	4,6-Dinitro-2-methylphenol	2.50E+01	µg/L	2.50E+01	µg/L	M	4.2E-07	mg/kg-day	N/A	N/A	
	Acenaphthylene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	1.2E-07
	Benzo(a)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.2E-06
	Benzo(b)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	1.2E-07
	Benzo(k)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E-02	(mg/kg-day) $^{-1}$	1.2E-08
	bis(2-Chloroethyl)ether	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	1.8E-07
	bis(2-Ethylhexyl)phthalate	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	1.4E-02	(mg/kg-day) $^{-1}$	2.3E-09
	Carbazole	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	2.0E-02	(mg/kg-day) $^{-1}$	3.4E-09
	Chrysene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E-03	(mg/kg-day) $^{-1}$	1.2E-09

TABLE 8.20.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Dibenz(a,h)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	1.2E-06
	Dibenzofuran	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	
	Hexachlorobenzene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	2.7E-07
	Hexachlorobutadiene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	1.3E-08
	Hexachloroethane	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	1.4E-02	(mg/kg-day) $^{-1}$	2.3E-09
	Indeno(1,2,3-cd)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.3E-01	(mg/kg-day) $^{-1}$	1.2E-07
	n-Nitroso-di-n-propylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	1.2E-06
	n-Nitrosodiphenylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	4.9E-03	(mg/kg-day) $^{-1}$	8.2E-10
	Naphthalene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.7E-07	mg/kg-day	N/A	N/A	
	Pentachlorophenol	2.50E+01	µg/L	2.50E+01	µg/L	M	4.2E-07	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	5.0E-08
	alpha-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	6.3E+00	(mg/kg-day) $^{-1}$	5.5E-09
	Aroclor-1016	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	7.0E-02	(mg/kg-day) $^{-1}$	1.2E-09
	Aroclor-1221	2.10E+00	µg/L	2.10E+00	µg/L	M	3.5E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	7.0E-08
	Aroclor-1232	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.4E-08
	Aroclor-1242	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.4E-08
	Aroclor-1254	1.00E+00	µg/L	1.00E+00	µg/L	M	1.7E-08	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.4E-08
	beta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	1.8E+00	(mg/kg-day) $^{-1}$	1.6E-09
	delta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	N/A	N/A	
	Heptachlor	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	4.5E+00	(mg/kg-day) $^{-1}$	3.9E-09
	Toxaphene	5.20E-02	µg/L	5.20E-02	µg/L	M	8.7E-10	mg/kg-day	1.1E+00	(mg/kg-day) $^{-1}$	9.6E-10
	Thallium	3.50E+00	µg/L	3.50E+00	µg/L	M	5.9E-08	mg/kg-day	N/A	N/A	
	(Total)										6.3E-06

TABLE 8.20.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	4,4'-DDD	6.60E-03	µg/L	6.60E-03	µg/L	M	5.4E-09	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	1.9E-09
	4,4'-DDE	2.70E-02	µg/L	2.70E-02	µg/L	M	1.9E-08	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	9.1E-09
	4,4'-DDT	1.10E-02	µg/L	1.10E-02	µg/L	M	1.8E-08	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	8.7E-09
	Aldrin	3.00E-03	µg/L	3.00E-03	µg/L	M	2.0E-11	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	6.6E-10
	Aroclor-1248	1.60E+00	µg/L	1.60E+00	µg/L	M	4.5E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	9.8E-06
	Dieldrin	1.50E-02	µg/L	1.50E-02	µg/L	M	1.1E-09	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	3.4E-08
	Mercury	1.20E-01	µg/L	1.20E-01	µg/L	M	1.3E-10	mg/kg-day	N/A	N/A	
	alpha-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	1.5E-08	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	1.1E-08
	Aroclor-1260	1.00E+00	µg/L	1.00E+00	µg/L	M	2.8E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	6.2E-06
	gamma-Chlordane	5.20E-02	µg/L	5.20E-02	µg/L	M	1.5E-08	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	1.1E-08
	Heptachlor epoxide	5.20E-02	µg/L	5.20E-02	µg/L	M	2.5E-09	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	3.1E-08
	Aluminum	7.81E+02	µg/L	7.81E+02	µg/L	M	8.4E-07	mg/kg-day	N/A	N/A	
	Antimony	4.90E+00	µg/L	4.90E+00	µg/L	M	5.3E-09	mg/kg-day	N/A	N/A	
	Arsenic	3.00E+00	µg/L	3.00E+00	µg/L	M	3.2E-09	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	1.2E-08
	Cadmium	1.30E+00	µg/L	1.30E+00	µg/L	M	1.4E-09	mg/kg-day	N/A	N/A	
	Chromium	1.20E+00	µg/L	1.20E+00	µg/L	M	1.3E-09	mg/kg-day	N/A	N/A	
	Copper	6.60E+00	µg/L	6.60E+00	µg/L	M	7.1E-09	mg/kg-day	N/A	N/A	
	Iron	2.42E+02	µg/L	2.42E+02	µg/L	M	2.6E-07	mg/kg-day	N/A	N/A	
	Lead	1.70E+00	µg/L	1.70E+00	µg/L	M	7.3E-12	mg/kg-day	N/A	N/A	
	1,1,2,2-Tetrachloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.2E-08	mg/kg-day	2.9E-01	(mg/kg-day) $^{-1}$	3.4E-09
	1,1,2-Trichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.0E-08	mg/kg-day	7.0E-02	(mg/kg-day) $^{-1}$	7.2E-10

TABLE 8.20.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	1,1-Dichloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	1.8E-08	mg/kg-day	6.0E-01	(mg/kg-day) $^{-1}$	1.1E-08
	1,2-Dibromoethane	1.00E+00	µg/L	1.00E+00	µg/L	M	2.8E-10	mg/kg-day	1.1E+02	(mg/kg-day) $^{-1}$	3.0E-08
	1,2-Dichloroethane	1.00E+00	µg/L	1.00E+00	µg/L	M	6.2E-09	mg/kg-day	9.1E-02	(mg/kg-day) $^{-1}$	5.6E-10
	1,2-Dichloropropane	1.00E+00	µg/L	1.00E+00	µg/L	M	1.2E-08	mg/kg-day	9.2E-02	(mg/kg-day) $^{-1}$	1.1E-09
	Bromodichloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	7.5E-09	mg/kg-day	6.3E-02	(mg/kg-day) $^{-1}$	4.8E-10
	Carbon tetrachloride	1.00E+00	µg/L	1.00E+00	µg/L	M	2.7E-08	mg/kg-day	2.0E-01	(mg/kg-day) $^{-1}$	5.4E-09
	Dibromochloromethane	1.00E+00	µg/L	1.00E+00	µg/L	M	5.8E-09	mg/kg-day	1.4E-01	(mg/kg-day) $^{-1}$	8.2E-10
	Tetrachloroethene	1.00E+00	µg/L	1.00E+00	µg/L	M	5.7E-08	mg/kg-day	5.2E-02	(mg/kg-day) $^{-1}$	3.0E-09
	trans-1,3-Dichloropropene	1.00E+00	µg/L	1.00E+00	µg/L	M	6.5E-09	mg/kg-day	1.8E-01	(mg/kg-day) $^{-1}$	1.2E-09
	2,4,6-Trichlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	6.2E-07	mg/kg-day	2.2E-02	(mg/kg-day) $^{-1}$	1.4E-08
	2,4-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	5.2E-08	mg/kg-day	N/A	N/A	
	2,6-Dinitrotoluene	1.00E+01	µg/L	1.00E+01	µg/L	M	3.4E-08	mg/kg-day	N/A	N/A	
	2-Chlorophenol	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-07	mg/kg-day	N/A	N/A	
	3,3'-Dichlorobenzidine	1.00E+01	µg/L	1.00E+01	µg/L	M	3.1E-07	mg/kg-day	9.0E-01	(mg/kg-day) $^{-1}$	2.8E-07
	4,6-Dinitro-2-methylphenol	2.50E+01	µg/L	2.50E+01	µg/L	M	3.5E-07	mg/kg-day	N/A	N/A	
	Acenaphthylene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-06	mg/kg-day	N/A	N/A	
	Benzo(a)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-05	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	3.0E-05
	Benzo(a)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.1E-05	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	5.0E-04
	Benzo(b)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.2E-05	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	5.1E-05
	Benzo(k)fluoranthene	1.00E+01	µg/L	1.00E+01	µg/L	M	5.1E-05	mg/kg-day	2.4E-01	(mg/kg-day) $^{-1}$	1.2E-05
	bis(2-Chloroethyl)ether	1.00E+01	µg/L	1.00E+01	µg/L	M	2.6E-08	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	5.8E-08
	bis(2-Ethylhexyl)phthalate	1.00E+01	µg/L	1.00E+01	µg/L	M	1.6E-06	mg/kg-day	7.4E-02	(mg/kg-day) $^{-1}$	1.2E-07
	Carbazole	1.00E+01	µg/L	1.00E+01	µg/L	M	9.0E-07	mg/kg-day	2.9E-02	(mg/kg-day) $^{-1}$	2.6E-08
	Chrysene	1.00E+01	µg/L	1.00E+01	µg/L	M	1.3E-05	mg/kg-day	2.4E-02	(mg/kg-day) $^{-1}$	3.0E-07

TABLE 8.20.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Dibenz(a,h)anthracene	1.00E+01	µg/L	1.00E+01	µg/L	M	5.9E-05	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	1.4E-03
	Dibenzofuran	1.00E+01	µg/L	1.00E+01	µg/L	M	1.2E-06	mg/kg-day	N/A	N/A	
	Hexachlorobenzene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.8E-06	mg/kg-day	3.2E+00	(mg/kg-day) $^{-1}$	1.5E-05
	Hexachlorobutadiene	1.00E+01	µg/L	1.00E+01	µg/L	M	2.3E-06	mg/kg-day	1.6E-01	(mg/kg-day) $^{-1}$	3.6E-07
	Hexachloroethane	1.00E+01	µg/L	1.00E+01	µg/L	M	6.8E-07	mg/kg-day	2.8E-02	(mg/kg-day) $^{-1}$	1.9E-08
	Indeno(1,2,3-cd)pyrene	1.00E+01	µg/L	1.00E+01	µg/L	M	4.1E-05	mg/kg-day	2.4E+00	(mg/kg-day) $^{-1}$	9.6E-05
	n-Nitroso-di-n-propylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	2.4E-09	mg/kg-day	2.8E+01	(mg/kg-day) $^{-1}$	6.7E-08
	n-Nitrosodiphenylamine	1.00E+01	µg/L	1.00E+01	µg/L	M	3.7E-07	mg/kg-day	2.0E-02	(mg/kg-day) $^{-1}$	7.2E-09
	Naphthalene	1.00E+01	µg/L	1.00E+01	µg/L	M	7.5E-07	mg/kg-day	N/A	N/A	
	Pentachlorophenol	2.50E+01	µg/L	2.50E+01	µg/L	M	3.3E-05	mg/kg-day	1.2E-01	(mg/kg-day) $^{-1}$	3.9E-06
	alpha-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.7E-09	mg/kg-day	6.5E+00	(mg/kg-day) $^{-1}$	1.1E-08
	Aroclor-1016	1.00E+00	µg/L	1.00E+00	µg/L	M	2.8E-06	mg/kg-day	7.8E-02	(mg/kg-day) $^{-1}$	2.2E-07
	Aroclor-1221	2.10E+00	µg/L	2.10E+00	µg/L	M	5.9E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	1.3E-05
	Aroclor-1232	1.00E+00	µg/L	1.00E+00	µg/L	M	2.8E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	6.2E-06
	Aroclor-1242	1.00E+00	µg/L	1.00E+00	µg/L	M	2.8E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	6.2E-06
	Aroclor-1254	1.00E+00	µg/L	1.00E+00	µg/L	M	2.8E-06	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	6.2E-06
	beta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.7E-09	mg/kg-day	2.0E+00	(mg/kg-day) $^{-1}$	3.4E-09
	delta-BHC	5.20E-02	µg/L	5.20E-02	µg/L	M	1.7E-09	mg/kg-day	N/A	N/A	
	Heptachlor	5.20E-02	µg/L	5.20E-02	µg/L	M	2.5E-09	mg/kg-day	6.3E+00	(mg/kg-day) $^{-1}$	1.5E-08
	Toxaphene	5.20E-02	µg/L	5.20E-02	µg/L	M	4.4E-09	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	9.7E-09
	Thallium	3.50E+00	µg/L	3.50E+00	µg/L	M	3.8E-09	mg/kg-day	N/A	N/A	
	(Total)										2.2E-03
										Total Risk Across All Exposure Routes/Pathways	2.2E-03

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Table 8.20.RME.UA Supplement
Calculation of Daevent
Construction Worker, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
4,4'-DDD	6.60E-03	2.8E-01	7.8E+00	3.7E+01	6.3E+01	8	4.0E-08	2
4,4'-DDE	2.70E-02	2.4E-01	7.6E+00	3.6E+01	4.9E+01	8	1.4E-07	2
4,4'-DDT	1.10E-02	4.3E-01	1.3E+01	6.0E+01	2.3E+02	8	1.3E-07	2
Aldrin	3.00E-03	1.6E-03	1.5E+01	3.6E+01	1.0E-01	8	1.5E-10	2
Aroclor-1248	1.60E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	3.3E-05	2
Dieldrin	1.50E-02	1.6E-02	1.8E+01	9.4E+01	3.6E+00	8	8.0E-09	2
Mercury	1.20E-01	1.0E-03	N/A	N/A	N/A	8	9.6E-10	1
alpha-Chlordane	5.20E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	1.1E-07	2
Aroclor-1260	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
gamma-Chlordane	5.20E-02	5.2E-02	2.8E+01	1.3E+02	3.5E+01	8	1.1E-07	2
Heptachlor epoxide	5.20E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	1.8E-08	2
Aluminum	7.81E+02	1.0E-03	NA	NA	NA	8	6.2E-06	1
Antimony	4.90E+00	1.0E-03	NA	NA	NA	8	3.9E-08	1
Arsenic	3.00E+00	1.0E-03	NA	NA	NA	8	2.4E-08	1
Cadmium	1.30E+00	1.0E-03	NA	NA	NA	8	1.0E-08	1
Chromium	1.20E+00	1.0E-03	NA	NA	NA	8	9.6E-09	1
Copper	6.60E+00	1.0E-03	NA	NA	NA	8	5.3E-08	1
Iron	2.42E+02	1.0E-03	NA	NA	NA	8	1.9E-06	1
Lead	1.70E+00	4.0E-06	N/A	N/A	N/A	8	5.4E-11	1
1,1,2,2-Tetrachloroethane	1.00E+00	9.0E-03	9.2E-01	2.2E+00	2.5E-02	8	8.8E-08	3
1,1,2-Trichloroethane	1.00E+00	8.4E-03	5.7E-01	1.4E+00	1.1E-02	8	7.6E-08	3
1,1-Dichloroethene	1.00E+00	1.6E-02	3.4E-01	8.2E-01	1.3E-02	8	1.4E-07	3
1,2-Dibromoethane	1.00E+00	2.0E-04	1.3E+00	3.0E+00	1.3E-04	8	2.1E-09	3
1,2-Dichloroethane	1.00E+00	5.3E-03	3.5E-01	8.4E-01	3.0E-03	8	4.6E-08	3
1,2-Dichloropropane	1.00E+00	1.0E-02	4.3E-01	1.0E+00	1.0E-02	8	8.8E-08	3
Bromodichloromethane	1.00E+00	5.8E-03	8.7E-01	2.1E+00	1.2E-02	8	5.6E-08	3
Carbon tetrachloride	1.00E+00	2.2E-02	7.6E-01	1.8E+00	6.8E-02	8	2.0E-07	3
Dibromochloromethane	1.00E+00	3.9E-03	1.6E+00	3.9E+00	1.7E-02	8	4.4E-08	3
Tetrachloroethene	1.00E+00	4.8E-02	9.0E-01	4.3E+00	2.5E-01	8	4.3E-07	3
trans-1,3-Dichloropropene	1.00E+00	5.5E-03	4.2E-01	1.0E+00	4.0E-03	8	4.8E-08	3
2,4,6-Trichlorophenol	1.00E+01	5.0E-02	1.4E+00	9.2E+00	4.9E-01	8	4.6E-06	2
2,4-Dinitrotoluene	1.00E+01	3.8E-03	1.1E+00	2.7E+00	9.5E-03	8	3.9E-07	3
2,6-Dinitrotoluene	1.00E+01	2.5E-03	1.1E+00	2.7E+00	5.2E-03	8	2.5E-07	3
2-Chlorophenol	1.00E+01	1.1E-02	5.3E-01	1.3E+00	1.4E-02	8	9.9E-07	3
3,3'-Dichlorobenzidine	1.00E+01	1.7E-02	3.1E+00	1.7E+01	NA	8	2.3E-06	2
4,6-Dinitro-2-methylphenol	2.50E+01	9.8E-03	1.4E+00	3.4E+00	5.0E-02	8	2.6E-06	3
Acenaphthylene	1.00E+01	1.3E-01	7.4E-01	5.8E+00	7.9E-01	8	9.4E-06	3
Benzo(a)anthracene	1.00E+01	8.1E-01	2.2E+00	1.0E+01	4.6E+01	8	9.4E-05	2
Benzo(a)pyrene	1.00E+01	1.2E+00	2.9E+00	1.4E+01	1.3E+02	8	1.6E-04	2
Benzo(b)fluoranthene	1.00E+01	1.2E+00	3.0E+00	1.4E+01	1.3E+02	8	1.6E-04	2
Benzo(k)fluoranthene	1.00E+01	2.8E+00	3.0E+00	1.4E+01	1.2E+02	8	3.8E-04	2
bis(2-Chloroethyl)ether	1.00E+01	2.1E-03	6.5E-01	1.6E+00	1.9E-03	8	2.0E-07	3
bis(2-Ethylhexyl)phthalate	1.00E+01	3.3E-02	2.1E+01	1.0E+02	1.3E+01	8	1.2E-05	2
Carbazole	1.00E+01	8.0E-02	9.2E-01	6.2E+00	5.2E-01	8	6.7E-06	3
Chrysene	1.00E+01	8.1E-01	2.2E+00	1.0E+01	4.6E+01	8	9.4E-05	2
Dibenz(a,h)anthracene	1.00E+01	2.7E+00	4.4E+00	2.1E+01	6.9E+02	8	4.4E-04	2
Dibenzofuran	1.00E+01	1.1E-01	9.3E-01	7.3E+00	8.1E-01	8	8.7E-06	3

Table 8.20.RME.UA Supplement
Calculation of Daevent
Construction Worker, Surface Water
MCAS Cherry Point, OU6 Site 12

Chemical of Potential Concern	Surface Water Concentration (CSW) (µg/L)	Permeability Coefficient (Kp) (cm/hr)	Lag Time (τ) (hr)	t* (hr)	B (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
Hexachlorobenzene	1.00E+01	2.1E-01	4.8E+00	2.3E+01	2.0E+01	8	3.6E-05	2
Hexachlorobutadiene	1.00E+01	1.2E-01	3.4E+00	1.7E+01	6.0E+00	8	1.7E-05	2
Hexachloroethane	1.00E+01	4.2E-02	2.4E+00	1.9E+01	8.5E-01	8	5.1E-06	2
Indeno(1,2,3-cd)pyrene	1.00E+01	1.9E+00	4.2E+00	2.0E+01	3.8E+02	8	3.0E-04	2
n-Nitroso-di-n-propylamine	1.00E+01	3.1E-04	5.4E-01	1.0E-04	1.3E+00	8	1.8E-08	3
n-Nitrosodiphenylamine	1.00E+01	3.6E-02	5.3E-01	7.6E+00	3.2E-01	8	2.7E-06	3
Naphthalene	1.00E+01	6.9E-02	5.3E-01	2.2E+00	2.0E-01	8	5.6E-06	3
Pentachlorophenol	2.50E+01	6.5E-01	3.7E+00	1.7E+01	7.2E+01	8	2.4E-04	2
alpha-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	1.3E-08	2
Aroclor-1016	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1221	2.10E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	4.4E-05	2
Aroclor-1232	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1242	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
Aroclor-1254	1.00E+00	7.1E-01	1.4E+01	6.6E+01	5.2E+02	8	2.1E-05	2
beta-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	1.3E-08	2
delta-BHC	5.20E-02	1.4E-02	5.2E+00	3.5E+01	5.2E-01	8	1.3E-08	2
Heptachlor	5.20E-02	1.1E-02	1.7E+01	9.4E+01	1.9E+00	8	1.8E-08	2
Toxaphene	5.20E-02	1.5E-02	2.9E+01	1.4E+02	6.6E+00	8	3.3E-08	2
Thallium	3.50E+00	1.0E-03	NA	NA	NA	8	2.8E-08	1

Inorganics: DAevent (mg/cm2-event) =
Kp x CSW x tevent x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
tevent<t*: DAevent (mg/cm2-event) =
2 x Kp x CSW x (sqrt((6 x τ x tevent)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

tevent>t*: DAevent (mg/cm2-event) =
Kp x CSW x (tevent/(1+B) + 2 x τ x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:

Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

TABLE 8.21.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	9.3E-05	mg/kg-day	N/A	N/A	
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	1.2E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	4,4'-DDD	6.20E+00	ug/kg	6.20E+00	ug/kg	M	6.7E-11	mg/kg-day	2.4E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-11
	4,4'-DDE	1.60E+00	ug/kg	1.60E+00	ug/kg	M	1.7E-11	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	5.8E-12
	4,4'-DDT	1.10E+01	ug/kg	1.10E+01	ug/kg	M	1.2E-10	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	4.0E-11
	Aldrin	4.50E+00	ug/kg	4.50E+00	ug/kg	M	4.8E-11	mg/kg-day	1.7E+01	$(mg/kg\text{-}day)^{-1}$	8.2E-10
	alpha-Chlordane	3.60E+01	ug/kg	3.60E+01	ug/kg	M	3.9E-10	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-10
	Aroclor-1248	9.10E+01	ug/kg	9.10E+01	ug/kg	M	9.8E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-09
	Aroclor-1260	9.10E+01	ug/kg	9.10E+01	ug/kg	M	9.8E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-09
	Dieldrin	7.00E-01	ug/kg	7.00E-01	ug/kg	M	7.5E-12	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	1.2E-10
	gamma-Chlordane	3.10E+01	ug/kg	3.10E+01	ug/kg	M	3.3E-10	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-10
	Heptachlor epoxide	2.60E+00	ug/kg	2.60E+00	ug/kg	M	2.8E-11	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-10
	Antimony	1.30E+00	mg/kg	1.30E+00	mg/kg	M	1.4E-08	mg/kg-day	N/A	N/A	
	Cadmium	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.0E-08	mg/kg-day	N/A	N/A	
	Chromium	1.16E+01	mg/kg	1.16E+01	mg/kg	M	1.2E-07	mg/kg-day	N/A	N/A	
	Copper	1.26E+01	mg/kg	1.26E+01	mg/kg	M	1.4E-07	mg/kg-day	N/A	N/A	
	Iron	3.34E+03	mg/kg	3.34E+03	mg/kg	M	3.6E-05	mg/kg-day	N/A	N/A	
	Lead	3.26E+01	mg/kg	3.26E+01	mg/kg	M	3.5E-07	mg/kg-day	N/A	N/A	
	Mercury	7.00E-02	mg/kg	7.00E-02	mg/kg	M	7.5E-10	mg/kg-day	N/A	N/A	

TABLE 8.21.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	1,2-Dibromoethane	1.30E+01	ug/kg	1.30E+01	ug/kg	M	1.4E-10	mg/kg-day	8.5E+01	(mg/kg-day) $^{-1}$	1.2E-08
	Benzo(a)pyrene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	5.3E-09	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	3.8E-08
	Dibenz(a,h)anthracene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	5.3E-09	mg/kg-day	7.3E+00	(mg/kg-day) $^{-1}$	3.8E-08
	Hexachlorobenzene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	5.3E-09	mg/kg-day	1.6E+00	(mg/kg-day) $^{-1}$	8.4E-09
	n-Nitroso-di-n-propylamine	4.90E+02	ug/kg	4.90E+02	ug/kg	M	5.3E-09	mg/kg-day	7.0E+00	(mg/kg-day) $^{-1}$	3.7E-08
	(Total)										1.6E-07
Dermal	Aluminum	8.64E+03	mg/kg	8.64E+03	mg/kg	M	1.02E-05	mg/kg-day	N/A	N/A	
	Arsenic	1.10E+00	mg/kg	1.10E+00	mg/kg	M	3.91E-09	mg/kg-day	3.7E+00	(mg/kg-day) $^{-1}$	1.4E-08
	4,4'-DDD	6.20E+00	ug/kg	6.20E+00	ug/kg	M	2.20E-11	mg/kg-day	3.4E-01	(mg/kg-day) $^{-1}$	7.6E-12
	4,4'-DDE	1.60E+00	ug/kg	1.60E+00	ug/kg	M	5.69E-12	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	2.8E-12
	4,4'-DDT	1.10E+01	ug/kg	1.10E+01	ug/kg	M	3.91E-11	mg/kg-day	4.9E-01	(mg/kg-day) $^{-1}$	1.9E-11
	Aldrin	4.50E+00	ug/kg	4.50E+00	ug/kg	M	5.33E-11	mg/kg-day	3.4E+01	(mg/kg-day) $^{-1}$	1.8E-09
	alpha-Chlordane	3.60E+01	ug/kg	3.60E+01	ug/kg	M	1.71E-10	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	1.2E-10
	Aroclor-1248	9.10E+01	ug/kg	9.10E+01	ug/kg	M	1.51E-09	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.4E-09
	Aroclor-1260	9.10E+01	ug/kg	9.10E+01	ug/kg	M	1.51E-09	mg/kg-day	2.2E+00	(mg/kg-day) $^{-1}$	3.4E-09
	Dieldrin	7.00E-01	ug/kg	7.00E-01	ug/kg	M	8.30E-12	mg/kg-day	3.2E+01	(mg/kg-day) $^{-1}$	2.7E-10
	gamma-Chlordane	3.10E+01	ug/kg	3.10E+01	ug/kg	M	1.47E-10	mg/kg-day	7.0E-01	(mg/kg-day) $^{-1}$	1.0E-10

TABLE 8.21.RME.UA
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage ditch south of runway
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Heptachlor epoxide	2.60E+00	ug/kg	2.60E+00	ug/kg	M	3.08E-11	mg/kg-day	1.3E+01	(mg/kg-day) $^{-1}$	3.9E-10
	Antimony	1.30E+00	mg/kg	1.30E+00	mg/kg	M	1.54E-09	mg/kg-day	N/A	N/A	
	Cadmium	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.32E-10	mg/kg-day	N/A	N/A	
	Chromium	1.16E+01	mg/kg	1.16E+01	mg/kg	M	1.38E-08	mg/kg-day	N/A	N/A	
	Copper	1.26E+01	mg/kg	1.26E+01	mg/kg	M	1.49E-08	mg/kg-day	N/A	N/A	
	Iron	3.34E+03	mg/kg	3.34E+03	mg/kg	M	3.96E-06	mg/kg-day	N/A	N/A	
	Lead	3.26E+01	mg/kg	3.26E+01	mg/kg	M	3.86E-08	mg/kg-day	N/A	N/A	
	Mercury	7.00E-02	mg/kg	7.00E-02	mg/kg	M	8.30E-11	mg/kg-day	N/A	N/A	
	1,2-Dibromoethane	1.30E+01	ug/kg	1.30E+01	ug/kg	M	4.62E-11	mg/kg-day	1.1E+02	(mg/kg-day) $^{-1}$	4.9E-09
	Benzo(a)pyrene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	7.55E-09	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	1.8E-07
	Dibenz(a,h)anthracene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	7.55E-09	mg/kg-day	2.4E+01	(mg/kg-day) $^{-1}$	1.8E-07
	Hexachlorobenzene	4.90E+02	ug/kg	4.90E+02	ug/kg	M	5.81E-09	mg/kg-day	3.2E+00	(mg/kg-day) $^{-1}$	1.9E-08
	n-Nitroso-di-n-propylamine	4.90E+02	ug/kg	4.90E+02	ug/kg	M	5.81E-09	mg/kg-day	2.8E+01	(mg/kg-day) $^{-1}$	1.6E-07
											5.7E-07
										Total Risk Across All Exposure Routes/Pathways	7.2E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 9.1.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	1.2E-07		1.0E-06	1.1E-06	Aluminum	CNS	1.2E-02		6.2E-02	7.4E-02
			2,3,7,8-TCDD TEQs	3.0E-10		9.6E-10	1.3E-09	Antimony	Blood/WB	8.9E-03		2.4E-01	2.5E-01
			4,4'-DDD	3.4E-10		7.7E-10	1.1E-09	Cadmium	Kidney	5.9E-03		3.1E-02	3.7E-02
			4,4'-DDE	2.6E-10		6.0E-10	8.6E-10	Chromium	NOAEL	8.5E-03		2.3E-01	2.3E-01
			4,4'-DDT	5.1E-10		1.2E-09	1.7E-09	Copper	GI	1.6E-02		2.9E-02	4.5E-02
			Aldrin	1.2E-08		1.3E-07	1.4E-07	Iron	GI	6.4E-03		2.3E-02	2.9E-02
			alpha-Chlordane	5.6E-09		2.4E-08	2.9E-08	4,4'-DDT	Liver	8.4E-06		1.9E-05	2.7E-05
			Aroclor-1248	2.9E-08		2.4E-07	2.6E-07	Aldrin	Liver	6.5E-05		6.9E-04	7.6E-04
			Dieldrin	4.2E-08		4.5E-07	4.9E-07	alpha-Chlordane	Liver	8.9E-05		3.8E-04	4.7E-04
			gamma-Chlordane	5.3E-09		2.2E-08	2.8E-08	Dieldrin	Liver	1.5E-04		1.6E-03	1.7E-03
			Heptachlor epoxide	1.9E-08		1.4E-07	1.6E-07	gamma-Chlordane	Liver	8.5E-05		3.6E-04	4.4E-04
			Arsenic	8.6E-07		3.4E-06	4.2E-06	Heptachlor epoxide	Liver	4.4E-04		3.3E-03	3.7E-03
			1,2-Dibromoethane	1.6E-07		3.2E-07	4.9E-07	Arsenic	Skin	5.4E-03		2.1E-02	2.7E-02
			3,3'-Dichlorobenzidine	7.8E-08		8.3E-07	9.1E-07	Mercury	CNS	8.9E-04		5.3E-04	1.4E-03
			Benzo(a)anthracene	1.3E-07		2.8E-06	3.0E-06	4,6-Dinitro-2-methylphenol	N/A	1.2E-02		6.3E-02	7.5E-02
			Benzo(a)pyrene	1.3E-06		2.8E-05	3.0E-05	Hexachlorobenzene	Liver	6.1E-04		6.5E-03	7.1E-03
			bis(2-Chloroethyl)ether	1.9E-07		2.0E-06	2.2E-06	Hexachlorobutadiene	Renal	2.4E-03		2.6E-02	2.8E-02
			Dibenz(a,h)anthracene	1.3E-06		2.8E-05	3.0E-05	Nitrobenzene	WB	9.8E-04		5.3E-03	6.3E-03
			Hexachlorobenzene	2.8E-07		3.0E-06	3.2E-06	Pentachlorophenol	Liver/Kidney	4.0E-05		5.2E-04	5.6E-04
			Hexachlorobutadiene	1.4E-08		1.4E-07	1.6E-07	(Total)		8.1E-02		7.4E-01	8.2E-01
			Indeno(1,2,3-cd)pyrene	1.3E-07		2.8E-06	3.0E-06						
			n-Nitroso-di-n-propylamine	1.2E-06		2.6E-05	2.7E-05						
			Pentachlorophenol	5.1E-08		6.7E-07	7.2E-07						
			Aroclor-1221	5.7E-08		4.7E-07	5.3E-07						
			Toxaphene	7.7E-08		8.2E-07	8.9E-07						
			(Total)	6.0E-06		1.0E-04	1.1E-04						

TABLE 9.1.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Air	Emissions from soil south of runway	2,3,7,8-TCDD TEQs		1.5E-14		1.5E-14	alpha-Chlordane	Liver		1.1E-08		1.1E-08
			4,4'-DDT		2.6E-14		2.6E-14	gamma-Chlordane	Liver		1.1E-08		1.1E-08
			Aldrin		6.0E-13		6.0E-13	Aluminum	CNS		5.9E-04		5.9E-04
			alpha-Chlordane		2.8E-13		2.8E-13	Chromium	Respiratory		4.3E-05		4.3E-05
			Aroclor-1248		1.4E-12		1.4E-12	Mercury	CNS		5.2E-08		5.2E-08
			Aroclor-1260		6.1E-12		6.1E-12	Hexachlorocyclopentadiene	Nasal		4.3E-07		4.3E-07
			Dieldrin		2.1E-12		2.1E-12	(Total)			6.3E-04		6.3E-04
			gamma-Chlordane		2.7E-13		2.7E-13						
			Heptachlor epoxide		9.4E-13		9.4E-13						
			Arsenic		4.3E-10		4.3E-10						
			Cadmium		6.7E-10		6.7E-10						
			Chromium		1.9E-08		1.9E-08						
			bis(2-Chloroethyl)ether		9.6E-12		9.6E-12						
			Hexachlorobenzene		1.4E-11		1.4E-11						
			(Total)		2.0E-08		2.0E-08						

TABLE 9.1.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Drainage ditch south of runway	4,4'-DDD	2.7E-11		1.7E-08	1.7E-08	4,4'-DDT	Liver	1.0E-06		1.3E-03	1.3E-03
			4,4'-DDE	1.5E-10		8.5E-08	8.5E-08	Aldrin	Liver	4.7E-06		3.4E-05	3.9E-05
			4,4'-DDT	6.3E-11		8.1E-08	8.2E-08	Dieldrin	Liver	1.4E-05		1.1E-03	1.1E-03
			Aldrin	8.6E-10		6.2E-09	7.1E-09	Mercury	CNS	5.6E-05		3.8E-05	9.4E-05
			Aroclor-1248	5.4E-08		9.2E-05	9.2E-05	alpha-Chlordane	Liver	4.9E-06		1.6E-03	1.6E-03
			Dieldrin	4.0E-09		3.2E-07	3.2E-07	gamma-Chlordane	Liver	4.9E-06		1.6E-03	1.6E-03
			alpha-Chlordane	3.1E-10		9.9E-08	9.9E-08	Heptachlor epoxide	Liver	1.9E-04		6.9E-03	7.1E-03
			Aroclor-1260	3.4E-08		5.8E-05	5.8E-05	Aluminum	CNS	3.7E-05		2.2E-04	2.6E-04
			gamma-Chlordane	3.1E-10		9.9E-08	9.9E-08	Antimony	Blood/WB	5.8E-04		1.7E-02	1.8E-02
			Heptachlor epoxide	7.9E-09		2.9E-07	3.0E-07	Arsenic	Skin	4.7E-04		7.0E-04	1.2E-03
			Arsenic	7.5E-08		1.1E-07	1.9E-07	Cadmium	Kidney	1.2E-04		7.3E-03	7.4E-03
			1,1,2,2-Tetrachloroethane	3.4E-09		3.1E-08	3.5E-08	Chromium	NOAEL	1.9E-05		5.6E-04	5.8E-04
			1,1,2-Trichloroethane	9.6E-10		6.8E-09	7.7E-09	Copper	GI	7.7E-06		1.5E-05	2.3E-05
			1,1-Dichloroethene	1.0E-08		1.0E-07	1.1E-07	Iron	GI	1.9E-05		7.6E-05	9.5E-05
			1,2-Dibromoethane	1.4E-06		2.8E-07	1.7E-06	1,1,2,2-Tetrachloroethane	N/A	7.8E-07		7.3E-06	8.1E-06
			1,2-Dichloroethane	1.5E-09		5.3E-09	6.8E-09	1,1,2-Trichloroethane	Blood	1.2E-05		8.4E-05	9.6E-05
			1,2-Dichloropropane	1.1E-09		1.0E-08	1.1E-08	1,1-Dichloroethene	Liver	5.2E-06		5.4E-05	5.9E-05
			Bromodichloromethane	1.0E-09		4.5E-09	5.5E-09	1,2-Dichloroethane	N/A	1.6E-06		5.4E-06	7.0E-06
			Carbon tetrachloride	2.2E-09		5.1E-08	5.3E-08	Bromodichloromethane	Kidney	2.3E-06		9.9E-06	1.2E-05
			Dibromochloromethane	1.4E-09		7.7E-09	9.1E-09	Carbon tetrachloride	Liver	6.7E-05		1.6E-03	1.6E-03
			Tetrachloroethene	8.7E-10		2.8E-08	2.9E-08	Dibromochloromethane	Liver	2.3E-06		1.3E-05	1.5E-05
			trans-1,3-Dichloropropene	1.7E-09		1.1E-08	1.3E-08	Tetrachloroethene	Liver	4.7E-06		1.5E-04	1.6E-04
			2,4,6-Trichlorophenol	1.8E-09		1.3E-07	1.3E-07	trans-1,3-Dichloropropene	Organs	1.6E-06		1.0E-05	1.2E-05
			3,3'-Dichlorobenzidine	7.5E-08		2.6E-06	2.7E-06	2,4-Dinitrotoluene	CNS	2.3E-04		8.0E-04	1.0E-03
			Benzo(a)anthracene	1.2E-07		2.8E-04	2.8E-04	2,6-Dinitrotoluene	WB	4.7E-04		1.1E-03	1.5E-03
			Benzo(a)pyrene	1.2E-06		4.7E-03	4.7E-03	2-Chlorophenol	Reproductive	9.4E-05		1.4E-03	1.5E-03

TABLE 9.1.RME.UA

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Benzo(b)fluoranthene	1.2E-07		4.8E-04	4.8E-04	4,6-Dinitro-2-methylphenol	N/A	1.2E-02		9.2E-02	1.0E-01
			Benzo(k)fluoranthene	1.2E-08		1.1E-04	1.1E-04	Acenaphthylene	Body Weight	2.3E-05		2.1E-03	2.1E-03
			bis(2-Chloroethyl)ether	1.8E-07		5.4E-07	7.2E-07	bis(2-Ethylhexyl)phthalate	Liver	2.3E-05		1.1E-02	1.1E-02
			bis(2-Ethylhexyl)phthalate	2.3E-09		1.1E-06	1.1E-06	Dibenzofuran	Kidney	1.2E-04		1.5E-02	1.6E-02
			Carbazole	3.4E-09		2.4E-07	2.4E-07	Hexachlorobenzene	Liver	5.9E-04		3.2E-01	3.2E-01
			Chrysene	1.2E-09		2.8E-06	2.8E-06	Hexachlorobutadiene	Renal	2.3E-03		6.1E-01	6.1E-01
			Dibenz(a,h)anthracene	1.2E-06		1.3E-02	1.3E-02	Hexachloroethane	Kidney	4.7E-04		3.6E-02	3.6E-02
			Hexachlorobenzene	2.7E-07		1.4E-04	1.5E-04	Naphthalene	Body Weight	2.3E-05		1.2E-03	1.3E-03
			Hexachlorobutadiene	1.3E-08		3.4E-06	3.4E-06	Pentachlorophenol	Liver/Kidney	3.9E-05		2.9E-02	2.9E-02
			Hexachloroethane	2.3E-09		1.8E-07	1.8E-07	Aroclor-1016	Birth Weight	6.7E-04		1.2E+00	1.2E+00
			Indeno(1,2,3-cd)pyrene	1.2E-07		9.0E-04	9.0E-04	Aroclor-1254	Immune System	2.3E-03		4.1E+00	4.1E+00
			n-Nitroso-di-n-propylamine	1.2E-06		6.3E-07	1.8E-06	Heptachlor	Liver	4.9E-06		1.8E-04	1.9E-04
			n-Nitrosodiphenylamine	8.2E-10		6.8E-08	6.9E-08	Thallium	Liver	2.3E-03		9.0E-03	1.1E-02
			Pentachlorophenol	5.0E-08		3.7E-05	3.7E-05	(Total)		2.3E-02		6.4E+00	6.4E+00
			alpha-BHC	5.5E-09		1.1E-07	1.1E-07						
			Aroclor-1016	1.2E-09		2.0E-06	2.0E-06						
			Aroclor-1221	7.0E-08		1.2E-04	1.2E-04						
			Aroclor-1232	3.4E-08		5.8E-05	5.8E-05						
			Aroclor-1242	3.4E-08		5.8E-05	5.8E-05						
			Aroclor-1254	3.4E-08		5.8E-05	5.8E-05						
			beta-BHC	1.6E-09		3.2E-08	3.4E-08						
			Heptachlor	3.9E-09		1.4E-07	1.5E-07						
			Toxaphene	9.6E-10		9.1E-08	9.2E-08						
			(Total)	6.4E-06		2.0E-02	2.0E-02						

TABLE 9.1.RME.UA

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Drainage ditch south of runway	Arsenic	3.5E-08		1.4E-07	1.7E-07	Aluminum	CNS	5.1E-04		2.7E-03	3.2E-03
			4,4'-DDD	3.1E-11		7.1E-11	1.0E-10	Arsenic	Skin	2.2E-04		8.6E-04	1.1E-03
			4,4'-DDE	1.1E-11		2.6E-11	3.7E-11	4,4'-DDT	Liver	1.3E-06		2.9E-06	4.2E-06
			4,4'-DDT	7.8E-11		1.8E-10	2.6E-10	Aldrin	Liver	8.8E-06		9.3E-05	1.0E-04
			Aldrin	1.6E-09		1.7E-08	1.9E-08	alpha-Chlordane	Liver	4.2E-06		1.8E-05	2.2E-05
			alpha-Chlordane	2.6E-10		1.1E-09	1.4E-09	Dieldrin	Liver	8.2E-07		8.7E-06	9.5E-06
			Aroclor-1248	3.8E-09		3.1E-08	3.5E-08	gamma-Chlordane	Liver	3.6E-06		1.5E-05	1.9E-05
			Aroclor-1260	3.8E-09		3.1E-08	3.5E-08	Heptachlor epoxide	Liver	1.2E-05		8.6E-05	9.8E-05
			Dieldrin	2.3E-10		2.5E-09	2.7E-09	Antimony	Blood/WB	1.9E-04		5.1E-03	5.2E-03
			gamma-Chlordane	2.3E-10		9.6E-10	1.2E-09	Cadmium	Kidney	1.6E-04		8.7E-04	1.0E-03
			Heptachlor epoxide	5.0E-10		3.7E-09	4.1E-09	Chromium	NOAEL	2.3E-04		6.0E-03	6.2E-03
			1,2-Dibromoethane	2.3E-08		4.6E-08	6.9E-08	Copper	GI	1.8E-05		3.3E-05	5.1E-05
			Benzo(a)pyrene	7.5E-08		1.7E-06	1.7E-06	Iron	GI	3.3E-04		1.2E-03	1.5E-03
			Dibenz(a,h)anthracene	7.5E-08		1.7E-06	1.7E-06	Mercury	CNS	4.1E-05		2.4E-05	6.5E-05
			Hexachlorobenzene	1.6E-08		1.7E-07	1.9E-07	Hexachlorobenzene	Liver	3.6E-05		3.8E-04	4.2E-04
			n-Nitroso-di-n-propylamine	7.2E-08		1.5E-06	1.6E-06	(Total)		1.8E-03		1.7E-02	1.9E-02
			(Total)	3.1E-07		5.3E-06	5.6E-06						

Total Risk Across Soil	1.1E-04
Total Risk Across Surface Water	2.0E-02
Total Risk Across Sediment	5.6E-06
Total Risk Across All Media and All Exposure Routes	2.0E-02

Total Hazard Index Across All Media and All Exposure Routes	7.3E+00

TABLE 9.1.RME.UA

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total CNS HI =	8.1E-02
Total Blood HI =	2.7E-01
Total Whole Body HI =	2.8E-01
Total Skin HI =	2.9E-02
Total Kidney HI =	7.7E-01
Total NOAEL HI =	2.4E-01
Total GI HI =	7.6E-02
Total Liver HI =	4.0E-01
Total Respiratory HI =	4.3E-05
Total Nasal HI =	4.3E-07
Total Reproductive HI =	1.2E+00
Total Immune System HI =	4.1E+00

TABLE 9.2.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	1.4E-08		9.7E-08	1.1E-07	Aluminum	CNS	3.3E-03		1.5E-02	1.8E-02
			2,3,7,8-TCDD TEQs	3.4E-11		9.3E-11	1.3E-10	Antimony	Blood/WB	2.5E-03		5.7E-02	6.0E-02
			4,4'-DDD	3.8E-11		7.4E-11	1.1E-10	Cadmium	Kidney	1.7E-03		7.6E-03	9.3E-03
			4,4'-DDE	2.9E-11		5.8E-11	8.7E-11	Chromium	NOAEL	2.4E-03		5.5E-02	5.7E-02
			4,4'-DDT	5.7E-11		1.1E-10	1.7E-10	Copper	GI	4.6E-03		7.0E-03	1.2E-02
			Aldrin	1.3E-09		1.2E-08	1.4E-08	Iron	GI	1.8E-03		5.5E-03	7.3E-03
			alpha-Chlordane	6.2E-10		2.3E-09	2.9E-09	4,4'-DDT	Liver	2.4E-06		4.6E-06	7.0E-06
			Aroclor-1248	3.2E-09		2.3E-08	2.6E-08	Aldrin	Liver	1.8E-05		1.7E-04	1.9E-04
			Dieldrin	4.8E-09		4.4E-08	4.9E-08	alpha-Chlordane	Liver	2.5E-05		9.2E-05	1.2E-04
			gamma-Chlordane	5.9E-10		2.2E-09	2.8E-09	Dieldrin	Liver	4.2E-05		3.8E-04	4.2E-04
			Heptachlor epoxide	2.1E-09		1.3E-08	1.6E-08	gamma-Chlordane	Liver	2.4E-05		8.7E-05	1.1E-04
			Arsenic	9.7E-08		3.3E-07	4.2E-07	Heptachlor epoxide	Liver	1.2E-04		7.9E-04	9.1E-04
			1,2-Dibromoethane	1.8E-08		3.2E-08	5.0E-08	Arsenic	Skin	1.5E-03		5.2E-03	6.7E-03
			3,3'-Dichlorobenzidine	8.8E-09		8.1E-08	9.0E-08	Mercury	CNS	2.5E-04		1.3E-04	3.8E-04
			Benzo(a)anthracene	1.4E-08		2.7E-07	2.9E-07	4,6-Dinitro-2-methylphenol	N/A	3.3E-03		1.5E-02	1.9E-02
			Benzo(a)pyrene	1.4E-07		2.7E-06	2.9E-06	Hexachlorobenzene	Liver	1.7E-04		1.6E-03	1.7E-03
			bis(2-Chloroethyl)ether	2.1E-08		2.0E-07	2.2E-07	Hexachlorobutadiene	Renal	6.8E-04		6.3E-03	7.0E-03
			Dibenz(a,h)anthracene	1.4E-07		2.7E-06	2.9E-06	Nitrobenzene	WB	2.7E-04		1.3E-03	1.6E-03
			Hexachlorobenzene	3.1E-08		2.9E-07	3.2E-07	Pentachlorophenol	Liver/Kidney	1.1E-05		1.2E-04	1.3E-04
			Hexachlorobutadiene	1.5E-09		1.4E-08	1.6E-08	(Total)		2.3E-02		1.8E-01	2.0E-01
			Indeno(1,2,3-cd)pyrene	1.4E-08		2.7E-07	2.9E-07						
			n-Nitroso-di-n-propylamine	1.4E-07		2.5E-06	2.7E-06						
			Pentachlorophenol	5.7E-09		6.5E-08	7.1E-08						
			Aroclor-1221	6.4E-09		4.6E-08	5.2E-08						
			Toxaphene	8.6E-09		7.9E-08	8.8E-08						
			(Total)	6.8E-07		9.9E-06	1.1E-05						

TABLE 9.2.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Air	Emissions from soil south of runway	2,3,7,8-TCDD TEQs		4.2E-16		4.2E-16	alpha-Chlordane	Liver		7.8E-10		7.8E-10
			4,4'-DDT		7.2E-16		7.2E-16	gamma-Chlordane	Liver		7.5E-10		7.5E-10
			Aldrin		1.7E-14		1.7E-14	Aluminum	CNS		4.1E-05		4.1E-05
			alpha-Chlordane		7.8E-15		7.8E-15	Chromium	Respiratory		3.0E-06		3.0E-06
			Aroclor-1248		4.0E-14		4.0E-14	Mercury	CNS		3.7E-09		3.7E-09
			Aroclor-1260		1.7E-13		1.7E-13	Hexachlorocyclopentadiene	Nasal		3.0E-08		3.0E-08
			Dieldrin		6.0E-14		6.0E-14	(Total)			4.4E-05		4.4E-05
			gamma-Chlordane		7.5E-15		7.5E-15						
			Heptachlor epoxide		2.6E-14		2.6E-14						
			Arsenic		1.2E-11		1.2E-11						
			Cadmium		1.9E-11		1.9E-11						
			Chromium		5.3E-10		5.3E-10						
			bis(2-Chloroethyl)ether		2.7E-13		2.7E-13						
			Hexachlorobenzene		3.9E-13		3.9E-13						
			(Total)		5.6E-10		5.6E-10						

TABLE 9.2.RME.UA

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Drainage ditch south of runway	4,4'-DDD	1.6E-11		1.7E-08	1.7E-08	4,4'-DDT	Liver	1.6E-06		3.3E-03	3.3E-03
			4,4'-DDE	9.3E-11		8.3E-08	8.3E-08	Aldrin	Liver	7.1E-06		8.3E-05	9.0E-05
			4,4'-DDT	3.8E-11		7.9E-08	8.0E-08	Dieldrin	Liver	2.1E-05		2.7E-03	2.8E-03
			Aldrin	5.2E-10		6.1E-09	6.6E-09	Mercury	CNS	8.5E-05		5.2E-05	1.4E-04
			Aroclor-1248	3.3E-08		9.0E-05	9.0E-05	alpha-Chlordane	Liver	7.4E-06		3.8E-03	3.9E-03
			Dieldrin	2.4E-09		3.1E-07	3.2E-07	gamma-Chlordane	Liver	7.4E-06		3.8E-03	3.9E-03
			alpha-Chlordane	1.9E-10		9.6E-08	9.6E-08	Heptachlor epoxide	Liver	2.8E-04		1.7E-02	1.7E-02
			Aroclor-1260	2.0E-08		5.7E-05	5.7E-05	Aluminum	CNS	5.6E-05		3.1E-04	3.6E-04
			gamma-Chlordane	1.9E-10		9.6E-08	9.6E-08	Antimony	Blood/WB	8.7E-04		2.4E-02	2.5E-02
			Heptachlor epoxide	4.8E-09		2.9E-07	2.9E-07	Arsenic	Skin	7.1E-04		9.8E-04	1.7E-03
			Arsenic	4.6E-08		6.1E-08	1.1E-07	Cadmium	Kidney	1.9E-04		1.0E-02	1.0E-02
			1,1,2,2-Tetrachloroethane	2.0E-09		2.5E-08	2.7E-08	Chromium	NOAEL	2.8E-05		7.8E-04	8.1E-04
			1,1,2-Trichloroethane	5.8E-10		4.8E-09	5.3E-09	Copper	GI	1.2E-05		2.2E-05	3.3E-05
			1,1-Dichloroethene	6.1E-09		6.7E-08	7.4E-08	Iron	GI	2.9E-05		1.1E-04	1.3E-04
			1,2-Dibromoethane	8.6E-07		2.3E-07	1.1E-06	1,1,2,2-Tetrachloroethane	N/A	1.2E-06		1.4E-05	1.6E-05
			1,2-Dichloroethane	9.3E-10		3.4E-09	4.3E-09	1,1,2-Trichloroethane	Blood	1.8E-05		1.5E-04	1.7E-04
			1,2-Dichloropropane	6.9E-10		6.8E-09	7.5E-09	1,1-Dichloroethene	Liver	7.9E-06		8.7E-05	9.5E-05
			Bromodichloromethane	6.3E-10		3.4E-09	4.1E-09	1,2-Dichloroethane	N/A	2.4E-06		8.8E-06	1.1E-05
			Carbon tetrachloride	1.3E-09		3.9E-08	4.1E-08	Bromodichloromethane	Kidney	3.6E-06		1.9E-05	2.3E-05
			Dibromochloromethane	8.5E-10		6.6E-09	7.5E-09	Carbon tetrachloride	Liver	1.0E-04		3.0E-03	3.1E-03
			Tetrachloroethene	5.3E-10		2.3E-08	2.3E-08	Dibromochloromethane	Liver	3.6E-06		2.8E-05	3.1E-05
			trans-1,3-Dichloropropene	1.0E-09		7.3E-09	8.3E-09	Tetrachloroethene	Liver	7.1E-06		3.1E-04	3.1E-04
			2,4,6-Trichlorophenol	1.1E-09		1.2E-07	1.3E-07	trans-1,3-Dichloropropene	Organs	2.4E-06		1.7E-05	1.9E-05
			3,3'-Dichlorobenzidine	4.6E-08		2.6E-06	2.6E-06	2,4-Dinitrotoluene	CNS	3.6E-04		1.6E-03	1.9E-03
			Benzo(a)anthracene	7.4E-08		2.7E-04	2.7E-04	2,6-Dinitrotoluene	WB	7.1E-04		2.1E-03	2.8E-03
			Benzo(a)pyrene	7.4E-07		4.6E-03	4.6E-03	2-Chlorophenol	Reproductive	1.4E-04		2.4E-03	2.6E-03
			Benzo(b)fluoranthene	7.4E-08		4.7E-04	4.7E-04	4,6-Dinitro-2-methylphenol	N/A	1.8E-02		1.9E-01	2.1E-01

TABLE 9.2.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Benzo(k)fluoranthene	7.4E-09		1.1E-04	1.1E-04	Acenaphthylene	Body Weight	3.6E-05		4.7E-03	4.7E-03
			bis(2-Chloroethyl)ether	1.1E-07		3.9E-07	5.0E-07	bis(2-Ethylhexyl)phthalate	Liver	3.6E-05		2.7E-02	2.7E-02
			bis(2-Ethylhexyl)phthalate	1.4E-09		1.1E-06	1.1E-06	Dibenzofuran	Kidney	1.8E-04		3.6E-02	3.6E-02
			Carbazole	2.0E-09		2.1E-07	2.1E-07	Hexachlorobenzene	Liver	8.9E-04		7.7E-01	7.7E-01
			Chrysene	7.4E-10		2.7E-06	2.7E-06	Hexachlorobutadiene	Renal	3.6E-03		1.5E+00	1.5E+00
			Dibenz(a,h)anthracene	7.4E-07		1.3E-02	1.3E-02	Hexachloroethane	Kidney	7.1E-04		8.7E-02	8.8E-02
			Hexachlorobenzene	1.6E-07		1.4E-04	1.4E-04	Naphthalene	Body Weight	3.6E-05		2.3E-03	2.4E-03
			Hexachlorobutadiene	7.9E-09		3.3E-06	3.3E-06	Pentachlorophenol	Liver/Kidney	5.9E-05		7.0E-02	7.0E-02
			Hexachloroethane	1.4E-09		1.7E-07	1.8E-07	Aroclor-1016	Birth Weight	1.0E-03		2.8E+00	2.8E+00
			Indeno(1,2,3-cd)pyrene	7.4E-08		8.8E-04	8.8E-04	Aroclor-1254	Immune System	3.6E-03		9.9E+00	9.9E+00
			n-Nitroso-di-n-propylamine	7.1E-07		6.4E-07	1.4E-06	Heptachlor	Liver	7.4E-06		4.4E-04	4.5E-04
			n-Nitrosodiphenylamine	5.0E-10		4.9E-08	5.0E-08	Thallium	Liver	3.6E-03		1.2E-02	1.6E-02
			Pentachlorophenol	3.1E-08		3.6E-05	3.6E-05	(Total)		3.5E-02		1.6E+01	1.6E+01
			alpha-BHC	3.3E-09		1.0E-07	1.1E-07						
			Aroclor-1016	7.1E-10		2.0E-06	2.0E-06						
			Aroclor-1221	4.3E-08		1.2E-04	1.2E-04						
			Aroclor-1232	2.0E-08		5.7E-05	5.7E-05						
			Aroclor-1242	2.0E-08		5.7E-05	5.7E-05						
			Aroclor-1254	2.0E-08		5.7E-05	5.7E-05						
			beta-BHC	9.5E-10		3.2E-08	3.2E-08						
			Heptachlor	2.4E-09		1.4E-07	1.4E-07						
			Toxaphene	5.8E-10		8.9E-08	8.9E-08						
			(Total)	3.9E-06		2.0E-02	2.0E-02						

TABLE 9.2.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Drainage ditch south of runway	Arsenic	6.5E-08		2.6E-07	3.3E-07	Aluminum	CNS	2.4E-03		1.3E-02	1.5E-02
			4,4'-DDD	5.8E-11		1.4E-10	2.0E-10	Arsenic	Skin	1.0E-03		4.1E-03	5.1E-03
			4,4'-DDE	2.1E-11		5.0E-11	7.1E-11	4,4'-DDT	Liver	6.0E-06		1.4E-05	2.0E-05
			4,4'-DDT	1.5E-10		3.5E-10	4.9E-10	Aldrin	Liver	4.1E-05		4.5E-04	4.9E-04
			Aldrin	3.0E-09		3.3E-08	3.6E-08	alpha-Chlordane	Liver	2.0E-05		8.7E-05	1.1E-04
			alpha-Chlordane	4.9E-10		2.2E-09	2.7E-09	Dieldrin	Liver	3.8E-06		4.2E-05	4.6E-05
			Aroclor-1248	7.1E-09		6.1E-08	6.8E-08	gamma-Chlordane	Liver	1.7E-05		7.5E-05	9.2E-05
			Aroclor-1260	7.1E-09		6.1E-08	6.8E-08	Heptachlor epoxide	Liver	5.5E-05		4.2E-04	4.7E-04
			Dieldrin	4.4E-10		4.8E-09	5.3E-09	Antimony	Blood/WB	8.9E-04		2.4E-02	2.5E-02
			gamma-Chlordane	4.2E-10		1.9E-09	2.3E-09	Cadmium	Kidney	7.7E-04		4.2E-03	5.0E-03
			Heptachlor epoxide	9.3E-10		7.1E-09	8.0E-09	Chromium	NOAEL	1.1E-03		2.9E-02	3.0E-02
			1,2-Dibromoethane	2.3E-08		8.9E-08	1.1E-07	Copper	GI	8.6E-05		1.6E-04	2.4E-04
			Benzo(a)pyrene	7.5E-08		3.2E-06	3.3E-06	Iron	GI	1.5E-03		5.6E-03	7.1E-03
			Dibenz(a,h)anthracene	7.5E-08		3.2E-06	3.3E-06	Mercury	CNS	1.9E-04		1.2E-04	3.1E-04
			Hexachlorobenzene	1.6E-08		3.4E-07	3.5E-07	Hexachlorobenzene	Liver	1.7E-04		1.8E-03	2.0E-03
			n-Nitroso-di-n-propylamine	7.2E-08		3.0E-06	3.0E-06	(Total)		8.2E-03		8.4E-02	9.2E-02
			(Total)	3.5E-07		1.0E-05	1.1E-05						

Total Risk Across Surface Soil	1.1E-05
Total Risk Across Surface Water	2.0E-02
Total Risk Across Sediment	1.1E-05
Total Risk Across All Media and All Exposure Routes	2.0E-02

Total Hazard Index Across All Media and All Exposure Routes	1.6E+01

TABLE 9.2.RME.UA

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
												Total CNS HI =	3.7E-02
												Total Blood HI =	1.1E-01
												Total Whole Body HI =	1.2E-01
												Total Skin HI =	1.4E-02
												Total Kidney HI =	1.7E+00
												Total NOAEL HI =	8.8E-02
												Total GI HI =	2.6E-02
												Total Liver HI =	9.3E-01
												Total Respiratory HI =	3.0E-06
												Total Nasal HI =	3.0E-08
												Total Reproductive HI =	2.8E+00
												Total Immune System HI =	9.9E+00

TABLE 9.3.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	alpha-Chlordane	1.9E-07			1.9E-07	alpha-Chlordane	Liver	3.1E-03			3.1E-03
			Aroclor-1248	1.1E-05			1.1E-05	Dieldrin	Liver	1.8E-02			1.8E-02
			Dieldrin	5.0E-06			5.0E-06	gamma-Chlordane	Liver	1.7E-03			1.7E-03
			gamma-Chlordane	1.0E-07			1.0E-07	Heptachlor epoxide	Liver	8.8E-02			8.8E-02
			Heptachlor epoxide	3.6E-06			3.6E-06	Aluminum	CNS	6.0E-02			6.0E-02
			Arsenic	1.3E-04			1.3E-04	Arsenic	Skin	8.4E-01			8.4E-01
			4,4'-DDD	1.1E-07			1.1E-07	Chromium	NOAEL	4.9E-02			4.9E-02
			4,4'-DDE	1.2E-07			1.2E-07	Iron	GI	7.0E-01			7.0E-01
			4,4'-DDT	1.6E-07			1.6E-07	4,4'-DDT	Liver	2.8E-03			2.8E-03
			Aldrin	2.6E-06			2.6E-06	Aldrin	Liver	1.5E-02			1.5E-02
			Aroclor-1260	9.6E-06			9.6E-06	Antimony	Blood/WB	7.5E-02			7.5E-02
			1,1,2,2-Tetrachloroethane	9.4E-07			9.4E-07	Cadmium	Kidney	5.5E-03			5.5E-03
			1,1,2-Trichloroethane	2.7E-07			2.7E-07	Copper	GI	2.4E-03			2.4E-03
			1,1-Dichloroethene	2.8E-06			2.8E-06	Mercury	CNS	1.9E-02			1.9E-02
			1,2-Dibromoethane	4.0E-04			4.0E-04	1,1,2,2-Tetrachloroethane	N/A	2.3E-04			2.3E-04
			1,2-Dichloroethane	4.3E-07			4.3E-07	1,1,2-Trichloroethane	Blood	3.4E-03			3.4E-03
			1,2-Dichloropropane	3.2E-07			3.2E-07	1,1-Dichloroethene	Liver	1.5E-03			1.5E-03
			Benzene	2.6E-07			2.6E-07	1,2-Dichloroethane	N/A	4.6E-04			4.6E-04
			Bromodichloromethane	2.9E-07			2.9E-07	Benzene	N/A	4.6E-03			4.6E-03
			Bromoform	3.7E-08			3.7E-08	Bromodichloromethane	Kidney	6.8E-04			6.8E-04
			Carbon tetrachloride	6.1E-07			6.1E-07	Bromoform	Liver	6.8E-04			6.8E-04
			Chloroform	2.9E-08			2.9E-08	Carbon tetrachloride	Liver	2.0E-02			2.0E-02
			cis-1,3-Dichloropropene	4.7E-07			4.7E-07	Chloroform	Liver	1.4E-03			1.4E-03
			Dibromochloromethane	3.9E-07			3.9E-07	cis-1,3-Dichloropropene	Organs	4.6E-04			4.6E-04
			Tetrachloroethene	2.4E-07			2.4E-07	Dibromochloromethane	Liver	6.8E-04			6.8E-04
			trans-1,3-Dichloropropene	4.7E-07			4.7E-07	Tetrachloroethene	Liver	1.4E-03			1.4E-03
			Vinyl chloride	3.4E-06			3.4E-06	trans-1,3-Dichloropropene	Organs	4.6E-04			4.6E-04
			1,4-Dichlorobenzene	1.1E-06			1.1E-06	Vinyl chloride	Liver	4.6E-03			4.6E-03

TABLE 9.3.RME.UA

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			2,4,6-Trichlorophenol	5.3E-07			5.3E-07	1,4-Dichlorobenzene	Liver	4.7E-03			4.7E-03
			3,3'-Dichlorobenzidine	2.2E-05			2.2E-05	2,4-Dinitrophenol	Eyes	1.7E-01			1.7E-01
			Benzo(a)anthracene	3.5E-05			3.5E-05	2,4-Dinitrotoluene	CNS	7.0E-02			7.0E-02
			Benzo(a)pyrene	3.5E-04			3.5E-04	2,6-Dinitrotoluene	WB	1.4E-01			1.4E-01
			Benzo(b)fluoranthene	3.5E-05			3.5E-05	2-Chlorophenol	Reproductive	2.8E-02			2.8E-02
			Benzo(k)fluoranthene	3.5E-06			3.5E-06	4,6-Dinitro-2-methylphenol	N/A	3.5E+00			3.5E+00
			bis(2-Chloroethyl)ether	5.3E-05			5.3E-05	4-Methylphenol	CNS, Lungs	2.8E-02			2.8E-02
			bis(2-Ethylhexyl)phthalate	6.7E-07			6.7E-07	Acenaphthylene	N/A	7.0E-03			7.0E-03
			Carbazole	9.6E-07			9.6E-07	bis(2-Ethylhexyl)phthalate	Liver	7.0E-03			7.0E-03
			Chrysene	3.5E-07			3.5E-07	Dibenzofuran	Kidney	3.5E-02			3.5E-02
			Dibenz(a,h)anthracene	3.5E-04			3.5E-04	Hexachlorobenzene	Liver	1.7E-01			1.7E-01
			Hexachlorobenzene	7.7E-05			7.7E-05	Hexachlorobutadiene	Renal	7.0E-01			7.0E-01
			Hexachlorobutadiene	3.7E-06			3.7E-06	Hexachloroethane	Kidney	1.4E-01			1.4E-01
			Hexachloroethane	6.7E-07			6.7E-07	Naphthalene	Body Weight	7.0E-03			7.0E-03
			Indeno(1,2,3-cd)pyrene	3.5E-05			3.5E-05	Nitrobenzene	WB	2.8E-01			2.8E-01
			n-Nitroso-di-n-propylamine	3.4E-04			3.4E-04	Pentachlorophenol	Liver and Kidney	1.2E-02			1.2E-02
			Pentachlorophenol	1.4E-05			1.4E-05	Aroclor-1016	Birth Weight	2.0E-01			2.0E-01
			alpha-BHC	1.5E-06			1.5E-06	Aroclor-1254	Immune System	7.0E-01			7.0E-01
			Aroclor-1016	3.4E-07			3.4E-07	Heptachlor	Liver	1.4E-03			1.4E-03
			Aroclor-1221	1.9E-05			1.9E-05	Thallium	Liver	6.8E-01			6.8E-01
			Aroclor-1232	9.6E-06			9.6E-06	(Total)		8.8E+00			8.8E+00
			Aroclor-1242	9.6E-06			9.6E-06						
			Aroclor-1254	9.6E-06			9.6E-06						
			Aroclor-1262	1.0E-05			1.0E-05						
			Aroclor-1268	1.0E-05			1.0E-05						
			Heptachlor	1.1E-06			1.1E-06						
			Toxaphene	2.6E-05			2.6E-05						
			(Total)	2.0E-03			2.0E-03						

TABLE 9.3.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Upper Aquifer - Shower	1,1,2,2-Tetrachloroethane		9.4E-07		9.4E-07	1,2-Dibromoethane	Sperm		2.4E-01		2.4E-01
			1,1,2-Trichloroethane		2.6E-07		2.6E-07	1,2-Dichloroethane	GI		9.8E-03		9.8E-03
			1,1-Dichloroethene		8.2E-07		8.2E-07	1,2-Dichloropropane	Nasal		1.2E-02		1.2E-02
			1,2-Dibromoethane		3.6E-06		3.6E-06	Benzene	Liver		8.1E-03		8.1E-03
			1,2-Dichloroethane		4.3E-07		4.3E-07	Carbon tetrachloride	Liver/NOAEL		2.4E-02		2.4E-02
			Benzene		1.4E-07		1.4E-07	Chloroform	Liver/Nasal		1.6E-01		1.6E-01
			Bromoform		1.8E-08		1.8E-08	cis-1,3-Dichloropropene	Organs/Nasal		2.4E-03		2.4E-03
			Carbon tetrachloride		2.5E-07		2.5E-07	Tetrachloroethene	Liver/Kidney		9.8E-05		9.8E-05
			Chloroform		3.8E-07		3.8E-07	trans-1,3-Dichloropropene	Organs/Nasal		2.4E-03		2.4E-03
			cis-1,3-Dichloropropene		6.6E-08		6.6E-08	Vinyl chloride	Liver		1.4E-04		1.4E-04
			Tetrachloroethene		9.5E-09		9.5E-09	(Total)			4.6E-01		4.6E-01
			trans-1,3-Dichloropropene		6.6E-08		6.6E-08						
			Vinyl chloride		7.2E-08		7.2E-08						
			(Total)		7.0E-06		7.0E-06						
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	1.6E-07		1.7E-06	1.8E-06	Aluminum	CNS	1.6E-02		1.1E-01	1.2E-01
			2,3,7,8-TCDD TEQs	4.1E-10		1.6E-09	2.0E-09	Antimony	Blood/WB	1.2E-02		4.1E-01	4.2E-01
			4,4'-DDD	4.5E-10		1.3E-09	1.7E-09	Cadmium	Kidney	8.3E-03		5.5E-02	6.3E-02
			4,4'-DDE	3.5E-10		1.0E-09	1.4E-09	Chromium	NOAEL	1.2E-02		3.9E-01	4.0E-01
			4,4'-DDT	6.9E-10		1.9E-09	2.6E-09	Copper	GI	2.3E-02		5.0E-02	7.3E-02
			Aldrin	1.6E-08		2.1E-07	2.3E-07	Iron	GI	8.9E-03		3.9E-02	4.8E-02
			alpha-Chlordane	7.5E-09		3.9E-08	4.7E-08	4,4'-DDT	Liver	1.2E-05		3.3E-05	4.5E-05
			Aroclor-1248	3.8E-08		3.9E-07	4.3E-07	Aldrin	Liver	9.2E-05		1.2E-03	1.3E-03
			Dieldrin	5.7E-08		7.5E-07	8.1E-07	alpha-Chlordane	Liver	1.2E-04		6.6E-04	7.8E-04
			gamma-Chlordane	7.1E-09		3.8E-08	4.5E-08	Dieldrin	Liver	2.1E-04		2.7E-03	3.0E-03
			Heptachlor epoxide	2.5E-08		2.4E-07	2.6E-07	gamma-Chlordane	Liver	1.2E-04		6.3E-04	7.4E-04
			Arsenic	1.2E-06		5.6E-06	6.8E-06	Heptachlor epoxide	Liver	6.2E-04		5.7E-03	6.3E-03

TABLE 9.3.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			1,2-Dibromoethane	2.2E-07		5.4E-07	7.6E-07	Arsenic	Skin	7.5E-03		3.7E-02	4.5E-02
			3,3'-Dichlorobenzidine	1.1E-07		1.4E-06	1.5E-06	Mercury	CNS	1.3E-03		9.2E-04	2.2E-03
			Benzo(a)anthracene	1.7E-07		4.7E-06	4.9E-06	4,6-Dinitro-2-methylphenol	N/A	1.7E-02		1.1E-01	1.3E-01
			Benzo(a)pyrene	1.7E-06		4.7E-05	4.9E-05	Hexachlorobenzene	Liver	8.5E-04		1.1E-02	1.2E-02
			bis(2-Chloroethyl)ether	2.6E-07		3.4E-06	3.7E-06	Hexachlorobutadiene	Renal	3.4E-03		4.5E-02	4.9E-02
			Dibenz(a,h)anthracene	1.7E-06		4.7E-05	4.9E-05	Nitrobenzene	WB	1.4E-03		9.2E-03	1.1E-02
			Hexachlorobenzene	3.7E-07		4.9E-06	5.3E-06	Pentachlorophenol	Liver/Kidney	5.5E-05		9.1E-04	9.7E-04
			Hexachlorobutadiene	1.8E-08		2.4E-07	2.6E-07	(Total)		1.1E-01		1.3E+00	1.4E+00
			Indeno(1,2,3-cd)pyrene	1.7E-07		4.7E-06	4.9E-06						
			n-Nitroso-di-n-propylamine	1.6E-06		4.3E-05	4.5E-05						
			Pentachlorophenol	6.8E-08		1.1E-06	1.2E-06						
			Aroclor-1221	7.6E-08		7.8E-07	8.6E-07						
			Toxaphene	1.0E-07		1.4E-06	1.5E-06						
			(Total)	8.1E-06		1.7E-04	1.8E-04						
Surface Soil	Air	Emissions from soil south of runway	2,3,7,8-TCDD TEQs		6.1E-14		6.1E-14	alpha-Chlordane	Liver		4.7E-08		4.7E-08
			4,4'-DDT		1.0E-13		1.0E-13	gamma-Chlordane	Liver		4.5E-08		4.5E-08
			Aldrin		2.4E-12		2.4E-12	Aluminum	CNS		2.5E-03		2.5E-03
			alpha-Chlordane		1.1E-12		1.1E-12	Chromium	Respiratory		1.8E-04		1.8E-04
			Aroclor-1248		5.8E-12		5.8E-12	Mercury	CNS		2.2E-07		2.2E-07
			Aroclor-1260		2.5E-11		2.5E-11	Hexachlorocyclopentadiene	Nasal		1.8E-06		1.8E-06
			Dieldrin		8.6E-12		8.6E-12	(Total)			2.7E-03		2.7E-03
			gamma-Chlordane		1.1E-12		1.1E-12						
			Heptachlor epoxide		3.8E-12		3.8E-12						
			Arsenic		1.8E-09		1.8E-09						
			Cadmium		2.7E-09		2.7E-09						
			Chromium		7.6E-08		7.6E-08						
			bis(2-Chloroethyl)ether		3.9E-11		3.9E-11						
			Hexachlorobenzene		5.7E-11		5.7E-11						
			(Total)		8.0E-08		8.0E-08						

Total Risk Across Groundwater	2.0E-03
Total Risk Across Surface Soil	1.8E-04
Total Risk Across All Media and All Exposure Routes	2.2E-03

Total Hazard Index Across All Media and All Exposure Routes	1.1E+01
Total Liver HI =	1.3E+00

6/4/2005

TABLE 9.3.RME.UA

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
												Total CNS HI =	3.1E-01
												Total Skin HI =	8.8E-01
												Total NOAEL HI =	4.8E-01
												Total GI HI =	8.4E-01
												Total Blood HI =	5.0E-01
												Total WB HI =	9.4E-01
												Total Kidney HI =	1.0E+00
												Total Eyes HI =	1.7E-01
												Total Reproductive HI =	4.7E-01
												Total Lungs/Respiratory HI =	2.8E-02
												Total Nasal HI =	1.8E-01
												Total Imune System HI =	7.0E-01

TABLE 9.4.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	alpha-Chlordane	1.1E-07		9.5E-07	1.1E-06	alpha-Chlordane	Liver	7.2E-03		6.3E-02	7.0E-02
			Aroclor-1248	6.3E-06		2.9E-04	3.0E-04	Dieldrin	Liver	4.2E-02		9.1E-02	1.3E-01
			Dieldrin	2.9E-06		6.3E-06	9.2E-06	gamma-Chlordane	Liver	3.9E-03		3.4E-02	3.8E-02
			gamma-Chlordane	5.9E-08		5.2E-07	5.8E-07	Heptachlor epoxide	Liver	2.1E-01		2.1E-01	4.1E-01
			Heptachlor epoxide	2.1E-06		2.1E-06	4.2E-06	Aluminum	CNS	1.4E-01		4.7E-03	1.5E-01
			Arsenic	7.5E-05		6.1E-07	7.6E-05	Arsenic	Skin	2.0E+00		1.6E-02	2.0E+00
			4,4'-DDD	6.7E-08		1.2E-06	1.3E-06	Chromium	NOAEL	1.2E-01		1.9E-02	1.3E-01
			4,4'-DDE	7.0E-08		1.1E-06	1.1E-06	Iron	GI	1.6E+00		3.6E-02	1.7E+00
			4,4'-DDT	9.5E-08		3.3E-06	3.4E-06	4,4'-DDT	Liver	6.5E-03		2.3E-01	2.4E-01
			Aldrin	1.5E-06		3.0E-07	1.8E-06	Aldrin	Liver	3.4E-02		6.8E-03	4.1E-02
			Aroclor-1260	5.6E-06		2.6E-04	2.7E-04	Antimony	Blood/WB	1.8E-01		2.9E-02	2.0E-01
			1,1,2,2-Tetrachloroethane	5.5E-07		1.1E-07	6.6E-07	Cadmium	Kidney	1.3E-02		4.2E-03	1.7E-02
			1,1,2-Trichloroethane	1.6E-07		1.9E-08	1.8E-07	Copper	GI	5.6E-03		6.1E-05	5.6E-03
			1,1-Dichloroethene	1.6E-06		2.4E-07	1.9E-06	Mercury	CNS	4.3E-02		1.6E-04	4.4E-02
			1,2-Dibromoethane	2.3E-04		1.1E-06	2.3E-04	1,1,2,2-Tetrachloroethane	N/A	5.3E-04		1.0E-04	6.4E-04
			1,2-Dichloroethane	2.5E-07		1.2E-08	2.6E-07	1,1,2-Trichloroethane	Blood	8.0E-03		1.0E-03	9.0E-03
			1,2-Dichloropropane	1.9E-07		2.6E-08	2.1E-07	1,1-Dichloroethene	Liver	3.6E-03		5.3E-04	4.1E-03
			Benzene	1.5E-07		2.6E-08	1.8E-07	1,2-Dichloroethane	N/A	1.1E-03		5.3E-05	1.1E-03
			Bromodichloromethane	1.7E-07		1.5E-08	1.8E-07	Benzene	N/A	1.1E-02		1.9E-03	1.3E-02
			Bromoform	2.2E-08		2.6E-09	2.4E-08	Bromodichloromethane	Kidney	1.6E-03		1.4E-04	1.7E-03
			Carbon tetrachloride	3.6E-07		1.7E-07	5.2E-07	Bromoform	Liver	1.6E-03		1.9E-04	1.8E-03
			Chloroform	1.7E-08		8.1E-09	2.5E-08	Carbon tetrachloride	Liver	4.6E-02		2.1E-02	6.7E-02
			cis-1,3-Dichloropropene	2.7E-07		2.8E-08	3.0E-07	Chloroform	Liver	3.2E-03		1.5E-03	4.7E-03
			Dibromochloromethane	2.3E-07		3.0E-08	2.6E-07	cis-1,3-Dichloropropene	Organs	1.1E-03		1.1E-04	1.2E-03
			Tetrachloroethene	1.4E-07		1.0E-07	2.5E-07	Dibromochloromethane	Liver	1.6E-03		2.1E-04	1.8E-03
			trans-1,3-Dichloropropene	2.7E-07		2.8E-08	3.0E-07	Tetrachloroethene	Liver	3.2E-03		2.3E-03	5.5E-03
			Vinyl chloride	2.6E-05		2.2E-07	2.6E-05	trans-1,3-Dichloropropene	Organs	1.1E-03		1.1E-04	1.2E-03
			1,4-Dichlorobenzene	6.7E-07		6.1E-07	1.3E-06	Vinyl chloride	Liver	1.1E-02		5.7E-04	1.1E-02

TABLE 9.4.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			2,4,6-Trichlorophenol	3.1E-07		5.8E-07	8.8E-07	1,4-Dichlorobenzene	Liver	1.1E-02		9.9E-03	2.1E-02
			3,3'-Dichlorobenzidine	1.3E-05		1.2E-05	2.5E-05	2,4-Dinitrophenol	Eyes	4.1E-01		1.3E-02	4.2E-01
			Benzo(a)anthracene	2.0E-05		1.3E-03	1.3E-03	2,4-Dinitrotoluene	CNS	1.6E-01		1.2E-02	1.8E-01
			Benzo(a)pyrene	2.0E-04		2.1E-02	2.1E-02	2,6-Dinitrotoluene	WB	3.3E-01		1.6E-02	3.4E-01
			Benzo(b)fluoranthene	2.0E-05		2.2E-03	2.2E-03	2-Chlorophenol	Reproductive	6.5E-02		1.7E-02	8.2E-02
			Benzo(k)fluoranthene	2.0E-06		5.1E-04	5.1E-04	4,6-Dinitro-2-methylphenol	N/A	8.1E+00		1.5E+00	9.6E+00
			bis(2-Chloroethyl)ether	3.1E-05		1.7E-06	3.2E-05	4-Methylphenol	CNS, Lungs	6.5E-02		9.9E-03	7.5E-02
			bis(2-Ethylhexyl)phthalate	3.9E-07		4.9E-06	5.3E-06	Acenaphthylene	N/A	1.6E-02		3.6E-02	5.2E-02
			Carbazole	5.6E-07		9.7E-07	1.5E-06	bis(2-Ethylhexyl)phthalate	Liver	1.6E-02		2.1E-01	2.2E-01
			Chrysene	2.0E-07		1.3E-05	1.3E-05	Dibenzofuran	Kidney	8.2E-02		2.7E-01	3.6E-01
			Dibenz(a,h)anthracene	2.0E-04		5.7E-02	5.8E-02	Hexachlorobenzene	Liver	4.1E-01		6.0E+00	6.4E+00
			Hexachlorobenzene	4.5E-05		6.5E-04	7.0E-04	Hexachlorobutadiene	Renal	1.6E+00		1.1E+01	1.3E+01
			Hexachlorobutadiene	2.2E-06		1.5E-05	1.7E-05	Hexachloroethane	Kidney	3.3E-01		6.7E-01	1.0E+00
			Hexachloroethane	3.9E-07		8.1E-07	1.2E-06	Naphthalene	Body Weight	1.6E-02		1.6E-02	3.3E-02
			Indeno(1,2,3-cd)pyrene	2.0E-05		4.1E-03	4.1E-03	Nitrobenzene	WB	6.5E-01		5.2E-02	7.0E-01
			n-Nitroso-di-n-propylamine	2.0E-04		5.9E-06	2.0E-04	Pentachlorophenol	Liver and Kidney	2.7E-02		5.4E-01	5.6E-01
			Pentachlorophenol	8.4E-06		1.7E-04	1.7E-04	Aroclor-1016	Birth Weight	4.7E-01		2.2E+01	2.2E+01
			alpha-BHC	8.8E-07		4.6E-07	1.3E-06	Aroclor-1254	Immune System	3.2E-03		7.6E+01	7.6E+01
			Aroclor-1016	2.0E-07		9.2E-06	9.4E-06	Heptachlor	Liver	1.6E+00		3.2E-03	1.6E+00
			Aroclor-1221	1.1E-05		5.2E-04	5.4E-04	Thallium	Liver	1.6E+00		3.4E-02	1.6E+00
			Aroclor-1232	5.6E-06		2.6E-04	2.7E-04	(Total)		2.1E+01		1.2E+02	1.4E+02
			Aroclor-1242	5.6E-06		2.6E-04	2.7E-04						
			Aroclor-1254	5.6E-06		2.6E-04	2.7E-04						
			Aroclor-1262	6.0E-06		2.8E-04	2.9E-04						
			Aroclor-1268	6.0E-06		2.8E-04	2.9E-04						
			Heptachlor	6.2E-07		6.2E-07	1.2E-06						
			Toxaphene	1.5E-05		3.9E-05	5.5E-05						
			(Total)	1.2E-03		9.0E-02	9.1E-02						

TABLE 9.4.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	3.8E-07		1.0E-06	1.4E-06	Aluminum	CNS	1.5E-01		2.6E-01	4.1E-01
			2,3,7,8-TCDD TEQs	9.5E-10		9.7E-10	1.9E-09	Antimony	Blood/WB	1.2E-01		9.9E-01	1.1E+00
			4,4'-DDD	1.1E-09		7.7E-10	1.8E-09	Cadmium	Kidney	7.7E-02		1.3E-01	2.1E-01
			4,4'-DDE	8.2E-10		6.0E-10	1.4E-09	Chromium	NOAEL	1.1E-01		9.4E-01	1.1E+00
			4,4'-DDT	1.6E-09		1.2E-09	2.8E-09	Copper	GI	2.1E-01		1.2E-01	3.3E-01
			Aldrin	3.7E-08		1.3E-07	1.6E-07	Iron	GI	8.3E-02		9.5E-02	1.8E-01
			alpha-Chlordane	1.7E-08		2.4E-08	4.1E-08	4,4'-DDT	Liver	1.1E-04		8.0E-05	1.9E-04
			Aroclor-1248	8.9E-08		2.4E-07	3.3E-07	Aldrin	Liver	8.5E-04		2.9E-03	3.8E-03
			Dieldrin	1.3E-07		4.5E-07	5.9E-07	alpha-Chlordane	Liver	1.2E-03		1.6E-03	2.7E-03
			gamma-Chlordane	1.7E-08		2.3E-08	3.9E-08	Dieldrin	Liver	1.9E-03		6.6E-03	8.6E-03
			Heptachlor epoxide	5.9E-08		1.4E-07	2.0E-07	gamma-Chlordane	Liver	1.1E-03		1.5E-03	2.6E-03
			Arsenic	2.7E-06		3.4E-06	6.1E-06	Heptachlor epoxide	Liver	5.8E-03		1.4E-02	1.9E-02
			1,2-Dibromoethane	5.1E-07		3.3E-07	8.4E-07	Arsenic	Skin	7.0E-02		9.0E-02	1.6E-01
			3,3'-Dichlorobenzidine	2.5E-07		8.4E-07	1.1E-06	Mercury	CNS	1.2E-02		2.2E-03	1.4E-02
			Benzo(a)anthracene	4.0E-07		2.8E-06	3.2E-06	4,6-Dinitro-2-methylphenol	N/A	1.6E-01		2.6E-01	4.2E-01
			Benzo(a)pyrene	4.0E-06		2.8E-05	3.2E-05	Hexachlorobenzene	Liver	8.0E-03		2.7E-02	3.5E-02
			bis(2-Chloroethyl)ether	6.0E-07		2.0E-06	2.6E-06	Hexachlorobutadiene	Renal	3.2E-02		1.1E-01	1.4E-01
			Dibenz(a,h)anthracene	4.0E-06		2.8E-05	3.2E-05	Nitrobenzene	WB	1.3E-02		2.2E-02	3.5E-02
			Hexachlorobenzene	8.7E-07		3.0E-06	3.8E-06	Pentachlorophenol	Liver/Kidney	5.2E-04		2.2E-03	2.7E-03
			Hexachlorobutadiene	4.3E-08		1.5E-07	1.9E-07	(Total)		1.1E+00		3.1E+00	4.1E+00
			Indeno(1,2,3-cd)pyrene	4.0E-07		2.8E-06	3.2E-06						
			n-Nitroso-di-n-propylamine	3.8E-06		2.6E-05	3.0E-05						
			Pentachlorophenol	1.6E-07		6.8E-07	8.4E-07						
			Aroclor-1221	1.8E-07		4.7E-07	6.5E-07						
			Toxaphene	2.4E-07		8.2E-07	1.1E-06						
			(Total)	1.9E-05		1.0E-04	1.2E-04						

TABLE 9.4.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Air	Emissions from soil south of runway	2,3,7,8-TCDD TEQs		4.3E-14		4.3E-14	alpha-Chlordane	Liver		1.3E-07		1.3E-07
			4,4'-DDT		7.3E-14		7.3E-14	gamma-Chlordane	Liver		1.3E-07		1.3E-07
			Aldrin		1.7E-12		1.7E-12	Aluminum	CNS		7.0E-03		7.0E-03
			alpha-Chlordane		7.9E-13		7.9E-13	Chromium	Respiratory		5.0E-04		5.0E-04
			Aroclor-1248		4.1E-12		4.1E-12	Mercury	CNS		6.2E-07		6.2E-07
			Aroclor-1260		1.7E-11		1.7E-11	Hexachlorocyclopentadiene	**Nasal**		5.1E-06		5.1E-06
			Dieldrin		6.1E-12		6.1E-12	(Total)			7.5E-03		7.5E-03
			gamma-Chlordane		7.5E-13		7.5E-13						
			Heptachlor epoxide		2.7E-12		2.7E-12						
			Arsenic		1.2E-09		1.2E-09						
			Cadmium		1.9E-09		1.9E-09						
			Chromium		5.3E-08		5.3E-08						
			bis(2-Chloroethyl)ether		2.7E-11		2.7E-11						
			Hexachlorobenzene		4.0E-11		4.0E-11						
			(Total)		5.6E-08		5.6E-08						

Total Risk Across Groundwater	9.1E-02
Total Risk Across Surface Soil	1.2E-04
Total Risk Across All Media and All Exposure Routes	9.1E-02
Total Hazard Index Across All Media and All Exposure Routes	1.4E+02

TABLE 9.4.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
												Total Liver HI =	1.2E+01
												Total CNS HI =	8.7E-01
												Total Skin HI =	2.1E+00
												Total NOAEL HI =	1.2E+00
												Total GI HI =	2.2E+00
												Total Blood HI =	1.3E+00
												Total WB HI =	2.4E+00
												Total Kidney HI =	1.5E+01
												Total Eyes HI =	4.2E-01
												Total Reproductive HI =	2.2E+01

TABLE 9.5.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Excavation Pit	alpha-Chlordane			1.1E-08	1.1E-08	alpha-Chlordane	Liver			4.6E-03	4.6E-03
			Aroclor-1248			3.5E-06	3.5E-06	Dieldrin	Liver			6.6E-03	6.6E-03
			Dieldrin			7.5E-08	7.5E-08	gamma-Chlordane	Liver			2.5E-03	2.5E-03
			gamma-Chlordane			6.2E-09	6.2E-09	Heptachlor epoxide	Liver			1.5E-02	1.5E-02
			Heptachlor epoxide			2.6E-08	2.6E-08	Aluminum	CNS			1.7E-03	1.7E-03
			Arsenic			3.6E-08	3.6E-08	Arsenic	Skin			5.7E-03	5.7E-03
			4,4'-DDD			1.4E-08	1.4E-08	Chromium	NOAEL			1.0E-03	1.0E-03
			4,4'-DDE			1.3E-08	1.3E-08	Iron	GI			1.3E-02	1.3E-02
			4,4'-DDT			4.0E-08	4.0E-08	4,4'-DDT	Liver			1.7E-02	1.7E-02
			Aldrin			3.6E-09	3.6E-09	Aldrin	Liver			4.9E-04	4.9E-04
			Aroclor-1260			3.2E-06	3.2E-06	Antimony	Blood/WB			1.0E-02	1.0E-02
			1,1,2,2-Tetrachloroethane			1.7E-09	1.7E-09	Cadmium	Kidney			1.5E-03	1.5E-03
			1,1,2-Trichloroethane			3.6E-10	3.6E-10	Copper	GI			2.2E-05	2.2E-05
			1,1-Dichloroethene			5.5E-09	5.5E-09	Mercury	CNS			5.7E-05	5.7E-05
			1,2-Dibromoethane			1.5E-08	1.5E-08	1,1,2,2-Tetrachloroethane	N/A			9.8E-06	9.8E-06
			1,2-Dichloroethane			2.8E-10	2.8E-10	1,1,2-Trichloroethane	Blood			1.1E-05	1.1E-05
			1,2-Dichloropropane			5.4E-10	5.4E-10	1,1-Dichloroethene	Liver			7.2E-05	7.2E-05
			Benzene			6.7E-10	6.7E-10	1,2-Dichloroethane	N/A			7.2E-06	7.2E-06
			Bromodichloromethane			2.4E-10	2.4E-10	Benzene	N/A			2.9E-04	2.9E-04
			Bromoform			3.2E-11	3.2E-11	Bromodichloromethane	Kidney			1.3E-05	1.3E-05
			Carbon tetrachloride			2.7E-09	2.7E-09	Bromoform	Liver			1.4E-06	1.4E-06
			Chloroform			1.6E-10	1.6E-10	Carbon tetrachloride	Liver			2.1E-04	2.1E-04
			cis-1,3-Dichloropropene			5.9E-10	5.9E-10	Chloroform	Liver			1.9E-04	1.9E-04
			Dibromochloromethane			4.1E-10	4.1E-10	cis-1,3-Dichloropropene	Organs			1.3E-05	1.3E-05
			Tetrachloroethene			1.5E-09	1.5E-09	Dibromochloromethane	Liver			1.7E-06	1.7E-06
			trans-1,3-Dichloropropene			5.9E-10	5.9E-10	Tetrachloroethene	Liver			2.0E-05	2.0E-05
			Vinyl chloride			3.0E-09	3.0E-09	trans-1,3-Dichloropropene	Organs			1.3E-05	1.3E-05
			1,4-Dichlorobenzene			9.4E-09	9.4E-09	Vinyl Chloride	Liver			9.6E-05	9.6E-05

TABLE 9.5.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			2,4,6-Trichlorophenol			7.0E-09	7.0E-09	1,4-Dichlorobenzene	Liver			9.2E-04	9.2E-04
			3,3'-Dichlorobenzidine			1.4E-07	1.4E-07	2,4-Dinitrophenol	Eyes			1.1E-03	1.1E-03
			Benzo(a)anthracene			1.5E-05	1.5E-05	2,4-Dinitrotoluene	CNS			1.1E-03	1.1E-03
			Benzo(a)pyrene			2.6E-04	2.6E-04	2,6-Dinitrotoluene	WB			1.4E-04	1.4E-04
			Benzo(b)fluoranthene			2.6E-05	2.6E-05	2-Chlorophenol	Reproductive			1.9E-04	1.9E-04
			Benzo(k)fluoranthene			6.1E-06	6.1E-06	4,6-Dinitro-2-methylphenol	N/A			1.2E-01	1.2E-01
			bis(2-Chloroethyl)ether			2.9E-08	2.9E-08	4-Methylphenol	CNS, Lungs			1.3E-03	1.3E-03
			bis(2-Ethylhexyl)phthalate			6.0E-08	6.0E-08	Acenaphthylene	N/A			2.8E-03	2.8E-03
			Carbazole			1.3E-08	1.3E-08	bis(2-Ethylhexyl)phthalate	Liver			1.5E-02	1.5E-02
			Chrysene			1.5E-07	1.5E-07	Dibenzofuran	Kidney			2.1E-02	2.1E-02
			Dibenz(a,h)anthracene			7.1E-04	7.1E-04	Hexachlorobenzene	Liver			4.3E-01	4.3E-01
			Hexachlorobenzene			7.9E-06	7.9E-06	Hexachlorobutadiene	Renal			8.3E-01	8.3E-01
			Hexachlorobutadiene			1.8E-07	1.8E-07	Hexachloroethane	Kidney			4.9E-03	4.9E-03
			Hexachloroethane			9.7E-09	9.7E-09	Naphthalene	Body Weight			1.7E-03	1.7E-03
			Indeno(1,2,3-cd)pyrene			4.9E-05	4.9E-05	Nitrobenzene	WB			6.1E-04	6.1E-04
			n-Nitroso-di-n-propylamine			3.4E-08	3.4E-08	Pentachlorophenol	Liver and Kidney			3.9E-02	3.9E-02
			Pentachlorophenol			2.0E-06	2.0E-06	Aroclor-1016	Birth Weight			1.6E+00	1.6E+00
			alpha-BHC			5.5E-09	5.5E-09	Aroclor-1254	Immune System			2.2E+00	2.2E+00
			Aroclor-1016			1.1E-07	1.1E-07	Heptachlor	Liver			2.3E-04	2.3E-04
			Aroclor-1221			6.3E-06	6.3E-06	Thallium	Liver			1.2E-02	1.2E-02
			Aroclor-1232			3.2E-06	3.2E-06	(Total)				5.4E+00	5.4E+00
			Aroclor-1242			3.2E-06	3.2E-06						
			Aroclor-1254			3.2E-06	3.2E-06						
			Aroclor-1262			3.4E-06	3.4E-06						
			Aroclor-1268			3.4E-06	3.4E-06						
			Heptachlor			7.4E-09	7.4E-09						
			Toxaphene			4.8E-07	4.8E-07						
			(Total)			1.1E-03	1.1E-03						

TABLE 9.5.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Upper Aquifer - Water Vapors at Excavation Pit	1,1,2,2-Tetrachloroethane		5.4E-12		5.4E-12	1,2-Dibromoethane	Sperm		3.2E-06		3.2E-06
			1,1,2-Trichloroethane		1.6E-12		1.6E-12	1,2-Dichloroethane	GI		1.5E-06		1.5E-06
			1,1-Dichloroethene		5.4E-12		5.4E-12	1,2-Dichloropropane	Nasal		5.6E-07		5.6E-07
			1,2-Dibromoethane		2.0E-11		2.0E-11	Benzene	Liver		1.3E-07		1.3E-07
			1,2-Dichloroethane		2.8E-12		2.8E-12	Carbon tetrachloride	Liver/NOAEL		3.4E-07		3.4E-07
			Benzene		9.5E-13		9.5E-13	Chloroform	Liver/Nasal		2.4E-06		2.4E-06
			Bromoform		9.5E-14		9.5E-14	cis-1,3-Dichloropropene	Organs/Nasal		3.7E-07		3.7E-07
			Carbon tetrachloride		1.5E-12		1.5E-12	Tetrachloroethene	Liver/Kidney		1.4E-08		1.4E-08
			Chloroform		2.4E-12		2.4E-12	trans-1,3-Dichloropropene	Organs/Nasal		3.7E-07		3.7E-07
			cis-1,3-Dichloropropene		4.2E-13		4.2E-13	Vinyl chloride	Liver		2.4E-08		2.4E-08
			Tetrachloroethene		5.5E-14		5.5E-14	(Total)			8.9E-06		8.9E-06
			trans-1,3-Dichloropropene		4.2E-13		4.2E-13						
			Vinyl chloride		5.3E-13		5.3E-13						
			(Total)		4.1E-11		4.1E-11						
Subsurface Soil	Subsurface Soil	Site Subsurface Soil	4,4'-DDD	9.5E-12		4.5E-12	1.4E-11	4,4'-DDT	Liver	5.6E-06		2.6E-06	8.2E-06
			4,4'-DDE	1.4E-11		6.4E-12	2.0E-11	Aldrin	Liver	7.5E-06		1.7E-05	2.4E-05
			4,4'-DDT	1.4E-11		6.4E-12	2.0E-11	alpha-Chlordane	Liver	1.7E-05		1.5E-05	3.1E-05
			Aldrin	5.5E-11		1.2E-10	1.8E-10	Dieldrin	Liver	5.6E-05		1.2E-04	1.8E-04
			alpha-Chlordane	4.1E-11		3.7E-11	7.8E-11	gamma-Chlordane	Liver	1.2E-05		1.0E-05	2.2E-05
			Aroclor-1248	7.9E-10		1.4E-09	2.2E-09	Heptachlor epoxide	Liver	1.4E-04		2.1E-04	3.5E-04
			Aroclor-1260	7.9E-10		1.4E-09	2.2E-09	Aluminum	CNS	6.4E-03		7.1E-03	1.3E-02
			Dieldrin	6.4E-10		1.4E-09	2.0E-09	Antimony	Blood/WB	1.4E-03		7.5E-03	8.8E-03
			gamma-Chlordane	3.0E-11		2.6E-11	5.6E-11	Arsenic	Skin	3.8E-03		3.0E-03	6.8E-03
			Heptachlor epoxide	2.3E-10		3.7E-10	6.0E-10	Cadmium	Kidney	2.3E-03		2.6E-03	4.9E-03
			Arsenic	2.4E-08		2.0E-08	4.4E-08	Chromium	NOAEL	5.6E-04		3.1E-03	3.7E-03
			Benzo(a)pyrene	4.7E-07		2.0E-07	6.7E-07	Copper	GI	1.3E-03		4.9E-04	1.8E-03
			Dibenz(a,h)anthracene	2.9E-07		1.3E-06	1.6E-06	Iron	GI	3.1E-03		2.3E-03	5.4E-03
			Hexachlorobenzene	2.9E-07		1.3E-06	1.6E-06	Mercury	CNS	3.8E-04		4.6E-05	4.2E-04
			n-Nitroso-di-n-propylamine	6.4E-08		1.4E-07	2.0E-07	Hexachlorobenzene	Liver	3.5E-03		7.7E-03	1.1E-02
			(Total)	2.8E-07		1.2E-06	1.5E-06	(Total)		2.3E-02		3.4E-02	5.7E-02
			(Total)	1.4E-06		4.3E-06	5.7E-06						

TABLE 9.5.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	Emissions from exposed soil	4,4'-DDT		2.4E-13		2.4E-13	alpha-Chlordane	Liver		7.3E-07		7.3E-07
			Aldrin		9.6E-13		9.6E-13	gamma-Chlordane	Liver		5.3E-07		5.3E-07
			alpha-Chlordane		7.2E-13		7.2E-13	Aluminum	CNS		1.1E-01		1.1E-01
			Aroclor-1248		1.4E-11		1.4E-11	Chromium	Respiratory		6.7E-04		6.7E-04
			Aroclor-1260		1.4E-11		1.4E-11	Mercury	CNS		7.7E-06		7.7E-06
			Dieldrin		1.1E-11		1.1E-11	Carbon tetrachloride	NOAEL		1.1E-03		1.1E-03
			gamma-Chlordane		5.2E-13		5.2E-13	Chloroform	Nasal		5.6E-03		5.6E-03
			Heptachlor epoxide		4.1E-12		4.1E-12	cis-1,3-Dichloropropene	Nasal		1.2E-03		1.2E-03
			Arsenic		4.2E-09		4.2E-09	trans-1,3-Dichloropropene	Nasal		1.2E-03		1.2E-03
			Cadmium		3.7E-09		3.7E-09	Vinyl chloride	Liver		4.3E-04		4.3E-04
			Chromium		1.2E-07		1.2E-07	Hexachlorocyclopentadiene	Nasal		8.6E-04		8.6E-04
			Carbon tetrachloride		4.7E-09		4.7E-09	(Total)			1.2E-01		1.2E-01
			Chloroform		5.6E-09		5.6E-09						
			cis-1,3-Dichloropropene		1.4E-09		1.4E-09						
			trans-1,3-Dichloropropene		1.4E-09		1.4E-09						
			Vinyl chloride		2.7E-09		2.7E-09						
			bis(2-Chloroethyl)ether		7.6E-10		7.6E-10						
			Hexachlorobenzene		1.1E-09		1.1E-09						
			(Total)		1.4E-07		1.4E-07						
Surface Water	Surface Water	Drainage ditch south of runway	4,4'-DDD	2.8E-12		1.9E-09	1.9E-09	4,4'-DDT	Liver	2.8E-06		3.6E-03	3.6E-03
			4,4'-DDE	1.6E-11		9.1E-09	9.1E-09	Aldrin	Liver	1.3E-05		9.1E-05	1.0E-04
			4,4'-DDT	6.7E-12		8.7E-09	8.7E-09	Dieldrin	Liver	3.8E-05		3.0E-03	3.0E-03
			Aldrin	9.1E-11		6.6E-10	7.5E-10	Mercury	CNS	1.5E-04		1.0E-04	2.5E-04
			Aroclor-1248	5.7E-09		9.8E-06	9.8E-06	alpha-Chlordane	Liver	1.3E-05		4.2E-03	4.2E-03
			Dieldrin	4.3E-10		3.4E-08	3.5E-08	gamma-Chlordane	Liver	1.3E-05		4.2E-03	4.2E-03
			alpha-Chlordane	3.3E-11		1.1E-08	1.1E-08	Heptachlor epoxide	Liver	5.0E-04		1.8E-02	1.9E-02
			Aroclor-1260	3.6E-09		6.2E-06	6.2E-06	Aluminum	CNS	9.8E-05		5.9E-04	6.8E-04
			gamma-Chlordane	3.3E-11		1.1E-08	1.1E-08	Antimony	Blood/WB	1.5E-03		4.6E-02	4.8E-02
			Heptachlor epoxide	8.5E-10		3.1E-08	3.2E-08	Arsenic	Skin	1.3E-03		1.9E-03	3.1E-03
			Arsenic	8.1E-09		1.2E-08	2.0E-08	Cadmium	Kidney	3.3E-04		2.0E-02	2.0E-02
			1,1,2,2-Tetrachloroethane	3.4E-09		3.4E-09	6.7E-09	Chromium	NOAEL	7.5E-06		2.3E-04	2.3E-04

TABLE 9.5.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			1,1,2-Trichloroethane	9.6E-10		7.2E-10	1.7E-09	Copper	GI	2.1E-05		4.1E-05	6.2E-05
			1,1-Dichloroethene	1.0E-08		1.1E-08	2.1E-08	Iron	GI	5.1E-05		2.0E-04	2.5E-04
			1,2-Dibromoethane	1.4E-06		3.0E-08	1.5E-06	1,1,2,2-Tetrachloroethane	N/A	2.1E-06		2.0E-05	2.2E-05
			1,2-Dichloroethane	1.5E-09		5.6E-10	2.1E-09	1,1,2-Trichloroethane	Blood	3.1E-06		2.2E-05	2.6E-05
			1,2-Dichloropropane	1.1E-09		1.1E-09	2.2E-09	1,1-Dichloroethene	Liver	1.4E-05		1.4E-04	1.6E-04
			Bromodichloromethane	1.0E-09		4.8E-10	1.5E-09	1,2-Dichloroethane	N/A	4.2E-06		1.4E-05	1.9E-05
			Carbon tetrachloride	2.2E-09		5.4E-09	7.6E-09	Bromodichloromethane	Kidney	6.3E-06		2.6E-05	3.3E-05
			Dibromochloromethane	1.4E-09		8.2E-10	2.2E-09	Carbon tetrachloride	Liver	1.8E-05		4.1E-04	4.3E-04
			Tetrachloroethene	8.7E-10		3.0E-09	3.9E-09	Dibromochloromethane	Liver	6.3E-07		3.4E-06	4.0E-06
			trans-1,3-Dichloropropene	1.7E-09		1.2E-09	2.8E-09	Tetrachloroethene	Liver	1.3E-06		4.0E-05	4.1E-05
			2,4,6-Trichlorophenol	1.8E-09		1.4E-08	1.5E-08	trans-1,3-Dichloropropene	Organs	4.2E-06		2.7E-05	3.1E-05
			3,3'-Dichlorobenzidine	7.5E-08		2.8E-07	3.6E-07	2,4-Dinitrotoluene	CNS	6.3E-04		2.1E-03	2.8E-03
			Benzo(a)anthracene	1.2E-07		3.0E-05	3.0E-05	2,6-Dinitrotoluene	WB	1.3E-04		2.8E-04	4.1E-04
			Benzo(a)pyrene	1.2E-06		5.0E-04	5.1E-04	2-Chlorophenol	Reproductive	2.5E-05		3.7E-04	4.0E-04
			Benzo(b)fluoranthene	1.2E-07		5.1E-05	5.1E-05	4,6-Dinitro-2-methylphenol	N/A	3.1E-02		2.5E-01	2.8E-01
			Benzo(k)fluoranthene	1.2E-08		1.2E-05	1.2E-05	Acenaphthylene	Body Weight	6.3E-05		5.5E-03	5.6E-03
			bis(2-Chloroethyl)ether	1.8E-07		5.8E-08	2.4E-07	bis(2-Ethylhexyl)phthalate	Liver	6.3E-05		2.9E-02	2.9E-02
			bis(2-Ethylhexyl)phthalate	2.3E-09		1.2E-07	1.2E-07	Dibenzofuran	Kidney	3.1E-04		4.1E-02	4.1E-02
			Carbazole	3.4E-09		2.6E-08	2.9E-08	Hexachlorobenzene	Liver	1.6E-03		8.4E-01	8.5E-01
			Chrysene	1.2E-09		3.0E-07	3.0E-07	Hexachlorobutadiene	Renal	6.3E-03		1.6E+00	1.6E+00
			Dibenz(a,h)anthracene	1.2E-06		1.4E-03	1.4E-03	Hexachloroethane	Kidney	1.3E-04		9.6E-03	9.7E-03
			Hexachlorobenzene	2.7E-07		1.5E-05	1.6E-05	Naphthalene	Body Weight	6.3E-05		3.3E-03	3.3E-03
			Hexachlorobutadiene	1.3E-08		3.6E-07	3.8E-07	Pentachlorophenol	Liver/Kidney	1.0E-04		7.7E-02	7.7E-02
			Hexachloroethane	2.3E-09		1.9E-08	2.1E-08	Aroclor-1016	Birth Weight	1.8E-03		3.1E+00	3.1E+00
			Indeno(1,2,3-cd)pyrene	1.2E-07		9.6E-05	9.6E-05	Aroclor-1254	Immune System	6.3E-03		1.1E+01	1.1E+01
			n-Nitroso-di-n-propylamine	1.2E-06		6.7E-08	1.2E-06	Heptachlor	Liver	1.3E-05		4.8E-04	4.9E-04
			n-Nitrosodiphenylamine	8.2E-10		7.2E-09	8.1E-09	Thallium	Liver	6.3E-03		2.4E-02	3.0E-02
			Pentachlorophenol	5.0E-08		3.9E-06	4.0E-06	(Total)		5.9E-02		1.7E+01	1.7E+01
			alpha-BHC	5.5E-09		1.1E-08	1.7E-08						
			Aroclor-1016	1.2E-09		2.2E-07	2.2E-07						
			Aroclor-1221	7.0E-08		1.3E-05	1.3E-05						
			Aroclor-1232	3.4E-08		6.2E-06	6.2E-06						
			Aroclor-1242	3.4E-08		6.2E-06	6.2E-06						
			Aroclor-1254	3.4E-08		6.2E-06	6.2E-06						

TABLE 9.5.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			beta-BHC	1.6E-09		3.4E-09	5.0E-09						
			Heptachlor	3.9E-09		1.5E-08	1.9E-08						
			Toxaphene	9.6E-10		9.7E-09	1.1E-08						
			(Total)	6.3E-06		2.2E-03	2.2E-03						
Sediment	Sediment	Drainage ditch south of runway	Arsenic	1.8E-08		1.4E-08	3.2E-08	Aluminum	CNS	6.5E-03		7.2E-03	1.4E-02
			4,4'-DDD	1.6E-11		7.6E-12	2.4E-11	Arsenic	Skin	2.8E-03		2.2E-03	5.0E-03
			4,4'-DDE	5.8E-12		2.8E-12	8.6E-12	4,4'-DDT	Liver	1.7E-05		7.8E-06	2.4E-05
			4,4'-DDT	4.0E-11		1.9E-11	5.9E-11	Aldrin	Liver	1.1E-04		2.5E-04	3.6E-04
			Aldrin	8.2E-10		1.8E-09	2.6E-09	alpha-Chlordane	Liver	5.4E-05		4.8E-05	1.0E-04
			alpha-Chlordane	1.4E-10		1.2E-10	2.5E-10	Dieldrin	Liver	1.1E-05		2.3E-05	3.4E-05
			Aroclor-1248	2.0E-09		3.4E-09	5.3E-09	gamma-Chlordane	Liver	4.7E-05		4.1E-05	8.8E-05
			Aroclor-1260	2.0E-09		3.4E-09	5.3E-09	Heptachlor epoxide	Liver	1.5E-04		2.3E-04	3.8E-04
			Dieldrin	1.2E-10		2.7E-10	3.9E-10	Antimony	Blood/WB	2.4E-03		1.3E-02	1.6E-02
			gamma-Chlordane	1.2E-10		1.0E-10	2.2E-10	Cadmium	Kidney	2.1E-03		2.3E-03	4.4E-03
			Heptachlor epoxide	2.5E-10		3.9E-10	6.4E-10	Chromium	NOAEL	4.4E-04		2.4E-03	2.8E-03
			1,2-Dibromoethane	1.2E-08		4.9E-09	1.7E-08	Copper	GI	2.4E-04		8.7E-05	3.2E-04
			Benzo(a)pyrene	3.8E-08		1.8E-07	2.2E-07	Iron	GI	4.2E-03		3.1E-03	7.3E-03
			Dibenz(a,h)anthracene	3.8E-08		1.8E-07	2.2E-07	Mercury	CNS	5.3E-04		6.5E-05	5.9E-04
			Hexachlorobenzene	8.4E-09		1.9E-08	2.7E-08	Hexachlorobenzene	Liver	4.6E-04		1.0E-03	1.5E-03
			n-Nitroso-di-n-propylamine	3.7E-08		1.6E-07	2.0E-07	(Total)		2.0E-02		3.2E-02	5.2E-02
			(Total)	1.6E-07		5.7E-07	7.2E-07						

TABLE 9.5.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
						Total Risk Across Groundwater	1.1E-03					Total Hazard Index Across All Media and All Exposure Routes	2.3E+01
						Total Risk Across Subsurface Soil	5.8E-06						
						Total Risk Across Surface Water	2.2E-03					Total Liver HI =	1.6E+00
						Total Risk Across Sediment	7.2E-07					Total CNS HI =	1.5E-01
						Total Risk Across All Media and All Exposure Routes	3.3E-03					Total Skin HI =	2.1E-02
												Total NOAEL HI =	8.9E-03
												Total GI HI =	2.8E-02
												Total Blood HI =	8.3E-02
												Total WB HI =	9.4E-02
												Total Kidney HI =	2.7E+00
												Total Eyes HI =	1.1E-03
												Total Reproductive HI =	4.7E+00
												Total Lungs/Respiratory HI =	1.9E-03
												Total Nasal HI =	9.4E-03
												Total Imune System HI =	1.3E+01

TABLE 9.6.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	alpha-Chlordane	2.9E-07		9.5E-07	1.2E-06						
			Aroclor-1248	1.7E-05		2.9E-04	3.1E-04						
			Dieldrin	7.9E-06		6.3E-06	1.4E-05						
			gamma-Chlordane	1.6E-07		5.2E-07	6.8E-07						
			Heptachlor epoxide	5.7E-06		2.1E-06	7.8E-06						
			Arsenic	2.0E-04		6.1E-07	2.0E-04						
			4,4'-DDD	1.8E-07		1.2E-06	1.4E-06						
			4,4'-DDE	1.9E-07		1.1E-06	1.2E-06						
			4,4'-DDT	2.6E-07		3.3E-06	3.6E-06						
			Aldrin	4.1E-06		3.0E-07	4.4E-06						
			Aroclor-1260	1.5E-05		2.6E-04	2.8E-04						
			1,1,2,2-Tetrachloroethane	1.5E-06		1.1E-07	1.6E-06						
			1,1,2-Trichloroethane	4.2E-07		1.9E-08	4.4E-07						
			1,1-Dichloroethene	4.5E-06		2.4E-07	4.7E-06						
			1,2-Dibromoethane	6.3E-04		1.1E-06	6.3E-04						
			1,2-Dichloroethane	6.8E-07		1.2E-08	6.9E-07						
			1,2-Dichloropropane	5.1E-07		2.6E-08	5.3E-07						
			Benzene	4.1E-07		2.6E-08	4.4E-07						
			Bromodichloromethane	4.6E-07		1.5E-08	4.8E-07						
			Bromoform	5.9E-08		2.6E-09	6.1E-08						
			Carbon tetrachloride	9.7E-07		1.7E-07	1.1E-06						
			Chloroform	4.5E-08		8.1E-09	5.3E-08						
			cis-1,3-Dichloropropene	7.4E-07		2.8E-08	7.7E-07						
			Dibromochloromethane	6.2E-07		3.0E-08	6.5E-07						
			Tetrachloroethene	3.9E-07		1.0E-07	4.9E-07						
			trans-1,3-Dichloropropene	7.4E-07		2.8E-08	7.7E-07						
			Vinyl chloride	2.9E-05		2.2E-07	3.0E-05						
			1,4-Dichlorobenzene	1.8E-06		6.1E-07	2.4E-06						
			2,4,6-Trichlorophenol	8.3E-07		5.8E-07	1.4E-06						
			3,3'-Dichlorobenzidine	3.4E-05		1.2E-05	4.6E-05						
			Benzo(a)anthracene	5.5E-05		1.3E-03	1.3E-03						
			Benzo(a)pyrene	5.5E-04		2.1E-02	2.2E-02						
			Benzo(b)fluoranthene	5.5E-05		2.2E-03	2.2E-03						

TABLE 9.6.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Benzo(k)fluoranthene	5.5E-06		5.1E-04	5.1E-04						
			bis(2-Chloroethyl)ether	8.3E-05		1.7E-06	8.5E-05						
			bis(2-Ethylhexyl)phthalate	1.1E-06		4.9E-06	6.0E-06						
			Carbazole	1.5E-06		9.7E-07	2.5E-06						
			Chrysene	5.5E-07		1.3E-05	1.3E-05						
			Dibenz(a,h)anthracene	5.5E-04		5.7E-02	5.8E-02						
			Hexachlorobenzene	1.2E-04		6.5E-04	7.7E-04						
			Hexachlorobutadiene	5.9E-06		1.5E-05	2.1E-05						
			Hexachloroethane	1.1E-06		8.1E-07	1.9E-06						
			Indeno(1,2,3-cd)pyrene	5.5E-05		4.1E-03	4.1E-03						
			n-Nitroso-di-n-propylamine	5.3E-04		5.9E-06	5.4E-04						
			Pentachlorophenol	2.3E-05		1.7E-04	1.9E-04						
			alpha-BHC	2.4E-06		4.6E-07	2.8E-06						
			Aroclor-1016	5.3E-07		9.2E-06	9.7E-06						
			Aroclor-1221	3.0E-05		5.2E-04	5.5E-04						
			Aroclor-1232	1.5E-05		2.6E-04	2.8E-04						
			Aroclor-1242	1.5E-05		2.6E-04	2.8E-04						
			Aroclor-1254	1.5E-05		2.6E-04	2.8E-04						
			Aroclor-1262	1.6E-05		2.8E-04	3.0E-04						
			Aroclor-1268	1.6E-05		2.8E-04	3.0E-04						
			Heptachlor	1.7E-06		6.2E-07	2.3E-06						
			Toxaphene	4.2E-05		3.9E-05	8.1E-05						
			(Total)	3.2E-03		9.0E-02	9.3E-02						

TABLE 9.6.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Upper Aquifer - Shower	1,1,2,2-Tetrachloroethane		9.4E-07		9.4E-07						
			1,1,2-Trichloroethane		2.6E-07		2.6E-07						
			1,1-Dichloroethene		8.2E-07		8.2E-07						
			1,2-Dibromoethane		3.6E-06		3.6E-06						
			1,2-Dichloroethane		4.3E-07		4.3E-07						
			Benzene		1.4E-07		1.4E-07						
			Bromoform		1.8E-08		1.8E-08						
			Carbon tetrachloride		2.5E-07		2.5E-07						
			Chloroform		3.8E-07		3.8E-07						
			cis-1,3-Dichloropropene		6.6E-08		6.6E-08						
			Tetrachloroethene		9.5E-09		9.5E-09						
			trans-1,3-Dichloropropene		6.6E-08		6.6E-08						
			Vinyl chloride		7.2E-08		7.2E-08						
			(Total)		7.0E-06		7.0E-06						
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	5.5E-07		2.7E-06	3.2E-06						
			2,3,7,8-TCDD TEQs	1.4E-09		2.6E-09	3.9E-09						
			4,4'-DDD	1.5E-09		2.1E-09	3.6E-09						
			4,4'-DDE	1.2E-09		1.6E-09	2.8E-09						
			4,4'-DDT	2.3E-09		3.1E-09	5.4E-09						
			Aldrin	5.3E-08		3.4E-07	3.9E-07						
			alpha-Chlordane	2.5E-08		6.3E-08	8.8E-08						
			Aroclor-1248	1.3E-07		6.3E-07	7.6E-07						
			Dieldrin	1.9E-07		1.2E-06	1.4E-06						
			gamma-Chlordane	2.4E-08		6.0E-08	8.4E-08						
			Heptachlor epoxide	8.4E-08		3.8E-07	4.6E-07						
			Arsenic	3.9E-06		9.0E-06	1.3E-05						
			1,2-Dibromoethane	7.3E-07		8.7E-07	1.6E-06						
			3,3'-Dichlorobenzidine	3.5E-07		2.2E-06	2.6E-06						
			Benzo(a)anthracene	5.7E-07		7.6E-06	8.2E-06						
			Benzo(a)pyrene	5.7E-06		7.6E-05	8.2E-05						
			bis(2-Chloroethyl)ether	8.6E-07		5.4E-06	6.3E-06						
			Dibenz(a,h)anthracene	5.7E-06		7.6E-05	8.2E-05						

TABLE 9.6.RME.UA
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Hexachlorobenzene	1.2E-06		7.9E-06	9.2E-06						
			Hexachlorobutadiene	6.1E-08		3.9E-07	4.5E-07						
			Indeno(1,2,3-cd)pyrene	5.7E-07		7.6E-06	8.2E-06						
			n-Nitroso-di-n-propylamine	5.5E-06		6.9E-05	7.5E-05						
			Pentachlorophenol	2.3E-07		1.8E-06	2.0E-06						
			Aroclor-1221	2.5E-07		1.3E-06	1.5E-06						
			Toxaphene	3.5E-07		2.2E-06	2.5E-06						
			(Total)	2.7E-05		2.7E-04	3.0E-04						
Surface Soil	Air	Emissions from soil south of runway	2,3,7,8-TCDD TEQs		1.0E-13		1.0E-13						
			4,4'-DDT		1.8E-13		1.8E-13						
			Aldrin		4.1E-12		4.1E-12						
			alpha-Chlordane		1.9E-12		1.9E-12						
			Aroclor-1248		9.9E-12		9.9E-12						
			Aroclor-1260		4.2E-11		4.2E-11						
			Dieldrin		1.5E-11		1.5E-11						
			gamma-Chlordane		1.8E-12		1.8E-12						
			Heptachlor epoxide		6.5E-12		6.5E-12						
			Arsenic		3.0E-09		3.0E-09						
			Cadmium		4.6E-09		4.6E-09						
			Chromium		1.3E-07		1.3E-07						
			bis(2-Chloroethyl)ether		6.6E-11		6.6E-11						
			Hexachlorobenzene		9.6E-11		9.6E-11						
			(Total)		1.4E-07		1.4E-07						
			Total Risk Across Groundwater				9.3E-02						N/A
			Total Risk Across Surface Soil				3.0E-04						
			Total Risk Across All Media and All Exposure Routes				9.3E-02						

Note: Risk equals sum of carcinogenic risks from Table 9.3.UA and Table 9.4.UA, adult and child carcinogenic risks.
However, dermal risk associated with groundwater is due to child exposure only, and inhalation risk associated with groundwater is due to adult exposure only.

TABLE 10.1.RME.UA
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	1.2E-07		1.0E-06	1.1E-06						
			Arsenic	8.6E-07		3.4E-06	4.2E-06						
			Benzo(a)anthracene	1.3E-07		2.8E-06	3.0E-06						
			Benzo(a)pyrene	1.3E-06		2.8E-05	3.0E-05						
			bis(2-Chloroethyl)ether	1.9E-07		2.0E-06	2.2E-06						
			Dibenz(a,h)anthracene	1.3E-06		2.8E-05	3.0E-05						
			Hexachlorobenzene	2.8E-07		3.0E-06	3.2E-06						
			Indeno(1,2,3-cd)pyrene	1.3E-07		2.8E-06	3.0E-06						
			n-Nitroso-di-n-propylamine	1.2E-06		2.6E-05	2.7E-05						
			(Total)	5.5E-06		9.7E-05	1.0E-04						
Surface Water	Surface Water	Drainage ditch south of runway	Aroclor-1248	5.4E-08		9.2E-05	9.2E-05	4,6-Dinitro-2-methylphenol	N/A	1.2E-02		9.2E-02	1.0E-01
			Aroclor-1260	3.4E-08		5.8E-05	5.8E-05	Hexachlorobenzene	Liver	5.9E-04		3.2E-01	3.2E-01
			1,2-Dibromoethane	1.4E-06		2.8E-07	1.7E-06	Hexachlorobutadiene	Renal	2.3E-03		6.1E-01	6.1E-01
			3,3'-Dichlorobenzidine	7.5E-08		2.6E-06	2.7E-06	Aroclor-1016	Birth Weight	6.7E-04		1.2E+00	1.2E+00
			Benzo(a)anthracene	1.2E-07		2.8E-04	2.8E-04	Aroclor-1254	Immune System	2.3E-03		4.1E+00	4.1E+00
			Benzo(a)pyrene	1.2E-06		4.7E-03	4.7E-03	(Total)		1.8E-02		6.2E+00	6.3E+00
			Benzo(b)fluoranthene	1.2E-07		4.8E-04	4.8E-04						
			Benzo(k)fluoranthene	1.2E-08		1.1E-04	1.1E-04						
			bis(2-Ethylhexyl)phthalate	2.3E-09		1.1E-06	1.1E-06						
			Chrysene	1.2E-09		2.8E-06	2.8E-06						
			Dibenz(a,h)anthracene	1.2E-06		1.3E-02	1.3E-02						
			Hexachlorobenzene	2.7E-07		1.4E-04	1.5E-04						
			Hexachlorobutadiene	1.3E-08		3.4E-06	3.4E-06						
			Indeno(1,2,3-cd)pyrene	1.2E-07		9.0E-04	9.0E-04						
			n-Nitroso-di-n-propylamine	1.2E-06		6.3E-07	1.8E-06						
			n-Nitrosodiphenylamine	8.2E-10		6.8E-08	6.9E-08						

TABLE 10.1.RME.UA
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Pentachlorophenol	5.0E-08		3.7E-05	3.7E-05						
			Aroclor-1016	1.2E-09		2.0E-06	2.0E-06						
			Aroclor-1221	7.0E-08		1.2E-04	1.2E-04						
			Aroclor-1232	3.4E-08		5.8E-05	5.8E-05						
			Aroclor-1242	3.4E-08		5.8E-05	5.8E-05						
			Aroclor-1254	3.4E-08		5.8E-05	5.8E-05						
			(Total)	6.1E-06		2.0E-02	2.0E-02						
						Total Risk Across Soil	1.0E-04					Total Hazard Index Across All Media and All Exposure Routes	6.3E+00
						Total Risk Across Surface Water	2.0E-02						
						cross All Media and All Exposure Routes	2.0E-02						

Total Kidney HI =	6.1E-01
Total Liver HI =	3.2E-01
Total Reproductive HI =	1.2E+00
Total Immune System HI =	4.1E+00

TABLE 10.2.RME.UA
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescents

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Drainage ditch south of runway	Aroclor-1248	3.3E-08		9.0E-05	9.0E-05	4,6-Dinitro-2-methylphenol	N/A	1.8E-02		1.9E-01	2.1E-01
			Aroclor-1260	2.0E-08		5.7E-05	5.7E-05	Hexachlorobenzene	Liver	8.9E-04		7.7E-01	7.7E-01
			1,2-Dibromoethane	8.6E-07		2.3E-07	1.1E-06	Hexachlorobutadiene	Renal	3.6E-03		1.5E+00	1.5E+00
			3,3'-Dichlorobenzidine	4.6E-08		2.6E-06	2.6E-06	Aroclor-1016	Birth Weight	1.0E-03		2.8E+00	2.8E+00
			Benzo(a)anthracene	7.4E-08		2.7E-04	2.7E-04	Aroclor-1254	Immune System	3.6E-03		9.9E+00	9.9E+00
			Benzo(a)pyrene	7.4E-07		4.6E-03	4.6E-03	(Total)		2.7E-02		1.5E+01	1.5E+01
			Benzo(b)fluoranthene	7.4E-08		4.7E-04	4.7E-04						
			Benzo(k)fluoranthene	7.4E-09		1.1E-04	1.1E-04						
			bis(2-Ethylhexyl)phthalate	1.4E-09		1.1E-06	1.1E-06						
			Chrysene	7.4E-10		2.7E-06	2.7E-06						
			Dibenz(a,h)anthracene	7.4E-07		1.3E-02	1.3E-02						
			Hexachlorobenzene	1.6E-07		1.4E-04	1.4E-04						
			Hexachlorobutadiene	7.9E-09		3.3E-06	3.3E-06						
			Indeno(1,2,3-cd)pyrene	7.4E-08		8.8E-04	8.8E-04						
			n-Nitroso-di-n-propylamine	7.1E-07		6.4E-07	1.4E-06						
			Pentachlorophenol	3.1E-08		3.6E-05	3.6E-05						
			Aroclor-1016	7.1E-10		2.0E-06	2.0E-06						
			Aroclor-1221	4.3E-08		1.2E-04	1.2E-04						
			Aroclor-1232	2.0E-08		5.7E-05	5.7E-05						
			Aroclor-1242	2.0E-08		5.7E-05	5.7E-05						
			Aroclor-1254	2.0E-08		5.7E-05	5.7E-05						
			(Total)	3.7E-06		2.0E-02	2.0E-02						
						Total Risk Across Surface Water	2.0E-02					Total Hazard Index Across All Media and All Exposure Routes	1.5E+01
						Total Risk Across All Media and All Exposure Routes	2.0E-02						

Total Kidney HI =	1.5E+00
Total Liver HI =	7.7E-01
Total Reproductive HI =	2.8E+00
Total Immune System HI =	9.9E+00

TABLE 10.3.RME.UA
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	Aroclor-1248	1.1E-05			1.1E-05	Arsenic	Skin	8.4E-01			8.4E-01
			Dieldrin	5.0E-06			5.0E-06	Iron	GI	7.0E-01			7.0E-01
			Heptachlor epoxide	3.6E-06			3.6E-06	2,4-Dinitrophenol	Eyes	1.7E-01			1.7E-01
			Arsenic	1.3E-04			1.3E-04	2,6-Dinitrotoluene	WB	1.4E-01			1.4E-01
			Aldrin	2.6E-06			2.6E-06	4,6-Dinitro-2-methylphenol	N/A	3.5E+00			3.5E+00
			Aroclor-1260	9.6E-06			9.6E-06	Hexachlorobenzene	Liver	1.7E-01			1.7E-01
			1,1-Dichloroethene	2.8E-06			2.8E-06	Hexachlorobutadiene	Renal	7.0E-01			7.0E-01
			1,2-Dibromoethane	4.0E-04			4.0E-04	Hexachloroethane	Kidney	1.4E-01			1.4E-01
			Vinyl chloride	3.4E-06			3.4E-06	Nitrobenzene	WB	2.8E-01			2.8E-01
			1,4-Dichlorobenzene	1.1E-06			1.1E-06	Aroclor-1016	Birth Weight	2.0E-01			2.0E-01
			3,3'-Dichlorobenzidine	2.2E-05			2.2E-05	Aroclor-1254	Immune System	7.0E-01			7.0E-01
			Benzo(a)anthracene	3.5E-05			3.5E-05	Thallium	Liver	6.8E-01			6.8E-01
			Benzo(a)pyrene	3.5E-04			3.5E-04	(Total)		8.2E+00			8.2E+00
			Benzo(b)fluoranthene	3.5E-05			3.5E-05						
			Benzo(k)fluoranthene	3.5E-06			3.5E-06						
			bis(2-Chloroethyl)ether	5.3E-05			5.3E-05						
			Dibenz(a,h)anthracene	3.5E-04			3.5E-04						
			Hexachlorobenzene	7.7E-05			7.7E-05						
			Hexachlorobutadiene	3.7E-06			3.7E-06						
			Indeno(1,2,3-cd)pyrene	3.5E-05			3.5E-05						
			n-Nitroso-di-n-propylamine	3.4E-04			3.4E-04						
			Pentachlorophenol	1.4E-05			1.4E-05						
			alpha-BHC	1.5E-06			1.5E-06						
			Aroclor-1221	1.9E-05			1.9E-05						
			Aroclor-1232	9.6E-06			9.6E-06						
			Aroclor-1242	9.6E-06			9.6E-06						
			Aroclor-1254	9.6E-06			9.6E-06						
			Aroclor-1262	1.0E-05			1.0E-05						
			Aroclor-1268	1.0E-05			1.0E-05						
			Heptachlor	1.1E-06			1.1E-06						
			Toxaphene	2.6E-05			2.6E-05						
			(Total)	2.0E-03			2.0E-03						

TABLE 10.3.RME.UA
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	1.6E-07		1.7E-06	1.8E-06	Aluminum	CNS	1.6E-02		1.1E-01	1.2E-01
			Arsenic	1.2E-06		5.6E-06	6.8E-06	Antimony	Blood/WB	1.2E-02		4.1E-01	4.2E-01
			3,3'-Dichlorobenzidine	1.1E-07		1.4E-06	1.5E-06	Chromium	NOAEL	1.2E-02		3.9E-01	4.0E-01
			Benzo(a)anthracene	1.7E-07		4.7E-06	4.9E-06	4,6-Dinitro-2-methylphenol	N/A	1.7E-02		1.1E-01	1.3E-01
			Benzo(a)pyrene	1.7E-06		4.7E-05	4.9E-05	(Total)		5.7E-02		1.0E+00	1.1E+00
			bis(2-Chloroethyl)ether	2.6E-07		3.4E-06	3.7E-06						
			Dibenz(a,h)anthracene	1.7E-06		4.7E-05	4.9E-05						
			Hexachlorobenzene	3.7E-07		4.9E-06	5.3E-06						
			Indeno(1,2,3-cd)pyrene	1.7E-07		4.7E-06	4.9E-06						
			n-Nitroso-di-n-propylamine	1.6E-06		4.3E-05	4.5E-05						
			Pentachlorophenol	6.8E-08		1.1E-06	1.2E-06						
			Toxaphene	1.0E-07		1.4E-06	1.5E-06						
			(Total)	7.6E-06		1.7E-04	1.7E-04						

Total Risk Across Groundwater	2.0E-03
Total Risk Across Surface Soil	1.7E-04
Total Risk Across All Media and All Exposure Routes	2.2E-03

Total Hazard Index Across All Media and All Exposure Routes	9.3E+00
Total Liver HI =	8.6E-01
Total CNS HI =	1.2E-01
Total Skin HI =	8.4E-01
Total NOAEL HI =	4.0E-01
Total GI HI =	7.0E-01
Total Blood HI =	4.2E-01
Total WB HI =	8.4E-01
Total Kidney HI =	8.4E-01
Total Eyes HI =	1.7E-01
Total Reproductive HI =	2.0E-01
Total Imune System HI =	7.0E-01

TABLE 10.4.RME.UA
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	alpha-Chlordane	1.1E-07		9.5E-07	1.1E-06	Dieldrin	Liver	4.2E-02		9.1E-02	1.3E-01
			Aroclor-1248	6.3E-06		2.9E-04	3.0E-04	Heptachlor epoxide	Liver	2.1E-01		2.1E-01	4.1E-01
			Dieldrin	2.9E-06		6.3E-06	9.2E-06	Aluminum	CNS	1.4E-01		4.7E-03	1.5E-01
			Heptachlor epoxide	2.1E-06		2.1E-06	4.2E-06	Arsenic	Skin	2.0E+00		1.6E-02	2.0E+00
			Arsenic	7.5E-05		6.1E-07	7.6E-05	Chromium	NOAEL	1.2E-01		1.9E-02	1.3E-01
			4,4'-DDD	6.7E-08		1.2E-06	1.3E-06	Iron	GI	1.6E+00		3.6E-02	1.7E+00
			4,4'-DDE	7.0E-08		1.1E-06	1.1E-06	4,4'-DDT	Liver	6.5E-03		2.3E-01	2.4E-01
			4,4'-DDT	9.5E-08		3.3E-06	3.4E-06	Antimony	Blood/WB	1.8E-01		2.9E-02	2.0E-01
			Aldrin	1.5E-06		3.0E-07	1.8E-06	1,1,2-Trichloroethane	Blood	8.0E-03		1.0E-03	9.0E-03
			Aroclor-1260	5.6E-06		2.6E-04	2.7E-04	2,4-Dinitrophenol	Eyes	4.1E-01		1.3E-02	4.2E-01
			1,1-Dichloroethene	1.6E-06		2.4E-07	1.9E-06	2,4-Dinitrotoluene	CNS	1.6E-01		1.2E-02	1.8E-01
			1,2-Dibromoethane	2.3E-04		1.1E-06	2.3E-04	2,6-Dinitrotoluene	WB	3.3E-01		1.6E-02	3.4E-01
			Vinyl chloride	2.6E-05		2.2E-07	2.6E-05	4,6-Dinitro-2-methylphenol	N/A	8.1E+00		1.5E+00	9.6E+00
			1,4-Dichlorobenzene	6.7E-07		6.1E-07	1.3E-06	bis(2-Ethylhexyl)phthalate	Liver	1.6E-02		2.1E-01	2.2E-01
			3,3'-Dichlorobenzidine	1.3E-05		1.2E-05	2.5E-05	Dibenzofuran	Kidney	8.2E-02		2.7E-01	3.6E-01
			Benzo(a)anthracene	2.0E-05		1.3E-03	1.3E-03	Hexachlorobenzene	Liver	4.1E-01		6.0E+00	6.4E+00
			Benzo(a)pyrene	2.0E-04		2.1E-02	2.1E-02.	Hexachlorobutadiene	Renal	1.6E+00		1.1E+01	1.3E+01
			Benzo(b)fluoranthene	2.0E-05		2.2E-03	2.2E-03	Hexachloroethane	Kidney	3.3E-01		6.7E-01	1.0E+00
			Benzo(k)fluoranthene	2.0E-06		5.1E-04	5.1E-04	Nitrobenzene	WB	6.5E-01		5.2E-02	7.0E-01
			bis(2-Chloroethyl)ether	3.1E-05		1.7E-06	3.2E-05	Pentachlorophenol	Liver and Kidney	2.7E-02		5.4E-01	5.6E-01
			bis(2-Ethylhexyl)phthalate	3.9E-07		4.9E-06	5.3E-06	Aroclor-1016	Birth Weight	4.7E-01		2.2E+01	2.2E+01
			Carbazole	5.6E-07		9.7E-07	1.5E-06	Aroclor-1254	Immune System	3.2E-03		7.6E+01	7.6E+01
			Chrysene	2.0E-07		1.3E-05	1.3E-05	Heptachlor	Liver	1.6E+00		3.2E-03	1.6E+00
			Dibenz(a,h)anthracene	2.0E-04		5.7E-02	5.8E-02	Thallium	Liver	1.6E+00		3.4E-02	1.6E+00
			Hexachlorobenzene	4.5E-05		6.5E-04	7.0E-04	(Total)		2.0E+01		1.2E+02	1.4E+02
			Hexachlorobutadiene	2.2E-06		1.5E-05	1.7E-05						
			Hexachloroethane	3.9E-07		8.1E-07	1.2E-06						
			Indeno(1,2,3-cd)pyrene	2.0E-05		4.1E-03	4.1E-03						
			n-Nitroso-di-n-propylamine	2.0E-04		5.9E-06	2.0E-04						
			Pentachlorophenol	8.4E-06		1.7E-04	1.7E-04						
			alpha-BHC	8.8E-07		4.6E-07	1.3E-06						

TABLE 10.4.RME.UA
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Aroclor-1016	2.0E-07		9.2E-06	9.4E-06						
			Aroclor-1221	1.1E-05		5.2E-04	5.4E-04						
			Aroclor-1232	5.6E-06		2.6E-04	2.7E-04						
			Aroclor-1242	5.6E-06		2.6E-04	2.7E-04						
			Aroclor-1254	5.6E-06		2.6E-04	2.7E-04						
			Aroclor-1262	6.0E-06		2.8E-04	2.9E-04						
			Aroclor-1268	6.0E-06		2.8E-04	2.9E-04						
			Heptachlor	6.2E-07		6.2E-07	1.2E-06						
			Toxaphene	1.5E-05		3.9E-05	5.5E-05						
			(Total)	1.2E-03		9.0E-02	9.1E-02						
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	3.8E-07		1.0E-06	1.4E-06	Aluminum	CNS	1.5E-01		2.6E-01	4.1E-01
			Arsenic	2.7E-06		3.4E-06	6.1E-06	Antimony	Blood/WB	1.2E-01		9.9E-01	1.1E+00
			3,3'-Dichlorobenzidine	2.5E-07		8.4E-07	1.1E-06	Cadmium	Kidney	7.7E-02		1.3E-01	2.1E-01
			Benzo(a)anthracene	4.0E-07		2.8E-06	3.2E-06	Chromium	NOAEL	1.1E-01		9.4E-01	1.1E+00
			Benzo(a)pyrene	4.0E-06		2.8E-05	3.2E-05	Copper	GI	2.1E-01		1.2E-01	3.3E-01
			bis(2-Chloroethyl)ether	6.0E-07		2.0E-06	2.6E-06	Iron	GI	8.3E-02		9.5E-02	1.8E-01
			Dibenz(a,h)anthracene	4.0E-06		2.8E-05	3.2E-05	Arsenic	Skin	7.0E-02		9.0E-02	1.6E-01
			Hexachlorobenzene	8.7E-07		3.0E-06	3.8E-06	4,6-Dinitro-2-methylphenol	N/A	1.6E-01		2.6E-01	4.2E-01
			Indeno(1,2,3-cd)pyrene	4.0E-07		2.8E-06	3.2E-06	Hexachlorobutadiene	Renal	3.2E-02		1.1E-01	1.4E-01
			n-Nitroso-di-n-propylamine	3.8E-06		2.6E-05	3.0E-05	(Total)		1.0E+00		3.0E+00	4.0E+00
			Toxaphene	2.4E-07		8.2E-07	1.1E-06						
			(Total)	1.8E-05		1.0E-04	1.2E-04						

Total Risk Across Groundwater	9.1E-02
Total Risk Across Surface Soil	1.2E-04
Total Risk Across All Media and All Exposure Routes	9.1E-02
Total Hazard Index Across All Media and All Exposure Routes	1.4E+02

TABLE 10.4.RME.UA
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
												Total Liver HI =	1.1E+01
												Total CNS HI =	7.3E-01
												Total Skin HI =	2.1E+00
												Total NOAEL HI =	1.2E+00
												Total GI HI =	2.2E+00
												Total Blood HI =	1.3E+00
												Total WB HI =	2.4E+00
												Total Kidney HI =	1.5E+01
												Total Eyes HI =	4.2E-01
												Total Reproductive HI =	2.2E+01
												Total Imune System HI =	7.6E+01

TABLE 10.5.RME.UA
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Excavation Pit	Aroclor-1248			3.5E-06	3.5E-06	4,6-Dinitro-2-methylphenol	N/A			1.2E-01	1.2E-01
			Aroclor-1260			3.2E-06	3.2E-06	Hexachlorobenzene	Liver			4.3E-01	4.3E-01
			Benzo(a)anthracene			1.5E-05	1.5E-05	Hexachlorobutadiene	Renal			8.3E-01	8.3E-01
			Benzo(a)pyrene			2.6E-04	2.6E-04	Aroclor-1016	Birth Weight			1.6E+00	1.6E+00
			Benzo(b)fluoranthene			2.6E-05	2.6E-05	Aroclor-1254	Immune System			2.2E+00	2.2E+00
			Benzo(k)fluoranthene			6.1E-06	6.1E-06	(Total)				5.2E+00	5.2E+00
			Dibenz(a,h)anthracene			7.1E-04	7.1E-04						
			Hexachlorobenzene			7.9E-06	7.9E-06						
			Indeno(1,2,3-cd)pyrene			4.9E-05	4.9E-05						
			Pentachlorophenol			2.0E-06	2.0E-06						
			Aroclor-1221			6.3E-06	6.3E-06						
			Aroclor-1232			3.2E-06	3.2E-06						
			Aroclor-1242			3.2E-06	3.2E-06						
			Aroclor-1254			3.2E-06	3.2E-06						
			Aroclor-1262			3.4E-06	3.4E-06						
			Aroclor-1268			3.4E-06	3.4E-06						
			(Total)			1.1E-03	1.1E-03						
Surface Water	Surface Water	Drainage ditch south of runway	Aroclor-1248	5.7E-09		9.8E-06	9.8E-06	4,6-Dinitro-2-methylphenol	N/A	3.1E-02		2.5E-01	2.8E-01
			Aroclor-1260	3.6E-09		6.2E-06	6.2E-06	Hexachlorobenzene	Liver	1.6E-03		8.4E-01	8.5E-01
			1,2-Dibromoethane	1.4E-06		3.0E-08	1.5E-06	Hexachlorobutadiene	Renal	6.3E-03		1.6E+00	1.6E+00
			Benzo(a)anthracene	1.2E-07		3.0E-05	3.0E-05	Aroclor-1016	Birth Weight	1.8E-03		3.1E+00	3.1E+00
			Benzo(a)pyrene	1.2E-06		5.0E-04	5.1E-04	Aroclor-1254	Immune System	6.3E-03		1.1E+01	1.1E+01
			Benzo(b)fluoranthene	1.2E-07		5.1E-05	5.1E-05	(Total)		4.7E-02		1.7E+01	1.7E+01
			Benzo(k)fluoranthene	1.2E-08		1.2E-05	1.2E-05						
			Dibenz(a,h)anthracene	1.2E-06		1.4E-03	1.4E-03						
			Hexachlorobenzene	2.7E-07		1.5E-05	1.6E-05						
			Indeno(1,2,3-cd)pyrene	1.2E-07		9.6E-05	9.6E-05						
			n-Nitroso-di-n-propylamine	1.2E-06		6.7E-08	1.2E-06						
			Pentachlorophenol	5.0E-08		3.9E-06	4.0E-06						
			Aroclor-1221	7.0E-08		1.3E-05	1.3E-05						

TABLE 10.5.RME.UA
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Aroclor-1232	3.4E-08		6.2E-06	6.2E-06						
			Aroclor-1242	3.4E-08		6.2E-06	6.2E-06						
			Aroclor-1254	3.4E-08		6.2E-06	6.2E-06						
			(Total)	5.9E-06		2.2E-03	2.2E-03						

Total Risk Across Groundwater	1.1E-03
Total Risk Across Surface Water	2.2E-03
Total Risk Across All Media and All Exposure Routes	3.3E-03

Total Hazard Index Across All Media and All Exposure Routes	2.2E+01
Total Liver HI =	1.3E+00
Total Kidney HI =	2.5E+00
Total Reproductive HI =	4.7E+00
Total Imune System HI =	1.3E+01

TABLE 10.6.RME.UA
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Upper Aquifer - Tap Water	Aroclor-1248	1.7E-05		2.9E-04	3.1E-04						
			Dieldrin	7.9E-06		6.3E-06	1.4E-05						
			Heptachlor epoxide	5.7E-06		2.1E-06	7.8E-06						
			Arsenic	2.0E-04		6.1E-07	2.0E-04						
			Aldrin	4.1E-06		3.0E-07	4.4E-06						
			Aroclor-1260	1.5E-05		2.6E-04	2.8E-04						
			1,1-Dichloroethene	4.5E-06		2.4E-07	4.7E-06						
			1,2-Dibromoethane	6.3E-04		1.1E-06	6.3E-04						
			Vinyl chloride	2.9E-05		2.2E-07	3.0E-05						
			1,4-Dichlorobenzene	1.8E-06		6.1E-07	2.4E-06						
			3,3'-Dichlorobenzidine	3.4E-05		1.2E-05	4.6E-05						
			Benzo(a)anthracene	5.5E-05		1.3E-03	1.3E-03						
			Benzo(a)pyrene	5.5E-04		2.1E-02	2.2E-02						
			Benzo(b)fluoranthene	5.5E-05		2.2E-03	2.2E-03						
			Benzo(k)fluoranthene	5.5E-06		5.1E-04	5.1E-04						
			bis(2-Chloroethyl)ether	8.3E-05		1.7E-06	8.5E-05						
			Dibenz(a,h)anthracene	5.5E-04		5.7E-02	5.8E-02						
			Hexachlorobenzene	1.2E-04		6.5E-04	7.7E-04						
			Hexachlorobutadiene	5.9E-06		1.5E-05	2.1E-05						
			Hexachloroethane	3.9E-07		8.1E-07	1.2E-06						
			Indeno(1,2,3-cd)pyrene	5.5E-05		4.1E-03	4.1E-03						
			n-Nitroso-di-n-propylamine	5.3E-04		5.9E-06	5.4E-04						
			Pentachlorophenol	2.3E-05		1.7E-04	1.9E-04						
			alpha-BHC	2.4E-06		4.6E-07	2.8E-06						
			Aroclor-1016	2.0E-07		9.2E-06	9.4E-06						
			Aroclor-1221	3.0E-05		5.2E-04	5.5E-04						
			Aroclor-1232	1.5E-05		2.6E-04	2.8E-04						
			Aroclor-1242	1.5E-05		2.6E-04	2.8E-04						
			Aroclor-1254	1.5E-05		2.6E-04	2.8E-04						
			Aroclor-1262	1.6E-05		2.8E-04	3.0E-04						
			Aroclor-1268	1.6E-05		2.8E-04	3.0E-04						
			Heptachlor	1.7E-06		6.2E-07	2.3E-06						
			Toxaphene	4.2E-05		3.9E-05	8.1E-05						
			(Total)	3.2E-03		9.0E-02	9.3E-02						

TABLE 10.6.RME.UA
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
MCAS Cherry Point, OU6 Site 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface soil south of runway	Aroclor-1260	5.5E-07		2.7E-06	3.2E-06						
			Arsenic	3.9E-06		9.0E-06	1.3E-05						
			3,3'-Dichlorobenzidine	3.5E-07		2.2E-06	2.6E-06						
			Benzo(a)anthracene	5.7E-07		7.6E-06	8.2E-06						
			Benzo(a)pyrene	5.7E-06		7.6E-05	8.2E-05						
			bis(2-Chloroethyl)ether	8.6E-07		5.4E-06	6.3E-06						
			Dibenz(a,h)anthracene	5.7E-06		7.6E-05	8.2E-05						
			Hexachlorobenzene	1.2E-06		7.9E-06	9.2E-06						
			Indeno(1,2,3-cd)pyrene	5.7E-07		7.6E-06	8.2E-06						
			n-Nitroso-di-n-propylamine	5.5E-06		6.9E-05	7.5E-05						
			Toxaphene	3.5E-07		2.2E-06	2.5E-06						
			(Total)	2.5E-05		2.7E-04	2.9E-04						
						Total Risk Across Groundwater	9.3E-02						N/A
						Total Risk Across Surface Soil	2.9E-04						
						Total Risk Across All Media and All Exposure Routes	9.3E-02						

Note: Risk equals sum of carcinogenic risks from Table 10.3.UA and Table 10.4.UA, adult and child carcinogenic risks.
However, dermal risk associated with groundwater is due to child exposure only, and inhalation risk associated with groundwater is due to adult exposure only.

Appendix G.2
Uncertainty Evaluation

Appendix G.3
Generation of Fugitive Dust during Construction Activities

APPENDIX G.3

GENERATION OF FUGITIVE DUST DURING CONSTRUCTION ACTIVITIES

Generation of Fugitive Dust During Construction Activities

Three types of activities have the potential to generate fugitive dust during potential future construction at Cherry Point, OU6 Site 12:

1. Traffic over unpaved surfaces`
2. Excavation of soil
3. Movement of soil (creation/destruction of temporary soil piles)

Fugitive dust generation during each type of activity is described as follows. The only time fugitive dust generation is expected to occur is during the site preparation and excavation phase. This period was assumed to be 8 weeks in duration.

Traffic Over Unpaved Surfaces During Construction Period

The following equation, from USEPA 1989, was used to estimate fugitive dust emissions during the site preparation and excavation period:

$$E = k\ (1.7)\ (s/12)\ (S/48)\ (W/2.7)^{0.7}\ (w/4)^{0.5}\ ((365-p)/p)$$

where:

E = emission rate (kg/vehicle kilometer traveled (VKT))
k = particle size multiplier
s = percent silt content
S = mean vehicle speed (km/hour)
W = mean vehicle weight (Mg)
w = mean number of wheels per vehicle
p = mean number of days/year with >= 0.01 inches of precipitation

A particle size multiplier of 0.5 was used to estimate the emission of particles smaller than 15 um in diameter, the largest particle size assumed to be inhalable. The percent silt content was assumed to be 25%. The mean vehicle speed was assumed to be 8 km/hour (5 mph), a mean vehicle weight of 22.6 Mg (25 tons) was estimated, and the average number of wheels per vehicle was 10. The estimated mean number of days with greater than or equal to 0.01

inches of precipitation per year at the site was 125 (Figure 21 from USEPA 1989). If it assumed 241 vehicle kilometers (150 miles) will be traveled on site during the site preparation and excavation period. Substituting these assumptions into the equation, the estimated emission rate of particles is 0.0397 kg/VKT. This will result in a fugitive dust emission of 9.6 kg during the construction period. Assuming the construction period is 8 weeks, the construction workers work 5 days a week and 8 hours each day, the fugitive dust emission rate is 0.03 kg/hour.

Excavation of Soil

It is expected that a bulldozer will be used to excavate soil at the site. The equation used to estimate particulate emissions due to excavation is from Table 25 in USEPA 1989:

$$E = 0.45\ (s)^{1.5}\ (M)^{-1.4}$$

where:

E = emission factor (kg/hr)

s = silt content

M = percent moisture

A silt content of 25% was used. A soil moisture content of 7.9% was assumed. Substitution of these values into the equation yields an estimated fugitive dust emission rate of 1.97 kg/hour.

Removal and Replacement of Soil

Fugitive dust emission is expected to occur during the removal and replacement of soil during excavation and site landscaping. This can be estimated using an equation developed to predict dust emissions from aggregate storage piles, for material loaded onto a pile, disturbances by strong winds, and loadout from the pile:

$$E = k\ (0.0016)\ (U/2.2)^{1.3}\ (M/2)^{-1.4}$$

where:

E = emission factor (kg/Mg)

k = particle size multiplier

U = mean wind speed (m/sec)

M = percent moisture

The particle size multiplier used was 0.48, corresponding to particles smaller than 15 mm. A soil moisture content of 7.9% was used. A mean wind speed of 0.45 m/sec (1 mph) was assumed based on conservative values. Substitution of these values into the equation yields an estimated fugitive dust emission rate of 0.009 kg/Mg of soil moved. Assuming that 0.5 Mg soil are moved per day, the emission rate is then 0.0045 kg/day, or 0.00056 kg/hour.

Total Fugitive Dust Emission Rate from all Sources

To estimate the total fugitive dust emission rate, the emission rates from all sources were added:

fugitive dust emission rate due to traffic	0.03 kg/hour
fugitive dust emission rate due to excavation	1.97 kg/hour
fugitive dust emission rate due soil piles	0.00056 kg/hour
total fugitive dust emission rate	2.0 kg/hour
	0.00056 kg/sec

Dispersion of Dusts throughout Site

A modified near-field box model was used to calculate the fugitive dust concentration in air. The concentration was estimated using the following equation (Horst, 1979):

$$PC = E / (W\ H\ m)$$

where:

PC = ambient air particulate concentration (kg/m^3)

E = particulate emission rate (kg/sec)

W = width of box in crosswind dimension (m)

H = downwind height of box (m)

m = average wind speed through box (m/sec)

The downwind height of the box, H, is determined by the downwind distance and the atmospheric turbulence at ground level, as follows:

$$z = 6.25\ r\ [(H/r)\ \ln(H/r) - 1.58(H/r) + 1.58]$$

where:

z = downwind distance to boundary (m)

r = terrain-dependent roughness height (m)

An r value of 4 cm was chosen (Table 5.1, Brutsaert, 1982), and a z value and W value of 220 m were chosen. H was calculated as 9 m. A mean wind speed of 0.45 m/sec (1 mph) was estimated based on conservative values. Using the calculated particulate emission rate of 0.00055 kg/sec, a particulate concentration of 6.24E-07 kg/m^3 was calculated.

References

Brutsaert, W., 1982. *Evaporation into the Atmosphere, Theory, History, and Applications*. D. Reidel Publishing Company, Boston.

Horst, T.W., 1979. Lagrangian Similarity Modeling of Vertical Diffusion from a Ground Level Source. Journal of Applied Meteorology, 18:733-740.

USEPA, 1989. *Air Superfund National Technical Guidance Study Series Volume III - Estimation of Air Emissions from Cleanup Activities at Superfund Sites*. Interim Final. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. EPA-450/1-89-003. January 1989.

Appendix G.4
Lead Model Results

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
door AIR Pb Conc: 30.0 percent of outdoor.
ner AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc; 1.20 ug Pb/L
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	84.0	200.0
1-2	84.0	200.0
2-3	84.0	200.0
3-4	84.0	200.0
4-5	84.0	200.0
5-6	84.0	200.0
6-7	84.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

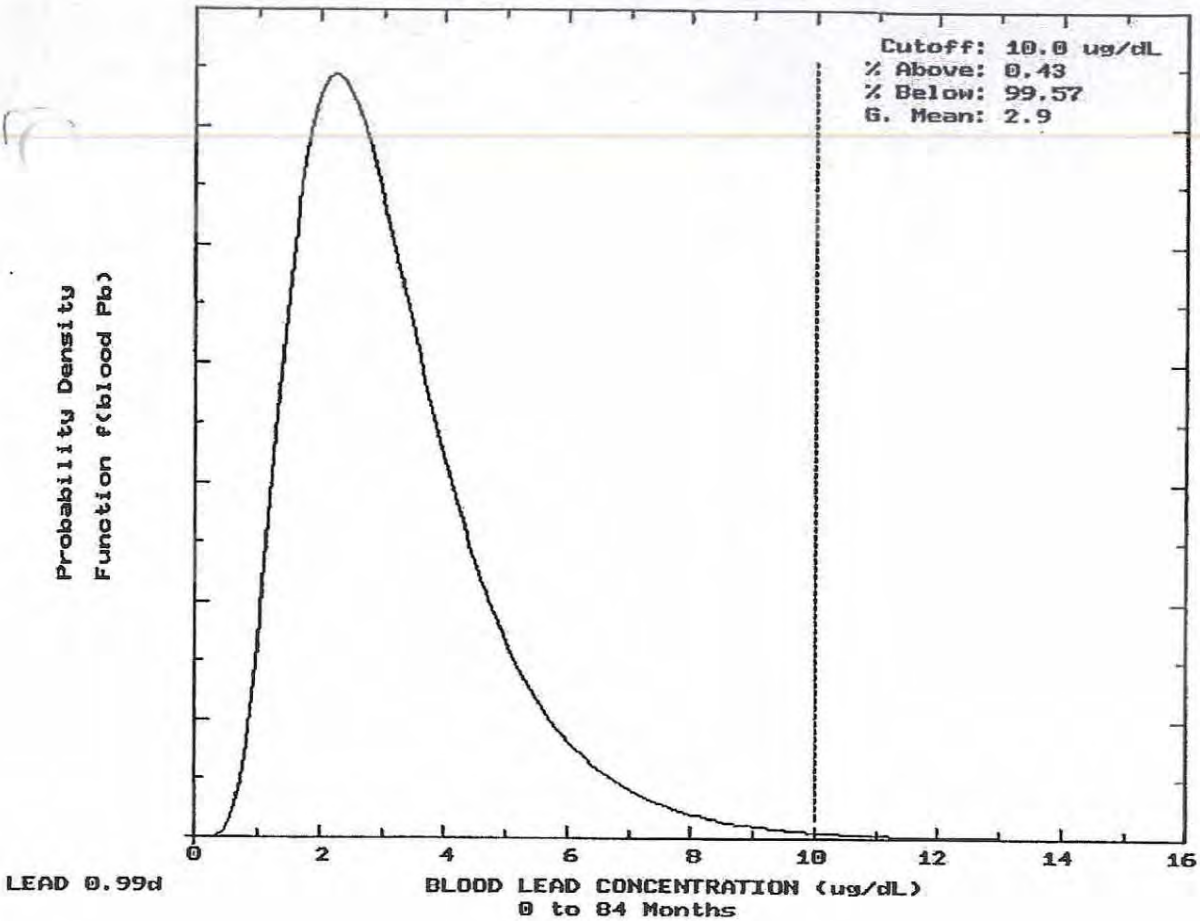
MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	3.4	6.22	3.51
1-2:	3.6	8.55	5.55
2-3:	3.3	8.99	5.60
3-4:	3.2	8.97	5.66
4-5:	2.7	7.53	4.26
5-6:	2.3	7.34	3.85
6-7:	2.1	7.47	3.65

AR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.58	0.11	0.00	0.02
1-2:	2.68	0.28	0.00	0.03
2-3:	3.04	0.29	0.00	0.06

3-4:	2.95	0.30	0.00	0.07
4-5:	2.88	0.32	0.00	0.07
5-6:	3.06	0.34	0.00	0.09
6-7:	3.39	0.34	0.00	0.09


Cutoff: 10.0 ug/dL
% Above: 0.43
% Below: 99.57
G. Mean: 2.9
Probability Density
Function f(blood Pb)
0
2
4
6
8
10
12
14
16
LEAD 0.99d
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 84 Months