N96095.AR 000483
NWIRP CALVERTON NY
5090.3a

Phase 2
Remedial Investigation and Focused Feasibility Study
for
Site 1 - Northeast Pond Disposal Area

Naval Weapons Industrial Reserve Plant
Calverton, New York

Engineering Field Activity Northeast
Naval Facilities Engineering Command
Contract Number N62472-90-D-1298
Contract Task Orders 0189 and 0270

February 2002

TETRA TECH NUS, INC.

040111/P

PHASE 2
REMEDIAL INVESTIGATION AND FOCUSED FEASIBILITY STUDY
FOR
SITE 1 - NORTHEAST POND DISPOSAL AREA

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
CALVERTON, NEW YORK

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Engineering Field Activity Northeast
Environmental Branch, Code EV
Naval Facilities Engineering Command
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CONTRACT TASK ORDERS 0189 AND 0270

FEBRUARY 2002

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ACRONYMS AND ABBREVIATIONS

AL	action level
ARAR	applicable or relevant and appropriate requirements
AWQC	ambient water quality criteria
AWQS	ambient water quality standard
BDAT	best-demonstrated available technology
bgs	below ground surface
BTAG	Biological Technical Assistance Group
CAA	Clean Air Act
CAMU	corrective action management unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
CMS	Corrective Measures Study
COC	chain-of-custody, chemical of concern
COPC	chemical of potential concern
CRDL	Contract Required Detection Limit
CRQL	contract required quantification limit
CSF	Cancer Slope Factor
CTO	Contract Task Order
CWA	Clean Water Act
cy	cubic yards
dL	deciliter
DO	dissolved oxygen
DOE	U.S. Department of Energy
DOH	Department of Health
DOT	Department of Transportation
DPT	direct push technology
ECL	Environmental Conservation Law
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
FFS	Focused Feasibility Study
FS	Feasibility Study
FWS	U.S. Fish and Wildlife Service

GC	gas chromatography
GOCO	government-owned-contractor-operated
HASP	health and safety plan
HDPE	high-density polyethylene
HHRA	human health risk assessment
HI	hazard index
HNUS	Halliburton NUS Corporation
HQ	hazard quotient
hr	hour
IAS	Initial Assessment Study
ICP	Inductively Coupled Plasma
ICR	incremental cancer risk
IDL	instrument detection limit
IEUBK	Integrated Exposure Uptake Biokinetic
IR	Installation Restoration
IRIS	Integrated Risk Information System
kg	kilogram
L	liter
lb	pound
LCV	least chronic value
LDR	land disposal restriction
LOAEL	lowest-observed-adverse effect level
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDL	method detection limit
MF	modifying factor
mg	milligram
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NAVFAC	Naval Facilities Engineering Command
NEPA	National Environmental Policy Act
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NOAEL	no-observed-adverse effect level
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
NTU	nephelometric turbidity unit
NWIRP	Naval Weapons Industrial Reserve Plant

NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
PA	Preliminary Assessment
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
POC	principal organic contaminant
POL	petroleum, oils, and lubricants
POTW	publicly owned treatment works
PPE	personal protective equipment
PRG	Preliminary Remediation Goal
PVC	polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RfD	Reference Dose
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
RPD	relative percent difference
SDWA	Safe Drinking Water Act
SI	Site Investigation
SOP	Standard Operating Procedure
SPDES	State Pollutant Discharge Elimination System
SSL	soil screening level
STARS	Spill Technology and Remediation Series
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target Analyte List
TBC	to be considered
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure

TDS	total dissolved solids
TIC	tentatively identified compound
TOGS	Technical and Operation Guidance Series
TRC	Technical Review Committee
TSD	treatment, storage, and disposal
TtNUS	Tetra Tech NUS, Inc.
TU	temporary unit
UF	uncertainty factor
UOC	unspecified organic contaminant
USDOI	U.S. Department of the Interior
VOC	volatile organic compound
µg	microgram

EXECUTIVE SUMMARY

This Phase 2 Remedial Investigation (RI) and Focused Feasibility Study (FFS) report has been prepared for the Department of the Navy, Engineering Field Activity Northeast Facilities Engineering Command by Tetra Tech NUS, Inc. (TtNUS), under Contract Task Orders (CTOs) 0189 (FFS) and 0270 (RI). This report summarizes the results of the Phase 2 RI and FFS for Site 1 – Northeast Pond Disposal Area at the Naval Weapons Industrial Reserve Plant (NWIRP) located in Calverton, New York.

The purpose of the RI is to characterize the nature and extent of contamination and estimate potential risks to human health and the environment. The Phase 2 RI serves as a supplemental report to the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report and Addendum for NWIRP Calverton, New York [Halliburton NUS Corporation (HNUS), 1995a and 1995b]. Phase 2 RI activities were conducted to fill data gaps from the previous investigations. The purpose of the FFS is to develop and evaluate potential remedial alternatives that address the risks identified in the Phase 1 RFI and Phase 2 RI.

The NWIRP Calverton facility is both a state Superfund site and a RCRA site. This report encompasses both state Superfund and RCRA requirements.

SITE DESCRIPTION

Site 1 is located approximately 1,000 feet south of Middle County Road (NY Route 25) and 0.95 mile east of the north gate. The site consists of a relatively flat borrow and disposal area that covers approximately 2 acres. The apparent disposal area is approximately 400 feet by 200 feet and is oriented south-southwest to north-northeast. The surface of the disposal area slopes gently from west-southwest to east followed by a steep 15- to 20-foot drop to the adjacent marsh/pond surface (Northeast Pond). The majority of the disposal area is covered with soil. There is a small area of exposed demolition debris, such as concrete chunks, wood scraps, and metal pieces, on the embankment at the south edge of the fill area.

Northeast Pond was glacially formed and is approximately 2.3 acres in size. The pond has no outlet. Based on observed water levels in soil borings, the surface water elevation approximates the local groundwater elevation. The center of the pond is covered by a thick marsh growth that forms an island. The pond and disposal area are surrounded by woodlands, except for a long, thin clearing leading west from the southwest corner of the disposal area.

Until 1984, Site 1 was used primarily for the disposal of demolition debris, such as concrete, brick, wood, and other construction materials. Other materials reportedly disposed include aircraft sections, junked aircraft assembly tooling, office materials and furniture, pallets, and paint cans. Waste materials were reportedly placed in low areas near the eastern edge of the pond. Clean fill material was then excavated from the hillside located along the western and northern edges of the disposal area, creating an embankment up to 8 feet high in the hillside. The excavated material was used to cover the waste. Hazardous materials are not known to have been purposefully disposed in the area. However, it is reported that any of the following materials may be present at the site: petroleum, oils, and lubricants (POL), asphalt paving materials, halogenated and non-halogenated solvents, and paint sludges.

A final soil cover was placed over the disposal area in 1984. A buried drum was encountered during the RFI test pit program (HNUS, 1995a). This drum and some contaminated soil were excavated, placed in an overpack container, and disposed off site in the spring of 1995. Confirmation sampling was not conducted. No other remedial actions have been conducted.

PREVIOUS INVESTIGATIONS

An RFI was conducted in 1994 and 1995 to determine the nature and extent of contamination (HNUS, 1995a and 1995b).

In general, volatile organic compounds (VOCs) were detected sporadically and at relatively low concentrations in the soil and fill material. Semivolatile organic compounds (SVOCs) including polynuclear aromatic hydrocarbons (PAHs), pesticides, and polychlorinated biphenyls (PCBs) were detected throughout the fill material. Metals including chromium, copper, lead, nickel, silver, and zinc were detected in a portion of the fill at concentrations approximately 100 to 1,000 times above background concentrations. Other metals were also detected at concentration above background concentrations. Some of the fill material (at one location) could be classifiable as a characteristic hazardous waste for chromium. The extent of contaminated soil (fill) was adequately defined in the RFI. The estimated areal extent of fill material is approximately 70,000 square feet (1.6 acres). At an average depth of 8 feet, the estimated volume of fill is 21,000 cubic yards (cy).

Groundwater testing during the RFI found aldrin and other pesticides, PCBs, hexavalent chromium, lead, mercury, and zinc at concentrations above federal and state drinking water standards and/or state groundwater quality standards. However, it was suspected that the detected chemicals resulted from fill intrusion into the well and did not reflect mobile groundwater contamination. Consequently, additional groundwater testing was conducted during the Phase 2 RI.

Testing of surface water from Northeast Pond only found 4,4'-DDD and iron at concentrations that exceeded state surface water quality standards. The extent of surface water contamination was adequately characterized and was limited to the area closest to the landfill, which is also the location of the most contaminated sediment.

Testing of sediment in Northeast Pond found 4,4'-DDD and other pesticides, PCBs, PAHs, lead, and other metals at concentrations that exceed state sediment screening criteria for protection of aquatic life. Based on the similarity between chemicals found in the fill material and sediment, it is likely that chemicals in the landfill have migrated into the pond sediment. Pesticides were detected throughout the upper 6 inches of sediment; however, contamination was also found at deeper locations (up to 1 foot) near the landfill. The horizontal extent of contamination was adequately defined during the RFI and is approximately 17,750 square feet (0.4 acre). However, the vertical extent of contamination needed to be better defined (see Phase 2 RI).

PHASE 2 RI

The following Phase 2 field investigation activities were conducted in 1997 to fill data gaps for Site 1:

- Test pits were installed in the location of a possible former trench located west of Site 1 that was identified on aerial photographs to determine whether disposal activities had occurred there. No waste was encountered.

- Three temporary monitoring wells were installed downgradient of the former buried drum that contained chlorinated solvents. Groundwater samples were collected at two depths and analyzed for VOCs, which were not detected.

- One intermediate depth monitoring well was installed in the landfill, and two shallow monitoring wells were installed downgradient of the landfill. Two rounds of groundwater samples were collected from all permanent wells using a low-flow sampling method and analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. Two VOCs were detected at concentrations above state groundwater quality standards in the intermediate well, with one VOC being detected in each sampling round. Sampling of the shallow wells indicated that iron, manganese, and thallium were detected at concentrations above state groundwater quality standards. The detections of thallium are not expected to be site related because this metal was not detected in soil, surface water, or sediment samples. The Phase 2 results confirmed that many of the chemicals detected during the RFI were false positives.

- Pond sediment samples were collected at 12 to 24 inches depth and analyzed for SVOCs, pesticides, PCBs, and metals. The types of chemicals that were found in the deepest sediment samples are

generally similar to those found in the shallowest sediment samples collected during the RFI. In most cases, the concentrations decrease with depth.

- Samples of benthic organisms were collected from the pond and analyzed. The results of this investigation did not indicate adverse impacts from contaminated surface water and sediment. The diversity of feeding groups suggests a normally functioning ecological community.

SITE RISKS

A human health risk assessment was conducted during the RFI and used data generated in 1994 and 1995. The risk assessment was not revised based on the additional data collected in 1997. The risk assessment concluded that the current conditions at Site 1 do not pose unacceptable carcinogenic or noncarcinogenic risks. The evaluated receptors include maintenance workers and adolescent recreations users. Residential exposure to soil and groundwater was also evaluated. The risks from exposure to soil were within the target risk range. The majority of the cancer and noncancer risks were from exposure to groundwater. The primary risk drivers were aldrin, dieldrin, PCBs, arsenic, manganese, and thallium. It should be noted that aldrin, dieldrin, and PCBs were not detected in groundwater samples collected in 1997, and arsenic was only detected in one groundwater sample collected in 1997. In addition, the detections of thallium are suspected to be false positives. Therefore, the risk estimate for groundwater would be much lower based on 1997 data.

An ecological risk assessment was conducted during the RFI and was expanded based on data collected during the Phase 2 RI. Chemicals detected in surface water that may potentially cause risks to ecological receptors include 4,4'-DDD, aluminum, cadmium, and iron. Toluene, phenolics, pesticides, PCBs, cadmium, lead, nickel, and silver in sediment would represent potential ecological risk. For surface soil on the landfill cover, chromium and PCBs represent a potential ecological risk. Although the potential for ecological risks from exposure to pond water and sediment has been identified, the results of a benthic macroinvertebrate investigation did not indicate adverse impacts.

The concentrations of several chemicals detected in soil, groundwater, and surface water exceeded state guidance or regulatory requirements. Chemicals detected in soil at concentrations higher than state guidance include 1,1-dichloroethane, benzo(a)pyrene, and several metals. Chemicals detected in groundwater at concentrations higher than state groundwater quality standards include 1,1-dichloroethane, 1,1,1-trichloroethane, iron, manganese, and thallium. Chemicals detected in surface water at concentrations higher than state surface water quality standards include 4,4'-DDD and iron.

REMEDIAL ALTERNATIVES

A limited number of remedial alternatives was developed to address landfill waste and soil and sediment contamination. Separate alternatives for surface water and groundwater were not developed. Contaminated surface water is believed to only be associated with contaminated sediment and does not represent a separate contaminated medium. Therefore, remediation of the contaminated sediment should also address the contaminated surface water. Groundwater contaminants include VOCs, iron, manganese, and thallium. The VOC and thallium detected do not significantly exceeded preliminary remediation goals (PRGs), and it is suspected that the detections of thallium are not site related. Thallium was detected in the upgradient well and downgradient wells, and it was not detected in other site media. The VOCs were only detected in one well, and the concentrations exceeded PRGs in one of two sampling rounds. It is anticipated that remedial actions for the source of contamination (waste and soil) will also address groundwater contamination.

Alternative 1 is the No Action alternative included to serve as a baseline against which other alternatives could be compared. There are no costs associated with this alternative.

Alternative 2 is a containment alternative that includes bank stabilization and capping. Regrading of the site, including the steep slopes adjacent to Northeast Pond, would be conducted to ensure a final stable grade for cap placement. Contaminated sediment from Northeast Pond would be removed, dewatered (or otherwise stabilized), and placed on top of, or consolidated within, the regraded landfill. A cap system with an impermeable geosynthetic membrane would be constructed on top of the regraded landfill and the area would be revegetated. Institutional controls would be implemented to restrict future site development and groundwater use. Long-term monitoring would be conducted to confirm the effectiveness of the remedy and whether there have been releases to groundwater from the capped landfill. The estimated net present worth (30-year) for Alternative 2 is $2,505,000.

Alternative 3 is a removal alternative. All landfill material, contaminated soil, and contaminated sediment would be excavated and transported off site for disposal. The landfill area would not be backfilled but would be returned to approximate pre-fill conditions and revegetated. Long-term monitoring would not be required because the sources of contamination would be removed. However, short-term monitoring would be conducted to evaluate source removal on groundwater quality. If groundwater quality does not improve, groundwater use restrictions would need to be implemented. The estimated net present worth for Alternative 3 is $6,329,000.

1.0 INTRODUCTION

1.1 PURPOSE

The Northern Division of the Naval Facilities Engineering Command (NAVFAC) has issued Contract Task Order (CTO) Numbers 0270 and 0189 to Tetra Tech NUS, Inc. (TtNUS) under the Comprehensive Long-Term Environment Action Navy (CLEAN) Contract N62472-90-D-1298 to perform a Phase 2 Remedial Investigation (RI) and Focused Feasibility Study (FFS) for Site 1 – Northeast Pond Disposal Area at the Naval Weapons Industrial Reserve Plant (NWIRP) located in Calverton, New York.

This work is part of the Navy's Installation Restoration (IR) Program, which is designed to identify contamination of Navy and Marine Corps lands and facilities resulting from past operations and to institute remedial actions as necessary. There are four distinct stages. Stage 1 is the Preliminary Assessment (PA), which was formerly known as the Initial Assessment Study (IAS). Stage 2 is a Resource Conservation and Recovery Act (RCRA) Facility Assessment-Sampling Visit (RFA), also referred to as a Site Investigation (SI), that augments information collected in the PA. Stage 3 is the RCRA Facility Investigation (RFI) and Corrective Measures Study (CMS), also referred to as an RI and Feasibility Study (FS) or FFS, that characterizes the contamination at a facility and develops options for remediation of the site. Stage 4 is the Corrective Action, also referred to as the Remedial Action, which results in the control or cleanup of contamination at sites. This report has been prepared under Stage 3 and serves as a supplemental report to the RFI Report and Addendum for NWIRP Calverton, New York [Halliburton NUS Corporation (HNUS), 1995a; HNUS, 1995b].

This report specifically addresses Site 1, the Northeast Pond Disposal Area. Based on the test results presented in this and previous reports (see Section 1.5), the nature and extent of contamination at this site have been adequately characterized. Therefore, the remediation process can proceed to the FS step, which is also included in this report. Additional data collection would be conducted under the Remedial Action stage, as required.

In addition to Site 1, Phase 2 RI testing and FS evaluations are continuing at several other IR sites. The results from the investigations and evaluations at the other sites have been or will be presented in supplemental Phase 2 RI and/or FS reports.

This Phase 2 RI and FFS, which is analogous to a Phase 2 RFI and CMS, was conducted in accordance with the requirements of the New York State Department of Environmental Conservation (NYSDEC) Division of Solid & Hazardous Materials Part 373 Permit that was issued to the Navy on April 18, 2000 under the NYSDEC implementing regulations [6 New York Codes, Rules, and Regulations (NYCRR) Part

621]. This permit supercedes and replaces the original Part 373 Permit to Operate a Hazardous Waste Storage Facility that was issued to then Grumman Aerospace Corporation on March 25, 1992. The new permit, issued only to the Department of the Navy, deals exclusively with those Solid Waste Management Units (SWMUs) that remain on the former NWIRP Calverton property and any Corrective Actions that may be required to adequately address each IR site. Although the Part 373 Permit is the enforceable document governing the Navy's remedial actions, the NYSDEC State Superfund group, located in the Albany office, retains primary responsibility for regulatory oversight of the Navy's actions. As such, the Navy has agreed to a request made by the NYSDEC State Superfund group to utilize terminology associated with the NYSDEC State Superfund program which is closely related to the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program. The CERCLA terminology that is to be used parallels the RCRA terminology, and the implementation phases of each have been determined to meet the substantive requirements of both programs and will also satisfy the Corrective Action requirements set forth in Module III of the Part 373 permit.

The area is listed as Classification 2 in the NYSDEC Registry of Inactive Waste Disposal Sites.

1.2 FACILITY LOCATION

Site 1 – Northeast Pond Disposal Area, is located within the confines of NWIRP Calverton, Suffolk County, New York (see Figure 1-1 and Figure 1-2). NWIRP Calverton is located on Long Island approximately 70 miles east of New York City. The facility is located within the municipality of Riverhead.

Prior to 1996, NWIRP Calverton was a government-owned-contractor-operated (GOCO) facility that was operated by the Northrop Grumman Corporation. The facility had an overall area of approximately 6,000 acres, of which 3,000 acres lie entirely within a fenced boundary. The majority of the industrial activity was confined to the south-central portion of the fenced area.

Currently, NWIRP Calverton consists of four separate parcels of land totaling approximately 358 acres. Eight Navy IR sites are included within these parcels as follows (see Figure 1-2).

<u>Parcel A (32 acres)</u>

Site 2 – Fire Training Area

<u>Parcel B1 (40 acres)</u>

Site 6A – Fuel Calibration Area

Site 10B – Engine Test House

Parcel B2 (131 acres)

Southern Area

Parcel C (10 acres)

Site 7 – Fuel Depot

Site 10A – Jet Fuel Systems Laboratory

Parcel D (145 acres)

Site 1 – Northeast Pond Disposal Area

Site 9 – ECM Area

1.3 FACILITY HISTORY

NWIRP Calverton has been owned by the U.S. Department of the Navy since the early 1950s, when the land was purchased from a number of private owners. The facility was expanded in 1958 through additional purchases of privately owned land. Northrop Grumman Corporation (previously Grumman Corporation) leased the land and was the sole operator of the facility from its construction until February 1996. In 1996, the land was returned to the Navy.

In September 1998, the majority of the land within the developed section of the facility was transferred to the Town of Riverhead for redevelopment. Because of the need for additional environmental investigation and the potential need for remediation, the Navy retained four parcels of land listed above within the developed section. These four parcels and associated Navy IR Sites are presented on Figure 1-2.

In September 1999, 2,935 acres of undeveloped land outside the fenced areas was transferred to NYSDEC who will continue to manage the property for resource conservation and recreational uses. An additional 140 acres of the northwest buffer zone was transferred to the Department of Veterans Affairs and will be used for expansion of the Calverton National Cemetery.

NWIRP Calverton was constructed in the early 1950s for use in the development, assembly, testing, refitting, and retrofitting of naval combat aircraft. The facility supported aircraft design and production at the Northrop Grumman's Bethpage facility, which is located in Nassau County, New York.

The majority of industrial activity at NWIRP Calverton was confined to the developed area in the center and south center of the facility between the two runways. Industrial activities were related to the manufacturing and assembly of aircraft and aircraft components. Operations that resulted in hazardous waste generation included, but were not limited to, metal finishing processes, such as metal cleaning and

electroplating, other maintenance operations, temporary storage of hazardous waste, fueling operations, and various training operations. The painting of aircraft and components resulted in additional waste generation.

1.4 SURFACE WATER HYDROLOGY

The majority of the NWIRP Calverton is located within the Peconic River drainage basin. The eastward-flowing Peconic River is located approximately 1,300 feet south of the facility at its closest point. The Peconic River discharges to Peconic Bay located 8.5 stream miles from the facility.

Surface water hydrology is illustrated on Figure 1-3. Major surface water features near the facility include McKay Lake and Northeast Pond (see Figure 1-2). McKay Lake is a man-made groundwater recharge basin located north of River Road, midway along the southern site border. Northeast Pond is located at the northeast corner of the facility. Several small drainage basins exist near the Fuel Calibration Area (Runway Ponds). All of these surface water features are land locked, with the exception of McKay Lake, which has an intermittent discharge to Swan Pond, located 1,500 feet to the south of NWIRP Calverton. Overland flow from the drainage basins to the Peconic River may also occur periodically.

A number of small wetlands exist on the Calverton facility. The U.S. Department of the Interior (USDOI), Fish and Wildlife Department classifies the western half of the 2-acre Northeast Pond as palustrine, forested/scrub/shrub/emergent wetland. The drainage basins are classified as palustrine, scrub/shrub/emergent wetland (USDOI, 1980).

1.5 PREVIOUS INVESTIGATIONS

Previous investigations at the site consisted of the following:

- IAS (Navy, 1986)
- SI (HNUS, 1992a)
- Hazard Ranking System Preliminary Scoring and Site Inspection Report Form (HNUS, 1992b)
- RFI (HNUS, 1995a)
- RFI Addendum (HNUS, 1995b)

This report has been prepared as an addendum to the NWIRP Calverton RFI reports issued in 1995, (HNUS, 1995a; HNUS, 1995b). The RFI reports concluded that additional testing was necessary to confirm the nature and extent of contamination at several sites, including Site 1 – Northeast Pond Disposal Area.

The Phase 2 RI testing program was presented in the Phase 2 RCRA Facility Investigation Field Sampling Plan (C.F. Braun, 1997) and incorporates comments from the NYSDEC, New York State Department of Health (DOH), The Nature Conservancy, Suffolk County Department of Health Services, and U.S. Environmental Protection Agency (EPA).

1.6 SUMMARY OF FIELD ACTIVITIES

Field activities conducted during the Phase 2 RI are summarized as follows. A detailed description of field activities is presented in Section 3.0 of this report.

- Pond sediment sampling and analysis for semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), metals, and benthic macroinvertebrates.
- Temporary monitoring well installation with groundwater sampling and analysis for volatile organic compounds (VOCs).
- Permanent monitoring well installation.
- Groundwater sampling using low-flow sample techniques and analysis for VOCs, SVOCs, pesticides, PCBs, and metals.

1.7 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) SAMPLES

The environmental samples were analyzed by Volumetric (48-hour turnaround time; groundwater only for limited VOCs) and Quanterra, Inc. [28-day turnaround for Target Compound List (TCL) VOCs, TCL SVOCs, TCL pesticides, TCL PCBs, and Target Analyte List (TAL) metals]. Analytical results, analytical methods, and data qualifiers are presented in Appendix A.

The Volumetric data were evaluated based on trip blank contamination. The findings of the site-wide evaluation are presented below. Because of the limited number of field quality assurance/quality control (QA/QC) samples and because the analytical method used was gas chromatography (GC), the data are considered usable only for screening purposes. The following VOCs were detected in the trip blanks at the concentrations indicated:

COC No.	Compound	Concentration (µg/L)	Action Level (µg/L)	Samples Affected
12	1,1-Dichloroethane	2.6	13	None
13	1,1-Dichloroethane	0.74	3.7	None
18	Benzene	0.54	2.7	None
18	Toluene	1.42	14.2	None
18	Ethylbenzene	0.53	2.65	JF-GW 16-20 JF-GW 16-35
19	Chloroform	0.72	3.6	JF-DUP-08

NOTE:
JF designations indicate samples collected at the Jet Fuel System Laboratory. The results of this investigation will be detailed in a subsequent RI report but will be used in this report as relevant.

The results of this evaluation did not find significant evidence of blank contamination with Volumetric test results for Site 1. On a facility-wide basis, several chemicals were detected in the trip blanks. However, 1,1-dichloroethane, benzene, and toluene were not detected in samples associated with these trip blanks. Positive results for ethylbenzene and chloroform in the samples shown above are at concentrations below the action levels and are considered false positives. Therefore, positive results for these compounds in the affected samples were struck out and qualified as artifacts of contamination, "B."

A more detailed evaluation of the data from Quanterra was conducted. Associated with these sample results are more extensive field QA/QC samples and detailed documentation of laboratory procedures. This data evaluated addresses only samples collected at Site 1 during the Phase 2 RI. Data evaluation included a review of laboratory and field QC samples and field duplicate results.

Evaluation of laboratory and field QC blanks was performed to aid in the elimination of false positive results identified as laboratory or field artifacts. Acetone was detected in a field ambient blank (labeled as a "field poured trip blank" on the chain-of-custody [COC] form). However, acetone was not detected in any of the associated field samples. No other VOCs, SVOCs, or pesticides/PCBs were detected in any of the laboratory or field QC blanks associated with Site 1. However, it is likely that the results for bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, and diethyl phthalate reported for groundwater and sediment samples collected at Site 1 are false positives. These chemicals are plasticizers used in gloves and other sample and analysis equipment and are commonly found in blanks.

It should be noted that thallium was detected in several groundwater samples collected at Site 1 in June 1997 at concentrations ranging from 3.3 to 6.7 micrograms per liter (µg/L). The detection limit was 2.7 µg/L). A review of the QA/QC data indicates that thallium was also detected in 6 of 13 laboratory and

field QC blanks associated with the June 1997 sampling event at concentrations ranging from 2.9 to 4.0 µg/L. Therefore, it appears that the results reported for thallium in groundwater from the June 1997 sampling event might be false positives. However, based on strict EPA Region 2 data validation guidelines, these results are not considered blank artifacts and are, therefore, included in the tables and figures included in Section 2.0. Thallium was detected at concentrations of 3.7 and 5.8 µg/L in two of the seven groundwater samples collected during the November 1997 sampling event. However, thallium was not detected in any of the QA/QC blanks associated with the November 1997 samples. In addition, the EPA Region 4 Office of Toxic Substances issued an alert on January 31, 2001 that use of the Inductively Coupled Plasma (ICP) analytical method for water samples may result in false positive detections of thallium above the drinking water standard. The ICP method was used for analysis of thallium in groundwater samples collected in 1997.

Field duplicate samples were collected from groundwater and sediment samples at Site 1. Field duplicate precision was evaluated by determining the relative percent difference (RPD) between field duplicate results. The criteria used for evaluation were limits of 30 percent RPD for water samples and 50 percent RPD for sediment samples, with the exception of metals results that were less than two times the Contract Laboratory Program (CLP) Contract Required Detection Limit (CRDL) used for reporting. In these cases, the criterion was the difference between field duplicate results was less than the CRDL. Results for aluminum and iron in groundwater sample NP-MW03 were qualified as estimated, "J," based on field duplicate results that exceed QC criteria.

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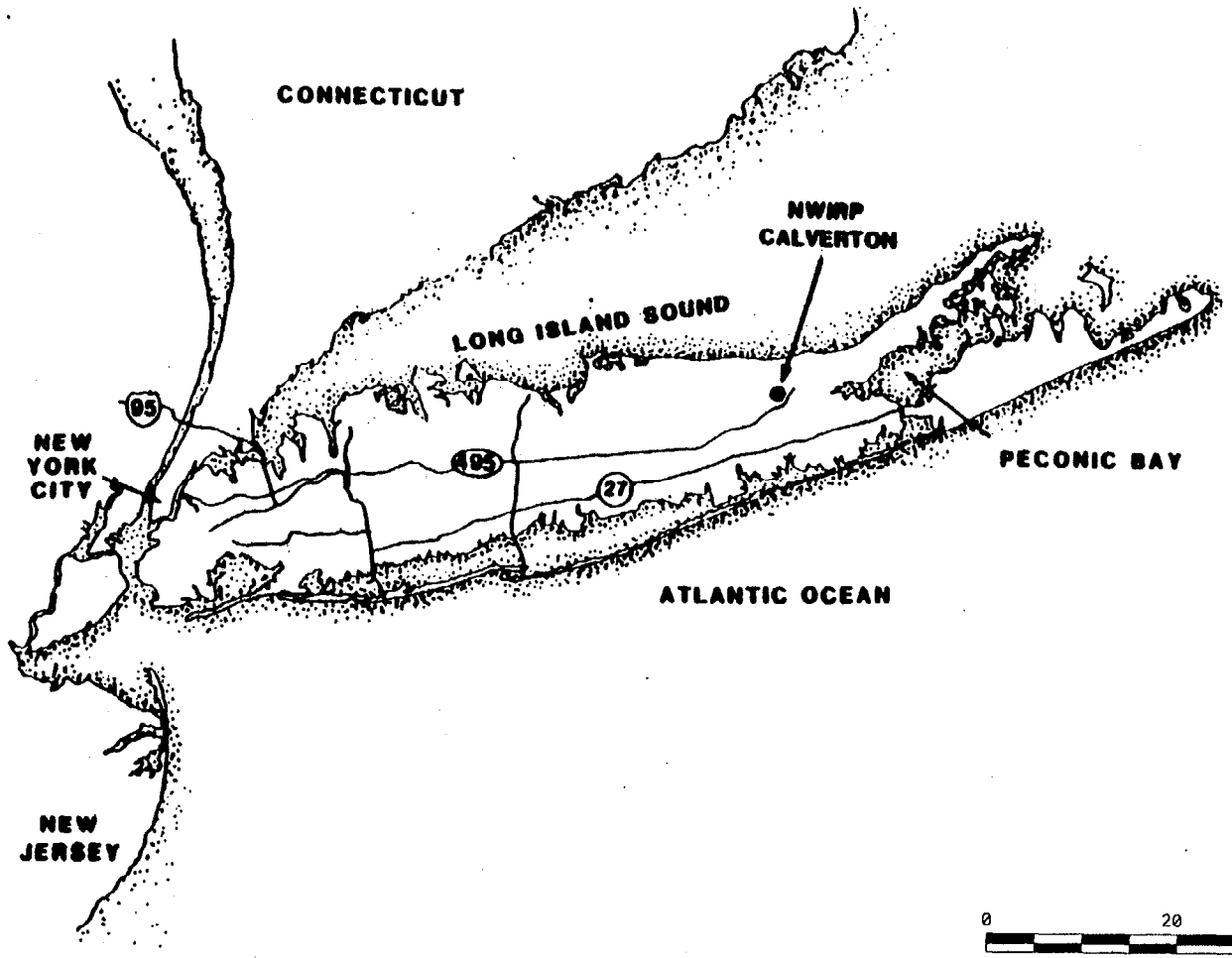

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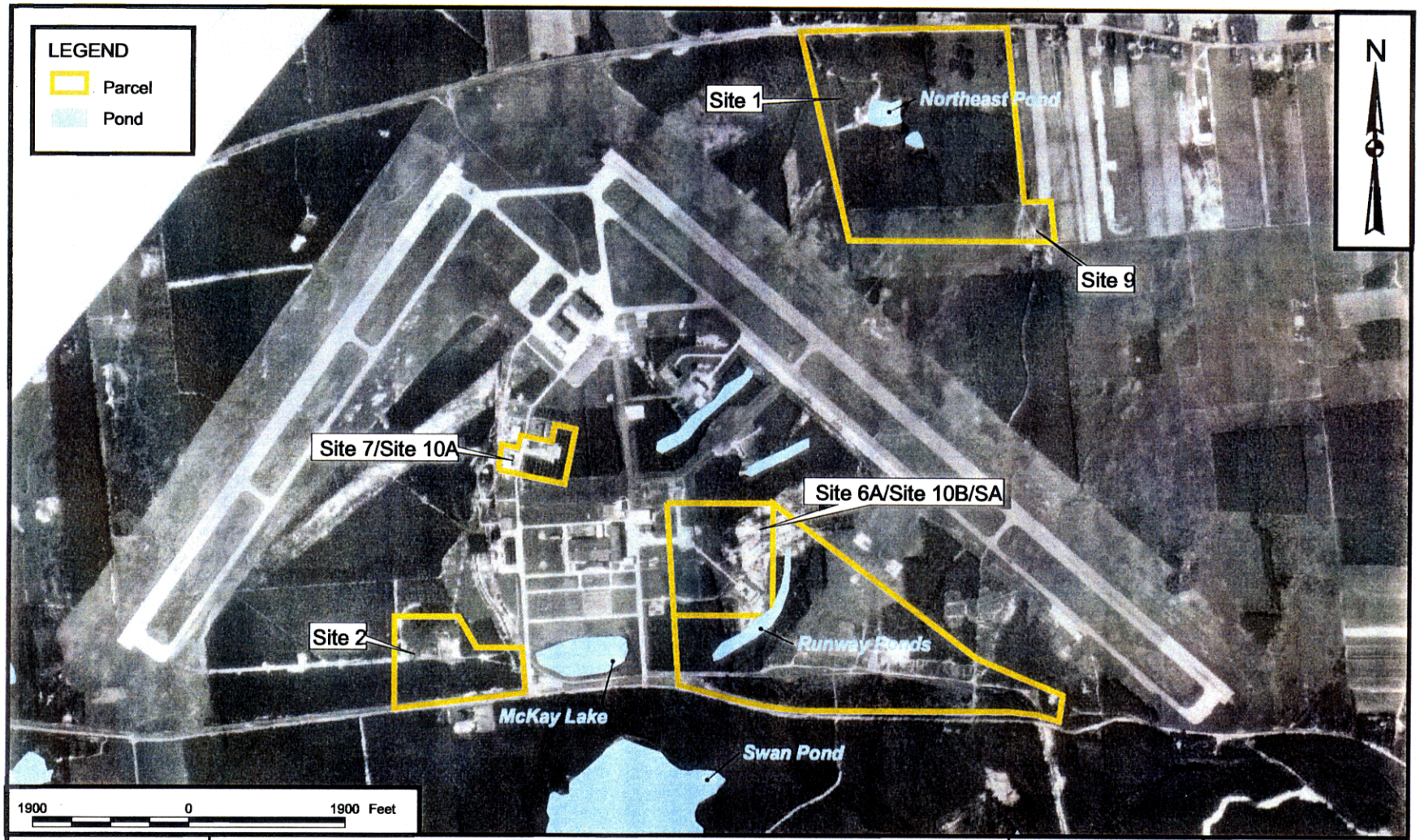

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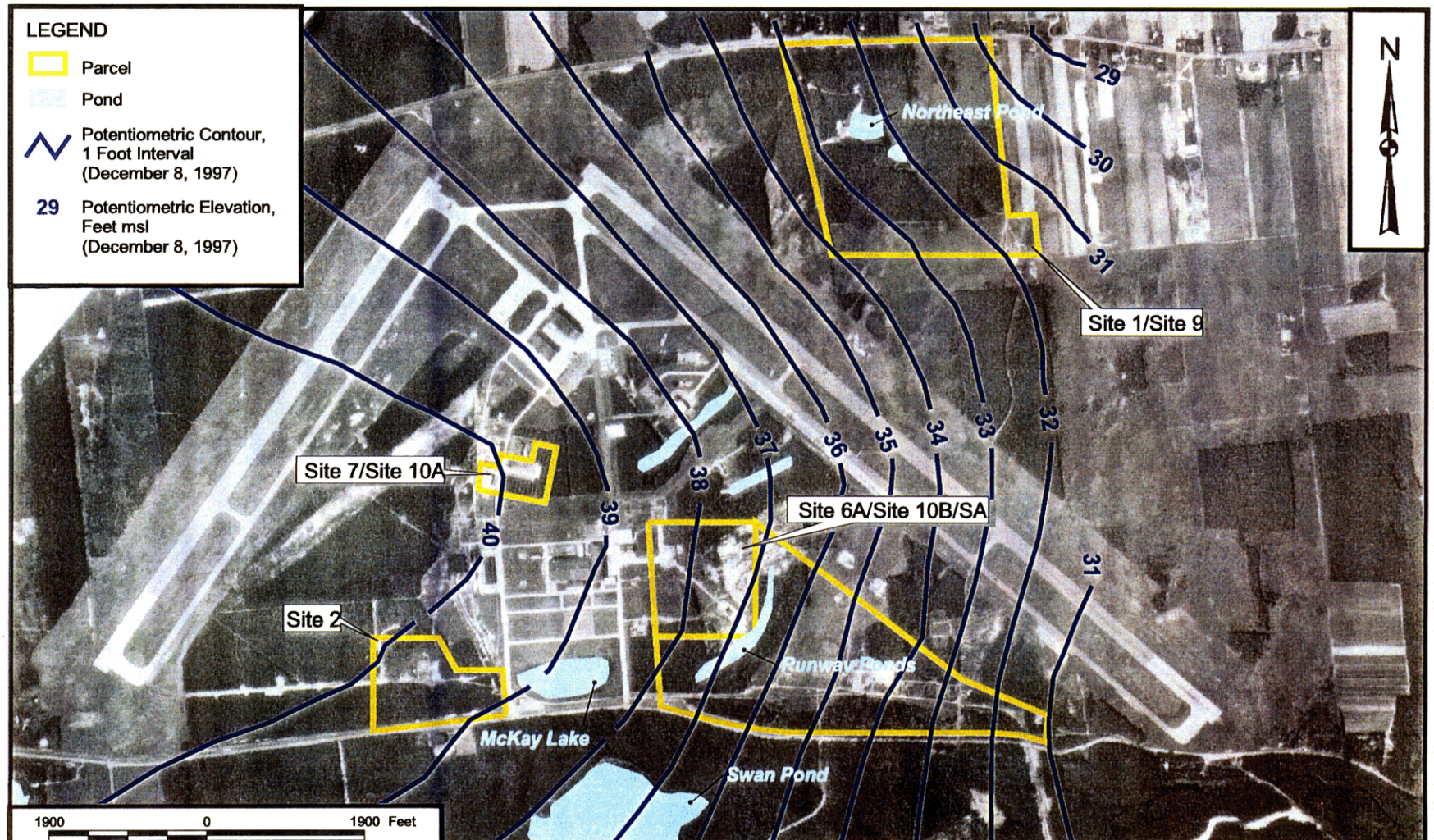

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P:\GIS\NWIRP_CALVERTON\PH2_REMEDIAL_INVESTIGATION.APR SUFACE WATER HYDROLOGY 4/24/01 JAL

2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION AND PHYSICAL SETTING

Site 1 – Northeast Pond Disposal Area is located approximately 1,000 feet south of Middle County Road (NY Route 25) and 0.95 mile east of the north gate (Figure 1-2). This site consists of a relatively flat borrow and disposal area that covers approximately 2 acres. The apparent disposal area measures approximately 400 feet by 200 feet and is oriented south-southwest to north-northeast. The top of the disposal area slopes gently from west-southwest to east followed by a steep 15- to 20-foot slope to the adjacent marsh/pond surface (Northeast Pond). The steep slope is unstable, contains sinkholes, and is eroding into the pond. The marsh/pond is glacially formed and approximately 2.3 acres in size (Figure 2-1).

Waste materials were reportedly placed in low areas near the eastern edge of the pond. Clean fill material was then excavated from the hillside located along the western and northern edges of the disposal area, creating an embankment up to 8 feet high in the hillside. The excavated material was used to cover the wastes.

The majority of the disposal area is covered with soil. There is a small area of exposed demolition debris on the embankment leading into the woods at the southern edge of the area.

The adjacent pond has no outlet. Based on observed water levels in the soil borings, the surface water elevation approximates the local groundwater elevation. The center of the pond is covered by a thick marsh growth that forms an island. The pond and disposal area are surrounded by woodlands, except for a long, thin, clearing leading westward from the southwest corner of the disposal area.

The Northeast Pond and surrounding area have been identified as a highly sensitive archeological area. Artifacts of prehistoric dates (from 8,000 to 500 years before present) have been identified in the immediate vicinity of Northeast Pond (Navy, 1997).

2.2 SITE HISTORY

The Northeast Pond Disposal Area was used primarily for the disposal of demolition debris, such as concrete, brick, wood, and other construction materials, until 1984. Other materials reportedly disposed include aircraft sections, junked aircraft assembly tooling, office materials and furniture, pallets, and paint cans. The wreckage of several aircraft may be present in the area. According to the IAS, approximately

7,500 cy of material may have been disposed in this area (Navy, 1986). The volume estimate has increased based on subsequent investigations.

Hazardous materials are not known to have been purposefully disposed in the area. However, it is reported in the IAS that any of the following wastes may be present at the site: petroleum, oils, and lubricants (POL), asphalt paving material, halogenated and non-halogenated solvents, and paint sludges.

The waste materials were placed in a depression adjacent to the pond and may have been used to fill portions of the pond. Soil borrowed from an adjacent hillside was used as cover material, creating a level area approximately 2 acres in size, with steep embankments up to 20 feet high leading into the pond from the eastern edge of the disposal area.

A final soil cover was placed over the disposed material in 1984. Details on the installation are not known.

No exposed wastes were observed on the surface or eastern embankment of the fill area during the field investigations. A small amount of debris, such as concrete chunks, wood scraps, and metal pieces, was exposed on the embankment leading into the woods from the south edge of the fill area.

A buried drum was encountered during the RFI test pit program. Testing of the drum contents and adjacent soils detected a relatively high concentration of 1,1,1-trichloroethane. The drum was excavated, placed in an overpack container, and disposed off site in the spring of 1995.

2.3 ECOLOGICAL SETTING

2.3.1 Vegetation

Five plant communities cover Site 1. When inspected in June 1997, the deeper waters of the Northeast Pond supported little or no emergent vegetation. The shallower waters around the outer perimeter of the pond and at the base of the landfill cover supported dense cover by phragmites (*Phragmites australis*). Phragmites is a tall, aggressive reed-like grass that typically occurs in dense, nearly monotypic stands in disturbed wetland soils. The landfill cover supports a sparse cover of upland grasses such as panicgrass (*Panicum lanuginosum*), quackgrass (*Agropyron repens*), tall fescue (*Festuca arundinacea*), and broomsedge (*Andropogon virginicus*) and weedy forbs such as plantain (*Plantago lanceolata*), yellow sweet clover (*Melilotus officinalis*), and pigweed (*Amaranthus retroflexus*). A shrub island in the center of the Northeast Pond supports widely spaced red maple (*Acer rubrum*) saplings undergrown by a dense cover of sweet pepperbush (*Clethra alnifolia*) and miscellaneous blueberry (*Vaccinium sp.*) shrubs.

The upland forest surrounding the pond and landfill is dominated by scarlet oak (*Quercus coccinea*) trees undergrown by a dense shrub cover of early low blueberry (*Vaccineum vacillans*). Other trees in the canopy of this forest include white oak (*Quercus alba*) and pitch pine (*Pinus rigida*). The infrequency of pitch pine, typically dominant in upland forests in the Long Island Pine Barrens, suggests that this forest has not experienced wildfires during the last several decades. Herbaceous cover is generally sparse, except for frequent occurrences of *Carex pennsylvanica*, an upland sedge species.

2.3.2 Wildlife

The interspersion of open water, marsh, shrub swamp, upland grassland, and upland forest cover at the site favors a diversity of wildlife. Monotypic stands of phragmites are generally recognized as being of little value to wildlife, but the shallow water and shrub island in the pond appear to be good habitat for a diversity of amphibians, reptiles, and small mammals. The open water appears to be too small to attract abundant waterfowl, although some migratory ducks and other waterfowl occasionally visit the pond. The oaks in the forest surrounding the pond produce abundant acorns that are a favored food source for white tail deer (*Odocoileus virginianus*), gray squirrels (*Sciurus carolinensis*), other mammals, and certain bird species such as bluejays (*Cyanocitta cristata*). The dense blueberries throughout the forest provide abundant fleshy berries that are favored as a food source by many songbird species and small mammals.

Several observations of wildlife were made at the pond during the June 1997 site visit. The croaking of bullfrogs emanating from the northern shore of the pond was frequently heard. A garter snake and muskrat were observed in the phragmites. Numerous redwing blackbirds (*Agelaius phoeniceus*) were observed flying low around the shrub island, suggesting that they nested there. Several white tail deer were observed in the forest.

2.3.3 Wetlands

Wetlands are limited to the pond basin and do not extend onto the landfill or into the woodlands surrounding the pond. The portion of the pond covered by phragmites would be classified as a Palustrine Emergent Wetland, persistent according to the U.S. Fish and Wildlife (FWS) classification system (Cowardin, L.M., et al., 1979). The shallow open water would be classified as Palustrine Open Water. No part of the pond would be classified as Lacustrine by the FWS because it covers an area less than 20 acres. Because the pond collects runoff from surrounding uplands and lacks an outlet, it likely contributes to recharging the underlying aquifer (Environmental Laboratory, 1991). The pond does not likely serve in flood control because of its location in a relatively flat coastal area.

2.3.4 Aquatic Biota

The small size, hydrological isolation, and prevalence of dense emergent vegetation limit the suitability of the pond as an adequate habitat for fish. Although the potential occurrence of fish tolerant of shallow, stagnant water cannot be ruled out, no attempt has been made to survey fish populations in the pond.

Surface sediment samples were recently collected from the pond using a kick net and a 2-inch diameter hand auger to characterize benthic macroinvertebrate populations. Benthic macroinvertebrates were selected for study because their distribution and abundance are often indicative of water quality and contamination. Furthermore, benthic macroinvertebrates occupy a low position in food chains that support fish and terrestrial wildlife. Hence, impacts to benthic macroinvertebrate communities can ultimately impact species that are higher on the food chain.

Based on testing discussed in Section 3.4.2.3, the benthic macroinvertebrate community in the pond is diverse but not abundant. The sediment samples contained representatives of several functional feed groups including collector/gatherers, shredders, predators, piercers, and scrapers. However, most of these groups were represented by one or two organisms. The representation by diverse functional feeding groups suggests that most ecological niches are filled and, thus, that the ecological functioning of the community is normal.

The apparently low abundance of benthic macroinvertebrates may be the result of the dense phragmites cover at each of the sample locations. Many of the samples were comprised mostly of phragmites roots rather than actual sediment. The very heavy phragmites biomass may have discouraged development of an extensive benthic macroinvertebrate community. However, the presence of the dense phragmites impeded the collection of sediment samples, and large numbers of benthic macroinvertebrates may have been dislodged as the sediment samples were collected from the dense root mat.

No single taxon or group of taxa adapted to high levels of organic contamination was dominant in sediment collected anywhere in the pond, as would be expected in response to contamination. In contrast to sediments from Northeast Pond, annelids of the Family Enchytraeidae were abundant and clearly dominant in the sediment collected from Shannon's Pond. The relatively high abundance of this taxon in Shannon's Pond may reflect the absence of phragmites.

2.3.5 Special Status Species

Records maintained by the NYSDEC Natural Heritage Program indicate that the tiger salamander (*Ambystoma tigrinum*) and Nuttall's lobelia (*Lobelia nuttallii*) were sighted at Northeast Pond in 1987 (Conrad, 1996). The tiger salamander is listed as endangered by New York State, and Nuttall's lobelia is

listed by the state as rare. Nuttall's lobelia was recently moved to the watch list (NYSDEC, 2000). The watch list contains taxa that are considered rare, uncommon, or declining in numbers, but which may need more information or monitoring to decide whether they should be actively inventoried.

The tiger salamander is an amphibian, 7 to 8 inches long at maturity, that occurs along the Atlantic coastal plain from Long Island southward. Like other mole salamanders (Family Ambystomatidae), tiger salamanders stay underground most of the year but congregate in temporary pools and ponds after early spring rains for courtship and egg laying (Conant, 1975). No tiger salamanders were observed during the June 1997 site visit, but the shallow waters of Northeast Pond, which appear to fluctuate from nearly dry to several inches deep, appear to be suitable habitat. Actual sightings have occurred in the past.

Nuttall's lobelia is a herbaceous forb up to 2 feet tall that favors damp to dry sandy or argillaceous soil (Fernald, 1970.) The soils around the shore of Northeast Pond are thus suitable for this plant, and it may have occurred prior to landfill activities. However, it is unlikely that any specimens of this plant, or any other rare plants, occur within the dense monotypic stand of phragmites at the edge of the landfill cover. If any Nuttall's lobelia were present, it would be along the eastern shore of Northeast Pond, opposite from the landfill, where phragmites is less dominant.

2.4 GEOLOGY

Five soil borings and four permanent monitoring wells were installed at Site 1 as part of the previous RFI activities. The depth of the soil borings ranged from 16 to 20 feet below ground surface (bgs). The wells range in depth from 23.5 to 50 feet bgs and were drilled to approximately 8 feet below the water table. Because of the shallow depth to groundwater beneath the site, the Upper Glacial Formation was the only geologic unit penetrated.

Based on soil and well borings, the site is underlain by two distinct lithofacies. The upper lithofacies consists predominantly of brown to black, pebbly, fine- to medium-grained sands with varying amounts of clay and silt. Fill encountered at the site is always associated with the upper lithofacies. The upper lithofacies was encountered in all five soil borings and wells NP-MW-01-S, NP-MW-02-S, and NP-MW-03-S. The lower lithofacies consists predominantly of tan, pebbly, fine- to medium-grained sand and may represent undisturbed glacial deposits. The lower lithofacies was encountered from 5 to 51 feet bgs (total depth) in well NP-MW-01-S and from 4 to 45 feet bgs (total depth) in well NP-MW-04-S. No samples were recovered from 0 to 4 feet bgs in well NP-MW-04-S.

2.5 HYDROGEOLOGY

Groundwater in the shallow aquifer beneath the site is under unconfined conditions. In 1995, the depth to shallow groundwater was measured to range from approximately 17 to 45 feet bgs. The elevation of the water table ranged from 33.66 feet above mean sea level (msl) in NP-MW-01-S, the westernmost well, to 33.24 feet above msl in NP-MW-04-S, the northernmost well.

The groundwater flow direction, based upon the on-site monitoring wells and the water elevation of the pond, was toward the east-northeast in 1995 and toward the northeast in 1997.. Groundwater in the shallow aquifer probably discharges in part of the pond located east of the fill area.

Hydraulic conductivities, calculated using the Hvorslev method from slug test data collected in well NP-MW-03-S, are 0.046 feet per minute (66 feet per day) from falling-head data and 0.0384 feet per minute (55 feet per day) from rising-head data. A mean hydraulic conductivity of 0.0422 feet per minute (61 feet per day) was calculated for well NP-MW-03-S. Hydraulic conductivity calculated from rising-head slug test data collected in well NP-MW-04-S is 0.057 feet per day (82 feet per day) (HNUS, 1995a).

2.6 PREVIOUS INVESTIGATIONS

2.6.1 Initial Assessment Study (IAS)

An IAS was performed for NWIRP Calverton in 1986 (Navy, 1986). This study identified seven potential areas of concern, including Site 1.

2.6.2 Site Investigation (SI)

As a follow-up to the IAS, an SI was conducted at NWIRP Calverton (HNUS, 1992a). The SI was conducted for seven sites, including Site 1. The sites identified can be classified as landfill-type sites or sites resulting from documented or suspected historic spills or leaks of fuels, oils, or solvents. Site 1 can be described as a landfill.

2.6.3 RCRA Facility Investigation (RFI)

An RFI was conducted in 1994 and 1995 (HNUS, 1995a; HNUS 1995b). The conclusions from this investigation are summarized in the following sections.

2.6.3.1 Soil (Fill)

Metals including chromium [70,600 milligrams per kilogram (mg/kg)], hexavalent chromium (191 mg/kg), copper (15,500 mg/kg), lead (3,940 mg/kg), silver (320 mg/kg), nickel (1,930 mg/kg), and zinc (989 mg/kg) were detected in a portion of the site soil (fill) at concentrations approximately 100 to 1,000 times above the corresponding background concentrations. Other metals were also detected at concentrations above background levels. Based on Toxicity Characteristic Leaching Procedure (TCLP) testing [40 Code of Federal Regulations (CFR) 261], some of the fill material (at one location) could be classifiable as a characteristic hazardous waste for chromium.

PCBs [8,400 micrograms per kilogram (µg/kg)], pesticides (less than 200 µg/kg), and SVOCs including polynuclear aromatic hydrocarbons (PAHs) and phthalates were detected throughout the fill materials. Typical PCB standards for industrial use and residential use are 10,000 µg/kg and 1,000 µg/kg, respectively.

In general, VOCs were detected sporadically and at relatively low concentrations in the fill material. However, 1,1,1-trichloroethane was detected at one location at a concentration of 390,000 µg/kg. The sample tested consisted of a mixture of soil and the contents of a buried drum. The drum was removed as an interim action. No other drums were found at the site.

The extent of contaminated soil (fill) was adequately defined in the Phase 1 RFI. The estimated areal extent of fill material is approximately 70,000 square feet (1.6 acres). At an average depth of 8 feet, the estimated volume of contaminated fill is 21,000 cubic yards.

2.6.3.2 Sediment

Testing of sediment in the Northeast Pond found 4,4'-DDD (2,000 µg/kg) and other pesticides, PCBs (980 µg/kg), PAHs (less than 1,000 µg/kg), lead (136 mg/kg), and other metals at concentrations that exceed NYSDEC sediment screening criteria for protection of aquatic life. VOCs and phthalates were detected in sediment at concentrations less than the NYSDEC sediment criteria.

Based on the similarity between chemicals found in the fill material and sediment, it is likely that chemicals in the fill material have migrated into the pond sediment. Because the chemicals detected are not very mobile in water, direct dispersion of fill material during disposal operations and/or by erosion of the fill material are the most likely migration pathway. Contaminant migration from the fill material to sediment by groundwater transport is a less likely migration pathway.

Pesticides were detected throughout the pond sediment. The vertical extent of contamination was mostly defined in the Phase 1 RFI as present in the upper 6 inches of sediment. However, contamination was found in deeper sediment at locations nearest the fill. Based on a general trend of less contamination deeper in the sediment and the low mobility of the chemicals detected, the vertical extent of contamination would not be expected to extend much below 12 inches.

2.6.3.3 Groundwater

Groundwater testing found aldrin [0.048 micrograms per liter (µg/L)] and other pesticides, PCBs (5.2 µg/L), lead (45.3 µg/L), mercury (4.1 µg/L), hexavalent chromium (76 µg/L), and zinc (1,260 µg/L) at concentrations above federal Maximum Contaminant Levels (MCLs) for drinking water and/or NYSDEC groundwater quality standards.

The chemicals found in the fill material and groundwater are similar. However, because of the low mobility of the contaminants detected and the placement of wells in the fill material, it is possible that the chemicals detected in groundwater result from fill intrusion through the sand pack into the well and do not necessarily reflect mobile groundwater contamination. Note that additional testing in 1997 supports the theory that many of the 1994 and 1995 detections are the result of fill intrusion and do not represent groundwater contamination.

The Phase 1 RFI concluded that the extent of groundwater contamination is partially characterized in the horizontal and vertical directions.

2.6.3.4 Surface Water

Testing of surface water from the Northeast Pond found 4,4'-DDD (0.02 µg/L) and iron at concentrations that exceed the NYSDEC surface water quality standards. The presence of this pesticide in the pond water likely results from equilibrium partitioning from the sediment to surface water.

The extent of surface water contamination is limited to the area closest to the fill material, which is also the location of the most contaminated sediment. The stagnant conditions and relatively low concentrations in the pond likely preclude significant contamination migration through surface water.

2.6.4 Baseline Human Health Risk Assessment

A baseline risk assessment was performed as part of the RFI. The baseline risk assessment found that adverse risks to current workers or recreational users are not expected. The primary factors precluding this risk include the presence of a soil cap and absence of a local potable water supply. Under a

hypothetical future residential land use scenario, unacceptable risks were calculated for domestic use of groundwater. The primary contaminants of concern for future residents include pesticides, PCBs, arsenic, manganese, and thallium.

Details of the baseline human health risk assessment are described in the following sections.

2.6.4.1 Risk Characterization Approach

The results of the risk assessment developed during the 1995 RFI (HNUS, 1995a) are summarized below. Additional detail is presented in Table 4-24 of the 1995 RFI Report. The potential receptors evaluated for the current land use scenario were a maintenance worker performing tasks near Site 1 and an adolescent recreational user. Risks to hypothetical receptors assuming a future residential land use scenario were also evaluated.

2.6.4.2 Current Maintenance Worker Exposure

The total incremental cancer risk (ICR) estimate for a maintenance worker assuming exposure to contaminants in soil at Site 1 was 7.3E-07. This ICR estimate is below the 1.0E-04 to 1.0E-06 target risk range often used by EPA to determine the need for action at Superfund and RCRA sites or to formulate standards and criteria (e.g., Federal Safe Drinking Water Act standards). The hazard index (HI), which is an indicator of the potential for noncarcinogenic adverse health effects, was calculated as 0.006. Adverse noncarcinogenic health effects are not anticipated when the HI is below 1.0.

2.6.4.3 Current Adolescent Recreational Exposure

The risk assessment of the hypothetical adolescent receptor at Site 1 considered exposure to potential chemicals of concern in surface water and sediment. The risk characterization results are similar to those presented for the maintenance worker. The total ICR estimate of 8.7E-07 is below the EPA target risk range, and the HI (0.02) is less than 1.0.

2.6.4.4 Future Residential Exposure

The risk assessment conducted assuming a future residential land use scenario considered direct contact at the representative concentrations for chemicals detected in soil and groundwater. The total ICR estimate for an adult residential receptor was 2.6E-03, which exceeds the EPA target risk range of 1.0E-04 to 1.0E-06. The ICR estimate developed for contaminants in soil (1.9E-05) was lower that that for contaminants in groundwater (2.5E-03). The risk estimate developed for PCBs in soil exceeds 1.0E-06.

Groundwater exposure provided most of the risk. The following chemicals are the principal risk drivers:

- Aldrin (1.37E-05)
- Dieldrin (2.63E-06)
- PCBs (2.14E-03)
- Arsenic (3.3E-04)

The noncarcinogenic HIs developed for adult and child receptors assuming a future residential land use scenario were 28 and 61, respectively. There is a potential for adverse noncarcinogenic health risks when either the cumulative HI or chemical-specific hazard quotient (HQ) exceeds 1.0. However, the majority of the noncarcinogenic risk was attributable to contaminants in groundwater. HIs developed for chemicals in soil and groundwater were 1.2 and 59, respectively, when the future child receptor was evaluated. HQs developed for individual contaminants in soil do not exceed 1.0. In contrast, HQs calculated for PCBs, arsenic, manganese, and thallium in groundwater are each greater than 1.0 when adult or child receptors are evaluated.

2.6.4.4 IEUBK Lead Modeling Results

The Integrated Exposure Uptake Biokinetic (IEUBK) Model was used to characterize potential effects associated with exposure to media containing lead. The model considers exposure to lead in air, food, soil and dust, and drinking water and estimates blood lead levels in receptors 0 to 6 years in age. The results are summarized in a probability histogram with the population experiencing blood lead levels greater than 10 µg/dL identified as a percentage. The representative lead concentration (3,490 mg/kg) results in blood lead concentrations greater than 10 µg/dL for 97 percent of the exposed population. The target value is less than 5 percent. Therefore, lead is a concern for the hypothetical future child resident.

2.6.4.5 Qualitative Risk Assessment

The focus of the qualitative risk assessment is to identify regulations, such as applicable or relevant and appropriate requirements (ARARs), and other standards, such as to be considered (TBC) criteria, that are exceeded by site contaminant levels. The standards presented have been developed for protection of human health or the environment. Criteria developed for the protection of ecological receptors are presented in the ecological risk assessment. Discussion of the qualitative risk assessment is presented by medium.

Soil Standards

Although no federal standards are generally available for evaluating soil in a qualitative manner, NYSDEC has adopted soil concentrations that are designed to be protective of human health and groundwater. The criteria are identified in Technical and Administrative Guidance Memorandum (TAGM) #4046 (NYSDEC, 1994). TAGM #4046 concentrations for organic compounds were developed to ensure attainment of groundwater standards under an equilibrium partitioning scenario. The numerical soil standard for protection of groundwater is based on a compound-specific organic carbon partitioning coefficient (Koc), a default dilution attenuation factor (100 to 1), and a soil organic carbon content of 1 percent. The standard for protection of human health is based on the risk from soil ingestion. Recommended clean-up objectives are identified on the basis of background (regional or site-specific) and health-based criteria.

As identified in the 1995 RFI report, at least one reported concentration for the following chemicals exceeded the TAGM #4046 clean-up goal: 1,1-dichloroethane, benzo(a)pyrene, antimony, cadmium, chromium, lead, selenium, silver, and cyanide. The TAGM #4046 clean-up goals for 1,1-dichloroethane and benzo(a)pyrene occurred at one location each at test pits 17 and 25, respectively. The exceedances for metals are based on a direct comparison to the 95th percentile value for the background data set. The metals identified were detected at concentrations greater than background using the T-test.

Groundwater Standards

Analytical results for groundwater samples were compared to federal and state MCLs and state groundwater quality standards to identify the location(s) where standards are exceeded. These standards were exceeded for aldrin, dieldrin, 4,4'-DDD, 4,4'-DDE, PCBs, lead, manganese, mercury, thallium, and zinc in at least one groundwater sample from Site 1. Based on the conclusion of the nature and extent of contamination, the inorganic exceedances may not be associated with contaminant release and may be associated with suspended materials present in the groundwater samples. The concentrations of organics that exceed the standards were detected in all monitoring well samples, except for the sample from well NP-MW01. Well NP-MW01 is located at the edge of the investigation area and is considered to the well most representative of background groundwater quality.

Surface Water Standards

Surface water samples collected from the Northeast Pond wetland area contained detectable amounts of toluene, 4,4'-DDD, cadmium, and manganese. The ponded water is shallow and subjected to stagnation and other environmental factors that may prohibit fish survival and propagation. The water body has been classified as "D fresh surface water." The surface water concentrations were compared to state

water quality standards in effect at the time of the RFI for Class D water and Federal Ambient Water Quality Criteria (AWQC) based on protection of human health from ingestion of water and organisms. Some of the standards and criteria are based on hardness, which was measured to be 35.6 mg/L. None of the surface water concentrations exceeded state water quality standards or AWQC for the protection of human health.

2.6.4.6 Conclusions

The conclusions of the baseline human health risk assessment were based on the results of quantitative and qualitative risk assessment methodologies and identify potential risks associated with exposure to soil, groundwater, surface water, and sediment at Site 1. The conservative nature of the risk assessment approach is intended to indicate possible risks; however, the assessment do not provide expressly accurate or definitive information regarding the occurrence of adverse health effects in humans exposed to site media. Several factors that are not apparent in the conclusions necessitate careful interpretation of the results and the risk management that will follow as future activities are planned. Cancer Slope Factors (CSFs) are the upper 95 percent confidence limit of a dose-response curve generally derived from animal studies. Actual human risk, while not identifiable, is not expected to exceed the upper limit based on the CSFs and, in fact, may be lower.

Conclusions were as follows:

- Based on the quantitative risk assessment, the current conditions at Site 1 do not pose cancer and noncancer risks at levels that exceed benchmarks commonly used by the EPA for risk management (i.e., ICR greater than 1.0E-06 and HI greater than 1.0).

- Under a hypothetical future residential land use scenario, the calculated risks are above cancer and noncancer risk benchmarks. Exposure scenarios including soil contact and domestic use of groundwater were evaluated. The majority of the risks are from exposure to groundwater. Although risks are also present from exposure to soil, the risk estimate was within the EPA target risk range of 1.0E-04 to 1.0E-06. The estimated ICR for adult residents (2.6E-03) is attributable to aldrin, dieldrin, PCBs, and arsenic in groundwater and PCBs in soil. The cumulative HI, an indicator of the potential for adverse systemic health effects, for the child resident is 60.4. Primary contributors to this HI are Aroclor-1254 (a PCB), arsenic, manganese, and thallium in groundwater. Soil exposures did not result in individual HQs greater than 1.0 for this receptor. The child resident is the most sensitive receptor for systemic health effects because of the high contact rate relative to the overall body weight of the receptor. The effects of these chemicals are likely to manifest themselves in the form of argyria (a skin condition), neurological dysfunction, and liver and kidney damage.

- Analytical results for some chemicals exceeded regulatory or other standards. The soil is contaminated with 1,1-dichloroethane, benzo(a)pyrene, and metals at concentrations above NYSDEC TAGM #4046 recommended clean-up goals. Groundwater chemical concentrations exceed state and Federal drinking water standards and state groundwater quality standards. Exceedances were noted for aldrin, dieldrin, 4,4'-DDD, 4,4'-DDE, PCBs, lead, manganese, mercury, thallium, and zinc. All surface water results were less than the comparative standards.

- The risk assessment indicated that exposure to soil and groundwater at Site 1 poses unacceptable human health risks for hypothetical future residents at the site. Chemicals of concern include PCBs in soil and pesticides (aldrin and dieldrin), PCBs, arsenic, manganese, and thallium in groundwater. Although several chemicals were detected in the soil, surface water, and sediment, the calculated risks and comparison to relevant standards indicated the current conditions pose an insignificant threat to human receptors engaged in routine recreational or occupational activities at the site.

2.6.5 Ecological Risk Assessment

An ecological risk assessment (ERA) was performed as part of the 1995 RFI. The intent of the ERA was to identify contaminants detected at a concentration that could pose adverse effects to biological organisms within the ecosystem at Site 1. Direct comparison of the contaminant concentrations to toxicity-based criteria was performed for qualitative identification of chemicals of concern. Evaluation of the soil and groundwater analytical data was not performed because there were no published criteria available for protection of ecological receptors or there was no direct contact exposure route.

Details of the ERA are described in the following sections.

2.6.5.1 ERA Approach

The impact of chemicals detected in surface water and sediment on indicator species was qualitatively considered by direct comparison of analytical results to available toxicological and TBC values. The results provide a preliminary indication of the potential effects of contaminants on the local ecosystem.

The indicator species used for the ERA was the tiger salamander (*Ambystoma tigrinum*). This receptor species provides an adequate measure of the effects of contaminants at Site 1 because it is an amphibian subject to exposure to both surface water and sediment. It is an endangered and protected species in the State of New York. Although attempts were made to obtain toxicological data for amphibian receptors, none were able to be located. As a default, results of animal studies (both mammalian and avian) were compiled for the potential chemicals of concern. These data were used to identify particular toxic chemicals for which surface water and sediment quality standards were not

available. It is recognized that the data are not directly applicable to the indicator species; however, these data are considered acceptable lacking any other evaluation method.

2.6.5.2 Risk Characterization

The ecological risk characterization was performed by direct comparison of analytical results to surface water and sediment standards. The AWQC represent surface water concentrations that provide continuous protection to freshwater aquatic life such as the tiger salamander. The sediment standards were criteria published by the NYSDEC Divisions of Fish and Wildlife and of Marine Resources and represent concentrations in which effects were noted in the lower 10 percent of a studied population of aquatic life forms. The toxicological data are presented for inter-chemical comparison of relative toxic potencies and are used for chemicals without published criteria or standards. Although the limitations associated with the use of toxicity data are recognized, these data provide some means for evaluating these chemicals.

Surface Water

All detected contaminant concentrations were less than the respective standards except for 4,4'-DDD, which exceeded the standard at all locations where detected. This pesticide is bioaccumulated in the food chain and may prove deleterious to the tiger salamander and other potentially sensitive populations in this ecosystem. Definitive conclusions regarding this impact and measurable endpoints in the population or welfare of this species cannot be made. Details regarding the nature of the study upon which the standard is based were not available.

Sediment

Comparison of sediment analytical results to sediment criteria indicated the possibility of impacts to sensitive receptors. Exceedances were identified for bis(2-ethylhexyl)phthalate, 4-methylphenol, phenol, phenanthrene, 1,2,4-trichlorobenzene, chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endosulfan I, endrin aldehyde, heptachlor epoxide, PCBs, cadmium, lead, and nickel. Incomplete data for toluene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and aldrin prevented direct comparison to a sediment screening value. However, comparison of the data to estimated screening values derived by extrapolation from toxicological data indicate these chemicals may pose a threat to ecological receptors.

2.6.5.3 Conclusions

The conclusions of the ERA are empirical. However, as a screening tool, this approach identified possible risks to ecological receptors from site related contaminants. The surface water contaminant that

exceeded screening values was 4,4'-DDD, which was detected at two of the four sampling locations. The concentrations of several chemicals including phenolics, 1,2,4-trichlorobenzene, bis(2-ethylhexyl)phthalate, PAHs, pesticides, PCBs, and metals exceeded sediment screening values. Although the impact to the indicator species was not quantitatively assessed, this qualitative assessment has identified the potential chemicals of concern in the pond water and sediment.

2.7 DATA GAPS

Site 1 was investigated to fully delineate the nature and extent of soil contamination and to determine whether there has been an impact to groundwater, surface water, or sediment. Data gaps from the previous RFI are as follows:

- The depth of contamination in pond sediment.
- The potential migration of surface water and groundwater contamination to hydraulically downgradient groundwater.
- The presence of relatively non-mobile contaminants (PCBs, pesticides, and metals) in groundwater.

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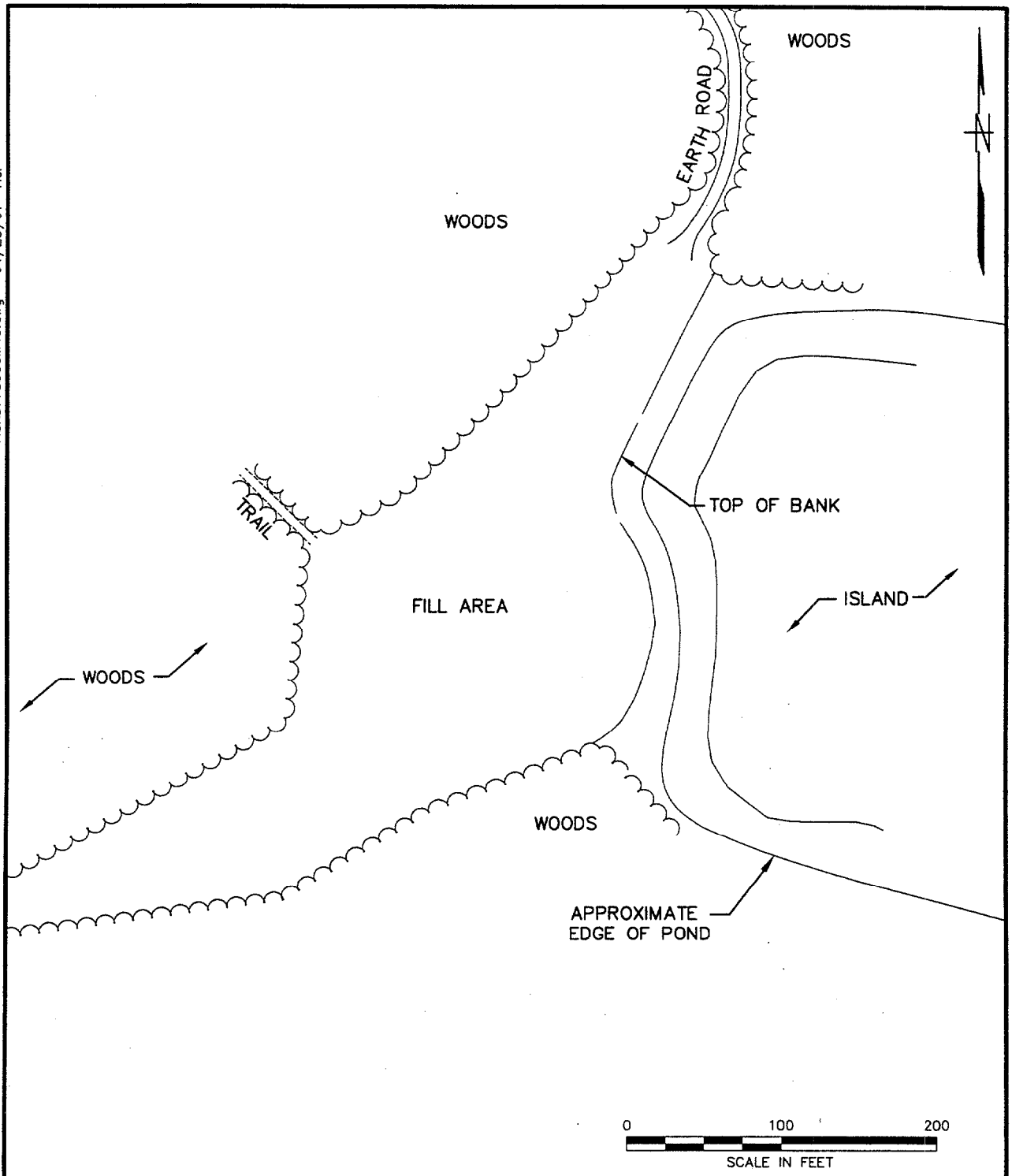

DRAWN BY HJP DATE 4/25/01	Tetra Tech NUS, Inc.	CONTRACT NO. 7398	OWNER NO. 0270
CHECKED BY DATE	SITE LAYOUT MAP SITE 1 – NORTHEAST POND DISPOSAL AREA NWIRP CALVERTON, NEW YORK	APPROVED BY DATE	
COST/SCHED–AREA		APPROVED BY DATE	
SCALE AS NOTED		DRAWING NO. FIGURE 2–1	REV. 0

FORM CADD NO. TtNUS_AV.DWG – REV 0 – 1/22/98

3.0 PHASE 2 REMEDIAL INVESTIGATION

Between March 1997 and November 1997, the following Phase 2 field investigation activities were conducted at Site 1:

- Test pits were installed in the location of the "slit-like trench" to determine whether disposal occurred in this area.

- Three temporary monitoring wells were installed hydraulically downgradient of the former buried drum that contained chlorinated solvents. Groundwater samples were collected at two depths and analyzed for VOCs.

- One intermediate depth monitoring well was installed in the area of the fill material, and two shallow (water table) monitoring wells were installed downgradient of landfill-affected portions of Northeast Pond.

- Two rounds of groundwater samples were collected from the permanent wells and analyzed for VOCs, SVOCs, pesticides, PCBs, and metals.

- Sediment samples were collected at 12 to 24 inches deep and analyzed for SVOCs, pesticides, PCBs, and metals.

- Samples of benthic organisms were collected from the pond and analyzed for diversity and abundance.

3.1 SLIT-LIKE TRENCH INVESTIGATION

A slit-like trench was identified west of Site 1 on aerial photographs of the facility. Although the photographs provided no evidence that disposal occurred, the presence of an excavation in this area near a disposal site warranted concerns that disposal may have occurred. Consequently, a test pit program was initiated in this area.

The area investigated is relatively flat and bordered by access roads to the Northeast Pond on the west, north, and south. There is a small bank (1 to 3 feet) and wooded area to the east. It is suspected that 1 to 3 feet of soil were excavated from this area to straighten or level the access road.

Eight test pits were installed in the area of the suspected trench (see Figure 3-1). The test pits were approximately 12 to 21 feet long, 2 to 5 feet wide, and 8 to 12 feet deep and oriented perpendicular to the suspected trench. Disturbed soil or buried wastes were not detected below the surface. Test pit log sheets are provided in Appendix B.

3.2 TEMPORARY MONITORING WELLS

Three temporary monitoring wells (NP-TW-01 to NP-TW-03) were installed to determine whether VOCs from a former buried drum (NP-WST22) had impacted groundwater. The drum was removed and disposed off site during the previous RFI. The locations of the temporary wells and the buried drum are presented on Figure 3-2.

The temporary monitoring wells were installed using the Geoprobe® direct push technology (DPT). The Geoprobe® consists of a truck-mounted sampling device that uses hydraulic pressure to push sample rods into the ground. Groundwater samples were collected at depths of approximately 5 feet and 20 feet below the water table.

Prior to sampling, three casing volumes of water were purged using a Geopump-brand peristaltic pump and dedicated Teflon® tubing. After purging, the tubing was cut, and the well and tubing were allowed to equilibrate. The groundwater was then sampled by capping the end of the tubing and withdrawing the tubing from the hole. The water was discharged into the sampling vials by releasing the capped end of the tube and allowing the water to drain from the tube. Sample log sheets are included in Appendix C, and chain-of-custody forms are included in Appendix D.

The samples were submitted to Volumetric for quick turnaround (48 hours) analysis. No VOCs were detected in any of these groundwater samples.

3.3 PERMANENT MONITORING WELLS

The groundwater flow direction at the site was re-evaluated in 1997 and included water level data obtained from the two new monitoring wells located hydraulically downgradient of the pond. Based on this data, it was concluded that an existing monitoring well (NP-MW02) is approximately downgradient of the former buried drum location. During a Technical Review Committee (TRC) meeting in June 1997, it was concluded that a new permanent monitoring well was not required to specifically monitor for VOCs from the former drum location because existing monitoring wells can be used. However, VOC analysis was added to the testing matrix for all of the groundwater monitoring wells.

Four permanent monitoring wells were to be installed. One well was to be located in the area hydraulically downgradient of the former buried drum location. One well was to be installed at depth near the existing shallow monitoring well in the fill. Two wells were to be located hydraulically downgradient of Northeast Pond and the disposal area. As discussed in above, a new permanent monitoring well was not installed downgradient of the former buried drum location. The other three permanent monitoring wells (NP-MW02-I, NP-MW05, and NP-MW06) were installed as planned. The well locations are shown on Figure 3-3. Construction details are summarized in Table 3-1, and monitoring well construction sheets are provided in Appendix E.

Groundwater samples were collected in June and November 1997. A low-flow sampling technique was used to collect these samples to minimize the potential concern with fill intrusion affecting sample results. The purpose of this sampling technique is to minimize stress on the surrounding fill material by using low water-level drawdowns and pumping rates. EPA Standard Operating Procedures (SOPs) were followed during collection of these samples (see Appendix F).

A Grunfos-brand submersible pump with a flow control box was used to collect the samples. Teflon™ lined polyethylene tubing was used as the discharge from the pump. The water level in each well was measured first, and then the pump was lowered slowly and gently to the mid-point of the saturated screen length. The pump was then turned on, and the flow rate was adjusted very slowly. The maximum amount of water pumped out of any well was 1 liter per minute.

While the well was being pumped, the following indicator field parameters were measured approximately every 5 minutes: temperature, specific conductivity, pH, dissolved oxygen (DO), and turbidity. The EPA Region 2 SOPs specify the following guidelines for field parameter stabilization:

- Temperature – 3 percent
- Specific conductivity – 3 percent
- pH – ±0.1 unit
- DO – 10 percent
- Turbidity – 10 percent for values greater than 1 nephelometric turbidity unit (NTU)

These guidelines were followed, and the data were recorded in field log sheets (Appendix G). After stabilization, the sample was collected directly from the tubing into the sample container. The submersible pump was decontaminated between each sampling location, the used tubing was discarded, and new tubing was used for the next sample.

Samples from each of the monitoring wells were analyzed for TCL VOCs, SVOCs, pesticides, and PCBs and TAL metals by Quanterra. Analytical results for the samples collected in 1997 are presented in Table 3-2. The analytical results that exceed federal or state drinking water or groundwater quality criteria are shown on Figure 3-3. Results that exceeded these criteria during previous rounds of groundwater testing are also shown on this figure.

During the June 1997 sampling round, thallium was detected in all shallow monitoring wells at concentrations ranging from 3.3 to 6.7 µg/L. These concentrations exceed the Federal MCL (2.0 µg/L) and the NYSDEC groundwater quality guidance value (0.5 µg/L). Thallium was not detected in the intermediate depth well (NP-MW02-I). Based on the low and relatively consistent concentrations detected in the samples, field blanks, and laboratory blanks, these positive detections of thallium may not be an indication of site contamination (see Section 1.7). During the 1997 testing, thallium was detected in wells NP-MW02-S (3.7 µg/L), NP-MW02-I (5.8 µg/L), and NP-MW03-S (5.8 µg/L) but not in the field duplicate sample from NP-MW03-S. It should also be noted that thallium was not detected in any other media at the site. Also, EPA Region 4 has found that the ICP analytical method used for analysis of thallium in 1997 groundwater samples may result in false positive detections above the drinking water standard.

Exceedances of criteria were noted for the following wells and chemicals:

- NP-MW01-S, June 1997: thallium (4.0 µg/L)
- NP-MW01-S, November, 1997: none
- NP-MW02-S, June 1997: iron (14,500 µg/L), manganese (1,720 µg/L), and thallium (6.7 µg/L)
- NP-MW02-S, November 1997: iron (5,250 µg/L), manganese (1,180 µg/L), and thallium (3.7 µg/L)
- NP-MW02-I, June 1997: 1,1,1-trichloroethane (5.7 µg/L) and iron (354 µg/L)
- NP-MW02-I, November 1997: 1,1-dichloroethane (5.9 µg/L) and thallium (5.8 µg/L)
- NP-MW03-S, June 1997: thallium (3.3 µg/L)
- NP-MW03-S, November 1997: thallium (5.8 µg/L)
- NP-MW03-S, November 1997, field duplicate: iron (698 µg/L)
- NP-MW04-S, June 1997: thallium (5.8 µg/l and 4.2 µg/L in field duplicate)
- NP-MW04-S, November 1997: none
- NP-MW05-S, June 1997: thallium (3.6 µg/L)
- NP-MW05-S, November, 1997: iron (5,500 µg/L)
- NP-MW06-S, June 1997: iron (3,920 µg/L) and thallium (3.4 µg/L)
- NP-MW06-S, November 1997: iron (493 µg/L)

During previous rounds of groundwater testing in 1994 and 1995, the concentrations of several other metals and PCBs were found to exceed groundwater criteria at Site 1. As previously indicated, these detections were suspected to have resulted from fill intrusion into the well and may not accurately reflect actual groundwater chemistry. Based on the 1997 groundwater testing, the other metals and PCBs are not present in on-site groundwater. It should be noted that thallium was only detected at one location during previous rounds of groundwater testing when many detections of other metals were biased high.

3.4 SEDIMENT INVESTIGATION

The purpose of the sediment investigation was to determine the vertical extent of pesticides, PCBs, and metals in pond sediment. The results were used to determine if there is evidence of impacts to ecological receptors.

3.4.1 Analytical Results

To evaluate the depth of chemicals in pond sediment, the approximate locations of previous sediment samples were identified. Samples were collected at depth intervals of 12 to 18 inches and 18 to 24 inches at these locations using a core sampler. The sediment samples were analyzed by Quanterra for TCL SVOCs, pesticides, and PCBs and TAL metals.

The results from the Phase 2 sampling round are presented in Table 3-3. The sampling locations and analytical results from Phase 1 and Phase 2 sampling are shown on Figure 3-4. Because of the absence of well-defined action levels, all positive detections of organics and all detections of metals greater than background concentrations are shown on the figure.

A statistical evaluation of the 1994 data had been performed during the Phase 1 RFI to determine whether the analytical results for metals exceeded background levels. A detailed statistical evaluation of the 1997 Phase 2 RI data was not conducted. Rather, Phase 1 RFI and Phase 2 RI data were compared. If the Phase 2 RI results were greater that those detected during the previous round, the Phase 2 data were included on the figure. If the Phase 2 results were in the same range or less that the Phase 1 results and the range of the previous data was determined to be equivalent to or less than background, the Phase 2 data were not included on the figure. Data from the Phase 2 RI were included on the figure and marked with an asterisk if comparison of the data sets alone could not confirm whether the new data statistically exceeded background.

The types of chemical found in the deepest sediment samples (18 to 24 inches) are generally similar to those found in the shallowest sediment samples (0 to 6 inches). In most cases, the concentrations decrease in each of the four depth intervals sampled during Phase 1 and Phase 2. The types of

chemicals and maximum concentrations detected in the shallowest and deepest sediment include total VOCs (25 µg/kg shallow and not analyzed deep), total PAHs (680 µg/kg shallow and 154 µg/kg deep), total phthalates (1,360 µg/kg shallow and 150 µg/kg deep), pesticides (2,000 µg/kg 4,4'-DDD shallow and 4.5 µg/kg endrin deep), total PCBs (980 µg/kg shallow and 76 µg/kg deep), and several metals (136 mg/kg lead shallow and 8.5 mg/kg lead deep).

3.4.2 Ecological Risk Evaluation

3.4.2.1 Preliminary Problem Formulation

A variety of ecological receptors could potentially be exposed to chemicals in soil, surface water, and sediment. The suspected source of chemicals entering Northeast Pond is the landfill on the western shore. The landfill includes a variety of fill materials covered by soil. The soil cover slopes steeply at the edge of the pond and is rapidly eroding and contributing sediment to the western part of the pond. Aquatic biota, including benthic macroinvertebrates, fish (if any), amphibians, and emergent wetland vegetation may be exposed to chemicals have that migrated into the pond. Chemicals absorbed (bioaccumulated) into the tissues of these macroinvertebrates and plants may represent a risk to terrestrial wildlife that feed on these organisms directly or via the food chain. Northeast Pond is surrounded by extensive areas of terrestrial habitat where receptors could also be at risk via the food chain.

3.4.2.2 Screening Level Analysis of Potential Ecological Effects Using Ecotoxicological Benchmarks

A screening level analysis of potential ecological effects was performed by comparing maximum concentrations of various chemicals of potential concern (COPCs) in sediment, water, and soil against benchmarks developed by federal and state regulatory agencies. This type of analysis is inherently conservative and is intended to eliminate from further consideration those COPCs that clearly represent little or no ecological risk. The benchmarks represent threshold concentrations of ecological concern for each COPC based on regulatory standards or guidance and a conservative interpretation of the ecotoxicological literature. If the maximum concentration of a COPC is below the corresponding benchmarks, the COPC may be eliminated from further consideration.

Sediment

Table 3-4 presents the comparison of the maximum concentration of each COPC in sediment against benchmarks developed for sediment. Two of the benchmark sets used in Table 3-4 were developed by NYSDEC based on water quality standards promulgated by the state. The first benchmark is based on potential chronic (long-term) injury to aquatic biota, and the second benchmark is based on potential

chronic injury to wildlife caused by bioaccumulation of contaminants in food sources (prey). An additional benchmark set developed for sediment by the U.S. Department of Energy (DOE) was also included in the table because it provided additional benchmarks for several organic COPCs for which NYSDEC has not established benchmarks.

Table 3-4 shows that one VOC (toluene) and several SVOCs, pesticides/PCBs, and metals were detected in Northeast Pond sediment at concentrations exceeding one or more ecological benchmarks. The SVOCs include bis(2-ethylhexyl)phthalate, phenolics (4-methylphenol and phenol), and PAHs (benzo(a)anthracene, 2-methylnaphthalene, and naphthalene). The pesticides include aldrin, alpha-chlordane, beta-BHC, 4,4'-DDT and breakdown products 4,4'-DDD and 4,4'-DDE, endosulfan I, endrin aldehyde, gamma-chlordane, and heptachlor epoxide. The pesticides are organochlorine insecticides no longer in active use but common while the landfill was active. The PCBs include Aroclor 1248, Aroclor 1254, and Aroclor 1260. The metals include cadmium, lead, nickel, and silver. The only exceedances of benchmark values in deeper samples (greater than 12 inches deep) were for pesticides and PCBs at location SD04. All other exceedances were in the shallow (less than 12 inches deep) samples. There is no apparent pattern to the exceedances. Except for pesticides and PCBs, many of the exceedances for a particular chemical only occurred at one sampling location. In addition, different chemicals exceeded benchmarks at different shallow sample locations, as presented below:

- NP-SD01: bis(2-ethylhexyl)phthalate, 2-methylnaphthalene, naphthalene, aldrin, alpha-chlordane, 4,4'-DDD, 4,4'-DDE, endrin aldehyde, gamma-chlordane, heptachlor epoxide, PCBs, and metals
- NP-SD02: benzo(a)anthracene, phenol, 4,4'-DDD, and 4,4'-DDE
- NP-SD03: 4-methylphenol, beta-BHC, alpha-chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endosulfan I, and gamma-chlordane
- NP-SD04: benzo(a)anthracene, 4,4'-DDD, 4,4'-DDE, and PCBs
- NP-SD05: 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT
- NP-SD06: toluene
- NP-SD07: none
- NP-SD08: beta-BHC, 4,4'-DDD, 4,4'-DDE, gamma-chlordane, and lead

Surface Water

Table 3-5 presents a comparison of the maximum concentrations of each COPC in surface water against benchmarks developed for surface water. The first two benchmarks used in Table 3-5 are the federal ambient water quality criteria (AWQC) established by EPA. The third and fourth sets of benchmarks are ambient water quality standards (AWQS) and guidance values, respectively, established by NYSDEC. The Tier II benchmarks were developed by DOE using EPA methodology for developing aquatic benchmarks for chemicals without an AWQC. The least chronic value (LCV) benchmarks were developed by DOE based on the lowest chronic value to ecological receptors reported in the scientific literature.

Table 3-5 shows exceedances of benchmark values for 4,4'-DDD (a breakdown product of the insecticide 4,4'-DDT), aluminum, cadmium, and iron. All detections of these chemicals exceeded at least one benchmark value. Further analysis of these chemicals will be necessary to determine whether they represent a significant ecological risk. Concentrations of iron and 4,4'-DDD consistently exceeded multiple benchmarks by a substantial margin. Aluminum and iron are among the most common elements in the earth's crust and are typically only toxic at unusual pH levels. The maximum aluminum concentration was above the federal AWQC but below the LCV for aquatic plants and was even further below LCVs for fish and daphnids (a group of microscopic fauna). These latter LCVs are not tabulated in Table 3-5. The maximum cadmium concentration slightly exceeded the LCV for daphnids but was below federal AWQC (chronic), state water quality standards, and the LCVs for fish and aquatic plants. The latter are not shown on Table 3-5. The maximum iron concentration exceeded all available benchmarks including federal AWQC (chronic), state water quality standards, and the LCV for daphnids. The maximum 4,4'-DDD concentration exceeded state water quality standards and Tier II (chronic) benchmarks.

Landfill Cover Soil

Table 3-6 presents a comparison of the maximum concentration of each COPC in soil samples from the landfill cover against benchmarks developed for soil. NYSDEC has not developed screening benchmarks for evaluating ecological risks from exposure to soil. The first two sets of benchmarks in Table 3-6 were developed by DOE and consider the potential impact of soil contaminants to plants and soil litter organisms (e.g., earthworms, bacteria, fungi), respectively. The next set of benchmarks was developed by the Province of Quebec and consider both human health and ecological risks. The last two sets of benchmarks were developed by the EPA Region 3 Biological Technical Assistance Group (BTAG).

The exceedances for the landfill cover soil are for chromium and PCBs, and these chemicals may represent a potential ecological risk. The chromium benchmarks exhibit a wide range of concentrations

(0.0075 mg/kg to 250 mg/kg). It should be noted that the chromium concentrations in background soil samples also exceeded many of the benchmarks. The detection limits for chromium are also higher than many of the benchmark concentrations. Risk management considerations, such as background chromium concentrations, are necessary to fully interpret the significance of the soil chromium levels at the landfill.

3.4.2.3 Analysis of Potential Ecological Effects by Comparing Benthic Macroinvertebrate Data to Reference Sites

Surface sediment samples were collected from Northeast Pond in June 1997 using a kicknet and a 2-inch diameter hand auger to characterize benthic macroinvertebrate populations. The sediment samples were preserved, and each benthic macroinvertebrate was identified and counted. Benthic macroinvertebrates were selected for study because their distribution is widely regarded as indicative of water quality and contamination. Diverse macroinvertebrate communities typically occur in small, isolated water bodies that support few or no fish.

Table 3-7 lists the macroinvertebrate species identified in samples collected from three locations in Northeast Pond and one location in Shannon's Pond, the reference pond. This is a small pond approximately 100 feet south of Northeast Pond for which there is no evidence of contamination. Sample locations are shown on Figure 3-4. Two of the sediment samples from Northeast Pond (NEP-2 and NEP-4) were collected adjacent to the edge of the landfill. The other sample from Northeast Pond (NEP-5) was collected at the southeastern shore, away from the landfill and suspected source of contamination. Location NEP-5 was investigated as an alternative reference site. It is distant from the eroding landfill bank, and it supports dense phragmites vegetation similar to the vegetation at the eroding bank. Shannon's Pond lacks phragmites. The benthic macroinvertebrate community in Northeast Pond was compared against that of Shannon's Pond to investigate effects from contamination originating from the landfill.

The data presented in Table 3-7 suggest that the benthic macroinvertebrate community in Northeast Pond is diverse but not abundant. The sediment samples contained representatives of several functional feeding groups, but most of these groups were represented by one or two organisms. The diverse functional feeding groups present in the samples suggest that contamination has not seriously damaged ecological functions within the benthic macroinvertebrate community. The low abundance of benthic macroinvertebrates in the samples from Northeast Pond relative to Shannon's Pond may reflect the dense phragmites cover. The heavy phragmites cover may have discouraged development of large numbers of benthic macroinvertebrates. Many benthic macroinvertebrates may have become dislodged as the sediment was pulled through the phragmites into the sample containers.

The principal difference between the benthic communities in Northeast Pond and Shannon's Pond is that the latter is dominated by a large population of annelids in the family Enchytraeidae, which is highly tolerant of organic contamination. This observation may be the result of factors other than contamination, such as dense phragmites in Northeast Pond and the lack of such vegetation in Shannon's Pond.

Abundance is highly variable. Diversity measures, such as the number of taxa, are usually considered more reliable indicators of adverse effects. There are no pronounced differences in the numbers of taxa among the sampling locations, except for the low values at the southeastern shore of Northeast Pond (NEP-5). The low diversity and numbers of organisms found in the samples from the southeastern shore contribute to the conclusion that the samples near the landfill do not indicate a sever effect

3.4.2.4 Preliminary Ecological Risk Characterization and Uncertainty Analysis

The benchmark screening process eliminated many COPCs at Northeast Pond from further consideration but still suggested that several metals and organic compounds in sediment and water in the pond, and/or soil on the landfill, could pose potential ecological risk. For Northeast Pond sediment, remaining COPCs are toluene, benzo(a)anthracene, bis(2-ethylhexyl)phthalate, 2-methylnaphthalene, 4-methylphenol, naphthalene, phenol, aldrin, alpha-chlordane, beta-BHC, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endosulfan I, endrin aldehyde, gamma-chlordane, heptachlor epoxide, PCBs, cadmium, lead, nickel, and silver. For surface water at the edge of the landfill, remaining COPCs are 4,4'-DDD, aluminum, cadmium, and iron. For surface soil on the landfill cover, remaining COPCs are PCBs and chromium.

The results of the benthic macroinvertebrate investigation do not demonstrate adverse impacts from surface water or sediment contaminants. The diversity of taxa and feeding groups were similar at the edge of the landfill and in the reference pond. However, the low numbers of organisms counted in sediment samples from both the edge of the landfill and from the reference pond contributed uncertainty to conclusions drawn from the data. Sediment in Northeast Pond supports dense phragmites cover, which is absent from the reference pond. This contributes additional uncertainty.

3.5 PHASE 2 RI CONCLUSIONS

The following conclusions are based on the results of the Phase 2 RI at Site 1, Northeast Pond Disposal Area:

- The test pit investigation at the slit-like trench area found no evidence of disposal activities. Based on the use of the site, the observed area of disturbance likely resulted from the construction of an access road to Northeast Pond.

- VOCs were not detected in groundwater from temporary wells installed hydraulically downgradient of the location of a former buried drum. High concentrations of VOCs had been detected from a sample of soil/drum contents taken at that location during the Phase 1 RFI.

- The decrease in the types and concentrations of chemicals detected in groundwater using a low-flow sampling technique (June and November 1997 samples) indicated that groundwater data from sampling conducted in 1994 and 1995 was biased high. Fill intrusion into the monitoring wells is the suspected cause of this bias. The chemicals and maximum concentrations that exceeded potential groundwater standards during the 1997 sampling are 1,1-dichloroethane (5.9 µg/L), 1,1,1-trichloroethane (5.7 µg/L), iron (14,500 µg/L), manganese (1,720 µg/L), and thallium (6.7 µg/L). Based on a QA/QC evaluation, the thallium may not be a site-related contaminant. The thallium may be of natural origin because it was detected in the most upgradient monitoring well or may have been introduced during sampling or analysis because it was detected in laboratory and field blanks. In addition, thallium was not detected in any soil, surface water, or sediment samples collected at Site 1,

- The concentrations of chemicals detected in sediment decreased by approximately a factor of 10 from the shallow sediments (0 to 6 inches deep) to the deeper sediments (18 to 24 inches deep). In general, the depth of sediment contamination is adequately defined. Based on exceedances of sediment ecological benchmarks, pesticide and PCB contamination may extend deeper than 2 feet at one location (NP-SD04).

- The ecological risk evaluation eliminated most of the chemicals detected in Northeast Pond from further consideration. However, toluene, several SVOCs, several pesticides/PCBs, cadmium, lead, nickel, and silver in sediment could represent potential ecological risk. Chemicals detected in surface water that may potentially cause risk to ecological receptors include 4,4'-DDD, aluminum, cadmium, and iron. For surface soil on the landfill cover, chromium and PCBs represent a potential ecological risk.

- The results of the benthic macroinvertebrate investigation did not indicate adverse impacts from contaminated sediment and surface water. The diversity of feeding groups suggests a normally functioning ecological community.

- Chemicals in the fill material and sediment adjacent to the landfill are eroding into the Northeast Pond and causing potential ecological risks.

- The nature and extent of soil and sediment contamination have been adequately defined. In addition, it appears that the chemicals in these media are not adversely affecting groundwater quality. Enough

data now exists to proceed to a FFS to evaluate remedial options for soil and sediment. The FFS constitutes the remainder of this report.

TABLE 3-1

GROUNDWATER MONITORING WELL CONSTRUCTION DETAILS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK

Well	Date Installed	Top of Casing Elevation (feet msl)	Depth to Water (feet)	Depth of Well (feet bgs)	Screened Interval (feet bgs)	Water Level Elevation (feet msl)
NP-MW02-I	5/8/97	---	16.92	70	60 – 70	---
NP-MW05	5/10/97	43.14	8.40	15	5 – 15	34.74
NP-MW06	5/10/97	39.17	4.45	13.5	3.5 – 13.5	34.72

bgs – below ground surface
msl – mean sea level
Well NP-MW02-I was not surveyed.

TABLE 3-2

SUMMARY OF GROUNDWATER ANALYTICAL DATA (µg/L)
SITE 1 - NORTH EAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
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Chemical	MDL/ IDL[1]	Groundwater Criteria[2]	NP-MW01-S		NP-MW02-S		NP-MW02-I		NP-MW05-S	
			06/97	11/97	06/97	11/97	06/97	11/97	06/97	11/97
Acetone	5.0	50[3]								
1,1-Dichloroethane	1.9	5					1.3	**5.9**		
1,1,1-Trichloroethane	1.8	5					**5.7**	4.4		
Bis(2-ethylhexyl)phthalate	1.4	5								
Diethyl phthalate	1.5	50[3]		1.1						
N-Nitrosdipropylamine	2.9	NA				8.0		7.3		
SVOC TICs	--	--				Detected	Detected			Detected
Pesticides/PCBs	--	--								
Aluminum	8.8	NA	37.7	61.7	23.8	52.2	13.8	37.4	436	336
Arsenic	2.3	25								
Barium	0.3	1000	16.2	16.2	121	129	49.7	27.8	15.5	3.8
Beryllium	0.1	3[3]	0.24		0.15		0.15		0.29	
Cadmium	2.6	5					3.8			
Calcium	6.6	NA	4290	4040	449,000	408,000	81,000	31,100	6620	7160
Chromium	2.3	50								
Cobalt	3.1	NA	4.1				6.3			
Copper	1.5	200		2.7		2.1	1.9	2.0		
Iron	3.6	300	6.6	82.4	**14,500**	**5250**	**354**	96.8	244	**5500**
Lead	1.0	15[4]	1.1							
Magnesium	10.9	NA	1290	1280	24,600	21,400	8500	5540	888	605
Manganese	0.9	300	56.5	40.7	**1720**	**1180**	33.3	2.8	24.2	69.4
Nickel	8.4	100					10.1			
Potassium	323	NA	758	652	16,800	15,500	5970	3000	359	
Selenium	3.0	10						2.6		
Sodium	7.5	20,000	4720	3810	15,000	14,400	8590	5390	3380	3540
Thallium	2.7	0.5[4]	**4.0**		**6.7**	**3.7**		**5.8**	**3.6**	
Vanadium	1.6	NA	1.8		4.9	5.6	2.8		2.4	2.7
Zinc	2.7	2000[3]	7.1	6.6	15.0	20.5	13.7	11.4	3.9	5.8

TABLE 3-2

SUMMARY OF GROUNDWATER ANALYTICAL DATA (µg/L)
SITE 1 - NORTH EAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 2 OF 3

Chemical	MDL/ IDL[1]	Groundwater Criteria[2]	NP-MW03-S			NP-MW04-S			NP-MW06-S	
			06/97	11/97	11/97 (dup)	06/97	06/97 (dup)	11/97	06/97	11/97
Acetone	5.0	50[3]			8.4					
1,1-Dichloroethane	1.9	5								
1,1,1-Trichloroethane	1.8	5								
Bis(2-ethylhexyl)phthalate	1.4	5				2.4	1.3			3.6
Diethly phthalate	1.5	50[3]			1.1					
N-Nitrosdipropylamine	2.9	NA								
SVOC TICs	--	--			Detected					
Pesticides/PCBs	--	--								
Aluminum	8.8	NA	76.6	285	745	137	145	217	455	433
Arsenic	2.3	25								3.0
Barium	0.3	1000	17.3	19.6	21.5	29.8	30.2	27.4	4.0	22.4
Beryllium	0.1	3[3]				0.61	0.68	0.62		
Cadmium	2.6	5								
Calcium	6.6	NA	37,600	40,400	44,200	1260	1370	1110	6220	7400
Chromium	2.3	50			7.0					
Cobalt	3.1	NA								4.0
Copper	1.5	200	2.5	4.5	9.2			5.1	2.2	2.4
Iron	3.6	300	24.2	194	**698**	7.1	11.1	35.8	**3920**	**493**
Lead	1.0	15[4]						2.8		
Magnesium	10.9	NA	2670	2220	2430	1820	1870	1250	673	573
Manganese	0.9	300	14.9	12.9	16.8	38.2	38.6	52.8	59.3	30.6
Nickel	8.4	100								
Potassium	323	NA	1870	1650	2030	567	724	427	354	
Sodium	7.5	20,000	1970	2040	2250	6770	6990	5410	3780	3790
Selenium	3.0	10								
Thallium	2.7	0.5[4]	**3.3**	**5.8**		**5.8**	**4.2**		**3.4**	
Vanadium	1.6	NA	3.0	4.1	7.0		1.8		1.8	4.7
Zinc	2.7	2000[3]	13.7	10.2	17.7	11.4	17.3	7.5	3.9	3.6

TABLE 3-2

SUMMARY OF GROUNDWATER ANALYTICAL DATA (µg/L)
SITE 1 - NORTH EAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
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1 Method detection limits (MDLs) are provided for organic compounds; instrument detection limits (IDLs) are provided for metals.
2 Groundwater criteria are NYSDEC MCLs or groundwater quality standards.
3 Guidance value.
4 Criterion provided is EPA MCL which is more stringent than New York State criteria.

NA - Standard not available
SVOC TICs - Semivolatile Tentatively Identified Compounds
A blank indicates that the chemical or chemical class was not detected.

TABLE 3-3

SUMMARY OF SEDIMENT ANALYTICAL DATA
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 1 OF 2

Chemical	MDL/IDL	NP-SD10-1218 (NP-SD01)	NP-SD10-1824 (NP-SD01)	NP-DUP05 (NP-SDO1)	NP-SD11-1218 (NP-SD02)	NP-SD11-1824 (NP-SD02)	NP-SD12-1218 (NP-SD03)	NP-SD12-1824 (NP-SD03)	NP-SD13-1218 (NP-SD04)	NP-SD13-1824 (NP-SD04)
			Field Duplicate Samples							
ORGANICS (µg/kg)										
Benzo(b)fluoranthene	44.3								59	55
Benzo(k)fluoranthene	34.6								50	
Bis(2-ethylhexyl)phthalate	33	120	150	100	95	120	110	81	120	120
Butyl benzyl phthalate	33					56			64	
Chrysene	33								61	51
Fluoranthene	51.6								62	
Pyrene	39.7								64	48
SVOC TICs	--	Detected	Detected	Detected	Detected	Detected	Detected	Detected	Detected	Detected
Endrin	0.12								11	4.5
Endrin aldehyde	0.05								6.0	
alpha-Chlordane	0.13								2.5	
Aroclor-1248	2.3								87	76
Aroclor-1260	2.2								130	
METALS (mg/kg)										
Aluminum	2	12500	10700	9680	2440	3700	3230	4440	2470	1770
Antimony	1.8								0.45	
Arsenic	0.74	2.0	2.3	1.7	1.2	1.3	0.89	1.3	2.0	1.0
Barium	0.1	24.8	25.0	18.3	4.3	7.2	5.8	8.1	20.4	10.3
Beryllium	0.1	0.37	0.31	0.28	0.14	0.12	0.08	0.12	0.13	0.08
Cadmium	0.72					0.42			0.49	0.32
Calcium	11.4	128	115	104	220	922	229	331	314	465
Chromium	0.65	11.4	10.8	8.6	9.8	50.9	5.3	6.4	29.0	47.8
Cobalt	0.45	2.1	2.4	1.7	1.4	0.67	0.96	1.1	0.75	
Copper	0.2	3.7	3.9	2.7	2.9	7.4	3.2	2.9	25.3	14.6
Iron	0.55	6900	8020	5350	2910	3380	3240	4170	2570	1710
Lead	0.36	6.5	4.7	4.1	4.6	4.9	3.0	3.4	11.7	8.5
Magnesium	3.7	902	1010	632	227	374	312	374	313	166

TABLE 3-3

SUMMARY OF SEDIMENT ANALYTICAL DATA
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
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Chemical	MDL/IDL	NP-SD10-1218 (NP-SD01)	NP-SD10-1824 (NP-SD01)	NP-DUP05 (NP-SD01)	NP-SD11-1218 (NP-SD02)	NP-SD11-1824 (NP-SD02)	NP-SD12-1218 (NP-SD03)	NP-SD12-1824 (NP-SD03)	NP-SD13-1218 (NP-SD04)	NP-SD13-1824 (NP-SD04)
			Field Duplicate Samples							
Manganese	0.11	30.7	34.6	22.2	16.3	25.7	30.0	29.8	12.0	9.1
Nickel	1.1	8.2	6.9	12.4	10	6.7	15.8		12.2	5.7
Potassium	76.0	304	260	248	171	149	159	118	146	111
Selenium	0.43	1.2	0.77	0.73						
Silver	0.32								1.1	1.1
Sodium	6	71.4	46.4	44.2	28.3	312	36.1	36.7	41.8	53.7
Vanadium	0.31	19.0	17.6	15.2	6.6	10.2	7.2	8.8	6.6	4.2
Zinc	1.3	14.4	14.6	12.2	7.1	15.4	8.7	8.1	29.7	21.4

Note: Method detection limits (MDLs) are provided for organic compounds; instrument detection limits (IDLs) are provided for metals.
SVOC TICs - Semivolatile Tentatively Identified Compounds

TABLE 3-4

COMPARISON OF SEDIMENT RESULTS TO SEDIMENT BENCHMARKS VALUES[1]
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
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Chemical of Potential Concern[2]	Maximum Concentration [3]	NYSDEC Aquatic Life (chronic)[4]	NYSDEC Wildlife Bioaccum-ulation[4]	US DOE[5]	Notes
VOLATILE ORGANICS (µg/kg)					
1,1-Dichloro-ethane	18	N/A	N/A	27	Available benchmarks do not suggest a potential ecological risk.
2-Butanone	83	N/A	N/A	N/A	No available benchmarks for this compound.
1,1,1-Trichloro-ethane	7	N/A	N/A	179	Available benchmarks do not suggest a potential ecological risk.
Toluene	610	**47**	N/A	786	Exceedance of aquatic life benchmark at one location (SD06).
SEMIVOLATILE ORGANICS (µg/kg)					
Phenol	46	**0.5** (total unchlorinated phenols)	N/A	420	Exceedance of aquatic life benchmark at one location (SD02).
4-Methylphenol	53	**0.5** (total unchlorinated phenols)	N/A	670	Exceedance of aquatic life benchmark at one location (SD03).
1,2,4-Trichloro-benzene	61	91 (trichloroben-zenes)	N/A	N/A	Available benchmarks do not suggest a potential ecological risk.
Naphthalene	47	**30**	N/A	407	Exceedance of aquatic life benchmark at one location (SD01).
2-Methyl-naphthalene	62	**34**	N/A	N/A	Exceedance of aquatic life benchmark at one location (SD01).
Phenanthrene	99	120	N/A	1,800	Available benchmarks do not suggest a potential ecological risk.

TABLE 3-4

COMPARISON OF SEDIMENT RESULTS TO SEDIMENT BENCHMARKS VALUES(1)
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 2 OF 4

Chemical of Potential Concern(2)	Maximum Concentration (3)	NYSDEC Aquatic Life (chronic)(4)	NYSDEC Wildlife Bioaccum-ulation(4)	US DOE(5)	Notes
Fluoranthene	140	1,020	N/A	6,200	Available benchmarks do not suggest a potential ecological risk.
Pyrene	200	961	N/A	13,100	Available benchmarks do not suggest a potential ecological risk.
Butylbenzyl phthalate	260	N/A	N/A	N/A	No available benchmarks for this compound.
Benzo(a) anthracene	75	**12**	N/A	108	Exceedance of aquatic life benchmark at two locations (SD02, SD04).
Chrysene	62	N/A	N/A	N/A	No available benchmarks for this compound.
Bis(2-ethylhexyl) phthalate	1,100	**199.5**	N/A	890,000,000	Exceedance of aquatic life benchmark at one location (SD01).
Benzo(b)-fluoranthene	63	N/A	N/A	N/A	No available benchmarks for this compound.
Benzo(k)-fluoranthene	83	N/A	N/A	N/A	No available benchmarks for this compound.
Benzo(a)pyrene	66	N/A	N/A	140	Available benchmarks do not suggest a potential ecological risk.
PESTICIDES/PCBs (µg/kg)					
beta-BHC	2.4	**0.06** (hexachloro-cyclohexanes)	**1.5** (hexachloro-cyclohexanes)	N/A	Exceedance of aquatic life benchmark at two locations (SD03, SD08). Exceedance of wildlife benchmark at one location (SD08).
Aldrin	5.3	N/A	**0.77** (Aldrin & Dieldrin)	N/A	Exceedance of wildlife benchmark at one location (SD01).
Heptachlor epoxide	7.1	**0.1** (Heptachlor and Heptachlor epoxide)	**0.03** (Heptachlor and Heptachlor epoxide)	**4.9**	Exceedance of multiple benchmarks at one location (SD01).

TABLE 3-4

COMPARISON OF SEDIMENT RESULTS TO SEDIMENT BENCHMARKS VALUES(1)
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 3 OF 4

Chemical of Potential Concern(2)	Maximum Concentration (3)	NYSDEC Aquatic Life (chronic)(4)	NYSDEC Wildlife Bioaccum-ulation(4)	US DOE(5)	Notes
Endosulfan I	0.79	**0.03**	N/A	N/A	Exceedance of aquatic life benchmark at one location (SD03).
4,4'-DDE	380	N/A	**1.0**	N/A	Exceedance of wildlife benchmark at multiple locations (SD01, SD02, SD03, SD04, SD05, SD08).
4,4'-DDD	2,000	N/A	**1.0**	**63**	Exceedance of multiple benchmarks at SD01, SD05, and SD08. Exceedances of wildlife benchmark at SD02, SD03, SD04.
4,4'-DDT	900	**1.0**	**1.0**	**745**	Exceedance of multiple benchmarks at two locations (SD03, SD05).
Endrin aldehyde	21	**4.0** (Endrin)	**0.8** (Endrin)	42	Exceedance of multiple benchmarks at one location (SD01).
alpha-Chlordane	16	**0.03** (Chlordane)	**0.006** (Chlordane)	437 (Chlordane)	Exceedance of multiple benchmarks at SD01 and SD03.
gamma-Chlordane	28	**0.03** (Chlordane)	**0.006** (Chlordane)	437 (Chlordane)	Exceedance of multiple benchmarks at SD01, SD03, and SD08.
Aroclor-1248	380	**19.3** (PCB)	**1.4** (PCB)	1,050	Exceedance of multiple benchmarks at SD01 and SD04.
Aroclor-1254	93	**19.3** (PCB)	**1.4** (PCB)	170	Exceedance of multiple benchmarks at one location (SD04).
Aroclor-1260	730	**19.3** (PCB)	**1.4** (PCB)	1,099,000	Exceedance of multiple benchmarks at one location (SD01).
METALS (mg/kg)					
Cadmium	4.1	**0.6**-low effect 9.0-severe	N/A	**0.6**-lowest effect **1.2**-effects range-low 9.6-effects range-median	Slight exceedance of conservative "low effects" benchmarks found at one location (SD01). Corresponding "severe effect" benchmarks were not exceeded.

TABLE 3-4

COMPARISON OF SEDIMENT RESULTS TO SEDIMENT BENCHMARKS VALUES(1)
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 4 OF 4

Chemical of Potential Concern(2)	Maximum Concentration (3)	NYSDEC Aquatic Life (chronic)(4)	NYSDEC Wildlife Bioaccum-ulation(4)	US DOE(5)	Notes
Lead	136	**31.0**-low effect **110.0**-severe	N/A	**46.7**-effects range-low 218-effects range-median	Exceedances of several available benchmarks suggests a potential for ecological risk at one location (SD01). No exceedances of this, or the corresponding "low effect" benchmark, found elsewhere in the pond.
Nickel	23.0	**16.0**-low effect 50.0-severe	N/A	**21**-effects range-low 52-effects range-median	Slight exceedance of conservative "low effect" benchmarks found at one location (SD01). The corresponding "severe effect" benchmark was not exceeded.
Selenium	2.3	N/A	N/A	N/A	No available benchmarks for this compound.
Silver	28.2	**1.0**-low effect **2.2**-severe	N/A	**1**-effects range-low **3.7**-effects range-median	Substantial exceedance of multiple benchmarks at one location (SD01).

1 Data presented for eight sediment sample locations at Northeast Pond, as reported in RFI dated August 1995. Sample depths were 0 to 6 inches and 6 to 12 inches.

2 Only those COPCs detected in one or more surface sediment samples at Northeast Pond are listed in this table. Sample data considered included that reported in Table 4-18 of the RFI for Sample Locations NP-SD01-0005, NP-SD01-0510, NP-SD02-0005, NP-SD02-0510, NP-SD03-0005, NP-SD03-0510, NP-SD04-0005, NP-SD04-0510, NP-SD05-0005, NP-SD06-0005, NP-SD07-0005, and NP-SD08-0005.

3 The listed concentration is the highest of those reported in Table 4-18 of the RFI for Sample Locations NP-SD01-0005, NP-SD01-0510, NP-SD02-0005, NP-SD02-0510, NP-SD03-0005, NP-SD03-0510, NP-SD04-0005, NP-SD04-0510, NP-SD05-0005, NP-SD06-0005, NP-SD07-0005, and NP-SD08-0005.

4 Source: New York State Department of Environmental Conservation, "Technical Guidance for Screening Contaminated Sediments", November 1993 (updated 1998 and 1999). Assumes organic carbon content of 555 mg/kg.

5 Source: "Screening Benchmarks for Ecological Risk Assessment", Version 1.5, January 1996. Computer database prepared by Environmental Sciences and Health Sciences Research Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

N/A - Not Available.

TABLE 3-5

COMPARISON OF SURFACE WATER RESULTS TO BENCHMARK VALUES[1]
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 1 OF 3

Chemical of Potential Concern[2]	Maximum Concen-tration (µg/L)[3]	AWQC acute[4] (µg/L)	AWQC chronic (µg/L)[4]	NYS AWQS Class D (µg/L)[5]	NYS Guid-ance (µg/L)[5]	Tier II acute[6] (µg/L)	Tier II chronic (µg/L)[6]	LCV (µg/L)[6]	Notes
Toluene	1	N/A[7]	N/A	6,000	480	120	9.8	1,269 (fish)	Available benchmarks do not suggest a potential risk.
4,4'-DDD	0.02	N/A	N/A	**8E-05**	N/A	0.19	**0.011**	1.69 (fish)	Acute benchmark not exceeded; chronic benchmark, and state AWQS exceeded. Risk appears to be marginal. Organisms most at risk would be expected to be invertebrates. However, macroinvertebrate inventory data for sediments collected from Northeast Pond and an uncontaminated reference pond does not suggest that populations are being significantly impacted.
Aluminum	218	750	**87**	N/A	N/A	N/A	N/A	460 (aqu. plants)	Acute benchmark not exceeded; chronic benchmark exceeded by a factor of less than 3. Risk appears to be marginal.

TABLE 3-5

COMPARISON OF SURFACE WATER RESULTS TO BENCHMARK VALUES(1)
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 2 OF 3

Chemical of Potential Concern[2]	Maximum Concen-tration (µg/L)[3]	AWQC acute(4) (µg/L)	AWQC chronic (µg/L)(4)	NYS AWQS Class D (µg/L)(5)	NYS Guid-ance (µg/L)(5)	Tier II acute(6) (µg/L)	Tier II chronic (µg/L)(6)	LCV (µg/L)(6)	Notes
Cadmium	0.20	1.20(8)	0.48(8)	1.2(8)	N/A	N/A	N/A	**0.15** (daph-nids)	Acute and chronic benchmarks not exceeded, but there have been reports of some macroinvertebrate species being adversely affected by cadmium concentrations slightly lower than those measured in water at Northeast Pond. However, macroinvertebrate inventory data for sediments collected from Northeast Pond and an uncontaminated reference pond does not suggest that populations are being significantly impacted.
Calcium	10,700	N/A	N/A	N/A	N/A	N/A	N/A	116,000 (daph-ids)	Available benchmarks do not suggest a potential risk.
Iron	1,470	N/A	**1,000**	**300**	N/A	N/A	N/A	**158** (daph-nids)	Chronic benchmark exceeded by a factor of approximately 1.5; there are reports of some macroinvertebrate species being adversely affected by iron concentrations approximately 10 percent of those measured at Northeast Pond. However, macroinvertebrate inventory data for sediments collected from Northeast Pond and an uncontaminated reference pond does not suggest that populations are being significantly impacted.

TABLE 3-5

COMPARISON OF SURFACE WATER RESULTS TO BENCHMARK VALUES[1]
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 3 OF 3

Chemical of Potential Concern[2]	Maximum Concen-tration (µg/L)[3]	AWQC acute[4] (µg/L)	AWQC chronic (µg/L)[4]	NYS AWQS Class D (µg/L)[5]	NYS Guid-ance (µg/L)[5]	Tier II acute[6] (µg/L)	Tier II chronic (µg/L)[6]	LCV (µg/L)[6]	Notes
Magnesium	1,130	N/A	N/A	N/A	N/A	N/A	N/A	82,000 (daph-nids)	Available benchmarks do not suggest a potential risk.
Manganese	61.4	N/A	N/A	N/A	N/A	2,300	120	<1,100 (daph-ids)	Available benchmarks do not suggest a potential risk.
Potassium	1,170	N/A	N/A	N/A	N/A	N/A	N/A	53,000 (daph-ids)	Available benchmarks do not suggest a potential risk.
Sodium	4,960	N/A	N/A	N/A	N/A	N/A	N/A	680,000 (daph-ids)	Available benchmarks do not suggest a potential risk.

1 Data presented for four surface water sample locations at Northeast Pond, as reported in RFI dated August 1995.
2 Only those COPCs detected in one or more surface water samples at Northeast Pond are listed in this table. Sample data considered included that reported in Table 4-16 of the RFI for Sample Locations NP-SW01, NP-SW03, NP-SW04, and NP-SW08.
3 The listed concentration is the highest of those reported in Table 4-16 of the RFI for Sample Locations NP-SW01, NP-SW03, NP-SW04, and NP-SW08.
4 Benchmarks based on national recommended water quality criteria (EPA, 1999).
5 Benchmarks are as listed in the October 1993 edition (and updates) of "Ambient Water Quality Standards and Guidance Values", published by the New York State Department of Environmental Conservation. NYSAWQS refers to New York State Ambient Water Quality Standards, which are New York State regulatory standards. The New York State (NYS) Guidance Values are nonregulatory benchmarks developed based on scientific literature.
6 The "Tier II" benchmarks and "LCV" benchmarks are as listed in "Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision" by G.W. Suter and C.L. Tsao. They are nonregulatory benchmarks based on scientific literature. "LCV" refers to least chronic value reported as having an adverse effect on any group of biological species.
7 N/A indicates that that category of benchmark has not been developed for the subject contaminant.
8 Based on hardness of 35.6 mg/L.

TABLE 3-6

COMPARISON OF SOIL RESULTS TO BENCHMARK VALUES
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 1 OF 4

Chemical of Potential Concern[2]	Maximum concen-tration[3]	DOE-OR Plants[4]	DOE-OR Litter[5]	Quebec B-level[6]	Region 3 Flora[7]	Region 3 Fauna[7]	Notes
SEMIVOLATILE ORGANICS (µg/kg)							
Di-n-butyl phthalate	240	200,000	N/A	N/A	N/A	N/A	Available benchmarks do not suggest a potential ecological risk.
Fluoranthene	27	N/A	N/A	10,000	100	100	Available benchmarks do not suggest a potential ecological risk.
Pyrene	35	N/A	N/A	10,000	100	100	Available benchmarks do not suggest a potential ecological risk.
Butylbenzyl-phthalate	82	N/A	N/A	N/A	N/A	N/A	No benchmarks available for this compound.
Chrysene	19	N/A	N/A	1,000	100	100	Available benchmarks do not suggest a potential ecological risk.
Bis(2-ethylhexyl)-phthalate	97	N/A	N/A	N/A	N/A	N/A	No benchmarks available for this compound.
Benzo(b)fluoran-thene	24	N/A	N/A	1,000	100	100	Available benchmarks do not suggest a potential ecological risk.
Benzo(k)-fluoranthene	28	N/A	N/A	1,000	100	100	Available benchmarks do not suggest a potential ecological risk.
Benzo(a)pyrene	20	N/A	N/A	1,000	N/A	100	Available benchmarks do not suggest a potential ecological risk.

TABLE 3-6

COMPARISON OF SOIL RESULTS TO BENCHMARK VALUES
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 2 OF 4

Chemical of Potential Concern[2]	Maximum concen-tration[3]	DOE-OR Plants[4]	DOE-OR Litter[5]	Quebec B-level[6]	Region 3 Flora[7]	Region 3 Fauna[7]	Notes
PESTICIDES/PCBs (µg/kg)							
Aldrin	4.0	N/A	N/A	N/A	<100	<100	Available benchmarks do not suggest a potential ecological risk.
Endosulfan	3.3	N/A	N/A	N/A	N/A	N/A	Although no specific benchmarks available, Quebec has established a B-level benchmark for the sum of all pesticides in soil of 1,000 µg/kg. The sum of the highest pesticide readings for soil at Northeast Pond is 69.3, which is below the benchmark.
4,4'-DDE	7.0	N/A	N/A	N/A	<100	<100	Available benchmarks do not suggest a potential ecological risk.
4,4'-DDD	12	N/A	N/A	N/A	<100	<100	Available benchmarks do not suggest a potential ecological risk.
4,4'-DDT	13	N/A	N/A	N/A	<100	<100	Available benchmarks do not suggest a potential ecological risk.
alpha-Chlordane	3.0	N/A	N/A	N/A	<100 (for chlordane)	<100 (for chlordane)	Available benchmarks do not suggest a potential ecological risk.
gamma-Chlordane	27	N/A	N/A	N/A	<100 (for chlordane)	<100 (for chlordane)	Available benchmarks do not suggest a potential ecological risk.

TABLE 3-6

COMPARISON OF SOIL RESULTS TO BENCHMARK VALUES
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 3 OF 4

Chemical of Potential Concern[2]	Maximum concen-tration[3]	DOE-OR Plants[4]	DOE-OR Litter[5]	Quebec B-level[6]	Region 3 Flora[7]	Region 3 Fauna[7]	Notes
Aroclor-1248	99	N/A	N/A	N/A	100 (for PCBs)	N/A	No benchmarks specific for this compound. There appears to be a potential ecological risk associated with total PCBs.
Aroclor-1254	280	N/A	N/A	N/A	**100** (for PCBs)	N/A	Available benchmarks suggests that there is a potential for significant ecological risk to a broad spectrum of receptors.
Aroclor-1260	28	N/A	N/A	N/A	100 (for PCBs)	N/A	No benchmarks specific for this compound. There appears to be a potential ecological risk associated with total PCBs.
METALS (mg/kg)							
Cadmium	2.5	3	20	5	2.5	N/A	Available benchmarks do not suggest a potential ecological risk.
Chromium	150	**1**	**0.4**	250	**0.020**	**0.0075**	Available benchmarks suggests that there is a potential for significant ecological risk to a broad spectrum of receptors.

1 Data presented for five surface soil sample locations at Northeast Pond, as reported in RFI dated August 1995. Sample depth was 0 to 6 inches.

2 Only those COPCs detected in one or more surface soil samples at Northeast Pond are listed in this table. Sample data considered included that reported in Table 4-8 of the RFI for Sample Locations NP-SS01-0005, NP-SS02-0005, NP-SS03-0005, NP-SS04-0005, and NP-SS05-0005.

3 The concentrations tabulated in this column represent the highest of those reported in Table 4-8 of the RFI for Sample Locations NP-SS01-0005, NP-SS02-0005, NP-SS03-0005, NP-SS04-0005, and NP-SS05-0005.

4 Source: Will, M. E. and G. W. Suter II, 1995a. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1995 Revision. Oak Ridge National Laboratory, Oak Ridge, Tennessee. 123 pp. ES/ER/TM-85/R2.

TABLE 3-6

COMPARISON OF SOIL RESULTS TO BENCHMARK VALUES
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 4 OF 4

5. Source: Will, M. E. and G. W. Suter II, 1995b. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes. Oak Ridge National Laboratory, Oak Ridge, Tennessee. 155 pp. ES/ER/TM-126/R1.
6 Source: Criteria for ascertaining the contamination of soil and groundwater in the Province of Quebec, Table 4.12 in "International Review of Approaches for Establishing Cleanup Goals for Hazardous Waste Contaminated Land" by R. L. Siegrist of the Institute for Georesources and Pollution Research, 1989. The B-level benchmarks represent concentration levels above which further analysis is necessary to determine whether there is potential risk to human or ecological receptors.
7 Source: Revised Region III BTAG Screening Levels, August 9, 1995

N/A - Not Available.

TABLE 3-7

BENTHIC MACROINVERTIBRATE POPULATION DATA
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 1 OF 3

Taxonomic Data			Shannon's Pond Reference Site		Northeast Pond Edge of Landfill		Northeast Pond Edge of Landfill		Northeast Pond Southeast Shore	
Species	TV(1)	FFG(2)	SP-1 Kicknet Sample(3)	SP-1 Core Mean(4)	NEP-2 Kicknet Sample(3)	NEP-2 Core Mean(4)	NEP-4 Kicknet Sample(3)	NEP-4 Core Mean(4)	NEP-5 Kicknet Sample(3)	NEP-5 Core Mean(4)
PHYLUM ANNELIDA	-	-								
Class Oligochaeta	-	-								
Order Haplotaxida	-	-								
Family Enchytraeidae	10	CG	315	7.5	0	0	0	0	0	0
Family Tubificidae	10	CG	0	0	1	0	0	0	0	0
Order Lumbriculida	-	-								
Family Lumbriculidae	-	-								
Lumbriculus sp.	8	CG	2	0	14	1.5	18	4.5	0	1.5
PHYLUM ARTHROPODA	-	-								
Class Insecta	-	-								
Order Odonata	-	-								
Family Libellulidae	-	-								
Libellula luctuosa	8	P	1	0	0	0	0	0	0	0

TABLE 3-7

BENTHIC MACROINVERTIBRATE POPULATION DATA
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 2 OF 3

Taxonomic Data			Shannon's Pond Reference Site		Northeast Pond Edge of Landfill		Northeast Pond Edge of Landfill		Northeast Pond Southeast Shore	
Species	TV(1)	FFG(2)	SP-1 Kicknet Sample(3)	SP-1 Core Mean(4)	NEP-2 Kicknet Sample(3)	NEP-2 Core Mean(4)	NEP-4 Kicknet Sample(3)	NEP-4 Core Mean(4)	NEP-5 Kicknet Sample(3)	NEP-5 Core Mean(4)
Order Coleoptera	-	-								
Family Dytiscidae	-	-								
Agabus sp.	5	P	0	0	0	0	1	0.5	0	0
Hydroporus sp.	3	PI	0	0	0	0	1	0	0	0
Family Elateridae	N/A	N/A	0	0.5	0	0	0	0.5	0	0
Family Scirtidae	4	SC	0	0	0	0	2	0	0	0
Order Diptera	-	-								
Family Ceratopogonidae	-	-								
Bezzia/Palpomyia sp.	6	P	0	0.5	0	0	0	0.5	0	0
Family Chironomidae	-	-								
Ablabesmyia mallochi	8	P	0	0.5	0	0	0	0.5	2	0
Chironominae	N/A	N/A	0	0	0	0	1	0	0	0
Chironomus sp.	10	CG	0	0	1	1	0	0	0	0
Limnophyes sp.	N/A	N/A	0	1	0	0	0	0	0	0
Orthocladiinae sp.	N/A	N/A	0	0	0	0	0	1	0	0
Parachironomus sp.	10	CG	0	0	0	0	0	0	0	0.5

TABLE 3-7

BENTHIC MACROINVERTIBRATE POPULATION DATA
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 3 OF 3

Taxonomic Data			Shannon's Pond Reference Site		Northeast Pond Edge of Landfill		Northeast Pond Edge of Landfill		Northeast Pond Southeast Shore	
Species	TV(1)	FFG(2)	SP-1 Kicknet Sample(3)	SP-1 Core Mean(4)	NEP-2 Kicknet Sample(3)	NEP-2 Core Mean(4)	NEP-4 Kicknet Sample(3)	NEP-4 Core Mean(4)	NEP-5 Kicknet Sample(3)	NEP-5 Core Mean(4)
Polypedilum illinoense	6	SH	0	0	2	0	0	0	1	0
Procladius sp.	9	P	1	0	0	0	0	0	0	0
Psectrocladius sp. (*Psectrocladius sp.*)	8	SH	0	0	1	0	0	0	0	0
Psectrocladius sp. (*Monopsectrocladius sp.*)	8	SH	2	0	0	0	0	0	0	0
Thienemannimyia sp.	6	P	0	0	0	0	1	0	0	0
Family Dolichopodidae	N/A	N/A	0	1	0	0	1	0	0	0
Family Psychodidae	10	CG	0	0	0	0	0	0.5	0	0
Family Tabanidae	-	-								
Tabanus sp.	5	PI	0	0.5	0	0	0	0	0	0
TOTAL NUMBER OF ORGANISMS	-	-	321	11.5	19	2.5	25	8	3	2
TOTAL NUMBER OF TAXA	-	-	5	4.5	5	1	7	4	2	1

1 TV: New York State Tolerance Value, indicates relative tolerance of the taxa to organic contaminants. Values range from 0 for taxa very intolerant of organic wastes to 10 for taxa very tolerant of organic waste.

2 FFG: Functional Feeding Group, provides information on the feeding habits of the taxa. SH=shredder, CG=collector/gatherer, FC=filtering collector, SC=scraper, P=predator, PI=piercer.

3 Kicknet sampling involved collecting upper 2 to 3 inches of surface sediment from roughly 1 square meter. Because of the dense vegetation at most locations, the volume of material collected was highly variable.

4 Means represent the average numbers of organisms in two sediment samples collected at each locations using a 2-inch diameter bucket auger in the upper 6 inches of sediment.

N/A - Not Available.

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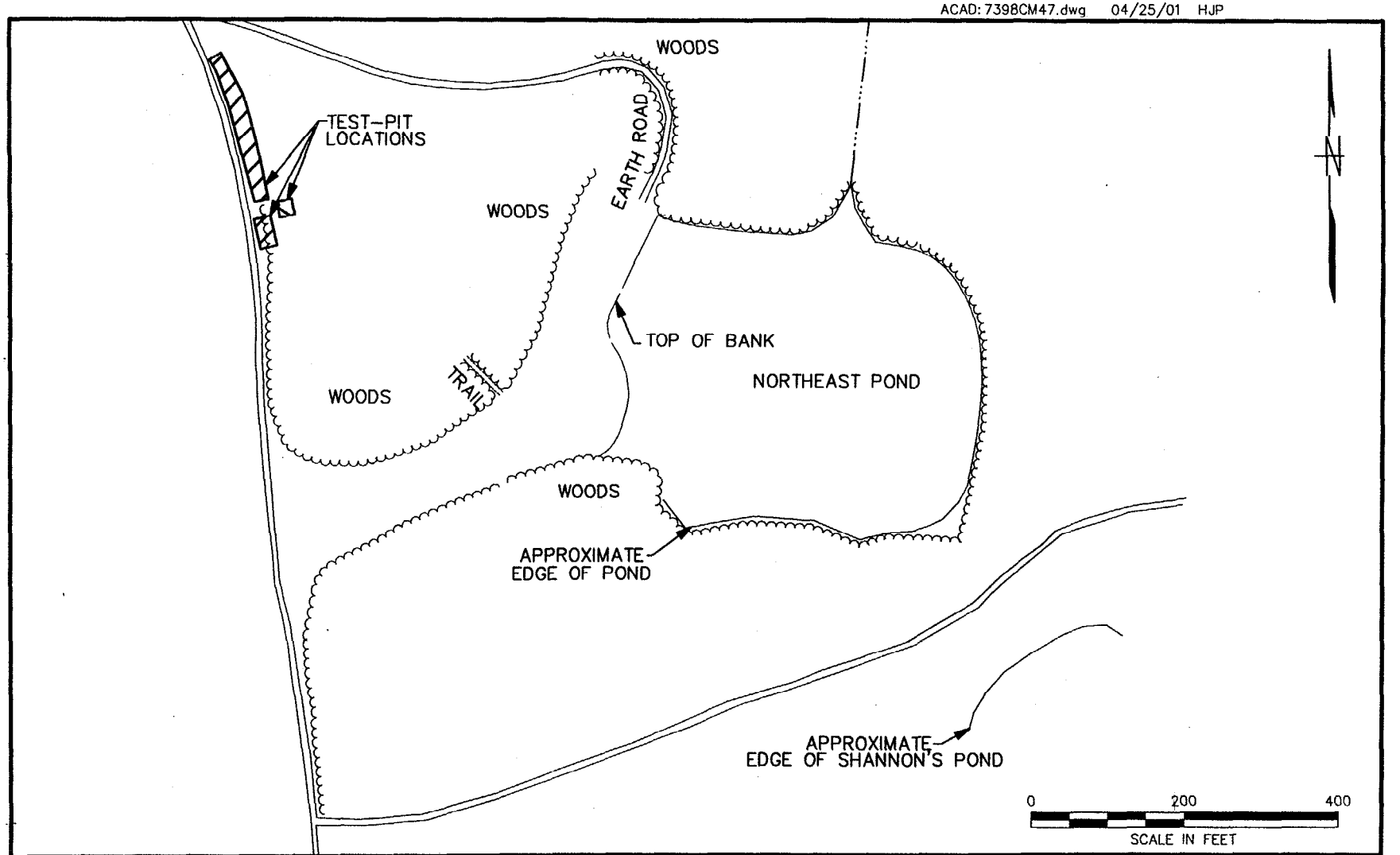

DRAWN BY HJP DATE 4/25/01	Tetra Tech NUS, Inc.	CONTRACT NO. 7398	OWNER NO. 0270
CHECKED BY DATE	TEST PIT LOCATIONS SITE 1 – NORTHEAST POND DISPOSAL AREA NWIRP CALVERTON, NEW YORK	APPROVED BY DATE	
COST/SCHED-AREA		APPROVED BY DATE	
SCALE AS NOTED		DRAWING NO. FIGURE 3-1	REV. 0

FORM CADD NO. TtNUS_AH.DWG - REV 0 - 1/22/98

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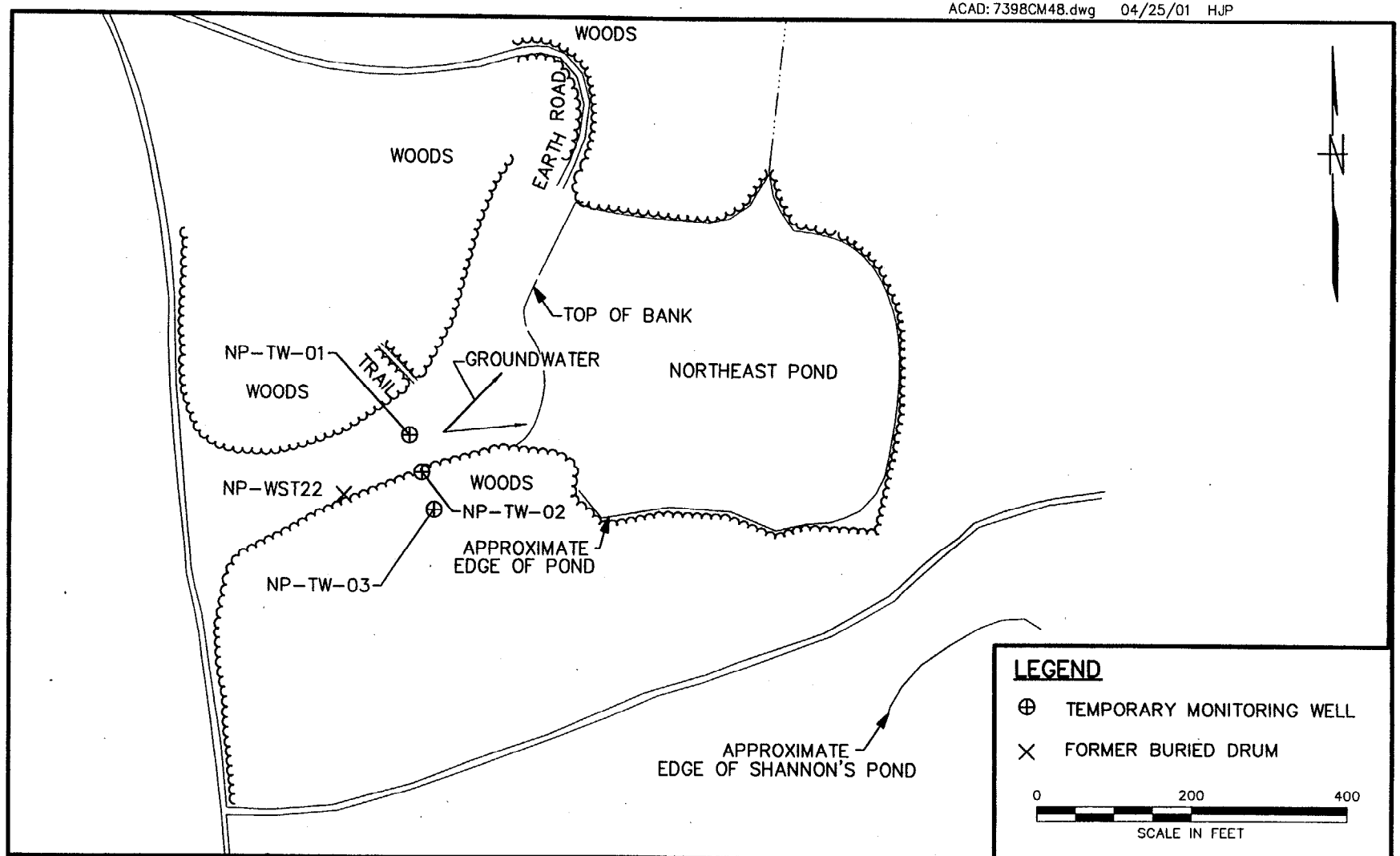
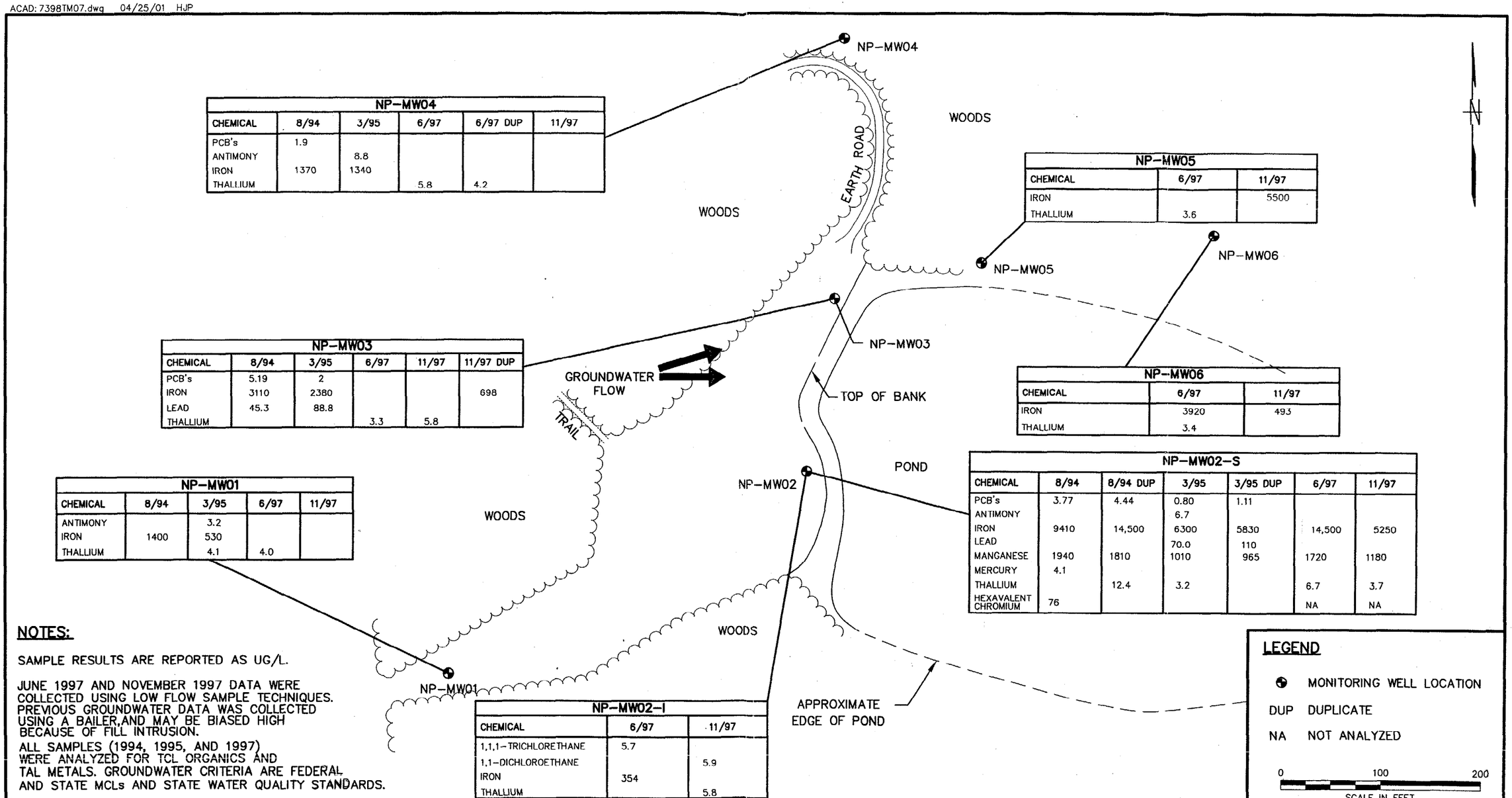


DRAWN BY HJP DATE 4/25/01	Tetra Tech NUS, Inc.	CONTRACT NO. 7398	OWNER NO. 0270
CHECKED BY DATE	TEMPORARY MONITORING WELL LOCATIONS SITE 1 – NORTHEAST POND DISPOSAL AREA NWIRP CALVERTON, NEW YORK	APPROVED BY DATE	
COST/SCHED-AREA		APPROVED BY DATE	
SCALE AS NOTED		DRAWING NO. FIGURE 3-2	REV. 0

FORM CADD NO. T+NUS_AH.DWG - REV 0 - 1/22/98

ACAD: 7398TM07.dwg 04/25/01 HJP



NP-MW04					
CHEMICAL	8/94	3/95	6/97	6/97 DUP	11/97
PCB's	1.9				
ANTIMONY		8.8			
IRON	1370	1340			
THALLIUM			5.8	4.2	

NP-MW05		
CHEMICAL	6/97	11/97
IRON		5500
THALLIUM	3.6	

NP-MW03					
CHEMICAL	8/94	3/95	6/97	11/97	11/97 DUP
PCB's	5.19	2			
IRON	3110	2380			698
LEAD	45.3	88.8			
THALLIUM			3.3	5.8	

NP-MW06		
CHEMICAL	6/97	11/97
IRON	3920	493
THALLIUM	3.4	

NP-MW02-S						
CHEMICAL	8/94	8/94 DUP	3/95	3/95 DUP	6/97	11/97
PCB's	3.77	4.44	0.80	1.11		
ANTIMONY			6.7			
IRON	9410	14,500	6300	5830	14,500	5250
LEAD			70.0	110		
MANGANESE	1940	1810	1010	965	1720	1180
MERCURY	4.1					
THALLIUM		12.4	3.2		6.7	3.7
HEXAVALENT CHROMIUM	76				NA	NA

NP-MW01				
CHEMICAL	8/94	3/95	6/97	11/97
ANTIMONY		3.2		
IRON	1400	530		
THALLIUM		4.1	4.0	

NP-MW02-I		
CHEMICAL	6/97	11/97
1,1,1-TRICHLORETHANE	5.7	
1,1-DICHLOROETHANE		5.9
IRON	354	
THALLIUM		5.8

NOTES:

SAMPLE RESULTS ARE REPORTED AS UG/L.

JUNE 1997 AND NOVEMBER 1997 DATA WERE COLLECTED USING LOW FLOW SAMPLE TECHNIQUES. PREVIOUS GROUNDWATER DATA WAS COLLECTED USING A BAILER,AND MAY BE BIASED HIGH BECAUSE OF FILL INTRUSION.

ALL SAMPLES (1994, 1995, AND 1997) WERE ANALYZED FOR TCL ORGANICS AND TAL METALS. GROUNDWATER CRITERIA ARE FEDERAL AND STATE MCLs AND STATE WATER QUALITY STANDARDS.

LEGEND

⊕ MONITORING WELL LOCATION

DUP DUPLICATE

NA NOT ANALYZED

0 100 200
SCALE IN FEET

REVISIONS	NO.	DATE	BY	CHKD	APPD	REFERENCES

DRAWN BY HJP DATE 4/25/01
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE RESULTS EXCEEDING CRITERIA
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK

CONTRACT NO. 7398
OWNER NO. 0270
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 3-3
REV. 0

FORM CADD NO. TtNUS_BH.DGN - REV 0 - 1/20/98

040111/P

CTOs 0189/0270

ACAD: 4570TM01.dwg 06/01/01 HJP

CHEMICAL	NP-SD-03-0006 (APR '94)	NP-SD-03-0612 (APR '94)	NP-SD12-1218 (JUN '97)	NP-SD12-1824 (JUN '97)
TOLUENE	5	6	NA	NA
TOTAL PAH'S	173	173		
TOTAL PHTHALATES			110	81
4-METHYLPHENOL		53		
BETA-BHC	0.41			
ENDUSULFAN I		0.79		
4,4'-DDE	1.6	4.0		
4,4'-DDD	2.0			
4,4'-DDT	2.3	3.7		
ENDRIN ALDEHYDE	0.48			
ALPHA CHLORDANE	0.71	0.61		
GAMMA CHLORDANE		1.1		
BERILLIUM			0.08*	0.12*
LEAD	6.2	16.6	3.0*	3.4*
NICKEL			15.8*	
ZINC			8.7*	8.1*
BENTHIC SPECIES-KN	5 SPECIES	NA	NA	NA
BENTHIC SPECIES-CO	1/1 SPECIES	NA	NA	NA

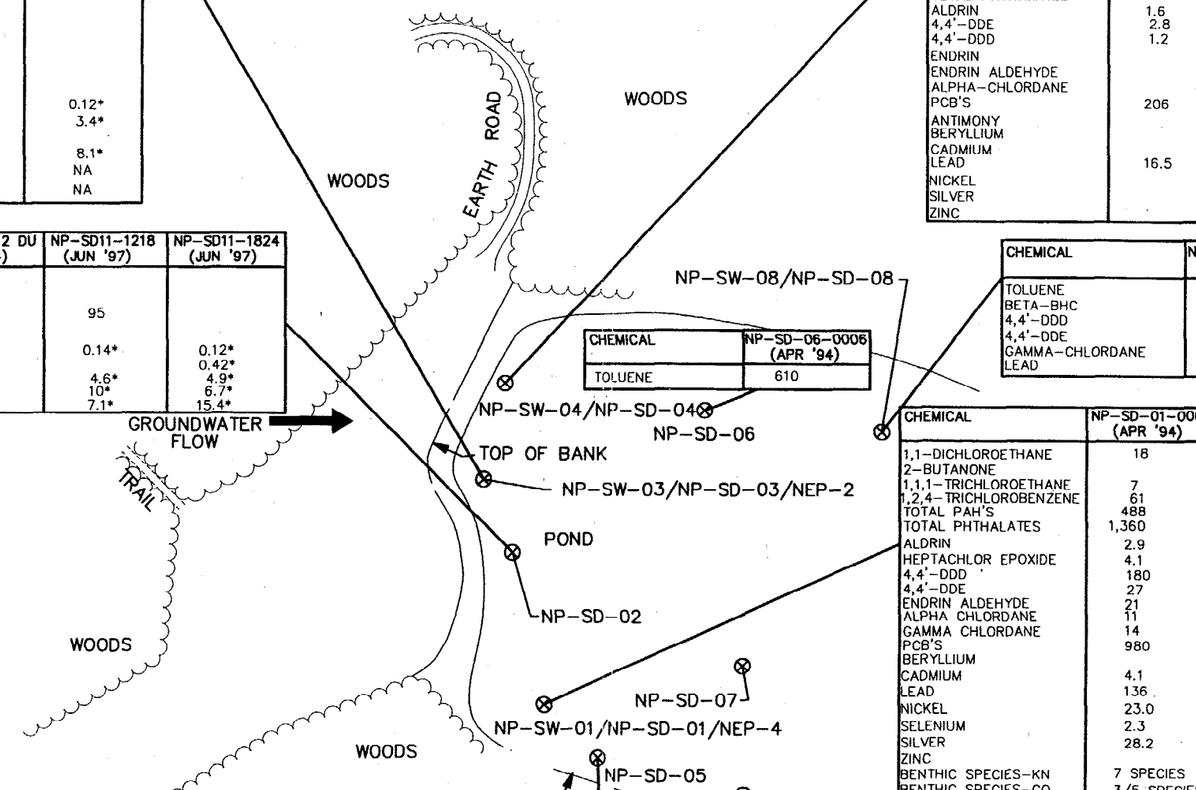
CHEMICAL	NP-SD-02-0006 (APR '94)	NP-SD-02-0612 (APR '94)	NP-SD02-0612 DU (APR '94)	NP-SD11-1218 (JUN '97)	NP-SD11-1824 (JUN '97)
PHENOL		46	44		
TOTAL PAH'S	680				
TOTAL PHTHALATES				95	
4,4'-DDE	2.0	2.4	2.0		
4,4'-DDD		2.5	2.5		
BERYLLIUM				0.14*	0.12*
CADMIUM					0.42*
LEAD				4.6*	4.9*
NICKEL				10*	6.7*
ZINC				7.1*	15.4*

CHEMICAL	NP-SD-04-0006 (APR '94)	NP-SD-04-0612 (APR '94)	NP-SD13-1218 (JUN '97)	NP-SD13-1824 (JUN '97)
1,1,1-TRICHLOROETHANE		1	NA	NA
TOLUENE		2	NA	NA
TOTAL PAH'S	380	370	296	154
TOTAL PHTHALATES		57	184	120
ALDRIN	1.6	2.2		
4,4'-DDE	2.8	2.8		
4,4'-DDD	1.2	1.7		
ENDRIN			11	4.5
ENDRIN ALDEHYDE			6.0	
ALPHA-CHLORDANE			2.5	
PCB'S	206	293	217	76
ANTIMONY			0.45*	
BERYLLIUM			0.13*	0.08*
CADMIUM			0.49*	0.32*
LEAD	16.5	19.2	11.7	8.5
NICKEL			12.2*	5.7*
SILVER			1.1*	1.1*
ZINC			29.7*	21.4*

CHEMICAL	NP-SD-06-0006 (APR '94)
TOLUENE	610

CHEMICAL	NP-SD-08-0006 (APR '94)
TOLUENE	16
BETA-BHC	2.4
4,4'-DDD	110
4,4'-DDE	29
GAMMA-CHLORDANE	1.2
LEAD	15.1

CHEMICAL	NP-SD-01-0006 (APR '94)	NP-SD-01-0612 (APR '94)	NP-SD10-1218 (JUN '97)	NP-SD10-1824 (JUN '97)	NP-SD10-1824 DU (JUN '97)
1,1-DICHLOROETHANE	18		NA	NA	NA
2-BUTANONE		83	NA	NA	NA
1,1,1-TRICHLOROETHANE	7		NA	NA	NA
1,2,4-TRICHLOROBENZENE	61				
TOTAL PAH'S	488				
TOTAL PHTHALATES	1,360	130	120	150	100
ALDRIN	2.9	5.3			
HEPTACHLOR EPOXIDE	4.1	7.1			
4,4'-DDD	180	71			
4,4'-DDE	27	12			
ENDRIN ALDEHYDE	21	5.4			
ALPHA CHLORDANE	11	16			
GAMMA CHLORDANE	14	28			
PCB'S	980	590			
BERYLLIUM			0.37*	0.31*	0.28*
CADMIUM	4.1	2.1			
LEAD	136	27.3	6.5	4.7*	4.1*
NICKEL	23.0		8.2*	6.9*	12.4*
SELENIUM	2.3	1.2	1.2	0.77*	0.73*
SILVER	28.2	4.5			
ZINC			14.4*	14.6*	12.2*
BENTHIC SPECIES-KN	7 SPECIES	NA	NA	NA	NA
BENTHIC SPECIES-CO	3/5 SPECIES	NA	NA	NA	NA



CHEMICAL	NP-SD-05-0006 (APR '94)
TOTAL PAH'S	79
4,4'-DDE	380
4,4'-DDD	2,000
4,4'-DDT	900
SELENIUM	1.1

BENTHIC TEST	NP-SD07-0006
BENTHIC SPECIES-KN	2 SPECIES
BENTHIC SPECIES-CO	1/1 SPECIES

BENTHIC TEST	SP-1
BENTHIC SPECIES-KN	5 SPECIES
BENTHIC SPECIES-CO	6/3 SPECIES

NOTES:

SAMPLE RESULTS FOR ORGANICS ARE REPORTED AS ug/kg .
SAMPLE RESULTS FOR INORGANICS ARE REPORTED AS mg/kg.

WITH THE EXCEPTION OF RESULTS MARKED WITH AN ASTERISK (*) INORGANIC RESULTS PRESENTED HAVE BEEN IDENTIFIED AS BEING AT CONCENTRATIONS STATISTICALLY GREATER THAN BACKGROUND AND TOXIC. TOXIC METALS INCLUDE ALL TAL METALS, EXCEPT CALCIUM, MAGNESIUM, POTASSIUM, AND SODIUM

THE LAST 4-FOUR DIGITS OF THE SAMPLE CODE INDICATE SAMPLE DEPTH MEASURED IN INCHES (e.g. 0006 IS EQUAL TO 0 TO 6 INCHES BELOW THE TOP OF THE SEDIMENT).

BENTHIC TESTING WAS CONDUCTED IN JUNE 1997;

LEGEND

⊗ SAMPLE LOCATION
CO CORE SAMPLE (PROFORMED IN DUPLICATE)
NA NOT ANALYZED
KN KICKNET
— - — PROPERTY LINE

0 120 240
SCALE IN FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY HJP DATE 6/1/01
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

Tetra Tech NUS, Inc.

SEDIMENT SAMPLE RESULTS
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK

CONTRACT NO. 4570
OWNER NO. 0189
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 3-4
REV. 0

FORM CADD NO. TtNUS_BH.DGN - REV 0 - 1/20/98

4.0 SUMMARY OF CURRENT CONDITIONS

The following sections provide a summary of the nature and extent of contamination, contaminant fate and transport, human health risk assessment, and ecological risk assessment. Much of the information provided is discussed in detail in Section 2.6 (Previous Investigations) and Section 3.0 (Phase 2 Remedial Investigation).

4.1 NATURE AND EXTENT OF CONTAMINATION

Contaminated materials identified at Site 1 include fill material, soil, groundwater, surface water, and sediment. The nature and extent of contamination have been defined adequately to develop and evaluate remedial alternatives.

In general, VOCs were detected sporadically and at relatively low concentrations in the fill materials. SVOCs, including PAHs and phthalates, pesticides, and PCBs were detected throughout the fill material. Metals, including chromium, copper, hexavalent chromium, lead, nickel, silver, and zinc, were detected in a portion of the fill at concentrations approximately 100 to 1,000 times background levels. Other metals were also detected at concentrations above background levels. The estimated areal extent of fill material is approximately 70,000 square feet (1.6 acres). At an average depth of 8.0 feet, the estimated volume of fill material is 21,000 cy.

The following discussion on groundwater contamination is based on samples collected in 1997. These samples were collected using a low-flow sampling technique and are more representative of current conditions than the samples collected in 1994 and 1995. VOCs and SVOCs were detected sporadically and at relatively low concentrations in groundwater. VOC concentrations only exceeded groundwater criteria at one location. No SVOC concentrations exceeded groundwater criteria. Pesticides and PCBs were not detected in any groundwater sample. Many metals were detected in groundwater. The chemicals that exceed potential groundwater standards are 1,1-dichloroethane, 1,1,1-trichloroethane, iron, manganese, and thallium. Thallium may not be site related. It was detected in the most upgradient well and laboratory and field blanks but not in other site media.

Toluene was the only VOC detected in surface water from Northeast Pond. No SVOCs or PCBs were detected. The only pesticide detected was 4,4'-DDD. Several metals were also detected in pond water samples. 4,4'-DDD was detected at concentrations above the state water quality standard in 2 of the 3 samples collected in the western portion of the pond near the landfill. This pesticide was not detected in a sample collected in the eastern portion of the pond. Iron was detected at concentrations above the

state water quality standard in all samples collected in western portion of the pond. The iron concentration in the eastern portion of the pond was below the state standard.

VOCs detected in shallow sediment samples from Northeast Pond include 2-butanone, 1,1-dichloroethane, toluene, and 1,1,1-trichloroethane. Deeper sediment samples were not analyzed for VOCs. SVOCs detected in sediment include phenolics, PAHs, and phthalates. Numerous pesticides, PCBs, and metals were also detected in sediment samples. The concentrations of chemicals detected in sediment decreased by approximately a factor of 10 from the shallowest sediment (0 to 6 inches deep) and the deepest sediment (18 to 24 inches deep). In general, the horizontal and vertical extent of sediment contamination is adequately defined. However, pesticide contamination may extend deeper than 2 feet at one location near the landfill. The estimated extent of sediment contamination is approximately 17,750 square feet (0.4 acre). At an average depth of 2.0 feet, the estimated volume of contaminated sediment is 1,315 cy.

4.2 CONTAMINANT FATE AND TRANSPORT

This section qualitatively describes the detected chemicals, transport potential, contaminant persistence, and observed chemical contaminant trends. Additional detail is provided in the RFI report (HNUS, 1995a).

4.2.1 Detected Chemicals and Transport Potential

A variety of VOCs, SVOCs, pesticides, PCBs, and inorganics were detected in fill material, soil, and sediment samples at Site 1. VOCs, SVOCs, and metals were detected in the most recent groundwater samples. VOCs, pesticides, and inorganics were detected in surface water samples. The physical transport data for the contaminants detected are presented in the RFI report.

For fill material and soil contaminants, surface dispersion transport modes, such as erosion and dust migration, typically do not provide the greatest contribution to the overall transport of chemicals in the environment. Most of the contamination detected is at subsurface locations. Vegetation in the landfill cover soil reduces, but does not eliminate, the erosion process. Many of the soil contaminants were detected at or near the groundwater interface; therefore, there is a potential for the more mobile soil contaminants to affect groundwater quality. Most of the organic chemicals detected in groundwater were also detected in soil. However, many more organics were detected in soil than in groundwater. PAHs, pesticides, and PCBs, which are relatively immobile in the environment, were detected in soil samples but not in groundwater samples. The only organic chemicals detected in groundwater but not in soil were acetone and n-nitrosodiphenylamine.

Although some exceptions are noted, most of the contaminants detected in sediment samples from Northeast Pond were also detected in soil samples. However, the major classes of chemical compounds detected in sediment (i.e., PAHs, phthalates, pesticides, and PCBs) were also detected in soil. These chemical classes are relatively immobile in the environment. This suggests that the sediment contaminants migrated from the landfill through erosion processes. The landfill is eroding along the pond shoreline. Sediment could also have been contaminated from waste disposal operations when the landfill was active.

Only two organic compounds, toluene and 4,4'-DDD, were detected in Northeast Pond water. The concentrations of these chemicals were much lower than in sediment samples. The large number of organics present in the sediment, compared to the surface water, may be attributable to the organic carbon present in the sediments. The contaminants would tend to be absorbed to the organic carbon and, therefore, concentrate in the pond sediment. The organics and metals detected in surface water may be present from erosion from the landfill or could be partitioning from the sediment.

4.2.2 Contaminant Persistence

Environmental persistence varies widely for the classes of chemicals detected at Site 1. Transformation of a chemical to degradation by-product(s) can result from numerous processes including biotransformation and uptake, photolysis, acid- or base-catalyzed reaction, or hydrolysis. The degradation by-product(s) may or may not have the same toxicological or physical transport properties. If the transformational process is known or suspected, product chemicals can be predicted, and the extent of transformation can be determined from chemical reaction rate data. Other transformational processes may be identified empirically from analytical data.

Although most chemicals are resistant to chemical change because of their stability and/or lack of reaction sites, many of the more mobile species are subjected to at least limited transformation. Because of more frequent contact with reactive dissolved species and catalysts when compared to unsaturated conditions, the contamination found in saturated media (e.g., groundwater, saturated zone soil, surface water, and sediment) are most likely to be transformed in the environment. Higher molecular weight contaminants tend to be less mobile and less prone to chemical transformation.

4.2.3 Observed Chemical Contaminant Trends

Despite having relatively high water solubility and being detected at relatively high concentrations in some of the unsaturated soil, significant amounts of VOCs were not detected in groundwater. Groundwater contaminant trends between the RFI and Phase 2 investigation cannot be established. Fill intrusion into the wells was evident during the RFI sampling, which caused the results to be biased high and to include

false positives. Based on the 1997 sample results, the concentrations of 1,1-dichloroethane, 1,1,1-trichloroethane, iron, manganese, and thallium exceed state groundwater quality standards. The data suggest that groundwater has been impacted, and further downgradient transport of the contaminants may occur. Without the benefit of a single identified source of the release and generally flat hydraulic gradient, accurate discussions about contaminant migration potential to downgradient locations cannot be made. The VOCs that exceed state standards were only detected at one location. All detections of thallium exceeded the state groundwater standard. In addition, the upgradient concentration of thallium is similar to downgradient concentrations, suggesting that the site may not be the source of this metal in groundwater. Other than thallium, iron was the only contaminant detected in downgradient wells at concentrations above the state standard.

Based on chemicals detected in surface water and groundwater, the groundwater at Site 1 has not adversely affected Northeast Pond water. The contaminants detected in surface water are likely the result of runoff and erosional dispersion that occurred during filling operations at the pond. The sediment may have contributed to the surface water contamination as evidenced by the detections of toluene and 4,4'-DDD. Downstream physical transport of surface water and sediment contaminants via runoff and erosion is not possible because the water in the area of the landfill is ponded and stagnant. Also, the Northeast Pond has no overland outlet. Although accumulation of contaminants in surface water and sediment may occur, the environmental conditions at the pond could promote degradation via biotransformation and other oxidative processes. The contaminant concentrations in sediment decrease significantly with depth, indicating that vertical migration is not significant.

4.3 HUMAN HEALTH RISK ASSESSMENT

A human health risk assessment (HHRA) was conducted during the RFI and used data generated in 1994 and 1995. The risk assessment was not revised based on the additional data collected in 1997.

Based on the quantitative risk assessment, the current conditions at Site 1 do not pose unacceptable carcinogenic or noncarcinogenic risks. The evaluated receptors include maintenance workers and adolescent recreational users. Current conditions pose an insignificant threat to human receptors engaged in routine occupational and recreational activities at the site.

Under a hypothetical future residential land use scenario, there would be unacceptable carcinogenic and noncarcinogenic risks from exposure to contaminated soil and groundwater. The ICR estimate developed for contaminants in soil (1.95E-05) is lower that that for contaminants in groundwater (2.5E-03). The primary risk drivers are aldrin, dieldrin, PCBs, and arsenic in groundwater and PCBs in soil. It should be noted that aldrin, dieldrin, and PCBs were not detected in groundwater samples collected in 1997, and arsenic was only detected in one groundwater sample collected in 1997. Therefore, the risk estimate for

groundwater would be much lower based on 1997 data. The risk from exposure to soil is within the EPA acceptable range of 1.0E-04 to 1.0E-06.

The cumulative HI for the child resident, the most sensitive receptor for systemic health effects, is 61.4. Primary contributors to this HI are PCBs, arsenic, manganese, and thallium in groundwater. Soil exposures did not result in individual HQs greater than 1.0, which indicates that adverse health effects would not be expected for this exposure route. As noted above, PCBs were not detected in 1997 groundwater samples, and arsenic was only detected at one location. In addition, the thallium concentrations in the upgradient monitoring well are similar to those at downgradient locations. Therefore, the HI for exposure to groundwater is biased high.

4.4 ECOLOGICAL RISK ASSESSMENT

The ERA conducted for the RFI identified potential chemicals of concern in water and sediment in Northeast Pond. The ERA was expanded based on the 1997 data and included an evaluation of benthic macroinvertebrate populations.

The ecological risk evaluation eliminated most of the chemicals detected in Northeast Pond and soil from further consideration. However, toluene, phenolics, pesticides, PCBs, cadmium, lead, nickel, and silver in sediment could represent potential ecological risk. Chemicals detected in surface water that may potentially cause risk to ecological receptors include 4,4'-DDD, aluminum, cadmium, and iron. For surface soil on the landfill cover, chromium and PCBs represent a potential ecological risk.

Although the potential for ecological risks from exposure to pond water and sediment has been identified, the results of the benthic macroinvertebrate investigation did not indicate adverse impacts. The diversity of feeding groups suggests a normally functioning ecological community.

5.0 REMEDIAL ACTION OBJECTIVES

The following section describes the development of the proposed remedial action objectives (RAOs) for the NWIRP Calverton Site 1, Northeast Pond Disposal Area. These RAOs and media clean-up standards are based on promulgated Federal and State of New York requirements, risk-derived standards, data and information gathered during the previous investigations, supplemental RFI/RI, and additional applicable guidance documents.

5.1 INTRODUCTION

RAOs are developed for each site as media-specific and contaminant-specific objectives that will result in the protection of human health and the environment. The development of RAOs for a site is based on human health and environmental criteria, RFI/RI gathered information, EPA guidance, and applicable federal and state regulations. Typically, RAOs are developed based on promulgated standards (e.g., water quality standards), background concentrations determined from a site-specific investigation, and human health and ecological risk-based concentrations developed in accordance with the EPA risk assessment guidance. The Phase 1 RFI (HNUS, 1995a and 1995b) and Phase 2 RI (Section 3.0) present a complete description of the nature and extent of contamination, contaminant fate and transport, baseline human health risk assessment, and ecological risk assessment. In addition, conclusions are presented. The purpose of this section is to identify ARARs and develop RAOs for remediation of Site 1. The RAOs are based on the contaminants, risk assessments, and compliance with risk-based (generally guidance) and ARAR-based action levels.

5.2 ARARS AND MEDIA OF CONCERN

5.2.1 ARAR Criteria

5.2.1.1 Introduction

The ARARs, which include the requirements, criteria, or limitations promulgated under the federal and state law that address a contaminant, action, or location at a site, are presented in this section. The definition of an ARAR is as follows:

- Any standard, requirement, criterion, or limitation under federal environmental law.
- Any promulgated standard, requirement, criterion, or limitation under a state environmental or facility-siting law that is more stringent than the associated federal standard, requirement, criterion, or limitation.

One of the primary concerns during the development of remedial alternatives for hazardous waste sites is the degree of human health and environmental protection afforded by a given remedy. Consideration should be given to remedial measures that attain or exceed ARARs.

Definitions of the two types of ARARs, as well as TBC criteria, are given below:

- Applicable Requirements means those clean-up standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that directly and fully address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a site.

- Relevant and Appropriate Requirements means those clean-up standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not "applicable," address problems or situations sufficiently similar (relevant) to those encountered at the site that their use is well suited (appropriate) to the particular site.

- TBC Criteria are non-promulgated, non-enforceable guidelines or criteria that may be useful for developing remedial alternatives and for determining action levels that are protective of human health or the environment.

These requirements are included to provide the decision makers with a complete evaluation of potential ARARs in developing, identifying, and selecting a remedial alternative.

5.2.1.2 ARAR and TBC Criteria Categories

ARARs and TBC criteria fall into three categories, based on the manner in which they are applied:

- Chemical Specific: Health or risk-based numerical values or methodologies that establish concentration or discharge limits for particular contaminants. Examples of chemical-specific ARARs include MCLs and water quality standards. Chemical-specific ARARs govern the extent of site clean-up.

- Location Specific: Restrictions based on the concentration of hazardous substances or the conduct of activities in specific locations. These may restrict or preclude certain remedial actions or may apply only to certain portions of site. Examples of location-specific ARARs include RCRA location requirements and wetland requirements. Location-specific ARARs pertain to special site features.

- Action Specific: Technology- or activity-based controls or restrictions on activities related to management of hazardous waste. Action-specific ARARs pertain to implementing a given remedy.

Table 5-1 presents a summary of potential federal and state ARARs and TBCs for remedial measures undertaken for Site 1 at NWIRP Calverton.

5.2.1.3 Chemical-Specific ARARs and TBCs

This section presents a summary of federal and state chemical-specific ARAR criteria of potential concern for Site 1. The ARAR criteria provide medium-specific guidance on "acceptable" or "permissible" concentrations of contaminants.

The Safe Drinking Water Act (SDWA) promulgated National Primary Drinking Water Standard MCLs (40 CFR Part 141). MCLs are enforceable standards for contaminants in public drinking water supply systems. They consider not only health factors but also the economic and technical feasibility of removing a contaminant from a water supply system. Secondary MCLs (40 CFR Part 143) are not enforceable but are intended as guidelines for contaminants that may adversely affect the aesthetic quality of drinking water, such as taste, odor, color, and appearance, and may deter public acceptance of drinking water provided by public water systems.

The SDWA also established Maximum Contaminant Level Goals (MCLGs) for several organic and inorganic compounds in drinking water. MCLGs indicate the level of contaminants in drinking water at which no known or anticipated health effects would occur, allowing for an adequate margin of safety. MCLGs are non-enforceable public health goals.

Table 5-2 provides Federal SDWA requirements that may be applicable to remedial actions involving groundwater. Drinking water standards may also be considered as discharge criteria for alternatives which include groundwater treatment.

The Clean Water Act (CWA) sets EPA AWQC that are non-enforceable guidelines developed for pollutants in surface waters pursuant to Section 304(a)(1) of the CWA. Although AWQC are not legally enforceable, they should be considered as potential ARARs. AWQC are available for the protection of human health from exposure to contaminants in surface water as well as from ingestion of aquatic biota and for the protection of freshwater and saltwater aquatic life. AWQC may be considered for actions that involve groundwater treatment and/or discharge to nearby surface waters. Table 5-3 provides AWQC for contaminants detected in surface water.

EPA Health Advisories are nonenforceable guidelines developed by the EPA Office of Drinking Water for chemicals that may be intermittently encountered in public water supply systems. Health advisories are available for short-term, longer-term, and lifetime exposures for a 10-kg child and a 70-kg adult.

Reference Dose (RfD), as defined in the EPA Integrated Risk Information System (IRIS), is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. RfDs are developed for chronic and/or subchronic human exposure to hazardous chemicals and are based on the assumption that thresholds exist for certain toxic effects. The RfD is usually expressed as an acceptable dose (mg) per unit body weight (kg) per unit time (day). The RfD is derived by dividing the no-observed-adverse effect level (NOAEL) or the lowest-observed-adverse effect level (LOAEL) by an uncertainty factor (UF) times a modifying factor (MF).

EPA Cancer Slope Factor, as defined in the IRIS, is an upper bound, approximating a 95 percent confidence limit, on the increased cancer risk from a lifetime exposure to a chemical. This estimate, usually expressed in units of proportion (of a population) affected per mg/kg/day, is generally reserved for use in the low-dose region of the dose-response relationship (i.e., for exposures corresponding to risks less than 1 in 100).

EPA Generic Soil Screening Levels (SSLs) are guidance that provides soil concentrations for protection of human health and for migration to groundwater. SSLs are risk-based concentrations derived from equations combining exposure information assumptions with EPA toxicity data. SSLs for protection of groundwater use a simple linear equilibrium soil/water partition equation or leach test to estimate contaminant releases in soil leachate.

The Clean Air Act (CAA) (42 USC 7401) consists of three programs or requirements that may be ARARs: National Ambient Air Quality Standards (NAAQS) (40 CFR Parts 50 and 53), National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR Part 61), and New Source Performance Standards (NSPS) (40 CFR Part 60). NESHAPs, which are emission standards for source types (i.e., industrial categories) that emit hazardous air pollutants, are not likely to be applicable or relevant and appropriate because they were developed for a specific source. EPA requires the attainment and maintenance of primary and secondary NAAQS to protect public health and public welfare, respectively. These standards are not source specific but rather are national limitations on ambient air quality. States are responsible for assuring compliance with the NAAQS. NSPS are established for new sources of air emissions to ensure that the new stationary sources minimize emissions. These standards are for categories of stationary sources that cause or contribute to air pollution that may endanger public health or welfare. Standards are based upon the best-demonstrated available technology (BDAT).

RCRA Subtitle C Hazardous Waste Identification and Listing (40 CFR Part 261) requirements are used to identify a material that is a hazardous waste and thus determine applicability or relevance of RCRA Subtitle C hazardous waste rules.

New York Ambient Air Quality Standards (6 NYCRR Parts 256 and 257) provide four general classifications of social and economic development and resulting pollution potential upon which standards are based. In addition, air quality standards are established to provide protection from adverse health effects of air contamination and to protect and conserve natural resources and the environment. Part 256 provides the air quality classification standards. The NWIRP is probably classified as Level II (predominantly single and two family residences, small farms, and limited commercial services and industrial development). Part 257 provides air quality standards for regulated contaminants, which include sulfur dioxide, particulates, carbon monoxide, photochemical oxidants, non-methane hydrocarbons, nitrogen dioxide, fluorides, beryllium, and hydrogen sulfide.

New York Public Water Supply Regulations (10 NYCRR Part 5) provide requirements for state public water supplies. Refer to Table 5-2 for standards that apply to Site 1.

New York Water Classifications and Quality Standards (6 NYCRR Parts 609 and 700 to 705) regulates reclassification of water based on use and value, including protection and propagation of fish, shellfish and wildlife, recreation in and on the water, public water supplies, and agricultural, industrial, and other purposes including navigation. Additionally, these requirements regulate the discharge of sewage, industrial waste, or other wastes to not cause impairment of the best usages of the receiving water as specified by the water classifications at the location of discharge. Both quantitative standards and narrative water quality standards (turbidity, solids, oil, etc.) are provided. (See Action Specific ARARs for Groundwater Effluent Standards that would be applicable for alternatives including reinjection to the aquifer.)

Part 701 provides the classification of surface water and groundwater. Groundwater beneath the NWIRP would be classified as Class GA. Class GA groundwater quality standards for Site 1 are provided in Table 5-2. Also for GA groundwater, pH shall be between 6.5 and 8.5, and total dissolved solids (TDS) shall not exceed 500 mg/l.

Surface water in Northeast Pond is classified as Class D. Class D water quality standards for Site 1 are provided in Table 5-3.

New York Technical and Operational Guidance, Division of Water (TOGS 1.1.1) provides a compilation of water quality standards, guidance values, and groundwater effluent limitations for use where there are no regulatory ambient water quality standards (in 6 NYCRR 703.5) or effluent limitations (in 6 NYCRR 703.6). For the convenience of the user, the standards in 703.5 and the limitations in 703.6 are included in this

document. The guidance values are appropriate for actions involving groundwater plume remediation and reinjection of treated groundwater into the aquifer. Groundwater quality standards, guidance values, and effluent limitations are provided in Table 5-2. Surface water quality standards and guidance values are provided in Table 5-3.

New York Technical and Administrative Guidance Memorandum on Determination of Soil Clean-up Objectives and Cleanup Levels (TAGM 4046) provides a basis and procedure to determine soil clean-up levels. Soil clean-up objectives are based on human health based levels that correspond to excess lifetime cancer risks, human health based levels for systemic toxicants calculated from RfDs, environmental concentrations which are protective of groundwater/drinking water quality based on promulgated or proposed New York State Standards, background values for contaminants, or detection limits. Clean-up objectives should be above the method detection limit (MDL) and preferably above the contract required quantification limit (CRQL). Table 5-4 provides soil clean-up objectives. For the protection of groundwater quality, concentrations are based on a total organic carbon content of 1 percent. Soil clean-up objectives are limited to the following maximum values: total VOCs less than or equal to 10 mg/kg, total SVOCs less than or equal to 500 mg/kg, individual SVOCs less than or equal to 50 mg/kg, and total pesticides less than or equal to 10 mg/kg. In addition, soil can not exhibit a discernible odor nuisance.

New York Spill Technology and Remediation Series, Petroleum-Contaminated Soil Guidance (STARS Memo #1) is intended as a guidance in determining whether petroleum-containing soil has been contaminated to levels that require investigation and remediation. In addition, if the soil contaminant concentrations meet the criteria provided, the soil can be reused or disposed as directed in this guidance (beneficial use). Soil that meets beneficial use conditions is no longer a solid waste as regulated by 6 NYCRR Part 360. This guidance applies to petroleum-contaminated soil that is not considered a characteristic hazardous waste as regulated by 6 NYCRR Part 371 (i.e., TCLP results less than or equal to the TCLP Extraction Guidance Values or contaminant concentrations in the soil less than TCLP Alternative Guidance Values). Guidelines for protection of groundwater (TCLP Extraction Guidance Values and Alternative Guidance Values), protection of human health (Human Heath Guidance Values), and protection against objectionable nuisance characteristics are provided. Guidance Values are provided for primary gasoline and fuel oil components of concern. If the soil does not exhibit petroleum-type odors and does not contain any individual contaminant at greater than 10,000 µg/kg, then the soil is considered acceptable for nuisance characteristics. Guidance is also provided for management of excavated (exsitu) and non-excavated (insitu) contaminated soil. TCLP Alternative Guidance Values and Human Health Guidance Values are presented in Table 5-4. As per discussions with NYSDEC, the TAGM 4046 guidance values are to be used. However, the STARS Memo #1 values are provided for informational purposes.

New York Technical Guidance for Screening Contaminated Sediment (Division of Fish and Wildlife and Division of Marine Resources, NYSDEC, November 1993) establishes sediment criteria for the purposes

of identifying contaminated sediments. Sediment with chemical concentrations that exceed the criteria is considered to be contaminated. These criteria are meant to identify areas of sediment contamination. They do not necessarily represent clean-up levels. Criteria are provided for 52 non-polar organic contaminants and 12 metals. Criteria are provided in Table 5-5.

5.2.1.2 Location-Specific ARARs and TBCs

This section presents a summary of federal and state location-specific ARARs and TBC criteria of potential concern for Site 1. These potential ARARs and TBCs are as follows:

Federal Protection of Wetlands Executive Order (E.O. 11990) requires federal agencies, in carrying out their responsibilities, to take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands (unless there is no practical alternative to that construction), minimize the harm to wetlands (if the only no practical alternative requires construction in the wetlands), and provide early and adequate opportunities for public review of plans involving new construction in wetlands. Wetlands are present in Northeast Pond, but they do not extend onto the landfill cover or into the woodlands surrounding the pond.

The Endangered Species Act of 1978 (16 USC 1531) (50 CFR Part 17) provides for consideration of the impacts on endangered and threatened species and their critical habitats. Remedial actions, if required, would need to be conducted in a manner such that the continued existence of any endangered or threatened species is not jeopardized or its critical habitat is not adversely affected. Consultation with the United States Fish and Wildlife Service is also required. There are no federal endangered or threatened species known to reside at or near Site 1. However, migrating species may move through the area.

The Fish and Wildlife Coordination Act (16 USC 661) provides for consideration of the impacts on wetlands and protected habitats. The act requires that federal agencies, before issuing a permit or undertaking federal action for the modification of any body of water, consult with the appropriate state agency exercising jurisdiction over wildlife resources to conserve those resources. Consultation with the United States Fish and Wildlife Service is also required.

Federal Floodplains Management Executive Order (E.O. 11988) provides for consideration of floodplains during remedial actions. This Executive Order requires that activities be conducted to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupation or modification of floodplains. Floodplain development should be avoided whenever there are practicable alternatives and should minimize potential harm to floodplains when there are no practical alternatives. Site 1 is not within a 100-year floodplain.

The Archaeological and Historic Preservation Act (16 USC Section 469) (36 CFR Part 65) establishes requirements relating to potential loss or destruction of significant scientific, historical, or archaeological data as a result of any proposed remedy. The Secretary of the Interior must be notified if a federal agency finds that its activities, in connection with any federal construction project, might cause loss or destruction of such data. The land surrounding Site 1 is classified as a high potential Prehistoric Sensitivity Area.

New York Freshwater Wetlands Act (ECL Article 24 and Title 23 of Article 71 of the New York Environmental Conservation Law) regulates activities within wetlands. New York Freshwater Wetlands Regulations (6 NYCRR Parts 662 to 664) provide regulations to preserve, protect, and conserve freshwater wetlands and regulate use and development of the wetlands. Activities within or adjacent to a wetland with an area of at least 12.4 acres or, if smaller, unusual local importance as determined by the state, require a permit or letter of approval. The adjacent area is considered the area within 100 feet of the wetland. Wetlands are classified according to the benefit of the wetlands, with Class I wetlands being the most beneficial to Class IV being the least beneficial. Wetlands are present in Northeast Pond, but they do not extend onto the landfill cover or into the woodlands surrounding the pond. Northeast Pond covers an area of approximately 2.3 acres.

New York Endangered and Threatened Species of Fish and Wildlife; Species of Special Concern (6 NYCRR Part 182) provides a list of regulated species. A state endangered species (*Ambystoma tigrinum*, tiger salamander) was sighted at Northeast Pond in 1987 (Conrad, 1996). No tiger salamanders were observed during a June 1997 site visit, but the shallow waters of Northeast Pond appear to be suitable habitat. This species is a state-regulated species but is not federally regulated, (NWIRP Calverton, 1989). A permit or license is required to take, import, transport, possess, or sell any endangered or threatened species.

New York Regulation for Administration and Management of the Wild, Scenic, and Recreational Rivers System in New York State Excepting the Adirondack Park (6 NYCRR Part 666) is authorized under the New York Wild, Scenic, and Recreational Rivers System Act (Title 27 of Article 15 of the New York Environmental Conservation Law) and provides regulations for the management, protection, enhancement, and control of land use and development in river areas on all designated wild, scenic, and recreational rivers (except within the Adirondack Park). The Peconic River and some of its tributaries are classified as a scenic river. Certain kinds of activities and developments within the defined river corridor are restricted or require a permit. Any new direct discharge of any substance into a scenic river must meet water quality standards, (6 NYCRR Parts 701 and 702). Site 1 activities are not expected to affect the Peconic River.

Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites Guidance (Division of Fish and Wildlife, NYSDEC, July 18, 1991) provides guidance for the evaluation of fish and wildlife concerns associated with the remediation of inactive hazardous waste sites. This guidance provides the required elements for a complete impact analysis including site description, contaminant-specific impact analysis, ecological effects of remedial alternatives, implementation of selected alternatives in design, and monitoring program.

New York State Environmental Quality Review (6 NYCRR Part 617) is required for actions that could affect any historic building, structure, facility, site or district, or prehistoric site that is listed, or proposed for listing, on the National Register of Historic Places or State Register of Historic Places. Site 1 is located within an area classified as high potential Prehistoric Sensitivity Area. Actions must be taken to identify, recover, and preserve artifacts prior to site activities and during excavation. The majority of Site 1 activities are expected to occur in fill material; however, some activities could effect adjacent areas, natural pond sediment, or native soil beneath the fill material.

5.2.1.5 Action-Specific ARARs and TBCs

This section presents a summary of federal and state action-specific ARAR criteria of potential concern for Site 1. These potential ARARs and TBCs are as follows:

RCRA Subtitle C regulates the treatment, storage, and disposal of hazardous waste from its generation until its ultimate disposal. In general, RCRA Subtitle C requirements for the treatment, storage, or disposal of hazardous waste will be applicable if:

- The waste is a listed or characteristic waste under RCRA.
- The waste was treated, stored, or disposed (as defined in 40 CFR 260.10) after the effective date of the RCRA requirements under consideration.
- The activity at the site constitutes current treatment, storage, or disposal as defined by RCRA.

RCRA Subtitle C requirements may be relevant and appropriate when the waste is sufficiently similar to a hazardous waste and/or the on-site remedial action constitutes treatment, storage, or disposal and the particular RCRA requirement is well suited to the circumstances of the contaminant release and site. RCRA Subtitle C requirements may also be applicable when the remedial action constitutes generation of a hazardous waste.

The following requirements included in the RCRA Subtitle C regulations may pertain to the NWIRP Calverton:

- Identification and listing of hazardous waste (40 CFR Part 261).
- Generator requirements (40 CFR Part 262).
- Transportation requirements (40 CFR Part 263).

- Standards for hazardous waste treatment, storage, and disposal (TSD) facilities (40 CFR Part 264) including corrective action management units (CAMUs) and temporary units (TUs).
- Land disposal restrictions (LDRs) (40 CFR Part 268).

Hazardous Waste Identification and Listing Regulations (40 CFR Part 261) define those solid wastes that are subject to regulation as hazardous waste under 40 CFR Parts 262 to 265 and Parts 124, 270, and 271.

Standards Applicable to Generators of Hazardous Waste (40 CFR Part 262) include manifest, pre-transport (i.e., packaging, labeling, and placarding), record keeping, and reporting requirements. The standards are applicable if actions taken at Site 1 constitute generation of a hazardous waste (e.g., generation of water treatment residues or excavation of contaminated soils and/or sediments that may be hazardous).

Standards Applicable to Transporters of Hazardous Waste (40 CFR Part 263) are applicable to off-site transportation of hazardous waste. These regulations include requirements for compliance with the manifest and record keeping systems and requirements for immediate action and clean-up of hazardous waste discharges (spills) during transportation. The standards are potentially applicable if corrective actions involve off-site transportation of hazardous waste from Site 1.

Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR Part 264) are potentially applicable to remedial actions including hazardous waste that may be taken at Site 1 and to off-site facilities that receive hazardous waste from the site for treatment or disposal. Standards for TSD facilities include requirements for preparedness and prevention, releases from solid waste management units (SWMUs) (i.e., corrective action requirements), closure and post-closure care, use and management of containers, and design and operating standards for tank systems, surface impoundments, waste piles, landfills, and incinerators. When a site, or portion thereof, receives a CAMU designation, the designated area qualifies for certain exemptions from RCRA Subtitle C requirements. Temporary units and staging piles also qualify for certain exemptions. These standards are potentially applicable if remedial actions involve the on-site treatment or disposal of hazardous waste at Site 1.

RCRA Land Disposal Restriction (LDR) Requirements (40 CFR Part 268) restrict certain hazardous wastes from being placed or disposed on the land unless they meet specific treatment standards. Removal and treatment of a RCRA hazardous waste or movement of the waste outside of a CAMU, thereby constituting "placement", may trigger the LDR requirements. LDRs are not triggered when hazardous remediation waste is placed in a CAMU, when remediation wastes generated at a facility outside a CAMU are consolidated into a CAMU, or when remediation wastes are moved between two or

more CAMUs. In addition, remediation wastes can be excavated from a CAMU, treated in a separate unit, and redeposited in the CAMU without triggering LDRs.

Placement of hazardous waste into underground injection wells constitutes "land disposal" under the LDRs. Furthermore, RCRA Section 3020(a) bans hazardous waste disposal by underground injection into or above an underground source of drinking water. RCRA Section 3020(b), however, exempts from the ban all reinjection of treated contaminated groundwater into such formations undertaken as part of a RCRA corrective action. The contaminated groundwater must be treated to substantially reduce hazardous constituents before such injection, and the corrective action must be sufficient to protect human health and the environment upon completion. LDRs would be potentially applicable if remedial actions at Site 1 include off-site disposal of wastes in a landfill or reinjection of treated groundwater.

RCRA Subtitle D establishes minimum design and operating criteria for solid (nonhazardous) waste landfills, and upgrading of open dumps. In general, this applies to landfills that receive municipal solid waste, codispose sewage sludge with municipal solid waste, receive nonhazardous municipal solid waste combustion ash, or are not regulated under RCRA Subtitle C. The closure and post-closure requirements may be applicable to capping alternatives.

Department of Transportation (DOT) Rules for Hazardous Materials Transport (49 CFR Parts 107 and 171 to 179) regulate the transport of hazardous materials, including packaging, shipping equipment, and placarding. These rules are considered applicable to wastes shipped off site for laboratory analysis, treatment, or disposal.

National Environmental Policy Act (NEPA) (42 USC 4321 et seq) and implementing regulations (40 CFR Part 6) require federal agencies to evaluate the environmental impacts associated with major actions that they fund, support, permit, or implement.

The CWA governs point-source discharges through the National Pollutant Discharge Elimination System (NPDES), discharge of dredged or fill material to surface water, and spills of oil and hazardous waste to surface water. NPDES requirements (40 CFR Part 122) will be applicable if the direct discharge of pollutants into surface water is part of the remedial action (e.g., discharge of effluent from a groundwater treatment system). This includes the discharge of storm water from construction and other industrial activities. These regulations contain discharge limitations, monitoring requirements, and best management practices. Dredge and fill requirements (40 CFR 230 to 232) may be applicable if fill materials are deposited into surface water.

Control of Air Emissions from Superfund Air Strippers at Superfund Groundwater Sites (Office of Solid Waste and Emergency Response (OSWER) Directive 9355.0-28) is a TBC that guides the control of air

emissions from air strippers. For sites located in areas that are not attaining NAAQS for ozone, add-on emission controls are required for an air stripper with an actual emission rate in excess of 3 pounds per hour (lb/hr), an actual emission rate in excess of 15 pounds per day, or a potential (i.e., calculated) emission rate of 10 tons per year of total VOCs. Generally, the guidelines are suitable for VOC air emissions from other vented extraction techniques (e.g., soil vapor extraction) but not from area sources (e.g., soil excavation). NWIRP Calverton is in a nonattainment area for ozone.

General Pretreatment Regulations for Existing and New Sources of Pollutants (40 CFR Part 403) controls the indirect discharge of pollutants to publicly owned treatment works (POTWs). The goal of the pretreatment program is to protect municipal wastewater treatment plants and the environment from damage that may occur when hazardous, toxic, or other non-domestic wastes are discharged in a sewer system. The regulations include general and specific prohibitions on discharges to POTWs. The regulations are potentially applicable if treated or untreated groundwater is discharged to a local POTW.

Underground Injection Control Program (40 CFR Parts 144 and 147) contains provisions for the control and prevention of pollutant injection into groundwater. Class IV wells are used to inject hazardous waste into or above a formation that, within 1/4 mile of the well, contains an underground drinking water source. Operation or construction of Class IV wells is prohibited and allowed only for the reinjection of treated wastes as part of a CERCLA or RCRA cleanup. The regulations are potentially applicable if groundwater is removed, treated, and reinjected into the formation from which it was withdrawn.

Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (OSWER Directive 9200.4-17P) contains guidelines for the use of monitored natural attenuation for the remediation of contaminated soil and groundwater. This guidance is a TBC criterion if monitored natural attenuation is a component of the remedial action at Site 1.

The Occupational Health and Safety Act (29 USC Sections 651 through 678) regulates worker health and safety during implementation of remedial actions.

New York Environmental Conservation Law (ECL) (New York Consolidated Laws, Chapter 43-B) concerns the conservation, improvement, and protection of state natural resources and environment and controls water, land, and air pollution.

The following requirements included in the ECL in particular may pertain to remedial activities at Site 1:

- Article 17-Water Pollution Control provides policy to require use of all known available and reasonable methods to prevent and control the pollution of state waters consistent with public health and use, propagation and protection of fish and wildlife, and the industrial development of the state.

- Article 19-Air Pollution Control Act provides policy to maintain the quality of the air resources of the state. Regulations for implementing this act are provided in 6 NYCRR Parts 200 to 257. This act also provides trial burn requirements for burning of hazardous waste.

- Article 27- New York Solid and Hazardous Waste Management Laws address solid and hazardous waste management, including waste transport permits, solid waste management and resource recovery facilities, industrial hazardous waste management, siting of hazardous waste facilities, and inactive hazardous waste disposal sites. A preferred state-wide hazardous management practices hierarchy is also provided: (1) reduce or eliminate to the maximum extent practical the generation of hazardous waste, (2) recover, reuse, or recycle generated hazardous waste to the maximum extent practical, (3) utilize detoxification, treatment, or destruction technology for hazardous waste that cannot be reduced, recovered, reused, or recycled, and (4) land disposal of industrial hazardous waste, except treated residuals posing no significant threat to the public health or environment. Special provisions for land burial and disposal in Nassau and Suffolk Counties are provided. No new landfills (or expansions to existing landfills) are allowed in a deep flow recharge area. For new landfills outside a deep flow recharge area, hazardous waste is prohibited, and the landfill can only accept material which is a product of resource recovery, incineration, or composting. Regulations to implement these laws are included in 6 NYCRR Parts 360 to 483.

- Article 70-Uniform Procedures establishes uniform review procedures for major regulatory programs of the NYSDEC and establishes time periods for NYSDEC action on permits under such programs. Procedures are provided for coordinating permitting for a project requiring one or more NYSDEC permits.

New York Air Pollution Control Regulations (6 NYCRR Parts 200 to 257) regulate emissions from specific sources. Part 212, General Process Emission Sources, provides general requirements. NWIRP is located in Suffolk County, which is considered part of the New York City Metropolitan Area. The degree of air cleaning required for the different contaminants ratings are as follows. For the most stringent rated contaminants (Rating A), for emission rate potentials greater than 1 lb/hr, 99 percent or more removal or best available control technology if required. For emission rate potentials less than 1 lb/hr, the degree of air cleaning required shall be specified by the state. For Ratings of B, C, or D and for emission rate potentials of 3.5 lb/hr or less, the degree of air cleaning required shall be specified by the state (Ratings B or C), or no cleaning is required (Rating D). For emission rate potentials greater than 3.5 lb/hr, reasonably available control technology shall be used. Part 231 regulates new source review for air contamination source projects in non-attainment areas. To be applicable, annual emissions (within a nonattainment area) from the source must

exceed the de minimus emission limits. The de minimus emission limit is 40 tons per year for volatile organics and 25 tons per year for particulates.

New York Waste Management Facilities Rules (6 NYCRR Part 360) regulate solid waste management facilities (other than hazardous waste management facilities subject to Parts 373 and 374). Siting requirements for solid waste management facilities include that the facility must not be constructed or operated in such a manner that may have an adverse affect on any endangered or threatened species or their critical habitat, and the facility cannot be located within the boundary of a regulated wetland. A permit is required to construct, operate, modify, or expand a solid waste management facility. However, temporary storage, treatment, incineration, and process facilities (including temporary mobile processing facilities) may be exempt from permitting requirements if the facility is located at an industrial or commercial establishment and is used exclusively for solid wastes generated at that location or at a location under the same ownership within a single region of the NYSDEC. These rules may be applicable if contaminated soil is stored or landfilled on site.

New York Rules for Siting Industrial Hazardous Waste Facilities (6 NYCRR Part 361) regulate the siting of new industrial hazardous waste facilities located wholly or partially within the state. Evaluation criteria for siting include consideration of population density, transportation routes, contamination of groundwater and surface water, air quality, and preservation of endangered, threatened, and indigenous species.

New York Waste Transporter Permit Regulations (6 NYCRR Part 364) governs the collection, transport, and delivery of regulated waste originating or terminating at a location within the state. These regulations are potentially applicable if contaminated soil or groundwater treatment residuals are hauled off site for treatment or disposal.

New York General Hazardous Waste Management System Regulations (6 NYCRR Part 370) provide general definitions and set forth state procedures for making information available to the public, confidentiality, petitioning equivalent testing methods, and petitioning for exclusion of a waste from a particular facility. These regulations are potentially applicable if waste, soil, or treatment residuals would be classified as a hazardous waste.

New York Identification and Listing of Hazardous Wastes Regulations (6 NYCRR Part 371) establish procedures for identifying solid wastes subject to regulation as hazardous wastes. These regulations would be used to determine whether waste, contaminated soil, or treatment residuals meet the definition of a hazardous waste.

New York Hazardous Waste Manifest System Regulations (6 NYCRR Part 372) establishes standards for hazardous waste generators, transporters, and TSD facilities associated with the use of the manifest system

and its record keeping requirements. These regulations are potentially applicable if remedial actions involve off-site transportation of hazardous waste.

New York Hazardous Waste Treatment, Storage, and Disposal Facility Permitting Requirements (6 NYCRR Subpart 373-1) regulate hazardous waste management facilities located within the state. These regulations are potentially applicable if remedial actions involve on-site treatment, storage, or disposal of hazardous waste.

New York Final Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (6 NYCRR Subpart 373-2) establish minimum state standards which define the acceptable management of hazardous waste. These standards are potentially applicable if remedial actions involve on-site treatment or disposal of hazardous waste at Site 1.

New York Interim Status Standards for Owners and Operators of Hazardous Waste Facilities (6 NYCRR Subpart 373-3) establish minimum state standards which define the acceptable management of hazardous waste during the period of interim status and until certification of closure. These standards are potentially applicable if remedial actions involve on-site treatment or disposal of hazardous waste.

New York Standards for the Management of Specific Hazardous Wastes and Hazardous Waste Management Facilities (6 NYCRR Part 374-1) contain requirements for generators and transporters of hazardous waste and for owners and operators of facilities managing hazardous wastes. The regulation specifically addresses recyclable materials, hazardous waste or used oil burned for energy recovery, and reclaimed lead-acid batteries. These standards would be potentially applicable in the unlikely event that recyclable hazardous waste materials are used in a manner constituting disposal.

New York Rules for Inactive Hazardous Waste Disposal Sites (6 NYCRR Part 375) apply to the development and implementation of programs to address inactive hazardous waste disposal sites. The goal for a specific site is to restore it to pre-disposal conditions to the extent feasible and authorized by law. At a minimum, the remedy selected shall eliminate or mitigate significant threats to the public health and the environment. State review and concurrence with the selected remediation scheme is required. The hierarchy of remedial technologies is as follows: destruction, separation/treatment, solidification/chemical fixation, and control and isolation.

New York Land Disposal Restrictions Regulations (6 NYCRR Part 376) identify hazardous wastes that are restricted from land disposal and define limited circumstances under which an otherwise prohibited waste may be land disposed. LDRs would be potentially applicable if remedial actions at Site 1 include land disposal of hazardous waste.

New York Rules on Hazardous Waste Program Fees (6 NYCRR Parts 483) address generator fees, TSD facility fees, and waste transporter fees.

New York Water Classifications and Quality Standards (6 NYCRR Parts 609 and 700 to 706) Parts 700 to 706 provide regulations for the discharge of sewage, industrial waste, or other wastes so as not to cause impairment of the best usages of the receiving water as specified by the water classification at the location of discharge. Part 703.6 provides groundwater effluent limitations. Treated groundwater may be reinjected to groundwater and would need to comply with groundwater effluent limitations (see Table 5-2). The NWIRP site is in Suffolk County and will additionally have to comply with a maximum concentration of 1,000 mg/L TDS and 10 mg/L total nitrogen (as N).

New York Regulations on State Pollutant Discharge Elimination System (6 NYCRR Parts 750 to 758) prescribe procedures and substantive rules concerning discharges to state waters. A State Pollutant Discharge Elimination System (SPDES) permit or NPDES permit is required to discharge to surface water. Amendments to these regulations will be proposed to repeal the current portions of Parts 750 through 758 that have been superceded by other law and regulation and renumber the remaining sections to develop a new comprehensive Part 750.

New York Technical and Administrative Guidance Memorandum on "Contained-In" Criteria for Environmental Media (TAGM 3028) is a guidance document applicable to soil, sediment, and groundwater contaminated by listed hazardous waste that has been removed from its natural environment. These criteria do not apply to listed or characteristic wastes as initially generated or residuals derived from treating these listed hazardous wastes. This TAGM sets minimum criteria for an environmental medium contaminated by listed hazardous waste, which must be met in order to preclude its management as hazardous waste. These criteria are not clean-up levels for contaminated environmental media. Criteria are provided in Tables 5-2 (water) and 5-4 (soil).

5.3 REMEDIAL ACTION OBJECTIVES

RAOs are developed in this section to address contaminated soil, groundwater, and sediment. RAOs generally identify chemicals of concern (COCs), receptor, pathways, and action levels [Preliminary Remediation Goals (PRGs)]. Media-specific RAOs and corresponding PRGs are presented in the following sections.

For the NWIRP Calverton Site 1, the RAOs address the identified environmental risks at the facility. Contaminated soil and groundwater represent a potential threat to human health at the site through ingestion, dermal contact, and inhalation of contaminated media. Contaminated surface water and sediment represent a potential threat to aquatic life in Northeast Pond.

5.3.1 Remedial Action Objectives for Soil

The RAOs for contaminated soil are as follows.

- Prevent human exposure (ingestion, dermal contact, dust inhalation) to contaminated soil in concentrations greater than the PRGs.
- Prevent ecological receptor exposure to contaminated soil.
- Prevent leaching of contaminants at resultant groundwater concentrations in excess of groundwater PRGs.
- Comply with chemical-specific, location-specific, and action-specific ARARs and guidance.

PRGs for contaminated soil are provided in Table 5-6. Also presented in this table is the maximum concentration detected for each chemical at Site 1. It should be noted that there are no specific federal or state standards for soil remediation. However, the recommended soil clean-up objectives in TAGM 4046 were used to develop PRGs for soil. In general, the lower of the clean-up objective to protect groundwater quality or to protect human health was used as the PRG. For some of the SVOCs, the detection limit is higher than the recommended clean-up objective. In these cases, the detection limit was selected as the PRG. For other SVOCs, the PRGs are based on the maximum value recommended in TAGM 4046 for any individual SVOC (50 mg/kg). In these cases, the clean-up objectives for both protection of groundwater and protection of human health in TAGM 4046 are greater than 50 mg/kg.

The following VOCs were detected at concentrations greater than the PRGs: 1,1-dichlorethane, 1,2-dichloroethane, 1,1,1-trichloroethane, and trichloroethene. No SVOCs or PCBs were detected at concentrations above the PRGs. Aldrin was the only pesticide detected at a concentration greater than the PRGs. The following metals were detected at concentrations greater than the PRGs: antimony, cadmium, chromium, lead, selenium, and silver.

TAGM 4046 does not provide clean-up objectives for ecological receptors. The ERA indicated potential risks to ecological receptors for exposure to PCBs and chromium in surface soil.

As per TAGM 4046, the soil clean-up objectives developed per this guidance should be used in selecting alternatives in the FS. Based on the proposed selected remedial technology (outcome of the FS), final site-specific soil clean-up levels are established in the Record of Decision (ROD) (or other decision

document). TAGM 4046 also notes that even after final soil clean-up levels are established, these levels may prove to be unattainable, and institutional controls may be necessary.

5.3.2 Remedial Action Objectives for Groundwater

The RAOs for contaminated groundwater are as follows.

- Prevent human exposure (through ingestion, inhalation, dermal contact) to groundwater having contaminants in concentrations greater than the PRGs.
- Restore contaminated groundwater quality to the PRGs to the extent that is technically feasible.
- Comply with contaminant-specific, location-specific, and action-specific ARARs and guidance.

If groundwater PRGs cannot be achieved or the aquifer cannot be restored, then at a minimum, the following objectives should be met:

- Reduce human exposure (ingestion, inhalation, dermal contact) to groundwater having contaminants in concentrations greater than the PRGs.
- Prevent further migration of contaminants.

PRGs for contaminated groundwater are provided in Table 5-7. Also presented in this table is the maximum concentration detected for each chemical based on 1997 sampling results. To develop the groundwater PRGs, the most stringent promulgated standard has been utilized, including Federal MCLs/MCLGs, New York State MCLs, and New York State Groundwater Quality Standards. Proposed federal standards or New York State guidance were only considered if no other criteria was available. If proposed standards were less than the detection limit, then the detection limit was selected as the PRG.

VOCs detected at concentrations above PRGs include 1,1-dichloroethane and 1,1,1-trichloroethane. These VOCs were only detected at one location. No SVOCs were detected at concentrations above PRGs. Pesticides and PCBs were not detected in groundwater. Metals detected at concentrations above PRGs include iron, manganese, and thallium. It should be noted that all detections of thallium exceeded the PRG, including the upgradient well, and thallium was not detected in waste, soil, sediment, or surface water samples. Therefore, the detections of thallium do not appear to be site related.

5.3.3 Remedial Action Objectives for Sediment

The RAOs for contaminated sediment are as follows:

- Prevent contact of contaminated sediment with surface water and aquatic life.

- Comply with chemical-, location-, and action-specific ARARs and guidance.

PRGs for contaminated sediment are provided in Table 5-8. The maximum concentration detected for each chemical is also presented in this table. The metals presented are only for those metals statistically detected above background samples. It should be noted that there are no specific federal or state standards for sediment remediation. However, the state Technical Guidance for Screening Contaminated Sediments (NYSDEC, 1993) was used to develop PRGs for sediment based on protection of benthic aquatic life and wildlife bioaccumulation. However, for many of the SVOCs and all the pesticides and PCBs, the detection limit is higher than the guidance value. In these cases, the detection limit was selected as the PRG.

The only VOC detected at a concentration above the PRG is toluene. The only SVOC detected at a concentration above the PRG is bis(2-ethylhexyl)phthalate. The only pesticides detected at concentrations above the PRG are 4,4'-DDT and breakdown products 4,4'-DDD and 4.4'-DDD. Aroclor 1248 and Aroclor 1260 were the PCBs detected at concentrations above the PRG. The following metals were detected at concentrations above the PRG: cadmium (lowest effect level), lead (lowest effect level and severe effect level), nickel (lowest effect level), and silver (lowest effect level and severe effect level).

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TABLE 5-1

SUMMARY OF ARARs AND TBC CRITERIA
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
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Requirement	Citation	Status	Synopsis	Comment
Chemical-Specific ARARs and TBCs				
Safe Drinking Water Act (SDWA) MCLs Secondary MCLs (SMCLs) MCL Goals (MCLGs)	42 USC 300f et seq. 40 CFR Parts 141 to 143	MCLs are relevant and appropriate; SMCLs and MCLGs are TBC	MCLs, SMCLs, and MCLGs established under this act are health-based limits for certain chemical substances in drinking water.	Relevant and appropriate or TBC for determining PRGs. Groundwater was identified as a concern under the RI.
CWA Ambient Water Quality Criteria (AWQC)	33 USC 1251 et seq. Section 304(a)(1)	TBC	Water-quality criteria are non-enforceable guidance and are used in conjunction with the designed use for a stream segment to establish water quality standards under CWA 303.	During remedial activities, groundwater or treatment by-products may be collected. AWQCs are TBC if this water is discharged to surface waters.
EPA Health Advisories	EPA 822-B-96-002	TBC	EPA Office of Drinking Water guidelines for chemicals that may be intermittently encountered in public water supply systems.	TBC for determining PRGs.
Reference Doses (RfDs) from Integrated Risk Information System	NA	TBC	EPA Office of Research and Development guidelines used in the public health assessment	TBC for determining PRGs.
Carcinogenic Slope Factors	NA	TBC	EPA Environmental Criteria and Assessment Office; EPA Carcinogen Assessment Group guidelines used in the public health assessment	TBC for determining PRGs.
EPA Generic Soil Screening Levels (SSLs)	EPA 540-R-96-018 Appendix A	TBC	Federal guidance that provides screening levels for protection of human health and groundwater from soil contaminants.	TBC for determining PRGs.
Clean Air Act (CAA)	42 USC 7401 et seq.	Relevant and Appropriate	Federal legislation that addresses air pollution control.	Pertinent sections of this Act are discussed as follows.
National Ambient Air Quality Standards (NAAQS)	40 CFR Part 50	Relevant and Appropriate	Non-source specific limitations for ambient air quality.	Any air emission would require appropriate controls to meet NAAQS.
New Source Performance Standards (NSPS)	40 CFR Part 60	Relevant and Appropriate	Emission standards established for new sources of air emissions.	Relevant and appropriate if the pollutants emitted and the technology employed (e.g., air stripping) during the clean-up action are sufficiently similar to the pollutant and source category regulated by an NSPS and are well suited to the circumstances at the site.
National Emission Standards for Hazardous Air Pollutants (NESHAPs)	40 CFR Part 61	Not Applicable	Emission standards for source types (i.e., industrial categories) that emit hazardous air pollutants.	Not likely to be applicable or relevant and appropriate because NESHAPs were developed for specific sources.
The Resource Conservation and Recovery Act (RCRA) Subtitle C – Hazardous Waste Identification and Listing Regulations	40 CFR Part 261	Potentially Applicable	These rules are used to identify a material as a hazardous waste, and thus determine applicability or relevance of RCRA Subtitle C hazardous waste management requirements.	Alternative implementation may involve excavating soil that may exceed toxicity characteristics leaching procedure (TCLP) criteria. If so, management of this contaminated soil would be conducted in compliance with RCRA requirements.

TABLE 5-1

SUMMARY OF ARARs AND TBC CRITERIA
SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
PAGE 2 OF 5

Requirement	Citation	Status	Synopsis	Comment
New York Ambient Air Quality Standards	6 NYCRR Parts 256 and 257	Applicable	Regulations for the control and prevention of air pollutants. The NWIRP site area is classified as Level II.	Particulate and non-methane hydrocarbon standards will be applicable to the site.
New York Public Water Supply Regulations	10 NYCRR Part 5	Relevant and Appropriate	Drinking water quality standards for New York	Drinking water standards impact selection of groundwater remediation goals, as well as treatment goals for reinjection of treated effluent to the aquifer.
New York Water Classifications and Quality Standards	6 NYCRR Parts 609 and 700 to 705	Applicable	Regulations for the control and prevention of water pollutants. NWIRP Calverton is in Suffolk County with groundwater classified as GA requiring reinjected groundwater to have a maximum concentration of 1,000 mg/l TDS and 10 mg/l total nitrogen. Northeast Pond is classified as Class D.	Standards applicable for actions involving the selection of groundwater plume remediation goals as well as treatment goals for reinjection of treated effluent to the aquifer.
New York Technical and Operational Guidance Series, Division of Water	TOGS 1.1.1	TBC	Provides a compilation of ambient water quality guidance values and groundwater effluent limitations for use when there are no regulatory standards and limitations.	TBC for actions involving groundwater plume remediation.
New York Technical and Administrative Guidance Memorandum on Determination of Soil Cleanup Objectives and Cleanup Levels	TAGM 4046	TBC	Provides a basis and procedure to determine soil clean-up levels.	TBC if alternative implementation involves excavating soils.
New York Spill Technology and Remediation Series, Petroleum-Contaminated Soil Guidance	STARS Memo # 1	TBC	Provides criteria to determine whether petroleum contaminated soil requires remediation and whether the soil meets beneficial use conditions.	As per NYSDEC, the TAGM 4046 guidance is to be used. Provided for informational purposes.
Location Specific ARARs and TBCs				
Federal Protection of Wetlands Executive Order	Executive Order (EO) 11990	Applicable	Requires the action of federal agencies to minimize the destruction, loss, or degradation of wetlands and preserve and enhance the natural and beneficial values of wetland.	Wetlands are located in Northeast Pond.
The Endangered Species Act of 1978	16 USC 1531 50 CFR Part 17	Potentially Applicable	Requires federal agencies to ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the future existence or critical habitat of any endangered or threatened species.	No federal endangered or threatened species are known to permanently reside in the vicinity of NWIRP. However, migrating species may occasionally move through the area.
The Fish and Wildlife Coordination Act	16 USC 661	Applicable	Provides for consideration of the impacts on wetlands and protected habitats.	Wetlands are located in Northeast Pond.
Federal Floodplains Management Executive Order	EO 11988	Not Applicable	Provides for consideration of floodplains during corrective actions.	Site 1 is not within a 100-year floodplain.
The Archaeological and Historic Preservation Act	16 USC 469 36 CFR 65	Potentially Applicable	Prior to site activities as well as during excavation, actions must be taken to identify, recover, and preserve artifacts.	The land surrounding Site 1 is classified as a high potential Prehistoric Sensitivity Area.

TABLE 5-1

SUMMARY OF ARARs AND TBC CRITERIA
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Requirement	Citation	Status	Synopsis	Comment
New York Freshwater Wetlands Act and New York Freshwater Wetlands Regulations	ECL Article 24 and Title 23 of Article 71 6 NYCRR Parts 662 to 664	Applicable	Activities within or adjacent to state regulated wetlands requires a permit or letter of approval. Adjacent area is considered the area within 100 feet of the wetlands.	Wetlands are located in Northeast Pond.
New York Endangered and Threatened Species of Fish and Wildlife; Species of Special Concern	6 NYCRR Part 182	Potentially Applicable	A permit or license is required to take, import, transport, possess, or sell any endangered or threatened species.	A state endangered species was sighted at Northeast Pond in 1987, but was not observed during a 1997 site visit.
Regulation for Administration and Management of the Wild Scenic and Recreational Rivers System in New York State Excepting Adirondack Park	6 NYCRR Part 666	Not Applicable	Certain kinds of activities and developments within the defined river corridor are restricted or require a permit.	The Peconic River and some of its tributaries are classified as a Scenic River. Site 1 activities are not expected to affect the Peconic River.
Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Site Guidance	Division of Fish and Wildlife, NYSDEC July 18, 1991	TBC	Provides guidance for the evaluation of fish and wildlife concerns associated with the remediation of inactive hazardous waste sites.	Considered during the evaluation of remedial measure alternatives.
New York State Environmental Quality Review	6 NYCRR 617	Potentially Applicable	Review required for actions that could affect any historic building, structure, facility, site or district, or prehistoric site that is listed or proposed to be listed on the National or State Register of Historic Places. Actions must be taken to identify, recover, and preserve artifacts prior to site activities and during excavation.	Site 1 is located within an area classified as high potential Prehistoric Sensitivity Area.
Action-Specific ARARs and TBCs				
RCRA Subtitle C	42 USC 6921 et seq.	Potentially Applicable	Establishes standards for hazardous waste management.	Potentially applicable if soil is determined to be hazardous.
Identification and Listing of Hazardous Waste	40 CFR Part 261	Potentially Applicable	Regulations that govern the procedures for identifying if a material is a hazardous waste.	Specific materials at the site may be classifiable as a characteristic or listed hazardous waste.
RCRA Standards Applicable to Generators of Hazardous Waste	40 CFR Part 262	Potentially Applicable	Regulations for generators of hazardous waste.	Applicable for removed wastes determined to be hazardous.
Standards Applicable to Transporters of Hazardous Waste	40 CFR Part 263	Potentially Applicable	Regulations for the manifest and record keeping systems and for the immediate action and cleanup of hazardous waste discharges (spills) during transportation.	Applicable for removed wastes determined to be hazardous that are transported off site.
Standards and Interim Standards for Owners and Operators of Hazardous Waste TSD Facilities	40 CFR Part 264 and 265	Potentially Applicable	Regulations that govern the treatment, storage, and disposal of hazardous waste.	These regulations may be applicable to waste removed from this site including both on-site and off-site management; however, the reuse of treated soils as backfill would not be subject to the disposal facility standard.
Land Disposal Restrictions (LDRs)	40 CFR Part 268	Potentially Applicable	Regulations that govern the treatment and disposal of certain hazardous waste.	Treatment or disposal of contaminated soils/ wastes and/or treatment residuals may be considered hazardous waste subject to land disposal restrictions.

TABLE 5-1

SUMMARY OF ARARs AND TBC CRITERIA
SITE 1 - NORTHEAST POND DISPOSAL AREA
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Requirement	Citation	Status	Synopsis	Comment
RCRA Subtitle D	40 USC 6941 et seq.	Potentially Applicable	Establishes design and operating criteria for solid waste (non-hazardous) landfills.	Potentially applicable if soil is determined to be nonhazardous.
Department of Transportation (DOT) Rules for Hazardous Materials Transport	49 CFR Parts 107 and 171 to 179	Potentially Applicable	Regulations for the transportation of hazardous materials. Requirements cover packaging, marking, labeling, and transportation methods.	Off-site shipments of any contaminated soil or treatment residual that is classified as a hazardous material would have to comply with these regulations.
National Environmental Policy Act (NEPA)	42 USC 4321 40 CFR Part 6	Potentially Applicable	Requires federal agencies to evaluate the environmental impacts associated with major actions that they fund, support, permit, or implement.	Alternatives could constitute significant activities, thereby making NEPA requirements ARARs.
CWA – National Pollution Discharge Elimination System (NPDES)	40 CFR Part 122 and Parts 230 to 232	Potentially Applicable	Regulations for discharge, dredge or fill materials, and oil or hazardous waste spills into the United States waters.	These requirements are applicable for all alternatives that include a discharge to surface water.
Control of Air Emission from Superfund Air Strippers at Superfund Sites	OSWER Directive 9355.0-28	TBC	Guidelines for control of air emissions from air strippers at Superfund groundwater remediation sites.	Site restoration at Site 1 may include air stripping and/or vapor extraction of groundwater and is in a NAAQS ozone non-attainment area.
General Pretreatment Regulations for Existing and New Sources of Pollutants	40 CFR Part 403	Potentially Applicable	Regulations for pretreatment of contaminated water prior to discharge to a POTW.	Effluent from a groundwater treatment system at Site 1 may be discharged to a local POTW.
Underground Injection Control Program	40 CFR Parts 144 and 147	Potentially Applicable	Regulations for the control and prevention of pollutant injection into groundwater.	Effluent from treatment of groundwater may be reinjected (Class IV well) into the same formation from which it was withdrawn.
Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites	OSWER Directive 9200.4-17P	TBC	Guidelines for use of monitored natural attenuation for the remediation of contaminated soil and groundwater sites.	TBC if monitored natural attenuation is one of the selected remedial options.
The Occupational Health and Safety Act (OSHA)	29 USC Sections 651 through 678	Potentially Applicable	Regulates worker health and safety during implementation of remedial actions.	Applicable for site workers during all investigations and remedial activities at Site 1.
New York Air Pollution Control Regulations	6 NYCRR Parts 200 to 257	Potentially Applicable	Regulations for the control and prevention of air pollution.	Remedial activities (air stripping, excavation, and vacuum extraction) may adversely impact air quality.
New York Waste Management Facilities Rules	6 NYCRR Part 360	Potentially Applicable	Provides standards for solid waste management facilities, including closure requirements.	Remedial activities may need to consider standards for solid waste management facilities.
New York Rules for Siting Industrial Hazardous Waste Facilities	6 NYCRR Part 361	Potentially Applicable	Provides evaluation criteria for siting new industrial hazardous waste facilities.	Remedial alternatives may need to consider criteria for industrial hazardous waste facilities.
New York Waste Transporter Permit Regulations	6 NYCRR Part 364	Potentially Applicable	Regulates off-site transport of wastes.	Transport of contaminated soils/wastes and/or treatment residuals needs to comply with these regulations.
New York General Hazardous Waste Management System	6 NYCRR Part 370	Potentially Applicable	Regulations that govern the management of hazardous waste.	Residuals from treatment could be considered as hazardous waste subject to these regulations.

TABLE 5-1

SUMMARY OF ARARs AND TBC CRITERIA
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Requirement	Citation	Status	Synopsis	Comment
New York Identification and Listing of Hazardous Wastes	6 NYCRR Part 371	Potentially Applicable	Regulations that govern the procedures for identifying a material as a hazardous waste.	Specific materials at the site may be classifiable as listed hazardous wastes or may test to be characteristic hazardous wastes.
New York Hazardous Waste Manifest System	6 NYCRR Part 372	Potentially Applicable	Regulations that govern the procedures for manifesting a material that is a hazardous waste.	Transport of hazardous contaminated soils/wastes and/or treatment residuals need to comply with these regulations.
New York Hazardous Waste Management Facilities	6 NYCRR Part 373	Potentially Applicable	Regulations that govern the treatment, storage, and disposal of hazardous waste.	Treatment and/or storage activities may take place on site. Site remediation activities must meet the substantive technical requirements.
New York Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities	6 NYCRR Part 374-1	Potentially Applicable	Regulations that govern the management of specific hazardous wastes.	Although unlikely, NWIRP site remedial alternatives may include recovery.
New York Rules for Inactive Hazardous Waste Sites	6 NYCRR Part 375	Potentially Applicable	Requires state review and concurrence of the selected remediation scheme. The hierarchy of remedial technologies is as follows: (1) destruction, (2) separation/ treatment, (3) solidification/chemical fixation, and (4) control and isolation.	Site 1 work should comply with these regulations.
New York Land Disposal Restrictions	6 NYCRR Part 376	Potentially Applicable	Regulations that govern the treatment and land disposal of certain hazardous waste.	Contaminated soils and/or treatment residuals may be considered hazardous waste subject to land disposal restrictions.
New York Rules on Hazardous Waste Program Fees	6 NYCRR Parts 483	Potentially Applicable	State hazardous waste program fees related to remedial actions.	Waste transporter program fees will be required for off-site disposal of wastes or treatment residuals.
New York Water Classifications and Quality Standards	6 NYCRR Parts 609 and 700 to 706	Potentially Applicable	Regulations for the control and prevention of water pollutants. NWIRP site groundwater is classified as GA.	Standards applicable for actions involving the selection of groundwater plume remediation goals as well as treatment goals for reinjection of treated effluent to the aquifer.
New York State Pollutant Discharge Elimination System (SPDES)	6 NYCRR Parts 750 to 758	Potentially Applicable	Regulations for the control of wastewater and storm water discharges in accordance with the Clean Water Act and controls point source discharges.	Permits (SPDES or NPDES) would be required for discharges to surface water.
New York Proposed State Pollutant Discharge Elimination System (SPDES)	Proposed Subpart 750-1 and 750-2	TBC	Proposed regulation for the control of wastewater and storm water discharges in accordance with the Clean Water Act and controls point source discharges to groundwater as well as surface water. Once adopted current Parts 750 to 758 will be repealed.	TBC as a proposed regulation, which may be in place prior to implementation of alternative. Treatment goals for discharge or reinjection of treated effluent.
New York Technical Manual "Contained-in" Criteria for Environmental Media	TAGM 3028	TBC	State guidelines used in the public health assessment.	May aid in establishing soil and groundwater cleanup goals.

TABLE 5-2

ARARs AND TBC CRITERIA FOR GROUNDWATER CONTAMINANTS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
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Chemical	MDL/ IDL	Federal Standards MCLs/MCLGs	New York State Standards			New York Guidance		
			MCLs[1]	GW Quality Standards[2]	GW Effluent Standards[2]	TOGS 1.1.1[3] Table 1 – Ambient Water Quality Standards (S) and Guidance Values (G)	TOGS 1.1.1[3] Table 5 – Groundwater Effluent Limitations	Contained in Policy [4]
Volatile Organics (µg/L)								
Acetone	2	---	50	---	---	50 (G)	50	---
1,1-Dichloroethane	2	---	5	5	---	5 (S)	5	5
1,1,1-Trichloroethane	1	200 (MCL)	5	5	---	5 (S)	5	5
Semivolatile Organics (µg/L)								
Bis(2-ethylhexyl)phthalate	2	6 (MCL)	6	5	5	5 (S)	5	50
Diethylphthalate	2	---	50	---	---	50 (G)	50	4
N-Nitrosodiphenylamine	2	---	50	---	---	50 (G)	50	---
Inorganics (µg/L)								
Aluminum	90	---	---	---	2,000	---	2,000	---
Arsenic	3	10 (MCL)	50	25	50	25 (S)	50	25
Barium	20	2,000 (MCL)	2,000	1,000	2,000	1,000 (S)	2,000	1,000
Beryllium	5	4 (MCL)	4	---	---	3 (G)	3	3
Cadmium	5	5 (MCL)	5	5	10	5 (S)	10	5
Calcium	1,000	---	---	---	---	---	---	---
Chromium	10	100 (MCL)	100	50	100	50 (S)	100	50 total 35,000 trivalent
Cobalt	10	---	---	---	---	---	---	---

TABLE 5-2

ARARs AND TBC CRITERIA FOR GROUNDWATER CONTAMINANTS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
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Chemical	MDL/ IDL	Federal Standards MCLs/MCLGs	New York State Standards			New York Guidance		
			MCLs(1)	GW Quality Standards(2)	GW Effluent Standards(2)	TOGS 1.1.1(3) Table 1 – Ambient Water Quality Standards (S) and Guidance Values (G)	TOGS 1.1.1(3) Table 5 – Groundwater Effluent Limitations	Contained in Policy (4)
Copper	10	1,300 (AL)	1,300 (AL)	200	1,000	200 (S)	1,000	<200
Iron	40	---	300	300	600	300 (S)	600	300
Lead	3	15 (AL)	15 (AL)	25	50	25 (S)	50	15
Magnesium	400	---	---	---	---	35,000 (G)	35,000	35,000
Manganese	5	---	300	300	600	300 (S)	600	300
Nickel	20	---	---	100	200	100 (S)	200	700
Potassium	600	---	---	---	---	---	---	---
Selenium	5	50 (MCL)	50	10	20	10 (S)	20	10
Sodium	1,000	---	---	20,000	---	20,000 (S)	---	<20,000
Thallium	5	2 (MCL) 0.5 (MCLG)	2	---	---	0.5 (G)	0.5	4
Vanadium	10	---	---	---	---	---	---	250
Zinc	10	---	---	---	5,000	2,000 (G)	5,000	<300

--- Not available
AL Action Level
IDL Instrument Detection Limit
MCL Maximum Contaminant Level
MCLG Maximum Contaminant Level Goal
MDL Method Detection Limit

TABLE 5-2

ARARs AND TBC CRITERIA FOR GROUNDWATER CONTAMINANTS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
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1 New York Public Supply Regulations, 10 NYCRR Part 5. Total Principal Organic Contaminants [POCs] (i.e., includes listed volatile organics) and Unspecified Organic Contaminants [UOCs] not to exceed 100 µg/L total.

2 New York Water Classifications and Quality Standards, 6 NYCRR Part 703.

3 NYSDEC, 1998. TOGS 1.1.1 Ambient water quality standards and guidance values, NYSDEC, Division of Water, June 1998, amended April 2000. Either standard or guidance value provided.

4 NYSDEC, 1992a. TAGM 3028, "Contained In" Criteria for Environmental Media. These criteria apply to listed hazardous wastes removed from their natural environment. These criteria must be met in order to preclude its management as hazardous waste. These criteria are not cleanup levels

TABLE 5-3

ARARs AND TBC CRITERIA FOR SURFACE WATER CONTAMINANTS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK

Chemical	MDL/IDL	Federal AWQC – Protection of Freshwater Aquatic Life (Chronic)[1]	Federal AWQC – Protection of Human Health (Consumption of Organisms)[1]	State Surface Water Quality Standards[2]	TOGS 1.1.1[3] Table 1 – Ambient Water Quality Standards (S) and Guidance Values (G)
Volatile Organics (µg/L)					
Toluene	1	---	200,000	6,000	6,000 (S) 480 (G)
Pesticides (µg/L)					
4,4'-DDD	0.057	---	0.00084	8E-5	8E-5 (S)
Metals (µg/L)					
Aluminum	90	87	---	---	---
Cadmium	5	0.48[4]	---	1.2[4]	1.2[4]
Calcium	1,000	---	---	---	---
Iron	40	1,000	---	300	300
Magnesium	400	---	---	---	---
Manganese	5	---	100	---	---
Potassium	600	---	---	---	---
Sodium	1,000	---	---	---	---

--- Not Available.
1 National Recommended Water Quality Criteria (EPA, 1999).
2 New York Water Classifications and Quality Standards (Class D), 6 NYCRR Part 703.
3 TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values, Class D (NYSDEC, 1998)
4 Based on hardness of 35.6 mg/L.

TABLE 5-4

ARARs AND TBC CRITERIA FOR SOIL CONTAMINANTS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
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Chemical	CRQL/ CRDL	New York State Guidance (TAGM 4046)		New York Guidance (STARS Memo #1)		Soil Contained In Policy (5)
		Protection of Groundwater (1)(2)	EPA Health Based (1)(3)	TCLP Alternative Value (4)	Human Health Guidance (4)	
Volatile Organics (µg/kg)						
Benzene	10	60	24,000 (C)	14	24,000	24,000
1,1-Dichloroethane	10	200	---	---	---	800,000
1,2-Dichloroethane	10	100	7,700 (C)	---	---	7,700
1,1-Dichloroethene	10	400	12,000 (C) 700,000 (S)	---	---	12,000
1,2-Dichloroethene	10	300 (trans)	2,000,000 (S)	---	---	800,000 (cis) 2,000,000 (trans)
Styrene	10	---	---	---	---	23,000
1,1,2,2-Tetrachloroethane	10	600	35,000 (C)	---	---	35,000
Tetrachloroethene	10	1,400	14,000 (C) 800,000 (S)	---	---	14,000
1,1,1-Trichloroethane	10	760	7,000,000 (S)	---	---	7,000,000
1,1,2-Trichloroethane	10	---	---	---	---	120,000
Trichloroethene	10	700	64,000 (C)	---	---	64,000
Semivolatile Organics (µg/kg)						
Benzo(a)anthracene	330	3,000	224 (C)	0.04	220	220
Benzo(a)pyrene	330	11,000	61 (C)	0.04	61	61
Benzo(b)fluoranthene	330	1,100	---	0.04	220	220
Benzo(g,h,i)perylene	330	800,000	---	0.04	---	---

TABLE 5-4

ARARs AND TBC CRITERIA FOR SOIL CONTAMINANTS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
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Chemical	CRQL/ CRDL	New York State Guidance (TAGM 4046)		New York Guidance (STARS Memo #1)		Soil Contained In Policy[5]
		Protection of Groundwater [1][2]	EPA Health Based [1][3]	TCLP Alternative Value[4]	Human Health Guidance[4]	
Benzo(k)fluoranthene	330	1,100	---	0.04	220	220
Bis(2-ethylhexyl)phthalate	330	435,000	50,000 (C) 2,000,000 (S)	---	---	---
Butylbenzyl phthalate	330	122,000	20,000,000 (S)	---	---	20,000,000
Carbazole	330	---	---	---	---	3,200
Chrysene	330	400	---	0.04	---	---
Di-n-butylphthalate	330	8,100	8,000,000 (S)	---	---	8,000,000
Diethyl phthalate	330	7,100	60,000,000 (S)	---	---	60,000,000
Fluoranthene	330	1,900,000	3,000,000 (S)	1,000	3,000,000	3,000,000
Indeno(1,2,3-cd)pyrene	330	3,200	---	0.04	---	---
Phenanthrene	330	220,000	---	1,000	---	---
Pyrene	330	665,000	2,000,000 (S)	1,000	2,000,000	2,000,000
Pesticides/PCBs (µg/kg)						
Aldrin	1.7	500	41 (C) 2,000 (S)	---	---	41
alpha-Chlordane	1.7	2,000	540 (C) 50,000 (S)	---	---	540
beta-BHC	1.7	200	3,890 (C)	---	---	3,900
4,4'-DDD	3.3	7,700	2,900 (C)	---	---	2,900
4,4'-DDE	3.3	4,400	2,100 (C)	---	---	2,100

TABLE 5-4

ARARs AND TBC CRITERIA FOR SOIL CONTAMINANTS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
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Chemical	CRQL/ CRDL	New York State Guidance (TAGM 4046)		New York Guidance (STARS Memo #1)		Soil Contained In Policy[5]
		Protection of Groundwater [1][2]	EPA Health Based [1][3]	TCLP Alternative Value[4]	Human Health Guidance[4]	
4,4'-DDT	3.3	2,500	2,100(C) 40,000 (S)	---	---	2,100
Dieldrin	3.3	100	44 (C) 4,000 (S)	---	---	44
Endosulfan I	3.3	900	---	---	---	---
Endrin aldehyde	3.3	---	---	---	---	---
Endrin ketone	3.3	---	---	---	---	---
gamma-Chlordane	1.7	14,000	540 (C) 5,000 (S)	---	---	540
Heptachlor	1.7	100	160 (C) 40,000 (S)	---	---	160
Methoxychlor	1.7	900,000	400,000 (S)	---	---	400,000
Aroclor 1242	16.5	10,000	1,000 (C)	---	---	1,000
Aroclor 1248	16.5	10,000	1,000 (C)	---	---	1,000
Aroclor 1254	16.5	10,000	1,000 (C)	---	---	1,000
Aroclor 1260	16.5	10,000	1,000 (C)	---	---	1,000
Metals (mg/kg)						
Antimony	12	---	SB	---	---	30
Cadmium	1	---	1 or SB	---	---	80
Chromium	2	---	10 or SB	---	---	80,000 (tri)

TABLE 5-4

ARARs AND TBC CRITERIA FOR SOIL CONTAMINANTS
SITE 1 – NORTHEAST POND DISPOSAL AREA
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Chemical	CRQL/ CRDL	New York State Guidance (TAGM 4046)		New York Guidance (STARS Memo #1)		Soil Contained In Policy[5]
		Protection of Groundwater [1][2]	EPA Health Based [1][3]	TCLP Alternative Value[4]	Human Health Guidance[4]	
Lead	0.6	---	SB	---	---	500
Selenium	1	---	2 or SB	---	---	---
Silver	2	---	SB	---	---	200

--- Not available
CRDL Contract Required Detection Limit
CRQL Contract Required Quantitation Limit
C Carcinogens
S Systemic Toxicants
SB Site Background

1 NYSDEC, 1994. TAGM 4046, Technical and Administrative Guidance Memorandum on Determination of Soil Cleanup Objectives and Cleanup Levels. Total VOC concentration must be less than or equal to 10 ppm; total SVOC concentration must be less than or equal to 500 ppm; individual SVOC concentration can not exceed 50 ppm. In addition, although contaminant concentrations may be under the cleanup level, soil must not exhibit a discernible oder nuisance.

2 Soil clean-up objectives to protect groundwater quality. Soil clean-up levels are developed for soil organic carbon content of 1 percent and should be adjusted for actual soil organic carbon content if it is known.

3 USEPA health based cleanup objectives, provided for carcinogens (C) and systemic toxicants (S).

4 NYSDEC, 1992b. New York Petroleum Contaminated Soil Guidance, STARS 1. TCLP Alternative Values are for the protection of groundwater. For protection against objectionable nuisance, soil can not have a petroleum-type odor and no individual contaminant with concentration greater than 10 ppm. Standards provided are for fuel-oil contaminated soil. For contaminants with high detection limits in comparison to TCLP Alternative Value, TCLP Extraction Method must be used to demonstrate groundwater quality protection for these contaminants.

5 NYSDEC, 1992a. TAGM 3028 "Contained In" Criteria for Environmental Media. Criteria apply to listed hazardous waste removed from its natural environment. These criteria must be met in order to preclude its management as a hazardous waste. These criteria are not clean-up levels and only consider protection of public health through direct ingestion.

TABLE 5-5

ARARs AND TBC CRITERIA FOR SEDIMENT
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
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Chemical	CRQL/ CRDL[1]	New York State Guidance[2]			
		Benthic Aquatic Life (Chronic)		Wildlife Bioaccumulation	
VOCs	**µg/kg**	**µg/gOC[3]**	**µg/kg[4]**	**µg/gOC[3]**	**µg/kg[4]**
2-Butanone	10	---[5]	---	---	---
1,1-Dichloroethane	5	---	---	---	---
Toluene	5	49	49	---	---
1,1,1-Trichloroethane	5	---	---	---	---
SVOCs	**µg/kg**	**µg/gOC[3]**	**µg/kg[4]**	**µg/gOC[3]**	**µg/kg[4]**
Benzo(a)anthracene	330	12	12	---	---
Benzo(a)pyrene	330	---	---	---	---
Benzo(b)fluoranthene	330	---	---	---	---
Benzo(k)fluoranthene	330	---	---	---	---
Bis(2-ethylhexyl)phthalate	330	199.5	199.5	---	---
Butylbenzyl phthalate	330	---	---	---	---
Chrysene	330	---	---	---	---
Fluoranthene	330	1,020	1,020	---	---
4-Methylphenol	330	0.5	0.5	---	---
Phenanthrene	330	120	120	---	---
Phenol	330	0.5	0.5	---	---
Pyrene	330	961	961	---	---
1,2,4-Trichlorobenzene	330	91	91	---	---
Pesticides/PCBs	**µg/kg**	**µg/gOC[3]**	**µg/kg[4]**	**µg/gOC[3]**	**µg/kg[4]**
Aldrin	8	---	---	0.77	0.77
alpha-Chlordane	80	0.03	0.03	0.006	0.006
beta-BHC	8	0.06	0.06	1.5	1.5
4,4'-DDD	16	---	---	1.0	1.0
4,4'-DDE	16	---	---	1.0	1.0
4,4'-DDT	16	1.0	1.0	1.0	1.0
Endosulfan I	16	0.03	0.03	---	---
Endrin	8	4.0	4.0	0.8	0.8
Endrin aldehyde	---	---	---	---	---
gamma-Chlordane	80	0.03	0.03	0.006	0.006
Heptachlor epoxide	8	0.1	0.1	0.03	0.03
Aroclor 1248	160	19.3	19.3	1.4	1.4
Aroclor 1254	160	19.3	19.3	1.4	1.4
Aroclor 1260	160	19.3	19.3	1.4	1.4

TABLE 5-5

ARARs AND TBC CRITERIA FOR SEDIMENT
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 2 OF 2

Chemical	CRQL/ CRDL[1]	New York State Guidance[2]	
Metals	**mg/kg**	**Lowest Effect Level (mg/kg)**	**Severe Effect Level (mg/kg)**
Aluminum	2.0	---	---
Antimony	0.6	---	---
Arsenic	0.1	6.0	33
Barium	2.0	---	---
Beryllium	0.05	---	---
Cadmium	0.05	0.6	9.0
Calcium	50	---	---
Chromium	0.1	26	110
Cobalt	0.5	---	---
Copper	0.25	16	110
Iron	1.0	20,000	40,000
Lead	0.03	31	110
Magnesium	50	---	---
Manganese	0.15	460	1,100
Nickel	0.4	16	50
Potassium	50	---	---
Selenium	0.05	---	---
Silver	0.1	1.0	2.2
Sodium	50	---	---
Vanadium	0.5	---	---
Zinc	0.2	120	270

--- Not available.
1 Contract Required Quantitation Limit (CRQL) and Contract Required Detection Limit (CRDL) are from TAGM #4046 for soil (NYSDEC, 1994).
2 NYSDEC, 1993. Technical Guidance for Screening Contaminated Sediment.
3 Micrograms per gram organic carbon.
4 Based on organic carbon content of 0.1 percent (1 gram organic carbon per kilogram).
5 Not available.

TABLE 5-6

SOIL PRGs AND MAXIMUM SITE DETECTIONS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 1 OF 2

Chemical	Maximum Concentration	PRG
Volatile Organics (µg/kg)		
Benzene	2	6[1]
1,1-Dichloroethane	340	20[1]
1,1-Dichloroethene	8	40[1]
1,2-Dichloroethane	40	10[1]
1,2-Dichloroethene	2	30[1]
Styrene	2	---
1,1,2,2-Tetrachloroethane	10	60[1]
Tetrachloroethene	10	140[1]
1,1,1-Trichloroethane	120	76[1]
1,1,2-Trichloroethane	35	---
Trichloroethene	240	70[1]
Semivolatile Organics (µg/kg)		
Benzo(a)anthracene	140	330[2]
Benzo(a)pyrene	110	330[2]
Benzo(b)fluoranthene	120	330[2]
Benzo(g,h,i)perylene	41	330[2]
Benzo(k)fluoranthene	120	330[2]
Bis(2-ethylhexyl)phthalate	97	50,000[3]
Butylbenzyl phthalate	270	50,000[3]
Carbazole	380	---
Chrysene	160	330[2]
Di-n-butyl phthalate	270	810[1]
Diethyl phthalate	50	710[1]
Fluoranthene	230	50,000[3]
Indeno(1,2,3-cd)pyrene	62	330[2]
Phenanthrene	150	50,000[3]
Pyrene	240	50,000[3]
Pesticides/PCBs (µg/kg)		
Aldrin	240	41[4]
alpha-Chlordane	11	200[1]
beta-BHC	0.78	20[1]
4,4'-DDD	45	770[1]
4,4'-DDE	25	440[1]
4,4'-DDT	180	250[1]
Dieldrin	8.4	10[1]

TABLE 5-6

SOIL PRGs AND MAXIMUM SITE DETECTIONS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 2 OF 2

Chemical	Maximum Concentration	PRG
Endosulfan I	3.3	90[1]
Endrin aldehyde	7.8	---
Endrin ketone	13	---
gamma-Chlordane	27	540[4]
Heptachlor	0.63	10[1]
Methoxychlor	9.7	10,000[5]
Aroclor 1248	99	1,000[4]
Aroclor 1254	280	1,000[4]
Aroclor 1260	28	1,000[4]
Metals (mg/kg)		
Antimony	47.7	SB[6]
Cadmium	2.5	1 or SB
Chromium (total)	150	10 or SB
Lead	3,490	SB
Selenium	1	2 or SB
Silver	330	SB

Chemicals with concentrations higher than the PRG are shown in bold type.

--- Not available.
1 TAGM #4046 based on protection of groundwater, adjusted for TOC of 0.1 percent.
2 PRG is the detection limit. TAGM #4046 recommended clean-up objective is less than the detection limit.
3 As per TAGM #4046, 50,000 µg/kg (maximum) for individual SVOCs.
4 TAGM #4046 based on protection of human health.
5 As per TAGM #4046, 10,000 µg/kg (maximum) for total pesticides.
6 Site background.

TABLE 5-7

GROUNDWATER PRGs AND MAXIMUM SITE DETECTIONS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK

Chemical	Maximum Concentration	PRG
Volatile Organics (µg/L)		
Acetone	8.4	50[1][2]
1,1-Dichloroethane	5.9	5[1][3]
1,1,1-Trichloroethane	5.7	5[1][3]
Semivolatile Organics (µg/L)		
Bis(2-ethylhexyl)phthalate	3.6	5[3]
Diethyl phthalate	1.1	50[1][2]
N-Nitrosodiphenylamine	8.0	50[1][2]
Metals (µg/L)		
Aluminum	745	---
Arsenic	3.0	50[4][5]
Barium	129	1,000[3]
Beryllium	0.68	4[4]
Cadmium	3.8	5[1][3][4]
Calcium	449,000	---
Chromium (total)	7.0	50[3]
Cobalt	6.3	---
Copper	9.2	200[3]
Iron	14,500	300[1][3]
Lead	1.1	15[1][4]
Magnesium	24,600	35,000[2]
Manganese	1,720	300[1][3]
Nickel	10.1	100[3]
Potassium	16,800	---
Selenium	2.6	10[3]
Sodium	15,000	20,000[3]
Thallium	6.7	2[4][6]
Vanadium	7.0	---
Zinc	20.5	2,000[2]

Chemicals with concentrations higher than the PRG are shown in bold type.

--- Not available.
1 State MCL.
2 State guidance value
3 State groundwater quality standard.
4 Federal MCL.
5 Proposed Federal MCL (10 µg/L) is under review by EPA.
6 The current Contract Laboratory Program CRDL is 10 µg/L; however, a CRDL of 5 µg/L is proposed.

TABLE 5-8

SEDIMENT PRGs AND MAXIMUM SITE DETECTIONS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 1 OF 2

Chemical	Maximum Concentration	PRG
Volatile Organics (µg/kg)		
2-Butanone	83	---
1,1-Dichloroethane	18	---
Toluene	610	49[1]
1,1,1-Trichloroethane	7	---
Semivolatile Organics (µg/kg)		
Benzo(a)anthracene	75	330[2]
Benzo(a)pyrene	66	---
Benzo(b)fluoranthene	63	---
Benzo(k)fluoranthene	83	---
Bis(2-ethylhexyl)phthalate	1,100	330[2]
Butylbenzyl phthalate	260	---
Chrysene	62	---
Fluoranthene	140	1,020[1]
4-Methylphenol	53	330[2]
Phenanthrene	99	330[2]
Phenol	46	330[2]
Pyrene	200	961[1]
1,2,4-Trichlorobenzene	61	91[1]
Pesticides/PCBs (µg/kg)		
Aldrin	5.3	8[2]
alpha-Chlordane	16	80[2]
beta-BHC	2.4	8[2]
4,4'-DDD	2,000	16[2]
4,4'-DDE	380	16[2]
4,4'-DDT	900	16[2]
Endosulfan I	0.79	16[2]
Endrin	11	8[2]
Endrin aldehyde	21	---
gamma-Chlordane	28	80[2]
Heptachlor epoxide	7.1	8[2]
Aroclor 1248	380	160[2]
Aroclor 1254	93	160[2]
Aroclor 1260	730	160[2]

TABLE 5-8

SEDIMENT PRGs AND MAXIMUM SITE DETECTIONS
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 2 OF 2

Chemical	Maximum Concentration	PRG
Metals (mg/kg)		
Cadmium	4.1	0.6[3] / 9.0[4]
Lead	136	31[3] / 110[4]
Nickel	23	16[3] / 50[4]
Selenium	2.3	---
Silver	28.2	1.0[3] / 2.2[4]

Chemicals with concentrations higher than the PRG are shown in bold type.

--- Not available.

1 NYSDEC, 1993. Guidance for Benthic Freshwater Aquatic Life (chronic) based on TOC of 0.1 percent.

2 PRG is the detection limit for soil from TAGM 4046. State guidance value is less than the detection limit.

3 Lowest Effect Level.

4 Severe Effect Level.

6.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

6.1 IDENTIFICATION AND PRELIMINARY SCREENING OF TECHNOLOGIES

Section 6.1 provides an initial identification and preliminary screening of technologies and process options for soil, waste, and sediment. The preliminary screening is conducted to eliminate those technologies and process options that clearly would not apply to the site. Section 6.2 presents a more detailed evaluation of technologies and process options that passed the initial screening.

The preliminary screening is based on the overall applicability (technical implementability) to the media of concern, primary contaminants, and conditions present at Site 1. The purpose of this screening effort is to investigate possible technologies and process options and eliminate those that are not applicable to the site, based on the RAOs and a comparison of the contaminant concentrations and PRGs.

Initial screening of technologies and process options for soil, fill material, and sediment is presented in Table 6-1. Screening comments are provided in the table. The technologies retained from this preliminary screening are summarized in Table 6-2.

The separate identification and screening of technologies and process options for surface water is not recommended. Remediation of the contaminant sources (waste, soil, and sediment) is expected to mitigate surface water contamination.

Based on the following factors, the separate identification and screening of technologies and process options for groundwater is also not recommended:

- The only contaminants detected at concentrations above PRGs are 1,1-dichloroethane, 1,1,1-trichloroethane, iron, manganese, and thallium. Most of the contaminants that were detected in soil and fill material samples were not detected in groundwater or were detected at concentrations below PRGs.

- The VOCs were only detected at one location (NP-MW02-I), which was sampled twice in 1997. The detected concentrations were not consistent. The concentration of 1,1-dichloroethane (5.9 µg/L) slightly exceeded the PRG (5.0 µg/L) only during the second sampling round. The concentration of 1,1,1-trichloroethane (5.7 µg/L) slightly exceeded the PRG (5.0 µg/L) only during the first sampling round.

- The presence of thallium in the groundwater does not appear to be related to activities at Site 1. The concentration in the upgradient well, NP-MW01-S, was 4.0 µg/L. Downgradient concentrations ranged from 3.3 µg/L to 6.7 µg/L. The PRG is 2 µg/L based on the EPA MCL. Thallium was detected in samples from all shallow wells in June 1997; however, thallium was also detected in 6 of 13 laboratory and field blank QC samples associated with this sampling event. This suggests that the reported results may be false positives. Thallium was only detected in samples from two shallow wells in November 1997 but was not detected in QC blanks. In another sample, thallium was detected in the original sample, but not in the associated field duplicate sample. Also, it should be noted that thallium was not detected in other media at the site.

- Remediation of the contaminant sources (waste, soil, and sediment) is expected to mitigate groundwater contamination.

6.2 SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS

The technologies and process options retained after the initial screening are broadly evaluated in this section. Technologies and process options that are retained will be evaluated in the detailed analysis of potential remedial alternatives.

Technologies and process options are evaluated using criteria of effectiveness, implementability, and relative cost. The criteria are defined as follows:

- Effectiveness: This criterion focuses on the potential effectiveness of process options in protecting human health and the environment and in meeting the RAOs. This criterion considers potential impacts to human health and the environment during construction and implementation. It also considers how proven the process is with respect to the contaminants and conditions at the site.

- Implementability: Implementability is a measure of both the technical and administrative feasibility of implementing a technology. It provides a means of evaluating the ability of a technology to be adapted to site-specific conditions. Technical feasibility includes consideration of construction and operational issues, demonstrated performance, and adaptability to site conditions. Administrative feasibility considerations include the ability to obtain and necessary permits or easements and adherence to applicable laws and concerns of regulatory agencies. General availability of necessary equipment and resources is also evaluated.

- Cost: Cost evaluations allow a relative comparison between similar technologies and process options. Cost plays a limited role in technology and process option screening. The cost analysis is based on engineering judgment. Each technology is evaluated as to whether costs are high,

medium, or low relative to other options in the same technology type. If there is only one process options, costs are compared to other candidate technologies.

One representative process option is selected, if possible, for each technology type to simplify the subsequent development and evaluation of alternatives without limiting flexibility during the remedial design.

The following general actions for soil, waste, and sediment are discussed in the following sections:

- No action
- Institutional actions
- Containment
- Removal
- Disposal

6.2.1 No Action

The no-action response provides a comparative baseline against which other alternatives can be evaluated. Under this response, no remedial action is taken.

6.2.1.2 Effectiveness

The no-action scenario would not achieve RAOs for Site 1. The potential for soil and waste contaminants to migrate to groundwater or Northeast Pond would remain. The steep landfill slope adjacent to Northeast Pond would continue to erode and waste materials would continue to erode into the pond sediment.

6.2.1.3 Implementability

Since there would be no remedial action, there are no implementability considerations associated with the no-action scenario.

6.2.1.4 Cost

There would be no costs associated with this option because no remedial action would be taken.

6.2.1.5 Conclusion

No action is retained to provide a baseline for comparison with other alternatives.

6.2.2 Institutional Actions

Institutional actions for waste, soil, and sediment include fencing, deed restrictions, and groundwater monitoring. Fencing is used to restrict access to waste, soil, and sediment. Deed restrictions are institutional controls placed on property deeds or transfer documents. These restrictions may limit future activities such as construction or placement of new wells. Groundwater monitoring would be used to determine whether groundwater concentrations are increasing or decreasing or to determine the effectiveness of a remedial action.

6.2.2.1 Effectiveness

Institutional actions would allow contaminated fill material, soil, and sediment to remain at the site. Fencing would prevent unauthorized access to the site. Deed restrictions could ensure that no potable water supply wells would be installed in areas of groundwater contamination and could prevent future site uses that could result in unacceptable risks (e.g., residential development). However, these restrictions, over the long term, may not reliable and may be difficult to enforce especially when the site is no longer under government control. These restrictions would not reduce potential risks to ecological receptors and the steep landfill slopes near the pond could continue to erode. Groundwater monitoring could be used to evaluate the effectiveness of a remedial action for waste, soil, and sediment. Monitoring could also be used to determine whether groundwater contaminant concentrations are increasing.

6.2.2.2 Implementability

Institutional actions are readily implementable because only administrative action and limited remedial activities would be required. Deed restrictions could be implemented by the Navy or could be incorporated into property transfer documents. Equipment and personnel to implement fencing and groundwater monitoring are readily available. Local and state permits may be required for monitoring well installation and would be readily obtained.

6.2.2.3 Cost

The cost of implementing institutional actions is low.

6.2.2.4 Conclusion

Institutional actions would not provide adequate protection of human health and the environment and are eliminated from further consideration as a stand-alone measure. However, institutional actions will be considered in conjunction with other process options when contaminated materials are left in place.

6.2.3 Containment

Capping technologies are used to minimize infiltration of precipitation and waste leaching, reduce migration of exposed waste materials, and minimize the potential for direct contact with waste, soil, and sediment contaminants. Capping can involve the installation of an impermeable barrier or compacted soil (permeable) layer over the wastes and can include an overlying layer of topsoil and vegetative cover to protect the cap. Excavation and grading in preparation for capping is often required. Impermeable barriers are often considered where soil contamination threatens groundwater or surface water.

RCRA regulations do not contain design requirements for non-hazardous, non-municipal waste landfills. However, closure requirements for hazardous waste landfills (40 CFR 264.310) provide performance standards for caps as follows:

- Provide long-term minimization of migration of liquids through the closed landfill.
- Function with minimum maintenance.
- Promote drainage and minimize erosion or abrasion of the cover.
- Accommodate settling and subsidence so that the cover's integrity is maintained.
- Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoil present.

Although RCRA closure regulations for hazardous waste landfills are not applicable, the cap performance standards provide a useful reference for the functional design of a cap.

Closure requirements for solid waste landfills are contained in New York State rules for solid waste management facilities (6 NYCRR Part 360). A final cover as described below (from bottom to top) or its equivalent is specified for the closure of a solid waste landfill:

- Bottom: A gas venting layer must be located above the compacted waste layer. The gas venting layer must have a minimum coefficient of permeability of $1x10^{-3}$ cm/sec and a maximum of 10 percent by weight passing the No. 200 sieve. A filter layer is necessary on the top and bottom, unless directly overlain by a geomembrane. A geosynthetic gas venting layer that effectively performs the equivalent function may also be used.

- Low permeability soil barrier, geomembrane, or composite cover: Low permeability soil cover is to consist of a layer of low permeability soil ($1x10^{-7}$ cm/sec, pass through a 1-inch screen, and 18-inch minimum thickness). The minimum thickness of a geomembrane cover is 40 mils or 60 mils for high-density polyethylene (HDPE). Composite covers must include a geomembrane cover (described

above) on top of an 18-inch or 24-inch layer of low permeability soil layer ($1x10^{-6}$ cm/sec), depending on the slope. For all covers, the final slopes must be between 4 and 33 percent.

- Barrier protection layer: This layer must be 24 inches thick and placed on top of the low permeability soil barrier, geomembrane, or composite cover.

- Topsoil layer: This layer must be 6 inches thick and suitable to maintain vegetative growth.

There is a variety of capping materials. Synthetic geomembranes such as HDPE, polyvinyl chloride (PVC), and Hypalon® have been used extensively as capping materials with positive, reliable results. Some geomembranes may require covering to prevent degradation by ultraviolet light. Cement and asphalt have also been used as capping materials; however, these materials are subject to cracking and deterioration.

Clay caps can provide an economical, low-permeability cover over the long term if suitable clay is used and the cap is properly constructed. The availability of local clay borrow areas must be determined, and the clay should have adequate plasticity to achieve the required permeability using normal compaction practices.

Compacted soil caps are similar to clay caps, except that a soil cap would be more permeable than a clay cap. A soil cap is primarily a means of covering exposed waste, in addition to reducing infiltration rates and reducing off-site transport of contaminants. The use of soil additives, such as bentonite, can be effective in cases where cover soils are abundant but too permeable for use as capping materials.

Containment of migration of contaminants from sediment cannot be accomplished by capping. However, a layer of clean sand or gravel can be placed over contaminated sediment to reduce the release of contaminants to surface water and to reduce direct contact.

6.2.3.1 Effectiveness

Capping would allow fill material and contaminated soil and sediment to remain at the site. Capping would protect human health, ecological receptors, and the environment by reducing the potential for direct contact with contaminated materials and reducing or eliminating the potential for off-site migration of contaminants by surface runoff or air dispersion. Impermeable capping is a reliable technology that would effectively limit the infiltration of water and leaching of contaminants to groundwater. A permeable cap would be effective in reducing the potential for direct contact but would be less effective in limiting infiltration. During remedial activities, fugitive dust emissions would need to be controlled to minimize

potential adverse effects on human health and the environment. Institutional actions would be required to limit future site uses that could damage the cap.

6.2.3.2 Implementability

The construction of an impermeable or permeable cap is expected to be implementable. A variety of proven construction methods is available for either type of cap. Some earthwork would be required to achieve stable slopes along Northeast Pond and to achieve proper slopes for run-off control. Oversize objects that are encountered during earthwork and cannot be placed beneath the area to be capped would need to be transported off site for disposal. This is not expected to affect the overall implementability. Remedial activities that involve capping are relatively common and can be conducted by many contractors. Other considerations for capping including the potential for long-term settlement of the landfill and local availability of suitable soil or clay.

6.2.3.3 Cost

Costs for an impermeable cap are expected to be moderate. Costs for a permeable cover are expected to be low. However, costs may be higher where significant site preparation and grading are required.

6.2.3.4 Conclusion

Capping is retained for Site 1. However, only an impermeable cap that meets state landfill closure requirements will be considered. A permeable cap does not meet the regulatory requirements.

6.2.4 Removal

Removal technologies include bulk excavation and dredging. Excavation can be performed with a variety of equipment, including front-end loaders, backhoes, clamshells, and draglines. The type of equipment selected must consider several factors, such as type of material, ability of the soil to support loads, rate of excavation required, depth of excavation, and site access. The excavated area is usually backfilled with clean fill, graded, and/or revegetated.

Mechanical dredging equipment is similar to that for excavation. Land-based and pontoon/barge-mounted equipment is available for dredging operations. Sediment resuspension and material loss are high during mechanical dredging, but this should not be a constraint because Northeast Pond has no outlet allowing sediment to migrate downstream.

Hydraulic dredging consists of the use of centrifugal pumps to remove and transport sediment in a slurry form. The sediment is pumped to the surface for dewatering and/or further treatment. The suction end can be raised or lowered to the specific depth required.

Pneumatic dredges use air-operated pumps to remove sediment. These dredges require a minimum water depth of 7.5 feet for efficient operation. Such equipment is not suitable to the shallow water in Northeast Pond.

6.2.4.1 Effectiveness

Excavation can be effected for the complete removal of contaminated materials from a site. Confirmatory sampling is usually required to confirm that all contaminated material has been removed. Soil samples are collected from the sides and bottom of the excavation and analyzed for the contaminants of concern to ensure that the clean-up goals have been attained. Best management practices to control stormwater and fugitive dust would be required to ensure the protection of human health and the environment during implementation.

Dredging of sediment with contaminant concentration above PRGs would be effective in meeting RAOs. However, the selection of the dredging method must consider the physical nature of the sediment, depth of contaminated sediment, and resuspension of sediment. Dredged sediment would be consolidated with waste and soil for further remediation. Dredging would temporarily remove the wetlands from the pond; however, removal of contaminated sediment would enhance the pond environment, and the wetlands would be expected to grow back naturally.

6.2.4.2 Implementability

The availability of excavation equipment is not a concern. The technology is well proven and established in the construction and remediation industries. Because of the presence of large, potentially interlocked debris, excavation could be slow and difficult. Also, once natural soils are reached, the excavated material would need to be screened for archeological artifacts.

Dredging is readily implementable, and equipment is readily available. However, the sediment would probably need to be dewatered prior to consolidation or disposal. In addition, temporary loss of ecological habitat would occur.

6.2.4.3 Cost

Excavation costs are typically low, unless unusual conditions are encountered. The costs for dredging are low to moderate.

6.2.4.4 Conclusion

Retain excavation of waste, soil, and sediment for further consideration at Site 1. Retain dredging of sediment for further consideration.

6.2.5 Disposal

Only off-site disposal is considered for Site 1. There is insufficient space available to construct a new on-site landfill at Site 1. Off-site disposal is applicable to excavated fill material, soil, and sediment. Landfills differ in the type of wastes that they are permitted to accept. Nonhazardous waste landfills are permitted to accept municipal solid waste, nonhazardous industrial waste, construction and demolition debris, contaminated soil, and other wastes that must be proven to have nonhazardous characteristics. Hazardous waste landfills can accept listed and characteristic RCRA hazardous wastes meet land disposal restrictions (LDRs). Any treatment needed to attain LDRs would be conducted at the disposal facility that receives the waste. Landfills also have limits on the amount of free liquid that can be present in the waste to be landfilled. On-site dewatering of sediment may be required prior to off-site disposal

6.2.5.1 Effectiveness

Landfilling can be an effective method for disposal of waste, soil, and sediment if the receiving facility is properly designed and operated. Risks to human health and the environment associated with implementing off-site landfilling are minor.

6.2.5.2 Implementability

There are no major implementability concerns with off-site landfilling. Off-site transport would need to be conducted according to DOT regulations, and the waste transporter must be licensed. Testing of excavated materials would be required to determine whether the material should be disposed in a hazardous waste or nonhazardous waste landfill. This testing would also be needed to determine if hazardous waste, if generated, complies with LDRs. In this case, the off-site hazardous waste landfill would also need to have the capability to treat the waste to attain LDRs. In addition, sediment and limited soil dewatering will be needed to remove free liquid from these materials prior to off-site transport. Dewatering could be implemented using a pad where the waste material would be allowed to dry naturally.

6.2.5.3 Cost

The costs for landfilling are low to moderate. Disposal in hazardous waste landfills is more expensive than in nonhazardous waste landfills. Treatment prior to disposal, if required, would increase the costs.

6.2.5.4 Conclusion

Off-site landfilling is retained for further consideration. The type of landfill would depend on the characteristics of the waste, soil, and sediment removed from the site.

6.3 DEVELOPMENT OF REMEDIAL ALTERNATIVES

The following sections provide the development of remedial alternatives to address the waste and contaminated soil and sediment at Site 1. As previously discussed, surface water contamination has been identified at Site 1. However, the contaminated surface water is believed to only be associated with contaminated sediment and does not represent a separate contaminated media. Therefore, remediation of the contaminated sediment should also address the contaminated surface water.

Contaminated materials identified at Site 1 consist of fill material (waste), soil, sediment, and groundwater. VOCs, pesticides, and metals were detected at concentrations above PRGs in fill material and soil throughout the fill area. Based on TCLP testing, some of the fill material could be classifiable as a hazardous waste because it exhibits the toxicity characteristic for chromium. Figures 6-1 and 6-2 show the estimated areal and vertical extent, respectively, of fill material and soil contamination. This extent is based on the test pit program and assumptions regarding the pre-fill site contours. The estimated extent of fill material is approximately 70,000 square feet (1.6 acres). At an average depth of 8 feet, the estimated volume of contaminated fill and soil is approximately 21,000 cy. The steep slope of the landfill is eroding into the western portion of the pond.

Sediment with concentrations of VOCs, SVOCs, pesticides, PCBs, and metals above PRGs were found in the western section of the pond near the landfill. Figure 6-3 shows the estimated extent of sediment contamination. The estimated area of sediment contamination is approximately 17,750 square feet (0.4 acre). At an average depth of 2 feet, the estimated volume of contaminated sediment is approximately 1,315 cy.

Groundwater contaminants include VOCs, iron, manganese, and thallium. The VOC and thallium detections do not significantly exceed PRGs. As previously discussed, it is believed that the detections of thallium are not site related. Thallium was detected in the upgradient well and downgradient wells, but it

was not detected in other site media. The VOCs were only detected in one well, and the concentrations exceeded PRGs in one of two sampling rounds. It is anticipated that remedial actions for the source of contamination (waste and soil) will also address groundwater contamination.

Three alternatives were developed to address waste, soil, and sediment at Site 1 based on the technologies and process options that were retained in Section 6.2. The alternatives are as follows:

- Alternative 1 – No Action
- Alternative 2 – Bank Stabilization and Capping
- Alternative 3 – Excavation and Off-Site Disposal

6.3.1 Alternative 1 – No Action

No remedial actions would be implemented under this alternative. This alternative is retained to provide a baseline for comparison to other alternatives. Therefore, it does not address the contamination at the site. There would be no reduction in toxicity, mobility, or volume of the contaminated materials. This alternative assumes that any existing remedial activities, monitoring programs, and institutional actions would be discontinued, and the property would be available for unrestricted use.

6.3.2 Alternative 2 – Bank Stabilization and Capping

Alternative 2 was developed as a containment alternative to minimize direct human and ecological receptor exposure to contaminated media, minimize contaminant transport through precipitation infiltration, and prevent continued erosion of contaminants to Northeast Pond. Under Alternative 2, the slope would be regraded back from the existing toe such that there would be no loss of pond area. Grouting, control of surface drainage, slope regrading, capping, and vegetation are the components of this alternative. Institutional actions would be implemented to limit future site use. A site plan showing the area affected by Alternative 2 is presented on Figure 6-4. Typical cross sections of the east face and south face of the landfill are presented on Figures 6-5 and 6-6, respectively. The bank stabilization and regrading design calculations, including slope stability analyses, are based on the Engineering Evaluation/Cost Analysis (EE/CA) that was previously prepared for Site 1 (TtNUS, 2001). Conceptual design calculations are provided in Appendix H.

6.3.2.1 Bank Stabilization and Regrading

Site preparation would be necessary for cap placement. Regrading of the site would be conducted to achieve acceptable cap sub-grade slopes to ensure a stable final grade. The bank would be regraded to approximately a 3 horizontal to 1 vertical (3H:1V) slope and capped. Steeper slopes (to 2H:1V) may be

used where removal of large pieces of structural debris, such as steel beams, concrete slabs, or large airplane parts, would result in significant over-excavation and hazardous conditions for workers. A bench would be provided in the regraded slopes where the vertical height of the slope exceeds 20 feet. Grades on slopes and benches would be at least 4 percent but not more than 2H:1V.

Visible sinkholes in the slopes would be filled with flowable grout. Grout may also be injected or pumped into slopes where the final grades remain steeper that 3H:1V to provide additional slope stability.

Oversized material that might be encountered during excavation would require over-excavation to remove. The oversized material would be disposed off site. Over-excavated areas would also require additional fill to be brought to grade.

A buried drum was encountered during the RFI test pit program. Testing of the drum contents and adjacent soils detected a relatively high concentration of 1,1,1-trichloroethane. The drum and some surrounding soil were excavated, placed in an overpack container, and disposed off site in the spring of 1995. However, confirmation samples were not collected to check for residual contamination. A sample of fill material collected in this area in 1994 had a TCLP extract chromium concentration of 13.3 mg/L, which exceeds the regulatory limit of 5 mg/L for classification as a hazardous waste. This area will need to be re-sampled and analyzed for the Toxicity Characteristic to determine whether any of the hazardous fill material remains so that known hazardous waste is not placed beneath the cap. If the soil in this area is determined to be a hazardous waste, it would be excavated and transported to an off-site hazardous waste treatment/disposal facility. Any other hazardous waste encountered during bank stabilization would also be transported off site for treatment/disposal.

Dust suppression, air monitoring, run-on and runoff controls, and other erosions and sediment controls would be implemented as necessary to protect human health and the environment during construction.

6.3.2.2 Sediment Removal

Contaminated sediment would be removed to an estimated average depth of 2 feet between the toe of the east face of the landfill and the Northeast Pond island. Approximately 0.4 acre (1,315 cy) of pond sediment would be excavated, leaving behind a deeper wetland. After removal of the sediment, the slope of the shore below the waterline would be reconstructed to be no steeper than 3H:1V. Sedimentation controls would be implemented to reduce the re-suspension of contaminated sediment during dredging. The use of dredge-type equipment and dredging during dry periods when less water is present could also reduce the possibility for re-suspension of sediment. The sediment would be dewatered (or otherwise stabilized) and placed on top of the regraded landfill (or incorporated within the regraded landfill).

Sediment would not be placed within 30 feet of the top of the slope to avoid saturating the bank. It is anticipated that wetland vegetation would re-establish itself naturally.

6.3.2.3 Capping

A cap system with an impermeable synthetic geomembrane would be constructed on top of the regraded landfill. The cap would be constructed in accordance with New York State solid waste management regulations (6 NYCRR Part 360). The cap would consist of, from bottom to top, a 12-inch thick gas venting layer, a geomembrane cover, a 24-inch thick barrier protection layer, and a 6-inch thick vegetative layer. An area of approximately 65,500 square feet would be capped. A cross section of the cap is shown on Figure 6-7.

The gas venting layer provides a prepared sub-base for the geomembrane cover and to minimize the potential for build-up of landfill gases. This layer should consist of material with a minimum coefficient of permeability of 1×10^{-3} cm/sec. Gas vents may be needed to vent gases from this layer to the atmosphere. These vents would be monitored to determine whether air pollution controls would be needed in the future.

The geomembrane functions to minimize infiltration of precipitation into the disposal area. The geomembrane layer consists of a flexible membrane with a minimum thickness of 40 mils (or 60 mils if an HDPE membrane is used). New York State regulations also allow the use of a low permeability material (1×10^{-7} cm/sec) layer instead of the geomembrane.

The barrier protection layer would be used to protect the geomembrane from potential root penetration and erosion. This layer also provides frost protection for the geomembrane cover. This layer could use native site soil or soil from an off-site borrow source. The vegetative layer consists of topsoil or alternative soil material that will maintain vegetative growth to reduce the potential for erosion of the cap.

Permanent erosion controls would be constructed. The surface area around the sinkholes and other overland flow channels would be graded to control precipitation runoff. Areas of concentrated flow, including the ditch along the roadway, would be lined with rock to reduce erosion. Energy dissipaters (rock-lined basins) would be needed at the outlet of rock-lined channels to prevent scour. A channel would be installed to the north to provide precipitation run-on/runoff control. The swale to the south of the site would be reconstructed to provide precipitation run-on/runoff control. Temporary erosion and sedimentation controls would be placed along the cap near the pond to minimize the potential for contaminants migrating to the pond. Additional erosion protection, such as erosion control matting, could be used to provide further slope protection. These temporary controls would be maintained until vegetation is established.

6.3.2.4 Institutional Actions and Monitoring

Institutional actions would be implemented after the cap and permanent erosion and sedimentation controls are in place. Deed restrictions on land use would be necessary to ensure that the cap is not disturbed or damaged. Site development restrictions would be included into facility transfer documents. Fencing would be constructed if necessary to control unauthorized access to the site.

Groundwater monitoring would be conducted to determine whether there have been releases to groundwater from the capped landfill. Groundwater samples would be collected quarterly for the first year and annually thereafter. The sampling would be performed based on state and federal regulations and would monitor the effectiveness of the remedy. For cost estimating purposes, it is assumed that seven wells would be sampled and analyzed for TCL organics and TAL metals.

6.3.3 Alternative 3 – Excavation and Off-Site Disposal

Alternative 3 was developed as an off-site disposal alternative to eliminate potential risks to human health and the environment from the fill material, contaminated soil, and contaminated sediment. These materials would be excavated and transported to a permitted off-site disposal facility. The site would be regraded to near pre-fill conditions and revegetated. Conceptual design calculations are provided in Appendix H.

Based on soil borings and test pit logs, the maximum depth of fill material is 20 feet at the eastern edge of the site. The average depth is 8 feet. Based on these estimates, approximately 21,000 cubic yards of fill material would be excavated and disposed off site.

A buried drum was encountered during the RFI test pit program. Testing of the drum contents and adjacent soils detected a relatively high concentration of 1,1,1-trichloroethane. The drum and some soil was excavated, placed in an overpack container, and disposed off site in the spring of 1995. However, confirmation samples were not collected. A sample of fill material in this area had a TCLP extract chromium concentration of 13.3 mg/L, which exceeds the regulatory limit of 5 mg/L for classification as a hazardous waste. This area will need to be sampled and analyzed for the Toxicity Characteristic to determine whether any of the hazardous fill material remains. Other excavated material may also be classified as a hazardous waste. Based on preliminary estimates, approximately 2,000 cy (2,600 tons) of contaminated soil and fill material has the potential to be classified as a hazardous waste. Lower or higher volumes may be present. Material determined to be a hazardous waste would be excavated and transported to an off-site hazardous waste treatment/disposal facility.

Contaminated sediment would be removed to an estimated average depth of 2 feet between the toe of the east face of the landfill and the Northeast Pond island. Approximately 0.4 acre (1,315 cy) of pond sediment would be excavated, leaving behind a deeper wetland. After removal of the sediment, the slope of the shore below the waterline would be reconstructed to be no steeper than 3H:1V. Sedimentation controls would be implemented to reduce the re-suspension of contaminated sediment during dredging. The use of dredge-type equipment and dredging during dry periods when less water is present could also reduce the possibility for re-suspension of sediment. The sediment would be dewatered (or otherwise stabilized) prior to off-site transport to a solid waste landfill. It is anticipated that wetland vegetation would revegetate naturally.

Dust suppression, air monitoring, run-on and runoff controls, and other erosions and sediment controls would be implemented as necessary to protect human health and the environment during construction. No institutional actions for land use would be required because all landfill material, contaminated soil, and contaminated sediment would be removed from the site. It is anticipated that groundwater concentrations would decrease after the source is removed. Limited groundwater monitoring following removal would be conducted to determine whether this has occurred.

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TABLE 6-1

SCREENING OF TECHNOLOGIES/PROCESS OPTIONS FOR SOIL, WASTE, AND SEDIMENT
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
PAGE 1 OF 5

General Action	Technology	Process Options	Description	General Screening	
No Action	No Action	No Action	No activities conducted at site to address contamination.	Retain for baseline comparison.	*
Institutional Controls	Institutional Controls	Deed Restrictions	Administrative action used to restrict groundwater use and future site activities.	Deed restrictions are viable, in combination with other technologies, since contaminated groundwater and material may remain in place. Deed restrictions could consist of land use and groundwater use restrictions.	*
		Groundwater Monitoring	Sampling and analysis to evaluate the migration of contaminants within or the potential contamination of groundwater.	Groundwater monitoring is viable for assessing the effectiveness of containment or treatment measures, during and following remediation.	*
Containment	Capping	Capping	Use of impermeable or semi-permeable materials (e.g., soil, clay, synthetic membrane, asphalt) to prevent exposure to contamination and/or reduce the vertical migration of contaminants to groundwater.	An impermeable cap would be successful in preventing exposure to contaminated material and in reducing infiltration of precipitation. A permeable cap would prevent exposure to contaminated materials, but would not prevent infiltration of precipitation.	*
	Erosion Control	Slope Stabilization	Sloping of banks and/or protecting the banks with riprap, piling, vegetation, etc. to stabilize landfill slopes.	Bank revetment may be considered as part of cap construction.	**
Removal	Bulk Excavation	Bulk Excavation	Mechanical removal of solid materials using common construction equipment.	Bulk excavation of soil and waste is feasible for alternatives that include off-site treatment or disposal.	*
	Dredging	Dredging	Use of mechanical, hydraulic, or pneumatic dredge to remove sediment or saturated soil.	Dredging may be necessary for removal of sediment from Northeast Pond.	*

TABLE 6-1

SCREENING OF TECHNOLOGIES/PROCESS OPTIONS FOR SOIL, WASTE, AND SEDIMENT
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
PAGE 2 OF 5

General Action	Technology	Process Options	Description	General Screening	
Disposal	Landfill	Hazardous or Nonhazardous Waste Landfill	Disposal of excavated material in an on-site or off-site landfill	Off-site hazardous and/or nonhazardous waste landfills may be utilized as a primary technology for disposal of contaminated material. As a secondary technology, off-site hazardous waste landfills may be used for disposal of concentration residuals from soil or waste treatment. Off-site nonhazardous waste landfills may be considered for nonhazardous soil and waste or treated materials. Eliminate on-site landfilling because suitable area is not available.	*
	Recycling and Salvage	Recycling and Salvage	Recycling of fill materials components instead of disposal.	Only recycling of scrap metal encountered during excavation or consolidation will be considered. Recycling is being considered as a secondary technology.	**
	Consolidation	Consolidation	Relocation of untreated soil and sediment on site.	Only consolidation of untreated or stabilized waste in an area to be capped will be considered. Consolidation is being considered as a secondary technology.	**
	Beneficial Reuse	Beneficial Reuse as Fill Material	On-site reuse of treated soil or other material.	Beneficial reuse as fill material for returning treated material to the site as backfill or cover material.	**
Ex-situ Treatment	Fixation	Solidification	Immobilization of contaminants by mixing with cement, fly ash, kiln dust, etc.	Solidification is feasible for treatment of soil contaminated with inorganics. It is not well suited for heterogeneous fill material present in the landfill.	x
	Physical	Soil Washing/Solvent Extraction	Separation of contaminants from a medium by contact with water or solvents with a high affinity for the contaminants of concern.	This process options is not well suited for heterogeneous fill material present in the landfill. May not be effective for metals present in contaminated soil.	x

TABLE 6-1

SCREENING OF TECHNOLOGIES/PROCESS OPTIONS FOR SOIL, WASTE, AND SEDIMENT
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
PAGE 3 OF 5

General Action	Technology	Process Options	Description	General Screening	
Ex-situ Treatment (cont.)	Physical (cont.)	Dewatering	Removal of free water from wastes using gravity (dewatering pad) or equipment such as a filter press.	Dewatering may be required prior to treatment, consolidation, or disposal of saturated contaminated soil and sediment.	**
	Thermal	Incineration	Volatilization and oxidation of organic compounds via conveyance through high temperature.	Would not be effective for inorganics present in contaminated soil, fill material, and sediment.	x
		Low-Temperature Thermal Stripping	Use of moderate temperatures to volatilize organics. Off-gas may require treatment to capture contaminants.	Although VOCs are a contaminant of concern, soil and sediment are also contaminated with a pesticide and metals. The landfill contains heterogeneous waste materials.	x
	Biological	Landfarming	Tilling of contaminated material in layers to remove VOCs and biodegrade organics.	Would not be effective for non-biodegradable organics and metals detected in soil and sediment. Not effective for heterogeneous landfill waste.	x
		Bioslurry Treatment	Treatment of contaminated material in a slurry reactor under controlled conditions using natural or cultured microorganisms to biodegrade organics.	Would not be effective for non-biodegradable organics and metals detected in soil and sediment. Not effective for heterogeneous landfill waste.	x
	Chemical	Oxidation	Use of strong oxidizers such as ozone, peroxide, chlorine, or permanganate to chemically oxidize materials.	Oxidation of solid waste streams is not a well established and is typically used for liquid wastes.	x
		Neutralization	Use of acids or bases to counteract excessive pH.	Neutralization is not required based on site contaminants and conditions.	x

TABLE 6-1

SCREENING OF TECHNOLOGIES/PROCESS OPTIONS FOR SOIL, WASTE, AND SEDIMENT
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
PAGE 4 OF 5

General Action	Technology	Process Options	Description	General Screening	
Ex-situ Treatment (cont.)	Chemical (cont.)	Dechlorination	Use of chemicals to remove chlorine from chlorinated compounds.	This technology is effective for concentrated halogenated compounds (e.g., PCBs). PCBs are not present at high concentrations in site media.	x
	Solids Processing	Crushing and Grinding	Use of crushing and grinding to reduce the size of an object.	Crushing and grinding may be required for alternatives that involve excavation or treatment. Oversize objects may be present in the landfill.	**
		Magnetic Separation	Separation of metal debris.	Magnetic separation may be warranted for alternatives that involve excavation or treatment. Metal debris may be present in the landfill.	**
		Screening	Separation of material into fractions of the same size by passing through screens or mesh.	Screening may be warranted for alternatives that involve excavation or treatment. Oversize objects may be present in the landfill.	**
In-situ Treatment	Thermal	Vitrification	Melting of solids using electrically generated heat to glassify metals and combust organics.	Implementation of this innovative process option is not feasible for a landfill with heterogeneous wastes.	x
		Radio Frequency Heating	Use of radio waves to heat and volatilize contaminants.	This technology is only applicable to organic contaminants. It is not implementable where there are buried metal objects, such as those that may be present in the landfill.	x
	Chemical/ Physical	Soil Washing	Flushing of contaminants using injection and extraction well system and aboveground treatment system.	This process option is not effective for heterogeneous wastes in a landfill. Would not be suitable for the soil cover on the landfill or pond sediment.	x

TABLE 6-1

SCREENING OF TECHNOLOGIES/PROCESS OPTIONS FOR SOIL, WASTE, AND SEDIMENT
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP, CALVERTON, NEW YORK
PAGE 5 OF 5

General Action	Technology	Process Options	Description	General Screening	
In-situ Treatment (cont.)	Physical	Vapor Extraction	Removal of VOCs using an induced vacuum created by an injection and extraction well system.	This process option would not be implementable for pond sediment, and it has not been demonstrated for heterogeneous landfill waste. It would not be effective for metals and pesticides in soil.	x
		Fixation	Pressure injection of cement or other pozzolanic materials to form an impermeable solid.	This process option would not be implementable for pond sediment. It has not been demonstrated for heterogeneous landfill waste.	x

* Potentially applicable as a primary technology.
** Potentially applicable as a secondary technology (e.g., handling of treatment residuals resulting from a primary technology). Discussed as appropriate under applicable alternatives.
x Not applicable as a primary technology.

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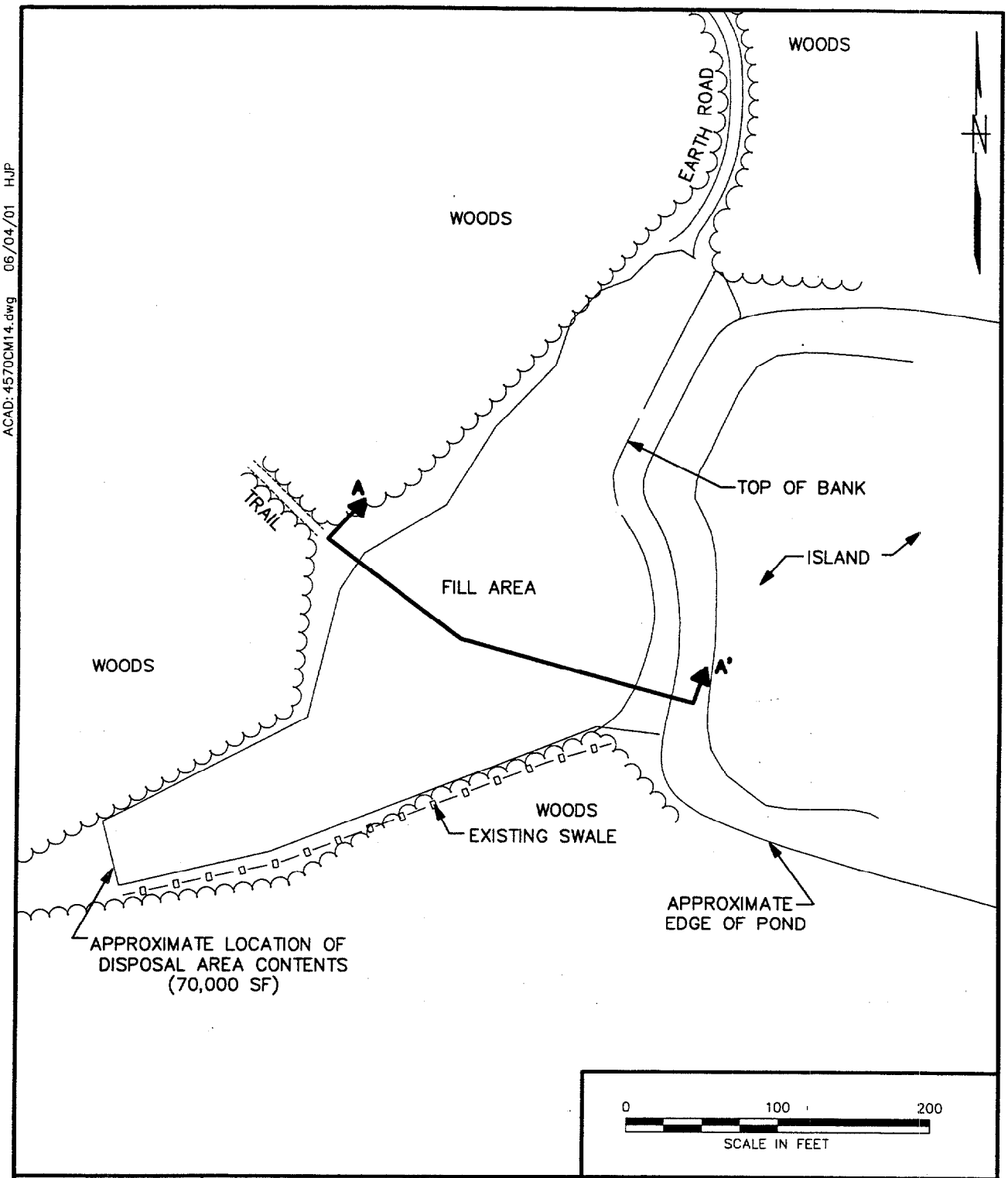

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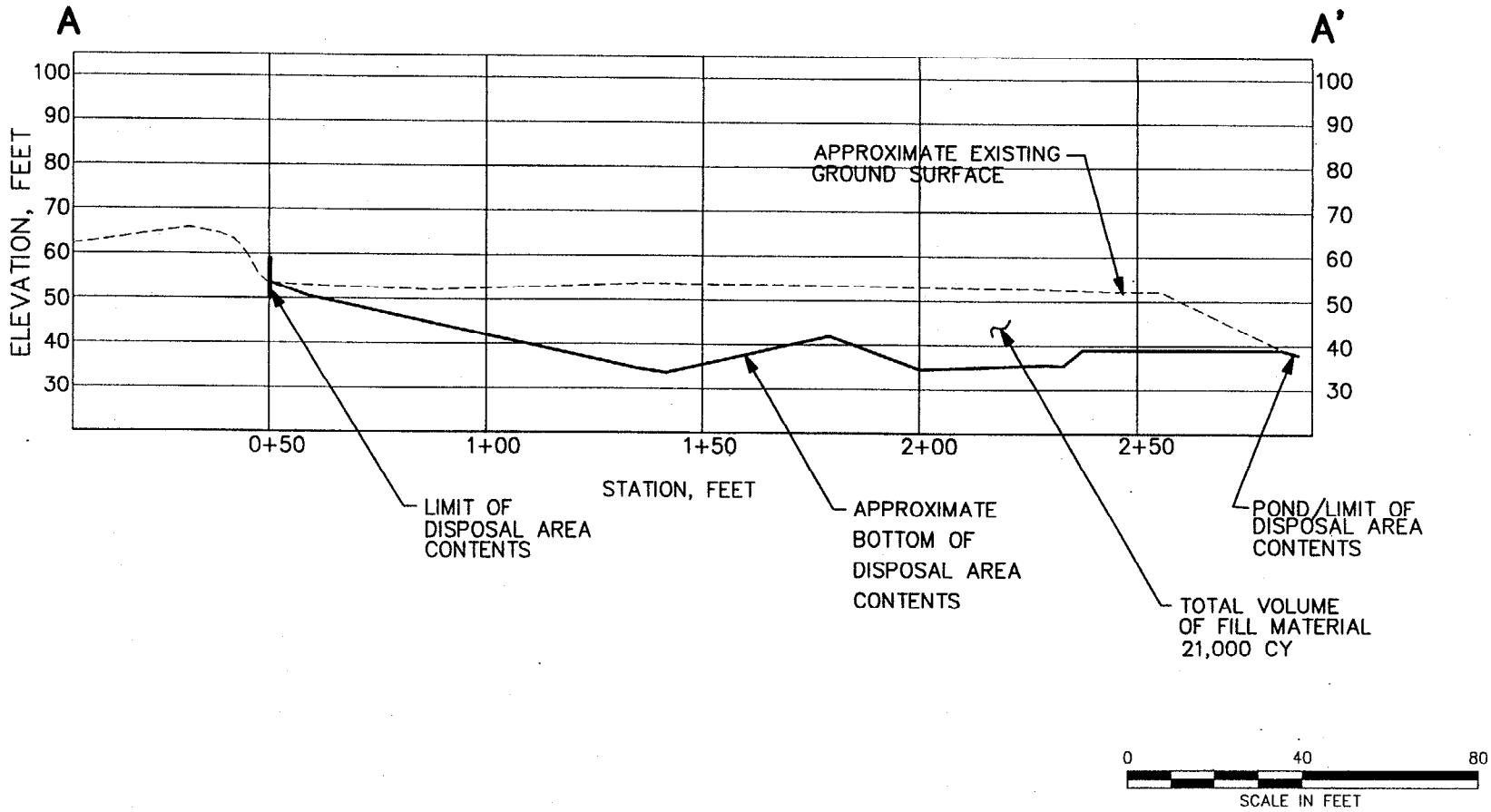

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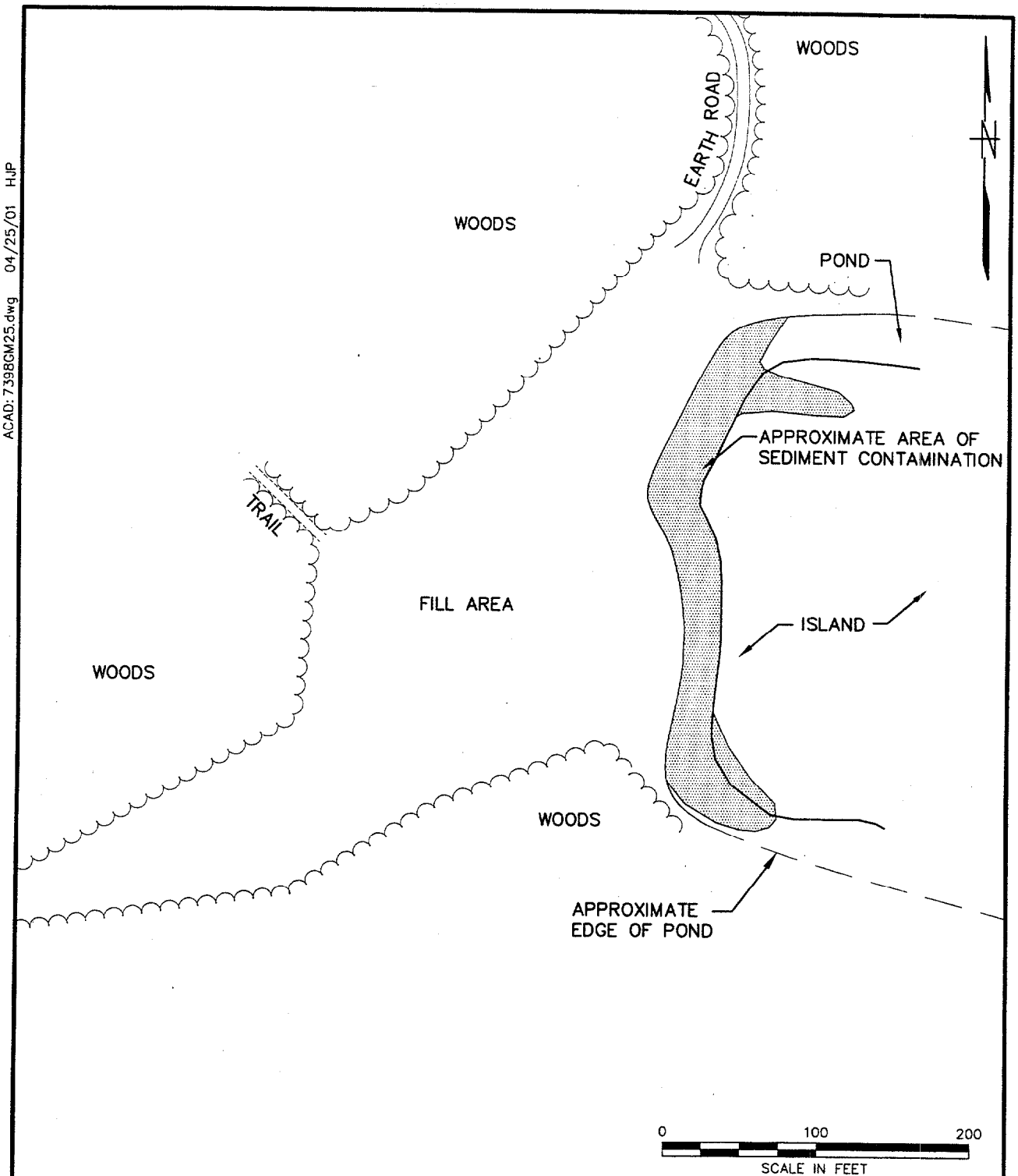

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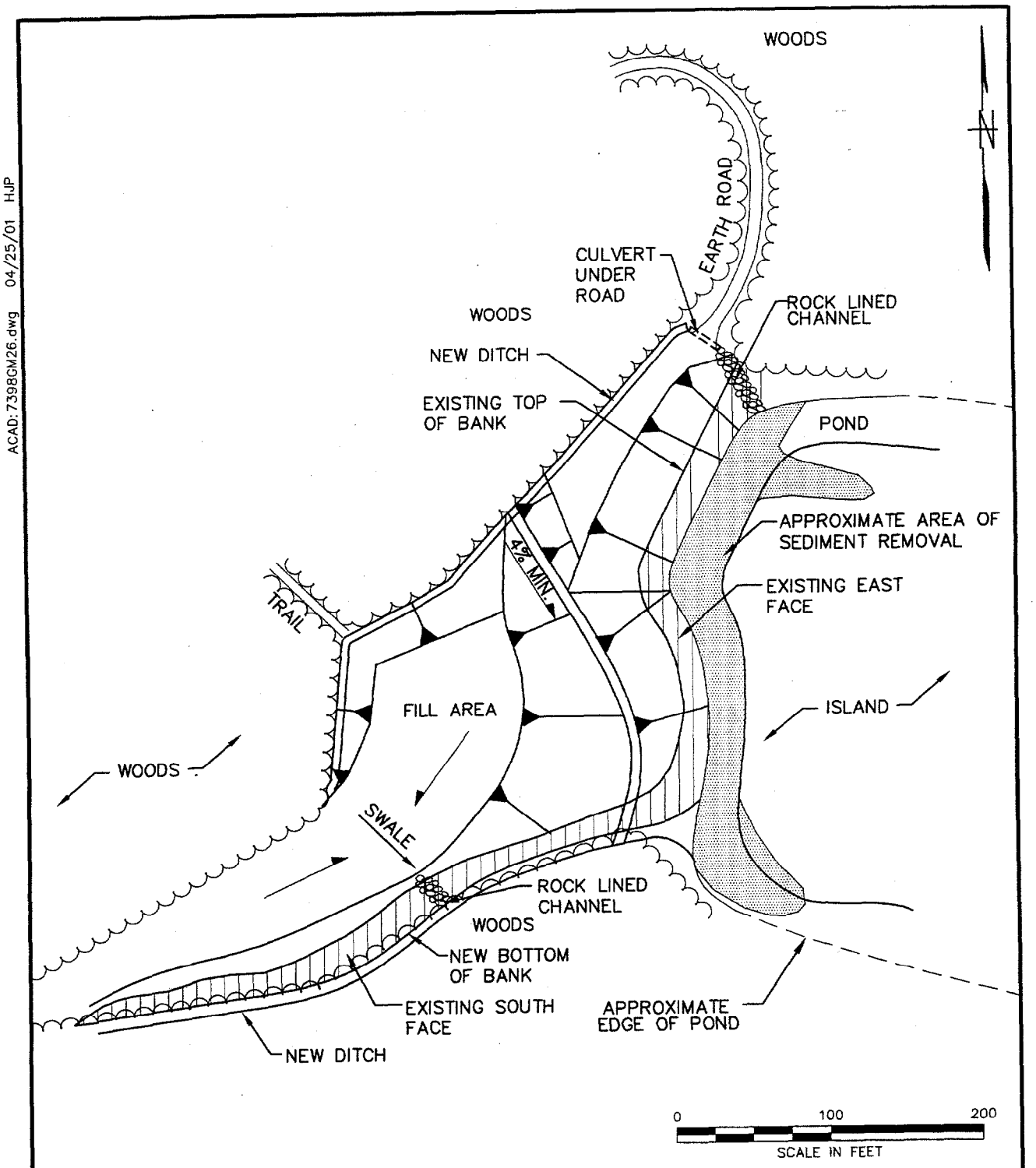

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COST/SCHED-AREA		APPROVED BY DATE	
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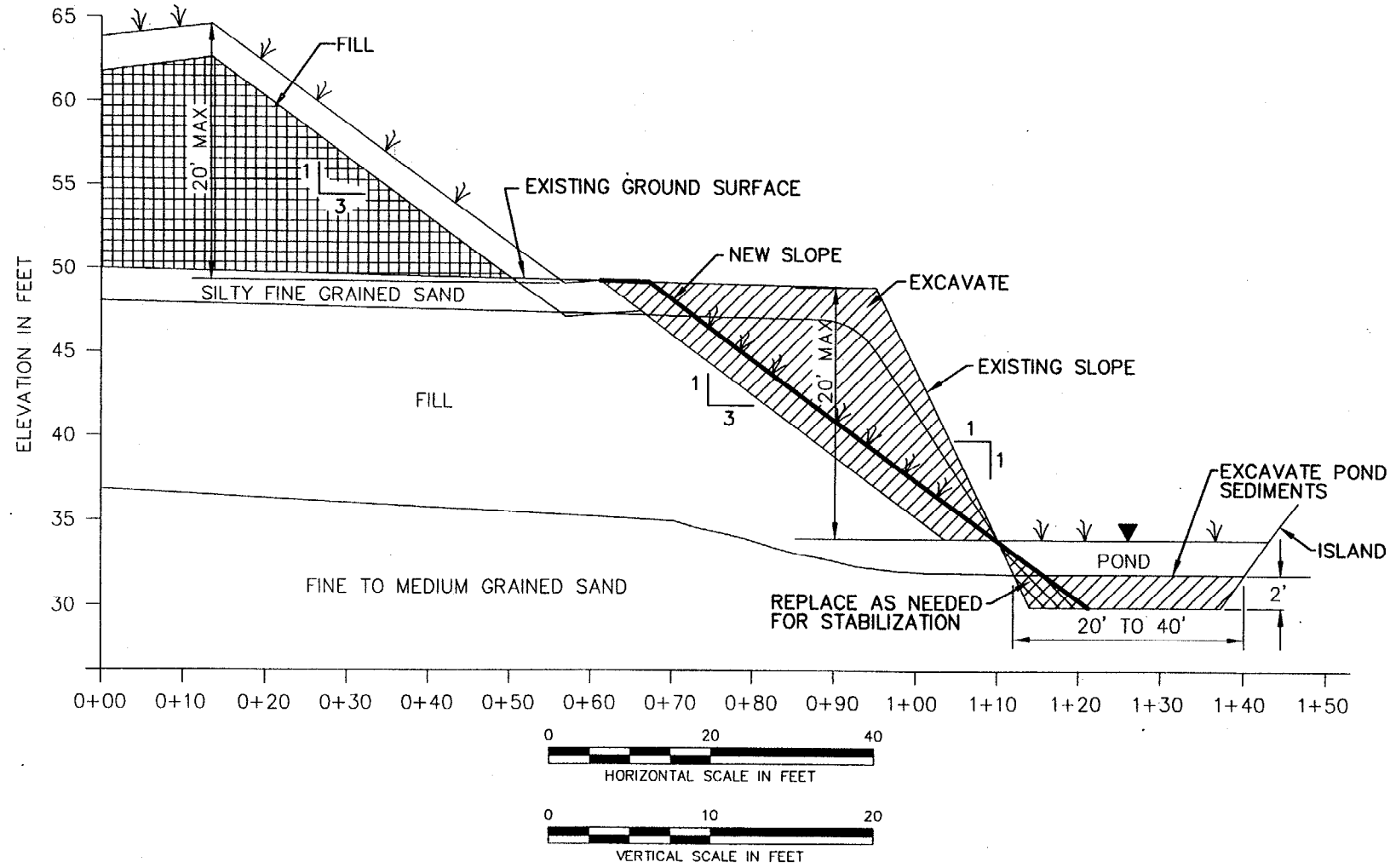

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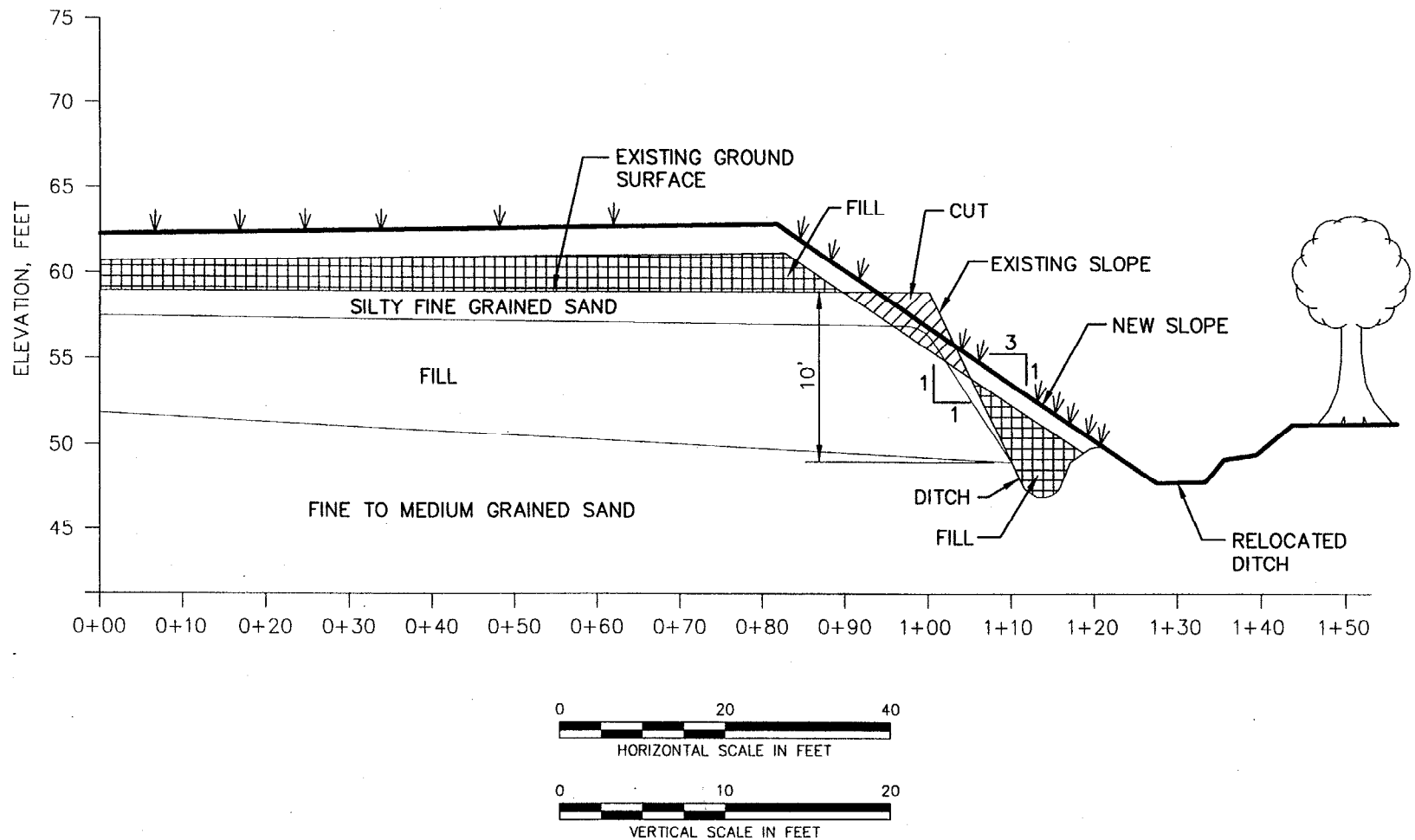

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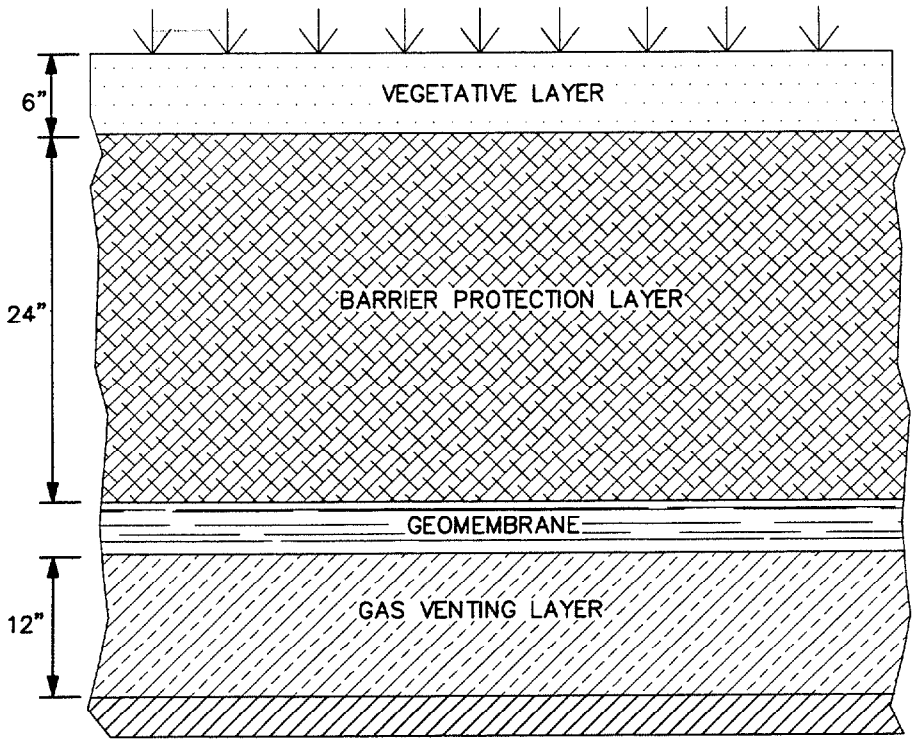

DISPOSAL AREA CONTENTS

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COST/SCHED–AREA		APPROVED BY DATE	
SCALE AS NOTED		DRAWING NO. FIGURE 6–7	REV. 0

FORM CADD NO. T+NUS_AV.DWG – REV 0 – 1/22/98

7.0 EVALUATION OF REMEDIAL ALTERNATIVES

7.1 INTRODUCTION

In this section, each remedial alternative developed in Section 6.0 is analyzed in detail in accordance with the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA, 1998). The detailed analysis of remedial alternatives provides information for the comparison of alternatives in Section 6.0 and the final selection of a remedial alternative.

The alternatives are also evaluated in relation to one another for each of the evaluation criteria. The purpose of the comparative analysis is to identify the relative advantages and disadvantages of each alternative.

7.2 CRITERIA FOR DETAILED ANALYSIS

The following criteria are used for the detailed analysis of each remedial alternative:

Threshold Criteria

- Overall protection of human health and the environment
- Compliance with ARARs and TBCs

Primary Balancing Criteria

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying Criteria

- State and EPA acceptance
- Community acceptance

The following is a description of each of the nine evaluation criteria.

Overall Protection of Human Health and the Environment. The primary requirement for remedial actions is that they are protective of human health and the environment. A remedy is protective if it adequately eliminates, reduces, or controls all current and potential risks. All pathways of exposure must be considered when evaluating the remedial alternative. If hazardous substances remain without engineering or institutional controls after the remedy is implemented, then the evaluation must consider unrestricted land use and unlimited exposure for human and environmental receptors. For those sites where hazardous substances remain and unrestricted use and unlimited access are not allowable, engineering controls, institutional controls, or some combination of the two must be implemented to control exposure and ensure reliable protection over time. In addition, implementation of a remedy cannot result in unacceptable short-term risks to, or cross-media impacts on, human health and the environment.

Compliance with ARARs. Compliance with ARARs is one of the requirements for remedy selection. Alternatives are developed and refined throughout the FS process to ensure that they will meet all their respective ARARs or that there is good rationale for waiving an ARAR. Alternatives may be refined to ensure compliance with these requirements.

Long-Term Effectiveness and Permanence. This criterion reflects the emphasis on implementing remedies that will ensure protection of human health and the environment in the future, as well as in the near term. In evaluating alternatives for long-term effectiveness and the degree of permanence they afford, the analysis should focus on the residual risks that will remain at the site after completion of the remedial action. The analysis should include consideration of the following:

- Degree of threat posed by the hazardous substances remaining at the site.
- Adequacy of any controls (e.g., engineering and institutional controls) used to manage the hazardous substances remaining at the site.
- Reliability of those controls.
- Potential impacts on human health and the environment should the remedy fail, based on assumptions included in the reasonable maximum exposure scenario.

Reduction of Toxicity, Mobility, or Volume through Treatment. This criterion addresses the preference for remedies that employ treatment as a principal element by ensuring that the relative performance of treatment alternatives in reducing toxicity, mobility, or volume will be addressed. Specifically, this analysis should examine the magnitude, significance, and irreversibility of reductions.

Short-Term Effectiveness. This criterion examines the short-term impacts of the alternative (i.e., impacts of the implementation) on the neighboring community, workers, and surrounding environment. This includes the potential threat to human health and the environment associated with excavation, treatment, and transportation of hazardous substances. The potential cross-media impacts of the remedy and the time to achieve protection of human health and the environment should also be analyzed.

Implementability. Implementability considerations include the technical and administrative feasibility of the alternatives. Implementability also considers the availability of goods and services (e.g., treatment, storage, or disposal capacity) on which the viability of the alternative depends. Implementation considerations can affect the timing of the various remedial alternatives. This includes limitations on the season in which the remedy can be implemented, the number and complexity of material-handling steps that must be followed, the need to obtain permits for off-site activities, and the need to secure technical services.

Cost. Cost includes all capital costs and operation and maintenance (O&M) costs incurred over the life of the project. The focus of the detailed analysis is on the net present values of these costs. Costs are used to select the least expensive or more cost effective alternative that will achieve the remedial action objectives. A 30-year maintenance life and a 7 percent annual discount factor are used to calculate the present worth of the capital and O&M costs.

State and EPA Acceptance. This criterion, which is an ongoing consideration through the remediation process, reflects the requirements to provide substantial and meaningful state and EPA involvement.

Community Acceptance. This criterion refers to community concerns on the remedial alternative under consideration. "Community" is broadly defined to include all interested parties. These comments are taken into account through the FS process. However, only preliminary assessment of community acceptance can be conducted during development of the FS because formal public comment will not be received until after the public comment period for the preferred alternative is held.

7.3 DETAILED ANALYSIS OF ALTERNATIVES

7.3.1 Alternative 1 – No Action

7.3.1.1 Description

No remedial action would be implemented under this alternative. This alternative is considered primarily for comparison to other remedial alternatives. The site would be left as is, and it is assumed that the property could be available for release for unrestricted use.

7.3.1.2 Overall Protection of Human Health and the Environment

Alternative 1 is partially protective of human health but is not protective of the environment. Based on the quantitative risk assessment, the current conditions at Site 1 do not pose unacceptable risks to human health. There are no current users of groundwater. However, under a hypothetical future residential land use scenario, there would be unacceptable risks from exposure to contaminated soil and groundwater. In addition, the sinkholes and unstable bank represent potential physical hazards. Under this scenario, Alternative 1 would not be protective of human health.

There may also be unacceptable risks to ecological receptors exposed to contaminated soil and contaminated surface water and sediment in Northeast Pond. Although the potential for ecological risks has been identified from exposure to surface water and sediment, the results of the benthic macroinvertebrate investigation did not indicate adverse impacts. The diversity of feeding groups suggests a normally functioning ecological community.

Landfill materials could continue to erode into the pond and would remain as a potential source of groundwater contamination.

7.3.1.3 Compliance with ARARs and TBCs

Alternative 1 would not comply with state groundwater quality standards, drinking water standards, or surface water quality standards. This alternative would not comply with state guidance on clean-up objectives for soil (TAGM 4046) or for screening contaminated sediments.

7.3.1.4 Long-Term Effectiveness and Permanence

The future threats to human health and the current and future threats to ecological receptors and the environment would remain. There would be no long-term management controls; therefore, the adequacy

and reliability of controls would not be applicable. There would be no long-term monitoring program to confirm that migration of contaminants from the site to the environment is not occurring.

7.3.1.5 Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 1 would not include treatment to reduce the toxicity, mobility, or volume of hazardous substances at the site.

7.3.1.6 Short-Term Effectiveness

Alternative 1 would not pose any short-term risks to the local community or on-site workers during implementation because no actions would occur. There would be no environmental impacts from implementation.

7.3.1.7 Implementability

There would be no remedial actions to implement under Alternative 1.

7.3.1.8 Costs

There would be no costs associated with the no-action alternative.

7.3.1.9 State and EPA Acceptance

NYSDEC and EPA acceptance will be addressed following receipt of comments on the draft RI/FFS. However, it is unlikely that the no-action alternative would be acceptable to either agency.

7.3.1.10 Community Acceptance

Community acceptance will be addressed in the ROD following the public comment period on the RI/FFS and Proposed Plan.

7.3.2 Alternative 2 – Bank Stabilization and Capping

7.3.2.1 Description

Alternative 2 is a containment alternative developed to minimize direct human and ecological receptor exposure to contaminated material, minimize contaminant transport through precipitation infiltration, and prevent continued erosion of contaminants into Northeast Pond. Regrading of the site would be conducted to achieve acceptable cap sub-grade slopes to ensure a final stable grade. Visible sinkholes

in the slopes would be filled with flowable grout. Oversized material that may be encountered during excavation and could not be consolidated within the landfill would be disposed off site. Any hazardous waste encountered near the location of a former buried drum would be excavated and disposed at an off-site RCRA landfill.

Contaminated sediment would be removed to an average depth of 2 feet between the toe of the east slope and the island in Northeast Pond. The sediment would be dewatered (or otherwise stabilized) and placed on top of, or consolidated within, the regraded landfill.

A cap system with an impermeable geosynthetic membrane would be constructed on top of the regraded landfill. The cap would be constructed in accordance with New York State solid waste management regulations.

Temporary erosion and sediment controls would be placed along the cap near the pond to minimize the potential for contaminants to migrate to the pond during construction. The temporary controls would be maintained until vegetation is established on the cap system. Permanent erosion controls would also be constructed. A channel would be installed north of the site, and a swale south of the site would be constructed to provide run-on and runoff controls.

Institutional actions would be implemented. Deed restrictions on land use would be implemented to ensure that the cap is not disturbed or damaged. Site development restrictions would be included in the NWIRP Calverton facility transfer documents. Fencing would be constructed if necessary to control unauthorized access to the site. Long-term groundwater monitoring would be conducted to determine the effectiveness of the remedy and whether there have been releases to groundwater from the capped landfill.

7.3.2.2 Overall Protection of Human Health and the Environment

Alternative 2 would protect human health and the environment by capping the entire landfill. Grading and bank stabilization would provide a stable sub-grade for the cap and prevent erosion of the landfill material into Northeast Pond. Additional controls include implementing future land-use restrictions and preventing groundwater use with groundwater use restrictions. This would reduce the potential for contaminants to enter the human exposure pathway through ingestion and dermal contact. Capping would protect ecological receptors by minimizing the potential for contact with contaminated surface soil. Removal of sediment from Northeast Pond would protect aquatic receptors.

Alternative 2 would also be protective of the environment by minimizing the infiltration of surface water, thus reducing the potential for migration of fill and soil contaminants to groundwater with subsequent

migration to surface water. Because Alternative 2 does not remove all waste or contaminants from the landfill, monitoring of groundwater would be performed to provide confirmation of the continued effectiveness of the remedial action. The monitoring program would help to determine whether supplemental remedial actions are required in the future.

7.3.2.3 Compliance with ARARs and TBCs

Alternative 2 is expected to comply with chemical-, location-, and action-specific ARARs and TBCs. The cap system design would comply with state regulations for closure of solid waste landfills (6 NYCRR 360). Landfill waste, soil, and sediment with contaminant concentrations higher than PRGs would be contained beneath the cap. This alternative does not include measures to actively reduce surface water contaminant concentrations to achieve state surface water quality standards. However, surface water concentrations are expected to decrease after the contaminated sediment is removed from the pond and the landfill is stabilized and capped so that contaminants do not migrate into the pond. In addition, this alternative does not include measures to actively reduce groundwater contaminant concentrations to achieve state groundwater quality standards. However, control of the potential sources of groundwater contamination (fill, soil, and sediment) is expected to cause a reduction in the downgradient iron and manganese concentrations. As stated in previous sections, the detections of thallium are not related to activities at the site.

7.3.2.4 Long-Term Effectiveness and Permanence

Capping is an effective, well-demonstrated method of containing waste. The entire landfill would be permanently covered. Exposed waste materials, contaminated soil, and contaminated sediment would be removed and consolidated beneath the cap. Although oversized debris that could not be consolidated beneath the cap may be disposed off site, the majority of the landfill would remain. However, the risks to human health and the environment would be reduced by limiting infiltration and potential contaminant migration to groundwater. Additionally, the erosion of landfill material into Northeast Pond would be eliminated. Land and groundwater use restrictions would reduce the potential human health hazard from the waste remaining in the landfill, and monitoring could confirm the continued effectiveness of the cap performance.

Land use controls would be protective over the long term provided they are enforced. Protection would depend on effective administration and management of the transfer documents. A reevaluation of the site would be performed every 5 years to determine whether any changes to the controls would be required and whether the remedy remains effective.

7.3.2.5 Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 2 would not include treatment to reduce the toxicity, mobility, or volume of hazardous substances at the site.

7.3.2.6 Short-Term Effectiveness

The remedial activities associated with construction of the cap are not expected to have an adverse impact on the community and would provide protection to human health and the environment once the geomembrane is installed over the landfill.

Workers could be exposed to the contaminated media during bank stabilization, waste and sediment removal and consolidation, and monitoring activities. Such exposure would be minimized by the use of personal protective equipment (PPE), engineering controls, and compliance with a site-specific health and safety plan (HASP) and Occupational Safety and Health Administration (OSHA) regulations.

Removal of contaminated sediment would have a short-term impact on the wetlands in the area. It is expected that the wetlands will naturally reestablish. Erosion controls would be provided during bank stabilization, sediment removal, and other construction activities to prevent additional contamination of the pond during implementation.

It is expected that the RAOs could be achieved within a 6 month construction duration.

7.3.2.7 Implementability

Alternative 2 would be implementable. Equipment and services necessary to excavate and consolidate wastes, stabilize the bank, remove contaminated sediment, and construct the cap are readily available. There is sufficient off-site disposal capacity for the quantities of oversized debris and hazardous waste anticipated. Because of the presence of large, potentially interlocked debris, excavation could be slow and difficult. Also, if natural soils are encountered, the excavated material would need to be screened for archeological artifacts.

Land and groundwater use restrictions are expected to be readily implementable because the site is located within a controlled facility, where rules and local ordinances can be strictly enforced. Restrictions for future property use would involve legal assistance and regulatory approval. Provisions would be defined in and enforced through the NWIRP Calverton transfer documents.

7.3.2.8 Cost

The estimated costs for Alternative 2 would be as follows:

- Capital ($): 2,103,00
- O&M ($/year): 74,000 (year 1); 25,000 (years 2 to 30) plus 20,000 (every 5 years)
- Present worth ($): 2,505,000

The present-worth cost estimate is based on a 30-year monitoring period. Details of the cost estimates are provided in Appendix I.

7.3.2.9 EPA and State Acceptance

EPA and state acceptance will be addressed following receipt of comments on the draft RI/FFS.

7.3.2.10 Community Acceptance

Community acceptance will be addressed in the ROD following the public comment period on the RI/FFS and Proposed Plan.

7.3.3 Alternative 3 – Excavation and Off-Site Disposal

7.3.3.1 Description

Alternative 3 is a removal alternative developed to eliminate direct human and ecological receptor exposure to contaminated material, contaminant transport through precipitation infiltration, and erosion of contaminants into Northeast Pond. All landfill material, contaminated soil, and contaminated sediment would be excavated and transported off site for disposal. The landfill area would not be backfilled but would be returned to approximate pre-fill conditions and revegetated.

Long-term monitoring would not be required because the sources of contamination would be removed. However, short-term monitoring would be conducted to evaluate source removal on groundwater quality. If groundwater quality does not improve, implementation of groundwater use restrictions would need to be implemented.

7.3.3.2 Overall Protection of Human Health and the Environment

Alternative 3 would protect human health and the environment by removing fill materials, contaminated soil, and contaminated sediment and, if necessary, preventing groundwater use with groundwater use

restrictions. This would reduce the potential for contaminants to enter the human exposure pathway through ingestion and dermal contact. Removal of contaminated soil and contaminated sediment would also protect ecological receptors.

Alternative 3 would also be protective of human health and the environment by verifying that groundwater contaminant concentrations decrease after the source is removed. Short-term monitoring of groundwater would provide the ability to evaluate the effectiveness of this remedial action on groundwater quality and whether additional modifications are required (e.g., groundwater use restrictions).

7.3.3.3 Compliance with ARARs and TBCs

Alternative 3 would be expected to comply with chemical-, location-, and action-specific ARARs and TBCs. Landfill waste and soil and sediment with contaminant concentrations higher than PRGs would be removed from the site. This alternative does not include measures to actively reduce surface water contaminant concentrations to achieve state surface water quality standards. However, surface water concentrations are expected to decrease after the contaminated sediment is removed from the pond and the landfill is removed. In addition, this alternative does not include measures to actively reduce groundwater contaminant concentrations to achieve state groundwater quality standards. However, removal of the potential sources of groundwater contamination (fill, soil, and sediment) is expected to cause a reduction in the downgradient iron and manganese concentrations. As stated in previous sections, the detections of thallium are not related to activities at the site.

7.3.3.4 Long-Term Effectiveness and Permanence

Waste materials, contaminated soil, and contaminated sediment would be permanently removed from the site. These materials are also the potential sources of surface water and groundwater contamination. If groundwater contaminant concentrations do not decrease as a result of source removal, groundwater use restrictions would be required to ensure the effectiveness of this alternative.

Groundwater use restrictions, if needed, would be protective over the long term provided they are enforced. Protection would depend on effective administration and management of the transfer documents. If groundwater use restrictions are needed, a reevaluation of the site would be performed every 5 years to determine whether any changes to the restrictions would be required and whether the remedy remains effective.

7.3.3.5 Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 3 would not include treatment to reduce the toxicity, mobility, or volume of hazardous substances at the site.

7.3.3.6 Short-Term Effectiveness

Hauling a large quantity of material off site would have a short-term impact on the community until remedial activities are completed. Additional traffic would be expected. Although there would be a potential for spills, all materials would be solids.

Exposure of workers to the contaminated media during excavation and monitoring activities would be minimized by the use of appropriate PPE, engineering controls, and compliance with a site-specific HASP and OSHA regulations.

Removal of contaminated sediment would have a short-term impact on the wetlands in the area. It is expected that the wetland will naturally reestablish. Erosion controls would be provided during excavation, sediment removal, and other construction activities to prevent additional contamination of the pond during implementation.

It is expected that the RAOs could be achieved within a 15 month construction duration.

7.3.3.7 Implementability

Alternative 3 would be implementable. Equipment and services necessary to excavate waste, soil, and sediment are readily available. Because of the presence of large, potentially interlocked debris, excavation could be slow and difficult. Also, once natural soils are reached, excavated materials would need to be screened for archeological artifacts. Landfill facilities are available; however, all excavated materials would require transportation over potentially long distances because no landfill facilities are available on Long Island. Transportation would need to be conducted in compliance with DOT regulations.

Groundwater use restrictions, if needed, are expected to be readily implementable because the site is located within a controlled facility, where rules and local ordinances can be strictly enforced. Restrictions for future groundwater use would involve legal assistance and regulatory approval. Provisions would be defined in and enforced through the NWIRP Calverton transfer documents.

7.3.3.8 Cost

The estimated costs for Alternative 3 would be as follows:

- Capital ($): 6,268,000
- O&M ($/year): 65,000 (year 1 only)
- Present worth ($): 6,329,000

The present worth cost estimate is based on a 1-year monitoring period. Details of the cost estimates are provided in Appendix I.

7.3.3.9 EPA and State Acceptance

EPA and state acceptance will be addressed following receipt of comments on the draft RI/FFS.

7.3.3.10 Community Acceptance

Community acceptance will be addressed in the ROD following the public comment period on the RI/FFS and Proposed Plan.

7.4 COMPARATIVE ANALYSIS OF ALTERNATIVES

In this section, the alternatives are evaluated in relation to one another for each of the evaluation criteria. The purpose of this analysis is to identify the relative advantages and disadvantages of each alternative. Table 7-1 summarizes the comparative analysis for the alternatives for Site 1.

7.4.1 Overall Protection of Human Health and the Environment

Alternative 3, Excavation and Off-Site Disposal, is the most protective of human health and the environment because all landfill waste and soil and sediment with contaminant concentrations greater than PRGs would be removed from the site. Potential sources of groundwater contamination would be removed from the site.

Alternative 2, Bank Stabilization and Capping, although less protective than Alternative 3, provides adequate protection of human health and the environment. Protection of human health would be achieved by imposing restrictions on future property use. Bank stabilization would prevent additional contaminants from eroding into the pond. Removal of sediment with contaminant concentrations greater than PRGs and capping the landfill would protect ecological receptors. Potential sources of groundwater contamination would be contained beneath the cap.

Alternatives 2 and 3 do not actively address surface water contamination. It is anticipated that surface water contaminant concentrations will decrease after the sediment is removed from the pond and the landfill waste is either contained (Alternative 2) or removed (Alternative 3).

Alternatives 2 and 3 do not actively address groundwater contamination. Groundwater use restrictions would be imposed to protect human health from exposure to contaminated groundwater under Alternative 2. Groundwater use restrictions would only be needed for Alternative 3 if removal of the contaminant source does not result in reduction of groundwater contaminant concentrations.

Alternative 2 includes long-term monitoring to ensure protection of the environment. Alternative 3 includes short-term monitoring to determine whether groundwater use restrictions would be required.

Alternative 1, No Action, would not provide adequate protection of human health or the environment.

7.4.2 Compliance with ARARs and TBCs

The cap system design for Alternative 2 would comply with state regulations for closure of solid waste landfills. Landfill waste and soil and sediment with contaminant concentrations higher than PRGs would be contained beneath the cap.

For Alternative 3, landfill waste and soil and sediment with contaminant concentration higher than PRGs would be removed from the site.

None of the alternatives includes measures to actively reduce surface water contaminant concentrations to achieve state surface water quality standards. For Alternative 2, surface water concentrations are expected to decrease after the contaminated sediment is removed and the landfill is stabilized and capped so that contaminants do not migrate into the pond. For Alternative 3, surface water concentrations are expected to decrease after the contaminated sediment is removed from the pond and the landfill is removed. Surface water contaminant concentrations are not expected to decrease under Alternative 1.

None of the alternatives includes measures to actively reduce groundwater contaminant concentrations to achieve state groundwater quality standards. For Alternative 2, control of the potential sources of groundwater contamination (fill, soil, and sediment) is expected to cause a reduction in the downgradient concentrations. For Alternative 3, removal of the potential sources of groundwater contamination is expected to cause a reduction in the downgradient concentrations. Only minor groundwater

contamination was detected at the site. Groundwater contaminant concentrations are not expected to decrease under Alternative 1.

7.4.3 Long-Term Effectiveness and Permanence

Alternative 3 would be the most protective over the long term because landfill waste, soil, and sediment contaminants would be permanently removed from the site. Groundwater use restrictions would be needed if removal of potential sources of groundwater contamination does not reduce contaminant concentrations.

Alternative 2 would be less effective in the long term because the waste, soil, and sediment would remain on site. However, the long-term effectiveness of this alternative would be monitored, and corrective measures could be taken if necessary. Land use controls would be needed to restrict land use, and groundwater use restrictions would be needed to restrict groundwater use.

The land use restrictions for Alternative 2 and the groundwater use restrictions for Alternative 2 (and Alternative 3 if needed) would be protective over the long term provided they are enforced. Protection would depend on effective administration and management of the transfer documents. For Alternative 2, a reevaluation of the site would be performed every 5 years to determine whether any changes to the controls would be required and whether the remedy remains effective. For Alternative 3, such reevaluation would only be needed if groundwater use restrictions are implemented.

Alternative 1 would not be effective over the long term.

7.4.4 Reduction of Toxicity, Mobility, or Volume through Treatment

None of the alternatives includes treatment to reduce the toxicity, mobility, or volume of the hazardous substances at the site.

7.4.5 Short-Term Effectiveness

There are no short-term effectiveness concerns with Alternative 1 because no remedial actions would be implemented.

The remedial activities associated with construction of the cap (Alternative 2) are not expected to have an adverse impact on the community. Off-site transport of large quantities of waste (especially for Alternative 3) would cause additional traffic and the potential for spills. For Alternative 2, approximately 30 loads of material would be hauled off site. For Alternative 3, over 1,100 loads of material would be

hauled off site. For both alternatives, the material could be hauled several hundred miles to the treatment/disposal facility.

For Alternative 2, workers could be exposed to the contaminated media during bank stabilization, waste and sediment removal, and consolidation. For Alternative 3, workers could be exposed to the contaminated media during excavation and removal activities. For both alternatives, such exposure would be minimized by the use of PPE, engineering controls, and compliance with a site-specific HASP and OSHA regulations.

Removal of contaminated sediment under Alternatives 2 and 3 would have a short-term impact on the wetlands in the area. It is expected that the wetlands will naturally reestablish. Erosion controls would be provided during implementation of both alternatives to prevent additional contamination of the pond during implementation.

It is expected that the RAOs could be achieved in 6 months for Alternative 2 and 15 months for Alternative 3.

7.4.6 Implementability

All the remedial alternatives are implementable. There are no implementability concerns for Alternative 1 because no action would be taken.

Equipment and services necessary to implement Alternatives 2 and 3 are readily available. For Alternative 2, there is sufficient off-site disposal capacity for the anticipated quantities of oversized debris and hazardous waste. There is also sufficient off-site disposal capacity for the much larger quantity of excavated waste, soil, and sediment for Alternative 3. For both alternatives, materials shipped off site for disposal would require transportation over potentially long distances because no landfill facilities are available on Long Island. Transportation would need to be conducted in compliance with DOT regulations for both alternatives.

The land and groundwater use restrictions for Alternative 2 and the groundwater use restrictions potentially needed for Alternative 3 are expected to be readily implementable because the site is located within a controlled facility. These restrictions would involve legal assistance and regulatory approval. Provisions would be defined in and enforced through the NWIRP Calverton transfer documents.

7.4.7 Cost

Alternative 1 would be the least costly, and Alternative 3 would be the most costly. The 30-year present-worth costs of the alternatives would be as follows:

- Alternative 1: $0
- Alternative 2: $2,505,000
- Alternative 3: $6,329,000

7.4.8 EPA and State Acceptance

EPA and state acceptance will be addressed following receipt of comments on the draft RI/FFS.

7.4.9 Community Acceptance

Community acceptance will be addressed in the ROD following the public comment period on the RI/FFS and Proposed Plan.

TABLE 7-1

SUMMARY OF EVALUATION OF ALTERNATIVES
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 1 OF 2

Evaluation Criteria	Alternative 1 – No Action	Alternative 2 – Bank Stabilization and Capping	Alternative 3 – Excavation and Off-Site Disposal
Threshold Criteria			
Overall Protection of Human Health and the Environment	No reduction in potential risks.	Bank stabilization, sediment removal, capping, land use controls, and groundwater use restrictions would reduce risks to human health, ecological receptors, and the environment.	Landfill, soil, and sediment removal and groundwater use restrictions (if needed) would eliminate risks to human health, ecological receptors, and the environment.
Compliance with ARARs			
Chemical-specific	Would not comply.	Would comply. Surface water and groundwater expected to attain ARARs once sources are controlled.	Would comply. Surface water and groundwater expected to attain ARARs once sources are removed.
Location-specific	Not applicable.	Would comply. Wetlands disturbed by remedial action would be expected to naturally reestablish.	Would comply. Wetlands disturbed by remedial action would be expected to naturally reestablish.
Action-specific	Not applicable.	Would comply. Cap design would comply with state landfill closure regulations.	Would comply.
Primary Balancing Criteria			
Long-term Effectiveness and Permanence	Allows risks to remain uncontrolled.	Although most of the contaminated materials would remain on site, they would be contained beneath the cap. Land and groundwater use restrictions would reduce potential risks from waste remaining on site, and monitoring would confirm the continued effectiveness of the cap. Erosion of the landfill into the pond would be eliminated. Monitoring and use restrictions provide adequate and reliable controls.	Waste, contaminated soil, and contaminated sediment would be permanently removed from the site. Groundwater use restrictions may be required if concentrations exceed state groundwater quality standards following source removal. Use restrictions provide adequate and reliable control.
Reduction in Toxicity, Mobility, or Volume through Treatment	No treatment.	No treatment.	No treatment.

TABLE 7-1

SUMMARY OF EVALUATION OF ALTERNATIVES
SITE 1 – NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON, NEW YORK
PAGE 2 OF 2

Evaluation Criteria	Alternative 1 – No Action	Alternative 2 – Bank Stabilization and Capping	Alternative 3 – Excavation and Off-Site Disposal
Short-term Effectiveness	Not applicable. No short-term impacts or concerns.	No impacts to community. Exposure of workers to contaminated media can be adequately controlled. Short-term impacts to wetlands. It is expected that wetlands will naturally reestablish. Six months to implement.	Short-term impacts to community associated with increased traffic and the potential for spills. Exposure of workers to contaminated media can be adequately controlled. Short-term impacts to wetlands. It is expected that wetlands will naturally reestablish. Fifteen months to implement.
Implementability	Nothing to implement. No monitoring to show effectiveness.	Alternative consists of common remediation practices that are readily available and implementable.	Alternative consists of common remediation practices that are readily available and implementable.
Cost			
Capital	$0	$2,103,000	$6,268,000
O&M	$0	$74,000 (year 1); $25,000 (years 2 to 30) plus $20,000 (every 5 years)	$65,000 (year 1 only)
Net Present Worth	$0	$2,505,000	$6,329,000
Modifying Criteria			
EPA and State Acceptance	To be determined.	To be determined.	To be determined.
Community Acceptance	To be determined.	To be determined.	To be determined.

REFERENCES

C.F. Braun, 1997. Phase 2 RCRA Facility Investigation Field Sampling Plan for Naval Weapons Industrial Reserve Plant, Calverton, New York. King of Prussia, Pennsylvania.

Conant, 1975. A Field Guide to Reptiles and Amphibians. Peterson Field Guide Series.

Conrad, N.B., 1996. Letter dated March 15, 1996 from N.B. Conrad of the New York Department of Environmental Conservation, Natural Heritage Program, to J.P. Doub of the C.F. Braun Engineering Corporation, concerning rare, threatened, and endangered species and habitats on NWIRP Calverton.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe, 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, FWS/OBS-79/31.

Environmental Laboratory, 1991. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

EPA (U.S. Environmental Protection Agency), 1995. Revision Region 3 BTAG Screening Levels. Philadelphia, Pennsylvania.

EPA (U.S. Environmental Protection Agency), 1998. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. EPA/540/G-89-004, Office of Emergency and Remedial Response, Washington, D.C.

EPA (U.S. Environmental Protection Agency), 1999. National Recommended Water Quality Criteria. EPA 822-Z-99-001, Office of Water, Washington, D.C.

Fernald, M. L., 1970. Grays Manual of Botany, Eighth Edition. D. Van Nostrand Company, New York.

HNUS (Halliburton NUS Corporation), 1992a. Final Site Investigation, Naval Weapons Industrial Reserve Plant, Calverton, New York. King of Prussia, Pennsylvania.

HNUS (Halliburton NUS Corporation), 1992b. Hazard Ranking System Preliminary Scoring and Site Inspection Report Form, Naval Weapons Industrial Reserve Plant, Calverton, New York. King of Prussia, Pennsylvania.

HNUS (Halliburton NUS Corporation), 1995a. RCRA Facility Investigation, Naval Weapons Industrial Reserve Plant, Calverton, New York. King of Prussia, Pennsylvania.

HNUS (Halliburton NUS Corporation), 1995b. RCRA Facility Investigation Addendum, Naval Weapons Industrial Reserve Plant, Calverton, New York. King of Prussia, Pennsylvania.

Navy, 1986. Initial Assessment Study of Naval Weapons Industrial Reserve Plant, Bethpage, New York and Naval Weapons Industrial Reserve Plant, Calverton, New York. Naval Energy and Environmental Activity, Philadelphia, Pennsylvania.

Navy, 1997. Final Environmental Impact Statement, Transfer and Reuse, Naval Weapons Industrial Reserve Plant, Calverton, New York. Naval Facilities Engineering Command, Northern Division, Lester, Pennsylvania.

NWIRP (Naval Weapons Industrial Reserve Plant) Calverton, 1989. Natural Resources Management Plan. Calverton, New York.

NYSDEC (New York State Department of Environmental Conservation), 1992a. Technical and Administrative Guidance Memorandum Number 3028, "Contained In" Criteria for Environmental Media. Albany, New York.

NYSDEC (New York State Department of Environmental Conservation), 1992b. Spill Technology and Remediation Series (STARS #1), Petroleum-Contaminated Soil Guidance Policy. Albany, New York.

NYSDEC (New York State Department of Environmental Conservation), 1993. Technical Guidance for Screening Contaminated Sediment (includes 1998 and 1999 updates). Division of Fish, Wildlife, and Marine Resources, Albany, New York.

NYSDEC (New York State Department of Environmental Conservation), 1994. Technical and Administrative Guidance Memorandum Number 4046, Determination of Soil Cleanup Objectives and Cleanup Levels, Albany, New York.

NYSDEC (New York State Department of Environmental Conservation), 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. Division of Water Technical and Operation Guidance Series (TOGS) 1.1.1, updated 2000, Albany, New York.

NYSDEC (New York State Department of Environmental Conservation), 2000. New York Natural Heritage Program, Rare Plant Status List. Edited by S.M. Young, Latham, New York.

Oak Ridge National Laboratory, 1996. Screening Benchmarks for Ecological Risk Assessment, Version 1.5. Computer Database, Environmental Sciences and Health Sciences Research Division, Oak Ridge, Tennessee.

Siegert, R.L., 1989. International Review of Approaches for Establishing Cleanup Goals for Hazardous Waste Contaminated Land. Institute for Georesources and Pollution Prevention, Quebec, Canada.

Suter, G.W. II and C.L Tsao, 1996. Toxicological Benchmarks for Screening Potential Contamimants of Concern for Effects on Aquatic Biota on Oak Ridge Reservation: 1996 Revision. Oak Ridge National Laboratory, Oak Ridge, Tennessee.

TtNUS (Tetra Tech NUS, Inc.), 2001. Engineering Evaluation/Cost Analysis (EE/CA), Site 1 – Northeast Pond Disposal Area, Naval Weapons Industrial Reserve Plant, Calverton, New York. King of Prussia, Pennsylvania.

USDOI (U.S. Department of the Interior, 1980). National Wetlands Inventory Maps for Wading River, Riverhead, and Mattituk, New York. Washington, DC.

Will, M.E. and G.W. Suter II, 1995a. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1995 Revision. ES/ER/TM-85/R2, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Will, M.E. and G.W. Suter II, 1995b. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes. ES/ER/TM-126/R1, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

APPENDIX A

ANALYTICAL LABORATORY DATA SHEETS

Volumetric Techniques, LTD.

317 Bernice Drive * Bayport, New York 11705 * (516) 472-4848

To: C F Braun, Kelly A. Johnson
661 Anderson Dr/Foster Plaza 7
Pittsburgh PA 15220
(412) 921-7273

Time Of Login : 10:35:30
Date:
Collected:04/20/97
Received :04/20/97
Completed:04/28/97

Sample Taken By
Client

Reported By:

N.Y.S. Lab I.D. #10058

Sample : Brown & Root Environmental
N P G W O 145
C O C #13
Liquid Sample/Sampled 10:32 A.M.
LIQUID

Sample Number 77939704

Analysis : EPA Method 601/602/

Parameters	Results ppb(mmg/l)	Parameters	Results ppb(mmg/l)
Methylene Chloride	<0.50	Ethylbenzene	<0.50
1,1-Dichloroethylene	<0.50	Toluene	<0.50
1,1-Dichloroethane	<0.50	Total Xylene	<0.50
Trans-1,2-Dichloroethylene	<0.50	Bromomethane	<0.50
Chloroform	<0.50	Chloromethane	<0.50
1,2-Dichloroethane	<0.50	Trichloro-Fluoromethane	<0.50
1,1,1-Trichloroethane	<0.50	Trichlorotrifluorethane	<0.50
Carbon Tetrachloride	<0.50	Chloroethane	<0.50
Bromodichloromethane	<0.50		
1,2-Dichloropropane	<0.50		
Cis-Dichloropropylene	<0.50		
Trans-Dichloropropylene	<0.50		
Trichloroethylene	<0.50		
Vinyl Chloride	<0.50		
1,1,2-Trichloroethane	<0.50		
Dibromochloroethane	<0.50		
Bromoform	<0.50		
Tetrachloroethane	<0.50		
Tetrachloroethylene	<0.50		
Cis-1,2-Dichloroethylene	<0.50		
Benzene	<0.50		
Chlorobenzene	<0.50		
O-Dichlorobenzene	<0.50		
M-Dichlorobenzene	<0.50		
P-Dichlorobenzene (1,4)	<0.50		

Comments
* Indicates less than 1 part per billion or below detection limit.

* CONSULTING CHEMISTS * COMPLETE LABORATORY TESTING *
* Sander R. Sternig * Director of Laboratories *

Volumetric Techniques, LTD.

317 Bernice Drive * Bayport, New York 11705 * (516) 472-4848

To: C F Braun, Kelly A. Johnson
661 Anderson Dr/Foster Plaza 7
Pittsburgh PA 15220
(412) 921-7273

Time Of Login : 10:37:25
Date:
Collected:04/20/97
Received :04/20/97
Completed:04/25/97

Sample Taken By
Client

Reported By:

N.Y.S. Lab I.D. #10058

Sample : Brown & Root Environmental
N P G W O 160
C O C #13
Liquid Sample/Sampled 11:18 A.M.
LIQUID

Sample Number 77949704

Analysis : EPA Method 601/602/

Parameters	Results ppb(mmg/l)	Parameters	Results ppb(mmg/l)
Methylene Chloride	<0.50	Ethylbenzene	<0.50
1,1-Dichloroethylene	<0.50	Toluene	<0.50
1,1-Dichloroethane	<0.50	Total Xylene	<0.50
Trans-1,2-Dichloroethylene	<0.50	Bromomethane	<0.50
Chloroform	<0.50	Chloromethane	<0.50
1,2-Dichloroethane	<0.50	Trichloro-Flouromethane	<0.50
1,1,1-Trichloroethane	<0.50	Trichlorotrifluorethane	<0.50
Carbon Tetrachloride	<0.50	Chloroethane	<0.50
Bromodichloromethane	<0.50		
1,2-Dichloropropane	<0.50		
Cis-Dichloropropylene	<0.50		
Trans-Dichloropropylene	<0.50		
Trichloroethylene	<0.50		
Vinyl Chloride	<0.50		
1,1,2-Trichloroethane	<0.50		
Dibromochloroethane	<0.50		
Bromoform	<0.50		
1,2-Dibromoethane	<0.50		
Tetrachloroethylene	<0.50		
Cis-1,2-Dichloroethylene	<0.50		
Benzene	<0.50		
Chlorobenzene	<0.50		
O-Dichlorobenzene (1,2)	<0.50		
M-Dichlorobenzene (1,3)	<0.50		
P-Dichlorobenzene	<0.50		

Comments
* Indicates less than 1 part per billion or below detection limit.

* CONSULTING CHEMISTS * COMPLETE LABORATORY TESTING *
* Sander R. Sternig * Director of Laboratories *

Volumetric Techniques, LTD.

317 Bernice Drive * Bayport, New York 11705 * (516) 472-4848

To: C F Braun, Kelly A. Johnson
661 Anderson Dr/Foster Plaza 7
Pittsburgh PA 15220
(412) 921-7273

Time Of Login : 12:31:18
Date:
Collected:04/21/97
Received :04/23/97
Completed:04/25/97
Reported By:

N.Y.S. Lab I.D. #10288

Sample Taken By
Client

Sample : Brown & Root Environmental
N P G W O 245
C O C #14
Liquid Sample/Sampled 10:27 A.M.
LIQUID

Sample Number 78269704

Analysis : EPA Method 601/602/

Parameters	Results ppb(mmg/l)	Parameters	Results ppb(mmg/l)
Methylene Chloride	<0.50	Ethylbenzene	<0.50
1,1-Dichloroethylene	<0.50	Toluene	<0.50
1,1-Dichloroethane	<0.50	Total Xylene	<0.50
Trans-1,2-Dichloroethylene	<0.50	Bromomethane	<0.50
Chloroform	<0.50	Chloromethane	<0.50
1,2-Dichloroethane	<0.50	Trichloro-Flouromethane	<0.50
1,1,1-Trichloroethane	<0.50	Trichlorotrifluorethane	<0.50
Carbon Tetrachloride	<0.50	Chloroethane	<0.50
Bromodichloromethane	<0.50		
1,2-Dichloropropane	<0.50		
Cis-Dichloropropylene	<0.50		
Trans-Dichloropropylene	<0.50		
Trichloroethylene	<0.50		
Vinyl Chloride	<0.50		
1,1,2-Trichloroethane	<0.50		
Dibromochloroethane	<0.50		
Bromoform	<0.50		
1,2-Dibromoethane	<0.50		
Tetrachloroethylene	<0.50		
Cis-1,2-Dichloroethylene	<0.50		
Benzene	<0.50		
Chlorobenzene	<0.50		
O-Dichlorobenzene (1,2)	<0.50		
M-Dichlorobenzene (1,3)	<0.50		
P-Dichlorobenzene	<0.50		

Comments
* Indicates less than 1 part per billion or below detection limit.

Volumetric Techniques, LTD.

317 Bernice Drive * Bayport, New York 11705 * (516) 472-4848

To: C F Braun, Kelly A. Johnson
661 Anderson Dr/Foster Plaza 7
Pittsburgh PA 15220
(412) 921-7273

Time Of Login : 12:29:15
Date:
Collected:04/21/97
Received :04/23/97
Completed:04/25/97

Sample Taken By
Client

Reported By:

N.Y.S. Lab I.D. 11[illegible]0058

Sample : Brown & Root Environmental
N P D U 05 Duplicate (Duplicate of NPGW0245)
C C C #14
Liquid Sample/Sampled 0:00
LIQUID

Sample Number 78259704

Analysis : EPA Method 601/602/

Parameters	Results ppb(mmg/l)	Parameters	Results ppb(mmg/l)
Methylene Chloride	<0.50	Ethylbenzene	<0.50
1,1-Dichloroethylene	<0.50	Toluene	<0.50
1,1-Dichloroethane	<0.50	Total Xylene	<0.50
Trans-1,2-Dichloroethylene	<0.50	Bromomethane	<0.50
Chloroform	<0.50	Chloromethane	<0.50
1,2-Dichloroethane	<0.50	Trichloro-Flouromethane	<0.50
1,1,1-Trichloroethane	<0.50	Trichlorotrifluorethane	<0.50
Carbon Tetrachloride	<0.50	Chloroethane	<0.50
Bromodichloromethane	<0.50		
1,2-Dichloropropane	<0.50		
Cis-Dichloropropylene	<0.50		
Trans-Dichloropropylene	<0.50		
Trichloroethylene	<0.50		
Vinyl Chloride	<0.50		
1,1,2-Trichloroethane	<0.50		
Dibromochloroethane	<0.50		
Bromoform	<0.50		
1,2-Dibromoethane	<0.50		
Tetrachloroethylene	<0.50		
Cis-1,2-Dichloroethylene	<0.50		
Benzene	<0.50		
Chlorobenzene	<0.50		
O-Dichlorobenzene (1,2)	<0.50		
M-Dichlorobenzene (1,3)	<0.50		
P-Dichlorobenzene	<0.50		

Comments
* Indicates less than 1 part per billion or below detection limit.

* CONSULTING CHEMISTS * COMPLETE LABORATORY TESTING *
* Sander R. Sternig * Director of Laboratories *

Volumetric Techniques, LTD.

317 Bernice Drive * Bayport, New York 11705 * (516) 472-4848

To: C F Braun, Kelly A. Johnson
661 Anderson Dr/Foster Plaza 7
Pittsburgh PA 15220
(412) 921-7273

Time Of Login : 12:33:27
Date:
Collected:04/21/97
Received :04/23/97
Completed:04/28/97
Reported By:

N.Y.S. Lab I.D. #10055

Sample Taken By
Client

Sample : Brown & Root Environmental
N P G W O 260
C O C #14
Liquid Sample/Sampled 11:05 A.M.
LIQUID

Sample Number 78279704

Analysis : EPA Method 601/602/

Parameters	Results ppb(mmg/l)	Parameters	Results ppb(mmg/l)
Methylene Chloride	<0.50	Ethylbenzene	<0.50
1,1-Dichloroethylene	<0.50	Toluene	<0.50
1,1-Dichloroethane	<0.50	Total Xylene	<0.50
Trans-1,2-Dichloroethylene	<0.50	Bromomethane	<0.50
Chloroform	<0.50	Chloromethane	<0.50
1,2-Dichloroethane	<0.50	Trichloro-Fluoromethane	<0.50
1,1,1-Trichloroethane	<0.50	Trichlorotrifluorethane	<0.50
Carbon Tetrachloride	<0.50	Chloroethane	<0.50
Bromodichloromethane	<0.50		
1,2-Dichloropropane	<0.50		
Cis-Dichloropropylene	<0.50		
Trans-Dichloropropylene	<0.50		
Trichloroethylene	<0.50		
Vinyl Chloride	<0.50		
1,1,2-Trichloroethane	<0.50		
Dibromochloroethane	<0.50		
Bromoform	<0.50		
Tetrachloroethane	<0.50		
Tetrachloroethylene	<0.50		
Cis-1,2-Dichloroethylene	<0.50		
Benzene	<0.50		
Chlorobenzene	<0.50		
O-Dichlorobenzene	<0.50		
M-Dichlorobenzene	<0.50		
P-Dichlorobenzene (1,4)	<0.50		

Comments
* Indicates less than 1 part per billion or below detection limit.

* CONSULTING CHEMISTS * COMPLETE LABORATORY TESTING *
* Sander R. Sternig * Director of Laboratories *

Volumetric Techniques, LTD.

317 Bernice Drive * Bayport, New York 11705 * (516) 472-4848

To: C F Braun, Kelly A. Johnson
661 Anderson Dr/Foster Plaza 7
Pittsburgh PA 15220
(412) 921-7273

Time Of Login : 12:35:15
Date:
Collected:04/21/97
Received :04/23/97
Completed:04/28/97

Sample Taken By
Client

Reported By:

N.Y.S. Lab I.D. #10058

Sample : Brown & Root Environmental
N P G W O 345
C C C #14
Liquid Sample/Sampled 2:09 P.M.
LIQUID

Sample Number 78289704

Analysis : EPA Method 601/602/

Parameters	Results ppb(mmg/l)	Parameters	Results ppb(mmg/l)
Methylene Chloride	<0.50	Ethylbenzene	<0.50
1,1-Dichloroethylene	<0.50	Toluene	<0.50
1,1-Dichloroethane	<0.50	Total Xylene	<0.50
Trans-1,2-Dichloroethylene	<0.50	Bromomethane	<0.50
Chloroform	<0.50	Chloromethane	<0.50
1,2-Dichloroethane	<0.50	Trichloro-Flouromethane	<0.50
1,1,1-Trichloroethane	<0.50	Trichlorotrifluorethane	<0.50
Carbon Tetrachloride	<0.50	Chloroethane	<0.50
Bromodichloromethane	<0.50		
1,2-Dichloropropane	<0.50		
Cis-Dichloropropylene	<0.50		
Trans-Dichloropropylene	<0.50		
Trichloroethylene	<0.50		
Vinyl Chloride	<0.50		
1,1,2-Trichloroethane	<0.50		
Dibromochloroethane	<0.50		
Bromoform	<0.50		
1,2-Dibromoethane	<0.50		
Tetrachloroethylene	<0.50		
Cis-1,2-Dichloroethylene	<0.50		
Benzene	<0.50		
Chlorobenzene	<0.50		
O-Dichlorobenzene (1,2)	<0.50		
M-Dichlorobenzene (1,3)	<0.50		
P-Dichlorobenzene	<0.50		

Comments
* Indicates less than 1 part per billion or below detection limit.

* CONSULTING CHEMISTS * COMPLETE LABORATORY TESTING *
* Sander R. Sternig * Director of Laboratories *

Volumetric Techniques, LTD.

317 Bernice Drive * Bayport, New York 11705 * (516) 472-4848

To: C F Braun, Kelly A. Johnson
661 Anderson Dr/Foster Plaza 7
Pittsburgh PA 15220
(412) 921-7273

Time Of Login : 12:07:00
Date:
Collected:04/21/97
Received :04/23/97
Completed:04/25/97
Reported By:

N.Y.S. Lab I.D. #10058

Sample Taken By
Client

Sample : Brown & Root Environmental
N P G W O 360
C O C #14
Liquid Sample/Sampled 2:36 P.M.
LIQUID

Sample Number 78299704

Analysis : EPA Method 601/602/

Parameters	Results ppb(mmg/l)	Parameters	Results ppb(mmg/l)
Methylene Chloride	<0.50	Ethylbenzene	<0.50
1,1-Dichloroethylene	<0.50	Toluene	<0.50
1,1-Dichloroethane	<0.50	Total Xylene	<0.50
Trans-1,2-Dichloroethylene	<0.50	Bromomethane	<0.50
Chloroform	<0.50	Chloromethane	<0.50
1,2-Dichloroethane	<0.50	Trichloro-Flouromethane	<0.50
1,1,1-Trichloroethane	<0.50	Trichlorotrifluorethane	<0.50
Carbon Tetrachloride	<0.50	Chloroethane	<0.50
Bromodichloromethane	<0.50		
1,2-Dichloropropane	<0.50		
Cis-Dichloropropylene	<0.50		
Trans-Dichloropropylene	<0.50		
Trichloroethylene	<0.50		
Vinyl Chloride	<0.50		
1,1,2-Trichloroethane	<0.50		
Dibromochloroethane	<0.50		
Bromoform	<0.50		
1,2-Dibromoethane	<0.50		
Tetrachloroethylene	<0.50		
Cis-1,2-Dichloroethylene	<0.50		
Benzene	<0.50		
Chlorobenzene	<0.50		
O-Dichlorobenzene (1,2)	<0.50		
M-Dichlorobenzene (1,3)	<0.50		
P-Dichlorobenzene	<0.50		

Comments
* Indicates less than 1 part per billion or below detection limit.

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 002

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL

Date Received: 06/24/97

Work Order: CAAHG101

Date Extracted: 06/26/97

Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW01-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U
71-55-6	1,1,1-Trichloroethane	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab-Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 002

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL

Work Order: CAAHG101

Date Received: 06/24/97
Date Extracted: 06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW01-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

0007

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 002

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL

Date Received: 06/24/97

Work Order: CAAHG101

Date Extracted: 06/26/97

Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW01-062397

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS DETECTED			ND

0008

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID:C7F240143 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CAAHG104
Dilution factor: 1
Moisture %:NA

Date Received: 06/24/97
Date Extracted:06/28/97
Date Analyzed: 07/28/97

QC Batch: 7186125

Client Sample Id: NP-MW01-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	bis(2-Ethylhexyl) phthalate	10	U
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U
84-66-2	Diethyl phthalate	10	U

FORM I

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CAAHG104
Dilution factor: 1
Moisture %: NA

Date Received: 06/24/97
Date Extracted: 06/28/97
Date Analyzed: 07/28/97

QC Batch: 7186125

Client Sample Id: NP-MW01-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U

FORM I

Lab Name:QUANTERRA SDG Number: BR320

Matrix: (soil/water) WATER Lab Sample ID:C7F240143 002
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/24/97
Work Order: CAAHG104 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/28/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW01-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID:C7F240143 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL

Date Received: 06/24/97

Work Order: CAAHG104

Date Extracted:06/28/97

Dilution factor: 1

Date Analyzed: 07/28/97

Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW01-062397

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS			ND

0032

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPMW01062397

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR320

Matrix: (soil/water) WATER Lab Sample ID: C7F240143002

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 06/24/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 06/28/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NP-MW01

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR320_

Matrix (soil/water): WATER Lab Sample ID: CAAHG

Level (low/med): LOW__ Date Received: 06/24/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	37.7	B		P_
7440-36-0	Antimony_	14.0	U		P_
7440-38-2	Arsenic__	2.3	U		P_
7440-39-3	Barium___	16.2	B		P_
7440-41-7	Beryllium	0.24	B		P_
7440-43-9	Cadmium__	2.6	U		P_
7440-70-2	Calcium__	4290	B		P_
7440-47-3	Chromium_	2.3	U		P_
7440-48-4	Cobalt___	4.1	B		P_
7440-50-8	Copper___	1.5	U		P_
7439-89-6	Iron_____	6.6	B		P_
7439-92-1	Lead_____	1.1	B		P_
7439-95-4	Magnesium	1290	B		P_
7439-96-5	Manganese	56.5	_		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	8.4	U		P_
7440-09-7	Potassium	758	B		P_
7782-49-2	Selenium_	3.0	U		P_
7440-22-4	Silver___	2.4	U		P_
7440-23-5	Sodium___	4720	B		P_
7440-28-0	Thallium_	4.0	B		P_
7440-62-2	Vanadium_	1.8	B		P_
7440-66-6	Zinc_____	7.1	B		P_

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

NP-MW01-062397

C7F240143002

0034

FORM I - IN ILM03.

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID: C7K140136 003

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE21R101
Dilution factor: 1
Moisture %: NA

Date Received: 11/14/97
Date Extracted: 11/18/97
Date Analyzed: 11/18/97

QC Batch: 7322109

Client Sample Id: NP-MW01

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID: C7K140136 003

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE21R101
Dilution factor: 1
Moisture %: NA

Date Received: 11/14/97
Date Extracted: 11/18/97
Date Analyzed: 11/18/97

QC Batch: 7322109

Client Sample Id: NP-MW01

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
71-55-6	1,1,1-Trichloroethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR345

Matrix: (soil/water) WATER Lab Sample ID:C7K140136 003
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL Date Received: 11/14/97
Work Order: CE21R101 Date Extracted:11/18/97
Dilution factor: 1 Date Analyzed: 11/18/97
Moisture %:NA

QC Batch: 7322109

Client Sample Id: NP-MW01

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	no tics detected			ND

0013

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 003

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE21R102
Dilution factor: 1
Moisture %:NA

Date Received: 11/14/97
Date Extracted:11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW01

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	bis(2-Ethylhexyl) phthalate	10	U
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID: C7K140136 003

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE21R102
Dilution factor: 1
Moisture %: NA

Date Received: 11/14/97
Date Extracted: 11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW01

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
84-66-2	**Diethyl phthalate**	**1.1**	**J**
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 003

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE21R102
Dilution factor: 1
Moisture %:NA

Date Received: 11/14/97
Date Extracted:11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW01

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 003

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL

Date Received: 11/14/97

Work Order: CE21R102

Date Extracted:11/18/97

Dilution factor: 1

Date Analyzed: 11/25/97

Moisture %:NA

QC Batch: 7324105

Client Sample Id: NP-MW01

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS			ND

0056

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NP-MW01

Lab Name: QUANTERRA PITT Contract:

Lab Code: Case No.: QPITTG SAS No.: SDG No.: BR345

Matrix: (soil/water) WATER Lab Sample ID: C7K140136003

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 11/14/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 11/18/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 11/29/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 5.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NPMW01

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 375241 SAS No.: _____ SDG No.: BR345_

Matrix (soil/water): WATER Lab Sample ID: CE21R

Level (low/med): LOW__ Date Received: 11/14/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	61.7	B		P_
7440-36-0	Antimony_	22.3	U		P_
7440-38-2	Arsenic__	1.9	U		P_
7440-39-3	Barium___	16.2	B		P_
7440-41-7	Beryllium	0.20	U		P_
7440-43-9	Cadmium__	2.3	U		P_
7440-70-2	Calcium__	4040	B		P_
7440-47-3	Chromium_	3.2	U		P_
7440-48-4	Cobalt___	3.5	U		P_
7440-50-8	Copper___	2.7	B		P_
7439-89-6	Iron_____	82.4	B		P_
7439-92-1	Lead_____	0.80	U		P_
7439-95-4	Magnesium	1280	B		P_
7439-96-5	Manganese	40.7	_		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	6.9	U		P_
7440-09-7	Potassium	652	B		P_
7782-49-2	Selenium_	2.5	U		P_
7440-22-4	Silver___	3.3	U		P_
7440-23-5	Sodium___	3810	B		P_
7440-28-0	Thallium_	3.7	U		P_
7440-62-2	Vanadium_	2.0	U		P_
7440-66-6	Zinc_____	6.6	B		P_

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

NP-MW01

C7K140136003

0097

FORM I - IN ILM03.0

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR322

Matrix: (soil/water) WATER

Lab Sample ID: C7F250118 003

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CAAPP101
Dilution factor: 1
Moisture %: NA

Date Received: 06/25/97
Date Extracted: 06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW02-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U
71-55-6	1,1,1-Trichloroethane	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR322

Matrix: (soil/water) WATER

Lab Sample ID:C7F250118 003

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CAAPP101
Dilution factor: 1
Moisture %:NA

Date Received: 06/25/97
Date Extracted:06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW02-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

0010

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 003
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL Date Received: 06/25/97
Work Order: CAAPP101 Date Extracted:06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW02-062497

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS DETECTED			ND

0011

FORM I - TIC

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 003
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/25/97
Work Order: CAAPP102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW02-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	bis(2-Ethylhexyl) phthalate	10	U
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U
84-66-2	Diethyl phthalate	10	U

FORM I

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 003
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/25/97
Work Order: CAAPP102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW02-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 003
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/25/97
Work Order: CAAPP102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW02-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 003
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/25/97
Work Order: CAAPP102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW02-062497

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS			ND

0036

FORM I - TIC

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPMW02062497

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR322

Matrix: (soil/water) WATER Lab Sample ID: C7F250118003

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 06/25/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 06/28/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NP-MW02

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 375241 SAS No.: _____ SDG No.: BR322_

Matrix (soil/water): WATER Lab Sample ID: CAAPP

Level (low/med): LOW__ Date Received: 06/25/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	23.8	B		P_
7440-36-0	Antimony_	14.0	U		P_
7440-38-2	Arsenic__	2.3	U		P_
7440-39-3	Barium___	121	B		P_
7440-41-7	Beryllium	0.15	B		P_
7440-43-9	Cadmium__	2.6	U		P_
7440-70-2	Calcium__	4490001	_		P_
7440-47-3	Chromium_	2.3	U		P_
7440-48-4	Cobalt___	3.1	U		P_
7440-50-8	Copper___	1.5	U		P_
7439-89-6	Iron_____	145001	_		P_
7439-92-1	Lead_____	1.0	U		P_
7439-95-4	Magnesium	24600	_		P_
7439-96-5	Manganese	1720	_		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	8.4	U		P_
7440-09-7	Potassium	16800	_		P_
7782-49-2	Selenium_	3.0	U		P_
7440-22-4	Silver___	2.4	U		P_
7440-23-5	Sodium___	15000	_		P_
7440-28-0	Thallium_	6.7	B		P_
7440-62-2	Vanadium_	4.9	B		P_
7440-66-6	Zinc_____	15.0	B		P_

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:
NP-MW02-062497
C7F250118003

0085

FORM I - IN ILM03.

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K120115 006

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE0HD101
Dilution factor: 1
Moisture %:NA

Date Received: 11/12/97
Date Extracted:11/14/97
Date Analyzed: 11/14/97

QC Batch: 7318125

Client Sample Id: NP-MW02

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K120115 006

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE0HD101
Dilution factor: 1
Moisture %:NA

Date Received: 11/12/97
Date Extracted:11/14/97
Date Analyzed: 11/14/97

QC Batch: 7318125

Client Sample Id: NP-MW02

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
71-55-6	1,1,1-Trichloroethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K120115 006

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE0HD101
Dilution factor: 1
Moisture %:NA

Date Received: 11/12/97
Date Extracted:11/14/97
Date Analyzed: 11/14/97

QC Batch: 7318125

Client Sample Id: NP-MW02

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS DETECTED			ND

0034

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K120115 006

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE0HD102
Dilution factor: 1
Moisture %:NA

Date Received: 11/12/97
Date Extracted:11/18/97
Date Analyzed: 11/26/97

QC Batch: 7324105

Client Sample Id: NP-MW02

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	bis(2-Ethylhexyl) phthalate	10	U
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K120115 006

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE0HD102
Dilution factor: 1
Moisture %:NA

Date Received: 11/12/97
Date Extracted:11/18/97
Date Analyzed: 11/26/97

QC Batch: 7324105

Client Sample Id: NP-MW02

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
84-66-2	Diethyl phthalate	10	U
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	**N-Nitrosodi-n-propylamine**	**8.0**	**J**
86-30-6	N-Nitrosodiphenylamine	10	U

0081

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID: C7K120115 006

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE0HD102
Dilution factor: 1
Moisture %: NA

Date Received: 11/12/97
Date Extracted: 11/18/97
Date Analyzed: 11/26/97

QC Batch: 7324105

Client Sample Id: NP-MW02

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID: C7K120115 006

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE0HD102
Dilution factor: 1
Moisture %: NA

Date Received: 11/12/97
Date Extracted: 11/18/97
Date Analyzed: 11/26/97

QC Batch: 7324105

Client Sample Id: NP-MW02

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN	6.4535	5.1	J
	UNKNOWN	7.7742	2.7	J
	UNKNOWN	11.786	2.3	J
10544-50-0	Sulfur, mol. (s8)	12.36	150	JN

0083

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NP-MW02

Lab Name: QUANTERRA PITT Contract:

Lab Code: Case No.: QPITTG SAS No.: SDG No.: BR344

Matrix: (soil/water) WATER Lab Sample ID: C7K120115006

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 11/12/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 11/18/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 11/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NPMW02

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 375241 SAS No.: _____ SDG No.: BR344_

Matrix (soil/water): WATER Lab Sample ID: CE0HD

Level (low/med): LOW__ Date Received: 11/12/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	52.2	B		P_
7440-36-0	Antimony_	22.3	U		P_
7440-38-2	Arsenic__	1.9	U		P_
7440-39-3	Barium___	129	B		P_
7440-41-7	Beryllium	0.20	U		P_
7440-43-9	Cadmium__	2.3	U		P_
7440-70-2	Calcium__	408000	_		P_
7440-47-3	Chromium_	3.2	U		P_
7440-48-4	Cobalt___	3.5	U		P_
7440-50-8	Copper___	2.1	B		P_
7439-89-6	Iron_____	5250	_		P_
7439-92-1	Lead_____	0.80	U		P_
7439-95-4	Magnesium	21400	_		P_
7439-96-5	Manganese	1180	_		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	6.9	U		P_
7440-09-7	Potassium	15500	_		P_
7782-49-2	Selenium_	2.5	U		P_
7440-22-4	Silver___	3.3	U		P_
7440-23-5	Sodium___	14400	_		P_
7440-28-0	Thallium_	3.7	B		P_
7440-62-2	Vanadium_	5.6	B		P_
7440-66-6	Zinc_____	20.5	_	*	P_

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:
NP-MW02
C7K120115006

0162

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 002
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / g Date Received: 06/25/97
Work Order: CAAPM101 Date Extracted:06/26/97
Dilution factor: 1 Date Analyzed: 06/26/97
Moisture %:NA

QC Batch: 7177160

Client Sample Id: NP-MW02I-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	**1,1-Dichloroethane**	**1.3**	**J**
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U
71-55-6	**1,1,1-Trichloroethane**	**5.7**	**J**

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR322

Matrix: (soil/water) WATER

Lab Sample ID: C7F250118 002

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / g

Date Received: 06/25/97

Work Order: CAAPM101

Date Extracted: 06/26/97

Dilution factor: 1

Date Analyzed: 06/26/97

Moisture %: NA

QC Batch: 7177160

Client Sample Id: NP-MW02I-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: QUANTERRA
SDG Number: BR322

Matrix: (soil/water) WATER
Lab Sample ID: C7F250118 002
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / g
Date Received: 06/25/97
Work Order: CAAPM101
Date Extracted: 06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW02I-062497

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS DETECTED			ND

0008

FORM I - TIC

Lab Name: QUANTERRA

SDG Number: BR322

Matrix: (soil/water) WATER

Lab Sample ID: C7F250118 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CAAPM102
Dilution factor: 1
Moisture %: NA

Date Received: 06/25/97
Date Extracted: 06/28/97
Date Analyzed: 07/29/97

QC Batch: 7186125

Client Sample Id: NP-MW02I-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	bis(2-Ethylhexyl) phthalate	10	U
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U
84-66-2	Diethyl phthalate	10	U

FORM I

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 002
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/25/97
Work Order: CAAPM102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW02I-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U

FORM I

Lab Name:QUANTERRA

SDG Number: BR322

Matrix: (soil/water) WATER

Lab Sample ID:C7F250118 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CAAPM102
Dilution factor: 1
Moisture %:NA

Date Received: 06/25/97
Date Extracted:06/28/97
Date Analyzed: 07/29/97

QC Batch: 7186125

Client Sample Id: NP-MW02I-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: QUANTERRA
SDG Number: BR322

Matrix: (soil/water) WATER
Lab Sample ID: C7F250118 002
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Date Received: 06/25/97
Work Order: CAAPM102
Date Extracted: 06/28/97
Dilution factor: 1
Date Analyzed: 07/29/97
Moisture %: NA

QC Batch: 7186125

Client Sample Id: NP-MW02I-062497

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN	4.1825	2.5	J

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPMW02I62497

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR322

Matrix: (soil/water) WATER Lab Sample ID: C7F250118002

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 06/24/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 06/28/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NP-MW02I

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 375241 SAS No.: _____ SDG No.: BR322_

Matrix (soil/water): WATER Lab Sample ID: CAAPM

Level (low/med): LOW__ Date Received: 06/25/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	13.8	B		P_
7440-36-0	Antimony_	14.0	U		P_
7440-38-2	Arsenic__	2.3	U		P_
7440-39-3	Barium___	49.7	B		P_
7440-41-7	Beryllium	0.15	B		P_
7440-43-9	Cadmium__	3.8	B		P_
7440-70-2	Calcium__	81000	_		P_
7440-47-3	Chromium_	2.3	U		P_
7440-48-4	Cobalt___	6.3	B		P_
7440-50-8	Copper___	1.9	B		P_
7439-89-6	Iron_____	354	_		P_
7439-92-1	Lead_____	1.0	U		P_
7439-95-4	Magnesium	8500	_		P_
7439-96-5	Manganese	33.3	_		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	10.1	B		P_
7440-09-7	Potassium	5970	_		P_
7782-49-2	Selenium_	3.0	U		P_
7440-22-4	Silver___	2.4	U		P_
7440-23-5	Sodium___	8590	_		P_
7440-28-0	Thallium_	2.7	U		P_
7440-62-2	Vanadium_	2.8	B		P_
7440-66-6	Zinc_____	13.7	B		P_

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:
NP-MW02I-062497
C7F250118002

0086

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K120115 007

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE0HE101
Dilution factor: 1
Moisture %:NA

Date Received: 11/12/97
Date Extracted:11/14/97
Date Analyzed: 11/14/97

QC Batch: 7318125

Client Sample Id: NP-MW02-I

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	**1,1-Dichloroethane**	**5.9**	**J**
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID: C7K120115 007

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE0HE101
Dilution factor: 1
Moisture %: NA

Date Received: 11/12/97
Date Extracted: 11/14/97
Date Analyzed: 11/14/97

QC Batch: 7318125

Client Sample Id: NP-MW02-I

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
71-55-6	**1,1,1-Trichloroethane**	**4.4**	**J**
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K120115 007

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE0HE101
Dilution factor: 1
Moisture %:NA

Date Received: 11/12/97
Date Extracted:11/14/97
Date Analyzed: 11/14/97

QC Batch: 7318125

Client Sample Id: NP-MW02-I

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT.	EST. CONC.	Q
	NO TICS DETECTED			ND

0037

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID: C7K120115 007

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE0HE102
Dilution factor: 1
Moisture %: NA

Date Received: 11/12/97
Date Extracted: 11/18/97
Date Analyzed: 11/26/97

QC Batch: 7324105

Client Sample Id: NP-MW02-I

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	bis(2-Ethylhexyl) phthalate	10	U
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID: C7K120115 007

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL

Date Received: 11/12/97

Work Order: CE0HE102

Date Extracted: 11/18/97

Dilution factor: 1

Date Analyzed: 11/26/97

Moisture %: NA

QC Batch: 7324105

Client Sample Id: NP-MW02-I

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
84-66-2	Diethyl phthalate	10	U
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	**N-Nitrosodi-n-propylamine**	**7.3**	**J**
86-30-6	N-Nitrosodiphenylamine	10	U

0085

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K120115 007

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE0HE102
Dilution factor: 1
Moisture %:NA

Date Received: 11/12/97
Date Extracted:11/18/97
Date Analyzed: 11/26/97

QC Batch: 7324105

Client Sample Id: NP-MW02-I

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR344

Matrix: (soil/water) WATER Lab Sample ID:C7K120115 007
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 11/12/97
Work Order: CE0HE102 Date Extracted:11/18/97
Dilution factor: 1 Date Analyzed: 11/26/97
Moisture %:NA

QC Batch: 7324105

Client Sample Id: NP-MW02-I

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS			ND

0087

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NP-MW02-I

Lab Name: QUANTERRA PITT Contract:

Lab Code: Case No.: QPITTG SAS No.: SDG No.: BR344

Matrix: (soil/water) WATER Lab Sample ID: C7K120115007

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 11/12/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 11/18/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 11/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 5.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NPMW02I

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 375241 SAS No.: _____ SDG No.: BR344_

Matrix (soil/water): WATER Lab Sample ID: CE0HE

Level (low/med): LOW__ Date Received: 11/12/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	37.4	B		P_
7440-36-0	Antimony_	22.3	U		P_
7440-38-2	Arsenic__	1.9	U		P_
7440-39-3	Barium___	27.8	B		P_
7440-41-7	Beryllium	0.20	U		P_
7440-43-9	Cadmium__	2.3	U		P_
7440-70-2	Calcium__	31100	_		P_
7440-47-3	Chromium_	3.2	U		P_
7440-48-4	Cobalt___	3.5	U		P_
7440-50-8	Copper___	2.0	B		P_
7439-89-6	Iron_____	96.8	B		P_
7439-92-1	Lead_____	0.80	U		P_
7439-95-4	Magnesium	5540	_		P_
7439-96-5	Manganese	2.8	B		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	6.9	U		P_
7440-09-7	Potassium	3000	B		P_
7782-49-2	Selenium_	2.6	B		P_
7440-22-4	Silver___	3.3	U		P_
7440-23-5	Sodium___	5390	_		P_
7440-28-0	Thallium_	3.7	U		P_
7440-62-2	Vanadium_	2.0	U		P_
7440-66-6	Zinc_____	7.1	B	*	P_

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

NP-MW02-1

C7K120115007

0163

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 004

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL

Date Received: 06/24/97

Work Order: CAAHJ101

Date Extracted: 06/26/97

Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW03-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U
71-55-6	1,1,1-Trichloroethane	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 004

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL

Work Order: CAAHJ101

Date Received: 06/24/97
Date Extracted: 06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW03-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 004

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL

Date Received: 06/24/97

Work Order: CAAHJ101

Date Extracted: 06/26/97

Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW03-062397

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS DETECTED			ND

0016

FORM I - TIC

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 004

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CAAHJ102
Dilution factor: 1
Moisture %: NA

Date Received: 06/24/97
Date Extracted: 06/28/97
Date Analyzed: 07/29/97

QC Batch: 7186125

Client Sample Id: NP-MW03-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	bis(2-Ethylhexyl) phthalate	10	U
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U
84-66-2	Diethyl phthalate	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR320

Matrix: (soil/water) WATER Lab Sample ID:C7F240143 004
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/24/97
Work Order: CAAHJ102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW03-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 004

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CAAHJ102
Dilution factor: 1
Moisture %: NA

Date Received: 06/24/97
Date Extracted: 06/28/97
Date Analyzed: 07/29/97

QC Batch: 7186125

Client Sample Id: NP-MW03-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID:C7F240143 004

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CAAHJ102
Dilution factor: 1
Moisture %:NA

Date Received: 06/24/97
Date Extracted:06/28/97
Date Analyzed: 07/29/97

QC Batch: 7186125

Client Sample Id: NP-MW03-062397

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS			ND

FORM I - TIC

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPMW03062397

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR320

Matrix: (soil/water) WATER Lab Sample ID: C7F240143004

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 06/24/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 06/28/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NP-MW03

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR320_

Matrix (soil/water): WATER Lab Sample ID: CAAHJ

Level (low/med): LOW__ Date Received: 06/24/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	76.6	B		P_
7440-36-0	Antimony_	14.0	U		P_
7440-38-2	Arsenic__	2.3	U		P_
7440-39-3	Barium___	17.3	B		P_
7440-41-7	Beryllium	0.12	U		P_
7440-43-9	Cadmium__	2.6	U		P_
7440-70-2	Calcium__	37600	_		P_
7440-47-3	Chromium_	2.3	U		P_
7440-48-4	Cobalt___	3.1	U		P_
7440-50-8	Copper___	2.5	B		P_
7439-89-6	Iron_____	24.2	B		P_
7439-92-1	Lead_____	1.0	U		P_
7439-95-4	Magnesium	2670	B		P_
7439-96-5	Manganese	14.9	B		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	8.4	U		P_
7440-09-7	Potassium	1870	B		P_
7782-49-2	Selenium_	3.0	U		P_
7440-22-4	Silver___	2.4	U		P_
7440-23-5	Sodium___	1970	B		P_
7440-28-0	Thallium_	3.3	B		P_
7440-62-2	Vanadium_	3.0	B		P_
7440-66-6	Zinc_____	13.7	B		P_

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

NP-MW03-062397

C7F240143004

0085

FORM I - IN ILM03.0

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 001

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE21M101
Dilution factor: 1
Moisture %:NA

Date Received: 11/14/97
Date Extracted:11/18/97
Date Analyzed: 11/18/97

QC Batch: 7322109

Client Sample Id: NP-MW03

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 001

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE21M101
Dilution factor: 1
Moisture %:NA

Date Received: 11/14/97
Date Extracted:11/18/97
Date Analyzed: 11/18/97

QC Batch: 7322109

Client Sample Id: NP-MW03

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
71-55-6	1,1,1-Trichloroethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 001

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE21M101
Dilution factor: 1
Moisture %:NA

Date Received: 11/14/97
Date Extracted:11/18/97
Date Analyzed: 11/18/97

QC Batch: 7322109

Client Sample Id: NP-MW03

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	no tics detected			ND

0005

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID: C7K140136 005

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE21W102
Dilution factor: 1
Moisture %: NA

Date Received: 11/14/97
Date Extracted: 11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: DUP-02

NP-MW03 DUP.

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	bis(2-Ethylhexyl) phthalate	10	U
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID: C7K140136 005

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE21W102
Dilution factor: 1
Moisture %: NA

Date Received: 11/14/97
Date Extracted: 11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: DUP-02

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
84-66-2	**Diethyl phthalate**	**1.1**	**J**
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR345

Matrix: (soil/water) WATER Lab Sample ID:C7K140136 005
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 11/14/97
Work Order: CE21W102 Date Extracted:11/18/97
Dilution factor: 1 Date Analyzed: 11/25/97
Moisture %:NA

QC Batch: 7324105

Client Sample Id: DUP-02

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 005

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE21W102
Dilution factor: 1
Moisture %:NA

Date Received: 11/14/97
Date Extracted:11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: DUP-02

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS			ND

0060

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NP-MW03

Lab Name: QUANTERRA PITT Contract:

Lab Code: Case No.: QPITTG SAS No.: SDG No.: BR345

Matrix: (soil/water) WATER Lab Sample ID: C7K140136001

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 11/14/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 11/18/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 11/29/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 5.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NP-MW03

Lab Name: QUANTERRA PITT Contract:

Lab Code: Case No.: QPITTG SAS No.: SDG No.: BR344

Matrix: (soil/water) WATER Lab Sample ID: C7K140136001

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 11/14/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 11/18/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 11/29/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 5.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NPMW03

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 375241 SAS No.: _____ SDG No.: BR345_

Matrix (soil/water): WATER Lab Sample ID: CE21M

Level (low/med): LOW__ Date Received: 11/14/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	285	_		P_
7440-36-0	Antimony_	22.3	U		P_
7440-38-2	Arsenic__	1.9	U		P_
7440-39-3	Barium___	19.6	B		P_
7440-41-7	Beryllium	0.20	U		P_
7440-43-9	Cadmium__	2.3	U		P_
7440-70-2	Calcium__	40400	_		P_
7440-47-3	Chromium_	3.2	U		P_
7440-48-4	Cobalt___	3.5	U		P_
7440-50-8	Copper___	4.5	B		P_
7439-89-6	Iron_____	194	_		P_
7439-92-1	Lead_____	0.80	U		P_
7439-95-4	Magnesium	2220	B		P_
7439-96-5	Manganese	12.9	B		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	6.9	U		P_
7440-09-7	Potassium	1650	B		P_
7782-49-2	Selenium_	2.5	U		P_
7440-22-4	Silver___	3.3	U		P_
7440-23-5	Sodium___	2040	B		P_
7440-28-0	Thallium_	5.8	B		P_
7440-62-2	Vanadium_	4.1	B		P_
7440-66-6	Zinc_____	10.2	B		P_

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:
NP-MW03
C7K140136001

0098

FORM I - IN ILM03.0

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 003

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL

Date Received: 06/24/97

Work Order: CAAHH101

Date Extracted: 06/26/97

Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW04-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U
71-55-6	1,1,1-Trichloroethane	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 003

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL

Date Received: 06/24/97

Work Order: CAAHH101

Date Extracted: 06/26/97

Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW04-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

0012

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: QUANTERRA
SDG Number: BR320

Matrix: (soil/water) WATER
Lab Sample ID: C7F240143 003
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CAAHH101

Date Received: 06/24/97
Date Extracted: 06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW04-062397

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	no tics detected			-

0013

FORM I - TIC

Lab Name:QUANTERRA SDG Number: BR320

Matrix: (soil/water) WATER Lab Sample ID:C7F240143 003
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/24/97
Work Order: CAAHH102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW04-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	**bis(2-Ethylhexyl) phthalate**	**2.4**	**J**
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U
84-66-2	Diethyl phthalate	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR320

Matrix: (soil/water) WATER Lab Sample ID:C7F240143 003
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/24/97
Work Order: CAAHH102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW04-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID:C7F240143 003

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CAAHH102
Dilution factor: 1
Moisture %:NA

Date Received: 06/24/97
Date Extracted:06/28/97
Date Analyzed: 07/29/97

QC Batch: 7186125

Client Sample Id: NP-MW04-062397

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID:C7F240143 003

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CAAHH102
Dilution factor: 1
Moisture %:NA

Date Received: 06/24/97
Date Extracted:06/28/97
Date Analyzed: 07/29/97

QC Batch: 7186125

Client Sample Id: NP-MW04-062397

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS			ND

0038

FORM I - TIC

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPMW04062397

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR320

Matrix: (soil/water) WATER Lab Sample ID: C7F240143003

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 06/24/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 06/28/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: QUANTERRA
SDG Number: BR320

Matrix: (soil/water) WATER
Lab Sample ID: C7F240143 005
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CAAHK101

Date Received: 06/24/97
Date Extracted: 06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-DUP01-W

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS DETECTED			ND

0019

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NP-MW04

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR320_

Matrix (soil/water): WATER Lab Sample ID: CAAHH

Level (low/med): LOW__ Date Received: 06/24/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	137	B		P_
7440-36-0	Antimony_	14.0	U		P_
7440-38-2	Arsenic__	2.3	U		P_
7440-39-3	Barium___	29.8	B		P_
7440-41-7	Beryllium	0.61	B		P_
7440-43-9	Cadmium__	2.6	U		P_
7440-70-2	Calcium__	1260	B		P_
7440-47-3	Chromium_	2.3	U		P_
7440-48-4	Cobalt___	3.1	U		P_
7440-50-8	Copper___	1.5	U		P_
7439-89-6	Iron_____	7.1	B		P_
7439-92-1	Lead_____	1.0	U		P_
7439-95-4	Magnesium	1820	B		P_
7439-96-5	Manganese	38.2	_		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	8.4	U		P_
7440-09-7	Potassium	567	B		P_
7782-49-2	Selenium_	3.0	U		P_
7440-22-4	Silver___	2.4	U		P_
7440-23-5	Sodium___	6770	_		P_
7440-28-0	Thallium_	5.8	B		P_
7440-62-2	Vanadium_	1.6	U		P_
7440-66-6	Zinc_____	11.4	B		P_

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

NP-MW04-062397

C7F240143003

0086

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 005

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL

Work Order: CAAHK101

Date Received: 06/24/97
Date Extracted: 06/26/97
Date Analyzed: 06/26/97

NP-MW04 DUPL.

QC Batch: 7177160

Client Sample Id: NP-DUP01-W

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U
71-55-6	1,1,1-Trichloroethane	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 005

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL

Date Received: 06/24/97

Work Order: CAAHK101

Date Extracted: 06/26/97

Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-DUP01-W

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

0018

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR320

Matrix: (soil/water) WATER Lab Sample ID:C7F240143 005
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/24/97
Work Order: CAAHK102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-DUP01-W

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	**bis(2-Ethylhexyl) phthalate**	**1.3**	**J**
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U
84-66-2	Diethyl phthalate	10	U

FORM I

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 005

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CAAHK102
Dilution factor: 1
Moisture %: NA

Date Received: 06/24/97
Date Extracted: 06/28/97
Date Analyzed: 07/29/97

QC Batch: 7186125

Client Sample Id: NP-DUP01-W

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID:C7F240143 005

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL

Date Received: 06/24/97

Work Order: CAAHK102

Date Extracted:06/28/97

Dilution factor: 1

Date Analyzed: 07/29/97

Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-DUP01-W

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR320

Matrix: (soil/water) WATER Lab Sample ID:C7F240143 005
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/24/97
Work Order: CAAHK102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-DUP01-W

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN	6.38	2.8	J

0046

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPDUP01W

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR320

Matrix: (soil/water) WATER Lab Sample ID: C7F240143005

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 06/24/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 06/28/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NP-DUP01-W

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR320_

Matrix (soil/water): WATER Lab Sample ID: CAAHK

Level (low/med): LOW__ Date Received: 06/24/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	145	B		P_
7440-36-0	Antimony_	14.0	U		P_
7440-38-2	Arsenic__	2.3	U		P_
7440-39-3	Barium___	30.2	B		P_
7440-41-7	Beryllium	0.68	B		P_
7440-43-9	Cadmium__	2.6	U		P_
7440-70-2	Calcium__	1370	B		P_
7440-47-3	Chromium_	2.3	U		P_
7440-48-4	Cobalt___	3.1	U		P_
7440-50-8	Copper___	1.5	U		P_
7439-89-6	Iron_____	11.1	B		P_
7439-92-1	Lead_____	1.0	U		P_
7439-95-4	Magnesium	1870	B		P_
7439-96-5	Manganese	38.6	_		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	8.4	U		P_
7440-09-7	Potassium	724	B		P_
7782-49-2	Selenium_	3.0	U		P_
7440-22-4	Silver___	2.4	U		P_
7440-23-5	Sodium___	6990	_		P_
7440-28-0	Thallium_	4.2	B		P_
7440-62-2	Vanadium_	1.8	B		P_
7440-66-6	Zinc_____	17.3	B		P_

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:
NP-DUP01-W
C7F240143005

0083

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 002

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE21Q101
Dilution factor: 1
Moisture %:NA

Date Received: 11/14/97
Date Extracted:11/18/97
Date Analyzed: 11/18/97

QC Batch: 7322109

Client Sample Id: NP-MW04

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 002

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE21Q101
Dilution factor: 1
Moisture %:NA

Date Received: 11/14/97
Date Extracted:11/18/97
Date Analyzed: 11/18/97

QC Batch: 7322109

Client Sample Id: NP-MW04

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
71-55-6	1,1,1-Trichloroethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 002

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE21Q101
Dilution factor: 1
Moisture %:NA

Date Received: 11/14/97
Date Extracted:11/18/97
Date Analyzed: 11/18/97

QC Batch: 7322109

Client Sample Id: NP-MW04

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	no tics detected			ND

0010

FORM I - TIC

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE21Q102
Dilution factor: 1
Moisture %:NA

Date Received: 11/14/97
Date Extracted:11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW04

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	bis(2-Ethylhexyl) phthalate	10	U
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID: C7K140136 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE21Q102
Dilution factor: 1
Moisture %: NA

Date Received: 11/14/97
Date Extracted: 11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW04

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
84-66-2	Diethyl phthalate	10	U
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE21Q102
Dilution factor: 1
Moisture %:NA

Date Received: 11/14/97
Date Extracted:11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW04

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR345

Matrix: (soil/water) WATER

Lab Sample ID:C7K140136 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE21Q102
Dilution factor: 1
Moisture %:NA

Date Received: 11/14/97
Date Extracted:11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW04

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS			ND

0052

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NP-MW04

Lab Name: QUANTERRA PITT Contract:

Lab Code: Case No.: QPITTG SAS No.: SDG No.: BR345

Matrix: (soil/water) WATER Lab Sample ID: C7K140136002

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 11/14/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 11/18/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 11/29/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 5.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NPMW04

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 375241 SAS No.: _____ SDG No.: BR345_

Matrix (soil/water): WATER Lab Sample ID: CE21Q

Level (low/med): LOW__ Date Received: 11/14/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	217			P
7440-36-0	Antimony_	22.3	U		P
7440-38-2	Arsenic__	1.9	U		P
7440-39-3	Barium___	27.4	B		P
7440-41-7	Beryllium	0.62	B		P
7440-43-9	Cadmium__	2.3	U		P
7440-70-2	Calcium__	1110	B		P
7440-47-3	Chromium_	3.2	U		P
7440-48-4	Cobalt___	3.5	U		P
7440-50-8	Copper___	5.1	B		P
7439-89-6	Iron_____	35.8	B		P
7439-92-1	Lead_____	2.8	B		P
7439-95-4	Magnesium	1250	B		P
7439-96-5	Manganese	52.8			P
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	6.9	U		P
7440-09-7	Potassium	427	B		P
7782-49-2	Selenium_	2.5	U		P
7440-22-4	Silver___	3.3	U		P
7440-23-5	Sodium___	5410			P
7440-28-0	Thallium_	3.7	U		P
7440-62-2	Vanadium_	2.0	U		P
7440-66-6	Zinc_____	7.5	B		P

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

NP-MW04

C7K140136002

0099

FORM I - IN ILM03.0

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 005
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL Date Received: 06/25/97
Work Order: CAAPT101 Date Extracted:06/26/97
Dilution factor: 1 Date Analyzed: 06/26/97
Moisture %:NA

QC Batch: 7177160

Client Sample Id: NP-MW05-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U
71-55-6	1,1,1-Trichloroethane	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR322

Matrix: (soil/water) WATER

Lab Sample ID:C7F250118 005

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CAAPT101
Dilution factor: 1
Moisture %:NA

Date Received: 06/25/97
Date Extracted:06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW05-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 005
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL Date Received: 06/25/97
Work Order: CAAPT101 Date Extracted:06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW05-062497

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS DETECTED			-

0017

Lab Name:QUANTERRA

SDG Number: BR322

Matrix: (soil/water) WATER

Lab Sample ID:C7F250118 005

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CAAPT102
Dilution factor: 1
Moisture %:NA

Date Received: 06/25/97
Date Extracted:06/28/97
Date Analyzed: 07/29/97

QC Batch: 7186125

Client Sample Id: NP-MW05-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	bis(2-Ethylhexyl) phthalate	10	U
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U
84-66-2	Diethyl phthalate	10	U

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR322

Matrix: (soil/water) WATER

Lab Sample ID: C7F250118 005

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CAAPT102
Dilution factor: 1
Moisture %: NA

Date Received: 06/25/97
Date Extracted: 06/28/97
Date Analyzed: 07/29/97

QC Batch: 7186125

Client Sample Id: NP-MW05-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 005
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/25/97
Work Order: CAAPT102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW05-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 005
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/25/97
Work Order: CAAPT102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW05-062497

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS			ND

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPMW05062497

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR322

Matrix: (soil/water) WATER Lab Sample ID: C7F250118005

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 06/25/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 06/28/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NP-MW05

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 375241 SAS No.: _____ SDG No.: BR322_

Matrix (soil/water): WATER Lab Sample ID: CAAPT

Level (low/med): LOW__ Date Received: 06/25/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	436			P
7440-36-0	Antimony	14.0	U		P
7440-38-2	Arsenic	2.3	U		P
7440-39-3	Barium	15.5	B		P
7440-41-7	Beryllium	0.29	B		P
7440-43-9	Cadmium	2.6	U		P
7440-70-2	Calcium	6620			P
7440-47-3	Chromium	2.3	U		P
7440-48-4	Cobalt	3.1	U		P
7440-50-8	Copper	1.5	U		P
7439-89-6	Iron	244			P
7439-92-1	Lead	1.0	U		P
7439-95-4	Magnesium	888	B		P
7439-96-5	Manganese	24.2			P
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	8.4	U		P
7440-09-7	Potassium	359	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	2.4	U		P
7440-23-5	Sodium	3380	B		P
7440-28-0	Thallium	3.6	B		P
7440-62-2	Vanadium	2.4	B		P
7440-66-6	Zinc	3.9	B		P

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:
NP-MW05-062497
C7F250118005

0087

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K130115 003

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE17G101
Dilution factor: 1
Moisture %:NA

Date Received: 11/13/97
Date Extracted:11/18/97
Date Analyzed: 11/18/97

QC Batch: 7322109

Client Sample Id: NP-MW05

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K130115 003

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE17G101
Dilution factor: 1
Moisture %:NA

Date Received: 11/13/97
Date Extracted:11/18/97
Date Analyzed: 11/18/97

QC Batch: 7322109

Client Sample Id: NP-MW05

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
71-55-6	1,1,1-Trichloroethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID: C7K130115 003

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE17G101
Dilution factor: 1
Moisture %: NA

Date Received: 11/13/97
Date Extracted: 11/18/97
Date Analyzed: 11/18/97

QC Batch: 7322109

Client Sample Id: NP-MW05

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	no tics detected			ND

0049

FORM I - TIC

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID: C7K130115 003

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE17G102
Dilution factor: 1
Moisture %: NA

Date Received: 11/13/97
Date Extracted: 11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW05

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	bis(2-Ethylhexyl) phthalate	10	U
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K130115 003

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE17G102
Dilution factor: 1
Moisture %:NA

Date Received: 11/13/97
Date Extracted:11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW05

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
84-66-2	Diethyl phthalate	10	U
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID: C7K130115 003

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE17G102
Dilution factor: 1
Moisture %: NA

Date Received: 11/13/97
Date Extracted: 11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW05

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR344

Matrix: (soil/water) WATER Lab Sample ID:C7K130115 003
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 11/13/97
Work Order: CE17G102 Date Extracted:11/18/97
Dilution factor: 1 Date Analyzed: 11/25/97
Moisture %:NA

QC Batch: 7324105

Client Sample Id: NP-MW05

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
112-39-0	Hexadecanoic acid, methyl es	11.157	5.6	JN

0095

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NP-MW05

Lab Name: QUANTERRA PITT Contract:

Lab Code: Case No.: QPITTG SAS No.: SDG No.: BR344

Matrix: (soil/water) WATER Lab Sample ID: C7K130115003

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 11/13/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 11/18/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 11/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 5.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NPMW05

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 375241 SAS No.: _____ SDG No.: BR344_

Matrix (soil/water): WATER Lab Sample ID: CE17G

Level (low/med): LOW__ Date Received: 11/13/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	336	_		P_
7440-36-0	Antimony_	22.3	U		P_
7440-38-2	Arsenic__	1.9	U		P_
7440-39-3	Barium___	3.8	B		P_
7440-41-7	Beryllium	0.20	U		P_
7440-43-9	Cadmium__	2.3	U		P_
7440-70-2	Calcium__	7160	_		P_
7440-47-3	Chromium_	3.2	U		P_
7440-48-4	Cobalt___	3.5	U		P_
7440-50-8	Copper___	1.6	U		P_
7439-89-6	Iron_____	5500	_		P_
7439-92-1	Lead_____	0.80	U		P_
7439-95-4	Magnesium	605	B		P_
7439-96-5	Manganese	69.4	_		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	6.9	U		P_
7440-09-7	Potassium	423	U		P_
7782-49-2	Selenium_	2.5	U		P_
7440-22-4	Silver___	3.3	U		P_
7440-23-5	Sodium___	3540	B		P_
7440-28-0	Thallium_	3.7	U		P_
7440-62-2	Vanadium_	2.7	B		P_
7440-66-6	Zinc_____	5.8	B	*	P_

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:
NP-MW05
C7K130115003

0164

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR322

Matrix: (soil/water) WATER

Lab Sample ID:C7F250118 004

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CAAPR101
Dilution factor: 1
Moisture %:NA

Date Received: 06/25/97
Date Extracted:06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW06-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U
71-55-6	1,1,1-Trichloroethane	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR322

Matrix: (soil/water) WATER

Lab Sample ID:C7F250118 004

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CAAPR101
Dilution factor: 1
Moisture %:NA

Date Received: 06/25/97
Date Extracted:06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW06-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 004
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL Date Received: 06/25/97
Work Order: CAAPR101 Date Extracted:06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-MW06-062497

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS DETECTED			ND

0014

FORM I - TIC

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 004
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/25/97
Work Order: CAAPR102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW06-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	bis(2-Ethylhexyl) phthalate	10	U
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U
84-66-2	Diethyl phthalate	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 004
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/25/97
Work Order: CAAPR102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW06-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U

FORM I

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 004
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/25/97
Work Order: CAAPR102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW06-062497

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 004
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL Date Received: 06/25/97
Work Order: CAAPR102 Date Extracted:06/28/97
Dilution factor: 1 Date Analyzed: 07/29/97
Moisture %:NA

QC Batch: 7186125

Client Sample Id: NP-MW06-062497

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS			ND

0040

FORM I - TIC

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPMW06062497

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR322

Matrix: (soil/water) WATER Lab Sample ID: C7F250118004

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 06/25/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 06/28/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 5.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NP-MW06

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 375241 SAS No.: _____ SDG No.: BR322_

Matrix (soil/water): WATER Lab Sample ID: CAAPR

Level (low/med): LOW__ Date Received: 06/25/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	455			P
7440-36-0	Antimony_	14.0	U		P
7440-38-2	Arsenic__	2.3	U		P
7440-39-3	Barium___	4.0	B		P
7440-41-7	Beryllium	0.12	U		P
7440-43-9	Cadmium__	2.6	U		P
7440-70-2	Calcium__	6220			P
7440-47-3	Chromium_	2.3	U		P
7440-48-4	Cobalt___	3.1	U		P
7440-50-8	Copper___	2.2	B		P
7439-89-6	Iron_____	3920			P
7439-92-1	Lead_____	1.0	U		P
7439-95-4	Magnesium	673	B		P
7439-96-5	Manganese	59.3			P
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	8.4	U		P
7440-09-7	Potassium	354	B		P
7782-49-2	Selenium_	3.0	U		P
7440-22-4	Silver___	2.4	U		P
7440-23-5	Sodium___	3780	B		P
7440-28-0	Thallium_	3.4	B		P
7440-62-2	Vanadium_	1.8	B		P
7440-66-6	Zinc_____	4.2	B		P

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:
NP-MW06-062497
C7F250118004

0088

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR344

Matrix: (soil/water) WATER Lab Sample ID:C7K130115 002
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL Date Received: 11/13/97
Work Order: CE17F101 Date Extracted:11/18/97
Dilution factor: 1 Date Analyzed: 11/18/97
Moisture %:NA

QC Batch: 7322109

Client Sample Id: NP-MW06

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR344

Matrix: (soil/water) WATER Lab Sample ID:C7K130115 002
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL Date Received: 11/13/97
Work Order: CE17F101 Date Extracted:11/18/97
Dilution factor: 1 Date Analyzed: 11/18/97
Moisture %:NA

QC Batch: 7322109

Client Sample Id: NP-MW06

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
71-55-6	1,1,1-Trichloroethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K130115 002

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CE17F101
Dilution factor: 1
Moisture %:NA

Date Received: 11/13/97
Date Extracted:11/18/97
Date Analyzed: 11/18/97

QC Batch: 7322109

Client Sample Id: NP-MW06

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	no tics detected			ND

0046

FORM I - TIC

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K130115 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE17F102
Dilution factor: 1
Moisture %:NA

Date Received: 11/13/97
Date Extracted:11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW06

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
83-32-9	Acenaphthene	10	U
208-96-8	Acenaphthylene	10	U
120-12-7	Anthracene	10	U
56-55-3	Benzo(a)anthracene	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
191-24-2	Benzo(ghi)perylene	10	U
50-32-8	Benzo(a)pyrene	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
111-44-4	bis(2-Chloroethyl) ether	10	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	10	U
117-81-7	**bis(2-Ethylhexyl) phthalate**	**3.6**	**J**
101-55-3	4-Bromophenyl phenyl ether	10	U
85-68-7	Butyl benzyl phthalate	10	U
106-47-8	4-Chloroaniline	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-58-7	2-Chloronaphthalene	10	U
95-57-8	2-Chlorophenol	10	U
7005-72-3	4-Chlorophenyl phenyl ether	10	U
218-01-9	Chrysene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
132-64-9	Dibenzofuran	10	U
84-74-2	Di-n-butyl phthalate	10	U
95-50-1	1,2-Dichlorobenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
120-83-2	2,4-Dichlorophenol	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K130115 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE17F102
Dilution factor: 1
Moisture %:NA

Date Received: 11/13/97
Date Extracted:11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW06

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
84-66-2	Diethyl phthalate	10	U
105-67-9	2,4-Dimethylphenol	10	U
131-11-3	Dimethyl phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
51-28-5	2,4-Dinitrophenol	25	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
206-44-0	Fluoranthene	10	U
86-73-7	Fluorene	10	U
118-74-1	Hexachlorobenzene	10	U
87-68-3	Hexachlorobutadiene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
67-72-1	Hexachloroethane	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
78-59-1	Isophorone	10	U
91-57-6	2-Methylnaphthalene	10	U
95-48-7	2-Methylphenol	10	U
106-44-5	4-Methylphenol	10	U
91-20-3	Naphthalene	10	U
88-74-4	2-Nitroaniline	25	U
99-09-2	3-Nitroaniline	25	U
100-01-6	4-Nitroaniline	25	U
98-95-3	Nitrobenzene	10	U
88-75-5	2-Nitrophenol	10	U
100-02-7	4-Nitrophenol	25	U
621-64-7	N-Nitrosodi-n-propylamine	10	U
86-30-6	N-Nitrosodiphenylamine	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID: C7K130115 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE17F102
Dilution factor: 1
Moisture %: NA

Date Received: 11/13/97
Date Extracted: 11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW06

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
108-95-2	Phenol	10	U
129-00-0	Pyrene	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
95-95-4	2,4,5-Trichlorophenol	25	U
88-06-2	2,4,6-Trichlorophenol	10	U
86-74-8	Carbazole	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR344

Matrix: (soil/water) WATER

Lab Sample ID:C7K130115 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 1000 / mL
Work Order: CE17F102
Dilution factor: 1
Moisture %:NA

Date Received: 11/13/97
Date Extracted:11/18/97
Date Analyzed: 11/25/97

QC Batch: 7324105

Client Sample Id: NP-MW06

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN	6.3485	2.4	J
112-39-0	Hexadecanoic acid, methyl es	11.159	5.1	JN
	UNKNOWN	17.349	3.2	J

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NP-MW06

Lab Name: QUANTERRA PITT Contract:

Lab Code: Case No.: QPITTG SAS No.: SDG No.: BR344

Matrix: (soil/water) WATER Lab Sample ID: C7K130115002

Sample wt/vol: 1000 (g/mL) ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 11/13/97

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 11/18/97

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 11/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 5.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

NPMW06

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 375241 SAS No.: _____ SDG No.: BR344_

Matrix (soil/water): WATER Lab Sample ID: CE17F

Level (low/med): LOW__ Date Received: 11/13/97

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	433	_		P_
7440-36-0	Antimony_	22.3	U		P_
7440-38-2	Arsenic__	3.0	B		P_
7440-39-3	Barium___	22.4	B		P_
7440-41-7	Beryllium	0.20	U		P_
7440-43-9	Cadmium__	2.3	U		P_
7440-70-2	Calcium__	7400	_		P_
7440-47-3	Chromium_	3.2	U		P_
7440-48-4	Cobalt___	4.0	B		P_
7440-50-8	Copper___	2.4	B		P_
7439-89-6	Iron_____	493	_		P_
7439-92-1	Lead_____	0.80	U		P_
7439-95-4	Magnesium	573	B		P_
7439-96-5	Manganese	30.6	_		P_
7439-97-6	Mercury__	0.20	U		CV
7440-02-0	Nickel___	6.9	U		P_
7440-09-7	Potassium	423	U		P_
7782-49-2	Selenium_	2.5	U		P_
7440-22-4	Silver___	3.3	U		P_
7440-23-5	Sodium___	3790	B		P_
7440-28-0	Thallium_	3.7	U		P_
7440-62-2	Vanadium_	4.7	B		P_
7440-66-6	Zinc_____	3.6	B	*	P_

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

NP-MW06

C7K130115002

0165

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID:C7F240143 001

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL

Work Order: CAAHF101

Date Received: 06/24/97
Date Extracted:06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-TB01W

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U
71-55-6	1,1,1-Trichloroethane	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR320

Matrix: (soil/water) WATER

Lab Sample ID: C7F240143 001

Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL

Work Order: CAAHF101

Date Received: 06/24/97
Date Extracted: 06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-TB01W

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

0004

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: QUANTERRA
SDG Number: BR320

Matrix: (soil/water) WATER
Lab Sample ID: C7F240143 001
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / mL
Work Order: CAAHF101

Date Received: 06/24/97
Date Extracted: 06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-TB01W

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS DETECTED			ND

0005

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 001
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / g Date Received: 06/25/97
Work Order: CAAPH101 Date Extracted:06/26/97
Dilution factor: 1 Date Analyzed: 06/26/97
Moisture %:NA

QC Batch: 7177160

Client Sample Id: NP-TB02-W

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	10	U
56-23-5	Carbon tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Dibromochloromethane	10	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	10	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	10	U
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	10	U
75-09-2	Methylene chloride	10	U
108-10-1	4-Methyl-2-pentanone	10	U
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	10	U
108-88-3	Toluene	10	U
71-55-6	1,1,1-Trichloroethane	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 001
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / g Date Received: 06/25/97
Work Order: CAAPH101 Date Extracted:06/26/97
Dilution factor: 1 Date Analyzed: 06/26/97
Moisture %:NA

QC Batch: 7177160

Client Sample Id: NP-TB02-W

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/L	Q
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	10	U
75-01-4	Vinyl chloride	10	U
1330-20-7	Xylenes (total)	10	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR322

Matrix: (soil/water) WATER Lab Sample ID:C7F250118 001
Method: OCLP OLM03.1
Volatile Organics, GC/MS (CLP -OLM03.1)

Sample WT/Vol: 5 / g Date Received: 06/25/97
Work Order: CAAPH101 Date Extracted:06/26/97
Date Analyzed: 06/26/97

QC Batch: 7177160

Client Sample Id: NP-TB02-W

(ug/L or ug/kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	NO TICS DETECTED			ND

0005

FORM I - TIC

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID: C7F110133 007

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FP102
Dilution factor: 1
Moisture %: 36

Date Received: 06/11/97
Date Extracted: 06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD10-1218

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
83-32-9	Acenaphthene	520	U
208-96-8	Acenaphthylene	520	U
120-12-7	Anthracene	520	U
56-55-3	Benzo(a)anthracene	520	U
205-99-2	Benzo(b)fluoranthene	520	U
207-08-9	Benzo(k)fluoranthene	520	U
191-24-2	Benzo(ghi)perylene	520	U
50-32-8	Benzo(a)pyrene	520	U
111-91-1	bis(2-Chloroethoxy)methane	520	U
111-44-4	bis(2-Chloroethyl) ether	520	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	520	U
117-81-7	**bis(2-Ethylhexyl) phthalate**	**120**	**J**
101-55-3	4-Bromophenyl phenyl ether	520	U
85-68-7	Butyl benzyl phthalate	520	U
106-47-8	4-Chloroaniline	520	U
59-50-7	4-Chloro-3-methylphenol	520	U
91-58-7	2-Chloronaphthalene	520	U
95-57-8	2-Chlorophenol	520	U
7005-72-3	4-Chlorophenyl phenyl ether	520	U
218-01-9	Chrysene	520	U
53-70-3	Dibenz(a,h)anthracene	520	U
132-64-9	Dibenzofuran	520	U
84-74-2	Di-n-butyl phthalate	520	U
95-50-1	1,2-Dichlorobenzene	520	U
541-73-1	1,3-Dichlorobenzene	520	U
106-46-7	1,4-Dichlorobenzene	520	U
91-94-1	3,3'-Dichlorobenzidine	520	U
120-83-2	2,4-Dichlorophenol	520	U
84-66-2	Diethyl phthalate	520	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 007
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FP102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:36

QC Batch: 7168161

Client Sample Id: NP-SD10-1218

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
105-67-9	2,4-Dimethylphenol	520	U
131-11-3	Dimethyl phthalate	520	U
117-84-0	Di-n-octyl phthalate	520	U
534-52-1	4,6-Dinitro-2-methylphenol	1300	U
51-28-5	2,4-Dinitrophenol	1300	U
121-14-2	2,4-Dinitrotoluene	520	U
606-20-2	2,6-Dinitrotoluene	520	U
206-44-0	Fluoranthene	520	U
86-73-7	Fluorene	520	U
118-74-1	Hexachlorobenzene	520	U
87-68-3	Hexachlorobutadiene	520	U
77-47-4	Hexachlorocyclopentadiene	520	U
67-72-1	Hexachloroethane	520	U
193-39-5	Indeno(1,2,3-cd)pyrene	520	U
78-59-1	Isophorone	520	U
91-57-6	2-Methylnaphthalene	520	U
95-48-7	2-Methylphenol	520	U
106-44-5	4-Methylphenol	520	U
91-20-3	Naphthalene	520	U
88-74-4	2-Nitroaniline	1300	U
99-09-2	3-Nitroaniline	1300	U
100-01-6	4-Nitroaniline	1300	U
98-95-3	Nitrobenzene	520	U
88-75-5	2-Nitrophenol	520	U
100-02-7	4-Nitrophenol	1300	U
621-64-7	N-Nitrosodi-n-propylamine	520	U
86-30-6	N-Nitrosodiphenylamine	520	U
87-86-5	Pentachlorophenol	1300	U
85-01-8	Phenanthrene	520	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID: C7F110133 007

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FP102
Dilution factor: 1
Moisture %: 36

Date Received: 06/11/97
Date Extracted: 06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD10-1218

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
108-95-2	Phenol	520	U
129-00-0	Pyrene	520	U
120-82-1	1,2,4-Trichlorobenzene	520	U
95-95-4	2,4,5-Trichlorophenol	1300	U
88-06-2	2,4,6-Trichlorophenol	520	U
86-74-8	Carbazole	520	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 007
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FP102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:36

QC Batch: 7168161

Client Sample Id: NP-SD10-1218

(ug/L or ug/kg) ug/kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN ALDOL CONDENSATION	3.3621	1600	JA
	UNKNOWN	3.8603	160	J
	UNKNOWN KETONE	4.0141	250	JB
	UNKNOWN	4.4683	530	J
	UNKNOWN	4.7248	140	JB
	UNKNOWN	4.9372	130	J
	UNKNOWN	16.029	160	J
	UNKNOWN	17.37	230	J
	UNKNOWN	17.443	170	J
	UNKNOWN BRANCHED ALKANE	18.175	120	J
	UNKNOWN BRANCHED ALKANE	19.274	150	J
	UNKNOWN	19.414	110	J
	UNKNOWN KETONE	20.923	2000	J
	UNKNOWN	21.494	140	J
	UNKNOWN	22.725	870	J

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPSD101218

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR319

Matrix: (soil/water) SOIL Lab Sample ID: C7F110133007

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 36 decanted: (Y/N) N Date Received: 06/11/97

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 06/21/97

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.7	U
319-85-7	beta-BHC	2.7	U
319-86-8	delta-BHC	2.7	U
58-89-9	gamma-BHC (Lindane)	2.7	U
76-44-8	Heptachlor	2.7	U
309-00-2	Aldrin	2.7	U
1024-57-3	Heptachlor epoxide	2.7	U
959-98-8	Endosulfan I	2.7	U
60-57-1	Dieldrin	5.2	U
72-55-9	4,4'-DDE	5.2	U
72-20-8	Endrin	5.2	U
33213-65-9	Endosulfan II	5.2	U
72-54-8	4,4'-DDD	5.2	U
1031-07-8	Endosulfan sulfate	5.2	U
50-29-3	4,4'-DDT	5.2	U
72-43-5	Methoxychlor	27	U
53494-70-5	Endrin ketone	5.2	U
7421-93-4	Endrin aldehyde	5.2	U
5103-71-9	alpha-Chlordane	2.7	U
5103-74-2	gamma-Chlordane	2.7	U
8001-35-2	Toxaphene	270	U
12674-11-2	Aroclor-1016	52	U
11104-28-2	Aroclor-1221	100	U
11141-16-5	Aroclor-1232	52	U
53469-21-9	Aroclor-1242	52	U
12672-29-6	Aroclor-1248	52	U
11097-69-1	Aroclor-1254	52	U
11096-82-5	Aroclor-1260	52	U

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

10-1218

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR319_

Matrix (soil/water): SOIL_ Lab Sample ID: CA3FP

Level (low/med): LOW__ Date Received: 06/11/97

% Solids: _63.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	12500		*	P
7440-36-0	Antimony_	0.44	U		P
7440-38-2	Arsenic__	2.0	B		P
7440-39-3	Barium___	24.8	B		P
7440-41-7	Beryllium	0.37	B		P
7440-43-9	Cadmium__	0.09	U		P
7440-70-2	Calcium__	128	B		P
7440-47-3	Chromium_	11.4			P
7440-48-4	Cobalt___	2.1	B		P
7440-50-8	Copper___	3.7	B	*	P
7439-89-6	Iron_____	6900			P
7439-92-1	Lead_____	6.5		E*	P
7439-95-4	Magnesium	902	B		P
7439-96-5	Manganese	30.7		*	P
7439-97-6	Mercury__	0.16	U		CV
7440-02-0	Nickel___	8.2	B		P
7440-09-7	Potassium	304	B		P
7782-49-2	Selenium_	1.2	B		P
7440-22-4	Silver___	0.94	U		P
7440-23-5	Sodium___	71.4	B		P
7440-28-0	Thallium_	1.2	U		P
7440-62-2	Vanadium_	19.0			P
7440-66-6	Zinc_____	14.4		E	P

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:

NP-SD10-1218

C7F11013307

STONES_&_WATER

FORM I - IN

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID: C7F110133 008

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FQ102
Dilution factor: 1
Moisture %: 24

Date Received: 06/11/97
Date Extracted: 06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD10-1824

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
83-32-9	Acenaphthene	440	U
208-96-8	Acenaphthylene	440	U
120-12-7	Anthracene	440	U
56-55-3	Benzo(a)anthracene	440	U
205-99-2	Benzo(b)fluoranthene	440	U
207-08-9	Benzo(k)fluoranthene	440	U
191-24-2	Benzo(ghi)perylene	440	U
50-32-8	Benzo(a)pyrene	440	U
111-91-1	bis(2-Chloroethoxy)methane	440	U
111-44-4	bis(2-Chloroethyl) ether	440	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	440	U
117-81-7	**bis(2-Ethylhexyl) phthalate**	**150**	**J**
101-55-3	4-Bromophenyl phenyl ether	440	U
85-68-7	Butyl benzyl phthalate	440	U
106-47-8	4-Chloroaniline	440	U
59-50-7	4-Chloro-3-methylphenol	440	U
91-58-7	2-Chloronaphthalene	440	U
95-57-8	2-Chlorophenol	440	U
7005-72-3	4-Chlorophenyl phenyl ether	440	U
218-01-9	Chrysene	440	U
53-70-3	Dibenz(a,h)anthracene	440	U
132-64-9	Dibenzofuran	440	U
84-74-2	Di-n-butyl phthalate	440	U
95-50-1	1,2-Dichlorobenzene	440	U
541-73-1	1,3-Dichlorobenzene	440	U
106-46-7	1,4-Dichlorobenzene	440	U
91-94-1	3,3'-Dichlorobenzidine	440	U
120-83-2	2,4-Dichlorophenol	440	U
84-66-2	Diethyl phthalate	440	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 008
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FQ102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:24

QC Batch: 7168161

Client Sample Id: NP-SD10-1824

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
105-67-9	2,4-Dimethylphenol	440	U
131-11-3	Dimethyl phthalate	440	U
117-84-0	Di-n-octyl phthalate	440	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
51-28-5	2,4-Dinitrophenol	1100	U
121-14-2	2,4-Dinitrotoluene	440	U
606-20-2	2,6-Dinitrotoluene	440	U
206-44-0	Fluoranthene	440	U
86-73-7	Fluorene	440	U
118-74-1	Hexachlorobenzene	440	U
87-68-3	Hexachlorobutadiene	440	U
77-47-4	Hexachlorocyclopentadiene	440	U
67-72-1	Hexachloroethane	440	U
193-39-5	Indeno(1,2,3-cd)pyrene	440	U
78-59-1	Isophorone	440	U
91-57-6	2-Methylnaphthalene	440	U
95-48-7	2-Methylphenol	440	U
106-44-5	4-Methylphenol	440	U
91-20-3	Naphthalene	440	U
88-74-4	2-Nitroaniline	1100	U
99-09-2	3-Nitroaniline	1100	U
100-01-6	4-Nitroaniline	1100	U
98-95-3	Nitrobenzene	440	U
88-75-5	2-Nitrophenol	440	U
100-02-7	4-Nitrophenol	1100	U
621-64-7	N-Nitrosodi-n-propylamine	440	U
86-30-6	N-Nitrosodiphenylamine	440	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	440	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 008
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FQ102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:24

QC Batch: 7168161

Client Sample Id: NP-SD10-1824

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
108-95-2	Phenol	440	U
129-00-0	Pyrene	440	U
120-82-1	1,2,4-Trichlorobenzene	440	U
95-95-4	2,4,5-Trichlorophenol	1100	U
88-06-2	2,4,6-Trichlorophenol	440	U
86-74-8	Carbazole	440	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 008
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FQ102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:24

QC Batch: 7168161

Client Sample Id: NP-SD10-1824

(ug/L or ug/kg) ug/kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN ALDOL CONDENSATION	3.5171	1200	JA
	UNKNOWN BRANCHED ALKANE	4.0372	1100	J
1740-19-8	1-Phenanthrenecarboxylic aci	14.902	200	JN
	UNKNOWN	15.627	280	J
	UNKNOWN	16.001	200	J
	UNKNOWN KETONE	20.909	170	J
	UNKNOWN	22.719	980	J

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPSD101824

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR319

Matrix: (soil/water) SOIL Lab Sample ID: C7F110133008

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 24 decanted: (Y/N) N Date Received: 06/11/97

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 06/21/97

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	2.2	U
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.3	U
72-55-9	4,4'-DDE	4.3	U
72-20-8	Endrin	4.3	U
33213-65-9	Endosulfan II	4.3	U
72-54-8	4,4'-DDD	4.3	U
1031-07-8	Endosulfan sulfate	4.3	U
50-29-3	4,4'-DDT	4.3	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.3	U
7421-93-4	Endrin aldehyde	4.3	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor-1016	43	U
11104-28-2	Aroclor-1221	88	U
11141-16-5	Aroclor-1232	43	U
53469-21-9	Aroclor-1242	43	U
12672-29-6	Aroclor-1248	43	U
11097-69-1	Aroclor-1254	43	U
11096-82-5	Aroclor-1260	43	U

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

10-1824

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR319_

Matrix (soil/water): SOIL_ Lab Sample ID: CA3FQ

Level (low/med): LOW__ Date Received: 06/11/97

% Solids: _75.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10700		*	P
7440-36-0	Antimony	0.37	U		P
7440-38-2	Arsenic	2.3	B		P
7440-39-3	Barium	25.0	B		P
7440-41-7	Beryllium	0.31	B		P
7440-43-9	Cadmium	0.08	U		P
7440-70-2	Calcium	115	B		P
7440-47-3	Chromium	10.8			P
7440-48-4	Cobalt	2.4	B		P
7440-50-8	Copper	3.9	B	*	P
7439-89-6	Iron	8020			P
7439-92-1	Lead	4.7		E*	P
7439-95-4	Magnesium	1010	B		P
7439-96-5	Manganese	34.6		*	P
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	6.9	B		P
7440-09-7	Potassium	260	B		P
7782-49-2	Selenium	0.77	B		P
7440-22-4	Silver	0.79	U		P
7440-23-5	Sodium	46.4	B		P
7440-28-0	Thallium	0.98	U		P
7440-62-2	Vanadium	17.6			P
7440-66-6	Zinc	14.6		E	P

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:

NP-SD10-1824

C7F11013308

STONES

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID: C7F110133 009

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FR102
Dilution factor: 1
Moisture %: 27

Date Received: 06/11/97
Date Extracted: 06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-DUP05

NP-SD10-1824 DUP

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
83-32-9	Acenaphthene	450	U
208-96-8	Acenaphthylene	450	U
120-12-7	Anthracene	450	U
56-55-3	Benzo(a)anthracene	450	U
205-99-2	Benzo(b)fluoranthene	450	U
207-08-9	Benzo(k)fluoranthene	450	U
191-24-2	Benzo(ghi)perylene	450	U
50-32-8	Benzo(a)pyrene	450	U
111-91-1	bis(2-Chloroethoxy)methane	450	U
111-44-4	bis(2-Chloroethyl) ether	450	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	450	U
117-81-7	**bis(2-Ethylhexyl) phthalate**	**100**	**J**
101-55-3	4-Bromophenyl phenyl ether	450	U
85-68-7	Butyl benzyl phthalate	450	U
106-47-8	4-Chloroaniline	450	U
59-50-7	4-Chloro-3-methylphenol	450	U
91-58-7	2-Chloronaphthalene	450	U
95-57-8	2-Chlorophenol	450	U
7005-72-3	4-Chlorophenyl phenyl ether	450	U
218-01-9	Chrysene	450	U
53-70-3	Dibenz(a,h)anthracene	450	U
132-64-9	Dibenzofuran	450	U
84-74-2	Di-n-butyl phthalate	450	U
95-50-1	1,2-Dichlorobenzene	450	U
541-73-1	1,3-Dichlorobenzene	450	U
106-46-7	1,4-Dichlorobenzene	450	U
91-94-1	3,3'-Dichlorobenzidine	450	U
120-83-2	2,4-Dichlorophenol	450	U
84-66-2	Diethyl phthalate	450	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 009
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FR102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:27

QC Batch: 7168161

Client Sample Id: NP-DUP05

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
105-67-9	2,4-Dimethylphenol	450	U
131-11-3	Dimethyl phthalate	450	U
117-84-0	Di-n-octyl phthalate	450	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
51-28-5	2,4-Dinitrophenol	1100	U
121-14-2	2,4-Dinitrotoluene	450	U
606-20-2	2,6-Dinitrotoluene	450	U
206-44-0	Fluoranthene	450	U
86-73-7	Fluorene	450	U
118-74-1	Hexachlorobenzene	450	U
87-68-3	Hexachlorobutadiene	450	U
77-47-4	Hexachlorocyclopentadiene	450	U
67-72-1	Hexachloroethane	450	U
193-39-5	Indeno(1,2,3-cd)pyrene	450	U
78-59-1	Isophorone	450	U
91-57-6	2-Methylnaphthalene	450	U
95-48-7	2-Methylphenol	450	U
106-44-5	4-Methylphenol	450	U
91-20-3	Naphthalene	450	U
88-74-4	2-Nitroaniline	1100	U
99-09-2	3-Nitroaniline	1100	U
100-01-6	4-Nitroaniline	1100	U
98-95-3	Nitrobenzene	450	U
88-75-5	2-Nitrophenol	450	U
100-02-7	4-Nitrophenol	1100	U
621-64-7	N-Nitrosodi-n-propylamine	450	U
86-30-6	N-Nitrosodiphenylamine	450	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	450	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 009
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FR102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:27

QC Batch: 7168161

Client Sample Id: NP-DUP05

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
108-95-2	Phenol	450	U
129-00-0	Pyrene	450	U
120-82-1	1,2,4-Trichlorobenzene	450	U
95-95-4	2,4,5-Trichlorophenol	1100	U
88-06-2	2,4,6-Trichlorophenol	450	U
86-74-8	Carbazole	450	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: QUANTERRA
SDG Number: BR319

Matrix: (soil/water) SOLID
Lab Sample ID: C7F110133 009
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FR102
Dilution factor: 1
Moisture %: 27

Date Received: 06/11/97
Date Extracted: 06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-DUP05

(ug/L or ug/kg) ug/kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN ALDOL CONDENSATION	3.3353	1500	JA
	UNKNOWN KETONE	4.0093	250	JB
	UNKNOWN KETONE	4.1192	96	J
	UNKNOWN	4.4635	310	J
	UNKNOWN	4.5734	130	J
	UNKNOWN	4.6247	160	J
	UNKNOWN	4.7273	110	J
	UNKNOWN BRANCHED ALKANE	16.207	140	J
	UNKNOWN	16.288	120	J
	UNKNOWN BRANCHED ALKANE	17.606	350	J
	UNKNOWN	17.694	230	J
	UNKNOWN	17.738	210	J
	UNKNOWN	17.848	340	J
	UNKNOWN BRANCHED ALKANE	18.185	97	J
	UNKNOWN	19.416	170	J
	UNKNOWN	19.651	110	J
	UNKNOWN KETONE	20.933	1200	J
	UNKNOWN	22.281	130	J
	UNKNOWN	22.764	3500	J

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPDUP05

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR319

Matrix: (soil/water) SOIL Lab Sample ID: C7F110133009

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 27 decanted: (Y/N) N Date Received: 06/11/97

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 06/21/97

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.3	U
319-85-7	beta-BHC	2.3	U
319-86-8	delta-BHC	2.3	U
58-89-9	gamma-BHC (Lindane)	2.3	U
76-44-8	Heptachlor	2.3	U
309-00-2	Aldrin	2.3	U
1024-57-3	Heptachlor epoxide	2.3	U
959-98-8	Endosulfan I	2.3	U
60-57-1	Dieldrin	4.5	U
72-55-9	4,4'-DDE	4.5	U
72-20-8	Endrin	4.5	U
33213-65-9	Endosulfan II	4.5	U
72-54-8	4,4'-DDD	4.5	U
1031-07-8	Endosulfan sulfate	4.5	U
50-29-3	4,4'-DDT	4.5	U
72-43-5	Methoxychlor	23	U
53494-70-5	Endrin ketone	4.5	U
7421-93-4	Endrin aldehyde	4.5	U
5103-71-9	alpha-Chlordane	2.3	U
5103-74-2	gamma-Chlordane	2.3	U
8001-35-2	Toxaphene	230	U
12674-11-2	Aroclor-1016	45	U
11104-28-2	Aroclor-1221	92	U
11141-16-5	Aroclor-1232	45	U
53469-21-9	Aroclor-1242	45	U
12672-29-6	Aroclor-1248	45	U
11097-69-1	Aroclor-1254	45	U
11096-82-5	Aroclor-1260	45	U

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

DUP05

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR319_

Matrix (soil/water): SOIL_ Lab Sample ID: CA3FR

Level (low/med): LOW__ Date Received: 06/11/97

% Solids: _72.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9680		*	P
7440-36-0	Antimony	0.38	U		P
7440-38-2	Arsenic	1.7	B		P
7440-39-3	Barium	18.3	B		P
7440-41-7	Beryllium	0.28	B		P
7440-43-9	Cadmium	0.08	U		P
7440-70-2	Calcium	104	B		P
7440-47-3	Chromium	8.6			P
7440-48-4	Cobalt	1.7	B		P
7440-50-8	Copper	2.7	B	*	P
7439-89-6	Iron	5350			P
7439-92-1	Lead	4.1		E*	P
7439-95-4	Magnesium	632	B		P
7439-96-5	Manganese	22.2		*	P
7439-97-6	Mercury	0.14	U		CV
7440-02-0	Nickel	12.4			P
7440-09-7	Potassium	248	B		P
7782-49-2	Selenium	0.73	B		P
7440-22-4	Silver	0.82	U		P
7440-23-5	Sodium	44.2	B		P
7440-28-0	Thallium	1.0	U		P
7440-62-2	Vanadium	15.2			P
7440-66-6	Zinc	12.2		E	P

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES____

Comments:

NP-DUP05

C7F110133O9

STONES

FORM I - IN

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID:C7F110133 005

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FM102
Dilution factor: 1
Moisture %:14

Date Received: 06/11/97
Date Extracted:06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD11-1218

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
83-32-9	Acenaphthene	380	U
208-96-8	Acenaphthylene	380	U
120-12-7	Anthracene	380	U
56-55-3	Benzo(a)anthracene	380	U
205-99-2	Benzo(b)fluoranthene	380	U
207-08-9	Benzo(k)fluoranthene	380	U
191-24-2	Benzo(ghi)perylene	380	U
50-32-8	Benzo(a)pyrene	380	U
111-91-1	bis(2-Chloroethoxy)methane	380	U
111-44-4	bis(2-Chloroethyl) ether	380	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	380	U
117-81-7	**bis(2-Ethylhexyl) phthalate**	**95**	**J**
101-55-3	4-Bromophenyl phenyl ether	380	U
85-68-7	Butyl benzyl phthalate	380	U
106-47-8	4-Chloroaniline	380	U
59-50-7	4-Chloro-3-methylphenol	380	U
91-58-7	2-Chloronaphthalene	380	U
95-57-8	2-Chlorophenol	380	U
7005-72-3	4-Chlorophenyl phenyl ether	380	U
218-01-9	Chrysene	380	U
53-70-3	Dibenz(a,h)anthracene	380	U
132-64-9	Dibenzofuran	380	U
84-74-2	Di-n-butyl phthalate	380	U
95-50-1	1,2-Dichlorobenzene	380	U
541-73-1	1,3-Dichlorobenzene	380	U
106-46-7	1,4-Dichlorobenzene	380	U
91-94-1	3,3'-Dichlorobenzidine	380	U
120-83-2	2,4-Dichlorophenol	380	U
84-66-2	Diethyl phthalate	380	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID: C7F110133 005

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FM102
Dilution factor: 1
Moisture %: 14

Date Received: 06/11/97
Date Extracted: 06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD11-1218

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
105-67-9	2,4-Dimethylphenol	380	U
131-11-3	Dimethyl phthalate	380	U
117-84-0	Di-n-octyl phthalate	380	U
534-52-1	4,6-Dinitro-2-methylphenol	960	U
51-28-5	2,4-Dinitrophenol	960	U
121-14-2	2,4-Dinitrotoluene	380	U
606-20-2	2,6-Dinitrotoluene	380	U
206-44-0	Fluoranthene	380	U
86-73-7	Fluorene	380	U
118-74-1	Hexachlorobenzene	380	U
87-68-3	Hexachlorobutadiene	380	U
77-47-4	Hexachlorocyclopentadiene	380	U
67-72-1	Hexachloroethane	380	U
193-39-5	Indeno(1,2,3-cd)pyrene	380	U
78-59-1	Isophorone	380	U
91-57-6	2-Methylnaphthalene	380	U
95-48-7	2-Methylphenol	380	U
106-44-5	4-Methylphenol	380	U
91-20-3	Naphthalene	380	U
88-74-4	2-Nitroaniline	960	U
99-09-2	3-Nitroaniline	960	U
100-01-6	4-Nitroaniline	960	U
98-95-3	Nitrobenzene	380	U
88-75-5	2-Nitrophenol	380	U
100-02-7	4-Nitrophenol	960	U
621-64-7	N-Nitrosodi-n-propylamine	380	U
86-30-6	N-Nitrosodiphenylamine	380	U
87-86-5	Pentachlorophenol	960	U
85-01-8	Phenanthrene	380	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID:C7F110133 005

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FM102
Dilution factor: 1
Moisture %:14

Date Received: 06/11/97
Date Extracted:06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD11-1218

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
108-95-2	Phenol	380	U
129-00-0	Pyrene	380	U
120-82-1	1,2,4-Trichlorobenzene	380	U
95-95-4	2,4,5-Trichlorophenol	960	U
88-06-2	2,4,6-Trichlorophenol	380	U
86-74-8	Carbazole	380	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 005
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FM102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:14

QC Batch: 7168161

Client Sample Id: NP-SD11-1218

(ug/L or ug/kg) ug/kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN	3.2227	270	J
	UNKNOWN ALDOL CONDENSATION	3.4058	1100	JA
	UNKNOWN	3.7355	220	J
	UNKNOWN	3.8894	2100	J
	UNKNOWN	4.0212	150	JB
	UNKNOWN	4.4608	190	JB
	UNKNOWN	4.7246	120	JB
	UNKNOWN	6.0433	110	J
57-10-3	Hexadecanoic acid	11.882	82	JN
	UNKNOWN	16.029	120	J
	UNKNOWN	17.596	85	J
	UNKNOWN	17.853	83	J
	UNKNOWN BRANCHED ALKANE	18.183	100	J
	UNKNOWN	18.923	110	J
	UNKNOWN BRANCHED ALKANE	19.282	140	J
	UNKNOWN	19.853	110	J
	UNKNOWN	22.718	150	J

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPSD111218

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR319

Matrix: (soil/water) SOIL Lab Sample ID: C7F110133005

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 14 decanted: (Y/N) N Date Received: 06/11/97

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 06/21/97

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.0	U
319-85-7	beta-BHC	2.0	U
319-86-8	delta-BHC	2.0	U
58-89-9	gamma-BHC (Lindane)	2.0	U
76-44-8	Heptachlor	2.0	U
309-00-2	Aldrin	2.0	U
1024-57-3	Heptachlor epoxide	2.0	U
959-98-8	Endosulfan I	2.0	U
60-57-1	Dieldrin	3.8	U
72-55-9	4,4'-DDE	3.8	U
72-20-8	Endrin	3.8	U
33213-65-9	Endosulfan II	3.8	U
72-54-8	4,4'-DDD	3.8	U
1031-07-8	Endosulfan sulfate	3.8	U
50-29-3	4,4'-DDT	3.8	U
72-43-5	Methoxychlor	20	U
53494-70-5	Endrin ketone	3.8	U
7421-93-4	Endrin aldehyde	3.8	U
5103-71-9	alpha-Chlordane	2.0	U
5103-74-2	gamma-Chlordane	2.0	U
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	38	U
11104-28-2	Aroclor-1221	78	U
11141-16-5	Aroclor-1232	38	U
53469-21-9	Aroclor-1242	38	U
12672-29-6	Aroclor-1248	38	U
11097-69-1	Aroclor-1254	38	U
11096-82-5	Aroclor-1260	38	U

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11-1218

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR319_

Matrix (soil/water): SOIL_ Lab Sample ID: CA3FM

Level (low/med): LOW__ Date Received: 06/11/97

% Solids: _86.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	2440		*	P
7440-36-0	Antimony_	0.32	U		P
7440-38-2	Arsenic__	1.2	B		P
7440-39-3	Barium___	4.3	B		P
7440-41-7	Beryllium	0.14	B		P
7440-43-9	Cadmium__	0.07	U		P
7440-70-2	Calcium__	220	B		P
7440-47-3	Chromium_	9.8			P
7440-48-4	Cobalt___	1.4	B		P
7440-50-8	Copper___	2.9	B	*	P
7439-89-6	Iron_____	2910			P
7439-92-1	Lead_____	4.6		E*	P
7439-95-4	Magnesium	227	B		P
7439-96-5	Manganese	16.3		*	P
7439-97-6	Mercury__	0.12	U		CV
7440-02-0	Nickel___	10			P
7440-09-7	Potassium	171	B		P
7782-49-2	Selenium_	0.60	U		P
7440-22-4	Silver___	0.69	U		P
7440-23-5	Sodium___	28.3	B		P
7440-28-0	Thallium_	0.86	U		P
7440-62-2	Vanadium_	6.6	B		P
7440-66-6	Zinc_____	7.1		E	P

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:
NP-SD11-1218
C7F11013305
STONES

FORM I - IN ILM03.0

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID:C7F110133 006

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FN102
Dilution factor: 1
Moisture %:19

Date Received: 06/11/97
Date Extracted:06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD11-1824

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
83-32-9	Acenaphthene	410	U
208-96-8	Acenaphthylene	410	U
120-12-7	Anthracene	410	U
56-55-3	Benzo(a)anthracene	410	U
205-99-2	Benzo(b)fluoranthene	410	U
207-08-9	Benzo(k)fluoranthene	410	U
191-24-2	Benzo(ghi)perylene	410	U
50-32-8	Benzo(a)pyrene	410	U
111-91-1	bis(2-Chloroethoxy)methane	410	U
111-44-4	bis(2-Chloroethyl) ether	410	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	410	U
117-81-7	**bis(2-Ethylhexyl) phthalate**	**120**	**J**
101-55-3	4-Bromophenyl phenyl ether	410	U
85-68-7	**Butyl benzyl phthalate**	**56**	**J**
106-47-8	4-Chloroaniline	410	U
59-50-7	4-Chloro-3-methylphenol	410	U
91-58-7	2-Chloronaphthalene	410	U
95-57-8	2-Chlorophenol	410	U
7005-72-3	4-Chlorophenyl phenyl ether	410	U
218-01-9	Chrysene	410	U
53-70-3	Dibenz(a,h)anthracene	410	U
132-64-9	Dibenzofuran	410	U
84-74-2	Di-n-butyl phthalate	410	U
95-50-1	1,2-Dichlorobenzene	410	U
541-73-1	1,3-Dichlorobenzene	410	U
106-46-7	1,4-Dichlorobenzene	410	U
91-94-1	3,3'-Dichlorobenzidine	410	U
120-83-2	2,4-Dichlorophenol	410	U
84-66-2	Diethyl phthalate	410	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 006
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FN102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:19

QC Batch: 7168161

Client Sample Id: NP-SD11-1824

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
105-67-9	2,4-Dimethylphenol	410	U
131-11-3	Dimethyl phthalate	410	U
117-84-0	Di-n-octyl phthalate	410	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
51-28-5	2,4-Dinitrophenol	1000	U
121-14-2	2,4-Dinitrotoluene	410	U
606-20-2	2,6-Dinitrotoluene	410	U
206-44-0	Fluoranthene	410	U
86-73-7	Fluorene	410	U
118-74-1	Hexachlorobenzene	410	U
87-68-3	Hexachlorobutadiene	410	U
77-47-4	Hexachlorocyclopentadiene	410	U
67-72-1	Hexachloroethane	410	U
193-39-5	Indeno(1,2,3-cd)pyrene	410	U
78-59-1	Isophorone	410	U
91-57-6	2-Methylnaphthalene	410	U
95-48-7	2-Methylphenol	410	U
106-44-5	4-Methylphenol	410	U
91-20-3	Naphthalene	410	U
88-74-4	2-Nitroaniline	1000	U
99-09-2	3-Nitroaniline	1000	U
100-01-6	4-Nitroaniline	1000	U
98-95-3	Nitrobenzene	410	U
88-75-5	2-Nitrophenol	410	U
100-02-7	4-Nitrophenol	1000	U
621-64-7	N-Nitrosodi-n-propylamine	410	U
86-30-6	N-Nitrosodiphenylamine	410	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	410	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 006
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FN102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:19

QC Batch: 7168161

Client Sample Id: NP-SD11-1824

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
108-95-2	Phenol	410	U
129-00-0	Pyrene	410	U
120-82-1	1,2,4-Trichlorobenzene	410	U
95-95-4	2,4,5-Trichlorophenol	1000	U
88-06-2	2,4,6-Trichlorophenol	410	U
86-74-8	Carbazole	410	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 006
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FN102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:19

QC Batch: 7168161

Client Sample Id: NP-SD11-1824

(ug/L or ug/kg) ug/kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN	3.1965	170	J
	UNKNOWN ACID	3.2478	270	J
	UNKNOWN ALDOL CONDENSATION	3.3577	2000	JA
	UNKNOWN	3.724	130	J
	UNKNOWN	3.8706	810	J
	UNKNOWN KETONE	4.0171	200	JB
	UNKNOWN	4.464	340	JB
	UNKNOWN	4.6252	140	JB
57-10-3	Hexadecanoic acid	11.878	88	JN
	UNKNOWN	16.625	110	J
	UNKNOWN	17.849	130	J
	UNKNOWN BRANCHED ALKANE	18.178	92	J
	UNKNOWN BRANCHED ALKANE	19.27	95	J

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPSD111824

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR319

Matrix: (soil/water) SOIL Lab Sample ID: C7F110133006

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 19 decanted: (Y/N) N Date Received: 06/11/97

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 06/21/97

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.1	U
72-55-9	4,4'-DDE	4.1	U
72-20-8	Endrin	4.1	U
33213-65-9	Endosulfan II	4.1	U
72-54-8	4,4'-DDD	4.1	U
1031-07-8	Endosulfan sulfate	4.1	U
50-29-3	4,4'-DDT	4.1	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.1	U
7421-93-4	Endrin aldehyde	4.1	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	83	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

11-1824

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR319_

Matrix (soil/water): SOIL_ Lab Sample ID: CA3FN

Level (low/med): LOW__ Date Received: 06/11/97

% Solids: _80.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3700		*	P
7440-36-0	Antimony	0.35	U		P
7440-38-2	Arsenic	1.3	B		P
7440-39-3	Barium	7.2	B		P
7440-41-7	Beryllium	0.12	B		P
7440-43-9	Cadmium	0.42	B		P
7440-70-2	Calcium	922	B		P
7440-47-3	Chromium	50.9			P
7440-48-4	Cobalt	0.67	B		P
7440-50-8	Copper	7.4		*	P
7439-89-6	Iron	3380			P
7439-92-1	Lead	4.9		E*	P
7439-95-4	Magnesium	374	B		P
7439-96-5	Manganese	25.7		*	P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	6.7	B		P
7440-09-7	Potassium	149	B		P
7782-49-2	Selenium	0.64	U		P
7440-22-4	Silver	0.74	U		P
7440-23-5	Sodium	312	B		P
7440-28-0	Thallium	0.92	U		P
7440-62-2	Vanadium	10.2	B		P
7440-66-6	Zinc	15.4		E	P

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:

NP-SD11-1824

C7F11013306

STONES

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID: C7F110133 003

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FK102
Dilution factor: 1
Moisture %: 21

Date Received: 06/11/97
Date Extracted: 06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD12-1218

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
83-32-9	Acenaphthene	420	U
208-96-8	Acenaphthylene	420	U
120-12-7	Anthracene	420	U
56-55-3	Benzo(a)anthracene	420	U
205-99-2	Benzo(b)fluoranthene	420	U
207-08-9	Benzo(k)fluoranthene	420	U
191-24-2	Benzo(ghi)perylene	420	U
50-32-8	Benzo(a)pyrene	420	U
111-91-1	bis(2-Chloroethoxy)methane	420	U
111-44-4	bis(2-Chloroethyl) ether	420	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	420	U
117-81-7	**bis(2-Ethylhexyl) phthalate**	**110**	**J**
101-55-3	4-Bromophenyl phenyl ether	420	U
85-68-7	Butyl benzyl phthalate	420	U
106-47-8	4-Chloroaniline	420	U
59-50-7	4-Chloro-3-methylphenol	420	U
91-58-7	2-Chloronaphthalene	420	U
95-57-8	2-Chlorophenol	420	U
7005-72-3	4-Chlorophenyl phenyl ether	420	U
218-01-9	Chrysene	420	U
53-70-3	Dibenz(a,h)anthracene	420	U
132-64-9	Dibenzofuran	420	U
84-74-2	Di-n-butyl phthalate	420	U
95-50-1	1,2-Dichlorobenzene	420	U
541-73-1	1,3-Dichlorobenzene	420	U
106-46-7	1,4-Dichlorobenzene	420	U
91-94-1	3,3'-Dichlorobenzidine	420	U
120-83-2	2,4-Dichlorophenol	420	U
84-66-2	Diethyl phthalate	420	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID:C7F110133 003

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FK102
Dilution factor: 1
Moisture %:21

Date Received: 06/11/97
Date Extracted:06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD12-1218

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
105-67-9	2,4-Dimethylphenol	420	U
131-11-3	Dimethyl phthalate	420	U
117-84-0	Di-n-octyl phthalate	420	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
51-28-5	2,4-Dinitrophenol	1000	U
121-14-2	2,4-Dinitrotoluene	420	U
606-20-2	2,6-Dinitrotoluene	420	U
206-44-0	Fluoranthene	420	U
86-73-7	Fluorene	420	U
118-74-1	Hexachlorobenzene	420	U
87-68-3	Hexachlorobutadiene	420	U
77-47-4	Hexachlorocyclopentadiene	420	U
67-72-1	Hexachloroethane	420	U
193-39-5	Indeno(1,2,3-cd)pyrene	420	U
78-59-1	Isophorone	420	U
91-57-6	2-Methylnaphthalene	420	U
95-48-7	2-Methylphenol	420	U
106-44-5	4-Methylphenol	420	U
91-20-3	Naphthalene	420	U
88-74-4	2-Nitroaniline	1000	U
99-09-2	3-Nitroaniline	1000	U
100-01-6	4-Nitroaniline	1000	U
98-95-3	Nitrobenzene	420	U
88-75-5	2-Nitrophenol	420	U
100-02-7	4-Nitrophenol	1000	U
621-64-7	N-Nitrosodi-n-propylamine	420	U
86-30-6	N-Nitrosodiphenylamine	420	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	420	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID: C7F110133 003

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g

Date Received: 06/11/97

Work Order: CA3FK102

Date Extracted: 06/17/97

Dilution factor: 1

Date Analyzed: 07/03/97

Moisture %: 21

QC Batch: 7168161

Client Sample Id: NP-SD12-1218

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
108-95-2	Phenol	420	U
129-00-0	Pyrene	420	U
120-82-1	1,2,4-Trichlorobenzene	420	U
95-95-4	2,4,5-Trichlorophenol	1000	U
88-06-2	2,4,6-Trichlorophenol	420	U
86-74-8	Carbazole	420	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 003
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FK102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:21

QC Batch: 7168161

Client Sample Id: NP-SD12-1218

(ug/L or ug/kg) ug/kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN ALDOL CONDENSATION	3.3121	1400	JA
	UNKNOWN	3.6931	130	J
	UNKNOWN	3.8543	1400	J
	UNKNOWN KETONE	4.0008	180	JB
	UNKNOWN	4.4624	400	JB
	UNKNOWN	4.7261	150	JB
	UNKNOWN	4.9239	87	J
57-10-3	Hexadecanoic acid	11.876	130	JN
	UNKNOWN	15.869	190	J
	UNKNOWN BRANCHED ALKANE	18.177	190	J
	UNKNOWN BRANCHED ALKANE	19.276	110	J
	UNKNOWN	19.408	88	J
	UNKNOWN	20.096	110	J
	UNKNOWN	20.704	86	J
	UNKNOWN	20.939	84	J
	UNKNOWN	21.085	120	J
	UNKNOWN	21.261	89	J
	UNKNOWN	21.899	210	J

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPSD121218

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR319

Matrix: (soil/water) SOIL Lab Sample ID: C7F110133003

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 20 decanted: (Y/N) N Date Received: 06/11/97

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 06/21/97

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.1	U
72-55-9	4,4'-DDE	4.1	U
72-20-8	Endrin	4.1	U
33213-65-9	Endosulfan II	4.1	U
72-54-8	4,4'-DDD	4.1	U
1031-07-8	Endosulfan sulfate	4.1	U
50-29-3	4,4'-DDT	4.1	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.1	U
7421-93-4	Endrin aldehyde	4.1	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	84	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

12-1218

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR319_

Matrix (soil/water): SOIL_ Lab Sample ID: CA3FK

Level (low/med): LOW__ Date Received: 06/11/97

% Solids: _79.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	3230		*	P
7440-36-0	Antimony_	0.35	U		P
7440-38-2	Arsenic__	0.89	B		P
7440-39-3	Barium___	5.8	B		P
7440-41-7	Beryllium	0.08	B		P
7440-43-9	Cadmium__	0.08	U		P
7440-70-2	Calcium__	229	B		P
7440-47-3	Chromium_	5.3			P
7440-48-4	Cobalt___	0.96	B		P
7440-50-8	Copper___	3.2	B	*	P
7439-89-6	Iron_____	3240			P
7439-92-1	Lead_____	3.0		E*	P
7439-95-4	Magnesium	312	B		P
7439-96-5	Manganese	30.0		*	P
7439-97-6	Mercury__	0.13	U		CV
7440-02-0	Nickel___	15.8			P
7440-09-7	Potassium	159	B		P
7782-49-2	Selenium_	0.65	U		P
7440-22-4	Silver___	0.75	U		P
7440-23-5	Sodium___	36.1	B		P
7440-28-0	Thallium_	0.93	U		P
7440-62-2	Vanadium_	7.2	B		P
7440-66-6	Zinc_____	8.7		E	P

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:
NP-SD12-1218
C7F110133003
STONES

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID: C7F110133 004

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FL102
Dilution factor: 1
Moisture %: 20

Date Received: 06/11/97
Date Extracted: 06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD12-1824

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
83-32-9	Acenaphthene	410	U
208-96-8	Acenaphthylene	410	U
120-12-7	Anthracene	410	U
56-55-3	Benzo(a)anthracene	410	U
205-99-2	Benzo(b)fluoranthene	410	U
207-08-9	Benzo(k)fluoranthene	410	U
191-24-2	Benzo(ghi)perylene	410	U
50-32-8	Benzo(a)pyrene	410	U
111-91-1	bis(2-Chloroethoxy)methane	410	U
111-44-4	bis(2-Chloroethyl) ether	410	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	410	U
117-81-7	**bis(2-Ethylhexyl) phthalate**	**81**	**J**
101-55-3	4-Bromophenyl phenyl ether	410	U
85-68-7	Butyl benzyl phthalate	410	U
106-47-8	4-Chloroaniline	410	U
59-50-7	4-Chloro-3-methylphenol	410	U
91-58-7	2-Chloronaphthalene	410	U
95-57-8	2-Chlorophenol	410	U
7005-72-3	4-Chlorophenyl phenyl ether	410	U
218-01-9	Chrysene	410	U
53-70-3	Dibenz(a,h)anthracene	410	U
132-64-9	Dibenzofuran	410	U
84-74-2	Di-n-butyl phthalate	410	U
95-50-1	1,2-Dichlorobenzene	410	U
541-73-1	1,3-Dichlorobenzene	410	U
106-46-7	1,4-Dichlorobenzene	410	U
91-94-1	3,3'-Dichlorobenzidine	410	U
120-83-2	2,4-Dichlorophenol	410	U
84-66-2	Diethyl phthalate	410	U

FORM I

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 004
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FL102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:20

QC Batch: 7168161

Client Sample Id: NP-SD12-1824

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
105-67-9	2,4-Dimethylphenol	410	U
131-11-3	Dimethyl phthalate	410	U
117-84-0	Di-n-octyl phthalate	410	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
51-28-5	2,4-Dinitrophenol	1000	U
121-14-2	2,4-Dinitrotoluene	410	U
606-20-2	2,6-Dinitrotoluene	410	U
206-44-0	Fluoranthene	410	U
86-73-7	Fluorene	410	U
118-74-1	Hexachlorobenzene	410	U
87-68-3	Hexachlorobutadiene	410	U
77-47-4	Hexachlorocyclopentadiene	410	U
67-72-1	Hexachloroethane	410	U
193-39-5	Indeno(1,2,3-cd)pyrene	410	U
78-59-1	Isophorone	410	U
91-57-6	2-Methylnaphthalene	410	U
95-48-7	2-Methylphenol	410	U
106-44-5	4-Methylphenol	410	U
91-20-3	Naphthalene	410	U
88-74-4	2-Nitroaniline	1000	U
99-09-2	3-Nitroaniline	1000	U
100-01-6	4-Nitroaniline	1000	U
98-95-3	Nitrobenzene	410	U
88-75-5	2-Nitrophenol	410	U
100-02-7	4-Nitrophenol	1000	U
621-64-7	N-Nitrosodi-n-propylamine	410	U
86-30-6	N-Nitrosodiphenylamine	410	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	410	U

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID:C7F110133 004

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FL102
Dilution factor: 1
Moisture %:20

Date Received: 06/11/97
Date Extracted:06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD12-1824

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
108-95-2	Phenol	410	U
129-00-0	Pyrene	410	U
120-82-1	1,2,4-Trichlorobenzene	410	U
95-95-4	2,4,5-Trichlorophenol	1000	U
88-06-2	2,4,6-Trichlorophenol	410	U
86-74-8	Carbazole	410	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 004
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FL102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:20

QC Batch: 7168161

Client Sample Id: NP-SD12-1824

(ug/L or ug/kg) ug/kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN ALDOL CONDENSATION	3.3482	1700	JA
	UNKNOWN	3.7145	180	J
	UNKNOWN	3.8757	1700	J
	UNKNOWN KETONE	4.0149	190	JB
	UNKNOWN	4.4618	400	JB
	UNKNOWN	4.7329	150	JB
	UNKNOWN	4.9233	90	J
	UNKNOWN	5.0625	94	J
	UNKNOWN	6.0369	92	J
	UNKNOWN	15.868	210	J
	UNKNOWN	16.623	130	J
	UNKNOWN	17.847	91	J
	UNKNOWN BRANCHED ALKANE	19.275	98	J
	UNKNOWN	22.719	91	J

FORM I - TIC

B 1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPSD121824

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR319

Matrix: (soil/water) SOIL Lab Sample ID: C7F110133004

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 20 decanted: (Y/N) N Date Received: 06/11/97

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 06/21/97

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/30/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.1	U
72-55-9	4,4'-DDE	4.1	U
72-20-8	Endrin	4.1	U
33213-65-9	Endosulfan II	4.1	U
72-54-8	4,4'-DDD	4.1	U
1031-07-8	Endosulfan sulfate	4.1	U
50-29-3	4,4'-DDT	4.1	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.1	U
7421-93-4	Endrin aldehyde	4.1	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	84	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

12-1824

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR319_

Matrix (soil/water): SOIL_ Lab Sample ID: CA3FL

Level (low/med): LOW__ Date Received: 06/11/97

% Solids: _80.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4440		*	P
7440-36-0	Antimony	0.35	U		P
7440-38-2	Arsenic	1.3	B		P
7440-39-3	Barium	8.1	B		P
7440-41-7	Beryllium	0.12	B		P
7440-43-9	Cadmium	0.08	U		P
7440-70-2	Calcium	331	B		P
7440-47-3	Chromium	6.4			P
7440-48-4	Cobalt	1.1	B		P
7440-50-8	Copper	2.9	B	*	P
7439-89-6	Iron	4170			P
7439-92-1	Lead	3.4		E*	P
7439-95-4	Magnesium	374	B		P
7439-96-5	Manganese	29.8		*	P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	2.4	U		P
7440-09-7	Potassium	118	B		P
7782-49-2	Selenium	0.65	U		P
7440-22-4	Silver	0.75	U		P
7440-23-5	Sodium	36.7	B		P
7440-28-0	Thallium	0.92	U		P
7440-62-2	Vanadium	8.8	B		P
7440-66-6	Zinc	8.1		E	P

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:

NP-SD12-1218

C7F110133004

STONES

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 001
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FH102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:23

QC Batch: 7168161

Client Sample Id: NP-SD13-1218

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
83-32-9	Acenaphthene	430	U
208-96-8	Acenaphthylene	430	U
120-12-7	Anthracene	430	U
56-55-3	Benzo(a)anthracene	430	U
205-99-2	**Benzo(b)fluoranthene**	**59**	**J**
207-08-9	**Benzo(k)fluoranthene**	**50**	**J**
191-24-2	Benzo(ghi)perylene	430	U
50-32-8	Benzo(a)pyrene	430	U
111-91-1	bis(2-Chloroethoxy)methane	430	U
111-44-4	bis(2-Chloroethyl) ether	430	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	430	U
117-81-7	**bis(2-Ethylhexyl) phthalate**	**120**	**J**
101-55-3	4-Bromophenyl phenyl ether	430	U
85-68-7	**Butyl benzyl phthalate**	**64**	**J**
106-47-8	4-Chloroaniline	430	U
59-50-7	4-Chloro-3-methylphenol	430	U
91-58-7	2-Chloronaphthalene	430	U
95-57-8	2-Chlorophenol	430	U
7005-72-3	4-Chlorophenyl phenyl ether	430	U
218-01-9	**Chrysene**	**61**	**J**
53-70-3	Dibenz(a,h)anthracene	430	U
132-64-9	Dibenzofuran	430	U
84-74-2	Di-n-butyl phthalate	430	U
95-50-1	1,2-Dichlorobenzene	430	U
541-73-1	1,3-Dichlorobenzene	430	U
106-46-7	1,4-Dichlorobenzene	430	U
91-94-1	3,3'-Dichlorobenzidine	430	U
120-83-2	2,4-Dichlorophenol	430	U
84-66-2	Diethyl phthalate	430	U

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 001
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FH102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:23

QC Batch: 7168161

Client Sample Id: NP-SD13-1218

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
105-67-9	2,4-Dimethylphenol	430	U
131-11-3	Dimethyl phthalate	430	U
117-84-0	Di-n-octyl phthalate	430	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
51-28-5	2,4-Dinitrophenol	1100	U
121-14-2	2,4-Dinitrotoluene	430	U
606-20-2	2,6-Dinitrotoluene	430	U
206-44-0	**Fluoranthene**	**62**	**J**
86-73-7	Fluorene	430	U
118-74-1	Hexachlorobenzene	430	U
87-68-3	Hexachlorobutadiene	430	U
77-47-4	Hexachlorocyclopentadiene	430	U
67-72-1	Hexachloroethane	430	U
193-39-5	Indeno(1,2,3-cd)pyrene	430	U
78-59-1	Isophorone	430	U
91-57-6	2-Methylnaphthalene	430	U
95-48-7	2-Methylphenol	430	U
106-44-5	4-Methylphenol	430	U
91-20-3	Naphthalene	430	U
88-74-4	2-Nitroaniline	1100	U
99-09-2	3-Nitroaniline	1100	U
100-01-6	4-Nitroaniline	1100	U
98-95-3	Nitrobenzene	430	U
88-75-5	2-Nitrophenol	430	U
100-02-7	4-Nitrophenol	1100	U
621-64-7	N-Nitrosodi-n-propylamine	430	U
86-30-6	N-Nitrosodiphenylamine	430	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	430	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR319

Lab Sample ID: C7F110133 001

Matrix: (soil/water) SOLID
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FH102
Dilution factor: 1
Moisture %: 23

Date Received: 06/11/97
Date Extracted: 06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD13-1218

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
108-95-2	Phenol	430	U
129-00-0	Pyrene	64	J
120-82-1	1,2,4-Trichlorobenzene	430	U
95-95-4	2,4,5-Trichlorophenol	1100	U
88-06-2	2,4,6-Trichlorophenol	430	U
86-74-8	Carbazole	430	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 001
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FH102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:23

QC Batch: 7168161

Client Sample Id: NP-SD13-1218

(ug/L or ug/kg) ug/kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN ALDOL CONDENSATION	3.362	1400	JA
	UNKNOWN	3.8675	100	J
	UNKNOWN KETONE	4.014	220	JB
	UNKNOWN	4.4609	270	JB
	UNKNOWN	4.6221	140	JB
	UNKNOWN	4.7247	110	J
	UNKNOWN	4.9225	110	J
	UNKNOWN	5.0544	140	J
57-10-3	Hexadecanoic acid	11.882	160	JN
	UNKNOWN BRANCHED ALKANE	15.926	91	J
	UNKNOWN	15.977	92	J
	UNKNOWN	19.414	110	J
	UNKNOWN	20.937	110	J
	UNKNOWN	21.267	87	J
	UNKNOWN	21.37	130	J
	UNKNOWN	21.897	190	J
	UNKNOWN	22.718	350	J

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPSD131218

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR319

Matrix: (soil/water) SOIL Lab Sample ID: C7F110133001

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 23 decanted: (Y/N) N Date Received: 06/11/97

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 06/21/97

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/29/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	2.2	U
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.3	U
72-55-9	4,4'-DDE	4.3	U
72-20-8	Endrin	11	
33213-65-9	Endosulfan II	4.3	U
72-54-8	4,4'-DDD	4.3	U
1031-07-8	Endosulfan sulfate	4.3	U
50-29-3	4,4'-DDT	4.3	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.3	U
7421-93-4	Endrin aldehyde	6.0	
5103-71-9	alpha-Chlordane	2.5	
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor-1016	43	U
11104-28-2	Aroclor-1221	87	U
11141-16-5	Aroclor-1232	43	U
53469-21-9	Aroclor-1242	43	U
12672-29-6	Aroclor-1248	87	
11097-69-1	Aroclor-1254	43	U
11096-82-5	Aroclor-1260	130	

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

13-1218

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR319_

Matrix (soil/water): SOIL_ Lab Sample ID: CA3FH

Level (low/med): LOW__ Date Received: 06/11/97

% Solids: _77.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2470		*	P
7440-36-0	Antimony	0.45	B		P
7440-38-2	Arsenic	2.0	B		P
7440-39-3	Barium	20.4	B		P
7440-41-7	Beryllium	0.13	B		P
7440-43-9	Cadmium	0.49	B		P
7440-70-2	Calcium	314	B		P
7440-47-3	Chromium	29.0			P
7440-48-4	Cobalt	0.75	B		P
7440-50-8	Copper	25.3		*	P
7439-89-6	Iron	2570			P
7439-92-1	Lead	11.7		E*	P
7439-95-4	Magnesium	313	B		P
7439-96-5	Manganese	12.0		*	P
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	12.2			P
7440-09-7	Potassium	146	B		P
7782-49-2	Selenium	0.67	U		P
7440-22-4	Silver	1.1	B		P
7440-23-5	Sodium	41.8	B		P
7440-28-0	Thallium	0.96	U		P
7440-62-2	Vanadium	6.6	B		P
7440-66-6	Zinc	29.7		E	P

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:

NP-SD13-1218

C7F110133001

STONES

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID:C7F110133 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FJ102
Dilution factor: 1
Moisture %:26

Date Received: 06/11/97
Date Extracted:06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD13-1824

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
83-32-9	Acenaphthene	450	U
208-96-8	Acenaphthylene	450	U
120-12-7	Anthracene	450	U
56-55-3	Benzo(a)anthracene	450	U
205-99-2	**Benzo(b)fluoranthene**	**55**	**J**
207-08-9	Benzo(k)fluoranthene	450	U
191-24-2	Benzo(ghi)perylene	450	U
50-32-8	Benzo(a)pyrene	450	U
111-91-1	bis(2-Chloroethoxy)methane	450	U
111-44-4	bis(2-Chloroethyl) ether	450	U
108-60-1	2,2'-Oxybis(1-Chloropropane)	450	U
117-81-7	**bis(2-Ethylhexyl) phthalate**	**120**	**J**
101-55-3	4-Bromophenyl phenyl ether	450	U
85-68-7	Butyl benzyl phthalate	450	U
106-47-8	4-Chloroaniline	450	U
59-50-7	4-Chloro-3-methylphenol	450	U
91-58-7	2-Chloronaphthalene	450	U
95-57-8	2-Chlorophenol	450	U
7005-72-3	4-Chlorophenyl phenyl ether	450	U
218-01-9	**Chrysene**	**51**	**J**
53-70-3	Dibenz(a,h)anthracene	450	U
132-64-9	Dibenzofuran	450	U
84-74-2	Di-n-butyl phthalate	450	U
95-50-1	1,2-Dichlorobenzene	450	U
541-73-1	1,3-Dichlorobenzene	450	U
106-46-7	1,4-Dichlorobenzene	450	U
91-94-1	3,3'-Dichlorobenzidine	450	U
120-83-2	2,4-Dichlorophenol	450	U
84-66-2	Diethyl phthalate	450	U

FORM I

BROWN & ROOT ENVIRONMENTAL

Lab Name:QUANTERRA SDG Number: BR319

Matrix: (soil/water) SOLID Lab Sample ID:C7F110133 002
Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g Date Received: 06/11/97
Work Order: CA3FJ102 Date Extracted:06/17/97
Dilution factor: 1 Date Analyzed: 07/03/97
Moisture %:26

QC Batch: 7168161

Client Sample Id: NP-SD13-1824

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
105-67-9	2,4-Dimethylphenol	450	U
131-11-3	Dimethyl phthalate	450	U
117-84-0	Di-n-octyl phthalate	450	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
51-28-5	2,4-Dinitrophenol	1100	U
121-14-2	2,4-Dinitrotoluene	450	U
606-20-2	2,6-Dinitrotoluene	450	U
206-44-0	Fluoranthene	450	U
86-73-7	Fluorene	450	U
118-74-1	Hexachlorobenzene	450	U
87-68-3	Hexachlorobutadiene	450	U
77-47-4	Hexachlorocyclopentadiene	450	U
67-72-1	Hexachloroethane	450	U
193-39-5	Indeno(1,2,3-cd)pyrene	450	U
78-59-1	Isophorone	450	U
91-57-6	2-Methylnaphthalene	450	U
95-48-7	2-Methylphenol	450	U
106-44-5	4-Methylphenol	450	U
91-20-3	Naphthalene	450	U
88-74-4	2-Nitroaniline	1100	U
99-09-2	3-Nitroaniline	1100	U
100-01-6	4-Nitroaniline	1100	U
98-95-3	Nitrobenzene	450	U
88-75-5	2-Nitrophenol	450	U
100-02-7	4-Nitrophenol	1100	U
621-64-7	N-Nitrosodi-n-propylamine	450	U
86-30-6	N-Nitrosodiphenylamine	450	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	450	U

BROWN & ROOT ENVIRONMENTAL

Lab Name: QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID: C7F110133 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FJ102
Dilution factor: 1
Moisture %: 26

Date Received: 06/11/97
Date Extracted: 06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD13-1824

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) ug/kg	Q
108-95-2	Phenol	450	U
129-00-0	**Pyrene**	**48**	**J**
120-82-1	1,2,4-Trichlorobenzene	450	U
95-95-4	2,4,5-Trichlorophenol	1100	U
88-06-2	2,4,6-Trichlorophenol	450	U
86-74-8	Carbazole	450	U

FORM I

BROWN & ROOT ENVIRONMENTAL
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:QUANTERRA

SDG Number: BR319

Matrix: (soil/water) SOLID

Lab Sample ID:C7F110133 002

Method: OCLP OLM03.1
Base/Neutrals and Acids (CLP-OLM03.1)

Sample WT/Vol: 30 / g
Work Order: CA3FJ102
Dilution factor: 1
Moisture %:26

Date Received: 06/11/97
Date Extracted:06/17/97
Date Analyzed: 07/03/97

QC Batch: 7168161

Client Sample Id: NP-SD13-1824

(ug/L or ug/kg) ug/kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	UNKNOWN ALDOL CONDENSATION	3.3549	1600	JA
	UNKNOWN	3.8604	230	J
	UNKNOWN KETONE	4.0143	260	JB
	UNKNOWN	4.4611	360	JB
	UNKNOWN	4.7249	110	JB
	UNKNOWN	4.9227	120	J
	UNKNOWN	5.0546	110	J
57-10-3	Hexadecanoic acid	11.875	130	JN
	UNKNOWN	12.168	110	J
	UNKNOWN	18.176	99	J
	UNKNOWN	19.414	150	J
	UNKNOWN	20.916	99	J
	UNKNOWN	21.055	180	J
	UNKNOWN	21.275	130	J
	UNKNOWN	21.385	450	J
	UNKNOWN	21.787	290	J
	UNKNOWN	21.905	520	J
	UNKNOWN	22.725	320	J

FORM I - TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NPSD131824

Lab Name: QUANTERRA PITT Contract:

Lab Code: QPITT Case No.: NWIRP SAS No.: SDG No.: BR319

Matrix: (soil/water) SOIL Lab Sample ID: C7F110133002

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 26 decanted: (Y/N) N Date Received: 06/11/97

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 06/21/97

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/29/97

Injection Volume: 1.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.3	U
319-85-7	beta-BHC	2.3	U
319-86-8	delta-BHC	2.3	U
58-89-9	gamma-BHC (Lindane)	2.3	U
76-44-8	Heptachlor	2.3	U
309-00-2	Aldrin	2.3	U
1024-57-3	Heptachlor epoxide	2.3	U
959-98-8	Endosulfan I	2.3	U
60-57-1	Dieldrin	4.5	U
72-55-9	4,4'-DDE	4.5	U
72-20-8	Endrin	4.5	P
33213-65-9	Endosulfan II	4.5	U
72-54-8	4,4'-DDD	4.5	U
1031-07-8	Endosulfan sulfate	4.5	U
50-29-3	4,4'-DDT	4.5	U
72-43-5	Methoxychlor	23	U
53494-70-5	Endrin ketone	4.5	U
7421-93-4	Endrin aldehyde	4.5	U
5103-71-9	alpha-Chlordane	2.3	U
5103-74-2	gamma-Chlordane	2.3	U
8001-35-2	Toxaphene	230	U
12674-11-2	Aroclor-1016	45	U
11104-28-2	Aroclor-1221	91	U
11141-16-5	Aroclor-1232	45	U
53469-21-9	Aroclor-1242	45	U
12672-29-6	Aroclor-1248	76	P
11097-69-1	Aroclor-1254	45	U
11096-82-5	Aroclor-1260	45	U

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

13-1824

Lab Name: QUANTERRA_PITTSBURGH_____ Contract: BROWN&ROOT

Lab Code: QESPA_ Case No.: 37524_ SAS No.: _____ SDG No.: BR319_

Matrix (soil/water): SOIL_ Lab Sample ID: CA3FJ

Level (low/med): LOW__ Date Received: 06/11/97

% Solids: _73.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1770		*	P
7440-36-0	Antimony	0.38	U		P
7440-38-2	Arsenic	1.0	B		P
7440-39-3	Barium	10.3	B		P
7440-41-7	Beryllium	0.08	B		P
7440-43-9	Cadmium	0.32	B		P
7440-70-2	Calcium	465	B		P
7440-47-3	Chromium	47.8			P
7440-48-4	Cobalt	0.60	U		P
7440-50-8	Copper	14.6		*	P
7439-89-6	Iron	1710			P
7439-92-1	Lead	8.5		E*	P
7439-95-4	Magnesium	166	B		P
7439-96-5	Manganese	9.1		*	P
7439-97-6	Mercury	0.14	U		CV
7440-02-0	Nickel	5.7	B		P
7440-09-7	Potassium	111	B		P
7782-49-2	Selenium	0.70	U		P
7440-22-4	Silver	1.1	B		P
7440-23-5	Sodium	53.7	B		P
7440-28-0	Thallium	1.0	U		P
7440-62-2	Vanadium	4.2	B		P
7440-66-6	Zinc	21.4		E	P

Color Before: BROWN____ Clarity Before: _____ Texture: COARSE

Color After: BROWN____ Clarity After: _____ Artifacts: YES___

Comments:

NP-SD13-1824

C7F110133002

STONES

APPENDIX B

TEST PIT LOG SHEETS

TEST PIT LOG — BROWN & ROOT ENVIRONMENTAL

PROJECT: CTO 270 - NWIRP Calverton — TEST PIT NO.: 01

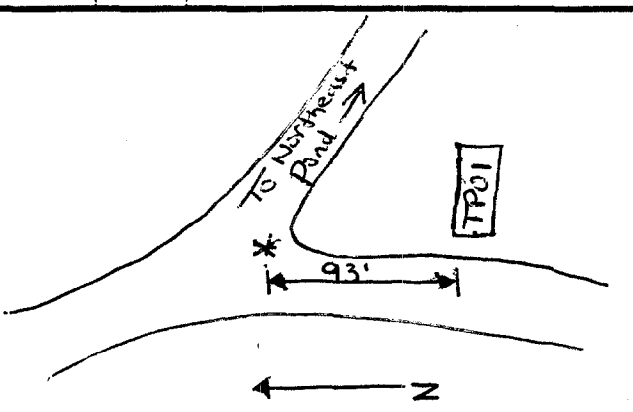
PROJECT NO.: 7398-0310 — DATE: 5/6/97

LOCATION: Site 1 : Northeast Pond

FIELD GEOLOGIST: S. Patselas

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Loose - yellow brown silty sand with well-rounded pebbles	SM	
1.5'				
		Light brown to tan sand with some clay lenses at 4.0' and well-rounded pebbles		
5.0'				
		Loose gray/white beach sand of fine-particle size		
8.0'				
		No evidence of fill material		

Test Pit Cross Section and / or Plan View



4'w x 18' L x 8'd

REMARKS: No stained soil or objects observed. No PID readings measured in soil pile. Test pit filled in with excavated soil and graded. No samples taken. West end of TP01 about 4' from road.

PHOTO LOG

TEST PIT 01

PAGE ____ OF

TEST PIT LOG

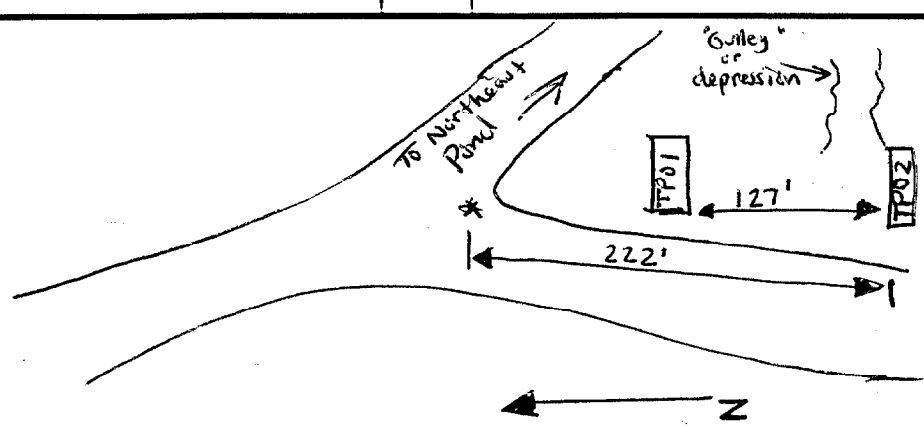
Brown & Root Environmental

PROJECT: CTO 270 - NWIRP Calverton TEST PIT NO.: 02
PROJECT NO.: 7398-0310 DATE: 5/6/97
LOCATION: Site 1 : Northeast Pond
FIELD GEOLOGIST: S. Patselus

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		Loose - orange brown silty	SM	
		sand w/ well-rounded pebbles		
1.5'				
		Loose brown-gray sand		
		w/ well-rounded pebbles		
		Orange-brown-white marble layer at 4.0'		
5.0'				
		Loose gray/white beach		
		sand of fine-particle size		
8.0'				
		No evidence of fill material		

Test Pit Cross Section and / or Plan View

Refer to TP01 cross-section



2'-3.5'w x 18'l x 8'd

REMARKS No stained soil or objects observed. No PID readings measured in soil pile. Test pit filled in with excavated soil and graded. No samples taken. West end of TP02 about 6' from road.

PHOTO LOG

TEST PIT 02

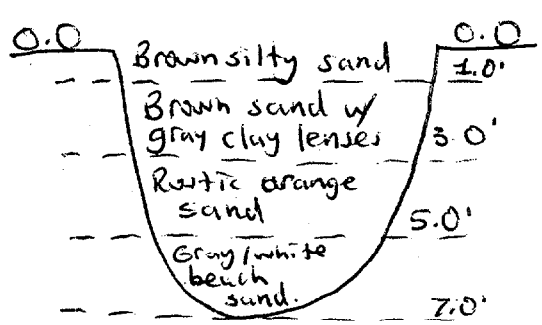
PAGE ____ OF

TEST PIT LOG — **Brown & Root Environmental**

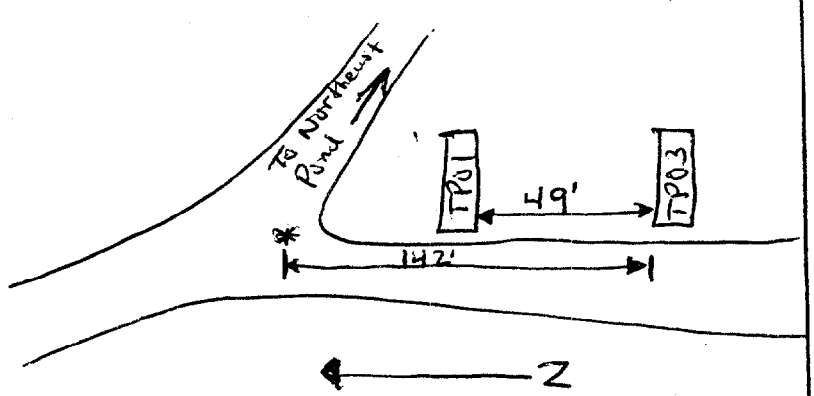
PROJECT: CTO 270 - NWIRP Calverton — TEST PIT NO.: 03
PROJECT NO.: 7398-0310 — DATE: 5/6/97
LOCATION: Site 1 : Northeast Pond
FIELD GEOLOGIST: S. Patselas

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Loose brown silty sand	SM	
		w/ well-rounded pebbles		
1.0'				
		Brown sand w/ gray clay		
		lenses and well-rounded		
		pebbles		
3.0				
		Rustic orange sand w/		
		well-rounded pebbles		
5.0'				
		Loose gray/white beach		
		sand of fine particle size		
7.0'				
		No evidence of fill material		

Test Pit Cross Section and / or Plan View



2'-4' w x 18' l x 8' d



REMARKS: No stained soil or objects observed. No PID readings measured in soil pile. Test pit filled in with excavated soil and graded. No samples taken. West end of TP03 about 4' from road.

PHOTO LOG

TEST PIT 03

PAGE ____ OF ____

TEST PIT LOG

Brown & Root Environmental

PROJECT: CTO 270 - NWIRP Calverton TEST PIT NO.: 04

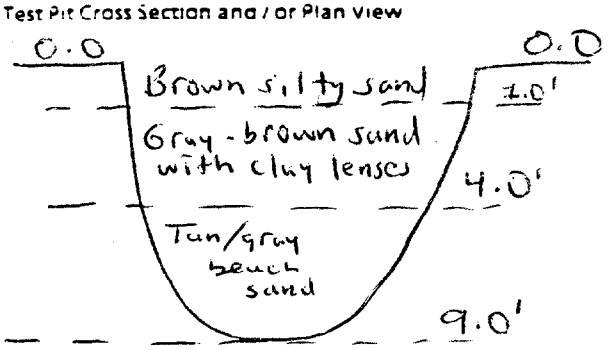
PROJECT NO.: 7398-0310 DATE: 5/6/97

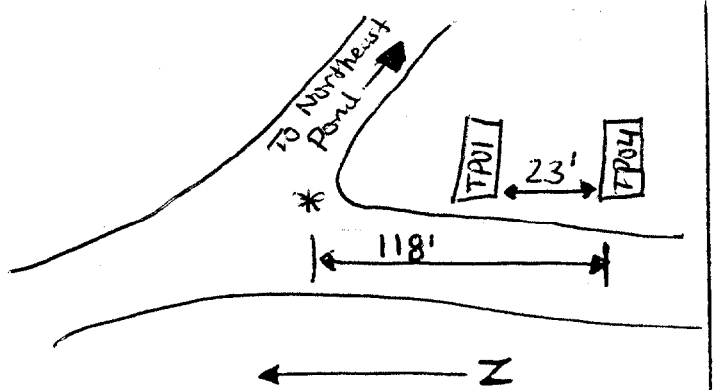
LOCATION: Site 1 : Northeast Pond

FIELD GEOLOGIST: S. Patselas

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Loose brown silty sand	SM	
		w/ well rounded pebbles		
1.0'				
		Gray-brown sand w/ clay		
		lenses and well rounded		
		pebbles		
4.0'				
		Loose tan/gray beach		
		sand of fine particle size		
9.0'				
		No evidence of fill material		

Test Pit Cross Section and / or Plan View





2'-5'w x 18'l x 9'd

REMARKS No stained soil or objects observed. No PID readings measured in soil pile. Test pit filled in with excavated soil and graded. No samples taken. West end of TP04 about 4' from road.

PHOTO LOG

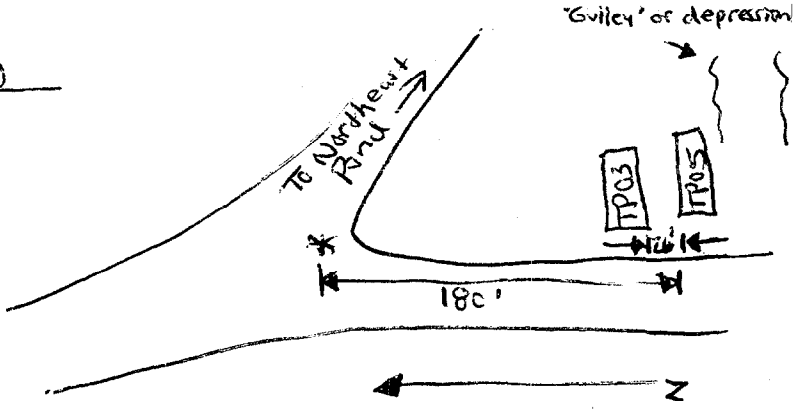
TEST PIT 04

PAGE ____ OF

PROJECT: CTO 270 - NWIRP Calverton TEST PIT NO.: 05
PROJECT NO. 7398-0310 DATE: 5/6/97
LOCATION: Site 1 : Northeast Pond
FIELD GEOLOGIST: S. Patselus

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Loose light brown silty sand	SM	
		w/ well rounded pebbles		
1.5'				
		Gray sand w/ well rounded		
		pebbles		
5.0'				
		Streaks of orange colored		
		sand		
6.5'				
		Loose gray/tan beach		
		sand of fine particle size		
12.0'				
		No evidence of fill material		

Test Pit Cross Section and / or Plan View



2'-4' w x 21' l x 12' d

REMARKS No stained soil or objects observed. No PID readings measured in soil pile. Test pit filled in with excavated soil and graded. No samples taken. west end of TP05 is about 6' from road.

PHOTO LOG

TEST PIT 05

PAGE OF

PROJECT: CTO 270 - NWIRP Calverton TEST PIT NO.: 06

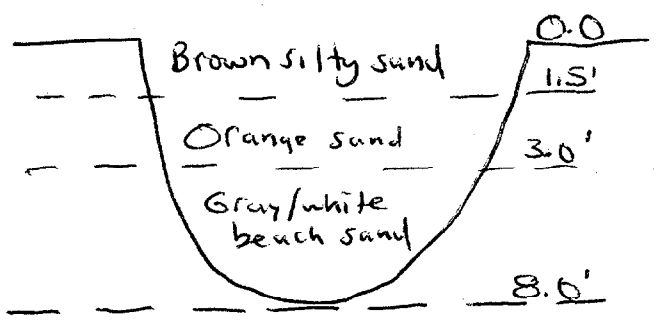
PROJECT NO. 7398-0310 DATE: 5/6/97

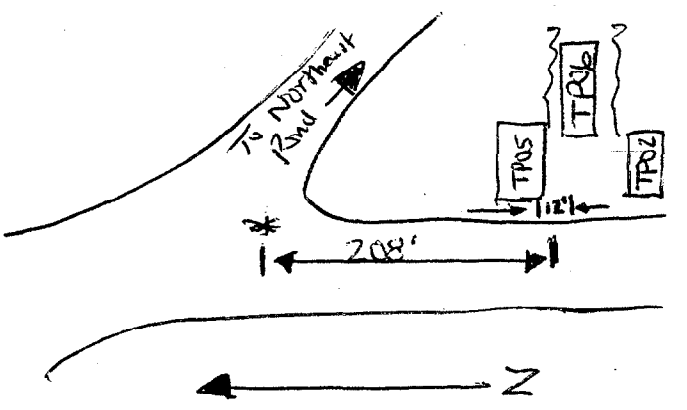
LOCATION: Site 1 : Northeast Pond

FIELD GEOLOGIST: S. Patselus

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Loose brown silty sand	Sm	
		w/ well rounded pebbles		
1.5'				
		Orange colored sand		
3.0'				
		Gray/white beach sand of		
		fine particle size		
8.0'				
		No evidence of fill material		

Test Pit Cross Section and / or Plan View





3'w x 12'l x 8'd

REMARKS No stained soil or objects observed. No PID readings measured in soil pile. Test pit filled in with excavated soil and graded. No samples taken. West end of TP06 is about 45' from road.

PHOTO LOG

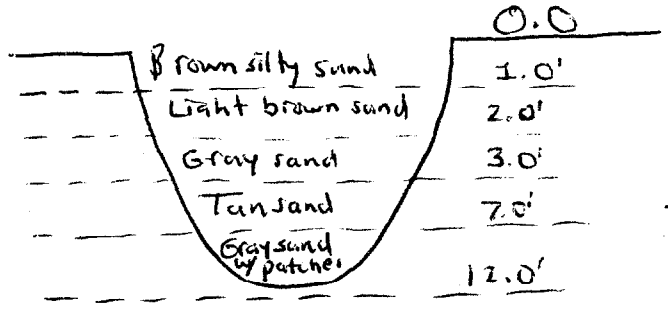
TEST PIT 06

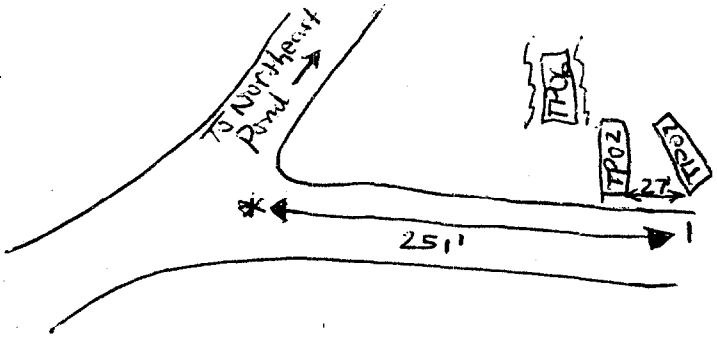
PAGE ____ OF

PROJECT: CTO 270 - NWIRP Calverton TEST PIT NO.: 07
PROJECT NO. 7398-0310 DATE: 5/6/97
LOCATION: Site 1 : Northeast Pond
FIELD GEOLOGIST: S. Patselus

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Loose brown silty sand w/ well	SM	
		rounded pebbles and roots		
1.0'				
		Light brown sand w/ well rounded pebbles		
2.0'				
		Gray sand sand w/ well rounded pebbles		
3.0'				
		Tan sand w/ well rounded pebbles		
7.0'		Gray sand w/ patches of		
		brown, orange, white layering		
12.0'				
		No evidence of fill material		

Test Pit Cross Section and / or Plan View





2'-4' w x 15' l x 12' d

N

REMARKS No stained soil or objects observed. No PID readings measured in soil pile. Test pit filled in with excavated soil and graded. No samples taken. west end of TP07 is about 8' from road.

PHOTO LOG

TEST PIT 07

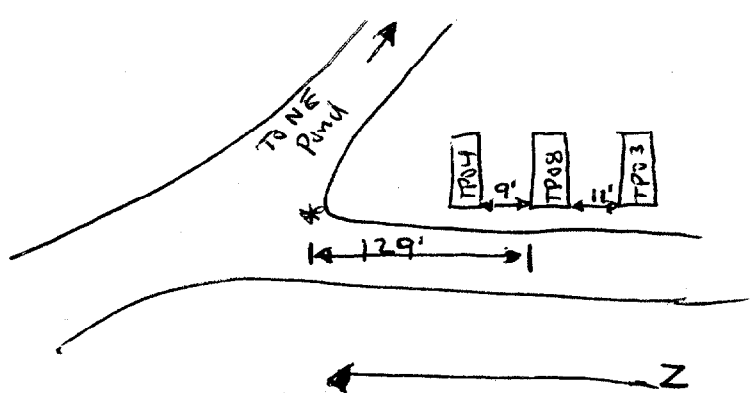
PAGE OF

PROJECT: CTO 270 - NWIRP Calverton TEST PIT NO.: 08
PROJECT NO.: 7398-0310 DATE: 5/6/97
LOCATION: Site 1 : Northeast Pond
FIELD GEOLOGIST: S. Patselas

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Loose brown silty sand w/ well	SM	
		rounded pebbles		
1.5'				
		Brown sand w/ well rounded pebbles		
4.0'				
		Light brown and orange sand		
		w/ well rounded pebbles		
6.0'				
		Gray w/ some rustic orange		
		sand of fine particle size		
12.0'				
		No evidence of fill material		

Test Pit Cross Section and / or Plan View

2'-5'w x 18'l x 12'd



REMARKS No stained soil or objects observed. No PID readings measured in soil pile. Test pit filled in with excavated soil and graded. No samples taken. West end of TP08 is about 6' from road.

PHOTO LOG

TEST PIT 08

PAGE ____ OF

APPENDIX C

SAMPLE LOG SHEETS

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWIRP-Calverton
Project No.: 7398

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW01-062397
Sample Location: NORTH POND
Sampled By: T. SAWYER / E. HESS
C.O.C. No.: 01W
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 6/23/97	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Time: 1345								
Method: ~~slow flow~~ / ~~GRAB~~	Clear	5.21	.063	13.2	0	9.25	0.00	

PURGE DATA:

Date: 6/23/97	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: SLOW FLOW	Initial							
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2							
Type: PVC - 4"	3		See purge sheet					
Total Well Depth (TD): 51.68								
Static Water Level (WL): 43.78								
One Casing Volume (gal/L): ~20								
Start Purge (hrs): 1240								
End Purge (hrs): 1340								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 80								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC'S	HCL	6 x 40 mL VIAL	✓
SVOC'S	Ice to 4°C	6 x Liter amber	✓
PEST/PCB'S	Ice to 4°C	6 x Liter amber	✓
METALS	HNO3	2 / Liter Plastic	✓

OBSERVATIONS / NOTES:

MS/MSD

Circle if Applicable:

MS/MSD	Duplicate ID No.:
X	

Signature(s): Teresa Sawyer

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWIRP-Calverton
Project No.: 7398

[ ] Domestic Well Data
[X] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: NP-MW02-06
Sample Location: NORTH POND
Sampled By: T. SAWYER / E. HESS
C.O.C. No.: #0200
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 6/24/97	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 1015	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: Slow flow / GRAB	Clear	6.89	2.00	13.4	0	-0.59	0.00	—

PURGE DATA:

Date: 6/24/97	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: SLOW FLOW	Initial							
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2							
Type: PVC	3		See purge sheet					
Total Well Depth (TD): 26.55								
Static Water Level (WL): 17.15								
One Casing Volume (gal/L): 5.8								
Start Purge (hrs): 0930								
End Purge (hrs): 1010								
Total Purge Time (min): 34								
Total Vol. Purged (gal/L): 34								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC'S	HCL	2 40 ml VIAL	✓
SVOC'S	Ice to 4°C	2 Liter amber	✓
PEST/PCB'S	Ice to 4°C	2 Liter amber	✓
METALS	HNO3	1 Liter Plastic	✓

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Teresa Sawyer

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWIRP-Calverton
Project No.: 7398

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW02-I-0624
Sample Location: NORTH POND
Sampled By: T.SAWYER/E. HESS
C.O.C. No.: #02 I
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 6/24/97	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Time: 0905								
Method: Slow flow/GRAB	clear	6.09	.484	12.9	0	2.00	0.0	—

PURGE DATA:

Date: 6/24/97	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: SLOW FLOW	Initial							
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2							
Type: PVC	3		See purge sheet					
Total Well Depth (TD): 71								
Static Water Level (WL): 17.09								
One Casing Volume (gal/L): 3.558								
Start Purge (hrs): 0815								
End Purge (hrs): 0900								
Total Purge Time (min): 45								
Total Vol. Purged (gal/L) 50								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC'S	HCL	2 40 ML VIAL	✓
SVOC'S	ice to 4°C	2 liter amber	✓
PEST/PCB'S	ice to 4°C	2 liter amber	✓
METALS.	HNO3	1 liter Plastic	✓

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Teresa Dawger

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWIRP-Calverton
Project No.: 7398

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW03
Sample Location: NORTH POND
Sampled By: T. SAWYER / E. HESS
C.O.C. No.: 01W
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 6/23/97	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 1710	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: slow flow / GRAB	CLEAR	6.04	.208	13.9	0	-0.44	0.0	

PURGE DATA:

Date: 6/23/97	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: SLOW FLOW	Initial							
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2							
Type: PVC	3		See Purge					
Total Well Depth (TD): 24.77				Sheet				
Static Water Level (WL): 15.79								
One Casing Volume(gal/L): 6								
Start Purge (hrs): 1550								
End Purge (hrs): 1705								
Total Purge Time (min): 75								
Total Vol. Purged (gal/L): 72								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC'S	HCL	2 40 ML VIAL	✓
SVOC'S	ICE to 4°C	2 Liter amber	✓
PEST/PCB'S	ICE to 4°C	2 Liter amber	✓
METALS	HNO3	1 Liter Plastic	✓

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Teresa Sawyer

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWIRP-Calverton
Project No.: 7398

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW04-062397
Sample Location: NORTH POND
Sampled By: T.SAWYER/E. HESS
C.O.C. No.: 010
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date: 6/23/97								
Time: 1530								
Method: slow flow/GRAB	Clear	5.10	.064	14.5	0	7.37	0.02	

PURGE DATA:

Date: 6/23/97	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: SLOW FLOW	Initial							
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2							
Type: PVC 4"	3							
Total Well Depth (TD): 47.05			See	purge	sheet			
Static Water Level (WL): 40.04								
One Casing Volume(gal/L): 1.24								
Start Purge (hrs): 1425								
End Purge (hrs): 1525								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 55								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC'S	HCL	4x 40 ML VIAL	✓
SVOC'S	ICE to 4°C	4x Liter amber	✓
PEST/PCB'S	ICE to 4°C	4x Liter amber	✓
METALS.	HNO3	2x Liter Plastic	✓

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
	NP-DUP01W

Signature(s): Teresa Dawyer

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWIRP-Calverton
Project No.: 7398

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW0586.24
Sample Location: NORTH POND
Sampled By: T.SAWYER/E. HESS
C.O.C. No.: # 026
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 6/24/97	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: slow flow/GRAB	Clear	5.56	.047	13.3	0	3.78	0.00	

PURGE DATA:

Date: 6/24/97	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: SLOW FLOW	Initial							
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2							
Type: PVC 4"	3		See	purge	sheet			
Total Well Depth (TD): 15.62								
Static Water Level (WL): 8.59								
One Casing Volume (gal/L): 18.4								
Start Purge (hrs): 1145								
End Purge (hrs): 1225								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 29								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC'S	HCL	2 40 ML VIAL	✓
SVOC'S	ICE to 4°C	2 Liter amber	✓
PEST/PCB'S	ICE to 4°C	2 Liter amber	✓
METALS	HNO3	1 Liter Plastic	✓

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Teresa Dawyer

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWIRP-Calverton
Project No.: 7398

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW06-062497
Sample Location: NORTH POND
Sampled By: T.SAWYER/E. HESS
C.O.C. No.: #026
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date: 6/24/97								
Time: 1130								
Method: slow flow/GRAB	Clear	5.89	.070	14.2	1	-0.52	0.00	—

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 6/24/97								
Method: SLOW FLOW	Initial							
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2							
Type: PVC	3							
Total Well Depth (TD): 15.53			See purge sheet					
Static Water Level (WL): 4.65								
One Casing Volume (gal/L) 28.8								
Start Purge (hrs): 1100								
End Purge (hrs): 1125								
Total Purge Time (min): 25								
Total Vol. Purged (gal/L): 19								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC'S	HCL	2 40 ML VIAL	✓
SVOC'S	ICE to 4°C	2 Liter amber	✓
PEST/PCB'S	ICE to 4°C	2 Liter amber	✓
METALS.	HNO3	1 Liter Plastic	✓

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Teresa Dawyer

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWIRP Cherton
Project No.: 7398

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW01
Sample Location: Northeast Pond
Sampled By: S. Patselw
C.O.C. No.: #4 of 5
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 11/13/97	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 1635	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: slow flow	clear	5.11	0.057	13.7	0.0	7.25	0.00	

PURGE DATA:

Date: 11/13/97	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: submersible pump	Initial							
Monitor Reading (ppm):	1							
Well Casing Diameter & Material	2							
Type: 4" PVC	3	see	low	flow	purge	data	sheet	
Total Well Depth (TD): 51.68'								
Static Water Level (WL): 45.87								
One Casing Volume (gal/L): 3.79								
Start Purge (hrs): 1555								
End Purge (hrs): 1625								
Total Purge Time (min): 30								
Total Vol. Purged (gal/L): 8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCl 4°C	(2) 40ml vials	✓
TCL SVOC	4°C	(2) 1 L ambers	✓
TCL Pest./PCB	4°C	(2) 1 L ambers	✓
metals	HNO_3 4°C	(1) 1 L poly	✓

OBSERVATIONS / NOTES:

Set pump approximately 47' below TOC
Pump flow rate at 900 ml/minute
Use 3/8" teflon tube

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWIRP- Calverton
Project No.: 7398

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW02-S
Sample Location: Northeast Pond
Sampled By: P. Davis/S. Patsalys
C.O.C. No.: #2
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 11/11/97								
Time: 1545	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: Slow Flow	Clear	6.75	1.93	14.3	4	2.69	0.09	—

PURGE DATA:

Date: 11/11/97	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Slow Flow	Initial	~~6.70~~	~~1.87~~		~~38~~			
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2							
Type: 4" - PVC	3		See	page	2			
Total Well Depth (TD): 26.80								
Static Water Level (WL): 19.40								
One Casing Volume (gal/L): 4.83								
Start Purge (hrs): ~~1450~~ 1500								
End Purge (hrs): 1540								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 9								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL	(2) 40 ml vials	✓
TCL SVOC	4°	(2) 1 L ambers	✓
TCL Pest./PCB'S	4°	(2) 1 L ambers	✓
metals	HNO3	(1) 1 L poly	✓

OBSERVATIONS / NOTES:

Set pump at 22' btoc
pump flow = 950 ml/min
Using Teflon 3/8" tubing

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Paul M. Davis

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWIRP- Calverton
Project No.: 7398

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW02-I
Sample Location: North East Pond
Sampled By: P. Davis / S. Patsela
C.O.C. No.: # 2
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 11/11/97	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 1655	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: Slow Flow	Clear	6.47	0.229	12.2	1	5.41	0.00	—

PURGE DATA:

Date: 11/11/97	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Slow Flow	Initial							
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2							
Type: 4" PVC	3		See	page	2			
Total Well Depth (TD): 71.18								
Static Water Level (WL): 18.99								
One Casing Volume (gal/L): 34.08								
Start Purge (hrs): 1600								
End Purge (hrs): 1650								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 50								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCL	(2) 40 ml vials	✓
TCL SVOC	4°	(2) 1L ambers	✓
TCL Pest. / PCB's	4°	(2) 1L ambers	✓
metals	HNO3	(1) 1L poly	✓

OBSERVATIONS / NOTES:

place pump at 66' btoc
pump flow = 1000 ml/min.
Using Teflon 3/8" tubing.

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Paul M. D[illegible]

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWIRP Calverton
Project No.: 7398-0201

[X] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW03
Sample Location: Northeast Pond
Sampled By: ~~#4~~ S. Patel
C.O.C. No.: ~~#4~~ of 5
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 11/13/97	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Time: 1010								
Method: slow flow	clear	5.85	0.220	15.9	0	1.40	0.0	

PURGE DATA:

Date: 11/13/97	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: submersible pump	Initial							
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2	see low flow purge data sheet						
Type: 4" PVC	3							
Total Well Depth (TD): 24.77'								
Static Water Level (WL): 17.78'								
One Casing Volume (gal/L): 4.56								
Start Purge (hrs): 0855								
End Purge (hrs): 0925								
Total Purge Time (min): 30								
Total Vol. Purged (gal/L): 8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCl, 4°C	(8) 40ml. Vials	✓
TCL SVOC	4°	(8) 1 L amber	✓
TCL Pest./PCB	4°	(8) 1 L amber	✓
Metals	HNO_3, 4°C	(4) 1 L poly	✓

OBSERVATIONS / NOTES:

Pump set approximately 20' below TOC
Pump flow at 1000 ml./minute
Use 3/8" teflon tube

Circle if Applicable:

MS/MSD: X
Duplicate ID No.: DUP-02

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWIRP Calverton
Project No.: 7398 / CTO 270

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW04
Sample Location: Northeast Pond
Sampled By: Stavros Tsatsakis
C.O.C. No.: #4
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date: 11/13/97								
Time: 1450								
Method: slow flow	clear	4.77	0.053	13.3	0.0	7.91	0.00	

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 11/13/97								
Method: submersible pump	Initial							
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2	See	low	flow	purge	data	sheet	
Type: 4" PVC	3							
Total Well Depth (TD): 47.21'								
Static Water Level (WL): 42.08'								
One Casing Volume (gal/L): 3.35								
Start Purge (hrs): 1405								
End Purge (hrs): 1440								
Total Purge Time (min): 25								
Total Vol. Purged (gal/L): 7								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCl, 4°C	(2) 40ml vials	✓
TCL SVOC	4°C	(2) 1 L Ambers	✓
TCL Pest./PCB	4°C	(2) 1 L Ambers	✓
Metals	HNO_3, 4°C	(1) 1 L Poly	✓

OBSERVATIONS / NOTES:

Pump set approximately 45' below TOC
Pump flow rate = 1000 ml/minute
Use 3/8" teflon tubing

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Calverton
Project No.: 7398

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW05
Sample Location: Northeast Pond
Sampled By: S. Putselas
C.O.C. No.: #3
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 11/12/97	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 11:55	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: slow flow	Clear	5.34	0.063	15.0	0.0	2.79	0.00	—

PURGE DATA:

Date: 11/12/97	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: submersible pump	Initial							
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2							
Type: 4" PVC	3		see low flow purge data sheet					
Total Well Depth (TD): 15.82								
Static Water Level (WL): 10.50								
One Casing Volume (gal/L): 3.47								
Start Purge (hrs): 1115								
End Purge (hrs): 1150								
Total Purge Time (min): 35								
Total Vol. Purged (gal/L): 10.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCl, 4°	(2) 40ml VIALS	✓
TCL SVOC	4°	(2) 1L ambers	✓
TCL Pest./PCB	4°	(2) 1L ambers	✓
metals	HNO_3, 4°	(1) 1L poly	✓

OBSERVATIONS / NOTES:

pump set at approximately 13' below TOC
pump flow between 950 to 1000 ml/minute
Use 3/8" teflon tubing

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWI RP Calverton
Project No.: 7398

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NP-MW06
Sample Location: Northeast Pond
Sampled By: S. Patselas
C.O.C. No.: #3
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 0945	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 0945	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: slow flow	clear	5.73	0.070	14.9	0	2.14	0.00	—

PURGE DATA:

Date: 11/12/97	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: submersible pump	Initial							
Monitor Reading (ppm): —	1							
Well Casing Diameter & Material	2	see low flow purge data sheet						
Type: 4" PVC	3							
Total Well Depth (TD): 15.57'								
Static Water Level (WL): 6.58'								
One Casing Volume(gal/L):								
Start Purge (hrs): 0907								
End Purge (hrs): 0937								
Total Purge Time (min): 30								
Total Vol. Purged (gal/L): 8 gal.								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOC	HCl, 4°C	(2) 40 ml vials	✓
TCL SVOC	4°C	(2) 1L ambers	✓
TCL Pest./PCB	4°C	(2) 1L ambers	✓
Metals	HNO_3, 4°C	(1) 1L poly	✓

OBSERVATIONS / NOTES:

Pump set at 10.5 feet below TOC
Pump flow at 1000 ml/minute
Use 3/8" teflon tubing

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Halliburton NUS CORPORATION

SINGLE SAMPLE LOG SHEET

Project Site Name: NWIRP-Colverton

Project No.: 7398

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☒ Sediment
- ☐ Other _____
- ☐ QA Sample Type: _____

Sample ID No.: NP-SD10-1218

Sample Location: NORTH POND

Sampled By: TERESA SAWYER / PEYTON DALLB

C.O.C. No.: I

Sample Method: DIRECT PUSH

Depth Sampled: 12" - 18"

Sample Date and Time: 6/10/97 1220

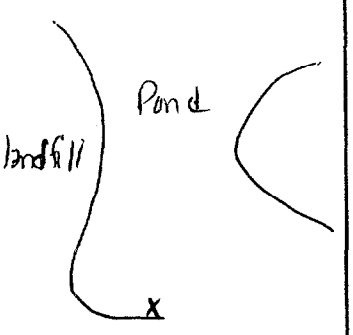
Type of Sample
- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ☐ Low Concentration

Composite Sample Data		
Sample	Time	Color/Description

Grab Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
BRN / TAN	WET SILTY SAND

Analysis	Container Requirements	Collected (✓)
SVOC'S	1 8oz glass	✓
PEST / PCB'S		
METALS		

Map:



Observations/Notes:

Circle if Applicable:

MS/MSD	Duplicate ID No:

Signature(s): Teresa Sawyer

Halliburton NUS CORPORATION

SINGLE SAMPLE LOG SHEET

Project Site Name: NWIRP-Colverton

Project No.: 7398

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☒ Sediment
- ☐ Other _____
- ☐ QA Sample Type: _____

Sample ID No.: NP-SD10-1824

Sample Location: NORTH POND

Sampled By: TERESA SAWYER / PEYTON DAUB

C.O.C. No.: I

Sample Method: DIRECT PUSH

Depth Sampled: 18" - 24"

Sample Date and Time: 6/10/97 1245

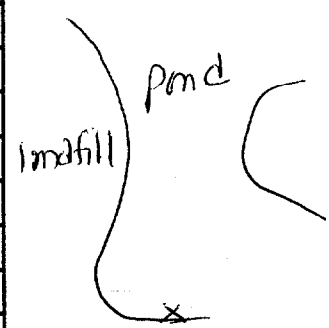
Type of Sample
- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ☐ Low Concentration

Composite Sample Data		
Sample	Time	Color/Description

Grab Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)

Analysis	Container Requirements	Collected (✓)
SVOC'S	1 8oz glass	✓
PEST/PCB'S		
METALS		

Map:



Observations/Notes:

Circle if Applicable:

MS/MSD

Duplicate ID No: NP-DUP05

Signature(s): Teresa Sawyer

Halliburton NUS CORPORATION

SINGLE SAMPLE LOG SHEET

Project Site Name: NWIRP-Colverton

Project No.: 7398

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☒ Sediment
- ☐ Other _____
- ☐ QA Sample Type: _____

Sample ID No.: NP-SD11-1218

Sample Location: NORTH POND

Sampled By: TERESA SAWYER/PEYTON DAUB

C.O.C. No.: I

Sample Method: DIRECT PUSH

Depth Sampled: 12" - 18"

Sample Date and Time: 6/10/97 1140

Type of Sample
- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ☐ Low Concentration

Composite Sample Data

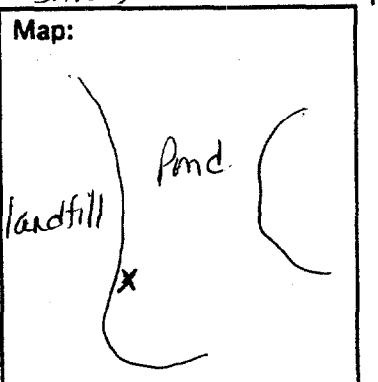
Sample	Time	Color/Description

Grab Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
BRN / TAN	WET SILTY SAND

Analysis	Container Requirements	Collected (✓)
SVOC'S	1 8oz glass	✓
PEST / PCB'S		
METALS		

Map:



Observations/Notes:

Circle if Applicable:

MS/MSD	Duplicate ID No:

Signature(s): Teresa Sawyer

Halliburton NUS CORPORATION

SINGLE SAMPLE LOG SHEET

Project Site Name: NWIRP-Calverton

Project No.: 7398

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☒ Sediment
- ☐ Other _____
- ☐ QA Sample Type: _____

Sample ID No.: NP-SD11-1824

Sample Location: NORTH POND

Sampled By: TERESA SAWYER/PEYTON DAWG

C.O.C. No.: I

Sample Method: DIRECT PUSH

Depth Sampled: 18" - 24"

Sample Date and Time: 6/10/97 1200

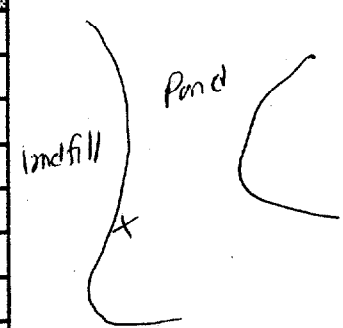
Type of Sample
- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ☐ Low Concentration

Composite Sample Data		
Sample	Time	Color/Description

Grab Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
BRN / TAN	WET SILTY SAND

Analysis	Container Requirements	Collected (✓)
SVOC'S	1 8oz glass	✓
PEST / PCB'S		
METALS		

Map:



Observations/Notes:

Circle if Applicable:	
MS/MSD	Duplicate ID No:

Signature(s): Teresa Sawyer

Halliburton NUS CORPORATION

SINGLE SAMPLE LOG SHEET

Project Site Name: NWIRP-Colverton

Project No.: 7398

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☒ Sediment
- ☐ Other _____
- ☐ QA Sample Type: _____

Sample ID No.: NP-SD12-12-18

Sample Location: NORTH POND

Sampled By: TERESA SAWYER/PEYTON DAUB

C.O.C. No.: I

Sample Method: DIRECT PUSH

Depth Sampled: 12" - 18"

Sample Date and Time: 6/10/97 1100

Type of Sample
- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ☐ Low Concentration

Composite Sample Data

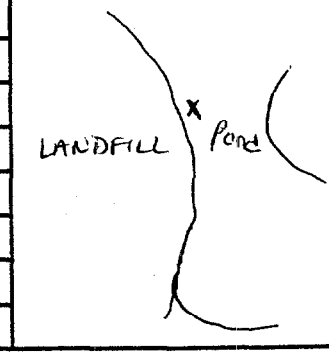
Sample	Time	Color/Description

Grab Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
BRN/TAN	WET SILTY SAND

Analysis	Container Requirements	Collected (✓)
SVOC'S	1 8oz glass	✓
PEST/PCB'S		
METALS		

Map:



Observations/Notes:

Circle if Applicable:

MS/MSD	Duplicate ID No:

Signature(s): Teresa Sawyer

Halliburton NUS CORPORATION

SINGLE SAMPLE LOG SHEET

Project Site Name: NWIRP-Colverton

Project No.: 7398

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☒ Sediment
- ☐ Other _____
- ☐ QA Sample Type: _____

Sample ID No.: NP-SD12-1824

Sample Location: NORTH POND

Sampled By: TERESA SAWYER/PEYTON DAUB

C.O.C. No.: I

Sample Method: DIRECT PUSH

Depth Sampled: 18"-24"

Sample Date and Time: 6/10/97 1115

Type of Sample
- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ☐ Low Concentration

Composite Sample Data

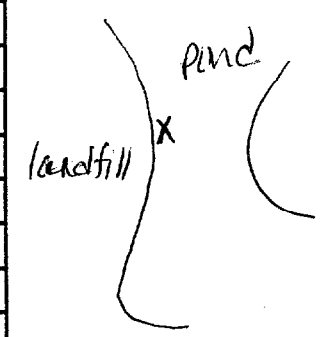
Sample	Time	Color/Description

Grab Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
TAN/BROWN	WET SILTY SAND

Analysis	Container Requirements	Collected (✓)
SVOC'S	1 8oz glass	✓
PEST/PCB'S		
METALS		

Map:



Observations/Notes:

Circle if Applicable:

MS/MSD	Duplicate ID No:

Signature(s): Teresa Sawyer

Halliburton NUS CORPORATION

SINGLE SAMPLE LOG SHEET

Project Site Name: NWIRP-Colverton

Project No.: 7398

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☒ Sediment
- ☐ Other _____
- ☐ QA Sample Type: _____

Sample ID No.: NP-SD13-1218

Sample Location: NORTH POND

Sampled By: TERESA SAWYER / PEYTON DALLAS

C.O.C. No.: I

Sample Method: DIRECT PUSH

Depth Sampled: 12"-18"

Sample Date and Time: 6/10/97 1000

Type of Sample
- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ☐ Low Concentration

Composite Sample Data

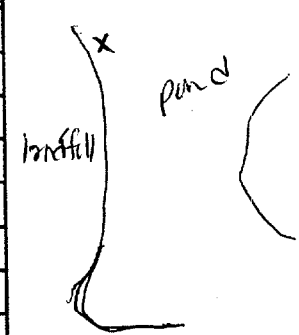
Sample	Time	Color/Description

Grab Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
BROWN TAN	SILTY WET SAND

Analysis	Container Requirements	Collected (✓)
SVOC'S	1 8oz glass	
PEST / PCB'S		✓
METALS		

Map:



Observations/Notes:

Circle if Applicable:

MS/MSD | Duplicate ID No:

Signature(s): Teresa Sawyer

Halliburton NUS CORPORATION

SINGLE SAMPLE LOG SHEET

Project Site Name: NWIRP-Colverton

Project No.: 7398

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☒ Sediment
- ☐ Other _____
- ☐ QA Sample Type: _____

Sample ID No.: NP-SD13-1824

Sample Location: NORTH POND

Sampled By: TERESA SAWYER/PEYTON DAVIS

C.O.C. No.: I

Sample Method: DIRECT PUSH

Depth Sampled: 18" - 24"

Sample Date and Time: 6/10/97 1030

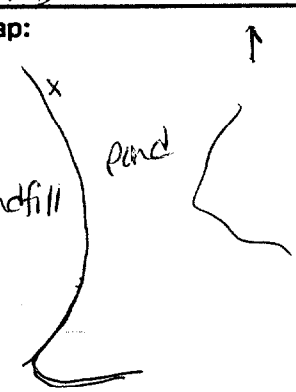
Type of Sample
- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ☐ Low Concentration

Composite Sample Data		
Sample	Time	Color/Description

Grab Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
BROWN/TAN	WET SILTY SAND

Analysis	Container Requirements	Collected (✓)
SVOC'S	1 8oz glass	✓
PEST/PCB'S		
METALS		

Map:



Observations/Notes:

Circle if Applicable:

MS/MSD

Duplicate ID No:

Signature(s): Teresa Sawyer

APPENDIX D

CHAIN OF CUSTODY FORMS

CHAIN OF CUSTODY RECORD

2 of 2 (COC # 13)

PROJECT NO.: 7398	SITE NAME: NWIRP CALVERTON													
SAMPLERS (SIGNATURE): [signature]														
STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	40ml VOA VGC							REMARKS
	4/20	1032		✓	NPGW0145 *	2	2							
	"	1118		✓	NPGW0160 *	2	2							
	"	1403		✓	FCGW0715	2	2							
	"	1428		✓	FCGW0730	2	2							
	"	1443		✓	FCGW0750	2	2							
	"	1546		✓	ETGW0715	2	2							
	"	1604		✓	ETGW0730	2	2							
	"	1624		✓	ETGW0750	2	2							

RELINQUISHED BY (SIGNATURE): [signature]	DATE / TIME: 4/21/97 1400	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: LAB PICKUP	

Order No. 70440 (0693)

* ASTERISK ADDED BY KCT 5/3/01 TO DELINEATE SAMPLES FOR SITE 1 - NORTHEAST POND DISPOSAL AREA

CHAIN OF CUSTODY RECORD

COC #14

PROJECT NO.: 7398

SITE NAME: NWIRP CALVERTON

SAMPLERS (SIGNATURE): Roland Marshall

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOA VOC						REMARKS
	4/21	0900		✓	NPTB11 *	2	2						TRIP BLANK
	4/21	000		✓	NPDU05 *	2	2						DUPLICATE
	"	1027		✓	NPGW0245 *	2	2						
	"	1105		✓	NPGW0260 *	2	2						
	"	1409		✓	NPGW0345 *	2	2						
	"	1426		✓	NPGW0360 *	2	2						
(pm)	~~4/22~~			✓	~~FCGW0420~~	~~2~~	~~2~~	(pm)					NO SAMPLE
	~~"~~			✓	~~FCGW0440~~	~~2~~	~~2~~						NO SAMPLE (pm)

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
Roland Marshall	4/23/97 0900				
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: LAB Pickup.	

Order No. 70440 (0

COC #1W

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7398

SITE NAME: NWIRP- Colverton

SAMPLERS (SIGNATURE): Teresa Scurzi

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	40 ml VIAL VOC's	1 liter Amber SVOC's	1 liter Amber PESTICIDES	1 liter plastic METALS			REMARKS
	6/23	0730		X	NP- TB01W *	2	2						TRIP BLANK
	6/23	1345		X	NP- MW01- 062397 MS/MSD *	21	6	6	6	3			MS/MSD
	6/23	1530		X	NP- MW04- 062397 *	9	2	2	2	1			
	6/23	1710		X	NP- MW03- 062397 *	7	2	2	2	1			
	6/23	0000		X	NP- DUP01- W *	7	2	2	2	1			Duplicate

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
Teresa Scurzi	6/23/97 1800	FEDERAL EXPRESS			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
'IISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: SHIPPED FED EX AIRBILL # 4293610123	

COC # 02W

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7398

SITE NAME: NWIRP- Calverton

SAMPLERS (SIGNATURE): Teresa Sawyer

STATION NO.	DATE 6/24	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	40 ml VIAL VOC's	1 liter amber SVOC's	1 liter amber PESTICIDES PCB's	1 liter plastic METALS	1 liter plastic CADMIUM	REMARKS
	6/24	0730		X	NP- TB02-W *	2	2					TRIPBLANK
	6/24	0905		X	NP-MW02I-062497 *	7	2	2	2	1		
	6/24	1015		X	NP-MW02-062497 *	7	2	2	2	1		
	6/24	1130		X	NP- MW06-062497 *	7	2	2	2	1		
	6/24	1230		X	NP- MW05-062497 *	7	2	2	2	1		
	6/24	1515		X	ECM-MW01-062497	1	0				1	
	6/24	1610		X	ECM- MW02-062497	1	0				1	

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
Teresa Sawyer	6/24/97 1600	FEDERAL EXPRESS			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: SHIPPED FED EX AIRBILL # 4293610112	

Order No. 70-W (0693)

COC II

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7398

SITE NAME: NWIBP - Colverton

SAMPLERS (SIGNATURE): Teresa Acuna

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	8 oz GLASS						REMARKS
	6/10	1000		X	NP-SD13-1218	1	1						SVOCS/PEST/PCBS/METALS
	6/10	1030		X	NP-SD13-1824	1	1						
	6/10	1100		X	NP-SD12-1218	1	1						
	6/10	1115		X	NP-SD12-1824	1	1						
	6/10	1140		X	NP-SD11-1218	1	1						
	6/10	1200		X	NP-SD11-1824	1	1						
	6/10	1220		X	NP-SD10-1218	1	1						
	6/10	1245		X	NP-SD10-1824	1	1						
	6/10	0000		X	NP-DUP05	1	1						

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
Teresa Acuna	6/10/98 1500	FEDEPAC EXPRESS			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: SHIPPED FED EX AIRBILL # 4293610182	

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
[illegible]	[illegible], NY

SAMPLERS (SIGNATURE): Paul M. [illegible]

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	REMARKS
[illegible]	[illegible]	[illegible]		✓	TB-111117	[illegible]	2						[illegible] Required Trip Blank
FT	[illegible]	[illegible]		✓	FT-mw36-S	2	2						
FT	[illegible]	[illegible]		✓	FT-mw37	2	2						
FT	[illegible]	[illegible]		✓	FT-mw36-I	2	2						
FT	[illegible]	[illegible]		✓	FT-mw35-I	2	2						
NP	[illegible]	[illegible]		✓	NP-mw02 KCT 5/4/01 *	7	2	2	2	1			
NP	[illegible]	[illegible]		✓	NP-mw02-I KCT 5/4/01 *	7	2	2	2	1			
[illegible]	[illegible]	[illegible]		✓	[illegible]	2	2						[illegible]

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
Paul M. [illegible]	11/11/97 1000				
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELI[illegible]HED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: Fed Ex # [illegible] 389 482	

CHAIN OF CUSTODY RECORD

Brown & Root Environmental Pit Re Project

PROJECT NO.: [illegible]

SITE NAME: [illegible]

SAMPLERS (SIGNATURE): [illegible]

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	[illegible]	[illegible]	[illegible]	[illegible]			REMARKS
TA/B	11/4/01	0930		✓	TB-111-11	2	2	–	–	–	–		Lab Provided Trip Blank
NP	11/4/01	0945		✓	NP-MW06 KCT 5/4/01 *	7	2	2	2	1			
NP	11/4/01	1155		✓	NP-MW05 KCT 5/4/01 *	7	2	2	2	1			
FD	11/4/01	1455		✓	FD-GW07	4	2	2	–	–			
FD	11/4/01	1405		✓	FD-GW06	4	2	2	–	–			
FD	11/4/01	1440		✓	FD-GW05	4	2	2	–	–			

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
[illegible]	11/12/01 1730				
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: Fed Ex Track # 5098140068 2	

Order No. 70440 (0593)

CHAIN OF CUSTODY RECORD

PROJECT NO.: [illegible]

SITE NAME: [illegible]

SAMPLERS (SIGNATURE): [illegible]

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	[illegible]	[illegible]	[illegible]	[illegible]			REMARKS
NP	11/14/11	1415		✓	NP-MW03 *	21	6	6	6	3			1 x MS/MSD
NP	11/14/11	1450		✓	NP-MW04 *	7	2	2	2	1			
NP	11/14/11	1635		✓	NP-MW01 *	7	2	2	2	1			
[illegible]	11/14/11	1215		✓	TB-[illegible]	2	2	—	—	—			Trip Blank
[illegible]	11/14/11	[illegible]		✓	DUP-[illegible]2 *	7	2	2	2	1			Field Replicate

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
[signature]	11/15/11 1750				
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	

APPENDIX E

MONITORING WELL CONSTRUCTION SHEETS

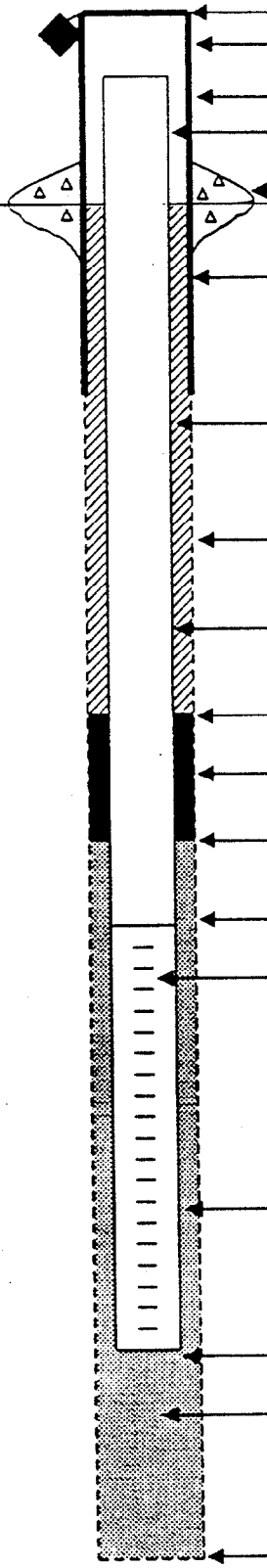
BORING NO.: NP-MW02 I

OVERBURDEN
MONITORING WELL SHEET

PROJECT NWIRP
PROJECT NO. 7398
ELEVATION
FIELD GEOLOGIST TERESA SAWYER

LOCATION Glenton, NY
BORING NP-MW02 I
DATE 5/8/97

DRILLER Mark Muller
DRILLING METHOD HSA
DEVELOPMENT METHOD



GROUND ELEVATION

ELEVATION OF TOP OF SURFACE CASING :
ELEVATION OF TOP OF RISER PIPE:
STICK - UP TOP OF SURFACE CASING:
STICK - UP RISER PIPE : 1.5
TYPE OF SURFACE SEAL: concrete
I.D. OF SURFACE CASING: 8"
TYPE OF SURFACE CASING: STEEL
RISER PIPE I.D. 4"
TYPE OF RISER PIPE: Schedule 40 PVC
BOREHOLE DIAMETER: 10.25
TYPE OF BACKFILL: cement/bentonite grout
ELEVATION / DEPTH TOP OF SEAL: 153
TYPE OF SEAL: 1/4 bentonite pellet
DEPTH TOP OF SAND PACK: 56
ELEVATION / DEPTH TOP OF SCREEN: 160
TYPE OF SCREEN: Schedule 40 PVC
SLOT SIZE x LENGTH: 0.020 10'
I.D. OF SCREEN: 4"
TYPE OF SAND PACK: #1 FILTER SA
ELEVATION / DEPTH BOTTOM OF SCREEN: 170
ELEVATION / DEPTH BOTTOM OF SAND PACK: 173
TYPE OF BACKFILL BELOW OBSERVATION WELL: # FILTER SAND
ELEVATION / DEPTH OF HOLE: 173

BORING NO.: NP-MW05

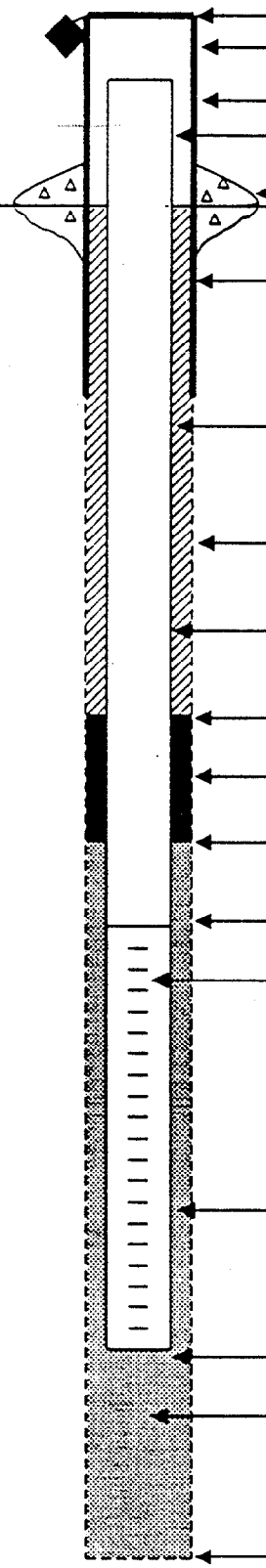
OVERBURDEN
MONITORING WELL SHEET

PROJECT NWIRP- Calverton
PROJECT NO. 7398
ELEVATION
FIELD GEOLOGIST T. Sawyer

LOCATION Calverton, NY
BORING NP-MW05
DATE 5/10/97

DRILLER M. Muller
DRILLING METHOD HSA
DEVELOPMENT METHOD

GROUND ELEVATION



ELEVATION OF TOP OF SURFACE CASING :
ELEVATION OF TOP OF RISER PIPE:

STICK - UP TOP OF SURFACE CASING:
STICK - UP RISER PIPE :

TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 8"
TYPE OF SURFACE CASING: STEEL

RISER PIPE I.D. 4"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 10.25

TYPE OF BACKFILL: Concrete

ELEVATION / DEPTH TOP OF SEAL: 12

TYPE OF SEAL: Bentonite Pellet Seal

DEPTH TOP OF SAND PACK: 3

ELEVATION / DEPTH TOP OF SCREEN: 15

TYPE OF SCREEN: Schedule 40 PVC

SLOT SIZE x LENGTH: 0.02 10'

I.D. OF SCREEN: 4"

TYPE OF SAND PACK: # 1 FILTER SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 15'

ELEVATION / DEPTH BOTTOM OF SAND PACK: 16
TYPE OF BACKFILL BELOW OBSERVATION WELL: # 1 FILTER SAND

ELEVATION / DEPTH OF HOLE: 16'

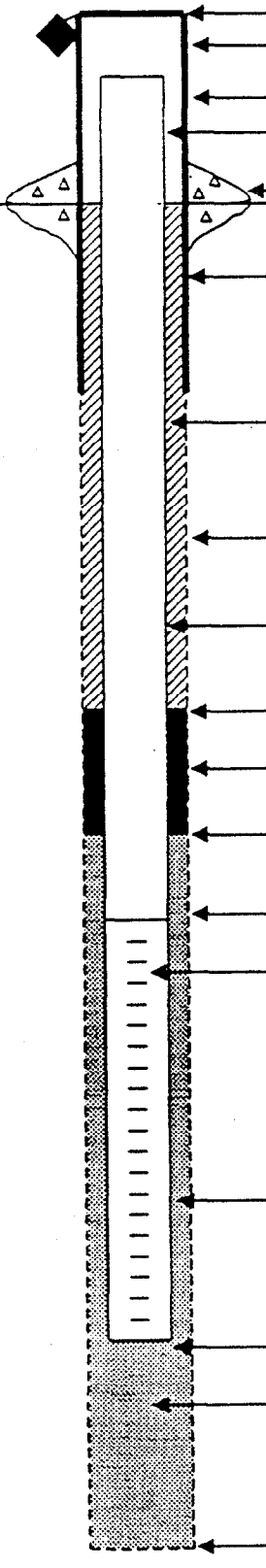
BORING NO.: NP-MW06

OVERBURDEN
MONITORING WELL SHEET

PROJECT NWIRP-Calverton
PROJECT NO. 7398
ELEVATION
FIELD GEOLOGIST T. Sawyer

LOCATION Calverton, NY
BORING NP-MW06
DATE 5/10/97

DRILLER M. Muller
DRILLING METHOD HSA
DEVELOPMENT METHOD



GROUND ELEVATION

ELEVATION OF TOP OF SURFACE CASING :
ELEVATION OF TOP OF RISER PIPE:

STICK - UP TOP OF SURFACE CASING:
STICK - UP RISER PIPE :

TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING: 8"
TYPE OF SURFACE CASING: STEEL

RISER PIPE I.D. 4"
TYPE OF RISER PIPE: Schedule 40 PVC

BOREHOLE DIAMETER: 10.25

TYPE OF BACKFILL: NA

ELEVATION / DEPTH TOP OF SEAL: 10'

TYPE OF SEAL: Concrete

DEPTH TOP OF SAND PACK: 2'

ELEVATION / DEPTH TOP OF SCREEN: 13.5

TYPE OF SCREEN: Schedule 40 PVC

SLOT SIZE x LENGTH: 0.02 10'

I.D. OF SCREEN: 4"

TYPE OF SAND PACK: #1 FILTER SAND

ELEVATION / DEPTH BOTTOM OF SCREEN: 13.5

ELEVATION / DEPTH BOTTOM OF SAND PACK: 15

TYPE OF BACKFILL BELOW OBSERVATION WELL: #1 FILTER SAND

ELEVATION / DEPTH OF HOLE: 15

APPENDIX F

EPA SOP FOR LOW FLOW SAMPLING

LOW FLOW SAMPLING PROCEDURE

SITE 1 - NORTHEAST POND DISPOSAL AREA
NWIRP CALVERTON NEW YORK, CTO 0270

CF Braun, under a contract with the United State Department of Navy, is conducting a Phase 2 RFI at the NWIRP Calverton. As part of this work, the first groundwater sample event is scheduled to occur in June 1997. Planned groundwater sample techniques consist of using either a bailer (for VOCs) or a submersible pump with low flow sample techniques. Previous groundwater samples at the facility have been collected via a bailer. The use of the low flow sampling technique is presented in the Phase 2 RFI Work Plan; however, specific equipment and procedural details were not provided. The purpose of this document is to provide these details.

Previous groundwater testing at this facility has determined that VOCs are the primary groundwater contaminants of concern at most of the sites. However, at one site, Site 1 - Northeast Pond Disposal Area, the primary potential groundwater contaminants of concern are pesticides, PCBs, and metals. In addition, VOC contaminants were not detected in the groundwater at this site. Based on the observed groundwater sample turbidity at this site during previous testing, and the typical partitioning of these types of contaminates onto soil particles, it is suspected that these sample results may have been biased high.

The objective of the sampling event at Site 1 is to determine if these chemicals are capable of migrating with the groundwater. To address this objective, a low flow sample technique will be used to minimize the possibility of false positive readings.

To conduct the low flow sampling event, CF Braun is proposing to use the USEPA Region I procedure dated July 30, 1995 (attached). Note that sample procedures for other sites and wells are presented in the RFI Work Plan.

Site-specific details presented are summarized as follows.

Equipment

Pump:	Adjustable rate - submersible. Pump to be decontaminated between wells.
Tubing:	Teflon.

Procedure

Flowrate:	Maximum - 1 liter per minute, limit drawdown to 0.3 feet.
Time Limit:	4 hours. Sample wells at this time.
Indicator Parameters:	Check every 15 minutes. Use a flow through cell.

U.S. ENVIRONMENTAL PROTECTION AGENCY
[redacted]

LOW STRESS (low flow) PURGING AND SAMPLING PROCEDURE FOR THE COLLECTION OF GROUND WATER SAMPLES FROM MONITORING WELLS

I. SCOPE & APPLICATION

This standard operating procedure (SOP) provides a general framework for collecting ground water samples that are indicative of mobile organic and inorganic loads at ambient flow conditions (both the dissolved fraction and the fraction associated with mobile particulates). The SOP emphasizes the need to minimize stress by low water-level drawdowns, and low pumping rates (usually less than 1 liter/min) in order to collect samples with minimal alterations to water chemistry. This SOP is aimed primarily at sampling monitoring wells that can accept a submersible pump and have a screen, or open interval length of 10 feet or less (this is the most common situation). However, this procedure is flexible and can be used in a variety of well construction and ground-water yield situations. Samples thus obtained are suitable for analyses of ground water contaminants (volatile and semi-volatile organic analytes, pesticides, PCBs, metals and other inorganics), or other naturally occurring analytes.

This procedure does not address the collection of samples from wells containing light or dense non-aqueous phase liquids (LNAPLs and DNAPLs). For this the reader may wish to check: Cohen, R.M. and J.W. Mercer, 1993, DNAPL Site Evaluation; C.K. Smoley (CRC Press), Boca Raton, Florida and U.S. Environmental Protection Agency, 1992, RCRA Ground-Water Monitoring: Draft Technical Guidance; Washington, DC (EPA/530-R-93-001).

The screen, or open interval of the monitoring well should be optimally located (both laterally and vertically) to intercept existing contaminant plume(s) or along flowpaths of potential contaminant releases. It is presumed that the analytes of interest move (or potentially move) primarily through the more permeable zones within the screen, or open interval.

Use of trademark names does not imply endorsement by U.S.EPA but is intended only to assist in identification of a specific type of device.

Proper well construction and development cannot be overemphasized, since the use of installation techniques that are appropriate to the hydrogeologic setting often prevents "problem well" situations from occurring. It is also recommended that as part of development or redevelopment the well should be tested to determine the appropriate pumping rate to obtain stabilization of field indicator parameters with minimal drawdown in shortest amount of time. With this information field crews can then conduct purging and sampling in a more expeditious manner.

The mid-point of the saturated screen length (which should not exceed 10 feet) is used by convention as the location of the pump intake. However, significant chemical or permeability contrast(s) within the screen may require additional field work to determine the optimum vertical location(s) for the intake, and appropriate pumping rate(s) for purging and sampling more localized target zone(s). Primary flow zones (high(er) permealability and/or high(er) chemical concentrations) should be identified in wells with screen lengths longer than 10 feet, or in wells with open boreholes in bedrock. Targeting these zones for water sampling will help insure that the low stress procedure will not underestimate contaminant concentrations. The Sampling and Analysis Plan must provide clear instructions on how the pump intake depth(s) will be selected, and reason(s) for the depth(s) selected.

Stabilization of indicator field parameters is used to indicate that conditions are suitable for sampling to begin. Achievement of turbidity levels of less than 5 NTU and stable drawdowns of less than 0.3 feet, while desirable, are not mandatory. Sample collection may still take place provided the remaining criteria in this procedure are met. If after 4 hours of purging indicator field parameters have not stabilized, one of 3 optional courses of action may be taken: a) continue purging until stabilization is achieved, b) discontinue purging, do not collect any samples, and record in log book that stabilization could not be achieved (documentation must describe attempts to achieve stabilization) c) discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization (note: there is a risk that the analytical data obtained, especially metals and strongly hydrophobic organic analytes, may not meet the sampling objectives).

Changes to this SOP should be proposed and discussed when the site Sampling and Analysis Plan is submitted for approval. Subsequent requests for modifications of an approved plan must include adequate technical justification for proposed changes. All changes and modifications must be approved before implementation in field.

II. EQUIPMENT

A. Extraction device

Adjustable rate, submersible pumps are preferred (for example, centrifugal or bladder pump constructed of stainless steel or Teflon).

Adjustable rate, peristaltic pumps (suction) may be used with caution. Note that EPA guidance states: "Suction pumps are not recommended because they may cause degassing, pH modification, and loss of volatile compounds" (EPA/540/P-87/001, 1987, page 8.5-11).

The use of inertial pumps is discouraged. These devices frequently cause greater disturbance during purging and sampling and are less easily controlled than the pumps listed above. This can lead to sampling results that are adversely affected by purging and sampling operations, and a higher degree of data variability.

B. Tubing

Teflon or Teflon lined polyethylene tubing are preferred when sampling is to include VOCs, SVOCs, pesticides, PCBs and inorganics.

PVC, polypropylene or polyethylene tubing may be used when collecting samples for inorganics analyses. However, these materials should be used with caution when sampling for organics. If these materials are used, the equipment blank (which includes the tubing) data must show that these materials do not add contaminants to the sample.

Stainless steel tubing may be used when sampling for VOCs, SVOCs, pesticides, and PCBs. However, it should be used with caution when sampling for metals.

The use of 1/4 inch or 3/8 inch (inner diameter) tubing is preferred. This will help ensure the tubing remains liquid filled when operating at very low pumping rates.

Pharmaceutical grade (Pharmed) tubing should be used for the section around the rotor head of a peristaltic pump, to minimize gaseous diffusion.

C. Water level measuring device(s), capable of measuring to 0.01 foot accuracy (electronic "tape", pressure transducer). Recording pressure transducers, mounted above the pump, are especially helpful in tracking water levels during pumping operations, but their use

must include check measurements with a water level "tape" at the start and end of each record.

D. Flow measurement supplies (e.g., graduated cylinder and stop watch).

E. Interface probe, if needed.

F. Power source (generator, nitrogen tank, etc.). If a gasoline generator is used, it must be located downwind and at least 30 feet from the well so that the exhaust fumes do not contaminate the samples.

G. Indicator field parameter monitoring instruments - pH, Eh, dissolved oxygen (DO), turbidity, specific conductance, and temperature. Use of a flow-through-cell is required when measuring all listed parameters, except turbidity. Standards to perform field calibration of instruments. Analytical methods are listed in 40 CFR 136, 40 CFR 141, and SW-846. For Eh measurements, follow manufacturer's instructions.

H. Decontamination supplies (for example, non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc.).

I. Logbook(s), and other forms (for example, well purging forms).

J. Sample Bottles.

K. Sample preservation supplies (as required by the analytical methods).

L. Sample tags or labels.

M. Well construction data, location map, field data from last sampling event.

N. Well keys.

O. Site specific Sample and Analysis Plan/Quality Assurance Project Plan.

P. PID or FID instrument (if appropriate) to detect VOCs for health and safety purposes, and provide qualitative field evaluations.

III. PRELIMINARY SITE ACTIVITIES

Check well for security damage or evidence of tampering, record pertinent observations.

Lay out sheet of clean polyethylene for monitoring and sampling equipment.

Remove well cap and immediately measure VOCs at the rim of the well with a PID or FID instrument and record the reading in the field logbook.

If the well casing does not have a reference point (usually a V-cut or indelible mark in the well casing), make one. Describe its location and record the date of the mark in the logbook.

A synoptic water level measurement round should be performed (in the shortest possible time) before any purging and sampling activities begin. It is recommended that water level depth (to 0.01 ft.) and total well depth (to 0.1 ft.) be measured the day before, in order to allow for re-settlement of any particulates in the water column. If measurement of total well depth is not made the day before, it should not be measured until after sampling of the well is complete. All measurements must be taken from the established referenced point. Care should be taken to minimize water column disturbance.

Check newly constructed wells for the presence of LNAPLs or DNAPLs before the initial sampling round. If none are encountered, subsequent check measurements with an interface probe are usually not needed unless analytical data or field head space information signal a worsening situation. Note: procedures for collection of LNAPL and DNAPL samples are not addressed in this SOP.

IV. PURGING AND SAMPLING PROCEDURE

Sampling wells in order of increasing chemical concentrations (known or anticipated) is preferred.

1. Install Pump

Lower pump, safety cable, tubing and electrical lines slowly (to minimize disturbance) into the well to the midpoint of the zone to be sampled. The Sampling and Analysis Plan should specify the sampling depth, or provide criteria for selection of intake depth for each well (see Section I). If possible keep the pump intake at least two

feet above the bottom of the well, to minimize mobilization of particulates present in the bottom of the well. Collection of turbid free water samples may be especially difficult if there is two feet or less of standing water in the well.

2. Measure Water Level

Before starting pump, measure water level. If recording pressure transducer is used-initialize starting condition.

3. Purge Well

3a. Initial Low Stress Sampling Event

Start the pump at its lowest speed setting and slowly increase the speed until discharge occurs. Check water level. Adjust pump speed until there is little or no water level drawdown (less than 0.3 feet). If the minimal drawdown that can be achieved exceeds 0.3 feet but remains stable, continue purging until indicator field parameters stabilize.

Monitor and record water level and pumping rate every three to five minutes (or as appropriate) during purging. Record any pumping rate adjustments (both time and flow rate). Pumping rates should, as needed, be reduced to the minimum capabilities of the pump (for example, 0.1 - 0.4 l/min) to ensure stabilization of indicator parameters. Adjustments are best made in the first fifteen minutes of pumping in order to help minimize purging time. During pump start-up, drawdown may exceed the 0.3 feet target and then "recover" as pump flow adjustments are made. Purge volume calculations should utilize stabilized drawdown value, not the initial drawdown. Do not allow the water level to fall to the intake level (if the static water level is above the well screen, avoid lowering the water level into the screen). The final purge volume must be greater than the stabilized drawdown volume plus the extraction tubing volume.

Wells with low recharge rates may require the use of special pumps capable of attaining very low pumping rates (bladder, peristaltic), and/or the use of dedicated equipment. If the recharge rate of the well is lower than extraction rate capabilities of currently manufactured pumps and the well is essentially dewatered during purging, then the well should be sampled as soon as the water level has recovered sufficiently to collect the appropriate volume needed for all anticipated samples (ideally the intake should not be moved during this recovery period). Samples may then be collected even though the indicator field parameters have not stabilized.

3b. Subsequent Low Stress Sampling Events

After synoptic water level measurement round, check intake depth and drawdown information from previous sampling event(s) for each well. Duplicate, to the extent practicable, the intake depth and extraction rate (use final pump dial setting information) from previous event(s). Perform purging operations as above.

4. Monitor Indicator Field Parameters

During well purging, monitor indicator field parameters (turbidity, temperature, specific conductance, pH, Eh, DO) every three to five minutes (or less frequently, if appropriate). Note: during the early phase of purging emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments. Purging is considered complete and sampling may begin when all the above indicator field parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings, taken at three (3) to five (5) minute intervals, are within the following limits:

turbidity (10% for values greater than 1 NTU),
DO (10%),
specific conductance (3%),
temperature (3%),
pH (± 0.1 unit),
ORP/Eh (± 10 millivolts).

All measurements, except turbidity, must be obtained using a flow-through-cell. Transparent flow-through-cells are preferred, because they allow field personnel to watch for particulate build-up within the cell. This build-up may affect indicator field parameter values measured within the cell and may also cause an underestimation of turbidity values measured after the cell. If the cell needs to be cleaned during purging operations, continue pumping and disconnect cell for cleaning, then reconnect after cleaning and continue monitoring activities.

The flow-through-cell must be designed in a way that prevents air bubble entrapment in the cell. When the pump is turned off or cycling on/off (when using a bladder pump), water in the cell must not drain out. Monitoring probes must be submerged in water at all times. If two flow-through-cells are used in series, the one containing the dissolved oxygen probe should come first (this parameter is most susceptible to error if air leaks into the system).

5. Collect Water Samples

Water samples for laboratory analyses must be collected before water has passed through the flow-through-cell (use a by-pass assembly or disconnect cell to obtain sample).

VOC samples should be collected first and directly into pre-preserved sample containers. Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

During purging and sampling, the tubing should remain filled with water so as to minimize possible changes in water chemistry upon contact with the atmosphere. It is recommended that 1/4 inch or 3/8 inch (inside diameter) tubing be used to help insure that the sample tubing remains water filled. If the pump tubing is not completely filled to the sampling point, use one of the following procedures to collect samples: (1) add clamp, connector (Teflon or stainless steel) or valve to constrict sampling end of tubing; (2) insert small diameter Teflon tubing into water filled portion of pump tubing allowing the end to protrude beyond the end of the pump tubing, collect sample from small diameter tubing; (3) collect non-VOC samples first, then increase flow rate slightly until the water completely fills the tubing, collect sample and record new drawdown, flow rate and new indicator field parameter values.

Add preservative, as required by analytical methods, to samples immediately after they are collected if the sample containers are not pre-preserved. Check analytical methods (e.g. EPA SW-846, water supply, etc.) for additional information on preservation. Check pH for all samples requiring pH adjustment to assure proper pH value. For VOC samples, this will require that a test sample be collected during purging to determine the amount of preservative that needs to be added to the sample containers prior to sampling.

If determination of filtered metal concentrations is a sampling objective, collect filtered water samples using the same low flow procedures. The use of an in-line filter is required, and the filter size (0.45 um is commonly used) should be based on the sampling objective. Pre-rinse the filter with approximately 25 - 50 ml of ground water prior to sample collection. Preserve filtered water sample immediately. Note: filtered water samples are not an acceptable substitute for unfiltered samples when the monitoring objective is to obtain chemical concentrations of total mobile contaminants in ground water for human health risk calculations.

Label each sample as collected. Samples requiring cooling (volatile organics, cyanide, etc.) will be placed into a cooler with ice or refrigerant for delivery to the laboratory. Metal samples after acidification to a pH less than 2 do not need to be cooled.

6. Post Sampling Activities

If recording pressure transducer is used, remeasure water level with tape.

After collection of the samples, the pump tubing may either be dedicated to the well for resampling (by hanging the tubing inside the well), decontaminated, or properly discarded.

Before securing the well, measure and record the well depth (to 0.1 ft.), if not measured the day before purging began. Note: measurement of total well depth is optional after the initial low stress sampling event. However, it is recommended if the well has a "silting" problem or if confirmation of well identity is needed.

Secure the well.

V.DECONTAMINATION

Decontaminate sampling equipment prior to use in the first well and following sampling of each subsequent well. Pumps will not be removed between purging and sampling operations. The pump and tubing (including support cable and electrical wires which are in contact with the well) will be decontaminated by one of the procedures listed below.

<u>Procedure 1</u>

The decontaminating solutions can be pumped from either buckets or short PVC casing sections through the pump or the pump can be disassembled and flushed with the decontaminating solutions. It is recommended that detergent and isopropyl alcohol be used sparingly in the decontamination process and water flushing steps be extended to ensure that any sediment trapped in the pump is removed. The pump exterior and electrical wires must be rinsed with the decontaminating solutions, as well. The procedure is as follows:

Flush the equipment/pump with potable water.

Flush with non-phosphate detergent solution. If the solution is

recycled, the solution must be changed periodically.

Flush with potable or distilled/deionized water to remove all of the detergent solution. If the water is recycled, the water must be changed periodically.

Flush with isopropyl alcohol (pesticide grade). If equipment blank data from the previous sampling event show that the level of contaminants is insignificant, then this step may be skipped.

Flush with distilled/deionized water. The final water rinse must not be recycled.

Procedure 2

Steam clean the outside of the submersible pump.

Pump hot potable water from the steam cleaner through the inside of the pump. This can be accomplished by placing the pump inside a three or four inch diameter PVC pipe with end cap. Hot water from the steam cleaner jet will be directed inside the PVC pipe and the pump exterior will be cleaned. The hot water from the steam cleaner will then be pumped from the PVC pipe through the pump and collected into another container. Note: additives or solutions should not be added to the steam cleaner.

Pump non-phosphate detergent solution through the inside of the pump. If the solution is recycled, the solution must be changed periodically.

Pump potable water through the inside of the pump to remove all of the detergent solution. If the solution is recycled, the solution must be changed periodically.

Pump distilled/deionized water through the pump. The final water rinse must not be recycled.

VI. FIELD QUALITY CONTROL

Quality control samples are required to verify that the sample collection and handling process has not compromised the quality of the ground water samples. All field quality control samples must be prepared the same as regular investigation samples with regard to sample volume, containers, and preservation. The following quality control samples shall be collected for each batch of samples (a bat

may not exceed 20 samples). Trip blanks are required for the VOC samples at a frequency of one set per VOC sample cooler.

Field duplicate.

Matrix spike.

Matrix spike duplicate.

Equipment blank.

Trip blank (VOCs).

Temperature blank (one per sample cooler).

Equipment blank shall include the pump and the pump's tubing. If tubing is dedicated to the well, the equipment blank will only include the pump in subsequent sampling rounds.

Collect samples in order from wells with lowest contaminant concentration to highest concentration. Collect equipment blanks after sampling from contaminated wells and not after background wells.

Field duplicates are collected to determine precision of sampling procedure. For this procedure, collect duplicate for each analyte group in consecutive order (VOC original, VOC duplicate, SVOC original, SVOC duplicate, etc.).

If split samples are to be collected, collect split for each analyte group in consecutive order (VOC original, VOC split, etc.). Split sample should be as identical as possible to original sample.

All monitoring instrumentation shall be operated in accordance with EPA analytical methods and manufacturer's operating instructions. EPA analytical methods are listed in 40 CFR 136, 40 CFR 141, and SW-846 with exception of Eh, for which the manufacturer's instructions are to be followed. Instruments shall be calibrated at the beginning of each day. If a measurement falls outside the calibration range, the instrument should be re-calibrated so that all measurements fall within the calibration range. At the end of each day, check calibration to verify that instruments remained in calibration. Temperature measuring equipment, thermometers and thermistors, need not be calibrated to the above frequency. They should be checked for accuracy prior to field use according to EPA Methods and the manufacturer's instructions.

VII. FIELD LOGBOOK

A field log shall be kept to document all ground water field monitoring activities (see attached example matrix), and record all of the following:

Well identification.

Well depth, and measurement technique.

Static water level depth, date, time and measurement technique.

Presence and thickness of immiscible liquid (NAPL) layers and detection method.

Pumping rate, drawdown, indicator parameters values, and clock time, at the appropriate time intervals; calculated or measured total volume pumped.

Well sampling sequence and time of each sample collection.

Types of sample bottles used and sample identification numbers.

Preservatives used.

Parameters requested for analysis.

Field observations during sampling event.

Name of sample collector(s).

Weather conditions.

QA/QC data for field instruments.

Any problems encountered should be highlighted.

Description of all sampling equipment used, including trade names, model number, diameters, material composition, etc.

VIII. DATA REPORT

Data reports are to include laboratory analytical results, QA/QC information, and whatever field logbook information is needed to allow for a full evaluation of data useability.

EXAMPLE (Minimum Requirements)

Page____of____

Well PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name)_____

Well Number_____ Date_____

Field Personnel_____

Sampling Organization_____

Identify MP

Depth to _____/_____ of screen
(below MP) top bottom

Pump Intake at (ft. below MP)_____

Purging Device; (pump type)_____

Clock Time 24 HR	Water Depth below MP ft	Pump Dial[1]	Purge Rate ml/min	Cum. Volume Purged liters	Temp. °C	Spec. Cond.[2] µS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turb-idity NTU	Comments

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. µSiemens per cm(same as µmhos/cm)at 25°C.
3. Oxidation reduction potential (stand in for Eh).

APPENDIX G

FIELD LOG SHEETS - LOW FLOW SAMPLING

EXAMPLE (Minimum Requirements) Page 1 of 1

Well PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name) NWIRP Calverton
Well Number NP MW01 Date 6/23/97
Field Personnel T. Sawyer ; E. Huss
Sampling Organization Bechtel ; Root Env.
Identify MP TOC

Depth to (below MP) 41.68 / 51.68 of screen (top / bottom)
Pump Intake at (ft. below MP) 47
Purging Device; (pump type) Grundfos

Clock Time 24 HR	Water Depth below MP ft	Pump Dial[1]	Purge Rate ml/min	Cum. Volume Purged liters	Temp. °C	Spec. Cond.[2] µS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turb-idity NTU	Comments
1240	43.78	161	1000	1	16.0	.068	5.38		9.69	7	
1246	43.84	161	1000	6	15.3	.067	5.33		9.16	0	
1250	43.85	161	1000	10	14.2	.064	5.26		9.41	0	
1255	43.87	161	1000	15	12.7	.064	5.28		9.53	0	
1202	43.87	160	1000	22	13.4	.064	5.31		9.44	0	1 volume
1215	43.87	160	1000	35	13.5	.064	5.24		9.16	0	
1220	43.87	160	1000	40	13.3	.064	5.22		9.21	0	2 volume
1230	43.87	160	1000	50	13.2	.064	5.23		9.21	0	
1240	43.86	160	1000	60	13.2	.063	5.21		9.25	0	3 volumes

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. µSiemens per cm (same as µmhos/cm) at 25°C.
3. Oxidation reduction potential (stand in for Eh).

EXAMPLE (Minimum Requirements)

Page 1 of 1

Well PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name) NWIRF Calverton
Well Number NP-MW02 Date
Field Personnel T. Sawyer E. Huss
Sampling Organization Brown + Root Environmental
Identify MP TOC

Depth to (below MP) 16.55 top / 26.55 bottom of screen
Pump Intake at (ft. below MP) 22.0
Purging Device; (pump type) Grundfos Redi-flow 2

Clock Time 24 HR	Water Depth below MP ft	Pump Dial[1]	Purge Rate ml/min	Cum. Volume Purged liters	Temp. °C	Spec. Cond.[2] mS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turb-idity NTU	Comments
											Start Purge 0936
0942	17.75	98	1.00	6	13.4	2.10	6.84		0.39	4	
0950	17.75	97	1.00	14	13.8	2.05	6.86		-0.39	2	
0955	17.75	96	1.00	19	13.5	2.05	6.86		-0.56	0	
1000	17.75	96	1.00	24	13.5	2.03	6.88		-0.58	0	
1005	17.75	96	1.00	29	13.4	2.01	6.89		-0.59	0	
1010	17.75	96	1.00	34	13.4	2.00	6.89		-0.59	0	

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. µSiemens per cm (same as µmhos/cm) at 25°C.
3. Oxidation reduction potential (stand in for Eh).

EXAMPLE (Minimum Requirements) Page 1 of 1

Well PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name) NWIRP-Calverton
Well Number NP-MW02-I Date 6/24/97
Field Personnel T. Zauner, E. Huss
Sampling Organization Brown & Root Environmental
Identify MP TOC

Depth to (below MP) 61 top / 71 bottom of screen
Pump Intake at (ft. below MP) 66
Purging Device; (pump type) Grundfos

Clock Time 24 HR	Water Depth below MP ft	Pump Dial[1]	Purge Rate ml/min	Cum. Volume Purged liters	Temp. °C	Spec. Cond.[2] mS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turb-idity NTU	Comments
											Start Purge 0825
0825	17.09	102	1.00	10	13.7	.526	6.08		1.51	0	
0825	17.10	102	1.00	20	13.2	.508	6.11		1.44	0	
0835	17.10	102	1.00	30	13.0	.492	6.09		1.66	0	
0840	17.10	102	1.00	35	13.0	.489	6.10		1.78	0	
0845	17.09	102	1.00	40	13.0	.485	6.09		1.93	0	
0850	17.10	102	1.00	45	13.0	.484	6.10		1.99	0	
0855	17.10	102	1.00	50	12.9	.484	6.09		2.00	0	

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. µSiemens per cm (same as µmhos/cm) at 25°C.
3. Oxidation reduction potential (stand in for Eh).

EXAMPLE (Minimum Requirements)

Page 1 of 1

Well PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name) NWIRP-Silverton
Well Number NP-MW03 Date 6/23/97
Field Personnel T Sawyer E Hall
Sampling Organization Parson & ROOT ENV
Identify MP TOC

Depth to (below MP) 14.77 top / 24.77 bottom of screen
Pump Intake at (ft. below MP) 20
Purging Device; (pump type) grunfos

Clock Time 24 HR	Water Depth below MP ft	Pump Dial[1]	Purge Rate l/min	Cum. Volume Purged liters	Temp. °C	Spec. Cond.[2] µS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turb-idity NTU	Comments Start purge 1550
1555	15.86	93	1.00	5.00	14.8	.204	6.06		-0.04	0	
1602	15.86	98	0.60/1.00	10.00	14.4	.205	6.03		-0.25	0	
1609	15.86	98	1.00	17.0	14.5	.205	6.02		0.39	0	
1616	15.86	98	1.00	24.0	14.5	.204	6.03		0.42	0	1st volume
1624	15.86	98	1.00	32.0	14.8	.206	6.01		0.42	0	Purge thru vessel related into Stride
1632	15.85	98	1.00	40.0	14.5	.207	6.02		0.02	0	
1639	15.85	98	1.00	49.0	13.6	.206	6.03		-0.38	0	2nd volume
1647	15.89	98	1.00	56.0	13.0	.207	6.03		-0.57	0	
1655	15.89	98	1.00	64.0	14.2	.208	6.04		0.64	0	
1703	15.89	98	1.00	72.0	13.9	.208	6.04		-0.44	0	

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. µSiemens per cm (same as µmhos/cm) at 25°C.
3. Oxidation reduction potential (stand in for Eh).

EXAMPLE (Minimum Requirements) Page 1

Well PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name) NWIRP-Calverton
Well Number NP-MW04 Date 6/23/97
Field Personnel T. Bauer, E. Huss
Sampling Organization Brown & Root Env.
Identify MP TOC

Depth to (below MP) 37.05 / 47.05 of screen (top / bottom)
Pump Intake at (ft. below MP) 44'
Purging Device; (pump type) grundfos

Clock Time 24 HR	Water Depth below MP ft	Pump Dial[1]	Purge Rate ml/min	Cum. Volume Purged liters	Temp. °C	Spec. Cond.[2] µS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turb-idity NTU	Comments
											Start pumping ~~[illegible]~~ 1425
1429	40.04	148	0.95	4	15.0	.066	5.18		7.01	0	
1435	40.09	146	1.00	10	14.6	.065	5.14		6.65	0	
1442	40.10	146	1.00	16	14.5	.065	5.10		7.68	0	1 volume
1448	40.10	146	0.95	22	14.5	.064	5.07		7.44	0	
1454	40.10	146	0.95	28	14.6	.064	5.14		7.62	0	
1502	40.11	146	1.00	36	14.6	.064	5.09		7.41	1	2nd volume
1508	40.11	146	1.00	42	14.5	.064	5.10		7.37	1	
1514	40.11	146	1.00	48	14.6	.064	5.10		7.04	0	
1521	40.11	146	1.00	55	14.5	.064	5.10		7.37	0	

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. µSiemens per cm (same as µmhos/cm) at 25°C.
3. Oxidation reduction potential (stand in for Eh).

WL 40.04

EXAMPLE (Minimum Requirements)

Page____of____

Well PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name) NWIRP - Calverton
Well Number NP-MW05 Date 6/24/97
Field Personnel T. Sawyer + E. Huss
Sampling Organization Brown + Root Environmental
Identify MP TOC

Depth to (below MP) 5.62 top / 15.62 bottom of screen
Pump Intake at (ft. below MP) 10.5
Purging Device; (pump type) Grundfos

Clock Time 24 HR	Water Depth below MP ft	Pump Dial[1]	Purge Rate ml/min	Cum. Volume Purged liters	Temp. °C	Spec. Cond.[2] mS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turb-idity NTU	Comments
											Start Purge 1145
1152	8.62	74	1.00	7	14.4	.046	4.96		6.60	2	
1158	8.62	70	1.00	13	12.5	.060	5.47		3.83	0	
1203	8.60	67	1.00	18	12.7	.067	5.58		3.56	0	
1207	8.60	67	1.00	22	13.1	.066	5.57		3.62	0	
1210	8.61	67	1.00	25	13.2	.067	5.57		3.66	0	
1214	8.61	67	1.00	29	13.3	.067	5.56		3.78	0	

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. µSiemens per cm (same as µmhos/cm) at 25°C.
3. Oxidation reduction potential (stand in for Eh).

EXAMPLE (imum Requirements) Page__ of 1

Well PURGING-FIELD WA..R QUALITY MEASUREMENTS FORM

Location (Site/Facility Name) NWIRP
Well Number NP-MW06 Date 6/24/97
Field Personnel J. Sawyer, E. Huss
Sampling Organization Brown & Root Environmental
Identify MP TOC

Depth to 5.53/ 15.53 of screen
(below MP) top bottom
Pump Intake at (ft. below MP) 10'
Purging Device; (pump type) Grundfos

Clock Time 24 HR	Water Depth below MP ft	Pump Dial[1]	Purge Rate ml/min	Cum. Volume Purged liters	Temp. °C	Spec. Cond.[2] µS/cm	pH	ORP/ Eh[3] mv	DO mg/L	Turb-idity NTU	Comments
											Start Purge 1100
1103	4.65	48	1.00	3	14.8	.080	6.04		-0.46	1	
1108	4.68	48	1.00	8	14.5	.073	5.96		-0.46	1	
1112	4.67	48	1.00	12	14.3	.071	5.90		-0.53	1	
1115	4.67	48	1.00	15	14.2	.070	5.90		-0.54	1	
1119	4.68	48	1.00	19	14.2	.070	5.88		-0.52	1	

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. µSiemens per cm (same as µmhos/cm) at 25°C.
3. Oxidation reduction potential (stand in for Eh).

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWTRP Culverton
PROJECT NUMBER: 7398 / CTO 270

WELL I.D.: NP-MW01
DATE: 11/13/97

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	Temp. (Celcius)	pH (S.U.)	Cond.	DO (mg/L)	Sal. %	Turb. (NTU)	Comments
1555	45.87	900	9.9	5.10	0.057	8.10	0.00	0.0	
1600	45.87	900	12.6	5.11	0.058	7.86	0.00	0.0	
1605	45.87	900	13.2	5.12	0.058	7.82	0.00	0.0	
1610	45.87	900	13.1	5.14	0.058	8.00	0.00	0.0	
1615	45.87	900	13.5	5.12	0.058	7.62	0.00	0.0	
1620	45.87	900	13.7	5.11	0.058	6.74	0.00	0.0	
1625	45.87	900	13.7	5.11	0.057	7.25	0.00	0.0	Purge ends
									8 gallons purged
									Sample 1635

SIGNATURE(S)

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWIRP- Calverton
PROJECT NUMBER: 7398

WELL I.D.: NP-MW02-S
DATE: 11/11/97

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	Temp. (Celcius)	pH (S.U.)	Cond.	DO (mg/L)	Sal. %	Turb. (NTU)	Comments
1500		950	13.5	6.74	1.90	1.64	0.08	38	
1510	19.41	950	13.6	6.76	1.89	3.08	0.08	32	
1515	19.41	950	13.7	6.77	1.90	3.15	0.08	33	
1520	19.41	950	14.1	6.76	1.91	2.91	0.08	29	
1525	19.41	950	14.5	6.77	1.90	2.90	0.08	22	
1530	19.41	950	14.7	6.77	1.91	2.75	0.08	17	
1535	19.41	950	14.4	6.75	1.92	2.76	0.09	9	
1540	19.41	950	14.3	6.75	1.93	2.69	0.09	4	stop. Tot. Amt: 9 gals
									Collect sample at 1545

SIGNATURE(S) Paul M. Dini

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LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWIRP - Calverton
PROJECT NUMBER: 7398

WELL I.D.: NP-MW02-I
DATE: 11/11/97

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	Temp. (Celcius)	pH (S.U.)	Cond.	DO (mg/L)	Sal. %	Turb. (NTU)	Comments
1600	19.00	1000	12.0	7.89	0.371	2.14	0.01	5	
1605	19.00	1000	12.2	7.53	0.349	2.09	0.01	9	
1610	19.00	1000	12.2	7.16	0.322	2.40	0.01	7	
1615	19.00	1000	12.4	7.12	0.315	2.35	0.01	7	
1620	19.00	1000	12.6	6.92	0.296	2.44	0.01	7	
1625	19.00	1000	12.4	6.90	0.271	2.27	0.01	7	
1630	19.00	1000	12.3	6.57	0.255	3.47	0.00	6	
1635	19.00	1000	12.2	6.49	0.239	4.45	0.00	5	
1640	19.00	1000	12.2	6.48	0.234	5.10	0.00	3	
1645	19.00	1000	12.2	6.48	0.230	5.21	0.00	2	
1650	19.00	1000	12.2	6.47	0.229	5.41	0.00	1	Stop purging
									Total amount purged
									= 50L = 13.2gal.
									Sampled at 1655

SIGNATURE(S) Paulm. D

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWIRP Calverton
PROJECT NUMBER: 7398

WELL I.D.: NP-MW03
DATE: 11/13/97

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	Temp. (Celcius)	pH (S.U.)	Cond.	DO (mg/L)	Sal. %	Turb. (NTU)	Comments
0855	17.80	1000	15.5	5.75	0.225	0.38	0.00	0.0	
0900	17.80	1000	15.7	5.86	0.216	2.14	0.00	0.0	
0905	17.80	1000	15.8	5.88	0.215	2.36	0.00	0.0	
0910	17.80	1000	16.2	5.89	0.212	2.53	0.00	0.0	
0915	17.80	1000	16.3	5.88	0.213	2.13	0.00	0.0	
0920	17.80	1000	16.1	5.86	0.216	1.60	0.00	0.0	
0925	17.80	1000	15.9	5.85	0.220	1.40	0.00	0.0	Stop purge ≅ 8gal. purged
									Sampled at 1010

SIGNATURE(S)

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWIRP Calverton
PROJECT NUMBER: 7398

WELL I.D.: NP-MW04
DATE: 11/13/97

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	Temp. (Celcius)	pH (S.U.)	Cond.	DO (mg/L)	Sal. %	Turb. (NTU)	Comments
1405	42.10'	1000	11.2	4.85	0.048	7.08	0.00	0.0	
1410	42.10'	1000	12.3	4.77	0.053	10.19	0.00	0.0	
1415	42.10'	1000	12.6	4.77	0.052	7.49	0.00	0.0	
1420	42.10'	1000	13.9	4.77	0.052	7.01	0.00	0.0	
1425	42.10'	1000	13.6	4.78	0.054	7.62	0.00	0.0	
1430	42.10'	1000	13.3	4.77	0.053	6.99	0.00	0.0	
1435	42.10'	1000	13.3	4.79	0.055	7.94	0.00	0.0	
1440	42.10'	1000	13.3	4.77	0.053	7.96	0.00	0.0	Stop Purge 6.6 gallons purged
									1450 collect sample

SIGNATURE(S)

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWIRP Calverton
PROJECT NUMBER: 7398

WELL I.D.: NP-MW05
DATE: 11/12/97

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	Temp. (Celcius)	pH (S.U.)	Cond.	DO (mg/L)	Sal. %	Turb. (NTU)	Comments
1115	10.51	1000	11.7	4.81	0.056	4.81	0.00	0.0	
1120	10.52	1000	14.1	4.79	0.059	3.44	0.00	0.0	
1125	10.52	1000	14.5	5.17	0.063	9.68	0.00	0.0	
1130	10.52	1000	15.3	5.20	0.060	3.37	0.00	0.0	
1135	10.52	1000	15.1	5.37	0.059	3.93	0.00	0.0	
1140	10.52	950	15.0	5.38	0.064	2.49	0.00	0.0	
1145	10.52	950	14.9	5.36	0.062	2.84	0.00	0.0	
1150	10.52	950	15.0	5.34	0.063	2.79	0.00	0.0	
1158									STOP PUMP After sample collection
									≅10.5 gallons purged

SIGNATURE(S) [signature]

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NWIRP Calverton
PROJECT NUMBER: 7398

WELL I.D.: NP-MW06
DATE: 11/12/97

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	Temp. (Celcius)	pH (S.U.)	Cond.	DO (mg/L)	Sal. %	Turb. (NTU)	Comments
0907	6.60	980	13.0	5.56	0.070	1.88	0.00	0	
0912	6.60	1000	14.4	5.71	0.074	8.50	0.00	30	
0917	6.60	1000	14.7	5.71	0.074	8.22	0.00	28	
0922	6.60	1000	14.8	5.73	0.075	8.17	0.00	21	
0927	6.60	1000	14.8	5.72	0.068	2.30	0.00	9	
0932	6.60	1000	14.9	5.72	0.070	2.53	0.00	0	
0937	6.60	1000	14.9	5.73	0.070	2.14	0.00	0	Stop Pump
									Total Amount Purged
									≅ 8 gallons

SIGNATURE(S)

APPENDIX H

CONCEPTUAL DESIGN CALCULATIONS

TETRA TECH NUS, INC. **CALCULATION WORKSHEET**

CLIENT NWIRP CALVERTON	JOB NUMBER CTO 189 N4570
SUBJECT ALTERNATIVE 2 - BANK STABILIZATION AND CAPPING	
BASED ON	DRAWING NUMBER

BY	CHECKED BY	APPROVED BY	DATE
KCT 6/5/01			

VOLUME ESTIMATES FOR EXCAVATION, CONSOLIDATION, BANK STABILIZATION, DRAINAGE DITCHES, AND AREA TO BE CAPPED ARE FROM THE ENGINEERING EVALUATION / COST ANALYSIS (EE/CA) FOR SITE 1 (TENUS, 2001)

CAP COMPONENTS - AREA TO BE CAPPED = 65,500 ft^2

GEOTEXTILE $\frac{65{,}500\ ft^2 \mid yd^2}{\mid 9\ ft^2} = 7{,}278\ sy$

GAS VENTING LAYER (12 in) $\frac{65{,}500\ ft^2 \mid 1\ ft \mid yd^3}{\mid \mid 27\ ft^3} = 2{,}426\ cy \Rightarrow 2430\ cy$

GEOMEMBRANE 65,500 sf

COVER SOIL (24 in) $\frac{65{,}500\ ft^2 \mid 2\ ft \mid yd^3}{\mid \mid 27\ ft^3} = 4{,}852\ cy \Rightarrow 4{,}860\ cy$

TOP SOIL (6 in) $\frac{65{,}500\ ft^2 \mid 0.5\ ft \mid yd^3}{\mid \mid 27\ ft^3} = 1{,}213\ cy \Rightarrow 1{,}215\ cy$

VEGETATION 65,500 sf

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NWIRP CALVERTON		JOB NUMBER CTO 189 N4570	
SUBJECT ALTERNATIVE 3 - LANDFILL REMOVAL			
BASED ON		DRAWING NUMBER	
BY KCT 6/5/01	CHECKED BY	APPROVED BY	DATE

LANDFILL VOLUME - AREA ~ 70,000 ft^2

AVG. DEPTH OF FILL = 8 ft

$$\frac{70{,}000\ ft^2 \mid 8\ ft \mid yd^3}{\mid \mid 27\ ft^3} = 20{,}741\ cy \Rightarrow 21{,}000\ cy$$

ASSUME 90% NONHAZARDOUS WASTE & DEBRIS ~ 19,000 cy

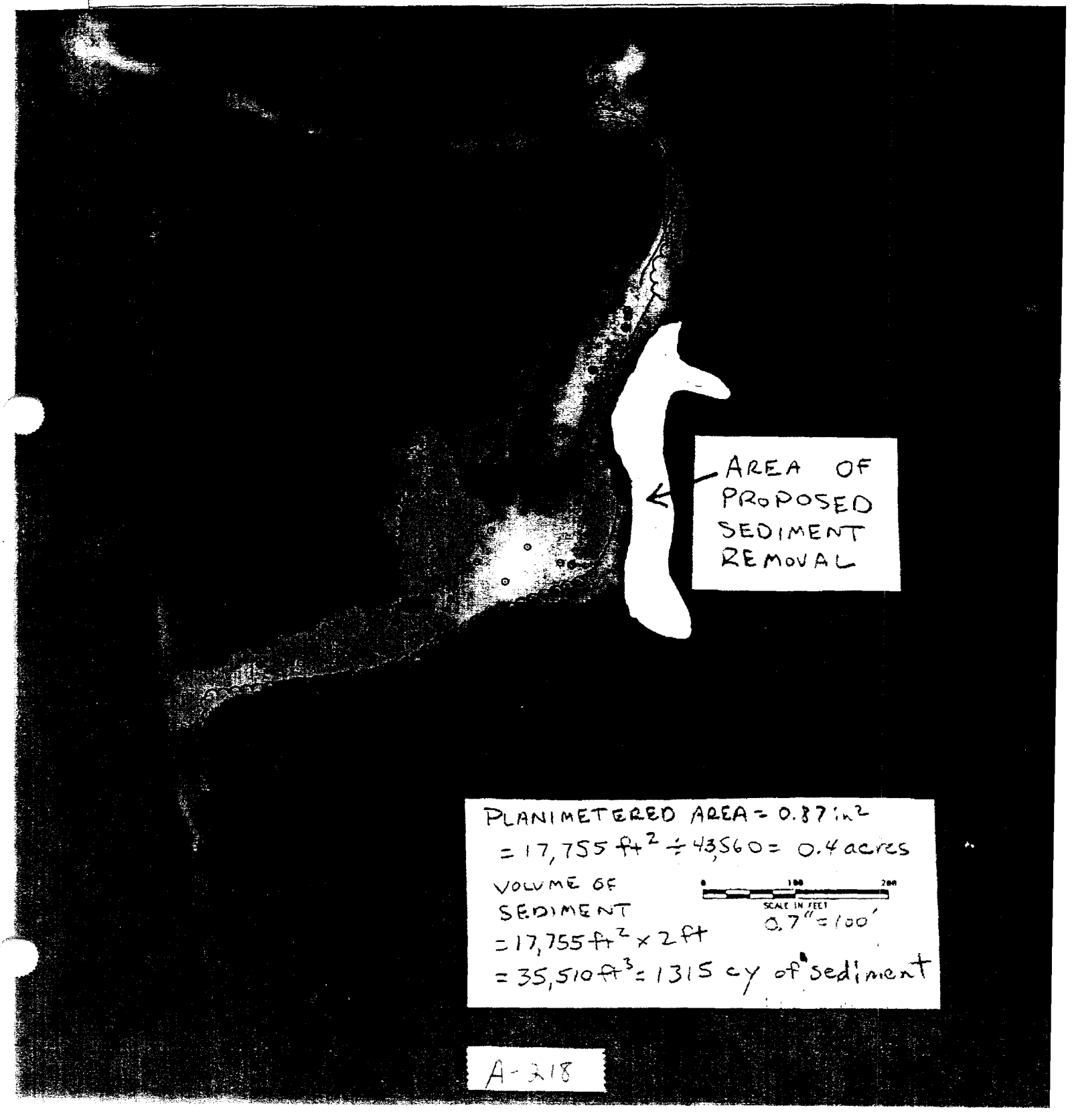
ASSUME 2,400 cy DEBRIS AND 16,600 cy NONHAZARDOUS

HAZARDOUS & PCB WASTE = 21,000 cy - 19,000 cy = 2,000 cy

ASSUME 50 cy PCB AND 1,950 cy HAZARDOUS

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT NORTHERN DIVISION-NFAC	JOB NUMBER CTO 189 N4570
SUBJECT VOLUME OF CONTAMINATED SEDIMENT TO REMOVE	
BASED ON ALT 2 AND ALT 3	DRAWING NUMBER
BY NJB 8/31/00 / CHECKED BY	APPROVED BY / DATE



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APPENDIX I

COST ESTIMATES

Site 1 - Northeast Pond
Naval Weapons Industrial Reserve Plant
Calverton, New York
Alternative 2 - Bank Stabilization, Sediment Removal, and Capping

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost	Comments
1 MOBILIZATION/DEMOBILIZATION AND FIELD SUPPORT												
1.1 Office Trailer	6	mo	$200.50	$0.00	$0.00	$0.00	$1,203	$0	$0	$0	$1,203	
1.2 *Field Office Expenses*	6	*mo*		$374.00	$0.00	$0.00	$0	$2,244	$0	$0	$2,244	
1.3 Storage Trailer	6	mo	$103.00	$0.00	$0.00	$0.00	$618	$0	$0	$0	$618	
1.4 Construction Survey Services	2	ls	$6,380.00	$0.00	$0.00	$0.00	$12,760	$0	$0	$0	$12,760	pre/post-construction w/ topo
1.5 Equipment Mobilization/Demobilization	1	ls	$25,000.00	$0.00	$0.00	$0.00	$25,000	$0	$0	$0	$25,000	
1.6 Site Utilities	6	mo	$1,000.00	$0.00	$0.00	$0.00	$6,000	$0	$0	$0	$6,000	including temporary set-up/tear-down
1.7 Pre and Post Construction Access Road Work	1	ls	$10,000.00	$0.00	$0.00	$0.00	$10,000	$0	$0	$0	$10,000	installation, removal, and E&S controls
1.8 Install new gate to site	1	ls	$0.00	$1,200.00	$730.00	$525.00	$0	$1,200	$730	$525	$2,455	20 foot wide
1.9 Upgrade road to site	502	cy	$0.00	$10.00	$9.00	$0.00	$0	$5,020	$4,518	$0	$9,538	1700 feet, 12 foot wide, 8" thick
1.10 Site Preparation	1	ls	$7,000.00	$0.00	$0.00	$0.00	$7,000	$0	$0	$0	$7,000	
2 DECONTAMINATION												
2.1 Decontamination Trailer	6	mo	$2,350.00	$0.00	$0.00	$0.00	$14,100	$0	$0	$0	$14,100	
2.2 Equipment Decon Pad	1	ls		$500.00	$450.00	$155.00	$0	$500	$450	$155	$1,105	
2.3 Decon Water	6000	gal		$0.20			$0	$1,200	$0	$0	$1,200	
2.4 Decon Water Storage Tank, 6,000 gallon	6	mo	$600.00				$3,600	$0	$0	$0	$3,600	
2.5 Clean Water Storage Tank, 4,000 gallon	6	mo	$540.00				$3,240	$0	$0	$0	$3,240	
2.6 PPE (5 p * 5 days * 12 weeks)	300	day		$30.90			$0	$9,270	$0	$0	$9,270	
2.7 Disposal of Decon Waste (liquid & solid)	6	mo	$900.00				$5,400	$0	$0	$0	$5,400	
3 GROUTING												
3.1 Grout	20	cy	$50.00	$0.00	$0.00	$0.00	$1,000	$0	$0	$0	$1,000	flowable fill w/ no aggregate
4 SEDIMENT REMOVAL												
4.1 *Contaminant Delineation Sampling & Analysis*	1	event	$10,000.00	$0.00	$0.00	$0.00	$10,000	$0	$0	$0	$10,000	
4.2 Sediment Excavation (2 cy, hydraulic excavator, Level I	1,315	cy	$0.00	$0.00	$2.15	$3.28	$0	$0	$2,822	$4,313	$7,136	labor & equipment 4x for 25% prod
4.3 Haul Sediment (1.3 x bulking factor)	1,710	cy	$0.00	$0.00	$4.44	$9.20	$0	$0	$7,591	$15,732	$23,323	labor & equipment 4x for 25% prod
4.4 *Condition Waste*	1,710	*cy*	$0.00	$0.00	$1.37	$3.42	$0	$0	$2,336	$5,848	$8,184	labor & equipment 2x for 50% prod
4.5 Haul to Landfill (assume 10% cannot be consolidated)	170	tons	$7.49	$0.00	$0.00	$0.00	$1,273	$0	$0	$0	$1,273	$3.75/loaded mile x 40 miles
4.6 Disposal (Non-Haz Landfill)	170	tons	$22.00	$0.00	$0.00	$0.00	$3,740	$0	$0	$0	$3,740	
4.7 *Archeological Investigation (Native American Artifacts)*	1	ls	$10,000.00	$0.00	$0.00	$0.00	$10,000	$0	$0	$0	$10,000	
5 LANDFILL EXCAVATION												
5.1 Excavate Fill and Sand from Bank (Level D)	4,500	cy	$0.00	$0.00	$9.24	$6.90	$0	$0	$41,570	$31,050	$72,620	labor & equip, 1.5x for location
5.2 Oversized Debris	430	cy	$0.00	$0.00	$61.59	$46.00	$0	$0	$26,482	$19,780	$46,262	*labor & equipment, 10X*
6 LANDFILL DISPOSAL												
6.1 Load Non- Hazardous Oversized Debris	430	cy	$0.00	$0.00	$47.50	$49.90	$0	$0	$20,425	$21,457	$41,882	3x soil load cost
6.2 T & D for Non- Hazardous Oversized Debris	700	tons	$34.00	$0.00	$0.00	$0.00	$23,800	$0	$0	$0	$23,800	
7 BANK STABILIZATION AND CAPPING												
7.1 Geotechnical Investigation & Laboratory Testing	1	ls	$10,000.00	$0.00	$0.00	$0.00	$10,000	$0	$0	$0	$10,000	
7.2 Soil Fill (on-site borrow source) (Level D)	4,940	cy	$0.00	$0.00	$9.24	$6.90	$0	$0	$45,635	$34,086	$79,721	labor & equip, 1.5x
7.3 Compact Fill, 12" lifts, 2 passes (Level D)	4,940	cy	$0.00	$0.00	$0.07	$0.07	$0	$0	$361	$346	$707	
7.4 Geotextile	7,278	sy		$1.25	$0.15		$0	$9,097	$1,092	$0	$10,189	
7.5 Gas Vent Layer, 12" thick, $k<10^{-3}$ cm/sec, delivered	2,430	cy	$18.15	$0.00	$0.00	$0.00	$44,105	$0	$0	$0	$44,105	vendor quote
7.6 Spread Gas Vent Layer, from stockpile, 300' haul	2,430	cy			$0.56	$1.28	$0	$0	$1,361	$3,110	$4,471	
7.7 Compact Gas Vent Layer, 12" lift, 4 passes	2,430	cy			$0.13	$0.14	$0	$0	$316	$340	$656	
7.8 40 mil LLDPE Geomembrane	65,500	sf		$0.28	$0.79	$0.17	$0	$18,340	$51,745	$11,135	$81,220	
7.9 Cover Soil, 2' thick, delivered	4,860	cy	$16.25	$0.00	$0.00	$0.00	$78,975	$0	$0	$0	$78,975	vendor quote
7.10 Spread Cover Soil, from stockpile, 300' haul	4,860	cy			$0.56	$1.28	$0	$0	$2,722	$6,221	$8,942	
7.11 Compact Cover Soil, 12" lift, 2 passes	4,860	cy	$0.00	$0.00	$0.06	$0.07	$0	$0	$292	$340	$632	
7.12 Top Soil, 6" thick, delivered	1,215	cy	$26.00	$0.00	$0.00	$0.00	$31,590	$0	$0	$0	$31,590	vendor quote
7.13 Spread Topsoil, from stockpile, 300' haul	1,215	cy			$0.56	$1.28	$0	$0	$680	$1,555	$2,236	
7.14 Compact Topsoil, 6' lift, 2 passes	1,215	cy	$0.00	$0.00	$0.11	$0.12	$0	$0	$134	$146	$279	
7.15 Erosion Control Mat	5,500	sy	$0.00	$3.76	$1.56	$0.52	$0	$20,680	$8,580	$2,860	$32,120	labor & equipment 2x for 50% prod
7.16 *Vegetation*	65.5	*msf*	$70.50	$0.00	$0.00	$0.00	$4,618	$0	$0	$0	$4,618	
7.17 Miscellaneous Excavation / Surface Preparation	38	cy	$0.00	$0.00	$1.07	$1.64	$0	$0	$41	$62	$103	labor & equipment 2x for 50% prod
7.18 Diversion Trench Along Crest of East Slope	700	lf	$12.00	$0.00	$0.00	$0.00	$8,400	$0	$0	$0	$8,400	
7.19 *Diversion Trench Along Top of Landfill at Treeline*	400	lf	$12.00	$0.00	$0.00	$0.00	$4,800	$0	$0	$0	$4,800	
7.20 Rip Rap Channel down the South Slope Face	1	ls	$2,500.00	$0.00	$0.00	$0.00	$2,500	$0	$0	$0	$2,500	
8 E & S CONTROL MEASURES												
8.1 Drainage Ditch Reconstruction at toe of South Slope	450	ft	$12.00	$0.00	$0.00	$0.00	$5,400	$0	$0	$0	$5,400	
8.1 Super Silt Fence	1,000	lf	$0.00	$0.30	$0.38	$0.00	$0	$300	$380	$0	$680	silt fence in adverse conditions
8.3 Regrade Landfill Surface	1	ls	$4,000.00	$0.00	$0.00	$0.00	$4,000	$0	$0	$0	$4,000	
9 MISCELLANEOUS SITE WORK												

Naval Weapons Industrial Reserve Plant
Calverton, New York
Alternative 2 - Bank Stabilization, Sediment Removal, and Capping

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost	Comments
9.1 Clearing and Grubbing	0.5	acres	$1,500.00	$0.00	$0.00	$0.00	$750	$0	$0	$0	$750	
9.2 Ecological considerations	1	ls	$10,000.00	$0.00	$0.00	$0.00	$10,000	$0	$0	$0	$10,000	
10 GAS VENTS												
10.1 Gas Vent Installation (3 at 20' each)	60	lf	$35.00	$0.00	$0.00	$0.00	$2,100	$0	$0	$0	$2,100	
10.2 Gas Vent Stick-up and Hood	3	ea	$550.00	$0.00	$0.00	$0.00	$1,650	$0	$0	$0	$1,650	
10.3 Gas Vent Development	6	hr	$35.00	$0.00	$0.00	$0.00	$210	$0	$0	$0	$210	
10.4 Collect/Containerize IDW and Soil	3	ea	$50.00	$0.00	$0.00	$0.00	$150	$0	$0	$0	$150	
10.5 Transport/Dispose IDW and Soil Off Site	3	drums	$150.00	$0.00	$0.00	$0.00	$450	$0	$0	$0	$450	
11 MONITORING WELL INSTALLATION												
11.1 Monitoring Well Installation (3 at 20' each)	60	lf	$35.00	$0.00	$0.00	$0.00	$2,100	$0	$0	$0	$2,100	
11.2 Well protection pad with posts	3	ea	$500.00	$0.00	$0.00	$0.00	$1,500	$0	$0	$0	$1,500	
11.3 Monitoring Well Development	6	hr	$35.00	$0.00	$0.00	$0.00	$210	$0	$0	$0	$210	
11.4 Collect/Containerize IDW and Soil	3	ea	$50.00	$0.00	$0.00	$0.00	$150	$0	$0	$0	$150	
11.5 Transport/Dispose IDW and Soil Off Site	3	drums	$150.00	$0.00	$0.00	$0.00	$450	$0	$0	$0	$450	
12 OFFICE SUPPORT/FIELD SUPPORT												
12.1 Field Oversight Personnel (1 person - full time)	1032	hours	$0.00	$0.00	$25.00	$0.00	$0	$0	$25,800	$0	$25,800	
12.2 Office Oversight Personnel (2 people - 1/4 time)	516	hours	$0.00	$0.00	$30.00	$0.00	$0	$0	$15,480	$0	$15,480	
12.3 Air Monitoring/Health & Safety Officer (1/2 time)	516	hours	$0.00	$0.00	$25.00		$0	$0	$15,480	$0	$15,480	
13 PROJECT DOCUMENTATION												
13.1 Pre- and Post-Construction Submittals	100	hours	$0.00	$0.00	$30.00	$0.00	$0	$0	$3,000	$0	$3,000	
13.2 Permitting/Planning Documents	250	hours	$0.00	$0.00	$50.00	$0.00	$0	$0	$12,500	$0	$12,500	
13.3 Prepare Deed Restrictions	40	hours	$0.00	$0.00	$40.00		$0	$0	$1,600	$0	$1,600	
Subtotal Direct Costs less Subcontract								$67,851	$294,121	$159,062	$521,034	
Local Area Adjustments								116.6%	131.1%	131.1%		
Subtotal								$79,115	$385,593	$208,530	$673,238	
Overhead on Labor Cost @ 30%									$115,678		$115,678	
G & A on Labor Cost @ 10%									$38,559		$38,559	
G & A on Material Cost @ 10%								$7,911			$7,911	
Total Direct Cost								$87,026	$539,830	$208,530	$835,386	
Indirects on Total Direct Labor Cost @ 75%									$404,872		$404,872	
Profit on Total Direct Cost @ 10%											$83,539	
Subtotal											$1,323,797	
Health & Safety Monitoring @ 0.5%											$6,619	
Total Field Cost											**$1,330,416**	
Subtotal Subcontractor Cost							$352,842				$352,842	
G & A on Subcontract Cost @ 10%							$35,284				$35,284	
Profit on Subcontractor Cost @ 5%											$17,642	
Subcontractor Cost											**$405,768**	
Subtotal											**$1,736,184**	
Contingency on Total Field and Subcontractor Costs @ 15%											$260,428	
Engineering on Total Field Cost @ 8%											$106,433	
TOTAL COST											**$2,103,045**	

Site 1 - Northeast Pond
Naval Weapons Industrial Reserve Plant
Calverton, New York
Alternative 2 - Bank Stabilization and Capping
Annual Operating and Maintenance Costs

	Item	Qty	Unit	Unit Cost	Subtotal Cost	Notes
1	Soil Cap Maintenance	1	ea	$5,000.00	$5,000	Years 1-30
2	Quarterly Inspections	4	ea	$1,000.00	$4,000	Years 1-30, local labor
	Total Annual Cost				$9,000	

Site 1 - Northeast Pond
Naval Weapons Industrial Reserve Plant
Calverton, New York
Alternative 2 - Bank Stabilization, Sediment Removal, and Capping
Annual Sampling Cost

Item	Annual Cost Year 1*	Annual Cost Years 2 thru 30*	Item Cost per 5 Years	Notes
Sampling	$17,088	$4,272		Collect groundwater samples plus travel, per diem and shipping
Analysis/Water	$28,000	$7,000		Water samples, 7 wells plus 3 QA samples per sampling period, for TCL VOCs, TCL SVOCs, TCL pesticides, TCL PCBs, and TAL metals/CN.
Report	$20,000	$5,000		Obtain lab, prepare sampling plan, document sampling events and results
Site Review	$0	$0	$20,000	Review of documents and data evaluation/recommendations; preparation of summary reports for 5-year reviews
TOTALS	$65,088	$16,272	$20,000	

* Quarterly year 1
** Annually years 2 through 30

Site 1 - Northeast Pond
Naval Weapons Industrial Reserve Plant
Calverton, New York
Alternative 2 - Bank Stabilization and Capping
Present Worth Analysis

Year	Capital Cost	Maintenance Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 7%	Present Worth
0	$2,103,045			$2,103,045	1.000	$2,103,045
1		$9,000	$65,088	$74,088	0.935	$69,272
2		$9,000	$16,272	$25,272	0.873	$22,062
3		$9,000	$16,272	$25,272	0.816	$20,622
4		$9,000	$16,272	$25,272	0.763	$19,283
5		$9,000	$36,272	$45,272	0.713	$32,279
6		$9,000	$16,272	$25,272	0.666	$16,831
7		$9,000	$16,272	$25,272	0.623	$15,744
8		$9,000	$16,272	$25,272	0.582	$14,708
9		$9,000	$16,272	$25,272	0.544	$13,748
10		$9,000	$36,272	$45,272	0.508	$22,998
11		$9,000	$16,272	$25,272	0.475	$12,004
12		$9,000	$16,272	$25,272	0.444	$11,221
13		$9,000	$16,272	$25,272	0.415	$10,488
14		$9,000	$16,272	$25,272	0.388	$9,806
15		$9,000	$36,272	$45,272	0.362	$16,388
16		$9,000	$16,272	$25,272	0.339	$8,567
17		$9,000	$16,272	$25,272	0.317	$8,011
18		$9,000	$16,272	$25,272	0.296	$7,481
19		$9,000	$16,272	$25,272	0.277	$7,000
20		$9,000	$36,272	$45,272	0.258	$11,680
21		$9,000	$16,272	$25,272	0.242	$6,116
22		$9,000	$16,272	$25,272	0.226	$5,711
23		$9,000	$16,272	$25,272	0.211	$5,332
24		$9,000	$16,272	$25,272	0.197	$4,979
25		$9,000	$36,272	$45,272	0.184	$8,330
26		$9,000	$16,272	$25,272	0.172	$4,347
27		$9,000	$16,272	$25,272	0.161	$4,069
28		$9,000	$16,272	$25,272	0.150	$3,791
29		$9,000	$16,272	$25,272	0.141	$3,563
30		$9,000	$36,272	$45,272	0.131	$5,931
					TOTAL PRESENT WORTH	**$2,505,408**

Site 1 - Northeast Pond
Naval Weapons Industrial Reserve Plant
Calverton, New York
Alternative 3 - Excavation and Off-Site Disposal
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost	Comments
1 MOBILIZATION/DEMOBILIZATION AND FIELD SUPPORT												
1.1 Office Trailer	15	mo	$200.50	$0.00	$0.00	$0.00	$3,008	$0	$0	$0	$3,008	
1.2 Field Office Expenses	15	mo		$374.00			$0	$5,610	$0	$0	$5,610	
1.3 Storage Trailer	15	mo	$103.00	$0.00	$0.00	$0.00	$1,545	$0	$0	$0	$1,545	
1.4 Construction Survey Services	2	ls	$6,380.00	$0.00	$0.00	$0.00	$12,760	$0	$0	$0	$12,760	pre/post-construction w/ topo
1.5 Equipment Mobilization/Demobilization	1	ls	$20,000.00				$20,000	$0	$0	$0	$20,000	
1.6 Site Utilities	15	mo	$1,000.00	$0.00	$0.00	$0.00	$15,000	$0	$0	$0	$15,000	including temporary set-up/tear-down
1.7 Pre and Post Construction Access Road Work	1	ls	$10,000.00	$0.00	$0.00	$0.00	$10,000	$0	$0	$0	$10,000	installation, removal, and E&S controls
1.8 Install new gate to site	1	ls	$0.00	$1,200.00	$730.00	$525.00	$0	$1,200	$730	$525	$2,455	20 foot wide
1.9 Upgrade road to site	502	cy	$0.00	$10.00	$9.00	$0.00	$0	$5,020	$4,518	$0	$9,538	1700 feet, 12 foot wide, 8" thick
2 DECONTAMINATION												
2.1 Decontamination Trailer	15	mo	$2,350.00				$35,250	$0	$0	$0	$35,250	
2.2 Equipment Decon Pad	1	ls		$500.00	$450.00	$155.00	$0	$500	$450	$155	$1,105	
2.3 Excavated Const Debris & Metal Decon Pad	1	ls		$500.00	$450.00	$155.00	$0	$500	$450	$155	$1,105	
2.4 Decon Water	15000	gal		$0.20			$0	$3,000	$0	$0	$3,000	
2.5 Decon Water Storage Tank, 6,000 gallon	15	mo	$600.00				$9,000	$0	$0	$0	$9,000	
2.6 Clean Water Storage Tank, 4,000 gallon	15	mo	$540.00				$8,100	$0	$0	$0	$8,100	
2.7 PPE (5 p * 5 days * 65 weeks)	1624	day		$30.90			$0	$50,174	$0	$0	$50,174	
2.8 Disposal of Decon Waste (liquid & solid)	15	mo	$900.00				$13,500	$0	$0	$0	$13,500	
3 SEDIMENT REMOVAL												
3.1 Contaminant Delineation Sampling & Analysis	1	event	$10,000.00	$0.00	$0.00	$0.00	$10,000	$0	$0	$0	$10,000	
3.2 Sediment Excavation (2 cy, hydraulic exc, Level D)	1,315	cy	$0.00	$0.00	$2.15	$3.28	$0	$0	$2,822	$4,313	$7,136	labor & equipment 4x for 25 % prod
3.3 Haul Sediment (1.3 x bulking factor)	1,710	cy	$0.00	$0.00	$4.44	$9.20	$0	$0	$7,591	$15,732	$23,323	labor & equipment 4x for 25 % prod
3.4 Condition Waste	1,710	cy	$0.00	$0.00	$1.37	$3.42	$0	$0	$2,336	$5,848	$8,184	labor & equipment 2x for 50 % prod
3.5 T & D Sediment (Non-Haz Landfill)	1,710	tons	$95.00	$0.00	$0.00	$0.00	$162,450	$0	$0	$0	$162,450	vendor quote
3.6 Archeological Investigation (Native Am. Artifacts)	1	ls	$10,000.00	$0.00	$0.00	$0.00	$10,000	$0	$0	$0	$10,000	
4 LANDFILL EXCAVATION AND DISPOSAL												
4.1 Clear and Grub Staging Area, Stumps to 6"	0.12	ac			$1,490.00	$1,830.00	$0	$0	$172	$212	$384	
4.2 Fine Grade Staging Area	560	sy			$0.05	$0.05	$0	$0	$28	$28	$56	
4.3 Bituminous Concrete Staging Area, 4" thick	560	sy		$5.80	$0.49	$0.38	$0	$3,248	$274	$213	$3,735	
4.4 Concrete Block Walls, Six 20' x 30' x 6" high bays	1,800	sf		$1.55	$2.39		$0	$2,790	$4,302	$0	$7,092	
4.5 Disposal Tesing (TCLP),1 per 40 cy	465	ea	$785.00				$365,025	$0	$0	$0	$365,025	
4.6 Excavate Nonhazardous Waste, Level D	16,600	cy			$1.07	$1.64	$0	$0	$17,815	$27,224	$45,039	labor & equip 2x, 2 cy backhoe
4.7 Haul Nonhaz Waste to Staging Area	16,600	cy			$1.46	$1.10	$0	$0	$24,293	$18,260	$42,553	front end loader, 300' haul x 2 (600' haul)
4.8 T & D Nonhazardous Waste	21,580	tons	$95.00				$2,050,100	$0	$0	$0	$2,050,100	vendor quote
4.9 Excavate Hazardous Waste, Level B	1,950	cy			$2.10	$2.73	$0	$0	$4,086	$5,330	$9,416	labor & equipment 2x for 50 % prod
4.10 Haul Hazardous Waste to Staging Area	1,950	cy			$2.86	$1.83	$0	$0	$5,571	$3,575	$9,146	front end loader, 300' haul x 2 (600' haul)
4.11 T & D Hazardous Waste	2,535	tons	$180.00				$456,300	$0	$0	$0	$456,300	vendor quote
4.12 Excavate Hazardous PCB Waste, Level B	50	cy			$2.10	$2.73	$0	$0	$105	$137	$241	labor & equipment 2x for 50 % prod
4.13 Haul Hazardous PCB Waste to Staging Area	50	cy			$2.86	$1.83	$0	$0	$143	$92	$235	front end loader, 300' haul x 2 (600' haul)
4.14 T & D Hazardous PCB Waste	85	tons	$210.00				$17,850	$0	$0	$0	$17,850	vendor quote
4.15 Excavate Nonhazardous Oversized Debris, Level D	2,400	cy			$5.37	$8.20	$0	$0	$12,878	$19,680	$32,558	labor & equipment 10x
4.16 Haul Nonhaz Oversize Debris to Staging Area	2,400	cy			$2.93	$2.20	$0	$0	$7,024	$5,280	$12,304	front end loader, 2 x 300' haul x 2
4.17 T & D Oversize Debris - Concrete	3,000	tons	$34.00				$102,000	$0	$0	$0	$102,000	
4.18 Recycle Metal	1,000	tons	$0.00				$0	$0	$0	$0	$0	vendor quote, profit & hauling break even
4.19 Decon Concrete and Metal Debris	20	hr			$29.85		$0	$0	$597	$0	$597	avg rate, skilled worker
4.20 Concrete Demolition	1,000	sf			$1.98	$0.38	$0	$0	$1,980	$380	$2,360	4" thick concrete floors, wire mesh reinf
4.21 Confirmation Testing	20	ea	$875.00				$17,500	$0	$0	$0	$17,500	
5 SITE RESTORATION												
5.1 Finish Grading	7,278	sy			$0.05	$0.05	$0	$0	$364	$364	$728	
5.2 Top Soil, 6" thick, delivered	1,215	cy	$26.00	$0.00	$0.00	$0.00	$31,590	$0	$0	$0	$31,590	vendor quote

Site 1 - Northeast Pond
Naval Weapons Industrial Reserve Plant
Calverton, New York
Alternative 3 - Excavation and Off-Site Disposal
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost	Comments
5.3 Spread Topsoil, from stockpile, 300' haul	1,215	cy			$0.56	$1.28	$0	$0	$680	$1,555	$2,236	
5.4 Vegetation	65.5	msf	$70.50	$0.00	$0.00	$0.00	$4,618	$0	$0	$0	$4,618	
6 OFFICE SUPPORT/FIELD SUPPORT												
6.1 Field Oversight Personnel (1 person - full time)	2580	hours	$0.00	$0.00	$25.00	$0.00	$0	$0	$64,500	$0	$64,500	
6.2 Office Oversight Personnel (2 people - 1/4 time)	1290	hours	$0.00	$0.00	$30.00	$0.00	$0	$0	$38,700	$0	$38,700	
6.3 Air Monitoring/Health & Safety Officer (full time)	2580	hours	$0.00	$0.00	$25.00		$0	$0	$64,500	$0	$64,500	
6.4 Archeological Investigation (Native Am. Artifacts)	2580	hours	$0.00	$0.00	$30.00		$0	$0	$77,400	$0	$77,400	
7 PROJECT DOCUMENTATION												
7.1 Pre- and Post-Construction Submittals	100	hours	$0.00	$0.00	$30.00	$0.00	$0	$0	$3,000	$0	$3,000	
7.2 Permitting/Planning Documents	250	hours	$0.00	$0.00	$50.00	$0.00	$0	$0	$12,500	$0	$12,500	
Subtotal Direct Costs less Subcontract								$72,042	$359,809	$109,057	$540,909	
Local Area Adjustments								116.6%	131.1%	131.1%		
Subtotal								$84,001	$471,710	$142,974	$698,685	
Overhead on Labor Cost @ 30%									$141,513		$141,513	
G & A on Labor Cost @ 10%									$47,171		$47,171	
G & A on Material Cost @ 10%								$8,400			$8,400	
Total Direct Cost								$92,401	$660,394	$142,974	$895,769	
Indirects on Total Direct Labor Cost @ 75%									$495,296		$495,296	
Profit on Total Direct Cost @ 10%											$89,577	
Subtotal											$1,480,642	
Health & Safety Monitoring @ 0.5%											$7,403	
Total Field Cost											**$1,488,045**	
Subtotal Subcontractor Cost							$3,355,595				$3,355,595	
G & A on Subcontract Cost @ 10%							$335,560				$335,560	
Profit on Subcontractor Cost @ 5%											$167,780	
Subcontractor Cost											**$3,858,935**	
Subtotal											**$5,346,980**	
Contingency on Total Field and Subcontractor Costs @15%											$802,047	
Engineering on Total Field Cost @8%											$119,044	
TOTAL COST											**$6,268,070**	

Site 1 - Northeast Pond
Naval Weapons Industrial Reserve Plant
Calverton, New York
Alternative 3 - Excavation and Off-Site Disposal
Annual Sampling Cost

Item	Annual Cost Year 1*	Notes
Sampling	$17,088	Collect groundwater samples plus travel, per diem and shipping
Analysis/Water	$28,000	Water samples, 7 wells plus 3 QA samples per sampling period, for TCL VOCs, TCL SVOCs, TCL pesticides, TCL PCBs, and TAL metals/CN.
Report	$20,000	Obtain lab, prepare sampling plan, document sampling events and results
TOTALS	$65,088	

* Quarterly year 1

Site 1 - Northeast Pond
Naval Weapons Industrial Reserve Plant
Calverton, New York
Alternative 3 - Excavation and Off-Site Disposal
Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 7%	Present Worth
0	$6,268,070		$6,268,070	1.000	$6,268,070
1		$65,088	$65,088	0.935	$60,857
				TOTAL PRESENT WORTH	**$6,328,927**

Site 1 - Northeast Pond
Naval Weapons Industrial Reserve Plant
Calverton, New York
Alternative 3 - Excavation and Off-Site Disposal
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost	Comments
1 MOBILIZATION/DEMOBILIZATION AND FIELD SUPPORT												
1.1 Office Trailer	15	mo	$200.50	$0.00	$0.00	$0.00	$3,008	$0	$0	$0	$3,008	
1.2 Field Office Expenses	15	mo		$374.00			$0	$5,610	$0	$0	$5,610	
1.3 Storage Trailer	15	mo	$103.00	$0.00	$0.00	$0.00	$1,545	$0	$0	$0	$1,545	
1.4 Construction Survey Services	2	ls	$6,380.00	$0.00	$0.00	$0.00	$12,760	$0	$0	$0	$12,760	pre/post-construction w/ topo
1.5 Equipment Mobilization/Demobilization	1	ls	$20,000.00				$20,000	$0	$0	$0	$20,000	
1.6 Site Utilities	15	mo	$1,000.00	$0.00	$0.00	$0.00	$15,000	$0	$0	$0	$15,000	including temporary set-up/tear-down
1.7 Pre and Post Construction Access Road Work	1	ls	$10,000.00	$0.00	$0.00	$0.00	$10,000	$0	$0	$0	$10,000	installation, removal, and E&S controls
1.8 Install new gate to site	1	ls	$0.00	$1,200.00	$730.00	$525.00	$0	$1,200	$730	$525	$2,455	20 foot wide
1.9 Upgrade road to site	502	cy	$0.00	$10.00	$9.00	$0.00	$0	$5,020	$4,518	$0	$9,538	1700 feet, 12 foot wide, 8" thick
2 DECONTAMINATION												
2.1 Decontamination Trailer	15	mo	$2,350.00				$35,250	$0	$0	$0	$35,250	
2.2 Equipment Decon Pad	1	ls		$500.00	$450.00	$155.00	$0	$500	$450	$155	$1,105	
2.3 Excavated Const Debris & Metal Decon Pad	1	ls		$500.00	$450.00	$155.00	$0	$500	$450	$155	$1,105	
2.4 Decon Water	15000	gal		$0.20			$0	$3,000	$0	$0	$3,000	
2.5 Decon Water Storage Tank, 6,000 gallon	15	mo	$600.00				$9,000	$0	$0	$0	$9,000	
2.6 Clean Water Storage Tank, 4,000 gallon	15	mo	$540.00				$8,100	$0	$0	$0	$8,100	
2.7 PPE (5 p * 5 days * 65 weeks)	1624	day		$30.90			$0	$50,174	$0	$0	$50,174	
2.8 Disposal of Decon Waste (liquid & solid)	15	mo	$900.00				$13,500	$0	$0	$0	$13,500	
3 SEDIMENT REMOVAL												
3.1 Contaminant Delineation Sampling & Analysis	1	event	$10,000.00	$0.00	$0.00	$0.00	$10,000	$0	$0	$0	$10,000	
3.2 Sediment Excavation (2 cy. hydraulic exc. Level D)	1,315	cy	$0.00	$0.00	$2.15	$3.28	$0	$0	$2,822	$4,313	$7,136	labor & equipment 4x for 25 % prod
3.3 Haul Sediment (1.3 x bulking factor)	1,710	cy	$0.00	$0.00	$4.44	$9.20	$0	$0	$7,591	$15,732	$23,323	labor & equipment 4x for 25 % prod
3.4 Condition Waste	1,710	cy	$0.00	$0.00	$1.37	$3.42	$0	$0	$2,336	$5,848	$8,184	labor & equipment 2x for 50 % prod
3.5 T & D Sediment (Non-Haz Landfill)	1,710	tons	$95.00	$0.00	$0.00	$0.00	$162,450	$0	$0	$0	$162,450	vendor quote
3.6 Archeological Investigation (Native Am. Artifacts)	1	ls	$10,000.00	$0.00	$0.00	$0.00	$10,000	$0	$0	$0	$10,000	
4 LANDFILL EXCAVATION AND DISPOSAL												
4.1 Clear and Grub Staging Area, Stumps to 6"	0.12	ac			$1,490.00	$1,830.00	$0	$0	$172	$212	$384	
4.2 Fine Grade Staging Area	560	sy			$0.05	$0.05	$0	$0	$28	$28	$56	
4.3 Bituminous Concrete Staging Area, 4" thick	560	sy		$5.80	$0.49	$0.38	$0	$3,248	$274	$213	$3,735	
4.4 Concrete Block Walls, Six 20' x 30' x 6" high bays	1,800	sf		$1.55	$2.39		$0	$2,790	$4,302	$0	$7,092	
4.5 Disposal Tesing (TCLP),1 per 40 cy	465	ea	$785.00				$365,025	$0	$0	$0	$365,025	
4.6 Excavate Nonhazardous Waste, Level D	8,100	cy			$1.07	$1.64	$0	$0	$8,693	$13,284	$21,977	labor & equip 2x, 2 cy backhoe
4.7 Haul Nonhaz Waste to Staging Area	8,100	cy			$1.46	$1.10	$0	$0	$11,854	$8,910	$20,764	front end loader, 300' haul x 2 (600' haul)
4.8 T & D Nonhazardous Waste	10,530	tons	$95.00				$1,000,350	$0	$0	$0	$1,000,350	vendor quote
4.9 Excavate Hazardous Waste, Level B	10,450	cy			$2.10	$2.73	$0	$0	$21,895	$28,563	$50,459	labor & equipment 2x for 50 % prod
4.10 Haul Hazardous Waste to Staging Area	10,450	cy			$2.86	$1.83	$0	$0	$29,857	$19,158	$49,015	front end loader, 300' haul x 2 (600' haul)
4.11 T & D Hazardous Waste	13,585	tons	$180.00				$2,445,300	$0	$0	$0	$2,445,300	vendor quote
4.12 Excavate Hazardous PCB Waste, Level B	50	cy			$2.10	$2.73	$0	$0	$105	$137	$241	labor & equipment 2x for 50 % prod
4.13 Haul Hazardous PCB Waste to Staging Area	50	cy			$2.86	$1.83	$0	$0	$143	$92	$235	front end loader, 300' haul x 2 (600' haul)
4.14 T & D Hazardous PCB Waste	85	tons	$210.00				$17,850	$0	$0	$0	$17,850	vendor quote
4.15 Excavate Nonhazardous Oversized Debris, Level D	2,400	cy			$5.37	$8.20	$0	$0	$12,878	$19,680	$32,558	labor & equipment 10x
4.16 Haul Nonhaz Oversize Debris to Staging Area	2,400	cy			$2.93	$2.20	$0	$0	$7,024	$5,280	$12,304	front end loader, 2 x 300' haul x 2
4.17 T & D Oversize Debris - Concrete	3,000	tons	$34.00				$102,000	$0	$0	$0	$102,000	
4.18 Recycle Metal	1,000	tons	$0.00				$0	$0	$0	$0	$0	vendor quote, profit & hauling break even
4.19 Decon Concrete and Metal Debris	20	hr			$29.85		$0	$0	$597	$0	$597	avg rate, skilled worker
4.20 Concrete Demolition	1,000	sf			$1.98	$0.38	$0	$0	$1,980	$380	$2,360	4" thick concrete floors, wire mesh reinf
4.21 Confirmation Testing	20	ea	$875.00				$17,500	$0	$0	$0	$17,500	
5 SITE RESTORATION												
5.1 Finish Grading	7,278	sy			$0.05	$0.05	$0	$0	$364	$364	$728	
5.2 Top Soil, 6" thick, delivered	1,215	cy	$26.00	$0.00	$0.00	$0.00	$31,590	$0	$0	$0	$31,590	vendor quote

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5.3 Spread Topsoil, from stockpile, 300' haul	1,215	cy			$0.56	$1.28	$0	$0	$680	$1,555	$2,236	
5.4 Vegetation	65.5	msf	$70.50	$0.00	$0.00	$0.00	$4,618	$0	$0	$0	$4,618	
6 OFFICE SUPPORT/FIELD SUPPORT												
6.1 Field Oversight Personnel (1 person - full time)	2580	hours	$0.00	$0.00	$25.00	$0.00	$0	$0	$64,500	$0	$64,500	
6.2 Office Oversight Personnel (2 people - 1/4 time)	1290	hours	$0.00	$0.00	$30.00	$0.00	$0	$0	$38,700	$0	$38,700	
6.3 Air Monitoring/Health & Safety Officer (full time)	2580	hours	$0.00	$0.00	$25.00		$0	$0	$64,500	$0	$64,500	
6.4 Archeological Investigation (Native Am. Artifacts)	2580	hours	$0.00	$0.00	$30.00		$0	$0	$77,400	$0	$77,400	
7 PROJECT DOCUMENTATION												
7.1 Pre- and Post-Construction Submittals	100	hours	$0.00	$0.00	$30.00	$0.00	$0	$0	$3,000	$0	$3,000	
7.2 Permitting/Planning Documents	250	hours	$0.00	$0.00	$50.00	$0.00	$0	$0	$12,500	$0	$12,500	
Subtotal Direct Costs less Subcontract								$72,042	$380,344	$124,584	$576,970	
Local Area Adjustments								116.6%	131.1%	131.1%		
Subtotal								$84,001	$498,631	$163,330	$745,961	
Overhead on Labor Cost @ 30%									$149,589		$149,589	
G & A on Labor Cost @ 10%									$49,863		$49,863	
G & A on Material Cost @ 10%								$8,400			$8,400	
Total Direct Cost								$92,401	$698,083	$163,330	$953,813	
Indirects on Total Direct Labor Cost @ 75%									$523,562		$523,562	
Profit on Total Direct Cost @ 10%											$95,381	
Subtotal											$1,572,757	
Health & Safety Monitoring @ 0.5%											$7,864	
Total Field Cost											**$1,580,620**	
Subtotal Subcontractor Cost							$4,204,845				$4,204,845	
G & A on Subcontract Cost @ 10%							$429,485				$429,485	
Profit on Subcontractor Cost @ 5%											$214,742	
Subcontractor Cost											**$4,939,072**	
Subtotal											**$6,519,692**	
Contingency on Total Field and Subcontractor Costs @15%											$977,954	
Engineering on Total Field Cost @8%											$126,450	
TOTAL COST											**$7,624,096**	

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1		$65,088	$65,088	0.935	$60,857
				TOTAL PRESENT WORTH	**$7,684,953**