4/17/06-04978

Capito, Bonnie P CIV NAVFAC Lant

From: Jackson, Rodger W CIV NAVFAC Lant
Sent: Monday, April 17, 2006 11:21 AM
To: Capito, Bonnie P CIV NAVFAC Lant
Subject: FW: Draft OU6 Site12 ROD comments/ Draft OU6 PRAP comments

Attachments: Draft OU6 Site12 ROD comments.pdf

Draft OU6 Site12 ROD comments....

ch. Pt. admin record

-----Original Message-----
From: George Lane [mailto:George.Lane@ncmail.net]
Sent: Monday, April 17, 2006 10:05
To: townsend.gena@epamail.epa.gov; jeffrey.christopher@usmc.mil; Jackson, Rodger W CIV NAVFAC Lant; william.friedmann@ch2m.com; Doug.Bitterman@ch2m.com
Cc: Brock.Martha@epamail.epa.gov
Subject: Draft OU6 Site12 ROD comments/ Draft OU6 PRAP comments

Hello Team,

I have attached my OU6 ROD comments to Gena's. In addition, I have no additional OU6 PRAP comments.

George L. Lane
State Environmental Project Manager
SF, Federal Remediation Branch
NCDENR
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1 Declaration

This Record of Decision (ROD) presents the Selected Remedy for Operable Unit (OU) 6, Site 12 at Marine Corps Air Station (MCAS) Cherry Point, North Carolina. MCAS Cherry Point was placed on the National Priorities List (NPL) December 16, 1994 (EPA ID: NC1170027261). The remedy was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on information contained in the Administrative Record for the site. Information not specifically summarized in this ROD or its references but contained in the Administrative Record is considered relevant and would support defense should the Selected Remedy be challenged.

The Navy, Marine Corps, and the United States Environmental Protection Agency (USEPA) jointly selected the remedy for Site 12, with the concurrence of the North Carolina Department of Environment and Natural Resources (NCDENR). The Navy provides funding for site cleanups at MCAS Cherry Point. The Federal Facility Agreement (FFA) for MCAS Cherry Point documents how the Navy and Marine Corps intend to meet and implement CERCLA in partnership with USEPA and NCDENR. [1]~~There have been no enforcement activities at Site 12.~~

Site 12 is one of several Installation Restoration (IR) Program sites addressed under CERCLA at MCAS Cherry Point. The Site Management Plan (SMP) for MCAS Cherry Point further details the schedule for CERCLA remediation activities and is updated annually. This is the final remedial action for Site 12 and does not include or affect any other IR sites at the facility.

1.1 Selected Remedy

The response action selected in this ROD is necessary to protect the public health, welfare, and the environment from actual or threatened releases of contaminants from the site. The response action for Site 12 addresses potential unacceptable human health and ecological risk associated with exposure to soil and groundwater and consists of excavation and off-site disposal of contaminated soil, and monitored natural attenuation (MNA) and land use controls (LUCs) for groundwater. The Selected Remedy meets the statutory requirements and is protective of human health and the environment, complies with Federal and State regulations that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. Because this remedy will result in pollutants or contaminants remaining on-site in groundwater above levels that allow for unlimited use/unrestricted exposure (UU/UE), a statutory review will be conducted within 5 years after the initiation of remedial action to ensure that the remedy is protective of human health and the environment.

Summary of Comments on Microsoft Word - Draft OU6 Site 12 ROD.doc

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~~This sentence appears to be out of place. Suggest creating an enforcement activities section "2.3.1 Enforcement Activities" and included the following~~ The Navy entered into a RCRA Section 3008(h) Administrative Order on Consent with EPA on December 14, 1989, Docket No. 89-12-R. MCAS Cherry Point was later placed on the CERCLA National Priorities List (NPL) effective January 17, 1995 (59 Federal Register 65206, December 16, 1994). In May 2005, USEPA Region 4, NCDENR, and the Navy and Marine Corps finalized a Federal Facilities Agreement (FFA) for MCAS Cherry Point. The primary purpose of the FFA is to ensure that environmental impacts associated with past and present activities at the site are thoroughly investigated and that the appropriate Remedial Action is taken as necessary to protect the public health, welfare, and the environment (MCAS FFA, 2005). The RCRA Section 3008(h) Administrative Order on Consent was terminated as of the effective date of the FFA (May 12, 2005). No enforcement activities have been recorded to date at OU6, Site 12.

1.2 Data Certification Checklist

The following was considered in selecting the remedy for Site 12:

- Chemicals of concern (COCs) and their respective concentrations (Sections 2.3 and 2.5).
- Baseline risk represented by the COCs (Section 2.5).
- Cleanup levels established for COCs and the basis for these levels (Sections 2.5 and 2.7).
- Principle threat wastes (Section 2.6)
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater (Section 2.4).
- Potential land and groundwater use that will be available at the site as a result of the Selected Remedy (Section 2.9.3).
- Estimated capital costs, annual operation and maintenance (O&M), and total present-worth costs; discount rate; and the number of years over which the remedy cost estimate is projected (Table 5).
- Key factors that led to selecting the remedy (i.e., a description of how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (Section 2.9.1).

If contamination posing an unacceptable risk to human health or the environment is discovered after execution of this ROD, the Navy will undertake all necessary actions to ensure continued protection of human health and the environment.

1.3 Authorizing Signatures

C. S. Patton
Brigadier General, U.S. Marine Corps
Commanding General
MCAS, Cherry Point

Date

~~Winston A. Smith, Director~~
Waste Management Division
USEPA – Region 4

Date

The NCDENR concurs:

Dexter R. Matthews, Director
Division of Waste Management
NCDENR

Date

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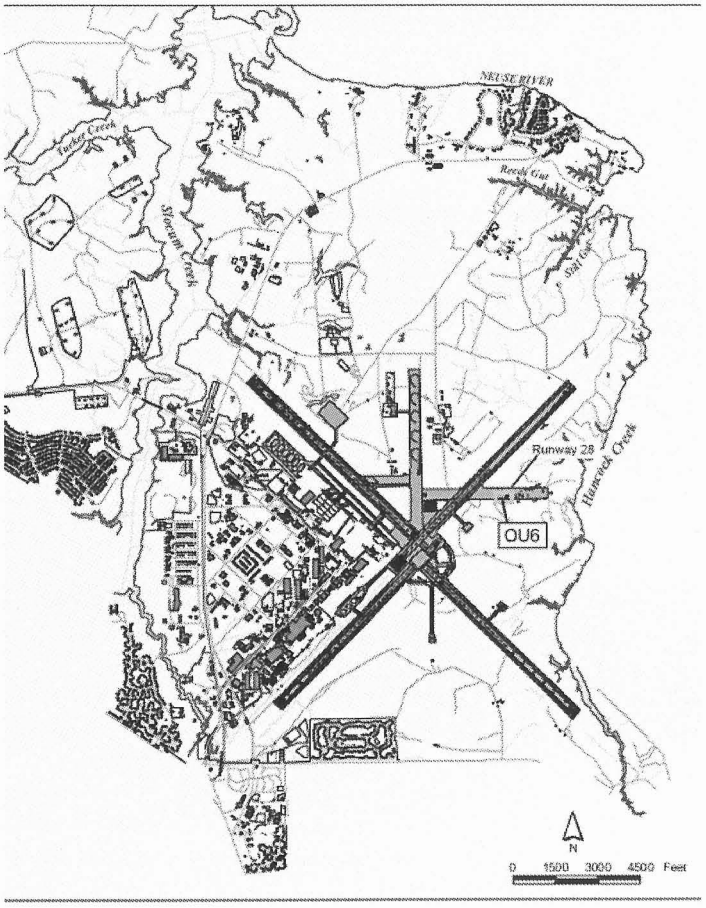
Beverly H. Banister, Acting Director

2 Decision Summary

2.1 Site Description and History

MCAS Cherry Point is a 13,164-acre military installation located in southeastern Craven County, North Carolina, just north of the town of Havelock. The mission of MCAS Cherry Point is to maintain and support facilities, services, and material of a Marine Aircraft Wing. OU 6 is located in the southeastern portion of the installation, in the eastern portion of Runway 28 (Figure 1). Runway 28 has not been active since the late 1950s. Since that time, the OU 6 area has been used for crash-crew training (fire fighting), engine run-up activities, and aircraft long-term storage experimentation. OU 6 initially consisted of three sites (Site 12, Site 35, and Point of Environmental Interest [POEI] 35a) (Figure 2). Site 35 was a Marine Aircraft Group (MAG)-14 Accumulation Area closed under Resource Conservation and Recovery Act (RCRA) in 1993 and POEI 35a was a High Power Run-Up Area and Test Cells closed as no further action (NFA) under a CERCLA Decision Document in 2004.

FIGURE 1
OU6 Location Map



Site 12 is the crash-crew training area that consists of one active and five historical burn pits (Burn Pits A through E) (Figure 2). Waste petroleum, oil, and lubricants and waste burnable solvents were historically burned in pits constructed of dirt placed on top of the asphalt runway surface and shaped into circular berms. The active crash-crew burn pit was constructed in 1985 and consists of a circular concrete pad used to burn waste jet fuel (JP-5). There is a trench drain surrounding the active burn pit that captures runoff from the concrete pad. Other principle site features include an oil/water separator, aboveground fuel storage tank, asphalt surfaces of the runway, and a drainage swale.

2.2 Site Characteristics

Site 12 is characterized by a flat topography with elevations ranging from 20 to 24 ft above mean sea level. The majority of surface runoff flows southward across the runway onto a mowed grassy area that includes a broad, shallow drainage swale. The swale drains west where it eventually joins a well-defined drainage ditch that flows east through a series of ponds in a swampy area, ultimately discharging to Hancock Creek.

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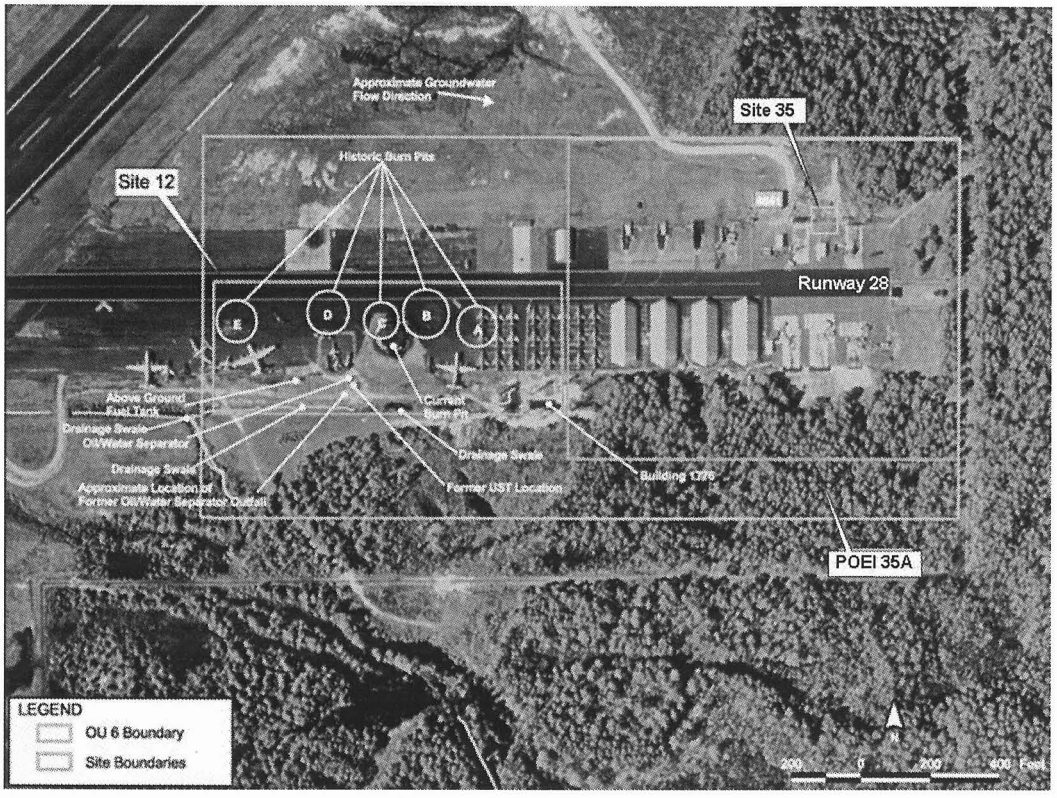
The hydrogeologic setting at Site 12 consists of a water table aquifer (Surficial Aquifer) and several deeper aquifers and intervening confining units (Yorktown, Pungo River, and Castle Hayne Aquifers). The Surficial Aquifer is the only aquifer relevant to potential contamination from historical activities at Site 12 due to the depth and thickness of the underlying confining units. The Surficial Aquifer consists of interlayered clay, silt, and sand to depths of 20 to 30 ft below ground surface (bgs). Groundwater beneath Site 12 occurs at approximately 11 ft bgs and flows east towards Hancock Creek (Figure 2).

FIGURE 2
Site 12



2.3 Previous Investigations

The source of potential contamination at Site 12 is from historical crash-crew burn pit training activities at Burn Pits A through E. Assessment of contamination and risk for Site 12 is based on Remedial Investigation (RI) activities conducted in 1999 and Supplemental RI activities conducted in 2003 and 2004. Both the RI and Supplemental RI activities are detailed in the RI. Table 1 summarizes the previous studies and investigations conducted at Site 12.

The nature and extent of contamination was defined by constituent concentrations in media exceeding regulatory screening values and background. In soil, methylene chloride, four pesticides, and eight metals were detected at concentrations exceeding the North Carolina Soil Screening Levels (NC SSLs) for protection of groundwater. In groundwater, four pesticides and the metals, iron and manganese were detected at concentrations that exceeded the North Carolina groundwater standards (NC 2Ls). Several metals were detected in both surface water and sediment and several pesticides and one PCB were detected in surface water at concentrations exceeding regulatory screening values. Upon further review of historical site information and limited soil and groundwater data in the in the western portion of Site 12, the MCAS Cherry Point Partnering Team agreed to conduct further investigation at Burn Pit E.

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.....is not used as drinking water source and consists.....

TABLE 1: PREVIOUS STUDIES AND INVESTIGATIONS

Previous Study / Investigation*	Date	Investigation Activities
Initial Assessment Study	1983	Site 12 was identified as a crash-crew training area. Due to small residual quantities of contamination and minimal potential for migration, no additional investigation was recommended.
RCRA Facility Investigation	1991	Soil, groundwater, surface water, and sediment sampling was conducted in the OU 6 vicinity. Oil and grease (O&G) and total petroleum hydrocarbons (TPH) were detected in soil; O&G and metals were detected in groundwater; TPH was detected in surface water; and O&G was detected in sediment. Further investigation was recommended to determine the extent of petroleum contamination.
Technical Direction Memorandum	1993	Soil, groundwater, and sediment sampling was conducted to further delineate the extent of petroleum contamination at OU 6. Benzene and TPH were detected in soil and sediment and metals were detected in groundwater. Additional soil sampling to the depth of the water table for full suite analysis was recommended.
Geoprobe Site Check, Former Underground Storage Tank Location 4182	1996	Soil and groundwater sampling was conducted following removal of an underground storage tank. O&G and TPH were detected in soil and lead was detected in groundwater.
Remedial Investigation Report, OU6, Site 12	2005	16 surface soil (0 to 1 ft below ground surface [bgs]), 32 subsurface soil (1 to 11 ft bgs), 7 groundwater (Surficial Aquifer), 3 drainage surface water, and 3 drainage sediment (0 to 0.5 ft bgs) samples were collected for analysis of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, pesticides, polychlorinated biphenyls (PCBs), petroleum-related compounds, and/or dioxins/furans. At Burn Pit E, 2 surface soil (0 to 1 ft bgs), 28 subsurface soil (1 to 6 ft bgs), 16 groundwater (Surficial Aquifer) samples were collected for analysis of VOCs, SVOCs, and/or PCBs.
Feasibility Study, OU6, Site 12	2006	Following an evaluation of remedial alternatives, excavation and off-site disposal for soil and MNA with LUCs for groundwater was selected as the Preferred Alternative.
Proposed Plan, OU6, Site 12	2006	Invites the public to review and comment on the Preferred Alternative for addressing environmental contamination at Site 12 prior to final remedy selection.

*The documents listed are available in the Administrative Record and provide detailed information used to support remedy selection at Site 12.

In the vicinity of Burn Pit E, one co-located surface and subsurface soil sample was collected beneath the asphalt runway surface and three groundwater samples were collected. Due to visual observations of a weathered petroleum-like substance during sampling, additional subsurface soil and groundwater samples were collected. Based on the constituents detected in soil and groundwater at Site 12, VOCs, SVOCs, and PCBs were evaluated at Burn Pit E. VOCs and SVOCs were detected in subsurface soil and groundwater. In subsurface soil, ethylbenzene, 2-methylnaphthalene, and naphthalene were detected at concentrations exceeding the NC SSLs. In groundwater, bis(2-ethylhexyl)phthalate, 2-methylnaphthalene, and naphthalene were detected at concentrations that exceeded the NC 2Ls. There is no definable plume and the contaminants have not migrated off-site, as they were not detected in downgradient groundwater.

2.4 Current and Potential Future Site Uses

Site 12 is currently used for the training of crash-crew fire-and-rescue personnel. The runway (Runway 28) is currently inactive. The Surficial and Yorktown Aquifers are not a resource at MCAS Cherry Point. The Castle Hayne Aquifer is used as a resource at MCAS Cherry Point for domestic and industrial supply and is classified by the state of North Carolina as an existing or potential source of drinking water. The nearest drinking water well is approximately 1.3 miles upgradient (northwest) of Site 12 and

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insert row for the "Remedial Investigation initiated" 1999 - 2003 and add minimal text for activities column.

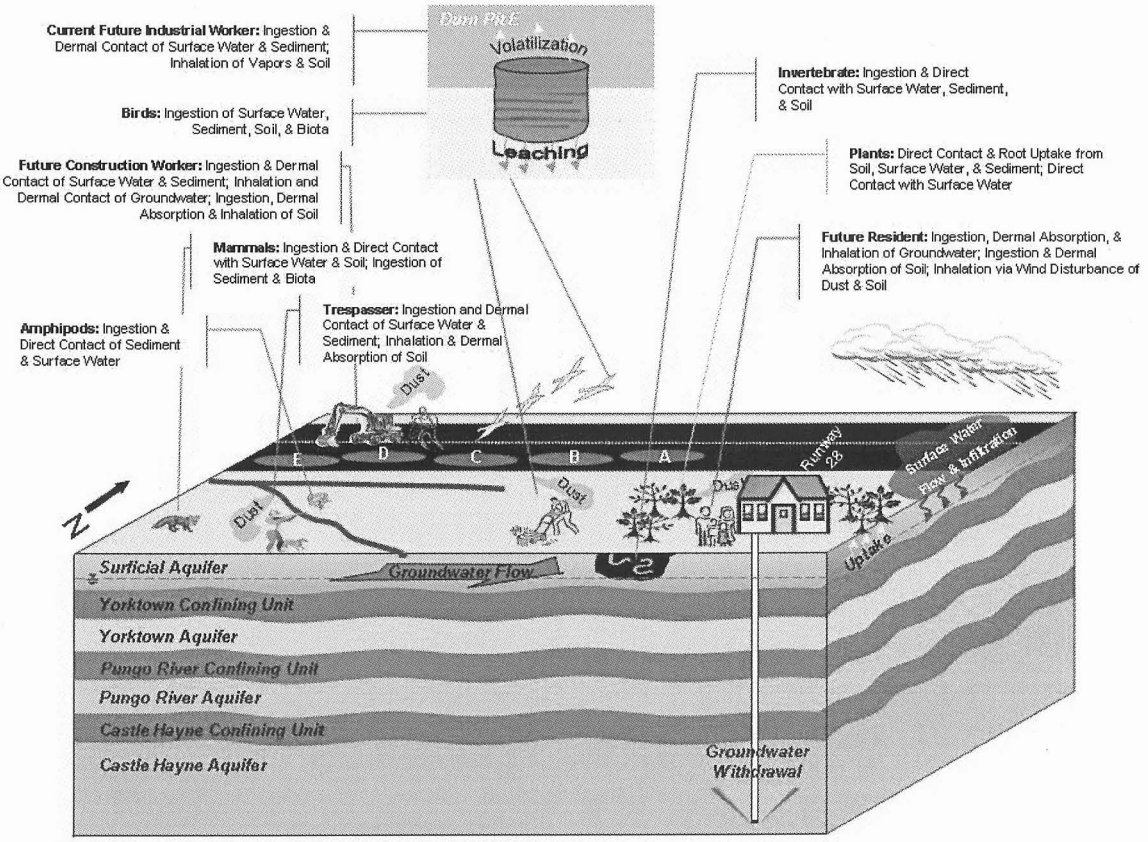
located in the Castle Hayne Aquifer. Based on the nature and thickness of the underlying confining units, no aquifers below the Surficial Aquifer have been impacted by MCAS Cherry Point activities.

MCAS Cherry Point is expected to remain an active military installation into the foreseeable future. Current land use is reasonably anticipated to continue indefinitely to support the mission of the facility. The Surficial Aquifer is not reasonably anticipated to provide a future groundwater resource. Should future land use differ from the reasonably anticipated land use, the Navy will reassess risks appropriate to future use. There are no current or future anticipated surface water resources at Site 12.

2.5 Summary of Site Risks

The source of potential contamination at Site 12 is from historical crash-crew burn pit training activities at Burn Pits A through E. The primary fate and transport mechanisms include infiltration of precipitation resulting in leaching of potential contaminants from former Site 12 to soil and groundwater, migration of contaminants in groundwater, and historical surface water runoff from the burn pits to the adjacent drainage swale. A site conceptual site model (CSM) for Site 12 is provided as Figure 3. Based on the CSM, Site 12 was evaluated for potential risks to human health and the environment as part of the RI and the results are summarized below. Additionally, North Carolina has developed risk-based maximum allowable concentrations for groundwater and soil. A comparison of soil and groundwater data to these concentrations is discussed below and provides the basis for action at Site 12.

FIGURE 3
Conceptual Site Model



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2.5.1 Human Health Risk Assessment

Based on a human health CSM, a quantitative human health risk assessment (HHRA) was completed for Site 12 for exposure to surface soil, subsurface soil, groundwater, surface water, and sediment (Figure 3). Potential cancer and non-cancer risks were calculated based on reasonable maximum exposure (RME) and the more realistic central tendency (CT) exposure point concentrations. Potential unacceptable cancer risks are expressed as the probability that a person has greater than a 1 in 10,000 (1×10^{-4}) chance of developing cancer. The USEPA's acceptable risk range is 10^{-4} to 10^{-6}. For non-cancer, a hazard index (HI) is calculated and a value greater than 1 indicates exposures may present an unacceptable risk.

Potential unacceptable risks include cancer risks and non-cancer hazards for a future resident from exposure to surface soil and groundwater (Table 2). All other pathways evaluated pose no unacceptable risks to human health.

Although the RME noncarcinogenic hazard is greater than 1 for potential exposure to surface soil by a future child resident, there are no individual target organs/effects with HIs greater than 1, the CT exposure is below 1, and the RME cancer risk is within USEPA's acceptable risk range.

In groundwater, potential cancer risks due to aroclor-1248 and arsenic and non-cancer hazards due to arsenic and iron were identified. However, aroclor-1248 was detected in only one of five groundwater samples at an estimated concentration (0.89 J µg/L) below the analytical quantitation limit (1 µg/L). Additionally, CT calculations for potential cancer risks associated with arsenic in groundwater are within USEPA's acceptable risk range. For non-cancer risks, the RME HIs for arsenic (2) and iron (1.6) in groundwater only slightly exceeded 1 for the child resident, and HIs are well below 1 for CT exposures. Based on these results, the potential unacceptable risks identified to human health from exposure to soil and groundwater were considered acceptable.

TABLE 2: SUMMARY OF POTENTIAL HUMAN HEALTH RISKS

Receptor	Media	Pathway	Chemical of Concern	RME Cancer Risk	RME Non-Cancer Risk (HI)	CT Cancer Risk	CT Non-Cancer Risk (HI)	Cancer Toxicity Factor (CSF) mg/kg-day^{-1}	Non-Cancer Toxicity Factor (RfD) mg/kg-day
Future Child Resident	Groundwater	Ingestion	Arsenic	7.5×10^{-5}	2.0	Not calculated due to no RME risks	0.39	1.5*	3.0×10^{-4}*
			Iron	Not carcinogenic	1.6		0.33	Not carcinogenic	6.0×10^{-1}**
		Dermal	Aroclor-1248	2.9×10^{-4}	Carcinogenic	1.5×10^{-4}	Carcinogenic	2.2*	NA
Future Adult Resident	Groundwater	Ingestion	Arsenic	1.3×10^{-4}	0.84	2.3×10^{-5}	0.33	1.5*	3.0×10^{-4}*
Future Lifetime Resident	Groundwater	Dermal	Aroclor-1248	2.9×10^{-4}	Not evaluated, risks were calculated for future child and adult residents	1.5×10^{-4}	Not evaluated, risks were calculated for future child and adult residents	2.2*	NA
		Ingestion	Arsenic	2.0×10^{-4}		7.3×10^{-5}		1.5*	3.0×10^{-4}*

Potential unacceptable risks are shaded yellow
* Source: Integrated Risk Information System (IRIS)
** Source: National Center for Environmental Assessment (NCEA)
CSF – Cancer Slope Factor
RfD – Reference Dose

Based on additional soil data collected from Burn Pit E, potential human health risks were further evaluated for the future construction worker. The soil data was screened against the USEPA Region 9 preliminary remediation goals (PRGs) and only two constituents (2-methylnaphthalene and naphthalene) were carried through the risk assessment process. Potential risks to the future resident for

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soil and future resident and construction worker for groundwater were not quantified at Burn Pit E because site-related chemicals detected in soil and groundwater would require remediation based on North Carolina standards that are protective of human health. Because remediation involving potential exposure to 2-methylnaphthalene and naphthalene in site soil was anticipated, a focused risk assessment was performed for the future construction worker. Potential risks were calculated for 2-methylnaphthalene and naphthalene from incidental ingestion, dermal contact, and inhalation. The results demonstrate that there are no unacceptable risks to the future construction worker associated with incidental ingestion (HI=0.0021), dermal contact (HI=0.003), and inhalation (HI=.000082) of site soil.

The risk measures used in risk assessments are not fully probabilistic estimates of risk but are conditional estimates given that a set of assumptions about exposure and toxicity are realized. The RI specifies the assumptions and uncertainties inherent in the risk assessment process.

2.5.2 Ecological Risk Assessment

An ecological risk assessment (ERA) was conducted for Site 12, consisting of Steps 1 through 3A of the Navy ERA process. In Step 1 (problem formulation), the environmental setting, chemical fate and transport, ecotoxicity and potential receptors, and complete exposure pathways were considered in order to develop an ecological CSM and assessment and measurement endpoints. Potentially complete exposure pathways were identified for both lower trophic-level (i.e, earthworms) and upper trophic-level (i.e., gray fox) terrestrial and aquatic receptor populations based on chemicals in surface soil, surface water, and sediment (Figure 3).

In Step 2, hazard quotients (HQs) were calculated to characterize the potential for chemicals to pose ecological risk using conservative exposure assumptions. HQs represent a ratio of the exposure level to an ecological effect level, and an estimate of potential risk. In Step 2, the exposure level for lower trophic-level receptors was the maximum detected chemical concentration in an exposure medium. For upper trophic-level receptors, the exposure level was the dietary dose estimated through food web modeling, but based on the maximum concentrations. For soil, sediment, and surface water (lower trophic receptors), the effect levels were Region 4 Biological Technical Assistance Group (BTAG) screening values. Upper trophic receptor effect levels were the No Observed Adverse Effects Levels (NOAELs) for reference toxicity values obtained from the scientific literature. Chemicals with HQs in excess of 1 were identified for each receptor population and selected as chemicals of potential concern (COPCs). Because COPCs were identified in Step 2, the ERA proceeded to Step 3A.

In Step 3A, the conservative exposure assumptions employed for Step 2 were refined and risk estimates (i.e., HQs) were recalculated using the same CSM and assessment/measurement endpoints. The primary refinement included using average, instead of maximum, chemical concentrations as the basis for exposure and estimating upper trophic-level doses. Following the refined risk calculations, few COPCs still exceeded 1. The potential for those COPCs yielding refined HQs that were greater than 1 to pose unacceptable risk was further characterized using multiple lines-of-evidence. The lines-of-evidence used to characterize remaining Step 3A COPCs included:

- Comparison of inorganic COPC concentrations in soil and sediment to MCAS Cherry Point background;
- Applying site use factors (SUF) to define a more realistic exposure scenario for upper trophic level receptors;
- Comparing COPC concentrations to other commonly used screening values from the scientific literature; and
- Consideration of the frequency of detection, frequency of screening value exceedance, magnitude of the HQs relative to 1, and spatial distribution of COPCs.

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Based on consideration of these lines of evidence, it was determined that none of the COPCs were expected to pose unacceptable risk to ecological receptor populations at Site 12. Although there was some uncertainty associated with this conclusion, the scope and conservativeness of the assessment provided additional support that the risk evaluation was protective.

2.5.3 North Carolina Standards

North Carolina requires chemical concentrations in soil and groundwater to meet the NC SSLs and NC 2Ls, respectively, for protection of human health. In soil, two VOCs (ethylbenzene and methylene chloride), two SVOCs (2-methylnaphthalene and naphthalene), four pesticides (alpha chlordane, dieldrin, gamma chlordane, and heptachlor epoxide), and eight metals (antimony, cadmium, chromium, iron, lead, manganese, mercury, and silver) exceeded the NC SSLs. In groundwater, three SVOCs (bis(2-ethylhexyl)phthalate, 2-methylnaphthalene, and naphthalene), four pesticides (alpha chlordane, dieldrin, gamma chlordane, and heptachlor epoxide), and two metals (iron and manganese) in groundwater exceeded the NC 2Ls.

Only ethylbenzene, 2-methylnaphthalene, and naphthalene in soil and 2-methylnaphthalene and naphthalene in groundwater at Burn Pit E are considered reflective of a site-related release based on the following rationale:

- Methylene chloride and bis(2-ethylhexyl)phthalate are common laboratory blank contaminants that were detected in groundwater infrequently at low, estimated concentrations.
- Pesticide concentrations in soil and groundwater are low and qualified as estimated below the quantitation limits.
- Chromium, iron, mercury, and silver concentrations in soil and manganese concentrations in groundwater are similar to background based on population-to-population statistical analysis of Site 12 and MCAS Cherry Point background data.
- Antimony, lead, and manganese were only detected in soil above the NC SSLs at isolated locations south of the burn pits.
- Average site concentrations of antimony, chromium, iron, manganese, and mercury detected in soil at Site 12 are within the average range of concentrations detected in eastern United States soil.
- The average lead concentration in site soil (83 mg/kg) is well below the USEPA Integrated Exposure Uptake Biokinetic (IEUBK) Model risk screening level of 400 mg/kg.
- Although cadmium was detected at levels consistently above the NC SSLs and background across the site (i.e., no source area or "hot spot") it is not expected to be a site-related contaminant based on the site history.
- Iron and manganese are essential nutrients frequently detected in Surficial Aquifer groundwater which is not likely to be used as a future potable source because it has a lower yield and poorer water quality than the available deeper Castle Hayne Aquifer.

2.5.4 Basis for Response Action

Based on all available data, the operational history of Site 12, human health and ecological risk assessment results, and risk management considerations presented herein, the Navy and Marine Corps, in partnership with USEPA and NCDENR, determined remedial action is necessary for site-related constituents in subsurface soil (ethylbenzene, 2-methylnaphthalene, and naphthalene) and groundwater (2-methylnaphthalene and naphthalene) at Burn Pit E to protect human health and the

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environment. The site-related constituents exceeding NC screening values that require a response action are summarized in Table 3 and shown on Figure 4.

TABLE 3: CHEMICALS OF CONCERN REQUIRING A RESPONSE ACTION

	Subsurface Soil			Groundwater		
Chemical of Concern	Maximum Detected (µg/kg)	NC SSL (µg/kg)	NC SSL Frequency of Exceedance	Maximum Detected (µg/L)	NC 2L (µg/L)	NC 2L Frequency of Exceedance
Ethylbenzene	560 J	241	1 / 1	NA	NA	NA
Naphthalene	10,800	585	14 / 27	87.7	21	2 / 14
2-Methylnaphthalene	17,100	1,720	12 / 27	42.0	14	2 / 14

J - Reported value is estimated
NA – Not applicable

2.6 Principal Threat Waste

The site history, nature and extent, fate and transport of contamination, and toxicity of COCs, indicate there are no principal threat wastes present at Site 12 because historic burning operations likely prevented accumulation of potentially hazardous source materials and concentrations of COCs in soil and groundwater are relatively low.

2.7 Remedial Action Objectives

Remedial action objectives (RAOs) are established based on attainment of regulatory requirements, standards, and guidance; contaminated media; COCs; potential receptors and exposure scenarios; and human health and ecological risks. The RAOs for Site 12 are to:

- Prevent human exposure to soil and groundwater containing COCs in excess of NC SSL and NC 2L standards, respectively.
- Reduce concentrations of COCs in soil and groundwater to the NC SSL and NC 2L standards, respectively, to allow for UU/UE.

Specific remediation goals to meet the RAOs are listed in Table 4.

TABLE 4: REMEDIATION GOALS

Chemical of Concern	Soil Remediation Goal (NC SSL)	Groundwater Remediation Goal (NC 2L)
Ethylbenzene	241 µg/kg	N/A
Naphthalene	585 µg/kg	21 µg/L
2-Methylnaphthalene	1,720 µg/kg	14 µg/L

2.8 Description and Evaluation of Remedial Alternatives

Response actions are required to meet NC requirements; therefore, a preliminary screening of General Response Actions (GRAs) and remedial approaches was completed to refine the remedy selection process, as detailed in the FS. Six soil and five groundwater remedial approaches were retained as preliminary remedial alternatives and were evaluated with respect to implementability, effectiveness, and relative cost. The preliminary remedial alternatives excluded from further analysis are:

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- UCs for soil and roundwater because they do not reduce concentrations of COCs to the remediation goals.
- Soil fracturing and soil vapor extraction (SVE) because the COCs do not readily volatilize and ex-situ treatment systems interfere with airfield operations.
- Thermal treatment for soil because it is not a cost effective remedy given the relatively low volume and concentrations of COCs.
- Groundwater pump and treat with air stripping and discharge to Hancock Creek because it is not a cost effective remedy given the lack of a defined contaminant plume and relatively low concentrations of COCs.

Although MNA for groundwater was evaluated further in the FS, it is not considered a stand-alone remedial alternative because it does not prevent human exposure to COCs in groundwater. Consistent with the NCP, a no action alternative was evaluated as a baseline for the comparative analysis. Three remedial alternatives for soil (no action, biostimulation and off-site disposal, and excavation and off-site disposal) and two remedial alternatives for roundwater (no action, and MNA and UCs) were etained for a detailed comparative analysis in accordance with the NCP.

2.8.1 Description of Remedial Alternatives

Table 5 provides t jor components, details, and cost of each remedial alternative identified for soil and groundwater.

2.8.2 Comparative Analysis of Alternatives

A comparative analysis of alternatives with respect to the **nine evaluation criteria** was completed and is provided below. Table 6 depicts a relative ranking of the alternatives. The distinguishing feature between the soil alternatives is on-site ex-situ treatment (biostimulation alternative) of contaminated soil prior to off-site disposal of clean material as compared to removal (excavation alternative) and off-site disposal of contaminated material.

Threshold Criteria

Overall Protection of Human Health and the Environment. The no action alternatives for soil and groundwater do not achieve RAOs and; therefore, do not protect human health and the environment and are not considered further in this ROD. Both the biostimulation and off-site disposal and the excavation and off-site disposal alternatives for soil would provide adequate protection of human health by eliminating exposure to contaminated soil through removal. The biostimulation and off-site disposal alternative is slightly less protective than the excavation and off-site disposal alternative because stockpiled material would remain on-site longer during ex-situ treatment. For groundwater, the MNA and LUCs alternative would provide adequate protection of human health and the environment by controlling exposure to groundwater through LUCs while concentrations of COCs naturally attenuate.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs). The soil and groundwater alternatives would comply with the **ARARs**.

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Sequence number: 1
Author: gtownsen
Subject: Note
Date: 4/12/2006 15:55:30
The statements (see highlights) appear to be conflicting. I would suggest to delete the "groundwater" in the first bullet or add "LUCs as a stand alone remedy for ....

Sequence number: 2
Author: gtownsen
Subject: Highlight
Date: 4/12/2006 15:51:43
groundwater

Sequence number: 3
Author: gtownsen
Subject: Highlight
Date: 4/12/2006 15:51:18
LUCs

Sequence number: 4
Author: gtownsen
Subject: Highlight
Date: 4/12/2006 15:52:01
LUCs

Sequence number: 5
Author: gtownsen
Subject: Highlight
Date: 4/12/2006 15:51:57
groundwater

Sequence number: 6
Author: gtownsen
Subject: Highlight
Date: 4/12/2006 15:52:08
retained

Sequence number: 7
Author: gtownsen
Subject: Note
Date: 4/12/2006 15:57:30
Move the actual table to this position. I understand that this maybe a formatting issue, but, it is better to read about the alternatives before comparing them.

TABLE 5 - REMEDIAL ALTERNATIVES

Alternative	Components	Details	Cost
Soil			
No Action *No action for contaminated soil with no restriction on activities.*	-Existing soil	-No action -Natural attenuation would potentially reduce chemical concentrations over time	No cost
Biostimulation and Off-Site Disposal *Excavation and stockpiling of contaminated soil for on-site ex-situ treatment followed by backfilling and site restoration.*	-Excavation of soil -Site restoration -On-site ex-situ biostimulation followed by off-site disposal -Site controls	-Excavation of 1,333 yd^3 of soil followed by segregation of contaminated and uncontaminated site soil based on visual inspection and photoionization detector (PID) readings (it is assumed that only 1/3 of excavated material is contaminated) -Collection of confirmation samples from the excavation for analysis of COCs to verify remediation goals are met -Mixing clean fill and uncontaminated site soil for backfill and site restoration (repaving) -Stockpiling of contaminated site soil and placement on a treatment pad with physical controls (fencing and signs) to prevent access and erosion and sediment controls (silt fencing) to prevent contaminant transport -Mixing stockpiled soil with amendments (i.e., commercial fertilizer) and bi-weekly aeration to stimulate biological degradation -Periodic sampling of stockpiled soil until remediation goals are met followed by off-site disposal	Capital Cost: $291,600 Annual O&M Cost: $0 **Present-Worth Cost: $291,600** Discount Rate: 3.5% Timeframe: 2 years
Excavation and Off-Site Disposal *Excavation of contaminated soil followed by off-site disposal, backfilling, and site restoration.*	-Excavation of soil -Site restoration -Off-site disposal -Site controls	-Excavation of 1,333 yd^3 of soil followed by segregation of contaminated and uncontaminated site soil based on visual inspection and PID readings (it is assumed that only 1/3 of excavated material is contaminated) -Collection of confirmation samples from the excavation for analysis of COCs to verify remediation goals are met -Stockpiling of contaminated site soil with physical controls (signs) to prevent access and erosion and sediment controls (silt fencing) to prevent contaminant transport during waste characterization -Waste characterization testing to classify the contaminated soil for proper off-site disposal -Mixing clean fill and uncontaminated site soil for backfill and site restoration (repaving)	Capital Cost: $229,300 Annual O&M Cost: $0 **Present-Worth Cost: $229,300** Discount Rate: 3.5% Timeframe: 1 month
Groundwater			
No Action *No action for contaminated groundwater with no restriction on activities.*	-Existing groundwater	-No action -Natural attenuation would potentially reduce chemical concentrations over time	No cost
MNA and LUCs *Groundwater monitoring to access concentrations of COCs until remediation goals have been achieved via natural attenuation*	-MNA groundwater monitoring -LUCs	-Periodic groundwater monitoring (three existing wells and one newly installed well) for natural attenuation indicator parameters and reporting -LUCs to restrict access to the Surficial Aquifer so that the potential exposure pathway to contamination would remain incomplete until remediation goals have been achieved -O&M of monitoring wells	Capital Cost: $73,400 Annual O&M Cost: $24,900 **Present-Worth Cost: $194,300** Discount Rate: 3.5% Timeframe: 5 years

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Primary Balancing Criteria

Long-Term Effectiveness and Permanence. The biostimulation alternative and excavation alternative for soil would remove contaminated soil resulting in UU/UE; thereby providing long-term effectiveness and permanence. Once remediation goals have been met, through MNA and LUCs for groundwater, long-term effectiveness and permanence is achieved.

Reduction in Toxicity, Mobility, or Volume through Treatment. While all the alternatives are expected to reduce toxicity, mobility, or volume, the only alternatives with treatment components are biostimulation and off-site disposal for soil and MNA for groundwater. Natural attenuation, through volatilization, diffusion, dispersion, and absorption, is expected to be an effective remedy for groundwater treatment based on the removal of the source material, the low concentrations and low frequency of detections above the NC 2L, and the lack of definable plume.

Short-Term Effectiveness. The excavation and off-site disposal alternative provides the greatest short-term effectiveness due to the shorter time frame (1 month) until protection is achieved, in comparison to biostimulation and off-site disposal (2 years). The excavation component of both soil alternatives have equal short-term effectiveness; however, the stockpiling and ex-situ treatment component of the biostimulation alternative results in increased duration exposure of contaminated media to workers and the environment during implementation. The excavation and off-site disposal alternative would result in a potential risk to surrounding communities during the transport of contaminated soil off-site. The MNA and LUCs alternative for groundwater poses minimal risk to workers conducting monitoring, as the risks are addressed through use of personal protective equipment, and the time to achieve protectiveness is 5 years.

Implementability. The excavation component of both soil alternatives is easily implemented using well-established technologies with conventional equipment and standard construction methods. The biostimulation alternative for soil is more difficult to implement because the on-site ex-situ treatment component adversely impacts MCAS Cherry Point operations by requiring bi-weekly manipulation in the airfield vicinity. Additionally, the soil pile and the mixing of soil amendments would likely attract birds requiring measures to minimize Bird Aircraft Strike Hazards (BASH). The MNA and LUCs alternative for groundwater can easily be implemented using standard procedures.

Cost. The estimated present-worth cost for excavation and off-site disposal ($229,300) is less than biostimulation and off-site disposal ($291,600). The estimated present-worth cost for the MNA and LUCs $194,300.

Modifying Criteria

State Acceptance. State involvement has been solicited throughout the CERCLA process. The NCDENR as the designated state support agency in North Carolina concurs with the Selected Remedy.

Community Acceptance. The public expressed its support for the preferred alternative presented in the public meeting. The questions and concerns raised at the meeting were general inquiries for informational purposes only; no significant comments were received from the public.

This page contains no comments

TABLE 6 – RELATIVE RANKING OF REMEDIAL ALTERNATIVES

CERCLA Criteria	Soil Alternatives			Groundwater Alternatives	
	No Action	Bio-stimulation and Off-Site Disposal	Excavation and Off-Site Disposal	No Action	MNA and LUCs
Threshold Criteria					
Overall Protection of Human Health and the Environment	□	❐	■	□	■
Compliance with ARARs	□	■	■	□	■
Balancing Criteria					
Long-Term Effectiveness and Permanence	□	■	■	□	❐
Reduction in Toxicity, Mobility or Volume through Treatment	NA	■	NA	NA	■
Short-Term Effectiveness	□	❐	■	□	❐
Implementability	■	□	❐	■	❐
Present-Worth Cost	$0	$291,600	$229,300	$0	$194,300
Modifying Criteria					
State Acceptance	□	❐	■	□	■
Community Acceptance	NC	NC	NC	NC	NC

Ranking: □ Low ❐ Moderate ■ High

NA: Not applicable
NC: No significant public comments were received on the Proposed Plan, questions raised at the public meeting were general inquiries for informational purposes only.

2.9 Selected Remedy

2.9.1 Rationale for Selected Remedy

The Selected Remedy for Site 12 is excavation and off-site disposal for soil and MNA and LUCs for groundwater because it provides the best balance of tradeoffs with respect to the nine criteria. This remedy meets the RAOs by excavating contaminated soil exceeding the NC SSLs, thereby removing the potential source of contaminants to groundwater, and prohibiting access to groundwater through LUCs until the NC 2Ls are met through MNA. The principal factors in this remedy selection decision are achieving the remediation goals in the shortest timeframe and in a cost-effective manner with minimal impacts to MCAS Cherry Point operations. The Selected Remedy for soil, in comparison with the biostimulation and off-site disposal alternative, achieves remediation goals for soil in 1 month as compared to 2 years, costs $229,300 as compared to $291,600, and does not result in stockpiled material remaining on-site hindering MCAS Cherry Point operations.

2.9.2 Description of Selected Remedy

To address soil containing COCs at concentrations exceeding NC SSLs, the Selected Remedy for soil consists of excavation of soil (1,333 yd^3) within Burn Pit E in an area approximately 6,000 ft^2 and to a depth of 6 ft bgs (Figure 4). The excavated soil will be segregated, based on visual inspection and PID readings, to identify contaminated soil for off-site disposal and uncontaminated soil for use in site restoration. It is assumed that approximately 1/3 of excavated soil will be identified as contaminated. Confirmation samples will be collected from the excavation for analysis of COCs to verify remediation

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goals are met. Waste characterization testing will be conducted to classify the contaminated soil for proper off-site disposal. Site restoration will include backfilling the excavation with clean fill and uncontaminated site soil and repaving.

To address groundwater containing COCs at concentrations exceeding NC 2Ls, the Selected Remedy consists of MNA and LUCs. MNA consists of periodic groundwater monitoring for COCs and natural attenuation indicator parameters to demonstrate if source removal results in reduction in concentrations over time. The groundwater monitoring system will consist of four monitoring wells (three existing wells and one newly installed well). O&M activities associated with MNA will consist of inspections to ensure integrity of the monitoring wells is maintained.

LUCs would be designed to restrict access to groundwater so the potential exposure pathway to these chemicals would remain incomplete. The LUCs will prohibit the withdrawal and/or future use of water, except for monitoring, from the Surficial Aquifer within the identified contaminated groundwater boundary; and prohibit intrusive activities that encounter the water table within the extent of current groundwater contamination unless specifically concurred with by both NC DENR and USEPA. Specific types of LUCs include: 1) incorporate land use prohibitions into the MCAS Cherry Point master planning process; 2) a deed Notice of Inactive Hazardous Substance or Waste Disposal filed in Craven County real property records per NCGS 130A-310.8; and 3) deed restrictions included in any deed transferring any portion of OU6, Site 12 to any non-Federal transferee. The site would be inspected periodically, and the effectiveness of the LUCs would be certified by USEPA and NC DENR. The Navy will implement MNA and LUCs within the boundaries of Burn Pit E (Figure 4) until the concentrations of COCs in groundwater meet the remediation goals.

The Navy shall develop and submit to USEPA and NCDENR, in accordance with the FFA and the schedule in the Site Management Plan, a Remedial Design (RD) to implement the Selected Remedy. The LUC portion of the RD will provide for implementation and maintenance actions, including periodic inspections and reporting. The Navy will implement, maintain, monitor, report on and enforce the LUCs according to the RD.

2.9.3 Expected Outcomes of the Selected Remedy

Although current land uses are expected to continue at Site 12 and there is no other planned land uses in the foreseeable future, UU/UE will be available at the site as a result of the Selected Remedy. The expected outcome of MNA of groundwater will be UU/UE once the remediation goals are met. Until then, exposure will be controlled through LUCs. The effectiveness of MNA in groundwater will be measured through implementation of a groundwater-monitoring program. When a single COC is at or below its respective remediation goal (Table 4) for four consecutive sampling events, this COC will no longer require monitoring, while the others will continue to be analyzed and documented in annual technical memoranda. When all COCs have achieved their goals for four consecutive sampling events, procedures for site closure will be initiated. Once RAOs for this groundwater action have been achieved, OU6, Site 12 is expected to be suitable for UU/UE. Therefore, the Navy, USEPA, and NC DENR may agree for the LUC component of the Selected Remedy to be terminated at site closeout. If the Navy determines that MNA and LUCs are insufficient to meet RAOs in a timeframe compatible with MCAS Cherry Point operations, other more ssive remedial approaches (i.e., in-situ treatment) will be evaluated and may be implemented.

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Sequence number: 1
Author: gtownsen
Subject: Inserted Text
Date: 4/12/2006 16:02:22
conducted by the Navy

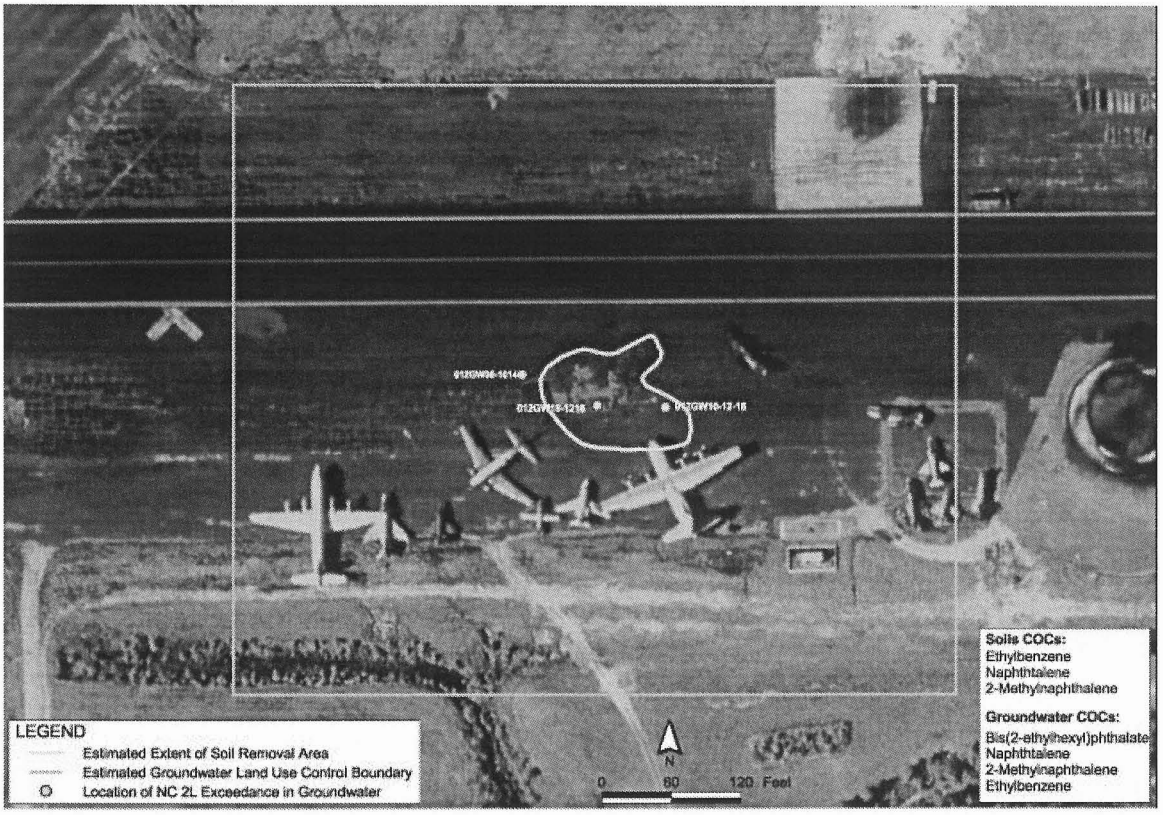
Sequence number: 2
Author: gtownsen
Subject: Inserted Text
Date: 4/12/2006 16:29:05
Add text "Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity.]

Sequence number: 3
Author: gtownsen
Subject: Inserted Text
Date: 4/12/2006 16:25:11
add sentence to specifically state - "IC s will be maintained until the concentration of hazardous substances in the groundwater are at such levels to allow for unrestricted use and unlimited exposure."]

Sequence number: 4
Author: gtownsen
Subject: Inserted Text
Date: 4/12/2006 16:30:42
"Within 120 days of ROD signature, the Navy shall prepare and submit to USEPA and NCDENR for review and concurrence, a RD document that shall contain implementation and maintenance actions, including periodic inspections. The Navy will implement, maintain, monitor, and enforce the ICs according to the RD.]

Sequence number: 5
Author: gtownsen
Subject: Note
Date: 4/12/2006 16:01:02
add "with EPA's and the State's approval/concurrence and community acceptance.

FIGURE 4
Extent of Soil Removal Area and LUC Boundary



2.9.4 Statutory Determinations

In accordance with the NCP, the Selected Remedy meets the following statutory determinations.

- **Protection of Human Health and the Environment** - The Selected Remedy will protect human health and the environment through excavation of contaminated soil and implementation of LUCs for groundwater until concentrations are reduced to acceptable levels.
- **Compliance with ARARs** - The Selected Remedy will attain the federal and state ARARs and to-be-considered criteria (TBC) presented in Attachment A. There are no ARARs that the remedy will not meet.
- **Cost-Effectiveness** - The Selected Remedy is the most cost-effective alternative and represents the most reasonable value for the money. The costs are proportional to overall effectiveness by achieving long-term effectiveness and permanence in a reasonable timeframe.
- **Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable** - The Navy, USEPA, and NCDENR determined that the Selected Remedy represents the maximum extent to which permanent solutions and alternative treatment technologies can be used in a practicable manner at Site 12. For groundwater, the remedy utilizes treatment through MNA to attain remediation goals. For soil, although a treatment alternative was evaluated, excavation and off-site disposal provides the best balance of tradeoffs given the relatively small volume of contaminated soil to achieve long-term

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effectiveness and permanence, ease of implementation using standard construction practices, and reasonable cost.

- **Preference for Treatment as a Principal Element -** ~~The Selected Remedy uses treatment (MNA) for groundwater as a principal element to attain remediation goals, and therefore satisfies the statutory preference for treatment.~~ Treatment is not a principal element for soil because excavation and off-site disposal provides the best balance of tradeoffs with respect to long-term effectiveness and permanence in the shortest timeframe for a reasonable cost.
- **Five-Year Review Requirements -** Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site in groundwater above levels that allow for UU/UE, a statutory review will be conducted no less often than each 5 years after the initiation of remedial action to ensure that the remedy is protective of human health and the environment.

2.10 Community Participation

Community participation at MCAS Cherry Point includes a Restoration Advisory Board (RAB), public meetings, public information repositories, newsletters and fact sheets, public notices, and an IR Program web site. The Community Involvement Plan for MCAS Cherry Point provides detailed information on community participation for the IR Program.

The RAB was formed in 1995 and consists of community members and representatives of the USEPA, NCDENR, Navy, and Marine Corps. RAB meetings are held about every 3 months and are open to the public to provide opportunity for public comment and input. The investigations conducted at OU6, the findings, and potential remedial approaches have been presented and discussed at the RAB meetings. The public information repository is located at the Havelock-Craven County Library, 301 Cunningham Blvd, Havelock, NC 28532, Phone 252-447-7509. Documents and relevant information relied upon in the remedy section process will be made available for public review in the public information repository or the IR Program website.

For access to the Administrative Record or additional information on the IR Program, contact:

Public Affairs Office
NAVFAC Atlantic
6506 Hampton Blvd.
Norfolk, VA 23508-1278
757-322-8005

In accordance with Sections 113 and 117 of CERCLA, the Navy and MCAS Cherry Point provided a public comment period from May X through June X, 2006, for the proposed remedial action described in the Proposed Plan for Site 12. A public meeting to present the Proposed Plan was held at the Havelock City Hall Auditorium, located in Havelock, North Carolina, on May X, 2006. Public notice of the meeting and availability of documents was placed in the *Havelock News* on April X, 2006; the *Windsock* on April X, 2006; and the *Carteret County News and Sun Journal Newspaper* on April X, 2006.

3 Responsiveness Summary

The participants in the public meeting, held on March X, 2006, included RAB members and representatives of the Navy, USEPA, and NCDENR. With the exception of the Modifying Criteria, rankings are provided as qualitative descriptions of the relative compliance of each alternative with the criteria. Questions and concerns received during the meeting were addressed at the meeting and are documented in the meeting transcript. No additional written comments, concerns, or questions were received by the Navy, USEPA, or NCDENR during the public comment period.

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Sequence number: 1
Author: gtownsen
Subject: Cross-Out
Date: 4/12/2006 16:22:44

~~It has been determined by EPA HQs that MNA is not a treatment per definition of CERCLA.~~

Sequence number: 2
Author: gtownsen
Subject: Inserted Text
Date: 4/12/2006 16:21:38

Although the Selected Remedy does not provide for treatment as a principle element, reduction of groundwater contamination concentrations are expected over time due to degradation, dispersion, advection, and adsorption processes. The Selected Remedy represents the maximum extent to which permanent solutions and treatment are practicable at OU6 because of the following reasons.

- A small localized area of groundwater contamination has been identified.
- Treatment of the groundwater is not practicable in a cost-effective manner because of the small area of contamination and low concentrations of VOCs.

The continuing source of the groundwater contamination will be removed.

Attachment A
Federal Chemical-Specific ARARs
Operable Unit 6, Site 12

Media	Requirement	Prerequisite	Citation	ARAR Determination	Comment
Safe Drinking Water Act					
Groundwater	SDWA standards serve to protect public water systems. Primary drinking water standards consist of federally enforceable MCLs. MCLs are the highest level of a contaminant that is allowed in drinking water.	Impact to public water systems that have at least 15 service connections or serve at least 25 year-round residents. May also be cleanup standards for on-site ground or surface waters that are current or potential sources of drinking water.	40 CFR 141.11 to 141.16 and 141.61 to 141.66	Relevant and Appropriate	Not applicable because groundwater remediation goals are based on the more stringent NC 2L Standards. Furthermore, the surficial aquifer does not serve as a drinking water supply.
Groundwater	SDWA standards serve to protect public water systems. The MCLG is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.	Impact to public water systems that have at least 15 service connections or serve at least 25 year-round residents. May also be cleanup standards for on-site ground or surface waters that are current or potential sources of drinking water.	40 CFR 141.50 to 141.55	Relevant and Appropriate	Not applicable because groundwater remediation goals are based on the more stringent NC 2L Standards. Furthermore, the surficial aquifer does not serve as a drinking water supply.
Groundwater	National Secondary Drinking Water Regulations (NSDWRs or secondary standards) are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water.	Impact to public water systems that have at least 15 service connections or serve at least 25 year-round residents. May also be cleanup standards for on-site ground or surface waters that are current or potential sources of drinking water.	40 CFR 143	To Be Considered	Although SMCLs may be considered, groundwater remediation goals are based on the more stringent NC 2L Standards. Furthermore, the surficial aquifer does not serve as a drinking water supply.
USEPA Region 3 RBC Tables					
Groundwater	Chemical-specific RBC screening levels.	Public water system.	USEPA Region 3 RBC Tables	To Be Considered	Although RBCs may be considered, groundwater remediation goals are based on NC 2L Standards. Furthermore, the surficial aquifer does not serve as a drinking water supply
Soil	Chemical-specific RBC screening levels.	CERCLA site.	USEPA Region 3 RBC Tables	To Be Considered	Although RBCs may be considered, soil remediation goals are based on NC SSLs.

This page contains no comments

Attachment A
North Carolina Action-Specific ARARs
Operable Unit 6, Site 12

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comment
Groundwater Classification and Standards [Title15A subchapter 2L]					
Corrective Action	Restoration of groundwater quality to the level of the standards, or as closely thereto as is economically and technologically feasible.	Areas where groundwater quality has been degraded. Activities resulting in the discharge of waste or hazardous substance and/or discovery of an unauthorized release to the surface or subsurface.	*15A NCAC 2L .0106*	Applicable	The OU6 remedy will include corrective action (MNA) to achieve 2L standards.
Well Construction Standards [Title15A subchapter 2C]					
Monitoring well installation, repair, and abandonment	Construction, operation, repair, or abandonment of wells not used for water supply must not adversely impact the quality of groundwater.	Wells not used for water supply.	*15A NCAC 2C .0108, .0112, .0113, and .0114*	Applicable	The OU6 MNA monitoring system will comply with this requirement.
Pumps and pumping equipment	The pump specifications and installation shall meet the specified requirements.	Wells constructed with a pumping mechanism.	*15A NCAC 2C .0109*	Relevant and Appropriate	The MNA monitoring network is not anticipated to include permanently installed pumping mechanisms.
Erosion and Sediment Control [Title15A subchapter 4B]					
Land disturbing activities	Activities that disturb land greater than one acre shall implement an erosion and sediment control plan and shall include the use of ground cover sufficient to restrain erosion. Control measures shall meet design and performance standards, provide stormwater outlet protection, and shall be inspected and adequately maintained. Disturbances to less than one acre of land must implement an erosion and sediment control plan, use best management practices, and provide ground cover for denuded areas. Storm drains and watercourses must be protected from sediment and debris contamination.	Existing uncovered areas greater than one acre and any new disturbances to land regardless of size. Land disturbing activities include the construction of access and haul roads, borrow and waste areas, and activities conducted in lakes or natural watercourses.	*15A NCAC 4B .0107-.0113, .0116, .0118, and .0129*	Applicable	The OU6 remedy includes soil excavation. Best management practices and sediment and erosion control measures will be implemented. Following excavation, the ground surface will be restored.
Land disturbing activities in or proximal to a watercourse	Minimum buffer zone areas must be maintained and construction and design requirements must be achieved. No land disturbing activity shall be undertaken within a buffer zone adjacent to designated trout waters that will cause adverse temperature fluctuations.	Land disturbing activities in sensitive watersheds or buffer zones.	*15A NCAC 4B .0124, and .0125*	Relevant and Appropriate	The remedy at OU6 is not expected to encroach into sensitive watersheds or buffer zones. In the event the remedy does encroach the buffer zone the activities will comply with the requirements.
Hazardous Waste Management [Title15A subchapter 13A]					
Storage, and/or disposal of hazardous waste	Characterization of waste. Activities associated with waste identified as hazardous waste must comply with requirements for manifesting, record keeping, reporting, shipping, and/or transporting of waste.	Identification, generation, shipment, and/or transport of hazardous waste.	*15A NCAC 13A .0106 and .0107*	Relevant and Appropriate	Excavation at OU6 will generate materials which will be characterized for off site disposal in an approved facility. Based on site history, it is not anticipated that excavated material will be characterized as hazardous waste.

This page contains no comments

Attachment A
North Carolina Action-Specific ARARs
Operable Unit 6, Site 12

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comment
Solid Waste Management Regulations [Title15A subchapter 13B]					
Storage, and/or disposal of solid waste	Solid waste shall be stored, collected, transported, separated, processed, recycled, recovered, and disposed of in a manner consistent with the requirements. No radioactive waste material shall be collected and transported, stored, treated, processed, disposed of or reclaimed, except as specifically authorized.	Storage, shipment, and/or transport of solid waste.	*15A NCAC 13B .0104, .0105, .0106*	Applicable	The excavation will generate material which will be characterized for off site disposal in an approved facility.
Air Pollution Control Requirements [Title15A subchapter 2D]					
Particulates from fugitive non-process dust emission sources	No facility or source of air pollution shall cause any ambient air quality standard to be exceeded or contribute to a violation of any ambient air quality standard except as allowed.	Generation of fugitive non-process particulate mater that is not collected by a capture system.	*15A NCAC 2D .0400* *15A NCAC 2D .0500*	Applicable	No discharges to air are anticipated other than fugitive dust.

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Attachment A
North Carolina Chemical-Specific ARARs
Operable Unit 6, Site 12

Media	Requirement	Prerequisite	Citation	ARAR Determination	Comment
Air Quality Rules **[Title15A subchapter 2D and 2Q]**					
Air	No facility or source of air pollution shall cause any ambient air quality standard to be exceeded or contribute to a violation of any ambient air quality standard except as allowed.	Air emission from agricultural, municipal and industrial processes, or other pollutant management activities.	15A NCAC 02D .0400 15A NCAC 02Q .0300	Applicable	The only potential air emission is from fugitive dust during excavation. Fugitive dust will be controlled during excavation
Groundwater Classification and Standards **[Title15A subchapter 2L]**					
Groundwater	Classifies groundwater by usage and occurrence. Specifies groundwater quality standards and threshold limits.	All groundwater potable or non potable.	15A NCAC 02L .0202	Applicable	2L groundwater standards are applicable remediation goals for the OU6 groundwater remedy.
Hazardous Waste Management **[Title15A subchapter 13A]**					
Soil, groundwater, surface water, sediment	Identification and listing of hazardous waste. Wastes to be managed must be sampled to determine the appropriate waste characterization.	Management of hazardous waste.	15A NCAC 13A .0106 15A NCAC 13A .0107 15A NCAC 13A .0119	Relevant and Appropriate	All material excavated will be characterized for proper off-site disposal. Based on site history, it is not anticipated that excavated material will be characterized as hazardous waste.
Solid Waste Management Rules **[Title15A subchapter 13B]**					
Solid Waste (soil, sediment, sludge)	All solid waste shall be stored, collected, transported, separated, processed, recycled, recovered, and disposed of in a manner consistent with this requirement.	Management of solid waste.	15A NCAC 13B .0100	Applicable	The excavation will generate material which will be characterized for off site disposal in an approved facility.
Soil Screening Levels **[NC Hazardous Waste Section]**					
Soil	Establishing unrestricted use levels that are protective of both human health and the environment. Two potential soil pathways are 1) direct contact to soil by residents, and 2) the leaching of a chemical from soil to groundwater. For unrestricted use, at a minimum, both of these standards must be met. If other exposure pathways exist or the exposure conditions at a site are greater in magnitude than the default values used to calculate the screening levels provided, additional steps are required.	Concentrations of chemicals in soil.	NC Guidelines for Establishing Remediation Goals at RCRA Hazardous Waste Sites. Soil screening levels are based on USEPA Region 9 RBCs.	To Be Considered	Guidelines for soil screening levels (SSL) will be considered as remediation goals for the remedy at OU6.

This page contains no comments

Attachment A
North Carolina Location-Specific ARARs
Operable Unit 6, Site 12

Location	Requirement	Prerequisite	Citation	ARAR Determination	Comment
Surface Water Standards [Title15A subchapter 2B]					
Riparian buffer of the Neuse River Basin	The riparian buffer shall maintain two zones as designated in this requirement. Disturbances are classified as exempt, allowable, allowable with mitigation, or prohibited. Any disturbance must comply with the designated classification requirements.	Activities within the fifty-foot wide riparian buffer adjacent to surface waters in the Neuse River Basin.	*15A NCAC 02B .0233*	Relevant and Appropriate	The remedy at OU6 is not expected to encroach into the 50-foot riparian buffer. In the event the remedy does encroach the 50-foot riparian buffer, activities would comply with the designated classification.
Solid Waste Management **[NCGS §130A]**					
Presence of an inactive hazardous substance or waste disposal site	A survey plat must be prepared and certified by a professional land surveyor. The Notice shall include a legal description of the site that would be sufficient as a description in an instrument of conveyance, shall meet the requirements for maps and plats, and shall identify: (1) The location and dimensions of the disposal areas and areas of potential environmental concern with respect to permanently surveyed benchmarks, (2) The type, location, and quantity of hazardous substances known by the owner of the site to exist on the site, and (3) Any approved restriction on the current or future use of the site. After the notice is approved and certified, a certified copy of the Notice shall be filed in the register of deeds' office in the county or counties in which the land is located.	Existence and location of an inactive hazardous substance or waste disposal site.	*NCGS § 130A-310.8*	Applicable	A survey plat will be prepared by a professional land surveyor and recorded with Craven County.
Coastal Management **[Title 15A subchapter 7H]**					
Estuarine and ocean systems	Uses which are not water dependent shall not be permitted in coastal wetlands, estuarine waters, and public trust areas. Uses that are water dependent must comply with the standards of this requirement.	Estuarine waters, coastal wetlands, public trust areas, and estuarine and public trust shorelines.	*15A NCAC 07H .0200*	Relevant and Appropriate	The remedy at OU6 is proximal to estuarine waters; however the activities associated with the remedy are not water dependen and are not expected to impact the estuarine waters.

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References

Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record[1]
Site 12 is the crash-crew training area	Section 2.1	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Attachment 2, Section 2.2, Pages 2-1 through 2-3. CH2M HILL, December 2005.
hydrogeologic setting	Section 2.2	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 4.3.4.1, Pages 4-10 through 4-13. CH2M HILL, December 2005.
constituent concentrations	Section 2.3	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 5, Tables 5-2 through 5-14. CH2M HILL, December 2005.
soil	Section 2.3	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 5, Figures 5-4 through 5-6. CH2M HILL, December 2005.
groundwater	Section 2.3	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 5, Figure 5-7. CH2M HILL, December 2005.
surface water	Section 2.3	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 5, Figure 5-8. CH2M HILL, December 2005.
sediment	Section 2.3	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 5, Figure 5-9. CH2M HILL, December 2005.
samples	Table 1	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 3, Tables 3-6 through 3-10. CH2M HILL, December 2005.
samples	Table 1	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Attachment 2, Sections 3.1 and 3.2, Pages 3-1 through 3-3. CH2M HILL, December 2005.
VOCs and SVOCs were detected	Section 2.3	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Attachment 2, Tables 2 and 3. CH2M HILL, December 2005.
subsurface soil	Section 2.3	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Attachment 2, Figure 6. CH2M HILL, December 2005.
groundwater	Section 2.3	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Attachment 2, Figure 7. CH2M HILL, December 2005.
human health CSM	Section 2.5.1	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 7, Figure 7-1. CH2M HILL, December 2005.

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quantitative human health risk assessment	Section 2.5.1	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 7, Tables 7-4, 7-5, and 7-6. CH2M HILL, December 2005.
Potential unacceptable risks	Section 2.5.1	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 7, Tables 7-10 and 7-11. CH2M HILL, December 2005.
no unacceptable risks	Section 2.5.1	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Appendix G-1, Tables 9.1 through 9.6. CH2M HILL, December 2005.
potential human health risks were further evaluated	Section 2.5.1	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Attachment 2, Section 4.4, Pages 4-5 and 4-6 Tables 7.1 and 7.2, Tables 8.1 and 8.2, Tables 9.1 and 9.2, and Tables 10.1 and 10.2. CH2M HILL, December 2005.
soil data	Section 2.5.1	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Attachment 2, Table 5. CH2M HILL, December 2005.
results	Section 2.5.1	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Attachment 2, Table 11. CH2M HILL, December 2005.
assumptions and uncertainties	Section 2.5.1	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 7.6.1 and 7.6.2, pages 7-31 through 7-36, Table 7-9. CH2M HILL, December 2005.
ecological CSM	Section 2.5.2	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 8, Figure 8-3. CH2M HILL, December 2005.
assessment and measurement endpoints	Section 2.5.2	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 8, Table 8-1. CH2M HILL, December 2005.
screening values	Section 2.5.2	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 8, Tables 8-2 through 8-4. CH2M HILL, December 2005.
reference toxicity values	Section 2.5.2	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 8, Tables 8-5 and 8-6. CH2M HILL, December 2005.
chemicals of potential concern	Section 2.5.2	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 8, Tables 8-2 through 8-4 and 8-9 through 8-13. CH2M HILL, December 2005.
refined	Section 2.5.2	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 8.6.1 and 8.6.2, pages 8-14 through 8-18, Tables 8-14 through 8-16, and Tables 8-18 through 8-22. CH2M HILL, December 2005.
site use factors	Section 2.5.2	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 8.6.1, pages 8-15 and 8-16. CH2M HILL, December 2005.
uncertainty	Section 2.5.2	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 8.6.3, page 8-18. CH2M HILL, December 2005.
NC SSLs	Section 2.5.3	Guidelines for Establishing Remediation Goals at RCRA Hazardous Waste Sites. Appendix 2, Appendix 3a, and Appendix 3b. North Carolina Department of Environment and Natural Resources, Division of Waste Management, Hazardous Waste Section, Revised May 2005.

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Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record[1]
NC 2Ls	Section 2.5.3	North Carolina Administrative Code Title 15A Subchapter 2L. 15A NCAC 02L.0202. Department of Environment, Health, and Natural Resources, April 2005.
soil	Section 2.5.3	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 5, Tables 5-2 and 5-7, Attachment 2, Table 2. CH2M HILL, December 2005.
groundwater	Section 2.5.3	Final Remedial Investigation Report, Operable Unit 6, Site 12, Crash Crew Training Area, MCAS Cherry Point, North Carolina. Section 5, Table 5-9, Attachment 2, Table 3. CH2M HILL, December 2005.
eastern United Stated soil	Section 2.5.3	Background Evaluation Report for MCAS Cherry Point, North Carolina. Section 1, Table 1-3. Navy, October 1999.
subsurface soil	Section 2.5.4	Final Feasibility Study for Operable Unit 6, MCAS Cherry Point, North Carolina. Section 4, Figure 4-1. CH2M HILL, January 2006.
groundwater	Section 2.5.4	Final Feasibility Study Report of Operable Unit 6, MCAS Cherry Point, North Carolina. Section 4, Figure 4-2. CH2M HILL, January 2006.
General Response Actions (GRAs) and remedial approaches	Section 2.8	Final Feasibility Study for Operable Unit 6, MCAS Cherry Point, North Carolina. Sections 6.1 and 6.2, Tables 6-1 through 6-4. CH2M HILL, January 2006.
preliminary remedial alternatives	Section 2.8	Final Feasibility Study for Operable Unit 6, MCAS Cherry Point, North Carolina. Section 6.3 and Table 6-5. CH2M HILL, January 2006.
nine evaluation criteria	Section 2.8.2	Final Feasibility Study for Operable Unit 6, MCAS Cherry Point, North Carolina. Section 7.1, pages 7-1 through 7-4. CH2M HILL, January 2006.
ARARs	Section 2.8.2	Final Feasibility Study for Operable Unit 6, MCAS Cherry Point, North Carolina. Appendix A, Tables A-1 through A-3, CH2M HILL, January 2006
Present-Worth Cost: $291,600	Table 6	Final Feasibility Study for Operable Unit 6, MCAS Cherry Point, North Carolina. Appendix B, Soil Alternative S4. CH2M HILL, January 2006.
Present-Worth Cost: $229,300	Table 6	Final Feasibility Study for Operable Unit 6, MCAS Cherry Point, North Carolina. Appendix B, Soil AlternativeS5. CH2M HILL, January 2006.
Present-Worth Cost: $194,300	Table 6	Final Feasibility Study for Operable Unit 6, MCAS Cherry Point, North Carolina. Appendix B, Groundwater Alternative G4, CH2M HILL, January 2006
IR Program website	Section 2.10	http://public.lantops-ir.org/sites/public/cherrypoint/default.aspx
meeting transcript	Section 3	

[1] Bold blue text indicates hyperlinks available on the reference CD to detailed site information contained in the publicly available Administrative Record.

For access to information contained in the Administrative Record for MCAS Cherry Point, please contact:

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