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RECORD OF DECISION FOR OPERABLE UNIT 7 (OU 7) SITE 32 NSY PORTSMOUTH ME
9/1/2013
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RECORD OF DECISION

OPERABLE UNIT 7 – SITE 32
(TOPEKA PIER SITE)

PORTSMOUTH NAVAL SHIPYARD
KITTERY, MAINE

CONTRACT NUMBER 62470-08-D-1001
CONTRACT TASK ORDER WE13

September 2013

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Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
BAP	Benzo(a)pyrene
bgs	Below ground surface
CDI	Chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Chemical of concern
COPC	Chemical of potential concern
CSF	Cancer slope factor
CTE	Central tendency exposure
EPC	Exposure point concentration
ER, N	Environmental Restoration, Navy
FFA	Federal Facility Agreement
FS	Feasibility Study
GHG	Greenhouse gas
HHRA	Human health risk assessment
HI	Hazard index
HQ	Hazard quotient
IEUBK	Integrated Exposure Uptake Biokinetic
IR	Installation Restoration
LUC	Land use control
MEDEP	Maine Department of Environmental Protection
mg/kg	Milligram per kilogram
MTADS	Multi-Sensor Towed-Array Detection System
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPW	Net present worth
O&M	Operation and maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PNS	Portsmouth Naval Shipyard
RAB	Restoration Advisory Board
RAO	Remedial action objective
RCRA	Resource Conservation and Recovery Act

RD	Remedial Design
RfD	Reference dose
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RME	Reasonable maximum exposure
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SF	Slope factor
SSI	Site Screening Investigation
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxicity equivalency quotient
TRW	Technical Review Workgroup
TSD	Treatment, storage, and disposal
UCL	Upper confidence limit
µg/dL	Microgram per deciliter
USC	United States Code
USEPA	United States Environmental Protection Agency

1.0 DECLARATION

1.1 SITE NAME AND LOCATION

Portsmouth Naval Shipyard (PNS)
United States Environmental Protection Agency (USEPA) ID No. ME7170022019
Operable Unit (OU) 7 – Site 32 (Topeka Pier Site)
Kittery, Maine

1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the Selected Remedy for contamination at OU7. This remedy was chosen by the Navy and USEPA in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (USC) §9601 et seq., as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300 et seq., as amended. This decision is based on information contained in the Administrative Record for the site. The Maine Department of Environmental Protection (MEDEP) concurs with the Selected Remedy (see Appendix A). The OU7 area of PNS is shown on Figure 1-1.

FIGURE 1-1. SITE LOCATION MAP

1.3 ASSESSMENT OF SITE

The response action alternative selected in this ROD is necessary to protect human health and the environment from actual or threatened releases of pollutants or contaminants from OU7 that may present an imminent and substantial endangerment to public health or welfare. A CERCLA action is required because concentrations of lead in surface soil and dioxins/furans, carcinogenic polycyclic aromatic hydrocarbon (PAHs), polychlorinated biphenyls (PCBs), antimony, copper, iron, and lead in subsurface soil pose potential unacceptable future risk to hypothetical residents and concentrations of dioxins/furans and PCBs in subsurface soil pose potential unacceptable current and future risk to industrial (construction and occupational) workers at OU7. In addition, as long as contaminated fill is present along the shoreline of OU7, shoreline erosion controls need to be maintained to ensure that future erosion of the fill does not occur and impact the offshore environment.

1.4 DESCRIPTION OF SELECTED REMEDY

The major components of the Selected Remedy for OU7 include the following:

- Excavation of soil associated with potentially unacceptable risks to industrial workers. Excavation of approximately 190 cubic yards of soil from two areas in the southeastern portion of the site will be conducted to meet industrial cleanup levels.
- Disposal of excavated soil in an offsite landfill and restoration of the excavated areas to pre-construction conditions.
- Implementation of land use controls (LUCs) via a LUC Remedial Design (RD) to restrict residential land use, require management of excavated subsurface soil, and require long-term management of the existing shoreline erosion controls at OU7.
- Five-year site reviews to ensure that the remedy remains protective of human health and the environment.

The Selected Remedy for OU7 removes contaminated soil associated with potentially unacceptable industrial worker risks for exposure to dioxins/furans and PCBs. Excavation based on industrial worker risk will also remove lead-contaminated surface soil associated with potentially unacceptable residential risks. However, contamination that poses potential unacceptable risks to hypothetical future residents will still remain in the subsurface. Therefore, LUCs will be implemented to prevent residential exposure to contaminated subsurface soil within the LUC boundary. Implementation of long-term management of shoreline erosion controls via a long-term management plan will prevent adverse impacts to the offshore from future erosion of contaminated material along the shoreline of OU7. The Selected Remedy for OU7 is expected to achieve substantial long-term risk reduction and allow the property to be used for current and reasonably anticipated future industrial land uses.

This ROD documents the final remedial decision for OU7 and does not include or affect any other sites at the facility. Implementation of this decision is consistent with current uses and the overall cleanup strategy for PNS to clean up sites to support base operations.

1.5 STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with federal and state requirements 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. The Selected Remedy does not satisfy the statutory preference for remedies that use treatment as a principal element to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, and contaminants. Based on the types, depths, and pattern of contamination across OU7, the Navy concluded that it was impracticable to treat the chemicals of concern (COCs) in a cost-effective manner. The use of excavation of contaminated soils, rather than

treatment, is suitable under the NCP criteria to address contamination, such as that at OU7, which poses a relatively low long-term threat to human health.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site in excess of levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years of initiation of the remedial action, and every 5 years thereafter, to ensure that the remedy is, or will be, protective of human health and the environment.

1.6 ROD Data Certification Checklist

The locations in Section 2.0, Decision Summary, of the information required to be included in the ROD are summarized in Table 1-1. Additional information can be found in the Administrative Record file for PNS.

Table 1-1. ROD Data Certification Checklist

Data	Location in ROD
COCs and their respective concentrations	Sections 2.5 and 2.7
Baseline risk represented by the COCs	Section 2.7
Cleanup levels established for COCs and the basis for these levels	Section 2.8
How source materials constituting principal threats are addressed	Section 2.11
Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the risk assessment	Section 2.6
Potential land and groundwater uses that will be available at the site as a result of the Selected Remedy	Section 2.12.3
Estimated capital, operating and maintenance, and total net present worth (NPW) costs; discount rate; and number of years over which the remedy costs are projected	Appendix F
Key factors that led to the selection of the remedy	Section 2.12.1

If previously unknown contamination posing an unacceptable risk to human health or the environment is discovered after execution of this ROD and is shown to be a result of Navy activities, the Navy will undertake the necessary actions to ensure continued protection of human health and the environment.

1.7 Authorizing Signatures

The signatures provided below and on the following page validate the selection by the Navy and USEPA of the final remedy for contamination at OU7. MEDEP concurs with the Selected Remedy.

William Greene

W. C. Greene
Captain, United States Navy
Commanding Officer
Portsmouth Naval Shipyard

9/27/13

Date

Nancy Barmakian for

James T. Owens, III, Director
Office of Site Remediation and Restoration
USEPA Region 1

09/30/13

Date

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

PNS, USEPA ID number ME7170022019, is a military facility with restricted access on an island located in the Piscataqua River, referred to on National Oceanic and Atmospheric Administration nautical charts as Seavey Island, with the eastern tip given the name Jamaica Island. Clark's Island is to the east attached by a rock causeway to Seavey Island. The Piscataqua River is a tidal estuary that forms the southern boundary between Maine and New Hampshire. PNS is located in Kittery, Maine, north of Portsmouth, New Hampshire, at the mouth to the Great Bay Estuary (commonly referred to as Portsmouth Harbor). The shipbuilding history of PNS dates back to the 1800s, and the facility has been engaged in the construction, conversion, overhaul, and repair of submarines for the Navy since 1917.

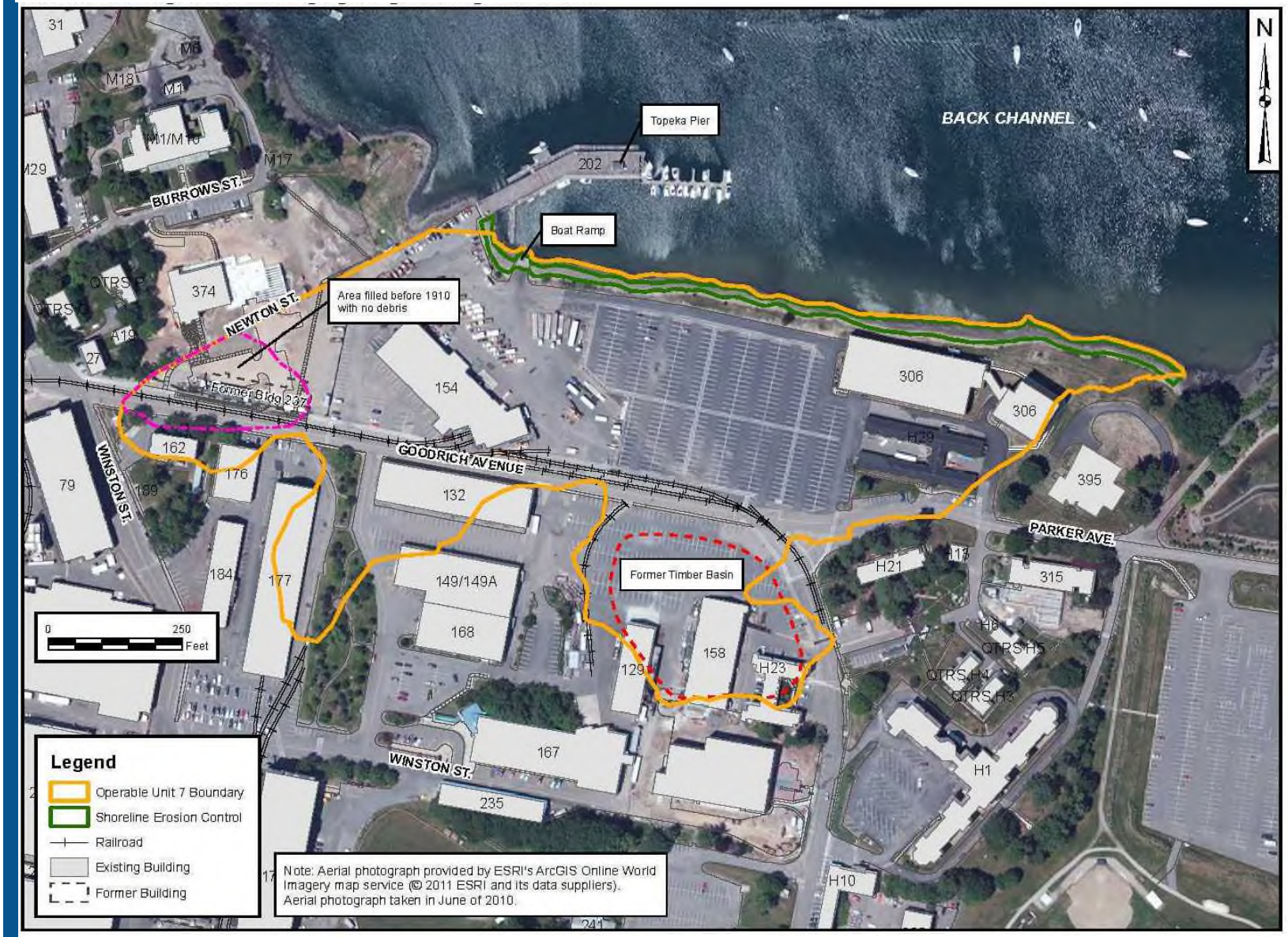
OU7 consists of Site 32 – Topeka Pier Site and is located along the northern boundary of PNS, along the Back Channel of the Piscataqua River. The site encompasses the area from just west of Building 162 to east of former Building H29 and from the Back Channel south to Building 129. Figure 1-1 shows the location of OU7 at PNS, and Figure 2-1 shows the layout of OU7.

OU7 is a tidal area that was filled from approximately 1900 to 1945 to allow use for various industrial activities in support of Shipyard operations. Past industrial activities included storing and milling of lumber, storing and seasoning wood (in the Former Timber Basin), storing coal and scrap iron, and storing combustibles including paints and oils. Materials used to fill the area consisted mostly of rock and soil, with some debris and scrap material. In the area filled before 1910 in the vicinity of Building 237, the fill material is mostly rock with some soil and no debris. Disposal of combustible material (possibly paint and oil) in the Former Timber Basin area reportedly began in 1939. By 1945, all filling and possible disposal at OU7 had ceased. A boat pier (Topeka Pier) was constructed along the shoreline in the western portion of the site around 1905.

The majority of OU7 has continued to be used for industrial activities since 1945. Current and future anticipated land use is industrial, with recreational use of the boat pier and launch (ramp). Current activities at OU7 include office parking, equipment storage, vehicle and rail car maintenance (Building 154), transducer repair (Building 306), boat launching (by Topeka Pier), and a hotel (Building H23).

PNS is an active facility, and environmental investigations and remediation at the facility are funded under the Environmental Restoration, Navy (ER, N) Program. The Navy is the lead agency for CERCLA activities at the facility, and USEPA and MEDEP are support agencies.

FIGURE 2-1. SITE FEATURES



2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Table 2-1 provides brief summaries of previous investigations at OU7. Results of these investigations indicate that dioxins/furans, carcinogenic PAHs, PCBs, antimony, copper, iron, and lead are present in OU7 soil at concentrations that exceed cleanup levels.

TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION

INVESTIGATION	DATE	ACTIVITIES
Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Data Gap Investigation	1994	Conducted to resolve data gaps to address deficiencies in the RFI. OU7 was not identified as a site at this time; however, one of the non-site related monitoring well clusters installed as part of this investigation (the FA monitoring well cluster) is located on what was later identified as OU7. Data from the RFI Data Gap Investigation were considered along with other geological and hydrogeological information to evaluate OU7 conditions including contaminant fate and transport.
Groundwater Monitoring	1996-1997	Facility-wide groundwater monitoring program conducted to resolve data gaps to address deficiencies in the RFI. The purpose of the program was to present a snapshot of overall groundwater quality at PNS based on four rounds of quarterly data from monitoring wells at PNS. The FA well cluster was included in this monitoring program, where four rounds of groundwater data were collected between December 1996 and November 1997. The data for the FA well cluster were used as part of data evaluation activities for the OU7 Remedial Investigation (RI).
Seep and Sediment Monitoring	1996-1997	Conducted to collect seep water and collocated sediment samples in several intertidal areas of PNS (i.e., areas exposed during low tide and submerged during high tide), along with groundwater samples to provide a comprehensive "snapshot" for use in contaminant fate and transport modeling. Four locations were sampled offshore of OU7 (BC-1016, BC-1017, BC-1018, and BC-1020). Data from the 1996 to 1997 seep/sediment monitoring (Rounds 7 through 10) were used to provide an indication of general chemical concentrations in the intertidal area and were used as part of data evaluation activities for the OU7 RI.
Site Screening Investigation (SSI)	2000	Conducted in 2000 to document the release or potential release of hazardous substances that may be present, to make recommendations for further action (e.g., an RI), and to eliminate from further investigation those portions of the site that may pose no appreciable risk to the environment or human health. The sampling and analyses targeted potential source areas at OU7 and provided soil and groundwater data for the site. Additionally, the SSI provided geological and hydrogeological information that was combined with other geological and hydrogeological information for the site to understand site conditions including contaminant fate and transport. Based on the chemical concentrations in surface and subsurface soil and groundwater samples, the SSI concluded that an RI was necessary.
Multi-Sensor Towed-Array Detection System (MTADS)	2001	Conducted to generate geophysical maps of Jamaica Island (OU3, located east of OU7) and OU7 to identify ferrous or steel-reinforced concrete containers that may have been used to dispose of materials. Conducted on the approximately one-fourth to one-third of OU7 that was accessible to identify magnetic and electromagnetic anomalies. The portions of the site not surveyed were inaccessible because of equipment, fenced laydown areas, railroad tracks, and other structures. The MTADS showed buried utility lines throughout the OU7 area, but an anomaly in the southeastern corner of the survey area did not correlate to site features (e.g., utilities). Based on historical figures, a railroad previously ran near the location of the anomaly (north of Goodrich Avenue), and utilities were previously located around the anomaly. Although it was likely that this anomaly was associated with former railroad tracks or utilities, the exact nature of the anomaly was unknown. The anomaly was investigated further during the RI; no drums were found.

TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION

INVESTIGATION	DATE	ACTIVITIES
Interim Offshore Monitoring	1999-2010	Interim offshore monitoring for OU4 was conducted to provide current data on the offshore areas to evaluate whether onshore remedial actions, natural processes, and/or other sources have affected chemical concentrations at OU4. Sediment at the two monitoring stations located in the offshore area of OU7 (MS-03 and MS-04) were sampled during the first seven rounds of the Interim Offshore Monitoring Program. Copper, nickel, and PAH sediment contamination was found. The copper and nickel were from foundry slag in the OU7 offshore area.
Phase I RI Field Work	2003	Soil, sediment, groundwater, and intertidal surface water (outfalls and nearby surface water) samples were collected at OU7 to support evaluation of the nature and extent of contamination and risk assessment. Approximately 70 soil samples, 10 groundwater samples, and six surface water samples were collected and analyzed for OU7 potential contaminants. Over 70 sediment samples were collected and analyzed for nickel and copper. A wetlands functions and values assessment of the intertidal area was also conducted. Data were evaluated to determine whether another phase of investigation (Phase II) was necessary. Based on the evaluation, it was recommended that one round of groundwater sampling be performed, soil sampling be performed in select areas to define the extent of high chemical concentrations, and exploratory borings be advanced to define the extent of potential petroleum contamination.
Removal Action for Site 32 Shoreline Stabilization	2008	In June 2006, the Navy conducted an emergency removal action along the OU7 shoreline to address erosion north of Building 306. Based on the presence of eroding debris, including foundry slag, the Navy removed surface debris and placed a shoreline erosion control (revetment) structure along the entire OU7 shoreline (approximately 1,200 linear feet) for the purpose of preventing erosion. The controls cover the high- to mid-tide portion of the shoreline and consist of a pea-stone layer to create the necessary grade for an 8-ounce, non-woven, geotextile fabric followed by two layers of graded rock.
Phase II RI Field Work	2008	Included collection of approximately 50 additional soil samples and 10 additional groundwater samples from OU7 wells and upgradient wells at Site 30, and approximately 40 sediment samples from the intertidal areas. Data were determined to sufficiently fill the data gaps identified after the Phase I RI sampling event.
RI	2011	Prepared to characterize the nature and extent of contamination, evaluate potential risks to human receptors, and determine the potential for OU7 contamination to adversely impact the offshore area. Potential onshore ecological risks were not evaluated because OU7 is in an industrial area with no onshore ecological habitats. The RI indicated that the nature and extent of contamination was sufficiently defined. Potentially unacceptable risks were found for current and future exposure to soil at OU7. Exposure to groundwater, surface water, and sediment does not pose unacceptable risks for human receptors. The area filled before 1910 without debris (in the vicinity of former Building 237) was evaluated separately from the rest of the site, and risks were acceptable for all receptors exposed to soil in this area. Groundwater, surface water, sediment, and soil data from OU7 and modeling conclusions show that migration of contaminants in groundwater from OU7 to the offshore does not pose a current and would not pose a future unacceptable risk. Evaluation of the existing shoreline erosion controls indicated that no further erosion is occurring; however, these controls need to be maintained to ensure that future erosion of contaminated fill does not occur and impact the offshore environment.
Feasibility Study (FS)	2013	Conducted to develop and evaluate potential cleanup alternatives for OU7.
Proposed Plan	2013	Presented the Navy's Preferred Alternative to address contamination at OU7.

On May 31, 1994, PNS was placed on the National Priorities List by USEPA pursuant to CERCLA of 1980 and SARA of 1986. The National Priorities List is a list of uncontrolled or abandoned hazardous

waste sites identified by USEPA as requiring priority remedial actions. The Navy and USEPA signed the Federal Facility Agreement (FFA) for PNS in 1999 to ensure that environmental impacts associated with past and present activities at PNS are thoroughly investigated and that the appropriate remedial action is pursued to protect human health and the environment. In addition, the FFA establishes a procedural framework and timetable for developing, implementing, and monitoring appropriate responses at PNS, in accordance with CERCLA (and SARA of 1986, Public Law 99-499), 42 USC §9620(e)(1); the NCP, 40 CFR 300; RCRA, 42 USC §6901 et seq., as amended by the Hazardous and Solid Waste Amendment of 1984; Executive Order 12580; and applicable state laws. There have been no cited violations under federal or state environmental law or any past or pending enforcement actions pertaining to the cleanup of OU7.

2.3 COMMUNITY PARTICIPATION

The Navy has been conducting community relations activities for the Installation Restoration (IR) Program at PNS since the program began. From 1988 to November 1994, Technical Review Committee meetings were held on a regular basis. In 1994, a Restoration Advisory Board (RAB) was established to increase public participation in the IR Program process. Many community relations activities for PNS involve the RAB, which historically met quarterly and recently has met two to four times per year. The RAB provides a forum for discussion and exchange of information on environmental restoration activities among the Navy, regulatory agencies, and the community, and it provides an opportunity for individual community members to review the progress and participate in the decision-making process for various IR Program sites including OU7. Details of the history, objectives, and implementation techniques of community relations activities at PNS can be found in the 2012 Final Community Involvement Plan Update.

The following community relations activities are conducted at PNS as part of the Community Relations Program:

Information Repositories: The Public Library in Portsmouth, New Hampshire, and the Rice Public Library in Kittery, Maine, are the designated Information Repositories for the PNS IR Program. Documents are available on the public website at http://go.usa.gov/vvb.

Key Contact Persons: The Navy has designated information contacts related to PNS. Materials distributed to the public, including any fact sheets and press releases, will indicate these contacts.

Regular Contact with Local Officials: The Navy arranges regular meetings to discuss the status of the IR Program with the RAB.

Press Releases and Public Notices: The Navy issues press releases and public notices as needed to local media sources to announce public meetings and comment periods and the availability of reports and to provide general information updates.

Public Meetings: The Navy conducts informal public meetings to keep residents and town officials informed about cleanup activities at PNS and significant milestones in the IR Program. Meetings are conducted to explain the findings of RIs, to explain the findings of FSs, and to present Proposed Plans, which explain the preferred alternatives for cleaning up individual sites.

Fact Sheets and Information Updates: The Navy develops fact sheets to mail to public officials and other interested individuals and/or to use as handouts at public meetings. Fact sheets are used to explain certain actions or studies, to update readers on revised or new health risks, or to provide general information on the IR Program process.

Responsiveness Summary: The Responsiveness Summary summarizes public concerns and issues raised during the public comment period on the Proposed Plan and documents the Navy's formal responses. The Responsiveness Summary may also summarize community issues raised during the course of the FS.

Announcement of the ROD: The notice of the final ROD will be published by the Navy in a major local newspaper prior to commencement of the selected remedial action.

Public Comment Periods: Public comment periods allow the public an opportunity to submit oral and written comments on the proposed cleanup options. Citizens have at least 30 days to comment on the Navy's preferred alternatives for cleanup actions as indicated in the Proposed Plan.

Technical Assistance Grant: A Technical Assistance Grant from USEPA can provide up to $50,000 to a community group to hire technical advisors to assist them in interpreting and commenting on site reports and proposed cleanup actions. A Technical Assistance Grant has been awarded to a community organization.

Site Tours: The PNS Public Affairs Office periodically conducts site tours for media representatives, local officials, and others.

A notice of availability of the Proposed Plan for OU7 was published on July 16, 2013, in the Portsmouth Herald and Fosters Daily Democrat. The Proposed Plan and other documents related to the site are available to the public through the PNS Environmental Restoration Program public website (http://go.usa.gov/vvb). Additionally, an index of available documents is available at the PNS Information Repositories located at the Portsmouth Public Library in Portsmouth, New Hampshire, and Rice Public Library located in Kittery, Maine. A copy of the notices and the Proposed Plan are included in Appendix B of this ROD.

The Proposed Plan notice of availability invited the public to attend a public meeting at the Kittery Town Hall in Kittery, Maine, on July 23, 2013. The public meeting presented the proposed remedy and solicited oral and written comments. At the public meeting, personnel from the Navy, USEPA, and MEDEP were available to answer questions from the attendees during the informal portion of the meeting. In addition, public comments on the Proposed Plan were formally received and transcribed. The transcript from the public meeting is provided in Appendix C. Responses to the comments received during the public comment period are discussed in the Responsiveness Summary in Section 3.0 of the ROD.

2.4 SCOPE AND ROLE OF OPERABLE UNIT

OU7 is part of a comprehensive environmental investigation and cleanup program currently being performed at PNS. In accordance with Section 120(e) of CERCLA, an FFA was entered into between the Navy and USEPA in 1999. Eleven sites are included in the IR Program at PNS. Ten of the sites (excluding Site 30) are included within one of the seven OUs at PNS. Final decisions regarding remedial actions have been made for Sites 8, 9, and 11 in the OU3 ROD (2001), for Site 10 in the OU1 ROD (2010), Sites 6 and 29 in the OU2 ROD (2011), and Site 5 in the OU4 ROD (2013). Site 32 is within OU7, which is the subject of this ROD. Decision documents are also being prepared for Site 34 (OU9) and Site 30. One site, Site 31 (OU8), is in the RI/FS stage. The Site Management Plan for PNS further details the schedule for IR Program activities and is updated annually.

OU7 consists of the onshore area, where soil and groundwater samples were collected, and the intertidal area (i.e., the area exposed during low tide and submerged during high tide) adjacent to the site along the shoreline, where sediment and surface water samples were collected. OU7 addresses past releases of contamination from filling and past industrial uses of the site to soil and groundwater and the future potential for contaminated soil and groundwater to migrate and adversely impact the offshore environment. OU7 is not a current source of contaminants that may pose unacceptable risk to the offshore area. Concerns associated with past releases from OU7 to the offshore (i.e., beyond the intertidal area associated with OU7) are being addressed as part of OU4. Investigations at OU7 indicated the presence of soil contamination that poses potential unacceptable risk to human health and the environment. A removal action conducted at OU7 in 2006 to address erosion along the shoreline included removing surficial debris (including foundry slag) in the intertidal area and placing shoreline erosion controls (a revetment structure) along the entire OU7 shoreline (approximately 1,200 linear feet).

The remedy documented in this ROD will achieve the remedial action objectives (RAOs) for OU7, as listed in Section 2.8. Implementation of the remedy will allow continued use of the site to support base operations, which is consistent with the current and reasonably anticipated future industrial use of this site and the overall cleanup strategy for PNS of restoring sites to support Shipyard operations.

2.5 SITE CHARACTERISTICS

Site characteristics, including physical characteristics, conceptual site model, and nature and extent and fate and transport of contamination are discussed herein. Elevations discussed herein are based on the 2002 PNS Vertical Datum, which equates 0 feet in the North American Vertical Datum of 1988 to 96.78 feet.

2.5.1 Physical Characteristics

OU7 is located along the northern boundary of PNS along the Back Channel of the Piscataqua River. OU7 is approximately 19 acres, encompassing the 17-acre onshore portion (including parking areas and buildings) and 2 acres of shoreline. The majority of OU7 has continued to be used for industrial activities since the early 1900s. There is also recreational use of the boat pier and ramp. Currently, specific activities at OU7 include office parking, equipment storage, vehicle and rail car maintenance, transducer repair, boat launching, and a hotel (Building H23).

The OU7 site boundary has an irregular shape defined by the historical fill in this area. The site is covered with pavement or buildings, with some small areas of grass landscaping. OU7 is relatively flat, with elevations around 107 to 108 feet on the northern portion decreasing to elevations of 105 feet at the top of the shoreline revetment. A boat ramp by Topeka Pier provides access to the intertidal area. Access to the intertidal area from other portions of OU7 is more difficult because of the steeper slope and rip rap (part of shoreline revetment) along the mid- to high-tide portion of the shoreline. Mudflats (muddy-sand or sandy-mud areas) are present in the low-tide portion of the shoreline. The 100-year flood zone in the vicinity of OU7 is at an elevation of 105 feet, and a portion of OU7 near the shoreline is between the 100-year and 500-year coastal flood zones.

PNS is a well-developed highly industrialized area with limited natural surface water drainage. PNS has an extensive storm water collection system that drains to the Piscataqua River. The storm sewer outfalls in the OU7 intertidal area are tidally influenced, and it is likely that the outfalls are points where groundwater from the site is being transported to the Back Channel. Direct surface water runoff also enters the Piscataqua River. Surface water offshore of OU7 is saline and is not used for drinking. Commercial and recreational boating and lobstering activities are conducted in the Back Channel in the general vicinity of OU7. As stated in Table 2-1, OU7 provides little onshore habitat for ecological receptors. No known endangered, threatened, or protected species or critical habitats are located within the boundaries of PNS, including OU7. However, the entire state of Maine is considered a habitat of the federally listed endangered short-nosed sturgeon. The Gulf of Maine population of Atlantic sturgeon is listed as a federal threatened species.

The current coastline and topography of OU7 were created by filling of the area. Fill material is encountered from the ground surface to a maximum depth of approximately 23 feet below ground surface (bgs), but fill material is present across OU7 to varying depths. The fill material is mostly rock and soil mixed with some debris. There are a few intermittent pockets of debris with little soil. Debris materials identified within the fill include slag, ash, metal, cinders, coal clinkers, wood, plastic, glass, concrete, porcelain, and brick, depending on the location at the site. In the area filled before 1910 in the vicinity of former Building 237, the fill material is mostly rock with some soil and no debris. The majority of fill material at OU7 is below the groundwater level at high tide. In addition, based on observations of shoreline erosion prior to the 2006 shoreline revetment construction, subsurface debris extends to the shoreline and is now covered by the revetment. Based on water level measurements at the OU7 groundwater monitoring wells, the elevation of groundwater at OU7 ranges from approximately 98 to 103 feet (3 to 7 feet bgs) at high tide and from less than 95 to approximately 102 feet bgs (4 to 10 feet bgs) at low tide.

2.5.2 Conceptual Site Model

Figure 2-2 presents the OU7 conceptual site model, which identifies contaminant sources, transport routes, and potential receptors. The source of contamination is associated with past filling activities and industrial use of the site.

OU7 is a tidal area that was filled from approximately 1900 to 1945 to allow use for various industrial activities in support of Shipyard operations. The fill material is mostly rock and soil, mixed with some debris. There are a few intermittent pockets of debris with little soil. Fill material with debris extends to the shoreline and is covered by the existing shoreline erosion controls. The fill is characterized by moderate to low levels of contamination, with greater concentrations (specifically of dioxins/furans and PCBs) in a portion of the Former Timber Basin area. Lower levels of contamination were found in the area filled before 1910, which is mostly rock, in the vicinity of former Building 237.

OU7 has been used for industrial activities since the early 1900s. Storing and milling of lumber in the area began by 1910, and a timber basin for storing and seasoning wood was established at the southeastern corner of the site at this time. Other past industrial activities included storing coal, wood, and scrap iron and storing combustibles including paints and oils. A boat pier (Topeka Pier) was constructed along the shoreline in the western portion of the site around 1905.

Current potential contaminant migration pathways from fill material to the offshore area involve leaching of contaminants to groundwater and subsequent discharge of groundwater to the river via transport of groundwater through intertidal surface water (seeps) and sediment and through the storm sewer system. If the buildings and pavement are removed in the future, site conditions could change such that contaminants in unsaturated zone soil could be mobilized to groundwater via infiltration of precipitation, and could then migrate to the offshore area via groundwater discharge. Migration of contamination from fill material through shoreline erosion is a future potential migration pathway, if shoreline erosion controls are removed.

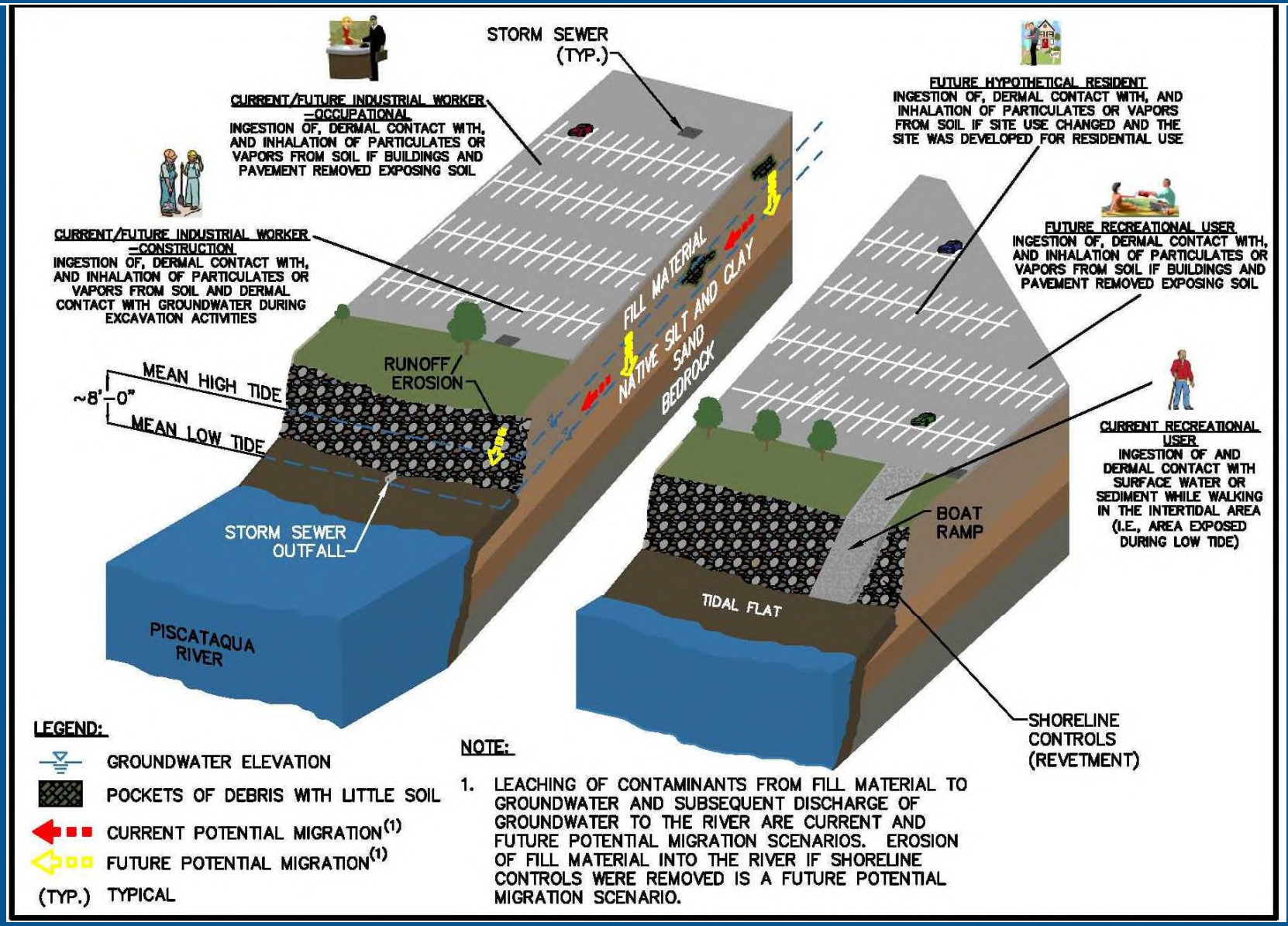
Current land use for OU7 is industrial, with potential recreational use in the intertidal area. The site uses are likely to remain as they are currently. Current construction workers could be exposed to shallow groundwater and surface/subsurface soil during construction activities (e.g., excavation or utility line repair activities). There is a current potential exposure pathway associated with people using the boat ramp to access the intertidal area (i.e., area exposed during low tide) and being exposed to sediment and surface water while walking in this area. Although there are current commercial/industrial activities at the site (i.e., vehicle and rail car maintenance, transducer repair, hotel activities), there are no current occupational exposures to soil because the site is almost totally covered by pavement and buildings, and there is no exposed soil in the limited grassy areas. Based on site conditions, there are also no current recreational activities (e.g., picnicking or walking) that would be result in exposures to soil. Occupational workers and recreational users might be exposed to surface and subsurface soil in the future if the buildings and pavement were removed from the site. Hypothetical future residential exposure to surface and subsurface soil at the site was considered if the site use changed and the site was developed for residential use.

Sufficient habitat at OU7 is not available for ecological receptors; therefore, onsite ecological exposure is not considered significant.

2.5.3 Nature and Extent and Fate and Transport of Contamination

The primary contaminant sources at OU7 are associated with the fill material and past industrial uses of the site. Soil contaminants identified at OU7 are metals (e.g., antimony, copper, iron, and lead), dioxins/furans, PCBs, and carcinogenic PAHs. In general, chemical concentrations greater than conservative levels that indicate a potential for human health risks (i.e., residential risk-based screening levels) were found in areas filled after 1910. Concentrations were lower in the area filled before 1910 in the vicinity of former Building 237, where the fill material consisted mostly of rock and soil with no debris.

FIGURE 2-2. CONCEPTUAL SITE MODEL



Chemical concentrations in surface soil were generally less than screening levels, whereas chemical concentrations in subsurface soil (i.e., over 2 feet bgs) across most of the areas filled after 1910 were greater than screening levels. However, the lead concentration in one surface soil sample in the Former Timber Basin area [13,200 milligrams per kilogram (mg/kg)] was significantly elevated compared to other lead detections in surface soil (generally less than 400 mg/kg). Concentrations of metals and PAHs in subsurface soil were variable across the site.

PCB and dioxin/furan concentrations were only elevated in subsurface soil within the Former Timber Basin area, where total PCB concentrations (based on total Aroclors) and dioxin/furan concentrations [based on 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxicity equivalency quotient (TEQ)] were elevated compared to the rest of the site. The area with elevated PCB concentrations is an estimated 10- by 50-foot area around sampling locations TP-SB112 and TP-SB108/TP-SB14 where total PCB concentrations in soil from approximately 3 to 8 feet bgs were 19 to 42 mg/kg. Total PCB concentrations elsewhere at OU7 were less than 2 mg/kg. The area with elevated dioxin/furan concentrations is an estimated 10- by 10-foot area around sampling location TP-SB27 where the 2,3,7,8-TCDD TEQ concentration from 2 to 5 feet bgs was 0.0017 mg/kg. The concentrations in samples from 0 to 2 and 5 to 8 feet bgs at this location and concentrations elsewhere at the site were less than 0.00004 mg/kg. The elevated lead concentration in surface soil was also located at TP-SB27.

Chemical concentrations in groundwater, surface water, and sediment were generally less than screening levels.

The OU7 site surface is mostly covered with asphalt/pavement, limiting mobilization of contaminants through surface water runoff or infiltration of precipitation. Much of the subsurface soil is in contact with groundwater. The mobility of PAHs via the groundwater pathway is not considered significant because PAHs were detected in groundwater infrequently and at levels several orders of magnitude less than risk-based screening levels. PCBs were not detected in groundwater. Data for OU7 do not indicate significant concentrations of organic chemicals that would facilitate migration of dioxins/furans in groundwater. The fate and transport of metals are controlled mainly by the movement of soil particles to which the metals may attach and dissolution into water present in their immediate environment. Metals do not undergo any of the degradation reactions that most organic chemicals do; therefore, they are considered to be persistent. The mobility of metals under strong acidic or alkaline conditions is expected to be limited at OU7 because of the buffering action of brackish/saline groundwater. The major fate mechanisms for metals are adsorption to the soil matrix and bioaccumulation.

Potential contaminant migration from fill material via leaching of contaminants to groundwater and subsequent discharge of groundwater to the river (transport of groundwater through intertidal surface water and sediment and through the storm sewer system) was evaluated through contaminant fate and transport modeling as part of the RI. The modeling assumed that the pavement at OU7 was removed, that the amount of infiltrating precipitation coming into contact with soil would be greatly increased compared to current conditions, and that overall groundwater flow conditions and contributions from storm water sewer discharge would not change significantly in the future. The modeling was used to predict future concentrations in groundwater, surface water, and sediment assuming maximum concentrations of chemicals detected in OU7 fill material were leaching to groundwater. The results were used to determine whether there could be adverse impacts to intertidal surface water and sediment from soil contaminant migration via groundwater transport. Groundwater, surface water, sediment, and soil data from OU7 were compared to modeling predicted concentrations. Based on comparisons of current and future predicted chemical concentrations to risk-based screening criteria, site conditions (most of fill material is in contact with groundwater), and history of the site (filled over 50 years ago), the evaluation concluded that potential contaminant migration from soil through groundwater transport is not having and would not have an adverse impact on intertidal surface water and sediment.

Shoreline stabilization was conducted in 2006 to cover fill material along the shoreline to prevent it from eroding to the offshore area. Current conditions indicate that no further erosion is occurring; however, there is potential future risk to the offshore from erosion of fill material should the controls fail and contaminated fill migrate to the offshore environment.

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The current land use patterns at PNS are well established and are not expected to change in the foreseeable future. Industrial areas that support maintenance of submarines are in the western portion of the facility and include all of the dry docks and submarine berths and numerous buildings that house trade shops related to the maintenance activities. Use of other portions of PNS include administration offices, officers' residences, equipment storage, parking, and recreational facilities.

The majority of OU7 currently and historically has been used for industrial activities. Current and future anticipated land use is industrial, with recreational use of the boat pier and launch (ramp). The site is covered with pavement or buildings, with some small areas of grass landscaping. Current activities at OU7 include office parking, equipment storage, vehicle and rail car maintenance, transducer repair, boat launching, and a hotel (Building H23). The site uses are likely to remain as they are currently.

PNS does not use groundwater for any purpose. Potable water is supplied to PNS from the Kittery Water District, which uses surface reservoirs located in the vicinity of York, Maine. Groundwater at the site is tidally influenced and is not suitable for human consumption. The Piscataqua River water is saline and is not suitable for human consumption. Various vessels operate in Portsmouth Harbor, including commercial tankers, cargo ships, fishing trawlers, lobster boats, recreational vessels, and submarines located at PNS. Commercial and recreational fishing occur in the harbor, including in the vicinity of PNS. In the Back Channel area offshore of OU7, Navy activities include the boat dock and pier. Non-Navy activities include commercial and recreational boat traffic, including fishing/lobster boats and recreational vessels. Future uses of this area are expected to be consistent with current uses.

2.7 SUMMARY OF SITE RISKS

The baseline risk assessment estimates what risks the site poses if no action was taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. A human health risk assessment (HHRA) was conducted in 2011 as part of the OU7 RI to estimate the probability and magnitude of potential adverse human health effects from exposure to contaminants associated with the site. Ecological risk assessment was not required.

2.7.1 Summary of Human Health Risk

The quantitative HHRA was conducted using chemical concentrations detected in soil, groundwater, sediment, and surface water samples at OU7. Key steps in the risk assessment process included identification of chemicals of potential concern (COPCs), exposure assessment, toxicity assessment, and risk characterization. Appendix D includes HHRA tables from the OU7 RI Report. For the OU7 HHRA, exposure to site contaminants in soil across the entire site and in soil in the area filled before 1910 (in the vicinity of former Building 237, see Figure 2-1) were evaluated separately.

Identification of Contaminants of Potential Concern

Tables 3.1 through 3.6 from Appendix D.1 of the OU7 RI Report (included in Appendix D of this ROD) include the exposure point concentrations (EPCs) for the COPCs identified in surface and subsurface soil, groundwater, and sediment at OU7. There were no COPCs identified for surface water in the HHRA. EPCs are presented for surface and subsurface soil for the entire site as one exposure unit and for surface and subsurface soil in the filled area in the vicinity of former Building 237 as a separate exposure unit. EPCs are also presented for sediment COPCs for recreational user exposures and for groundwater COPCs for construction worker dermal contact exposures. EPCs are the concentrations used in the risk assessment to estimate exposure and risk from each COPC. For each COPC, information in the tables includes the EPC and how the EPC was derived. Based on the statistical distributions of the data and the results of the preliminary calculations, with the exception of lead, maximum detected concentrations or 95-percent upper confidence limits (UCLs) on the mean were used as the EPCs for COPCs. As recommended in USEPA guidance [Integrated Exposure Uptake Biokinetic (IEUBK) Model and Technical

Review Workgroup (TRW) Adult Lead Model guidance], the arithmetic mean was used as the EPC for lead.

Exposure Assessment

During the exposure assessment, current and potential future exposure pathways through which humans might come into contact with the COPCs identified in the previous step were evaluated. Surface soil, subsurface soil, groundwater, and intertidal area sediment were identified as the media of concern. Potential exposure routes for soil include incidental ingestion (swallowing small amounts of soil), dermal contact (skin exposure), and inhalation of air/dust particulates and vapors. Possible exposure routes for groundwater include dermal contact and inhalation during excavation for construction workers. Possible exposure routes for sediment include incidental ingestion and dermal contact. The HHRA considered receptor exposure under non-residential land use (construction and occupational workers and recreational users) and hypothetical future residential land use. Current and hypothetical future exposure pathways at OU7 are summarized in Table 2-2.

TABLE 2-2. RECEPTORS AND EXPOSURE ROUTES EVALUATED IN HHRA

RECEPTOR	EXPOSURE ROUTE
Construction Workers (current/future land use)	Soil ingestion and dermal contact (surface and subsurface) Soil inhalation of air/dust particulates and vapors (surface and subsurface) Groundwater dermal contact (during excavation) Groundwater inhalation of volatiles (during excavation)(1)
Occupational Workers (current/future land use)	Soil ingestion and dermal contact (surface and subsurface)(2) Soil inhalation of air/dust particulates and vapors (surface and subsurface)(2)
Recreational Users (current/future land use)	Soil ingestion and dermal contact (surface and subsurface)(2) Soil inhalation of air/dust particulates and vapors (surface and subsurface)(2) Sediment ingestion and dermal contact Surface water ingestion and dermal contact(1)
Hypothetical Future Residents (future land use)	Soil ingestion and dermal contact (surface and subsurface)(2) Soil inhalation of air/dust particulates and vapors (surface and subsurface)(2)

1 - Not evaluated quantitatively in the OU7 HHRA because no COPCs were selected for surface water or for groundwater inhalation.

2 - Although occupational workers and recreational users are current receptors at OU7, there is no current exposure route to surface or subsurface soil for these receptors. Quantitative evaluations of residents, recreational users, and occupational workers for exposure to subsurface soil (2 to 10 feet) were conducted for completeness.

Toxicity Assessment

Toxicity assessment involves identifying the types of adverse health effects caused by exposure to site COPCs and determining the relationship between the magnitude of exposure and the severity of adverse effects (i.e., dose-response relationship) for each COPC. Based on the quantitative dose-response relationships determined, toxicity values for both cancer (cancer slope factor [CSF]) and non-cancer (reference dose [RfD]) effects were derived and used to estimate the potential for adverse effects.

Tables 5.1 and 5.2 from Appendix D.1 of the OU7 RI Report (included in Appendix D of this ROD) provide the OU7 COPC non-carcinogenic RfDs and associated target organs for oral/dermal and inhalation routes of exposure, respectively. For non-carcinogenic hazards, the chronic toxicity data available for oral exposure to these COPCs were used to develop oral RfDs ranging from 1×10^{-9} to $1.5 \times 10^{+0}$ mg/kg/day. Dermal RfDs range from 1×10^{-9} to 7×10^{-1} mg/kg/day. The available toxicity data indicate the primary target organ affected by each COPC. Dermal RfDs were extrapolated from oral RfDs by applying an adjustment factor as appropriate. Adjustment factors varied by chemical and ranged from 0.013 to 1.

Tables 6.1 and 6.2 from Appendix D.1 of the OU7 RI Report (included in Appendix D of this ROD) provide the OU7 COPC carcinogenic CSFs for oral/dermal and inhalation routes of exposure, respectively. For

carcinogenic risks, CSFs are not available for the dermal route of exposure; therefore, dermal slope factors were extrapolated from oral values. Adjustment factors, if available, are applied to extrapolate dermal values from oral values depending on how well the chemical is absorbed via the oral route. No adjustment factors were required for the OU7 carcinogenic COPCs; the oral CSFs were used as the dermal CSFs.

Exposure to lead in soil and sediment was evaluated using the IEUBK Model and TRW Adult Lead Model for residential and non-residential exposure scenarios, respectively, as recommended by USEPA. The blood-lead concentration of a receptor is considered a key indicator of the potential for adverse health effects from lead contamination. The IEUBK and TRW Models calculate the probability of a receptor's blood-lead level exceeding 10 micrograms per deciliter (µg/dL), the minimum concentration considered to be a "concern." In addition, the USEPA goal is to limit the risk (i.e., probability) of exceeding a 10-µg/dL blood-lead concentration to 5 percent of the population. The IEUBK Model for lead is designed to estimate blood levels of lead in children (under 7 years of age), and using the TRW model, adult exposure to lead in soil is addressed by evaluating the relationship between site soil lead concentrations and blood-lead concentrations in developing fetuses of adult women. Appendix D.6 of the OU7 RI Report (included in Appendix D of this ROD) provides the input parameters and results of the IEUBK and TRW Adult Lead Model analyses.

Risk Characterization

During the risk characterization, the outputs of the exposure and toxicity assessments are combined to characterize the baseline risk (cancer risks and non-cancer hazards) at the site if no action was taken to address the contamination. Potential cancer risks and non-cancer hazards were calculated based on reasonable maximum exposure (RME) and central tendency exposure (CTE) assumptions. The RME scenario assumes the maximum level of human exposure that could reasonably be expected to occur, and the CTE scenario assumes a median or average level of human exposure.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$Risk = CDI \times SF$$

where: risk = a unitless probability (e.g., 2×10^{-5}) of an individual developing cancer
CDI = chronic daily intake averaged over 70 years (in mg/kg/day)
SF = slope factor [in $(mg/kg\text{-}day)^{-1}$]

These calculated risks are probabilities that are usually expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} under an RME scenario indicates that an individual experiencing the RME estimate has an "excess lifetime cancer risk" of 1 in 1,000,000 because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual developing cancer from all other causes has been estimated to be as high as one in three. USEPA's generally acceptable risk range for site-related exposures is 1×10^{-6} to 1×10^{-4}. The State of Maine cancer risk guideline is 1×10^{-5}.

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., a lifetime) to an RfD derived for a similar exposure period. An RfD represents a level to which an individual may be exposed that is not expected to cause any deleterious effect. The ratio of exposure dose to the RfD is called a hazard quotient (HQ). An HQ less than 1 indicates that a receptor's dose of a single contaminant is less than the RfD and that toxic non-carcinogenic effects from that chemical are unlikely. The hazard index (HI) is generated by adding the HQs for all chemicals that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may be reasonably exposed. An HI less than 1 indicates that, based on the sum of all HQs from different contaminants and exposure routes, toxic non-

carcinogenic effects from all contaminants are unlikely. An HI greater than 1 indicates that site-related exposures may present a risk to human health. The HQ is calculated as follows:

Non-cancer HQ = CDI / RfD

where: CDI = chronic daily intake (in mg/kg/day)
RfD = reference dose (in mg/kg/day)

CDIs and RFDs are expressed in the same units and represent the same exposure period (i.e., chronic, sub-chronic, or short-term).

Tables 9.1 through 9.8 for RME from Appendix D.1 and Tables 9.2 through 9.8 for RME from Appendix D.7.1 of the OU7 RI Report (included in Appendix D of this ROD) provide RME cancer risk estimates for OU7 surface and subsurface soil, sediment, and groundwater for the significant receptors and routes of exposure developed by taking into account various conservative assumptions about the frequency and duration of exposure for each receptor and also about the toxicity of the COPCs. Cancer risk estimates are presented for surface and subsurface soil for the entire site as one exposure unit and for surface and subsurface soil in the filled area in the vicinity of former Building 237 as another exposure unit. Cancer risk estimates for current recreational exposure are presented for sediment only and for future recreational exposure are presented for surface and subsurface soil and sediment. Total cancer risk estimates for all applicable exposure routes range from 2×10^{-8} for current and future construction workers exposed to surface soil in the filled area in the vicinity of former Building 237 to 6×10^{-4} for hypothetical future lifetime residents exposed to entire site subsurface soil. These risk levels indicate that if no cleanup action was taken, the increased probabilities of developing cancer as a result of site-related exposure would range from approximately 2 in 100,000,000 to 6 in 10,000. Cancer risks estimates were only greater than USEPA's acceptable risk of 1×10^{-4} for hypothetical future residents exposed to subsurface soil. Carcinogenic PAHs, PCBs, and dioxins/furans were the main contributors to the unacceptable cancer risks.

Tables 9.1 through 9.8 for RME from Appendix D.1 and Tables 9.2 through 9.8 for RME from Appendix D.7.1 of the OU7 RI Report (included in Appendix D of this ROD) also provide RME non-cancer HQs for the each receptor and route of exposure and total HIs for all routes of exposure. Total HIs for all applicable exposure routes range from 0.001 for recreational exposure to subsurface soil in the filled area in the vicinity of Building 237 to 34 for hypothetical future residents exposed to subsurface soil. RME HIs for construction workers, occupational workers, and hypothetical future residents were greater than 1, with individual target organ HIs also exceeding 1, for exposure to subsurface soil. The primary contributors to non-cancer hazards for construction and occupational workers were dioxins/furans. The primary contributor to non-cancer hazards for hypothetical future residents were dioxins/furans, PCBs, antimony, copper, and iron.

Appendix D.6 of the OU7 RI Report (included in Appendix D of this ROD) includes the lead model output results for OU7 surface and subsurface soil and sediment. The predicted blood-lead levels for residents (child resident receptor) exceeded the USEPA goal of no more than 5 percent of children having a blood-lead concentration greater than 10 µg/dL. The estimated probabilities of exceeding 10 µg/dL ranged from 9.2 percent for surface soil to 69 percent for subsurface soil. The predicted blood-lead levels for other receptors exposed to surface and subsurface soil and for recreational exposure to sediment did not exceed USEPA's goal of no more than 5 percent of receptors having a blood-lead concentration of 10 µg/dL. Lead was not a COPC for soil in the filled area in vicinity of Building 237.

There were two major sources of uncertainty, other than those typically associated with risk assessment estimates, identified for the HHRA. One source of uncertainty was related to construction worker risks associated with exposure to manganese and the other was for construction and occupational worker risks associated with exposure to PCBs in subsurface soil. Non-cancer risks for manganese exceeded 1 for construction worker exposure to subsurface soil (for the entire site exposure unit) based on a conservative soil exposure frequency of 150 days per year. Evaluation of a more realistic exposure frequency for OU7 of 60 days per year was provided in the OU7 FS Report, and the conclusion was that

construction worker risks were acceptable for exposure to manganese. Therefore, manganese was not identified as a COC for construction worker exposure. For PCBs, there was uncertainty because elevated concentrations of PCBs were detected in one localized area (at locations TP-SB108, TP-SB14, and TP-SB112 in the Former Timber Basin area). Concentrations of PCBs as great as 42 mg/kg were detected in subsurface soil in this area compared to the EPC for the entire site exposure unit of 4.6 mg/kg It was determined that risks for construction or occupational worker exposure to subsurface soil in this localized area may be unacceptable. Therefore, PCBs were identified as COCs for construction and occupational worker exposure to subsurface soil.

2.7.2 Summary of Ecological Risk

Potential onshore ecological risks were not evaluated because OU7 is in an industrial area with no onshore ecological habitats. The offshore area is included as part of OU4; therefore, an offshore ecological risk assessment was not conducted as part of OU7. Risks from past releases of contamination in the offshore area of OU7 are being addressed under OU4.

2.7.3 Basis for Action

As a result of past activities at OU7, contamination is present in soil at concentrations that could result in unacceptable human health risks for construction and occupational workers and hypothetical future residents, if action is not taken to prevent exposure to contaminated soil at OU7. In addition to human health risks at the site, there is a future concern associated with potential impacts to the OU7 offshore area from erosion of contaminated fill material should the shoreline erosion controls fail and contaminated fill enters the offshore environment.

Based on the potential site risks, the COCs for construction and occupational workers (referred collectively to as industrial workers) are dioxins/furans and PCBs in subsurface soil, and the COCs for hypothetical future residents are lead in surface soil and antimony, copper, iron, lead, dioxins/furans, carcinogenic PAHs, and PCBs in subsurface soil. Because risks were identified under current and future potential land use scenarios for human receptors and because potential future migration risks exist, a response action is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment that may present an imminent and substantial endangerment to public health or welfare.

2.8 REMEDIAL ACTION OBJECTIVES

RAOs are medium-specific goals that define the objective of conducting remedial actions to protect human health and the environment. RAOs specify the COCs, potential exposure routes and receptors, and acceptable concentrations (i.e., cleanup levels) for a site and provide a general description of what the cleanup will accomplish. RAOs typically serve as the design basis for the remedial alternatives described in Section 2.9. The RAOs developed for OU7 considering current and future land uses at PNS are as follows:

- Prevent residential exposure through ingestion of, dust inhalation of, and dermal contact with surface soil containing lead and subsurface soil containing antimony, copper, dioxins/furans, iron, lead, carcinogenic PAHs, and PCBs concentrations exceeding residential cleanup levels.
- Prevent industrial worker (construction and occupational) exposure through ingestion of, dust inhalation of, and dermal contact with subsurface soil containing dioxins/furans and PCBs concentrations exceeding industrial cleanup levels.
- Protect the offshore environment from erosion of contaminated soil from the OU7 shoreline.

The cleanup levels for OU7 were developed in the OU7 FS Report. The cleanup levels are the chemical-specific goals for representative site concentrations (based on the exposure concentration) that, when achieved, will result in site concentrations that pose an acceptable risk for the targeted receptor. Cleanup levels were developed on a receptor-specific basis for protection of human health from exposure to soil contaminants. Cleanup levels were developed for soil COCs including antimony, copper, iron, lead, carcinogenic PAHs, dioxins/furans, and PCBs. Cleanup levels for the COCs at OU7 are summarized in Table 2-3.

TABLE 2-3. CLEANUP LEVELS [1]

RECEPTOR	MEDIA	COC	CLEANUP LEVEL (MG/KG)	BASIS
Industrial Worker	Subsurface Soil	Dioxins/Furans[2]	0.0006	Site-specific non-cancer hazard based on HI of 1 (Target organ/system - reproductive and thyroid)
		Total PCBs	7.4	Site-specific cancer risk based on an individual chemical risk of $1x10^{-5}$
Resident	Surface Soil	Lead	400	USEPA Office of Solid Waste and Emergency Response (OSWER) Directive 9355.4-12 soil screening level for residential land use
	Subsurface Soil	Carcinogenic PAHs[2]	0.5	Site-specific cancer risk based on individual chemical risk of $3.3x10^{-5}$
		Dioxins/Furans[2]	0.000051	Site-specific non-cancer hazard based on HI of 1 (Target organ/system - reproductive and thyroid)
		Total PCBs[3]	7.3	Site-specific cancer risk based on individual chemical risk of $3.3x10^{-5}$
		Antimony	31	Site-specific non-cancer hazard based on HI of 1 (Target organ/system - blood)
		Copper	1500	Site specific non-cancer hazard based on HI of 0.5 (Target organ/system - gastrointestinal system)
		Iron	27,000	Site-specific non-cancer hazard based on HI of 0.5 (Target organ/system - gastrointestinal system)
		Lead	400	OSWER Directive 9355.4-12 soil screening level for residential land use

1. Cleanup levels are goals for representative exposure concentrations for an exposure unit and are not intended as excavation (pick-up) levels that need to be met on a sample by sample basis.
2. Dioxins/furans are evaluated based on 2,3,7,8-TCDD TEQs and carcinogenic PAHs are evaluated based on benzo(a)pyrene (BAP) TEQs.
3. The selected residential cleanup level for total PCBs was developed based on site-specific potential carcinogenic risks. Although a non-carcinogenic based residential cleanup level may be lower, as discussed in the development of preliminary cleanup levels in the FS for OU7, there is uncertainty in a cleanup level based on non-carcinogenic risks. However, as shown in the FS for OU7, remediation of contaminated soil based on the industrial cleanup level for total PCBs will also result in acceptable carcinogenic and non-carcinogenic residential risks for exposure to total PCBs in soil at OU7.

For evaluation of remedial alternatives, the cleanup levels were applied based on average residual soil exposure concentrations, or EPCs, for OU7. By remediating soil within the identified remediation areas, the resulting average soil exposure concentrations, or EPCs, would be less than the chemical-specific cleanup levels or OSWER level for lead and would pose no unacceptable risks for the targeted receptors. Depths of remediation were based on the exposure depths evaluated in the HHRA, surface soil from 0 to

2 feet bgs and subsurface soil from 2 to 10 feet bgs or groundwater table at high tide, whichever is shallower.

Dioxin/furan and PCB concentrations in subsurface soil and lead concentrations in surface soil were only greater than cleanup levels in a portion of the Former Timber Basin area. For the other COCs, concentrations in subsurface soil were greater than cleanup levels throughout most of OU7, except for in the area filled in the vicinity of former Building 237, where there were no unacceptable risks.

2.9 DESCRIPTION OF ALTERNATIVES

To address potential unacceptable human health risks associated with contamination at OU7, a preliminary technology screening evaluation was conducted in the FS Report. The general response actions retained after the technology screening are presented in Table 2-4.

TABLE 2-4. GENERAL RESPONSE ACTIONS

GENERAL RESPONSE ACTION	TECHNOLOGY	PROCESS OPTIONS
No Action	None	Not Applicable
Limited Action	LUCs	Passive Controls: Land Use Restrictions
	Monitoring	Inspection
Removal	Bulk Excavation	Excavation
Disposal	Landfill/Recycling	Offsite Landfilling

The technologies and process options retained after detailed screening were assembled into remedial alternatives. Three alternatives were evaluated to address contamination at OU7. Consistent with the NCP, the no action alternative was evaluated as a baseline for comparison with other alternatives during the comparative analysis. Table 2-5 describe the major components and provides cost estimates for remedial alternatives developed for OU7. A remedial alternative for complete excavation of contamination to meet residential cleanup levels for unlimited use and unrestricted exposure was screened out in the FS Report because of significant interferences to day-to-day Shipyard operations and very high costs for an unlikely land use.

TABLE 2-5. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED

ALTERNATIVE	COMPONENTS	DETAILS	COST
Alternative 1: **No Action** *No action to address contamination and no use restrictions*	No action would be conducted	Five-year reviews would not be included under the no action alternative.	Cost: $0
Alternative 2: **LUCs and Long-Term Management of Shoreline Controls** *Residential and industrial land use restrictions and inspection and maintenance of LUCs and shoreline erosion controls*	LUCs	Prohibition of future residential use of the site and implementation of requirements for management of excavated soil during potential future construction activities at the site.	**Capital:** $15,000 **30-Year NPW**: $381,000
		Implementation of access restrictions for industrial use within a portion of the Former Timber Basin area.	
		Implementation of requirements for long-term management of existing shoreline erosion controls.	

TABLE 2-5. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED			
ALTERNATIVE	**COMPONENTS**	**DETAILS**	**COST**
	Inspection	Annual inspection of LUCs, including inspection of existing shoreline erosion controls. Performing maintenance as needed based on the results of the inspections. For costing, it was assumed that 25 percent of the shoreline controls would require replacement every 15 years.	
Alternative 3 **Limited Excavation in Former Timber Basin Area, Residential LUCs, and Long-Term Management of Shoreline Controls** *Excavation and offsite disposal of contaminated subsurface soil causing unacceptable industrial worker risk within a portion of the Former Timber Basin area, residential land use restrictions, and inspection and maintenance of LUCs and shoreline erosion controls*	Excavation and Offsite Disposal	Excavation and offsite disposal of approximately 190 cubic yards of contaminated soil, within a portion of the Former Timber Basin area, associated with unacceptable industrial worker risk to subsurface soil. Excavation would be to where exceedances of industrial worker cleanup levels in subsurface soil were detected. Shoring of the excavation and protection or removal and replacement of utilities would be conducted as necessary during excavation activities.	**Capital:** $760,000 **30-Year NPW**: $1,127,000
	Site Restoration	Backfilling to establish pre-construction grades, elevations, and surface types using clean soil and pavement.	
	LUCs	Prohibition of future residential use of the site and implementation of requirements for management of excavated subsurface soil during potential future construction activities at the site.	
		Implementation of requirements for long-term management of existing shoreline erosion controls.	
	Inspections	Annual inspection of LUCs, including inspection of existing shoreline erosion controls. Performing maintenance as needed based on the results of the inspections. For costing, it was assumed that 25 percent of the shoreline controls would require replacement every 15 years.	

2.10 COMPARATIVE ANALYSIS OF ALTERNATIVES

Table 2-6 and subsequent text in this section summarize the comparison of the remedial alternatives with respect to the nine CERCLA evaluation criteria outlined in the NCP at 40 CFR 300.430 (e)(9)(iii) and categorized as threshold, primary balancing, and modifying. Further information on the detailed comparison of remedial alternatives is presented in the OU7 FS Report.

TABLE 2-6 COMPARISON OF REMEDIAL ALTERNATIVES

CRITERION	ALTERNATIVE 1 NO ACTION	ALTERNATIVE 2 LUCS ONLY	ALTERNATIVE 3 LIMITED EXCAVATION AND LUCS
Estimated Time Frame (months)			
Designing and Constructing the Alternative	NA	12	12
Achieving the Cleanup Objectives	NA	12	14
Criteria Analysis			
Threshold Criteria			
Protects Human Health and the Environment ➢ Will it protect you and the animal life on and near the site?	○	●	●
Meets federal and state regulations ➢ Does the alternative meet federal and state environmental statutes, regulations, and requirements?	NA	●	●
Primary Balancing Criteria			
Provides long-term effectiveness and is permanent ➢ Will the effects of the cleanup last?	○	◘	●
Reduces mobility, toxicity, and volume of contaminants through treatment ➢ Are the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present reduced?	○	○	○
Provides short-term protection ➢ How soon will the site risks be reduced? ➢ Are there hazards to workers, residents, or the environment that could occur during cleanup?	NA	●	●
Can it be implemented ➢ Is the alternative technically feasible? ➢ Are the goods and services necessary to implement the alternative readily available?	NA	●	◘
Cost ($) ➢ Upfront costs to design and construct the alternative (capital costs) ➢ Operating and maintaining any system associated with the alternative (O&M costs) ➢ Periodic costs associated with the alternative ➢ Total cost in today's dollars (30-year NPW cost)	$0	$15,000 capital 30-year NPW: $381,000	$760,000 capital 30-year NPW: $1,127,000
Modifying Criteria			
State Agency Acceptance ➢ Does MEDEP agree with the Navy's recommendation?	MEDEP concurs with Alternative 3, and a letter of concurrence is included in Appendix A.		
Community Acceptance ➢ What objections, suggestions, or modifications does the public offer during the comment period?	Comments received during the public comment period support Alternative 3. Section 3.0 provides the Responsiveness Summary. Public comments received and responses are provided in Appendix C.		
Relative comparison of the nine balancing criteria and each alternative: ● – Good, ◘ – Average, ○ – Poor, NA – Not applicable			

Threshold Criteria

Overall Protection of Human Health and the Environment. The no action alternative would not achieve RAOs and would not protect human health and the environment; therefore, it is not discussed further in this ROD. Both of the other alternatives would be protective of human health and the environment.

Alternatives 2 and 3 are both consistent with current and reasonably anticipated industrial land use and would be equally protective of human health and the environment because these alternatives would prevent contact with contaminated material and prevent future erosion of contaminated material from the shoreline. Unacceptable exposure for industrial workers would be prevented by LUCs under Alternative 2 and by removal of contaminated soil under Alternative 3. Unacceptable exposure for hypothetical future residential users would be prevented by LUCs under Alternatives 2 and 3. Although removal of contaminated soil under Alternative 3 would also result in reducing surface soil concentrations to acceptable levels for hypothetical future residents, potential unacceptable risks for hypothetical future residential exposure to subsurface soil would still remain. Alternatives 2 and 3 both would include long-term management of the existing shoreline erosion controls to prevent future erosion of contaminated material to the offshore area. Alternative 3 would allow unrestricted industrial exposure, rather than having industrial land use restrictions as provided under Alternative 2.

Compliance with ARARs. Applicable or Relevant and Appropriate Requirements (ARARs) include any federal or state standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate to the site or remedial action. Alternatives 2 and 3 would meet the alternative-specific ARARs.

Primary Balancing Criteria

Long-Term Effectiveness and Permanence. Alternative 3 would provide greater long-term effectiveness and permanence than Alternative 2 because it would remove contaminated materials from the Former Timber Basin area, allowing for unrestricted industrial exposure instead of relying on LUCs. Both alternatives would include LUCs to prevent residential land use and to ensure long-term management of existing shoreline erosion controls. Continued implementation of LUCs would be necessary to be effective in the long term.

Reduction in Toxicity, Mobility, or Volume Through Treatment. Neither alternative would involve an active treatment process that would reduce the toxicity, mobility, or volume of COCs through treatment.

Short-Term Effectiveness. Alternatives 2 and 3 would have the same short-term effectiveness concerns for implementation of LUCs. Alternative 3 would have additional short-term effectiveness concerns for remediation construction workers and the environment related to removal and processing of contaminated material. However, these concerns could be effectively controlled using personal protective equipment, compliance with proper site-specific health and safety procedures, and use of best management practices to prevent exposure to and migration of contamination during construction activities. Alternative 3 would have a greater environmental impact than Alternative 2 due to greater estimated greenhouse gas (GHG) emissions, nitrous and sulfur oxide emissions, particulate matter emissions, energy consumption, and water usage related to soil removal construction activities (excavation, offsite transportation, and disposal, grading, backfilling, and paving). The estimated time for implementation of Alternatives 2 and 3 is 12 months for preparation of remedial action documents. Alternative 2 would achieve RAOs upon implementation, and Alternative 3 would achieve RAOs within 2 months of implementation.

Implementability. Alternative 3 would be more difficult to implement than Alternative 2 because Alternative 3 would involve excavation and offsite transportation and disposal of contaminated materials. Resources are readily available for construction activities; however, these activities would require additional access of vehicles to the Shipyard for transportation of excavated material off site and transportation of backfill materials on site, which would require coordination with Shipyard personnel for

access to the facility and traffic control at the site. Alternative 2 and 3 would have relatively few implementation difficulties associated with development of a LUC RD and long-term management plan to document the necessary LUCs and inspections.

Cost. The estimated NPW costs for Alternatives 2 and 3 are $381,000 and $1,127,000, respectively.

Modifying Criteria

State Acceptance. State involvement has been solicited throughout the CERCLA process. MEDEP, as the designated support agency in Maine, concurs with the Selected Remedy.

Community Acceptance. No comments were received that changed the preferred remedial alternative.

2.11 PRINCIPAL THREAT WASTE

Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or that would present a significant risk to human health or the environment should exposure occur. A source material is a material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. The NCP at 40 CFR 300.430(a)(1)(iii)(A) establishes an expectation that treatment will be used to address the principal threats posed by a site wherever practicable. At OU7, contaminated soil concentrations are not highly toxic or highly mobile; therefore, principal threat wastes are not present at the site.

2.12 SELECTED REMEDY

2.12.1 Rationale for Selected Remedy

The Selected Remedy for OU7 is Alternative 3 (Limited Excavation in Former Timber Basin Area, Residential LUCs, and Long-Term Management of Shoreline Controls), which was selected because it provides the best balance of tradeoffs with respect to the nine evaluation criteria. Alternative 3 was selected over the other alternatives because it provides the greatest long-term effectiveness considering current and planned future industrial use of the site. The Selected Remedy will remove contaminated soil to prevent current site users from exposure to contaminated subsurface soil and will implement LUCs to prevent residential use of OU7. Long-term management of the existing shoreline controls will prevent future erosion of contaminated fill material from adversely impacting the offshore environment. Alternative 3 provides greater long-term effectiveness than Alternative 2 because contamination that is potentially an unacceptable risk to current industrial users at OU7 will be removed rather than using restrictions to prevent exposure.

The principal factors in the selection of this remedy for OU7 include the following:

- Excavation based on industrial (occupational and construction) worker exposure will also address potential unacceptable risks for exposure to surface soil for hypothetical future residential exposure. Excavation under Alternative 3 will result in unrestricted exposure for current industrial workers and unrestricted exposure to surface soil at OU7.
- The remedy is consistent with the reasonably anticipated future industrial use of the site.
- The remedy provides greater confidence in achievement of the RAO for current industrial land use at an acceptable greater cost than Alternative 2 ($1,127,000 compared to $381,000).

2.12.2 Description of Selected Remedy

The Selected Remedy for OU7 includes four major components: (1) excavation and offsite disposal of soil associated with potentially unacceptable risks to industrial workers, (2) restoring excavated areas to establish pre-construction grades, elevations, and surface types, (3) implementing LUCs to prohibit future residential use, provide requirements for management of excavated soil, and provide requirements for long-term management of existing shoreline erosion controls, and (4) inspection of LUCs.

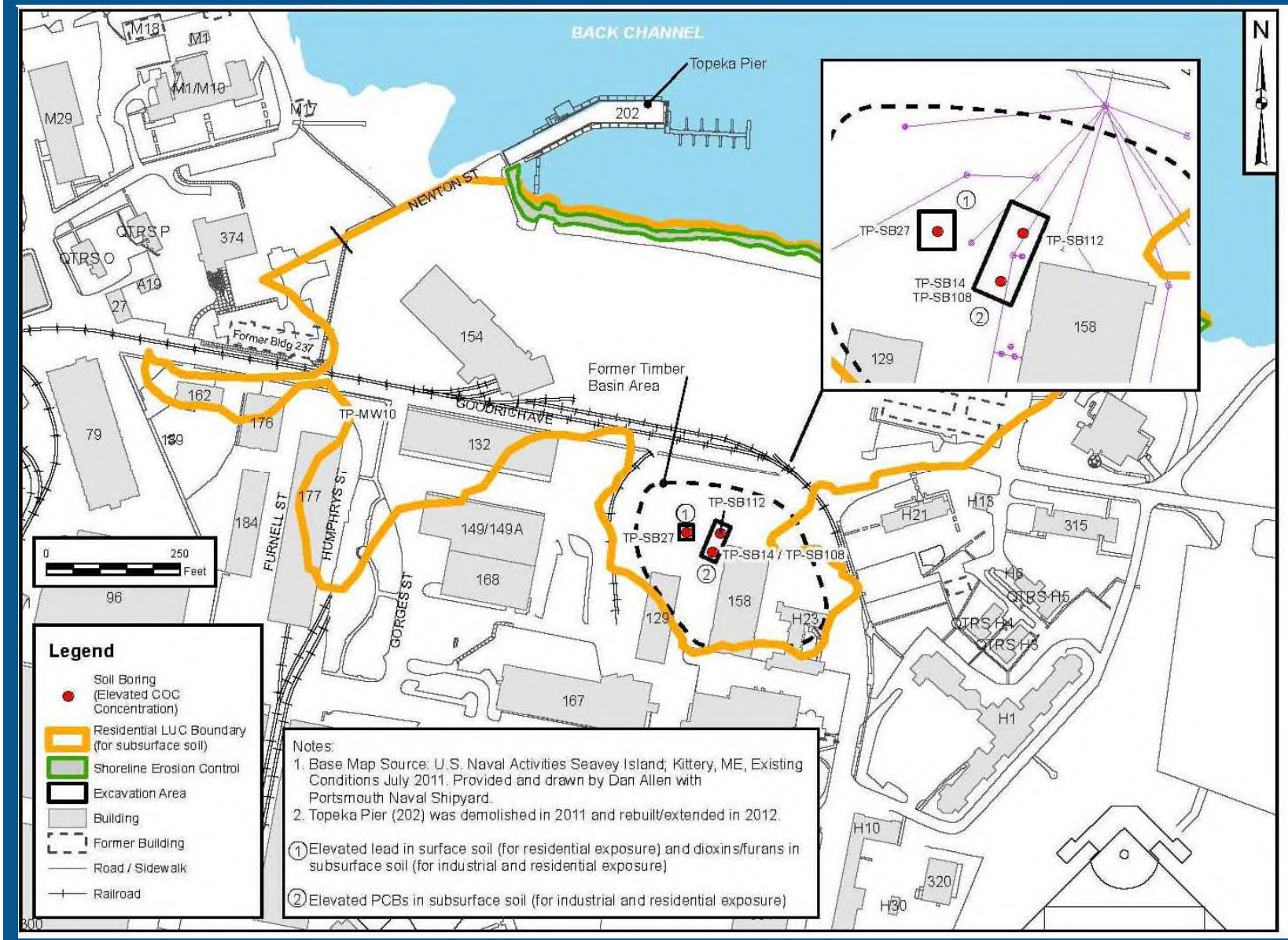
Excavation will consist of removal of an estimated 190 cubic yards of soil associated with potentially unacceptable industrial worker risk for exposure to dioxins/furans and total PCBs in subsurface soil. Two excavation areas were delineated, as shown on Figure 2-3. Excavation of soil from the ground surface to 5 feet bgs in Excavation Area 1 and from the ground surface to 9 feet bgs in Excavation Area 2 will reduce the concentrations of dioxins/furans and PCBs at the site to less than industrial worker cleanup levels. Excavation Area 1 is an estimated 10- by 10-foot area around sampling location TP-SB27 where dioxins/furans concentrations were elevated in subsurface soil from 2 to 5 feet bgs. The estimated volume of soil in this area is 20 cubic yards. Removal of contaminated soil in Excavation Area 1 will also reduce the concentration of lead in surface soil at the site to less than residential cleanup levels. Excavation Area 2 is an estimated 10- by 50-foot area around sampling locations TP-SB112 and TP-SB108/TP-SB14 where total PCB concentrations were elevated in subsurface soil from 3 to 8 feet bgs. The estimated volume of soil in this area is 170 cubic yards.

Confirmation soil samples will be collected from the bottoms and sidewalls of the excavations to determine whether dioxin/furan and PCB contamination in subsurface soil has been sufficiently removed to meet cleanup levels. Because concentrations of dioxins/furans and total PCBs at OU7 were only elevated in the two excavation areas, remediation of subsurface soil to industrial worker cleanup levels will also result in concentrations of these COCs less than the residential cleanup level for dioxins/furans and total PCBs. Additionally, excavating these areas will also result in lead surface soil concentrations meeting the residential cleanup level for lead. Confirmation soil samples from Excavation Area 1 will be analyzed for dioxins/furans and confirmation soil samples from Excavation Area 2 will be analyzed for total PCBs. If concentrations of these COCs in confirmation samples are greater than the identified excavation (pick-up) levels, the Navy in consultation with USEPA and MEDEP will determine whether additional excavation is necessary to eliminate unacceptable risks based on current industrial site uses. Factors to be considered will be presented in the remedial action documents, such as calculating post-remedial EPCs for the COCs to determine whether the cleanup goals have been met.

Because of utilities in the area, depth of the excavation, and location of buildings in relation to the excavation areas, shoring of the excavation and activities to protect or remove and replace utilities may be necessary. Excavated material will be characterized before transportation to an approved offsite treatment, storage, and disposal (TSD) facility. Because of the presence of lead, there is a potential that the soil could be hazardous based on Toxicity Characteristic Leaching Procedure (TCLP) results for lead. If characterized to be hazardous for lead, the soil may be stabilized prior to offsite disposal to render the soil nonhazardous for lead. Excavated areas will be restored to establish pre-construction grades, elevations, and surface types using clean fill and pavement to be consistent with current and planned site uses. The Navy will prepare remedial action documents (e.g., work plan) that will specify the appropriate measures for excavation, treatment (if necessary), confirmation sampling, and site restoration.

LUCs will be implemented for OU7 through a LUC RD to prevent residential land use, provide requirements for management of excavated soil, and provide long-term management of the existing shoreline erosion controls. The LUC boundary is shown on Figure 2-3.

FIGURE 2-3. OU7 SELECTED REMEDY



Consistent with the RAOs developed for the site, the specific performance objectives for the LUCs to be implemented at OU7 are as follows:

- To prohibit residential reuse of the site unless additional action is undertaken to prevent residential exposure to contamination in subsurface soil. Prohibited residential uses shall include, but are not limited to, any form of residential housing (excluding transient housing such as a hotel), child-care facilities, pre-schools, elementary schools, secondary schools, playgrounds, convalescent, or nursing care facilities.
- To provide requirements for proper management of excavated subsurface soil from the site as part of any future construction or maintenance activities.
- To maintain the existing shoreline erosion controls to prevent erosion of contaminated fill along the shoreline to the offshore area.

The LUCs will be implemented and maintained by the Navy until concentrations of hazardous substances in soil are at levels that allow for unlimited use and unrestricted exposure. Within 90 days of ROD signature, the Navy as lead agency shall develop, prepare, and submit to USEPA for review and approval a LUC RD as a primary document per the FFA that shall contain LUC implementation actions, including maintenance, monitoring, and enforcement requirements that are consistent with the requirements under this ROD. The Navy is responsible for implementing, maintaining, reporting on, and enforcing the LUCs described in this ROD. 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 the remedy integrity.

As part of LUCs, regular inspection of site conditions and of the existing shoreline erosion controls will be conducted. Maintenance of the shoreline erosion controls will be conducted as necessary based on the results of the inspections. A long-term management plan will be prepared to provide the requirements for inspection and maintenance of the shoreline erosion controls.

2.12.3 Expected Outcomes of Selected Remedy

The current and reasonably anticipated future plan is to continue to use OU7 for industrial purposes. Under current conditions, exposure to soil at OU7 is limited to construction workers who may conduct excavation work at these sites. Current and reasonably anticipated future potential exposure pathways are for people working in buildings at the site or accessing the area for occupational activities or construction workers exposed to contaminants in surface and subsurface soil. The excavation portion of the Selected Remedy eliminates potential unacceptable risks to industrial workers. The LUC portion of the Selected Remedy eliminates potential unacceptable risks to hypothetical future residential users for exposure to soil and potential for future erosion of contaminated fill material under the existing shoreline erosion controls.

Groundwater at the site is not used and is not expected to be used in the future, and the Selected Remedy will have no impact on current or future groundwater uses available at the site. There are no socio-economic, community revitalization, or economic impacts or benefits associated with implementation of the Selected Remedy. It is estimated that the RAOs for OU7 will be achieved within approximately 2 months of implementation of the remedy. Table 2-7 describes how the Selected Remedy mitigates risk and achieves RAOs.

TABLE 2-7. HOW SELECTED REMEDY FOR OU7 MITIGATES RISK AND ACHIEVES RAOS		
RISK	RAO	COMMENTS
Potential unacceptable risks to hypothetical future residents from exposure to contaminated soil.	Prevent residential exposure through ingestion of, dust inhalation of, and dermal contact with surface soil containing lead and subsurface soil containing antimony, copper, dioxins/furans, iron, lead, carcinogenic PAHs, and PCBs concentrations exceeding residential cleanup levels.	LUCs will restrict residential use of the site and provide requirements for management of excavated subsurface soil. Excavation to meet industrial cleanup levels will incidentally reduce lead concentrations in surface soil to less than cleanup levels thereby eliminating risks for exposure to lead in surface soil. Excavation to meet industrial cleanup levels will reduce dioxins/furans and PCBs concentrations to less than residential cleanup levels; however, concentrations of antimony, copper, iron, and lead in subsurface soil will remain greater than residential cleanup levels.
Potential unacceptable risks industrial workers from exposure to contaminated subsurface soil.	Prevent industrial worker (construction and occupational) exposure through ingestion of, dust inhalation of, and dermal contact with subsurface soil containing dioxins/furans and PCBs concentrations exceeding industrial cleanup levels.	Excavation of contaminated subsurface soil in Excavation Areas 1 and 2 will reduce risks to acceptable levels for current and future industrial exposure to subsurface soil.
Potential unacceptable risks to offshore ecological receptors from erosion of contaminated soil	Protect the offshore environment from erosion of contaminated soil from the OU7 shoreline.	Implementation of LUCs to provide requirements for long-term management of the existing shoreline controls will prevent future erosion of contamination along the shoreline of OU7.

2.13 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 for OU7 is needed to prevent potential unacceptable risks based on current industrial land use (occupational and construction) and hypothetical future residential land use. Excavation of contaminated soil in the two excavation areas and implementation of LUCs will prevent exposure to contamination at OU7. Long-term management of the existing shoreline controls will prevent future risks to the offshore environment from erosion on contaminated material along the shoreline of OU7.
- **Compliance with ARARs** – The Selected Remedy for OU7 will attain all identified federal and state ARARs, as presented in Appendix E.
- **Cost-Effectiveness** – The Selected Remedy provides the most long-term effectiveness and permanence for current and planned future industrial use of the site by removing soil contamination to allow for unrestricted industrial exposure rather than relying on LUCs to restrict industrial exposure. Construction activities associated with soil removal are implementable, and would only have a short-term (2 months) impact on current facility operations in a small portion of the site. The costs for the Selected Remedy are considered to be proportional to overall effectiveness by achieving an adequate amount of long-term effectiveness and permanence within a reasonable time frame. Therefore, the Selected Remedy will achieve a positive balance between long-term effectiveness for current and planned future industrial use of the site, implementability, and cost. Detailed cost estimates for the Selected Remedy are presented in Appendix F.
- **Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable** – The Selected Remedy represents

the maximum extent to which permanent solutions and alternative treatment technologies can be used in a practical manner at OU7. Based on the small volume of dioxin/furan and PCB contamination and the heterogeneous mixture of other organic and inorganic COCs (PAHs, antimony, copper, iron, and lead) and their distributions across the site, the Navy concluded that it was impracticable to treat the COCs in a cost effective manner. Removal of contaminated soil to achieve concentrations protective of current industrial workers at OU7 provides the best balance of tradeoffs for long-term effectiveness and permanence with ease of implementation for reasonable cost.

- **Preference for Treatment as a Principal Element** – Treatment is not a principal element of the Selected Remedy for OU7 because there are no principal threat wastes at the site.
- **Five-Year Review Requirement** – Five-year site reviews are required for OU7 because contamination will remain in excess of levels that allow for unlimited use and unrestricted exposure and will be conducted to confirm that the remedy remains protective of human health and the environment.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

CERCLA Section 117(b) requires that the ROD document and discuss the reasons for any significant changes made to the Selected Remedy presented in the Proposed Plan that was published for public comment. The Navy in consultation with USEPA determined that modifications to the Selected Remedy based on comments received during the public comment period were not required. Comments received during the public comment period are discussed in Section 3.0, Responsiveness Summary.

There were no significant changes made to the Selected Remedy from what was presented in the Proposed Plan (provided in Appendix B). However, based on discussion among the Navy, USEPA, and MEDEP, the Navy agreed to include a treatment option to stabilize soil if the soil is characterized as hazardous for lead. Depending on the result of characterization sampling for disposal and in consultation with USEPA and MEDEP, the Navy may treat the soil to allow disposal at a non-hazardous disposal facility. The requirements for characterization, treatment, and disposal will be provided in the work plan for the remedial action, which will be reviewed by USEPA and MEDEP.

3.0 RESPONSIVENESS SUMMARY

3.1 STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES

Based on the results of the public comment period, no changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate. Participants in the public meeting held July 23, 2013, included a RAB member, the Technical Assistance Grant consultant for the community organization, and representatives of the Navy, USEPA, and MEDEP. The RAB member is a representative of the community organization that provided oral and written comments during the public comment period. Comments received during the public comment period are included in Appendix C. The community organization indicated general support for the proposed remedy. There were no comments on the proposed remedy; however, there were comments and questions related to information on site characteristics, risk assessment, and migration of contamination that were addressed in the RI and FS Reports for OU7 and comments and questions in regard to consideration of factors that relate to future conditions at PNS. The Navy will prepare a LUC RD and long-term management plan and conduct five-year site reviews that will address any future conditions that could affect the long-term protectiveness of the remedy for OU7. The Navy's responses to these comments are provided in Appendix C.

3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues associated with the OU7 ROD were identified.

Administrative Record Reference Table

DETAILED ADMINISTRATIVE RECORD REFERENCE TABLE

Item	Reference Phrase in ROD	Location in ROD	Location of Information in Administrative Record (N00102)	
			Record Number	Document Title
1	RCRA RFI Data Gap Investigation	Table 2-1	002634	Remedial Investigation for Operable Unit 7, Tetra Tech, July 2011
2	Groundwater Monitoring	Table 2-1	002634	Remedial Investigation for Operable Unit 7, Tetra Tech, July 2011
3	Seep and Sediment Monitoring	Table 2-1	002634	Remedial Investigation for Operable Unit 7, Tetra Tech, July 2011
4	SSI concluded that an RI was necessary	Table 2-1	002634	Remedial Investigation for Operable Unit 7, Tetra Tech, July 2011
5	No drums were found	Table 2-1	002634	Remedial Investigation for Operable Unit 7, Tetra Tech, July 2011
6	Interim Offshore Monitoring	Table 2-1	002749	Feasibility Study Report for Operable Unit 4, Tetra Tech, September 2012
			001416 and 001417	Rounds 1 through 7 Interim Offshore Monitoring Program Report, Tetra Tech November 2004
7	Site 32 Shoreline Stabilization	Table 2-1	001665	Closeout Report for Site 29 Removal of Waste Debris and Site 32 Shoreline Stabilization, Tetra Tech EC, June 2008
			002634	Remedial Investigation for Operable Unit 7, Tetra Tech, July 2011
			002842	Feasibility Study Report for Operable Unit 7, Tetra Tech, June 2013
8	RI Report for OU7	Table 2-1	002634	Remedial Investigation for Operable Unit 7, Tetra Tech, July 2011
9	FS and cleanup alternatives	Table 2-1	002842	Feasibility Study Report for Operable Unit 7, Tetra Tech, June 2013
10	Site Characteristics	Section 2.5	002634	Remedial Investigation for Operable Unit 7, Tetra Tech, July 2011
11	Land uses and resources	Section 2.6	002634	Remedial Investigation for Operable Unit 7, Tetra Tech, July 2011
12	Human health risk	Section 2.7.1	002634	Remedial Investigation for Operable Unit 7, Tetra Tech, July 2011
13	Remedial action objectives and cleanup levels	Section 2.8	002842	Feasibility Study Report for Operable Unit 7, Tetra Tech, June 2013
14	Preliminary technology/screening	Section 2.9	002842	Feasibility Study Report for Operable Unit 7, Tetra Tech, June 2013
15	Remedial alternatives	Section 2.9	002842	Feasibility Study Report for Operable Unit 7, Tetra Tech, June 2013

DETAILED ADMINISTRATIVE RECORD REFERENCE TABLE

Item	Reference Phrase in ROD	Location in ROD	Location of Information in Administrative Record (N00102)	
			Record Number	Document Title
16	Nine CERCLA evaluation criteria	Section 2.10	002842	Feasibility Study Report for Operable Unit 7, Tetra Tech, June 2013
17	Chemical-, location-, and action-specific ARARs	Section 2.10	002842	Feasibility Study Report for Operable Unit 7, Tetra Tech, June 2013
18	Public meeting	Section 3.1	Not Applicable	The public meeting for the Proposed Plan for OU7 was held on July 23, 2013. Transcripts are provided in Appendix C.

Appendix A
State of Maine Concurrence Letter

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PATRICIA W. AHO
COMMISSIONER

September 18, 2013

James T. Owens, I11
Director, Office of Site Remediation & Restoration EPA New England, Region I
5 Post Office Sq. Suite 100
Mail Code OSRR07-5
Boston, MA 02109-3912

Re: Record of Decision for Operable Unit 7
Portsmouth Naval Shipyard, Kittery, Maine

Dear Mr. Owens:

The Maine Department of Environmental Protection (MEDEP) has reviewed the Record of Decision – Operable Unit 7 – Site 32 (Topeka Pier Site), Portsmouth Naval Shipyard, Kittery, Maine dated September 2013. The Record of Decision (ROD) summarizes the results from the Interim Offshore Monitoring, the Removal Action for Site 32 Shoreline Stabilization, the Remedial Investigation and the Feasibility Study, and documents Navy's rationale for selecting soil removal and offsite disposal, land use controls (LUCs) and annual inspections of LUCs as the remedy for OU7. MEDEP concurs with the selected decision for site soils of soil removal and offsite disposal, land use controls and annual inspections of LUCs.

The State's concurrence of the selected decision, as described above, should not be construed as the State's concurrence with any conclusion of law or finding of fact, which may be set forth in the ROD or supporting documents for the site listed above. The State reserves any and all rights to challenge any such finding of fact or conclusion of law in any other context.

This concurrence is based on the State's understanding that the Navy will continue to solicit MEDEP's review and concurrence with the Remedial Design, Remedial Action oversight, Remedial Action report and Land Use Controls Remedial Design for OU7.

MEDEP looks forward to working with the Department of the Navy and Environmental Protection Agency to resolve the environmental issues remaining at the Portsmouth Naval Shipyard. If you have any questions or comments, please contact Iver McLeod at iver.j.mcleod@maine.gov or 207-287-8010.

Best regards,

Melanie Loyzim, Director
Bureau of Remediation and Waste Management

pc: Iver McLeod – MEDEP
Elizabeth Middleton – US Navy
Matt Audet - EPA

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Appendix B
Proposed Plan for Operable Unit 7

Proposed Plan

Operable Unit 7

Portsmouth Naval Shipyard, Kittery, Maine

The Cleanup Proposal

This Proposed Plan has been prepared, in accordance with federal law and the Federal Facility Agreement for Portsmouth Naval Shipyard (PNS), to present the Navy's preferred approach for addressing contaminated soil at Operable Unit (OU) 7, PNS, Kittery, Maine. OU7 includes Site 32 – Topeka Pier Site.

After careful study, the Navy, with concurrence from the United States Environmental Protection Agency (EPA) and Maine Department of Environmental Protection (MEDEP), proposes:

- Excavation and disposal of surface and subsurface soil in an area with elevated contaminant concentrations.
- Implementation of **land use controls (LUCs)**.
- Performance of five-year reviews to ensure continued protectiveness.

Removal of the contaminated soil located within a portion of the Former Timber Basin area within OU7 would reduce potential surface soil risks to acceptable levels for hypothetical future residential land use. It would also reduce potential subsurface soil risks to acceptable levels for current industrial land use. LUCs would prevent future residential exposure to subsurface soil and provide long-term maintenance of shoreline controls to prevent erosion of contaminated soil along the shoreline of the site.

This plan provides information on the remedial alternatives evaluated for impacted soil, the public comment period, the informational open house and public hearing, and how the final remedy for OU7 will ultimately be selected.

Let us know what you think

Mark Your Calendar!

Public Comment Period

July 16, 2013 to August 14, 2013

The Navy will accept comments on this Proposed Plan for OU7 during this comment period. You do not have to be a technical expert to comment. To provide formal comments, you may offer oral comments during the public hearing or provide written comments either at the informational open house, at the public hearing, or by fax or mail. Send written comments postmarked no later than August 14, 2013, to:

Ms. Danna Eddy Public Affairs Office (Code 100PAO)
Portsmouth Naval Shipyard,
Portsmouth, New Hampshire 03804-5000

Fax: (207) 483-1266

Informational Open House and Public Hearing

July 23, 2013

The Navy invites you to attend an informational open house from 7:00 pm to 7:30 pm to learn about the proposed OU7 cleanup plan and how it compares with other cleanup options for the site. The informational session will include posters describing the Proposed Plan and an informal question and answer session. A formal public hearing for OU7 will follow, from 7:30 to 7:50 pm, during which the Navy will receive comments on the Proposed Plan for OU7 from the public. It is at this formal hearing that an official transcript of the comments will be recorded. The above activities will be held at the Kittery Town Hall in Kittery, Maine.

*Federal and state environmental laws govern cleanup activities at federal facilities. A federal law called the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**, better known as Superfund, provides procedures for investigation and cleanup of environmental problems. Under this law, the Navy is pursuing cleanup of designated sites at PNS to return the property to a condition that protects the community, workers, and the environment.*

Technical terms used throughout this Proposed Plan are explained in the Glossary of Terms on Page 14

INTRODUCTION

This Proposed Plan provides information on the preferred approach for addressing contaminated soil at OU7 and provides the rationale for this preference. In addition, this plan includes summaries of other cleanup alternatives evaluated for use at OU7. This document is issued by the Navy, as the lead agency for all investigation and cleanup programs ongoing at PNS, and EPA, with the concurrence of MEDEP. The Navy and EPA, in consultation with MEDEP, will select the final remedy for OU7 after reviewing and considering all information submitted during the 30-day public comment period and may modify the preferred alternative or select another response action presented in this plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives presented in this Proposed Plan.

The Navy is issuing this Proposed Plan as part of its public participation responsibilities under Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**. The Proposed Plan summarizes information that can be found in greater detail in the **Remedial Investigation (RI)**, **Feasibility Study (FS),** and other documents included in the PNS Information Repositories, located at the Rice Public Library in Kittery, Maine, and Portsmouth Public Library in Portsmouth, New Hampshire. The Navy and EPA encourage the public to review these documents to gain a more comprehensive understanding of the site and associated environmental activities. Please refer to the Next Steps section on Page 13 for location and contact information for these facilities.

The purposes of this Proposed Plan are to:

- Provide the public with basic background information about PNS and OU7. This information includes a description of the OU that was developed by reviewing past documents, investigating soil, groundwater, surface water, and sediment at OU7, and evaluating potential human and ecological impacts.
- Describe the cleanup options that were considered.
- Identify the Navy's preferred alternative for remedial action at OU7 and explain the reasons for that preference.
- Provide the public information on how the public can be involved in the remedy selection process.
- Solicit and encourage public review of the Proposed Plan.

After the public has had the opportunity to review and comment on this Proposed Plan, the Navy will summarize and respond to all significant comments received during the comment period in a Responsiveness Summary. The Navy and EPA, in consultation with MEDEP, will carefully consider all comments received and could even select a remedy different from that proposed in this plan after appropriate additional opportunity for comment. Ultimately, the selected remedy for OU7 will be documented in a **Record of Decision (ROD)**. The Responsiveness Summary will be issued with the ROD.

History of Site Investigations and Interim Actions

1994 through 1997: Environmental samples were collected at OU7 as part of various investigations including the **Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)** Data Gap Investigation in 1994, groundwater monitoring from 1996 to 1997, and **intertidal surface water and sediment** monitoring from 1996 to 1997.

1998 – Site Screening Investigation (SSI): Conducted to determine whether further action (e.g., an RI) or no further action was required for the site. Soil and groundwater samples were collected, and the SSI concluded that additional investigation was necessary for OU7. The results were used in the RI for OU7.

1998 – Multi-Sensor Towed-Array Detection System (MTADS): Conducted to generate geophysical maps of OU7 to identify drums that may have been used to dispose of materials. The survey indicated one potential drum location that was investigated further during the RI; however, no drums were found.

1999 through 2010 – Interim Offshore Monitoring for OU4: The results of sediment samples collected in the nearshore area of OU7 were used in the RI for OU7.

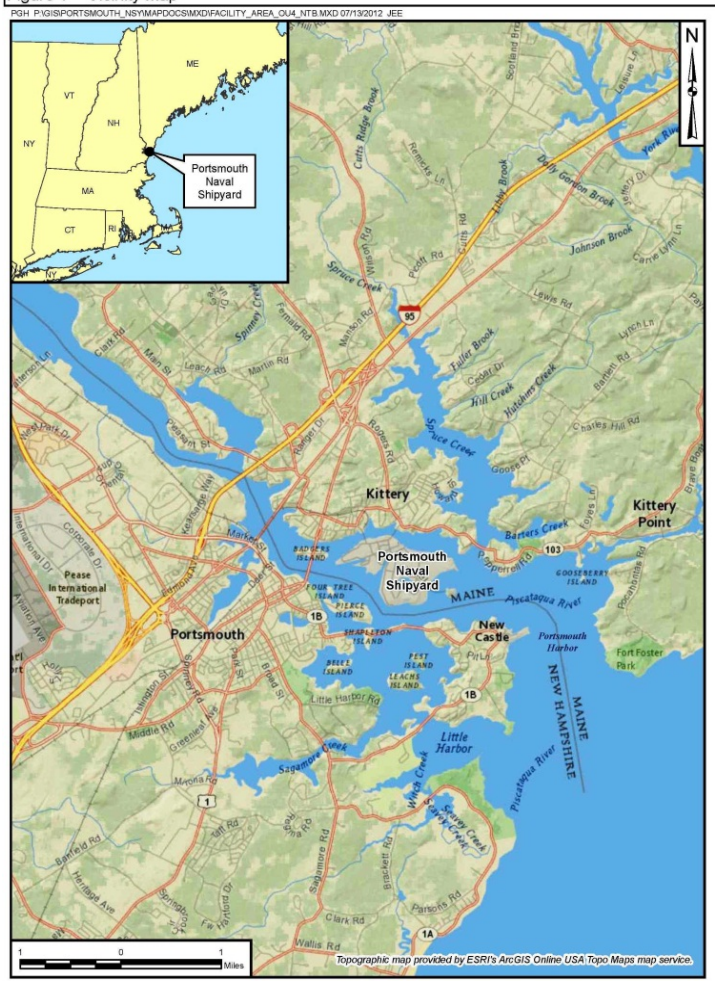
2003 and 2008 – Phase I and II RI Field Work: Soil, groundwater, and nearshore sediment and surface water samples were collected to support delineation of the nature and extent of contamination and evaluate potential risks to human receptors as part of the RI for OU7.

2006 - Shoreline Stabilization: In June 2006, the Navy conducted an emergency action to stabilize eroding debris along the OU7 shoreline. The Navy removed surface debris and placed a shoreline control structure (revetment) along the entire OU7 shoreline to prevent future erosion.

2011 – RI: Summarized the results of previous investigations for OU7, determined the nature and extent of contamination, evaluated potential risks to human receptors, and determined the potential for OU7 contamination to move or discharge to the offshore area. Sediment contamination from past releases to the offshore area is being addressed as part of OU4.

2012 – FS: Conducted to develop and evaluate potential cleanup alternatives for OU7.

Figure 1 - Vicinity Map



SITE BACKGROUND

PNS is a military facility with restricted access located on an island in the Piscataqua River. The Piscataqua River is a tidal estuary that forms the southern boundary between Maine and New Hampshire. PNS was established as a government facility in 1800 and served as a repair and building facility for ships during the Civil War. The first government-built submarine was designed and constructed at PNS during World War I. A large number of submarines have been designed, constructed, and repaired at this facility since 1917. PNS continues to service submarines as its primary military focus. Figure 1 shows the location of PNS, and Figure 2 shows the layout of OU7.

Where is OU7 within the Shipyard?

OU7 consists of Site 32 - Topeka Pier Site and is located on the northern boundary of PNS, along the Back Channel of the Piscataqua River.

For what was OU7 used?

OU7 is a tidal area that was filled from approximately 1900 to 1945 to allow use for various industrial activities in support of Shipyard operations. Past industrial activities included storing and milling of lumber, storing and seasoning wood (in the Former Timber Basin), storing coal, wood, and scrap iron, and storing combustibles including paints and oils. Materials used to fill the area consisted mostly of rock and soil, with some debris and scrap material. Disposal of combustible material (possibly paint and oil) in the Former Timber Basin area reportedly began in 1939. By 1945, all filling and possible disposal at OU7 had ceased. A boat pier (Topeka Pier) was constructed around 1905.

What is the current and future land use at the site?

The majority of OU7 has continued to be used for industrial activities since 1945. Current and future anticipated land use is industrial, with recreational use of the boat pier and launch (ramp). Current activities at OU7 include office parking, equipment storage, vehicle and rail car maintenance, transducer repair, boat launching, and a hotel (Building H23).

SITE CHARACTERISTICS

What does OU7 look like?

The OU7 site boundary has an irregular shape defined by the historical filling in this area. The site is relatively flat and is almost entirely covered with pavement or buildings, with some small areas of grass landscaping. The boat ramp provides access to the Back Channel of the Piscataqua River. Although the shoreline is not a recreational area, people can walk in the intertidal area (the portion of the shoreline exposed during low tide and submerged during high tide), which can be easily accessed from the boat ramp. Access to the intertidal area from other portions of OU7 is more difficult because of the steeper slope and rip rap along the mid- to high-tide portion of the shoreline, which is covered with shoreline controls.

The current shoreline and topography of OU7 were created by filling of the area. Fill material is encountered across OU7 to varying depths, ranging from the ground surface to approximately 23 feet below ground surface (bgs). The fill material is mostly rock and soil mixed with some debris. There are a few intermittent pockets of debris with little soil. In the area filled before 1910 in the vicinity of former Building 237, the fill material is mostly rock with some soil and no debris. The majority of fill material at OU7 is below the groundwater level at high tide. The conceptual site model for OU7 is shown on Figure 3.

What is the size of OU7?

OU7 is approximately 19 acres in size, including the intertidal area (exposed during low tide and under water at high tide) along the shoreline. The onshore portion (including parking areas and buildings) of OU7 is estimated to be 17 acres.

How much and what types of chemicals are present?

Soil contaminants identified at OU7 are **metals** (e.g., antimony, copper, iron, and lead), **dioxins/furans**, **polychlorinated**

TECHNICAL TERMS USED THROUGHOUT THIS PROPOSED PLAN ARE EXPLAINED IN THE GLOSSARY OF TERMS ON PAGE 14

biphenyls (PCBs), and carcinogenic **polycyclic aromatic hydrocarbons (PAHs)**. In general, chemical concentrations greater than conservative levels (i.e., residential risk-based screening levels) that indicate a potential for human health risks are found in areas filled after 1910. Concentrations were lower in the area filled before 1910 in the vicinity of former Building 237, where the fill material consisted mostly of rock and soil with no debris.

Chemical concentrations in surface soil were generally less than screening levels, whereas chemical concentrations in subsurface (i.e., over 2 feet bgs) soil across most of the areas filled after 1910 were greater than screening levels. Concentrations of metals and PAHs in subsurface soil were variable across the site. PCB and dioxin/furan concentrations were only elevated in subsurface soil within the Former Timber Basin area, where PCB concentrations of approximately 40 parts per million (ppm) and dioxin/furan concentrations of approximately 1 part per billion (ppb) were detected. PCB and dioxin/furan concentrations were less than 2 ppm and 0.04 ppb, respectively, in surface and subsurface soil elsewhere at OU7. Chemical concentrations in groundwater, surface water, and sediment were low (i.e., less than screening levels).

Figure 2 - Site Layout

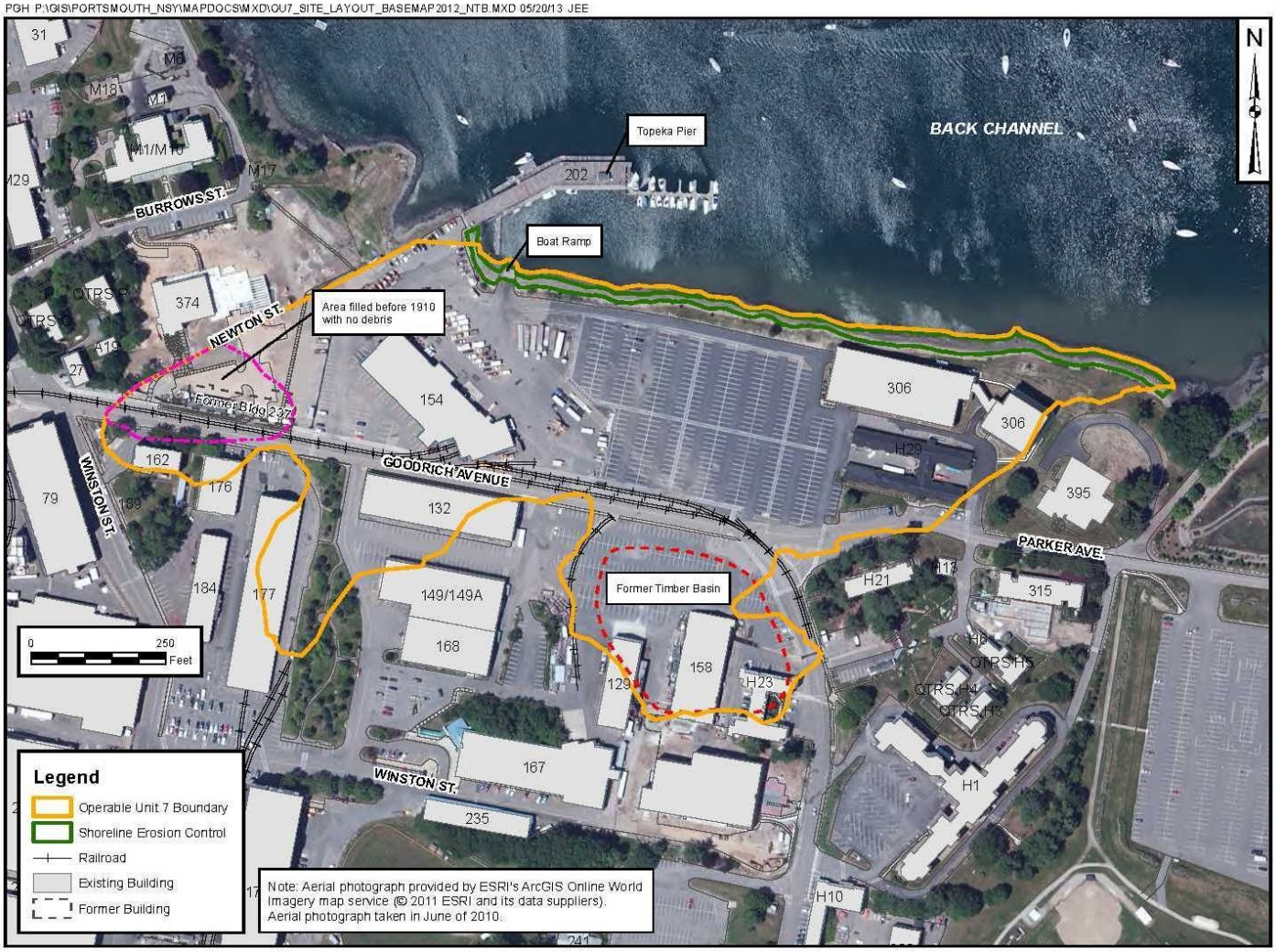
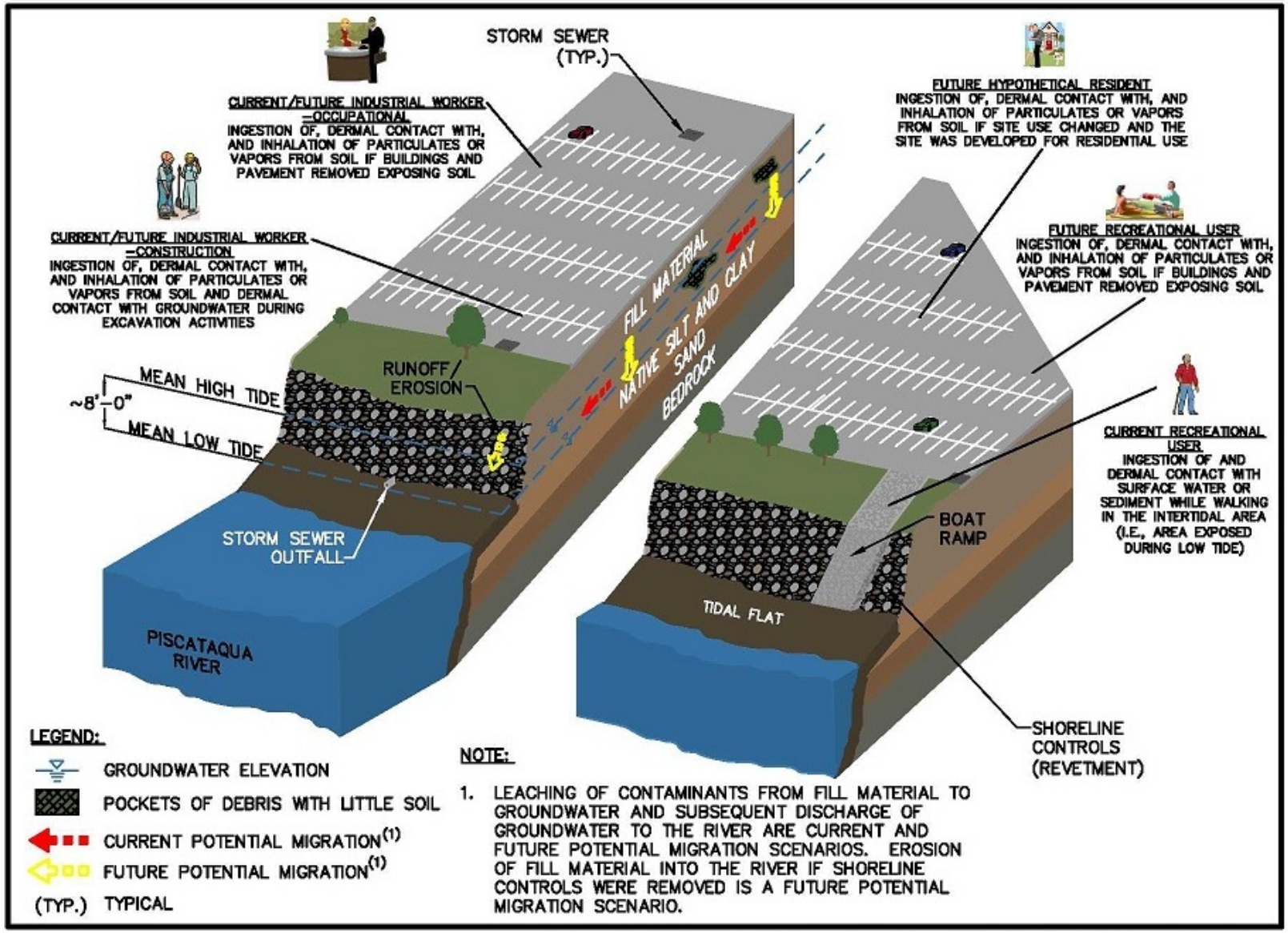


Figure 3 - Conceptual Site Model



Scope and Role of the OU7 Response Action

OU7 is one of several OUs at PNS identified for assessment and cleanup under CERCLA. Each of these OUs is undergoing the CERCLA cleanup process independently of the others. The Proposed Plan for OU7 is not expected to have an impact on the strategy or progress of cleanup for the other sites at PNS. Proposed Plans have been prepared and RODs have been signed for OU1, OU2, and OU3. A Proposed Plan has been prepared and a ROD will be signed for OU4. A Proposed Plan is being prepared for OU9. One OU (OU8) is under investigation.

Summary of Site Risks

As part of OU7 investigation activities, the Navy completed a risk assessment to evaluate current and future potential for adverse human health effects caused by exposure to site contaminants. The results of the risk assessment are described below. Potential for adverse ecological effects from exposure to site contaminants was not evaluated as part of a risk assessment because OU7 is currently and has historically been an industrial area with no significant habitats for ecological exposure. Current and future potential for contaminant migration from soil to the offshore (e.g., surface water and sediment) that could result in adverse human health and ecological effects was evaluated and is discussed in the text box, ***Is Contaminant Migration an Issue?***, on Page 7.

Human Health Risks

The **Human Health Risk Assessment (HHRA)** estimates the baseline risk, which is the likelihood of health problems occurring if cleanup actions were not taken at the site. The OU7 HHRA evaluated current and future potential for adverse human health effects from exposure to site contaminants in soil, groundwater, and intertidal sediment and surface water at OU7. For the OU7 HHRA, exposure to site contaminants in soil across the entire site and in soil in the area filled before 1910 (in the vicinity of former Building 237, see Figure 2) were both evaluated. To estimate the baseline risk for humans using the EPA HHRA methodology, a four-step process was used.

Step 1 – Identify Chemicals of Potential Concern (COPCs)

COPCs are chemicals found at the site at concentrations greater than risk-based screening criteria (and for select organic compounds and metals greater than facility **background** levels). The COPCs were further evaluated in Steps 2 through 4 of the risk assessment.

Step 2 – Conduct an Exposure Assessment

In this step, the many ways that people could come into contact with soil, groundwater, and intertidal surface water and sediment at OU7 were considered. Both current and future exposure scenarios were identified based on site conditions and uses. Commercial/industrial (construction and occupation workers), recreational, and hypothetical residential exposure scenarios were considered.

There is potential construction worker exposure to surface and subsurface soil during construction activities. Although there are current commercial/industrial activities at the site (i.e., vehicle and rail car maintenance, transducer repair, hotel activities), there are no current occupational exposures to soil because the site is almost totally covered by pavement and buildings, and there is no exposed soil in the limited grassy areas. Based on site conditions, there are also no current recreational activities (e.g., picnicking or walking) that would be result in exposures to soil. Occupational workers and recreational users might be exposed to surface and subsurface soil in the future if the buildings and pavement were removed from the site. Hypothetical future residential exposure to surface and subsurface soil at the site was considered if the site use changed and the site was developed for residential use. Exposure to soil for the HHRA was evaluated based on the assumption that people may come in contact with soil through touching (dermal contact), ingesting, and breathing in soil particles (as dust) or breathing vapors emanating from soil (inhalation).

Groundwater at OU7 is too saline (i.e., the salt content is too high) to be used as a drinking water supply; therefore, use of groundwater for drinking water by hypothetical future residents at the site was not evaluated in the OU7 HHRA. Construction worker exposure to groundwater was evaluated based on the assumption that workers may come into contact with groundwater through dermal (skin) contact and inhaling vapors from groundwater during subsurface excavation or utility line repair activities.

There is a current potential exposure pathway associated with people using the boat ramp to access the intertidal area (i.e., area exposed during low tide) and being exposed to sediment and surface water while walking in this area. This scenario was termed “recreational” exposure for purposes of the OU7 HHRA. Recreational exposure to surface water and sediment was evaluated based on the assumption that people may touch or ingest surface water and sediment while walking in the intertidal area.

Step 3 – Complete a Toxicity Assessment

At this step, possible harmful effects from exposure to the individual COPCs were evaluated. Generally, these chemicals are separated into two groups, carcinogens (chemicals that may cause cancer) and non-carcinogens (chemicals that may cause adverse effects other than cancer). Lead is not evaluated in the same manner as most other chemicals and therefore was assessed separately.

Step 4 – Characterize the Risk

The results of Steps 2 and 3 were combined to estimate the overall risk from exposure to chemicals at OU7. The terms used to define the estimated risk are explained in the text box, ***What is the Potential Risk to Me?***, below. **Chemicals of concern (COCs)** are identified based on the risk characterization.

The results of the OU7 HHRA for people potentially exposed to soil indicated that risks were acceptable for construction and occupational workers and recreational users exposed to surface soil; recreational users exposed to surface water and sediment; and construction workers exposed to groundwater. Risks were also acceptable for all people potentially exposed to soil in the area filled before 1910.

What is the Potential Risk to Me?

In evaluating risks to people, risk estimates for carcinogens (chemicals that may cause cancer) and non-carcinogens (chemicals that may cause adverse effects other than cancer) are expressed differently.

For carcinogens, risk estimates are expressed in terms of probability. For example, exposure to a particular carcinogenic chemical may present a 1 in 10,000 increased chance of getting cancer over an estimated lifetime of 70 years. This can also be expressed as $1x10^{-4}$. The EPA acceptable risk range for carcinogens is within $1x10^{-6}$ to $1x10^{-4}$ or a one in a million to a 1 in 10,000 increased chance of getting cancer. Cleanup would be considered for calculated risks greater than the acceptable risk range.

For non-carcinogens, exposures are first estimated and then compared to a reference dose (RfD). The RfD is developed by EPA scientists to estimate the amount of a chemical a person (including the most sensitive person) could be exposed to over a lifetime without developing adverse (non-cancer) health effects. This measure is known as a hazard index and is the ratio of daily intake of a chemical from onsite exposure divided by the RfD. A hazard index greater than 1 suggests that adverse effects are possible.

Exposure to lead is evaluated by using blood-lead concentration as a biomarker. Environmental exposures to lead are modeled using the EPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model and EPA's Technical Review Workgroup (TRW) Adult Lead Model to predict blood-lead levels associated with those exposures. The goal of the EPA is to limit the risk of exceeding a 10 microgram per deciliter (µg/dL) blood-lead concentration to 5 percent of the population.

Estimated non-cancer hazards were greater than EPA's acceptable level for construction and occupational workers and hypothetical future residents exposed to subsurface soil at OU7. Unacceptable non-cancer hazards were due mainly to dioxins/furans for construction and occupational workers and due mainly to dioxins/furans, PCBs, and three metals for hypothetical future residents. Estimated cancer risks were only greater than EPA's target risk range for hypothetical future residents exposed to subsurface soil at OU7. Unacceptable cancer risks in subsurface soil for hypothetical future residents were due mainly to carcinogenic PAHs, PCBs, and dioxins/furans. Adverse effects estimated for lead in surface and subsurface soil were greater than EPA's acceptable level for hypothetical future residential exposure only. Because concentrations of PCBs in subsurface soil in the Former Timber Basin area were much greater than concentrations in the rest of OU7, PCBs were also retained as a COC for construction and occupational workers exposed to subsurface soil.

Is Contaminant Migration an Issue?

Contaminant migration for OU7 was evaluated for leaching of contaminants from fill material to groundwater and from erosion of fill material.

Potential contaminant migration from fill material via leaching of contaminants to groundwater and subsequent discharge of groundwater to the river (transport of groundwater through intertidal surface water and sediment and through the storm sewer system) was evaluated. A computer model was used to predict future concentrations in groundwater, surface water, and sediment assuming OU7 soil contaminants were leaching to groundwater. The results were used to determine whether there could be adverse impacts to intertidal surface water and sediment from soil contaminant migration via groundwater transport. Based on comparison of current and future predicted chemical concentrations to risk-based screening criteria, site conditions (most of soil is in contact with groundwater), and history of the site (filled over 50 years ago), the evaluation concluded that potential contaminant migration from soil through groundwater transport is not having and would not have an adverse impact on intertidal surface water and sediment.

Shoreline stabilization (including placement of rip rap) was conducted in 2006 to cover fill material along the shoreline to prevent it from eroding to the offshore area. Current conditions indicate that no further erosion is occurring, and maintaining the shoreline controls will ensure that future erosion does not occur. Therefore, to address future potential contaminant migration from erosion, shoreline controls would need to be maintained in the long term.

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Why is action needed at the site?

As a result of past activities at OU7, dioxins/furans, carcinogenic PAHs, PCBs, antimony, copper, iron, and lead are present in soil at concentrations that could result in unacceptable human health risks if action is not taken to prevent exposure to contaminated soil. In addition, as long as contaminated fill is present along the shoreline of OU7, shoreline controls need to be maintained to ensure that future erosion of the contaminated fill does not occur and impact the offshore environment.

It is the current judgment of the Navy and EPA, in consultation with MEDEP, that remedial action is necessary to protect public health and welfare from actual or threatened releases of these hazardous substances into the environment, and that the preferred alternative is the appropriate remedial alternative for this purpose.

Remedial Action Objectives

Remedial action objectives (RAOs) are the goals that a cleanup plan should achieve. They are established to protect human health and the environment and to comply with all pertinent federal and state regulations. The following RAOs were developed for OU7 based on its current and reasonably anticipated future use:

- Prevent residential exposure through ingestion of, dust inhalation of, and dermal contact with surface soil containing lead and subsurface soil containing antimony, copper, dioxins/furans, iron, lead, carcinogenic PAHs, and PCBs concentrations exceeding residential **cleanup levels**.
- Prevent industrial worker (construction and occupational) exposure through ingestion of, dust inhalation of, and dermal contact with subsurface soil containing dioxins/furans and PCBs concentrations exceeding industrial cleanup levels.
- Protect the offshore environment from erosion of contaminated soil from the OU7 shoreline.

OU7 cleanup levels were developed in the FS for surface and subsurface soil. The proposed cleanup levels are listed in Table 1 and are based on average exposure. Cleanup levels for industrial workers are protective of construction and occupational workers. The lead cleanup level is a regulatory-based criterion. Cleanup levels for the other COCs are site-specific risk-based concentrations developed to meet the RAOs.

Dioxins/furans and PCBs concentrations in subsurface soil and lead concentrations in surface soil were only greater than cleanup levels in a portion of the Former Timber Basin area. For the other COCs, concentrations in subsurface soil were greater than cleanup levels throughout most of OU7, except for in the area filled before 1910 in the vicinity of former Building 237.

Table 1 OU7 Proposed Cleanup Levels

Receptor	Medium	COC	Cleanup Level (ppm)
Industrial Worker	Subsurface soil	Dioxins/Furans	0.0006
		Total PCBs	7.4
Residential	Surface Soil	Lead	400
	Subsurface Soil	Carcinogenic PAHs	0.5
		Dioxins/Furans	0.000051
		Total PCBs	7.3
		Antimony	31
		Copper	1,500
		Iron	27,000
		Lead	400

Summary of Remedial Alternatives

Remedial alternatives, or cleanup options, were identified in the OU7 FS to meet the RAOs. These alternatives are different combinations of plans to restrict access and to contain, remove, or treat contamination to protect human health and the environment. Alternatives were developed for OU7, based on types and concentrations of contaminants in soil. The alternatives evaluated for OU7 in the FS included:

- Alternative 1 – No Action
- Alternative 2 – LUCs and Long-Term Management of Shoreline Controls
- Alternative 3 – Limited Excavation in Former Timber Basin Area, Residential LUCs, and Long-Term Management of Shoreline Controls

No Action Alternative

A "no action" alternative, where no cleanup remedy would be applied at the site, was evaluated for OU7. This is required under CERCLA, and it serves as a baseline for comparison with other alternatives. OU7 would be left as it is today under the no action alternative.

LUCs and Long-Term Management of Shoreline Controls

Alternative 2 would consist of implementing LUCs (institutional or administrative controls and/or engineering or physical

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controls) to prevent unacceptable human exposure to contaminated surface and subsurface soil and conducting long-term management of the shoreline controls. LUCs to prevent residential land use would protect hypothetical future residents from exposure to contaminated surface soil and subsurface soil, and LUCs for industrial workers would prevent unrestricted exposure to subsurface soil within a portion of the Former Timber Basin area. LUCs would also specify requirements for management of excavated soil as part of any future construction activities within the LUC boundary. Long-term management of shoreline controls would include inspection and maintenance of existing shoreline controls to ensure that contaminated soil does not erode from the shoreline and migrate to the offshore environment. Five-year reviews would be required.

Limited Excavation in Former Timber Basin Area, Residential LUCs, and Long-Term Management of Shoreline Controls

Alternative 3 would consist of excavation and offsite disposal of soil within a portion of the Former Timber Basin area to reduce surface soil risks to acceptable levels for hypothetical future residents and to reduce subsurface soil risks to acceptable levels for industrial workers. Following soil removal, the excavated areas would be restored using clean soil and pavement. LUCs would be implemented to prevent residential land use to protect hypothetical future residents from exposure to contaminated subsurface soil. LUCs would also specify requirements for management of excavated subsurface soil as part of any future construction activities within the LUC boundary. LUCs would not be required for industrial workers because contaminated soil associated with unacceptable industrial risks would be removed. Long-term management of shoreline controls would include inspection and maintenance of shoreline controls to ensure that contaminated soil does not erode from the shoreline and migrate to the offshore environment. Five-year reviews would be required.

Evaluation of Alternatives

EPA has established nine criteria for use in comparing the advantages/disadvantages of cleanup alternatives. These criteria fall into three groups, threshold criteria, primary balancing criteria, and modifying criteria. These nine criteria are explained in the text box, ***What are the Nine Evaluation Criteria?***, below. A detailed analysis of alternatives can be found in the FS. The evaluated alternatives are compared based on seven of the nine criteria in Table 2. The two modifying criteria, State Agency and Community Acceptance, are evaluated following the public comment period.

What are the Nine Evaluation Criteria?

The following is a summary of the nine criteria used to evaluate the remedial alternatives. The first two criteria are considered threshold criteria, and any alternative selected must meet them. The next five criteria are the balancing criteria. The last two criteria, state (MEDEP) and community acceptance, will be addressed after the public comment period on this Proposed Plan.

1. ***Overall Protection of Human Health and the Environment*** determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
2. ***Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)*** evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.
3. ***Long-Term Effectiveness and Permanence*** considers the ability of an alternative to maintain protection of human health and the environment.
4. ***Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment*** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
5. ***Short-Term Effectiveness*** considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
6. ***Implementability*** considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
7. ***Cost*** includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over the time in terms of today's dollar value. The alternative should provide the necessary protection for a reasonable cost. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
8. ***State/Support Agency Acceptance*** considers whether the state agrees with EPA's analyses and recommendations, as described in the FS and Proposed Plan.
9. ***Community Acceptance*** considers whether the local community agrees with the Navy and EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

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TABLE 2 COMPARISON OF OU7 REMEDIAL ALTERNATIVES			
CRITERION	**ALTERNATIVE 1**	**ALTERNATIVE 2**	**ALTERNATIVE 3**
Estimated Time Frame (months)			
Designing and Constructing the Alternative	NA	12	12
Achieving the Cleanup Objectives	NA	12	14
Criteria Analysis			
Threshold Criteria			
Protects Human Health and the Environment ➢ Will it protect you and the animal life on and near the site?	○	●	●
Meets federal and state regulations ➢ Does the alternative meet federal and state environmental statutes, regulations, and requirements?	NA	●	●
Primary Balancing Criteria			
Provides long-term effectiveness and is permanent ➢ Will the effects of the cleanup last?	○	◘	●
Reduces mobility, toxicity, and volume of contaminants through treatment ➢ Are the harmful effects of the contaminants, their ability to spread, and the amount of contaminated material present reduced?	○	○	○
Provides short-term protection ➢ How soon will the site risks be reduced? ➢ Are there hazards to workers, residents, or the environment that could occur during cleanup?	NA	●	●
Can it be implemented ➢ Is the alternative technically feasible? ➢ Are the goods and services necessary to implement the alternative readily available?	NA	●	◘
Cost ($) ➢ Upfront costs to design and construct the alternative (capital costs) ➢ Operating and maintaining any system associated with the alternative (O&M costs) ➢ Periodic costs associated with the alternative ➢ Total cost in today's dollars (**Net Present Worth [NPW]** cost)	$0	$15,000 capital 30-year NPW: $381,000	$760,000 capital 30-year NPW: $1,127,000
Modifying Criteria			
State Agency Acceptance ➢ Does MEDEP agree with the Navy's recommendation?	To be determined after the public comment period on the Proposed Plan		
Community Acceptance ➢ What objections, suggestions, or modifications does the public offer during the comment period?	To be determined after the public comment period on the Proposed Plan		
Relative comparison of the nine balancing criteria and each alternative: ● – Good, ◘ – Average, ○ – Poor, NA – Not applicable			

PREFERRED ALTERNATIVE

Based on information available at this time, the Navy recommends Alternative 3 as the preferred alternative to address contaminated soil at OU7 and to provide long-term risk reduction. The Navy believes that Alternative 3 meets the threshold criteria and provides the best balance of tradeoffs among the balancing criteria (see Table 2). The Navy proposes that this be the final remedy for OU7.

The Navy expects the preferred alternative to satisfy the following statutory requirements of CERCLA Section 121(b): (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost-effective; and (4) utilize permanent solutions to the maximum extent practicable. The Navy may decide to change its preferred alternative in response to public comments or new information. After the end of the public comment period on this Proposed Plan, the Navy, with the concurrence of EPA and after consultation with MEDEP, will document its selected remedy in a ROD.

The proposed alternative would include excavating contaminated soil, implementing residential LUCs, performing long-term management of shoreline controls, and conducting five-year reviews.

Excavation of contaminated soil would be conducted in two areas within the Former Timber Basin area to reduce dioxin/furan and PCB concentrations in subsurface to industrial worker cleanup levels. The excavation would also reduce lead concentrations in surface soil to residential cleanup levels. The approximate excavation areas are shown on Figure 4. The excavated soil would be disposed of in an offsite landfill, and the excavation areas would be restored to pre-construction conditions. Activities, including confirmation sampling, would be conducted in accordance with a remedial action work plan.

LUCs would be implemented to prevent hypothetical future residential exposure to subsurface soil by restricting residential land use. LUCs would also specify requirements for management of excavated subsurface soil as part of any future construction activities within the LUC boundary. LUCs would be implemented via a LUC Remedial Design (RD) to document the LUCs, identify inspection requirements, and document responsible parties. LUCs would be required as long as COC concentrations in subsurface soil exceed levels that allow for unlimited use and unrestricted exposure.

Long-term management of existing shoreline controls would be conducted in accordance with a work plan that would specify inspection and maintenance requirements for the shoreline controls and document responsible parties.

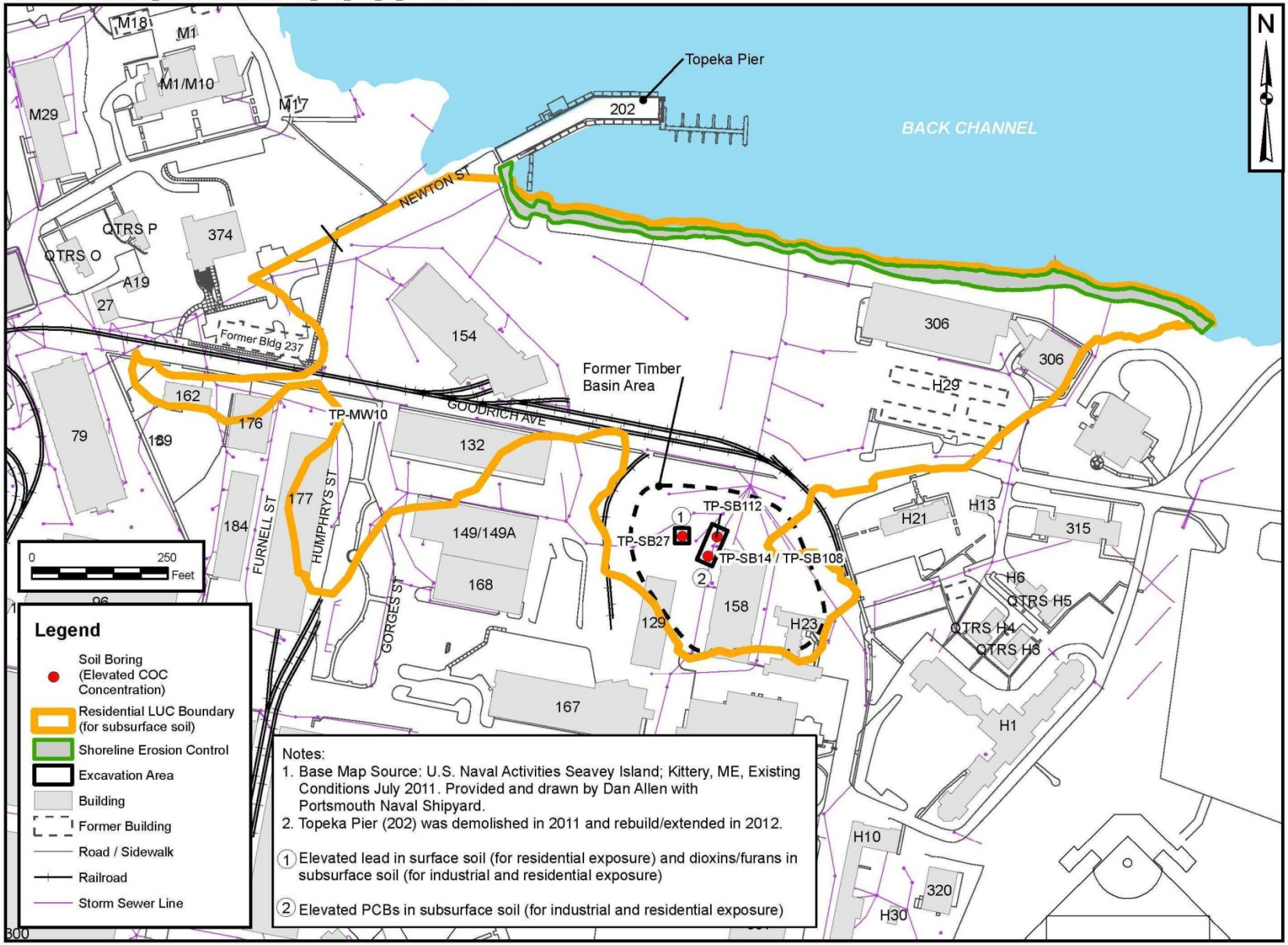
Reviews would be conducted every 5 years to ensure that the remedy remains protective.

Alternative 3 is preferred over Alternative 2 (LUCs only) because it would remove soil contamination and allow unrestricted industrial exposure rather than relying only on institutional or administrative controls to restrict industrial exposure, as provided under Alternative 2. Removal of the surface soil contamination would allow for unlimited use and unrestricted exposure for surface soil. LUCs would prevent future hypothetical residential exposure to subsurface soil, and inspection and maintenance of shoreline controls would ensure that these controls are maintained in the long term. Alternative 3 would achieve a positive balance between long-term effectiveness for current and planned future industrial use of the site, implementability, and cost.

FIVE-YEAR REVIEW REQUIREMENTS

Because contamination would remain at OU7 in excess of levels that allow for unlimited use and unrestricted exposure, reviews of the continued protectiveness of the remedy would be needed every 5 years as part of the preferred remedy. Five-year reviews would confirm that the remedy remains protective of human health and the environment. Five-year reviews would be needed as long as COC concentrations at the site exceed levels that allow for unlimited use and unrestricted exposure.

Figure 4 - Alternative 3 Excavation and Residential LUCs Boundaries



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COMMUNITY PARTICIPATION

The public is encouraged to participate in the decision-making process for the cleanup of OU7 by reviewing and commenting on this Proposed Plan during the public comment period, which is from July 16, 2013 to August 14, 2013.

What Do You Think?

You do not have to be a technical expert to comment. If you have a comment, the Navy would like to hear it before beginning the cleanup.

What is a Formal Comment?

Federal regulations make a distinction between "formal" comments received during the 30-day comment period and "informal" comments received outside this comment period. Although the Navy uses comments throughout the cleanup process to help make cleanup decisions, it is required to respond to formal comments.

Your formal comments will become part of the official record for OU7. This is a crucial element in the decision-making process for the site. The Navy will consider all significant comments received during the comment period prior to making the final cleanup decision for the site. Written comments will be included in the Responsiveness Summary contained in the ROD.

Formal comments can be made in writing or orally. To make a formal comment on the Proposed Plan, you may:

- Offer oral comments during the public hearing on July 23, 2013.
- Provide written comments at the informational open house, at the public hearing, or by fax or mail. Comments must be postmarked no later than August 14, 2013.

A tear-off mailer is provided as part of this document for your convenience.

NEXT STEPS

The Navy will consider and address all significant public comments received during the comment period. The responses to comments will be included in the Responsiveness Summary in the ROD, which will document the final CERCLA remedy selected by the Navy and EPA, in consultation with MEDEP, for OU7. After the ROD is signed, it will be made available to the public on the public website and at the Information Repositories.

To Comment Formally:

Send Written Comments postmarked no later than August 14, 2013, to:

Ms. Danna Eddy
Public Affairs Office (Code 100PAO)
Portsmouth Naval Shipyard
Portsmouth, NH 03804-5000

Fax Comments by August 14, 2013, to the attention of:

Ms. Danna Eddy
Public Affairs Office (Code 100PAO)
Portsmouth Naval Shipyard
Fax: (207) 438-1266

For More Detailed Information, You May Go to the Public Information Repositories or Public Website

The Proposed Plan was prepared to help the public understand and comment on the preferred cleanup alternatives for this site and provides a summary of a number of reports and studies.

Information Repositories

Rice Public Library
8 Wentworth Street
Kittery, Maine 03904
Telephone: (207) 439-1553

Portsmouth Public Library
175 Parrott Avenue
Portsmouth, New Hampshire 03801
Telephone: (603) 427-1540

Public Website

http://go.usa.gov/vvb

GLOSSARY OF TERMS

This glossary defines the bolded terms used in this Proposed Plan. The definitions in this glossary apply specifically to this Proposed Plan and may have other meanings when used in different circumstance

Applicable or Relevant and Appropriate Requirements (ARARs): The federal, state, and local environmental rules, regulations, and criteria that must be met by the selected cleanup action under CERCLA.

Background: Concentrations of chemicals that would be found in the environment even if there had been no man-made sources or releases of chemicals at the site.

Chemical of Concern (COC): Chemicals of potential concern (COPCs) that through further evaluation in human health risk assessments are determined to present a potential adverse effect on human health and the environment.

Cleanup Level: A numerical concentration agreed upon by the Navy and EPA, in consultation with MEDEP, as having to be reached for a certain COC to meet one or more of the RAOs. A cleanup level may be regulatory-based criterion, a risk-based concentration, or even a background value.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law also known as "Superfund." This law was passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

Dioxins/furans: Dioxins and furans are a family of toxic substances that share a similar chemical structure. Most dioxins and furans are created during the production of other chemicals or when products are burned. Dioxins and furans are highly persistent in the environment and can accumulate in the fatty tissues of animals.

Feasibility Study (FS): A report that presents the description and analysis or evaluation of potential cleanup alternatives for a site. The report also provides other remedial options screened out in the FS because they were not considered to be applicable for the site conditions.

Human Health Risk Assessment (HHRA): An evaluation of current and future potential for adverse human health effects from exposure to site contaminants.

Intertidal surface water and sediment: Water and sediment in the offshore area exposed during low tide and submerged during high tide. Intertidal surface water includes groundwater exiting in the intertidal area and mixing with river water.

Land use controls (LUCs): Engineered and non-engineered measures formulated and enforced to regulate current and future land use options. Engineered measures include fencing and posting. Non-engineered measures typically consist of administrative restrictions that prohibit residential land use and/or groundwater use.

Metals: Metals are naturally occurring elements. Some metals, such as lead, can have toxic effects. Other metals, such as iron, are essential to the metabolism of humans. Metals are classified as inorganic because they are of a mineral origin.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): More commonly called the National Contingency Plan, it is the federal government's blueprint for responding to both oil spills and hazardous substance releases. Following the passage of Superfund (CERCLA) legislation in 1980, the NCP was broadened to cover releases at hazardous waste sites requiring emergency removal actions. A key provision involves authorizing the lead agency to initiate appropriate removal action in the event of a hazardous substance release.

Net Present Worth (NPW): A cost evaluation technique that expresses the total of initial capital expenditure and long-term operation and maintenance costs in terms of present-day dollars.

Polychlorinated biphenyls (PCBs): A class of organic compounds with 1 to 10 chlorine atoms attached to a biphenyl, which is a molecule composed of two benzene rings. PCBs were widely used for many applications, especially as dielectric fluids in transformers, capacitors, and coolants. Due to PCB's toxicity and classification as a persistent organic pollutant, PCB production was banned by the United States Congress in 1979.

Polycyclic aromatic hydrocarbons (PAHs): High molecular weight, relatively immobile, and moderately toxic solid organic chemicals that include multiple benzene (aromatic) rings in their chemical formula. PAHs are normally formed during the incomplete combustion of coal, oil, gas, garbage, or other organic substances. Typical PAHs include anthracene, phenanthrene, and benzo(a)pyrene.

Record of Decision (ROD): An official document that describes the selected cleanup action for a specific site. The ROD documents the cleanup selection process and is issued by the Navy following the public comment period.

Remedial action objective (RAO): A cleanup objective agreed upon by the Navy and EPA, in consultation with MEDEP. One or more RAOs are typically formulated for each environmental site.

Remedial Investigation (RI) or Resource Conservation and Recovery (RCRA) Facility Investigation (RFI): An in-depth study designed to gather data needed to determine the nature and extent of contamination and risks at a Superfund or RCRA site. Information supports establishing site cleanup criteria, identifying preliminary alternatives for remedial action, and technical and cost analyses of alternatives.

Use This Space to Write Your Comments

Your input on the Proposed Plan for contamination at OU7 at Portsmouth Naval Shipyard is important to the Navy, EPA, and MEDEP. Comments provided by the public are valuable in helping to select the remedy for this site.

You may use the space below to write your comments, then fold and mail. Comments must be postmarked by August 14, 2013. Comments can be submitted via mail or fax and should be sent to the following address:

Ms. Danna Eddy
Public Affairs Office (Code 100PAO)
Portsmouth Naval Shipyard
Portsmouth, NH 03804-5000

Fax: (207) 438-1266

Name:
Address:
City:
State: Zip Code:
Telephone:

FOLD HERE

_____
_____
_____
_____

PLACE
STAMP
HERE

Ms. Danna Eddy

Public Affairs Office (Code 100PAO)

Portsmouth Naval Shipyard

Portsmouth, NH 03804-5000

Hampshire State Police have identified a Connecticut man who drowned in the Saco River in North Conway.

Police say three people had jumped more than 30 feet from a railroad trestle into the river to swim Saturday afternoon, and one of them did not resurface.

Police say that about 15 minutes later, Edward Foster, 30, of Gales Ferry, Conn., was recovered from the water, about 600 feet from the trestle. Police say CPR was performed on him and he was taken from the Saco River Campground

Legal Notice
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OU7 consists of Site 32 – Topaks Pier Site, which is an industrial area located along the northern boundary of PNS, along the Back Channel of the Piscataqua River. OU7 is a tidal area that was filled from approximately 1900 to 1945 to allow use for various industrial activities in support of Shipyard operations. Past industrial activities included storing and milling of lumber, storing and seasoning wood, storing coal and scrap iron, and storing combustibles including paints and oils. By 1945, all filling and possible disposal at OU7 had ceased. A boat pier (Topeka Pier) was constructed along the shoreline in the western portion of the site around 1905. Shoreline controls were put in place to prevent fill material from eroding to the offshore (Piscataqua River).

The primary contaminant sources at OU7 are associated with the fill material and past industrial uses of the site. Concentrations of dioxin/furans and polychlorinated biphenyls (PCBs) in subsurface soil in a portion of the site pose a potential unacceptable risk to workers at the site if the material was brought to the surface. Concentrations of lead in surface soil and lead and other metals, dioxins/furans, PCBs, and polycyclic aromatic hydrocarbons (PAHs) in subsurface soil pose a potential unacceptable risk to hypothetical future residents, if the site was redeveloped for residential use and the contaminated soil uncovered or brought to the surface.

Based on the OU7 investigation results, site conditions, and current and planned land use, the Navy evaluated three potential cleanup alternatives. The Navy evaluated the effectiveness, implementability, and cost of these alternatives, and based on the results of the evaluation, the Navy's preferred method of addressing soil contamination at OU7 is to excavate subsurface soil contaminated with dioxins/furans and PCBs to eliminate potential unacceptable risk to workers at the site and to implement land use controls (LUCs) to restrict residential use of the site. The LUCs would also provide requirements for long-term management of the existing shoreline controls to prevent future erosion of contaminated soil to the offshore.

Community input is integral to the remedy selection process. The public is encouraged to review the Proposed Plan for OU7 on the Navy's public website for PNS or at the Information Repositories at Rice and Portsmouth Public Libraries during normal hours of operation:

Rice Public Library 8 Wentworth Street Kittery, ME 03904 207-439-1633	Portsmouth Public Library 175 Parrott Avenue Portsmouth, NH 03801 603-427-1540	Public Website http://go.usa.gov/vvb (see the Administrative Record tab)

On July 23, 2013, the Navy will hold a public meeting at the Kittery Town Hall in Kittery, Maine, consisting of an informational session to be held from 7:00 to 7:30 pm where Navy personnel will be on hand to provide information and answer questions regarding the OU7 proposed cleanup. Following this informational session, the Navy will accept oral and written comments from the public from 7:30 to 7:50 pm. Written comments can also be submitted during the public comment period by mail or fax to the Navy contact listed below, and must be postmarked no later than August 14, 2013.

Ms. Danna Eddy, Public Affairs Office (Code PAO100)
Portsmouth Naval Shipyard, Portsmouth, NH 03804-5000
Telephone: 207-438-1140 Fax: 207-438-1266

#21344 1tP7/17

Legal Notice
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OU9 consists of Site 34 (the Former Oil Gasification Plant, Building 62), located in the northwestern portion of PNS, east of the access bridge from the mainland to PNS. Buildings 62 and 62 Annex are located on the site. Polycyclic aromatic hydrocarbon (PAH) contamination is present in the subsurface at the site from past industrial operations in Building 62. The contamination resulted from disposal of ash and burnt materials from use of coal as part of oil gasification plant and blacksmith operations conducted in Building 62. Coal was used to provide heat for oil gasification operations from the 1870s to the early 1900s and for the blacksmith shop from 1915 to 1930. Ash and burnt material from these operations were deposited in the area surrounding Building 62. The majority of the ash and burnt material surrounding Building 62 was removed as part of a cleanup action in 2007. However, some ash and burnt material remains in the subsurface north of Building 62. In addition, PAH-contaminated ash and burnt material may be present beneath the foundation of Building 62 Annex, built after coal-burning operations ended in Building 62.

PAH contamination at the site does not pose a current potential risk. Contamination potentially beneath the foundation of Building 62 Annex would pose an unacceptable future risk to workers at the site, if the foundation was removed uncovering the contaminated material. Contamination in the subsurface north of Building 62 and potentially under the foundation of Building 62 Annex would pose an unacceptable risk to hypothetical future residents, if the site was redeveloped for residential use and the contamination uncovered.

Based on the OU9 investigation results, site conditions, and current and planned land use, the Navy evaluated four potential cleanup alternatives. The Navy evaluated the effectiveness, implementability, and cost of these alternatives, and based on the results of the evaluation, the Navy's preferred method of addressing contamination at OU9 is land use controls (LUCs) to prevent industrial worker exposure to contamination beneath the foundation of Building 62 Annex and to restrict residential land use of OU9.

Community input is integral to the remedy selection process. The public is encouraged to review the Proposed Plan for OU9 on the Navy's public website for PNS or at the Information Repositories at Rice and Portsmouth Public Libraries during normal hours of operation:

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#21344 1tP7/16

HAVE YOU HEARD?

We now offer **FREE** merchandise ads on items priced up to **$1000**! Place your ad online or send it to us via email or mail. Sorry, we cannot accept these ads over the phone. Ads will publish based on space availability, on a first come, first served basis. Sorry, no pet or transportation ads are included in this promotion.

FREE

Foster's Daily Democrat

Classified Marketplace

July 16, 2013 Section | B

Five easy ways to place your ad!

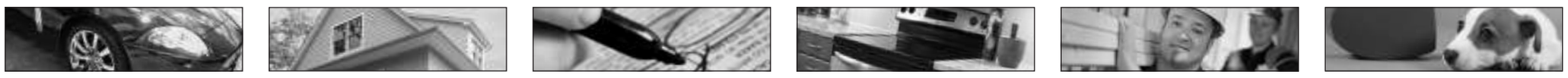
Online: go to fosters.com, click on classifieds, and select "place a classified ad" from the drop down menu - available 24/7

Email: fddads@fosters.com - checked Monday-Friday 8:00 a.m.-5:00 p.m.

Fax: (603) 740-3460 - checked Monday- Friday 8:00 a.m.-5:00 p.m.

Phone: 1-866-414-7355 - representatives available Monday - Friday 8:00 a.m. to 5:00 p.m.

Mail: Foster's Daily Democrat, Attention: Classified Advertising, 150 Venture Dr., Dover, NH 03820



TRANSPORTATION · REAL ESTATE · EMPLOYMENT · MERCHANDISE · SERVICE · PETS

Employment

146 Help Wanted

AUDIO VIDEO SALES-PERSON seeking experienced Audio Video salesperson for full-time position in Portsmouth. Great pay and benefits. Please send resume to: dlafferman@ssdiscount.com

CARPENTER NEEDED Roofing & siding experience. Must be able to work with minimal supervision. No sub contractors please. Non-smoking work place. driver's license required. (207) 252-5463

HOUSE CLEANERS: Days 25-30 hours week. Experience, honest, hardworking, motivated & detail oriented. Call 603-664-8098

NORTHERN TILE is expanding and looking for expierenced tile setter or will train right person. Send resume to ricknotherntile@gmail.com or call 603-522-8987

Toolmaker
(Machine Shop/Tooling)

Vishay HiRel Systems, a leader in magnetics manufacturing for military, medical and avionics applications, is seeking a Machine Shop/Toolmaker for its manufacturing facility in Dover, NH.

As our Machine Shop/Toolmaker, you'll be responsible for designing and creating tools, jigs, fixtures and templates for use as work aids in production; studying blueprints, verifying dimensions, alignments and clearances for finished parts by using calipers, gauge blocks, micrometers and dial indicators; operating a drill press, lathes, milling machines, vertical and horizontal saws, shapers and grinders; and assisting manufacturing with tooling projects. You will interact daily with production management, engineering and quality to understand and address tooling needs in direct production floor support.

Successful candidate will possess a technical degree in Machine Tool Technology and 5+ years related experience in machine shop/tool designing. CNC machining education and/or experience is a plus. Knowledge of Solid Works preferred. General machine shop capabilities essential. Excellent written, oral, interpersonal and problem solving skills necessary, as well as PC skills (Microsoft Office and CAD), and the ability to prioritize tasks and thrive in a team environment.

Apply to:
http://hr.vishay.com/careers/01-31-130333/desc.htm

EOE/AAP/M/F Employer Pre-employment Background and Drug Screening Required

Instruction

210 Job Training

CNA/LNA Training Day, evening & weekend classes all held in Dover! Graduate in just 5-8 weeks! (603) 647-2174. www.LNAHealthCareers.com

Announcements

13 Mortgage Foreclosure

POSTPONEMENT OF MORTGAGEE'S SALE

The Mortgagee's Sale public auction concerning the mortgage given by Charles H. Smith, to Jay M. Smith, dated August 6, 1999, said mortgage now being held by the Estate of Jay M. Smith, and said mortgage being recorded at the Carroll County Registry of Deeds at Book 1833, Page 410, for premises located at 140 Ryefield Road, Effingham, Carroll County, State of New Hampshire, scheduled for July 8, 2013 at 11:00 A.M., has been postponed until August 7, 2013 at 11:00 A.M..

Dated this 8th day of July, 2013.

The Estate of Jay M. Smith
By Its Attorney:
James H. Schulte, Esquire
(603) 743-6300

Farm-Livestock

238 Dogs-Cats/Birds/Pets

CHIHUAHUA I PUPPY left. Tri color ready July 22. $275 603 953-7990

PET CONNECTION Discount Pet Supply, Route 125 Barrington, N.H. 603-905-9006

Merchandise

306 Appliances - New

AUGER & SONS
SEWING MACHINES
VACUUM CLEANERS
603-332-5572

310 Articles for Sale

100 BALL ANTIQUE Mason Jars from the 1940's-50's, $2.00 each. (603)743-3230

12 AMERICAN GIRL Dolls with books never used $60 each or $600 all 12. 207-752-1813

1950 BLONDE BEDROOM set $333 679-8323 bondon101@COMCAST.NET

2004 ALINER HARD Side Pop-up Camper Trailer. $6000.00. Call 603-969-9713 tbeckemeyer@live.com

Ablounger Exercise Machine new $25.. cross country machine, fold up $15. 603 679-5966

ALUMINUM RAMPS a tv, used only 2 times. $225 or best offer. Call 603-534-3563

Armoire, $1200 new, very sturdy. Middleton. $225 or best offer. 603-473-0011

ARMOIRE for clothes/entertainment with power. 80" tall $400 603-866-4259

CLOCK 9MM 3 CLIPS, 16 shots, holster, excellent condition. $495. Call (207)363-3614

DEER HEAD and sheep mount $250 each. Sax and trumpet $150 each Call 749-9437

DIVE SUIT O'NEILL XTS, XL Tall, farmer John, excellent condition. $200. 603-335-3094

EARLY AMERICAN HUTCH, $100.00 603-659-5920 chickie4234@gmail.com

FOUR TRAILOR wheels 13inch tires, galvonized 5 lug cost $475.00 sell $250 731-9600

GLASS TOP COFFEE table, sofa or window table and end table $100.00 207-752-1813

GULFCOAST SPA 4 years old, excellent condition, $6500 new, asking $1200. 743-3230

HAMMOND DOUBLE Keyboard Organ $50.00 u pick up. 603-692-2280

Announcements

13 Mortgage Foreclosure

PUBLIC NOTICE

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603-427-1540

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Portsmouth Naval Shipyard,
Portsmouth, NH 03804-5000
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Announcements

17 Public Notice

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Portsmouth, NH 03804-5000
Telephone: 207-438-1140 • Fax: 207-438-1266

Announcements

17 Public Notice

NOTICE OF PUBLIC HEARING

The Newmarket Housing Authority proposed Agency Plan in compliance with the QHWR Act of 1998 is available for review at the NHA office, 34 Gordon Avenue, Newmarket, NH. In addition, a public hearing will be held at 6:00 pm on Tuesday, August 20, 2013 at the NHA office.

Town of Berwick

is interested in selecting a qualified engineering firm to Complete a holistic assessment of building systems including HVAC, lighting, and envelope. For full details, please refer to the Town's official website at www.berwickmaine.org, or contact Town Manager Patrick Venne at 11 Sullivan Street, Berwick, ME 03901, or 207-698-1101 ext. 111.

NOTICE

SAU 56 (Somersworth/Rollinsford) had limited openings for the Pre-School Program. Applications for the Program will be scheduled on July 22, 2013.

To schedule an appointment please call Judy Barry at 603-692-4450.

LEGAL NOTICE
ZONING BOARD OF ADJUSTMENT
NEWMARKET, NH

AUGUST 5, 2013
7:00 P.M.
TOWN COUNCIL CHAMBERS

You are hereby notified of a Zoning Board of Adjustment public hearing concerning a request by F J Durell Corp/Perkins Agency Inc/David Loiselle for a Special Exception reference Section 2.03(B)(2), of the Newmarket Zoning Ordinance.

The applicants request a Special Exception to permit changing the existing single-family dwelling to a professional office, with a residential unit on the second floor. The lot is located at 195 South Main Street, Tax Map U4, Lot 27, M3 Zone.

Employment

146 Help Wanted

Merchandise

310 Articles for Sale

Kenmore 500 washing machine and GE extra large capacity dryer $250 for pair 603 978-5754 dispi@comcast.net

LARGE WOODSTOVE JOTUL, moose detailed $500. 603-730-6570

ONE QUARTER YARD Electric Cement Mixer $100. 603-642-3031

PACIFIC WOODSTOVE with half cord seasoned wood. $425. must see 207-339-0180 after noon

PACKAGE DEAL 3 aluminum vans 16x8 ft., storage only, $2700. 603-664-7675

PACK AND PLAY good condition , clean, light tan color 731-9600

POOL, NEW FAST SET, size 12 feet x 30 inches, soft sides, pool , pump & filter. $50. 731-9600

SCHWINN COLLEGIATE BOYS BICYCLE Blue, 26", $45. excellent condition. (603)343-5006

SHOPSMITH MARK V with belt sander, bandsaw, & planer. $1000. (603)859-7980

SOLID OAK DINING table 48"x60", leaf is 18 1/4", 6 chairs; matching hutch with glass doors on top, 3 drawers and doors below 60 3/4"W x 78"H x18"D. Excellent condition. $999 for set 603-978-5754 dispi@comcast.net

SURF SUIT RIP CURL Insulator 654, XL tall, excellent condition. $200. 603-335-3094

TELESCOPE MEADE D60MM-F900MM with tripod. $45.00. Call 603 679-5966

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Appendix C
Comments Received During the Public Comment Period and Navy Responses

Public Hearing for the Proposed Plan for Operable Unit 7

Meeting

Taken on: July 23, 2013

JENSEN LITIGATION SOLUTIONS
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Chicago, IL 60601
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JENSEN
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PUBLIC HEARING FOR

ENVIRONMENTAL RESTORATION

WORK AT PORTSMOUTH NAVAL SHIPYARD

at

Kittery Municipal Building

200 Rogers Road

Kittery, Maine

on

Tuesday, July 23, 2013

at 7:30 p.m.

Court Reporter:

Karen D. Pomeroy, RDR, CRR

MS. MIDDLETON: Good evening. My name is Liz Middleton, and I'm a remedial project manager for NAVFAC Mid-Atlantic.

Welcome to the public meeting for the Proposed Remedial Action Plan for OU7 for the Portsmouth Naval Shipyard.

During this meeting we will accept oral and written comments on this plan. We will also accept written comments until August 13th, and details about how to submit those can be found in the proposed plan.

A responsiveness summary will address any significant comments we receive and will be included in the remedial -- I'm sorry, not the remedial but the record of decision for OU7.

So at this time we will begin accepting oral comments.

If you'd just please state your name and organization prior to providing the comments.

So does anyone have comments to submit?

MS. LEPAGE: Okay. My name is Carolyn Lepage. I'm a Maine certified geologist from Auburn, Maine; and I serve under contract as the technical advisor to the Seacoast Anti-Pollution League, also known by the acronym SAPL, which is spelled S-A-P-L.

The following comments regarding the July 2013 proposed plan for Operable Unit 7 are presented on behalf of SAPL.

One, support for the preferred remedy.

SAPL supports remediation of OU7, also known as Site 32 and the Topeka Pier Site, as described in the July 13th -- July 2013 proposed plan.

The Navy's preferred remedy includes the removal of contaminated soil from OU7, the implementation of land use controls to prevent exposure to contaminants remaining on site, and the ongoing inspection and maintenance of shoreline protection structures to prevent erosion and contaminant migration to the offshore.

The protectiveness of the remedy will be evaluated at least every five years as part of the five-year review process.

However, SAPL still has questions and concerns about the Navy's preferred remedy as follows:

Two, lack of response to SAPL's previous comments.

SAPL submitted comments on the May 2013 draft proposed plan for Operable Unit 7 with the hope that revisions would be incorporated in the final proposed plan to enhance the public's understanding and

participation during the public comment period.

Many of the suggestions were intended to clarify the proposed plan and make it easier for the public to understand, especially those who are not knowledgeable about the ongoing CERCLA-related investigations and cleanup actions at the shipyard.

Therefore, SAPL is disappointed that most of the comments submitted in its July 1, 2013, letter to the Navy have not been addressed in the final proposed plan that is the subject of tonight's public hearing.

Three, multiple site names.

The public website listed on page 13 of the proposed plan is a useful resource for those interested in or needing to check supporting documentation contained in the administrative record, particularly those who are unable to easily visit the information repositories at the two public libraries also identified on page 13.

As an aside, this website should have been specifically mentioned on page 2 of the proposed plan, along with the two libraries, as a source of information.

However, a quick search of the administrative record on the website reveals an inconsistency in the

naming or identification of the site when it comes tracking down relevant documents.

A search for, in quotes, OU7 brings up a list of 14 documents dating from only November 2011 to the present; but a search for Site 32 brings up 95 records dating back to 1997.

To the uninitiated, searching for OU7 documents would have eliminated a significant amount of information from consideration.

Therefore, SAPL suggests that the cross-referencing of the public website be improved so that a search for OU7, Site 32, or Topeka Pier Site would bring up the same extensive listing of documents.

Furthermore, while it is too late to revise the proposed plan, SAPL recommends that the title of the record of decision, as well as relevant sections of the text of the ROD, such as introductions, site history, and background sections, also clearly state the multiple names for the site.

Four, site elevation.

SAPL had asked that the Navy add information regarding the elevation, such as average or range of the site to the, in quotes, What Does OU7 Look Like, end quote, section of the proposed plan.

However, that information was not added to the final proposed plan. This is very important information given the site's proximity to water, its low and flat nature, and the knowledge that sea level is rising. Therefore, this information must be included in the site description section of the record of decision.

Five, vapor inhalation risk.

The risk of vapor inhalation is mentioned in the Site Conceptual Model shown as Figure 3 but not in the text of the proposed plan.

In its comment letter on the draft proposed plan, SAPL asked what the current risk of vapor intrusion in buildings at or near the site is and how were they evaluated and about future risks.

Information about this potential exposure pathway must be added to the record of decision as part of the conceptual model and human health risk assessment discussions.

Six, relationship between OU7 and OU4. This is a reiteration of SAPL's comment on the draft proposed plan. The scope and role of the OU7 Response Action section on page 6 states the following:

Quote, The proposed plan for OU7 is not expected

to have an impact on the strategy or progress of cleanup for the other sites at PNS, end quote.

SAPL agrees with this statement except for OU4, which addresses offshore areas adversely impacted by shipyard activities.

The Navy's preferred alternative for OU4 requires remediation of four out of 12 offshore areas of concern, and two of these four areas are adjacent to OU7.

The contamination of offshore areas MS-03 and MS-04 resulted from the storage, handling, and disposal activities at OU7 and the poor condition or ineffectiveness of the shoreline control structures between OU7 and OU4.

The relationship between the two operable units is the basis for requiring long-term inspection and maintenance of the shoreline structures as part of the Navy's preferred alternative for OU7.

SAPL requests that the Navy clearly explain the past, current, and likely future relationship between OU7 and OU4 in the record of decision and how that affects the selection and implementation of the remedy for OU7.

Seven, potential ecological risks.

The Summary of Site Risks section on page 6 states the following:

Quote, Potential for adverse ecological effects from exposure to site contaminants was not evaluated as part of a risk assessment because OU7 is currently and has historically been an industrial area with no significant habitats for ecological exposure, end quote.

In the July 1st comment letter SAPL had asked how potential risks for ecological receptors would be evaluated in the future should land use changes result in the creation of habitats of potential significance.

For example, the area is currently paved. However, closure or downsizing of the shipyard operations might encourage the removal of the pavement and creation of green space which could result in an environment much more favorable to ecological receptors. This question should now be answered in the record of decision.

Eight, consideration of sea level rise in risk assessment.

SAPL had asked the following with regard to the draft proposed plan. Please clarify in the text if/how the exposure assessment scenarios or any other steps in

the human health risk assessment take into consideration rising sea level and resulting changes in groundwater levels, erosion and deposition patterns, and increasing storm and wave action impacts on protective coastal structures and site contaminants.

SAPL requests that the answers be provided in the Summary of Site Risks discussion in the record of decision.

Nine, sea level rise.

SAPL has raised the following question during the public comment period for the proposed plan for Operable Unit 4 earlier this year and has not yet seen the Navy's response; therefore, SAPL is repeating the comment as it applies to OU7.

SAPL again expresses its concerns with the effect of rising sea level on the contamination located at various sites around the shipyard, as well as on the remedial measures taken to clean up the sites.

A recent report from Carbon Solutions New England at the University of New Hampshire entitled, quote, Climate Change in the Piscataqua/Great Bay Region: Past, Present, and Future, end quote, concludes that, quote, We can expect a -- excuse me, we can expect the 100-year flood height to increase several feet over the

next 90 years, end quote, which will result in severe flooding in coastal New Hampshire in the future.

Recent work by UNH and regional researchers is illustrated in a map showing 100-year flooding and storm surge levels that by the year 2050 will inundate significant areas along the shipyard shoreline, including OU7.

The effect of such an increase on the Great Bay Area can be observed at a website developed by Princeton University climate scientists, sealevel.climatecentral.org/surgingseas.

Rising sea levels will alter the current groundwater/surface water system and affect the stability of shoreline structures. The remedy for OU7 relies on the integrity of shoreline structures to maintain stability along the shoreline slopes and to prevent erosion and further migration of waste and contaminated soil that will remain onshore at the site.

How was sea level rise considered in the development of potential remedies for OU7 and in the selection of the Navy's preferred alternative?

What are the effects of rising sea level and increasing frequency and/or severity of storm events on the proposed remedy, and how have they been evaluated?

What range of sea level change was considered?

What are the potential future impacts of the Navy's preferred alternative as sea level rises?

How has the Navy planned to deal with the potential future impacts?

Ten, impact of shipyard closure.

What will happen if the shipyard closes and the Navy is no longer on the property to keep an eye on various sites?

Recent experience at another Navy facility in Maine that recently closed has shown that security measures for even the most dangerous sites will no longer be maintained at a high level once the base closes.

In the event of closure, how will the Navy ensure that there are no adverse impacts at OU7 or on adjacent OU4 offshore areas as a result of activities or actions on the former shipyard property?

Eleven, new or emerging contaminants.

SAPL had also raised the question of, in quotes, emerging contaminants during the public comment period for the proposed plan for Operable Unit 4 earlier this year and again has not yet seen the Navy's response.

What contingencies or plans does the Navy have to

redress -- to address emerging contaminants or other, quote, new contaminants at shipyard sites?

Twelve, maintaining the integrity of shoreline structures.

The sidebar entitled Is Contaminant Migration An Issue on page 7 ends with the statement that shoreline controls need to be maintained in the long term to prevent future contamination migration due to erosion.

SAPL agrees with that statement but had asked that a statement be added to the final proposed plan regarding how future sea level rise and anticipated storm and wave intensity increases will -- have been or will be factored into the shoreline management process and decision making so that it is anticipatory rather than reactionary. Since the Navy did not add this information to the proposed plan, SAPL believes it must be incorporated into the record of decision.

MS. MIDDLETON: Thank you for your comments.

Are there other comments?

(No response.)

MS. MIDDLETON: Then the public meeting for OU7 at the Portsmouth Naval Shipyard is now closed.

Thank you.

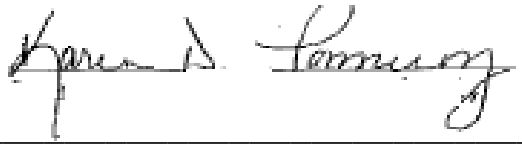
(Conclusion of proceedings at 7:47 p.m. this date.)

CERTIFICATE

I, Karen D. Pomeroy, a Registered Diplomate Reporter, do hereby certify that the within transcription is a true and accurate record, to the best of my knowledge, skills and ability, of the proceedings.

I further certify that I am not related to any of the parties in this matter by blood or marriage and that I am in no way interested in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office this 30th day of July, 2013.



Karen D. Pomeroy, RDR, CRR

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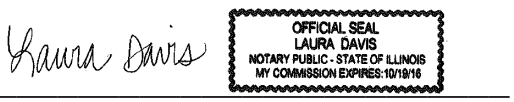

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August 14, 2013

Ms. Danna Eddy
Public Affairs Office (Code 100PAO)
Portsmouth Naval Shipyard
Portsmouth, NH 03804-5000

Fax Number: 207-438-1266

Subject: July 2013 *Proposed Plan for Operable Unit 7*

Dear Ms. Eddy:

This letter is submitted as requested by and on behalf of the Seacoast Anti-Pollution League (SAPL) regarding the July 2013 *Proposed Plan for Operable Unit 7, Portsmouth Naval Shipyard, Kittery, Maine* (the Proposed Plan). Most of the comments below reflect the oral comments presented on behalf of, and with input from, SAPL members at the July 23, 2013, Public Hearing held at the Kittery Town Hall.

1. Support for the Preferred Remedy.

SAPL supports remediation of OU7, also known as Site 32 and the Topeka Pier site, as described in the July 2013 Proposed Plan. The Navy's preferred remedy includes the removal of a limited area of contaminated soil from OU7, the implementation of Land Use Controls to prevent exposure to contaminants remaining on-site, and the on-going inspection and maintenance of shoreline protection structures to prevent erosion and contaminant migration to the offshore environment. The protectiveness of the remedy will be evaluated at least every five years as part of the Five Year Review process. However, SAPL still has questions and concerns about the Navy's preferred remedy as follows:

2. Lack of Response to SAPL's Previous Comments

SAPL submitted comments on the May 2013 Draft *Proposed Plan for Operable Unit 7,* with the hope that revisions would be incorporated in the final Proposed Plan to enhance the public's understanding and participation during the public comment period. Many of the suggestions were intended to clarify the Proposed Plan and make it easier for the public to understand, especially those who are not knowledgeable about the ongoing CERCLA-related investigations and cleanup actions at the Shipyard. Therefore, SAPL is disappointed that most of the comments submitted in its July 1, 2013, letter to the Navy have not been addressed the final Proposed Plan.

3. Multiple Site Names

The public website listed on page 13 of the Proposed Plan is a useful resource for those interested in or needing to check supporting documentation contained in the Administrative Record, particularly those who are unable to easily visit the information repositories at the two public libraries also identified on page 13. [As an aside, this website should have been specifically mentioned on page 2 of the Proposed Plan along with the two libraries as a source of information.] However, a quick search of the Administrative Record on the website reveals an inconsistency in the naming or identification of the site when it comes to tracking down relevant documents. A search for "OU7" brings up a list of fourteen (14) documents dating from only November 2011 to the present. But a search for "Site 32" brings up around ninety-six (96) documents. To the uninitiated, searching for OU7 documents would have eliminated a significant amount of information from consideration. Therefore, SAPL suggests that the cross-referencing of the public website be improved so that a search for OU7, Site 32, or Topeka Pier site would bring up the same extensive listing for documents. Furthermore, while it is too late to revise the Proposed Plan, SAPL recommends that the title of the Record of Decision, as well as relevant sections of the text, such as the Introduction, Site History, and Background sections, also clearly state the multiple names for the site.

4. Elevation and Other Site Characteristics

SAPL had asked that the Navy add information regarding the elevation (average, range) of the site to the "What does OU7 look like?" section of the Proposed Plan. However, that information was not added to the final Proposed Plan. This is very important information given the site's proximity to water, its low and flat nature, and the knowledge that sea level is rising. Recent projections by University of New Hampshire researchers of future storm surges in the estuary show significant potential impacts along the entire shoreline of the Shipyard. [Please refer to the following link for maps and details: http://www.granit.unh.edu/Projects/Details?project_id=264] Therefore, this information must be included in the site description in the Record of Decision.

SAPL had also suggested adding information to the Site Background and Site Characteristics sections of the Proposed Plan would benefit the reader's understanding. For example, it would have been helpful if examples of the debris found in the fill were provided in the "For what was OU7 Used?" section. Also, some perspective on the documentation on the fill and disposal activities at the site was needed. How good or complete is the documentation, what don't we know, and how has that been that addressed? A brief description of where the contaminants listed in the "How much and what types of chemicals are present?" section of the Proposed Plan came from would also be helpful. For instance, are the dioxins/furans associated with ash disposal at the site? If so, where did the ash come from? Are the PCBs the result of transformer oils being handled at the site? Please add this information to the Record of Decision.

5. Vapor Inhalation Risk

The risk of vapor inhalation is mentioned in the Site Conceptual Model shown as Figure 3, but not in the text of the Proposed Plan. In its comment letter on the draft Proposed Plan, SAPL asked what the current risk of vapor intrusion in buildings at or near the site is, how were it was evaluated and about future risks. Information about this potential exposure pathway must be added to the Record of Decision as part of the conceptual model and human health risk assessment discussions.

6. Relationship Between OU7 and OU4

This is a reiteration of SAPL's comment on the draft Proposed Plan. The Scope and Role of the OU7 Response Action section on page 6 states the following: "*... The Proposed Plan for OU7 is not expected to have an impact on the strategy or progress of cleanup for the other sites at PNS. ...*" SAPL agrees with this statement except for OU4, which addresses offshore areas adversely impacted by Shipyard activities. The Navy's Preferred Alternative for OU4 requires remediation of four out of twelve offshore areas of concern, and two out of these four areas are adjacent to OU7. The contamination of offshore areas MS-03 and MS-04 resulted from the storage, handling, and disposal activities at OU7 and the poor condition or ineffectiveness of the shoreline control structures separating OU7 and OU4. The relationship between the two operable units is the basis for requiring long-term inspection and maintenance of the shoreline structures as part of the Navy's Preferred Alternative for OU7. SAPL requests that the Navy clearly explain the past, current, and possible future relationship between OU7 and OU4 in the Record of Decision and how that affects the selection and implementation of the remedy for OU7.

7. Potential Ecological Risks

The Summary of Site Risks section on page 6 states the following: *"Potential for adverse ecological effects from exposure to site contaminants was not evaluated as part of a risk assessment because OU7 is currently and has historically been an industrial area with no significant habitats for ecological exposure*." In the July 1st comment letter, SAPL had asked how potential risks for ecological receptors would be evaluated in the future, should land use changes result in the creation of habitats of potential significance. For example, the area is currently paved. However, closure or down-sizing of shipyard operations might encourage the removal of the pavement and creation of green space which could result in an environment much more favorable to ecological receptors. This question must now be answered in the Record of Decision.

8. Consideration of Sea Level Rise in Risk Assessment

SAPL had asked the following with regard to the draft Proposed Plan: Please clarify in the text if/how the exposure assessment scenarios or any other steps in the human health risk assessment take into consideration rising sea level and resulting changes in groundwater levels, erosion and deposition patterns, and increasing storm/wave action impacts on protective coastal structures and site contaminants. SAPL requests that the answers be provided in the summary of site risks discussion in the Record of Decision.

9. Sea Level Rise

SAPL had raised the following question during the public comment period for the "Proposed Plan for Operable Unit 4" earlier this year, and has not yet seen the Navy's response. Therefore, SAPL is repeating the comment as it applies to OU7:

SAPL again expresses its concern with the effect of rising sea level on the contamination located at various sites around the Shipyard, as well as on the remedial measures taken to clean up the sites. A recent report from Carbon Solutions New England at the University of New Hampshire, entitled "*Climate Change in the Piscataqua/Great Bay Region: Past, Present, and Future*" concludes that "we can expect the 100-year flood height to increase several feet over the next 90 years", which will result in more severe flooding in coastal New Hampshire in the future. Recent work by UNH and regional researchers is

illustrated in a map showing 100-year flooding and storm surge levels that by 2050 will inundate significant areas along the Shipyard shoreline, including OU7.
[More details, other maps, and contact information is at:
http://www.granit.unh.edu/Projects/Details?project id=264]

The effect of such an increase on the Great Bay area can be observed at a website developed by Princeton University climate scientists, sealevel.climatecentral.org/surgingseas.
[http://sealevel.climatecentral.org/surgingseas/place/states/NH#center=14/43.0761/-70.7407&surge=3&show=cities]

Rising sea level will alter the current groundwater/surface water system and affect the stability of shoreline structures. The remedy for OU7 relies on the integrity of shoreline structures to maintain stability along the shoreline slopes and to prevent erosion and further migration of the waste and contaminated soil that will remain on shore at the site.

How was rising sea level considered in the development of potential remedies for OU7, and in the selection of the Navy's preferred alternative? What are the effects of rising sea level and increasing frequency and/or severity of storm events on the proposed remedy and how have they been evaluated? What range of sea-level change was considered? What are the potential future impacts to the Navy's preferred alternative as sea level rises? How has the Navy planned to deal with the potential future impacts? These questions should be answered in the Record of Decision.

10. Impact of Shipyard Closure

What will happen if the Shipyard closes and the Navy is no longer on the property to keep an eye on various sites? Recent experience at another Navy facility in Maine that recently closed has shown that security measures for even the most dangerous sites will no longer be maintained at a high level once a base closes. In the event of closure, how will the Navy ensure that there are no adverse impacts at OU7 or on OU4 offshore areas as a result of activities or actions on the former Shipyard property?

11. "New" or Emerging Contaminants.

SAPL had also raised the question of "emerging contaminants" during the public comment period for the "Proposed Plan for Operable Unit 4" earlier this year, and again, has not yet seen the Navy's response. What contingencies or plans does the Navy have to address "emerging contaminants" or other "new" contaminants at Shipyard sites?

12. Maintaining the Integrity of Shoreline Structures

The sidebar entitled "Is Contaminant Migration an Issue?" on page 7 ends with the statement that shoreline controls need to be maintained in the long term to prevent future contaminant migration due to erosion. SAPL agrees with that statement, but had asked that a statement be added to the final Proposed Plan regarding how future sea level rise and anticipated storm and wave intensity increases have been or will be factored into the shoreline management process and decision-making so that it is anticipatory rather than reactionary. Since the Navy did not add this information to the Proposed Plan, SAPL believes it must be incorporated in the Record of Decision.

Please do not hesitate to contact me if you have any questions.

Sincerely,

Carolyn A. Lepage

Carolyn A. Lepage, C.G. & P.G.
President
State of Maine Certified Geologist No. GE202

cc: Doug Bogen, SAPL
Iver McLeod, MEDEP
Matthew Audet, EPA
Deborah Cohen, TetraTech
Elizabeth Middleton, Navy

105OU7PRAP FinalComments14.AG3

TABLE C-1
RESPONSES TO COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD ON THE PROPOSED PLAN FOR OPERABLE UNIT 7, PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Oral comments during the July 23, 2013 public hearing and written comments dated August 14, 2013, were received from one community organization, Seacoast Anti-Pollution League (SAPL), on the July 2013 Proposed Plan for Operable Unit (OU) 7. The SAPL representative, who is also a Restoration Advisory Board (RAB) member, and SAPL's Technical Assistance Grant (TAG) Consultant attended the public hearing. No changes to the remedy, as originally identified in the Proposed Plan, were necessary based on comments received during the public comment period. A summary of the comments received and the Navy's responses to these comments are provided in the table herein.

Summary of Comments Received during the Public Comment Period and Navy Responses	
Question/Comment	**Navy Response**
1. SAPL indicated support for the preferred remedy.	Comment noted.
2. SAPL commented on the Navy lack of response to their comments on a draft version of the Proposed Plan for OU7.	The Navy provided a presentation on the draft Proposed Plan at the June 4, 2013 RAB meeting, during which the Navy explained the contents of the Proposed Plan and the Navy's preferred remedy. The Navy responded to SAPL questions during this meeting. The referenced May 2013 draft version of the Proposed Plan was only provided for regulatory review and comment. The final July 2013 Proposed Plan that was provided for public comment reflects revisions made based on regulatory review and comment. As provided in the Navy's email dated July 11, 2013 in response to SAPL's comments on the draft Proposed Plan, the Navy indicated that the comments would be taken into consideration, and to submit the comments during the public comment period to ensure that they are included in the administrative record. SAPL provided comments during the public comment period, which are included in Appendix C of the Record of Decision (ROD) for OU7. Navy responses to comments provided during the public comment period are provided herein.
3. SAPL commented that the public website does not provide cross-referencing for the various documents prepared for OU7. Cross-referencing of the multiple names for the site should be included in the ROD	The multiple names for OU7 (Site 32, Topeka Pier Site) are indicated on Pages 1 and 3 of the Proposed Plan and are provided on the title page and first pages of Sections 1 and 2 of the ROD. In addition, the ROD provides an Administrative Record Reference Table that shows the document title and Administrative Record number for easy search for the document on the public website. The public website has a tab entitled "Site Description" that provides a table with cross-referencing of the multiple site names. The search tool in the Administrative Record provides a simple search function and does not allow for multiple search criteria in a single search.

Summary of Comments Received during the Public Comment Period and Navy Responses	
Question/Comment	**Navy Response**
Several of SAPL's comments are on format and content of the Proposed Plan and information to include in the ROD. These are: 4. Adding information on site elevation and other site characteristic information. 5. Discuss risks for vapor intrusion. 6. Discuss the relationship between OU7 and OU4. 7. Discuss future potential ecological risks. 8. Discuss consideration of sea level rise in risk assessment.	4. Technical information on site characteristics, such as elevations of site and groundwater and nature and extent of contamination, are detailed in the Remedial Investigation (RI) Report for OU7 and summarized in the Feasibility Study (FS) Report for OU7. A high level of technical detail is not included in the Proposed Plan, which is intended to be a concise explanation of the site and proposed plan for cleanup of the site. Information on site elevations and other characteristics of the site is provided in Section 2.5 (Site Characteristics) in the ROD. 5. Vapor inhalation is included as a potential exposure pathway in the Conceptual Site Model and summary of site risks (Figure 3 and Pages 6 and 7 of the Proposed Plan, respectively). Vapor intrusion is not a potential exposure pathway for OU7 because compounds detected at the site are not sufficiently volatile and toxic to be a vapor intrusion concern. Therefore, vapor intrusion was not included in the Conceptual Site Model or in the risk discussion in the Proposed Plan. 6. As part of investigation at PNS, potential offshore impacts from past releases to the offshore was separated from the onshore areas. OU4 was designated as the offshore OU and it addresses offshore impacts from past releases from onshore Installation Restoration (IR) Program sites. The remedy for OU4 includes removing contamination associated with unacceptable risks from past releases from OU7 (MS-03 and MS-04 portion of OU4). Evaluation of OU7 shows that there are no current unacceptable risks in the offshore area from OU7. Future potential releases and impacts to the OU7 offshore area is part of OU7 and is not part of OU4. Therefore, the remedy for OU7 will not impact the remedy for OU4. Text in the Proposed Plan explains what is being addressed as part of OU4 (see the text box on Page 2) and OU7 (see the top of Page 8 for example). Section 2.4 (Scope and Role of Operable Unit) of the ROD also provides information on the relationship between OU7 and OU4. 7. There is no potential for ecological exposure based on current and future anticipated land use. More than just pavement removal and creation of green space would be necessary to result in ecological exposure to subsurface material based on site conditions; therefore, this was not considered a future potential exposure. However, if there was a change in land use or site conditions that could result in ecological exposure, then this would be addressed as part of five-year reviews. 8. The various predictions of future sea levels were not considered in the site risk assessments and no discussion of potential sea level change is required in the ROD. As the Navy explained during the May 2012 RAB presentation on the draft OU7 FS report and June 2013 RAB presentation on the draft OU7 Proposed Plan, the evaluation of potential risks from contaminant migration showed no future potential risks from migration based on the highest levels of contamination being located adjacent to the shoreline within the water table. Sea level rise would not change the risk conclusions for OU7.

Summary of Comments Received during the Public Comment Period and Navy Responses	
Question/Comment	**Navy Response**
9. SAPL expressed concern with the effect of rising sea level on contamination and integrity of shoreline structures at OU7. SAPL asked how sea level was considered in the development and selection of remedies for OU7, what the potential future impacts may be to the Navy's preferred remedy as sea level rises and/or increasing frequency and/or severity of storm events, and how the Navy will address potential future impacts from sea level rise at OU7.	As the Navy has indicated in previous responses to similar questions regarding sea level rise, evaluations of the potential migration of contamination from onshore IR Program site soil to groundwater have been conducted. The evaluations assumed worst-case conditions, assuming that the highest contamination was directly in contact with groundwater and was near the shoreline. Therefore, changes in sea level would not change the conclusions of these evaluations. In addition, five-year reviews will be required for sites where contamination remains in excess of levels that allow for unlimited use and unrestricted exposure to ensure that the remedy remains protective of human health and the environment in the future. Changes in site conditions that could affect the protectiveness of the remedy are evaluated as part of the five-year review process. Predictions of sea level rise and changes in storm events were not considered in the development or selection of the remedy. However common reference datum such as National Oceanic and Atmospheric Administration (NOAA)'s mean high and mean low water levels and Federal Emergency Management Agency (FEMA)'s 100-year and 500-year flood elevations are used in understanding site characteristics, development of the conceptual site model, and development and selection of remedies as appropriate. Changes in these parameters would be considered as necessary as part of changes in site conditions as part of the five-year review process. The remedy for OU7 includes long-term management of the existing shoreline controls as part of the land use controls (LUCs) for the site. Periodic inspections and any required maintenance based on the results of the inspections will be conducted as part of the long-term management of the shoreline controls, and specific requirements will be provided in a Long-Term Management Plan. Inspections would also identify any significant changes in site conditions, such as significant changes in water levels.
10. SAPL asked what happens if the Shipyard closes and the Navy is no longer on the property to inspect various onshore sites and how the Navy will ensure no adverse impacts at OU7 or OU4.	For the various sites that required continued controls, as provided in previous responses to similar questions from SAPL regarding hypothetical Shipyard closure, the LUC Remedial Design (RD) indicates procedures pertaining to changes in land use, including property transfer. The deed associated with any future transfer of property would require continued implementation of the LUCs, including long-term management requirements. The Navy is responsible for implementing, maintaining, reporting on, and enforcing the LUCs. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy will retain ultimate responsibility for remedy integrity. As part of the OU4 remedy, contaminated sediment in the offshore area will be removed such that LUCs or other activities, including five-year reviews, will not be required for OU4.

Summary of Comments Received during the Public Comment Period and Navy Responses	
Question/Comment	**Navy Response**
11. SAPL asked what contingencies or plans does the Navy have to address emerging or other new contaminants at Shipyard sites.	As discussed in answer to a similar question from SAPL during the December 2012 RAB meeting, the Navy makes decisions on investigating emerging contaminants based on site-specific conditions. There needs to be a reason to investigate a specific emerging contaminant. At the Shipyard, historical filling and contamination of metals and PAHs are the primary issues for the IR Program sites at PNS. Investigation of OU7 included a large number of potential contaminants based on the historical filling of the site. However, if in the future information becomes available such that new contaminants need to be considered for OU7, the Navy in consultation with U. S. Environmental Protection Agency would conduct the necessary actions.
12. SAPL asked how future sea level rise and anticipated storm and waver intensity increases have been or will be factored into the shoreline management process and decision-making.	Long-term management of the shoreline controls will be conducted and will include inspection and maintenance of the controls. Five-year site reviews will be conducted to ensure the remedy remains protective of human health and the environment in the future. Changes in site conditions would be considered as appropriate as part of long-term management and five-year site reviews. Please also see the Navy's response to Comment No. 9 regarding sea level rise.

Appendix D
Human Health Risk Tables

Excerpts from Appendix D of the Remedial Investigation Report for OU7

APPENDIX D.1

RAGS-PART D TABLES

RAGS Part D Table 3

Medium-Specific Exposure Point Concentration Summary

LIST OF TABLES
RAGS PART D TABLE 3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY

Table No.

Reasonable Maximum/Central Tendency Exposures

TABLE 3.1.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale[1]
OU7	BAP Equivalent	mg/kg	0.72	1.8 (L)	6.3	1.8	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL
	Aroclor-1248	mg/kg	--	--	1.5	1.5	mg/kg	Maximum Concentration	(3)
	Barium	mg/kg	120	335(NP)	2530	335	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL
	Chromium	mg/kg	52.8	62.2(L)	280	62.2	mg/kg	95% Modified-t UCL	ProUCL
	Copper	mg/kg	402	1030(NP)	5620	1030	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL
	Iron	mg/kg	27500	34200 (NP)	196000	34200	mg/kg	95% Modified-t UCL	ProUCL
	Lead	mg/kg	510	2140 (L)	13200	510	mg/kg	Mean Concentration	(2)
	Mercury	mg/kg	0.72	2.1 (L)	16.3	2.1	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL
	Thallium	mg/kg	0.49	0.48 (G)	1.1	0.48	mg/kg	95% KM (t) UCL	ProUCL

For non-detects, the sample quantitation limit was used as an input to ProUCL; for duplicate sample results, the average value was used in the calculation.

G = Gamma
L = Lognormal
NP = Non-parametric

1. Exposure point concentration is the value recommended by USEPA's ProUCL. The maximum detected concentration is used if the recommended UCL is greater than the maximum or if the dataset contains less than 10 samples.
2. As per USEPA guidance for lead, the mean concentration is used as the exposure point concentration for lead.
3. Hotspot maximum concentration.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

TABLE 3.2.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale[(1)]
OU7	BAP Equivalent	mg/kg	0.64	1.1 (NP)	5.8	1.1	mg/kg	95% KM (Chebyshev) UCL	ProUCL
	Aroclor-1248	mg/kg	--	--	41.0	41	mg/kg	Maximum Concentration	(3)
	Aroclor-1260	mg/kg	0.95	4.6 (NP)	42	4.6	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL
	2,3,7,8-TCDD TEQ	mg/kg	0.00013	0.0013 (NP)	0.0017	0.0013	mg/kg	99% Chebyshev (Mean, Sd) UCL	ProUCL
	Antimony	mg/kg	31.2	182 (L)	1430	182	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL
	Barium	mg/kg	152	280(NP)	1580	280	mg/kg	95% Chebyshev (Mean, Sd) UC	ProUCL
	Cadmium	mg/kg	2.8	5.1 (NP)	24.1	5.1	mg/kg	95% KM (Chebyshev) UCL	ProUCL
	Chromium	mg/kg	121	290(NP)	2860	290	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL
	Cobalt	mg/kg	14.5	15.9(L)	85.2	15.9	mg/kg	95% H-UCL	ProUCL
	Copper	mg/kg	3000	6020(NP)	40400	6020	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL
	Iron	mg/kg	64700	97100(NP)	280000	97100	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL
	Lead	mg/kg	1600	5630 (L)	40000	1600	mg/kg	Mean Concentration	(2)
	Manganese	mg/kg	662	969 (NP)	4370	969	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL
	Mercury	mg/kg	2.6	9.4 (L)	120	9.4	mg/kg	95% KM (Chebyshev) UCL	ProUCL
	Nickel	mg/kg	229	484 (NP)	3920	484	mg/kg	95% KM (Chebyshev) UCL	ProUCL
	Thallium	mg/kg	0.85	0.89 (G)	3.6	0.89	mg/kg	95% KM (t) UCL	ProUCL
	Zinc	mg/kg	1510	2600(L)	15800	2600	mg/kg	95% H-UCL	ProUCL

For non-detects, the sample quantitation limit was used as an input to ProUCL; for duplicate sample results, the average value was used in the calculation.

G = Gamma
L = Lognormal
NP = Non-parametric

1. The maximum concentration was used as the EPC because the dataset contained less than 10 samples for each of the COPCs.
2. As per USEPA guidance for lead, the mean concentration is used as the exposure point concentration for lead.
3. Hotspot maximum concentration.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

TABLE 3.3.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Scenario Timeframe: Current/Future
Medium: Surface Soil - Former Location of Building 237
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale[(1)]
OU7	Aroclor-1254	mg/kg	--	--	0.28	0.28	mg/kg	Maximum Concentration	< 10 Samples

For non-detects, the sample quantitation limit was used as an input to ProUCL; for duplicate sample results, the average value was used in the calculation.

1. The maximum concentration was used as the EPC because the dataset contained less than 10 samples for each of the COPCs.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

TABLE 3.4.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Scenario Timeframe: Current/Future
Medium: Subsurface Soil - Former Location of Building 237
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale[(1)]
OU7	BAP Equivalent	mg/kg	--	--	0.25	0.25	mg/kg	Maximum Concentration	< 10 Samples
	Manganese	mg/kg	--	--	405	405	mg/kg	Maximum Concentration	< 10 Samples

For non-detects, the sample quantitation limit was used as an input to ProUCL; for duplicate sample results, the average value was used in the calculation.

1. The maximum concentration was used as the EPC because the dataset contained less than 10 samples for each of the COPCs.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

TABLE 3.5.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale[1]
OU7	BAP Equivalent	mg/kg	0.99	1.2(G)	8.2	1.2	mg/kg	95% Approximate Gamma UCL	ProUCL
	TEQ PCB	mg/kg	0.00028	0.0016(NP)	0.007	0.0016	mg/kg	99% KM (Chebyshev) UCL	ProUCL
	Total PCB Congeners	mg/kg	0.34	0.42(G)	2.7	0.42	mg/kg	95% Approximate Gamma UCL	ProUCL
	Arsenic	mg/kg	12.7	14.5(G)	36.2	14.5	mg/kg	95% Approximate Gamma UCL	ProUCL
	Chromium	mg/kg	132	150(N)	208.8	150	mg/kg	95% Student's-t UCL	ProUCL
	Iron	mg/kg	36733	45900(NP)	141000	45900	mg/kg	95% Modified-t UCL	ProUCL
	Lead	mg/kg	187	248(NP)	575	187	mg/kg	Mean Concentration	(2)
	Manganese	mg/kg	425	468(N)	684.4	468	mg/kg	95% Student's-t UCL	ProUCL

For non-detects, the sample quantitation limit was used as an input to ProUCL; for duplicate sample results, the average value was used in the calculation.

G = Gamma
N = Normal
NP = Non-parametric

1. The maximum concentration was used as the EPC because the dataset contained less than 10 samples for each of the COPCs.
2. As per USEPA guidance for lead, the mean concentration is used as the exposure point concentration for lead.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

TABLE 3.6.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
OU7	Thallium	ug/L	8.8	9.0 (G)	66.1 J	66.1	mg/kg	Maximum Detected Concentration	(1)

For non-detects, the sample quantitation limit was used as an input to ProUCL; for duplicate sample results, the average value was used in the calculation.

G = Gamma
J = Estimated

1 - The maximum detected concentration is used as the exposure point concentration for groundwater.

Exposure point concentrations for the RME scenarios are also the exposure point concentrations for the CTE scenarios.

RAGS Part D Table 5

Non-Cancer Toxicity Data

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
OPERABLE UNIT 7 REMEDIAL INVESTIGATION
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Semivolatile Organic Compounds										
BAP Equivalent	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs										
Aroclor-1254	Chronic	5.0E-02	mg/kg/day	1	5.0E-02	mg/kg/day	Immune	300/1	IRIS	6/10/2011
Aroclor-1260[3]	Chronic	5.0E-02	mg/kg/day	1	5.0E-02	mg/kg/day	NA	300/1	IRIS	6/10/2011
TEQ PCB[4]	Chronic	1.0E-09	mg/kg/day	1	1.0E-09	mg/kg/day	Developmental	90	ASTDR	12/1995
Total PCB Congeners[5]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxins/Furans										
2,3,7,8-TCDD TEQ	Chronic	1.0E-09	mg/kg/day	1	1.0E-09	mg/kg/day	Developmental	90	ASTDR	12/1995
Inorganics										
Antimony	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Blood	1000/1	IRIS	6/10/2011
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	6/10/2011
Barium	Chronic	2.0E-01	mg/kg/day	0.07	1.4E-02	mg/kg/day	Kidney	300/1	IRIS	6/10/2011
Cadmium[6]	Chronic	1.0E-03	mg/kg/day	0.025	2.5E-05	mg/kg/day	NA	10/1	IRIS	6/10/2011
Chromium[7]	Chronic	1.5E+00	mg/kg/day	0.013	2.0E-02	mg/kg/day	NOAEL	100/10	IRIS	6/10/2011
Cobalt	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Blood	3000/1	PPRV	8/25/2008
Copper	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	GS	NA	HEAST	7/1997
Iron	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	GS	1.5	PPRTV	9/11/2006
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (soil)[8]	Chronic	1.4E-01	mg/kg/day	0.04	5.6E-03	mg/kg/day	CNS	1/1	IRIS	6/10/2011
Mercury[9]	Chronic	3.0E-04	mg/kg/day	0.07	2.1E-05	mg/kg/day	Autoimmune	1000/1	IRIS	6/10/2011
Nickel	Chronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300/1	IRIS	6/10/2011
Thallium	Chronic	1.0E-05	mg/kg/day	1	1.0E-05	mg/kg/day	Skin	3000/1	PPRTV	10/8/2010
Zinc	Chronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	Blood	3/1	IRIS	6/10/2011

Notes:
1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
3 - Values are for Aroclor-1254.
4 - Criteria for 2,3,7,8-TCDD were used for this parameter.
5 - Criteria for PCBs (high risk) were used for this parameter.
6 - Values are for cadmium - diet.
7 - Values are for trivalent chromium.
8 - Adjusted IRIS value in accordance with USEPA Region I Risk Update Number 4, November 1996.
9 - Values are for mercuric chloride (and other mercury salts).

Definitions:
CNS = Central Nervous System
CVS = Cardiovascular system
GS = Gastrointestinal
HEAST = Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Available.
NOAEL = No observed adverse effect level
PPRTV = Provisional Peer Reviewed Toxicity Values

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
OPERABLE UNIT 7 REMEDIAL INVESTIGATION
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE
PAGE 1 OF 1

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[1]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Semivolatile Organic Compounds									
BAP Equivalent	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs									
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA
TEQ PCB[2]	Chronic	4.00E-08	mg/m^3	1.1E-08	(mg/kg/day)	Liver, Respiratory, Developmental	NA	Cal EPA	12/2000
Total PCB Congeners[3]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxins/Furans									
2,3,7,8-TCDD TEQ	Chronic	4.00E-08	mg/m^3	1.1E-08	(mg/kg/day)	Liver, Respiratory, Developmental	NA	Cal EPA	12/2000
Inorganics									
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	Chronic	1.50E-05	mg/m^3	4.3E-06	(mg/kg/day)	NA	NA	Cal EPA	9/2009
Barium	Chronic	5.0E-04	mg/m^3	1.4E-04	(mg/kg/day)	Fetotoxicity	1000/1	HEAST	9/1997
Cadmium	Chronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	NA	NA	Cal EPA	12/2000
Chromium[4]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	Chronic	6.0E-06	mg/m^3	1.7E-06	(mg/kg/day)	Lungs	NA	PPRTV	8/25/2008
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	Chronic	5.0E-05	mg/m^3	1.4E-05	(mg/kg/day)	CNS	1000/1	IRIS	6/10/2011
Mercury	NA	3.0E-05	NA	NA	NA	CNS	NA	Cal EPA	12/2008
Nickel	Chronic	9.00E-05	mg/m^3	2.6E-05	(mg/kg/day)	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	Respiratory	30/1	ATSDR	9/2005
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1 - Extrapolated RfD = RfC *$20m^3$/day / 70 kg

2 - Criteria for 2,3,7,8-TCDD were used for this parameter.

3 - Criteria for PCBs (high risk) were used for this parameter.

4 - Total and trivalent chromium are considered.

Definitions:

CNS = Central Nervous System

HEAST= Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System

NA = Not Applicable

PPRTV = Provisional Peer Reviewed Toxicity Values

RAGS Part D Table 6

Cancer Toxicity Data

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
OPERABLE UNIT 7 REMEDIAL INVESTIGATION
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Semivolatile Organic Compounds								
BAP Equivalent[3]	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	6/10/2011
PCBs								
Aroclor-1254	2.0E+00	$(mg/kg/day)^{-1}$	1	2.0E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	9/1996
Aroclor-1260	2.0E+00	$(mg/kg/day)^{-1}$	1	2.0E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	9/1996
TEQ PCB[4]	1.3E+05	$(mg/kg/day)^{-1}$	1	1.3E+05	$(mg/kg/day)^{-1}$	NA	CAL EPA	9/2009
Total PCB Congeners[5]	2.0E+00	$(mg/kg/day)^{-1}$	1	2.0E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	6/10/2011
Dioxins/Furans								
2,3,7,8-TCDD TEQ	1.3E+05	$(mg/kg/day)^{-1}$	1	1.3E+05	$(mg/kg/day)^{-1}$	NA	CAL EPA	9/2009
Inorganics								
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A (Human Carcinogen)	IRIS	6/10/2011
Barium	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	6/10/2011
Cadmium	NA	NA	NA	NA	NA	B1 / Probable human carcinogen	IRIS	6/10/2011
Chromium	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	6/10/2011
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	6/10/2011
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	6/10/2011
Manganese	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	6/10/2011
Mercury	NA	NA	NA	NA	NA	C/ Possible Human Carcinogen	IRIS	6/10/2011
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	6/10/2011
Zinc	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	6/10/2011

Notes:
1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
2 - Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral Absorption Efficiency for Dermal.
3 - The carcinogenic PAHs are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).
4 - Criteria for 2,3,7,8-TCDD were used for this parameter.
5 - Criteria for PCBs (high risk) were used for this parameter.

Definitions:
HEAST = Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System.
NA = Not Available.

USEPA(1) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
OPERABLE UNIT 7 REMEDIAL INVESTIGATION
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Semivolatile Organic Compounds							
BAP Equivalent[2]	1.1E-03	$(ug/m^3)^{-1}$	3.9E+00	$(mg/kg/day)^{-1}$	NA	IRIS	6/10/2011
PCBs							
Aroclor-1254	5.7E-04	$(ug/m^3)^{-1}$	2.0E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	9/1996
Aroclor-1260	5.7E-04	$(ug/m^3)^{-1}$	2.0E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	9/1996
TEQ PCB[3]	3.8E+01	$(ug/m^3)^{-1}$	1.3E+05	$(mg/kg/day)^{-1}$	NA	CAL EPA	9/2009
Total PCB Congeners[4]	5.7E-04	$(ug/m^3)^{-1}$	2.0E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	9/09/2009
Dioxins/Furans							
2,3,7,8-TCDD TEQ	3.8E+01	$(ug/m^3)^{-1}$	1.3E+05	$(mg/kg/day)^{-1}$	NA	CAL EPA	9/2009
Inorganics							
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E-03	$(ug/m^3)^{-1}$	1.5E+01	$(mg/kg/day)^{-1}$	A / Known human carcinogen	IRIS	6/10/2011
Barium	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	6/10/2011
Cadmium[5]	1.8E-03	$(ug/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B1 / Probable human carcinogen	IRIS	6/10/2011
Chromium[6]	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	6/10/2011
Cobalt	9.0E-03	$(ug/m^3)^{-1}$	3.2E+01	$(mg/kg/day)^{-1}$	NA	PPRTV	8/25/2008
Copper	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	6/10/2011
Iron	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	6/10/2011
Manganese	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	6/10/2011
Mercury	NA	NA	NA	NA	C/ Possible Human Carcinogen	IRIS	6/10/2011
Nickel	2.6E-04	$(ug/m^3)^{-1}$	9.1E-01	$(mg/kg/day)^{-1}$	NA	NA	NA
Thallium	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	6/10/2011
Zinc	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	6/10/2011

1 - Inhalation CSF = Unit Risk * 70 kg / $20m^3$/day.

2 - The carcinogenic PAHs are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

3 - Criteria for 2,3,7,8-TCDD were used for this parameter.

4 - Criteria for PCB hexachlorobiphenyl (2,3,3',4,4',5') were used for this parameter.

5 - Values are for cadmium - diet.

6 - Values are for total chromium.

IRIS = Integrated Risk Information System.

NA = Not Available.

USEPA(1) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

RAGS Part D Table 9

Summary Of Receptor Risks And Hazards For COPCs

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SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

REASONABLE MAXIMUM EXPOSURES

CENTRAL TENDENCY EXPOSURES

TABLE 9.1A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Current
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	4E-07	--	1E-07	--	5E-07	NA	--	--	--	--
			Aroclor-1248	8E-08	--	3E-08	--	1E-07	NA	--	--	--	--
			Barium	- -	--	- -	--	- -	Kidney	0.003	--	--	0.003
			Chromium	- -	--	- -	--	- -	None Reported	0.00008	--	--	0.00008
			Copper	- -	--	- -	--	- -	GS	0.05	--	--	0.05
			Iron	- -	--	- -	--	- -	GS	0.09	--	--	0.09
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Mercury	- -	--	- -	--	- -	Autoimmune	0.01	--	--	0.01
			Thallium	- -	--	- -	--	- -	NA	0.09	--	--	0.09
			Chemical Total	4E-07	--	2E-07	--	6E-07		0.3	--	--	0.3
		Exposure Point Total						6E-07					0.3
	Exposure Medium Total							6E-07					0.3
	Air	OU7	Benzo(a)pyrene Equivalents	--	3E-09	--	--	3E-09	NA	--	--	--	--
			Aroclor-1248	--	1E-09	--	--	1E-09	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.06	--	0.06
			Chromium	--	- -	--	--	- -	Respiratory	--	--	--	--
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.007	--	0.007
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	4E-09	--	--	4E-09		- -	0.07	- -	0.07
		Exposure Point Total						4E-09					0.07
	Exposure Medium Total							4E-09					0.07
Medium Total								6E-07					0.3
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	2E-07	--	9E-08	--	3E-07	NA	--	--	--	--
			Aroclor-1248	2E-06	--	1E-06	--	3E-06	NA	--	--	--	--
			Aroclor-1260	3E-07	--	1E-07	--	4E-07	NA	0.4	--	0.2	0.6
			2,3,7,8-TCDD Equivalents	5E-06	--	4E-07	--	5E-06	Developmental	3	--	0.2	3
			Antimony	- -	--	- -	--	- -	Blood	0.9	--	--	0.9
			Barium	- -	--	- -	--	- -	Kidney	0.003	--	--	0.003
			Cadmium	- -	--	- -	--	- -	NA	0.010	--	0.001	0.01
			Chromium	- -	--	- -	--	- -	None Reported	0.0004	--	--	0.0004
			Cobalt	- -	--	- -	--	- -	Thyroid	0.1	--	--	0.1
			Copper	- -	--	- -	--	- -	GS	0.3	--	--	0.3
			Iron	- -	--	- -	--	- -	GS	0.3	--	--	0.3
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.01	--	--	0.01
			Mercury	- -	--	- -	--	- -	Autoimmune	0.06	--	--	0.06
			Nickel	- -	--	- -	--	- -	Body Weight	0.05	--	--	0.05
			Thallium	- -	--	- -	--	- -	NA	0.2	--	--	0.2
			Zinc	- -	--	- -	--	- -	Blood	0.02	--	--	0.02
			Chemical Total	7E-06	--	2E-06	--	9E-06		5	--	0.4	5
		Exposure Point Total						9E-06					5
	Exposure Medium Total							9E-06					5

TABLE 9.1A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Current
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	OU7	Benzo(a)pyrene Equivalents	--	2E-09	--	--	2E-09	NA	--	--	--	--
			Aroclor-1248	--	3E-08	--	--	3E-08	NA	--	--	--	--
			Aroclor-1260	--	4E-09	--	--	4E-09	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	--	7E-08	--	--	7E-08	NA	--	0.003	--	0.003
			Antimony	--	- -	--	--	- -	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.05	--	0.05
			Cadmium	--	1E-08	--	--	1E-08	NA	--	0.02	--	0.02
			Chromium	--	- -	--	--	- -	Respiratory	--	--	--	--
			Cobalt	--	2E-07	--	--	2E-07	Respiratory	--	0.3	--	0.3
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	CNS	--	2	--	2
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.03	--	0.03
			Nickel	--	2E-07	--	--	2E-07	Respiratory	--	0.5	--	0.5
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Zinc	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	5E-07	--	--	5E-07		- -	3	- -	3
		Exposure Point Total						5E-07					3
	Exposure Medium Total							5E-07					3
Medium Total								9E-06					8
Groundwater	Groundwater	OU7	Thallium	- -	--	- -	--	- -	NA	--	--	0.1	0.1
			Chemical Total	- -	--	- -	--	- -		--	--	0.1	0.1
		Exposure Point Total						- -					0.1
	Exposure Medium Total							- -					0.1
Medium Total								- -					0.1
Receptor Total							Receptor Risk Total	1E-05				Receptor HI Total	8

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Autoimmune HI	0.07
Total Blood HI	0.9
Total Body Weight HI	0.05
Total CNS HI	2
Total Developmental HI	3
Total Fetotoxicity HI	0.1
Total GS HI	0.7
Total Kidney HI	0.04
Total Respiratory HI	0.8
Total None Reported HI	0.0005
Total Thyroid HI	0.1
Total NA HI	1

TABLE 9.1.B.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Current
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Aroclor-1254	2E-08	--	7E-09	--	2E-08	Immune	0.03	--	0.01	0.04
			Chemical Total	2E-08	--	7E-09	--	2E-08		0.03	--	0.01	0.04
		Exposure Point Total						2E-08					0.04
	Exposure Medium Total							2E-08					0.04
	Air	OU7	Aroclor-1254	--	2E-10	--	--	2E-10	NA	--	--	--	--
			Chemical Total	--	2E-10	--	--	2E-10		- -	--	- -	--
		Exposure Point Total						2E-10					--
	Exposure Medium Total							2E-10					--
Medium Total								2E-08					0.04
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	5E-08	--	2E-08	--	7E-08	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.006	--	--	0.006
			Chemical Total	5E-08	--	2E-08	--	7E-08		0.006	--	--	0.006
		Exposure Point Total						7E-08					0.006
	Exposure Medium Total							7E-08					0.006
	Air	OU7	Benzo(a)pyrene Equivalents	--	4E-10	--	--	4E-10	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	CNS	--	0.8	--	0.8
			Chemical Total	--	4E-10	--	--	4E-10		- -	0.8	- -	0.8
		Exposure Point Total						4E-10					0.8
	Exposure Medium Total							4E-10					0.8
Medium Total								7E-08					0.8
	Exposure Medium Total							4E-10					0.8
Medium Total								7E-08					0.8
Receptor Total			Receptor Risk Total					9E-08	Receptor HI Total				0.8

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CNS HI	0.8
Total Immune HI	0.04

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Current
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	5E-06	--	4E-06	--	9E-06	NA	--	--	--	--
			Aroclor-1248	1E-06	--	1E-06	--	2E-06	NA	--	--	--	--
			Barium	- -	--	- -	--	- -	Kidney	0.002	--	--	0.002
			Copper	- -	--	- -	--	- -	GS	0.03	--	--	0.03
			Iron	- -	--	- -	--	- -	GS	0.05	--	--	0.05
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Mercury	- -	--	- -	--	- -	Autoimmune	0.007	--	--	0.007
			Thallium	- -	--	- -	--	- -	NA	0.05	--	--	0.05
			Chemical Total	6E-06	--	5E-06	--	1E-05		0.1	--	--	0.1
		Exposure Point Total						1E-05					0.1
	Exposure Medium Total							1E-05					0.1
	Air	OU7	Benzo(a)pyrene Equivalents	--	1E-11	--	--	1E-11	NA	--	--	--	--
			Aroclor-1248	--	6E-12	--	--	6E-12	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.00001	--	0.00001
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000015	--	0.0000015
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	2E-11	--	--	2E-11		- -	0.00002	- -	0.00002
		Exposure Point Total						2E-11					0.00002
	Exposure Medium Total							2E-11					0.00002
Medium Total								1E-05					0.1

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Autoimmune HI	0.007
Total CNS HI	0.0000015
Total Fetotoxicity HI	0.00001
Total GS HI	0.07
Total Kidney HI	0.002
Total NA HI	0.05

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Current
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	9E-07	--	5E-07	--	1E-06	NA	--	--	--	--
			Aroclor-1248	2E-07	--	1E-07	--	3E-07	NA	--	--	--	--
			Barium	- -	--	- -	--	- -	Kidney	0.0006	--	--	0.0006
			Copper	- -	--	- -	--	- -	GS	0.009	--	--	0.009
			Iron	- -	--	- -	--	- -	GS	0.02	--	--	0.02
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Mercury	- -	--	- -	--	- -	Autoimmune	0.002	--	--	0.002
			Thallium	- -	--	- -	--	- -	NA	0.02	--	--	0.02
			Chemical Total	1E-06	--	6E-07	--	2E-06		0.05	--	--	0.05
		Exposure Point Total						2E-06					0.05
	Exposure Medium Total							2E-06					0.05
	Air	OU7	Benzo(a)pyrene Equivalents	--	9E-13	--	--	9E-13	NA	--	--	--	--
			Aroclor-1248	--	4E-13	--	--	4E-13	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.000001	--	0.000001
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000002	--	0.0000002
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	1E-12	--	--	1E-12		- -	0.000002	- -	0.000002
		Exposure Point Total						1E-12					0.000002
	Exposure Medium Total							1E-12					0.000002
Medium Total								2E-06					0.05
Sediment	Sediment	OU7	Benzo(a)pyrene Equivalents	5E-08	--	2E-08	--	7E-08	NA	--	--	--	--
			TEQ PCB	1E-06	--	1E-07	--	1E-06	Developmental	0.04	--	0.005	0.05
			Total PCB Congeners	5E-09	--	3E-09	--	7E-09	NA	--	--	--	--
			Arsenic	1E-07	--	1E-08	--	1E-07	Skin, CVS	0.001	--	0.0002	0.001
			Chromium	- -	--	- -	--	- -	NA	0.000003	--	--	0.000003
			Iron	- -	--	- -	--	- -	GS	0.002	--	--	0.002
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.00009	--	--	0.00009
			Chemical Total	1E-06	--	2E-07	--	1E-06		0.05	--	0.005	0.05
		Exposure Point Total						1E-06					0.05
	Exposure Medium Total							1E-06					0.05
Medium Total								1E-06					0.05

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Autoimmune HI	0.002
Total CNS HI	0.00009
Total CVS HI	0.001
Total Fetotoxicity HI	0.000001
Total GS HI	0.03
Total Kidney HI	0.0006
Total Skin HI	0.001
Total NA HI	0.02

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Current
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	3E-06	--	3E-06	--	6E-06	NA	--	--	--	--
			Aroclor-1248	2E-07	--	3E-07	--	5E-07	NA	--	--	--	--
			Barium	- -	--	- -	--	- -	Kidney	0.0009	--	--	0.0009
			Copper	- -	--	- -	--	- -	GS	0.01	--	--	0.01
			Iron	- -	--	- -	--	- -	GS	0.03	--	--	0.03
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Mercury	- -	--	- -	--	- -	Autoimmune	0.004	--	--	0.004
			Thallium	- -	--	- -	--	- -	NA	0.03	--	--	0.03
			Chemical Total	3E-06	--	4E-06	--	7E-06		0.07	--	--	0.07
		Exposure Point Total						7E-06					0.07
	Exposure Medium Total							7E-06					0.07
	Air	OU7	Benzo(a)pyrene Equivalents	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Aroclor-1248	--	3E-13	--	--	3E-13	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.000001	--	0.000001
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000002	--	0.0000002
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	2E-12	--	--	2E-12		- -	0.000002	- -	0.000002
		Exposure Point Total						2E-12					0.000002
	Exposure Medium Total							2E-12					0.000002
Medium Total								7E-06					0.07
Sediment	Sediment	OU7	Benzo(a)pyrene Equivalents	2E-07	--	2E-07	--	3E-07	NA	--	--	--	--
			TEQ PCB	1E-06	--	3E-07	--	2E-06	Developmental	0.07	--	0.02	0.08
			Total PCB Congeners	5E-09	--	6E-09	--	1E-08	NA	--	--	--	--
			Arsenic	1E-07	--	3E-08	--	2E-07	Skin, CVS	0.002	--	0.0005	0.003
			Chromium	- -	--	- -	--	- -	NA	0.000004	--	--	0.000004
			Iron	- -	--	- -	--	- -	GS	0.003	--	--	0.003
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.0001	--	--	0.0001
			Chemical Total	2E-06	--	5E-07	--	2E-06		0.07	--	0.02	0.09
		Exposure Point Total						2E-06					0.09
	Exposure Medium Total							2E-06					0.09
Medium Total								2E-06					0.09

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Autoimmune HI	0.004
Total CNS HI	0.0001
Total CVS HI	0.003
Total Fetotoxicity HI	0.000001
Total GS HI	0.04
Total Kidney HI	0.0009
Total Skin HI	0.003
Total NA HI	0.03

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Current
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Current
Receptor Population: Recreational User
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	4E-06	--	4E-06	--	8E-06
			Aroclor-1248	4E-07	--	4E-07	--	8E-07
			Barium	- -	--	- -	--	- -
			Copper	- -	--	- -	--	- -
			Iron	- -	--	- -	--	- -
			Lead	- -	--	- -	--	- -
			Mercury	- -	--	- -	--	- -
			Thallium	- -	--	- -	--	- -
			Chemical Total	4E-06	--	4E-06	--	9E-06
		Exposure Point Total						9E-06
	Exposure Medium Total							9E-06
	Air	OU7	Benzo(a)pyrene Equivalents	--	3E-12	--	--	3E-12
			Aroclor-1248	--	6E-13	--	--	6E-13
			Barium	--	- -	--	--	- -
			Copper	--	- -	--	--	- -
			Iron	--	- -	--	--	- -
			Lead	--	- -	--	--	- -
			Mercury	--	- -	--	--	- -
			Thallium	--	- -	--	--	- -
			Chemical Total	--	3E-12	--	--	3E-12
		Exposure Point Total						3E-12
	Exposure Medium Total							3E-12
Medium Total								9E-06

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Current
Receptor Population: Recreational User
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Sediment	Sediment	OU7	Benzo(a)pyrene Equivalents	2E-07	--	2E-07	--	4E-07
			TEQ PCB	2E-06	--	4E-07	--	3E-06
			Total PCB Congeners	1E-08	--	8E-09	--	2E-08
			Arsenic	3E-07	--	5E-08	--	3E-07
			Chromium	- -	--	- -	--	- -
			Iron	- -	--	- -	--	- -
			Lead	- -	--	- -	--	- -
			Manganese	- -	--	- -	--	- -
			Chemical Total	3E-06	--	7E-07	--	4E-06
		Exposure Point Total						4E-06
	Exposure Medium Total							4E-06
Medium Total								4E-06

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Current
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	1E-05	--	6E-06	--	2E-05	NA	--	--	--	--
			Aroclor-1248	1E-06	--	8E-07	--	2E-06	NA	--	--	--	--
			Barium	- -	--	- -	--	- -	Kidney	0.002	--	--	0.002
			Copper	- -	--	- -	--	- -	GS	0.04	--	--	0.04
			Iron	- -	--	- -	--	- -	GS	0.07	--	--	0.07
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Mercury	- -	--	- -	--	- -	Autoimmune	0.010	--	--	0.010
			Thallium	- -	--	- -	--	- -	NA	0.07	--	--	0.07
			Chemical Total	1E-05	--	7E-06	--	2E-05		0.2	--	--	0.2
		Exposure Point Total						2E-05					0.2
	Exposure Medium Total							2E-05					0.2
	Air	OU7	Benzo(a)pyrene Equivalents	--	1E-10	--	--	1E-10	NA	--	--	--	--
			Aroclor-1248	--	3E-11	--	--	3E-11	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.00007	--	0.00007
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000072	--	0.0000072
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	2E-10	--	--	2E-10		- -	0.00008	- -	0.00008
		Exposure Point Total						2E-10					0.00008
	Exposure Medium Total							2E-10					0.00008
Medium Total								2E-05					0.2

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Autoimmune HI	0.01
Total CNS HI	0.000007
Total Fetotoxicity HI	0.00007
Total GS HI	0.1
Total Kidney HI	0.002
Total NA HI	0.07

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Current
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	8E-05	--	3E-05	--	1E-04	NA	--	--	--	--
			Aroclor-1248	3E-06	--	1E-06	--	5E-06	NA	--	--	--	--
			Barium	- -	--	- -	--	- -	Kidney	0.02	--	--	0.02
			Copper	- -	--	- -	--	- -	GS	0.3	--	--	0.3
			Iron	- -	--	- -	--	- -	GS	0.6	--	--	0.6
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Mercury	- -	--	- -	--	- -	Autoimmune	0.09	--	--	0.09
			Thallium	- -	--	- -	--	- -	NA	0.6	--	--	0.6
			Chemical Total	8E-05	--	3E-05	--	1E-04		2	--	--	2
		Exposure Point Total						1E-04					2
	Exposure Medium Total							1E-04					2
	Air	OU7	Benzo(a)pyrene Equivalents	--	9E-11	--	--	9E-11	NA	--	--	--	--
			Aroclor-1248	--	7E-12	--	--	7E-12	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.00007	--	0.00007
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000072	--	0.0000072
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	1E-10	--	--	1E-10		- -	0.00008	- -	0.00008
		Exposure Point Total						1E-10					0.00008
	Exposure Medium Total							1E-10					0.00008
Medium Total								1E-04					2

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Autoimmune HI	0.09
Total CNS HI	0.000007
Total Fetotoxicity HI	0.00007
Total GS HI	1
Total Kidney HI	0.02
Total NA HI	0.6

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Current
Receptor Population: Residents
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	9E-05	--	3E-05	--	1E-04
			Aroclor-1248	5E-06	--	2E-06	--	7E-06
			Barium	- -	--	- -	--	- -
			Copper	- -	--	- -	--	- -
			Iron	- -	--	- -	--	- -
			Lead	- -	--	- -	--	- -
			Mercury	- -	--	- -	--	- -
			Thallium	- -	--	- -	--	- -
			Chemical Total	9E-05	--	4E-05	--	1E-04
		Exposure Point Total						1E-04
	Exposure Medium Total							1E-04
	Air	OU7	Benzo(a)pyrene Equivalents	--	2E-10	--	--	2E-10
			Aroclor-1248	--	4E-11	--	--	4E-11
			Barium	--	- -	--	--	- -
			Copper	--	- -	--	--	- -
			Iron	--	- -	--	--	- -
			Lead	--	- -	--	--	- -
			Mercury	--	- -	--	--	- -
			Thallium	--	- -	--	--	- -
			Chemical Total	--	3E-10	--	--	3E-10
		Exposure Point Total						3E-10
	Exposure Medium Total							3E-10
Medium Total								1E-04

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Appendix D.7.1

Additional Receptors Exposed to Subsurface Soil

LIST OF TABLES
ALTERNATE RAGS PART D TABLE 9
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

REASONABLE MAXIMUM EXPOSURES

CENTRAL TENDENCY EXPOSURES

ALTERNATE TABLE 9.2A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	5E-06	--	4E-06	--	9E-06	NA	--	--	--	--
			Aroclor-1248	1E-06	--	1E-06	--	2E-06	NA	--	--	--	--
			Barium	- -	--	- -	--	- -	Kidney	0.002	--	--	0.002
			Copper	- -	--	- -	--	- -	GS	0.03	--	--	0.03
			Iron	- -	--	- -	--	- -	GS	0.05	--	--	0.05
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Mercury	- -	--	- -	--	- -	Autoimmune	0.007	--	--	0.007
			Thallium	- -	--	- -	--	- -	NA	0.05	--	--	0.05
			Chemical Total	6E-06	--	5E-06	--	1E-05		0.1	--	--	0.1
		Exposure Point Total						1E-05					0.1
	Exposure Medium Total							1E-05					0.1
	Air	OU7	Benzo(a)pyrene Equivalents	--	1E-11	--	--	1E-11	NA	--	--	--	--
			Aroclor-1248	--	6E-12	--	--	6E-12	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.00001	--	0.00001
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000015	--	0.0000015
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	2E-11	--	--	2E-11		- -	0.00002	- -	0.00002
		Exposure Point Total						2E-11					0.00002
	Exposure Medium Total							2E-11					0.00002
Medium Total								1E-05					0.1
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	3E-06	--	2E-06	--	5E-06	NA	--	--	--	--
			Aroclor-1248	3E-05	--	3E-05	--	6E-05	NA	--	--	--	--
			Aroclor-1260	3E-06	--	3E-06	--	6E-06	NA	0.2	--	0.2	0.4
			2,3,7,8-TCDD Equivalents	6E-05	--	1E-05	--	7E-05	Developmental	1	--	0.3	2
			Antimony	- -	--	- -	--	- -	Blood	0.4	--	--	0.4
			Barium	- -	--	- -	--	- -	Kidney	0.001	--	--	0.001
			Cadmium	- -	--	- -	--	- -	NA	0.005	--	0.001	0.006
			Cobalt	- -	--	- -	--	- -	Thyroid	0.05	--	--	0.05
			Copper	- -	--	- -	--	- -	GS	0.1	--	--	0.1
			Iron	- -	--	- -	--	- -	GS	0.1	--	--	0.1
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.007	--	--	0.007
			Mercury	- -	--	- -	--	- -	Autoimmune	0.03	--	--	0.03
			Nickel	- -	--	- -	--	- -	Body Weight	0.02	--	--	0.02
			Thallium	- -	--	- -	--	- -	NA	0.09	--	--	0.09
			Zinc	- -	--	- -	--	- -	Blood	0.008	--	--	0.008
			Chemical Total	9E-05	--	4E-05	--	1E-04		2	--	0.5	3
		Exposure Point Total						1E-04					3
	Exposure Medium Total							1E-04					3

ALTERNATE TABLE 9.2A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	OU7	Benzo(a)pyrene Equivalents	--	9E-12	--	--	9E-12	NA	--	--	--	--
			Aroclor-1248	--	2E-10	--	--	2E-10	NA	--	--	--	--
			Aroclor-1260	--	2E-11	--	--	2E-11	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	--	4E-10	--	--	4E-10	NA	--	0.0000007	--	0.0000007
			Antimony	--	- -	--	--	- -	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.00001	--	0.00001
			Cadmium	--	7E-11	--	--	7E-11	NA	--	0.000005	--	0.000005
			Cobalt	--	1E-09	--	--	1E-09	Respiratory	--	0.00006	--	0.00006
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	CNS	--	0.0004	--	0.0004
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000065	--	0.0000065
			Nickel	--	9E-10	--	--	9E-10	Respiratory	--	0.0001	--	0.0001
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Zinc	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	3E-09	--	--	3E-09		- -	0.0006	- -	0.0006
		Exposure Point Total						3E-09					0.0006
	Exposure Medium Total							3E-09					0.0006
Medium Total								1E-04					3
Receptor Total							Receptor Risk Total	1E-04				Receptor HI Total	3

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Autoimmune HI	0.04
Total Blood HI	0.5
Total Body Weight HI	0.02
Total CNS HI	0.007
Total Fetotoxicity HI	0.00003
Total GS HI	0.4
Total Kidney HI	0.003
Total Respiratory HI	0.0002
Total None Reported HI	0.0000
Total Thyroid HI	0.05
Total NA HI	0.6
Total Developmental	2

ALTERNATE TABLE 9.2B.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Aroclor-1254	2E-07	--	2E-07	--	4E-07	Immune	0.01	--	0.01	0.03
			Chemical Total	2E-07	--	2E-07	--	4E-07		0.01	--	0.01	0.03
		Exposure Point Total						4E-07					0.03
	Exposure Medium Total							4E-07					0.03
	Air	OU7	Aroclor-1254	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Chemical Total	--	1E-12	--	--	1E-12		- -	--	- -	--
		Exposure Point Total						1E-12					--
	Exposure Medium Total							1E-12					--
Medium Total								4E-07					0.03
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	6E-07	--	5E-07	--	1E-06	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.003	--	--	0.003
			Chemical Total	6E-07	--	5E-07	--	1E-06		0.003	--	--	0.003
		Exposure Point Total						1E-06					0.003
	Exposure Medium Total							1E-06					0.003
	Air	OU7	Benzo(a)pyrene Equivalents	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	CNS	--	0.0002	--	0.0002
			Chemical Total	--	2E-12	--	--	2E-12		- -	0.0002	- -	0.0002
		Exposure Point Total						2E-12					0.0002
	Exposure Medium Total							2E-12					0.0002
Medium Total								1E-06					0.003
Receptor Total							Receptor Risk Total	2E-06				Receptor HI Total	0.03

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CNS HI 0.0002

ALTERNATE TABLE 9.3A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	9E-07	--	5E-07	--	1E-06	NA	--	--	--	--
			Aroclor-1248	2E-07	--	1E-07	--	3E-07	NA	--	--	--	--
			Barium	- -	--	- -	--	- -	Kidney	0.0006	--	--	0.0006
			Copper	- -	--	- -	--	- -	GS	0.009	--	--	0.009
			Iron	- -	--	- -	--	- -	GS	0.02	--	--	0.02
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Mercury	- -	--	- -	--	- -	Autoimmune	0.002	--	--	0.002
			Thallium	- -	--	- -	--	- -	NA	0.02	--	--	0.02
			Chemical Total	1E-06	--	6E-07	--	2E-06		0.05	--	--	0.05
		Exposure Point Total						2E-06					0.05
	Exposure Medium Total							2E-06					0.05
	Air	OU7	Benzo(a)pyrene Equivalents	--	9E-13	--	--	9E-13	NA	--	--	--	--
			Aroclor-1248	--	4E-13	--	--	4E-13	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.000001	--	0.000001
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000002	--	0.0000002
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	1E-12	--	--	1E-12		- -	0.000002	- -	0.000002
		Exposure Point Total						1E-12					0.000002
	Exposure Medium Total							1E-12					0.000002
Medium Total								2E-06					0.05
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	6E-07	--	3E-07	--	9E-07	NA	--	--	--	--
			Aroclor-1248	6E-06	--	3E-06	--	9E-06	NA	--	--	--	--
			Aroclor-1260	6E-07	--	4E-07	--	1E-06	NA	0.08	--	0.05	0.1
			2,3,7,8-TCDD Equivalents	1E-05	--	1E-06	--	1E-05	Developmental	0.5	--	0.05	0.5
			Antimony	- -	--	- -	--	- -	Blood	0.2	--	--	0.2
			Barium	- -	--	- -	--	- -	Kidney	0.0005	--	--	0.0005
			Cadmium	- -	--	- -	--	- -	NA	0.002	--	0.0003	0.002
			Cobalt	- -	--	- -	--	- -	Thyroid	0.02	--	--	0.02
			Copper	- -	--	- -	--	- -	GS	0.05	--	--	0.05
			Iron	- -	--	- -	--	- -	GS	0.05	--	--	0.05
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.002	--	--	0.002
			Mercury	- -	--	- -	--	- -	Autoimmune	0.01	--	--	0.01
			Nickel	- -	--	- -	--	- -	Body Weight	0.009	--	--	0.009
			Thallium	- -	--	- -	--	- -	NA	0.03	--	--	0.03
			Zinc	- -	--	- -	--	- -	Blood	0.003	--	--	0.003
			Chemical Total	2E-05	--	5E-06	--	2E-05		0.9	--	0.1	1.0
		Exposure Point Total						2E-05					1.0
	Exposure Medium Total							2E-05					1.0

ALTERNATE TABLE 9.3A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	OU7	Benzo(a)pyrene Equivalents	--	5E-13	--	--	5E-13	NA	--	--	--	--
			Aroclor-1248	--	1E-11	--	--	1E-11	NA	--	--	--	--
			Aroclor-1260	--	1E-12	--	--	1E-12	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	--	2E-11	--	--	2E-11	NA	--	0.00000007	--	0.00000007
			Antimony	--	- -	--	--	- -	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.000001	--	0.000001
			Cadmium	--	4E-12	--	--	4E-12	NA	--	0.0000006	--	0.0000006
			Cobalt	--	6E-11	--	--	6E-11	Respiratory	--	0.000006	--	0.000006
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	CNS	--	0.00004	--	0.00004
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000007	--	0.0000007
			Nickel	--	6E-11	--	--	6E-11	Respiratory	--	0.00001	--	0.00001
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Zinc	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	2E-10	--	--	2E-10		- -	0.00006	- -	0.00006
		Exposure Point Total						2E-10					0.00006
	Exposure Medium Total							2E-10					0.00006
Medium Total								2E-05					1.0
Sediment	Sediment	OU7	Benzo(a)pyrene Equivalents	5E-08	--	2E-08	--	7E-08	NA	--	--	--	--
			TEQ PCB	1E-06	--	1E-07	--	1E-06	Developmental	0.04	--	0.005	0.05
			Total PCB Congeners	5E-09	--	3E-09	--	7E-09	NA	--	--	--	--
			Arsenic	1E-07	--	1E-08	--	1E-07	Skin, CVS	0.001	--	0.0002	0.001
			Chromium	- -	--	- -	--	- -	None Reported	0.000003	--	--	0.000003
			Iron	- -	--	- -	--	- -	GS	0.002	--	--	0.002
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.00009	--	--	0.00009
			Chemical Total	1E-06	--	2E-07	--	1E-06		0.05	--	0.005	0.05
		Exposure Point Total						1E-06					0.05
	Exposure Medium Total							1E-06					0.05
Medium Total								1E-06					0.05
Receptor Total							Receptor Risk Total	3E-05				Receptor HI Total	1

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Autoimmune HI	0.01
Total Blood HI	0.2
Total Body Weight HI	0.009
Total CNS HI	0.003
Total CVS HI	0.001
Total Fetotoxicity HI	0.000003
Total GS HI	0.1
Total Kidney HI	0.001
Total Respiratory HI	0.00002
Total None Reported HI	0.000003
Total Skin HI	0.001
Total Thyroid HI	0.02
Total NA HI	0.2
Total Developmental HI	0.6

ALTERNATE TABLE 9.3B.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Aroclor-1254	4E-08	--	2E-08	--	6E-08	Immune	0.005	--	0.003	0.008
			Chemical Total	4E-08	--	2E-08	--	6E-08		0.005	--	0.003	0.008
		Exposure Point Total						6E-08					0.008
	Exposure Medium Total							6E-08					0.008
	Air	OU7	Aroclor-1254	--	7E-14	--	--	7E-14	NA	--	--	--	--
			Chemical Total	--	7E-14	--	--	7E-14		- -	--	- -	--
		Exposure Point Total						7E-14					--
	Exposure Medium Total							7E-14					--
Medium Total								6E-08					0.008
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	1E-07	--	7E-08	--	2E-07	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.001	--	--	0.001
			Chemical Total	1E-07	--	7E-08	--	2E-07		0.001	--	--	0.001
		Exposure Point Total						2E-07					0.001
	Exposure Medium Total							2E-07					0.001
	Air	OU7	Benzo(a)pyrene Equivalents	--	1E-13	--	--	1E-13	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	CNS	--	0.00002	--	0.00002
			Chemical Total	--	1E-13	--	--	1E-13		- -	0.00002	- -	0.00002
		Exposure Point Total						1E-13					0.00002
	Exposure Medium Total							1E-13					0.00002
Medium Total								2E-07					0.001
Sediment	Sediment	OU7	Benzo(a)pyrene Equivalents	5E-08	--	2E-08	--	7E-08	NA	--	--	--	--
			TEQ PCB	1E-06	--	1E-07	--	1E-06	Developmental	0.04	--	0.005	0.05
			Total PCB Congeners	5E-09	--	3E-09	--	7E-09	NA	--	--	--	--
			Arsenic	1E-07	--	1E-08	--	1E-07	Skin, CVS	0.001	--	0.0002	0.001
			Chromium	- -	--	- -	--	- -	None Reported	0.000003	--	--	0.000003
			Iron	- -	--	- -	--	- -	GS	0.002	--	--	0.002
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.00009	--	--	0.00009
			Chemical Total	1E-06	--	2E-07	--	1E-06		0.05	--	0.005	0.05
		Exposure Point Total						1E-06					0.05
	Exposure Medium Total							1E-06					0.05
Medium Total								1E-06					0.05
Receptor Total							Receptor Risk Total	2E-06				Receptor HI Total	0.06

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

ALTERNATE TABLE 9.4A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil (Entire Site)	Surface Soil	OU7	Benzo(a)pyrene Equivalents	3E-06	--	3E-06	--	6E-06	NA	--	--	--	--
			Aroclor-1248	2E-07	--	3E-07	--	5E-07	NA	--	--	--	--
			Barium	- -	--	- -	--	- -	Kidney	0.0009	--	--	0.0009
			Copper	- -	--	- -	--	- -	GS	0.01	--	--	0.01
			Iron	- -	--	- -	--	- -	GS	0.03	--	--	0.03
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Mercury	- -	--	- -	--	- -	Autoimmune	0.004	--	--	0.004
			Thallium	- -	--	- -	--	- -	NA	0.03	--	--	0.03
			Chemical Total	3E-06	--	4E-06	--	7E-06		0.07	--	--	0.07
		Exposure Point Total						7E-06					0.07
	Exposure Medium Total							7E-06					0.07
	Air	OU7	Benzo(a)pyrene Equivalents	--	2E-12	--	--	2E-12	NA	--	--	--	--
			Aroclor-1248	--	3E-13	--	--	3E-13	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.000001	--	0.000001
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000002	--	0.0000002
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	2E-12	--	--	2E-12		- -	0.000002	- -	0.000002
		Exposure Point Total						2E-12					0.000002
	Exposure Medium Total							2E-12					0.000002
Medium Total								7E-06					0.07
Subsurface Soil (Entire Site)	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	2E-06	--	2E-06	--	4E-06	NA	--	--	--	--
			Aroclor-1248	6E-06	--	7E-06	--	1E-05	NA	--	--	--	--
			Aroclor-1260	7E-07	--	8E-07	--	2E-06	NA	0.1	--	0.1	0.3
			2,3,7,8-TCDD Equivalents	1E-05	--	3E-06	--	2E-05	Developmental	0.7	--	0.2	0.9
			Antimony	- -	--	- -	--	- -	Blood	0.2	--	--	0.2
			Barium	- -	--	- -	--	- -	Kidney	0.0008	--	--	0.0008
			Cadmium	- -	--	- -	--	- -	NA	0.003	--	0.0009	0.004
			Cobalt	- -	--	- -	--	- -	Thyroid	0.03	--	--	0.03
			Copper	- -	--	- -	--	- -	GS	0.08	--	--	0.08
			Iron	- -	--	- -	--	- -	GS	0.08	--	--	0.08
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.004	--	--	0.004
			Mercury	- -	--	- -	--	- -	Autoimmune	0.02	--	--	0.02
			Nickel	- -	--	- -	--	- -	Body Weight	0.01	--	--	0.01
			Thallium	- -	--	- -	--	- -	NA	0.05	--	--	0.05
			Zinc	- -	--	- -	--	- -	Blood	0.005	--	--	0.005
			Chemical Total	2E-05	--	1E-05	--	4E-05		1	--	0.3	2
		Exposure Point Total						4E-05					2
	Exposure Medium Total							4E-05					2

ALTERNATE TABLE 9.4A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil (Entire Site)	Air	OU7	Benzo(a)pyrene Equivalents	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Aroclor-1248	--	7E-12	--	--	7E-12	NA	--	--	--	--
			Aroclor-1260	--	8E-13	--	--	8E-13	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	--	2E-11	--	--	2E-11	NA	--	0.00000007	--	0.00000007
			Antimony	--	- -	--	--	- -	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.000001	--	0.000001
			Cadmium	--	3E-12	--	--	3E-12	NA	--	0.0000006	--	0.0000006
			Cobalt	--	4E-11	--	--	4E-11	Respiratory	--	0.000006	--	0.000006
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	CNS	--	0.00004	--	0.00004
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000007	--	0.0000007
			Nickel	--	4E-11	--	--	4E-11	Respiratory	--	0.00001	--	0.00001
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Zinc	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	1E-10	--	--	1E-10		- -	0.00006	- -	0.00006
		Exposure Point Total						1E-10					0.00006
	Exposure Medium Total							1E-10					0.00006
Medium Total								4E-05					2
Sediment	Sediment	OU7	Benzo(a)pyrene Equivalents	2E-07	--	2E-07	--	3E-07	NA	--	--	--	--
			TEQ PCB	1E-06	--	3E-07	--	2E-06	Developmental	0.07	--	0.02	0.08
			Total PCB Congeners	5E-09	--	6E-09	--	1E-08	NA	--	--	--	--
			Arsenic	1E-07	--	3E-08	--	2E-07	Skin, CVS	0.002	--	0.0005	0.003
			Chromium	- -	--	- -	--	- -	None Reported	0.000004	--	--	0.000004
			Iron	- -	--	- -	--	- -	GS	0.003	--	--	0.003
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.0001	--	--	0.0001
			Chemical Total	2E-06	--	5E-07	--	2E-06		0.07	--	0.02	0.09
		Exposure Point Total						2E-06					0.09
	Exposure Medium Total							2E-06					0.09
Medium Total								2E-06					0.09

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Autoimmune HI	0.02
Total Blood HI	0.3
Total Body Weight HI	0.01
Total CNS HI	0.004
Total CVS HI	0.003
Total Fetotoxicity HI	0.000003
Total GS HI	0.2
Total Kidney HI	0.002
Total Respiratory HI	0.00002
Total None Reported HI	0.000004
Total Skin HI	0.003
Total Thyroid HI	0.03
Total NA HI	0.08
Total Developmental HI	1.0

ALTERNATE TABLE 9.4B.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Aroclor-1254	4E-08	--	5E-08	--	9E-08	Immune	0.008	--	0.009	0.02
			Chemical Total	4E-08	--	5E-08	--	9E-08		0.008	--	0.009	0.02
		Exposure Point Total						9E-08					0.02
	Exposure Medium Total							9E-08					0.02
	Air	OU7	Aroclor-1254	--	5E-14	--	--	5E-14	NA	--	--	--	--
			Chemical Total	--	5E-14	--	--	5E-14		- -	--	- -	--
		Exposure Point Total						5E-14					--
	Exposure Medium Total							5E-14					--
Medium Total								9E-08					0.02
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	4E-07	--	5E-07	--	9E-07	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.002	--	--	0.002
			Chemical Total	4E-07	--	5E-07	--	9E-07		0.002	--	--	0.002
		Exposure Point Total						9E-07					0.002
	Exposure Medium Total							9E-07					0.002
	Air	OU7	Benzo(a)pyrene Equivalents	--	3E-13	--	--	3E-13	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	CNS	--	0.00002	--	0.00002
			Chemical Total	--	3E-13	--	--	3E-13		- -	0.00002	- -	0.00002
		Exposure Point Total						3E-13					0.00002
	Exposure Medium Total							3E-13					0.00002
Medium Total								9E-07					0.002
Sediment	Sediment	OU7	Benzo(a)pyrene Equivalents	2E-07	--	2E-07	--	3E-07	NA	--	--	--	--
			TEQ PCB	1E-06	--	3E-07	--	2E-06	Developmental	0.07	--	0.02	0.08
			Total PCB Congeners	5E-09	--	6E-09	--	1E-08	NA	--	--	--	--
			Arsenic	1E-07	--	3E-08	--	2E-07	Skin, CVS	0.002	--	0.0005	0.003
			Chromium	- -	--	- -	--	- -	None Reported	0.000004	--	--	0.000004
			Iron	- -	--	- -	--	- -	GS	0.003	--	--	0.003
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.0001	--	--	0.0001
			Chemical Total	2E-06	--	5E-07	--	2E-06		0.07	--	0.02	0.09
		Exposure Point Total						2E-06					0.09
	Exposure Medium Total							2E-06					0.09
Medium Total								2E-06					0.09

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

ALTERNATE TABLE 9.5A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	4E-06	--	4E-06	--	8E-06
			Aroclor-1248	4E-07	--	4E-07	--	8E-07
			Barium	- -	--	- -	--	- -
			Copper	- -	--	- -	--	- -
			Iron	- -	--	- -	--	- -
			Lead	- -	--	- -	--	- -
			Mercury	- -	--	- -	--	- -
			Thallium	- -	--	- -	--	- -
			Chemical Total	4E-06	--	4E-06	--	9E-06
		Exposure Point Total						9E-06
	Exposure Medium Total							9E-06
	Air	OU7	Benzo(a)pyrene Equivalents	--	3E-12	--	--	3E-12
			Aroclor-1248	--	6E-13	--	--	6E-13
			Barium	--	- -	--	--	- -
			Copper	--	- -	--	--	- -
			Iron	--	- -	--	--	- -
			Lead	--	- -	--	--	- -
			Mercury	--	- -	--	--	- -
			Thallium	--	- -	--	--	- -
			Chemical Total	--	3E-12	--	--	3E-12
		Exposure Point Total						3E-12
	Exposure Medium Total							3E-12
Medium Total								9E-06

ALTERNATE TABLE 9.5A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	2E-06	--	2E-06	--	5E-06
			Aroclor-1248	1E-05	--	1E-05	--	2E-05
			Aroclor-1260	1E-06	--	1E-06	--	3E-06
			2,3,7,8-TCDD Equivalents	3E-05	--	5E-06	--	3E-05
			Antimony	- -	--	- -	--	- -
			Barium	- -	--	- -	--	- -
			Cadmium	- -	--	- -	--	- -
			Cobalt	- -	--	- -	--	- -
			Copper	- -	--	- -	--	- -
			Iron	- -	--	- -	--	- -
			Lead	- -	--	- -	--	- -
			Manganese	- -	--	- -	--	- -
			Mercury	- -	--	- -	--	- -
			Nickel	- -	--	- -	--	- -
			Thallium	- -	--	- -	--	- -
			Zinc	- -	--	- -	--	- -
			Chemical Total	4E-05	--	2E-05	--	6E-05
		Exposure Point Total						6E-05
	Exposure Medium Total							6E-05

ALTERNATE TABLE 9.5A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Subsurface Soil	Air	OU7	Benzo(a)pyrene Equivalents	--	2E-12	--	--	2E-12
			Aroclor-1248	--	2E-11	--	--	2E-11
			Aroclor-1260	--	2E-12	--	--	2E-12
			2,3,7,8-TCDD Equivalents	--	4E-11	--	--	4E-11
			Antimony	--	- -	--	--	- -
			Barium	--	- -	--	--	- -
			Cadmium	--	7E-12	--	--	7E-12
			Cobalt	--	1E-10	--	--	1E-10
			Copper	--	- -	--	--	- -
			Iron	--	- -	--	--	- -
			Lead	--	- -	--	--	- -
			Manganese	--	- -	--	--	- -
			Mercury	--	- -	--	--	- -
			Nickel	--	9E-11	--	--	9E-11
			Thallium	--	- -	--	--	- -
			Zinc	--	- -	--	--	- -
			Chemical Total	--	3E-10	--	--	3E-10
		Exposure Point Total						3E-10
	Exposure Medium Total							3E-10
Medium Total								6E-05

ALTERNATE TABLE 9.5A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Sediment	Sediment	OU7	Benzo(a)pyrene Equivalents	2E-07	--	2E-07	--	4E-07
			TEQ PCB	2E-06	--	4E-07	--	3E-06
			Total PCB Congeners	1E-08	--	8E-09	--	2E-08
			Arsenic	3E-07	--	5E-08	--	3E-07
			Chromium	- -	--	- -	--	- -
			Iron	- -	--	- -	--	- -
			Lead	- -	--	- -	--	- -
			Manganese	- -	--	- -	--	- -
			Chemical Total	3E-06	--	7E-07	--	4E-06
		Exposure Point Total						4E-06
	Exposure Medium Total							4E-06
Medium Total								4E-06
Receptor Total							Receptor Risk Total	7E-05

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

ALTERNATE TABLE 9.5B.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Aroclor-1254	8E-08	--	7E-08	--	2E-07
			Chemical Total	8E-08	--	7E-08	--	2E-07
		Exposure Point Total						2E-07
	Exposure Medium Total							2E-07
	Air	OU7	Aroclor-1254	--	1E-13	--	--	1E-13
			Chemical Total	--	1E-13	--	--	1E-13
		Exposure Point Total						1E-13
	Exposure Medium Total							1E-13
Medium Total								2E-07
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	6E-07	--	5E-07	--	1E-06
			Manganese	- -	--	- -	--	- -
			Chemical Total	6E-07	--	5E-07	--	1E-06
		Exposure Point Total						1E-06
	Exposure Medium Total							1E-06
Subsurface Soil	Air	OU7	Benzo(a)pyrene Equivalents	--	4E-13	--	--	4E-13
			Manganese	--	- -	--	--	- -
			Chemical Total	--	4E-13	--	--	4E-13
		Exposure Point Total						4E-13
	Exposure Medium Total							4E-13
Medium Total								1E-06

ALTERNATE TABLE 9.5B.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Sediment	Sediment	OU7	Benzo(a)pyrene Equivalents	2E-07	--	2E-07	--	4E-07
			TEQ PCB	2E-06	--	4E-07	--	3E-06
			Total PCB Congeners	1E-08	--	8E-09	--	2E-08
			Arsenic	3E-07	--	5E-08	--	3E-07
			Chromium	- -	--	- -	--	- -
			Iron	- -	--	- -	--	- -
			Lead	- -	--	- -	--	- -
			Manganese	- -	--	- -	--	- -
			Chemical Total	3E-06	--	7E-07	--	4E-06
		Exposure Point Total						4E-06
	Exposure Medium Total							4E-06
Medium Total								4E-06
Receptor Total							Receptor Risk Total	5E-06

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	1E-05	--	6E-06	--	2E-05	NA	--	--	--	--
			Aroclor-1248	1E-06	--	8E-07	--	2E-06	NA	--	--	--	--
			Barium	- -	--	- -	--	- -	Kidney	0.002	--	--	0.002
			Copper	- -	--	- -	--	- -	GS	0.04	--	--	0.04
			Iron	- -	--	- -	--	- -	GS	0.07	--	--	0.07
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Mercury	- -	--	- -	--	- -	Autoimmune	0.010	--	--	0.010
			Thallium	- -	--	- -	--	- -	NA	0.07	--	--	0.07
			Chemical Total	1E-05	--	7E-06	--	2E-05		0.2	--	--	0.2
		Exposure Point Total						2E-05					0.2
	Exposure Medium Total							2E-05					0.2
	Air	OU7	Benzo(a)pyrene Equivalents	--	1E-10	--	--	1E-10	NA	--	--	--	--
			Aroclor-1248	--	3E-11	--	--	3E-11	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.00007	--	0.00007
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000072	--	0.0000072
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	2E-10	--	--	2E-10		- -	0.00008	- -	0.00008
		Exposure Point Total						2E-10					0.00008
	Exposure Medium Total							2E-10					0.00008
Medium Total								2E-05					0.2
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	7E-06	--	4E-06	--	1E-05	NA	--	--	--	--
			Aroclor-1248	4E-05	--	2E-05	--	6E-05	NA	--	--	--	--
			Aroclor-1260	4E-06	--	2E-06	--	7E-06	NA	0.3	--	0.2	0.5
			2,3,7,8-TCDD Equivalents	8E-05	--	1E-05	--	9E-05	Developmental	2	--	0.2	2
			Antimony	- -	--	- -	--	- -	Blood	0.6	--	--	0.6
			Barium	- -	--	- -	--	- -	Kidney	0.002	--	--	0.002
			Cadmium	- -	--	- -	--	- -	NA	0.007	--	0.001	0.008
			Cobalt	- -	--	- -	--	- -	Thyroid	0.07	--	--	0.07
			Copper	- -	--	- -	--	- -	GS	0.2	--	--	0.2
			Iron	- -	--	- -	--	- -	GS	0.2	--	--	0.2
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.009	--	--	0.009
			Mercury	- -	--	- -	--	- -	Autoimmune	0.04	--	--	0.04
			Nickel	- -	--	- -	--	- -	Body Weight	0.03	--	--	0.03
			Thallium	- -	--	- -	--	- -	NA	0.1	--	--	0.1
			Zinc	- -	--	- -	--	- -	Blood	0.01	--	--	0.01
			Chemical Total	1E-04	--	4E-05	--	2E-04		3	--	0.4	4
		Exposure Point Total						2E-04					4
	Exposure Medium Total							2E-04					4

TABLE 9.6A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	OU7	Benzo(a)pyrene Equivalents	--	8E-11	--	--	8E-11	NA	--	--	--	--
			Aroclor-1248	--	8E-10	--	--	8E-10	NA	--	--	--	--
			Aroclor-1260	--	9E-11	--	--	9E-11	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	--	2E-09	--	--	2E-09	NA	--	0.000003	--	0.000003
			Antimony	--	- -	--	--	- -	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.00006	--	0.00006
			Cadmium	--	3E-10	--	--	3E-10	NA	--	0.00003	--	0.00003
			Cobalt	--	5E-09	--	--	5E-09	Respiratory	--	0.0003	--	0.0003
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	CNS	--	0.002	--	0.002
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.000032	--	0.000032
			Nickel	--	4E-09	--	--	4E-09	Respiratory	--	0.0006	--	0.0006
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Zinc	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	1E-08	--	--	1E-08		- -	0.003	- -	0.003
		Exposure Point Total						1E-08					0.003
	Exposure Medium Total							1E-08					0.003
Medium Total								2E-04					4
Receptor Total							Receptor Risk Total	2E-04				Receptor HI Total	4

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Autoimmune HI	0.05
Total Blood HI	0.6
Total Body Weight HI	0.03
Total CNS HI	0.01
Total Fetotoxicity HI	0.0001
Total GS HI	0.5
Total Kidney HI	0.004
Total Respiratory HI	0.0008
Total None Reported HI	0.0000
Total Thyroid HI	0.07
Total NA HI	0.7
Total Developmental HI	2

TABLE 9.6B.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Aroclor-1254	3E-07	--	1E-07	--	4E-07	Immune	0.02	--	0.01	0.03
			Chemical Total	3E-07	--	1E-07	--	4E-07		0.02	--	0.01	0.03
		Exposure Point Total						4E-07					0.03
	Exposure Medium Total							4E-07					0.03
	Air	OU7	Aroclor-1254	--	6E-12	--	--	6E-12	NA	--	--	--	--
			Chemical Total	--	6E-12	--	--	6E-12		- -	--	- -	--
		Exposure Point Total						6E-12					--
	Exposure Medium Total							6E-12					--
Medium Total								4E-07					0.03
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	2E-06	--	8E-07	--	2E-06	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.004	--	--	0.004
			Chemical Total	2E-06	--	8E-07	--	2E-06		0.004	--	--	0.004
		Exposure Point Total						2E-06					0.004
	Exposure Medium Total							2E-06					0.004
	Air	OU7	Benzo(a)pyrene Equivalents	--	2E-11	--	--	2E-11	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	CNS	--	0.0008	--	0.0008
			Chemical Total	--	2E-11	--	--	2E-11		- -	0.0008	- -	0.0008
		Exposure Point Total						2E-11					0.0008
	Exposure Medium Total							2E-11					0.0008
Medium Total								2E-06					0.005
Exposure Medium Total								2E-11					0.0008
Medium Total								2E-06					0.005
Receptor Total			Receptor Risk Total					3E-06	Receptor HI Total				0.03

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

ALTERNATE TABLE 9.7A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	8E-05	--	3E-05	--	1E-04	NA	--	--	--	--
			Aroclor-1248	3E-06	--	1E-06	--	5E-06	NA	--	--	--	--
			Barium	- -	--	- -	--	- -	Kidney	0.02	--	--	0.02
			Copper	- -	--	- -	--	- -	GS	0.3	--	--	0.3
			Iron	- -	--	- -	--	- -	GS	0.6	--	--	0.6
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Mercury	- -	--	- -	--	- -	Autoimmune	0.09	--	--	0.09
			Thallium	- -	--	- -	--	- -	NA	0.6	--	--	0.6
			Chemical Total	8E-05	--	3E-05	--	1E-04		2	--	--	2
		Exposure Point Total						1E-04					2
	Exposure Medium Total							1E-04					2
	Air	OU7	Benzo(a)pyrene Equivalents	--	9E-11	--	--	9E-11	NA	--	--	--	--
			Aroclor-1248	--	7E-12	--	--	7E-12	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.00007	--	0.00007
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.0000072	--	0.0000072
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	1E-10	--	--	1E-10		- -	0.00008	- -	0.00008
		Exposure Point Total						1E-10					0.00008
	Exposure Medium Total							1E-10					0.00008
Medium Total								1E-04					2
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	5E-05	--	2E-05	--	6E-05	NA	--	--	--	--
			Aroclor-1248	9E-05	--	4E-05	--	1E-04	NA	--	--	--	--
			Aroclor-1260	1E-05	--	4E-06	--	1E-05	NA	3	--	1	4
			2,3,7,8-TCDD Equivalents	2E-04	--	2E-05	--	2E-04	Developmental	17	--	1	18
			Antimony	- -	--	- -	--	- -	Blood	6	--	--	6
			Barium	- -	--	- -	--	- -	Kidney	0.02	--	--	0.02
			Cadmium	- -	--	- -	--	- -	NA	0.07	--	0.007	0.07
			Cobalt	- -	--	- -	--	- -	Thyroid	0.7	--	--	0.7
			Copper	- -	--	- -	--	- -	GS	2	--	--	2
			Iron	- -	--	- -	--	- -	GS	2	--	--	2
			Lead	- -	--	- -	--	- -	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.09	--	--	0.09
			Mercury	- -	--	- -	--	- -	Autoimmune	0.4	--	--	0.4
			Nickel	- -	--	- -	--	- -	Body Weight	0.3	--	--	0.3
			Thallium	- -	--	- -	--	- -	NA	1	--	--	1
			Zinc	- -	--	- -	--	- -	Blood	0.1	--	--	0.1
			Chemical Total	3E-04	--	7E-05	--	4E-04		32	--	3	34
		Exposure Point Total						4E-04					34
	Exposure Medium Total							4E-04					34

ALTERNATE TABLE 9.7A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Air	OU7	Benzo(a)pyrene Equivalents	--	6E-11	--	--	6E-11	NA	--	--	--	--
			Aroclor-1248	--	2E-10	--	--	2E-10	NA	--	--	--	--
			Aroclor-1260	--	2E-11	--	--	2E-11	NA	--	--	--	--
			2,3,7,8-TCDD Equivalents	--	4E-10	--	--	4E-10	NA	--	0.000003	--	0.000003
			Antimony	--	- -	--	--	- -	NA	--	--	--	--
			Barium	--	- -	--	--	- -	Fetotoxicity	--	0.00006	--	0.00006
			Cadmium	--	8E-11	--	--	8E-11	NA	--	0.00003	--	0.00003
			Cobalt	--	1E-09	--	--	1E-09	Respiratory	--	0.0003	--	0.0003
			Copper	--	- -	--	--	- -	NA	--	--	--	--
			Iron	--	- -	--	--	- -	NA	--	--	--	--
			Lead	--	- -	--	--	- -	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	CNS	--	0.002	--	0.002
			Mercury	--	- -	--	--	- -	CNS, Kidney	--	0.000032	--	0.000032
			Nickel	--	1E-09	--	--	1E-09	Respiratory	--	0.0006	--	0.0006
			Thallium	--	- -	--	--	- -	NA	--	--	--	--
			Zinc	--	- -	--	--	- -	NA	--	--	--	--
			Chemical Total	--	3E-09	--	--	3E-09		- -	0.003	- -	0.003
		Exposure Point Total						3E-09					0.003
	Exposure Medium Total							3E-09					0.003
Medium Total								4E-04					34
Receptor Total							Receptor Risk Total	5E-04				Receptor HI Total	36

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Autoimmune HI	0.5
Total Blood HI	6
Total Body Weight HI	0.3
Total CNS HI	0.09
Total Fetotoxicity HI	0.0001
Total GS HI	5
Total Kidney HI	0.04
Total Respiratory HI	0.0008
Total None Reported HI	0.000
Total Thyroid HI	0.7
Total NA HI	6
Total Developmental HI	18

ALTERNATE TABLE 9.7B.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Aroclor-1254	6E-07	--	2E-07	--	9E-07	Immune	0.2	--	0.07	0.2
			Chemical Total	6E-07	--	2E-07	--	9E-07		0.2	--	0.07	0.2
		Exposure Point Total						9E-07					0.2
	Exposure Medium Total							9E-07					0.2
	Air	OU7	Aroclor-1254	--	1E-12	--	--	1E-12	NA	--	--	--	--
			Chemical Total	--	1E-12	--	--	1E-12		- -	--	- -	--
		Exposure Point Total						1E-12					--
	Exposure Medium Total							1E-12					--
Medium Total								9E-07					0.2
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	1E-05	--	4E-06	--	1E-05	NA	--	--	--	--
			Manganese	- -	--	- -	--	- -	CNS	0.04	--	--	0.04
			Chemical Total	1E-05	--	4E-06	--	1E-05		0.04	--	--	0.04
		Exposure Point Total						1E-05					0.04
	Exposure Medium Total							1E-05					0.04
	Air	OU7	Benzo(a)pyrene Equivalents	--	1E-11	--	--	1E-11	NA	--	--	--	--
			Manganese	--	- -	--	--	- -	CNS	--	0.0008	--	0.0008
			Chemical Total	--	1E-11	--	--	1E-11		- -	0.0008	- -	0.0008
		Exposure Point Total						1E-11					0.0008
	Exposure Medium Total							1E-11					0.0008
Medium Total								1E-05					0.04
Receptor Total			Receptor Risk Total					2E-05	Receptor HI Total				0.3

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.8A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Benzo(a)pyrene Equivalents	9E-05	--	3E-05	--	1E-04
			Aroclor-1248	5E-06	--	2E-06	--	7E-06
			Barium	- -	--	- -	--	- -
			Copper	- -	--	- -	--	- -
			Iron	- -	--	- -	--	- -
			Lead	- -	--	- -	--	- -
			Mercury	- -	--	- -	--	- -
			Thallium	- -	--	- -	--	- -
			Chemical Total	9E-05	--	4E-05	--	1E-04
		Exposure Point Total						1E-04
	Exposure Medium Total							1E-04
	Air	OU7	Benzo(a)pyrene Equivalents	--	2E-10	--	--	2E-10
			Aroclor-1248	--	4E-11	--	--	4E-11
			Barium	--	- -	--	--	- -
			Copper	--	- -	--	--	- -
			Iron	--	- -	--	--	- -
			Lead	--	- -	--	--	- -
			Mercury	--	- -	--	--	- -
			Thallium	--	- -	--	--	- -
			Chemical Total	--	3E-10	--	--	3E-10
		Exposure Point Total						3E-10
	Exposure Medium Total							3E-10
Medium Total								1E-04

TABLE 9.8A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	5E-05	--	2E-05	--	7E-05
			Aroclor-1248	1E-04	--	6E-05	--	2E-04
			Aroclor-1260	1E-05	--	6E-06	--	2E-05
			2,3,7,8-TCDD Equivalents	3E-04	--	3E-05	--	3E-04
			Antimony	- -	--	- -	--	- -
			Barium	- -	--	- -	--	- -
			Cadmium	- -	--	- -	--	- -
			Cobalt	- -	--	- -	--	- -
			Copper	- -	--	- -	--	- -
			Iron	- -	--	- -	--	- -
			Lead	- -	--	- -	--	- -
			Manganese	- -	--	- -	--	- -
			Mercury	- -	--	- -	--	- -
			Nickel	- -	--	- -	--	- -
			Thallium	- -	--	- -	--	- -
			Zinc	- -	--	- -	--	- -
			Chemical Total	5E-04	--	1E-04	--	6E-04
		Exposure Point Total						6E-04
	Exposure Medium Total							6E-04

TABLE 9.8A.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Subsurface Soil	Air	OU7	Benzo(a)pyrene Equivalents	--	1E-10	--	--	1E-10
			Aroclor-1248	--	1E-09	--	--	1E-09
			Aroclor-1260	--	1E-10	--	--	1E-10
			2,3,7,8-TCDD Equivalents	--	2E-09	--	--	2E-09
			Antimony	--	- -	--	--	- -
			Barium	--	- -	--	--	- -
			Cadmium	--	4E-10	--	--	4E-10
			Cobalt	--	6E-09	--	--	6E-09
			Copper	--	- -	--	--	- -
			Iron	--	- -	--	--	- -
			Lead	--	- -	--	--	- -
			Manganese	--	- -	--	--	- -
			Mercury	--	- -	--	--	- -
			Nickel	--	6E-09	--	--	6E-09
			Thallium	--	- -	--	--	- -
			Zinc	--	- -	--	--	- -
			Chemical Total	--	2E-08	--	--	2E-08
		Exposure Point Total						2E-08
	Exposure Medium Total							2E-08
Medium Total								6E-04
Receptor Total							Receptor Risk Total	7E-04

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.8B.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
PORTSMOUTH NAVAL SHIPYARD OPERABLE UNIT 7 REMEDIAL INVESTIGATION

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total
Surface Soil	Surface Soil	OU7	Aroclor-1254	9E-07	--	4E-07	--	1E-06
			Chemical Total	9E-07	--	4E-07	--	1E-06
		Exposure Point Total						1E-06
	Exposure Medium Total							1E-06
	Air	OU7	Aroclor-1254	--	7E-12	--	--	7E-12
			Chemical Total	--	7E-12	--	--	7E-12
		Exposure Point Total						7E-12
	Exposure Medium Total							7E-12
Medium Total								1E-06
Subsurface Soil	Subsurface Soil	OU7	Benzo(a)pyrene Equivalents	1E-05	--	5E-06	--	2E-05
			Manganese	- -	--	- -	--	- -
			Chemical Total	1E-05	--	5E-06	--	2E-05
		Exposure Point Total						2E-05
	Exposure Medium Total							2E-05
	Air	OU7	Benzo(a)pyrene Equivalents	--	3E-11	--	--	3E-11
			Manganese	--	- -	--	--	- -
			Chemical Total	--	3E-11	--	--	3E-11
		Exposure Point Total						3E-11
	Exposure Medium Total							3E-11
Medium Total								2E-05
Receptor Total							Receptor Risk Total	2E-05

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

APPENDIX D.6

LEAD MODELING RESULTS

Child Resident
Surface Soil Entire site

LEAD MODEL FOR WINDOWS Version 1.1

Model Version: 1.1 Build9
User Name: LC
Date: 09/18/09
Site Name: OU7
Operable Unit: Portsmouth Naval Shipyard
Run Mode: Site Risk Assessment

Soil/Dust Data

Soil/Dust Data
Mean concentration of lead in surface soil = 510 mg/kg

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 µg Pb/L

****** Soil & Dust ******

Child Resident

Surface Soil Entire Site.

Multiple Source Analysis Used
Average multiple source concentration: 367.000 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	510.000	367.000
1-2	510.000	367.000
2-3	510.000	367.000
3-4	510.000	367.000
4-5	510.000	367.000
5-6	510.000	367.000
6-7	510.000	367.000

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 1.000 µg Pb/dL

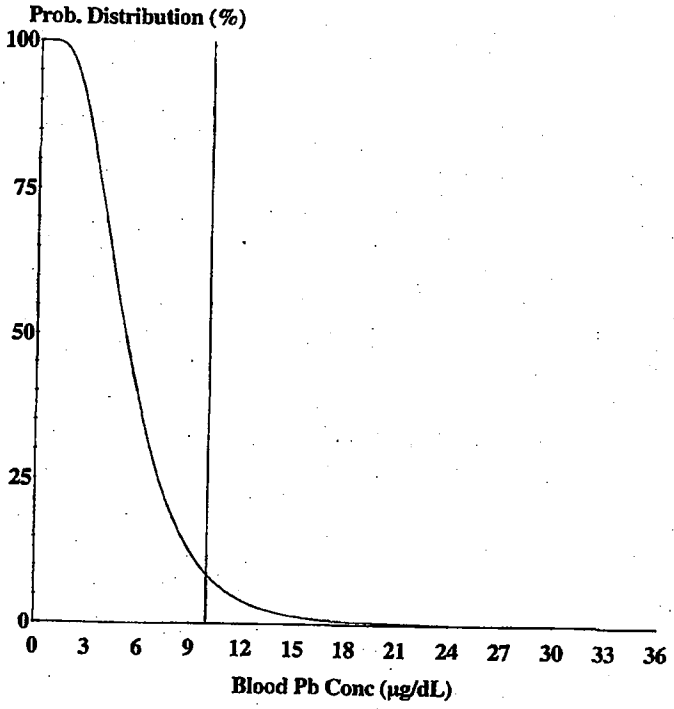
****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	0.995	0.000	0.352
1-2	0.034	0.844	0.000	0.861
2-3	0.062	0.935	0.000	0.913
3-4	0.067	0.912	0.000	0.947
4-5	0.067	0.903	0.000	1.019
5-6	0.093	0.962	0.000	1.089
6-7	0.093	1.049	0.000	1.116

Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	9.685	11.053	5.9
1-2	15.046	16.785	6.9
2-3	15.342	17.253	6.4
3-4	15.612	17.538	6.1
4-5	11.985	13.974	5.0
5-6	10.931	13.076	4.2
6-7	10.399	12.657	3.7

Child Resident

Surface Soil Entire Site



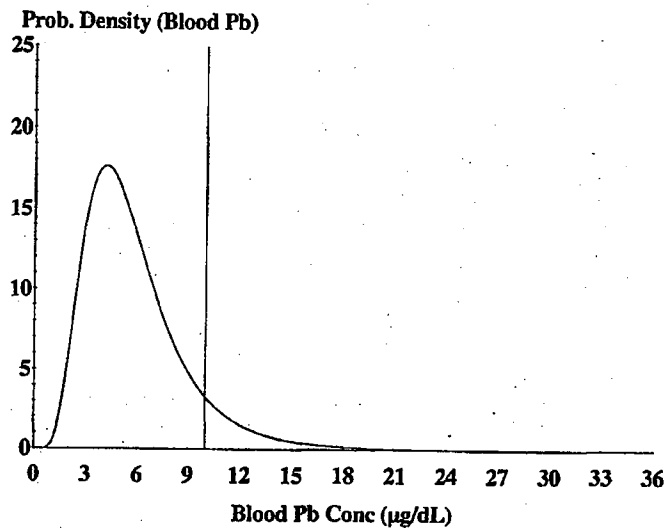
Cutoff = 10.000 µg/dl
Geo Mean = 5.361
GSD = 1.600
% Above = 9.235

Age Range = 0 to 84 months

Run Mode = Site Risk Assessment
Comment = Mean Pb Conc in SS = 510 mg/kg

Child Resident

Surface Soil Entire Site



Cutoff = 10.000 µg/dl
Geo Mean = 5.361
GSD = 1.600
% Above = 9.235
% Below = 90.765

Age Range = 0 to 84 months

Run Mode = Site Risk Assessment
Comment = Mean Pb Conc in SS = 510 mg/kg

Child Resident

Subsurface Soil Entire Site

LEAD MODEL FOR WINDOWS Version 1.1

Model Version: 1.1 Build9
User Name: LC
Date: 09/18/2009
Site Name: OU7
Operable Unit: Portsmouth Naval Shipyard
Run Mode: Site Risk Assessment

Soil/Dust Data
Mean concenctration of lead in subsurface soil = 1600 mg/kg

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 µg Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 1130.000 µg/g

Child Resident
Subsurface Soil Entire Site

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	1600.000	1130.000
1-2	1600.000	1130.000
2-3	1600.000	1130.000
3-4	1600.000	1130.000
4-5	1600.000	1130.000
5-6	1600.000	1130.000
6-7	1600.000	1130.000

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

****** Maternal Contribution: Infant Model ******

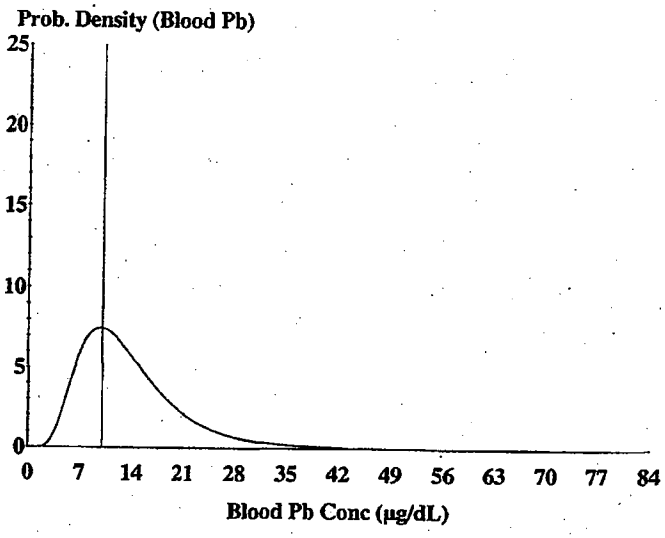
Maternal Blood Concentration: 1.000 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	0.829	0.000	0.293
1-2	0.034	0.684	0.000	0.698
2-3	0.062	0.774	0.000	0.756
3-4	0.067	0.770	0.000	0.800
4-5	0.067	0.801	0.000	0.904
5-6	0.093	0.871	0.000	0.986
6-7	0.093	0.961	0.000	1.022

Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	25.087	26.230	13.6
1-2	37.910	39.326	15.8
2-3	39.507	41.100	14.9
3-4	41.005	42.641	14.5
4-5	33.075	34.847	12.2
5-6	30.787	32.738	10.3
6-7	29.623	31.699	9.1

Child Resident
Subsurface Soil Entire Site



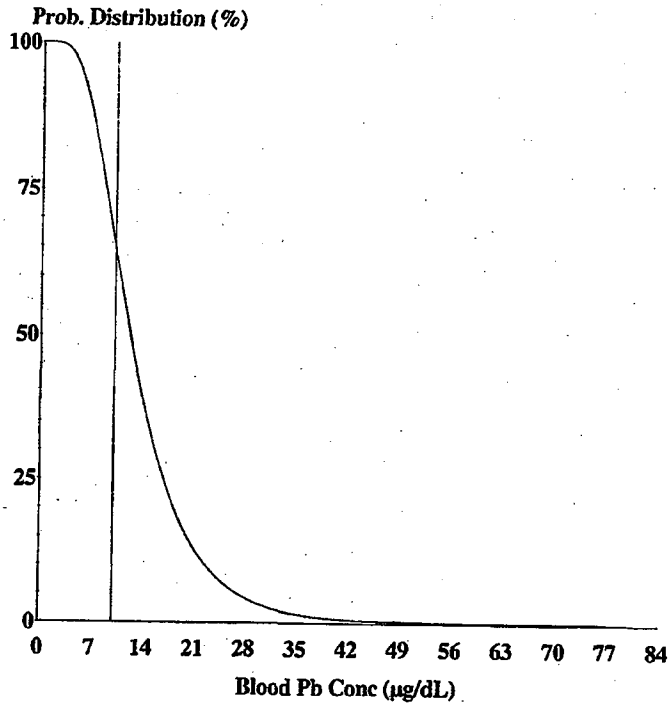
Cutoff = 10.000 µg/dl
Geo Mean = 12.617
GSD = 1.600
% Above = 68.956
% Below = 31.044

Age Range = 0 to 84 months

Run Mode = Site Risk Assessment
Comment = Mean Pb Conc in SB=1600 mg/kg

Child Resident

Subsurface Soil Entire Site



Cutoff = 10.000 µg/dl
Geo Mean = 12.617
GSD = 1.600
% Above = 68.956

Age Range = 0 to 84 months

Run Mode = Site Risk Assessment
Comment = Mean Pb Conc in SB=1600 mg/kg

Calculations of Preliminary Remediation Goals (PRGs)

Surface Soil

Medium: Surface Soil
Site: Operable Unit 7, Portsmouth Naval Shipyard
Location: Kittery, Maine
Receptor: Construction Worker

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee
Version date 6/21/09

			[illegible] JEAN 2004
PbS	Soil lead concentration	ug/g or ppm	510
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	–	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	–	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.1
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	–
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	–	–
K_{SD}	Mass fraction of soil in dust	–	–
$AF_{S,D}$	Absorption fraction (same for soil and dust)	–	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	150
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**2.0**
$PbB_{fetal,0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	4.7
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.2%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

Subsurface Soil

Medium: Subsurface Soil
Site: Operable Unit 7, Portsmouth Naval Shipyard
Location: Kittery, Maine
Receptor: Construction Worker

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee
Version date 6/21/09

Variable	Definition of Variable	Units	Value
PbS	Soil lead concentration	ug/g or ppm	1600
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.1
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S,D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	150
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**4.2**
$PbB_{fetal,0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	9.8
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**4.7%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

Surface Soil

Medium: Surface Soil
Site: Operable Unit 7, Portsmouth Naval Shipyard
Location: Kittery, Maine
Receptor: Occupational Worker

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee
Version date 6/21/09

Variable	Description of Variable	Units	USD Analytical Results 1995-2004
PbS	Soil lead concentration	ug/g or ppm	510
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S,D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	250
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.8**
$PbB_{fetal,0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	4.4
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.1%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

Subsurface Soil

Medium: Subsurface Soil
Site: Operable Unit 7, Portsmouth Naval Shipyard
Location: Kittery, Maine
Receptor: Occupational Worker

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee
Version date 6/21/09

Variable	Description of Variable	Units	User Input
PbS	Soil lead concentration	ug/g or ppm	1600
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S,D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	250
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**3.6**
$PbB_{fetal,0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	8.6
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**2.9%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

Sediment

Medium: Sediment
Site: Operable Unit 7, Portsmouth Naval Shipyard
Location: Kittery, Maine
Receptor: Adolescent/Adult Recreational User

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee
Version date 6/21/09

Variable	Description	Units	95% UCL Based on Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	187
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S,D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	52
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.1**
$PbB_{fetal,0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	2.5
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.0033%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

Surface Soil and Sediment

Medium: Surface Soil/Sediment
Site: Operable Unit 7, Portsmouth Naval Shipyard
Location: Kittery, Maine
Receptor: Adolescent/Adult Recreational User

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee
Version date 6/21/09

Variable	Definition of Variable	Units	GSD Default from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	487
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S,D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	52
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.2**
$PbB_{fetal,\ 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	2.8
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.0063%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

Subsurface Soil and Sediment

Medium: Subsurface Soil/Sediment
Site: Operable Unit 7, Portsmouth Naval Shipyard
Location: Kittery, Maine
Receptor: Adolescent/Adult Recreational User

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee
Version date 6/21/09

Variable	Description of Variable	Units	Selected Input Values (OU7-2009)
PbS	Soil lead concentration	ug/g or ppm	1500
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	–	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	–	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	–
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	–	–
K_{SD}	Mass fraction of soil in dust	–	–
$AF_{S,D}$	Absorption fraction (same for soil and dust)	–	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	52
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.5**
$PbB_{fetal,0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	3.6
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.0347%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Appendix E
Applicable or Relevant and Appropriate Requirements

TABLE E-1
ALTERNATIVE 3: LIMITED EXCAVATION IN FORMER TIMBER BASIN AREA, RESIDENTIAL LAND USE CONTROLS, AND LONG-TERM MANAGEMENT OF SHORELINE CONTROLS
CHEMICAL, LOCATION AND ACTION-SPECIFIC ARARs
OPERABLE UNIT 7 RECORD OF DECISION
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
FEDERAL CHEMICAL-SPECIFIC ARARs and TBCs				
Soil/Risk Assessment	United States Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response (OSWER) Directive 9355.4-12	To be considered (TBC)	USEPA has provided recommended methodology for assessing risk caused by exposure to lead in surface soil under residential scenarios.	Guidelines were used to develop residential risk-based cleanup goals for lead in soil.
	USEPA Risk Reference Doses (RfDs) from Integrated Risk Information System (IRIS)	TBC	RfDs are estimates of daily exposure for human populations (including sensitive subpopulations) considered unlikely to cause significant adverse health effects associated with a threshold mechanism of action in human exposure over a lifetime.	RfDs were used to develop risk-based soil cleanup goals for antimony, copper, dioxins/furans, and iron.
	USEPA Human Health Assessment Group Cancer Slope Factors (CSFs) from IRIS	TBC	CSFs present the most up-to-date information on cancer risk potency for known and suspected carcinogens.	CSFs were used to develop risk-based soil cleanup goals for polychlorinated biphenyls (PCBs) and carcinogenic polycyclic aromatic hydrocarbons (PAHs).
	Guidelines for Carcinogen Risk Assessment EPA/630/P-03/001F (2005a)	TBC	These guidelines are used to perform Human Health Risk Assessment (HHRA). They provide a framework for assessing possible cancer risks from exposures to pollutants or other agents in the environment.	These guidelines were used to develop risk-based soil cleanup goals for PCBs and PAHs.
	Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens EPA/630/R-03/003F (2005b)	TBC	These guidelines are used to perform HHRA and address a number of issues pertaining to cancer risks associated with early-life exposures in general and provide specific guidance on potency adjustment for carcinogens acting through a mutagenic mode of action.	This guidance was used to develop risk-based soil cleanup goals for PCBs and PAHs.

TABLE E-1
ALTERNATIVE 3: LIMITED EXCAVATION IN FORMER TIMBER BASIN AREA, RESIDENTIAL LAND USE CONTROLS, AND LONG-TERM MANAGEMENT OF SHORELINE CONTROLS
CHEMICAL, LOCATION AND ACTION-SPECIFIC ARARs
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PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
STATE CHEMICAL-SPECIFIC ARARs and TBCs: No ARARs or TBCs				
FEDERAL LOCATION-SPECIFIC ARARs and TBCs				
Coastal Zone Management	Coastal Zone Management Act [16 United States Code (USC) 1451 *et seq*]	Applicable	This act provides for the preservation and protection of coastal zone areas. Federal activities that are in or directly affecting the coastal zone must be consistent, to the maximum extent practicable, with a federally approved state management program.	Future maintenance activities as part of long-term management of shoreline erosion controls that may take place in the coastal zone will be controlled according to the requirements of the MEDEP program. MEDEP will review the long-term management plan and work plans associated with shoreline control maintenance activities to ensure that they meet the substantive requirements of this act. The requirements of the act will continue to apply during the operation and maintenance of the remedy.
Wetlands and US Waters	Clean Water Act (CWA) Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material [40 Code of Federal Regulations (CFR) 230; 33 CFR 320, 322, and 323]	Applicable	These regulations outline the requirements for the discharge of dredged or fill material into US waters, including wetlands. No activity that adversely affects a US waters is permitted if a practicable alternative that has less effect is available. If there is no other practicable alternative, impacts must be mitigated.	Future maintenance activities as part of long-term management of shoreline erosion controls will be performed so as to not impact the offshore area.

TABLE E-1
ALTERNATIVE 3: LIMITED EXCAVATION IN FORMER TIMBER BASIN AREA, RESIDENTIAL LAND USE CONTROLS, AND LONG-TERM MANAGEMENT OF SHORELINE CONTROLS
CHEMICAL, LOCATION AND ACTION-SPECIFIC ARARs
OPERABLE UNIT 7 RECORD OF DECISION
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
Other Natural Resources	The Endangered Species Act of 1973 (16 USC 1531 *et seq*.; 50 CFR Parts 17 and 402)	Applicable	Provides for consideration of the impacts on endangered and threatened species and their critical habitats. Requires federal agencies to ensure that any action carried out by the agency is not likely to jeopardize the continued existence of any endangered or threatened species or adversely affect its critical habitat. The entire state of Maine is considered a habitat of the federally-listed endangered short-nosed sturgeon. The Gulf of Maine population of Atlantic sturgeon is listed as a threatened species.	There are no known endangered, threatened, or protected species or critical habitats within the boundaries of PNS. However short-nosed and Atlantic sturgeon are present in the Piscataqua River. Future maintenance activities as part of long-term management of the shoreline erosion controls will be conducted so as to avoid any adverse effect under the act to these sturgeon.
	Fish and Wildlife Coordination Act (16 USC 661 *et seq.*)	Applicable	This act requires any federal agency proposing to modify a body of water to coordinate with the United States Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS) and appropriate state agencies if alteration of a body of water, including discharge of pollutants into a wetland or construction in a wetland, will occur as a result of offsite remedial activities.	The Navy will coordinate with USFWS in the event that future maintenance activities as part of long-term management of shoreline erosion controls may impact the coastal floodplain and river.
Floodplain Management and Protection of Wetlands	44 CFR 9	Relevant and Appropriate	FEMA regulations that set forth the policy, procedure, and responsibilities to implement and enforce Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands.	Future maintenance activities as part of long-term management of shoreline erosion controls within the 100-year floodplain of the Piscataqua River or federal jurisdictional wetlands will be implemented in compliance with these standards.

TABLE E-1
ALTERNATIVE 3: LIMITED EXCAVATION IN FORMER TIMBER BASIN AREA, RESIDENTIAL LAND USE CONTROLS, AND LONG-TERM MANAGEMENT OF SHORELINE CONTROLS
CHEMICAL, LOCATION AND ACTION-SPECIFIC ARARs
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PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
STATE LOCATION-SPECIFIC ARARs and TBCs				
Other Natural Resources	Maine Natural Resources Protection Act Permit by Rule Standards [38 Maine Revised Statutes Annotated (MRSA) 480 *et seq.*; 06-096 Code of Maine Rules (CMR) Part 305, 1, 2, and 8]	Applicable	This act regulates activity conducted in, on, or over any protected natural resource or any activity conducted adjacent to and operated in such a way that material or soil may be washed into any freshwater or coastal wetland, great pond, river, stream or brook.	Future maintenance activities as part of long-term management of shoreline erosion controls will be conducted so as to avoid washing any soil into the nearby Piscataqua River or adjacent wetlands. Stormwater management and erosion control practices will be used to prevent sediment from entering the river or adjacent wetlands during remedial activities.
Wetlands	Maine Wetland Protection Rules(06-096 CMR Part 310)	Applicable	Standards are provided for protection of wetlands, as defined in MEDEP Ch. 1000 Guidelines for Municipal Shoreline Zoning Ordinances. Jurisdiction under the Rules includes the area adjacent to the wetlands, which is the area within 75 feet of the normal high water line. Activities that have an unreasonable impact on wetlands are prohibited.	Future maintenance activities as part of long-term management of shoreline erosion controls will be conducted to avoid impacts to wetlands and coastal wetlands, which include tidal and subtidal lands.
Coastal Zone	Maine Coastal Management Policies (38 MRSA 1801 *et seq*.) (06-096 CMR Chapter 1000)	Applicable	Regulates activities near great ponds, rivers and larger streams, coastal areas, and wetlands. Regulates shoreland activities and development, including (but not limited to) water pollution prevention and control, wildlife habitat protection, and freshwater and coastal wetlands protection. The law is administered at the local government level. Shoreland areas include areas within 250 feet of the normal high-water line of any river or saltwater body and areas within 75 feet of the high-water line of a stream.	Future maintenance activities as part of long-term management of shoreline erosion controls that may affect storm water runoff, erosion and sedimentation, and surface water quality will be controlled according to these regulations.

TABLE E-1
ALTERNATIVE 3: LIMITED EXCAVATION IN FORMER TIMBER BASIN AREA, RESIDENTIAL LAND USE CONTROLS, AND LONG-TERM MANAGEMENT OF SHORELINE CONTROLS
CHEMICAL, LOCATION AND ACTION-SPECIFIC ARARs
OPERABLE UNIT 7 RECORD OF DECISION
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
FEDERAL ACTION-SPECIFIC ARARs and TBCs				
Surface Water	CWA [33 USC § 1251 *et seq.*]; National Recommended Water Quality Criteria (NRWQC) (40 CFR Part 122.44)	Relevant and Appropriate	These criteria are used to establish water quality standards for the protection of aquatic life.	Future maintenance activities as part of long-term management of shoreline erosion controls will be conducted to reduce adverse impacts to the Piscataqua River. Stormwater management and erosion control practices will be used to prevent soil and contamination from entering the river during maintenance of shoreline controls.
Water Management	CWA Section 402 National Pollutant Discharge Elimination System (NPDES) (40 CFR 122.26)	Applicable	CWA Section 402 requires NPDES permits for stormwater discharges to navigable waters.	Stormwater management would be implemented during excavation and maintenance of shoreline erosion controls to minimize discharges of contaminants to the Piscataqua River and meet the substantive requirements of this act.
STATE ACTION-SPECIFIC ARARs and TBCs				
Hazardous Waste	Identification of Hazardous Wastes 06-096 Part 850	Applicable	These standards establish requirements for determining whether wastes are hazardous based on either characteristic or listing. Wastes with PCB concentrations greater than or equal to 50 ppm are hazardous wastes in Maine.	Wastes generated during excavation will be analyzed to determine whether they are RCRA characteristic hazardous wastes. If determined to be hazardous, then the waste will be managed in accordance with regulatory requirements.
	Standards for Generators of Hazardous Waste (38 MRSA 1301 *et seq.*, 06-096 Part 851)	Applicable	These regulations contain requirements for the generators of hazardous waste.	Wastes generated during remedial activities that are determined to be hazardous waste will be managed in accordance with regulatory requirements.

TABLE E-1
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PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
Hazardous Waste	Standards for Hazardous Waste Facilities Additional Standards Applicable to Miscellaneous Units (06-096 Part 854.15)	Applicable	These standards provide requirements for treatment of hazardous wastes.	Soil in the excavation areas at OU7 characterized as hazardous for lead based on Toxicity Characteristic Leaching Procedure (TCLP) for lead may be stabilized prior to offsite disposal to render the soil nonhazardous for lead.
Water Management	Maine Discharge Licenses (38 MRSA 413 *et seq*.) and Waste Discharge Permitting Program (06-096 CMR 520-629)	Applicable	These standards regulate the discharge of pollutants from point sources.	These regulations area applicable to water management during soil excavation and discharges of treated water to a surface water body, if required. The substantive requirements will be met if any discharges of treated water to surface water bodies are required during the remedial action.
Waste Management	Additional Standards Applicable to Waste Facilities Located in a Flood Plain (06-096 CMR 854.16)	Relevant and Appropriate	Any facility located or to be located within 300 feet of a 100 year flood zone must be constructed, operated, and maintained to prevent wash-out of any hazardous waste by a 100 year flood or have procedures in place which will cause the waste to be removed to a location where the waste will not be vulnerable to flood waters and to a location which is authorized to manage hazardous waste safely before flood water can reach the facility.	Future maintenance activities as part of long-term management of shoreline erosion controls conducted within 300 feet of the 100-year flood zone will be conducted in compliance with these standards.
Erosion	Erosion and Sedimentation Control (38 MRSA Part 420-C)	Applicable	Erosion control measures must be in place before activities such as filling, displacing, or exposing soil or other earthen materials occur. Prior MEDEP approval is required if the disturbed area is in the direct watershed of a body of water most at risk for erosion or sedimentation.	These controls will be applicable to remedial activities that need to address erosion and sedimentation. Applicable plans will be coordinated with MEDEP before implementation.

TABLE E-1
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Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
Air Emissions	Visible Emissions Regulation (38 MRSA Part 584; 06-096 CMR Part 101)	TBC	These regulations establish opacity limits for emissions from several categories of air contaminant sources, including general fugitive emissions.	These regulations will be considered for excavation and backfilling activities. These standards will be met if any of the activities result in emission of particulate matter and fugitive matter to the atmosphere (e.g., dust generation).

Appendix F
Alternative Calculations and Cost Estimates

CLIENT: **PORTSMOUTH NAVAL SHIPYARD**		JOB NUMBER: **112G02100 - FS.DR.DF**	
SUBJECT: **OU7 FS - QUANTITY CALCULATIONS**			
BASED ON:		DRAWING NUMBER:	
BY: LW Date: 10/06/2011	CHECKED BY AMC Date: 05/17/2012	APPROVED BY: MDK	DATE: 01/02/2013

PURPOSE:

The purpose of this calculation is to determine the volumes, areas, and quantities of materials associated with the remedial action alternatives presented in the OU7 FS. These material and volume quantities are presented within the FS text and are used to support the cost estimates provided in Appendix C.

DISCUSSION:

The volume, area, and quantity calculations presented below are based on the descriptions of the alternatives presented in Section 4.0 of the text and FS Figures 4-1 and 4-2.

CALCULATIONS:

Alternative 2 - Land Use Controls and Long-term Management of Shoreline Controls

Alternative 2 includes the implementation of land use controls and long term management of the shorline controls identified in Figure 4-1.

Land use control area

Area of the LUC limits on Fig. 4-1 = 839,080 sf

Five year reviews are also required under this alternative.

Alternative 3 - Limited Excavation in Former Timber Basin Area, Residential Land Use Controls, and Long-term Management of Shorline Controls

Alternative 3 includes excavation of PCB, lead, and dioxin/furan contaminated soil in the former timber basin, LUCs, and long term management. All excavated soil will be characterized and disposed off-site. The excavation areas will be backfilled to existing grade and surface conditions will be returned. The following presents the volumes quantities of materials involved in the excavation and cover construction process.

Excavation Areas

Area 1
Assume a 10ft x 10ft areal extent at TP-SB27 with Lead (Surface) and Dioxins/Furans (Subsurface) Contamination

Area = 100 sf
Depth = 5 ft
(Assume no shoring is required)

CLIENT:	PORTSMOUTH NAVAL SHIPYARD	JOB NUMBER:	112G02100 - FS.DR.DF
SUBJECT:	OU7 FS - QUANTITY CALCULATIONS		
BASED ON:		DRAWING NUMBER:	
BY: LW Date: 10/06/2011	CHECKED BY AMC Date: 05/17/2012	APPROVED BY: MDK	DATE: 01/02/2013

Volume = 500 cf
= 19 cy

Area 2
Assume a 10ft x 50ft areal extent at TP-SB112 (PCBs Contamination at 5-8ft bgs) and TP-SB108/14 (PCBs Contamination at 3-9ft bgs)

Area = 500 sf
Depth = 9 ft
(Assume shoring is required)
Volume = 4500 cf
= 167 cy

Total Volume of Material Excavated and Disposed Off-site = 185 cy

Confirmation samples will be collected from the floor and sidewalls of each excavation area.

Number of Confirmation Samples = 14 samples

Characterization sampling for off-site disposal will be collected at a rate of 1 sample for every 500 cy of material going off-site for disposal or at least 1 sample from each excavation area

Number of Characterization Samples = 2 samples

Assume the excavated material from the hot spots will be disposed as hazardous waste.

Following excavation and off-site disposal, excavated areas will need to be backfilled and restored to site condition. The following calculations present the volume of material needed to backfill the excavation areas and the volume of material needed to construct the asphalt cover.

Volume of Backfill Material for Area 1 = 19 cy
Area of pavement (from excavation only)= 100 sf
Assume the area of pavement needs replacement = 200 sf
(to account for damage by excavation equipment)
Top 9-inches asphalt pavement = 6 cy
Volume of Backfill Soil for Area 1 = 16 cy

Volume of Backfill Material for Area 2 = 167 cy
Area of pavement (from excavation only)= 500 sf
Assume the area of pavement needs replacement = 700 sf
(to account for damage by excavation equipment)

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Top 9-inches asphalt pavement =	19	cy
Volume of Backfill Soil for Area 2 =	153	cy
Total Volume of Backfill Soil =	169	cy
Total Area of Pavement to restore for Excavation Areas =	900	sf (9-inch thick section)

LUCs

Alternative 3 also includes the implementation of LUCs.

Area of the LUC limits on Fig. 4-2 = 839,080 sf

Five Year Reviews

Five year reviews are also required under this alternative.

PORTSMOUTH NAVAL SHIPYARD
Kittery, Maine
OU7 FS
Alternative 3 - Limited Excavation in Former Timber Basin Area, Residential Land Use Controls, and Long-term Management of Shoreline Controls
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Prepare LUC Documents	200	hr			$39.00		$0	$0	$7,800	$0	$7,800
1.2 Prepare Documents & Plans including Permits	300	hr			$39.00		$0	$0	$11,700	$0	$11,700
2 MOBILIZATION AND DEMOBILIZATION											
2.1 Site Support Facilities (trailers, phone, electric, etc.)	1	ls		$1,000.00		$3,500.00	$0	$1,000	$0	$3,500	$4,500
2.2 Equipment Mobilization/Demobilization	3	ea			$188.00	$566.00	$0	$0	$564	$1,698	$2,262
3 FIELD SUPPORT AND SITE ACCESS											
3.1 Office Trailer	1	mo				$365.00	$0	$0	$0	$365	$365
3.2 Field Office Equipment, Utilities, & Support	1	mo		$508.00			$0	$508	$0	$0	$508
3.3 Storage Trailer	1	mo				$94.00	$0	$0	$0	$94	$94
3.4 Survey Support	3	day	$1,150.00				$3,450	$0	$0	$0	$3,450
3.5 Site Superintendent	25	day		$153.00	$420.00		$0	$3,825	$10,500	$0	$14,325
3.6 Site Health & Safety and QA/QC	25	day		$153.00	$370.00		$0	$3,825	$9,250	$0	$13,075
3.7 Underground Utility Clearance	1	ls	$9,500.00				$9,500	$0	$0	$0	$9,500
4 DECONTAMINATION											
4.1 Decontamination Services	1	mo		$1,220.00	$2,345.00	$1,550.00	$0	$1,220	$2,345	$1,550	$5,115
4.2 Equipment Decon Pad	1	ls		$4,500.00	$3,200.00	$725.00	$0	$4,500	$3,200	$725	$8,425
4.3 Decon Water	1,000	gal		$0.20			$0	$200	$0	$0	$200
4.4 Decon Water Storage Tank, 6,000 gallon	1	mo				$813.00	$0	$0	$0	$813	$813
4.5 Clean Water Storage Tank, 4,000 gallon	1	mo				$731.00	$0	$0	$0	$731	$731
4.6 Disposal of Decon Waste (liquid & solid)	1	mo	$995.00				$995	$0	$0	$0	$995
5 AREAS 1 and 2 EXCAVATION AND DISPOSAL											
5.1 Temporary Fence	300	lf	$8.75				$2,625	$0	$0	$0	$2,625
5.2 Excavator, 2 cy	10	day			$382.40	$1,253.00	$0	$0	$3,824	$12,530	$16,354
5.3 Compactor Attachment	4	day				$280.00	$0	$0	$0	$1,120	$1,120
5.4 Pavement Saw, 18 hp	3	day				$66.00	$0	$0	$0	$198	$198
5.5 Sheetpile	1,080	sf	$44.00				$47,520	$0	$0	$0	$47,520
5.6 Sheetpile Equipment (mob/demob)	2	ea	$25,000.00				$50,000	$0	$0	$0	$50,000
5.7 Dewatering Pump & Filter	7	day				$151.50	$0	$0	$0	$1,061	$1,061
5.8 Site Labor, (3 laborers)	75	day			$280.80		$0	$0	$21,060	$0	$21,060
5.9 Confirmation Sampling, lead	4	ea	$50.00	$30.00	$50.00	$30.00	$200	$120	$200	$120	$640
5.10 Confirmation Sampling, dioxin/furan	5	ea	$1,200.00	$30.00	$50.00	$30.00	$6,000	$150	$250	$150	$6,550
5.11 Confirmation Sampling, PCBs	5	ea	$160.00	$30.00	$50.00	$30.00	$800	$150	$250	$150	$1,350
5.12 T & D of Excavated Soil, hazardous	25	ton	$245.00				$6,125	$0	$0	$0	$6,125
5.13 T & D of Excavated Soil, non-hazardous	250	ton	$85.00				$21,250	$0	$0	$0	$21,250
5.14 T & D of Demo Materials	20	ton	$55.00				$1,100	$0	$0	$0	$1,100
5.15 Waste Disposal Characterization / Analytical	2	ea	$850.00	$30.00	$50.00	$30.00	$1,700	$60	$100	$60	$1,920
5.16 Backfill, common fill	186	cy		$18.33			$0	$3,409	$0	$0	$3,409
5.17 Geotextile Fabric	285	sy		$1.14			$0	$325	$0	$0	$325
5.18 Waste Water Line Removal, Bypass, Replacement	1	ls	$10,000.00				$10,000	$0	$0	$0	$10,000
5.19 Storm Sewer Line Removal, Bypass, Replacement	1	ls	$20,000.00				$20,000	$0	$0	$0	$20,000
5.20 Heat Cool Line Removal, Bypass, Replacement	1	ls	$12,500.00				$12,500	$0	$0	$0	$12,500
5.21 Pavement Repair (6" base, 2" binder, 1" top)	2,500	sf	$2.46				$6,150	$0	$0	$0	$6,150
6 POST CONSTRUCTION COST											
6.1 Contractor Completion Report	150	hr			$39.00		$0	$0	$5,850	$0	$5,850
6.2 Remedial Action Closeout Report	150	hr			$39.00		$0	$0	$5,850	$0	$5,850
Subtotal							$199,915	$19,292	$82,743	$24,865	$326,815

PORTSMOUTH NAVAL SHIPYARD
Kittery, Maine
OU7 FS
Alternative 3 - Limited Excavation in Former Timber Basin Area, Residential Land Use Controls, and Long-term Management of Shoreline Controls
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
Overhead on Labor Cost @ 30%									$24,823		$24,823
G & A on Labor, Material, Equipment, & Subs Cost @ 10%							$19,992	$1,929	$8,274	$2,486	$32,681
Tax on Materials and Equipment Cost @ 6%								$1,158		$1,492	$2,649
Total Direct Cost							$219,907	$22,379	$115,840	$28,843	$386,969
Indirects on Total Direct Cost @ 30%		(excluding transportation and disposal cost)									$107,250
Profit on Total Direct Cost @ 10%											$38,697
Subtotal											$532,915
Health & Safety Monitoring @ 2%											$10,658
Total Field Cost											$543,573
Contingency on Total Field Costs @ 20%											$108,715
Engineering on Total Field Cost @ 20%											$108,715
TOTAL CAPITAL COST											**$761,003**

PORTSMOUTH NAVAL SHIPYARD
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Alternative 3 - Limited Excavation in Former Timber Basin Area, Residential Land Use Controls, and Long-term Management of Shoreline Controls
Shoreline Maintenance Years 15 and 30

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1 MOBILIZATION AND DEMOBILIZATION											
1.2 Equipment Mobilization/Demobilization	3	ea			$188.00	$566.00	$0	$0	$564	$1,698	$2,262
2 FIELD SUPPORT AND SITE ACCESS											
2.1 Storage Trailer	1	mo				$94.00	$0	$0	$0	$94	$94
2.2 Survey Support	1	day	$1,150.00				$1,150	$0	$0	$0	$1,150
2.3 Site Superintendent	5	day		$153.00	$420.00		$0	$765	$2,100	$0	$2,865
3 SHORELINE MAINTENANCE											
3.1 Backfill, gravel	82	cy		$41.00			$0	$3,362	$0	$0	$3,362
3.2 Riprap	14	cy		$31.50			$0	$441	$0	$0	$441
3.3 Excavator, 2.5 cy long reach	5	day			$382.40	$2,312.80	$0	$0	$1,912	$11,564	$13,476
3.4 Front End Loader, 185 hp	5	day			$382.40	$611.00	$0	$0	$1,912	$3,055	$4,967
3.5 Site Labor, (3 laborers)	15	day			$280.80		$0	$0	$4,212	$0	$4,212
4 POST CONSTRUCTION COST											
4.1 Contractor Completion Report	80	hr			$39.00		$0	$0	$3,120	$0	$3,120
Subtotal							$1,150	$4,568	$39,560	$16,411	$61,689
Overhead on Labor Cost @ 30%									$11,868		$11,868
G & A on Labor, Material, Equipment, & Subs Cost @ 10%							$115	$457	$3,956	$1,641	$6,169
Tax on Materials and Equipment Cost @ 6%								$274		$985	$1,259
Total Direct Cost							$1,265	$5,299	$55,384	$19,037	$80,985
Indirects on Total Direct Cost @ 20%											$16,197
Profit on Total Direct Cost @ 10%											$8,098
Subtotal											$105,280
Health & Safety Monitoring @ 0%											$0
Total Field Cost											$105,280
Contingency on Total Field Costs @ 20%											$21,056
Engineering on Total Field Cost @ 15%											$15,792
TOTAL CAPITAL COST											**$142,128**

PORTSMOUTH NAVAL SHIPYARD
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Alternative 3 - Limited Excavation in Former Timber Basin Area, Residential Land Use Controls, and Long-term Management of Shoreline Controls
Annual Cost

Item	Item Cost years 1 - 30	Item Cost every 5 years	Notes
Annual Site Inspection & Report	$2,950		Labor and supplies once a year to inspect Land Use Controls with Report.
Five Year Site Review		$23,000	Labor and supplies to evaluate site every five years for 5-year review
SUBTOTAL	$2,950	$23,000	
Contingency @ 10%	$295	$2,300	
TOTAL	**$3,245**	**$25,300**	

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Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate 2.0%	Present Worth
0	$761,003		$761,003	1.000	$761,003
1		$3,245	$3,245	0.980	$3,181
2		$3,245	$3,245	0.961	$3,119
3		$3,245	$3,245	0.942	$3,058
4		$3,245	$3,245	0.924	$2,998
5		$28,545	$28,545	0.906	$25,854
6		$3,245	$3,245	0.888	$2,881
7		$3,245	$3,245	0.871	$2,825
8		$3,245	$3,245	0.853	$2,770
9		$3,245	$3,245	0.837	$2,715
10		$28,545	$28,545	0.820	$23,417
11		$3,245	$3,245	0.804	$2,610
12		$3,245	$3,245	0.788	$2,559
13		$3,245	$3,245	0.773	$2,508
14		$3,245	$3,245	0.758	$2,459
15	$142,128	$28,545	$170,673	0.743	$126,813
16		$3,245	$3,245	0.728	$2,364
17		$3,245	$3,245	0.714	$2,317
18		$3,245	$3,245	0.700	$2,272
19		$3,245	$3,245	0.686	$2,227
20		$28,545	$28,545	0.673	$19,210
21		$3,245	$3,245	0.660	$2,141
22		$3,245	$3,245	0.647	$2,099
23		$3,245	$3,245	0.634	$2,058
24		$3,245	$3,245	0.622	$2,017
25		$28,545	$28,545	0.610	$17,399
26		$3,245	$3,245	0.598	$1,939
27		$3,245	$3,245	0.586	$1,901
28		$3,245	$3,245	0.574	$1,864
29		$3,245	$3,245	0.563	$1,827
30	$142,128	$28,545	$170,673	0.552	$94,224
				TOTAL PRESENT WORTH	**$1,126,630**