U.S. NAVY
Portsmouth Naval Shipyard
Kittery, Maine

Decision Document

No Further Action
SWMUs 12, 13, 16, and 23

July 1997

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NO FURTHER ACTION DECISION DOCUMENT FOR SWMUS 12, 13, 16 AND 23
PORTSMOUTH NAVAL SHIPYARD
KITTERY, MAINE

1.0 DECLARATION

Site Name and Location

The following solid waste management units (SWMUs) located at the Portsmouth Naval Shipyard (PNS), Kittery, Maine are addressed in this No Further Action Decision Document.

SWMU 12 - Boiler Blowdown Tank No. 25
SWMU 13 - Rinse Water Tank No. 27
SWMU 16 - Rinse Water Tank No. 34
SWMU 23 - Chemical Cleaning Facility Tank (Building 174)

The location of PNS is shown in Figure 1-1.

Statement of Basis and Purpose

This decision document presents the basis for the selection of No Further Action (NFA) for SWMUs 12, 13, 16, and 23 at PNS, Kittery, Maine. As required by the Corrective Action Permit under the Resource Conservation and Recovery Act (RCRA; 42 U.S.C. Section 6901 et seq) Hazardous and Solid Waste Amendments of 1984 (HSWA Permit) for PNS (U.S. EPA, 1989), these SWMUs were investigated during the RCRA Facility Investigation (RFI). Interim remedial action (tank closure) was also conducted during the RFI at SWMUs 13, 16, and 23. On the basis of investigative and interim remedial action results, and in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA; 42 U.S.C. Section 9601 et seq), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 Code of Federal Regulations [CFR] Part 300) and its related laws and regulations, it is the Navy's decision, with concurrence of the U.S. Environmental Protection Agency (U.S. EPA) and the Maine Department of Environmental Protection (MEDEP), that no further response actions are warranted at SWMUs 12, 13, 16, and 23. Copies of the investigation reports and documents supporting these decisions are maintained in the Public Information Repository(ies) for PNS.

Description of No Further Remedial Action

SWMU 12 is recommended for no further action based on the history of use of the tank and the tank content sample results. SWMUs 13, 16, and 23 are recommended for no further action based on the history of use of the tanks, interim remedial actions to remove the tanks, and the results of confirmation sampling after tank removal. Media (tank contents and/or soil) were sampled and analyzed at SWMUs 12, 13, 16, and 23 and found either (1) not to exhibit hazardous characteristics (as defined by 40 CFR Part 261 Subpart C) and/or (2) not to have any analyte which exceeded risk-based guidelines for human health protection (i.e., Future Industrial Land Use Media Protection Standards). Actual or threatened releases of hazardous substances from these SWMUs are not a concern (i.e., considered safe); therefore, no further remedial action at these SWMUs is deemed necessary to ensure the protection of human health and the environment.

Declaration Statement

On the basis of findings at SWMUs 12, 13, 16, and 23, there is no evidence or reason to conclude that any possible residual contamination has caused significant environmental contamination or continues to pose a threat to human health or the environment. SWMU 12 has not and does not contain hazardous materials and interim remedial actions conducted at SWMUs 13, 16, and 23 eliminated the need for any further action at these three SWMUs. The decision therefore has been made for no further action at SWMUs 12, 13, 16, and 23. As residual contamination is not above health-based levels, five-year site reviews are also not required for these sites.

Signature and Support Agency Acceptance

The U.S. EPA and the MEDEP are in concurrence with the Navy that no further action is necessary at SWMUs 12, 13, 16, and 23 located at PNS, Kittery, Maine.

Al Haring — 6/19/97

Signature (NORTHDIV; Al Haring) — Date

Signature and Support Agency Acceptance

The U.S. EPA and the MEDEP are in concurrence with the Navy that no further action is necessary at SWMUs 12, 13, 16, and 23 located at PNS, Kittery, Maine.

Signature (PNS; Ken Plaisted) — Date: 5/30/97

Signature and Support Agency Acceptance

The U.S. EPA and the MEDEP are in concurrence with the Navy that no further action is necessary at SWMUs 12, 13, 16, and 23 located at PNS, Kittery, Maine.

Signature (MEDEP; Allan R. Ball)

June 13, 1997
Date

Signature and Support Agency Acceptance

The U.S. EPA is in concurrence with the Navy that no further action is necessary at SWMUs 12, 13, 16, and 23 located at PNS, Kittery, Maine.

Paula Lia Fitzsimmons, Chief
Remediation and Restoration II Branch
Region I
U.S. Environmental Protection Agency

6/12/97
Date

2.0 DECISION SUMMARY

Site Name, Location and Description

PNS, Kittery, Maine, is located on an island in the Piscataqua River referred to on National Oceanic and Atmospheric Administration (NOAA) nautical charts as Seavey Island, with the eastern tip given the name Jamaica Island. Attached by a rock causeway is Clark's Island which is not industrialized. The Piscataqua River is a tidal estuary which forms the southern boundary between New Hampshire and Maine. PNS is located at the mouth of the Great Bay Estuary (commonly referred to as Portsmouth Harbor).

PNS is engaged in the conversion, overhaul, and repair of submarines for the Navy. PNS has a long history dating back to 1800 when the facility was established. 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 from 1917 to present. PNS continues to service submarines as its primary business focus.

The SWMUs addressed in this NFA Decision Document, SWMUs 12, 13, 16, and 23, are located within the Controlled Industrial Area (CIA) in the northwestern portion of the facility. Major activities related to servicing submarines are located within the CIA, a controlled-access, industrially developed portion of the facility. The locations of the four SWMUs are shown in Figure 2-1.

Site History and Enforcement Action

A HSWA Permit was issued by the U.S. EPA in March 1989 for 13 SWMUs at PNS. In accordance with the permit requirements, an RFI was performed. The RFI consisted of several phases of investigations spanning from October 1989 to February 1992. The results of the RFI were then assembled into the RFI Report (McLaren/Hart, 1992). The RFI was conditionally approved by the U.S. EPA ("Approval with Conditions" issued in March of 1993). The Addendum to the RFI Report (McLaren/Hart, 1993) and the RFI Data Gap Report (Halliburton NUS, 1995) address the "Approval with Conditions" and are supplemental to the RFI Report. Investigation of SWMUs 12, 13, 16, and 23 was conducted during the RFI.

Prior to the RFI, the tank at SWMU 12 was tested and determined to be intact. During the RFI, the contents of the tank at SWMU 12 were sampled and analyzed for priority pollutant metals (August 1990) to determine if the tank contents exhibited hazardous characteristics based on metals concentrations. The contents of the tank at SWMU 12 were determined to be non-hazardous and no further investigation of this SWMU was conducted during the RFI (McLaren/Hart, 1992).

Prior to the RFI, the tanks at SWMUs 13, 16, and 23 were tested and the results were inconclusive. During the RFI, interim remedial actions involving tank closure were conducted at these SWMUs. Tank closure included removal and proper disposal of all liquids within the tanks, tank excavation, removal and disposal, and confirmation soil sampling followed by excavation backfilling and asphalting. During tank removal operations, each tank's external surface was examined and evaluated for structural integrity and areas of considerable corrosion. All tank removals were performed in coordination with the MEDEP. Prior to excavation, the tanks were pumped dry by PNS personnel utilizing a vacuum tanker. After excavation, the empty tanks were transported to the PNS Hazardous Waste Storage Area. Confirmation samples were collected from the bottom and the side walls of the excavation of each tank and analyzed for grain size, percent moisture, Total Organic Carbon (TOC), and Appendix IX Organics and Inorganics. Based on the results of the tank content characterization and confirmation sampling, no further investigation of SWMUs 13, 16, and 23 was conducted during the RFI (McLaren/Hart, 1992).

Analytical data collected during the RFI were evaluated in accordance with the U.S. EPA Superfund Risk Assessment Guidance. The results of this evaluation were summarized in the Public Health and Environmental Risk Evaluation: Part A Human Health Risk Assessment (PHERE), (McLaren/Hart, 1994a). Exposure to various media (groundwater, surface water, sediment, soil, air, and food) by residential, recreational, and occupational (industrial) receptors was evaluated in the risk assessment. Chemicals were identified which had estimated risks exceeding U.S. EPA and MEDEP guidelines for human health for these receptors. Although an "acceptable risk range" of 10^{-6} to 10^{-4} for the incremental risk resulting from exposure to chemicals is defined in the NCP, U.S. EPA Region I utilizes the more conservative 10^{-6} as the risk goal for carcinogens. The MEDEP Incremental Lifetime Cancer Risk Guidance is 10^{-5}.

For each chemical, the associated concentration at a $1x10^{-6}$ incremental risk for carcinogens or a Hazard Index of 1.0 for noncarcinogens was calculated and compared to the background concentration. Proposed Media Protection Standards (MPSs) for each site were determined by selecting the higher concentration between background or the risk-based concentration. In some cases pertinent regulatory guidance was used to select the proposed MPS. This methodology for the development of MPSs is described in detail in the Final Media Protection Standards Proposal (McLaren/Hart, 1994b). Final MPSs were then set by the U.S. EPA (U.S. EPA, 1994). The final MPSs differ from the proposed in that the final MPSs are applied based on potential future land use (future industrial land use or future residential land use). Industrially developed areas (e.g., within the CIA) are assumed not to have potential future residential use and no potential use of groundwater. Future Industrial Land Use MPSs for soils are applied to these sites, which include SWMUs 12, 13, 16, and 23.

Highlights of Community Participation

A history of community relations at PNS is presented in the Community Relations Plan for PNS (B&R Environmental, 1996). Community participation has been and is continued to be promoted at PNS through public workshops, Technical Review Committee/Restoration Advisory Board (TRC/RAB) meetings, public comment periods, public hearings, news releases, and community interviews.

This NFA Decision Document has been submitted for regulatory review (i.e., U.S. EPA, MEDEP) and for review by the RAB members. Revisions to this document have been made based on comments received from the U.S. EPA and MEDEP. The NFA Decision Document was also presented at the RAB meeting held on May 30, 1996. RAB meeting minutes summarize the status, strategy and any action items associated with community involvement for SWMUs 12, 13, 16, and 23 and are included in the Information Repository(ies) for PNS. Only one RAB question, related to SWMU 12, was made on the NFA SWMUs; however, no revisions were necessary based on this comment. A notice of the availability of this NFA Decision Document was placed in the Portsmouth Herald on January 17, 1997. The public comment period began on January 21, 1997 and lasted 30 days. A concise and complete summary of significant comments received from the public and the responses to these comments are included as part of the Responsiveness Summary (refer to Section 7.0).

Documents referenced in this NFA Decision Document are available to the public in the Information Repository(ies). A list of documents available is provided in the reference section (refer to Section 8.0), and includes both documents referenced herein, as well as the following supplemental documents: Draft Revised Corrective Measures Study Proposal (Halliburton NUS, 1994a); Applicable or Relevant and Appropriate Requirements (ARARs) Report (Halliburton NUS, 1994b); On-Shore Feasibility Study (FS) Report (Draft) (Halliburton NUS, 1995); RCRA Facility Assessment (Kearney and Baker, 1986); RCRA Facility Investigation Work Plan (McLaren/Hart, 1991); and Initial Assessment Study (Weston, 1983).

3.0 SWMU 12 - BOILER BLOWDOWN TANK NO. 25

Site Name, Location, and Description

SWMU 12 - Boiler Blowdown Tank No. 25, operated from 1974 to present, is a 3800-gallon underground, steel tank. The tank is located in the northwestern portion of the facility, located adjacent to Building 72 within the CIA. The tank is used as a flow through tank for boiler blowdown water, acting as a lift station and allowing the water to cool prior to discharge. Boiler blowdown refers to the removal of water from the boiler to prevent accumulation of solids and maintain water chemistry suitable for the boiler. Water for the boiler is taken from the drinking water supply (potable) and must be treated further to removed dissolved solids and

hardness which would interfere with the operation of the boiler. This treatment is similar to water softening which is done by some cities and homeowners to remove hardness. The primary concern with blowdown water is pH (which is modified to maintain the proper water chemistry in the boiler) and temperature.

The tank at SWMU 12 utilizes a gravity drain with dual-pump lift station backup that provides a nearly continuous flow-through process for eliminating boiler blowdown water. The water is drained directly into the sanitary sewer system which discharges to the Kittery Sewage Treatment Plant. Minor amounts of boiler water treatment chemicals and mineral deposits which are non-hazardous are generally found in boiler blowdown water (i.e., disodium phosphate, sodium sulfite, Betz Balanced Polymer BP5205, sodium hydroxide, and Nalco Chemical Company "Transport Plus").

Figure 3-1 shows the approximate location of the tank at SWMU 12.

Scope and Role of Response Action

The contents of the boiler blowdown tank were sampled and analyzed three times over a three week period (August 7 to 29, 1990) during Phase II of the RFI. Due to the use of the wastewater and additives employed, only metals contamination was suspected. Therefore the samples were analyzed for priority pollutant metals. When compared to metal concentrations identified in 40 CFR Part 261, Subpart C, no sample exhibited hazardous characteristics (McLaren/Hart, 1992). A summary of analytical results is provided in Table 3-1. No further investigation was performed.

Site Characteristics

SWMU 12 is located in an industrially developed area of PNS. The tank at SWMU 12 was drained and physically inspected. Additionally, a one week leak test was performed by isolating the tank and monitoring the water level. The tank was found to be mechanically sound, intact, and stable. Based on the tank use and tank content analysis, the tank was determined not to contain hazardous material. In addition, tank contents are considered suitable for direct discharge to the sanitary sewer system as the blowdown water meets the requirements of the industrial pretreatment agreement which the Shipyard has with the Kittery Sewer Department. The tank is buried and covered by asphalt.

Summary of Site Risks

SWMU 12 was evaluated during the human health risk assessment (PHERE). SWMU 12 is located within the CIA which can only be accessed by authorized personnel; therefore, residential and recreational exposures are not possible. In addition for SWMU 12, the risk assessment determined that there are also no

occupational exposure routes because there is no contaminant of concern and there is no potential contact with media at the site (i.e., soil, groundwater, surface water/sediment, or air). As there are no ecological receptors in the vicinity of SWMU 12, this SWMU was not considered by the onshore ecological risk assessment. Therefore, no risks associated with this SWMU have been identified.

Based on site characteristics and site risks, no further action is necessary at SWMU 12 to protect human health and the environment.

4.0 SWMU 13 - RINSE WATER TANK NO. 27

Site Name, Location, and Description

SWMU 13 - Rinse Water Tank No. 27, used only occasionally from 1974 to 1989, was a 700-gallon underground tank constructed of steel. The tank was located in the northwestern portion of the facility adjacent to Building 76 within the CIA. Unspecified rinse water (from parts cleaning operations), believed to be slightly acidic and possibly containing oil contaminants from an oil quench, metals, and cyanide, was stored in this tank.

Figure 4-1 shows the location of the tank at SWMU 13.

Scope and Role of Response Action

As part of Phase IV of the RFI, the tank was excavated and removed by PNS in November 1991. During tank removal operations, the external surface of the tank was examined and evaluated for structural integrity and areas of considerable erosion. Four composite confirmation soil samples were collected from the bottom and the side walls of the excavation of the tank: two from the floor, one from the north and west wall and one from the south and east wall. A minimum of three locations of the wall or bottom were included in each composite. The three locations were approximately at the bottom third of the excavation for walls and the center of the tank for the bottom. Samples were analyzed for grain size, percent moisture, TOC, and Appendix IX Organics and Inorganics. Table 4-1 summarizes the analytical results from the soils collected. The excavation was backfilled with removed fill material, brought up to grade with 18 inches of sandy gravel, and covered with 4 inches of hot asphalt, to replace existing pavement (McLaren/Hart, 1992).

Prior to excavation, as part of the RFI, the tank was pumped dry by PNS personnel utilizing a vacuum tanker. After excavation, the empty tank was transported to the PNS Hazardous Waste Storage Area (McLaren/Hart, 1992). In addition, tank contents were sampled and analyzed by McLaren/Hart for hazardous waste characteristics, as defined in 40 CFR Part 261 Subpart C.

Site Characteristics

SWMU 13 is located in an industrially developed area of PNS. The tank at SWMU 13 was removed in 1991 according to a closure plan approved by MEDEP. The tank was found to be intact with no evidence of deterioration. Also, no visual or olfactory evidence of contamination in the fill material was encountered during tank excavation. The fill material was replaced during backfilling and covered with hot asphalt pavement. Tank contents were not RCRA hazardous, based on sample results for reactivity, ignitability, corrosivity, and Toxicity Characteristic Leaching Procedure (TCLP) (McLaren/Hart, 1992). Confirmation soil sample results indicate the presence of low concentrations of organic compounds and low to moderate concentrations of metals; however, there are no exceedances of Future Industrial Land Use MPSs and metals concentrations were generally less than background. Note that although the MPSs do not account for leaching of contaminants from soil to groundwater, this is not considered to be a migration pathway of concern because the tank was removed intact, site soils are covered with asphalt, and groundwater was not encountered during excavation of the tank.

Summary of Site Risks

SWMU 13 was evaluated in the human health risk assessment (PHERE). For SWMU 13, residential, recreational, and current occupational exposure routes were not identified; therefore, risks for these exposure routes were not calculated. The only potential exposure routes identified were ingestion of and dermal contact with subsurface soil by workers during activities (excavation, remediation, or construction) where subsurface soils would be exposed. Risks resulting from potential future occupational exposure to subsurface soils through ingestion and dermal contact were calculated. A summary of the calculated risks is provided in Appendix A. Individual and cumulative risks of ingestion and dermal contact associated with chemicals detected at SWMU 13 are less than 10^{-6} for carcinogens and have Hazard Indexes of less than 1.0, indicating that chemicals detected at SWMU 13 are not considered to be at concentrations which may pose a risk to workers. As no ecological receptors exist in the vicinity of SWMU 13, this SWMU was not considered by the onshore ecological risk assessment. Therefore, no adverse risks to human health and the environment associated with this SWMU have been identified.

Based on site characteristics and site risks, no further action is necessary at SWMU 13 to protect human health and the environment.

5.0 SWMU 16 - RINSE WATER TANK NO. 34

Site Name, Location, and Description

SWMU 16 - Rinse Water Tank No. 34, used from 1978 to approximately 1985, was a 750-gallon underground tank constructed of steel. The tank was located in the northwestern portion of the facility, adjacent to Building 174 within the CIA. Rinse waters, generated from parts cleaning and preparation operations, may have contained dilute hydrochloric acid, acetic acid, sodium hydroxide and metal residue from a descaling process. A series of wash and rinse tanks inside the building may have overflowed into a large concrete shallow sump which reportedly drained into the 750 gallon underground tank.

Scope and Role of Response Action

As part of Phase IV of the RFI, the tank was excavated and removed by PNS in November 1991. During tank removal operations, the external surface of the tank was examined and evaluated for structural integrity and areas of considerable erosion. Two composite confirmation soil samples were collected from the side walls of the excavation of the tank: one from the north and west wall and one from the south and east wall. Composite soil samples could not be collected from the bottom of the excavation because of a concrete saddle underlying the tank. A duplicate sample was collected from the tank excavation wall instead. A minimum of three locations of the wall were included in each composite. The three locations were approximately at the bottom third of the excavation for walls. Samples were analyzed for grain size, percent moisture, TOC, and Appendix IX Organics and Inorganics. Table 5-1 summarizes the analytical results from the soils collected. The excavation was backfilled with removed fill material, brought up to grade with 18 inches of sandy gravel, and covered with 4 inches of hot asphalt pavement (McLaren/Hart, 1992).

Prior to excavation, as part of the RFI, the tank was pumped dry by PNS personnel utilizing a vacuum tanker. After excavation, the empty tank was transported to the PNS Hazardous Waste Storage Area (McLaren/Hart, 1992). In addition, tank contents were sampled and analyzed by McLaren/Hart for hazardous waste characteristics, as defined in 40 CFR Part 261 Subpart C.

Site Characteristics

SWMU 16 is located in an industrially developed area of PNS. The tank at SWMU 16 was removed in 1991 according to a closure plan approved by MEDEP. The tank was found to be intact with no evidence of deterioration. Also, no visual or olfactory evidence of contamination in the fill material was encountered during tank excavation. The fill material was replaced during backfilling and covered with hot asphalt pavement. Tank contents were not RCRA hazardous, based on sample results for reactivity, ignitability,

corrosivity, and TCLP (McLaren/Hart, 1992). Confirmation soil sample results indicate the presence of low concentrations of organic compounds and low to moderate concentrations of metals; however, there are no exceedances of Future Industrial Land Use MPSs and metals concentrations were generally less than background. Note that although the MPSs do not account for leaching of contaminants from soil to groundwater, this is not considered to be a migration pathway of concern because the tank was removed intact, site soils are covered with asphalt, and groundwater was not encountered during excavation of the tank.

Summary of Site Risks

SWMU 16 was evaluated in the human health risk assessment (PHERE). For SWMU 16, residential, recreational and current occupational exposure routes were not identified; therefore, risks for these exposure routes were not calculated. The only potential exposure routes identified were ingestion of and dermal contact with subsurface soil by workers during activities (excavation, remediation, or construction) where subsurface soils would be exposed. Risks resulting from potential future occupational exposure to subsurface soils through ingestion and dermal contact were calculated. A summary of calculated risks is provided in Appendix A. Cumulative risks of ingestion associated with chemicals detected at SWMU 16 are 1.55×10^{-6} (average) and 2.35×10^{-6} (maximum) for carcinogens and have Hazard Indexes of less than 1.0 for noncarcinogens. Cumulative risks of dermal contact are less than 10^{-6} for carcinogens and have Hazard Indexes of less than 1.0 for noncarcinogens. No individual chemical has risks from ingestion or dermal contact and greater than 10^{-6} for carcinogens or a Hazard Index of greater than 1.0 for noncarcinogens.

While cumulative risks of ingestion slightly exceed the 10^{-6} risk goal for carcinogens, risks are within the acceptable range (10^{-6} to 10^{-4}) defined in the NCP and are below the MEDEP Incremental Lifetime Cancer Risk Guidance (10^{-5}). Therefore chemicals detected at SWMU 16 are not considered to be at concentrations which may pose a risk to workers. As no ecological receptors exist in the vicinity of SWMU 16, this SWMU was not considered by the onshore ecological risk assessment. Therefore, no adverse risks to human health and the environment associated with this SWMU have been identified.

Based on site characteristics and site risks, no further action is necessary at SWMU 16 to protect human health and the environment.

6.0 SWMU 23 - CHEMICAL CLEANING FACILITY TANK (BUILDING 174)

Site Name, Location, and Description

SWMU 23 - Chemical Cleaning Facility Tank (Building 174), used from 1978 to 1990, was a 2270-gallon underground tank constructed of steel. The tank was located in the northwestern portion of the facility, between Building 174 and Dry Dock 3 within the CIA. The tank, which held unspecified waste acid and alkaline metal surface-cleaning solutions and solid residues, was part of a chemical cleaning facility. Cleaning solutions may have contained hydrochloric acid, acetic acid and sodium hydroxide. A series of wash and rinse tanks inside the building could have overflowed into a large concrete shallow sump which is believed to have drained into this tank.

Scope and Role of Response Action

As part of Phase IV of the RFI, the tank was excavated and removed by PNS in November 1991. During tank removal operations, the external surface of the tank was examined and evaluated for structural integrity and areas of considerable erosion. Four composite confirmation soil samples were collected from the bottom and the side walls of the excavation of the tank: two from the floor, one from the north and west wall and one from the south and east wall. A minimum of three locations of the wall or bottom were included in each composite. The three locations were approximately at the bottom third of the excavation for walls and the center of the tank for bottom. Samples were analyzed for grain size, percent moisture, TOC, and Appendix IX Organics and Inorganics. Table 6-1 summarizes the analytical results from the soils collected. The excavation was backfilled with removed fill material, brought up to grade with 18 inches of sandy gravel, and covered with 4 inches of hot asphalt pavement (McLaren/Hart, 1992).

Prior to excavation, as part of the RFI, the tank was pumped dry by PNS personnel utilizing a vacuum tanker. After excavation, the empty tank was transported to the PNS Hazardous Waste Storage Area (McLaren/Hart, 1992). In addition, tank contents were sampled and analyzed by McLaren/Hart for hazardous waste characteristics, as defined in 40 CFR Part 261 Subpart C.

Site Characteristics

SWMU 23 is located in an industrially developed area of PNS. The tank at SWMU 23 was removed in 1991 according to a closure plan approved by MEDEP. The tank was found to be intact with no evidence of deterioration. However, the inflow line from Building 174 contained a small amount of liquid (less than one gallon) which discharged into the excavation when the line was severed from the tank. No other visual or

olfactory evidence of contamination in the fill material was encountered during tank excavation. The fill material was replaced during backfilling and covered with hot asphalt pavement (McLaren/Hart, 1992).

Tank contents were found to be RCRA hazardous for cadmium at 1.63 mg/l compared to the criteria of 1.0 mg/l. No other hazardous characteristics resulted, based on sample results for reactivity, ignitability, corrosivity, and TCLP (McLaren/Hart, 1992). Previous tank content testing did not indicate that tank contents were RCRA hazardous (PNS, 1990). Confirmation soil sample results indicate the presence of low concentrations of organic compounds and low to moderate concentrations of metals; however, there are no exceedances of Future Industrial Land Use MPSs. Cadmium concentrations detected in the confirmation soil samples (maximum concentration of 2.2 mg/kg) are below base-wide background (4.95 mg/kg; also the Future Residential Land Use MPS for cadmium). Other metals concentrations were generally less than background. Note that although MPSs do not account for leaching of contaminants from soil to groundwater, this is not considered to be a migration pathway of concern because the tank was removed intact, site soils are covered with asphalt, and groundwater was not encountered during excavation of the tank.

Summary of Site Risks

SWMU 23 was evaluated in the human health risk assessment (PHERE). For SWMU 23, residential, recreational, and current occupational exposure routes were not identified; therefore, risks for these exposure routes were not calculated. The only potential exposure routes identified were ingestion of and dermal contact with subsurface soil by workers during activities (excavation, remediation, or construction) where subsurface soils would be exposed. Risks resulting from potential future occupational exposure to subsurface soils through ingestion and dermal contact were calculated. A summary of calculated risks is provided in Appendix A. Cumulative risks of ingestion are 6.59×10^{-7} (average) and 1.04×10^{-6} (maximum) for carcinogens and have Hazard Indexes of less than 1.0 for noncarcinogens. Cumulative risks of dermal contact are less than 10^{-6} for carcinogens and have Hazard Indexes of less than 1.0 for noncarcinogens. No individual chemical risk associated with chemicals detected at SWMU 23 is greater than 10^{-6} for carcinogens or greater than a Hazard Index of 1.0 for noncarcinogens.

While maximum cumulative risk for ingestion slightly exceeds the 10^{-6} risk goal for carcinogens; risks are within the acceptable range (10^{-6} to 10^{-4}) defined in the NCP and are below the MEDEP Incremental Lifetime Cancer Risk Guidance (10^{-5}). Therefore chemicals detected at SWMU 23 are not considered to be at concentrations which may pose a risk to workers. As no ecological receptors exist in the vicinity of SWMU 23, this SWMU was not considered by the onshore ecological risk assessment. Therefore, no adverse risks to human health and the environment associated with this SWMU have been identified.

Based on site characteristics and site risks, no further action is necessary at SWMU 23 to protect human health and the environment.

7.0 RESPONSIVENESS SUMMARY

The Responsiveness Summary provides a concise and complete summary of significant comments received from the public and includes responses to these comments. This Responsiveness Summary was prepared after the comment period in accordance with EPA guidance provided in "Community Relations in Superfund: A Handbook" (OSWER Directive 9230.0-3B, U.S. EPA, January 1992). The Responsiveness Summary provides the decision-maker with information about the views of the community. It also documents the agency's consideration of public comments during the decision-making process and provides answers to major comments. The Responsiveness Summary consists of three sections: overview, background on community involvement, and summary of comments received during the public comment period.

Overview

This decision document identifies a decision of no further action for SWMUs 12, 13, 16, and 23 at Portsmouth Naval Shipyard (PNS) in Kittery, Maine. No change was made to the selected remedy based on comments from regulatory and Restoration Advisory Board (RAB) review of the draft decision document. Furthermore, no comments on the draft final decision document were received during the public comment period.

Note that in October 1996, the boiler blowdown tank No. 25 at SWMU 12 was taken out of service because of operational changes at PNS. The tank was excavated and determined to be intact with no evidence of leaking. The tank was discovered to be attached by metal straps to a concrete slab and was resting against the wall of the power plant (Building 72). Because of concern for undermining the wall of Building 72, the metal straps were cut and only the top portion of the tank was removed. The portion of the tank remaining in the ground was filled with soil, the excavation was backfilled, and the area was covered with asphalt.

Background on Community Involvement

Community involvement at PNS is promoted through the community relations program for PNS, which includes public meetings, fact sheets, public notices, public comment periods, newspaper advertisements, and community interviews.

Information on community relations is provided in the Community Relations Plan for PNS (B&R Environmental, 1996). Community relations activities associated with PNS began in August 1986 when the first public informational workshop was held. The first Technical Review Committee (TRC) meeting was held in December 1987; such meetings were conducted on an as-needed basis through March 1995. In 1995, the TRC evolved into the RAB. The RAB now acts as a forum to discuss issues and exchange information between the Navy, regulatory agencies, and the community on environmental restoration issues. The RAB provides an opportunity for community members to participate in the decision-making process by reviewing and commenting on proposed actions involving PNS.

Specific community relations for this decision document included presentation of the decision document at the May 30, 1996, RAB meeting. A newspaper advertisement was placed in the *Portsmouth Herald* on January 17, 1997, announcing the public comment period on the decision document and the location of the information repository for PNS. Finally, the public comment period was held from January 21 to February 21, 1997.

Summary of Comments Received During the Public Comment Period and Agency Responses

Although the public comment period was held from January 21 to February 21, 1997, no comments were received on the decision document for no further action for SWMUs 12, 13, 16, and 23.

8.0 REFERENCES

1. B&R Environmental, 1996. "Community Relations Plan," for Portsmouth Naval Shipyard, Kittery, Maine, Brown & Root Environmental, Wayne, PA, October 1996.

2. Halliburton NUS, 1994a. "Draft Revised Corrective Measures Study Proposal" for Portsmouth Naval Shipyard, Kittery, Maine, Halliburton NUS Corporation, Wayne, PA, July 1994.

3. Halliburton NUS, 1994b. "Applicable or Relevant and Appropriate Requirements (ARARs) Report" for Portsmouth Naval Shipyard, Halliburton NUS Corporation, Wayne, PA, September 1994.

4. Halliburton NUS, 1995. "On-Shore Feasibility Study (FS) Report (Draft)" for Portsmouth Naval Shipyard, Halliburton NUS Corporation, Wayne, PA, March 1995.

5. Halliburton NUS, 1995. "RCRA Facilities Investigation (RFI) Data Gap Report (Final)" for Portsmouth Naval Shipyard, Halliburton NUS Corporation, Wayne, PA, November 1995.

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12. McLaren/Hart, 1994b. "Final Media Protection Standards Proposal" for Portsmouth Naval Shipyard, Kittery, Maine, McLaren/Hart Environmental Engineering Corporation, Albany, NY, April 8, 1994.

13. PNS, 1990. Comments in Response to 1/19/90 Version of "Checklist Permit Requirements, Portsmouth Naval Shipyard, Environmental Division, Code 410," Portsmouth Naval Shipyard, February 1990.

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15. U.S. EPA, 1993. Letter Correspondence from Matthew R. Hoagland, Chief (ME, NH, and VT Waste Regulation Section), U.S. EPA Region I to Captain Thomas Felton, USN, Shipyard Commander, Portsmouth Naval Shipyard, Concerning U.S. EPA "Approval with Conditions" of the RCRA Facility Investigation (RFI) Report for Portsmouth Naval Shipyard, March 31, 1993.

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9.0 LIST OF ACRONYMS AND ABBREVIATIONS

ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (Superfund)
CFR	Code of Federal Regulations
CIA	Controlled Industrial Area
FS	Feasibility Study
HSWA Permit	Corrective Action Permit under the RCRA Hazardous and Solid Waste Amendments of 1984
MEDEP	Maine Department of Environmental Protection
MPS	Media Protection Standard
NCP	National Oil and Hazardous Substances Contingency Plan (40 CFR 300)
NFA	No Further Action
NOAA	National Oceanic and Atmospheric Administration
PHERE	Public Health and Environmental Risk Evaluation: Part A Human Health Risk Assessment
PNS	Portsmouth Naval Shipyard
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SARA	Superfund Amendments and Reauthorization Act
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
TRC	Technical Review Committee
U.S. EPA	United States Environmental Protection Agency

TABLE 3-1

TANK CONTENT RESULTS FOR CHEMICALS OF POTENTIAL CONCERN AT THE BOILER BLOWDOWN TANK, SWMU NO. 12 NSY PORTSMOUTH, KITTERY, MAINE[1]

ANALYTE	NUMBER OF SAMPLES	NUMBER OF DETECTIONS	MINIMUM DETECTED CONCENTRATION	MAXIMUM DETECTED CONCENTRATION	ARITHMETIC MEAN	TCLP CRITERIA[2]
INORGANICS (MG/L)						
Antimony	3	0	ND	ND	ND	NA
Arsenic	3	3	0.0013	0.0045	0.0028	5.0
Beryllium	3	0	ND	ND	ND	NA
Cadmium	3	3	0.0100	0.0246	0.0120	1.0
Chromium	3	3	0.2000	0.4420	0.2145	5.0
Copper	3	3	0.0996	249.0000	110.0665	NA
Lead	3	3	0.1740	0.7710	0.3153	5.0
Mercury	3	3	0.0002	0.0003	0.0002	0.2
Nickel	3	3	3.6200	7.8000	3.8078	NA
Selenium	3	3	0.0014	0.0032	0.0017	1.0
Silver	3	3	0.0145	0.0487	0.0214	5.0
Zinc	3	3	0.0746	16.2000	7.8548	NA

NA - Not Available.
ND - Not Detected.

1 Source: Corrective Measures Study Proposal (McLaren/Hart, 1993a)
2 Toxicity Characteristic Leaching Procedure (TCLP) criteria provided in 40 CFR Part 261, Subpart C.

TABLE 4-1
SUBSURFACE SOIL SUMMARY RESULTS FOR CHEMICALS OF POTENTIAL CONCERN
AT RINSE WATER TANK NO. 27, SWMU NO. 13
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

ANALYTE	NUMBER OF SAMPLES	NUMBER OF DETECTIONS	LOWER BOUND DETECTION LIMIT**	UPPER BOUND DETECTION LIMIT**	MINIMUM DETECTED CONCENTRATION	MAXIMUM DETECTED CONCENTRATION	ARITHMETIC MEAN	STANDARD DEVIATION	95% UPPER CONFIDENCE LIMIT	MEDIA PROTECTION STANDARDS***
INORGANICS (MG/KG)										
ANTIMONY	4	1	4.1000	4.6500	---	10.2000	5.7750	2.5640	8.7910	
ARSENIC	4	4	---	---	12.8000	16.7000	14.1250	1.5290	15.9240	
BARIUM	4	4	---	---	62.0000	173.0000	104.4750	45.1240	157.5630	
CADMIUM	4	4	---	---	1.1000	2.3000	1.5500	0.4560	2.0860	
CHROMIUM	4	4	---	---	16.9000	30.0000	23.8000	4.8870	29.5500	
COBALT	4	4	---	---	6.9000	10.7000	8.8750	1.4010	10.5230	
COPPER	4	4	---	---	92.1000	390.0000	246.2750	142.9560	414.4630	
LEAD	4	4	---	---	24.0000	193.0000	92.5500	70.0070	174.9140	1000.0000
NICKEL	4	4	---	---	40.0000	101.0000	61.7750	24.9760	91.1600	
TIN	4	4	---	---	6.0000	20.5000	12.3750	5.5160	18.8650	
VANADIUM	4	4	---	---	11.3000	21.4000	16.6750	3.9980	21.3780	
ZINC	4	4	---	---	127.0000	399.0000	273.5000	105.3510	397.4450	
VOLATILE ORGANICS (MG/KG)										
ACETONE	4	1	0.0110	0.0140	---	0.2000	0.0591	0.0813	0.1548	
TOLUENE	4	3	---	0.0030	0.0010	0.0050	0.0028	0.0015	0.0045	
XYLENE (TOTAL)	4	1	0.0030	0.0030	---	0.0030	0.0030	0.0000	0.0030	
PESTICIDES (MG/KG)										
44-'DDT	4	1	0.0047	0.0048	---	0.0160	0.0075	0.0049	0.0133	
SEMIVOLATILES (MG/KG)										
2-METHYLNAPHTHALENE	4	3	---	0.1950	0.2600	0.2800	0.2538	0.0349	0.2948	
ACENAPHTHENE	4	4	---	---	0.0450	0.3100	0.1588	0.0955	0.2712	
ACENAPTHYLENE	4	2	0.1950	0.1950	0.0560	0.0590	0.1263*	0.0688	0.2071	
ANTHRACENE	4	4	---	---	0.2600	1.1000	0.6075	0.3224	0.9869	
BENZO(A)ANTHRACENE	4	4	---	---	0.2700	0.9500	0.5550	0.2658	0.8677	9.8500
BENZO(A)PYRENE	4	4	---	---	0.1800	0.8200	0.4675	0.2535	0.7658	9.8600
BENZO(B)FLUORANTHENE	4	4	---	---	0.4100	1.7000	0.8025	0.5271	1.4226	9.8400
BENZO(G,H,I)PERYLENE	4	3	---	0.1950	0.1200	0.3400	0.2063	0.0818	0.3025	
BIS(2-ETHYLHEXYL)PHTHALATE	4	2	---	0.1950	0.0160	0.0400	0.1115*	0.0839	0.2102	
CHRYSENE	4	4	---	---	0.2800	1.1000	0.6350	0.3186	1.0099	
DI-N-BUTYLPHTHALATE	4	4	---	---	0.1000	0.1300	0.1200	0.0122	0.1344	
DI-N-OCTYLPHTHALATE	4	1	0.1950	0.2000	0.0300	0.0030	0.1438*	0.0839	0.2469	
DIBENZ(A,H)ANTHRACENE	4	1	0.1950	0.2000	0.0900	0.0090	0.1498*	0.0813	0.2454	
DIBENZOFURAN	4	4	---	---	0.0500	0.2400	0.1425	0.0672	0.2216	

TABLE 4-1
SUBSURFACE SOIL SUMMARY RESULTS FOR CHEMICALS OF POTENTIAL CONCERN
AT RINSE WATER TANK NO. 27, SWMU NO. 13
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

ANALYTE	NUMBER OF SAMPLES	NUMBER OF DETECTIONS	LOWER BOUND DETECTION LIMIT**	UPPER BOUND DETECTION LIMIT**	MINIMUM DETECTED CONCENTRATION	MAXIMUM DETECTED CONCENTRATION	ARITHMETIC MEAN	STANDARD DEVIATION	95% UPPER CONFIDENCE LIMIT	MEDIA PROTECTION STANDARDS***
FLUORANTHENE	4	4	---	---	1.3000	3.7000	2.1250	0.9601	3.2546	
FLUORENE	4	4	---	---	0.0610	0.3300	0.1903	0.0969	0.3042	
INDENO(1,2,3-CD)PYRENE	4	4	---	---	0.0960	0.3900	0.1990	0.1156	0.3350	
NAPHTHALENE	4	3	---	0.1950	0.1100	0.1700	0.1488	0.0351	0.1900	
PHENANTHRENE	4	4	---	---	0.9100	3.7000	2.0025	1.0414	3.2277	
PYRENE	4	4	---	---	0.9500	2.6000	1.5625	0.6455	2.3220	

NOTES:

* - AVERAGE VALUE EXCEEDS MAXIUMUM VALUE DUE TO THE LOW FREQUENCY OF DETECTION AND SUBSTITUTION 1/2 OF DETECTION LIMIT VALUE FOR NON-DETECT VALUES

** - VALUE SHOWN IS EQUAL TO 1/2 OF THE DETECTION LIMIT VALUE. IF AN ANALYTE WAS DETECTED IN ALL SAMPLES ANALYZED, THIS VALUE NOT PROVIDED.

*** - FUTURE INDUSTRIAL LAND USE MPSs. BLANK SPACE INDICATES AN MPS WAS NOT DEVELOPED.

--- NOT APPLICABLE

SOURCE: DRAFT PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION PART A: HUMAN HEALTH RISK ASSESSMENT REPORT, PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE, McLAREN/HART, AUGUST 20, 1992.

TABLE 5-1
SUBSURFACE SOIL SUMMARY RESULTS FOR CHEMICALS OF POTENTIAL CONCERN
AT RINSE WATER TANK NO. 34, SWMU NO. 16
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

ANALYTE	NUMBER OF SAMPLES	NUMBER OF DETECTIONS	LOWER BOUND DETECTION LIMIT**	UPPER BOUND DETECTION LIMIT**	MINIMUM DETECTED CONCENTRATION	MAXIMUM DETECTED CONCENTRATION	ARITHMETIC MEAN	STANDARD DEVIATION	95% UPPER CONFIDENCE LIMIT	MEDIA PROTECTION STANDARDS***
INORGANICS (MG/KG)										
ARSENIC	2	2	---	---	15.8000	18.0500	16.9250	1.1250	21.9480	
BARIUM	2	2	---	---	48.6500	57.3000	52.9750	4.3250	72.2850	
CADMIUM	2	2	---	---	1.6500	2.4000	2.0250	0.3750	3.6990	
CHROMIUM	2	2	---	---	26.2500	31.6000	28.9250	2.6750	40.8680	
COBALT	2	2	---	---	11.5500	11.6000	11.5750	0.0250	11.6870	
LEAD	2	2	---	---	10.3000	11.0500	10.6750	0.3750	12.3490	1000.0000
NICKEL	2	2	---	---	32.6500	38.0000	35.3250	2.6750	47.2680	
VANADIUM	2	2	---	---	29.0500	32.3000	30.6750	1.6250	37.9300	
ZINC	2	2	---	---	59.5500	68.1000	63.8250	4.2750	82.9110	
VOLATILE ORGANICS (MG/KG)										
TOLUENE	2	2	---	---	0.0020	0.0020	0.0020	---	---	
SEMIVOLATILES (MG/KG)										
2-METHYLNAPHTHALENE	2	2	---	---	0.0540	0.1300	0.0920	0.0380	0.2617	
ACENAPHTHENE	2	2	---	---	0.0930	0.3100	0.2015	0.1085	0.6859	
ACENAPTHYLENE	2	1	---	0.1140	---	0.1600	0.1370	0.0230	0.2397	
ANTHRACENE	2	2	---	---	0.2200	0.9200	0.5700	0.3500	2.1327	
BENZO(A)ANTHRACENE	2	2	---	---	0.9550	4.4000	2.6780	1.7230	10.3680	9.8500
BENZO(A)PYRENE	2	2	---	---	0.8700	4.2000	2.5350	1.6650	9.9688	9.8600
BENZO(B)FLUORANTHENE	2	2	---	---	0.8850	8.3000	4.5900	3.7080	21.1415	9.8400
BENZO(G,H,I)PERYLENE	2	2	---	---	0.3650	1.1000	0.7325	0.3675	2.3730	
BIS(2-ETHYLHEXYL)PHTHALATE	2	1	---	0.1875	---	0.1140	0.1508	0.0368	0.3148	
CHRYSENE	2	2	---	---	1.1100	5.3000	3.2050	2.0950	12.5586	
DI-N-BUTYLPHTHALATE	2	2	---	---	0.0450	0.0900	0.0858	0.0043	0.1047	
DIBENZ(A,H)ANTHRACENE	2	1	---	0.2175	---	0.1300	0.1738	0.0438	0.3691	
DIBENZOFURAN	2	2	---	---	0.1025	0.3100	0.2063	0.1038	0.6695	
FLUORANTHENE	2	2	---	---	2.0000	9.1000	5.5500	3.5500	21.3997	
FLUORENE	2	2	---	---	0.1800	0.6800	0.4300	0.2500	1.5462	
INDENO(1,2,3-CD)PYRENE	2	2	---	---	0.4150	1.2000	0.8075	0.3925	2.5599	
NAPHTHALENE	2	2	---	---	0.1300	0.2600	0.2275	0.0325	0.3726	
PHENANTHRENE	2	2	---	---	1.1170	4.8000	2.9850	1.8150	11.1803	
PYRENE	2	2	---	---	1.7000	7.3000	4.5000	2.8000	17.0012	

NOTES:
* - AVERAGE VALUE EXCEEDS MAXIMUM VALUE DUE TO THE LOW FREQUENCY OF DETECTION AND SUBSTITUTION 1/2 OF DETECTION LIMIT VALUE FOR NON-DETECT VALUES.
** - VALUE SHOWN IS EQUAL TO 1/2 OF THE DETECTION LIMIT VALUE. IF AN ANALYTE WAS DETECTED IN ALL SAMPLES ANALYZED, THIS VALUE NOT PROVIDED.
*** - FUTURE INDUSTRIAL LAND USE MPSs. BLANK SPACE INDICATES ON MPS WAS NOT DEVELOPED.
--- NOT APPLICABLE
SOURCE: DRAFT PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION PART A: HUMAN HEALTH RISK ASSESSMENT REPORT, PORTSMOUTH NVAL SHIPYARD, KITTERY, MAINE, McLAREN/HART, AUGUST 20, 1992

TABLE 6-1
SUBSURFACE SOIL SUMMARY RESULTS FOR CHEMICALS OF POTENTIAL CONCERN
AT CHEMICAL CLEANING FACILITY TANK, SWMU NO. 23
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

ANALYTE	NUMBER OF SAMPLES	NUMBER OF DETECTIONS	LOWER BOUND DETECTION LIMIT**	UPPER BOUND DETECTION LIMIT**	MINIMUM DETECTED CONCENTRATION	MAXIMUM DETECTED CONCENTRATION	ARITHMETIC MEAN	STANDARD DEVIATION	95% UPPER CONFIDENCE LIMIT	MEDIA PROTECTION STANDARDS***
INORGANICS (MG/KG)										
ANTIMONY	4	1	4.4500	4.7000	---	9.9000	5.9250	2.2970	8.6270	
ARSENIC	4	4	---	---	15.0000	18.6000	16.4500	1.4360	18.1400	
BARUIM	4	4	---	---	40.4000	61.6000	47.3500	8.4810	57.3280	
CADMIUM	4	4	---	---	1.7000	2.2000	1.9500	0.2060	2.1930	
CHROMIUM	4	4	---	---	26.4000	44.8000	32.6000	7.2230	41.0970	
COBALT	4	4	---	---	10.9000	15.2000	12.3000	1.7130	14.3160	
LEAD	4	4	---	---	13.4000	21.6000	18.0500	3.2420	21.8650	1000.0000
NICKEL	4	4	---	---	30.6000	51.5000	41.8000	7.7960	50.9720	
TIN	4	1	2.7000	8.0000	---	9.7000	6.5380	2.6210	9.6220	
VANADIUM	4	4	---	---	26.2000	41.8000	31.1500	6.2120	38.4580	
ZINC	4	4	---	---	48.3000	69.3000	58.5250	9.8060	70.0610	
VOLATILE ORGANICS (MG/KG)										
TETRACHLOROETHENE	4	1	0.0025	0.0030	---	0.0040	0.0031	0.0005	0.0038	
TOLUENE	4	3	---	0.0030	0.0010	0.0020	0.0018	0.0008	0.0027	
XYLENE(TOTAL)	4	1	0.0025	0.0030	---	0.0140	0.0056	0.0048	0.0113	
PESTICIDES (MG/KG)										
METHYL PARATHION	4	1	0.0220	0.0225	---	0.2000	0.0666	0.0770	0.1572	
SEMIVOLATILES (MG/KG)										
ACENAPHTHENE	4	2	0.1850	0.1850	0.0880	0.1900	0.1620	0.0428	0.2123	
ANTHRACENE	4	3	0.1850	0.1850	0.0630	0.5400	0.2370	0.1808	0.4497	
BENZO(A)ANTHRACENE	4	4	---	---	0.1400	1.2000	0.5225	0.4139	1.0095	9.8500
BENZO(A)PYRENE	4	4	---	---	0.1400	1.1000	0.4850	0.3750	0.9262	9.8600
BENZO(B)FLUORANTHENE	4	4	---	---	0.1600	1.1000	0.5725	0.4042	1.0480	9.8400
BENZO(G,H,I)PERYLENE	4	3	0.1850	0.1850	0.0660	0.5100	0.2353	0.1656	0.4301	
BENZO(K)FLUORANTHENE	4	4	---	---	0.1300	2.2000	0.7400	0.8490	1.7388	9.8500
CHRYSENE	4	4	---	---	0.1700	1.3000	0.5925	0.4340	1.1031	
DI-N-BUTYLPHTHALATE	4	4	---	---	0.0740	0.0960	0.0838	0.0079	0.0931	
DIBENZ(A,H)ANTHRACENE	4	2	0.1850	0.1850	0.0540	0.0930	0.1293*	0.0574	0.1968	
DIBENZOFURAN	4	2	0.1850	0.1850	0.0640	0.1300	0.1410*	0.0498	0.1996	
FLUORANTHENE	4	4	---	---	0.3100	3.0000	1.3175	1.0520	2.5551	
FLUORENE	4	2	0.1850	0.1850	0.1100	0.2500	0.1825	0.0496	0.2408	
INDENO(1,2,3-CD)PYRENE	4	2	0.1850	0.1850	0.0760	0.1900	0.1590	0.0479	0.2154	
NAPHTHALENE	4	2	0.1850	0.1850	0.1500	0.2800	0.2000	0.0483	0.2569	
PHENANTHRENE	4	4	---	---	0.1900	2.2000	0.9225	0.7882	1.8499	
PYRENE	4	4	---	---	0.2900	2.6000	1.1375	0.8933	2.1885	

NOTES:

* - AVERAGE VALUE EXCEEDS MAXIMUM VALUE DUE TO THE LOW FREQUENCY OF DETECTION AND SUBSTITUTION 1/2 OF DETECTION LIMIT VALUE FOR NON-DETECT VALUES.

** - VALUE SHOWN IS EQUAL TO 1/2 OF THE DETECTION LIMIT VALUE. IF AN ANALYTE WAS DETECTED IN ALL SAMPLES ANALYZED, THIS VALUE NOT PROVIDED.

*** - FUTURE INDUSTRIAL LAND USE MPSs. BLANK SPACE INDICATES AN MPS WAS NOT DEVELOPED.

--- NOT APPLICABLE

SOURCE: DRAFT PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION PART A: HUMAN HEALTH RISK ASSESSMENT REPORT, [illegible] 3MOU[illegible] AL SHI[illegible] KITTE[illegible] NE, M[illegible] /HART[illegible] 3T 20, [illegible]

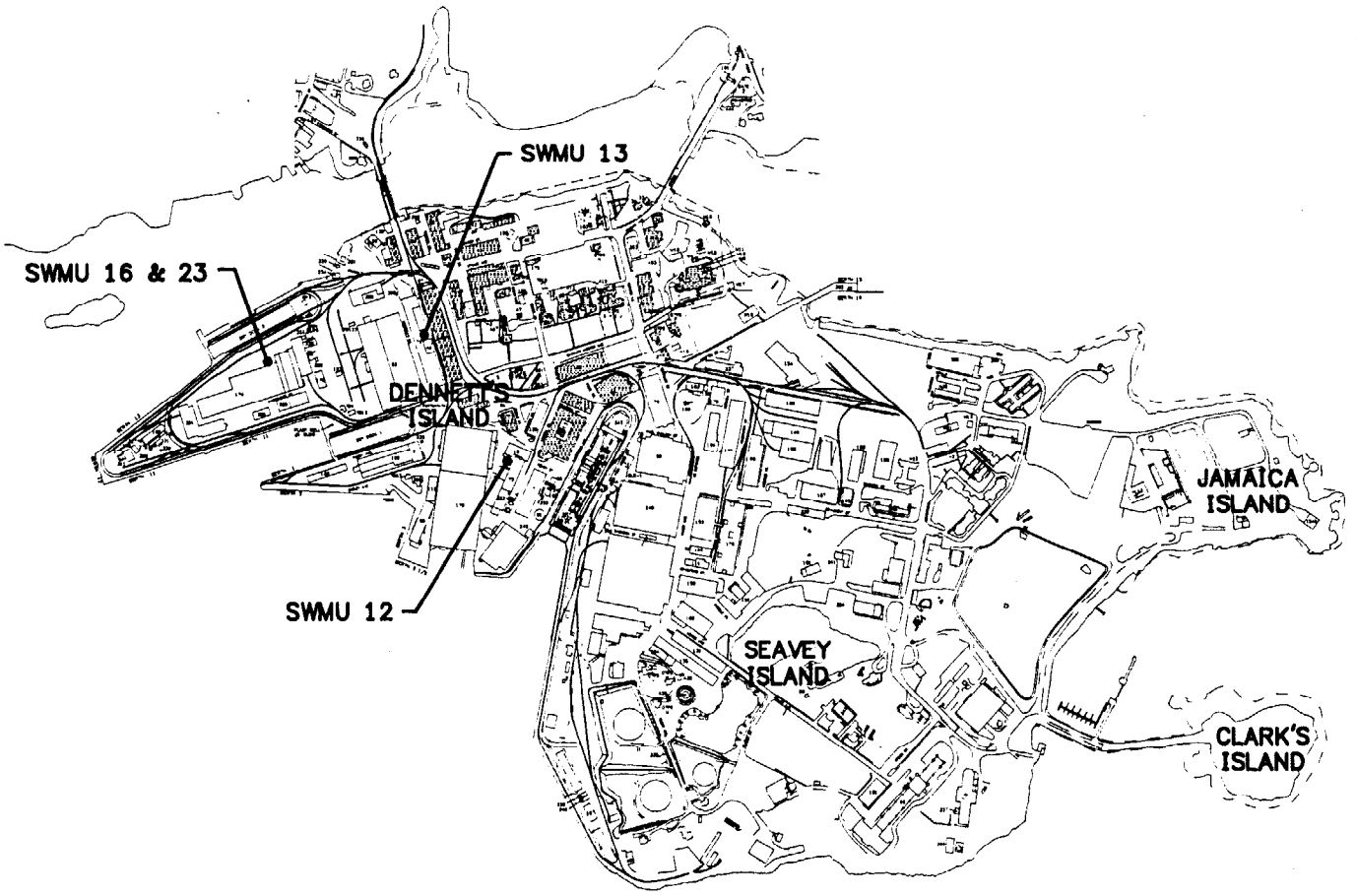
PNS LOCATION MAP
PORTSMOUTH NAVAL SHIPYARD
KITTERY, MAINE

0 2000 4000
SCALE IN FEET

FIGURE 1-1

Brown & Root Environmental

ACAD: O:\DATA\CADD\5008\5008BM05.DWG 03/20/96 MB PLOT LIMITS XREF=5008YDMP.DWG



SWMU 12 – BOILER BLOWDOWN TANK NO. 25
SWMU 13 – RINSE WATER TANK NO. 27
SWMU 16 – RINSE WATER TANK NO. 34
SWMU 23 – CHEMICAL CLEANING FACILITY TANK NO. 26 (BUILDING 174)

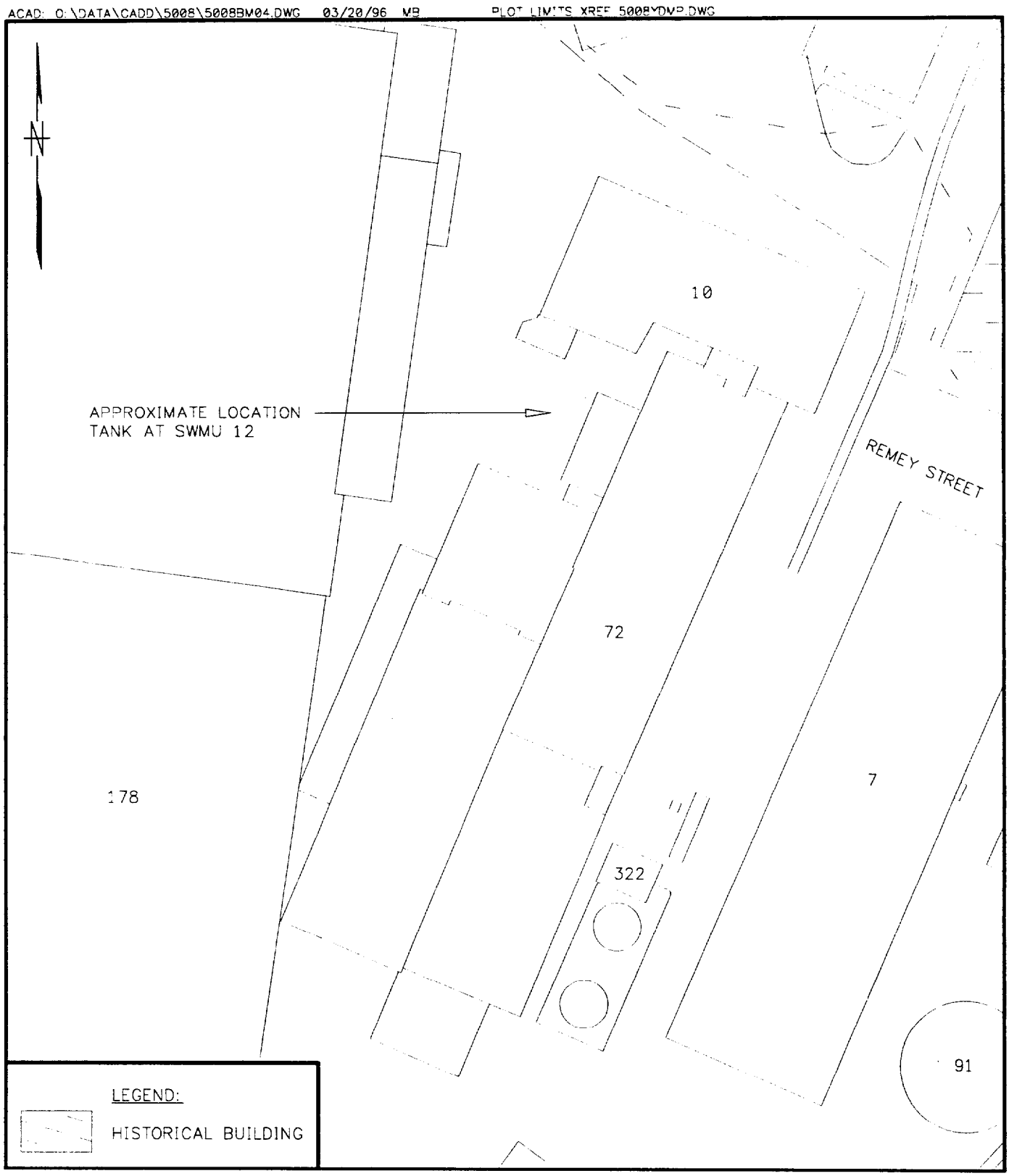
LEGEND:
HISTORICAL BUILDING

FIGURE 2-1

FACILITY MAP
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

0 1000 2000
SCALE IN FEET

Brown & Root Environmental

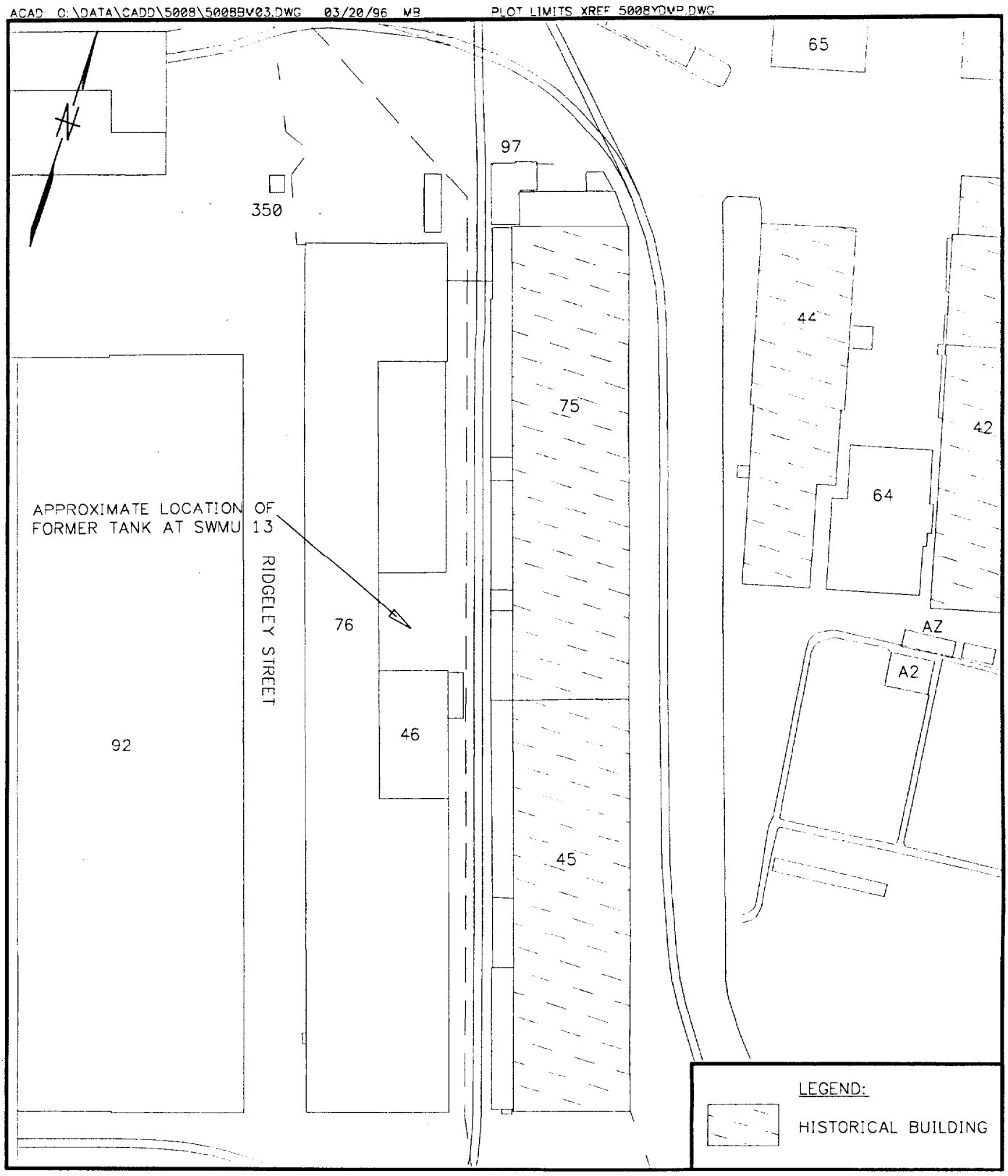


SITE LOCATION MAP
SWMU 12 – BOILER BLOWDOWN TANK NO. 25
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

FIGURE 3-1

0 60 120
SCALE IN FEET

Brown & Root Environmental

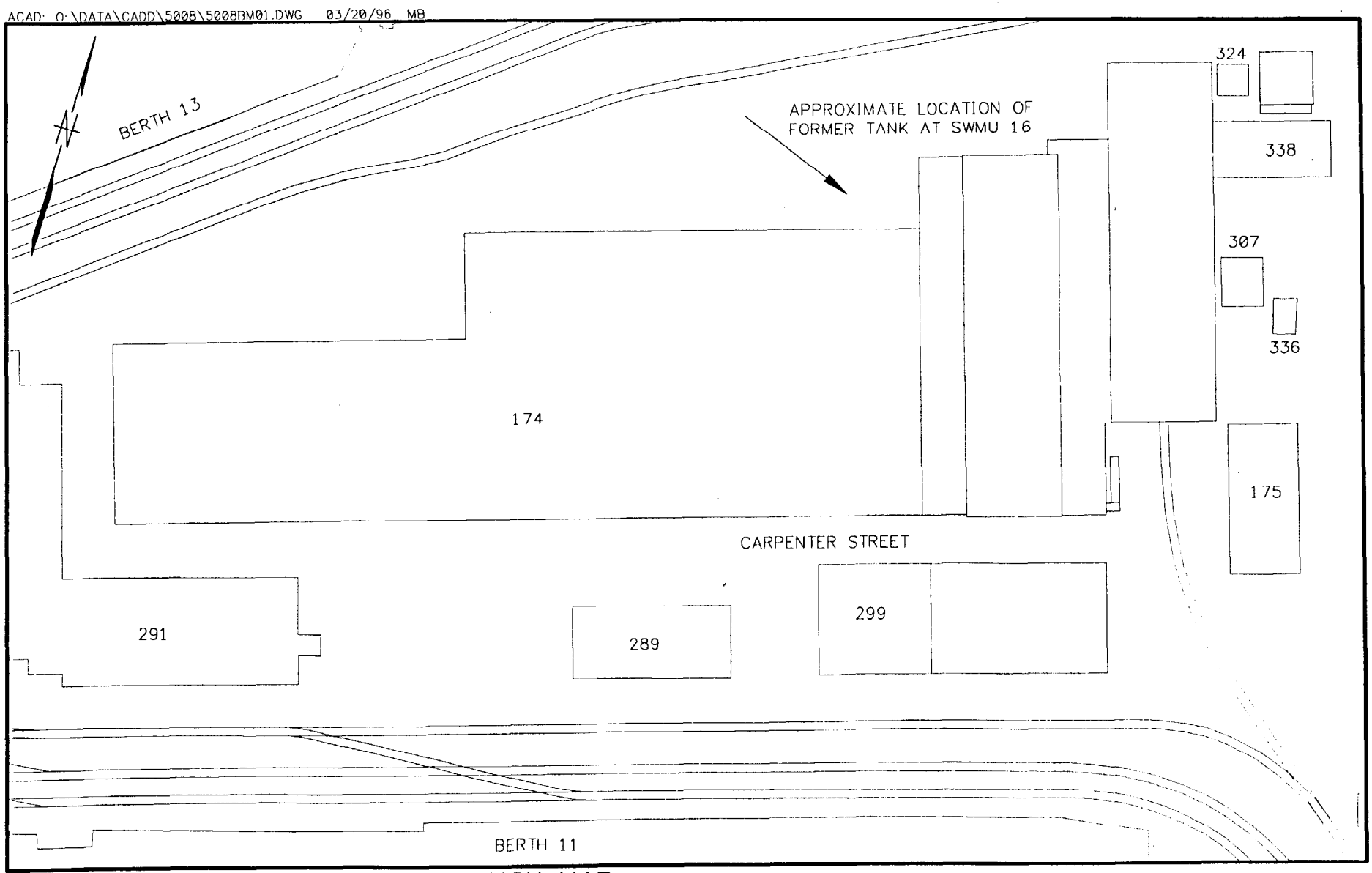


SITE LOCATION MAP
SWMU 13 – RINSE WATER TANK NO. 27
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

FIGURE 4-1

0 80 160
SCALE IN FEET

Brown & Root Environmental



SITE LOCATION MAP

SWMU 16 – RINSE WATER TANK NO. 34

PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

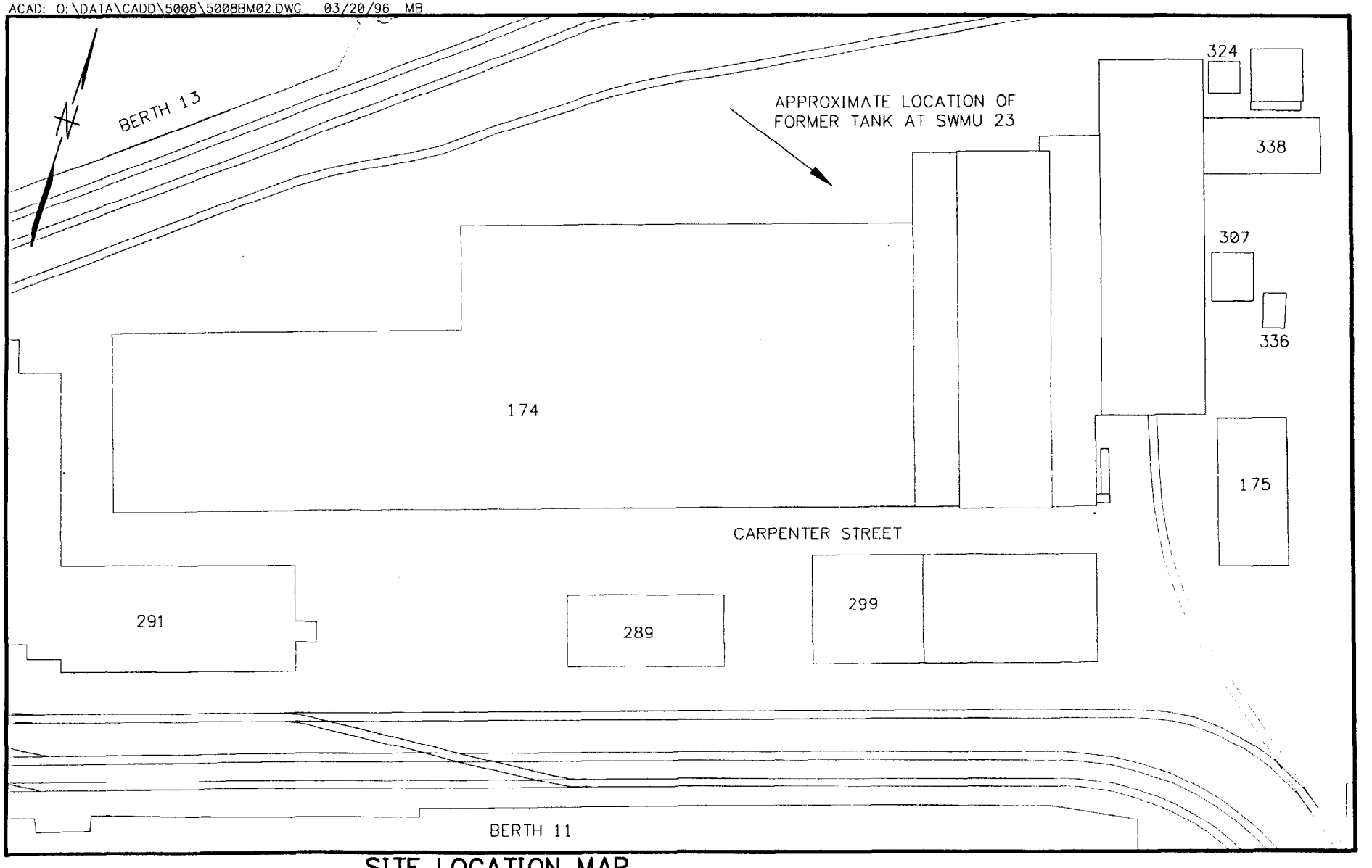
0 80 160

SCALE IN FEET

FIGURE 5–1

Brown & Root Environmental

ACAD: O:\DATA\CADD\5008\5008BM02.DWG 03/20/96 MB



SITE LOCATION MAP

SWMU 23 – CHEMICAL CLEANING FACILITY TANK NO. 26 (BUILDING 174)
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

0 80 160
SCALE IN FEET

FIGURE 6-1

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APPENDIX A

CALCULATED RISK TABLES

Tables reprinted from the Public Health and Environmental Risk Evaluation - Part A Human Health Risk Assessment (PHERE), McLaren/Hart Environmental Engineering Corporation, Albany, New York, March 4, 1994.

A.1 SWMU 13

TABLE 5-38
POTENTIAL RISKS CALCULATED FOR INGESTION OF CHEMICALS IN SUBSURFACE SOILS FOR POTENTIAL FUTURE CONDITIONS
OCCUPATIONAL ON-SITE EXPOSURES AT RINSE WATER TANK NO. 27, SWMU NO. 13
DURING EXCAVATION/REMEDIATION/CONSTRUCTION OF SUBSURFACE SOILS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ANTIMONY	8.07E-08	1.43E-07		ND	-	-	2.83E-06	4.99E-06	4.00E-04		7.06E-03	1.25E-02
ARSENIC	1.97E-07	2.33E-07	1.75E+00	ND	3.46E-07	4.09E-07	6.91E-06	8.17E-06	3.00E-04		2.30E-02	2.72E-02
BARIUM	1.46E-06	2.42E-06		ND	-	-	5.11E-05	8.46E-05	7.00E-02		7.30E-04	1.21E-03
CADMIUM	2.17E-08	3.21E-08		ND	-	-	7.58E-07	1.13E-06	1.00E-03		7.58E-04	1.13E-03
CHROMIUM	3.33E-07	4.19E-07		ND	-	-	1.16E-05	1.47E-05	5.00E-03		2.33E-03	2.94E-03
COBALT	1.24E-07	1.50E-07		ND	-	-	4.34E-06	5.23E-06		ND	-	-
COPPER	3.44E-06	5.45E-06		ND	-	-	1.20E-04	1.91E-04	9.70E-02		1.24E-03	1.97E-03
LEAD	1.29E-06	2.70E-06		ND	-	-	4.53E-05	9.44E-05		ND	-	-
NICKEL	8.64E-07	1.41E-06		ND	-	-	3.02E-05	4.94E-05	2.00E-02		1.51E-03	2.47E-03
TIN	1.73E-07	2.87E-07		ND	-	-	6.05E-06	1.00E-05		ND	-	-
VANADIUM	2.33E-07	2.99E-07		ND	-	-	8.16E-06	1.05E-05	7.00E-03		1.17E-03	1.50E-03
ZINC	3.02E-06	5.58E-06		ND	-	-	1.34E-04	1.95E-04	2.00E-01		6.69E-04	9.76E-04
VOLATILE ORGANICS												
ACETONE	8.26E-10	2.80E-09		ND	-	-	2.89E-08	9.78E-08	1.00E-01		2.89E-07	9.78E-07
TOLUENE	3.84E-11	6.99E-11		ND	-	-	1.35E-09	2.45E-09	2.00E-01		6.73E-09	1.22E-08
XYLENE (TOTAL)	4.19E-11	4.19E-11		ND	-	-	1.47E-09	1.47E-09	2.00E+00		7.34E-10	7.34E-10
PESTICIDES (PCB/PEST)												
4,4'-DDT	1.05E-10	2.24E-10	3.40E-01		3.57E-11	7.62E-11	3.67E-09	7.83E-09	5.00E-04		7.34E-06	1.57E-05

NOTES:

*** - AVERAGE CONCENTRATION EXCEEDS MAXIMUM DETECTED VALUE; MAXIMUM VALUE WAS USED IN CALCULATING EXPOSURES AND RISKS.**
ND - NO DATA AVAILABLE

SOURCE: PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION: PART A HUMAN HEALTH RISK ASSESSMENT (PHERE), McLAREN/HART ENVIRONMENTAL ENGINEERING CORPORATION, ALBANY, NY, MARCH 4, 1994.

TABLE 5-38
POTENTIAL RISKS CALCULATED FOR INGESTION OF CHEMICALS IN SUBSURFACE SOILS FOR POTENTIAL FUTURE CONDITIONS
OCCUPATIONAL ON-SITE EXPOSURES AT RINSE WATER TANK NO. 27, SWMU NO. 13
DURING EXCAVATION/REMEDIATION/CONSTRUCTION OF SUBSURFACE SOILS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
SEMIVOLATILES (8C0/8C0)												
2-METHYLNAPHTHALENE	3.55E-09	3.91E-09		ND	-	-	1.24E-07	1.37E-07		ND	-	-
ACENAPHTHENE	2.22E-09	4.33E-09		ND	-	-	7.77E-08	1.52E-07	6.00E-02		1.29E-06	2.53E-06
ACENAPTHYLENE	8.25E-10 <	8.25E-10		ND	-	-	2.89E-08 <	2.89E-08		ND	-	-
ANTHRACENE	8.49E-09	1.54E-08		ND	-	-	2.97E-07	5.38E-07	3.00E-01		9.91E-07	1.79E-06
BENZO(A)ANTHRACENE	7.70E-09	1.33E-08	5.80E+00		4.50E-08	7.70E-08	2.72E-07	4.65E-07		ND	-	-
BENZO(A)PYRENE	6.53E-09	1.15E-08	5.80E+00		3.79E-08	6.65E-08	2.29E-07	4.01E-07		ND	-	-
BENZO(B)FLUORANTHENE	1.12E-08	2.38E-08	5.80E+00		6.51E-08	1.38E-07	3.93E-07	8.32E-07		ND	-	-
BENZO(G,H,I)PERYLENE	2.08E-09	4.75E-09		ND	-	-	1.01E-07	1.66E-07	4.00E-03		2.52E-05	4.16E-05
BIS(2-ETHYLHEXYL)PHTHALATE	5.99E-10 <	5.99E-10	1.40E-02		7.83E-12 <	7.83E-12	1.96E-08 <	1.96E-08	2.00E-02		9.80E-07 <	9.78E-07
CHRYSENE	8.88E-09	1.54E-08	5.80E+00		5.15E-08	8.92E-08	3.11E-07	5.38E-07		ND	-	-
DI-N-BUTYLPHTHALATE	1.68E-09	1.82E-09		ND	-	-	5.87E-08	6.36E-08	1.00E-01		5.87E-07	6.36E-07
DI-N-OCTYLPHTHALATE	4.19E-11 <	4.19E-11		ND	-	-	1.47E-09 <	1.47E-09	2.00E-02		7.35E-08 <	7.34E-08
DIBENZ(A,H)ANTHRACENE	1.26E-10 <	1.26E-10	5.80E+00		7.31E-10 <	7.30E-10	4.40E-09 <	4.40E-09		ND	-	-
DIBENZOFURAN	1.99E-09	3.35E-09		ND	-	-	6.97E-08	1.17E-07		ND	-	-
FLUORANTHENE	2.97E-08	5.17E-08		ND	-	-	1.04E-06	1.81E-06	4.00E-02		2.60E-05	4.53E-05
FLUORENE	2.64E-09	4.61E-09		ND	-	-	9.31E-08	1.61E-07	4.00E-02		2.33E-06	4.04E-06
INDENO(1,2,3-CD)PYRENE	2.78E-09	5.45E-09	5.80E+00		1.61E-08	3.16E-08	9.74E-08	1.91E-07		ND	-	-
NAPHTHALENE	2.06E-09	2.38E-09		ND	-	-	7.22E-08	8.32E-08	4.00E-03		1.82E-05	2.08E-05
PHENANTHRENE	2.89E-08	5.17E-08		ND	-	-	9.80E-07	1.81E-06	4.00E-03		2.45E-04	4.53E-04
PYRENE	2.18E-08	3.63E-08		ND	-	-	7.64E-07	1.27E-06	3.00E-02		2.55E-05	4.24E-05
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					5.62E-07	8.11E-07	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				3.09E-02	5.25E-02

NOTES:

< - AVERAGE CONCENTRATION EXCEEDS MAXIMUM DETECTED VALUE; MAXIMUM VALUE WAS USED IN CALCULATING EXPOSURES AND RISKS.
ND - NO DATA AVAILABLE

SOURCE: PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION: PART A HUMAN HEALTH RISK ASSESSMENT (PHERE), McLAREN/HART ENVIRONMENTAL ENGINEERING CORPORATION, ALBANY, NY, MARCH 4, 1994.

TABLE 5-39
POTENTIAL RISKS CALCULATED FOR DERMAL CONTACT WITH CHEMICALS IN SUBSURFACE SOILS FOR POTENTIAL FUTURE CONDITIONS
OCCUPATIONAL ON-SITE EXPOSURES AT RINSE WATER TANK NO. 27, SWMU NO. 13
DURING EXCAVATION/REMEDIATION/CONSTRUCTION OF SUBSURFACE SOILS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD (mg/kg/day)		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX			AVG	MAX
VOLATILE ORGANICS												
ACETONE	2.07E-09	6.99E-09		ND	-	-	7.23E-08	2.45E-07	1.00E-01		7.23E-07	2.45E-06
TOLUENE	9.41E-11	1.75E-10		ND	-	-	3.36E-09	6.12E-09	2.00E-01		1.68E-08	3.06E-08
XYLENE (TOTAL)	1.05E-10	1.05E-10		ND	-	-	3.67E-09	3.67E-09	2.00E+00		1.83E-09	1.83E-09
PESTICIDES (ug/kg)												
4,4'-DDT	2.62E-11	5.59E-11	3.40E-01		8.91E-12	1.90E-11	9.17E-10	1.96E-09	5.00E-04		1.83E-06	3.92E-06
SEMIVOLATILES (ug/kg)												
2-METHYLNAPHTHALENE	8.87E-10	9.78E-10		ND	-	-	3.10E-08	3.42E-08		ND	-	-
ACENAPHTHENE	5.55E-10	1.08E-09		ND	-	-	1.94E-08	3.79E-08	6.00E-02		3.24E-07	6.32E-07
ACENAPHTHYLENE	2.06E-10 <	2.06E-10		ND	-	-	7.22E-09 <	7.22E-09		ND	-	-
ANTHRACENE	2.12E-09	3.84E-09		ND	-	-	7.43E-08	1.35E-07	3.00E-01		2.48E-07	4.48E-07
BENZO(A)ANTHRACENE	1.94E-09	3.32E-09	5.80E+00		1.12E-08	1.93E-08	6.79E-08	1.16E-07		ND	-	-
BENZO(A)PYRENE	1.63E-09	2.87E-09	5.80E+00		9.48E-09	1.66E-08	5.72E-08	1.00E-07		ND	-	-
BENZO(B)FLUORANTHENE	2.80E-09	5.94E-09	5.80E+00		1.63E-08	3.45E-08	9.82E-08	2.08E-07		ND	-	-
BENZO(G,H,I)PERYLENE	7.21E-10	1.19E-09		ND	-	-	2.52E-08	4.16E-08	4.00E-03		6.31E-06	1.04E-05
BIS(2-ETHYLHEXYL)PHTHALATE	1.40E-10 <	1.40E-10	1.40E-02		1.96E-12 <	1.96E-12	4.89E-09 <	4.89E-09	2.00E-02		2.44E-07 <	2.45E-07
CHRYSENE	2.22E-09	3.84E-09	5.80E+00		1.29E-08	2.23E-08	7.77E-08	1.35E-07		ND	-	-
DI-N-BUTYLPHTHALATE	4.19E-10	4.54E-10		ND	-	-	1.47E-08	1.59E-08	1.00E-01		1.47E-07	1.59E-07
DI-N-OCTYLPHTHALATE	1.05E-11 <	1.05E-11		ND	-	-	3.67E-10 <	3.67E-10	2.00E-02		1.83E-08 <	1.83E-08
DIBENZ(A,H)ANTHRACENE	3.15E-11 <	3.15E-11	5.80E+00		1.83E-10 <	1.82E-10	1.10E-09 <	1.10E-09		ND	-	-
DIBENZOFURAN	4.90E-10	8.39E-10		ND	-	-	1.74E-08	2.94E-08		ND	-	-
FLUORANTHENE	7.43E-09	1.29E-08		ND	-	-	2.60E-07	4.53E-07	4.00E-02		6.50E-06	1.13E-05
FLUORENE	6.65E-10	1.15E-09		ND	-	-	2.33E-08	4.04E-08	4.00E-02		5.82E-07	1.01E-06
INDENO(1,2,3-CD)PYRENE	6.95E-10	1.36E-09	5.80E+00		4.03E-09	7.90E-09	2.43E-08	4.77E-08		ND	-	-
NAPHTHALENE	5.20E-10	5.94E-10		ND	-	-	1.82E-08	2.08E-08	4.00E-03		4.55E-06	5.20E-06
PHENANTHRENE	7.00E-09	1.29E-08		ND	-	-	2.45E-07	4.53E-07	4.00E-03		6.12E-05	1.13E-04
PYRENE	5.46E-09	9.09E-09		ND	-	-	1.91E-07	3.18E-07	3.00E-02		6.37E-06	1.06E-05
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					5.41E-08	1.01E-07	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				8.91E-05	1.60E-04

NOTES:

< - AVERAGE CONCENTRATION EXCEEDS MAXIMUM DETECTED VALUE; MAXIMUM VALUE WAS USED IN CALCULATING EXPOSURES AND RISKS.
ND - NO DATA AVAILABLE

SOURCE: PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION: PART A HUMAN HEALTH RISK ASSESSMENT (PHERE), McLAREN/HART ENVIRONMENTAL ENGINEERING CORPORATION, ALBANY, NY, MARCH 4, 1994.

A.2 SWMU 16

TABLE 5-40
POTENTIAL RISKS CALCULATED FOR INGESTION OF CHEMICALS IN SUBSURFACE SOILS FOR POTENTIAL FUTURE CONDITIONS
OCCUPATIONAL ON-SITE EXPOSURES AT RINSE WATER TANK NO. 34, SWMU NO. 16
DURING EXCAVATION/REMEDIATION/CONSTRUCTION OF SUBSURFACE SOILS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ARSENIC	2.37E-07	2.52E-07	1.75E+00		4.14E-07	4.42E-07	8.28E-06	8.83E-06	3.00E-04		2.76E-02	2.94E-02
BARIUM	7.40E-07	8.01E-07		ND	-	-	2.59E-05	2.80E-05	7.00E-02		3.70E-04	4.00E-04
CADMIUM	2.83E-08	3.35E-08		ND	-	-	9.91E-07	1.17E-06	1.00E-03		9.91E-04	1.17E-03
CHROMIUM	4.04E-07	4.42E-07		ND	-	-	1.42E-05	1.55E-05	5.00E-03		2.83E-03	3.09E-03
COBALT	1.62E-07	1.62E-07		ND	-	-	5.66E-06	5.68E-06		ND	-	-
LEAD	1.49E-07	1.54E-07		ND	-	-	5.22E-06	5.41E-06		ND	-	-
NICKEL	4.94E-07	5.31E-07		ND	-	-	1.73E-05	1.86E-05	2.00E-02		8.64E-04	9.30E-04
VANADIUM	4.29E-07	4.51E-07		ND	-	-	1.50E-05	1.58E-05	7.00E-03		2.14E-03	2.26E-03
ZINC	8.92E-07	9.52E-07		ND	-	-	3.12E-05	3.33E-05	2.00E-01		1.56E-04	1.67E-04
VOLATILE ORGANICS												
TOLUENE	2.80E-11	2.80E-11		ND	-	-	9.78E-10	9.78E-10	2.00E-01		4.89E-09	4.89E-09
SEMIVOLATILES												
2-METHYLNAPHTHALENE	1.29E-09	1.82E-09		ND	-	-	4.50E-08	6.36E-08		ND	-	-
ACENAPHTHENE	2.82E-09	4.33E-09		ND	-	-	9.86E-08	1.52E-07	6.00E-02		1.64E-06	2.53E-06
ACENAPTHYLENE	1.92E-09	2.24E-09		ND	-	-	6.70E-08	7.83E-08		ND	-	-
ANTHRACENE	7.97E-09	1.29E-08		ND	-	-	2.79E-07	4.50E-07	3.00E-01		9.30E-07	1.50E-06
BENZO(A)ANTHRACENE	3.74E-08	6.15E-08	5.80E+00		2.17E-07	3.57E-07	1.31E-06	2.15E-06		ND	-	-
BENZO(A)PYRENE	3.54E-08	5.87E-08	5.80E+00		2.06E-07	3.41E-07	1.24E-06	2.05E-06		ND	-	-
BENZO(B)FLUORANTHENE	6.42E-08	1.16E-07	5.80E+00		3.72E-07	6.73E-07	2.25E-06	4.06E-06		ND	-	-
BENZO(G,H,I)PERYLENE	1.02E-08	1.54E-08		ND	-	-	3.58E-07	5.38E-07	4.00E-03		8.96E-05	1.35E-04
BIS(2-ETHYLHEXYL)PHTHALATE	2.11E-09	1.59E-09	1.40E-02		2.95E-11	2.23E-11	7.38E-08	5.58E-08	2.00E-02		3.69E-06	2.79E-06
CHRYSENE	4.48E-08	7.41E-08	5.80E+00		2.60E-07	4.30E-07	1.57E-06	2.59E-06		ND	-	-
DI-N-BUTYLPHTHALATE	1.20E-09	1.26E-09		ND	-	-	4.20E-08	4.40E-08	1.00E-01		4.20E-07	4.40E-07
DIBENZ(A,H)ANTHRACENE	2.43E-09	1.82E-09	5.80E+00		1.41E-08 ◆	1.05E-08	8.50E-08	6.36E-08		ND	-	-
DIBENZOFURAN	2.88E-09	4.33E-09		ND	-	-	1.01E-07	1.52E-07		ND	-	-
FLUORANTHENE	7.76E-08	1.27E-07		ND	-	-	2.72E-06	4.45E-06	4.00E-02		6.79E-05	1.11E-04
FLUORENE	6.01E-09	9.51E-09		ND	-	-	2.10E-07	3.33E-07	4.00E-02		5.26E-06	8.32E-06
INDENO(1,2,3-CD)PYRENE	1.13E-08	1.68E-08	5.80E+00		6.55E-08	9.73E-08	3.95E-07	5.87E-07		ND	-	-
NAPHTHALENE	3.18E-09	3.63E-09		ND	-	-	1.11E-07	1.27E-07	4.00E-03		2.78E-05	3.18E-05
PHENANTHRENE	4.17E-08	6.71E-08		ND	-	-	1.46E-06	2.35E-06	4.00E-03		3.65E-04	5.87E-04
PYRENE	6.29E-08	1.02E-07		ND	-	-	2.20E-06	3.57E-06	3.00E-02		7.34E-05	1.19E-04
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					1.55E-06	2.35E-06	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				3.56E-02	3.85E-02

NOTES:

◆ - AVERAGE CONCENTRATION EXCEEDS MAXIMUM DETECTED VALUE; MAXIMUM VALUE WAS USED IN CALCULATING EXPOSURES AND RISKS.
ND - NO DATE AVAILABLE

SOURCE: PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION: PART A HUMAN HEALTH RISK ASSESSMENT (PHERE), McLAREN/HART ENVIRONMENTAL ENGINEERING CORPORATION, ALBANY, NY, MARCH 4, 1994

TABLE 5-41
POTENTIAL RISKS CALCULATED FOR DERMAL CONTACT WITH CHEMICALS IN SUBSURFACE SOILS FOR POTENTIAL FUTURE CONDITIONS
OCCUPATIONAL ON-SITE EXPOSURES AT RINSE WATER TANK NO. 34, SWMU NO. 16
DURING EXCAVATION/REMEDIATION/CONSTRUCTION OF SUBSURFACE SOILS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
VOLATILE ORGANICS												
TOLUENE	6.99E-11	6.99E-11		ND	-	-	2.45E-09	2.45E-09	2.00E-01		1.22E-08	1.22E-08
SEMIVOLATILES												
2-METHYLNAPHTHALENE	3.21E-10	4.54E-10		ND	-	-	1.13E-08	1.59E-08		ND	-	-
ACENAPHTHENE	7.04E-10	1.00E-09		ND	-	-	2.46E-08	3.79E-08	6.00E-02		4.11E-07	6.32E-07
ACENAPTHYLENE	4.79E-10	5.59E-10		ND	-	-	1.68E-08	1.96E-08		ND	-	-
ANTHRACENE	1.99E-09	3.21E-09		ND	-	-	6.97E-08	1.13E-07	3.00E-01		2.32E-07	3.75E-07
BENZO(A)ANTHRACENE	9.36E-09	1.54E-08	5.80E+00		5.43E-08	8.92E-08	3.28E-07	5.38E-07		ND	-	-
BENZO(A)PYRENE	8.86E-09	1.47E-08	5.80E+00		5.14E-08	8.51E-08	3.10E-07	5.14E-07		ND	-	-
BENZO(B)FLUORANTHENE	1.60E-08	2.90E-08	5.80E+00		9.30E-08	1.68E-07	5.61E-07	1.02E-06		ND	-	-
BENZO(G,H,I)PERYLENE	2.56E-09	3.84E-09		ND	-	-	8.96E-08	1.35E-07	4.00E-03		2.24E-05	3.36E-05
BIS(2-ETHYLHEXYL)PHTHALATE	5.27E-10	3.98E-10	1.40E-02		7.38E-12	5.58E-12	1.84E-08	1.39E-08	2.00E-02		9.22E-07	6.97E-07
CHRYSENE	1.12E-08	1.85E-08	5.80E+00		6.50E-08	1.07E-07	3.92E-07	6.48E-07		ND	-	-
DI-N-BUTYLPHTHALATE	3.00E-10	3.15E-10		ND	-	-	1.05E-08	1.10E-08	1.00E-01		1.05E-07	1.10E-07
DIBENZ(A,H)ANTHRACENE	6.07E-10	4.54E-10	5.80E+00		3.52E-09	2.63E-09	2.13E-08	1.59E-08		ND	-	-
DIBENZOFURAN	7.21E-10	1.08E-09		ND	-	-	2.52E-08	3.79E-08		ND	-	-
FLUORANTHENE	1.94E-08	3.18E-08		ND	-	-	6.79E-07	1.11E-06	4.00E-02		1.70E-05	2.78E-05
FLUORENE	1.50E-09	2.38E-09		ND	-	-	5.26E-08	8.32E-08	4.00E-02		1.31E-06	2.08E-06
INDENO(1,2,3-CD)PYRENE	2.82E-09	4.19E-09	5.80E+00		1.64E-08	2.43E-08	9.88E-08	1.47E-07		ND	-	-
NAPHTHALENE	7.95E-10	9.09E-10		ND	-	-	2.78E-08	3.18E-08	4.00E-03		6.96E-06	7.95E-06
PHENANTHRENE	1.04E-08	1.68E-08		ND	-	-	3.65E-07	5.87E-07	4.00E-03		9.13E-05	1.47E-04
PYRENE	1.57E-08	2.55E-08		ND	-	-	5.50E-07	8.93E-07	3.00E-02		1.83E-05	2.98E-05
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					2.84E-07	4.77E-07	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				1.99E-04	2.98E-04

NOTES:

*** - AVERAGE CONCENTRATION EXCEEDS MAXIMUM DETECTED VALUE; MAXIMUM VALUE WAS USED IN CALCULATING EXPOSURES AND RISKS.**
ND - NO DATE AVAILABLE

SOURCE: PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION: PART A HUMAN HEALTH RISK ASSESSMENT (PHERE), McLAREN/HART ENVIRONMENTAL ENGINEERING CORPORATION, ALBANY, NY, MARCH 4, 1994.

A.3 SWMU 23

TABLE 5-44

POTENTIAL RISKS CALCULATED FOR INGESTION OF CHEMICALS IN SUBSURFACE SOILS FOR POTENTIAL FUTURE CONDITIONS
OCCUPATIONAL ON-SITE EXPOSURES AT CHEMICAL CLEANING FACILITY TANK, SWMU NO. 23
DURING EXCAVATION/REMEDIATION/CONSTRUCTION OF SUBSURFACE SOILS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
INORGANICS												
ANTIMONY	8.28E-08	1.38E-07		ND	-	-	2.90E-06	4.84E-06	4.00E-04		7.25E-03	1.21E-02
ARSENIC	2.30E-07	2.60E-07	1.75E+00		4.02E-07	4.55E-07	8.05E-06	9.10E-06	3.00E-04		2.68E-02	3.03E-02
BARIUM	6.62E-07	8.61E-07		ND	-	-	2.32E-05	3.01E-05	7.00E-02		3.31E-04	4.31E-04
CADMIUM	2.73E-08	3.08E-08		ND	-	-	9.54E-07	1.08E-06	1.00E-03		9.54E-04	1.08E-03
CHROMIUM	4.56E-07	6.26E-07		ND	-	-	1.59E-05	2.19E-05	5.00E-03		3.19E-03	4.38E-03
COBALT	1.72E-07	2.12E-07		ND	-	-	6.02E-06	7.44E-06		ND	-	-
LEAD	2.52E-07	3.02E-07		ND	-	-	8.83E-06	1.06E-05		ND	-	-
NICKEL	5.84E-07	7.20E-07		ND	-	-	2.05E-05	2.52E-05	2.00E-02		1.02E-03	1.26E-03
TIN	9.14E-08	1.36E-07		ND	-	-	3.20E-06	4.75E-06	6.00E-01		5.33E-06	7.91E-06
VANADIUM	4.35E-07	5.84E-07		ND			1.52E-05	2.05E-05	7.00E-03		2.18E-03	2.92E-03
ZINC	8.18E-07	9.69E-07		ND	-	-	2.86E-05	3.39E-05	2.00E-01		1.43E-04	1.70E-04
VOLATILE ORGANICS												
TETRACHLOROETHENE	4.37E-11	5.59E-11	5.20E-02		2.23E-12	2.85E-12	1.53E-09	1.96E-09	1.00E-02		1.53E-07	1.96E-07
TOLUENE	2.45E-11	2.80E-11		ND	-	-	8.56E-10	9.78E-10	2.00E-01		4.28E-09	4.89E-09
XYLENE (TOTAL)	7.86E-11	1.96E-10		ND	-	-	2.75E-09	6.85E-09	2.00E+00		1.38E-09	3.42E-09
PESTICIDES												
METHYL PARATHION	9.31E-10	2.80E-09		ND	-	-	3.26E-08	9.78E-08	2.50E-04		1.30E-04	3.91E-04
SEMIVOLATILES												
ACENAPHTHENE	2.26E-09	2.66E-09		ND	-	-	7.93E-08	9.30E-08	6.00E-02		1.32E-06	1.55E-06
ANTHRACENE	3.31E-09	7.55E-09		ND	-	-	1.16E-07	2.64E-07	3.00E-01		3.86E-07	8.81E-07
BENZO(A)ANTHRACENE	7.30E-09	1.68E-08	5.80E+00		4.24E-08	9.73E-08	2.56E-07	5.87E-07		ND	-	-
BENZO(A)PYRENE	6.78E-09	1.54E-08	5.80E+00		3.93E-08	8.92E-08	2.37E-07	5.38E-07		ND	-	-
BENZO(B)FLUORANTHENE	8.00E-09	1.54E-08	5.80E+00		4.64E-08	8.92E-08	2.80E-07	5.38E-07		ND	-	-
BENZO(G,H,I)PERYLENE	3.29E-09	7.13E-09		ND	-	-	1.15E-07	2.50E-07	4.00E-03		2.88E-05	6.24E-05
BENZO(K)FLUORANTHENE	1.03E-08	3.08E-08	5.80E+00		6.00E-08	1.78E-07	3.62E-07	1.08E-06		ND	-	-

NOTES:

* - AVERAGE CONCENTRATION EXCEEDS MAXIMUM DETECTED VALUE; MAXIMUM VALUE WAS USED IN CALCULATING EXPOSURES AND RISKS.
ND - NO DATE AVAILABLE

SOURCE: PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION: PART A HUMAN HEALTH RISK ASSESSMENT (PHERE), McLAREN/HART ENVIRONMENTAL ENGINEERING CORPORATION, ALBANY, NY, MARCH 4, 1994.

TABLE 5-44
POTENTIAL RISKS CALCULATED FOR INGESTION OF CHEMICALS IN SUBSURFACE SOILS FOR POTENTIAL FUTURE CONDITIONS
OCCUPATIONAL ON-SITE EXPOSURES AT CHEMICAL CLEANING FACILITY TANK, SWMU NO. 23.
DURING EXCAVATION/REMEDIATION/CONSTRUCTION OF SUBSURFACE SOILS
PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS						NONCARCINOGENIC RISKS					
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK		CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT	
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG	MAX	AVG	MAX	(mg/kg/day)		AVG	MAX
CHRYSENE	8.29E-09	1.82E-08	5.80E+00		4.80E-08	1.05E-07	2.90E-07	6.36E-07		ND	-	-
DI-N-BUTYLPHTHALATE	1.17E-09	1.34E-09		ND	-	-	4.10E-08	4.70E-08	1.00E-01		4.10E-07	4.70E-07
DIBENZ(A,H)ANTHRACENE	1.30E-09 <	1.30E-09	5.80E+00		7.54E-09 <	7.54E-09	4.55E-08 <	4.55E-08		ND	-	-
DIBENZOFURAN	1.82E-09 <	1.82E-09		ND	-	-	6.36E-08 <	6.36E-08		ND	-	-
FLUORANTHENE	1.84E-08	4.19E-08		ND	-	-	6.45E-07	1.47E-06	4.00E-02		1.61E-05	3.67E-05
FLUORENE	2.55E-09	3.49E-09		ND	-	-	8.93E-08	1.22E-07	4.00E-02		2.23E-06	3.04E-06
INDENO(1,2,3-CD)PYRENE	2.22E-09	2.66E-09	5.80E+00		1.29E-08	1.54E-08	7.78E-08	9.30E-08		ND	-	-
NAPHTHALENE	2.80E-09	3.91E-09		ND	-	-	9.78E-08	1.37E-07	4.00E-03		2.45E-05	3.42E-05
PHENANTHRENE	1.29E-08	3.08E-08		ND	-	-	4.51E-07	1.08E-06	4.00E-03		1.13E-04	2.69E-04
PYRENE	1.59E-08	3.63E-08		ND	-	-	5.57E-07	1.27E-06	3.00E-02		1.86E-05	4.24E-05
					AVG	MAX					AVG	MAX
CUMULATIVE CARCINOGENIC RISK:					6.59E-07	1.04E-06	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				4.22E-02	5.35E-02

NOTES:

< - AVERAGE CONCENTRATION EXCEEDS MAXIMUM DETECTED VALUE; MAXIMUM VALUE WAS USED IN CALCULATING EXPOSURES AND RISKS.
ND - NO DATE AVAILABLE

SOURCE: PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION: PART A HUMAN HEALTH RISK ASSESSMENT (PHERE), McLAREN/HART ENVIRONMENTAL ENGINEERING CORPORATION, ALBANY, NY, MARCH 4, 1994.

TABLE 5-45
POTENTIAL RISKS CALCULATED FOR DERMAL CONTACT. WITH CHEMICALS IN SUBSURFACE SOILS FOR POTENTIAL FUTURE CONDITIONS OCCUPATIONAL ON-SITE EXPOSURES AT CHEMICAL CEALING FACILITY TANK, SWMU NO. 23 DURING EXCAVATION/REMEDIATION/CONSTRUCTION OF SUBSURFACE SOILS PORTSMOUTH NAVAL SHIPYARD

	CARCINOGENIC RISKS					NONCARCINOGENIC RISKS				
	CHRONIC DAILY INTAKE (mg/kg/day)		ORAL SLOPE FACTOR		CHEMICAL SPECIFIC RISK	CHRONIC DAILY INTAKE (mg/kg/day)		RfD		CHEMICAL SPECIFIC HAZARD QUOTIENT
ANALYTE	AVG	MAX	(mg/kg/day)-1		AVG MAX	AVG	MAX	(mg/kg/day)		AVG MAX
VOLATILE ORGANICS										
TETRACHLOROETHENE	1.09E-10	1.40E-10	5.20E-02		5.57E-12 7.13E-12	3.82E-09	4.89E-09	1.00E-02		3.82E-07 4.89E-07
TOLUENE	6.12E-11	6.99E-11		ND	- -	2.14E-09	2.45E-09	2.00E-01		1.07E-08 1.22E-08
XYLENE (TOTAL)	1.97E-10	4.89E-10		ND	- -	6.88E-09	1.71E-08	2.00E+00		3.44E-09 8.56E-09
PESTICIDES										
METHYL PARATHION	2.33E-10	6.99E-10		ND	- -	8.15E-09	2.45E-08	2.50E-04		3.26E-05 9.80E-05
SEMIVOLATILES										
ACENAPHTHENE	5.66E-10	6.64E-10		ND	- -	1.98E-08	2.32E-08	6.00E-02		3.30E-07 3.87E-07
ANTHRACENE	8.28E-10	1.89E-09		ND	- -	2.90E-08	6.60E-08	3.00E-01		9.66E-08 2.20E-07
BENZO(A)ANTHRACENE	1.83E-09	4.19E-09	5.80E+00		1.06E-08 2.43E-08	6.39E-08	1.47E-07		ND	- -
BENZO(A)PYRENE	1.69E-09	3.84E-09	5.80E+00		9.83E-09 2.23E-08	5.93E-08	1.35E-07		ND	- -
BENZO(B)FLUORANTHENE	2.00E-09	3.84E-09	5.80E+00		1.16E-08 2.23E-08	7.00E-08	1.35E-07		ND	- -
BENZO(G,H,I)PERYLENE	8.22E-10	1.78E-09		ND	- -	2.88E-08	6.24E-08	4.00E-03		7.19E-06 1.56E-05
BENZO(K)FLUORANTHENE	2.59E-09	7.69E-09	5.80E+00		1.50E-08 4.46E-08	9.05E-08	2.69E-07		ND	- -
CHRYSENE	2.07E-09	4.54E-09	5.80E+00		1.20E-08 2.63E-08	7.25E-08	1.59E-07		ND	- -
DI-N-BUTYLPHTHALATE	2.93E-10	3.35E-10		ND	- -	1.02E-08	1.17E-08	1.00E-01		1.02E-07 1.17E-07
DIBENZ(A,H)ANTHRACENE	3.25E-10 *	3.25E-10	5.80E+00		1.88E-09 * 1.88E-09	1.14E-08 *	1.14E-08		ND	- -
DIBENZOFURAN	4.54E-10 *	4.54E-10		ND	- -	1.59E-08 *	1.59E-08		ND	- -
FLUORANTHENE	4.60E-09	1.05E-08		ND	- -	1.61E-07	3.67E-07	4.00E-02		4.03E-06 9.17E-06
FLUORENE	6.38E-10	8.74E-10		ND	- -	2.23E-08	3.06E-08	4.00E-02		5.58E-07 7.64E-07
INDENO(1,2,3-CD)PYRENE	5.56E-10	6.64E-10	5.80E+00		3.22E-09 3.85E-09	1.94E-08	2.32E-08		ND	- -
NAPHTHALENE	6.99E-10	9.78E-10		ND	- -	2.45E-08	3.42E-08	4.00E-03		6.12E-06 8.56E-06
PHENANTHRENE	3.22E-09	7.69E-09		ND	- -	1.13E-07	2.69E-07	4.00E-03		2.82E-05 6.73E-05
PYRENE	3.98E-09	9.09E-09		ND	- -	1.39E-07	3.18E-07	3.00E-02		4.64E-06 1.06E-05
					AVG MAX					AVG MAX
CUMULATIVE CARCINOGENIC RISK:					6.41E-08 1.46E-07	CUMULATIVE NONCARCINOGENIC HAZARD QUOTIENT:				8.43E-05 2.11E-04

NOTES:

*** - AVERAGE CONCENTRATION EXCEEDS MAXIMUM DETECTED VALUE; MAXIMUM VALUE WAS USED IN CALCULATING EXPOSURES AND RISKS.**
ND - NO DATE AVAILABLE

SOURCE: PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION: PART A HUMAN HEALTH RISK ASSESSMENT (PHERE), McLAREN/HART ENVIRONMENTAL ENGINEERING CORPORATION, ALBANY, NY, MARCH 4, 1994.