## *GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS*

| | | |
|---|---|---|
| ***Project Name*** | ***BREMERTON NAVAL COMPLEX*** | ***ProjectID:*** 10-10 |
| ***Last Updated:*** | 09/03/02 | |

| | |
|---|---|
| ***City:*** | Bremerton |
| ***County:*** | Kitsap |
| ***State:*** | WA |
| ***Country:*** | USA |
| ***Bodies of Water:*** | Sinclair Inlet on Puget Sound |
| ***US EPA Region:*** | X |
| ***Status (Active, Complete, or Monitoring Only):*** | Complete |
| ***Date On NPL:*** | 1994 |
| ***ROD/ESD Date:*** | 2000 |
| ***Operable Unit:*** | B (Marine) |
| ***Areas of Concern (length or acres):*** | The full length of the Naval Complex shoreline extending 1,500 feet into Sinclair Inlet (about 230 acres total). |
| ***Other Characteristics of Water Body:*** | The marine portion of OU B (Marine OU B) is located between OU A and Site 10 East along the shoreline of the Naval Complex and extends approximately 1,500 feet outward into Sinclair Inlet. OU B is bounded to the northeast by Sinclair Inlet shoreline, and to the southwest by the Navy property line west of Mooring F and by the exclusion zone east of Mooring F.<br><br>Marine OU B is primarily subtidal with a small intertidal area located in the southwest portion of the Naval Complex. Marine OU B contains the outfalls for the Complex's stormwater drain systems, receiving stormwater runoff from the terrestrial portions of the Complex that is discharged under an NPDES permit. Three outfalls associated with a system of six drydocks also discharge to Marine OU B.<br><br>The Complex shoreline was historically tidelands, marshes, and forests and was cleared and filled beginning in the late 1800s to accommodate Naval operations. The shoreline presently comprises quay walls and riprap that has been developed with over-water structures. Along quay walls, water depth is approximately 15 to 20 feet below MLLW and in riprapped shoreline areas typically less than 5 feet MLLW, but then drops off quickly. Water depths generally range between 40 and 50 feet.<br><br>From the June 2000 ROD (Reference A-708): "Nearshore sediments along the north shore of Sinclair Inlet and in the central inlet are dominated by silt and clay, while those along the south shore are predominantly sandy. Coarser sediments are only present in intertidal areas affected by significant wave action (e.g., Ross Point). The implications of the depositional nature of the inlet are for contaminated sediments to remain resident in the inlet for long periods."<br><br>and<br><br>"Tidal currents and winds are the primary sources of water circulation in Sinclair Inlet. Weak tidal currents move water in and out of the inlet with a maximum velocity of 0.2 to 0.3 knots. Analysis of tidal currents in 1994 indicated residual current speeds of less than 0.2 knots (10 cm/s) for more than 90 percent of the time, regardless of site location, water depth, or season. Residual current speeds higher than 0.2 knots were rare, and speeds higher than 0.4 knots occurred less than 0.5 percent of the time. Surface currents generally flow out of the inlet, although surface current flow into the inlet has been observed during summer months. Near- |

bottom currents primarily flow into the inlet, regardless of season. Currents are generally not capable of resuspending bottom sediments."

***Contaminants of Concern:*** PCB; PAHs; mercury; arsenic; copper; lead; and zinc.

***Source of Contamination:*** Historical point and non-point discharges from the Naval Complex originating from a variety of ship building, demolition, and maintenance activities that included plating wastes, metal filings and shavings associated with metal work, petroleum products, transformers containing PCBs, electrical components, batteries, acids, oxidizing materials, paints and paint chips, degreasing and cleaning solvents, and wood and miscellaneous materials.

***Contaminated Area Physical Characteristics:*** PCB concentrations in surface sediment samples collected in Marine OU B in 1998 and 1999 ranged from 1.6 to 61.7 ppm on an organic carbon basis. The depth of sediment impacted by PCBs is generally less than three feet.

***Type of Regulatory Action:*** US Navy-lead. Final

***Overall Status Summary:*** Investigation by the US Navy of the Bremerton Naval Complex Marine Operable Unit (OU) B began in 1990 under a Comprehensive Long-Term Environmental Action Navy contract with URS Consultants, Inc. The site inspection documented the existence of a variety of inorganic and semivolatile organic chemicals exceeding three-times background (screening criteria) levels and was used to establish marine sediment criteria. Project management plans for performing a Remedial Investigation (RI) in Marine OU B were completed in 1994. Sampling of the sediment and benthic community, and water column and sediment transport studies within Sinclair Inlet, were performed as part of the RI process. PCB concentrations in Marine OU B surface sediments were found to range from 1.6 to 61.7 ppm on an organic carbon (OC) basis, and the surface area-weighted average concentration (SAWAC) of PCBs in Marine OU B sediment was approximately 7.8 ppm OC.

In June 2000, the US Navy, the Washington State Department of Ecology, and USEPA, under an interagency agreement, issued an early action ROD for Marine OU B. The ROD required the removal of 200,000 cy of contaminated sediment from 32 acres of Marine OU B. The ROD was issued under early action status (i.e., issued prior to completion of the RI and Feasibility Study) to combine the project with a proposed navigational dredging project (about 370,000 cy) planned for Marine OU B. Under the ROD, contaminated sediment would be removed to reduce the SAWAC of PCBs within surface sediment from 7.8 to 4.1 ppm OC. Natural recovery is then expected to further reduce the SAWAC of PCBs to 3.0 ppm OC, the sediment quality standard, within 10 years.

Sediments removed as part of both navigational and remedial dredging would be disposed in confined aquatic disposal (CAD) cells totaling approximately 10 acres and located within Marine OU B. Additionally, the remedy requires that approximately 60,000 cy of clean sediment be used for enhanced natural recovery and in-situ capping. Enhanced natural recovery will involve thin-layer capping of areas to produce a nominal thickness of at least 20 cm of clean sediment. This layer is intended to provide a clean layer of sediment for establishment of the benthic community and not as an isolation layer for the more contaminated, deeper sediment. In situ capping requires a nominal thickness of three feet of clean sediment. Habitat restoration will also be performed.

Construction began June 15, 2000 and the CAD pit was finished mid-August 2000. CERCLA sediment (from Marine OU B) and navigational dredged sediment non-suitable for open-ocean disposal were then dredged from mid-August 2000 until February 15, 2001 when dredging was required to halt for four months due to a fish protection window. Placement of dredged sediment into the CAD pit was completed prior to halting dredging, which allowed time for the material to consolidate prior to installation of the cap. Navigational dredging was completed in

| | | |
|---|---|---|
| ***Project Name*** | ***BREMERTON NAVAL COMPLEX*** | ***ProjectID:*** 10-10 |
| ***Last Updated:*** | 09/03/02 | |

October 2001.

Total volume of material dredged for the project was 1,056,000 cy. A further breakdown is as follows:

- CAD pit installation material, suitable for open-ocean disposal: 376,000 cy;
- CERCLA sediment from around docks and berthing areas: 225,000 cy;
- Navigational dredged sediment non-suitable for open-ocean disposal: 174,000 cy; and
- Navigational dredged sediment suitable for open-ocean disposal: 281,000 cy.

| | |
|---|---|
| ***Remedial Action Planned:*** | ☑ |
| ***Risk Assessment:*** | ☑ |
| ***Remedial Action Implemented:*** | ☑ |
| ***Status of Dredging*** | ☐ |
| ***PRPs:*** | ☑ |
| ***Contacts:*** | ☑ |
| ***References:*** | ☑ |
| ***Modeling:*** | ☑ |
| ***Fishing Advisory:*** | ☑ |

***Key Conditions:*** capping, dredging, fish spawning limitations, habitat/streambank restoration, natural recovery, navigational dredging component, post monitoring, tidal fluctuations.

## *REMEDIAL ACTION PLANNED*

| | | |
|---|---|---|
| ***Project Name*** | ***BREMERTON NAVAL COMPLEX*** | ***ProjectID:*** 10-10 |
| ***Last Updated:*** | 09/03/02 | |

***Target Sediment Cleanup Standards (TSCS):***

Achieve the Minimum Cleanup Level (MCUL) of 3 ppm PCBs on an organic carbon (OC) basis within 10 years. This will be accomplished by removing contaminated sediment greater than 12 ppm PCBs OC to obtain a 4.1 ppm PCB OC surface area-weighted average concentration (SAWAC); natural recovery is anticipated to result in further reduction to 3 ppm PCBs OC SAWAC within 10 years of dredging completion. The long-term (greater than 10 years) goal is a SAWAC of 1.2 ppm PCBs OC.

***How TSCS Established:***

Based on fate and transport modeling results for natural recovery within 10 years.

***Target Bank and Floodplain Cleanup Levels (if applicable):***

***Other Target:***

Enhanced natural recovery for sediment containing between 6 ppm and 12 ppm PCBs OC and removal of sediment containing both 6 ppm or greater PCBs OC and 3 ppm or greater mercury.

***Environmental Sample Data References:***

- ***Sediment:***
- ***Water:***
- ***Fish:***

***Estimated Target Volume:***

200,000 cy

***Planned Disposal Method:***

Confined aquatic disposal cells (CAD) located at the east end of the Marine OU B boundary.

***Estimated Calendar Time to Implement Remedy:***

***Estimated Time to Implement Remedy:***

***Estimated Cost to Implement Remedy:***

$14 million

***Stated Remedial Action Objectives (and Source):***

Source: June 2000 ROD; Reference A-708:

1. "Reduce the concentration of PCBs in sediments to below the minimum cleanup level (MCUL) of 3 ppm on an organic carbon basis in the biologically active zone (0 to 10 cm depth) within the marine OU B, as a measure expected to reduce PCB concentrations in fish tissue;"

2. "Control shoreline erosion of contaminated fill material at Site 1;" and

3. "Selectively remove sediment with high concentrations of mercury co-located with PCBs."

***Measures of Success to be Used:***

Results of long-term monitoring of chemical concentrations in fish and sediment.

***Planned Monitoring and Restoration:***

Monitoring during implementation of the remedy is to include water column monitoring during dredging, disposal, and capping operations. Marine tissue and sediments will be monitored to document progress toward and attainment of the cleanup goals.

***Agency Position on Sediment Removal (and Source):***

Source: June 2000 ROD, Reference A-708:

"The Navy intends to accelerate the cleanup of the marine portions of OU B and address terrestrial OU B separately. The Navy, Ecology, and EPA concur that the marine cleanup plans must be resolved promptly to seize the opportunity to coordinate cleanup with navigational dredging planned at the Complex. Because of the nature of the navigation dredging and construction in support of home-port activities, the OU B sediment cleanup would be delayed for 3 years or more if the Navy could not combine these projects. The navigational project is expected to involve dredging approximately 370,000 cubic yards of marine sediment. This work will occur within the marine area adjacent to the Naval Complex. Specifics of the navigational dredging project are discussed in a separate design report for that project."

"The results of the baseline human health risk assessment indicate that potential long-term risks associated with fish tissue contamination in Sinclair Inlet are above acceptable levels defined under both the state (MTCA) and federal (Superfund) regulations. The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. Such a release or threat of release may present an imminent and substantial endangerment to public health, welfare, or the environment. Consistent with the NCP, EPA policy, and MTCA, remedial action is warranted to address these potential risks."

***Project Name*** ***BREMERTON NAVAL COMPLEX*** ***ProjectID:*** 10-10

***Last Updated:*** 09/03/02

***RA Type:*** Baseline Human Health & Ecological; Public Health

***RA Status:*** Complete

***RA Objectives:*** To evaluate the need for remedial action at Marine OU B

***Company Performing RA:***

***RA Reference Report:*** Section 8.0 of the Final ROD, June 2000 (Reference A-708)

***RA Summary and Conclusions:*** Identified the following human health chemicals of concern (COCs): PCBs, bis(2-ethylhexyl)phthalate, Heptachlor, Aldrin, benzo(a)pyrene, mercury, arsenic, chromium, and selenium. Five human health exposure scenarios were evaluated including: subsistence and recreational finfish harvesting, subsistence and recreational sea cucumber harvesting, and subsistence shellfish harvesting. For noncancer risks, a hazard quotient (HQ) of 11 was derived for PCBs, the only chemicals with HQs above 1 for any of the scenarios. The subsistence finfisher had a computed hazard index (HI) of 12, due almost entirely to the presence of PCBs in fish tissue. The finfisher scenario was the only scenario with a computed HI greater than one (the HI reflects the combined effect of all of the COCs). For excess risks, USEPA uses an upper limit of 10-4 and WADOE uses a limit of 1x10-5. Cancer risks were calculated as: subsistence finfish harvester: 5x10-4 (due almost entirely to PCBs in fish tissue); recreational finfisher harvester: 2x10-5; subsistence shellfish harvester: 1x10-4 (due mostly to arsenic and PCBs in shellfish tissue); and subsistence sea cucumber harvester: 2x10-5.

"A qualitative summary of several of the primary uncertainties in the marine HHRA for OU B was provided. A primary goal of the baseline risk assessment process is to avoid underestimating risk, for example, by using conservative screening methods. Consequently, the risk assessment results also tend to be conservative. However, the conservative screening methods are not generally considered an appropriate basis for setting cleanup levels without further refinement."

The following uncertainties were explained:

- "The subsistence seafood harvesting scenario assumed that all sea cucumbers and half of all finfish and shellfish consumed are collected from Sinclair Inlet, despite numerous alternative sites for seafood harvesting in the area (likely to cause overestimation of potential risk)."

- "The shellfish harvesting exposure scenario did not include any collection of naturally occurring shellfish from the site. Instead, the results of the caged mussel study conducted to support the ecological risk assessment were adopted as the best information available on shellfish tissue chemical levels. However, the mussels were only exposed to inlet conditions for 3 months and were suspended 1 meter above the seafloor and, thus, not in contact with sediment as clams would be. Also, only a very small area at the Complex appears to have conditions that could support clams, and access to much of this area is prohibited. Thus, the idea of the OU B site being a significant component in a future subsistence shellfish consumption scenario is highly implausible. Another source of uncertainty is the use of the results of chemical analyses of shallow nearshore sediments in the OU A area. These data were used because this is the one area at OU B that appears capable of supporting significant numbers of clams."

- "Detection limits significantly exceeding the RBSCs for individual chemicals are a common source of uncertainty when a reported nondetection of a chemical is represented numerically by a value of one-half the detection limit in risk assessment calculations. Detection limits significantly exceeded the RBSCs for PCBs and arsenic in sediment, two primary human health risk drivers, implying at least moderate uncertainty in the results."

• "Exclusive use of reasonable maximum exposure values for exposure point concentrations for the marine HHRA scenarios likely tends to moderately overestimate site risks. The assumption that the exposure point concentrations remain constant throughout the exposure duration, which ranges between 30 to 70 years, also likely moderately overestimates risk."

• "Using results from English sole tissue to represent all varieties of fish consumed by a seafood harvester likely introduces moderate uncertainty. The most probable outcome is an overestimate of risk since an actual seafood diet would likely include species such as salmon that tend to spend less time in contact with sediment than sole and, hence, can be expected to have lower chemical levels."

• "The assumption that risks from various chemicals are additive is an oversimplification. In some cases, the effect of one chemical can increase the effect of another chemical (synergism) while in other cases one chemical may suppress the effect of another (antagonism)."

• "Overall there is a low probability that the actual risks were underestimated and a high probability that risks were overestimated."

Additionally:

"Limited contact with marine sediment and occasional consumption of common seafood species from Sinclair Inlet do not appear to constitute significant human health risks. The most significant finding of the risk assessment is that unacceptable risks are posed to subsistence seafood harvesters relying on seafood collected in Sinclair Inlet as a principal component of their diet. These risks are primarily from the presence of PCBs in tissues of bottom-dwelling fish. Subsistence consumption of seafood with elevated levels of PCBs could expose a person to a chance of both cancer and noncancer health effects."

"Although mercury has been found at concentrations above the State cleanup screening level of 0.59 mg/kg (ppm) in marine sediments throughout much of Sinclair Inlet, a wide variety of marine studies completed during the RI indicate little or no ecological or human health risk from mercury."

"Since the OU B risk assessment was completed, additional information has become available showing that mercury levels in rockfish, especially older fish, tend to be considerably higher than have been measured in English sole. This may be because rockfish live longer than sole and can accumulate chemicals for a longer time. The Kitsap County Health Department has issued an advisory recommending against consumption of rockfish from the inlet, and the recent findings are a source of concern. A study of rockfish tissue by Washington State Fish and Wildlife found some mercury concentrations greater than 1 mg/kg. U.S. Food and Drug Administration guidelines require that action be taken to prevent human consumption of fish with concentrations above 1 mg/kg."

For the ecological risk assessment, four indicator animals were identified: benthic invertebrates, shellfish, bottom-dwelling fish, and marine birds. The assessment suggests the following COCs: antimony, arsenic, bis(2-ethylhexyl)phthalate, cadmium, chromium, copper, endrin, endrin ketone, lead, mercury, PCBs, selenium, and zinc. The assessment determined that there is a relatively minor threat to benthic invertebrates due to the presence of chemical contamination. Shellfish were prone to accumulate more chemical in the Sinclair Inlet than in the reference location, however, the risk was considered minimal. For the bottom-dwelling fish, there was some indication of limited risk from antimony, chromium, mercury, and lead. Finally, the assessment suggests a limited risk for marine birds.

From the June 2000 ROD:

***Project Name*** ***BREMERTON NAVAL COMPLEX*** ***ProjectID:*** 10-10

***Last Updated:*** 09/03/02

"Elevated levels of a variety of chemicals are found in the surface marine sediments of Sinclair Inlet. However, the results of the ecological risk assessment suggest that chemicals in inlet sediments pose only a limited threat to marine life and seabirds preying on marine species. The ecological risk assessment did not confirm the need for remedial action. Some areas that have sediment concentrations of several key inorganic and organic chemicals exceeding the SQS and that are co-located or adjacent to areas with minor adverse bioassay results may be remediated as part of a human-health-based cleanup program. In these locations, an improvement in ecological health is expected."

| | | |
|---|---|---|
| ***Project Name:*** | ***BREMERTON NAVAL COMPLEX*** | ***ProjectID:*** 10-10 |
| ***Last Updated:*** | 09/03/02 | |

***Physical Target:*** Sediments with PCB concentrations greater than 12 ppm on an organic carbon (OC) basis will be dredged. Sediments will also be dredged in areas with both mercury concentrations exceeding 3 ppm and PCB concentrations exceeding 6 ppm OC.

***Goals:***

***Primary Contractor:*** Foster Wheeler Environmental (dredging design and construction)

***Other Contractors:*** General Construction, Seattle, WA (dredging)

***Generic Remediation Method:*** Mechanical dredging

***Equipment:*** Cable Arm conventional clamshell bucket (24 cy); Atlas clamshell bucket (27 cy); diver-assisted small hydraulic dredge unit; dredging units equipped with WINOPS positioning systems (which included two electronic tide gauges); split-hull dump barges (1,500 cy); pocket scow (7 pockets - 300 cy per pocket) for placing CAD cap sediment; large crane-operated magnet for before dredging debris removal from around piers and berthing areas.

***Material Handling:*** The CAD pit was dredged first, with the sediment stockpiled in-water nearby. A concern that discarded air cylinders in the areas around berthing and dock areas would be environmentally dredged prompted use of a crane-mounted magnet to sweep these areas prior to dredging. The magnet was lowered into the water to the sediment interface and was used to sweep the areas targeted for dredging. Approximately 30 large cylinders were recovered, along with a significant amount of other metallic debris (e.g., chains, cables) that could have impacted dredging. Sediment removal was then primarily by use of the Cable Arm bucket; the Atlas bucket was used in areas of consolidated sediment. A small area was dredged using a small hydraulic dredge and divers resulting in one barge load of slurried sediment. Dredged sediment was placed into split-hull barges for transport to the CAD pit (for both CERCLA and navigational sediment not suitable for open-ocean disposal) or an open-ocean site (for "clean" navigational sediment) for disposal.

The CAD cap consisted of three distinct layers in ascending order: a minimum one foot of sand, three feet of "clean" sediment dredged from navigational areas, and one foot of top sediment removed as part of the CAD pit installation. The sand was placed using the Cable Arm bucket to provide more control over its distribution, similar to the method used for capping at Ketchikan, AK (Project ID 10-09). The three-foot sediment layer was placed using the split-hull barges and the one-foot layer using the pocket barges. The pocket barges also provided more control over the placement of the sediment.

***Volume Removed:*** Total volume of material dredged for the project was 1,056,000 cy. A further breakdown is as follows:

- CAD pit installation material, suitable for open-ocean disposal: 376,000 cy;
- CERCLA sediment from around docks and berthing areas: 225,000 cy;
- Navigational dredged sediment non-suitable for open-ocean disposal: 174,000 cy; and
- Navigational dredged sediment suitable for open-ocean disposal: 281,000 cy.

***Calendar Time:*** Construction began June 15, 2000 and the CAD pit was finished mid-August 2000. CERCLA sediment (from Marine OU B) and navigational dredged sediment non-suitable for open-ocean disposal were then dredged from mid-August 2000 until February 15, 2001 when dredging was

| | | |
|---|---|---|
| ***Project Name:*** | ***BREMERTON NAVAL COMPLEX*** | ***ProjectID:*** 10-10 |
| ***Last Updated:*** | 09/03/02 | |

| | |
|---|---|
| | required to halt for four months due to a fish protection window. Placement of dredged sediment into the CAD pit was completed prior to halting dredging, which allowed time for the material to consolidate prior to installation of the cap. Navigational dredging was completed in October 2001. During dredging and CAD cap placement, crews worked 24 hours per day, six days per week. |
| ***Time To Implement:*** | 17 months |
| ***Total Cost:*** | Unavailable |
| ***Dredging Cost:*** | Unavailable |
| ***Disposal of Sediment:*** | Into a single nine-acre confined aquatic disposal (CAD) pit (600 feet x 615 feet) located within the confines of Marine OU B. Following the receipt of CERCLA sediment and navigational dredged sediment unsuitable for open ocean dumping, the CAD pit was covered with a five-foot cap consisting of (in ascending order): a minimum of one foot of clean sand (averaged 1.4 feet thick) , three feet of clean navigational dredged sediment, and one foot of sediment saved from the CAD pit installation. |
| ***Volume of Water:*** | N/A |
| ***Method of Water Treatment:*** | N/A |
| ***Water Discharge Limit:*** | N/A |
| ***Air Monitoring During Remediation:*** | None performed |
| ***Water Monitoring During Remediation:*** | During dredging of CERCLA sediment, monitoring was performed at the point of dredging and at 150 feet and 300 feet downstream (depending on the tides) of the point of dredging. Turbidity was monitored electronically. Allowable turbidity levels were exceeded several times during installation of the CAD pit but were rectified by slowing down the dredging operation. Water samples for analysis of PCBs and metals were collected from these same locations twice per day coinciding with the tidal cycles. The samples were composites of three samples collected at three feet above the top-of-sediment, at mid-water column, and at three feet below the top of water. No water quality parameters in any of the samples exceeded the allowable limits. |
| ***Outcome:*** | Approximately 225,000 cy of contaminated sediment containing 12 ppm PCBs on an organic carbon (OC) basis were dredged from in and around docks and berthing areas within Marine OU B at the Bremerton Naval Complex in conjunction with a larger navigational dredging project that removed another 831,000 cy from areas that included the Sinclair Inlet to Puget Sound. The 225,000 cy, designated CERCLA sediment, along with another 174,000 cy of sediment removed during navigational dredging considered non-suitable for open-ocean dumping, were disposed of in a confined aquatic disposal (CAD) pit located within Marine OU B.<br><br>USEPA, USACE, and Foster Wheeler consider both the dredging and CAD disposal successful. Water column monitoring at the point of dredging did not indicate that the water quality limits were exceeded for any of the parameters being monitored.<br><br>Preparations for dredging of the CERCLA sediments were accelerated to coincide with the navigational dredging, which had been planned first. Due to scheduling conflicts with the U.S. Navy, dredging of the CERCLA sediment could not have been performed for another five years if it was not performed along with the navigational dredging.<br><br>Verification sampling was not performed during dredging and the project was considered a |

contaminant mass removal effort. Long-term monitoring will be performed to determine if natural attenuation allows recovery of sediment and fish sufficient to meet risk assessment goals.

***Restoration and Post-Monitoring:***

The U.S. Navy will perform long-term monitoring to: (1) verify attainment of the cleanup objectives; (2) confirm the physical integrity of the CAD cell and shoreline stabilization measures; (3) measure extent of natural recovery of sediments in Marine OU B; and (4) evaluate the success of remediation in reducing concentrations of constituents of concern in fish tissue as represented by English sole.

The long-term monitoring is to be performed until the sediment cleanup goal of 1.2 ppm PCBs on an organic carbon (OC) basis is attained in the top 10 cm of sediment, concentrations of PCBs in English sole from Sinclair Inlet decrease to levels consistent with the risk assessment goal, and the Navy, EPA, and Ecology mutually agree that continued monitoring is no longer providing useful information.

The U.S. Navy is currently preparing a long-term monitoring plan.

***Site-Specific Difficulties:***

- A separate company had performed the bathymetry used for design of the project and for estimating removal volumes. The bathymetry method used by Foster Wheeler to verify sediment depths before and after dredging was different, resulting in final removed volumes that were different from those in the design plan.

- Overdigging by the contractor (navigational dredging mentality) occurred during removal of dredged material to be placed in the CAD pit. There were significant concerns early in the project regarding whether the CAD pit was large enough to hold the sediment identified as non-suitable for open-ocean dumping. If the CAD pit could not hold all of the material, the excess material would have been sent for upland disposal at a considerably greater expense.

- Working around Naval vessel movements presented continual logistical difficulties.

***Monitoring Data References:***

- ***Sediment***
- ***Water:***
- ***Fish:***

## *POTENTIALLY RESPONSIBLE PARTIES*

***Project Name*** ***BREMERTON NAVAL COMPLEX*** ***ProjectID:*** 10-10

***PRP Name:*** **PRP INFORMATION NOT RELEASED** ***PRPID:***

***Street Address:***

***City:***

***State:***

## *KEY CONTACTS*

***Project Name*** ***BREMERTON NAVAL COMPLEX*** ***ProjectID:*** 10-10

***Last Name:*** **KEY CONTACT INFORMATION NOT RELEASED** ***Contact ID:***

***First Name:***

***Title:***

***Company:***

***Address:***

***City:***

***State:***

***Postal Code:***

***Work Phone # :*** ***Other Phone #:***

***Fax # :***

***Email Address:***

***Project Name*** ***BREMERTON NAVAL COMPLEX*** ***ProjectID:*** 10-10

***Reference Type:*** A ***ReferenceID:*** 209

***Title:*** ***Development of Sediment Quality Criteria for the Protection of Human Health (Puget Sound)***

***Location:*** AEM

***Category:*** Cleanup Levels and Risks

***Prepared by/Author:*** Glen Patrick and David McBride

***Preparer/Author Address:*** Environmental Health Programs
Office of Toxic Substances
P.O. Box 47825
Olympia, WA 98504-7825

***Prepared For:*** General Public

***Date Published:*** June 1995

***Key Words and Phrases:***

---

***Reference Type:*** A ***ReferenceID:*** 565

***Title:*** ***Sediment Management Standards; Table III - Puget Sound Marine Sediment Cleanup Screening Levels and Minimum Cleanup Levels -- Chemical Criteria [Ch. 173-204 WAC-46]***

***Location:*** AEM

***Category:*** Cleanup Levels and Risks

***Prepared by/Author:*** The State of Washington

***Preparer/Author Address:***

***Prepared For:*** General Public

***Date Published:*** December 29, 1995

***Key Words and Phrases:***

---

***Project Name*** ***BREMERTON NAVAL COMPLEX*** ***ProjectID:*** 10-10

***Reference Type:*** A ***ReferenceID:*** 646

***Title:*** ***Puget Sound Confined Disposal Site Study - Final Programmatic Environmental Impact Statement (CD-ROM)***

***Location:*** AEM

***Category:*** Contaminated Sediments: Disposal Methods

***Prepared by/Author:*** (1) U.S. Army Corps of Engineers; (2) Washington State Department of Ecology; and (3) Washington Department of Natural Resources

***Preparer/Author Address:*** (1) Seattle District
P.O. Box 3755
Seattle, WA 98124-3755
(2) P.O. Box 47600
Olympia, WA 98504-7600
(3) P.O. Box 47207
Olympia, WA 98504-7027

***Prepared For:***

***Date Published:*** October 1999

***Key Words and Phrases:***

---

***Reference Type:*** A ***ReferenceID:*** 708

***Title:*** ***Final Record of Decision: Bremerton Naval Complex - OU B Marine***

***Location:*** AEM

***Category:*** ROD/Proposed Plan/Action Memo/Decision Document

***Prepared by/Author:*** US Navy

***Preparer/Author Address:*** 19917 7th Avenue NE
Poulsbo, WA 98370-7570

***Prepared For:***

***Date Published:*** June 2000

***Key Words and Phrases:***

***Project Name*** ***BREMERTON NAVAL COMPLEX*** ***ProjectID:*** 10-10

***Reference Type:*** B ***ReferenceID:*** 605

***Title:*** ***Puget Sound Naval Shipyard Complex***

***Location:*** AEM

***Category:*** Site Update

***Prepared by/Author:*** US EPA Region X

***Preparer/Author Address:***

***Prepared For:*** General Public

***Date Published:*** April 2001

***Key Words and Phrases:***

---

***Reference Type:*** G ***ReferenceID:*** 48

***Title:*** ***Remedy Effectiveness: Comparison of Remediation Technologies (for complete presentation see Reference G-41)***

***Location:*** AEM

***Category:*** Dredging: Equipment

***Prepared by/Author:*** (1) William Elmer, (2) John Lally

***Preparer/Author Address:*** (1), (2) Foster Wheeler Environmental

***Prepared For:*** EPA Forum on Managing Contaminated Sediments at Hazardous Waste Sites

***Date Published:*** May 30 - June 1, 2001

***Key Words and Phrases:***

---

***Reference Type:*** L ***ReferenceID:*** 107

***Title:*** ***Memo re: Puget Sound Naval Shipyard***

***Location:*** AEM

***Category:*** Site Update

***Prepared by/Author:*** AEM, Inc.

***Preparer/Author Address:*** Malvern, PA 19355

***Prepared For:*** General Electric

***Date Published:*** June 14, 2000

***Key Words and Phrases:***

---

***Project Name:*** ***BREMERTON NAVAL COMPLEX*** ***ProjectID:*** 10-10

***Last Updated:*** 12/28/01

***Modeling Performed:*** Fate and Transport

***Modeling Objectives:*** To define a time frame for natural recovery of sediments from 4.1 ppm PCBs on an organic carbon (OC) basis to 3 ppm OC.

***Modeling Description:*** Modeled the role of natural deposition of clean sediments in Sinclair Inlet to predict time required for the reduction in PCB concentrations.

***Company Performing Modeling:***

***Modeling Status:*** Preliminary modeling has been completed; however, modeling will continue as monitoring data are received and processed.

***Modeling Summary:*** A time frame of approximately 10 years is predicted to reduce surface area-weighted average PCB concentrations from 4.1 ppm OC to 3 ppm OC in the biologically active sediment zone (0 to 10 cm) of Marine OU B.

***Project Name*** ***BREMERTON NAVAL COMPLEX*** ***ProjectID:*** 10-10

| | | | |
|---|---|---|---|
| ***Advisory:*** | Puget Sound | ***AdvisoryID:*** | 1106 |
| ***Extent:*** | North end of Indian Island | | |
| ***Pollutant:*** | chlorinated pesticides | | |
| ***Species:*** | shellfish | | |
| ***Population:*** | NCGP | | |
| ***Population Definition:*** | No Consumption-General Population: Advise against consumption by the general population. | | |
| ***Advisory Type:*** | Coastal | ***Advisory Number:*** | 4249 |
| ***Status (Active or Rescinded):*** | Active | ***Date Rescinded:*** | |
| ***Contact Name:*** | Dave McBride | ***Contact Number:*** | 360-236-3176 |

| | | | |
|---|---|---|---|
| ***Advisory:*** | Puget Sound | ***AdvisoryID:*** | 1105 |
| ***Extent:*** | North end of Indian Island | | |
| ***Pollutant:*** | metals | | |
| ***Species:*** | shellfish | | |
| ***Population:*** | NCGP | | |
| ***Population Definition:*** | No Consumption-General Population: Advise against consumption by the general population. | | |
| ***Advisory Type:*** | Coastal | ***Advisory Number:*** | 4249 |
| ***Status (Active or Rescinded):*** | Active | ***Date Rescinded:*** | |
| ***Contact Name:*** | Dave McBride | ***Contact Number:*** | 360-236-3176 |

| | | | |
|---|---|---|---|
| ***Advisory:*** | Puget Sound | ***AdvisoryID:*** | 1107 |
| ***Extent:*** | North end of Indian Island | | |
| ***Pollutant:*** | PCBs (total) | | |
| ***Species:*** | shellfish | | |
| ***Population:*** | NCGP | | |
| ***Population Definition:*** | No Consumption-General Population: Advise against consumption by the general population. | | |
| ***Advisory Type:*** | Coastal | ***Advisory Number:*** | 4249 |
| ***Status (Active or Rescinded):*** | Active | ***Date Rescinded:*** | |
| ***Contact Name:*** | Dave McBride | ***Contact Number:*** | 360-236-3176 |

***Project Name*** ***BREMERTON NAVAL COMPLEX*** ***ProjectID:*** 10-10

| | | | |
|---|---|---|---|
| ***Advisory:*** | Sinclair Inlet | ***AdvisoryID:*** | 1098 |
| ***Extent:*** | Port Washington narrows west to Gorst | | |
| ***Pollutant:*** | metals | | |
| ***Species:*** | all bottomfish | | |
| ***Population:*** | NCGP | | |
| ***Population Definition:*** | No Consumption-General Population: Advise against consumption by the general population. | | |
| ***Advisory Type:*** | Estuary | ***Advisory Number:*** | 4243 |
| ***Status (Active or Rescinded):*** | Active | ***Date Rescinded:*** | |
| ***Contact Name:*** | Dave McBride | ***Contact Number:*** | 360-236-3176 |

| | | | |
|---|---|---|---|
| ***Advisory:*** | Sinclair Inlet | ***AdvisoryID:*** | 1100 |
| ***Extent:*** | Port Washington narrows west to Gorst | | |
| ***Pollutant:*** | metals | | |
| ***Species:*** | rockfish | | |
| ***Population:*** | NCGP | | |
| ***Population Definition:*** | No Consumption-General Population: Advise against consumption by the general population. | | |
| ***Advisory Type:*** | Estuary | ***Advisory Number:*** | 4243 |
| ***Status (Active or Rescinded):*** | Active | ***Date Rescinded:*** | |
| ***Contact Name:*** | Dave McBride | ***Contact Number:*** | 360-236-3176 |

| | | | |
|---|---|---|---|
| ***Advisory:*** | Sinclair Inlet | ***AdvisoryID:*** | 1102 |
| ***Extent:*** | Port Washington narrows west to Gorst | | |
| ***Pollutant:*** | metals | | |
| ***Species:*** | shellfish | | |
| ***Population:*** | NCGP | | |
| ***Population Definition:*** | No Consumption-General Population: Advise against consumption by the general population. | | |
| ***Advisory Type:*** | Estuary | ***Advisory Number:*** | 4243 |
| ***Status (Active or Rescinded):*** | Active | ***Date Rescinded:*** | |
| ***Contact Name:*** | Dave McBride | ***Contact Number:*** | 360-236-3176 |

***Project Name*** ***BREMERTON NAVAL COMPLEX*** ***ProjectID:*** 10-10

| | | | |
|---|---|---|---|
| ***Advisory:*** | Sinclair Inlet | ***AdvisoryID:*** | 1104 |
| ***Extent:*** | Port Washington narrows west to Gorst | | |
| ***Pollutant:*** | metals | | |
| ***Species:*** | shellfish-crab | | |
| ***Population:*** | NCGP | | |
| ***Population Definition:*** | No Consumption-General Population: Advise against consumption by the general population. | | |
| ***Advisory Type:*** | Estuary | ***Advisory Number:*** | 4243 |
| ***Status (Active or Rescinded):*** | Active | ***Date Rescinded:*** | |
| ***Contact Name:*** | Dave McBride | ***Contact Number:*** | 360-236-3176 |

| | | | |
|---|---|---|---|
| ***Advisory:*** | Sinclair Inlet | ***AdvisoryID:*** | 1097 |
| ***Extent:*** | Port Washington narrows west to Gorst | | |
| ***Pollutant:*** | PAHs | | |
| ***Species:*** | all bottomfish | | |
| ***Population:*** | NCGP | | |
| ***Population Definition:*** | No Consumption-General Population: Advise against consumption by the general population. | | |
| ***Advisory Type:*** | Estuary | ***Advisory Number:*** | 4243 |
| ***Status (Active or Rescinded):*** | Active | ***Date Rescinded:*** | |
| ***Contact Name:*** | Dave McBride | ***Contact Number:*** | 360-236-3176 |

| | | | |
|---|---|---|---|
| ***Advisory:*** | Sinclair Inlet | ***AdvisoryID:*** | 1099 |
| ***Extent:*** | Port Washington narrows west to Gorst | | |
| ***Pollutant:*** | PAHs | | |
| ***Species:*** | rockfish | | |
| ***Population:*** | NCGP | | |
| ***Population Definition:*** | No Consumption-General Population: Advise against consumption by the general population. | | |
| ***Advisory Type:*** | Estuary | ***Advisory Number:*** | 4243 |
| ***Status (Active or Rescinded):*** | Active | ***Date Rescinded:*** | |
| ***Contact Name:*** | Dave McBride | ***Contact Number:*** | 360-236-3176 |

***Project Name*** ***BREMERTON NAVAL COMPLEX*** ***ProjectID:*** 10-10

| | | | |
|---|---|---|---|
| ***Advisory:*** | Sinclair Inlet | ***AdvisoryID:*** | 1101 |
| ***Extent:*** | Port Washington narrows west to Gorst | | |
| ***Pollutant:*** | PAHs | | |
| ***Species:*** | shellfish | | |
| ***Population:*** | NCGP | | |
| ***Population Definition:*** | No Consumption-General Population: Advise against consumption by the general population. | | |
| ***Advisory Type:*** | Estuary | ***Advisory Number:*** | 4243 |
| ***Status (Active or Rescinded):*** | Active | ***Date Rescinded:*** | |
| ***Contact Name:*** | Dave McBride | ***Contact Number:*** | 360-236-3176 |

| | | | |
|---|---|---|---|
| ***Advisory:*** | Sinclair Inlet | ***AdvisoryID:*** | 1103 |
| ***Extent:*** | Port Washington narrows west to Gorst | | |
| ***Pollutant:*** | PAHs | | |
| ***Species:*** | shellfish-crab | | |
| ***Population:*** | NCGP | | |
| ***Population Definition:*** | No Consumption-General Population: Advise against consumption by the general population. | | |
| ***Advisory Type:*** | Estuary | ***Advisory Number:*** | 4243 |
| ***Status (Active or Rescinded):*** | Active | ***Date Rescinded:*** | |
| ***Contact Name:*** | Dave McBride | ***Contact Number:*** | 360-236-3176 |