

# Health Consultation

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Follow-Up Evaluation

PORT HADLOCK DETACHMENT (INDIAN ISLAND DEPOT)

PORT HADLOCK, JEFFERSON COUNTY, WASHINGTON

EPA FACILITY ID: WA4170090001

AUGUST 21, 2008

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service  
Agency for Toxic Substances and Disease Registry  
Division of Health Assessment and Consultation  
Atlanta, Georgia 30333

## **Health Consultation: A Note of Explanation**

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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**Port Hadlock Detachment (Indian Island Depot)**

**Follow-Up Evaluation**

**Port Hadlock, Jefferson County, Washington**

**Cerclis NO. WA4170090001**

**July 28, 2008**



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## Foreword

The Agency for Toxic Substances and Disease Registry (ATSDR), based in Atlanta, Georgia, is a federal public health agency of the U.S. Department of Health and Human Services. ATSDR serves the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances. This information is often provided in the form of public health assessments, health consultations, letter consultations, or could be technical assists. These health evaluations indicate if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced or prevented.

ATSDR and the Department of Defense (DoD) services have discussed ways in which to review previous recommendations made in health evaluations to ensure that the public health recommendations have been completed or are compatible with potential changes in current site use. Upon request, ATSDR performs follow-up evaluations on locations where health evaluations have been completed. ATSDR performs the follow-up evaluation by reviewing previous conclusions and recommendations; evaluating current site conditions and environmental remediation as necessary; and determining if there is a need for further review of environmental data.

Selection of a site for follow-up evaluation may be initiated for reasons such as: Site clean-up and mitigation measures may have reduced or eliminated contamination and/or exposures; an incident or exercise may produce an immediate need to evaluate a pathway; a new method may be developed that allows us to measure chemicals or markers of exposure in a new way; new statistical tools or procedures may facilitate the investigation of a pathway in a new way; or new biomedical or toxicological studies may change the way we assess risks.

Findings on the follow-up efforts will be discussed with the services on a site by site basis. If further evaluation efforts are determined to be needed by ATSDR and the respective DOD service, a timeline to address this follow-up will be agreed upon by these parties. Should ATSDR decide that a public health evaluation is necessary and the DOD service does not concur, the agency may conduct the follow-up evaluation using other resources.

## Exposure

As the first step in the evaluation, ATSDR scientists review environmental data to see what chemicals are present, where the chemicals were found, and how people might come into contact with the chemicals. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When environmental data does not allow ATSDR to fully evaluate exposure, the report will indicate what further sampling data is needed.

## Health Based Screening/Data Reduction

ATSDR uses several screening values that are derived from human and animal exposure studies. The screening values are meant to be protective of health and to allow scientists to eliminate further analysis of those chemicals that could not pose a hazard. Further analysis of the pathway is necessary when a chemical exceeds a health-based screening value. The pathway analysis may use other situation-specific screening values or may involve actual health effects data.

### **Health Effects**

If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists evaluate whether or not these exposures may result in harmful effects. ATSDR recognizes that developing fetuses, infants, and children can be more sensitive to exposures than are adults. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable than adults. Thus, the health impact to the children is considered first when evaluating exposure and the potential adverse effects to a community. The health impacts to other groups within the community (such as the elderly, chronically ill, and people engaging in high-exposure practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicologic, and epidemiologic studies, to determine the likelihood of health effects that may result from exposures. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. In this case, this report suggests what further public health actions are needed.

### **Conclusions**

This report evaluates the current status of a previously assessed site and presents conclusions about the public health threat, if any, posed by the site. These conclusions will include threats from individual pathways and a general conclusion of the health status of the site for the follow-up evaluation. Any health threats that have been determined for the general public as a result of this follow-up evaluation, including high-risk groups (such as children, the elderly, chronically ill people, and people engaging in high-risk practices), are summarized in the Conclusions section of the report. ATSDR has agreed to work with DoD and any other responsible parties to develop appropriate ways to stop or reduce exposure.

ATSDR is primarily an advisory agency, so its reports usually identify what actions are appropriate to be undertaken by DoD, other responsible parties, or the research or education divisions of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

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## Summary and Statement of Issues

The Agency for Toxic Substances and Disease Registry (ATSDR) is releasing this Health Consultation as a follow-up assessment to the December 1999 Public Health Assessment (PHA) for Port Hadlock Detachment (Indian Island Depot). ATSDR conducted the PHA for the Port Hadlock site to determine whether releases to the environment posed past, current or potential future health hazards. The focus of this follow-up consultation is: 1) to determine whether ATSDR's recommended actions for the site have been taken by the specified party or parties; 2) to identify whether any existing or new concerns need to be evaluated; and 3) review any new information (i.e., reports released after ATSDR's previous data review) that could potentially change the public health hazard conclusions for the site. (For more information on terms used in this document, please see ATSDR's online glossary at <http://www.atsdr.cdc.gov/glossary.html>.)

## Background

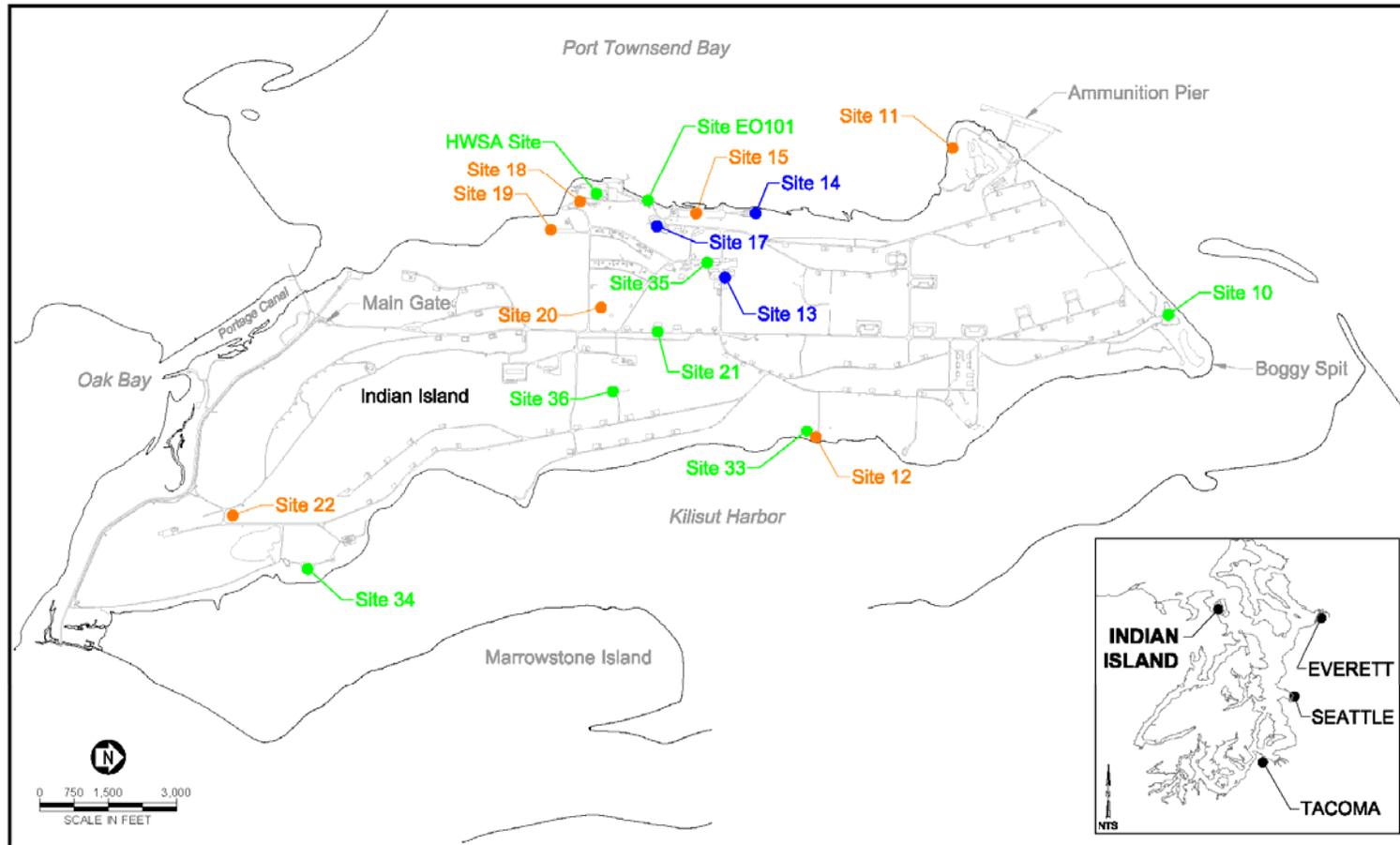
The Naval Ordnance Center, Pacific Division, Port Hadlock Detachment (Port Hadlock) is on Indian Island in Jefferson County, Washington. Indian Island is pictured in the photo to the right and is 5 miles long, one-half mile wide, and covers approximately 2,700 acres. Indian Island is bordered by Kilisut Harbor to the east, by Port Townsend Bay to the west



and north, and by Oak Bay and Portage Canal to the south (Figure 1). Fort Flagler State Park is a few hundred feet from the north end of the island. No private residences are on the island; however, there are 14 military residences. A public highway connects the Olympic Peninsula with Indian Island and Marrowstone Island, which has a community of about 250 residences. Although most of Indian Island is restricted, civilian boaters occasionally enter along beaches to collect clams. Native Americans have treaty rights to collect shellfish in this area (ATSDR 1999).

In 1939, the Navy purchased Indian Island as a storage site for ordnances, seaplanes, and antisubmarine cable nets. More recently, the site has been used to assemble antisubmarine rocket airframes, to provide mine maintenance, and to receive, store, maintain, and issue naval ordnance. Contaminants generated during operational activities include ordnance compounds, metals, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), and pesticides. A variety of hazardous materials have been handled, stored, and disposed at Port Hadlock, resulting in soil, groundwater, surface water, sediment, and shellfish contamination. Indian Island was included on the National Priorities List (NPL) in June 1994 (ATSDR 1999; U.S. Navy 2005).

**Figure 1. Map of Port Hadlock Detachment (Indian Island) and location of Designated Sites**



Source: US. Navy 2005

In 1994, ATSDR representatives conducted a site visit of Port Hadlock and met with personnel from the Navy, Environmental Protection Agency (EPA)-Region 10, Washington Department of Fisheries, Washington Department of Ecology (Ecology), Washington Department of Health (WDOH), and local citizens. No immediate public health hazards were identified at the time; however, ATSDR identified two sites that required further evaluation: 1) the North End Landfill (Site 10), which is associated with shellfish contamination; and 2) the Central Island Disposal Site (Site 21), which is associated with groundwater contamination. ATSDR visited Port Hadlock again in 1998. In response to community concerns about potential shellfish contamination along the eastern shores of Indian Island and areas between Indian and Marrowstone Islands, ATSDR conducted an exposure investigation at Marrowstone Island. As part of this investigation, ATSDR collected shellfish samples from 10 locations along Marrowstone Island's shores and at three reference locations. ATSDR also met with personnel from the Navy, WDOH, and the Washington State Department of Fish and Wildlife (ATSDR 1998; 1999).

Most remedial actions for Site 10 and 21 at Port Hadlock Detachment were carried out just prior to the 1999 PHA. Remedial actions taken by the Navy included the installation of additional monitoring wells in 1995 to support a 2-year groundwater monitoring program at Site 21 and the construction of a landfill cap and erosion protection system at Site 10 in 1997. Additional site-wide remedial actions included excavation of areas of soil contamination and the removal of underground storage tanks (USTs) from several on-site locations (ATSDR 1999). In 2000, the Navy conducted its first Five-Year Review of response actions completed under the Record of Decision (ROD). A second Five-Year Review was conducted in 2005. The review of current conditions is required to ensure that the remedial actions are working and are protective of human health and the environment. In January 2005, a Final Close Out Report was released. The report documented that the Navy has completed response actions for Port Hadlock Detachment in accordance with Close Out Procedures for National Priorities List Sites. The response actions were conducted by the Navy with regulatory oversight by Ecology in accordance with a 1996 Interagency Agreement between the Navy, Region 10 EPA, and Ecology (URS 2005). Port Hadlock was removed from the EPA's NPL in June 2005 (EPA 2007).

## **Discussion**

ATSDR's initial evaluation of Port Hadlock Detachment identified two pathways (consumption of shellfish and ingestion of drinking water) that could potentially result in human exposure from site-related contamination. Other pathways (e.g., air pollutants, soil, sediment, or surface water contamination) were evaluated and determined not to be a potential human health concern at the site. This section provides a brief summary of the 1999 PHA findings of ATSDR's pathway evaluation of shellfish (Site 10) and drinking water (Site 21); an update of these two exposure pathways; and any other current issues or concerns related to the site based on a review of the most current data and information available.

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## Initial Evaluation Summary

### *Site 10*

Site 10 (Northend Landfill) is a 5-acre landfill used from the 1940s through the mid-1970s. The landfill is located on Boggy Spit and is surrounded by beaches and tidal lagoons. In the past, landfill contaminants migrated into the marine environment via erosion, surface water runoff, and groundwater discharge. At low tide, discharge from the landfill seeped into Port Townsend Bay.

The potential for contaminant migration from the Northend Landfill led the Navy to conduct routine monitoring of groundwater, sediment, and clams. In 1988, the Navy prohibited shellfish harvesting from beaches immediately adjacent to Site 10 (beach 19) and along Boggy Spit (beaches 1 and 2). This ban was issued as a precautionary measure because low levels of metals, ordnance compounds, pesticides, and SVOCs detected in clam tissue samples collected from areas adjacent to Site 10 and along Boggy Spit were higher than levels detected at selected reference (i.e., background) locations (U.S. Navy 2005).

In the 1999 PHA, ATSDR reviewed the Navy monitoring data and did not identify any contaminants detected in clams at levels of health concern during its assessment. Arsenic was the only compound detected above ATSDR's health-based screening values. Arsenic in the Boggy Spit clams averaged about 2.5 ppm at Site 10, whereas typical arsenic levels in all fish and seafood are about 4-5 ppm (ATSDR 2005). Additionally, studies have shown that much of the arsenic in fish and shellfish is usually present as the organic arsenic compound, arsenobetaine, which does not appear to be harmful to humans and is excreted, rapidly and unchanged, in urine (ATSDR 2005). The clams from Port Hadlock did not contain higher levels of arsenic than FDA's level of concern for average consumption (FDA 1993). The estimated doses from consumption of clams at Site 10 were below those associated with adverse health effects found in the toxicological and epidemiological literature.

The evaluation also revealed that some of the Navy's analytical methods used to measure certain compounds did not have adequate detection limits (i.e., the method detection limits [MDL] were above ATSDR's health based screening values), and therefore, compounds that were not detected could not be completely ruled out as contaminants of concern. For these compounds, ATSDR calculated doses based on the reported MDL for the specific compound because the MDL represented the upper bound concentration for that compound.

ATSDR recommended that for future monitoring efforts the Navy use analytical techniques with detection limits lower than EPA's Region III risk-based concentrations<sup>1</sup>, which are the screening values ATSDR used to evaluate contaminants in fish and shellfish tissue. ATSDR also recommended that the Navy include nitrobenzene and 2,4,6-trinitrotoluene (2,4,6-TNT)<sup>2</sup> in their analyte list for future monitoring rounds at Site 10.

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<sup>1</sup> ATSDR has not developed screening values for contaminants in fish and shellfish tissue. ATSDR often uses the Environmental Protection Agency's Region III risk-based concentrations (RBCs) to screen contaminants detected in fish and shellfish tissues.

<sup>2</sup> Note: A typographical error in the 1999 PHA release was made in the Recommended Actions section of the report. The original report recommended that the Navy include the ordnance compound 2,4,5-TNT in future rounds of shellfish monitoring. The recommendation should have been for 2,4,6-TNT **not** 2,4,5-TNT to be included in future rounds of monitoring.

### ***Site 21***

Site 21 is an area comprising approximately 5,000 square feet located immediately east of Building 86. This area was reportedly used as a disposal site for waste oils, solvents, electrical equipment, fill soil, and paint in the 1940s. The only production wells located in this area are backup water supply wells No. 1 (located 1,500 feet north of Site 21) and No. 2 (located 100 feet south of Site 21) (ATSDR 1999). At the time of the 1999 PHA release, there were no immediate plans to use these wells as a source of drinking water.

The Navy conducted four semiannual groundwater monitoring rounds at Site 21 from 1995 to 1997. Most inorganic compounds (e.g., antimony, arsenic, beryllium, lead, manganese, and nickel) were detected below levels of human health concern. Total arsenic concentrations ranged from 1.0-4.2 parts per billion (ppb). No sample exceeded the federal maximum contaminant level (MCL) of 10 ppb (Ecology 2000). Organic contaminants previously detected in groundwater at Site 21 (i.e., benzene, hexachlorobutadiene, and bis [2-ethylhexyl]phthalate) were not detected in recent sampling events. These contaminants were detected in groundwater at Site 21 prior to the release of the PHA in 1999.

### ***Other site-related issues***

No other site-related issues from the initial Port Hadlock Detachment PHA were identified as a concern for this follow-up assessment.

### **Follow-up Evaluation**

#### ***Site 10***

At the time of the release of the 1999 Port Hadlock (Indian Island Depot) PHA, sediment and clam tissue sampling at Site 10 had been conducted during four time periods: 1986, 1989, 1993, and 1998. Since the PHA, the Navy conducted two additional rounds of clam and sediment monitoring near Site 10. In 2000, clam tissue samples were analyzed for total metals, pesticides, PCBs, SVOCs, and ordnance compounds (The Environmental Company, 2001a; 2001b). In 2004, the most recent sampling event, monitoring only included metals and ordnance compounds. One composite tissue sample from each beach and the background location was also analyzed for arsenic speciation (The Environmental Company, 2004). Some previously analyzed compounds, which included selected pesticides, SVOCs, and PCBs, were not included in the 2004 analyses.

#### **What is the Source of Arsenic at Site 10?**

Arsenic is a naturally occurring element common in the earth's crust. Arsenic has been used extensively in the past and to a much lesser extent today in a number of industrial and commercial products.

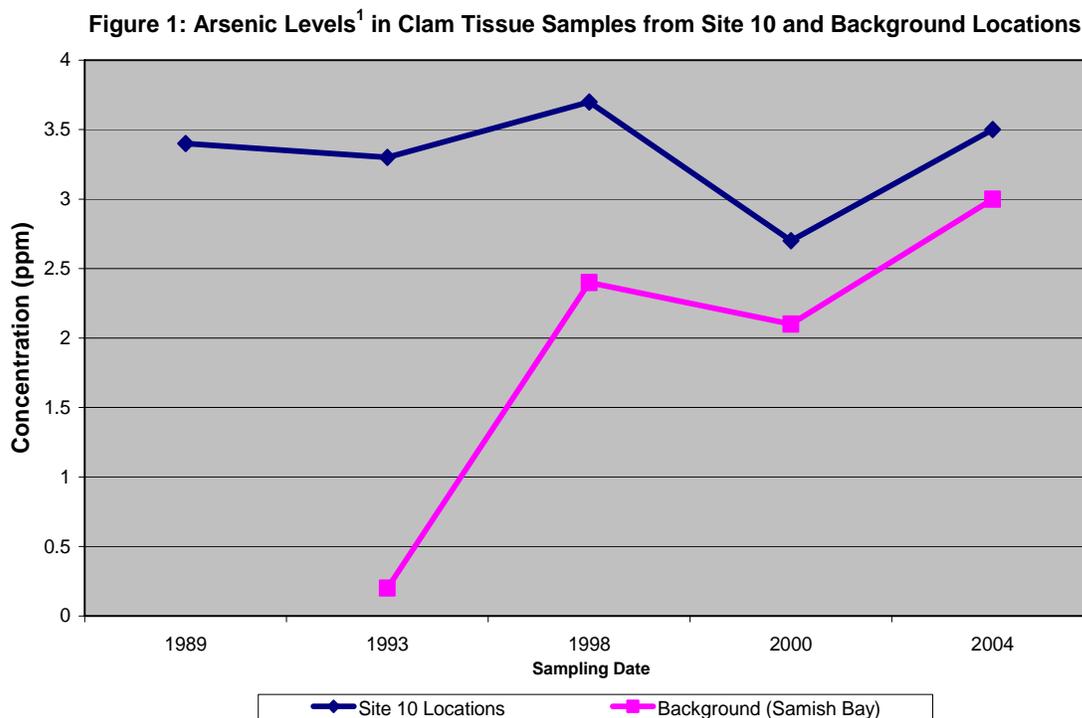
- Arsenic was used extensively in pesticides and herbicides until the late 1960s; most agricultural uses have now been banned.
- Arsenic was also a major component of the preservative solution chromated copper arsenate (CCA) used in pressure-treated lumber. Most uses of this preservative in the U.S. were discontinued as of 2004.
- Arsenic may have been used in other industrial or commercial items that were disposed of at Site 10.

The source of arsenic in clams near Site 10 has not been established. According to recent sampling conducted by the Navy and Washington Department of Ecology, the levels of arsenic detected in clam tissue samples from other locations in Puget Sound are similar to those found near Site 10. This suggests that if Site 10 landfill contaminants are contributing to arsenic levels in the clams, the amount represents only a small proportion of the total amount accumulated.

Source: HartCrowser 2001

The 2000 and 2004 clam tissue sampling analysis results were generally consistent with previous sampling efforts. With the exception of total arsenic, compounds were either generally not detected at levels above EPA’s Region III risk-based concentration (RBCs) or were below the analytical MDL. The results of the recent monitoring efforts along with an assessment of the Navy’s MDLs are summarized below.

*Arsenic:* Arsenic remained the only compound detected above the health-based screening value. Figure 1 shows the maximum arsenic levels detected from Site 10 and corresponding background locations, when available, in each of the sampling periods beginning in 1989. The maximum detected arsenic concentrations from 1989 to 2004 arsenic levels are consistently around 3 ppm and vary by 1 ppm. Maximum arsenic concentrations detected in background samples from Samish Bay are consistently lower than the Site 10 maximum concentrations during each of four sampling periods displayed; although the difference is most notable in 1993. Refer to the text box for more information about possible sources of arsenic in shellfish.



<sup>1</sup> Arsenic concentrations represent the maximum detected values for each sampling period  
 Source: Environmental Company, Inc., September 2004.

Note: Corresponding background sampling data for 1989 were not available

According to Navy reports, the average total arsenic concentrations detected in clams at Site 10 during the last three sampling periods (1998, 2000, and 2004) was 2.5 parts per million (ppm); whereas the average total arsenic concentrations detected in background samples collected from Samish bay was 2.4 ppm in 1998 and 2.1 ppm in 2000. Additionally, average total arsenic concentrations reported at other locations in Puget Sound range from 1.4 (South Puget Sound) to 5.1 (Sequim Bay) (HartCrowser 2001; The Environmental Company, 2004). Therefore, arsenic concentrations detected in clams at Site 10 sampling locations are well within the range of those reported from other Puget Sound locations.

ATSDR reviewed the sampling protocol to confirm that the number of samples and amount of tissue collected at on-site locations was similar to what was collected at background locations. The number of little neck clam samples collected from each of the on-site sampling stations ranged between 13 and 50 clams during the 2001 monitoring and between 7 and 37 clams during the 2004 monitoring; whereas the number of little neck clam samples collected from the Samish Bay background location was 42 and 50 clams in 2001 and 2004, respectively. A limited number of butter clams were also sampled at both on-site and background locations. The average wet weight of the samples collected at each of the on site monitoring stations was generally higher than the average wet weight of samples collected from the background locations. There was no indication in the monitoring reports that the laboratory analysis was limited by insufficient tissue quantity at any of the on-site or background locations.

*Other Contaminants:* Although arsenic was the only contaminant detected in clams at levels exceeding its screening value during the 2000 and 2004 monitoring periods, these levels are much lower than market based surveys. A number of other contaminants were detected below the MDL. The findings were consistent with earlier monitoring periods. However, some of the MDLs during those earlier sampling efforts were higher than their respective screening value. In the 1999 PHA, ATSDR recommended that the Navy improve detection limits for these chemicals so that their levels could be adequately assessed.

During this follow-up evaluation ATSDR reviewed the two most current rounds of monitoring (2000 and 2004) to determine whether the analytical methods had improved. ATSDR compared the MDLs from earlier clam tissue analyses with the more recent analyses performed. Additionally, two polycyclic aromatic hydrocarbons (PAHs), benzo(a)pyrene and dibenzo(a,h)anthracene were detected at levels that exceeded their RBCs during the earlier monitoring periods. PAHs were sampled during the 2000 monitoring event and both compounds were below the laboratory MDL. ATSDR compared the MDL for these two PAHs with their corresponding RBC to ensure that the laboratory MDLs are health protective.

Table 1 presents the maximum concentrations for selected contaminants reported in clam tissue samples. The contaminants listed in the table represent contaminants with previously reported MDLs exceeding their respective EPA risk-based concentration (RBC) value or ones previously detected above their respective RBC. Two previously analyzed PAH compounds, benzo(e)perylene and perylene, were not included as analytes in either 2002 or 2004.

As indicated by the shaded cells, some of the contaminants detected in clams, or their reported MDLs, continued to exceed their RBCs during the 2000 monitoring. However, improvements in the MDLs were noted with several contaminants during the 2000 monitoring and further

improvements in MDLs of ordnance compounds occurred in 2004. Additionally, the MDL for benzo(a)pyrene and dibenzo(a,h)anthracene are very close to their corresponding RBCs and are adequate to evaluate exposure.

During the 1999 PHA, ATSDR recommended that the Navy include the ordnance compounds nitrobenzene and 2,4,6-TNT in future rounds of tissue monitoring. The Navy included both of these compounds, which were not detected in clam tissue monitoring in 2000 and 2004. Additionally, Table 1 shows that the reported MDL for nitrobenzene is below the corresponding RBC value during both 2000 and 2004. During the 2000 monitoring round, the reported MDL for 2,4,6-TNT was still slightly above the corresponding RBC, but below the RBC during the 2004 monitoring period.

<b>Table 1. Maximum Contaminant Concentrations Reported in Clam Tissue Samples<sup>1</sup></b>				
Contaminants	ATSDR or Navy Sampling	Navy Monitoring		RBC (ppm)
	Previous Max <sup>2</sup>	Max (2000)	Max (2004)	
BEHP	MDL (3) 1993*	0.56	NS	0.23
Benzo(e)perylene	0.0038	NS	NS	0.00043
Benzo(a)pyrene	0.003	MDL (0.0005)	NS	0.00043
Dibenzo (a,h) anthracene	0.0025			
Nitrobenzene	MDL (1)	MDL (0.2 )	MDL (0.02)	0.68
Pentachlorophenol (PCP)	MDL (0.049)	MDL (0.009)	NS	0.026
Perylene	0.0035	NS	NS	0.00043
RDX	MDL (1)	MDL (0.8)	MDL (0.02)	0.029
4-Amino-2,6-dinitrotoluene	MDL (1)	0.2	0.06 (estimated)	0.081 <sup>3</sup>
2-Amino-4,6-dinitrotoluene	MDL (1)	0.2	MDL (0.013)	0.081 <sup>3</sup>
2,4,6-trinitrotoluene (TNT)	MDL (3)	MDL (0.2)	MDL (0.014)	0.11

Sources: ATSDR 1999; Environmental CO, Inc 2001a; 2001b, 2004

BEHP = Bis(2-Ethylhexyl)phthalate  
MDL = method detection limit  
NS = not sampled  
RDX = Cyclotrimethylenetrinitramine

<sup>1</sup> The contaminants presented represent those analytes with MDLs exceeding their respective EPA risk-based concentration (RBC) value or analytes detected above their respective RBC value.

<sup>2</sup> Unless otherwise noted, all samples were collected in 1998.

<sup>3</sup> RBC is for aminodinitrotoluenes.

\* This sample was collected by the Navy in 1993 as part of a remedial investigation/feasibility study (RI/FS).

Notes:  
Values in parentheses represent the analytical detection limit.  
Shaded cells indicate that detected concentration or MDL still exceeds the corresponding RBC value.

### ***Site 21***

Since the release of the PHA in 1999, Ecology, EPA, and the Navy continued to monitor groundwater reports and indicated that they would take necessary actions (e.g., abandoning backup water supply wells Nos. 1 and 2 and instituting deed restrictions to prevent installation of future wells) if groundwater was deemed to pose a health concern. Based on a review of the compliance monitoring data in 2000, Ecology concluded that no further action was necessary for Site 21 (HartCrowser 2000; U.S. Navy 2005). ATSDR concurs with Ecology's assessment of groundwater beneath Site 21.

ATSDR also followed up with the Navy regarding the existing supply wells and confirmed that the two backup wells are not connected to the water supply system. Additionally, the Navy plans to decommission both wells in 2010 and has no plans to replace them with other wells. The base currently receives water from Public Utilities District #1 of Jefferson County, Washington, which obtains water from off-base sources (Thelin, 2007).

### ***Other site-related issues***

A representative of WDOH inquired whether the Navy had collected any sediment and/or tissue samples from the public beach at Fort Flagler State Park. Fort Flagler State Park is currently designated as "Unclassified." Unclassified beaches are defined as those where no formal assessment of contaminants in shellfish has been conducted. WDOH has received a request for commercial shellfish harvesting at Fort Flagler and is in the process of completing a pollution source evaluation along the shoreline of Fort Flagler State Park. WDOH is interested in ATSDR's follow-up evaluation as it related to information that could be used to assist the department in determining whether commercial harvesting along Ratt Island, which is the area of the park closest to Site 10, should be approved (Berbells, 2007).

Although ATSDR is not aware of any recent sediment or tissue samples that have been collected at Fort Flagler State Park, the Navy's 2000 and 2004 clam tissue monitoring included samples collected at Beaches 1, 2, and 19, located on Indian Island. These sampling locations are closer to Site 10 than any shoreline area located at Fort Flagler State Park. Site-related contaminants at these three beaches were not detected at levels of health concern. These findings would suggest that clams and possibly other shellfish at Fort Flagler would not be adversely impacted by contaminants from Site 10 and are safe for human consumption. However, as a precautionary measure, ATSDR recommends site- and species-specific shellfish monitoring prior to allowing commercial harvesting in this area.

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## Community Health Concerns

Inquiries regarding community concerns associated with the Port Hadlock Detachment site were made with ATSDR's Region 10 representatives, the Washington State Department of Health (WDOH), and Navy representatives. No specific community concerns were identified during ATSDR's follow-up assessment.

## Conclusions

### Site 10

- A review of clam tissue monitoring conducted by the Navy in 2000 and 2004 did not identify contaminants at levels of health concern.
- ATSDR's recommendation to include nitrobenzene and 2,4,6-TNT was met. Both of these compounds were included in the analysis in the 2000 and 2004 clam tissue monitoring and were below the reported MDL. Therefore, these compounds were not present at levels of health concern.
- ATSDR's recommendation to use analytical techniques that have detection limits lower than EPA's Region III RBCs was met. ATSDR reviewed the MDLs for the reported analytes and they were below their corresponding EPA Region III RBC values during the 2004 monitoring period.
- Pesticides and PAHs were not included in the most recent sampling event in 2004. Prior sampling indicated that these contaminants were not present at levels of concern and, therefore, the Navy removed them from the analyte list during the recent monitoring periods. Both EPA and Ecology approved the clam tissue monitoring work plans and ATSDR believes that the Navy's monitoring was sufficient to protect public health.

### Site 21

- Site-related contaminants in groundwater beneath Site 21 were not detected at levels of health concern.
- ATSDR has confirmed with the Navy that the two supply wells will be decommissioned and no new well installations are planned.

## New Recommendations

- There is interest in opening shellfish beds for commercial harvesting at Fort Flagler State Park, near Site 10. Before the WDOH considers harvesting in the area they should consider developing a fish monitoring plan that includes consultations with the Navy to define potential harvesting zones (beds). Additionally, the monitoring plan should include the collection of sufficient number of shellfish of numerous sizes.

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