

**PUBLIC HEALTH ASSESSMENT**  
**CURTIS BAY COAST GUARD YARD**  
(a/k/a U.S. COAST GUARD, HAWKINS POINT RD.)  
**BALTIMORE, ANNE ARUNDEL COUNTY, MARYLAND**  
**EPA FACILITY ID: MD4690307844**

Prepared by:

Federal Facilities Assessment Branch  
Division of Health Assessment and Consultation  
Agency for Toxic Substances and Disease Registry



## FOREWORD

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the *Superfund law*. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. (The legal definition of a health assessment is included on the inside front cover.) If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements. The public health assessment program allows the scientists flexibility in the format or structure of their response to the public health issues at hazardous waste sites. For example, a public health assessment could be one document or it could be a compilation of several health consultations - the structure may vary from site to site. Nevertheless, the public health assessment process is not considered complete until the public health issues at the site are addressed.

**Exposure:** As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

**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 contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries, to determine the 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. When this is so, the report will suggest what further public health actions are needed.

**Conclusions:** The report presents conclusions about the public health threat, if any, posed by a site. When health threats have been determined for high risk groups (such as children, elderly, chronically ill, and people engaging in high risk practices), they will be summarized in the conclusion section of the report. Ways to stop or reduce exposure will then be recommended in the public health action plan.

ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA, 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.

**Interactive Process:** The health assessment is an interactive process. ATSDR solicits and evaluates information from numerous city, state and federal agencies, the companies responsible for cleaning up the site, and the community. It then shares its conclusions with them. Agencies are asked to respond to an early version of the report to make sure that the data they have provided is accurate and current. When informed of ATSDR's conclusions and recommendations, sometimes the agencies will begin to act on them before the final release of the report.

**Community:** ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the comments received from the public are responded to in the final version of the report.

**Comments:** If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Chief, Program Evaluation, Records, and Information Services Branch, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E-60), Atlanta, GA 30333.

## Table of Contents

Foreword.....	2
List of Abbreviations .....	ii
Summary .....	1
Background.....	3
Site Description and Operational History.....	3
Remedial and Regulatory History.....	3
ATSDR Activities.....	5
Demographics and Land Use.....	5
Quality Assurance and Quality Control.....	6
Evaluation of Environmental Contamination and Exposure Pathways .....	7
Introduction.....	7
Evaluation of the Surface Soil Pathway .....	9
Evaluation of the Surface Water and Sediment Pathway .....	14
Evaluation of the Biota Consumption Pathway.....	15
Community Health Concerns.....	19
Child Health Considerations.....	21
Conclusions.....	22
Recommendations.....	23
Public Health Action Plan.....	23
Authors, Technical Advisors .....	25
References.....	26
Tables.....	28
Table 1. Evaluation of Potential Public Health Hazards at Curtis Bay Coast Guard Yard	28
Table 2. Exposure Pathways Evaluation Table	33
Figures.....	35
Figure 1. Area Map: Curtis Bay Coast Guard Yard	35
Figure 2. Site Map: Curtis Bay Coast Guard Yard	36
Figure 3. Demographics Within 1-Mile Buffer Around Curtis Bay Coast Guard Yard	37
Figure 4. ATSDR's Exposure Evaluation Process	38
Appendix A. Glossary.....	A-1
Appendix B. ATSDR's Assessment Methodology and Comparison Values .....	B-1
Appendix C. A Guide to Healthy Eating of the Fish You Catch.....	C-1

---

## List of Abbreviations

AOC	Area of Concern
ATN	Aids to Navigation
ATSDR	Agency for Toxic Substances and Disease Registry
CAG	Community Advisory Group
CEL	Cancer Effect Level
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CREG	ATSDR's cancer risk evaluation guide
CRP	Community Response Plan
CVs	comparison value
DD	Decision Document
EMEG	ATSDR's environmental media evaluation guide
EPA	U.S. Environmental Protection Agency
HRS	Hazard Ranking System
kg	kilogram
LOAEL	Lowest-observed-adverse-effect-level
MCL	EPA's maximum contaminant level
MDE	Maryland Department of the Environment
mg	milligram
MRL	ATSDR's minimal risk level
NIOSH	National Institute for Occupational Safety and Health
NPL	EPA's National Priorities List
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PA	Preliminary Assessment
PA/SI	Preliminary Assessment/Site Investigation
PCBs	polychlorinated biphenyls
PHA	public health assessment
PHAP	Public Health Action Plan

ppb	parts per billion
ppm	parts per million
RBC	EPA's risk-based concentration
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RMEG	ATSDR's reference media evaluation guide
SI	Site Inspection
SVOCs	semi-volatile organic compounds
UST	underground storage tank
VOCs	volatile organic compounds





## Summary

The Agency for Toxic Substances and Disease Registry (ATSDR) prepared this public health assessment (PHA) to evaluate the potential for contamination from the United States Coast Guard (Coast Guard) Yard (the Yard) site. Specifically, ATSDR wanted to know whether any such contamination would cause harm to people working at or living near the facility. Following a detailed review, ATSDR finds that the Yard poses no threat to public health.

The Yard occupies 113 acres in Ann Arundel County, Maryland, approximately 6 miles southeast of downtown Baltimore (Tetra Tech 2000a). The Yard was originally established in 1899 as a Coast Guard training academy and boat repair facility. By 1910, the Yard had become a fully operational shipbuilding and repair facility (EPA 2002).

As a result of more than 100 years of activity at this site, chemicals have been released to the environment. In 1993 the Coast Guard conducted a Preliminary Assessment (PA) at the Yard. In 1998, the Coast Guard submitted to the U.S. Environmental Protection Agency (EPA) information supplemental to the 1993 PA. Sampling results indicate contamination from semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), metals, polychlorinated biphenyls (PCBs), pesticides, and dioxins (EPA 2002). It is also possible for such contamination to migrate into adjacent surface water. On September 5, 2002, the EPA added the Yard to the National Priorities List (NPL) of sites to be investigated, primarily due to concerns about surface water and fishery contamination (Tetra Tech 2000b). The NPL is a part of the federal government's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as "Superfund."

Through its PHA process, ATSDR conducted a site visit and met with representatives from the Yard and the Coast Guard. At the time of the visit, ATSDR did not identify any hazards posing immediate threats to public health. ATSDR determined, however, that it needed additional information for a more complete evaluation of ways in which people could have been exposed, or could be exposed, to contaminated surface soil, surface water/sediment, and fish in the nearby waterways. ATSDR addresses these issues in this document.

After evaluating environmental monitoring data and key potential exposure situations, ATSDR determined that potential exposures associated with groundwater, surface soil, surface water/sediment, and biota at the Yard do not pose past, current, or future public health hazards. Specifically,

Contamination in groundwater poses no past, current, or future public health hazard. The Yard and nearby residents have received their drinking water from the City of Baltimore water supply since at least the 1940s. Therefore, Yard employees and residents have not been exposed to contaminated groundwater.

Contamination in surface soil is not expected to pose a health threat. Certain areas of the Yard contain VOCs, SVOCs, pesticides, PCBs, and metals in surface soil. However, a perimeter fence and a gated entrance largely prevent public access to these contaminated areas. Although workers or trespassers might have come in contact with contaminants in surface soil, contact was likely both infrequent and brief. Intermittent contact with surface soil contaminants — even

at the highest levels reported — is not expected to pose a health concern. Moreover, access restrictions and land use controls will help to prevent potential future exposures to any soil contaminants.

Contamination in surface water and sediment of the local waterways is not expected to pose a health threat. Contaminants from the Yard's former operations could have migrated into Curtis Creek and Arundel Cove. Some VOCs, SVOCs, pesticides, PCBs, and metals were detected in surface water and sediment samples near the Yard. Public access to the waterways is, however, limited. Although there is no evidence of people wading or playing in or near the waterways, any exposure would likely be infrequent and of short duration. Accordingly, such limited exposure with low-level contamination in the waterways is not expected to pose a health concern.

If recreational fishermen follow the Maryland Department of the Environment (MDE) fish advisory, consumption of locally caught fish and crab is not expected to pose a health threat. Yard employees and Coast Guard retirees are permitted to fish off the marina along Arundel Cove, which borders the Yard property to the east and flows to Curtis Creek. Fish from Curtis Bay and upper Curtis Creek have been tested by the MDE for possible uptake of contamination. ATSDR has reviewed this data, and MDE currently has fish advisories on blue crab, brown bullhead, small and largemouth bass, eel, carp, catfish and perch. ATSDR recommends that sport anglers follow all MDE fish consumption advisories. Considering this information, ATSDR concludes that fish from Curtis Creek should be safe to eat in proportions recommended by MDE.

## **Background**

### **Site Description and Operational History**

The United States Coast Guard (Coast Guard) Yard (the Yard) is a government-owned facility comprising 113 acres in Baltimore, Anne Arundel County, Maryland. Hawkins Point Road borders the Yard on the north. Curtis Creek forms the southern boundary of the Yard. Arundel Cove, which flows to Curtis Creek, forms the eastern boundary. Tri-Star Trucking and CSX railroad border the Yard to the west (Tetra Tech 2000a). Figure 1 shows the area surrounding the Yard.

The Yard was originally established in 1899 as a Coast Guard training academy and boat repair facility. Industrial development began at the Yard around 1906. By 1910, the Yard had become a fully operational shipbuilding and repair facility. The Yard reached its peak of activity during World War II.

The current mission of the Yard is to provide core industrial support for the Coast Guard, including the design, construction, and repair of ships and boats. The mission entails full-service repair, overhaul, and modification of ships, manufacture of articles not available from commercial suppliers, overhaul of ordnance equipment, and installation of electronic equipment (Tetra Tech 2000a).

### **Remedial and Regulatory History**

The Coast Guard began environmental investigations at the Yard around 1988. A Preliminary Assessment (PA) and PA-Level Hazard Ranking System (HRS) Score were prepared in 1993 (SAIC 1993). In January 1998, the Coast Guard submitted correspondence to the U.S. Environmental Protection Agency (EPA) containing information supplemental to the 1993 PA (Tetra Tech 2000a). Former site-related activities are suspected to have contributed to contamination of on-site soils, groundwater, surface water, and sediments. The sampling results from the assessments indicate soil and sediment contamination with semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), pesticides, and dioxins (EPA 2003).

As a result of the detected contamination, on September 5, 2002, the EPA added the Yard to the National Priorities List (NPL). The EPA cited soil contamination with SVOCs, metals, PCBs, pesticides, and dioxin as the reason for NPL inclusion. The NPL is a part of the federal government's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as "Superfund." Although the activities that originally caused the contamination have ceased, the remaining contaminated soil and sediment could affect adjacent Curtis Creek, which is used for fishing (EPA 2003).

Environmental investigations to date have helped identify 13 potential areas of concern (AOCs) at the Yard where groundwater, soil, or surface water are contaminated or suspected to be contaminated with SVOCs, VOCs, metals, PCBs, pesticides, and dioxins. Four of the 13 sites were identified as petroleum-release sites, which are exempt from CERCLA. The nine remaining areas of potential contamination were addressed in the Site Inspection (SI) conducted in 2000 (Tetra Tech 2000a). Two of these areas (Areas 6 and 13) are not evaluated in the HRS scoring because

available data indicate no significant chemical contamination associated with these sources. Six of the nine areas of potential contamination are included as sources in the HRS scoring (EPA 2002).

Table 1 lists the sites, describes past investigations, and completed or planned remedial investigations. The table also provides an evaluation of potential public health hazards associated with each site. Key AOCs at the Yard are shown in Figure 2.

The Areas consist of:

**Area 1-Dry Dock Sediments.** This includes the Curtis Creek sediments in the area immediately surrounding the dry docks. These sediments potentially contain heavy metals from grit blast metal cleaning operations at the dry docks.

**Area 4-Salvage Lot.** The salvage lot has been used for the storage of scrap metal, oil, batteries, and transformers. The surface soils in this area are contaminated with lead and PCBs.

**Area 5-Creosote-Stained Soils.** This location was identified as a potential concern, based on a report of a historical creosote coating operation within the area.

**Area 6-Cosmoline Discharge.** Cosmoline was reportedly discharged on the ground surface near Buildings 34 and 35.

**Area 7-Former Burn Pit.** This area is located near the southwestern end of the salvage lot and was previously used as a waste oil burn pit. A leaking underground storage tank (UST) containing diesel fuel was located about 100 feet away. Petroleum-related contaminants and PCBs were identified in groundwater and lead was identified in soil. Soil sample analysis indicated the presence of unknown hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), alkyl-substituted benzenes, naphthalenes, and metals.

**Area 8-Former Incinerator.** The incinerator was removed in 1996, and the area has been graded and seeded. The incinerator was only used to burn wood, paper, and cardboard.

**Area 9-Reported Bilge Slop Area.** Prior to the 1970s, this area was reportedly used to discharge bilge water, used as a scrap metal storage yard, used for open burning and dumping, and possibly used as a disposal area for ash from the former incinerator.

**Area 11-Spent Abrasive Blast Grit.** Spent blast grit was observed on the ground surface north of Building 34. Soil samples were collected and analyzed for PCBs, metals, total copper, and total zinc. Results indicated the presence of low levels of PCBs and lead.

**Area 13-Acid Tanks.** This area contained two USTs that were used to store rinse water from a hydrofluoric acid cleaning process. Analysis of the tank contents indicated the presence of trivalent chromium. The tanks are not known to have leaked or spilled.

The Coast Guard has undertaken several actions at these AOCs. In November 1992 two USTs were abandoned in-place at Site 13-Alanite Acid Tanks. The Site 4-Salvage Lot was cleaned in the mid-1980s — physical debris was removed and a concrete sub-base was installed. In the late-1980s the Site 11-Spent Abrasive Blast Grit function was changed to an indoor blasting system. Additionally, in the early-1990s a grit separator was installed in the storm grate. Both of these actions were implemented to prevent grit from washing into nearby waterways. The nine AOCs have been

grouped into six sites. The Coast Guard will conduct a Remedial Investigation/Feasibility Study (RI/FS) at each of the six sites.

### **ATSDR Activities**

Through the public health assessment process, ATSDR assesses site conditions from a public health perspective to determine whether people, both on- and off-site, could be exposed to site-related contaminants through contact with the groundwater/drinking water, surface water, soil, biota, or air. ATSDR conducted a site visit on December 11–13, 2002. During the visit, ATSDR staff toured the facility, reviewed installation files, and met with Coast Guard and Yard representatives. ATSDR did not identify any exposure situations requiring immediate attention. ATSDR did note three exposure pathways that required further evaluation, including contact with contaminated surface soil and surface water/sediment, and consumption of local fish and crab. ATSDR's evaluation of these exposure pathways is found in the Evaluation of Environmental Contamination and Exposure Pathways and in the Community Health Concerns sections of this document.

### **Demographics and Land Use**

ATSDR examines demographic data (i.e., population information) to determine the number of people potentially exposed to environmental chemicals and to determine the presence of sensitive populations, such as children (age 6 and younger), women of childbearing age (age 15 – 44), and the elderly (age 65 and older). Figure 3 shows demographic statistics for a 1-mile radius surrounding the Yard. Demographic data also provide details on population mobility which, in turn, helps ATSDR evaluate how long residents might have been exposed to environmental chemicals.

In addition to demographic information, ATSDR examines the many ways that the people near the Yard might use the land and its natural resources. ATSDR does this to determine what activities might put people at risk for exposure. This information is important because land use affects exposures to contamination by controlling the types and frequencies of activities in those areas. ATSDR uses this information as part of the evaluation of contamination and exposure in this document. Below, we provide both the demographic and the land use information we used in our analysis.

At peak operation during World War II, the number of workers at the Yard exceeded 3,000. Some workers also lived in staff housing located on Yard property. About 1,300 workers are currently employed at the Yard, including civilian and Coast Guard personnel (Tetra Tech 2000a). The installation is surrounded by a perimeter fence, and access to the Yard was and still is restricted to Coast Guard personnel and civilian employees. Authorized visitors can enter by passing through a security guard station, registering their vehicle, and obtaining a pass. Once within the Yard boundaries, access to contaminated areas is not limited, except for fenced-off areas.

The Yard is located in Baltimore, Maryland in Anne Arundel County. Although most of the Yard land area is located in Anne Arundel County, the northern portions of the Yard are within the Baltimore city limits. As indicated in Figure 3, about 282 people live within a 1-mile buffer of the site boundary, including 11 children 6 years of age and younger and 44 adults age 65 and older (ATSDR 2003). The city of Baltimore (population 645,305) is 6 miles northwest of the Yard (Census Bureau 2003).

The Yard contains 113 acres of densely developed industrial and non-industrial lands with significant marine and shipbuilding facilities, numerous administration buildings, industrial shops, equipment staging areas, piers, bulkheads, and parking lots. Land use surrounding the Yard is primarily heavy industrial and commercial, although scattered residences are found within 1 mile (Tetra Tech 2000a). Anne Arundel County has zoned the Yard as Government/Institutional (Anne Arundel County 2002).

Coast Guard employees and retirees are allowed to fish at the recreational marina on Arundel Cove. Employees also fish off the piers. The most common fish caught at the Yard are rockfish (striped bass), perch, and catfish. Crabbing with traps is also common at the recreational marina and off the docks. People do not swim at the recreational marina, however (Richard Raker, personal communications with Katherine Hanks, December 11–13, 2002).

### **Quality Assurance and Quality Control**

In preparing this PHA, ATSDR reviewed and evaluated information provided in the referenced documents. Documents prepared for the CERCLA program must meet standards for quality assurance, and for quality control measures for chain-of-custody, laboratory procedures, and data reporting. The environmental data presented in this PHA are from Coast Guard site and remedial investigations. After an evaluation, ATSDR determined that the quality of environmental data available for the Yard is adequate for making public health decisions.

## Evaluation of Environmental Contamination and Exposure Pathways

### Introduction

#### *Defining Exposure*

ATSDR's public health assessments are exposure, or contact-driven. Given sufficient exposure levels, chemical contaminants disposed of or released into the environment have the potential to cause adverse health effects. That said, however, a release does not always result in exposure. People can only be exposed to a contaminant if they come in contact with that contaminant. That exposure could occur by breathing, eating, or drinking a substance containing the contaminant, or by skin contact with a substance containing the contaminant.

#### *Selecting Exposure Situations for Evaluation*

ATSDR evaluates site conditions to determine whether people could have been (a past scenario), are (a current scenario), or could be (a future scenario) exposed to site-related contaminants. When evaluating exposure pathways, ATSDR identifies whether exposure to contaminated media (e.g., soil, water, air, or biota) has occurred, is occurring, or will occur through ingestion, dermal (skin) contact, or inhalation. ATSDR also identifies an exposure pathway as completed or potential, or eliminates the pathway from further evaluation. Completed exposure pathways exist if all elements of a human exposure pathway are present. (See Appendix B for a description of the elements of a completed exposure pathway.) A potential pathway is one that ATSDR cannot rule out because one or more of the pathway elements cannot be definitely proven or disproven. If one or more of the elements is definitely absent, a pathway is eliminated.

If exposure was, is, or could be possible, ATSDR then considers whether contamination is present at levels that might affect public health. ATSDR scientists select contaminants for further evaluation by comparing them to health-based comparison values (CVs). ATSDR develops comparison values from scientific literature available on exposure and health effects. These CVs are derived for each of the various media and reflect an estimated contaminant concentration that is not expected to cause adverse health effects for a given chemical, assuming a standard daily contact rate (e.g., amount of water or soil consumed or amount of air breathed) and body weight.

CVs are not thresholds for adverse health effects. To be conservative and protective of public health, ATSDR CVs generally are based on contaminant concentrations many times lower than levels at which no effects were observed in experimental animals or human epidemiologic studies. If contaminant concentrations are above CVs, ATSDR further analyzes exposure variables (for example, duration and frequency), the toxicology of the contaminant, other epidemiology studies, and the weight of evidence for possible health effects.

Some of the CVs used by ATSDR scientists include ATSDR's environmental media evaluation guides (EMEG), reference dose media evaluation guides (RMEG) cancer risk evaluation guides (CREG), and EPA's maximum contaminant levels (MCL). MCLs are enforceable drinking water regulations developed to protect public health. CREGs, EMEGs, and RMEGs are non-enforceable, health-based CVs developed by ATSDR for screening environmental contamination for further evaluation.

ATSDR's Public Health Assessment Guidance Manual contains more information about the ATSDR evaluation process: <http://www.atsdr.cdc.gov/HAC/HAGM/>, or contact ATSDR at 1-888-42ATSDR.

### ***Determining Health Impacts of Exposures***

As stated, exposure does not always result in harmful health effects. The type and severity of health effects depend on the exposure concentration (how much), the frequency or duration of exposure (how long), the route or pathway of exposure (breathing, eating, drinking, or skin contact), and the multiplicity of exposure (combination of contaminants). Once exposure occurs, characteristics such as age, sex, nutritional status, genetics, lifestyle, and health status of the exposed individual influence how the individual absorbs, distributes, metabolizes, and excretes the contaminant. Together, these factors and characteristics determine the health effects that could occur as a result of exposure to a contaminant in the environment.

Considerable uncertainty exists about the true level of exposure to environmental contamination. To account for the uncertainty and to be protective of public health, ATSDR scientists typically use worst-case exposure level estimates as the basis for determining whether adverse health effects are possible. These estimated exposure levels usually are much higher than the levels to which people are actually exposed. If the exposure levels indicate that adverse health effects are possible, then a more detailed review of exposure, combined with scientific information from the toxicological and epidemiologic literature about the health effects from exposure to hazardous substances, is performed. Figure 4 provides an overview of ATSDR's exposure evaluation process.

### ***Exposure Situations at Curtis Bay Coast Guard Yard***

ATSDR analyzed data for the Yard's source areas to determine if they are associated with past, current, or future public health hazards. Table 1 provides a description of each site and a summary of our evaluation. Our review indicated two principal reasons why most sites at the Yard are not associated with any known public health hazards: (1) contaminant concentrations detected are too low to pose a health hazard, or (2) past or current exposure to the general public has been prevented.

The groundwater pathway was eliminated because direct contact with contaminated groundwater does not occur. The Yard and nearby residents receive their drinking water from the City of Baltimore water supply (Richard Slagle, personal communications with Katherine Hanks, December 11–13, 2002). The Yard's drinking water has been supplied by the City of Baltimore since at least the 1940s. Previously, the Yard had its own water supply provided by two on-site groundwater wells. Sampling data does not exist for the groundwater used for drinking water prior to the 1940s. The decision to switch to city water was most likely due to a need for a greater volume of water at the Yard (Galliford, personal communication, 2004).

From this review, however, ATSDR did identify three exposure pathways at the Yard for further evaluation. These pathways are:

- Contact with contaminated surface soil
- Contact with contaminants in surface water and sediment of local waterways



- Consumption of locally-caught fish and crab

Our evaluation on exposure pathways is summarized in Table 2 and discussed in greater detail in the following discussion.

To acquaint the reader with terminology and methods used in this PHA, Appendix A provides a glossary of environmental and health terms used in this PHA and Appendix B outlines the assessment methodology and lists the comparison values also used in this PHA.

## **Evaluation of the Surface Soil Pathway**

### ***Discussion***

#### *Nature and Extent of Contamination*

The Coast Guard has conducted preliminary source investigations of soil at five of the six sites and has begun to investigate and assess any potential CERCLA risk for the six sites. The site that has not been investigated is the Dry Dock Sediments site — therefore, surface soil evaluation is not applicable. The Coast Guard investigations have revealed that soil at some of these areas is contaminated with VOCs, SVOCs, pesticides, PCBs, and metals. ATSDR screening of soil sample results are described below by site areas, and are generally summarized in Table 1 of this PHA. A discussion of future land use for each site is also provided.

#### Soils associated with Sites 4 and 7—The Salvage Lot and Former Burn Pit

This area includes Site 4—Salvage Lot, and Site 7—Former Burn Pit. Since its construction in the early 1940s, the Salvage Lot has been used for the storage of scrap metal, 55-gallon drums of waste lube oil, lead-acid batteries, transformers, and possibly transformer oil (TetraTech 2002). From the late 1940s through 1963, the Former Burn Pit was used for the disposal and intermittent incineration of liquids, solid waste, oil, batteries, scrap metal, and asbestos-containing materials (TetraTech 2002). Numerous investigations have been performed on these areas to determine whether specific chemicals remain in soil after past operations. Soil samples were collected from areas most likely to contain the highest concentrations of VOCs, SVOCs, metals, dioxin/furans, and PCBs.

Analytical results from the on-site data were screened using ATSDR comparison values. The following contaminants exceeded ATSDR's comparison values:

#### Site 4:

1. arsenic (up to 4.1 parts per million [ppm]),
2. benzo(a)anthracene (up to 1.4 ppm),
3. benzo(a)pyrene (up to 1.2 ppm), and
4. benzo(b)fluoranthene (up to 3.7 ppm)

---

**Site 7:**

1. antimony (up to 55.3 ppm),
2. arsenic (up to 9.9 ppm),
3. copper (up to 3340 ppm),
4. benzo(a)anthracene (up to 5.3 ppm),
5. benzo(a)pyrene (up to 4.1 ppm),
6. benzo(b)fluoranthene (up to 2.1 ppm),
7. dibenzo(a,h)anthracene (up to 0.42 ppm), and
8. indeno(1,2,3-cd)pyrene (up to 2.4 ppm)

(TetraTech 2002).

Ingestion exposure doses were calculated for each of the contaminants that exceeded ATSDR's comparison values. None of the doses exceeded available health guidelines. From October 2003 through May 2004 the Coast Guard conducted a Remedial Investigation (RI) of Sites 4 and 7 to define further the extent of contamination. Results of the RI are not yet available.

Soils associated with Sites 5, 6, & 11-Creosote Stained Soils, Cosmoline Discharge Area, and Spent Abrasive Blast Grit

Site investigations beginning in 1994 indicated that soils at Sites 5, 6, and 11 were contaminated with, primarily, VOCs, SVOCs, metals, PCBs, and pesticides. In the early 1940s, timbers were treated with creosote and stored along the shoreline at Site 5. Site 6 is the area designated for storage of Aids to Navigation (ATN), which were treated with cosmoline. The stored ATNs (buoys) were rinsed down, allowing the rinse water and cosmoline to discharge to the site soils. Open air blasting was conducted at Site 11 to remove rust and paint from docked ships and ship parts. Past maintenance activities included periodic area washdowns in which the wastewater and spent grit discharged to Curtis Creek (TetraTech 2002).

Analytical results from the on-site data were screened using the ATSDR comparison values. The following are the only contaminants that exceeded ATSDR's comparison values at Sites 5, 6, and 11: arsenic (up to 3.9 ppm), and benzo(a)pyrene (up to 0.7 ppm), were present at Site 5; arsenic was found (up to 4.2 ppm) at Site 6; and arsenic (up to 3 ppm) and benzo(a)pyrene (up to 0.2 ppm) were found at Site 11 (TetraTech 2002). Ingestion exposure doses were calculated for each of the contaminants exceeding ATSDR's comparison values. None of the doses exceeded available health guidelines. In October 2006 a Remedial Investigation/Feasibility Study (RI/FS) is scheduled to begin at Sites 5, 6, and 11.

Soils associated with Site 8-Former Incinerator

The incinerator was constructed in the 1930s to 1940s and demolished in 1996. It was used to burn wood, paper, and cardboard. It is not known where the ash was disposed of. It may have been disposed of off-site, or at Site 9 (TetraTech 2002). Numerous investigations have been performed

on these areas to determine whether specific chemicals remain in soil after past operations. Soil samples were collected from areas most likely to contain the highest concentrations of SVOCs, metals, dioxin/furans, PCBs, and pesticides.

Analytical results from the on-site data were screened using ATSDR comparison values. The following contaminants found at Site 8 exceeded ATSDR's comparison values:

1. arsenic (up to 4.1 ppm),
2. benzo(a)anthracene (up to 2.0 ppm),
3. benzo(a)pyrene (up to 1.8 ppm),
4. benzo(b)fluoranthene (up to 2.0 ppm),
5. dibenzo(a,h)anthracene (up to 0.09 ppm), and
6. indeno(1,2,3-cd)pyrene (up to 1.3 ppm)

(TetraTech 2002).

Ingestion exposure doses were calculated for each of the contaminants exceeding ATSDR's comparison values. None of the doses exceeded available health guidelines. In October 2005 a Remedial Investigation/Feasibility Study (RI/FS) is scheduled to begin at Site 8.

#### Soils associated with Site 9-Reported Bilge Slop Area

From at least the 1940s through the 1950s, and possibly into the 1960s, Site 9 consisted of an all-purpose storage and work area used as a dump, a scrap metal yard, and possibly a bilge dump area (TetraTech 2002). Numerous investigations have been performed on these areas to determine whether specific chemicals remain in soil after past operations. Soil samples were collected from areas most likely to contain the highest concentrations of VOCs, SVOCs, metals, PCBs, and pesticides.

Analytical results from the on-site data were screened using ATSDR comparison values. The following contaminants found at Site 9 exceeded ATSDR's comparison values:

1. arsenic (up to 48.4 ppm),
2. cadmium (up to 67.9 ppm),
3. copper (up to 32,700 ppm),
4. lead (up to 21,800 ppm),
5. vanadium (up to 258 ppm),
6. zinc (up to 44,200 ppm),

7. benzo(a)anthracene (up to 53 ppm),
8. benzo(a)pyrene (up to 13 ppm),
9. benzo(b)fluoranthene (up to 10 ppm),
10. benzo(k)fluoranthene (up to 13 ppm),
11. dibenzo(a,h)anthracene (up to 1.2 ppm), and
12. indeno(1,2,3-cd)pyrene (up to 9.8 ppm)

(TetraTech 2002).

Ingestion exposure doses were calculated for each of the contaminants that exceeded ATSDR's comparison values. None of the doses exceeded available health guidelines. In December 2004 a Remedial Investigation/Feasibility Study (RI/FS) is scheduled to begin at Site 9.

#### Soils associated with Site 13-Alanite Acid Tanks

Site 13 consists of two 800-gallon steel underground storage tanks (USTs) which were abandoned in-place in November 1992. The USTs were formerly used for the accumulation of waste rinse water generated from an alanite (or hydrofluoric acid) cleaning process. The exact location of each tank is unknown, as is the start-up date and the age of the tanks at abandonment (TetraTech 2002). Numerous investigations have been performed on these areas to determine whether specific chemicals remain in soil after past operations. Soil samples were collected from areas most likely to contain the highest concentrations of VOCs, SVOCs, metals, PCBs, and pesticides.

Analytical results from the on-site data were screened using ATSDR comparison values. The only contaminant that exceeded ATSDR's comparison values at Site 13 was arsenic (up to 2.5 ppm) (TetraTech 2002). The ingestion exposure dose was calculated for arsenic. The dose did not exceed the health guideline. In June 2006 a Remedial Investigation/Feasibility Study (RI/FS) is scheduled to begin at Site 13.

#### ***Potential Public Health Hazards***

Contaminated surface soils at the Yard are inaccessible to the general public — a perimeter fence with a gated entrance limits unauthorized access to the Yard. ATSDR looked at whether anyone with access to the site could be exposed to the contaminants in surface soil, either now or in the past. ATSDR determined that people in this category include site workers, on-site residents, and sport anglers. ATSDR also assessed possible exposure of family members of staff who also live on the Yard grounds.

ATSDR's review of the data indicated that people allowed on Yard property have not and are not likely to come into contact with harmful levels of soil contaminants for several reasons, including:

- Contaminants were detected at various sites located at the Yard. Most sites are, however, not associated with any known public health hazard because 1) contaminant concentrations

detected are too low to pose a health hazard or 2) the operational area was surrounded by perimeter fencing or covered surfaces (e.g., vegetative growth, paved areas.) Table 1 provides a summary of potential public health hazards associated with soil contamination at each site.

- Any incidental exposure of workers, residents, or fishermen to contaminated soil would have most likely been intermittent and brief. Such minimal, infrequent exposure to on-site contaminants — if it occurred at all — would not be expected to result in adverse health impacts. ATSDR bases its conclusion on the following:

*Workers:* ATSDR evaluates exposure to the general community surrounding hazardous waste sites. ATSDR's mandate does not include workers. Agencies such as the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA) typically evaluate worker exposure issues. Nevertheless, at any time over the Yard's operational history Yard employees were not expected to contact contaminated soil for extended periods during their routine responsibilities. Contracted construction workers could have come into contact with contaminated soil for short periods of time, but they would wear protective clothing such as coveralls, boots and gloves, which would further reduce exposure and any associated health effects.

*Residents:* A small number of Coast Guard staff live on the Yard grounds. The living quarters are located outside the industrial area of the Yard; therefore residents do not have access to contaminated areas.

*Sport Anglers:* Fishing is reportedly limited to Coast Guard personnel or retirees. While fishing, these individuals are required to stay in a designated area along the marina, located away from the sites; however, some employees do fish near the Dry Docks. These restrictions greatly limit the number of potentially exposed persons as well as the extent to which any one angler could actually come in contact with contaminated soil. Prior to September 11, 2001, the general public was allowed on site to fish at the marina. Since then, however, security has tightened and only Yard employees or retirees are allowed to fish at the Yard (Dottie Mitchell, personal communications, December 11–13, 2002).

ATSDR does not anticipate any future harmful exposures to soil contamination. With oversight by EPA and Maryland Department of the Environment (MDE), the Coast Guard will conduct Remedial Investigation/Feasibility Studies (RI/FS) at each of the sites. The industrial portions of the Yard will remain industrial and will not be used for residential or agricultural uses. The Coast Guard will retain control of the Yard and restrict access to the property. The Yard is completely fenced, and there are also fences around certain parts of the industrial areas. Existing Coast Guard regulations make the sale of the Yard industrial property unlikely. Furthermore, CERCLA Section 120(h) requires that if the property is sold or transferred, each deed must contain language ensuring that specific actions necessary to protect public health and the environment to be taken before the date of property transfer.

In evaluating available monitoring data and proposed remedial actions, ATSDR has identified no past, current, or future public health hazards associated with contaminated soil. ATSDR concludes that contaminants in surface soil are not expected to pose a past, current, or future public health hazard.

## Evaluation of the Surface Water and Sediment Pathway

### *Discussion*

#### *Surface Hydrology and Use*

Surface water at the Yard is associated with one of two main water bodies. Curtis Creek borders the site to the south and west, and Arundel Cove is a small arm of Curtis Creek that borders the site to the east. Surface drainage from the site flows into either Curtis Creek or Arundel Cove. Curtis Creek flows northward from the site for approximately 2.0 miles and empties into Curtis Bay. Curtis Bay flows eastward for approximately 0.7 mile and empties into the Patapsco River. The Patapsco River flows southeastward for approximately 8.0 miles and empties into the Chesapeake Bay. The Patapsco River and all tributaries near the site, including Curtis Creek, are classified by the State of Maryland as Use I waters. Use I waters are waters designated for water contact recreation, fishing, and the protection of aquatic life and wildlife. No on-site surface water intakes are available for potable water to supply either the Yard or any other water user. No off-site surface water intakes for drinking water supplies have been identified within the 15-mile surface water migration pathway from the Yard (TetraTech 2000a). Using a review of historic versus current shorelines, the shoreline within the vicinity of the drydock area has been extended southward into Curtis Creek by approximately 300 feet. Periodic dredging of Curtis Creek has also occurred over the years (TetraTech 2002).

Many of the sites at the Yard drained or released wastewater into the on-site water bodies. Thirty-eight stormwater outfalls are at the Yard (Galliford, personal communication, 2002). One of the source areas, Area 1 Dry Dock Sediments, is in Curtis Creek. Previously, grit containing heavy metals from grit blast metal cleaning operations was washed off the dry docks into Curtis Creek. Grit separators are now tied into the storm drains at the shiplift (Galliford, personal communication, 2002). Surface water bodies could still receive contaminant discharges from the shallow aquifer or with surface water runoff. The Yard's future investigations will further analyze groundwater contamination in the shallow aquifer.

#### *Nature and Extent of Contamination*

Between November 30 and December 3, 1999, surface water and sediment samples were collected to characterize the environmental conditions of Curtis Bay. Surface water and sediment samples were acquired from Curtis Bay at off-site background locations, and near the Yard piers and dry docks in Area 1 (TetraTech 2000a). The Coast Guard selected these water bodies for sampling because any surface water releases at the Yard would have eventually flowed toward and into these waterways. Samples were analyzed for VOCs, SVOCs, inorganics, pesticides, and PCBs. The results of the sampling are discussed below.

#### Curtis Creek Surface Water Samples

Surface water samples were collected from Curtis Creek at three off-site background locations and three on-site locations (Area 1 Dry Docks). No detectable levels of VOCs, SVOCs, pesticides, or PCBs were reported in either the Area 1 Dry Dock samples or the off-site background samples (TetraTech 2000a). Some inorganics were detected in the Area 1 Dry Dock samples and in the off-site surface water background samples; however, the detected compounds are common and

naturally occurring. None of the compounds detected in the on-site samples exceeded ATSDR comparison values (CVs). Only one compound was detected in one background sample that exceeded ATSDR's CV. Arsenic was detected at 3.6 parts per billion (ppb). The CVs were developed for the exposure route of ingestion of drinking water. The water in Curtis Creek is not used as a drinking water source; therefore, the CVs are overly conservative. The ingestion exposure dose was calculated for arsenic, and the dose did not exceed the health guideline.

### Curtis Creek Sediment Samples

Sediment samples were acquired from Curtis Creek at three off-site background locations and 14 on-site locations. The on-site sediment samples came from Area 1 and from the storm water conveyance system. Some VOCs, SVOCs, pesticides, PCBs, and inorganics were detected in the on-site and off-site sediment samples (TetraTech 2000a). Only one of the compounds detected in the on-site samples exceeded the ATSDR CV. Arsenic was detected at 0.86 ppm in one of the storm sewer sediment samples. The ingestion exposure dose was calculated for arsenic, and the dose did not exceed the health guideline.

### ***Potential Public Health Hazards***

VOCs, SVOCs, inorganics, pesticides and PCBs have been detected in surface water and sediment of waterways that traverse the Yard. People are not, however, expected to come in contact with harmful levels of contaminants. The fencing that borders the Yard restricts the public's access to the on-site portions of Curtis Creek. Some low-level contamination could be exiting the site in the creek. There are no indications that people use or will use the water in ways that would result in appreciable skin contact with contaminated surface water or sediment. Any skin contact with contaminants in sediment and surface water is therefore expected to be limited in frequency and duration, and not at levels of health concern. ATSDR concludes that incidental exposure to primarily low levels of contaminants in the sediment and surface water of Curtis Creek is not expected to pose a past, current, or future public health hazard.

### **Evaluation of the Biota Consumption Pathway**

Contaminants released from the Yard could accumulate in plants and animals, collectively known as biota. The Yard is home to a broad range of wildlife, including several species of fish and crab inhabiting Curtis Creek and Arundel Cove. Many of these are important sources of food, but people who consume them could potentially be exposed to contaminants. ATSDR assessed potential environmental impacts on the local fish and crab population and any associated health hazards.

### ***Consumption of Fish and Crab***

ATSDR's review of site data suggests that consumption of fish from surface water at the Yard is a plausible pathway for exposure to site-related and non-site-related contaminants. The water bodies on-site support a sustainable fish population. Still, access to the Yard is restricted to employees and retirees — the general public is not permitted to fish in any of the on-site water bodies. According to Yard employees, fishing in the Curtis Creek area is recreational rather than subsistence-oriented, thereby decreasing exposure to possibly contaminated fish.

Fishing occurs at select locations on the piers and marina at the Yard. Fish species caught from these waters include rockfish, perch, and catfish. Some of the processing areas at the Yard drained or released wastewater into on-site waterways that ultimately discharged into Curtis Creek.

ATSDR has reviewed fish tissue sampling data from the Patapsco River basin, collected by the Maryland Department of the Environment (MDE) from 1997–2003, for possible health concerns (MDE 2004a). The species sampled included blue crab, brown bullhead, channel catfish, white catfish, white perch, and white sucker. ATSDR compared levels of PCBs and metals detected in fish and crab to EPA's Risk-Based Concentrations (RBCs) for fish (EPA 2004b).

Arsenic, selenium, and PCBs exceeded EPA's RBCs. EPA recommends using an intake rate of 6.6 g/day of freshwater/estuarine fish, 13.5 g/day of marine fish, and 20.1 g/day of all fish for the general population to estimate fish consumption (EPA 2004c). ATSDR assumed that people living in this part of the country, near the Chesapeake Bay, could have higher ingestion rates of seafood than the general population. ATSDR calculated exposure doses for arsenic, selenium, and PCBs using a consumption rate of 25 g/day for adults. This consumption rate is the highest, and therefore, the most conservative consumption rate recommended for sport anglers by EPA (EPA 2004c). For children, ATSDR used a consumption rate of 6 g/day.

The highest level of arsenic detected was 1.39 ppm, and the highest level of selenium detected was 6.89 ppm. ATSDR calculated exposure doses for adults and children for arsenic and selenium. The exposure doses were below ATSDR's Minimal Risk Levels (MRLs). Please see Appendix B for more information about ATSDR's comparison values and health guidelines, such as the MRL.

The highest level of PCBs detected in fish was 1.62 ppm. Although this level exceeds EPA's RBC, it is below the U.S. Food and Drug Administration (FDA) tolerance level of 2 ppm (FDA 2004). ATSDR calculated an exposure dose for PCBs. The calculated exposure doses were  $5.79 \times 10^{-4}$  milligrams/kilograms/day (mg/kg/day) for adults and  $6.08 \times 10^{-4}$  mg/kg/day for children. These exposure doses exceeded ATSDR's MRL of  $2.0 \times 10^{-5}$  mg/kg/day. This exposure dose calculation is, however, highly conservative. It used the highest, rather than average, level of PCBs detected, it assumed that all fish consumed had this elevated level of PCBs, and it assumed that fish were consumed raw rather than cooked, which would have reduced the PCB level. To determine a more likely consumption scenario, ATSDR also calculated an exposure dose using the average level of PCBs detected (0.537 ppm) and incorporated a cooking reduction of 30% (Sherer and Price 1993). These calculated exposure doses were  $1.34 \times 10^{-4}$  mg/kg/day for adults and  $1.41 \times 10^{-4}$  mg/kg/day for children. These exposure doses also exceeded ATSDR's MRL, although not by as large an amount as the more conservative calculation.

Even if an exposure dose is higher than the MRL, it does not necessarily follow that harmful health effects will occur. To maximize human health protection, MRLs have built-in uncertainty or safety factors, making these values considerably lower than levels at which health effects have been observed.

If health guidelines such as the MRL are exceeded, ATSDR examines the health effect levels discussed in the scientific literature and more fully reviews exposure potential. ATSDR reviews available human studies as well as experimental animal studies. This information is used to describe the disease-causing potential of a particular chemical. It is also used to compare site-



specific dose estimates with doses shown in applicable studies to result in illness. For cancer effects, ATSDR compares an estimated lifetime exposure dose to available cancer effect levels (CELs), which are doses that produce significant increases in the incidence of cancer or tumors. ATSDR also estimates excess lifetime cancer risks. ATSDR then reviews genotoxicity studies to understand further the extent to which a chemical might be associated with cancer outcomes. This process enables ATSDR to weigh the available evidence in light of uncertainties and to offer perspective on the plausibility of harmful health outcomes under site-specific conditions.

Health effects (specifically, decreased antibody response and eyelid and toe/finger nail changes) have been observed in female Rhesus monkeys chronically exposed to  $5.0 \times 10^{-3}$  mg/kg/day of a type of PCB called Arochlor 1254 (Arnold et al. 1993a; Tryphonas et al. 1989, 1991a as cited in ATSDR 2000). This is the lowest-observed-adverse-effect-level (LOAEL) identified in the scientific literature for chronic exposure to PCB mixtures. ATSDR's estimated exposure doses are order of magnitude below the LOAEL. In addition, it should be noted that a few studies have shown that humans are less sensitive than monkeys on a dose basis (Arnold 1993a, 1995; Emmett et al. 1988a; Fischbein et al. 1979; James et al. 1993; Kimbrough 1995 as cited in ATSDR 2000). Therefore, ATSDR does not expect that exposures to PCBs in the fish will cause harmful non-cancer health effects.

Studies of workers provide evidence that exposure to PCBs is associated with certain types of cancer in humans, such as cancer of the liver and biliary tract. Cancer incidence was studied in cohorts of fishermen from the Swedish east and west coasts who had high intakes of PCBs in fish (Svensson et al. 1995a as cited in ATSDR 2000). Although the data indicated that the incidence of stomach cancer was elevated, the results were confounded by exposure to other contaminants in the fish. In another study, rats that ate commercial PCB mixtures throughout their lives developed liver cancer. Using the evidence for cancer in animals, the Department of Health and Human Services (DHHS) has stated that PCBs could reasonably be anticipated to be carcinogens. Both EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans. The EPA estimates cancer risks using a conservative mathematical model. Using this model, the hypothetical cancer risk for an adult who ate fish containing the average concentration of PCBs found in fish in Curtis Creek for 30 years would be about  $1.2 \times 10^{-4}$ . Since this is a conservative estimate, the actual risk could be less than this, or even zero. Furthermore, the lowest exposure doses, Cancer Effect Levels (CELs), that have been shown to cause cancer in animals are 1.0-5.4 mg/kg/day. No CELs exist for humans (ATSDR 2000). The estimated exposure doses from the Patapsco River basin fish are four orders of magnitude below the CELs reported in the literature. Therefore, no excess cancers from PCB exposures are expected from consumption of fish taken from Curtis Creek.

The MDE recently expanded its fish advisory due to concern over elevated levels of PCBs in fish. The expanded fish advisory includes eel, carp, catfish and perch, in addition to the previous advisory covering blue crab, brown bullhead, and small and largemouth bass.

The MDE tests fish from Maryland water bodies to determine whether unhealthy levels of contaminants are accumulating in edible fish populations. The MDE primarily tests fish for evidence of inorganic and organic chemicals (MDE 2003). Information through this program is available for Curtis Creek and the Patapsco River.

The MDE issues consumption advisories for only recreationally caught fish species. The recommended maximum allowable blue crab consumption from the Patapsco River is eight meals per month for the general population, and two for children. MDE also cautions people not to eat the mustard from the crab. One meal equals nine legal crabs for adults, and four for children. The contaminant predominantly found in the blue crabs in the Patapsco River is PCBs (MDE 2004b).

The recommended maximum allowable brown bullhead consumption from Curtis Creek is nine meals per year for the general population, eight for women of childbearing age who are or could become pregnant, and six for children. One meal is defined as eight ounces of fish for adults, six ounces for women, and three ounces for children. The contaminants predominantly found in the brown bullhead in Curtis Creek are PCBs and pesticides (MDE 2004b). ATSDR calculated the exposure dose using levels of PCBs detected in brown bullhead samples collected by MDE in 2001 and 2003, and the consumption rate recommended by MDE. ATSDR found MDE's consumption advisory to be protective of human health.

The recommended maximum allowable small and largemouth bass consumption from all rivers and streams in Maryland is eight meals per month for women of childbearing age who are or could become pregnant, and children. There is no advisory for the general population. The contaminants predominantly found in the small and largemouth bass in Maryland are methylmercury, PCBs and pesticides (MDE 2004b).

The recommended maximum allowable white perch from the Patapsco River is five meals per year for the general population. MDE cautions women of childbearing age, who are or could become pregnant, and children to avoid white perch from the Patapsco River. MDE recommends everyone avoid channel catfish and common carp from the Patapsco River. The contaminants predominantly found in the white perch, channel catfish, and common carp in Maryland are PCBs and pesticides (MDE 2004b).

PCBs, pesticides, and methylmercury are common contaminants found in fish and crabs in Maryland. While these contaminants are not necessarily contaminants of concern at the Yard, this information provides some insight into the general quality of the local fish and crab population. ATSDR found MDE's consumption advisories to be protective of public health. ATSDR recommends that community members follow MDE's consumption advisories. For more information on MDE's fish consumption advisories, please visit: [http://www.mde.state.md.us/assets/document/fish/advisory\\_summary.pdf](http://www.mde.state.md.us/assets/document/fish/advisory_summary.pdf) or call MDE at 410-537-3906. Additionally, Appendix C contains "A Guide to Healthy Eating of the Fish You Catch" which shows ways to catch, clean, and cook fish which can help reduce exposure to contaminated fish.

## **Community Health Concerns**

The Yard has a Community Relations Plan (CRP) that provides guidance for involving the community and other interested parties in the remediation decision-making process and for distributing information to these parties. As part of its community relations activities, the Yard formed a Community Advisory Group (CAG). The CAG, which is represented largely by local community members, meets periodically to review site documents and comment on the Yard's actions and proposed actions. Through the public health assessment process, ATSDR has gathered information about health concerns identified in the CRP or voiced by community members at the CAG or at less formal meetings. The following is a summary of the community health concerns that have come to ATSDR's attention:

### **Concern about Neighboring Industry in the Area**

The Yard is located in an industrial area of Baltimore. Local community members are concerned about the neighboring industry, which includes a manganese plant, a chemical company that manufactures silicon beads, a landfill, and sewage and medical waste incinerators. Some community members are concerned about the additive effects of contamination on air quality and fish from the local industry. Three other National Priorities List (NPL) sites are located in Anne Arundel County, and three are located in the City of Baltimore. Information on these sites can be found at <http://www.epa.gov/superfund/sites/npl/md.htm#statelist>. Concerns about neighboring NPL sites can be directed to each site's respective EPA Remedial Project Manager.

### **Concern about Keeping the Lines of Communication Open and Consistent**

The Yard is currently developing a Community Evaluation Form to interview local community members, Yard employees, and local officials face-to-face (Galliford, personal communication, 2004). The purpose of the evaluation is to gather concerns and information needs from the local community.

In June 2003, the Yard published a Draft Community Relations Plan (CRP) to help inform employees, media, and the community about the Yard's clean-up progress (USCG 2003). The Yard has published a quarterly Superfund update bulletin since 2001. The bulletin is sent to over 100 people and organizations including churches, real estate associations, schools, and community members.

The Yard has also established a Community Advisory Group (CAG). The CAG includes representatives from the Yard, such as the Commanding Officer, the Environmental Engineer, and the Public Affairs Officer, as well as the local community. The purpose of the CAG is to allow individuals the opportunity to advise the Yard, EPA, and MDE on the NPL/Superfund program; and act as an information exchange point with the local community (USCG 2003). The CAG generally meets quarterly.

---

### **Public Comments Received During the Public Comment Period**

An early version of this public health assessment was made available at the Yard and the local repository for review from July 28, 2004 to September 13, 2004. No comments from the public were received during this time.

## Child Health Considerations

ATSDR's Child Health Initiative recognizes that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contamination of their water, soil, air, or food. Children are at greater risk than adults from certain kinds of exposures to hazardous substances emitted from waste sites and emergency events. In general, children are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. Children are shorter than adults, which means they breathe dust, soil, and heavy vapors closer to the ground. Children are also smaller than are adults, so they receive higher doses of chemical exposures in proportion to their body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. Most importantly, however, children depend completely on adults for risk identification and management decisions, housing decisions, and access to medical care.

ATSDR has attempted to identify populations of children in the vicinity of the Yard. Approximately 11 children age 6 years and under live within a 1-mile buffer surrounding the Yard. There are no schools within a 1-mile radius. The closest school is an elementary school 3 miles away from the Yard. Approximately 3000 school-age children live within a 40 square-mile radius of the Yard and attend the elementary, middle, and high schools in the school district.

Like other people living or working at or in the vicinity of the Yard, children might inadvertently come in contact with low levels of contaminants. Following a careful evaluation of these pathways as they relate to children, ATSDR determined that harmful exposures unique to children are not expected to occur. Children cannot access the site or any contaminated locations at the Yard. Thus, no site-related harmful exposures are specific to children who might be in the vicinity of the Yard. Potential exposure pathways are discussed in the Evaluation of Environmental Contamination and Exposure Pathways section of this PHA. Additionally, parents should follow the Maryland Department of the Environment (MDE) consumption advisories for locally-caught fish and crab.

## Conclusions

After evaluating environmental contamination data for the Yard and how people might come into contact with that contamination, ATSDR has reached the following conclusions. (Refer to the Glossary (Appendix A) for definitions of the hazard categories that ATSDR uses here).

1. Surface soil at some areas of the Yard is contaminated with VOCs, SVOCs, metals, pesticides, and PCBs. None of the detected levels exceed ATSDR's health guidelines. A perimeter fence and gated entrance largely prevent public access to these contaminated areas. Workers or trespassers could contact contaminants in surface soil, but such contact would most likely be infrequent and brief. Intermittent contact with surface soil contaminants — even at the highest levels reported — is not expected to cause harmful effects. ATSDR concludes that the surface soil pathway does not pose a public health hazard. ATSDR categorizes surface soil as “No apparent public health hazard.”
2. Surface water and sediment at some areas of Curtis Creek is contaminated with VOCs, SVOCs, metals, pesticides, and PCBs. Monitoring to date has identified inorganics in the surface water in Curtis Creek, and some VOCs, SVOCs, metals, pesticides, and PCBs were detected in the sediment in Curtis Creek. None of the detected levels exceeded ATSDR's health guidelines. ATSDR concludes that any infrequent handling of the surface water or sediment in the waterways is not expected to be detrimental to one's health — thus this pathway does not pose a public health hazard. ATSDR categorizes the surface water and sediment pathway as “No apparent public health hazard.”
3. Fishing by employees and Coast Guard retirees is allowed at the Yard. ATSDR has reviewed fish tissue sampling data from the Maryland Department of the Environment (MDE) for health concerns. The MDE expanded the fish advisory due to elevated levels of PCBs. Still, ATSDR categorizes the biota pathway as “No apparent public health hazard,” so long as recreational fishermen consume fish in proportions no higher than those recommended by MDE's fish advisory.

## Recommendations

1. ATSDR recommends sport anglers follow all Maryland Department of the Environment (MDE) fish consumption advisories. For more information on MDE's fish consumption advisories, please visit:  
[http://www.mde.state.md.us/assets/document/fish/advisory\\_summary.pdf](http://www.mde.state.md.us/assets/document/fish/advisory_summary.pdf) or call MDE at 410-537-3906.

## Public Health Action Plan

The public health action plan (PHAP) for the Curtis Bay Coast Guard Yard (the Yard) contains a description of actions taken and those to be taken subsequent to the completion of this public health assessment at and in the vicinity of the site by ATSDR, the Coast Guard, the Environmental Protection Agency (EPA), and the Maryland Department of the Environment (MDE). The purpose of the PHAP is to ensure that this PHA not only identifies potential and ongoing public health hazards, but also provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. The public health actions that are completed or ongoing/planned are as follows:

### Completed Actions

1. In 2004 the MDE expanded its fish advisory for the Patapsco River basin to include eel, carp, catfish, and perch, in addition to the blue crab, brown bullhead, and small and largemouth bass previously listed.
2. EPA placed the Yard on its National Priorities List of sites to be investigated on September 5, 2002, due to surface water and fishery contamination.
3. The Yard received The International Organization for Standardization's (ISO) ISO 14001 certification in 2000. This certification helps maintain a comprehensive environmental compliance program.
4. Environmental investigations found elevated levels of semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), metals, polychlorinated biphenyls (PCBs), pesticides, and dioxins in groundwater, soil or surface water at several areas of the site.
5. In November 1992 two underground storage tanks (USTs) were abandoned in-place at Site 13-Alanite Acid Tanks.
6. In the late 1980's the Site 11-Spent Abrasive Blast Grit function was changed to an indoor blasting system. Additionally, in the early 1990's a grit separator was installed in the storm grate. Both of these actions were implemented to prevent grit from washing into nearby waterways.
7. The Site 4-Salvage Lot was cleaned in the mid 1980's. Physical debris was removed and a concrete sub-base installed. The soil remained on site, however, and was pushed back to the west edge of the Salvage Lot.

### **Ongoing/Planned Actions**

1. Remedial Investigation/Feasibility Studies are planned for each of the six sites that encompass all nine areas of concern.
2. Members of the community and the Yard participate in regularly scheduled community advisory group meetings. These meetings serve as a forum for communication of ongoing and planned activities at the Yard to the community, and for communication of community concerns to Yard personnel.
3. The Yard publishes and distributes a quarterly Superfund update bulletin. Additionally, in June 2003 the Yard published a Community Relations Plan.
4. ATSDR will re-evaluate the potential for public health hazards if ATSDR becomes aware of changes in proposed land use, remedial activities, or risk management actions (e.g., institutional controls) that could possibly lead to future exposures at levels of public health concern.



## **Authors, Technical Advisors**

Katherine E. Hanks

Environmental Health Scientist

Federal Facilities Assessment Branch

Division of Health Assessment and Consultation

## References

- Anne Arundel County, Maryland. 2002. Pasadena/Marley Neck Small Planning Area Existing Zoning and Land Use.
- [ATSDR] Agency for Toxic Substances and Disease Registry. 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta: US Department of Health and Human Services. Available at: <http://www.atsdr.cdc.gov/toxprofiles/tp17.html>. Last accessed 22 November 2004.
- [ATSDR]. 2003. ATSDR demographic statistics for 1-mile buffer around Curtis Bay Coast Guard Yard. Atlanta: US Department of Health and Human Services.
- Bureau of the Census. 2003. US Census Bureau Web site. Population estimates, cities and towns. Available at: <http://www.census.gov/popest/states/asrh/tables/SC-EST2003-02/SC-EST2003-02-24.pdf>. Last accessed 23 November 2004.
- [FDA] US Food and Drug Administration. 2004. FDA web site. Unavoidable contaminants in food for human consumption and food-packing material. Available at: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/search/search.cfm?db=CFR&ID=109.30>. Last accessed 23 November 2004.
- Galliford H. 2004. January 12 e-mail communication with Theresa Nesmith, ATSDR regarding Curtis Bay Coast Guard Yard Community Relations Plan.
- [MDE] Maryland Department of the Environment. 2003. MDE Web site. Fish and Shellfish Contaminant Monitoring. Available at: <http://www.mde.state.md.us/CitizensInfoCenter/FishandShellfish/home/index.asp>. Last accessed 23 November 2004.
- [MDE] Maryland Department of the Environment. 2004a. Patapsco River Basin Fish Tissue Data, 1986–2003.
- [MDE] Maryland Department of the Environment. 2004b. MDE Web site. Recommended maximum allowable yearly fish consumption from select Maryland waters. Available at: [http://www.mde.state.md.us/assets/document/fish/advisory\\_summary.pdf](http://www.mde.state.md.us/assets/document/fish/advisory_summary.pdf). Last accessed 23 November 2004.
- [SAIC] Science Applications International Corporation. 1993. April 19th Preliminary Assessment contracted by the US Coast Guard Yard, Curtis Bay, Maryland.
- Sherer RA, Price PS. Quality Assurance. 1993. December; 2(4):396-407. The effect of cooking processes on PCB levels in edible fish tissue.
- [Tetra Tech] Tetra Tech NUS, Inc. 2000a. Site Inspection Report for US Coast Guard Yard, Hawkins Point Road, Baltimore, MD.
- [Tetra Tech] Tetra Tech. 2000b. Hazard Ranking System Pre-Score for US Coast Guard Yard, Hawkins Point Road, Baltimore, MD.
- [Tetra Tech] Tetra Tech. 2002. Site Management Plan for US Coast Guard Yard, Hawkins Point Road, Baltimore, MD.

- 
- [USCG] US Coast Guard. 2003. Environmental Restoration Program NPL/Superfund Community Relations Plan for US Coast Guard Yard, Curtis Bay, MD.
- [USEPA] US Environmental Protection Agency. 2002. EPA Web site. NPL Site Narrative for Curtis Bay Coast Guard Yard. Available at: <http://www.epa.gov/superfund/sites/npl/nar1645.htm>. Last accessed 23 November 2004.
- [USEPA] US Environmental Protection Agency. 2003. EPA Web site. Current site information for Curtis Bay Coast Guard Yard. Available at: <http://www.epa.gov/reg3hwmd/npl/MD4690307844.htm>. Last accessed 23 November 2004.
- [USEPA] US Environmental Protection Agency. 2004a. EPA Web site. NPL Sites in Maryland. Available at: <http://www.epa.gov/superfund/sites/npl/md.htm#statelist>. Last accessed 23 November 2004.
- [USEPA] US Environmental Protection Agency. 2004b. EPA Region III Web site. Risk-Based Concentration Table. Available at: <http://www.epa.gov/reg3hwmd/risk/index.htm>. Last accessed 23 November 2004.
- [USEPA] US Environmental Protection Agency. 2004c. EPA Web site. Exposure Factors Handbook, August 1997. Available at: <http://www.epa.gov/ncea/pdfs/efh/sect10.pdf>. Last accessed 23 November 2004.