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*cont.*

# Introduction

This report identifies uncontrolled hazardous waste sites that could pose a threat to natural resources for which the National Oceanic and Atmospheric Administration (NOAA) acts as a trustee. NOAA carries out responsibilities as a Federal trustee for natural resources under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Contingency Plan. As a trustee, NOAA is responsible for identifying sites that could affect natural resources, evaluating the injury to the resources, determining dollar values for resource losses, and carrying out restoration actions. NOAA works with the U.S. Environmental Protection Agency (EPA) to identify and assess risks to coastal resources from hazardous waste sites and to develop strategies to minimize those risks.

NOAA regularly conducts evaluations of hazardous waste sites proposed for addition to the National Priorities List[1] (NPL) by EPA. The waste sites evaluated in this report are drawn from the list of sites, including Federal facilities, proposed for inclusion on the NPL. The sites covered in this report are either proposed for inclusion on the NPL by EPA in Update #7, or were listed in earlier NPL updates but not covered in previous NOAA reports.

The sites of concern to NOAA are located in states bordering the Atlantic Ocean, Pacific Ocean, and Gulf of Mexico. However, not all sites in coastal states will affect NOAA trust resourcesSites with the potential to affect trust resources are initially identified by their location in coastal counties or are adjacent to anadromous and catadromous fish habitat. This selection method works better in some states than in others. It is dependent on topography, hydrography, and political subdivisions.

Seventy-nine coastal sites were identified in 1989 using this selection method. Further investigation showed that eight of these sites were not likely to affect NOAA trust resources. Coastal hazardous waste site reports were completed for the remaining 71 sites. A total of 584 coastal hazardous waste sites have been reviewed by NOAA since 1984. One hundred forty-two sites identified as potentially affecting NOAA trustee resources were reported on in April 1984,[2] June 1985,[3] April 1986,[4] and June 1987[5]. The 71 sites in this report bring the total number of sites identified by NOAA as having the potential to affect trust resources to 213.

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[1]National Oil and Hazardous Substances Pollution Contingency Plan, <u>40 CFR Part 300</u>.

[2]Ocean Assessments Division. 1984. <u>Coastal Hazardous Waste Site Review April 13, 1984</u>. NOAA/OAD, Seattle, Washington.

[3]Pavia, R., et al. 1985. <u>Coastal Hazardous Waste Site Review June 1985</u>. NOAA/OAD, Seattle, Washington.

[4]Pavia, R., et al. 1986. <u>Coastal Hazardous Waste Site Review April 1986</u>. NOAA/OAD, Seattle, Washington.

[5]Pavia, R., et al. 1987. <u>Coastal Hazardous Waste Site Review June 1987</u>. NOAA/OAD, Seattle, Washington.

Each 1989 coastal hazardous waste site report contains three major sections. The "Site Exposure Potential" section provides information on activities at the site that resulted in the release of contaminants and a description of the local topography and contaminant migration pathways. The "Site-Related Contamination" section identifies contaminants of concern to NOAA, the partitioning of the contaminants in the environment, and the concentrations at which the contaminants are found. The "NOAA Trust Habitats and Species in Site Vicinity" section describes the types of habitats and species potentially injured by releases from the site. Information on the life stages of organisms using habitats near the site is included when available.

Information in the hazardous waste sites reports provides an overall guide to the severity of potential injury to NOAA trust resources resulting from a site. This information is used by NOAA to establish priorities for investigating sites. Other Federal and state trustees use the information to help determine the risk of injury to their trust resources. EPA uses the information to help identify the types of information that may be necessary to complete an environmental assessment of the site.

Table 1 lists all the sites identified by NOAA as of November 1988 that have the potential to affect trust resources. Table 2 lists acronyms, abbreviations, and terms commonly used in these waste site reviews.

Table 1. Sites identified by NOAA with potential to affect trust resources.

| State | Site Name | NOAA Report Date |
|---|---|---|
| **Federal Region 1** | | |
| Maine | McKin Company | 1984 |
| Maine | O'Connor Company | 1984 |
| Maine | Brunswick Naval Air Station | 1987 |
| Maine | Saco Municipal Landfill | 1989 |
| New Hampshire | Coakley Landfill | 1985 |
| New Hampshire | Grugnale Waste Disposal Site | 1985 |
| New Hampshire | Savage Municipal Water Supply | 1985 |
| New Hampshire | Sylvester's | 1985 |
| New Hampshire | Dover Municipal Landfill | 1987 |
| New Hampshire | Fletcher's Paint Works & Storage | 1989 |
| New Hampshire | Rose Hill Regional Landfill | 1989 |
| Vermont | BFI Sanitary Landfill | 1989 |
| Massachusetts | Cannon Engineering | 1984 |
| Massachusetts | Haverhill Municipal Landfill | 1985 |
| Massachusetts | New Bedford | 1984 |
| Massachusetts | Charles George Land Reclamation | 1987 |
| Massachusetts | Groveland Wells 1 & 2 | 1987 |
| Massachusetts | Industri-Plex 128 | 1987 |
| Massachusetts | Nyanza Chemical, Ashland | 1987 |

| | | |
|---|---|---|
| Massachusetts | Sullivan's Ledge | 1987 |
| Massachusetts | Atlas Tack Corp. | 1989 |
| Rhode Island | Davis Liquid Waste Site | 1987 |
| Rhode Island | Peterson/Puritan Site | 1987 |
| Rhode Island | Picillo Farm, Coventry | 1987 |
| Rhode Island | Stamina Mills, Forestdale | 1987 |
| Rhode Island | Western Sand and Gravel | 1987 |
| Connecticut | Beacon Heights, Inc. | 1984 |
| Connecticut | O'Sullivans Island | 1984 |
| Connecticut | Yaworski Waste Lagoon | 1985 |
| Connecticut | Kellogg-Deering Well Field | 1987 |
| Connecticut | Barkhamsted-New Hartford LF | 1989 |
| Connecticut | Gallups Quarry | 1989 |

| State | Site Name | NOAA Report Date |
|---|---|---|
| **Federal Region 2** | | |
| New York | Applied Environmental Services | 1985 |
| New York | Liberty Industrial Finishing | 1985 |
| New York | Marathon Battery | 1984 |
| New York | North Sea Municipal Landfill | 1985 |
| New York | Port Washington Landfill | 1984 |
| New York | Jones Sanitation | 1987 |
| New York | Rowe Industries Ground Water Cont. | 1987 |
| New York | Action Anodizing, Plating Polish | 1989 |
| New York | C & J Disposal Leasing Co. Dump | 1989 |
| New York | Carroll & Dubias Sewage Disposal | 1989 |
| New York | Mattiace Petrochem Co., Inc. | 1989 |
| New Jersey | Albert Steel Drum | 1984 |
| New Jersey | American Cyanamid | 1985 |
| New Jersey | Bog Creek Farm | 1984 |
| New Jersey | Brick Township Landfill | 1984 |
| New Jersey | Chemical Control | 1984 |
| New Jersey | Chipman Chemical | 1985 |
| New Jersey | Ciba-Geigy Corp. (Toms River Chemical Co) | 1984 |
| New Jersey | De Rewal Chemical Co. | 1985 |
| New Jersey | Denzer and Schafer X-Ray | 1984 |
| New Jersey | Diamond Alkali/Diamond Shamrock | 1984 |
| New Jersey | Hercules, Inc. | 1984 |
| New Jersey | Horseshoe Road Dump | 1984 |
| New Jersey | Ideal Cooperage | 1984 |
| New Jersey | Jackson Township Landfill | 1984 |
| New Jersey | Kin-Buc Landfill | 1984 |
| New Jersey | Koppers Company | 1984 |
| New Jersey | Krycowaty Farm | 1985 |
| New Jersey | Mobil Chemical Company | 1984 |

| | | |
|---|---|---|
| New Jersey | N.L. Industries | 1984 |
| New Jersey | Perth Amboy's PCBs | 1984 |
| New Jersey | PJP landfill | 1984 |
| New Jersey | Price Landfill | 1984 |
| New Jersey | Roebling Steel Company | 1984 |
| New Jersey | Roosevelt Drive-In | 1984 |
| New Jersey | Sayerville Landfill | 1984 |
| New Jersey | Sayerville Pesticide | 1984 |
| New Jersey | Scientific Chemical Processing, Inc. | 1984 |
| New Jersey | Sycon Resins | 1984 |
| New Jersey | T. Fiore Demolition, Inc. | 1984 |
| New Jersey | Universal Oil Products, Inc. | 1984 |
| New Jersey | Ventron/Velsicol | 1984 |
| New Jersey | White Chemical Company | 1984 |
| New Jersey | Williams Property | 1984 |
| New Jersey | Cosden Chemical Coatings Corp. | 1987 |
| New Jersey | Curcio Scrap Metal, Inc. | 1987 |
| New Jersey | Horstmann's Dump | 1987 |
| New Jersey | Brook Industrial Park | 1989 |
| New Jersey | Garden State Cleaners Co. | 1989 |
| New Jersey | Global Sanitary Landfill | 1989 |

| **State** | **Site Name** | **NOAA Report Date** |
|---|---|---|
| **Federal Region 2**, *cont.* | | |
| New Jersey | Higgins Disposal | 1989 |
| New Jersey | Higgins Farm | 1989 |
| New Jersey | Industrial Latex Corp. | 1989 |
| New Jersey | Kauffman & Minteer, Inc. | 1989 |
| New Jersey | South Jersey Clothing Co. | 1989 |
| Puerto Rico | Clear Ambient Service | 1984 |
| Puerto Rico | Fontera Creek | 1984 |
| Puerto Rico | Naval Security Group Activity | 1989 |
| **Federal Region 3** | | |
| Pennsylvania | Bridesburg Dump | 1984 |
| Pennsylvania | Croydon TCE | 1986 |
| Pennsylvania | Enterprise Avenue | 1984 |
| Pennsylvania | Metal Bank of America | 1984 |
| Pennsylvania | Revere Chemical Company | 1986 |
| Pennsylvania | Rohm and Haas Landfill | 1986 |
| Pennsylvania | Tinicum National Environmental Center | 1986 |
| Pennsylvania | Tysons Dump | 1985 |
| Pennsylvania | Wade (ABM) Site | 1984 |
| Pennsylvania | Butler Tunnel | 1987 |
| Pennsylvania | Douglassville Disposal | 1987 |
| Pennsylvania | Hellertown Manufacturing Co. | 1987 |

| | | |
|---|---|---|
| Pennsylvania | Paoli Rail Yards | 1987 |
| Pennsylvania | Boarhead Farms | 1989 |
| Pennsylvania | Elizabethtown Landfill | 1989 |
| Pennsylvania | Jacks Creek/Sitkin Smelting | 1989 |
| Pennsylvania | Keyser Ave Borehole | 1989 |
| Pennsylvania | Recticon/Allied Steel | 1989 |
| Pennsylvania | Occidental Chem/Firestone | 1989 |
| Delaware | Army Creek Landfill | 1984 |
| Delaware | Cokers Sanitation Services Landfills | 1986 |
| Delaware | Delaware City PVC | 1984 |
| Delaware | Delaware Sand and Gravel Landfill | 1984 |
| Delaware | Halby Chemical Company | 1986 |
| Delaware | National Cash Register Corp. | 1986 |
| Delaware | New Castle Spill Site | 1984 |
| Delaware | New Castle Steel | 1984 |
| Delaware | Old Brine Sludge | 1984 |
| Delaware | Standard Chlorine of Delaware, Inc. | 1986 |
| Delaware | Tybouts Corner Landfill | 1984 |
| Delaware | Wildcat Landfill | 1984 |
| Delaware | Dover Air Force Base | 1987 |
| Delaware | Dover Gas Light Co. | 1987 |
| Delaware | E.I. DuPont (Newport Plant Landfill) | 1987 |
| Delaware | Pigeon Point Landfill | 1987 |
| Delaware | Sealand Limited | 1989 |
| Delaware | Sussex County Landfill | 1989 |
| Delaware | Kent County Landfill | 1989 |
| Maryland | Aberdeen Proving Ground | 1986 |
| Maryland | Aberdeen, Michaelsville Landfill | 1986 |
| Maryland | Joy Reclamation Co. | 1984 |

| **State** | **Site Name** | **NOAA Report Date** |
|---|---|---|
| **Federal Region 3**, *cont.* | | |
| Maryland | Sand, Gravel, and Stone | 1984 |
| Maryland | Southern Maryland Woodtreating | 1987 |
| Maryland | Woodlawn County Landfill | 1987 |
| Maryland | Anne Arundel County Landfill | 1989 |
| Maryland | Bush Valley Landfill | 1989 |
| Virginia | Chisman Creek | 1984 |
| Virginia | Atlantic Wood Industries, Inc. | 1987 |
| Virginia | C&R Battery Co. Inc. | 1987 |
| Virginia | Saunders Supply Co. | 1987 |
| Virginia | Abex Corp | 1989 |
| Virginia | Arrowhead Assoc./Scovill Corp | 1989 |
| | | |
| **Federal Region 4** | | |
| North Carolina | ABC One Hour Cleaners | 1989 |

| | | |
|---|---|---|
| North Carolina | Camp Lejeune Marine Corps Base | 1989 |
| North Carolina | FCX, Inc. | 1989 |
| North Carolina | New Hanover Co. Airport Burn Pit | 1989 |
| North Carolina | Potter's Septic Tank Service Pits | 1989 |
| South Carolina | Geiger (C&M Oil) | 1984 |
| South Carolina | Wamchem, Inc. | 1984 |
| South Carolina | Helena Chemical Co. Landfill | 1989 |
| Florida | 62nd Street Dump | 1984 |
| Florida | American Creosote Works | 1984 |
| Florida | Harris Corporation/General Development Utilities | 1986 |
| Florida | Kassouf-Kimerling | 1984 |
| Florida | Munisport Landfill | 1984 |
| Florida | Picketville Landfill | 1984 |
| Florida | Agrico Chemical Co. | 1989 |
| Florida | Standard Auto Bumper Corp. | 1989 |
| Florida | Woodbury Chemical | 1989 |
| Alabama | Redwing Carriers, Inc. | 1989 |
| Mississippi | Gautier Oil Co., Inc. | 1989 |
| **Federal Region 6** | | |
| Louisiana | Bayou Sorrell | 1984 |
| Texas | Bailey Waste Disposal | 1985 |
| Texas | Motco Corp. | 1984 |
| Texas | Brio Refining Company, Inc. | 1989 |
| Texas | Crystal Chemical Company | 1989 |
| Texas | Dixie Oil Processors, Inc. | 1989 |
| Texas | French Limited | 1989 |
| Texas | Highlands Acid Pit | 1989 |
| Texas | Sikes Disposal Pits | 1989 |
| Texas | Tex-Tin Corp. | 1989 |
| **Federal Region 9** | | |
| California | Alviso Dumping Areas (South Asbestos) | 1985 |
| California | Coast Wood Preserving | 1984 |
| California | Del Norte County Pesticide Storage Area | 1984 |
| California | Liquid Gold Corporation | 1984 |

| State | Site Name | NOAA Report Date |
|---|---|---|
| **Federal Region 9**, *cont.* | | |
| California | MGM Brakes | 1984 |
| California | Moffett Field Naval Air Station | 1986 |
| California | Montrose Chemical Corporation | 1985 |
| California | Zoecon Corp./Rhone-Poulenc, Inc. | 1985 |
| California | Alameda Naval Air Station | 1989 |
| California | Concord Naval Weapons Station | 1989 |
| California | CTS Printex, Inc. | 1989 |
| California | El Toro Marine Corps Air Station | 1989 |

| | | |
|---|---|---|
| California | GBF, Inc. Dump | 1989 |
| California | Hewlett-Packard (620-40 Page Mill) | 1989 |
| California | Intersil Inc./Siemens Components | 1989 |
| California | Iron Mountain Mine | 1989 |
| California | Jasco Chemical Corp. | 1989 |
| California | Pacific Coast Pipe Lines | 1989 |
| California | Riverbank Army Ammunition Plant | 1989 |
| California | Sola Optical USA, Inc. | 1989 |
| California | Treasure Island Hunters Point Annex | 1989 |
| American Samoa | Taputimu Farm, Tutuila Island | 1984 |
| Hawaii | Pearl City Landfill | 1984 |

**Federal Region 10**

| | | |
|---|---|---|
| Oregon | Gould Inc. | 1984 |
| Oregon | Stauffer Chemical Company | 1984 |
| Oregon | Teledyne Wah Chang | 1985 |
| Oregon | Allied Plating, Inc. | 1987 |
| Oregon | Martin Marietta Aluminum Co. | 1987 |
| Washington | Commencement Bay Nearshore/Tideflats | 1984 |
| Washington | Commencement Bay South Tacoma Channel | 1984 |
| Washington | Harbor Island | 1984 |
| Washington | NAS Whidbey Island Ault Field | 1986 |
| Washington | NAS Whidbey Island Seaplane Base | 1986 |
| Washington | Quendall Terminal | 1985 |
| Washington | Western Processing | 1984 |
| Washington | Wyckoff Company | 1986 |
| Washington | ALCOA - Vancouver | 1989 |
| Washington | American Crossarm & Conduit | 1989 |
| Washington | Centralia Landfill | 1989 |
| Washington | Hanford 100/200/300/1100 | 1989 |
| Washington | Kent Highlands Landfill | 1989 |
| Washington | Northwest Transformer | 1989 |

Table 2. Frequently used terms and abbreviations

| | |
|---|---|
| Acute | Occurring over a short period of time; used to describe brief exposures and effects which appear promptly after exposure. |
| Ambient | Environmental or surrounding conditions |
| AWQC | Ambient Water Quality Criteria; criteria for the concentration of a substance in water established by the EPA to protect saltwater and freshwater aquatic life (EPA 1986). |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act of 1980; also known as "Superfund." |
| CFR | Code of Federal Regulations |
| Chronic | Occurring over a long period of time, either continuously or intermittently; used to describe ongoing exposures and effects that develop only after a long exposure. |
| EPA | United States Environmental Protection Agency |
| Federal Enforcement | Sites where the United States has filed a civil complaint (including cost recovery actions) or issued an administrative order. This category includes sites at which Federal court-mandated response actions are being carried out under EPA supervision. |
| Federal facility | A facility operated by the Federal Government. This category includes sites where response actions are being carried out under the supervision and funding of the Federal agency operating the facility. |
| Federal Fund | Sites at which Federal agencies have started response actions using CERCLA funds. |
| Hardness dependent criteria | AWQC which varies with water hardness; values used based on hardness equal to 100 mg/l $CaCO_3$ |
| LOEL | Lowest Observed Effect Level; the lowest dose that has been observed in toxicity experiments to produce an observable adverse effect. |

| | |
|---|---|
| MSL | Mean sea level |
| NOAA | National Oceanic and Atmospheric Administration |
| RCRA | Resource Conservation and Recovery Act of 1976 |
| RD/RA | Remedial design/Remedial Action |
| RI/FS | Remedial investigation/Feasibility Study |
| RI/FS Workplan | Identifies and documents tasks that are to be conducted during the RI/FS |
| ROD | Record of Decision; documents selection of cost-effective Superfund remedy |
| State Enforcement | Sites where a State has filed a civil complaint or issued an administrative order. This category includes sites at which State court-mandated response actions are being carried out under State supervision. |
| State Fund | Sites where State agencies have started response actions under a cooperative agreement with EPA using CERCLA funds. |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |

Quantitative Measures

| | |
|---|---|
| hectare | 10,000 $m^2$; 2.47 acres |
| km | kilometer (1000 meters); 0.62 miles |
| l | liter; 1.06 quarts |
| m meter; 39.37 inches | |
| mg/kg | milligrams per kilogram (parts per million ) |
| µg/l | micrograms per liter (parts per billion ) |
| pCi/l | picocurie per liter; a measure of radiation |
| ppm | parts per million (mg/l; mg/kg) |

| | |
|---|---|
| ppb | parts per billion (µg/l;  µg/kg) |
| ppt | parts per thousand (µg/kg;  mg/g) |

Contaminants

| | |
|---|---|
| $CaCO_3$ of | Calcium carbonate; a commercial and normal component natural waters; used as a measure of water hardness |
| $CO_2$ | Carbon dioxide |
| PAHs | polynuclear aromatic hydrocarbons |

Contaminants*, cont*.

| | |
|---|---|
| PCBs | polychlorinated biphenyls |
| TCA | trichloroethane |
| TCE | trichloroethene |
| TICs | tentatively identified compounds |
| Trace metals | general category of inorganic substances, most of which are metals; also includes other  elements (e.g. arsenic, barium) |
| VOCs | Volatile organic compounds |

**Saco Municipal Landfill**
**Saco, Maine**
**Region 1**
**MED980504393**

## Site Exposure Potential

The Saco Municipal Landfill site covers four hectares 3 km northwest of Saco, Maine (Figure 1) (NUS 1987). The landfill is owned by the city of Saco and was first used for open dumping around 1960. Wastes were burned on-site until local opposition halted burning activities. The landfill consists of an active industrial dump, an active municipal refuse dump, and a capped, inactive dump that appears as a broad, flat meadow. The industrial dump contains industrial waste and construction and demolition debris. The municipal waste area receives municipal refuse and four to five metric tons of de-watered, chromium-laden, tannery sludge daily. The tannery sludge is deposited in unlined trenches, often directly in contact with groundwater. In addition, illegal dumping of hazardous waste has allegedly occurred at the site. There are large, open pits south of the active dump that presumably have been mined for fill because they show no signs of dumping. The Saco Municipal Landfill is near capacity and the city of Saco has been required to complete a closure plan.

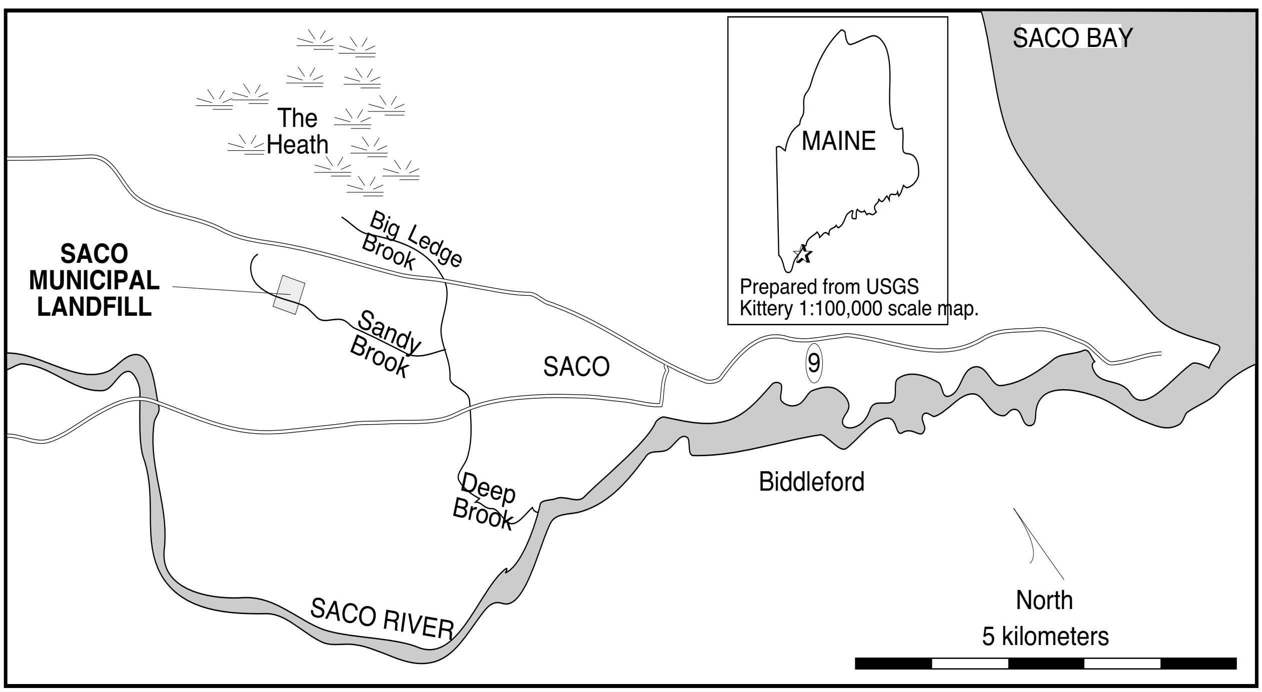


Figure 1. The Saco Municipal Landfill in Saco, Maine.

An extensive wetland area, The Heath, is 2 km northeast of the site. Sandy Brook originates in the wetland and flows through the site, separating the municipal refuse area from the industrial and inactive dump areas, draining 90 percent of the site. The remaining 10 percent of the site drains to an unnamed tributary of Deep Brook. Sandy Brook joins Big Ledge Brook 0.7 km below the site to form Deep Brook. Deep Brook flows 2 km to the Saco River, which flows 10 km further to the Atlantic Ocean.

Possible contaminant migration pathways to NOAA trust resources include leachate, surface water runoff, and groundwater flow to Sandy and Deep brooks.

## Site-Related Contamination

Trace metals are the contaminants of concern to NOAA. Both arsenic and mercury in leachate, and chromium in groundwater, were measured in concentrations exceeding AWQC for the protection of freshwater aquatic life (Table 1) (EPA 1986; NUS 1987). Moderate levels of several organic compounds have also been measured in on-site groundwater, the spring, and leachate.

Table 1. Maximum concentrations of selected contaminants at the Saco Municipal Landfill (NUS 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in µg/l.

| Contaminant | On-site Groundwater | On-site Leachate | On-site Spring | Upstream | Sandy Brook Adjacent | Down-stream | AWQC Acute | Chronic |
|---|---|---|---|---|---|---|---|---|
| Semi-Volatiles | | | | | | | | |
| p-cresol | 590 | N/A | 280 | N/A | N/A | N/A | N/D | N/D |
| m-cresol | 100 | N/A | 28 | N/A | N/A | N/A | N/D | N/D |
| o-cresol | 84 | N/A | N/A | N/A | N/A | N/A | N/D | N/D |
| Trace Metals | | | | | | | | |
| arsenic | N/A | 300 | N/A | N/A | N/A | 13 | 360 | 190 |
| chromium | 200 | N/A | 0.008 | <0.02 | <0.02 | N/A | 16 | 11 |
| mercury | N/A | 0.2 | N/A | N/A | N/A | N/A | 2.4 | 0.012 |

N/A: Not available N/D: Criteria not determined

## NOAA Trust Habitats and Species in Site Vicinity

No information was available on the aquatic habitats of the unnamed tributary and Sandy Brook. However, Deep Brook is a small, continuously flowing, low-gradient stream with a width ranging from 0.6 to 6 meters and an average depth of 0.3 meters (Pearce 1988). The substrate in the brook is sand. The water quality in Deep Brook is fair; siltation and low dissolved oxygen values have been reported from the brook. Sandy Brook and Deep Brook are classified B-1 by the Maine Department of Environmental Protection (suitable habitat for propagation of fish and wildlife).

American eel is the only NOAA trust resource using the watershed near the site. There are several dams on the Saco River and restoration of anadromous fish runs has been proposed for the river. Atlantic salmon, American shad, and alewife are expected to use the Saco River near the site when the restoration is completed. Restoration of the lower reaches of the river near the mouth of Deep Brook should be completed by the early 1990s (Pearce 1988).

**Response Category:** Not Determined

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| David Webster 617-573-5780 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Ken Finkelstein 617-573-9699 |

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

NUS Corporation. 1987. Hazard Ranking System Package, Saco Municipal Landfill, Saco, Maine. Boston: U.S. Environmental Protection Agency. TDD No. F1-8702-21.

Pearce, S., fishery biologist, Maine Department of Fish and Wildlife Services, Fishery Division, Gray, Maine, personal communication, December 12, 1988.

**Fletcher's Paint Works and Storage**
**Milford, New Hampshire**
**Region 1**
**NHD001079649**

## Site Exposure Potential

The Fletcher's Paint Works site consists of two properties: the main complex on a 0.06-hectare lot at 21 Elm Street, Milford, New Hampshire, and a warehouse 200 meters south on Mill Street. Fletcher's Paint Works began operations at the Elm Street site in the early 1950s. The primary activity at the facility is the manufacture, distribution, and sale of paints and stains for commercial and residential uses. Annual production is estimated at 94,600 to 132,500 liters. Approximately 250 drums with unknown contents are stored on a parking lot at the plant. Many of the drums are bulging and show signs of spills on the ground in the area. Two additional underground steel storage tanks, containing naphtha and 100% mineral spirits, are located on the property. Each of these tanks has a capacity of 5,680 liters, is unlined, and has no leak detection system (NUS 1986).

The warehouse has been owned by Fletcher's Paint Works for approximately 30 years. During this period, it has either lain idle or been used for storing dry paint pigment. The warehouse is on a 1,200 $m^2$ lot. Numerous drums have been stored outside of the building. Most of the drums were open, empty, and stored on their sides in an area without a liner or other containment system (NUS 1987).

Before its use by Fletcher's Paint Works, the Elm Street site was an industrial finishing facility that manufactured baked enamels, lacquers, and hampers (NUS 1986). A portion of the site was formerly occupied by the town dump and operated as a burning dump from the turn of the century to the 1920s. The property on Mill Street is thought to have been occupied by a grain storage shed that burned prior to the purchase by Fletcher's Paint Works (NUS 1987).

The site is in a valley formed by the Souhegan River (Figure 1). The valley walls rise from 90 to 150 meters above the valley floor. The Elm Street property is on the floodplain next

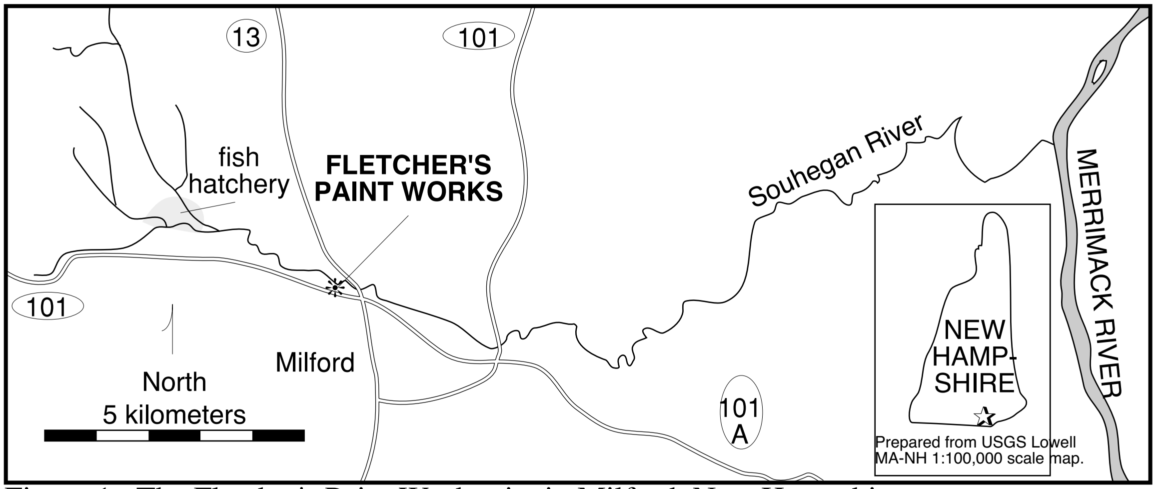

Figure 1. The Fletcher's Paint Works site in Milford, New Hampshire.

to the river. A waste and drum storage area at the edge of the river bank slopes toward the river at about 45 degrees. The parking area is surrounded by a 0.3-meter high berm that appears to be constructed of coarse, sandy material. Surface runoff from the parking area is collected in an underground steel storage tank periodically emptied directly into the Souhegan River.

The warehouse facility is on a flat river terrace 12 meters above the river. A wetland covering 4.5 hectares adjacent to the Mill Street property drains northward into a ditch that flows along the western boundary of the warehouse lot. Surface runoff from the lot discharges into the ditch or into a storm drain that empties into the wetland. The drainage ditch runs northward, intersects the Hampshire Paper Company property, and then discharges into the Souhegan River. The part of the Hampshire Paper property that contains the drainage ditch is included in the Fletcher's site (NUS 1986, 1987).

The Souhegan River flows 18 km to the Merrimack River, which enters the Atlantic Ocean 105 km below the site.

Contaminant pathways of concern to NOAA are surface water runoff and groundwater discharge to the Souhegan River.

## Site-Related Contaminants

Contaminants of concern to NOAA include VOCs, PCBs, and trace metals, which have been detected in Elm Street site surface soil, Souhegan River sediments, and Souhegan River surface water (NUS 1986, 1987). Trace metals detected in on-site soils included chromium, copper, lead, nickel, and zinc. PCBs have been detected in on-site surface soils as high as 1,250 mg/kg. Groundwater data is lacking at this site. Preliminary screening results from the warehouse on Mill Street found soil samples containing VOCs, PCBs, and trace metals.

**NOAA Trust Habitats and Species in Site Vicinity**

Resources of concern to NOAA include blueback herring, American shad, Atlantic salmon, and alewife in the Merrimack River. NOAA resources are prevented from migrating to the site by two dams on the Souhegan River located at Milford (0.8 km below the site) and at the confluence of the Souhegan and Merrimack rivers (18 km below the site). There are plans to install a fish ladder in the dam at the mouth of the Souhegan River as part of the current state and Federal Merrimack River Atlantic Salmon Restoration program. This will allow alewife, American shad, and Atlantic salmon to migrate to within 0.8 km of the site. There are no plans to place fish ladders on any other dams on the Souhegan River (McKeon 1988).

There is a State fish hatchery on the Souhegan River upstream of the Fletcher site. The Souhegan River is stocked with fingerlings and smolts of Atlantic salmon on a yearly basis, with these fish moving downstream past the Fletcher site and into the Merrimack River. This management program is intended to augment salmon populations in the Merrimack River (McKeon 1989).

**Response Category:** Not determined

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Daniel Coughlin 617-573-9620 |

**NOAA Coastal Resources Coordinator**

| |
|---|
| Ken Finkelstein 617-573-9699 |

**References**

DHHS. 1988. Memorandum from David Mellard, Emergency Response Branch, to Marilyn DiSirio, Public Health Advisor, EPA Region 1. May 3, 1988. Department of Health and Human Services. Concord, New Hampshire: Department of Health and Human Services.

EPA. 1983. Hazardous Waste Land Treatment. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. SW-874.

McKeon, J., fishery biologist, U.S. Fish and Wildlife Service, Concord, New Hampshire, personal communication, December 1, 1988.

McKeon, J., fishery biologist, U.S. Fish and Wildlife Service, Concord, New Hampshire, personal communication, March 13, 1989.

NUS Corporation. 1986. Fletcher's Paint Works, Milford, New Hampshire. Final Site Inspection Report, TDD No. FI-8506-10. Boston: U.S. Environmental Protection Agency, Region 1.

NUS Corporation. 1987. Fletcher's Paint Storage Facility, Milford, New Hampshire. Final Site Inspection, TDD No. Fl-8611-32. Boston: U.S. Environmental Protection Agency, Region 1.

**Rose Hill Regional Landfill**
**South Kingston, Rhode Island**
**Region 1**
**RID980521025**

## Site Exposure Potential

The Rose Hill Regional Landfill covers 28 hectares in South Kingston, Rhode Island (Figure 1). Before its use as a landfill, the site was used for sand and gravel operations. From 1967 to 1983, an unknown quantity of domestic and industrial wastes was disposed of in three areas at the landfill: an 11-hectare solid waste landfill, a 4.5 hectare-bulk waste disposal area, and a sewage sludge landfill. Copper and zinc sludge and process water containing trichloroethylene were included in the industrial wastes. During operation, wastes were buried below the water table. When operation ceased in 1983, the three areas were covered with soil, graded, and seeded. A transfer station for municipal refuse now occupies the site (NUS 1987).

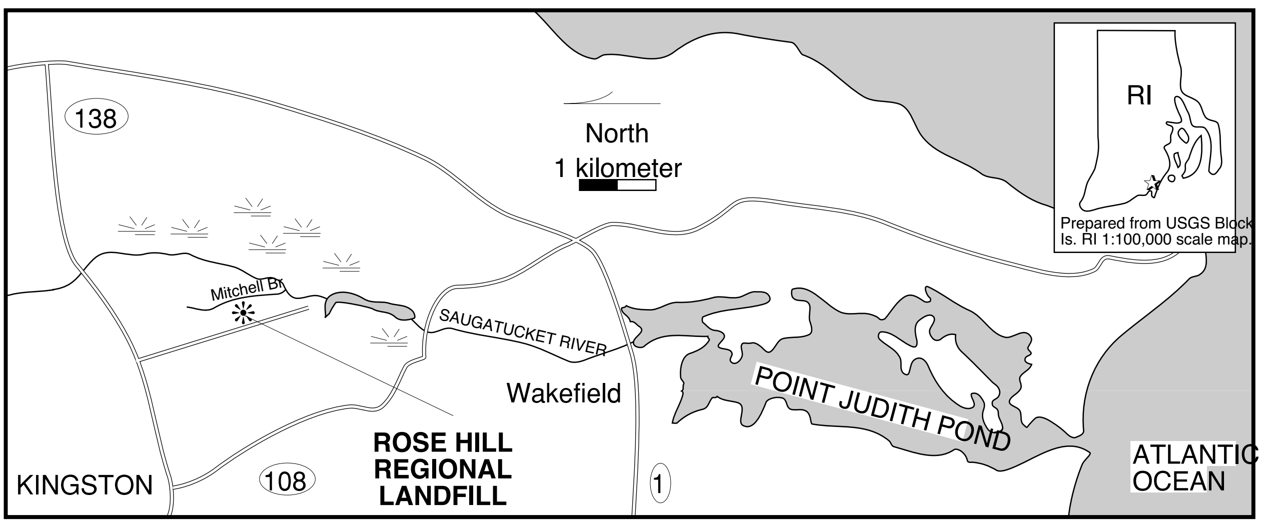


Figure 1. The Rose Hill Regional Landfill site in South Kingston, Rhode Island.

The topography in the area, typical of the coastal lowlands, is generally flat with gently rolling hills (NUS 1987). Elevations range from 15 to 30 meters above mean sea level with slopes less than three percent. There are three surface water bodies near the site. The Saugatucket River flows south, 60 to 90 meters east of the site. Mitchell Brook flows along the northern perimeter of the site and south between the solid waste landfill and the bulk waste disposal area on the site. Mitchell Brook joins the Saugatucket River 300 meters southeast of the site. An unnamed brook flows southeast 90 meters from the site and joins the Saugatucket River 150 meters south of the confluence of the river and Mitchell Brook. The Saugatucket River flows 4.5 km into Point Judith Pond,which empties into the Atlantic Ocean.

Contaminant migration pathways include leachates, surface water runoff, and groundwater discharge to Mitchell Brook and the Saugatucket River

**Site-Related Contamination**

Trace metals and VOCs are the contaminants of concern. Concentrations of cadmium, lead, mercury, and silver in on-site groundwater exceeded AWQC (Table 1) (EPA 1986; NUS 1987). In addition, concentrations of benzene and 1,2-dichloroethene exceeding LOEL were found in on-site groundwater. Limited surface water sampling and analysis found low concentrations (<10 µg/l) of several VOCs in Mitchell Brook.

Table 1. Maximum concentrations of selected contaminants at the Rose Hill Regional Landfill site (NUS 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in µg/l.

| Contaminant | On-site Groundwater | AWQC Acute | AWQC Chronic |
|---|---|---|---|
| ORGANIC COMPOUNDS | | | |
| Semi-Volatile | | | |
| benzene | 12,220 | 5,300* | N/D |
| 1,2-dichloroethene | 80,300 | 11,600* | N/D |
| INORGANIC SUBSTANCES | | | |
| Trace Metals | | | |
| cadmium | 165 | 3.9† | 1.1† |
| lead | 100 | 82† | 3.2† |
| mercury | 4 | 2.4 | 0.012 |
| silver | 30 | 4.1† | 0.12 |

* LOEL; † Hardness-dependent (based on 100 mg/l $CaCO_3$); N/D: Criteria not determined

**NOAA Trust Habitats and Species in Site Vicinity**

Habitats of interest to NOAA include the Saugatucket River, Point Judith Pond, and the Atlantic Ocean near the mouth of Point Judith Pond (Table 2). The Saugatucket River is a continuously flowing, low-gradient river system with an average width of 2.5 meters and an average depth of 0.2 meters. River water quality is generally good. The two small dams on the lower reach of the Saugatucket River both permit fish passage. The Saugatucket River supports an alewife run, estimated at 20,000-50,000 individuals (Gibson 1988). American eel also use the Saugatucket River. Point Judith Pond is a mid-salinity estuary used by NOAA trust resources. Mussels use this estuary for spawning. This habitat supports recreational fishing (Gibson 1989); the area of the Atlantic Ocean near the mouth of Point Judith Pond also supports numerous species. Mitchell Brook, the stream that flows near the Rose Hill site, is only a small, intermittent stream and is unlikely to be an important habitat of concern to NOAA (Gibson 1988).

Table 2. Selected resources in the vicinity of the Rose Hill Regional Landfill (USFWS 1980; Gibson 1989).

| Species | Saugatucket River | Point Judith Pond |
|---|---|---|
| INVERTEBRATES | | |
| mussels | | A,S,R |
| | | |
| FISH | | |
| alewife | S,A,M | S,A,M |
| American eel | A | A |
| winter flounder | | S,A,C,R |
| striped bass | | M,A,R |
| white perch | | M,A,R |
| spanish mackerel | | |
| S : Spawning area; A : Adult area; M : Migration route; C : Commercial fishery; R : Recreational fishery | | |

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Dave Newton 617-573-9612 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Ken Finkelstein 617- 573-9699 |

**References**

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Gibson, M., fishery biologist, Rhode Island Fish and Wild Life Services, Sweetwater, Rhode Island, personal communications, December 1, 1988; March 9, 1989.

NUS. 1987. HRS Documentation Package, Rose Hill Regional Landfill, South Kingston, Rhode Island. TDD No. F1-8707-22. Boston: U.S. Environmental Protection Agency, Region 1.

USFWS. 1980. Atlantic coast ecological inventory: Providence. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map. 41069-A8-EI-250.

**BFI Sanitary Landfill**
**Rockingham, Vermont**
**Region 1**
**VTD980520092**

## Site Exposure Potential

The BFI Sanitary Landfill covers 10 hectares on a 42-hectare property in Rockingham, Vermont (Figure 1). The site was originally a soil borrow area owned by Mr. Shepard, who began operating a municipal landfill in 1968; in 1977, the landfill was purchased by BFI. The landfill is unlined and records indicate that it receives 21,228 metric tons of municipal, industrial, and solid waste each year. The wastes include grinding sludge, waste oils, cutting fluids, pesticides, solvents, and epoxy resin (NUS 1987).

Groundwater discharges out of the bedrock cliff face west of the landfill and flows the length of the landfill. The waste directly contacts the groundwater. To reduce leachate generation, a bituminous (tar) intermediate liner was installed in 1981 over the western portion of the landfill and sprayed against the exposed cliff face. However, the liner has been only marginally successful in reducing the leachate. Leachate from the western part of the landfill is channeled to a runoff collection pond at the southwestern end of the landfill. Sediment settles in the pond before runoff drains into a culvert that discharges to the Connecticut River. Surface water from the northern part of the landfill is routed directly to the river. The volume of leachate ranges from 1,900 to 18,900 liters per day. Reported fish kills in the Connecticut River may have been the result of leachate runoff from the landfill (NUS 1987).

In 1986, BFI began using a 0.6-hectare expansion area lined with 40-milliliter, high-density polyethylene (NUS 1987). Leachate generated in the new area is stored in a 38,000-liter tank before being pumped to the Springfield Wastewater Treatment Facility. The landfill sends 3,800 liters of leachate per day to the treatment facility.

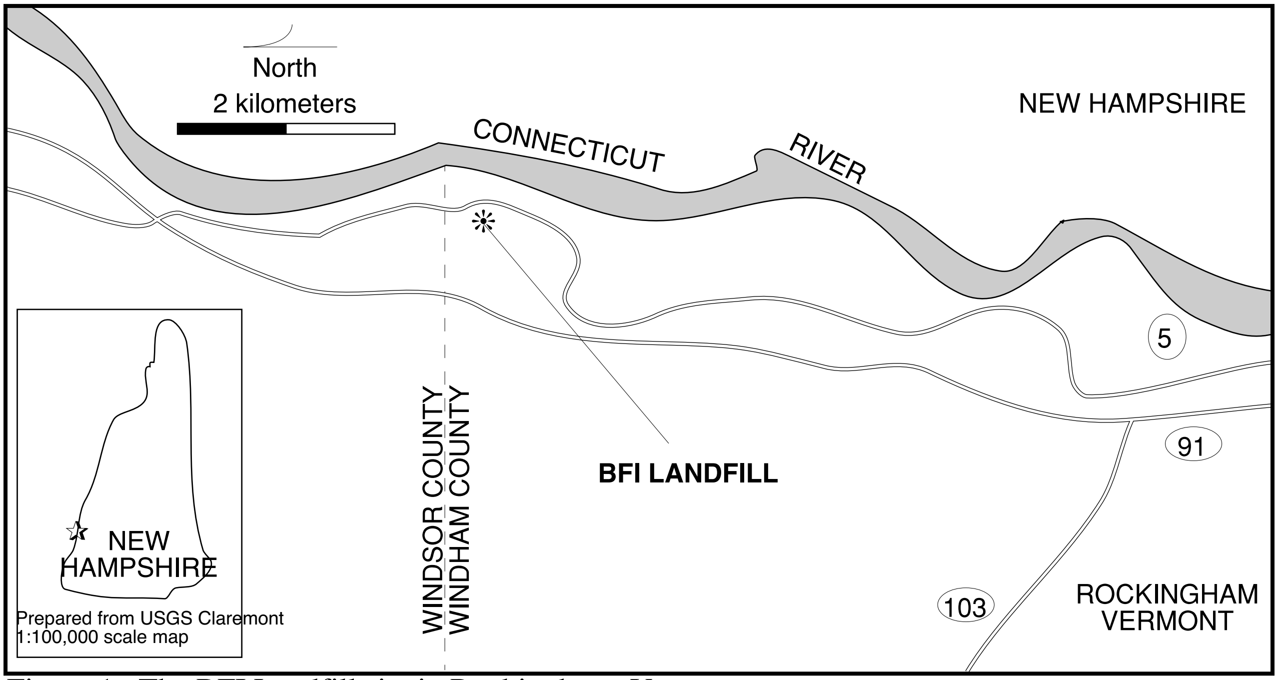


Figure 1. The BFI Landfill site in Rockingham, Vermont.

The BFI landfill area was originally a glacier-derived terrace 140 to 160 meters above mean sea level (NUS 1987). A steep cliff face forms the western boundary of the site. The Connecticut River is less than 160 meters east of the landfill and flows 230 km to the Atlantic Ocean.

Contaminant migration pathways to NOAA trust resources are leachates, surface water runoff, and groundwater flow to the Connecticut River.

## Site-Related Contamination

The contaminants of concern to NOAA include the trace metals cadmium, chromium, copper, and lead, which have been measured in groundwater at concentrations that exceeded AWQC for the protection of freshwater aquatic life by up to 440 times (Table 1) (EPA 1986; NUS 1987). In addition, high levels of VOCs have been measured in the groundwater. No data were available regarding contamination by pesticides.

Table 1. Maximum concentrations of selected contaminants at the BFI Sanitary Landfill site (NUS 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in µg/l.

| | | AWQC | |
|---|---|---|---|
| Contaminant | Groundwater | Acute | Chronic |
| Semi-Volatiles | | | |
| acetone | 18,000 | N/D | N/D |
| 2-butanone | 92,000 | N/D | N/D |
| | | | |
| Trace Metals | | | |
| cadmium | 290 | 3.9* | 1.1* |
| chromium | 147.5 | 16 | 11 |
| copper | 1,400 | 18* | 12* |
| lead | 457 | 82* | 3.2* |

N/D: Criteria not determined * Hardness-dependent (based on 100 mg/l $CaCO_3$)

## NOAA Trust Habitats and Species in Site Vicinity

The Connecticut River is a continuously flowing, low-gradient river system and the largest river in New England. Near the site, the river is 90 to 150 meters wide (McMeniny 1988). The river has been classified by the State of Vermont as a coldwater fish habitat and the water quality is generally good. There is a 1.6-hectare, intermittently flooded wetlands area 1.5 km downstream of the landfill.

An Atlantic salmon run has been restored on the Connecticut River adjacent to the site. The run is small, but is expected to grow considerably over the next few years (McMeniny 1988). The aquatic habitats near the site are used as nursery area and as a migratory corridor. Atlantic salmon smolt are stocked on the river and its tributaries; the White River National Fish Hatchery, 84 km upstream from the landfill, can produce more than one million Atlantic salmon smolts.

American shad also use the Connecticut River near the site (McMeniny 1988). Historically, the American shad run terminated in the area near Bellows Falls, 14 km below the site. However, when the fish passage was installed on the dam at Bellows Falls, a few American shad began to migrate further upstream.

**Response Category:** Not Determined

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| David Webster 617-573-5780 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Ken Finkelstein 617- 573-9699 |

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

McMeniny, J. , fishery biologist, Vermont Department of Fish and Wildlife Services, Burlington, Vermont, personal communication, December 14, 1988.

NUS Corporation. 1987. Final Site Inspection Report, BFI Landfill, Rockingham, Vermont. Boston: U.S. Environmental Protection Agency, Region 1.
TDD No. F1-8706-09.

**Atlas Tack Corporation**
**Fairhaven, Massachusetts**
**Region 1**
**MAD001026319**

## Site Exposure Potential

The Atlas Tack Corporation site covers five hectares in Fairhaven, Massachusetts (Figure 1). Since 1810, the facility has produced cut and wire tacks, steel nails, rivets, bolts, nuts, and screws. Discharges to the environment from these processes have occurred for 119 years. Waste quantities are unknown. During the 1940s, a lagoon was excavated for use as an acid neutralizing pond. Discharges to the lagoon stopped in 1978, but the lagoon and its contents remain. An unknown quantity of waste was disposed of in

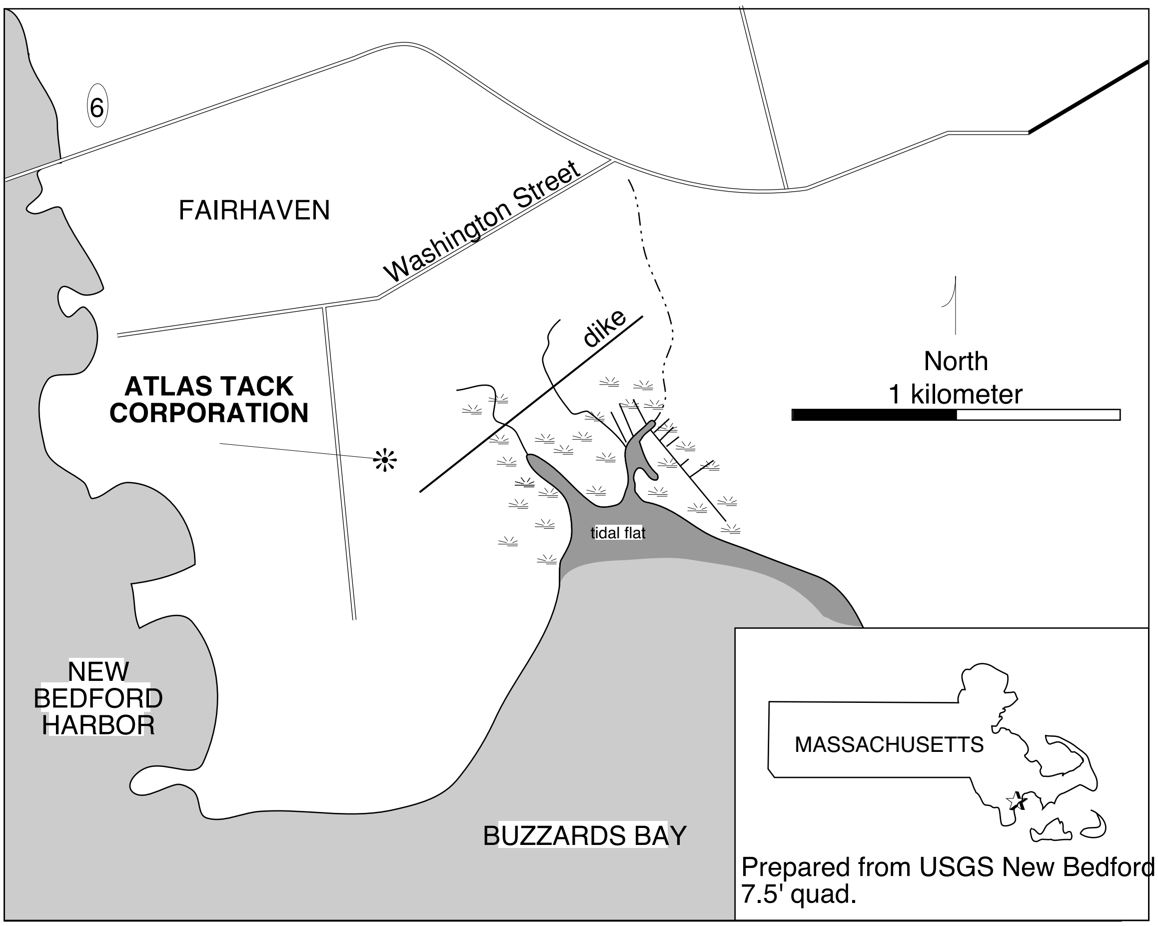


Figure 1. The Atlas Tack Corporation site in Fairhaven, Massachusetts.

the lagoon. From the 1970s until operations at the facility stopped in 1985, manufacturing was limited to shoe, garment, and industrial eyelets that were plated, painted, or plain (EPA 1987). Finishing operations included annealing, pickling, plating, enameling, and cleaning. The plating and pickling operations were reportedly discontinued in 1974 (NUS 1984).

The site is less than 3 meters above mean sea level on coastal lowland. The lagoon covers 900 $m^2$ and is believed to be unlined. A 4.5-meter high dike surrounds the lagoon. An overflow pipe that discharges into the wetland is located in the dike wall. A tidal wetland borders the site to the east and south. Another dike cuts across the wetland 120 meters southeast of the site, dividing the wetland into two areas. The wetlands north and south of the dike cover 4 and 28 hectares, respectively. The wetland areas are connected by tidal creeks to Buzzards Bay, an embayment of the Atlantic Ocean, 500 meters south of the site (NUS 1984).

Possible contaminant migration pathways to the wetlands are groundwater flow, surface water runoff, direct discharge, and erosion and runoff of contaminated surface soils to the adjacent wetlands and Buzzards Bay.

**Site-Related Contamination**

The contaminants at the site of concern to NOAA include cyanide, trace metals, and semi-volatile organic compounds. Concentrations of cyanide were measured in on-site groundwater and surface water from the lagoon at levels exceeding AWQC for the protection of saltwater aquatic life (Table 1). In addition, cyanide was measured in on-site sludge at concentrations of up to 37,200 mg/kg. Analyses indicated that 50 percent of the cyanide present in the lagoon sludge and groundwater was free cyanide.

Table 1. Maximum concentrations of contaminants at the Atlas Tack Corporation site (NUS 1984; SES 1987); natural soil; AWQC for the protection of saltwater aquatic life (EPA 1986); concentrations in sediment and soil in mg/kg and in water in µg/l.

| Contaminant | On-site Soil | Off-site Sediment | Ground-water | Surface Water Lagoon | Off-site | AWQC Acute | Chronic |
|---|---|---|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | | | | |
| Semi-volatiles | | | | | | | |
| toluene | N/A | 3,090 | 173,025† | N/A | 9,510† | 6,300* | 5,000* |
| | | | | | | | |
| INORGANIC SUBSTANCES | | | | | | | |
| Trace Metals | | | | | | | |
| arsenic | 21 | 12 | 82 | N/A | 15 | 69 | 36 |
| cadmium | 1.05 | 1.11 | 210 | 4.1 | 19 | 43 | 9.3 |
| chromium | 2.3 | 180 | N/A | N/A | N/A 1,100 | | 50 |
| copper | 7,400† | 2,040† | 4,300† | 210† | 3,000† | 2.9 | 2.9 |
| lead | 1340 | 430 | N/A | N/A | N/A 140 | 5.6 | |
| mercury 0.79 | 0.22 | 1.8 | 0.56 | 2.1 | 2.1 | 0.025 | |
| nickel | 700 | 120 | 8,950 | 120 | 200 75 | 8.3 | |
| zinc | 11,000† | 1,100† | 48,000† | 730† | 1,780† | 95 | 86 |
| | | | | | | | |
| Other | | | | | | | |
| cyanide 810 | N/A | 1,040† | 120† | N/A | 1.0 1.0 | | |

† Estimated value
N/A: Not available
* LOEL

The concentrations of a number of trace metals measured in groundwater and in surface water on- and off-site exceeded AWQC. Only one of the volatile organic compounds, toluene, was measured in on-site groundwater and off-site surface water at concentrations that exceeded LOEL (NUS 1984; EPA 1986; SES 1987). Off-site surface water and sediment samples were collected in the adjacent wetland area.

**NOAA Trust Habitats and Species in Site Vicinity**

Aquatic habitats that support NOAA trust resources near the site include two wetlands and Buzzards Bay. The wetland area adjacent to the site is criss-crossed by mosquito control ditches and tidal creeks. Marsh cordgrass, spike grass, and salt meadow grass dominate the wetland. The wetlands north and south of the dike are connected via tidal creeks that are culverted under the dike. The vegetation in the southern wetland is dominated by spike grass, salt meadow grass, and marsh elder in the higher areas and by salt marsh cordgrass in the lower areas (SES 1987). The substrate in the two wetland areas is fine sand to mud. Wetlands water quality is degraded by discharge from a sewage plant with high concentrations of fecal coliform bacteria (Dirmano 1989).

Buzzards Bay is a major bay on the coast of Massachusetts. The water quality in the bay, up to 2.5 km from New Bedford Harbor, is degraded by PCB contamination in the harbor and high concentrations of fecal coliform bacteria. The harbor is 0.9 km east of the site. The rest of the bay has been classified by the Massachusetts Division of Water Pollution as class SA coastal water, suitable for high water quality use (NUS 1984; Dirmano 1989).

The wetland areas and Buzzards Bay contain a number of NOAA trust species, including demersal fish such as American eel, flounder, and tautog, and anadromous fish such as American shad, striped bass, and alewife (Table 2). Juvenile stages of flounders and

Table 2. NOAA trust resource use of wetlands next to the Atlas Tack site and of BuzzardsBay (USFWS 1980; Dirmano 1989).

| Species | Wetland areas | Buzzards Bay |
|---|---|---|
| INVERTEBRATES | | |
| blue crab | S,N,A,R | S,N,A,R |
| hard clam | S,N,A,R | S,N,A,R,C |
| soft shell clam | S,N,A,R | S,N,A,R |
| | | |
| FISH | | |
| alewife | | A |
| American eel | A | A |
| American shad | | A |
| Atlantic cod | | S,N,A |
| Atlantic mackerel | | S,N,A |
| Atlantic silverside | N | S,A |
| Atlantic tomcod | | S,N,A |
| black sea bass | | S,N,A |
| blueback herring | | A |
| bluefish | | S,N,A,R,C |
| mullet | N | S,A |
| pollock | | S,N,A |
| striped bass | | A |
| summer flounder | N | S,A |
| winter flounder | N | S,A |
| yellowtail flounder | N | S,A |
| S: Spawning area; N: Nursery area; A: Adult area; R: Recreational fishery; C: Commercial fishery | | |

mullet use the wetland areas as a nursery. Most estuarine fish migrate onto tidal flats and into the tidal creeks and wetland vegetation during flood tides to feed. There are recreational fishery for clams and blue crab throughout the wetland areas and in Buzzards Bay. There is also a major recreational fishery of bluefish along the Buzzards Bay shoreline. Commercial fishery for finfish has been banned in New Bedford Harbor due to the PCB contamination in the harbor. Commercial fishery for clams has been banned in the outer portion of the harbor up to 2.5 km offshore due to high concentrations of fecal coliform bacteria. There are extensive commercial fishery for hard clams and finfish beyond this boundary (Dirmano 1989).

**Response Category:** Undetermined

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Richard Cavagnero | 617-573-5730 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Ken Finkelstein | 617- 573-9699 |

**References**


Dirmano, F., fishery biologist, Massachusetts Division of Marine Resources, Boston, personal communication, January 9, 1989.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Hazardous Ranking Scoring Package, Atlas Tack Corporation, Fairhaven, Massachusetts. Boston: U.S. Environmental Protection Agency, Region 1.

NUS Corporation. 1984. Site Inspection Atlas Tack Corporation Fairhaven, Massachusetts. Boston: U.S. Environmental Protection Agency, Region 1. TDD NO. F1-8403-01A.

Sanford Ecological Services (SES) Inc. 1987. New Bedford Harbor Superfund Project Wetland Assessment. Boston: U.S. Environmental Protection Agency, Region 1.

USFWS. 1980. Atlantic coast ecological inventory: Providence. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map.

**Barkhamsted-New Hartford Landfill**
**Barkhamsted, Connecticut**
**Region 1**
**CTD980732333**

## Site Exposure Potential

Since 1974, the Barkhamsted-New Hartford Landfill, in a rural/residential area of Barkhamsted, Connecticut, has received municipal and industrial wastes, including an estimated 2,700 metric tons of oily, metal-grinding sludge (Figure 1). A barrel-crushing operation was also performed on the site (NUS 1987).

The unlined landfill encompasses 42 hectares on a northward- and eastward-sloping hillside (NUS 1987). An unnamed brook borders the site to the southwest and north. The terrain slopes an average of six percent between the facility and the unnamed brook. The brook flows for 2 km before entering the West Branch of the Farmington River, which flows 65 km before it enters the Connecticut River. The Connecticut River empties into the Atlantic Ocean 150 km below the site. A 22-hectare freshwater wetland is 450 meters downstream from the site along the unnamed brook.

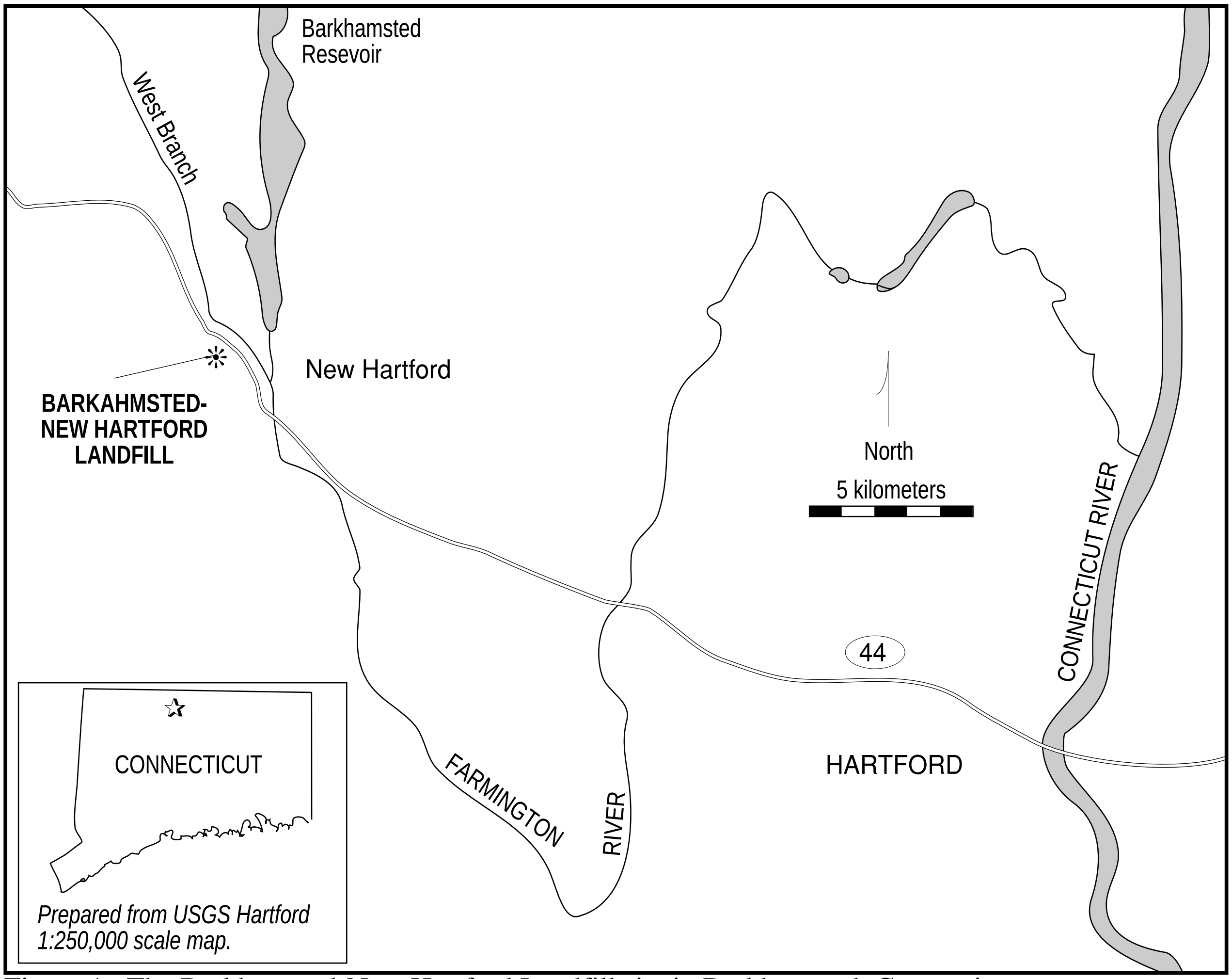

Figure 1. The Barkhamsted-New Hartford Landfill site in Barkhamsted, Connecticut.

Contaminant migration pathways to NOAA trust resources include leachates, surface water runoff, and, possibly, groundwater flow to the unnamed brook and the West Branch of the Farmington River.

## Site-Related Contamination

The contaminants of concern to NOAA include trace metals and VOCs. Copper, lead, and zinc were measured in groundwater in concentrations that exceeded AWQC for the protection of freshwater aquatic life (EPA 1986; NUS 1987) (Table 1). In addition, benzene was observed in groundwater at a concentration exceeding LOEL. Low levels (less than 50 µg/l) of VOCs have been measured in the surface water of the unnamed brook. Concentrations of chromium were measured in on-site sludge at levels exceeding the level found in natural soils. Investigators reportedly developed nausea, headaches, and dizziness from fumes emitted by the unnamed brook bordering the landfill and from leachate that enters the brook (EPA 1983).

Table 1. Maximum concentrations of contaminants at the Barkhamsted-New Hartford Landfill site (NUS 1987); ranges in natural soil (EPA 1983); AWQC for the protection of freshwater aquatic life (EPA 1986); sludge and soil concentrations in mg/kg and water concentrations in µg/l.

| | | Range in | | AWQC | |
|---|---|---|---|---|---|
| Contaminant | Sludge | Natural Soils | Groundwater | Acute | Chronic |
| Volatile Organic Compounds | | | | | |
| benzene | N/A | N/A | 50,000 | 5,300* | N/D |
| acetone | N/A | N/A | 12,000 | N/D | N/D |
| | | | | | |
| Trace Metals | | | | | |
| cadmium | 10.0 | 1-0.7 | 2 | 3.9† | 1.1† |
| chromium | 1,700 | 1-1,000 | 1 | 16 | 11 |
| copper | 71 | 2-100 | 40 | 18† | 12† |
| lead | 30 | 2-200 | 14 | 82† | 3.2† |
| nickel | 120 | 5-500 | 20 | 1400† | 160† |
| zinc | 43 | 10-300 | 2,300 | 120† | 110† |

N/A:Not available; N/D: Criteria not determined; * LOEL; † Hardness-dependent (based on 100 mg/l $CaCO_3$)

## NOAA Trust Habitats and Species in Site Vicinity

No information was available in the documents reviewed regarding the aquatic habitats of the unnamed brook. The West Branch of the Farmington River is a continuously flowing, low-gradient river that averages 30 meters wide, 0.6 meters deep, and has pools up to five meters deep on the stretch of the river near the site (Hagstrom 1988). The substrate consists of large rocks and boulder with some patches of gravel and coarse sand. The water quality is generally good. The banks along the river are moderately to well-vegetated by trees, shrubs, and grass.

Restoration of anadromous fish runs is underway for the Farmington River. Atlantic salmon and American shad are being released in the river near the site (Minta 1988). Alewife and blueback herring are also expected to use the river near the site when the restoration is completed. All of these species will have access to the unnamed brook, although only strays are expected to use it.  The Farmington River is used for recreational fishery.

The Connecticut River supports runs of American shad, Atlantic salmon, alewife, and blueback herring at its confluence with the Farmington River (Minta 1988).

**Response Category:** Not Determined

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Margaret Leshen 617-573-9660 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Ken Finkelstein 617-573-9699 |

**References**

EPA. 1983. Hazardous Waste Land Treatment. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. SW-874.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Hagstrom, N., field biologist, Connecticut Department of Environmental Protection, Hartford, personal communication, December 12, 1988.

Minta, P., fishery biologist, Connecticut Department of Environmental Protection, Hartford, personal communication, December 12, 1988.

NUS Corporation. 1987. Final Hazard Ranking System Package, Barkhamsted-New Hartford Landfill, Barkhamsted, Connecticut. Boston: U.S. Environmental Protection Agency, Region 1. TDD No. F1-8706-15.

**Gallups Quarry**
**Plainfield, Connecticut**
**Region 1**
**CTD108960972**

## Site Exposure Potential

The Gallups Quarry occupies nine hectares in Plainfield, Connecticut (Figure 1). The site was used as an unlicensed chemical waste disposal area from 1974 to 1977. Before 1974, it was used for gravel mining. Chemicals were disposed of in three distinct locations on the site: a seepage bed that covers an area of 180 $m^2$, a secondary barrel and liquid burial area covering 0.03 hectares, and a 0.2-hectare chemical waste lagoon and primary barrel disposal pit. An unknown quantity of low-pH liquids containing various trace metals and dyes was disposed of in the seepage bed. The secondary barrel and liquid burial area consists of a linear trench in which barrels and free liquids were deposited and covered with soil in at least two layers. Two hundred barrels were uncovered in the area. Twelve hundred barrels of mixed chemicals were disposed of in the southern part of the waste lagoon/barrel disposal pit. The northern part of the pit was used for the disposal of an unknown quantity of free liquid wastes (Fuss & O'Neill 1979).

There is evidence that various liquids were dumped on the ground in and around the primary and secondary barrel locations. The stored barrels leaked over the two barrel sites after being removed from the pits (Fuss & O'Neill 1979).

The site has numerous excavations and is largely devoid of any vegetation (Fuss & O'Neill 1979). The nearest downslope surface water body, Mill Brook, is 150 meters north of the site. Mill Brook flows approximately 5 km before it enters the Quinebaug River. The Quinebaug River discharges into Thames River 23 km further downstream. The Thames River empties into the Atlantic Ocean 50 km below the site. The groundwater flows radially from the center of the site to the north and west and discharges ultimately into Mill Brook (Fuss & O'Neill 1979). Extensive contamination of the groundwater has been observed, extending 135 meters west of the pits. Discharge of contaminated groundwater into Mill Brook was observed in spring and fall 1978.

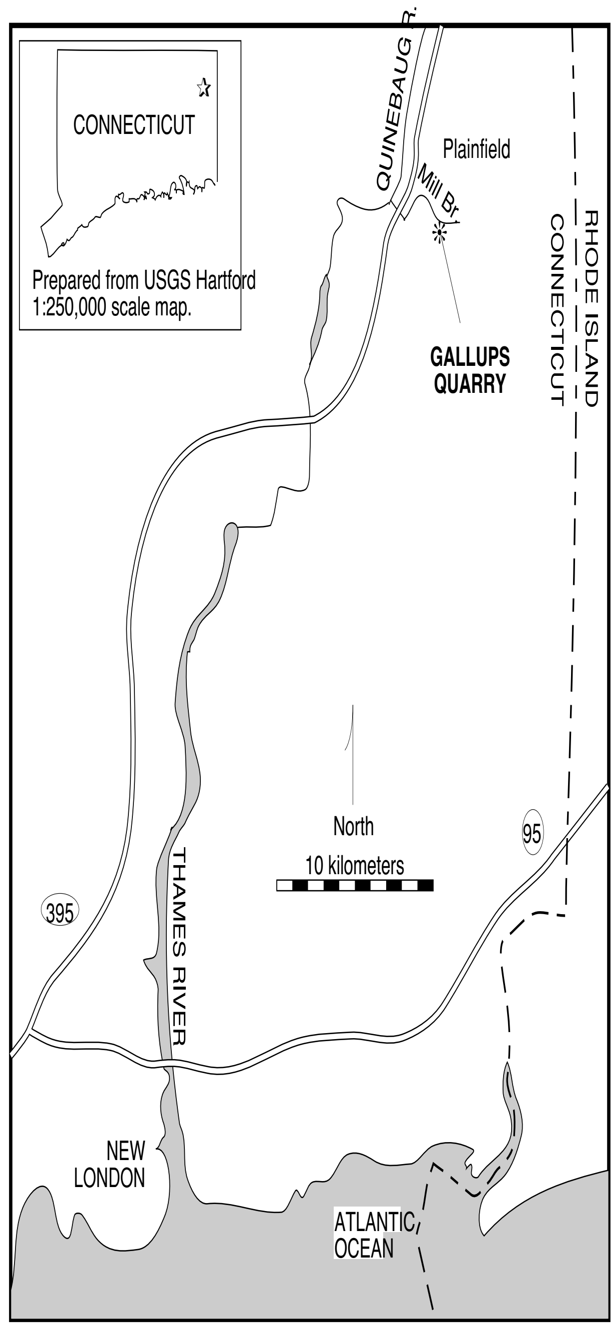


Figure 1. The Gallups Quarry site in Plainfield, Connecticut.

The primary contaminant migration pathways are surface runoff and groundwater flow to Mill Brook .

### Site-Related Contamination

The contaminants of primary concern to NOAA are trace metals and VOCs. All of the trace metals detected in the groundwater were at concentrations that exceeded AWQC for the protection of freshwater aquatic life (Table 1) (Fuss & O'Neill 1979; EPA 1986). Mill Brook surface waters showed concentrations of cadmium, chromium, nickel, lead, and zinc exceeding AWQC. High concentrations of several VOCs were observed in on-site groundwater. The concentration of tetrachloroethylene exceeded LOEL.

Table 1. Maximum concentrations of contaminants at the Gallups Quarry site (Fuss & O'Neill 1979); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in µg/l.

| | | Mill Brook | AWQC | |
|---|---|---|---|---|
| Contaminant | Groundwater | Surface Water | Acute | Chronic |
| ORGANIC COMPOUNDS | | | | |
| Volatile | | | | |
| ethyl acetate | 5,000 | N/A | N/D | N/D |
| isopropanol | 5,000 | N/A | N/D | N/D |
| tetrachloroethylene | 20,000 | N/A | 5,280* | 840* |
| toluene | 10,000 | N/A | 17,500* | N/D |
| INORGANIC SUBSTANCES | | | | |
| Trace Metals | | | | |
| cadmium | 22,100 | 10 | 3.9† | 1.1† |
| chromium | 5,390 | 15 | 16 | 11 |
| copper | 485,000 | <10 | 18† | 12† |
| nickel | 91,700 | 480 | 1400† | 160† |
| lead | N/A | 230 | 82† | 3.2† |
| silver | 36 | <2 | 4.1† | 0.12 |
| zinc | 270,000 | 2310 | 120† | 110† |

* LOEL
† Hardness-dependent (based on 100 mg/l $CaCO_3$)
N/D: Criteria not developed
N/A: Not available

### Trust Habitats and Species in Site Vicinity

Habitats of interest to NOAA include Quinebaug River and Thames River. The Quinebaug River is undergoing restoration for anadromous fish. Atlantic salmon fry are stocked in the tributaries of the Quinebaug River but not in Mill Brook. It is expected that sea run brown trout, alewife, and blueback herring will use the aquatic habitats of the river when the restoration is completed in the 1990s. Several anadromous fish species, including American shad, sea run brown trout, alewife, blueback herring, rainbow smelt, striped bass, and white perch use the Thames River.

Mill Brook, the creek flowing adjacent to the site, is a small, continuously flowing, low-gradient creek with a large wetland area adjacent. At present, there are no known anadromous fish species utilizing the creek. In addition, it is unknown if catadromous

American eels are present in Mill Brook (Schluntz 1988). The extent to which anadromous fish will use Mill Brook after the restoration is unknown.
**Response Category:** Undetermined

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Margaret Leshen 617-573-9660 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Ken Finkelstein 617- 537-9799 |

**References**

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Fuss & O'Neill Inc. 1979. Untitled report regarding the hydrology and contamination of the Gallups Quarry, Plainfield, Connecticut.

Schluntz, E., fisheries biologist, Connecticut Department of Environmental Protection, Marlborough, Connecticut, personal communication, December 19, 1988.

**Action Anodizing**
**Copiague, New York**
**Region 2**
**NYD072366453**

## Site Exposure Potential

The Action Anodizing site is in Copiague, New York (Figure 1). Action Anodizing, Plating, and Polishing Corporation uses the site as a small anodizing facility, with some cadmium plating occurring on-site. Wastewater containing high concentrations of trace metals was discharged to leaching pools until 1982. Wastewater in the ponds was allowed to infiltrate into the ground (EPA 1987).

Amityville Creek, 550 meters west and downgradient from the site, is the nearest surface water body. Woods Creek is 825 meters south of the site. Both creeks empty into the Great South Bay, 3 km south of the site. Contaminants in surface soil at the site could possibly reach Amityville Creek through surface water runoff.

Depth to groundwater at the site is four meters and the distance between the bottom of the liquid waste in the leaching ponds and the top of the water table is less than 1.5 meters (EPA 1987).

Possible contaminant migration pathways to NOAA trust resources are surface water runoff and infiltration of contaminants from leaching ponds to groundwater, then transport by groundwater flow to Amityville Creek, Woods Creek, and South Oyster Bay.

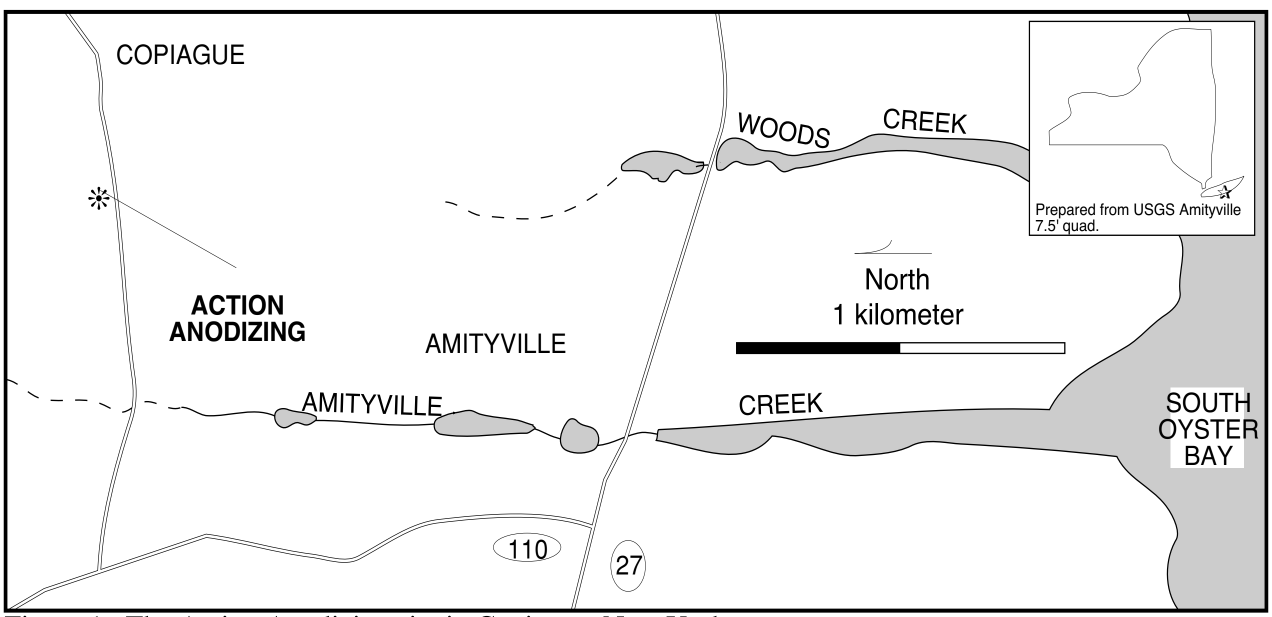

Figure 1. The Action Anodizing site in Copiague, New York.

## Site-Related Contamination

Trace metals are the contaminants of concern to NOAA at this site. Water samples were collected from the leaching ponds in January 1980 while the ponds were still in use. These samples contained concentrations of trace metals up to six orders of magnitude higher than the AWQC for the protection of saltwater aquatic life (Table 1). A soil sample taken from an area of stained soil on the west side of the building on-site contained 680 mg/kg chromium and 640 mg/kg cadmium (EPA 1987). There is insufficient
information to determine whether there has been any significant contamination of the groundwater or local surface waters of interest to NOAA.

Table 1. Maximum concentrations of selected contaminants (HRS 1987) observed in surface water at the Action Anodizing site; AWQC for the protection of saltwater aquatic life (EPA 1986); concentrations in µg/l.

| | | AWQC | |
|---|---|---|---|
| Contaminant | Leaching Ponds | Acute | Chronic |
| cadmium | 2,200,000 | 43 | 9.3 |
| chromium | 790,000 | 1100 | 50 |
| copper | 50,000 | 2.9 | 2.9 |
| lead | 50,000 | 140 | 5.6 |
| nickel | 180,000 | 75 | 8.3 |
| silver | 640 | 2.3 | N/D |
| zinc | 78,000 | 95 | 86 |
| N/D: Not determined | | | |

## NOAA Trust Habitats and Species in Site Vicinity

Habitats of interest to NOAA include the lower reaches of Amityville and Woods creeks and South Oyster Bay (Table 2). The lower reaches of Amityville and Woods creeks are tidally influenced estuarine habitats. Some estuarine species, such as white perch and

Table 2. Selected NOAA trust resource use of the South Oyster Bay (USFWS 1980).

| Species | Spawning Area | Nursery Area | Migration Route | Adult Area | Commercial Fisheries | Recreational Fisheries |
|---|---|---|---|---|---|---|
| INVERTEBRATES | | | | | | |
| bay scallop | | X | | X | | X |
| blue crab | X | X | | X | X | X |
| eastern oyster | X | X | | X | X | X |
| | | | | | | |
| FISH | | | | | | |
| alewife | | | X | | | |
| American shad | | | X | | | |
| Atlantic cod | | | | | | X |
| Atlantic croaker | | | | X | | |
| Atlantic eel | | | X | X | X | X |
| Atlantic menhaden | | X | | X | X | |
| Atlantic sturgeon | | | X | | | |
| blueback herring | | | X | | | |
| bluefish | | | | X | X | X |
| summer flounder | | X | | X | X | X |
| winter flounder | | X | | X | X | X |
| striped bass | | | X | X | X | X |
| scup | | | | x | x | x |
| white perch | | | X | | X | X |
| spot | | | | X | | |
| weakfish | X | X | | X | X | X |
| tautog | | | | X | | X |
| weakfish | X | X | | X | X | X |
| whit perch | | | X | | X | X |

American eel, frequent these portions of the streams, but there is insufficient information to determine how much the streams are used by species in South Oyster Bay (Guthrie 1989).

South Oyster Bay provides productive estuarine and shallow, marine shelf habitats harboring many marine species (USFWS 1980). American shad migrate through the Great South Bay and are important regionally since they listed as a threatened species by the State of New Jersey.

**Response Category:** Undetermined

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Dorothy Allen 212-264-2647 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| John Lindsay 404-347-5231 |

**References**


Guthrie, C., aquatic biologist, New York Department of Environmental Conservation Bureau of Fisheries, New York City, personal communication, January 12, 1989.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. HRS Package. Action Anodizing, Plating and Polishing Corporation. Copiague, New York. New York: U.S. Environmental Protection Agency, Region 2.

USFWS. 1980. Atlantic coast ecological inventory. New York. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250 000 scale map. 40072-AI-EI-250.

**C & J Disposal Site**
**Hamilton, New York**
**Region 2**
**NYD981561954**

## Site Exposure Potential

The C & J Disposal site is located in a rural area north of Hamilton, New York (Figure 1). C & J Leasing Company, owners of the property next to the disposal site, used 0.04 hectares of New York Department of Transportation property as a dumping area for lead-based paints and other liquid wastes. Wastes were dumped directly on the ground. These activities occurred through 1976. C & J Leasing also abandoned seventy-five to 100 55-gallon drums at the site. Rather than removing the drums when requested by the New York Department of Environmental Conservation, C & J Leasing is reported to have buried them (EPA 1987).

Near-site surface waters include a small marsh next to the site and a pond south of the site. A small, unnamed stream drains these, as well as surface runoff from the site, and flows to Woodman Pond 800 meters downstream of the site. Woodman Pond drains via an unnamed stream to Payne Brook, which flows to the Chenango River 9 km south of the site. The Chenango River joins the Susquehanna River 96 km from Payne Brook. The Susquehanna River flows south for 465 km until it enters the northern reaches of the Chesapeake Bay estuary.

Groundwater is three meters below the site. A groundwater divide exists at the site and groundwater may flow away from the site in any direction (EPA 1987).

Possible contaminant pathways to NOAA trust resources include surface runoff, infiltration to the groundwater, and groundwater flow to Payne Brook and the Chenango River.

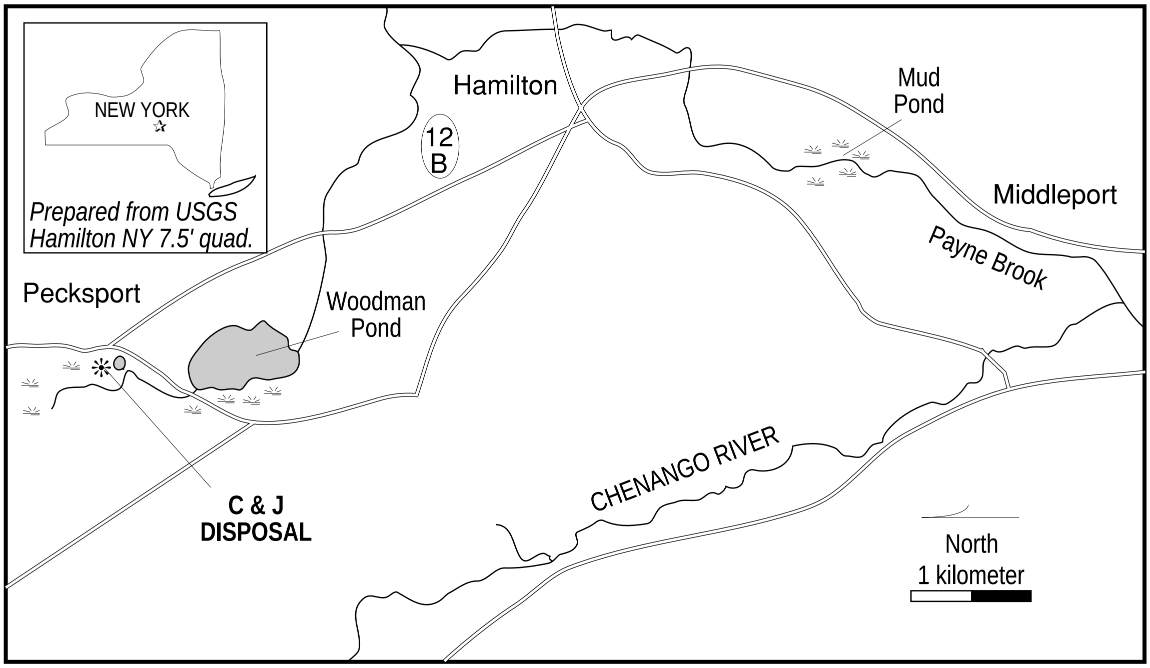


Figure 1. The C & J Disposal site in Hamilton, New York.

**Site-Related Contamination**

Contaminants of concern to NOAA are metals and PAHs. Metals were found in on-site soils, surface waters, sediments, and groundwater (Table 1). A surface water sample collected from the pond next to the site contained lead. One groundwater sample taken from a well near the site contained 91 µg/l nickel.

Soil samples taken from the site contained PAHs, metals, and other contaminants (EPA 1987). A sediment sample taken from the pond on-site contained cadmium, lead, nickel, and zinc. A sediment sample taken from the small stream that drains the near-site pond, collected near Woodman Pond, contained PAHs. Bis(2-ethylhexyl)phthalate was detected in a surface water sample collected from the pond.

Table 1. Maximum concentrations of selected contaminants at the C & J Disposal site (EPA 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); soil and sediment concentrations in mg/kg; water concentrations in µg/l.

| Contaminant | Sediment Pond | Sediment Stream | Soil On-site | Groundwater On-site | Surface water Pond | Surface water Stream | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | | | | | |
| Volatiles | | | | | | | | |
| 4-methyl-2-pentanone | ND | ND | 0.03 | ND | ND | ND | N/D | N/D |
| tetrachloroethene | ND | ND | 0.01 | ND | ND | ND | N/D | N/D |
| toluene | ND | ND | 0.29 | ND | ND | ND | *17500 | N/D |
| ethylbenzene | ND | ND | 0.11 | ND | ND | ND | *32000 | N/D |
| total xylenes | ND | ND | 0.48 | ND | ND | ND | N/D | N/D |
| Semi-volatiles | | | | | | | | |
| total PAHs | ND | 7.3 | 34 | ND | ND | ND | N/D | N/D |
| bis(2-ethylhexyl)phthalate | ND | ND | 322 | ND | 33.0 | ND | N/D | N/D |
| INORGANIC SUBSTANCES | | | | | | | | |
| Trace Metals | | | | | | | | |
| cadmium | 6.5 | ND | 165 | ND | ND | ND | 3.9† | 1.1† |
| lead | 15 | ND | 10400 | ND | 8.3 | ND | 82† | 3.2† |
| manganese | 499 | ND | 1310 | 19.0 | 126 | ND | N/D | N/D |
| nickel | 109 | ND | 62 | 91.0 | ND | ND | 1400† | 160† |
| zinc | 77 | ND | 152 | ND | ND | ND | 120† | 110† |

ND: Not detected N/D: Not determined
† hardness-dependent (based on 100 mg/l $CaCO_3$) * LOEL

## NOAA Trust Habitats and Species in Site Vicinity

No NOAA trust resources use the waters near the C&J Disposal site; a series of hydroelectric dams in the lower Susquehanna River blocks anadromous and catadromous fish from migrating to the upper watersheds. There are four major dams on the Susquehanna River. In the order as they occur from the river mouth, they include the Conowingo Dam (569 km from site), the Holtwood Dam (563 km from site), the Safe Harbor Dam (560 km from site), and the York Haven Dam (distance from site unknown). Full fish passage has been blocked since 1910. Because of the length of time that the dams have blocked the migration of fish to the upper watersheds, little information is available on historical runs on the Chenango River and Payne Brook near the site. However, before the dams were constructed, it is known that blueback herring, alewife, American eel, American shad, white perch, and striped bass migrated up the Susquehanna River as far as the Chenango River tributary, 9 km south of the site (Wedge 1989).
By a 1986 court order, Philadelphia Electric must provide fish passage at the Conowingo Dam by 1991. Planning and construction of fish passage facilities are underway on the Holtwood, Safe Harbor, and York Haven dams on the Susquehanna River (Daniels 1989).

An experimental fish trap and fish planting operation has existed since 1973 on the Susquehanna River at Conowingo Dam; captured American eel and American shad have been placed into pools above the Holtwood, Safe Harbor, and York Haven dams.

The waters near the site may become important to NOAA trust resources with the restoration of fish runs to the Susquehanna River and its tributaries.

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Joel Schlagel 212-264-9588 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| John Lindsay 404-347-5231 |

**References**


Daniels, S., fisheries biologist, Pennsylvania Fish Commission, Philadelphia, personal communication, January 11, 1989.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Hazardous ranking system package, C & J disposal site, Hamilton, New York, Region 2. New York: U.S. Environmental Protection Agency, Region 2.

Wedge, L., biologist, New York State Department of Environmental Conservation, New York City, personal communication, January 12,1989.

**Carroll and Dubias Sewage Disposal**
**Deerpark, New York**
**Region 2**
**NYD010968014**

## Site Exposure Potential

The Carroll and Dubias site is in Deerpark, New York (Figure 1). The site has been operated primarily as a junkyard for automobile parts. Seepage wastes and industrial sludges have also been received at this site and stored in four unlined waste lagoons. Two of the lagoons were covered with soil and two remain uncovered (WEHRAN 1986). One of the uncovered lagoons is currently used for seepage waste and the other is inactive (EPA 1987).

The site slopes to the southeast with Gold Creek the nearest downslope water body, 330 meters southeast of the site. Gold Creek flows parallel to the Neversink River and discharges into it 1.5 km downstream. The Neversink River flows for 2 km before discharging into the Delaware River, which flows to Delaware Bay, approximately 350 km downstream of the site. Depth to the groundwater at the site is nine meters.

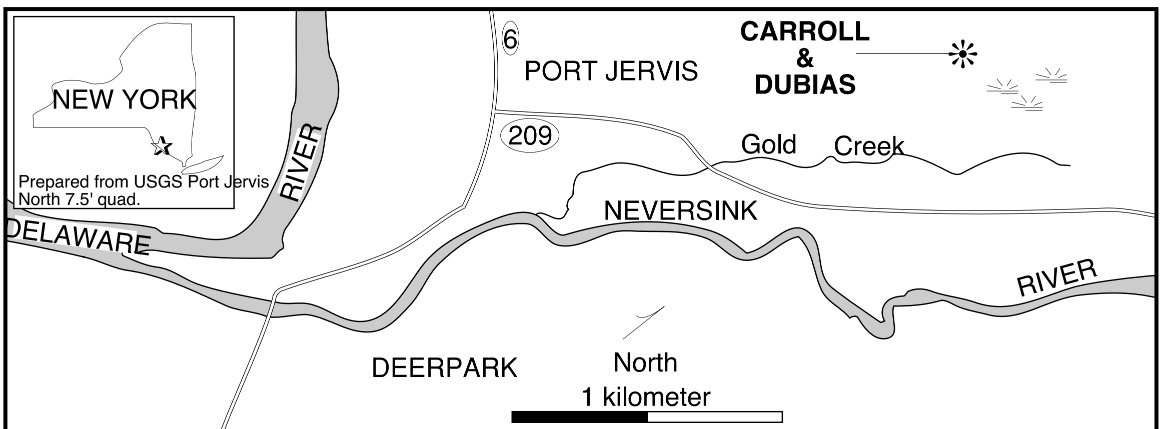


Figure 1. The Carroll & Dubias site in Deerpark, New York.

Possible contaminant migration pathways to NOAA trust resources are surface water runoff and groundwater flow to Gold Creek and the Neversink River (EPA 1987).

## Site-Related Contamination

Contaminants of concern to NOAA are organic compounds and trace metals, which have been detected in groundwater, lagoon water, and lagoon sediment (Table 1) (EPA 1987). Concentrations of several metals in groundwater samples exceeded AWQC for the protection of freshwater aquatic life. Several pesticides were detected, but could not be quantified in the lagoon water. Due to the high detection limits for the pesticide, it was not possible to determine whether the values were above or below AWQC. There were no data available on on-site surface soils.

Table 1. Maximum concentrations of selected contaminants at the Carroll and Dubias site (EPA 1987) ; AWQC for the protection of freshwater aquatic life (EPA 1986); sediment concentrations in mg/kg; water concentrations in µg/l.

| Contaminant | Lagoon Sediment | Groundwater | Lagoon Water | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | | |
| Volatiles | | | | | |
| chlorobenzene | 3.4 | N/A | 3,400 | 250† | 50† |
| Semi-volatiles | | | | | |
| bis(2-ethylhexyl)phthalate | 48.3 | N/A | N/A | 40† | 3† |
| Pesticides | | | | | |
| 2,4-D | N/A | N/A | <100 | N/D | N/D |
| endrin | N/A | N/A | <10 | 0.18 | 0.0023 |
| toxaphene | N/A | N/A | <100 | 0.73 | 0.0002 |
| INORGANIC SUBSTANCES | | | | | |
| Trace Metals | | | | | |
| arsenic | 8.2 | <10 | <1000 | 360 | 190 |
| cadmium | 4.6 | <4 | 90 | 3.9* | 1.1* |
| chromium | 33.9 | 60 | <80 | 16 | 11 |
| copper | 1,390 | 130 | N/A | 18* | 12* |
| lead | 536 | 200 | <200 | 82* | 3.2* |
| mercury | N/A | N/A | <200 | 2.4 | 0.012 |
| nickel | 121 | 170 | N/A | 1400* | 160* |
| silver | 10.4 | N/A | <50 | 4.1* | 0.12* |
| zinc | 1,820 | 290 | N/A | 120* | 110* |
| Other | | | | | |
| cyanide | 3 | N/A | N/A | 22 | 5.2 |

N/A: Not available
N/D: Not determined
† LOEL
* Hardness-dependent (based on 100 mg/l $CaCO_3$)

## NOAA Trust Habitats and Species in Site Vicinity

NOAA trust resources in the vicinity of the site include American eel and American shad. Resources of interest to NOAA are limited near the Carroll and Dubias site due to the distance from the site to Delaware Bay. The American eel is found in the Delaware River, the Neversink River, and Gold Creek. Limited numbers of American shad spawn in both the Neversink River and Delaware River (Pierce 1989).

**Response Category:** Undetermined

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Caroline Kwan | 212-264-0151 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Hazardous ranking system package. Carroll and Dubias, Deerpark, New York. New York: U.S. Environmental Protection Agency, Region 2.

Pierce, R., aquatic biologist, New York Department of Environmental Conservation Bureau of Fisheries, New York City, personal communication.

USFWS. 1980. Atlantic coast ecological inventory: New York. Washington, D.C.: U.S. Fish and Wildlife Service. 40072-AI-EI-250. 1:250 000 scale map.

WEHRAN. 1986. Wehran Engineering site inspection form. Deerpark, New York: Carroll and Dubias. (#336015), Orange County.

**Mattiace Petrochemical Company, Inc.**
**Glen Cove, New York**
**Region 2**
**NYD000512459**

## Site Exposure Potential

The Mattiace Petrochemical site occupies one hectare in an industrial area of Glen Cove, New York (Figure 1). Mattiace Petrochemical receives chemicals by tank trucks and stores the chemicals in 24 above- and 32 below-ground tanks. Drums are filled with petrochemical products in an open-sided building and distributed to clients. M & M Drum Cleaning Company, owned by Mattiace Industries, also operated in the open-sided building on the site until 1982. Other facilities on-site include a hangar, an office trailer, and three concrete loading platforms. A 1980 New York State Department of Environmental Conservation site inspection discovered numerous drums containing suspected hazardous wastes buried along the western side of the site. In addition, liquid wastes from the drum-cleaning operation had been discharged into subsurface leaching pools (vertically placed, open-ended concrete pipes partially buried in the soil) in the northwestern corner of the site (Woodward-Clyde 1986).

The site is 170 meters north of Glen Cove Creek, a tidal tributary of Hempstead Harbor in Long Island Sound. Glen Cove Creek flows north for 1 km to Hempstead Harbor. There are designated tidal wetlands in and along Glen Cove Creek, Hempstead Harbor, and Long Island Sound. The site slopes at a three percent grade towards Glen Cove Creek. Surface water runoff from the site is collected and routed by way of a shallow underground

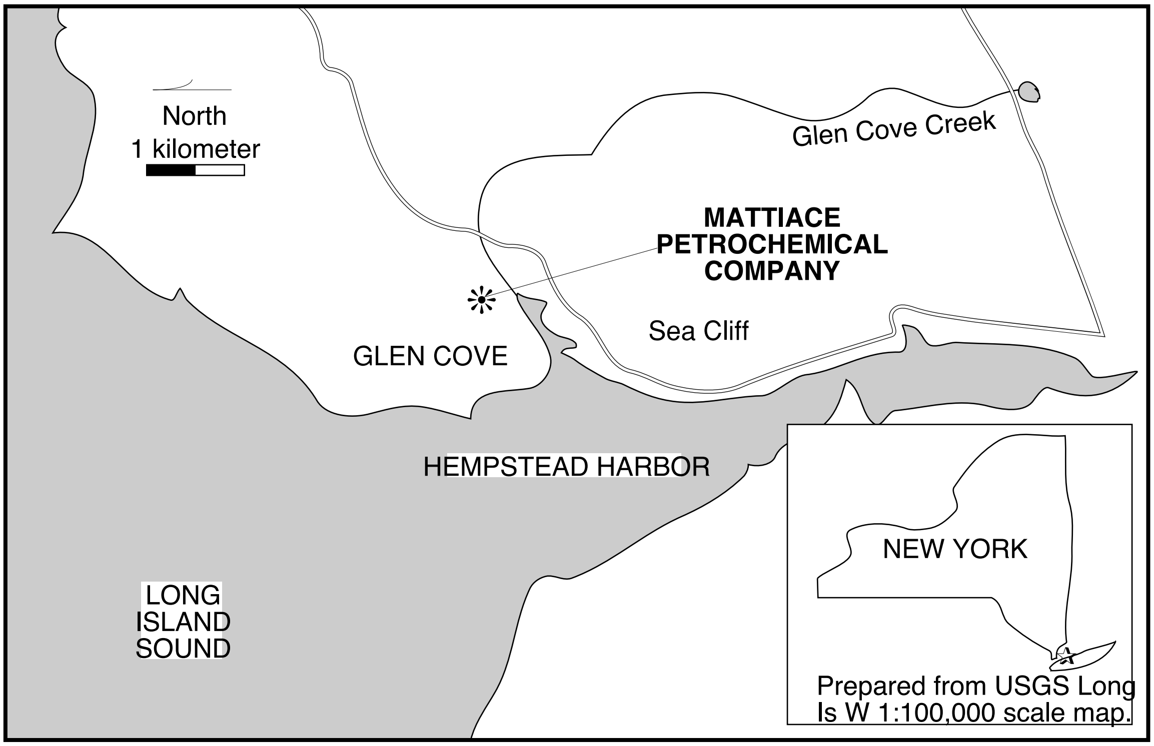

Figure 1. The Mattiace Petrochemical site in Glen Cove, New York.

drainage system and is discharged at the southwest corner of the site. This water then flows towards the south on the driveway leaving the site. The documents reviewed provided no information on the eventual fate of this runoff. The depth to groundwater in the site area is eight meters. Shallow groundwater flow in the vicinity of the site is to Long Island Sound, northwest of the site (Woodward-Clyde 1986).

Possible contaminant migration pathways to NOAA trust resources include groundwater flow and surface water runoff to Glen Cove Creek, Hempstead Harbor, and Long Island Sound.

## Site-Related Contamination

The contaminants of concern to NOAA are VOCs and phenols (Table 1). Groundwater samples contained high concentrations of VOCs, with the levels of six compounds exceeding LOEL (EPA 1986). Toluene was the only VOC detected in on-site surface water samples. VOC levels reported from soil/sediment samples were not high. Moderate levels of total phenols were detected in on-site soils, sediment, surface water, and groundwater.

Table 1. Maximum concentrations of selected contaminants at the Mattiace Petrochemical site (NCDH 1982; Woodward-Clyde 1986); LOEL (EPA 1986); water concentrations in µg/l and soil concentrations in mg/kg.

| Contaminant | On-Site Soil | Culvert On-Site Sediment | Ground-water | Culvert Surface water | LOEL Acute | LOEL Chronic |
|---|---|---|---|---|---|---|
| Volatiles | | | | | | |
| methylene chloride | 7.9 | N/A | N/A | N/A | N/D | N/D |
| 1,1-dichloroethane | 1.7 | 1.0 | 15,000 | ND | 118,000 | 20,000 |
| trans-dichloroethylene | 8.4 | ND | 120,000 | ND | 11,600 | N/D |
| 1,1,1-trichloroethane | 17 | 2.3 | 21,000 | ND | N/D | N/D |
| trichloroethylene | 46 | ND | 84,000 | ND | 45,000 | 21,900 |
| tetrachloroethylene | 19 | ND | 5,100 | ND | 5,280 | 840 |
| toluene | 1,400 | 34 | 88,000 | 6,600 | 17,500 | N/D |
| xylene | 3,100 | 86 | 540,000 | ND | N/D | N/D |
| ethylbenzene | 920 | 16 | 140,000 | ND | 32,000 | N/D |
| 4- methyl-2-pentenone | 0.48 | ND | 170,000 | ND | N/D | N/D |
| Semi-Volatiles | | | | | | |
| total phenols | 0.62 | 1.2 | 7,000 | 57 | 10,200 | 2,560 |

ND: Not detected N/A: Not available N/D: Not determined

**NOAA Trust Habitats and Species in Site Vicinity**

Habitats of interest to NOAA include Glen Cove Creek, Hempstead Harbor, and Long Island Sound. Glen Cove Creek and Hempstead Harbor are tidal estuarine systems with tidal wetlands. Hard clams use both Glen Cove Creek near the site and Hempstead Harbor as spawning, nursery, and adult areas. Hard clams are recreationally fished in both areas. Long Island Sound is a high-salinity estuarine system with extensive habitat areas used by NOAA trust species (Table 2). NOAA trust resources use Long Island Sound as a spawning and nursery area, including soft shell clams, American lobster, winter flounder, and blue crab.

Table 2. Selected NOAA trust resource use of Long Island Sound (USFWS 1980; Research Planning Institute 1985).

| Species | Spawning Area | Nursery Area | Adult Area | Migration Route | Recreational Fishery | Commercial Fishery |
|---|---|---|---|---|---|---|
| INVERTEBRATES | | | | | | |
| blue crab | X | X | | | | |
| soft shell clam | X | X | X | | X | X |
| hard clam | X | X | X | | | |
| FISH | | | | | | |
| American eel | | | X | | X | X |
| American lobster | X | X | X | | X | X |
| American shad | | | | X | | |
| Atlantic menhaden | | | X | | | X |
| Atlantic sturgeon | | | | X | | |
| blueback herring | | | | X | | |
| bluefish | | | X | | X | X |
| flounder | | X | X | | X | X |
| striped bass | | | X | X | X | X |
| white perch | | | | X | X | X |
| winter flounder | X | X | X | | X | X |

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

Brooks Mullen 212-264-6321

**NOAA Coastal Resource Coordinator**

John Lindsay 404-347-5231

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

NCDH. 1982. Soil boring analytical data from the Mattiace Petrochemical Site, Glen Cove, New York. Long Island, New York: Nassau County Department of Health.

Research Planning Institute. 1985. Sensitivity of coastal environments and wildlife to spilled oil: Long Island. An atlas of coastal resources. Seattle: Ocean Assessments Division, NOAA.

USFWS. 1980. Atlantic coast ecological inventory: New York. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250 000 scale map. 40072-A1-EI-250.

Woodward-Clyde Consultants. 1986. Phase II Investigations at the Mattiace Petrochemical Site, Glen Cove, New York. New York: U.S. Environmental Protection Agency, Region 2.

**Sidney Landfill**
**Sidney, New York**
**Region 2**
**NYD980507677**

## Site Exposure Potential

Sidney Landfill site covers 20 hectares in Sidney, New York (Figure 1). The landfill received an unknown amount of municipal and commercial refuse and waste oil from the Bendix Corporation between 1967 to 1972. The wastes included PCBs, oil, phenols, and volatile organic compounds. Leachate problems have been associated with the site since the late 1960s. No leachate collection system has been used at the site (EPA 1987).

The site is located on a natural ridge 545 to 636 meters above mean sea level (EPA 1987). The ridge slopes 20 percent west toward the valley floor. The surrounding topography is characterized by steep hills, farmlands, and wooded areas. Several areas of leachate seeps and stained soil have been observed on the site. The vegetation in the leachate seeps is stressed. Seepage from the site drains into a ditch that empties into two small wetlands 45 meters downgradient from the landfill. An unnamed stream drains the wetlands and flows through another wetland and two small ponds before discharging into Carrs Creek

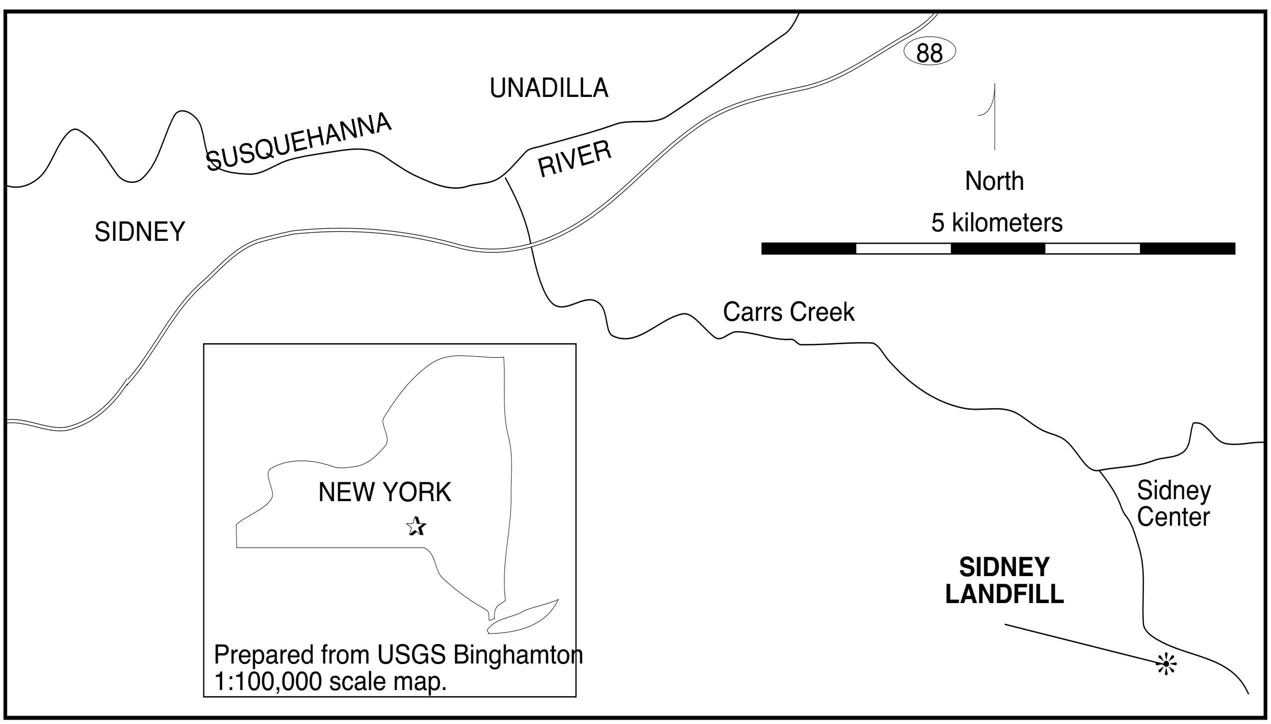


Figure 1. The Sidney Landfill site in Sidney, New York.

2.5 km below the site (USGS 1982). Carrs Creek enters the Susquehanna River 10 km further downstream. The Susquehanna River flows 500 km before it empties into the Chesapeake Bay.

Contaminant migration pathways to NOAA trust resources include surface water and groundwater discharge to Carrs Creek.

## Site-Related Contamination

The contaminants of concern to NOAA are PCBs. PCBs have been measured in groundwater on the site at concentrations that exceeded AWQC for the protection of freshwater aquatic life (Table 1) (EPA 1986, 1987). Low levels of volatile organic and inorganic compounds were also detected in groundwater. Volatile organics were detected at concentrations below 100 µg/l while the concentrations of inorganics were not reported in the documents reviewed

Table 1. Maximum concentration of selected contaminants at the Sidney Landfill site (EPA 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in µg/l.

| | | | AWQC | |
|---|---|---|---|---|
| Contaminant | Groundwater | Leachate | Acute | Chronic |
| PCB (Aroclor 1248) | 5.2 | ND | 2.0 | 0.014 |
| PCB (Aroclor 1242) | 17 | ND | 2.0 | 0.014 |
| ND: Not detected | | | | |

## NOAA Trust Habitats and Species in Site Vicinity

No information was available regarding the aquatic habitats of the unnamed stream. Carrs Creek is a small, continuously flowing, low-gradient stream that is an average of five meters wide (Sandford 1988). Creek depth varies from 0.03 meters in the riffle areas to one meter in the pooled areas. The substrate consists of cobble and gravel. The water quality is generally good. The Susquehanna River is a continuously flowing, low-gradient river system an average of 75 meters wide near its confluence with Carrs Creek. River depth varies from 0.03 meters in the riffle areas to two meters in the pooled areas. The substrate is a mixture of gravel and cobble in the riffle areas and silt in the pooled areas.

American eel is the only NOAA trust resource near the site. Four dams at the mouth of the Susquehanna River block the runs of anadromous fish species, but American eel and American shad are stocked above the dams. While this restoration project will permit anadromous fish to move up the Susquehanna River, it is not clear whether Carrs Creek will be used by fish due to the creek's small size (Sandford 1988). -By a 1986 court order, Philadelphia Electric must provide fish passage at the Conowingo Dam by 1991. Planning and construction of fish passage facilities are underway on the Holtwood, Safe Harbor, and York Haven dams on the Susquehanna River (Daniels 1989).

**Response Category:** Federal Enforcement

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Ronald Borseylino | 212-264-8667 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.
EPA. 1987. Hazard Ranking System Package, Sidney Landfill, Sidney, New York. New York: U.S. Environmental Protection Agency, Region 2.

Sandford, K., fishery biologist, Department of Environmental Conservation, Fishery Division, Stanford, New York, personal communication, December 15, 1988.

**Brook Industrial Park**
**Bound Brook, New Jersey**
**Region 2**
**NJD078251675**

## Site Exposure Potential

The Brook Industrial Park is a two-hectare, multi-service manufacturing site in Bound Brook, New Jersey (Figure 1). Activities at this site included chemical and insecticide manufacturing and storage, metal plating, plastics extrusion, and steel fabrication. From February 14 to March 27, 1980, Jame Fine Chemical, Incorporated illegally discharged cooling water used in the manufacture of mandelic acid (a urinary antiseptic) via surface drainage channels to the Raritan River. From 1971 to 1982, Blue Spruce International formulated pesticides that were banned from use in the United States (the pesticides were manufactured for export only). Investigations performed by the New Jersey Department of Environmental Protection and the local health department showed frequent spills in the facility's basement and adjacent outdoor areas. National Metal Finishing, Incorporated, still operating at the site, has been cited for discharging metal plating wastes to the groundwater without a permit from approximately 1976 to 1986 (NUS 1986).

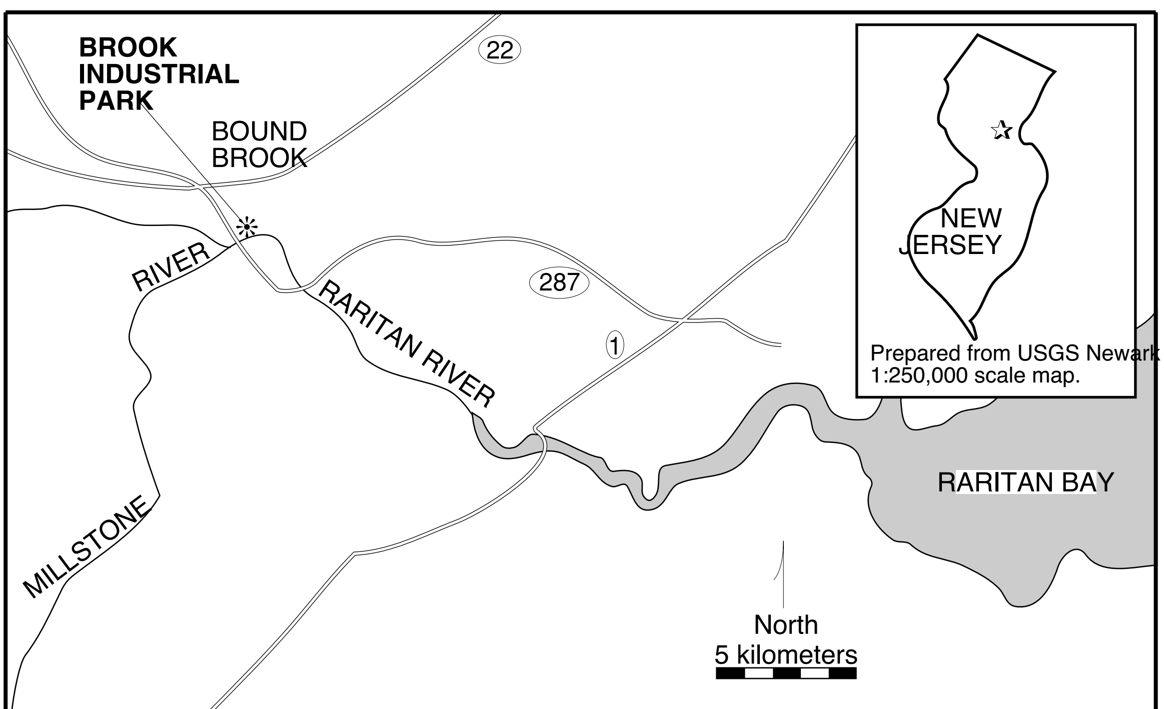


Figure 1. The Brook Industrial Park site in Bound Brook, New Jersey.

The site is on the northern bank of the Raritan River, 60 meters from the river. Surface water runoff drains into two ditches that discharge into the river. The Raritan River flows 25 km before it enters Raritan Bay. Flooding often occurs in the lower reaches of the river and the site is known to have been flooded (NUS 1986).

Possible contaminant migration pathways to NOAA trust resources are groundwater flow, surface water runoff of spills, direct discharge, and erosion and runoff of contaminated surface soils to the Raritan River.

**Site-Related Contamination**

Contaminants of concern to NOAA include pesticides, trace metals, and volatile and semi-volatile organic compounds. Very limited information was available regarding the concentrations of these substances at the site. VOCs were measured in groundwater and surface water (Table 1). The concentration of tetrachloroethene measured in on-site surface water exceeded LOEL (EPA 1986; NUS 1986). No information was available on contaminants in on-site soil.

Table 1. Maximum concentrations of selected contaminants at the Brook Industrial Park site (NUS 1986); LOEL (EPA 1986); concentrations in µg/l.

| Contaminant | On-site Groundwater | On-site Surface Water | LOEL Acute | LOEL Chronic |
|---|---|---|---|---|
| Volatile Organic Compounds | | | | |
| benzene | 260 | N/A | 5,300 | N/A |
| ethylbenzene | N/A | 65 | 32,000 | N/A |
| tetrachloroethene | N/A | 6,300 | 5,280 | 840 |
| toluene | 9,000 | 175 | 17,500 | N/A |
| trichloroethane | N/A | 2,400 | 18,000 | 9,400 |
| trichloroethene | N/A | 80 | 45,000 | 21,900 |
| xylenes | 3,140 | N/A | N/A | N/A |
| N/A: Data not available | | | | |

**NOAA Trust Habitats and Species in Site Vicinity**

The Raritan River is a continuously flowing, low-gradient river system that flows through the gently rolling coastal plain of New Jersey. The drainage area of the Raritan River at the Brook Industrial Park site is 2,033 $km^2$. The river is an average of 30 meters wide and 0.3 to 2 meters deep, with a substrate of shale and sandy silt. Water quality is fair and the river is tidally influenced up to a point 5 km downstream of the site (USFWS 1980;
Stuart 1989).

American shad, blueback herring, and alewife use the reaches of the river near the site as a migratory route. There are also adult American eel in the river. Chinook salmon and steelhead trout have been planted in the Raritan River to introduce runs of these species to the river (Stuart 1989). The State of New Jersey lists American shad as a threatened species (USFWS 1980).

**Response Category:** Federal Enforcement

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Pat Evangelista 212-264-6311 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| John Lindsay 404-347-5231 |

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

NUS. 1986. Final Draft Site Inspection Report and Hazard Ranking System Model Brook Industrial Park, Bound Brook, New Jersey. Edison, New Jersey: Environmental Service Division, U.S. Environmental Protection Agency.

Stuart, R., biologist, New Jersey Bureau of Freshwater Fisheries, Lebanon, New Jersey, personal communication, January 12, 1989.

USFWS. 1980. Atlantic coast ecological inventory: Newark. Washington, D.C.: U.S. Fish and Wildlife Service. 1:25,000 scale map.

**Garden State Cleaners**
**Minotola, New Jersey**
**Region 2**
**NJD053280160**

## Site Exposure Potential

The Garden State Cleaners site is located in Minotola, New Jersey (Figure 1). Garden State Cleaners has used tetrachloroethylene at the site for dry cleaning of clothes since 1966 (NJDEP undated). In April 1981, during a remedial investigation by the New Jersey Department of Environmental Protection (DEP) of another facility in Minotola, it was determined that elevated levels of tetrachloroethylene were emanating from the Garden State Cleaners site. During a site inspection by the DEP, the owners acknowledged discharging wastes onto the ground. In December 1985, the DEP issued Garden State Cleaners an Administrative Consent Order to investigate the extent of soil and groundwater contamination. Another NPL site, South Jersey Clothing Company, is less than 250 meters from this site.

Groundwater flows south beneath the site toward two small streams, Cedar Brook and Panther Brook, 1.2 km southwest and southeast of the site, respectively (USGS 1970). Cedar Brook flows for 6 km and Panther Brook for 7 km before they merge and form Manantico Creek. Manantico Creek flows for 20 km before it enters the Maurice River. A dam on the creek 10 km below the site forms Manantico Lake. The Maurice River empties into Maurice Cove in the Delaware Bay, 33 km below the site.

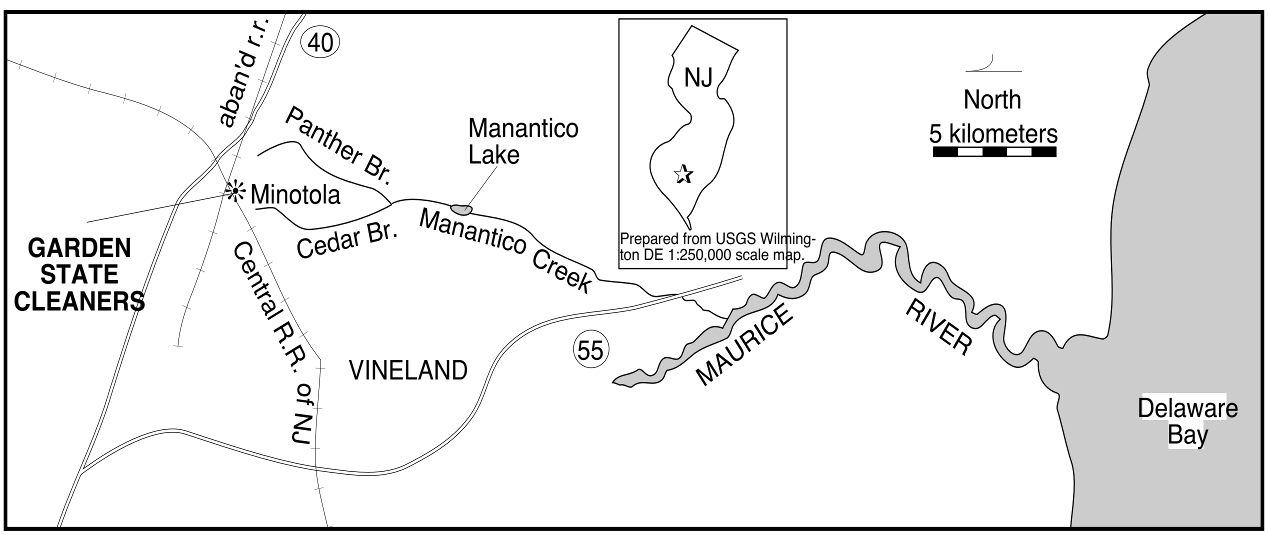


Figure 1. The Garden State Cleaners site in Minotola, New Jersey.

Groundwater flow to Manantico Creek is a possible contaminant migration pathway to NOAA trust resources.

## Site-Related Contamination

VOCs are the contaminants of concern to NOAA at the site. Several VOCs were detected in the groundwater on-site but did not exceed their respective LOEL (Table 1) (NJDEP undated; EPA 1986). Soil samples collected from the immediate area of the discharge point contained elevated concentrations of several VOCs. No measurements of other substances were reported.

Table 1. Maximum concentrations of VOCs at the Garden State Cleaners Site (NJDEP undated) and LOEL (EPA 1986); concentrations in mg/kg for soil and in µg/l for water.

| | | | LOEL | |
|---|---|---|---|---|
| Contaminant | Soil | Groundwater | Acute | Chronic |
| tetrachloroethylene | 43 | 6,600 | 10,200 | 450 |
| trichloroethylene | 16.5 | 87 | 2,000 | 21,900 |
| dichloroethylene | 24 | N/A | 224,000 | N/A |

N/A: Not available

## NOAA Trust Habitats and Species in Site Vicinity

No information was available on NOAA trust resource use of aquatic habitats of Cedar or Panther brooks. Manantico Creek is a continuously flowing, low-gradient stream with a total drainage area of 33 hectares. In the upper reaches the creek ranges from four to six meters wide and 0.5 to 1 meter deep (Bolton 1989). The substrate is sand or silty sand, and the water quality is generally good. Extensive wetland areas, mostly forested with white cedar, pine, and lowlands oak, border Manantico Creek to its confluence with the Maurice River. A good portion of Manantico Creek is in its natural state. Maurice River is three meters deep and 400 meters wide at its confluence with Manantico Creek, and has a silty sand substrate. The stretch of the river at the confluence is tidally influenced and has low salinity ranging from 0.5 to 5 ppt. The Maurice River is bordered by extensive wetland areas from its confluence with Manantico Creek to Maurice Cove (USFWS 1981).

American shad, alewife, white perch, and blueback herring are present at the mouth of Manantico Creek and may use the lower reaches of the creek up to the dam at Manantico Lake (Bolton 1989). The dam is in such disrepair that fish are not completely restricted by it (Byrne 1989). Blueback herring spawn in Manantico Creek and juveniles of blueback herring and alewife may use the creek as nursery area. American eel use Manantico Creek as adult habitat and may be present in the headwaters of the creek near the site. NOAA trust resources use the Maurice River as a spawning and nursery area and as a migratory route (Table 2) (USFWS 1981). There are recreational and commercial fisheries for alewife, striped bass, white perch, and American eel on the Maurice River. The Maurice River system is being reviewed by the U.S. Fish and Wildlife Service for possible classification as a Wild and Scenic River.

Table 2. NOAA trust resource use of Manantico Creek and Maurice River (USFWS 1981).

| Species | Manantico Creek | Maurice River |
|---|---|---|
| alewife | M,N | M,S,N,C,R |
| American eel | A,M | A,M,C,R |
| American shad | M | M |
| Atlantic sturgeon | | M |
| blueback herring | M, S,N | M,S,N |
| hickory shad | | M |
| striped bass | | M,C,R |
| white perch | M | S,N,A,M,C,R |

M: Migration route A: Adult area S: Spawning area N: Nursery area C: Commercial fishery R: Recreational fishery

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Steve Siepo | 212-264-8667 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

**References**


Bolton, F., fishery biologist, Bureau of Freshwater Fisheries, Lebanon, New Jersey, personal communication, January 3, 1989.

Byrne, D., fishery biologist, New Jersey Department of Fish and Game, Port Republic, New Jersey, personal communication, March 1, 1989.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

NJDEP. Undated. Administrative Consent Order. Newark, New Jersey: New Jersey Department of Environmental Protection, Division of Water Resources.

USFWS. 1981. Atlantic coast ecological inventory: Wilmington. Washington, D.C.: U.S. Fish and Wildlife Service. 1:25000 scale map.

USGS. 1970. Buena, New Jersey. Washington, D.C.: U.S. Geological Survey. 7.5 minute series quadrangle. 1953 photorevised 1970.

**Global Sanitary Landfill**
**Old Bridge Township, New Jersey**
**Region 2**
**NJD063160667**

## Site Exposure Potential

The Global Sanitary Landfill site occupies 24 hectares in a residential area of Old Bridge Township, New Jersey (Figure 1). During the landfill's operation from 1968 through 1984, municipal and non-chemical industrial wastes were disposed of. Reportedly, drums of hazardous materials have been buried on-site. The main section of the landfill is a 21-hectare mound ranging in elevation from 1.5 to 4.6 meters above mean sea level (MSL) at

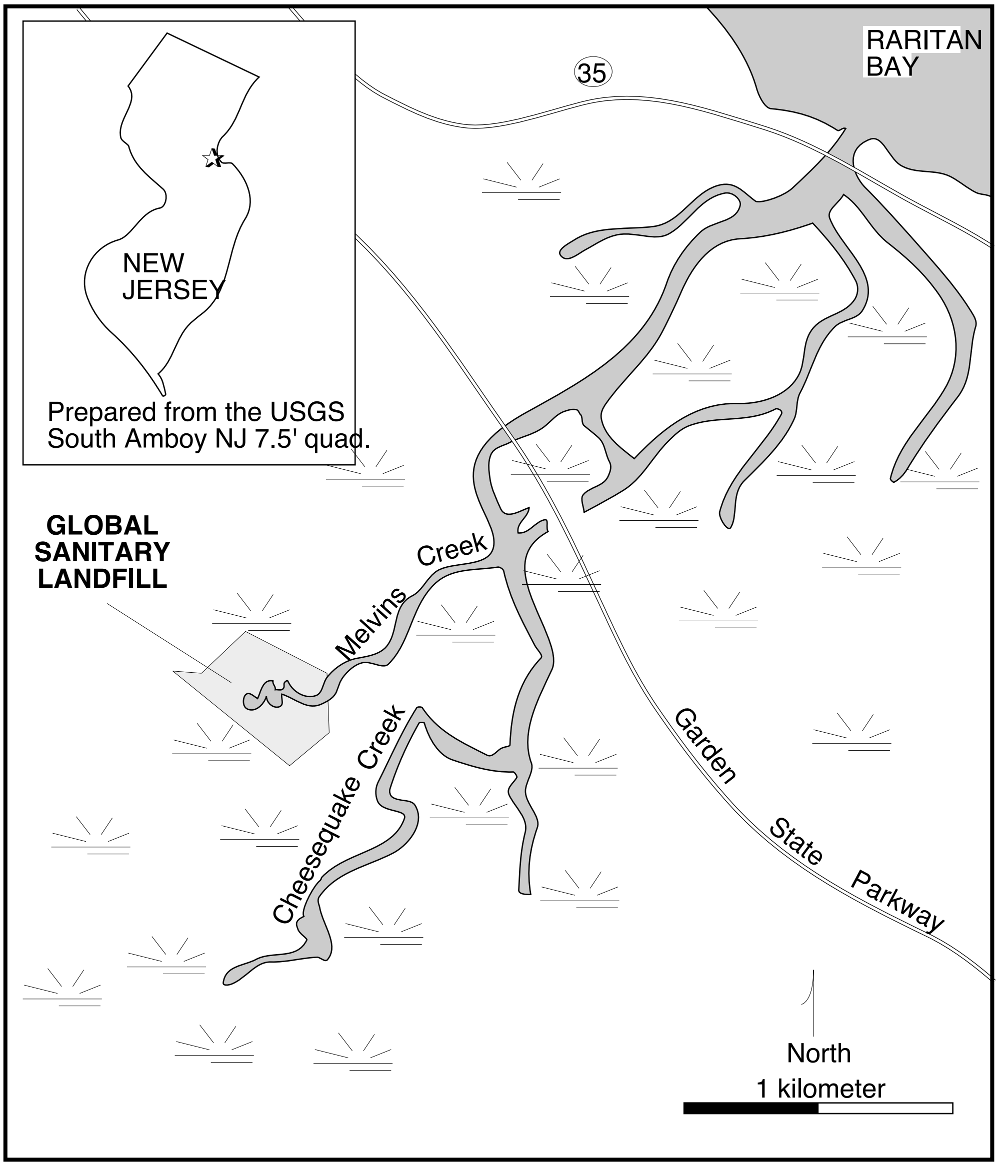


Figure 1. The Global Sanitary Landfill site in Old Bridge Township, New Jersey.

the base, to 27 to 33 meters above MSL at the top. The flattop area occupies five hectares. The mound contains 1.4 million $m^3$ of waste. There is a soil cover of unknown thickness on the mound but, due to the lack of vegetation, the soil cover is eroding, forming gullies on the side slopes and exposing waste materials. A perimeter dike has been constructed along the northeast and southwest toes of the landfill. A three-hectare tract of land next to the northwest portion of the mound contains solid waste up to four meters deep. An estimated 60 drums of hazardous materials are buried there (Killam 1988).

The landfill is bordered to the northeast, southeast, and southwest by tidal wetlands in the drainage basin of Cheesequake Creek. Melvins Creek drains the site and enters

Cheesequake Creek 300 meters below the landfill. Cheesequake Creek flows into Raritan Bay and the
Atlantic Ocean 3 km northeast of the site. In 1984, a slope failure on the southeast side of the landfill filled a 1.6-hectare section of the adjoining wetlands. This area has subsequently been filled, regraded, and topped with soil cover. Elevations of the adjacent wetlands range from one to two meters above MSL. Leachate seeps and ponded leachate have been frequently observed flowing from the landfill into adjoining wetlands (Killam 1988).

Possible contaminant migration pathways to NOAA trust resources are surface water runoff and groundwater discharge to Melvins and Cheesequake creeks.

## Site-Related Contamination

The contaminants of concern to NOAA include both organic compounds and trace metals (Table 1). The pesticide heptachlor was found in groundwater at concentrations that

Table 1. Maximum concentrations of selected contaminants at the Global Sanitary Landfill site (Killiam 1988); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in µg/l.

| Contaminant | Leachate | Groundwater | Surface Water | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | | |
| Volatiles | | | | | |
| chlorobenzene | 15.3 | 270 | ND | 250* | 50* |
| Semi-volatiles | | | | | |
| naphthalene | 36 | 150 | ND | 2,300* | 620* |
| phenanthrene | 27.2 | 20 | ND | N/D | N/D |
| Pesticides/PCBs | | | | | |
| Aroclor 1260 | 16 | 1.2 | ND | 2.0 | 0.014 |
| heptachlor | ND | 71 | ND | 0.52 | 0.0038 |
| 4,4 DDD | 0.082 | ND | ND | 0.06* | 0.001 |
| lindane | N/A | 0.14 | N/A | 2.0 | 0.08 |
| INORGANIC SUBSTANCES | | | | | |
| Trace Metals | | | | | |
| arsenic | 110 | 8.6 | 5.4 | 360 | 190 |
| chromium | 496 | 165 | 5.6 | 16 | 11 |
| copper | 319 | 69.9 | 4.6 | 18 † | 12 † |
| lead | 5,530 | 209 | 7.8 | 82 † | 3.2 † |
| nickel | 180 | 235 | 18 | 1,400 † | 160 † |
| silver | <4.0 | <4.0 | 2.5 | 4.1 † | 0.12 |

* LOEL
† Hardness-dependent (based on 100 mg/l $CaCO_3$)
ND: Not detected
N/D: Not determined
N/A: Not available

exceeded AWQC for the protection of freshwater aquatic life by four orders of magnitude. The PCB Aroclor 1260 was measured in leachate and groundwater at concentrations that exceeded AWQC. Lead, chromium, nickel, and copper measured in groundwater and in leachate were observed at concentrations that exceeded their respective AWQC (EPA 1986; Killam 1988). No data were available on soil or sediment contamination related to the site.

**NOAA Trust Habitats and Species in Site Vicinity**

Melvins and Cheesequake creeks and the adjacent wetlands are estuarine habitats with a salinity ranging from 5 to 16.5 ppt. No information was available on the aquatic habitats of Melvins Creek. Cheesequake Creek is a continuously flowing, low-gradient stream an average of 12 meters wide and 0.4 meters deep. The substrate consists of silt and the water quality is fair due to urban runoff (Andrews 1989).

Limited information was available regarding the use of the Cheesequake Creek drainage basin by marine and anadromous fish species. Marine species that may be present in the creek include bluefish, weakfish, and blue crab (Table 2) (Andrews 1989). Catadromous American eel are probably present throughout the wetland area. Numerous NOAA trust resources use the Raritan Bay as nursing and adult area, and as a migratory route (USFWS 1980). Commercial fishery for clams has been banned in the Raritan Bay because of high concentrations of various contaminants in the bay.

Table 2. NOAA trust resource use of Cheesequake Creek and Raritan Bay (USFWS 1980; Andrews 1989).

| Species | Cheesequake Creek and Melvins Creek | Raritan Bay |
|---|---|---|
| INVERTEBRATES | | |
| blue crab | S,N,A | N,A |
| hard clams | | S,N,A |
| soft shell clams | | S,N,A |
| | | |
| FISH | | |
| American eel | A | A,M,C |
| American shad | | M |
| Atlantic croaker | | A,C,R |
| Atlantic menhaden | | A,C |
| Atlantic sturgeon | | M |
| bay anchovy | | S,N,A |
| blueback herring | | M |
| bluefish | N,A | N,A,C,R |
| northern buffer | | A,R |
| northern kingfish | | A,R |
| scup | | A,C,R |
| silver perch | | S,N,A,R |
| spot | | A,R |
| striped bass | | A,M,C,R |
| summer flounder | N,A | S,N,A,C,R |
| tautog | | A,R |
| weakfish | N,A | S,N,A,C,R |
| white perch | | A,M,C |
| winter flounder | N,A | S,N,A,R |
| S : Spawning area; N : Nursery area; A : Adult area; M : Migratory route; C : Commercial fishery; R : Recreational fishery | | |

**Response Category:** State Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Jim Schmidtberger | 212-264-6479 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

**References**

Andrews, B., New Jersey Department of Fish and Game, Newark, personal communication, January 23, 1989.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Killam Associates. 1988. Focus Feasibility Study, Global Landfill, Old Bridge, New Jersey. Edison, New Jersey: U.S. Environmental Protection Agency.

USFWS. 1980. Atlantic coast ecological inventory: Newark. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map.

**Higgins Disposal Service**
**Kingston, New Jersey**
**Region 2**
**NJD053102232**

## Site Exposure Potential

The Higgins Disposal Service site covers 15 hectares north of Kingston, New Jersey (Figure 1). From an unknown date, an unpermitted landfill and waste transfer facility operated on the site. The quantity of chemical wastes on-site was estimated at 1,730 $m^3$ in 1974. In October 1982, the New Jersey Department of Environmental Protection issued an Administrative Order to cease the acceptance and disposal of solid waste and to remove waste already at the facility (EPA 1986). Another NPL site, Higgins Farm, is nearby.

A small pond is 180 meters downgradient from the landfill. The pond drains via a conduit into Dirty Brook 200 meters from the landfill (EPA 1986). Dirty Brook flows 600 meters, under the Delaware Raritan Canal via a culvert, and into the Millstone River (USGS 1981; Stuart 1989). The Millstone River flows for 22 km before it enters the Raritan River, which empties into Raritan Bay 35 km below the confluence with the Millstone (USFWS 1980).

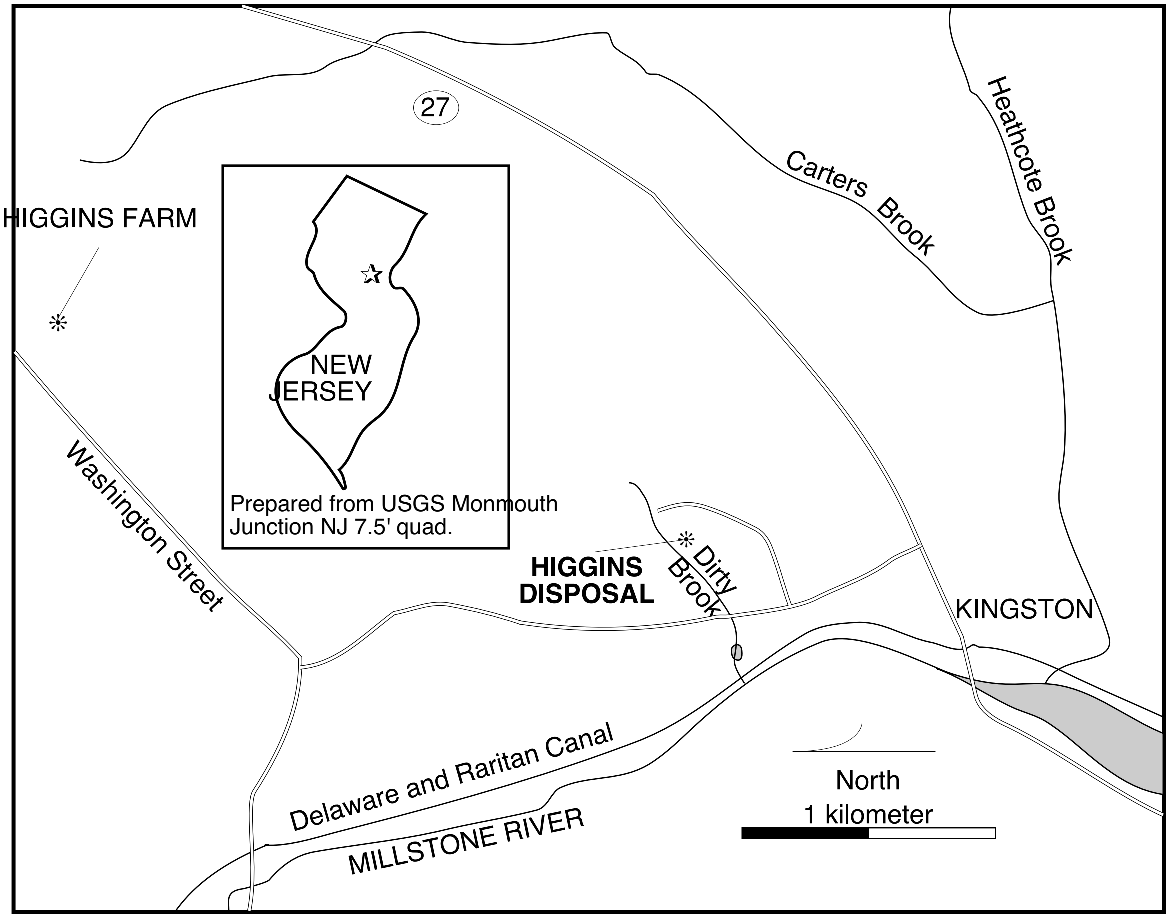


Figure 1. The Higgins Disposal site in Kingston, New Jersey.

Possible contaminant migratory pathways to NOAA trust resources are surface water runoff and groundwater flow to the Millstone River.

## Site-Related Contamination

The contaminants of primary concern to NOAA at the site include PCBs, pesticides, and volatile and semi-volatile organic compounds. A PCB mixture, Aroclor 1248, was found in soil from the landfill and in sediment collected in the pond. Other contaminants found in soil and sediment collected at the site included 4,4'-DDD; tetrachloroethene; 1,2-dichlorobenzene; and bis(2-ethylhexyl)phthalate. Concentrations of these contaminants were not available in the document reviewed (EPA 1986).

## NOAA Trust Habitats and Species in Site Vicinity

Dirty Brook is a small, continuously flowing, low-gradient stream. No additional information on the stream was available. The Millstone River is a slow, continuously flowing, low-gradient system that is 12 to 15 meters, and 0.3 to 2 meters deep. The substrate consists of silt. Water quality is degraded in the stretch of the river at Kingston (Stuart 1989).

There are runs of blueback herring and alewife on the Millstone River, but they have not been documented in Dirty Brook and are not expected to use the stream due to the culvert under the Delaware and Raritan Canal. American eels have been documented in the river and are expected to be present in Dirty Brook (Table 1) (Stuart 1989).

Table 1. NOAA trust resource use of the Millstone River and Dirty Brook (Stuart 1989).

| Species | Dirty Brook | Millstone River |
|---|---|---|
| alewife | | S,N,M |
| American eel | A | A,M |
| blueback herring | | S,N,M |
| S: Spawning area; N: Nursery; A: Adult area; M: Migratory route | | |

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Jim Schmidtberger 212-264-6479 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| John Lindsay 404-347-5231 |

**References**


EPA. 1986. Hazardous Ranking Score worksheets and documentation for Higgins Disposal Service, Kingston, New Jersey. Edison, New Jersey: U.S. Environmental Protection Agency, Region 2.

Stuart, R., biologist, New Jersey Bureau of Freshwater Fisheries, Atlantic City, personal communication, January 12, 1989.

USFWS. 1980. Atlantic coast ecological inventory: Newark. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map.

USGS. 1981. Monmouth Junction, New Jersey. Washington, D.C.: U.S. Geological Survey. 7.5 minute series quadrangle.

**Higgins Farm**
**Franklin Township, New Jersey**
**Region 2**
**NJD981490261**

## Site Exposure Potential

The Higgins Farm site covers 30 hectares in Franklin Township, New Jersey (Figure 1) and is currently being used to raise cattle. In 1985, the New Jersey Department of Environmental Protection discovered elevated levels of chlorobenzene in a residential well near the site. Subsequent investigations revealed buried drums at the farm 12 meters from the contaminated well. In 1986, 50 drums were excavated, along with visibly contaminated soil in the area (EPA 1986). Another NPL site, Higgins Disposal Service, is nearby.

The site rests on a plateau that is drained by streams to the northeast, southeast, and southwest. The closest surface water body is Carters Brook, 600 meters east of the site (EPA 1986), which runs for 5 km before discharging into Heathcote Brook. Heathcote Brook flows under the Delaware and Raritan Canal via a culvert and into the Millstone River

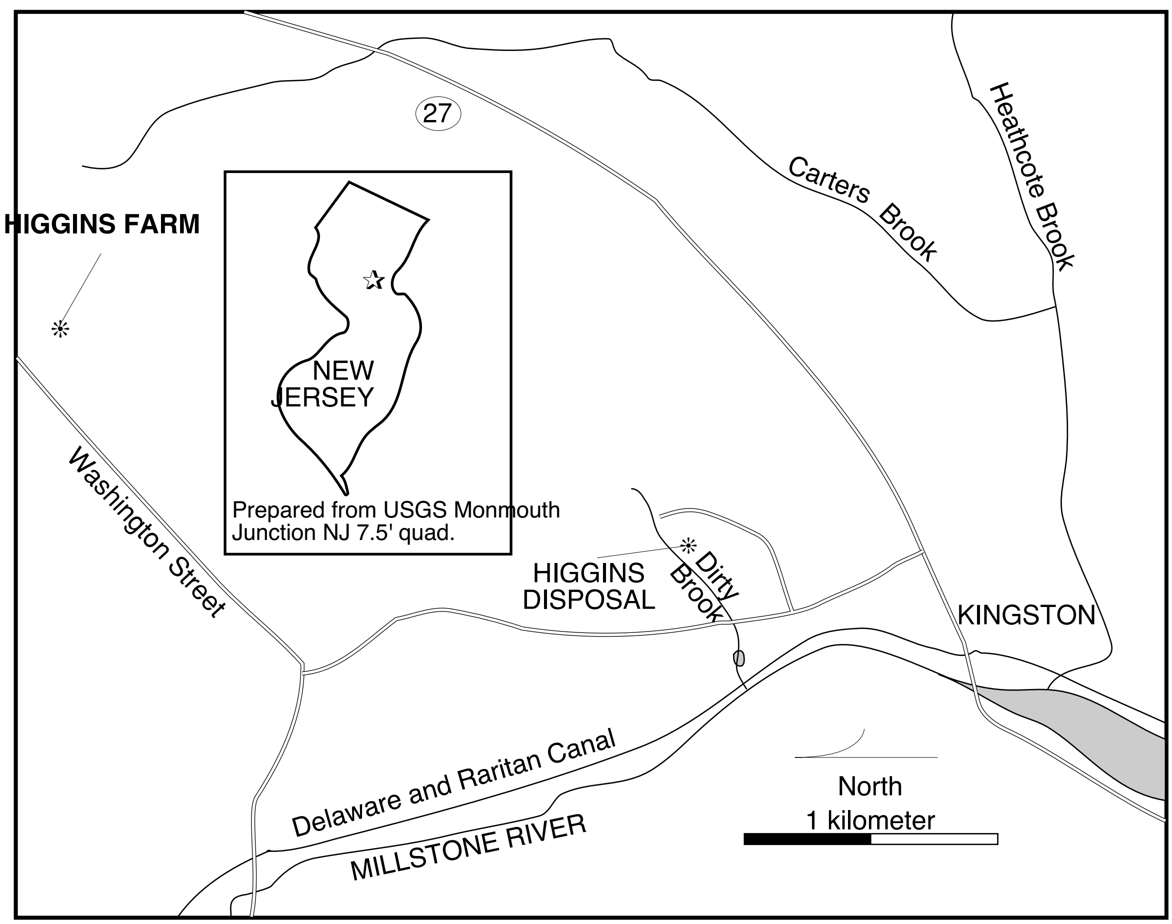


Figure 1. The Higgins Disposal site in Kingston, New Jersey.

7 km below the site. The Millstone River flows for 23 km before it enters the Raritan River, which empties into Raritan Bay 35 km below the confluence with the Millstone (USFWS 1980; USGS 1981a,b).
Possible contaminant migratory pathways to NOAA trust resources are surface water runoff and groundwater discharge to Carters and Heathcote brooks.

## Site-Related Contamination

The contaminants of concern to NOAA at the site include trace metals, pesticides, dioxins, furans, and volatile and semi-volatile organic compounds. Analyses of soils remaining in the excavation area revealed contamination by dieldrin, endrin, arsenic, dioxins, furans, bis(2-ethylhexyl)phthalate, and pentachlorophenol. In addition, groundwater in the wells near the site has been contaminated by volatile organic compounds. No information was available on contaminant concentrations (EPA 1986).

## NOAA Trust Habitats and Species in Site Vicinity

Carters Brook and Heathcote Brook are small, continuously flowing, low-gradient streams. Carters Brook is an average of three meters wide and 0.06 meters deep. The substrate is sandy and the water quality is somewhat degraded due to acidic soils. The lower reaches of Heathcote Brook has an average width of 2 meters and depth ranging from 0.3 to 0.6 meter. The substrate consists of sand. The creek has generally low water quality and fish kills in the creek were reported in the late 1970s. The Millstone River is a slow, continuously flowing, low-gradient riverine system. Width and depth range from 12 to 15 m and 0.3 to 2 m, respectively. The substrate consists of silt. Water quality is degraded in the stretch of the river adjacent to the town of Kingston (Stuart 1989).

Millstone River supports runs of blueback herring and alewife and provides both spawning and nursery habitat. Neither species has been documented in Heathcote and Carters brooks and they are not expected to use the streams due to the culvert under the Delaware Raritan Canal. American eels have been documented in the Millstone River and in Carters and Heathcote brooks (Table 1) (Stuart 1989).

Table 1. NOAA trust resource use of the Millstone River and Dirty Brook (Stuart 1989).

| Species | Carters Brook | Heathcote Brook | Millstone River |
|---|---|---|---|
| alewife | | | S,N,M |
| American eel | A | A | A,M |
| blueback herring | | | S,N,M |
| S : Spawning area; N : Nursery; A: Adult area; M: Migratory route | | | |

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Jim Schmidtberger | 212-264-6479 |

**NOAA Coastal Resources Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

**References**


Stuart, R., biologist, New Jersey Bureau of Freshwater Fisheries, Atlantic City, personal communication, January 12, 1989.

EPA. 1986. Hazardous Ranking Score worksheets and documentation for Higgins Farm, Franklin Township, New Jersey. Edison, New Jersey: U.S. Environmental Protection Agency, Region 2.

USFWS. 1980. Atlantic coast ecological inventory: Newark. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map.

USGS. 1981a. Hightown, New Jersey, 7.5 minute series quadrangle. Washington, D.C.: U.S. Geological Survey.

USGS. 1981b. Monmouth Junction, New Jersey, 7.5 minute series quadrangle. Washington, D.C.: U.S. Geological Survey.

**Industrial Latex**
**Wallington, New Jersey**
**Region 2**
**NJD981178411**

## Site Exposure Potential

The Industrial Latex site occupies four hectares in Wallington, New Jersey (Figure 1). Industrial Latex formulated chemical adhesives and natural and synthetic rubber compounds at the site for 30 years, until 1980. Waste oils containing Aroclor 1260 (a PCB mixture) were burned on-site to generate heat and steam, a process that may create dioxins and furans. Twenty-two underground storage tanks contained feed stocks for the manufacture of latex adhesives and other rubber compounds. Process wastes were stored in above-ground tanks or drummed. The drums were either stored on-site before disposal or buried on-site. In addition, an on-site, sanitary-septic system was used to store other chemical wastes. Effluent from a drum-washing operation was discharged directly to a drainage ditch along the eastern perimeter of the site (EPA 1987). From April 1986 through January 1987, EPA removed 1,900 waste drums, 22 buried tanks, and 15 chemical processing vats from the site. Some of the drums had ruptured and were leaking directly onto the soil and others had been emptied directly onto the soil. Six of the underground storage tanks were leaking when removed (NUS 1987).

The site averages 18 meters above mean sea level and is in a small valley between two northward-trending ridges. Surface water runoff from the site is channeled by drainage ditches along the Conrail track north into the Saddle River 1.6 km from the site. The Saddle River flows for 1 km before it enters the Passaic River. The Passaic River discharges into Newark Bay 19 km further downstream. Depth to groundwater in the site vicinity is 4.5 meters and groundwater flows to the west toward the Passaic River.

Possible contaminant migration pathways to NOAA trust resources are groundwater flow and surface water runoff to the Saddle and Passaic rivers.

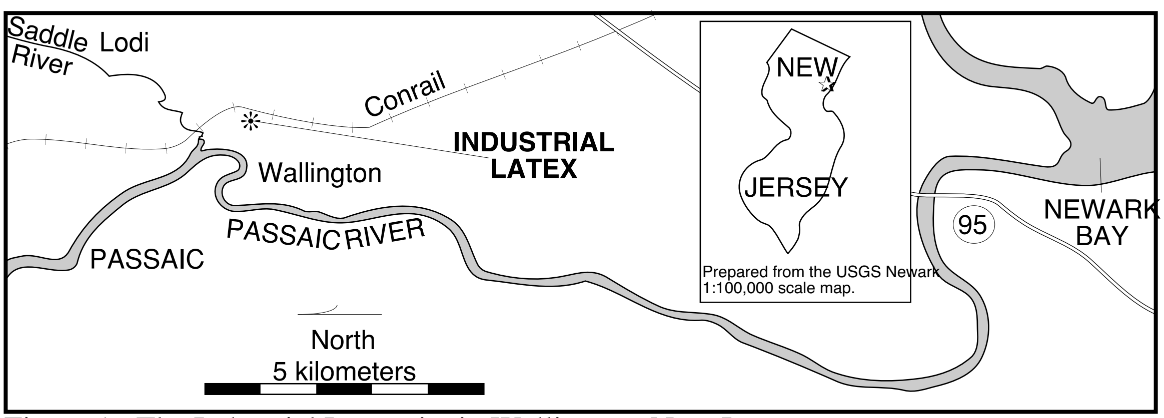

Figure 1. The Industrial Latex site in Wallington, New Jersey.

## Site-Related Contamination

Contaminants of concern to NOAA are PCBs, dioxins, furans, trace metals, and volatile and semi-volatile organic compounds. Contaminant levels in on-site soils, groundwater, and surface water were not available, except for a PCB concentration of 57 mg/kg in soil. High concentrations of contaminants were reported in waste liquids and solids (Table 1).

Table 1. Maximum concentrations of selected contaminants at the Industrial Latex site (NUS 1987); concentrations for solids in mg/kg and for liquids in µg/l.

| Contaminant | Solid Waste | Liquid Waste |
|---|---|---|
| ORGANIC COMPOUNDS | | |
| Volatiles | | |
| benzene | 1,600 | N/A |
| ethyl benzene | 2,200 | N/A |
| xylene | 10,000 | N/A |
| toluene | N/A | 12,000,000 |
| Semi-Volatiles | | |
| phenol | 6 | N/A |
| PCBs | | |
| Aroclor 1260 | 18,000 | N/A |
| | | |
| INORGANIC SUBSTANCES | | |
| Trace Metals | | |
| arsenic | N/A | 4 |
| cadmium | N/A | 40 |
| lead | N/A | 6,000 |
| Other | | |
| cyanide | 2 | N/A |
| N/A: Not available | | |

## NOAA Trust Habitats and Species in Site Vicinity

The lower portion of the Saddle River is a low-gradient system that averages 12 meters wide and 0.4 meters deep. Near its confluence with the Passaic River, the Saddle River is tidally influenced, with water quality degraded by extensive industrial development. The substrate consists of organic-rich silt and sand.

At its confluence with the Saddle River, the Passaic River is 60 meters wide and 0.9 meters deep. The Passaic River is tidally influenced and the water quality is fair to degraded. The substrate consists of silt with patches of rocks (Papson 1989).

NOAA trust resources use the Passaic River and the mouth of the Saddle River as a migratory route and nursery habitat (Table 2) (Papson 1989). There are catadromous American eel in the Saddle River near the site; there are no anadromous fish runs on the Saddle River, although one stray striped bass has been documented in the Saddle River at Lodi, 2 km upgradient from the site. American shad is protected by New Jersey law.

Table 2. NOAA trust resource use of the Saddle and Passaic rivers in the vicinity of the Industrial Latex site (Papson 1989).

| Species | Saddle River | Passaic River |
|---|---|---|
| alewife | | N,M |
| American eel | A | A,M |
| American shad | | N,M |
| blueback herring | | N,M |
| striped bass | S* | N,M |
| N: Nursery A: Adult area | S*: stray | M: Migratory route |

**Response Category:** Federal Fund

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

Pat Evangelista 212-264-6311

**NOAA Coastal Resource Coordinator**

John Lindsay 404-347-5231

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Hazardous Ranking System Package, Industrial Latex Site, Wallington, New Jersey. Edison, New Jersey: U.S. Environmental Protection Agency, Region 2.

NUS. 1987. Potential Hazardous Waste Site Inspection Report Executive Summary, Industrial Latex, Wallington, New Jersey. Edison, New Jersey: U.S. Environmental Protection Agency, Region 2.

Papson, R., biologist, New Jersey Bureau of Freshwater Fisheries, Atlantic City, personal communication, January 17, 1989.

**Kauffman & Minteer**
**Jobstown, New Jersey**
**Region 2**
**NJD002493054**

## Site Exposure Potential

The Kauffman & Minteer site is located on two hectares in Jobstown, New Jersey (Figure 1). The area surrounding the site is rural and has a relatively low slope (0-2%) to the southeast. Kauffman & Minteer is a transporter of bulk liquids (primarily plasticizers), resins, vegetable oils, petroleum oils, and alcohols. From 1960 to 1980, water used to wash the interiors of tanker trucks was discharged to a diked, unlined lagoon that does not have a retention pond to prevent overflow during periods of heavy rainfall. In the spring of 1981, on-site dumping of tanker wash water ceased. On June 1, 1984, the dike surrounding the lagoon collapsed, discharging 13,000 $m^3$ of wastewater to an adjacent wetland southeast of the site. A September 5, 1985 site inspection discovered rusted and unlabeled drums in and around the lagoon (NUS 1987).

The wetland that received the wastewater in 1984 is at the head of an intermittent stream that flows southeast to Barkers Brook, 320 meters from the site. Barkers Brook flows into Assiscunk Creek 8 km from the site. Assiscunk Creek empties into the Delaware River at the town of Burlington, 16 km west of Barkers Brook. The Delaware River flows 160 km from this point to the Delaware Bay. Depth to groundwater at the site is 2.5 to 3 meters and groundwater flow follows local topography to the southeast (NUS 1987).

Possible contaminant migration pathways to NOAA trust resources include surface water runoff and groundwater flow to Barkers Brook and Assiscunk Creek.

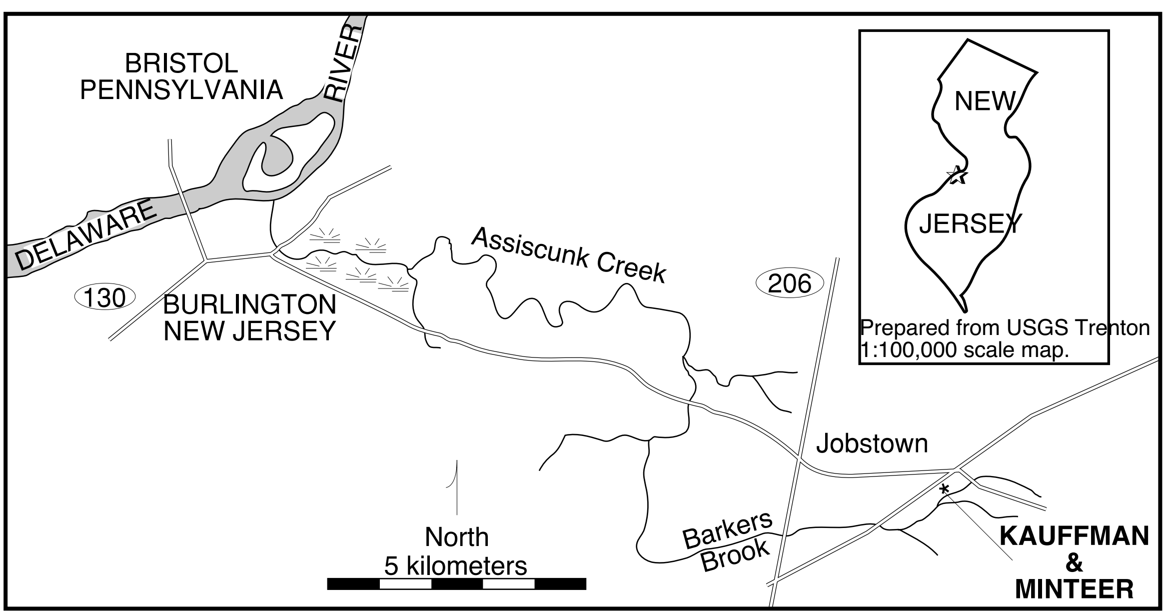

Figure 1. The Kauffman & Minteer, Inc., site in Jobstown, New Jersey.

## Site-Related Contamination

The contaminants of concern to NOAA include semi-volatile organic compounds and trace metals (Table 1). Phthalate esters were detected in lagoon sediment and surface water, on-site soils, and groundwater. Seven trace metals were detected at levels exceeding AWQC (EPA 1987). There was no information in the documents reviewed concerning concentrations of contaminants in off-site areas.

Table 1. Maximum concentrations of selected contaminants at the Kauffman & Minteer site (NUS 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); soil and sediment concentrations in mg/kg; water concentrations in µg/l.

| Contaminant | Lagoon Sediment | Soil | Groundwater | Lagoon Surface Water | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|---|
| Semi-Volatiles | | | | | | |
| bis(2-ethylhexyl)phthalate | 415.0* | 5.0 | N/A | N/A | 940† | 3† |
| butyl benzyl phthalate | 5970.0* | 0.88 | N/A | N/A | 940† | 3† |
| di-n-butyl phthalate | 55.6 | 1.4 | N/A | N/A | 940† | 3† |
| di-n-ocytl phthalate | 1430* | 5.3* | 30.0 | 44,000* | 940† | 3† |
| | | | | | | |
| Trace Metals | | | | | | |
| cadmium | 10 | 0.7 | 14 | 16 | 3.9†† | 1.1†† |
| chromium | 0.54 | 92 | 170 | 40 | 16 | 11 |
| copper | 67 | 13 | 70 | 40 | 18†† | 12†† |
| lead | 14 | 75 | 50 | 92 | 82†† | 3.2†† |
| mercury | 0.11 | 0.26 | N/A | 0.37 | 2.4 | 0.012 |
| silver | 1 | N/A | 10 | N/A | 4.1†† | 0.12 |
| zinc | 36 | 110 | 180 | 380.0 | 120†† | 110†† |

* Estimated value; † LOEL; †† Hardness-dependent (based on 100 mg/l $CaCO_3$); N/A: Not available

## NOAA Trust Habitats and Species in Site Vicinity

The Delaware River supports substantial NOAA trust resources (Table 2). Of the species found in the Delaware River in the vicinity of the site, American shad, blueback herring, and alewife are the primary species of interest. American shad and Atlantic sturgeon are classified as threatened by the State of New Jersey, with the shortnose sturgeon federally listed as an endangered species (USFWS 1980). Shortnosed sturgeon are reported to spawn in the Delaware River in the vicinity of the site (Soldwedel 1989).

Table 2. Selected NOAA trust resource use of the Delaware River (USFWS 1980; Soldwedel 1989).

| Species | Spawning Area | Nursery Area | Adult Area | Migration Route | Recreational Fisheries |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| alewife | X | X | X | | X |
| American eel | | | X | | X |
| American shad | | | | X | |
| Atlantic sturgeon | | | | X | |
| blueback herring | X | X | X | | X |
| shortnose sturgeon | X | X | | X | |
| striped bass | X | X | X | | X |
| white perch | X | X | X | | X |

Barkers Brook is a small, low-gradient stream with no recorded presence of anadromous or catadromous fish species. Assiscunk Creek, a much larger stream, flows into the Delaware River. There is also no record of anadromous fish runs in this creek, but fish from the Delaware River may occasionally enter the lower reaches. The catadromous American eel is believed to occasionally use Assiscunk Creek as adult habitat (Byrne 1989).

**Response Category:** Not Determined

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Tom Dunkelman 212-264-5386 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| John Lindsay 404-347-5231 |

**References**

Byrne, D., New Jersey Department of Fish and Game Bureau of Marine Fisheries, Port Republic, New Jersey, personal communication, January 20, 1989.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Hazardous ranking system package Kauffman & Minteer site, Jobstown, New Jersey. Newark: U.S. Environmental Protection Agency, Region 2.

NUS. 1987. Final Site Inspection Report and Hazardous Ranking System Model, Kauffman & Minteer, Jobstown, New Jersey. Edison, New Jersey: U.S. Environmental Protection Agency.

Soldwedel, B., fisheries biologist,New Jersey Bureau of Freshwater Fisheries, Lebanon, New Jersey, personal communication, March 23, 1989.

USFWS. 1980. Atlantic coast ecological inventory: Newark. Washington, D.C.: U.S. Fish and Wildlife Service. 40074-AI-EI-250.

**South Jersey Clothing Company**
**Minotola, New Jersey**
**Region 2**
**NJD980766828**

## Site Exposure Potential

The South Jersey Clothing Company site is located in Minotola, New Jersey (Figure 1). South Jersey Clothing Company manufactures clothing for the military (NJDEP 1981). The dry cleaning involved in the process creates wastewater containing trichloroethylene and other VOCs. The wastewater was routinely discharged into the ground. The company has used 98,400 liters of trichloroethylene in the last 10 years. The extent of groundwater contamination was investigated in 1982 and 1984, and the company is conducting remedial actions (NJDEP undated). Groundwater is withdrawn from selected wells and treated at the Minotola Municipal Utilities Authority sewage treatment plant. Another NPL site, Garden State Cleaners, is less than 250 meters from this site.

Two small streams, Cedar Brook and Panther Brook, are located 1.4 km southwest and southeast, respectively, of the site (USGS 1970). Cedar Brook flows for 6 km and Panther Brook for 7 km before they merge and form Manantico Creek. Manantico Creek flows for 20 km before it enters the Maurice River. A dam on the creek 10 km below the site forms Manantico Lake. The Maurice River empties into Maurice Cove in the Delaware Bay, 33 km below the site.

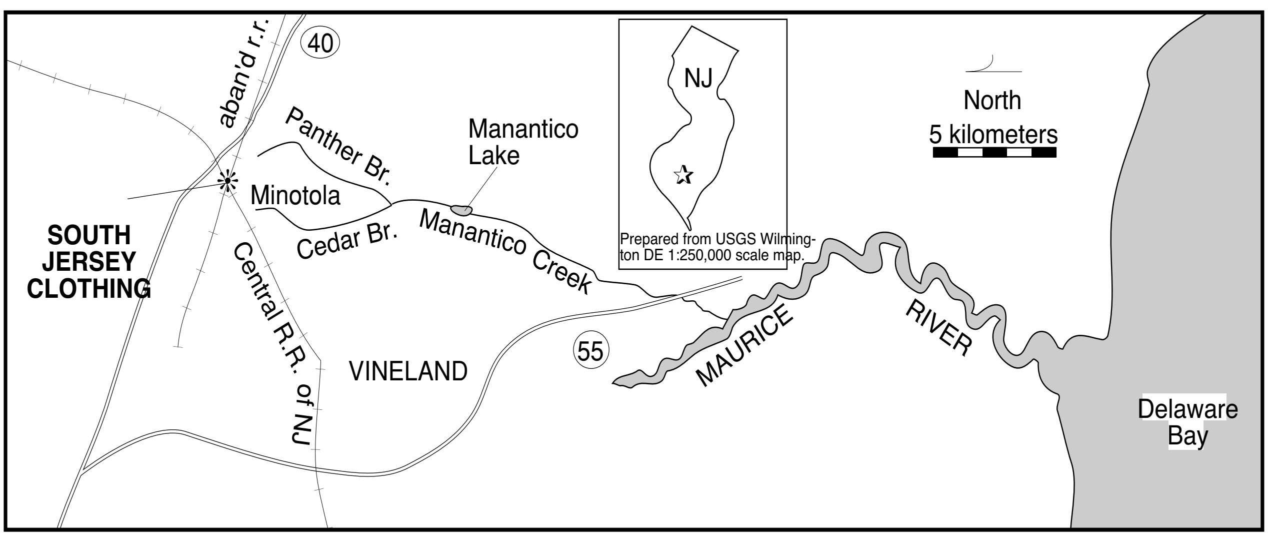


Figure 1. The South Jersey Clothing site in Minotola, New Jersey.

A possible contaminant migration pathway to NOAA trust resources is groundwater flow to Manantico Creek.

## Site-Related Contamination

VOCs were the only contaminants analyzed for at the site. Of the VOCs detected in on-site groundwater, trichloroethylene exceeded the LOEL (Table 1) (NJDEP 1981; EPA 1986). VOCs were observed in a groundwater plume that has migrated off-site. Analysis of on-site sludges showed that 16 percent of the total mass is VOCs.

Table 1. Maximum concentrations of selected contaminants at the South Jersey Clothing site (NJDEP 1981); LOEL (EPA 1986); concentrations in µg/l.

| | | | LOEL | |
|---|---|---|---|---|
| Contaminant | Liquid† | Groundwater | Acute | Chronic |
| trichloroethylene | N/A | 9,860 | 2,000 | N/A |
| toluene | N/A | 82 | 6,300 | 5,000 |
| 1,2-dichloroethane | N/A | 159 | 113,000 | N/A |
| ethylbenzene | 3450 | N/A | 430 | N/A |
| o-xylene | 9,189 | N/A | N/A | N/A |
| n-butyl benzene | 4,530 | N/A | N/A | N/A |

† Liquid/solid from a puddle near the outfall pipe; N/A: Data not available

## NOAA Trust Habitats and Species in Site Vicinity

No information was available regarding the aquatic habitats of Cedar Brook and Panther Brook. Manantico Creek is a continuously flowing, low-gradient stream whose upper reaches range from four to six meters wide and 0.5 to 1 meters deep (Bolton 1989). The substrate is sand or silty sand. The water quality is generally good. Extensive wetland areas border Manantico Creek to its confluence with the Maurice River. The wetlands are mostly forested with white cedar, pine, and lowlands oak. A good portion of Manantico Creek is in its natural state. The Maurice River is three meters deep and 400 meters wide at its confluence with Manantico Creek. The stretch of the river at the confluence is tidally influenced and has salinity ranging from 0.5 to 5 ppt. The substrate is silty sand. The Maurice River is bordered by extensive wetland areas from the confluence of Manantico Creek to Maurice Cove (USFWS 1981).

American shad, alewife, white perch, and blueback herring are present at the mouth of Manantico Creek and may use the lower reaches of the creek up to the dam at Manantico Lake (Bolton 1989). The dam is presently in such disrepair that fish are not completely restricted by it (Byrne 1989). Blueback herring may spawn in the creek and juveniles of blueback herring and alewife may use the creek as nursery area. American eel use the Manantico Creek as adult habitat and may be present in the headwaters of the creek near the site. NOAA trust resources use the Maurice River as a spawning and nursery area and as a migratory route (Table 2) (USFWS 1981). There are recreational and commercial fisheries for alewife, striped bass, white perch, and American eel on the Maurice River. The Maurice River system is presently under review by the U.S. Fish and Wildlife Service for possible classification as a Wild and Scenic River.

Table 2. NOAA trust resource use of Manantico Creek and Maurice River (USFWS 1981).

| Species | Manantico Creek | Maurice River |
|---|---|---|
| alewife | M,N | M,S,N,C,R |
| American eel | A,M | A,M,C,R |
| American shad | M | M |
| Atlantic sturgeon | | M |
| blueback herring | M, S,N | M,S,N |
| hickory shad | | M |
| striped bass | | M,C,R |
| white perch | M | S,N,A,M,C,R |

M: Migration route  A: Adult area  S: Spawning area  N: Nursery area  C: Commercial fishery  R: Recreational fishery

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Steve Siepo | 212-264-8667 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

**References**


Bolton, F., fishery biologist, New Jersey Bureau of Freshwater Fisheries, Lebanon, New Jersey, personal communication, January 3, 1989.

Byrne, D., fishery biologist, New Jersey Department of Fish and Game, Port Republic, New Jersey, personal communication, March 1, 1989.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

NJDEP. undated. Administrative Consent Order. Newark, New Jersey: New Jersey Department of Environmental Protection, Division of Water Resources.

NJDEP. 1981. Analytical data sheets. Newark, New Jersey: New Jersey Department of Environmental Protection, Division of Hazard Management.

USFWS. 1981. Atlantic coast ecological inventory: Wilmington. Washington, D.C.: U.S. Fish and Wildlife Service. 1:25000 scale map.

USGS. 1970. Buena, New Jersey. Washington, D.C.: U.S. Geological Survey. 7.5 minute series quadrangle. 1953 photorevised 1970.

**Naval Security Group Activity (NSGA)**
**Sabana Seca, Puerto Rico**
**Region 2**
**PR4170027383**

## Site Exposure Potential

The Naval Security Group Activity (NSGA) site is a communications station in Sabana Seca, Puerto Rico (Figure 1). The station encompasses over 890 hectares and is divided into the North and South tracts. From the 1950s to 1970, waste generated at the facility was deposited at seven disposal areas on the South Tract. The Public Works Department at the station used the areas to dispose of paints; solvents; waste oil; and vehicular fluids, including battery acid. There was also a pest control shop where spills of DDT; lindane; chlordane; 2,4-D; and sevin were reported in and around the building (Greenleaf/Telesca and E&E 1984).

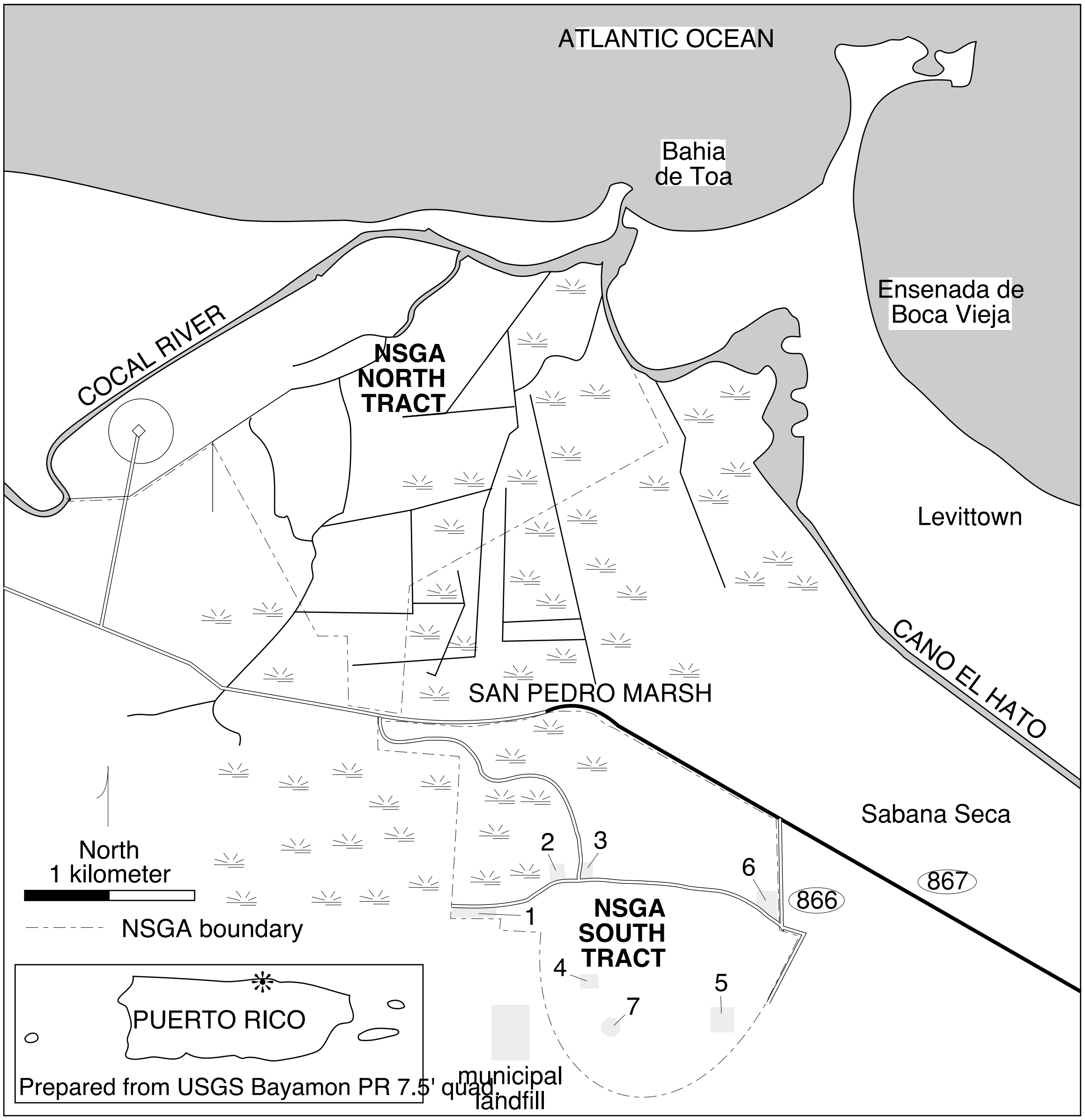


Figure 1. The Naval Security Group Activity site in Sabana Seca, Puerto Rico.

Surface waters of interest include the San Pedro Marsh, a large coastal wetland on both the North and South tracts. This marsh covers 101 hectares and is fed by several unnamed streams that flow through the facility. There are numerous drainage ditches throughout the marsh. The wetland flows into the Cocal River, which flows along the western border of the facility and discharges into the Atlantic Ocean to the north. There is a mangrove area along the northeast part of the north tract and along the border of the Cocal River. A canal, Cano el Hato, is east of the site and flows into the Atlantic Ocean. The ground on the NSGA facility allows water to rapidly filtrate into the aquifer. Groundwater movement is considered rapid and flows north into the Cocal River and Atlantic Ocean (Greenleaf/Telesca and E&E 1984).

The pathways of concern to NOAA include groundwater flow and surface water runoff to the Cocal River, San Pedro Marsh, and the Atlantic Ocean.

**Site-Related Contamination**

No extensive on-site study has assessed contaminants at the NSGA site. Due to the wide variety of materials used and disposed of on the facility, it is not possible to determine which contaminants may pose a major threat to natural resources. Materials known to have been used on-site include pesticides, paint materials, arsenic, trace metals, and industrial and residential wastes (Greenleaf/Telesca and E&E 1984).

**NOAA Trust Habitats and Species in Site Vicinity**

The habitats of concern to NOAA include the Cocal River, San Pedro Marsh, and the Atlantic Ocean (Table 1). A forthcoming management study done by the U.S. Fish and Wildlife Service for the Navy will add further resource information. The Cocal River and San Pedro Marsh support a large population of land crabs, which are important both recreationally and commercially. These land crabs live along the banks of the Cocal River and in the marsh area. Catadromous freshwater shrimp migrate through the Cocal River to spawn in the Atlantic Ocean. These shrimp are collected both in the river and on the shores of the Atlantic Ocean. Shallow water coastal habitat that might be used as nursery is limited near the shoreline of the Atlantic due to a rapid increase in water depth. Two threatened species, the green sea turtle and the loggerhead sea turtle, are found along the coast (Lopez 1989).

Table 1. Selected NOAA trust resource use of the Cocal River, San Pedro Marsh, and the Atlantic Ocean near Sabana Seca, Puerto Rico (Lopez 1989).

| Species | Cocal River | San Pedro Marsh | Atlantic Ocean |
|---|---|---|---|
| INVERTEBRATES | | | |
| blue crab | X | X | X |
| freshwater shrimp | X | | X |
| land crab | X | X | |
| | | | |
| FISH | | | |
| grunt | | | X |
| snook | X | | X |
| tarpon | X | | X |
| | | | |
| MISCELLANEOUS | | | |
| green turtle | | | X |
| loggerhead turtle | | | X |

**Response Category:** Undetermined

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Juan Dazila | 212-264-6669 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

**References**


Greenleaf/Telesca & Ecology and Environment. 1984. Initial Assessment Study of Naval Security Group Activity, Sabana Seca and Naval Communications Station, Puerto Rico. Miami: Navy Assessment and Control of Installation Pollutants (NACIP) Department. Naval Energy and Environmental Support Activity (NAVENENSA).

Lopez, F., fisheries biologist, U.S. Fish and Wildlife Service, Cabo Rojo, Puerto Rico, personal communication, January 16, 1989.

**Boarhead Farms**
**Bridgeton Township, Pennsylvania**
**Region 3**
**PAD047726161**

## Site Exposure Potential

The Boarhead Farms site covers 45.8 hectares in Bridgeton Township, Pennsylvania (Figure 1). A waste salvaging and hauling business operated on the site from 1970 to 1976. The site includes pits, sumps, a tanker truck area, and excavated and regraded areas.

Little is known about the quantities and types of waste that may have been deposited, but three documented spills have occurred on the property: 9,463 liters of ferrous chloride in October 1973; 15,140 liters of anhydrous ammonia in April 1976; and 3,785 liters of sulfuric acid in September 1976. After the last spill, the State of Pennsylvania issued an injunction forbidding more chemicals being brought onto the property (EPA 1988).

The Boarhead Farms site is on a topographic plateau 165 meters above mean sea level (USGS 1970). The land drops sharply to 36 meters along the Delaware River. The site is partly covered by woods and lowlands, and there are four ponds on the property. A spring originates on the site and flows through two of the ponds before entering a wetland that is partly on-site. The wetland is drained by an unnamed creek, which discharges into the Delaware River 3 km from the Boarhead Farms site. The Delaware River flows 215 km before discharging into Delaware Bay (NUS 1986).

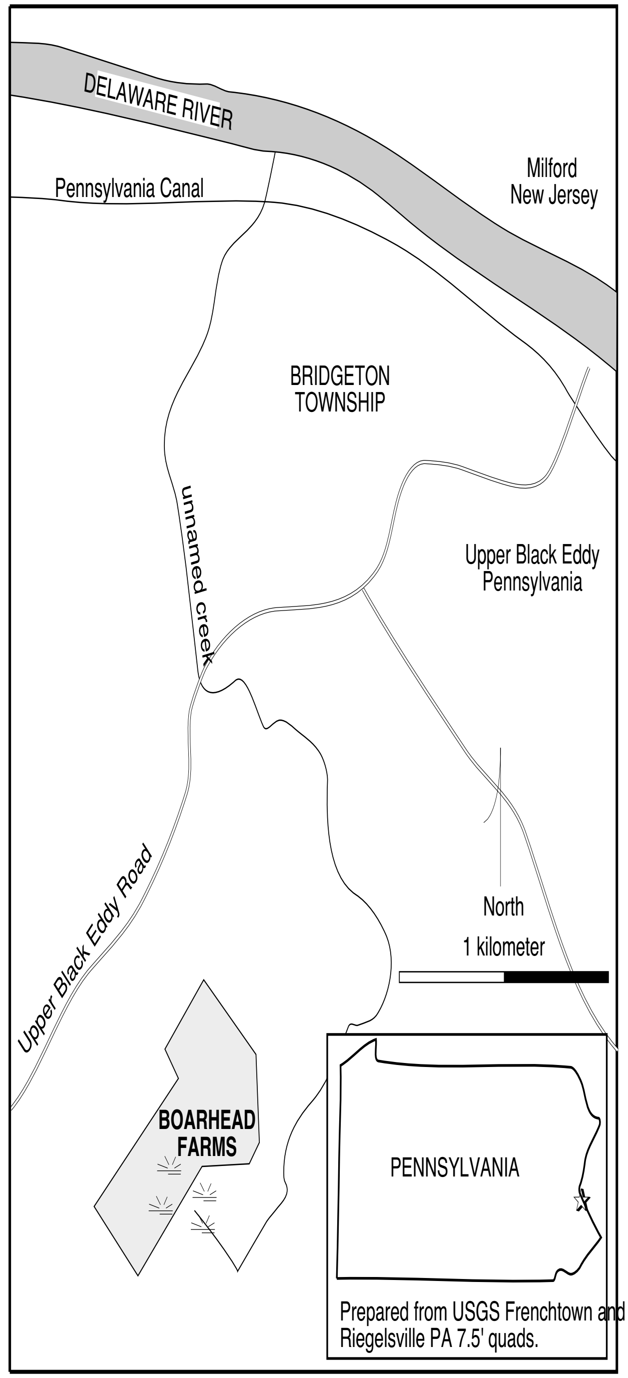


Figure 1. The Boarhead Farms site in Bridgeton Township, Pennsylvania.

**Site-Related Contamination**

The major contaminants of concern at the Boarhead Farms site are trace metals. The concentrations of chromium, copper, nickel, and zinc measured in on-site surface waters exceeded the chronic AWQC for the protection of freshwater aquatic life by up to

25 times (Table 1) (EPA 1986; NUS 1986).  In addition, the levels of copper, zinc, and cyanide observed in groundwater exceeded the chronic AWQC by up to 15 times. Cadmium, copper, nickel, and zinc were measured in on-site sediments at concentrations that exceeded the range observed in natural soil.

Table 1.  Maximum concentrations of selected contaminants at the Boarhead Farms site (NUS 1986); ranges in natural soils (EPA 1988); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations for water in µg/l and for sediments in mg/kg.

| Contaminant | Ground-water | Surface water | AWQC Acute | AWQC Chronic | Sediment | Range in Natural Sediments |
|---|---|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | | | |
| Semi-volatiles | | | | | | |
| di-n-octylphthalate | 690 | N/A | N/D | N/D | N/A | N/A |
| PCBs | | | | | | |
| PCB 1260 | N/A | N/A | 2 | 0.014 | 0.03 | N/A |
| INORGANIC SUBSTANCES | | | | | | |
| Trace Metals | | | | | | |
| cadmium | N/A | N/A | 3.9† | 1.1† | 8.3 | 0.01-0.7 |
| chromium | N/A | 250 | 16 | 11 | 978 | 1-1,000 |
| copper | 100 | 110 | 18† | 12† | 123 | 2-100 |
| nickel | N/A | 1,430 | 1,400† | 160† | 516 | 5-500 |
| zinc | 60 | 120 | 120† | 110† | 3,200 | 10-300 |
| Other | | | | | | |
| cyanide | 20 | N/A | 22.0 | 5.2 | 4 | N/A |

N/A:  Not available;  N/D:  Criteria not determined;  † Hardness-dependent (based on 100 mg/l $CaCO_3$)

## NOAA Trust Habitats and Species in Site Vicinity

The unnamed creek adjacent to the Boarhead Farms site is a small, continuously flowing, low-gradient stream.  The creek flows through the wooded areas of the plateau for 2 km before descending to the floodplains of the Delaware River through a ravine (USGS 1970).  Before discharging into the river, the creek flows under the Pennsylvania Canal.  The Delaware River near the site is a continuously flowing, low-gradient river system that is 200 to 400 meters wide and 0.6 to 3.5 meters deep (Koffman 1988).  The substrate varies from cobble and gravel in the faster-flowing stretches of the river to sandy silt in the pooled areas.  The shorelines are wooded.

Five anadromous fish species use the Delaware River as nursery and adult areas and as a migratory route (Table 2) (Koffman 1988).  Shortnosed sturgeon, a federally endangered species given special status in the states of Pennsylvania and New Jersey, is common in the reaches of the river near the site.  A substantial population of American shad (listed as threatened by the State of New Jersey) uses the river near the site as spawning ground and migratory route.  The use of the unnamed creek by anadromous fish species has not been investigated.

Table 2. NOAA trust resource use of the Delaware River near the site (Koffman 1988).

| Fish Species | Spawning Area | Nursery Area | Adult Area | Migration Route | Recreational Fishery |
|---|---|---|---|---|---|
| American shad | X | X | | X | |
| Atlantic sturgeon | | | | X | |
| blueback herring | | X | X | X | X |
| shortnosed sturgeon | | | | X | |
| striped bass | | X | X | X | X |

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Suzanne T. Billings 215-597-8240 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Alyce Fritz 215- 597-3636 |

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1988. National Priorities List, Superfund Hazardous Waste Site Listed under CERCLA, Boarhead Farms, Bridgeton Township, Pennsylvania. Philadelphia: U.S. Environmental Protection Agency, Region 3.

Koffman, M., fishery biologist, Pennsylvania Fish Commission, Revere, Pennsylvania, personal communication, November 15, 1988.

NUS Corporation. 1986. Site Inspection Report, Section 6. TDD No. F3-8403-25. Philadelphia: U.S. Environmental Protection Agency, Region 3.

USGS. 1970. Frenchtown , New Jersey - Pennsylvania. Washington, D.C.: U.S. Geological Survey. 7.5 minute series quadrangle. 1955 photorevised 1970.

**Elizabethtown Landfill**
**Elizabethtown, Pennsylvania**
**Region 3**
**PAD980539712**

## Site Exposure Potential

The Elizabethtown Landfill occupies six hectares in Lancaster County, 1.5 km southwest of Elizabethtown, Pennsylvania (Figure 1). The landfill is an abandoned, unlined sandstone quarry in an agricultural and rural residential area. The unpermitted landfill operated under various owners from 1958 to 1973, accepting unknown quantities of industrial and municipal wastes from surrounding communities. A Consent Decree filed by the State of Pennsylvania ordered operations at the landfill to cease by July 1974. Waste

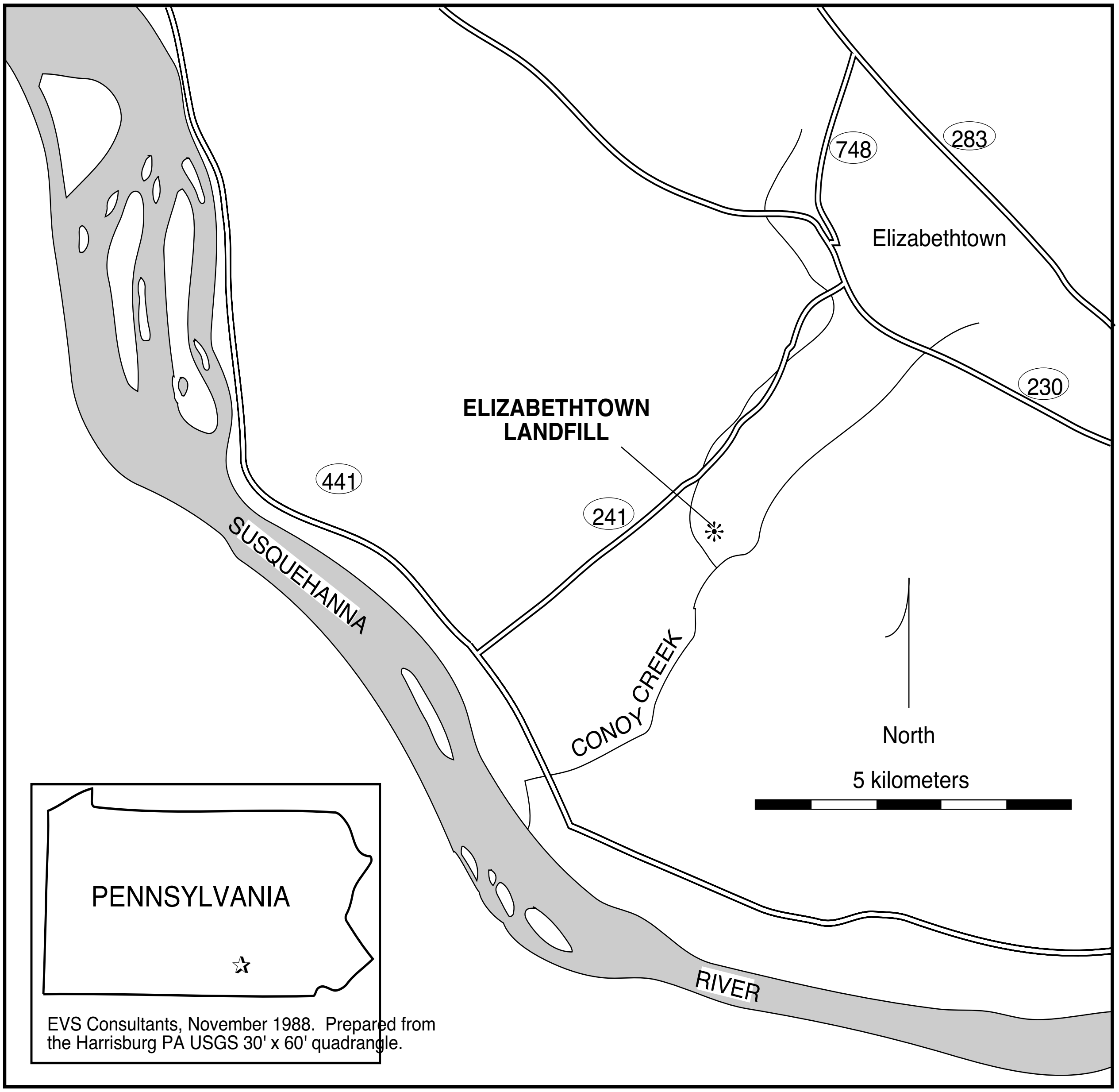


Figure 1. The Elizabethtown Landfill site in Elizabethtown, Pennsylvania.

Management, Inc. (WMI) acquired the site in October 1984. In 1986, WMI covered the site with 60 cm of clay and 15 cm of topsoil, installed vents to control migration of methane, installed a system to collect leachate, constructed a sedimentation basin, and installed a drainage system to channel runoff to the basin (EPA 1986a).
Surface waters of interest near the site include Conoy Creek and the Susquehanna River. Conoy Creek originates 250 meters below the site and flows for 8 km before it discharges into the Susquehanna River. The Susquehanna River discharges into the Chesapeake Bay 85 km downstream.

Possible contaminant migration pathways to NOAA trust resources include groundwater and surface water flow to Conoy Creek and the Susquehanna River.

## Site-Related Contamination

The contaminants of concern to NOAA include benzene, 1,1-dichloroethane, and chlorobenzene (Table 1). Manganese and lead have also been detected in some samples, but the values obtained were not considered valid because they failed to pass EPA quality assurance/quality control review.

Table 1. Concentrations of selected contaminants at the Elizabethtown Landfill site (EPA 1986a); AWQC for the protection of freshwater aquatic life (EPA 1986b); concentrations in µg/l.

| Contaminant | soil leachate | well water | well leachate | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | | |
| Volatiles | | | | | |
| benzene | 16.0 | ND | 14.6 | 5,300.0* | N/A |
| chlorobenzene | 112.0 | 54.0 | 236.0 | 250.0* | 50.0* |
| vinyl chloride | ND | 15.6 | 17.7 | N/A | N/A |
| 1,1-dichloroethane | ND | 18.1 | 50.7 | N/A | N/A |
| INORGANIC SUBSTANCES | | | | | |
| Trace Metals | | | | | |
| copper | 22.0 | ND | 17.0 | 18.0† | 12.0† |
| Other | | | | | |
| cyanide | 15.0 | ND | ND | 22.0 | 5.2 |

ND: Not detected; N/A: Not available; * LOEL; † Hardness-dependent (based on 100 mg/l $CaCO_3$)

## NOAA Trust Habitats and Species in Site Vicinity

Conoy Creek is a small, coolwater, continuously flowing, low-gradient stream. The creek is shallow, only one meter wide and 15 cm deep, with a gravel/sand substrate in the riffle reaches. At its confluence with Conoy Creek, the Susquehanna River is 0.8 km wide, 1.5 meter deep, and has a gravel/cobble substrate in its riffle reaches. This river is generally considered to have good water quality with some minimal problems from agricultural runoff (Koffman 1988).

The fisheries resources in this area have been greatly altered by a series of dams on the Susquehanna River. The largest of these dams is at Conowingo, Maryland, 75 km downstream of the mouth of Conoy Creek. The Conowingo Dam has prevented the natural migration of coastal fish species into the upper Susquehanna River. American shad and American eel are trapped below this dam, but stocked above the dams on the Susquehanna. American eel do migrate up to the mouth of Conoy Creek.

The Susquehanna River Anadromous Fish Restoration Committee (of which NOAA is a member) has revived interest in restoring shad runs to the river. In 1986, construction was ordered for a new fishway and improvements in an existing, inadequate fish lift for Conowingo Dam. Agreements were also reached for the construction of fishways at Holtwood, Safe Harbor, and York Haven (Goodger 1987). Once the fishways are complete, the Susquehanna River and Conoy Creek will likely play an important role in supporting NOAA trust resources.

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Chris Pilla | 215-597-3169 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Alyce T. Fritz | 215-597-3636 |

**References**


EPA. 1986a. Hazardous Ranking System Package. Elizabethtown Landfill. Elizabethtown, Pennsylvania. Philadelphia: U.S. Environmental Protection Agency, Region 3.

EPA. 1986b. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Goodger, T., ecologist, Habitat Conservation Branch, NOAA National Marine Fisheries Service, personal communication, June 1987.

Koffman, M., fisheries biologist, Pennsylvania Fisheries Commission, Revere, Pennsylvania, personal communication.

**Jacks Creek/Sitkin Smelting & Refining**
**Maitland, Pennsylvania**
**Region 3**
**PAD980829493**

## Site Exposure Potential

The Jacks Creek/Sitkin Smelting & Refining, Inc. site is located on 47 hectares 15 km east of Maitland, Pennsylvania (Figure 1). Sitkin used the facility for smelting and refining metal until declaring bankruptcy in 1977. Currently, 130,000 metric tons of ball mill tailings containing lead and other heavy metals are stockpiled on the site. Part of the facility was purchased by Joseph Krentzman and Sons, Inc., to use as a scrapyard; CIT Corporation and the Alabama Bankruptcy Court own the remainder. In 1984, EPA detected PCBs in on-site soil, and lead and PCBs in Jacks Creek. Preliminary results indicate that lead may also be present in on-site groundwater. Krentzman has submitted a proposal to the Pennsylvania Department of Environmental Resources (PA DER) to remove the PCB-contaminated soil and encapsulate it elsewhere on the site. The company also plans to dismantle the smelters and arrange for proper disposal. Sitkin Smelting is cooperating with the PA DER to control contaminant migration to Jacks Creek, but no cleanup has taken place (EPA 1987).

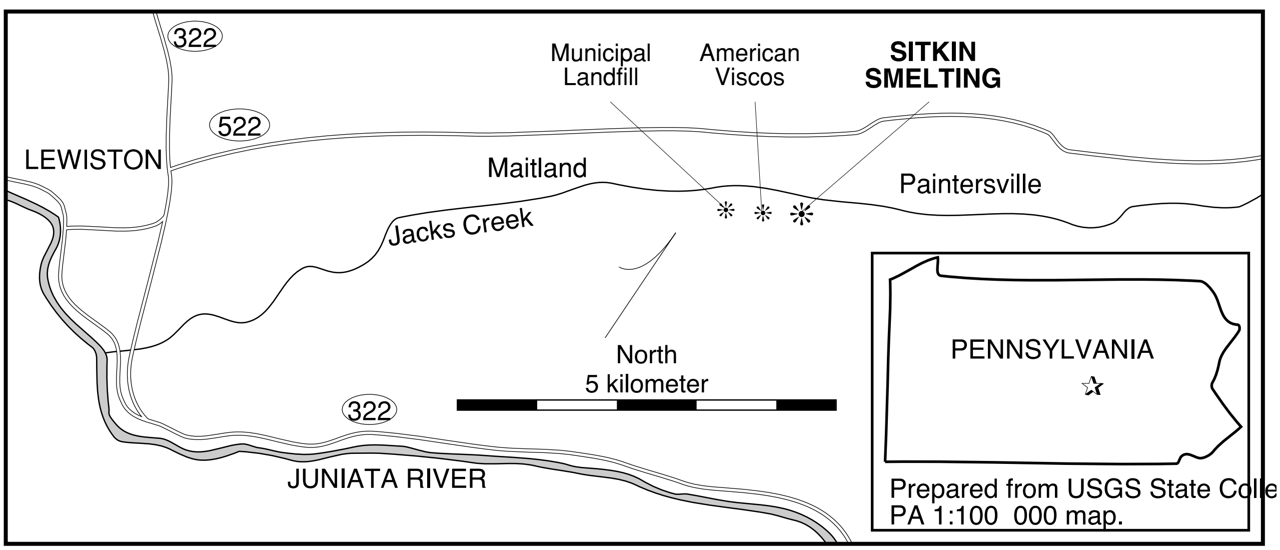


Figure 1. The Jacks Creek/Sitkin Smelting site in Maitland, Pennsylvania.

A small creek flows through a culvert beneath the mining waste piles and discharges into Jacks Creek off-site. Jacks Creek flows west along the northern perimeter of the facility and through a small wetland before discharging into the Juniata River 11 km from the site. The Juniata River flows for 75 km before it merges with the Susquehanna River, a tributary of the Chesapeake Bay. The Sitkin Smelting Site is 236 km from the Chesapeake Bay.

Two other sites of interest are downgradient and adjacent to Jacks Creek west of the site: a closed chemical waste lagoon owned by American Viscos, a rayon manufacturer, and a closed municipal landfill.

Possible contaminant migration pathways to NOAA trust resources include groundwater flow, leachate, and surface water runoff to Jacks Creek and the Juniata River.

**Site-Related Contamination**

Based on a preliminary assessment, contaminants of concern to NOAA at the site include trace metals and PCBs (Table 1). Copper, lead, and zinc were measured above AWQC in groundwater, Jacks Creek, and surface water from an on-site culvert. Sediments from Jacks Creek downstream of the site had elevated levels of chromium, copper, lead, and PCBs; sediments from the on-site culvert had high levels of lead. PCBs were also detected in Jacks Creek sediment downstream of the site and in sediments from the on-site culvert.

Table 1. Maximum concentrations of selected contaminants at the Jacks Creek site (EPA 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in water in µg/l and in sediment in mg/kg.

| | Jacks Creek | Jacks Creek Sediment | | | On-Site Culvert | | | |
|---|---|---|---|---|---|---|---|---|
| AWQC | | | | | | | | |
| Contaminant | Surface Water | Upstream | Downstream | Groundwater | Water | Sediment | Acute | Chronic |
| ORGANIC COMPOUNDS | | | | | | | | |
| PCBs | N/A | N/A | 1.9 | N/A | N/A | 2.2 | 2 | 0.014 |
| INORGANIC SUBSTANCES | | | | | | | | |
| Trace Metals | | | | | | | | |
| cadmium | N/A | N/A | N/A | 24 | 18 | N/A | 3.9† | 1.1† |
| chromium | N/A | <12 | 156 | 529 | N/A | N/A | 16 | 11 |
| copper | 77 | <21 | 434 | 7,120 | 3,860 | N/A | 18† | 12† |
| lead | 59 | <29 | 999 | 2,030 | 1,620 | 3,270 | 82† | 3.2† |
| zinc | 197 | N/A | N/A | 11,600 | 4,740 | N/A | 120† | 110† |

N/A: Not available    † Hardness-dependent (based on 100 mg/l $CaCO_3$)

**NOAA Trust Habitats and Species in Site Vicinity**

Jacks Creek is a medium-sized stream that flows along the northern border of the Sitkin Smelter facility. The creek, six to nine meters wide and between 0.5 and 1.0 meters deep, supports a diverse benthic community and is considered to have water quality improved from past conditions (Schott 1989). Juniata River, a warmwater system with generally good water quality, is 150 meters wide and three meters deep near the site.

Resources of interest to NOAA in Jacks Creek and the Juniata River are limited by a series of four dams on the Susquehanna River 75 km downstream of the site. The Conowingo Dam is the largest of these dams that prevent natural migration of coastal fish species into the upper Susquehanna River. The Susquehanna River Anadromous Fish Restoration Committee (of which NOAA is a member) has revived interest in restoring American shad runs to the Susquehanna River and its associated tributaries. In 1986, construction was ordered for a new fishway and improvements in an existing, inadequate fish lift for the Conowingo Dam. Agreements for the construction of fishways at Holtwood, Safe Harbor, and York Haven were also reached (Goodger 1987). Once the fishways are complete, the waterways above the dams, including the Juniata River and Jacks Creek, will be accessible to NOAA trust resources. Fish species believed to be affected by the restoration project include blueback herring, American shad, and striped bass. There is an American shad hatchery on the Juniata River near Thomastown, Pennsylvania, 25 km downstream of the mouth of Jacks Creek (Jackson 1989).

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Ann DeLong 215-597-8216 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Alyce Fritz 215-597-3636 |

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Hazardous Ranking System Package. Jacks Creek/Sitkin Smelting & Refining, Inc. Maitland, Pennsylvania. Philadelphia: U.S. Environmental Protection Agency, Region 3.

Goodger, T., ecologist, Habitat Conservation Branch, NOAA National Marine Fisheries Service, Oxford, Maryland, personal communication, June 1987.

Jackson, L., regional fisheries biologist, Pennsylvania Fish Commission, Carlisle, Pennsylvania, personal communication, January 1989.

Schott, B., biologist, Pennsylvania Department of Environmental Resources, Harrisburg, Pennsylvania, personal communication, January 1989.

**Keyser Avenue Borehole**
**Scranton, Pennsylvania**
**Region 3**
**PAD981036049**

## Site Exposure Potential

The Keyser Avenue Borehole is on a residential property in Scranton, Pennsylvania (Figure 1). The borehole was originally used in conjunction with coal mining operations (EPA 1987). In 1984, the Pennsylvania Court of Common Pleas found that, between 1976 and 1979, William Lavelle had dumped 13.2 million liters of liquid wastes into the borehole via a floor drain in a rented commercial garage. Approximately 6.8 million liters were food processing wastes and approximately 5.3 million liters were from the solvent recyclers, Spectron and Marisol (Hornberger et al. 1983). The remaining 1.1 million liters of wastes were from five smaller waste generators: two generated mixed solvent wastes, two generated "undescribed waste," and one generated aqueous pharmaceutical wastes.

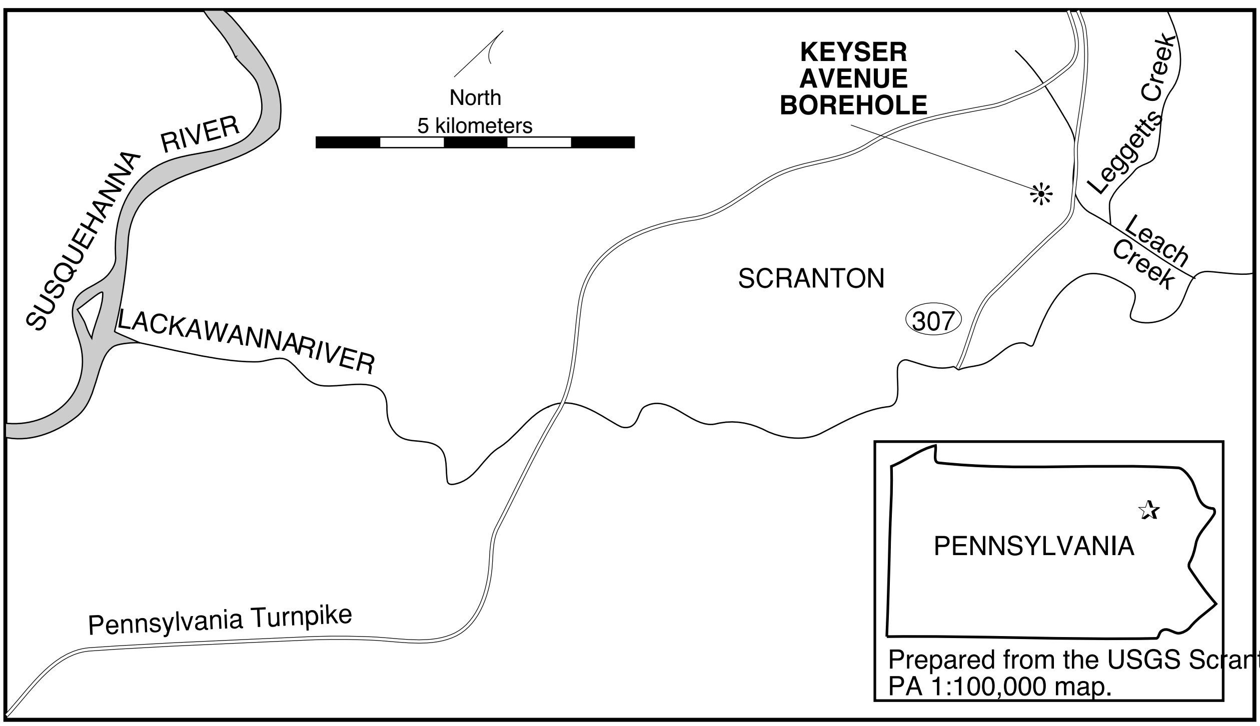


Figure 1. The Keyser Avenue Borehole site in Scranton, Pennsylvania.

The site is 265 meters above mean sea level (MSL) on the northwestern slope of a valley trough (Hornberger et al. 1983). The Lackawanna River flows through the valley at 212 meters above MSL. The borehole is 0.6 meters in diameter and 33 meters deep, with a mine pool 46 meters beneath the bottom of the borehole. Other pools in the area hold a combined total of 38 million liters of water. In the mine pool, fluids flow south through interconnections in the adjoining abandoned underground mines toward the two major overflows from the mine pool complex. These two overflows, Old Forge Borehole and the Duryea Ditch, are 11 km and 13.5 km, respectively, down the Lackawanna River from the site.

The closest surface water is Leach Creek, 0.5 km east of the site. Leach Creek runs 1 km before discharging into Leggetts Creek, which meets the Lackawanna River 1.5 km farther on. The river flows for 21.5 km before it discharges into the Susquehanna River. The Susquehanna River enters Chesapeake Bay 300 km below the confluence of the two rivers.

A possible contaminant migration pathway to NOAA resources is the movement of water through the underground mine passages to the Old Forge Borehole and Duryea Ditch overflows, which discharge into the Lackawanna River.

## Site-Related Contamination

The contaminants of concern to NOAA are VOCs (Hornberger et al. 1983). Four of the contaminants were measured in liquids collected at boreholes downgradient from the site at concentrations exceeding LOEL (Table 1). The major part of the contamination appears to be spread southeast 450 meters downgradient from the site. The comparison of contaminant values from the liquid waste in the borehole with LOEL values is valid since the waste is mixed with groundwater that discharges into the Lackawanna River 11 and 13.5 km downstream of the Keyser Avenue Borehole site.

Table 1. Maximum concentrations of selected contaminants at the Keyser Avenue Borehole site (Hornberger et al. 1983); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in µg/l.

| | | AWQC | |
|---|---|---|---|
| Contaminant | Liquid Waste (Borehole) | Acute | Chronic |
| 1,1,2,2-tetrachloroethane | 24,000 | N/D | 2400* |
| trichloroethylene | 11,000 | 45,000* | 21,900* |
| tetrachloroethylene | 17,000 | 5,280* | 840* |
| 1,2-dichloroethane | 8,600 | 118,000* | 20,000* |
| toluene | 18,000 | 17,500* | N/D |
| chloroform | 7,500 | 28,900* | 1,240* |

*LOEL; N/D: Criteria not determined

## NOAA Trust Habitats and Species in Site Vicinity

The closest resources of concern to NOAA are American shad and American eel in the Susquehanna River, 4.5 km from the site. A series of dams on the lower Susquehanna River blocks the passage of fish into the upper reaches near the site. However, American shad and American eel are trapped below these dams and stocked above the dams on the Susquehanna. The Susquehanna River Anadromous Fish Restoration Committee, of which NOAA is a member, has revived interest in restoring natural shad runs to the river. In 1986, construction was ordered for a new fishway and improvements in an existing, inadequate fish lift for the dams (Goodger 1987). Once the fishways are complete, there should be increased use by NOAA resources of the Susquehanna River in the vicinity of the Lackawanna River.

American eel are present in the lower reaches of the Lackawanna River, but are not usually found upstream in the vicinity of the site. Water quality in this stretch of the river has been degraded by sewer line overflow and heavy mining activity.

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Fran Burns | 215-597-4750 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Alyce Fritz | 215-597-3636 |

**References**

Daniels, S., Pennsylvania Fish Commission, Sweet Valley, Pennsylvania, personal communication, November 22, 1988.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. National Priority List, Superfund Hazardous Waste Site Listed under the CERCLA, Keyser Avenue Borehole, Scranton, Pennsylvania. Philadelphia: U.S. Environmental Protection Agency, Region 3.

Goodger, T., ecologist, Habitat Conservation Branch, NOAA National Marine Fisheries Service, Oxford, Maryland, personal communication, June 1987.

Hornberger, R. , B. Borry, and K. Laslow. 1983. Hydrogeological Investigation of Lavelle Waste Disposal Sites, Scranton Area, Lackawanna County. Harrisburg, Pennsylvania: Department of Environmental Resources, Commonwealth of Pennsylvania.

**Recticon/Allied Steel Corporation**
**East Coventry Township, Pennsylvania**
**Region 3**
**PAD002353969**

## Site Exposure Potential

The Recticon/Allied Steel Corporation site consists of two properties on 12 hectares in East Coventry Township, Pennsylvania (Figure 1). One property was Rockwell International's Recticon plant. The other, less than 30 meters to the southeast, is the Allied Steel facility. The two properties are suspected of contributing to elevated trichloroethylene (TCE) levels found in regional groundwater (EPA 1987).

Recticon manufactured silicon wafers from 1974 to 1981. The property was also used by a former tenant to produce silicon wafers. In 1980, a Recticon contractor found TCE in drain lines from the plant, in sludge trapped in buried waste lines, and in soils. In May 1981, the contaminated soil was removed and transported to a hazardous waste facility. Recticon and the Pennsylvania Department of Environmental Resources entered into a Consent Order and Agreement in October 1981, under which Recticon was to pump and treat groundwater (EPA 1987).

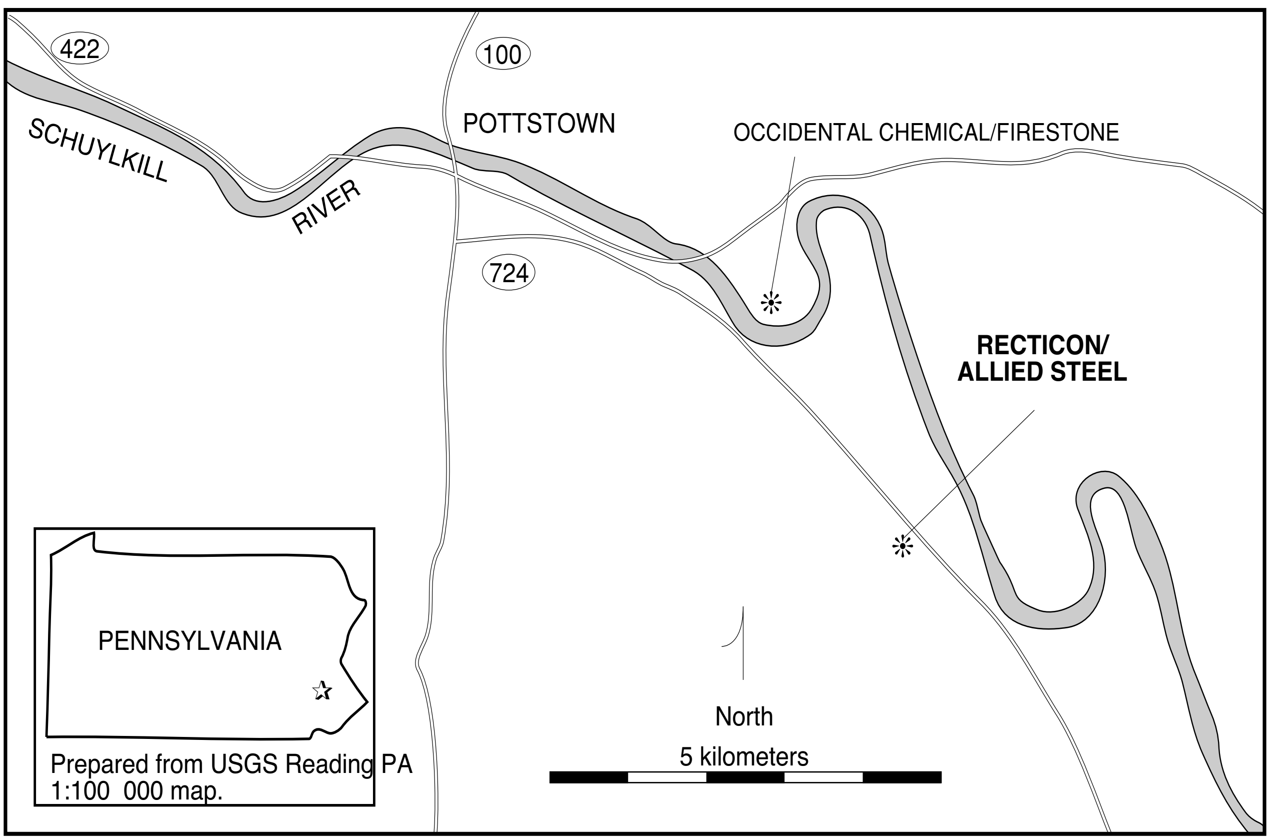


Figure 1. The Recticon/Allied Steel site in East Coventry Township, Pennsylvania.

Allied Steel Corporation has fabricated steel since 1972. In 1984, an Allied contractor determined that leakage in the area of Allied's compressor room had released TCE to the ground. In addition, high levels of TCE were found in Allied's on-site well (EPA 1987).

The Recticon/Allied Steel Corporation site lies on the southwest portion of the Schuylkill River floodplain (Weston undated). The site slopes gently towards the river, less than 750 meters from the site (EPA 1987). The Schuylkill River flows 60 km before merging with the Delaware River, which enters Delaware Bay 150 km below the site. Another Superfund site, Occidental Chemical/Firestone, is located less than 5 km north of the site.

The major contaminant pathways to habitats of concern to NOAA are groundwater flow and surface water runoff to the Schuylkill River.

## Site-Related Contamination

The contaminants of concern to NOAA are VOCs, which have been detected in soils and groundwater. TCE and 1,2-dichloroethene have been measured in on-site groundwater at high concentrations, but maximum concentrations of both compounds are well below LOEL for freshwater aquatic life. No sampling has been done for other possible contaminants at the site.

Table 1. Maximum concentrations of selected contaminants at the Recticon/Allied Steel site (Weston undated); LOEL (EPA 1986); concentrations in (µg/l).

| | | LOEL | |
|---|---|---|---|
| Contaminant | Groundwater | Acute | Chronic |
| trichloroethylene | 6,496 | 45,000 | 21,900 |
| 1,2-dichloroethene | 6,571 | 11,600 | N/D |

N/D Not determined

## Trust Habitats and Species in Site Vicinity

The reach of the Schuylkill River that flows near the site is a low-gradient, warmwater river one to two meters deep and 30 to 100 meters wide. This river is considered the most heavily used water body for wastewater assimilation in Pennsylvania. There is also a great deal of agricultural runoff affecting the river. Due to these factors, the river is generally considered to be of low water quality. The river substrate is gravel/cobble in riffle reaches and silt in pool reaches. Heavy aquatic plant beds are found throughout the river, with the dominant plant species being water milfoil and pickerelweed (Koffman 1989).

Anadromous fish species are prevented access to the Schuylkill River adjacent to the site by a series of six dams from Philadelphia to Pottstown. Of these dams, only Fairmount, the dam furthest downstream near Philadelphia, permits fish passage. There is a move towards installing fish passages on the entire series of dams to reestablish a natural fish run. American shad are presently being stocked in the river above the dams near Pottstown and catadromous American eel presently migrate the entire length of the river. Hence, both species use the freshwater habitats of the Schuylkill River near the site. If the fish passages are installed, the expected future anadromous fish runs adjacent to the site will include striped bass, alewife, and blueback herring (Koffman 1989).

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| David Byro | 215-597-8250 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Alyce T. Fritz | 215-597-3636 |

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. National Priorities List, Superfund Hazardous Waste Site Listed under the CERCLA, Recticon/Allied Steel Corporation, East Coventry Township, Pennsylvania. Philadelphia: U.S. Environmental Protection Agency, Region 3.

Koffman, M., fisheries biologist, Pennsylvania Fish Commission, Revere, Pennsylvania, personal communication, January 18, 1989.

Weston. undated. Final Report Review of Groundwater Monitoring Data, Rockwell International Recticon, Inc., Pottstown, Pennsylvania. East Coventry Township, Pennsylvania: Allied Steel Corporation.

**Occidental Chemical/Firestone**
**Pottstown, Pennsylvania**
**Region 3**
**PAD980229298**

## Site Exposure Potential

The Occidental Chemical Corporation/Firestone Tire and Rubber Company site occupies 101 hectares on the Schuylkill River in Pottstown, Pennsylvania (Figure 1). Firestone produced both polyvinyl chloride (PVC) and tires on the site from 1945 until 1980, when the facility was sold to Occidental Chemical Company. Since 1980, Occidental has manufactured PVC at the plant (EPA 1987).

Both Firestone and Occidental disposed of wastes on 12 hectares of the property. The disposal areas consist of an inactive, seven-hectare landfill; an active, three-hectare landfill; four inactive seepage lagoons; and two active, lined lagoons. The four seepage lagoons received PVC waste from 1945 to 1974. Sludge from the lagoons was periodically removed and disposed of in the inactive seven-hectare landfill. In 1971, the Pennsylvania

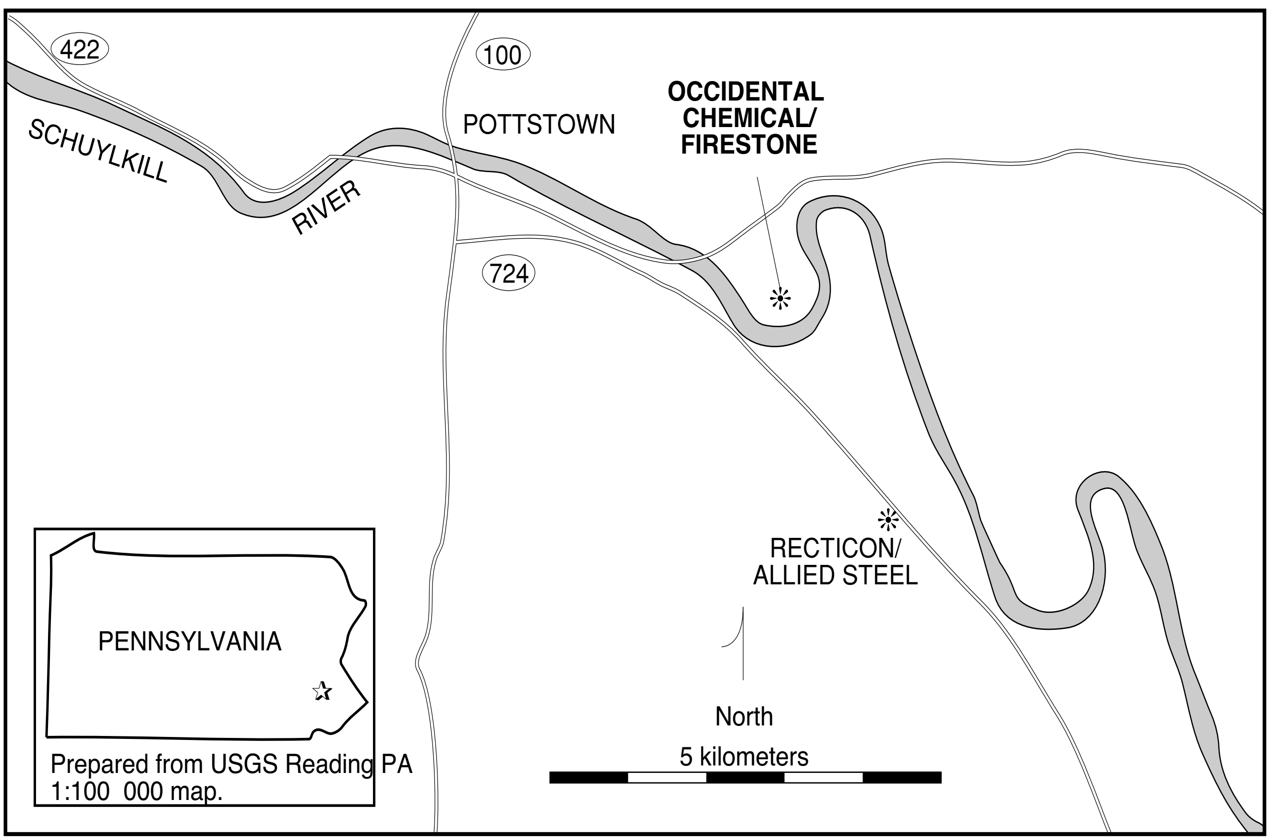


Figure 1. The Occidental Chemical/Firestone site in Pottstown, Pennsylvania.

Department of Environmental Resources (PA DER) issued a permit to Firestone to operate the seven hectares as a sanitary landfill. In 1985, Occidental Chemical closed the landfill under a PA DER closure plan; the landfill was capped with a cover, 60 cm of earth and topsoil, and then seeded (EPA 1987). All of the landfills and lagoons are between 45 and 300 meters from the Schuylkill River.

Under current practices, PVC waste is pre-treated by filtering out the solids, mixed with fly ash, and disposed of in an active landfill. The resulting effluent is discharged to the municipal sanitary sewer system. The sludge goes to the two lined lagoons, constructed in 1974 (EPA 1987).

The major surface water of interest near this site is the Schuylkill River, which meanders along three sides of the site. The site is in the 100-year floodplain of the Schuylkill River. The river flows 75 km to the Delaware River. There are several groundwater aquifers that are connected with each other and the Schuylkill River. Another NPL site, Recticon/Allied Steel, is approximately 4 km southeast of the Occidental Chemical site.

Possible contaminant migration pathways to NOAA trust resources are surface water runoff and groundwater flow to the Schuylkill River.

### Site-Related Contamination

The contaminants of concern at this site are trace metals and VOCs (Table 1). In 1984, trichloroethene was spilled on the site and was subsequently found in well water and soils on-site. Concentrations of chromium, copper, mercury, and zinc in well water exceeded AWQC for the protection of freshwater aquatic life.

Table 1. Maximum levels of contaminants at the Occidental Chemical/Firestone site (EPA 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations for soil in mg/kg and for water in µg/l.

| Contaminant | Soil | Well Water | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | |
| Volatiles | | | | |
| 1,2-dichloroethane | 3.6 | NA | 118,000.0†† | 20,000.0†† |
| ethylbenzene | 100.0 | NA | 32,000.0†† | N/D |
| trans-1,2-dichloroethene | 500.0 | 750.0 | N/D | N/D |
| trichloroethene | 18.0 | 1,500.0 | 45,000.0†† | 21,900.0†† |
| vinyl chloride | 420.0 | 11.0 | N/D | N/D |
| INORGANIC SUBSTANCES | | | | |
| Trace Metals | | | | |
| chromium | 0.07 | 173.0 | 16.0 | 11.0 |
| copper | 0.02 | 1966.0 | 18.0† | 12.0† |
| manganese | 0.25 | 10,010.0 | N/D | N/D |
| mercury | 0.001 | 4.00 | 2.4 | 0.012 |
| zinc | NA | 1,005.0 | 120.0† | 110.0† |

† Hardness-dependent (based on 100 mg/l $CaCO_3$) ; †† LOEL; NA: Not available; N/D: Not determined

## NOAA Trust Habitats and Species in Site Vicinity

The Schuylkill River is designated a Warm Water Fishery (WWF) under Title 25, Chapter 93, of the Pennsylvania Department of Environmental Resources Water Quality Standards (PA DER undated). The reach of the Schuylkill River that flows near the Occidental Chemical/Firestone site at Pottstown is one to two meters deep and 30 to 100 meters wide, and is the flowing water system most heavily used for wastewater assimilation in Pennsylvania. A great deal of agricultural runoff affects the river, resulting in low water quality. The river substrate consists of gravel/cobble in riffle reaches and silt in pool reaches. Heavy aquatic plant beds are found throughout the river, with the dominant plant species being water milfoil and pickerelweed (Koffman 1989).

American eel are present the entire length of the Schuylkill River. American shad are stocked in the river near Pottstown and use the freshwater habitat adjacent to the site. A series of six dams downstream of Pottstown blocks natural anadromous fish runs on the Schuylkill River in the vicinity of the site. Of these dams, only Fairmount, the furthest downstream near Philadelphia permits fish passage. Fish passages may be installed on the entire series of dams in order to reestablish a natural fish run. American shad are presently stocked above the dams near Pottstown and the catadromous American eel currently migrates the entire length of the river. Hence, both species use the freshwater habitats of the Schuylkill River near the site. If the fish passages are installed, the expected future anadromous fish runs adjacent to the site will include striped bass, alewife, and blueback herring (Koffman 1989).

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Suzanne T. Billings | 215-597-8240 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Alyce T. Fritz | 215-597-3636 |

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. National Priorities List Package (CERCLA). Occidental Chemical Corporation/Firestone Tire and Rubber Company. Pottstown, Pennsylvania. Philadelphia: U.S. Environmental Protection Agency, Region 3.

Koffman, M., fisheries biologist, Pennsylvania Fish Commission, Revere, Pennsylvania, personal communication, March 3, 1989.

PA DER. undated. Water Quality Standards. Rules and Regulations. Chapter 93. Philadelphia: Pennsylvania Department of Environmental Resources.

**Sealand Limited**
**Mount Pleasant, Delaware**
**Region 3**
**DED981035520**

## Site Exposure Potential

From 1971 to 1979, Adams Laboratory operated a rendering plant on the Sealand Limited site in Mount Pleasant, Delaware (Figure 1). In 1979, the property was cleaned up by Conrail and left vacant until 1982, when it was used as a creosote manufacturing plant under the name Sealand Limited and Oil Industry. The facility was also used to store coal tar, gas tar, and ink oil wastes for recycling. In 1983, after the facility was abandoned with all the chemical wastes left in storage on the site, the Delaware Department of Natural Resources and Environmental Control found that many of the storage tanks were leaking creosols, solvents, and other substances containing PAHs. EPA used CERCLA funds to remove the hazardous chemicals and cap the site with a layer of clay.

The Sealand Limited site is on 0.8 hectares of relatively level ground in a primarily agricultural and residential area of northern Delaware. The site includes a concrete slab, a one-story building, an abandoned rail terminus, old storage tanks, and miscellaneous debris.

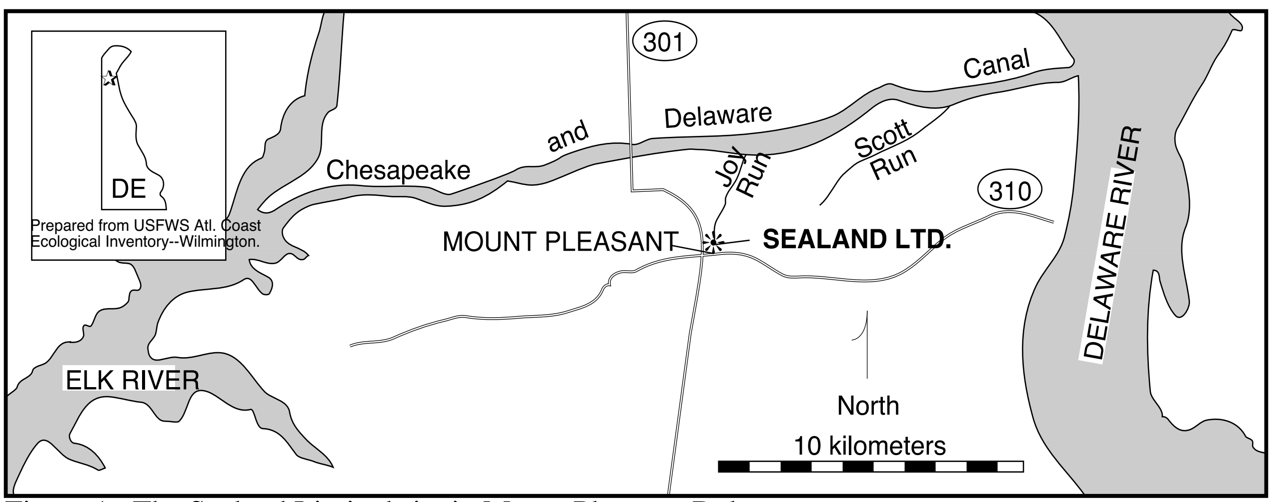


Figure 1. The Sealand Limited site in Mount Pleasant, Delaware.

Joy Run, a small, continuously flowing, low-gradient creek, flows from the Sealand Limited site northward for 3 km before discharging into the Chesapeake and Delaware (C & D) Canal. This canal connects Chesapeake Bay with the Delaware River. Soils on the site are permeable and groundwater is shallow (1-3 meters below the surface). Groundwater flow is towards Joy Run and probably discharges into the creek.

Possible contaminant migration pathways to NOAA trust resources are groundwater and surface water runoff to Joy Run and the C & D Canal.

**Site-Related Contamination**

PAHs, trace metals, and PCBs are contaminants of concern to NOAA (Table 1). PAHs were the dominant chemicals detected at the site. These compounds are major constituents of coal tars, creosote, and many petroleum-based substances. PCBs and the trace metals chromium, nickel, and lead were also detected in groundwater and soils on-site. Available data indicate that off-site groundwater has not been contaminated by site-related chemicals, but extensive sampling of off-site groundwater has not yet been conducted (BCM 1988).

Table 1. Maximum concentrations of selected contaminants at the Sealand Limited site (BCM 1988); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations for water in µg/l and for soil in mg/kg.

| | On-site | On-site | Off-site | AWQC | |
|---|---|---|---|---|---|
| Contaminants | Soil | Groundwater | Groundwater | Acute | Chronic |
| ORGANIC COMPOUNDS | | | | | |
| Pesticides/PCBs | | | | | |
| PCBs | 21.8 | ND | ND | 2.0 | 0.014 |
| Volatile | | | | | |
| benzene | 0.017 | 5.5 | ND | 5,300.0* | N/A |
| toluene | 0.081 | 5.5 | ND | 17,500.0* | N/A |
| Semi-volatile | | | | | |
| anthracene | 710.0 | 10.1 | ND | N/A | N/A |
| benzo(a)anthracene | 1110.0 | 11.2 | ND | N/A | N/A |
| benzo(a)pyrene | 530.0 | 11.7 | ND | N/A | N/A |
| 2-methylnaphthalene | N/A | 18.4 | ND | N/A | N/A |
| naphthalene | 1,820.0 | 18.1 | ND | 2,300.0* | 620.0* |
| phenanthrene | 4,260.0 | 30.9 | ND | N/A | N/A |
| phenol | 0.69 | 63.0 | 5.0 | 10,200.0* | 2,560.0* |
| pyrene | 2,080.0 | 28.9 | ND | N/A | N/A |
| | | | | | |
| INORGANIC SUBSTANCES | | | | | |
| Trace metals | | | | | |
| chromium | 53.0 | <10.0 | ND | 16.0 | 11.0 |
| copper | N/A | <25.0 | ND | 18.0† | 12.0† |
| lead | 960.0 | <5.0 | ND | 82.0† | 3.2† |
| nickel | 46.0 | 1,200.0 | ND | 1,400.0† | 160.0† |
| zinc | N/A | 125.0 | 674.0 | 120.0† | 110.0† |

N/A: Not available
ND: Not detected
* LOEL
† Hardness-dependent (based on 100 mg/l $CaCO_3$)

**NOAA Trust Habitats and Species in Site Vicinity**

The primary habitat of concern to NOAA is the C & D Canal, an artificial system that connects the Delaware River with the Elk River, an extension of Chesapeake Bay. The canal is used mainly for navigation, although there is some local fishing, recreational boating, and swimming. The canal is a tidally influenced, brackish water system with a salt concentration of between 0 and 2 ppt. Flow in the canal is minimal and is generally believed to flow from west to east, although tidal action may alter flow direction. The canal is 12 meters deep with sides of rip-rap (Miller 1988).

Eight species of anadromous fish use the C & D Canal as spawning and nursery habitat (Table 2). Striped bass, which spawn in the western end of the canal, are of special concern since their populations have declined over the years; currently, there is a moratorium on their collection in both Maryland and Delaware. American shad and Atlantic sturgeon are protected under New Jersey State legislation. The Chesapeake and Delaware Canal connects the Delaware River with the Elk River. Both of these waterways are important resource areas that have extensive fisheries and associated habitats.

Table 2. NOAA trust resource use of the Chesapeake and Delaware Canal and adjacent waters (USFWS 1980; Research Planning Institute 1985).

| Species | Spawning Area | Nursery Area | Adult Habitat | Migratory Route | Recreational Fishery | Commercial Fishery |
|---|---|---|---|---|---|---|
| alewife | | X | | X | X | X |
| American eel | | | X | | X | X |
| American shad | | | X | X | X | X |
| Atlantic sturgeon | | | X | X | | |
| blueback herring | | X | | X | X | X |
| hickory shad | | X | | X | X | X |
| striped bass | X | X | | X | | |
| white perch | | X | | X | X | X |

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** Remedial Investigation

**EPA Site Manager**

| |
|---|
| Leslie Banker 215-597-0985 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Alyce T. Fritz 215-597-3636 |

**References**

BCM. 1988. Remedial Investigation/Feasibility Study, Sealand Site. Mt. Pleasant, New Castle County, Delaware. Philadelphia: U.S. Environmental Protection Agency, Region 3.

Blosser, M., fisheries biologist, Delaware Department of Natural Resources and Environmental Control, Dover, Delaware, personal communication, December 14, 1988.

EPA. 1983. Hazardous Waste Land Treatment. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. SW-874.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Miller, R., fisheries biologist, Delaware Department of Fish and Game, Dover, Delaware, personal communication, December 15, 1988.

Research Planning Institute. 1985. Sensitivity of coastal environments and wildlife to spilled oil: Delaware, New Jersey, and Pennsylvania. An atlas of coastal resources. Seattle: Ocean Assessments Division, NOAA.

USFWS. 1980. Atlantic coast ecological inventory: Wilmington. Washington, D.C.: U.S. Fish and Wildlife Service. No. 39074-A1-EI-250.

**Sussex County Landfill**
**Laurel, Delaware**
**Region 3**
**DED980494637**

## Site Exposure Potential

The inactive Sussex County Landfill occupies a 15.2-hectare site 3 km southwest of Laurel, Delaware (Figure 1) (EPA 1987). From May 1970 to April 1979, the unpermitted landfill accepted municipal wastes and an unknown quantity of VOCs. The wastes were deposited below the water table. The groundwater flows north at an estimated 12 cm per day. The total volume of the landfill has been estimated to be 298,000 $m^3$.

The landfill is in an area dominated by agriculture and pine forest and is 30.3 to 33.2 meters above mean sea level (EPA 1987). The landfill is mostly vegetated with stands of young pine trees. However, there are scattered patches of dead vegetation and some completely barren areas on the landfill (NUS 1985). Surface waters near the site

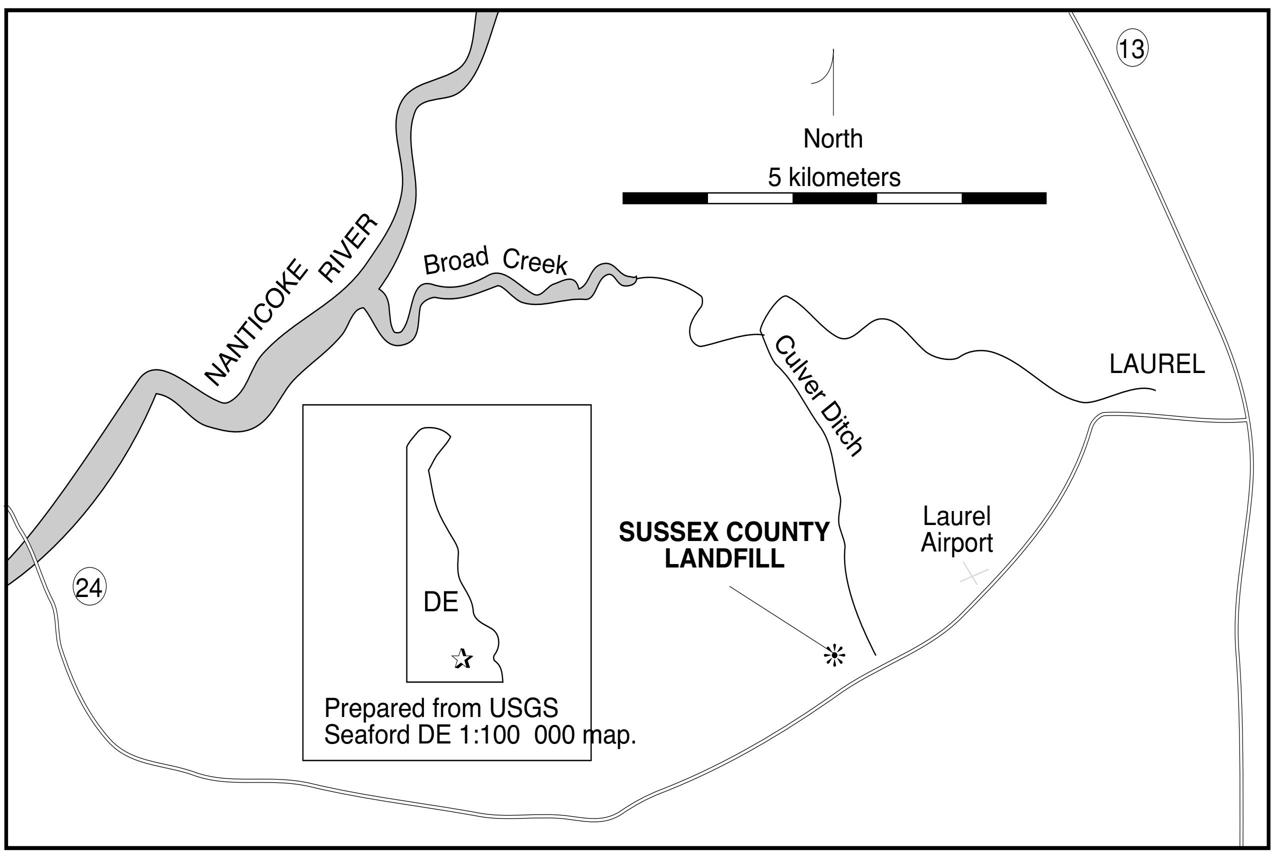


Figure 1. The Sussex County Landfill site in Laurel, Delaware.

include two shallow ponds and a ditch. The two ponds on the site cover 4 $m^2$ and 12.5 $m^2$, respectively. Culver Ditch runs 0.5 km east of the landfill and feeds into Broad Creek, 3.5 km north of the site. Broad Creek flows west and discharges into the

Nanticoke River, 11 km from the site. Nanticoke River enters the Chesapeake Bay 45 km below the confluence of Broad Creek.

Possible contaminant migration pathways to NOAA trust resources are surface water runoff and groundwater flow to Broad Creek and the Nanticoke River.

**Site-Related Contamination**

The contaminants of concern to NOAA at the site are trace metals (NUS 1985). Seven trace metals were detected in on-site groundwater at concentrations that exceeded AWQC for the protection of freshwater aquatic life (Table 1). In addition, the criteria for cadmium, mercury, silver, and zinc were exceeded in surface water from the ponds. A groundwater plume has been detected extending to a depth of 10.6 meters, approximately 150 meters north of the landfill.

Table 1. Maximum concentrations of selected contaminants at the Sussex County Landfill (NUS 1985); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in sediment and soil in mg/kg and in water in µg/l.

| Contaminant | On-site Groundwater | Pond Sediment | Pond Surface water | Culver Ditch Sediment | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|---|
| Volatile Organic Compounds | | | | | | |
| acetone | 280†† | N/A | N/A | N/A | N/D | N/D |
| benzoic acid | N/A | N/A | N/A | 4.68 | N/D | N/D |
| 2-butanone | 470†† | N/A | N/A | N/A | N/D | N/D |
| Trace Metals | | | | | | |
| cadmium | 34* | N/A | 2.3* | N/A | 3.9† | 1.1† |
| chromium | 47 | N/A | N/A | N/A | 16 | 11 |
| copper | 32 | 3.5 | N/A | N/A | 18† | 12† |
| lead | 64 | 8.6 | N/A | 105 | 82† | 3.2† |
| mercury | 6.1* | N/A | 2.3* | 0.12 | 2.4 | 0.012 |
| silver | 13* | N/A | 13* | N/A | 4.1† | 0.12 |
| zinc | 629* | 18* | 342* | 291 | 120† | 110† |

* Questionable data; † Hardness-dependent (based on 100 mg/l $CaCO_3$)
†† Quantitative approximation; N/A: Not available; N/D: Criteria not developed

**NOAA Trust Habitats and Species in Site Vicinity**

Habitats of concern to NOAA include Broad Creek and the Nanticoke River. There is insufficient information on Culver Ditch to determine its importance as a habitat. Broad Creek is a slow, continuously flowing, low-gradient stream with 1.5-meter high banks and extensive freshwater wetlands along its shoreline. Near the site, the creek has sandy substrate and is 23 to 30 meters wide and one meter deep. Broad Creek has high water quality and is tidal past its confluence with Culver Ditch. The Nanticoke River, 76 meters wide and three to six meters deep, is the largest river in Delaware. The river is bordered by extensive freshwater wetlands. The substrate in the river is sandy silt and the water quality is high. The Nanticoke Wildlife Area is at the confluence of Broad Creek and the Nanticoke River, less than 8 km downstream from the site (Blosser 1988).

Alewife, blueback herring, white perch, and, possibly, striped bass use Broad Creek as a spawning/nursery area and as a migration route (Table 2) (Miller 1988; Martin 1989). Fish found in Broad Creek, along with American eel and American shad, also use the reach of the Nanticoke River near the mouth of Broad Creek. The State of Delaware has given Broad Creek Exceptional Recreational Ecological Significance (ERES) status, which does not permit the release of any contaminants above background levels. Both Broad Creek and the Nanticoke River are valuable recreational fishing areas (Miller 1988).

Table 2. NOAA trust resource use of Broad Creek and the Nanticoke River (Miller 1988).

| Species | Broad Creek | Nanticoke River |
|---|---|---|
| alewife | S,N,M | S,N,M |
| American eel | A | A,M,R |
| American shad | | S,N,M,R |
| blueback herring | S,N,M | S,N,M |
| striped bass | S,N,M,R | S,N,M,R |
| white perch | S,N,M,R | S,N,M,R |
| S: Spawning area, N: Nursery area, M: Migration route, A: Adult area, R: Recreational fishing | | |

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| Eric Newman 215-597-9238 |
|---|

**NOAA Coastal Resource Coordinator**

| Alyce T. Fritz 215-597-3636 |
|---|

**References**

Blosser, M., Department of Natural Resources and Environmental Control, Dover, Delaware, personal communication, November 10, 1988.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. National Priorities List, Superfund Hazardous Waste Site Listed under CERCLA, Sussex County Landfill #5. Philadelphia: U.S. Environmental Protection Agency, Region 3.

Martin, C. fisheries biologist, U.S. Fish and Wildlife Service, Dover, Delaware, personal communication, March 15, 1989.

Miller, R., fisheries biologist, U.S. Fish and Wildlife Service, Dover, Delaware, personal communication, December 12, 1988.

NUS Corporation. 1985. Site Inspection of Sussex County Landfill #5, August 7, 1985. Philadelphia: U.S. Environmental Protection Agency, Region 3.

**Kent County Landfill**
**Houston, Delaware**
**Region 3**
**DED980705727**

## Site Exposure Potential

From 1969 to 1980, Kent County disposed of both municipal and industrial wastes at a county-owned and operated landfill 3.5 km north of Houston, Delaware. The Kent County Landfill is believed to hold 1.5 million $m^3$ of waste and fill materials, including trash, pesticides, sludges from poultry processing plants, oil sludges, hospital wastes, waste polymers, and solvents. The landfill has no liner or leachate collection system and the base of the fill is below the top of the water table. In 1980, the county covered the landfill with one to two meters of sandy soil and vegetated the area (EPA 1986a). Leachate seeped to the surface along the northern end of the landfill. Two seeps originate near the landfill terminus and flow untreated directly into Browns Branch. The leachate stained the sediments orange in Browns Branch (NUS 1986).

The Kent County Landfill site is in a flat, relatively rural area in the Browns Branch watershed. The 44-hectare site slopes slightly from the center of the landfill toward Browns Branch. Groundwater flows from the site north-northeast toward Browns Branch. The surrounding area is forested with deciduous and coniferous species. Surface soils on-site are poorly drained with moderately permeable subsoil (EPA 1986a).

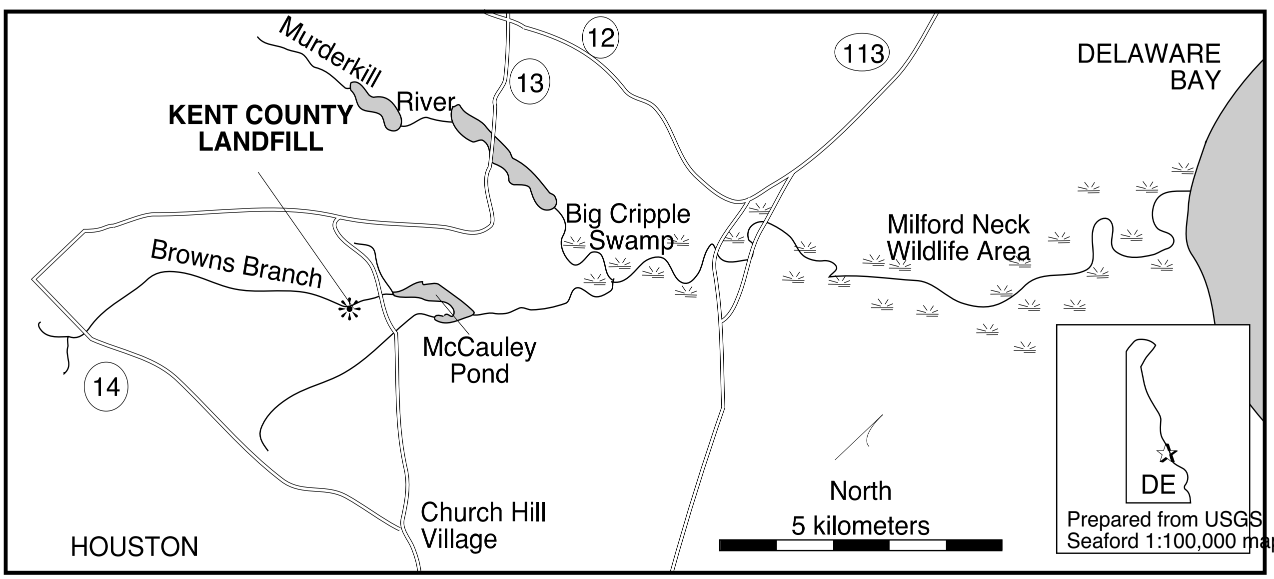


Figure 1. The Kent County Landfill site in Houston, Delaware.

Browns Branch is a medium-sized creek that flows to within 100 meters of the northern perimeter of Kent County Landfill. This creek flows 1.5 km before discharging into McCauley Pond, which is impounded for recreational fishing. Browns Branch flows 5 km below the pond before merging with Murderkill River. The lower reach of Browns Branch and the Murderkill River flow through wetland habitat, and the lower Murderkill

River flows through the Milford Neck Wildlife Area. Water from the Murderkill River/wetland area enters Delaware Bay 21 km from the landfill site.

Possible contaminant migration pathways to NOAA trust resources are groundwater and leachate flow to Browns Branch.

**Site-Related Contamination**

Trace metals, the contaminants of concern at the site, were detected in Browns Branch sediments, surface water, and in on-site groundwater (Table 1). Copper was the only trace metal detected in Browns Branch surface water in concentrations above AWQC. Manganese was the only trace metal found in significantly greater concentrations downstream of the site then upstream. It is difficult to assess whether other contaminants in the surface water were above or below AWQC because of high detection limits. Arsenic, cadmium, copper, lead, nickel, and zinc all exceeded AWQC in groundwater samples. Organic contaminants measured in Browns Branch surface water and groundwater were below AWQC. There was no on-site soil data available.

Table 1. Maximum concentrations of contaminants at the Kent County Landfill site (E&E 1986; NUS 1986); AWQC for the protection of freshwater aquatic life (EPA 1986b); concentrations in sediment in mg/kg, water in µg/l.

| | Browns Branch | Browns Branch Surface Water | | | | |
|---|---|---|---|---|---|---|
| AWQC | | | | | | |
| Contaminant | Sediment | Upstream | Downstream | Groundwater | Acute | Chronic |
| arsenic | 0.37 | ND | ND | 207 | 360 | 190 |
| cadmium | 0.08 | <5 | <5 | 16 | 3.9† | 1.1† |
| cobalt | 2.5 | 15 | 20 | 3360 | N/D | N/D |
| copper | 2.3 | 46 | 27 | 154 | 18† | 12† |
| lead | 5.5 | <40 | <40 | 116 | 82† | 3.2† |
| mercury | ND | <1 | <1 | <1 | 2.4 | 0.012 |
| manganese | ND | <20 | 120 | 45,200 | N/D | N/D |
| nickel | 1.4 | ND | ND | 331 | 1400 | 160 |
| zinc | 10 | 4 | 7 | 1110 | 120† | 110† |

†: Hardness-dependent (based on 100 mg/l $CaCO_3$); N/D: Criteria not determined; ND: Not detected

**NOAA Trust Habitats and Species in Site Vicinity**

Surface waters of interest to NOAA include the lower reach of Browns Branch to the Delaware Bay (Table 2) (Miller 1988). The dam at McCauley Pond prevents access further upstream. The reach of Browns Branch below the impoundment is more than six meters wide, with medium flow and a sand/gravel substrate. The Murderkill River is a medium-

Table 2. NOAA resource use of the Murderkill River (USFWS 1980; Miller 1988).

| Species | Murderkill River and Associated Wetland |
|---|---|
| INVERTEBRATES | |
| eastern oyster | S,N |
| hard clam | |
| whelk | |
| | |
| FISH | |
| alewife | A |
| Atlantic menhaden | N |
| black drum | |
| blueback herring | A |
| bluefish | |
| summer flounder | |
| shortnose sturgeon | |
| weakfish | |
| white perch | N |
| S: spawning area; N: nursery area; A: adult area | |

sized, low-gradient river with low water quality caused by high nutrient loading, and low dissolved oxygen during the summer. The Murderkill River is part of a wetland system, and both the river and wetland are tidally influenced. Lower reaches of the Murderkill River and its associated wetland are mid-salinity (5-16.5 ppt) estuarine habitats.

The marine/estuarine invertebrate species in the Murderkill River are only found in the lower reaches of the river and its associated wetland. The fish species of interest to NOAA in this river are found from the mouth upstream to the impoundment at McCauley Pond (Table 2). The lower Murderkill River is closed to fishing due to high bacterial levels (Miller 1988). NOAA trust resources use Delaware Bay for spawning and nursery habitat, and as a migratory route. Commercial and recreational fisheries are also important in the bay (USFWS 1980).

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Leslie Brunker 215-597-0985 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Alyce T. Fritz 215-597-3636 |

**References**

E&E (Ecology and Environment Inc.). 1986. Site Inspection/Sampling of Kent County Landfill, Houston, DE. Field Investigations of Uncontrolled Hazardous Waste Sites. Philadelphia: U.S. Environmental Protection Agency, Region 3.

EPA. 1986a. Hazardous Ranking System Package. Kent County Landfill (Houston). Houston, DE, EPA Region 3. Philadelphia: U.S. Environmental Protection Agency, Region 3.

EPA. 1986b. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Miller, R., Program Manager, Fisheries, Delaware Fisheries and Wildlife Services, Dover, Delaware, personal communication, January 19, 1989.

NUS. 1986. Site Inspection of Kent County Landfill. (Houston). Philadelphia: U.S. Environmental Protection Agency, Hazardous Site Control Division.

USFWS. 1980. Atlantic coast ecological inventory: Wilmington, Delaware. Washington, D.C.: U.S. Fish and Wildlife Service. 39074-A1-EI-250.

**Anne Arundel County Landfill**
**Glen Burnie, Maryland**
**Region 3**
**MDD980705057**

## Site Exposure Potential

The Anne Arundel County Landfill covers 52.6 hectares in an industrial and commercial section of Glen Burnie, Maryland (Figure 1). From the late 1950s to 1970, 12 hectares of the site were a privately-owned landfill, with no disposal records kept. Anne Arundel County closed the old landfill in 1970 and operated it as a municipal solid waste landfill until 1982. The closure in 1970 consisted of capping with 0.3-0.6 meters of clay, revegetation, and installation of 50 vents. Under county ownership, the only recorded disposal of hazardous wastes at the site was 91 metric tons of inorganic salts and solids from Diamond Shamrock Corporation's plant in Baltimore (EPA 1987).

The Anne Arundel County Landfill site is on the northern bank of Furnace Creek (EPA 1987), which flows east and enters Curtis Creek 1.5 km from the site (USFWS 1980). Curtis Creek flows north and discharges into the Patapsco River 5 km further downstream. The Patapsco River enters Chesapeake Bay 15 km from the site.

Contaminant migration pathways to NOAA trust resources are surface water runoff and groundwater flow to Furnace and Curtis creeks.

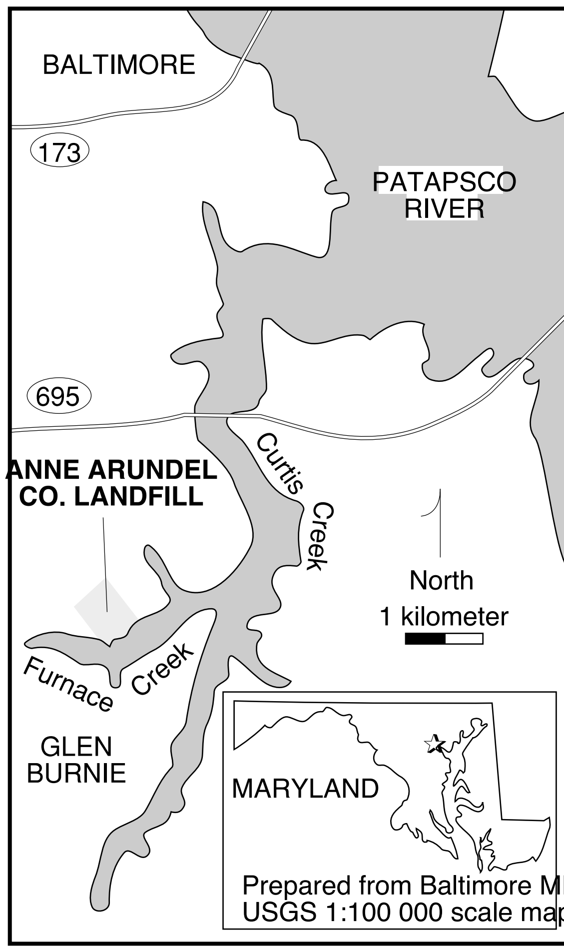

Figure 1. The Anne Arundel Landfill in Glen Burnie, Maryland.

## Site-Related Contamination

The contaminants of concern to NOAA at the site are trace metals and cyanide (Table 1). These inorganic contaminants were observed in groundwater at concentrations exceeding AWQC for the protection of saltwater aquatic life by up to 584 times. Concentrations of copper, lead, mercury, zinc, and cyanide exceeding AWQC were measured in Furnace Creek. Because Furnace Creek is tidally influenced, areas both upstream and downstream of the site could be

influenced by contaminants leaving the
site (NUS 1984).

Table 1. Maximum concentrations of selected contaminants at the Anne Arundel County Landfill site (NUS 1984); AWQC for the protection of saltwater aquatic life (EPA 1986); concentrations in µg/l.

| | Furnace Creek | | | | |
|---|---|---|---|---|---|
| | | Surface Water | | AWQC | |
| Contaminant | Groundwater | Downstream | Upstream | Acute | Chronic |
| INORGANIC SUBSTANCES | | | | | |
| Trace Metals | | | | | |
| arsenic | 294 | 1.26 | 2.05 | 69 | 36 |
| chromium | 307 | 2.1 | 3.3 | 1100 | 50 |
| copper | 272 | N/A | 4.7 | 2.9 | 2.9 |
| lead | 16 | 70 | 68 | 140 | 5.6 |
| mercury | 14.6* | 12.7* | 6.3* | 2.1 | 0.025 |
| nickel | 227* | N/A | 3.7* | 75 | 8.3 |
| zinc | 628 | 89* | 32* | 95 | 86 |
| Other | | | | | |
| cyanide | 110 | 42 | 110 | 1.0 | 1.0 |
| * Questionable data | | | | | |

## NOAA Trust Habitats and Species in Site Vicinity

The major habitat of concern to NOAA is Curtis Creek (Table 2). Under base flow conditions, Curtis Creek is 200 to 300 meters wide at its confluence with Furnace Creek. The depth in the upper reaches of Curtis Creek ranges from 3 to 6 meters; the creek is dredged to a depth of eight meters in the lower reaches. Due to the larger volume of water and higher flow, the water quality in Curtis Creek is fairly good. Curtis Creek supports a diverse population of marine and anadromous fish species, benthic organisms, and zooplankton (USFWS 1980). A commercial and recreational fishery exists for many of these species in Curtis Creek and the Patapsco River.

Table 2. NOAA trust resource use of Curtis Creek (USFWS 1980; VIMS 1983).

| Species | Spawning Area | Nursery Area | Adult Area | Migration Route | Commercial Fishery | Recreational Fishery |
|---|---|---|---|---|---|---|
| alewife | X | X | | X | X | X |
| American eel | | | X | | X | X |
| American shad | | X | | X | X | X |
| Atlantic sturgeon | | | | X | | |
| blueback herring | X | X | | X | X | X |
| hickory shad | X | X | | X | | X |
| gizzard shad | X | X | | X | X | X |
| striped bass | | | | X | X | X |
| white perch | X | X | X | X | X | X |

Furnace Creek, which is adjacent to the site, is an estuarine tidal system 60 to 90 meters wide and up to four meters deep. Large parts of the creek are organic-rich mud flats that are covered by shallow water or exposed during low tide (Butler 1988; Garrison 1988). The tide ranges from 0.3 to 0.5 meters and the salinity ranges from 0.5 to 5 ppt. Urban runoff has degraded the water quality in Furnace Creek. Low, dissolved oxygen caused by algal blooms has been a recurring problem and there have been fish kills of white perch and menhaden in the upper parts of the creek. Furnace Creek has a less diverse population of aquatic organisms than Curtis Creek and does not support runs of anadromous fish. However, most fish species using Curtis Creek may be present in Furnace Creek.

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Gerardo Amador | 215-597-3167 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Alyce Fritz | 215-597-3636 |

**References**


Butler, W., field biologist. Maryland Department of the Environment, Baltimore, Maryland, personal communication, November 9, 1988.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. National Priority List, Superfund Hazardous Waste Site Listed under the CERCLA. Anne Arundel County Landfill, Glen Burnie, Maryland. Philadelphia: U.S. Environmental Protection Agency, Region 3.

Garrison, Natural Resources Biologist, Maryland Department of the Environment, Baltimore, Maryland, personal communication, November 9, 1988.

NUS Corporation. 1984. Site Inspection Report, TDD No. F3-8305-23. Philadelphia: U.S. Environmental Protection Agency, Region 3.

USFWS. 1980. Atlantic coast ecological inventory: Baltimore. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map.

Virginia Institute of Marine Science (VIMS). 1983. Sensitivity of coastal environments and wildlife to spilled oil: Maryland. An atlas of coastal resources. Seattle: Ocean Assessment Division, NOAA.

**Bush Valley Landfill**
**Abingdon, Maryland**
**Region 3**
**MDD980504195**

## Site Exposure Potential

The Bush Valley Landfill is an inactive landfill on 12 hectares in Abingdon, Maryland (Figure 1). Before 1977, the landfill was allegedly used for open burning of trash. From 1977 to 1982, the landfill had a permit from the State of Maryland to accept municipal wastes. According to American Cyanamid, the landfill also received industrial process wastes (EPA 1986a).

Between 1979 and 1984, the State of Maryland issued an Administrative Order regarding the landfill's operating procedures and closure (EPA 1986a). The owner never complied fully with the orders; the landfill is only partially capped and there are no diversion ditches or leachate collection systems.

The landfill is unlined and rises 7.5 meters above the surrounding area. The north slope and the top are only sparsely vegetated because erosion gullies have formed. The south face is well-vegetated. Leachate seeps have been observed along the northern and southern slopes. Two unlined basins on the east side of the landfill collect surface runoff. One of the basins discharges into the adjacent stream, Bynum Run, via a pipeline. The shallow groundwater below the landfill flows southeast towards the lower reach of Bynum Run and the Bush River (NUS 1985).

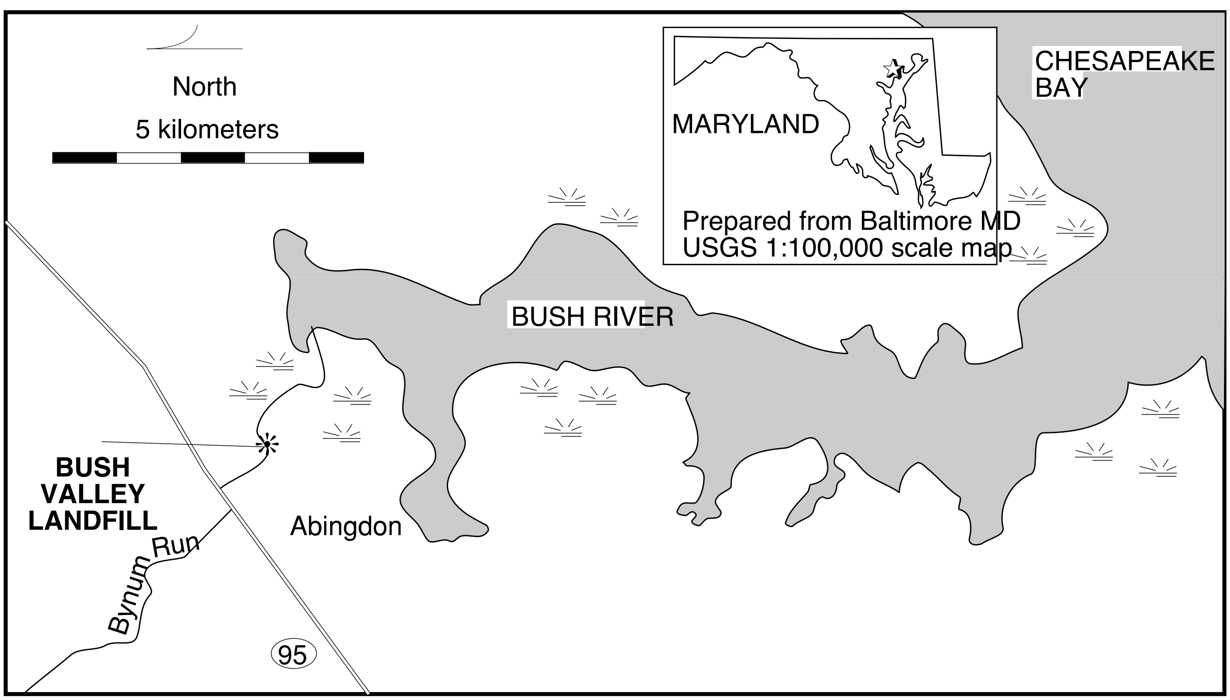


Figure 1. The Bush Valley Landfill in Abingdon, Maryland.

Bynum Run is about 90 meters north of the site. The floodplain of Bynum Run is wooded and slopes an average of five percent towards the stream (NUS 1985). Part of the property is within the 100-year floodplain. A 49-hectare marsh is 60 meters east of the site. Bynum Run flows southeast for 2 km before entering the Bush River, which discharges into Chesapeake Bay 16 km below the site.
Contaminant migration pathways to NOAA trust resources are surface water runoff, leachate discharges, and groundwater flow to Bynum Run.

## Site-Related Contamination

Trace metals, the contaminants of concern at the site, were observed in groundwater at concentrations exceeding AWQC for the protection of freshwater aquatic life (Table 1) (NUS 1985; EPA 1986b). Zinc was also measured in leachate and silver was measured in water collected in Bynum Run downstream of the site at concentrations that exceeded the respective acute freshwater aquatic life AWQC. None of the concentrations of trace metals measured in sediment collected from the leachate areas, the sediment basins, or in Bynum Run exceeded the levels observed in natural sediments (EPA 1983).

Table 1. Maximum concentration of selected contaminants at the Bush Valley Landfill site (NUS 1985); AWQC for the protection of freshwater aquatic life (EPA 1986b); concentrations in µg/l.

| Contaminant | Groundwater | Leachate | Bynum Run Downstream Surface water | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|
| arsenic | 75 | N/A | N/A | 360 | 190 |
| cadmium | 3.0** | N/A | N/A | 3.9* | 1.1* |
| chromium | 809 | N/A | N/A | 16 | 11 |
| copper | 819 | N/A | N/A | 18* | 12* |
| lead | 164 | N/A | N/A | 82* | 3.2* |
| mercury | 0.63 | N/A | N/A | 2.4 | 0.012 |
| nickel | 506 | N/A | N/A | 1400* | 160* |
| silver | N/A | N/A | 10 | 4.1* | 0.12 |
| zinc | 668 | 1210 | N/A | 120* | 110* |

* Hardness-dependent (based on 100 mg/l $CaCO_3$) ; ** Questionable data ; N/A: Not available

## NOAA Trust Habitats and Species in Site Vicinity

The marsh adjacent to the site is a tidally influenced, brackish, cattail/arrowhead marsh (EPA 1986a). Bynum Run is a small stream five meters wide and 0.15 meters deep with a substrate of gravel and cobble. The lower part of Bynum Run, 500 meters downgradient from the site, is tidally influenced. Benthic community structure near the site indicates good to excellent water quality; several anadromous fish species use the mouth of Bynum Run (Table 2). Catadromous American eel may be present in the wetland and creek adjacent to the site, although their presence has not been documented. Bynum Run is classified by the Maryland Department of Natural Resources as a Class III natural trout stream. There are small populations of trout in the free-flowing stretch of Bynum Run and the creek is used for recreational fishery (Butler 1988).

The Bush River is an estuarine tidal system with salinity ranging from 0.5 to 5 ppt. Near its confluence with Bynum Run, the upper reaches of the Bush River range from 0.9 to 3.5 km wide and from 0.3 to 1.8 meters deep (Garrison 1988). The substrate is silty sand. Water quality in the upper reaches of the Bush River is fair, due to urban and agricultural runoff, sewer overflows, and poor flushing of the tidal river (MDHMH 1987). Although the lower part of the tidal Bush River is Class II (open for shellfish harvesting), it is not fished because the natural population is too small. The Bush River supports a diverse population of marine and anadromous fish species, benthic organisms, and zooplankton (Table 2) (USFWS 1980).

Table 2. NOAA trust resource use of the Bush River and the mouth of Bynum Run (USFWS 1980; VIMS 1983).

| Species | Spawning Area | Nursery Area | Adult Area | Migration Route | Commercial Fishery | Recreational Fishery |
|---|---|---|---|---|---|---|
| alewife | X | X | | X | X | X |
| American eel | | | X | | X | X |
| American shad | | X | | X | X | X |
| Atlantic sturgeon | | | | X | | |
| blueback herring | X | X | | X | X | X |
| gizzard shad | X | X | | X | X | X |
| hickory shad | X | X | | X | | X |
| striped bass | | | | X | X | X |
| white perch | X | X | X | X | X | X |

**Response Category:** State Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Garth Conner 215-597-0429 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Alyce T. Fritz 215-597-3636 |

**References**

Butler, W., field biologist, Maryland Department of the Environment, Baltimore, personal communication, November 9, 1988.

EPA. 1983. Hazardous Waste Land Treatment. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. SW-874.

EPA. 1986a. National Priority List, Superfund Hazardous Waste Site Listed under the CERCLA, Bush Valley Landfill, Abingdon, Maryland. Philadelphia: U.S. Environmental Protection Agency, Region 3.

EPA 1986b. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Garrison, Natural Resources Biologist, Maryland Department of the Environment, Baltimore, personal communication, November 9, 1988.

MDHMH. 1986. Maryland Water Quality Inventory. Baltimore: Maryland Department of Health and Mental Hygiene.

NUS Corporation, FIT III. 1985. Site Inspection Logbook No. 829 TDD No. F3-8405-44. July 11, 1985. Philadelphia: U.S. Environmental Protection Agency, Region 3.

USFWS. 1980. Atlantic coast ecological inventory: Baltimore. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map.

Virginia Institute of Marine Science (VIMS). 1983. Sensitivity of coastal environments and wildlife to spilled oil: Maryland. An atlas of coastal resources. Seattle: Ocean Assessments Division, NOAA.

**Arrowhead Associates, Inc./Scovill Corporation**
**Montross, Virginia**
**Region 3**
**VAD042916361**

## Site Exposure Potential

The Arrowhead Associates, Inc./Scovill Corporation site is in a rural area of Westmoreland County, 3 km southeast of Montross, Virginia (Figure 1). Scovill electroplated and lacquered metal cosmetic cases from 1966 to 1972. In 1972, Arrowhead bought the facility and continued electroplating until 1979; from 1979 to 1981, Arrowhead filled cases with cosmetics at the site. Other firms also used the site to fill cosmetic cases from 1979 to the present (EPA 1987).

Plating wastes were treated in surface impoundments and discharged to Scates Branch with a permit issued under the National Pollutant Discharge Elimination System. When plating ceased in 1979, process equipment and materials were abandoned at the site. Drums containing wastes and raw materials (including organic solvents) remained outside in various stages of deterioration. In 1986, Scovill signed a Consent Order with EPA to

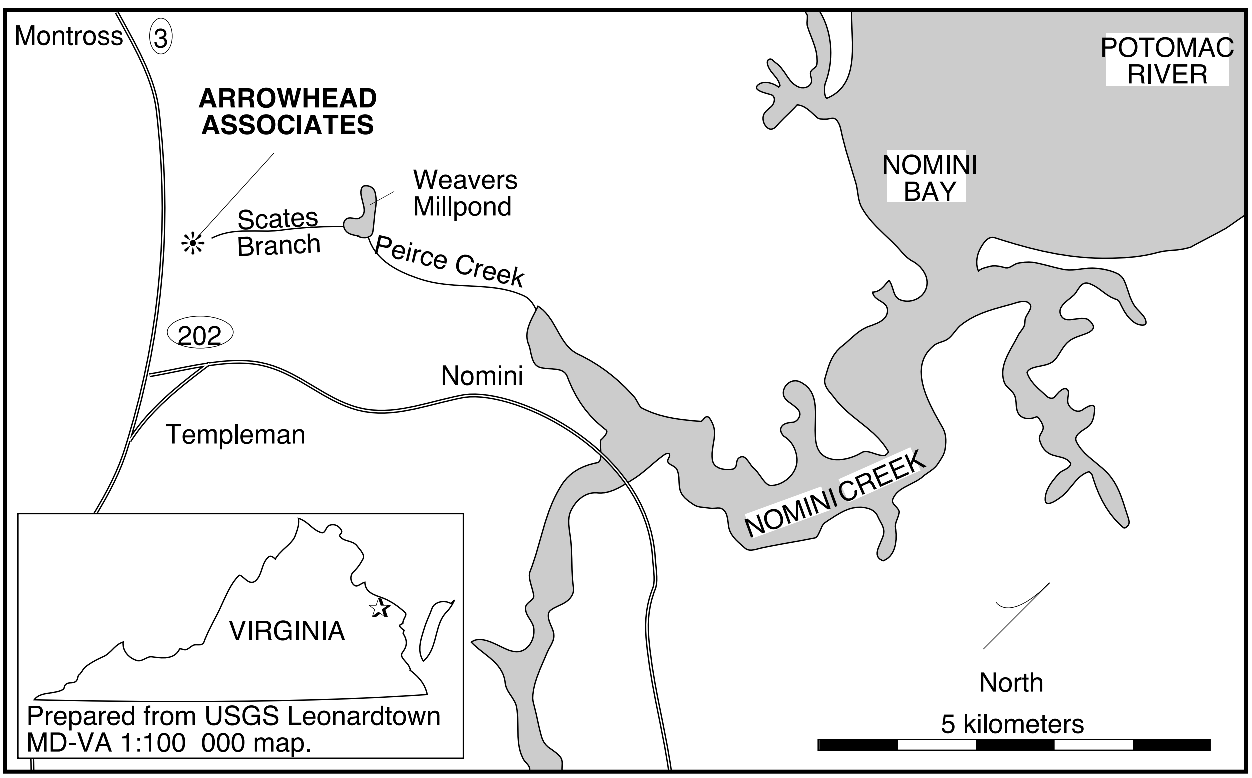

Figure 1. The Arrowhead Associates site in Montross, Virginia.

develop a plan to decontaminate or remove the drums and dispose of the contents; excavate, containerize, and dispose of visibly contaminated soils and surface materials;

and sample the soil, water, and sediments to define the depth and lateral extent of contamination and to identify the spread of contamination by surface water runoff routes. Scovill is currently implementing the plan (EPA 1987).

The site covers 10 hectares, with the manufacturing building centered on the southern half of the property. The northern half has six process waste impoundments and two sanitary waste impoundments. Groundwater is shallow (seven meters) and soil is permeable. Processed water from the surface impoundment system was discharged into Scates Branch.

Scates Branch originates 0.25 km northeast of the Arrowhead/Scovill site and flows northeast 1 km to Weavers Millpond. Weavers Millpond drains into Peirce Creek, which flows into Nomini Creek. Nomini Creek discharges into Nomini Bay on the Potomac River. The Potomac River, Nomini Bay, Nomini Creek, and Peirce Creek are all tidally influenced up to 1.9 km from the site. Wetlands are present throughout the tidally influenced areas (Virginia Department of Health 1986).

Contaminant migration pathways to NOAA trust resources are groundwater flow, waste discharge from the ponds, and surface water runoff from the site to Scates Branch and Peirce Creek.

**Site-Related Contamination**

The major contaminants of concern at the site include inorganic compounds from the electroplating process; cyanide and zinc were detected in greatly elevated concentrations (Table 1) (Law Environmental Services 1985). Other trace metals may be present, but high detection limits were used in the preliminary study. High levels of cyanide, copper, and zinc were discharged from the pond to Scates Branch, but actual concentration levels were not reported (EPA 1987). Sample analyses have not been conducted to determine the level of organic contaminants in Scates Branch.

Table 1. Maximum concentrations of contaminants at the Arrowhead Associates, Inc./Scovill Corp. site (Law Environmental Services 1985); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations for water in µg/l and for soil/sludge in mg/kg.

| | | | Settling Pond | | Sludge BedsDrain | | AWQC | |
|---|---|---|---|---|---|---|---|---|
| Contaminant | Soil | Water | Sludge | Water | Sludge | Water | Acute | Chronic |
| INORGANIC SUBSTANCES | | | | | | | | |
| Trace Metals | | | | | | | | |
| cadmium | <2.0 | <20.0 | <20.0 | <0.05 | <20.0 | <0.05 | 3.9* | 1.1* |
| chromium | 40.0 | <100.0 | <100.0 | <0.1 | 400.0 | <0.1 | 16.0 | 11.0 |
| lead | 120.0 | <100.0 | <100.0 | <0.2 | <100.0 | <0.2 | 82.0* | 3.2* |
| mercury | 0.3 | <0.5 | <0.5 | 0.001 | <0.5 | 0.003 | 2.4 | 0.012 |
| selenium | <1.0 | <5.0 | <5.0 | <1000.0 | <5.0 | <1000.0 | 260.0 | 35.0 |
| silver | <10.0 | <30.0 | <30.0 | <0.05 | <30.0 | <0.05 | 4.1* | 0.12 |
| zinc | 950.0 | 40.0 | <30.0 | N/A | 260,000.0 | N/A | 120.0* | 110.0* |
| Other | | | | | | | | |
| cyanide | 74.0 | 28.0 | 15.0 | 0.36 | 11,000.0 | 0.27 | 22.0 | 5.2 |

* Hardness-dependent (based on 100 mg/l $CaCO_3$) N/A: Not available

## NOAA Trust Habitats and Species in Site Vicinity

There is no available resource information for Scates Branch, Weavers Millpond, or Peirce Creek. Since the lower reach of Peirce Creek is tidal and has adjacent wetlands, it is likely that some of the species found in Nomini Creek make their way into Peirce Creek and, possibly, farther upstream. The habitats downstream of Peirce Creek are important to NOAA resources. Nomini Creek is a low-salinity, estuarine habitat (0.5-5.0 ppt); Nomini Bay is a mid-salinity, estuarine habitat (5.0-16.5 ppt).

Table 2. Selected NOAA trust resource use of Nomini Creek and Nomini Bay (USFWS 1980; VIMS 1983).

| Species | Nomini Creek | Nomini Bay |
|---|---|---|
| INVERTEBRATES | | |
| blue crab | | C,R |
| eastern oyster | | |
| soft shell clam | | |
| | | |
| FISH | | |
| alewife | M, S,N,C,R | M,C,R |
| American eel | C,R | C,R |
| American shad | M,S,N,R | M,C,R |
| Atlantic croaker | N,C,R | N,C,R |
| Atlantic menhaden | | C |
| Atlantic sturgeon | M | M |
| black drum | | N |
| blueback herring | M,S,N,C,R | M,C,R |
| bluefish | | N,A,C |
| hickory shad | M,S,N,R | M |
| red drum | | N |
| spot | | N,C,R |
| striped bass | M,C,R | M,C,R |
| summer flounder | | N |
| weakfish | | N,C,R |
| white perch | | M,C,R |
| winter flounder | | N,R |

S: spawning ground; M: migration route; N : nursery area; R: recreational fishing; A : adult concentration
C : commercial fishing

**Response Category:** State Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

Terry Stilman 215-597-0984

**NOAA Coastal Resource Coordinator**

Alyce Fritz 215-597-3636

**References**

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. National Priorities List Package (CERCLA). Arrowhead Associates, Inc./Scovill Corporation. Montross, VA. Philadelphia: U.S. Environmental Protection Agency, Region 3.

Law Environmental Services. 1985. Scovill Assessment Remediation. LES Job No. HC528. Philadelphia: U.S. Environmental Protection Agency, Region 3.

USFWS. 1980. Atlantic coast ecological inventory: Washington. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250 000-scale map. No. 38076-A1-EI-250.

Virginia Department of Health. 1986. Preliminary Assessment of Arrowhead Associates Facility. Richmond, Virginia: Bureau of Solid Waste Management, Commonwealth of Virginia.

Virginia Institute of Marine Science (VIMS). 1983. Sensitivity of coastal environments and wildlife to spilled oil: Virginia. An atlas of coastal resources. Seattle: Ocean Assessments Division, NOAA.

**ABC One Hour Cleaners**
**Jacksonville, North Carolina**
**Region 4**
**NCD024644494**

## Site Exposure Potential

The ABC Cleaners site is on 0.4 hectares in a residential area of Jacksonville, North Carolina (Figure 1). The site consists of two buildings joined to form one complex. Since 1954, ABC has operated a commercial dry cleaning operation at the site. The facility uses 380 liters of tetrachloroethylene (PCE) per month for dry cleaning. Directly behind the two buildings is a smaller building that houses a septic tank/soil absorption system, two dry-cleaning machines, and a 950-liter above-ground PCE tank. During its entire period of operation, ABC has used the septic system for disposal of waste water and sewage. According to the site owner, PCE could have entered the septic tank through leaks in the dry-cleaning machines or from small spills. Spent solvent from dry cleaning operations is recycled (distilled) on-site. From 1954 to 1985, sludge from the bottoms of the distillation tanks (still bottoms) was used to fill in potholes on-site or was buried on-site as a means of disposal. In 1985, a groundwater monitoring study suggested that ABC was a source of PCE contamination to a community well field. Since that time, the still bottoms have been shipped off-site for disposal at an approved hazardous waste disposal facility (EPA 1987).

ABC One Hour Cleaners is 1 km northwest of estuarine wetlands adjacent to Northeast Creek, which is 1.3 km southeast of the site and the nearest downslope surface water body to the site. Northeast Creek flows southwest into the New River, which drains into the Atlantic Ocean 29 km further downstream to the southeast. The average slope of terrain between the site and Northeast Creek is 0.7 percent. Groundwater beneath the site occurs in two aquifers: a surficial sands aquifer and the Castle Hayne Limestone aquifer.

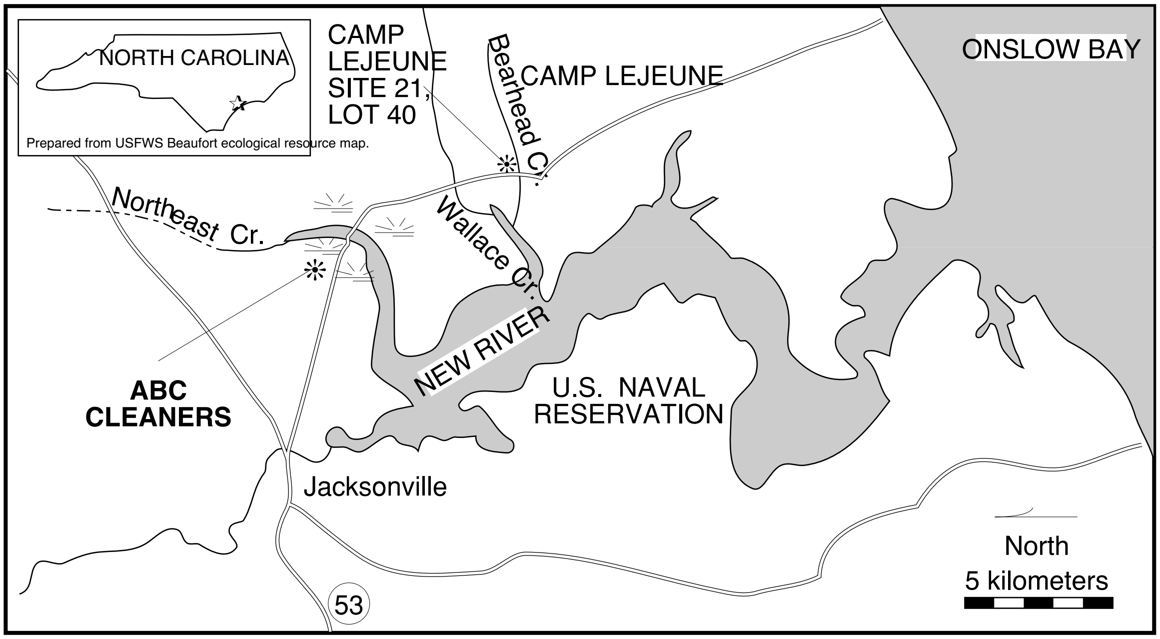


Figure 1. The ABC One Hour Cleaners site in Jacksonville, North Carolina.

Groundwater in the surficial sands aquifer occurs at depths as shallow as two meters below the ground surface. Groundwater migration in the area is to the southeast (EPA 1987). The Superfund site, Camp Lejeune Marine Corps Base (Site 21 Lot 40) is to the south on Bearhead Creek, which also drains into the New River.

Possible contaminant migration pathways to NOAA trust resources include groundwater flow and surface water runoff to Northeast Creek.

## Site-Related Contaminations

The contaminants of concern to NOAA are tetrachloroethylene (PCE), trichloroethylene (TCE), dichloroethylene, and vinyl chloride (Table 1). Vogel and McCarty (1985) have proposed that TCE, dichloroethylene, and vinyl chloride are products of the anaerobic biodegradation of PCE in groundwater. In 1984, the U.S. Marine Corps sampled 40 municipal wells near the site and detected PCE and related organic contaminants in three wells just downgradient from the ABC facility. As a result, in 1985 the North Carolina Department of Natural Resources and Community Development (NRCD) drilled three additional wells, one on-site and two just downgradient of the site (NRCD 1986). PCE and TCE were detected in the ABC well at concentrations of 12,000 µg/l and 2.7 µg/l, respectively. The five wells downgradient of the site exhibited PCE concentrations up to 1,580 µg/l. TCE was detected in four of the wells at concentrations up to 57 µg/l, and trans-dichloroethylene was detected in one well at 92 µg/l.

Table 1. Maximum concentrations of selected contaminants at the ABC One Hour Cleaners site (NRCD 1986); LOEL (EPA 1986); concentrations in µg/l.

| Contaminant | Groundwater Downgradient Wells | Groundwater On-site Wells | LOEL Acute | LOEL Chronic |
|---|---|---|---|---|
| Volatile Organic Compounds | | | | |
| tetrachloroethylene | 1,580 | 12,000 | 10,200 | 450 |
| trichloroethylene | 57 | 2.7 | 2,000 | N/A |
| trans-dichloroethylene | 92 | ND | 224,000 | N/A |
| vinyl chloride | 27 | ND | N/A | N/A |
| N/A: Not available; | ND: Not detected | | | |

## NOAA Trust Habitats and Species in Site Vicinity

Habitats of interest to NOAA include the lower reaches of Northeast Creek. Northeast Creek, a tidally influenced, mid-salinity estuarine creek, provides habitat for NOAA trust species (Table 2). The headwaters of Northeast Creek are intermittent and the creek mouth is 60 meters wide. There are saltwater wetlands along the lower reaches of the creek. The New River is a high-salinity, channelized estuarine system. Channelization has resulted in reduced habitat diversity, although this river supports NOAA trust species (Nelson 1989). Atlantic sturgeon and American shad are protected by North Carolina law.

Table 2. NOAA trust resource use of lower Northeast Creek (USFWS 1980).

| Commercial Species Fishery | | Spawning | Nursery | Migratory Adult | Route Recreational | Fishery |
|---|---|---|---|---|---|---|
| INVERTEBRATES | | | | | | |
| blue crab | X | X | X | | X | X |
| brown shrimp | | X | | | X | X |
| white shrimp | | X | | | X | X |
| pink shrimp | | X | | | X | X |
| | | | | | | |
| FISH | | | | | | |
| alewife | | | | X | | |
| American eel | | | X | | X | X |
| American shad | | | X | | | |
| Atlantic croaker | X | X | | X | X | Atlantic menhaden |
| X | X | | | X | | |
| Atlantic sturgeon | | | | X | | |
| blueback herring | | | | X | | |
| hickory shad | | | | X | | |
| mullet | | X | X | | X | X |
| southern flounder | | | X | | X | X |
| southern kingfish | | X | X | | X | X |
| summer flounder | | | X | | X | X |
| spotted seatrout | | X | X | | X | X |
| striped bass | | | | X | | |
| weakfish | | X | X | | X | X |
| white perch | | X | X | X | X | X |

**Response Category:** Federal Fund

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Steve Nohrstedt | 404-347-3402 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

**References**

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Hazardous Ranking System Package, ABC One Hour Cleaners, Jacksonville, Onslow County, North Carolina. Atlanta: U.S. Environmental Protection Agency, Region 4.

McMorris, C., U.S. Environmental Protection Agency, Atlanta, personal communication with Victor Melts, Manager, ABC One Hour Cleaners, Jacksonville, North Carolina, May 1987.

NRCD. 1986. Investigation to Define the Source(s) of Tetrachloroethylene that Have Contaminated the Community Water Supply Wells at Tarawa Terrace I, Camp Lejeune Marine Corps Marine Base, Onslow County. Raleigh, North Carolina: North Carolina Department of Natural Resources and Community Development.

Nelson, K., fisheries biologist, North Carolina Department of Natural Resources and Community Development, Bureau of Inland Fisheries, Greenville, North Carolina, personal communication, January 20, 1989.

USFWS. 1980. Atlantic coast ecological inventory: Beaufort, North Carolina. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 map scale. 34076-A1-EI-250.

Vogel, T., and P. McCarty. 1985. Biotransformation of tetrachloroethylene to trichloroethylene, dichloroethylene, vinyl chloride, and carbon dioxide under methanogenic conditions. In: <u>Applied and Environmental Microbiology</u>, May 1985, pp. 1080-1083.

**Camp Lejeune Marine Corps Base: Site 21 Lot 40**
**Onslow County, North Carolina**
**Region 4**
**NC6170022580**

## Site Exposure Potential

The Camp Lejeune Marine Corps Base was established in 1941 and occupies 440 $km^2$ in Onslow County, North Carolina (Figure 1). Site 21 Lot 140 is one of 22 sites on the base identified by the U.S. Navy as a waste disposal area posing a potential threat to the environment. Site 21 Lot 140 is an 18,000 $m^2$ area where pesticides were mixed and pesticide application equipment was cleaned. In addition, PCB-contaminated transformer oil was reportedly dumped in a 2.5-meter deep pit on the site during 1950 and 1951 (EPA 1986).

The site is 900 meters from the marshland around Bearhead Creek. Surface water runoff drains via a railroad ditch into Bearhead Creek, 2.5 km west of the site (EPA 1987). Bearhead Creek flows for 2 km before entering Wallace Creek, which discharges into the tidal portion of the New River, 1.5 km further downstream (USGS 1971). The river drains into the Atlantic Ocean 25 km south of the mouth of Wallace Creek (USFWS 1980).

Another NPL site, ABC One Hour Cleaners, is north of Camp Lejeune on Northeast Creek, which also drains to the New River.

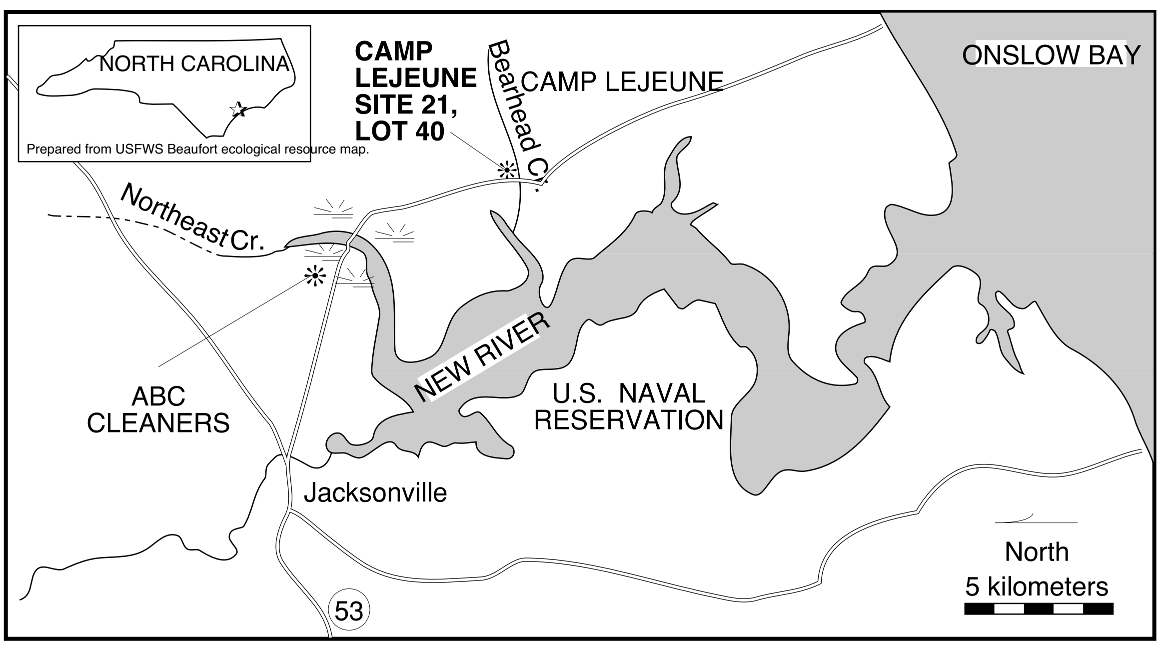


Figure 1. Camp Lejeune Site 21 Lot 40 in Onslow County, North Carolina.

Possible contaminant migration pathways to NOAA trust resources include surface water runoff and groundwater flow to Bearhead Creek, Wallace Creek, and the New River.

## Site-Related Contamination

The contaminants of concern to NOAA are pesticides and PCBs. Soil sampling and analyses conducted on-site indicated the presence of DDT, DDE, DDD, aldrin, and heptachlor in the soils. The extent or severity of this contamination could not be determined with the information available. It is not known whether PCB contamination was detected on-site. There was no information on groundwater contamination in the documents reviewed (EPA 1986).

## Trust Habitats and Species in Site Vicinity

Habitats of interest to NOAA include Bearhead Creek, Wallace Creek, and the New River (Table 1). No information was available regarding the aquatic habitats of Bearhead Creek. Wallace Creek, at its confluence with Bearhead Creek, is 100 meters wide and is a tidally influenced, mid-salinity estuarine creek. There are saltwater wetlands along the lower reaches of the creek. The New River is a high-salinity, channelized estuarine system. Channelization has reduced habitat diversity (Nelson 1989).

Table 1. NOAA trust resource use of lower Wallace Creek, and the New River (USFWS 1980; Nelson 1989).

| Species | Lower Wallace Creek | New River |
|---|---|---|
| INVERTEBRATES | | |
| blue crab | S,N,A,R,C | S,N,O,A,R,C |
| brown shrimp | N,C,R | N,R,C |
| pink shrimp | N,C,R | N,R,C |
| white shrimp | N,R,C | N,R,C |
| | | |
| FISH | | |
| alewife | | M |
| American eel | A,R,C | S,N,A,R,C |
| American shad | | M |
| Atlantic croaker | N,A,R,C | N,A,R,C |
| Atlantic menhaden | N,A,C | N,A,C |
| Atlantic sturgeon | | M |
| blueback herring | | M |
| hickory shad | | M |
| mullet | N,A,R,C | N,A,R,C |
| southern flounder | A,R,C | A,R,C |
| southern kingfish | N,A,R,C | N,A,R,C |
| spotted seatrout | N,A,R,C | S,N,A,R,C |
| striped bass | | M,A,R,C |
| summer flounder | A,R,C | A,R,C |
| weakfish | N,A,R,C | S,N,A,R,C |
| white perch | | M,A,R,C |
| | | |
| MISCELLANEOUS | | |
| Atlantic bottlenose dolphin | | A |
| green sea turtle | | A |
| harbor seal | | A |
| Kemp's Ridley turtle | | A |
| loggerhead sea turtle | | A * |

S: spawning area ; N: nursery area; A: adult concentration; O: overwintering area; M: migratory route R: recreational fisheries; C: commercial fisheries; * reported to nest along coastline of Onslow Bay

The use of Bearhead Creek by NOAA resources has not been documented, but American eel are probably present in the creek. The lower stretch of Wallace Creek is used by several marine species as nursery and adult habitat. The New River contains numerous NOAA trust resources,some of which are of special interest due to state and/or Federal law. North Carolina law protects Atlantic sturgeon, American shad, green turtle, loggerhead sea turtle, and Kemp's Ridley turtle. The loggerhead and green turtles are also federally listed threatened species, and the Kemp's Ridley turtle is federally listed as an endangered species (USFWS 1980; Nelson 1989).

**Response Category:** Federal Facility

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Victor Weeks 404-347-3402 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| John Lindsay 404-347-5231 |

**References**


EPA. 1986. Hazardous Ranking System Package, Camp Lejeune Marine Corps Base, Onslow County, North Carolina. Atlanta: U.S. Environmental Protection Agency, Region 4.

EPA. 1987. Hazardous Ranking System Package, ABC One-Hour Cleaners, Jacksonville, North Carolina. Atlanta: U.S. Environmental Protection Agency, Region 4.

Nelson, K., fisheries biologist, North Carolina Department of Natural Resources and Community Development, Bureau of Inland Fisheries, Greenville, North Carolina, personal communication, January 24, 1989.

USFWS. 1980. Atlantic coast ecological inventory: Beaufort, North Carolina. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250 000 map scale. 34076-A1-EI-250.

USGS. 1971. Camp Lejeune, North Carolina. Washington, D.C.: U.S. Geological Survey. 7.5 minute series map.

**FCX, Incorporated**
**Washington, North Carolina**
**Region 4**
**NCD981475932**

## Site Exposure Potential

The FCX, Inc. site occupies 3.25 hectares outside Washington, North Carolina (Figure 1). The site is bordered on the northeast by a railroad, on the northwest and southeast by agricultural land, and on the southwest by a wetland. FCX repacked and sold agricultural chemicals on the site from 1945 to 1986. Facilities include a large warehouse and a tank farm with 18 above-ground storage tanks. In the early 1970s, an unlined trench measuring 4 meters by 75 meters and three to four meters deep was dug 60 meters southwest of the warehouse. The trench was backfilled with one meter of soil and filled with waste agricultural chemicals contained in jugs and paper and plastic bags. These wastes were then covered with 60 cm of soil (Nicholson 1987).

The closest surface water to the site is a 111-hectare freshwater wetland 90 meters to the southwest of the trench on the FCX site. This wetland is drained by Kennedy Creek; a small arm of Kennedy Creek is within 300 meters of the trench. The wetlands between the site and Kennedy Creek slope to the southwest at less than an one percent grade. Kennedy Creek flows 900 meters to the southeast before discharging into the Pamlico River, which empties into Pamlico Sound.

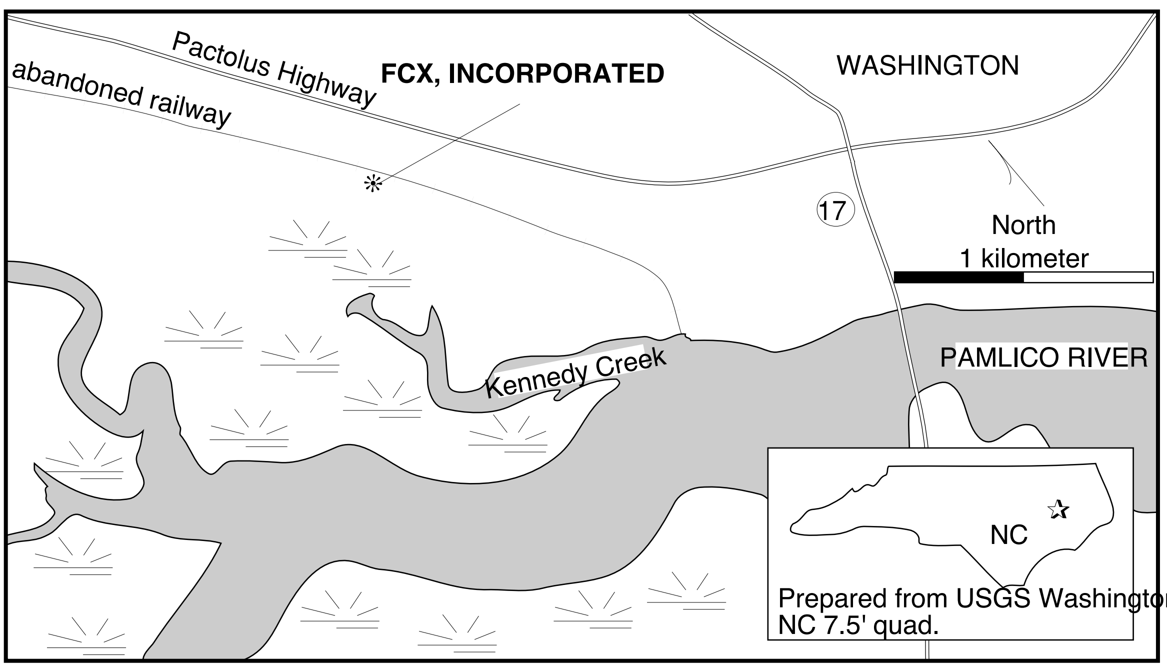


Figure 1. The FCX, Incorporated, site in Washington, North Carolina.
Groundwater occurs 3.25 to 4 meters below the site (Nicholson 1987). No information was available regarding the direction of groundwater flow or possible groundwater discharge points. As the deepest point of pesticide and herbicide disposal was two to

three meters below the ground surface, these chemicals may contaminate the groundwater.

Possible contaminant migration pathways to NOAA trust resources are surface water runoff and groundwater discharge to wetland habitats in Kennedy Creek and the Pamlico River.

## Site-Related Contamination

The contaminants of concern to NOAA are pesticides, mercury, and other agricultural chemicals (Table 1). Contaminant levels in soil samples taken adjacent to the disposal trench reportedly were generally much higher than in soils sampled away from the disposal trench. Contaminants present in high concentrations included chlordane, aldrin, DDT, DDE, and dieldrin; aldrin had the highest concentrations (1,585 mg/kg). Mercury was found at high levels in soil samples away from the disposal trench.

Table 1. Maximum concentrations of contaminants at the FCX site (Nicholson 1987); concentrations in mg/kg.

| Contaminant Disposal Trench | Soils Adjacent To Other Locations on Site | Soils from |
|---|---|---|
| ORGANIC COMPOUNDS | | |
| Semi-Volatiles | | |
| hexachlorobenzene | 9.3 | ND |
| PAHs | 20.6 | 4.0 |
| | | |
| Pesticides | | |
| chlordane | 50.9 | 1.7 |
| aldrin | 1,585 | 0.15 |
| DDT | 159.5 | 1.8 |
| DDD | 0.26 | 0.46 |
| DDE and dieldrin | 37.7 | 0.61 |
| malathion | ND | 0.28 |
| carbon disulfide | 6.2 | ND |
| | | |
| INORGANIC SUBSTANCES | | |
| Trace Metals | | |
| mercury ND | 28 | |

ND: Not detected

## NOAA Trust Habitats and Species in Site Vicinity

Habitats with resources of concern to NOAA include the wetlands adjacent to Kennedy Creek, Kennedy Creek itself, the Pamlico River, and Pamlico Sound (Table 2). The wetlands are brackish and provide nursery and adult habitat for many of the commercially important species found in Pamlico Sound (Table 2).

NOAA trust resources use Kennedy Creek and the upper reaches of the Pamlico River, which are low-salinity and have a limited tidal range. Kennedy Creek receives sewage effluent from the city of Washington and thermal discharges from National Spinning, a textile mill situated along its banks. The creek suffers from low dissolved-oxygen levels during the summer months (Hawkins 1989). Kennedy Creek and the upper Pamlico River provide spawning and nursery habitat for blueback herring, striped bass, and pwhite perch. Although there is some recreational fishing in Kennedy Creek, the fish are not harvested as a food source because of the creek's poor water quality (Shiloar 1989).

The lower Pamlico River is a mid-salinity, tidal river used by blue crab and pink, white, and brown shrimp as a nursery area. This area is important for both recreational and commercial fisheries.

Pamlico Sound supports diverse marine resources; eastern oyster, blue crab, bay scallop, and pink shrimp are all significant fisheries in the sound. Green sea and loggerhead turtles, which are both federally listed as threatened species, use Pamlico Sound for migration and as adult habitat (USFWS 1980).

Table 2. Selected NOAA trust resource use of habitats in Kennedy Creek, the Pamlico River, and Pamlico Sound (USFWS 1980; Shiloar 1989).

| Species | Kennedy Creek/ Upper Pamlico River | Lower Pamlico River | Pamlico Sound |
|---|---|---|---|
| INVERTEBRATES | | | |
| bay scallop | | | A,C,N,R,S |
| blue crab | A,N,R | S,N,A,O,R,C | A,C,N,O,R,S |
| brown shrimp | | N,C,A,R | A,C,N,R |
| eastern oyster | | | A,C,N,R,S |
| pink shrimp | A,N,R | N,C,A,R | A,C,N,R |
| white shrimp | | N,C,A,R | A,C,N,R |
| | | | |
| FISH | | | |
| alewife | A,N,R,C | A,M,C,R | A,M,C,R |
| American eel | A,R,C | A,R,C | A,C,R |
| American shad | A,R,M,C | A,M,C,R | A,M,C,R |
| Atlantic menhaden | A,N,R | N,C,A | N,A,C,R |
| Atlantic sturgeon | C,M | M,C | M,C |
| blueback herring | A,N,R,S,C | A,M,C,R | A,M,C,R |
| flounder | | A,C,R | A,C,R |
| hickory shad | A,R,M,C | A,M,C,R | A,M,C,R |
| red drum | | R | R |
| striped bass | A,N,R,S,M | M,A,C,R | A,C,R |
| striped mullet | A,N,R,C | N,A,C,R | A,C,R |
| white perch | S,A,N,R,C | N,A,M,C,R | A,M,C,R |
| | | | |
| MISCELLANEOUS | | | |
| green sea turtle | | | A,M |
| loggerhead sea turtle | | | A,M |

A: adult habitat C: commercial fishery M: migration corridor O: overwintering area
N: nursery habitat R: recreational fishery S: spawning habitat

**Response Category:** Federal Fund

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Michael Townsend | 404-347-3402 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

**References**


EPA. 1987. Potential Hazardous Waste Site, Site Inspection Report, FCX-Washington site, Washington, North Carolina. Atlanta: U.S. Environmental Protection Agency, Region 4.
Hawkins, J., biologist, North Carolina Division of Marine Fisheries, Washington, North Carolina, personal communication, January 26, 1989.

Nicholson, G. C. 1987. Site Inspection Report, FCX-Washington site. Atlanta: Solid and Hazardous Waste Management Branch, CERCLA Unit, U.S. Environmental Protection Agency.

Shiloar, T., biologist, North Carolina Division of Marine Fisheries, Washington, North Carolina, personal communication, January 27, 1989.

USFWS. 1980. Atlantic coast ecological inventory: Rocky Mount, North Carolina. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map. 35076-A1-EI-250.

**New Hanover County Airport Burn Pit**
**Wilmington, North Carolina**
**Region 4**
**NCD981021157**

## Site Exposure Potential

The New Hanover County Airport Burn Pit is just west of the county airport in Wilmington, North Carolina (Figure 1). The above-ground burn pit is of earthen construction, with a valve on the side to drain off excess fluid into the surrounding soil. The pit was used from 1968 to 1979 for fire fighting training exercises. Flammable materials, including aviation fuel, fuel oil, kerosene, oil spill residues, and tank bottoms from fuel storage tanks, were poured into the pit, ignited, and extinguished using water, $CO_2$, or dry chemicals. In 1982, sorbent materials from (unidentified) river spill cleanups were reportedly dumped in the pit. As a result of all of these activities, wastes remaining in the pit have reportedly formed three layers: a light, oily top layer; a water layer; and a heavy sludge layer. The total waste volume remaining is estimated at 85,000 liters. In May 1986, New Hanover County sought to close the pit. The current status of the closure proposal is unknown (EPA 1986a,b).

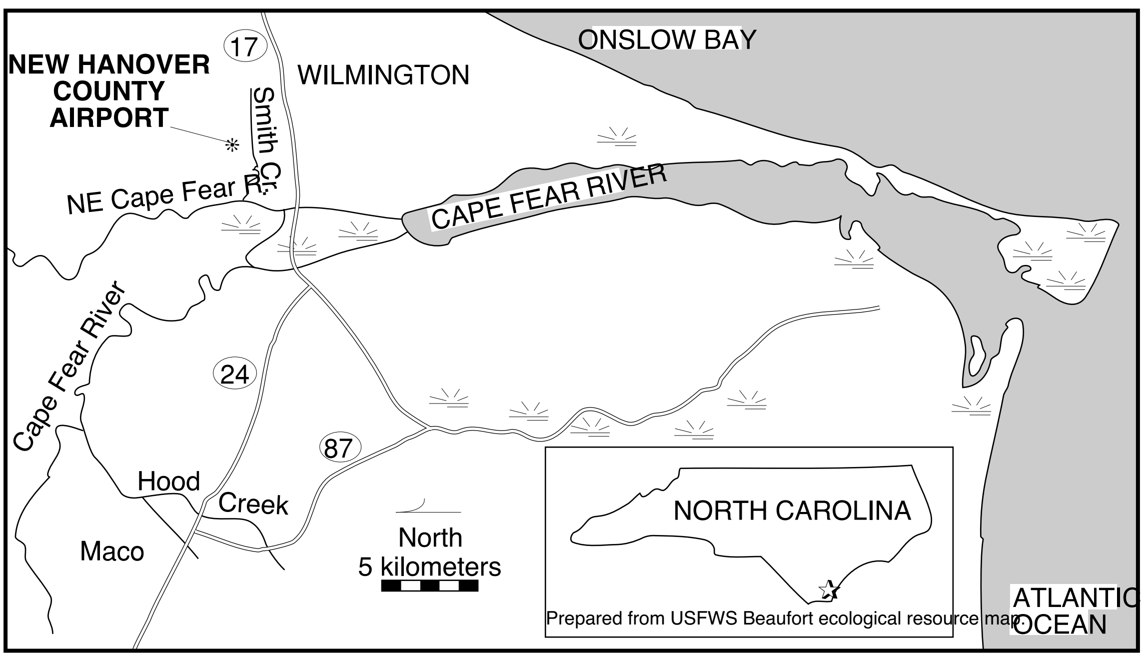


Figure 1. The New Hanover County Airport Burn Pit site in Wilmington, North Carolina. The site is 1.5 km north of Smith Creek. The average slope of terrain between the site and Smith Creek is 0.6 percent. The creek flows southwest for 4 km before discharging into the Northeast Cape Fear River which, in turn, flows into the Cape Fear River. The Cape Fear River flows into the Atlantic Ocean 35 km from the mouth of Smith Creek. Groundwater beneath the site occurs at an average depth of 1.5 meters. The direction of shallow groundwater migration at the site is south towards Cape Fear River (EPA 1986a,b).

Possible contaminant pathways to NOAA trust resources include groundwater flow and surface water runoff to Smith Creek and the Cape Fear River system.

**Site-Related Contamination**

The contaminants of concern to NOAA at the site are trace metals, VOCs, and PAHs. A January 1985 sampling of sludge from the burn pit revealed levels of lead contamination up to 182 mg/kg (DeRosa 1986). A study performed by the North Carolina Division of Health Services in May 1986 reported elevated concentrations of arsenic, barium, cadmium, chromium, lead, and mercury in soil around the pit, and VOCs and PAHs in other on-site soil samples (NCDHS 1985). Locations of these samples and the concentrations at which these contaminants were found were not provided in the documents reviewed.

**NOAA Trust Habitats and Species in Site Vicinity**

Habitats with resources of interest to NOAA include lower Smith Creek, Northeast Cape Fear River, and Cape Fear Riven. Smith Creek is a low-gradient, tidal, estuarine creek with an average width of 30 meters. There was no information available on resources in the upper reaches of Smith Creek, but the lower reach of Smith Creek is used extensively as a nursery and adult area for NOAA trust resources (Table 1). From the mouth of Smith Creek downstream to the upper reaches of Cape Fear River, the Northeast Cape Fear River is a mid-salinity estuarine system used by a number of fish species as a migratory corridor to upstream reaches. The Cape Fear River is classified as a high-salinity estuarine system and is important to shellfish both as a nursery and as a recreational/commercial fishing area.

Table 1. Selected NOAA trust resource use of Smith Creek and the Cape Fear River system (USFWS 1980; Nelson 1989).

| Species | Lower Smith Creek | Northeast Cape Fear River | Lower Cape Fear River |
|---|---|---|---|
| INVERTEBRATES | | | |
| blue crab | | A | S,N,A,O,R,C |
| brown shrimp | | | N,A,R,C |
| pink shrimp | | | N,A,R,C |
| white shrimp | | | N,A,R,C |
| | | | |
| FISH | | | |
| alewife | N,A,R | S,N,M,A,R,C | M,C |
| American eel | A | A,R,C | A,R,C |
| American shad | N,A, | S,N,M,A,R | M |
| Atlantic croaker | | N | N,A,R,C |
| Atlantic menhaden | | N | N,A,C |
| Atlantic sturgeon | A | S,N,M | M |
| blueback herring | N,A,R | S,N,M,A,R,C | M |
| croaker | | | N,A,R,C |
| flounder | | | N,A,R,C |
| hickory shad | N,A,R | S,N,M | M |
| kingfish | | N,A,R,C | N,A,R,C |
| red drum | | | A,R |
| spot | | | N,A,R,C |
| striped bass | N,A,R | M,A | M |
| white perch | N,A,R | S,N,M,A,R,C | S,N,M,R,C,A |

S : Spawning area; N: Nursery area; M: Migratory route; A: Adult Habitat; C: Commercial fishery; R : Recreational Fishery ; O : Overwintering area

Atlantic sturgeon and American shad, two species protected by North Carolina law, occur in the Cape Fear River system.

**Response Category:** Federal Enforcement

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Michelle Glenn | 404-347-3402 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

**References**

DeRosa, R. May 2, 1986. Letter to Denise Bland, EPA Region 4 CERCLA Project Officer, Atlanta. Raleigh, North Carolina: North Carolina Division of Health Services.

EPA. 1986a. Hazardous ranking system package. New Hanover County Airport Burn Pit, Wilmington, North Carolina. Atlanta: U.S. Environmental Protection Agency, Region 4.

EPA. 1986b. Potential Hazardous Waste Site Preliminary Assessment Form; New Hanover County Airport Burn Pit. Wilmington, North Carolina. Atlanta: U.S. Environmental Protection Agency, Region 4.

NCDHS. 1985. Groundwater Laboratory Analysis Sheets. Raleigh: North Carolina Department of Human Resources Division of Health Services.

Nelson, K., fisheries biologist, North Carolina Department of Natural Resources and Community Development, Division of Inland Fisheries, Greenville, North Carolina, personal communication, January 24, 1989.

USFWS. 1980. Atlantic coast ecological inventory.: Beaufort, N.C. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250 000 scale map. 34076-A1-EI-250.

**Potter's Septic Tank Services Pits**
**Maco, North Carolina**
**Region 4**
**NCD981023260**

## Site Exposure Potential

Potter's Septic Tank Services pits occupy 0.2 hectares in a residential area near Maco, North Carolina (Figure 1). From 1969 through 1976, Potter's Septic Tank Services used four on-site pits for the disposal of liquid, solid, and semi-solid wastes, including waste oil from spills, creosote, and sludge.

In August 1976, the U.S. Coast Guard was notified of an oil spill on Rattlesnake Branch, a small tributary stream of Hood Creek near Maco. This spill was traced back to the Potter's Septic Tank Services pits. Approximately 75,000 liters of waste oil had spilled from one of the pits into Rattlesnake Branch and the surrounding wetlands. Another 75,000 liters of waste oil were removed from this pit, and unknown amounts of oils, sludges, and contaminated soils were removed from the other pits. In 1983, trace metals and VOCs were detected in on- site soil, sludge, and groundwater. In the spring of 1984, 1,400 metric tons of contaminated soil were removed from the site for disposal at an approved hazardous waste disposal facility (EPA 1986).

The area surrounding the town of Maco is flat and dominated by extensive wetland areas. The site is 0.9 km east of Rattlesnake Branch and 1.8 km west of Hood Creek. Rattlesnake Branch drains into Hood Creek 4 km north of the site. Hood Creek flows north another 5 km before it joins the Cape Fear River, which flows into the Atlantic Ocean

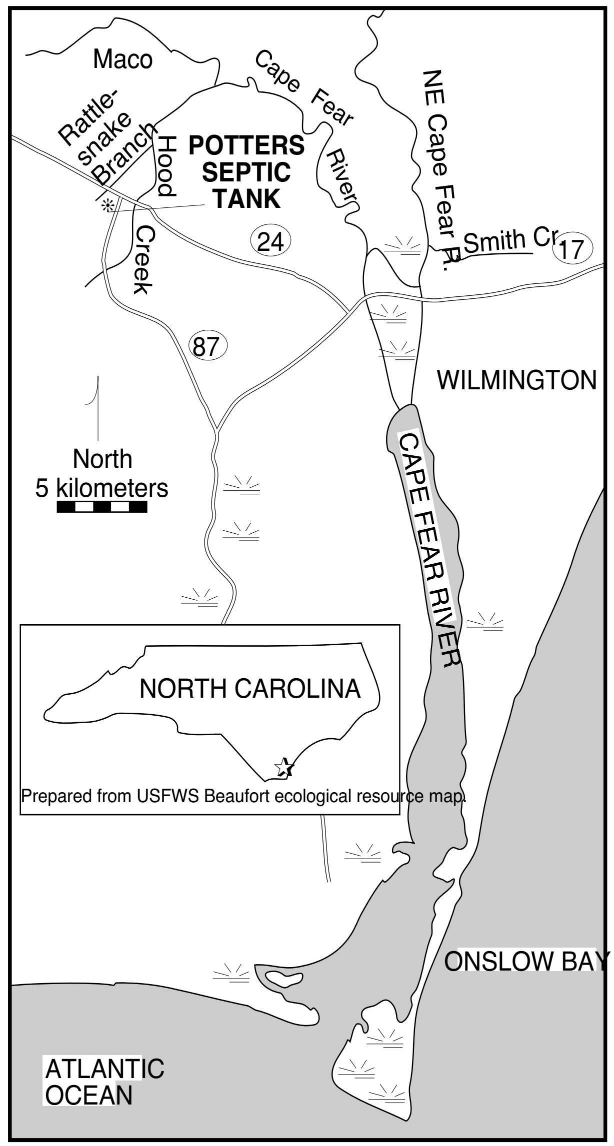


Figure 1. The Potters Septic Tank site in Maco, North Carolina.

55 km southeast of the site
(USFWS 1980; EPA 1986).
Potential contaminant migration pathways to NOAA trust resources are surface water runoff and groundwater flow to Hood Creek and the Cape Fear River.

**Site-Related Contamination**

The contaminants of concern to NOAA are trace metals and VOCs. Several trace metals have been detected in on-site soil and groundwater samples, including arsenic, chromium, mercury, cadmium, and cyanide. In addition, benzene, toluene, ethylbenzene, and other VOCs were detected in on-site soil and groundwater (EPA 1986). Sample locations, matrix types, and contaminant concentrations were not available in the documents reviewed.

**NOAA Trust Habitats and Species in Site Vicinity**

Hood Creek is a continuously flowing, low-gradient stream that averages eight meters wide and 1.5 meters deep. The substrate consists of sandy silt. The water quality is fair and slightly acidic; pH ranges from 4 to 5. No information was available on the aquatic habitats of Rattlesnake Branch. The Cape Fear River is the largest watershed in North Carolina. The stretch of the river at the confluence of Hood Creek is tidally influenced, with a salinity ranging from 0.5 to 5 ppt and average width of 90 meters and depth 1 to 5 meters. The river's substrate consists of sandy silt. Water quality in the lower reaches of the Cape Fear River is fair (USFWS 1980; Ashley 1989).

Several NOAA trust resources, including alewife, American shad, and Atlantic sturgeon, use Hood Creek and the Cape Fear River as spawning and nursery areas and as a migratory route (Table 1) (USFWS 1980). A number of euryhaline species use the tidal portion of the Cape Fear River (Allison 1989). Atlantic sturgeon and American shad, two species protected by North Carolina law, occur in the Cape Fear River system. There are recreational fisheries on Hood Creek and extensive commercial and recreational fisheries on the Cape Fear River (USFWS 1980; Allison 1989).

Table 1. NOAA trust resource use of Hood Creek and the Cape Fear River above the confluence with the Northeast Cape Fear River (USFWS 1980; Allison 1989).

| Species | Hood Creek | Cape Fear River |
|---|---|---|
| INVERTEBRATES | | |
| blue crab | | S,N,A |
| shrimp | | S,N,A,R,C |
| | | |
| FISH | | |
| alewife | S,N,A,M,R | S,N,A,M,R,C |
| American eel | A | A |
| American shad | S,N,A,M,R | S,N,A,M,R,C |
| Atlantic sturgeon | S,N,M | S,N,M |
| blueback herring | S,N,A,M,R | S,N,A,M,R,C |
| croaker | | N,A,R,C |

| | | |
|---|---|---|
| flounder | | N,A,R,C |
| hickory shad | S,N,A,M,R | S,N,A,M,R |
| red drum | | N,A,R,C |
| spot | | N,A,R,C |
| striped bass | S,N,A,M,R | S,N,A,M,R,C |
| white perch | S,N,M,R | S,N,M,R,C |
| S: Spawning area; N: Nursery area; M: Migratory route; A: Adult habitat; C: Commercial fishery; R: Recreational fishery | | |

**Response Category:** Federal Fund

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

Barbara Benoy 404-257-7791

**NOAA Coastal Resource Coordinator**

John Lindsay 404-347-5231

**References**


Allison, North Carolina Department of Natural Resources, Division of Marine Fisheries, Morehead, North Carolina, personal communication, January 20, 1989.

Ashley, North Carolina Department of Natural Resources, Department of Wildlife, Raleigh, North Carolina, personal communication, January 20, 1989.

EPA. 1986. Hazardous ranking system package, Potter's Septic Tank Services Pits, Maco, North Carolina. Atlanta: U.S. Environmental Protection Agency, Region 4.

USFWS. 1980. Atlantic coast ecological inventory: Florence. Washington, D.C.: U.S. Fish and Wildlife Service. 1: 250,000 scale map.

**Helena Chemical Company**
**Fairfax, South Carolina**
**Region 4**
**SCD058753971**

## Site Exposure Potential

The Helena Chemical Company site occupies 5.5 hectares near the southern city limits of Fairfax, South Carolina (Figure 1). There are four buildings on-site: a former powder formulation building, a former liquid formulation building, an office building, and an abandoned residence. From 1971 to 1978, Helena Chemical Company formulated liquid and dry pesticides and herbicides on the site. The major area of concern is a 3,450-$m^3$, unlined landfill in the northeast corner of the site. Spent drums, buckets, and bags of pesticides and/or herbicides were reportedly buried in the landfill. In the spring of 1984, the company transported some of the waste to an approved hazardous waste facility and capped the landfill with clay. This cap did not extend far enough in all directions to prevent surface water infiltration. In addition, portions of the southern sides of the cap have eroded, exposing the original landfill (EPA 1985). Also of concern on the site are small areas where agricultural chemicals were stored and loaded, and the area around the outfall of a drain from the former liquid formulation building. Continually flowing streams of toxaphene-contaminated liquid have been claimed to exist at the plant at one time (EPA 1986a).

The site slopes at a 5 to 7 percent grade towards a swampy area to the north. A small, unnamed stream 100 meters from the site drains the swampy area and discharges into the

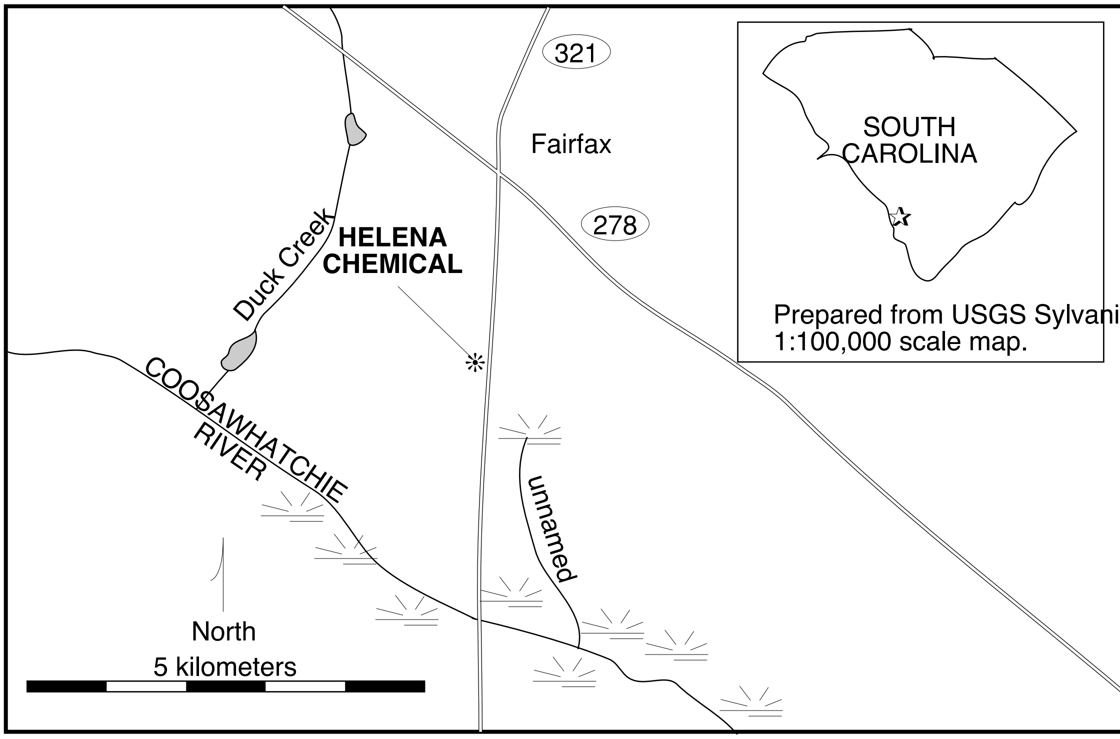

Figure 1. The Helena Chemical site in Fairfax, South Carolina.

Coosawhatchie River 6 km below the site. The Coosawhatchie River enters the Atlantic Ocean 90 km further downstream. Duck Creek, a small tributary of the river, is 1.5 km north of the site. Shallow groundwater beneath the site moves towards Duck Creek, while deep regional groundwater flows towards the southeast (EPA 1986a).

Possible contaminant migration pathways to NOAA trust resources include surface water runoff and groundwater flow to the unnamed stream and the Coosawhatchie River.

## Site-Related Contamination

The contaminants of concern to NOAA at the Helena Chemical site are pesticides and trace metals. DDT, toxaphene, and lindane have been measured in on-site surface water and groundwater at concentrations exceeding AWQC by up to five orders of magnitude. In addition, high concentrations of several pesticides were measured in on-site soils. The trace metals arsenic and lead, were measured in on-site soils at levels exceeding the average content found in natural soils (EPA 1983).

Table 1. Maximum concentrations of selected contaminants at the Helena Chemical site (Pace & Coop 1982); AWQC for the protection of freshwater aquatic life (EPA 1986b); soil concentrations in mg/kg and water concentrations in µg/l.

| Contaminant | Ground-water | Surface Water | Subsurface Soil | Surface Soil | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|---|
| Pesticides | | | | | | |
| DDT | N/A | 10 | 678 | 41.3 | 1.1 | 0.001 |
| DDE | 0.14 | N/A | 225 | 39 | ,050* | N/D |
| DDD | N/A | 10 | 353 | 55.9 | N/D | N/D |
| toxaphene | N/A | 50 | 1,288 | 89.3 | 0.73 | 0.0002 |
| lindane | 0.18 | N/A | N/A | N/A | 2.0 | 0.08 |
| 2,4-D | 0.804 | N/A | N/A | N/A | N/D | N/D |
| 2,4,5-TP | 0.142 | N/A | N/A | N/A | N/D | N/D |
| aldrin | N/A | N/A | 2,000 | N/A | 3.0 | N/D |
| dieldrin | N/A | N/A | N/A | 5.0 | 2.5 | 0.0019 |
| chlordane | N/A | N/A | N/A | 25.3 | 2.4 | 0.0043 |
| | | | | | | |
| Trace Metals | | | | | | |
| arsenic | N/A | N/A | N/A | 360360 | 190 | |
| lead N/A | N/A | N/A | 8882† | 3.2† | | |

N/A: Not available
N/D: Not determined
* LOEL
† Hardness-dependent (based on 100 mg/l $CaCO_3$)

## NOAA Trust Habitats and Species in Site Vicinity

No information was available regarding the aquatic habitats of the unnamed stream or Duck Creek. The Coosawhatchie River is a slow-moving, coastal plain river bordered by wetlands. The floodplain is 200 meters wide, but the actual river channel is less than 30 meters wide. The river drains 500 $km^2$ and has an average discharge of 5,100 liters per second near the town of Fairfax. The substrate consists of sand with a high content of detritus. The water has been classified by the State of South Carolina as Class A, which is considered to be of the highest quality, or pristine. However, low levels of dissolved oxygen occur in the river (Michel 1989).

NOAA trust resources use the Coosawhatchie River near the Helena Chemical Company site as spawning and nursery area, and as a migratory route (Table 2). The lower stretch of the river is a low-salinity, estuarine habitat that supports a number of anadromous fish species. The shortnosed sturgeon is a federally listed endangered species (USFWS 1980).

Table 2. NOAA trust resource use of the Coosawhatchie River (USFWS 1980).

| Species | Upper Reaches of the River near the Site | Lower Reaches of the River |
|---|---|---|
| American eel | A,M | A,M |
| American shad | S,N,M | S,N,M,C,R |
| Atlantic sturgeon | | S,N,M |
| blueback herring | S,N,M | S,N,M,C,R |
| hickory shad | S,N,M | S,N,M, C,R |
| longnose gar | | S,N,A |
| shortnosed sturgeon | | M |
| striped bass | | S,N,M,R |
| white perch | | S,N,M,R |

S : Spawning area; N : Nursery area; A : Adult area; M : Migratory Route;
R : Recreational fishery; C : Commercial fishery

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

Michael Townsend 404-347-3402

**NOAA Coastal Resource Coordinator**

John Lindsay 404-347-5231

**References**

EPA. 1983. Hazardous Waste Land Treatment. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. SW-874.

EPA. 1985. Potential Hazardous Waste Site Preliminary Assessment Form; Helena Chemical Company, Fairfax, South Carolina. Atlanta: U.S. Environmental Protection Agency, Region 4.

EPA. 1986a. Hazardous ranking system package Helena Chemical Company, Fairfax, South Carolina. Atlanta: U.S. Environmental Protection Agency, Region 4.

EPA. 1986b. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Michel, J., geochemist, Research Planning Institute International, Columbia, South Carolina, personal communication, January 25, 1989.

Pace, B., and P. Coop. 1982. Environmental Impacts and Proposed Mitigation Activity at a Site in Fairfax, S.C. Fairfax, South Carolina: Environmental and Safety Designs, Inc.,
and Helena Chemical Company.

USFWS. 1980. Atlantic coast ecological inventory: Savannah. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map.

**Agrico Chemical Company**
**Pensacola, Florida**
**Region 4**
**FLD980221857**

## Site Exposure Potential

The Agrico Chemical Company site occupies 2.4 hectares in an industrial area of Pensacola, Florida (Figure 1). The site is bordered by major roadways to the south and east, a railroad yard to the west, and an abandoned quarry to the north. From 1889 to 1920, the site was used to produced sulfuric acid from pyrite rock. From 1920 to 1959, Agrico produced fertilizer from phosphate rock at the site. The latter process produced hydrofluoric and fluosilicic acid gases. Water used to scavenge these gases was disposed of in a series of outdoor ponds, whose total capacity is estimated to be 21,000 $m^3$. The tanks, trough, and agitators used in the plant may have been made of lead, which corrodes when exposed to concentrated acid at high temperatures. In 1959, the fertilizer factory, fluoride plant, and all storage and shipping houses were torn down.

The nearest surface water body to the site is Texar Bayou, 2 km to the east. It is unlikely that there is a direct surface water migration pathway from the site to Texar Bayou (EPA 1987). A four-lane highway with a trough-like, high-shouldered median, and several other roadways lie between the site and Texar Bayou. A surface water pathway to Pensacola Bay, more than 5 km south, is unlikely for the same reasons. Groundwater occurs 17 meters beneath the site. The groundwater flows east-southeast toward Texar Bayou and Pensacola Bay.

Groundwater flow is the potential contaminant migration pathway to NOAA trust resources.

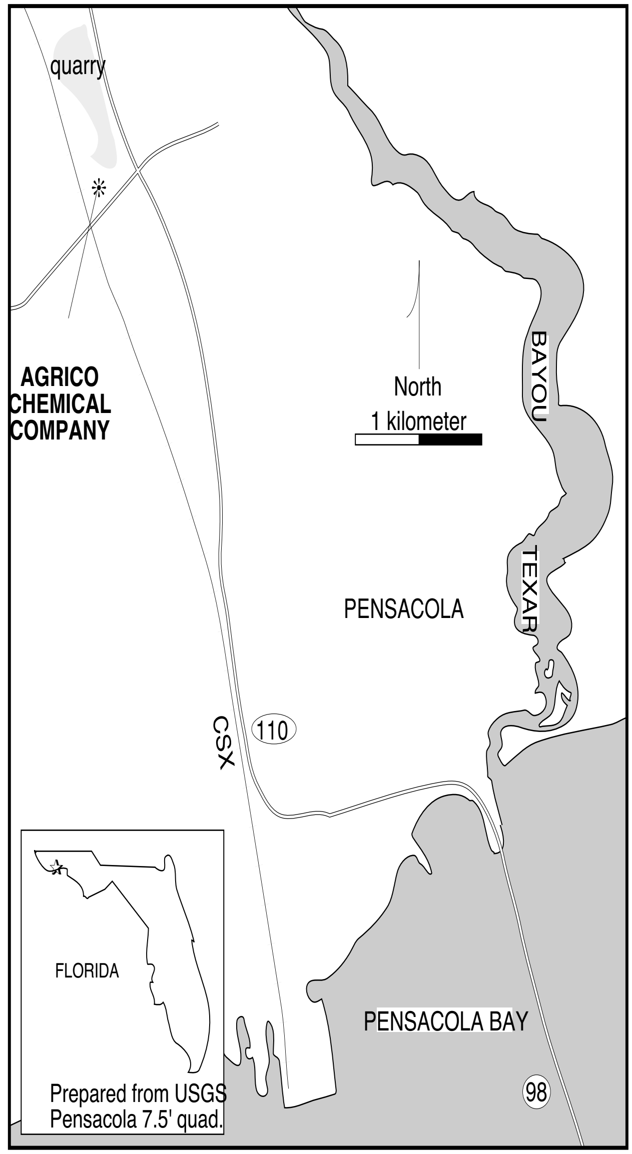


Figure 1. The Agrico Chemical Company site in Pensacola, Florida.

### Site-Related Contamination

Fluoride, lead, zinc, and sulfuric, hydrofluoric, and fluosilicic acids are the contaminants of concern to NOAA. In 1983, EPA site investigators sampled a white, gelatinous substance observed in two of the discharge ponds, and took a surface water sample from each of the two ponds and one from a concrete basin on the western edge of the site. These samples were analyzed for nitrates, phosphates, chemical oxygen demand, and trace metals. The gelatinous samples taken from the ponds showed high fluoride and lead concentrations (Table 1). The surface water samples taken from the ponds had high concentrations of fluoride (135,000 µg/l) and zinc (1,100 µg/l). Acute toxicity for rainbow trout has been observed in fluoride concentrations ranging from 2,700 to 4,700 µg/l (Nuehold and Sigler 1960). The pH of these water samples was found to be 4.4 and 5.2, respectively. The sample taken from the concrete basin had a pH of 8.5. There were no groundwater data presented in the documents reviewed.

Table 1. Maximum concentrations of selected contaminants at the Agrico Chemical site (EPA 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); solid concentrations in mg/kg and water concentrations in µg/l.

| Contaminant | Gelatinous Waste Material | Surface Water Samples | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|
| aluminum | 1,900 | 35,000 | N/D | N/D |
| barium | 46 | 38 | N/D | N/D |
| chromium | 23 | 15 | 16 | 11 |
| fluoride | 58,000 | 135,000 | N/D | N/D |
| lead | 130 | <30 | 82* | 3.2* |
| mercury | 0.36 | <0.5 | 2.4 | 0.012 |
| strontium | 130 | 960 | N/D | N/D |
| zinc | 20 | 1,100 | 120* | 110* |

* Hardness-dependent (based on 100 mg/l $CaCO_3$)

N/D: Criteria not determined.

**NOAA Trust Habitats and Species in site Vicinity**

Though wetland habitat has been significantly reduced, commercially important species found in Pensacola Bay are also present in Texar Bayou (Table 2). Blue crab, shrimp, striped mullet, and gulf flounder have been observed using the bayou as nursery and adult habitat. Many of the fish species are recreationally harvested from the bayou. Eastern oysters are found along the outer Pensacola Bay portions of the bayou. Pensacola Bay supports a significant blue crab and shrimp fishery (Ray 1989).

Table 2. NOAA trust resource use of Texar Bayou and Pensacola Bay (USFWS 1982).

| Species | Texar Bayou | Pensacola Bay |
|---|---|---|
| INVERTEBRATES | | |
| blue crab | A,N,R | A,C,R,S |
| eastern oyster | A,N,R | A,C,N,R,S |
| shrimp | A,N,R | A,C,R,S |
| | | |
| FISH | | |
| Atlantic croaker | A,N,R | A,C,N,R,S |
| Atlantic sturgeon | | M |
| black drum | A,N,R | A,C,N,R,S |
| gulf flounder | A,N,R | A,C,N,R,S |
| red drum | A,N,R | A,C,N,R,S |
| sand seatrout | A,N,R | A,C,N,R,S |
| sheepshead | A,N,R | A,C,N,R,S |
| spotted seatrout | A,N,R | A,C,N,R,S |
| striped mullet | A,N,R | A,C,N,R,S |
| | | |
| MISCELLANEOUS | | |
| Atlantic bottlenose dolphin | | M |

A: adult habitat  C: commercial fishery  R: recreational fishery  M: migration corridor
N: nursery  S: spawning/mating

Texar Bayou is bordered by residential housing and light industry, and is impacted by surface water runoff from these sources. The bayou has been closed periodically to swimming due to water quality problems; information is currently being gathered on the physical characteristics and biota present in Texar Bayou as part of a study of non-point source pollution in the bayou (Moshiri 1989). Texar Bayou is 6.5 km long with an average depth of 2.1 meters. Though much of the bayou's wetlands have been lost to development, some habitat does exist in its upper reaches. Both Texar Bayou and Pensacola Bay have little tidal variation and only minor flushing. During the summer months, low dissolved-oxygen levels occur (Ray 1989).

**Response Category:** Not Determined

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Martha Berry 404-347-2643 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| John Lindsay 404-347-5231 |

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Hazardous Waste Site Investigation, Agrico Chemical Company site, Pensacola, Florida. Atlanta: U.S. Environmental Protection Agency, Region 4.

Moshiri, G., Professor of Biology, University of West Florida, Pensacola, personal communication, January 25, 1989.

Nuehold, J.M.and W.F. Sigler. 1960. Effects of sodium fluoride on carp and rainbow trout. Transactions of the American Fisheries Society, Vol 89(4), October 1960.

Ray, D., biologist, Florida Department of Environmental Regulation, Tallahassee, Florida, personal communication, January 25, 1989.

USFWS. 1982. Gulf coast ecological inventory: Pensacola, Florida. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map. 30086-A1-E1-250.

**Standard Auto Bumper Corporation**
**Hialeah, Florida**
**Region 4**
**FLD004126520**

## Site Exposure Potential

The Standard Auto Bumper Corporation site occupies 0.3 hectares in an industrial area of Hialeah, Florida (Figure 1). Since 1959, Standard Auto Bumper has used trace metals, acids, and caustics for electroplating automobile bumpers, furniture, and other objects on the site. Facilities on-site include one main building, a process-water treatment facility, a septic tank/percolator pit connected to a drainfield system, and a groundwater well. From 1959 to 1972, wastewater from electroplating and stripping processes was discharged into

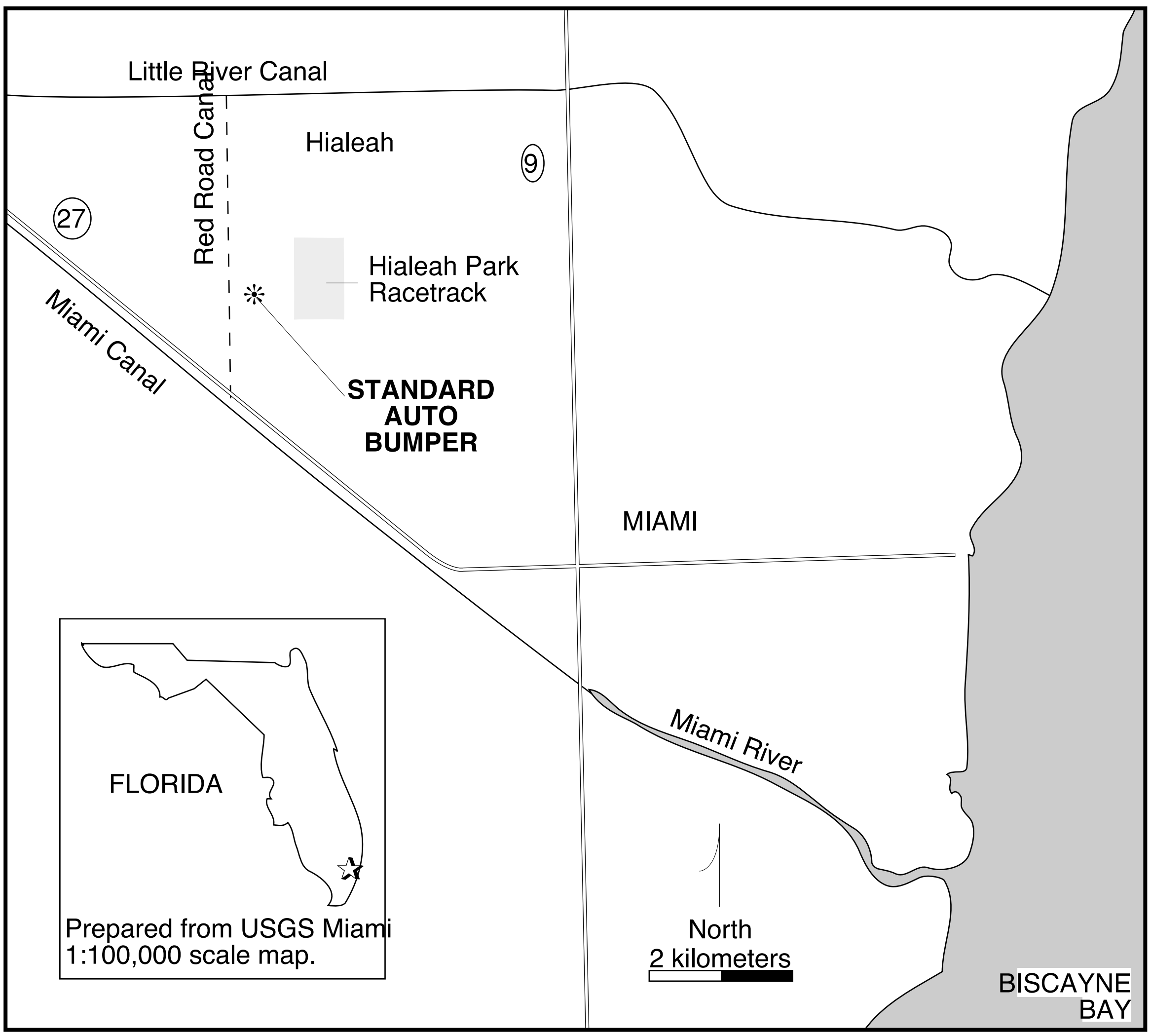


Figure 1. The Standard Auto Bumper Corporation site in Hialeah, Florida.

ditch between the site and railroad tracks next to and west of the site. The wastes were commonly seen traveling up to 120 meters north in this ditch, eventually percolating into the ground. From 1972 to 1979, the company treated its plating waste by reducing hexavalent chromium to trivalent chromium before discharging it into the septic tank/drainfield system. Since 1972, metal-containing sludges have been shipped off-site to an approved hazardous waste facility. Since 1979, the treated wastewater has been discharged into the Hialeah sewer system. Various remedial and monitoring measures for the site are under consideration, including removing contaminated soils, excavating the drainage ditch, and installing a series of groundwater monitoring wells (Young 1988).

Red Road Canal runs north-south 90 meters west of the site on the far side of railroad tracks and Red Road, a five-lane highway. Red Road Canal flows south 2.5 km to the Miami Canal. The Miami Canal flows 6 km southeast into the Miami River, which flows southeast another 7 km into the Atlantic Ocean. Since there are no culverts under the tracks or Red Road near the site, surface water is unlikely to migrate directly from the site to Red Road Canal.

There is groundwater beneath the site in the gravel and sand of the upper Biscayne aquifer, three meters deep and below. This gravel and sand is underlain by the highly permeable limestone bedrock of the Biscayne aquifer below depths of 12 meters. Regional deep groundwater flow is towards the east (seaward).

Possible contaminant migration pathways to NOAA trust resources include groundwater discharge to Red Road Canal (NUS 1987).

## Site-Related Contamination

Contaminants of concern to NOAA at the site include chromium, copper, nickel, and lead (Table 1). High levels of all four trace metals were found in on-site surface and subsurface soils, and groundwater. Groundwater concentrations were well above AWQC for the protection of saltwater aquatic life. There were no data available about contaminant concentrations in any of the canals near the site.

Table 1. Maximum concentrations of selected contaminants at the Standard Auto Bumper site (NUS 1987); AWQC for the protection of saltwater aquatic life (EPA 1986); soil concentrations for mg/kg and water concentrations in µg/l.

| Contaminant | Surface Soils | Sub-surface Soils | Groundwater | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|
| chromium | 8,300* | 1,600 | 16,000 | 1,100 | 50 |
| copper | 9,000* | 840* | 6,300* | 2.9 | 2.9 |
| nickel | 24,000* | 3,100 | 34,000 | 75 | 8.3 |
| lead | 260* | 120* | 810* | 140 | 5.6 |

* Estimated value, presence of contaminant verified

## NOAA Trust Habitats and Species in Site Vicinity

Red Road and Miami canals do not have any habitats used by NOAA trust resources. Habitats of interest to NOAA include Miami River, which is the lower 5 km of the Miami Canal, and Biscayne Bay. The Miami River is a mid-salinity estuarine habitat. Biscayne Bay is an estuarine system with numerous species using its diverse habitats (Table 2). This bay has a number of federally protected species, including the endangered Kemp's Ridley sea turtle and leatherback sea turtle; and the threatened green sea turtle and loggerhead sea turtle (USFWS 1980).

Table 2. Selected NOAA trust resource use of Biscayne Bay (USFWS 1980).

| Species | Breeding Area | Nursery Area | Adult Area | Recreational Fishing | Commercial Fishing |
|---|---|---|---|---|---|
| INVERTEBRATES | | | | | |
| shrimp | | X | X | X | X |
| spiny lobster | | X | X | X | X |
| stone crab | | X | X | X | X |
| | | | | | |
| FISH | | | | | |
| bluefish | | X | X | X | |
| Florida pompano | | | X | X | |
| grouper | | X | X | X | |
| mullet | X | X | X | X | X |
| red drum | | X | X | X | X |
| snapper | | X | X | X | |
| spotted seatrout | | X | X | X | X |
| | | | | | |
| MISCELLANEOUS | | | | | |
| green sea turtle | | | X | | |
| Kemp's Ridley sea turtle | | | X | | |
| leatherback sea turtle | | | X | | |
| loggerhead sea turtle | | | X | | |

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Barbara Schuster | 404-347-2643 |

**NOAA Coastal Resources Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

## References

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

NUS. 1987. Draft Expanded Site Investigation, Standard Auto Bumper Site, Hialeah, Florida. 1987. Atlanta: U.S. Environmental Protection Agency, Region 4.

USFWS. 1980. Gulf coast ecological inventory: Miami, Fl. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250 000 scale map. 25080-A1-EI-250.

Young, N. 1988. August 15, 1988 letter to Dolores Smith, Florida Department of Environmental Resources Management. Miami: AB2MT Consultants, Inc.

**Woodbury Chemical Company**
**Princeton, Florida**
**Region 4**
**FLD004146346**

## Site Exposure Potential

The Woodbury Chemical Company site is located on one hectare in Princeton, Florida (Figure 1). Woodbury bought the site in 1975 and is uses its six buildings and several above-ground storage tanks primarily for mixing of technical-grade materials to produce pesticides and fertilizers (EPA 1987).

The site is in the Sandy Flatlands area, which is characterized by little to no relief at an average elevation of 1.2 meters above mean sea level. The majority of the storage tanks are diked and most of the facility is paved. Drainage from the site flows to an on-site sump and is then absorbed directly into the soil. Canal C102, 700 meters northeast of the site, discharges into Biscayne Bay 10 km from the site. Regional groundwater flow is southeast towards the canal and the sea (EPA 1987).

Possible contaminant migration pathways to NOAA trust resources are groundwater and surface water flow to Biscayne Bay.

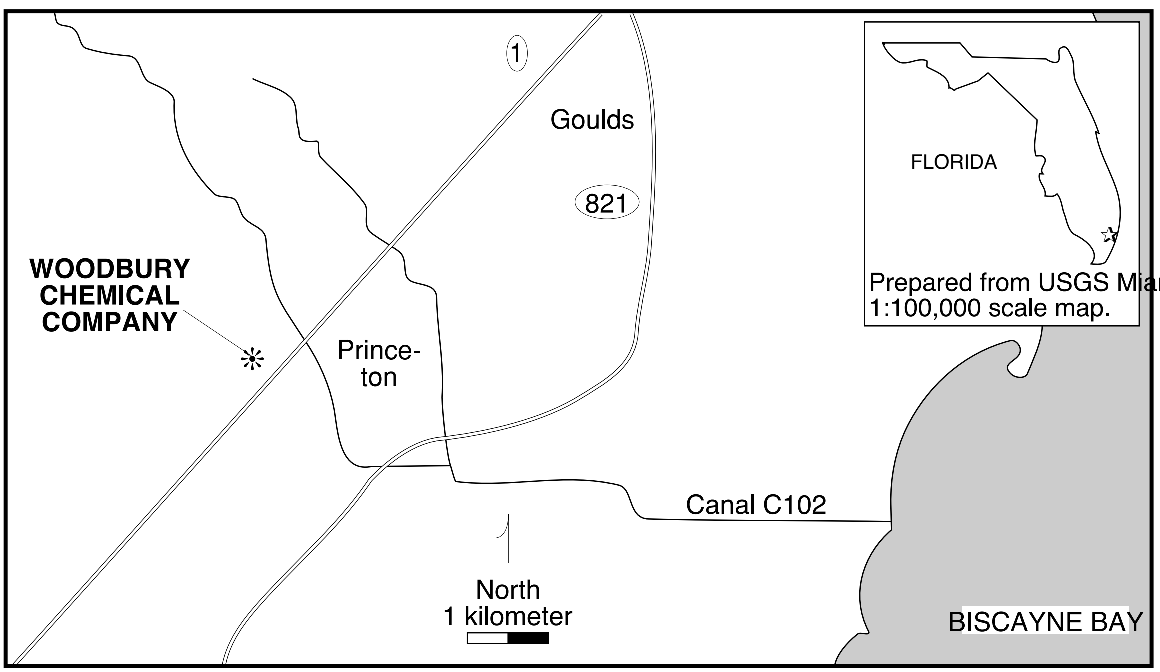


Figure 1. The Woodbury Chemical Company site in Princeton, Florida.

**Site-Related Contamination**

The contaminants of primary concern to NOAA are pesticides, trace metals, and VOCs. Aldrin, dieldrin, and toxaphene were measured in on-site groundwater at concentrations that exceeded AWQC for the protection of saltwater aquatic life (Table 1). In addition, seven trace metals were observed in groundwater or on-site standing surface water at levels that exceeded AWQC. Ethylbenzene was measured in groundwater at concentrations exceeding LOEL (EPA 1985, 1986). Although extremely high concentrations of trace metals were reported in the information reviewed, these data were not included in Table 1 because the concentrations were unreasonably high and the sampling locations were not available (OHM/NUS 1985).

Table 1. Maximum concentrations of selected contaminants observed at the Woodbury Chemical site (EPA 1985); AWQC for the protection of saltwater aquatic life (EPA 1986); concentrations in soil in mg/kg and in water in µg/l.

| Contaminant | Soil | Groundwater | On-Site Standing Surface Water | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | | |
| Volatiles | | | | | |
| ethylbenzene | 82.5 | 8,700 | N/A | 430* | N/D |
| total xylenes | N/A | 5,000 | N/A | N/D | N/D |
| Pesticides | | | | | |
| aldrin | 33 | 60 | N/A | 1.3 | N/D |
| chlordane | 130 | N/A | N/A | 0.09 | 0.004 |
| dieldrin | 69 | 1 | N/A | 0.71 | 0.0019 |
| endrin | 18 | N/A | N/A | 0.037 | 0.0023 |
| gamma-BHC | N/A | 0.25 | N/A | 0.34* | N/D |
| toxaphene | 48 | 110 | N/A | 0.21 | 0.0002 |
| INORGANIC SUBSTANCES | | | | | |
| Trace Metals | | | | | |
| arsenic | 24 | 12 | 140 | 69 | 36 |
| cadmium | 5.3 | 30 | N/A | 43 | 9.3 |
| chromium | 55.6 | 110 | 148 | 1,100 | 50 |
| copper | 50 | 62 | 92 | 2.9 | 2.9 |
| lead | 677 | 11 | N/A | 140 | 5.6 |
| nickel | 16.8 | 477 | N/A | 75 | 8.3 |
| zinc | 250 | 570 | N/A | 95 | 86 |
| Other | | | | | |
| cyanide | 3.3 | N/A | 140 | 1.0 | 1.0 |

N/A: Not available; N/D: Criteria not developed; * LOEL

**NOAA Trust Habitats and Species in Site Vicinity**

The canal that drains the Princeton area is 20 to 35 meters wide and is an average of five meters deep. The substrate consists of sand with patches of gravel and rocks. The water quality in the canal is good. The lower stretch of the canal flows through a beach face covered with mangrove into Biscayne Bay, a large embayment on the southeastern coast of Florida (USFWS 1982; Shafland 1989).

American eel use the canal near the site as adult habitat. NOAA trust resources, including dolphin and sea turtles, use Biscayne Bay. The Kemp's Ridley, leatherback, and green sea turtles are federally designated endangered species in Florida. The loggerhead turtle is a federally designated threatened species. Some euryhaline fish species, including snapper, ladyfish, crevalle jacks, and tarpon, may stray up the canal (Table 2) (USFWS 1982; Shafland 1989).

Table 2. NOAA trust resource use of the C102 Canal and Biscayne Bay (USFWS 1982; Shafland 1989).

| Species | Canal C102 | Biscayne Bay |
|---|---|---|
| INVERTEBRATE | | |
| spiny lobster | | S,N,A,C,R |
| stone crab | | S,N,A,C,R |
| | | |
| FISH | | |
| American eel | A | A,M |
| Atlantic spadefish | | S,N,A,R |
| bluefish | | S,N,A,R |
| bonefish | | S,N,A,R |
| crevalle jack | A | N,A,R |
| Florida pompano | | S,N,A,R |
| grouper | | S,N,A,R |
| grunt | | S,N,A,R |
| ladyfish | A | N,A,R |
| mullet | A | S,N,A,C,R |
| permit | | N,A,R |
| pigfish | | N,A,R |
| red drum | | S,N,A,R |
| silver perch | | S,N,A,R |
| snapper | A | S,N,A,R |
| snook | A | S,N,A,R |
| Spanish mackerel | | N,A,R |
| spotted seatrout | | S,N,A,C,R |
| tarpon | A | N,A,R |
| | | |
| MISCELLANEOUS | | |
| Atlantic bottlenose dolphin | | A |
| green turtle | | A |
| Kemp's Ridley sea turtle | | A |
| leatherback sea turtle | | A |
| loggerhead sea turtle | | A |

S: Spawning area; N: Nursery; A: Adult area; M: Migration route; C: Commercial fishery; R: Recreational fishery

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Diane Scott | 404-347-2643 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

**References**


EPA. 1985. Report Woodbury Chemical Company, site number - D37 (D99). Miami: U.S. Environmental Protection Agency. Florida project, ESD project #85E-102, Dade County, Florida.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. National Priority List Superfund Hazardous Waste Site Listed under CERCLA, Woodbury Chemical Co, Princeton, Florida. Atlanta: U.S. Environmental Protection Agency, Region 4.

OHM/NUS. 1985. I.C.P.analysis. Miami: U.S. Environmental Protection Agency. Florida site investigations, project no. 2842.

Shafland P., fishery biologist, Department of Natural Resources, Tampa, Florida, personal communication, January 13, 1989.

USFWS. 1982. Gulf coast ecological inventory: Miami, Florida. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map.

**Redwing Carriers, Inc.**
**Saraland and Creola, Alabama**
**Region 4**
**ALD980844385**

## Site Exposure Potential

Redwing Carriers, Inc., is a trucking company with an abandoned truck washing site in Saraland and an active truck transfer station in Creola (Figure 1). Redwing used the 0.4-hectare Saraland site from 1961 to 1971. Trucks that were washed at this site transported asphalt, diesel fuel, weed killer, tall oil, and sulfuric acid. When the Saraland site was sold in 1971, it was covered with fill material, graded, and an apartment complex was built on it. After a tar-like substance was observed oozing to the surface at numerous locations in the apartment complex, a study of potential contamination was done in 1985. The study revealed contamination in soils and leachates from the tarry material. Redwing removed some of the contaminated soil in 1985 and periodically inspects the site, removing any tar that rises to the surface (NUS 1987).

Since 1972, Redwing has used a three-hectare site in Creola to wash tankers and trailers that haul bulk chemicals. The liquid wastes generated from steam-and-water washing of the trucks were originally treated using an oil-water separator and subsequently disposed of in two underground 3,800-liter railcars for settlement of solids. Liquid from the railcars was pumped into two connected surface ponds in the southeastern portion of the facility. Since 1980, the railcars and ponds have been closed and three new ponds have been

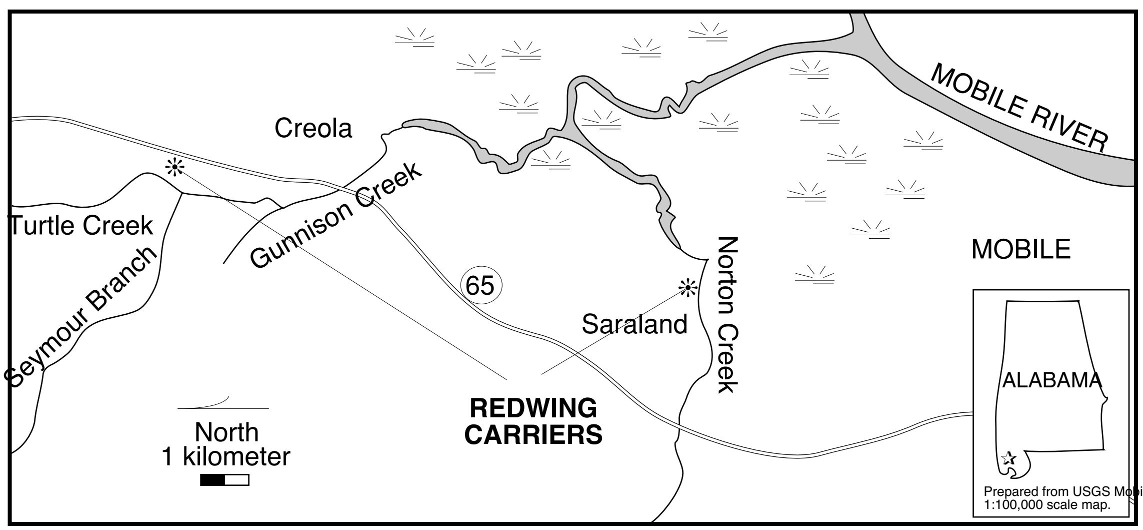


Figure 1. The Redwing Carriers, Incorporated, site in Saraland, Alabama.

excavated along the western edge of the site. These ponds, which average 0.25 hectares each and are 1.5 meters deep, were constructed of compacted clay to prevent seepage. During an earlier inspection of the site by the State of Alabama Water Improvement Commission, it was reported that water from one of the ponds was draining into an

adjacent swamp (Allen 1980). It was also reported that sludge excavated from the inactive ponds was being buried on-site. In 1984, the Alabama Department of Environmental Management ordered RCRA closure (under 40 CFR 265) of the active ponds. By March 1985, all wastewater discharges into the ponds had ceased, and by May 1985, the wastewater and sludge ponds were deemed "empty and inactive." Since March 1985, all waste generated has been shipped off-site for disposal (NUS 1987).
The Saraland site is 1 km from Norton Creek, which drains into the Mobile River 9 km east of the site. The Mobile River flows south another 12 km into the Gulf of Mexico.

Redwing's Creola site is 855 meters east of Turtle Creek. The average slope of terrain between the site and Turtle Creek is 0.67 percent. Turtle Creek drains almost immediately downstream from the site into Seymour Branch, which drains into Gunnison Creek. Gunnison Creek drains into the Mobile River 5 km east of the site. The Mobile River flows south 20 km from Gunnison Creek and drains into the the Gulf of Mexico.

The groundwater beneath both sites is generally three to four meters deep and flows to the south and southwest.

Possible contaminant migration pathways to NOAA trust resources include groundwater flow and, possibly, surface water runoff to Turtle, Gunnison, and Norton creeks.

**Site-Related Contamination**

Compounds detected in high concentrations in samples of soil and tar seeps at Redwing's Saraland site included 1,2,4-trichlorobenzene; phenanthrene; naphthalene; and acenaphthene (NUS 1987). No information was provided about the locations of these samples or the concentrations at which these compounds were found.

Contaminants in surface and groundwater at the Creola site included 2,4-D; lindane; arsenic; chromium; cadmium; lead; mercury; and silver (Table 1). Cadmium, chromium, and mercury were found at concentrations above AWQC for the protection of freshwater aquatic life. In addition, the company has reported that two unknown, "acutely toxic" substances, designated P020 and P022, were disposed of in the ponds (NUS 1987).

Table 1. Maximum concentrations of selected contaminants at the Redwing Carrier Creola site (Micro Methods 1982; Polyengineering 1982); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in µg/l.

| Contaminant | On-site Groundwater | On-site Surface Water | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|
| Pesticides | | | | |
| lindane | 0.08 | N/A | N/D | N/D |
| 2,4-D | 6,100 | N/A | N/D | N/D |
| | | | | |
| Trace Metals | | | | |
| arsenic | 40 | 95 | 360 | 190 |
| cadmium | 51 | <2 | 3.9† | 1.1† |
| chromium | 1,400 | 990 | 16 | 11 |
| lead | <10 | <10 | 82† | 3.2† |
| mercury | 1.5 | N/A | 2.4 | .012 |
| silver | <10 | <10 | 4.1† | 0.12 |

N/A: Not available N/D: Not determined † Hardness-dependent (based on 100 mg/l $CaCO_3$)

## NOAA Trust Habitats and Species in Site Vicinity

Habitats of concern to NOAA include Gunnison and Norton creeks, the wetlands at the mouth of the creeks where there are critical nursery areas, and the lower Mobile River. The Mobile Delta, of which Norton and Gunnison creeks are a part, is the second largest river delta system in the United States. It extends 64 km upriver and is 16 km wide. The delta is a network of brackish wetlands that serves as important nursery habitat and forms the main marine wetland resource for the state of Alabama. Norton Creek flows through Saraland; there are light industry and residential housing developments along its shores. In some parts of the stream, the banks have been riprapped and channeled. Gunnison Creek is less impacted by development and is used for recreational fishing. Both creeks are tidal and have brackish water.

NOAA trust resources use the delta wetlands, including the wetlands at the mouth of Gunnison and Norton creeks (Table 2) (USFWS 1981). These wetlands serve as both adult and nursery habitat for estuarine-dependent species, including coastal fish species; blue crab; and brown, white, and pink shrimp, all species of commercial fisheries importance in the Gulf of Mexico. The brackish water clam occurs throughout the lower river delta area. The anadromous gulf sturgeon and Alabama shad use the Mobile River as a migration corridor (Tucker 1989).

Table 2. NOAA trust resource use of the lower wetlands of Gunnison and Norton creeks near the Mobile River Delta and the lower reach of Mobile River (USFWS 1981).

| Species | Gunnison and Norton Creeks | Lower Mobile River |
|---|---|---|
| INVERTEBRATES | | |
| blue crab | A,N,R | A,N,R |
| brackish water clam | | A |
| shrimp | A,N,R | A,N |
| FISH | | |
| Alabama shad | A,M,N,R | A,M,C |
| Atlantic threadfish | A,N,R | A,N,R |
| black drum | A,N,R | A,N,R |
| gulf flounder | A,N,R | A,N,R |
| gulf menhaden | A,N,R | N |
| southern flounder | A,N,R | A,N,R |
| gulf sturgeon | A,M,N | A,M,N,R |
| red drum | A,N,R | A,N,R |
| sheepshead | A,N,R | A,N,R |
| spotted sea trout | A,N,R | A,N,R |
| striped mullet | A,N,R | A,N,R |
| A: adult habitat; C: commercial fishery; M: migration corridor; N: nursery habitat; R: recreational fishery | | |

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Ben Moore/Charles King | 404-347-2643 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| John Lindsay | 404-347-5231 |

**References**


Allen, G. 1980. Interoffice memo to J. Williford regarding Redwing inspection. Mobile, Alabama: Alabama Water Improvement Commission.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Micro Methods. 1982. Groundwater Analysis Report Form, Redwing Carriers. Pascagoula, Mississippi: Micro Methods.

NUS. 1987. Site Inspection Report and Hazard Ranking System Model. Redwing Carriers, Inc., Creola, Alabama. Edison, New Jersey: NUS Corporation.

Polyengineering. 1982. Groundwater Analysis Report Form, Redwing Carriers. Mobile, Alabama: Polyengineering.

Tucker, B., fisheries biologist, Alabama Department of Fish and Game, Mobile, Alabama, personal communication, January 27, 1989.

USFWS. 1981. Gulf coast ecological inventory: Mobile, Alabama. Washington, D.C.: U.S. Fish and Wildlife Service. Map scale 1:250,000.

**Gautier Oil Company, Inc.**
**Gautier, Mississippi**
**Region 4**
**MSD098596489**

## Site Exposure Potential

The Gautier Oil Company, Inc., site covers one hectare in Gautier, Mississippi (Figure 1). The site is an abandoned wood-preserving and oil recovery facility that operated for 104 years under various owners. The current owner is Seaboard Railroad, Inc. The site contains storage and process tanks, two sand filter beds, a lagoon, rusting drums, and piles of sludges. The reportedly unlined lagoon was constructed in 1972 to contain wastewater from the creosote wood-preserving process. At least 2,700 metric tons of liquid and sludges containing phenol, naphthalene, chloroform, and lead were deposited in the lagoon and in on-site sludge piles. Operations ceased in 1983 (EPA 1987).

On April 24, 1985, EPA issued an Administrative Order by Consent to Seaboard to remove contaminated soil, sludge, containers, and equipment from the site. Seaboard transported over 480 metric tons of materials to a regulated hazardous waste facility (EPA 1987).

The site is on the bank of the West Pascagoula River, 2.4 meters above mean sea level. The slope of the intervening terrain is 11.4 percent and the site is within the 100-year floodplain. Overflow from the lagoon discharges into the West Pascagoula River, 20 meters away, via an outfall pipe and a secondary lagoon. The river enters Pascagoula Bay on the Gulf of Mexico 0.5 km below the site (EPA 1987).

Possible contaminant migration pathways to the Pascagoula River are groundwater flow, surface water runoff, and direct discharge.

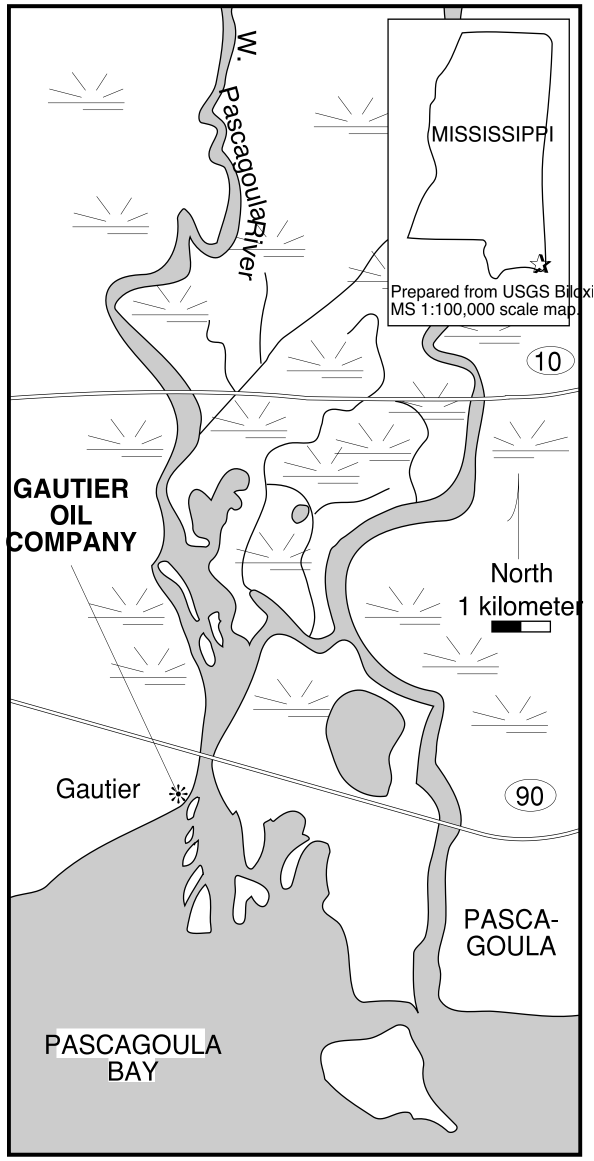

Figure 1. The Gautier Oil Company site in Gautier, Mississippi.

## Site-Related Contamination

High concentrations of lead, chromium, chloroform, toluene, naphthalene, phenol, and pentachlorophenol were reportedly measured in soils, sludges, and sediments on-site, but no quantitative data were presented. PCBs were also found on-site at concentrations of less than 50 mg/kg (EPA 1987).

## NOAA Trust Habitats and Species in Site Vicinity

The lower reaches of the West Pascagoula River are mid-salinity, estuarine habitats. The river is 1 km wide at the mouth and from 0.3 to 3 meters deep. The substrate consists of muddy sand. Saltwater wetlands are situated along the shoreline of the river less than 0.8 km from the site. Pascagoula Bay is a mid-salinity embayment of the Gulf of Mexico. The bay is generally shallow, except for dredged areas around the town of Pascagoula, with a substrate of muddy sand. The water quality in the river and bay is degraded due to sewage outfalls (USFWS 1982; Buchanan 1989).

NOAA trust resources, including seatrout, anchovy, and mullet, use the Pascagoula River and Pascagoula Bay near the site as spawning and nursery areas (Table 1). There is a large population of oysters in the lower reaches of the river and in the bay, and shrimp and

Table 1. Selected NOAA trust resource use of Pascagoula Bay and River (USFWS 1982).

| Species | Spawning Area | Nursery Area | Adult Area | Migratory Route | Commercial Fishery | Recreational Fishery |
|---|---|---|---|---|---|---|
| INVERTEBRATES | | | | | | |
| blue crab | X | X | | | X | X |
| oyster | X | X | X | | | |
| shrimp | | X | | | X | X |
| | | | | | | |
| FISH | | | | | | |
| Alabama shad | | | | X | | |
| Atlantic croaker | | X | | | X | X |
| bay anchovy | X | X | X | | | |
| black drum | X | X | | | X | X |
| blue catfish | | | | | X | X |
| blue runner | | X | | | X | X |
| bluefish | | X | | | X | X |
| crevalle jack | | X | | | X | X |
| Florida pompano | | X | | | X | X |
| gulf kingfish | | X | | | X | X |
| gulf menhaden | | X | | | X | |
| red drum | X | X | | | X | X |
| sand seatrout | | X | | | X | X |
| sea catfish | X | X | | | X | X |
| sheepshead | | X | | | X | X |
| southern flounder | | X | | | X | X |
| southern kingfish | | X | | | X | X |
| spot | | X | | | X | X |
| spotted seatrout | X | X | | | X | X |
| striped mullet | X | X | | | X | X |
| white mullet | X | X | | | X | X |
| | | | | | | |
| MARINE MAMMALS | | | | | | |
| Atlantic bottlenose dolphin | X* | X | X | | | |
| *breeding area | | | | | | |

blue crab also use the area as nursery grounds. There are extensive commercial and recreational fisheries for various fish species in the Pascagoula River and Pascagoula Bay. Shellfishing has been prohibited in the river and restricted in the inner bay due to high levels of coliform bacteria (USFWS 1982; Buchanan 1989). Bottlenose dolphin use Pascagoula Bay and the Pascagoula River as breeding and nursery areas.

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Charles King    404-347-2643 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| John Lindsay    404-347-5231 |

**References**

Buchanan, M., Bureau of Marine Resources, Department of Wildlife Conservation, Biloxi, Mississippi, personal communication, January 27, 1989.

EPA. 1987. National Priority List, Superfund Hazardous Waste Site Listed under CERCLA, Gautier Oil Company, Incorporated, Gautier, Mississippi. Atlanta: U.S. Environmental Protection Agency, Region 4.

USFWS. 1982. Gulf coast ecological inventory: Mobile. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map.

**Brio Refining, Inc.**
**Friendswood, Texas**
**Region 6**
**TXD980625453**

## Site Exposure Potential

The Brio site is in Harris County, Texas, 32 km southeast of Houston and approximately 3 km north of Friendswood, Texas (Figure 1). From 1957 to 1978, the major industrial operations on the Brio site included regeneration of copper catalysts and recovery of a variety of chemicals from styrene tars, vinyl chloride still bottoms, and phenol heavy ends. Between 1966 and 1969, the Lowe Chemical Company (initial owners of the Brio site) committed several permit and water quality violations, including spilling aromatic oils and copper chloride into Mud Gully, resulting in fish kills in Clear Creek. From 1969 until 1983, under the ownership of several different companies, numerous other spills and permit violations occurred (I.T. Corp. 1987). The recycling and recovery plant at Brio was converted to a crude oil topping unit for jet fuel production in 1978 and operated intermittently until 1982. All plant operations were terminated in December 1982.

The Brio site has a north and a south parcel that cover 23.5 hectares. Brio North was used primarily for storage purposes and covers 19.8 hectares. Brio South was used for processing activities and occupies 3.8 hectares. Twenty-two disposal/storage pits were installed at the Brio site. Other prominent structural features are tanks, warehouses, and processing units from former operations. There are components of a wastewater treatment system, including two wastewater impoundments, on the Brio North parcel. Dixie Oil Processors, another NPL site, is adjacent to Brio (I.T. Corp. 1987).

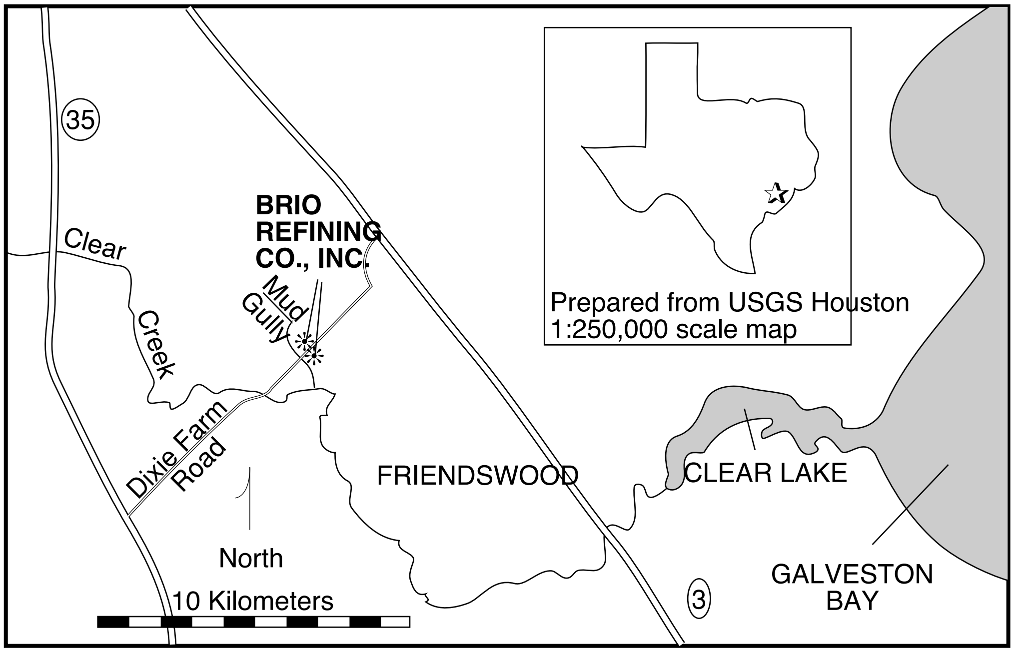

Figure 1. The Brio Refining site in Friendswood, Texas.

Mud Gully separates the northern parcels of the Brio and Dixie Oil properties and flows about 200 meters west of Brio South (I.T. Corp. 1987). Surface water and groundwater flow from the site into the gully. Discharges from Houston's Southeast Sewage Treatment Plant, 5 km upstream, provide a continuous but variable base flow in the gully. Mud Gully flows about 600 meters from the site before discharging into Clear Creek, which discharges to Clear Lake 19 km downstream. Clear Lake flows into Galveston Bay, a large estuary of the Gulf of Mexico, 28 km below the site.

The contaminant migration pathways to NOAA trust resources are groundwater and surface water runoff to Mud Gully and Clear Creek.

## Site-Related Contamination

The contaminants of concern to NOAA are trace metals and VOCs (Table 1). A dense, non-aqueous phase liquid (DNAPL) layer of PAHs and VOCs 10 to 15 centimeters thick

Table 1. Maximum concentrations of contaminants at the Brio Refining site (I.T. Corp. 1987, 1988); AWQC for the protection of saltwater aquatic life (EPA 1986); concentrations in soil and sediment in mg/kg, and in water and DNAPL in µg/l.

| | On-site | | | Mud Gully | | | |
|---|---|---|---|---|---|---|---|
| Contaminant | Ground-water | DNAPL* | Surface Soil | Water | Sediment | AWQC Acute | AWQC Chronic |
| ORGANIC COMPOUNDS | | | | | | | |
| Volatiles | | | | | | | |
| benzene | 778 | 257,000 | N/A | ND | N/A | 5,100† | 700† |
| carbon tetrachloride | ND | 171,000 | N/A | ND | N/A | 50,000† | N/D |
| chlorobenzene | ND | 3,650,000 | N/A | ND | N/A | 160† | 129† |
| chloroform | 8,850 | 3,580,000 | N/A | 3.8 | N/A | N/D | N/D |
| 1,1-dichloroethane | 55,400 | 3,380,000 | N/A | 7.83 | N/A | N/D | N/D |
| 1,1-dichloroethylene | 134,000 | 8,820,000 | N/A | 16 | N/A | 224,000† | N/D |
| 1,1,2-trichloroethane | 2,170,000 | 48,700,000 | 166,000 | 118 | ND | N/D | N/D |
| 1,2-dichloroethane | 1,760,000 | 39,000,000 | 245,000 | 287 | ND | 113,000† | N/D |
| ethyl benzene | 3,180 | 4,750,000 | 2,190 | ND | ND | 430† | N/D |
| methylene chloride | 19,700 | 44,000 | 1,000 | ND | ND | N/D | N/D |
| 1,1,2,2-tetrachloroethane | N/A | 777,000 | N/A | N/A | N/A | 9,020† | N/D |
| tetrachloroethylene | 2,190 | 1,580,000 | N/A | N/A | N/A | 10,200† | 450† |
| toluene | 971 | 437,000 | N/A | N/A | N/A | 6,300† | 5000† |
| 1,2-trans-dichloroethylene | 124,000 | 7,740,000 | N/A | 24.7 | N/A | 31,200† | N/D |
| 1,1,1-trichloroethane | N/A | 166,000 | N/A | N/A | N/A | N/D | N/D |
| trichloroethylene | 11,300 | 2,760,000 | N/A | N/A | N/A | 2,000† | N/D |
| vinyl chloride | 240,000 | 8,400,000 | 22,700 | 56.1 | ND | N/D | N/D |
| Semi-volatiles | | | | | | | |
| anthracene | ND | 308,000 | 86.5 | ND | ND | N/D | N/D |
| bis(2-chloroethyl)-ether | 33,940 | 383,170,000 | N/A | ND | N/A | N/D | N/D |
| bis(2-ethylhexyl)-phthalate | ND | 293,000 | N/A | ND | N/A | N/D | N/D |
| dichlorobenzenes | N/A | 742,000 | N/A | N/A | N/A | 1,970† | N/D |
| fluoranthene | ND | 148,000 | 16.1 | ND | 70.3 | N/D | N/D |
| fluorene | ND | 428,000 | N/A | ND | N/A | N/D | N/D |
| hexachloroethane | NA | 27,000 | NA | NA | NA | 940† | N/D |
| INORGANIC SUBSTANCES | | | | | | | |
| Trace Metals | | | | | | | |
| arsenic | 110 | ND | ND | N/A | N/A | 69 | 36 |
| chromium | 200 | ND | 1,300 | N/A | 27 | 1,100 | 50 |
| copper | 18,100 | ND | 182,000 | N/A | 1,384 | 2.9 | 2.9 |
| lead | 100 | ND | 10,000 | N/A | N/A | 140 | 5.6 |
| mercury | 5 | ND | N/A | N/A | N/A | 2.1 | 0.03 |

* DNAPL: Dense, non-aqueous phase layer of volatile organic compounds

† LOEL N/A: Not available ND: Not detected N/D: Not determined

was found in two wells in the shallow groundwater beneath the waste pits. PAH and VOC concentrations in the DNAPL layer were up to four orders of magnitude above levels observed to be toxic to saltwater aquatic life. VOCs were also observed in the groundwater outside of the DNAPL layer at concentrations exceeding LOEL. Copper concentrations from one groundwater well on-site (18,100 µg/l) greatly exceeded the EPA ambient water quality criterion of 2.9 µg/l for the protection of saltwater aquatic life.

Chromium, copper, and lead in waste pit soil, and chromium and copper in Mud Gully sediment were detected at levels exceeding the natural concentrations observed in soils in the United States. Sediment samples collected upstream and downstream of the site had concentrations of PAHs and trace metals similar to each other and below those in sediment samples collected adjacent to the site.

## NOAA Trust Habitats and Species in Site Vicinity

Habitats of concern to NOAA include Clear Creek and Clear Lake. The lower reach of the Clear Creek watershed is a tidally influenced, estuarine habitat, while the upper reaches are freshwater. The distance of the saline/freshwater interface from the site depends on the tidal stage and the season of the year. The maximum incursion of estuarine waters is 25 km upstream of Galveston Bay (ACOE 1982). Marine fauna similar to those of Galveston Bay dominate the estuarine portion of the creek while freshwater species of inland rivers inhabit the non-saline portions. There is an intermediate zone between 22 and 32 km upstream of the mouth in which both marine and freshwater fauna can be found (ACOE 1982). The confluence of Mud Gully and Clear Creek, 600 meters below the site, is within this intermediate zone. Freshwater species dominate in this zone, but a few marine euryhaline species are also present (Table 2).

Table 2. Marine euryhaline species present in Clear Creek near the site (ACOE 1982).

| Species | Estuarine[1] | Intermediate zone[2] | Freshwater[3] |
|---|---|---|---|
| INVERTEBRATES | | | |
| blue crab | x | x | |
| brown shrimp | x | x | |
| grass shrimp | x | x | |
| white shrimp | x | x | |
| | | | |
| FISH | | | |
| alligator gar | x | x | |
| gizzard shad | x | x | x |
| spotted gar | x | x | |

1 Lower Clear Creek/Clear Lake
2 Between 22 and 32 km upstream from the mouth (confluence of Mud Gully and Clear Creek is within this zone)
3 Greater than 32 km upstream from the mouth (above the confluence of Mud Gully and Clear Creek)

The Clear Lake estuary and lower Clear Creek is an important nursery area of the Galveston Bay system. This estuary has considerable value to both the commercial and sport fisheries of Texas and the Gulf of Mexico. Lower Clear Creek and Clear Lake have been classified by the Texas Parks and Wildlife Department as "nursery habitat-seasonal estuarine shallow water areas."

**Response Category:** Federal Enforcement

**Current Stage of Site Action:** Record of Decision signed March 18, 1988.

**EPA Site Manager**

| | |
|---|---|
| Lou Barinka | 214- 655-6735 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Sharon Christopherson | 206-526-6317 |

**References**


ACOE. 1982. Clear Creek, Texas - Flood Control, Preconstruction Authorization Planning Report, Appendix VI, Natural Resources. Galveston, Texas: U.S. Army Corps of Engineers.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

I.T. Corporation. 1987. Summary Report for the Brio Refining, Inc.and Dixie Oil Processors Site, Friendswood, Texas-Final Report. Dallas: U.S. Environmental Protection Agency, Region 6.

I.T. Corporation. 1988. Endangerment Assessment for the Brio Refining, Inc. and Dixie Oil Processors Site, Friendswood, Texas-Final Report. Dallas: U.S. Environmental Protection Agency, Region 6.

**Crystal Chemical Company**
**Houston, Texas**
**Region 6**
**TXD990707010**

## Site Exposure Potential

The Crystal Chemical Company site occupies two hectares of relatively flat land in a metropolitan area of Houston, Texas (Figure 1). The company manufactured herbicides from 1968 to 1981, with the majority being arsenic-based, mono- and disodium methoanearsenic acid (MSMA and DSMA) and cacodylic acid (CAOC). During the 1970s, floodwaters transported both arsenic and phenols off-site, violating Texas Department of Water Resources standards. In 1981, Crystal Chemical Company declared bankruptcy and abandoned the site, leaving 375 $m^3$ of arsenic trioxide in storage tanks and 2,271 $m^3$ of process wastewater in the treatment ponds. EPA's site cleanup included the removal of the liquid wastes from the ponds; the removal of the top 30 cm of soil, which was treated and placed in the wastewater ponds; and the placement of a polyethylene cover over the pond with 15 to 30 cm of clay. The buildings and equipment were then decontaminated (ATSDR 1988) and the buildings subsequently removed from the site.

Site facilities included six buildings and four wastewater ponds. Dikes along the site perimeter contain production wastewater and surface water runoff to the Harris County Flood Control Channel, which flows south along the western side of the facility. Soils on the site are clayey and are generally poorly drained; subsurface soil is mainly sandy. Groundwater is shallow. The surrounding land is zoned industrial and/or commercial.

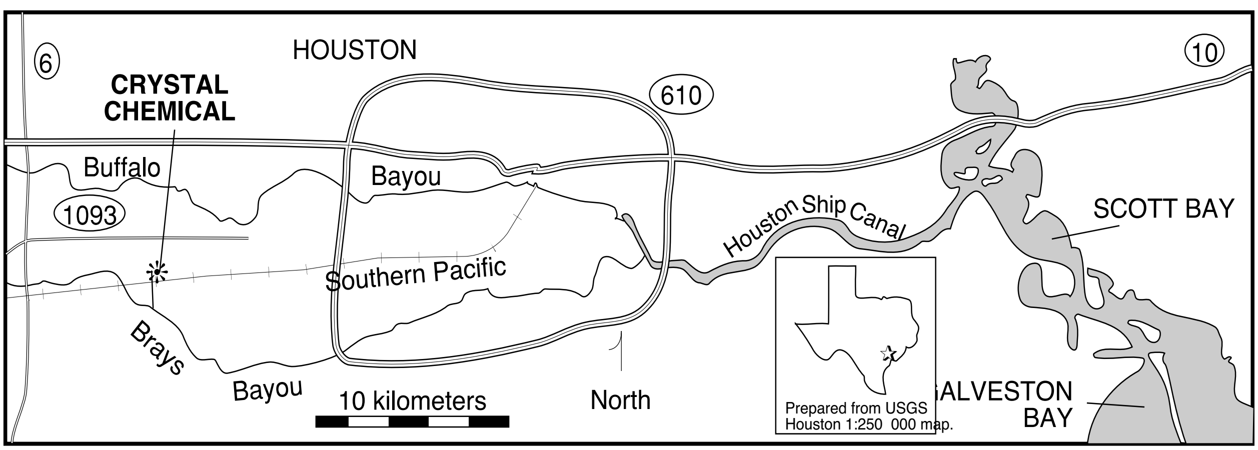


Figure 1. The Crystal Chemical Company site in Houston, Texas.

The major surface waters of interest include the Harris Flood Control Channel, which discharges into Brays Bayou 1.6 km from the site. Brays Bayou flows eastward for 31 km, at which point it merges with Buffalo Bayou, also known as the Houston Ship Canal. Buffalo Bayou flows for 20 km before discharging into Scott Bay, an embayment of Galveston Bay (D'Appolonia 1983).

Contaminant migration pathways to NOAA trust resources are groundwater discharge and surface water runoff to the Harris County Flood Control Channel and Brays Bayou.

**Site-Related Contamination**

Arsenic is the contaminant of concern (Table 1). While phenolics have been detected, concentration levels are relatively low. In contrast, arsenic levels (organic and inorganic) are high in both sediment/soil and water. High levels of arsenic (1,340 mg/kg) were detected in Harris County Flood Control Channel sediments adjacent to the site. High levels of arsenic were also found in stormwater (3,740,000 µg/l), flood control channel surface water (510 µg/l), and on-site groundwater (917,000 µg/l). Dissolved arsenic concentrations (up to 270 µg/l) exceeding AWQC have been detected at a U.S. Geological Survey gauging station on Brays Bayou 7 km below the site (Ferguson 1989).

Table 1. Maximum levels of selected contaminants at the Crystal Chemical Company site (Life Systems 1988); AWQC for the protection of saltwater aquatic life (EPA 1986); concentrations for sediment and soil in mg/kg and for water in µg/l.

| Chemicals | Sediment | Off-Site Soils | On-Site Soils | Storm Water | Harris Channel Water | Shallow Groundwater | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|---|---|---|
| arsenic | 1,340 | 1,570 | 27,310 | 3,740,000 | 510 | 917,000 | 69 | 36 |
| phenolics | <2.6 | 110 | 142 | 300 | 90 | 600 | 5800† | N/D |

† LOEL (phenol)

**NOAA Trust Habitats and Species in Site Vicinity**

Scott Bay is a low-salinity, estuarine habitat physically connected with the much larger Galveston Bay (Table 2). There is little available data on Brays Bayou, so it is difficult to assess its relative importance to NOAA trust resources. Habitats with resources of concern to NOAA include Buffalo Bayou and Scott Bay. Buffalo Bayou is a major waterway in southeast Texas and, due to its physical connection with Scott Bay, is tidally influenced in

Table 2. NOAA trust resource use of Buffalo Bayou and Scott Bay (USFWS 1982).

| Species | Lower Buffalo Bayou* | Scott Bay* |
|---|---|---|
| INVERTEBRATES | | |
| blue crab | N | N |
| brackish water clam | | |
| brown shrimp | N | N |
| eastern oyster | | |
| white shrimp | N | N |
| | | |
| FISH | | |

| | | |
|---|---|---|
| Atlantic croaker | | |
| black drum | | N |
| gulf kingfish | | |
| menhaden | C | C |
| red drum | R | R |
| sand seatrout | | |
| sea catfish | | |
| sheepshead | | N |
| southern flounder | | N |

N: nursery  C: commercial fishery  R: recreational fishery  M: migratory route
*  low salinity estuarine habitat (0.5 - 5.0 ppt)

its lower reach. The reach of Buffalo Bayou above its confluence with Brays Bayou is considered poor habitat quality with no coastal resources of concern to NOAA. The reach of Buffalo Bayou from its confluence with Brays Bayou downriver is classified as an industrial/shipping waterway, is dredged to 12 meters, and is 30 to 60 meters wide. Habitat quality generally improves toward Scott Bay, where is an increased presence of shrimp, crab, and fish (Guillen 1989).

**Response Category:** Federal Enforcement

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Lou Barinka | 214-655-6735 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Sharon Christopherson | 206-526-6317 |

**References**

ATSDR. 1988. Health Assessment for Crystal Chemical Company Site. Houston, TX. Atlanta: Agency for Toxic Substances and Disease Registry, U.S. Public Health Service.

D'Appolonia. 1983. Site investigation report. Crystal Chemical Company. Houston, TX. Volume I. Dallas: U.S. Environmental Protection Agency, Region 6.

Ferguson, U.S. Geological Survey, Houston, Texas, personal communication, February 23, 1989.

Guillen, G., Supervisor, Biology Section, Texas Water Commission, Houston, personal communication, December 1988.

Life Systems. 1988. Endangerment/Risk Assessment for the Crystal Chemical Site. ICAIR, Life Systems, Inc. Dallas: Jacobs Engineering Group Inc.

USFWS. 1982. Gulf coast ecological inventory: Houston, TX. Washington, D.C.: U.S. Fish and Wildlife Service. No. 29094-A1-EI-250.

**Dixie Oil Processors**
**Friendswood, Texas**
**Region 6**
**TXD089793046**

## Site Exposure Potential

The Dixie Oil Processors site is in an area of intensive oil and gas drilling 3 km north of Friendswood, Texas, 32 km southeast of Houston (Figure 1). The site consists of north and south parcels separated by Dixie Farm Road. The property adjacent to the site contains another potential source of hazardous waste, the Brio Refining Inc. Superfund site (I.T. Corp. 1987).

From 1969 to 1978, Intercoastal Chemical Company conducted copper recovery and hydrocarbon washing operations on the eight-hectare northern parcel. During this period, a series of surface impoundments was used to store cuprous wastewater prior to copper recovery and to treat wastewater prior to discharge. The impoundments have all been closed and filled in (I.T. Corp. 1987).

In 1978, Dixie Oil Processors began operations on the 3.4-hectare southern parcel. This portion of the site was used primarily for regeneration of cuprous chloride catalyst; hydrocarbon washing for oil recovery and to produce ethylbenzene, toluene, aromatic solvents, styrene pitch; and blending of chemical plant and refinery wastes. Although there has been no known disposal of material in pits on the southern parcel, an area of tarry material was found in 1984. Approximately 4,600 $m^3$ of this material were removed from two areas and disposed of off-site. Activity on the site ceased in 1986 (I.T. Corp. 1987).

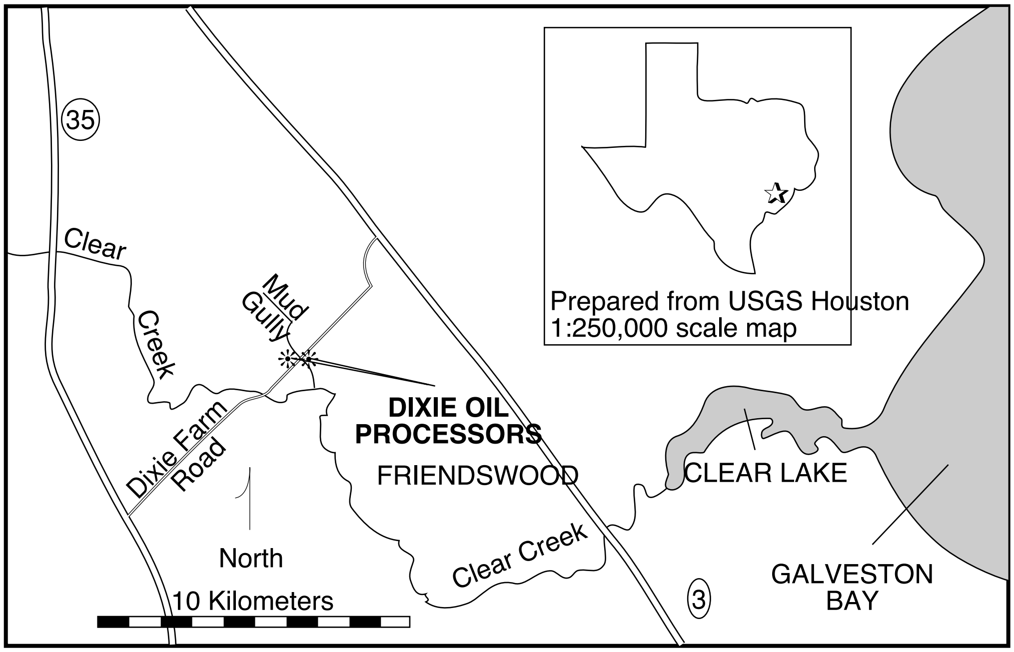

Figure 1. The Dixie Oil Processors site in Friendswood, Texas.

Surface water runoff from most of the site drains into a flood control ditch called Mud Gully. Mud Gully flows along the site boundary for 600 meters before discharging into Clear Creek. Clear Creek flows into Clear Lake, 19 km further downstream and, 8 km after Clear Lake, the stream enters Galveston Bay and the Gulf of Mexico. A large portion of the site was originally within the 100-year floodplain. However, the floodplain has probably been altered by the extensive stream channelization for flood control that has been performed upstream of the site since 1981. The southern parcel is elevated approximately 1.8 meters above the surrounding natural grade, which likely places it above the floodplain. Groundwater is shallow and flows toward Mud Gully and will either run parallel to, or discharge into, the gully.

Contaminant migration pathways to NOAA trust resources are groundwater discharge and surface water runoff to Mud Gully and Clear Creek.

## Site-Related Contamination

The contaminants of concern to NOAA are trace metals; high levels of copper and lead have been measured in on-site pits (Table 1). Copper concentrations in on-site runoff (3,500 µg/l) and groundwater (110,000 µg/l) exceeded both the acute (2.9 µg/l) and chronic (2.9 µg/l) AWQC for the protection of saltwater aquatic life. Chromium concentrations exceeding the chronic AWQC of 50 µg/l were also observed in runoff (EPA 1986). In addition, high levels of organic compounds have been measured in on-site groundwater. Elevated concentrations of copper and total PAHs have been documented in the stretch of Mud Gully adjacent to the site.

Table 1. Maximum concentrations of selected contaminants at the Dixie Oil Processors site and in Mud Gully (I.T. Corp. 1987); concentrations in soil and sediment in mg/kg and in water in µg/l.

| Contaminant | Groundwater | On-site Runoff | Pit Soil | Mud Gully Sediment Upstream | Mud Gully Sediment Adjacent | Mud Gully Sediment Downstream |
|---|---|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | | | |
| Volatiles | | | | | | |
| 1,1,2 trichloroethane | 4,910 | N/A | N/A | N/A | N/A | N/A |
| ethylbenzene | 480 | ND | ND | ND | ND | ND |
| vinyl chloride | 2,470 | ND | ND | ND | ND | ND |
| Semi-volatiles | | | | | | |
| hexachlorobenzene | N/A | N/A | 674 | N/A | N/A | N/A |
| total base/neutral organics | N/A | N/A | 885 | N/A | N/A | N/A |
| INORGANICS | | | | | | |
| Trace Metals | | | | | | |
| copper | 110,000 | 3,500 | 98,900 | 370 | 1,586 | 167 |
| chromium | ND | 260 | 226 | 34 | 35 | 26 |
| lead | N/A | N/A | 8648 | N/A | N/A | N/A |

N/A: Not available ND: Not detected

## NOAA Trust Habitats and Species in Site Vicinity

Habitats of interest to NOAA include Clear Creek and Clear Lake. Clear Creek, 610 meters below the site, is the trust habitat of concern. The lower reaches of the Clear Creek watershed are tidally influenced, estuarine habitats, while the upper reaches are freshwater. The saline/freshwater interface is variable, depending upon the tidal stage and the season of the year. The maximum incursion of estuarine waters is 25 km upstream of Galveston Bay (ACOE 1982). Marine fauna similar to those in Galveston Bay dominate the estuarine portion of the creek, whereas freshwater species of inland rivers inhabit the non-saline portions. Both marine and freshwater fauna can be found in an intermediate zone that is between 22 and 32 km above the stream mouth (ACOE 1982). The confluence of Mud Gully and Clear Creek 600 meters below the site is within this intermediate zone. Freshwater species are predominant in this zone; however, a few marine euryhaline species are also present (Table 2).

Table 2. Marine euryhaline species present near the Dixie Oil Processors site (ACOE 1982).

| Species | Estuarine [1] | Intermediate Zone [2] | Freshwater [3] |
|---|---|---|---|
| INVERTEBRATES | | | |
| blue crab | x | x | |
| brown shrimp | x | x | |
| grass shrimp | x | x | |
| white shrimp | x | x | |
| FISH | | | |
| alligator gar | x | x | |

| | | | |
|---|---|---|---|
| gizzard shad | x | x | x |
| spotted gar | x | x | |

1 Clear Lake/Lower Clear Creek
2 Between 22 and 32 km upstream from the mouth (confluence of Mud Gully and Clear Creek is within this zone)
3 Greater than 32 km upstream from the mouth (above the confluence of Mud Gully and Clear Creek)

The Clear Lake estuary and lower Clear Creek form an important nursery area of the Galveston Bay system. This estuary has considerable value to both the commercial and sport fisheries of Texas and the Gulf of Mexico. Lower Clear Creek and Clear Lake have been classified by the Texas Parks and Wildlife Department as "nursery habitat-seasonal estuarine shallow water areas."

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** Record of Decision signed March 31, 1988

**EPA Site Manager**

Lou Barinka 214-655-6735

**NOAA Coastal Resource Coordinator**

Sharon Christopherson 206-526-6317

**References**

ACOE. 1982. Clear Creek, Texas - Flood Control, Preconstruction Authorization Planning Report, Appendix VI, Natural Resources. Galveston, Texas: U.S. Army Corps of Engineers.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

I.T. Corporation. 1987. Summary Report for the Brio Refining, Inc. and Dixie Oil Processors Site, Friendswood, Texas-Final Report. Dallas: U.S. Environmental Protection Agency, Region 6.

I.T. Corporation. 1988. Endangerment Assessment for the Brio Refining, Inc. and Dixie Oil Processors Site, Friendswood, Texas-Final Report. Dallas: U.S. Environmental Protection Agency, Region 6.

**French Limited**
**Crosby, Texas**
**Region 6**
**TXD980514814**

## Site Exposure Potential

The French Limited site is at the intersection of State Highway 90 and Gulf Pump Road in northeast Harris County, Texas (Figure 1). The nine-hectare site contains a three-hectare unlined lagoon that was formed during sand mining operations in the 1960s. Between 1966 and 1972, 76,500 $m^3$ of industrial wastes were received at the site from local industry. Most of the wastes were deposited in the lagoon, and the remaining wastes stored in several large tanks, then burned in open pits. In 1973, French Limited was ordered to cease all operations and to remove all of the site structures, tankage, and process equipment (EPA 1987).

The site has been flooded by the San Jacinto River at least four times in the recent past. During one of these floods, the dike surrounding the waste lagoon was overtopped and breached, and contaminated sludges were discharged into the adjacent slough. An immediate removal action pumped most of the discharged sludge back into the lagoon and an overflow structure was installed to prevent future overtopping of the dike (EPA 1987).

The site is 1.5 km east of the San Jacinto River. The entire site, which is three meters above mean sea level, lies within the 100-year floodplain of the San Jacinto River. The area surrounding the site is largely undeveloped with numerous active and abandoned sand pits and low-lying swampy areas. The predominant surface water flow path is west-southwest towards the San Jacinto River. Jackson Bayou, a small tributary of the San Jacinto River, is 1 km northwest of the site. The San Jacinto River empties into Galveston Bay 27 km downstream. The Gulf of Mexico is 80 km from the site (USFWS 1982; EPA 1987).

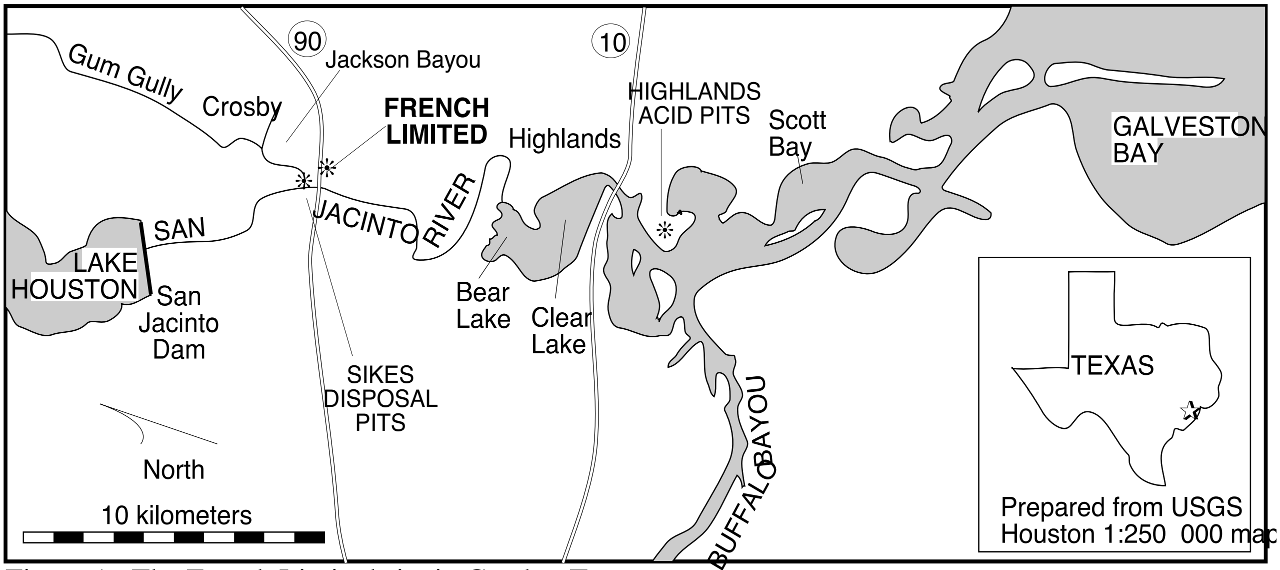

Figure 1. The French Limited site in Crosby, Texas.

Two other NPL sites, Sikes Disposal Pits and Highlands Acid Pits, are in the San Jacinto River watershed near the French Limited site. Sikes Disposal Pits is between the French Limited site and the San Jacinto River.

Possible contaminant migration pathways to NOAA trust resources include surface water runoff, groundwater flow, and periodic flooding to the San Jacinto River.

## Site-Related Contamination

The contaminants of concern to NOAA include PCBs, pesticides, trace metals, and semi-volatile and volatile organic compounds (Table 1). PCBs were measured in moderate to high concentrations in soil, sludge, and sediments, ranging from 18 to 616 mg/kg.

Table 1. Maximum concentrations of selected contaminants at the French Limited site (EPA 1983; 1987); AWQC for the protection of saltwater aquatic life (EPA 1986); sediment and sludge concentrations in mg/kg and water concentrations in µg/l.

| Contaminant | On-Site Soil | Waste Pit Sludge | Off-site Sediment | On-site Sediment | Waste Pit Water | On-site Groundwater | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | | | | | |
| Volatiles | | | | | | | | |
| benzene | ND | 270 | 0.05 | 0.27 | 1500 | 2,500 | 5,100* | 700* |
| chloroform | ND | 230 | ND | ND | 390 | 18,000 | N/D | N/D |
| 1,2-dichloroethane | ND | 348 | ND | ND | 190 | 21,200 | 113,000* | N/D |
| 1,2-dichloropropane | ND | 100 | ND | ND | ND | ND | 10,300* | 3,040* |
| ethylbenzene | ND | 380 | ND | 0.2 | 580 | 370 | 430* | N/D |
| tetrachloroethene | ND | 120 | ND | ND | 60 | 1,640 | 10,200* | 450* |
| toluene | ND | 420 | ND | 0.04 | ND | ND | 6,300* | 5,000* |
| Semi-Volatiles | | | | | | | | |
| acenaphthylene | 280 | 2,000 | ND | 17 | 240 | ND | N/D | N/D |
| acenaphthene | 68 | 4,100 | ND | 27 | 260 | ND | 970* | 710* |
| anthracene | 16 | 4,400 | 0.07 | 9.4 | 220 | ND | N/D | N/D |
| fluoranthene | 140 | 3,000 | 0.09 | 21 | 630 | ND | 40* | 16* |
| fluorene | 140 | 5,400 | ND | 59 | 570 | ND | N/D | N/D |
| naphthalene | 480 | 8,700 | 0.02 | 160 | 720 | 196 | 2,350* | N/D |
| phenanthrene | 360 | 8,300 | ND | 91 | 1,300 | ND | N/D | N/D |
| pentachlorophenol | ND | 740 | ND | ND | ND | ND | 13 | 7.9* |
| pyrene | 110 | 2,500 | 0.1 | 18 | 740 | ND | N/D | N/D |
| Pesticides/PCBs | | | | | | | | |
| PCBs | 237 | 616 | 18 | 33 | ND | ND | 10 | 0.03 |
| 4,4'-DDT | ND | 23.3 | ND | ND | ND | ND | 0.13 | 0.001 |
| beta endosulfan | ND | 70.1 | ND | ND | ND | ND | 0.034 | 0.0087 |
| INORGANIC SUBSTANCES | | | | | | | | |
| Trace Metals | | | | | | | | |
| arsenic | ND | 9.9 | ND | ND | ND | ND | 69 | 36 |
| cadmium | ND | 7.7 | ND | ND | ND | ND | 43 | 9.3 |
| chromium | 220 | 486 | 13 | ND | 13 | 13 | 1,100 | 50 |
| copper | 96 | 254 | 6 | ND | 6.0 | 30 | 2.9 | 2.9 |
| lead | 136 | 120 | 21.5 | ND | 20 | 6 | 140 | 5.6 |
| mercury | 1.6 | 7.0 | 0.26 | ND | ND | 0.3 | 2.1 | 0.025 |
| nickel | 12 | 592 | 10 | ND | ND | ND | 75 | 8.3 |
| silver | 0.1 | 7.75 | 0.02 | ND | ND | ND | 2.3 | N/D |
| zinc | 122 | 8,350 | 68 | ND | 13 | 50 | 95 | 86 |

ND: Not detected; N/D: Not determined; *LOEL

4,4-DDT and beta-endosulfan were measured in on-site sludge at maximum concentrations of 23.3 mg/kg and 70.1 mg/kg, respectively. Trace metals were detected in soil, sediment, and sludge, with chromium, copper, nickel, and zinc having the highest concentration levels. The concentrations of copper and lead in lagoon surface water, and mercury, copper, and lead in groundwater exceeded AWQC. Three organic compounds, benzene, fluoranthene, and ethylbenzene, measured in on-site surface water exceeded their respective LOEL (EPA 1983; 1986; 1987).

**NOAA Trust Habitats and Species in Site Vicinity**

The San Jacinto River is a continuously flowing, low-gradient, river system with a drainage basin of 7,500 $km^2$. The stretch of the river near the site is a natural river channel three to six meters deep and 60 to 90 meters wide (Ferguson 1988). The San Jacinto Dam is 5 km above the site (Guillen 1988). The dam releases only limited fresh water; as a result, the San Jacinto River is tidal and brackish up to the base of the dam. No information was available regarding the aquatic habitats of Jackson Bayou.

NOAA trust resources use the lower San Jacinto River 10 km below the site as nursery and spawning habitat (Table 2) (USFWS 1982). NOAA resource use of the immediate vicinity of the site is probably restricted to periods of drought, when the salinity rises because of less freshwater input to the system. The presence of euryhaline silversides and anadromous striped bass in the San Jacinto River above the site at the base of the Lake Houston Dam was documented in a recent fish kill resulting from poor flow regulation and reduced dissolved oxygen (Spencer 1988). Blue crab are also known to inhabit the San Jacinto River up to the dam (Guillen 1989).

Surface waters in the general vicinity of the French Limited site area are used for recreational fishing. PCBs have been found in fillets of fish collected in the nearby waters beneath the U.S. Highway 90 bridge and near the mouth of Jackson Bayou northwest of the site (EPA 1987).

Table 2. Selected NOAA trust resource use of the lower stretch of the San Jacinto River (USFWS 1982).

| Species | Spawning | Nursery | Adult | Recreational Fishery |
|---|---|---|---|---|
| INVERTEBRATES | | | | |
| blue crab | | X | | X |
| brown shrimp | | X | | |
| white shrimp | | X | | |
| | | | | |
| FISH | | | | |
| Atlantic croaker | | X | | X |
| black drum | | X | | X |
| gars | X | X | | |
| killifish | X | X | X | |
| mullet | | X | | X |
| red drum | | X | | |
| sand seatrout | | X | | X |
| sheepshead | | X | | X |
| silverside | | X | X | |
| southern flounder | | X | | |
| spotted seatrout | | X | | X |

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** Record of Decision signed March 23, 1988

**EPA Site Manager**

| | |
|---|---|
| Deborah Couchman-Griswold | 214-655-6715 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Sharon Christopherson | 206-526-6829 |

**References**


EPA. 1983. Hazardous Waste Land Treatment. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. SW-874.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Endangerment Assessment for French Limited Site, Barrett/Crosby, Texas. Dallas: U.S. Environmental Protection Agency, Region 6.

Ferguson, D., U.S. Geological Survey, Houston, Texas, personal communication, December 21, 1988.

Guillen, G., Texas Water Commission, Deer Park, Texas, personal communication, December 16, 1988.

Spencer, S., biologist, Texas Parks and Wildlife Commission, Seabrook, Texas, personal communication, November 15, 1988.

USFWS. 1982. Gulf coast ecological inventory: Houston, Texas. Washington, D.C.: U.S. Fish and Wildlife Service.

**Highlands Acid Pits**
**Highlands, Texas**
**Region 6**
**TXD980514996**

## Site Exposure Potential

The Highlands Acid Pits site is 2 km west of Highlands, Texas, and 13 km southeast of the San Jacinto Dam at the south end of Lake Houston (Figure 1). During the early 1950s, the site was used for the disposal of an unknown quantity of industrial waste sludge, believed to be spent sulfuric acid from oil refinery processes. Such waste materials are characterized by low pH values and elevated concentrations of heavy metals and organic compounds, principally benzene, toluene, xylene, and methylene chloride. The site investigation showed extensive contamination across broad areas of the site with very limited off-site impacts. The site extends over 0.6 hectares and includes an estimated 10,700 $m^3$ of wastes and contaminated sands above the water table. The shallow groundwater is also contaminated: based on a surface area covering the entire site and total saturated thickness of six meters, a total of 18 million liters of contaminated groundwater underlie the site (EPA 1987).

The site is situated on a 2.4-hectare peninsula extending into Clear Lake, an embayment of the San Jacinto River (EPA 1987). To the north, the site is bordered by the San Jacinto River, to the west by a part of Grennel Slough, to the south by Clear Lake, and to the east by sand pits. The site is less than 30 meters from Clear Lake, less than 7 meters from the San Jacinto River, and within the 10-year floodplain of the river. The site is 1.5 to 3 meters above mean sea level, although nearly 1.5 meters of subsidence has been recorded in the general area between 1890 and 1973 (0.73 meters since 1964). The site was flooded in 1961 by Hurricane Carla. The San Jacinto River flows 19 km before it enters Galveston Bay, on the Gulf of Mexico.

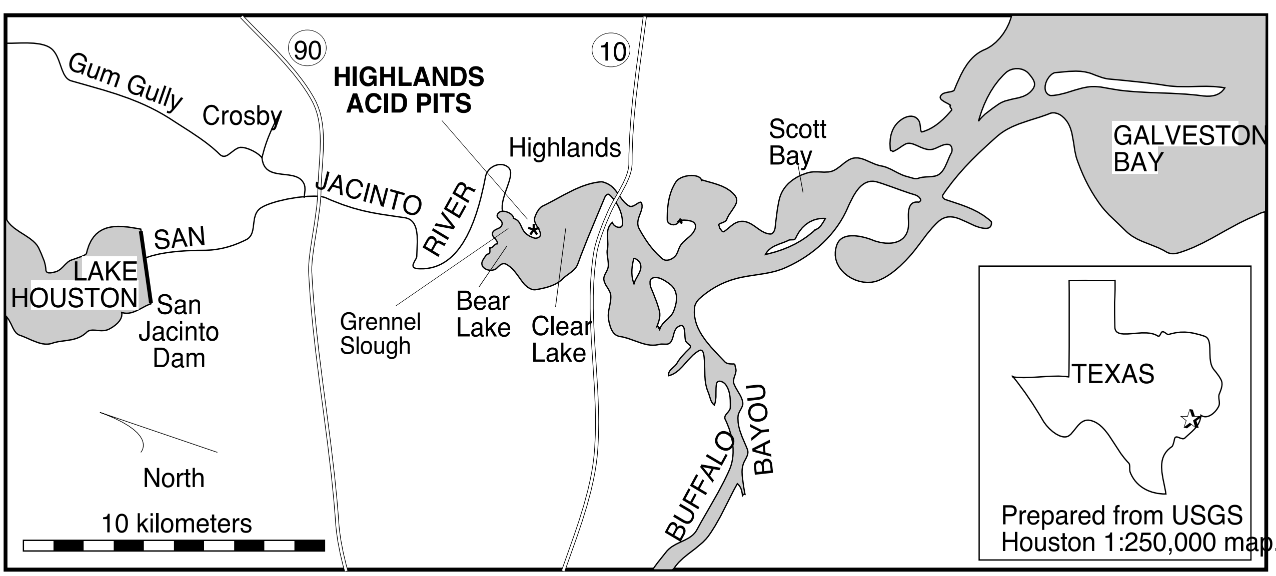


Figure 1. The Highlands Acid Pits site in Highlands, Texas.

The site has been divided into the Source Operable Unit and the Groundwater Operable Unit. The 1984 Record of Decision calls for excavation and off-site transport of contaminated materials above the groundwater table in the area of the main pits and backfilling with clean material for the Source Operable Unit (EPA 1984). The 1987 Record of Decision states that, upon completion of the source removal action, a long-term monitoring program will be implemented for the upper and middle sand aquifers and for surrounding surface water bodies (EPA 1987).

Groundwater in the upper sand aquifer flows radially from the site and discharges to Grennel Slough, Clear Lake, and the sand pits. Surface water runoff conforms to the site topography and drains into Grennel Slough, Clear Lake, and the sand pits. About 14.2 metric tons of sediment per year is eroded from the bare portion of the waste area by surface water runoff. The sediment collects in a swamp near the north shore of Clear Lake.

Possible contaminant migration pathways to NOAA trust resources are groundwater discharge, surface water runoff, and sediment erosion to the San Jacinto River (EPA 1987).

**Site-Related Contamination**

The contaminants of concern to NOAA include the trace metals arsenic, cadmium, chromium, and lead, and VOCs. Trace metals were measured in on-site groundwater in concentrations exceeding AWQC for the protection of saltwater aquatic life (Table 1) (EPA 1986, 1987). In addition, benzene was observed in groundwater at concentrations exceeding LOEL. Contaminants in groundwater were found to be highest in the well on the eastern side of the site toward Grennel Slough. Information on the groundwater contamination pattern across the site was not provided in the documents reviewed. Concentrations of cadmium measured in the on-site soil and waste mixture exceeded that observed in natural soils.

Table 1. Maximum concentrations of contaminants at the Highlands Acid Pits site (EPA 1983); range in natural soil (EPA 1987); AWQC for the protection of saltwater aquatic life (EPA 1986); concentrations for water in µg/l and for soil in mg/kg.

| Contaminant | Soil/Waste | Range of Content in Natural Soil | Groundwater | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | | |
| Volatiles | | | | | |
| benzene | 822 | N/A | 210,000 | 5,100* | 700* |
| toluene | 21.2 | N/A | 202 | 6,500* | 5,000* |
| xylene | 23.6 | N/A | 417,000 | N/D | N/D |
| pyrene | 13 | N/A | 3,200 | N/D | N/D |
| INORGANIC SUBSTANCES | | | | | |
| Trace Metals | | | | | |
| arsenic | 12 | 1-50 | 1,200 | 69 | 36 |
| cadmium | 2.9 | 0.01-0.7 | 19 | 43 | 9.3 |
| chromium | 44 | 1-1,000 | 2,699 | 1,100 | 50 |
| lead | 185 | 2-200 | 820 | 140 | 5.6 |

* LOEL N/A: Not available N/D: Criteria not developed

With the exception of chromium, no contamination was detected in the San Jacinto River, Grennel Slough, Clear Lake, or the sand pits. Total chromium was detected at 5 µg/l in Grennel Slough, an order of magnitude less than AWQC (Espey, Huston & Assoc. 1986). Sediments sampled at the same locations as the surface waters were reported to have levels not much greater than background concentrations, although no data were presented in the reports reviewed.

**NOAA Trust Habitats and Species in Site Vicinity**

The San Jacinto River is a continuously flowing, low-gradient river system. The San Jacinto Dam, 17 km above the site, releases only limited freshwater and, as a result, the San Jacinto River is tidal and brackish up to the base of the dam (Guillen 1988). The stretch of river at the site is a drowned river valley with wetlands, submerged trees, sand banks, and channels. The river ranges from 100 to 400 meters wide at the site and is a maximum of two meters deep, with a sandy silt substrate and good water quality.

NOAA trust resources use the aquatic habitats near the site (Table 2) (USFWS 1982). A reported fish kill in Clear Lake adjacent to the site was possibly associated with contaminants released from the Highlands Acid Pits (time of fish kill undocumented). However, an investigation of the benthic community near the site found no adverse effect to the community (EPA 1984).

Table 2. NOAA trust resource use of Clear Lake and the San Jacinto River (USFWS 1982).

| Species | Spawning Area | Nursery Area | Adult Area | Recreational Fishery |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| INVERTEBRATES | | | | |
| blue crab | | X | | X |
| brown shrimp | | X | | |
| white shrimp | | X | | |
| | | | | |
| FISH | | | | |
| Atlantic croaker | | X | | X |
| black drum | | X | | X |
| gar | X | X | | |
| killifish | X | X | X | |
| mullet | | X | | X |
| red drum | | X | | |
| sand seatrout | | X | | X |
| sheepshead | | X | | X |
| southern flounder | | X | | |
| silverside | | X | X | |
| spotted seatrout | | X | | X |

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** Operation and Maintenance (O/P)

**EPA Site Manager**

| | |
|---|---|
| Deborah Couchman-Griswold | 214-655-6715 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Sharon Christopherson | 206-526-6317 |

**References**


EPA. 1983. Hazardous Waste Land Treatment. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. SW-874.

EPA. 1984. Record of Decision, Highland Acid Pits, Harris County, Texas. Dallas: U.S. Environmental Protection Agency, Region 6.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Abbreviated Record of Decision, Highlands Acid Pits, Groundwater Operable Unit. Dallas: U.S. Environmental Protection Agency, Region 6.

Espey, Huston & Associates, Inc. 1986. Highlands Acid Pits Site-Post Closure Monitoring & Maintenance Plan. Austin, Texas: Texas Water Commission.

Guillen, G., Texas Water Commission, Deer Park, Texas, personal communication, December 16, 1988.

USFWS. 1982. Gulf coast ecological inventory: Houston, Texas. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000-scale map.

**Sikes Disposal Pits**
**Crosby, Texas**
**Region 6**
**TXD980513956**

## Site Exposure Potential

The Sikes Disposal Pits site occupies 75 hectares, 3 km southwest of Crosby, Texas (Figure 1). The Sikes Disposal Pits were used as a waste depository from the early 1960s to 1967. During this period, a variety of chemical wastes from area petrochemical industries were deposited on-site in several sand pits. Drums of wastes were also left on the property. Areas of significant waste deposits include a main waste pit and overflow area, three smaller waste pits, and drum waste areas. Preliminary sampling at the site in 1982 indicated phenolic compounds, xylene, benzene, creosote, toluene, and other organic compounds. An Immediate Removal Action performed at the site by the EPA Emergency Response Branch in June 1983 included the removal of 336 $m^3$ of phenolic tars from a partially buried pit. In the September 1986 Record of Decision, EPA selected on-site incineration of contaminated sludges and soils as the disposal method. The Sikes site is presently in the Remedial Design phase (EPA 1988).

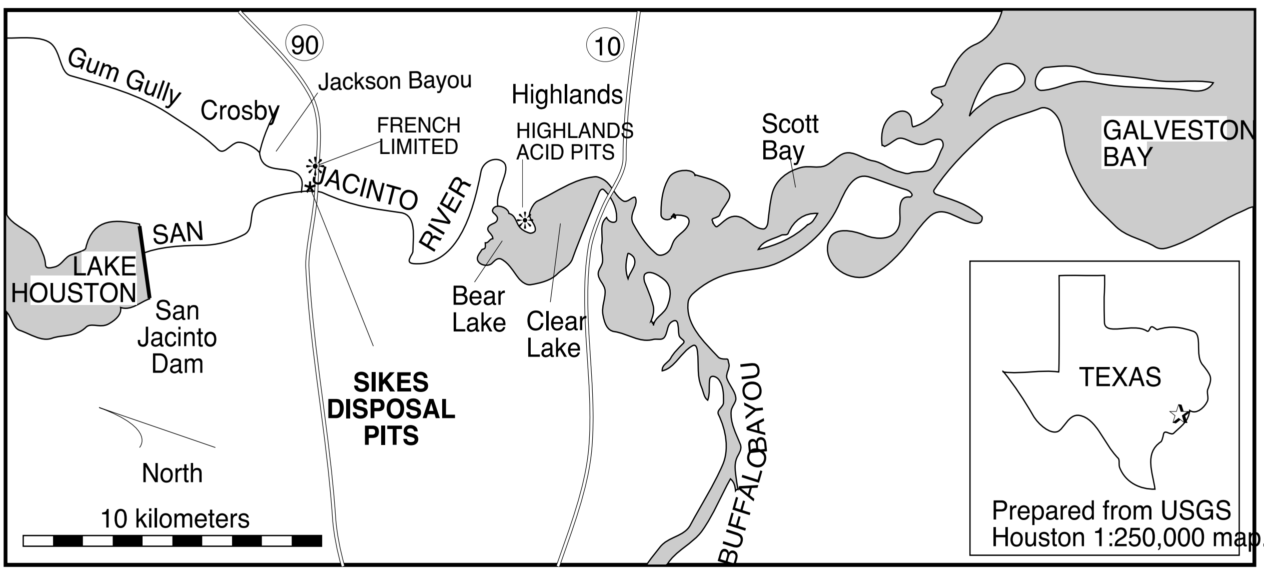


Figure 1. The Sikes Disposal Pits site in Crosby, Texas.

The site is bordered by the San Jacinto River on the west, Jackson Bayou on the north, and U.S. Highway 90 on the south (EPA 1988). The entire site, which is three to six meters above mean sea level, lies within the 100-year floodplain of the San Jacinto River, while portions of the site lie within the 10-year and 50-year floodplains. The site has been flooded four times since 1969. The area surrounding the site is largely undeveloped and has both active and abandoned sand pits, and low-lying, swampy areas. The San Jacinto River empties into Galveston Bay 27 km downstream of the site. The Gulf of Mexico is 80 km from the site (EPA 1988).

Two Superfund sites, French Limited and Highlands Acid Pits, are on the San Jacinto River watershed near the Sikes Disposal Pits site.

Contaminant migration pathways to NOAA trust resources include periodic flooding, surface water runoff, and groundwater flow to Jackson Bayou and the San Jacinto River.

**Site-Related Contamination**

The contaminants of concern to NOAA are volatile and semi-volatile organic compounds and lead. Ethylbenzene, naphthalene, and total phenols were measured in groundwater at concentrations that exceeded LOEL (Table 1) (EPA 1986, 1988). High levels of several volatile and semi-volatile organic compounds were measured in on-site soils and sludges.

Sediment collected from a surface seep draining into Jackson Bayou had concentrations of total semi-volatile organic compounds ranging from 961 to 9,630 mg/kg, while sediments collected in the San Jacinto River near the site contained concentrations of total semi-volatile organic compounds ranging from 751 to 2,270 mg/kg (EPA 1988). No data on concentrations of specific compounds in bayou or river sediments were presented in documents available for review.

High levels of lead were observed in wastes on site and concentrations exceeding AWQC for the protection of saltwater aquatic life were observed in groundwater on-site.

Table 1. Maximum concentrations of contaminants at the Sikes Disposal Site (EPA 1988); LOEL (EPA 1986); concentrations in soil and sludge in mg/kg and in water in µg/l.

| Contaminant | Soil | Sludge | Groundwater | Surface Water | LOEL Acute | LOEL Chronic |
|---|---|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | | | |
| Volatiles | | | | | | |
| benzene | 320 | 400 | 10,000 | 9 | N/D | N/D |
| 1,2-dichloroethane | 1,000 | 1,400 | 2,200 | 93 | 113,000 | N/D |
| 1,1,2-trichloroethane | 500 | 290 | 390 | 4 | N/D | N/D |
| ethylbenzene | 100 | 52 | 1,700 | ND | 430 | N/D |
| toluene | 93 | 48 | 4,300 | 2 | 6,300 | 5,000 |
| Semi-Volatiles | | | | | | |
| naphthalene | 1,200 | 78,300 | 5,900 | ND | 2,350 | N/D |
| fluorene | 290 | 1,600 | ND | ND | N/D | N/D |
| pyrene | 590 | 3,300 | ND | 190 | N/D | N/D |
| total phenols | N/A | 595,000 | 15,000 | 23 | 5,800 | N/D |
| INORGANIC SUBSTANCES | | | | | | |
| Trace Metals | | | | | | |
| lead | 370 | 4,150 | 46 | ND | 140* | 5.6* |

N/A: Not available N/D: Criteria not determined ND: Not detected * AWQC

**NOAA Trust Habitats and Species in Site Vicinity**

The San Jacinto River is a continuously flowing, low-gradient river system with a drainage basin of 7,500 $km^2$. The stretch of the river near the site is a natural river channel three to six meters deep and 60 to 90 meters wide (Ferguson 1988). The San Jacinto Dam is 5 km above the site (Guillen 1988). The dam releases limited fresh water and, as a result, the San Jacinto River is tidal and brackish up to the base of the dam.

NOAA trust resources use the lower San Jacinto River 10 km below the site as nursery and spawning habitat (Table 2) (USFWS 1982). NOAA resource use of the immediate vicinity of the site is probably restricted to periods of drought, when the salinity rises because of less freshwater input to the system. The presence of euryhaline silversides and anadromous striped bass in the San Jacinto River above the site at the base of the Lake Houston Dam was documented in a recent fish kill resulting from poor flow regulation and reduced dissolved oxygen (Spencer 1988). Blue crab are also known to inhabit the San Jacinto River up to the dam (Guillen 1989).

Table 2. NOAA trust resource use of the lower stretch of the San Jacinto River (USFWS 1982).

| Species | Spawning Area | Nursery Area | Adult Area | Recreational Fishery |
|---|---|---|---|---|
| INVERTEBRATES | | | | |
| blue crab | | X | | X |
| brown shrimp | | X | | |
| white shrimp | | X | | |
| | | | | |
| FISH | | | | |
| Atlantic croaker | | X | | X |
| black drum | | X | | X |
| gar | X | X | | |
| killifish | X | X | X | |
| mullet | | X | | X |
| red drum | | X | | |
| sand seatrout | | X | | X |
| sheepshead | | X | | X |
| silverside | | X | X | |
| spotted seatrout | | X | | X |
| southern flounder | | X | | |

**Response Category:** Federal Fund Lead

**Current Stage of Site Action:** RD/RA Phase

**EPA Site Manager**

| | |
|---|---|
| Deborah Couchman-Griswold | 214-655-6715 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Sharon Christopherson | 206-526-6317 |

**References**

EPA. 1983. Hazardous Waste Land Treatment. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. SW-874.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1988. Record of Decision for Remedial Alternative Selection and Remedial Investigation Reports (Vols. I and III). Dallas: U.S Environmental Protection Agency, Region 6.

Ferguson, D., U.S. Geological Survey, Houston, Texas, personal communication, December 21, 1988.

Guillen, G., Texas Water Commission, Deer Park, Texas, personal communications, December 16, 1988; March 1, 1989.

USFWS. 1982. Gulf coast ecological inventory: Houston, Texas. Washington, D.C.: U.S. Fish and Wildlife Service.

**Tex-Tin Corporation**
**Texas City, Texas**
**Region 6**
**TXD062113329**

## Site Exposure Potential

The Tex-Tin site is an active tin smelter operating in an industrial area of Texas City, Texas (Figure 1). The facility was constructed by the U.S. Government during World War II. Wah Chang Corporation purchased the facility after the war and sold it in 1970 to Gulf Chemical and Metallurgical Company, which changed the name to Tex-Tin Corporation in 1985. In 1985, EPA issued an Administrative Order under the Clean Water Act charging Tex-Tin with violating a permit issued under the National Pollutant Discharge Elimination System (EPA 1987).

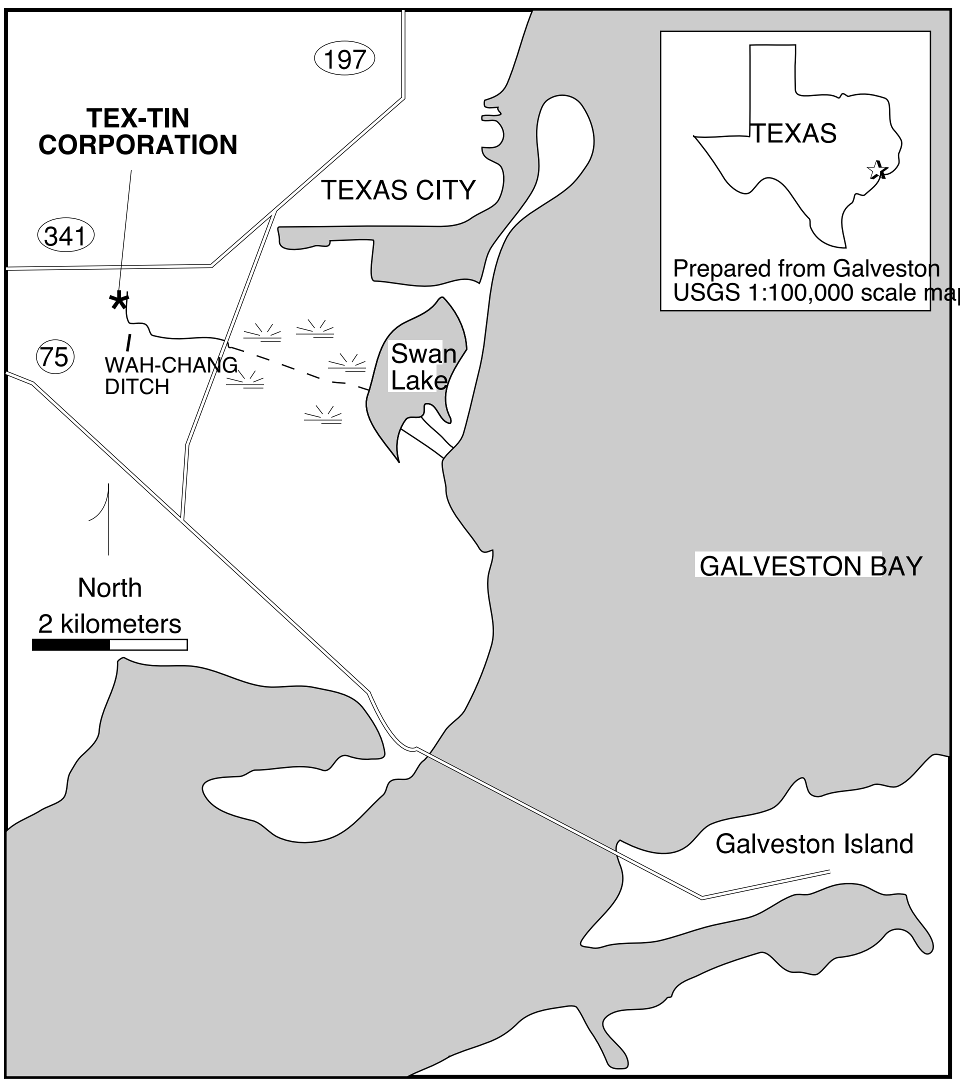


Figure 1. The Tex-Tin Corporation site in Texas City, Texas.

The site occupies 52 hectares of flat land and consists of numerous buildings, five wastewater treatment ponds, a slurry pond, open and closed acid ponds, three inactive impoundments, slag piles, and a permitted, inactive landfill containing radioactive wastes (EPA 1987).

Surface waters of interest include the Wah Chang Ditch, which receives treated effluent from the facility (EPA 1987). This ditch runs south along the eastern side of the site and discharges into an unnamed intermittent stream. This stream flows for 3 km through a coastal wetland and into Swan Lake. Swan Lake empties directly into Galveston Bay, 5 km from the site. The groundwater is shallow and flows south toward the bay area.

Contaminant migration pathways of concern to NOAA include surface water runoff and groundwater flow to Swan Lake and Galveston Bay.

## Site-Related Contamination

Contaminants of concern to NOAA at the Tex-Tin facility include a number of trace metals associated with the smelting process (Table 1). The majority of contaminants detected in water samples from the Wah Chang Ditch exceeded AWQC for the protection of saltwater aquatic life, with concentrations of copper, lead, and nickel especially high. Concentrations of copper, manganese, nickel, and tin were also high in the groundwater at the site (EPA 1987). No soil or sediment data were reported.

Table 1. Maximum concentrations of selected contaminants (EPA 1987) observed at the Tex-Tin Corporation site; AWQC for the protection of saltwater aquatic life (EPA 1986); concentrations in µg/l.

| | Wah Chang | | AWQC | |
|---|---|---|---|---|
| Contaminants | Ditch | Groundwater | Acute | Chronic |
| cadmium | 383 | N/A | 43 | 9.3 |
| chromium | 274 | N/A | 1100 | 50 |
| copper | 15,000 | 365,000 | 2.9 | 2.9 |
| lead | 16,000 | N/A | 140 | 5.6 |
| manganese | N/A | 357,000 | N/D | N/D |
| mercury | 3.0 | N/A | 2.1 | 0.025 |
| nickel | 1,610 | 4,700 | 75 | 8.3 |
| silver | 245 | N/A | 2.3 | N/D |
| tin | <20 | 85,000 | N/D | N/D |

N/A: Not available
N/D: Criteria not determined

## NOAA Trust Habitats and Species in Site Vicinity

The habitats of interest to NOAA include Swan Lake, its associated wetland, and Galveston Bay. Swan Lake is a shallow estuarine system with a maximum depth of one meter. The lake supports diverse habitats and is generally considered to be of good water quality. Swan Lake and the associated saltwater marsh are strongly tidal due to the proximity of Galveston Bay. Swan Lake serves as a nursery area for eastern oyster, white shrimp, and brown shrimp. It is presently prohibited to take shellfish from this lake due to high fecal coliform levels (Guillen 1988). Swan Lake is used for other forms of recreational fishing. The saltwater wetland area surrounding the lake is also important since many species use this area for foraging during periods of high water (Johns 1988). Many NOAA trust resources use Galveston Bay as nursery, breeding, and foraging habitat. Galveston Bay is an important area for both recreational and commercial fishing (Table 2).

Table 2. NOAA trust resource use of Swan Lake and Galveston Bay (USFWS 1981; Guillen 1988).

| Species | Swan Lake | Galveston Bay |
|---|---|---|
| INVERTEBRATES | | |
| blue crab | | A, R, C |
| brown shrimp | N | M , R, C |
| eastern oyster | N | B, N, C |
| white shrimp | N | M , R, C |
| | | |
| FISH | | |
| Atlantic croaker | A, R | B, A, R, C |
| black drum | A, R | B, M , A, R |
| Florida pompano | | N, C, R |
| gulf kingfish | | C, R |
| ladyfish | | B, N, R |
| menhaden | | N |
| red drum | A, R | B, M , A,R |
| sand seatrout | | B, C, R |
| sea catfish | | B, N, R, C |
| sheepshead | A, R | M , A, R, C |
| southern kingfish | | C, R |
| southern flounder | A, R | N, M , A, C |
| spotted seatrout | A, R | B, A, R, C |
| spot | A, R | A, R,C |
| striped mullet | | N, C, R |

N: Nursery area; B: Breeding area; M: Migratory route; A: Adult concentration
R: Recreational Fishery; C: Commercial Fishery

**Response Category :** Federal Enforcement Lead

**Current Stage of Site Action :** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Ruth Izraeli 214-655-6735 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Sharon Christopherson 206- 526-6829 |

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Hazardous Ranking System Package. Tex-Tin Corporation, Texas City, TX. Dallas: U.S. Environmental Protection Agency, Region 6.

Guillen, G., Supervisor, Biology Section, Texas Water Commission, Deer Park, Texas, personal communication, 1988.

Johns, M., Research Specialist, Texas Parks and Wildlife, La Porte, Texas, personal communication, 1988.

USFWS. 1981. Gulf coast ecological inventory: Galveston Bay, TX. Washington, D.C.: U.S. Fish and Wildlife Service.

**Naval Air Station Alameda**
**Alameda, California**
**Region 9**
**CA2170023236**

## Site Exposure Potential

Naval Air Station (NAS) Alameda occupies the western tip of Alameda Island in Alameda County, California (Figure 1). Contamination may be present at 20 locations on the base, including storage areas, maintenance and power facilities, and some areas, such as Oakland Inner Harbor, that could have been contaminated by spills or runoff. Some of the sites have no record of toxic chemicals being released into the environment (DNWD 1988).

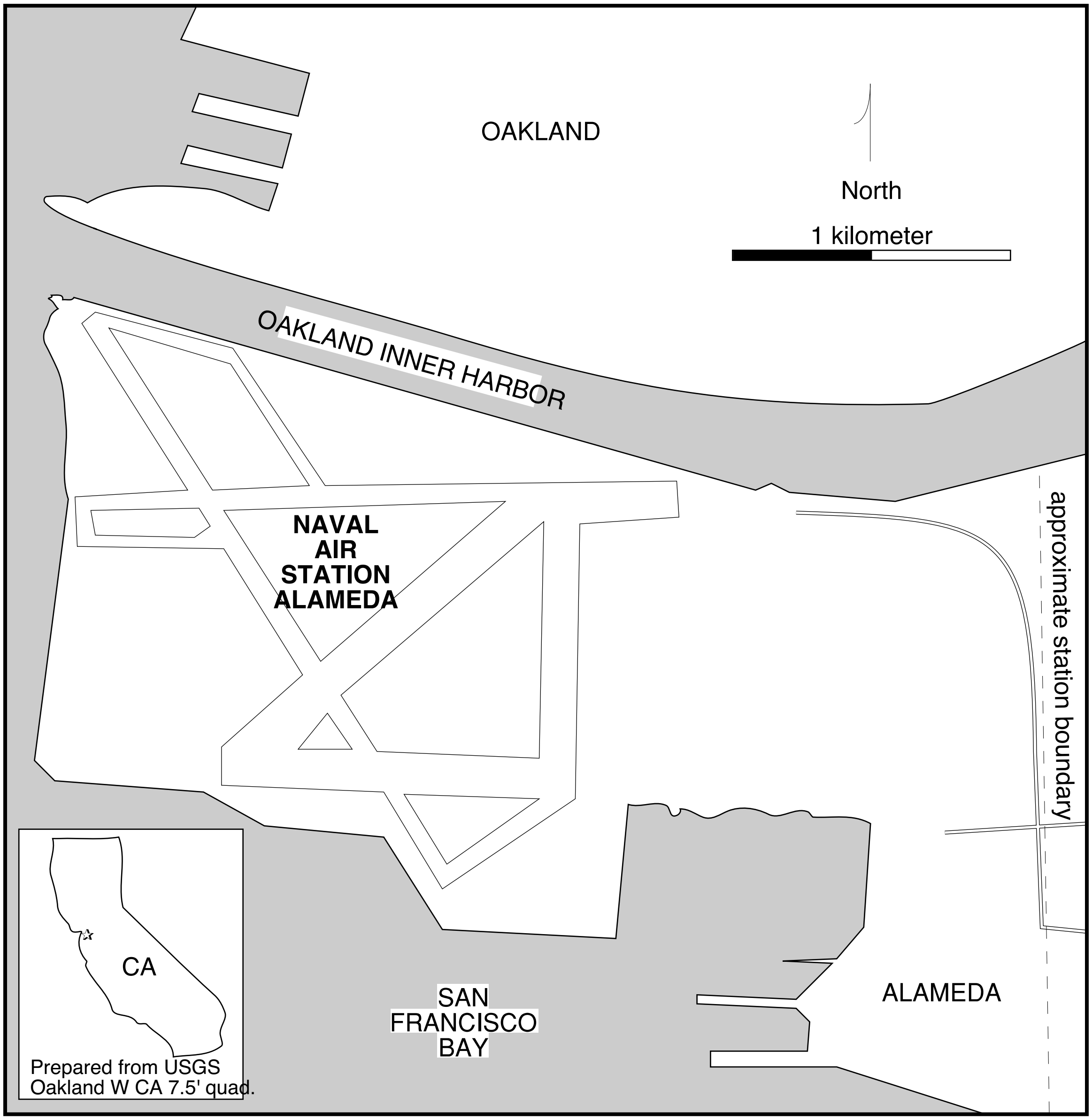


Figure 1. The Naval Air Station Alameda site in Alameda, California.

Alameda Island is on the eastern side of central San Francisco Bay and is separated from the mainland by Oakland Inner Harbor, an inlet of the bay. The NAS occupies 1,066 hectares (618 hectares on land and 448 hectares in the water). The station is flat, with elevations between 3 and 4.5 meters above sea level. Most of the dry land is reclaimed marsh and open water that has been filled. A large part of the fill used in this reclamation was dredge spoils from San Francisco Bay and Oakland Inner Harbor. There is no significant natural surface water drainage within the station. Precipitation is removed by infiltration, runoff, and artificial storm drainage. It is generally believed that all surface and groundwater is discharged into the surrounding bay and estuary (DNWD 1988).

Possible contaminant migration pathways to NOAA trust resources are groundwater flow and surface runoff to Oakland Inner Harbor and San Francisco Bay.

## Site-Related Contamination

Contaminants of concern to NOAA include trace metals, PCBs, pesticides, and volatile and semi-volatile organic compounds (DNWD 1988). No information was available regarding contaminant concentrations.

## NOAA Trust Habitats and Species in Site Vicinity

San Francisco Bay is an estuarine environment providing nursery, adult, and spawning habitat for NOAA trust resources (Table 1). The southern bay area is used mostly as a seasonal nursery ground. Smelt and herring spawn in the central areas of the bay and use the nearshore estuaries for juvenile growth. Several flatfish species also use the nearshore area as juvenile nursery grounds and as adult habitat. Sea perch use the area year-round and can often be found just beyond the intertidal zone. Leopard sharks, dogfish, and bat rays are relatively shallow-water carnivores that feed on smaller fish and benthic invertebrates along the mud flats during high tide. Commercially important shrimp species are also found in San Francisco Bay, with juveniles present in nearshore waters and adults in the central portions of the bay. Pacific salmon and steelhead trout use the bay as a migratory route (USFWS 1981). Harbor seals in the southern part of the bay would only be found near the site when moving through the area (Lecky 1989).

Table 1. NOAA trust resources in San Francisco Bay near NAS Alameda (USFWS 1981).

| Species | Spawning Area | Nursery Area | Adult Area | Migration Route | Commercial Fishery | Recreational Fishery |
|---|---|---|---|---|---|---|
| INVERTEBRATES | | | | | | |
| bay shrimp | X | X | X | | X | X |
| bent-nose clam | X | X | X | | | |
| Dungeness crab | | X | | | | |
| rock crab | X | X | X | | | |
| soft-shell clam | X | X | X | | | |
| | | | | | | |
| FISH | | | | | | |
| anchovy | | X | | | | |
| barred perch | X | X | X | | | |
| bat ray | | X | X | | | |
| California tonguefish | | X | X | | | |
| English sole | | X | X | | | |
| jack smelt | | X | | | | |
| leopard shark | | X | X | | | |
| Pacific herring | | X | | | | |
| Pacific salmon | | | | X | | |
| sand dab | | X | X | | | |
| shiner perch | X | X | X | | | |
| starry flounder | | X | X | | | |
| steelhead trout | | | | X | | |
| striped bass | | X | X | | | X |
| sturgeon | | | X | X | | X |
| spiny dogfish | | X | X | | | |

| | | | |
|---|---|---|---|
| top smelt | X | | |
| | | | |
| MAMMALS | | | |
| harbor seal | | X | |

**Response Category:** Federal Facility

**Current Stage of Site Action:** Not Determined

**EPA Site Manager**

| |
|---|
| Julie Anderson 415-974-8891 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Chip Demarest 415-974-8509 |

**References**


DNWD. 1988. Sampling Plan, Remedial Investigation/Feasibility Study, Naval Air Station Alameda, Alameda, California. Vol. I. San Bruno, California: Department of the Navy Western Division.

Lecky, James, biologist, Marine Mammal Branch, National Marine Fisheries Service, NOAA, Los Angeles, California, personal communication, March 15, 1989.

USFWS. 1981. Pacific coast ecological inventory: San Francisco, California. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map.

**Naval Weapons Station**
**Concord, California**
**Region 9**
**CA7170024528**

## Site Exposure Potential

Naval Weapons Station (NWS) Concord is the U.S. Navy's major ammunition transshipment port on the West Coast. The station is in the north central portion of Contra Costa county, 50 km northeast of San Francisco (Lee et al. 1986). The site is on the south shore of Suisun Bay and is bounded to the south and west by the city of Concord, California (Figure 1). Eighty-one hectares of the NWS are contaminated with hazardous substances as a result of discharges from adjacent properties and operations on the site prior to its acquisition by the Navy. Potential off-site sources of contamination include six properties located east of the site (O'Neil 1988).

The NWS site includes both upland areas and intertidal estuarine wetlands. The dryer, upland portion of the tidal area and all of the inland area are grassland. A small creek, that originates in the hills south of the site crosses the contaminated area and terminates in Suisun Bay. The watershed of the creek is slightly over 1.6 $km^2$ (Lee et al. 1986). A second stream from a watershed west of the creek joins the creek just before it enters the marsh area. The entire wetland area of Suisun Bay is inundated during ten-year high tides. The San Joaquin and Sacramento rivers flow into Suisun Bay from the east, with Suisun Bay connecting to the San Francisco Bay through San Pablo Bay. The Sacramento River and San Pablo Bay may be important areas of concern due to tidal influences.

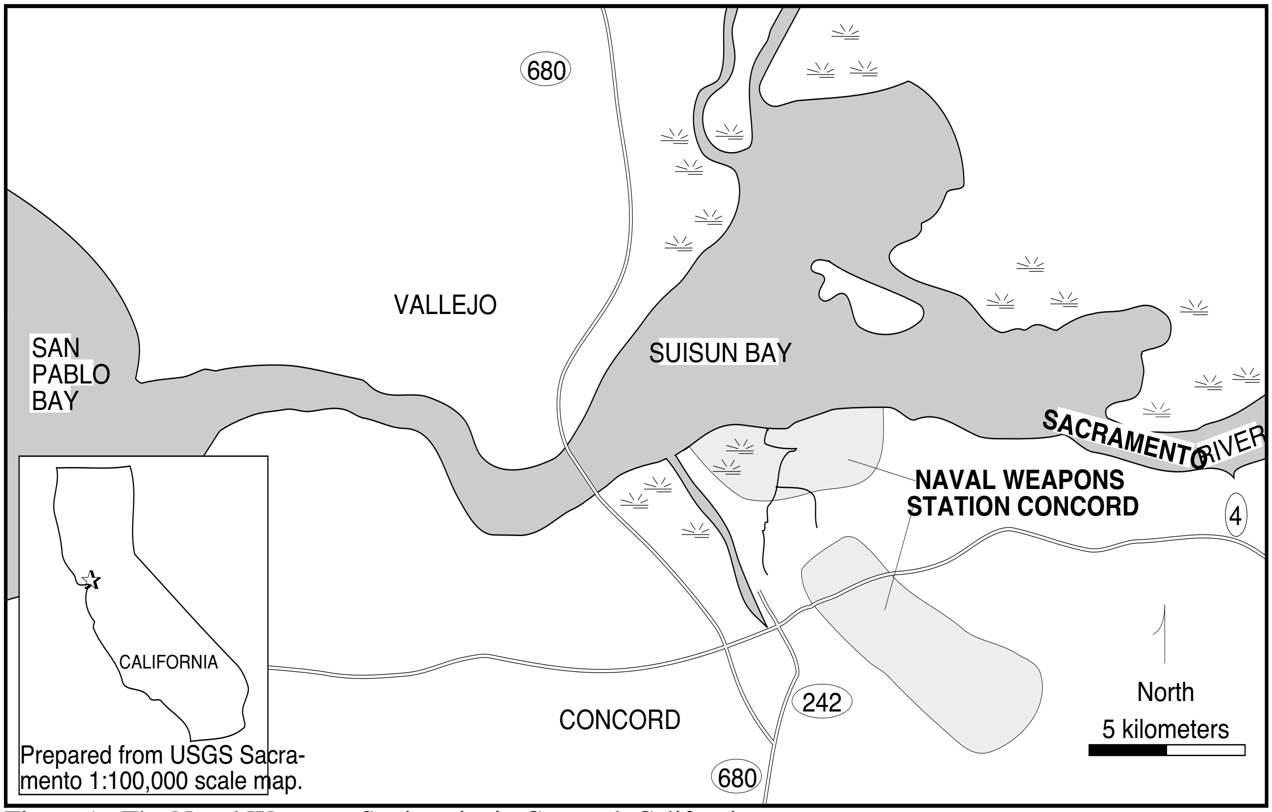


Figure 1. The Naval Weapons Station site in Concord, California.

A contaminant migration pathway to NOAA trust resources is surface water runoff to the Sacramento River, and Suisun and San Pablo bays.

## Site-Related Contamination

The contaminants of concern to NOAA are trace metals, which have been observed in on-site soils (Table 1) (EPA 1983; Lee et al. 1986). Groundwater and surface water contamination has not been investigated.

Table 1. Maximum concentrations of selected contaminants at the NWS Concord site (O'Neil 1988); range in natural soil (EPA 1983); concentrations in mg/kg.

| | | Content in Natural Soil | |
|---|---|---|---|
| Contaminant | Soil | Range | Average |
| arsenic | 3,490 | 1-50 | 5 |
| cadmium | 89 | 0.01-0.7 | 0.06 |
| chromium | 258 | 1-1,000 | 100 |
| copper | 10,500 | 2-100 | 30 |
| lead | 7,760 | 2-200 | 10 |
| nickel | 258 | 5-500 | 40 |
| selenium | 138 | 0.1-2 | 0.3 |
| zinc | 85,500 | 10-300 | 50 |

**NOAA Trust Habitats and Species in Site Vicinity**

NOAA trust resources are found in Suisun Bay, the delta region of the Sacramento River, and San Pablo Bay (Table 2). Suisun Bay is a transition zone between the saltwater ecosystem of San Francisco Bay and the freshwater ecosystems of the San Joaquin and Sacramento rivers. The tidal areas of Suisun Bay wetlands are characterized by cattails (*Typha augustifolia*) and other plants that tolerate frequent inundation by brackish water. Part of the Suisun Bay marsh was designated a California Wetland Preserve in 1984 (Lee et al. 1986). The Sacramento River delta forms a tidal, estuarine habitat with salinity ranging from 0.5 to 5 ppt (USFWS 1981). San Pablo Bay is the northern end of San Francisco Bay

Table 2. NOAA trust resource use of the Sacramento River, Suisun Bay, and San Pablo Bay (USFWS 1981).

| Species | Sacramento River Delta | Suisun Bay | San Pablo Bay |
|---|---|---|---|
| INVERTEBRATES | | | |
| common littleneck clam | | | A |
| Dungeness crab | | | N,A |
| soft-shell clam | | | A |
| | | | |
| FISH | | | |
| American shad | M,R,N | M,R,N | M,R,N |
| chinook salmon | M,R,N | M,R,N | M,R,N |
| coho salmon | | | M,R |
| starry flounder | | | R |
| steelhead trout | R,M,N | R,M,N | R,A,M |
| striped bass | R,M,S,N,R | R,M,N,R | R,M |
| white sturgeon | R,M,R | R,M,N | R,M,N |
| M : migratory route; R: recreational fishing; A: adult concentration; N: nursery area; C: commercial fishery | | | |

San Pablo and Suisun Bay form a migration corridor and nursery area for anadromous fish that spawn in the Sacramento and San Joaquin rivers. NOAA trust invertebrates are found in San Pablo Bay, and Dungeness crab use the bay as a nursery area (USFWS 1981). Striped bass is the only anadromous fish migrating through Suisun Bay which spawns in the river delta region. Chinook salmon, steelhead trout, white sturgeon, and American shad spawn in the upper reaches and tributaries of the Sacramento and San Joaquin rivers, with the largest populations found in the Sacramento River. All five anadromous species use the river delta region as nursery area. Extensive recreational fishing of these anadromous species occurs in the river delta region, Suisun Bay, and San Pablo Bay. Coho salmon and winter flounder are also recreationally fished in San Pablo Bay
(USFWS 1981; Wolcott 1989).

**Response Category:** Federal Facility

**Current Stage of Site Action:** RI/FS has been completed.

**EPA Site Manager**

| | |
|---|---|
| Julie Anderson | 415-974-8891 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Chip Demarest | 415-974-8509 |

**References**


EPA. 1983. Hazardous Waste Land Treatment. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. SW-874.

Lee et al. 1986. Remedial Investigation of Contaminant Mobility at Naval Weapons Station, Concord, California, Miscellaneous Paper EL-86-2. Vicksburg, Mississippi: U.S. Army Corps of Engineers Waterways Experiment Station.

O'Neil, L.J. 1988. Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California; Vol II: Biological Assessment, Miscellaneous Paper EL-86-3. Vicksburg, Mississippi: U.S. Army Corps of Engineers Waterways Experiment Station.

USFWS. 1981. Pacific coast ecological inventory: Santa Rosa, California. Washington, D.C.: U.S. Fish and Wildlife Service. 38122-A1-EI-250.

Wolcott, R., fisheries biologist, National Marine Fisheries Service, NOAA, Santa Rosa, California, personal communication, March 15, 1989.

**CTS Printex, Inc.**
**Mountain View, California**
**Region 9**
**CAD009212838**

## Site Exposure Potential

The CTS Printex site consists of seven buildings located on 2.3 hectares in a commercial/industrial area of Mountain View, California (Figure 1). CTS Printex manufactured printed circuit boards on-site from 1966 to 1985. The manufacturing process generated large quantities of chemical wastes, including toluene; methylene chloride; TCE; TCA; acids; and wastes containing iron, nickel, tin, lead, and copper. In one building, wastewater containing copper, lead, TCE, and TCA was discharged over a wet floor area that drained into a subsurface pH neutralization sump. After neutralization with ammonia, these wastes were discharged into the municipal sanitary sewer. Organic chemicals, iron, copper, and lead wastes were often drummed and stored on-site (EPA 1987).

The site is flat, with most of the area covered by buildings or paved with asphalt. The slope of the surrounding area is north-northeast at less than three percent toward San Francisco Bay. The site is bordered to the west by Permanente Creek, which discharges into San Francisco Bay via Mountain View Slough, 4 km from the site. A second drainage system runs along the northwestern corner of the site and drains into the Coast Casey Canal, 1.8 km northwest of the site. Water in the Coast Casey Canal is pumped into San Francisco Bay (ATT 1987).

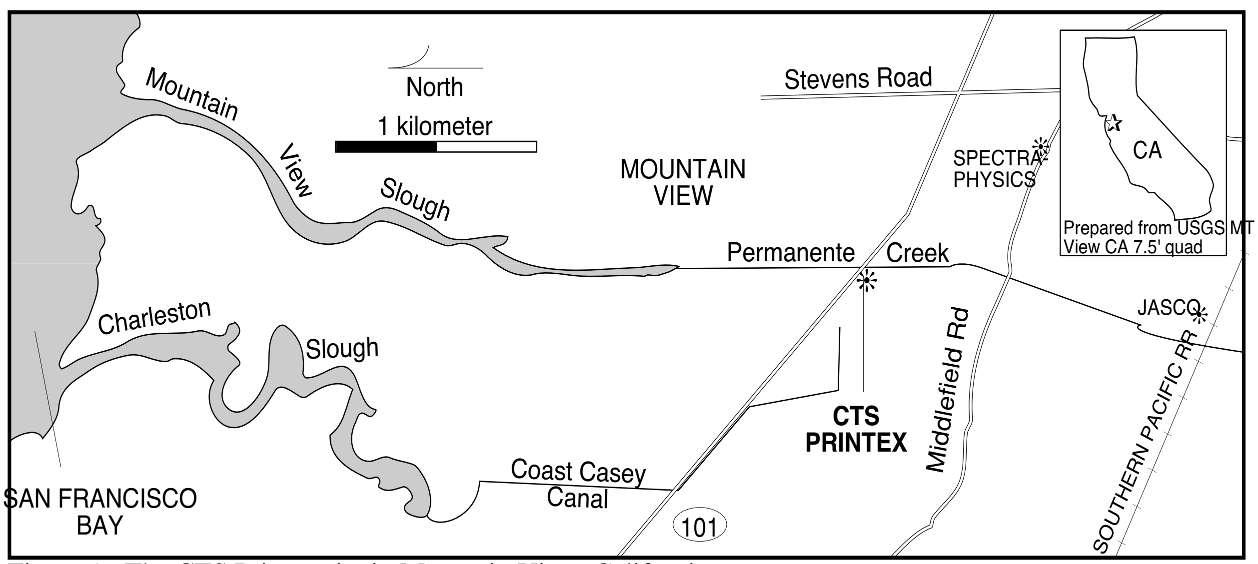

Figure 1. The CTS Printex site in Mountain View, California.

Surface runoff is a possible pathway for contaminants from the site to NOAA trust resources, but the most likely migratory pathway is groundwater flow. Most of the contaminants of concern are under the pavement near the wet floor facility. Groundwater is two to 30 meters below the site. Regional groundwater flows north, discharging into south San Francisco Bay. The potential for groundwater discharge to Permanente Creek is unclear; there is no evidence of direct contaminant discharge to the creek (ATT 1987). A groundwater flow study currently underway should give a clearer picture of contaminant pathways.

Two other NPL sites, Jasco Chemical Corporation and Spectra-Physics, Inc., are adjacent to Permanente Creek, upstream of the site.

**Site-Related Contamination**

The contaminants of concern to NOAA are copper and lead (Table 1) (ATT 1987). Maximum lead and copper concentrations greatly exceeding the range in natural soils were found in samples taken from soil borings one meter below the wet concrete floor where the floor was severely deteriorated (EPA 1983; ATT 1987). Analyses of soil borings taken from the excavated sump indicated that trace metal concentrations were not above background levels. Both lead and copper exceeded AWQC in on-site groundwater. Low concentrations of several VOCs were detected in groundwater.

Table 1. Maximum concentrations of selected contaminants at the CTS Printex site (ATT 1987); AWQC for the protection of saltwater aquatic life (EPA 1986); ranges in natural soils (EPA 1983); soil concentrations in mg/kg and water concentrations in µg/l.

| | | AWQC | | | |
|---|---|---|---|---|---|
| Contaminant | Groundwater | Acute | Chronic | Soil | Range in Natural Soils |
| copper | 1,000 | 2.9 | 2.9 | 22,000 | 2-100 |
| lead | 50 | 140 | 5.6 | 2,500 | 2-200 |

**NOAA Trust Habitats and Species in Site Vicinity**

Habitats of concern to NOAA include Mountain View Slough, San Francisco Bay, and Permanente Creek. Permanente Creek is a continuously flowing, low-gradient stream that is an average of six meters wide and 0.3 to 1.5 meters deep (Rugg 1988). The lower 1.5-km stretch of the creek is diked and tidally influenced. Steelhead trout is the only anadromous fish species in Permanente Creek. The run is very small, consisting of less than 50 individuals (Rugg 1988).

Mountain View Slough is a tidally influenced waterway that connects Permanente Creek with the southern portion of San Francisco Bay. The area around Mountain View Slough is diked and wetland habitat is extremely limited. From a resource perspective, the Slough acts as a narrow extension of San Francisco Bay. There are important NOAA trust resources in Mountain View Slough and in San Francisco Bay (Table 2) (USFWS 1981).

Table 2. Selected NOAA trust resource use of Mountain View Slough and southern San Francisco Bay (USFWS 1981).

| Species | Spawning Area | Nursery Area | Adult Area | Migratory Route | Commercial Fishery | Recreational Fishery |
|---|---|---|---|---|---|---|
| INVERTEBRATE | | | | | | |
| bay shrimp | X | X | X | | X | |
| common littleneck clam | X | X | X | | | |
| soft-shell clam | X | X | X | | | |
| | | | | | | |
| FISH | | | | | | |
| silver salmon | | | | X | | |
| steelhead trout | | | | X | | |
| striped bass | | | | X | | |
| white sturgeon | | | X | | | X |
| green sturgeon | | | X | | | X |
| | | | | | | |
| MAMMAL | | | | | | |
| harbor seal | | X | X | | | |

**Response Category:** State Fund Lead (Regional Water Quality Control Board) through a cooperative agreement with EPA Region 9.

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Melanie Field 415-974-8444 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Chip Demarest 415-974-8509 |

**References**


ATT. 1987. Site Inspection Report , Former CTS Printex Facilities, Mountain View, California. April 8, 1987. Mountain View, California: CTX Printex.

EPA. 1983. Hazardous Waste Land Treatment. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. SW-874.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. National Priorities List, Superfund Hazardous Waste Site Listed under the CERCLA, CTS Printex, Inc., Mountain View, California. San Francisco: U.S. Environmental Protection Agency, Region 9.

Rugg, M., Water Quality Biologist, California Department of Fish and Game, Napa, California, personal communication, November 29, 1988.

USFWS. 1981. Pacific coast ecological inventory: San Francisco, California. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000-scale map.

**El Toro Marine Corps Air Station**
**El Toro, California**
**Region 9**
**CA6170023208**

## Site Exposure Potential

The El Toro Marine Corps Air Station is located on 1,900 hectares in a primarily urban area of El Toro, Orange County, California (Figure 1). The station was commissioned in 1943 to support the Fleet Marine Forces in the Pacific Ocean. Twenty-one problem areas have been identified at the site, including three landfills containing both hazardous and solid waste; buried drums of explosives and low-level radioactive waste; and areas where PCBs, battery acids, leaded fuels, and other hazardous substances were dumped or spilled. In 1983, the Orange County Water District detected trichloroethylene (TCE) and tetrachloroethylene (TCA) in shallow irrigation wells both on-site and downgradient of the site (EPA 1987).

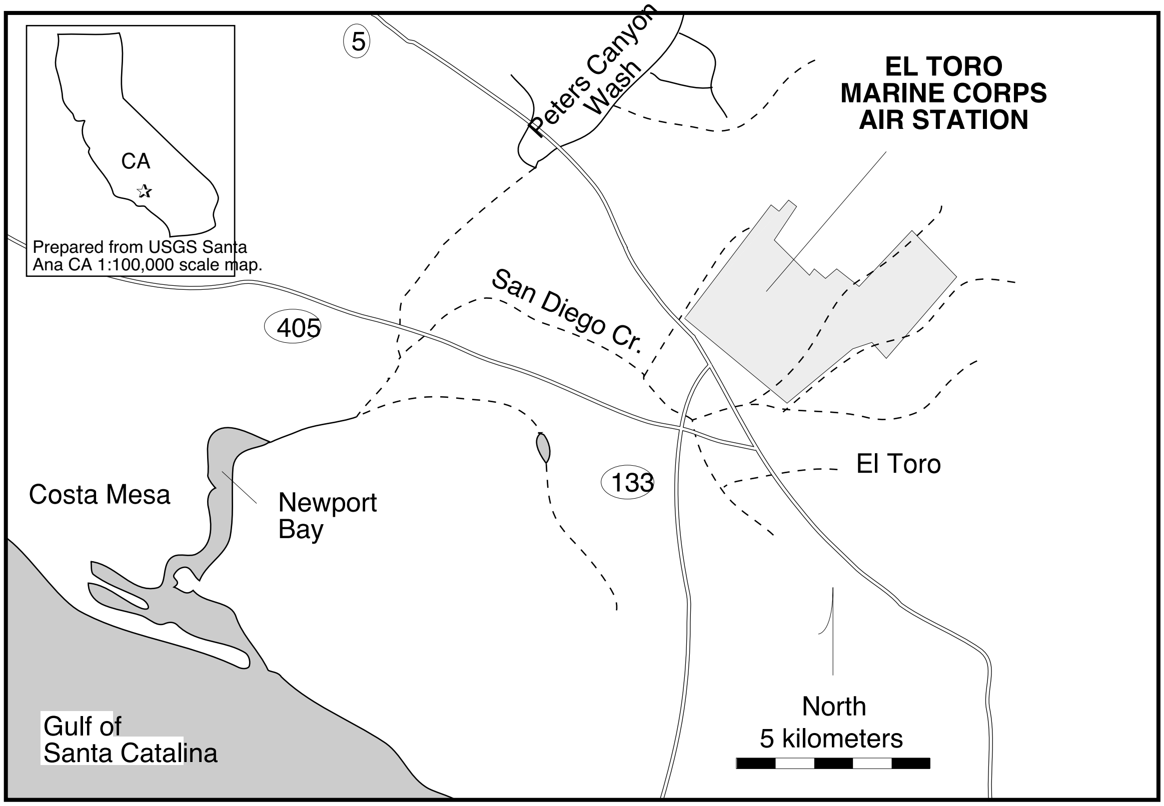

Figure 1. The Marine Corps Air Station site in El Toro, California.

Three intermittent streams flow either through or adjacent to the El Toro site. Two flow along the border of the facility, with the third passing through the center of the site. All three streams flow into San Diego Creek southwest of the site, with San Diego Creek flowing into Newport Bay 14 km from the site. San Diego Creek was originally an intermittent stream, but is now a continuously flowing, low-gradient stream due to surface water runoff from development in the watershed (St. Amant 1989). Newport Bay empties into the Gulf of Santa Catalina.

While there is insufficient information on overall contaminant pathways to NOAA trust resources, it is likely that both surface water runoff and groundwater flow to Newport Bay are possible pathways of concern.

## Site-Related Contaminants

Contaminants of concern to NOAA include PCBs and trace metals. There is little data on contaminants and their respective concentrations on the El Toro site. Contaminants believed to be on-site include PCBs, lead, chloroform, TCA, and TCE. TCE was detected in on-site wells, but concentration levels were not presented in the documents available for review (EPA 1987).

## NOAA Trust Habitats and Species in Site Vicinity

There are no known NOAA trust resources in the creeks near the El Toro site (St. Amant 1989). The closest habitat of interest is the Upper Newport Bay Ecological Reserve, 14 km downstream from the site. This area is of special interest and is undergoing habitat restoration by the California Department of Fish and Game. Wetlands in the Upper Newport Bay area are used by NOAA trust resources as nursery and spawning grounds (Table 1) (Gregory 1989).

Table 1. Selected NOAA trust resource use of Newport Bay (USFWS 1981).

| Species | Spawning Area | Nursery Area | Adult Area |
|---|---|---|---|
| anchovy | | X | X |
| California halibut | | X | X |
| spotted sand bass | X | X | X |
| striped mullet | | X | X |
| top smelt | X | X | X |
| white sea bass | | X | X |

Three areas along the coast just south of Newport Bay have been designated by the State as "Areas of Special Biological Significance" that support either wetlands or intertidal areas: Newport Beach Marine Life Refuge, Irvine Coast Marine Life Refuge, and Heisler Park Ecological Reserve.

**Response Category:** Federal Facility

**Current Stage of Site Action:** Not Determined

**EPA Site Manager**

| |
|---|
| Julie Anderson 415-974-8891 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Chip Demarest 415-974-8509 |

**References**


EPA. 1987. HRS Scoring Package. El Toro Marine Corps Air Station. El Toro, CA. San Francisco: U.S. Environmental Protection Agency, Region 9.

Gregory, P., Fisheries Biologist, California Department of Fish and Game, Long Beach, California, personal communications, January 25, 1989; March 14, 1989.

St. Amant, J., fisheries biologist, California Department of Fish and Game, Long Beach, California, personal communication, January 25, 1989.

USFWS. 1981. Pacific coast ecological inventory: Santa Ana, California. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map. 33116-A1-EI-250.

**GBF, Inc. Dump**
**Antioch, California**
**Region 9**
**CAD980498562**

## Site Exposure Potential

The GBF Dump site is located on a 25-hectare property in Antioch, California (Figure 1). From 1960 to 1974, 24 hectares of the GBF site were covered by ten solar evaporation ponds used for the disposal of hazardous liquid wastes. These unlined, uncovered ponds were a deliberate attempt to allow wastes to evaporate into the air and percolate into the ground. Wastes disposed of in these ponds included waste oils, chlorinated and non-chlorinated solvents, acids, pesticides, PCBs, and beryllium and phosphorous wastes. There is little documentation of the total volume of these materials, but it has been reported that 4,655,500 liters of liquid waste were disposed of in these ponds over a 17-month period in 1973 and 1974. Concentrations of organic chemicals in the ponds were frequently high enough to burn; at least three major fires were documented on the site in the early 1970s. In 1974, the California Central Regional Water Quality Control Board (CRWQCB) ordered the site closed because of concerns that site operations might endanger groundwater in the area. Site closure consisted of filling the ponds with earth and sealing the surface with a clay layer (EPA 1987).

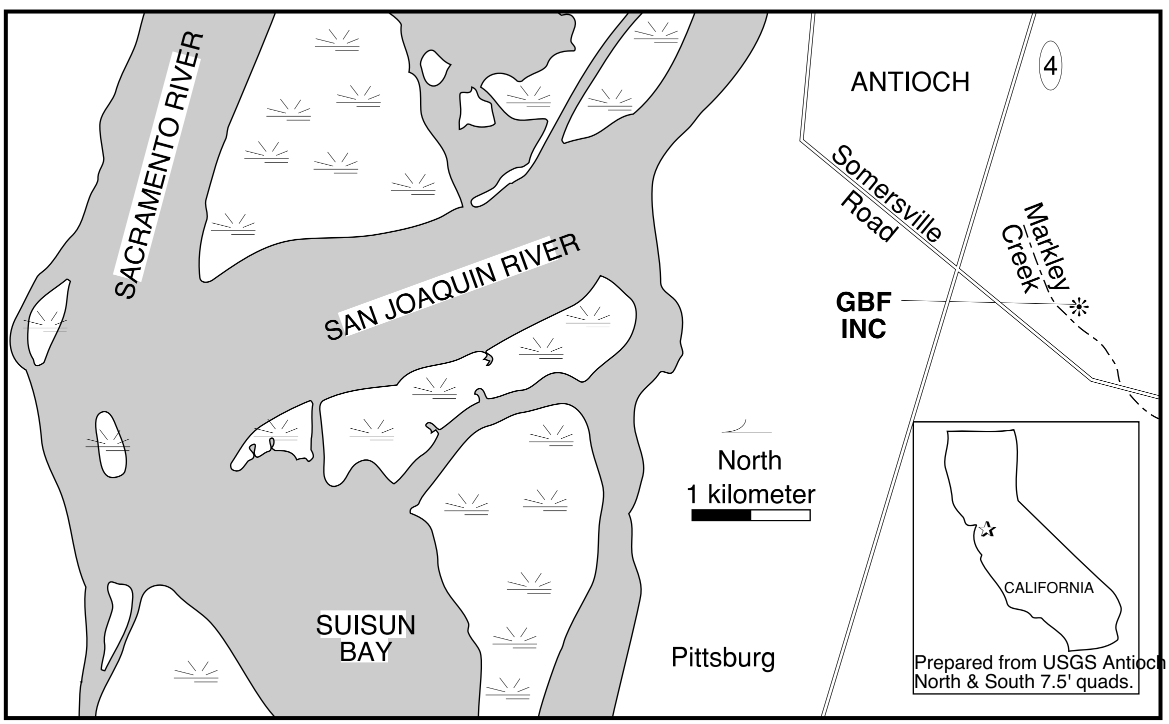


Figure 1. The GBF, Inc., Dump site in Antioch, California.

Markley Creek is an intermittent stream 60 meters northwest and downslope of the site (EPA 1987). The creek ceases one kilometer downstream from the site (USGS 1978, 1980), but the stream may reach the San Joaquin River, 3.5 km from the site via a small ditch (Garcia 1987). This ditch is not shown on U.S. Geological Survey topographical maps or in the documents reviewed. The San Joaquin River merges with the Sacramento River before entering Suisun Bay, 3.5 km further downstream. Suisun Bay connects the delta region of the Sacramento and San Joaquin rivers with San Francisco Bay.

Groundwater at the site is present at depths ranging from 6 to 100 meters below the ground surface. Regional groundwater flows north towards the San Joaquin River and Suisun Bay (EPA 1987).

Contaminant migration pathways include surface water runoff to Markley Creek and groundwater flow to the San Joaquin River.

## Site-Related Contamination

The contaminants at the site of primary concern to NOAA are trace metals, pesticides, and VOCs. Arsenic, chromium, lead, and mercury were measured in on-site groundwater in concentrations that exceeded AWQC for the protection of saltwater aquatic life (Table 1) (CRWQCB 1986a,b; EPA 1986). Two of several VOCs and pesticides observed in groundwater exceeded LOEL (Clement 1985; CRWQCB 1986b). 1,2-dichloropropane and chloroform in groundwater exceeded LOEL (CRWQCB 1986a,b; EPA 1986). No data were available regarding the levels of contaminants in on-site soil. PCBs have been disposed of at the site, but no analyses for these substances have been performed.

Table 1. Maximum concentrations of selected contaminants at the GBF, Inc., site (CRWQCB 1986 a,b); AWQC for the protection of saltwater aquatic life (Clement 1985; EPA 1986); concentrations in µg/l.

| Contaminant | Groundwater | AWQC Acute | AWQC Chronic |
|---|---|---|---|
| ORGANIC COMPOUNDS | | | |
| Volatile | | | |
| acetone | 440,000 | N/D | N/D |
| chloroform | 2,200 | N/D | N/D |
| trichloroethylene | 680 | 2,000* | N/D |
| 1,2-dichloropropane | 3,700 | 10,300* | 3,040* |
| Pesticides | | | |
| 2,4-D | 123,370 | N/D | N/D |
| 2,4,5-T | 5,390 | N/D | N/D |
| Silvex | 720 | N/D | N/D |
| Dicamba | 6,730 | N/D | N/D |
| Dichlorprop | 3,125 | N/D | N/D |
| | | | |
| INORGANIC SUBSTANCES | | | |
| Trace Metals | | | |
| arsenic | 92 | 69 | 36 |
| chromium | 520 | 1100 | 50 |
| lead | 190 | 140 | 5.6 |
| mercury | 3.7 | 2.1 | 0.025 |

* LOEL; N/D: Not determined

## NOAA Trust Habitats and Species in Site Vicinity

NOAA trust resources use the delta region of the San Joaquin and Sacramento rivers, and Suisun Bay (Table 2). The delta of the two rivers forms a tidal, estuarine habitat with salinity ranging from 0.5 to 5 ppt (USFWS 1981). Near the site, the San Joaquin River is 0.8 to 5 km wide, 4.5 to 9 meters deep, and has a silty sand substrate (Rugg 1988). Suisun Bay is a transition zone between the saltwater ecosystem of San Francisco Bay and the freshwater ecosystems of the San Joaquin and Sacramento rivers. The tidal areas of Suisun Bay wetlands are characterized by cattails (*Typha augustifolia*) and other plants that tolerate frequent inundation by brackish water. Part of the Suisun Bay marsh was designated a California Wetland Preserve in 1984 (Lee et al. 1986).

Chinook salmon, steelhead trout, white sturgeon, and American shad spawn in the upper reaches and tributaries of the Sacramento and San Joaquin rivers, with the largest populationsfound in the Sacramento River. Striped bass is the only anadromous species that spawns in the river delta region, although all of the anadromous species use the river delta region as a nursery area Suisun Bay is a migration corridor for these anadromous fish and is used by the same species as a nursery ground before migrating to coastal areas.  Extensive recreational fishing of these anadromous species occurs in both the river delta region and Suisun Bay (USFWS 1981; Wolcott 1989).

Table 2.  NOAA trust resource use of the San Joaquin and Sacramento river delta and Suisun Bay (USFWS 1981; Wolcott 1989).

| Species | San Joaquin and Sacramento River Delta | Suisun Bay |
| --- | --- | --- |
| American shad | M,R,N | M,N,R |
| chinook salmon | M,R,N | M,N,R |
| steelhead trout | M,R,N | M,N,R |
| striped bass | M,R,S,N | M,N,R |
| white sturgeon | M,R,N | M,N,R |
| M : migratory route;   R : recreational fishing;   S : spawning area;   N : nursery area | | |

**Response Category:**  State Enforcement Lead (California Department of Health Services) with the PRPs conducting the RI/FS work

**Current Stage of Site Action:**  RI/FS Workplan is being finalized with final version expected to be released in June 1989

**EPA Site Manager**

| |
| --- |
| Betsy Curnow     415-974-8364 |

**NOAA Coastal Resource Coordinator**

| |
| --- |
| Chip Demarest     415-974-8509 |

**References**

California Regional Water Quality Control Board (CRWQCB).  1986a. Correspondence between Dr. Brunner, Contra Costa County Health Department, and Mr. Landau, CRWQCB.  October 30, 1986.  Sacramento:  California Regional Water Quality Control Board.

CRWQCB.  1986b. Correspondence between Dr. Brunner, Contra Costa County Health Department, and Mr. Landau, CRWQCB.  December 16, 1986.  Sacramento:  California Regional Water Quality Control Board.

Clement Associates.  1985.  Chemical, Physical, and Biological Properties of Compounds Present at Hazardous Waste Sites, Final Report.  San Francisco:  Office of Waste Program Enforcement, U.S. Environmental Protection Agency.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. National Priority List, Superfund Hazardous Waste Site Listed under CERCLA, GBF, Inc., Dump, Antioch, California. San Francisco: U.S. Environmental Protection Agency, Region 9.

Garcia, L., Antioch City Public Works, Antioch, California, personal communication with C. LaPlante, Ecology and Environment, Inc., San Francisco, California, August 5, 1987.

Lee et al. 1986. Remedial Investigation of Contaminant Mobility at Naval Weapons Station, Concord, California, Miscellaneous Paper EL-86-2. Vicksburg, Mississippi: U.S. Army Corps of Engineers Waterways Experiment Station.

Rugg, M., Water Quality Biologist, California Department of Fish and Game, Napa, California, personal communication, November 29, 1988.

USFWS. 1981. Pacific coast ecological Iinventory: Santa Rosa, CA. Washington, D.C.: U.S. Fish and Wildlife Service. No. 38122-A1-EI-250. 1:250 000 scale.

Wolcott, R., fisheries biologist, National Marine Fisheries Service, NOAA, Santa Rosa, California, personal communication, March 15, 1989.

**Hewlett-Packard**
**Palo Alto, California**
**Region 9**
**CAD980884209**

## Site Exposure Potential

The Hewlett-Packard site is in Palo Alto, California (Figure 1), on land leased from Stanford University since 1964. Hewlett-Packard Optoelectronics Division used the facility for research and production operations until 1986. There are currently no operations at the site. In July 1981, it was discovered that a 3,800-liter underground waste storage tank had leaked 1,100 liters of waste solvents. The waste chemicals typically stored in the tank included 1,1,1-trichloroethane, trichloroethene, toluene, xylene, alcohols, and other chemicals used in manufacturing processes at the site. The leaking tank and 76.5 $m^3$ of contaminated soil were subsequently excavated on July 29, 1981, and removed from the site (EPA 1987).

The site is 600 meters west of Matadero Creek, which becomes Matadero Canal. Matadero Canal flows for 5 km before discharging into San Francisco Bay.

Depth to the groundwater is six meters near the site. Of the two aquifers under the site, the first has a thickness of 13 meters. The depth to the second aquifer is 21 to 24 meters. Groundwater in both aquifers flows in a northeasterly direction (McLaren Environmental Engineering 1986).

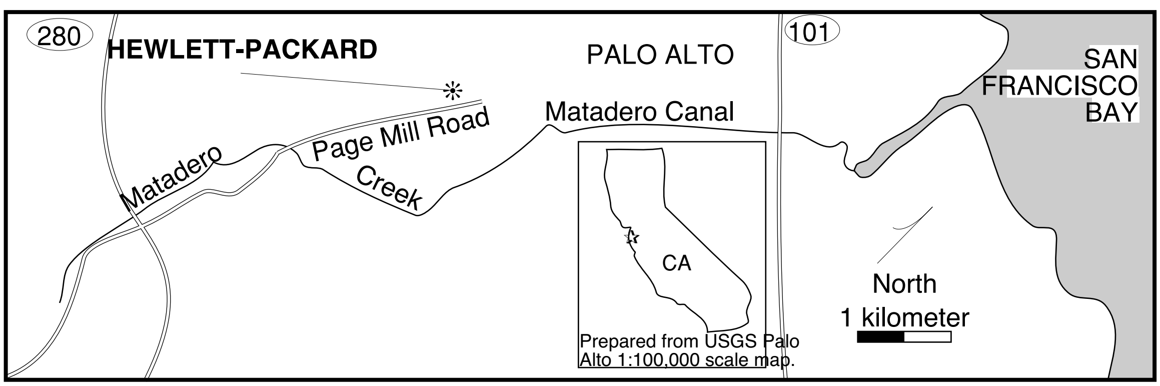

Figure 1. The Hewlett-Packard site in Palo Alto, California.

A possible contaminant migration pathway to NOAA trust resources is groundwater flow to the Matadero Canal.

## Site-Related Contamination

Chemical contaminants detected in soil and groundwater on the Hewlett-Packard site include VOCs (Table 1). 1,1,1-trichloroethane and trichloroethene were detected in high concentrations in soil samples from near the tank excavation area. Monitoring well sampling detected VOCs in the upper aquifer at levels that exceed LOEL. Contaminant concentrations in the lower aquifer were much lower than in the upper aquifer (EPA 1987).

Table 1. Maximum concentrations of selected contaminants at the Hewlett-Packard site (EPA 1987); LOEL (EPA 1986); concentrations in soil in mg/kg and in water in µg/l.

| Contaminant | Soil | Upper Aquifer | Lower Aquifer | LOEL Acute | LOEL Chronic |
|---|---|---|---|---|---|
| 1,1,1-trichloroethane | 2,200,000 | 304,000 | 270 | 18,000 | N/A |
| trichloroethene | 7,900,000 | 240,000 | 870 | 45,000 | 21,900 |
| 1,1-dichloroethane | N/A | 28,000 | 45 | N/A | N/A |
| trans-1,2-dichloroethylene | N/A | 35,000 | 4.5 | 11,600 | N/A |
| toluene | N/A | 3,600 | 3.1 | 17,500 | N/A |
| total xylenes | N/A | 14,000 | 2.1 | N/A | N/A |
| 2-propanol | N/A | 4,800,000 | ND | N/A | N/A |
| N/A: Not available | | | | | |

## NOAA Trust Habitats and Species in Site Vicinity

Matadero Creek and south San Francisco Bay are habitats of concern to NOAA (Table 2). Matadero Creek is an urban creek affected by non-point source pollution. The creek becomes the channelized Matadero Canal within the city of Palo Alto before flowing through flood gates into San Francisco Bay. The discharge levels in Matadero Creek/Canal fluctuate due to concrete channeling, infrequent but occasionally heavy rainfall, and the increase in impervious surfaces in nearby drainage areas. Matadero Creek provides limited aquatic and riparian habitat near the site due, in part, to the concrete channeling. The tide gates at the mouth of the flood basin only open during high flows, restricting fish migration at all other times. The Santa Clara County Water Department uses flow-restricting baffles to retain water in the system during low-flow conditions (Goldner 1989).

Table 2. Selected NOAA trust resource use of of Matadero Creek and south San Francisco Bay (USFWS 1981).

| Aquatic resources | Matadero Creek | South San Francisco Bay |
|---|---|---|
| INVERTEBRATES | | |
| bay shrimp | | A,N,R,C |
| common little neck | | A,N,S |
| soft-shell clam | | A,N,S |
| | | |
| FISH | | |
| chinook salmon | | M |
| steelhead trout | M,N,S | M |
| striped bass | | A,N,R |
| sturgeon | | A,R |
| | | |
| MAMMALS | | |
| harbor seal | | A,N,S |

| | | |
|---|---|---|
| A: adult habitat | N: nursery grounds | M: migration corridor |
| S: spawning/mating | R: recreational fishery | C: commercial fishery |

During high flows, steelhead trout use the headwaters of Matadero Creek for spawning. The run size has not been determined, but the potential run is limited because of physical and environmental constraints. Chinook salmon have also been observed in Matadero Creek, but it is believed that the fish were strays from other, more viable creeks. It is not known whether chinook salmon have spawned in Matadero Creek (Ulmer 1989).
South San Francisco Bay supports a diverse marine/estuarine community. Sturgeon, striped bass, and shrimp are a few of the species recreationally harvested in this area. Bay shrimp are commercially harvested. The network of deltas and their adjoining wetlands near the mouth of Matadero Creek and in the greater south bay area are a refuge for the juvenile development of harbor seals, shrimp, and several fish species (Ulmer 1989).

**Response Category:** State Fund Lead

**Current Stage of Site Action:** Remdial Investigation is nearing completion. Record of Decision is expected by fourth quarter of FY90.

**EPA Site Manager**

| |
|---|
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**NOAA Coastal Resource Coordinator**

| |
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| Chip Demarest 415-974-8509 |

**References**

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Hazardous Ranking Score Worksheets and Documentation for Hewlett-Packard (620-40 Page Mill Rd), Palo Alto, CA. San Francisco: U.S. Enviromental Protection Agency, Region 9.

Goldner, B., Environmental Biologist, Santa Clara County Water Department, Palo Alto, California, personal communication, January 17, 1989.

McLaren Environmental Engineering. 1986. Summary report: Hewlett-Packard Corporation. San Francisco: U.S. Environmental Protection Agency, Region 9.

USFWS. 1981. Pacific coast ecological inventory: San Francisco, California. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale. 37122-A1-E1-250.

Ulmer, L., field biologist, California Department of Fish and Game, Bonnyview, California, personal communication, January 18, 1989.

**Intersil, Inc., and Siemens Components**
**Cupertino, California**
**Region 9**
**CAD041472341**

## Site Exposure Potential

For several years, Intersil, Inc., and Siemens Components have manufactured semiconductors on two adjacent properties on six hectares in Cupertino, California (Figure 1). Intersil has several underground tanks, including two 33,000-liter neutralization systems, one 2,000-liter waste solvent tank, two 2,000-liter concrete scrubber pit sumps, and an abandoned 12,000-liter neutralization system. Siemens pumped waste solvents to four separate underground storage tanks that have since been removed. In 1982, the California Regional Water Quality Control Board's (CRWQCB) tank leak detection program conducted soil and groundwater studies at the sites and found widespread organic chemical contamination in soil and groundwater (EPA 1987).

Calabazas Creek is 400 meters east of the site (Geomatrix 1987). The creek flows north 5 km to discharge into Guadalupe Slough, which empties into the southern part of San Francisco Bay, 9.5 km north of the site.

Surface runoff of contaminants to Calabazas Creek is minimal because all tanks and contamination are underground. There is groundwater 18 meters below the site. Overall flow is towards the east, with smaller components towards the north and south (Geomatrix 1987). Contaminants may migrate to Calabazas Creek via groundwater.

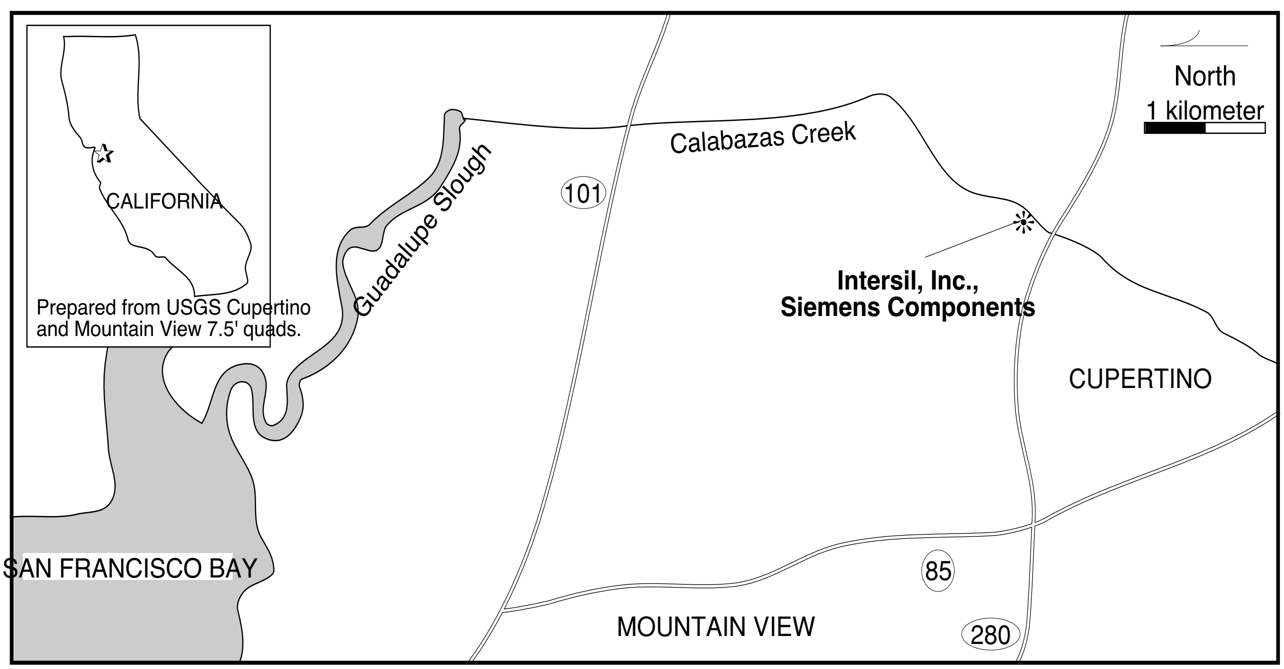


Figure 1. The Intersil, Inc., and Siemens Components site in Cupertino, California.

## Site-Related Contamination

The contaminants of concern to NOAA are VOCs, which were detected in on-site groundwater. Concentrations of trichloroethylene exceeded LOEL (EPA 1986). Concentrations of VOCs in groundwater and soils were generally far higher on the Siemens property than on the Intersil property (Table 1). Contamination in the soil was found at depths of two to 14 meters on the Siemens site and at depths of between 5 and 30 meters on the Intersil site. No analyses for trace metals have been conducted at the two sites. Contamination by VOCs has been found in groundwater collected from wells up to 1.6 km downgradient from the sites (Geomatrix 1987).

Table 1. Maximum concentration of selected contaminants at the Intersil/Siemens site (Geomatrix 1987); LOEL (EPA 1986); concentrations for soil in mg/kg and for water in µg/l.

| | Soil | | Groundwater | | LOEL | |
|---|---|---|---|---|---|---|
| Contaminant | Intersil | Siemens | Intersil | Siemens | Acute | Chronic |
| trichloroethylene | 7 | 17 | 33,000 | 110,000 | 45,000 | 21,900 |
| 1,1,1-trichloroethane | 0.05 | 11,000 | 610 | 27,000 | N/D | N/D |
| 1,1-dichloroethene | 1.5 | 11,000 | 39 | 4,300 | 11,600 | N/D |
| trichlorobenzene | ND | 15,200 | N/A | N/A | N/D | N/D |
| xylenes | 1.8 | 14,000 | 4 | ND | N/D | N/D |
| n-butyl-acetate | ND | 21,000 | N/A | N/A | N/D | N/D |

N/A: Not available ND: Not detected N/D: Criteria not determined

## NOAA Trust Habitats and Species in Site Vicinity

Calabazas Creek is a continuously flowing, low-gradient stream an average of nine meters wide and 0.3 to 1.5 meters deep. The lower 4 km of the creek has been channelized. The substrate in the lower stretch of the creek is muddy silt and in the upper reaches silty sand mixed with gravel. The water quality is fair, but there have been thermal problems that have caused algae blooms and degradation of the water quality. Calabazas Creek has been classified by the CRWQCB as a warm freshwater habitat, a cold freshwater habitat, and a wildlife habitat (Rugg 1988).

Guadalupe Slough is a major continuously flowing, low-gradient stream in the southern San Francisco Bay area. Width ranges from 30 meters at the mouth to three to five meters at the headwaters. Depth ranges from five meters at the mouth to 0.3 meters at the headwaters (Rugg 1988). The substrate in the lower portion of the slough consists of silty sand and gravel in the upper reaches. The water quality in Guadalupe Slough is fair.

Calabazas Creek supports a natural run of striped bass and a residual coho salmon run. Guadalupe Slough is used as a migratory corridor and nursery area by striped bass and coho salmon. The slough also supports a residual steelhead trout run (Rugg 1988).

**Response Category:** State Fund Lead

**Current Stage of Site Action:** RI/FS Workplan is currently in second draft (approval expected in April 1989); certain RI activities and interim actions are ongoing.

**EPA Site Manager**

| | |
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| Mary Masters | 415-974-7552 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Chip Demarest | 415-974-8509 |

**References**


EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. National Priorities List, Superfund Hazardous Waste Site Listed under the CERCLA, Intersil, Inc./Siemens Components, Cupertino, California. San Francisco: U.S. Environmental Protection Agency, Region 9.

Geomatrix Consultants. 1987. Comments on the Siemens/Woodward-Clyde Consultants Report of 11, 13 and 20 March 1987. May 8, 1987. Cupertino, California: Intersil, Inc./Siemens Components.

Rugg, M., Water Quality Biologist, California Department of Fish and Game, Napa, California, personal communication, 1988.

**Iron Mountain Mine**
**Redding, California**
**Region 9**
**CAD980498612**

## Site Exposure Potential

Iron Mountain Mine is 14.5 km northwest of Redding, California in the foothills of the Trinity Mountains, in the northwest Sacramento Valley (Figure 1). Iron Mountain Mine is the southernmost mine in the West Shasta Mining District, an area of silver, gold, copper, zinc, and iron pyrite mines. Open pit and subterranean mining activities were performed at Iron Mountain Mine from the late 1800s to 1963. Acid mine drainage is produced at the site as water passes through the sulfide ores and discharges through mine portals and seeps. Secondary sources of acid mine drainage result from runoff through and over waste rock piles, tailings piles, and other surface areas. In addition to acid, mine drainage at Iron Mountain contains high concentrations of copper, zinc, and cadmium (CDM 1987).

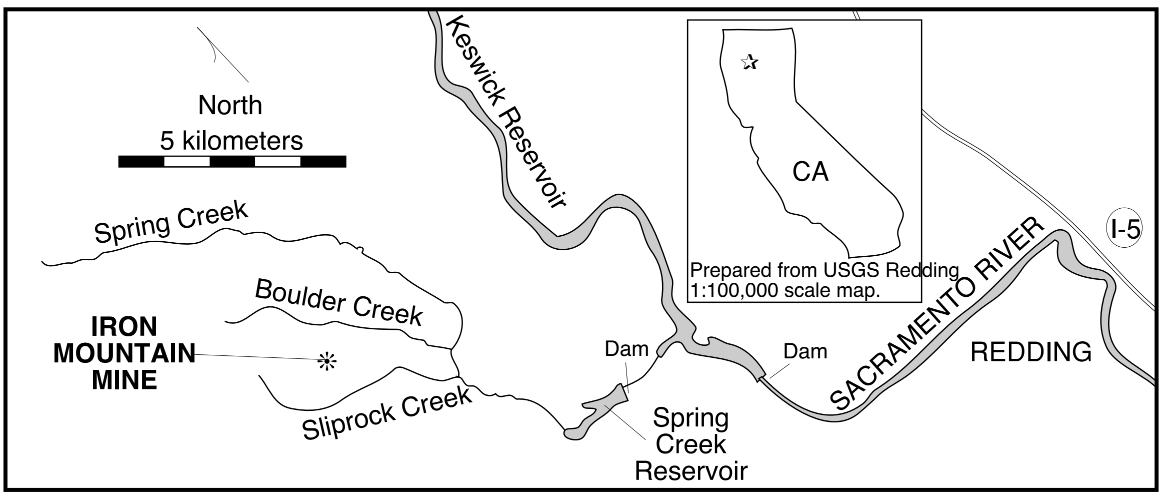


Figure 1. The Iron Mountain Mine site in Redding, California.

The rugged region is steeply sloped, with narrow valleys and long ridges. The site is on the southern and eastern slopes of Iron Mountain and consists of underground and open-pit mines, waste-rock dumps, tailings piles, roads, and several buildings. Boulder Creek and Sliprock Creek form the eastern and western borders of the site. From the site, these streams flow southeast for 3 km before discharging into Spring Creek. Spring Creek flows southeast for 7 km until it enters Spring Creek Reservoir. Immediately below the Spring Creek Dam, the creek enters Keswick Reservoir, an impoundment of the Sacramento River (CDM 1987). The Sacramento River enters San Francisco Bay 360 km below the Keswick Reservoir.

Contaminant migration pathways to NOAA trust resources is primarily via surface water flow to Spring Creek. During periods of heavy winter rains, high volumes of runoff are produced from the Spring Creek watershed. This coincides with high production of acid mine drainage from the mine. The drainage is released through the Spring Creek Reservoir dam into the Keswick Reservoir and the Sacramento River (CDM 1987).

## Site-Related Contamination

The contaminants of concern to NOAA are the trace metals copper, cadmium, and zinc, which have been detected in Sliprock Creek, Boulder Creek, and Spring Creek in concentrations that exceeded chronic AWQC by up to 3,700 times. Acidities below chronic AWQC have also been documented in the watershed (Table 1) (EPA 1986a; CDM 1987).

Table 1. Maximum concentrations of selected contaminants at the Iron Mountain Mine site (CDM 1987); AWQC for the protection of freshwater aquatic life (EPA 1986a); concentrations in µg/l.

| Contaminant | Sliprock Creek | Boulder Creek | Spring Creek | Spring Creek Reservoir | Keswick Reservoir | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|---|---|
| cadmium | 73 | 19 | 1,320 | 980 | 5.5 | 3.9* | 1.1* |
| copper | 27,100 | 3,520 | 21,000 | 45,000 | 95 | 18* | 12* |
| zinc | 18,500 | 302,000 | 172,000 | 126,000 | 500 | 120* | 110* |
| pH | 2.9 | 2.25 | 3.2 | 3.7 | 8.5 | N/A | 6.5-9 |

* Hardness-dependent (based on 100 mg/l $CaCO_3$); N/A: Not available

## NOAA Trust Habitats and Species in Site Vicinity

The closest aquatic habitat supporting NOAA trust resources is the Sacramento River below the Keswick Dam. Below the dam, the river ranges from 120 to 180 meters wide and averages three meters deep. The substrate consists of gravel, cobble, and bedrock. The water quality of the Sacramento River below the dam is generally good (Helley 1989).

Chinook salmon, steelhead trout, and their habitats are the NOAA trust resources potentially impacted by the Iron Mountain site. Four races of chinook salmon use the Sacramento River and its tributaries: the fall, late fall, winter, and spring runs. Each run is a genetically distinct stock that migrates into the river and reproduces within specific time periods and locations. Salmon at various life stages are found in the river during every month of the year. The spawning population of chinook salmon in the Sacramento River has declined steadily since the 1950s: the population was estimated to be 408,000 fish in 1953, while only 27,000 were estimated to be present in 1983. Numerous fish kills associated with drainage from Iron Mountain Mine have been documented on the Sacramento River (EPA 1986b). In 1969, the most recent fish kill, an estimated 200,000 adult salmon were killed (CDM 1987).

Under the Endangered Species Act of 1973, the NOAA National Marine Fisheries Service is currently reviewing the status of Sacramento River winter-run chinook to determine whether listing it as a threatened species is warranted (CDM 1987). Recreational fishery of winter-run chinook salmon in the Sacramento River below the Keswick Dam is closed to protect the species (Helley 1989).

Restoration of anadromous fish runs above the Keswick Dam has been considered, but was abandoned due to contamination from the Iron Mountain Mine (Helley 1989).

**Response Category:** Superfund Lead

**Current Stage of Site Action:** RI/FS activities are continuing at the site. A Record of Decision for interim Remedial Action was signed October 3, 1986; a cap at the site is being implemented and creek diversion is currently under design.

**EPA Site Manager**

| | |
|---|---|
| Rick Sugarek | 415-974-8230 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Chip Demarest | 415-974-8509 |

**References**

CDM. 1987. Draft Final Report Iron Mountain Mine Endangerment Assessment. December 4, 1987. San Francisco: U.S. Environmental Protection Agency, Region 9.

EPA. 1986a. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1986b. Record of Decision - Iron Mountain Mine, Redding, CA. San Francisco: U.S. Environmental Protection Agency, Region 9.

Helley, T., fishery biologist, California Department of Fish and Game, Napa, California, personal communication, January 13, 1989.

**Jasco Chemical Corporation**
**Mountain View, California**
**Region 9**
**CAD009103318**

## Site Exposure Potential

The Jasco Chemical site is a 0.8-hectare property in a commercial/residential area of Mountain View, California. The site is bordered on the northeast by the Central Expressway and the Southern Pacific Railroad and on the remaining sides by residential neighborhoods (Figure 1). Since 1976, the Jasco Chemical Corporation has formulated chemical products at the site, which has a tank farm with eight underground storage tanks ranging in size from 19,000 to 45,000 liters. Methylene chloride, pentachlorophenol, paint thinner, denatured alcohol, methanol, deodorized kerosene, lacquer thinner, and acetone have been stored in these tanks. Two dry wells on-site collect storm water runoff from roofs and paved areas. In addition, surface runoff drains into a pipe that discharges off-site. Spills are known to have occurred at the site (EPA 1987).

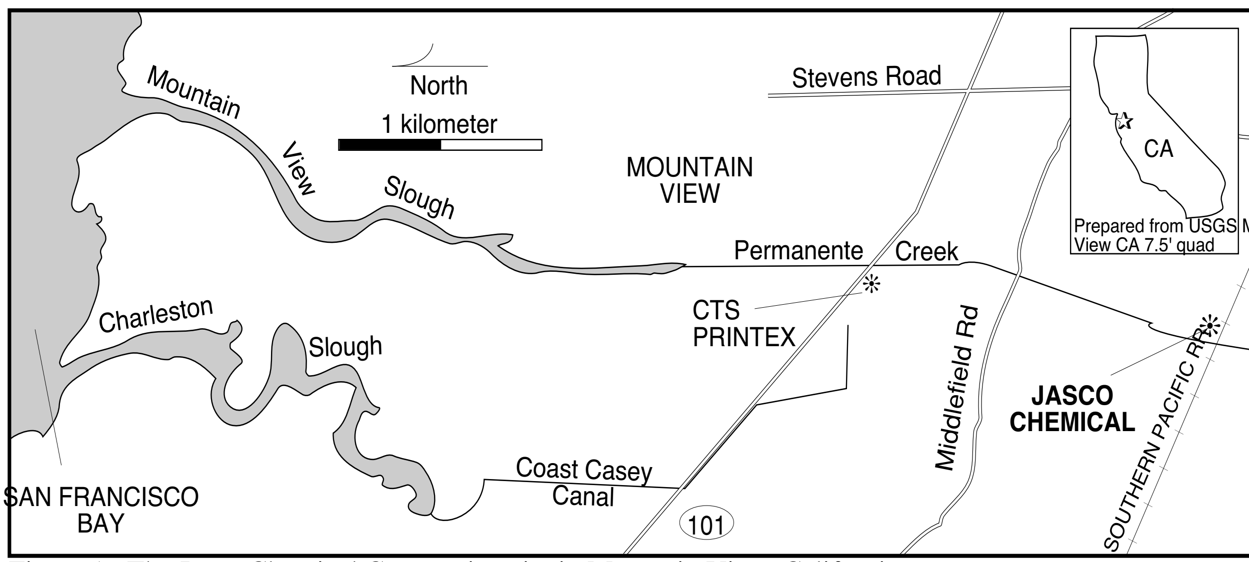

Figure 1. The Jasco Chemical Corporation site in Mountain View, California.

The site is flat, with the slope of the surrounding area less than three percent toward San Francisco Bay to the north-northeast (EPA 1987). Permanente Creek, less than 100 meters west of the site, flows 4 km to Mountain View Slough, which empties into San Francisco Bay 6 km below the site. Two other NPL sites, CTS Printex and Spectra-Physics, Inc., are in the Permanente Creek drainage area below the Jasco Chemical site.

Possible contaminant migratory pathways include surface water runoff and groundwater flow to Permanente Creek and Mountain View Slough.

## Site-Related Contamination

In 1983, a citizen complained to the California Regional Water Quality Control Board that dumping of solvents at the rear of the site occurred on a daily basis (EPA 1987). Subsequent analysis of soil and groundwater samples taken from the site revealed high levels of methylene chloride, pentachlorophenol (PCP), creosote, 1,1,1-trichloroethane, and toluene in soil and groundwater (Wahler Associates 1987). PCP concentrations in groundwater exceeded acute AWQC (Table 1) (EPA 1986).

Table 1. Maximum concentration of contaminants at the Jasco Chemical Corporation site (Wahler Associates 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations for soil in mg/kg and for water in µg/l.

| | | | AWQC | |
|---|---|---|---|---|
| Contaminant | Soil | Groundwater | Acute | Chronic |
| methylene chloride | 3,400 | 142,000 | N/D | N/D |
| pentachlorophenol | 0.2 | 50 | 20†† | 13†† |
| 1,1,1-trichloroethane | 22 | 2,040 | N/D | N/D |
| toluene | 1,700 | N/A | 17,500 † | N/D |

N/A: Not available; N/D: Criteria not developed; † LOEL; †† pH -dependent (based on a pH of 7.8)

## NOAA Trust Habitats and Species in Site Vicinity

Habitats of concern to NOAA include Mountain View Slough, San Francisco Bay, and Permanente Creek. Permanente Creek is a continuously flowing, low-gradient stream with an average width of six meters and a depth ranging from 0.3 to 1.5 meters (Rugg 1988). The lower 1.5-km stretch of the creek is diked and tidally influenced. Steelhead trout is the only anadromous fish species in Permanente Creek. The run is very small, consisting of less than 50 individuals (Rugg 1988).

Mountain View Slough is a tidally influenced waterway that connects Permanente Creek with the southern portion of San Francisco Bay. The area around Mountain View Slough is diked and wetland habitat is extremely limited. From a resource perspective, the Slough acts as a narrow extension of San Francisco Bay and is not a unique habitat in itself. NOAA trust resources are present in Mountain View Slough and in San Francisco Bay (Table 2) (USFWS 1981).

Table 2. NOAA trust resource use of Mountain View Slough and the southern part of San Francisco Bay (USFWS 1981).

| Species | Spawning Area | Nursery Area | Adult Area | Migratory Route | Commercial Fishery | Recreational Fishery |
|---|---|---|---|---|---|---|
| INVERTEBRATES | | | | | | |
| bay shrimp | X | X | X | | X | |
| softshell clam | X | X | X | | | |
| common littleneck clam | X | X | X | | | |
| | | | | | | |
| FISH | | | | | | |
| white sturgeon | | | X | | | X |
| green sturgeon | | | X | | | X |
| steelhead trout | | | | X | | |
| silver salmon | | | | X | | |
| striped bass | | | | X | | |
| | | | | | | |
| MAMMALS | | | | | | |
| harbor seal | | X | X | | | |

**Response Category:** Superfund Lead

**Current Stage of Site Action:** RI/FS is in progress with ongoing interim actions. Formal submittal of RI/FS Workplan from contractors is anticipated soon.

**EPA Site Manager**

| | |
|---|---|
| Rob Saunders | 415-974-7469 |

**NOAA Coastal Resource Coordinator**

| | |
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**References**

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. National Priorities List, Superfund Hazardous Waste Site Listed under the CERCLA, Jasco Chemical Corporation, Mountain View, California. San Francisco: U.S. Environmental Protection Agency, Region 9.

Rugg, M., Water Quality Biologist, California Department of Fish and Game, Napa, California, personal communication, November 29, 1988.

USFWS. 1981. Pacific coast ecological inventory: San Francisco, California. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000-scale map.

Wahler Associates. 1987. Site Inspection Report, Jasco Chemical Corporation, June 1987. Mountain View, California: Jasco Chemical Corporation.

**Pacific Coast Pipelines**
**Fillmore, California**
**Region 9**
**CAD980636781**

## Site Exposure Potential

Between 1920 and 1952, Pacific Coast Pipelines (PCPL) operated a petroleum refinery in Fillmore, California (Figure 1). Liquid and semi-solid refinery wastes were disposed of in unlined pits and sumps on-site. Wastes have been found in seven pits and are suspected in two additional areas. The largest of these pits, along the western boundary, contains 8,500 $m^3$ of wastes. Since 1953, the PCPL site has been a crude oil pumping station. It is believed that the waste disposal areas have not been used since 1953 (Radian 1984).

The site is bordered on the west by the Pole Creek flood control channel, on the east and north by steep hills that are part of the Topatopa Mountains, and on the south by the Southern Pacific Railroad (Radian 1984). Pole Creek enters the Santa Clara River 1 km south of the site (USFWS 1981). Sespe Creek, 3 km west of the site, flows 3.5 km before joining the Santa Clara River, 4.5 km below the mouth of Pole Creek. The Santa Clara River enters the Pacific Ocean 45 km from the site. Groundwater flows generally to the southwest; depth to groundwater at the site is an estimated 26 meters (EPA 1987).

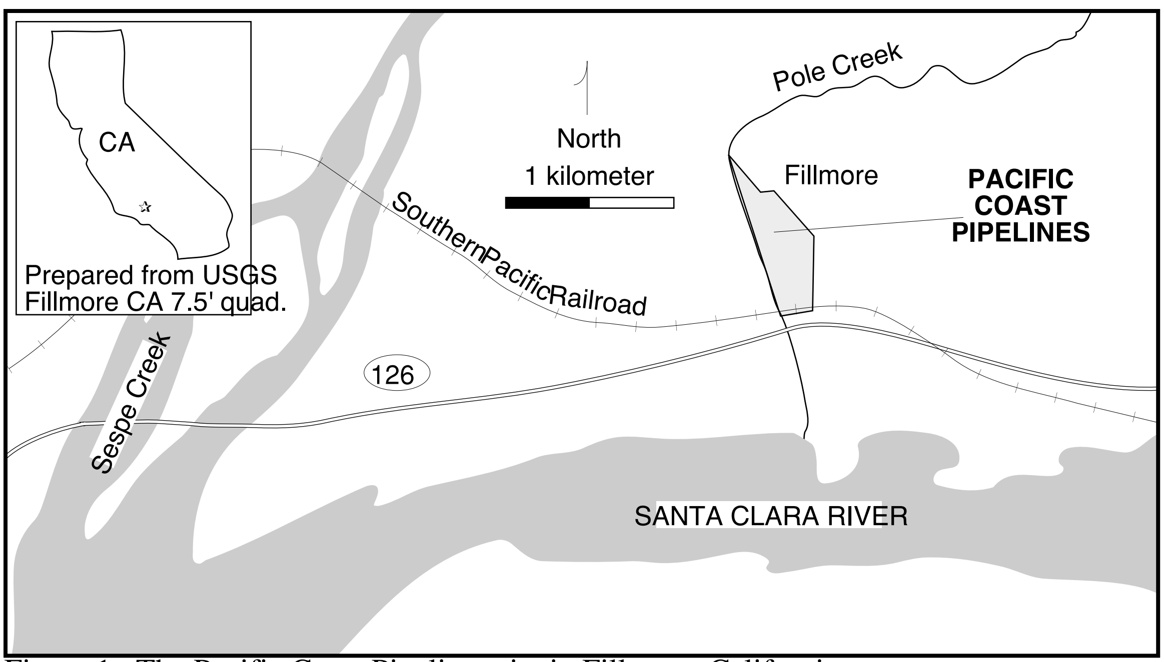


Figure 1. The Pacific Coast Pipelines site in Fillmore, California.

Possible contaminant migratory pathways to NOAA trust resources include surface runoff, flooding and subsequent erosion of materials from the waste pits, and groundwater flow to Pole Creek.

**Site-Related Contamination**

The contaminants of concern to NOAA are trace metals. High levels of several trace metals have been measured in waste collected from the on-site pit areas (Table 1) (Radian 1984). The waste has been described as varying from generally soft, semi-fluid to hard soil/waste mixtures with a pH below 2.0. Analysis of the waste showed 82 to 93 percent VOCs and 7 to 18 percent ash. The high levels of trace metals were predominantly in the ash. Elevated concentrations of metals were measured in groundwater with the concentrations of cadmium, lead, and mercury exceeding the chronic AWQC for the protection of freshwater aquatic life (Radian 1984; EPA 1986). Low to moderate concentrations of VOCs were also found in groundwater.

Table 1. Maximum concentrations of selected contaminants at the Pacific Coast Pipelines site (Radian 1984); AWQC for the protection of freshwater aquatic life (EPA 1986); waste concentrations in mg/kg and water concentrations in µg/l.

| Contaminant | On-Site Waste | Groundwater | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | |
| Volatile | | | | |
| benzene | N/A | 798 | 5,300* | N/D |
| | | | | |
| INORGANIC SUBSTANCES | | | | |
| Trace Metals | | | | |
| arsenic | 666 | 5 | 360 | 190 |
| cadmium | 10 | 5 | 3.9† | 1.1† |
| chromium | 371 | <1 | 16 | 11 |
| copper | 504 | N/A | 18† | 12† |
| lead | 44,800 | 45 | 82† | 3.2† |
| mercury | 0.2 | 3.1 | 2.4 | 0.012 |
| nickel | 5,556 | N/A | 1400† | 160† |
| zinc | 520 | N/A | 120† | 110† |

N/D: Criteria not determined; N/A: Not available; * LOEL
† Hardness-dependent (based on 100 mg/l $CaCO_3$)

**NOAA Trust Habitats and Species in Site Vicinity**

The habitat of concern to NOAA is the Santa Clara River, which flows through a wash-like floodplain and has a maximum width of 1 km near the site. The water flow is regulated by dams above the site and varies considerably over the seasons. A diversion dam 25 km below the site is passable during high flow, but restricts the access of anadromous fish species to the upper Santa Clara River watershed during the dry summer months. The Santa Clara River is used as a migratory route by adult steelhead trout and as nursery area and migratory route for the outmigrating juveniles. The size of the run is unknown (Harper 1988).

Pole Creek, which flows adjacent to the site and into the Santa Clara River, is a small, intermittent creek and is not believed to harbor species of concern to NOAA (Sasaki 1989).

Although Sespe Creek is not physically connected to Pole Creek, it is of concern because it is one of the most valuable steelhead trout streams in southern California and originates downstream of the mouth of Pole Creek in the direction of the contaminant pathway. There is a 67-km stretch of stream within Sespe Creek that has suitable spawning habitats for steelhead trout. Adult steelhead migrate up the watershed to spawn during the winter months. The juveniles stay in the watershed for at least a year before they migrate to the Pacific Ocean.
**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** Removal of contaminated soil under State (Department of Health Services) Order completed. PRP is currently doing independent site characterization. RI/FS is planned for the future but scope will be limited because of extent of prior PRP-sponsored remedial work.

**EPA Site Manager**

| | |
|---|---|
| Mike Montgomery | 415-974-9383 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Chip Demarest | 415-974-8509 |

**References**

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

EPA. 1987. Documentation Records for Hazard Ranking System. Washington, D.C.: U.S. Environmental Protection Agency.

Harper, B., fisheries biologist, U.S. Fish and Wildlife Service, Laguna Niguel, California, personal communication, December 6, 1988.

Radian Corporation. 1984. Environmental Evaluation, Final Report, Pacific Coast Pipelines Facility, Fillmore, California. February 1984. Fillmore, California: Pacific Coast Pipelines.

Sasaki, K., fisheries biologist. California Department of Fish and Game, Santa Barbara, California, personal communication, March 7, 1989.

# Riverbank Army Ammunition Depot
# Riverbank, California
# Region 9
# CA7210020759

## Site Exposure Potential

The Riverbank Army Ammunition Depot (RBAAD) site is located on 70 hectares in Riverbank, 16 km northeast of Modesto, on the northern border of Stanislaus County, California (Figure 1). The main facility covers 59 hectares, including a landfill area. The remaining 11 hectares are occupied by four unlined industrial waste treatment ponds (ATHMA 1980).

RBAAD was built by the Aluminum Company of America in 1942 as an aluminum reduction plant for the U.S. military. The plant was closed in August 1944 and reopened in 1951 as an industrial metal-working plant manufacturing cartridge cases, grenades, and projectiles. These activities generated corrosive wastes, solvents, and wastewater containing metals. Liquid wastes were discharged to the industrial waste treatment ponds, which flooded in the 1950s, 1960s, and 1970s (ATHMA 1980). Landfill dumping activities occurred on-site until 1966.

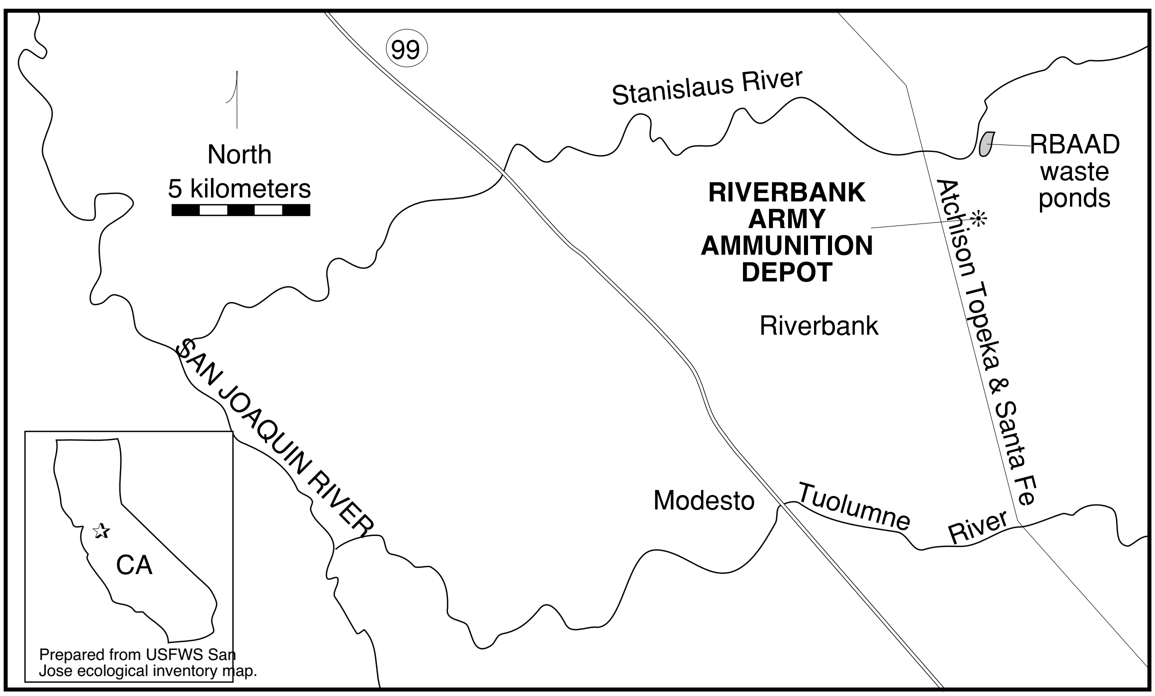


Figure 1. The Riverbank Army Ammunition Depot (RBAAD) site in Riverbank, California.

Dumped materials included oils, greases, solvents, hospital wastes, industrial sludges, and aluminum-reduction process wastes. The hazardous waste quantity has been estimated to be at least 19,563,000 metric tons. Spills reportedly occurred on-site in 1956, 1972, and 1978 (ATHMA 1980).

The topography of the Riverbank area ranges from low hills (three to six meters high) to nearly flat land. The four waste ponds are adjacent to the Stanislaus River, 4 km north of the main facility. The Stanislaus River flows for 35 km before entering the San Joaquin River. The San Joaquin River enters Suisun Bay 95 km below the site. Suisun Bay then flows into San Pablo Bay and San Francisco Bay. A portion of the surface runoff from the main facility has been reported to flow via aqueducts and irrigation channels to the Tuolumne River 11 km south of the main facility. The Tuolumne River empties into the San Joaquin River 30 km west of the plant. Groundwater flows west towards the San Joaquin River (ATHMA 1980).

Possible contaminant migratory pathways to NOAA trust resources include surface water runoff, flooding of the waste treatment ponds, and groundwater flow to the Stanislaus and Tuolumne rivers.

## Site-Related Contamination

The contaminants at the site of concern to NOAA are trace metals and cyanide. Concentra-tions of chromium, copper, lead, and zinc exceeding AWQC for the protection of freshwater aquatic life were measured in waste pond surface water. Chromium and cyanide were also measured in on-site groundwater at levels exceeding chronic AWQC by up to three orders of magnitude (Table 1) (ATHMA 1980; EPA 1986).

Table 1. Maximum concentrations of contaminants at the RBAAD site (ATHMA 1980); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in µg/l.

| Contaminant | On-site Groundwater | Off-site Groundwater | Waste Pond Surface Water | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|
| INORGANIC SUBSTANCES | | | | | |
| Trace metals | | | | | |
| chromium | 2,000 | <50 | 1,200 | 16† | 11† |
| copper | N/A | N/A | 100 | 18† | 12† |
| lead | N/A | N/A | 80 | 82† | 3.2† |
| zinc | N/A | N/A | 840 | 120† | 110† |
| Other | | | | | |
| cyanide | 22,600 | <11 | N/A | 22 | 5.2 |

N/A: Not available; † Hardness-dependent (based on 100 mg/l $CaCO_3$)

## NOAA Trust Habitats and Species in Site Vicinity

The Stanislaus and Tuolumne rivers are low-gradient river systems. The Stanislaus River has an average width of 40 meters and and average depth of one meter near the site. The Tuolumne River is larger, with an average width of 70 meters and average depth of 1.5 meters. The substrate in both rivers is gravel and cobble in the riffle areas and silty sand in the pooled areas. The water quality in both rivers is generally good (Loudermilk 1989).

The Stanislaus and Tuolumne rivers support fall runs of chinook salmon (Table 2). The run in the Stanislaus River consisted of 16,000 adults in 1988; the run in the Tuolumne River, 3,000 adults. Normally, the run in the Tuolumne River is the larger of the two. In addition, the Stanislaus River supports a small run of steelhead trout. The area of the Stanislaus River next to the four waste ponds is used by both species as a nursery area and a migratory route. There are recreational fisheries of chinook salmon, steelhead trout, and rainbow trout on both rivers (Loudermilk 1989).

Table 2. NOAA trust resource use of the Stanislaus, Tuolumne, and San Joaquin rivers (Loudermilk 1989).

| Species | Stanislaus River | Tuolumne River | San Joaquin River |
|---|---|---|---|
| American shad | | | S,N,M |
| chinook salmon | S,N,M | S,N,M | S,N,M |
| steelhead trout | S,N,M | S,N,M | S,N,M |
| striped bass | | | S,N,M |
| white sturgeon | | | S,N,M |
| S : Spawning area | N : Nursery | M : Migratory route | |

**Response Category:** Federal Facility Lead

**Current Stage of Site Action:** RI/FS is expected to be released for comment very soon and finalized by July 1989.

**EPA Site Manager**

| | |
|---|---|
| Julie Anderson | 415-974-8891 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Chip Demarest | 415-974-8509 |

**References**


ATHMA. 1980. Installation Assessment of Riverbank Army Ammunition Plant. Aberdeen Proving Grounds, Maryland: U.S. Army Toxic and Hazardous Materials Agency. Report No. 144.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Loudermilk, B., California Department of Fish and Game, Fresno, California, personal communication, January 19, 1989.

**Sola Optical USA, Inc.**
**Petaluma, California**
**Region 9**
**CAD981171523**

## Site Exposure Potential

Optical lenses have been manufactured since 1978 at the Sola Optical USA site in Petaluma, California (Figure 1). In 1985, contamination was detected in soils and groundwater near the 14-hectare site, and six on-site underground storage tanks were removed (EPA 1987).

Depth to groundwater at the site is 4.5 meters. Groundwater flow is believed to be to the southwest and west towards Adobe Creek and the Petaluma River (Levine-Fricke 1987). Adobe Creek lies 460 meters west of the site and flows into the Petaluma River, 1.6 km from the site. The Petaluma River empties into San Pablo Bay, 13 km from the confluence with Adobe Creek.

A contaminant migratory pathway to NOAA trust resources is via groundwater flow to Adobe Creek.

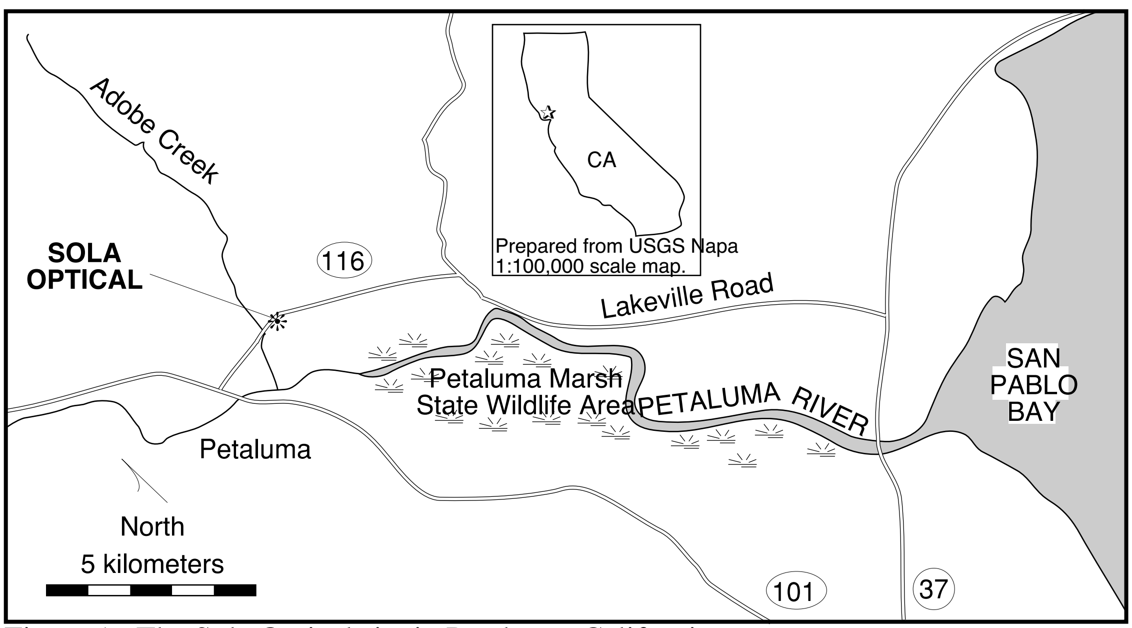

Figure 1. The Sola Optical site in Petaluma, California.

## Site-Related Contamination

Soil borings near the underground storage tanks and groundwater sampling from on-site wells indicated that the soils and shallow subsurface water (less than 12 meters below the surface) were contaminated with VOCs, but levels were not reported. Contaminants were not detected in upgradient wells. Contaminants found in wells off-site and downgradient of the site included 1,1-dichloroethene (maximum of 3,300 µg/l); 1,1-dichloroethane (maximum of 680 µg/l); and trichloroethane (maximum of 1,700 µg/l). There is no reported evidence of surface water contamination at this site. No substances other than VOCs have been sampled for (EPA 1987).

**NOAA Trust Habitats and Species in Site Vicinity**

Adobe Creek is a continuously flowing, low-gradient tidal creek. There are no known resources of concern to NOAA in Adobe Creek (Enig 1989). However, a local high school has begun artificial propagation of steelhead along Adobe Creek, with assistance from the California Department of Fish and Game. This creek could become of interest to NOAA if the program is successful.

Habitats presently of concern to NOAA include the Petaluma River (Table 1). The Petaluma River is a low-salinity, tidal river near the site. The Petaluma Marsh State Wetland Area extends along the west bank of the Petaluma River from Adobe Creek to the river's entrance into San Pablo Bay (Enig 1989). Twenty mating pairs of steelhead trout use the Petaluma River headwaters for spawning. No other salmonids use the Petaluma River drainage basin for spawning; loss of spawning habitat and poor water quality limits salmonid production for this system (Rugg 1989).

Table 1. NOAA trust resource use of the Petaluma River and lower marshland estuary (USFWS 1981).

| Species | Nursery Area | Spawning Area | Adult Area | Migration Corridor | Recreational Fishery | Commercial Fishery |
|---|---|---|---|---|---|---|
| INVERTEBRATES | | | | | | |
| bay shrimp | X | X | X | | X | X |
| Dungeness crab | X | X | X | | X | |
| | | | | | | |
| FISH | | | | | | |
| chinook salmon | | | X | X | X | |
| coho salmon | | | X | X | X | |
| green sturgeon | | | X | X | X | |
| starry flounder | X | | X | | X | |
| steelhead | X | X | X | X | | |
| striped bass | X | | X | | X | |

Dungeness crab, starry flounder, striped bass, and bay shrimp use the lower Petaluma River estuary and associated wetlands for juvenile development. Extensive channels reach into the marshlands, providing access to the productive brackish waters. Adult chinook and coho salmon use the lower estuary as foraging grounds as they migrate to the Sacramento River. Green sturgeon, though not common, have been reported in the Petaluma River. Green sturgeon, like chinook and coho salmon, use the lower estuary for foraging. There is a bay shrimp fishery in northern San Pablo Bay near the Petaluma River estuary. Dungeness crab, starry flounder, striped bass, and sturgeon are harvested recreationally in the lower Petaluma River estuary (Rugg 1989).

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Mike Montgomery 415-974-8512 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Chip Demarest 415-974-8509 |

**References**


EPA. 1987. Hazard Ranking System Package, Sola Optical USA, Inc., Petaluma, California. San Francisco: U.S. Environmental Protection Agency, Region 9.

Enig, J., fisheries biologist, California Department of Fish and Game, Napa, California, personal communication, January 17, 1989.

Levine-Fricke. 1989. Identification, Location, and Evaluation fo Public and Private Wells and Potential Deep Well Conduits near Sola Optical, Inc., Petaluma, California. Petaluma, California: Sola Optical USA, Inc.

Rugg, M., water quality biologist, California Department of Fish and Game, Napa, California, personal communication, January 19, 1989.

USFWS. 1981. Pacific coast ecological inventory: Santa Rosa, California. Washington, D.C.: U.S. Fish and Wildlife Service. Map scale 1:250,000. 38122-A1-E1-250.

**Naval Station Treasure Island - Hunters Point Annex**
**San Francisco, California**
**Region 9**
**CA1170090087**

## Site Exposure Potential

From 1869 to 1940, Hunters Point Annex was a commercial dry dock facility in San Francisco, California (Figure 1). The U.S. Navy bought the property in 1940 and leased it to Bethlehem Steel in 1940 and 1941. No data are available regarding activities prior to 1941, but the Navy operated the shipyard for ship construction, maintenance, and repair from 1942 to 1974. Shore facilities included industrial buildings, offices, and housing; waterfront facilities included forty 150-meter long deepwater berths and six dry docks. The facility was also used for experiments on radioactive decay, properties of fallout, fallout effects on animals, and physics of instrumentation and shielding. Navy ships used in the Bikini Atoll nuclear tests were decontaminated by sandblasting at Hunters Point. All radioactive wastes were reportedly disposed of off-site (DNWD 1988).

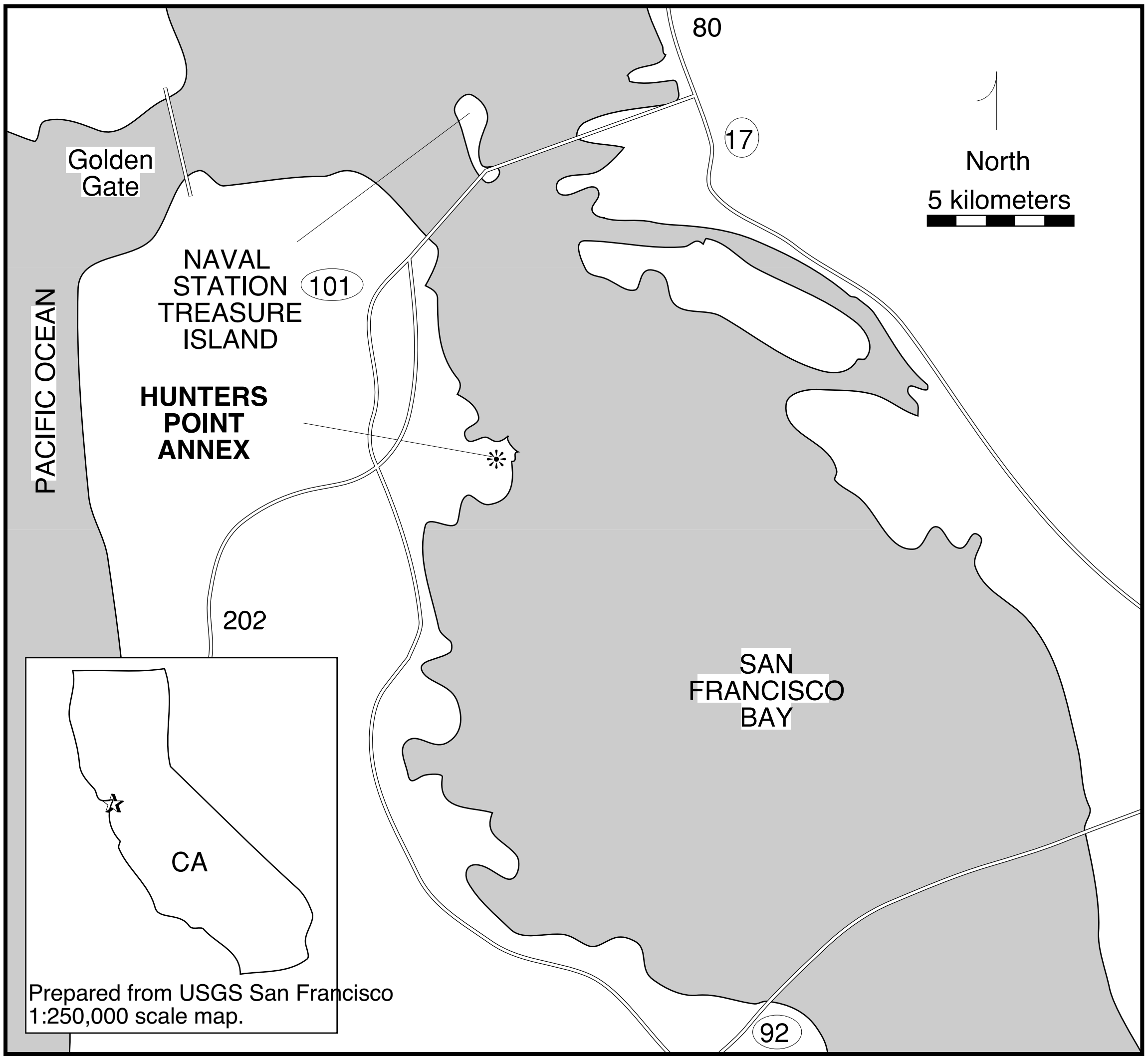


Figure 1. The Hunters Point Annex site in San Francisco, California.

In May 1976, most of the facility was leased to Triple A, who operated it as a commercial ship repair facility until June 1987. Triple A sublet portions of the site to private firms for warehouse, industrial, and commercial activities. Wastes were generated from ship repair and maintenance, facilities maintenance, and building demolition. Activities by all tenants resulted in the largely undocumented disposal of sandblast waste, paints, solvents, fuels and oils, acids, bases, metals, PCBs, and asbestos (DNWD 1988).

The Hunters Point Annex property covers 390 hectares; 211 hectares on land, 179 hectares in San Francisco Bay. The site is bounded on three sides by the bay and on the fourth side by the residential/commercial/industrial area of Hunters Point. The northern and eastern shores of the site have dry dock and berthing ship repair facilities. The southern shore is primarily fill. Nearly 80 percent of the land area of the site is relatively level lowland areas that were built by placing fill along the margin of the bay. The remaining area is a moderate to steeply sloping ridge in the northwest portion of the site. Elevations range from two to four meters above mean sea level (MSL) in the lowlands to about 55 meters MSL at the crest of the ridge. Surface drainage is primarily sheet-flow runoff collected by on-site storm sewers and discharged to the bay. There are no naturally occurring drainage features across the facility. Groundwater beneath the site may flow radially toward the bay from higher elevation inland areas, and may be tidally influenced in some areas (DNWD 1988).

Possible contaminant migration pathways are groundwater flow, surface water runoff, direct discharge, and erosion and runoff of contaminated surface soils to San Francisco Bay .

**Site-Related Contamination**

Contaminants of concern to NOAA include trace metals, PCBs, and volatile and semi-volatile organic compounds (Table 1). Arsenic, cadmium, chromium, copper, lead, silver, and zinc were observed in on-site groundwater in concentrations that exceeded acute AWQC by up to

Table 1. Maximum concentrations of selected contaminants at the Hunters Point site (DNWD 1988); range in natural soils (EPA 1983); AWQC for the protection of saltwater aquatic life (EPA 1986); concentrations for soils in mg/kg and for water in µg/l.

| Contaminant | Soil | Range in Natural Soils | Groundwater | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|
| ORGANICS | | | | | |
| PCBs | | | | | |
| PCBs | 89 | N/A | 4 | 10 | 0.03 |
| Volatile | | | | | |
| pyrene | 16 | N/A | 470 | N/D | N/D |
| xylene | N/A | N/A | 42,000 | N/D | N/D |
| Semi-Volatile | | | | | |
| naphthalene | 84 | N/A | 290 | 2,350* | N/D |
| INORGANICS | | | | | |
| Trace Metals | | | | | |
| arsenic | N/A | 1-50 | 30,000 | 69 | 36 |
| cadmium | 54 | 0.01-0.7 | 650 | 43 | 9.3 |
| chromium | 55,000 | 1-1,000 | 4900 | 1,100 | 50 |
| copper | 37,000 | 2-100 | 130,000 | 2.9 | 2.9 |
| lead | 52,000 | 2-200 | 71,000 | 140 | 5.6 |
| mercury | 6.1 | 0.01-0.3 | N/A | 2.1 | 0.25 |
| nickel | 1,000 | 5-500 | N/A | 75 | 8.3 |
| silver | 1.7 | 0.01-5 | 100 | 2.3 | N/D |
| tin | N/A | 2-200 | 410,000 | N/D | N/D |
| zinc | 150,000 | 10-300 | 26,000 | 95 | 86 |

N/A: Not available N/D: Criteria not developed * LOEL

four orders of magnitude. High levels of tin (410,000 µg/l) were also observed in on-site groundwater. Levels of cadmium, chromium, copper, lead, mercury, silver, and zinc measured in on-site soils exceeded the range commonly found in natural soils (EPA 1983). PCBs were found in on-site groundwater and soils; PCB concentrations observed in groundwater exceeded AWQC. Volatile and semi-volatile organic compounds were measured in on-site groundwater and soils, but none of the concentrations exceeded available toxicity criteria (EPA 1986; DNWD 1988).

## NOAA Trust Habitats and Species in Site Vicinity

San Francisco Bay is an estuarine environment providing nursery, adult, and spawning habitat for NOAA trust resources (Table 2). The southern bay area is used mostly as a seasonal nursery ground. Species such as smelt and herring spawn in the central areas of the bay and use the nearshore estuaries for juvenile growth. Several flatfish species also use the nearshore area as juvenile nursery grounds and as adult habitat. Sea perch are year-round residents of the area and can often be found just beyond the intertidal zone. Leopard sharks, dogfish, and bat rays are relatively shallow-water carnivores that feed on smaller
fish and benthic invertebrates along the mud flats during high tide. Commercially important shrimp species are also found in San Francisco Bay, with juveniles present in

Table 2. NOAA trust resource use of San Francisco Bay near the Hunters Point site (USFWS 1981).

| Species | Spawning Area | Nursery Area | Adult Area | Migration Route | Commercial Fishery | Recreational Fishery |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| INVERTEBRATES | | | | | | |
| bay shrimp | X | X | X | | X | X |
| bent-nose clam | X | X | X | | | |
| Dungeness crab | | X | | | | |
| rock crab | X | X | X | | | |
| soft-shell clam | X | X | X | | | |
| | | | | | | |
| FISH | | | | | | |
| anchovy | | X | | | | |
| barred perch | X | X | X | | | |
| bat ray | | X | X | | | |
| California tonguefish | | X | X | | | |
| English sole | | X | X | | | |
| jack smelt | | X | | | | |
| leopard shark | | X | X | | | |
| Pacific salmon | | | | X | | |
| Pacific herring | | X | | | | |
| sand dab | | X | X | | | |
| shiner perch | X | X | X | | | |
| spiny dogfish | | X | X | | | |
| staghorn sculpin | X | X | X | | | |
| starry flounder | | X | X | | | |
| steelhead trout | | | | X | | |
| striped bass | | X | X | | | X |
| top smelt | | X | | | | |
| yellowfin gobie | X | X | X | | | |
| | | | | | | |
| MAMMALS | | | | | | |
| harbor seal | | X | X | | | |

nearshore waters and adults in the central portions of the bay. Pacific salmon and steelhead trout use the bay as a migratory route (USFWS 1981). Harbor seals are found in the more southern part of the bay, near the site only when moving through the area (Lecky 1989).

**Response Category:** Federal Facility

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| |
|---|
| Julie Anderson 415-974-8891 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Chip Demarest 415-974-8509 |

## References

DNWD. 1988. Scoping Document Remedial Investigations/Feasibility Studies Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California. San Bruno, California: Department of the Navy Western Division.

EPA. 1983. Hazardous Waste Land Treatment. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. SW-874.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Lecky, James, biologist, Marine Mammal Branch, NOAA, Los Angeles, California, personal communication, March 15, 1989.

USFWS. 1981. Pacific coast ecological inventory: San Francisco, California. Washington, D.C.: U.S. Fish and Wildlife Service. 1:250,000 scale map.

**Aluminum Company of America (ALCOA)**
**Vancouver, Washington**
**Region 10**
**WAD009045279**

## Site Exposure Potential

The ALCOA facility lies on the northern bank of the Columbia River, 4 km west of Vancouver, Washington, in an area that is primarily industrial or undeveloped (Figure 1). In 1940, the facility began operating a primary aluminum smelter and support facilities (Hart Crowser 1987b). As part of the aluminum production process, waste materials were generated that consisted of spent potlining and reclaimed alumina insulation containing cyanide, fluoride, and trace metals (Hart Crowser 1987a). From the early 1950s to 1973,

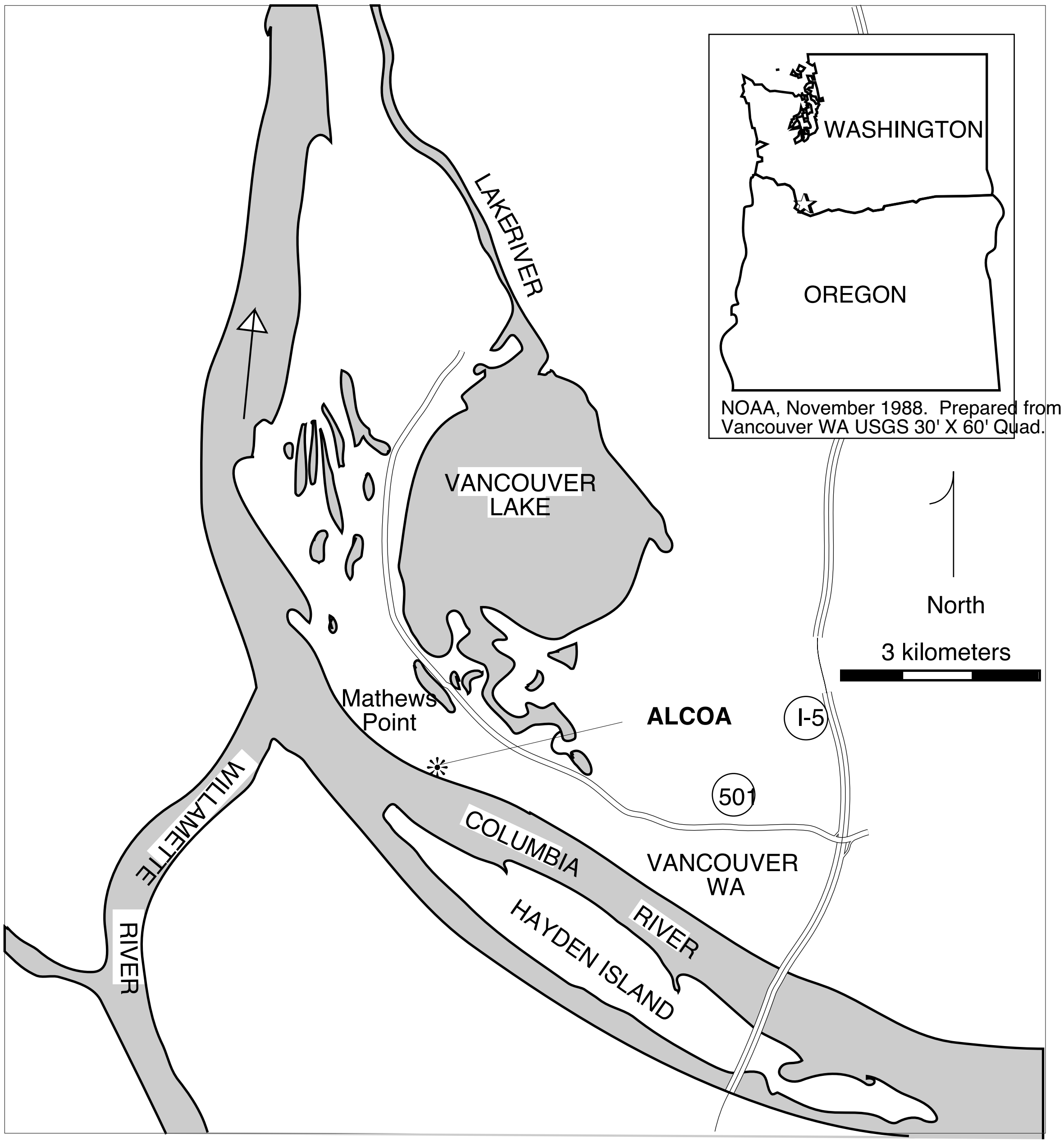


Figure 1. The ALCOA site in Vancouver, Washington.

these waste materials were shipped to Longview, Washington. Between 1973 and 1981, the waste materials were stored on-site in three waste piles estimated to be 43,500; 9,100; and 7,300 metric tons, respectively (Hart Crowser 1987b). These waste piles were covered with impermeable polyvinyl chloride caps, soil covers, and revegetated in 1978 and 1981. The caps do not extend past the toes of the piles; surface drainage has infiltrated the piles along the perimeters. Precipitation may infiltrate the piles, which are 90 to 150 meters north of the Columbia River.

The Columbia River is a habitat of major interest to NOAA. Due to permeable soils in the area, contaminant migration from the waste piles to the river is possible via groundwater.

## Site-Related Contamination

The contaminants of primary concern for the protection of NOAA trust resources are fluoride and cyanide. High concentrations of both of these substances have been detected in the groundwater and in soils on-site (Table 1). Moderate levels of cyanide have been detected in standing water on the site. Fluoride measurements in the groundwater on-site greatly exceed concentrations that have been observed to be toxic to salmonids. Acute toxicity in rainbow trout was observed at fluoride concentrations ranging from 2,700 to 4,700 µg/l (Neuhold and Sigler 1960). Significant avoidance behavior in adult salmonids has been observed at concentrations as low as 500 µg/l (Damkaer and Dey, in press). Cyanide is probably present as free cyanide and cyanides complexed with iron formed during the electrolytic smelting process. Free cyanide is very toxic to aquatic organisms; concentrations measured in the groundwater on site greatly exceeded AWQC.

In addition to fluoride and cyanide, low to moderate levels of arsenic, cadmium, chromium, copper, and zinc have been detected in the groundwater (Table 1). Maximum concentrations detected were within an order of magnitude of the applicable AWQC.

Table 1. Maximum concentrations of selected contaminants at the ALCOA site (Hart Crowser 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations for water in µg/l and for soil in mg/kg.

| | | Water Table Aquifer | | | Deeper | Surface | AWQC | |
|---|---|---|---|---|---|---|---|---|
| Contaminant | Soil | Shallow | Intermediate | Deep | Aquifer | Water | Acute | Chronic |
| INORGANIC SUBSTANCES | | | | | | | | |
| Trace Metals | | | | | | | | |
| arsenic | N/A | 40 | 350 | 20 | 20 | N/A | 360 | 190 |
| cadmium | N/A | 1 | 10 | 1 | 1 | N/A | 3.9 | 1.1* |
| chromium | N/A | 4 | 48 | 1 | 1 | N/A | 16 | 11 |
| copper | N/A | 43 | 210 | 3 | 3 | N/A | 18* | 12* |
| zinc | N/A | 32 | 65 | 36 | 54 | N/A | 120* | 110* |
| Other | | | | | | | | |
| cyanide | 91.9 | 73,200 | 320,000 | 73,000 | 530 | 37 | 22 | 5.2 |
| fluoride | 3,450 | 700,000 | 1,340,000 | 33,000 | 55 | N/A | N/A | N/A |

* Hardness-dependent (based on 100 mg/l $CaCO_3$)

N/A: Not available

## NOAA Trust Habitats and Species in Site Vicinity

The lower Columbia River is a tidally influenced, continuously flowing, low-gradient river system with a drainage area of 622,080 $km^2$. The river near the site has an unconsolidated sand/silt bottom that is unsuitable substrate for salmonid spawning.

There are five salmon species, steelhead trout, smelt, American shad, and white sturgeon in the Columbia River near the site (Table 2) (Beccasio et al. 1981; King 1988). Adult salmonid, and shad immigrants and juvenile outmigrants, use the river near the site as a migratory corridor. In addition, juvenile salmonids and shad may use the area as a nursery and for foraging. White sturgeon and smelt may use the deeper pools near the site as spawning grounds.

Table 2. NOAA trust resource use of the Columbia River near the ALCOA site (Beccasio et al. 1980; King 1988).

| Species | Spawning Area | Nursery Area | Adult Habitat | Migratory Route | Recreational Fishery | Commercial Fishery |
|---|---|---|---|---|---|---|
| American shad | | | | X | X | |
| chinook salmon | | X | | X | X | X |
| chum salmon | | X | | X | X | X |
| coho salmon | | X | | X | X | X |
| pink salmon | | X | | X | X | X |
| smelt | X | X | | X | X | |
| sockeye salmon | | X | | X | X | X |
| white sturgeon | X | X | | X | X | X |

There are commercial fisheries on the Columbia River near the site for chinook, coho, sockeye, and chum salmon; white sturgeon; and American shad (Bennett 1988). Up to 55,087 salmonids; 1,303 white sturgeon; and 16,218 American shad were harvested each year between 1982 and 1987. There are recreational fisheries on the Columbia River for chinook salmon, steelhead, white sturgeon, and shad. Up to 577 chinook salmon, 614 steelhead, 945 white sturgeon, and 191 shad were harvested each year between 1982 and 1987 by Washington bank and boat anglers.

**Response Category:** State Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**State Site Manager**

| |
|---|
| Ted Mix 206-438-7012 |

**NOAA Coastal Resource Coordinator**

| |
|---|
| Lew Consiglieri 206-442-2101 |

**References**

Beccasio, A. D., J. S. Isakson, A. E. Redfield, W. M. Blaylock, H. C. Finney, R. L. Frew, D. C. Lees, D. Petrula, R. E. Godwin. 1981. Pacific coast ecological inventory: user's guide and information base. Washington, D.C: Biological Services Program, U.S. Fish and Wildlife Service. 159 p.

Bennett, Don, fisheries biologist, Oregon Department of Fish and Wildlife, Clackamas, Oregon, personal communication, October 25, 1988.

Damkaer, D. and D. Dey. In Press. Evidence for fluoride effects on salmon passage at John Day Dam, Columbia River (1982-1986). North American Journal of Fisheries Management 1(9).

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Hart Crowser. 1987a. Feasibility study, Aluminum Company of America, Vancouver operations, Vancouver Washington,Vancouver, Washington: Aluminum Company of America.

Hart Crowser. 1987b. Remedial investigation, Aluminum Company of America, Vancouver operations, Vancouver Washington, Volume I. Vancouver, Washington: Aluminum Company of America.

King, Steve, fishery biologist, Oregon Department of Fish and Wildlife, Clackamas, Oregon, personal communication, June 28, 1988.

Neuhold, J.M.and W.F. Sigler. 1960. Effects of sodium fluoride on carp and rainbow trout. Transactions of the American Fisheries Society 89(4), October 1960.

**American Crossarm and Conduit Company**
**Chehalis, Washington**
**Region 10**
**WAD057311094**

## Site Exposure Potential

From the 1930s to 1983, the American Crossarm and Conduit Company (ACC) operated a wood-preserving facility on a 6.5-hectare parcel in a commercial/residential section of Chehalis, Washington (Figure 1) (EPA undated). The facility consisted of a wood treatment facility, sawmill, kilns, a wastewater impoundment area, and a landfill. From 1950 to 1983, the company pressure-treated utility pole crossarms and conduits using pentachlorophenol (PCP) or creosote as the preserving agent (Howard Edde Inc. and Landau Assoc. Inc. 1986). While some process chemicals were recycled, wastewater and surface water runoff were discharged to the unlined surface impoundment and ditch under a Washington State Department of Ecology permit. The landfill received construction debris, soils, and miscellaneous waste, possibly contaminated with PCP, from the facility (WDOE 1985).

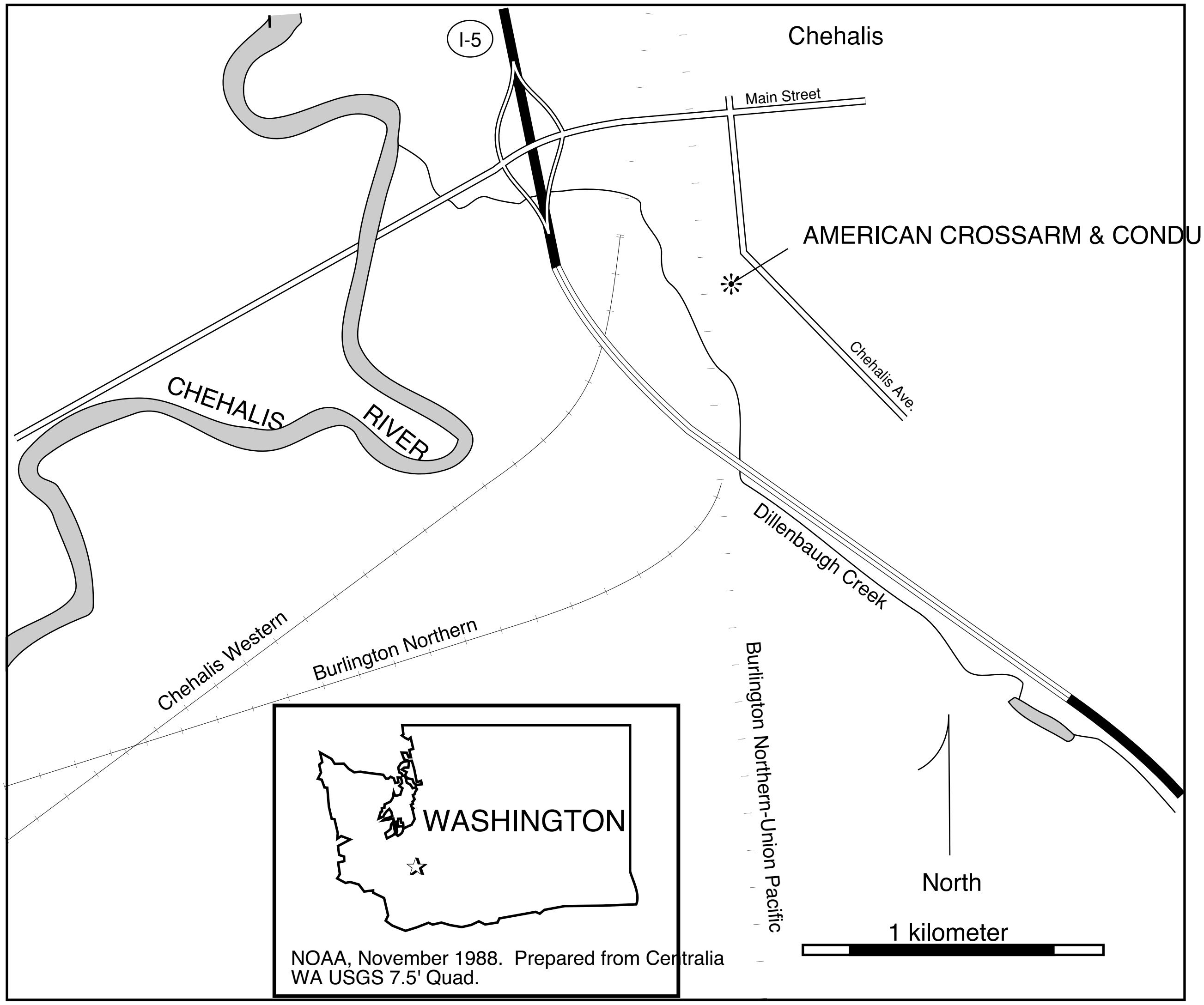


Figure 1. American Crossarm & Conduit site in Chehalis, Washington.

After production ended in 1983, the surface impoundment was regraded and the soil compacted to form a relatively flat topography (Howard Edde Inc.and Landau 1986). On November 25, 1986, the Chehalis River flooded, releasing approximately 37,850 liters of PCP-treated diesel oil from underground tanks and open sumps at the site. Dillenbaugh Creek, the Chehalis River, and part of the town of Chehalis were contaminated. All wastes from the winter 1986-87 emergency cleanup of this spill were stored at the ACC site, and are now being incinerated on-site.

The ACC site is on the northwest side of an alluvial valley formed by the confluence of the Chehalis and the Newaukum rivers (Howard Edde Inc. and Landau Assoc. Inc. 1986). The site is adjacent to a 22-hectare wetland that extends east to Dillenbaugh Creek. Part of the site's surface runoff flows west via a storm drain to an off-site lagoon. The lagoon discharges into Dillenbaugh Creek, 215 meters west of the site. The remaining surface runoff flows south via drainage ditches and discharges into the creek. Dillenbaugh Creek joins the Chehalis River 1 km west of the site. The Chehalis River enters Grays Harbor on the Pacific Coast 95 km downstream from the ACC site. The site is 53 to 55 meters above mean sea level; most of the ground surface is within the 100-year floodplain.

Possible contaminant migration pathways include surface water runoff via the storm drain and drainage ditch and sediment/soil transport during flooding to Dillenbaugh Creek and the Chehalis River.

## Site-Related Contamination

The contaminants of concern to NOAA are PCP, dioxins, and furans. High levels of PCP were found in soils from the production area (Table 1) (Howard Edde Inc. and Landau Assoc. 1986). PCP was measured in on-site groundwater and off-site surface water at concentrations exceeding AWQC for the protection of freshwater aquatic life (20 µg/l

Table 1. Maximum concentrations of selected contaminants at the ACC site (Howard Edde Inc. and Landau Assoc. 1986; Yake 1987); water concentrations in µg/l, for oil and soil in mg/kg, and for sediment in µg/kg.

| Media | PCP | Naphthalene | PAHs | Chlor. Dioxins | Chlor. Furans |
|---|---|---|---|---|---|
| Surface water | | | | | |
| standing water on-site | 43,000 | N/A | N/A | N/A | N/A |
| upstream of site on Dillenbaugh Creek | ND | N/A | N/A | N/A | N/A |
| storm drain lagoon off-site | 590 | N/A | N/A | N/A | N/A |
| Dillenbaugh Creek downstream of lagoon | 3.6 | N/A | N/A | N/A | N/A |
| confluence with Chehalis River | 9.3 | N/A | N/A | N/A | N/A |
| Groundwater | 5120 | 3,300 | N/A | N/A | N/A |
| Oil | | | | | |
| flood dispersed | 38,000 | N/A | N/A | 229.5 | N/A |
| Soil | | | | | |
| facility area | 5,000 | 47 | 1,600 | 2.88 | N/A |
| landfill | 5,775 | N/A | N/A | 4.15 | N/A |
| retort sump | 31,000 | 240 | N/A | N/A | N/A |
| sludge, main sump | 1,600 | N/A | N/A | N/A | N/A |
| off-site downgradient | 770 | N/A | N/A | 1.29 | N/A |
| off-site upgradient | 7.7† | N/A | N/A | N/A | N/A |
| Sediment | | | | | |
| storm drain lagoon | 8.2 | N/A | N/A | 1530 | 373.1 |
| Dillenbaugh Creek downstream of lagoon | N/A | N/A | N/A | 103 | 13.3 |

† estimated value; N/A: Not available; ND: Not detected

and 13 µg/l, respectively). Dioxins, impurities in PCP, were found in moderate to high concentrations in on-site soils and flood-dispersed oil. High concentrations of dioxins were measured in sediment from the storm drain at the discharge point to Dillenbaugh Creek (Yake 1987). Another group of impurities in PCP, furans, were also found in sediment at the discharge point in moderate to high concentrations.

## NOAA Trust Habitats and Species in Site Vicinity

Dillenbaugh Creek, a continuously flowing, low-gradient stream, flows along the western border of the site. The creek is less than one meter wide and has a substrate of sand and silt with some gravel and cobble, and provides suitable spawning and nursery habitat for coho salmon (Table 2) (Brix 1988). Adult coho spawn 7 to 12 km upstream of the site during November and December. Juvenile coho probably use the nursery areas in Dillenbaugh Creek throughout the winter, spring, and fall months.

The Chehalis River near the site provides nursery habitat and a migratory corridor for fall and spring chinook, coho, and chum salmon, and steelhead trout. A small number of fall chinook salmon may also spawn in this stretch, but are more likely to spawn up- and downstream of the site area (WDF 1975; Brix 1988). Steelhead trout, and chinook and coho salmon use the Chehalis River near the site over the entire year, while chum salmon use the river from mid-October to mid-June. All four anadromous species are commercially and recreationally fished on the Chehalis River.

Table 2. NOAA trust resource use of Dillenbaugh Creek and the Chehalis River in the vicinity of the site (WDW undated; WDF 1975; Ward 1988).

| Species | Migration Route | Spawning Ground | Nursery Area | Commercial Fishery | Recreational Fishery |
|---|---|---|---|---|---|
| Dillenbaugh Creek | | | | | |
| coho salmon | X | X | X | | |
| | | | | | |
| Chehalis River | | | | | |
| chinook salmon | X | X | X | X | X |
| coho salmon | X | | X | X | X |
| chum salmon | X | | X | X | X |
| steelhead trout | X | | X | X | X |

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Lee Marshall | 206-442-2723 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Lew Consiglieri | 206-442-2101 |

**References**


Brix, R, fisheries biologist, Washington State Department of Fisheries, Montesano, Washington, personal communication, November 4, 1988.

EPA. Undated. National Priorities List. Superfund Hazardous Waste Site Listed under CERCLA, American Crossarm and Conduit Company. Seattle: U.S. Environmental Protection Agency, Region 10.

EPA. 1988. Hazardous Ranking System Scoring Package for American Crossarm and Conduit Company. Seattle: U.S. Environmental Protection Agency, Region 10.

Howard Edde Inc. and Landau Assoc. Inc. 1986. Hazardous Waste Surface Impoundment Closure and Post-Closure Plan at American Crossarm and Conduit Company. Seattle: U.S. Environmental Protection Agency, Region 10.

USGS. 1986. Water Resources Data, Washington, Water Year 1986. Washington, D.C.: U.S. Geological Survey. Water-Data Report WA-86-1.

WDF. 1975. A Catalog of Washington Streams and Salmon Utilization, Volume 2, Coastal Region. Olympia, Washington: Washington Department of Fisheries.

WDOE. 1985. Potential Hazardous Waste Site, Preliminary Assessment. Summary Memorandum, American Crossarm and Conduit Company. Olympia, Washington: Washington State Department of Ecology.

WDW. Undated. Summary of Summer Run and Winter Run Steelhead Trout Sport Catch in Washington. Data summaries for the years 1981 to 1987. Olympia, Washington: Washington State Department of Wildlife.

Ward, D, fisheries biologist, Washington State Department of Fisheries, Olympia, personal communication, November 2, 1988.

Yake, B. 1987. Receiving Water and Sediment Sampling American Crossarm and Conduit Company Pentachlorophenol Spill. Olympia, Washington: Washington State Department of Ecology, Water Quality Investigations Section.

**Centralia Landfill**
**Centralia, Washington**
**Region 10**
**WAD980836662**

## Site Exposure Potential

The Centralia Landfill is an active municipal landfill located in the southern part of Centralia, Washington (Figure 1). The City of Centralia has owned and operated the landfill for domestic, commercial, and light industrial solid wastes since 1958. An estimated 45,359 metric tons of refuse per year is deposited at the unlined landfill, including an unknown quantity of hazardous wastes. Hazardous wastes known to be buried at the landfill include PCB-contaminated soils, incinerator ash classified by the State of Washington as extremely hazardous, clarifier sludges, boiler ash, and solvents (CH2M Hill 1987).

An 18-hectare area on the central portion of the 32-hectare landfill is active (E&E 1987). The site is bordered to the south by Salzer Creek, which flows 700 meters into the Chehalis River (E&E 1987). From the site, the Chehalis River flows 112 km to the Pacific Ocean (WDF 1975). The undeveloped portion of the landfill adjacent to Salzer Creek is flat and subject to periodic flooding. Though elevated, the active portion of the landfill is on the 100-year floodplain (E&E 1987).

There are two groundwater aquifers beneath the site: an unconfined water table aquifer and a deeper aquifer. The unconfined aquifer is very shallow, a maximum of four meters below the landfill's surface. Both aquifers are believed to flow to the southwest, toward Salzer Creek and the Chehalis River (E&E 1987).

Possible contaminant migration pathways to NOAA trust resources are leachate flows, surface water runoff, and groundwater discharge to Salzer Creek and the Chehalis River. In addition, contaminated soil and sediment may migrate into the surface waters during flooding.

## Site-Related Contamination

The contaminants at the site of concern to NOAA include the trace metals cadmium, chromium, copper, mercury, and zinc, and many tentatively identified organic compounds (TICs) and other unknown substances (E&E 1987).

Both the leachate and groundwater at the site are contaminated with a number of trace metals, the most frequently observed being cadmium, chromium, copper, and zinc. The concentrations of these metals often exceeded AWQC for the protection of freshwater aquatic life. Cadmium and copper were also measured in Salzer Creek in concentrations above AWQC (Table 1) (E&E 1987), but similar levels were observed at stations both upstream and downstream of the landfill. In contrast to the water, the concentrations of trace metals measured in samples of surface soil from the landfill and in sediment samples from Salzer Creek were only slightly elevated compared to uncontaminated natural soils of the United States.

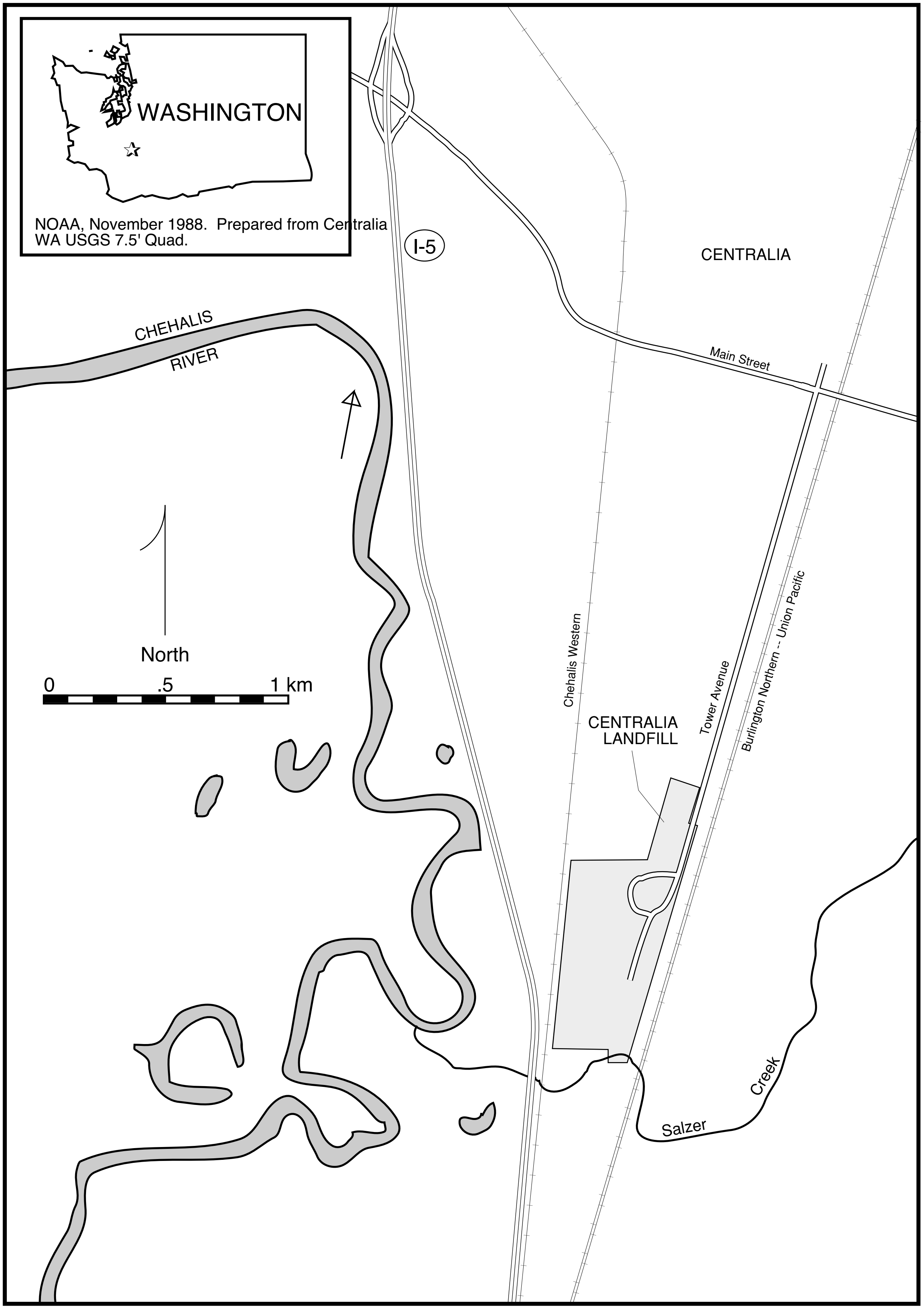


Figure 1. The Centralia Landfill site in Centralia, Washington.

Table 1. Maximum concentrations of selected contaminants at the Centralia Landfill site (E&E 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in µg/l.

| Contaminant | Ground-water | Leachate | Surface Water (Drainage Ditch) | Salzer Creek (Downstream) | Salzer Creek (Upstream) | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|---|---|
| Trace Metals | | | | | | | |
| cadmium | <10 | 18 | 2 | 2 | 3 | 3.9† | 1.1† |
| chromium | 23 | 146 | 3 | <1 | 4 | 16 | 11 |
| copper | 35 | 95 | 17 | 16 | 14 | 18† | 12† |
| lead | <20 | <1 | <1 | 2 | <1 | 82† | 3.2† |
| mercury | 0.03 | 0.7 | N/A | <0.2 | <0.2 | 2.4 | 0.012 |
| nickel | 49 | 366 | 68 | 32 | 33 | 1,400† | 160† |
| silver | <10 | <4 | N/A | <4 | <4 | 4.1† | 0.12 |
| zinc | 170 | 6,750 | 117 | 60 | 38 | 120† | 110† |
| Organic Compounds | | | | | | | |
| methyl ethyl ketone | N/A | 55,000 | N/A | N/A | N/A | N/D | N/D |
| 2-hexanone | N/A | 9,600 | N/A | N/A | N/A | N/D | N/D |
| benzoic acid | N/A | 87,000 | N/A | N/A | N/A | N/D | N/D |
| 4-methylphenol | N/A | 930 | N/A | N/A | N/A | N/D | N/D |

† Hardness-dependent (based on 100 mg/l $CaCO_3$); N/A: Not available; N/D: Criteria not determined

## NOAA Trust Habitats and Species in Site Vicinity

Salzer Creek and the Chehalis River are the trust habitats near the site. Salzer Creek is a small, slow-flowing stream two to seven meters wide. The creek bottom in the vicinity of the landfill is sand and silt with a few areas of gravel and cobble. The Chehalis River is a continuously flowing, low-gradient river system.

Salzer Creek has limited spawning grounds and nursery habitat for coho salmon (Table 2) (WDF 1975). Adult coho migrate to spawning grounds upstream of the site during November and December. Juvenile coho probably rear in Salzer Creek during the winter, spring, and fall months but use the mainstem Chehalis River during the summer due to lower flow and warm temperatures.

The Chehalis River near the site provides nursery habitat and a migratory corridor for steelhead trout; and fall and spring chinook, coho, and chum salmon. A small number of fall chinook salmon may spawn in this stretch, but most suitable spawning habitat is up- and downstream of the site (Brix 1988). Chinook and coho salmon, and steelhead trout may use the Chehalis River near the site year-round (WDF 1975). Chum salmon use the

Table 2. NOAA trust resource use of Salzer Creek and the Chehalis River in the vicinity of the site (WDW undated a,b; WDF 1975; Ward 1988).

| Species | Migration Route | Spawning Ground | Nursery Area | Commercial Fishery | Recreational Fishery |
|---|---|---|---|---|---|
| Salzer Creek | | | | | |
| coho salmon | X | X | X | | |
| | | | | | |
| Chehalis River | | | | | |
| chinook salmon | X | X | X | X | X |
| coho salmon | X | | X | X | X |
| chum salmon | X | | X | X | X |
| steelhead trout | X | | X | X | X |

river for shorter periods; adults migrate past the site from mid-October to mid-January, and juveniles begin outmigration soon after emergence during late January to mid-June.

Due to its small size, Salzer Creek does not have significant fisheries, but the Chehalis River supports a large commercial and recreational fishery for adult salmonids (WDW undated a,b; Ward 1988). The Chehalis Indian Tribe commercially harvests salmon and steelhead near Oakville, Washington, 50 km downstream of the site. The Quinault Indian Tribe also harvests salmonids in streams tributary to the lower Chehalis River and near the mouth of the river at Grays Harbor. Recreational fishing takes place along the entire stretch of the river.

**Response Category:** State Enforcement Lead

**Current Stage of Site Action:** RI/FS Workplan

**State Site Manager**

| | |
|---|---|
| Guy Gregory | 206-753-6880 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Lew Consiglieri | 206-442-2101 |

**References**

Brix, Rick, fisheries biologist, Washington State Department of Fisheries, Montesano, Washington, personal communication, November 4, 1988.

CH2M Hill. 1987. Centralia Landfill, Site Development and Operations Plan. Centralia, Washington: City of Centralia.

Ecology & Environment (E&E). 1987. Site Inspection Report for Centralia Landfill, Centralia Washington. Seattle: U.S. Environmental Protection Agency, Region 10.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

WDF. 1975. A Catalog of Washington Streams and Salmon Utilization, Volume 2, Coastal Region. Olympia: Washington State Department of Fisheries.

WDW. Undated a. Summary of Summer Run and Winter Run Steelhead Trout Sport Catch in Washington. Data summaries for the years 1981 to 1987. Olympia: Washington State Department of Wildlife.

WDW. Undated b. Washington State Reported Boldt Case Area (BCA) and Columbia River Treaty Indian Steelhead Catch. Data summaries for the years 1981 to 1987. Olympia: Washington State Department of Wildlife.

Ward, D., fisheries biologist, Washington State Department of Fisheries, Olympia, Washington, personal communication, November 2, 1988.

**Hanford - Areas 100, 200, 300, 1100**
**Richland, Washington**
**Region 10**
**WA3890090075**

## Site Exposure Potential

The U.S. Department of Energy's (DOE) Hanford site was established in 1943 to conduct research and development in nuclear energy technology. The entire site occupies 1,500 $km^2$ and contains 355 inactive waste disposal locations. Due to the large area and number of disposal sites, four subareas have been designated: Areas 100, 200, 300, and 1100 (Figure 1). Area 100 is adjacent to the Columbia River in the northern section of the Hanford site and is the farthest upstream of the four sites. This site contains nine inactive nuclear reactors that produced plutonium and generated electricity. Area 200 is in the middle of the Hanford site and is used by DOE for the recovery of plutonium and the

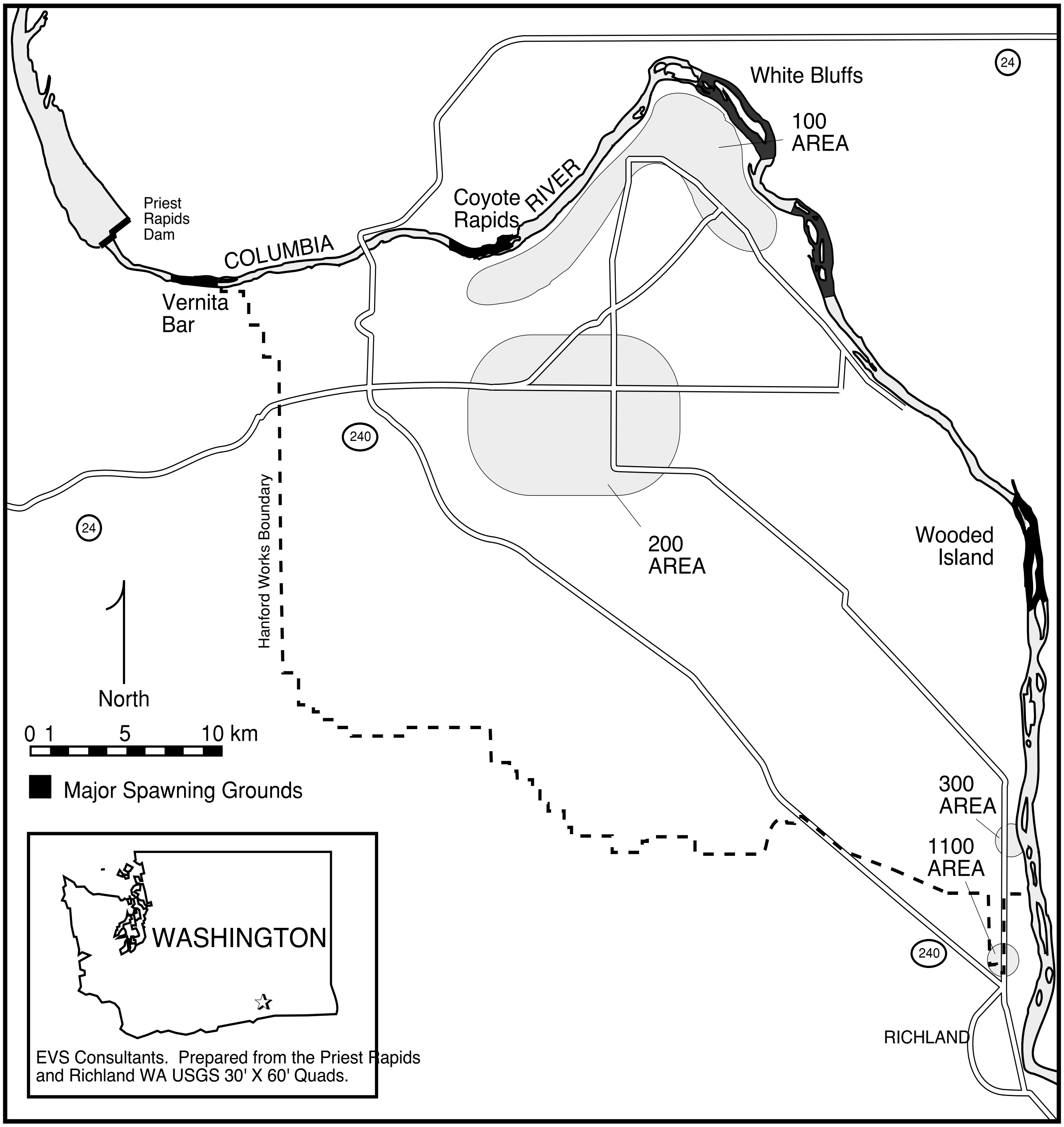


Figure 1. Waste disposal locations and salmon spawning grounds at Hanford.

processing and storing of waste materials. Area 300 is adjacent to the Columbia River in the southern portion of the site and has been used by DOE to fabricate nuclear reactor fuel. Area 1100 is adjacent to the Columbia River just south of Area 300 and is used by DOE for equipment maintenance operations (EPA 1987).

The site is in a rural region north of Richland, Washington. The Columbia River forms the northern and eastern boundaries of the Hanford site for 90 km (Battelle 1980). This stretch, the Hanford Reach, is the only remaining free-flowing stretch of the river in the

United States. The Columbia River drains a total area of 70,800 $km^2$ and flows 560 km from the site to the Pacific Ocean. The Columbia River is regulated by 11 dams in the United States. All dams below the Hanford site have fish passage facilities.

The major contaminant transport pathway from the Hanford site to the Columbia River is groundwater flow. Surface water runoff is negligible due to low rainfall, high evaporation, relatively level topography, and high infiltrative rates and capacity.

## Site-Related Contamination

The major contaminants of concern in Area 100 are radionuclides and inorganic and organic contaminants. An estimated 3.3 billion $m^3$ of solid and liquid waste were disposed of in more than 110 waste disposal locations in Area 100. The disposal locations and plumes of contaminated groundwater cover 28.5 $km^2$ (EPA 1987). Strontium-90 and chromium were monitored as indicators for groundwater transport of contaminants. Low levels of strontium-90 were detected both in the groundwater beneath Area 100 and in the Columbia River. Chromium has also been detected in the groundwater at levels two orders of magnitude above AWQC for the protection of freshwater aquatic life (Table 1).

Table 1. Maximum concentrations of contaminants near Area 100 (EPA 1987); AWQC for the protection of freshwater aquatic life (EPA 1986).

| | Groundwater | | Columbia River | | AWQC | |
|---|---|---|---|---|---|---|
| Contaminant | Upgradient | Downgradient | Upgradient | Downgradient | Acute | Chronic |
| strontium-90 | <0.753 pCi/l* | 12.5 pCi/l* | 0.34 pCi/l* | 28 pCi/l** | N/D | N/D |
| chromium | 10.0 µg/l | 1,560.0 µg/l | N/A | N/A | 16 | 11 |

N/A: Not available
N/D Not determined
* pCi/l : picocuries per liter. A curie is the official unit of radioactivity, defined as 3.70 x $10^{10}$ disintegrations per second. This decay rate is nearly equivalent to that exhibited by one gram of radium in equilibrium with its disintegration products. A picocurie (pCi) is $10^{-12}$ curie.

The major contaminants of concern to NOAA in Area 200 are radionuclides and inorganic and organic contaminants. An estimated 765 million $m^3$ of radioactive, mixed, and hazardous solid and dilute liquid wastes were disposed of in over 230 waste disposal locations in Area 200. The disposal locations and plumes of contaminated groundwater cover 557 $km^2$ (EPA 1987). Releases to the groundwater from Area 200 have been demonstrated using tritium, iodine-129, uranium, cyanide, and carbon tetrachloride (Table 2).

Table 2. Observed releases to groundwater from Area 200 (EPA 1987).

| Contaminant | Background | Downgradient |
|---|---|---|
| | | |
| tritium | <320.0 pCi/l | 1,600,000.0 pCi/l |
| | | 22,000.0 pCi/l |
| | | 35,400.0 pCi/l |
| iodine-129 | 0.000094 pCi/l | 4.89 pCi/l |
| uranium | 1.06 pCi/l | 14,900.0 pCi/l |
| | | 2,748.0 pCi/l |
| cyanide | <10.0 µg/l | 405.0 µg/l |
| carbon tetrachloride | <10.0 µg/l | 2000.0 µg/ |

* pCi/l : picocuries per liter. A curie is the official unit of radioactivity, defined as 3.70 x $10^{10}$ disintegrations per second. This decay rate is nearly equivalent to that exhibited by one gram of radium in equilibrium with its disintegration products. A picocurie (pCi) is $10^{-12}$ curie.

Similarly, tritium and iodine-129 have been used to demonstrate contaminant movement from Area 200 to surface water by comparing upstream and downstream concentrations (Table 3).

Table 3. Surface water data from Area 200 (EPA 1987); units in pCi/l.

| Contaminant | Background | Downgradient |
|---|---|---|
| | | |
| iodine-129 | 3.3 x$10^{-6}$ | 63.0 x$10^{-6}$ |
| | 1.04 x$10^{-5}$ | 16.1 x$10^{-5}$ |
| tritium | 107.0 | 60,600.0 |
| | 119.0 (mean)* | 165.0 (mean)* |
| | | |

* Comparison of the 75 downstream samples (mean = 165) to the 75 upstream samples (mean = 119) using a one-tailed T-Test, indicated that there is a 95% probability that the downstream sample mean is significantly higher than the upstream. Statistical analyses performed by DOE in 1985 and 1986 of upstream-downstream sampling data showed similar results.

The major contaminants of concern in Area 300 are radionuclides and inorganic and organic contaminants. An estimated 20.6 million $m^3$ of radioactive, hazardous, and mixed waste materials have been placed in 14 disposal locations. The disposal locations and plumes of contaminated groundwater in Area 300 cover 13 $km^2$. Uranium was used as an indicator constituent in Area 300, and its measurement has verified groundwater contamination beneath the site. Levels ranged from 20 pCi/l to 42 pCi/l. Releases of uranium to springs along the river bank have also been observed. The springs discharge into the Columbia River (EPA 1987).

The major contaminants in Area 1100 threatening natural resources are inorganic and organic contaminants. An estimated 56,775 liters of waste battery acid were disposed of in an unlined sand pit. Also, an unknown amount of waste antifreeze was placed in a 19,000-liter underground tank (EPA 1987).

**NOAA Trust Habitats and Species in Site Vicinity**

The Columbia River is a large, low-gradient riverine system. Flow rates vary due to power production from the Priest Rapids Dam, 20 km upstream of the site. River width in the Hanford Reach ranges from 300 to 600 meters with an average depth of eight meters. Daily fluctuations in depth caused by release from the Priest Rapids Dam can be as much as three meters just below the dam and 1.5 meters at the Hanford site. The upper part of the Hanford Reach, near Areas 100 and 200, is a riffle with gravel/cobble substrate; the benthic invertebrate community in this section is relatively diverse. In contrast, the lower section of the Hanford Reach near Richland is more pool-like with a silt substrate and therefore a less diverse invertebrate community (Cushing 1988).

The Columbia River is the largest salmonid river on the West Coast of the United States. Steelhead trout and chinook, coho, and sockeye salmon use the Hanford Reach adjacent to the site as spawning ground, nursery area, foraging area, and migratory corridor (Table 4). The Hanford Reach provides the only spawning grounds in the river for fall chinook salmon and steelhead trout (Battelle 1980; Battelle 1985). Spawning in Hanford Reach has increased five-fold since 1960. This increase is attributed to the loss of upstream spawning grounds after the construction of the Priest Rapids Dam. Several spawning grounds near Area 100 are susceptible to contaminant discharge from Hanford. These include White Bluffs and Coyote Rapids near Area 100, and Wooded Island downstream of Area 100. Wooded Island is also susceptible to contaminant discharge from Area 200. The Hanford Reach also provides critical nursery and foraging habitat for juvenile fall chinook salmon and steelhead over the entire year. Two hatcheries on the Hanford Reach release as many as 20 million juvenile chinook salmon and steelhead trout in the Hanford Reach each year (Battelle 1985).

American shad and white sturgeon have also been reported in the Hanford Reach (Gray and Dauble 1977). American shad probably use the Reach as spawning ground and nursery but this has not been confirmed; this species has not been found in great abundance. White sturgeon are fairly abundant and use the Hanford Reach as spawning ground, nursery area, and adult habitat. However, it is questionable whether sturgeon in the Reach are anadromous, since most populations above the Bonneville Dam are considered landlocked (Battelle 1980).

Table 4. NOAA trust resource use of the Hanford Reach of the Columbia River (EPA 1987).

| Species | Spawning Area | Nursery Area | Adult Area | Migration Route |
|---|---|---|---|---|
| American shad | X* | X* | | |
| chinook | X | X | X | X |
| coho X | X | X | X | |
| sockeye | X | X | X | X |
| steelhead | X | X | X | X |
| white sturgeon | X | X | X | |
| * unconfirmed | | | | |

**Response Category:** Federal Facility

**Current Stage of Site Action:** RI/FS Workplan

**EPA Site Manager**

| | |
|---|---|
| Paul Day | 509-376-6623 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Lew Consiglieri | 206-442-2101 |

**References**

Battelle Pacific Northwest Laboratories. 1980. Aquatic and Riparian Resource Study of the Hanford Reach, Columbia, River, Washington. Seattle: U.S. Army Corps of Engineers.

Battelle Pacific Northwest Laboratories. 1985. Anadromous Salmonids of the Hanford Reach, Columbia River: 1984 status. Washington, D.C.: U.S. Department of Energy.

Blaylock, B. G. and J. R. Trabalka. 1978. Evaluating the effects of ionizing radiation on aquatic organisms. Advances in Radiation Biology 7:103-152.

Cushing, C. E., Environmental Assessment, Battelle Northwest Laboratories, Richland, Washington, personal communication, January 13, 1988.

DOE. 1986. Draft Phase I Installation Assessment of Inactive Waste-Disposal Sites at Hanford, Vol. I & II. Washington, D.C.: U.S. Department of Energy.

EPA. 1987. Hazardous Ranking System Scoring Package for 200 Area. Seattle: U.S. Environmental Protection Agency, Region 10.

Gray, R.H. and D.D. Dauble. 1977. Checklist and relative abundance of fish species from the Hanford Reach of the Columbia River. Northwest Science 51(3), August 1977.

**Kent Highlands Landfill**
**Kent, Washington**
**Region 10**
**WAD980639462**

## Site Exposure Potential

The City of Seattle operated the Kent Highlands Landfill in Kent, Washington, 22 km south of Seattle, from June 1968 to December 1986 (Figure 1). The landfill accepted municipal wastes from Kent and Seattle, and may have accepted minor amounts of sand-blasting grit, some industrial sludges, and other industrial wastes. The landfill occupies 24 hectares of a 36-hectare site and consists of 80 percent waste and 20 percent cover soil. The landfill is in a ravine that slopes east toward the Green River. The elevation of the landfill varies from about 91 meters above mean sea level (MSL) near the western site boundary to about 12 meters above MSL near the river. Landfilling operations began on the western side of the site and proceeded eastward down the ravine, forming a steep slope toward the river (Parametrix 1987).

The start of landfilling operations in 1968 diverted a small tributary of the Green River (Parametrix 1987). The springs that feed the stream are still active and are intercepted by drains within the landfill. Most of the surface water runoff from the site is channeled to two ponds. Water from the ponds is either pumped into the city sewer or discharged into the Green River through a submerged pipe. A small, shallow stream, Midway Creek, flows through the landfill and discharges into the Green River 50 meters from the site (Parametrix 1987). The Green River flows into Duwamish River 8 km below the site, and the Duwamish River discharges into Elliott Bay, an embayment of Puget Sound, 26 km from the site.

Contaminant migration pathways to NOAA trust resources are surface water runoff, groundwater flow, and leachate seepage to the Green River.

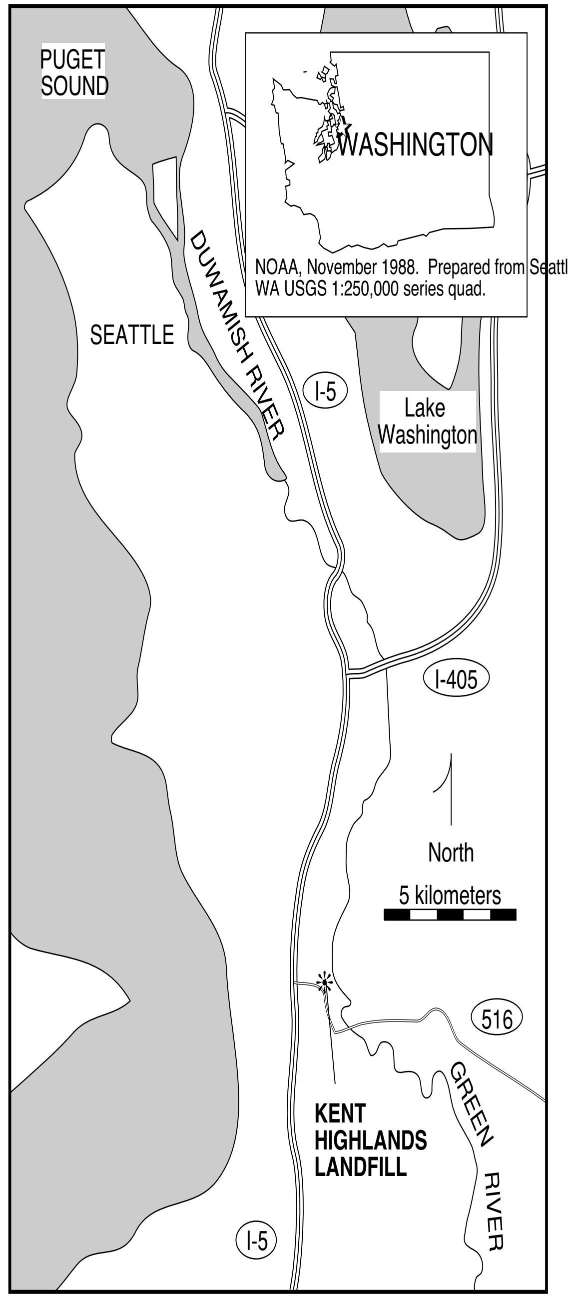


Figure 1. The Kent Highlands Landfill site in Kent, Washington.

**Site-Related Contamination**

The principal contaminants of concern at the site are trace metals, which have been detected in groundwater, seeps, and Midway Creek in concentrations exceeding AWQC for the protection of freshwater aquatic life (Table 1) (EPA 1986; Parametrix 1986, 1987). High levels of cadmium, copper, iron, nickel, and zinc have been observed in leachate from the landfill and high concentrations of copper, iron, and zinc have been observed in Midway Creek.

Table 1. Maximum concentrations of selected contaminants at the Kent Highlands site (Parametrix 1986, 1987); AWQC for the protection of freshwater aquatic life (EPA 1986); concentrations in µg/l.

| Contaminant | Ground-water | Leachate | Leachate Pond | Upper North Pond | South Pond | Midway Creek | Green River | AWQC Acute | AWQC Chronic |
|---|---|---|---|---|---|---|---|---|---|
| ORGANIC COMPOUNDS | | | | | | | | | |
| Volatile | | | | | | | | | |
| toluene | 140 | N/A | 45.6 | N/A | N/A | N/A | N/A | 17,500* | N/A |
| Semi-Volatile | | | | | | | | | |
| bis 2-ethyl hexyl phthalate | 1100 | N/A | ND | N/A | N/A | N/A | N/A | 940 | 3 |
| INORGANIC SUBSTANCES | | | | | | | | | |
| Trace metals | | | | | | | | | |
| arsenic | 38 | N/A | 33 | 8 | <5 | 9 | <5 | 360 | 190 |
| cadmium | <1 | 350 | <1 | <1 | <1 | <30 | <1 | 3.9† | 1.1† |
| chromium | <5 | <170 | 7 | <5 | <5 | <170 | <5 | 16 | 11 |
| copper | 74 | 700 | <5 | <5 | <5 | 190 | <5 | 18† | 12† |
| iron | 85,000 | 191,700 | 20,000 | 880 | 430 | 16,000 | 370 | N/A | 1,000 |
| lead | 31 | <500 | <5 | <5 | <5 | <500 | <5 | 82† | 3.2† |
| mercury | <0.2 | N/A | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | 2.4 | 0.012 |
| nickel | 23 | 6,060 | 33 | 11 | 10 | <300 | <5 | 1400† | 160† |
| zinc | 1,990 | 5,710 | 130 | 2 | 11 | 3,570 | 2 | 120† | 110† |

N/A: Not available; ND: Not detected; * LOEL; † Hardness-dependent (based on 100 mg/l $CaCO_3$)

## NOAA Trust Habitats and Species in Site Vicinity

The Green River is the only major trust habitat near the site. This river drains 1,034 km$^2$ and is characterized as a slow, continuously flowing, low-gradient river system with an unconsolidated bottom of sand, cobble, and gravel. The river, 20 to 30 meters wide and two to three meters deep near the site, is a coolwater, high-oxygen system with suitable habitat for salmonids. The banks are steep and heavily vegetated with grasses and shrubs.

The Green River supports significant runs of chinook, chum, and coho salmon; and searun steelhead, cutthroat, and Dolly Varden trout (Table 2) (Parametrix 1987). Most of the chinook salmon use the river during the fall (WDF 1975). Chinook spawning grounds are primarily above the site, but occasional spawning occurs near the landfill. Juvenile chinook rear in the entire length of the river, where they stay for three months before

Table 2. NOAA trust resource use of the Green River near the Kent Highlands Landfill (WDF 1975; Parametrix 1987).

| Species | Migration Route | Spawning Area | Nursery Area | Recreational Fishery |
|---|---|---|---|---|
| Chinook salmon | X | X | X | X |
| chum salmon | X | X | X | X |
| coho salmon | X | | X | X |
| cutthroat | | | X | X |
| Dolly Varden | | | X | X |
| steelhead | | | X | X |

migrating to Puget Sound. Chum salmon use the slow-flowing section of the Green River, including the stretch near the site, as spawning grounds. The chum spawning season lasts
from November to January and juveniles migrate soon after to the lower 10 to 13 km of the Duwamish River. Coho salmon use virtually all accessible streams and tributaries in the Green River watershed. The chinook and coho spawning season lasts from November through January; juveniles rear throughout the Green River for one year before migrating to Puget Sound.

Both juvenile chinook and coho salmon use the section of Midway Creek that flows on landfill property as nursery habitat. Neither species spawns in the creek because there is no suitable substrate (Arnold 1988).

**Response Category:** State Enforcement Lead

**Current Stage of Site Action:** A RI/FS is scheduled to be completed in April 1989.

**State Site Manager**

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**NOAA Coastal Resources Coordinator**

Lew Consiglieri 206-442-2101

**References**

Arnold, Gail, Environmental Scientist, Seattle City Light, Seattle, Washington, personal communication, 1988.

EPA. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-86-001.

Parametrix, Inc. 1986. Draft Environmental Impact Study, Technical Appendices. Seattle: U.S. Environmental Protection Agency, Region 10.

Parametrix, Inc. 1987. Remedial Investigation/Feasibility Study, Kent Highlands Landfill Closure Plan, Technical Appendix A. Seattle: U.S. Environmental Protection Agency, Region 10.

USGS. 1986. Water Resources Data - Washington. Water Year 1986. Washington, D.C.: U.S. Geological Survey.

WDF. 1975. Catalog of Washington Streams and Salmon Utilization, Volume 1. Olympia: Washington State Department of Fisheries.

**Northwest Transformer**
**Everson, Washington**
**Region 10**
**WAD027315621**

## Site Exposure Potential

From 1958 to 1987, Northwest Transformer reclaimed, stored, and manufactured transformers in a single building in a commercial/residential area of Everson, Whatcom County, Washington (Figure 1) (WDOE 1986). These transformers contained dielectric fluids contaminated with PCBs. Oil storage tanks and drums were also stored on the site.

The ground at the 0.2-hectare site slopes slightly toward the Nooksack River, 300 meters to the southwest. Spills in outdoor storage areas entered storm drains, while spills inside the facility entered the sanitary sewers. Presently, the storm water and sewage treatment systems discharge into the Nooksack River through separate outfalls located near the sewage treatment plant. Before July 5, 1988, the two systems were connected at the site and water from the site could flow through either outfall on the Nooksack River (Raider 1988). No other surface water runoff to the river has been identified near the site.

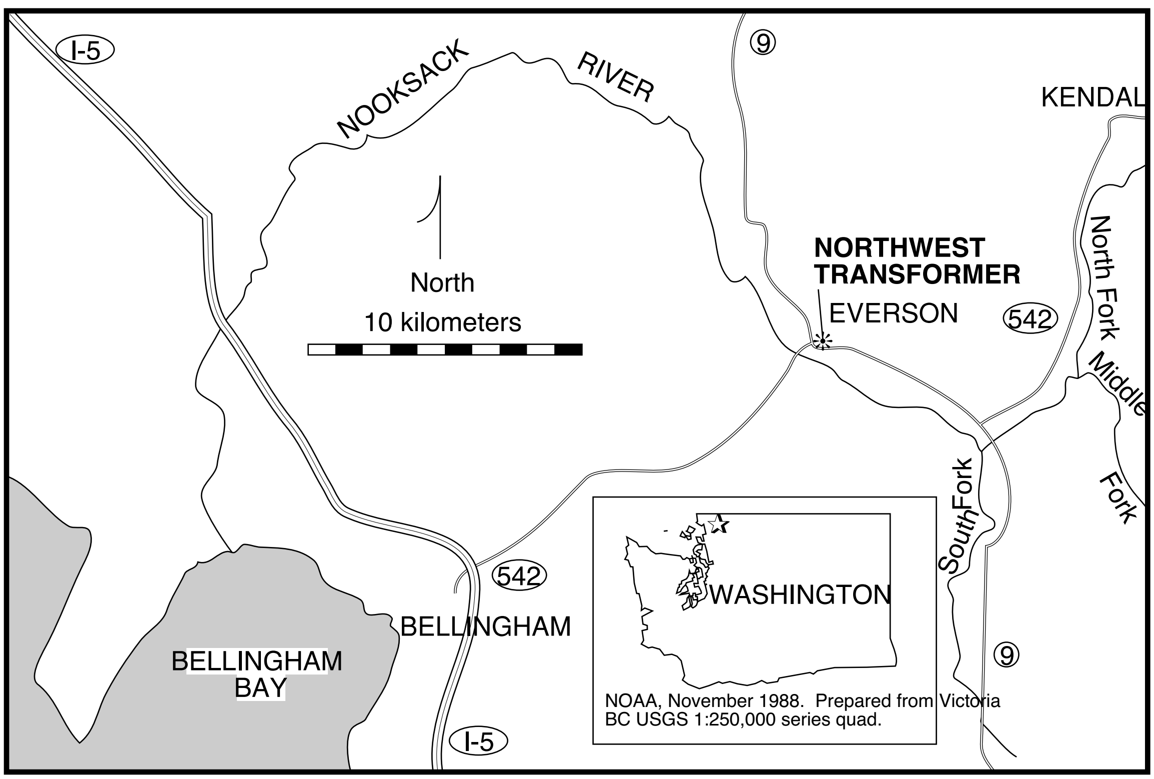


Figure 1. The Northwest Transformer site in Everson, Washington.

Two possible migratory pathways of contaminants to the Nooksack River are storm drains and the sanitary sewage system. Contaminants may also reach the river through the groundwater. The groundwater is six to 23 meters below the site and reportedly flows northeast, away from the Nooksack River (WDOE 1986). However, flow near the site has not been characterized.

**Site-Related Contamination**

The contaminants of concern at the Northwest Transformer site are PCBs from the transformer dielectric fluids. While little information is available regarding the volume of PCBs handled or disposal practices at the facility, it is known that PCB-contaminated oils were stored north of the building in an open area; PCB-contaminated oils were spilled both inside and outside of the building; and waste transformer oil was burned for space heating in a furnace at the facility (WDOE 1985). In 1981, EPA cited and fined the company for violations of record keeping, marking, storage, dating, and disposal requirements. Preliminary investigations found high levels of PCBs in sludge samples from drains at the facility and moderate levels in surface soils on the site. These investigations also detected PCBs in a sediment sample collected in one of the outfall pipes at the Nooksack River (Table 1) (WDOE 1986).

Table 1. PCB analyses conducted during preliminary investigations of the Northwest Transformer site (WDOE 1986); concentrations in µg/kg.

| PCB Type | Sediment Nooksack River Outfall* | Sludge Floor Drain | Soil Storage Area Concrete Pad | Soil Outdoor Storage Tank | Soil Alley Way Across Street |
|---|---|---|---|---|---|
| Aroclor 1254 | 40 | <1000 | <200 | <100 | 390 |
| Aroclor 1260 | 120 | 154000 | 19000 | 6700 | 130 |
| Total PCBs | 160 | 154000 | 19000 | 6700 | 520 |

* It is not certain whether this sample was collected at the storm water runoff outfall or the sewage treatment outfall

**NOAA Trust Habitats and Species in Site Vicinity**

The Nooksack River drains an area measuring 1,513 $km^2$ and flows west 35 km below the site before discharging into Bellingham Bay on Puget Sound. The river is a low-gradient system characterized by an unconsolidated bottom of sand, gravel, and cobble. The river is leeved at various locations along the river with the riparian zone consisting of willows, cottonwoods, and forbs.

The Nooksack River supports a number of NOAA trust species, including coho, chinook, chum, pink, and sockeye salmon (Beccasio et al. 1981; Ward 1988). Adult salmonids use the area near and below the site primarily as a migratory corridor and as nursery habitat. The primary spawning grounds for salmonids are upstream of the site in the north, south, and middle forks of the Nooksack River and in small tributary streams (Hendricks 1988). Large recreational and commercial tribal fisheries are present throughout the mainstem of the Nooksack River, including areas near the site (Table 2) (Ward 1988).

A Washington State Department of Fisheries hatchery and two tribal hatcheries (Nooksack and Lummi Tribes) are located on the North Fork of the Nooksack River near Kendall, Washington. From 1983 to 1986, over 15,000,000 juvenile salmon per year were stocked into the watershed above the site (Fuss 1988).

Table 2. Commercial and recreational fishery harvests on the mainstem Nooksack River from 1982 to 1986 (Ward 1988).

| | Chinook | | Chum | | Pink | | Coho | | Sockeye* | Jacks*† |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Comm. | Rec. | Comm. | Rec. | Comm. | Rec. | Comm. | Rec. | Comm. | Rec. |
| 1982 | 869 | 36 | 5,006 | 27 | 1 | 0 | 4,001 | 644 | 28 | 932 |
| 1983 | 1,106 | 58 | 3,854 | 30 | 81 | 3 | 4,102 | 831 | 1 | 1,322 |
| 1984 | 2,849 | 435 | 6,467 | 58 | 40 | 0 | 10,170 | 1,766 | 38 | 1,090 |
| 1985 | 1,559 | 159 | 5,240 | 68 | 458 | 98 | 9,122 | 1,482 | 37 | 593 |
| 1986 | 968 | 101 | 1,636 | 31 | 45 | 0 | 4,850 | 1,477 | 6 | 610 |

Comm.: Commercial Fishery
Rec.: Recreational Fishery
* Recreational catch of sockeye salmon and commercial catch of jacks not available
† Jacks are early -returning chinook or coho salmon that are smaller in size.

**Response Category:** Federal Enforcement Lead

**Current Stage of Site Action:** Initial RI/FS activities are scheduled to begin during the second quarter of FY89.

**EPA Site Manager**

| | |
|---|---|
| Sally Martyn | 206-442-2102 |

**NOAA Coastal Resource Coordinator**

| | |
|---|---|
| Lew Consiglieri | 206-442-2101 |

**References**

Beccasio, A.D., J.S. Isakson and A.E. Redfield, et al. 1981. Pacific coast ecological inventory: user's guide and information base. Slidell, Louisiana: Biological Services Program, U.S. Fish and Wildlife Service. FWS/OBS-81/30.

Fuss, Howard, fisheries biologist, Washington State Department of Fisheries, Olympia, personal communication, August 15, 1988.

Hendricks, Dave, Washington State Department of Fisheries, Olympia, personal communication, August 15, 1988.

Raider, H., Harper and Owes, Seattle, Washington, personal communication, July 6, 1988.

USGS. 1986. Water Resources Data Washington: Water Year 1986. Washington, D.C.: U.S. Geological Survey.

Ward, D., Washington State Department of Fisheries, Olympia, personal communication, August 18, 1988.

WDOE. 1985. Sample Collection Receipt, Northwest Transformer Site. Olympia, Washington: Washington State Department of Ecology.

WDOE. 1986. Site Inspection Report - The Northwest Transformer Site, Harkness Street, Everson, Washington. Olympia, Washington: Washington State Department of Ecology.