# PUBLIC HEALTH ASSESSMENT

AMERICAN CREOSOTE WORKS INC. (PENSACOLA)

PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CERCLIS NO. FLD008161994

Prepared by

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## SUMMARY

The American Creosote Works, Inc.,National Priorities List (NPL) site, is near Pensacola Bay in Pensacola, Florida. American Creosote operated a wood preserving business from 1902 until 1981. Soils, buried sludge, ground water, sediments, and air are contaminated with numerous of chemicals including; pentachlorophenol, polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzodioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), and benzene. Ground water contamination extends about 1,500 feet south of the site to within about 500 feet of Pensacola Bay. Approximately 1,000 people live in the neighborhood adjoining the site and all are on municipal water supply. The residents are concerned about health effects from past exposure to contaminants in ground water and ingestion of home grown vegetables. Florida Department of Health and Rehabilitation Service (HRS) epidemiologists found that the rates of cancer and birth defects near American Creosote are not unusual.

The site is fenced; however, site trespass continues to occur. Children trespassing on the site are likely to be exposed to pentachlorophenol, PAHs, and PCDDs/PCDFs in the soil via incidental ingestion and may suffer chloracne, liver damage, and an increased risk of cancer. Incidental ingestion of off-site soil by children may also increase their risk of chloracne and liver damage, but actual health effects depend on the frequency and duration of the exposure. Inhalation of benzene in the on-site air may increase the lifetime risk of cancer for children and other site trespassers.

Vegetables from gardens near the site are not contaminated from either being grown in contaminated soil or watered with contaminated ground water. It is unlikely that past exposures to contaminated ground water via lawn irrigation or car washing caused any health effects. Ingestion of contaminated fish and other aquatic life from Pensacola Bay near this site is a potential exposure pathway, but no samples have been tested.

This site is a public health hazard due to the risk of adverse health effects from long term exposure to hazardous chemicals in the air, soil, and ground water. The soil at this site should be remediated as soon as possible. Until soil remediation is complete, an adequate number of warning signs should be posted to prevent continued vandalism of the fence and site trespass. During soil remediation, effective dust control measures should be used to prevent off-site migration of contaminated dust and appropriate air monitoring should be conducted at the periphery of the site to ensure the safety of nearby residents. Contaminated ground water should not be used for potable purposes until it is remediated.

The Agency for Toxic Substances and Disease Registry (ATSDR), Health Activities Recommendation Panel reviewed this public health assessment and determined that community health education is needed. This determination is based on indications that long-term exposure to hazardous chemicals in the air, soil, and ground water is likely to have occurred and may currently be occurring. This site is also being considered for a disease- and symptom-prevalence study by the Division of Health Studies, ATSDR.

## BACKGROUND

### A. Site Description and History

The American Creosote site is located within the Pensacola city limits in Escambia County, one mile southwest of downtown Pensacola, Florida near the corner of Barrancas Avenue and "L" Street, (see map in Appendix A). This level, 18-acre tract is bounded on the north and west by an industrial/commercial area and on the south and east by a residential neighborhood. Pensacola Bay is about 2,000 feet south of the site.

American Creosote Works, Inc. (American Creosote) operated a wood preserving business at this site from 1902 to 1981. American Creosote used creosote to treat wood for use as telephone poles, railroad ties, fence posts, etc. After the 1950s, increasing amounts of technical grade pentachlorophenol were also used. Wood was treated under pressure in an air-tight cylinder using diesel fuel as a carrier solvent for the preservatives. American Creosote discharged the excess diesel fuel, creosote, and pentachlorophenol into two wastewater lagoons located in the southwest corner of the site. The soil under the entire site is porous sand which allowed rapid infiltration of the wastewater. About 14,000 gallons of wastewater were discharged to the lagoons (1) monthly. Before 1970, the lagoons often overflowed due to heavy rains or too much wastewater. Wastewater overflow from the lagoons flowed south to a drainage ditch and into Pensacola Bay near Bayou Chico. After 1970, when the lagoons were full, American Creosote pumped the wastewater to an "overflow" pond or other areas on the site and allowed it to soak into the ground.

In March 1980, while installing underground utilities south of the site, Escambia County employees discovered ground water contaminated with an "oily/asphaltic/creosote" substance. The U.S. Geological Survey (USGS) installed nine monitor wells and confirmed that the ground water was contaminated with creosote. Further investigations by the USGS and the EPA delineated the extent of the soil, sediment, and ground water contamination.

American Creosote closed in 1981 and filed for bankruptcy. The Environmental Protection Agency (EPA) has supervised site characterization and remediation since the site was added to the "Superfund" National Priorities List (NPL) in 1983. This same year, in an emergency action, EPA dewatered the wastewater lagoons; added lime and fly ash to the remaining sludge; and covered the resulting solids with a clay cap. EPA then conducted an initial Remedial Investigation/Feasibility Study (RI/FS) and signed a Record of Decision (ROD) in 1985, proposing to consolidate contaminated soil in an on-site landfill. The Florida Department of Environmental Regulation (DER) objected to the ROD since it did not address ground water contamination. In

1986, EPA removed the former structures at this site and fenced the western three quarters of the property. Also in 1986, the Agency for Toxic Substances and Disease Registry (ATSDR) prepared a health assessment for this site (2). After a "Post"-RI/FS and Risk Assessment, EPA signed a second ROD in 1989 for cleanup of on-site and off-site soils (Operable Unit I). The Florida Department of Health and Rehabilitative Services (HRS) has prepared this public health assessment for ATSDR in anticipation of a ROD (Operable Unit II) scheduled for release in the spring of 1992. This ROD will primarily address the cleanup of the ground water and solidified sludge.

After design studies are completed in the spring of 1992, EPA will clean the soils using bioremediation techniques (Operable Unit I). EPA is finalizing the Risk Assessment and Feasibility Study for the solidified sludge and ground water (Operable Unit II) and is expected to hold a public meeting in the fall of 1991 to discuss cleanup options. The property is currently in receivership. After remediation is complete, it is anticipated that the property will be sold and the proceeds applied toward the cleanup costs.

B. Site Visit

Chuck Pietrosewicz, ATSDR Regional Representative for Region IV, and Beverly Houston, of the Environmental Protection Agency, Region IV conducted a site visit on September 6, 1989. Community health concerns were expressed at a pubic meeting that evening (see Community Health Concerns section).

Randy Merchant, HRS, and Robert Merritt of the Escambia County Public Health Unit (CPHU) conducted a second site visit on April 19, 1991, from about 1:30 to 3:00 pm. They observed a six-foot chain link fence enclosing the western three-quarters of the site. There were numerous fence repairs which indicate past site access. Although the fence had recently been repaired, a new hole had already been cut at the time of this visit.

There are not enough warning signs posted at this site to discourage trespassers. Trespass across this site is a short-cut from the residential neighborhood south of the site to commercial areas north of the site. There were few warning signs at the site and those were not posted at the entrances to the site nor spaced to be visible from any approach. Chapter 403.704 and 403.7255, Florida Statutes, and Rule 17-736, Florida Administrative Code require warning signs be posted every 100 feet at all Superfund National Priority List sites and be visible from any approach.

Weeds and grasses cover the entire site. The clay cap over the former wastewater lagoons was intact and in most places, was covered with grass. Drums from previous remedial work were

locked inside a second fence. There were no obvious signs of contamination of the drainage ditch south of the site at the Pensacola Yacht Club.

Mr. Merritt and Mr. Merchant drove through the neighborhood surrounding the site. No vegetable gardens were noticed. Neither Merritt nor Merchant collected any environmental samples during this site visit.

Mr. Merchant reviewed the Escambia CPHU file on American Creosote and discussed the history of community health concerns with Mr. Merritt. Historically, residents have been concerned about health risks from consuming plants grown in contaminated soil or irrigated with contaminated ground water.

C. Demographics, Land Use, and Natural Resource Use

The American Creosote site is bordered on the south and east by a residential neighborhood and on the north and west by a commercial/industrial area. The nearest residences are about 100 feet from the site. In 1970, about 5,000 people lived within one mile of the site. About 1,000 lived in the 15-block residential neighborhood located south and east of the site (3). This neighborhood is predominately white, low to middle income. The population in this area has been fairly stable since the 1950s. Most residents in this area are between 45 and 65 years old and many have lived here for more than 40 years. Some had small vegetable gardens, but discontinued this practice in the mid-1980s. An eight-unit condominium was built near the southwest corner of the site in 1980. (see map in Appendix A)

Some of the residents south of the site used shallow wells for lawn and garden irrigation, car washing, etc. Those wells have not been used since the mid-1980s when ground water contamination was widely publicized. In February 1991, EPA plugged and abandoned the private well at the condominiums on "L" Street. Since the 1950s, Escambia County has supplied potable water in this area via buried water mains. The closest water supply well is located about 900 feet northeast of the site (hydrologically upgradient) at Peoples Ice Company. This well is sampled annually and the results are monitored by the Escambia CPHU.

The Pensacola Yacht Club is located about 1,500 feet south-southwest of the site where Bayou Chico joins Pensacola Bay. The yacht club property extends north from the bay to within 300 feet of the site. Access to the yacht club property is restricted by a fence. The gate to the yacht club property; however, is left open during the day and the drainage ditch outfall on the yacht club property is easily accessible from Sanders Beach by walking along the beach. A public park, Sanders Beach, is located on Pensacola Bay, about 1,400 feet south of the site and immediately east of the yacht club drainage ditch outfall. This park is used

for picnicking and fishing. The bridge over Bayou Chico, west of the yacht club, is also used for fishing.

The Florida Department of Environmental Regulation (DER) has classified the waters of Pensacola Bay near the site as Class III (recreation, propagation and maintenance of healthy, well balanced populations of fish and wildlife). The nearest Class II waters (usable for shellfish propagation or harvesting) in Pensacola Bay are located about four miles to the east.

Access to the site was not restricted between the time American Creosote closed in 1981 and in 1986 EPA erected a fence. No one lives on this site and except for sampling and remedial workers, no one has worked on this site since 1981. Exposure data and medical records for workers at this site are unavailable. There are no schools, day-care centers, nursing homes, or hospitals in the immediate vicinity of the site.

*D. State and Local Health Data*

HRS epidemiologists reviewed the state birth defect and cancer registry data bases for the 32501 zip code. This zip code includes the area around American Creosote and most of downtown Pensacola. In 1980, the population in this zip code was 19,266. The population in the residential neighborhood around the site (about 1,000 in 1970) makes up about 5% of the total population in this zip code (4). The birth defect data base was searched even though there have been no allegations or indication of elevated birth defect rates near this site. The birth defect data base covers birth defects reported from 1980 through 1982 and the cancer data base covers cancers reported from 1981 through 1987. The results of the review of the cancer and birth defects data are discussed in the Public health Implications, Health Outcome Data Evaluation section.

Since 1988, one complaint of contaminated stormwater runoff from the American Creosote site has been received by the Escambia CPHU. Results of this complaint investigation are discussed in the Public Health Implications, Health Outcome Data Evaluation section.

## COMMUNITY HEALTH CONCERNS

Members of the community around American Creosote expressed health concerns at EPA sponsored public meetings on August 15, 1985 (5) and September 6, 1989 (6). Health concerns were also expressed through a telephone/mail survey conducted by HRS in May 1991. A copy of this telephone/mail survey can be found in Appendix B. Residents around American Creosote are concerned about the following:

The community is concerned about the toxicity of creosote components and pentachlorophenol, and exposure leading to cases of skin and lung cancer and/or death in the surrounding neighborhood.

The community is concerned about exposure of humans to contaminated ground water where it discharges into Pensacola Bay at Sanders Beach.

The community is concerned that contaminated soil, blown by the wind or hauled to nearby homes, has contaminated home-grown produce.

The community is concerned that use of contaminated ground water for irrigation, car washing, etc. has resulted in exposure.

The community is concerned that children and other site trespassers are being exposed to hazardous chemicals.

## ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

The following chemicals or chemical groups were selected as representative of the distribution and toxicity of the hundreds of individual chemicals associated with this site.

Pentachlorophenol

Carcinogenic polycyclic aromatic hydrocarbons (PAHs)
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Dibenzo(a,h)anthracene
- Indeno(1,2,3-cd)pyrene

Polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDDs/PCDFs)

Benzene

Pentachlorophenol was selected since American Creosote used large quantities of this chemical. Carcinogenic (cancer causing) PAHs were selected due to their toxicity and their occurrence in creosote, which American Creosote also used in large quantities. PCDDs and PCDFs were selected due to their toxicity and their existence as impurities in technical grade preparations of pentachlorophenol. In addition, benzene was selected due to its toxicity and its detection in several on- and off-site wells. Mere selection of these chemicals or chemical groups, however,

does not imply that a human health threat exists at this site. The basis for the comparison values and the health implications of these chemicals will be discussed in the Public Health Implications section.

The toxicity equivalency factor (TEF) method was used to simplify the public health assessment of the complex mixture of the polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDDs and PCDFs) found at this site. This method relates the toxicity of the 210 structurally related PCDDs and PCDFs to the highly studied 2,3,7,8-tetrachlorodibenzo-p-dioxin. Concentrations of the PCDDs and PCDFs are expressed as "2,3,7,8-tetrachlorodibenzo-p-dioxin toxicity equivalence" (2,3,7,8-TCDD TEQ). When concentrations of PCDD and PCDF homologs and not individual PCDDs and PCDFs were identified by the laboratory, method "A" was used to estimate the toxicity equivalency factor. Method "A" is health protective, assuming that all of the PCDD and PCDF homologs are the more toxic 2,3,7,8-isomers (7).

Soil and ground water contamination both on and around this site has been adequately characterized by extensive sampling. Sampling of surface water and sediments in the Pensacola Yacht Club drainage ditch and Pensacola Bay near the drainage ditch have also been adequate to determine the extent of contamination in these media. Sampling of pecans and vegetables around this site has been adequate to demonstrate that plants have not accumulated contaminants from the soil. Food fish and other aquatic life in Pensacola Bay near this site have not been tested to determine if they have accumulated significant concentrations of contaminants. It may be difficult to link contaminated food fish or other contaminated aquatic life directly to American Creosote since this area is commercialized and there have been other sources of discharge to the Pensacola Bay. There is no record of worker exposure or air quality sampling during the time American Creosote was operational.

To identify facilities that could possibly contribute to the soil, air, and ground water contamination near the American Creosote site, the authors searched the 1987, 1988, and 1989 Toxic Chemical Release Inventory (TRI). TRI is developed by the U.S. Environmental Protection Agency (EPA) from the chemical release (air, water, soil) information provided by certain industries. TRI did not contain information on toxic chemical releases in the area surrounding American Creosote (32501, 32505, 32507 ZIP codes).

A. On-Site Contamination

The definition of "on site" in this public health assessment is the area within the property owned by American Creosote (see map in Appendix A). This is the same definition used in the EPA Remedial Investigation/Feasibility Studies.

Soils, solidified sludge, ground water, and air on this site are contaminated. PAHs are the contaminants at highest concentration at this site and are concentrated in the solidified sludge buried at the west end of the site.

Site Surface Soils

In 1988 and 1990, EPA collected surface soil samples (0 to 1 ft. below land surface) on site (8,9). Some of these soil samples were taken from the unfenced area on the east end of the site. Pentachlorophenol was found in 13 of 19 surface soil samples tested. The concentrations of pentachlorophenol were above the health-based comparison value in all 13 of those samples . A variety of polycyclic aromatic hydrocarbons (PAHs) were found in 18 out of 19 surface soil samples tested. In three of those samples, the concentrations of one PAH, benzo(a)pyrene, exceeded the health-based comparison value. Health-based comparison values for the other PAHs are not available. Benzene was found in one of the 19 surface soil samples tested. The concentration of benzene in this sample exceeded the health-based comparison value. The background soil sample collected two blocks north of the site was not contaminated.

A variety of polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDDs and PCDFs) were found in all 12 surface soil samples tested. In all 12 of these samples, the concentrations of PCDDs and PCDFs, expressed as equivalent concentrations of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD TEQ), exceeded the health-based comparison value. None of the surface soil samples contained the extremely toxic compounds 2,3,7,8-tetrachlorodibenzo-p-dioxin or 2,3,7,8-tetrachlorodibenzofuran.

On-Site Subsurface Soils

In 1988 and 1990, EPA collected 38 subsurface soil samples (1-6.5 feet below land surface) on site (8,9). Pentachlorophenol was found in eight of 19 subsurface soil samples tested. The concentrations of pentachlorophenol exceeded the health-based comparison value in those eight samples. A variety of PAHs were found in 12 of the 19 subsurface soil samples tested. The concentration of one PAH, benzo(a)pyrene, exceeded the health-based comparison value in one sample. Health-based comparison values for the other PAHs are not available.

A variety of PCDDs and PCDFs were found in all 10 subsurface soil samples tested. In five of those samples, the concentrations of PCDDs and PCDFs, expressed as equivalent concentrations of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD TEQ), exceeded the health-based comparison value. None of the subsurface soil samples contained the extremely toxic compounds 2,3,7,8-tetrachlorodibenzo-p-dioxin or 2,3,7,8-tetrachlorodibenzofuran. The concentration of benzene, found in one subsurface soil sample, did not exceed the health-based comparison value.

Table 1. Contaminant Concentrations in On-Site Surface Soil (0-1 ft. deep)

| Contaminants of Concern | Concentration (mg/kg) | Comparison Values (mg/kg) |
|---|---|---|
| Pentachlorophenol | nd - 110 | 0.15[a] |
| Benzo(a)anthracene | nd - 170 | na |
| Benzo(a)pyrene | nd - 23* | 7.5[b] |
| Benzo(b and/or k) fluoranthene | nd - 90 | na |
| Dibenzo(a,h)anthracene | nd - 12 | na |
| Indeno(1,2,3-cd)pyrene | nd - 46 | na |
| 2,3,7,8-TCDD TEQ | 0.0005 - 0.01 | 0.00005[c] |
| Benzene | nd - 0.005 | 0.003[d] |

Source : EPA 1989 and 1990 Remedial Investigations (8,9)
mg/kg - milligrams per kilogram
nd - not detected (detection limits not reported)
na - Health-based comparison values are not available.
* - Quality control indicates that the data are unusable and the compound may or may not be present. The value is that reported by the laboratory. Resampling and reanalysis is necessary for verification.
[a] - Based on 1991 ATSDR oral Minimal Risk Level of 0.002 mg/kg/day (intermediate exposure duration and an uncertainty factor of 1000), assuming a 15 kg child consumes 0.2 g of soil per day.
[b] - Based on 1991 ATSDR Minimal Risk Level of 0.1 mg/kg/day assuming a one- to six-year old, 15 kg child consumes 0.2 g of soil per day.
[c] - 1991 ATSDR, Preliminary Draft, Soil Environmental Media Evaluation Guide (EMEG) for child.
[d] - Based on the 1989 ATSDR $10^{-6}$ individual upper-bound estimate of cancer risk of 0.000036 mg/kg/day, assuming a 15 kg child consumes 0.2 g of soil per day.

On-Site Solidified Sludge

In 1988 and 1990, EPA collected 24 samples from the solidified sludge buried on site (8,9). The solidified sludge is located at the western end of the site and was created by an emergency dewatering of the wastewater lagoons in 1983. Pentachlorophenol was found in three of nine solidified sludge samples tested. The concentrations of pentachlorophenol exceeded the health-based comparison value in all three of those samples. A variety of PAHs were found in all nine solidified sludge samples tested.

health-based comparison value in eight of those samples. Health-based comparison values for the other PAHs are not available. In all five solidified sludge samples tested, the concentrations of PCDDs and PCDFs, expressed as equivalent concentrations of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD TEQ), exceeded the health-based comparison value. None of the solidified sludge samples contained the extremely toxic compounds 2,3,7,8-tetrachlorodibenzo-p-dioxin or 2,3,7,8-tetrachlorodibenzofuran. Benzene was found in four of the 11 solidified sludge samples tested. The concentrations of benzene exceeded the health-based comparison value in all four of those samples.

Table 2. Contaminant Concentrations in On-Site Subsurface Soil (1-6.5 feet deep)

| Contaminants of Concern | Concentration (mg/kg) | Comparison Values (mg/kg) |
|---|---|---|
| Pentachlorophenol | nd - 17 | 0.15[a] |
| Benzo(a)anthracene | nd - 300 | na |
| Benzo(a)pyrene | nd - 160* | 7.5[b] |
| Benzo(b and/or k) fluoranthene | nd - 240 | na |
| Dibenzo(a,h)anthracene | nd - 1.7 | na |
| Indeno(1,2,3-cd)pyrene | nd - 38 | na |
| 2,3,7,8-TCDD TEQ | 0.000001 - 0.016 | 0.00005[c] |
| Benzene | nd - 0.003 | 0.003[d] |

Source: EPA 1989 and 1990 Remedial Investigations (8,9)
mg/kg - milligrams per kilogram
nd - not detected (detection limits not reported)
na - Health-based comparison values are not available.
* - Quality control indicates that the data are unusable and the compound may or may not be present. The value is that reported by the laboratory. Resampling and reanalysis is necessary for verification.
[a] - Based on 1991 ATSDR oral Minimal Risk Level of 0.002 mg/kg/day (intermediate exposure duration and an uncertainty factor of 1000), assuming a 15 kg child consumes 0.2 g of soil per day.
[b] - Based on 1991 ATSDR Minimal Risk Level of 0.1 mg/kg/day assuming a one- to six-year old, 15 kg child consuming 0.2 g of soil per day.
[c] - 1991 ATSDR Soil Environmental Media Evaluation Guide (EMEG) for child.
[d] - Based on the 1989 ATSDR $10^{-6}$ individual upper-bound estimate of cancer risk of 0.000036 mg/kg/day, assuming a 15 kg child consumes 0.2 g of soil per day.

Table 3. Contaminant Concentrations in On-Site Solidified Sludge

| Contaminants of Concern | Concentration (mg/kg) | Comparison Values (mg/kg) |
|---|---|---|
| Pentachlorophenol | nd - 250 | 0.15[a] |
| Benzo(a)anthracene | nd - 130 | na |
| Benzo(a)pyrene | nd - 49 | 7.5[b] |
| Benzo(b and/or k) fluoranthene | nd - 63 | na |
| Dibenzo(a,h)anthracene | nd | na |
| Indeno(1,2,3-cd)pyrene | nd - 0.02 | na |
| 2,3,7,8-TCDD TEQ | 0.003 - 0.051 | 0.00005[c] |
| Benzene | nd - 5.2 | 0.003[d] |

Source: EPA 1989 and 1990 Remedial Investigations (8,9)
mg/kg - milligrams per kilogram
nd - not detected (detection limits not reported)
na - Health-based comparison values are not available.

[a] - Based on 1991 ATSDR oral Minimal Risk Level of 0.002 mg/kg/day (intermediate exposure duration and an uncertainty factor of 1000), assuming a 15 kg child consumes 0.2 g of soil per day.

[b] - Based on 1991 ATSDR Minimal Risk Level of 0.1 mg/kg/day assuming a one- to six-year old, 15 kg child consuming 0.2 g of soil per day.

[c] - 1991 ATSDR Soil Environmental Media Evaluation Guide (EMEG) for child.

[d] - Based on the 1989 ATSDR $10^{-6}$ individual upper-bound estimate of cancer risk of 0.000036 mg/kg/day, assuming a 15 kg child consumes 0.2 g of soil per day.

On-Site Ground Water

In 1990, EPA collected ground water samples from five wells located in the southwest corner of the site (8). Those wells were located 10 feet south (hydraulically downgradient) of the former wastewater lagoons (now solidified sludge). The screened intervals for these wells ranged from 17 to 98 feet below land surface. Ground water contamination in this area is concentrated at from 40 to 60 feet below land surface.

Pentachlorophenol was found in two of the five wells. In both wells, the concentrations of pentachlorophenol exceeded the health-based comparison value. A variety of PAHs were found in all five of the wells tested. In two of those wells, the concentrations of two PAHs, benzo(a)anthracene and benzo(b and/or k)fluoranthene, exceeded the health-based comparison values. On-site ground water was not tested for PCDDs and PCDFs. Benzene was found in three of the four wells tested. In those three wells, the concentrations of benzene exceeded the health-based comparison value. Except for very low levels of phenol (0.002 mg/L), the two upgradient, background wells were free from contamination.

Table 4. Contaminant Concentrations in On-Site Ground Water

| Contaminants of Concern | Concentration (mg/L) | Comparison Values (mg/L) |
|---|---|---|
| Pentachlorophenol | nd - 3.9 | 0.001[a] |
| Benzo(a)anthracene | nd - 120 | 0.0002[b] |
| Benzo(a)pyrene | nd | --- |
| Benzo(b and/or k) fluoranthene | nd - 98 | 0.0002[b] |
| Dibenzo(a,h)anthracene | nd | --- |
| Indeno(1,2,3-cd)pyrene | nd | --- |
| 2,3,7,8-TCDD TEQ | not tested | --- |
| Benzene | nd - 0.1 | 0.001[c] |

Source: EPA 1990 Remedial Investigation (8)
mg/L - milligrams per Liter
nd - not detected (detection limits not reported)
[a] - 1991 EPA Maximum Contaminant Level for drinking water.
[b] - EPA Proposed Maximum Contaminant Level for drinking water.
[c] - Florida Primary Drinking Water Standard: Rule 17-550.310, Florida Administrative Code.

On-Site Air

There is no record of air quality sampling during the time American Creosote was operational. EPA collected five air samples on site in 1982 and 1983 (3). Those air samples were not tested for pentachlorophenol or PAHs. Concentrations of PCDDs and PCDFs were below detection limits. Concentrations of benzene in all five samples exceeded the health-based comparison value.

Table 5. Contaminant Concentrations in On-Site Air

| Contaminants of Concern | Concentration ($\mu g/m^3$) | Comparison Values ($\mu g/m^3$) |
|---|---|---|
| Pentachlorophenol | not tested | --- |
| Benzo(a)anthracene | not tested | --- |
| Benzo(a)pyrene | not tested | --- |
| Benzo(b and/or k) fluoranthene | not tested | --- |
| Dibenzo(a,h)anthracene | not tested | --- |
| Indeno(1,2,3-cd)pyrene | not tested | --- |
| 2,3,7,8-TCDD TEQ | nd | --- |
| Benzene | 0.26 - 22 | 0.12[a] |

Source: EPA 1985 Remedial Investigation (3)
$\mu g/m^3$ - micrograms per cubic meter
nd - not detected (detection limits not reported)
[a] - Based on the September 1990 EPA Health Effects Assessment Summary Tables (HEAST). The $10^{-6}$ additional lifetime cancer risk was calculated from a inhalation unit risk (slope factor) of 0.029 mg/kg/day assuming a 70 kg adult inhales 20 $m^3$ of air per day.

B. Off-Site Contamination

The definition of "off site" in this public health assessment is the area outside the property owned by American Creosote (see map in Appendix A). This is the same definition used in the EPA Remedial Investigation/Feasibility Studies.

Off-site surface soils, ground water, and sediments are contaminated due to migration of contaminants from American Creosote. Food fish and other aquatic animals in Pensacola Bay have not been tested. Off-site soils and sediments are contaminated with PAHs and dibenzodioxins/dibenzofurans. Off-site ground water taken from monitoring and irrigation wells is contaminated with PAHs and benzene.

The soils with the highest concentrations of contaminants are located south and west of the southwest corner of the site (8,9). Contamination of off-site surface soils is likely due to stormwater overflows from the former wastewater lagoons. Transport of soils from the site for gardening has also contributed to off-site soil contamination.

Contaminated ground water is migrating south toward Pensacola Bay from the former wastewater lagoons. Contaminated ground water is not discharging directly into Pensacola Bay, but discharges into the drainage ditch which empties into the Bay. Contamination of surface water in the Pensacola Yacht Club drainage ditch and Pensacola Bay; however, is minimal due to dilution and tidal mixing. The sediments in this drainage ditch and Pensacola Bay

near the ditch outfall; however, are contaminated. This contamination is likely the result of past wastewater lagoon overflows and/or ground water discharge.

In 1985, Florida HRS and EPA tested seven plant samples (pecans, greens, and peppers) from six residential gardens near the site and found them to be free of contamination (11,12). Those pecan trees and gardens were located south and west of the site and were representative of plants grown in the area. The closest garden was at the north end of "K" Street, about 100 feet south of the site and the former wastewater lagoons. The most distant was between "G" and "H" Streets, about 500 feet south of the site. All of those gardens or pecan trees were in the path of ground water flow from the site and three were located within the area of contaminated ground water.

Off-Site Surface Soils

In 1988 and 1990, EPA collected 31 off-site composite surface soil samples (0 to 1 ft. below land surface) (8,9). These samples were from the grounds of the Pensacola Yacht Club and from residential yards south and west of the site. The soils south and west of the southwest corner of the site had the highest concentrations of contaminants. Pentachlorophenol was found in one sample. The concentration of pentachlorophenol in this sample exceeded the health-based comparison value. A variety of PAHs were found in 15 out of 31 off-site surface soil samples. The concentration of one PAH, benzo(a)pyrene, did not exceed the health-based comparison value. Health-based comparison values for the other PAHs are not available. A variety of PCDDs and PCDFs were found in eight of nine surface soil samples tested. In one sample, the concentrations of PCDDs and PCDFs, expressed as an equivalent concentration of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD TEQ), exceeded the health-based comparison value. None of these surface soil samples collected off site contained the extremely toxic compounds 2,3,7,8-tetrachlorodibenzo-p-dioxin or 2,3,7,8-tetrachlorodibenzofuran. Benzene was not found in any of the off-site surface soils sampled. Concentrations of site related chemicals in the background soil sample, collected two blocks north of the site, were below detection limits.

Table 6. Contaminant Concentrations in Off-Site Surface Soils (0-1 ft. deep)

| Contaminants of Concern | Concentration (mg/kg) | Comparison Values (mg/kg) |
|---|---|---|
| Pentachlorophenol | nd - 0.54 | 0.15[a] |
| Benzo(a)anthracene | nd - 6.2 | na |
| Benzo(a)pyrene | nd - 1.8 | 7.5[b] |
| Benzo(b and/or k) fluoranthene | nd - 11 | na |
| Dibenzo(a,h)anthracene | nd - 4.7 | na |
| Indeno(1,2,3-cd)pyrene | nd - 9.2 | na |
| 2,3,7,8-TCDD TEQ | nd - 0.001 | 0.00005[c] |
| Benzene | nd | --- |

Source: EPA 1989 and 1990 Remedial Investigations (8,9)
mg/kg - milligrams per kilogram
nd - not detected (detection limits not reported)
na - Health-based comparison values are not available.
[a] - Based on 1991 ATSDR oral Minimal Risk Level of 0.002 mg/kg/day (intermediate exposure duration and an uncertainty factor of 1000), assuming a 15 kg child consumes 0.2 g of soil per day.
[b] - Based on 1991 ATSDR Minimal Risk Level of 0.1 mg/kg/day assuming a 1 to 6 year old, 15 kg child consuming 0.2 g of soil per day.
[c] - 1991 ATSDR Soil Environmental Media Evaluation Guide (EMEG) for child.

Off-Site Ground Water

Contaminated ground water has migrated off site, south toward Pensacola Bay. In the early 1980s, the U.S. Geological Survey (USGS) investigated this site and found contaminated ground water in monitoring wells located from near the former wastewater lagoons to about 1,200 feet south of the site. The contaminated ground water extended to about 110 feet below land surface (10). In 1988 and 1989, EPA collected ground water samples from 28 additional monitoring wells south of the site (8,9). The extent of the ground water contaminated was inferred from these monitoring wells. There are no potable wells in the area; however, one residential irrigation well located about 200 feet south of the former waste water lagoons was contaminated.

Pentachlorophenol was found in only one out of 28 off-site wells tested. The concentration of pentachlorophenol in this well, a residential irrigation well no longer in use, exceeded the health- based comparison value. A variety of PAHs were found in

14 of the 26 off-site monitoring and in both off-site irrigation wells tested. In 1 of the off-site monitoring wells, the concentration of one PAH, benzo(a)anthracene, exceeded the health-based comparison value. Off-site ground water was not tested for PCDDs or PCDFs. Benzene was found in 16 of the 29 off-site wells. In 15 of these wells, the concentration of benzene exceeded the health-based comparison value. The comparison values for pentachlorophenol and benzene assume use of the water for drinking. Except for very low levels of phenol (0.002 mg/L), the two upgradient, background monitoring wells were free from contamination.

Table 7. Contaminant Concentrations in Off-Site Ground Water

| Contaminants of Concern | Concentration (mg/L) | Comparison Values (mg/L) |
|---|---|---|
| Pentachlorophenol | nd - 0.18 | 0.001[a] |
| Benzo(a)anthracene | nd - 0.034 | 0.0002[b] |
| Benzo(a)pyrene | nd | --- |
| Benzo(b and/or k) fluoranthene | nd | --- |
| Dibenzo(a,h)anthracene | nd | --- |
| Indeno(1,2,3-cd)pyrene | nd | --- |
| 2,3,7,8-TCDD TEQ | not tested | --- |
| Benzene | nd - 0.12 | 0.001[c] |

Source: EPA 1989 and 1990 Remedial Investigations (8,9)
mg/L - milligrams per Liter
nd - not detected (detection limits not reported)
[a] - 1991 EPA Maximum Contaminant Level for drinking water.
[b] - EPA Proposed Maximum Contaminant Level for drinking water.
[c] - Florida Primary Drinking Water Standard: Rule 17-550.310, Florida Administrative Code.

Off-Site Surface Water

In 1988, EPA collected five surface water samples downgradient from the site (8). Three samples were taken from the Pensacola Yacht Club drainage ditch and two were taken from Pensacola Bay near the drainage ditch. Pentachlorophenol and PAHs were not found. Samples were not tested for PCDDs or PCDFs. Benzene was found in one sample, but at a concentration that did not exceed the comparison value. Since surface waters do not exist upgradient from this site, there are no background samples for comparison.

Table 8. Contaminant Concentrations in Off-Site Surface Water

| Contaminants of Concern | Concentration (mg/L) | Comparison Values (mg/L) |
|---|---|---|
| Pentachlorophenol | nd | --- |
| Benzo(a)anthracene | nd | --- |
| Benzo(a)pyrene | nd | --- |
| Benzo(b and/or k) fluoranthene | nd | --- |
| Dibenzo(a,h)anthracene | nd | --- |
| Indeno(1,2,3-cd)pyrene | nd | --- |
| 2,3,7,8-TCDD TEQ | not tested | --- |
| Benzene | nd - 0.0008 | 0.071[a] |

Source: EPA 1988 Remedial Investigation (8)
mg/L - milligrams per Liter
nd - not detected (detection limits not reported)
[a] - Florida Class III surface water standard, Rule 17-302.530, Florida Administrative Code. Florida Class III surface water standards are designed to protect surface waters for recreation, propagation and management of fish and wildlife.

Off-Site Sediments

1. Drainage Ditch - In 1988, EPA collected three sediment grab samples (0-3" in depth) from the Pensacola Yacht Club drainage ditch (8). Although this drainage ditch is not directly connected to American Creosote, it receives stormwater runoff from the site. It is likely that this drainage ditch also receives contaminated ground water discharge. Pentachlorophenol was not found in any of the samples from this drainage ditch. PAHs were found in all three samples. Health-based comparison

   values for these PAHs are not available. One sediment sample was tested for PCDDs and PCDFs, but none were found. Benzene was not found in any of those sediment samples. There are no surface water bodies, and thus no sediments upgradient from this site for comparison.

2. Pensacola Bay - In 1988 and 1990 EPA collected 11 sediment grab samples (0-1 ft. in depth) from Pensacola Bay near the drainage ditch (8,9). Pensacola Bay ultimately receives all of the surface water and ground water discharge from this site. Pentachlorophenol was not found in any of the sediment samples. A variety of PAHs were found in five of the 11 samples. Health-based comparison values for these PAHs are not available. Samples were not tested for PCDDs or PCDFs. Benzene was not found in any of the sediment samples. American Creosote may not be the only source of sediment contamination in Pensacola Bay; however, since this area is commercialized and there have been other discharges.

Table 9. Contaminant Concentrations in Off-Site Sediments (0-1 ft. deep)

| Contaminants of Concern | Concentration (mg/kg) | Comparison Values (mg/kg) |
|---|---|---|
| Pentachlorophenol | nd | --- |
| Benzo(a)anthracene | nd - 12 | na |
| Benzo(a)pyrene | nd - 17 | na |
| Benzo(b and/or k) fluoranthene | nd - 23 | na |
| Dibenzo(a,h)anthracene | nd - 2.4 | na |
| Indeno(1,2,3-cd)pyrene | nd - 8 | na |
| 2,3,7,8-TCDD TEQ | not tested | --- |
| Benzene | nd | --- |

Source: EPA 1988 and 1990 Remedial Investigation (8,9)
mg/kg - milligrams per kilogram
nd - not detected (detection limits not reported)
na - Health-based comparison values are not available.

Off-Site Biota

In 1985, the Florida HRS Toxicology Laboratory tested pecans from a pecan tree in the neighborhood south of the site for pentachlorophenol, PAHs, 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) and benzene. None of those chemicals were found (11). Also in 1985, EPA collected plant samples (pecans, greens, and peppers) from six residential gardens in this neighborhood and tested for PAHs. No PAHs were found (12). No food fish or other aquatic organisms (shell fish, crabs, etc.) from Pensacola Bay have been tested.

Table 10. Contaminant Concentrations in Off-Site Biota (pecans, greens, and peppers)

| Contaminants of Concern | Concentration (mg/kg) | Comparison Values (mg/kg) |
|---|---|---|
| Pentachlorophenol | nd | --- |
| Benzo(a)anthracene | nd | --- |
| Benzo(a)pyrene | nd | --- |
| Benzo(b and/or k) fluoranthene | nd | --- |
| Dibenzo(a,h)anthracene | nd | --- |
| Indeno(1,2,3-cd)pyrene | nd | --- |
| 2,3,7,8-TCDD TEQ | nd | --- |
| Benzene | nd | --- |

Source: 1985 letter from R.L. DuBose to K. Kelson (11) and EPA Site Investigation Report (12).
mg/kg - milligrams per kilogram
nd - not detected (detection limits not reported)

C. Quality Assurance and Quality Control

In preparing this public health assessment, Florida HRS and ATSDR relied on the information provided in the referenced documents and assumed that adequate quality assurance and quality control measures were followed regarding to chain-of-custody, laboratory procedures, and data reporting. The validity of the analysis and conclusions drawn for this public health assessment is determined by the completeness and reliability of the referenced information. The data on which this public health assessment is based are assumed to be reliable since the samples were collected and tested directly by the EPA and the USGS or their contractors. EPA has not prepared a formal Data Review Summary for this site.

D. Physical and Other Hazards

No physical hazards were observed during the site visits. All structures at this site have been removed. EPA has locked drums from a previous remedial action inside a second fence.

## PATHWAYS ANALYSES

As discussed in the Site Description and History Subsection, past wastewater disposal at this site has caused air, soil and ground water contamination. Movement of contaminants has resulted in off-site contamination of soil, ground water, and sediments south and west of the site. The environmental and human exposure pathways associated with the site are discussed in the following subsections.

A. Environmental Pathways (Fate and Transport)

Air

Testing has shown that the air at this site is an environmental pathway for the movement of volatile contaminants, such as benzene. Although wind-blown dust has not been tested, during periods of low rainfall it is likely that contaminated dust was also a pathway for the movement of non-volatile contaminants. The spread of contaminants via wind blow dust, however, is likely to be small compared with the transport via stormwater runoff. Currently, vegetation on the site limits the spread of contaminated dust.

Soil remediation plans call for excavation, sorting, and stockpiling of the contaminated soil before on-site bioremediation (6). If dust suppression techniques are not used, these operations are likely to create a large amount of contaminated dust, especially during periods of low rainfall.

Soil

The main source of soil contamination at this site was pentachlorophenol and creosote disposed of in two on-site wastewater lagoons. In addition, American Creosote's practice of diverting wastewater to other areas when the lagoons were full resulted in low levels of soil contamination throughout the site.

Most of off-site soil contamination was caused by overflows from the former wastewater lagoons. Wind and stormwater erosion has also contributed to contamination of off-site soils. Due to the influence of nearby Pensacola Bay, the predominate winds are from the south during the day (sea breeze) and from the north at night (land breeze). Some residents near the site report transporting soil from the site for use in their vegetable gardens.

Surface Water

The Pensacola Yacht Club drainage ditch and Pensacola Bay receive surface runoff from the site. In addition, the Pensacola Yacht Club drainage ditch receives contaminated ground water discharge. The concentrations of contaminants in these two surface water bodies are low due to tidal mixing and dilution.

Sediments

Past overflows from the wastewater lagoons spread contaminants to sediments south along a drainage path. Sediments in the Pensacola Yacht Club drainage ditch and Pensacola Bay near the drainage ditch are contaminated. American Creosote may not be the only source of sediment contamination in Pensacola Bay, however, since this area is commercialized and there have been other discharges.

Ground Water

The former wastewater lagoons are the main source of ground water contamination. The more water soluble chemicals (pentachlorophenol, benzene, etc.) in the wastewater moved through the porous sands of the lagoons to the shallow ground water below. Natural ground water flow has spread contamination south toward Pensacola Bay. A 20-foot thick clay layer south of the former wastewater lagoons divides the contaminated ground water into an upper and lower portion. Contamination in the upper portion (0 - 50 feet deep) has moved about 1,000 feet south of the site, halfway to Pensacola Bay. Microbial degradation and discharge into the drainage ditch has slowed migration of the contaminated ground water in the upper portion. Contaminated ground water in the lower portion (70 - 120 feet deep) has moved about 1,500 feet south of the site, to a point within 500 feet of Pensacola Bay (10).

In the past, residents in the neighborhood south of the site used private wells (< 120 feet deep) as a source of water for lawn irrigation, car washing, etc. Most of those wells were abandoned in the mid-1980s. The nearest potable well is located about 900 feet northeast (hydraulically upgradient) of the site. It is not contaminated and is sampled annually to insure its continued safety.

Biota

Some residents of the neighborhood south of the site had vegetable gardens and pecan trees. Testing has shown that these plants have not accumulated contaminants from the soil. Although fishing occurs in Pensacola Bay near this site, no fish or other aquatic life have been tested. Therefore, it is not known if fish, crabs, etc., near this site are contaminated.

B. Human Exposure Pathways

Skin Absorption

It is likely that workers at American Creosote were exposed to pentachlorophenol or creosote liquids via skin contact with contaminated wastewater or contaminated soil. There are no data; however, to document this exposure.

Use of contaminated ground water from off-site irrigation wells for lawn irrigation, car washing, etc., is not likely to have resulted in significant exposures through skin absorption. Those activities were too infrequent and too short in duration to result in significant absorption. Dermal contact with on-site subsurface soils or off-site sediments in the Pensacola Yacht Club drainage ditch or Pensacola Bay is unlikely.

Ingestion

Currently, incidental ingestion of on- and off-site surface soils is a potential exposure pathway. Recurring vandalism of the fence around the site allows for frequent trespass. Children, ages one to six, playing on this site are likely to ingest about 0.2 kg of soil per day. The average weight for children in this age group is 15 kg (13).

Ingestion of contaminated ground water is unlikely since wells in contaminated areas south and west of the site have never been used for drinking water. Although contaminated ground water was used to irrigate home vegetable gardens, plants were not contaminated.

Ingestion of contaminated fish or other aquatic animals from Pensacola Bay is a potential exposure pathway. Pensacola Bay at Sanders Beach and the Bayou Chico bridge have been used for fishing, but the extent of fish contamination or the amount of fish consumed is unknown.

Inhalation

It is likely that workers at American Creosote were exposed to pentachlorophenol or creosote via inhalation of vapors; however, there are no data to document this exposure. Inhalation of contaminants from the site may have been a significant route of exposure for nearby residents before 1981. Inhalation of vapors and gases, such as benzene, from the site is a potential exposure pathway. Currently, inhalation of contaminated dust is unlikely

since the site is vegetated. Future site remediation has the potential to release volatile contaminants and suspend contaminated dust in the air, thus increasing the exposure of nearby residents to PAHs, PCDDs/PCDFs, and benzene.

| PATHWAY NUMBER | EXPOSURE PATHWAY ELEMENTS | | | | | TIME |
|---|---|---|---|---|---|---|
| | SOURCE | ENVIRON-MENTAL MEDIA | POINT OF EXPOSURE | ROUTE OF EXPOSURE | EXPOSED POPULATION | |
| 1. | waste-water disposal | surface soil (dust) | on site | inhalation | workers | 1902-1981 |
| 2. | waste-water disposal | surface soil | on site | skin | workers | 1902-1981 |
| 3. | waste-water disposal | air | on site | inhalation | children, trespassers | 1981-present |
| 5. | waste-water disposal | surface soil | on site | ingestion | children | 1981-present |
| 6. | waste-water disposal | water, sediments | fish in Pensacola Bay | ingestion | local fish eaters | 1902-present |

## PUBLIC HEALTH IMPLICATIONS

As discussed in the Environmental Contamination and Other Hazards and Pathways Analyses Sections, workers may have been exposed to site contaminants via inhalation and skin absorption. Children and other trespassers on this site are likely to be exposed to site contaminants via incidental ingestion and inhalation. Although no testing has been done, ingestion of fish caught in Pensacola Bay near this site may also be a source of exposure.

### A. Toxicological Implications

#### Pentachlorophenol

Pentachlorophenol can cause damage to the liver and kidneys. The central nervous system and the immune system also appear to be affected by pentachlorophenol exposure, generally as a result of hyperthermia induced by the uncoupling of oxidative phosphorylation (central nervous system), or due to the presence of impurities such as polychlorinated dibenzo-p-dioxins (immune system effects). Humans are generally exposed to technical grade pentachlorophenol which usually contains such toxic impurities as polychlorinated dibenzo-p-dioxins and dibenzofurans (14). EPA has also classified pentachlorophenol as a Class B2 carcinogen (probable human carcinogen) (15).

The most likely human exposure pathway to pentachlorophenol from this site is incidental ingestion of surface soil by children. The health-based comparison value of 0.15 mg/kg for ingestion of pentachlorophenol in soil (Tables 1,2,3, and 6) was calculated from the 1991 ATSDR oral Minimal Risk Level of 0.002 mg/kg/day, assuming a 15 kg child consumes 0.2 g of soil per day. The 1991 ATSDR oral Minimal Risk Level of 0.002 mg/kg/day is based on liver effects, intermediate exposure duration, and an uncertainty factor of 1000 (16).

The on-site surface soil with the highest concentration of pentachlorophenol (110 mg/kg) is about 1,000 times greater than this health-based comparison value. In a worst case, a child who played on this site every day for the past 10 years and was exposed via incidental ingestion to 0.2 g/day of soil with the highest pentachlorophenol concentration, would likely suffer liver damage. Also kidney, central nervous system, and immune system damage would be possible. Actual health effects would depend on the frequency and duration of contaminated soil ingestion.

The highest concentration of pentachlorophenol in off-site surface soils (0.54 mg/kg) is about 4 times the health-based comparison value of 0.15 mg/kg. Children playing in the off-site soil may suffer health effects (liver damage, etc) from incidental ingestion of pentachlorophenol in the soil depending on the frequency and duration of their exposure.

The risk of cancer for children from incidental ingestion of 0.2 g/day of on-site soil with the highest concentration of pentachlorophenol is low. The risk of cancer for children from incidental ingestion of off-site soil with the highest concentration of pentachlorophenol is insignificant.

On- and off-site ground water is neither suitable nor used for human consumption. Concentration of pentachlorophenol in both on- and off-site ground water exceed the EPA drinking water Maximum Contaminant Level (MCL). EPA established the MCL of 0.001 mg/L for pentachlorophenol based on a cancer slope factor of 0.12 per mg/kg/day (15). Consumption of 2 L/day of water with 0.001 mg/L of pentachlorophenol by a 70 kg adult would result in an upper bound cancer risk of three in a million. Ingestion of the on-site ground water for 70 years would result in a moderate increased risk of cancer, while ingestion of the off-site ground water for 70 years would result in a low increased risk of cancer.

Polycyclic Aromatic Hydrocarbons (PAHs)

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene are PAHs that have caused cancer in laboratory animals through ingestion, skin contact, and inhalation. Long-term ingestion of PAHs in food has resulted in adverse effects on the liver and blood in mice. Reports in humans show that individuals exposed by inhalation or skin contact to mixtures of PAHs and other compounds for long periods, may also develop cancer. Reproductive effects have occurred in animals that were fed

certain PAHs. These effects may also occur in humans, but there is no evidence to prove this. These PAHs as a group cause skin disorders, however, specific effects of individual PAHs, except for benzo(a)pyrene have not been reported (17).

The most likely human exposure pathway to PAHs from this site is incidental ingestion of surface soil by children. The health-based comparison value of 7.5 mg/kg for ingestion of benzo(a)pyrene in soil (Tables 1,2,3, and 6) was calculated from the 1991 ATSDR oral Minimal Risk Level of 0.1 mg/kg/day, assuming a 15 kg child consumes 0.2 g of soil per day. The 1991 ATSDR oral Minimal Risk Level of 0.1 mg/kg/day for benzo(a)pyrene is based on developmental effects, acute exposure duration, and an uncertainty factor of 100 (18). Health-based comparison values for the other PAHs are not available.

The on-site surface soil with the highest concentration of benzo(a)pyrene (23 mg/kg) is about three times greater than this health-based comparison value. Children who play on this site daily and are exposed via incidental ingestion to 0.2 g/day of soil with the highest benzo(a)pyrene concentration, may suffer developmental effects. Actual health effects will depend on the frequency and duration of children playing on this site and ingesting the contaminated soil. The concentrations of benzo(a)pyrene in off-site surface soils are below the health-based comparison value.

On- and off-site ground water is neither suitable nor used for human consumption. Concentration of benzo(a)anthracene and benzo(b and/or k)fluoranthene in on-site ground water, and concentrations of benzo(a)anthracene in off-site ground water, exceed the proposed EPA Maximum Contaminant Level (MCL). EPA proposed a MCL of 0.0002 mg/L for benzo(a)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene based on the occurrence of these PAHs with benzo(a)pyrene (19). Benzo(a)pyrene has been shown to be carcinogenic in a number of animal studies.

Although no testing has been done, ingestion of fish and other aquatic organisms (oysters, crabs, etc.) caught in Pensacola Bay near this site may also be a source of exposure to PAHs. PAHs can accumulate in aquatic organisms from water, sediments, and food. Bioconcentration factors of PAHs in fish and crustaceans have frequently been reported to be in the range of 100 to 2,000 (17).

Polychlorinated dibenzodioxins and
polychlorinated dibenzofurans (PCDDs and PCDFs)

In humans, 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) causes chloracne, a severe skin lesion that usually occurs on the head and upper body. Unlike common acne, chloracne is more disfiguring and often lasts for years after the initial exposure. There is suggestive evidence that 2,3,7,8-TCDD causes liver damage in humans, as indicated by an increase in levels of certain enzymes in the blood. Animal studies have demonstrated severe liver damage in some species. There is suggestive evidence that 2,3,6,7-TCDD causes loss of appetite, weight loss,

and digestive disorders in humans. Animal exposure to 2,3,7,8-TCDD results in severe loss of body weight prior to death. The human evidence for 2,3,7,8-TCDD alone is inadequate to demonstrate or reflect a carcinogenic hazard. Based on the positive evidence in animal studies; however, 2,3,7,8-TCDD is probably carcinogenic in humans (20).

Although a variety of polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDDs and PCDFs) were found in on- and off-site soils, none contained the extremely toxic compounds 2,3,7,8-tetrachlorodibenzo-p-dioxin or 2,3,7,8-tetrachlorodibenzofuran. Little toxicity data exists for most of the PCDDs and PCDFs. The toxicity equivalency factor (TEF) method was used to simplify the public health assessment for the PCDDs and PCDFs (7). This method relates the toxicity of the 210 structurally related PCDDs and PCDFs to the highly studied 2,3,7,8-tetrachlorodibenzo-p-dioxin. Concentrations of the PCDDs and PCDFs are then expressed as "2,3,7,8-tetrachlorodibenzo-p-dioxin toxicity equivalence" (2,3,7,8-TCDD TEQ).

The most likely human exposure pathway to PCDDs and PCDFs from this site is incidental ingestion of on- and off-site surface soil by children. The health-based comparison value of 0.00005 mg/kg for ingestion of 2,3,7,8-TCDD TEQ in soil (Tables 1,2,3, and 6) is the preliminary draft 1991 ATSDR Environmental Media Evaluation Guide (EMEG) for soil (21). This EMEG assumes incidental ingestion of 0.2 g of soil per day by a 15 kg child.

The highest concentration of 2,3,7,8-TCDD TEQ in the on-site surface soil exceed the health-based comparison value by 200 times. Children who play on this site daily and are exposed via incidental ingestion to 0.2 kg/day of soil with the highest 2,3,7,8-TCDD TEQ concentration, may suffer chloracne. Actual health effects will depend on the frequency and duration of ingesting the contaminated soil. The highest concentration of 2,3,7,8-TCDD TEQ in the off-site soil exceeds the health-based comparison value by 20 times. Children who are exposed to 2,3,7,8-TCDD TEQ in the off-site soil via incidental ingestion are less likely to suffer chloracne.

The increase in risk of cancer from incidental ingestion of on- or off-site soil with the highest concentrations of 2,3,7,8-TCDD TEQ is insignificant. This is based on an EPA estimate of an increased lifetime cancer risk of $10^{-6}$ for the lifetime ingestion of 0.0064 $\mu$g/kg/day 2,3,7,8-TCDD (20). EPA is reviewing its risk assessment of 2,3,7,8-TCDD. New data suggest the human cancer risk from 2,3,7,8-TCDD exposure may be less than originally thought.

Benzene

From overwhelming human evidence and supporting animal studies, benzene is known to be a human carcinogen. Leukemia (cancer of the tissues that form the white blood cells) and subsequent death from cancer have occurred in some workers exposed to benzene for periods of less than five or up to 30 years. Long-term exposures to benzene may affect normal blood production, possibly resulting

to benzene may affect normal blood production, possibly resulting in severe anemia and internal bleeding. In addition, human studies indicate that benzene is harmful to the immune system, increasing the chance for infections and perhaps lowering the body's defense against tumors. Exposure to benzene has also been linked with genetic changes in humans and animals (22).

Although the concentration of benzene in the on-site surface soils exceeds the health-based comparison value by two times, the increased risk of cancer or other health effects from incidental soil ingestion is insignificant.

On- and off-site ground water is neither suitable or used for human consumption. Concentration of benzene in both on- and off-site ground water exceed the Florida Primary Drinking Water standard. Florida established a Primary Drinking Water standard of 0.001 mg/L for benzene based on the $10^{-6}$ lifetime cancer risk for lifetime consumption. Concentrations of benzene in both on- and off-site ground water exceed this standard by about 100 times. Ingestion of the on- or off-site ground water for 70 years would result in a low increased risk of cancer.

The highest concentration of benzene measured in the air at this site (22 $\mu g/m^3$) exceed the health-based comparison value by about 180 times. This comparison value is based on the $10^{-6}$ additional lifetime cancer risk calculated from a inhalation unit risk (slope factor) of 0.029 mg/kg/day assuming a 70 kg adult inhales 20 $m^3$ of air per day (23). Inhaling air with benzene at this concentration 24 hours per day for 70 years, would result in a low increased risk of cancer.

B. Health Outcome Data Evaluation

The Escambia County Public Health Unit (CPHU) has been involved in public health at the American Creosote site, but has not conducted any independent health studies or investigations. Escambia CPHU received one complaint of contaminated stormwater runoff, but did not take a sample since they felt the concentrations of contaminants in the stormwater were not likely to be of health concern.

HRS epidemiologists found that the rates of cancer and birth defects in the population near the American Creosote site are not unusual. However, since the actual number of birth defects and cancer in this zip code are low, a comparison with rates for the entire county or the state would not be statistically valid.

C. Community Health Concerns Evaluation

1. The community is concerned about the toxicity of creosote components and pentachlorophenol, and exposure leading to cases of skin and lung cancer and/or death in the surrounding neighborhood.

   The greatest risk from this site is due to incidental ingestion of the contaminated soils by children trespassing on the site and from drinking the contaminated ground water.

The contaminated ground water on and off the site is not used as a drinking water supply. HRS epidemiologists found that the rates of cancer and birth defects in the 32501 ZIP code that includes the American Creosote site are not unusual.

2. The community is concerned about exposure of humans to contaminated ground water where it discharges into Pensacola Bay at Sanders Beach.

   Contaminated ground water is not discharging directly into Pensacola Bay, but is discharging into the drainage ditch which empties into the Bay. The public health threat from contaminants dissolved or suspended in the waters of Pensacola Bay is minimal. The concentrations of contaminants in the water of the drainage ditch and Pensacola Bay are low due to tidal mixing and dilution.

3. The community is concerned that contaminated soil, blown by the wind or hauled to nearby homes, has contaminated home-grown produce.

   Eating plants grown near the site is not a health risk. EPA and HRS collected pecans, greens, and peppers from gardens in the neighborhoods around the site and found that these plants had not accumulated concentrations of contaminants at levels of health concern from the soil.

4. The community is concerned that use of contaminated ground water for irrigation, car washing, etc., has resulted in exposure.

   It is unlikely that past use of contaminated ground water for irrigation, car washing, etc., will cause any health effects since exposure was short and infrequent.

5. The community is concerned that children and other site trespassers are being exposed to hazardous chemicals.

   Children trespassing on the site may suffer chloracne, liver damage and an increased risk of cancer from incidental ingestion of the contaminated soil. Children and residents in this area should not walk across the site.

   In December 1991, the Florida HRS mailed a one page fact sheet to the local residents, media, and elected officials summarizing the preliminary findings of this public health assessment. This fact sheet announced the availability of the draft public health assessment at the local document repository and solicited public comment until January 31, 1992. No inquiries or comments were received.

## CONCLUSIONS

From the information reviewed, this site is judged to be a public health hazard because of the likelihood of past and current exposure to hazardous substances in the air, soil and ground water.

1. In spite of a fence, site trespass continues to occur. There are not enough hazardous waste warning signs to comply with the State of Florida requirements for warning signs at contaminated sites: Chapter 403.704 and 403.7255, Florida Statutes, and Rule 17-736, Florida Administrative Code. Children trespassing on the site are likely to be exposed to pentachlorophenol, PAHs, and PCDDs/PCDFs in the soil via incidental ingestion and may suffer chloracne, liver damage, and an increased risk of cancer. Inhalation of benzene in the on-site air may increase the lifetime risk of cancer for children and other site trespassers.

2. The risk of liver damage and chloracne in children, due to incidental ingestion of off-site soil contaminated with pentachlorophenol and PCDDs/PCDFs, depends on the frequency and duration of their exposure.

3. Planned remediation at this site is likely to expose contaminated surface and subsurface soils, increase the off-site transport of PAH contaminated dust and benzene vapors, and increase nearby residential exposure.

4. Wastewater disposal by American Creosote contaminated ground water making it unsuitable for domestic use. It is unlikely that past use of this contaminated ground water for lawn irrigation, car washing, etc., has caused or will cause any health effects since exposure was short and infrequent.

5. Past overflows and stormwater runoff from this site have contaminated the sediments of Pensacola Bay near the site. American Creosote may not be the only source of sediment contamination in Pensacola Bay; however, since this area is commercialized and there have been other discharges. Although fishing occurs in this area, there are no data to determine the level of fish contamination or consumption.

6. Eating plants grown near the site is not a health risk since they have not concentrated contaminants from the soil.

7. The public health threat from contaminants dissolved or suspended in the waters of Pensacola Bay is minimal.

8. The rates of cancer and birth defects in the population near the American Creosote site are not unusual.

## RECOMMENDATIONS

1. Remediate the on-site surface soils. Until on-site soil remediation is complete, site access should be strictly limited and nearby residents (especially children) should not go on this site. Post an adequate number of warning signs to discourage vandalism of the existing fence and continued site trespass. This site should comply with the State of Florida requirements for warning signs at contaminated sites: Chapter 403.704 and 403.7255, Florida Statutes, and Rule 17-736, Florida Administrative Code.

2. Remediate the off-site surface soils near this site as soon as possible.

3. Employ effective dust control techniques during soil remediation to prevent further off-site migration of PAHs and PCDDs/PCDFs. Conduct appropriate air monitoring at the periphery of the site to ensure the safety of nearby residents.

4. Prevent the use of contaminated ground water for potable, agricultural, or industrial purposes until it is remediated.

5. Test aquatic life in Pensacola Bay (fish, oysters, crabs, clams, etc.) for PAHs and other site related contaminants. Estimate the quantity of fish or other aquatic life caught in this area for human consumption.

6. The data and information developed in the Public Health Assessment of the American Creosote Works, Inc., has been evaluated for appropriate follow-up health activities. The Health Activities Recommendation Panel (HARP) determined that community health education is needed. This determination is based on indications that long-term exposure to hazardous chemicals in the air, soil, and ground water is likely to have occurred and may occur in the future. The Division of Health Studies, ATSDR, has determined that a disease- and symptom-prevalence study is appropriate for this site.

## Public Health Action Plan

Based on the data evaluated and the recommendations made by the HARP, ATSDR and Florida HRS will coordinate to conduct the following actions:

1. Community health education to assist the community in understanding their potential for exposure or in assessing possible adverse health outcomes associated with exposures to hazardous substances present in the environment.

2. A disease- and symptom-prevelance study is appropriate for this site because of long-term exposure to hazardous chemicals in the air, soil, and ground water are likely to have occurred and may be currently occurring.

The U.S. Environmental Protection Agency and the Florida Department of Environmental Regulation have been informed of recommendations 1 through 5. They have not committed to carrying out these recommendations.

## PREPARERS OF REPORT

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Division of Health Assessment and Consultation

ATSDR REGIONAL REPRESENTATIVE

Chuck Pietrosewicz
ATSDR Regional Representative
Regional Services
Office of the Assistant Administrator

CERTIFICATION

This public health assessment was prepared by the Florida Department of Health and Rehabilitative Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the public health assessment was begun.

Technical Project Officer, SPS, RPB, DHAC

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health assessment, and concurs with its findings.

Director, DHAC, ATSDR

## REFERENCES


1. United States Geological Survey. Phenolic Contamination in the Sand-and-Gravel Aquifer from a Surface Impoundment of Wood Treatment Wastes, Pensacola, Florida. U.S. Geological Survey, Water-Resources Investigation Report 84-4230, 1984.

2. Agency for Toxic Substances and Disease Registry. Health Assessment for American Creosote Works: Cerclis No. FLD008161994, Pensacola, Florida January 6, 1986.

3. Environmental Protection Agency, Region IV. Remedial Investigation Report Volume I. American Creosote Works, Inc. Site. Pensacola, Florida. EPA Work Assignment #30-4L45, NUS Corporation. January, 1985.

4. Personal communication with Cathy Clay, Epidemiologist, Florida Department of Health and Rehabilitative Services, Environmental Epidemiology Section. July 1991.

5. Environmental Protection Agency, Region IV. Responsiveness Summary for the American Creosote Works, Inc. NPL Site Pensacola, Florida. Based on Comments from the Public Meeting of August 15, 1985.

6. Environmental Protection Agency, Region IV. Record of Decision, American Creosote Site, 1990.

7. Environmental Protection Agency. Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and -Dibenzofurans (CDDs and CDFs) and 1989 Update. EPA/625/3-89/016, March 1989.

8. Environmental Protection Agency, Region IV. Post Remedial Investigation, American Creosote Works, Pensacola, Florida. U.S. Environmental Protection Agency, Environmental Services Division, 1989.

9. Environmental Protection Agency, Region IV. Remedial Investigation, Phase II, American Creosote Works, Pensacola, Florida. U.S. Environmental Protection Agency, Region IV, Environmental Services Division, 1990.

10. United States Geological Survey. Point-Source Ground-Water Contamination, Distribution and Movement of Wood-Preserving Compounds in a Surficial Aquifer, Pensacola, Florida. National Water Summary 1986 - Ground-Water Quality: Water-Quality Issues. U.S. Geological Survey Water Resources Water-Supply Paper 2325, 1986.

11. Letter dated December 26, 1985 from R.L. DuBose, Assistant Environmental Health Director of the Escambia County Public Health Unit to Mr. Kenneth Kelson, Escambia County Commissioner.

12. Environmental Protection Agency, Region IV. American Creosote Investigation Report: Emergency Response, November 11, 1985. ESD Project #86-082.

13. Environmental Protection Agency. Exposure Factors Handbook. Office of Health and Environmental Assessment, Washington, D.C. EPA/600/8-89/043. July 1989.

14. ATSDR, Toxicological Profile for Pentachlorophenol, ATSDR/TP-89/19, December 1989.

15. Federal Register, Vol. 56, No. 126. Monday July 1, 1991.

16 ATSDR, Minimum Risk Level for Pentachlorophenol, July 1991.

17. ATSDR, Toxicological Profile for Polycyclic Aromatic Hydrocarbons, ATSDR/TP/90/20, December 1990.

18. ATSDR, Minimum Risk Level for Benzo(a)pyrene, July 1991.

19. Federal Register, Vol. 55, No. 143. Wednesday July 25, 1990.

20. ATSDR, Toxicological Profile for 2,3,7,8-Tetrachlorodibenzo-p-dioxin, ATSDR/TP-88/23, June 1989.

21. ATSDR, Preliminary Draft - Environmental Media Evaluation Guides (EMEGs), July 1991.

22. ATSDR, Toxicological Profile for Benzene, ATSDR/TP/88/03, May 1989.

23. Environmental Protection Agency. Health Effects Summary Tables, Fourth Quarter FY-1990. OERR 9200 6-303 (90-4), September 1990.

## SELECTED BIBLIOGRAPHY

ATSDR, Toxicological Profile for Creosote, ATSDR/TP-90/09, December 1990.

Environmental Protection Agency, Region IV. Draft Baseline Risk Assessment for the American Creosote Works Site Pensacola, Florida. January 21, 1991.

Environmental Protection Agency, Region IV. Draft Feasibility Study Report, Operable Unit II for the American Creosote Works Site Pensacola, Florida, March 1, 1991.

Environmental Protection Agency, Region IV. Post-Feasibility Study: Options for Remediation at the American Creosote Works, Inc. NPL Site. Pensacola, Escambia County Florida, September 1989.

Environmental Protection Agency, Region IV. Record of Decision for American Creosote Site, Pensacola, Florida 1985.

Environmental Protection Agency, Region IV. Risk Assessment, American Creosote Works Site, Escambia County, Florida, June 1989.

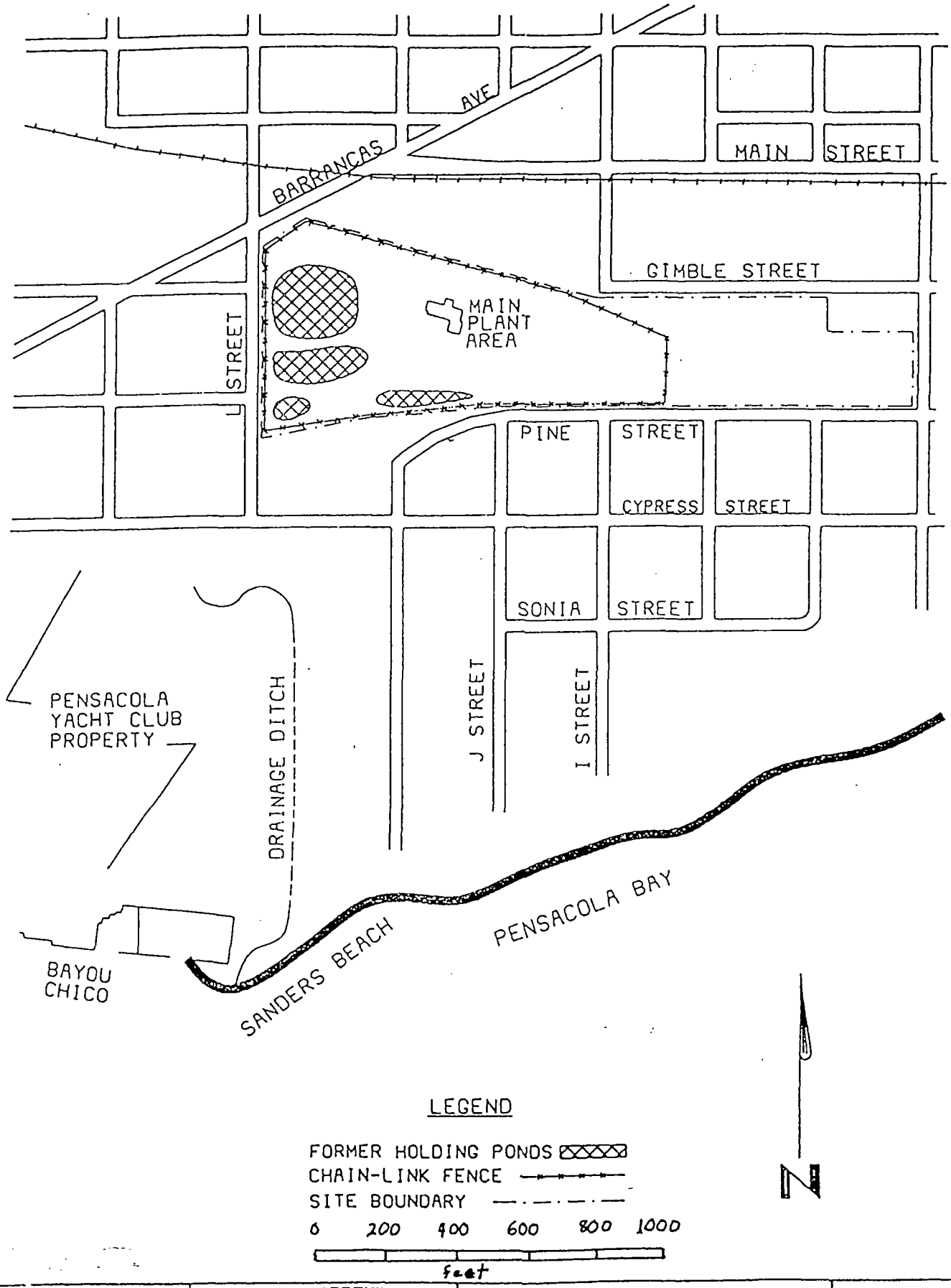
United States Geological Survey. Hydrogeology and Flow of Water in a Sand and Gravel Aquifer Contaminate by Wood-Preserving Compounds, Pensacola, Florida. U.S.G.S. Water-Resources Investigations Report 87-4260, 1988.

United States Geological Survey. Movement and Fate of Creosote Waste in Ground Water, Pensacola, Florida: U.S. Geological Survey Toxic Waste-Ground-Water Contamination Program. U.S.G.S. Water-Supply Paper 2285, 1986.

## LIST OF APPENDICES

Appendix A - Site Map

Appendix B - State of Florida Department of Health and Rehabilitation Services Cover Letter and Survey




APPENDIX A 1
SITE DESCRIPTION

AMERICAN CREOSOTE WORKS, INC
PENSACOLA, FL

Background - American Creosote

American Creosote was a wood preserving plant that treated timber with creosote and pentachlorophenol (PCP) from 1902 until it went out of business in 1981. During its years of operation, liquid wastes were discharged into two large unlined lagoons near "L" Street. Prior to 1970, the liquid wastes in these lagoons were allowed to overflow and follow a drainage course into Bayou Chico and Pensacola Bay. After 1970, the liquid wastes were routinely pumped from these lagoons and allowed to soak into the ground on the site. However, these lagoons still overflowed during periods of heavy rainfall. In 1983, EPA designated American Creosote a "Superfund" hazardous waste site, dewatered the two large lagoons, solidified the remaining sludge and covered it with a layer of clay.

The soils on this site are contaminated with pentachlorophenol (PCP) and chemicals common to creosote: polyaromatic hydrocarbons (PAHs), phenols, dioxins/dibenzofurans, and phthalates. The ground water is contaminated with PCP, PAHs, and phenols.

EPA Clean-up Plans

EPA plans to break down the contaminants in the soils on the site by adding water, nutrients, and bacteria. The design for this system should be completed by September 1991 and actual clean-up of the soil to start soon after. EPA has not decided on how to clean-up the contaminated ground water and buried sludge but will hold a public meeting this fall to present its plans.

Thanks again for talking with me on the phone. Please complete and return the survey on health concerns as soon as possible.

Sincerely,

E. Randall Merchant
Biological Administrator
Toxicology and Hazard Assessment
(904) 488-3385

RM/rm

enclosure

APPENDIX B 2

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

Date

Resident
Street Address
Pensacola, FL 32501

Dear Resident:

Thank you for talking with me on the phone (Date) about the American Creosote site, located along "L" street south of Barrancas Avenue. Please write down any health concerns you may have about working near this site on the enclosed survey and return it to me. Feel free to pass this survey along to others who may be interested or have them call me. If you have any questions or think of something else, please call me at (904) 488-3385 between 8:00 and 5:00 (Eastern). I will include your health concerns (anonymously) when I write the Health Assessment and send you a copy of the draft when it becomes available this summer.

Health Assessments

The Florida Department of Health and Rehabilitative Services (HRS) prepares a Health Assessment report for each "Superfund" hazardous waste site in Florida. The Agency for Toxic Substances and Disease Registry (ATSDR), a division of the U.S. Public Health Service, pays HRS to prepare these reports. The purpose of a Health Assessment is to consider what hazardous chemicals have been released, evaluate possible health effects, and recommend any follow-up health studies that may be needed. Follow-up health studies, if needed, could include annual surveys to look for unusually high rates of disease, medical monitoring, etc. Equally important, the Environmental Protection Agency (EPA) considers Health Assessments when deciding how best to clean-up hazardous waste sites. In the next few weeks, I will be preparing the Health Assessment report for the American Creosote site. It is important that any concerns you may have for your health from living near this site be expressed so they can be considered when the site is cleaned-up and any follow-up health studies conducted.

APPENDIX B 1



1317 WINEWOOD BLVD. • TALLAHASSEE, FL 32399-0700

LAWTON CHILES, GOVERNOR

Background - American Creosote

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EPA plans to break down the contaminants in the soils on the site by adding water, nutrients, and bacteria. The design for this system should be completed by September 1991 and actual clean-up of the soil to start soon after. EPA has not decided on how to clean-up the contaminated ground water and buried sludge but will hold a public meeting this fall to present its plans.

Thanks again for talking with me on the phone. Please complete and return the survey on health concerns as soon as possible.

Sincerely,

E. Randall Merchant
Biological Administrator
Toxicology and Hazard Assessment
(904) 488-3385

RM/rm

enclosure

APPENDIX B 2

## HEALTH EFFECTS SURVEY

## AMERICAN CREOSOTE HAZARDOUS WASTE SITE

## PENSACOLA FLORIDA

The purpose of this survey is to determine the health concerns of people who live near the American Creosote "Superfund" hazardous waste site in Pensacola. Expressing these concerns will insure that clean-up of this site will protect the health of the people who live near the site and also determine if any follow-up health studies are needed. Your name will not be used in the Health Assessment report. Please fill out this survey as soon as possible and return to:

Mr. E. Randall Merchant
Florida Department of Health
and Rehabilitative Services
HSET
1317 Winewood Blvd.
Tallahassee, FL 32399-0700
(904) 488-3385

---

1. Name:

   Address:

2. How long have you lived near the American Creosote site?

3. Did you ever work at this site? If so, for how long?

4. Have you been on this site? If so, for how long?

5. Do you think living near this site has effected your health or the health of your family? If so, how?

6. Do you think living near this site will affect your health or the health of your family in the future? If so, how?

Thank you for completing this survey. Please mail it as soon as possible to Mr. Merchant at the above address or call him at (904)488-3385 in Tallahassee if you have any questions.

Site: ACW
Breaks: 3.11
Other:

# Public Health Assessment for

**AMERICAN CREOSOTE WORKS INC. (PENSACOLA)**
**PENSACOLA, ESCAMBIA COUNTY, FLORIDA**
**CERCLIS NO. FLD008161994**
**JULY 29, 1992**

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry