PUBLIC HEALTH ASSESSMENT

CONROE CREOSOTING COMPANY
CONROE, MONTGOMERY COUNTY, TEXAS
CERCLIS No. TXD008091951
NOVEMBER 23, 2004

Prepared by:
The Texas Department of Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Table of Contents

Summary

The Conroe Creosoting Company (CCC) site is a former wood-treatment facility east of the city limits of Conroe, Montgomery County, Texas. The 147-acre property lies on the north side of State Highway 105 at 1776 E. Davis. Located to the west of CCC is Stewart's Creek, and to the east are an on-site lake and Little Caney Creek. From 1946 until 1997, workers at this facility treated lumber with creosote, pentachlorophenol (PCP), or copper-chromated-arsenic (CCA) to preserve the wood for use as fence posts, railroad ties, or utility poles.

The Texas Department of Health (TDH) and the Agency for Toxic Substances and Disease Registry (ATSDR) have concluded that exposure to the *soil and sediment downstream* of the CCC site in and along Stewart's Creek and Little Caney Creek poses no apparent public health hazard to adults or children because contaminants are not present at levels expected to cause a health problem or because people are unlikely to come into contact with contaminated sediments in enough frequency or duration to result in health problems under current circumstances.

In the past, contamination in *on-site soil and sediment* may have posed a public health hazard. In 2002–2003, the U.S. Environmental Protection Agency (EPA) took action to remove contaminated soil on the site and contaminated sediment along Stewart's Creek; therefore, exposure to on-site soil and sediment no longer poses a potential threat to public health.

Because EPA has removed and contained contaminated soil, sediment, and materials from the site, including the former drainage ditch, *surface water* is no longer a potential threat to public health. Consequently, TDH and ATSDR have classified the exposure to surface water on the site or from Stewart's Creek adjacent to the CCC site as posing no public health hazard.

TDH and ATSDR previously concluded that the drinking water on the CCC site and in the vicinity poses no public health hazard to children or adults who may use the water for drinking or other household uses. Affected groundwater has not migrated off-site and water from groundwater monitoring wells at the CCC site is not used for drinking or other household uses. Therefore, TDH and ATSDR have concluded that *on-site groundwater* from the monitoring wells poses no apparent public health hazard.

Due to a lack of available air data while the site was operating, past exposure to contaminants in the air could not be evaluated and has been classified by TDH and ATSDR as posing an indeterminate public health hazard. Current releases to the air are prevented from occurring by the cap of the Resource Conservation and Recovery Act (RCRA) vault that consists of a layer of high-density polyethylene and a layer of 3-foot thick compacted clay. Therefore, TDH and ATSDR have classified current exposure to *air* on the CCC site and in the vicinity as posing no public health hazard.

Contaminants have been contained and are no longer migrating from the site, although the fish have not been tested. In addition, the nearest fishable, downstream waterway is at least 6 miles from the site. Therefore, eating *fish* caught downstream from the CCC site is not likely to pose a current or future public health hazard.

Introduction

The Agency for Toxic Substances and Disease Registry (ATSDR) was established under the mandate of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. This act, also known as the "Superfund" law, authorized the U.S. Environmental Protection Agency (EPA) to conduct clean-up activities at hazardous waste sites. EPA was directed to compile a list of sites considered hazardous to public health, called the National Priorities List (NPL). The 1986 Superfund Amendments and Reauthorization Act (SARA) directed ATSDR to prepare a Public Health Assessment (PHA) for each NPL site (Note: Appendix A provides a listing of abbreviations and acronyms used in this report).

In conducting the PHA, three types of information are used: environmental data, community health concerns, and health outcome data. The environmental data are reviewed to determine whether people in the community might be exposed to hazardous materials from the NPL facility. If people are being exposed to these chemicals, ATSDR will determine whether the exposure is at levels that might cause harm. Community health concerns are collected to determine whether health concerns expressed by community members could be related to exposure to chemicals released from the facility. If the community raises concerns about specific diseases in the community, health outcome data (information from state and local databases or health care providers) can be used to address the community concerns. Also, if ATSDR finds that harmful exposures have occurred, health outcome data can be used to determine if illnesses are occurring that could be associated with the hazardous chemicals released from the NPL facility.

In accordance with an Interagency Cooperative Agreement, ATSDR and TDH have prepared this PHA for the Conroe Creosoting Company site. This PHA presents conclusions about whether exposures are occurring, and whether a health threat is present. In some cases, exposures can be determined to have occurred in the past; however, often a lack of appropriate historical data makes it difficult to quantify past exposures. If a threat to public health exists, recommendations are made to stop or reduce the threat to public health.

ATSDR PUBLIC HEALTH CONCLUSION CATEGORIES

CATEGORY A. URGENT PUBLIC HEALTH HAZARD[1]	CATEGORY B. PUBLIC HEALTH HAZARD[1]	CATEGORY C. INDETERMINATE PUBLIC HEALTH HAZARD	CATEGORY D. NO APPARENT PUBLIC HEALTH HAZARD[1]	CATEGORY E. NO PUBLIC HEALTH HAZARD
This category is used for sites where short-term exposures (<1 yr) to hazardous substances or conditions could result in adverse health effects that require rapid intervention.	This category is used for sites that pose a public health hazard due to the existence of long-term exposures(>1 yr) to hazardous substances or conditions that could result in adverse health effects.	This category is used for sites in which "critical" data are *insufficient* with regard to extent of exposure and/or toxicologic properties at estimated exposure levels.	This category is used for sites where human exposure to contaminated media might be occurring, might have occurred in the past, and/or might occur in the future, but the exposure is not expected to cause any adverse health effects.	This category is used for sites that, because of the absence of exposure, do NOT pose a public health hazard.
Criteria: Evaluation of available information[2] indicates that site-specific conditions or likely exposures have had, are having, or are likely to have in the future, an adverse impact on human health and requires immediate action or intervention. Such site-specific conditions or exposures might include the presence of serious physical or safety hazards, such as open mine shafts, poorly stored or maintained flammable/explosive substances, or medical devices which, upon rupture, could release radioactive materials.	**Criteria**: Evaluation of available relevant information[2] suggests that, under site-specific conditions of exposure, long-term exposures to site-specific contaminants (including radionuclides) have had, are having, or are likely to have in the future, an adverse impact on human health that requires one or more public health interventions. Such site-specific exposures might include the presence of serious physical hazards, such as open mine shafts, poorly stored or maintained flammable/explosive substances, or medical devices, which, upon rupture, could release radioactive materials.	**Criteria**: The health assessor must determine, using professional judgment, the "criticality" of such data and the likelihood that the data can be obtained and will be obtained in a timely manner. Where some data are available, even limited data, the health assessor is encouraged to the extent possible to select other hazard categories and to support their decision with clear narrative that explains the limits of the data and the rationale for the decision.	**Criteria**: Evaluation of available information[2] indicates that, under site-specific conditions of exposure, exposures to site-specific contaminants in the past, present, or future are not likely to result in any adverse impact on human health.	**Criteria**: Sufficient evidence indicates that no human exposures to contaminated media have occurred, none are now occurring, and none are likely to occur in the future.

[1] Each of these designations represent a professional judgment made in any given case on the basis of critical data that ATSDR regards as sufficient to support a decision. It does not imply, however, that the available data are necessarily complete; in some cases, additional data may be required to confirm or further support the decision.

[2] Examples include environmental and demographic data; health outcome data; community health concerns information; toxicologic, medical, and epidemiologic data.

Background

Site Description and History

The Conroe Creosoting Company (CCC) site is a former wood-treatment facility east of the city limits of Conroe, Montgomery County, Texas (Figure 1). The 147-acre property lies on the north side of State Highway 105 at 1776 E. Davis. Located to the west of CCC is Stewart's Creek, to the east are an on-site lake and Little Caney Creek, and to the north is forested land. [1].

From 1946 until 1997, workers at this facility treated lumber with creosote, pentachlorophenol (PCP), or copper-chromated-arsenic (CCA) to preserve the wood for use as fence posts, railroad ties, or utility poles [1]. The Texas Commission on Environmental Quality (TCEQ), formerly, the Texas Natural Resource Conservation Commission, and the EPA documented the contamination of site soil and sediment with these wood-treatment chemicals [2,3]. TDH staff noticed heavily stained soil areas and chemical odors, particularly around the tanks and process areas, when they visited the site with EPA and ATSDR regional staff in May of 2002 (Figures 2,3,4). EPA pointed out that part of the property was being leased and operated by three businesses, and parts of the site were accessible to those people working at these businesses as well as to their customers [1]. To get to two of the businesses, workers and customers had to drive onto the site and pass the PCP/creosote process area. By the fall of 2002, when the EPA began removing tanks, pipes, and other equipment from the site, the three businesses were no longer operating on the property.

Between 2002 and 2003, the EPA removed contaminated soil and sediment from the site and from a section of Stewart's Creek along the west side of the site to 1,500 feet south of State Highway 105. An RCRA vault[1] was built on the northeast part of the site; contaminated soil, sediment, pipe and other materials were moved into this vault (Figure 5). The removal and cleanup activities were completed in September 2003 (Figure 6) with natural attenuation as the selected remedy for contaminants in the groundwater [4,5]. A chain-link fence and warning signs were put up around the RCRA vault to minimize access. The CCC site was proposed to the EPA's NPL on April 30, 2003, and was added to the List on September 25, 2003.

Land Use and Natural Resource Use

The EPA is working with the City of Conroe to develop site reuse options [1]. The perimeter of the RCRA vault is fenced, and this part of the property will be excluded from future use. An on-site groundwater well (165 feet deep) is located near the center of the site. This well has been tested and is free of contamination.

Groundwater is the main source of public and private drinking water in the area around the CCC site. The wells are screened in one of three aquifers in order of increasing depth: the Chicot Aquifer, the Evangeline Aquifer, and the upper 300 feet of the Jasper Aquifer. Nearby and on the

1 An RCRA vault is a large, generally deep pit that is lined with compacted clay and high-density polyethylene (HDPE). It is covered with at least 3 feet of compacted clay and an additional liner. It is specially designed to enclose contaminants to keep them from spreading.

CCC site are private water supply wells screened at depths greater than 100 feet in the shallow part of the Chicot Aquifer. Public water supply wells for the city of Conroe are screened in the deeper Evangeline Aquifer at 825 to 1,190 feet below ground surface [1,6].

The CCC site is in the San Jacinto River Basin approximately 6 miles upgradient of the San Jacinto River. Before the EPA's removal action, runoff from heavy rainfall onto the site flowed primarily west into Stewart's Creek through a constructed drainage ditch. Some of the site runoff traveled east over the surface of the site toward the on-site lake. The lake is formed from a dammed section of Little Caney Creek. Both Stewart's Creek and Little Caney Creek eventually join with the West Fork of the San Jacinto River, located approximately 6 to 7 miles downstream.

Site Visit

Representatives from TDH and ATSDR initially visited the site with the EPA on May 29, 2002. Several hours were spent examining the site and the surrounding neighborhoods. At that time, the site was partly surrounded by a barbed wire fence and a "No Trespassing" sign was posted. Three businesses were operating on the site: Plane Fast Trucking Company, Conroe Truck & Trailer, and Big Tin Barn lumberyard. Two of the businesses could only be accessed by driving next to, or through the former processing areas. The CCC site was accessible to customers, workers, and vendors at the Big Tin Barn lumberyard.

Evidence of trespassers or vandals was not observed on the part of the site previously used for wood treating operations but TDH and ATSDR did see old beverage cans, a shotgun shell, and an old cane fishing pole in the area around the lake - evidence that people occasionally frequent this area.

On the former processing areas, the vegetation was sparse and a strong creosote odor was noticeable. Dark sludge covered some areas around the tanks. The door to the lab was on the ground next to the building. Inside the lab, containers of chemicals were accessible; among these containers were metallic mercury and various acids (chromic, hydrochloric, and nitric). No evidence was observed that trespassers had entered.

The nearest occupied residence is less than ¼ mile from the site. An elementary school is within 200 feet of the north property boundary and about ½ mile northwest of the former wood treatment areas. Thick woods are between the former processing areas and the school. The neighborhood to the south was a low-to-middle socioeconomic level. The homes were generally wood on pier and beam. The residential neighborhood to the east of the site was a middle socioeconomic status and consisted of brick and prefabricated homes. The neighborhood north of the site consisted of brick and wood homes. Trees in all three neighborhoods were tall; grass in the yards appeared healthy and dense. No gardens were observed. Chickens, dogs, and two horses were observed in the neighborhood south of the site. Commercial and light industrial businesses also were located south of State Highway 105 from the site. Among these businesses were a waste handler, a drilling business, a beverage distributor, and a center for business and industrial training.

TDH and ATSDR periodically visited the site between May 2002 and September 2003 and observed the improvements to the site as EPA began removing contaminated soil and structures, redirecting surface water runoff, and constructing and completing the RCRA vault [4,5,6].

Demographics

The City of Conroe has a population of 27,610 [8]. The population within ½ mile of the Conroe Creosoting Company site is 2,065. Of this population 68.3 % (1,411 people) are white, 10.0 % (206 people) are black, 31.9 % (658 people) are of Hispanic origin, and 21.7 % (448 people) describe themselves as being of other races (Figure 1) [8].

It is not known how many people worked at CCC during the time it was operating. However, until Fall 2002, we estimated that 20-25 vendors per week visited the operating businesses on site and approximately nine employees worked between 35 and 50 hours per week at the site [4].

Community Health Concerns

In an attempt to determine community health concerns related to the CCC site, TDH and ATSDR contacted several different agencies and individuals by telephone. The regional offices of both the TDH and the TCEQ were contacted. In addition to state agencies, we contacted Montgomery County Health Department staff and local residents. TDH and ATSDR staff attended open houses held by the EPA in 2002 and 2003 to gather questions from community members. Community concerns were compiled from residents attending the meetings and from people TDH staff spoke with while going door to door in the neighborhood with EPA. TDH and ATSDR received and addressed the following health concerns:

1. Residents were concerned about whether or not their water was safe for drinking and other household uses.

   To address the community's concern that area drinking water wells may have been affected by site contaminants TDH and ATSDR prepared a health consultation in February 2003. Six wells, representative of both public water supply wells and private water wells, were evaluated. Based on the sample results, TDH and ATSDR concluded that the well water in the vicinity of the CCC site poses no public health hazard to children or adults who may use the water for drinking or other household activities (Appendix D) [7].

2. People were concerned about possible exposure to chemicals in the past when Stewart's Creek overflowed into their yards during heavy rainfall.

   TDH and ATSDR prepared a health consultation in August 2003 to evaluate the potential for contamination from the site to affect people living in the neighborhoods downstream (Appendix E) [3]. TDH and ATSDR evaluated test results of 111 sediment and five soil samples in and along Stewart's Creek and Little Caney Creek and concluded that exposure to sediment and soil posed no apparent public health hazard to children or adults. Contaminants

were either not present at levels that would be expected to cause a health problem or because people were not likely to come into contact with the sediments in enough frequency or duration. In 2002–2003, the EPA removed contaminated soil and sediment from on the Conroe site and along Stewart's Creek and placed it in an approved RCRA vault on the site. Therefore, the potential for site contaminants to be transported downstream has been eliminated [4,5,6].

3. Some people were concerned that their neighborhood might have more cancer than other neighborhoods.

The TDH Cancer Registry Division (TDHCRD) investigated the 1995–1999 cancer incidence and the 1995–2000 cancer mortality data for the Conroe zip code area 77301. The analysis included cancers of the lung and bronchus, liver and intrahepatic bile duct, kidney and renal pelvis, breast, prostate, and bladder. Moderate but statistically significant elevations were observed in the incidence of cancers of the lung and bronchus in males and in mortality from breast cancer in females. We could not rule out factors such as smoking (in lung and bronchus cancer) or family history (in breast cancer) [9].

Health Outcome Data

Health outcome data (HOD) record certain health conditions that occur in populations. These data can provide information on the general health of communities living near a hazardous waste site. They also can provide information on patterns of specified health conditions. Some examples of health outcome databases are tumor registries, birth defects registries, and vital statistics. Information from local hospitals and other health care providers also can be used to investigate patterns of disease in a specific population. TDH and ATSDR look at appropriate and available health outcome data when a completed exposure pathway or community concerns exist. Because no completed exposure pathways exist, a more extensive review of HOD was not conducted for this site.

Discussion

Introduction

The presence of chemical contaminants in the environment does not always result in exposure to or contact with the chemicals. Because chemicals have the potential to cause adverse health effects only when people actually come into contact with them, the exposure (the contact that people have with the contaminants) drives the PHA process.

People can be exposed to contaminants by breathing, eating, drinking, or coming into direct contact with a substance containing the contaminant. This section reviews available information to determine whether people in the community have been, currently are, or could be exposed to contaminants associated with this site.

To determine whether people are exposed to site-related contaminants, investigators evaluate the environmental and human components leading to human exposure. This analysis consists of evaluating the five elements of an exposure pathway:

- source of contamination,
- transport through an environmental medium,
- point of exposure,
- route through which the contaminant can enter the body, and
- receptor population.

Exposure pathways can be complete, potential, or eliminated. For a person to be exposed to a contaminant, the exposure pathway must be complete. An exposure pathway is considered complete when all five elements in the pathway are present and exposure has occurred, is occurring, or will occur in the future. A potential pathway is missing at least one of the five elements but could be complete in the future. An eliminated pathway is missing one or more elements and will never be completed. Table 1 identifies pathways important to this site. The following discussion incorporates only those pathways relevant and important to the site. Because exposure does not always result in adverse health effects, an evaluation of whether the exposure could be sufficient to pose a hazard to people in the community also is done. The factors that influence whether exposure to a contaminant or contaminants could or would result in adverse health effects include the following

1. toxicological properties of the contaminant;
2. how much of the contaminant to which the individual is exposed;
3. how often or how long the exposure occurs;
4. manner in which the contaminant enters or contacts the body (breathing, eating, drinking, or skin/eye contact); and
5. number of contaminants to which an individual is exposed (combinations of contaminants).

Once exposure occurs, characteristics such as age, sex, nutritional status, genetics, lifestyle, and health status of the exposed person influence how that person absorbs, distributes, metabolizes, and excretes the contaminant.

When identifying plausible potential exposure scenarios, the first step is to assess the potential public health significance of the exposure. This process is done by comparing contaminant concentrations to health assessment comparison (HAC) values for both noncarcinogenic and carcinogenic end points. HAC values are media-specific contaminant concentrations used to screen contaminants for further evaluation. Although exceeding a HAC value does not necessarily mean that a contaminant represents a public health threat, it does suggest that the contaminant warrants further consideration.

Non-cancer comparison values also are known as environmental media evaluation guides (EMEGs) or reference dose media evaluation guides (RMEGs) and are based on ATSDR's minimal risk levels (MRLs) and EPA's reference doses (RfDs), respectively. MRLs and RfDs are estimates of daily human exposure to a contaminant that is unlikely to cause adverse non-

cancer health effects over a lifetime. Cancer risk comparison values are also known as carcinogenic risk evaluation guides (CREGs) and are based on EPA's chemical-specific cancer slope factors and an estimated excess lifetime cancer risk of 1-in-1-million persons exposed for a lifetime. Standard assumptions are used to calculate appropriate HAC values [10].

The environmental data evaluated in this PHA were collected by the TCEQ and EPA between 2001–2003 [1,4,5]. The samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, metals, and a limited number of on-site samples were tested for dioxins. In reviewing the sampling data, the information provided in the referenced documents was used. Adequate Quality Assurance/Quality Control (QA/QC) measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting.

Exposure Pathways

In February 2003, TDH and ATSDR prepared a health consultation that concluded that the well water in the vicinity of the CCC site posed no public health hazard to children or adults who may use the water for drinking or other household activities. (Appendix D) [7].

In August 2003, TDH and ATSDR prepared a health consultation that concluded that exposure to sediment and soil posed no apparent public health hazard to children or adults. Contaminants were either not present at levels that would be expected to cause a health problem or because people were not likely to come into contact with the sediments in enough frequency or duration. (Appendix E) [3].

On-Site Sediment and Soil

In November 2001, the TCEQ collected four background sediment samples and eight sediment source samples on the CCC site and in the vicinity, and three background soil samples, and 11 soil samples at the CCC site. None of the constituents detected in the sediment were at levels exceeding HAC values, with the exception of arsenic at a level of 14.2 mg/kg that is well within the range of normal background levels observed in the Western United States [10].

On-site soil collected near the center of the site contained pentachlorophenol (994 mg/kg) at levels exceeding both the intermediate and chronic EMEGs for both children and adults. Another sample contained naphthalene at 3,120 mg/kg, which exceeded the RMEG for a child. Benzo(a)pyrene (maximum concentration 73.3 mg/kg) and arsenic (maximum concentration 1,790 mg/kg) exceeded the CREG values in the on-site soil samples in which it was detected.

In January 2002, prior to removal of site contamination, EPA's contractor, Roy F. Weston, collected 32 on-site soil samples and two sediment samples [4]. In samples collected at 0-3 inches below ground surface, arsenic (maximum concentration 168 mg/kg), chromium (maximum concentration 170 mg/kg), and pentachlorophenol (maximum concentration 480 mg/kg) were detected. Noncarcinogenic polycyclic aromatic hydrocarbons (PAHs) were measured (maximum concentration 22,081 mg/kg), and a benzo(a)pyrene equivalent of 404.9

mg/kg was calculated from soil samples that were collected at the creosote and PCP tank and process area. Dioxins as 2,3,7,8 – tetrachlorodibenzo-p-dioxin equivalents (TCDD) (maximum concentration 0.103 mg/kg) were measured at the former creosote and pentachlorophenol tank battery area. These on-site contaminant levels exceed HAC values and in the past posed a potential public health hazard to on-site workers [4].

In 2002–2003, EPA removed contaminated soil, sediment, and materials from the site and stained sediments from along Stewart's Creek. Contaminated soil and sediments are no longer a potential threat to public health [6]. Consequently, TDH and ATSDR have classified this site as posing no public health hazard for current or future exposure to soil on the site or sediments from Stewart's Creek adjacent to the CCC site.

On-site Surface Water

In January 2002, prior to removal of site contamination, EPA's contractor, Roy F. Weston, collected surface water samples. Three grab samples were collected from different sections of the on-site drainage ditch, and one grab sample was collected from Stewart's Creek near the site [4]. Arsenic, PCP, and PAHs were detected at maximum concentrations of 1,740 µg/L, 3,200 µg/L, and 125,300 µg/L respectively. Chromium (15 µg/L) was detected in only one of the samples and did not exceed ATSDR HAC values. The levels of arsenic and PCP exceeded ATSDR HAC values. In the past, skin contact with or incidental ingestion of surface water from the ditch or Stewart's Creek near the CCC site may have posed a public health hazard. Because EPA has removed and contained contaminated soil, sediment, and materials from the site, including the former drainage ditch, surface water is no longer a potential threat to public health [6]. Consequently, TDH and ATSDR have classified exposure to surface water on the site or from Stewart's Creek adjacent to the CCC site as posing no public health hazard.

On-site Groundwater

To determine the extent of groundwater contamination at the CCC site, EPA's contractor sampled 24 groundwater-monitoring wells between June and November 2003. These monitoring wells are screened between 54 and 142 feet below ground surface (bgs). Table 6 describes the monitoring well (MW) locations.

Test results of water collected from monitoring wells on the site were compared to HAC values. Only pentachlorophenol and chromium exceeded their respective HAC values. The maximum level of pentachlorophenol detected (50 µg/L) was measured in MW-10B (June 2003). The maximum level of chromium detected (54.7 µg/L) was measured in MW-9B (November 2003).[2] Low levels of naphthalene (74 µg/L) and 2-methylnapthalene (12 µg/L) were measured in groundwater monitoring wells, but the levels were not above health-based screening values. Affected groundwater is not widespread and has not migrated off-site [5]. The highest concentrations of wood-treating-related constituents are in groundwater west of the former tank

2 Elevated barium (955 µg/L) and chromium (134 µg/L) had previously been measured in MW-4 and MW-3, respectively. These previously detected levels of metals were related to the grout used to set the well casing, not the quality of the water [5].

battery area. Water from groundwater monitoring wells at the CCC site is not used for drinking or other household uses. TDH and ATSDR have concluded that on-site groundwater from the monitoring wells (54-142 feet bgs) poses no apparent public health hazard.

Air

Air sampling data from historical air releases from the Conroe Creosoting site were not available for review. Volatilization of chemicals at the site from storage tanks, chemical overflows, and spills likely occurred during operations. The potentially exposed population would have consisted of on-site workers and people working or residing in the surrounding area. During the site visit, TDH noted chemical odors. Because of the lack of historical air sampling data, we could not adequately evaluate past exposure to contaminants from breathing air on the CCC site and in the vicinity. Therefore, TDH and ATSDR classified past exposure to contaminants in the air as posing an indeterminate public health hazard. EPA contained contaminated soil, sediment, and materials in the on-site RCRA vault during the 2002–2003 removal action. Releases to the air are prevented from occurring by the cap of the vault that has a layer of high-density polyethylene and a layer of 3-foot thick compacted clay. Therefore, TDH and ATSDR have classified current exposure to air on the CCC site and in the vicinity as posing no public health hazard.

Fish

In the past, when the potential existed for contaminants to run off the site and into Stewart's Creek, the on-site lake, and Little Caney Creek, fish may have taken up some of the site contaminants. Stewart's Creek and Little Caney Creek are fairly shallow supporting only smaller fish. The on-site lake, though deep enough to support larger fish, currently has restricted access. The West Fork of the San Jacinto River is the nearest downstream location that is fished. This location, at least 6 miles downstream of the CCC site is unlikely to be affected by previous releases from the CCC site. In addition, area fishers tend to go to Lake Conroe, which is located northeast and upgradient of the site. Although fish have not been tested, contaminants have been contained and are no longer migrating from the site. In addition, the nearest fishable, downstream waterway is at least 6 miles from the site. Therefore, eating fish caught downstream from the CCC site is not likely to pose a current or future public health hazard.

Children's Health Considerations

ATSDR's Child Health Initiative recognizes that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contamination of their water, soil, air, or food. Children are at greater risk than adults from certain kinds of exposures to hazardous substances emitted from waste sites and emergency events [11,12]. They are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. They are shorter than an adult, which means they breathe dust, soil, and heavy vapors close to the ground. Children are also smaller, resulting in higher doses of chemical exposure per body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur

during critical growth stages. Most importantly, children depend completely on adults for risk identification and management decisions, housing decision, and access to medical care [13]. Although some contaminants in soil and groundwater exceeded their respective health-based comparison values for children, exposure to these contaminants would not occur or would not be frequent enough to pose a public health hazard. As with adults, past exposure to contaminants in the air could not be evaluated, but current exposure to air on the CCC site and in the vicinity poses no public health hazard to children. Children cannot come in contact with contaminants from the site; contaminated soil, sediment, and materials from the site are enclosed in the RCRA vault, and the vault is not accessible.

Conclusions

Based on all of the available information, TDH and ATSDR have classified the Conroe Creosoting Company site as posing no apparent public health hazard.

1. TDH and ATSDR have concluded that exposure to the sediment and soil downstream of the CCC site in and along Stewart's Creek and Little Caney Creek pose no apparent public health hazard to adults or children because contaminants are not present at levels expected to cause a health problem or because people are unlikely to come into contact with contaminated sediments in enough frequency or duration to result in health problems.

2. In the past, contamination in soil and sediment on the CCC site may have posed a public health hazard. In 2002–2003, the EPA took action to remove contaminated soil on the site and contaminated sediment along Stewart's Creek; therefore, exposure to on-site soil and sediment no longer poses a potential threat to public health.

3. Because EPA has removed and contained contaminated soil, sediment, and materials from the site, including the former drainage ditch, surface water is no longer a potential threat to public health. Consequently, TDH and ATSDR have classified exposure to surface water on the site or from Stewart's Creek adjacent to the CCC site as posing no public health hazard.

4. TDH and ATSDR previously have concluded that the drinking water on the CCC site and in the vicinity poses no public health hazard to the children or adults who may use the water for drinking or other household uses. Affected groundwater has not migrated off-site and water from groundwater monitoring wells at the CCC site is not used for drinking or other household uses. Therefore, TDH and ATSDR have concluded that on-site groundwater from the monitoring wells poses no apparent public health hazard.

5. Due to a lack of available air data while the site was operating, past exposure to contaminants in the air could not be evaluated and has been classified by TDH and ATSDR as posing an indeterminate public health hazard. Releases to the air are currently prevented from occurring by the cap of the RCRA vault, which consists of a layer of high-density polyethylene and a layer of 3-foot thick compacted clay. Therefore, TDH and ATSDR have classified that current exposure to air on the CCC site and in the vicinity poses no public health hazard

6. Although the fish have not been tested, contaminants have been contained and are no longer migrating from the site. In addition, the nearest fishable, downstream waterway is at least 6 miles from the site. Therefore, eating fish caught downstream from the CCC site is not likely to pose a current or future public health hazard.

Public Health Action Plan

Actions Completed

1. The EPA completed the removal and remedial activities in September 2003. Contaminated soil on the site and sediments along Stewart's Creek were excavated and enclosed in the on-site RCRA vault, removing the potential threat to public health from contaminated soil and sediments.

2. TDH and ATSDR assisted EPA in addressing community health concerns by participating in community meetings.

3. TDH evaluated additional sampling information and prepared a health consultation evaluating the safety of area drinking water wells. TDH also evaluated off-site sediment and soil in the neighborhood and along Stewart's Creek.

Actions Recommended

There are no recommendations at this time, but if new information becomes available, TDH and ATSDR will reevaluate this site.

Actions Planned

EPA plans to continue groundwater monitoring to ensure continued natural attenuation of shallow groundwater contaminants.

Authors, Technical Advisors, and Organizations

Preparers of the Report

Lisa R. Saunders, MS
Toxicologist

Susan L. Prosperie, MS, RS
Environmental Specialist

John F. Villanacci, PhD, NREMT-I
Director
Environmental Epidemiology and Toxicology Division

ATSDR REGIONAL REPRESENTATIVE

Jennifer Lyke
Regional Representative
ATSDR - Region 6

Karl Markiewicz, PhD
Senior Toxicologist
ATSDR – Region 6

ATSDR TECHNICAL PROJECT OFFICER

Robert B. Knowles, MS, REHS
Environmental Health Scientist
Division of Health Assessment and Consultation
Superfund Site Assessment Branch
State Programs Section

References

1. Texas Natural Resource Conservation Commission. Expanded Screening Inspection Report. Conroe Creosoting Company. June 2002.

2. US Environmental Protection Agency Region 6. Sediment sampling data. Dallas: November 2002.

3. Texas Department of Health. Health Consultation for Sediments in Stewart's Creek. Conroe Creosoting Company. Montgomery County, Texas. August 2003.

4. U.S. Environmental Protection Agency, Region 6. Removal Assessment Report. Conroe Creosoting 1776 East Davis, Conroe, Montgomery County, Texas. Prepared by Roy F. Weston, Inc. March 2002.

5. U.S. Environmental Protection Agency, Region 6. Remedial Investigation Report for Conroe Creosoting Company Site. Conroe, Montgomery County, Texas. July 2003.

6. U.S. Environmental Protection Agency, Region 6. Conroe Creosoting Site, Conroe, Texas. Fact Sheet No. 6. November 2003

7. Texas Department of Health. Health Consultation for Groundwater Wells on and off-site. Conroe Creosoting Company, Montgomery County, Texas. February 2003

8. Bureau of Census. 1990 census data. Database: C90STF1A; Summary Level: Conroe, Texas.

9. Texas Department of Health. Cancer Cluster Investigation for zip code 77301, Conroe, Texas. Oct. 31, 2003.

10. Agency for Toxic Substances and Disease Registry. Public Health Assessment Guidance Manual. Atlanta: US Department of Health and Human Services; 1993.

11. U.S. Environmental Protection Agency. Strategy for Research on Environmental Risks to Children. Washington, DC: US Environmental Protection Agency, Office of Research and Development. EPA/600/R-00/068, Section 1.2. 2000.

12. Agency for Toxic Substances and Disease Registry. Child Health Initiative. Atlanta: US Department of Health and Human Services; 1995.

13. U.S. Environmental Protection Agency. The Children's Environmental Health Yearbook; 1998.

Appendices

APPENDIX A: Acronyms and Abbreviations
APPENDIX B: Tables
APPENDIX C: Figures
APPENDIX D: Conroe Creosoting Company Health Consultation, February 19, 2003
APPENDIX E: Conroe Creosoting Company Health Consultation, August 25, 2003

Appendix A: Acronyms and Abbreviations

Acronyms and Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CREG	Carcinogenic Risk Evaluation Guide
EMEG	Environmental Media Evaluation Guide
EPA	Environmental Protection Agency
HAC	Health Assessment Comparison Value
HOD	Health Outcome Data
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
MRL	Minimal Risk Level
NPL	National Priorities List
PCBs	Polychlorinated biphenyls
PHA	Public Health Assessment
ppb	parts per billion
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation Recovery Act
RfD	Reference Dose
RMEG	Reference Dose Media Evaluation Guide
SARA	Superfund Amendments and Reauthorization Act of 1986
SVOCs	Semi-Volatile Organic Compounds
TCEQ	Texas Commission on Environmental Quality
TDH	Texas Department of Health
µg/L	micrograms per liter
VOCs	Volatile Organic Compounds

Appendix B: Tables

Table 1. Evaluation of Potential Exposure Pathways for the Conroe Creosoting Company Site

PATHWAY NAME	PRIMARY CONTAMINANTS OF CONCERN	EXPOSURE PATHWAY ELEMENTS					TIME	CONCLUSIONS
		Source	Transport Media	Point of Exposure	Route of Exposure	Exposed Population		
Potential Exposure Pathways								
Soil On-Site	*Benzo(a)pyrene Arsenic Pentachlorophenol Naphthalene Chromium Dioxins*	*On-site activities, tanks, spills*	*Soil*	*On-site*	*Incidental ingestion, Dermal contact*	*Trespassers, Worker*	*Past* *Present Future*	*In the past, the site contaminants may have posed a public health hazard to on-site workers, trespassers and customers traversing the site.* *Contaminated soil was removed from the site in 2002-2003; therefore*, **exposure to soil on the site poses no health hazard**..
Off-Site	*No constituents at levels of health concern*			*Off-site Residential yards*		*Residents living along Stewart's Creek*	*Past Present Future*	**No apparent public health hazard**
Sediment On-Site	*Benzo(a)pyrene Arsenic*	*On-site activities, tanks, spills*	*Sediment*	*On-site drainage ditch and Stewart's Creek where it joins the drainage ditch*	*Incidental ingestion, Dermal contact*	*Workers, Trespassers on process areas*	*Past* *Present Future*	*In the past, site contaminants may have posed a public health hazard to on-site workers and trespassers.* *Contaminated sediment was removed from the site and a section of Stewart's Creek in 2002-2003; therefore*, **exposure to sediment on the site poses no health hazard**..
Off-Site	*No constituents at levels of health concern*			*Off-site Stewart's Creek below SH 105*		*Residents living along Stewart's Creek*	*Past Present Future*	**No apparent public health hazard**
Surface Water On-Site	*Arsenic Pentachlorophenol*	*Drainage ditch, Stewart's Creek*	*Surface Water*	*On-site drainage ditch*	*Incidental ingestion, Dermal contact*	*Workers, Trespassers*	*Past* *Present Future*	*In the past, surface water in the drainage ditch and entering Stewart's Creek may have posed a public health hazard.* **No public health hazard**
Groundwater Monitoring Wells	*Pentachlorophenol*	*On-site activities, tanks, spills*	*Groundwater*	*Monitoring wells*	*Incidental ingestion, Dermal contact*	*On-site workers*	*Present Future*	**No apparent public health hazard** *Water from the shallow aquifer is not used for drinking water or other household uses*

Table 2. On-site Soil Sample Locations (0-6"depth) November 2001 Conroe Creosoting Company Site Prior to Removal Action [4]	
Sample ID	**Sample Location**
SO1	Background sample collected north of the fenced boundary
SO2	Background sample collected north of the fenced boundary
SO3	Background sample Lion's Park
SO4	Collected near the center of the site beside lumber piles
SO5	Duplicate of SO-4
SO6	Located next to the CCA building
SO7	Duplicate of SO-6
SO8	Collected next to a pressure vessel near the CCA area
SO9	Collected next to creosote tanks
SO10	Stained soil collected next to entry ramp of concrete surface impoundment
SO11	Collected next to the east tree line between the operations area and the lake
SO12	Collected near SO-11 behind an abandoned truck
SO13	Collected at the end of a concrete lined drainage ditch leading toward Stewart's Creek
SO14	Collected from natural drain pathway on west side of the site

Table 3. Sediment samples collected* on and in the vicinity of the Conroe Creosoting Company site November 2001	
Sample ID	**Sample Location**
SE-1	Background sample collected in Stewart's Creek 0.67 miles upstream of CCC site
SE-2	Background sample collected in Stewart's Creek 0.6 miles upstream of CCC site
SE-15	Little Caney Creek 0.3 miles upstream of CCC site
SE-16	Little Caney Creek 0.4 miles upstream of CCC site
SE-4	Stewart's Creek along the west side of the CCC site
SE-5	Stewart's Creek 50 yards downstream of the SE-4
SE-9	Wetland along Stewart's Creek
SE-10	Stewart's Creek 0.1 mile downstream of SE-09
SE-17	The west bank of the on-site lake
SE-18	The west bank of the on-site lake south of SE-17
SE-19	Duplicate SE-18
SE-20	The beginning of Little Caney Creek after the spillway of the lake

* Prior to EPA removal action

Table 4. Constituents[1] Exceeding HAC Values in On-site Soil Samples Conroe Creosoting Company November 2001

Sample (mg/kg)	SO4	SO5	SO6	SO7	SO8	SO9	SO10	SO11	SO12	SO13	SO14	Health Assessment Comparison Value HAC (mg/kg)[2]
Semivolatile Organic Compounds												
Pentachlorophenol	994	111	nd	nd	nd	nd	24	nd	150	nd	nd	50 child/700 adult chronic/int EMEG[3] 2,000 child/20,000 RMEG[4]
Benzo(a)pyrene	71.6	73.3	nd	nd	3.3	28	nd	2.7	25	1.1	nd	0.1 CREG[5]
Naphthalene	1,860	3,120	nd[6]	nd	nd	nd	nd	nd	nd	nd	nd	1,000 child/10,000 adult RMEG/EMEG
Metals												
Arsenic	nd	nd	187	162	1,790	8.4	nd	52.7	nd	23	7.2	20 child/200 adult EMEG/RMEG 0.5 CREG
Chromium	nd	nd	64	77	999	10.5	5	111	14	13	9	200 child / 2,000 adult RMEG

[1]mg/kg=milligrams per kilogram
[2]Health based comparison values are based on an assumed ingestion rate of 100 kg of soil for adults (body weight 70 kilograms) and an ingestion rate of 200 kg of soil for children (body weight 10 kg).
[3]EMEG=Environmental Media Evaluation Guide and is based on ATSDR's MRL for chronic exposure
[4]RMEG=Reference dose Media Evaluation Guide and is based on EPA's RfD for chronic exposure (unless otherwise specified)
[5]CREG=Cancer Risk Evaluation Guide and is based on an excess cancer risk of one in one-million persons exposed over a lifetime
[6]not detectable at quantitation limits

Table 5. Constituents Exceeding HAC Values (mg/kg)[1] in On-site Sediment Samples Conroe Creosoting Company

Sample	SE-4	SE-5	SE-9	SE-10	SE-20	Health Assessment Comparison Value (mg/kg)[2]
Arsenic	6	6.3	14.2	10.3	6.6	20 child/200 adult EMEG[3]/RMEG[4] 0.5 CREG[5]

[1]mg/kg=milligrams per kilogram
[2]Health based comparison values are based on an assumed daily ingestion rate of 100 mg of soil for a 70 kilogram (kg) body weight adult and an ingestion rate of 200 mg of soil for a 10 kg child.
[3]EMEG=Environmental Media Evaluation Guide and is based on ATSDR's MRL for chronic exposure
[4]RMEG=Reference Dose Media Evaluation guide and is based on EPA's RfD for chronic exposure
[5]CREG=Cancer Risk Evaluation Guide and is based on an excess cancer risk of one in one-million persons exposed over a lifetime

Table 6. Description of Monitoring Wells on the Conroe Creosoting Company Site

Well Identifier	Well Location	Unit Screened	Screened Interval (depth below ground surface in feet)
MW1A	300' northeast of rework area	Shallow	59.5-74.8
MW1B			94.2-104.2
MW2A	300' northeast of Plane Fast Trucking Company	Shallow	60-75
MW2B			98.7-108.7
MW3A	150' southeast of re-work area	Shallow	53.9-68.9
MW3B			100.5-110.5
MW4A	Southeast corner of site between Big Tin Barn lumber yard and nearest residence	Shallow	55-70
MW4B			99-109
MW5A	Southeast corner of site near Big Tin Barn lumber yard and SH 105*	Shallow	59.7-74.7
MW5B			94.2-104.2
MW6A	Southwest corner of Big Tin Barn lumber yard and SH 105	Shallow	65-80
MW6B			98.5-108.5
MW7A	Adjacent to Conroe Truck and Trailer Company and SH 105	Shallow	64.4-79.4
MW7B			108.3-118.3
MW8A	Between creosote process area and SH 105	Shallow	59.4-74.4
MW8B			100-110.9
MW9A**	Center of site adjacent to miscellaneous sheds area	Shallow	62-77
MW9B			93-103
MW10A	Center of site	Shallow	60-75
MW10B			108.4-118.4
MW11A	Southeast corner of site near Big Tin Barn lumber yard	Shallow	61-76
MW12	Southeast corner of site near Big Tin Barn lumber yard and SH 105	Deep	129-139
MW13	Southeast corner of site near Big Tin Barn lumber yard and SH 105	Deep	132-142
MW14	South of the former creosote/PCP area	Deep	129-139

* SH 105 – State Highway 105

**A private water supply well is located adjacent to MW9A/9B; it is screened between 150 and 165 feet below ground surface (deep)

Appendix C: Figures

Figure 1. General Location and Demographics Information

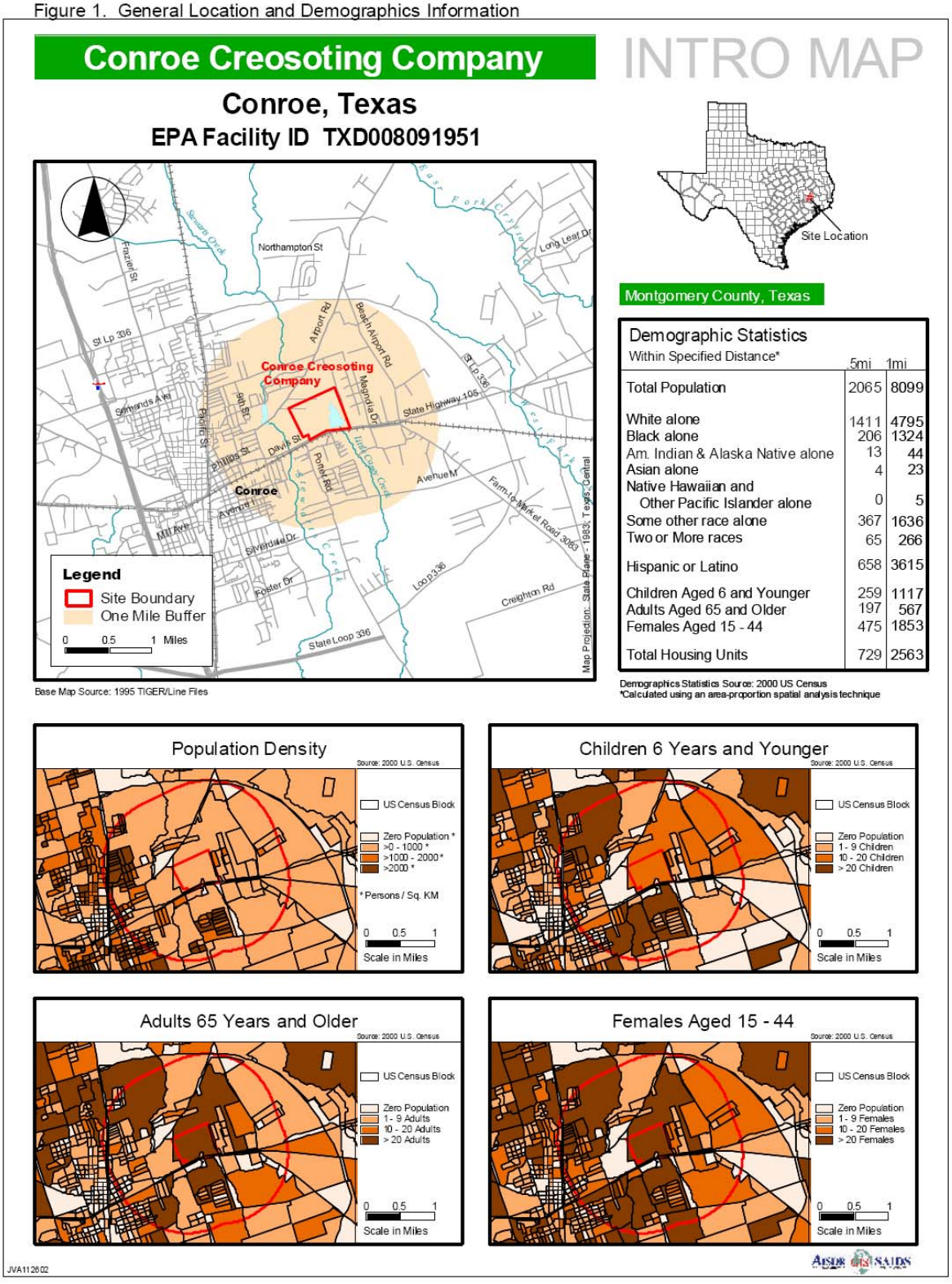

Figure 2.
Above Ground Storage Tanks

Figure 3.
Extensive Areas of Contaminated Soil
Prior to Cleanup

Figure 4. Soil Contamination Prior to Cleanup

Figure 5. Vault Construction

Figure 6. Final Vault

Appendix D
Conroe Creosoting Company Health Consultation, February 19, 2003

Holder for Conroe Creosoting Company Groundwater Health Consultation
February 19, 2003

http://www.tdh.state.tx.us/epitox/hat/ccc_hc_groundwater.pdf

Appendix E
Conroe Creosoting Company Health Consultation, August 25, 2003

Placeholder for Conroe Creosote Company Sediment Health Consultation
August 25, 2003

http://www.tdh.state.tx.us/epitox/hat/cccsed_hc_fnl.pdf