

**HEALTH CONSULTATION**

**Sediments in Stewarts Creek**

**CONROE CREOSOTING COMPANY  
CONROE, MONTGOMERY COUNTY, TEXAS  
CERCLIS No. TXD008091951**

August 25, 2003



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

## **Summary and Statement of Issues**

The U.S. Environmental Protection Agency (EPA) Region 6 asked the Agency for Toxic Substances and Disease Registry (ATSDR) and the Texas Department of Health, Environmental Epidemiology and Toxicology Division (TDH), to evaluate the potential for contamination from the Conroe Creosoting Company (CCC) site to pose a public health hazard to people living downstream on Stewarts Creek.

## **Background**

### **Site Description and History**

The CCC site is east of the city limits of Conroe, Montgomery County, Texas (Figure 1). It sits on the north side of State Highway 105 at 1776 E. Davis. Stewarts Creek is to the west; an on-site lake and Little Caney Creek lie to the east.

From 1946 until 1997, workers at this facility treated lumber with chemicals—creosote, pentachlorophenol (PCP), or copper-chromated-arsenic (CCA)—to preserve the wood for use as fence posts, railroad ties, or utility poles. The Texas Natural Resource Conservation Commission (November 2001) and the EPA (January and November of 2002) documented contamination of site soil and sediment with these wood-treatment chemicals [1, 2, 3]. TDH staff noticed heavily stained soil areas and chemical odors, particularly around tanks and process areas, when they visited the site with EPA and ATSDR regional staff in May 2002.

The EPA began removing tanks, pipes, and other equipment from the site in the Fall 2002. A Resource Conservation and Recovery Act (RCRA) vault was built on the site to contain contaminated soil and sediment. Runoff from heavily contaminated areas was redirected and contained [3]. In the past, rain and runoff that contacted contaminated areas tended to flow into an on-site drainage ditch and then west into Stewarts Creek, which flows south past residential homes and yards that have flooded during heavy rainfall.

In November 2002, to better characterize off-site contaminant concentrations around the CCC site, a contractor for the EPA collected 111 sediment and five soil samples. These samples were analyzed for semi-volatile organic compounds (SVOCs) and metals [4]. In addition, 101 of the sediment samples and all five of the soil samples were analyzed for dioxins/furans. The sediment samples were collected along Stewarts Creek, along Little Caney Creek, at the on-site lake, and elsewhere on the CCC site. Soil samples also were collected from three residential yards and a schoolyard along Stewarts Creek.

Benzo(a)pyrene, an SVOC, exceeded its health-based screening value<sup>1</sup> in 44 of the sediment samples and in one of the soil samples.

Arsenic exceeded health-based screening values in 75 sediment samples and in all five of the soil samples (Table 1). However, the levels of arsenic in sediment from Stewarts Creek (not detected to 19 mg/kg) and Little Caney Creek (not detected to 4.1 mg/kg), as well as in soil from the residential yards (2.6–4.7 mg/kg) and the schoolyard (1.5–4.5 mg/kg), were comparable to background soil arsenic concentrations for uncontaminated soil [5]. Therefore, further consideration of arsenic in this health consultation was not warranted.

Dioxins, as 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin equivalents (TCDD), exceeded ATSDR's action level for soil of 0.001 milligrams TCDD per kilogram (mg/kg) [6] in one of the 101 sediment samples, but did not exceed this value in any of the five soil samples. The sediment sample with TCDD exceeding ATSDR's action level for soil was found where the on-site drainage ditch entered Stewarts Creek. This sediment has since been removed and transferred to the on-site RCRA vault. Since dioxins were below levels of concern in soil and sediment, it is unlikely that significant exposure opportunities existed. Therefore, further consideration of dioxins in this health consultation was not warranted.

In April 2003, more-focused sediment sampling was conducted by EPA along two sections of Stewarts Creek: 1) under and near the State Highway 105 bridge over the creek; and 2) near Avenue M. Forty-two (42) sediment samples from each location were analyzed for SVOCs.

For the State Highway 105 bridge location, 28 of the 42 samples exceeded the screening value for the SVOC benzo(a)pyrene. The maximum level of the benzo(a)pyrene measured at this location was 30 mg/kg. This sample was collected in a difficult-to-access area below the bridge. For the Avenue M area, 26 of the 42 samples had levels of benzo(a)pyrene exceeding screening

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<sup>1</sup> To assess the potential health risks associated with the contaminants found in the various media (soil and creek sediment), TDH compared each contaminant detected with its health-based assessment comparison (HAC) values for non-cancer and cancer endpoints. TDH used either EPA's reference doses (RfDs) or ATSDR's minimal risk levels (MRLs) to derive the non-cancer HAC values. RfDs and MRLs are based on the assumption that there is an identifiable exposure threshold (both for the individual and for populations) below which there are no observable adverse effects. Thus, RfDs and MRLs are estimates of daily exposures to contaminants that are unlikely to cause adverse non-cancer health effects even if exposure occurs for a lifetime. The cancer risk comparison values used in this consultation are based on EPA's chemical-specific cancer slope factors (CSFs), an estimate of excess lifetime risk of one cancer in one million ( $1 \times 10^{-6}$ ) exposed people and an exposure period of 70 years. TDH used standard assumptions for body weight (15 kilograms, child; 70 kilograms, adult) and soil/sediment incidental ingestion rates (200 milligrams per day, child; 100 milligrams per day, adult) to calculate the HAC values.

Health assessment comparison (HAC) values are guidelines that specify levels of chemicals in specific environmental media (soil, air, and water) that are considered safe for human contact. Because many of the assumptions used to calculate HAC values are conservative with respect to protecting public health, exceeding a HAC value does not necessarily mean that adverse health effects will occur. However, exceeding a HAC value does suggest that potential site-specific exposure to the contaminant warrants further consideration.

values. The maximum level of benzo(a)pyrene measured in sediment from the Avenue M area was 1.4 mg/kg.

## Discussion

The environmental sampling data reviewed in this report includes data collected by EPA in 2002 and 2003. In preparing this report, TDH and ATSDR relied on those data and assumed adequate quality assurance/quality control (QA/QC) procedures were followed with regard to data collection, chain-of-custody, laboratory procedures, and data reporting.

Reviewers evaluated the results by comparing the contaminants to screening values and by selecting results that exceeded the screening level. Benzo(a)pyrene was selected for further consideration.

The most likely exposure route for benzo(a)pyrene in creek sediment or soil is through incidental ingestion of contaminated sediment or soil.<sup>2</sup> To assess the risk for those ingesting sediments, TDH used the following conservative exposure scenario: A worker ingesting 100 mg of sediment containing the highest level of benzo(a)pyrene measured in CCC area sediments (30 mg/kg) during his work week for 30 years might have a slightly elevated ( $1.34 \times 10^{-4}$ ) risk of developing cancer over a lifetime of exposure. Because the area that had the highest level of benzo(a)pyrene under and near the State Highway 105 bridge is not readily accessible, the probability of exposure and subsequent potential for adverse health outcomes is low.

Similarly, a child or an adult regularly exposed to the maximum level of benzo(a)pyrene (1.4 mg/kg) measured along Stewarts Creek at Avenue M would have no apparent increased risk of developing cancer.

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<sup>2</sup> Although dermal absorption via skin contact with contaminated soil/sediment may have been a concern during heavy rainfall and flooding of yards along the creek, the contaminants in the soil and sediment were more likely to remain joined on the soil/sediment particles than to cling to and absorb into the skin of people who may have come in contact with flood water.

## **Children's Health Concerns**

### **ATSDR's Child Health Initiative**

We recognize that the unique vulnerabilities of children demand special attention. Windows of vulnerability (critical periods) exist during a child's development, particularly during early gestation but also throughout pregnancy, infancy, childhood, and adolescence—periods when toxicants may permanently impair or alter structure and function [7].

Unique childhood vulnerabilities may be present because at birth many organs and body systems (including the lungs and the immune, endocrine, reproductive, and nervous systems) have not achieved structural or functional maturity. These organ systems continue to develop throughout childhood and adolescence. Children may exhibit differences in absorption, metabolism, storage, and excretion of toxicants, possibly resulting in higher doses to target tissues. Depending on the media, exposure for children may be more than for adults because of behavior patterns specific to children, such as a tendency to ingest dirt. In an effort to account for children's unique vulnerabilities, and in accordance with ATSDR's Child Health Initiative [8] and EPA's National Agenda to Protect Children's Health from Environmental Threats [9], we used the potential exposure for children as a guide in assessing the potential public health implications of the contaminants.

## **Conclusions**

Based on available information, we have concluded that current and future exposures to the sediment and soil in and along Stewarts Creek and Little Caney Creek, downstream from the Conroe Creosoting Company site, pose no apparent public health hazard to adults or children. This is either because contaminants are not present at levels expected to cause a health problem and/or because under current circumstances people are unlikely to come into contact with contaminated sediments often enough or for long enough duration to result in health problems. Therefore, TDH and ATSDR have classified this site as posing no apparent public health hazard.

## **Public Health Action Plan**

### **Actions Completed**

1. EPA has demolished the creosoting/PCP process unit, constructed the RCRA vault on the site to contain the contaminated material, and has completed moving contaminated soil and material into the RCRA vault.
2. EPA conducted additional characterization of sediment in Stewarts Creek and Little Caney Creek and soil in residential yards and a schoolyard downstream of the Conroe Creosoting site in November 2002 and in April 2003.
3. EPA has redirected site drainage to control surface water runoff. Additional contouring will be completed in the drainage area to direct the flow of rainwater to the creeks.
4. TDH and EPA contacted and worked with church leaders and leaders of other community groups from the nearby neighborhoods to better address community health concerns about the CCC site.

### **Actions Recommended**

1. None at this time.

### **Actions Planned**

1. EPA plans to fence the RCRA vault storage area and to post warning signs.
2. TDH plans to assist EPA in addressing community health concerns by participating in community meetings.
3. TDH will evaluate additional sampling information as needed and as data become available. Because the site was proposed for the EPA's National Priorities List, TDH will prepare a public health assessment for the Conroe Creosoting Company site by April 2004.

## CERTIFICATION

This Health Consultation for the Conroe Creosoting-Stewards Creek Sediment was prepared by the Texas Department of Health (TDH) under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.

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Robert Knowles  
Technical Project Officer, SSAB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.

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Roberta Erlwein  
Section Chief, SPS, SSAB, DHAC, ATSDR

## **Authors, Technical Advisors, and Organizations**

### **Preparers of the Report**

Susan L. Prosperie, M.S., R.S.  
Environmental Specialist  
Environmental Epidemiology and Toxicology Division  
Texas Department of Health

John F. Villanacci, Ph.D.  
Director  
Environmental Epidemiology and Toxicology Division  
Texas Department of Health

### **ATSDR Regional Representative**

Karl Markiewicz, Ph.D.  
Regional Representative  
ATSDR - Region 6

Jennifer Lyke  
Regional representative  
ATSDR, Region 6

### **ATSDR Technical Project Officer**

Robert B. Knowles, M.S., R.E.H.S.  
Environmental Health Scientist  
Division of Health Assessment and Consultation  
Superfund Site Assessment Branch  
State Programs Section

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## **Appendices**

APPENDIX A: Acronyms and Abbreviations

APPENDIX B: Figure

APPENDIX C: Table

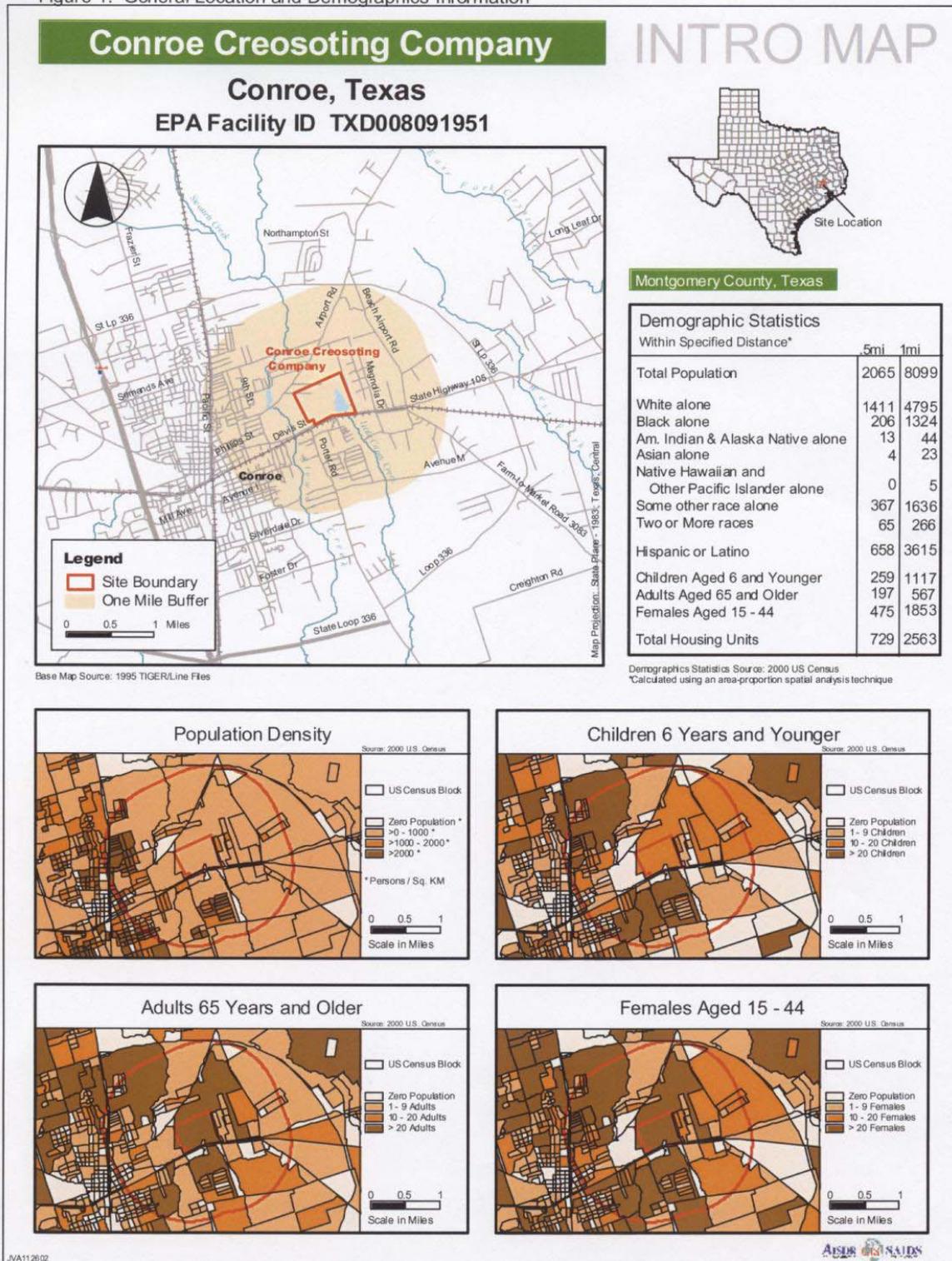
## **Appendix A**

### **Acronyms and Abbreviations**

ATSDR	Agency for Toxic Substances and Disease Registry
CCA	Copper chromated arsenic
CCC	Conroe Creosoting Company
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CREG	Carcinogenic Risk Evaluation Guide
EMEG	Environmental Media Evaluation Guide
EPA	United States Environmental Protection Agency
HAC	Health Assessment Comparison Value
MRL	Minimal risk level
NPL	U.S. EPA National Priorities List
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PCP	Pentachlorophenol
RCRA	Resource Conservation and Recovery Act
RfD	Reference dose
RMEG	Reference Dose Media Evaluation Guide
SARA	Superfund Amendments and Reauthorization Act of 1986
SVOCs	Semi-volatile organic compounds
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TDH	Texas Department of Health
TNRCC	Texas Natural Resource Conservation Commission
VOCs	Volatile organic compounds

**Appendix B**  
**Figure**

Figure 1. General Location and Demographics Information



Appendix C

<b>Table 1. Constituents Exceeding Health-based Screening Values in Soil/Sediment Samples Collected November 13, 2003.</b>			
	Benzo(a)pyrene Range; #/#*	Arsenic Range; #/#	Dioxins <sup>†</sup> as TCDD equivalents #/#
<b>Sediment Samples (mg/kg)</b>			
Stewarts Creek	ND <sup>‡</sup> -3.0; 32/65	0.9U-19; 40/65	0/60
Stewarts Creek upstream of CCC	ND-0.17 <sup>§</sup> ; 4/7	1.0-5.0; 3/7	0/6
Onsite along Stewarts Creek	ND-2.1; 4/5	2.7-22; 4/5	0.001399; 1/4
Little Caney Creek	ND-0.39J; 3/26	0.96U-4.1; 21/26	0/24
Lake entry to Little Caney Creek	ND; 0/2	4.6-18; 2/2	0/2
Lake	ND-1.3; 1/6	1.2-30; 6/6	0/5
<b>Soil Samples (mg/kg)</b>			
Residential	ND-0.18J; 1/3	2.6-4.7; 3/3	0/3
School yard	ND; 0/2	1.5-4.5; 2/3	0/2
Health-based screening values (mg/kg)	CREG <sup>¶</sup> 0.1	CREG 0.5	<0.001

\* #/# Number of samples exceeding health based screening value per total number of samples collected

<sup>†</sup> ATSDR Action Level for TCDD equivalents in soil

<sup>‡</sup> ND not detected

<sup>§</sup> estimated value

<sup>¶</sup> CREG Cancer Risk Evaluation Guide