

Health Consultation

AMERICAN CREOSOTE WORKS SUPERFUND SITE

WINNFIELD, WINN PARISH, LOUISIANA

**Prepared by
Louisiana Department of Health and Hospitals**

SEPTEMBER 30, 2011

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

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Prepared By:

Louisiana Department of Health and Hospitals
Office of Public Health
Section of Environmental Epidemiology and Toxicology
Under a Cooperative Agreement with the
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List of Acronyms

ATSDR	Agency for Toxic Substances and Disease Registry
BaP	benzo(a)pyrene
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act
COC	contaminant of concern
CREG	cancer risk evaluation guide
CSF	cancer slope factor
EMEG	environmental media evaluation guide
ERCS	EPA Emergency Response Cleanup Services
FS	Feasibility Study
ft bgs	feet below ground surface
ft/day	feet per day
LDEQ	Louisiana Department of Environmental Quality
LDHH	Louisiana Department of Health and Hospitals
MRL	minimal risk levels
NPL	National Priorities Listing
NAPL	Non-Aqueous Phase Liquids
OPH	Office of Public Health
PCP	pentachlorophenol
PAH	polycyclic aromatic hydrocarbon
PLTS	Process Liquids Treatment System
ppb	parts per billion
RBC	risk-based concentration
RECAP	Risk Evaluation/Corrective Action Program
RfD	reference dose
RI	Remedial Investigation
RMEG	reference dose media evaluation guide
SEET	Section of Environmental Epidemiology and Toxicology
SVOC	semivolatile organic compound
TCDD	tetrachlorodibenzo-p-dioxin
ug/L	micrograms per liter
US EPA	United States Environmental Protection Agency
VOC	volatile organic compound

Summary and Statement of Issues

INTRODUCTION

In May 2010, the United States Environmental Protection Agency (US EPA) released the “Third Five-Year Review Report for the American Creosote Works Superfund Site,” which reviewed data collected as part of site monitoring and investigation activities between December 2004 and December 2008 at a former wood treatment facility in Winnfield, Louisiana.

Through our cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), and in cooperation with EPA, the Louisiana Department of Health and Hospitals/Office of Public Health/Section of Environmental Epidemiology and Toxicology (LDHH/OPH/SEET) has evaluated the most recent dataset available for the American Creosote Works site. This data was collected during EPA’s routine monitoring of the NPL site and is presented in the aforementioned “Third Five-Year Review Report for the American Creosote Works Superfund Site”. LDHH/OPH/SEET’s review of this data was performed to determine whether the American Creosote Works site poses potential harm to public health.

CONCLUSION

After assessing the potential for the public to be exposed to these contaminants through skin contact, inhalation, or consumption, SEET concludes that the contaminants remaining at the American Creosote Works site and in Creosote Branch Creek adjacent to the site will not harm people’s health. SEET is unable to determine the impact of any residual contaminants that may disperse downstream into the creek or into subsequent water bodies used for recreation.

BASIS FOR DECISION

The site’s groundwater does not come into contact with the city’s recreational water sources or with the municipal water sources that provide the community’s water supply. Public access to the site is prohibited and is limited by fencing and a security system. The creek adjacent to the site is not currently suitable for recreational purposes. Therefore, we do not expect any exposures to site-related contaminants to occur at these locations. Samples of surface water and sediment from downstream areas where recreational activities may occur are currently unavailable.

American Creosote Works

NEXT STEPS

SEET will be available to assess samples collected during the Revised Feasibility Study in process at the American Creosote Works, Inc. site. SEET will be available to assess any additional samples collected from the site or to reassess the current data following any changes in usage of or access to the site.

The information produced within this health consultation will be made available to the community members and stakeholders in Winnfield, LA.

FOR MORE INFORMATION

If you have further concerns about the site, questions may be directed to LDHH/OPH/SEET at 1-888-293-7020.

Background and Site History

The American Creosote Works site's physical address is 1006 Front Street, Winnfield, Winn Parish, Louisiana, 71483 (Figures A-1 and A-2) [1, 2]. The site, which is approximately 34 acres, is bound on the north and east by Creosote Branch Creek, by Front Street to the west, and by Watts and Grove Streets to the south. An inactive lumber mill is located across Creosote Branch Creek. The site is in a primarily residential zone that also has industrial, recreational, and agricultural uses; soybeans, wheat, cotton, and corn are among the crops that are grown nearby [2, 3].

The site is currently divided into two land parcels (north and south), both owned by Winn Parish. The south parcel, which was used to store and prepare timber before treatment, has been released for reuse. The north parcel, where wood treating operations were historically concentrated, is under EPA control through an access agreement. It is completely enclosed by a security fence with locked gates and a 6-foot high chain link fence topped by barbed wire. The site is monitored with security cameras. A conveyance notice filed for the site warns that hazardous constituents remain in the soil and groundwater above levels that allow for unrestricted exposure and that unauthorized disturbance of soil or groundwater at this site could result in legal liability [2, 3]. EPA is working with the City of Winnfield to eventually transfer the site to industrial use. One-third of the site is now occupied by a local construction firm [2].

Wood treatment operations began at the site in 1901, under the ownership of the Bodcaw Lumber Company. The site was purchased in 1910 by the Louisiana Creosoting Company. In 1938 the site was purchased by American Creosote Works of Louisiana, Inc., which later became American Creosote Works, Inc. In 1979, the City of Winnfield seized the then-inactive property from the site owner, Dickerson Lumber Company, for failure to pay taxes. The Stallworth Timber Company purchased the site and, by 1981, resumed operations on a small scale. The Louisiana Department of Environmental Quality (LDEQ) found the site abandoned in June 1985 [3].

Environmental investigations at the site were initially undertaken in 1966, when the State of Louisiana Stream Control Commission found high levels of phenols and biological oxygen demand in site wastewater discharges. Between 1982 and 1986, LDEQ conducted inspections that noted spillage of creosote, abandoned pits and containers, and offsite contamination. LDEQ referred the site to EPA in March 1987, and EPA conducted investigations in 1987 and 1988. Beginning in 1988, the EPA Emergency Response Cleanup Services (ERCS) conducted a series of emergency removal actions to address immediate short-term risks posed by the site. A Remedial Investigation/Feasibility Study conducted by the EPA for the site in 1992 concluded that site soils were contaminated with polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), dioxins, and pentachlorophenol (PCP). The shallow aquifer under the site was contaminated with PAHs, phenols, and benzene. Sediments near the site were contaminated with PAHs and PCP. The surface waters of Creosote Branch Creek were determined to not pose a significant threat to human health or the environment [3].

EPA performed a Remedial Investigation/Feasibility Study (RI/FS) at the site between December 1991 and April 1993. The EPA proposed the site to the National Priorities

Listing (NPL) in February 1992. The site listing was final in October 1992. The following site remediation activities are completed:

- onsite incineration of approximately 56,500 tons of contaminated materials (the ash was returned to the excavation site, which was lined with a geotextile liner, and buried under a three feet thick clay cap);
- excavation and consolidation of 7,000 cubic yards of material with low-level contamination, which has been capped with a low-permeability clay cover;
- installation of a fluids recovery system to extract contaminated groundwater and a Process Liquids Treatment System (PLTS) to address contamination in the shallow groundwater;
- construction of an in-situ bioremediation system to remediate contaminated site groundwater and subsurface soils; and
- redirection of surface water away from the most heavily contaminated portions of the site.

From October 1996 through December 2008, approximately 70,602,000 gallons of groundwater and 183,300 gallons of Non-Aqueous Phase Liquids (NAPL) were extracted and treated at the site; effluent treated by the PLTS system is either discharged to Creosote Branch Creek or injected back into the shallow groundwater for use in the in-situ bioremediation system. As of 2008, an estimated 400,000 gallons of free-phase NAPL remain at the site, necessitating the continuation of treatment, monitoring, and sampling activities [3].

Under the statutory requirements of Section 121(c) of the Comprehensive Environmental Response, Compensation, & Liability Act (CERCLA, or “Superfund”), five-year reviews are required for sites where “hazardous substances remain onsite above levels that allow for unrestricted use and unrestricted exposure”. The EPA released the “Third Five-Year Review Report for the American Creosote Works Superfund Site” in May 2010. This report reviewed data collected during monitoring and investigation activities at the site’s north parcel between December 2004 and December 2008. The report states that the site remedies are functioning as intended. The report concludes with the identification of issues that need to be addressed to ensure the continued protectiveness of the remedies and to address the potential for offsite migration [3].

Groundwater contamination at the site is primarily within the shallow aquifer. Sampling performed during the Third Five-Year Review found PAH contamination within a deeper aquifer, at the northern edge under the site. This contamination is believed to have occurred when a malfunctioning PLTS system injected its effluent into the deep aquifer. Recommendations stated in the Third Five-Year Review include a re-evaluation of the PLTS sampling scheme to improve its effectiveness and the cessation of the discharge of this effluent to off-site surface water when the system fails to meet effluent limits. The Third Five-Year Review also noted that the analysis for carcinogenic compounds in groundwater was performed using analytical reporting limits that exceeded the groundwater remedial goal for the site (a benzo(a)pyrene (B(a)P) equivalent of 0.20 micrograms per liter (ug/L)). Monitoring of carcinogenic PAHs in groundwater at the site is now performed using lower analytical reporting limits [3].

The Third Five-Year Review reported a malfunction of the bioreactor in the PLTS system that is believed to have contributed to a release of effluent with elevated contaminant levels to Creosote Branch Creek. At the time the Third Five-Year Review was released, new equipment was being introduced into the PLTS system [3].

The Third Five-Year Review also notes that the levels of contamination detected in surface water and sediment samples may be due to runoff from the site during remedial construction or prior to the establishment of the clean and vegetated soil cover. Elevated levels of PCP and PAHs at the background sample location (SW1/SD1) suggest that there may be an offsite source contributing to the contaminant levels in Creosote Branch Creek [3].

A revised FS was initiated at the site in September 2010. This FS will include pilot studies of various remediation technologies to determine if a new remedy is warranted at the site [3, 9].

Demographics

The 2010 Census results reported a total population of 4,840 within the approximate 3.3-square mile boundaries of Winnfield, LA. The largest ethnic group in the city is Caucasian (49%), followed by African-American (48%), those identifying themselves as belonging to 2 or more races (1.0%), American Indian and Alaskan Native (0.5%), and Asian (0.4%). Two point two percent (2.2%) of the population identified themselves as Hispanic or Latino of any race. Thirty-seven point one percent (37.1 %) of the population in Winnfield, LA who were at least 25 years of age in the year 2000 had earned at least a high school diploma. The median household income was \$19,342. The largest employers in Allen Parish were in education, health, social services manufacturing and retail trades [4].

The closest residence is located 200 feet away from the American Creosote Works site [2]. Within approximately 1 mile of the site are three childcare centers, a Head Start center, and three primary to intermediate level grade schools [5].

Discussion

Data Used

Through our cooperative agreement with ATSDR, and in cooperation with EPA, LDHH/OPH/SEET evaluated the most recent dataset available for the American Creosote Works site. This data was collected during EPA's routine monitoring of the NPL site. The Third Five-Year Review summarized data collected during routine site monitoring events between December 2004 and December 2008. SEET's health assessment focuses on the most recent data-- the samples collected during 2008.

Groundwater Samples

Groundwater samples were collected from 26 wells monitoring the shallow aquifer and one well that monitors the deeper aquifer (DMW-02) (see Figures A-3 and A-4). Monitoring well DMW-02 is located at the lowest area of the boundary between the shallow and deeper aquifers and is sampled to monitor the presence or absence of PAH contaminants in the deeper aquifer [6].

- Two groundwater samples from each well (one collected on June 1, 2008, and one collected on December 1, 2008) were analyzed for the presence of PCP.
- Two groundwater samples from each well (one collected between June 16-19, 2008, and one collected between December 16-18, 2008) were analyzed for the presence of PAHs (as benzo(a)pyrene (BaP) equivalents).
- One groundwater sample from each well (collected between December 16-18, 2008) was analyzed for volatile organic compounds (VOCs), specifically benzene, toluene, ethylbenzene, and xylene [3].

Table B-1 lists the ranges of contaminants detected in groundwater sampled at the site.

PLTS Effluent

One PLTS effluent sample was collected on 10/16/2008 and one on 12/18/2008. These samples were analyzed for PAHs (as BaP equivalents), 39 semi-volatile organic compounds (SVOCs), 4 VOCs (benzene, toluene, ethylbenzene, and xylene), 3 metals (arsenic, chromium, and zinc) and total petroleum hydrocarbons as “oil & grease” [3]. Table B-2 lists the ranges of contaminants detected in PLTS effluent from the site.

Surface Water and Sediment Samples

Eight surface water samples were collected from Creosote Branch Creek along the site’s northern and western perimeter in February 2008 (see Figure A-5). Five of these sample locations were chosen for comparison to the comprehensive sampling event performed for the February-March 1992 RI. The sediment samples were collected from two depths at each sampling location:

- one surface sample taken at depths of zero to 0.5 feet
- one lower sample taken at depths between 1.5 to 3 feet.

Samples were analyzed for PAHs (as BaP equivalents) and SVOCs (carbazole, dibenzofuran, 2-methylnaphthalene, naphthalene, and PCP). For screening purposes, two perimeter sediment samples (SD2 and SD3) and the background sediment sample (SD1) were also tested for dioxins and furans as 2,3,7,8- tetrachlorodibenzo-p-dioxin (TCDD) equivalents; further dioxin testing is under consideration for the Revised Feasibility Study [9, 10]. These screening samples were not included in the site assessment. Table B-3 lists the ranges of contaminants detected in surface water samples. Table B-4 lists the ranges of contaminants detected in sediment samples.

Exposure Pathways

An exposure pathway consists of five elements: a source of contamination, transport through an environmental medium (air, water, or soil), a point of exposure, a route of human exposure (ingestion, dermal exposure, or inhalation), and a population. Completed pathways require that all five necessary elements exist and that exposure to a contaminant has occurred in the past, is presently occurring, or will occur in the future. An exposure pathway can be eliminated if at least one of the five elements is missing and will never be present.

Groundwater

Exposure to the contaminants in groundwater from the site is unlikely. Most of the residents of Winnfield receive drinking water from the Winnfield Water System, which uses the Sparta Aquifer as its source. The Sparta Aquifer lies 180-300 feet below ground surface (ft bgs). Due to their relatively low permeability, neither of the aquifers related to the site are considered to be viable alternatives to the Sparta Aquifer for drinking water. Neither aquifer discharges into a water body that is currently used as a drinking water source.

The shallow aquifer beneath the site discharges northward into the Creosote Branch Creek at a velocity ranging from 0.002 feet per day (ft/day) to 0.05 ft/day. Within the bedrock below the shallow aquifer, at depths ranging from 55 to 65 ft bgs, a deeper aquifer flows toward the northwest with a velocity ranging from 0.01 to 0.13 ft/day [4,7]. An upward vertical gradient exists between the two aquifers, with hydraulic interchange limited by the bedrock within which the deeper aquifer lies. The bedrock, combined with the pump and treat operation running at the site, has also been observed to effectively prevent downward migration of site related contaminants [3]

Within a one-mile radius of the north parcel at the American Creosote Works site, there are seven active wells that are not environmental monitoring or recovery wells. Figure A-6 shows the location of these seven wells. Two of these wells are used for industrial purposes, and the other six are described as public supply wells. All of these wells are screened at depths lower than the aquifers at the American Creosote Works site and do not draw water from the shallow or deep aquifers at the site [8].

PLTS Effluent

The PLTS was designed to separate contamination from the site's groundwater. The four phases of PLTS treatment involve an oil/water separator, flocculation and settling of small particles, decomposition of biodegradable organic compounds, and filtration through sand and activated carbon. The cleaned effluent is then either used for in-situ bioremediation or discharged to Creosote Branch Creek surface water. Creosote Branch Creek is not a drinking water source, but the public could theoretically be exposed to the discharged effluents through recreational activities in the creek, such as swimming and fishing. Potential exposures to Creosote Branch Creek are discussed further in the following section on "Surface Water".

Surface Water and Sediment

Exposure to surface water or sediment contaminants from the American Creosote Works site could theoretically occur through ingestion (drinking the water or accidentally ingesting sediment), dermal contact, or inhalation of vapors from surface water or sediment in Creosote Branch Creek.

The site topography slopes downward from south to north. Runoff from the site drains into Creosote Branch Creek, which flows within a 10-12 feet deep drainage. Creosote Branch Creek flows two miles east-southeast into Port de Luce Creek, which joins three miles southeast with Cedar Creek, which empties into the Dugdemona River, one of the largest waterways in the Winnfield area. The designated uses of the Dugdemona River are primary and secondary contact recreation (such as swimming, wading, and fishing) and fish and wildlife propagation. None of the water bodies from Creosote Branch Creek to the Dugdemona River serve as primary sources of drinking water for the community [3, 6].

No fishing has been observed in Creosote Branch Creek near the American Creosote Works site; this portion of the creek is not a prime site for recreational activities. The banks of the creek near the site are reported to be steep and high (averaging 10 feet) and the water level at this portion of the creek is low (averaging 6 inches in depth and a few feet in width) [9]. SEET therefore concludes that exposure to contaminants from the site by way of the surface water or sediment at Creosote Branch Creek next to the site is unlikely.

Evaluation Process

The evaluation process used to assess the potential public health hazard at the American Creosote Works site is described in Appendix B. Contaminant concentrations were initially compared to comparison values (CVs) appropriate for their media. These conservative screening values are only used to determine which environmental contaminants need further evaluation. CVs are not used to predict adverse human health effects. Contaminant concentrations that exceeded CVs are identified as contaminants of concern (COCs) and are listed in Tables B-1 through B-4.

As noted in the Third Five-Year Review, groundwater analyses for carcinogenic compounds was performed using reporting limits that were above the corresponding comparison values. Effective assessment of contaminants recorded using these reporting limits was not possible.

Health Effects Evaluation

Groundwater

There is no current use of the site groundwater as a drinking water source or for bathing or recreational purposes. SEET therefore concludes that groundwater from the site will not harm people's health. However, if the hydrogeological conditions at the site change, allowing groundwater from the site to come into contact with an existing local water supply or be considered as a water supply itself, the levels of contaminants present in the shallow and deep aquifers should be reassessed for their potential to pose harm to people's health.

PLTS Effluent, Surface Water, and Sediment

There is no current use of the sediment or surface water at Creosote Branch Creek (which receives effluent from the PLTS) for recreational purposes. The portion of Creosote Branch Creek at the site is not well suited to public use due to its steep banks and heavy vegetation [9]. SEET therefore concludes that the surface water and the sediment at the portion of Creosote Branch Creek adjacent to the American Creosote Works site will not harm people's health. No soil or sediment samples were available from further downstream at any locations along Creosote Branch Creek where further dispersal and dilution of site contaminants may occur and where recreational activities have been observed to occur.

Child Health Considerations

The physical differences between children and adults demand special emphasis in assessing public health hazards. Children may be at greater risk than are adults from exposures to hazardous substances. Children play outdoors and engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than adults and breathe dust, soil, and vapors close to the ground. A child's lower body weight and higher intake rate result in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage.

Children would not be regularly exposed to the groundwater, PLTS effluent, surface water, or sediment from American Creosote Works or from the portion of Creosote Branch Creek adjacent to the site. Offsite exposures would occur where Creosote Branch Creek is used for recreational purposes. As there are no samples available from offsite portions of Creosote Branch Creek that are being used for recreational purposes, SEET cannot determine whether residual contaminants are present in surface water or sediment at these offsite locations in concentrations that would pose harm to public health.

Conclusions

SEET and ATSDR are committed to recognizing and addressing community concerns about the risks involved in exposure to unsafe chemicals. Our agencies are committed to providing the community of Winnfield, LA, with the best science-based information available to keep the community safe. SEET concludes that the groundwater, PLTS effluent, surface water, and sediment at the American Creosote Works, Inc., site and in the portion of Creosote Branch Creek immediately adjacent to the site will not harm people's health. Under current site conditions, no routes of exposure exist between residual site contaminants in these media and the public. There is no connection between the site's groundwater and the recreational or municipal water sources for the community, so community members will not drink groundwater from the site or use it for any washing activities or recreational activities. Public access to the site is prohibited and limited by fencing and a security system. The creek adjacent to the site is not currently suitable for recreational purposes.

However, SEET is unable to determine whether residual contaminants from the American Creosote Works, Inc., site have been transported to sediment or surface water downstream at Creosote Branch Creek and beyond, where recreational activities are more likely to occur.

If you have further concerns about the site, you can call LDHH/OPH/SEET at 1-888-293-7020.

Recommendations

SEET will be available to assess samples collected during the Revised FS currently in process at the American Creosote Works, Inc. site. This study is slated to include the evaluation of risk issues associated with the creek and is expected to be completed within a year of its inception [3, 9]. SEET will be available to assess any additional samples collected from the site or to reassess the current data following any changes in usage of or access to the site.

Future sampling for carcinogenic compounds at the American Creosote Works site should be performed using analytical reporting limits that fall below the most current corresponding comparison values.

Public Health Action Plan

The information produced within this health consultation will be disseminated to the regulators, community members and stakeholders in Winnfield, LA.

Report Preparation

This Public Health Consultation for the American Creosote Works Superfund Site was prepared by the Louisiana Department of Health and Hospitals under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with the approved agency methods, policies, procedures existing at the date of publication. Editorial review was completed by the cooperative agreement partner. ATSDR has reviewed this document and concurs with its findings based on the information presented. ATSDR's approval of this document has been captured in an electronic database, and the approving agency reviewers are listed below.

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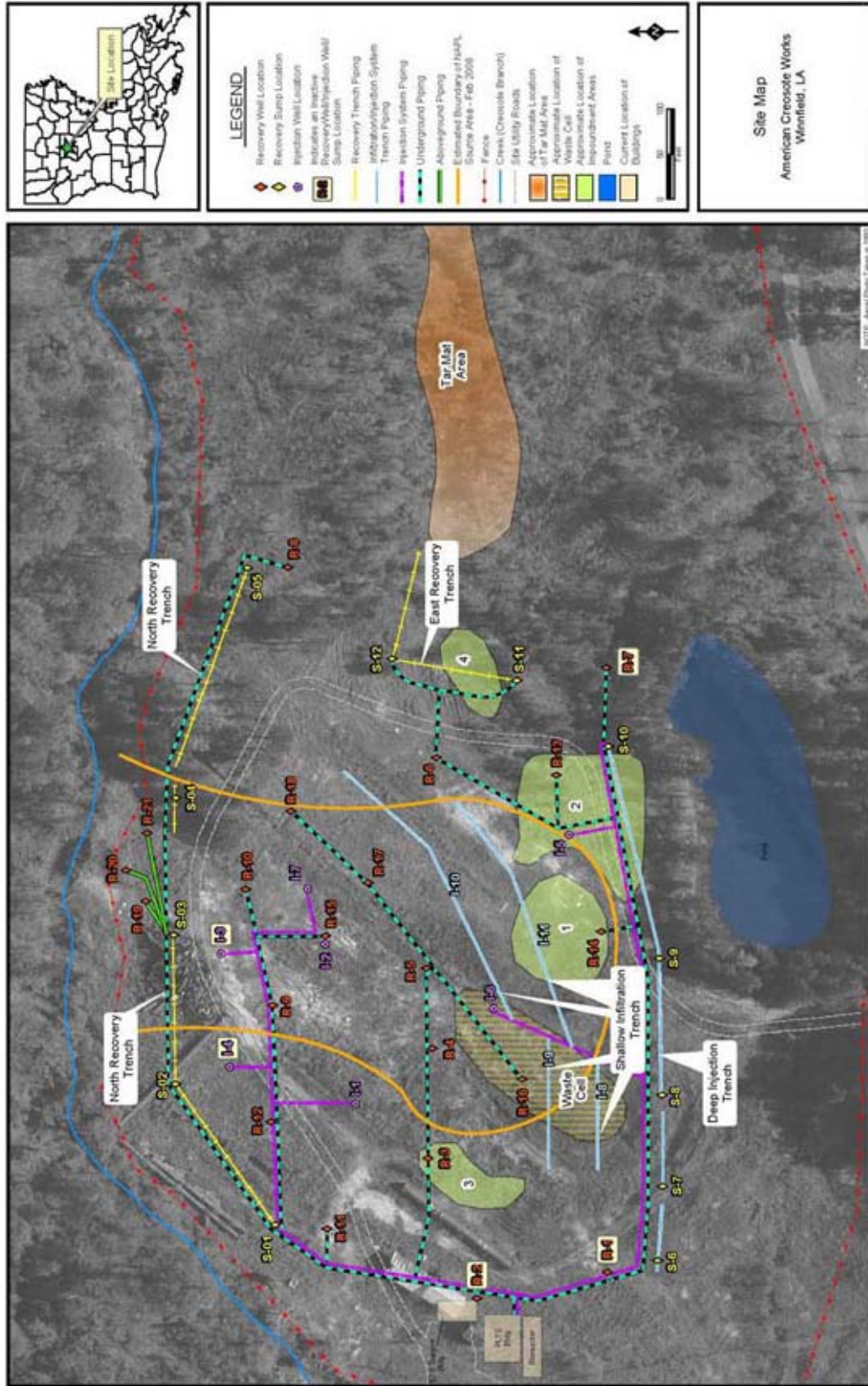
APPENDIX A: Maps

Figure A-1: Location of the American Creosote Works, Inc. (boundaries approximated by shading)



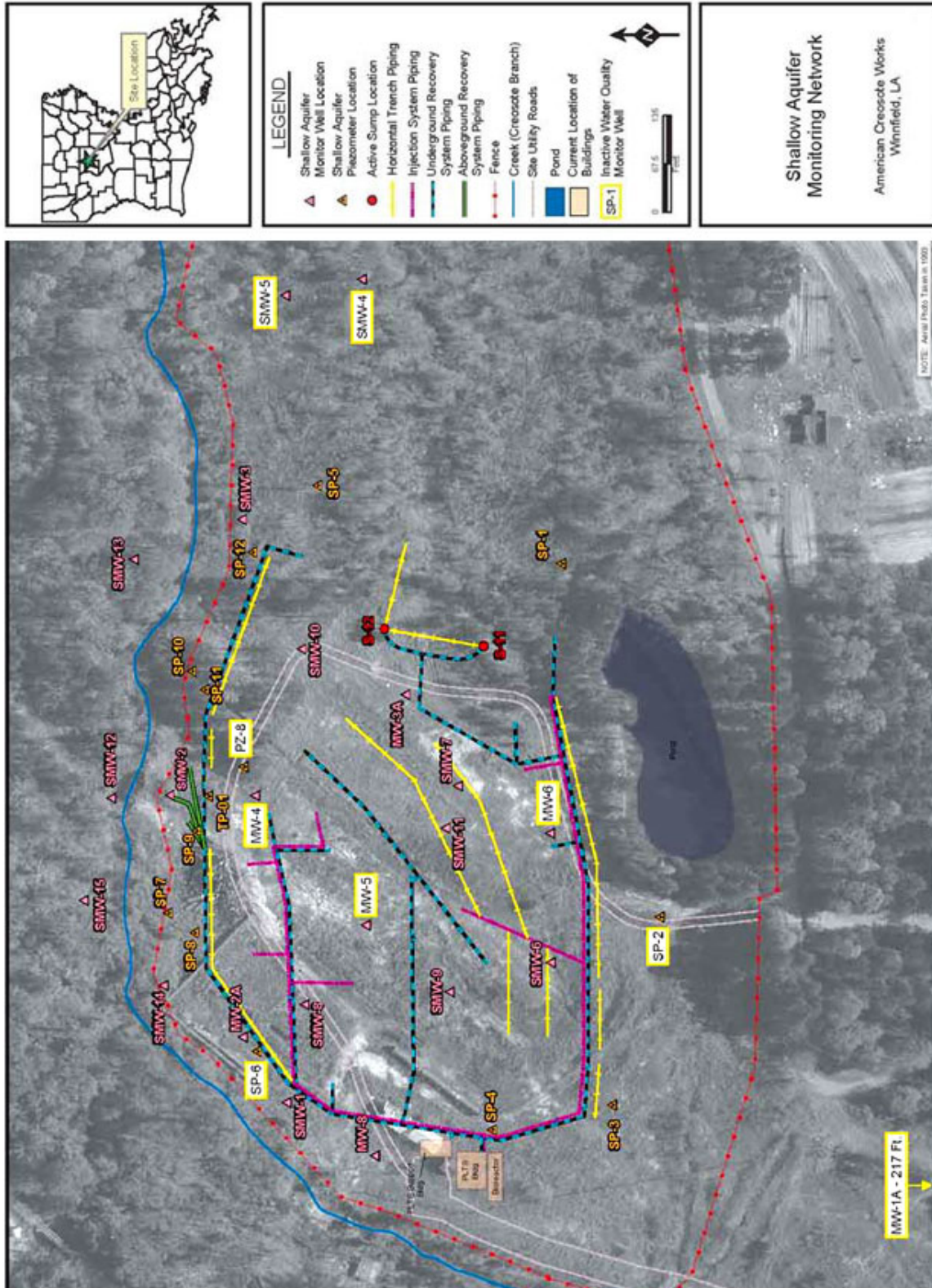
Adapted from: **Google Earth**. "American Creosote Works". 31°55'11.54" N and 92°38'09.12" W. Accessed 3 May 2011.

Figure A-2: Map of sampled portion of the American Creosote Works, Inc. Site



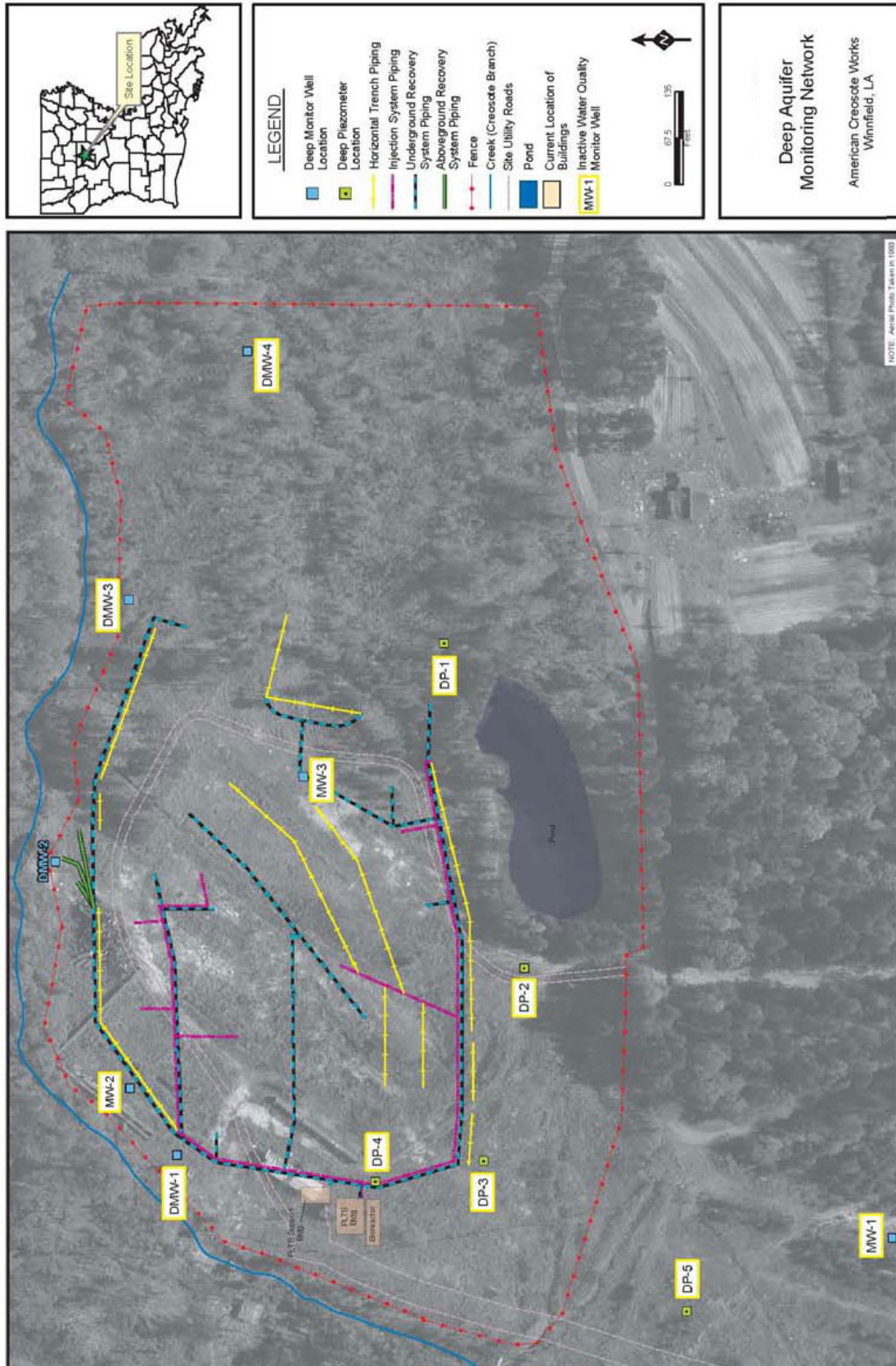
Adapted from: United States Environmental Protection Agency. Third Five-Year Review Report for the American Creosote Works Superfund Site. EPA ID# LAD000239814. 2010 May.

Figure A-3: Map of groundwater sampling for the shallow aquifer at the American Creosote Works, Inc. Site



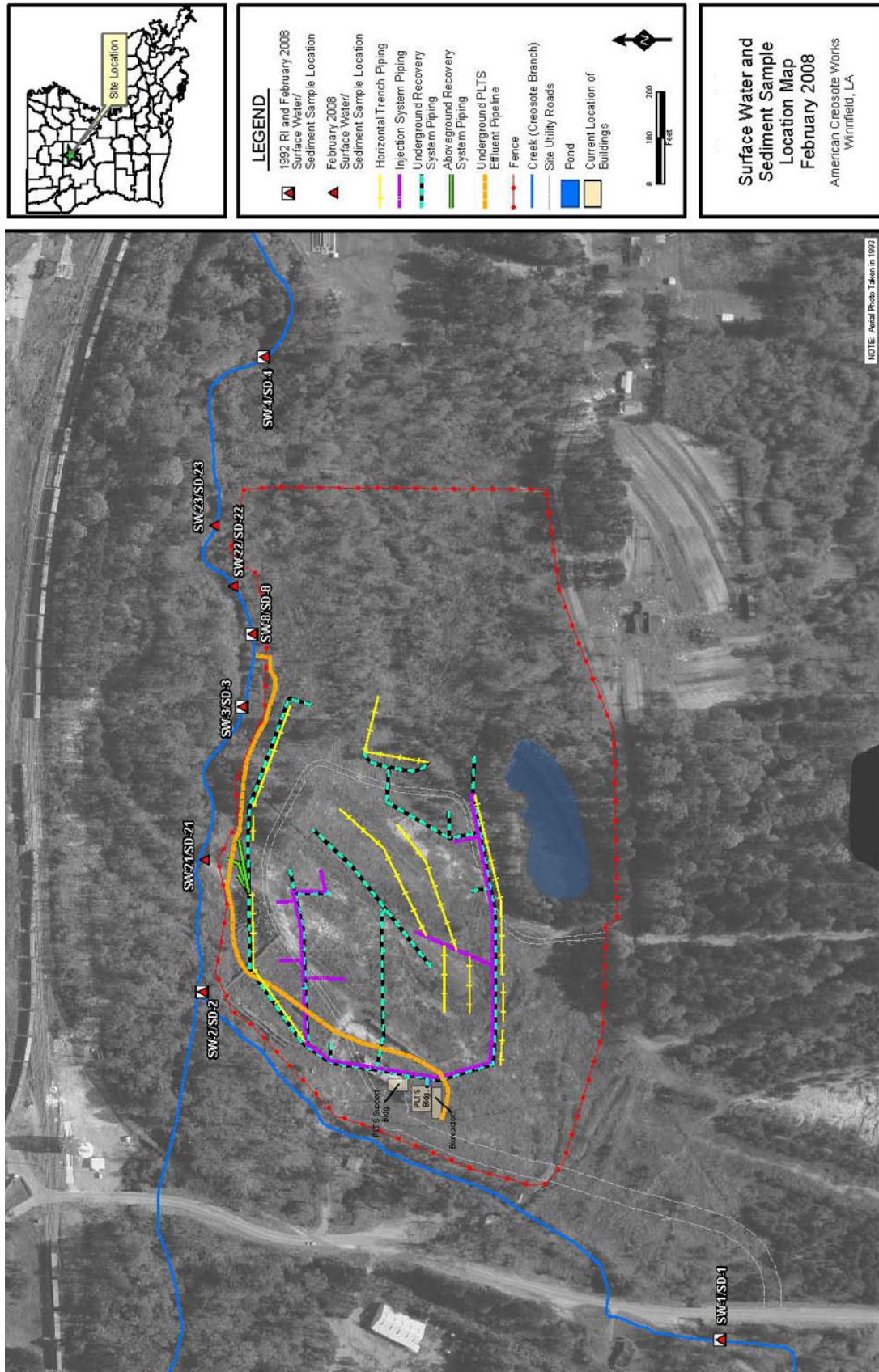
Adapted from: United States Environmental Protection Agency. Third Five-Year Review Report for the American Creosote Works Superfund Site. EPA ID# LAD000239814. 2010 May.

Figure A-4: Map of groundwater sampling for the deep aquifer at the American Creosote Works, Inc. Site



Adapted from: United States Environmental Protection Agency. Third Five-Year Review Report for the American Creosote Works Superfund Site. EPA ID# LAD000239814. 2010 May.

Figure A-5: Map of surface water and sediment sampling at the American Creosote Works, Inc. Site



Adapted from: United States Environmental Protection Agency. Third Five-Year Review Report for the American Creosote Works Superfund Site. EPA ID# LAD000239814. 2010 May.

Figure A-6: Map of active water wells (excluding monitoring wells and environmental recovery wells) located within a one mile radius of the north parcel of the American Creosote Works site



Key	Local Well Number	Well Depth (feet deep)	Water Level (ft bgs*)	Use Description
A	229	605	94	Public Supply
B	10	420	0	Industrial
C	5423Z	610	70	Industrial
D	24	478	37.75	Public Supply
E	202	682	41	Public Supply
F	46	427	36	Public Supply
G	165	459	62	Public Supply

*feet below ground surface

Map produced by the Louisiana Department of Health and Hospitals, Office of Public Health, Center for Environmental Health Services, Section of Environmental Epidemiology & Toxicology. 9 May 2011.

APPENDIX B: Data Evaluation

Screening Process

Table B-1 lists the ranges of contaminant concentrations detected in groundwater at the American Creosote Works site. Because no pathway of exposure exists between the site groundwater and the public, no further screening was employed.

Table B-1 lists the ranges of contaminant concentrations detected in the Process Liquid Treatment System (PLTS) effluent. Tables B-3 lists the ranges of contaminant concentrations detected in surface water and sediment in Creosote Branch Creek adjacent to the site. Because no pathway of exposure exists between the surface water and sediment at these locations and the public, no further screening was employed.

The following comparison values were used in the evaluation of samples collected from the American Creosote Works site:

Reference dose media evaluation guides (RMEGs) are estimated contaminant concentrations at which noncarcinogenic health effects are unlikely. They are calculated from the U.S. Environmental Protection Agency's (EPA) reference dose (RfD).

Cancer risk evaluation guides (CREGs) are estimated contaminant concentrations that would be expected to cause no more than one additional excess cancer in 1 million exposed persons over a lifetime. CREGs are calculated from EPA's cancer slope factors (CSFs).

Environmental media evaluation guides (EMEGs) are estimated contaminant concentrations at which noncarcinogenic health effects are unlikely. EMEGs are calculated from the Agency for Toxic Substances and Disease Registry's (ATSDR) minimal risk levels (MRLs).

Risk-based concentrations (RBCs) are estimated contaminant concentrations in a media at which noncarcinogenic or carcinogenic health effects are unlikely.

When no health-based comparison value was available for a contaminant, screening was based on the Louisiana Department of Environmental Quality's Risk Evaluation/Corrective Action Program (RECAP) screening standards. *RECAP screening standards* are concentrations at or above which remediation of a medium (soil, sediment, or water) should occur.

Contaminants that were not detected at concentrations above the reporting limit (labeled with a "U") were assessed using a value of half the reporting limit.

There were no health-based comparison values or RECAP screening standards available with which to evaluate benzo(g,h,i)perylene, carbazole, or "oil & grease".

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Table B-1: Ranges of contaminants detected in groundwater from the American Creosote Works site

(Contaminant concentrations exceeding their screening values are listed in bold red)

Contaminant	Range of concentrations detected (ppb*)		Sample ID [†] , Maximum Concentration	CV [‡] (ppb)	CV reference
	Minimum	Maximum			
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	0.05 U [§]	1,800	SMW-02 17 Jun 08	600	Child RMEG**
Acenaphthylene	0.05 U	280	SMW-02 17 Jun 08	100	RECAP GW SS ^{††}
Anthracene	0.05 U	1,100	SP-09 18 Dec 08	3,000	Child RMEG
Benzo(a)anthracene	0.05 U	900	SP-09 18 Dec 08	2.90E-2	RBC ^{‡‡}
Benzo(a)pyrene	0.05 U	430	SP-09 18 Dec 08	5.00E-3	CREG ^{§§}
Benzo(b)fluoranthene	0.05 U	660	SP-09 18 Dec 08	2.90E-2	RBC
Benzo(g,h,i)perylene	0.05 U	190	SP-09 18 Dec 08	NA***	NA
Benzo(k)fluoranthene	0.05 U	250	SP-09 18 Dec 08	0.29	RBC
Chrysene	0.05 U	760	SP-09 18 Dec 08	2.90	RBC
Dibenzo(a,h)anthracene	0.05 U	60	SP-09 18 Dec 08	2.90E-3	RBC
Fluoranthene	0.05 U	4,500	SP-09 18 Dec 08	400	Child RMEG
Fluorene	0.05 U	2,200	SP-09 18 Dec 08	400	Child RMEG
Indeno (1,2,3-cd)pyrene	0.05 U	180	SP-09 18 Dec 08	2.90E-2	RBC
Phenanthrene	0.05 U	7,900	SP-09 18 Dec 08	180	RECAP GW SS
Pyrene	0.05 U	2,700	SP-09 18 Dec 08	300	Child RMEG
Semivolatile Organic Compounds					
Naphthalene	0.05 U	23,000	SMW-02 17 Jun 08	200	Child RMEG
Pentachlorophenol	0.033	110	SMW-11 01 Jun 08	0.09	CREG
Volatile Organic Compounds					
Benzene	0.25 U	327	SMW-02	0.60	CREG

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Contaminant	Range of concentrations detected (ppb [*])		Sample ID [†] , Maximum Concentration	CV [‡] (ppb)	CV reference
	Minimum	Maximum			
Ethylbenzene	0.25 U	408	SMW-02	1,000	Child RMEG
Toluene	0.25 U	613	SMW-02	200	Child Int. EMEG
m, p-Xylene	0.05 U	464	SMW-02	2,000	Child RMEG
o-Xylene	0.25 U	288	SMW-02	2,000	Child RMEG

^{*} ppb =parts per billion

[†]ID = identification

[‡]CV=comparison value

[§] U = not detected (concentration listed is half the reporting limit)

^{**} RMEG = Reference dose Media Evaluation Guide

^{††} RECAP GW SS =Louisiana Department of Environmental Quality Risk Evaluation/Corrective Action Program Screening Option Screening Standard for Groundwater

^{††}RBC = Risk=-based concentration

^{§§}CREG = cancer risk evaluation guide

^{***} NA = not available

^{†††}Int. EMEG = Intermediate Environmental Media Evaluation Guide

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Table B-2: Ranges of contaminants detected in Process Liquid Treatment System (PLTS) effluent at the American Creosote Works site

(Contaminant concentrations exceeding their screening values are listed in bold red)

Contaminant	Range of concentrations detected (ppb *)		Sample Date, Maximum Concentration	CV† (ppb)	CV reference
	Minimum	Maximum			
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	0.75 U‡	170	12/18/2008	600	Child RMEG§
Acenaphthylene	0.80 U	8.80	12/18/2008	100	RECAP GW SS**
Anthracene	0.90 U	24	12/18/2008	3,000	Child RMEG
Benzo (a) anthracene	0.70 U	5.60	12/18/2008	2.90E-2	RBC††
Benzo (a) Pyrene	0.80 U	2.20	12/18/2008	5.00E-3	CREG‡‡
Benzo (b) fluoranthene	1.50	3.00	12/18/2008	2.90E-2	RBC
Benzo (g,h,i) Perylene	1.15 U	1.25 U	10/16/2008	NA§§	NA
Benzo (k) Fluoranthene	0.75 U	0.80 U	10/16/2008	0.29	RBC
Chrysene	1.40	5.20	12/18/2008	2.90	RBC
Dibenzo(a,h) anthracene	0.60 U	0.65 U	10/16/2008	2.90E-3	RBC
Fluoranthene	1.70	53	12/18/2008	400	Child RMEG
Fluorene	2.10	106	12/18/2008	400	Child RMEG
Indeno (1,2,3-cd) pyrene	1.10 U	1.20 U	10/16/2008	2.90E-2	RBC
Phenanthrene	0.80 U	201	12/18/2008	180	RECAP GW SS
Pyrene	1.80	28	12/18/2008	300	Child RMEG
Semi-volatile Organic Compounds					
1,2,4-Trichlorobenzene	4.75E-1 U	0.50 U	10/16/2008	100	Child RMEG
1,2-Dichlorobenzene	0.70 U	0.80 U	10/16/2008	900	Child RMEG
1,2-Diphenylhydrazine	0.55 U	0.60 U	10/16/2008	0.04	CREG
1,3-Dichlorobenzene	0.75 U	0.80 U	10/16/2008	200	Child Int. EMEG***
1,4-Dichlorobenzene	0.70 U	0.75 U	10/16/2008	700	Child Int. EMEG
2,4,6-Trichlorophenol	0.70 U	0.75 U	10/16/2008	3	CREG
2,4-Dichlorophenol	0.80 U	0.90 U	10/16/2008	30	Child RMEG

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Contaminant	Range of concentrations detected (ppb*)		Sample Date, Maximum Concentration	CV [†] (ppb)	CV reference
	Minimum	Maximum			
2,4-Dimethylphenol	1.30	724	12/18/2008	200	Child RMEG
2,4-Dinitrophenol	1.10 U	1.20 U	10/16/2008	20	Child RMEG
2,4-Dinitrotoluene	1.10 U	1.20 U	10/16/2008	20	Child RMEG
2,6-Dinitrotoluene	0.80 U	0.85 U	10/16/2008	40	Child Int. EMEG
2-Chloronaphthalene	0.55 U	0.60 U	10/16/2008	800	Child RMEG
2-Chlorophenol	0.65 U	0.70 U	10/16/2008	50	Child RMEG
2-Nitrophenol	0.75 U	0.80 U	10/16/2008	NA	NA
3,3'-Dichlorobenzidine	1.75 U	1.85 U	10/16/2008	0.08	CREG
4,6-Dinitro-2-Methylphenol	1.80 U	1.95 U	10/16/2008	NA	NA
4-Bromophenyl phenyl ether	1.00 U	1.05 U	10/16/2008	NA	NA
4-Chlorophenyl phenyl ether	0.70 U	0.75 U	10/16/2008	NA	NA
4-Nitrophenol	0.80 U	0.85 U	10/16/2008	50	RECAP GW SS
Benzidine	11.50 U	12.50 U	10/16/2008	2.00E-4	CREG
Bis(2-chloroethoxy)methane	0.75 U	0.80 U	10/16/2008	110	RBC
Bis(2-chloroethyl)Ether	0.55 U	0.60 U	10/16/2008	0.03	CREG
Bis(2-chloroisopropyl)ether	0.50 U	0.55 U	10/16/2008	400	Child RMEG
Bis(2-ethylhexyl)phthalate	0.70 U	0.75 U	10/16/2008	200	Child RMEG
Butyl benzyl phthalate	0.80 U	0.85 U	10/16/2008	2,000	Child RMEG
Di-n-Butylphthalate	0.70 U	0.80 U	10/16/2008	1,000	Child RMEG
Di-n-Octylphthalate	0.60 U	0.65 U	10/16/2008	4,000	Child Int. EMEG
Diethylphthalate	0.50 U	0.55 U	10/16/2008	8,000	Child RMEG
Dimethyl phthalate	0.85 U	0.90 U	10/16/2008	37,000	RECAP GW SS
Hexachlorocyclopentadiene	0.65 U	0.70 U	10/16/2008	60	Child RMEG
Hexachloroethane	0.80 U	0.85 U	10/16/2008	2	CREG
Isophorone	0.55 U	0.60 U	10/16/2008	40	CREG

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Contaminant	Range of concentrations detected (ppb [*])		Sample Date, Maximum Concentration	CV [†] (ppb)	CV reference
	Minimum	Maximum			
N-Nitrosodi-n-Propylamine	0.75 U	0.85 U	10/16/2008	5.00E-3	CREG
N-Nitrosodimethylamine	0.60 U	0.65 U	10/16/2008	7.00E-4	CREG
N-Nitrosodiphenylamine	0.900 U	0.95 U	10/16/2008	7	CREG
Naphthalene	0.75 U	194	12/18/2008	200	Child RMEG
Nitrobenzene	0.65 U	0.70 U	10/16/2008	20	Child RMEG
Pentachlorophenol	2.00 U	211	12/18/2008	0.09	CREG
Phenol	0.26 U	143	12/18/2008	3,000	Child RMEG
Volatile Organic Compounds					
Benzene	0.23 U	0.90	12/18/2008	0.6	CREG
Ethylbenzene	0.225 U	0.77	12/18/2008	1,000	Child RMEG
Toluene	0.24 U	3.10	12/18/2008	200	Child Int. EMEG
Xylenes, Total	0.70 U	8.20	12/18/2008	2,000	Child RMEG
Metals					
Arsenic	1.35 U	2.70 U	12/18/2008	0.02	Child RMEG
Chromium	0.90 U	1.00 U	12/18/2008	NA	NA
Zinc	12.00	15.00	12/18/2008	3,000	Child RMEG
Total Petroleum Hydrocarbons					
Oil & Grease	420 U	1,900	12/18/2008	NA	NA

* ppb =parts per billion

† CV=comparison value

‡ U = not detected (concentration listed is half the reporting limit)

§ RMEG = Reference dose Media Evaluation Guide

** RECAP GW SS =Louisiana Department of Environmental Quality Risk Evaluation/Corrective Action Program Screening Option Screening Standard for Groundwater

†† RBC = Risk-based concentration

‡‡CREG = cancer risk evaluation guide

§§ NA = not available

*** Int. EMEG = Intermediate Environmental Media Evaluation Guide

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Table B-3: Ranges of contaminants detected in surface water sampled at the American Creosote Works site

(Contaminant concentrations exceeding their screening values are listed in bold red)

Contaminant	Range of concentrations detected (ppb*)		Sample ID [†] , Maximum Concentration	CV [‡] (ppb)	CV reference
	Minimum	Maximum			
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	0.05 U [§]	22	SW-22	600	Child RMEG**
Acenaphthylene	0.05 U	0.62	SW-22	100	RECAP GW SS ^{††}
Anthracene	0.05 U	3.00	SW-22	3,000	Child RMEG
Benzo (a) anthracene	0.05 U	0.85	SW-22	2.90E-2	RBC ^{‡‡}
Benzo (a) Pyrene	0.05 U	0.31	SW-22	5.00E-3	CREG ^{§§}
Benzo (b) fluoranthene	0.05 U	0.49	SW-22	2.90E-2	RBC
Benzo (g,h,i) Perylene	0.05 U	0.15	SW-22	NA ^{***}	NA
Benzo (k) Fluoranthene	0.05 U	0.16	SW-08 SW-22 SW-23	0.29	RBC
Chrysene	0.05 U	0.79	SW-22	2.90	RBC
Dibenzo(a,h) anthracene	0.05 U	0.05 U	(all samples)	2.90E-3	RBC
Fluoranthene	0.05 U	8.40	SW-22	400	Child RMEG
Fluorene	0.05 U	19	SW-22	400	Child RMEG
Indeno (1,2,3-cd) pyrene	0.05 U	0.14	SW-22	2.90E-2	RBC
Phenanthrene	0.05 U	21	SW-22	180	RECAP GW SS
Pyrene	0.05 U	6.4	SW-22	300	Child RMEG
Semivolatile Organic Compounds					
Carbazole	2.50 U	2.50 U	(all samples)	NA	NA
Dibenzofuran	2.50 U	11	SW-22	3.70	RBC
2-Methylnaphthalene	2.50 U	2.50 U	(all samples)	40	Child RMEG
Naphthalene	0.05 U	0.14	SW-02	200	Child RMEG
Pentachlorophenol	0.10 U	13	SW-22	0.09	CREG

* ppb =parts per billion

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[†]ID = identification

[†]CV=comparison value

[§] U = contaminant not detected

^{**} RMEG = Reference dose Media Evaluation Guide

^{††} RECAP GW SS =Louisiana Department of Environmental Quality Risk Evaluation/Corrective Action
Program Screening Option Screening Standard for Groundwater

^{††} RBC = risk-based concentration

^{§§}CREG = cancer risk evaluation guide

^{***} NA= not available

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Table B-4: Ranges of contaminants detected in sediment sampled at the American Creosote Works site

(Contaminant concentrations exceeding their screening values are listed in bold red)

Contaminant	Range of concentrations detected (ppb*)		Sample ID [†] , Maximum Concentration	CV [‡] (ppb)	CV reference
	Minimum	Maximum			
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	1.50E-3 U [§]	3,200	SD-21 2 ft bgs**	3.00E6	Child RMEG ^{††}
Acenaphthylene	1.65 U	270	SD-22 0.5 ft bgs	3.50E5	RECAP Soil SSni ^{‡‡}
Anthracene	1.65 U	2,000	SD-23 0.5 ft bgs	2.00E7	Child RMEG
Benzo (a) anthracene	1.65 U	1,800	SD-23 0.5 ft bgs	150	RBC ^{§§}
Benzo (a) Pyrene	1.65 U	820	SD-22 0.5 ft bgs	100	CREG ^{***}
Benzo (b) fluoranthene	1.65 U	1,500	SD-23 0.5 ft bgs	150	RBC
Benzo (g,h,i) Perylene	1.65 U	310	SD-21 2 ft bgs	NA ^{†††}	NA
			SD-23 0.5 ft bgs		
Benzo (k) Fluoranthene	1.50 U	730	SD-22 0.5 ft bgs	1,500	RBC
Chrysene	1.65 U	1,800	SD-23 0.5 ft bgs	1.50E4	RBC
Dibenzo(a,h) anthracene	1.50 U	170	SD-22 0.5 ft bgs	15	RBC
Fluoranthene	2.20E-2	6,400	SD-23 0.5 ft bgs	2.00E6	Child RMEG
Fluorene	1.50 U	2,900	SD-21 2 ft bgs	2.00E6	Child RMEG
Indeno (1,2,3-cd) pyrene	1.65 U	360	SD-22 0.5 ft bgs	150	RBC
Phenanthrene	6.00E-3 U	4,700	SD-21 2 ft bgs	2.10E6	RECAP Soil SSni
Pyrene	2.00E-2	5,900	SD-23 0.5 ft bgs	2.00E6	Child RMEG
Semivolatile Organic Compounds					
Carbazole	38	1,500	SD-21 2 ft bgs	NA	NA
Dibenzofuran	23	1,800	SD-21 2 ft bgs	2.90E4	RECAP Soil SSni
2-Methylnaphthalene	85 U	580	SD-01 0.5 ft bgs	200	Child RMEG

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Contaminant	Range of concentrations detected (ppb [*])		Sample ID [†] , Maximum Concentration	CV [‡] (ppb)	CV reference
	Minimum	Maximum			
Naphthalene	1.50E-3 U	3,500	SD-21 2 ft bgs	1.00E6	Child RMEG
Pentachlorophenol	3.35 U	1,600	SD-23 0.5 ft bgs	2,000	CREG

^{*} ppb =parts per billion

[†]ID = identification

[‡]CV=comparison value

[§] U = contaminant not detected

^{**} ft bgs = feet below ground surface

^{††}RMEG = Reference dose Media Evaluation Guide

^{‡‡} RECAP Soil SSni =Louisiana Department of Environmental Quality Risk Evaluation/Corrective Action Program Screening Option Screening Standard for Non-Industrial Soils

^{§§} RBC =Risk-based concentration

^{***}CREG = cancer risk evaluation guide

^{†††}NA= not available