

Health Consultation

W.J. SMITH WOOD PRESERVING COMPANY

DENISON, GRAYSON COUNTY, TEXAS

EPA FACILITY ID: TXD066368879

MARCH 17, 2005

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Agency for Toxic Substances and Disease Registry

Division of Health Assessment and Consultation

Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR 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 which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR TOLL FREE at
1-888-42ATSDR

or

Visit our Home Page at: <http://www.atsdr.cdc.gov>

HEALTH CONSULTATION

W.J. SMITH WOOD PRESERVING COMPANY

DENISON, GRAYSON COUNTY, TEXAS

EPA FACILITY ID: TXD066368879

Prepared by:

Texas Department of Health
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

Table of Contents

Summary and Statement of Issues	2
Background	2
Site Description and History	2
Community Health Concerns.....	3
Discussion	4
Introduction.....	4
Sample Collection.....	4
Toxicologic Evaluation.....	4
Sample Locations.....	5
Sampling Results	5
Public Health Implications.....	8
Children’s Health Considerations	9
Conclusions.....	9
Recommendations.....	10
Public Health Action Plan.....	10
Authors, Technical Advisors, and Organizations	11
References.....	12
Certification	13
Appendices.....	14
Appendix A - Acronyms and Abbreviations	15
Appendix B – Tables	17
Table 1 – Sediment	18
Table 2 - Surface Water	19
Table 3 – Groundwater	20

Summary and Statement of Issues

A citizen petitioned the Agency for Toxic Substances and Disease Registry (ATSDR) to investigate the potential health risks associated with contamination found at the former W. J. Smith Wood Preserving Company facility in Denison, Texas. The petitioner was concerned that there a high incidence of cancer existed in the community because of chemicals used by the former wood preserving company. The Texas Department of Health (TDH) Environmental Epidemiology and Toxicology Division, under a cooperative agreement with the ATSDR, reviewed environmental sampling data collected on and near the site. Specifically, TDH evaluated soil, sediment, surface water, and groundwater sampling data collected on and near the site to determine whether people were being exposed to site contaminants. (Note: Appendix A provides a listing of abbreviations and acronyms used in this report.)

Background

Site Description and History

The former W. J. Smith Wood Preserving Company is located at 1700 West Morton Street in Denison, Grayson County, Texas. According to the 2000 United States Census, the total population of Grayson County was 110,595 residents [1]. The city of Denison has a population of 22,773, with 4,436 people living within 1 mile of the site [2, 3]. The site is in the north-central portion of the city on approximately 60 acres. Commercial business properties are north of the site. Residential and recreational areas are located to the south, east, and west. The water supply source for area residents is Randell Lake, which is approximately 10 miles north of and upgradient of the site. The water is made potable by the city of Denison.

W. J. Smith Wood Preserving Company began operating in 1909. Wooden products such as railroad ties, poles, and fence posts were pressure-treated with creosote and creosote solutions to prevent decay and insect damage. The creosote operation and storage areas were located near the east central portion of the facility. The company ceased operation in April 1991. Most structures were dismantled and removed from the site between May 1991 and February 1992. During this time approximately 15,000 tons of creosote-contaminated soil/debris [4] and 1,500 tons of storage tank bottom sludge were removed and sent to a permitted hazardous waste landfill for disposal [5].

Since 1991, additional remedial measures taken were the excavation and treatment of soil, collection and treatment of storm water runoff, and isolation of storm water from subsurface soil containing chemical contaminants. Since 1993, surface water drainage from the site has been pumped to an on-site wastewater treatment plant and then discharged into the city of Denison wastewater system [5]. In February 1996, a land treatment unit (LTU) was constructed on the site to bioremediate the remaining contaminated soil. From March 1996 to the present, approximately 16,000 cubic yards of contaminated soil has been treated at the LTU [6].

We visited the facility site and surrounding areas on August 2, 2001 and September 20, 2001. On both occasions, the site was fenced and we saw no indication of trespassing activity. During our second visit, a rain shower occurred and we observed storm water runoff patterns at both on-site and off-site locations.

Community Health Concerns

The petitioner expressed a concern that a high incidence of cancer existed in Denison, Texas because of the chemical contaminants from the former wood-preserving facility. Malignancies mentioned by the petitioner include those located in the bone, brain, breast, colon, lung, kidney, prostate, skin, and stomach. Other health ailments mentioned by the petitioner were brain tumors, kidney failure, blisters on lungs, respiratory and eye problems, severe nosebleeds, stomach ailments, diarrhea, headaches, nausea, and cysts on breast, kidneys, ovaries, and stomach. The petitioner also was concerned that there were clusters of illnesses in families and on particular streets, and that an elevated number of children had Attention-Deficit/Hyperactivity Disorder (ADHD).

In response to public concern, the TDH Cancer Registry Division examined cancer-incidence data from 1995 to 1997 and cancer-mortality data from 1990 to 1999 to investigate the occurrence of cancer in Grayson County, Texas. Incidence data are the best indicators of the occurrence of cancer in an area. The Cancer Registry examined data for cancers of the stomach, lung, bronchus, kidney, renal pelvis, bladder, brain, skin (melanoma) and lymphatic and hematopoietic tissues (leukemia and Hodgkin's disease) and concluded that the results do not support an observed excess being caused by environmental exposure [7]. Information to assess the incidence of ADHD in Denison or in the state of Texas is not available. Therefore, it is not possible to determine whether ADHD incidence is elevated.

Discussion

Introduction

The operation of the W. J. Smith facility involved the pressure treatment and preservation of wooden products with creosote and creosote solutions. Creosote is the name for a variety of chemical preservatives: wood creosote, coal tar creosote, coal tar, and coal tar pitch. It is a complex mixture of numerous chemical compounds, primarily polycyclic aromatic hydrocarbons (PAHs). These chemicals are created during high temperature treatment of coal, wood (i.e., beech) or the resin of the creosote bush. Its color can range from colorless, to yellowish, to amber, or to black, and may have a smoky smell [8]. Wood creosote has been used as a disinfectant, a laxative, and as a cough treatment. Coal tar creosote was the most widely used creosote in the United States. Other than as a wood preservative, creosote was used in medicines to treat skin diseases. Coal tar creosote also was used in insecticides, fungicides, roofing, and road paving [8].

Sample Collection

This health consultation specifically evaluates soil, sediment, surface water, and groundwater sampling data collected on the former W. J. Smith facility site and surrounding areas between February 2002 and February 2003. These samples were analyzed for semi-volatile organic compounds (SVOCs) and volatile organic compounds (VOCs). The purpose of the sampling was to document the presence and extent of chemical contamination both on and off the site. TDH and ATSDR relied on the information provided in the referenced documents and assumed that adequate quality assurance/quality control (QA/QC) procedures were followed with regard to data collection, chain-of-custody, laboratory procedures, and data reporting.

Toxicologic Evaluation

In considering the potential public health significance of these sample results, we recognize that some of the data were not necessarily collected with the goal of assessing human exposure. Surface samples, less than or equal to 3 inches in depth, the type of samples most appropriate for assessing actual human exposure to soil contaminants, were not collected. The soil samples available for this consultation were collected from 2 to 22 feet below the ground surface with the purpose of determining the extent of chemical contamination [9].

To assess the potential health risks associated with the contaminants found in various media (e.g., sediment, surface water, and groundwater), each contaminant was compared with its specific health-based assessment comparison (HAC) value. The HAC values are guidelines for levels of chemicals in specific environmental media (soil, water, and air) 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, but it does mean that the contaminant warrants further consideration.

TDH used either the ATSDR's minimal risk levels (MRLs) or the U.S. Environmental Protection Agency's (EPA's) reference doses (RfDs) to derive the non-cancer HAC values. MRLs and RfDs

are based on the assumption that there is a chemical exposure threshold below which adverse health effects are not likely. Thus, MRLs and RfDs are estimates of the daily exposure to contaminants that are unlikely to cause adverse health effects even if exposure occurs for a lifetime. The cancer risk evaluation guide (CREG) values that TDH used in this consultation are based on EPA's chemical-specific cancer slope factors. CREG values are based on an estimated risk of one additional cancer in one million exposed people over a period of 70 years.

TDH also compared the concentrations of chemicals in the surface water and groundwater with the EPA's maximum contaminant levels (MCLs). The MCLs are the maximum allowable concentration for specific chemicals in public drinking water. We often use them as a guide in assessing the potential health implications because they are considered protective of public health over a lifetime exposure of 70 years.

Sample Locations

Soil, sediment, surface water and groundwater samples were collected from five areas located on and off the facility site.

- Area A - The W.J. Smith facility: The facility property is where wood products were treated with creosote and then stored prior to shipment.
- Area B - The tributary to Iron Ore Creek: The tributary is located approximately 1,650 feet south of the site and eventually drains into Iron Ore Creek.
- Area C - East of railroad: The area to the east and southeast is separated from the site by railroad tracks.
- Area D - West Ditch: A drainage ditch near the western portion of the site which travels less than $\frac{3}{4}$ mile in a southerly direction and eventually discharges into Waterloo Lake.
- Area E - Royal Ridge Subdivision: Located south of the site, this subdivision consists of homes that were built in the late 1960s.

Sampling Results

Soil

One hundred sixty-four (164) soil samples were collected from both on and off the site at depths ranging from 2 to 22 feet below ground surface (bgs). The goal of the soil sampling was to determine the extent of any contamination both on and off the facility site.

Contaminated soil was found both on and off the site. Contamination attributable to the historical use of creosote was found on site in the operations area of the facility (Area A) and east of the railroad (Area C near the operations area). Contamination of soil in the tributary to Iron Ore Creek (Area B), the West Ditch (Area D), and the Royal Ridge subdivision (Area E) was determined to be due to leakage from abandoned vehicles, automobile oil and fluids, and automobile exhaust fallout [6, 9]. Because of the absence of surface soil sample results, we were not able to evaluate possible human exposure to contamination.

Sediment

Nineteen (19) sediment samples were collected both on and off site in April 2002. Nine (9) of the samples equaled or exceeded their respective health-based screening values for acenaphthene, benzo(a)pyrene, fluoranthene, fluorene, naphthalene, and pyrene [Appendix B; Table 1]. Five (5) of the samples exceeded only their respective non-cancer health values for children. Adult non-cancer HAC values were not exceeded in any sample.

Chemical concentrations of samples collected on the W. J. Smith site, (Area A) were higher than those collected off-site (Areas B, C, D, and E). On-site, benzo(a)pyrene exceeded its cancer risk value in two (2) samples. The highest concentration, 279 parts per million (ppm), was measured in sample AS-4. The next highest sample, AS-2, had a benzo(a)pyrene concentration of 3.27 ppm. Exposure to these concentrations would be infrequent as the site has limited access.

Two (2) off-site sediment samples, collected from Areas B (tributary to Iron Ore Creek) and D (West Ditch), exceeded the cancer risk value for benzo(a)pyrene. These samples; BS-11 and DS-9, had benzo(a)pyrene concentrations of 0.642 ppm and 0.386 ppm respectively. Chronic exposure to these concentrations via ingestion would result in an insignificant or no increased risk for developing cancer. These estimates are conservative with respect to protecting public health; as they are based on ingesting 100 milligrams (mg) of the sediment sample concentration everyday for 70 years. The chemical contaminants detected off site, are consistent with urban runoff and not the facility [6, 9]. The potential sources include construction debris, tires, abandoned automobiles, and 55-gallon drums [6].

Surface Water

Water drainage in the vicinity of the former operations area is in a southerly direction. Storm water runoff from the operations area is captured on the facility property and pumped to an on-site water treatment facility, then to the city of Denison wastewater system.

An underground storm sewer directs off-site runoff from the eastern and southern areas surrounding the site into a tributary to Iron Ore Creek. Storm water runoff from the western portion of the site enters the West Ditch and eventually discharges into Waterloo Lake. This 50 acre lake is owned by the city of Denison and is located approximately $\frac{3}{4}$ mile southwest of the site. The public uses the lake for fishing and boating; however, swimming is not allowed.

A total of eighteen (18) surface water samples were collected in May 2002 from the site and surrounding areas. Samples collected from fourteen (14) off-site locations indicated that contaminants either were not detected or at levels below their respective HAC values. Of those chemicals that were detected, urban runoff appears to be the source and not the facility site [6, 9].

Four (4) samples were collected from on the facility site. Two (2) of these surface water samples, CW-3 and CW-4, had constituents which equaled or exceeded their respective non-cancer health-based screening values for fluoranthene, fluorene, naphthalene, and pyrene for children [Appendix

B; Table 2]. Adult non-cancer HAC values for naphthalene were exceeded in only one (1) of the samples.

Cancer risk values for benzene and benzo(a)pyrene were exceeded. Chronic exposure to the 15.5 parts per billion (ppb) concentration of benzene (sample CW-4) would result in no increased lifetime risk for developing cancer. Chronic exposure to the benzo(a)pyrene concentration (sample CW-3) of 100 ppb would result in a moderate increased cancer risk. The estimated risks are conservative with respect to protecting public health, because they are based on ingesting 2 liters of the sample concentrations everyday for 70 years. In addition, it should also be noted that the on-site surface water is not used as a drinking water source.

Groundwater

Groundwater formations and hydrogeologic conditions underlying the site and the surrounding area where contaminants have been detected are not conducive for use as a potential water source because of low permeabilities and sporadic occurrence. The groundwater movement is estimated to travel from 1 to 20 feet per year. In February 2003, a database search by an environmental consulting firm identified two (2) offsite groundwater wells within 1 mile of the facility. These wells are located northwest and upgradient from the W. J. Smith site. They were installed in 1963 at depths greater than 670 feet below the ground surface. Both wells have been plugged and are not in use [5, 6, 9].

Shallow groundwater beneath the facility site and the surrounding area is usually encountered at a depth of less than 10 feet below the surface. The groundwater beneath the site flows generally from the north to the south, following the slope of the land. After passing under the site, the groundwater flow eventually shifts towards the south and southwest [5, 9].

Historical sampling indicates that groundwater that contains chemical contamination is associated with the contaminated soils in and adjacent to the former operations area. Also indicated by historical sampling, is that the migration of the contaminants in the groundwater has stabilized [6].

In May 2002, January 2003, and February 2003, a total of twelve (12) groundwater samples were collected from monitoring wells located both on and off the facility site. Chemical concentrations exceeded their respective HAC values in six (6) of the samples collected from off-site monitoring wells in Area C (east of the railroad) and Area E (Royal Ridge subdivision).

The following individual constituents exceeded their respective health-based screening values: benzene, bromodichloromethane, 2,4-dimethylphenol, naphthalene, and toluene (Appendix B; Table 3]. The majority of chemicals only exceeded their respective non-cancer health values for children. Naphthalene was the only constituent that exceeded its non-cancer screening value for adults.

Cancer risk values were exceeded for benzene and bromodichloromethane. The highest concentrations of benzene, 380 and 316 parts per billion (ppb), were collected from Area C.

Chronic exposure to these concentrations would result in a low increased lifetime risk for developing cancer. Chronic lifetime exposure to the 12.1 ppb sample of benzene, also from Area C, would result in no increased cancer risk. Exposure to the 0.8 ppb concentration of bromodichloromethane, collected from Area E, results in no increased lifetime risk for developing cancer. These estimates are conservative with respect to protecting public health because they are based on ingesting 2 liters of the sample concentration everyday for 70 years.

Public Health Implications

Sampling Results Interpretation

Soil

Because of the absence of surface soil samples, we were not able to evaluate possible human exposure to soil contamination. Thus, exposure to the surface soil currently poses an indeterminate public health hazard.

Sediment

Exposure to the contaminants in the on-site sediment would be unlikely or infrequent. Because the site is fenced, access to the facility by trespassers is restricted. Exposure to the concentrations of contaminants in the off-site sediments would not be likely to result in any adverse health effects. Chronic exposure to the off-site sediment concentrations would result in an insignificant or no increased risk for developing cancer. Therefore, exposure to contaminants in the sediment currently poses no apparent public health hazard.

Surface Water

The surface water on the site is not potable (drinkable). The site is fenced to prevent trespassing, and access to the facility is limited. Surface water runoff is collected and pumped to an on-site water treatment plant, and then pumped to the city's wastewater system for further treatment. Thus, actual exposure to the site contaminants in the surface water through ingestion or dermal exposure would be unlikely and infrequent. Therefore, exposure to surface water on the W. J. Smith site would be expected to pose no apparent public health hazard. Contaminants in surface water samples collected from off the facility site were either not detected or were at levels that had no risk to health.

Groundwater

The area surrounding the site has ready access to city water for drinking and other purposes. No shallow groundwater wells were found in the area. Existing evidence indicates there is no likelihood of human exposures to the groundwater, and none are likely to occur in the future. Therefore, the groundwater at the W. J. Smith site and surrounding area poses no public health hazard.

Children's Health Considerations

TDH and ATSDR recognize that the unique vulnerabilities of infants and children demand special consideration. Children are at greater risk than adults for certain kinds of exposures to hazardous substances emitted from waste sites and emergency events. Children are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. They are shorter than adults, 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. Children's developing bodies can sustain permanent damage if toxic exposures occur during critical growth stages. Children depend completely on adults for risk identification and management decisions, housing decisions, and access to medical care.

TDH and ATSDR evaluated the likelihood for children living in the vicinity of the former W. J. Smith Wood Preserving Company, to be exposed to site contaminants at levels of health concern. Trespassing onto the site by children is unlikely because of the limited access to the property. If trespassing did occur, we believe that exposure to contaminated sediment and surface water would be infrequent and not at sufficient concentrations to cause a health concern.

Conclusions

1. Human exposure to contaminants in the soil was not evaluated because of the lack of surface samples. Thus, possible exposure to the surface soil would pose an indeterminate public health hazard.
2. Using the maximum contaminant concentrations measured in the sediment and surface water, the TDH/ATSDR concluded that the exposures to the chemical contaminants from the former W. J. Smith Wood Preserving Company site and surrounding areas, pose no apparent public health hazard.
3. Evidence indicates that no human exposures to the groundwater are occurring and none are likely to occur in the future. Because no completed exposure pathways exist, the groundwater on the former W. J. Smith Wood Preserving site and surrounding areas would pose no public health hazard.

Recommendations

1. Continue to limit access to site. Maintain fencing to prevent unauthorized access.
2. Collect surface soil samples, less than or equal to 3 inches in depth, to evaluate possible human exposure to the site contaminants.

Public Health Action Plan

Actions Completed

1. RCRA investigations of the former W. J. Smith Wood Preserving Company site and surrounding areas were conducted by an environmental consulting firm in 2001 and 2003.
2. A corrective measures study of the former W. J. Smith Wood Preserving Company site and surrounding areas was completed in 2003.

Actions Planned

1. This health consultation report will be provided to the petitioner and appropriate agencies.
2. The TDH/ATSDR should review any additional environmental sampling results when they become available.

Authors, Technical Advisors, and Organizations

Report Prepared by

Tom Ellerbee
Environmental Specialist
TDH Environmental Epidemiology and Toxicology Division

Susan Prosperie, MS, RS
Environmental Specialist
TDH Environmental Epidemiology and Toxicology Division

Richard Beauchamp, MD
Senior Medical Toxicologist
TDH Environmental Epidemiology and Toxicology Division

John F. Villanacci, PhD, EMT
Director
TDH Environmental Epidemiology and Toxicology Division

Jennifer Lyke
Regional Representative
ATSDR Region 6

George Pettigrew, PE
Senior Regional Representative
ATSDR Region 6

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

References

1. U.S. Census Bureau. American Fact Finder. Profile of General Demographic Characteristics: 2000. Grayson County, Texas. Available from URL: <http://www.census.gov/main/www/cen2000.html>. Accessed on June 17, 2004.
2. City of Denison, Texas. General Information. Available from URL: <http://www.ci.denison.tx.us/geninfo.htm>. Accessed on June 17, 2004.
3. U.S. Environmental Protection Agency. Enforcement & Compliance History Online (ECHO). <http://www.epa.gov/echo>. June 17, 2004.
4. Pendergast Sarni Itell. North ditch investigation. W. J. Smith Wood Preserving Company. Volume I of II. June 14, 1999.
5. Pendergast Sarni Group LLC. Current conditions report and RCRA facility investigation work plan. W. J. Smith Wood Preserving Company. September 25, 2001.
6. Domani, LLC. Corrective measures study prepared for W. J. Smith Wood Preserving Company. May 8, 2003.
7. Texas Department of Health. Cancer Registry Division. Summary of investigation into the occurrence of cancer. Grayson County, Texas. 1990-1999. Cluster Request #01042. July 20, 2001.
8. Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological profile for wood creosote, coal creosote, coal tar, coal tar pitch, and coal tar pitch volatiles. September 2002.
9. Domani, LLC. W. J. Smith Wood Preserving Company. RCRA Facility investigation report. May 8, 2003.

Certification

This W. J. Smith Wood Preserving Company Site public health consultation was prepared by the Texas Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the public health consultation was initiated.

Technical Project Officer, SPS, SSAB, DHAC, ATSDR

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

Chief, State Programs Section, SSAB, DHAC, ATSDR

Appendices

Appendix A: Acronyms and Abbreviations

Appendix B: Tables

Appendix A - Acronyms and Abbreviations

Acronyms and Abbreviations

ADHD	Attention-Deficit/Hyperactivity Disorder
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	Below Ground Surface
CREG	Cancer Risk Evaluation Guide
EPA	Environmental Protection Agency
HAC	Health Assessment Comparison Value
LTU	Land Treatment Unit
MCL	Maximum Contaminant Level
mg	Milligrams
MRL	Minimal Risk Level
PAHs	Polycyclic Aromatic Hydrocarbons
ppb	Parts Per Billion
ppm	Parts Per Million
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RfD	Reference Dose
SVOCs	Semi-Volatile Organic Compounds
TDH	Texas Department of Health
VOCs	Volatile Organic Compounds

Appendix B – Tables

Table 1 – Sediment W. J. Smith Wood Preserving Company Site and Surrounding Areas Chemicals Exceeding Health Assessment Screening Values April 2002			
Chemical	Analysis Result (ppm)	Sample ID	Health Assessment Comparison Value (ppm)
Acenaphthene	2120	AS-4	1000 pica child - intermediate EMEG 3000 child - RMEG 40000 adult - RMEG 30000 child - intermediate EMEG 400000 adult - intermediate EMEG
Benzo(a)pyrene	279	AS-4	0.1 – CREG
	3.27	AS-2	
	0.642	BS-11	
	0.386	DS-9	
Fluoranthene	4120	AS-4	800 pica child - intermediate EMEG 2000 child - RMEG 30000 adult - RMEG 20000 child - intermediate EMEG 300000 adult - intermediate EMEG
Fluorene	2120	AS-4	800 pica child - intermediate EMEG 2000 child - RMEG 30000 adult - RMEG 20000 child - intermediate EMEG 300000 adult - intermediate EMEG
Naphthalene	1730	AS-4	1000 pica child - intermediate EMEG 1000 child - RMEG 10000 adult - RMEG 30000 child - intermediate EMEG 400000 adult - intermediate EMEG
Pyrene	2520	AS-4	2000 child - RMEG 20000 adult – RMEG

CREG = Cancer Risk Evaluation Guide
 EMEG = Environmental Media Evaluation Guide
 RMEG = Reference Dose Media Evaluation Guide

Table 2 - Surface Water W. J. Smith Wood Preserving Company Site and Surrounding Areas Chemicals Exceeding Health Assessment Screening Values May 2002			
Chemical	Analysis Result (ppb)	Sample ID	Health Assessment Comparison Value (ppb)
Benzene	15.5	CW-4	0.6 – CREG 5 - MCL 40 child - RMEG 100 adult – RMEG
Benzo(a)pyrene	100	CW-3	0.005 – CREG
	30	CW-4	0.2 – MCL
Fluoranthene	1000	CW-3	400 child – RMEG 1000 adult - RMEG
	400	CW-4	4000 child - intermediate EMEG 10000 adult - intermediate EMEG
Fluorene	550	CW-3	400 child – RMEG 1000 adult - RMEG 4000 child - intermediate EMEG 10000 adult - intermediate EMEG
Naphthalene	924	CW-4	100 – LTHA 200 child - RMEG 700 adult - RMEG
	180	CW-3	6000 child - intermediate EMEG 20000 adult - intermediate EMEG
Pyrene	770	CW-3	300 child – RMEG
	300	CW-4	1000 adult – RMEG

CREG = Cancer Risk Evaluation Guide
 EMEG = Environmental Media Evaluation Guide
 LTHA = Lifetime Health Advisory
 MCL = Maximum Contaminant Level
 MCLG = Maximum Contaminant Level Goal
 RMEG = Reference Dose Media Evaluation Guide

Table 3 – Groundwater W. J. Smith Wood Preserving Company Site and Surrounding Areas Chemicals Exceeding Health Assessment Screening Values May 2002, January 2003, and February 2003			
Chemical	Analysis Result (ppb)	Sample ID	Health Assessment Comparison Value (ppb)
Benzene	380	MW-23 (2002)	0.6 – CREG
	316	MW-23 (2003)	5 - MCL
	12.1	MW-20	40 child - RMEG
	1.1 J	MW-24	100 adult - RMEG
	0.8 J	MW-26	
Bromodichloromethane	0.8 J	MW-26	0.6 - CREG 80 - MCL 200 child - chronic EMEG & RMEG 700 adult - chronic EMEG & RMEG
2,4-Dimethylphenol	610	MW-23 (2002)	200 child - RMEG 700 adult - RMEG
Naphthalene	19000	MW-23 (2002)	100 - LTHA
	16500	MW-23 (2003)	200 child - RMEG
	880	MW-20	700 adult - RMEG
	144	MW-19	6000 child - intermediate EMEG 20000 adult - intermediate EMEG
Toluene	600	MW-23 (2002)	200 child - intermediate EMEG
	444	MW-23 (2003)	700 adult - intermediate EMEG 1000 - LTHA & MCL & MCLG 2000 child - RMEG 7000 adult - RMEG

CREG = Cancer Risk Evaluation Guide
 EMEG = Environmental Media Evaluation Guide
 LTHA = Lifetime Health Advisory
 MCL = Maximum Contaminant Level
 MCLG = Maximum Contaminant Level Goal
 RMEG = Reference Dose Media Evaluation Guide