

Health Consultation

**Federal Creosote Site (2#NJ)
Manville, New Jersey**

May 1, 1997

**U.S. Department of Health and Human Services
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Exposure Investigation and Consultation Branch
Atlanta, Georgia 30333**

BACKGROUND AND STATEMENT OF ISSUES:

The Region II U.S. Environmental Protection Agency (EPA) has requested that the Agency for Toxic Substances and Disease Registry (ATSDR) comment on the public health implications of contamination present at the Federal Creosote site in Manville, New Jersey. Although environmental sampling at the site is very limited, and more comprehensive site characterization will be occurring, this health consultation will serve as a preliminary assessment of the site.

Railroad ties were treated with creosote at the former Federal Creosote facility which has been closed now for approximately 40 years. Residential dwellings have since been constructed over the former site. During stormwater drain repair operations in the area, a black tar-like substance was uncovered. This material, along with a naphthalene-like odor, was also detected surfacing through a sump pump in a basement on-site [1]. The tar-like material is believed to be creosote waste.

Soil samples were collected at a storm sewer excavation and from two borings (see attached table) from a property on Valerie Drive [1]. Samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds, pesticides, and inorganics. The results show the presence of polycyclic aromatic hydrocarbons (PAHs) and VOCs. PAHs were detected at the storm sewer excavation 6 feet below the surface at a total concentration of approximately 19,200 parts-per-million (ppm). Benzene (116.8 ppm), toluene (200.2 ppm), ethylbenzene (60 ppm), and xylenes (364 ppm) were also detected in the soils approximately 7 feet below the surface (boring #1).

In addition to the soil samples, a "slam bar" was used to probe the soil to a depth of 5 feet around a residence on Valerie Drive. Air readings were taken with an HNu showing concentrations 5-15 units (non-specific) above background [1]. A follow-up inspection of the residence was conducted on April 25, 1996. No creosote product was noted at the time of the inspection. A naphthalene-like odor was detected by the sump, and HNu readings (not provided) were detected above background [1].

According to discussions held during a conference call between EPA, ATSDR, and the New Jersey Department of Health (NJDOH) on April 4 1997, the homes in the area are serviced by municipal water. However, it is not known at this time if there are any private wells in the area. EPA has been requested by the New Jersey Department of Environmental Protection (NJDEP) to assist at the site. EPA has proposed to conduct indoor air sampling in the area to determine if VOCs, and to a lesser extent PAHs, have migrated into some of the homes that were built over the former wood treating facility.

DISCUSSION:

The presence of creosote contamination in a residential setting raises concerns of potential exposure and possible adverse health effects. Creosote is a complex mixture of many chemicals. The most common form, coal tar creosote, is derived from high temperature treatment of coal and contains hazardous chemical such as PAHs, phenols, and cresols [2]. Limited sampling has detected PAHs at 19,200 ppm (total), and VOCs such as benzene measuring 116.8 ppm in subsurface soils adjacent to residential dwellings.

Skin contact with a few drops of coal tar creosote irritates and burns the skin and eyes. Coal tar creosote may also cause the skin to be more sensitive to the effects of the sun. These effects include burning, irritation, and swelling. Creosote has been shown to induce skin cancer in animal studies, but evidence of cancer in humans is less definitive. Some studies of workers showed an association between the development of skin cancer and long-term exposure to creosote. However, several studies suggest there is no association between exposure to creosote and other coal tar products and cancer in humans [2]. Since creosote contains mixtures of several carcinogenic PAHs, it is prudent to assume that there may be an increased risk of cancer associated with long-term exposure to creosote.

The primary exposure route for creosote in a residential setting would be direct dermal contact [2]. To a lesser degree, incidental ingestion of contaminated soil may also occur. In addition, inhalation of volatile fractions of the creosote may occur, particularly in an enclosed space (e.g., a basement) where they may accumulate to levels of health concern. The majority of the PAHs, particularly the more toxic compounds, are relatively non-volatile, and do not pose an inhalation threat unless attached to large amounts of dust, or if the creosote was heated to volatilize some of the compounds.

Although PAHs have been detected at levels in soil warranting concern, full characterization of the site has not been completed, and it is not known if the contamination is present on the surface where direct human contact is more likely. If the creosote is confined to the subsurface, exposure would be limited unless excavation or other activities occur that would expose the contaminated soil.

If PAH contamination is found in the surface soils at similar levels discovered at depth, there is a potential for residents to experience health effects from direct contact with the soil. Dermal exposure to the contaminated soil may lead to irritation and other skin effects. These effects would be expected to stop when exposure to the contaminated soil stops. Frequent long-term exposure to the carcinogenic PAHs may lead to a slight increase risk of developing cancer over a lifetime.

There is also the possibility of inhaling some of the more volatile compounds such as benzene, toluene, and ethylbenzene detected in the soil. Again, the potential threat is more likely to occur in enclosed spaces where these volatile compounds can accumulate. To date, air sampling has been limited to real-time, non-compound specific measurements.

Since a creosote-like material has already entered the basement of one home, the possibility exists that migration of contaminants has occurred, or will occur in the future in other homes. Direct contact with the creosote waste may occur in the home. Inhalation of VOCs associated with the waste is also possible.

CONCLUSIONS:

Based on the information provided, ATSDR concludes the following:

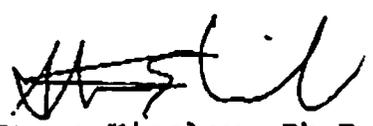
1. The levels of PAHs detected in subsurface soils pose a threat to area residents if the material is unearthed, or if additional contamination at similar levels is detected at the surface.
2. Creosote contamination entering the basement of one home may pose a skin contact hazard for residents. There is also a potential for VOCs to migrate into the home at levels of health concern.
3. The extent of creosote and other contamination at the site has not been fully characterized.
4. It is not known if the groundwater in the area is being used and/or impacted by site contamination.

RECOMMENDATIONS:

1. Characterize soil contamination at the site to determine if exposure to residents is occurring. Surface soil samples (0-3 inches) should be collected from suspected areas of contamination.
2. Determine if any private wells are being used for potable purposes. If so, determine if site related contaminants have impacted groundwater.

ATSDR is available to assist in developing an indoor air sampling plan and assessing results when they become available.


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REFERENCES:

1. March 27, 1997 Letter from NJDEP to Richard Caspe, U.S. EPA Region II.
2. ATSDR Toxicological Profile for Creosote, TP-90-09, December 1990.

Table I Manville Sampling Data

Location Depth	Storm Sewer @6'0"	Hole-2 Valerie Dr. @2'6"-3'0"	Boring-1 Valerie Dr. @7'2"-7'8"
Semi Volatile Organics mg/kg (ppm)			
Acenaphthene	960	-----	109.6
Acenepthylene	328	0.822	536
Anthracene	2,067	1.88	64.1
Benzo [a]athracene	626	5.74	267.5
benzo [b] fluoranthene	266	5.22	137.1
Benzo [k] fluoranthene	278	1.11	83.5
Benzo [a] pyrene	324	3.33	91.7
Benzo [g, h, i] perylene	91	1.07	14.9
Chrysene	582	8.02	31.5
Dibenzo [a, h] anthracene	55	0.229	10.7
Dibenzofuran	1,152	-----	-----
2,4 Dimethylphenol	-----	-----	52.9
Fluoranthene	2,252	10.9	629.9
Fluorene	1,542	0.11	123.6
Indeno [1, 2, 3-cd] pyrene	97	1.33	18.8
2-methylnapthalene	1,354	-----	-----
Napthalene	2,879	0.071	1,450.3
Phenanthrene	3,114	0.639	1,082.4
Phenol	0	-----	5.1
Pyrene	1,309	10.4	444.5
Volatile Organic Compounds mg/kg (ppm)			
Benzene	-----	-----	116.8
Toluene	-----	-----	200.2
Ethylbenzene	-----	-----	60.8
M, P-xylene	-----	-----	259.2
O-xylene	-----	-----	104.8
Total xylenes	-----	-----	364

Approved:

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5-7-97

Chief, EICB, DHAC

Date