

# **Health Consultation**

PAVILION AVENUE FIELD

RIVERSIDE, BURLINGTON COUNTY, NEW JERSEY

CERCLIS NO. NJ0001898055

MAY 20, 1999

**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://atsdr1.atsdr.cdc.gov:8080/>

**HEALTH CONSULTATION**

**PAVILION AVENUE FIELD**

**RIVERSIDE, BURLINGTON COUNTY, NEW JERSEY**

**CERCLIS NO. NJ0001898055**

**Prepared by:**

**New Jersey Department of Health and Senior Services  
Consumer and Environmental Health Services  
Under a Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry**

## **Background and Statement of Issues**

The Environmental Protection Agency (EPA), Region II Removal Action Branch, has requested that the Agency for Toxic Substances and Disease Registry (ATSDR) and the New Jersey Department of Health and Senior Services (NJDHSS) evaluate the 1997 soil and radiological sampling results from the Pavillion Avenue site in order to respond to the following questions:

- (1) Does the data present a public health hazard?
- (2) What does ATSDR/NJDHSS recommend?

Only the public health significance of exposures to soils on-site, based on the 1997 sampling event, will be evaluated in this health consultation. The public health consequences of potential exposures to other environmental media, if contaminated, will not be addressed within the context of this health consultation.

The Pavillion Avenue site is a former metals recovery facility located on approximately 14 acres in Riverside Township (Burlington County), New Jersey at 40° 02.58 N, 74° 57.54 W. It is bordered by Rancocas Creek which empties to the Delaware River (approximately 10% of the site area is tidal) on the north, Pavillion Avenue on the west, TCR Metals on the east, and by railroad tracks on the south.

Sampling of on-site soils was conducted on October 2, 1997 and October 29, 1997 by Earth Tech, Inc., under an Administrative Order of Consent between USEPA Region II and the owner of the property. Analysis<sup>(1)</sup> of these samples showed the presence of several metals in surface soils above background levels for the area.

### **Site Visit**

A site visit was conducted by NJDHSS, ATSDR, and EPA Region II personnel on December 2, 1998. The western portion of the property was found to consist of vacant fields which had previously been used for storage of copper sludge from waste water treatment. Vegetation in this area appears to be stressed. The eastern portion of the site contains an abandoned facility which was previously used for treatment of waste waters generated during metals recycling and recovery. This structure appears to be unstable and represents a physical hazard.

Although the site is fenced, numerous breaches in the perimeter fence allow trespassers entry as evidenced by the observation of beer cans along the portion of the site adjacent to the creek, and graffiti covering on site structures.

## Discussion

### Contamination of On-Site Media

Samples of on-site environmental media (primarily surface soil) were obtained and analyzed in October 1997.<sup>(1)</sup> Elevated concentrations of Target Analyte List (TAL) metals (including beryllium, nickel, chromium, copper, lead, and zinc) were found in 13 surface soil samples (see Table 1). Of the metals detected during the 1997 sampling events, copper, hexavalent chromium (children only), nickel (children only), zinc (children only) and lead have been selected for further analysis because they were detected above health comparison values (see Table 1). ATSDR's comparison values (CV) for soil are used to determine which contaminants detected in soils may be at levels of health concern and should be further evaluated from a public health perspective. However, soil contamination levels above an ATSDR CV does not necessarily represent a health threat and CVs should not be used for setting clean-up levels.

The 13 surface soil samples were also analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and PCBs, but these contaminants were either not detected, or detected at background concentrations. The organic contaminants detected in the 13 surface soil samples are not present at levels of public health concern for the occasional trespasser.

A radiological<sup>(2)</sup> survey, performed in 1998, showed gamma radiation levels on the Pavillion Avenue property of up to about 20  $\mu\text{R/hr}$ . "Background" measurements taken adjacent to the site were found to be 5-7  $\mu\text{R/hr}$ . These levels of radiological activity are not considered to pose a risk to human health under current site conditions (occasional trespassing).

### Pathways Analysis

An exposure pathway<sup>(3)</sup> is the process by which an individual is exposed to contaminants that originate from some source of contamination. A completed exposure pathway consists of five elements:

- (1) Source of contamination;
- (2) Environmental media and transport mechanisms;
- (3) Point of exposure;
- (4) Route of exposure; and
- (5) Receptor population.

A completed exposure pathway must include each of the elements that link a contaminant source to a receptor population.

As indicated above, breaches in the fence and evidence of trespassing were noted during the December 1998 site visit. Therefore, based on the current site conditions, it is reasonable to assume that a completed exposure pathway exists to those individuals who trespass on the site. For the purposes of this health consultation, it is further assumed that children (elementary school age and older) and adults can, and have, accessed the site and can, and have, ingested contaminated surface soils. Moreover, we assumed that a child or adult may visit the site several times a week for up to 6 weeks per year. Therefore, a child or adult may be exposed from one up to 12 days per year. This exposure scenario, under ATSDR's definition, would constitute an acute exposure (exposures from 1-14 days).

### **Public Health Implications of Ingestion of Contaminated Surface Soils**

The toxicological effects of each contaminant detected in the various environmental media are presented individually in the Toxicological Profile. However, cumulative or synergistic effects of mixtures of contaminants may alter the public health significance. Additionally, contaminants (separately or in mixtures) may cause adverse effects which are greater in children than in adults. However, the nature of any adverse effects is highly dependent upon the specific contaminant, the route of exposure, and differences in toxicity and pharmacokinetics between children and adults.

To evaluate the public health significance of the completed human exposure pathway associated with ingestion of on-site surface soils at the Pavillion Avenue site, doses have been estimated by assuming, for an adult, a body mass of 70 kg and ingestion rate of 50-100 mg/day, and for a child, a body mass of 35 kg and ingestion of 100-200 mg/day.

### **Toxicological Evaluation of Metal Contaminants**

This section contains a discussion of the health effects in persons (trespassers) exposed to specific metal contaminants detected in on-site soils. Health effects evaluations are accomplished by estimating the amount (or dose) of those contaminants that a person might come in contact based on the site-specific exposure scenario discussed above. This estimated exposure dose is then compared to established health guidelines and evaluated using a weight-of-evidence approach. People who are exposed for some crucial length of time to contaminants of concern at levels above established health guidelines are more likely to have associated illnesses or disease.

#### ***Hexavalent Chromium and Nickel***

Hexavalent chromium ( $\text{Cr}^{+6}$ ) and nickel will be discussed together because the health outcome from exposure to these metals at the Pavillion Avenue site are similar. Based on the doses calculated for the these metals at the highest concentrations found in on-site soils, allergic dermatitis is a likely health effect to children (not adults) who may trespass on-site. These

dermal effects were found in humans after a one or two time dose at similar exposure doses calculated for the highest hexavalent chromium and nickel levels found on-site.<sup>4,7</sup> However, these effects were only noted in individuals with previous chromium or nickel sensitivity.<sup>4,7</sup> Therefore, only children with some previous sensitization (i.e., previous visits to the site or other non-site related exposures) are likely to experience this health outcome. Direct contact with hexavalent chrome and nickel by children who trespass on-site may also elicit dermatitis; however, based on the literature, it is difficult to determine if the levels found on-site are likely to produce this health outcome. Although it would be prudent public health practice for chromium and nickel sensitive children to avoid exposures to on-site soils, any exposures that have or are occurring do not constitute a public health hazard for the child who occasionally trespasses on-site.

### *Lead*

Based on calculated doses to the highest levels of lead found in on-site soils, the only health outcome that may result from exposures to children and adults who trespass on-site is mild hematological effects.<sup>6</sup> These effects are not considered serious; therefore, the exposures to children and adults who occasionally trespass on-site do not constitute a public health hazard.

### *Zinc*

Based on calculated doses to the highest level of zinc found in on-site soils samples (35,200 ppm), the only health outcome that may result from exposures to children who trespass on-site is a mild systemic effect (decreased serum cortisol levels).<sup>8</sup> However, this effect would only be for those children who are exposed under the trespassing scenario to the highest level found on-site. Given that it is unlikely that a child would be exposed to just this one area with the highest level detected and the less serious nature of the possible health outcome, exposure to zinc in on-site soils does not constitute a public health hazard to a child who occasionally trespasses on-site.

### *Copper*

Based on calculated doses to most of the copper levels detected in on-site soils, the health outcome of significant public health importance is **acute** gastrointestinal effects to children and adults who may trespass on-site. These health outcomes are based on several reports in the literature of acute accidental poisoning in humans following copper ingestion. The victims reported gastrointestinal effects involving abdominal pain, vomiting, and diarrhea.<sup>5</sup> The persons who consumed copper from these accidental poisonings likely ingested copper in the form of copper sulfate. Although the form of copper found at the Pavillion Avenue site is not known from the available sampling results, the color of the copper contaminated areas (blue-green) is consistent with one of the physical states of copper sulfate.<sup>5</sup> The acute gastrointestinal effects described above for children and adults who trespass on-site and are exposed to copper contaminated soils are considered to be a public health hazard.

## **Conclusions**

Based on available data reviewed for the Pavillion Avenue site, the site currently poses a public health hazard to children and adults who trespass on-site. Exposure to copper in on-site surface soils is considered to be of significant public health concern because children (elementary school age and above) and adults who occasionally trespass on-site may experience acute gastrointestinal effects, including vomiting and diarrhea.

Other less serious health effects may also occur to the occasional trespasser at the Pavillion Avenue site. These adverse health effects include allergic dermatitis from hexavalent chromium and nickel exposures to children (especially those with previous nickel or chromium sensitivity), mild hematological effects from lead exposure to children and adults, and mild systemic effect (decreased serum cortisol levels) from zinc exposures to children. However, none of these exposures and health effects are considered to be an immediate public health hazard to the occasional trespasser at the site.

The conclusions of this health consultation are based on current site conditions and data available. If the current land use were to change (i.e., to residential or other uses that would likely increase the exposure to on-site soils) additional contaminants of concern and exposures of public health significance would likely emerge. In addition, the conclusion of this health consultation are strictly based on the data available for the soil exposure pathway and do not make any conclusions regarding the public health significance of other potentially contaminated media.

## **Recommendations**

### **Recommendations of Cease/Mitigate Exposure**

The following actions are recommended to minimize human exposure to contaminants associated with the Pavillion Avenue site:

- (1) Appropriate actions should be taken to eliminate the threat of exposure to contaminated soils.
- 2) The site should not be used for any purpose that would increase exposure to site contaminants.
- (3) If changes to the land use are planned, the site should be reevaluated by ATSDR/NJDHSS to determine the public health significance of these changes.

**Certification**

This Health Consultation on Pavillion Avenue Corporation, Riverside Township, Burlington County, New Jersey was prepared by the New Jersey Department of Health and Senior Services (NJDHSS) 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 this document was initiated.



Gregory V. Ulirsch

Technical Project Officer

Superfund Site Assessment Branch

Division of Health Assessment and Consultation (DHAC)

ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed This Health Consultation and concurs with its findings.



for Richard Gillig

Chief, SSAB, DHAC, ATSDR

## **Preparer of Report**

### **Prepared By:**

Bruce E. Wilcomb, Ph.D.  
ATSDR Project  
Consumer and Environmental Health Services  
New Jersey Department of Health and Senior Services

Gregory V. Ulirsch  
Environmental Health Engineer  
Superfund Site Assessment Branch  
Division of Health Assessment and Consultation

### **ATSDR Technical Project Officer:**

Gregory V. Ulirsch  
Environmental Health Engineer  
Superfund Site Assessment Branch  
Division of Health Assessment and Consultation

### **ATSDR Regional Representative:**

Arthur Block  
Senior Regional Representative, Region 2  
Regional Operations  
Office of the Assistant Commissioner

### **Any questions concerning this document should be directed to:**

James Pasqualo  
ATSDR Project Manager  
New Jersey Department of Health and Senior Services  
Consumer and Environmental Health Services  
210 South Broad Street  
P.O. Box 360  
Trenton, New Jersey 08625-0360

## References

1. Sampling and Analysis Report, Pavillion Avenue Field Site, Earth Tech (under contract to USEPA Region 2 Removal Action Branch), April 1998
2. Radiation Survey Map - Pavillion Avenue Site, Roy Weston, Inc. (for USEPA Region 2 Remedial Action Branch), March 2, 1998
3. Public Health Assessment Guidance Manual, ATSDR, Lewis Publishers, 1992
4. Draft Toxicological Profile for Chromium (Update), ATSDR, August 1998
5. Toxicological Profile for Copper, TP-90/08, ATSDR, December 1990
6. Draft Toxicological Profile for Lead, ATSDR, August 1997
7. Toxicological Profile for Nickel (Update), ATSDR, August 1995
8. Toxicological Profile for Zinc (Update), TP-93/15, ATSDR, May 1994

Table 1. Pavillion Avenue Surface Soil (0-3") October 1997 (ppm) [1]

	1-1	1-2	2-1	2-2	2-3	3-1	3-2	4-1	4-2	5-1	5-2	5-3	6-1	CV (child/adult)
As	8.1	8.8	<b>14.8</b>	11.2	13.4	13	11.6	6.1	3.7	5	4.2	7.4	7.3	20/200
Be	<b>69.8</b>	4.9	43	13.4	38.4	48.7	36.3	4.1	14.3	4	2.5	6.1	2.4	100/1,000
Cr	11,300	537	443	1,290	452	<b>25,100</b>	14,100	809	2,350	955	198	890	907	200/2,000 (Cr <sup>+6</sup> ) 80,000/1,000,000 (Cr <sup>+3</sup> )
Cr6	<b>860</b>	64.4	255	154	208	845	377	74.5	137	70.2	22.4	93.2	ND	200/2,000 (Cr <sup>+6</sup> )
Cu	51,400	13,200	70,000	52,500	73,500	<b>121,000</b>	64,200	5,000	12,900	9,750	6,190	6,990	3,870	300/4,000 <sup>1</sup>
Pb	573	787	<b>2,380</b>	785	2,180	1,590	1,010	409	242	323	216	680	504	NE
Ni	2,920	903	3,480	1,330	3,230	<b>7,090</b>	3,920	153	762	486	426	504	250	1,000/10,000
Zn	8,430	2,010	11,800	<b>35,200</b>	13,200	15,400	8,400	364	1,420	1,140	728	1,030	652	20,000/200,000

**BOLD** - Highest measured concentration

ND - Not Detected

CV - ATSDR Comparison Value for soil

NE - Not Established

1 - Comparison Value for copper cyanide--no CV developed for copper or copper sulfate