

**HEALTH CONSULTATION**

**PJP LANDFILL**

**JERSEY CITY, HUDSON COUNTY, NEW JERSEY**

**CERCLIS NO. NJD980505648**

**August 11, 1995**

**Prepared by:**

**New Jersey Department of Health  
Under Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry**

## BACKGROUND AND STATEMENT OF ISSUES

PJP Landfill is an inactive landfill located in Jersey City, New Jersey (Figure 1). The site occupies approximately 87 acres of former tidal marsh land along the Hackensack River. Land use in the area is primarily industrial and commercial, although two high-rise apartment complexes are located within one half mile of the site. A small stream called the Sip Avenue Ditch cuts through the site and runs west to the Hackensack River (Figure 2).

The PJP Landfill was operated as a commercial landfill, accepting chemical and industrial waste, including drums, from about 1968 to 1974. An unknown quantity of hazardous substances were disposed at the site during and after these dates. From 1970 to 1985 subsurface fires, which were attributed to spontaneous combustion and decomposition of landfill materials, burned almost continuously at portions of the landfill. These fires were known to emit large amounts of smoke. All fires at the site were extinguished by 1986. The site was placed on the National Priorities List (NPL- a.k.a. Superfund) in 1983.

The landfill is no longer active and was partially capped with soil and seeded during interim remedial measures (IRM) performed in 1986. As part of the IRM, some 4,559 cubic yards of soil, 4,700 drums of chemical waste, 60 lab pack drums, 136 compressed gas cylinders, and other contaminated debris were removed from the landfill. In addition, 49 gas vents and a gravel lined ditch around the cap were added. The ditch transports drainage water from the landfill cap to the Hackensack River. The landfill was fenced along its southern and eastern borders.

In 1990 an investigation was conducted to characterize the nature and extent of the contamination including: geophysical investigations, installation of 24 groundwater monitoring wells, collection and analysis of all environmental media and, a buried drum investigation<sup>(1)</sup>.

A Preliminary Health Assessment was prepared by the Agency for Toxic Substances and Disease Registry (ATSDR) on October 11, 1988<sup>(2)</sup>. The Preliminary Health Assessment identified that contaminated surface water and inhalation of volatile contaminants from the gas venting system were the major human exposure pathways at the landfill. The route of human exposure from surface water was through contact with contaminated water by swimming, boating, and other public uses.

The Preliminary Health Assessment also concluded that: potential human exposure pathways to contamination were associated with contact (dermal and ingestion) with on-site soils, and contamination of the groundwater resulting from percolation through the on-site soils from surface water and leachate. It was noted that actions taken in the IRM (eg. capping) diminished the importance of some exposure pathways including inhalation of and/or human contact with on-site surface soils.

The major contaminants identified in the previous Health Assessment consisted of chromium, phenols, various pesticides, and volatile organic compounds (VOC's) in the groundwater and VOC's and lead in the Sip Avenue ditch leachate.

The Preliminary Health Assessment did not report site-related community health concerns. ATSDR found, based on the available data, the PJP Landfill site to be of potential public health concern because of the risk to human health from possible exposure to site-related contaminants. The report recommended additional data be collected regarding on-site and off-site soil and groundwater contamination, to help in assessing exposure pathways.

A Site Review and Update (SRU) for the PJP Landfill site was prepared by the New Jersey Department of Health (NJDOH) on August 30, 1993<sup>(9)</sup>. This SRU recommended a health consultation be performed to address two specific issues:

- 1) An evaluation of past and present exposures to contaminated media in the Sip Avenue Ditch and past exposures to on-site soil. In addition, ATSDR and NJDOH would review the proposed selected remedy for the Sip Avenue Ditch.
- 2) Design of the new landfill venting system. The ATSDR and NJDOH would evaluate the potential human health risk (to nearby workers and area residents) from the inhalation of site-related contaminants, which may be vented into the ambient air via the gas collection system.

This health consultation will deal with the evaluation of past and present exposures to contaminated media in the Sip Avenue Ditch and past exposures to on-site soil. Since the 1993 SRU was written, no additional data are available regarding the design of the remedy for the Sip Avenue Ditch or the new landfill venting system. The New Jersey Department of Environmental Protection (NJDEP) proposed plan for the PJP site is still in the draft stage. Therefore, these issues can not be addressed at this time.

## DISCUSSION

This section contains discussion of the health effects in persons potentially exposed to specific contaminants found on the site. Health effects evaluations are accomplished by estimating the amount (or dose) of those contaminants that a person might come in contact with on a daily basis. This estimated exposure dose is then compared to established health guidelines such as ATSDR's health assessment comparison values. People who are exposed for some crucial length of time to contaminants of concern at levels above established guidelines are more likely to have associated illnesses or disease.

Comparison values are contaminant concentrations in specific media used to select contaminants for further evaluation. Examples of health guidelines are the ATSDR's Minimum Risk Level (MRL), environmental media evaluation guides (EMEGs), and cancer risk evaluation guides (CREGs). When exposure (or dose) is below the MRL than non-cancer, adverse health effects are unlikely to occur. CREGs are estimated contaminant concentrations based on the incidence of one excess cancer in a million persons exposed over a lifetime.

MRLs are developed for each route of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (365 days and greater). ATSDR presents these MRLs in Toxicological Profiles. These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status.

The toxicological effects of the contaminants detected in the environmental media have been considered singly. The cumulative or synergistic effects of mixtures of contaminants may serve to enhance their public health significance. Additionally, individual or mixtures of contaminants may have the ability to produce greater adverse health effects in children as compared to adults. This situation depends upon the specific chemical being ingested or inhaled, its pharmacokinetics in children and adults, and its toxicity in children and adults.

The NJDOH has determined that trespassers to the Sip Avenue Ditch and on the landfill surface soils may be or may have been exposed to several contaminants at levels of public health significance. It is very unlikely that very young children would trespass on the site, mostly due to the remoteness of the site and the fence which surrounds most of the site perimeter. It is likely that trespassers would be either adults or older children with body weights  $\geq 35$  Kg.

Because of the large diversity of compounds present, this toxicological evaluation includes those compounds which present the highest potential for adverse health effects. In addition, contaminants present at concentrations in excess of their ATSDR comparison value were also selected for evaluation.

### *Sip Avenue Ditch*

A potential human pathway of concern, identified in the 1993 SRU, was identified as exposure to contaminated environmental media (surface water and sediments) by trespassers in the Sip Avenue Ditch section of the landfill. Access to the site is possible through breaks in the fence, and from the warehouse and the scrapyards by crossing the Sip Avenue Ditch. Environmental samples were taken from surface water and sediments found in the ditch. The greatest concentrations of site related contaminants were found in the ditch sediments, therefore the following discussion will use these data.

During the 1990 Remedial Investigation/Feasibility Study (RI/FS) the New Jersey Department of Environmental Protection Energy (NJDEP) determined that the Sip Avenue Ditch sediments were contaminated with a variety of volatile organic compounds (VOC's), semivolatile organic compounds, and metals. Table 1 lists the contaminants of public health concern found in the ditch.

**Table 1. Contaminants of Concern; On-Site Sediments; Sip Avenue Ditch; PJP Landfill Site, Hudson County, NJ. Contaminants with Comparison Values.**

Contaminant	Maximum Concentration (ppm)	Ref.	Comparison Value	
			(ppm)	Source
Benzo (A) Pyrene	1.6	4	0.1	CREG*
Arsenic	9.5	5	.4	CREG*

\*CREG - Cancer Risk Evaluation Guide for  $1 \times 10^{-6}$  excess cancer risk

To estimate exposure doses of persons trespassing on the site, the following assumptions were made. It was assumed that the site was visited by children (35 kg), 2 times per week, for a period of four months per year, and that they would ingest 200 milligrams (mg) of soil during each visit.

#### Benzo (A) pyrene<sup>(4)</sup>

Trespassers at the Sip Avenue Ditch may be exposed to Benzo (A) Pyrene at a maximum concentration of 1.6 ppm. Exposure doses may be estimated based upon the assumptions made above. The resultant estimated exposure dose of  $4.02 \times 10^{-7}$  mg/kg/day is much lower than ATSDR's acute oral MRL of 0.1 mg/kg/day. Exposure doses were well below the no observed adverse effect levels (NOAELs) for chronic oral exposure in animals (for effects other than cancer), cited in the ATSDR Toxicological Profile for Benzo (A) Pyrene<sup>(4)</sup>.

Benzo (A) Pyrene is carcinogenic in animals and potentially carcinogenic in humans; the USEPA classifies Benzo (A) Pyrene as a probable human carcinogen. Based upon the maximum concentration of Benzo (A) Pyrene found in sediments of the Sip Avenue Ditch, the lifetime excess cancer risk (LECR) associated with oral exposure to Benzo (A) Pyrene would present an insignificant or no increased risk of cancer.

#### Arsenic<sup>(5)</sup>

Trespassers at the Sip Avenue Ditch may be exposed to arsenic at a maximum concentration of 9.5 ppm. The estimated exposure dose of  $2.5 \times 10^{-6}$  mg/kg/day is below the chronic oral MRL of 0.0003 ( $3.0 \times 10^{-4}$ ) mg/kg/day. Exposure doses do not exceed the no observed adverse effect levels (NOAELs) for chronic exposure in humans (for effects other than cancer) cited in the ATSDR Toxicological Profile for this element<sup>(5)</sup>.

Studies have shown that arsenic is a human carcinogen, and is so classified by the USEPA. Based upon the maximum concentration found outside the fenced areas at the site, the estimated ( $6.1 \times 10^{-7}$ ) lifetime excess cancer risk (LECR) associated with oral exposure to arsenic present an insignificant or no increased risk of cancer.

### *On-Site Soil*

A potential human pathway of concern, identified in the 1993 SRU, was identified as past exposure to contaminated surface soil by recurrent site trespassers at the PJP landfill. During the 1990 Remedial Investigation/Feasibility Study (RI/FS) environmental samples of surface soil were taken from the drum storage and staging area used during the IRM activities in 1985 and 1986. This area was designated as an area of specific concern by NJDEP because of the likelihood of severe soil contamination.

Sampling results indicated that the on-site surface soils were contaminated with a variety of volatile organic compounds (VOC's), semivolatle organic compounds, and metals. Table 2 lists the contaminants of public health concern found in the surface soils.

To estimate exposure doses of persons trespassing on the site, the following assumptions were made. It was assumed that the site was visited by children (35 kg), 2 times per week, for a period of four months per year, and that they would ingest 200 milligrams (mg) of soil during each visit.

**Table 2.** Contaminants of Concern; On-Site Soils; PJP Landfill Site, Hudson County, NJ. Contaminants with Comparison Values.

Contaminant	Maximum Concentration (ppm)	Ref.	Comparison Value	
			(ppm)	Source
Di(2-ethylhexyl)phthalate	140	6	50	CREG
Arsenic	29.1	5	.4	CREG

CREG - Cancer Risk Evaluation Guide for  $1 \times 10^{-6}$  excess cancer risk

### Di(2-ethylhexyl)phthalate (DEHP)<sup>(6)</sup>

Trespassers at the site may be exposed to Di(2-ethylhexyl)phthalate at a maximum concentration of 140 ppm. The estimated exposure dose of  $3.52 \times 10^{-5}$  mg/kg/day is much lower than ATSDR's intermediate oral MRL of 0.4 mg/kg/day. Exposure doses were well below the no observed adverse effect levels (NOAELs) for chronic oral exposure in animals (for effects other than cancer), cited in the ATSDR Toxicological Profile for Di(2-ethylhexyl)phthalate<sup>(6)</sup>.

Di(2-ethylhexyl)phthalate is carcinogenic in animals and potentially carcinogenic in humans; the USEPA classifies DEHP as a probable human carcinogen. Based upon the maximum concentration of DEHP found in on-site surface soils, the estimated ( $1.35 \times 10^{-6}$ ) lifetime excess cancer risk (LECR) associated with oral exposure to DEHP would present an insignificant or no increased risk of cancer.

#### Arsenic<sup>(5)</sup>

Trespassers at the PJP Landfill may be exposed to arsenic at a maximum concentration of 29.1 ppm. The estimated exposure dose of  $7.32 \times 10^{-6}$  mg/kg/day is below the chronic oral MRL of 0.0003 ( $3.0 \times 10^{-4}$ ) mg/kg/day. Exposure doses do not exceed the no observed adverse effect levels (NOAELs) for chronic exposure in humans (for effects other than cancer) cited in the ATSDR Toxicological Profile for this element<sup>(5)</sup>.

Studies have shown that arsenic is a human carcinogen, and is so classified by the USEPA. Based upon the maximum concentration found outside the fenced areas at the site, the estimated ( $1.79 \times 10^{-6}$ ) lifetime excess cancer risk (LECR) associated with oral exposure to arsenic present an insignificant or no increased risk of cancer.

## CONCLUSIONS

There are areas of documented on-site soil and sediment contamination, and contaminated surface water flows off the site through the Sip Avenue Ditch. Health risks can be estimated for the potential exposure pathway associated with a recurrent trespasser at the PJP Landfill site. The following conclusions were made regarding exposure to contaminants in the Sip Avenue Ditch:

1. Based upon the maximum concentration of contaminants found in Sip Avenue Ditch sediments, exposure doses calculated for recurrent site trespassers were: a) below the Lowest-Observed-Adverse-Effects Level (LOAEL) (animals) for intermediate oral exposure to Benzo (A) Pyrene; and b) were below the No-Observed-Adverse-Effects Level (NOAEL) (humans) for chronic oral exposure to arsenic.
2. The lifetime excess cancer risk (LECR) associated with oral exposure to Benzo (A) Pyrene and arsenic present "an insignificant or no increased risk of cancer".

The following conclusions were made regarding exposure to contaminants in on-site soils:

1. Based upon the maximum concentration of contaminants found in on-site soils, exposure doses calculated for recurrent site trespassers were: a) below the NOAEL (animals) for chronic oral exposure to DEHP; and b) were below the No-Observed-Adverse-Effects Level (NOAEL) (humans) for chronic oral exposure to arsenic.

2. The lifetime excess cancer risk (LECR) associated with oral exposure to DEHP and arsenic present "an insignificant or no increased risk of cancer".

Based on available information, and a worse case scenario of exposure dose and duration, recurrent trespassers at the site are not likely to be exposed to contamination at concentrations sufficient to constitute a public health hazard. Therefore, exposure to contaminants in the Sip Avenue Ditch and on site soils are of no apparent health hazard.

Two remaining issues regarding the design of the remedy for the Sip Avenue Ditch and the new landfill gas venting system could not be addressed at this time.

Conclusions made concerning this site relate to its current conditions and use. Any proposed change in land use for the landfill will likely require re-examination of site data by ATSDR/NJDOH.

## RECOMMENDATIONS

After a review of the most recent documents for the PJP Landfill site, the ATSDR and the NJDOH have determined that, based on the current site conditions, no further action by ATSDR/NJDOH is required at the site at this time because of the following facts: (1) ATSDR/NJDOH has determined that estimated exposure doses, for past exposures at the PJP Landfill site, were well below ATSDR's minimum risk level (MRL) and the lifetime excess cancer risk (LECR) associated with oral exposure to site contaminants would present "an insignificant or no increased risk of cancer"; and (2) there are no current exposures at the site that are likely to result in adverse health effects.

The data and information developed in this Health Consultation has been evaluated by ATSDR's Health Activities Recommendation Panel (HARP). The panel determined that, although past exposures to site-related contaminants have occurred, no followup health actions are indicated at this time.

ATSDR/NJDOH should review the issues regarding the design of the remedy for the Sip Avenue Ditch and the new landfill gas venting system when relevant data are available. This should be done by a Health Consultation or other appropriate mechanism.

New environmental, toxicological, health outcome data, or changes in conditions as a result of implementing the proposed remedial plan, may determine the need for other additional actions at this site.



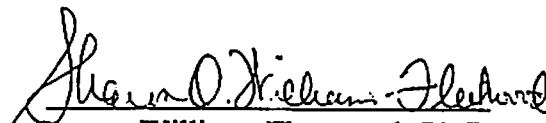
## CERTIFICATION

This Health Consultation was prepared by the New Jersey 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 health consultation was begun.



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ATSDR

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



Sharon Williams-Fleetwood, Ph.D.  
Chief, SSAB, DHAC, ATSDR

## DOCUMENTS REVIEWED

1. Phase I Remedial Investigation Report for PJP Landfill, Jersey City, New Jersey, IFC Technology Incorporated, April 1990.
2. Agency for Toxic Substances and Disease Registry, Health Assessment for PJP Landfill, Hudson County, Jersey City, New Jersey, ATSDR, October 11, 1988.
3. Agency for Toxic Substances and Disease Registry, Site Review and Update, PJP Landfill, Hudson County, Jersey City, New Jersey, August 30, 1993.
4. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Benzo (A) Pyrene. Atlanta: ATSDR, May 1990.
5. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Arsenic. Atlanta: ATSDR, April 1993.
6. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Di(2-ethylhexyl)phthalate. Atlanta: ATSDR, April 1993.

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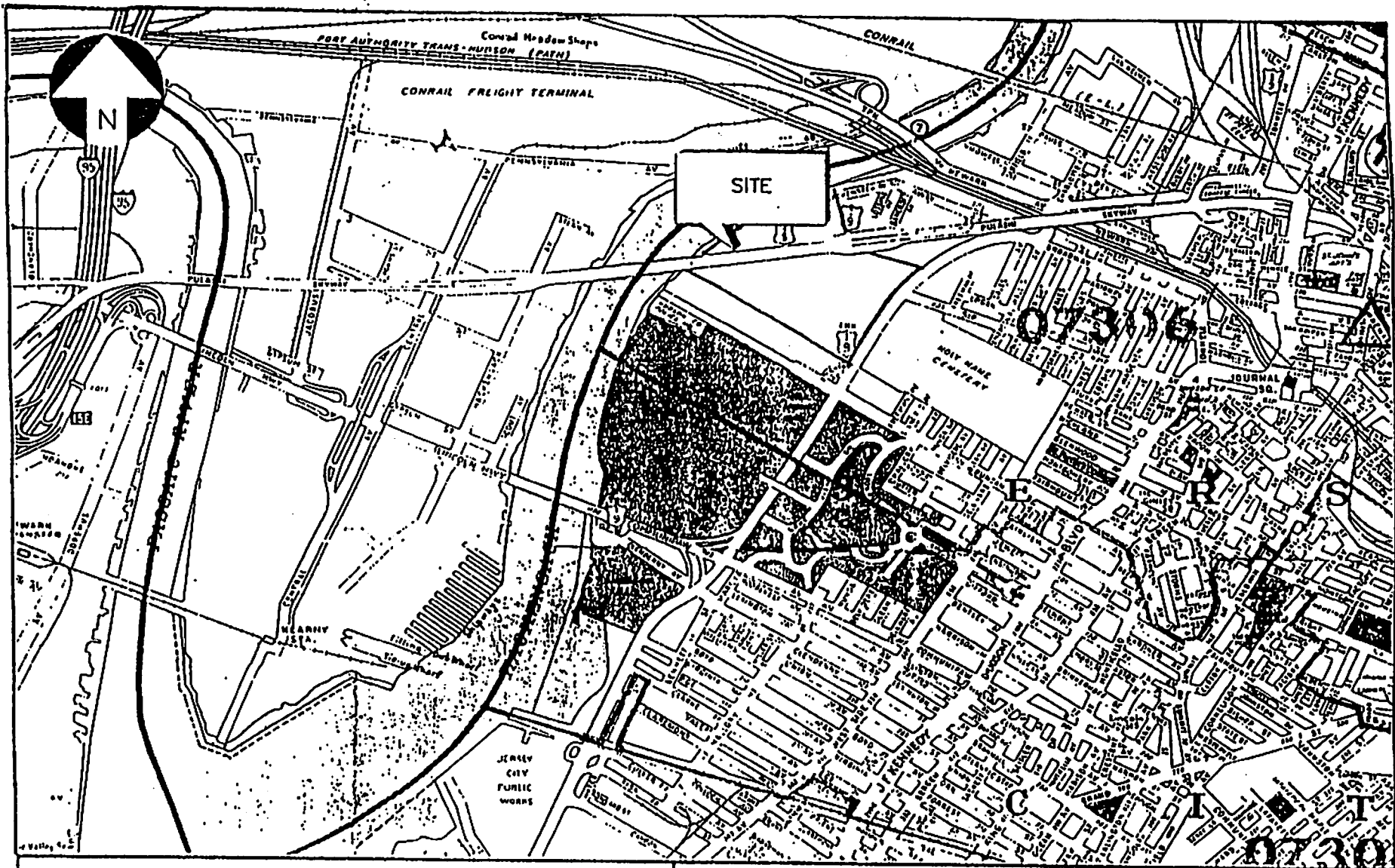


Figure 1  
Site Location Map

PJP LANDFILL, JERSEY CITY, NEW JERSEY  
ICF TECHNOLOGY, INC