PRELIMINARY

Health Assessment for

FORT DIX SANITARY LANDFILL

PEMBERTON TOWNSHIP, NEW JERSEY

DECEMBER 19, 1988

Agency for Toxic Substances and Disease Registry
U.S. Public Health Service

THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104(i)(7)(A) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term 'health assessment' shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risk assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, ATSDR has conducted this preliminary health assessment on the data in the site summary form. Additional health assessments may be conducted for this site as more information becomes available to ATSDR.

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Prepared by:
Office of Health Assessment
Agency for Toxic Substances and Disease Registry (ATSDR)

Background

The 113-acre Fort Dix Sanitary Landfill is located in the southwest section of the U.S. Army Fort Dix Military Reservation near Pemberton Township, Burlington County, New Jersey. The landfill is approximately 90 miles southwest of New York City. The landfill is surrounded by Pointville Road to the north, Pipeline Road to the west, Juliustown-Browns Mills Road to the east, and Pemberton-Browns Mill Road to the south. Cannon Run is located on the east side of the landfill and flows south into the North Branch of Rancocas Creek. Another unnamed stream located northwest of the landfill flows to the west into North Branch of Rancocas Creek. A hardwood swamp is located towards the west and south of the landfill. The Fort Dix Sanitary Landfill is on the U.S. Environmental Protection Agency's (EPA) National Priorities List (NPL).

The Fort Dix Sanitary Landfill was in operation from 1950 until official closing on July 6, 1984. Both Fort Dix and McGuire Air Force Base used the landfill. Waste from Fort Dix and McGuire Air Force Base were buried in a series of parallel trenches (approximately ten feet in-depth). The trenches were covered with about two feet of native soil that had been removed during trench excavation. Some of the types of waste disposed of in the landfill included washrack sludge, waste paints and thinners, pesticide and empty containers, and combined wastes. Demolition debris, domestic waste (tires, clothing, food containers, etc.), mess hall grease, and coal ash have also been reported to be in the landfill.

The following documents were provided to ATSDR for review: Remedial Investigation/Feasibility Study for Fort Dix Sanitary Landfill Pemberton Township, New Jersey, Proposed Response, September 1986; Remedial Investigation/Feasibility Study for Fort Dix Sanitary Landfill Pemberton Township, New Jersey, Proposed Response, Addendum 1, January 1987; Remedial Investigation/Feasibility Study for Fort Dix Sanitary Landfill Pemberton Township, New Jersey, Proposed Response, Addendum 2, August 1987. These documents form the basis of this Preliminary Health Assessment.

Fort Dix Sanitary Landfill

Environmental Contamination and Physical Hazards

Soil, sediment, surface water, air, and groundwater samples were taken at the Fort Dix Sanitary Landfill. Analyses of these samples show no contamination of public health concern in the air or soil at the landfill. Sediment and surface water samples taken in Cannon Run and the unnamed stream show no contamination of public health concern. No contaminants of public health concern were shown in the swamp sediment. No subsurface soils samples were taken in the landfill because of the explosive hazard associated with that type of operation at this site. The table below lists the contaminants of public health concern shown in the groundwater beneath the landfill and the western swamp surface water.

Table of Contaminants of Concern

Contaminant	Range in Parts per Billion (ppb)
Groundwater	
Methylene chloride	<2-110
Vinyl chloride	<3-22
Trichloroethylene	<1-18
Benzene	<2-12
Tetrachloroethylene	<1-9
Manganese (total)	<7-10,620
Lead (total)	<2-114
Cadmium (total)	<3-10
Surface Water (western swamp)	
Methylene chloride	<2-110
Manganese (total)	<7-865
Lead (total)	<2-11

The information provided to ATSDR did not document any physical hazards associated with the Fort Dix Sanitary Landfill.

Potential Environmental and Human Exposure Pathways

Groundwater monitoring data show that the groundwater contamination beneath the Fort Dix Sanitary Landfill is migrating towards the south southwest. The groundwater contamination is shown to be only in the upper

unconfined aquifers (Cohansey and Kirkwood Formations). These aquifers appear to discharge to the swamp area west and southwest of the landfill. Therefore, the potential human exposure pathways are the ingestion, inhalation, and direct dermal contact with the contaminated groundwater and surface water. The information provided to ATSDR indicates that no potable water supply wells are near or threatened by the groundwater contamination.

Another human exposure pathway at the Fort Dix Sanitary Landfill is the ingestion of contaminated on-site biota. The biota in the swamp could bioaccumulate the contaminants. The information provided to ATSDR indicates that there are no fish in the hardwood swamp. There are, however, naturally occurring consumable plants and animals (e.g., racoons) found in the swamp. It is possible that animals and plants could accumulate site-related heavy metals to levels of public health concern, if consumed by humans. No crops or livestock are grown at the Fort Dix Sanitary Landfill.

Demographics

The Fort Dix Sanitary Landfill is surrounded by woods and dense vegetation. This area is in the flight line of McGuire Air Force Base; construction of occupied buildings in this area is not permitted. Military field training exercised are carried out in the wooded areas immediately surrounding the landfill. The area is open to the public during the hunting season. Unauthorized recreational activities such as dirt biking have been observed.

Military housing (barracks, houses, and Fort Dix Elementary School) is located approximately 4,000 feet northwest of and upgradient from the landfill. Approximately 5,000 people live in this area.

The Pemberton Township is about 4,000 feet southwest of the landfill. The Township has a population of 500.

The Burlington County Juvenile Detention Center and Shelter are approximately 3,000 feet south of the landfill. The Pinelands Village, approximately 12 homes and county buildings, is also south of the landfill.

Most of the local population obtains potable water from the aquifers in the Raritan and Magothy Formations, which are beneath the Cohansey and Kirkwood Aquifers. Fort Dix utilizes Greenwood Branch (a tributary upgradient from the landfill that enters the North Branch of Rancocas Creek) as its potable water supply source.

Only one potable water supply well has been identified that withdraws water from the Kirkwood Formation (one of the aquifers contaminated by the Fort Dix Sanitary Landfill). However, this well is south and east of the surface discharge points of the groundwater from the landfill.

Evaluation and Discussion

Groundwater monitoring data show that the contaminants are in the upper aquifers (Cohansey and Kirkwood Formations). These unconsolidated aquifers are believed to flow to the south-southwest and discharge to the swamp and Cannon Run next to the landfill. Contaminants in the groundwater have been shown in the surface water of the swamp. Samples from groundwater monitoring wells further south of the swamp show no site-related contaminants.

The upper aquifers are separated from the lower aquifers (e.g., Raritan and Magothy Formations) by a series of aquitards (Manasquan, Vincentown, and Hornerstown Formations). Analyses of groundwater samples taken from the lower aquifers show no site-related contaminants.

On-site sediment (swamp and creek) and soil samples show DDT and its metabolic breakdown products (DDD and DDE), 890-8,940 ppb. The presence of these compounds is not believed to be related to the Fort Dix Sanitary Landfill, but to surface spraying of DDT and subsequent surface runoff during precipitation. However, the levels shown in the Fort Dix Sanitary Landfill sediment and soil samples are higher than those typically shown in agricultural soils sprayed with DDT, 3000-6000 ppb. DDT is known to bioaccumulate in biota. This could result in human exposure if biota is consumed.

Groundwater samples show gross alpha and beta radiation above the EPA national drinking water standards. It is believed that most of the radiation shown in the samples is naturally occurring and not site-related.

ATSDR has prepared Toxicological Profiles on the site contaminants (with the exception of barium and manganese) noted above. EPA has promulgated national drinking water standards for barium and manganese (1,000 and 50 ppb respectively).

Conclusions and Recommendations

Based on the available information, this site is considered to be of potential public health concern because of the risk to human health caused by the possibility of exposure to hazardous substances via ingestion of surface water, biota, and groundwater, and inhalation or direct dermal contact with surface water and groundwater.

In order to protect the public health, ATSDR recommends the following:

1. Consideration should be given to adopting institutional controls to prevent future installation and use of potable water supply wells in the contaminated portion of the aquifer.

2. Consideration should be given to conducting a biota human consumption survey. If biota are consumed by humans, consideration should be given to obtaining edible fish, animal, or plant samples from the swamp and local creeks. This sampling should be conducted to assure that heavy metals and DDT and its metabolic breakdown products (DDD and DDE) have not bioaccumulated in the biota.

Further environmental characterization and sampling of the site and impacted off-site areas should be designed to address the environmental and human exposure pathways discussed above. When additional information and data become available such material will form the basis for further assessments by ATSDR, as warranted by site specific public health issues.