

Health Assessment for

SHARKEY LANDFILL

TROY HILLS, NEW JERSEY

DECEMBER 7, 1988

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

SUMMARY

The Sharkey Landfill is a National Priorities List (NPL) site located in the Townships of Parsippany-Troy Hills and East Hanover, Morris County, New Jersey. The total landfill area is approximately 90 acres and is divided into 4 separate sections: the North Fill, South Fill, Northwest Fill, and the Southwest Fill. The landfill began operation in 1945 accepting municipal wastes from several surrounding counties and some hazardous and/or toxic materials. Records indicated these materials included approximately 100,000 gallons of various volatile organic compounds (VOC's). The landfill also accepted wastes from sewage treatment plants. Although the landfill ceased operations in September 1972, there have been unverified reports of several million gallons of wastewater from a chemical manufacturer being disposed of in the landfill from 1972 to 1974. Data from monitoring wells on-site indicated the groundwater in the shallow aquifer is contaminated with VOC's and metals at concentrations above the drinking water standards. Generally, this aquifer is not used for supplying drinking water, although some area private wells are screened in this aquifer. Most of the residences in the area are supplied water by the municipality which draws its water from deeper aquifers and also makes use of surface water from the Whippany River. The closest surface water intake is 8 miles downstream. The surface water quality does not appear to be measurably diminished by the landfill. Sharkey Landfill is of potential health concern because there is potential for contaminant migration off-site in groundwater and surface water. There are some area private wells screened in the shallow aquifer which have the potential to become contaminated. The Record of Decision (ROD) selected a remedy which adequately addresses the public health concerns associated with the landfill by providing for the treatment of contaminated groundwater, implementing surface water controls to stabilize the areas of the landfill which are being undercut by the rivers, and construction of a Resource Conservation and Recovery Act approved cap.

BACKGROUND

A. SITE DESCRIPTION

The Sharkey Landfill is a NPL site located in the Townships of Parsippany-Troy Hills and East Hanover, Morris County, New Jersey, with the main entrance on Edwards Road. The areas are known as: North Fill, South Fill, Northwest Fill, and the Southwest Fill.

The North Fill is a 26-acre island at the end of Sharkey Road. It is surrounded by branches of the Rockaway River, which have undercut the landfill banks and exposed fill material in some areas. The sides of the landfill are steep and contain leachate seeps and erosion gullies. The fill material is approximately 80 feet deep in the deepest section and about 40 feet deep at the shallowest.

The South Fill located southeast of Sharkey Road is bounded by the Rockaway and Whippany Rivers and the Parsippany-Troy Hills Sewage Treatment Plant. There is also some fill located to the northwest of Sharkey Road. Several acres of the fill material were removed from this area during the sewage treatment plant expansion and were placed into the North Fill area. The total area of South Fill, including the sewage treatment plant, is approximately 64 acres. The area containing landfill material occupies about 29 acres. The fill is approximately 70 feet deep. The site maps in the Remedial Investigation/Feasibility Study (RI/FS) indicate the presence of small ponds bordering this area. These ponds were reported to be clean and to support life. Currently, the ponds are used as collection basins for storm water runoff from Parsippany and Troy Hills and may be only wet weather ponds.

The Northwest fill area is separated into two sections by Route 280. The section northeast of Route 280 is approximately 11 acres bordered by Whippany River to the southeast. The other section is approximately 15 acres and is also bordered on one side by the Whippany River. These areas have fill material about 20 feet deep and in some areas the fill material was exposed and contained uncovered drums.

The Southwest Fill is in East Hanover Township and is approximately 9 acres. It is also bordered by the Whippany River, the old river channel to the southwest and the current channel to the northwest. The fill is about 20 feet deep and relatively level. It was reported this landfill received some of the fill material that was excavated when Route 280 was constructed through the landfill.

None of the landfill areas have restricted access, except for the restrictions imposed by the terrain.

B. SITE VISIT

The Agency for Toxic Substances and Disease Registry (ATSDR) conducted a site visit in October 1988. The information gained from this visit is presented throughout this Health Assessment.

ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

A. ON-SITE CONTAMINATION

Of primary concern is the groundwater contamination beneath the site. Twenty-six monitoring wells were installed in the landfill study area during the RI/FS. The greatest amount of groundwater contamination detected was from monitoring well WS-11, located in the center of the North Fill area. Concentrations of the contaminants were low, a combined total of VOC's and semi-volatile compounds was reported as 269 ug/l. The VOC's most commonly detected in all the shallow monitoring wells were benzene, ethylbenzene, and chlorobenzene. Although the New Jersey State Drinking Water Regulations and the U.S. Environmental Protection Agency (EPA) Primary Drinking Water Regulations maximum contaminant levels (MCL) were exceeded for certain compounds, there were no individual VOC concentrations which exceeded 75 ug/l. The samples analyzed for metals contamination were unfiltered which may partially account for the elevated concentrations. The Table of Contaminants lists the contaminants of concern.

Table of Groundwater Contaminants

| <u>Parameter/ Location</u> | <u>Lead ug/l</u> | <u>Cadmium ug/l</u> | <u>Chromium ug/l</u> | <u>Benzene ug/l</u> | <u>Chlorobenzene ug/l</u> |
|--------------------------------|----------------------|-------------------------|--------------------------|-------------------------|-------------------------------|
| North Fill | | | | | |
| WS- 9 | 480 | 7.4 | 146 | --- | 17 |
| WS-11 | --- | 5.3 | 334 | --- | --- |
| WS-12 | 77 | --- | 75 | 5 | 18 |
| WS-13 | 14 | 4.1 | 182 | 22 | --- |
| South Fill | | | | | |
| WS- 2 | --- | 11 | --- | --- | --- |
| WS- 6 | 63 | 13 | 4,990 | 6 | 75 |
| WI- 6 | 7.5 | --- | 97 | --- | --- |
| WS- 7 | 29 | --- | 24 | --- | --- |
| WI- 7 | --- | 3 | 16 | --- | --- |
| WS-17 | 145 | 8.1 | 34 | 4 | --- |
| WI-17 | --- | --- | 206 | --- | --- |
| Northwest Fill | | | | | |
| WS- 3 | 290 | 8.4 | 54 | --- | --- |
| WI- 3 | 26 | 3.9 | 68 | --- | --- |
| WS- 5 | 9 | --- | 6.8 | 28 | 23 |
| WI- 5 | --- | 8.3 | 24 | --- | --- |
| Southwest Fill | | | | | |
| WS- 4 | 81 | 6.2 | 341 | --- | --- |
| WI- 4 | --- | 5.4 | 21 | --- | --- |

WS Shallow monitoring wells
 WI Intermediate depth monitoring wells
 Results from November 1985

There was difficulty in the quality control samples being outside of the established confidence intervals in some analyses and the results in the above table may be inaccurate.

Soil samples were taken from leachate seeps, erosion channels, and area "hot spots". Contaminants found included VOC's, pesticides, and polynuclear aromatic hydrocarbons. All concentrations were relatively low and more than half of the compounds were present in the blanks at similar concentrations.

Air monitoring of the ambient on-site air did not indicate VOC contamination above background concentrations. However, higher concentrations (up to 16 parts per million) were detected immediately above seeps and vents to the landfill cap.

B. OFF-SITE CONTAMINATION

The groundwater from several off-site wells was sampled, four residential wells, a public water supply well, and two industrial wells. It is currently unknown if these wells are still in service. Two residential wells (RW-101 and RW-203) are in the vicinity of the North Fill. Their approximate locations are 500 feet west of the lower portion of the North Fill and 1,000 feet to the northeast of the northernmost section, respectively. The other two residential wells, RW-351 and RW-365, are south and southeast of the Southwest Fill area approximately 3,500 feet and 2,000 feet, respectively. The commercial wells are located on the other side of the river from the North Fill. The public water supply well was about 1 mile south of the Southwest Fill portion. These wells ranged in depth from 8 to 120 feet. The organic compounds found in the samples (bis (2-ethylhexyl) phthalate and benzo(a)pyrene) were also found in the blank at a similar concentration. The metals did not exceed the MCL's, although some secondary standards were exceeded, i.e., iron and manganese. These metals were not included in the Table of Contaminants because the concentrations present affect the esthetics of the water and do not present a health concern. Three of the residential wells were reported to be upgradient of the site and the other has not been in use for a number of years.

The surface water analyses indicated no significant degradation in water quality between upstream and downstream samples.

C. PHYSICAL HAZARDS

The physical hazards on-site include the exposed rubbish and drums in areas where the landfill covering has deteriorated, erosion gullies, and areas where the river has undercut the landfill. Although the landfill areas are not fenced, access is somewhat limited by the terrain.

DEMOGRAPHICS OF POPULATION NEAR SITE

The area to the west and north of the site is primarily light industrial, although there are scattered residential properties in the area. The area to the east and south is primarily swampland and undeveloped. The Parsippany-Troy Hills area has a total population of approximately 50,000, while the towns of Montville and East Hanover have populations of approximately 12,000 each. The water in the area is supplied by the municipalities; however, older residences (or industries) may still have private wells. The Morris County Health Department reported there were no

private residential wells or commercial wells currently in use in the immediate area. There are currently no health advisories for the Whippany or Rockaway Rivers in this area.

EVALUATION

A. SITE CHARACTERIZATION

1. Environmental Media

The available data were several years old and changes may have occurred in physical conditions at the site or in contaminant concentrations. The food chain was not addressed in the RI. No information was available on cultivated or non-cultivated foods growing at the site.

2. Land Use and Demographics

Future land use on-site and adjacent to the site is uncertain; however, proposals for development of adjacent areas is likely. Should land use or zoning change, further ATSDR review may be warranted. No further demographic information is currently necessary.

3. Quality Assurance and Quality Control

A significant portion of the data were suspect because of inconsistencies in the results and quality control sample results were outside the designated confidence intervals. The Case Narrative, prepared by the contractor, or the Data Review Summary, prepared by EPA, were not supplied in the information package. It was assumed that the analytical data has been reviewed by EPA and has met their acceptability criteria. The conclusions in this Health Assessment were based on the information received. The accuracy of these conclusions is determined by the completeness and reliability of that information.

B. ENVIRONMENTAL PATHWAYS

Although some data may be in question, what is indicated by the data is contamination may be present in all of the fill areas. Anecdotal information indicates hazardous wastes are present in the landfill; however, the concentrations reported in the information received are not atypical of other landfills accepting domestic wastes and sludge wastes from sewage treatment plants nor does it indicate significant or catastrophic releases of hazardous substances.

The two primary pathways are surface water runoff and groundwater transport. The Whippany and Rockaway Rivers are the major surface water features in the area. Leachate from landfill seeps, surface water runoff from rainfall events and the introduction of contaminants and fill material to the rivers by the undercutting action on the landfill sides are mechanisms that may introduce the contamination into the rivers. The RI reported that the surface water quality was not diminished downstream from the landfill. Other surface water features include the ponds west of the South Fill section and swamplands east and south of the Southwest Fill area. It was reported, however, that these ponds were used as storm water collection ponds and were uncontaminated.

Groundwater discharge from the shallow aquifer into the rivers and ponds may also contribute to surface water contamination. The shallow aquifer was contaminated with metals and VOC's and the lower aquifer also showed contamination although the concentrations were generally lower. The contamination in the shallow aquifer does not appear to have moved off-site.

Air monitoring did not indicate the presence of VOC's or other air contaminants in the ambient air and migration of contaminants through the air is not considered a viable pathway.

Soil sampling was conducted in areas suspected of highest contamination, i.e., seeps and eroded areas. The results indicated the soil was contaminated; however, no information was available on surficial soil samples from areas where the landfill cover's integrity had not been compromised. Generally, the cover was vegetated thereby reducing erosion and windblown dusts.

The ROD Selected Alternative addresses the potential health concerns by constructing a 2-foot clay cap over the fill areas, and implementing surface water controls, a pump and treat regime for the shallow aquifer groundwater, and a gas venting system.

The surface cap would reduce or eliminate erosion by surface water runoff and help to reduce the amount of leachate produced in the landfill by reducing the infiltration of precipitation. The proposed pump and treat regime should remove the contaminated groundwater from the shallow aquifer before it migrates off-site.

C. HUMAN EXPOSURE PATHWAYS

The groundwater on-site has been contaminated with VOC's and some metals. Some residences in the area may be using the groundwater for domestic purposes, (bathing, drinking, cooking, etc.) and they have the potential for exposure should the contaminants migrate from the landfill into their wells. The RI reported that 4 residential wells were tested for the contaminants and that detectable quantities of VOC's were found. However, the concentrations detected were similar to the concentrations found in the blank samples. The residential wells surveyed were considered to be upgradient from the landfill areas; therefore, it is concluded the contaminants found were probably laboratory introduced contaminants.

Exposure through dermal contact appears minimal since the contamination is below the landfill cap and the landfill is closed. The surface water results indicated the rivers were not degraded by the landfill and that exposure or contact with either would be of minimal concern. Concern is warranted for the remedial workers, especially during activities which disturb the landfill cap. These activities may include the installation of the new cap, stabilization of the shoreline, and installment of the groundwater collection system.

Inhalation of VOC's are of concern to the remedial workers during activities on-site, especially when installing the gas collection system, the groundwater collection system, or whenever the landfill cap is disturbed.

Food chain pathways were not investigated in the RI; however, it would appear that bio-accumulation of contaminants by plants or animals would be minimal because of the lack of contact with the contaminants.

PUBLIC HEALTH IMPLICATIONS

Chromium has been detected in the soils and groundwater of the landfill. Chromium exists primarily in two oxidation states, trivalent, and hexavalent. While trace quantities of trivalent chromium are essential for carbohydrate metabolism, hexavalent chromium is a human carcinogen by the inhalation exposure route. There was no speciation information presented. The concentrations present, considered to be hexavalent chromium (to err on the side of safety), may cause effects such as acute renal tubular necrosis through the ingestion pathway. Also, dermatitis and allergic skin reactions can occur with dermal exposure at higher concentrations.

Lead is present in the groundwater on-site at concentrations above the primary drinking water regulations MCL in some areas of the landfill. Adverse health effects have been observed at concentrations below this standard and estimated long-term exposures to lead at concentrations present in the groundwater are of public health concern. Exposure to lead may produce several effects. It may inhibit hemoglobin synthesis or decrease red blood cell survival; cause peripheral nerve dysfunction; and may increase blood pressure. There are several sub-populations that are particularly susceptible to lead toxicity. These sub-populations include developing fetuses, children, and individuals with hepatic or renal disorders.

Cadmium was detected in the groundwater from some monitoring wells slightly above the MCL; however, the data was suspect because recoveries were outside the defined confidence limits. Cadmium exposure through inhalation may result in lung and/or prostate cancer but by oral ingestion, cadmium has not been shown to be a carcinogen. However, chronic ingestion may result in renal tubular dysfunction. Other effects on the respiratory tract, which may be proportional to the concentrations and duration of exposure, can range from chronic bronchitis to emphysema.

CONCLUSIONS AND RECOMMENDATIONS

Based on the information reviewed, ATSDR has concluded that this site is of potential health concern because of the potential risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects. As noted in the Environmental Pathways and Human Exposure Pathways Sections above, exposure to VOC's, lead, and chromium at concentrations of health concern may occur in the future. The ROD, with its proposed remediation activities, adequately addresses (and appears to eliminate) the potential for any future exposure to site contaminants.

The remedial workers and those who trespass on the landfill are of most concern. The workers may be exposed to the contaminants through dermal contact with the soils and groundwater, inhalation of the VOC's and the other gases after violating the integrity of the cap, and the inadvertent ingestion of the soils or groundwater.

The recommendations are as follows:

1. Provide proper safety training and protective equipment to remedial workers.
2. Restrict access to the contaminated areas.
3. In accordance with Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended, the Sharkey Landfill Site has been evaluated for appropriate follow-up with respect to health effects studies. Inasmuch as there is no extant documentation or indication in the information and data reviewed for this Health Assessment that human exposure to on-site contaminants is occurring or has occurred in the past, this site is not being considered for follow-up health studies at this time. However, if data becomes available suggesting that human exposure to significant levels of hazardous substances is currently occurring or has occurred in the past, ATSDR will reevaluate this site for any indicated follow-up.

PREPARER OF REPORT

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REFERENCES

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3. Remedial Investigation and Feasibility Study, Quality Assurance Project Management Plan, R.E. Wright Associates, Inc., October 1984.
4. Remedial Investigation and Feasibility Study, Task 3B, Field Investigations, R.E. Wright Associates, Inc., February 1986.
5. Record of Decision, Remedial Alternative Selection, US EPA Region II, September 1986.
6. Anecdotal information received from EPA in comments on the Draft Health Assessment, November 1988.