

Health Assessment for

COMBE FILL SOUTH LANDFILL

MORRIS COUNTY, NEW JERSEY

MAY 1988

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

SUMMARY

The Combe Fill South Landfill National Priorities List (NPL) Site is located on the township boundary between Chester and Washington Townships in Morris County, New Jersey. There are approximately 56 homes within a half-mile radius of the site with a population of 170 people. The Record of Decision (ROD) mandates several actions which include an alternate water supply, a cap over the 65-acre refuse disposal area, an active collection and treatment system for landfill gases, a pump and treat system for shallow groundwater and leachate, a control system for surface runoff, a security fence around the perimeter of the site, a monitoring program, and a supplemental Feasibility Study (FS) to further evaluate remedial alternatives for the bedrock aquifer. Until the remedial activities are complete, there is a potential public health threat from inhalation of gases produced within the waste pile, consumption of trout from Trout Brook, incidental ingestion and/or dermal absorption of surface water, dermal absorption and ingestion of ground water used in homes, and inhalation of volatile organic chemicals (VOC's) volatilized from contaminated ground water during household uses.

BACKGROUND

A. SITE DESCRIPTION

The Combe Fill South Landfill NPL site is located on the township boundary between Chester and Washington Townships in Morris County, New Jersey. The 115-acre landfill was in operation from the 1940's to 1981. In 1978 the landfill was bought by Combe Fill Corporation (CFC). While under CFC management, procedures at the landfill violated many of the New Jersey solid waste administrative codes.

Concern about disposal practices at Combe Fill South caused the residents in the area to become active in several citizens' groups: Help Avoid a Landfill Tragedy (HALT) and Upper Raritan Watershed Association (URWA). URWA took samples of ground water and leachate on-site and ground water and surface water off-site, in 1980 to 1981.

In 1981 CFC went bankrupt before the landfill was properly closed. The ROD, signed in September 1986, mandated several actions which include: an alternate water source for affected residents, a cap to be placed over the 65-acre refuse disposal area, an active collection and treatment system for landfill gases, a pump and treat system for shallow ground water and leachate, a control system for surface water runoff, a security fence around the perimeter of the site, a monitoring program to ensure the effectiveness of the remedial action, and a supplemental FS to further evaluate the bedrock aquifer.

Currently the site is in the design phase of the remediation. The security fence is planned for 1989.

B. SITE VISIT

ATSDR has not made a site visit to date.

ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

A. ON-SITE CONTAMINATION

Samples were taken of the leachate from several seeps located on-site. The results indicated the presence of VOC's, base-neutral extractable compounds (BNEC), metals, cyanides, and phenols. Soil/sediment samples indicated levels of BNEC's and metals several orders of magnitude higher than the concentrations detected in the seeps themselves. Other contaminants detected on-site are summarized in Table I below.

The low contaminant concentrations in the east and west branches of Trout Brook are not representative of the contamination suspected from the seeps and ground water discharge. It is possible that the contaminants volatilize, adsorb to sediment, or dilute once they reach the Brook. Therefore, it has been assumed that the contamination has not yet reached a level such that it could exceed the natural assimilative capacities of the Brook.

Medium	Contaminants	Concentration
Ground Water		(ppb)
Saprolite	Benzene	80
Aquifer	1,2-Dichloroethane	6
	Methylene Chloride	56
Bedrock	Benzene	252
Aquifer	Chloroform	155
	1,2-Dichloroethane	40.5
	TCE	57
Soil		
Test Pit	Aldrin	132
	Dieldrin	76
Air	Benzene	460 (ppb)

Legend:
TCE-Trichloroethene

B. OFF-SITE CONTAMINATION

Medium	Contaminants	Concentration
Ground Water		(ppb)
Saprolite	Chloroform	58
Aquifer		
Bedrock	Chloroform	209
Aquifer	1,2-Dichloroethane	8
	TCE	8
Residential	Chloroform	70
	Methylene Chloride	210
	TCE	37
	Arsenic	13

Legend:
TCE-Trichloroethene

C. PHYSICAL HAZARDS

A potential hazard is the generation and migration of gas (methane and other gases commonly found at landfills). This gas can be highly explosive if allowed to accumulate in an enclosed environment.

DEMOGRAPHICS OF POPULATION NEAR SITE

The area surrounding the site is semi-rural. There are approximately 56 homes within a half-mile radius of the site (the closest residence is less than a quarter-mile from the site) with a population of 170 people. There is also a nursery school, which uses a public water supply, located slightly more than a half-mile away. Most of the residents use private wells as their source of potable water.

Limited farming occurs in the area near the site (i.e., horse husbandry, vegetable, grain, and orchard farming), but most of the fields now lie fallow. There are also a few commercial establishments in the area (e.g., car repair shop).

EVALUATION

A. SITE CHARACTERIZATION (DATA NEEDS AND EVALUATION)

1. Environmental Media

In the Remedial Investigation (RI), references were made to plates that had been included in the original RI that illustrated the ground water flow patterns. These plates were not included in the information packet received by ATSDR, but they have been requested.

Additional information required for ATSDR's evaluation include: (1) A drinking water survey indicating the location and population using the ground water (public and private wells) or the surface water; (2) Information regarding possible consumption of food chain entities obtained in the area (e.g., fish, fowl, etc.). If such consumption is identified, flesh samples should be taken from the suspected source.

2. Land Use and Demographics

Additional information on the individuals living in homes near the site would be helpful in defining possible exposures to sensitive populations (e.g., children and elderly).

3. Quality Assurance/Quality Control

There was a problem with missing pages in several different portions of the documents received by ATSDR (e.g., Appendices). Only the pages that contained necessary information were requested, most have been received.

Conclusions contained in this Health Assessment are based on the information received by ATSDR. The accuracy of these conclusions is determined by the availability and reliability of the data.

B. ENVIRONMENTAL PATHWAYS

There has been a history of leachate seeps at the landfill. The leachate contains elevated levels of VOC's and metals. The cap, if properly maintained, should minimize such seeps. The cap will also prevent penetration of the waste by water from runoff and precipitation reducing the chance that leachate will be formed. A fence will be installed to restrict access to the site, preventing trespassers from coming in contact with the seeps.

Surface runoff has been contaminated by passing across the uncovered surface of the waste and has then drained into both branches of Trout Brook that border the site to the east and west, and a tributary to the north. Trout Brook is stocked with trout approximately 1.5 miles downstream of the site and has been designated a non-degradation water by NJDEP. Information available on the surface water features near the site was not adequate to eliminate surface water as a potential environmental pathway. The surface water controls and terraced cap will help to reduce erosion damage to the waste pile and will also prevent runoff and leachate seeps from draining into the surface water features.

On-site, the ground water is significantly contaminated. However, there is no known use of the water. Off-site the ground water shows contamination in monitoring wells and residential wells close to the site. The residential wells are contaminated with high levels of chloroform, methylene chloride, and TCE. The ROD provides for the affected residents to be placed on a permanent alternate water supply. Bottled water has been supplied to the residents. This measure will not address the concern for dermal and/or inhalation exposure to residential well water during the interim. Also, it has been reported that the residents affected may not be using the bottled water because it is not delivered directly to individual homes, but is distributed from a central location.

The air survey conducted at the site indicated the presence of methane as well as elevated levels of benzene, ethylbenzene, toluene and other gases. There is a potential for contaminants to volatilize through the soil, into the air, or to volatilize and follow a plume of methane gas (generated by anaerobic bacteria within the landfill) as it moves in the soil-air (EPA 1986). The soil-gas monitoring planned to begin in the summer of 1988 will help to determine whether or not this has been occurring.

Prior to the completion of the remedial actions proposed in the ROD, some environmental pathways will be cause for concern: leachate seeps present on-site, gases produced within the waste pile which may be released, contamination of trout from Trout Brook, contaminated surface water; and contaminated ground water used in homes (e.g., bathing, showering, drinking).

C. HUMAN EXPOSURE PATHWAYS

Potential human exposure pathways are: dermal absorption and ingestion of contaminants present in leachate seeps and the soil around the site; inhalation of volatilized contaminants, re-entrained contaminated dust, and gases released from the waste pile; consumption of contaminated trout from Trout Brook; incidental ingestion and/or dermal absorption of surface water found near the site; and dermal absorption, inhalation, and ingestion of the contaminants in water found in homes. These exposures would involve the remedial workers and trespassers on-site, residents living off-site, and people involved in recreational activities off-site.

The flesh of the trout living in Trout Brook has not been sampled, therefore, it is a potential human exposure pathway. Because of the existence of trout stocking and the lack of definite data on the contaminant levels in the stocked trout, we have assumed that the trout are of potential public health concern through consumption.

The actions implemented as a result of the ROD, should protect public health and reduce the potential for human exposure to the contamination related to the site. Continued monitoring will indicate any changes that occur in the ground water quality.

PUBLIC HEALTH IMPLICATIONS

Until the remedial activities are complete, there is a potential public health threat from dermal absorption or ingestion of contaminated soils; consumption of the trout from Trout Brook; inhalation of volatilized contaminants, re-entrained contaminated dust, and gases produced within the waste pile; incidental ingestion and/or dermal absorption of surface water found near the site; and dermal absorption, inhalation, and ingestion of contaminants in ground water in homes off-site.

Inhalation of VOC's that volatilize out of the waste pile during remediation may pose a potential threat to the unprotected remedial workers. Some VOC's cause central nervous system depression. At high concentrations, some VOC's cause hepatic, hematopoietic, renal, and pulmonary effects. Also, there has been evidence that some VOC's are carcinogenic in animals. Dermal contact may produce irritation of the eyes and skin. Prolonged exposure may cause burning.

CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

This site is of potential public health concern because of the risk to human health that could result from possible exposure to hazardous substances at levels that may result in adverse health effects over time. As noted in the Environmental Pathways Section, the remedial action proposed by the ROD will be protective of public health. Until the

remediation is complete, however, there is some concern about exposure to gases, volatilized contaminants, and re-entrained contaminated dust produced within the landfill; dermal absorption and ingestion exposure to the soil; consumption of trout from Trout Brook; and dermal absorption, inhalation, and ingestion of contaminated ground and surface water.

B. RECOMMENDATIONS

1. During remediation, measures should be taken to protect people, on-site and off-site from exposure to any dusts or vapors that may be released. Workers on-site should be provided adequate protective equipment and training, in accordance with 29 CFR 1910.120, and should follow appropriate National Institute for Occupational Safety and Health, and Occupational Safety and Health Administration guidelines, when involved in activities that may result in an exposure. Workers should implement optimal dust control. During working hours, appropriate monitoring should be utilized at the worksite periphery to protect nearby residents.
2. An effort should be made to connect the alternate water source for both drinking and all other household purposes as soon as possible. In the mean time, the residents should be instructed to use the bottled water provided.
3. Public access to the site before and during remediation should be restricted (i.e., security fence).
4. The information required by ATSDR should be provided (see discussion Data Needs and Evaluation Section).
5. In accordance with Comprehensive Environmental Response, Compensation, and Liability Act as amended, the Combe Fill South, Morris County, New Jersey, has been evaluated for appropriate follow-up with respect to health effects studies. Although there are indications that past exposures to water with low levels of contamination may have possibly occurred, this site is not being considered for follow-up health studies at this time, because no current pathway of exposure can be defined and no test is available to evaluate past exposure.

PREPARERS OF REPORT

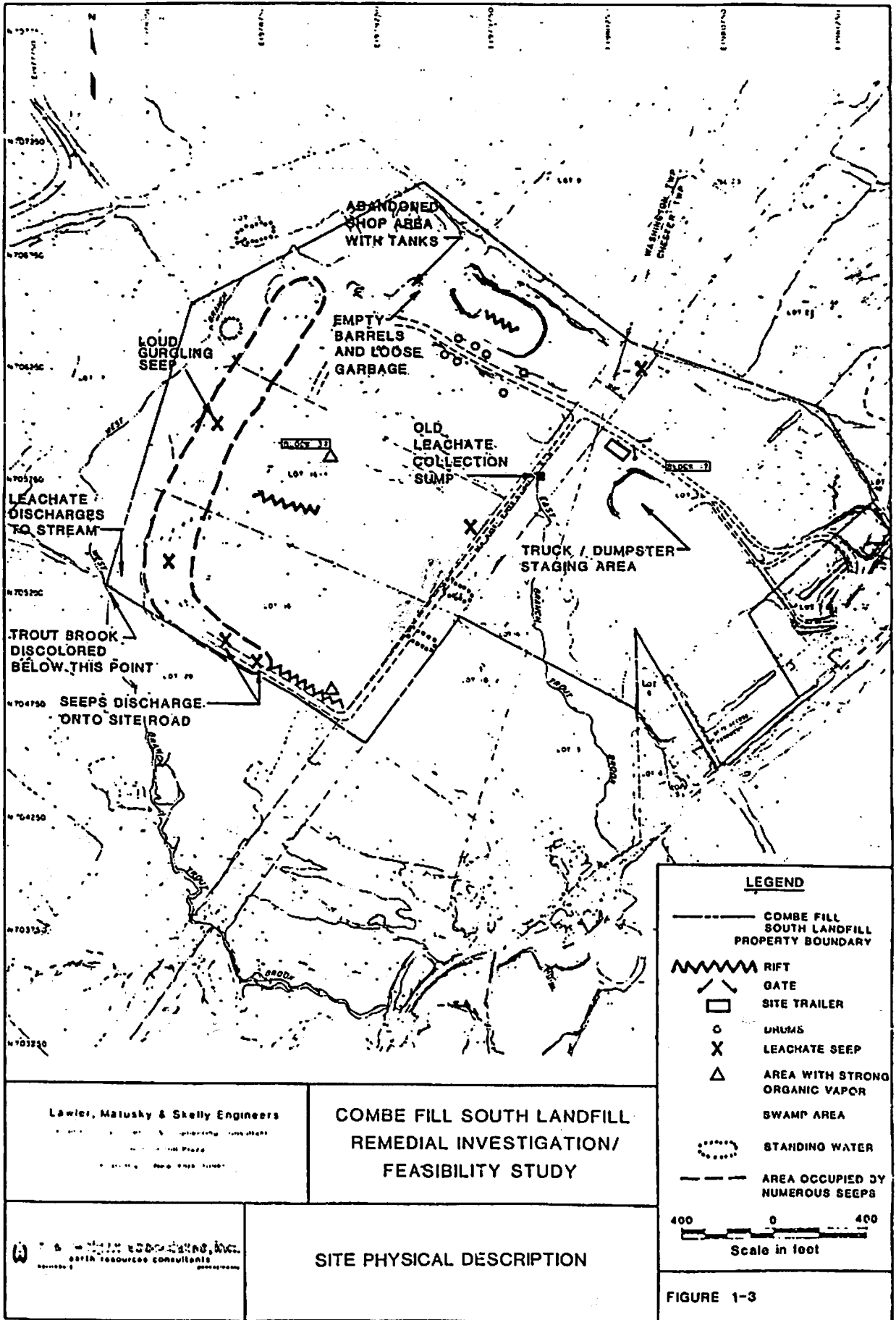
Environmental Reviewer: Susan L. Mueller, Environmental Health Specialist, Health Sciences Branch.

Regional Representative: Denise Johnson, ATSDR Regional Representative, Region II.

REFERENCES

1. Record of Decision, Combe Fill South Landfill, 1986.
2. Final Remedial Investigation Report and Appendices, Combe Fill South Landfill, prepared by Lawler, Matusky, and Skelly Engineers, May 1986.
3. Final Feasibility Report, Combe Fill South Landfill, prepared by Lawler, Matusky, and Skelly Engineers, January 1987.
4. Casarett and Doull's Toxicology, The Basic Science of Poisons, Ed. 3, Curtis D. Klaassen, Ph. D. et al., Macmillan Publishing Company, New York, 1986.
5. USEPA Leachate Collection and Gas Migration and Emission Problems at Landfills and Surface Impoundments (PB 86-162 104/AS), 1986.
6. Environmental and Occupational Medicine, Rom, 1983.

APPENDIX



Lawler, Malusky & Skelly Engineers

COMBE FILL SOUTH LANDFILL REMEDIAL INVESTIGATION/ FEASIBILITY STUDY

SITE PHYSICAL DESCRIPTION

W. J. Malusky & Associates, Inc.
Soil Resources Consultants