

# Health Assessment for

GOOSE FARM NATIONAL PRIORITIES LIST (NPL) SITE

PLUMSTED TOWNSHIP, OCEAN COUNTY, NEW JERSEY

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

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## SUMMARY

The Goose Farm National Priorities List (NPL) Site is located in Plumsted Township, Ocean County, New Jersey. Both solid and liquid wastes in bulk, 55-gallon drums, 5-gallon pails, and lab packs were disposed at the site in a 15-foot deep pit from the mid-1940s to the mid-1970s. Approximately ten private residences are located within 2,000 feet of the site. Potentially sensitive populations that live in the area and may be impacted by the contamination at the site were not identified in the materials reviewed by ATSDR.

On-site and off-site media are contaminated with a variety of volatile organic compounds (VOCs), heavy metals, polychlorinated biphenyls (PCBs), acid base neutral compounds, and semi-volatile compounds. Environmental media that have been contaminated are surface water, groundwater, and subsurface soils. The potential human exposure pathways of concern at the site include: Dermal, inhalation, and oral exposure of on-site workers during remedial activities; ingestion of contaminated groundwater; inhalation of VOCs that may volatilize from groundwater during domestic use; consumption of contaminated consumable plants and animals; and, incidental ingestion of contaminated off-site surface water.

The remediation proposed in the Record of Decision (ROD) calls for flushing of the contaminated soil and treatment of groundwater underlying the site. The flushing will be conducted after the PCB soil remediation is completed. The groundwater will be withdrawn using a well system and treated on-site prior to re-injection into the soil. It is estimated that withdrawal and flushing of up to ten pore volumes will be required to remove the mobile contaminants from the soil and groundwater. On-site soil, contaminated with PCBs above 5 parts per million (ppm), is currently being excavated and disposed in an approved off-site facility. The selected remedial alternative should reduce the potential for further off-site migration of contaminants. Over time, the remediation should mitigate the contamination at the Goose Farm Site, thus protecting the health of the human population in the area.

## BACKGROUND

### A. SITE DESCRIPTION

The 4-acre Goose Farm Site National Priorities List (NPL) Site is located in Plumsted Township, New Jersey about two miles northeast of the Town of New Egypt, New Jersey. The site is located adjacent to a forest and a small stream that flows north into Lahaway Creek. Goose Farm was used as a hazardous waste disposal site from the mid-1940's to the mid-1970's. A majority of the wastes were deposited in a 15-foot deep pit located on-site.

From February to June 1980, the New Jersey Department of Environmental Protection (NJDEP) conducted an investigation of the site. The investigation included the installation and sampling of 17 monitoring wells, metal detection surveys, and resistivity surveys. The results of this work indicated that a contaminant plume, which originated in the waste pit area, had migrated north, toward a nearby stream. During the next phase of the investigation the NJDEP installed and sampled 34 additional monitoring wells.

In September 1980, the NJDEP proceeded with removal activities at the site in an attempt to eliminate the discharge of contaminants to the nearby stream. Approximately 5,000 containers of waste were removed from the waste pit area as well as an estimated 9,000 gallons of bulk liquids. These wastes were disposed off-site. The remedial activities also included the installation of a wellpoint groundwater collection and spray irrigation system located hydraulically downgradient of the disposal area and upgradient of the stream.

In December 1980, a two phase wellpoint groundwater collection/spray irrigation/pressure injection system was installed at the site. This system replaced the old wellpoint system which was shut down in February 1981. The new two phase system operated until March 1981. In November 1981, 3,500 tons of contaminated soils and 12 drums of PCB waste were transported off-site for disposal.

The remediation proposed in the 1985 ROD calls for flushing of the contaminated soil and treatment of groundwater underlying the site. The groundwater will be removed using a withdrawal well system and will be treated on-site prior to re-injection into the soil. It is estimated that withdrawal and flushing up to ten pore volumes will be required to remove the mobile contaminants from the soil and groundwater.

A testing program designed to determine the extent of PCB contamination in the former drum pit area was completed in 1987. Although some of the analytical results from the PCB sampling did not pass quality assurance/quality control (QA/QC) validation processes, concentrations ranging from less than 5 to 478 parts per million (ppm) total PCBs were identified in the former drum pit area. Soil with concentrations of PCBs above 5 ppm are currently being removed from the site and deposited in appropriate facilities.

#### B. SITE VISIT

The information provided in the materials reviewed by ATSDR was sufficient in extent and nature that a site visit was not deemed necessary to complete this Health Assessment.

ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

A. ON-SITE CONTAMINATION<sup>1</sup>.

The following table contains a list of the contaminants of concern on-site, the media in which they are found, and the range of concentrations detected in each media.

MEDIA	CONTAMINANT	RANGE OF CONCENTRATIONS <sup>2</sup> .
Subsurface Soil	Toluene	10-640,000
	Ethylbenzene	11-20,000
	Trichloroethene (TCE)	11-9300
	Bis(2-chloroethoxy)Methane	830-40,000
	Bis(2-chloroisopropyl)Ether	1030-35,000
	PCB-1254	54-160,000
	Phenol	ND-21,300
	Arsenic, total	620-14,000
	Zinc	2600-65,200
	1,3-Dimethylbenzene	620-235,500
	Ethane (Dithioic) Acid	5600-99,000
	O-Decyl-Hydroxylamine	6600-1,202,600
	Groundwater	Methylene Chloride
Benzene		100-9500
Toluene		770-5500
Acrylonitrile		110-4100
1,1-Dichloroethane(1,1-DCA)		ND-510
1,2-Dichloroethane(1,2-DCA)		ND-1700
TCE		ND-250
Arsenic, total		ND-200
Leachate	Benzene	ND-12,000
	Methylene Chloride	ND-6300
	Toluene	ND-2200
	1,2-DCA	ND-770

Notes:

1. All data shown in the table are from the 1984 sampling events.
2. Concentrations are presented in parts per billion (ppb) unless otherwise noted.

ND = Non detected

Soil sampling in the former drum disposal area was conducted in October 1987. At that time, total PCB concentrations ranged from less than 5 ppm to 478 ppm.

## B. OFF-SITE CONTAMINATION

The following table shows a list of contaminants of concern found off-site, the range of concentrations found, and the media affected.

MEDIA	CONTAMINANT	RANGE OF CONCENTRATIONS
Surface Water	Methylene Chloride	10-1100
Groundwater <sup>3</sup> .	Methylene Chloride	ND-17
	Tetrachloroethene (PCE)	ND-23

### Notes:

1. All data shown in the table are from the 1984 sampling events.
2. Concentrations are presented in ppb.
3. Methylene chloride found in private wells #1 and #2; PCE was found in well #5 in 1984. These wells are used to supply potable water. According to the New Jersey Department of Health, contamination was not found in the potable wells during a 1986 sampling event.

## C. PHYSICAL HAZARDS

There are no known physical hazards present at the Goose Farm Site.

## LAND USE AND DEMOGRAPHICS

The Goose Farm Site is located in a rural area characterized by agricultural land and low-density residential development. The Town of New Egypt is located approximately 2.5 miles southwest of the site. The smaller town of Hornerstown is located approximately one mile northwest of the site. Other significant types of land use in the area of the site include the Great Adventure Amusement Park, Fort Dix and McGuire Air Force Base, and the Colliers Mills Wildlife Management Area.

Approximately ten private residences are located within 2,000 feet of the site. A delicatessen is located within 600 feet of the site.

## EVALUATION

### A. SITE CHARACTERIZATION (DATA NEEDS AND EVALUATION)

#### 1. Environmental Media

Samples of soils, groundwater, surface water, stream sediments, leachate, and potable well water were taken at or near the Goose Farm Site. Information on field filtering of samples, biota that may have been effected by site contaminants, off-site groundwater (monitoring wells) and sediment sampling, and depth to water table were not present in the materials reviewed by ATSDR.

## 2. Land Use and Demographics

Information on the socioeconomic and ethnic distribution, age, and sex of the population within one mile of the site was not included in the information provided to ATSDR. Information was not available for determining the presence of potentially sensitive populations that may be effected by site contamination.

## 3. Quality Assurance\Quality Control

The conclusions contained in this report are based on the information received by ATSDR. The accuracy of these conclusions is based on the reliability of the information reviewed.

### B. ENVIRONMENTAL PATHWAYS

Goose Farm is located approximately 600 feet south of a small unnamed stream which flows in a northerly direction and joins Lahaway Creek about 6,000 feet downstream of the site. Leachate from the site is reportedly discharging into this stream. Water samples collected from the unnamed stream in 1984 were contaminated with methylene chloride and low levels of other VOCs. A sediment sample from the stream did not contain significant metal contamination; however, analyses were not performed for organic chemicals. Surface water in the study area is not used as a source of potable water; however, it is used for irrigation of agricultural lands. Surface streams may also be used for recreational purposes.

Data from monitoring wells on-site indicate that groundwater contamination is confined to the Manasquan Formation (35-45 feet deep). Several monitoring wells are screened below the Manasquan Formation and groundwater monitoring from these wells indicates no contamination. Groundwater leaving the site flows to the north-northwest and is used as the source of potable water throughout Plumstead Township and the surrounding area.

Analysis of potable water samples collected from wells approximately 2,000 feet downgradient of the site (Well #1, 2, and 5) showed low levels of VOC contamination. Information on off-site groundwater contamination (monitoring wells) was not present in the materials reviewed, therefore, exposure to this media cannot be accurately assessed. The New Egypt Water Company uses two wells (250 and 275 feet deep) which are located in New Egypt near Oakford Lake, approximately three miles southwest of the Goose Farm Site. The two wells are thought to draw from the Englishtown Formation. The remainder of Plumsted Township obtains its potable water from domestic wells that tap primarily the Vincetown (45-75 feet deep) and Mount Laurel-Wenonah Formations. The Vincetown Formation consists of an upper calcite-clay and sand member and a lower glauconitic sand member. The Mount Laurel-Wenonah Formation is comprised of clayey glauconitic quartz sand and quartz silt.

Air samples taken at the site detected such compounds as ketones, chlorinated alkanes, substituted aromatics, and chlorinated aromatics. These compounds were identified but not quantified.

Significant levels of contamination were present in on-site subsurface soils at depths ranging from two to twelve feet below land surface at the site. The contaminated soils contained volatiles and acid/base/neutral organic compounds. Lack of surface soil analysis prevents a more comprehensive evaluation of this pathway.

### C. HUMAN EXPOSURE PATHWAYS

As previously indicated, several contaminants have been identified in various environmental media at the Goose Farm Site. Based on the characteristics of the populations potentially affected by exposure to these contaminated media and the reported contaminant levels in the various media, the human exposure pathways of concern at the site include the following:

1. Dermal absorption of contaminants by people who may use nearby surface water bodies during recreational activities.
2. Inhalation, dermal, and oral (incidental ingestion) exposures to contaminated soil by unprotected workers engaged in remedial cleanup activities on the site.
3. Ingestion of contaminated groundwater.

Residential potable water supplies downgradient of the site were found to be contaminated with low concentrations of VOCs during the 1984 sampling event.

4. Inhalation of VOCs that may volatilize from groundwater used for non-consumption domestic purposes by residents in the area.
5. Consumption of contaminated biota that may have bioaccumulated site related contaminants.
6. Off-site incidental ingestion of contaminants by persons involved in recreational activities at nearby surface water bodies.
7. Off-site inhalation of contaminants, that volatilize on-site, by residents in the area.

## PUBLIC HEALTH IMPLICATIONS

Previous waste disposal activities at the site have resulted in contamination of the underlying groundwater with high concentrations of VOCs. Water samples collected from potable wells located downgradient of the site in 1984 showed low levels of VOCs. In three potable well samples, methylene chloride concentrations as high as 17 ppb were detected in the groundwater. However, the 1986 sampling of potable wells in the area of the site reportedly did not detect VOC contamination.

Methylene chloride is a contaminant of potential concern at this site because, in animal experiments, inhalation exposures to methylene chloride have induced tumors of the liver, lung, and other organs. Noncarcinogenic toxic effects on the liver and kidneys have also been observed in animals exposed to high concentrations of methylene chloride.

The use of potable water containing methylene chloride can result in exposure from the direct ingestion of water used in food and drinks. In addition, inhalation exposures can occur from methylene chloride released to indoor air from water during showering, clothes washing, etc. Because of the potential carcinogenic risk resulting from long-term exposure to methylene chloride, it is recommended that the contaminated groundwater should not be used as a source for potable or non-potable water inside the home.

Water from one potable well was also contaminated with tetrachloroethene (PCE). The absence of this compound from other groundwater samples at the site suggests that its presence in the potable well may not be site-related. Nevertheless, the reported concentration of PCE exceeds acceptable health-based standards. It is therefore recommended that the groundwater in this well should not be used as a long-term source of potable water unless appropriate removal treatment is implemented.

Human contact with contaminated water in the small unnamed stream, which is a tributary of Lahaway Creek, could result in the dermal absorption of VOCs. The health implications of this exposure pathway cannot be assessed because of the absence of information on the recreational use of the streams or the likelihood of human contact with these waters.

Surface water downstream of the study area is not used for potable supply, but it is reportedly used for the irrigation of agricultural lands. The concentration of VOCs in downstream waters would probably be substantially reduced by the volatilization of VOCs and by dilution. However, no data were available to document whether VOCs were present in water at the point of irrigational use. Agricultural products were not tested for VOCs; however, significant bioaccumulation of VOCs in terrestrial plants would not be expected because of their volatility.



During removal actions conducted in 1981, approximately 3,500 tons of grossly contaminated soil were excavated and disposed off-site. However, high concentrations of organic contaminants and metals were detected in soil borings from the former landfill area. No information was provided on contaminant concentrations in surface soils. Therefore, this environmental pathway cannot be evaluated at this time.

Although access to the site is presently unrestricted, low barrier fencing and warning signs are to be installed in the future. A twenty-four hour security guard is also being considered. Trespassers and unprotected workers on the site could be exposed to surface contaminants by dermal exposure, by ingestion of soil, or by the inhalation of volatile chemicals or contaminated airborne dust. These pathways cannot be assessed because of the absence of information on surface soil contamination. Future construction or remedial activities involving digging or trenching operations could expose unprotected workers to organic contaminants and metals.

A 1981 contractor report indicated that ketones, chlorinated alkanes, substituted aromatics, and chlorinated aromatics were detected in air samples at the site. However, levels of the contaminants were not quantitated. No additional air sampling has been conducted since 1981. In the absence of additional information, no assessment of this exposure pathway can be offered.

No information was provided on whether fish or other biota in the area of the site are consumed, nor were any biota tested for contamination. In the absence of this information, no assessment of this exposure pathway can be offered.

#### CONCLUSIONS AND RECOMMENDATIONS

The remedial action proposed by the ROD should be protective of public health if properly implemented. Until the remediation is completed, however, there is the possibility that the human population near the site may be exposed to site related contaminants via dermal, inhalation, and oral exposure of on-site workers during remedial activities, ingestion of contaminated groundwater, inhalation of VOCs that may volatilize from groundwater during domestic activities, consumption of contaminated consumable plants and animals, and incidental ingestion of contaminated off-site surface water.

Based on 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. ATSDR recommends the following to protect human health:

1. Regular monitoring of wells downgradient of the site should be continued until groundwater contamination has been remediated.

2. Access to the landfill and other contaminated areas near the site should be restricted. Analysis of ambient air at the site is needed to assess the potential impact on public health.
3. Remedial work activity performed at the site should comply with Occupational Safety and Health Administration (OSHA) standards and National Institute of Occupational Safety and Health (NIOSH) recommendations. Workers should be equipped with proper protective equipment.
4. In accordance with CERCLA as amended, the Goose Farm NPL Site, Plumsted, NJ has been evaluated for appropriate follow-up with respect to health effects studies. Because there is insufficient information to evaluate the potential pathways of human exposure with regard to health studies, no health study recommendation can be made at this time.

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#### REFERENCES

1. Record of Decision: Remedial Alternative Selection for the Goose Farm Site, Plumsted, New Jersey, signed September 27, 1985.
2. Goose Farm Remedial Investigation Report (Draft II), Elson T. Killiam Associates, Inc., June 1985.
3. Draft Feasibility Study for the Goose Farm NPL Site, Elson T. Killiam Associates, Inc., June 1985.