

Health Assessment for

CINNAMINSON TOWNSHIP (BLOCK 702) GROUND WATER CONTAMINATION

CERCLIS NO. NJD980785638

CINNAMINSON, BURLINGTON COUNTY, NEW JERSEY

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Agency for Toxic Substances
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, this Health Assessment has been conducted using available data. Additional Health Assessments may be conducted for this site as more information becomes available.

The conclusions and recommendations presented in this Health Assessment are the result of site specific analyses and are not to be cited or quoted for other evaluations or Health Assessments.

**HEALTH ASSESSMENT
CINNAMINSON GROUNDWATER CONTAMINATION STUDY AREA
BURLINGTON COUNTY
CINNAMINSON, NEW JERSEY**

Prepared by:
Environmental Health Service
New Jersey Department of Health (NJDOH)

Prepared for:
Agency for Toxic Substances and Disease Registry (ATSDR)

OBJECTIVES

The Phase I Remedial Investigation of the Cinnaminson Groundwater Contamination Study Area was completed in August 1989. The objectives of this Health Assessment, based on the stage of the remediation of the site, are to:

- * Assess potential current and past health effects that may be associated with the site;
- * Identify, if necessary, additional exposure and sampling locations;
- * Identify, if necessary, any actions that could be taken to prevent or minimize exposure to contamination associated with the site;
- * Document the concerns of the community with respect to the public health implications of the site;
- * Identify and fill in, if possible, information or data gaps relating to the site; and
- * Assess whether further health study or evaluation of the site is warranted.

SITE SUMMARY

A draft Remedial Investigation Report was issued in August, 1989. Phase I of the Remedial Investigation of the Cinnaminson Groundwater Study Area indicates that the Landfill is the major source of groundwater contamination in the area. The site's restricted access and cap decrease the possibility of health

hazards from direct contact. Groundwater contamination appears to be the major pathway of concern. To date, it does not appear that the groundwater plume(s) have reached the potable wells.

On the basis of the information reviewed, the Cinnaminson Groundwater Contamination Study Area is considered to be a potential public health concern. However, since a population exposed to on-site or off-site contaminants at a level of public health concern has not been identified, the Cinnaminson Groundwater Contamination Study Area Site is not being considered for follow-up health study or evaluation.

SITE BACKGROUND

The Cinnaminson Sanitary Landfill began operations in the mid-1950's, when wastes were deposited in an unlined, former gravel pit. There are allegations that illegal chemical wastes were deposited in the landfill. Groundwater in the area is used for potable purposes. There are both public and private water potable wells within one mile of the study area. In the 1970's, the Landfill was cited several times by the New Jersey Department of Environmental Protection (NJDEP) for violations of landfill regulations. In 1979, analyses of the groundwater revealed that the groundwater underneath and adjacent to the landfill was contaminated. The landfill was closed in 1980. (Project Operations Plan, December 1987) The study area is currently ranked 68 out of New Jersey's 108 Superfund sites.

The Cinnaminson Sanitary Landfill is located in an industrial area, although there are residential areas nearby. There was concern that the other industries in the area could be major contributors to the groundwater contamination that has been observed. Industries in the area included Hoeganaes Corporation (a manufacturer of specialty iron powders), Redi-Mix Concrete Company, Del Val Ink and Color, and Meredith Paving Company.

The Phase I RI results indicated that the Cinnaminson Sanitary Landfill was the major source of groundwater contamination. Future investigations will be designed to delineate the groundwater contamination and further characterize the site.

COMMUNITY CONCERNS

The concerns of the community in the vicinity of the site focus primarily upon the sanitary landfill, its effects upon groundwater quality, and the ultimate remediation process. In the past, documented issues of community concern included: off-site odors and run-off from the landfill, sloppy hauling and disposal operations, the generation of methane by the landfill,

and long term health and environmental effects. Current concerns of the community with regard to the site may be summarized as follows:

- * The impact of ground water contamination upon the potable wells used prior to the availability of New Jersey Water Company public water. Residents are also concerned as to the possible contamination of the public water supply wells.
- * The cumulative health effects of area residents who may have been exposed to hazardous wastes since the 1950s. These concerns include a perception of a locally high cancer incidence, a perceived link between air emissions and respiratory illness, and concern over the continued use of private wells to irrigate lawns and vegetable gardens.
- * Concern as to the details and implementation of the NJDEP closure plan for the landfill.
- * There is a farm across the street from the Landfill, where crops may have been killed by methane migration from the Landfill.

Other community concerns include the negative effect to commercial and residential property values in the area and the perceived lack of efficient communication channels. Citizens have perceived federal, state, and local officials as being relatively unresponsive to their concerns.

SITE VISIT

A site visit to the Cinnaminson Groundwater Contamination Study Area was conducted on October 14, 1988. The Landfill is surrounded by industries, although there are a few residences nearby that are private potable wells. A public supply well is located at the northwest corner of the industrial area. The landfill was secured with a fence and barbed wire. Signs were posted to keep trespassers off of the property. Pompeston Creek and Swede Run, which are each located approximately one half mile away from the site, appeared to be too far away to be contaminated via surface runoff or groundwater discharge from the site. (Samples taken of surface water have not indicated contamination.)

ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

Samples taken to date have been designed to determine the major source(s) of the contamination and have concentrated

heavily on the groundwater. Surface water and sediment were also sampled. Unless otherwise specified, information in this section is from EPA Superfund documents on the site. Groundwater sampling has included both monitoring and private potable wells, along with leachates from the existing gas vent wells. Chemicals that were detected in the groundwater included volatile organic compounds (VOCs), phenols, phthalates, polycyclic aromatic hydrocarbons (PAHs), xylenes, pesticides, and metals. Contaminants were detected in both the shallow and deep wells. High TVOC concentration were also detected in samples from the gas vent wells. The highest concentrations were detected adjacent to and downgradient from the landfill. No significant concentrations of TVOCs were detected upgradient of the landfill. Groundwater conductivity measurements indicated that the total dissolved solid (TDS) concentrations in the groundwater might be high. High TDS concentrations could be indicative of landfill leachate.

Groundwater samples were also taken from twelve domestic wells. Although organic compounds (i.e., methylene chloride, dieldrin, dimethyl phthalate, toluene, and 1,1,1 trichloroethylene) were detected in the potable wells, their detected concentrations were very low, most of which are below drinking water standards. Two chemicals were detected for which there are no promulgated standards, dieldrin and dimethyl phthalate. Dieldrin was detected at 0.24 ppb. The household in which the dieldrin was detected has been connected to a public water supply (New Jersey Water Company). The presence of methylene chloride at a concentration of 5 ppb in one sample could be due to laboratory contamination, as methylene chloride was also detected in a blank sample. Table I presents maximum concentrations of contaminants of concern in the groundwater, that were selected based on their toxicity and detected concentrations.

Chemicals that were detected in the groundwater samples were not detected in surface water or sediment samples. High chromium and nickel concentrations were detected in surface water near the Hoeganeas, Inc. surface impoundment along the railroad track. A pond on the landfill property was found to contain elevated concentrations of nickel, but the nickel may be coming from a discharge from Meredith Paving, Inc. The railroad may be responsible for the base/neutral extractable compounds (1600 ppb) that were detected in the sediment of the Pompeston Creek.

Analyses that were run on air samples were not conclusive. The blank used for the tenax tube samples were contaminated with a variety of volatile chemicals. The presence of this contamination reduced confidence in the interpretation of the data on chemicals that were detected. (Three chemicals were detected in the samples but not in the blanks: 4-methyl-2-pentanone, tetrachloroethene, and chlorobenzene.)

Methylene chloride was the only compound that was detected in the charcoal absorbent tube samples, at concentrations of 3.49 ng/l and 16.03 ng/l. The presence of methylene chloride was attributed to Del-Val Ink Company and the Landfill.

QUALITY ASSURANCE/QUALITY CONTROL

Based on conversations with NJDEP, it is believed that the soil and water data on the site has passed a quality assurance/quality control (QA/QC) review. The contamination of blanks used in the air sampling made it impossible to interpret most of the air information. Since the site is an EPA lead, EPA is responsible for such a review. Additional QA/QC data is being sought and will be reported in an updated health assessment.

DEMOGRAPHICS

The Cinnaminson Groundwater Contamination Study Area is located in an industrial area. According to the RI Report, there are at least 12 private wells near the site that are used for potable purposes and other wells in the study area that may be used for irrigation. Most of these wells are upgradient of the site. It is not clear how many of these wells, or other private wells may be downgradient of the site and still be in use.

Most of the potable water in the immediate vicinity of the Landfill is from public water supply (New Jersey Water Company). There are seven pumping stations with a 2-mile radius of the Cinnaminson Study Area and either two or three industrial wells in the Study Area. According to the HRS, there are approximately 54,223 people living within a 3-mile radius of the site.

Demographic information that needs to be presented includes the number of private potable wells downgradient of the site, and a characterization of the potentially exposed population (i.e. identification of sensitive populations). In addition, the census information provided in the HRS needs to be verified or updated.

ENVIRONMENTAL DATA GAPS

Much of the work to date has been designed to determine the source of the groundwater problem. The groundwater plume(s) need to be characterized and delineated. Due to the quality assurance problems concerning the air samples and the potential for air exposures, the air around the Study Area needs to be sampled and analyzed.

EXPOSURE PATHWAYS

The major concern has been contamination of the groundwater. The hydrogeology beneath the landfill is very complicated, primarily due to the presence of clay lenses, the intensive pumping of groundwater to the east of the site, and the possibility of a groundwater divide below the site. Information on site hydrogeologic conditions indicates that the velocity of groundwater flow in the area downgradient from the site is slow.

However, data from potable well samples indicates that the contaminant plume(s) have not yet reached the potable wells. If the plume reaches the potable wells, exposure could occur via ingestion, dermal contact, and/or inhalation of volatile organic chemicals.

Inhaling contaminants that are volatilized or suspended in the air are potential exposure pathways that require further evaluation. If the landfill cap is eroded, or may erode, resuspension of dust particulates, and/or volatilization of organic chemicals from surface soils constitute a potential environmental pathway.

Surface water and sediment samples indicated that metals, particularly elevated concentrations of chromium and nickel were present in ponded areas in the industrial area and are not attributable to the Landfill. Although these areas are not easily accessible, exposure to the contaminants could result from contamination of the groundwater or trespassing on the site.

PUBLIC HEALTH IMPLICATIONS

There is no documentation of current or recent chronic exposure to chemicals from the site. Past exposure is difficult to ascertain. Actions need to be taken to insure that the plume(s) do not reach the potable wells, and to verify that air contamination does not pose a potential public health concern.

CONCLUSIONS AND RECOMMENDATIONS

On the basis of the information reviewed, ATSDR has concluded that this site is of potential public health concern because humans may be exposed to hazardous substances at concentrations that may result in adverse health effects. As noted in the Environmental Contamination and Physical Hazards section and Exposure Pathways section, human exposure to VOC's and heavy metals may occur via ingestion of contaminated ground water and by inhalation.

Contamination of the groundwater in the Cinnaminson Groundwater Contamination Study Area has been established. Additional groundwater samples are needed to delineate the groundwater plume(s), to assess what actions may be necessary to avoid future potential contamination of potable wells, and to take the necessary actions. This delineation is being planned for in the "Design" phase of the remedial process. In addition, the air near the Study Area needs to be resampled. Nickel and chromium contamination, that is not attributable to the Landfill, may also require further investigation.

In accordance with CERCLA as amended, the Cinnaminson Groundwater Contamination Study Area site has been evaluated for appropriate follow-up with respect to health effects studies. Since a population exposed to on-site and off-site contaminants at a level of public health concern has not yet been identified, the Cinnaminson Groundwater Contamination Study Area site is not being considered for follow-up health studies at this time. However, if data become available suggesting that human exposure to significant levels of hazardous substances is currently occurring or has occurred in the past, ATSDR and NJDOH will reevaluate this site for any indicated follow-up.

This Health Assessment was prepared by the State of New Jersey, Department of Health, Environmental Health Service, under a Cooperative Agreement with the Agency for Toxic Substances and Disease Registry. The Division of Health Assessment and Consultation and the Division of Health Studies of ATSDR have reviewed this Health Assessment and concur with its findings.

REFERENCES

Superfund Documents:

Hazard Rank Scoring Documentation, April 13, 1984.
Final Work Plan, November 1987.
Preliminary Assessment, February 5, 1985.
Project Operations Plan, December 1987.
Final Remedial Investigation Report, May 22, 1989.
Draft Feasibility Study Report, July 26, 1989.
Public Health Evaluation, July 1989.

Interview and File Review:

Technical Coordinator, NJDEP

TABLE 1 - Groundwater Analysis (Monitoring Wells)

Maximum Detected Concentrations in Parts Per Billion (ppb)

Organic Compounds	Deep Aquifer	Perched Water Zone	Leachate: Gas Vent Wells	MCL
1,1-Dichloroethane	440	10	-	NA
1,1-Dichloroethene	4	-	-	1
1,2-Dichloroethane	230	50	-	2
1,2-Dichloroethene	260	25	2	10
1,2-Dichloropropane	35	-	-	5
4-Methylphenol	-	-	240	NA
Acetone	2,900	29	-	NA
Benzene	310	12	27	1
Bis(2-Ethyhexyl)Phthalate	400	-	110	NA
Chlorobenzene	84	412	16	4
Chloroethane	68	39	-	NA
Chloroform	2,100	-	-	NA
Di-Benzofuran	-	-	23	NA
Di-Isopropyl Ether	5.6	-	-	NA
Heptachlor Epoxide	-	-	1.5	0.2
Methylene Chloride	100	-	5	2
Tetrachloroethene	110	5	-	1
Total Xylenes	1,100	67	420	44
Trichloroethene	380	3	-	1
Vinyl Chloride	85	34	3	2
Inorganic Compounds				
Antimony	54	-	-	NA
Arsenic	110	3.8	785	50
Barium	1,820	144	1,650	1,000
Beryllium	12	-	3	NA
Cadmium	13.8	-	17	5
Chromium	939	145	452	50
Lead	319	898	792	5
Mercury	1.1	0.7	48	2
Nickel	731	79	511	NA
Silver	18.7	31	-	10

NA = Not Available.

MCL = Maximum Contaminant Level (New Jersey Safe Drinking Water Act).

Data from Public Health Evaluation.