

Public Health Assessment for



**MANNHEIM AVENUE DUMP
GALLOWAY TOWNSHIP, ATLANTIC COUNTY, NEW JERSEY
CERCLIS NO. NJD980654180
NOVEMBER 5, 1993**

**U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry**



THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations 42 C.F.R. Part 90). In preparing this document ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30 day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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PUBLIC HEALTH ASSESSMENT

MANNHEIM AVENUE DUMP

GALLOWAY TOWNSHIP, ATLANTIC COUNTY, NEW JERSEY

CERCLIS NO. NJD980654180 .

PREPARED BY:

**New Jersey State Department Of Health .
Under A Cooperative Agreement With The
Agency For Toxic Substances And Disease Registry**

FOREWORD

The Agency for Toxic Substances and Disease Registry, ATSDR, is an agency of the U.S. Public Health Service. It was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the Superfund law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. (The legal definition of a health assessment is included on the inside front cover.) If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists then evaluate whether or not there will be any harmful effects from these exposures. The report focuses on public health, or the health impact on the community as a whole, rather than on individual risks. Again, ATSDR generally makes use of existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. When this is so, the report will suggest what further research studies are needed.

Conclusions: The report presents conclusions about the level of health threat, if any, posed by a site and recommends ways to stop or reduce exposure in its public health action plan. ATSDR is primarily an advisory agency, so usually these reports

identify what actions are appropriate to be undertaken by EPA, other responsible parties, or the research or education divisions of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Interactive Process: The health assessment is an interactive process. ATSDR solicits and evaluates information from numerous city, state and federal agencies, the companies responsible for cleaning up the site, and the community. It then shares its conclusions with them. Agencies are asked to respond to an early version of the report to make sure that the data they have provided is accurate and current. When informed of ATSDR's conclusions and recommendations, sometimes the agencies will begin to act on them before the final release of the report.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the comments received from the public are responded to in the final version of the report.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Chief, Program Evaluation, Records, and Information Services Branch, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E-56), Atlanta, GA 30333.

SUMMARY

The Mannheim Avenue Dump Site is a former sand and gravel mine located on a 2-acre sand and gravel-covered clearing in a rural location within Galloway Township, Atlantic County, New Jersey. During the years 1964-1967, Lenox China, with the knowledge and approval of Galloway Township, used the site to dispose of industrial wastes produced at its manufacturing facility in Pomona, New Jersey. The principal contaminants associated with the site are trichloroethene (TCE) and lead. An Agency for Toxic Substances and Disease Registry (ATSDR) preliminary health assessment was performed in November, 1988.

Tap samples were collected from 13 residential wells. Lead (may not be site-related) and TCE was detected in one or more wells. The ATSDR Region II was contacted for a health consultation in February 1991. ATSDR reviewed the results and recommended that EPA resample all the residences using 5 ppb of lead as a detection limit. ATSDR stated that there is no need for undue concern as no overt health effects have previously been reported in individuals drinking water containing 15 ppb of lead which is the federal guideline for protection of public health. ATSDR, however, indicated that because of the uncertainty surrounding the levels of lead that produce adverse health effects, it was prudent to reduce exposures via all media including drinking water.

The Mannheim Avenue Dump Site is considered to pose no apparent public health hazard. Human exposure to TCE may have occurred in the past via inhalation, direct contact and ingestion of contaminated groundwater from downgradient residential wells. Exposure to TCE is unlikely to result in adverse health effects. Periodic sampling of residential wells and monitoring wells located downgradient is recommended.

Human exposure to lead poses an indeterminate public health hazard. Human exposure to lead may have occurred or be occurring via ingestion of residential well water. Lead contamination of residential water may not be site related.

The Mannheim Avenue Dump site has been reviewed by ATSDR and the New Jersey Department of Health (NJDOH) to determine appropriate follow-up public health actions or health effect studies. ATSDR's Health Activities Recommendation Panel determined that all children between 6-7 months, who were exposed to lead through ingestion of contaminated drinking water (probably not site-related), be screened for blood lead. The NJDOH is referring this public health assessment to the Atlantic County Department of Health for consideration to include these children (and possibly adults) in their lead screening program.

BACKGROUND

A. SITE DESCRIPTION AND HISTORY

The Mannheim Avenue Dump Site is located on a 2-acre sand and gravel-covered clearing in a rural location within Galloway Township, Atlantic County, New Jersey. A map showing the site location is included as Appendix 1. The site lies on Mannheim Avenue between Shiller Road and Clarks Landing Road. The site is approximately 1500 feet southeast of the Tar Kiln Branch and two miles southwest of the Mullica River and associated tidal marsh. The area immediately surrounding the site is comprised of relatively flat woodlands of scrub pine and low bush. This area is within the New Jersey Pineland Protection Area.

The Mannheim Avenue Dump Site is owned by Galloway Township. Historically, the site was mined up to a depth of 5 feet to obtain sand and gravel for the construction of Township roads¹. After mining operations ceased in 1964, the excavated portions of the site were used for waste disposal.

During the years 1964-1967, Lenox China, with the knowledge and approval of Galloway Township, used the site to dispose of industrial wastes produced at its manufacturing facility in Pomona, New Jersey¹. Approximately three hundred 55-gallon drums of degreasing sludge were buried at a depth of 5 feet below the ground surface. Drummed wastes, some of which included solid asphaltic sludge, were deposited on the excavated portions.

An 1981 industrial survey report submitted by Lenox China notified the NJDEPE that hazardous wastes may have been disposed of at the Mannheim Avenue Site⁵. The survey indicated that 55-gallon drums of trichloroethene (TCE) degreasing sludge were disposed of at the site and in other locations. A subsequent investigation by NJDEPE revealed that many of the 55-gallon drums were exposed and/or deteriorating. Sampling of these exposed drums indicated the presence of TCE at a maximum concentration of 1,640 parts per million (ppm), toluene at 230 ppm, ethylbenzene at 350 ppm, methylene chloride at 220 ppm, cadmium at 22 ppm, lead at 2,600 ppm, nickel at 27 ppm, and chromium at 6 ppm¹.

The site was placed on the NPL in 1983. In December 1984, the EPA issued an Administrative Order (AO) to Lenox China and the Township of Galloway to remove the waste material buried in the soil mounds at the Site, conduct soil and groundwater sampling, and excavate and remove contaminated soil from the site. By August 1985, Lenox China completed the excavation and approximately 25,000 pounds of degreasing sludge were separated from the general trash. Asphaltic sludge was packed into 247 new fiber drums and incinerated off-site. This removal represented over 95 percent of the total

sludge. Thirty-five mounds of soil remained, many with residual contamination. These wastes were subsequently compacted along with other municipal wastes, and covered with soil. Leaded porcelain fragments and household refuse were also mixed in the waste mounds.

Lenox China conducted soil, groundwater, limited surface water, and domestic well sampling. The principal contaminants associated with the site were lead and TCE. In June 1989, the 35 mounds of lead and TCE contaminated soil were excavated and disposed of off-site by Lenox China. In July 1988 and March 1989, EPA sampled the drinking water from 25 local residential wells surrounding the site and one well from Bethel Christian School for VOCs and metals. No VOCs or metals were detected above EPA's drinking water standards. In May 1988, EPA entered into an Administrative Order of Consent with Lenox China, Inc., identified as a potentially responsible party (PRP) and the Township of Galloway to conduct a remedial investigation (RI) and feasibility study (FS) at the site⁶. An RI/FS was completed in June 1990.

A Record of Decision was signed in September 1990, calling for groundwater remediation and both short-term and long-term groundwater monitoring. The ATSDR preliminary health assessment of 1988 concluded that there was risk to human health by the possibility of human exposure to hazardous substances via migration of hazardous substances into groundwater used for potable purposes. To ensure that the community was not drinking contaminated water, tap samples were collected from 13 residential wells for analysis. After reviewing sampling results, EPA Region II contacted ATSDR Region II for a health consultation on February 2nd, 1991³. The questions posed by EPA were:

- (1) Is the water safe for drinking and other domestic uses? and
- (2) Do residents need to stop drinking the water and immediately seek remedial actions?

ATSDR Region II representatives reviewed the results from the November 5 and 6, 1990 sampling of these thirteen residential wells. ATSDR recommended that EPA resample all the residences using 5 ppb lead as a detection limit. ATSDR stated that there is no need for undue concern as no overt health effects have been noted in individuals drinking water containing 50 ppb⁴. ATSDR, however, indicated that because of the uncertainty surrounding the levels of lead that produce adverse health effects, it was prudent to reduce exposures via all media including drinking water. In addition, ATSDR recommended quarterly monitoring³ of residential wells.

B. SITE VISIT

On October 30, 1990 Laurie Pyrch and Rosaline Dhara of the New

Jersey Department of Health (NJDOH) visited the Mannheim Avenue Dump Site. The purpose of the visit was to inspect the site and record the observed physical condition of the site. NJDOH personnel were accompanied on the site visit by the Case Manager for Mannheim Avenue Dump Site from the New Jersey Department of Environmental Protection and Energy (NJDEPE). Approximately two hours were spent in the site vicinity. The site was inspected from outside the fence as it was only two acres in size and observed the following:

On-site:

- * The site is located in a two-acre sand and gravel clearing on Mannheim Avenue road and is readily accessible. The area around the site is surrounded by relatively flat woodlands of scrub pine and low bush. The terrain is composed of sand and gravel.
- * The site was fenced, locked and posted with Hazard and No Trespassing signs. There were no signs of trespassing on-site.
- * There were two 55 gallon drums on-site.
- * There were no observed lagoons, pits or stacks of drums on-site.
- * Sampling equipment for on-site monitoring wells was observed.
- * Scattered mounds of soil and scant vegetation were present.
- * Porcelain fragments and municipal wastes were present on-site.
- * No persons were seen on or in the immediate vicinity of the site.

Off-site:

- * A walking path trail was observed along the perimeter of the site.
- * Northeast of the site is a suspect covered trench, an alleged source of volatile organic chemical (VOC) contamination. It is currently unclear and undetermined if this VOC contamination is attributable to the Mannheim Avenue Dump site or another independent source¹.
- * A second sand and gravel pit, owned and operated by Galloway Township, is located across the street from the

site. Suspected shallow surface water contamination in this region is currently being evaluated^h.

Conditions at the site have not significantly changed since the 1990 site visit.

C. DEMOGRAPHICS, LAND USE, AND NATURAL RESOURCE USE

Demographics

There are approximately 328 residents who live in at least 82 residences which lie within a one-mile radius of the site¹. The closest residence is approximately 0.1 mile from the site⁷. The Bethel Christian Elementary School with approximately 200 students is located within 5000 feet south of the site.

Land Use

The site is located in a rural area that is zoned as residential with a minimum lot size of 5 acres. The area to the northeast is predominantly zoned as a preservation area. Based on current zoning, the maximum development downgradient from the site is an additional seven houses.

Natural Resource Use

The site is underlain by the Cohansey Sand and the Kirkwood Formation. A clay aquitard with an average thickness of 3 to 5 feet underlies the shallow system at a depth of approximately 50 feet below the land surface. The clay unit has low permeability and is continuous within the area of Mannheim Avenue site. Underlying the clay is the deeper flow system or aquifer which flows toward the northeast. The deeper flow system is assumed to extend from a depth of approximately 55 feet below the land surface of the site to a depth of approximately 200 to 250 feet below land surface. The deeper ground-water system flows toward and discharges into the Mullica River. Flow in the shallow system is toward the west and changes to a northwesterly direction away from the site.

Only groundwater from the deeper system is used for potable purposes. Eighty-two residences and facilities within a one-mile radius of the site rely on ground water wells. Twenty three of these are located downgradient from the site; nine are downgradient with respect to the deeper flow system; and 14 are downgradient with respect to the shallow flow system. However, only five of these houses are located between the site and Tar Kiln Branch, the presumed discharge boundary for the shallow flow system.

The nearest surface water bodies are the Tar Kiln Branch, located approximately 1500 ft northwest of the site, and the Mullica River, located approximately 2 miles northeast of the site. While people use the Mullica River for recreational fishing and swimming, no information exists on the number of persons engaged in these activities.

D. HEALTH OUTCOME DATA

Health outcome data was not evaluated for this site. Please refer to the Health Outcome Data Evaluation section below for a discussion why this source of information was considered inappropriate for evaluation.

COMMUNITY HEALTH CONCERNS

Community health concerns primarily centered around ground water contamination and the spread of the contamination⁸. Forty citizens attended the Mannheim Avenue Town meeting in August, 1990. The only community health concern expressed was with regard to the consumption of contaminated drinking water by the children of Bethel School⁹.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

The tables in this section list the contaminants of concern. We evaluate these contaminants in the subsequent sections of the public health assessment and determine whether exposure to them has a public health significance¹⁰. ATSDR selects and discusses these contaminants based upon the following factors:

1. Concentrations of contaminants on and off the site.
2. Field data quality, laboratory data quality, and sample design.
3. Comparison of on-site and off-site concentrations with public health assessment comparison values for noncarcinogenic endpoints and carcinogenic endpoints.
4. Community health concerns.

In the data tables that follow under the On-site Contamination subsection and the Off-site Contamination subsection, the listing of a contaminant does not necessarily mean that it will cause adverse health effects from exposures. Instead, the list indicates

which contaminants will be evaluated further in the Public health assessment.

The data tables include the following acronyms:

- * EMEG = ATSDR Environmental Media Evaluation Guideline
- * ND or '-' = Not detected
- * NA = Not Analyzed
- * NJDEPE = New Jersey Department Of Environmental Protection and Energy
- * PMCLG = EPA Proposed Maximum Contaminant Level Goal
- * MCL = EPA Maximum Contaminant Level
- * MCLG = EPA Maximum Contaminant Level Goal
- * ppb = parts per billion
- * ppm = parts per million
- * RfD = EPA Reference Dose
- * RfC = EPA Reference Concentration

Comparison values for public health assessment are contaminant concentrations in specific media that are used to select contaminants for further evaluation.

These values include Environmental Media Evaluation Guides (EMEGs), Cancer Risk Evaluation Guides (CREGs), and other relevant guidelines. CREGs are estimated contaminant concentrations based on one excess cancer in a million persons exposed over a lifetime. CREGs are calculated from EPA's cancer slope factors. EPA's Maximum Contaminant Level Goal (MCLG) is a drinking water health goal. EPA believes that the MCLG represents a level that no known or anticipated adverse effect on the health of persons should occur which allows a margin of safety. Proposed Maximum Contaminant Level Goals (PMCLGs) are MCLGs that are being proposed. Maximum Contaminant Levels (MCLs) represent contaminant concentrations that EPA deems protective of public health (considering the availability and economics of water treatment technology) over a lifetime (70 years) at an exposure rate of 2 liters water per day. While MCLs are regulatory concentrations, PMCLGs and MCLGs are not. EPA's Reference Dose (RfD) and Reference Concentration (RfC) are estimates of the daily exposure to a contaminant that is unlikely to cause adverse health effects.

Toxic Chemical Release Inventory (TRI) Data:

To identify possible facilities that could contribute to contamination of environmental media near the Mannheim Avenue Dump site, ATSDR and NJDOH searched the 1987, 1988 and 1989 Toxic Release Inventory (TRI). The first available TRI database year is 1987 and the latest is 1989. TRI is developed by the USEPA from the chemical release (air, water, and soil) information provided by certain industries. Several manufacturing facilities within the

08215 zipcode area filed TRI data for the years 1987, 1988 and 1989. These facilities are Ray Plastics, Egg Harbor Yacht Co. Inc., Egg Harbor Boat Co. Inc., Ocean Yachts Inc and Ocean Yachts II Inc. Table 1 summarizes reported releases to the environment via fugitive or non-point air emissions and point sources or stack emissions in 1987, 1988, and 1989 from these facilities. It also indicates the maximum amounts of the chemical stored on site. Examination of the regional map did not indicate the location of these facilities in the vicinity of the Mannheim Avenue Dump site. In addition, the releases from these facilities are not similar to site contaminants.

TABLE 1

FACILITY	CHEMICAL	YEAR	TOTAL AIR RELEASE lbs/yr
Ray Plastics	Styrene	1987	500
Egg Harbor Yacht Co Inc.	Acetone	1987	67,880
	Acetone	1989	14,505
	Styrene	1989	15,997
Egg Harbor Boat Co Inc.	Acetone	1988	54,693
	Styrene	1988	15,733
Ocean Yacht Co.	Acetone	1988	45,720
	Styrene	1988	29,635
	Styrene	1989	22,225
Ocean Yachts II	Styrene	1988	4,667
	Styrene	1989	3,500

A. ON-SITE CONTAMINATION

Under an Administrative Consent Order (ACO) issued by the EPA in May 1988, Lenox China collected environmental data for the Mannheim Avenue Dump site as part of the RI/FS¹. Data from the analysis of the following media were available for review: asphaltic sludge, groundwater, surface water, soil, and residential wells.

Asphaltic Sludge:

Split samples of asphaltic sludge were collected on August 3rd, 1982 by NJDEPE and Lenox China for waste characterization. Table 2 presents the constituents reported in at least one of the samples at a level above 100 mg/kg. The asphaltic sludge has been excavated and incinerated off-site. The removal represented 95% of the total sludge. The remaining wastes were compacted into mounds and subsequently removed. This removal eliminated a source of contamination¹¹.

TABLE 2
Maximum Contaminant Concentration in On-site Asphaltic Sludge

Contaminant	Concentration ppm	Date	Comparison Value-ppm	Source
Methylene Chloride	220.0	1982	93	CREG
Trichloroethene	2,000.0	1982	1	NJDEPE
Lead	4,230.0	1982	NA	NA

NJDEP - New Jersey Department of Environmental Protection Interim Soil Action Levels

NA - Not applicable

Subsurface Soil:

In July 1989, twenty soil samples were collected from the site. These samples were collected at depths of 0 to 6 inches or 10 to 14 inches below land surface and were analyzed for either lead or lead and VOC's. 1,1,2,2-Tetrachloroethane was not detected in any samples. The contaminants of concern in on-site soil samples are presented in Table 3. The data demonstrate that the remaining wastes meet NJDEP interim soil action levels. The data also indicate that wastes were not deposited beneath the grade level of the site. On-site surface soil has not been characterized as on-site soils have been excavated and removed for off-site incineration.

TABLE 3 - Contaminant Concentration in On-site Soil Samples

Contaminant	Concentration range-ppm	Date	Depth	Comparison Value-ppm	Source
1,1,2,2-tetrachloroethane	ND-4	1989	10-14"	3.5	CREG
Lead	2.6-648	1989	0-14"	NA	NA

* Source Remedial Investigation, Revision 1, June 1990.

NA - Not applicable

Groundwater:

Analytical results of groundwater sampling indicate that trichloroethene (TCE) is the predominant contaminant of concern. TCE was detected in all sampling events. The highest concentration reported in monitoring wells was 140 parts per billion (ppb) in the shallow system (July, 1986) and 45 ppb in the deep system (April, 1986). The on-going monitoring program indicates that the concentration of trichloroethene in the groundwater has been

decreasing with time. Polychlorinated biphenyls (PCBs) compounds though not detected in the initial sampling round, were found in concentrations of up to 15 ppb in two deep wells in the second sampling in 1986. Subsequent sampling in 1989 did not show the presence of PCBs or pesticides in groundwater.

Wastes contaminated with lead were present at the Mannheim Avenue site for approximately 25 years prior to the removal operation during 1989¹. The highest concentration of dissolved lead in on-site wells was 5.4 ppb. Unfiltered concentration of the other 12 priority pollutant metals were all below federal and New Jersey drinking water standards. The contaminants of concern in on-site groundwater samples from monitoring wells are presented in Table 4. Trichloroethene levels have decreased in the shallow aquifer since the 1986 sampling.

TABLE 4 - Contaminant Concentration in Groundwater Samples

Contaminant	Concentration range-ppb	Date	Depth	CV-ppb	Source
TCE	1-140	1986	35	0/5	MCLG/MCL
	1-45	1986	feet 55 feet		
Lead	2-8.9	1989	35 feet	0	MCLG

* Source: Remedial Investigation, Revision 1, June 1990.

CV - Health Comparison Value.

Air:

An air quality investigation was not conducted as part of the RI. Required monitoring by a photoionization detector during the field investigation activities did not reveal the presence of any hazardous concentrations in ambient air. Lack of information on ambient air quality constitutes a data gap in assessing the site's public health implications.

B. OFF-SITE CONTAMINATION

Soil:

No off-site soil sampling was performed. Since no surface soil data exist for residential yards, a data gap exists in assessing the site's public health implications. Surface soil is defined as the soil extending up to a depth of 3 inches from the ground surface.

Groundwater - Monitoring Wells:

Analytical results of off-site groundwater sampling indicate that TCE is the frequently detected contaminant of concern and the only site related contaminant that migrated off-site from the wastes. TCE was detected in all sampling events and concentrations ranged from <1 to 29 ppb in the shallow flow system and from <1 to 47 ppb in the deeper flow system. At the furthest point of measurement in the shallow zone (400 feet) TCE was found at a concentration of 5.9 ppb.

Chloroform in the range of 1 to 3 ppb was found in nearly all the monitoring wells. In the September 1989 sampling, toluene was detected infrequently in the deeper system and was not detected in any of the shallow wells. Although toluene was detected at a maximum concentration of 200 ppb in the deeper system it was not detected during the December 1989 sampling. The presence of toluene might be attributed to a survey marker that has a base composed of toluene and petroleum distillates. Other VOCs were detected in only trace amounts.

Bis(2-ethylhexyl)phthalate was detected only once in a concentration of 60 ppb in the deep system. Polychlorinated biphenyls compounds were found in concentrations of up to 7.3 ppb in one well during the second sampling in 1986. No PCBs or pesticides were detected in any groundwater samples collected during 1989.

With one exception, the unfiltered lead concentrations were below drinking water standards. The concentrations of total chromium exceeded federal standards at four sampling points (September, 1989). However, the December 1989 results showed total lead at an estimated concentration of 19.9 ppb and the total chromium value was 84 ppb. Table 5 presents the concentration ranges of contaminants of concern from the September 1989 sampling.

TABLE 5
Contaminant Concentration in Off-site Groundwater Samples

Contaminant	Concentration range-ppb	Depth	Comparison Value- ppb	Source
Trichloroethene	1-29 1-47	35 feet 55 feet	0/5	MCLG/ MCL
Lead	12-85,600	35 feet	0	MCLG
Chromium	5.5-359	35 feet	50	EMEG

Source: Remedial Investigation, Revision 1, June 1990.

Groundwater - Residential Wells:

Eight residential wells surrounding the site and two wells at the Bethel Christian Day School were sampled in 1986 and analyzed for VOCs, semi-volatile organic compounds, metals, cyanide, and phenols. One school well contained 12 ppb of 1,2-dichloropropane. A repeat sampling did not indicate the presence of 1,2-dichloropropane or any site-related contaminants¹. It is important to note that on-site groundwater results did not report contamination with 1,2-dichloropropane. According to current site data and information, 1,2-dichloropropane is not a site related contaminant (USEPA).

Groundwater - Residential Tap sampling:

Following the September 1990 ROD, tap samples were collected from thirteen residential wells near Mannheim Avenue Dump site in November 1990 and repeated quarterly thereafter¹². Table 6 summarizes the contaminant concentrations detected in these wells. The organic compound detected at the highest concentrations and consistently was 1,2-dichloropropane. Although lead was detected in two samples the levels did not exceed the MCL of 50 ppb of lead. Chromium, another inorganic compound of concern, was not detected in any of the residential tap samples.

TABLE 6
Contaminant Concentration in Off-Site Residential Tap Samples

Contaminant	Concentration range-ppb	Date	Comparison Value- ppb	Source
Trichloroethene	0-1.0	Nov.1990	0/5	MCLG MCL
Lead	22.7-49.2	Nov.1990	0	MCLG
1,2-dichloropropane	0.4-10 *	Nov.1990	5	MCL

Source: Remedial Investigation, Revision 1, June 1990..

* = Non-Site Related Contaminant

A repeat sampling of all thirteen residential taps in March 1991 revealed the continued presence of VOCs and inorganic organic compounds at lower concentration levels. Due to the fluctuating levels of lead three residential wells were resampled in June, 1991. Results indicated that all lead levels were below EPA's new level of concern of 15 ppb, except for the laundry room sample from residence 'O'. During the sampling round in August 1991, one result to note was the lead level found in residence 'B'. While lead was not detected at this residence during the previous two sampling events, this time, 24 ppb of lead was detected. Important to note here, however, is that a different method which yields a lower detection limit is now being used to analyze for lead; so, the detection limit in November 1990 and March 1991 was 20 ppb, as opposed to 3 ppb in June 1991 and August 1991. Table 7 summarizes the lead results from all the sampling events. It is unclear if the elevated levels of lead are due to leaching of lead solder frequently used for pipe joining or due to the lower laboratory detection limits. EPA, however, has concluded that the problem in residence 'O' is in the sink piping, and not in the well.¹² Sampling locations of residential wells have been included as appendix¹³.

TABLE 7
Lead Concentration in Off-site Residential Tap Samples
(ppb)

Residence	Nov. 1990	Mar.1991	June 1991	Aug. 1991
Residence 'O': Wellhead	ND	ND	5.3	5.9
Basement	ND	ND	ND	-
Laundry	ND	155	134/128	-
Residence 'M': Basement	49.2	ND	11.8	5.1
Kitchen	ND	ND	ND	ND
Residence 'P': Basement	22.7	ND	ND	3.0
Kitchen	ND	ND	ND	ND
Residence 'B': Basement	ND	ND	-	24

Surface water:

In 1986 a sample was collected from Tar Kiln Branch at a location downgradient from the site and analyzed for VOCs, semi-volatiles, metals and phenols. No site-related contaminants were detected¹. The southern tributary of the Tar Kiln Branch is close enough to the site to potentially have been impacted. A repeat sampling of surface water and sediment at the Tar Kiln Branch were performed in May 1990 but the results are currently unavailable for review.

C. QUALITY ASSURANCE AND QUALITY CONTROL

All analytical work was performed by Enseco East of Somerset, New Jersey. Enseco East is a participant in the USEPA Contract Laboratory Program and is certified by NJDEP. Soil samples were collected according to the procedures detailed in the Project Operations Plan (POP). On July 13, 1989, bottles containing Samples 11 and 15 were broken in transit to the laboratory and could not be analyzed. To supplement the RI database, the results of the USEPA's split sample analyses of Samples 11 and 15 were used.

The VOC analyses of groundwater samples were performed by Gas Chromatograph/Method Series (GC/MS) 524.2. The version used by Enseco does not specify the concentration for the lowest calibration standard. The laboratory chose to use a low standard of 20 ppb. Therefore, results between 1 and 5 ppb are considered "estimated" and have been flagged with a "J". This estimation of low VOC values is the only performance criterion specified in the POP that was not met.

The data that have been collected have passed a quality assurance/quality control (QA/QC) review (personal communications, NJDEPE and EPA). The validity of the analysis and conclusions drawn for the public health assessment is determined by the completeness and reliability of the referenced information.

D. PHYSICAL AND OTHER HAZARDS

The Mannheim Avenue Dump site does not represent a physical hazard as there are no pits, lagoons or drums present on site. There were municipal wastes as well as sampling equipment present on the site.

PATHWAYS ANALYSES

To determine whether nearby residents are exposed to contaminants migrating from the site, NJDOH evaluated the environmental and human components that lead to human exposure. This pathway analysis consists of five elements: a source of contamination; transport through an environmental medium; a point of exposure; a route of human exposure; and an exposed population. Based on these five elements these pathways are identified as completed, potential or eliminated. Completed pathways should have all five elements present, for potential pathways, at least one of the five elements is missing, but could exist, and eliminated pathways have at least one of the elements missing and may never be present. Completed and potential exposure pathways indicate whether exposure to a contaminant has occurred in the past, is currently occurring, or will occur in the future and can be eliminated when one of the elements is unlikely to exist.

As discussed in the Site Description and Site History subsection, many of the past disposal activities at the site have resulted in the contamination of on-site soils and groundwater. The complete exposure pathways that were identified are discussed in the following subsection.

A. COMPLETED EXPOSURE PATHWAYS

Private Well Pathways

Past and current completed exposure pathways exist from contaminated groundwater in private residential wells. The pathways in which the residents may have been exposed to contaminants are: dermal contact with contaminated groundwater drawn from wells located downgradient of the site; ingestion of groundwater from wells located downgradient of the site; and inhalation of chemicals volatilized from groundwater during home use.

Transport of contaminants in the groundwater to downgradient wells is the only mechanism that could effect the receptor population by

the ingestion route. The use of groundwater for domestic purposes is the exposure pathway of concern for lead. As mentioned in the environmental contamination section, of the thirteen downgradient residential wells sampled, only three had levels of lead above the MCL. Repeated sampling has however indicated that the fluctuant levels of lead are due to a lowered laboratory detection limit for lead.

The populations at risk of exposure include residents living in the vicinity of the site. Residents who live downgradient of the deeper aquifer have a higher likelihood of being exposed to site-related contaminants as groundwater from the deeper aquifer is used for potable purposes. Based on November 1989 township tax records, approximately 328 people live in 82 houses within a 1-mile radius of the site. However, only twenty three houses are located downgradient from the site; nine are downgradient with respect to the deeper flow system; and fourteen are downgradient with respect to the shallow flow system. Assuming an average of four people in each house, approximately 36 people with respect to the deeper flow system are at risk of exposure.

B. POTENTIAL EXPOSURE PATHWAYS

Surface Soil Pathways

Past and present exposures are possible from contaminated on-site surface soils. As the site is secure and there is no evidence of trespassing, workers on site are the only people who may be or might have been exposed. The pathway through which workers may be exposed are dermal contact with the soil, incidental ingestion of the soil, and inhalation of soil dispersed into the air.

Past exposures to off-site contaminated surface soil may have been possible at residences (backyards), but as no data exist to confirm this, a pathway analysis cannot be performed. The sources of past residential soil contamination include 1) transport of site contaminants by entrainment of contaminated soil particles into air during excavation and construction activities to residential surface soils, and 2) surface runoff. While entrainment of contaminated soil particles into the atmosphere via wind-mediated dispersion and deposition onto surface soils is assessed to be a possible contaminant transport and migration mechanism for the site¹, it is unlikely that significant levels of contaminants settled in yards. Removal of wastes from the site has eliminated the source of future contamination (excavated wastes) for surface soils at residences. While exposure can occur at the site itself, residential areas can be eliminated as exposure points.

Sediment/Surface Water Pathways

Surface water and sediment sampling in 1986 at the Tar Kiln Branch did not show evidence of contamination. In addition, surface water is not considered a receiving medium because the Tar Kiln Branch and the Mullica River, are 2,000 feet and two miles away, respectively, and modelling presented in the RI indicate that the plumes are not likely to reach the surface water discharge boundaries¹. However, from samples taken in May 1990, lead was detected in one surface water sample at 27.1 ppb and in sediment samples at concentrations of 65.3, 32.8 and 97.0 ppb. It is unknown if the site is the source of this contamination.

PUBLIC HEALTH IMPLICATIONS

Introduction:

In this section we discuss the health effects in persons exposed to specific contaminants, evaluate health outcome data, and address specific community health concerns.

A. TOXICOLOGICAL EVALUATION

Given the environmental and demographic data the major public health impacts from the site can be primarily from exposure to TCE and lead. Although not site related, the presence of 1,2-dichloropropane was evaluated for its toxicological significance. To evaluate health effects, ATSDR has developed Minimal Risk Levels (MRL) for contaminants commonly found at hazardous waste sites. The MRL is an estimate of daily human exposure to a contaminant below which non-cancer, adverse health effects are unlikely to occur. ATSDR presents these MRLs in Toxicological Profiles. In the following discussion, we have used ATSDR Toxicological Profiles for TCE¹⁴, lead¹⁵ and 1,2-dichloropropane¹⁷.

Trichloroethene

TCE exposure through skin contact and ingestion of groundwater from downgradient wells may have occurred and may be occurring in some residents that live near the site. The most likely health effects that may result from chronic exposure to TCE at this site involve the nervous system. Possible neurological effects include (1) painful inflammation of the nerves, particularly the face, (2) tingling sensation in the arms, hands, and legs, (3) loss of the sense of touch, (4) altered electroencephalogram, and (5) slowed responses to stimuli. Non-carcinogenic health effects are unlikely to occur in residents along Mannheim Avenue road as TCE is present only in the range of 0-1 ppb in residential wells. Although TCE is carcinogenic via inhalation, ingestion and by dermal exposure it

was detected in concentrations of 1 ppb and does not pose a carcinogenic risk.

Lead

Chronic exposure to low levels of lead produces adverse effects on a number of different tissues¹⁵. Lead presents a hazard to reproduction and primarily effects the kidneys, hemopoietic system (liver), the central nervous system and the gastrointestinal system. Toxic effects of lead have been observed at relatively low blood lead concentrations (5-10 ug/dl)¹⁵, and the effects are particularly significant in children¹⁶. Lead exposure is especially dangerous for unborn children because lead crosses the placenta and causes premature birth, low birth weight, and miscarriages. For infants and young children, lead exposure can cause a decrease in intelligence (IQ) scores, slow growth, and cause hearing problems. These effects can persist as children get older and can interfere with successful performance in school. In adult men lead exposure can increase blood pressure and effect sperm or damage other parts of the male reproductive system. While lead has not been shown to cause cancer in humans, animal studies have shown that lifetime lead exposure in rodents can cause cancer.

Residential tap samples showed a maximum concentration of 155 ppb of lead and exceeded federal MCL. Mild adverse health effects involving the central nervous system, the liver, and the blood might have resulted from drinking lead contaminated water in two of the households. However, we cannot be certain of this conclusion because lead levels fluctuated over time; therefore, the amount of lead exposure fluctuated. Biological tests, such as measuring lead in blood is better at determining whether excessive lead exposure is occurring. The most sensitive groups appear to be unborn and young children. Blood-lead levels of individuals from these households have not been examined.

1,2-Dichloropropane

Analysis of samples from private wells indicated contamination with 1,2-dichloropropane. ATSDR estimated the exposure dose for persons who drank water contaminated with 12 ppb 1,2-dichloropropane, the maximum level found in private well water samples. The dose is two orders of magnitude (an order of magnitude is 10 times) lower than the level ATSDR has determined is of minimal risk (MRL) for chronic (long-term, over a year), intermediate (more than two weeks but less than a year) and acute (less than two weeks) exposure. The dose is also several orders of magnitude lower than levels which have resulted in health effects in experimental animals¹⁷.

B. HEALTH OUTCOME DATA EVALUATION

Although a completed exposure pathway for on-site contaminants exists or existed in the past, primarily through ingestion of contaminated water from private wells, health outcome data for the community surrounding the Mannheim Avenue Dump Site was not evaluated. As the facility is inactive and all wastes have been excavated and removed from the site, the risk of exposure to on-site contaminants via groundwater is minimal.

Though cancer is a plausible health outcome from long-term exposure to TCE, although unlikely, pertinent information for the Mannheim Avenue Dump Site has not been requested from the New Jersey State Cancer Registry as the receptor population is too small to draw statistically valid conclusions.

Sampling of two wells at the Bethel Elementary school did not reveal any contamination with lead. There is no indication for further evaluation of learning disabilities at the current time.

C. COMMUNITY HEALTH CONCERNS EVALUATION

We have addressed community health concerns as follows:

Will the consumption of contaminated drinking water by the children of Bethel School affect the health of the children?

Analysis of samples from two wells at Bethel Elementary school indicated contamination with 1,2-dichloropropane. Children who are enrolled in the Bethel Elementary School may have been exposed to this contaminant in the past. However, a repeat sampling showed no evidence of persistent contamination. ATSDR estimated the exposure dose for children who drink water contaminated with 12 ppb 1,2-dichloropropane, the maximum level found in school water. The dose is two orders of magnitude (an order of magnitude is 10 times) lower than the level ATSDR has determined is of minimal risk (MRL) for chronic (long-term, over a year), intermediate (more than two weeks but less than a year) and acute (less than two weeks) exposure. The dose is also several orders of magnitude lower than levels which have resulted in health effects in experimental animals¹⁷. Exposure to site related contaminants is highly unlikely in the future.

Public Comment Period

The New Jersey Department of Health (NJDOH) conducted a public comment period for the Public Health Assessment for the Mannheim Avenue Dump site from July 6, 1993 to August 6, 1993. The Public

Health Assessment document was placed in local repositories to facilitate commentary and reaction by the public at large. Additionally, the Public Health Assessment was circulated to the Atlantic County Health Department for the purpose of soliciting commentary by local health officials.

A summary of commentary received by the NJDOH and associated responses is contained in Appendix 3.

CONCLUSIONS

1. On the basis of the information reviewed, NJDOH has concluded that the Mannheim Avenue Dump Site poses no apparent public health hazard. Past human exposure to VOC contaminants is not likely to result in adverse health effects. VOCs including TCE are considered to be moving from the site. Although currently below health concern levels, it is possible that VOC concentrations could increase to health concern levels at a later date¹.
2. Human exposure to lead (may not be site-related) is an indeterminate public health hazard. Exposure has probably occurred via ingestion of lead from residential tap water. However, the source of the lead contamination may not be site-related. Mild adverse health effects involving the central nervous system, the liver, and the blood might have resulted from drinking lead contaminated water in two of the households. However, we cannot be certain of this conclusion because lead levels fluctuated over time; therefore, the amount of lead exposure fluctuated. Biological tests, such as measuring lead in blood is better at determining whether excessive lead exposure is occurring. The most sensitive groups appear to be unborn and young children. Blood-lead levels of individuals from these households have not been examined.
3. Since all wastes have been removed from the site exposure to site soil does not constitute a health risk¹³.
4. The presence of 1,2-dichloropropane in residential wells located downgradient is apparently not site related. There are no data or information available regarding the possible source of this contaminant. At calculated exposure doses derived from minimum concentrations of 1,2-dichloropropane, adverse health effects would not be expected to occur.

RECOMMENDATIONS

Recommendations to Cease/Reduce Exposure

1. As soon as possible educate current residents of Mannheim Avenue about the possible health impacts of exposure to lead (may not be site-related). All residents with increased lead levels in their wells are advised to let the taps run before using water for drinking purposes to help clear any lead possibly originating from the pipes.
2. If contaminant concentrations are found to be increasing, then an alternate water supply should be provided to residents who use private well water for potable purposes in order to be protective of public health.
3. Implement institutional controls in the near future to prevent residential development around Mannheim Avenue Dump site until remediation of site is complete.

Recommendations to Characterize the Site

1. Periodic sampling of residential wells and monitoring wells located downgradient should be continued.

Other Recommendations

The Atlantic County Health Department has a free lead screening program for children and adults. It is recommended that all children and adults living in residences with increased lead levels in tap samples be screened for blood lead. Individuals, particularly pregnant women and young children, should contact the Atlantic County Health Department for further details.

Health Activities Recommendation Panel (HARP) Recommendation

The data and information evaluated in the public health assessment for the Mannheim Avenue Dump site, Galloway Township, Atlantic County, New Jersey, has been reviewed by ATSDR's Health Activities Recommendation Panel for appropriate follow up with respect to health activities. Because of past and possibly current exposure to lead, through the ingestion of contaminated drinking water, the HARP panel recommends this site for follow up health activities. Specifically, the HARP determined that children (6-71 months) be tested for lead in their blood (per the Centers for Disease Control and Prevention guidelines). In addition, the HARP determined that the Atlantic County Health Department be contacted to inform them of the HARP recommendation. The HARP concurs with the community health education that is being performed by the EPA.

PUBLIC HEALTH ACTIONS

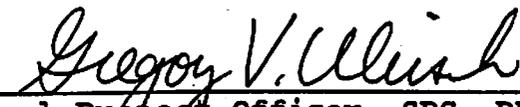
The Public Health Action Plan (PAP) for the Mannheim Avenue site contains a description of the actions to be taken by ATSDR and/or NJDOH at or in the vicinity of the site subsequent to the completion of this Public Health Assessment. The purpose of the PAP is to ensure that this health assessment not only identifies public health hazards, but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. Included, is a commitment on the part of ATSDR/NJDOH to follow up on this plan to ensure that it is implemented. The public health actions to be implemented by ATSDR/NJDOH are as follows:

1. The NJDOH will provide a copy of this public health assessment to the Atlantic County Health Department to consider inclusion of children (and possibly adults) in their lead screening program.
2. ATSDR and the NJDOH will coordinate with the appropriate environmental agencies to develop plans to implement the cease/reduce exposure and site characterization recommendations contained in this health assessment.
3. ATSDR will provide an annual follow up to this PAP, outlining the actions completed and those in progress. This report will be placed in repositories that contain copies of this health assessment, and will be provided to persons who request it.

ATSDR will re-evaluate and expand the Public Health Action Plan (PAP) when needed. New environmental, toxicological, health outcome data, or the results of implementing the above proposed actions may determine the need for additional actions at this site.

CERTIFICATION

The Public Health Assessment for the Mannheim Avenue Dump site was prepared by the New Jersey Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the public health assessment was initiated.



Technical Project Officer, SPS, RPB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this Public Health Assessment and concurs with its findings.



Division Director, DHAC, ATSDR

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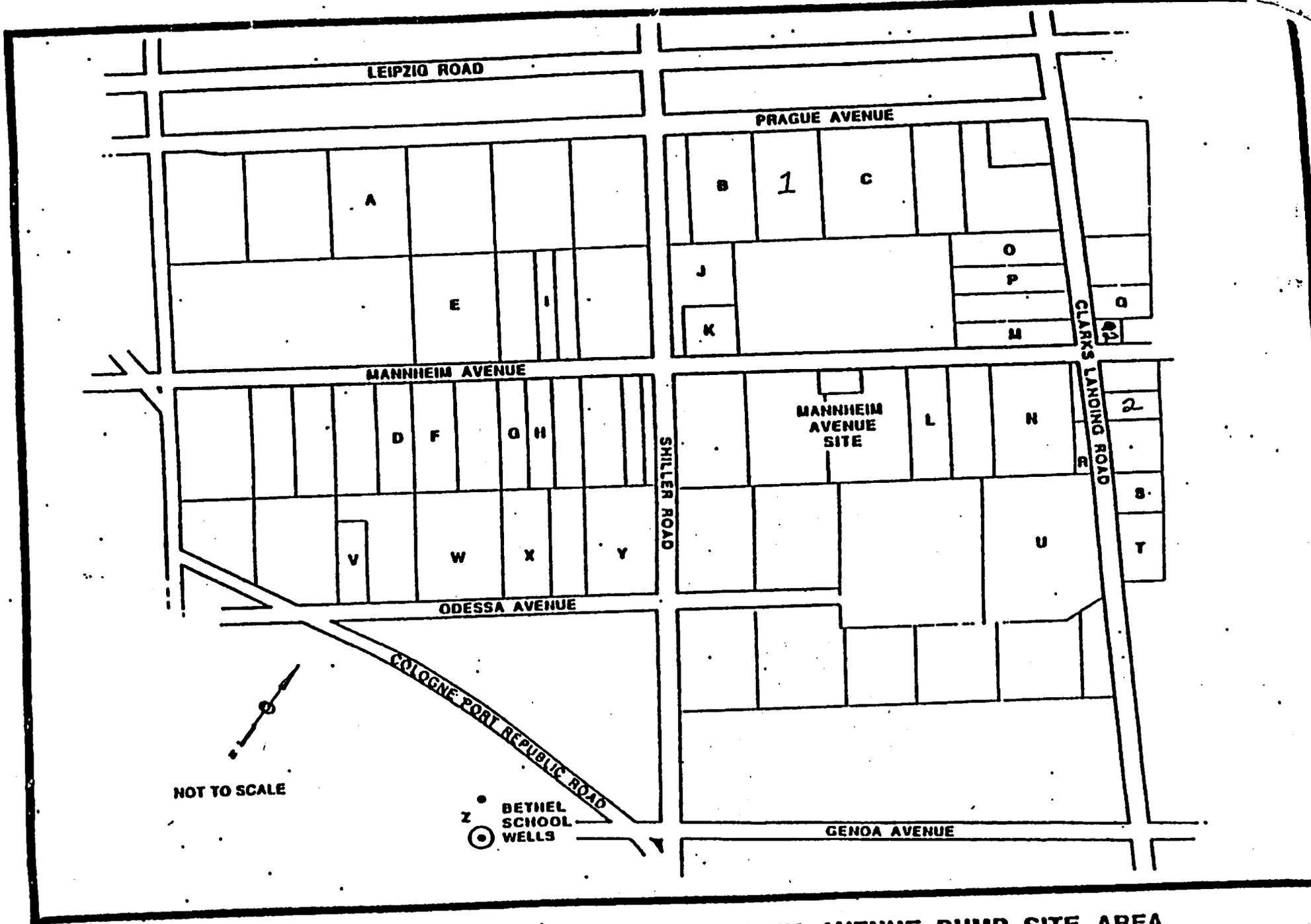
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18. USEPA Region II: Post-Record of Decision Residential Well Sampling results.

INTERVIEWS:

- a. Site Manager, NJDEP
- b. Site Manager EPA
- c. ATSDR Region II representatives.

APPENDICES:

1. Site Location Map.
2. Residential Well sampling locations.
3. Response Summary



**SAMPLING LOCATIONS, MANNHEIM AVENUE DUMP SITE AREA,
GALLOWAY TOWNSHIP, NEW JERSEY**

APPENDIX 3

RESPONSE SUMMARY

This response summary represents those comments and reactions to the Public Health Assessment received during the public comment period described in the Community Concerns Evaluation section. In some cases, similar commentary was received from various sources, while other concerns were specific to individuals or groups. Comments and concerns have been grouped by content and are followed by the consequent response.

Those comments pertinent to the Health Assessment process are presented below.

Comment:

Comments were received indicating that the chemical 1,2-dichloropropane was incorrectly listed in the Public Health Assessment as a principal contaminant associated with the site.

Response:

Reference to 1,2-dichloropropane, as a principal contaminant associated with the Mannheim Avenue Dump site, have been deleted.

Comment:

A comment was received that suggests that the Public Health Assessment infers that lead found in the groundwater is site related.

Response:

The Public Health Assessment document clearly states that the lead level found in the groundwater may not be site related. The health effects section of the Public Health Assessment identifies all environmental contaminants. The lead levels detected in the residential wells has public health significance.