

# Health Assessment for

DENZER AND SCHAGER X-RAY COMPANY

CERCLIS NO. NJD046644407

BAYVILLE, OCEAN COUNTY, NEW JERSEY

AUG 03 1990

Agency for Toxic Substances and Disease Registry  
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  
DENZER AND SCHAFER X-RAY COMPANY  
OCEAN COUNTY  
BAYVILLE, NEW JERSEY**

Prepared by:  
Environmental Health Service  
New Jersey Department of Health

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

**OBJECTIVES**

Phase II of the Remedial Investigation (RI) of the site has recently been completed. The major objectives of this health assessment, based on the stage of the remediation of the site are:

- \* to assess current or past health effects that may be associated with the site,
- \* to identify any action that could be taken to prevent exposure to chemicals on the site, if necessary,
- \* to identify, and if possible fill in, information or data gaps relating to the site,
- \* to recommend further sampling, if necessary, and
- \* to assess whether a health study of the site is feasible or warranted.

**SUMMARY**

The groundwater under the Denzer and Schafer X-Ray Company site has been contaminated, presumably by the discharge of wastes in the septic tanks on site. Although soil contamination has not been detected, the site requires further characterization. A potential concern is that the groundwater plume from the site could reach private wells and public water supply wells. The Denzer and Schafer X-Ray Company site is considered to be a potential public health concern. However, since a population exposed to on-site and off-site contaminants at a level of public health concern has not yet been identified, the Denzer and Schafer X-Ray site is not being considered for follow-up health studies at this time.

## **SITE BACKGROUND**

Denzer and Schafer, an active facility in Bayville, New Jersey (Berkeley Township), is in a mixed residential and commercial area. It is near the coastline, close to Potters Creek and Barnegat Bay. Denzer and Schafer is involved in the reclamation of silver from both microfilm and x-ray negatives. Contamination of the site was due to the practices that were conducted on the site, primarily the discharge of the stripping solutions to the sanitary septic system. Microfilm processing waste from a nearby facility may have also been disposed of in the Denzer and Schafer septic tanks. This means of disposal was used at the site from 1974 through 1981. Other identified sources of contamination could have included the stockpiling of shredded and stripped film and, prior to 1974, the incineration of the film waste. Characteristics of the wastewater that was disposed include high pH, high chemical oxygen demand, high total dissolved solids concentrations, high total Kjeldahl nitrogen and the presence of the following compounds: arsenic, barium, cadmium, chromium, lead, mercury, nickel, selenium, silver, benzene, chlorobenzene, ethyl benzene, toluene, methylene chloride, tetrachloroethylene, trichloroethylene, bis(2-ethylhexyl) phthalate, diethyl phthalate, p-chloro-m-cresol, phenol, and 2-chloroethylvinyl ether. (RI Report)

The sanitary septic tank is currently filled with sand and current waste materials that are generated are reportedly disposed off-site. Sampling of the groundwater has demonstrated contamination by a number of chemicals. The report for Phase I of the Remedial Investigation was finalized on March 25, 1988.

## **COMMUNITY CONCERNS**

On February 25, 1987, the New Jersey Department of Environmental Protection (NJDEP) conducted a public meeting to discuss the initiation of the Remedial Investigation/Feasibility Study (RI/FS) for the Denzer and Schafer X-Ray Company site. The issues and concerns presented by the attending public during this meeting may be summarized as follows:

- \* The potential health effects associated with the contamination of groundwater,
- \* The impact to the private home development across Hickory Lane,

\* Requests for additional sampling and improvement in coordination of potable well testing between the Ocean County Health Department and NJDEP, and

\* Questions as to why this site is on the Superfund list.

Other community concerns include the perception of an extremely long time necessary for remediation to take place, the perceived lack of a clear and accurate channel of communication between residents, local and county officials, and agencies responsible for remediation, and questions about why the United States Environmental Protection Agency (EPA) or NJDEP did not loan the owner of the site approximately \$100,000 to remediate the site.

#### **SITE VISIT**

A site visit has not yet been conducted by the New Jersey Department of Health (NJDOH), although information from NJDEP personnel who have been on the site was used in this health assessment. A site visit will be conducted by NJDOH and will be included in an addendum to this health assessment. Reportedly, the site is not fenced and no warning signs are posted. However, the site is an active site and there has been no evidence of trespassing or vandalism.

#### **ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS**

Media on the site that have been sampled include groundwater (monitoring wells, private potable wells, and a public well), subsurface soils, air, sediment, and surface soil and water. Unless otherwise specified, information in this section is from the Phase I RI Report. Magnetometer and electromagnetic scans were used to identify groundwater movement and potential buried drums and/or buried metallic debris. Magnetometer studies and chemical analyses of groundwater indicated that the groundwater is moving in a northeast direction. The electromagnetic scan (EM) identified two areas of magnetic anomalies that will be investigated in Phase II of the RI. Methylene chloride and acetone were detected in all of the media sampled, but the results of these analyses were negated since methylene chloride and acetone were also detected in the blanks.

Based on samples analyzed to date, the primary contaminated media of concern is groundwater. Analyses from groundwater samples taken from 17 monitoring wells detected elevated concentrations of a number of chemicals, particularly

chloroform, toluene, antimony, arsenic, chromium, lead, benzoic acid, and tentatively identified compounds (including trichlorotrifluoroethane, trichlorofluoromethane, and octanal). 1,1,1-Trichloroethane (TCA), trichloroethylene (TCE), bromomethane, vinyl chloride, and benzene were detected in the groundwater below the detection limits. However, the detection limit was too high to enable one to determine if their presence is a concern. Non-chemical parameters that were also detected at significant concentrations were coliform bacteria (presumably from human wastes from the septic tanks) and nitrates (presumably from waste that was discharged to the septic tank).

Fifteen potable wells and one water supply well were sampled. Contaminants that were detected at elevated concentrations include 1,1-dichloroethylene, antimony, lead, and tentatively identified compounds. The contaminants that were detected in the potable wells may not be due to the site, as the contaminant plume from the site may not yet have reached the potable wells. A number of volatile organic compounds were detected below their detection limits. Phthalates, methylene chloride, and acetone were again detected in these samples, but the results were negated due to contamination of the blanks.

Table 1 summarizes the results of ground water analysis for monitoring and residential wells, and associated action levels.

Analyses performed on samples from the subsurface soil, surface soil, surface water, and sediment did not identify the source of the contamination. At 13 boring locations the only chemical detected at a significant concentration was cadmium (at one location). Cadmium was not detected in the groundwater. Tentatively identified compounds (particularly "unknown" base/neutral compounds) were detected at elevated concentrations, but their toxicity cannot be evaluated until clear identification is made. 4-Hydroxy-4-methyl-2-pentanone (HMP) concentrations were negated due to contamination of blanks. Likewise, besides chemicals that were negated due to blank contamination and tentatively identified compounds, the surface soil analyses did not detect appreciable concentrations of priority pollutant list chemicals.

Carbon disulfide, vinyl acetate, and HMP were detected in the sediment sample. No significant concentrations of contaminants were detected in the water sample, although the concentration of coliform bacteria was high.

Air samples on the site was analyzed using a Flame Ionization Detector (FID), which can measure organic vapor concentrations. No elevated organic vapors were measured on the site during sampling, with the exception of vapors from the well heads immediately after removing the well caps.

**TABLE 1. Phase I Groundwater Analysis.**

Compound	Monitoring Wells	Potable Wells	Drinking Water Standard +
Benzene	54*	4.9	1
Vinyl Chloride	22*	-	2
Chloroform	25	4.7	NA
Toluene	1,600	5.2	NA
Trichlorotrifluoroethane	48	40	NA
Trichlorofluoromethane	42	34	NA
Octanal	1,200	8.3	NA
Di-N-Octylphthalate	54	-	NA
Di-N-Butylphthalate	54	21	NA
Benzoic Acid	13,000	-	NA
1,1,1-Trichloroethane	42*	14	26
Trichloroethylene	32*	3.9*	1
Bromomethane	29	-	NA
1,1-Dichloroethylene	-	11	2
Antimony	89	36	NA
Arsenic	72	-	50
Chromium	120	11	50
Lead	127	359	50
Mercury	1.2	-	2

(All concentrations in parts per billion (ppb), and represent maximum detected concentrations)

\* = Estimated value. NA = None available.

- = Not detected.

+ = New Jersey or Federal Drinking Water Standard

#### QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance/quality control (QA/QC) reviews were performed by both the consultant and NJDEP. The major problem was the negation of certain compounds, when these compounds were detected in blanks. These compounds included methylene chloride, acetone, 4-hydroxy-4-methyl-2-pentanone, phthalates, and benzo(a)pyrene. The negation of methylene chloride may be important, since methylene chloride was identified in wastewater discharged to the septic tank and was detected in all of the samples (although detection in the samples was negated since methylene chloride was also detected in all of the blanks).

## DEMOGRAPHICS

The site is located in a mixed residential/commercial area. The nearest existing residential area is about 500 feet north of the site. The area south of the site is being planned for residential development (approximately 180 dwellings). The Ocean County sewage treatment plant is about 3,000 feet west of the site. Drinking water in the area comes from both private wells or a public water supply. The Denzer and Schafer water comes from the groundwater. The nearest off-site private potable well is about 500 feet from the site. Most of the potable water supplied to residential and commercial dwellings in Bayville that do not have private wells comes from a Berkeley Township Water Company water distribution well, which is located about 1 mile northeast of the site. There are several schools, day care centers, and a nursing home within a 3-mile radius of the site.

Demographic information provided in the RI describes Berkeley Township, not the areas adjacent to the site. Information on population density, the exact location of private potable wells, and additional information and characterization of sensitive populations within a 2-3 mile radius of the site needs to be presented.

## ENVIRONMENTAL DATA GAPS

Additional information is needed to adequately characterize the site. Many of the activities and sampling that is discussed in this section are being performed in Phase II of the RI. More groundwater samples are needed to delineate the plume that is moving off site. The exact direction of the groundwater movement must be ascertained. More potable well samples may be necessary, in the future, dependent on the delineation of the groundwater plume(s), the hydraulic gradient, the number of wells in the area that have not been sampled, and future environmental data.

Chemical analyses in Phase I sampling failed to identify the exact location of the source of the contamination. If contamination of the groundwater is only from the septic tank area and/or the stockpiling areas, these areas need to be sampled in more detail. In Phase I, the deepest subsurface samples were taken at a distance of 2 feet from groundwater. In future sampling, samples need to be taken directly above the groundwater table to analyze the concentration of chemicals that may be in contact with the aquifer. Volatile compounds in this area above the groundwater may be leaching into the groundwater but may not have been detected in Phase I. The



causes of the magnetic anomalies encountered during the EM scan need to be identified. Numerous tentatively identified compounds were detected in Phase I of the RI. Better identification of some of these compounds are needed in future analyses.

The vegetation in a large portion of the site is stressed (Personal communications, NJDEP). Chemical analyses of borings in these areas did not identify what is causing the stress. A possibility is that the vegetative stress is due to non-chemical contamination, either nitrates or high pH that were present in the wastewater. These parameters were not analyzed for in the soil. These parameters need to be analyzed for in future sampling events. The cause of the stress needs to be addressed and, if possible, identified in Phase II of the study.

Nitrate concentrations were also high in the groundwater below the site, but were not analyzed for in potable well samples or soils. Analyzing potable wells for nitrates could possibly give one an idea of the groundwater plume movement.

#### **EXPOSURE PATHWAYS**

The primary concern is associated with groundwater contamination. People can be exposed to groundwater via the use of groundwater wells. The discharge of groundwater to surface water or the run-off of contaminants into surface water is not identified as a pathway of concern. The argument, used by the consultant, that the chemicals found in the potable wells cannot be from the site because the well nearest to the site is 400 feet further than a model predicted that the groundwater could move should be rejected. Groundwater movement has not been fully characterized and there are uncertainties associated with the models. The argument needs to be based on environmental data and groundwater characterization.

Some of the potable wells had elevated concentrations of chemicals, particularly of 1,1-dichloroethylene, phenols, antimony, and lead. Further sampling and/or investigation is needed to determine if the groundwater plume has adversely impacted the potable wells. Much of this work is scheduled in Phase II of the RI. Antimony and 1,1-dichloroethylene were not contaminants of concern on the site and were not detected in wastewater samples. Lead is an area-wide concern in the townships near the site, and no clear pattern of lead contamination was observed in the samples taken. Phenols and methylene chloride were both detected in the wastewater that

was disposed. The phenols detected in the potable wells were not of a public health concern, but proof is needed that the phenols are not from on-site contamination. Methylene chloride is impossible to evaluate, as methylene chloride was detected in the blanks. Better QA/QC needs to be performed on future potable well sample analysis.

If the plume(s) from the site reach the potable wells, exposure would occur via ingestion of contaminated groundwater, inhalation of volatile compounds from the groundwater, and use of the groundwater for garden irrigation.

The source of the groundwater contamination needs to be addressed in Phase II of the RI. Have all the contaminants been washed through the soil or is there residual contamination? Why is the vegetation on site stressed? If there are other contaminants that are detected on site, this health assessment will be revised and the additional exposure pathways will be addressed.

#### **PUBLIC HEALTH IMPLICATIONS**

Concentrations of 1,1-dichloroethylene, benzene, and lead detected in the private wells and the public supply well were above standards. Of particular public health concern are concentrations of lead that were found in the public supply well (203 ppb), well RW-5 (359 ppb), well RW-10 (170 ppb), and well RW-2 (60 ppb). Lead samples were taken from the potable wells after 15 minutes of flushing and from the discharge pipe spigot on the public supply well. Therefore, these samples are probably representative of actual concentrations in the groundwater. Although there are high concentrations of lead in the groundwater in the area, the concentrations in the public supply well, well RW-5, and RW-10 are higher than can be explained. Chronic inorganic lead exposure causes effects on the hematopoietic system producing anemia. Other effects, such as neurological, renal, and reproductive effects are also associated with chronic exposure to inorganic lead compounds. Developmental effects in children from chronic lead exposure have been extensively documented. This is a primary public health concern as several schools, day care centers and a nursing home are located within three miles of the site. These population subsets, located downgradient, could have exposure potential to site associated contaminants. Organic contaminants in wells RW-10 and RW-14, where 1,1-dichloroethylene was detected at concentrations slightly above the standard and other volatile organic chemicals were detected at very low concentrations, are also of some concern.

## RECOMMENDATIONS AND CONCLUSIONS

On the basis of the information reviewed, NJDOH and ATSDR have concluded that the Denzer and Schafer X-ray Company 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 Public Health Implications section above, human exposure to lead and volatile organic chemicals may occur and may have occurred in the past via ingestion and inhalation of contaminants in the groundwater.

More characterization of the site is needed. The groundwater plume(s) and movement need to be better defined. The on-site source of the groundwater contamination needs to be clearly identified. The cause of the vegetative stress area needs to be identified. The issue of contamination of potable wells in the area needs to be better addressed. Measures need to be taken to insure that the plume of contaminants does not reach the potable wells, as potable use of this water could adversely impact public health. In the future, additional potable well samples may be needed. A detailed inventory of wells downgradient of the site, that could be potentially affected by the site, is needed. Much of this work will be accomplished during Phase II of the remedial investigation.

The source of the lead concentrations may be due to lead solder and the acidic nature of the groundwater, not Denzer and Schafer. Measures need to be taken to notify the residents of lead in the water and to investigate possible sources.

In accordance with CERCLA as amended, the Denzer and Schafer X-Ray Company 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 Denzer and Schafer X-Ray 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

Phase I Remedial Investigation Report: Denzer and Schafer X-Ray Company, March 25, 1988.

Personal Communication, Technical Coordinator, New Jersey Department of Environmental Protection (NJDEP)/Division of Hazardous Site Mitigation.

Personal Communication, Area Engineer, NJDEP/Bureau of Safe Drinking Water.

Denzer and Shafer X-Ray Company Site  
Update - July 12, 1990

The Phase II RI Report for Denzer and Shafer X-Ray Company has been completed. Some of the data gaps that were discussed in this health assessment, particularly data gaps relating to the groundwater were not adequately addressed. A review of the Phase II RI Report will be included in the form of an addendum to this health assessment, when this assessment is updated.