

Site Review And Update

DENZER & SCHAFFER X-RAY COMPANY

BERKELEY TOWNSHIP, OCEAN COUNTY, NEW JERSEY

CERCLIS NO. NJD046644407

MAY 1, 1995

REVISED

DECEMBER 20, 1995

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Agency for Toxic Substances and Disease Registry

Division of Health Assessment and Consultation

Atlanta, Georgia

Site Review and Update: A Note of Explanation

The purpose of the Site Review and Update is to discuss the current status of a hazardous waste site and to identify future ATSDR activities planned for the site. The SRU is generally reserved to update activities for those sites for which public health assessments have been previously prepared (it is not intended to be an addendum to a public health assessment). The SRU, in conjunction with the ATSDR Site Ranking Scheme, will be used to determine relative priorities for future ATSDR public health actions.

REVISED

SITE REVIEW AND UPDATE

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BERKELEY TOWNSHIP, OCEAN COUNTY, NEW JERSEY

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Prepared by

**The New Jersey Department of Health
Environmental Health Service
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry**

SUMMARY OF BACKGROUND AND HISTORY

Denzer & Schafer X-Ray (D&S) is an active facility located on Hickory Lane at Block 858, Lot 46A, Berkeley Township, Ocean County, New Jersey (Appendix 1). The site consists of approximately ten acres of land surrounded by commercial and residential buildings (Appendix 2). D&S is one mile west of Highway Route 9, and three miles east of the Garden State Parkway. The company reclaims silver from used X-ray film. The plant consists of a process building, a X-ray shredding/bailing shed, and an above-ground wastewater holding tank inside the process building. Also located at the facility is Microindustries Inc., a microfilming service company.

Denzer & Schafer originally incinerated X-ray film as part of the silver reclamation process. This was changed to a caustic soda (3.5% sodium hydroxide solution) and salt stripping process, in 1974. From 1974 through 1981, D&S discharged the spent stripping solutions into the plant's septic system. Currently, the spent process wastewater is transferred to a above-ground storage tank for periodic off-site disposal.

The shredded and stripped film was originally stockpiled just north of the D&S facility. This material has been disposed of at an off-site landfill. The shredded film is now being stored on-site because the county landfill refuses to accept the waste.

Near the southeastern boundary of the site is Potters Creek and the coastal area of Barnegat Bay. A wetland area also is located along the site's southeastern property boundary. The D&S site is located on sandy soil above both a shallow and a deep aquifer. Many residents around the site have used in the past and presently continue to use the aquifers as their source of drinking water.

The New Jersey Department of Environmental Protection (NJDEP) issued Administrative Orders (AO) in January 1977 and in May 1981, requiring Denzer & Schafer to immediately cease the discharge of wastewater to their septic system, to submit a proposal for permanent treatment and off-site disposal, and for the installation of a ground-water monitoring system. D&S refused to sign a third AO in 1985, causing the site to be placed on the United States Environmental Protection Agency's (USEPA) National Priority List.

Sampling was conducted three different times. Phase I sampling was conducted in April 1987, Phase II sampling was performed in March 1989, and Phase III sampling was done in October 1992.^(1,2)

Two surface soil and 39 sub-surface samples were taken during the Phase I sampling. No priority pollutants were detected in the surface soil samples and low levels of phenolics were detected in the sub-surface soils. During Phase II sampling, additional subsurface soil samples were collected in areas of potential contamination. Silver was detected in several of the soil samples. No other contaminants were found in significant concentrations.

Phase I sampling showed that an area that was devoid of vegetation had a soil pH value of about 12. No significant amounts of any contaminants were found. It is reported that the pH of the soil was elevated as a result of the caustic stripping solution being stored in this area.

The process wastewater in the original underground holding tank was analyzed during Phase I and Phase II sampling and only the groundwater was sampled during Phase III. The process wastewater was found to contain mainly volatile organic compounds (VOC's) and heavy metals.

The RI/FS found that the groundwater was contaminated via leaching of the wastes from the site. The superficial groundwater flows in a northeasterly direction. Potable wells were found to be contaminated with low levels of volatile organic compounds and lead, but these were not necessarily attributable to the site because they were also detected in upgradient monitoring wells.

Homes around the D&S site have the option to be hooked up to the city water supply. Although many residences have been connected to the city water supply, many homes still remain on well water for economic reasons. No public water supply line was installed for the homes on Hickory Lane and these residents continue to use well water.

A health assessment (HA) was prepared by the New Jersey Department of Health (NJDOH) for the Agency for Toxic Substances and Disease Registry (ATSDR) on August 3, 1990 (1). The HA identified the primary exposure pathway as being groundwater contamination.

The health assessment stated that the community concerns associated with the D&S site included: 1) The potential health effects associated with the contamination of groundwater; 2) The impact on private home development across Hickory Lane; 3) The need for additional sampling of potable wells; and 4) The length of time necessary for remediation to take place. Public health concerns were not addressed in the health assessment.

The conclusions in the HA were: 1) The Denzer & Schafer site is of potential public health concern because humans may be exposed to hazardous substances at concentrations that may result in adverse health effects; 2) 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; and 3) The source of lead may be due to extrinsic sources such as lead solder and the acidic nature of the groundwater rather than from the site.

It was recommended in the HA that: 1) The site needs to be better characterized in regards to the groundwater plume; 2) The on-site source of groundwater contamination needs to be clearly identified; 3) the cause of the vegetative stress area needs to be identified; 4) The issue of contamination of potable wells in the area needs to be better addressed; 5) Measures need to be taken to insure that the plume of contaminants does not reach the potable wells; 6) A detailed inventory of downgradient wells that could be affected by the site should be made; 7) The source of lead contamination should be determined; 8) Measures should be taken to notify the residents

of lead in the water; and 9) ATSDR and NJDOH should reevaluate this site for any indicated follow-up if data become available suggesting that human exposure to significant levels of hazardous substances is currently occurring or has occurred in the past.

CURRENT SITE CONDITIONS

On June 6, 1994, a site visit was conducted by James Pasqualo and Howard Reuben of the NJDOH, the NJDEP Site Manager, and the Health Officer from the Ocean County Health Department. The site is an active facility consisting of a process building, a shed where the X-ray film is shredded and bailed, an above-ground process waste storage tank inside the process building, and large quantities of shredded X-ray film stored around the process building.

The shredded X-ray film was placed in cardboard and bailed. The processed film was scattered throughout the site due to the deterioration of the cardboard containers being kept outdoors. The reclaimed film had been taken to the local landfill until it was closed. No other landfills have been willing to accept the material although it has been classified as dry non-hazardous industrial waste (ID-27 waste). The film will be stored on site until Denzer & Schafer can find a suitable means for disposal.

The site was not enclosed and no signs were present indicating that this is a Superfund site. However, there were no indications of trespassing or vandalism.

The physical hazards found at the site included the shredded X-ray film which was lying loose on the ground and the shed, where the processed X-ray film is shredded and bailed, is dilapidated. Physical hazards are not considered to be a significant problem at this site.

The nearest homes consist of a housing development about 500 feet north of the site. These homes are supplied with city water. At the edge of the site, a small grove of trees lay between the edge of the site and the housing development.

Changes in site conditions subsequent to the 1990 health assessment consist of preliminary remediation efforts. The old septic system was filled with sand and then subsequently removed. The original underground process tank remains in place, but is no longer in use. A process waste storage tank was constructed above-ground inside the process building.

The health assessment was correct in its conclusions. Phase II and Phase III data, obtained subsequent to the health assessment indicate that the groundwater is continuing to be contaminated with VOC's and metals, although some of these chemicals are not associated with the D&S site. Several potable wells were found to be contaminated with benzene, 1,1-dichloroethylene, lead, and/or trichloroethylene for Phase I sampling. Potable wells were not contaminated with compounds above their health comparison values in subsequent sampling. These contaminants are of concern since they can be deleterious to human health.

The NJDEP conducted additional sampling twice since the 1990 health assessment was released. Phase II sampling included the contents of the underground process wastewater tank and groundwater. Phase III sampling was only concerned with groundwater from monitoring wells. Approximately 46 monitoring wells have been installed on and around the site.

A comparison was made between the chemicals found in the process wastewater and the chemicals found in the monitoring wells. Five chemicals found in the process wastewater and in the groundwater were found to be above their respective health comparison values: 1) 32 ppb of trichloroethene was found during phase I, sampling but not during phase II or phase III sampling; 2) benzene was found at a maximum of 54 ppb during Phase I, 8 ppb during Phase II, and not detected during Phase III sampling; 3) chromium was found at a maximum value of 391, 397, and 408 ppb in Phase I, Phase II, and Phase III sampling, respectively; 4) a maximum value of 95 ppb of lead was found during Phase I, 97.4 during Phase II, and 237 ppb was found during Phase III sampling; and 5) silver was not detected during Phase I sampling, were detected up to 102 ppb during Phase II sampling, and was found at a maximum of 96.4 ppb during Phase II sampling. The maximum concentrations found in the process wastewater were 220 ppb of trichloroethene, 140 ppb of benzene, 749 ppb of chromium, 54 ppb of lead, and 2,200 ppb of silver. Chromium, lead, and silver were found in one or more upgradient monitoring well samples, indicating that the Denzer & Schafer site was not the source of these metals. Thus, the D&S site may be adding to the total groundwater burden for these metals.

The compounds identified in the process wastewater and in off-site residential wells above their respective health comparison values were benzene, 4.9 ppb; 1,1-dichloroethylene; 11 ppb, and lead; 359 ppb. Trichloroethylene at 3.9 ppb was above its detection limit (1.7 ppb). VOC's and metals below comparison limits were found in several wells.

CURRENT ISSUES

Public health concerns revolve around the possibility of potable wells currently being contaminated or becoming contaminated in the future. Residents potentially impacted by the site have been allowed to be connected to city supplied water. However, not all of the residents have agreed to be connected to city water for economic reasons. Several wells were found to be contaminated during Phase I sampling. The possibility exists that additional residential wells may become contaminated in the future. The wells are not routinely monitored. Therefore, exposure occurred in the past and may still be occurring.

The groundwater is contaminated with a variety of chemicals and metals not associated with this site. Several of the chemicals common with the process wastewater and the groundwater are found upgradient to the site. Therefore, the amount of contamination attributable to the Denzer and Schafer X-ray site has not been determined.

The Ocean County Health Officer stated that public health concerns focused on the groundwater. They are concerned about the length of time it is taking to prepare the Record of Decision

(ROD) which will present the most practical remediation procedure. The Health Officer expressed concern that the remaining residential wells may become contaminated in the future. However, the local Health Department does not have the authority to order the residents to hook up to city water unless their wells become contaminated above regulatory levels. According to the Ocean County Health Officer, no residential wells contained contaminants that were above their regulatory values when the Phase I sampling results were obtained. Some regulatory values were subsequently lowered.

Community health concerns as stated in the health assessment focused on the potential of adverse health effects resulting from exposure to contaminated groundwater, the impact to the private home development across Hickory Lane, and the length of time necessary for remediation to occur. No new completed human exposure pathways have been identified since the release of the health assessment. The NJDOH and ATSDR consider the public health concerns to be the potential for exposure to residents with wells and the source of the groundwater pollutants. The groundwater will remain contaminated until the source of the upgradient contamination is located and contained.

PUBLIC HEALTH IMPLICATIONS

This section contains discussion of the potential health effects in persons exposed to contaminants at the D&S site in order to address specific community health concerns. Health effects evaluations are accomplished by estimating the amount (or dose) of those contaminants that a person might come in contact with on a daily basis. This estimated exposure dose is then compared to established health guidelines. People who are exposed for some crucial length of time to contaminants of concern at levels above established guidelines are more likely to have associated illnesses or disease. In evaluating the toxicological significance of potential exposure of contaminated well water, the following assumptions were made: 1) Adults drink 2 liter of water per day; 2) An adult body weight is 70 kg; 3) The maximum concentrations in potable residential wells were 4.9 ppb of benzene, 11 ppb of 1,1-dichloroethylene, and 359 ppb of lead (1); and 4) Denzer & Schafer started operations in 1974, and exposure ceased in 1989, when no further contamination was found in the residential wells (Phase II sampling).

Health guidelines are developed for contaminants commonly found at hazardous waste sites. Examples of health guidelines are the ATSDR's Minimum Risk Level (MRL) and the USEPA's Reference Dose (RfD). When exposure (or dose) is below the MRL or RfD; then, non-cancer, adverse health effects are unlikely to occur.

MRL's are developed for each route of exposure, such as acute (Less than 14 days), intermediate (15 to 364 days), and chronic (365 days and greater). ATSDR presents these MRL's in Toxicological Profiles. These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status.

The toxicological effects of contaminants detected in environmental media are considered singly. The cumulative or synergistic effects of mixtures of contaminants may serve to enhance their public health significance. Additionally, individual or mixtures of contaminants may have the ability to produce greater adverse health effects in children as compared to adults. This situation depends upon the specific chemical being ingested or inhaled, its pharmacokinetics in children and adults, and its toxicity in children and adults.

The estimated exposure dose for adults (1.4×10^{-4} mg/kg/d) and for children (4.9×10^{-4} mg/kg/d) obtained by drinking benzene-contaminated residential well water is below the No Observed Adverse Effect Level (NOAEL) for chronic oral exposure for non-cancer effects cited in the ATSDR Toxicological Profile for Benzene.⁽⁴⁾ The benzene cancer risk resulting from drinking benzene-contaminated residential well water (9.3×10^{-7} for adults and 3.2×10^{-6} for children) slightly exceeded the estimated upper bound human cancer risk levels for adults and children. The maximum dose for adults and children is considered to present an insignificant excess cancer risk.

The adult and child lead exposure dose, 1.03×10^{-2} and 3.59×10^{-2} mg/kg/d, respectively, exceeded the Lowest Observed Adverse Effect Level (LOAEL) for less serious cardiovascular effects for animals for both adults and children.⁽⁵⁾

The estimated exposure dose for adults (3.0×10^{-4} mg/kg/d) and for children (1.1×10^{-3} mg/kg/d) obtained by drinking residential well water containing 1,1-dichloroethylene is below the MRL for adults and slightly exceeded the MRL for less serious hepatic effects in animals for children.⁽⁶⁾ Based upon calculated exposure doses, the LECR for 1,1-dichloroethylene resulting is 4.1×10^{-5} for adults and 1.5×10^{-4} for children. At this level 1,1-dichloroethylene is considered to have no apparent increased cancer risk for adults and a low increased risk for children. This may be interpreted according to the following scenario for the Life-Time Excess Cancer Risk (LECR): If 100,000 people ingested 1,1-dichloroethylene contaminated well water at the maximum reported concentrations found for 16 years, at most 20 additional cases of cancer from 1,1-dichloroethylene in residential well water could result over a 70 year period. Therefore, it is unlikely that residents would contract cancer as a result of their exposure to and 1,1-dichloroethylene in well water.

CONCLUSIONS

1. The ATSDR and the NJDOH consider the Denzer and Schafer X-Ray site to have presented a public health concern in the past based upon chronic oral exposure to lead and 1,1-dichloroethylene in potable well water. However, it cannot be presently determined if the source of contamination was the Denzer and Schafer X-Ray site; therefore, the site currently poses an indeterminate public health hazard. Non-site related sources may be contributing to an area wide ground water contamination problem.

- 2) Routine potable well sampling is indicated based on current site data and information. Most residential wells exhibiting lead contamination in 1987 remain in use.
- 3) Trespassing and physical hazards are not of concern for the D&S site.

RECOMMENDATIONS

- 1) The status of wells determined to contain lead above comparison values, in 1987, should be confirmed. All potable wells which may be impacted by the groundwater contamination problem should be regularly monitored.
- 2) An investigation of contamination sources, both site-related and non-site related should be made to determine the nature and extent of the overall groundwater contamination problem.
- 3) The recommendations in the health assessment have not been adequately addressed except for the cause of the vegetative stress area and the notification of residents about lead in the water.
- 4) The ROD is protective of the public health and should be implemented as soon as possible.
- 5) Future environmental, toxicological, health outcome data or changes in environmental conditions, may determine the need for additional actions at this site.

HEALTH ACTIVITIES RECOMMENDATION PANEL (HARP) RECOMMENDATION

The data and information developed in the Site Review and Update for the Denzer and Schafer X-Ray Company, Berkeley Township, New Jersey, has been evaluated by ATSDR's Health Activities Recommendation Panel (HARP) for appropriate follow-up with respect to health activities. Because of exposures to ground water contaminants (May not be site-related), the panel determined that community health education is indicated. Specifically, the NJDOH will coordinate this educational activity through the local health department.

PUBLIC HEALTH ACTION PLAN (PHAP)

The Public Health Action Plan (PHAP) for the Denzer & Schafer site contains a description of actions to be taken by NJDOH and/or ATSDR at and around the site subsequent to the completion of this site review and update. The purpose of the PHAP is to ensure that this site

review and update 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 NJDOH and ATSDR to follow-up on this plan to ensure that it is implemented.

A. Public Health Actions Taken

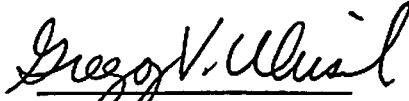
1. Berkeley Township made city water available to the residents nearby the site who used well water.

B. Public Health Actions Planned

1. The NJDOH will coordinate with the Ocean County Health Department to determine if wells with high lead concentrations are still in use. Residents utilizing contaminated wells will be provided with educational materials, and be urged to implement a filtration system or use city water if available.
2. The ATSDR and /or the NJDOH will review additional groundwater data for public health significance when it becomes available.
3. The ATSDR and the NJDOH will consider further follow-up activities if additional data become available that suggest human exposure is occurring or has occurred in the past.

CERTIFICATION

The Site Review and Update for the Denzer and Schafer X-Ray Company 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 Site Review and Update was initiated.



Technical Project Officer, SPS, RPB, DHAC

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


for Division Director, DHAC, ATSDR

DOCUMENTS REVIEWED

- 1) New Jersey Department of Environmental Protection. Remedial Investigation/Feasibility Study (RI/FS) Phase II Remedial Investigation Report, Denzer & Schafer X-Ray Company, Berkeley Township, Ocean County, New Jersey. April 26, 1991.
- 2) New Jersey Department of Environmental Protection. Phase III sampling data, Denzer & Schafer X-Ray Company, Berkeley Township, Ocean County, New Jersey. October 1992.
- 3) Agency for Toxic Substances and Disease Registry. Health Assessment for Denzer & Schafer X-Ray Company, Berkeley Township, Ocean County, New Jersey, August 3, 1990.
- 4) Agency for Toxic Substances and Disease Registry, Toxicological Profile for Benzene. Atlanta, Georgia: Agency for Toxic Substances and Disease Registry, April 1993.
- 5) Agency for Toxic Substances and Disease Registry, Toxicological Profile for Lead. Atlanta, Georgia: Agency for Toxic Substances and Disease Registry, April 1993.
- 6) Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for 1,1-Dichloroethene. Atlanta, Georgia: Agency for Toxic Substances and Disease Registry, October 1992.
- 7) Ingenito, Robert J. Memo from Ocean County Health Department to NJDOH. Potable well sampling results from 1981 through 1987. Denzer & Schafer X-Ray Company, Berkeley Township, Ocean County, New Jersey. June 10, 1994.

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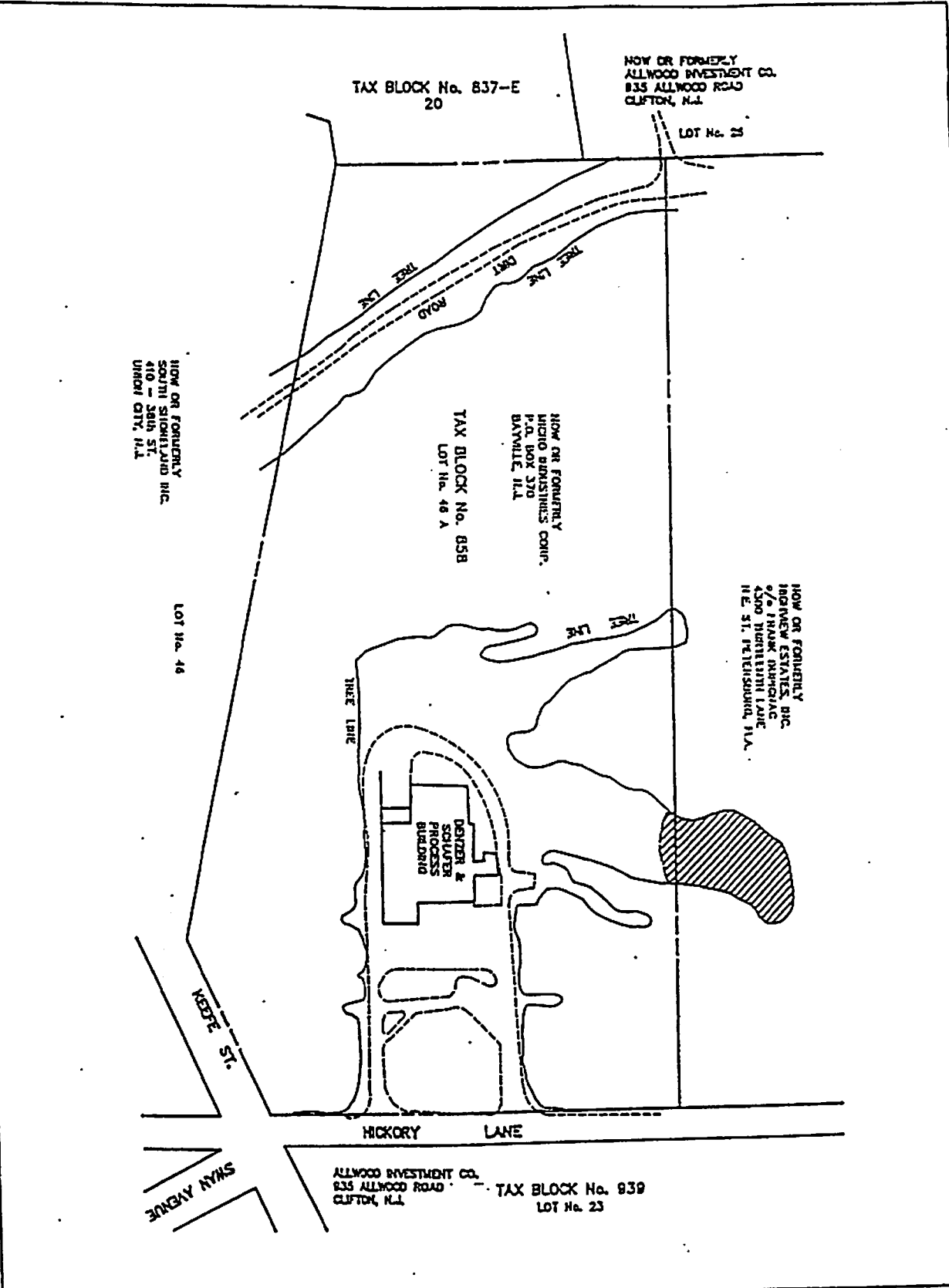
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APPENDICES



LEGEND

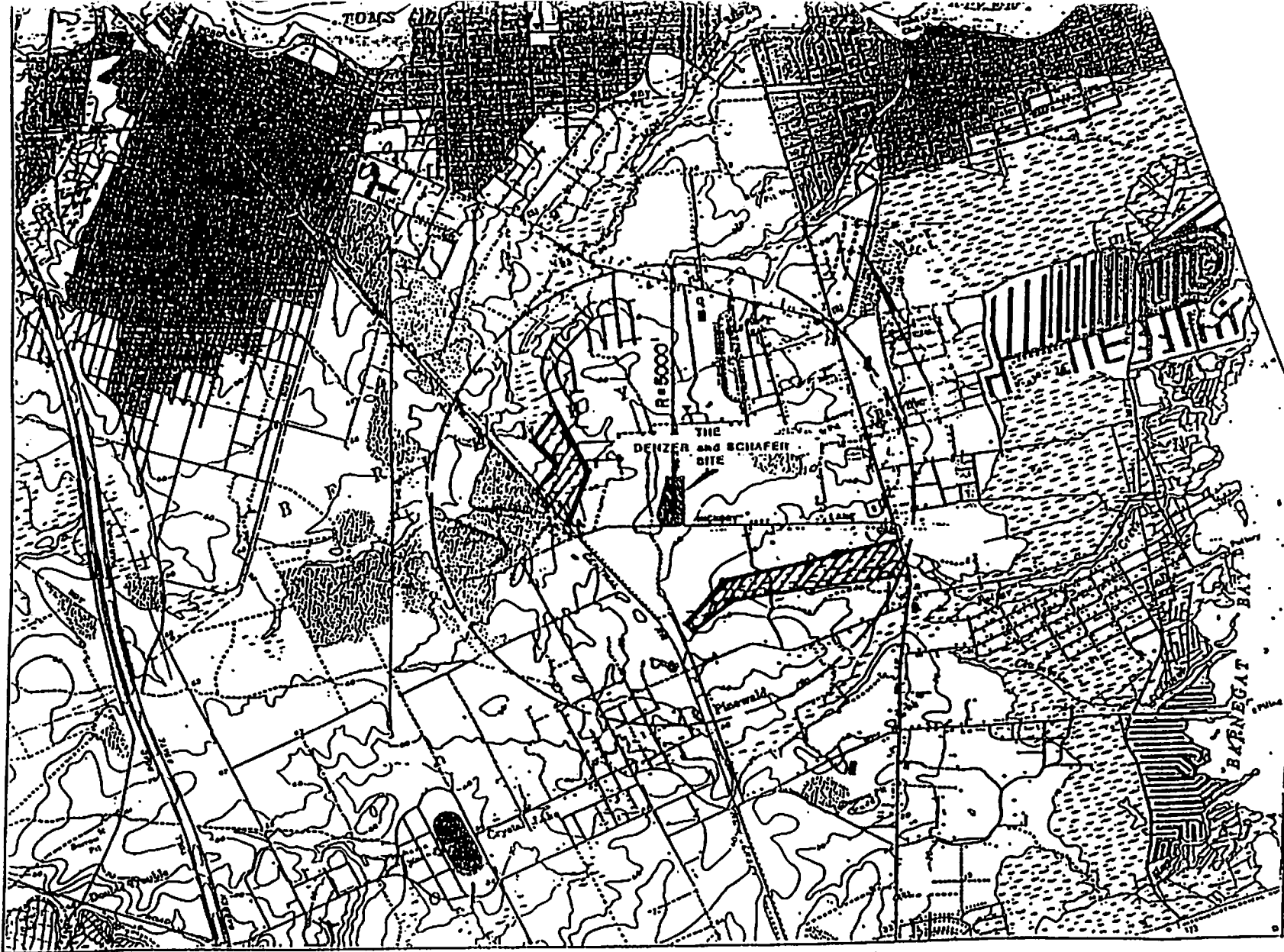
- PROPERTY BOUNDARY
- - - DIRT ROAD
- POTENTIAL WETLAND AREA

SCALE


0 50' 100'

FIGURE 1-1
 SITE MAP
 DEITZER & SCHAFER R/T'S INVESTIGATION

SAC ENVIRONMENTAL SERVICES GROUP
 Engineers, Managers, Scientists & Planners
 VALLEY FORGE, PA.



LEGEND

 100/500 YEAR FLOODPLAIN DESIGNATED BY FEMA

SOURCE: TOMS RIVER QUADRANGLE U.S.C. 7.5 MINUTE SERIES TOPOGRAPHIC PHOTO REVISED 1970 MAP

SCALE

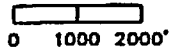



FIGURE 1-2
LOCATION MAP
DENZER & SCHAFER RI/FS INVESTIGATION

 **SMC MARTIN INC.**
Engineering & Geotechnical Consultants
VALLEY FORGE, PA.