

# Health Assessment for

ROCKY HILL MUNICIPAL WELLFIELD

ROCKY HILL, NEW JERSEY

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

DRAFT

## SUMMARY

The Rocky Hill Municipal Wellfield (RHMW) National Priorities List (NPL) site is located in Somerset County, New Jersey. The site is a strip of land approximately 2 acres in size. In 1979 samples from the RHMW wells were shown to be contaminated with high levels of trichloroethene (TCE) as well as other volatile organic compounds (VOC's). Presently, the municipal well which is still in operation (Well #2) is provided with an air stripping unit, installed in 1983. The Record of Decision (ROD) for the second operable unit (i.e., groundwater treatment), signed June 1988, selected a remedy that includes: extraction of groundwater from the surficial aquifer, provision of municipal water to the remaining private well users, sealing of abandoned private wells, and provision of a groundwater monitoring system. This remedy should be adequate to address exposure to groundwater contamination, however, exposure of area residents to airborne VOC's, volatilizing from contaminated soil or groundwater, is still a potential health concern at this site.

## BACKGROUND

### A. SITE DESCRIPTION

The RHMW NPL site is located on approximately 2 acres in Somerset County, New Jersey. The RHMW consists of two wells (Well #1 and Well #2) which were constructed in 1936. Well #1 was abandoned and sealed between 1976 and 1978. The Well #2 is screened in the unconfined water-bearing portion of the Brunswick Formation (red shale and mudstone bedrock), 278 feet below the surface of the site. There is a thin overburden of no more than 30 feet of unconsolidated sediments above the bedrock.

Immediately north of the site is another NPL site, Montgomery Township Housing Development (MTHD); see Appendix A. In 1978 samples from Well #2 were shown to be contaminated with 25 parts per billion (ppb) TCE. Monitoring of the domestic wells has continued on a periodic basis. A Health Assessment has been prepared for MTHD by ATSDR which contains all the health effects information pertaining to MTHD.

In 1984 the New Jersey Department of Environmental Protection (NJDEP) and the U.S. Environmental Protection Agency (EPA) signed a cooperative agreement enabling NJDEP to conduct the Remedial Investigation and Feasibility Study (RI/FS) on both sites. The RI initially identified 13 potentially responsible parties (PRP's). The major source has been identified as the property underlying Princeton Gamma-Tech, Inc. (Princeton Gamma-Tech).

During the investigation of Princeton Gamma-Tech, TCE was detected in the shallow groundwater below the Princeton Gamma-Tech facility at a maximum concentration of 5,900 ppb. TCE was also detected in elevated concentrations in the Princeton Gamma-Tech septic tank. A more recent sample from the septic tank indicated that the concentration of TCE had decreased. Soil samples were taken at various locations throughout the Princeton Gamma-Tech property, none of which indicated the presence of TCE. It was reported in the RI that a past discharge of TCE to the Princeton Gamma-Tech septic tank was the likely source of the TCE contamination. Further investigation of other PRP's will be conducted.

The ROD for the second operable unit, which was to determine the source of the contamination and evaluate alternatives for remediation of the groundwater, was signed June 30, 1988. Part of the selected remedy is extraction of groundwater from the primary plume, treatment of the extracted water through the use of air strippers, and injection of the treated water outside the area of the primary plume. The rest of the selected remedy includes: provision of municipal water to the remaining private well users (most users were connected to municipal water through their own action or through the action mandated by the ROD for the first operable unit regarding MTHD, signed September 1987), sealing of abandoned private wells, and provision of a groundwater monitoring system to monitor the raw water and the treated water several times annually.

## B. SITE VISIT

ATSDR has not made a site visit to date.

### ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

#### A. ON-SITE CONTAMINATION AND OFF-SITE CONTAMINATION

The primary plume is the area of the plume where the concentration of TCE is greater than 100 ppb. The secondary plume is the area of the plume that is less than 100 ppb (see Appendix B). The maximum concentration detected in the primary plume was 5,900 ppb. The range of concentrations detected in Well #2 from 1978 to 1983 (when the air stripper was installed) was 50 ppb to 200 ppb. Other volatiles such as 1,1-dichloroethane, trans-1,2-dichloroethene, and tetrachloroethene have been detected as well.

#### B. PHYSICAL HAZARDS

There do not appear to be any physical hazards present at this site.

### DEMOGRAPHICS OF POPULATION NEAR SITE

There are 77 homes located in the MTHD. The estimated population of people in 39 homes not yet supplied municipal water is 120, 6 of whom are under the age of 5, and 28 of whom are under the age of 17. These residences are to be connected to the Elizabethtown Water Company Distribution System in the fall of 1988. Well #2 supplies water to the residents of the Borough of Rocky Hill, population 970.

The area surrounding the site is wooded and predominately agricultural. There is also an industrial research center in the area as well as some commercial development, all of which appear to have private wells. One is within the threatened area, but when it was sampled, there was no contamination detected. The well is not currently used, however, it may be used in the future.

### EVALUATION

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

##### 1. Environmental Media

There has been some sampling of the Millstone River and Bedden Brook (see Appendix A for the location of the surface water bodies). Continued monitoring of the surface water bodies should be done during the design phase of the Remedial Action to verify whether or not contamination has reached either surface water body.

No air sampling was conducted on-site, nor was any recommendation made to monitor the exhaust from the air stripping units. If the stripper exhaust is not controlled as an EPA permitted emission, air monitoring is needed to insure that groundwater contamination does not develop into an air

contamination problem. If the air monitoring results should indicate that the concentrations of TCE or other VOC's are of concern, some form of air treatment will be needed for the air stripping units.

There may be a potential for the contaminants to volatilize from the groundwater into the soil-air and from the soil-air into basements or crawl spaces of the homes located in MTHD. Indoor air monitoring is necessary to determine if this is occurring.

## 2. Land Use and Demographics

The land use and demographic information provided to ATSDR was incomplete. Additional information about authorized and unauthorized activities occurring on-site, numbers of people involved, and potential exposures caused by the activities would be helpful in defining potential human exposure pathways. A detailed site map indicating the type of security at the site, land uses indicative of high risk subpopulations (e.g., schools, nurseries, etc.), population distribution by age, sex, ethnic background, and socioeconomic status, current land use (e.g., locations of commercial activities or others currently operating on-site, etc.), nearby residential population, and site boundaries would also be very helpful.

## 3. Quality Assurance/Quality Control

Conclusions contained in this Health Assessment are based on the information received by ATSDR. The accuracy of these conclusions is determined by the availability and reliability of the data.

### B. ENVIRONMENTAL PATHWAYS

The Brunswick Formation is composed of fractured bedrock covered with up to 30 feet of unconsolidated sediments. Within the Brunswick Formation the aquifer exists in two levels, a shallow unconfined aquifer located in the weathered top of the formation (consisting of clay and rock fragments) and a deeper semi-confined aquifer located in the fractured bedrock. The shallow aquifer flow is a subdued reflection of the topography of the area, discharging into nearby surface water features (see Appendix C). The deeper aquifer flows northeast and is controlled by vertical fractures. There is movement between the aquifers because of differences in pressure and fractures in the bedrock that connect them. This movement is limited and discontinuous in a downward direction from the shallow aquifer to the deeper aquifer.

Groundwater is the medium in which the contamination has been detected and is, therefore, the primary environmental pathway of concern. TCE is slightly water soluble and is quite stable in groundwater for several months to years (EPA, 1987). The plume has been defined as roughly 4,000 feet wide and 2,000 feet long. There is a leg on the west end of the plume that extends south (see Appendix B) which is approximately 1,500 feet wide and 2,000 feet long. It is projected that the plume could expand to the north and the east in the future. The water from Well #2 has been treated by air stripping since 1983. This air stripping is planned to continue. The treated water is routinely monitored by either the State or local authorities. The extraction, treatment, and

reinjection of the contaminated groundwater should prevent the plume from expanding and should greatly reduce the concentration of the contamination. The monitoring program planned should confirm that this does occur.

The soil, surface water, and sediment sampling done with regard to this site has revealed no contamination of concern. Further investigation of potential sources may reveal that additional sampling of these media is warranted.

There has been no ambient air or indoor-air sampling conducted at this site. Since the primary contaminants of concern are TCE and other VOC's, and since the selected remedy includes air stripping, transport of contaminants through the air is certainly a possibility.

#### C. HUMAN EXPOSURE PATHWAYS

Since the contaminated groundwater is treated before it is distributed to the residents of the Rocky Hill Borough, the potential for human exposure to contaminated groundwater has been removed. However, since there has been no air monitoring done, there is a potential for inhalation exposure to TCE and other VOC's on-site and off-site.

#### PUBLIC HEALTH IMPLICATIONS

Inhaled TCE can adversely effect the central nervous system (CNS). CNS effects for humans have been detected in a range from 81 parts per million (ppm) to 110 ppm (Nomiya and Nomiya 1977, Salvini et al., 1971). Hepatic and renal toxicity can occur in humans as a result of acute exposure to TCE. Based on liver tumor production in mice, EPA has designated TCE as a potential human carcinogen. Although these levels are considerably higher than those expected for this site, since air monitoring results are not available and exposure concentrations at this site are unknown, the public health implications of such exposure cannot be accurately assessed at this time.

There is also potential public health concern for individuals exposed to VOC's other than TCE at this site through inhalation of contaminated air. Some of these VOC's may cause depression of the CNS at high concentrations. Also, some VOC's cause liver and kidney toxicity as well as damage to the pulmonary and hematopoietic systems. In addition, there is evidence that some VOC's are carcinogenic in laboratory animals.

#### CONCLUSIONS AND RECOMMENDATIONS

##### A. CONCLUSIONS

This site is of potential health concern because of the risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects. As noted in the Environmental Pathways and Human Exposure Pathways Sections above, human exposure to contamination present in the air or groundwater may have occurred in the past or may be occurring now. The actions implemented as

a result of the ROD should adequately remove the potential for further exposure to contamination from the groundwater, but it may not prevent exposure to contaminated air.

#### B. RECOMMENDATIONS

1. Indoor air samples should be taken to determine if contaminants are off-gassing into area residences from contaminated groundwater.
2. Continued surface water and sediment samples should be taken in Bedden Brook and Millstone River to determine whether any contamination reaches either of the surface water bodies before the planned remedial actions take effect.
3. The information requested in the Data Needs and Evaluation Section of this Health Assessment should be provided to ATSDR.
4. In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act as amended, RHMW has been evaluated for appropriate follow-up with respect to health effects studies. Although there are indications that human exposure to on-site and off-site contaminants may have occurred in the past, this site is not being considered for follow-up health studies at this time because no current pathway of exposure can be defined and no test is available to evaluate past exposure.

#### PREPARERS OF REPORT

Environmental Reviewer: Susan L. Mueller, Environmental Health Specialist, Health Sciences Branch.

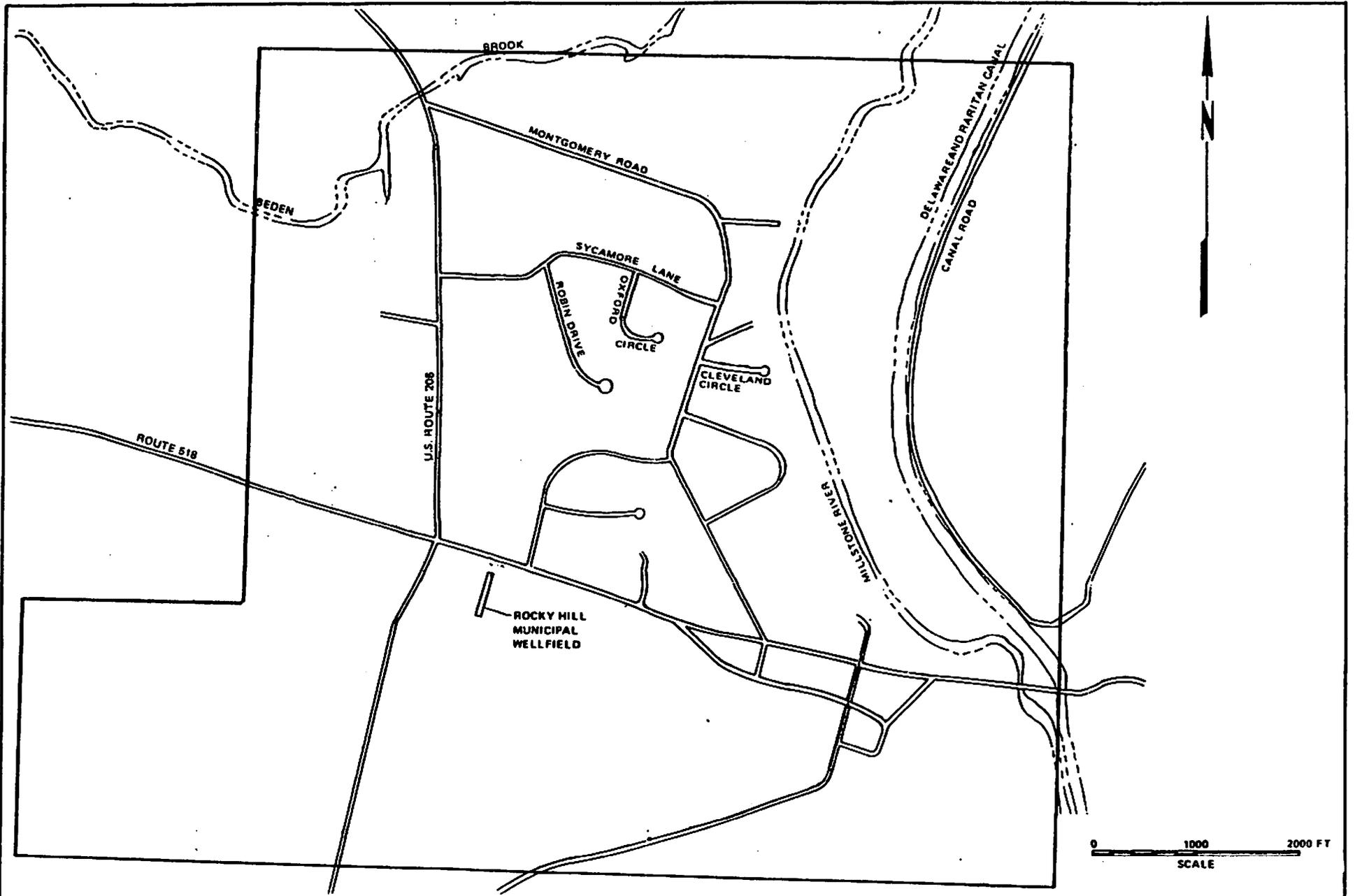
Regional Representative: Denise Johnson, ATSDR Regional Representative, Region II.

## REFERENCES

1. Remedial Investigation/Feasibility Study for Montgomery Township Housing Development/Rocky Hill Municipal Wellfield Site, Volumes I and II, Woodward-Clyde Consultants, January 1988.
2. Remedial Investigation/Feasibility Study for Montgomery Township Housing Development/Rocky Hill Municipal Wellfield Site, Volumes I and II, Woodward-Clyde Consultants, June 1987.
3. Record of Decision, Rocky Hill Municipal Wellfield, June 1988.
4. Casarett and Doull's Toxicology, The Basic Science of Poisons, Ed. 3, Curtis D. Klaassen, Ph.D. et al., Macmillan Publishing Company, New York, 1986.
5. Nomiyama K., Nomiyama H. 1977. Dose-response relationship for trichloroethylene in man. Int Arch Occup Environ Health; 39:237-248.
6. Salvini M., Binaschi S., Riva M. 1971. Evaluation of the psychophysiological functions in humans exposed to trichloroethylene. Br J Ind Med; 28:293-295.

**APPENDICES**

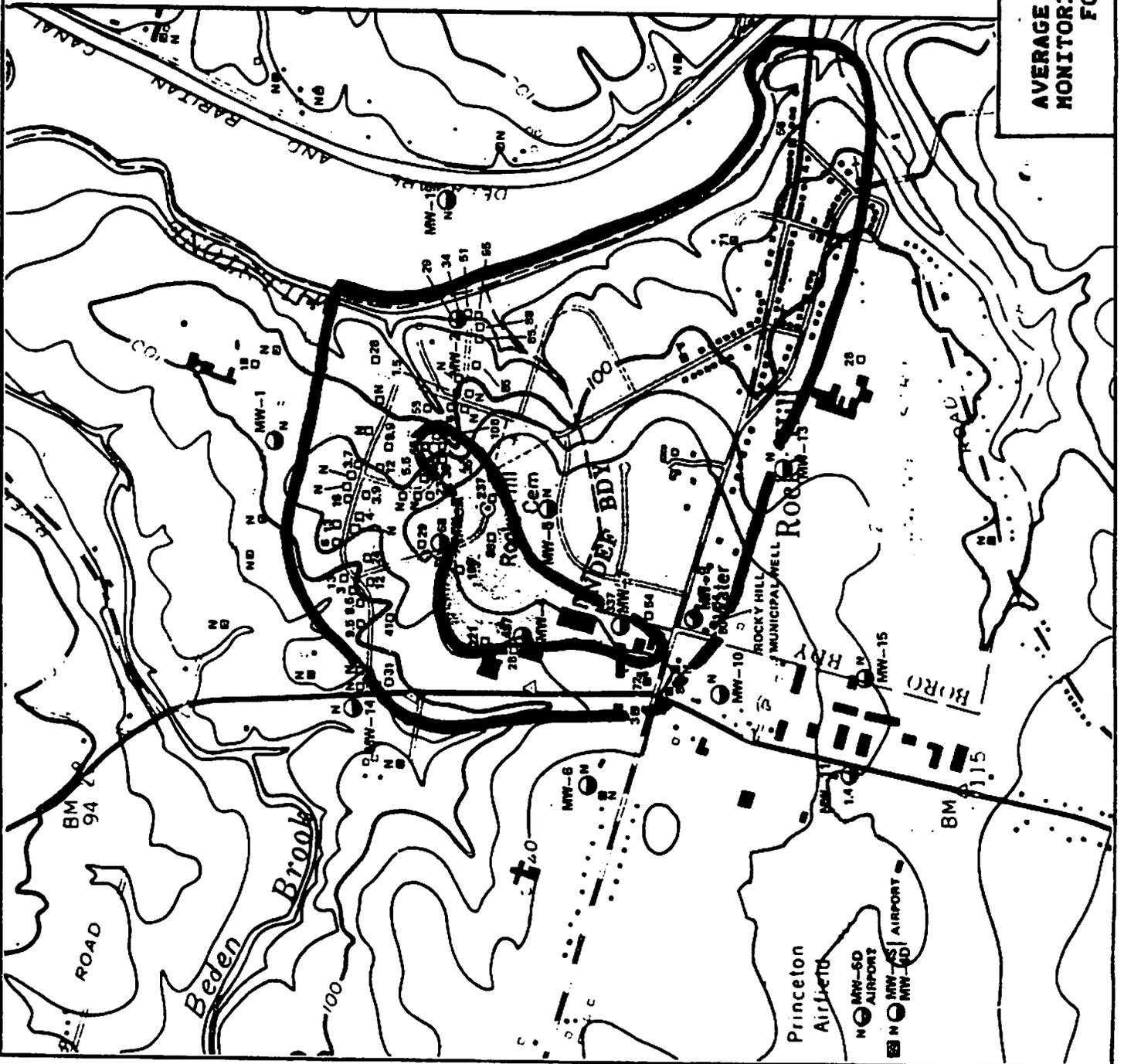
Appendix A



**FIGURE 1**  
**STUDY AREA FOR MONTGOMERY TOWNSHIP**  
**HOUSING DEVELOPMENT AND ROCKY HILL**  
**MUNICIPAL WELLFIELD SITES**

SOURCE: MTHD/RHMW RI/FS

**Appendix B**



**LEGEND**

● MW-6  
○ MW-8  
○ MW-10  
○ MW-12  
○ MW-14  
○ MW-15

AVERAGE TCE CONCENTRATION 1978-1987

N NOT DETECTED  
 3-99 ug/l  
 ≥ 100 ug/l

**NOTES:**

1. TCE CONCENTRATIONS ARE MEAN AVERAGES OF ALL DATA (1978-1987) FOR DOMESTIC, COMMERCIAL WATER SUPPLY, AND DEEP MONITORING WELLS.
2. DETECTION LIMITS FOR HISTORICAL ANALYSES VARIED BETWEEN 1 AND 5 UG/L.
3. THE CONCENTRATION FIELDS ARE SHOWN ONLY TO AID IN THE VISUALIZATION OF THE DISTRIBUTION OF TCE ACROSS THE SITE. THE CONCENTRATION FIELDS ARE INTENDED TO ILLUSTRATE AREAS WHERE IT IS PROBABLE THAT GROUND WATER OF THE INDICATED TCE CONCENTRATION RANGE MAY BE ENCOUNTERED AT THE PRESENT TIME.
4. ALTHOUGH THIS PLUME IS BASED ON ALL HISTORICAL DATA, IT IS CONSISTENT WITH THE MOST RECENT (1987) ANALYTICAL DATA.

**SOURCE:**

USGS MAP 7.5 MINUTE SERIES,  
 ROCKY HILL QUADRANGLE,  
 NEW JERSEY, DATED 1970.



**FIGURE 7**  
**AVERAGE TCE CONCENTRATIONS IN DEEP MONITORING WELLS AND POTABLE WELLS FOR RHNW/MTHD SITES**

Appendix C

