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Superfund Record of Decision:

Rocky Hill, NJ

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First Remedial Action - Final

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16. Abstract (Limit: 200 words)

The 2-acre Rocky Hill Municipal Well Field site (RHMW) is located in Montgomery Township, Somerset County, New Jersey. Montgomery Township Housing Development (MTHD), located north of the well field contains 77 private homes. RHMW is listed on both the State and National Registers of Historic Places. Additionally, a nearby corridor has a potential for archaeological significance. Two wells, numbered 1 and 2, were constructed in 1936 to provide a source of potable water to the Borough of Rocky Hill (BRH). A 1978 Rutgers University study revealed TCE contamination levels in Well 1, and it was abandoned and sealed by 1978. Further testing, conducted between 1978 and 1983 revealed cycles of elevated levels of TCE in Well 2. It was closed in November 1979. Declining levels of TCE in the well field resulted in the reopening of the well; however, levels increased and the well was again closed in January of 1982. During the shutdown of Well 2, BRH obtained potable water from the privately-owned Elizabethtown Water Company. After the installation of two air stripping units by the borough, Well 2 reopened as a potable water source. Recently, 38 MTHD residents elected to connect to the municipal supply. The first operable unit ROD, signed in September 1987, provided for the supply of alternate water through the permanent hookup of all remaining MTHD residences and 6 residences outside of MTHD. Approximately 13 possible
(See Attached Sheet)

17. Document Analysis a. Descriptors
Record of Decision
Rocky Hill, NJ
First Remedial Action - Final
Contaminated Media: gw
Key Contaminants: metals, TCE

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement

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EPA/ROD/R02-88/061
Rocky Hill, NJ
First Remedial Action - Final

16. ABSTRACT (continued)

sources of contamination are under evaluation. TCE is the most predominant site contaminant, both with respect to concentration and areal extent. Several additional components such as chlordane and metals are sporadically present; however, these compounds were not considered to be related to the TCE contamination.

The selected remedial action for this site includes: ground water pump and treatment using air stripping with reinjection; connection of any remaining affected residences to the public water supply; sealing remaining private water supply and monitoring wells within the contamination plume; and implementation of ground water sampling program to monitor the effectiveness of the cleanup. The estimated capital cost for this remedial action is $1,618,000 with annual O&M of $84,000.

DECLARATION STATEMENT

RECORD OF DECISION

Rocky Hill Municipal Wellfield

SITE NAME AND LOCATION

Rocky Hill Municipal Wellfield, Montgomery Township, Somerset County, New Jersey.

STATEMENT OF PURPOSE

This decision document presents the selected remedial action for the Rocky Hill Municipal Wellfield site, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent applicable, the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300.

Rocky Hill Municipal Wellfield and Montgomery Township Housing Development are two Superfund sites in southern Somerset County. Because of the close proximity of the sites, and the similarity of the contaminants present, both sites were addressed in a single remedial investigation and feasibility study. Similarly, the attached Decision Summary and Responsiveness Summary cover both sites.

STATEMENT OF BASIS

I am basing my decision primarily on the following documents, which are contained in the administrative record, and that characterize the nature and extent of contamination and evaluate remedial alternatives for the Rocky Hill Municipal Wellfield site:

- Operable Unit Remedial Investigation Report, Montgomery Township Housing Development, prepared by Woodward-Clyde Consultants, July 1987;

- Operable Unit Feasibility Study Report, Montgomery Township Housing Development, prepared by Woodward-Clyde Consultants, July 1987;

- Record of Decision (for first operable unit), Montgomery Township Housing Development, September 1987;

- Remedial Investigation Report, Montgomery Township Housing Development and Rocky Hill Municipal Wellfield, prepared by Woodward-Clyde Consultants, April 1988;

- Feasibility Study Report, Montgomery Township Housing Development and Rocky Hill Municipal Wellfield, prepared by Woodward-Clyde Consultants, April 1988;

- Proposed Remedial Action Plan, Montgomery Township Housing Development and Rocky Hill Municipal Wellfield, May 1988;

- The attached Decision Summary for the Montgomery Township Housing Development and Rocky Hill Municipal Wellfield sites;

- The attached Responsiveness Summary for the sites, which incorporates public comments received; and

- Staff summaries and recommendations.

DESCRIPTION OF SELECTED REMEDY

The remedial alternative presented in this document represents a final remedial solution for the Montgomery Township Housing Development site. It addresses ground water contamination in the underlying aquifer. A previous Record of Decision, signed in September 1987, provided for the connection of residences with impacted or threatened wells to a public water supply and the sealing of those private wells.

The specific components of the remedial action are as follows:

- Extraction of contaminated ground water from the primary source area followed by on-site treatment and reinjection of the treated water back into the underlying aquifer. The ground water will be treated to achieve federal and state cleanup standards;

- Connecting any remaining affected residences to the public water supply;

- Sealing of remaining private water supply and monitoring wells within the contaminant plume; and

- Implementation of a ground water sampling program to monitor the effectiveness of the cleanup.

DECLARATIONS

Consistent with the Comprehensive Environmental Response, Compensation and Liability Act, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300, I have determined that the selected remedy is protective of human health and the environment, attains federal and state requirements that are applicable or relevant and appropriate for this action, and is cost-effective.

Furthermore, this remedy satisfies the preference for treatment that reduces the toxicity, mobility or volume as a principal element. Finally, I have determined that this remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable.

The State of New Jersey has been consulted and agrees with the selected remedy for the Montgomery Township Housing Development site.

June 30, 1988
Date

Christopher J. Daggett
Regional Administrator

Decision Summary

Montgomery Township Housing Development Site
Rocky Hill Municipal Wellfield Site

SITE LOCATION AND DESCRIPTION

The Montgomery Township Housing Development (MTHD) and Rocky Hill Municipal Wellfield (RHMW) sites are located in Somerset County, New Jersey, in the vicinity of the intersection of U.S. Route 206 and N.J. Route 518. The MTHD includes approximately 72 acres located east of Route 206 and north of Route 518. The development and surrounding area include 77 private homes. The RHMW is a 2 acre tract of land in the Borough of Rocky Hill, which services the residents of Rocky Hill. The RHMW is located east of Route 206, south of Route 518, and south of the MTHD. Figure 1 shows the study area.

Properties along Montgomery Road, the northern border of the MTHD site, are wooded, residential or agricultural lots. To the southwest are two shopping centers and an office center. To the south is a residential area of Rocky Hill. The homes on the end of Cleveland Circle within MTHD are bordered to the east by the Millstone River, which parallels the Delaware and Raritan Canal.

The MTHD/RHMW sites lie within the Piedmont Physiographic Province and are underlain by bedrock of the Brunswick Formation covered with a relatively thin veneer of unconsolidated sediments (up to about 30 feet thick). Regionally, the Brunswick Formation primarily consists of varying thicknesses of red shale and mudstone, and is the principle aquifer in the area. Ground water exists in a number of water-bearing zones which are generally under unconfined to semi-confined conditions. Intersecting vertical and horizontal fractures have resulted from jointing and provide the principal means of storage and movement of ground water in the formation.

Drinking water for the MTHD is supplied by private residential wells and by the privately-owned Elizabethtown Water Company. Thirty-eight of the 71 residences of MTHD are currently connected to Elizabethtown's system. The remaining 33 residences of MTHD and 6 residences outside of MTHD continue to use private wells but will be connected pursuant to the Record of Decision signed for the MTHD site in September 1987. Individual septic tanks are used to dispose of wastewater. The residential wells in the affected area are at an average depth of 125 feet.

The RHMW which supplies public water to the Borough of Rocky Hill extends to a depth of 278 ft. An air stripping treatment unit on the well was installed by the Borough in 1983 as a response to the presence of contamination, and consists of two cylindrical towers operating in series with a capacity of 250 gallons per minute.

The RHMW is located in the Rocky Hill Historic District and is listed on both the State and National Register of Historic Places. The corridor adjacent to the Millstone River has a potential for archaeological

significance, according to the State Historic Preservation Officer.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Maps indicate that until 1961, the MTHD site was used for farming. Construction of the homes began in 1961 and the area was divided into 71 lots with private wells and septic tanks.

RHMW wells numbered 1 and 2 were constructed in 1936. These two wells provided a source of potable water to the Borough of Rocky Hill. Well number 1 was abandoned and sealed between 1976 and 1978. In 1978, a study by Rutgers University on the RHMW revealed trichloroethene (TCE) contamination levels of about 25 parts per billion (ppb). Continued testing of this well by Rocky Hill from 1978 to 1983 indicated that the TCE concentration ranged from about 50 ppb to 200 ppb. Due to the elevated levels of TCE in the water, well number 2 was closed in November 1979. Levels of TCE in the well water eventually declined, and the well was subsequently reopened. Levels of TCE, however, increased, and the well was closed for a second time in January 1982. During the shutdown of well number 2, the Borough of Rocky Hill obtained potable water from Elizabethtown Water Company. After the installation of two air stripping units by the borough for well number 2, the well reopened as a potable source of water in July 1983.

Concern over the ground water contamination in Rocky Hill spurred the initial sampling of commercial and domestic wells in Montgomery Township from December 1979 to January 1980. Figure 2 shows the results of potable well samples prior to the initiation of the remedial investigation and feasibility study (RI/FS) for the MTHD site. Data shown are averages of TCE concentrations found in domestic wells between 1979 and 1985. Residences at the ends of Robin Drive, Oxford Circle and Cleveland Circle were found to have the highest TCE concentrations whereas lower TCE concentrations were found in wells along Sycamore Lane. TCE was not detected in any domestic wells proximate to the northern portion of Montgomery Road. The historical results were insufficient to adequately delineate a plume of contaminated ground water.

In March 1981, Elizabethtown Water Company water lines were installed in MTHD, and residents were advised not to use well water. Twenty homes initially elected to connect to the municipal supply. At the present time, 38 residences have hooked up. In January 1986, the New Jersey Department of Environmental Protection (NJDEP), Division of Water Resources placed a restriction on future well drilling for water supply wells in the area. In September 1987, an operable unit Record of Decision (ROD) was signed by the United States Environmental Protection Agency (USEPA), with the concurrence of NJDEP. The September 1987 ROD provided for the supply of alternate water through the permanent hookup of all MTHD residences and 6 residences outside of MTHD to the available public water supply system.

Field investigative activities were initiated by NJDEP and USEPA to identify the source(s) of contamination for both sites. Soil borings, septic samples, site inspections, and continued ground water monitoring have been used to identify 13 possible sources of contamination. Figure 3 shows these facilities. At the present time, investigatory measures are

incomplete. Requests for information are being sent to current owners, past owners, and past tenants. No notice letters have been sent to potentially responsible parties; and determination of enforcement actions, if any, will be made upon review of all relevant information.

COMMUNITY RELATIONS

Community Relations activities for the MTHD/RHMW sites were initiated by the NJDEP in 198- with the development of a Community Relations Plan.

An initial public meeting was held in January 1986 to present NJDEP's plans for the RI/FS for the MTHD/RHMW sites.

In September 1987, a ROD was issued in which the USEPA and NJDEP agreed to provide connections to an available public water supply. Public participation was solicited as part of this ROD's development through a public notice, public meeting, and public comment process similar to the one discussed below.

On April 25, 1988 the completed draft RI/FS and the Proposed Remedial Action Plan (PRAP) addressing the overall ground water problem were made available for public review and comment at five public information repositories. The PRAP defines NJDEP's and USEPA's preferred remedial alternative for the sites. Notices regarding the PRAP, public meeting and public comment period were sent to all contacts identified in the Community Relations Plan and to the news media. The 30-day public comment period was extended through May 31, 1988 at the request of a commentor.

A public meeting was held in May 1988 to discuss the results of the RI/FS and the PRAP for the MTHD/RHMW sites.

The primary concerns of the affected residents involve the location of equipment and possible associated air and noise pollution. The owners of one property, identified as a primary source of the contamination, expressed concern regarding the necessity of remediating the aquifer, and proposed that natural attenuation be relied upon for the entire remediation. A Responsiveness Summary, which addresses the comments and questions raised, is attached to this ROD.

The officials from Montgomery Township and the Borough of Rocky Hill have requested continued involvement through the design and construction. This interest is based on their concerns about equipment placement, noise, and air emissions. NJDEP noted that continued updates would be provided.

SCOPE AND ROLE OF OPERABLE UNIT

This ROD addresses the second of two planned operable units for the sites. The first operable unit addressed the provision of an alternate water supply to MTHD residents. A water connection and well sealing program is currently being implemented as identified in the ROD signed in September 1987.

The second operable unit RI/FS addresses identification of the source(s) of contamination, determination of the nature and extent of

contamination, and evaluation of alternatives for the remediation of ground water. Upon completion of this operable unit the concentrations of the site contaminants are expected to be significantly reduced, such that they comply with all applicable or relevant and appropriate requirements (ARARs) as required by Section 121 of the Superfund Amendments and Reauthorization Act (SARA), and no longer pose a threat to the public or the environment. Therefore, no further operable units are anticipated.

SITE CHARACTERISTICS

In 1984, the NJDEP entered into two Cooperative Agreements with the USEPA under which it would perform the RI/FSs for the MTHD and the RHMW sites. Because of the proximity of the two sites and the similarity of contaminants found, a single RI/FS for the two sites was performed under one professional contract.

Investigative activities under this project were developed to identify possible sources of contamination in an attempt to eliminate continued discharges, and to determine the nature and extent of the ground water contamination. These activities included a file search; ground water flow studies; along with ground water, septic tank, surface water, sediment, and soil boring sampling. In addition to information collected directly under this program, results from other sources (such as RHMW water analysis and site investigations conducted outside this program) provided information.

Once the ground water data were compiled under this program, the feasibility of supplying several alternative drinking water sources was evaluated in an Interim RI/FS Report in July 1987. The associated risk assessment indicated that many of those residents using their private wells as a water supply were being exposed to increased health risks, and in September 1987, the USEPA issued the previously mentioned ROD with the concurrence of NJDEP.

The Brunswick Formation in this area was observed to strike N40^{o} to N50^{o}E and dip gently to the NW about 10 to 15^{o}. Most of the fractures in the bedrock were not bedding plane joints, but rather sets of near vertical fractures at an acute angle to the bedding. The predominant trend of fractures was found to average N60^{o}E. Nevertheless, the geophysical survey also identified some near-horizontal fracture zones, which may be associated with the bedding planes.

Nearly all of the porosity in the Brunswick Formation occurs in the fractures. Although the distribution of fractures decreases with depth in the Brunswick Formation, site data suggests that water-bearing zones persist to a depth of at least 500 ft. The slug test data suggests that locally, most of the fractures intercepted by an individual well are limited in extent with respect to their ability to transmit water. However, more extensive water-bearing fractures which persist laterally in excess of 1,500 ft. are evidenced by the results of the pumping test.

Depth to ground water in the shallow wells (screened in the weathered top of bedrock) was found to range from approximately 5 to 54 ft. below ground surface. Deeper wells (to depths of 100 to 250 ft.) uniformly exhibited lower piezometric heads than the paired shallow well, indicating a

potential for downward vertical flow of ground water.

Contours of ground water elevations and piezometric head appear concordant with the topographic contours in the MTHD. That is, the ground water table is a subdued expression of the land surface. Static ground-water flow in both shallow and deep aquifers appears to be toward the Millstone River (eastern region) and Beden Brook (western and northern regions). The shallow aquifer intersects and discharges to the Millstone River and Beden Brook and to several small streams which are tributaries of the Millstone River and Beden Brook. Figures 4, 5 and 6 present the ground water contours for the shallow ground water, deep ground water under static conditions, and deep ground water during the pumping test, respectively.

Although the potential for downward vertical flow exists, hydrologic and geochemical evidence suggests that zones of high vertical permeability may be discontinuous and limited in extent. This is exemplified by the fact that the RHMW pump test caused drawdowns in the deep wells, but none of the shallow wells appeared to be affected during the period of pumping.

On 19 occasions between November 1979 and July 1987, ground water samples were collected and analyzed for either volatile organics or for TCE only. The ground water samples collected during the RI in 1986 were also analyzed for other organics and inorganics. Table 1 lists the contaminants detected in the ground water during the RI sampling events. This table presents the maximum and mean concentrations of compounds which were detected.

The RI ground water results are further summarized in Table 2 by comparing the results for the indicator chemicals identified in the risk assessment with the remedial response objectives (see the "Description of Alternatives" section of this ROD and Table 3 for the discussion of the response objectives). This comparison presents two significant issues. The first item to note is that TCE is the most predominant site contaminant, both with respect to concentration and areal extent.

The second item noted from Table 2 is that several compounds are only sporadically present. Chlordane, for example, was present only in 2 samples out of 86. Examination of the locations of these findings found no relationship to the TCE contamination, nor was any other evidence of a separate plume of chlordane found. Similar findings were noted for arsenic, barium, beryllium, chromium, lead, nickel, and silver. These compounds were not considered to be related to the TCE contamination, and were not considered when the effectiveness of remedial alternatives were evaluated. 1,1-dichloroethene was found in only one sample, but the coincidental presence of significant levels of other compounds related to the plume (eg: TCE) prevented the elimination of this compound from consideration.

Results of these sampling programs have revealed that a plume of TCE contamination roughly extends from Route 206 east to the Millstone River north to Sycamore Lane and south to Route 518. Concentrations of TCE within the plume range from below the detection limit, 5 ppb, to 650 ppb in monitoring wells. A TCE concentration as high as 950 ppb was detected in a domestic well on Robin Drive on one occasion in 1982, prior to the RI/FS. Figure 7 shows the areal extent of the contaminant plume by graphically

depicting the distribution of TCE.

Neither the surface water nor the sediment samples from the Millstone River or Beden Brook identified the presence of contamination. The septic tank sampling found some compounds in low concentration but TCE was not detected.

The following compounds were present in the soils in excess of the NJDEP action levels; xylenes, PCBs, arsenic, copper, and mercury. Xylenes, PCBs, arsenic, and copper were identified at the location of 1377 Route 206. This contamination is currently being addressed as part of other NJDEP actions (Administrative Order with property owners), and will not be addressed as part of this remedial action. Mercury was identified in a septic field boring in concentrations only slightly above the action level (3.7 parts per million (ppm) vs. 1 ppm), and at a depth of 16 feet. Mercury was not identified in the ground water. Due to the low concentration and depth of this compound, it will not be addressed in the remedial action alternatives. None of the compounds found to be of concern in the ground water were identified in excess of action levels in the soils. Identified soil contamination is therefore not a concern for the MTHD/RHMW sites because links to ground water contamination have not been made, and the presence of those compounds is being addressed further by appropriate NJDEP programs. If any additional sampling identifies other contaminated areas, those areas would have to be addressed accordingly.

An investigation at the Princeton Gamma Tech property located on Route 518 was conducted under NJDEP's Environmental Cleanup Responsibility Act program (ECRA). ECRA is designed to resolve environmental problems prior to the sale or closure of certain industrial properties. The investigation found TCE in the shallow ground water beneath the Princeton Gamma Tech property at concentrations of 5,000 ppb. This information combined with findings of shallow TCE contamination in an onsite RI/FS well, and the property location with respect to the upgradient edge of the ground water plume led to the conclusion that this property was a primary source of TCE contamination in the area.

While an earlier septic tank sample at this property identified the presence of TCE, a recent sample found only residual TCE in the septic tank. The RI reported results for 28 soil samples at the property, none of which showed TCE contamination. The property owner is currently involved in independent soil sampling activities under the guidance of NJDEP. The above information indicates the likelihood that some past discharge was the source of contamination presently found in the shallow ground water.

As indicated above, TCE is currently detected in the ground water. No TCE has been found in any surface water samples. Thus, the major transport of TCE is via ground water. The direction of ground water flow is generally to the northeast in the eastern part of the MTHD/RHMW sites and to the northwest in the northwestern part of the sites (See Figures 4, 5).

The primary impact of the TCE contamination is on the quality and potential use of the ground water. In addition, ground water discharge to the Millstone River is likely; however, as previously noted TCE has not yet been detected in surface water samples.

SUMMARY OF SITE RISKS

A public health assessment was conducted for the sites in accordance with the Superfund Public Health Evaluation Manual (1986). Since the site characterization noted that soils and surface waters are not currently being impacted by the site related contamination present in the ground water, exposure to soils and surface waters was not included in the health assessment of the MTHD/RHMW sites. Thus, the risk assessment only considered exposure to contaminated ground waters.

A comparison of calculated total dose levels for indicator chemicals with reference dose levels (RfD) and acceptable daily intake levels (ADI) shows that the estimated maximum dose exceeds the cited threshold level in seven of the eleven cases of total adult dose levels investigated, and eleven of the eleven child dose levels calculated. This indicates that exposure to contaminants at the maximum concentration detected, over a lifetime, may lead to noncarcinogenic adverse health effects. The hazard index from an adult exposure to plume contamination is 13.21 and 175.07, for mean and maximum exposures respectively. The background hazard index is 0.60 for mean dose and 4.03 for maximum doses of indicator chemicals. A hazard index in excess of 1.0 is indicative of the presence of a noncarcinogenic health concerns.

Dose calculations for the MTHD/RHMW sites indicate that the largest estimated dose for organic compounds occurs from inhalation (caused by volatilization of compounds from ground water used for cooking or showering), followed by ingestion and dermal adsorption. All of the increased lifetime cancer risks associated with exposure to organics and metals in the ground water are larger than one in one hundred thousand (1×10^{-5}). The total upper bound risk level is between four in one hundred and six in ten (4.14×10^{-2} to 5.47×10^{-1}). Increased lifetime cancer risks from exposure to background levels of indicator chemicals at the sites are a maximum of two in one thousand (2.52×10^{-3}).

The data collected for the RI indicates that many of the compounds used in estimating the risk were sporadically detected, and are not site related (inorganics and chlordane). Negating these compounds inclusion when estimating the risks of the sites, the increased lifetime cancer risk ranges from a mean of eight in ten thousand (8.6×10^{-4}) to a maximum of seven in one thousand (7.0×10^{-3}), as compared to a maximum background risk of four in one million (3.8×10^{-6}).

DOCUMENTATION OF SIGNIFICANT CHANGES

The PRAP presented the preferred remedy illustrated in the following excerpt:

> "NJDEP and USEPA recommend that an aquifer treatment system consisting of pumping at the source area, air stripping units and upgradient reinjection be selected as the most appropriate site remedy (Alternative 7 with consideration to combine some air strippers as discussed in Alternative 5B). This system would protect public health and the environment in the most cost effective and implementable fashion, and best meet all applicable

TABLE 3, SHEET 1 OF 3

CRITERIA REVIEWED FOR GROUND WATER REMEDIAL OBJECTIVES

Substances	NJ MCL (A-280) (ug/l)(b)	MCL(c) (ug/l)	NJ GW Quality Standards (ug/l)(t)	MCLG(d) (ug/l)	Health Advisories (ug/l)(e)	NJ Interim Groundwater Clean-up Guidance (ug/l)(u)	Reference Levels for Carcinogens (ug/l)(f)	Site-Specific ARAR (ug/l)(g)	Site-Specific Goal to be Considered (ug/l)(h)	S S, Obje (ug/
Acetone						-				
2,3 Benzofuran										
Bis(2-ethylhexyl)phthalate(r)							51		51	
Bromodichloromethane(THM)		100(m)				(v)		100		
N-Butylbenzene										
Carbon Tetrachloride	2	5(y)		0	0.3(q)	5(v)	0.27	2	0	
Chlordane	0.5			0(p)	0.0218(q)	-	0.022	0.5	0	
Chloroform		100(m)				5(v)	0.43	100	0.43	
Cyclopropylbenzene										
O-Dichlorobenzene	600			620(p)	3,125	-		600	600	6
1,1 Dichloroethane						(v)			(v)	(
1,2 Dichloroethane	2	5(y)		0	0.95(q)	5(v)	0.38	2	0	
1,1-Dichloroethene(-ethylene)	2	7(y)		7	0.24(q)	5(v)	0.06	2	0.06	
Trans-1,2-Dichloroethene(-ethylene)	10			70(p)	350	(v)		10	10	
Diethylphthalate						-				
Di-n-butylphthlate										
Ethylbenzene				680(p)	680				680	6
Methylene Chloride	2				5(q)	5(v)		2	2	
N-Nitrosodiphenylamine										
Phenol			3,500						3,500	3,5
Tetrachloroethene	1			(1)	0.7(q)	5(v)	0.69	1	0.69	
1,2,4-trichlorobenzene	8							8		
1,1,1 Trichloroethane	26	200(y)		200	22,000(q)	-		26	26	2
Trichloroethene(-ethylene)	1	5(y)		0		5(v)	3.2	1	0	
Trichlorofluoromethane						-				
Toluene				2,000(p)	10,100	(v)			(v)	(v

SOURCE: MTHD/RHMW RI/

TABLE 3, SHEET 2 OF 3

CRITERIA REVIEWED FOR GROUND WATER REMEDIAL OBJECTIVES

Substances	NJ MCL (A-280) (ug/l)(b)	MCL(c) (ug/l)	NJ GW Quality Standards (ug/l)(t)	MCLG(d) (ug/l)	Health Advisories (ug/l)(e)	NJ Interim Groundwater Clean-up Guidance (ug/l)(u)	Reference Levels for Carcinogens (ug/l)(f)	Site-Specific ARAR (ug/l)(g)	Site-Specific Goal to be Considered (ug/l)(h)	Site Specific Objective (ug/l)
Aluminum										
Arsenic		50(m)	50	50(p)	50		0.002	50	0.002	50
Barium		1,000(m)	1,000	1,500(p)	1,800			1,000	1,000	1,000
Beryllium							NA			5 (aa)
Cadmium		10(m)	10	5(p)	18		NA	10	5	10
Calcium										
Chromium		50(m)(s)	50	120(p)	170		NA	50	50	50
Cobalt										
Copper			1,000(w)	1,300(p)					300	300
Cyanide			200		750				200	200
Iron			300(w)							
Lead		50(m)	50	20(p)	10(k)			50	10	50
Magnesium										
Manganese			50(w)							
Mercury		2(m)	2	3(p)	5.5			2	2	2
Nickel					350		NA		350	350
Potassium										
Silver		50(m)	50					50	50	50
Sodium			50,000(w)							
Thallium										
Vanadium										
Zinc			5,000(w)							

SOURCE: MT[redacted]/RHMW RI/FS

TABLE 3, SHEET 3 OF 3

CRITERIA REVIEWED FOR GROUND WATER REMEDIAL OBJECTIVES

NOTES:

a. Federal and State criteria reviewed to prepare this table.
b. Maximum Contaminant Level, State Safe Drinking Water Act.
c. Maximum Contaminant Level, Federal Safe Drinking Water Act.
d. Maximum Contaminant Level Goal, Federal Safe Drinking Water Act.
e. EPA drinking water health advisories, based on life time exposure.
f. The reference concentration for carcinogens is calculated based on a 1×10^{-6} risk and the cancer potency factor (CPF) provided in the Superfund Pul Health Evaluation Manual (USEPA, 1986b) as follows:

$$\text{reference concentration (ug/l)} = (1 \times 10^{-6})/\text{CPF}$$

Where available oral route CPFs are used, some reference concentrations are based on inhalation route CPFs.
g. Most stringent site specific applicable or relevant and appropriate requirement.
h. Most stringent health-based goal to be considered for action being considered.
i. An MCLG was proposed but subsequently withdrawn, a new MCLG currently under discussion (USEPA, ODW, 1987).
j. DEHP included as per input from NJDEP.
k. Based on Health Advisory of 20 ug/day and ingestion of 2 liters per day.
m. Interim MCL.
p. Proposed value.
q. Reference concentrations for potential carcinogens, corresponds to a potential cancer.
r. Di(ethylhexyl)phthlate or Bis(2-ethylhexyl)phthlate.
s. Value of Chromium(+6).
t. NJAC 7:9-6, New Jersey Groundwater Quality Standards, Primary Standard, Class GW2.
u. New Jersey Interim Groundwater Clean-up Guidance, developed 1986. On an interim basis the corrective action level of 5 ppb (ug/l) is applied to individual chemicals categorized as carcinogens by NJDEP.
v. On an interim basis, the corrective action criteria for groundwater of 50 ppb total volatile organic toxic pollutants in groundwater shall apply to t sum of all compounds indicated.
w. NJAC 7:9-6, New Jersey Groundwater Quality Standards, Secondary Standards, Class GW2.
y. U.S.EPA 1987 National Primary Drinking Water Regulations - Synthetic Organic Chemicals. Federal Register 52 (130): 25689-25717.
z. EPA Ambient Water Quality Criteria (WQC) for Protection of Human Health.
aa. Value calculated from CPF for inhalation route of 7.0 $(mg/kg/day)^{-1}$, was below the method detection limit and below background quality. Since th an objective to be considered for cleanup, the goal will be set at the lowest technically achievable level (i.e. the method detection limit).
bb. "NA" indicates that the information is not available
cc. "ug/l" is equivalent to parts per billion (ppb)

SOURCE: MTHD/RHMW RI/FS

TABLE 4, SHEET 1 OF 5
SUMMARY OF REMEDIAL ATLERNATIVES

ALTERNATIVE	CAPITAL COST ($1000)	ANNUAL O&M COSTS ($1000)	PRESENT WORTH ($1000)	TIME TO ACHIEVE ARARs (years)
1. NO ACTION: Ground water monitoring, 5-year site reviews.	13	34	222	40
2. AQUIFER ISOLATION: Public water hookups, seal private wells, ground water monitoring, 5-year site reviews.	94	34	303	40
3A. PUMP/AIR STRIP IN ENTIRE PLUME, DISCHARGE TO SURFACE WATER AND GROUND WATER: Extraction wells (13), air stripping, some discharge to SW, some discharge to GW, public water hookups, seal private wells, ground water monitoring.	3,534	124	4,296	4
3B. PUMP/AIR STRIP IN ENTIRE PLUME, DISCHARGE TO GROUND WATER: Extraction wells (13), air stripping, discharge to GW, public water hookups, seal private wells, ground water monitoring.	4,713	151	5,641	4
3C. PUMP/AIR STRIP IN ENTIRE PLUME, USE TREATED WATER AS A POTABLE SUPPLY: Extraction wells (13), air stripping, use treated water as a potable supply, public water hookups, seal private wells, ground water monitoring.	3,204	131	4,132	40

TABLE 4, SHEET 2 OF 5
SUMMARY OF REMEDIAL ATLERNATIVES

ALTERNATIVE	CAPITAL COST ($1000)	ANNUAL O&M COST ($1000)	PRESENT WORTH ($1000)	TIME TO ACHIEVE ARARs (years)
4A. PUMP/CARBON ADSORPTION IN ENTIRE PLUME, DISCHARGE TO SURFACE WATER AND GROUND WATER: Extraction wells (13), carbon adsorption, some discharge to SW, some discharge to GW, public water hookups, seal private wells, ground water monitoring.	4,153	1,059	10,653	4
4B. PUMP/CARBON ADSORPTION IN ENTIRE PLUME, DISCHARGE TO GROUND WATER: Extraction wells (13), carbon adsorption, discharge to GW, public water hookups, seal private wells, ground water monitoring.	5,332	1,081	11,998	4
4C. PUMP/CARBON ADSORPTION IN ENTIRE PLUME, USE TREATED WATER AS A POTABLE SUPPLY: Extraction wells (13), carbon adsorption, use treated water as a potable supply, public water hookups, seal private wells, ground water monitoring.	3,823	1,081	10,489	40

TABLE 4, SHEET 3 OF 5
SUMMARY OF REMEDIAL ATLERNATIVES

ALTERNATIVE	CAPITAL COST ($1000)	ANNUAL O&M COST ($1000)	PRESENT WORTH ($1000)	TIME TO AGHIEVE ARARs (years)
5A. PUMP/AIR STRIP IN SOURCE AREA, DISCHARGE TO GROUND WATER DOWN GRADIENT: Extraction wells (3), air stripping, discharge to GW down gradient, public water hookups, seal private wells, ground water monitoring.	1,974	94	2,548	5
5B. PUMP/AIR STRIP IN SOURCE AREA, DISCHARGE TO GROUND WATER UP GRADIENT: Extraction wells (3), air stripping, discharge to GW up gradient, public water hookups, seal private wells, ground water monitoring.	1,942	94	2,516	5
5C. PUMP/AIR STRIP IN SOURCE AREA, USE TREATED WATER AS A POTABLE SUPPLY: Extraction wells (3), air stripping, use treated water as a potable supply, public water hookups, seal private wells, ground water monitoring.	1,443	94	2,081	40

TABLE 4, SHEET 4 OF 5
SUMMARY OF REMEDIAL ATLERNATIVES

ALTERNATIVE	CAPITAL COST ($1000)	ANNUAL O&M COST ($1000)	PRESENT WORTH ($1000)	TIME TO ACHIEVE ARARs (years)
6A. PUMP/CARBON ADSORPTION IN SOURCE AREA, DISCHARGE TO GROUND WATER DOWN GRADIENT: Extraction wells (3), carbon adsorption, discharge to GW down gradient, public water hookups, seal private wells, ground water monitoring.	2,123	579	5,677	5
6B. PUMP/CARBON ADSORPTION IN SOURCE AREA, DISCHARGE TO GROUND WATER UP GRADIENT: Extraction wells (3), carbon adsorption, discharge to GW up gradient, public water hookups, seal private wells, ground water monitoring.	2,091	579	5,645	5
6C. PUMP/CARBON ADSORPTION IN SOURCE AREA, USE TREATED WATER AS A POTABLE SUPPLY: Extraction wells (3), carbon adsorption, use treated water as a potable supply, public water hookups, seal private wells, ground water monitoring.	1,592	579	5,146	40

TABLE 4, SHEET 5 OF 5
SUMMARY OF REMEDIAL ATLERNATIVES

ALTERNATIVE	CAPITAL COST ($1000)	ANNUAL O&M COST ($1000)	PRESENT WORTH ($1000)	TIME TO ACHIEVE ARARs (years)
7. PUMP/AIR STRIP IN SOURCE AREA WITH VICINITY INJECTION (3 AIR STRIPPERS): Extraction wells (3) air stripping (3 units) discharge to GW near treatment, public water hookups, seal private wells, ground water monitoring.	1,618	84	2,136	7

NOTE:

1) Present worth is calculated using an interest rate of 10%, and a project duration of 10 years. System operation for the full period was assumed in calculating the present worth.

2) Estimated times presented are relative times for remediation of the contaminated ground water, and are based on assumptions of the degree of aquifer flushing caused by implementing each alternative and the necessary amount of flushing required for remediation.

TABLE 5
The Nine Remedial Evaluation Criteria

Short-Term Effectiveness	Long-term Effectiveness and Permanence	Reduction of Toxicity, Mobility and Volume (TMV)	Implementability	Cost
. Potential impacts on community during RA implementation . Potential impacts on workers during RA and the effectiveness and reliability of protective measures Potential environmental impacts of RA and the effectiveness and reliability of mitigative measures Time until protection is achieved	. Magnitude of total residual risk in terms of untreated waste & treatment residuals . Adequacy and suitability of controls (engineering & institutional) used to manage untreated waste and treatment residuals . Reliability of controls over time, including potential for failure and potential resulting risk	. Treatment process and amount of material to be treated . Amount of hazardous materials that will be destroyed or reduced including how principal threat is addressed through treatment . Degree of expected TMV reduction (e.g. percent of total, order of magnitude) . Degree to which treatment is irreversible . Type and quantity of residuals resulting from treatment process	. Technical feasibility - Difficulties & unknowns associated with technology - Reliability of technology - Ease of undertaking additional action, if required - Reliability & effectiveness of monitoring . Administrative feasibility - Ability & time necessary to obtain required approvals/permits - Steps required to coordinate with other Agencies and associated time requirements . Availability of services and materials - Treatment, storage or disposal capacity - Existence of multiple vendors - Availability of needed equipment & specialists - Timing of technology availability	. Capital . Operation and maintenance . Present worth

Compliance with ARARs	Overall Protection	State Acceptance	Community Acceptance
Attainment of chemical-location-, and action-specific requirements Compliance with other criteria, advisories, and guidance Grounds for invoking a waiver	. How alternative eliminates reduces, or controls existing and potential risks to human health and the environment through treatment, engineering controls, and/or institutional controls	. Features of the alternative the State supports . Features of the alternative about which the State strongly opposes	. Features of the alternative the community supports. . Features of the alternative about which the community has reservations. . Elements of the alternative the community strongly opposes

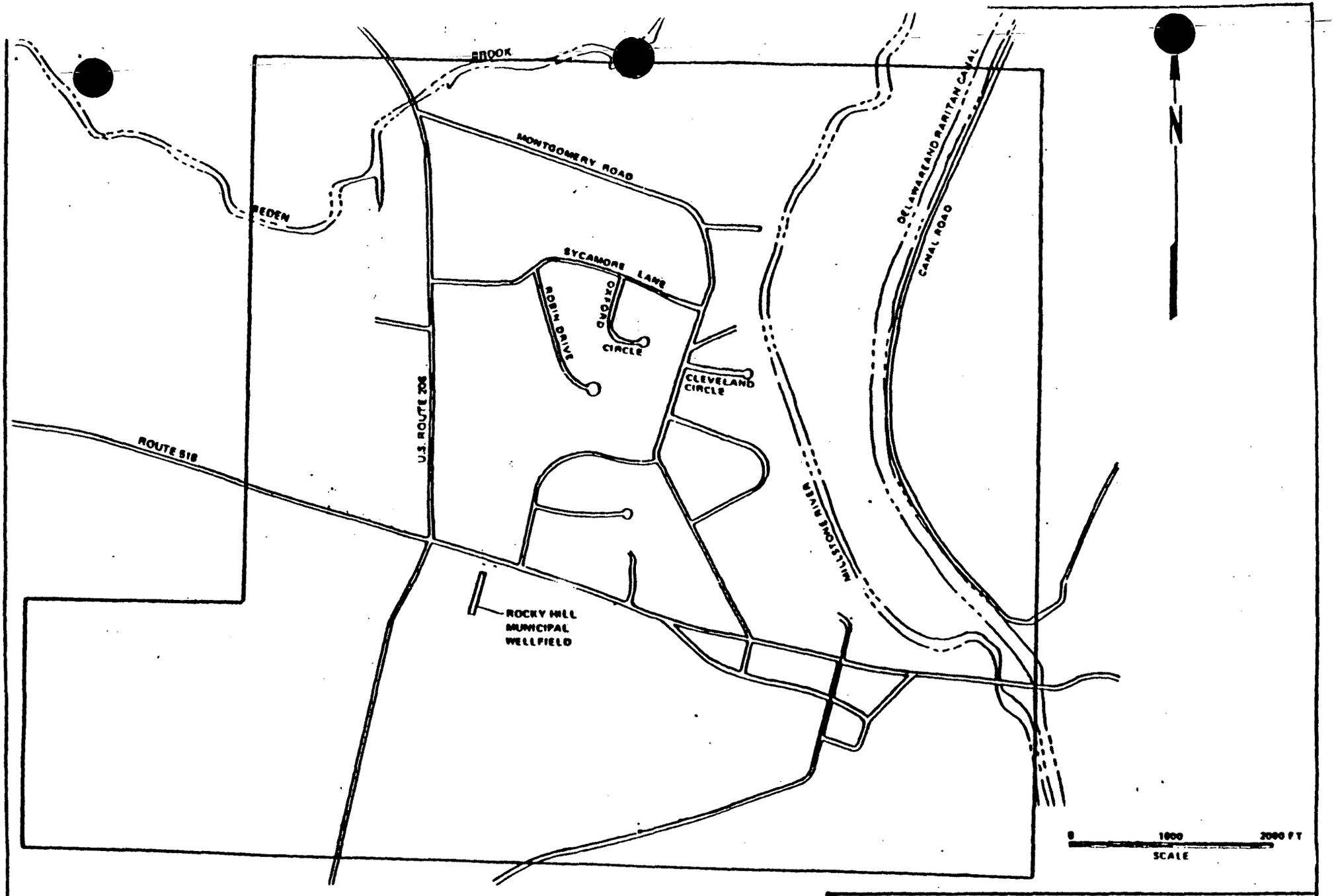

FIGURE 1
STUDY AREA FOR MONTGOMERY TOWNSHIP HOUSING DEVELOPMENT AND ROCKY HILL MUNICIPAL WELLFIELD SITES

SOURCE: MTHD/RHMW RI/FS

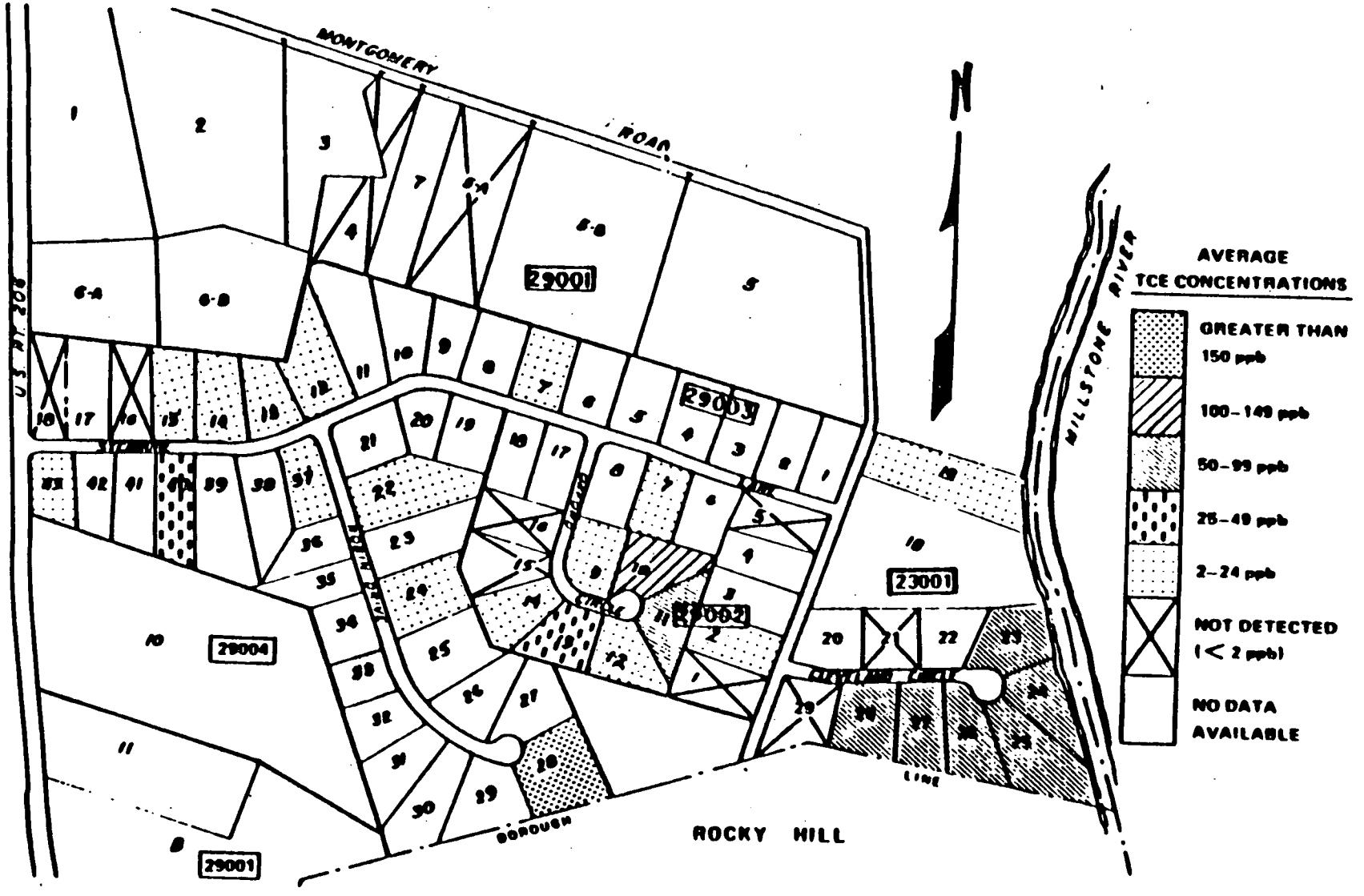

FIGURE 2
AVERAGE TCE CONCENTRATIONS FROM 1979 THROUGH 1985 IN MONTGOMERY TOWNSHIP HOUSING DEVELOPMENT

SOURCE: MTHD/RAMW RI/FS

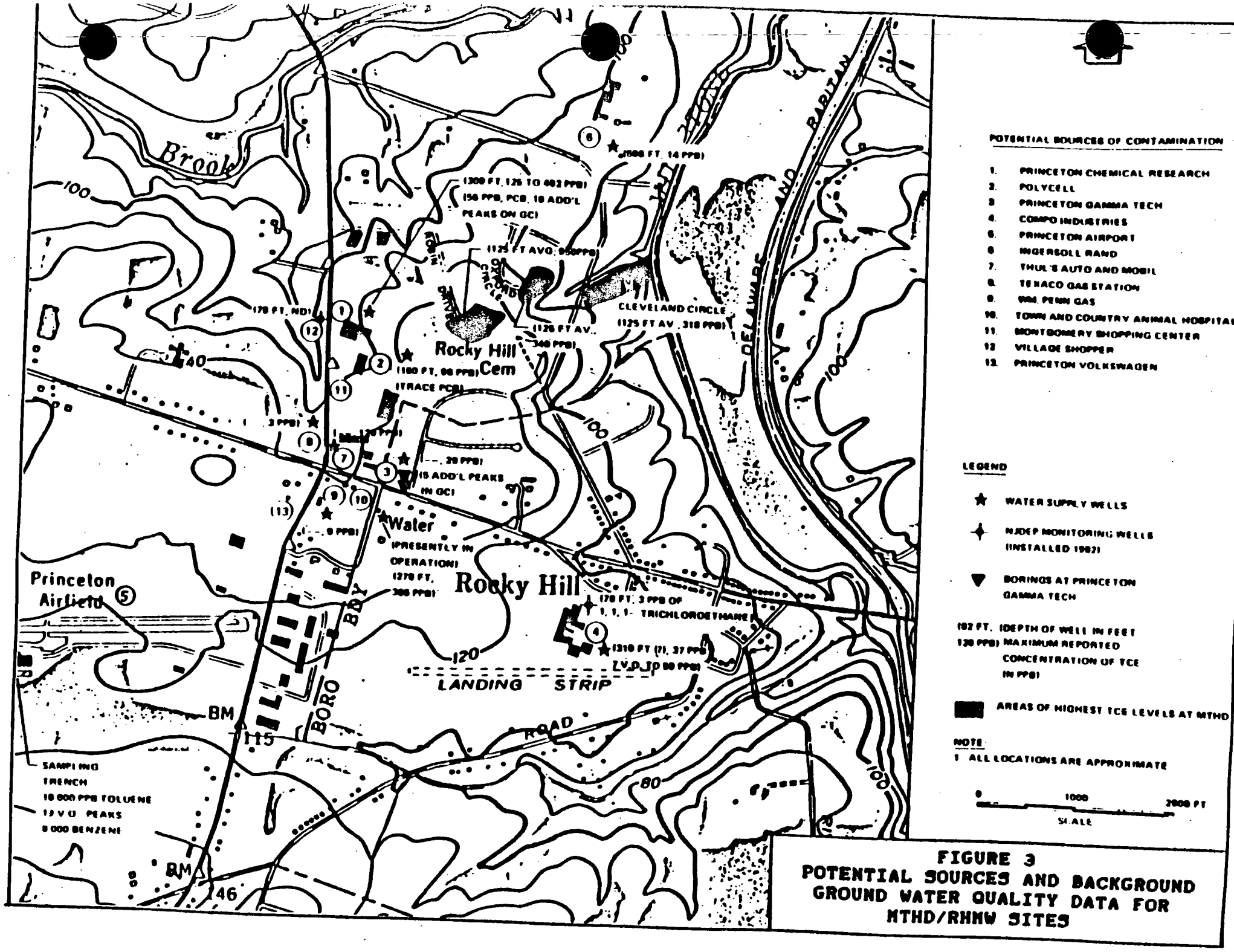

FIGURE 3
POTENTIAL SOURCES AND BACKGROUND GROUND WATER QUALITY DATA FOR MTHD/RHMW SITES

SOURCE: MTHD/RHMW INTERIM REPORT

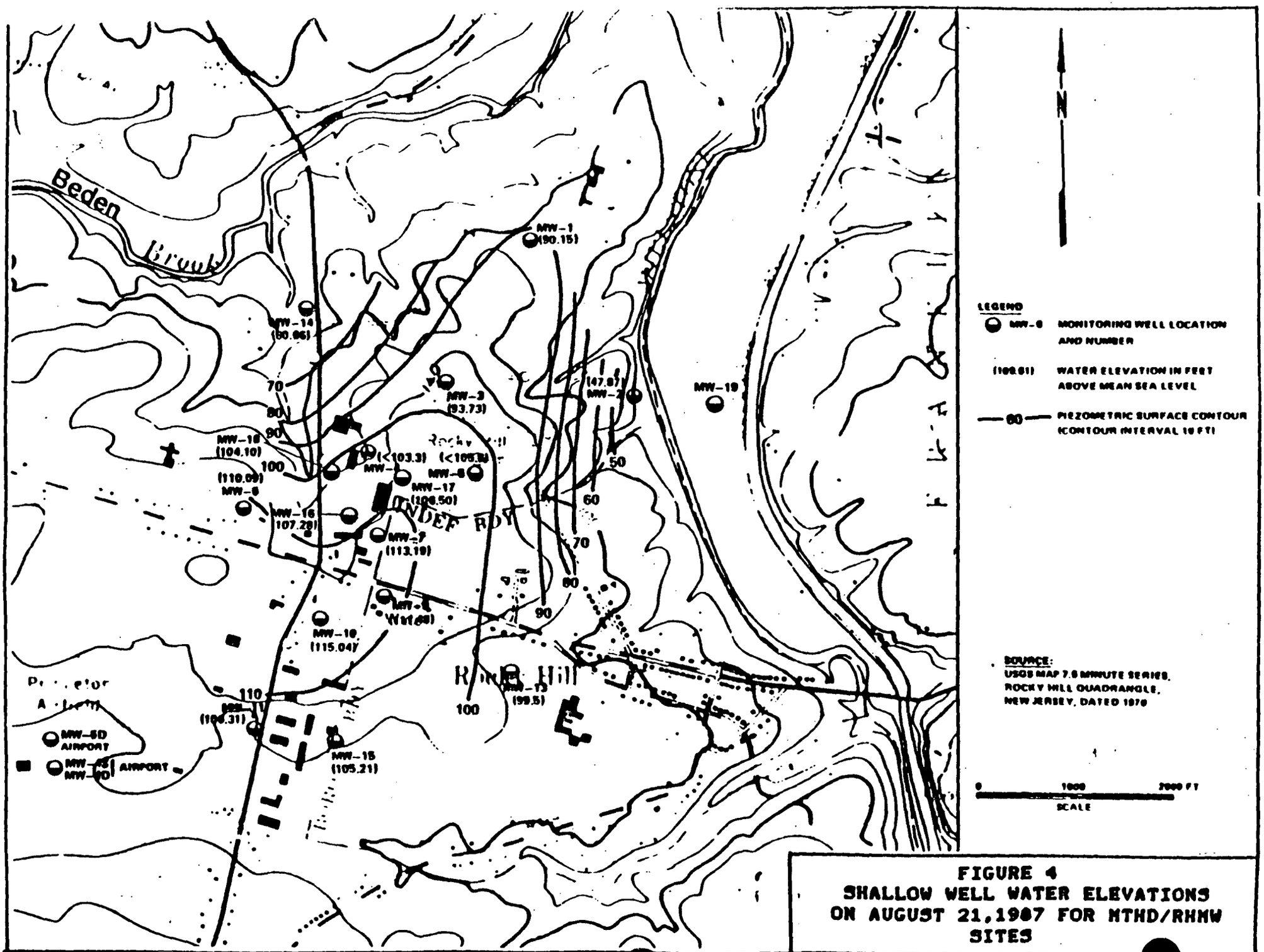

FIGURE 4
SHALLOW WELL WATER ELEVATIONS ON AUGUST 21,1987 FOR MTHD/RHMW SITES

SOURCE: MTHD/RHMW RI/FS

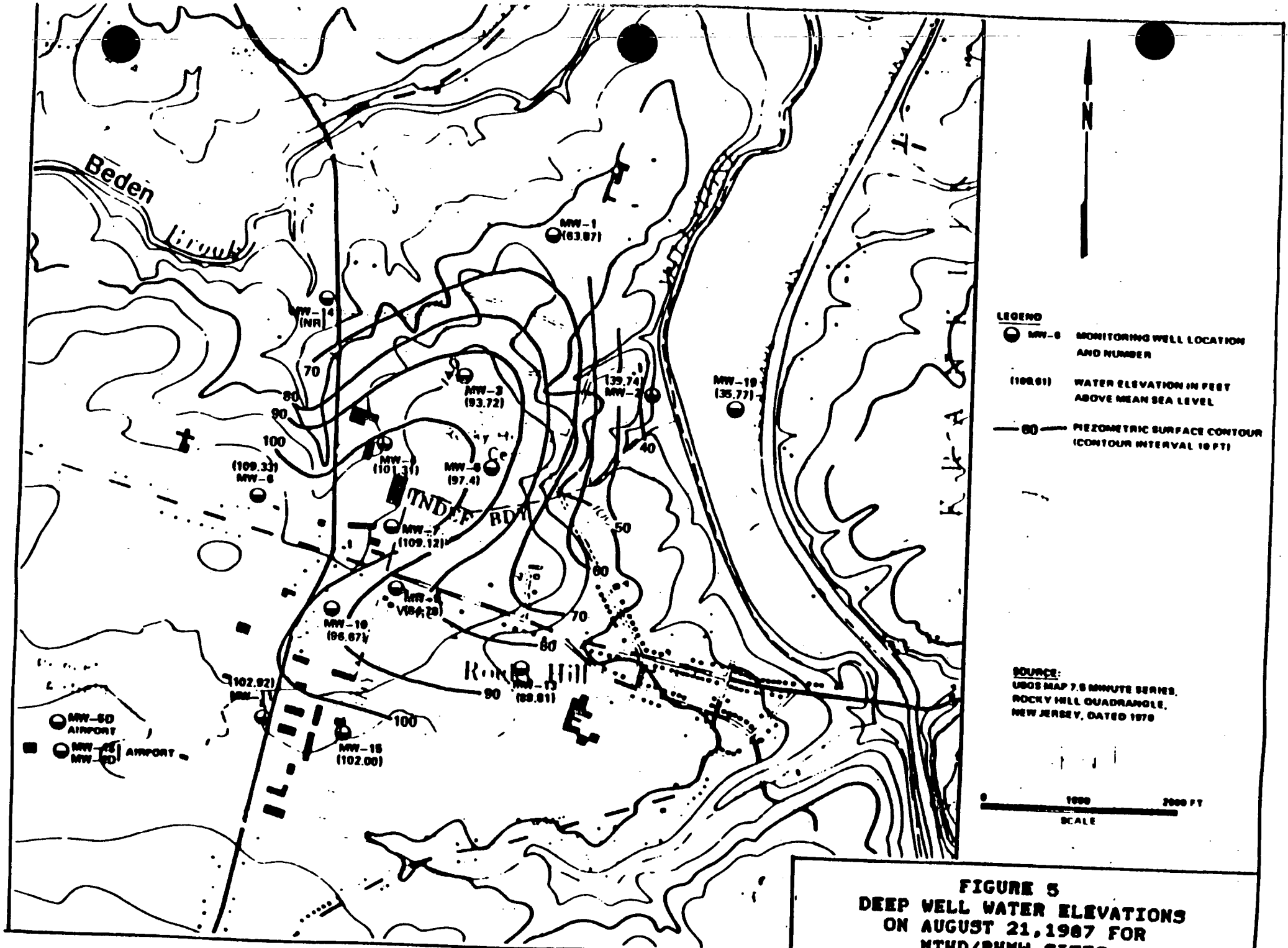

FIGURE 5
DEEP WELL WATER ELEVATIONS ON AUGUST 21,1987 FOR MTHD/RHMW SITES

SOURCE: MTHD/RHMW PLANS

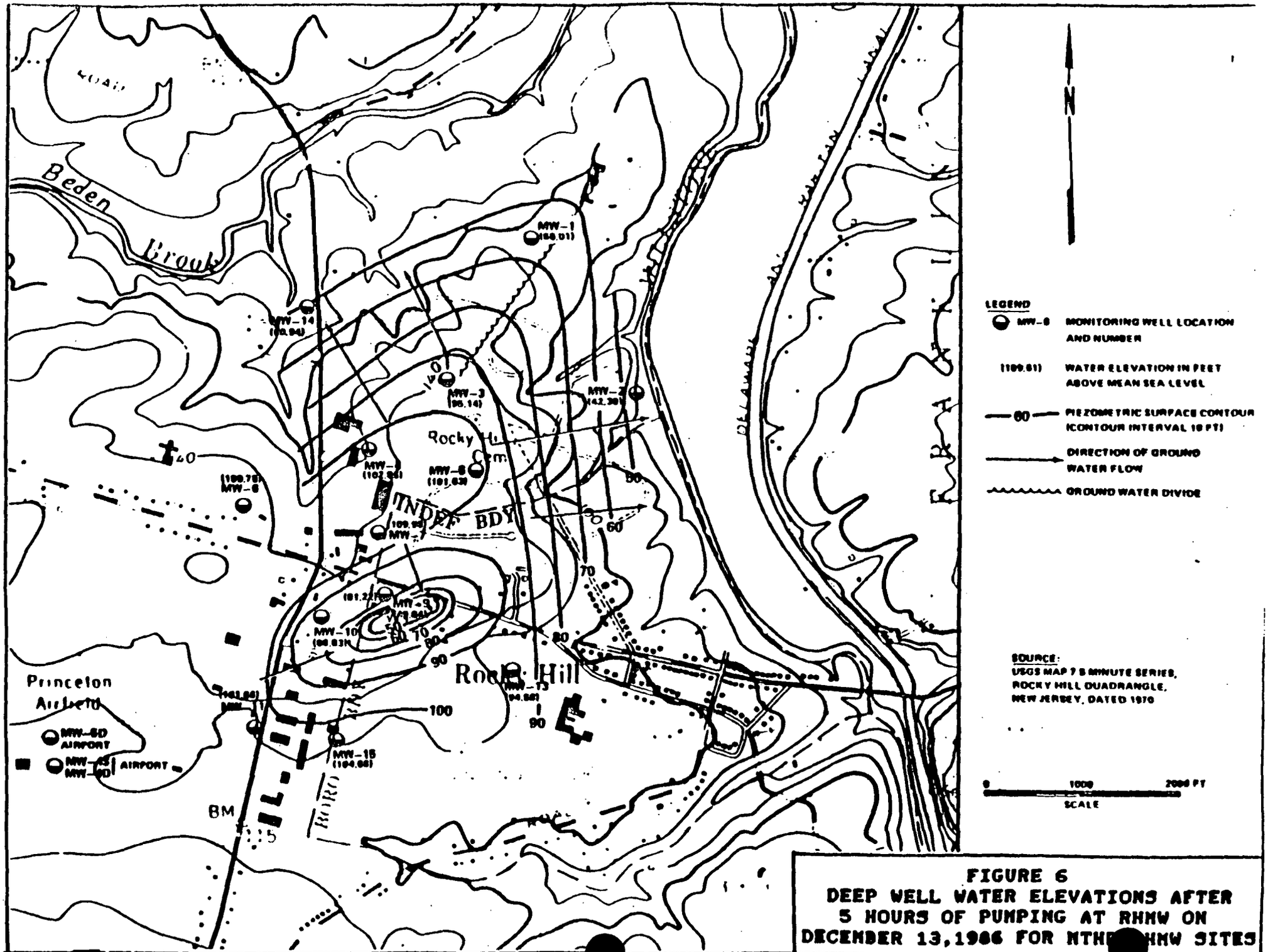

FIGURE 6
DEEP WELL WATER ELEVATIONS AFTER 5 HOURS OF PUMPING AT RHMW ON DECEMBER 13,1986 FOR NTH[illegible]HMW SITES

SOURCE: MTHD/PUMP TEST

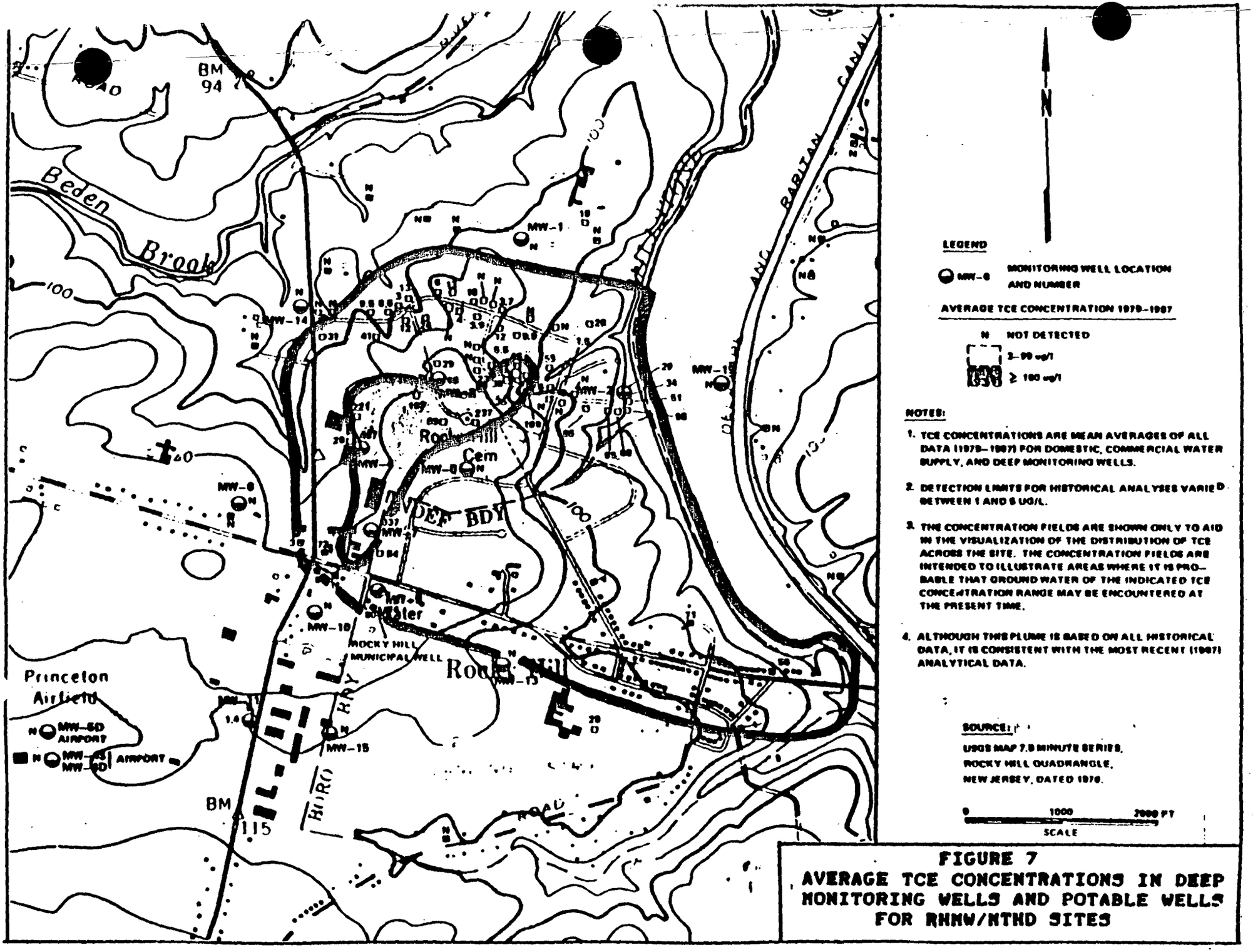

FIGURE 7
AVERAGE TCE CONCENTRATIONS IN DEEP MONITORING WELLS AND POTABLE WELLS FOR RHMW/NTHD SITES

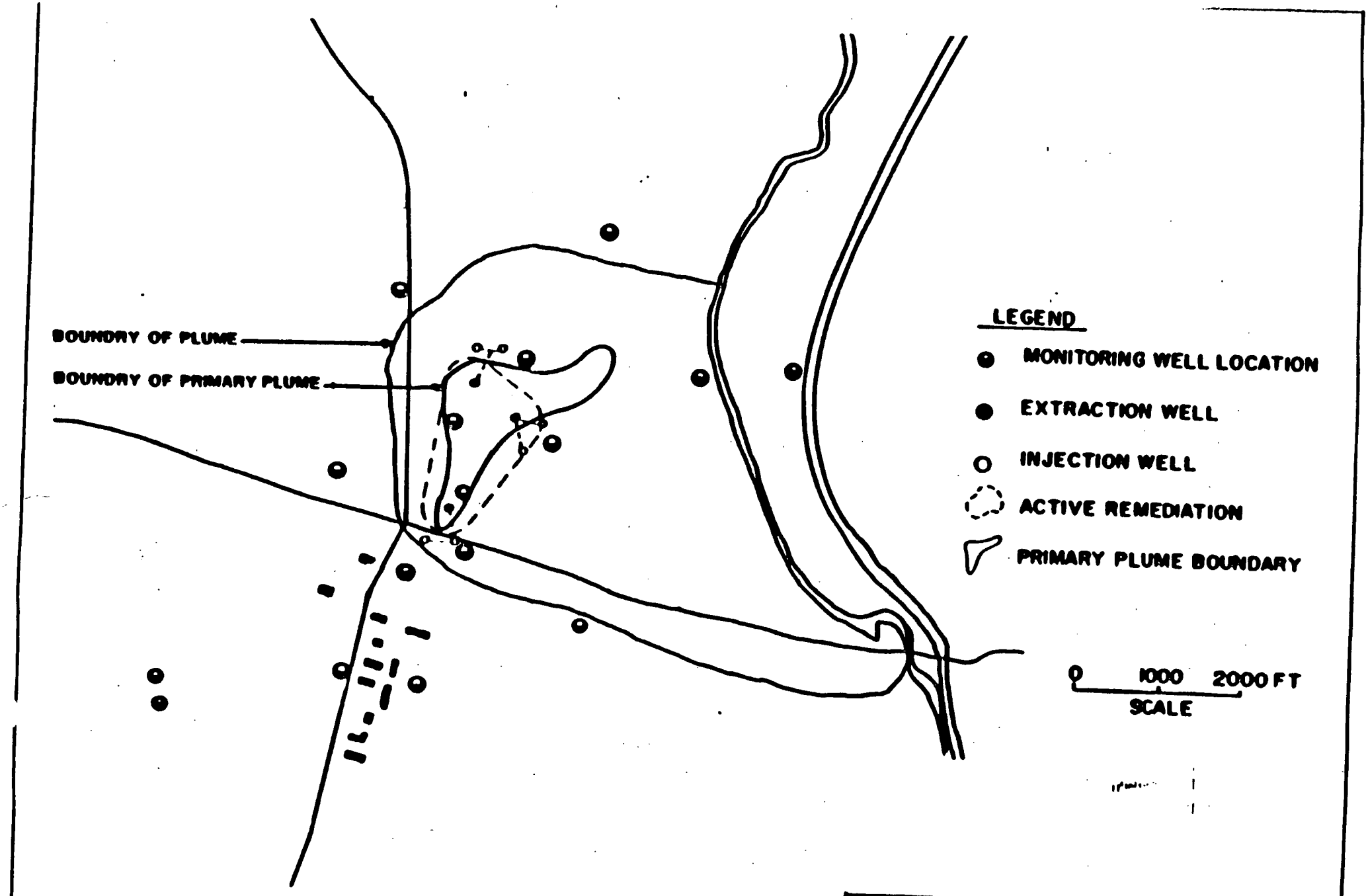

FIGURE 8
CONCEPTUALIZED LAYOUT OF EXTRACTION WELLS AND INJECTION WELLS IN ALTERNATIVE #7 FOR RHMW/MTHD SITES

SOURCE: MTHD/RHMW RI/FS

or relevant and appropriate regulations (as required by the Superfund Amendments and Reauthorization Act). Implementation of this system would include connection of the residence in the southwest section of the site to public water, sealing of affected private wells, and flushing the source area by extracting, treating (air stripping) and reinjecting the treated ground water."

No significant changes have been made to this preferred remedy as a result of the public comment period.

DESCRIPTION OF ALTERNATIVES

A total of 15 alternatives were developed and evaluated in the RI/FS (seven alternatives plus several sub-alteratives). These alternatives were developed in a three stage process consisting of response objective development, technology review and screening, and assembly of technologies into a variety of feasible alternatives.

Remedial response objectives generally include the protection of human health and the environment from existing or potential threats posed by contaminated materials. The objectives are used to focus the development and evaluation of remedial alternatives possible for the site. Response objectives are selected in consideration of the site-specific data generated during the in-field investigations, ARARs, and other response guidance. The objectives are consistent with NJDEP and USEPA requirements/policies. Since contamination was generally limited to the ground water, the response objectives specifically focus on ground water issues.

No single set of federal or state criteria applies to allowable concentrations in drinking water for all of the contaminants detected in ground water at the sites. For this reason, all ARARs and criteria to be considered have been reviewed and summarized in the final three columns of Table 3. These columns present the most stringent site-specific ARARs, the selected site-specific health based goals to be considered, and the site-specific remedial response objectives.

The area of contamination within the aquifer includes approximately 200 acres and is 100 to 200 feet thick. The area of contamination is further described by dividing it into a primary plume (TCE concentrations greater than 100 ppb), and a secondary plume (TCE detected at less than 100 ppb) (See Figure 7). The maximum TCE concentration detected in the primary plume is 5,900 ppb (at Princeton Gamma Tech); the mean TCE concentration in this primary plume is 200 ppb. The secondary plume has a mean concentration of 50 ppb. The objective of the remediation alternatives is to reduce the entire ground water concentration of TCE to one (1) ppb. One ppb is a New Jersey maximum concentration limit (MCL) for TCE which is currently proposed, and is expected to be promulgated in the near future. This level is being used at these sites in place of the federal MCL of 5 ppb. Tetrachloroethene and 1,1-dichloroethene will also have a remedial objective of reducing such concentrations to below 1 ppb and 2 ppb, respectively.

In addition to the remediation of the aquifer, short term actions must be performed to protect the public health during remediation. Residences currently using private wells should be provided with an alternate public

water supply. While approximately 40 residences are on private wells, all but one are already part of a water line connection program (September 1987 ROD). The remaining residences should be connected under this program.

In order to prevent future uncontrolled contacts with the ground water, affected private wells and unused monitor wells should be sealed. The 1987 ROD included sealing of the potable wells for those residences being connected to the public water supply. Other residences have previously connected to the public supply, these should be sealed. Approximately 60 wells would be affected.

The possibility of secondary TCE contamination sources down gradient of Princeton Gamma Tech still remains, but ground water contamination up gradient or side gradient of these properties makes any determination extremely difficult. A monitoring program should be instituted to observe whether these locations begin to exhibit evidence of contamination as regional ground water conditions improve. As a final consideration, the water treatment prior to distribution currently being employed by RHMW should continue.

A variety of remedial technologies were evaluated in the FS to determine the most feasible methods of remediating the ground water at the sites. The technologies were screened and refined through a preliminary evaluation. The only technology class eliminated during this preliminary evaluation was the in-situ treatment. Concern regarding the implementation of the in-situ treatment technology in the fractured rock aquifer of the MTHD/RHMW sites was the primary reason for eliminating this technology. Several variations within the flushing technologies were retained for further consideration. These variations either allowed for site remediation in different time periods or offered different treatment methods.

Seven remedial alternatives with several sub-alternatives were identified to protect human health and the environment from the contamination at these sites. Table 4 lists these alternatives, and they are described below:

Alternative 1 - No Action consists of providing no control measures to mitigate the contamination or isolate the remaining residence(s) from the contaminated ground water. Natural attenuation would be the only method used to reduce the levels of contamination. Contaminant levels and distribution would be monitored on a regular basis to observe possible changes that may warrant additional measures (such as delineating secondary sources or notifying residents). Since contamination would remain essentially unremediated, reevaluation of the no action response would be performed at five-year intervals (as prescribed by SARA) to address whether changes in site characteristics and to evaluate whether the remedy is protective of human health and the environment.

Alternative 2 - Aquifer Isolation. The September 1987 Record of Decision for the MTHD site provides for the connection of all affected residences to public water, and the sealing of their wells. The aquifer isolation alternative expands upon this past decision by incorporating site knowledge gained during Phase II sampling. This alternative requires that present private wells be sealed and future well installations be prohibited in order

to isolate the aquifer from uncontrolled potable water usage. In addition, residences within the contaminant plume would be provided with public water. The Phase II results have identified one additional residence affected by the contamination plume, located on the eastern edge of Rocky Hill. This residence was not included under the September 1987 ROD, but would be addressed in this alternative. The monitoring elements from Alternative 1 would also be performed as part of the aquifer isolation.

Alternative 3 - Pump and Air Strip in the Entire Plume represents an aggressive aquifer remediation strategy designed to minimize the time required to clean up the site. In addition to the public water connection and well sealing components identified in Alternative 2, an aquifer remediation system would be employed using an estimated 13 extraction wells consisting of 4 wells within the primary plume and 9 wells located in the secondary plume within the eastern residential areas. Extracted ground water would be treated by air stripping. The alternative is further divided into 3 sub-alternatives, which differ in the possible discharge locations for the treated ground water (3A - combination of surface water and ground water discharge; 3B - ground water injection; 3C - use as a potable water supply).

Alternative 4 - Pump and Treat with Carbon Adsorption in the Entire Plume is identical to Alternative 3 and its sub-alternatives except that activated carbon adsorption would be the central unit process (4A, 4B and 4C correspond to 3A, 3B and 3C).

Alternative 5 - Pump and Air Strip in the Source Area represents an aquifier remediation strategy which is designed to focus active remedial efforts in the most contaminated regions of the aquifer. The ground water secondary plume would be allowed to remediate itself via natural attenuation, while isolation and cleanup of the primary plume is achieved by extraction wells within the source region. Although extraction wells would not be installed in the secondary plume, cleanup of this area would be enhanced because any contribution from the source area would be arrested. Additional enhancement (i.e. reduction in time to remediate) can also be achieved by reinjection of the treated water up gradient of this area, which would accelerate the natural attenuation of the ground water.

Alternative 5 includes the public water connection and well sealing components of Alternative 2 and an aquifer flushing system using an estimated 3 extraction wells located in the primary plume within the commercial areas of Montgomery Township. Extracted ground water would be treated by air stripping. The alternative is further divided into 3 sub-alternatives, which differ in the possible discharge locations for the treated ground water, but incorporate all other elements of Alternative 5 (5A - ground water injection downgradient; 5B - ground water injection upgradient; 5C - use as a potable water supply).

Alternative 6 - Pump and Treat with Carbon Adsorption in the Source Area is identical to Alternative 5 and its sub-alternatives, except that carbon adsorption would be the central unit process (6A, 6B and 6C correspond to 5A, 5B and 5C).

Alternative 7 - Pump and Air Stripping in the Source Area with Vicinity

Injection - During the development of the equipment and piping layout and costs for Alternative 5, it became evident that another alternative warranted evaluation. This alternative uses the same 3 primary plume extraction wells outlined in Alternatives 5 and 6; however, instead of incorporating a single centralized treatment unit, individual air strippers are installed at each pumping location. Discharge from each unit would be to two injection wells located at nearby points, selected to enhance flushing within both the primary and secondary plumes. As with the other flushing alternatives, Alternative 7 includes the public water connections and well sealings of Alternative 2.

SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

The site remediation alternatives described above are evaluated below. The evaluation discusses the relative advantages/disadvantages of the alternatives in relation to each of 9 remedial evaluation criteria utilized in current USEPA guidance (Draft RI/FS Guidance, 3/88; Draft Proposed Plan and ROD Guidance, 3/88). Table 5 summarizes these criteria. The evaluations are typically presented in comparison to either Alternative 5B or Alternative 7, which comprise the elements of the selected remedy.

The Short Term Effectiveness criteria evaluates alternatives in light of potential impacts during construction, potential impacts to workers and the community, potential impacts to the environment during implementation, and time until protection is achieved.

Except for Alternative 1, all alternatives equally protect human health by connecting affected residences to public water supply.

While all alternatives are expected to eventually result in the ground water contamination being reduced to acceptable levels, the time for this cleanup is estimated to vary several fold between the alternatives. Alternatives that reinject the treated ground water performed significantly better than the others, with minimum cleanup time estimates being reduced from 40 years (Alternatives 1, 2, 3C, 4C, 5C, 6C) to less than 7 years (Alternatives 3A, 3B, 4A, 4B, 5A, 5B, 6A, 6B, 7). Estimated cleanup time for Alternatives 5A, B and 6A, B are five years, and seven years for Alternative 7. Those alternatives which do not include reinjection, have estimated cleanup times of 40 years minimum. In summary the short term effectiveness evaluation indicates a preference for Alternatives 3A, 3B, 4A, 4B, 5A, 5B, 6A, 6B, 7 mainly because of the shorter time frames for achievement of ARARs, and notes shortcomings for Alternatives 1, 2, 3C, 4C, 5C, 6C, because of the longer time frames.

Evaluation of Long Term Effectiveness and Permanence yields no significant variations between the alternatives. The long term effectiveness and permanence criteria evaluates the magnitude of total residual risks of untreated waste, adequacy of controls used to manage this waste and reliability of controls over time. As previously noted, implementation of all alternatives would result in the eventual reduction of contaminant levels to the site specific clean-up goals and/or applicable or relevant and appropriate requirements.

In a similar manner the evaluation of the Reduction of Toxicity,

Mobility, and Volume did not note major differences between the various alternatives since all should eventually reduce contaminants to acceptable levels

The Implementability criteria addresses technical and administrative feasibility as well as the availability of goods and services. Differences between alternatives only exist when considering administrative feasibility. The evaluation of the implementability of alternatives notes that undeveloped land is limited across the sites, and much of the development is for single family homes. The evaluation further notes that construction in the eastern region of the sites would potentially impact both a designated historic district (Rocky Hill), and the flood plain for the Millstone River, which would necessitate a flood plain assessment. Added agency coordination would be expected because of these factors. Alternatives 3A, 3B, 3C, 4A, 4B, and 4C all require the construction of wells and treatment units within both the residential areas and eastern region of the sites. Alternatives 5A, 5B, 5C, 6A, 6B, 6C, and 7 all limit construction of extraction wells and treatment systems to undeveloped or commercially developed areas; although minor impact by subsurface piping and injection wells located in residential areas would occur. Although Alternative 7 necessitates the siting of 3 treatment systems as opposed to 1 unit for Alternatives 5 and 6, a less extensive piping network would be used. Alternatives 1 and 2 have no major construction and are therefore relatively implementable with respect to land use.

Other factors regarding implementability (i.e. technical feasibility and availability of goods) do not note significant differences between the alternatives. In summary, the implementability evaluation indicates a preference for Alternatives 1, 2, 5A, 5B, 5C, 6A, 6B, 6C and 7 which rated favorably under the administrative feasibility criteria, and notes shortcoming for alternatives 3A, 3B, 3C, 4A, 4B, and 4C, because of the need to construct wells within residential/historical/flood plain areas.

Comparative Costs are summarized in Table 4. Review of this table shows that alternatives incorporating carbon adsorption as the unit process are significantly more expensive than those that utilize air stripping. Lacking major differences in effectiveness or implementability these cost differences favor the air stripping alternatives. In summary the evaluation of costs notes a preference for alternatives 1, 2, 3A, 3B, 3C, 5A, 5B, 5C and 7 as compared to 4A, 4B, 4C, 6A, 6B, 6C.

Compliance with ARARs has been evaluated by reviewing chemical, action and location specific ARARs related to the sites or actions. Chemical specific ARARs, developed in reference to present and potential potable water usage including the Federal Safe Drinking Water Act and New Jersey Water Pollution Control Act as amended by Assembly Bill A280 and are summarized in Table 3. The Federal Water Pollution Control Act and New Jersey Surface Water Quality Standards are applicable to discharges to the Millstone River. Action specific ARARs were reviewed typically in reference to air or noise concerns and include the Federal Clean Air Act, New Jersey Air Quality Standards and New Jersey Noise Control Act. Location specific ARARs were developed specifically in relation to the cultural sensitivity of the eastern regions of the sites. The National Historic Preservation Act is applicable since this area encompasses a historic district, potential

archeological sites and historic canal regions. In addition, Executive Order 11988 and 111990, which pertain to floodplains also applies, since the area includes a floodplain.

With the exception of Alternative 1, all alternatives are expected to be in compliance with the ARARs. Review of the location specific ARARs has resulted in a preference for alternatives which do not call for construction in the sensitive eastern region though this preference is not considered overwhelming enough to eliminate those alternatives from consideration (3A, 3B, 3C, 4A, 4B, 4C).

Evaluation of Overall Protection summarizes how the alternative eliminates, reduces or controls existing and potential risks to human health and the environment through treatment, engineering controls and/or institutional controls. Other than Alternatives 1 and 2 all alternatives would provide protection to human health and the environment. As discussed under the short-term effectiveness, the remedies differ in the overall time for remediation. Alternatives 3C, 4C, 5C, 6C may involve institutional controls over a longer period of time since their estimated cleanup times are longer than for Alternatives 3A, 3B, 4A, 4B, 5A, 5B, 6A, 6B, 7. Under all alternatives except Alternative 1, the existing risk to human health would be mitigated by providing an alternate water supply to all affected residences. (Note: Following implementation of the September 1987 ROD, all residences within the MTHD site will be connected to available alternative water supplies).

This summary evaluation results in a preference for Alternatives 3A, 3B, 4A, 4B, 5A, 5B, 6A, 6B, 7 since overall protection to human health would be achieved with a shorter time period for institutional controls (i.e. alternate water supply) necessary than for 1, 2, 3C, 4C, 5C, 6C.

State Acceptance has been noted for the preferred alternative (Alternative 7 with acceptability of combining some treatment units if overwhelming land use concerns arise). The ground water is considered by the state to be unsuitable as a private potable water supply, and as such Alternative 1 is opposed. A preference for a timely and effective aquifer remediation results in a general reservation for Alternatives 2, 3C, 4C, 5C, 6C which all have excessive cleanup times.

Community Acceptance has been noted for the preferred alternative provided that concerns regarding the prevention of air and noise pollution associated with air stripping units be addressed. The community has identified this concern as the inadvertent trading of one pollution type (ground water) for others (air and noise). A responsiveness summary is attached to address and respond to community concerns.

THE SELECTED REMEDY

After careful review and evaluation of the alternatives presented in the feasibility study to achieve the best balance of all evaluation criteria, NJDEP and USEPA presented a composite of Alternatives 5B and 7 to the public as the preferred remedy for the Montgomery Township Housing Development and Rocky Hill Municipal Well Field sites. Alternative 5B and 7 best satisfy the evaluation criteria in that they have relatively short

remediation time frames to achieve ARARs and are most administratively feasible and cost effective when compared to the remaining alternatives.

The input received during the public comment period, consisting primarily of questions and statements transmitted at the public meeting held on May 12, 1988, is presented in the attached Responsiveness Summary. Public comments received encompassed a wide range of issues but did not necessitate any major changes in the remedial approach taken at the site. Accordingly, the preferred alternative was selected as a permanent solution for the site. Some activities will be performed during the initial phases of the remedial design process and prior to implementation of the selected remedial alternative. Components of the selected alternative are described as follows:

1) Extraction of the contaminated ground water through pumping followed by on-site treatment and reinjection of the treated water back into the underlying aquifer. The ground water will be treated to achieve federal and state cleanup standards:

- An aquifer remediation system will be installed to actively flush the primary plume. The less contaminated ground water in the secondary plume limits will be permitted to attenuate through natural means, although enhanced flushing will accelerate the remediation process. The conceptualized system consists of three extraction wells, each pumping at 350 gpm, individual air stripping units to reduce contaminant levels from 200 ppb to 1.0 ppb, and two reinjection wells per extraction well. Figure 8 shows the conceptualized locations of these wells. As previously noted, this system will be refined and modified, if necessary, during design.

2) Connection of any remaining affected residences to the public water supply:

- Provision of public water would be made to residences within the contamination area, not already connected as part of the September 1987 ROD. This is believed to involve one residence, though a questionnaire would be distributed to potentially affected residents prior to implementation. Implementation of this activity would occur separately from other remedial activities, so as not to cause unnecessary delay.

3) Sealing of private water supply and monitoring wells within the contaminant plume:

- An estimated 60 private water supply wells and monitor wells would be sealed in the site area. Well sealing is being conducted to assure that the contaminated aquifer is not being utilized for potable purposes during remediation.

4) Implementation of a ground water sampling program to monitor the effectiveness of the cleanup:

- It will be necessary to sample and analyze the raw water from each

extraction well and the treated effluent several times during the year to monitor the treatment efficiency of the system and to monitor the extracted groundwater quality. Details of the monitoring program will be developed during the design.

Prior to implementation of the selected remedy, a design would be conducted which would include: a pump test with analytical sampling of the pumped water, a bench scale treatability study of the planned air stripper system, and a ground water model of the planned extraction and injection system. The goals of these activities include the determination of extraction well number locations and capacities, injection well number locations and capacities, air stripper sizing, pretreatment or post treatment requirements (if any), and the possible need for short term carbon adsorption on the exhaust from some air strippers.

STATUTORY DETERMINATIONS

The selected remedy provides for restoring the contaminated ground water to acceptable levels, and assuring that contact with the ground water is limited while remediation is underway. This remedy has been additionally determined in the RI/FS to be a cost effective means of achieving the necessary remedial objectives. This remedy is therefore protective of human health and the environment, attains federal and state requirements that are applicable or relevant and appropriate for this action, and is cost effective and utilizes alternatives treatment technologies to the maximum extent practicable. The preference for treatment to reduce the mobility, toxicity or volume of the hazardous substance is also met by the selected alternative. The selected alternative is therefore in compliance with Section 121 of SARA.

Protectiveness is being attained by providing well sealing and water connections to eliminate present risks, and restoring the aquifer to eliminate future risks. ARARs are all being met by the selected remedy, both with respect to present and future site conditions. The identification of ARARs was done as part of the comparative analysis of the alternatives, and will, therefore not be repeated here.

Since the selected remedy utilizes air stripping versus carbon adsorption, and natural attenuation to the greatest extent practical, it is the most cost effective means of achieving the site objectives. The remedy provides the best balance among the 9 evaluation criteria by utilizing an alternative treatment technology to remediate the contaminant plume in a reasonable time frame. There are no short-term effects during the remediation. Institutional controls will be in place during the restoration period and all affected residences will be hooked up to an alternative water supply to eliminate the existing risks at the site.

The selected remedy results in the attainment of remedial response objectives through treatment and natural attenuation. The remedy therefore satisfies the preference for the reduction of toxicity, mobility and volume of site contaminants.

TABLE 1

COMPOUNDS DETECTED IN RESIDENTIAL AND MONITORING WELLS AT MONTGOMERY TOWNSHIP HOUSING DEVELOPMENT AND ROCKY HILL MUNICIPAL WELLFIELD SITES DURING THE REMEDIAL INVESTIGATION

	plume max. conc. (a)		plume mean conc. (a)		background max. conc.(b)	background mean conc.(b)
	MONITORING WELLS	POTABLE WELLS	MONITORING WELLS	POTABLE WELLS		
ORGANICS	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
1,1,1-trichloroethane*	2	37	4.9	5.7	3.25	BDL
1,1-dichloroethene*	19	8.6	5.4	4.9	5	BDL
1,1-dichoroethene*	ND	44	ND	5.9	5	BDL
1,2-dichloroethene*	37	17	7.8	5.0	5	BDL
acetone*	80	12	13.8	8.6	22	11.1
bis(2-ethylhexyl)phthalate	58	ND	13.3	ND	17	10.5
bromodichloromethane	ND	ND	ND	ND	5	BDL
chlordane	1.3	0.76	0.52	0.5	0.5	BDL
chloroform*	19	ND	6.1	ND	5	BDL
di-n-butylphthalate	ND	ND	ND	ND	10	BDL
diethylphthalate	ND	4.2	ND	9.8	3	BDL
ethylbenzene	ND	5.3	ND	5.0	5	BDL
methylene chloride*	15	18	4.7	4.7	8.3	4.1
n-nitrosodiphenylamine	ND	ND	ND	ND	2.6	BDL
phenols	63	54	15.3	12.2	10	BDL
pyrene	3.6	ND	9.7	ND	10	BDL
tetrachloroethene*	53	26	9.2	5.5	5	4.7
toluene	1.2	ND	4.9	ND	5	BDL
trichloroethene*	650	340	102	38.6	5	4.8
METALS AND MISC. COMPOUNDS	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
aluminum	140	0.19	19	0.120	23.4	5.1
antimony	0.11	ND	0.06	ND	0.06	0.010
arsenic	0.186	0.04	0.018	0.010	0.0041	0.008
barium	2.3	0.3	0.4	0.120	0.232	0.1
beryllium	0.017	ND	0.005	0.005	0.0038	0.004
cadmium	0.007	0.01	0.005	0.005	0.005	BDL
calcium	2230	336	202	49.0	34.6	15.1
chromium	0.406	0.12	0.06	0.014	0.014	0.009
cobalt	0.098	0.081	0.03	0.010	0.023	0.022
copper	0.581	0.2	0.09	0.060	0.053	0.037
cyanide	ND	0.1	ND	0.010	-	-
iron	165	3.8	25	0.220	18.4	4.5
lead	0.786	2.2	0.09	0.090	0.039	0.013
magnesium	193	76	29	14.0	19.1	8.4
manganese	6.4	0.3	1.1	0.030	1.15	0.3
mercury	0.0004	0.0002	0.0002	0.0001	0.0002	BDL
nickel	0.34	0.07	0.07	0.020	0.04	0.034
potassium	56.6	1.9	8.7	1.7	3.94	2.4
silver	0.026	0.18	0.01	0.017	0.036	0.014
sodium	82	58	20	13.0	11.1	8.0
thallium	ND	0.006	ND	0.010		
vanadium	0.2	43	0.05	1.2	0.033	0.027
zinc	1	0.21	0.17	0.070	0.16	0.1

a. plume max. and means are calculated from RI data for all residential wells and all monitoring wells except MW-60,MW-110,MW-115,MW-130,MW-135,MW-150.

b. background max.and means are calculated from RI data for the designated background wells MW-60,MW-110,MW-115,MW-130,MW-135,MW-150.

c. In calculting the mean conentrations, the contract detection limit for each individual compound was used for all values reported as not detected; therefore, all means are conservatively high estimates. If the maximum detected value reported was below the method detection limit, it is possible for the mean to exceed the maximum.

* indicates compounds for which values were re-calculated to include the results of additional sampling performed in April and August, 1987.

SOURCE: MTHD/RHMW RI/FS

TABLE 2

COMPARISON OF SITE DATA FOR INDICATOR CHEMICALS WITH GROUND WATER REMEDIAL RESPONSE OBJECTIVES

SUBSTANCE	RESPONSE OBJECTIVE (ug/l)	MONITORING WELL DATA MAXIMUM (ug/l)	MEAN (ug/l)	# DETECTED\ #.ANALYZED (a)	OCCURENCES ABOVE OBJECTIVE	POTABLE WELL DATA MAXIMUM (ug/l)	MEAN (ug/l)	# DETECTED\ # ANALYZED	OCCURENCES ABOVE OBJECTIVE
Trichloroethene	1.0	650	102.5	23\44	23	340	38.6	26\42	26
Tetrachloroethene	1.0	53	9.2	13\44	4	26	5.5	8\42	8
Chlordane	0.5	1.3	0.52	1\44	1	0.76	0.5	1\42	1
1,1-dichloroethene	2.0	ND	ND	0\44	0	44	5.9	1\42	1
Arsenic	50	186 (b)	17.8	9\19	1 (b)	39	10.6	13\36	0
Barium	1000	2300	398.7	19\19	2 (c)	306	116.2	36\36	0
Beryllium	5.0	17	5.2	12\19	3 (d)	ND	ND	0\36	0
Chromium	50	406	57	12\19	4 (d)	117	13.6	33\36	0
Lead	50	786	85.9	12\19	2 (c)	2170	94.5	29\36	4
Nickel	350	340	72.6	6\19	0	71	22.3	32\36	0
Silver	50	24	10.9	5\19	0	180	17.2	21\36	1

(a) Background wells are not included in this data.
(b) Not detected in duplicate sample taken from same well.
(c) Exceeded objectives in samples 3D and 3D duplicate. Monitoring well 3D from which these samples were collected was a poorly installed well and data from this well is highly questionable.
(d) Exceeded objectives in samples 3D, 3D duplicate, and 3S. Monitoring wells 3D and 3S from which these samples were collected were poorly installed wells and data from these wells is highly questionable.
ND Not detected

SOURCE: MTHD/RHMW RI/FS

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MONTGOMERY TOWNSHIP HOUSING DEVELOPMENT AND ROCKY HILL MUNICIPAL WELLFIELD SUPERFUND SITES
MONTGOMERY TOWNSHIP AND ROCKY HILL BOROUGH
SOMERSET COUNTY
NEW JERSEY

RESPONSIVENESS SUMMARY

This community relations Responsiveness Summary, prepared as part of the Record of Decision (ROD), is divided into the following sections:

I. OVERVIEW

This section discusses the New Jersey Department of Environmental Protection's (NJDEP) and the United States Environmental Protection Agency's (USEPA) preferred alternative for remedial action and likely public reaction to this alternative.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

This section provides a brief history of community interest in the Montgomery Township Housing Development/Rocky Hill Municipal Wellfield (MTHD/RHMW) Superfund sites and identifies key community issues. A chronology of community relations activities conducted by the NJDEP and USEPA prior to and during the Remedial Investigation/Feasibility Study (RI/FS) is included.

III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND NJDEP'S RESPONSES

This is a summary of major questions and comments regarding the results of the RI/FS directed to NJDEP during the public comment period. This section also addresses major concerns expressed throughout the RI/FS phase. NJDEP's/USEPA's responses are included in this section.

IV. REMAINING CONCERNS

This describes the remaining community concerns of which NJDEP and USEPA should be aware in conducting the Remedial Design and Remedial Actions at the MTHD/RHMW sites.

ATTACHMENTS:

A. Agendas and Fact Sheets distributed at the 1/14/86, 7/29/87 and 5/12/88 Public Meetings.

B. List of speakers at the 5/12/88 Public Meeting.

C. Letters sent to NJDEP during the public comment period (April 25, 1988 - May 31, 1988).

D. Public notices and press releases concerning the 1/14/86, 7/29/87 and 5/12/88 Public Meetings, and an informational flyer.

E. New Jersey State Department of Health Stream or Wastewater Analysis Field Information Data Sheets.

F. Proposed Remedial Action Plan (PRAP).

I. OVERVIEW

The remedial alternative presented in this Record of Decision represents a final remedial solution for the RHMW/MTHD sites. It addresses ground water contamination in the underlying aquifer.

The specific components of the remedial action are as follows:

- Extraction of the contaminated ground water through pumping followed by on-site treatment and reinjection of the treated water back into the underlying aquifer. The ground water will be treated to achieve federal and state cleanup standards;

- Connection of any remaining affected residences to the public water supply;

- Sealing of private water supply and monitoring wells within the contaminant plume; and

- Implementation of a ground water sampling program to monitor the effectiveness of the cleanup.

Based on comments received during the public comment period, Montgomery Township officials and residents are concerned about the placement of the pump and treatment units as well as the air emissions and potential noise pollution associated with these units. The Borough of Rocky Hill has expressed concern regarding payment for costs incurred in the installation and operation of the Borough's water supply treatment system.

These concerns have been addressed both at the May 12, 1988 public meeting and within this Responsiveness Summary.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Concern over the quality of potable water from the Rocky Hill well first developed as a result of a Rutgers University study in 1979 which indicated high levels of trichloroethene (TCE) at this municipal facility. The Rocky Hill findings triggered a subsequent sampling program for the neighboring Montgomery Township Housing Development.

Residents of both Montgomery Township and the Borough of Rocky Hill expressed concerns early on regarding the water quality and the economic implications associated with this problem. This included Rocky Hill residents' dissatisfaction with the taste and higher cost of the water supplied by the Elizabethtown Water Company. Borough officials addressed these concerns and acted to protect public health by installing air stripping units which effectively treat the water supply so that it meets potable standards.

In Montgomery Township, the Health Department took an early lead in initiating the testing of private wells for contaminants, alerting the community to possible problems and organizing Township meetings. In 1980, a citizens' committee was formed in Montgomery Township. This committee sent a petition to the Township requesting a clean water supply for all the residents. The group also produced newsletters, coordinated meetings, helped organize a sampling program and gathered information about the water problems in their area. This organization's activities apparently diminished over the next three years. Three of the committee leaders relocated, while only two or three families from the development attended an update meeting in May of 1983. The Montgomery Township Health Department, the USEPA and the NJDEP do not have records of any recent activities sponsored by this citizens' committee.

Other organized bodies involved in these issues have included: The Montgomery Township Board of Health, the Montgomery Township Environmental Commission and the Association to Improve Montgomery Township.

Montgomery Township officials arranged for the Elizabethtown Water Company to extend service into the MTHD beginning in 1981. At present, roughly one-half of the residences have been connected to this supply. A September 1987 Operable Unit Record of Decision addressed this issue.

Other community concerns not addressed in this 1988 Responsiveness Summary were addressed in detail in the September 1987 Operable Unit Record of Decision.

Chronology of Major Community Relations Activities

Community Relations activities conducted at the MTHD/RHMW sites to date include the following:

-- A Community Relations Plan was prepared (June, 1985).

-- Municipal officials were contacted to advise them of a contract award to conduct the RI/FS for the MTHD/RHMW sites (August, 1985).

-- An informational flyer was distributed to homes in the MTHD regarding the RI/FS and planned activities (November, 1985).

-- NJDEP held a briefing for municipal officials (November 14, 1985).

-- Notices were sent to those listed on the Contacts list of the Community Relations Plan and press releases were sent to the media announcing the January 14, 1986 public meeting (December 1985).

-- A public meeting was held at the Montgomery Township Municipal Building to discuss the initiation of the RI/FS. Approximately 35 people attended including citizens, local officials and media representatives (January 14, 1986).

-- The Operable Unit MTHD RI/FS report was placed in repository for public review and comment at five locations: the Montgomery Township Municipal Building, the Mary Jacobs Library in Rocky Hill, the Somerset County Library Main Branch, NJDEP in Trenton and USEPA in New York. The public comment period was from July 15, 1987 to August 14, 1987.

-- Notices were sent to those listed on the Contacts list of the Community Relations Plan and press releases were sent to the media announcing the remedial action alternatives and the July 29, 1987 public meeting (July 1987).

-- A public meeting was held at the Montgomery Township Municipal Building to discuss the completion of the Operable Unit RI/FS for Private Potable Wells. Approximately 35 people attended including citizens, local officials and media representatives (July 29, 1987).

-- The MTHD/RHMW RI/FS report and Proposed Remedial Action Plan (PRAP) was placed in repositories for public review and comment at five locations: the Montgomery Township Municipal Building, the Mary Jacobs Library in Rocky Hill, the Somerset County Library Main Branch, the NJDEP in Trenton and the USEPA in New York. The public comment period was from April 25, 1988 to May 31, 1988.

-- A Notice was sent to those listed on the Contacts list of the Community Relations Plan and a press release was sent to the media announcing the May 12, 1988 public meeting and the availability of the PRAP (April 1988).

-- NJDEP held a briefing for municipal officials (May 12, 1988).

-- A public meeting was held at the Montgomery Township Municipal Building to discuss the completion of the RI/FS for the MTHD/RHMW sites. Approximately 30 people attended including citizens, local officials and media representatives (May 12, 1988).

-- Telephone contact and written correspondence was maintained between NJDEP and municipal officials and the press (ongoing throughout RI/FS).

III. SUMMARY OF MAJOR QUESTIONS/AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND NJDEP'S RESPONSES

In April 1988, the Remedial Investigation/Feasibility Study (RI/FS) and the Proposed Remedial Action Plan (PRAP) were placed in the following repositories for review: Somerset County Library, North Bridge St. & Voge Ave; Mary Jacobs Library, 64 Washington Street, Rocky Hill; Montgomery Township Municipal Building; NJDEP, 401 East State Street, Trenton; and USEPA Emergency & Remedial Response Division, 26 Federal Plaza, New York.

On May 12, 1988 NJDEP held a public meeting to present the results of the RI/FS and to receive comments/questions. (See attachment A: agenda and fact sheet distributed at the meeting.) The meeting was held at the Montgomery Township Municipal Building. Notification of the public meeting and the availability of the RI/FS reports and the PRAP was accomplished through press releases and direct mailing of notices to contacts listed in the Community Relations Plan including local, state and federal officials, as well as identified concerned citizens. Approximately 30 people attended including citizens, local officials and media representatives and five people commented during the meeting (see Attachment B). NJDEP also held a briefing for municipal officials prior to the public meeting on May 12, 1988.

The public comment period was originally scheduled from April 25, 1988 through May 23, 1988 but was extended to May 31, 1988 at the request of a former commercial property owner in the area. In addition to the comments made during the public meeting and briefing, four letters were received by NJDEP (see Attachment C).

Following is a summary, organized by subject, of all major questions/ comments received by NJDEP at the public meeting, briefing and during the comment period. Major subjects include:

. Payment of costs to the Borough of Rocky Hill.

. Consideration of technologies for the prevention of air and noise pollution associated with air stripping units;

. Concerns associated with the placement of the pump and treat units;

Comments contained in the report, "Evaluation of Remedial Investigation/Feasibility Study of Montgomery Township Housing Development and Rocky Hill Municipal Wellfield #2 Somerset County, New Jersey"; and

Comments submitted to NJDEP by Geraghty & Miller on behalf of Princeton Gamma Tech (PGT).

Payment of Costs to the Borough of Rocky Hill

1. The Borough of Rocky Hill expressed concern regarding payment for costs incurred in the installation and operation of the Borough's water supply treatment system.

   Response: While the RI/FS evaluated the response action taken by the Borough of Rocky Hill to the contamination and concluded that it was appropriate, determination of whether federal funds would be provided for this action has not been made at this time.

Consideration of Technologies for the Prevention of Air and Noise Pollution

1. Montgomery Township Officials expressed a preference for the carbon adsorption alternative or the use of carbon adsorption equipment on the air stripping unit(s) as a means of minimizing noise and air pollution. In addition the municipality requested that they be involved with the location and design of the selected alternative early on and that the public have input into Remedial Design Phase decisions (see Attachment C).

   Response: As part of the development of a response to this question, NJDEP/USEPA have further evaluated the air emissions from the system recommended by NJDEP/USEPA. The results of this evaluation appear below:

   The air stripper system identified in the RI/FS as Alternative 5B was used as the basis in this evaluation. This system treats ground water contaminated with a concentration of 200 parts per billion (ppb) TCE at a flow rate of 1,050 gallons per minute (GPM). TCE would be displaced into an air stream being introduced at a rate of 50 parts air to one part of water, or 7,000 cubic feet per minute (CFM). Further assumptions for the calculations of ground-level concentrations and impacts are the following: stack height - 20 ft., stack velocity 1,000 feet per minute (FPM), and duration of operation - 10 years.

   The resulting ground-level concentration has been estimated at 6.3 ppb as a maximum concentration, with an average concentration of 0.63 ppb. The potential for odor concern can be identified by comparing the maximum concentration (6.3 ppb) with the odor threshold identified for TCE (50,000 ppb), and the result is that the odor threshold has not been exceeded. The probability for increased cancer risk from exposure to the average concentration (0.63 ppb) is about one in ten million (0.12×10^{-6}), which is well below the typically applied negligible risk of one in one million (1.0×10^{-6}).

The above evaluation indicates that neither health, nor odor concerns are expected from implementation of the remedy. In addition, the air and water quality will be monitored in a manner prescribed in the Design Phase. As previously stated in the RI/FS, the need for carbon adsorption on the air stream would be determined once more accurate expectations of ground water flow, TCE concentrations and resulting air emissions are developed during Design.

Noise concerns will be addressed in the Design Phase by proper equipment selection, sizing and location. The likelihood of noise problems from a well designed system is minor, as can be exhibited by the similar (although somewhat smaller) treatment unit currently in operation at Rocky Hill Wellfield.

NJDEP will keep the Township informed during the Design Phase. A briefing will be held for municipal officials and a fact sheet and press release will be issued. This will further help to assure that the community's concerns are addressed; NJDEP requests that the Township initiate contacts with NJDEP as the need arises. NJDEP's Bureau of Community Relations can be contacted at (609) 984-3081.

2. The Township Health Officer had several questions regarding air pollution: Who will conduct air monitoring? How often will monitoring and stack testing be done? Who will pay for the monitoring? The Health Officer further requested that the results be sent to the Health Department.

   Response: NJDEP or the NJDEP contractor will conduct air monitoring as part of standard Operations and Maintenance procedures. The sampling results will be sent to the Township Health Department. NJDEP's Division of Environmental Quality will assist in developing a sampling program, including a schedule for sampling. Operations and Maintenance tasks are publicly funded by the state and federal governments unless agreements can be reached with a responsible party to fund this work.

Concerns Associated with the Placement of the Pump and Treat Units

1. A resident requested a copy of the diagrams used by the consultant to demonstrate the proposed location of the pump and treat units.

   Response: The resident was informed that the diagrams used at the public meeting are part of the RI/FS reports which are available for public review in local repositories. In addition, the Township Health Officer has a copy of the RI/FS reports.

Comments contained in the report, "Evaluation of Remedial Investigation/ Feasibility Study of Montgomery Township Housing Development and Rocky Hill Municipal Wellfield #2 Somerset County, New Jersey", submitted to NJDEP by Groundwater Technology, Inc. on behalf of EG & G, Inc. (See Attachment C)

(EG & G, Inc. engaged the services of Groundwater Technologies, Inc. to prepare comments on the RI/FS and PRAP. EG & G is the current owner of Princeton Applied Research, Inc. (PAR), who occupied the current PGT facility during a period reportedly from 1966 through 1971. Summaries of the comments are presented below, and their associated responses follow, in order.

Inventory of Potential Sources:

1. The inventory of potentially responsible parties is not complete since it fails to identify or discuss the following:

   a. Princeton North Shopping Center which includes a six-bay Goodyear auto service store (Princeton Tires), a print shop (Triangle Reproduction) and a dry cleaners (Mrs. B's Dry Cleaning and Laundry);

   b. Princeton Gamma Tech facility on the west side of Route 206;

   c. Current Thul's Auto Supply store on Route 518 west of Route 206;

   d. G. M. Printing, and

   e. Princeton Research Printers.

   Response: Princeton North Shopping Center (which includes the current Goodyear and Triangle Reproduction facilities) was constructed in 1973 or 1974, and has been connected to the available sewer system since that date. Available information notes that the dry cleaner in the shopping center did not dry clean on the premises until just recently.

   No phase II RI field efforts were focused on the PGT/Route 206 facility because an early site visit noted that the nature of the facility's operation was mainly offices, and no contamination was found in either Monitor well (MW-6) or MW-10.

   Thul's Auto Supply was located on Route 206 during the late 70's (while the contamination was already evident in RHMW). Sampling was performed at the Route 206 property, although sampling was not performed where Thul's relocated to Route 518.

   G.M. Printing is connected to the Montgomery Shopping Center septic system. This system was sampled during the RI.

   1377 Route 206 is also known as Princeton Chemical Research, which is the name of a previous owner. Samples of water, soil and septic tanks have been collected, the results of which are available in the RI/FS reports.

Ground Water Flow Direction:

2. No discussion is presented to support the implication that the RI/FS RHMW #2 pump test conditions and historic production conditions produced comparable directions of ground water flow, despite the availability of a procedure to evaluate the drawdown of intermittently pumped wells.

Response: Pumping at a capacity greater than the daily pumping rate accentuates the aquifer properties; it does not change them. Although other pumping test procedures are available, the procedures used in this test were designed to collect the maximum amount of data in the minimum time period.

Baseline Contamination:

3. The RI should have investigated all possible septic fields for TCE contamination and other chlorinated volatile organic compounds to properly establish baseline conditions.

   Response: Fifteen septic fields were investigated in the RI (13 'SF' samples and SB-13, SB-16). In addition seven septic tank samples were collected. This is considered to be appropriate for the site. Several background monitor wells were installed to identify baseline groundwater conditions. The RI has addressed all compounds of concern at the site. TCE was used as an indicator chemical and TCA was not, based in part on frequency of detection. The following table illustrates this point:

Number of Detections of TCA and TCE

	Phase I Monitor Wells	Phase I Potable Wells	Phase II Monitor Wells	Phase II Potable Wells
TCA	0	1	0	1
TCE	9	21	15	5

Limitations:

4. The statement of limitation in the RI employs several unsubstantiated assertions to support the assumption that the Brunswick Formation meets the classical definitions of unconfined and semi-confined aquifers despite the existence of data indicating otherwise.

   Response: Although the presence of fractures results in anisotropic aquifer characteristics, the flow characteristics in any given direction are more typical of porous media conditions rather than channel flow conditions. This conclusion has been substantiated in the RI.

RI/FS Timetable:

5. The date on the Feasibility Study Volume 2 (March 1988) precedes the date on the Remedial Investigation Volume 1 (April 1988), suggesting that the identification of the source area is biased.

   Response: The different dates on the two report covers is from an error in report production. Both the RI and FS were completed in April 1988. RI development began well before the FS, but the submittal for public comment was deferred to coincide with FS release.

Anecdotal Information:

6. Unsubstantiated anecdotal information regarding TCE usage appears to be extensively relied upon to draw conclusions regarding the source area. In addition, the narrative of Potential Sources of Contamination highlights multiple potential sources for TCE but does not explain why these potential source areas were not investigated further.

   Response: The comment refers to Chapter 3 of the RI, which is entitled "Site Background Information". Unconfirmed results and findings were included in the chapter to serve as the basis for the site investigation. The findings of the RI, not unsubstantiated information, were primarily used for development of the conclusions stated in the report.

   The comment further notes that additional data is needed to support eliminating these facilities. The task of virtually eliminating any possibility of secondary contamination is difficult, especially when an identified upgradient source contributes contamination. This was not within the scope of the RI.

Well Installation and Sampling:

7. It appears that a significant number of wells were not adequately designed for the scope of the project. (Ten of the thirty wells installed for the RI could not be sampled during the first round because they were dry). Furthermore, the excessively wide temperature range ($5^{o}C$ to $23.0\ C^{o}$) of ground water samples taken for the two sampling rounds suggests that either the thermometer used may have been faulty, not enough time was allowed for the thermometer to reach equilibrium, or that the wells were inadequately purged to provide a representative sample. At a minimum, the significant temperature range should have been discussed and justified.

   Response: The well construction program was developed to monitor two ground water regions. The first region was the overburden and heavily weathered bedrock, and the second was the competent bedrock. Early in drilling it became evident that some of the shallow boreholes were dry, though the use of mud-rotary drilling techniques made precise determination difficult. The choices remained to either: 1) drill slightly deeper until a water filled well was expected (possibly by using the water depth of the corresponding deep well as a guide), 2) abandon dry boreholes, or complete the wells as originally planned, since some dry wells were expected to fill with water either after development (water jetting was used) or during a wetter season. The idea of completing a deeper well would have resulted in a well which would not satisfy the objectives of the shallow wells, probably getting most water from the competent bedrock. The decision proved to be sound since many 'dry' boreholes produced water upon development, and other wells which were dry in round one sampling later contained water.

Regarding the temperature range of the samples, the cause was not identified. It can be noted however, that inadequate well purging has been ruled out as the cause for these variations. Monitor wells were all purged of 3 to 5 well casing volumes of water prior to sampling, except for a couple of shallow wells which were very slow to recover with water. These wells were purged till dry and allowed to recover. Domestic wells were purged by running the tap for an excess of 30 minutes.

Pump Test:

8. The absence of significant drawdown in the shallow wells indicates that the six-hour pump test was not of sufficient duration since the well logs indicate that the deep/shallow pairs actually monitor the same ground water system.

   It also appears that the choice of data points was based solely on those points falling in a straight line, without consideration of the hydrologic characteristics which they represent.

   In addition, a drastic increase in drawdown occurred at 110 minutes in all wells, yet pumping did not continue past 360 minutes. This steepening of drawdown curve could represent a sudden dewatering of fractures or encroachment on an impervious boundary.

   Finally, according to the pump test data, ground water (and any accompanying contamination) should be expected to move toward RHMW #2 from a greater distance in a northeast-southeast direction. Hydrogeologic characteristics of the area should therefore inhibit (but not necessarily prevent) the movement of ground water flow from PGT to RHMW #2.

   Response: While it is agreed that the duration of the pumping test could have been longer than six hours, it is obvious from the results that the shallow and deep ground water zones monitored are in poor hydraulic connection.

   Curve matching of pumping test data is the science of obtaining a closest fit (best match) to a type curve produced by field data. The NJDEP & USEPA believe this procedure to be correct. A relatively poor hydraulic connection, as indicated by the pump test, has been noted in the RI.

Nature and Quality of Ground Water Data:

9. Given the extensively fractured nature of the aquifer, it must be assumed that the shallow and deep zones are in hydraulic communication at each pair of monitoring wells, offering man-made pathways for deep infiltration of shallow contaminants, driven by existing vertical gradients (Table 5-1). Thus, ground water samples from these monitoring wells must be regarded as composite samples with possible man-made impacts, and water quality data cannot be interpreted with reference to its alleged vertical position. Furthermore, since round two sampling took approximately seven weeks to complete, data may not be internally consistent and comparable.

Response: Since the shallow monitor wells and deep monitor wells were not installed in the same borehole, it is not necessary to assume the shallow and deep monitor wells are in hydraulic connection with each other. Although it is possible that the wells monitor the same zone, it is also quite probable that properly installed monitor wells can evaluate specific zones of interest. Data suggests (water levels analyses) that individual zones are being monitored by the wells.

Ground Water Divide:

10. Based on standard accepted pumping test criteria of 72 hours drawdown and 48 hours of recovery, a 14-hour recovery period is considered insufficient time for complete recovery of a pumping well prior to starting the actual pump test (RI page 5-3). Therefore conclusions drawn from the RHMW #2 pump test data should be considered suspect.

    In addition, the RI does not address the possibility that intermittent pumping could easily affect the location of the inferred on-site ground water divide due to the relatively flat piezometric surface.

    Response: The use of RHMW as the pump test well placed operational limits on the pump test duration. This test was still preferred as compared to a typical pump test, which would have been operated for the standard accepted duration, but would have utilized a much smaller flow rate as part of its standard accepted design.

    Regarding the variations between the pump test duration and actual pumping condition, it must be noted that the pump test was designed to obtain aquifer flow constants, and not just ground water contours. The pump test was therefore designed to place a maximum stress upon the aquifer (within operational limits of the wellfield) in order to obtain the best possible information. Typical ground water contours are noted to be variable between those for pumping and non-pumping conditions.

Analytical Data:

11. It is an inappropriate conclusion that a 20 ppb difference for a selected compound (between MW-7 and MW-4) be used to identify the source area, based on two rounds of sampling approximately eight months apart. Due to the inherent impurities and composition variations, chlorinated solvent analyses of trends should have, at a minimum, been based on the total chlorinated volatile organic compounds, including tentatively identified compounds. In addition, ECRA wells MW-3 and MW-4 on the hydraulically upgradient side of PGT showed elevated levels of 1,2-dichloroethene suggesting that there are other sources upgradient of PGT.

    Response: The RI report conclusions were not based on a ratio in TCE concentration of less than 1.5:1 between onsite and offsite condition (relative to the PGT property). Conclusions are based on several factors including hydrologic conditions and onsite TCE concentrations reported by PGT in excess of 4,900 ppb, which is closer to 10 times greater than offsite conditions (the minimum noted ratio of average concentration was between results for PGT's MW-1 to and MW-4D, which is about 5.5:1).

QA/QC Issues:

12. On the table labeled Round One Monitoring Well Samples Tentatively Identified Compounds, the location of MW-4S is identified as "Polycell" and should be listed as "airport".

    The absence of a lock (contrary to NJDEP regulation) on MW-16 and the integrity of data is of particular concern since it is between monitoring wells MW-7S, MW-7D, and MW-4D, which have had elevated concentrations of contaminants, while monitoring well MW-16 has not.

    Response: The comment regarding table headings is correct; the tentatively identified compounds noted for MW-4S actually apply to MW-4S "airport". The lock on MW-16 was broken several months after the sample was collected during a water level survey by NJDEP and Geraghty & Miller. The lock has since been replaced.

Comments Submitted to NJDEP by Geraghty & Miller on behalf of Princeton Gamma Tech (PGT)

PGT engaged the services of Arent, Fox, Kintner, Plotkin & Kahn (Arent et al.) to prepare comments on the RI/FS and PRAP. Arent et al. additionally hired Geraghty & Miller, Inc. (G & M) and Roy F. Weston, Inc. to present comments.

The comments were numerous and diverse as indicated by their extensive volume, although three major issues are noted within these comments. These major issues are as follows:

-- Concern was expressed that portions of the RI were not adequately performed. Examples of inadequacies included a lack of details in the background search, and lack of a soil gas survey.

-- PGT noted that other possible source areas exist and expressed concern that these areas were not eliminated as potential sources.

-- Preference was noted for Alternative #2, which consisted of providing water connections, but not flushing the aquifer.

As a response to the first major issue, it must be noted that the background search, and the scope of the site investigation at these sites are already relatively extensive. The presentation of additional background information, or the recommendation that another one of the myriad of investigative techniques be utilized does not alter the results of the RI. Specifically, this information does not detract from the findings that relatively high concentrations of TCE are present in a location which could impact the ground water of both RHMW and MTHD.

Regarding the second issue, significant efforts were made to identify and characterize all potential sources within the study area. NJDEP recognizes the fact that these efforts do not virtually eliminate the possibility that any given location is a contamination source. To accomplish this task would amount to conducting a major field investigation at every property in the study area, which is not required to meet the objectives of the study.

The third issue must be based on the comparison of the benefits of a more expedient cleanup and the disadvantages of increased costs. Review of the costs and cleanup times of the different alternatives presented in the RI/FS resulted in a marked preference on the part of NJDEP and USEPA for alternatives utilizing a limited aquifer flushing scheme.

MTHD Contamination:

1. The estimates of maximum rate of ground water flow found in the RI prove that PGT could not have contaminated the ground water under MTHD. Shallow ground water flow from PGT is in a northwest or west-northwest direction away from the MTHD. In addition, available data indicate that deep ground water flow from PGT would be in the southeast direction also away from the MTHD. Further, there is no explanation as to why PGT's ECRA water-level analyses were excluded from the RI/FS whereas the chemical analyses are included (at Vol. 3, Appendix 1).

   Response: Several homes in the MTHD are currently supplied by municipal water. Prior to connection to the municipal water supply, the homes were supplied by privately owned individual wells. The comment fails to address the impact of the pumping of the individual wells on the ground water flow direction and flow rate. Additionally, although the ground water flow component at the PGT facility is predicted (by PGT consultants) to be to the northwest, the regional ground water flow component is to the northeast as evidenced by fracture trace analyses and ground water flow contours as stated in the RI/FS report. The northeast orientation of the primary fracture system, coupled with the pumping of all the MTHD individual residential wells, could have potentially induced ground water flow toward the MTHD greater than what is currently evidenced beneath the PGT facility.

   The water level information collected by PGT under the ECRA program was not included in the appendix since it was not referenced in the RI. This data was not referenced for the following reasons:

-- It was preliminary and only part of ongoing PGT activities regarding water levels.

-- As noted above, it did not present information beyond that presented in the regional study of the RI.

-- Minor discrepancies were noted in the reported well casing elevations, which would have required resolution prior to inclusion in the report.

RHMW Contamination:

2. PGT could not have contaminated the RHMW for the following reasons:

   a. Contaminated shallow ground water under PGT flows naturally away from the RHMW (G & M Assessments, Figures 1 and 7; pages 2,11-12);

b. Pumping action does not draw the contaminated water to the RHMW (RI at 5-5 and 6-3) and;

c. Wells between PGT and the RHMW were not contaminated (RI at 5-29 Table 5-7).

Response: No conclusion has been reached stating that PGT contaminated the ground water entering either RHMW or MTHD. The conclusions presented in the RI/FS report note that the property is a primary source area for contamination to the sites. Among other factors presented in the report, the results used in forming this conclusion include a water level in Monitor Well MW-7D of 3 to 4 feet below that in MW-75, a water level in (MW-7D) and RHMW of 5 to 60 feet below that in MW-7D, and the presence of ground water TCE contamination in PGT's MW-1 in concentrations typically 20 times greater than that in RHMW. The general downward water flow, the location of the PGT property upgradient of any contaminated offsite location, and the presence of on-site TCE in concentrations well above those found offsite is typical across the entire RHMW/MTHD site.

The presence of TCE in MW-9D, MW-9S and the PGT production well only serves to further support the above conclusions, since the only identified upgradient source of contamination to these wells is the PGT property. The variations in shallow well elevations are negligibly minor when compared to the differences found both within the on-site well pair, and across the site as a whole.

Deficiencies of RI/FS:

3. Public participation was not timely invited.

Response: In accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Superfund Amendments Reauthorization Act (SARA), NJDEP conducted an extensive community relations program. The major community relations activities conducted at the MTHD/RHMW sites to date are outlined earlier in this Responsiveness Summary under the Chronology of Community Relations Activities. PGT received a hand-delivered informational flyer describing planned RI/FS activities in November 1985.

4. Why did NJDEP's Consultant, Woodward-Clyde Consultants (WCC), not use the resources of USEPA's Denver facility for sophisticated analyses of aerial photographs and also make use of the 1961 and 1974 aerial photographs considered by G & M? What indications of disturbed areas did WCC find on the aerial photographs it considered? How did its findings influence decisions to sample or not to sample?

Response: The degree to which aerial photographs were used in this RI/FS is considered to be appropriate by NJDEP/USEPA. Although aerial photos can be a useful supplement to a ground water investigation, primary data collection should be relied upon as the principal investigative technique. The fact that the G & M aerial photo review found no significant new information further supports this.

Spray Waste Irrigation Area:

5. What is the location of the tank farm referenced on the RI (at 3-10) and the spray waste irrigation area? Is the disturbed area identified by G & M (Figure 4) the tank farm and/or the irrigation area? Finally, why were soil samples taken and monitoring wells installed outside the disturbed area identified by G & M and no samples taken or analyses conducted in the tank farm or spray waste irrigation areas?

   Response: The waste discharge area behind the property once operated by Princeton Chemical Research (PCR) has been identified as the patch of white sand clearly evident in aerial photos. This area is the location of SB-2. The tank farm at the PCR facility is the rectangular area of graded land immediately behind the building. Soil boring SB-3 is in this location.

6. We request access to the entire file of NJDEP's investigations of 1377 Route 206, since only selected portions appear to be included in the RI/FS.

   Response: Available results regarding the 1377 Route 206 property are included in the RI report. The RI compiled the limited historical data currently available, and augmented it with six soil borings, a pair of monitor wells and a septic sample. PGT's request for file access should be coordinated through the NJDEP Division of Hazardous Waste Management.

Residential Septic Sampling System:

7. Why did WCC not sample residential septic systems in the MTHD or in Rocky Hill Borough?

   Response: Residential septic systems were sampled as part of the RI/FS. Only one residential septic tank sample was collected (Tank 4). Septic field borings were typically used in the residential locations instead of tank samples (SF-1, SF-2, SF-3, SF-4) in an attempt obtain evidence of past discharge.

Potentially Responsible Parties:

8. The Fifth Dimension was not identified as a potential responsible party (PRP), and its old septic system was not sampled. Field samplings were not attempted at Fifth Dimension or the disturbed area to the east of it, and a monitoring well was not placed directly between Fifth Dimension and the RHMW.

Response: The background investigation and earlier Remedial Action Master Plan did not identify the former Fifth Dimension facility as a potential source of TCE contamination. Information suggesting their contribution has only recently been made available by PGT.

The site investigation used several wells upgradient of RHMW to help identify potential sources from outside of the study area. These wells, which were all uncontaminated, include MW-6, MW-10, MW-11, MW-14, MW-15. MW-10 is located 500 feet north in a line between the Fifth Dimension location and RHMW; it is actually between the facility and PGT and is somewhat downgradient of the location. Another well located more downgradient of the location (static conditions) is MW-13, which also is not contaminated. It should be noted that possible contribution from this or any location has not been virtually eliminated as a result of the RI.

9. Why was Nemes omitted as a PRP and its old septic system not sampled?

Response: Because of a lack of an apparent cause, no sampling or investigation was conducted at this property as part of the RI. Please note the introductory response to general issues raised by G & M on behalf of PGT earlier in this Responsiveness Summary.

Analytical Assurance:

10. What analytical assurance did WCC or NJDEP secure that the TCA reported in the Montgomery Township Shopping Center's septic system as of 2/11/80 was not TCE (Weston Letter at 5)?

Response: Two septic fields, two septic tanks and three monitor wells were sampled on this property as part of the RI. Historical samples were also reviewed. The area identified as disturbed soil north of the facility appears to be mounded material generated during construction of the shopping center.

The comment also questioned data quality, and suggested (by reference to the Weston letter) that the full data package be included as part of the RI. Data packages were not included as a means of keeping the report size to a minimum. Data for this site encompassed approximately 25,000 pages, which is excessive for inclusion in the report. Analytical assurances for sample data are secured by preparation and review of the following information:

1) Quality Assurance Project Management Plan;

2) Field Sampling Plan;

3) Field Sampling Audits by NJDEP;

4) Data packages prepared in accordance with NJDEP Tier I deliverable requirements;

5) Audits of data packages by the Bureau of Environmental Measurements and Quality Assurance - Office of Quality Assurance.

In general, the work conducted by Woodward Clyde and their laboratory has been acceptable to NJDEP and USEPA.

Regarding the identification of TCA in the Montgomery Shopping Center septic tank, the results were obtained from the lab data sheet (and not the RAMP) and no further confirmation was employed since the information was used to a limited extent.

Soil Gas Surveys:

11. Why were cost effective soil gas surveys of vicinity properties not conducted (Weston Letter)?

Response: Neither a soil-gas survey nor other similar field survey techniques were employed at these sites. Combined use of monitor wells and source borings was used instead.

Other Contaminants:

12. The RI/FS fails to consider and pursue data which indicate that there are sources of both TCE and other contaminants in the area which are not associated with PGT.

Response: All RI sample results identified in concentrations greater than the typically applied response objectives (such as drinking water regulations or soil action levels) have been discussed in the RI/FS. Please refer to section 4.2, Evaluation of Cleanup Criteria, within the FS for an example of this discussion.

History of PRP Sites:

13. The RI/FS failed to investigate some PRP sites and did not disclose the history of others.

Response: Chapter 2 (Introduction) and Chapter 3 (Site Background Information) of the RI/FS reports, as well as Appendices A and B, provide a summary of the background information. More detailed historical information is present in the two Remedial Action Master Plans and the Background Report.

The comment also refers to a previous letter from Arent et al. (Attachment C) that noted an error in the reporting of septic tank contamination at PGT. The attached data sheets (Attachment E) indicate that two samples were collected at this location, unlike the RI which presents the data as a single sampling event.

The RI attempted to find the source(s) of contamination, not the individual(s) responsible for this contamination. Historical information was used for the development of the field investigation, not for responsibility assignment.

The possibility of secondary contribution will be addressed in the monitoring program being incorporated as part of the remedy.

TCE Migration:

14. Has the TCE migrated from its source?

Response: While a portion of the TCE has migrated from the source, shallow ground water contamination is still evident at the primary source area. The conclusions of the RAMPs regarding TCE migration were based on information available at the time (1983-4). The conclusions of the RI/FS include significant additional information which has failed to support the issues of the comment.

Counterpumping:

15. Counterpumping is unjustified because of the geology of the site and the numerous unidentified sources of Volatile Organic Compounds (VOC) which may presently be contaminating the ground water.

Response: The possibility of secondary contribution will be addressed in the monitoring program being incorporated as part of the remedy.

Public Health Rationale:

16. The public health rationale of the FS underlying the PRAP does not make sense.

Response: The Public Health Assessment contained in the RI/FS report was performed in a manner consistent with USEPA guidance (USEPA, 1986) and satisfies all applicable or relevant and appropriate requirements as designated by SARA.

TCE Sources:

17. Since WCC failed to identify the TCE source, WCC is in no position to design a rational FS, beyond the measures already mandated and undertaken plus Aquifer Isolation and Monitoring, Alternative 2.

Response: The primary source area was identified as the current PGT property. It is correct that only low concentrations of TCE have been found in one septic tank sample. No soil samples were contaminated with TCE. The FS is nonetheless acceptable.

Precedence for Alternative 2:

18. There is precedence for Alternative 2 reflected in at least three Records of Decisions which addressed situations similar to the MTHD and RHMW contamination. These RODs appear to be the appropriate

models for addressing the concern at the MTHD and the RHMW Superfund sites particularly since the installation of air stripping at the RHMW in 1983 and the 1987 ROD for the MTHD have already addressed and eliminated any public health concerns.

Response: Section 4.2 within the FS identifies the remedial response objectives for the MTHD/RHMW sites and discusses the formulation of the site specific remediation criteria for ground water, soils and surface waters.

Remedial response objectives address the protection of public health, welfare, and the environment from existing or potential threats posed by contaminated materials. The objectives are used to focus the development and evaluation of all the site specific remedial alternatives possible. Response objectives are selected in consideration of the site specific data generated during the field investigations, the applicable or relevant and appropriate requirements (ARARs), and other response guidance. The objectives developed for (MTHD/RHMW) are consistent with USEPA requirements/policies.

Costs of Response:

19. Given the serious flaws of the RI/FS set forth in the above comments and in the attachments, we do not concede that the costs of preparing the WCC RI/FS may properly be considered "costs of response" under CERCLA or the New Jersey Spill Act.

Response: The RI/FS has been conducted in accordance with CERCLA, and is therefore an appropriate cost.

G & M Assessment and Weston Letter:

20. Since the Rocky Hill Municipal Well (RHMW) represents one of the Superfund sites, at a minimum, several water samples should have been obtained from this well during the RI for an analysis of Priority Pollutant constituents plus 40 peaks.

Response: Water quality samples are collected by the Township as part of their operation. Some of these results are included in the RI.

21. During the December 13, 1986 pump test, time-dependent water samples should have been analyzed to assess TCE variations with the enlargement of the capture zone for the RHMW over the duration of the pumping test.

Response: This was not done. However, analytical samples of water were collected after treatment as part of the NJDEP discharge requirements.

22. The well inventory (description of well construction details) for domestic wells in the MTHD and other wells in the study area is inadequate in terms of domestic and production well locations and pertinent well construction details.

Response: Well logs are included in the interim report (on file) which provide some additional information.

23. The number and location of water-level measurement points (monitoring wells) that form the basis of the RI at the MTHD is insufficient for an assessment of shallow ground water flow conditions in this area.

Response: The hydrologic investigation is considered adequate and appropriate by NJDEP and USEPA.

24. The deep monitoring wells are cased in the bedrock over almost the entire thickness of the Brunswick Aquifer to the depth the wells were drilled. This does not allow for an assessment of ground water flow conditions in the deeper portions of the Brunswick Aquifer. In addition, well depths are highly variable (85 to 250 feet), further complicating an assessment of deeper flow conditions.

Response: The investigative methodology is considered appropriate mostly based upon the fact that natural flow is predominately within vertical fractures.

25. Given the WCC pumping test results and their statement that "the facility for contaminant migration would be greatest along strike" (RI, Page 3-6), it is surprising that the WCC study did not concentrate on studying potential sources that lie along formation strike in proximity to RHMW.

Response: The investigation maintained an effort to investigate potential sources of contamination to MTHD/RHMW sites without concentrating along the strike. While the ground water flow is greatest along the strike, flow perpendicular to the strike is also expected.

26. The Public Health Assessment (PHA) did not address the No Action and Aquifer Isolation alternatives in any detail. The Aquifer Isolation Alternative warrants consideration.

Response: The PHA was based upon a No Action scenario. The Aquifer Isolation Alternative has been considered throughout the RI/FS Study. The Alternative, however, was not as effective at achieving the site objectives as the selected alternative.

27. How was the "perceived likelihood of finding non-volatiles in a given boring" evaluated (RI at p. 4-5)?

Response: Selection of samples for analysis was based upon the following instructions presented to WCC:

Hierarchy for deciding which samples are to be sent to the lab are as follows (in descending preference).

a) High OVA reading
b) Visible contamination
c) Bottom of Boring (Water-Table)
d) 2-4 feet depth

28. The statement (RI at p. 6-7) referring to "the plume" as having achieved "steady state" is inaccurate. The TCE concentrations are erratic with time, and no other data are presented to indicate that any "plume" has achieved steady state.

Response: In context, the statement in question refers to a lack of significant trends. Variations in samples at a given location are recognized.

IV. REMAINING CONCERNS

Many of the issues addressed in this Responsiveness Summary will continue to be of concern to the community. Montgomery Township officials have requested that they be kept up-to-date on Remedial Design activities, including a briefing during this phase, and have also requested an opportunity to provide input into the Design. Honoring of this request should help to further alleviate some of the above concerns, including those of noise and air pollution and placement of the pump and treat units.

The concerns regarding the sealing of private wells and connections to the public water supply system for the MTHD are generally being addressed under the September 1987 Operable Unit Record of Decision.

The issue of payments for past water line connections in MTHD is continuing to be addressed by NJDEP and USEPA under applicable laws and regulations.

Although NJDEP and USEPA have been able to identify a primary source of the contamination, a responsible party(ies) has not been named. Should payment to the communities for past actions be precluded by applicable laws and regulations, then the question of reimbursement for past costs may remain unanswered until a responsible party(ies) is identified, at which time the communities may choose to pursue reimbursement from the responsible party(ies).