FINAL REPORT
HYDROGEOLOGIC INVESTIGATION
ROCKY HILL MUNICIPAL WELL SUPERFUND SITE
FORMER FIFTH DIMENSION FACILITY
MONTGOMERY TOWNSHIP, NEW JERSEY
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1.0 INTRODUCTION AND BACKGROUND

Under Work Assignment 3-355, the United States Environmental Protection Agency/Environmental Response Team Center (U.S. EPA/ERTC) tasked the Response Engineering and Analytical Contract (REAC) with providing technical support in conducting an extent of contamination investigation at the former Fifth Dimension facility. The former Fifth Dimension facility is located at 471-475 Wall Street in Montgomery Township, Somerset County, New Jersey, just south of the intersection of State Routes 206 and 518. The site was occupied by Fifth Dimension from 1961 until 1974 when it burned down. Today, the site is occupied by an office building. The investigation was conducted in the parking lot of the office building. The site is located south of the Rocky Hill Municipal Well Superfund Site (Figure 1).

The objectives of this project were to:

- Determine the extent and magnitude of volatile organic compound (VOC) contamination, in particular trichloroethene (TCE), in soil surrounding the former Fifth Dimension facility, and
- Determine the vertical extent of groundwater contamination by VOCs beneath the site and identify potential contaminant migration pathways.

To achieve the project objectives, REAC accomplished the following:

- Collected soil gas samples at 32 locations and soil samples at 8 locations using a Geoprobe™ system.
- Supervised the work of a drilling contractor to install one groundwater monitor well.
- Completed three soil borings and collected soil samples from the borings for analysis for volatile organic compounds (VOCs).
- Performed packer testing during drilling of the monitor well to collect groundwater samples from discrete intervals.
- Performed geophysical logging on the new monitor well (FD-1D) and seven other existing monitor wells.
- Procured and supervised the work of a New Jersey Licensed surveyor to survey the location and elevation of the new well, eleven existing wells, soil gas sampling locations, soil boring locations, and building corners.
- Procured and supervised the work of a waste disposal contractor to dispose of soil, rock cuttings, and water generated during the drilling program.
- Performed periodic water level measurements.

On 25 April 1998, REAC personnel set up a sampling grid as described in the work plan prepared by Environ for Hilton Realty (Appendix A). The sampling grid is shown in Figure 2. The origin of the grid, 100 North (N) 0 East (E), was on the southwest side of the office building at 471-475 Wall Street.

2.0 METHODOLOGY

2.1 Standard Operating Procedures

In completing the field and laboratory work on this project, REAC utilized the following ERTC/REAC Standard Operating Procedures (SOPs):

- ERTC/REAC SOP #2002, *Sample Documentation*
- ERTC/REAC SOP #4005, *Chain of Custody Procedures*
- ERTC/REAC SOP #2004, *Sample Packaging and Shipment*
- ERTC/REAC SOP #2006, *Sampling Equipment Decontamination*
- ERTC/REAC SOP #2012, *Soil Sampling*
- ERTC/REAC SOP #2042, *Soil Gas Sampling*
- ERTC/REAC SOP #2043, *Water Level Measurement*

- ERTC/REAC SOP #2048, *Model 5400 Geoprobe Operation*
- ERTC/REAC SOP #2102, *Tedlar Bag Sampling*
- ERTC/REAC SOP #2104, *Tenax/CMS Tube Sampling*
- ERTC/REAC SOP #2106, *Photovac 10SPlus Portable Gas Chromatograph Operation*
- ERTC/REAC SOP #2109, *Photovac GC Analysis for Soil, Water, and Air/Soil Gas*
- ERTC/REAC SOP #2110, *Microsensor P200*

2.2 Soil Gas Sampling

Using a Geoprobe, REAC personnel collected soil gas samples at the former Fifth Dimension facility on 27, 28, and 29 April 1998. Soil gas samples were collected at 32 locations surrounding the office building at 471-475 Wall Street. The majority of the sampling points were to the east of the office building. From these 32 locations, a total of 40 samples were collected. Thirty-one samples were collected at 8-feet below ground surface (bgs), six were collected at 4 feet bgs, two at 12 feet bgs, and one at 2 feet bgs. Eight feet bgs was chosen as the initial sampling depth because it was below any disturbed material at the site but above the water table (expected to be about 12 to 15 feet bgs). The samples collected at 4 and 12 feet bgs were collected at locations where an 8-foot sample was also collected. The sample collected at 2 feet bgs was the only sample collected at this location (232N40E) because the probe was blocked from proceeding deeper by an unknown obstruction. Sampling on the north side of the office building was limited by the presence of buried utilities and a slope. Sampling was not attempted immediately to the east of the building due to the presence of underground utility lines.

Quality control samples collected included duplicates, equipment blanks, ambient air samples, and travel blanks. A total of five duplicate samples were collected over the 3-day sampling program. Equipment blanks and ambient air samples were collected daily. Travel blanks were prepared by the mobile laboratory personnel each morning, carried with the samples throughout the day, and analyzed at the end of the day. The travel blanks consisted of analyte free "zero" air.

Soil gas samples were analyzed on site, normally within 10 to 20 minutes after collection using the Trace Atmospheric Gas Analyzer (TAGA). This system and its operation is described in detail in the report on soil gas sample analyses prepared by the TAGA group within REAC (Appendix B).

Tenax™/Carbonized Molecular Sieve (CMS) samples were collected from nine soil gas samples which were originally collected in Tedlar bags and analyzed using the TAGA. The samples were selected based on the TAGA results. These samples were shipped back to the REAC Laboratory in Edison, New Jersey for confirmatory analysis using gas chromatography/mass spectrometry (GC/MS). A complete discussion of the Tenax/CMS tube analyses is included in the REAC report attached as Appendix C.

2.3 Geoprobe Soil Sampling

Based on the results of the soil gas sampling, 24 soil samples were collected using the Geoprobe macro core tube sampler. Sample depths ranged from 4 to 12 feet bgs. Samples were collected from eight locations: 140N300E, 160N0E, 180N300E, 190N415E, 220N220E, 220E300E, 230N380E, and 236N220E (Figure 2). All samples were collected on 30 April 1998. These samples were analyzed for VOCs using a modified version of U.S. EPA Method 524.2 at the REAC Laboratory in Edison, New Jersey. A complete report on the results of the sampling is included in Appendix D. Lithologic logs for the Geoprobe soil borings are included in Appendix E.

2.4 Soil Borings

On 3 June 1998, soil borings were completed at locations 180N220E, 180N300E, and 220N220E to further define the vertical extent of VOC contamination in soil and assess the vertical extent of the unconsolidated formation. A total of 28 soil samples were collected, usually at 5-foot intervals, to depths of 40 to 45 feet bgs. These samples were sent to a laboratory under subcontract to the U.S. EPA Region II Superfund Technical Assessment and Response Team (START) contractor for VOC analysis using GC/MS. Lithologic logs for the soil borings are included in Appendix E. Permits for the soil borings are included in Appendix F. Appendix G includes a copy of the final analytical report from START for the soil samples.

2.5 Monitor Well FD-1D Boring and Packer Testing

On 4 June 1998 the installation of monitor well FD-1D began at the site (see Appendix F for the well permit). This new monitor well was installed about 30 feet to the east of existing monitor well FD-1. The purpose of this well was to determine the vertical extent of VOC contamination in the bedrock aquifer underlying the site and to place the screened interval in the bottom of the contaminated zone. First, a 12-inch borehole was advanced to 80 feet bgs and then an 8-inch steel casing was installed and grouted in place. This casing was allowed to set until 8 June 1998 when an 8-inch nominal borehole was advanced below the bottom of the casing. During this first phase of drilling, the plan was to advance the borehole in 20 foot increments or until a significant water bearing interval was encountered after which a water sample would be collected using a single packer system. Using this approach, water samples were collected from the intervals 80 to 98 feet bgs, 100 to 120 feet bgs, and 122 to 142 feet bgs on 9 June and 10 June 1998. These samples were collected using a single packer to seal off the bottom 18 to 20 feet of the borehole.

After completing drilling to 142 feet bgs and receiving initial analytical results on these samples, it was decided to drill to a depth of approximately 270 feet bgs which would put the bottom of the FD-1D borehole approximately at the elevation of the bottom of the Rocky Hill Municipal well. Drilling was completed to a depth of 267 feet bgs on 15 June 1998 after which a suite of geophysical logs was run on the borehole (see Subsection 2.6). Based on the results of the geophysical logs, a double or straddle packer system was used to collect water samples from the following intervals: 135 to 155 feet bgs, 171 to 191 feet bgs, 202 to 222 feet bgs, and 235 to 255 feet bgs. These samples were collected by installing the packer system in the well to seal the deepest interval first. After collecting the sample, the system was raised to the next interval and so forth until the last, and shallowest interval was sampled. This packer testing was completed on 16 June 1998.

After the packer or straddle packer was set and inflated, the water level above the top packer was checked. During pumping the water level above the packer was monitored to ensure that a proper seal was maintained. If the water level dropped significantly, the packer was repositioned and inflated. Table 1 lists the water levels at the start and end of pumping from each interval. The water level drops during pumping ranged from 0.15 to 1.12 feet. In one case the water level actually rose 1 foot during pumping. These data indicate that a good seal was maintained during pumping and sampling thereby helping to ensure that a representative water sample was collected from the interval.

All water samples collected during the packer testing program were screened at the REAC facility in Edison, New Jersey using the P200 Field Portable Gas Chromatograph (GC). Samples were screened for TCE, cis-1,2-dichloroethene, trans-1,2-dichloroethene, and tetrachloroethene. These compounds were selected as indicator VOCs based on review of historical data. Included in Appendix H is the final report on the results of the P200 analyses. Selected samples were also submitted to a laboratory under subcontract to the U.S. EPA Region II START contractor for

confirmatory analysis of VOCs using GC/MS. The results of these analyses are included in Appendix G. Appendix E contains the lithologic log for monitor well FD-1D.

2.6 Borehole Geophysical Logging

During the period from 11 to 15 June 1998, borehole geophysical logs were collected from monitor wells MW-7D, MW-9D, MW-10D, MW-11D, MW-15D, MW-16D, MW-20D, and FD-1D. Geophysical logs collected included caliper, natural gamma-ray, electric (64 inch normal and 16 inch normal, lateral resistivity), fluid resistivity, spontaneous potential, single-point resistance, temperature, temperature gradient, and acoustic televiewer. The purpose of the geophysical logging was to help select intervals for packer test sample collection from monitor well FD-1D before installation of the well and to provide data for use in constructing a hydrogeologic cross-section through the site. Copies of the borehole geophysical logs are included in Appendix I. Included in Appendix J are copies of the lithologic and well construction logs for the existing wells where geophysical logging was completed.

Natural Gamma Log

The natural gamma log measures the total radioactivity, in counts per second (cps), in the rock surrounding the borehole. Gamma-emitting radioisotopes are natural products of the uranium-238 (U-238), thorium-232 (Th-232), and potassium-40 (K-40) decay series. Typically, fine-grained clays, shales, and micaceous rocks will exhibit a greater gamma-ray count rate than will coarse-grained sands, conglomerates, or limestones. In igneous and metamorphic rock, gamma radiation is primarily directly proportional to the felsic mineral content of the rock. The natural gamma response is usually enhanced in porphyritic zones and altered rocks because of secondary mineralization.

Fluid Resistivity Log

Fluid resistivity logging or its inverse, fluid conductivity logging, is the measurement of the electrical conductivity of the borehole fluid between two closely spaced electrodes in the sonde. The measurement is used primarily to locate points of influx or egress of waters of different quality (dissolved ionic content). Such zones may often be identified by sharp changes in conductivity. Therefore, changes in this value with depth may help to identify water-bearing fracture zones. Borehole conditions that affect the resistivity measurements are borehole size, open hole (fluid filled only), and wash-outs. The Compulog™ fluid conductivity sensor has a range of 50 to 50,000 micro-Siemens per centimeter (μS/cm), with a resolution of ± 5 μS/cm, and an accuracy of better than ±2.5 percent at 500 μS/cm.

Fluid Temperature and Delta Temperature Log

A fluid temperature log measures the temperature and change in temperature (delta temperature) of fluids in the borehole. Changes in the temperature of the borehole fluids can be an indicator of groundwater entering the borehole through fluid filled fractures. Groundwater that flows through fractures will have a temperature different from the static fluids in the borehole. Therefore, the change in the temperature of fluids in the borehole can be an indicator of groundwater influx. The delta temperature log is a measure of the change in temperature over a small distance down the borehole and is especially sensitive to small changes in the temperature gradient. The Compulog fluid temperature sensor has a range of 0 to 56 degrees Celsius (°C) with a resolution of 0.004 °C and an accuracy of better than ±5 percent.

Self-Potential Log

The self-potential (SP) log is a measure of the difference between the electrical potential of a moveable electrode in the borehole and a fixed reference electrode on the surface. The SP response results from electrochemical and electrokinetic potentials which are present at the interface between permeable beds and/or water bearing zones (e.g., bedding planes or fractures). The deflection of the SP depends on the contrast between such things as the ion content of the formation water, the clay content, and bedding thickness. The Compulog SP sensor has a range of 0 to 400 millivolts (mV) with a resolution of ±0.1 mV and an accuracy of better than ±5 percent.

Electric Logs (64-inch normal resistivity, 16-inch normal resistivity and, lateral resistivity)
The electric logs are a combination 64-inch normal resistivity, 16-inch normal resistivity, and lateral resistivity measurements. Approximately 50 percent of the signal measured by the electrode comes from a volume whose radius is twice the electrode spacing. Therefore, the 16 inch normal tool has 50 percent of its signal coming from a 32 inch radius around the tool. The 64 inch normal tool has 50 percent of its signal coming from a 128 inch radius around the tool. Because of the large volume of investigation, the resolution of the normal devices are proportional to the electrode spacing. The Compulog electrical resistivity sensors have a range of 0 to 2,000 ohm-per-meter with a resolution of ±0.1 ohm and an accuracy of better than ±5 percent.

Caliper Log

A caliper sonde provides a continuous record of borehole diameter. Caliper logs were correlated with formation conductivity, fluid conductivity, and fluid temperature logs in order to determine if fractures are water-producing or water-receiving zones. High angle fractures may not be detected with a mechanical caliper log. The logging speed (up only) was 12 feet per minute.

Acoustic Televiewer Log

The acoustic televiewer log (ATV) provides an image of the borehole wall by scanning the borehole with an acoustic transducer and measuring the amplitude and travel time of the reflected signal. The entire borehole circumference is scanned approximately 3 times per second at a frequency of approximately 2,000 hertz (Hz). The probe position around the vertical axis of the borehole is tracked with a magnetometer within the probe that orients the returned signal with respect to magnetic north. The resulting log represents the acoustical characteristics of the borehole wall as if the borehole were split along the vertical axis and laid flat. By convention, magnetic north is on the left of the log with compass directions proceeding clockwise from left to right across the log.

The returned signal may be processed by both signal strength and travel time. Fractures or openings are generally indicated by low amplitudes and long travel times. Because the entire borehole wall is scanned, the attitude of a planar surface as it enters and leaves the borehole can be calculated from the log. Thus the dip and strike of the bedrock units or of fractures can be determined by conventional trigonometry. The ATV log requires a fluid-filled borehole.

2.7 Monitor Well FD-1D Installation

Based on the results of the analysis of the packer test water samples and review of the geophysical and acoustic televiewer logs, REAC, in consultation with the ERTC Work Assignment Manager, decided to install the groundwater monitor well with a screened interval from 171 to 191 feet bgs. The packer test water sample data showed that this interval was at the bottom of the contaminated groundwater zone beneath the site and the packer test pumping, geophysical and acoustic televiewer data showed a significant water bearing fracture at 181 feet bgs.

The plan was to backfilled the borehole with cement/bentonite grout using a tremie pipe to a total depth of 193 feet. Excess grout, however, was emplaced in the borehole to a depth of 179 feet, potentially sealing off the water bearing fracture at 181 feet. The excess grout was flushed from the borehole to a depth of 194 feet bgs. The packer was reinstalled and the interval from 171 to 191 feet bgs was pumped. This test showed that the fracture at about 181 feet bgs was still yielding water (Table 1). During packer testing and water sampling of the interval it was pumped for 16 minutes at 10 gallons per minute (gpm) without running dry. After the grout was flushed the interval was pumped three times at a rate of 7 gpm for intervals of 10, 7.2, and 6.37 minutes. Pumping was stopped each time because the interval ran dry. However, significant recovery occurred withing about ½ hour after pumping stopped. Based on these observations, REAC decided that the fracture in the interval had not been sealed off, that it still yielded a significant amount of water, and that the well should be installed as planned.

After the packer was removed, a 4-inch monitor well was then installed in the borehole. The well was constructed of polyvinyl chloride (PVC) pipe and was screened from 171 to 191 feet bgs. The screen size was number 20 slot (0.02 inches). Appendix E contains the well construction log for monitor well FD-1D. After installation, the well was developed on 22 June, 24 June, and 25 June 1998. Pumping rates ranged from 1 to 6 gpm, with the screened interval frequently running dry. A total of four well volumes were removed from the well during development. During development the pH of the water was approximately 12 standard units. During packer testing the pH observed in the water samples was approximately 7.5. This elevated pH was due to the excess grout that had to be flushed from the borehole. During development the conductivity of the water ranged from 10 to 12 milliSiemans per centimeter (mS/cm) while the turbidity was less than 50 Nephelometric Turbidity Units (NTU). The well was completed on 25 June 1998 by first cutting the 8-inch outer casing off below grade and then fitting a flush mounted protective cover over the well. The inner 4-inch casing was fitted with a vented, 4-inch cap. The vent allows the water level in the well to equalize with atmospheric pressure.

2.8 Water Level Monitoring

Commencing on 1 June 1998, water level data was collected from 12 monitor wells: MW-10S, MW-10D, MW-11S, MW-11D, MW-15S, MW-15D, MW-20S, MW-20D, FD-1, FD-2, and FD-3. Complete rounds of water level measurements were collected manually on 1 June, 24 June, and 28 July 1998. Starting on 8 July 1998, the water level in monitor well FD-1D was also monitored. In addition, at the beginning of the period, automated downhole pressure transducer/data logger instruments (the In-Situ SE-4000) were deployed in six of these wells to collect water level data automatically at 15 minute intervals. The monitor wells include the shallow/deep bedrock well pairs MW-11S/MW-11D, MW-20S/MW-20D, shallow bedrock well FD-1, and deep bedrock well MW-10D. On 8 July 1998, the transducer in monitor well MW-10D was moved to monitor well FD-1D to collect water level data continuously. REAC personnel collected a final round of water level measurements on 28 July and downloaded and retrieved all the transducers at that time.

The raw data files downloaded from the transducers were converted to ASCII text files and then assembled in a spreadsheet. Depth to water and water level elevation values were calculated and hydrographs were prepared for each well. A copy of the raw data files, in ASCII text file format, are included on the diskette at the back of this report. Copies of the spreadsheets for each well, showing the transducer data, depth to water, and water level elevation are included in Appendix K.

To provide quality assurance for the data collected by the transducers, REAC personnel collected manual water level measurements and pressure head readings from each well and transducer. The pressure head reading indicates the amount of water, in feet, that the transducer "thinks" is above the sensor. REAC used this value to compute the depth to water as measured by the transducer.

REAC compared these calculated depths to water with manual measurements to check for accuracy. Using this method, REAC found that all the transducers except those installed in monitor wells MW-20S and FD-1 yielded reliable data. Transducer data from monitor wells MW-20S and FD-1 were not used and the manual measurements were used instead.

2.9 Surveying

Surveying of all soil gas and soil sampling locations, monitor wells FD-1D, MW-10S, MW-10D, MW-11S, MW-11D, MW-20S, and MW-20D, and the building corners of the office building at 451-475 Wall Street was completed on 9 July 1998. The location and elevation of monitor wells MW-15S and MW-15D were surveyed on 5 August 1998 to ensure the wells were on the same vertical datum. A copy of the surveyor's final report is included as Appendix L.

2.10 Monitor Well Groundwater Sampling

Groundwater samples were collected from monitor wells FD-1, FD-2, FD-3, FD-1D, MW-9D, MW-10S, MW-10D, MW-11S, MW-11D, MW-15S, MW-15D, MW-20S, and MW-20D during the week of 29 June 1998 by the U.S. EPA Region II START contractor. A duplicate sample was collected from monitor well MW-9D. In addition, two rinsate blanks and two trip blanks were collected. The samples were analyzed for VOCs using GC/MS by H2M Labs, Incorporated under subcontract to START. In addition, samples from monitor wells FD-1D, MW-9D, MW-10D, MW-11D, and MW-20D were analyzed for gross alpha, cobalt-60, cesium-137, potassium-40, and americium-241. These samples were analyzed by Thermo Nutech in Oak Ridge, Tennessee. Samples were analyzed for gross alpha using a modified version of U.S. EPA Method 900.0. Samples were analyzed for Cobalt-60, Cesium-137, Potassium-40, Americium-241 using a modified version of U.S. EPA Method 901.1. Included as Appendix G is a copy of the final analytical report for these analyses.

2.11 Waste Handling and Disposal

Water, soil, rock, and other solid waste were contained on site, analyzed and disposed of at the conclusion of the installation of monitor well FD-1D. Soil cuttings generated during Geoprobe™ soil sampling in April 1998 were contained on site along with cuttings from the soil borings completed in early June 1998. Two composite samples were collected from these cuttings and sent to Advanced Environmental Technical Services (AETS), REAC's waste disposal subcontractor, for characterization. During drilling of monitor well FD-1D a containment area, consisting of plastic sheeting and hay bails, was set up around the drilling rig to contain soil, rock, and water. Water was pumped from the containment area into three 30 cubic yard, water tight roll-offs equipped with plastic liners. Soil and rock cuttings were placed into a 20 cubic yard, water tight roll-off. At the conclusion of drilling, one composite cuttings sample was collected and submitted to AETS for characterization. The three composite samples were submitted by AETS to American Environmental Network (AEN) Laboratory for the following analysis: toxicity characterization leaching procedure (TCLP) by EPA Method 1311, volatiles by SW846 8260A, semivolatiles by SW846 3510A/8270B, polychlorinated biphenyl (PCBs) by SW846 3510A/8081, metals by SW846 6010A/7000A, corrosivity by SW846 9045, ignitability by SW846 1010A, and reactivity by SW846.

During drilling of the borehole for monitor well FD-1D a hydraulic hose on the rear of the drilling rig broke spilling about 5 gallons of hydraulic oil. The spill was contained in the containment area built of plastic sheeting and hay bails around the rear of the rig. Oil was absorbed with spill pads. The spill pads were disposed of in the 20 cubic yard roll off.

Water samples were collected from each of the 30-yard containers and analyzed at REAC in Edison, New Jersey for VOCs using a modified version of U.S. EPA Method 524.1. Water

samples from two of the 30-yard containers showed no detectable VOCs [detection limits of 1 to 4 microgram per liter (μg/L)]. This water, about 10,000 gallons, was disposed of on site by discharging it to a nearby storm sewer. Water from the remaining 30-cubic yard roll-off contained low levels of some VOCs. This water, about 5,000 gallons, was removed from the roll-off by AETS using a vacuum truck. The liners and any mud were removed from each of the 30-yard roll-offs and placed in the 20-yard roll off. Each container was then rinsed using hot, high pressure water. The rinsate was collected by the vacuum truck. This water was transported and disposed of off-site in an appropriate manner.

All solid waste (soil, rock, plastic sheeting, hay bails, liners from the 30-yard roll-offs, cardboard, gloves, booties, and Tyveks) were consolidated into the 20-yard roll-off for disposal off-site. This container was removed from the site by AETS and disposed of off-site in an appropriate manner.

Drums with liners were used to hold soil pending the results of characterization. Once characterization showed the soil was non-hazardous, the drums and liners were emptied into the 20-yard roll-off. The empty drums were removed from the site by Summit Drilling, the REAC drilling subcontractor.

3.0 RESULTS

3.1 Soil Gas Sampling

Soil gas sampling results are posted on Figure 2 and listed on Table 2. The highest concentrations of TCE in soil gas were detected in the vicinity of grid location 236N220E and ranged from 3,500 parts per billion by volume (ppbv) at 4 feet bgs to 4,300 ppbv at 8 feet bgs. Similar concentrations were observed 16 feet to the south of this location, at 220N220E, where TCE concentrations ranged from 1,300 ppbv at 8 feet bgs to 3,700 ppbv at 4 feet bgs. TCE concentrations in soil gas close to or above 1,000 ppb were also observed at locations 180N300E and 190N415E. Moving south and west from these locations, the concentration of TCE in soil gas fell off rapidly until it was consistently not detected at and south of the 100N grid line and west of the 160E grid line. Tenax/CMS tube samples provided good confirmation of the TAGA results and are also listed on Table 2.

3.2 Geoprobe Soil Sampling

Based on the soil gas sample results, soil samples were collected at grid locations 140N300E, 160N0E, 180N220E, 180N300E, 190N415E, 220N220E, 220E300E, 230N380E, and 236N220E. These locations were selected to determine if the soil gas results represented the presence of TCE in soil. The results of the soil sampling conducted using the Geoprobe™ are posted on Figure 2 and listed on Table 3. These results show that TCE was detected above 1,000 micrograms per kilogram (μg/kg) in samples collected from 4 to 14 feet bgs at location 220N220E. Within 40 feet of this location, to the east and southeast, concentrations of TCE in soil dropped significantly to concentrations ranging from 9.4 μg/kg (236N220E at 8 feet) to 240 μg/kg (220N300E at 4 feet). Further to the east, at locations 230N380E and 190N415E, TCE concentrations in soil were less than 10 μg/kg. Finally, soil samples were collected at location 160N0E, on the west side of the office building, to check soil gas sample results and TCE was not detected in samples from 4 and 8 feet bgs. Acetone, methylene chloride, cis-1,2-dichloroethene, chloroform, 1,2-dichloroethene, 1,1,2-Trichloroethene, toluene, and tetrachloroethene were also detected but only at significant concentrations in the samples from location 220N220E.

3.3 Soil Borings

To confirm the Geoprobe™ soil sample results, further assess vertical extent of soil contamination, and check on the extent of soil contamination to the south of location 220N220E,

soil borings were completed to auger refusal at locations 180N220E, 220N220E, and 180N300E. The results of the soil borings are posted on Figure 2 and listed on Table 3. The results from the boring at location 180N300E were consistent with the Geoprobe™ soil sample results. TCE was detected in samples from 5, 15, 20, and 25 feet bgs at concentrations ranging from 16 to 66 μg/kg. TCE was not detected from 30 to 45 feet bgs at this location. The results from location 180N220E showed TCE in samples from 5 to 30 feet bgs at concentrations ranging from 52 to 130 μg/kg. TCE was not detected from 35 to 40 feet bgs at this location. Finally, the results from location 220N220E showed that TCE concentrations above 1,000 μg/kg extend from 5 to 30 feet bgs, with the maximum concentration of 8,000 μg/kg at 20 feet bgs. TCE was detected at 19 μg/kg in the sample from 34 feet bgs and then it was not detected in the sample from 41 feet bgs at this location. Acetone, methylene chloride, total 1,2-dichloroethene, chloroform, 1,2-dichloroethene, 1,1,2-Trichloroethene, toluene, and tetrachloroethene were also detected but only at significant concentrations in the samples from location 220N220E.

3.4 Overburden Lithology

During drilling of the soil borings, soil samples were collected continuously using a split-spoon sampler. The overburden consisted of unconsolidated, dark reddish brown silt with some fine grained sand and some clay. Moisture content ranged from dry to moist. No significant water bearing zones were encountered in the overburden. Depth to bedrock was determined by split-spoon refusal, and was determined to be at 45 feet bgs at 180N300E, 47 feet bgs at 180N220E, and 43 feet bgs at 220N220E (Figure 2).

3.5 Packer Testing

The results of the packer testing conducted in the borehole for monitor well FD-1D are listed in Table 1. TCE was detected in the samples collected from 80 to 98 feet bgs and 122 to 142 feet bgs at concentrations of 80 and 26 to 37 parts per billion, by weight/volume (ppb w/v). Trans-1,2-dichloroethene was also detected in these samples and in the sample from 135 to 145 feet bgs at concentrations ranging from 12 to 29 ppb w/v. None of the target analytes were detected in samples collected from 171 to 191 feet bgs, 202 to 222 feet bgs, and from 235 to 255 feet bgs. Based on these results, REAC personnel in consultation with the ERTC Work Assignment Manager, decided to screen the monitor well, FD-1D, from 171 to 191 feet bgs. In this way the screened zone allows monitoring of the bottom of the contaminated zone in the aquifer beneath the site.

3.6 Bedrock Lithology and Borehole Geophysical Surveying

The site is underlain by the Passaic Formation (referred to as the Brunswick Formation in the Woodward Clyde, 1988) which consists of varying thicknesses of red shale, mudstone, siltstone, and argillite. During drilling of the borehole for monitor well FD-1D, the borehole lithology was logged from cuttings as the borehole was advanced using air rotary drilling. The bedrock consisted of reddish gray and gray shale and gray to grayish brown calcareous mudstones in alternating layers. The red shale was observed from 80 to 98 feet bgs. At 98 feet bgs calcite grains were observed in the rock and the color began to shift to dark reddish gray as the rock type began to shift to mudstone. At 135 feet bgs the transition to a gray color was complete. A calcareous gray mudstone was observed from 138 to 162 feet bgs. At 162 feet bgs the rock became a grayish red mudstone, only weakly reactive to acid (indicating a low calcium carbonate concentration) and pyrite crystals were observed in about 10 percent of the rock matrix. This grayish red, silty, non calcareous mudstone was observed to the bottom of the borehole. (Since the borehole was logged from cuttings, the depths sited above are not sharp breaks but rather depths at which changes became apparent in the rock cuttings.) The lithology encountered in the monitor well FD-1D boring was similar to that reported by Woodward Clyde (1988) for the deep bedrock monitor wells that they installed.

Figure 3 shows the gamma-ray and 64-inch resistivity logs from 120 to 260 feet bgs in the borehole for monitor well FD-1D. These logs show a cycle where the natural gamma ray readings rise and fall with a period of about 18 feet. Similarly, the resistivity values follow the same cycle only the resistivity highs correspond to the gamma ray lows and the resistivity lows correspond to the gamma ray highs. This pattern is representative of a changing depositional environment caused by the rise and fall of water levels on a geologic time scale on the order of 20,000 years. High resistivity/low gamma readings are indicative of shallow water depositional environments. Such environments would tend to produce the reddish, non-calcareous mudstone or shale observed in the FD-1D borehole. Low resistivity/high gamma readings are indicative of deeper water depositional environments. Such environments would tend to produce the grayish, calcareous mudstone observed in the FD-1D borehole.

This pattern in the gamma-ray and resistivity data was observed in all the wells in which geophysical logging was completed during this project. This is not surprising since they are all relatively close together in the same bedrock unit. Figure 4 shows the location of two cross-sections prepared to illustrate the results of the geophysical logging.

Figure 6 shows cross-section A-A' which trends northeast-southwest and includes monitor wells MW-7D, MW-9D, MW-20D, FD-1D, and MW-11D. Figure 7 shows cross-section B-B' which trends north-south and includes monitor wells MW-16D, MW-10D, MW-20D, and MW-15D. Included on the cross-section are the natural gamma-ray logs and fracture and bedding plane locations as identified from the caliper and acoustic televiewer logs. Also included are the locations where groundwater is believed to either be entering or leaving the borehole based on temperature and fluid resistivity logs. Table 4 summarizes the borehole anomalies identified from the caliper, fluid resistivity, temperature, and acoustic televiewer logs. This data was used in constructing the cross-sections. Note that the rightward shift in gamma ray data in each log indicates where the bottom of the steel casing is in each well. Depths range from about 25 feet in monitor well MW-11D to about 100 feet at monitor well MW-20D. That the gamma-rays are attenuated by the steel casing indicates that their source in the formation is uranium decay. Uranium decay produces less energetic gamma rays than the decay of potassium-40.

The fracture strike data (true north) obtained from the acoustic televiewer was used to construct a rose diagram (circular histogram). The rose diagram for 173 fractures and bedding planes is shown in Figure 5. This diagram shows that the bulk of the fractures strike north 87 degrees west (N87W). Dip azimuth and dip angle data for the fractures and bedding planes identified from the ATV logs are included in Table 4.

3.7 Water Level Monitoring

Figures 8 through 14 show hydrographs for monitor wells MW-10D, MW-11S, MW-11D, MW-15S and MW-15D, MW-20S, MW-20D, and FD-1, FD-2, and FD-3. These data show three trends: 1) the water level in the wells were observed to be declining between 1 June and 28 July 1998; 2) the deep bedrock monitor wells MW-10D, MW-11D, and MW-20D show a daily, periodic rise and fall in water level consistent with the influence of pumping at the Rocky Hill Municipal well; and 3) there is a strong vertical downward flow gradient from the shallow bedrock to the deeper bedrock. This regular periodic trend is imposed on the overall drop in water levels in each of these wells. The regular, periodic rise and fall in water level is largest in monitor well MW-10D where it is about 15 feet. This well is closest to the municipal well. At monitor well MW-20D the rise and fall is about 6 feet. This well is further from the municipal well than monitor well MW-10D. At monitor well MW-11D, the furthest well from the municipal well, the rise and fall is only about 3 feet. (Since continuous water level data was not collected from monitor well MW-15D it is not possible to determine if the same periodic rise and fall of water levels occurs in this well.) The drop in the shallow bedrock wells was slow and continuous without any periodic daily fluctuations such as those observed in the deep wells.

Rainfall data was checked for weather stations near the site and showed that precipitation was about normal and not excessively low for the period June-July 1998. This observation suggests that the decline in water levels observed in monitor wells is related to consumption or a seasonal decline in recharge. During June 1998 a total of 1.76 inches of precipitation was recorded at Trenton, New Jersey, south of the site. During July 1998 a total of 4.31 inches of precipitation was recorded at Trenton, New Jersey. These observations are normal for this station. Data was also checked at Newark Airport, to the north of the site. During June 1998 a total of 5.98 inches of precipitation was recorded at Newark, New Jersey. This was 2.76 inches greater that the normal precipitation for June at this station. In July 1998, 1.34 inches of precipitation was recorded at Newark, New Jersey which was 3.16 below the normal for this month. There is a weather station at Wertsville, New Jersey which is closer to the site but data for the June-July 1998 period is not available at this time. This data was obtained online from the National Oceanographic and Atmospheric Administration's National Climatic Data Center website at http://www.ncdc.noaa.gov.

Over the period from 1 June 1998 to 28 July 1998, the slow, steady drop in water levels ranged from 5 to 8 feet in the shallow bedrock monitor wells MW-10S, MW-11S, MW-15S, and FD-1. In monitor wells FD-2 and FD-3, over the same period, the drop was 3 to 4 feet. During this period, the drop in the deep bedrock monitor wells was 3 feet in MW-10D, 6 feet in MW-11D, 6 feet in MW-15D, and 8 feet in MW-20D.

Figures 15, 16, and 17 show water level elevations from monitor wells MW-10D, MW-11D, and MW-20D. These data were collected by transducers over 3 day periods: 4-6 June 1998 (Figure 15), 22-24 June 1998 (Figure 16), and 26-28 July 1998 (Figure 17).

Figure 15 shows that during the early June period the drawdown periods lasted about 3 hours and the recovery period lasted 5 to 9 hours. The drawdown was about 14 feet in monitor well MW-10D, dropped to about 6 feet at monitor well MW-20D, and was only about 3 feet in monitor well MW-11D.

Figure 16 shows that during the late June period the drawdown periods lasted about 2 to 3 hours, with one exception, and the recovery period lasted five to ten hours, again with one exception. This one exception was the drawdown period which began at about 1700 hours on 23 June 1998 and ended at about 0500 hours on 24 June 1998. This was followed by a recovery period of about 13 hours. The drawdown was about 14 feet in monitor well MW-10D, dropped to about 7 feet at monitor well MW-20D, and was only 3 to 4 feet in monitor well MW-11D.

Figure 17 shows that during the late July period the drawdown periods lasted about 3 hours and the recovery period lasted about 3 to 6 hours. Since the transducer had been removed from monitor well MW-10D at this point, data from this well was not available. At monitor well MW-11D, the drawdown was about 2 to 3 feet, down from about 3 to 4 feet in late June 1998. At monitor well MW-20D, the drawdown was at least 2 feet. However, due to the general decline in water levels, the transducer in monitor well MW-20D was dewatered (water level fell below transducer) during part of the drawdown phase as indicated by the flat line in the graph of the data.

Figure 18 shows the hydrograph for monitor well FD-1D. The initial rise in the water level between 6 and 13 July 1998 reflects recovery of the well after the completion of development. After 13 July 1998, the water level falls along a line connecting it with an earlier, pre-development water level, collected on 22 June 1998. These data suggest a drop of 3 feet in the water level in the wells between 22 June and 28 July 1998. In addition, it is noteworthy that the periodic, daily water level fluctuation observed in the other three deep bedrock wells was not observed in monitor well FD-1D. This observation suggests that the fracture screened by monitor

well FD-1D is not well connected to the fracture system influenced by pumping at the municipal well.

Transducer data from monitor wells FD-1 and MW-20S was not used to prepare hydrographs since the transducers malfunctioned. The transducer in monitor well FD-1D collected data which diverged from manual measurements collected overtime from the monitor well. After the transducer from monitor well MW-20S was retrieved it was found that the transducer had leaked and water damaged the instrument. The manually collected data has been used in place of the transducer data in the hydrographs prepared for these two wells.

Review of the well construction data in Table 5 indicates that the monitor wells installed at and in the vicinity of the site monitor three zones. Monitor wells MW-10S, MW-11S, and MW-15S monitor the shallow bedrock zone. Monitor wells FD-1, FD-2, FD-3, and MW-20S monitor the intermediate depth bedrock zone and monitor wells MW-10D, MW-11D, MW-15D, and MW-20D monitor the deep bedrock zone. The pattern of water level change observed in monitor wells MW-10D, MW-11D, and MW-20D suggest that the deep bedrock zone is confined. The nature of the intermediate depth zone is undetermined while the shallow bedrock zone is probably unconfined.

REAC prepared potentiometric surface maps using data from 1 June 1998, 24 June 1998, and 28 July 1998 for the shallow and intermediate depth monitor wells. These surfaces are shown on Figures 19, 20, and 21. Table 6 lists the water level observations used to prepare the potentiometric surface maps. Review of these figures shows that groundwater flow in the shallow bedrock zone is to the south. This flow direction remains consistent through the end of July 1998 although the overall elevation of the surface drops about five feet from 1 June through 28 June 1998. The surfaces for the intermediate depth zone show a consistent flow direction to the west-southwest and again about a 5-foot drop in elevation over the observation period.

REAC prepared potentiometric surface maps using data from 4 June 1998, 22 June 1998, and 28 July 1998 for the deep bedrock monitor wells. These surfaces are shown on Figures 22, 23, and 24. Table 6 lists the water level observations used to prepare the potentiometric surface maps. In preparing these figures data was selected to capture the potentiometric surface just before drawdown began (maximum elevation) and just before recovery began (minimum elevation). This data was taken from the transducers where available. When transducer data was not available, the closest manual observation (in time) was used. Review of these figures shows that groundwater flow in the deep bedrock zone is to the south when the municipal well is off and recovery is nearly complete. The deep bedrock surface is about 6 to 10 feet lower in elevation that the shallow bedrock surface. This maximum elevation potentiometric surface is most clearly illustrated in Figure 23 for late June 1998. The maximum elevation surface for 28 July 1998 was constructed using data from 1000 hours because this is when the water level was checked in monitor well MW-10D. The maximum elevation was at 1100 hours. This surface shows flow to the north and south, away from monitor well MW-20D, but the surface has a very gentle gradient.

The minimum elevation potentiometric surfaces for early and late June 1998, Figures 22 and 23, show that pumping at the municipal well reverses the flow direction from the south to the north-north east with a steeper gradient to the north of MW-20D. The minimum elevation surface for 28 July was difficult to construct due to the lack of data from monitor well MW-10D at 0700 hours (the time of minimum elevation.) The potentiometric surface indicates flow to the southwest and a shallow gradient. This may indicate that as the water levels have dropped in the wells over the summer, the capture zone of the municipal well has shifted to the northeast so that while monitor wells MW-20D and MW-11D are influenced by pumping in the municipal well they are outside the well's capture zone.

3.8 Surveying

Table 7 summarizes the final surveying data. In comparing the new survey data for locations surveyed previously, such as monitor wells MW-10S, MW-10D, MW-11S, MW-11D, MW-15S, MW-15D, FD-1, FD-2, and FD-3, REAC noted that the new elevations were lower than the old elevations. For example, the new ground elevations for the wells that had been surveyed previously (MW-10S, MW-10D, MW-11S, MW-11D, MW-15S, MW-15D, FD-1, FD-2, and FD-3) were from 0.45 to 1.26 feet lower than the previously surveyed elevations. This may be due to a change in the datum between this survey and the previous survey. Periodically, datums are revised by the surveying community. In the survey performed by REAC the vertical datum was the North American Vertical Datum of 1988 and the horizontal datum was the New Jersey State Plane North American Datum of 1983 (1986 adjustment). REAC does not know what datums were used in the earlier surveys.

3.9 Monitor Well Groundwater Sampling

Table 8 summarizes the results of the groundwater sampling for VOCs that was conducted by START at the end of June 1998. Target analytes were not detected in samples from monitor wells FD-2, FD-3, MW-10S, MW-10D, MW-11S, and MW-15S. TCE was detected at trace concentrations of 3, 4, and 2 μg/L, respectively, in samples from wells FD-1D, MW-11D, and MW-15D. The highest TCE concentrations were in the samples from monitor wells MW-20S, at 140 μg/L, and MW-20D at 90 μg/L. TCE was detected at 15 μg/L in the sample from monitor well FD-1 and at 25 μg/L in the sample and duplicate from monitor well MW-9D.

Two rinsate blanks and two trip blanks were collected as part of the field quality assurance/quality control effort. Analyses of these samples showed only chloroform at the very low concentration of 2 μg/L. These results indicate that the samples were not contaminated with target analytes either by the sampling equipment or during transport to the laboratory.

The results of radionuclide analyses are not presented in this report since they are beyond the scope of this report.

4.0 CONCLUSIONS

- The highest concentrations of TCE in soil gas were observed near the northeast corner of the office building occupying the former Fifth Dimension facility at locations 236N220E and 220N220E.

- The highest concentrations of TCE and other VOCs, including 1,2-dichloroethene, were observed in soil samples from location 220N220E. TCE concentrations were greater than 1,000 μg/kg in samples from 4 to 30 feet bgs with a maximum of 8,000 μg/kg at 20 feet bgs.

- TCE and 1,2-dichloroethene are present in groundwater beneath the site as evidenced by the results for groundwater sampling at monitor well FD-1 and packer test water samples collected during the drilling of the borehole for monitor well FD-1D. The highest concentrations of both analytes, about 80 μg/L of TCE and about 40 μg/L of total 1,2-dichloroethene, were observed in groundwater samples collected during packer testing from 80 to 98 feet bgs. Concentrations decreased with depth to trace levels of 4 and 2 μg/L of TCE detected in samples collected, respectively, from 171 to 191 feet and from 202 to 222 feet.

- Pumping at the Rocky Hill Municipal well field strongly influences water levels in the bedrock aquifer in the vicinity of the former Fifth Dimension facility. When the well is pumping it induces a hydraulic gradient in the aquifer toward the pumping well.

- Soil and groundwater quality data indicate that the former Fifth Dimension facility is a source of VOC contamination, principally TCE and 1,2-dichloroethene, to the bedrock aquifer beneath the site.

- The water level observations and water quality data (from both the packer testing and groundwater monitor well sampling conducted in early July 1998) indicate that pumping at the Rocky Hill municipal well creates a groundwater flow gradient which has drawn contaminated groundwater from the vicinity of the former Fifth Dimension facility towards the municipal well field. This movement of contaminants has resulted in the highest concentrations of TCE and 1,2-dichloroethene being observed in groundwater samples collected from monitor wells MW-20S and MW-20D in early July 1998. These monitor wells are between the municipal well and the former Fifth Dimension facility.

REFERENCES

Woodward Clyde 1988. "Remedial Investigation/Feasibility Study for Montgomery Township Housing Development/Rocky Hill Municipal Well Field Site." Prepared for the New Jersey Department of Environmental Protection, Division of Hazardous Site Mitigation, Bureau of Site Management, Trenton, New Jersey. Woodward Clyde Consultants, Wayne, New Jersey. January 1988.

Tables

TABLE 1
Packer Test Water Sample Results
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Sample[1]	Laboratory Instrument	Interval (feet bgs)	Date Collected	Flow Rate (gpm)	Minutes Pumped	Depth to Water at Start[2]	Depth to Water at Stop[3]	Change in Water Level (feet)	Trichloro-ethene	cis-1,2-Dichloro-ethene[4]	trans-1,2-Dichloro-ethene	Tetrachloro-ethene	Toluene[5]
FD-1D-98	P200	80 to 98	9 June 1998	10	15	not recorded (nr)	nr	n/a	80	10 U	20	10 U	n/a
FD-1D-98 Duplicate	P200	80 to 98	9 June 1998						80	10 U	20	10 U	n/a
FD-1D-98	GC/MS	80 to 98	9 June 1998						84	21	n/a	10 U	9 J
FD-1D-98 Duplicate	GC/MS	80 to 98	9 June 1998						89	23	n/a	10 U	4 J
FD-1D-120	P200	100 to 120	10 June 1998	8.8	2[6]	nr	nr	n/a	10 U	10 U	10 U	10 U	n/a
FD-1D-142	P200	122 to 142	10 June 1998	10	3	56.7	57.66	0.96	26	10 U	10 U	10 U	n/a
FD-1D-142	P200	122 to 142	10 June 1998						33	10 U	12	10 U	n/a
FD-1D-142	P200	122 to 142	10 June 1998						33	10 U	12	10 U	n/a
FD-1D-142	P200	122 to 142	10 June 1998						37	10 U	12	10 U	n/a
FD-1D-142	GC/MS	122 to 142	10 June 1998						49	15	n/a	10 U	1 J
FD-1D-145	P200	135 to 155	16 June 1998	10	14.5	35.01	36.13	1.12	10 U	10 U	29	10 U	n/a
FD-1D-181	P200	171 to 191	16 June 1998	10	16	35.8	36.75	0.95	10 U	10 U	10 U	10 U	n/a
FD-1D-181	GC/MS	171 to 191	16 June 1998						4 J	10 U	n/a	10 U	10 U

bgs = below ground surface
All P200 results are in parts per billion, by weight/volume. P200 analytical work was performed by REAC in Edison, NJ.
All GC/MS results are in μg/L (micrograms per Liter). GC/MS analytical work was performed by a laboratory under subcontract to START.
U = not detected, value to left is the detection limit, J = estimated concentration, n/a = not analyzed, n/r = not recorded
1. For samples FD-1D-198, 120, and 142, the number is the depth of the bottom of the sample interval in feet bgs. For the other samples, the number indicates the midpoint of the sample interval.
2. Depth to water above packer at start of pumping.
3. Depth to water above packer at stop of pumping, if similar to depth to water above packer at start of pumping this indicates a good seal.
4. In the GC/MS analyses the value of cis-1,2-dichloroethene is for total 1,2-dichloroethene.
5. Toluene was not analyzed for in the P200 analyses.
6. This interval was pumped dry after 4 minutes of pumping on 9 June 1998 and allowed to recover over night.
7. Straddle packer test conducted on interval from 171 to 191 feet after grout was flushed from this interval.

TABLE 1 (Cont'd)
Packer Test Water Sample Results
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Sample [1]	Laboratory Instrument	Interval (feet bgs)	Date Collected	Flow Rate (gpm)	Minutes Pumped	Depth to Water at Start[2]	Depth to Water at Stop[3]	Change in Water Level (feet)	Trichloro-ethene	cis-1,2-Dichloro-ethene[4]	trans-1,2-Dichloro-ethene	Tetrachloro-ethene	Toluene[5]
171-191 [7]	n/a	171-191	18 June 1998 @ 1500 hours	7	10 (ran dry)	35.10	35.9	0.8	n/a	n/a	n/a	n/a	n/a
171-191 [7]	n/a	171-191	18 June 1998 @ 1536 hours	7	7.2 (ran dry)	about 50	n/r	n/a	n/a	n/a	n/a	n/a	n/a
171-191 [7]	n/a	171-191	19 June 1998 @0815 hours	7	6.37 (ran dry)	35.05	35.73	0.68	n/a	n/a	n/a	n/a	n/a
FD-1D-212	P200	202 to 222	16 June 1998	10	16	36.59	36.74	0.15	10 U	10 U	10 U	10 U	n/a
FD-1D-212	GC/MS	202 to 222	16 June 1998						2 J	10 U	n/a	10 U	10 U
FD-1D-245	P200	235 to 255	16 June 1998	10	52	40.7	39.7	-1	10 U	10 U	10 U	10 U	n/a
FD-1D-245 Duplicate	P200	235 to 255	16 June 1998						10 U	10 U	10 U	10 U	n/a

bgs = below ground surface
All P200 results are in parts per billion, by weight/volume. P200 analytical work was performed by REAC in Edison, NJ.
All GC/MS results are in μg/L (micrograms per Liter). GC/MS analytical work was performed by a laboratory under subcontract to START.
U = not detected, value to left is the detection limit, J = estimated concentration, n/a = not analyzed, n/r = not recorded
1. For samples FD-1D-198, 120, and 142, the number is the depth of the bottom of the sample interval in feet bgs. For the other samples, the number indicates the midpoint of the sample interval.
2. Depth to water above packer at start of pumping.
3. Depth to water above packer at stop of pumping, if similar to depth to water above packer at start of pumping this indicates a good seal.
4. In the GC/MS analyses the value of cis-1,2-dichloroethene is for total 1,2-dichloroethene.
5. Toluene was not analyzed for in the P200 analyses.
6. This interval was pumped dry after 4 minutes of pumping on 9 June 1998 and allowed to recover over night.
7. Straddle packer test conducted on interval from 171 to 191 feet after grout was flushed from this interval.

TABLE 2
Soil Gas Sample Results
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

REAC Sample Number	Northing	Easting	Sample Depth (feet bgs)	Date Sample Collected	Trichloro-ethene	1,2-Dichloro-ethene (trans-1,2-DCE for Tenax/CMS Results)	Benzene	Tetrachloro-ethene	Toluene	Vinyl Chloride	Xylene
SG04078	60	260	8	4/27/98	4.2 J	DL=4.1	6.1 J	DL=1.6	8.6 J	2.2 J	10 J
SG04078B Duplicate of SG04078	60	260	8	4/27/98	3.8 J	DL=4.1	DL=5.1	DL=1.6	8.0 J	DL=2.0	11 J
SG04088	60	300	8	4/28/98	1.8 J	DL=4.3	DL=5.4	DL=1.8	DL=7.0	DL=2.0	DL=7.2
SG04089	70	220	8	4/28/98	2.2 J	DL=4.3	DL=5.4	DL=1.8	9.3 J	DL=2.0	39
SG04094	100	0	8	4/28/98	DL=1.7	DL=4.3	DL=5.4	DL=1.8	9.8 J	2.1 J	17 J
SG04093	100	40	8	4/28/98	DL=1.7	DL=4.3	DL=5.4	DL=1.8	DL=7.0	DL=2.0	11 J
SG04091	100	100	8	4/28/98	DL=1.7	DL=4.3	6.8 J	DL=1.8	10 J	4.1 J	20 J
AB06595 Tenax/CMS Confirmatory Sample	100	100	8	4/28/98	1 J	10 U	8 J	10 U	11	10 U	8 J
SG04090	100	160	8	4/28/98	DL=1.7	DL=4.3	DL=5.4	DL=1.8	DL=7.0	2.5 J	DL=7.2
SG04079	100	220	8	4/27/98	3.7 J	10 J	5.5 J	DL=1.6	16 J	2.5 J	14 J
SG04073	100	260	8	4/27/98	DL=1.6	DL=4.1	6.3 J	DL=1.6	11 J	DL=2.0	15 J
SG04074	100	300	8	4/27/98	2.5 J	25	6.5 J	DL=1.6	16 J	10	23 J
SG04082	140	220	8	4/27/98	78	21	5.2 J	3.5 J	10 J	3.2 J	12 J

All results in parts per billion by volume (ppbv)
DL =Detection limit, in ppbv
U = Not detected, value to left is detection limit
CMS = Carbonized molecular sieve
J =Results above DL, below Quantitation Limit
DCE = dichloroethene
bgs = below ground surface

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TABLE 2 (Cont'd)
Soil Gas Sample Results
Rocky Hill Municipal Well Field Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

REAC Sample Number	Northing	Easting	Sample Depth (feet bgs)	Date Sample Collected	Trichloro-ethene	1,2-Dichloro-ethene (trans-1,2-DCE for Tenax/CMS Results)	Benzene	Tetrachloro-ethene	Toluene	Vinyl Chloride	Xylene
AB06598 Tenax/CMS Confirmatory Sample	140	220	8	4/27/98	83	10 U	7 J	4 J	11	10 U	7 J
SG04071	140	260	8	4/27/98	25	6.1 J	5.5 J	DL=1.6	11 J	DL=2.0	14 J
SG04075	140	300	8	4/27/98	97	13 J	6.9 J	4.3 J	12 J	2.6 J	29
AB06592 Tenax/CMS Confirmatory Sample	140	300	8	4/27/98	100	10 U	7 J	5 J	20	10 U	11
AB06592 Duplicate Tenax/CMS Confirmatory Sample	140	300	8	4/27/98	99	10 U	7 J	5 J	9 J	10 U	13
SG04121	150	340	8	4/29/98	25	DL=4.8	7.3 J	2.1 J	DL=9.6	3.2 J	11 J
SG04122 Duplicate of SG04121	150	340	8	4/29/98	11	DL=4.8	DL=6.2	DL=2.1	DL=9.6	DL=2.5	10 J
SG04123	150	380	8	4/29/98	3.5 J	DL=4.8	DL=6.2	DL=2.1	DL=9.6	DL=2.5	6.7 J
SG04124	150	420	8	4/29/98	2.4 J	DL=4.8	DL=6.2	DL=2.1	DL=9.6	DL=2.5	8.7 J
SG04097	160	0	8	4/28/98	DL=1.7	DL=4.3	DL=5.4	DL=1.8	7.4 J	DL=2.0	12 J
SG04098 Duplicate of SG04097	160	0	8	4/28/98	DL=1.7	DL=4.3	DL=5.4	DL=1.8	DL=7.0	DL=2.0	11 J
SG04083	180	220	8	4/27/98	260	83	DL=5.1	3.4 J	9.2 J	2.5 J	9.4 J
SG04084	180	220	8	4/27/98	8.8	14	DL=5.1	DL=1.6	DL=7.9	DL=2.0	DL=7.6

All results in parts per billion by volume (ppbv)
DL =Detection limit, in ppbv
U = Not detected, value to left is detection limit
CMS = Carbonized molecular sieve
J =Results above DL, below Quantitation Limit
DCE = dichloroethene
bgs = below ground surface

TABLE 2 (Cont'd)
Soil Gas Sample Results
Rocky Hill Municipal Well Field Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

REAC Sample Number	Northing	Easting	Sample Depth (feet bgs)	Date Sample Collected	Trichloro-ethene	1,2-Dichloro-ethene (trans-1,2-DCE for Tenax/CMS Results)	Benzene	Tetrachloro-ethene	Toluene	Vinyl Chloride	Xylene
SG04077	180	260	8	4/27/98	15	DL=4.1	DL=5.1	DL=1.6	8.1 J	DL=2.0	13 J
SG04105	180	300	4	4/28/98	1100	98	6.9 J	21	12 J	2.6 J	20 J
SG04113	180	300	4	4/29/98	110	11 J	DL=6.2	2.9 J	DL=9.6	DL=2.5	7.9 J
A14204 Tenax/CMS Confirmatory Sample	180	300	4	4/29/98	110	5 U	6	3 J	5	5 U	4 J
SG04076	180	300	8	4/27/98	1700	2700	35	1400	64	70	150
SG04106	180	300	12	4/28/98	140	14 J	DL=6.2	2.9 J	DL=9.6	DL=2.5	16 J
SG04107	180	300	12	4/28/98	90	8.4 J	DL=6.2	2.5 J	DL=9.6	DL=2.5	14 J
SG04114	180	300	12	4/29/98	83	7.3 J	DL=6.2	3.1 J	DL=9.6	DL=2.5	8.1 J
SG04109	190	340	8	4/28/98	1800	130	8.9 J	63	13 J	2.9 J	24
SG04115	190	340	8	4/29/98	54	6.9 J	DL=6.2	2.7 J	DL=9.6	DL=2.5	11 J
SG04116	190	380	8	4/29/98	11	DL=4.8	DL=6.2	DL=2.1	DL=9.6	DL=2.5	11 J
SG04117	190	415	8	4/29/98	990	55	DL=6.2	83	DL=9.6	DL=2.5	10 J
SG04099	200	0	4	4/28/98	DL=1.7	DL=4.3	DL=5.4	DL=1.8	10 J	DL=2.0	27

All results in parts per billion by volume (ppbv)
DL =Detection limit, in ppbv
U = Not detected, value to left is detection limit
CMS = Carbonized molecular sieve
J =Results above DL, below Quantitation Limit
DCE = dichloroethene
bgs = below ground surface

TABLE 2 (Cont'd)
Soil Gas Sample Results
Rocky Hill Municipal Well Field Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

REAC Sample Number	Northing	Easting	Sample Depth (feet bgs)	Date Sample Collected	Trichloro-ethene	1,2-Dichloro-ethene (trans-1,2-DCE for Tenax/CMS Results)	Benzene	Tetrachloro-ethene	Toluene	Vinyl Chloride	Xylene
AB06596 Tenax/CMS Confirmatory Sample	200	0	4	4/28/98	5 U	5 U	4 J	5 U	9	5 U	15
SG04100	200	0	8	4/28/98	DL=1.7	DL=4.3	DL=5.4	DL=1.8	DL=7.0	DL=2.0	9.6 J
SG04101	200	0	12	4/28/98	DL=1.7	DL=4.3	DL=5.4	DL=1.8	7.7 J	DL=2.0	12 J
SG04085	220	220	8	4/27/98	3700	100	7.0 J	12	29	29	11 J
SG04086	220	220	8	4/27/98	1300	39	DL=5.1	2.6 J	15 J	15	13 J
SG04103	220	260	8	4/28/98	51	8.4 J	DL=5.4	DL=1.8	7.8 J	2.3 J	17 J
SG04104	220	300	8	4/28/98	250	24	6.3 J	8.6	9.0 J	DL=2.0	16 J
AB06594 Tenax/CMS Confirmatory Sample	220	300	8	4/28/98	230	10 U	9 J	10	8 J	10 U	6 J
SG04120	230	340	8	4/29/98	17	5.1 J	DL=6.2	DL=2.1	9.6 J	2.8 J	12 J
SG04126	230	380	4	4/29/98	1400	96	DL=6.2	95	DL=9.6	DL=2.5	9.5 J
SG04127 Duplicate of SG04126	230	380	4	4/29/98	1600	110	DL=6.2	110	DL=9.6	DL=2.5	8.6 J
SG04128	230	380	8	4/29/98	6.3 J	DL=4.8	DL=6.2	DL=2.1	DL=9.6	DL=2.5	7.5 J
SG04129 Duplicate of SG04128	230	380	8	4/29/98	3.5 J	DL=4.8	DL=6.2	DL=2.1	DL=9.6	DL=2.5	7.8 J

All results in parts per billion by volume (ppbv)
DL =Detection limit, in ppbv
U = Not detected, value to left is detection limit
CMS = Carbonized molecular sieve
J =Results above DL, below Quantitation Limit
DCE = dichloroethene
bgs = below ground surface

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TABLE 2 (Cont'd)
Soil Gas Sample Results
Rocky Hill Municipal Well Field Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

REAC Sample Number	Northing	Easting	Sample Depth (feet bgs)	Date Sample Collected	Trichloro-ethene	1,2-Dichloro-ethene (trans-1,2-DCE for Tenax/CMS Results)	Benzene	Tetrachloro-ethene	Toluene	Vinyl Chloride	Xylene
SG04125	230	420	8	4/29/98	DL=2.1	DL=4.8	DL=6.2	DL=2.1	DL=9.6	DL=2.5	7.4 J
SG04102	232	40	2	4/28/98	3.4 J	DL=4.3	DL=5.4	DL=1.8	DL=7.0	DL=2.0	11 J
AB06597 Tenax/CMS Confirmatory Sample	232	40	2	4/28/98	3	3 U	2 J	0.4 J	6	3 U	4
SG04108	236	220	4	4/28/98	830	21	DL=6.2	DL=2.1	10 J	3.2 J	18 J
SG04110	236	220	4	4/29/98	3500	62	6.3 J	8.6	DL=9.6	14	14 J
SG04111	236	220	8	4/29/98	4300	57	6.6 J	12	10 J	15	15 J
AB14202 Tenax/CMS Confirmatory Sample	236	220	8	4/29/98	3300 E	50 U	32 J	12 J	70	50 U	19 J
SG04080 Ambient Air Sample	Collected at 140N220E		n/a	4/27/98	2.8 J	DL=4.1	DL=5.1	DL=1.6	DL=7.9	DL=2.0	8.0 J
SG04081 Equipment Blank	Collected at 140N220E		n/a	4/27/98	2.5 J	DL=4.1	DL=5.1	DL=1.6	DL=7.9	DL=2.0	DL=7.6
SG04095 Ambient Air Sample	Collected at 100N0E		n/a	4/28/98	DL=1.7	DL=4.3	DL=5.4	DL=1.8	DL=7.0	DL=2.0	8.8 J
SG04096 Equipment Blank	Collected at 100N0E		n/a	4/28/98	DL=1.7	DL=4.3	DL=5.4	DL=1.8	DL=7.0	DL=2.0	9.5 J

All results in parts per billion by volume (ppbv)
DL =Detection limit, in ppbv
U = Not detected, value to left is detection limit
CMS = Carbonized molecular sieve
J =Results above DL, below Quantitation Limit
DCE = dichloroethene
bgs = below ground surface

TABLE 2 (Cont'd)
Soil Gas Sample Results
Rocky Hill Municipal Well Field Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

REAC Sample Number	Northing	Easting	Sample Depth (feet bgs)	Date Sample Collected	Trichloro-ethene	1,2-Dichloro-ethene (trans-1,2-DCE for Tenax/CMS Results)	Benzene	Tetrachloro-ethene	Toluene	Vinyl Chloride	Xylene
SG04118 Ambient Air Sample	Collected at 190N415E		n/a	4/29/98	3.7 J	DL=4.8	DL=6.2	DL=2.1	DL=9.6	DL=2.5	7.6 J
SG04119 Equipment Blank	Collected at 190N415E		n/a	4/29/98	DL=2.1	DL=4.8	DL=6.2	DL=2.1	DL=9.6	DL=2.5	8.7 J

All results in parts per billion by volume (ppbv)
DL =Detection limit, in ppbv
U = Not detected, value to left is detection limit
CMS = Carbonized molecular sieve
J =Results above DL, below Quantitation Limit
DCE = dichloroethene
bgs = below ground surface

TABLE 3
Soil Sample Results
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Northing	Easting	Sample Depth (feet bgs)[1]	Date Sample Collected	Sampling Method	Trichloro-ethane	Acetone	Methylene Chloride	2-Butanone	cis-1,2-Dichloro-ethene[2]	Chloroform	1,2-Dichloro-ethane	1,1,2-Tri-chloro-ethane	4-Methyl-2-Pentanone	Toluene	Tetrachloro-ethene	p&m Xylene[3]
140	300	4	30 April 1998	Geoprobe	44	2.7 U	11	5.5 U	1.5	1.4 U	1.4 U	1.4 U	2.7 U	1.4 U	2.4	1.4 U
140	300	8	30 April 1998	Geoprobe	37	3.0 U	1.5 U	6.0 U	2.6	1.5 U	1.5 U	1.5 U	3.0 U	1.5 U	1.6	1.5 U
160	0	4	30 April 1998	Geoprobe	1.3 U	2.6 U	1.3 U	5.2 U	1.3 U	1.3 U	1.3 U	1.3 U	2.6 U	1.3 U	1.3 U	1.3 U
160	0	8	30 April 1998	Geoprobe	1.4 U	2.7 U	1.4 U	5.5 U	1.4 U	1.4 U	1.4 U	1.4 U	2.7 U	1.4 U	1.4 U	1.4 U
180	220	5	3 June 1998	Soil Boring	64	10 UJ	10 U	10 UJ	8 J	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
180	220	10	3 June 1998	Soil Boring	60	10 UJ	10 U	10 U	6 J	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	220	15	3 June 1998	Soil Boring	71	10 UJ	10 U	10 UJ	13 J	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
180	220	20	3 June 1998	Soil Boring	130	10 UJ	10 U	10 U	32	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	220	25 Duplicate	3 June 1998	Soil Boring	66	10 UJ	10 U	10 UJ	9 J	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
180	220	25	3 June 1998	Soil Boring	53	10 UJ	10 U	10 U	7 J	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	220	30	3 June 1998	Soil Boring	52	9 J	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	220	35	3 June 1998	Soil Boring	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	220	40	3 June 1998	Soil Boring	10 U	6 J	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	300	4	30 April 1998	Geoprobe	63	2.6 U	1.3 U	5.2 U	2.8	1.3 U	1.3 U	1.3 U	2.6 U	1.3 U	2.9	1.3 U
180	300	5	4 June 1998	Soil Boring	33	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	300	8	30 April 1998	Geoprobe	57	3.0 U	1.5 U	6.1 U	4	1.5 U	1.5 U	1.5 U	3.0 U	1.5 U	2.3	1.5 U
180	300	10	4 June 1998	Soil Boring	12 J	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	300	12	30 April 1998	Geoprobe	140	2.8 U	1.4 U	5.6 U	12	0.7 J	1.4 U	0.7 J	2.8 U	1.4 U	3.8	1.4 U
180	300	15	4 June 1998	Soil Boring	8 J	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	300	20	4 June 1998	Soil Boring	66	10 UJ	10 U	10 U	6 J	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	300	25	4 June 1998	Soil Boring	16	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U

All sample results are in micrograms per kilogram (μg/kg)
U = not detected, value to left is the detection limit
J = estimated concentration
1. bgs = below ground surface
2. Total 1,2- dichloroethane is listed in the "cis-1,2-dichloroethene" column for soil boring sample locations
3. Total xylenes are listed in the "p&m Xylene" column for soil boring sample locations

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TABLE 3 (Cont'd)
Soil Sample Results
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Northing	Easting	Sample Depth (feet bgs) [1]	Date Sample Collected	Sampling Method	Trichloro-ethane	Acetone	Methylene Chloride	2-Butanone	cis-1,2-Dichloro-ethene [2]	Chloroform	1,2-Dichloro-ethane	1,1,2-Tri-chloro-ethane	4-Methyl-2-Pentanone	Toluene	Tetrachloro-ethene	p&m Xylene [3]
180	300	30 Duplicate	4 June 1998	Soil Boring	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	300	30	4 June 1998	Soil Boring	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	300	35	4 June 1998	Soil Boring	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	300	40	4 June 1998	Soil Boring	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
180	300	45	4 June 1998	Soil Boring	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
190	415	4	30 April 1998	Geoprobe	2.3	200	1.5 U	5.9 U	1.5 U	1.5 U	1.5 U	1.5 U	37	1.5 U	1.5 U	1.5 U
190	415	8	30 April 1998	Geoprobe	4.4	2.9 U	1.4 U	5.8 U	1.4 U	1.4 U	1.4 U	1.4 U	2.9 U	1.4 U	1.4 U	1.4 U
220	220	2	30 April 1998	Geoprobe	590	1.5 J	1.2 U	4.8 U	5.5	2.9	17	4.5	2.4 U	0.7 J	1.2	1.2 U
220	220	4	30 April 1998	Geoprobe	1300	4.1	11	5.3 U	43	19	95	20	2.7 U	24	8.1	1.3 U
220	220	4	30 April 1998	Geoprobe	1600	2.5 J	5	5.4 U	16	7.9	49	12	2.7 U	9.6	2.7	1.4 U
220	220	5	3 June 1998	Soil Boring	2200	8 J	10 J	10 UJ	41 J	22	79 J	42	10 U	87	8 J	10 U
220	220	6	30 April 1998	Geoprobe	1900	2.9 U	15	5.9 U	35	15	120	28	2.9 U	42	7	0.5 J
220	220	8	30 April 1998	Geoprobe	2500	17	13	5.3 U	31	12	90	21	2.7 U	33	6.5	1.3 U
220	220	10	3 June 1998	Soil Boring	2600	110 J	18	10 UJ	55 J	24	81 J	49	10 U	160	13 J	10 U
220	220	10	30 April 1998	Geoprobe	2300	30	28	5.9 U	73	25	130	42	2.9 U	77	24	1.5 U
220	220	12	30 April 1998	Geoprobe	1800	59	20	5.8 U	51	15	79	32	2.9 U	81	16	1.4 U
220	220	14	30 April 1998	Geoprobe	2500	80	24	6.5	75	19	61	26	2.7 U	160	27	1.3 J
220	220	15	3 June 1998	Soil Boring	5400	360 J	18	10 UJ	98 J	16	40 J	42	10 U	170	15	10 U
220	220	20 Duplicate	3 June 1998	Soil Boring	2900	120 J	5 J	10 UJ	38 J	10 U	4 J	10 U	10 U	39	10 U	10 U
220	220	20	3 June 1998	Soil Boring	8000	100 J	18 J	10 UJ	280 J	19	15 J	36	10 U	260	26	10 U
220	220	25	3 June 1998	Soil Boring	6800	10 UJ	7 J	10 UJ	260 J	10 J	4 J	18	10 U	10 U	21	10 U

All sample results are in micrograms per kilogram (μg/kg)
U = not detected, value to left is the detection limit
J = estimated concentration
1. bgs = below ground surface
2. Total 1,2- dichloroethane is listed in the "cis-1,2-dichloroethene" column for soil boring sample locations
3. Total xylenes are listed in the "p&m Xylene" column for soil boring sample locations

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TABLE 3 (Cont'd)
Soil Sample Results
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Northing	Easting	Sample Depth (feet bgs) [1]	Date Sample Collected	Sampling Method	Trichloro-ethane	Acetone	Methylene Chloride	2-Butanone	cis-1,2-Dichloro-ethene [2]	Chloroform	1,2-Dichloro-ethane	1,1,2-Tri-chloro-ethane	4-Methyl-2-Pentanone	Toluene	Tetrachloro-ethene	p&m Xylene [3]
220	220	30	3 June 1998	Soil Boring	1800	10 UJ	10 U	10 UJ	190 J	10 U	10 U	10 U	10 U	10 U	6 J	10 U
220	220	34	3 June 1998	Soil Boring	19	10 UJ	10 U	10 U	8 J	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
220	220	41	3 June 1998	Soil Boring	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
220	300	4	30 April 1998	Geoprobe	240	2.6 U	1.3 U	5.2 U	4.3	1.3 U	1.3 U	1.3 U	2.6 U	1.3 U	24	1.3 U
220	300	8	30 April 1998	Geoprobe	120	2.9 U	1.4 U	5.8 U	8.4	1.4 U	1.4 U	1.4 U	2.9 U	1.4 U	4	1.4 U
220	300	8	30 April 1998	Geoprobe	180	2.8 U	1.4 U	5.6 U	12	1.4 U	1.4 U	1.4 U	2.8 U	1.4 U	5	1.4 U
230	380	4	30 April 1998	Geoprobe	2.1	2.7 U	1.4 U	5.4 U	1.4 U	1.4 U	1.4 U	1.4 U	2.7 U	1.4 U	1.4 U	1.4 U
230	380	8	30 April 1998	Geoprobe	3.1	2.8 U	1.4 U	5.6 U	1.4 U	1.4 U	1.4 U	1.4 U	2.8 U	1.4 U	1.4 U	1.4 U
236	220	4	30 April 1998	Geoprobe	13	2.7 U	1.4 U	5.4 U	1.4 U	1.4 U	1.4 U	1.4 U	2.7 U	2.4	1.4 U	1.4 U
236	220	8	30 April 1998	Geoprobe	9.4	2.7 U	1.4 U	5.5 U	1.4 U	1.4 U	1.8	1.4 U	2.7 U	2.6	1.4 U	1.4 U

All sample results are in micrograms per kilogram (μg/kg)
U = not detected, value to left is the detection limit
J = estimated concentration
1. bgs = below ground surface
2. Total 1,2- dichloroethane is listed in the "cis-1,2-dichloroethene" column for soil boring sample locations
3. Total xylenes are listed in the "p&m Xylene" column for soil boring sample locations

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TABLE 4
Borehole Geophysical Data Summary
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Location	Elevation of Reference Point 1.	Depth To Water at Time of Logging 2.	Water Level Elevation at Time of Logging	Elevation of Top of Fracture or Bedding Plane Defined on the ATV Log	Fracture Depth (based on Caliper)	Depth of Fluid Resistivity Anomaly	Depth of Temperature Anomaly	Water Entry Zone	Acoustic Televiewer (ATV)					
									Top of Fracture (feet bgs)	Bottom of Fracture (feet bgs)	Description	Strike (true)	Dip Angle (Degrees)	Dip Azimuth (true)
MW-07D	145.26	33.61 (TIC)	108.65	102.48	43 to 72				42.78	43.28	Fracture	104	44.21	194
				101.97					43.29	44.2	Fracture	79	59.98	169
				100.78					44.48	45.88	Fracture	89	68.81	179
				98.42					46.84	47.8	Fracture	271	64.55	1
				95.61					49.65	51.85	Fracture	102	77.22	192
				94.15					51.11	52.74	Fracture	82	70.92	172
				93.47					51.79	52.99	Fracture	84	68.75	174
				93.21					52.05	53.27	Fracture	90	69.01	180
				91.56					53.7	54.61	Fracture	93	63.37	183
				90.34					54.92	55.28	Bedding Plane	272	37.56	2
				89.27					55.99	57.61	Fracture	269	75.28	359
				88.11					57.15	58.48	Bedding Plane	274	71.89	4
				85.44					59.82	62.13	Fracture	97	75.21	187
				74.71					70.55	71.8	Fracture	85	64.83	175
				73.37					71.89	73.23	Fracture	86	66.22	176
				72.17					73.09	74.56	Fracture	81	67.55	171
				71.41					73.85	75.46	Fracture	88	69.05	178
				69.53					75.73	75.98	Bedding Plane	269	30.09	359
				67.78					77.48	77.64	Bedding Plane	275	21.32	5
				67.2					78.06	79.38	Fracture	86	65.47	176
				65.97					79.29	80.14	Fracture	90	55.62	180
				60.4					84.86	85.15	Bedding Plane	263	34.3	353
				55.32	87	87, increased Total Dissolved Solids (TDS)	87	87	89.94	92.01	Fracture	55	72.37	145
				50.84					94.42	94.55	Bedding Plane	271	19.45	1
				48.54	97 to 101				96.72	96.84	Bedding Plane	275	19.34	5
				28.74					116.52	117.09	Fracture	88	41.37	178
				28.11					117.15	118.01	Fracture	86	52.45	176
				27.62					117.64	118.56	Fracture	90	54.08	180
				3.39	140		140	140	141.87	142.02	Bedding Plane	152	9.13	242
MW-09D	151.88	48.62 (TIC)	103.26	96.46	47 to 160				48.8	50.13	Fracture	266	68.94	356
				92.3					52.96	53.41	Fracture	345	41.72	75
				90.65					54.61	54.9	Fracture	91	30.25	181
				86.83					58.43	58.73	Fracture	312	30.12	42
				85.19					60.07	60.48	Fracture	264	40.26	354
				83.11					62.15	62.28	Bedding Plane	268	14.11	358

1. All elevations are in feet above mean sea level, NAVD 1988. Note that the elevation at FD-1D was for the 8-inch casing before it was cut off below ground surface.
2. All depths are in feet below reference point. Some water level measurements were made from the top of inside casing (TIC) and some from the top of outside casing (TOC). In each case the elevation was computed using the appropriate reference point elevation.
3. For geophysical logging the reference point was the top of outside casing (TOC).

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TABLE 4 (Cont'd)
Borehole Geophysical Data Summary
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Location	Elevation of Reference Point 1.	Depth To Water at Time of Logging 2.	Water Level Elevation at Time of Logging	Elevation of Top of Fracture or Bedding Plane Defined on the ATV Log	Fracture Depth (based on Caliper)	Depth of Fluid Resistivity Anomaly	Depth of Temperature Anomaly	Water Entry Zone	Acoustic Televiewer (ATV)					
									Top of Fracture (feet bgs)	Bottom of Fracture (feet bgs)	Description	Strike (true)	Dip Angle (Degrees)	Dip Azimuth (true)
				81.87					63.39	68.72	Fracture	91	85.04	181
				81.76					63.5	63.6	Bedding Plane	259	12	349
				79.93					65.33	65.53	Bedding Plane	265	21.56	355
				79.25					66.01	70.64	Fracture	88	84.56	178
				73.95					71.31	71.69	Bedding Plane	279	37.15	9
				70.34					74.92	76.16	Fracture	120	69.01	210
				68.6					76.66	76.91	Bedding Plane	268	25.64	358
				67.55					77.71	77.9	Bedding Plane	271	20.15	1
				62.07					83.19	83.37	Bedding Plane	282	20.82	12
				60.81					84.45	84.59	Bedding Plane	287	16.42	17
				60.34			85		84.92	85.09	Bedding Plane	287	18.46	17
				59.18					86.08	86.29	Bedding Plane	283	22.95	13
				51.8					93.46	93.58	Bedding Plane	261	13.6	351
				50.01				95	95.25	95.4	Bedding Plane	268	16.3	358
				47.43					97.83	99.99	Fracture	89	76.44	179
				46.24					99.02	99.23	Bedding Plane	289	23.03	19
				41.37					103.89	103.97	Bedding Plane	269	9.97	359
				39.02					106.24	106.47	Bedding Plane	278	25.32	8
				30.62					114.64	114.72	Bedding Plane	271	9.72	1
				30.21					115.05	116.56	Fracture	49	71.09	139
				26.27					118.99	119.22	Bedding Plane	324	23.88	54
				24.92					120.34	120.43	Bedding Plane	324	9.61	54
				22.71					122.55	122.77	Bedding Plane	278	24.95	8
				21.82			123		123.44	127.78	Fracture	87	84.33	177
				17.94				125	127.32	129.66	Fracture	94	77.51	184
				16.51					128.75	130.12	Fracture	91	69.24	181
				15.55					129.71	129.73	Bedding Plane	254	3.44	344
				15.22					130.04	131.32	Fracture	105	68.44	195
				13.68					131.58	132.27	Fracture	98	53.88	188
				13.57					131.69	132.99	Fracture	109	69.23	199
				12.28					132.98	133.85	Fracture	84	59.34	174
				11.91					133.35	134.38	Fracture	88	63.98	178
				7.98					137.28	139.24	Fracture	93	75.89	183
				7.04					138.22	140.08	Fracture	97	74.75	187
				6.06					139.2	140.13	Fracture	86	61.25	176
				4.52					140.74	142.54	Fracture	104	73.81	194

1. All elevations are in feet above mean sea level, NAVD 1988. Note that the elevation at FD-1D was for the 8-inch casing before it was cut off below ground surface.
2. All depths are in feet below reference point. Some water level measurements were made from the top of inside casing (TIC) and some from the top of outside casing (TOC). In each case the elevation was computed using the appropriate reference point elevation.
3. For geophysical logging the reference point was the top of outside casing (TOC).

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TABLE 4 (Cont'd)
Borehole Geophysical Data Summary
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Location	Elevation of Reference Point 1.	Depth To Water at Time of Logging 2.	Water Level Elevation at Time of Logging	Elevation of Top of Fracture or Bedding Plane Defined on the ATV Log	Fracture Depth (based on Caliper)	Depth of Fluid Resistivity Anomaly	Depth of Temperature Anomaly	Water Entry Zone	Acoustic Televiewer (ATV)					
									Top of Fracture (feet bgs)	Bottom of Fracture (feet bgs)	Description	Strike (true)	Dip Angle (Degrees)	Dip Azimuth (true)
				4.49					140.77	141.27	Fracture	84	43.87	174
				3.62					141.64	141.78	Bedding Plane	11	14.68	101
				-0.32					145.58	145.81	Bedding Plane	242	25.98	332
				-11.55					156.81	156.85	Bedding Plane	264	4.64	354
				-29.71					174.97	175.13	Bedding Plane	268	18.76	358
				-32.09					177.35	178.7	Fracture	70	68.41	160
				-33.37					178.63	179.42	Fracture	66	56.08	156
				-36.63					181.89	182.09	Bedding Plane	319	21.98	49
				-39.88					185.14	187.28	Fracture	89	75.92	179
				-53.36					198.62	198.82	Bedding Plane	274	24.01	4
				-55.8	201	202, increased TDS	202	201	201.06	201.33	Bedding Plane	271	28.98	1
				-57.9					203.16	203.34	Bedding Plane	252	20.67	342
				-59.5					204.76	204.98	Bedding Plane	295	24.21	25
				-62.98					208.24	208.33	Bedding Plane	317	10.59	47
				-85.99					231.25	231.47	Bedding Plane	273	25.52	3
MW-10D	151.54	62.03 (TIC)	89.51	84.77					66.77	68.17	Fracture	130	71.11	220
				82.97				68	68.57	70.58	Fracture	93	75.6	183
				82.68					68.86	71.14	Fracture	98	77.7	188
				80.26					71.28	71.45	Bedding Plane	271	19.28	1
				73.94					77.6	77.73	Bedding Plane	265	14.86	355
				68.24					83.3	84.07	Fracture	94	56.42	184
				67.39					84.15	84.24	Bedding Plane	311	8.95	41
				54.99					96.55	97.65	Fracture	89	68.63	179
				53.56					97.98	99.33	Fracture	77	68.24	167
				29.44				125	122.1	122.31	Bedding Plane	298	23.29	28
				23.88					127.66	129.61	Fracture	88	74.08	178
				20.15					131.39	131.54	Bedding Plane	280	17.74	10
				18.03					133.51	133.95	Fracture	85	39.93	175
				17.09					134.45	134.82	Fracture	91	35.56	181
				13.22					138.32	139.26	Fracture	92	60.52	182
				12.29					139.25	139.9	Fracture	93	51.49	183
				11.85					139.69	140.5	Fracture	92	57.14	182
				11.07					140.47	141.24	Fracture	90	55.79	180
				8.21					143.33	144.4	Fracture	110	64.07	200
				3.02					148.52	151.75	Fracture	82	79.55	172
				-3.47	155 to 159				155.01	156.39	Fracture	100	69.22	190

1. All elevations are in feet above mean sea level, NAVD 1988. Note that the elevation at FD-1D was for the 8-inch casing before it was cut off below ground surface.
2. All depths are in feet below reference point. Some water level measurements were made from the top of inside casing (TIC) and some from the top of outside casing (TOC). In each case the elevation was computed using the appropriate reference point elevation.
3. For geophysical logging the reference point was the top of outside casing (TOC).

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TABLE 4 (Cont'd)
Borehole Geophysical Data Summary
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Location	Elevation of Reference Point 1.	Depth To Water at Time of Logging 2.	Water Level Elevation at Time of Logging	Elevation of Top of Fracture or Bedding Plane Defined on the ATV Log	Fracture Depth (based on Caliper)	Depth of Fluid Resistivity Anomaly	Depth of Temperature Anomaly	Water Entry Zone	Acoustic Televiewer (ATV)					
									Top of Fracture (feet bgs)	Bottom of Fracture (feet bgs)	Description	Strike (true)	Dip Angle (Degrees)	Dip Azimuth (true)
				-4.55					156.09	158.8	Fracture	84	78.19	174
				-10.32					161.86	162.67	Fracture	92	56.25	182
				-20.63					172.17	174.41	Fracture	98	75.9	188
				-38.61				180	190.15	190.28	Bedding Plane	289	15.18	19
				-41.25	198				192.79	192.85	Fracture	115	5.65	205
				-58.3	210				209.84	209.88	Bedding Plane	153	6.17	243
				-61.74		218, increased TDS	215	215	213.28	213.45	Bedding Plane	265	21.21	355
				-83.62					235.16	235.32	Bedding Plane	285	19.08	15
MW-11D	127.6	27.23 (TOC)	100.37	99.78					27.82	29.7	Fracture	123	74.94	213
				96.61					30.99	31	Bedding Plane	249	2.61	339
				95.29					32.31	33.77	Fracture	74	69.55	164
				93.11					34.49	37.13	Fracture	101	78.11	191
				85.8					41.8	44.15	Fracture	92	76.22	182
				56.11		60 to 80, transitional zone to increased TDS			71.49	71.52	Bedding Plane	208	3.03	298
				44.38				80	83.22	83.36	Bedding Plane	269	19.66	359
				43.36					84.24	84.34	Bedding Plane	288	15.69	18
				42.92					84.68	84.83	Bedding Plane	270	25.38	0
				42.16	85 to 99				85.44	85.53	Bedding Plane	278	15.16	8
				41.41					86.19	86.3	Bedding Plane	271	17.58	1
				34.16					93.44	98.11	Fracture	92	79.25	182
				26.33					101.27	101.41	Bedding Plane	286	21.5	16
				-31.4	161			160	159	160	Fracture	354	69	84
				-0.99					128.59	128.62	Bedding Plane	271	5.49	1
				-112.22	238 to 242				239.82	241.32	Fracture	111	56.37	201
MW-15D	123.63	20.81 (TIC)	102.82	87.43	42			48	36.2	36.27	Bedding Plane	60	7.21	150
				65.91					57.72	58.23	Fracture	127	43.24	217
				57.84	62				65.79	65.95	Bedding Plane	267	19.32	357
				51.24					72.39	72.73	Bedding Plane	197	33.55	287
				45.89				77	77.74	78.99	Fracture	113	64.16	203
				35.73					87.9	87.97	Bedding Plane	253	10.85	343
				25.24					98.39	99.02	Fracture	144	46.52	234
				18.61					105.02	105.85	Fracture	140	53.17	230
				1.85					121.78	121.88	Bedding Plane	281	18.66	11
				-4.17	128 to 138		126	132	127.8	132.45	Fracture	62	80.28	152
				-13.23				152	136.86	136.96	Bedding Plane	293	20.14	23

1. All elevations are in feet above mean sea level, NAVD 1988. Note that the elevation at FD-1D was for the 8-inch casing before it was cut off below ground surface.
2. All depths are in feet below reference point. Some water level measurements were made from the top of inside casing (TIC) and some from the top of outside casing (TOC). In each case the elevation was computed using the appropriate reference point elevation.
3. For geophysical logging the reference point was the top of outside casing (TOC).

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TABLE 4 (Cont'd)
Borehole Geophysical Data Summary
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Location	Elevation of Reference Point 1.	Depth To Water at Time of Logging 2.	Water Level Elevation at Time of Logging	Elevation of Top of Fracture or Bedding Plane Defined on the ATV Log	Fracture Depth (based on Caliper)	Depth of Fluid Resistivity Anomaly	Depth of Temperature Anomaly	Water Entry Zone	Acoustic Televiewer (ATV)					
									Top of Fracture (feet bgs)	Bottom of Fracture (feet bgs)	Description	Strike (true)	Dip Angle (Degrees)	Dip Azimuth (true)
				-48.34					171.97	175.26	Fracture	68	74.14	158
				-56.96		182, top of transitional zone to more saline water		185	180.59	183.51	Fracture	140	72.11	230
				-65.95				205	189.58	189.59	Bedding Plane	287	9.32	17
MW-16D	125.42 (Used elevation from MW-16)	17.07 (TOC)	108.35		100 to 101				ATV Log Was Not Run at this Location					
					103									
					113 to 118									
					128 to 141									
MW-20D	149.08	45.21 (TOC)	103.87	45.63					103.45	103.54	Fracture	23	10.7	113
				43.6					105.48	106.05	Fracture	103	47.63	193
				37.82	111 to 115			110	111.26	114.16	Fracture	101	78.66	191
				25.35	129 to 131				123.73	123.89	Bedding Plane	252	20.62	342
				12.32				130	136.76	136.92	Bedding Plane	264	20.81	354
				11.37					137.71	137.85	Bedding Plane	271	18.75	1
				5.19					143.89	143.99	Bedding Plane	270	15.56	360
				5.07					144.01	144.1	Bedding Plane	268	14.74	358
				4.97					144.11	144.23	Bedding Plane	291	16.33	21
				3.42	145				145.66	145.79	Bedding Plane	252	17.56	342
				-1.64					150.72	154.19	Fracture	76	77.99	166
FD-1D	139.03	38.5 (Temporary TOC)	100.53	55.89				80	83.14	84.59	Fracture	303	63.53	33
				49.25					89.78	89.95	Bedding Plane	310	16.65	40
				32.46					106.57	106.86	Fracture	98	19	188
				29.49					109.54	109.73	Bedding Plane	198	18.32	288
				15					124.03	124.23	Bedding Plane	310	21.61	40
				11.17					127.86	128.94	Fracture	63	53.4	153
				1.85			135		137.18	137.32	Bedding Plane	338	12.24	68
				-0.08	142 to 145		137		139.11	139.24	Bedding Plane	329	11.34	59
				-11.37					150.4	150.47	Bedding Plane	250	13.33	340
				-17.32	155			156	156.35	156.47	Bedding Plane	112	3.1	202
				-19.72					158.75	159.7	Fracture	230	63.61	320
				-40.72					179.75	180.88	Fracture	213	67.1	303
				-43.62	181				182.65	182.74	Bedding Plane	207	8.99	297
				-86.9	211				225.93	226	Bedding Plane	277	16.82	7
				-92.9				241	231.93	232.34	Fracture	142	24.37	232
				-118.94	245				257.97	258.4	Fracture	218	42.47	308

1. All elevations are in feet above mean sea level, NAVD 1988. Note that the elevation at FD-1D was for the 8-inch casing before it was cut off below ground surface.
2. All depths are in feet below reference point. Some water level measurements were made from the top of inside casing (TIC) and some from the top of outside casing (TOC). In each case the elevation was computed using the appropriate reference point elevation.
3. For geophysical logging the reference point was the top of outside casing (TOC).

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TABLE 5
Monitor Well Construction Summary
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Location	TOC Elevatinon[1]	TIC Elevation	Ground Surface Elevation	Inner Casing Stickup (feet ags)[2]	Total Depth (feet bgs)[3, 4]	Elevation of Well Bottom	Casing Depth[3, 6]	Elevation of Bottom of Casing (feet bgs)	Well (w) or Open Hole Diameter (inches)	Open (O) Interval or Screened (S) Interval (feet bgs)	Screened Interval (Elevation)
MW-07D	145.50	145.26	143.8	1.46	148.54 (150)[5]	-4.74	42	101.8	6 (o)	O: 42 to 150	101.8 to -6.2
MW-09D	151.96	151.88	149.80	2.08	247.92 (250)	-98.12	47	102.8	6 (o)	O: 47 to 250	102.8 to -100.2
MW-10S	153.17	152.24	150.49	1.75	46.95 (46.5)	103.54	Not Applicable	Not Applicable	4 (w)	S: 26.5 to 46.5	123.89 to 103.89
MW-10D	151.81	151.54	150.52	1.02	240.1 (250)	-89.58	47	103.52	6 (o)	O: 47 to 240.1	103.52 to -89.58
MW-11S	129.12	128.75	126.74	2.01	24.7 (25)	102.04	Not Applicable	Not Applicable	4 (w)	S: 5 to 20	121.74 to 101.74
MW-11D	128.57	127.60	126.82	0.78	246.5 (250)	-119.68	25	101.82	6 (o)	O: 25 to 246.5	101.82 to -119.68
MW-15S	125.00	124.27	123.25	1.02	25.98 (25.5)	97.27	Not Applicable	Not Applicable	4 (o)	S: 5.5 to 25.5	117.75 to 97.75
MW-15D	123.97	123.63	123.45	0.18	232 (250)	-108.55	26	97.45	6 (o)	O: 26 to 232	97.45 to -108.55
MW-16D	125.76	125.42	125.7	-0.28	150	-24.30	100	25.7	6 (o)	O: 100 to 150	25.7 to -24.3
MW-20S	149.79	149.00	149.79	-0.79	79.8 (80)	69.99	Not Applicable	Not Applicable	4 (w)	S: 60 to 79.8	89.79 to 69.99
MW-20D	149.70	149.08	149.7	-0.62	156.3 (200)	-6.60	100	49.7	6 (o)	O: 100 to 156.3	49.7 to –6.6
FD-1	138.27	137.77	138.27	-0.50	64.7 (64.5)	73.57	Not Applicable	Not Applicable	4 (w)	S: 44.5 to 64.5	93.77 to 73.77

TABLE 5 (Cont'd)
Monitor Well Construction Summary
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Location	TOC Elevatinon[1]	TIC Elevation	Ground Surface Elevation	Inner Casing Stickup (feet ags)[2]	Total Depth (feet bgs)[3, 4]	Elevation of Well Bottom	Casing Depth[3, 6]	Elevation of Bottom of Casing (feet bgs)	Well (w) or Open Hole Diameter (inches)	Open (O) Interval or Screened (S) Interval (feet bgs)	Screened Interval (Elevation)
FD-2	137.71	137.38	137.68	-0.30	66 (65.5)	71.68	Not Applicable	Not Applicable	4 (w)	S: 45.5 to 65.5	92.18 to 72.18
FD-3	134.15	133.51	134.11	-0.60	76.8 (74.5)	57.31	Not Applicable	Not Applicable	4 (w)	S: 54.5 to 74.5	79.61 to 59.61
FD-1D	138.65	138.29	138.61	-0.32	190.58	-51.97	80	58.61	4 (w)/7.63 (o)	S: 170.58 to 190.58	-31.97 to -51.97

1. Elevations are in feet above sea level. Elevations for monitor wells MW-7D, MW-9D, and MW-16D are from Woodward Clyde 1988. For MW-16D, the elevations for MW-16 were used since no survey data for MW-16D is available. MW-16 is immediately adjacent to MW-16D. All other elevations were obtained by REAC, July-August 1998, see Appendix L.
2. ags = above ground surface
3. bgs = below ground surface
4. Total depths for monitor wells MW-7D and MW-9D are from geophysical logs, all others were measured by REAC during June 1998.
5. Values in parentheses are the original well depths as reported in Woodward Clyde 1988.
6. Not applicable means that an outer casing was not installed. Casing depth for monitor well MW-16D was taken from the geophysical logs.

TABLE 6
Water Level Elevation Data Used in Potentiometric Surface Maps
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Location	4 June 1998		22 June 1998		28 July 1998	
	Minimum Elevation at 1200 hours	Maximum Elevation at 1800 hours	Minimum Elevation at 1730 hours	Maximum Elevation at 1500 hours	Minimum Elevation at 0700 hours	Maximum Elevation at 1000 hours
Deep Monitor Wells						
MW-10D	91.25	105.06	89.63	104.03	not available	98.17 @ 1005
MW-11D	102.68	104.89	101.00	103.76	96.25	98.39
MW-15D	not available	104.10 @ 1608 on 1 June 1998	not available	102.9	not available	98.32 @ 1035
MW-20D	99.03	105.35	97.33	104.17	97.07	98.48
FD-1D	Well was not installed	Well was not installed	100.68 @ 1112	100.68 @ 1112	97.60	97.59
"Intermediate" Bedrock Monitor Wells						
Location	1 June 1998		24 June 1998		28 July 1998	
FD-1	108.69 @ 1625		106.73 @ 1504		101.60 @ 1048	
FD-2	102.81 @ 1641		105.53 @ 1529		99.42 @ 1055	
FD-3	102.28 @ 1649		104.25 @ 1513		99.26 @1101	
MW-20S	108.42 @1708		105.58 @ 1521		101.44 @ 1019	
Shallow Bedrock Monitor Wells						
MW-10S	117.83 @ 1503		115.62 @ 1512		113.08 @ 1003	
MW-11S	109.64 @1532		107.62 @ 1519		102.37 @ 1025	
MW-15S	107.93 @ 1610		106.51 @ 1526		100.47 @ 1003	

All elevations are in feet above mean sea level.

TABLE 7
Surveying Data
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Description	Northing[1]	Easting	Ground Elevation[2]	Top of Inner Casing Elevation	Top of Outer Casing Elevation
N60E260	570489.68	450317.98	132.25	n/a	n/a
N60E300	570477.38	450355.92	131.95	n/a	n/a
N70E220	570511.03	450283.42	133.04	n/a	n/a
N100E0	570605.77	450081.74	134.77	n/a	n/a
N100E40	570593.45	450120.01	134.3	n/a	n/a
N100E100	570575.52	450177.07	134	n/a	n/a
N100E160	570558.57	450234.60	134.11	n/a	n/a
N100E220	570540.22	450291.43	134.32	n/a	n/a
N100E260	570527.62	450329.30	134.15	n/a	n/a
N100E300	570515.53	450367.59	133.97	n/a	n/a
N100E320	570509.24	450386.58	133.74	n/a	n/a
N140E220	570577.82	450303.48	135.57	n/a	n/a
N140E260	570565.62	450341.48	136.14	n/a	n/a
N140E300	570552.56	450380.17	135.95	n/a	n/a
N150E340	570550.25	450420.78	135.9	n/a	n/a
N150E380	570538.60	450458.50	135.22	n/a	n/a
N150E420	570526.76	450497.13	135.26	n/a	n/a
N160E0	570663.55	450098.73	136.15	n/a	n/a
N180E220	570615.61	450316.18	136.39	n/a	n/a
N180E260	570603.54	450353.56	137.58	n/a	n/a
N180E300	570591.73	450391.49	137.63	n/a	n/a
N190E340	570589.10	450433.77	137.29	n/a	n/a
N190E380	570577.43	450470.06	136.67	n/a	n/a
N190E415	570566.39	450503.36	136.14	n/a	n/a
N200E0	570702.96	450110.02	136.92	n/a	n/a
N220E220	570654.63	450327.84	137.49	n/a	n/a
N220E260	570642.26	450364.63	138.41	n/a	n/a
N220E300	570629.29	450402.72	138.66	n/a	n/a
N230E340	570626.81	450444.01	138.66	n/a	n/a
N230E380	570615.01	450482.41	137.62	n/a	n/a
N230E420	570603.96	450519.22	136.62	n/a	n/a
N232E40	570719.65	450157.78	137.77	n/a	n/a
N236E220	570669.89	450331.02	137.96	n/a	n/a
N237E100	570706.99	450216.69	138.53	n/a	n/a

1. New Jersey State Plane North American Datum of 1983, 1986 adjustment.
2. All elevations are in feet above mean sea level, NAVD 1988.
3. 8-inch casing stickup was 0.42 feet above ground surface before it was cut off to allow installation of the flush mount surface casing on 25 June 1998.
n/a = not applicable

355\del\fr\9809\fr3355.wpd

TABLE 7 (Cont'd)
Surveying Data
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Description	Northing[1]	Easting	Ground Elevation[2]	Top of Inner Casing Elevation	Top of Outer Casing Elevation
Soil Boring at 180N300E	570591.03	450393.39	137.6	n/a	n/a
Soil Boring at 180N220E	570613.64	450317.33	136.35	n/a	n/a
Soil Boring at 220N220E	570653.64	450332.02	137.56	n/a	n/a
Building Corner 1	570579.08	450283.71	n/a	n/a	n/a
Building Corner 2	570662.24	450310.60	n/a	n/a	n/a
Building Corner 3	570694.64	450242.66	n/a	n/a	n/a
Building Corner 4	570706.20	450206.07	n/a	n/a	n/a
Building Corner 5	570718.60	450132.65	n/a	n/a	n/a
Building Corner 6	570635.11	450106.97	n/a	n/a	n/a
MW-10-S	571176.46	450489.02	150.49	152.24	153.17
MW-10-D	571170.25	450486.85	150.52	151.54	151.81
MW-11-S	570299.61	449897.53	126.74	128.75	129.12
MW-11-D	570301.19	449906.64	126.82	127.6	128.57
MW-15S	569943.22	450722.19	123.25	124.27	125.00
MW-15D	569948.50	450722.73	123.45	123.63	123.97
MW-20-S	570705.29	450567.56	149.79	149	149.79
MW-20-D	570709.24	450558.16	149.7	149.08	149.7
FD-1	570656.10	450353.23	138.27	137.77	138.27
FD-1D	570642.92	450371.56	138.61	138.29	138.65 (139.03 before surface completion)[3]
FD-2	570733.53	450114.12	137.68	137.38	137.71
FD-3	570535.38	450173.81	134.11	133.51	134.15

1. New Jersey State Plane North American Datum of 1983, 1986 adjustment.
2. All elevations are in feet above mean sea level, NAVD 1988.
3. 8-inch casing stickup was 0.42 feet above ground surface before it was cut off to allow installation of the flush mount surface casing on 25 June 1998.
n/a = not applicable

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TABLE 8
Groundwater Sample Analytical Results
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

Location	Date Sample Collected	Trichloro-ethene	Tetrachloro-ethane	1,1-Dichloro-ethene	1,1-Dichloro-ethane	1,2-Dichloro-ethene (total)	Chloroform	Toluene
FD-1	6/30/98	15	10 U	10 U	10 U	3 J	10 U	10 U
FD-1D	6/30/98	3 J	10 U	10 U	10 U	10 U	10 U	2 J
FD-2	6/30/98	10 U	10 U	10 U	10 U	10 U	10 U	10 U
FD-3	6/30/98	10 U	10 U	10 U	10 U	10 U	10 U	10 U
MW-9D	7/1/98	25	10 U	10 U	10 U	10 UJ	10 U	10 U
MW-9D duplicate	7/1/98	25	10 U	10 U	10 U	10 J	10 U	10 U
MW-10S	7/1/98	10 U	10 U	10 U	10 U	10 U	10 U	10 U
MW-10D	6/29/98	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U
MW-11S	7/1/98	10 U	10 U	10 U	10 U	10 U	10 U	10 U
MW-11D	7/1/98	4 J	10 U	10 U	10 U	10 U	10 U	10 U
MW-15S	7/1/98	10 U	10 U	10 U	10 U	10 U	10 U	10 U
MW-15D	7/1/98	2 J	3 J	3 J	2 J	10 U	10 U	10 U
MW-20S	6/29/98	140	10 U	10 U	10 UJ	24	10 U	10 U
MW-20D	6/29/98	90	1 J	10 U	10 UJ	27	10 U	10 U

All results are in micrograms per liter (μg/L).
J = Estimated concentration.
U = Not detected, value to left is detection limit.

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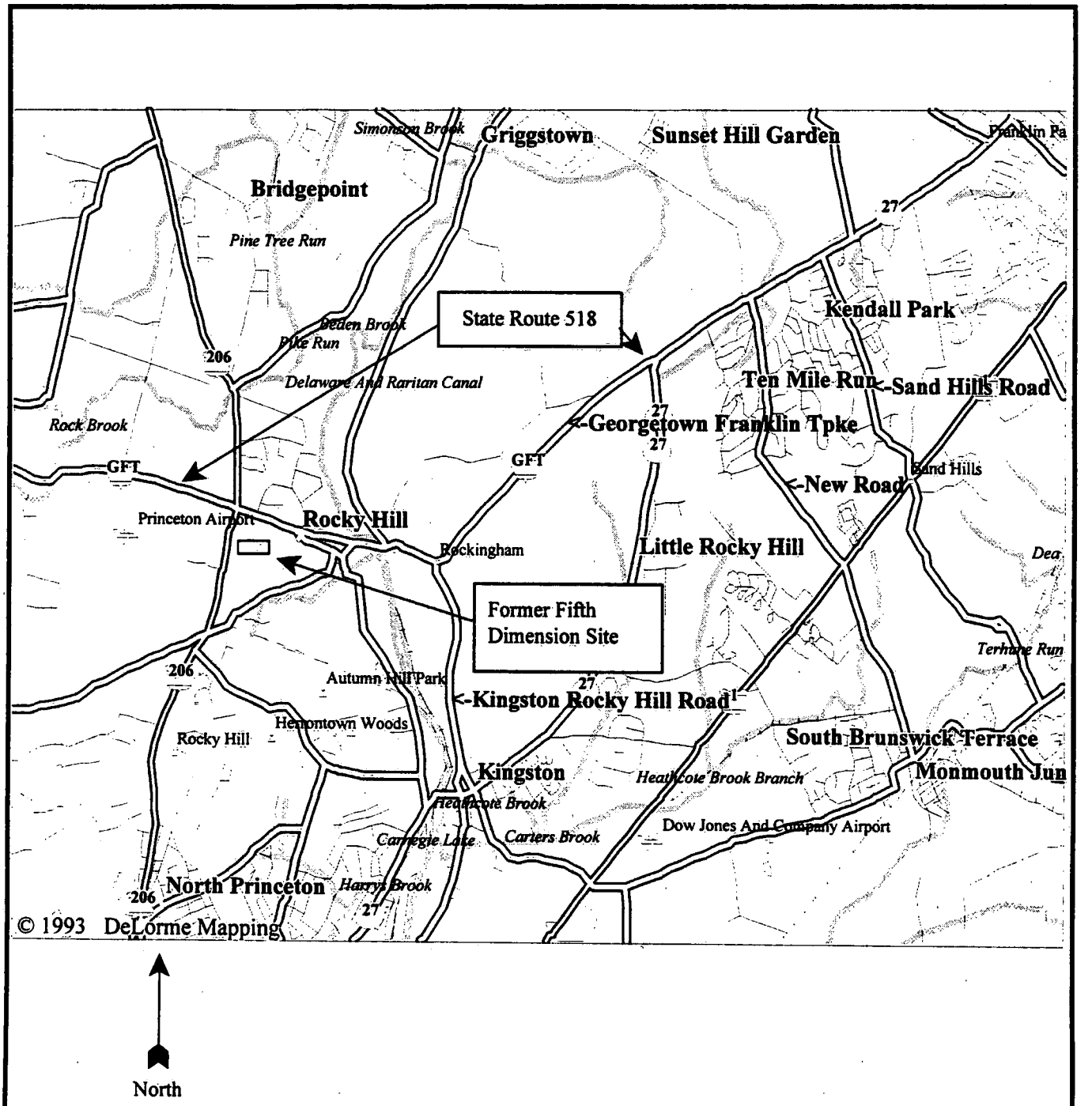
Figures



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W.O.# 03347-143-001-3355-01

FIGURE 1
Site Location
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

355\del\fr\9809\fr3355.wpd

LEGEND

180N220E = SAMPLE LOCATION GRID COORDINATE

D = SAMPLE DEPTH IN FEET BELOW GROUND SURFACE

SG = SOIL GAS SAMPLE RESULT IN PARTS PER BILLION BY VOLUME (ppbv), SAMPLES COLLECTED 27–29 APRIL 1998.

GEO = SOIL SAMPLES COLLECTED USING A GEOPROBE, RESULTS ARE IN MICROGRAMS PER KILOGRAM (µg/kg), SAMPLES COLLECTED ON 30 APRIL 1998.

SB = SOIL BORING SAMPLES, RESULTS ARE IN µg/kg SAMPLES COLLECTED 3–4 JUNE 1998.

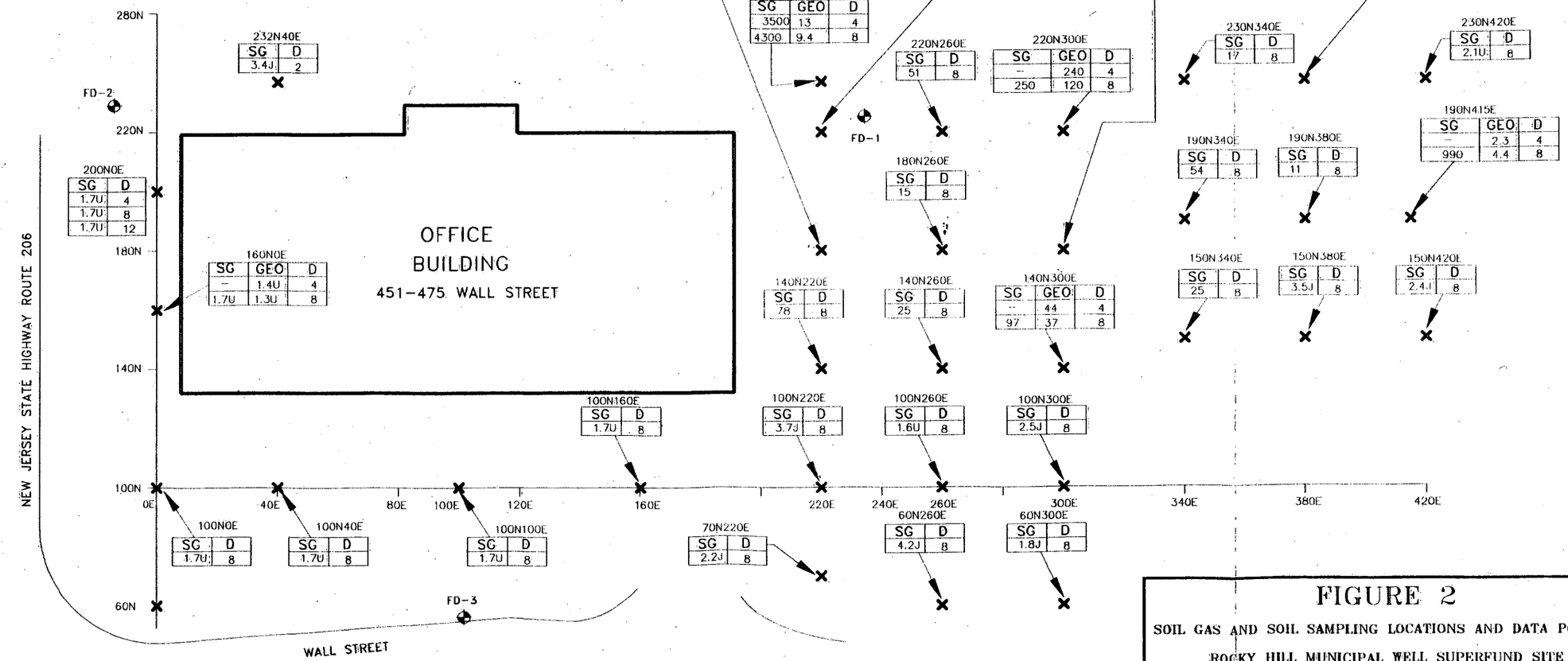
– = NO SAMPLE COLLECTED

U = NOT DETECTED; VALUE TO LEFT IS THE DETECTION LIMIT

J = ESTIMATED CONCENTRATION

✕ = SAMPLING LOCATION

⊕ = MONITOR WELL



GRAPHIC SCALE

40 0 20 40 80 FEET

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FIGURE 2

SOIL GAS AND SOIL SAMPLING LOCATIONS AND DATA POSTING
ROCKY HILL MUNICIPAL WELL SUPERFUND SITE
FORMER FIFTH DIMENSION FACILITY
MONTGOMERY TOWNSHIP, NEW JERSEY
SEPTEMBER 1998

355/SITE_MAP.DWG 8/24/98

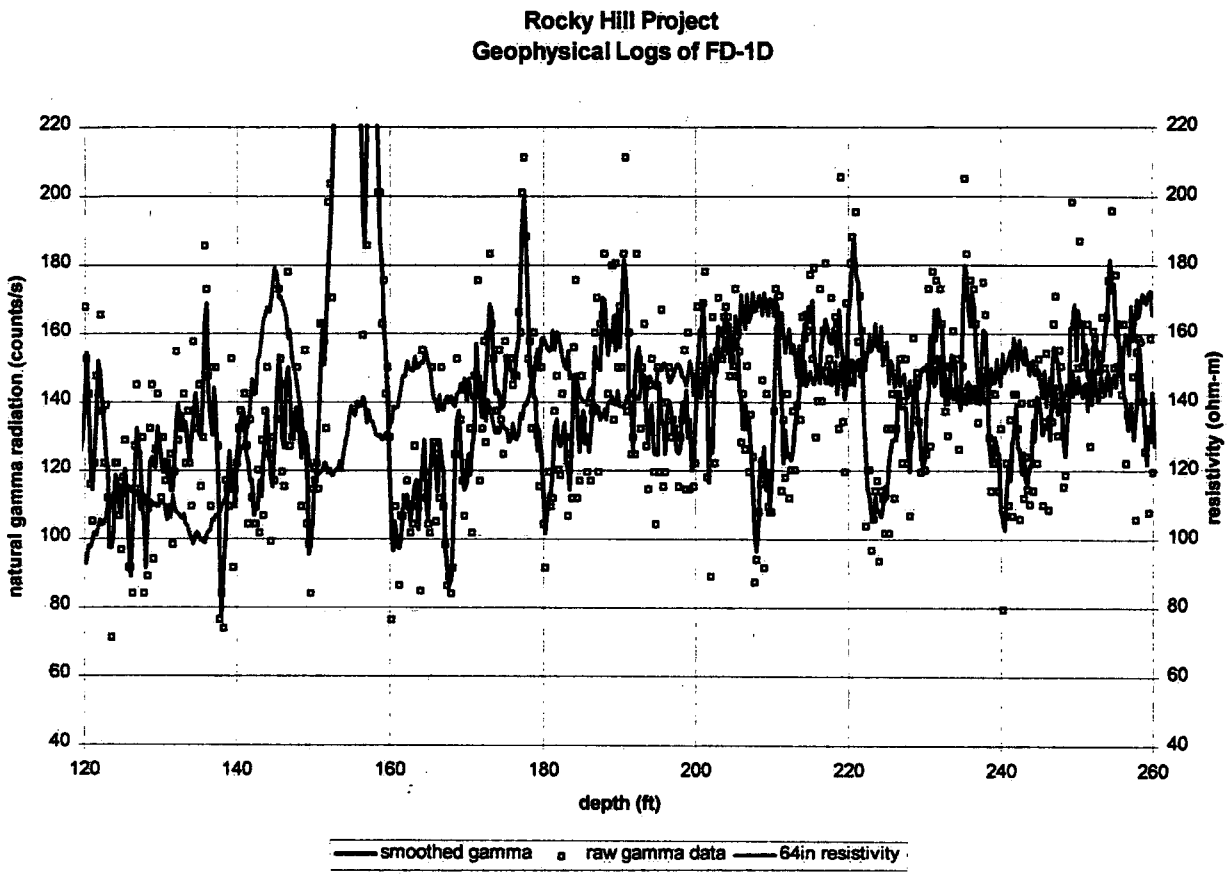

FIGURE 3
Geophysical Logs of Monitor Well FD-1D
Showing Raw Versus Smoothed Natural Gamma-Ray
Data in Comparison With 64-Inch Resistivity Data
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

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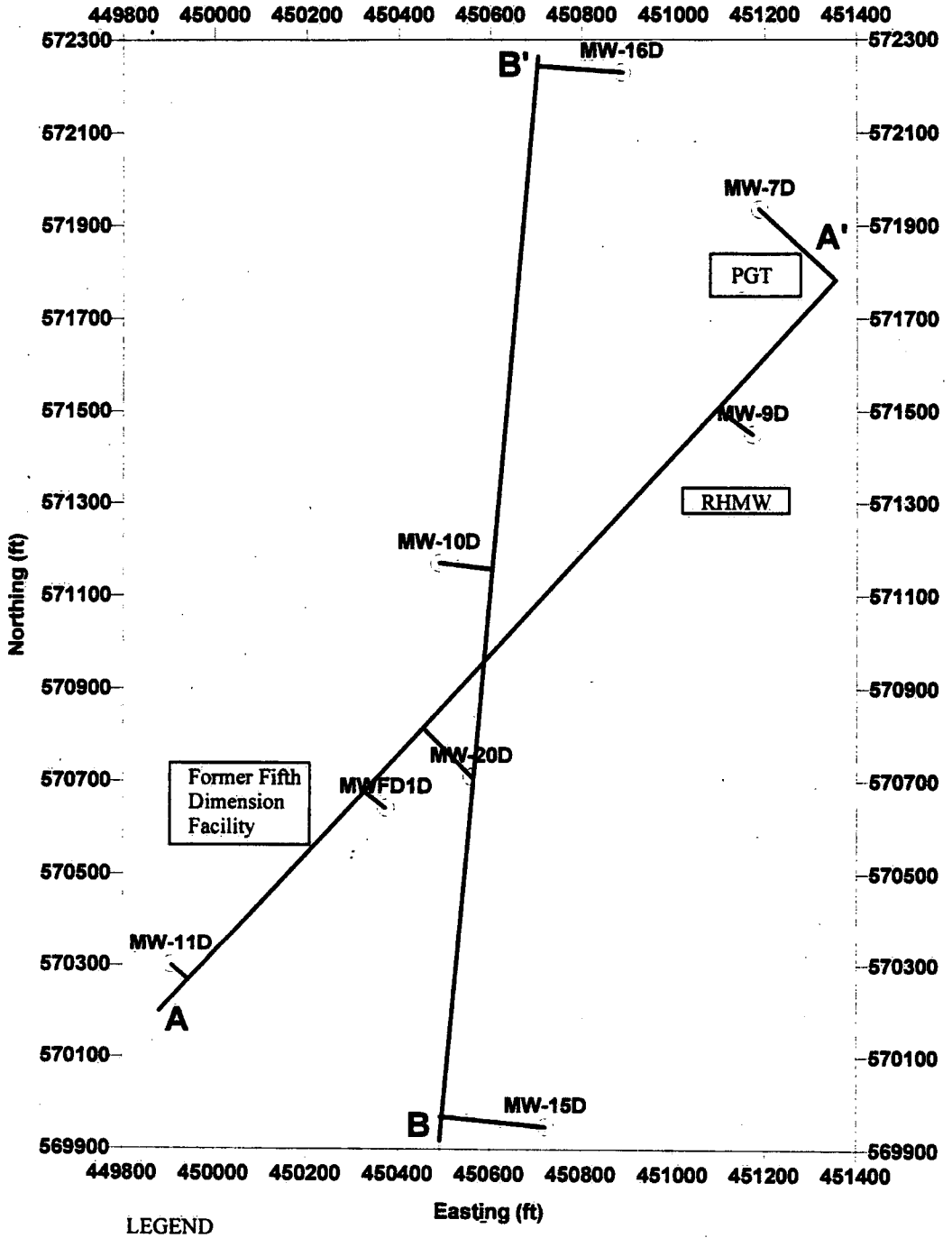

LEGEND

PGT = Princeton Gamma Tech
RHMW = Rocky Hill Municipal Well
Locations of PGT, RHMW, and the former Fifth Dimension facility are shown for information only.
The locations are approximate and not to scale.

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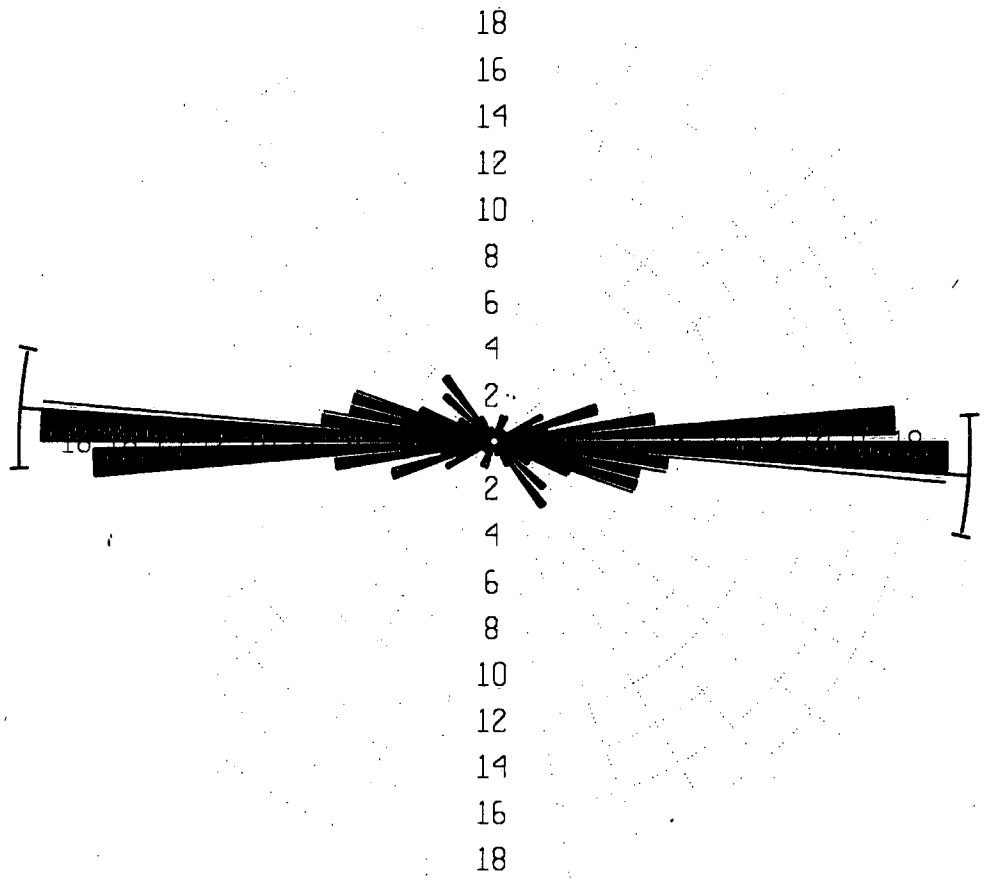
FIGURE 4
Well Locations Showing Cross-Section Lines A-A' and B-B' and Well Projections Onto Section
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998



Calculation Method	Frequency
Class Interval	5 Degrees
Filtering	Deactivated
Data Type	Bidirectional
Rotation Amount	0 Degrees
Population	173
Maximum Percentage	19 7 Percent
Mean Percentage	3 2 Percent
Standard Deviation	4 55 Percent
Vector Mean	273 96 Degrees
Confidence Interval	7 2 Degrees
R-mag	0 7

Strike data is oriented to true north, magnetic declination at the site is N11W.

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FIGURE 5
Rose Diagram
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

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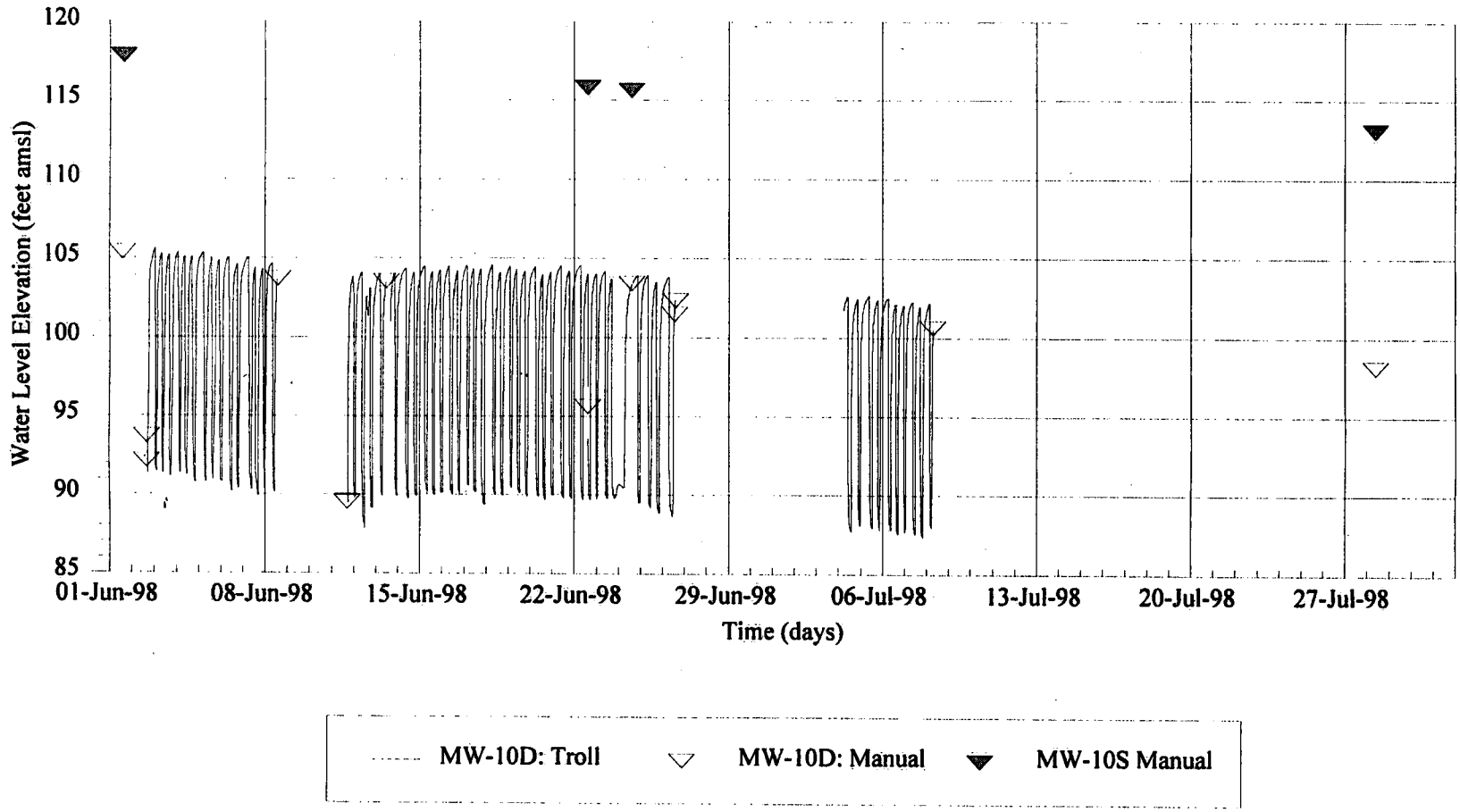

amsl = above mean sea level

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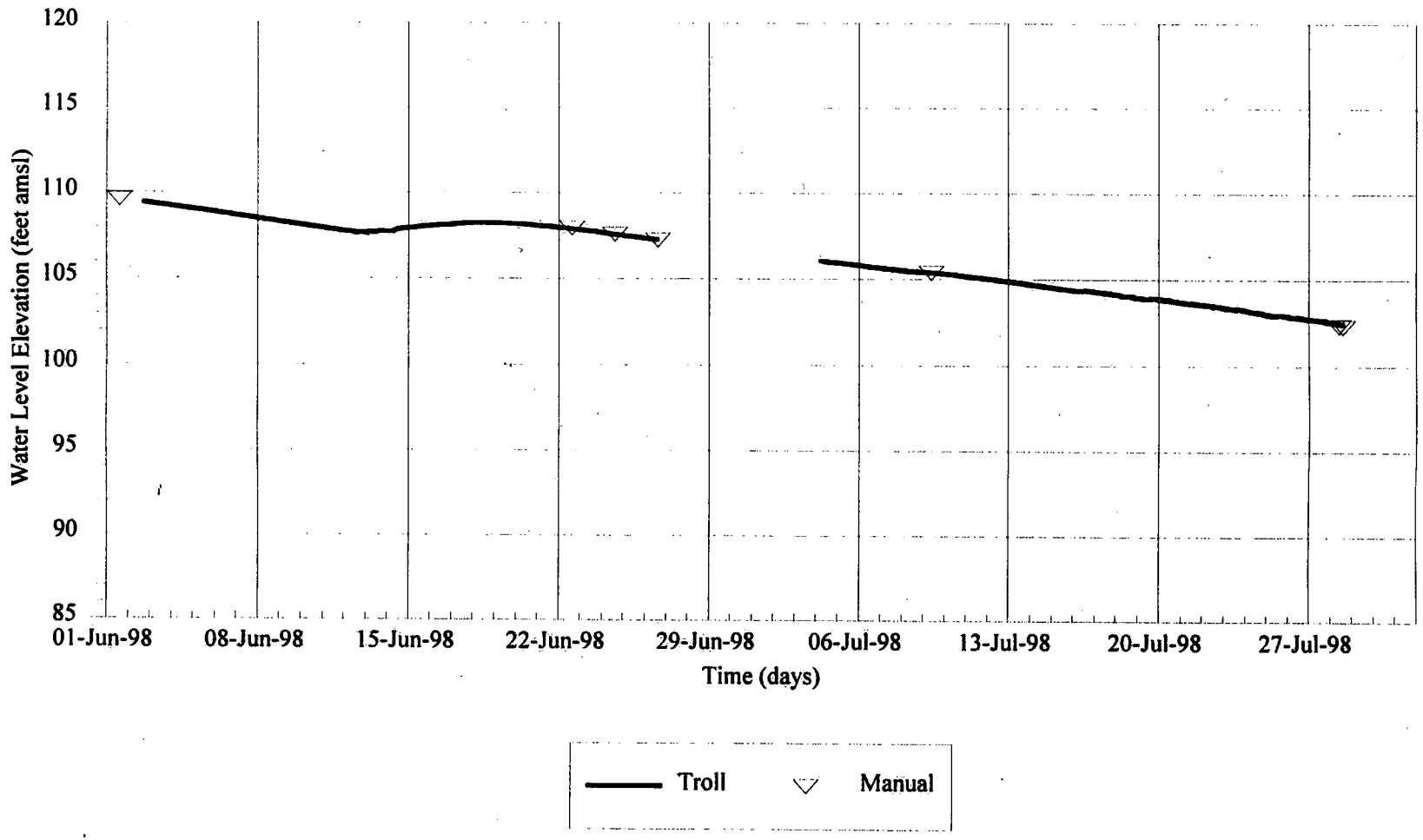
FIGURE 8
Monitor Well MW-10S and MW-10D Water Level Data
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

355\del\fr\9809\fr3355.wb2



amsl = above mean sea level

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FIGURE 9
Monitor Well MW-11S Water Level Data
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

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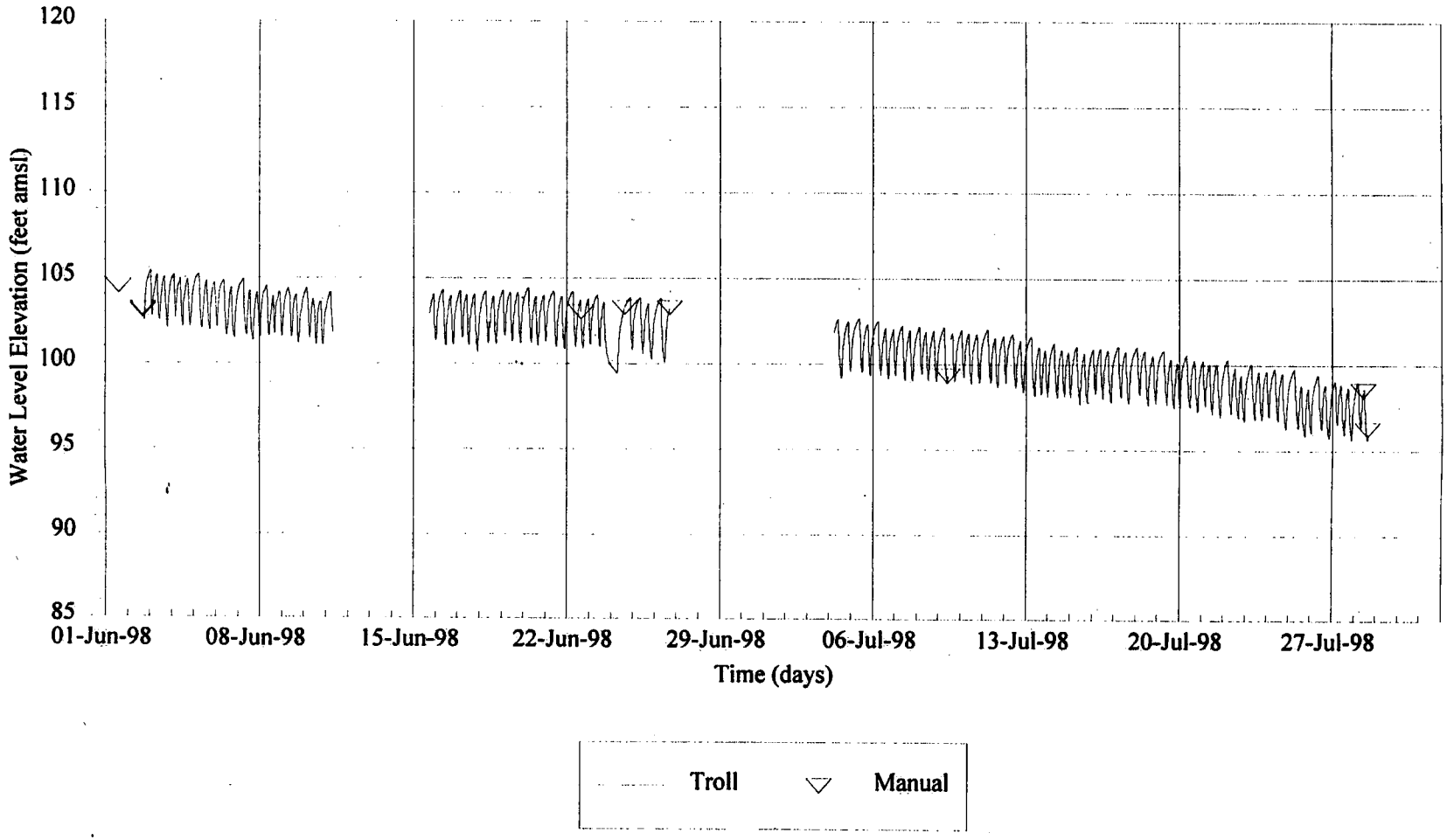

amsl = above mean sea level

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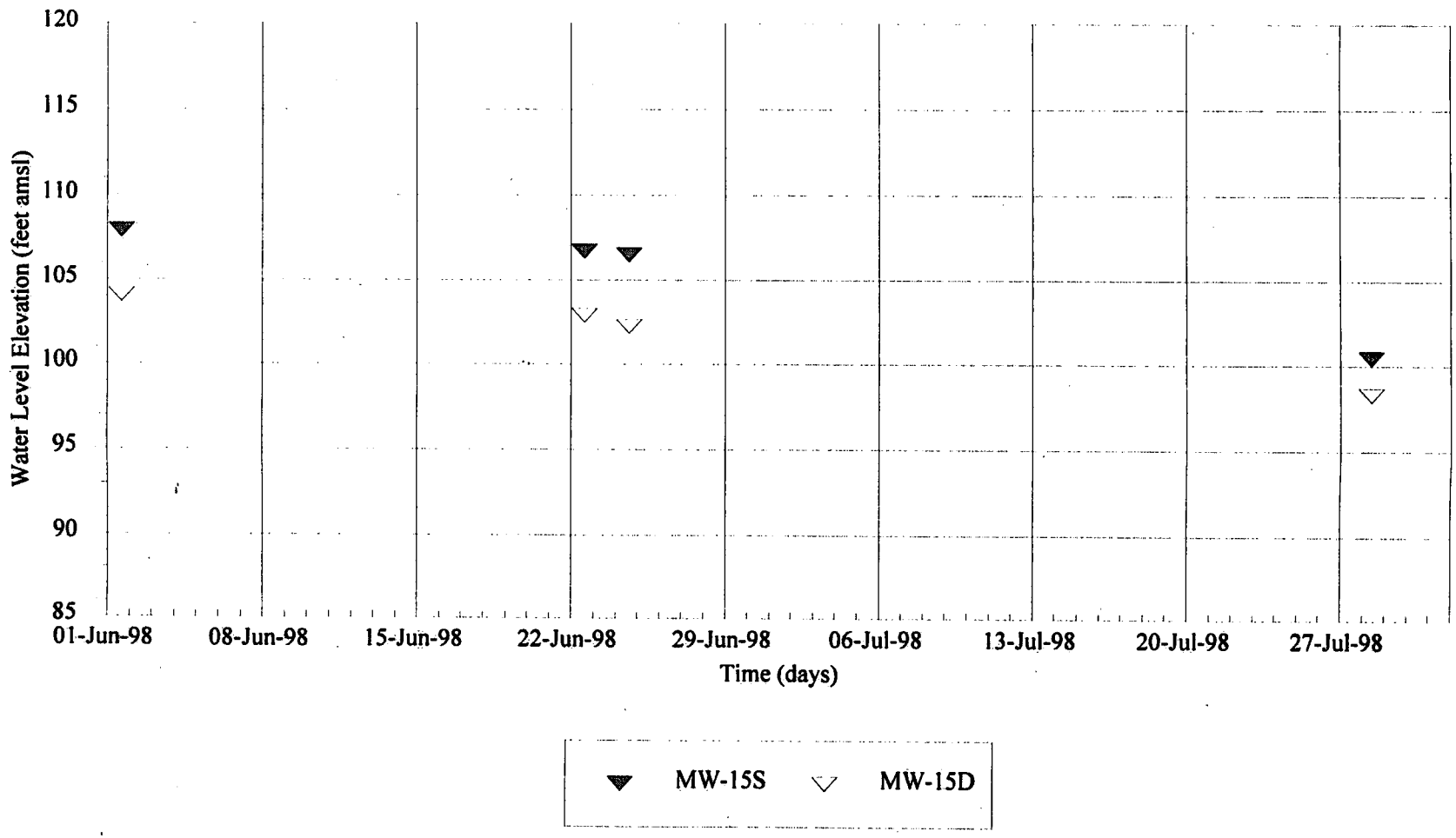
FIGURE 10
Monitor Well MW-11D Water Level Data
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

355\del\fr\9809\fr3355.wb2



amsl = above mean sea level

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FIGURE 11
Monitor Well MW-15S and MW-15D Water Level Data
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

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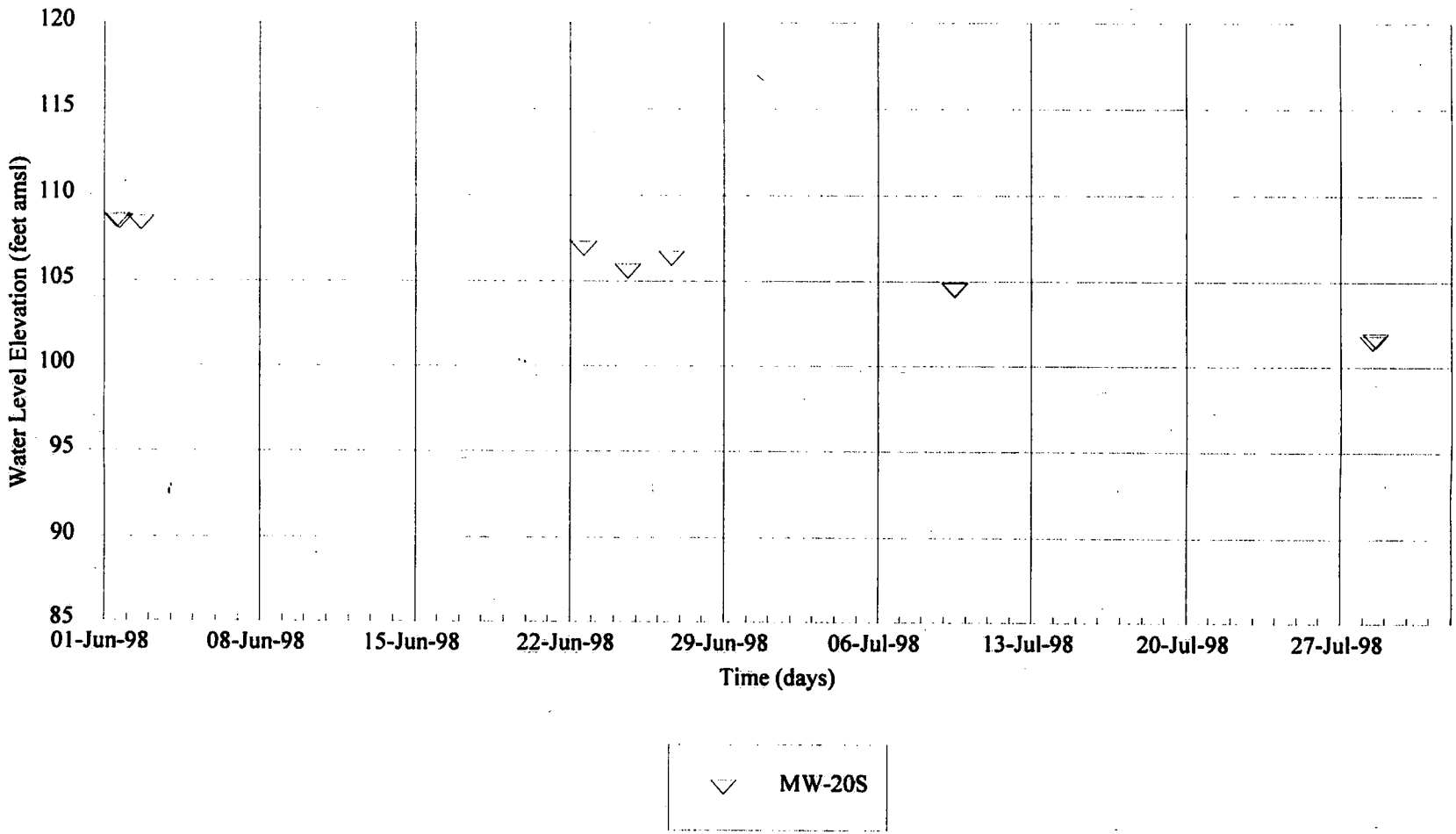

amsl = above mean sea level

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FIGURE 12
Monitor Well MW-20S Water Level Data
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

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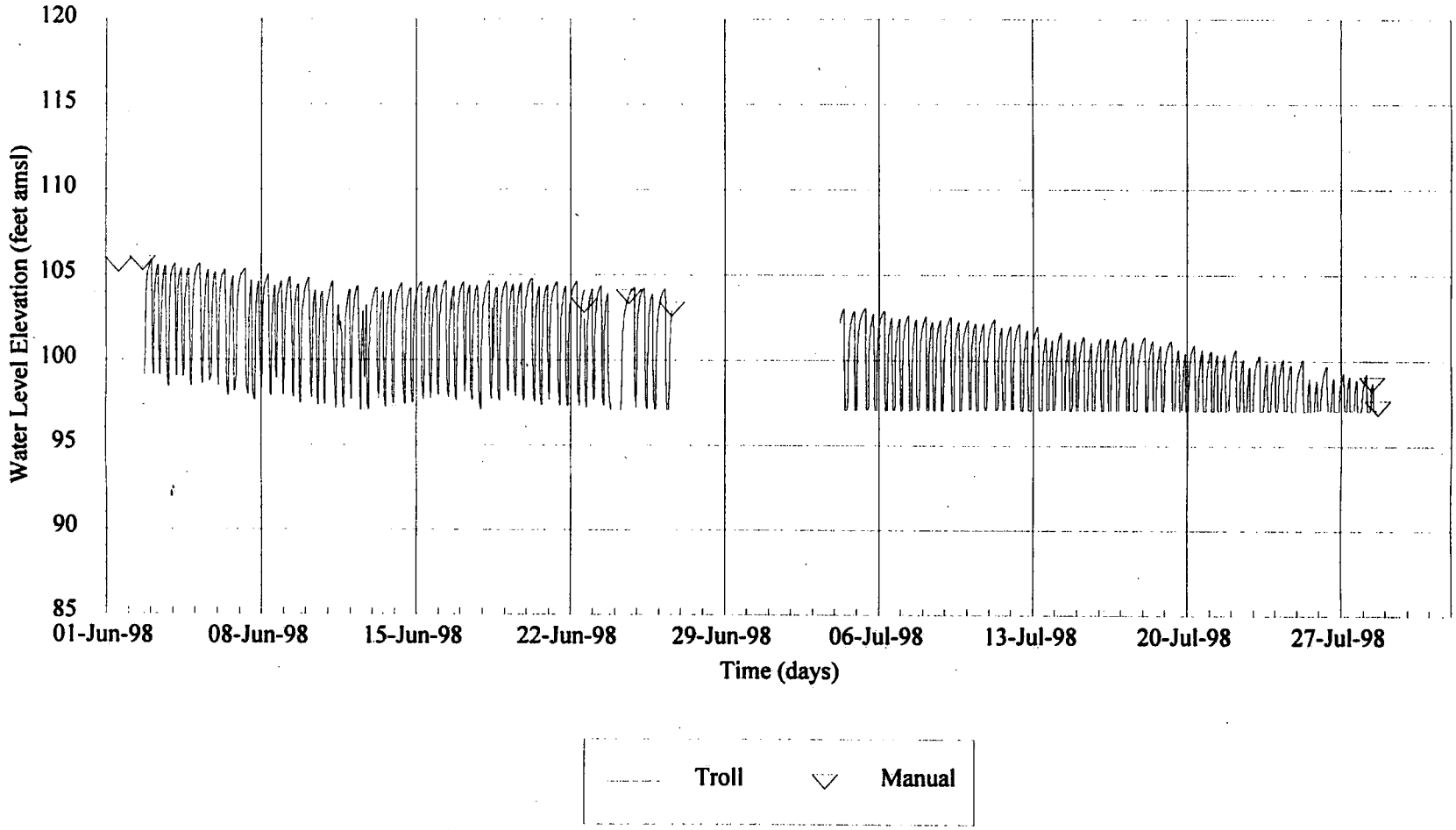

amsl = above mean sea level

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68-C4-0022
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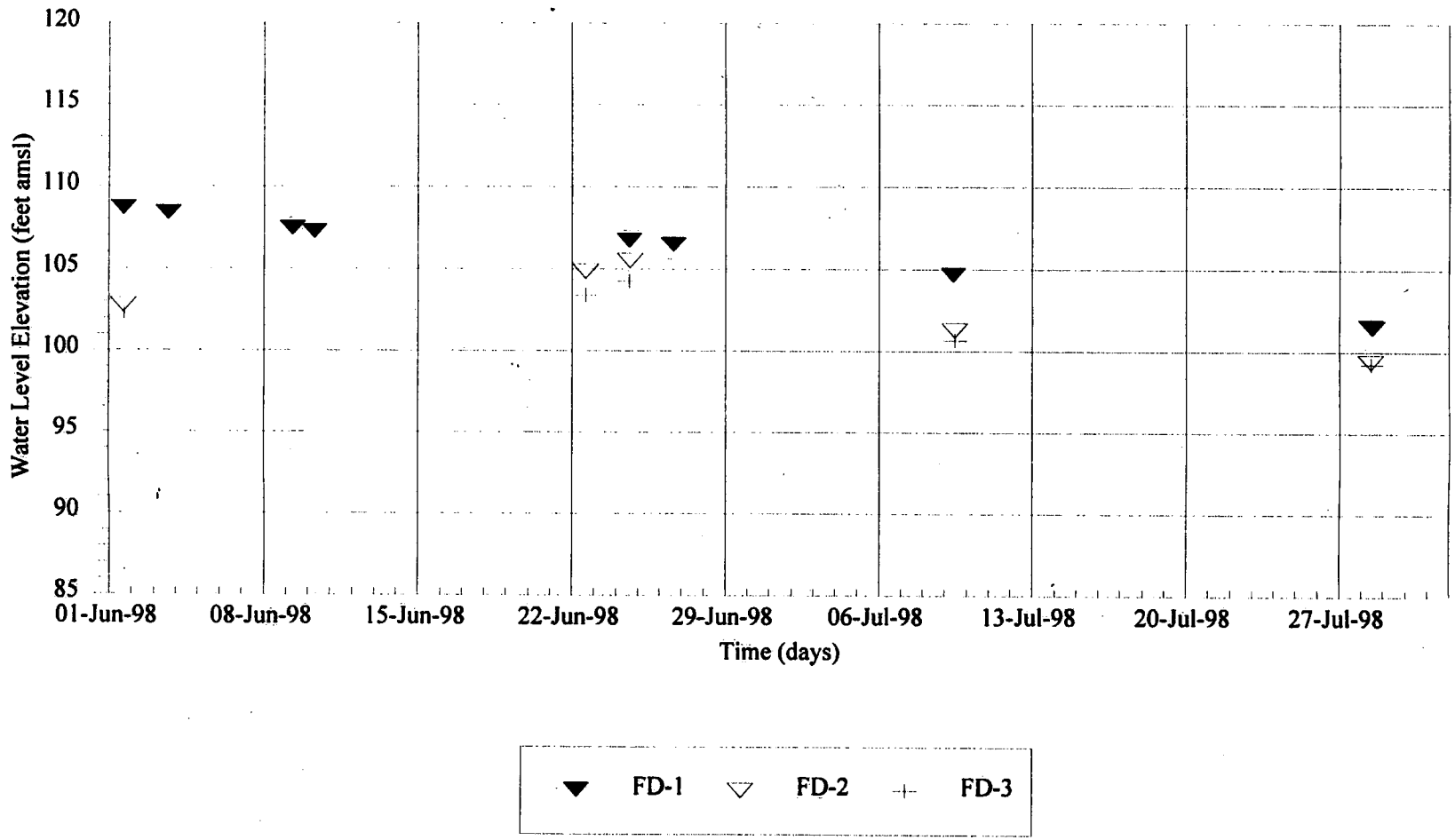
FIGURE 13
Monitor Well MW-20D Water Level Data
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

355\del\fr\9809\fr3355.wb2



amsl = above mean sea level

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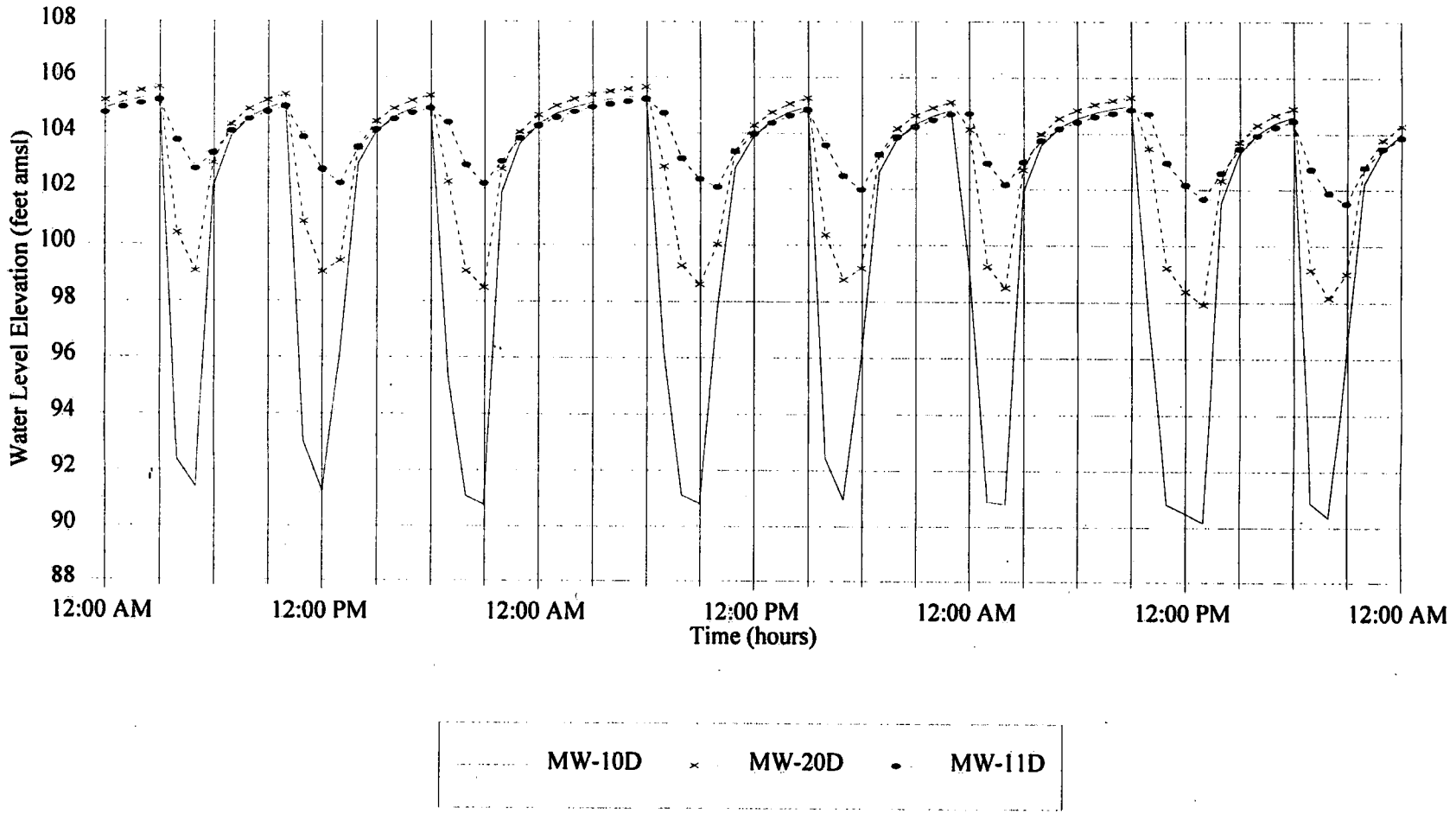
03347-143-001-3355-01

FIGURE 14
Monitor Well FD-1, FD-2, and FD-3 Water Level Data
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

355\del\fr\9809\fr3355.wb2



amsl = above mean sea level

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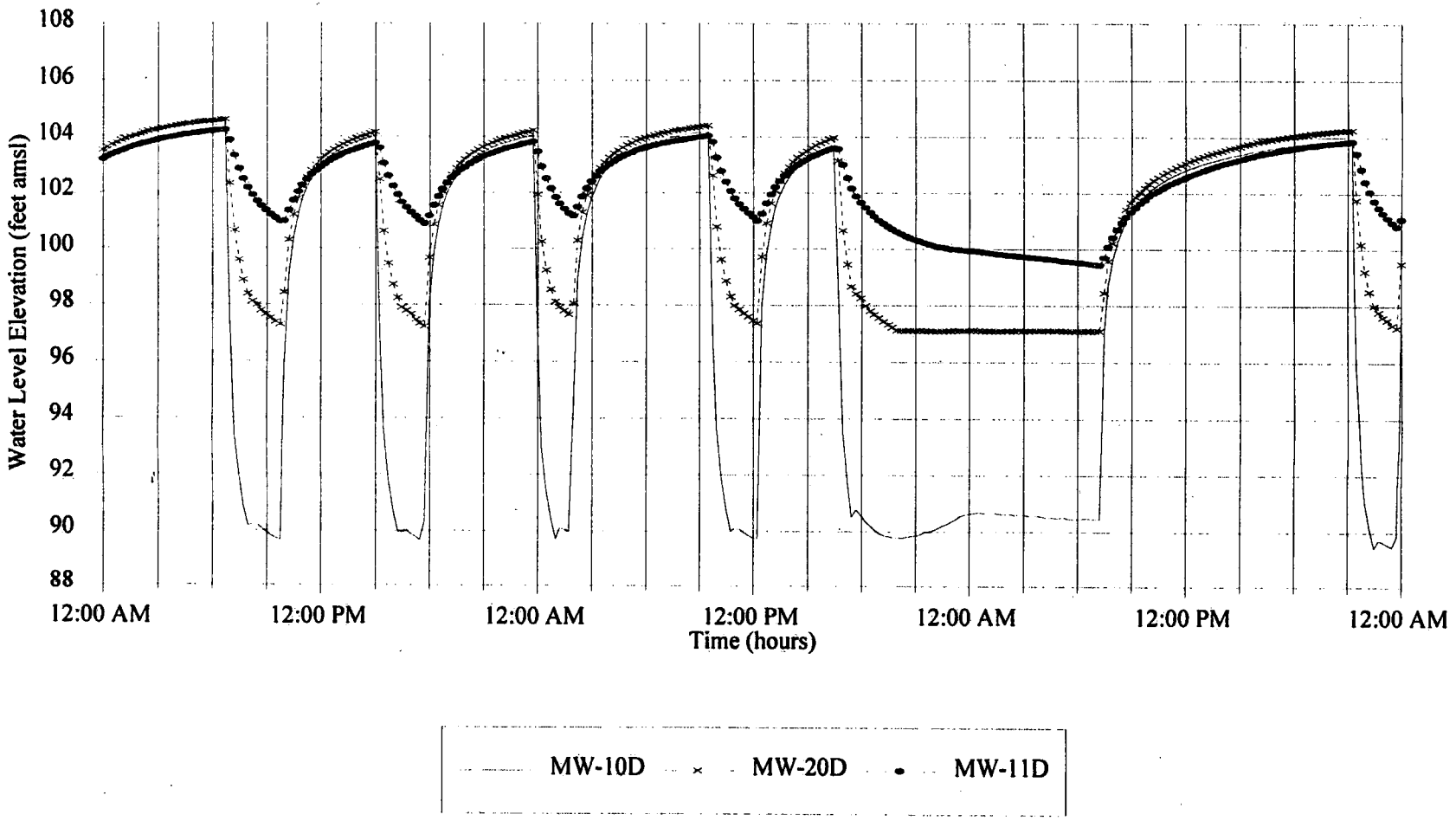
FIGURE 15
Deep Monitor Well Water Level Data: 4-6 June 1998
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

355\del\fr\9809\fr3355.wb2



amsl = above mean sea level

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03347-143-001-3355-01

FIGURE 16
Deep Monitor Well Water Level Data: 22-24 June 1998
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

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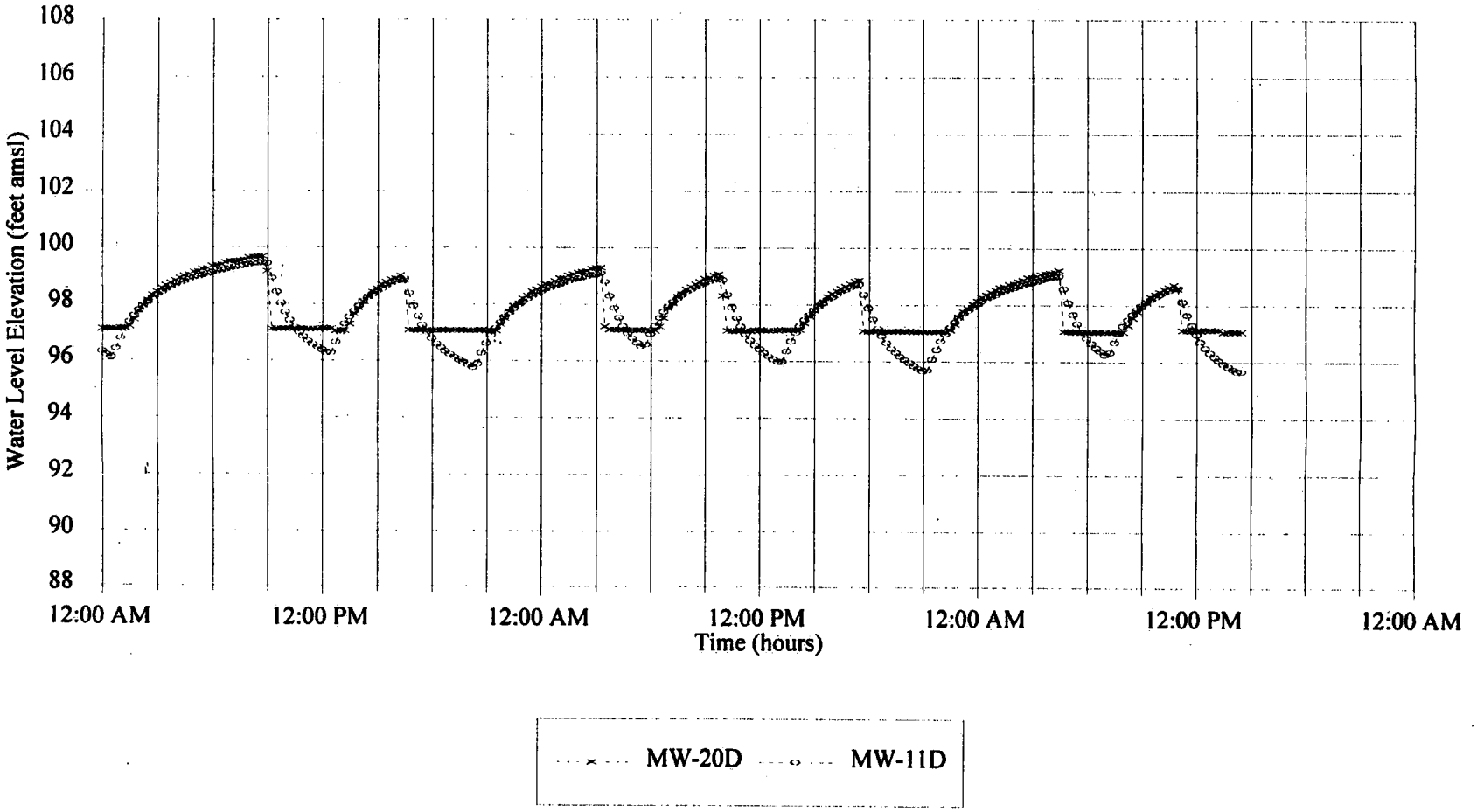

amsl = above mean sea level

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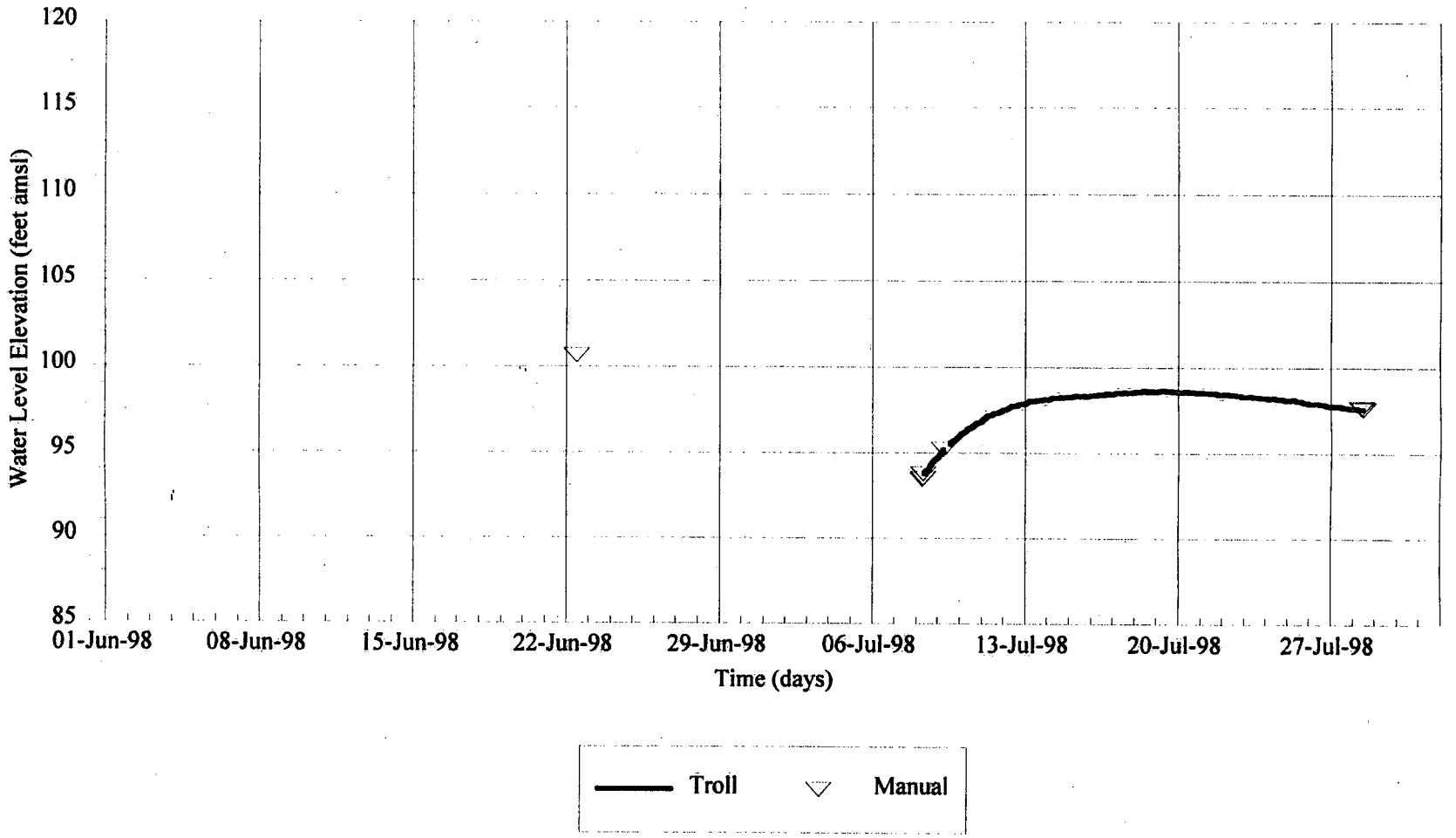
68-C4-0022
03347-143-001-3355-01

FIGURE 17
Deep Monitor Well Water Level Data: 26-28 July 1998
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

355\del\fr\9809\fr3355.wb2



amsl = above mean sea level

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68-C4-0022
03347-143-001-3355-01

FIGURE 18
Monitor Well FD-1D Water Level Data
Rocky Hill Municipal Well Superfund Site
Former Fifth Dimension Facility
Montgomery Township, New Jersey
September 1998

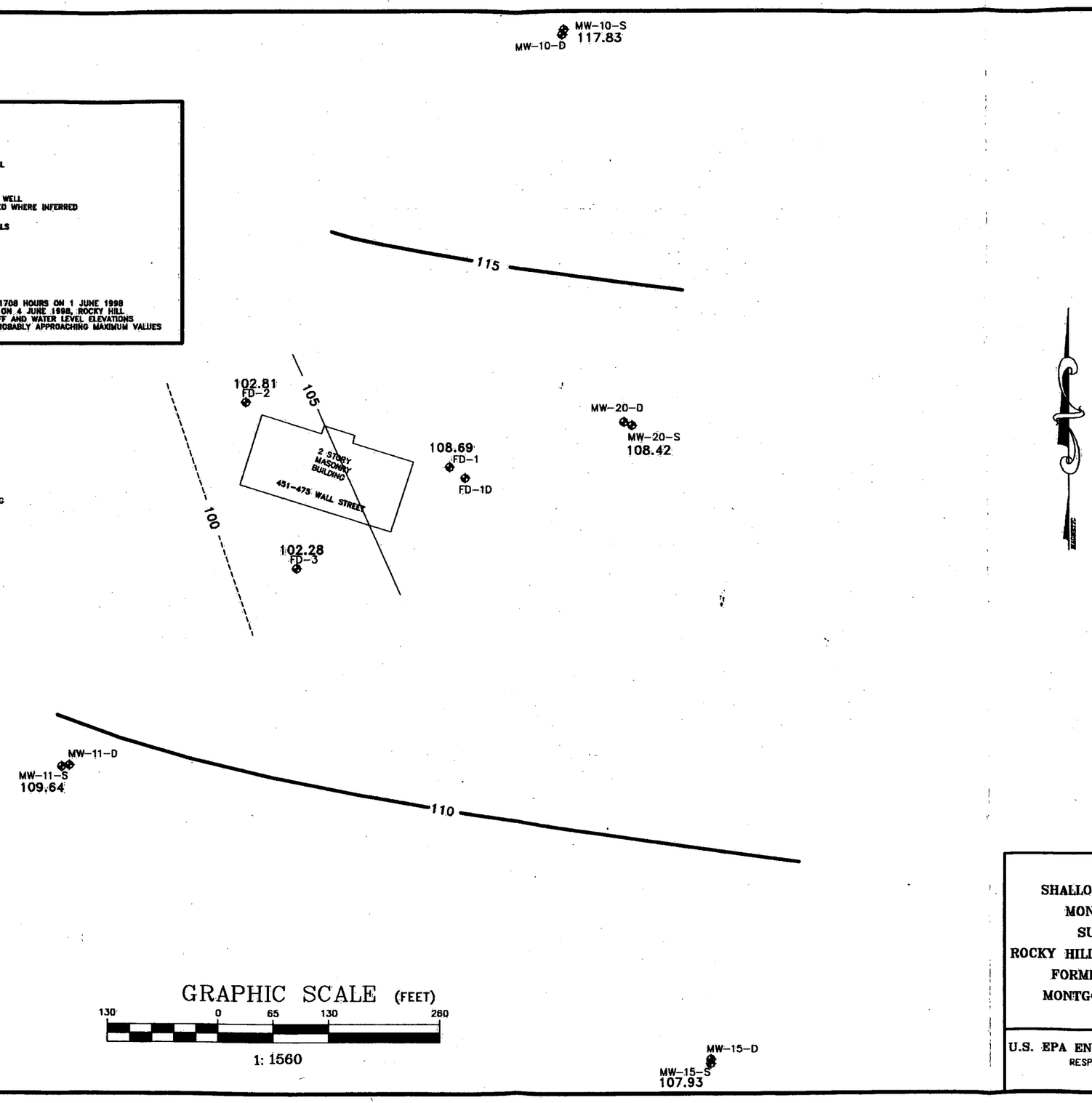
355\del\fr\9809\fr3355.wb2

LEGEND

◆	MONITORING WELL
—110—	SHALLOW BEDROCK MONITOR WELL POTENTIOMETRIC SURFACE
—105— —	INTERMEDIATE BEDROCK MONITOR WELL POTENTIOMETRIC SURFACE, DASHED WHERE INFERRED
MW-10S, MW-11S, MW-15S	SHALLOW BEDROCK MONITOR WELLS
FD-1, FD-2, FD-3, MW-20S	INTERMEDIATE DEPTH BEDROCK MONITOR WELL
102.81	WATER LEVEL ELEVATION, DATA COLLECTED BETWEEN 1503 AND 1708 HOURS ON 1 JUNE 1998 JUDGING FROM DATA COLLECTED ON 4 JUNE 1998, ROCKY HILL MUNICIPAL WELL IS PROBANLY OFF AND WATER LEVEL ELEVATIONS IN DEEP BEDROCK WELLS ARE PROBABLY APPROACHING MAXIMUM VALUES

NOTE:

- ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.
- THE COORDINATE SYSTEM IS BASED ON THE NEW JERSEY STATE PLANE NORTH AMERICAN DATUM OF 1983 (1986 ADJUSTMENT)
- BASED ON SURVEY CONDUCTED BY NASSAU SURVEYING ON 7/9/98, THEIR PROJECT NO. 4-51-33218-50.
- MONTGOMERY TOWNSHIP TAX MAP:
  SHEET NO. 13
  BLOCK 35001
  LOTS 9 & 11



GRAPHIC SCALE (FEET)

130 0 65 130 260

1: 1560

FIGURE 19

SHALLOW AND INTERMEDIATE BEDROCK MONITOR WELL POTENTIOMETRIC SURFACE MAP: 1 JUNE 1998

ROCKY HILL MUNICIPAL WELL SUPERFUND SITE

FORMER FIFTH DIMENSION FACILITY

MONTGOMERY TOWNSHIP, NEW JERSEY

SEPTEMBER 1998

U.S. EPA ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O.# 03347-143-001-3355-01

355/1JUNE.DWG 8/3/98

LEGEND

⊕	MONITORING WELL
—110—	SHALLOW BEDROCK MONITOR WELL POTENTIOMETRIC SURFACE
—105— —	INTERMEDIATE BEDROCK MONITOR WELL POTENTIOMETRIC SURFACE, DASHED WHERE INFERRED
MW-10S, MW-11S, MW-15S	SHALLOW BEDROCK MONITOR WELLS
FD-1, FD-2, FD-3, MW-20S	INTERMEDIATE DEPTH BEDROCK MONITOR WELL
105.53	WATER LEVEL ELEVATION, DATA COLLECTED BETWEEN 1504 AND 1529 HOURS ON 24 JUNE 1998. ROCKY HILL MUNICIPALWELL ASSUMED TO BE OFF. WATER LEVELS IN DEEP BEDROCK WELLS ABOUT HALF WAY BETWEEN MINIMUM AND MAXIMUM ELEVATION.

NOTE:

- ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.
- THE COORDINATE SYSTEM IS BASED ON THE NEW JERSEY STATE PLANE NORTH AMERICAN DATUM OF 1983 (1986 ADJUSTMENT)
- BASED ON SURVEY CONDUCTED BY NASSAU SURVEYING ON 7/9/98, THEIR PROJECT NO. 4-51-33218-50.
- MONTGOMERY TOWNSHIP TAX MAP: SHEET NO. 13 BLOCK 35001 LOTS 9 & 11

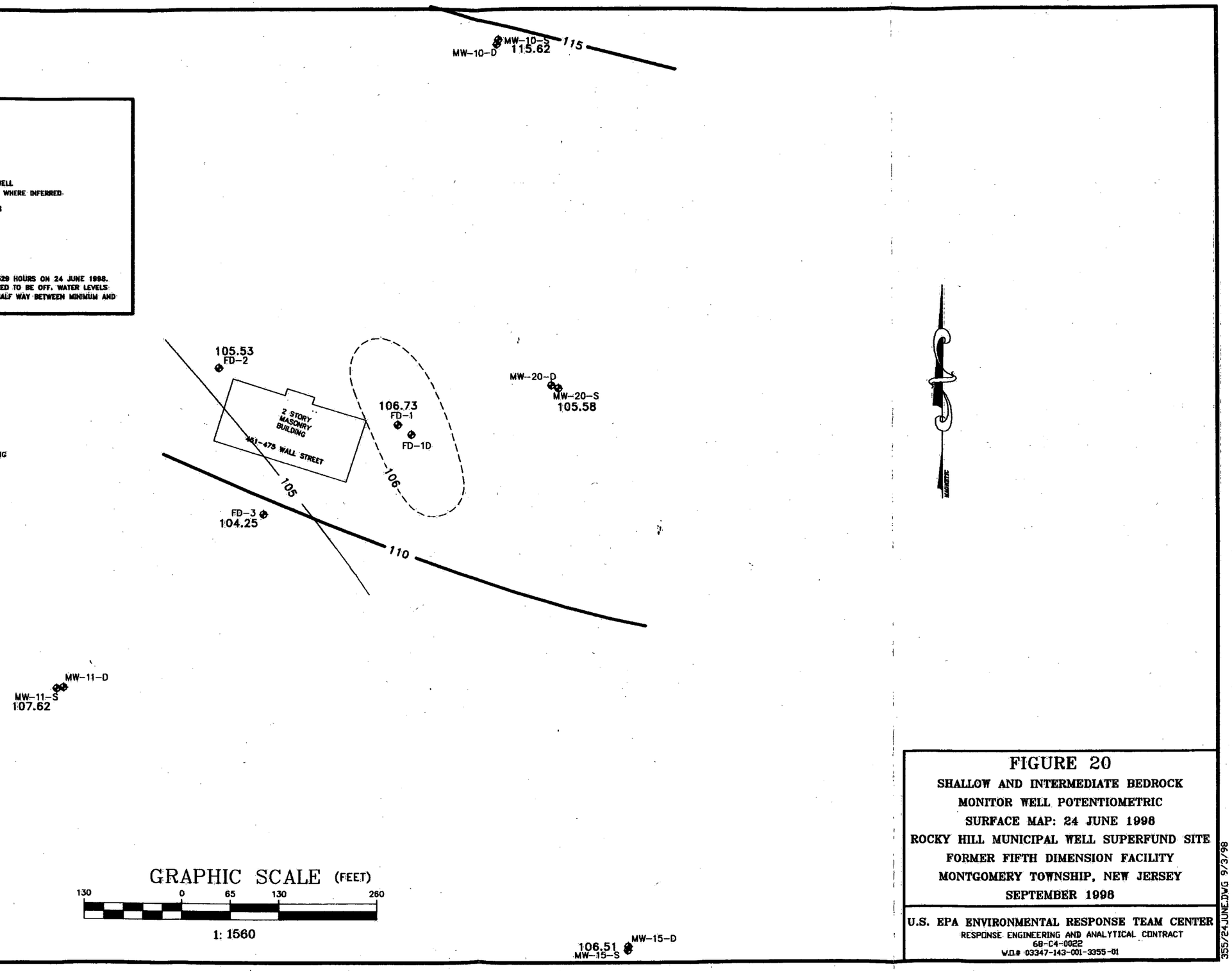


FIGURE 20

SHALLOW AND INTERMEDIATE BEDROCK MONITOR WELL POTENTIOMETRIC SURFACE MAP: 24 JUNE 1998

ROCKY HILL MUNICIPAL WELL SUPERFUND SITE

FORMER FIFTH DIMENSION FACILITY

MONTGOMERY TOWNSHIP, NEW JERSEY

SEPTEMBER 1998

U.S. EPA ENVIRONMENTAL RESPONSE TEAM CENTER

RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O.# 03347-143-001-3355-01

355/24JUNE.DWG 9/3/98

LEGEND

⊕	MONITORING WELL
—110—	SHALLOW BEDROCK MONITOR WELL POTENTIOMETRIC SURFACE
—100— —	INTERMEDIATE BEDROCK MONITOR WELL POTENTIOMETRIC SURFACE
MW-10S, MW-11S, MW-15S	SHALLOW BEDROCK MONITOR WELLS
FD-1, FD-2, FD-3, MW-20S	INTERMEDIATE DEPTH BEDROCK MONITOR WELL
99.42	WATER LEVEL ELEVATION, DATA COLLECTED BETWEEN 1003 AND 1101 HOURS ON 28 JULY 1998. ROCKY HILL MUNICIPAL WELL ASSUMED TO BE PUMPING WITH WATER LEVELS IN DEEP BEDROCK WELLS ABOUT HALFWAY BETWEEN MAXIMUM AND MINIMUM ELEVATION.

NOTE:

- ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.
- THE COORDINATE SYSTEM IS BASED ON THE NEW JERSEY STATE PLANE NORTH AMERICAN DATUM OF 1983 (1986 ADJUSTMENT)
- BASED ON SURVEY CONDUCTED BY NASSAU SURVEYING ON 7/9/98, THEIR PROJECT NO. 4-51-33218-50.
- MONTGOMERY TOWNSHIP TAX MAP:
  SHEET NO. 13
  BLOCK 35001
  LOTS 9 & 11

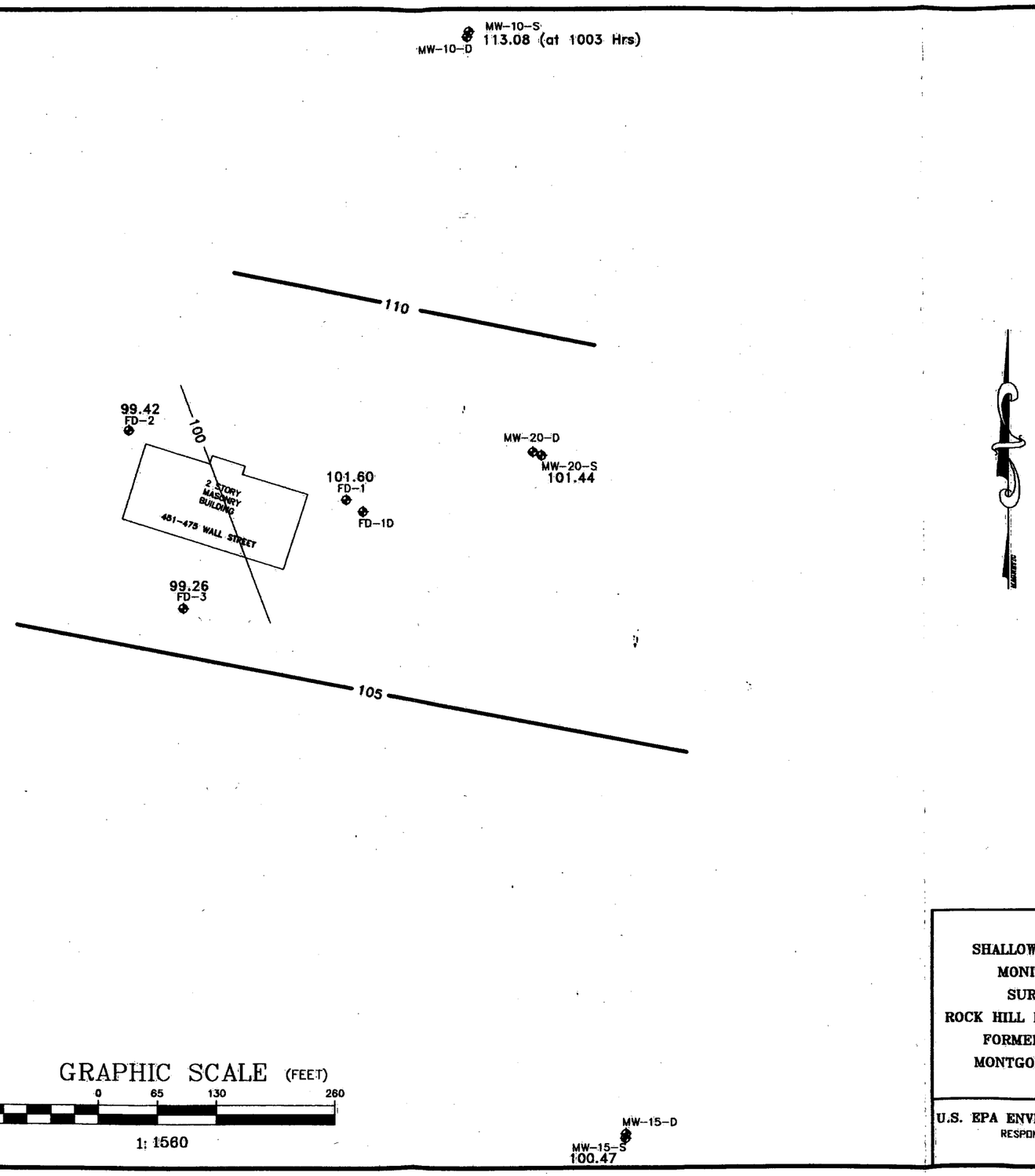


FIGURE 21

SHALLOW AND INTERMEDIATE BEDROCK MONITOR WELL POTENTIOMETRIC SURFACE MAP: 28 JULY 1998

ROCK HILL MUNICIPAL WELL SUPERFUND SITE

FORMER FIFTH DIMENSION FACILITY

MONTGOMERY TOWNSHIP, NEW JERSEY

SEPTEMBER 1998

U.S. EPA ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O.# 03347-143-001-3355-01

355/28July.dwg 8/2/98

LEGEND

FD-1D	MONITORING WELL
98.50	POTENTIOMETRIC SURFACE BASED ON DEEP (D) MONITOR WELL DATA AT 1000 HOURS ON 28 JULY 1998, MAXIMUM ELEVATION, ASSUME ROCKY HILL MUNICIPAL WELL PUMP OFF, DASHED WHERE INFERRED
96.5	POTENTIOMETRIC SURFACE BASED ON DEEP (D) MONITOR WELL DATA AT 0700 HOURS ON 28 JULY 1998, MINIMUM ELEVATION, ASSUME ROCKY HILL MUNICIPAL WELL PUMP ON, DASHED WHERE INFERRED
98.60	MAXIMUM WATER LEVEL ELEVATION AT 1000 HOURS
96.25	MINIMUM WATER LEVEL ELEVATION AT 0700 HOURS

NOTE:

- ELEVATIONS SHOWN HEREON ARE IN FEET ABOVE MEAN SEA LEVEL AND ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.
- THE COORDINATE SYSTEM IS BASED ON THE NEW JERSEY STATE PLANE NORTH AMERICAN DATUM OF 1983 (1988 ADJUSTMENT)
- BASED ON SURVEY CONDUCTED BY NASSAU SURVEYING ON 7/9/98, THEIR PROJECT NO. 4-51-33218-50.
- MONTGOMERY TOWNSHIP TAX MAP:
  SHEET NO. 13
  BLOCK 35001
  LOTS 9 & 11

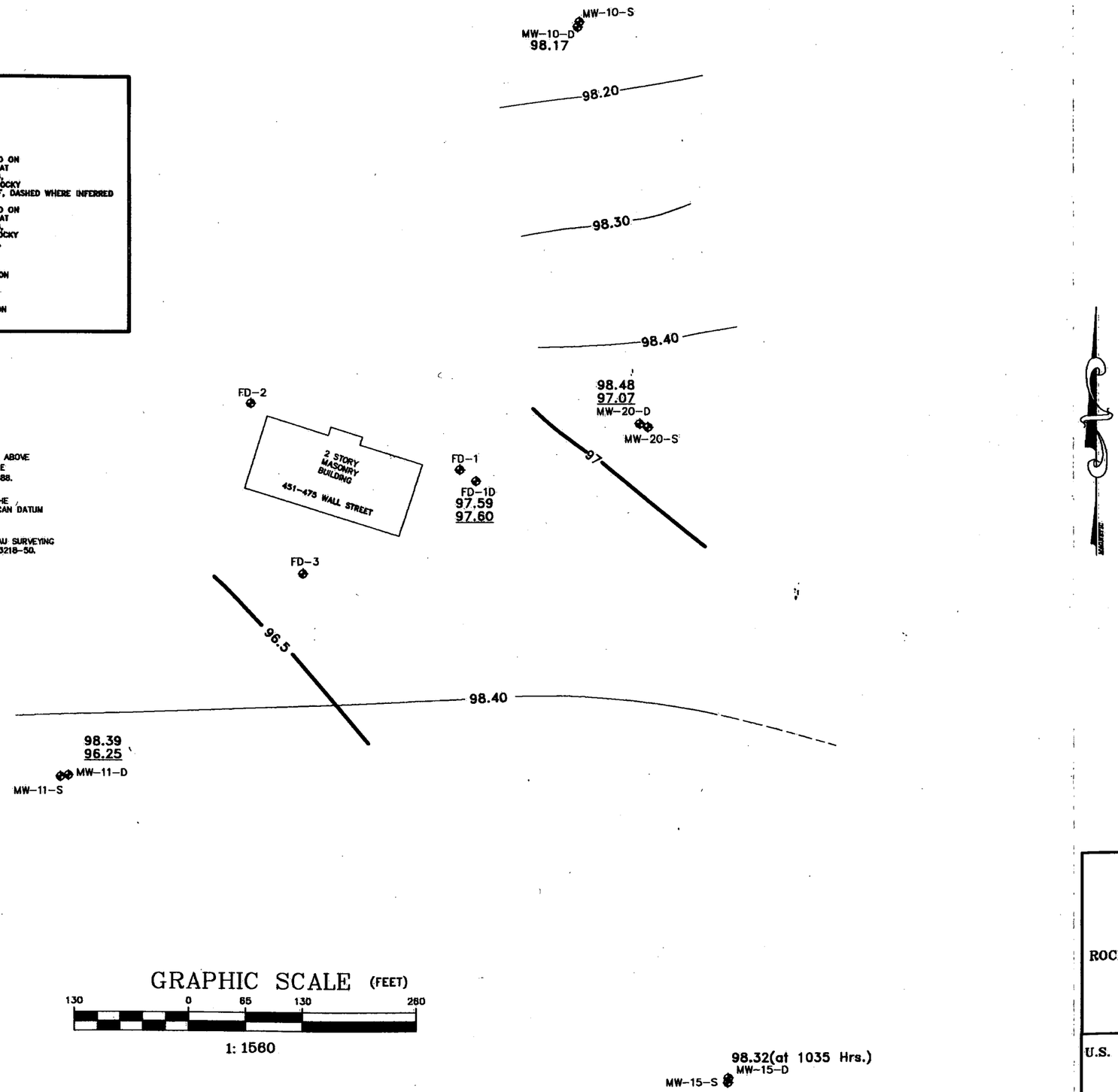


FIGURE 24

DEEP BEDROCK MONITOR WELL
POTENTIOMETRIC SURFACE MAP:
28 JULY 1998
ROCKY HILL MUNICIPAL WELL SUPERFUND SITE
FORMER FIFTH DIMENSION FACILITY
MONTGOMERY TOWNSHIP, NEW JERSEY
SEPTEMBER 1998

U.S. EPA ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O.# 03347-143-001-3355-01

355/SURF_28.DWG 9/3/98