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Phase III
Hydrogeologic/Subsurface Contamination Investigation
Powerex Facility
Auburn, New York

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1.0 EXECUTIVE SUMMARY

This report presents the findings of the third phase of an on-going hydrogeologic/subsurface contamination investigation being performed at the Powerex facility (previously owned and operated by General Electric) in Auburn, New York. A site location map is included as Figure 1. The field work was performed in October and November 1987 and consisted of a soil gas survey; installation of additional micro-wells, overburden and bedrock monitoring wells and a single piezometer; hydraulic conductivity testing; as well as surface water and groundwater analyses. The data resulting from the Phase III work has been combined with the data generated from the previous two phases to formulate the conclusions/recommendations that are presented within this report.

Four sources of groundwater contamination have been identified. They are 1) the North Evaporation Pit, 2) an unlocated West Evaporation Pit, 3) the waste solvent tank area, and 4) an area in the vicinity of micro-well PS-9. Volatile organic compounds (VOCs) emanating from each of these sources have impacted the groundwater quality at the site. VOCs have been observed in both the overburden and bedrock aquifers. Those VOCs found to be both widespread and in high concentrations are trichloroethylene, 1,2-dichloroethylene, vinyl chloride, acetone, toluene, total xylenes and ethylbenzene.

The general areal extent of VOC contamination in the overburden aquifer has been defined. Due to the relatively impermeable nature of the overburden material, primarily silty clay and glacial till, contaminant migration has been very slow with an estimated groundwater flow rate ranging from 0.032 to 0.095 feet/day. The extent of overburden groundwater contamination is well within the Powerex property boundaries. An "outer" series of monitoring wells, either uncontaminated or with very low levels of VOCs, is currently in place. By monitoring these "outer" wells along with selected "internal" wells, evidence of further migration of VOCs in the overburden aquifer may be obtained.

The lateral and vertical extent of VOC contamination in the bedrock aquifer cannot be delineated with the current bedrock monitoring network. Due to the nature of flow within the limestone aquifer, a large number of wells is required to accurately determine the groundwater flow system. An estimate of the rate of groundwater flow in the bedrock aquifer has been calculated (1.4 to 3.5 feet/day) but the actual groundwater flow rate will vary considerably within individual fractures. Additional bedrock wells will be installed to refine the current understanding of groundwater flow and further delineate the distribution of VOC contamination.

Relatively low concentrations of VOCs were detected in a surface water sample collected in the drainage ditch near the property line on the west side of the facility. Reduced VOC concentrations are expected further downstream due to volatilization and dilution. Despite the relatively low levels of VOCs observed, a surface water treatment system will be implemented to further reduce the VOC concentrations within the drainage ditch.

2.0 INTRODUCTION/SITE HISTORY

Dunn Geoscience Corporation (DGC) of Albany, New York was authorized to perform the Phase III work by General Electric (GE) in August 1987 in response to a DGC proposal dated June 12, 1987. Additional work was performed by the following subcontractors: Pine and Swallow Associates (PSA) of Acton, Massachusetts performed the soil gas analysis/micro-well installation/field groundwater analyses; Parratt Wolff, Inc. of East Syracuse, New York performed monitoring well/piezometer drilling and installation services; and ERCO Laboratory, a division of ENSECO Inc. of Cambridge, Massachusetts provided analytical services.

The goals of the third phase of the project were to:

- obtain a more thorough understanding of the groundwater flow conditions within the bedrock and overburden aquifers as related to the migration of dissolved synthetic organic compounds;
- further define the nature and extent of groundwater contamination across the site; and
- investigate the possibility of surface water contamination.

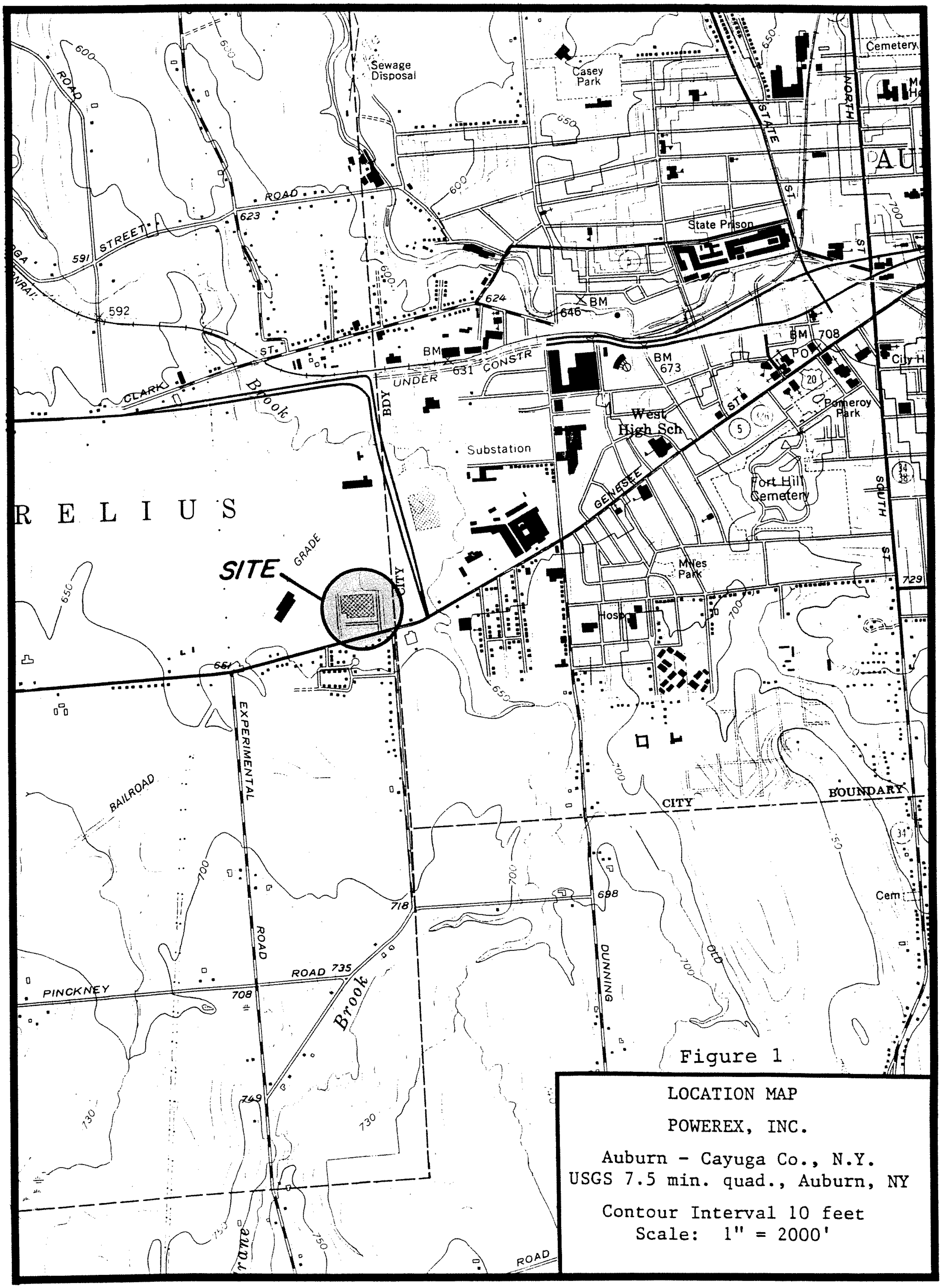


Figure 1

LOCATION MAP

POWEREX, INC.

Auburn - Cayuga Co., N.Y.
USGS 7.5 min. quad., Auburn, NY

Contour Interval 10 feet
Scale: 1" = 2000'

Past waste disposal at the facility took place at an unlined evaporation pit located immediately north of the fence-enclosed facility. Additional information obtained as part of the Phase III interviews suggests that the pit was utilized from 1962 or 1963 to 1966 or 1967 and not from the 1950s to 1965 as was previously reported. Employee interviews revealed that a second evaporation pit that pre-dated the pit north of the fence (North Evaporation Pit) existed in the open field area west of the manufacturing building. It was this "West Evaporation Pit" that was constructed some time in the early 1950's in order to dispose of waste solvents generated at the facility. The dimensions of the pit were similar to the North Evaporation Pit, approximately 30 feet in diameter and 24 inches in depth. An unknown quantity of waste solvents was purportedly disposed in this pit. Historical accounts indicate that acetone was used to ignite fires in the pit in an effort to "burn-off" the ponded waste solvents. The burning was believed to have been discontinued and the pit abandoned in 1962 due to the construction of an addition to the north end of the manufacturing facility. Prevailing wind directions may have caused smoke from the burning to enter the construction area and interfere with work activities. The pit was thought to have been closed by bulldozing the area.

3.0 PROJECT SCOPE

The following activities were conducted at the Powerex facility during the Phase III study:

- Plans and diagrams of the facility, adjacent buildings, and sewer and utility lines were evaluated to identify potential migratory pathways for contaminated groundwater;

- Additional plant personnel interviews were conducted pertaining to past and present chemical handling and waste disposal practices at the facility;

- Three surface water samples were collected to evaluate the quality of the surface water on site and at the property boundary;

- Soil gas samples were collected and analyzed for volatile organic compounds (VOCs) in potentially contaminated areas not previously investigated;
- Nineteen 1/2-inch micro-wells were installed at locations based on the results of the soil gas analysis;
- One overburden and six bedrock monitoring wells were installed at locations selected to further define the nature and extent of groundwater contamination;
- A single piezometer was installed adjacent to a newly-installed micro-well to determine if the different construction methods yield comparable water levels;
- Soil samples from the monitoring well borings were screened for total VOCs using an HNU-101 portable photoionization unit;
- Groundwater samples from selected monitoring wells and micro-wells were sampled and analyzed for VOCs;
- Water levels were recorded on a bi-weekly basis to evaluate groundwater flow at the facility;
- Hydraulic conductivity testing was performed in the newly-installed monitoring wells; and
- Utilizing a data base management system, the resulting data was evaluated and this report was prepared to detail the hydrogeologic conditions and extent of subsurface contamination at the facility.

4.0 FIELD INVESTIGATION

A variety of field activities were performed in October and November 1987 to further evaluate the nature and extent of surface and subsurface contamination at the site. The methodology used to undertake each field activity is presented in this section.

No problems were encountered in accessing any of the drilling locations. Weather conditions were generally favorable during field activities.

4.1 Soil Gas Analysis

Soil gas chromatography was used to detect VOCs originating from contaminated soil or groundwater. Volatile organic compounds that move as a contaminant plume within an aquifer diffuse from the groundwater to a vapor phase within the soil pores above the water table. Thus, a contaminant plume in the groundwater generates a unique gaseous fingerprint in the overlying soil.

Soil gas samples were collected by augering a small diameter hole (one-inch) into the upper 6 to 12 inches of soil. A thin hollow probe was driven into the ground and packed off. Typically, at least ten well volumes of soil air were pumped by a vacuum pump before a sample of the gas was withdrawn. A Photovac 10A10 gas chromatograph was used to analyze the soil gas samples, which allowed comparison of relative concentrations of volatile constituents. Chromotographic results were known within minutes of sampling, allowing new test locations to be chosen in an efficient manner. The pattern of sampling, therefore, was tailored to the site as data were generated in the field.

Areas of saturated surface soils and standing water could not be investigated by this method. Sixty-three soil gas test locations were sampled and analyzed over a four day period during October/November 1987. Locations are shown on Plate 1 in Appendix A.

4.2 Micro-Well Installation

Several small diameter "micro-wells" were installed and analyzed. Locations for these wells were based on results of the soil gas analysis, previous groundwater analyses, land use, and the need for groundwater elevation measuring points to further define directions of groundwater flow.

A DGC hydrogeologist supervised the installation of nineteen 1/2-inch micro-wells. The wells were installed at fifteen locations over a four day period during October/November 1987. Locations are indicated on Plate 2 in Appendix A. Wells consist of 1/2-inch steel pipe and 3.8 to 9 foot screens with longitudinal 0.020-inch slots. A sketch of a typical micro-well installation has been included as Figure 2. A high frequency percussion hammer was used to install the wells. To prevent the intrusion of silt and clay into the longitudinal slots of the micro-wells during the installation process, clean silica sand was used to fill the steel pipe. The sand, which was later removed by a peristaltic pump during well development, significantly reduced the amount of silt and clay forced into the well during the installation process. A summary of the micro-well construction details is located in Table 1.

Micro-wells PS-17, 18, 19 and 34 were installed to monitor groundwater flow in the area of the neutralization building and to determine if the groundwater had been impacted by the wastewater that was being carried to and treated within the neutralization building. Micro-well PS-20 was located in an "upgradient" area. Micro-wells PS-21, 22, 23 and 33 were installed to further define groundwater flow and the outer extent of contamination within this area of the overburden aquifer. The locations of these four wells were based on soil gas results. Micro-wells 24 and 25 were positioned within the west field at "hot spots" indicated by the soil gas readings. Micro-well 26 was installed to verify petroleum-based soil gas readings at that location. Micro-wells 27, 28, 29 and 30 were positioned on either side of the storm water drain pipe that is buried within the west field to determine if contamination was preferentially traveling along the bed of the pipe. These wells were also expected to aid in

FIGURE 2

TYPICAL MICRO-WELL INSTALLATION

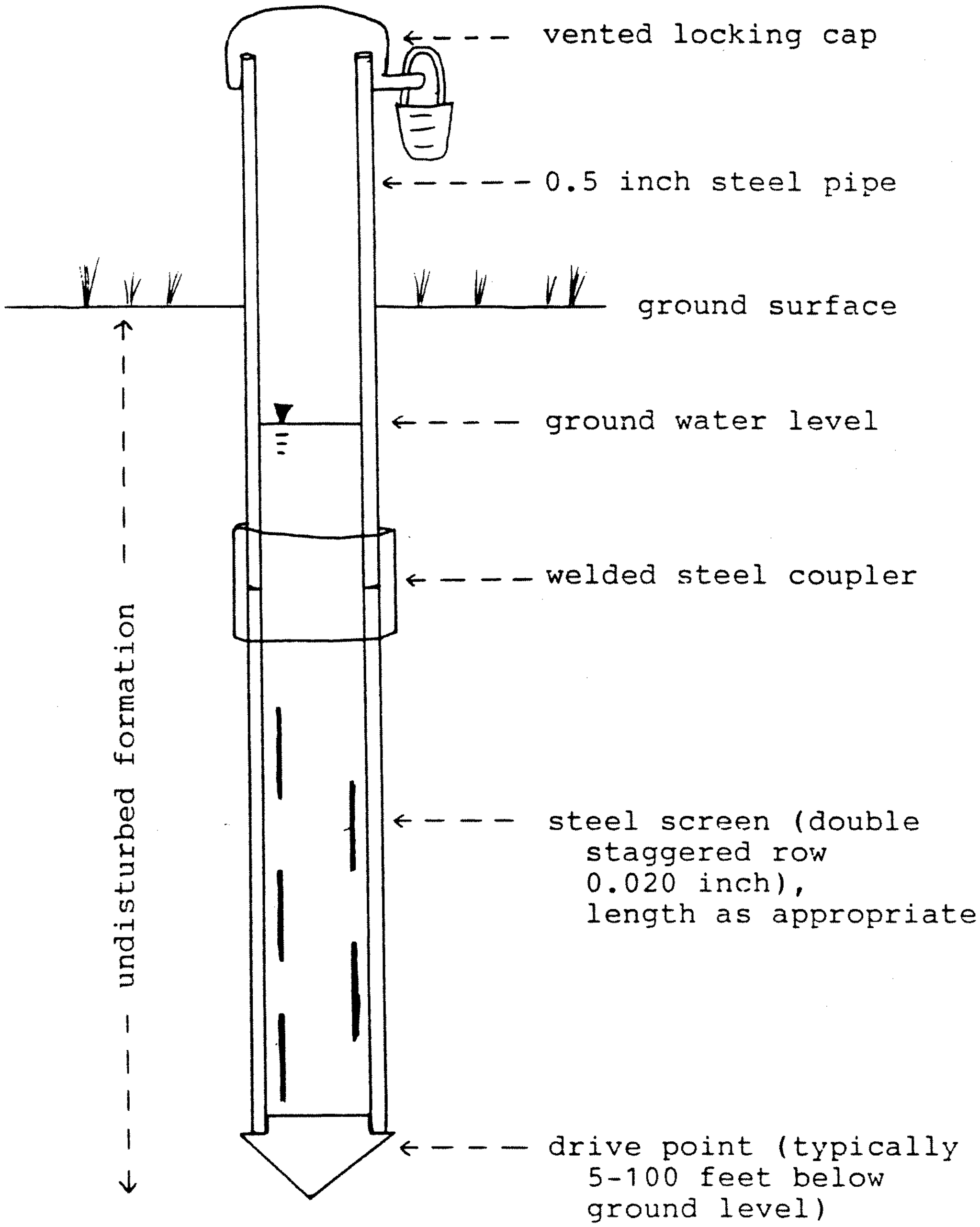


TABLE 1
MICRO-WELL INFORMATION
POWEREX FACILITY
AUBURN, NEW YORK

WELL ID	INSTALLATION DATE	INSPECTOR	DRILLING COMPANY	SCREEN TYPE	WELL DIAMETER (INCHES)	BORING DEPTH (FEET)	DEPTH TO TOP OF SCREEN (FEET)	DEPTH TO BOTTOM OF SCREEN (FEET)	TOP OF SCREEN ELEVATION (FEET-MSL)	BOTTOM OF SCREEN ELEVATION (FEET-MSL)	GROUND ELEVATION (FEET-MSL)	MEASURING POINT ELEVATION (FEET-MSL)
PS-1	12/10/86	BEGOR	PSA	STEEL	0.5	13.3	3.3	12.3	632.0	623.0	635.3	637.25
PS-2	12/10/86	BEGOR	PSA	STEEL	0.5	8.9	2.9	7.9	634.9	629.9	637.8	639.31
PS-3S	12/10/86	BEGOR	PSA	STEEL	0.5	9.0	3.0	8.0	635.2	630.2	638.2	639.78
PS-3D	12/10/86	BEGOR	PSA	STEEL	0.5	17.0	11.0	16.0	627.2	622.2	638.2	640.11
PS-4	12/10/86	BEGOR	PSA	STEEL	0.5	11.6	1.6	10.6	635.9	626.9	637.5	639.43
PS-5	12/11/86	BEGOR	PSA	STEEL	0.5	9.0	3.0	8.0	638.4	633.4	641.4	642.91
PS-6	12/11/86	BEGOR	PSA	STEEL	0.5	12.9	2.9	11.9	633.3	624.3	636.2	638.52
PS-7	12/11/86	BEGOR	PSA	STEEL	0.5	10.7	0.7	9.7	636.1	627.1	636.8	638.58
PS-8A	12/11/86	BEGOR	PSA	STEEL	0.5	9.0	0.5	8.0	635.6	628.1	636.1	637.29
PS-8B	12/11/86	BEGOR	PSA	STEEL	0.5	8.7	2.7	7.7	633.5	628.5	636.2	637.83
PS-9	12/11/86	BEGOR	PSA	STEEL	0.5	11.3	1.3	10.3	637.3	628.3	638.6	640.39
PS-10	12/12/86	BEGOR	PSA	STEEL	0.5	10.2	0.2	9.2	635.9	626.9	636.1	637.83
PS-11A	12/12/86	BEGOR	PSA	STEEL	0.5	8.7	1.0	7.7	632.7	626.0	633.7	636.22
PS-11B	12/12/86	BEGOR	PSA	STEEL	0.5	8.4	2.4	7.4	631.4	626.4	633.8	635.77
PS-12	12/12/86	BEGOR	PSA	STEEL	0.5	9.0	3.0	8.0	631.2	626.2	634.2	636.18
PS-13	12/12/86	BEGOR	PSA	STEEL	0.5	13.4	3.4	12.4	631.8	622.8	635.2	636.43
PS-14	12/12/86	BEGOR	PSA	STEEL	0.5	13.3	3.3	12.3	633.8	624.8	637.1	638.18
PS-15	12/13/86	BEGOR	PSA	STEEL	0.5	10.7	1.0	9.7	635.6	626.9	636.6	638.11
PS-16S	12/13/86	BEGOR	PSA	STEEL	0.5	8.0	2.0	7.0	633.7	628.7	635.7	637.51
PS-16D	12/13/86	BEGOR	PSA	STEEL	0.5	13.2	7.2	12.2	628.6	623.6	635.8	637.30
PS-17	10/28/87	BEGOR	PSA	STEEL	0.5	9.0	3.0	8.0	634.7	629.7	637.7	639.13
PS-18	10/28/87	BEGOR	PSA	STEEL	0.5	8.8	2.8	7.8	635.2	630.2	638.0	639.70
PS-19	10/28/87	BEGOR	PSA	STEEL	0.5	9.0	3.0	8.0	639.2	634.2	642.2	643.78
PS-20	10/28/87	BEGOR	PSA	STEEL	0.5	8.6	2.6	7.6	635.2	630.2	637.8	639.75
PS-21	10/28/87	BEGOR	PSA	STEEL	0.5	8.2	2.2	7.2	632.9	627.9	635.1	637.39
PS-22	10/28/87	BEGOR	PSA	STEEL	0.5	8.3	2.3	7.3	634.2	629.2	636.5	638.62
PS-23	10/28/87	BEGOR	PSA	STEEL	0.5	6.4	0.4	5.4	638.4	633.4	638.8	640.77
PS-24	10/29/87	BEGOR	PSA	STEEL	0.5	8.8	2.8	7.8	635.7	630.7	638.5	640.27
PS-25	10/29/87	BEGOR	PSA	STEEL	0.5	6.9	0.9	5.9	636.0	631.0	636.9	638.34
PS-26	10/29/87	BEGOR	PSA	STEEL	0.5	8.5	2.5	7.5	637.6	632.6	640.1	640.00
PS-27	10/29/87	BEGOR	PSA	STEEL	0.5	6.9	0.9	5.9	634.2	629.2	635.1	636.15
PS-28	10/29/87	BEGOR	PSA	STEEL	0.5	7.1	1.1	6.1	634.0	629.0	635.1	635.94
PS-29	10/29/87	BEGOR	PSA	STEEL	0.5	8.2	2.2	7.2	633.1	628.1	635.3	637.12
PS-30	10/29/87	BEGOR	PSA	STEEL	0.5	8.0	2.0	7.0	633.1	628.1	635.1	637.10
PS-31	10/30/87	BEGOR	PSA	STEEL	0.5	10.8	5.5	9.3	631.2	627.4	636.7	638.59
PS-32	10/30/87	BEGOR	PSA	STEEL	0.5	7.8	1.8	6.8	629.6	624.6	631.4	635.05
PS-33	11/02/87	BEGOR	PSA	STEEL	0.5	8.5	3.2	8.2	636.7	631.7	639.9	639.81
PS-34	11/02/87	BEGOR	PSA	STEEL	0.5	13.7	8.4	13.4	629.1	624.1	637.5	639.77
PS-35	11/02/87	BEGOR	PSA	STEEL	0.5	10.1	0.8	9.8	636.3	627.3	637.1	636.91

determining the effect of the storm drain line on groundwater flow in the surrounding aquifer. Micro-well PS-31 was installed to help determine the extent of contamination north of the drainage ditch and west of the North Evaporation Pit. PS-32 was installed within the drainage ditch at the outfall of storm water drain pipe to determine if contamination may have entered the overburden aquifer at this point. And lastly, PS-35 was installed adjacent to the underground waste solvent tanks, located at the northwest corner of the manufacturing building, to monitor the effect of the tanks on the overburden groundwater quality.

4.3 Monitoring Well Installation

Drilling and installation of seven groundwater monitoring wells occurred between October 26, 1987 and November 6, 1987. Locations are indicated on Plate 2 in Appendix A. These monitoring wells were installed to obtain groundwater samples for chemical analysis and to aid in the determination of groundwater flow directions. A single shallow well, DGC-11S, was installed to monitor the overburden aquifer. The remaining six wells, DGC-2B, 6B, 7B, 8B, 9B and 10B, were installed to monitor the underlying bedrock aquifer. Borings logs, rock core logs and monitoring well construction diagrams are located in Appendix B. A summary of monitoring well construction details is provided in Table 2.

Bedrock monitoring well DGC-2B was installed approximately five feet from the existing overburden well DGC-2S. DGC-2B was positioned at this location to assess the groundwater quality of the bedrock aquifer northwest of the North Evaporation Pit and to determine vertical hydraulic gradients between the bedrock and overburden aquifers. Wells DGC-6B and 7B were installed to determine whether the contamination detected at DGC-1B in January 1987 was emanating from the north evaporation pit, and if so, the approximate lateral extent of the plume. The location of DGC-7B was further refined based on the results of an aerial photo fracture trace analysis. DGC-8B was positioned in proximity to the North Evaporation Pit to evaluate the groundwater quality near the source. DGC-9B was installed in the waste solvent tank area to assess the water quality of the bedrock aquifer in that area. The location of DGC-10B was

TABLE 2
MONITORING WELL INFORMATION
POWEREX FACILITY
AUBURN, NEW YORK

WELL ID	INSTALLATION DATE	INSPECTOR	DRILLING COMPANY	SCREEN TYPE	FORMATION SCREENED	WELL DIAMETER (INCHES)	BORING DEPTH (FEET)	DEPTH TO TOP OF SCREEN (FEET)	DEPTH TO BOTTOM OF SCREEN (FEET)	TOP OF SCREEN ELEVATION (FEET-MSL)	BOTTOM OF SCREEN ELEVATION (FEET-MSL)	ROCK ELEVATION (FEET-MSL)	GROUND ELEVATION (FEET-MSL)	MEASURING POINT ELEVATION (FEET-MSL)
DGC-1S	12/29/86	HOWARD	CATOH	PVC	TILL	2.00	19.6	7.2	17.0	633.1	623.3	0.0	640.3	642.33
DGC-1B	01/08/87	HOWARD	CATOH	PVC	LIMESTONE	2.00	33.0	23.2	33.0	617.2	607.4	620.8	640.4	642.40
DGC-2S	12/30/86	HOWARD	CATOH	PVC	LIMESTONE/TILL	2.00	13.4	4.0	12.0	630.4	622.4	0.0	634.4	635.98
DGC-2B	10/30/87	SUTCH	PARRATWOLF	PVC	LIMESTONE	2.00	25.7	15.7	25.7	618.5	608.5	620.5	634.2	635.82
DGC-3S	12/31/86	HOWARD	CATOH	PVC	LACUSTRINE	2.00	12.0	4.0	10.5	633.1	626.6	0.0	637.1	639.14
DGC-3B	01/09/87	HOWARD	CATOH	PVC	LIMESTONE	2.00	26.5	16.7	26.5	620.3	610.5	625.0	637.0	638.76
DGC-4S	12/31/86	HOWARD	CATOH	PVC	TILL	2.00	14.8	6.0	12.8	632.6	625.8	0.0	638.6	640.77
DGC-4B	01/06/87	HOWARD	CATOH	PVC	LIMESTONE	2.00	28.9	19.1	28.9	619.8	610.0	624.1	638.9	640.79
DGC-5B	01/10/87	HOWARD	CATOH	PVC	LIMESTONE	2.00	23.2	13.3	23.2	624.2	614.3	627.0	637.5	637.57
DGC-6B	10/27/87	SUTCH	PARRATWOLF	PVC	LIMESTONE	2.00	30.0	20.0	30.0	618.8	608.8	621.5	638.8	641.18
DGC-7B	10/29/87	SUTCH	PARRATWOLF	PVC	LIMESTONE	2.00	37.5	27.5	37.5	613.7	603.7	616.7	641.2	643.46
DGC-8B	11/02/87	SUTCH	PARRATWOLF	PVC	LIMESTONE	2.00	27.0	17.0	27.0	619.8	609.8	623.0	636.8	638.79
DGC-9B	11/03/87	SUTCH	PARRATWOLF	PVC	LIMESTONE	2.00	30.0	20.0	30.0	616.7	606.7	619.4	636.9	636.76
DGC-10B	11/05/87	SUTCH	PARRATWOLF	PVC	LIMESTONE	2.00	23.0	13.0	23.0	622.1	612.1	624.1	635.1	637.80
DGC-11S	11/06/87	SUTCH	PARRATWOLF	PVC	TILL	2.00	7.5	2.5	7.5	634.7	629.7	0.0	637.2	639.88
PZ-1	11/06/87	SUTCH	PARRATWOLF	PVC	FILL	1.25	9.0	1.0	6.0	636.1	631.1	0.0	637.1	640.21

selected to fill a gap in the bedrock monitoring network west of the facility. DGC-11S was installed at a location expected to be downgradient of the estimated position of the west evaporation pit. The well will provide chemical data necessary to assess the extent of overburden aquifer contamination in this direction.

The monitoring well drilling and installations were performed by Parratt Wolff, Inc. of East Syracuse, New York and were supervised by a hydrogeologist from DGC. The drilling rig utilized for these operations was a Mobile Drill B-53 mounted on a John Deere 450-B truck rig.

The drilling of the shallow monitoring well (DGC-11S) was accomplished utilizing a 4-1/4-inch I.D. hollow stem auger. The original location for DGC-11S was approximately 12 feet south-southwest of its final position. Continuous sampling was conducted to refusal at the original location (see boring log "Boring-11S" in Appendix B) using a 2-inch split-spoon sampler, following ASTM procedures. Samples were described using a modified version of the Burmister System and classified using the Unified Soil Classification System. Representative portions of all samples were retained by DGC for future examination. Refusal occurred at 7 feet with no indication that the water table had been reached. For this reason, a second boring was advanced approximately 5 feet to the north-northeast with refusal again occurring at 7 feet. A third boring (see boring log "DGC-11S" in Appendix B) was advanced at the final location of monitoring well DGC-11S with refusal occurring at 7.5 feet. Groundwater was encountered at this location allowing the installation of a monitoring well to occur.

The well assembly for DGC-11S was installed in the boring immediately following drilling. The well assembly consists of 10 slot (0.010 inch), schedule 40 PVC well screen threaded onto to a 2-inch diameter, schedule 40 PVC riser pipe. The annulus surrounding the well assembly was packed with Morie grade 00 silica sand to a half foot above the top of the screen, sealed with a half foot of bentonite pellets and grouted to the surface with cement grout. A lockable protective steel casing was installed over the riser pipe and cemented into place. Well construction details are provided in Appendix B.

The bedrock monitoring wells were advanced with augers to apparent bedrock. Drilling and sampling procedures similar to those stated above for the shallow monitoring well were utilized throughout the overburden. To confirm that bedrock had been reached, rather than a boulder, the augers were then removed and a 4-1/4 inch I.D. casing was inserted into the boring and firmly seated into the rock. This was accomplished by spinning the casing with an attached cutting shoe to a maximum depth of 1.2 feet into the rock. Once the casing was in place, a 4-inch O.D. diamond bit core barrel was used to core 12 feet of rock. The rock cores were placed in core boxes, logged and retained by DGC for examination.

The bedrock well assembly was installed in the borings immediately following drilling. A 10 slot (0.010 inch), schedule 40 PVC screen with a bottom end cap and stainless steel centralizer, attached at the screen's midpoint, was inserted to the bottom of each of the bedrock sockets. The top of the PVC screens in all the bedrock monitoring wells were installed at least two feet below the top of the bedrock. Two-inch, flush joint threaded, schedule 40 PVC riser pipe was installed from the top of the screen to approximately two feet above the ground surface. The annulus surrounding the well assembly was packed with Morie grade 00 silica sand to at least a half foot above the top of the screen and then sealed with no less than 1-1/2 feet of bentonite pellets. The bentonite seals extended to, or above, the top of rock. A cement-bentonite grout was then tremied into the remainder of the annulus from the top of the pellets to about two feet below ground surface. A lockable protective steel casing was installed over the riser pipe and cemented into place. The surface construction was modified at DGC-9B where the riser pipe was cut off below ground surface and placed within a curb box.

4.4 Piezometer Installation

A single piezometer (PZ-1) was installed adjacent to micro-well PS-25 (see Plate 2 in Appendix A). The purpose of installing a piezometer at this location was two fold. First, the piezometer would be used to evaluate the effectiveness of using micro-wells as water table measuring devices. Second, geologic information was important at this location, as this area had been identified as the general location of the West Evaporation Pit.

The boring for PZ-1 was advanced using 4-1/4 inch I.D. augers with continuous split-spoon sampling as previously described in Section 8.3. Auger refusal occurred at 9 feet. The boring was backfilled with bentonite pellets to a depth of 7.5 feet. Morie sand (00 size) was backfilled to 6 feet. The piezometer consists of 1-1/4 inch, 0.006 inch slot, PVC screen that extends from 1 foot to 6 feet below ground. The screen is threaded onto 1-1/4 inch PVC riser pipe. The annulus of the boring was filled with sand to the top of the screen (1 foot below ground). Above the sand is a half foot bentonite seal with a half foot of soil cuttings above the pellets. A non-locking cap was placed on the piezometer and no protective casing was installed.

4.5 Decontamination Procedures

Prior to drilling the first boring, the equipment used in drilling and well installation was cleaned to remove possible contaminants encountered during drilling at previous jobs. All equipment which came in contact with the soil, as well as water tanks, drill tools, pumps and hoses underwent the initial cleaning procedure. While working at the site, the drilling equipment was decontaminated between boring locations to prevent cross contamination. All PVC screen, riser pipe, bottom caps and stainless steel centralizers were decontaminated and sealed in plastic before beginning drilling at the first location.

Decontamination took place at a designated area on site. The cleaning process involved the use of a high pressure steam cleaner. Uncontaminated water, from the facility's public water supply, was used for all decontamination procedures.

4.6 HNU Screening Procedure

Soil samples collected as part of the monitoring well/piezometer installation program (Sections 7.3 & 7.4) were screened for volatile organics using an HNU Model PI-101 photoionizer with a 10.2 eV lamp. Screening was performed the same evening that the samples were collected. Samples were allowed to reach room temperature prior to screening. The HNU-101 was calibrated each evening and background readings were recorded prior to each measurement. Measurements were obtained by removing the screw-on lid and piercing the aluminum foil covering the top of each sample jar with the 8-inch extension to the photoionization probe. The head space was tested for the presence of volatile organic vapors and the results recorded after five seconds (optimum response time indicated by manufacturer).

The HNU-101 operates on the principle of photoionization. The sample molecule absorbs a photon of ultraviolet radiation with energy sufficient to ionize the molecule. For this process to be successful, the energy (electron voltage [eV]) of the ultraviolet lamp must be greater than the ionization potential of the sample. The HNU is an appropriate screening method for the chemicals of interest at the Powerex facility. Table 3 presents the ionization potential of the chemicals of interest.

4.7 Well Development

All micro-wells, monitoring wells and piezometer PZ-1 were developed to increase the hydraulic connection between the well and the adjacent formation. Each 1/2-inch micro-well was developed by pumping and surging with a surge block device that was specially developed for the micro-wells and a peristaltic pump and dedicated polyethylene tubing. Distilled water was added to the well and a slurry created by mixing the water with the sand that was used to fill the screened portion during installation and the clayey silt that accumulated within the screened section. If the silt accumulation created a blockage, mixing was accomplished by spinning a section of wire extending to the bottom of the well with a power drill. Additional surging action was produced through the use of the surge block device or by moving a section of

Table 3

IONIZATION POTENTIALS

Parameters	Ionization Potential (eV)	*HNU Response (ppm)
Benzene	9.245	10.0
Acetone	9.69	6.3
Vinyl Chloride	9.99	5.0
Trichloroethylene	9.45	8.9
1,2-Dichloroethylene	9.6	---
Toluene	8.82	10.0
Ethylbenzene	8.76	---
Xylene, Total **	8.5	11.3
Tetrachloroethylene	9.32	---
1,1-Dichloroethylene	----	---

* HNU response when calibrated against 10 ppm of Benzene

** Average of Ortho, Para and Meta Xylene polyethylene tubing up and down within the well. The resulting slurry was pumped out of the well through the polyethylene tubing using the peristaltic pump. The process was repeated until the well was free of sand and/or accumulated clayey silt. The use of distilled water was necessary due to the slow recharge nature of the surrounding geologic material.

Each 2-inch monitoring well was developed using a suction-lift pump. The suction-lift pumps were equipped with dedicated polyethylene discharge tubing that was utilized as both a surge block device to free the fine-grained materials from the screened formation and to remove these materials from the well. The process of repeated surging and pumping was continued until either the water had sufficiently cleared of suspended materials or a minimum of five well volumes of water had been removed. To prevent cross-contamination during the well development process, the polyethylene discharge tubing used during pumping was discarded following the completion of development at each well.

4.8 Surveying

Surveying was performed at the site during November 9 and 10, 1987 to establish measuring point elevations and surface water/soil gas/ groundwater monitoring locations. Additional surveying provided data to modify the base map by incorporating changes to the site since the completion of Phase II work. This included locating the storm drain west of the manufacturing building, the Phase III soil gas points, both sets of newly-installed wells (1/2-inch micro-wells and 2-inch monitoring wells) and the piezometer PZ-1. All surveyed points were referenced to USGS benchmark T-35. All measuring point elevations are listed in Table 4.

4.9 Water Level Measurements

Water level measurements were collected on a weekly basis beginning August 12, 1987. It was later decided, however, that sufficient water level information would be provided by recording water levels on a bi-weekly basis. Bi-weekly readings began on November 17, 1987. Measurements are taken at all micro-wells and 2-inch monitoring wells by Powerex employees using an electronic water level meter. The water level measurements are converted to USGS elevation and

TABLE 4

MEASURING POINT ELEVATIONS MONITORING WELLS AND MICRO-WELLS

Well No.	M.P. Elevation
PS-17	639.13*
PS-18	639.70*
PS-19	643.78*
PS-20	639.75*
PS-21	637.39*
PS-22	638.62*
PS-23	640.77*
PS-24	640.27*
PS-25	638.34*
PS-26	640.00*
PS-27	636.15*
PS-28	635.94*
PS-29	637.12*
PS-30	637.10*
PS-31	638.59*
PS-32	635.05*
PS-33	639.81*
PS-34	639.77*
PS-35	636.91*
DGC-2B	635.82**
DGC-6B	641.18**
DGC-7B	643.46**
DGC-8B	638.79**
DGC-9B	636.76***
DGC-10B	637.80**
DGC-11S	639.88**
PZ-1	640.21**

*	measured from top of steel pipe
**	measured from top of PVC
***	measured from top of brass adaptor

stored in the computerized data base. Water level elevations have been tabulated in Appendix D. Selected graphs depicting water level fluctuations over time are also included in Appendix D.

4.10 Hydraulic Conductivity Testing

Slug tests (no bail tests were used) were performed to estimate the hydraulic conductivity of both the unconsolidated and bedrock aquifers on November 19 and 20, 1987. These tests were conducted after the newly-installed 2-inch monitoring wells had been developed and sampled. The slug test procedure involves observing the recovery of water levels toward an equilibrium level after a volume of water (one gallon of distilled water) has been quickly introduced to the well casing. A pressure transducer set below the static water level was used to record water level recovery.

The hydraulic conductivity data was analyzed using the Hvorslev (1951) method. The principle behind Hvorslev's method is based on the fact that a plot of recovery data versus time theoretically follows an exponential decline. Hydraulic conductivity (K) is, therefore, calculated as follows:

$$K = \frac{r^2 \ln(L/R)}{2LT_0}$$

where: K = hydraulic conductivity

r = radius of riser in which water level fluctuations occur

R = radius of well screen

L = length of well screen

T_0 = basic time lag

Calculations of hydraulic conductivity (K) were also performed using the following equation (Department of the Navy, 1982):

$$K = \frac{R^2}{2L} \ln\left(\frac{L}{R}\right) \frac{\ln(H_1/H_2)}{(T_2-T_1)}$$

where: K = horizontal hydraulic conductivity
R = inside radius of casing-screen
L = length of uncased (screened) portion of well
H = pressure (distance) of water level from equilibrium value
T = time elapsed from test start

A summary of hydraulic conductivity test results and overall averages of the hydraulic conductivity tests using both methods is presented in Table 5.

4.11 Surface Water Sampling

On November 4, 1987, three surface water samples were collected at locations SW-A, B and C (see Plate 2 in Appendix A). The samples were collected by hand in 40 ml VOA vials and analyzed for volatile organic compounds by EPA Method 624. Analytical results and the chain-of-custody form are provided in Appendix G.

SW-A was collected approximately one foot into the storm drain at the catch basin west of the manufacturing building. SW-B was collected approximately three feet into the storm drain near the outfall at PS-32. These sampling locations were selected to assess any change in VOC concentrations as storm water passes through the storm drain that lies within the field west of the manufacturing building. SW-C was collected from the middle of the stream, approximately 25 feet east of the confluence with the drainage stream entering from the south. This sample was collected to determine if VOCs were leaving the site via surface water flow.

4.12 Groundwater Sampling

4.12.1 Field Analyses

Preliminary analysis of the micro-wells was performed by PSA in early November 1987 using a peristaltic pump and dedicated polyethylene tubing. Groundwater

Table 5

SUMMARY OF HYDRAULIC CONDUCTIVITY TESTING

Well No.	Hydraulic Conductivity (cm/sec)				
	HVORSLEV		DM7		Arithmetic Mean
	Slug	Bail	Slug	Bail	
DGC-1S*	1.2×10^{-4}	1.8×10^{-5}	1.1×10^{-4}	2.4×10^{-5}	6.8×10^{-5}
DGC-1B*	1.5×10^{-3}	5.8×10^{-4}	1.4×10^{-3}	6.3×10^{-4}	1.0×10^{-3}
DGC-2S*	----	2.7×10^{-5}	----	2.9×10^{-5}	2.8×10^{-5}
DGC-2B	6.6×10^{-4}	----	6.4×10^{-4}	----	6.5×10^{-4}
DGC-3S*	----	5.6×10^{-5}	----	1.1×10^{-4}	8.3×10^{-5}
DGC-3B*	8.3×10^{-4}	6.1×10^{-4}	8.2×10^{-4}	6.3×10^{-4}	7.2×10^{-4}
DGC-4S*	----	7.0×10^{-4}	----	6.4×10^{-4}	6.7×10^{-4}
DGC-4B*	7.1×10^{-4}	6.4×10^{-4}	7.3×10^{-4}	6.3×10^{-4}	6.8×10^{-4}
DGC-5B*	----	5.0×10^{-3}	----	2.8×10^{-3}	3.9×10^{-3}
DGC-6B	7.6×10^{-4}	----	7.6×10^{-4}	----	7.6×10^{-4}
DGC-7B	8.8×10^{-4}	----	8.9×10^{-4}	----	8.9×10^{-4}
DGC-8B	9.7×10^{-4}	----	7.9×10^{-4}	----	8.8×10^{-4}
DGC-10B	2.1×10^{-4}	----	2.1×10^{-4}	----	2.1×10^{-4}
DGC-11S	3.1×10^{-4}	----	2.9×10^{-4}	----	3.0×10^{-4}
PZ-1	5.8×10^{-4}	----	4.8×10^{-4}	----	5.3×10^{-4}

* Tested during Phase II, March 1987

---- Not performed

Geometric Means

Overburden Aquifer: 1.6×10^{-4} cm/sec (0.45 ft/day)

Bedrock Aquifer: 8.1×10^{-4} cm/sec (2.3 ft/day) samples were collected from the 1/2-inch micro-wells by inserting the 1/2-inch polyethylene tubing to the bottom of the water column. The pump was turned on and off being careful to draw groundwater only into the tubing and not into the pump. The tubing was withdrawn from the well and the bottom of the tubing placed over the sample container. The pump direction was reversed allowing entrapped water to enter the sample container. Standard 40 ml VOA vials were used and stored in a chilled sample chest. As an added precaution, the pump was flushed with distilled water between samples. All samples were analyzed for volatile organics by the headspace method using a Photovac 10A10 gas chromotograph which utilizes a photoionization detector. Quantification was by reference standards prepared in the laboratory using reagent grade chemicals. Analytical results are located in Appendix G.

4.12.2 Laboratory Analyses

On November 24 and 25, 1987, groundwater samples were collected from all 2-inch monitoring wells and fifteen 1/2-inch micro-wells. DGC personnel collected the samples and ERCO laboratory, a division of ENSECO Inc., of Cambridge, Massachusetts analyzed the samples.

Three well volumes of groundwater were removed from each monitoring well prior to sampling. Those wells that recharged slowly were evacuated to dryness. Dedicated polyethylene tubing coupled to a suction-lift pump was used to evacuate each of the 1/2-inch micro-wells and 2-inch monitoring wells. Samples were collected within three hours of evacuating each well if sufficient recharge had occurred. Because of slow recharge, it was necessary to allow several of the micro-wells to recharge overnight to obtain an adequate volume of groundwater for the analytical procedure.

Groundwater samples were collected from the 2-inch monitoring wells, both overburden and bedrock, utilizing 5-foot, dedicated, PVC, bottom-filling, check valve bailers. These bailers were pre-cleaned prior to being used in the field and wrapped in separate plastic envelopes. The bailers were lowered into the well in such a way as to minimize the disruption of the water column and in turn, minimize volatilization of organic compounds.

Groundwater samples were collected from the 1/2-inch micro-wells by inserting polyethylene tubing into the water column and then capping the top of the tubing with a thumb and withdrawing the tubing from the well. The bottom of the tubing was placed over the sample container and the thumb removed, allowing rapid, non-agitated collection of water samples.

All samples were transported to the laboratory via express mail in a portable cooler, containing ice. Samples were analyzed for purgeable organics by EPA Method 624. Analytical results and chain-of-custody forms are located in Appendix G.

5.0 GEOLOGY

The following geologic descriptions are based on the information obtained during the Phase III investigation as well as geologic material collected and documented during previous phases of work. The generalized stratigraphy and geohydrology at the site are shown in Table 6. Continuous sampling of the unconsolidated deposits was performed at monitoring well borings DGC-2B, 6B, 7B, 8B, 9B and 10B; Boring 11S; and piezometer boring PZ-1 during Phase III field activities. Bedrock cores were obtained from monitoring well borings DGC-2B, 6B, 7B, 8B, 9B and 10B. Phase III boring logs and rock core logs are located in Appendix B.

5.1 Unconsolidated Deposits

Unconsolidated deposits were found to range in thickness from 11 to 24.5 feet across the site. The material is glacial in origin with the exception of isolated areas of fill. The glacial deposits can be divided into four distinct stratigraphic units. They are, in descending order, upper glaciolacustrine clay and silt, upper glacial till, lower glaciolacustrine clay and silt, and lower glacial till. The lower two units were only identified in borings DGC-1S, 6B and 7B. These three borings are located northeast of the facility in an area where overburden contamination has not been detected. Four geologic cross sections have been prepared for the section lines shown on Plate 3 in Appendix A. The sections, labeled A-A', B-B', C-C' and D-D', are included as Figures 3, 4, 5 and 6, respectively.

Table 6

GENERALIZED STRATIGRAPHY AND GEOHYDROLOGY

Thickness (feet)	Stratigraphic Unit	General Description	Geohydrologic Unit
0 - 9	Man-made Fill	Recompacted silt & clay and glacial till; minor amounts of gravel and wood	Leaky Aquitard
0 - 11.5	Upper Glaciolacustrine	Brown to reddish brown silty clay, discontinuous silt and fine sand seams	Leaky Aquitard
0.5 - 12	Upper Glacial Till	Brown poorly sorted mixture of gravel and boulders in a silty clay matrix	Leaky Aquitard
0 - 6	Lower Glaciolacustrine	Brownish-red to gray-brown silty clay, trace fine gravel, extremely dense	Leaky Aquitard
0 - 3	Lower Glacial Till	Gray poorly sorted mixture of gravel and boulders in a fine sand and silt matrix	Leaky Aquitard
?	Onondaga Limestone	Medium dark to dark gray finely crystalline and generally non-fossiliferous limestone, argillaceous with occasional shale partings	Semi-Confined Aquifer

Fill was encountered in significant thicknesses at borings DGC-9B and PZ-1. The material is primarily composed of recompacted glaciolacustrine and glacial till sediments. The fill at DGC-9B is probably backfill associated with the excavation created in that area during the installation of the underground waste solvent tanks. The approximately seven feet of fill found at PZ-1 may have resulted from past construction activities in that area.

The upper glaciolacustrine unit is comprised of nearly horizontally-bedded distinct layers of sediment ranging from clay to fine sand. The predominant material is brown to reddish brown silty clay. Pocket penetrometer results averaged 1.75 tons per ft^2. Silt and fine sand seams were encountered infrequently and do not appear to be continuous between boring locations. The upper glaciolacustrine unit ranges in thickness from zero (in fill areas) to 11.5 feet at DGC-3S.

The upper glacial till consists of a poorly sorted mixture of gravel and boulders in a clayey silt matrix. Minor amounts of sand were also identified in the matrix. The till is generally brown with an occasional red or gray tint and ranges in thickness from 0.5 feet at DGC-3S to 13.6 feet at DGC-1S.

The lower glaciolacustrine unit was identified only at borings DGC-1S, 6B and 7B with thicknesses ranging from a minimum of 1.6 feet at DGC-1S to greater than 6 feet at DGC-7B. The silty clay comprising this unit is extremely stiff and dense with pocket penetrometer readings averaging greater than 4.4 tons per ft^2. The color ranges from brown-red to gray-brown. No layering was evident in this unit. Trace amounts of subangular fine gravel, primarily limestone, were observed within the silty clay. This is most likely the result of gravel that melted out of ice floating on the glacial lake and was subsequently deposited within the lake bed sediments. Due to the extremely dense nature of the lower glaciolacustrine material, most samples appeared to be dry even though they were obtained from below the water table.

The lowermost unconsolidated unit at the site is glacial till. This unit was identified only at boring DGC-6B. The lower till may also be present in boring DGC-7B at a depth between 20 feet and 24.5 feet. Conclusive evidence is lacking as no split spoon samples were obtained at that depth. Distinct differences exist between the lower till and the upper till. The color of the lower till is gray rather than brown as was characteristic of the upper till, and the matrix material is fine sand and silt instead of silty clay.

The observed stratigraphy suggests at least two glacial advances. The lower glacial till is a lodgement till deposited beneath the ice during the first advance. During a period of glacial retreat, a glacial lake formed in the Owasco Lake basin. The lower glaciolacustrine silt and clay were deposited as lake bottom sediments. The initial stage of the next glacial advance selectively scoured away most of the existing glacial deposits (lower glaciolacustrine and till) leaving evidence of those deposits only at borings DGC-1S, 6B and 7B. The direction of this readvance was approximately from north-northwest to south-southeast as indicated by the orientation of the axes of the area's drumlins (streamlined hills or ridges of glacial till with long axes paralleling the direction of ice flow). The immense pressure exerted by the weight of the ice was responsible for creating the dense nature of the lower glaciolacustrine silt and clay.

During the latter stage of the glacial readvance, the nearly ubiquitous upper glacial till layer was deposited. The higher percentage of silt and clay in the upper glacial till is due to the incorporation of the lower glaciolacustrine silt and clay into the sediment load of the advancing glacier. During the final phase of the glacial retreat, a lake was again formed in the Owasco Lake basin. The upper glaciolacustrine silt and clay unit was deposited during this lake stage. The layered or varved nature of the upper glaciolacustrine deposits resulted from periodic changes in the sediment load associated with seasonal changes in climate.

5.2 Bedrock

The site is underlain by Onondaga limestone (probable Nedrow Member) of Lower Devonian Age. The Onondaga limestone is believed to range from 15 to 50 feet in thickness in this area. Underlying the Onondaga is the Oriskany Formation, a thin (less than 10 feet) sandstone layer, and approximately 50 feet of Helderberg Group limestone and dolostone. The bedrock dips to the south at approximately 25 feet per mile.

Bedrock coring at the site was restricted to the upper 13 feet of the Onondaga limestone. A bedrock surface elevation contour map has been included as Plate 4 in Appendix A. The elevation of the bedrock surface was observed to vary by 8.8 feet across the site. Two areas of "high" relief appear to exist on site in the vicinity of DGC-3B and south of the manufacturing building. The lowest elevation on site appears to exist in the vicinity of DGC-7B. The installation of more bedrock wells will provide additional information on the bedrock surface across the site.

The following description is based on the evaluation of the resulting rock core. The limestone is medium dark to dark gray, finely crystalline and generally non-fossiliferous. The rock is argillaceous with occasional shale partings and scattered pyrite and chert nodules. There is no evidence of solution cavities. Frequent jointing exists at angles ranging from 10° to 60° (angle to core); the majority of jointing is at 60°. Infrequent fractures were noted but were often partially or totally healed by calcite deposits. Cores obtained from borings DGC-2B and 8B exhibited the highest degree of jointing and fracturing. Occasional clay-filled horizontal seams, up to 1-inch in diameter, appear to be associated with shale partings.

6.0 HYDROGEOLOGY

Groundwater levels were measured on a weekly basis beginning August 12, 1987 and later modified to biweekly measurements beginning November 17, 1987. All measurements recorded since August have been graphed to visually depict water level fluctuations at specific wells (see Appendix D). Water levels recorded on December 3, 1987 and January 25, 1988 provided the data for the four groundwater elevation contour maps presented in Appendix E as Plates 5, 6, 7 and 8. The two dates that were selected are representative of the flow regimes observed on all measuring dates. Two maps were prepared for each date, one depicting groundwater flow in the overburden aquifer and the other showing groundwater flow in the upper portion of the bedrock aquifer.

As evidenced by the hydrographs located in Appendix D, vertical hydraulic gradients within the overburden aquifer (PS-3S/3D, PS-17/34) and between the overburden and bedrock aquifers (DGC-1S/1B, DGC-2S/2B, DGC-3S/3B, PS-35/DGC-9B) were found to be in the downward direction at most of the well pairs. Exceptions were noted at DGC-4S/4B and PS-16S/16D where vertical gradients were observed to reverse frequently and at DGC-5B where an upward gradient has continually been observed (the bedrock aquifer at DGC-5B is under artesian conditions). Seasonal fluctuations in the gradients are expected but, in general, there is a downward gradient at the site within the overburden aquifer as well as between the overburden and bedrock aquifers. Vertical gradients within the bedrock aquifer are not known at this time. Additional monitoring well/piezometer pairs within the bedrock will provide that information.

6.1 Overburden Aquifer

Plates 5 and 7 of Appendix E depict the groundwater elevations within the overburden aquifer on December 3, 1987 and January 25, 1988, respectively. Groundwater flow within the overburden aquifer is predominantly toward the west-northwest. In the vicinity of the drainage ditch, however, groundwater flow is into the ditch. Vertical hydraulic gradients are generally in the downward direction.

The drainage ditch appears to have a significant impact on groundwater flow at the site throughout the year, providing a local discharge point for groundwater. It was originally hypothesized that the drainage ditch might only impact groundwater flow during the winter/spring months, when groundwater levels were elevated. During the dryer summer and fall months, it was thought that the water table might drop below the base of the drainage ditch. If this occurred, the drainage ditch would switch from a discharge point to a recharge point during precipitation events. However, based on the visual accounts made by the Powerex employees that record weekly/biweekly water level measurements, water has regularly been evident in the drainage ditch since August 12, 1987. Therefore, the drainage ditch is believed to act as a discharge point throughout the entire year.

The storm drain line in the west field also appears to act as a localized groundwater discharge area. This observation is based on the water level measurements from micro-wells PS-27, 28, 29 and 30. PS-27 and 28 were installed such that their screens are positioned in the fill material directly adjacent to the storm drain. PS-29 and 30 are positioned 10 to 20 feet on either side of the storm drain and at the approximate depth of PS-27 and 28. Lower water level measurements were noted at PS-27 and 28 indicating flow toward the storm drain. The drain pipe and associated backfilled material is believed to be more permeable than the surrounding natural geologic material. Therefore, the line may act as a conduit, creating preferential flow of groundwater to the northwest. The discharge point for this groundwater is the drainage ditch. This scenario is, of course, dependent on the water table rising above the elevation of the bottom of the storm drain. Additional water level measurements are necessary to determine if this condition exists throughout the year.

A groundwater divide was found to exist northeast of the manufacturing building in the vicinity of PS-5 and DGC-1S. The divide reflects topographic relief in the area. Additionally, a groundwater mound appears to exist west of the manufacturing building near PS-2, 24 and 26 (see the corresponding hydrograph located in Appendix D.). The position of this groundwater mound may be due to increased infiltration in the grassy area (west field) as opposed to the lack of infiltration beneath the paved and building areas to the south and east. The groundwater mound was observed to decrease in size and "migrate" to the north from December 1987 to January 1988 (see Plates 5 and 7). This is likely due to a drop in temperature and subsequent delay or decrease in infiltration due to the frozen ground surface.

Groundwater flow south and east of the manufacturing building is believed to be toward the building. This is based on the topography of the area and the understanding that the manufacturing building acts as a "cap", preventing infiltration to the underlying aquifer and, thereby, causing groundwater to flow underneath the building before ultimately discharging to the drainage ditch.

Hydraulic conductivity tests performed on all 2-inch overburden monitoring wells indicate a geometric mean hydraulic conductivity of 0.45 feet/day (see Table 5). Based on hydraulic gradients calculated from the December 3, 1987 and January 25, 1988 water level data, the rate of groundwater flow within the overburden aquifer, as calculated using Darcy's formula, ranges from 0.032 to 0.063 feet/day in the north field and from 0.047 to 0.095 feet/day in the west field. The velocities were based on the following parameters:

hydraulic conductivity (K) =	0.45 ft/day
hydraulic gradient (I) =	0.014 (north field)
	0.021 (west field)
effective porosity (n) =	10 to 20% (estimated)

where:

velocity = KI/n

All 2-inch monitoring wells and 1/2-inch micro-wells were used to construct the overburden groundwater contour maps. The effectiveness of the micro-wells as water table measuring devices was evaluated by the installation of a single piezometer (PZ-1) adjacent to a micro-well (PS-25). After two months of water level measurements (see the corresponding hydrograph located in Appendix D), the two measuring devices were found to be similar with respect to corresponding water level measurements. The initial variation that was noted in the readings is attributed to the effects of well development or measurement error. The continued minor variations between the micro-well and the piezometer result from the small scale changes in hydraulic conductivity between the two locations and the fact that the sand pack for PZ-1 extends slightly below the elevation of the bottom of the screen of PS-25.

6.2 Bedrock Aquifer

Plates 6 and 8 of Appendix E illustrate the potentiometric head elevations within the upper 12 to 14 feet of the bedrock aquifer on December 3, 1987 and January 25, 1988, respectively. Based on water levels from all ten bedrock wells on both dates, groundwater flow appears to be radially inward from the north, west and south to the area just north of the manufacturing building. Discharge appears to be to the east. Vertical gradients within the bedrock aquifer are currently unknown. Due to the nature of flow within limestone aquifers, widely varying potentiometric head values can exist between relatively closely spaced fractures. The result of this condition is that a large number of wells/ piezometers (when compared to a fairly homogeneous unconsolidated aquifer) is required to accurately determine the groundwater flow system. Therefore, refinements to the current understanding of groundwater flow are expected after additional bedrock wells are installed and water level measurements are taken over an extended period of time.

Groundwater flow within the Onondaga limestone occurs predominantly through secondary porosity such as fractures, joints and bedding planes. An estimate of the rate of groundwater flow in the bedrock aquifer has been calculated using Darcy's formula. However, due to the nature of fracture flow, the actual groundwater flow rate will vary considerably within individual fractures. Hydraulic conductivity tests performed on all 2-inch bedrock monitoring wells indicate a geometric mean hydraulic conductivity of 2.3 ft/day (see Table 5). Based on hydraulic gradients calculated from the December 3, 1987 and January 25, 1988 water level data, the generalized rate of groundwater flow within the bedrock aquifer has been estimated at 1.4 feet/day in the north and west fields and 3.5 feet/day underneath the building. The velocities were based on the following parameters:

hydraulic conductivity (K) =	2.3 ft/day
hydraulic gradient (I) =	0.006 (north & west fields)
=	0.015 (underneath the building)
effective porosity (n) =	1% (estimated)

where:

Velocity = KI/n

7.0 NATURE AND EXTENT OF CONTAMINATION

7.1 Soil Screening Results

Results of the HNU-101 volatile organic field screening are presented in Table 7. The screening methodology is discussed in Section 8.6. Profiles relating the lithology with the HNU results are located in Appendix C. Significant concentrations of volatile organics were detected in soil samples from monitoring wells DGC-8B and 9B and piezometer PZ-1. These concentrations were not unexpected, as each of these wells is located near a known or suspected source area: DGC-8B is approximately 40 feet from the North Evaporation Pit; DGC-9B is in the waste solvent tank area; and PZ-1 is located within the suspected area of the West Evaporation Pit. An isolated detection of VOCs in the uppermost soil sample at DGC-2B, located northwest of the North Evaporation Pit, may suggest the possibility of some surface contamination in that area.

7.2 Soil Gas Analytical Results

Based on the results of the Phase II and III soil gas investigations, contamination associated with the waste solvent tank area and the North and West Evaporation Pits appears to be limited in nature and extent within the overburden aquifer. Soil gas results have been reported in Table 8 with sampling locations noted on Plate 1 in Appendix A.

Principal contaminants detected in the soil gas include trichloroethylene and its daughter products, cis- and trans-1,2-dichloroethylene. In addition to these contaminants, there are localized elevated soil gas concentrations of 1,1-dichlorethylene northwest of the North Evaporation Pit in the vicinity of PS-10; tetrachloroethylene northeast of the North Evaporation Pit in the vicinity of PS-9; and methylene chloride in the waste solvent tank area and in a limited area in the west field. The highest levels of contamination were observed in the waste solvent tank area. Other areas exhibiting high concentrations were detected in the vicinity of PS-10 and PS-24.

Table 7

HNU-101 SOIL SAMPLE SCREENING RESULTS

DGC-2B
(background = 0.6)

S-1 = >20
S-2 = <0
S-3 = <0
S-4 = <0
S-5A = <0
S-5B = <0
S-6 = <0
S-7 = <0

DGC-6B
(background = 1.0-1.5)

S-1 = 0.8
S-2 = 0.6
S-3 = 0.8
S-4A = <0
S-4B = 0.8
S-5A = 0.8
S-5B = 0.8
S-6 = 0.8
S-7 = 0.5
S-8 = 0.2
S-9 = 0

DGC-7B
(background = 0.6)

S-1 = 7.2
S-2 = 0.4
S-3 = 0.6
S-4 = 0.6
S-5A = <0
S-5B = 1.0
S-6 = 0.6
S-7 = 0.6
S-8 = 0.4
S-9 = 0.7

DGC-8B
(background = 0.6-3.6)

S-1 = 4
S-2 = 50(+)
S-3 = 600(+)
S-4A = 500
S-4B = 600
S-4C = 600
S-4D = 700
S-5 = 400
S-6 = 500

DGC-9B
(background = 0.7-3.2)

S-2 = 300
S-3 = 170
S-4 = 240
S-5 = 280
S-6 = 500
S-7 = 380
S-8 = 530
S-9 = 280

DGC-10B
(background = 1.0)

S-1 = 0.6
S-2 = 0.4
S-3 = 1.4
S-4 = 8
S-5 = 18

DGC-11S
(background = 2.4-2.5)

S-1 = 1.4
S-2 = 1.3
S-3A = 1.3
S-3B = 1.4
S-5 = 36

PZ-1
(background = 2.4-2.7)

S-1 = 4.4
S-2 = 20
S-3 = 100
S-4 = 400

Notes:
1) Samples were allowed to reach room temperature before screening
2) All results are in PPM

TABLE 8

ANALYSIS OF SOIL GAS SAMPLES

Relative Concentration (not ppb)

(See Section 4.1)

Sample Location	Date Tested	No VOC Detected	1,1 Dichloro-ethylene	trans-Dichloro-ethylene	cis-Dichloro-ethylene	Trichloro-ethylene	Tetrachloro-ethylene	Methylene Chloride
L 0 + 9	10/26/87	X						
0 + 59	"	X						
0 + 109	"				4	11		
0 + 159	"	X						
M 0 + 9	"				75	180		
0 + 59	"	X						
0 + 109	"			160	5,500	11,000		
0 + 159	"	X						
N 0 + 9	"	X						
0 + 59	Saturated soil -- no vadose zone.							
0 + 109	10/26/87			160	3,200	800		
0 + 159	"	X						

Table 8 (continued)

ANALYSIS OF SOIL GAS SAMPLES

Relative Concentration (not ppb)

(See Section 4.1)

Sample Location	Date Tested	No VOC Detected	1,1 Dichloro-ethylene	trans-Dichloro-ethylene	cis-Dichloro-ethylene	Trichloro-ethylene	Tetrachloro-ethylene	Methylene Chloride
O 0 + 84	10/26/87			70	1,200	1,000		
P 0 + 34	"			360	690	3,600		
0 + 59	"	X						
0 + 109	"					20		
0 + 159	"	X						
R 0 + 9	"							96
0 + 59	"							360
0 + 109	"							100
0 + 159	"	X						
S 0 + 59	"	X						
0 + 109	"	X						
0 + 159	"	X						

Table 8 (continued)

ANALYSIS OF SOIL GAS SAMPLES

Relative Concentration (not ppb)

(See Section 4.1)

Sample Location	Date Tested	No VOC Detected	1,1 Dichloro-ethylene	trans-Dichloro-ethylene	cis-Dichloro-ethylene	Trichloro-ethylene	Tetrachloro-ethylene	Methylene Chloride
T 0 + 5	10/27/87	X						
0 + 55	"	X						
0 + 105	"	X						
0 + 155	"	X						
0 + 205	"	X						
U 0 + 5	"					5		
0 + 55	"	X						
0 + 105	"	X						
0 + 155	"	X						
V 0 + 5	"	X						
0 + 55	"	X						
0 + 105	"	X						
0 + 155	"	X						

Table 8 (continued)

ANALYSIS OF SOIL GAS SAMPLES

Relative Concentration (not ppb)

(See Section 4.1)

Sample Location	Date Tested	No VOC Detected	1,1 Dichloro-ethylene	trans-Dichloro-ethylene	cis-Dichloro-ethylene	Trichloro-ethylene	Tetrachloro-ethylene	Methylene Chloride
W 0 + 00	10/27/87	X						
0 + 25	"	X						
0 + 50	"	X						
0 + 100	"	X						
X 0 + 00	"			13	840	57		
0 + 25 *	"							
0 + 50 *	"							
Y 0 + 30	11/2/87					6		
0 + 104	"					32		
0 + 154	"					40		
0 + 204	"					2		
0 + 253	"	X						

Table 8 (continued)

ANALYSIS OF SOIL GAS SAMPLES

Relative Concentration (not ppb)

(See Section 4.1)

Sample Location	Date Tested	No VOC Detected	1,1 Dichloro-ethylene	trans-Dichloro-ethylene	cis-Dichloro-ethylene	Trichloro-ethylene	Tetrachloro-ethylene	Methylene Chloride
Z 0 + 14	11/2/87	X						
0 + 54	"					90		
0 + 104	"					5		
0 + 155	"					20		
0 + 205	"					4		
0 + 253	"					16		
0 + 303	"					30		
0 + 353	"	X						
0 + 403	"	X						
AA 0 + 49	"	X						
0 + 100	"	X						
0 + 150	"	X						

Table 8 (continued)

ANALYSIS OF SOIL GAS SAMPLES

Relative Concentration (not ppb)

(See Section 4.1)

Sample Location	Date Tested	No VOC Detected	1,1 Dichloroethylene	trans-Dichloroethylene	cis-Dichloroethylene	Trichloroethylene	Tetrachloroethylene	Methylene Chloride
AA 0 + 175 Offset 25	11/2/87	X						
0 + 200	"	X						

* Concentrations Off-Scale

Soil gas results are generally confirmed by the results of the overburden aquifer groundwater analyses. Groundwater samples from PS-35, located adjacent in the waste solvent tank area, PS-10 and PS-24 similarly exhibited the highest VOC concentrations. The absence of volatiles in the soil gas in areas that are known to be contaminated, based on groundwater analyses, is probably due to a layer of clean water masking the underlying contaminated groundwater.

7.3 Surface Water Quality

Surface water sampling was performed on November 4, 1987 to determine if surface water traveling across the site has been impacted by past disposal practices. Results of the surface water sampling have been included in Appendix G.

Surface water samples SW-A and SW-B were collected specifically to assess any change in VOC concentrations as the storm water passes through the storm drain that lies within the field west of the manufacturing building. Based on only this single round of monitoring, results of these two samples indicate that chemical concentrations of some compounds increase slightly as the storm water passes through the storm drain (Sample SW-B). Compounds detected in the two surface water samples (SW-A, SW-B) and their corresponding concentrations include trans-1,2-dichloroethylene (11, 93 ppb), chloroform (16, 11 ppb), bromodichloromethane (4.3, 2.8 ppb), trichloroethylene (14, 97 ppb) and vinyl chloride (ND, 5 ppb). The occurrence of chloroform and/or bromodichloromethane in surface waters is not unusual. Both compounds are commonly associated with the chlorination process of public waters. As the source of the surface water at location SW-A appears to be from underneath the building, coupled with the fact that there are fire lines in the immediate area that could possibly be leaking, the source of these compounds may be the public water supply.

Surface water sample SW-C was collected to determine if VOCs were leaving the site via surface water flow. Compounds present in the sample include trans-1,2-dichloroethylene (35 ppb); chloroform (4.8 ppb); 1,1,1-trichloroethane (3.6 ppb); trichloroethylene (34 ppb); and tetrachloroethylene (7.1 ppb). Although

1,1,1-trichloroethane and tetrachloroethylene were not present at surface water sampling locations SW-A or SW-B, both compounds have been detected within the groundwater at the site. The drainage ditch is believed to be a groundwater discharge point and therefore, is expected to reflect groundwater conditions. Although it appears from the results of SW-C that VOCs are leaving the site via surface water flow, the levels are relatively low; and based on the nature of the contaminants, these compounds are expected to volatilize with increased distance from the source area. No known users of the surface water exist.

7.4 Groundwater Quality

The following discussion of groundwater quality at the site is divided into two sections, overburden and bedrock aquifer groundwater quality. Data resulting from all three phases of work has been utilized in the groundwater quality evaluation. Three plates (located in Appendix F) have been prepared to summarize the groundwater quality. Plates 9, 10 and 11 depict the maximum, minimum and average concentrations of the eleven most pervasive VOCs based on field screening and laboratory results from Phase II and III. Results from Phase III field and laboratory groundwater analyses are presented in Appendix G. Sampling and analysis procedures are discussed in Sections 8.12.1 and 8.12.2. Previous groundwater sampling results are available in the Phase II report (July 3, 1987). Soil analyses from the North Evaporation Pit are available in the Phase I report (February 10, 1986).

7.4.1 Overburden Aquifer

The nature and general extent of contamination in the overburden aquifer have been determined as a result of the installation and analysis of Phase III wells. A series of eleven isoconcentration contour maps have been prepared depicting the approximate concentrations and extent of the most prevalent VOCs detected in the overburden aquifer. The contouring is based on the highest concentration of a particular compound detected at each well during any of the past sampling events. The eleven VOCs and corresponding figure numbers are as follows:

COMPOUND	FIGURE	COMPOUND	FIGURE
Trichloroethylene (TCE)	7	Toluene	12
1,2-Dichloroethylene (DCE)	8	Total Xylenes	13
Vinyl Chloride (VC)	9	Ethylbenzene	14
Acetone	10	Methylene Chloride (MC)	15
Benzene	11	1,1,1-Trichlorethane (TCA)	16
		Tetrachloroethylene (PCE)	17

Four possible source areas of overburden aquifer contamination have been identified. They include:

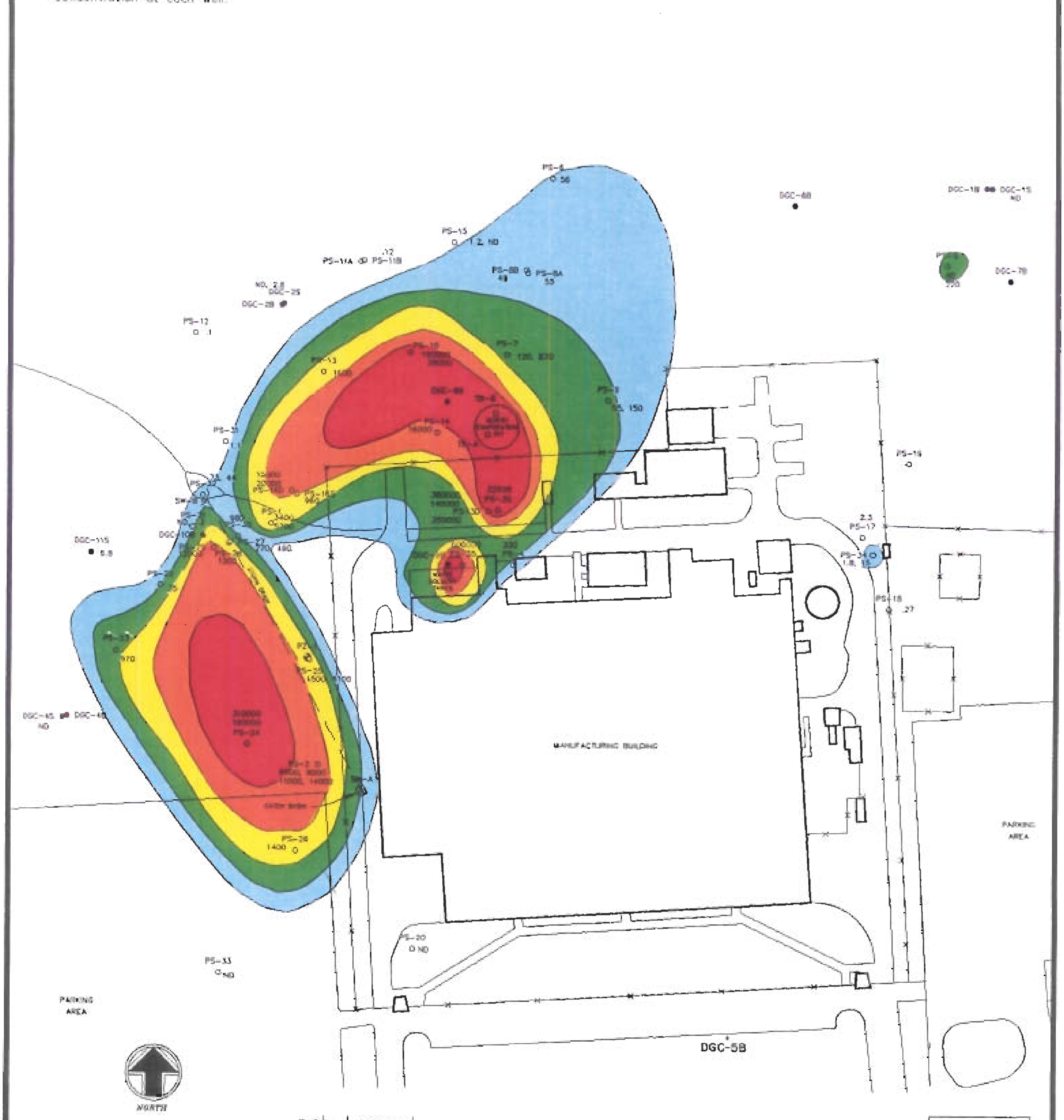
- The previously identified North Evaporation Pit;
- A source area west of the manufacturing building tentatively attributed to an unlocated West Evaporation Pit;
- The waste solvent tank area where the following activities may have released solvents to the surrounding soil/groundwater:
    - Surface spillage during filling of the above-ground storage tanks.
    - Surface spillage during handling of waste solvents destined for disposal in the evaporation pit(s).
    - Surface spillage during the storage or handling of raw materials.
    - Leakage from the underground waste solvent tanks.
- An unexplained PCE source east of the North Evaporation Pit.

Trichloroethylene

TCE source areas include the North and West Evaporation Pits and the waste solvent tank area (see Figure 7). Concentrations greater than 100,000 ppb are associated with each source area with the highest concentrations observed in wells PS-35 (waste solvent tank area); PS-3D and 10 (North Evaporation Pit);

NOTES:

1. Concentrations include field and laboratory results from Phase II and Phase III.
2. Contours are based on the higest concentration at each well.



ppb Legend

🟦 > 10
🟩 > 100
🟨 > 1000
🟧 > 10,000
🟥 > 100,000

FIGURE 7. Trichloroethylene ISOCONCENTRATION MAP OVERBURDEN AQUIFER

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and PS-24 (suspected West Evaporation Pit). The detection of TCE is in general agreement with groundwater flow within the overburden aquifer. The presence of moderate levels of TCE in areas not downgradient of the North and West Evaporation Pits may result from contaminant dispersion from the pits, minor spills in these areas, and/or overland flow from the pits during heavy rainfalls or overfilling of the pits. The presence of TCE at PS-26 may also be attributed to temporary changes in groundwater flow in this area. The parking area appears to act as a groundwater sink at certain times, causing groundwater movement and associated dissolved contaminants to move from the vicinity of PS-24 to the parking lot area. The TCE that was observed at PS-5 during Phase II was not detected during the Phase III analyses. Sample contamination which could include contamination during sampling, use of a contaminated VOA vial or contamination during the analytical procedure is believed to have caused the occurrence of TCE at PS-5. An additional sampling of PS-5 is considered appropriate to conclusively demonstrate the absence of TCE in this area.

The extent of TCE contamination associated with the waste solvent tank area has not been fully determined. However, based on the direction of groundwater flow in this area (generally to the north), widespread contamination beneath the manufacturing building is not expected.

Based on the nature of past waste solvent disposal practices and observed concentrations of dissolved TCE, the potential for a separate phase of TCE exists. A separate phase such as this is commonly referred to as a dense non-aqueous phase liquid (DNAPL). Since the specific gravity of TCE is 1.46 (at 20°C), TCE disposed within the evaporation pits or emanating from the waste solvent tank area, would sink, due to density differences, down through the aquifer material until an "impermeable" layer was encountered. A pool of TCE would tend to form on this impermeable surface. The geologic material through which the TCE passed would also retain a portion of the TCE (residual) which would, in itself, become a source of groundwater contamination. Soil analyses from Test Boring B (refer to Phase I report), located within the North

Evaporation Pit, suggests the presence of residual TCE in the upper 8 feet of the soil column. Concentrations within this zone range from 2600 to 4400 ppm (solubility of TCE is 1100 ppm at 20°C).

The movement of a DNAPL through geologic media is driven by gravity (density differences) rather than by groundwater flow. Variations in the geologic medium with regard to permeability play an important role in the migratory pathway of a DNAPL. Significant lateral movement of a DNAPL may occur before encountering an impermeable layer (i.e., a DNAPL pool may exist some distance from the site of disposal activities or a spill). The silty clay layers within the glaciolacustrine deposits appear to be ineffective in preventing downward migration of the waste solvents. This conclusion is based on the results of the soil sampling within the North Evaporation Pit during Phase I, the presence of an oily film observed on sampling equipment used at PS-3D, and the high levels of dissolved TCE within the bedrock aquifer.

As a basic rule of thumb, groundwater samples with concentrations of a DNAPL compound greater than about 20 percent of saturation suggest the presence of a DNAPL. However, due to the presence of several other dissolved organic compounds at this site, the "20 percent of saturation" guideline is not directly applicable. These other compounds, primarily acetone, will increase the solubility of TCE thereby creating a condition where unusually high concentrations of TCE can occur.

1,2-Dichloroethylene and Vinyl Chloride

The distribution of DCE and VC (Figures 8 and 9) is similar to that of TCE. As DCE and VC were not known to have been used on site, the source of these compounds is believed to be the result of biologically enhanced dechlorination of TCE. Additional evidence supporting the theory that DCE and VC are "daughter products" of TCE is that the levels of DCE and VC in the soil samples obtained from the North Evaporation Pit during Phase I were relatively low. DCE was detected in only one sample at 1.6 ppm (reporting limit of 0.5 ppm) and VC was "Not Detected" (ND) in any sample (reporting limit of 0.5 ppm). The

NOTES.

1. Concentrations include field and laboratory results from Phase II and Phase III.
2. Contours are based on the higest concentration at each well.

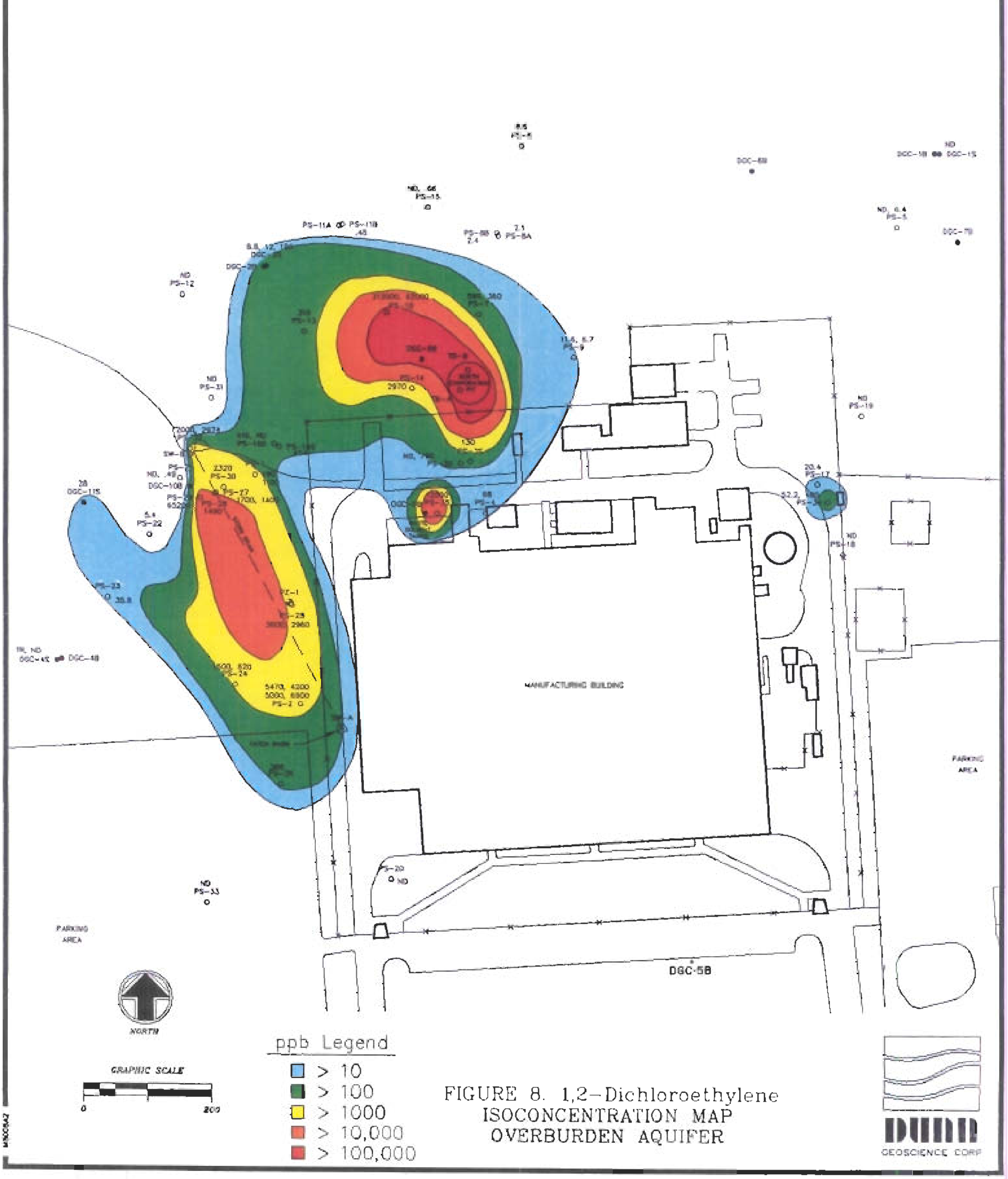

FIGURE 8. 1,2-Dichloroethylene ISOCONCENTRATION MAP OVERBURDEN AQUIFER

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NOTES:

1. Concentrations include field and laboratory results from Phase II and Phase III.
2. Contours are based on the higest concentration at each well.

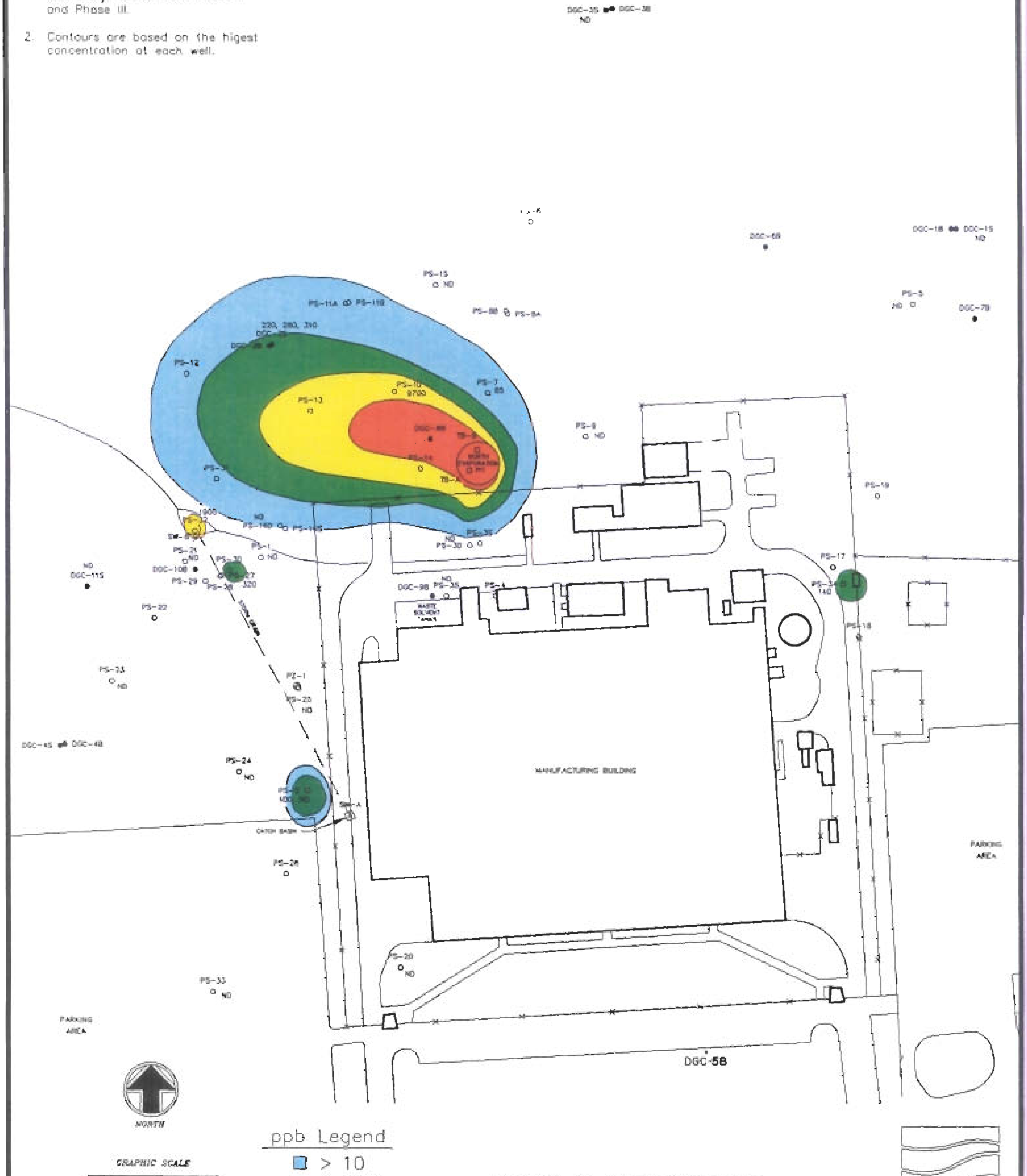

FIGURE 9. Vinyl Chloride ISOCONCENTRATION MAP OVERBURDEN AQUIFER

ppb Legend

- 🟦 > 10
- 🟩 > 100
- 🟨 > 1000
- 🟧 > 10,000
- 🟥 > 100,000

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process by which TCE is biodegraded has been well documented in the past few years in both laboratory studies and field observations. The process occurs under anaerobic conditions such as exists at some depth within the aquifer. TCE is broken down to the three dichloroethylene isomers (1,1; Trans-1,2; Cis-1,2). The dichloroethylene isomers are, in turn, further dechlorinated to VC. The rate of biodegradation depends on such a variety of factors that it is not currently possible to calculate a meaningful estimate of the biodegradation rates. However, as a general rule, higher proportions of degradation products are expected further from the source areas. These higher proportions of DCE and VC are most evident near the downgradient edges of the plumes. In particular, DGC-2S, DGC-11S, PS-27 and PS-32 exhibited higher levels of DCE and VC than their "parent compound", TCE.

Higher concentrations of daughter products were also observed at PS-34 where DCE and VC were an order of magnitude greater than TCE. Based on the direction of groundwater flow in the PS-34 area and the observed concentrations in relation to the overall site contamination, further investigation of this area is not believed to be necessary at this time.

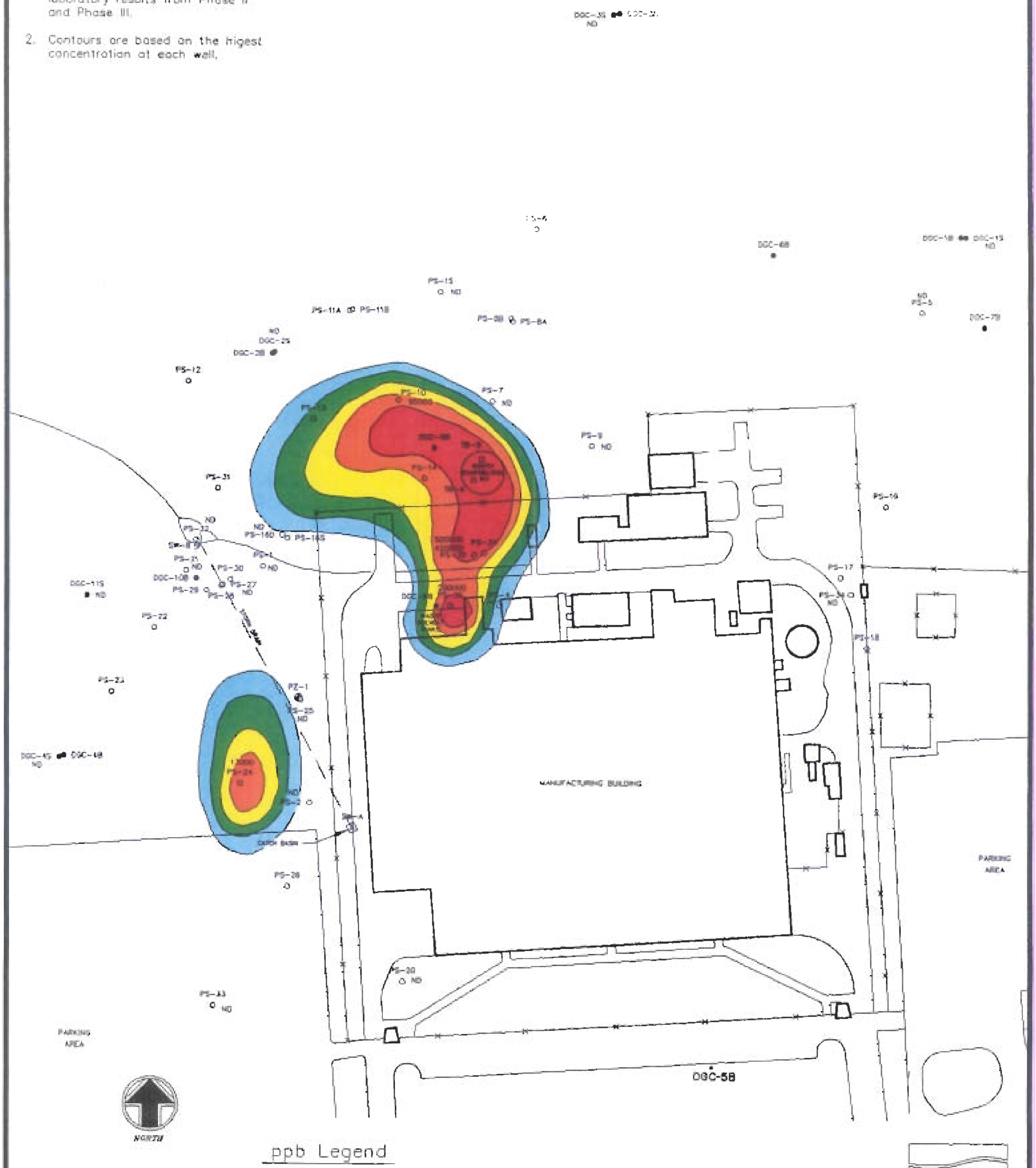
The apparent absence of VC in the west field is likely attributable to elevated laboratory reporting limits for VC. Due to the presence of high levels of TCE in samples from PS-24 and PS-25, these samples were diluted for analysis. The diluting process resulted in reporting limits of 1,300 ug/l and 1,000 ug/l for PS-24 and PS-25, respectively. An analogous situation exists for PS-1 where the reporting limit for VC was 500 ug/l. For this reason, the absence of VC in the west field has not been truly demonstrated and, in fact, the distribution of VC in this area may agree with the TCE and DCE plumes.

Acetone

Acetone (Figure 10) has been detected at high concentrations in wells near the North Evaporation Pit (PS-3D and 10), the suspected area of the West Evaporation Pit (PS-24) and the waste solvent tank area (PS-35). Unlike TCE and associated "daughter" products, the areal extent of acetone is much more

NOTES:

1. Concentrations include field and laboratory results from Phase II and Phase III.
2. Contours are based on the higest concentration at each well.



GRAPHIC SCALE

0 200

ppb Legend

- 🟦 > 10
- 🟩 > 100
- 🟨 > 1000
- 🟧 > 10,000
- 🟥 > 100,000

FIGURE 10. Acetone ISOCONCENTRATION MAP OVERBURDEN AQUIFER

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limited. Two samples of the glaciolacustrine aquifer material were analyzed for total organic carbon (TOC) to qualitatively assess the potential for partitioning of VOCs between the aqueous phase and the soil particles.

Analytical results yielded TOC values of 0.16 percent and less than 0.02 percent. Because of the low organic content of these soils, little sorption of the VOCs is expected. Acetone is completely miscible with water and considered very highly mobile. Therefore, the limited extent of acetone contamination is not expected to be related to sorptive retardation. Rather, the absence of acetone at significant distances from the source areas is probably the result of the rapid rate at which acetone biodegrades. Biodegradation of acetone will occur in both aerobic and anaerobic environments. The CERCLA persistence rating for acetone is zero. The acetone plumes within the overburden aquifer may have reached a steady-state condition due to the combined processes of dilution and biodegradation. If this is the case, no further migration of acetone is expected.

Benzene, Toluene, Total Xylenes, Ethylbenzene

Toluene (Figure 12), total xylenes (Figure 13) and ethylbenzene (Figure 14) were detected in the soil samples taken from the North Evaporation Pit during Phase I as well as at wells downgradient of the pit. Both ethylbenzene and total xylenes were detected above their solubility limits (150 ppm at 20^oC for ethylbenzene and 146 to 175 ppm at 25^oC for total xylenes) in the North Evaporation Pit. Benzene (Figure 11) does not appear to have been disposed of in the North Evaporation Pit. Benzene was, however, detected at PS-16D at a concentration of 53 ug/l. The isolated occurrence of benzene at this location is of minor concern when compared to concentrations of the other compounds.

In the area of the West Evaporation Pit, toluene and total xylenes have been detected at concentrations greater than 1,000 ug/l. Low levels of benzene and ethylbenzene were also detected in the vicinity of the west parking lot area. The benzene and ethylbenzene detections in this area may be common low-level BTX (benzene, toluene, total xylenes) contamination associated with parking lot areas where small quantities of petroleum compounds are often spilled. A

NOTES:

1. Concentrations include field and laboratory results from Phase II and Phase III.
2. Contours are based on the higest concentration at each well.

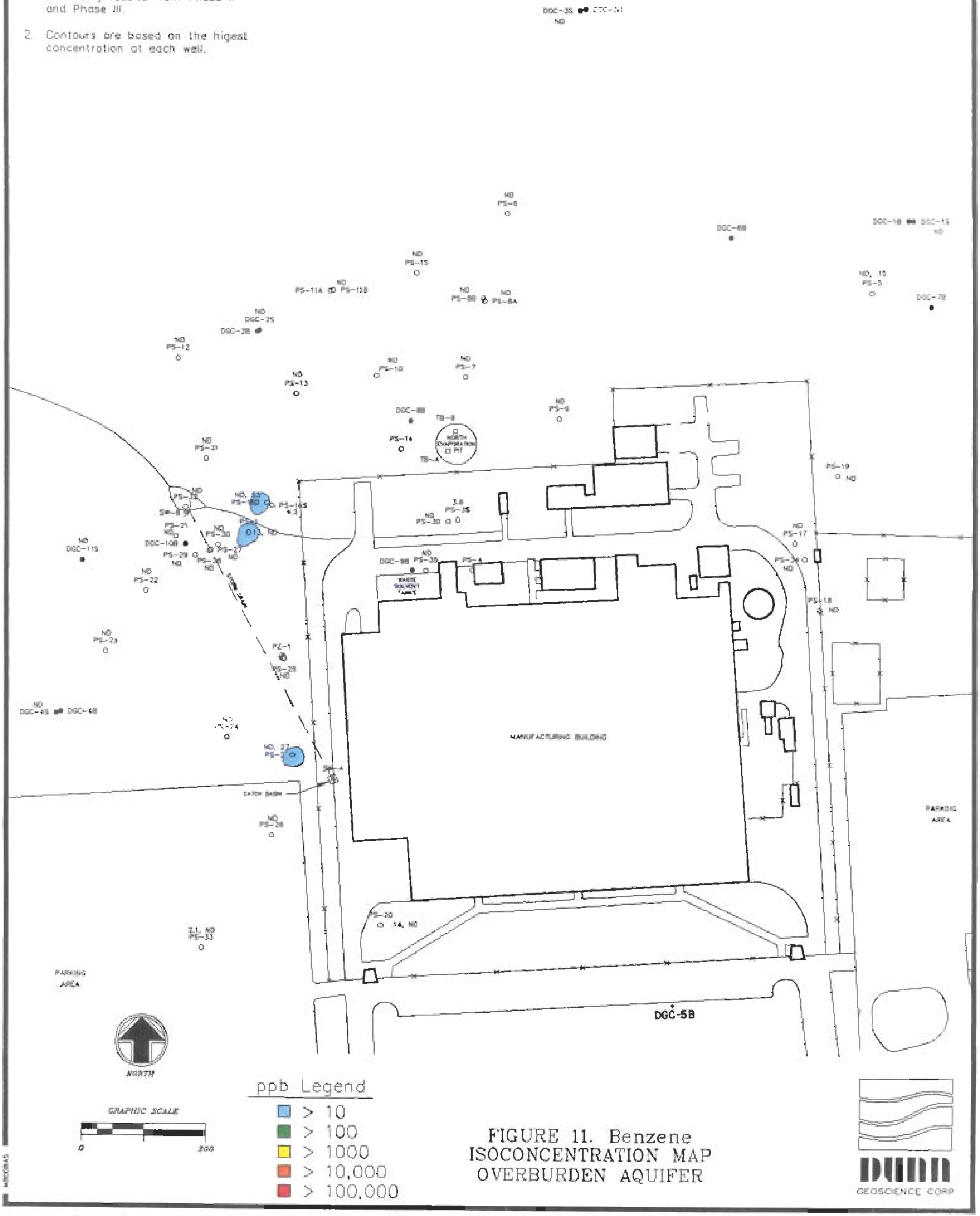

FIGURE 11. Benzene ISOCONCENTRATION MAP OVERBURDEN AQUIFER

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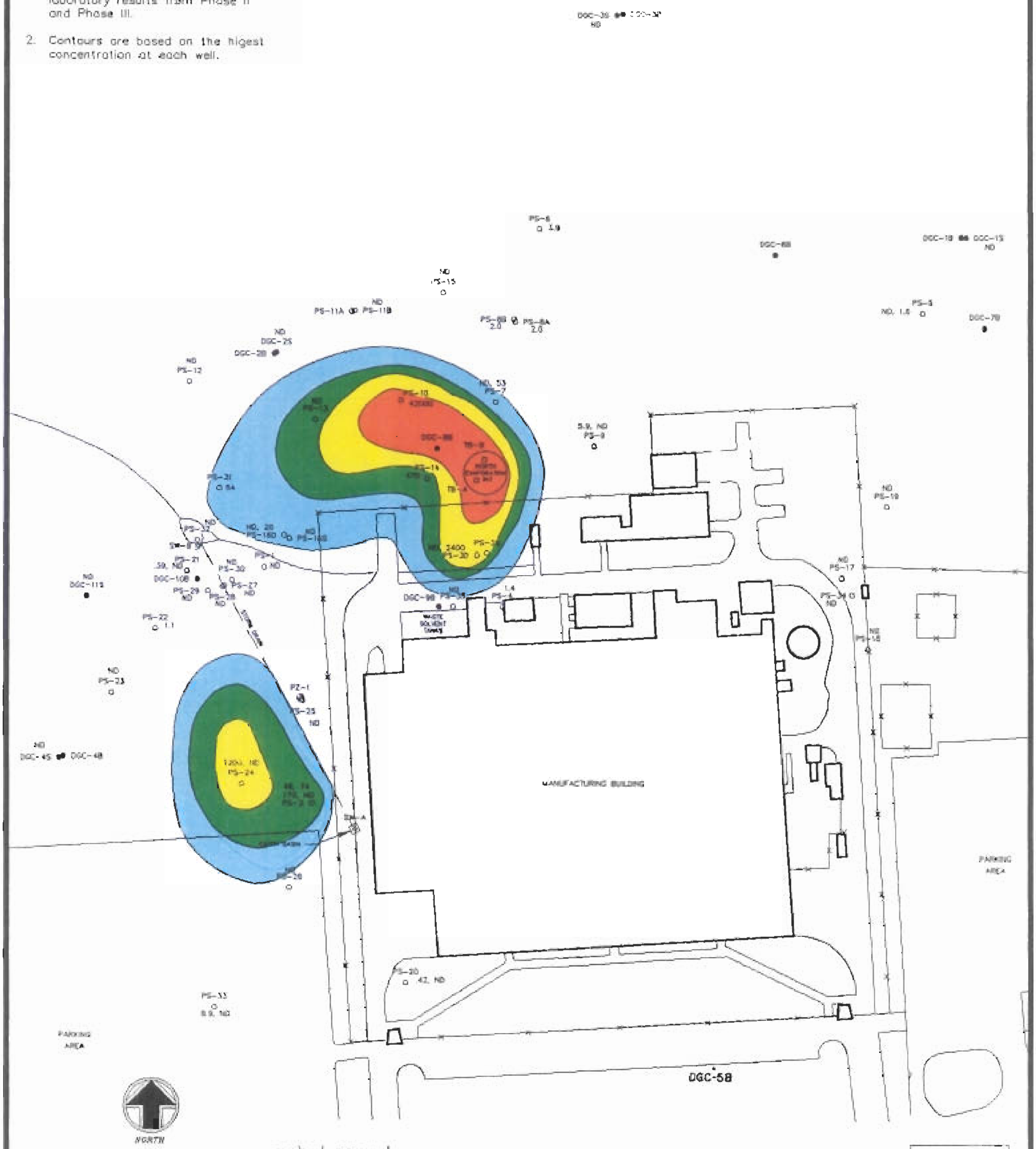
NOTES:

1. Concentrations include field and laboratory results from Phase II and Phase III.
2. Contours are based on the higest concentration at each well.



ppb Legend

🟦 > 10
🟩 > 100
🟨 > 1000
🟧 > 10,000
🟥 > 100,000

GRAPHIC SCALE
0 200

FIGURE 12. Toluene
ISOCONCENTRATION MAP
OVERBURDEN AQUIFER

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N O T E S:

1. Concentrations include field and laboratory results from Phase II and Phase III.
2. Contours are based on the higest concentration at each well.

ppb Legend

- 🟦 > 10
- 🟩 > 100
- 🟨 > 1000
- 🟧 > 10,000
- 🟥 > 100,000

FIGURE 13. Total Xylenes
ISOCONCENTRATION MAP
OVERBURDEN AQUIFER

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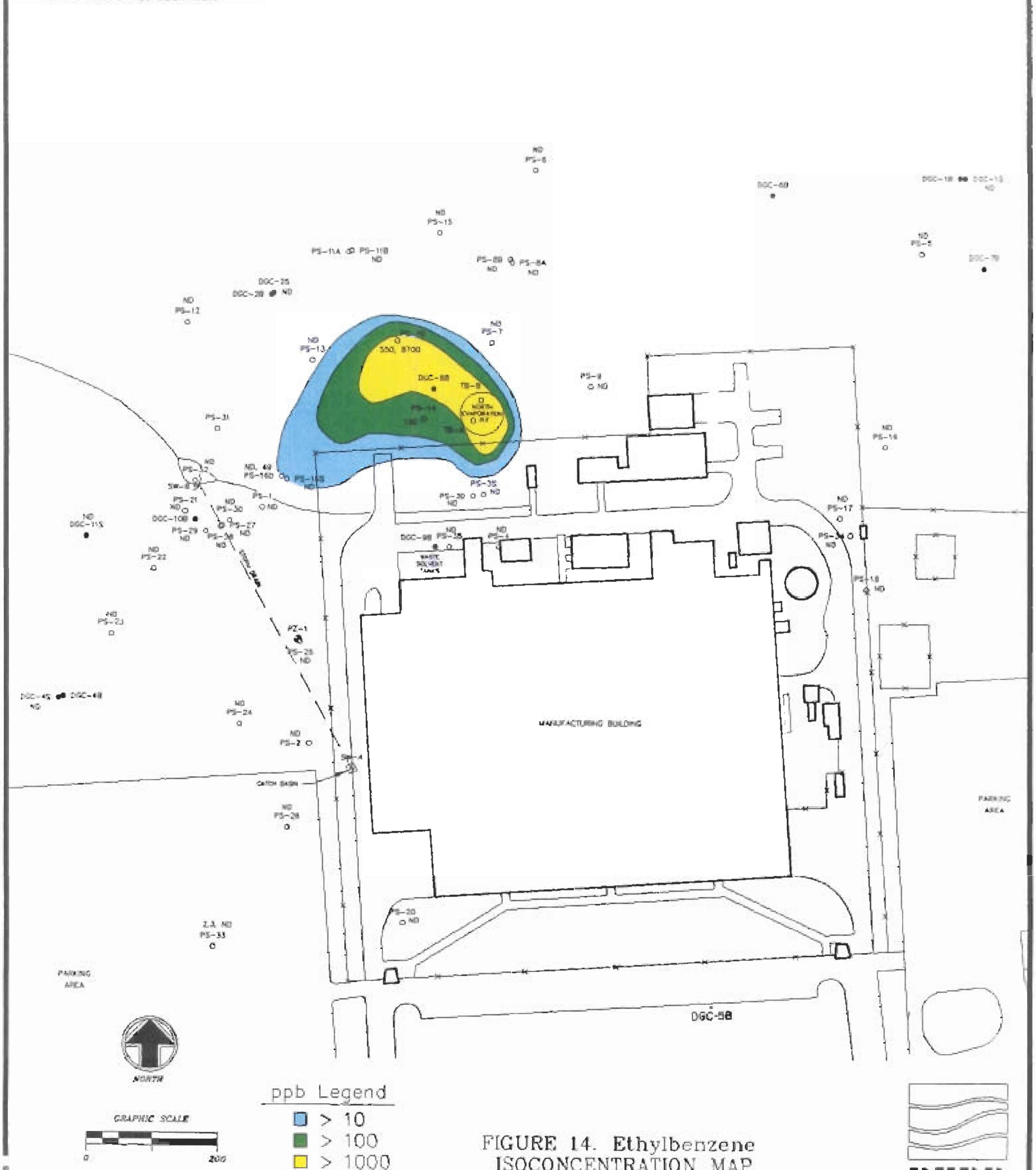
NOTES:

1. Concentrations include field and laboratory results from Phase II and Phase III.
2. Contours are based on the higest concentration of each well.



ppb Legend

🟦 > 10

🟩 > 100

🟨 > 1000

🟧 > 10,000

🟥 > 100,000

FIGURE 14. Ethylbenzene ISOCONCENTRATION MAP OVERBURDEN AQUIFER

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second possibility is that benzene and ethylbenzene are present in the suspected West Evaporation Pit area but are being masked by the high reporting limits at PS-24 and 25 (500 ug/l and 400 ug/l, respectively).

Only total xylenes was detected in the waste solvent tank area (PS-35). Again, high reporting limits (5,000 ug/l) may be masking the presence of the other aromatic compounds in this area.

Methylene Chloride, 1,1,1-Trichloroethane

MC (Figure 15) and TCA (Figure 16) were detected only at PS-35. The isolated occurrence of these compounds is attributed to leakage/surface spillage during receiving, storage and/or handling of virgin solvents and waste solvents in this area. Both compounds are more dense than water (specific gravity of both MC and TCA is 1.3 @ 20°C). MC is very soluble in water (13,200 ppm @ 20°C) and considered very mobile. TCA has a solubility of 700 ppm at 20°C and is considered moderately mobile. The concentrations of MC and TCA detected at PS-35, however, do not suggest the presence of a DNAPL for either compound.

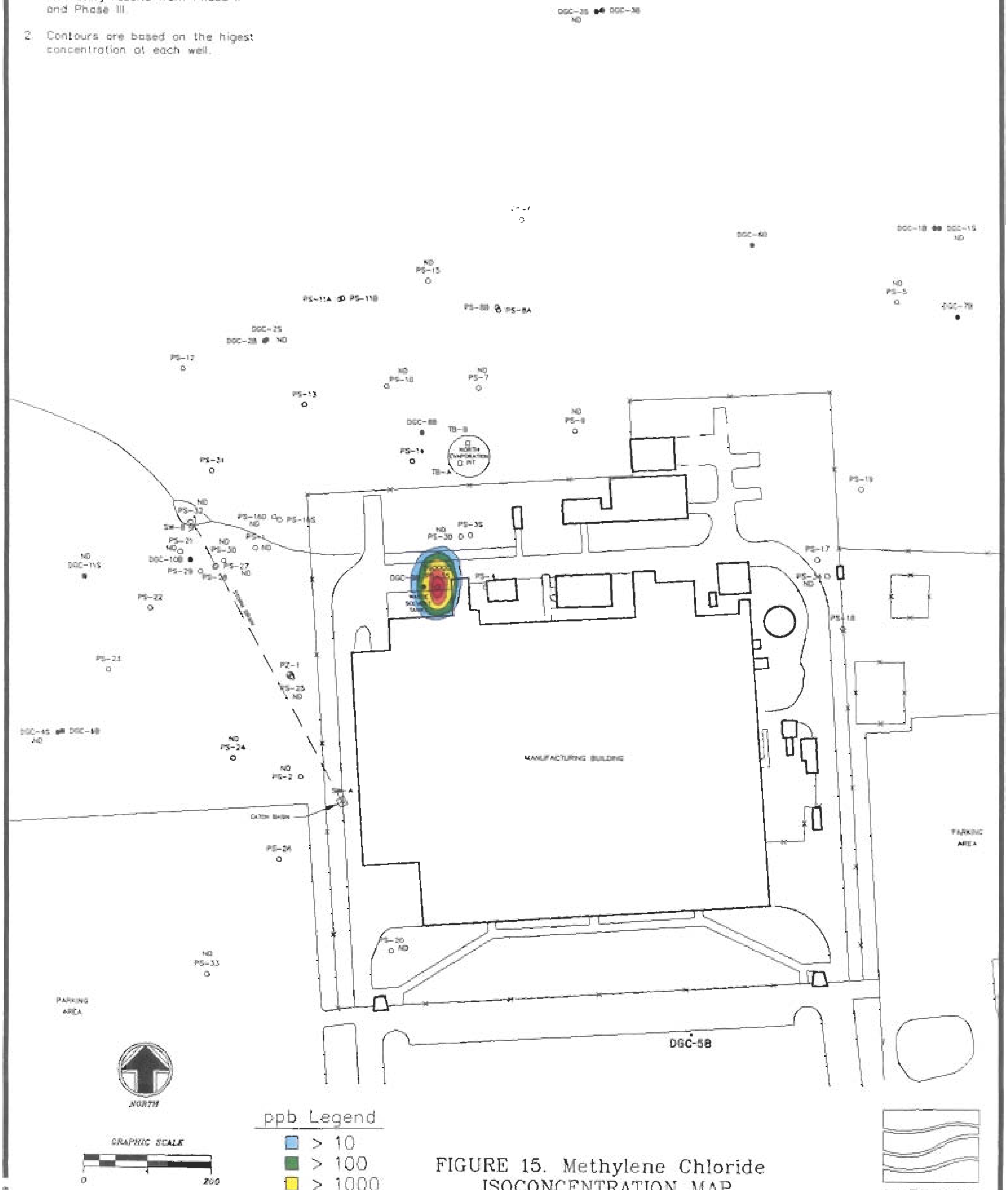
Tetrachloroethylene

Tetrachloroethylene (PCE) (Figure 17) appears to be associated with two sources. One source is the waste solvent tank area. This is evidenced by the high concentration of PCE detected in PS-35. The second source of PCE exists in the general area of PS-9. No other compounds are associated with this source area and no records, written or verbal, suggest a disposal area near PS-9. Soil samples from the North Evaporation Pit analyzed as part of Phase I indicate a maximum PCE concentration of 3 ppm in the pit. Other scattered occurrences of PCE were observed, most notable at PS-23, but the moderate to low levels at this location do not suggest any significant additional source.

N O T E S:

1. Concentrations include field and laboratory results from Phase II and Phase III.

2. Contours are based on the higest concentration at each well.



ppb Legend

🟦 > 10
🟩 > 100
🟨 > 1000
🟧 > 10,000
🟥 > 100,000

FIGURE 15. Methylene Chloride
ISOCONCENTRATION MAP
OVERBURDEN AQUIFER

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NOTES:

1. Concentrations include field and laboratory results from Phase II and Phase III.
2. Contours are based on the higest concentration at each well.

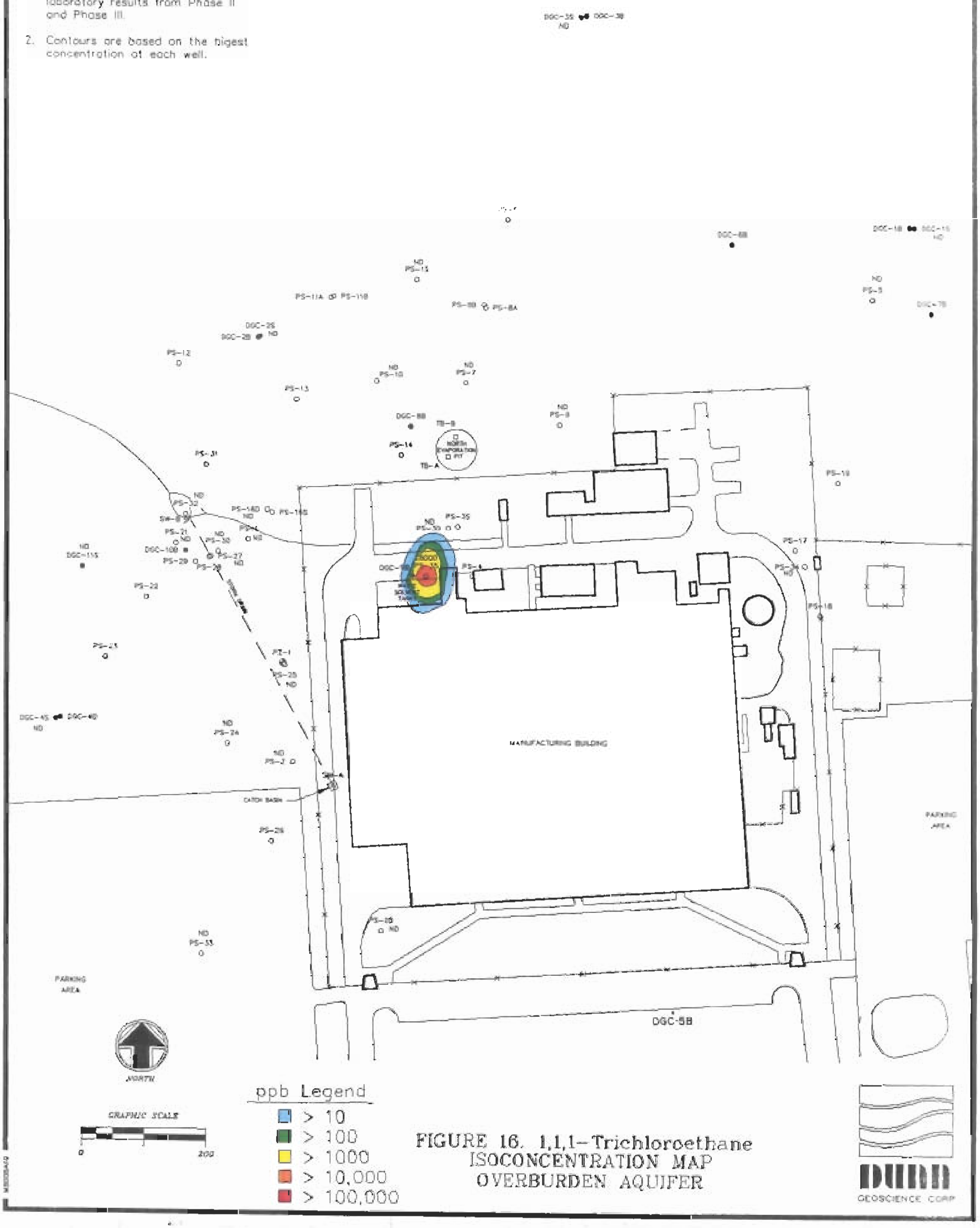
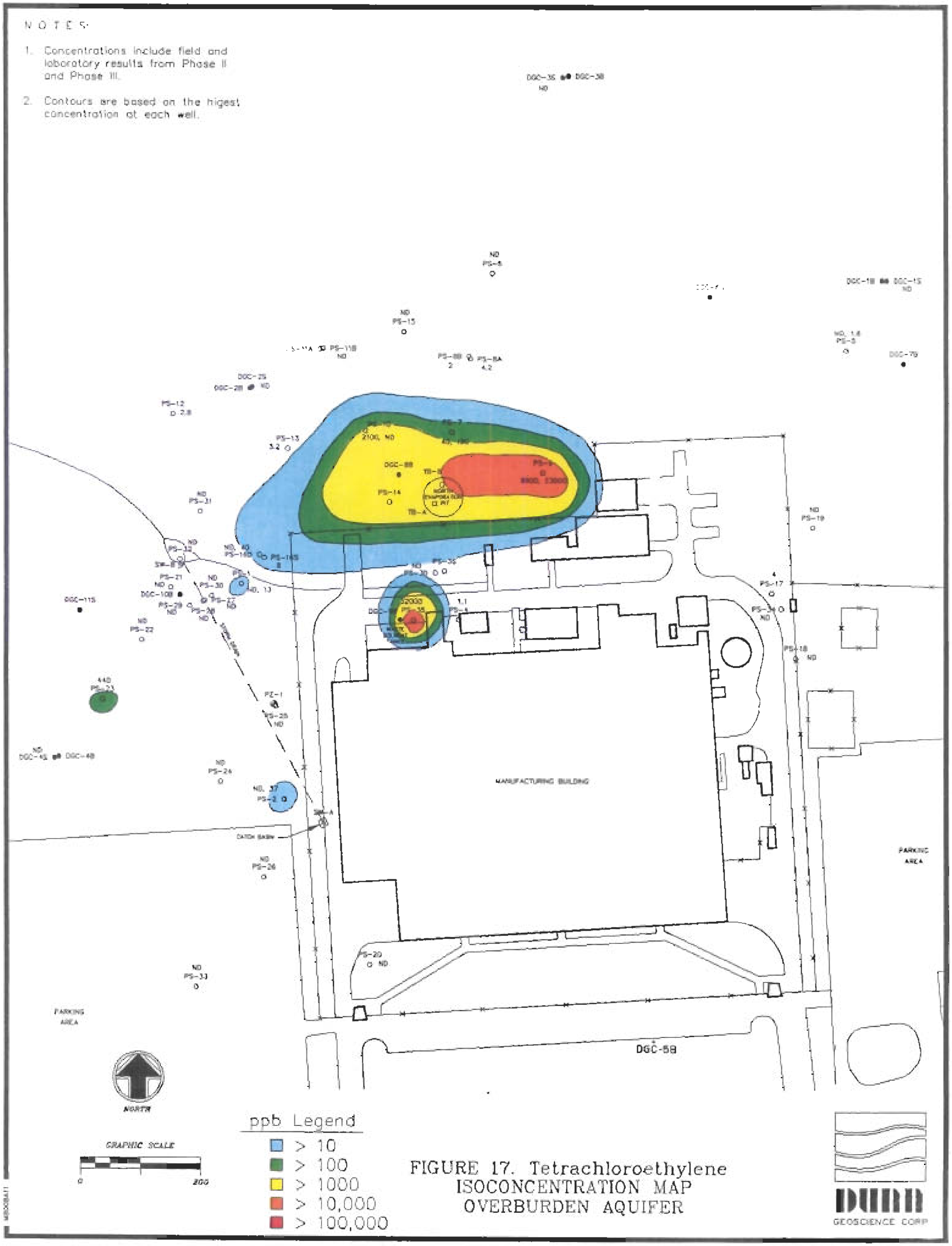


FIGURE 16. 1,1,1-Trichloroethane ISOCONCENTRATION MAP OVERBURDEN AQUIFER



NOTES:

1. Concentrations include field and laboratory results from Phase II and Phase III.
2. Contours are based on the higest concentration at each well.

ppb Legend

- 🟦 > 10
- 🟩 > 100
- 🟨 > 1000
- 🟧 > 10,000
- 🟥 > 100,000

FIGURE 17. Tetrachloroethylene ISOCONCENTRATION MAP OVERBURDEN AQUIFER

DUNN GEOSCIENCE CORP

PCE is more dense than water (specific gravity is 1.6 @ 20°C) and relatively insoluble (150 ppm @ 20°C). It is considered moderately mobile. The concentrations at the site do not suggest a non-aqueous phase (DNAPL). Migration of the plume resulting from the source near PS-9 is in agreement with observed groundwater flow within the overburden aquifer. The extent of PCE migration associated with the solvent tank area is unknown in the absence of monitoring wells west and northwest of that particular area. The maximum western extent is, however, defined by several micro-wells in the field west of the manufacturing building.

Summary

Several VOC compounds have been detected in the overburden aquifer. Major source areas of these compounds include the North Evaporation Pit; the yet unlocated West Evaporation Pit; and the waste solvent tank area. An additional source area has been identified in the vicinity of PS-9 where only PCE appears to have been disposed.

The general areal extent of each of these compounds has been defined as a result of the additional wells installed and sampled during Phase III. Further refinement of the areal configuration of individual plumes is not considered necessary. Because individual plumes associated with each source area meet and, in some instances, overlap; remedial actions focusing on preventing further contaminant migration can be designed to treat the multiple plumes as one. An "outer" series of wells, either uncontaminated or with very low levels of VOCs, is currently in place. By monitoring these "outer" wells along with selected "internal" wells, evidence of further migration of the VOCs may be obtained. Furthermore, the relatively limited area of overburden aquifer that has been contaminated to date, coupled with existing information about the permeability of the aquifer material, indicates that contaminant migration rates within the overburden aquifer are very low.

7.4.2 Bedrock Aquifer

The following description of bedrock aquifer groundwater quality is based on the Phase II and Phase III bedrock monitoring well analytical results, the nature and magnitude of overburden aquifer contamination, Phase I soil sample analytical results from the North Evaporation Pit, information about historical waste disposal practices, and the site's hydrogeologic characteristics. A total of ten bedrock wells have been installed on site, six of these as part of Phase III activities. All bedrock monitoring wells were sampled during Phase III (see Appendix G). Bedrock wells were installed in the upper 12 to 14 feet of bedrock to reduce the potential for downward migration of contaminants through the screened zones. Therefore, the following discussion of the bedrock aquifer groundwater quality is actually limited to the upper portion of the bedrock aquifer. Due to the limited number of bedrock monitoring wells, sufficient data was not available to construct meaningful isoconcentration contour maps for individual compounds. Refer to Plates 9, 10 and 11 for analytical results.

Trichloroethylene, 1,2-Dichloroethylene, Vinyl Chloride

Very high concentrations of TCE, DCE and VC have been detected in several of the bedrock wells. As previously discussed in the overburden groundwater quality section, DCE and VC are biodegradation daughter products of TCE. The most contaminated wells are DGC-8B (near the North Evaporation Pit) and DGC-9B (located in the waste solvent tank area). Similar to micro-wells PS-3D, 10, 24 and 35, TCE and DCE concentrations of this magnitude suggest the presence of a separate non-aqueous phase (DNAPL). Joints and fractures exposed at the bedrock/till interface could provide the avenue for a DNAPL to enter the secondary porosity network of the limestone aquifer (i.e., fractures, joints, bedding planes). It should be noted that an unidentified oily film was observed at DGC-9B on the polyethylene purge tubing during well development and on the bailer during sampling.

As expected, higher proportions of breakdown products, DCE and VC, were detected further from the source areas (DGC-1B, 2B, 4B, 6B, 7B and 10B). It should be noted that VC may also be present at DGC-8B and 9B at concentrations below the reporting limits (50,000 ug/l and 25,000 ug/l, respectively). Due to the higher groundwater velocities in the bedrock aquifer (estimated to be 1 to 2 orders of magnitude greater than the overburden), DCE and VC contamination extends beyond the areal extent of these compounds in the overburden aquifer. Based on the current number of wells, contamination appears to extend in a roughly east-west orientation. Groundwater flow data collected this winter indicates flow inward to the North Evaporation Pit area from the north, south and west, with discharge occurring to the east. The concentrations of DCE and VC detected at DGC-2B suggests that groundwater flow may be to the northwest at other times of the year. Additional bedrock monitoring wells and water level data interpretation will be necessary to further evaluate the nature and 3-dimensional extent of TCE, DCE and VC contamination.

Acetone

High levels of acetone were detected at DGC-8B, 9B, 1B and 7B. Probable sources of the acetone are the North Evaporation Pit and the waste solvent tank area. As is the case with TCE and associated "daughter" products, the contamination appears to have migrated in both east and west directions. The current bedrock monitoring network is insufficient to determine the lateral and vertical extent of the acetone contamination in the limestone aquifer.

Other VOCs

No 1,1,1-trichloroethane, methylene chloride or tetrachloroethylene was detected in any bedrock monitoring well. As stated in the overburden aquifer groundwater discussion, TCA and MC were only detected at PS-35. These compounds probably resulted from surface spillage in the waste solvent tank area and have apparently not impacted the bedrock aquifer, at least not at concentrations exceeding the reporting limits for PS-35 (25,000 ug/l for MC; 10,000 ug/l for TCA). PCE was not detected in any bedrock monitoring well at concentrations greater than the reporting limits.

Benzene, toluene, total xylenes and ethylbenzene were detected at relatively low concentrations at DGC-2B, 10B and 1B. Highest concentrations were detected at DGC-2B which again suggests at least seasonal groundwater flow to the northwest from the North Evaporation Pit area. High reporting limits at DGC-8B and 9B may again be masking the existence of BTX and ethylbenzene at these locations. As all of these compounds are less dense than water and not prone to sinking due to density differences, only downward vertical gradients would cause these compounds to enter the bedrock aquifer.

Summary

The major compounds detected in the bedrock aquifer are acetone as well as TCE and its biodegradation products, DCE and VC. The extremely high TCE, DCE and VC concentrations provide indirect evidence of a non-aqueous phase (DNAPL) of TCE. Sources of these VOCs appear to be the North Evaporation Pit and the waste solvent tank area. The distribution of these compounds suggests groundwater movement to the east and west, perhaps due to seasonal fluctuations of the potentiometric head within the bedrock aquifer. The lateral and vertical extent of these compounds cannot be delineated with the current bedrock monitoring network.

8.0 CONCLUSIONS

Recent information regarding the existence of the West Evaporation Pit and the contamination that appears to be associated with the waste solvent tank area has played a significant role in altering some of the conclusions stated in the Phase II report. The following conclusions are based on data gathered during all three phases of the investigation:

- Four distinct unconsolidated stratigraphic units have been identified. They are, in descending order, upper glaciolacustrine clay and silt, upper glacial till, lower glaciolacustrine clay and silt, and lower glacial till. The lower glaciolacustrine clay and silt and glacial till sequences are evident only in the vicinity of DGC-1, 6B and 7B and are not believed to play a significant role in contaminant migration.

- Groundwater flow within the overburden aquifer is predominantly toward the west-northwest. In the vicinity of the drainage ditch, however, groundwater flow is toward the ditch.

- The drainage ditch is believed to act as a discharge point throughout the year.

- The velocity of groundwater flow within the overburden aquifer is estimated to range from 0.032 to 0.095 feet/day.

- Groundwater flow within the bedrock aquifer appears to be radially inwards from the north, west and south to the area just north of the manufacturing building. Discharge is to the east. Additional bedrock wells and continued water level readings may change the current understanding of groundwater flow.

- The generalized velocity of groundwater flow within the bedrock aquifer is estimated to range from 1.4 to 3.5 feet/day across the site.

- Vertical hydraulic gradients within the overburden aquifer as well as between the overburden and bedrock aquifers were found to be in the downward direction at most of the well pairs.

- The pattern of overburden contamination, as indicated by soil gas analysis, is in general agreement with the overburden aquifer groundwater analyses.

- Relatively low concentrations of VOCs were detected in a surface water sample collected in the drainage ditch near the property line on the west side of the facility. Reduced VOC concentrations are expected further downstream due to volatilization and dilution.

- The general areal extent of each of the VOCs within the overburden aquifer has been defined. Further refinement of the areal configuration of individual plumes is not considered necessary.

- The extent of contamination in the bedrock aquifer is currently undefined. Significant concentrations of VOCs were identified northwest of the North Evaporation Pit at DGC-2B and 8B; east of the North Evaporation Pit at DGC-1B and 7B; and in the waste solvent tank area at DGC-9B.

- The following volatile organic compounds (VOCs) have been detected in the groundwater:
  - trichloroethylene
  - 1,2-dichloroethylene
  - vinyl chloride
  - acetone
  - benzene
  - toluene
  - total xylenes
  - ethylbenzene
  - 1,1,1-trichloroethane*
  - tetrachloroethylene*
  - methylene chloride *

  *compounds detected in the overburden aquifer only.

- The highest concentrations of benzene, toluene, total xylenes, ethylbenzene, 1,1,1-trichloroethane, tetrachloroethylene and methylene chloride were detected in the overburden aquifer. The highest concentrations of trichloroethylene, 1,2-dichloroethylene, vinyl chloride and acetone were detected in the bedrock aquifer.

- Four possible sources of groundwater contamination have been identified. They are:
  - the North Evaporation Pit where direct disposal of waste solvents occurred.
  - the yet unlocated West Evaporation Pit where direct disposal of waste solvents occurred.
  - the waste solvent tank area where leakage/surface spillage during receiving, storage and/or handling of virgin solvents and waste solvents may have occurred.
  - the vicinity of PS-9 where unexplained disposal of tetrachloroethylene may have occurred.

9.0 RECOMMENDATIONS

Recommendations have been made for additional activities focused on 1) further defining the extent of groundwater contamination within the bedrock aquifer; 2) further refining the direction of groundwater flow in the overburden and bedrock aquifers; 3) treating surface water traveling off site. Specific recommendations are as follows:

- Install several bedrock monitoring well pairs near the site perimeter to further delineate the areal and vertical extent of bedrock contamination. Proposed well locations have been included on Plate 12 in Appendix H. Final placement of the bedrock wells will be determined by geophysical surveys, further use of the fracture trace analysis, current understanding of groundwater flow and extent of contamination as well as use of an on-site gas chromatograph for field VOC screening.
- Install piezometers in areas where water table elevations are needed (see Plate 12 in Appendix H for proposed locations).
- Sample and analyze new and selected existing wells for VOCs.
- Design a surface water treatment system to reduce VOC concentrations prior to surface water leaving the property (see Appendix I for details).
- Perform a joint frequency and orientation analysis of nearby bedrock outcrops.
- Re-install DGC-8B and 9B (possibly DGC-2B) using stainless steel well materials.
- Record monthly water level measurements.

- Document the condition of the waste solvent tank and surrounding soil during tank closure activities.

- Re-analyze PS-5 for trichloroethylene.

- Re-analyze SW-C.

APPENDIX A

SEE

PAPER

FILES

FOR

OVER SIZED

DOCUMENT(S)

LEGEND

325 ▲ PHASE II SOIL GAS SAMPLING LOCATIONS

200 ▲ PHASE III SOIL GAS SAMPLING LOCATIONS

NOTE:

MAP COMPILED FROM AERIAL PHOTOGRAPHY BY
LOCKWOOD SUPPORT SERVICES, INC.
ROCHESTER, N.Y., APRIL 24, 1982.

PLATE I

N	BY
Y FOR PHASE 3	KB/RS

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205

SOIL GAS LOCATIONS
POWEREX, INC.
(GENERAL ELECTRIC CO.)

CITY OF AUBURN CAYUGA COUNTY, N.Y.

PROJECT MANAGER:
Rodney W. Sutch
Kristen Franz-Begor
PREPARED BY:

CHECKED BY:

DRAFTED BY:
Charles T. O'Clair
PROJECT NO.
2092-5-321
SHEET . OF .

MAP NO.
M7830
DATE:
November 1987

LEGEND

●	DGC−3S DGC−3B	2 inch Overburden Monitoring Wells 2 inch Bedrock Monitoring Wells
○	PS−16S PS−16D PS−16	1/2 inch Overburden Micro−Wells
◕	PZ−1	Piezometer Location
△	SW−A	Surface Water Sampling Location
□	TB−A	Test Boring Location

NOTE:

MAP COMPILED FROM AERIAL PHOTOGRAPHY BY
LOCKWOOD SUPPORT SERVICES, INC.
ROCHESTER, N.Y., APRIL 24, 1982.

PLATE 2

ION	BY
VEY FOR **PHASE** 3	KB/RS

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205

SITE MAP
POWEREX, INC.
(GENERAL ELECTRIC CO.)
CITY OF AUBURN CAYUGA COUNTY, N.Y.

PROJECT MANAGER:
Rodney W. Sutch
Kristen Franz−Begor
PREPARED BY:

CHECKED BY:

DRAFTED BY:
Charles T. O'Clair
PROJECT NO.
2092−5−321
SHEET . OF .

MAP NO.
M7830
DATE:
November 1987

LEGEND

● DGC−3S 2 inch Overburden Monitoring Wells
DGC−3B 2 inch Bedrock Monitoring Wells

○ PS−16S, PS−16D, PS−16 — 1/2 inch Overburden Micro−Wells

◐ PZ−1 Piezometer Location

△ SW−A Surface Water Sampling Location

□ TB−A Test Boring Location

NOTE:

MAP COMPILED FROM AERIAL PHOTOGRAPHY BY LOCKWOOD SUPPORT SERVICES, INC. ROCHESTER, N.Y., APRIL 24, 1982.

PLATE 3

SION	BY
IRVEY FOR **PHASE** 3	KB/RS

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205

LOCATION OF GEOLOGIC CROSS−SECTIONS

POWEREX, INC.

(GENERAL ELECTRIC CO.)

CITY OF AUBURN CAYUGA COUNTY, N.Y.

PROJECT MANAGER:
Rodney W. Sutch
Kristen Franz−Begor
PREPARED BY:
Rodney W. Sutch
CHECKED BY:

DRAFTED BY:
Charles T. O'Clair
PROJECT NO.
2092−5−321
SHEET . OF .

MAP NO.
M8003
DATE:
November 1987

LEGEND

● DGC-3S 2 inch Overburden Monitoring Wells
DGC-3B 2 inch Bedrock Monitoring Wells

○ PS-16S, PS-16D, PS-16 — 1/2 inch Overburden Micro-Wells

◕ PZ-1 Piezometer Location

△ SW-A Surface Water Sampling Location

□ TB-A Test Boring Location

— Bedrock Surface Elevation (dashed where inferred) Contour Interval 1.0'

━ Bedrock Surface Elevation (dashed where inferred) Contour Interval 5.0'

NOTE:

MAP COMPILED FROM AERIAL PHOTOGRAPHY BY
LOCKWOOD SUPPORT SERVICES, INC.
ROCHESTER, N.Y., APRIL 24, 1982.

PLATE 4

N	BY
Y FOR PHASE 3	KB/RS

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205

BEDROCK SURFACE ELEVATION CONTOUR MAP

POWEREX, INC.

(GENERAL ELECTRIC CO.)

CITY OF AUBURN CAYUGA COUNTY, N.Y.

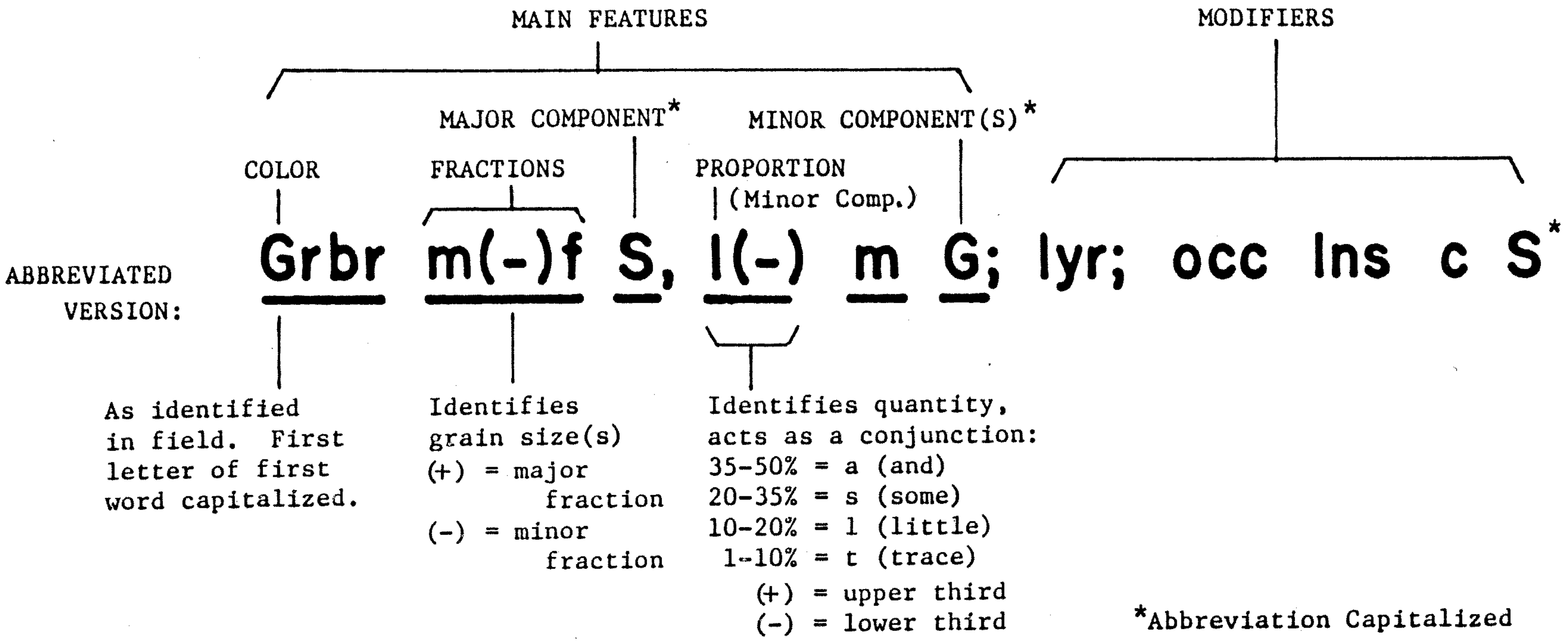
PROJECT MANAGER:
Rodney W. Sutch
Kristen Franz-Begor
PREPARED BY:
Maureen Lawler
CHECKED BY:

DRAFTED BY:
Michael T. Maksymik
PROJECT NO.
2092-5-321
SHEET . OF

MAP NO.
8033
DATE:
February 1988

APPENDIX B

MODIFIED BURMISTER SYSTEM



ABBREVIATED VERSION: **Grbr m(-)f S, l(-) m G; lyr; occ lns c S***

As identified in field. First letter of first word capitalized.

Identifies grain size(s)
(+) = major fraction
(-) = minor fraction

Identifies quantity, acts as a conjunction:
35-50% = a (and)
20-35% = s (some)
10-20% = l (little)
1-10% = t (trace)
(+) = upper third
(-) = lower third

*Abbreviation Capitalized

UNABBREVIATED VERSION: **Gray brown medium (-) to fine SAND, little (-) medium Gravel; layered; occasional lens coarse Sand (SP).**

UNIFIED SOIL CLASSIFICATION:** Adequate for a generalized stratum description.

Dunn Geoscience Corporation uses a modified BURMISTER SYSTEM for detailed identification of soil components, fractions, and proportions. The UNIFIED SOIL CLASSIFICATION,** based upon field data, is also presented.

VISUAL IDENTIFICATION OF SAMPLES

The samples were identified in accordance with the American Society for Engineering Education System of Definition.

I. Definition of Soil Components and Fractions

Material	Symbol	Fraction	Sieve Size	Definition
Boulders	Bldr	—	9" +	Material retained on 9" sieve.
Cobbles	Cbl	—	3" to 9"	Material passing the 9" sieve and retained on the 3" sieve.
Gravel	G	coarse (c) medium (m) fine (f)	1" to 3" ⅜" to 1" No. 10 to ⅜"	Material passing the 3" sieve and retained on the No. 10 sieve.
Sand	S	coarse (c) medium (m) fine (f)	No. 30 to No. 10 No. 60 to No. 30 No. 200 to No. 60	Material passing the No. 10 sieve and retained on the No. 200 sieve.
Silt	$	—	Passing No. 200 (0.074 mm)	Material passing the No. 200 sieve that is non-plastic in character and exhibits little or no strength when air dried.

Organic Silt (O$)

Material passing the No. 200 sieve which exhibits plastic properties within a certain range of moisture content, and exhibits fine granular and organic characteristics.

		Plasticity	Plasticity Index
Clayey SILT	Cy$	Slight (Sl)	1 to 5
SILT & CLAY	$&C	Low (L)	5 to 10
CLAY & SILT	C&$	Medium (M)	10 to 20
Silty CLAY	$yC	High (H)	20 to 40
CLAY	C	Very High (VH)	40 plus

Clay-Soil

Material passing the No. 200 sieve which can be made to exhibit plasticity and clay qualities within a certain range of moisture content, and which exhibits considerable strength when air-dried.

II. Definition of Component Proportions

Component	Written	Proportions	Symbol	Percentage Range by Weight *
Principal	CAPITALS	—		50 or more
Minor	Lower Case	and	a.	35 to 50
		some	s.	20 to 35
		little	l.	10 to 20
		trace	t.	1 to 10

* Minus sign (—) lower limit, plus sign (+) upper limit, no sign middle range.

III. Glossary of Modifying Abbreviations

Category	Symbol	Term	Symbol	Term	Symbol	Term
A. Borings	U/D	Undisturbed	B	Exploratory	A	Auger
B. Samples	C	Casing	L	Lost	U	Undisturbed
	D	Denison	S	Spoon	W	Wash
	O.E.	Open End				
C. Colors	bk	black	gn	green	wh	white
	bl	blue	or	orange	yw	yellow
	br	brown	rd	red	dk	dark
	gr	gray	tn	tan	lt	light
D. Organic Soils	dec	decayed	o	organic	veg	vegetation
	dec'g	decaying	rts	roots	pt	peat
	lig	lignite	ts	topsoil		
E. Rocks	LS	Limestone	rk	rock	Shst	Schist
	Gns	Gneiss	SS	Sandstone	Sh	Shale
F. Fill and Miscellaneous Materials	bldr (s)	boulder (s)	cbl (s)	cobble(s)	gls	glass
	brk (s)	brick (s)	wd	wood	misc	miscellaneous
	cndr (s)	cinder (s)	dbr	debris	rbl	rubble
G. Miscellaneous Terms	do	ditto	pp	pocket penetrometer	ref	refusal
	el, El	elevation			sm	small
	fgmt (s)	fragment(s)	P. I.	Plasticity Index	W. L.	water level
	frqt	frequent			W. H.	weight of hammer
	lrg	large	P	pushed	W. R.	weight of rods
	mtld	mottled		pressed		
	no rec	no recovery	pc (s)	piece (s)		
	pen	penetration	rec or R	recovered		
H. Stratified Soils	alt	alternating				
	thk	thick				
	thn	thin				
	w	with				
	prt	parting	— 0 to 1/16" thickness			
	seam	seam	— 1/16 to ½" thickness			
	lyr	layer	— ½ to 12" thickness			
	stra	stratum	— greater than 12" thickness			
	vvd c	varved Clay	— alternating seams or layers of sand, silt and clay			
	pkt	pocket	— small, erratic deposit, usually less than 1 foot			
	lns	lens	— lenticular deposit			
	occ	occasional	— one or less per foot of thickness			
	freq	frequent	— more than one per foot of thickness			

Dunn Geoscience Corp.
Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. DGC-2B

PROJECT	GE Auburn - Phase 3	SHEET 1 OF	2
CLIENT	General Electric Company	JOB No.	2092-5-321
DRILLING CONTRACTOR	Parratt Wolff, Inc.	MEAS. PT. ELEV.	635.82'
PURPOSE	Monitoring Well Installation/Subsurface Investigation	GROUND ELEV.	634.2'
DRILLING METHOD	H.S.A.	DATUM	M.S.L.
DRILL RIG TYPE	Mobile Drill B-53	DATE STARTED	10/29/87
GROUNDWATER DEPTH	4.32'	DATE FINISHED	10/30/87
MEASURING POINT	PVC	DRILLER	Paul LeClair
DATE OF MEASUREMENT	11/5/87	INSPECTOR	Rodney Sutch

	SAMPLE	CORE	CASING
TYPE	SS	HX	flush joint
DIA.	2" OD	3" ID	4¼" ID
WEIGHT	140#		
FALL	30"		

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-1	2 5 5 10			Dk Br Cy$; rts, topsoil -.3' Tn Cy$ s, f S; frqt ~1/16" dk br $ seams Br $ a, f S	Rec=0.8' Moist
	S-2	2 10 12 8			2.2' Rd Br $yC; mtld w/lt gr $yC 2.6' Br $ a, f S	Rec=1.0' Moist
5	S-3	2 4 5 4			Br Cy$ a, f S 4.3' Rd Br $yC; mtld lt gr lenses, PP=1.25 t/ft² 4.7' Br Cy$ a, f S 4.95' Rd Br $yC; mtld lt gr, bk & tn $yC lenses <u>Red Brown SILTY CLAY; alternating layers of Silt and fine Sand</u> (GLACIOLACUSTRINE)	Rec=1.6' Moist
	S-4	8 16 18 14			Rd Br $yC; occ lt gr prt -7.0' Br $ s, f S, t f G	Rec=1.4' Moist PP=0.5 t/ft²
	S-5A	6			Rd Br $yC; lt gr prt at top 8.65'	Rec=1.9' Moist
10	S-5B	8 16 34			Br Gr $ a(+), f S, s mf G	

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Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. DGC-2B

PROJECT GE Auburn - Phase 3

SHEET 2 OF 2

CLIENT General Electric Company

JOB No. 2092-5-321

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-6	36			Br $ a(+), f S, s cmf G; very dense from 11 to 12'	Rec=2.0' Moist
		54			Gray Brown SILT and, fine Sand, some coarse to fine Gravel	
		56			(GLACIAL TILL)	
		100/.4				11.2' auger refusal, case hole, auger to 12'
	S-7	66			Gr Br $ a, f S, 1(+) cmf G	
		100/.1'				Rec=.55' Moist
						boulder @ 12.6' to 13.2' weathered rock @ 13.4'
					Rock @ 13.7'	
15						

Well Construction Details

T.D.	25.7'
0.010 in. slot PVC screen	25.7-15.7'
00 Morie sandpack	25.7-14.5'
Bentonite Pellets	14.5-13.0'
Grout-cement/bentonite	13.0'-ground

6" locking protective steel casing

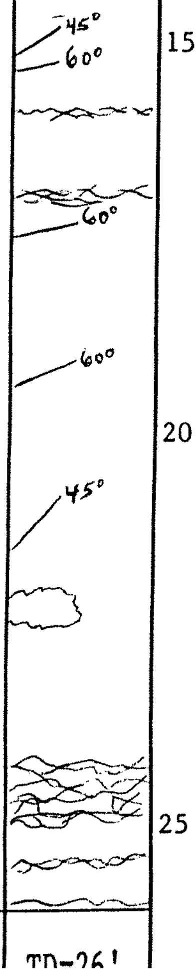
Dunn Geoscience Corporation
Core Log

Client General Electric Company
Project GE Auburn
2092-5-321
Location Auburn, NY

Logged by DHH
Date Logged 12/14/87
Drilling Co. Parratt-Wolff, Inc.
Driller Paul LeClair
Started 10/30/87
Finished 10/30/87

Hole DGC-2B
Depth 26.0'
Elev. 634.2 grd
Core Dia. HX

FORMATION: Onondaga
Member: Probable Nedrow
Zone/Unit
Graphic Log 1" = 2.5'



Depth: 15, 20, 25

Descriptive Log
ROCK TYPE: color; grain size; texture; bedding; minerals; remarks, etc.

Top of Rock = 13.7'   Top of Core = 14.0'

14.0 - 26.0'	LIMESTONE, dark gray to medium dark gray (N3 to N4), finely crystalline mostly nonfossiliferous; argillaceous, joints; scattered pyrite.
14.7'	Shale partings
15.0-15.5'	Fractured rock, curved fracture (artificial)
15.5'	Joints, 45° to 60° to core
16.0'	Shale partings
16.9-17.0'	Shale partings, break filled with drillers mud.
17.2'	Joint, 60° to 70° to core
19.5'	Joint, 60° to core
21.5'	Joint, 45° to core.
22.3'	Healed fracture
24.0-25.0'	Argillaceous partings, possible algal mut development, poorly developed.
25.0-25.3'	Broken rock, possible weak argillaceous limestone
25.3-25.8'	Fractured rock
25.7-26.0'	Argillaceous partings, anastomosing

Angle of Bedding to Core

% Core

Run
14-1
±95%
RQD=

Run
18-2
±95%
RQD=

Run
22-2
±95%
RQD=

Hole No. DGC-
Sheet 1 of

Dunn Geoscience Corp.
Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. DGC-6B

PROJECT GE Auburn - Phase 3
CLIENT General Electric Company
DRILLING CONTRACTOR Parratt Wolff, Inc.
PURPOSE Monitoring Well Installation/Subsurface Investigation
DRILLING METHOD H.S.A.
DRILL RIG TYPE Mobile Drill B-53
GROUNDWATER DEPTH 9.65'
MEASURING POINT PVC
DATE OF MEASUREMENT 11/5/87

	SAMPLE	CORE	CASING
TYPE	SS	HX	flush joint
DIA.	2" OD	3" ID	4¼" ID
WEIGHT	140#		
FALL	30"		

SHEET 1 OF 2
JOB No. 2092-5-321
MEAS. PT. ELEV. 641.18
GROUND ELEV. 638.8
DATUM M.S.L.
DATE STARTED 10/27/87
DATE FINISHED 10/27/87
DRILLER P. LeClair/Ellingworth
INSPECTOR Rodney Sutch

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-1	2 4 5 7	CL		Dk Br $ & C; mtld Or Br, Bk .1' layer	Rec=1.0' Moist
	S-2	5 5 8 7	CL		Lt Br Cy$; mtld dk br & gr lenses -2.6' Br $ Light Brown CLAYEY SILT; frequent layers of Silt or layers of Red Brown Silty Clay (GLACIOLACUSTRINE)	(PP=1.25 t/ft^2) Rec=1.0' Moist (PP=1.25 t/ft^2)
5	S-3	3 6 5 7	CL		Rd Br $yC; mtld lt gr & bk prt -4.7' Lt Br $	Rec=.7 WET (PP=2.0 t/ft^2)
	S-4A	3			Lt Br $ -6.5'	Rec=2.0 WET (PP=.75 t/ft^2)
	S-4B	4 3 3	CL		Rd Br $yC; freq dk br $yC prt	
	S-5A	6 9 27	CL		Lt Br Cy$; .2' lyr Rd Br $yC -8.7' Gr Rd $yC; .2' ly Gr $ -9.6'	Rec=2.0 WET (PP=3.0 t/ft^2)
10	S-5B	68	GC		Br $ & C a, cmf G	

Dunn Geoscience Corp.
Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. DGC-6B

SHEET 2 OF 2

ROJECT GE Auburn - Phase 3

JOB No. 2092-5-321

CLIENT General Electric Company

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-6	6 10 20 11	GC		Brown SILT and CLAY and (+), coarse to fine Gravel (GLACIAL TILL) Br C & S a(+), cmf G	Rec=1.1' Moist
	S-7	17 20 28 46	CL		Brown to Red Brown CLAY and SILT trace, fine Gravel (GLACIOLACUSTRINE) Rd Br $yC t(-), f G; stiff	Rec=1.3' Dry PP=1/8" penetration at 4.5 t/ft^2
	S-8	.2'/100	CL		Br $ & C t(-), f G Note: Grinded auger to 15', set 4" casing and roller bit to 15.3'	Rec=.3 Dry
15					(GLACIAL TILL)	
	S-9	38 55 30 70	GC		Gr f S, l $, a c(-)mf G	Rec=2.0' Moist

Rock @ 17.3'

Well Construction Details

T.D.	30'
Screen 0.010 inch slot PVC	30-20'
Sand pack	30-19'
Bentonite Pellets	19-17.3'
Cement/bentonite grout	17.3-ground

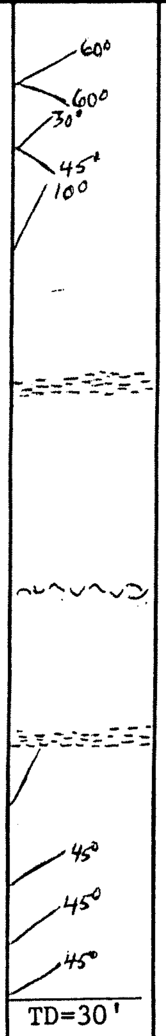
6" lockable protective steel casing

Dunn Geoscience Corporation
Core Log

Client General Electric Company
Project GE Auburn
2092-5-321
Location Auburn, NY

Logged by DHH Date Logged 12/15/87
Drilling Co. Parratt-Wolff, Inc.
Driller P. LeClair/M. Ellingworth
Started 9/11/87 Finished 9/11/87

Hole DGC-6B
Depth 30.0'
Elev. 638.8 grd
Core Dia. HX

FORMATION	Member	Zone/Unit	Graphic Log 1" = 2.5'	Depth	**Descriptive Log** ROCK TYPE: color; grain size; texture; bedding; minerals; remarks, etc.	Angle of Bedding to Core	% Core
Onondaga	Probable Nedrow			18 20	Top of Rock = 18.0' Top of Core = 18.0' 18.0-30.0' <u>LIMESTONE</u>, medium dark to dark gray (N4-N3), finely crystalline, mostly nonfossiliferous; argillaceous, scattered joints; scattered pyrite. 18.5-18.7' Two intersecting joints, 60° to core.		Run 18- 2.6
				22	19.1' Broken rock, artificial 19.5-20.1' Two joints, 30° and 45° to core 20.1-21.0' Fractured rock 10° to core 21.0-21.5' Calcite healed fracture		RQD
				24 25	22.5' Argillaceous limestone, non-weathered		Run 21- 95% RQD=
				26 27	25.2' Scattered brachiopod fossils 26.7' Shale partings 27.7' Chert nodule, 1" 27.9' Healed fracture		
				28 29 30	28.7' Joint, 45° to core 29.5' Joint, 45° to core 30.0' Joint, 45° to core		Run 26- 95% RQD

Hole No. DGC
Sheet 1 of 1

Dunn Geoscience Corp.
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TEST BORING LOG

BORING No. DGC-7B

PROJECT GE Auburn - Phase 3
SHEET 1 OF 3
CLIENT General Electric Company
JOB No. 2092-5-321
DRILLING CONTRACTOR Parratt Wolff, Inc.
MEAS. PT. ELEV. 643.46'
PURPOSE Monitoring Well Installation/Subsurface Investigation
GROUND ELEV. 641.2'
DRILLING METHOD H.S.A.
DATUM M.S.L.
DRILL RIG TYPE Mobile Drill B-53
DATE STARTED 10/28/87
GROUNDWATER DEPTH 12.33'
DATE FINISHED 10/29/87
MEASURING POINT PVC
DRILLER Paul LeClair
DATE OF MEASUREMENT 11/5/87
INSPECTOR Rodney Sutch

	SAMPLE	CORE	CASING
TYPE	SS	HX	flush joint
DIA.	2" OD	3" ID	4¼" ID
WEIGHT	140#		
FALL	30"		

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-1	2 3 5 6	CL		Dk Br Cy$; rts, topsoil -.9' Or Br $ & C; dk br mtld lenses	Rec=1.0' Moist
	S-2	8 7 7 7	CL		Or Br $yC; mtld gr & bk lenses, more silty toward top	Rec=0.9' Moist PP=2.5 t/ft^2
5	S-3	5 7 12 7	CL		Or Br $ -4.45' Or Br $yC; mtld gr & bk -4.75' Or Br f S t, $	Rec=1.1' WET PP=1.4 t/ft^2
	S-4	3 4 4 4	CL		Or Br f S, t $ -6.8' Or Br $yC Orange Brown SILTY CLAY; alternating layers of Orange Brown fine Sand (GLACIOLACUSTRINE)	Rec=1.65' WET PP=1.0 t/ft^2
	S-5A	5 5	CL		Or Br $yC; mtld gr lenses, .2" quartz gravel bottom of sample -9.2'	Rec=1.8' WET
	S-5B	10 12	GC		Lt Br Cy$ a, cmf G; ~¼" Dk Br S at top of till, subangular gravel	
10						

Dunn Geoscience Corp.
Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. DGC-7B

SHEET 2 OF 3

JOB No. 2092-5-321

PROJECT GE Auburn - Phase 3

CLIENT General Electric Company

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-6	10 12 20 35			-.1 Dk Br limestone plug in end of spoon Brown CLAYEY SILT and, coarse to fine Gravel; subangular gravel (GLACIAL TILL)	Rec=.1'
		100/.45'			Boulder @ 12', grind w/auger from 12.45 to 12.7' (auger refusal); install 4" casing and roller bit to 14.0', set up to core from 14-18'	
						bottom of boulder @ 14.2'
15	S-7		GC		Br Gr $yC t(-), mf(+) G; ls chips decreasing with depth, 14.7-14.9' ls Brown to Gray Brown SILTY CLAY trace(-), medium to fine(+) Gravel GLACIOLACUSTRINE	Rec=3.0' (core barrel) PP=no penetration Dry (?)
	S-8	10 18 28 58	GC		1st spoon - no recovery Br $yC t(-), f G; most gravel is angular ls, rounded red SS f G also noted, 1/16" gr S pkt	Rec=1.2' Moist PP=4.0 t/ft^2
20						

Dunn Geoscience Corp.
Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. DGC-7B

PROJECT GE Auburn - Phase 3	SHEET 3 OF 3
CLIENT General Electric Company	JOB No. 2092-5-321

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
						spin casing to 24', roller bit to 24'.
		38			Rock @ 24.5'	
25	S-9	100/.4			LS fragments	Rec=.35' casing set @ 25'

<u>Well Construction Details</u>

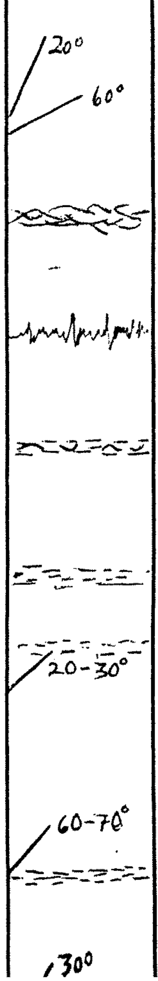
T.D.	37.5'
0.010" slot PVC screen	37.5-27.5'
00 Morie sandpack	37.5-26.0'
Bentonite Pellets	26.0-24.5'
Cement/Bentonite Grout	24.5-ground surface
6" protective steel casing w/lock	

Dunn Geoscience Corporation
Core Log

Client General Electric Company
Project GE Auburn
2092-5-321
Location Auburn, NY

Logged by DHH Date Logged 12/14/87
Drilling Co. Parratt-Wolff, Inc.
Driller Paul LeClair
Started 10/28/87 Finished 10/29/87

Hole DGC-7B
Depth 37.5'
Elev. 641.2 grd
Core Dia. HX

FORMATION	Member	Zone/Unit	Graphic Log 1" = 2.5'	Depth	Descriptive Log ROCK TYPE: color; grain size; texture; bedding; minerals; remarks, etc.	Angle of Bedding to Core	% Core
Onondaga	Probable Nedro				Top of Rock 24.9 Top of Core 24.5 (?)		
					24.5 - 37.5 LIMESTONE, medium dark to dark gray (N4 to N3), finely crystalline mostly non fossiliferous, argillaceous, joints, fractures		Ru 24. 2 ±95 RQD
				25	25.0' Joint/fracture 20° to core, shale parting Joint 60° to core		
					25.8' Joint 60° to core		Run
					26.2' Joint 60° to core		28. 3 ±95 RQD
					27.3' Shale partings, anastomosing		
					28.5' Possible stylolitealong core break		
				30	30.0' Argillaceous limestone, scattered brachiopods, pyrite nodule ½"		
					31.5'-31.8' Shale partings causing rock breakage		Run 33. 3 ±95 RQD
					32.3' Joint 30° to core		
					32.4' Shale parting		
					32.9' Joint 20-30° to core		
				35	35.3' Joint, 60-70° to core		
					35.4' Shale seam		
					37.0' Joint 45° to core		
					37.5' Joints, 30° and 45° to core		

Hole No. DGC
Sheet 1 of

Dunn Geoscience Corp.
Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. DGC-8B

PROJECT GE Auburn - Phase 3

CLIENT General Electric Company

DRILLING CONTRACTOR Parratt Wolff, Inc.

PURPOSE Monitoring Well Installation/Subsurface Investigation

DRILLING METHOD H.S.A.

DRILL RIG TYPE Mobile Drill B-53

GROUNDWATER DEPTH 6.89'

MEASURING POINT PVC

DATE OF MEASUREMENT 11/5/87

	SAMPLE	CORE	CASING
TYPE	SS	HX	flush joint
DIA.	2" OD	3" ID	4¼" ID
WEIGHT	140#		
FALL	30"		

SHEET 1 OF 2

JOB No. 2092-5-321

MEAS. PT. ELEV. 638.79'

GROUND ELEV. 636.8'

DATUM M.S.L.

DATE STARTED 11/2/87

DATE FINISHED 11/2/87

DRILLER LeClair/Ellingworth

INSPECTOR Rodney Sutch

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-1	1 3 4 8			Dk Br $yC; rts, topsoil Brown fine SAND, and Silt; alternating with layers of Red Brown Clayey Silt (GLACIOLACUSTRINE)	Rec=0.7' Moist
	S-2	3 4 6 7	SM		Lt Br f S, a(+) $; C & $ lyr @ 2.7-2.9' mtld lt gr and black	Rec=1.2' WET @ 3'
5	S-3	6 4 4 4	SM		Br f S, a(+) $; fining downward to C & $ 4.35' Gr f S, s $; odor (unknown) 4.55' Br Gr f S, a $ 4.75' Rd Br Cy$ s, f S	Rec=0.8' WET
	S-4A S-4B S-4C S-4D	5 6 11 100/.3'	SM GC		Rd Br $yC; (PP=0.75 t/ft^2) 6.9' Br cmf S, 1(+) $, f G; odor -7.0' Br Rd $yC t, f G; br f S, a f G lyr @ 7.35' (PP=4.5 t/ft^2) -7.5' Gr Br f S, 1 $, a cmf G; unknown odor	Rec=1.6' WET
		10/.0'			Gray Brown to Dark Brown fine SAND and (+), Silt, some coarse to fine Gravel (GLACIAL TILL)	spoon bouncing, continue augering to 10', difficult drilling.
10						

Dunn Geoscience Corp.
Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. DGC-8B

SHEET 2 OF 2

PROJECT GE Auburn - Phase 3

JOB No. 2092-5-321

CLIENT General Electric Company

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-5	16 18 24 36	GC		Dk Br f S, s $, s mf G; odor	Rec=2.0' WET
	S-6	12 26 100/.3'	GC		Dk Br $ a(+), f S, s mf G; faint odor	Rec=0.6' WET
					Rock @ 13.8'	water in hole during augering; 13.8' auger refusal; spin casing and roller bit to 15'

Well Construction Details

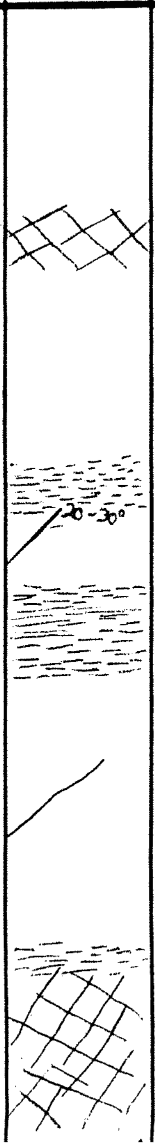
T.D.	27.0'
0.010 inch slot PVC screen	27.0-17.0'
00 Morie sandpack	27.0-15.0'
Bentonite Pellets	15.0-13.0'
Cement/Bentonite grout	15.0'-ground
6" locking protective steel casing	

Dunn Geoscience Corporation
Core Log

Client General Electric Company
Project GE Auburn
2092-5-321
Location Auburn, NY

Logged by DHH
Date Logged 12/14/87
Drilling Co. Parratt-Wolff, Inc.
Driller Paul LeClair/M. Ellingworth
Started 11/2/87
Finished 11/2/87

Hole DGC-8B
Depth 27.0'
Elev. 636.8 grd
Core Dia. HX

FORMATION	Member	Zone/Unit	Graphic Log 1" = 2.5'	Depth
Onondaga	Probable Nedrow			15 20 25

Descriptive Log
ROCK TYPE: color; grain size; texture; bedding; minerals; remarks, etc.

Top of Rock = 15.0'
Top of Core = 15.0'

15.0 - 27.0' LIMESTONE, medium dark to dark gray (N4 to N3), finely crystalline, generally nonfossiliferous; agrillaceous, jointed, fractured; scattered pyrite.

15.0 - 16.0' Jointed and fractured

18.4 - 18.9' Argillaceous, shale partings

19.0 - 19.6' Joint, 20-30° to core

20.0 - 20.6' Very argillaceous, broken rock

20.6 - 21.7' Argillaceous

22.5' Healed fracture

24.1 - 25.0' Argillaceous

24.1 - 27.0' Highly jointed, fractured, 20 to 70° to core

Angle of Bedding to Core	% Core Recovery
	Run 1 15-17 ±95% RQD=5
90%	Run 2 17.5- 22.5 ±95% RQD=3
90%	Run 3 22.5 27.C ±95% RQD=2
90%	
90%	

Hole No. DGC-8
Sheet 1 of 1

Dunn Geoscience Corp.
Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. DGC-9B

PROJECT GE Auburn - Phase 3
CLIENT General Electric Company
DRILLING CONTRACTOR Parratt Wolff, Inc.
PURPOSE Monitoring Well Installation/Subsurface Investigation
DRILLING METHOD H.S.A.
DRILL RIG TYPE Mobile Drill B-53
GROUNDWATER DEPTH 5.54'
MEASURING POINT brass adaptor
DATE OF MEASUREMENT 11/5/87

SHEET 1 OF 2
JOB No. 2092-5-321
MEAS. PT. ELEV. 636.76
GROUND ELEV. 636.92
DATUM M.S.L.
DATE STARTED 11/3/87
DATE FINISHED 11/3/87
DRILLER Mike Ellingworth
INSPECTOR Rodney Sutch

	SAMPLE	CORE	CASING
TYPE	SS	HX	flush joint
DIA.	2" OD	3" ID	4¼" ID
WEIGHT	140#		
FALL			

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
					Blacktop 0-.3', crushed stone .3-.7'	No sample collected
	S-1	7 10	ML		Dk Br cmf S, 1 \$, s(+) cmf G; strong odor	Rec=.2' Moist
	S-2	7 8 9 9	ML		Br f S, a \$; strong odor -2.3 Rd Br \$yC FILL-reworked glaciolacustrine silt & clay, and glacial till	Rec=.7' Moist
5	S-3	5 10 11 15	ML		Rd Br \$yC; .1' S seam @ 4.15'; (PP=2.25 t/ft^2) -4.7 -5.1 Rd Br \$ & C t, f G (PP=4.25 t/ft^2) -5.5 Lt Br f S, a \$	Rec=1.5' WET
	S-4	15 23 23 25	ML		Br C & \$ a, f S, s mf G -6.5 Br f S, a \$, t(+) f G	Rec=2.0' WET
	S-5	7 7 7 23	ML		Rd Br \$yC; cmf S, a f G pkts -.3 Br f S, a \$, 1 mf G - - - - - - - - - - - - - - Glacial Till in nose of spoon	Rec=1.1' WET
10						

Dunn Geoscience Corp.
Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. DGC-9B

SHEET 2 OF 2

JOB No. 2092-5-321

ROJECT GE Auburn - Phase 3

CLIENT General Electric Company

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
					Br f S, s $, s mf G 10.2'	
	S-6	23 60 100/.0'	GC		Gr Br $ a(+), f S, s(+) mf G; very dense, odor Gray Brown SILT and(+), fine Sand, some coarse to fine Gravel; Sand increasing with depth (GLACIAL TILL)	Rec=1.2' Moist 11.5 to 12.2' drilled through cobbles (?)
	S-7	27 40 55 64	GC		Br $ a(+), f S, s(+) cmf G; sand increasing with depth, very dense, odor, gravel is made up of a variety of rock types	Rec=1.4' Moist
15	S-8	16 100/.4'	GC		Gr Br mf S, 1 $, s cmf G; odor	Rec=1.1' Moist
	S-9	33 75/.15'	GC		Gr Br mf S, 1 $, 1 mf G; odor stronger than other samples in the till	Rec=.4' WET
					Rock @ 17.5'	spin casing and roller bit to 18'

Well Construction Details

T.D.	30.2'
0.010 inch slot PVC screen	30-20'
Sand pack (00 Morie)	30-18.5'
Bentonite pellets	18.5-17.0'
Cement/bentonite grout	17' to surface
6" locking protective steel casing	

Dunn Geoscience Corporation
Core Log

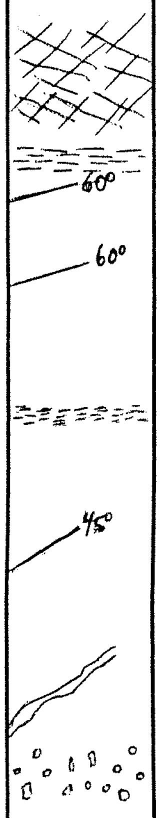
Client General Electric Company
Project GE Auburn
2092-5-321
Location Auburn, NY

Logged by DHH
Date Logged 12/14 /87
Drilling Co. Parratt-Wolff, Inc.
Driller Mike Ellingworth
Started 11/3/87
Finished 11/3/87

Hole DGC-9B
Depth 30.0'
Elev. 636.92 grd
Core Dia. HX

FORMATION: Onondaga
Member: Probable Nedrow
Zone/Unit:

Graphic Log 1" = 2.5'



Depth: 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29

Descriptive Log

ROCK TYPE: color; grain size; texture; bedding; minerals; remarks, etc.

Top of Rock = 17.5', Top of Core = 18.0'

18.0 - 30.0'	LIMESTONE, medium dark to dark gray (N4-N3), finely crystalline majority of rock is nonfossiliferous; occasional healed fractures; argillaceous; upper 2' highly jointed; scattered pyrite.
18.0-19.6'	Broken rock along joints, joint sets at 30° and 60° to core
19.9'	Argillaceous limestone, non-weathered.
19.9-20.0'	Clay filled seam, 1" thick; questionable origin
20.2'	Joint, 60° to core
20.8'	Broken core, artificial due to "spin off".
21.8'	Joint, 60° to core
22.9-23.2'	Shaly partings, argillaceous limestone, non-weathered.
24.7'	Joint, 45° to core
25.4'	Broken rock, artificial due to "spin off".
26-27.2'	Healed fracture
27.5-27.9'	Wormborrows?
28.8'	Fractured rock, 10° to core
29.0-30.0'	Jointed rock, 30° and 60° to core, argillaceous seams.

Angle of Bedding to Core

% Core Recovery

Run
18'-
21.8
2.7/
3.8
20%RQ

Run 2
21.8-
26'
4.1/4
84% R

4/4'

Hole No. DGC-9
Sheet 1 of 1

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-10B

PROJECT GE Auburn - Phase 3	SHEET 1 OF 2
CLIENT General Electric Company	JOB No. 2092-5-321
DRILLING CONTRACTOR Parratt Wolff, Inc.	MEAS. PT. ELEV. 637.80'
PURPOSE Monitoring Well Installation/Subsurface Investigation	GROUND ELEV. 635.1'

		SAMPLE	CORE	CASING	
DRILLING METHOD H.S.A.					DATUM M.S.L.
DRILL RIG TYPE Mobile Drill B-53	TYPE	SS	HX	flush joint	DATE STARTED 11/4/87
GROUNDWATER DEPTH 6.34'	DIA.	2" OD	3" ID	4¼" ID	DATE FINISHED 11/5/87
MEASURING POINT PVC	WEIGHT	140#			DRILLER Paul LeClair
DATE OF MEASUREMENT 11/6/87	FALL	30"			INSPECTOR Rodney Sutch

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-1	2	ML		Br $ t, f S; rts; lower .3' or, lt gr & bk mtld	Rec=0.9' Dry
		6				
		10				
		8				
	S-2	3	ML		Br Cy$; mtld or and bk pkts Brown CLAYEY SILT; mottled orange, light gray and black (GLACIOLACUSTRINE)	Rec=0.7' Dry
		4				
		4				
		9				
	S-3	8	ML		Br Cy$, or $ pkt (PP=.5 t/ft^2) 4.35 Gr Br Cy$ 1(+), cmf G (PP=2.0 t/ft^2)	Rec=1.0' Moist
5		16	GC			
		18				
		23				
	S-4	8	GC		Br $ s, f S, 1(+) cmf G; rd SS c G @ 6.8' Brown CLAYEY SILT and, fine Sand, and coarse to fine Gravel (GLACIAL TILL)	Rec=1.0' WET
		20				
		31				
		42				
	S-5	13	GC		Br Cy$ a, f S, a cmf G; becomes very dense @ 8.3', LS cobble in nose of spoon	Rec=0.9' Moist
		44				
		100/.4				
10						

Dunn Geoscience Corp. Albany, NY 12205 (518)458-1313	TEST BORING LOG	BORING No. DGC-10B
PROJECT GE Auburn - Phase 3		SHEET 2 OF 2
CLIENT General Electric Company		JOB No. 2092-5-321

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
10		10/.0'				spoon bouncing; auger refusal @ 10.5' spin casing and roller bit to 12.0'
					Rock at 11.0'	

Well Construction Details

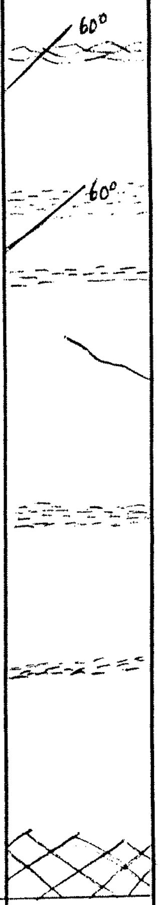
T.D.	23.2'
0.010 inch PVC screen	23.0-13.0'
00 Morie sandpack	23.0-11.5'
Bentonite Pellets	11.5-10.0'
Cement/bentonite grout	10' - surface
6" locking protective steel casing	

Dunn Geoscience Corporation
Core Log

Client General Electric Company
Project GE Auburn
2092-5-321
Location Auburn, NY

Logged by DHH Date Logged 12/14/87
Drilling Co. Parratt-Wolff, Inc.
Driller Paul LeCalir
Started 11/4/87 Finished 11/4/87

Hole DGC-10B
Depth 23.0'
Elev. 635.1 grd
Core Dia. NX

FORMATION	Member	Zone/Unit	Graphic Log 1" = 2.5'	Depth	Descriptive Log ROCK TYPE: color; grain size; texture; bedding; minerals; remarks, etc.	Angle of Bedding to Core	% Core Recovery
Onondaga	Probable Nedrow				Top of Rock = 10.5' Top of Core = 12.0'		
				12	12.0 - 23.0' LIMESTONE, medium dark to dark gray (N4-N3), finely crystalline, argillaceous. Occasional joints, fractures, shale partings. Scattered pyrite.	90%	Run 1 12-15 ±90% RQD=6
					12.6' Anastomosing shale partings		
					12.7' Broken rock, jointed, 60° to core; highly argillaceous limestone.		
					14.3 - 14.7' Shale partings	90%	Run 2 15-17 ±95% RQD=8
				15	14.8' Joint 60° to core		
					15.3' Shale parting		Run 3 17-20 ±95% RQD=8
					15.9 - 16.5' healed fracture	90%	
					16.7' Pyrite nodule		
					18.4 - 18.5' Shale seam of unknown origin.	90%	Run 4 20-22 ±95% RQD=8
					20.6' Argillaceous partings		
				20	22.0 - 23.0' Jointed, 10-30° to core	90%	Run 5 22-23 ±95% RQD=1
			TD=23'				

Hole No. DGC-1
Sheet 1 of 1

Dunn Geoscience Corp.
Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. Boring 11S

PROJECT GE Auburn - Phase 3
CLIENT General Electric Company
DRILLING CONTRACTOR Parratt Wolff, Inc.
PURPOSE Monitoring Well Installation/Subsurface Investigation
DRILLING METHOD H.S.A.
DRILL RIG TYPE Mobile Drill B-53
GROUNDWATER DEPTH ---
MEASURING POINT ---
DATE OF MEASUREMENT ---

	SAMPLE	CORE	CASING
TYPE	SS		
DIA.	2" OD		
WEIGHT	140#		
FALL	30"		

SHEET 1 OF 1
JOB No. 2092-5-321
MEAS. PT. ELEV. ---
GROUND ELEV. ~638'
DATUM M.S.L.
DATE STARTED 11/6/87
DATE FINISHED 11/6/87
DRILLER Paul LeClair
INSPECTOR Rodney Sutch

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
		3			Dk Br $ & C; rts, topsoil	Rec=1.0' Moist
	S-1	5			.8' Or Br $	
		10			(FILL?)	
		10				
		10			Br $ 2.1' Rd Br $yC (PP=3.75 t/ft^2) 2.5'- - - - - - - - - - - - - - - - - - - -	Rec=0.65' Moist
	S-2	8			Br Cy$ s, mf G	
		15			Light Brown to Red Brown SILT and CLAY some, fine Sand, little medium to fine Gravel	
		15			(GLACIAL TILL)	
	S-3A	12			Rd Br C & $ l(+), cmf G	Rec=1.4' Moist
5		16			4.9'	
	S-3B	23			Lt Br $ s(+), f S, l mf G	
		78				Auger Refusal @ 6'
		100/.0'				
					NO WELL INSTALLED AT THIS LOCATION	
10						

Dunn Geoscience Corp.
Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. DGC-11S

SHEET 1 OF 1	
JOB No.	2092-5-321
MEAS. PT. ELEV.	639.88'
GROUND ELEV.	637.2'
DATUM	M.S.L.
DATE STARTED	11/6/87
DATE FINISHED	11/6/87
DRILLER	Paul LeClair
INSPECTOR	Rodney Sutch

ROJECT GE Auburn - Phase 3
LIENT General Electric Company
RILLING CONTRACTOR Parratt Wolff, Inc.
URPOSE Monitoring Well Installation
RILLING METHOD H.S.A.
RILL RIG TYPE Mobile Drill B-53
ROUNDWATER DEPTH 9.15'
EASURING POINT PVC
ATE OF MEASUREMENT 11/6/87

	SAMPLE	CORE	CASING
TYPE	---		
DIA.	---		
WEIGHT	---		
FALL	---		

EPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSI-FICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION		REMARKS
					No Sampling Performed		Located approximately 12' NNE of Boring 11S
					T.D.	7.5'	
					Screen 10 slot PVC	7.5-2.5'	
					Sand 00 Morie	7.5-2.0'	
					Bentonite Pellets	2.0-1.5'	
					Locking protective steel casing		
					Concrete	1.5'-ground	
5							
10							

Dunn Geoscience Corp.
Albany, NY 12205 (518)458-1313

TEST BORING LOG

BORING No. PZ-1

SHEET 1 OF 1
JOB No. 2092-5-321
MEAS. PT. ELEV. 640.21'
GROUND ELEV. 637.1'
DATUM M.S.L.
DATE STARTED 11/6/87
DATE FINISHED 11/6/87
DRILLER Paul LeClair
INSPECTOR Rodney Sutch

PROJECT GE Auburn - Phase 3
CLIENT General Electric Company
DRILLING CONTRACTOR Parratt Wolff, Inc.
PURPOSE Piezometer Installation/Subsurface Investigation
DRILLING METHOD H.S.A.
DRILL RIG TYPE Mobile Drill B-53
GROUNDWATER DEPTH 7.21'
MEASURING POINT top of PVC
DATE OF MEASUREMENT 11/6/87

	SAMPLE	CORE	CASING
TYPE	S.S.		
DIA.	2" OD		
WEIGHT	140#		
FALL	30"		

DEPTH FT.	SAMPLE NUMBER	BLOWS ON SAMPLE SPOON PER 6"	UNIFIED CLASSIFICATION	GRAPHIC LOG	GEOLOGIC DESCRIPTION	REMARKS
	S-1	2 3 6 10	ML		Dk Br Cy$ t(-) f G; rts, topsoil -.8 Dk Br Cy$ t(-) f G; tn, or, bk mtld	Rec=1.2' Moist
	S-2	12 12 15 18	ML		Br Cy$ t, cmf S, t(-) f G; mtld yellow, or, bk (FILL)	Rec=0.6' Moist
5	S-3	6 14 38 17	ML		Br Cy$, t mf G; mtld tn, or, dk br, bk Cy$; rts	Rec=0.8' Moist
	S-4	12 22 50 58	ML		Lt Br $ s, f S, l(+) cmf G; pkts of gr f S, wd piece @ 6.2-6.4' 7.5' (GLACIAL TILL)	Rec=1.4' WET
	S-5	32 68 100/.0'	GC		Lt Br $ s(+), cmf S, l(+) mf G 9.0'	Rec=0.5' WET
10						auger refusal @ 9' alot of water noted compared to other borings
15						
20						

Piezometer Construction

Bentonite Pellets	9.0-7.5'
00 Morie Sand	7.5-1.0'
6-slot 1¼" screen	6.0-1.0'
Bentonite Pellets	1.0-0.5'
Soil Backfill	0.5-0.0'

Note: no protective steel casing installed

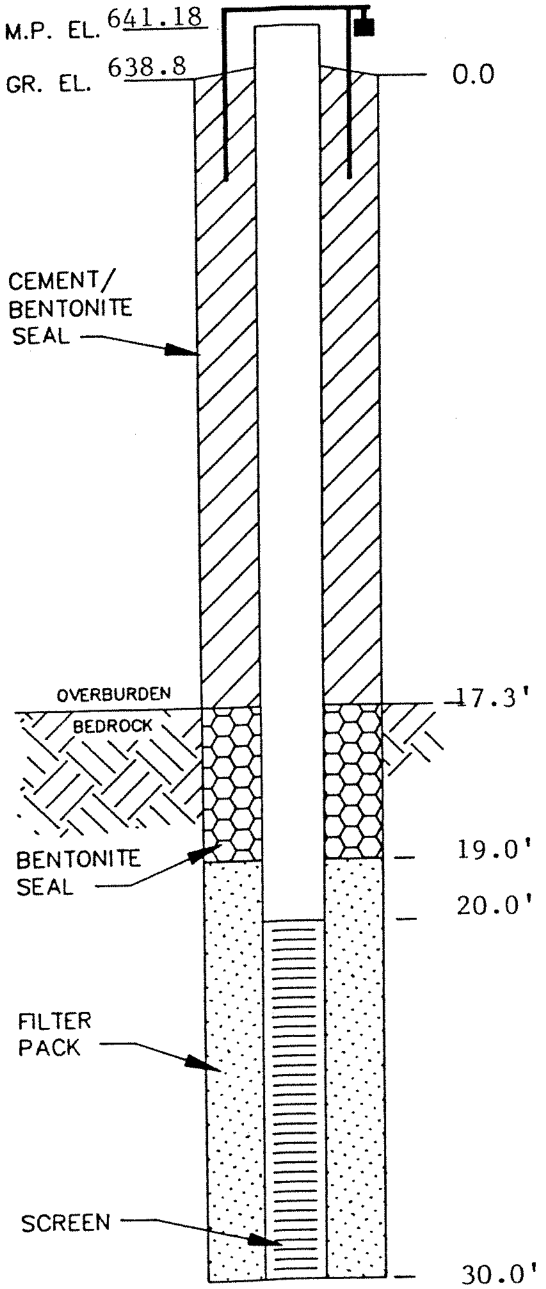
MONITORING WELL COMPLETION LOG

WELL NO. DGC-6B

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313

Project GE Auburn - Phase 3
Client General Electric
Location Auburn, New York
Project No. 2092-5-321
Date Drilled 10/27/87
Date Developed 11/4/87

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Rodney Sutch
Drilling Contractor Parratt Wolff, Inc.

Type of Well Monitoring
Static Water Level 9.65' Date 11/5/87
Measuring Point (M.P.) Top of PVC
Total Depth of Well 30'

Drilling Method
Type Hollow Stem Auger Diameter nominal 4" ID
Casing 4¼" ID

Sampling Method
Type Split Spoon Diameter 2" OD
Weight 140 lbs Fall 30"
Interval 0.0-17.3'

Riser Pipe Left in Place
Material PVC Diameter 2"
Length 22.4' Joint Type Flush

Screen
Material PVC Diameter 2"
Slot Size 0.010" Length 10'
Stratigraphic Unit Screened Limestone

Filter Pack
Sand X Gravel ___ Natural ___
Grade 00 Morie
Amount --- Interval 19.0-30.0'

Seal(s)
Type Cement/Bentonite Grout Interval 0.0-17.3'
Type Bentonite Pellets Interval 17.3-19.0'
Type ___ Interval ___

Locking Casing ☒ Yes ☐ No

Notes: NX core barrel used to produce the rock hole, rock core logged and retained Stainless steel centralizer installed at screen center.

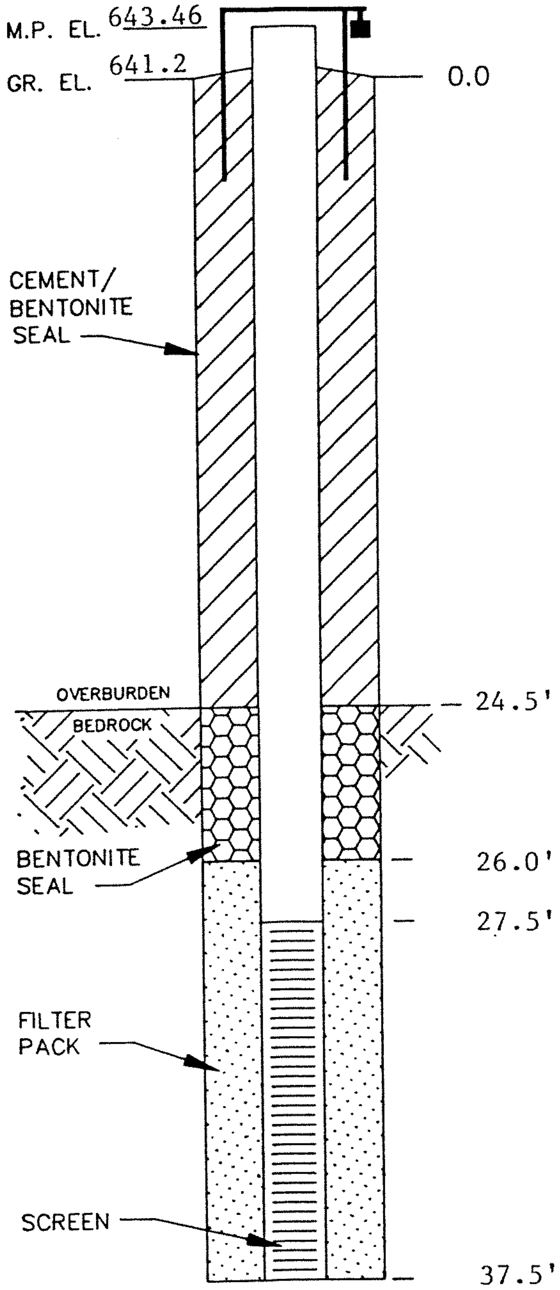
MONITORING WELL COMPLETION LOG

WELL NO. DGC-7B

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313
DUNN GEOSCIENCE CORP

Project GE Auburn - Phase 3
Client General Electric
Location Auburn, New York
Project No. 2092-5-321
Date Drilled 10/28-29/87
Date Developed 11/4/87

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Rodney Sutch
Drilling Contractor Parratt Wolff, Inc.

Type of Well Monitoring
Static Water Level 12.33' Date 11/5/87
Measuring Point (M.P.) Top of PVC
Total Depth of Well 37.5'

Drilling Method
Type Hollow Stem Auger Diameter nominal 4" ID
Casing 4¼" ID

Sampling Method
Type Split Spoon Diameter 2" OD
Weight 140 lbs Fall 30"
Interval 0.0-24.5'

Riser Pipe Left in Place
Material PVC Diameter 2"
Length 30' Joint Type flush

Screen
Material PVC Diameter 2"
Slot Size 0.010" Length 10'
Stratigraphic Unit Screened Limestone

Filter Pack
Sand X Gravel ______ Natural ______
Grade 00 Morie
Amount --- Interval 26.0-37.5'

Seal(s)
Type Cement/Bentonite Grout Interval 0.0-24.5'
Type Bentonite Pellets Interval 24.5-26.0'
Type ______ Interval ______

Locking Casing ☒ Yes ☐ No

Notes: NX core barrel used to produce the rock hole, rock core logged and retained Stainless steel centralizer installed at screen center.

FORM026-1/88

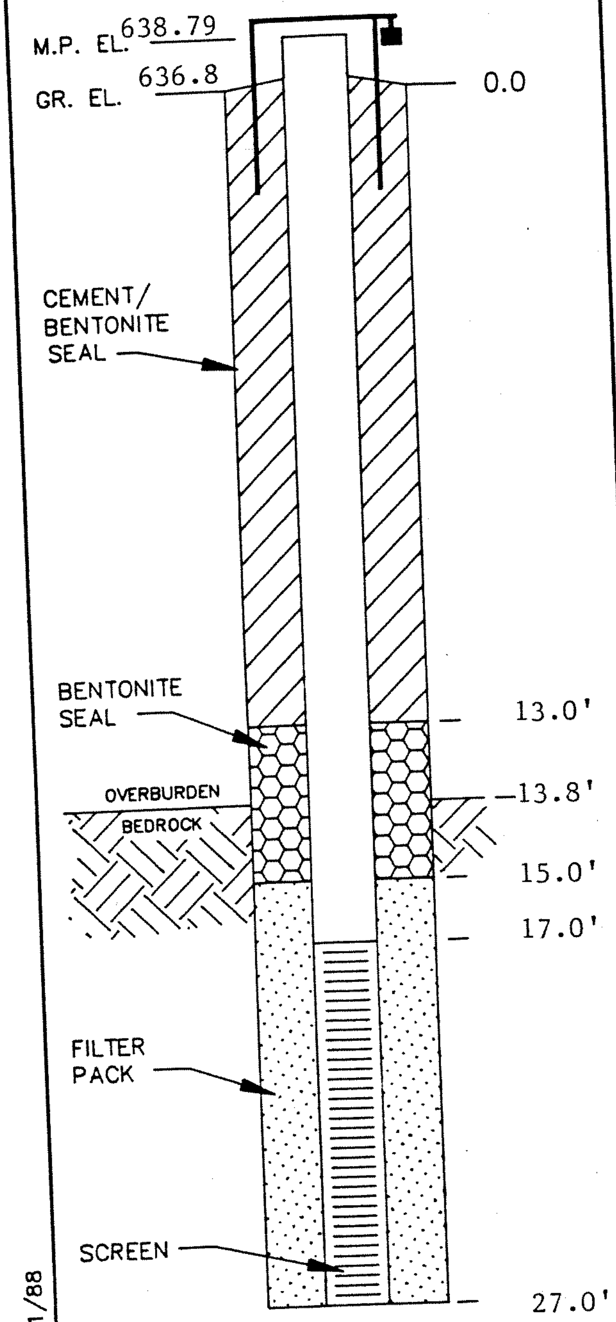
MONITORING WELL COMPLETION LOG

WELL NO. DGC-8B

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313

Project GE Auburn - Phase 3
Client General Electric
Location Auburn, New York
Project No. 2092-5-321
Date Drilled 11/2/87
Date Developed 11/3/87

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Rodney Sutch
Drilling Contractor Parratt Wolff, Inc.

Type of Well Monitoring
Static Water Level 6.89' Date 11/5/87
Measuring Point (M.P.) Top of PVC
Total Depth of Well 27.0'

Drilling Method
Type Hollow Stem Auger Diameter nominal 4" ID
Casing 4¼" ID

Sampling Method
Type Split Spoon Diameter 2" OD
Weight 140 lbs Fall 30"
Interval 0.0-13.0'

Riser Pipe Left in Place
Material PVC Diameter 2"
Length 19.0' Joint Type flush

Screen
Material PVC Diameter 2"
Slot Size 0.010" Length 10'
Stratigraphic Unit Screened Limestone

Filter Pack
Sand X Gravel ___ Natural ___
Grade 00 Morie
Amount --- Interval 15.0-27.0'

Seal(s)
Type Cement/Bentonite Grout Interval 0.0-13.0'
Type Bentonite Pellets Interval 13.0-15.0'
Type ___ Interval ___

Locking Casing ☒ Yes ☐ No

Notes: NX core barrel used to produce the rock core, rock core logged and retained Stainless steel centralizer installed at screen center.

FORM025-1/88

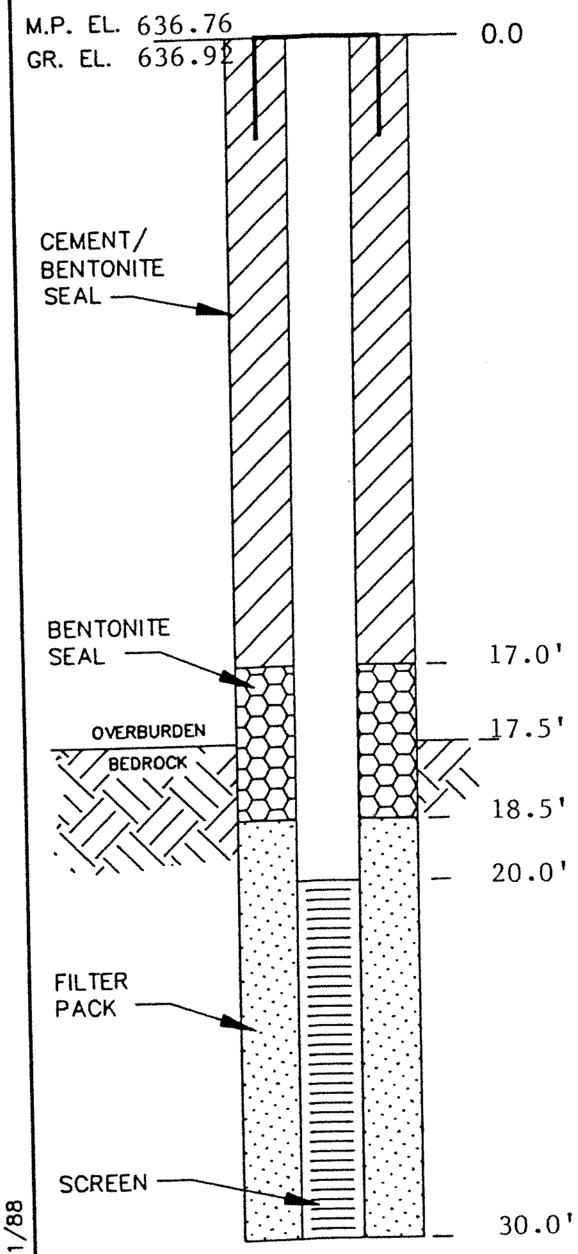
MONITORING WELL COMPLETION LOG

WELL NO. DGC-9B

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313

Project GE Auburn - Phase 3
Client General Electric
Location Auburn, New York
Project No. 2092-5-321
Date Drilled 11/3/87
Date Developed 11/4/87

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Rodney Sutch
Drilling Contractor Parratt Wolff, Inc.

Type of Well Monitoring
Static Water Level 5.54' Date 11/5/87
Measuring Point (M.P.) Brass adaptor on top of PVC
Total Depth of Well 30'

Drilling Method
Type Hollow Stem Auger Diameter nominal 4" ID
Casing 4¼" ID

Sampling Method
Type Split Spoon Diameter 2" OD
Weight 140 lbs Fall 30"
Interval 0.0-18.0'

Riser Pipe Left in Place
Material PVC Diameter 2"
Length 19.8' Joint Type Flush

Screen
Material PVC Diameter 2"
Slot Size 0.010" Length 10'
Stratigraphic Unit Screened Limestone

Filter Pack
Sand X Gravel ___ Natural ___
Grade 00 Morie
Amount --- Interval 18.5-30.0'

Seal(s)
Type Cement/Bentonite Grout Interval 0.4-17.0'
Type Bentonite Pellets Interval 17.0-18.5'
Type ___ Interval ___

Locking Casing ☒ Yes ☐ No

Notes:
1. Protective casing is flush with ground
2. NX core barrel used to produce the rock hole, rock core logged and retained
3. Stainless steel centralizer installed at screen center.

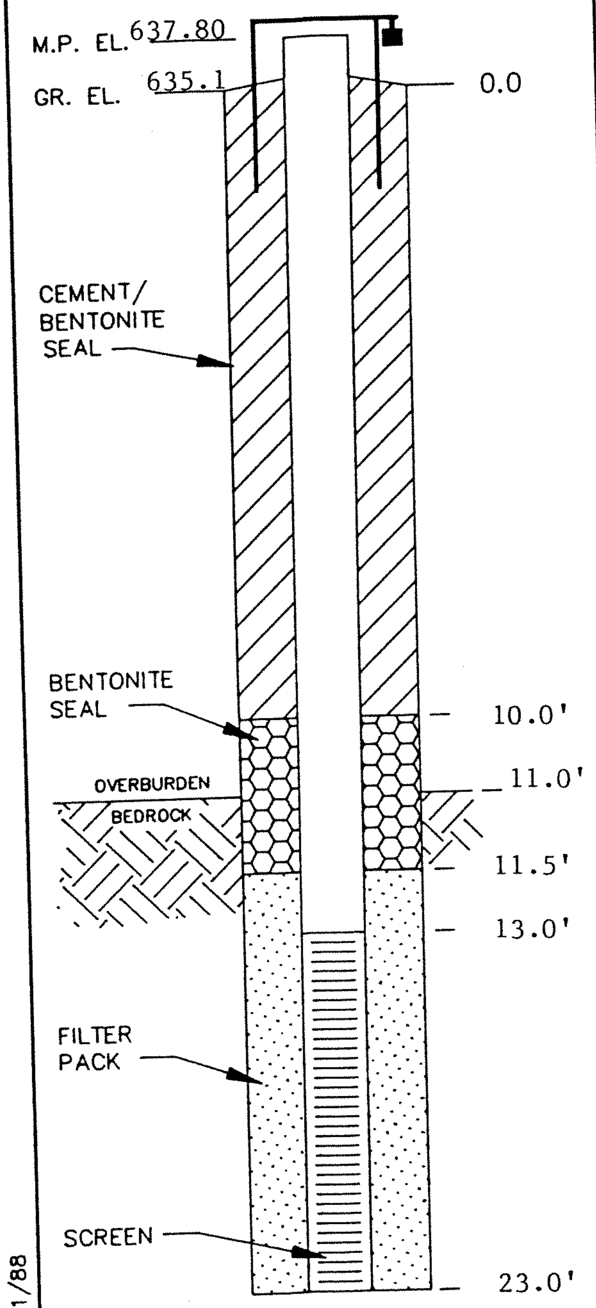
MONITORING WELL COMPLETION LOG

WELL NO. DGC-10B

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313

Project GE Auburn - Phase 3
Client General Electric
Location Auburn, New York
Project No. 2092-5-321
Date Drilled 11/4-5/87
Date Developed 11/5/87

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Rodney Sutch
Drilling Contractor Parratt Wolff, Inc.

Type of Well Monitoring
Static Water Level 6.34' Date 11/6/87
Measuring Point (M.P.) Top of PVC
Total Depth of Well 23.2'

Drilling Method
Type Hollow Stem Auger Diameter nominal 4" ID
Casing 4¼" ID

Sampling Method
Type Split Spoon Diameter 2" OD
Weight 140 lbs Fall 30"
Interval 0.0-10.0'

Riser Pipe Left in Place
Material PVC Diameter 2"
Length 15.7' Joint Type Flush

Screen
Material PVC Diameter 2"
Slot Size 0.010" Length 10'
Stratigraphic Unit Screened Limestone

Filter Pack
Sand X Gravel Natural
Grade 00 Morie
Amount --- Interval 11.5-23.0'

Seal(s)
Type Cement/Bentonite Grout Interval 0.0-10.0'
Type Bentonite Pellets Interval 10.0-11.5'
Type Interval

Locking Casing ☒ Yes ☐ No

Notes: NX core barrel used to produce the rock core, rock core logged and retained Stainless steel centralizer installed at screen center.

FORM025-1/88

MONITORING WELL COMPLETION LOG

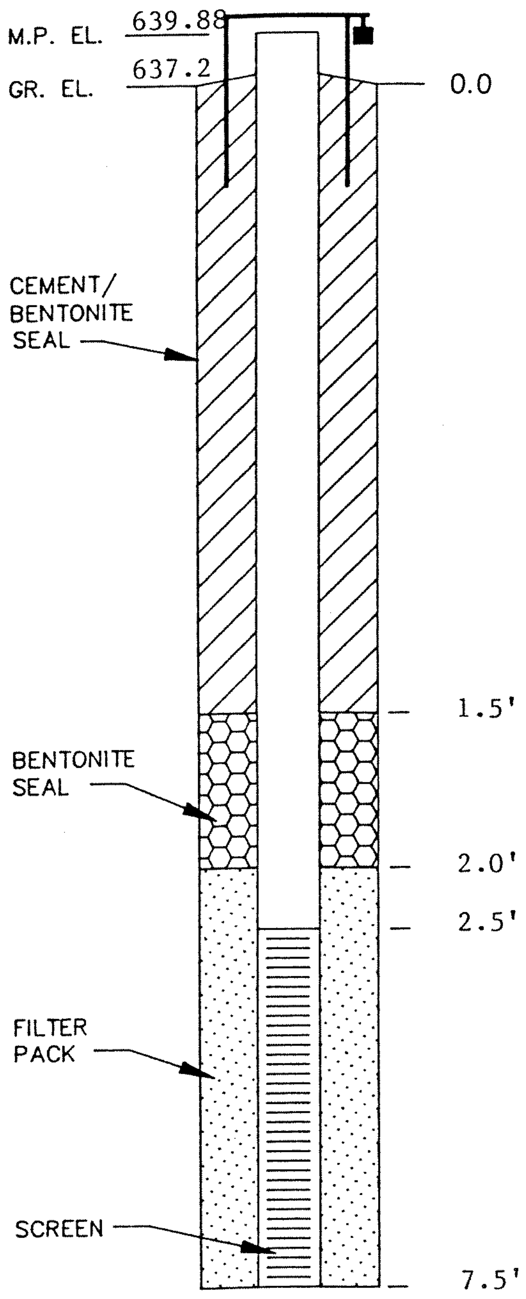
WELL NO. DGC-11S

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313

DUNN GEOSCIENCE CORP

Project GE Auburn - Phase 3
Client General Electric
Location Auburn, New York
Project No. 2092-5-321
Date Drilled 11/6/87
Date Developed 11/6/87

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Rodney Sutch
Drilling Contractor Parratt Wolff, Inc.

Type of Well Monitoring
Static Water Level 9.15' Date 11/6/87
Measuring Point (M.P.) Top of PVC
Total Depth of Well 7.5'

Drilling Method
Type Hollow Stem Auger Diameter nominal 4" ID
Casing ---

Sampling Method
Type None Diameter ---
Weight --- Fall ---
Interval ---

Riser Pipe Left in Place
Material PVC Diameter 2"
Length 5.2' Joint Type Flush

Screen
Material PVC Diameter 2"
Slot Size 0.010" Length 5'
Stratigraphic Unit Screened Silty Clay & Till

Filter Pack
Sand X Gravel ____ Natural ____
Grade 00 Morie
Amount --- Interval 2.0-7.5'

Seal(s)
Type Concrete Interval 0.0-1.5'
Type Bentonite Pellets Interval 1.5-2.0'
Type ____ Interval ____

Locking Casing ☒ Yes ☐ No
Notes:

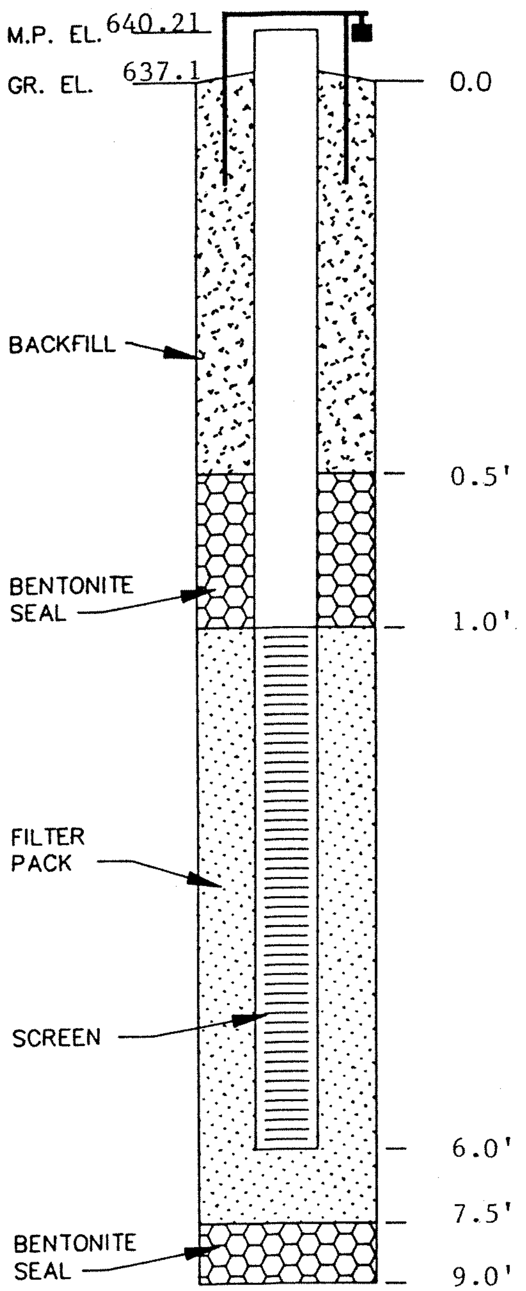
MONITORING WELL COMPLETION LOG

WELL NO. PZ-1

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205
(518)458-1313

Project GE Auburn - Phase 3
Client General Electric
Location Auburn, New York
Project No. 2092-5-321
Date Drilled 11/6/87
Date Developed 11/6/87

WELL CONSTRUCTION DETAIL



NOT TO SCALE

Inspector Rodney Sutch
Drilling Contractor Parratt Wolff, Inc.

Type of Well Piezometer
Static Water Level 7.21' Date 11/6/87
Measuring Point (M.P.) Top of PVC
Total Depth of Well 6.0'
Total Depth of Boring 9.0'

Drilling Method
Type Hollow Stem Auger Diameter nominal 4" ID
Casing ---

Sampling Method
Type Split Spoon Diameter 2" OD
Weight 140 lbs Fall 30"
Interval 0.0-9.0'

Riser Pipe Left in Place
Material PVC Diameter 1¼"
Length 4.1' Joint Type flush

Screen
Material PVC Diameter 1¼"
Slot Size 0.006" Length 5.0'
Stratigraphic Unit Screened Clayey Silt - FILL

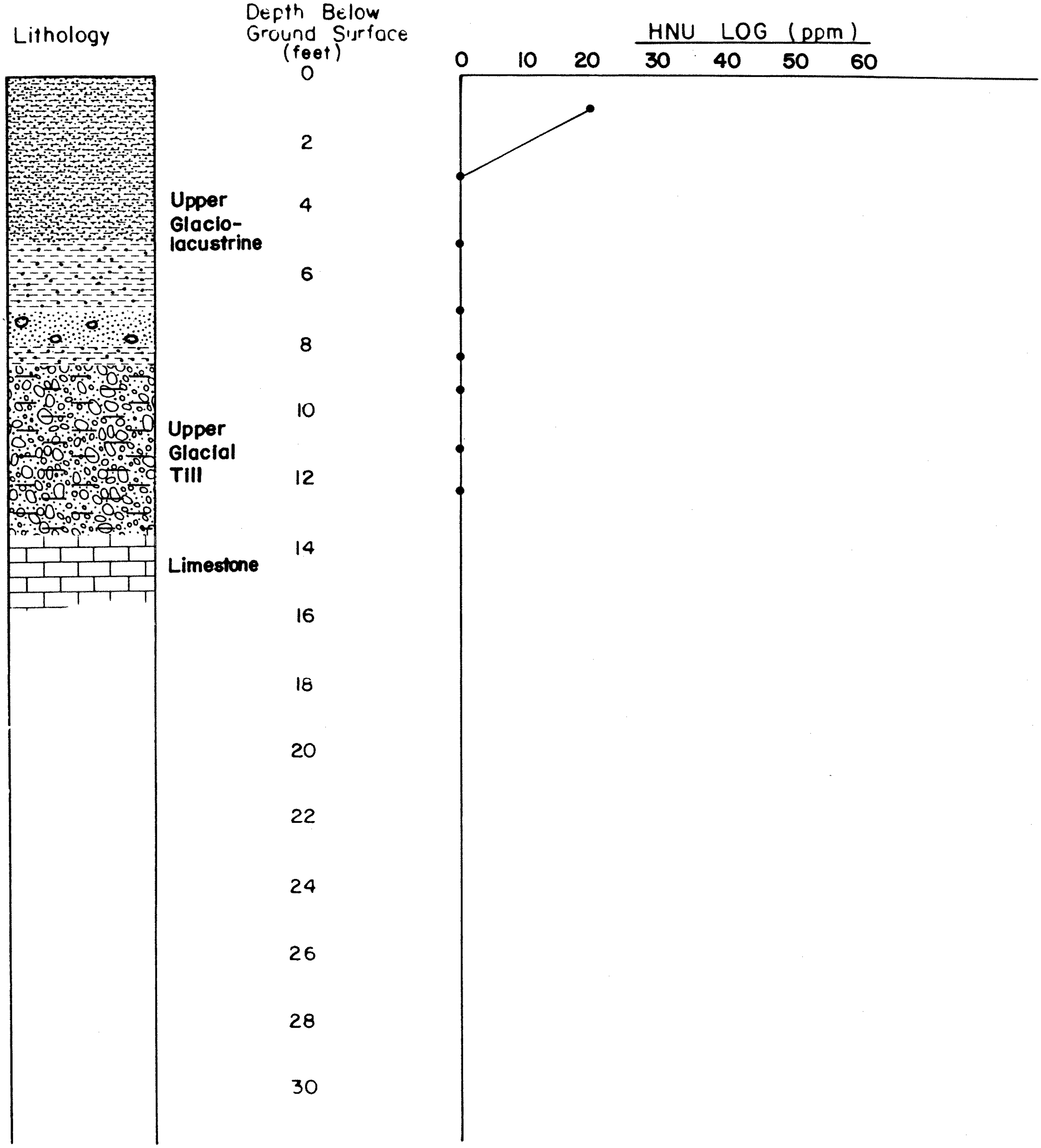
Filter Pack
Sand X Gravel ______ Natural ______
Grade 00 Morie
Amount --- Interval 1.0-7.5'

Seal(s)
Type Bentonite Pellets Interval 0.5-1.0'
Type Bentonite Pellets Interval 7.5-9.0'
Type ______ Interval ______

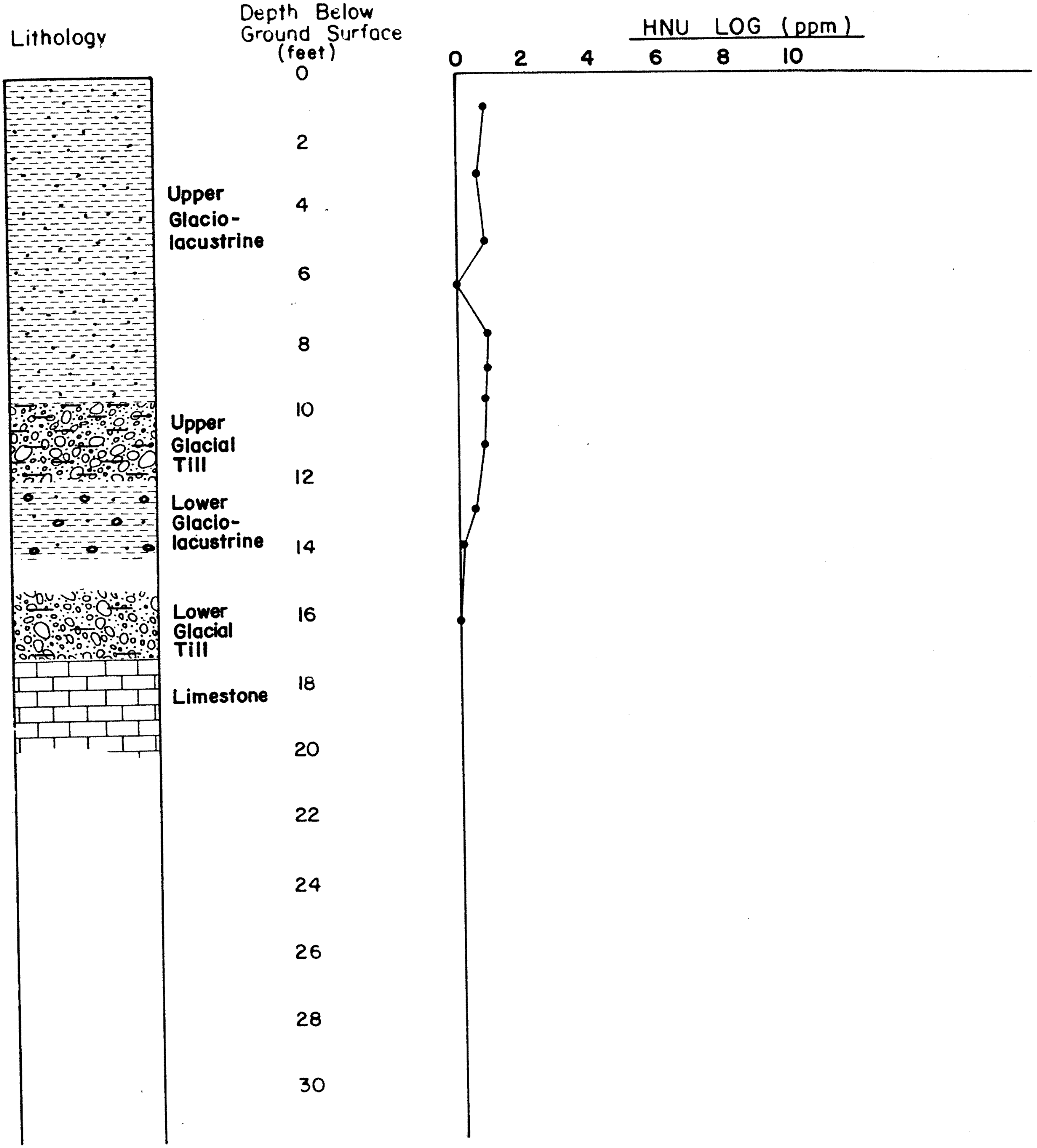
Locking Casing ☐ Yes ☒ No
Notes:

APPENDIX C

PHASE III
HNU SOIL SCREENING RESULTS
Boring Location: DGC-2B
Powerex Facility - Auburn, N.Y.



PHASE III
HNU SOIL SCREENING RESULTS
Boring Location: DGC- 6B
Powerex Facility - Auburn, N.Y.

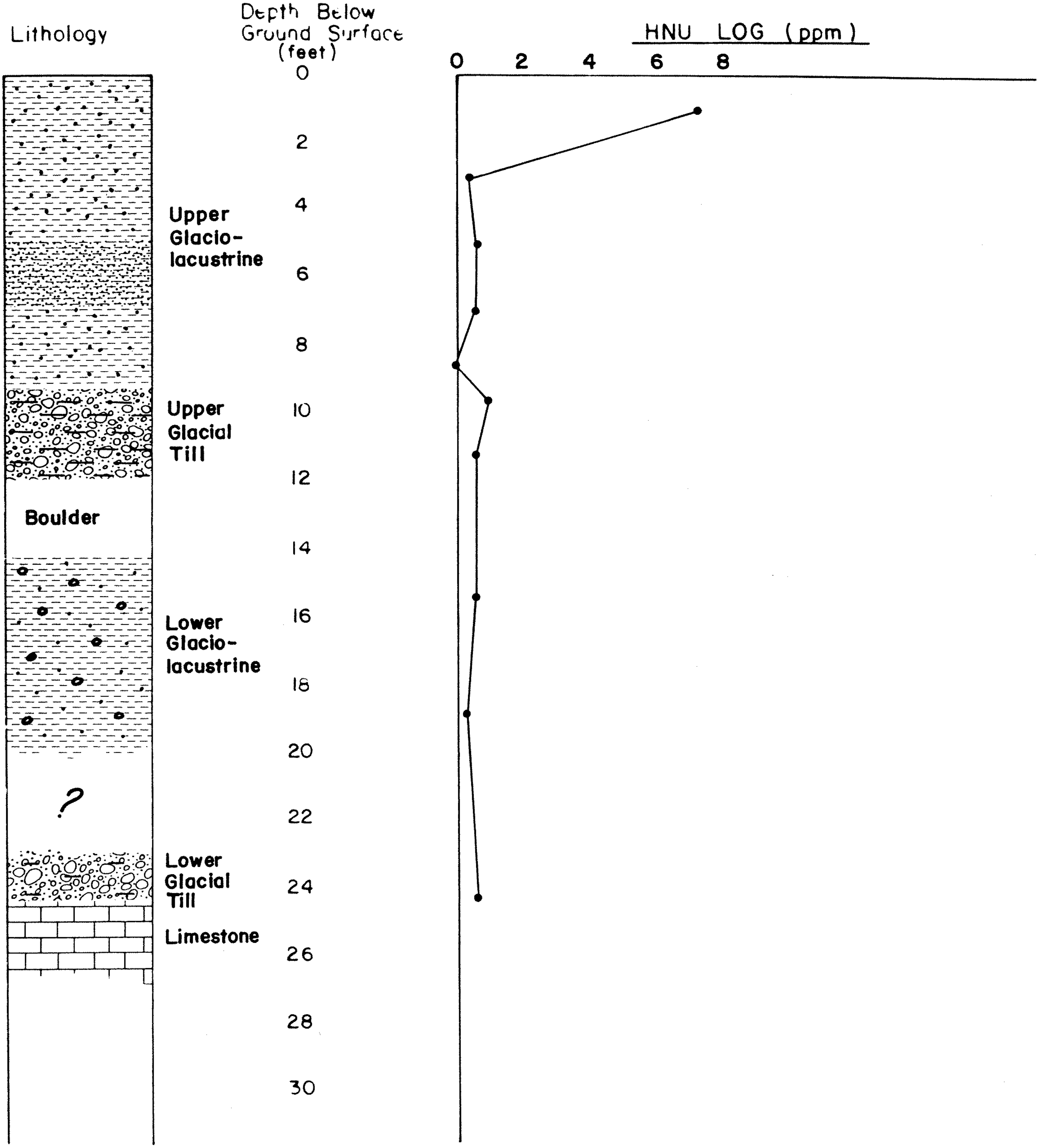


PHASE III

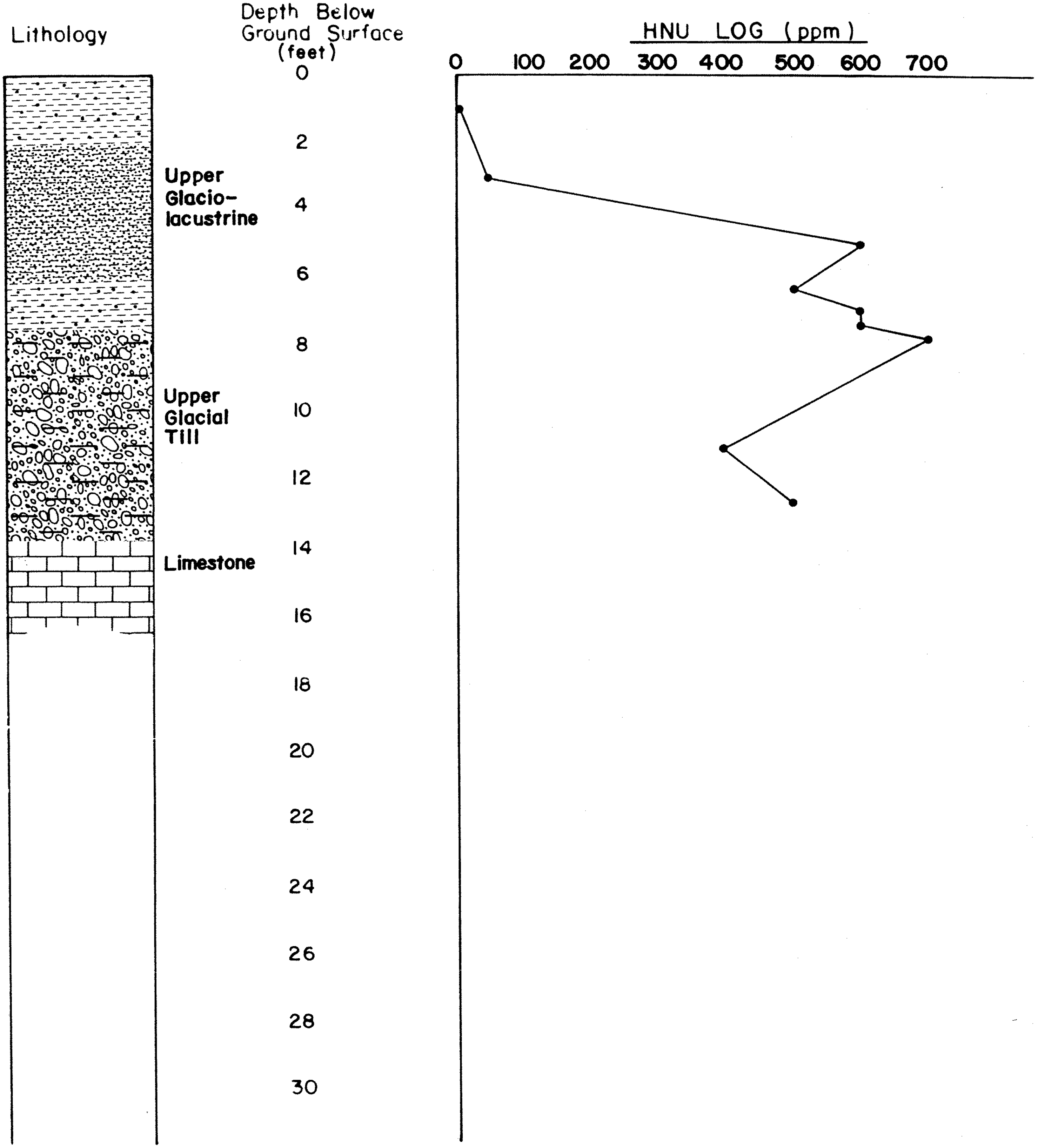
HNU SOIL SCREENING RESULTS

Boring Location: DGC-7B

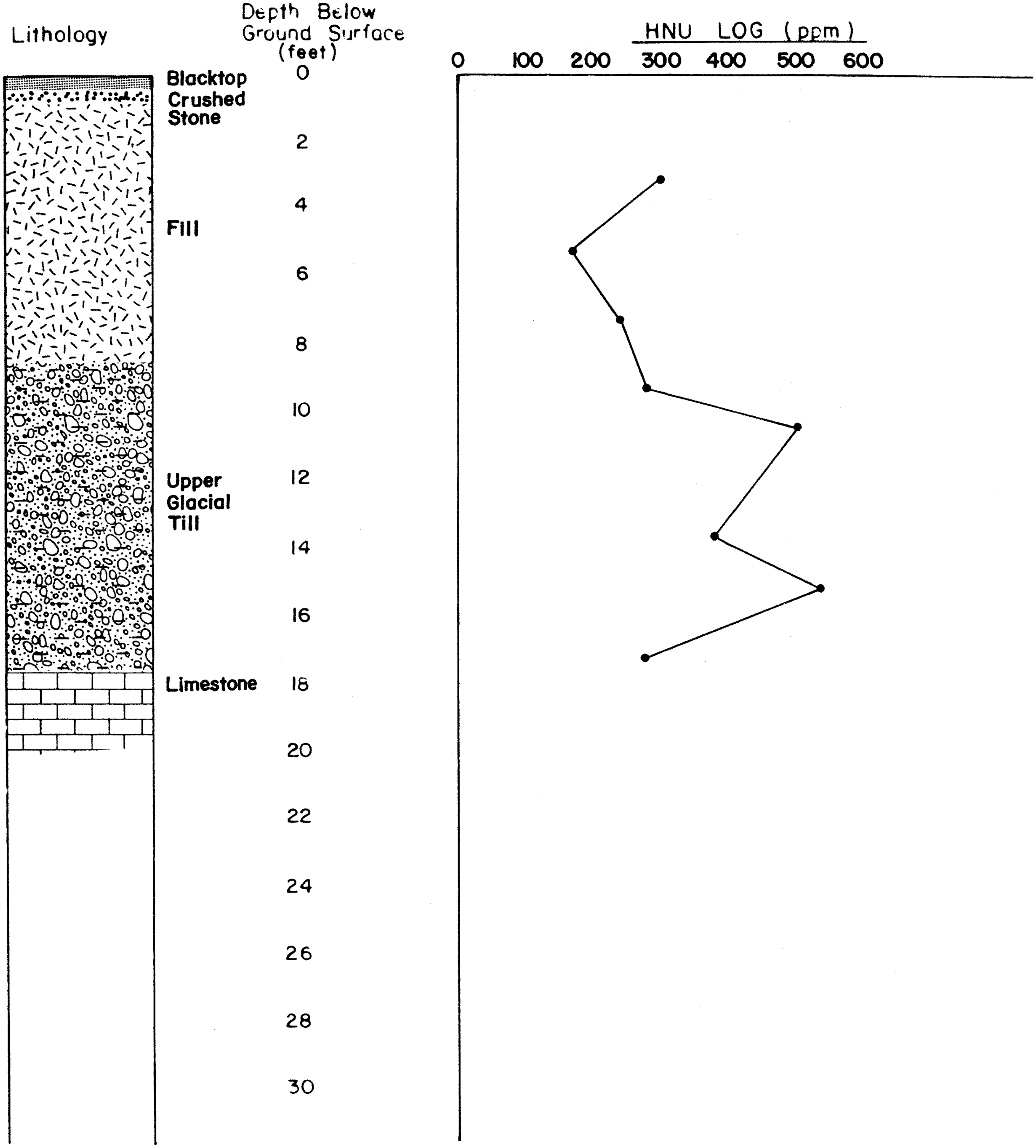
Powerex Facility - Auburn, N.Y.



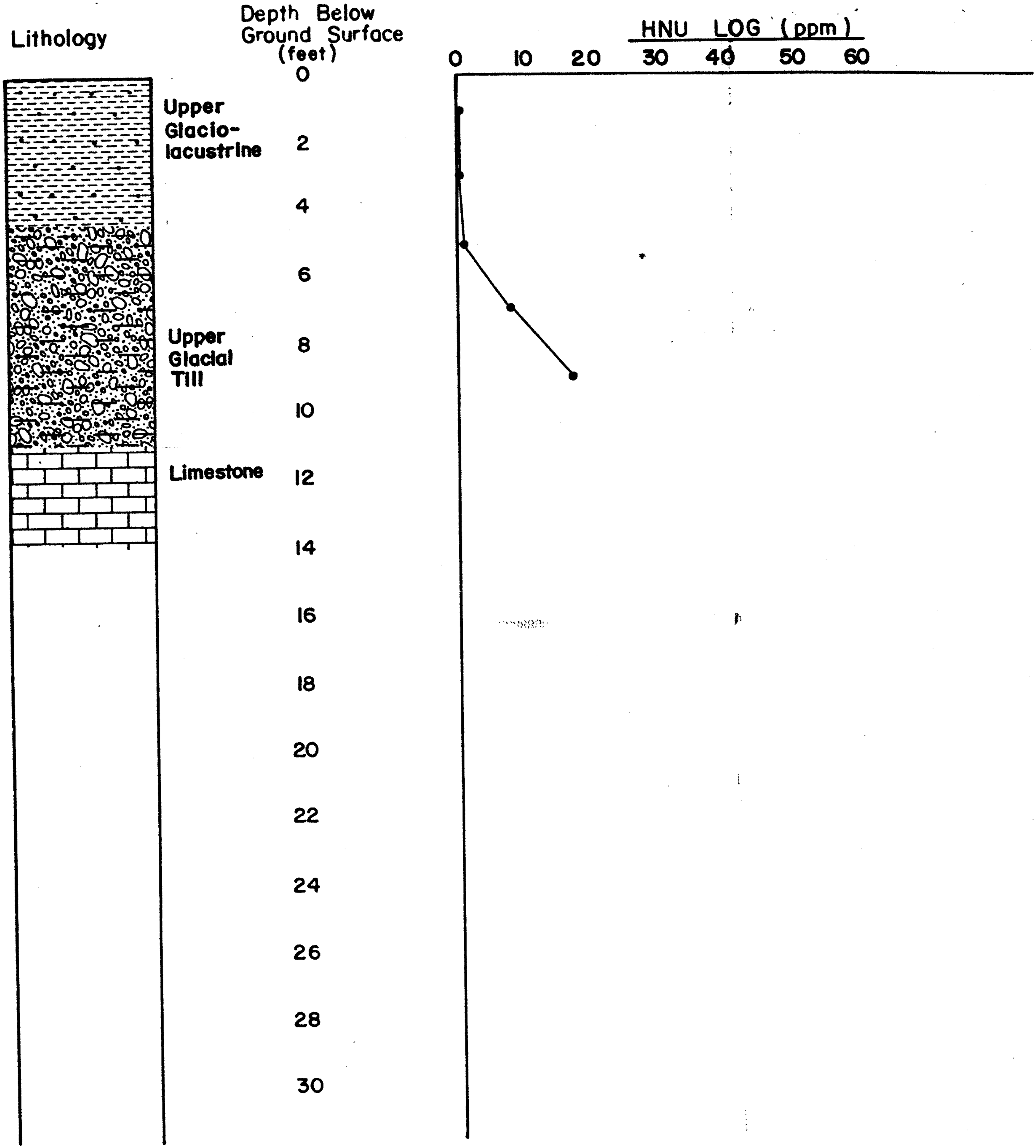
PHASE III
HNU SOIL SCREENING RESULTS
Boring Location: DGC-8B
Powerex Facility - Auburn, N.Y.



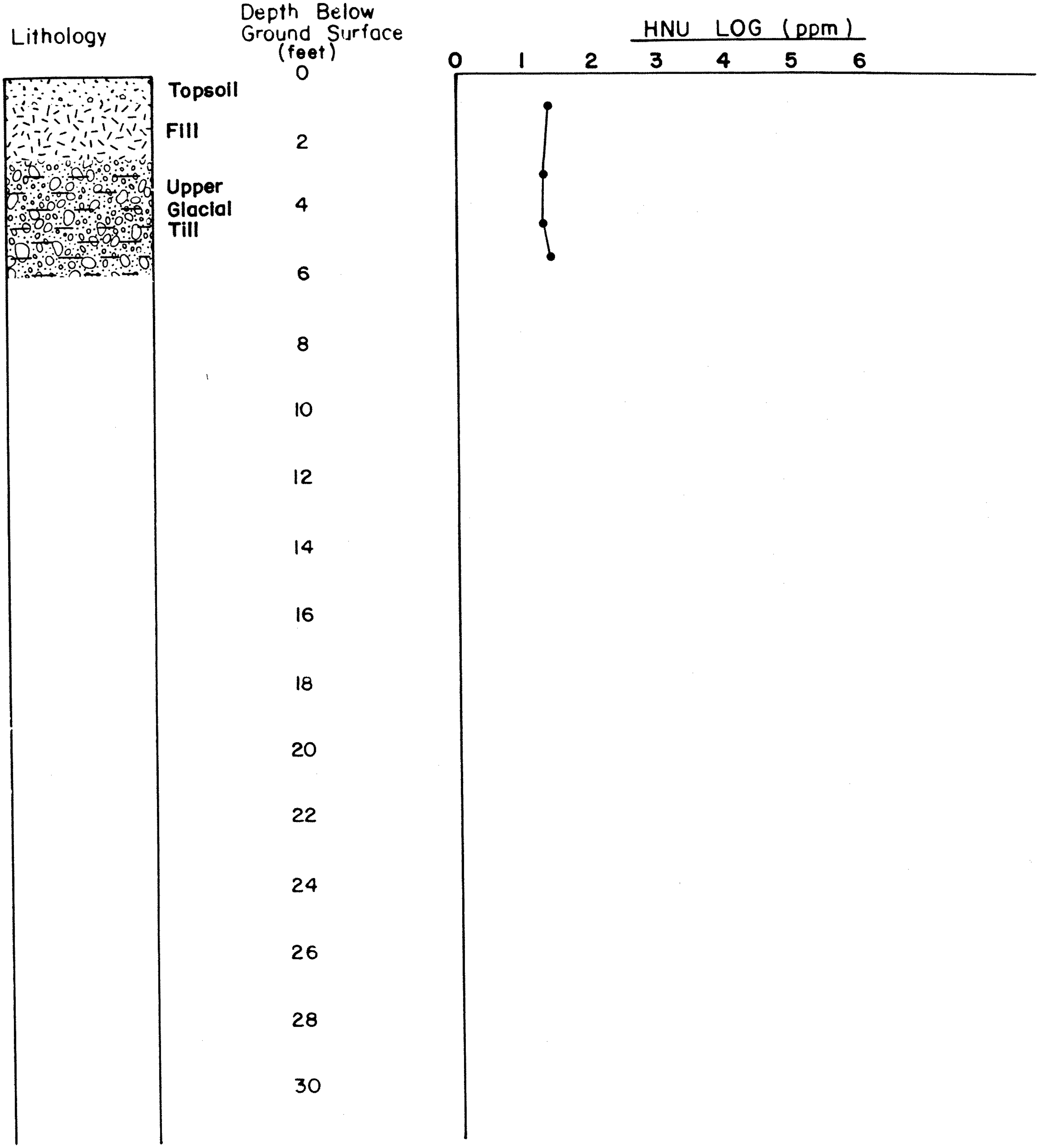
PHASE III
HNU SOIL SCREENING RESULTS
Boring Location: DGC-9B
Powerex Facility - Auburn, N.Y.



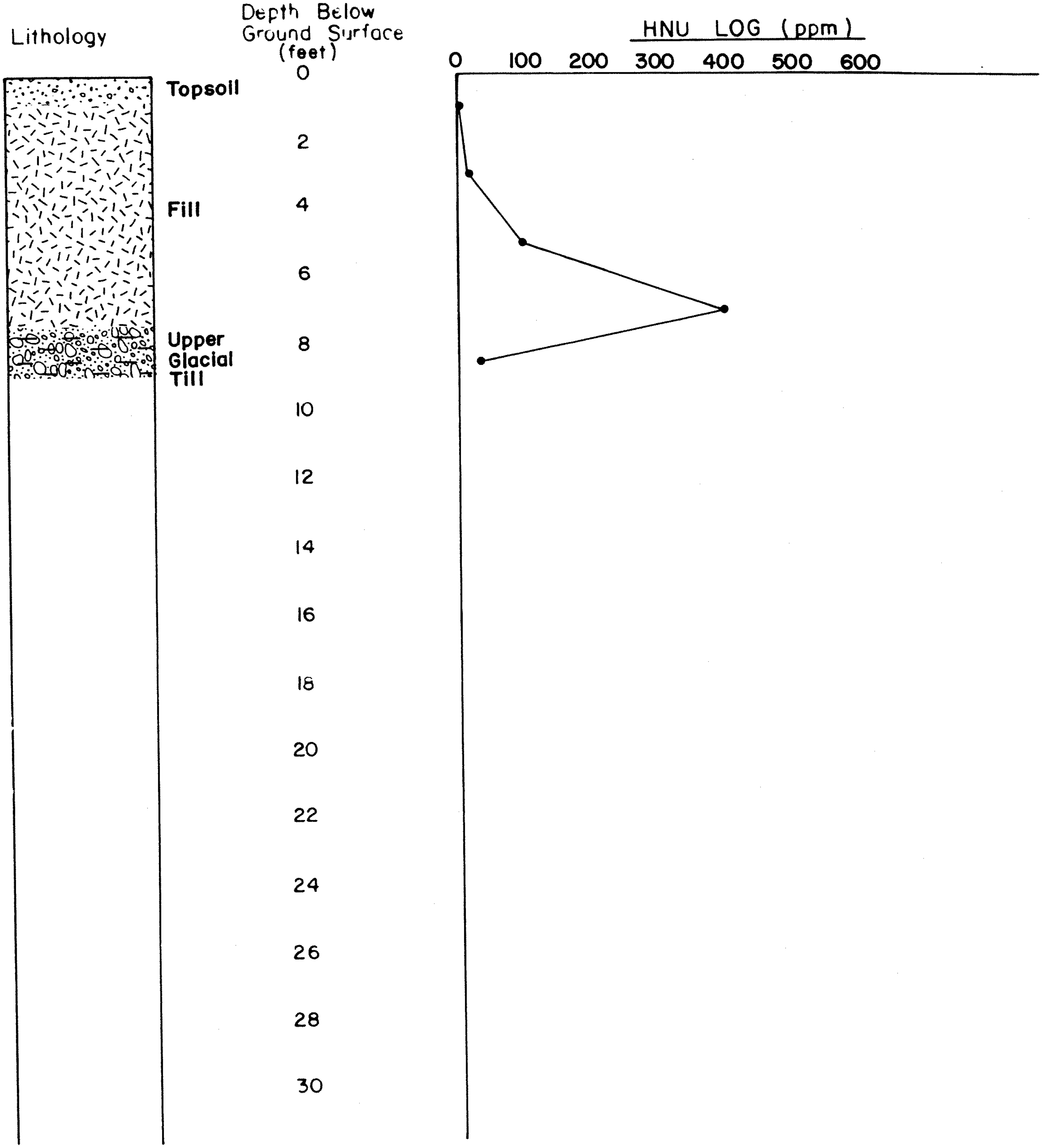
PHASE III
HNU SOIL SCREENING RESULTS
Boring Location: DGC-10 B
Powerex Facility - Auburn, N.Y.



HNU SOIL SCREENING RESULTS
Boring Location: Boring-11S
Powerex Facility - Auburn, N.Y.



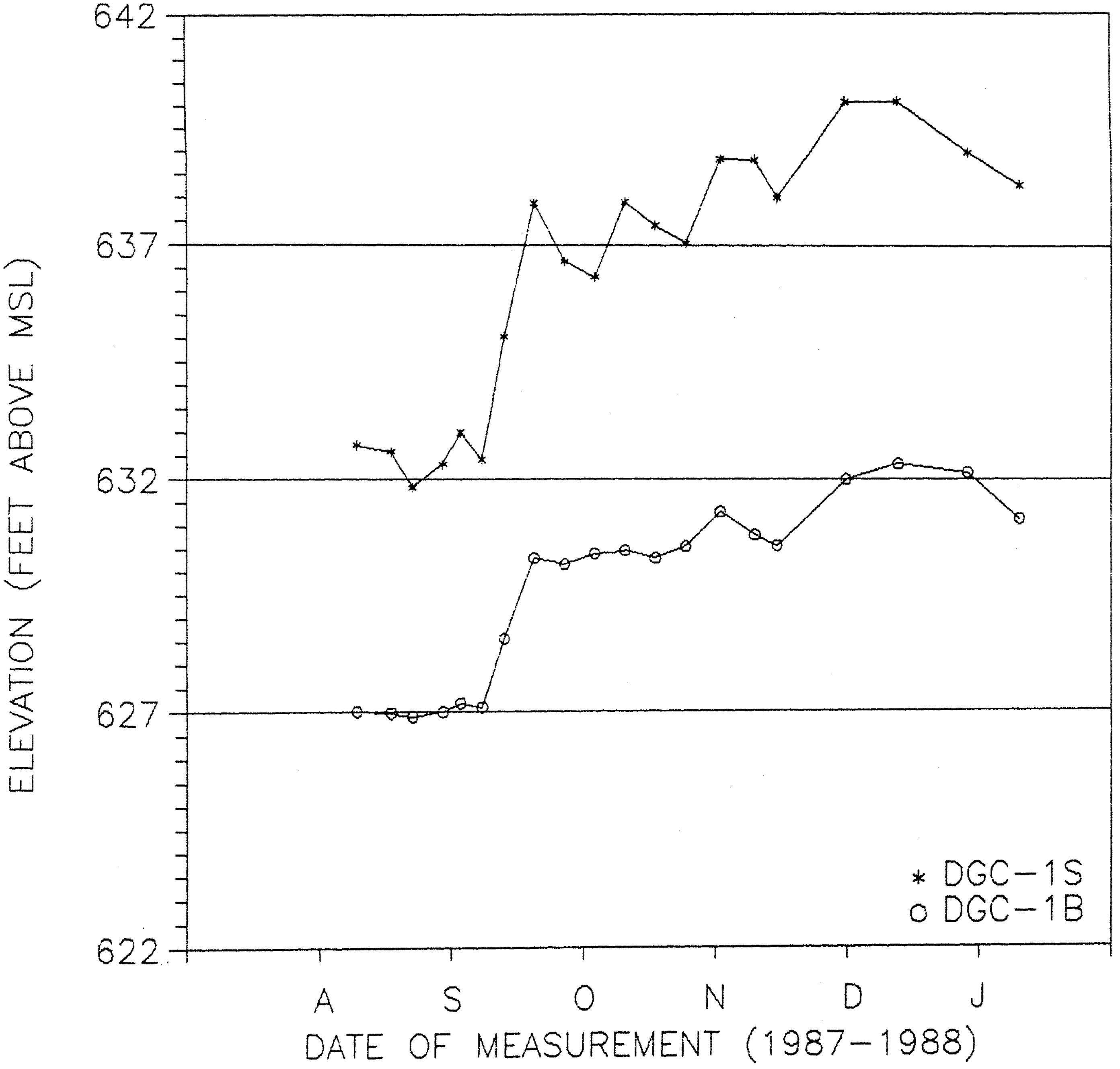
PHASE III
HNU SOIL SCREENING RESULTS
Boring Location: PZ-1
Powerex Facility - Auburn, N.Y.



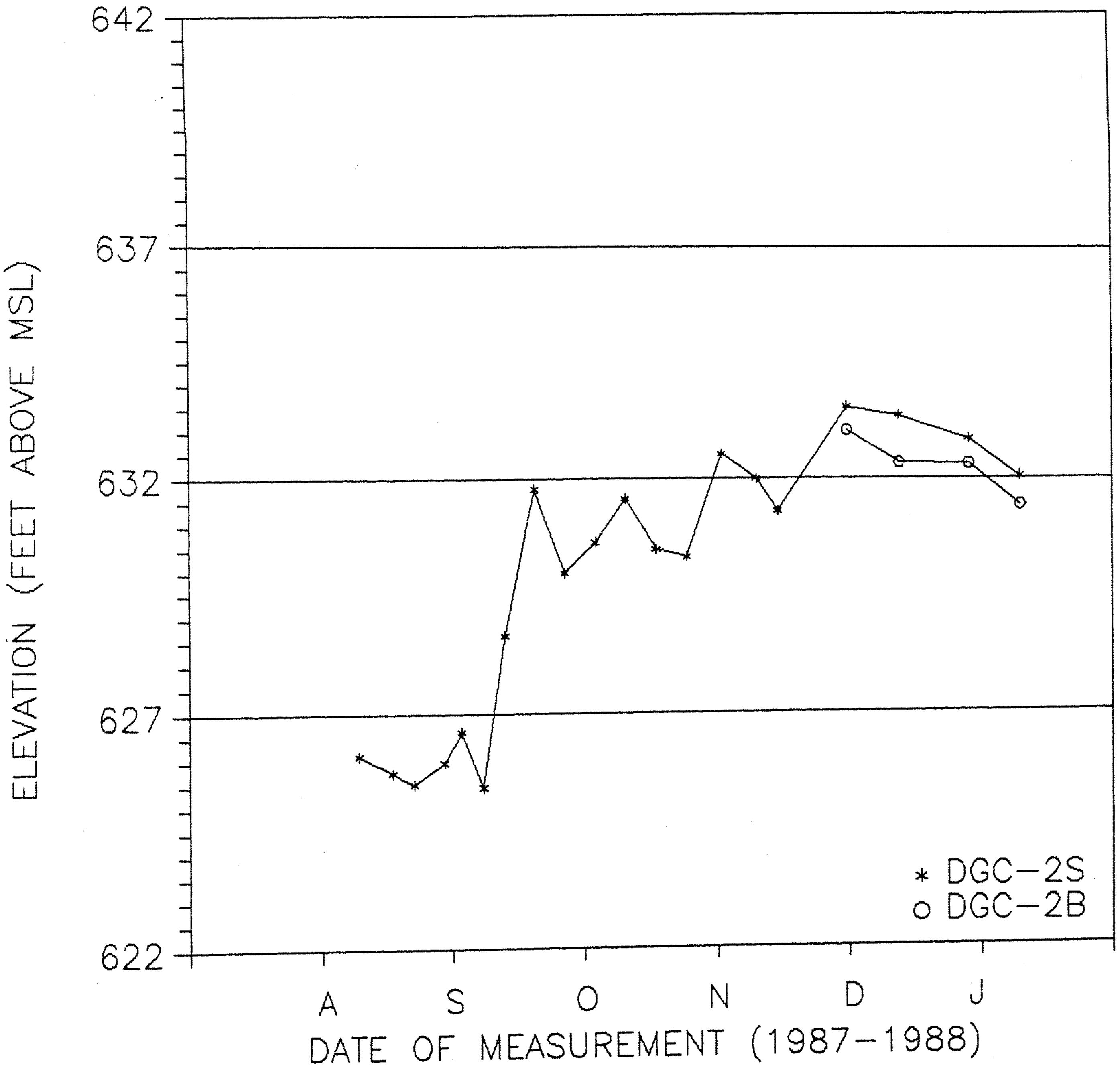
DUNN

APPENDIX D

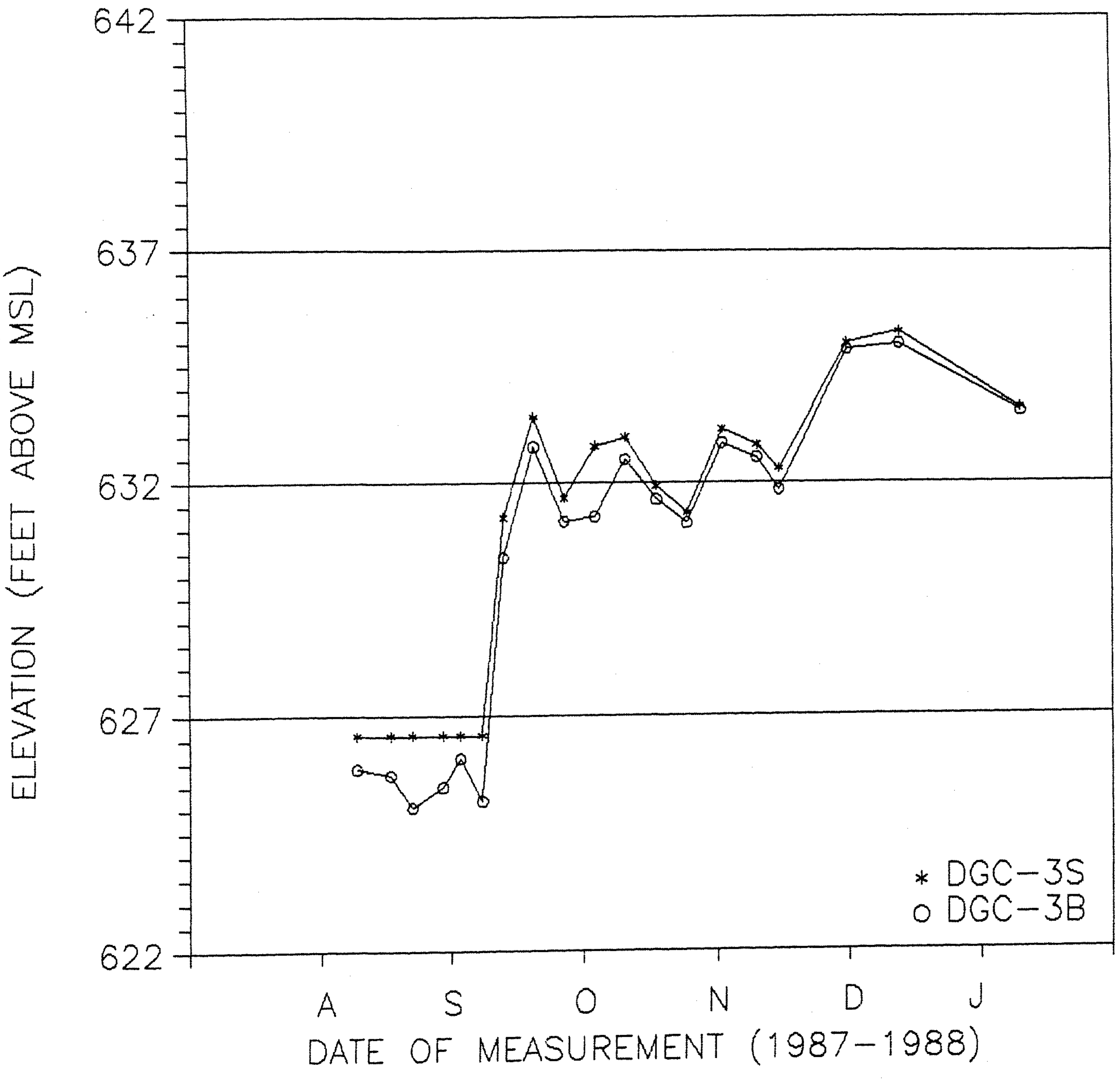
WATER LEVELS
POWEREX FACILITY – AUBURN, NEW YORK



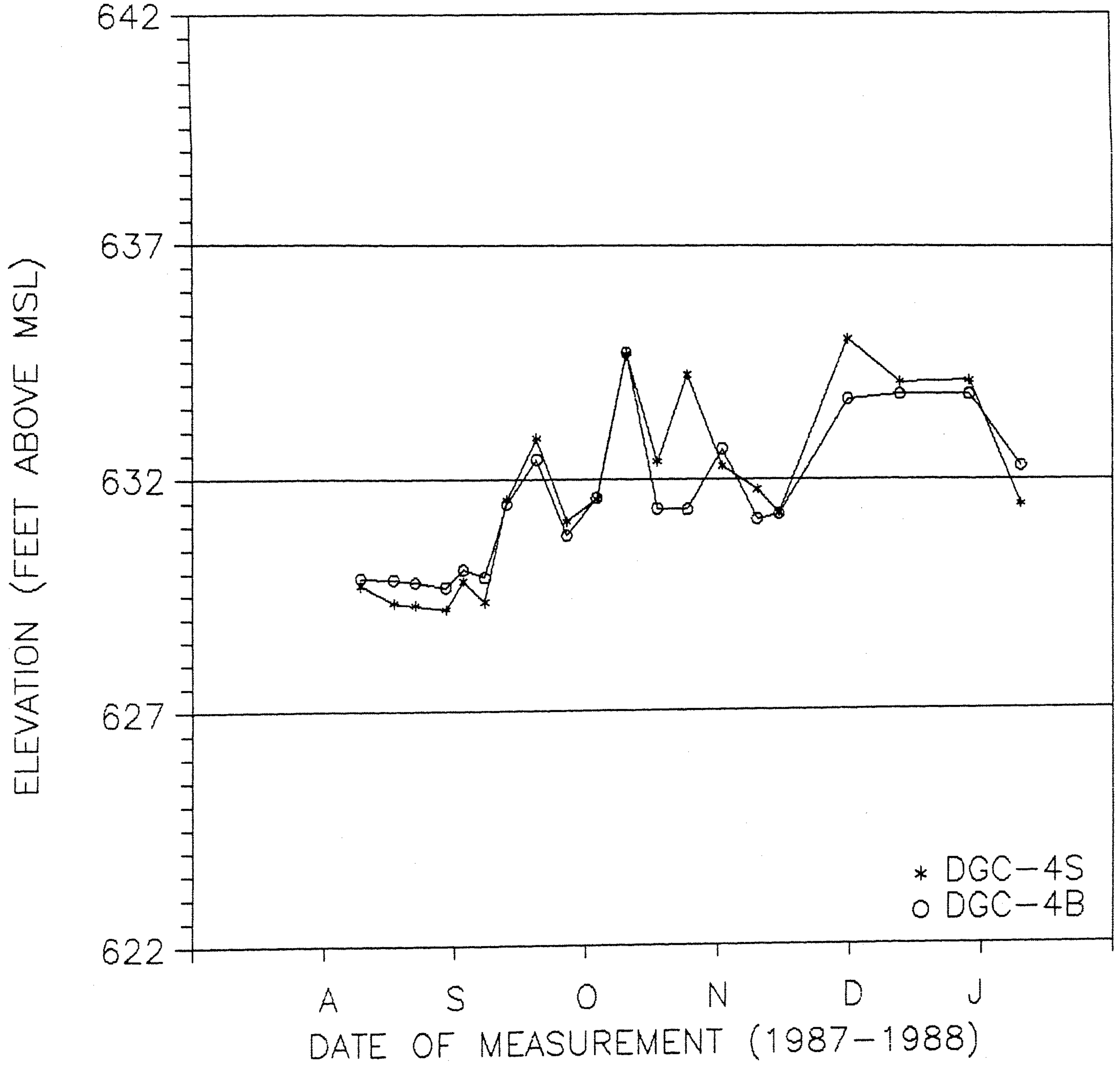
WATER LEVELS
POWEREX FACILITY – AUBURN, NEW YORK



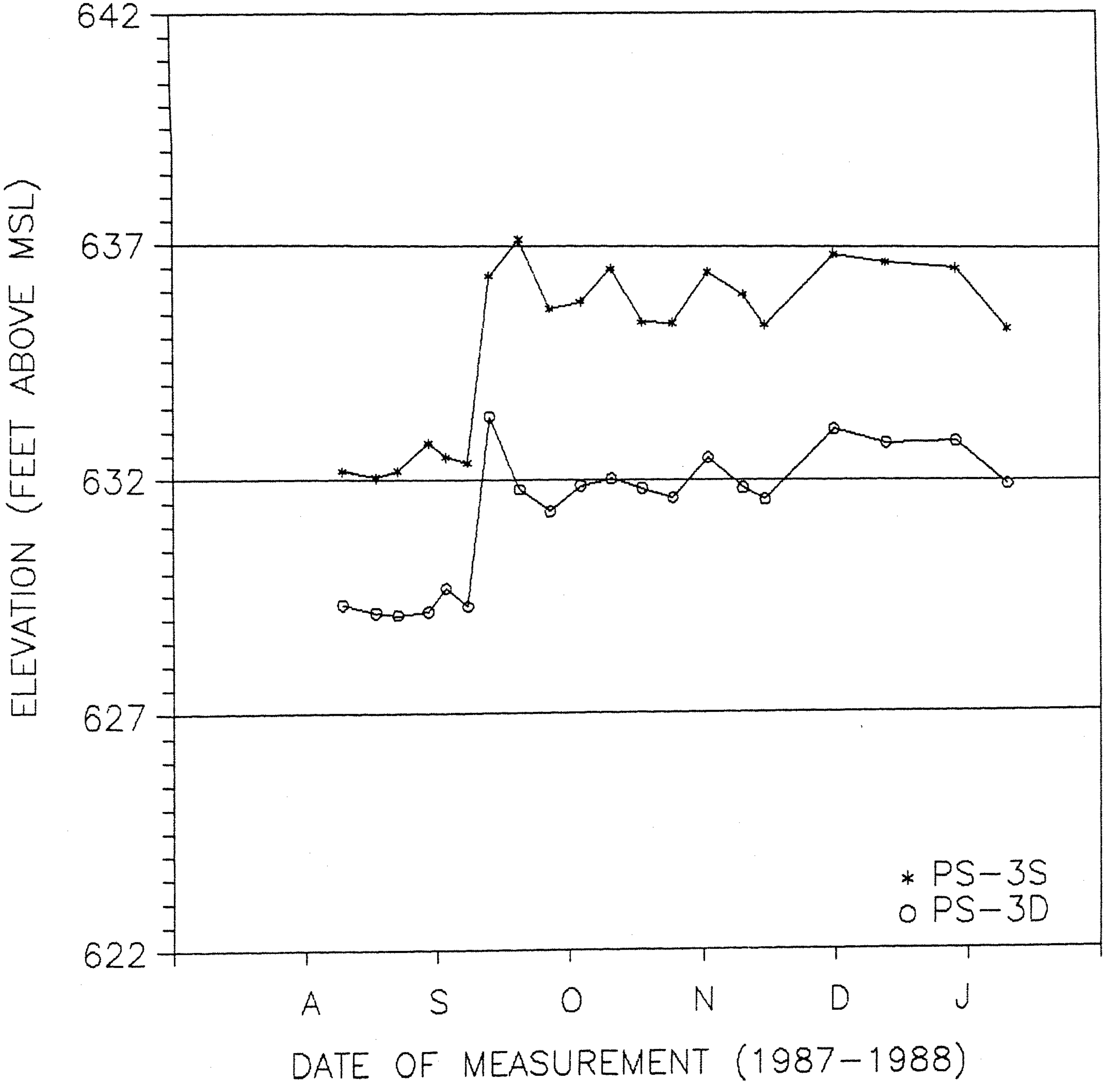
WATER LEVELS
POWEREX FACILITY - AUBURN, NEW YORK



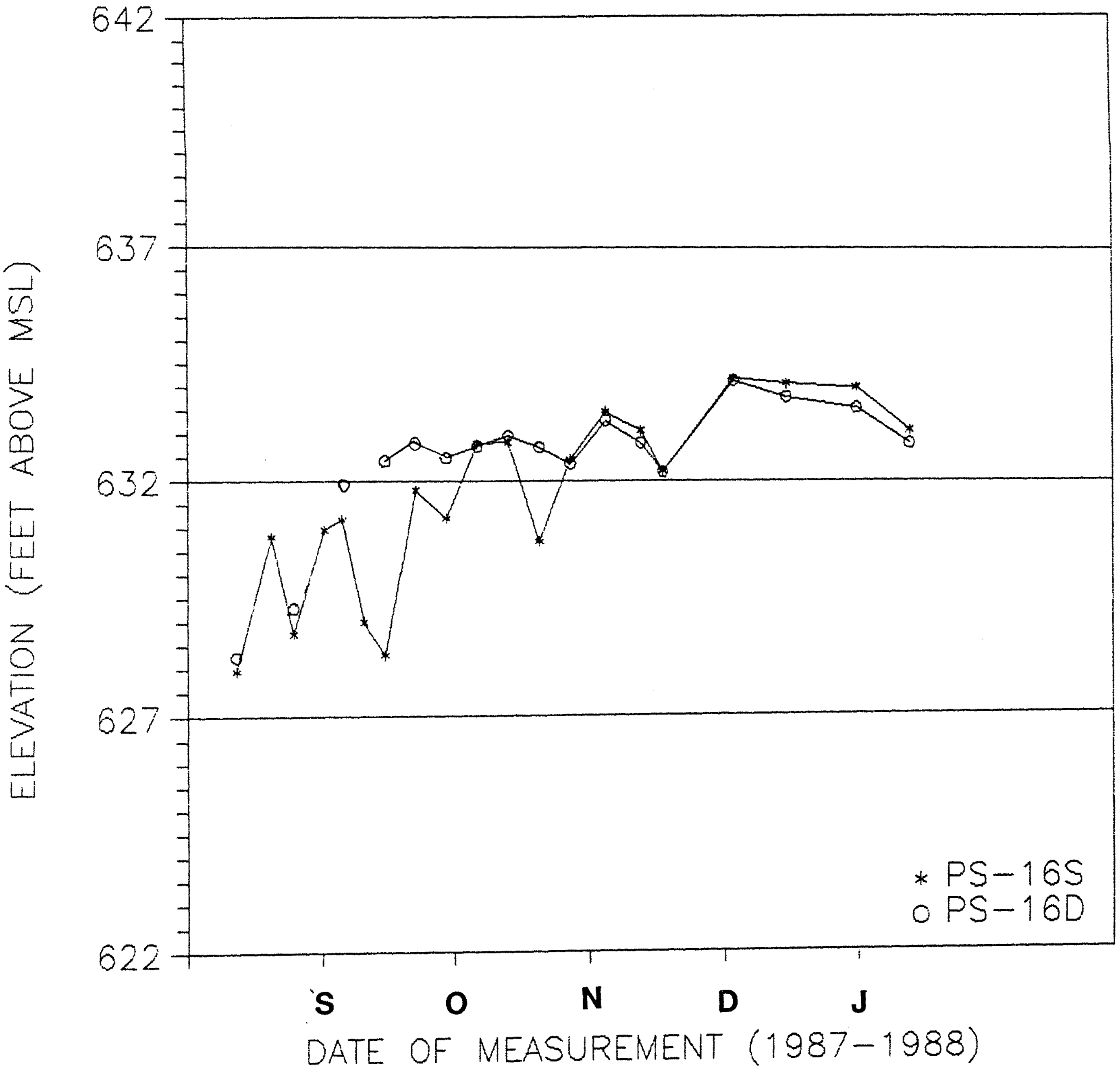
WATER LEVELS
POWEREX FACILITY - AUBURN, NEW YORK



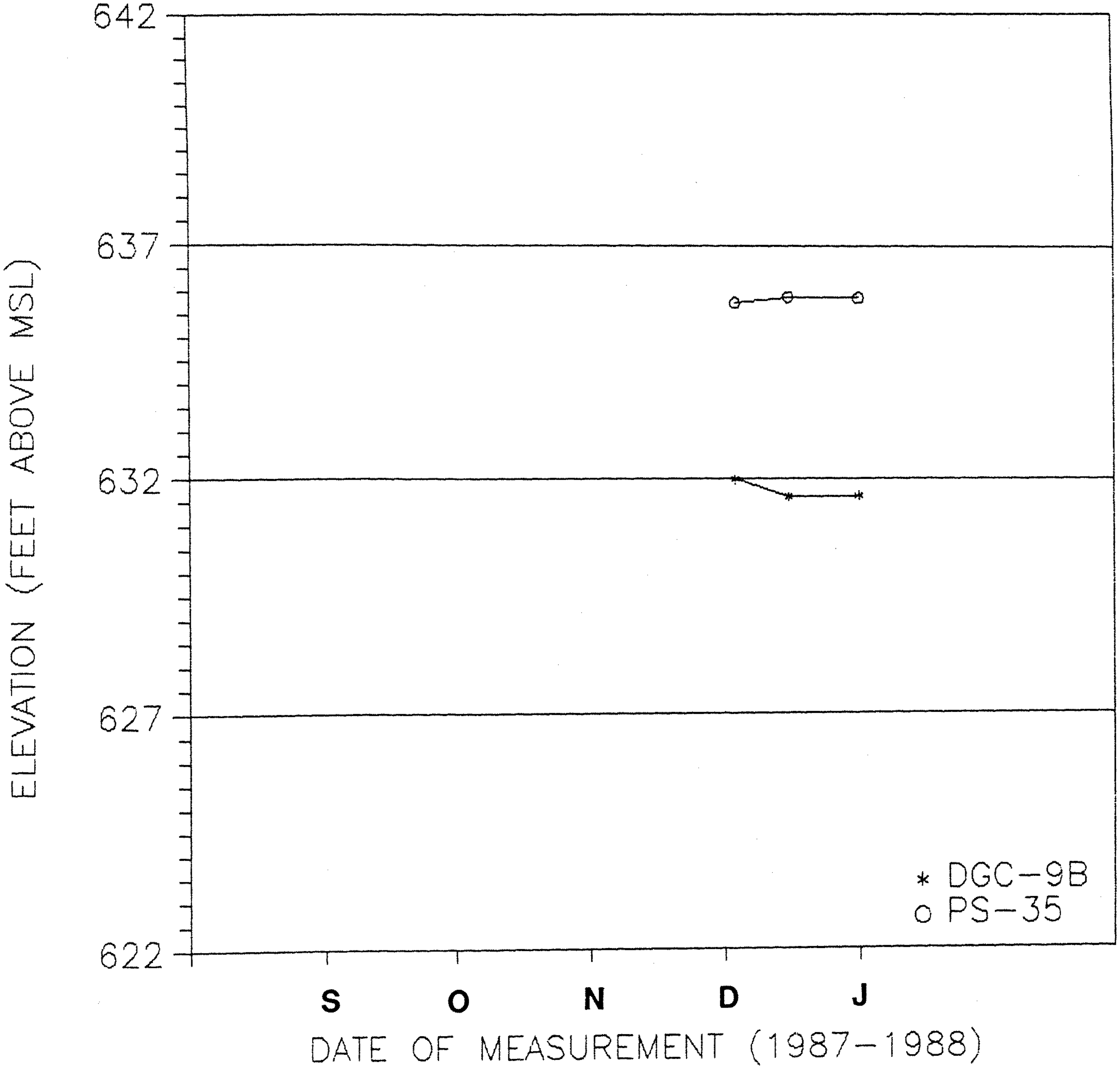
WATER LEVELS
POWEREX FACILITY - AUBURN, NEW YORK



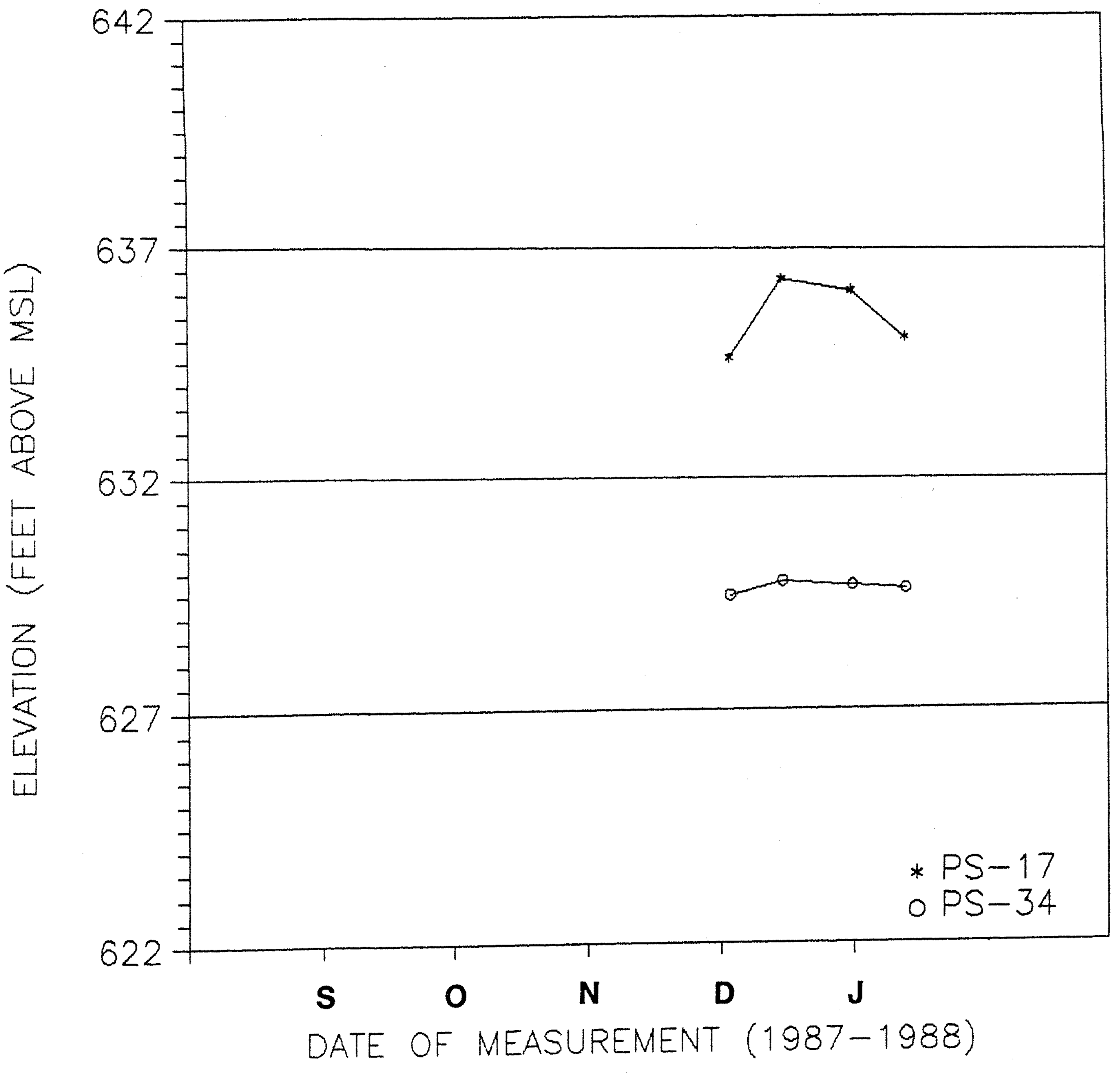
WATER LEVELS
POWEREX FACILITY - AUBURN, NEW YORK



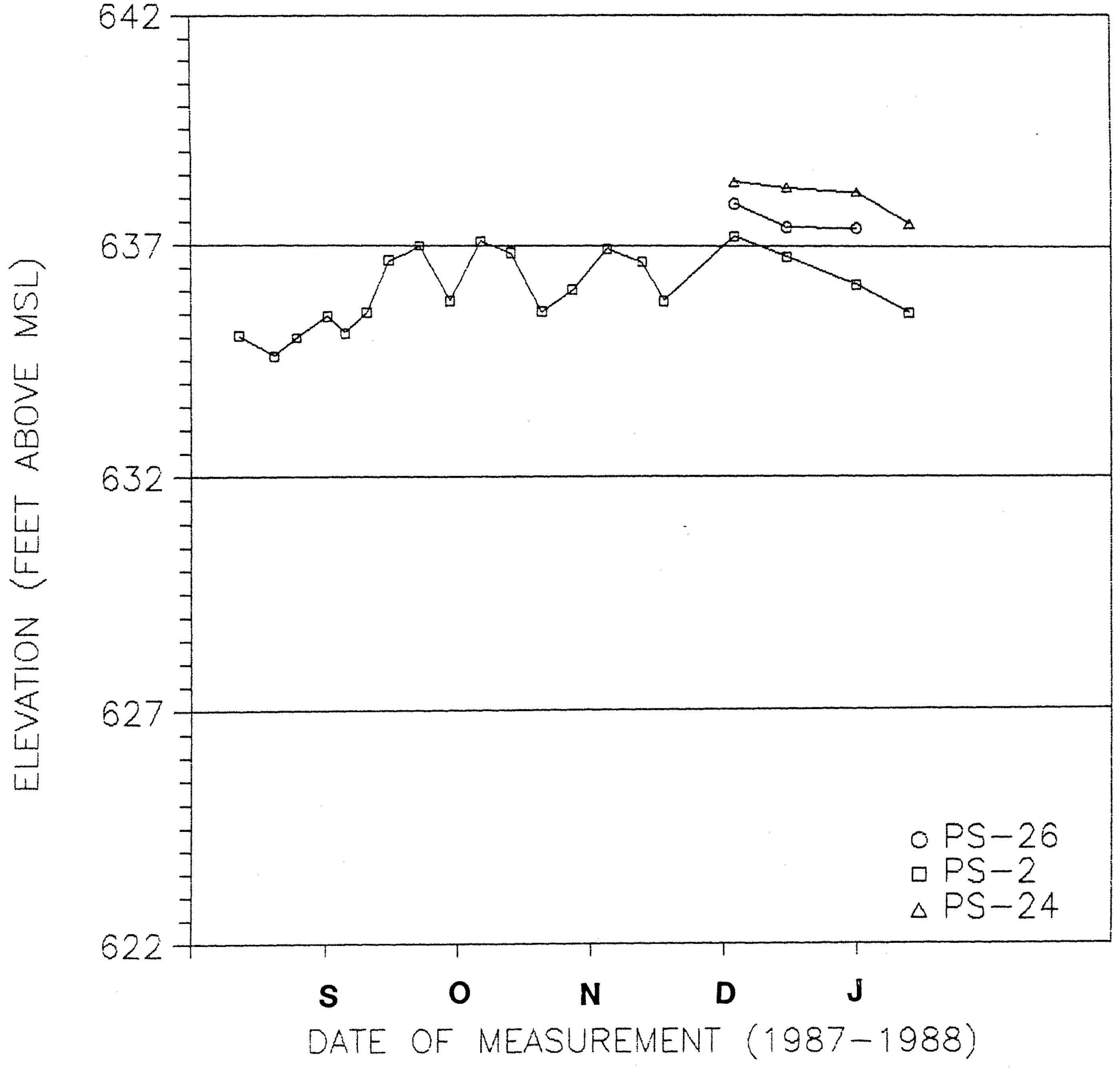
WATER LEVELS
POWEREX FACILITY - AUBURN, NEW YORK



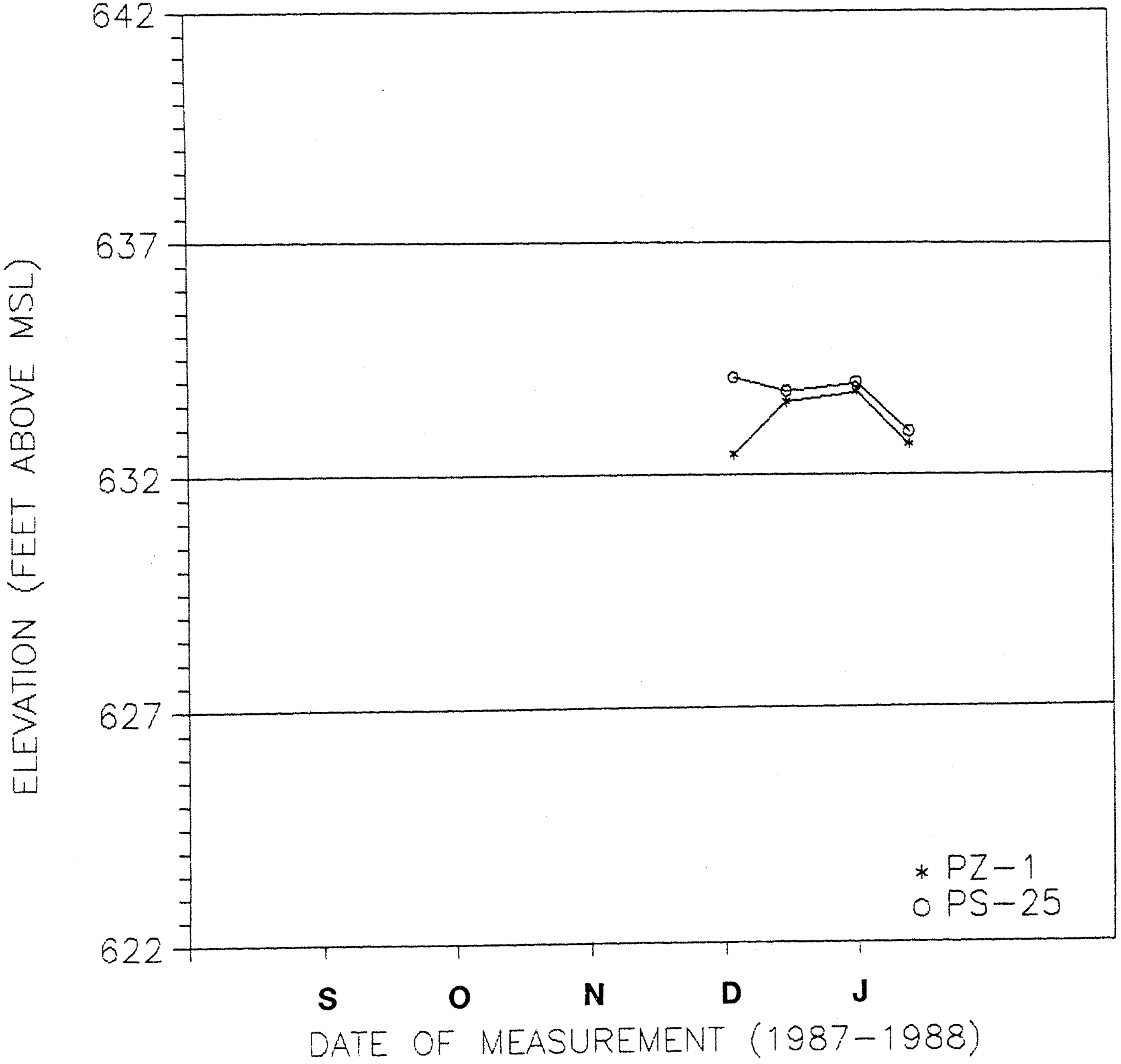
WATER LEVELS
POWEREX FACILITY – AUBURN, NEW YORK



WATER LEVELS
POWEREX FACILITY - AUBURN, NEW YORK



WATER LEVELS
POWEREX FACILITY - AUBURN, NEW YORK



WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 08/12/87

DGC-1B	627.01
DGC-1S	632.74
DGC-2S	626.13
DGC-3B	625.89
DGC-3S	626.60
DGC-4B	629.88
DGC-4S	629.73
DGC-5B	635.39
PS-1	630.08
PS-10	629.50
PS-11A	626.00
PS-11B	625.83
PS-12	627.18
PS-13	628.96
PS-14	632.18
PS-15	627.24
PS-16D	628.26
PS-16S	627.97
PS-2	635.04
PS-3D	629.33
PS-3S	632.17
PS-4	633.63
PS-5	633.33
PS-6	627.07
PS-7	628.09
PS-8A	628.66
PS-8B	628.34
PS-9	632.24

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 08/20/87

DGC-1B	626.99
DGC-1S	632.60
DGC-2S	625.78
DGC-3B	625.76
DGC-3S	626.60
DGC-4B	629.85
DGC-4S	629.36
DGC-5B	635.07
PS-1	630.55
PS-10	629.04
PS-11A	626.00
PS-11B	626.40
PS-12	626.24
PS-13	622.80
PS-14	629.90
PS-15	626.54
PS-16D	623.60
PS-16S	630.82
PS-2	634.61
PS-3D	629.16
PS-3S	632.04
PS-4	634.03
PS-5	633.29
PS-6	624.30
PS-7	627.84
PS-8A	628.69
PS-8B	628.18
PS-9	630.90

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 08/25/87

DGC-1B	626.90
DGC-1S	631.83
DGC-2S	625.53
DGC-3B	625.06
DGC-3S	626.60
DGC-4B	629.79
DGC-4S	629.30
DGC-5B	634.87
PS-1	630.83
PS-10	628.83
PS-11A	626.00
PS-11B	625.77
PS-12	627.18
PS-13	628.43
PS-14	629.18
PS-15	626.48
PS-16D	629.30
PS-16S	628.76
PS-2	635.01
PS-3D	629.11
PS-3S	632.18
PS-4	634.43
PS-5	632.23
PS-6	626.72
PS-7	628.98
PS-8A	628.10
PS-8B	628.29
PS-9	630.85

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 09/01/87

DGC-1B	627.00
DGC-1S	632.33
DGC-2S	625.98
DGC-3B	625.50
DGC-3S	626.60
DGC-4B	629.69
DGC-4S	629.22
DGC-5B	635.12
PS-1	627.82
PS-10	628.83
PS-11A	626.00
PS-11B	626.40
PS-12	626.36
PS-13	628.43
PS-14	629.86
PS-15	626.90
PS-16D	623.60
PS-16S	630.98
PS-2	635.48
PS-3D	629.18
PS-3S	632.78
PS-4	634.80
PS-5	633.50
PS-6	626.59
PS-7	627.98
PS-8A	628.63
PS-8B	629.38
PS-9	631.07

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 09/05/87

DGC-1B	627.18
DGC-1S	633.01
DGC-2S	626.63
DGC-3B	626.11
DGC-3S	626.60
DGC-4B	630.06
DGC-4S	629.82
DGC-5B	635.52
PS-1	631.33
PS-10	629.14
PS-11A	626.00
PS-11B	626.05
PS-12	627.87
PS-13	629.71
PS-14	630.03
PS-15	627.75
PS-16D	631.92
PS-16S	631.19
PS-2	635.11
PS-3D	629.68
PS-3S	632.48
PS-4	633.85
PS-5	634.01
PS-6	627.43
PS-7	628.46
PS-8A	629.05
PS-8B	628.59
PS-9	632.49

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 09/10/87

DGC-1B	627.10
DGC-1S	632.43
DGC-2S	625.45
DGC-3B	625.20
DGC-3S	626.60
DGC-4B	629.89
DGC-4S	629.37
DGC-5B	635.47
PS-1	630.65
PS-10	628.20
PS-11A	626.00
PS-11B	626.40
PS-12	626.63
PS-13	627.80
PS-14	627.27
PS-15	626.38
PS-16D	623.60
PS-16S	629.01
PS-2	635.56
PS-3D	629.29
PS-3S	632.35
PS-4	636.06
PS-5	633.15
PS-6	626.40
PS-7	627.53
PS-8A	627.94
PS-8B	627.77
PS-9	631.01

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 09/15/87

DGC-1B	628.56
DGC-1S	635.05
DGC-2S	628.63
DGC-3B	630.40
DGC-3S	631.24
DGC-4B	631.46
DGC-4S	631.55
DGC-5B	637.06
PS-1	632.09
PS-10	631.25
PS-11A	633.22
PS-11B	631.31
PS-12	626.41
PS-13	628.99
PS-14	630.18
PS-15	630.06
PS-16D	632.44
PS-16S	628.29
PS-2	636.69
PS-3D	633.33
PS-3S	636.34
PS-4	635.67
PS-5	640.61
PS-6	634.04
PS-7	632.22
PS-8A	627.47
PS-8B	628.13
PS-9	637.01

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 09/22/87

DGC-1B	630.30
DGC-1S	637.90
DGC-2S	631.77
DGC-3B	632.76
DGC-3S	633.40
DGC-4B	632.41
DGC-4S	632.86
DGC-5B	637.57
PS-1	632.81
PS-10	628.86
PS-11A	633.02
PS-11B	631.86
PS-12	632.52
PS-13	632.25
PS-14	633.55
PS-15	630.25
PS-16D	632.80
PS-16S	631.81
PS-2	637.01
PS-3D	631.78
PS-3S	637.13
PS-4	636.15
PS-5	640.85
PS-6	636.42
PS-7	635.15
PS-8A	633.19
PS-8B	633.39
PS-9	637.54

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 09/29/87

DGC-1B	630.17
DGC-1S	636.67
DGC-2S	629.98
DGC-3B	631.16
DGC-3S	631.66
DGC-4B	630.79
DGC-4S	631.09
DGC-5B	637.57
PS-1	631.98
PS-10	629.13
PS-11A	626.00
PS-11B	629.32
PS-12	631.48
PS-13	632.83
PS-14	634.83
PS-15	630.23
PS-16D	632.50
PS-16S	631.21
PS-2	635.81
PS-3D	631.31
PS-3S	635.63
PS-4	635.66
PS-5	640.21
PS-6	633.66
PS-7	632.58
PS-8A	628.29
PS-8B	628.13
PS-9	636.29

03/03/88

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 10/06/87

DGC-1B	630.40
DGC-1S	636.33
DGC-2S	630.63
DGC-3B	631.26
DGC-3S	632.77
DGC-4B	631.59
DGC-4S	631.57
DGC-5B	637.57
PS-1	632.25
PS-10	632.43
PS-11A	632.72
PS-11B	631.30
PS-12	632.18
PS-13	633.43
PS-14	636.18
PS-15	630.74
PS-16D	632.75
PS-16S	632.81
PS-2	637.11
PS-3D	631.86
PS-3S	635.78
PS-4	635.53
PS-5	640.65
PS-6	633.82
PS-7	633.58
PS-8A	633.09
PS-8B	632.83
PS-9	637.09

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 10/13/87

DGC-1B	630.47
DGC-1S	637.93
DGC-2S	631.56
DGC-3B	632.49
DGC-3S	632.96
DGC-4B	634.69
DGC-4S	634.67
DGC-5B	637.57
PS-1	632.48
PS-10	630.40
PS-11A	632.52
PS-11B	631.44
PS-12	632.08
PS-13	633.53
PS-14	636.44
PS-15	631.61
PS-16D	632.98
PS-16S	632.84
PS-2	636.85
PS-3D	632.01
PS-3S	636.51
PS-4	636.33
PS-5	640.91
PS-6	634.34
PS-7	633.72
PS-8A	633.49
PS-8B	633.23
PS-9	637.39

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 10/20/87

DGC-1B	630.30
DGC-1S	637.43
DGC-2S	630.48
DGC-3B	631.62
DGC-3S	631.91
DGC-4B	631.36
DGC-4S	632.36
DGC-5B	637.57
PS-1	632.14
PS-10	630.93
PS-11A	632.37
PS-11B	630.82
PS-12	631.25
PS-13	633.50
PS-14	635.36
PS-15	628.66
PS-16D	632.73
PS-16S	630.71
PS-2	635.57
PS-3D	631.80
PS-3S	635.34
PS-4	634.93
PS-5	640.31
PS-6	633.58
PS-7	633.23
PS-8A	633.06
PS-8B	632.33
PS-9	636.68

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 10/27/87

DGC-1B	630.55
DGC-1S	637.06
DGC-2S	630.31
DGC-3B	631.12
DGC-3S	631.34
DGC-4B	631.34
DGC-4S	634.21
DGC-5B	637.57
PS-1	631.95
PS-10	631.03
PS-11A	632.00
PS-11B	630.90
PS-12	631.11
PS-13	632.93
PS-14	635.24
PS-15	631.46
PS-16D	632.38
PS-16S	632.47
PS-2	636.05
PS-3D	631.60
PS-3S	635.33
PS-4	635.58
PS-5	640.26
PS-6	633.33
PS-7	632.98
PS-8A	632.62
PS-8B	632.57
PS-9	636.82

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 11/04/87

DGC-1B	631.30
DGC-1S	638.87
DGC-2S	632.51
DGC-3B	632.83
DGC-3S	633.13
DGC-4B	632.64
DGC-4S	632.27
DGC-5B	637.57
PS-1	632.50
PS-10	631.83
PS-11A	632.95
PS-11B	632.49
PS-12	632.50
PS-13	633.88
PS-14	637.16
PS-15	632.68
PS-16D	633.30
PS-16S	633.49
PS-2	636.95
PS-3D	632.46
PS-3S	636.44
PS-4	636.73
PS-5	640.46
PS-6	634.69
PS-7	634.30
PS-8A	633.78
PS-8B	633.85
PS-9	637.71

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 11/12/87

DGC-1B	630.80
DGC-1S	638.85
DGC-2S	631.98
DGC-3B	632.52
DGC-3S	632.79
DGC-4B	631.13
DGC-4S	631.77
DGC-5B	637.57
PS-1	632.40
PS-10	631.48
PS-11A	632.82
PS-11B	632.35
PS-12	632.03
PS-13	633.80
PS-14	636.31
PS-15	632.90
PS-16D	632.82
PS-16S	633.09
PS-2	636.66
PS-3D	631.81
PS-3S	635.95
PS-4	635.53
PS-5	640.81
PS-6	634.57
PS-7	634.14
PS-8A	633.61
PS-8B	633.53
PS-9	637.39

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 11/17/87

DGC-1B	630.57
DGC-1S	638.03
DGC-2S	631.28
DGC-3B	631.83
DGC-3S	632.28
DGC-4B	631.24
DGC-4S	631.27
DGC-5B	637.57
PS-1	631.98
PS-10	631.73
PS-11A	632.72
PS-11B	631.82
PS-12	631.56
PS-13	633.66
PS-14	636.08
PS-15	632.64
PS-16D	632.20
PS-16S	632.21
PS-2	635.81
PS-3D	631.56
PS-3S	635.28
PS-4	634.88
PS-5	640.58
PS-6	634.05
PS-7	633.68
PS-8A	633.62
PS-8B	633.53
PS-9	637.14

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 12/03/87

DGC-10B	632.95
DGC-11S	633.17
DGC-1B	632.00
DGC-1S	640.10
DGC-2B	633.02
DGC-2S	633.53
DGC-3B	634.85
DGC-3S	634.99
DGC-4B	633.69
DGC-4S	634.99
DGC-5B	637.57
DGC-6B	632.43
DGC-7B	635.26
DGC-8B	633.05
DGC-9B	632.00
PS-1	633.13
PS-10	632.67
PS-11A	633.91
PS-11B	633.72
PS-12	633.01
PS-13	634.58
PS-14	636.63
PS-15	634.81
PS-16D	634.15
PS-16S	634.21
PS-17	634.60
PS-18	635.20
PS-19	640.63
PS-2	637.23
PS-20	635.98
PS-21	633.59
PS-22	634.02
PS-23	636.52
PS-24	638.39
PS-25	634.09
PS-26	637.92
PS-27	632.58
PS-28	632.12
PS-29	633.58
PS-30	632.60
PS-31	633.47
PS-32	632.20
PS-33	637.11
PS-34	629.47
PS-35	635.78
PS-3D	633.06
PS-3S	636.83
PS-4	636.50

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

PS-5	641.08
PS-6	635.77
PS-7	635.08
PS-8A	635.71
PS-8B	635.88
PS-9	638.33
PZ-1	632.45

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 12/15/87

DGC-10B	632.60
DGC-11S	632.08
DGC-1B	640.10
DGC-1S	632.33
DGC-2B	632.32
DGC-2S	633.33
DGC-3B	634.97
DGC-3S	635.23
DGC-4B	633.79
DGC-4S	634.06
DGC-5B	637.57
DGC-6B	632.61
DGC-7B	632.26
DGC-8B	632.94
DGC-9B	631.62
PS-1	633.12
PS-10	633.26
PS-11A	633.54
PS-11B	633.58
PS-12	633.63
PS-13	634.58
PS-14	636.62
PS-15	634.51
PS-16D	633.80
PS-16S	634.09
PS-17	636.33
PS-18	633.99
PS-19	640.56
PS-2	636.78
PS-20	635.75
PS-21	633.11
PS-22	633.62
PS-23	634.77
PS-24	638.27
PS-25	633.79
PS-26	637.42
PS-27	632.35
PS-28	632.31
PS-29	632.66
PS-30	632.84
PS-31	632.99
PS-32	632.35
PS-33	636.91
PS-34	629.77
PS-35	635.91
PS-3D	632.78
PS-3S	636.66
PS-4	636.26

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

PS-5	640.98
PS-6	635.57
PS-7	635.78
PS-8A	635.19
PS-8B	635.23
PS-9	637.71
PZ-1	633.56

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

** DATE 12/31/87

DGC-10B	632.62
DGC-11S	632.30
DGC-1B	632.15
DGC-1S	639.03
DGC-2B	632.30
DGC-2S	632.83
DGC-3B	0.00
DGC-3S	0.00
DGC-4B	633.79
DGC-4S	634.09
DGC-5B	0.00
DGC-6B	632.46
DGC-7B	631.96
DGC-8B	632.45
DGC-9B	631.63
PS-1	633.13
PS-10	633.15
PS-11A	633.38
PS-11B	633.54
PS-12	633.48
PS-13	634.29
PS-14	636.40
PS-15	634.29
PS-16D	633.56
PS-16S	634.01
PS-17	636.08
PS-18	633.40
PS-19	639.75
PS-2	636.17
PS-20	635.74
PS-21	633.14
PS-22	633.59
PS-23	634.66
PS-24	638.18
PS-25	633.99
PS-26	637.40
PS-27	632.33
PS-28	632.34
PS-29	632.59
PS-30	632.80
PS-31	632.59
PS-32	632.04
PS-33	637.71
PS-34	629.68
PS-35	635.89
PS-3D	632.82
PS-3S	636.54
PS-4	636.21

03/03/88

WATER LEVEL ELEVATIONS
POWEREX FACILITY
AUBURN, NEW YORK

PS-5	640.66
PS-6	635.52
PS-7	634.79
PS-8A	635.19
PS-8B	634.83
PS-9	637.39
PZ-1	633.79

APPENDIX E

SEE

PAPER

FILES

FOR

OVER SIZED

DOCUMENT(S)

LEGEND

●	DGC-3S DGC-3B	2 inch Overburden Monitoring Wells 2 inch Bedrock Monitoring Wells
○	PS-16S PS-16D PS-16	1/2 inch Overburden Micro-Wells
◕	PZ-1	Piezometer Location
△	SW-A	Surface Water Sampling Location
□	TB-A	Test Boring Location
▬		Water Table Elevation (M.S.L.) (dashed where inferred)

NOTE:

MAP COMPILED FROM AERIAL PHOTOGRAPHY BY
LOCKWOOD SUPPORT SERVICES, INC.
ROCHESTER, N.Y., APRIL 24, 1982.

* BELIEVED TO BE AN INNACURATE MEASUREMENT

PLATE 5

SION	BY
RVEY FOR PHASE 3	KB/RS

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205

WATER TABLE CONTOUR MAP
December 3, 1987
POWEREX, INC.
(GENERAL ELECTRIC CO.)

CITY OF AUBURN CAYUGA COUNTY, N.Y.

PROJECT MANAGER:
Rodney W. Sutch
Kristen Franz-Begor
PREPARED BY:
Maureen Lawler
CHECKED BY:

DRAFTED BY:
Michael T. Maksymik
PROJECT NO.
2092-5-321
SHEET . OF .

MAP NO.
8031
DATE:
February 1988

LEGEND

●	DGC-3S	2 inch Overburden Monitoring Wells
	DGC-3B	2 inch Bedrock Monitoring Wells
○	PS-16S PS-16D PS-16	1/2 inch Overburden Micro-Wells
◕	PZ-1	Piezometer Location
△	SW-A	Surface Water Sampling Location
□	TB-A	Test Boring Location
—		**Potentiometric Surface (M.S.L.) Contour Interval 1.0'** **(dashed where inferred)**
▬		**Potentiometric Surface (M.S.L.) Contour Interval 5.0'** **(dashed where inferred)**

NOTE:

MAP COMPILED FROM AERIAL PHOTOGRAPHY BY
LOCKWOOD SUPPORT SERVICES, INC.
ROCHESTER, N.Y., APRIL 24, 1982.

PLATE 6

	BY
FOR PHASE 3	KB/RS

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205

POTENTIOMETRIC SURFACE WITHIN THE BEDROCK AQUIFER
December 3, 1987

POWEREX, INC.
(GENERAL ELECTRIC CO.)

CITY OF AUBURN CAYUGA COUNTY, N.Y.

PROJECT MANAGER:
Rodney W. Sutch
Kristen Franz-Begor
PREPARED BY:
Maureen Lawler
CHECKED BY:

DRAFTED BY:
Michael T. Maksymik
PROJECT NO.
2092-5-321
SHEET . OF .

MAP NO.
8029
DATE:
February 1988

LEGEND

●	DGC–3S DGC–3B	2 inch Overburden Monitoring Wells 2 inch Bedrock Monitoring Wells
○	PS–16S PS–16D PS–16	1/2 inch Overburden Micro–Wells
◕	PZ–1	Piezometer Location
△	SW–A	Surface Water Sampling Location
□	TB–A	Test Boring Location
▬		Water Table Elevation (M.S.L.) (dashed where inferred)

NOTE:

MAP COMPILED FROM AERIAL PHOTOGRAPHY BY
LOCKWOOD SUPPORT SERVICES, INC.
ROCHESTER, N.Y., APRIL 24, 1982.

PLATE 7

N	BY
FOR PHASE 3	KB/RS

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205

WATER TABLE CONTOUR MAP
January 25, 1988
POWEREX, INC.
(GENERAL ELECTRIC CO.)
CITY OF AUBURN CAYUGA COUNTY, N.Y.

PROJECT MANAGER: Rodney W. Sutch Kristen Franz–Begor PREPARED BY: Maureen Lawler CHECKED BY:	DRAFTED BY: Michael T. Maksymik PROJECT NO. 2092-5-321 SHEET . OF .	MAP NO. 8032 DATE: February 1988

LEGEND

●	DGC-3S DGC-3B	2 inch Overburden Monitoring Wells 2 inch Bedrock Monitoring Wells
○	PS-16S PS-16D PS-16	1/2 inch Overburden Micro-Wells
◒	PZ-1	Piezometer Location
△	SW-A	Surface Water Sampling Location
□	TB-A	Test Boring Location
—		Potentiometric Surface (M.S.L.) Contour Interval 1.0' (dashed where inferred)
━		Potentiometric Surface (M.S.L.) Contour Interval 5.0' (dashed where inferred)

NOTE:

MAP COMPILED FROM AERIAL PHOTOGRAPHY BY
LOCKWOOD SUPPORT SERVICES, INC.
ROCHESTER, N.Y., APRIL 24, 1982.

PLATE 8

SION	BY
RVEY FOR PHASE 3	KB/RS

DUNN GEOSCIENCE CORP

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205

POTENTIOMETRIC SURFACE WITHIN THE BEDROCK AQUIFER

January 25, 1988

POWEREX, INC.

(GENERAL ELECTRIC CO.)

CITY OF AUBURN CAYUGA COUNTY, N.Y.

PROJECT MANAGER:
Rodney W. Sutch
Kristen Franz-Begor
PREPARED BY:
Maureen Lawler
CHECKED BY:

DRAFTED BY:
Michael T. Maksymik
PROJECT NO.
2092-5-321
SHEET . OF .

MAP NO.
8030
DATE:
February 1988

APPENDIX F

SEE

PAPER

FILES

FOR

OVER SIZED

DOCUMENT(S)

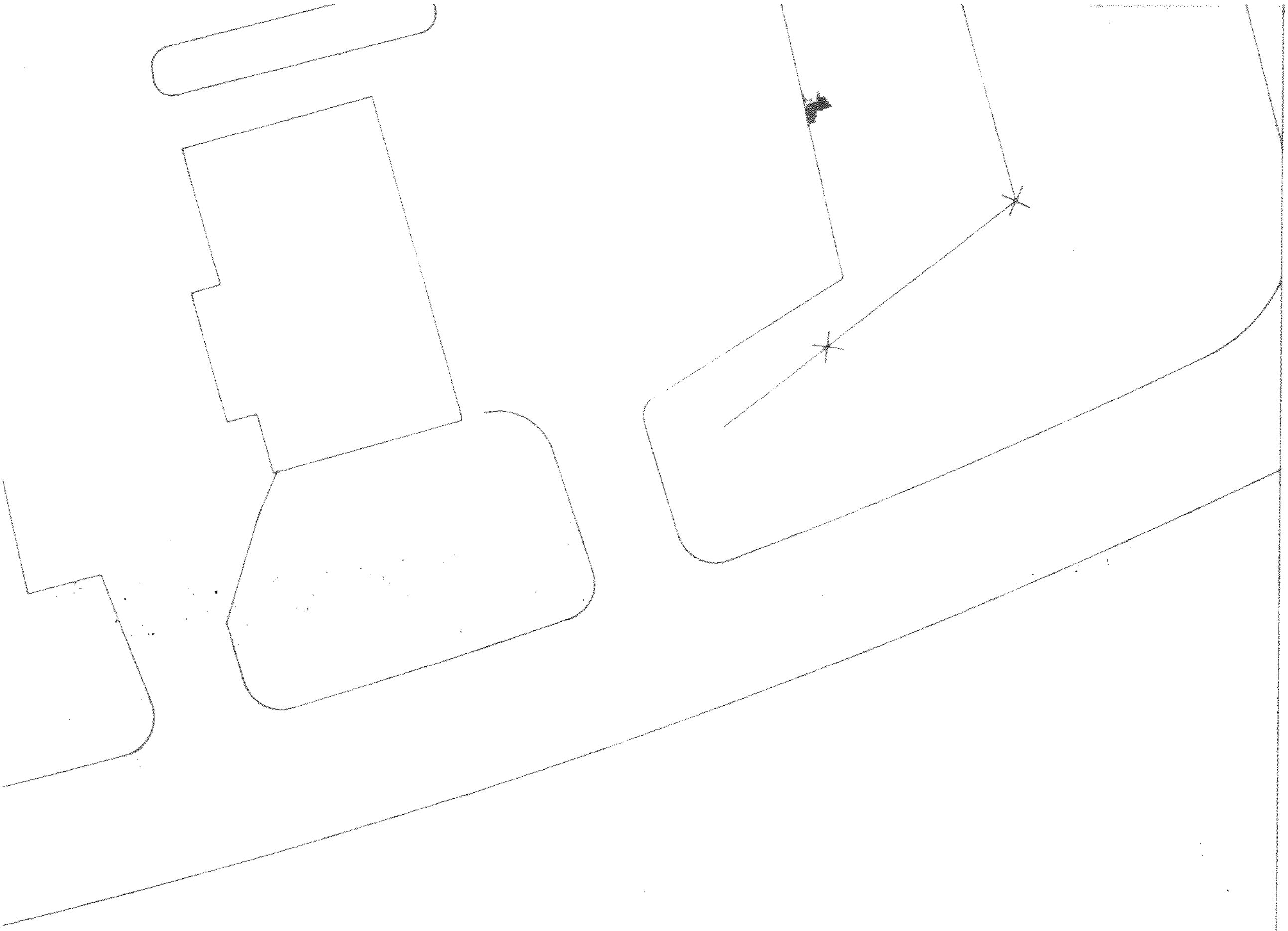


PLATE 9

	BY

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205

MAXIMUM, MINIMUM, AVERAGE OF PHASE II & III
ANALYTICAL RESULTS

POWEREX, INC.
(GENERAL ELECTRIC CO.)

CITY OF AUBURN
CAYUGA COUNTY, N.Y.

PROJECT MANAGER:
Rodney W. Sutch
Kristen Franz-Begor

PREPARED BY:

CHECKED BY:

DRAFTED BY:
Charles T. O'Clair

PROJECT NO.
2092-5-321

SHEET OF

MAP NO.
M8008_1

DATE:
February 1988

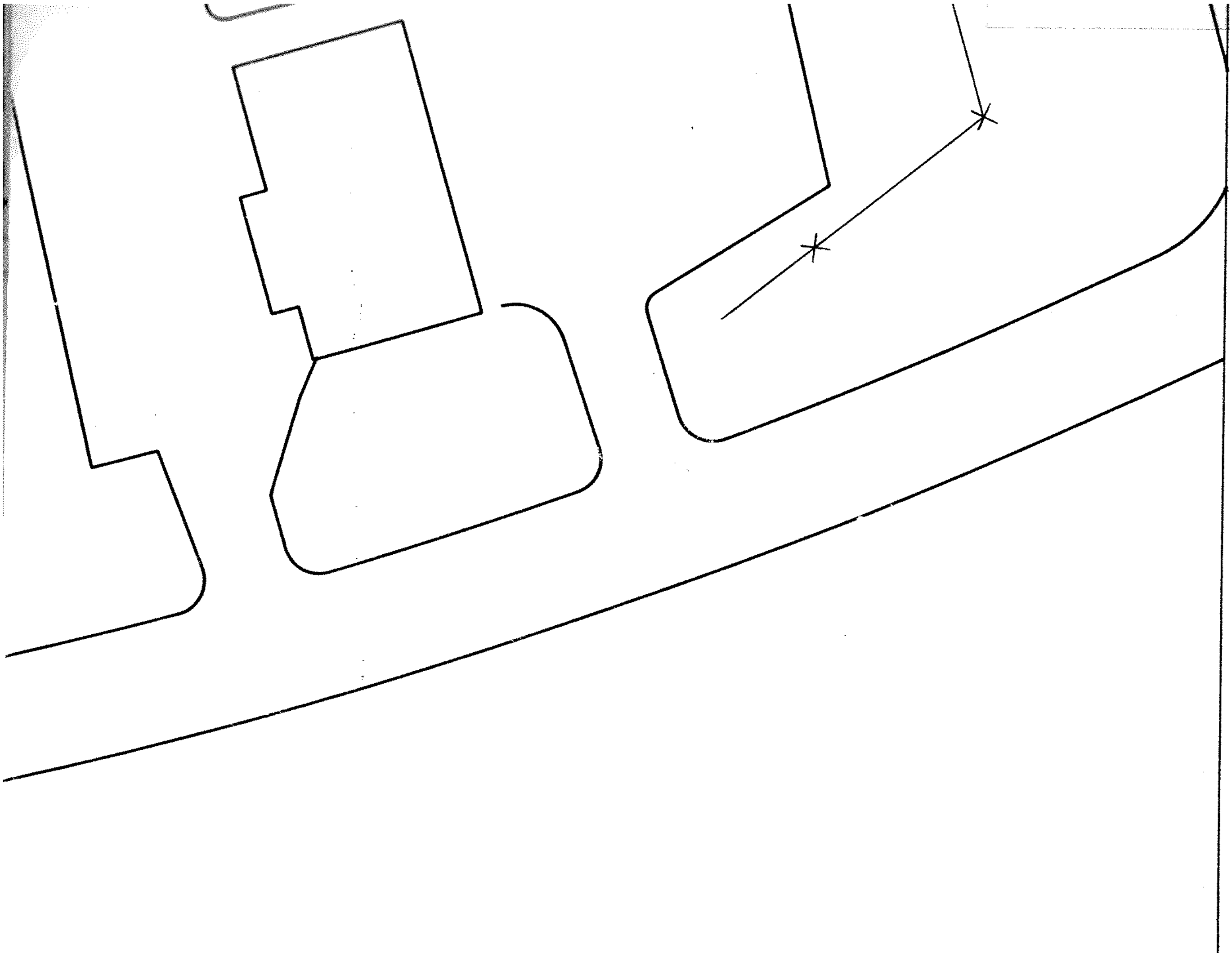


PLATE 10

ISION	BY

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205

MAXIMUM, MINIMUM, AVERAGE OF PHASE II & III ANALYTICAL RESULTS

POWEREX, INC.
(GENERAL ELECTRIC CO.)

CITY OF AUBURN
CAYUGA COUNTY, N.Y.

PROJECT MANAGER:
Rodney W. Sutch
Kristen Franz-Begor
PREPARED BY:

CHECKED BY:

DRAFTED BY:
Charles T. O'Clair
PROJECT NO.
2092-5-321
SHEET OF

MAP NO.
M8008_2
DATE:
February 1988

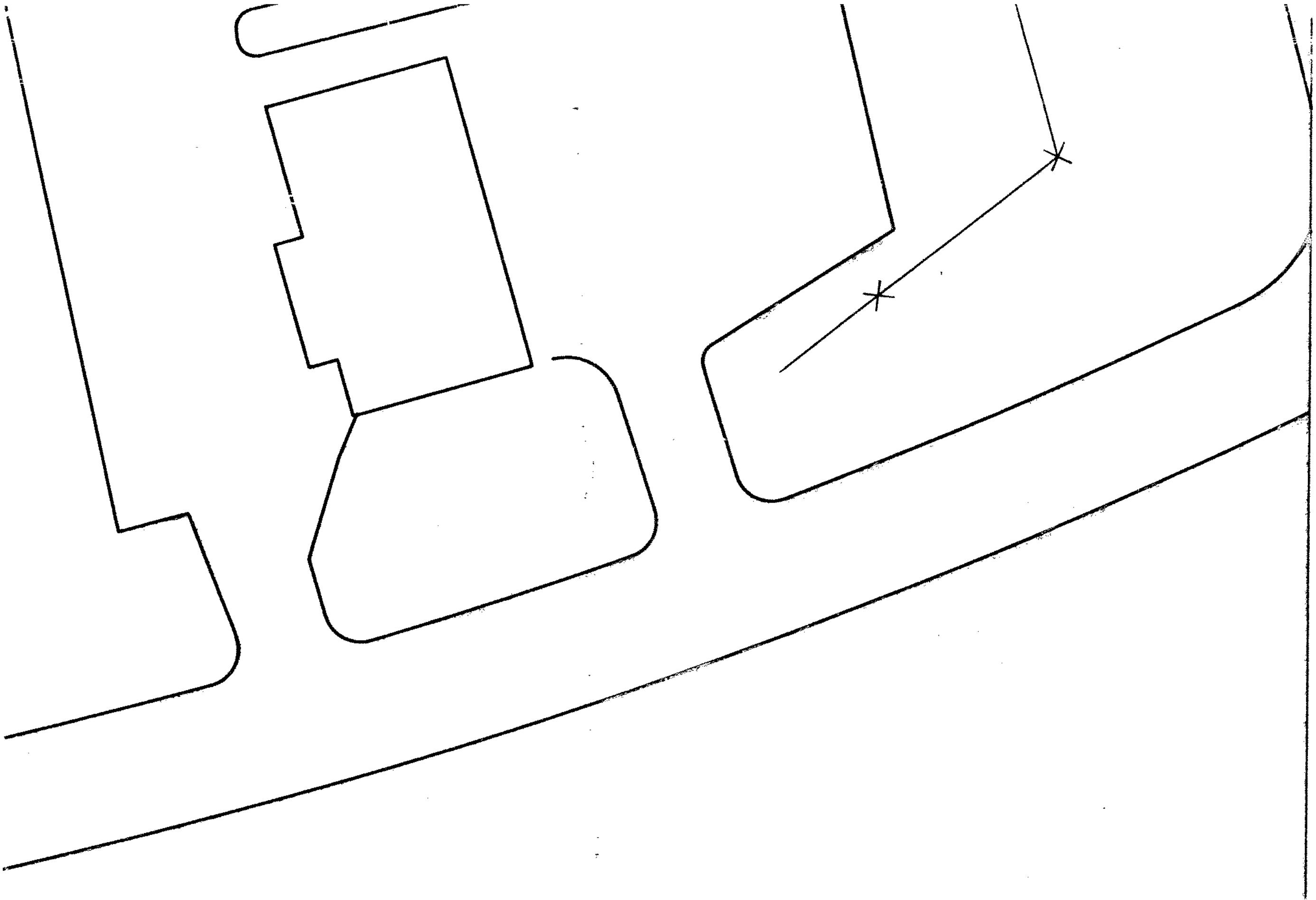


PLATE II

EVISION	BY

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205

MAXIMUM, MINIMUM, AVERAGE OF PHASE II & III ANALYTICAL RESULTS

POWEREX, INC.
(GENERAL ELECTRIC CO.)

CITY OF AUBURN CAYUGA COUNTY, N.Y.

PROJECT MANAGER:
Rodney W. Sutch
Kristen Franz–Begor

PREPARED BY:

CHECKED BY:

DRAFTED BY:
Charles T. O'Clair

PROJECT NO.
2092–5–321

SHEET OF

MAP NO.
M8088_3

DATE:
February 1988

APPENDIX G

Trichloroethylene
Phase II & III Analytical Results

Record#	LOCID	LABORATORY	DATE	CONCENTRAT	UNITS
43	PS-12	PSA	12/13/86	0.1000	PPB
42	PS-11B	PSA	12/13/86	0.1200	PPB
49	PS-18	PSA	11/02/87	0.2700	PPB
50	PS-31	PSA	11/02/87	1.1000	PPB
46	PS-15	PSA	12/13/86	1.2000	PPB
54	PS-34	PSA	11/03/87	1.8000	PPB
2	DGC-4B	ERCO	01/28/87	2.1000	PPB
55	PS-17	PSA	11/02/87	2.3000	PPB
8	DGC-2S	ERCO	11/24/87	2.6000	PPB
12	DGC-11S	ERCO	11/25/87	6.8000	PPB
1	DGC-1B	ERCO	01/28/87	9.9000	PPB
10	DGC-6B	ERCO	11/24/87	11.0000	PPB
51	PS-21	PSA	10/30/87	13.0000	PPB
15	SW-A	ERCO	11/04/87	14.0000	PPB
14	PS-34	ERCO	11/24/87	15.0000	PPB
9	DGC-4B	ERCO	11/24/87	33.0000	PPB
17	SW-C	ERCO	11/04/87	34.0000	PPB
52	PS-22	PSA	10/30/87	35.0000	PPB
53	PS-32	PSA	11/02/87	44.0000	PPB
39	PS-8B	PSA	12/13/86	49.0000	PPB
5	PS-9	ERCO	01/28/87	55.0000	PPB
38	PS-8A	PSA	12/13/86	55.0000	PPB
36	PS-6	PSA	12/13/86	56.0000	PPB
18	PS-32	ERCO	11/24/87	73.0000	PPB
16	SW-B	ERCO	11/04/87	97.0000	PPB
4	PS-7	ERCO	01/28/87	120.0000	PPB
40	PS-9	PSA	12/13/86	150.0000	PPB
35	PS-5	PSA	12/13/86	220.0000	PPB
13	PS-27	ERCO	11/24/87	270.0000	PPB
34	PS-4	PSA	12/13/86	330.0000	PPB
57	PS-27	PSA	11/03/87	490.0000	PPB
37	PS-7	PSA	12/13/86	870.0000	PPB
47	PS-16S	PSA	12/14/86	960.0000	PPB
61	PS-23	PSA	11/03/87	970.0000	PPB
60	PS-30	PSA	11/03/87	980.0000	PPB
58	PS-28	PSA	11/03/87	1300.0000	PPB
63	PS-26	PSA	11/04/87	1400.0000	PPB
44	PS-13	PSA	12/14/86	1600.0000	PPB
19	DGC-10B	ERCO	11/25/87	3200.0000	PPB
29	PS-1	PSA	12/13/86	3400.0000	PPB
11	DGC-10B	ERCO	11/25/87	4000.0000	PPB
62	PS-25	PSA	11/04/87	4500.0000	PPB
20	PS-1	ERCO	11/24/87	5700.0000	PPB
22	PS-25	ERCO	11/24/87	6100.0000	PPB
21	PS-2	ERCO	11/24/87	6600.0000	PPB
31	PS-2	PSA	12/14/86	9000.0000	PPB
3	PS-2	ERCO	01/28/87	11000.0000	PPB
59	PS-29	PSA	11/03/87	12000.0000	PPB
30	PS-2	PSA	12/13/86	14000.0000	PPB
48	PS-16D	PSA	12/14/86	15000.0000	PPB
45	PS-14	PSA	12/14/86	16000.0000	PPB
24	PS-16D	ERCO	11/24/87	20000.0000	PPB
32	PS-3S	PSA	12/13/86	22000.0000	PPB
6	PS-10	ERCO	01/28/87	39000.0000	PPB
26	DGC-9B	ERCO	11/24/87	130000.0000	PPB
33	PS-3D	PSA	12/14/86	140000.0000	PPB
41	PS-10	PSA	12/13/86	190000.0000	PPB
56	PS-24	PSA	11/03/87	190000.0000	PPB
23	PS-24	ERCO	11/24/87	310000.0000	PPB
28	PS-3D	ERCO	11/24/87	350000.0000	PPB
7	PS-3D	ERCO	01/28/87	380000.0000	PPB
25	PS-35	ERCO	11/24/87	600000.0000	PPB

Notes:
1. Includes all field and laboratory analyses.
2. "Not Detected" (ND) results not included.
3. Listed by increasing concentration.

1,2-Dichloroethylene
Phase II & III Analytical Results

```
Record#  LOCID         LABORATORY DATE        CONCENTRAT UNITS
     44  PS-17         PSA        11/02/87        0.4200 PPB
     37  PS-9          PSA        12/13/86        0.6000 PPB
     43  PS-34         PSA        11/03/87        3.2000 PPB
     50  PS-23         PSA        11/03/87        3.8000 PPB
      7  PS-9          ERCO       01/28/87        6.7000 PPB
      3  DGC-2S        ERCO       01/28/87        8.8000 PPB
     17  SW-A          ERCO       11/04/87       11.0000 PPB
      2  DGC-2S        ERCO       01/28/87       12.0000 PPB
     36  PS-7          PSA        12/13/86       19.0000 PPB
     14  DGC-11S       ERCO       11/25/87       28.0000 PPB
     35  PS-4          PSA        12/13/86       28.0000 PPB
     19  SW-C          ERCO       11/04/87       35.0000 PPB
      4  DGC-4B        ERCO       01/28/87       55.0000 PPB
     52  PS-26         PSA        11/04/87       58.0000 PPB
     33  PS-1          PSA        12/13/86       60.0000 PPB
     40  PS-16S        PSA        12/14/86       64.0000 PPB
     12  DGC-6B        ERCO       11/24/87       70.0000 PPB
     42  PS-32         PSA        11/02/87       74.0000 PPB
     18  SW-B          ERCO       11/04/87       93.0000 PPB
     41  PS-16D        PSA        12/14/86       96.0000 PPB
     39  PS-14         PSA        12/14/86      170.0000 PPB
     10  DGC-2S        ERCO       11/24/87      190.0000 PPB
     47  PS-28         PSA        11/03/87      190.0000 PPB
     45  PS-24         PSA        11/03/87      230.0000 PPB
     34  PS-2          PSA        12/13/86      270.0000 PPB
     46  PS-27         PSA        11/03/87      300.0000 PPB
      6  PS-7          ERCO       01/28/87      360.0000 PPB
     11  DGC-4B        ERCO       11/24/87      390.0000 PPB
     49  PS-30         PSA        11/03/87      420.0000 PPB
      1  DGC-1B        ERCO       01/28/87      440.0000 PPB
     51  PS-25         PSA        11/04/87      460.0000 PPB
     16  PS-34         ERCO       11/24/87      480.0000 PPB
      9  PS-3D         ERCO       01/28/87      790.0000 PPB
     23  PS-1          ERCO       11/24/87     1100.0000 PPB
     15  PS-27         ERCO       11/24/87     1400.0000 PPB
     28  PS-24         ERCO       11/24/87     1500.0000 PPB
     27  DGC-7B        ERCO       11/24/87     1900.0000 PPB
     21  PS-32         ERCO       11/24/87     2000.0000 PPB
     26  PS-25         ERCO       11/24/87     3600.0000 PPB
      5  PS-2          ERCO       01/28/87     5000.0000 PPB
     48  PS-29         PSA        11/03/87     5200.0000 PPB
     25  PS-2          ERCO       11/24/87     6900.0000 PPB
     30  PS-35         ERCO       11/24/87    12000.0000 PPB
     38  PS-10         PSA        12/13/86    13000.0000 PPB
     20  DGC-2B        ERCO       11/24/87    15000.0000 PPB
     22  DGC-10B       ERCO       11/25/87    19000.0000 PPB
     13  DGC-10B       ERCO       11/25/87    22000.0000 PPB
     24  DGC-2B        ERCO       11/24/87    22000.0000 PPB
     29  DGC-1B        ERCO       11/24/87    23000.0000 PPB
      8  PS-10         ERCO       01/28/87    62000.0000 PPB
     31  DGC-9B        ERCO       11/24/87   200000.0000 PPB
     32  DGC-8B        ERCO       11/24/87   360000.0000 PPB

. assist
```

Notes:
1. Includes all field and laboratory analyses.
2. "Not Detected" (ND) results not included.
3. Listed by increasing concentration.

Vinyl Chloride
Phase II & III Analytical Results

```
Record# LOCID      LABORATORY DATE      CONCENTRAT UNITS
     14 SW-B       ERCO       11/04/87      5.0000 PPB
      4 DGC-4B     ERCO       01/28/87     51.0000 PPB
      6 PS-7       ERCO       01/28/87     85.0000 PPB
      9 DGC-4B     ERCO       11/24/87    110.0000 PPB
     13 PS-34      ERCO       11/24/87    140.0000 PPB
     10 DGC-6B     ERCO       11/24/87    160.0000 PPB
      3 DGC-2S     ERCO       01/28/87    220.0000 PPB
      2 DGC-2S     ERCO       01/28/87    280.0000 PPB
      8 DGC-2S     ERCO       11/24/87    310.0000 PPB
     12 PS-27      ERCO       11/24/87    320.0000 PPB
      5 PS-2       ERCO       01/28/87    400.0000 PPB
      1 DGC-1B     ERCO       01/28/87    410.0000 PPB
     17 DGC-10B    ERCO       11/25/87    770.0000 PPB
     11 DGC-10B    ERCO       11/25/87    820.0000 PPB
     16 PS-32      ERCO       11/24/87   1900.0000 PPB
     19 DGC-7B     ERCO       11/24/87   3000.0000 PPB
      7 PS-10      ERCO       01/28/87   9700.0000 PPB
     20 DGC-1B     ERCO       11/24/87  16000.0000 PPB
     15 DGC-2B     ERCO       11/24/87  36000.0000 PPB
     18 DGC-2B     ERCO       11/24/87  64000.0000 PPB

. assist
```

Notes:
1. Includes all field and laboratory analyses.
2. "Not Detected" (ND) results not included.
3. Listed by increasing concentration.

Benzene
Phase II & III Analytical Results

Record#	LOCID	LABORATORY	DATE	CONCENTRAT	UNITS
9	PS-20	PSA	10/29/87	0.1400	PPB
6	PS-5	PSA	12/13/86	0.1500	PPB
2	PS-33	ERCO	11/24/87	2.1000	PPB
5	PS-3S	PSA	12/13/86	3.6000	PPB
7	PS-16S	PSA	12/14/86	4.3000	PPB
3	PS-1	PSA	12/13/86	13.0000	PPB
4	PS-2	PSA	12/13/86	27.0000	PPB
1	DGC-10B	ERCO	11/25/87	31.0000	PPB
8	PS-16D	PSA	12/14/86	53.0000	PPB

. assist

Notes:
1. Includes all field and laboratory analyses.
2. "Not Detected" (ND) results not included.
3. Listed by increasing concentration.

Toluene
Phase II & III Analytical Results

Record#	LOCID	LABORATORY	DATE	CONCENTRAT	UNITS
22	PS-21	PSA	10/30/87	0.3900	PPB
24	PS-20	PSA	10/29/87	0.4200	PPB
23	PS-22	PSA	10/30/87	1.1000	PPB
11	PS-4	PSA	12/13/86	1.4000	PPB
12	PS-5	PSA	12/13/86	1.6000	PPB
15	PS-8A	PSA	12/13/86	2.0000	PPB
16	PS-8B	PSA	12/13/86	2.0000	PPB
13	PS-6	PSA	12/13/86	3.9000	PPB
17	PS-9	PSA	12/13/86	5.9000	PPB
5	PS-33	ERCO	11/24/87	8.9000	PPB
1	DGC-1B	ERCO	01/28/87	14.0000	PPB
20	PS-16D	PSA	12/14/86	20.0000	PPB
2	PS-2	ERCO	01/28/87	49.0000	PPB
14	PS-7	PSA	12/13/86	53.0000	PPB
4	DGC-10B	ERCO	11/25/87	54.0000	PPB
21	PS-31	PSA	11/02/87	54.0000	PPB
9	PS-2	PSA	12/13/86	74.0000	PPB
10	PS-2	PSA	12/14/86	170.0000	PPB
19	PS-14	PSA	12/14/86	470.0000	PPB
6	DGC-2B	ERCO	11/24/87	490.0000	PPB
7	DGC-2B	ERCO	11/24/87	650.0000	PPB
8	PS-24	ERCO	11/24/87	1200.0000	PPB
3	PS-3D	ERCO	01/28/87	2400.0000	PPB
18	PS-10	PSA	12/13/86	42000.0000	PPB

Notes:

1. Includes all field and laboratory analyses.
2. "Not Detected" (ND) results not included.
3. Listed by increasing concentration.

Ethylbenzene
Phase II & III Analytical Results

Record#	LOCID	LABORATORY	DATE	CONCENTRAT	UNITS
4	PS-33	ERCO	11/24/87	2.3000	PPB
1	DGC-1B	ERCO	01/28/87	2.8000	PPB
3	DGC-10B	ERCO	11/25/87	5.5000	PPB
8	PS-16D	PSA	12/14/86	49.0000	PPB
5	DGC-2B	ERCO	11/24/87	82.0000	PPB
7	PS-14	PSA	12/14/86	150.0000	PPB
2	PS-10	ERCO	01/28/87	550.0000	PPB
6	PS-10	PSA	12/13/86	8700.0000	PPB

. assist

Notes:
1. Includes all field and laboratory analyses.
2. "Not Detected" (ND) results not included.
3. Listed by increasing concentration.

Total Xylenes
Phase II & III Analytical Results

Record#	LOCID	LABORATORY	DATE	CONCENTRAT	UNITS
1	DGC-1B	ERCO	01/28/87	13.0000	PPB
4	PS-33	ERCO	11/24/87	17.0000	PPB
3	DGC-10B	ERCO	11/25/87	19.0000	PPB
6	PS-32	ERCO	11/24/87	57.0000	PPB
7	DGC-2B	ERCO	11/24/87	400.0000	PPB
5	DGC-2B	ERCO	11/24/87	420.0000	PPB
8	PS-24	ERCO	11/24/87	1100.0000	PPB
2	PS-10	ERCO	01/28/87	1800.0000	PPB
9	PS-35	ERCO	11/24/87	13000.0000	PPB

Notes:
1. Includes all field and laboratory analyses.
2. "Not Detected" (ND) results not included.
3. Listed by increasing concentration.

1,1,1-Trichloroethane
Phase II & III Analytical Results

Record#	LOCID	LABORATORY	DATE	CONCENTRAT	UNITS
1	SW-C	ERCO	11/04/87	3.6000	PPB
2	PS-35	ERCO	11/24/87	28000.0000	PPB

Notes:

1. Includes all field and laboratory analyses.
2. "Not Detected" (ND) results not included.
3. Listed by increasing concentration.

ANALYSIS OF GROUND WATER SAMPLES (ppb)

Sample Location	Date Sampled ; Date Tested	1,1 Di-chloro-ethylene	trans-Dichloro-ethylene	cis-Di-chloro-ethylene	Trichloro-ethylene	Tetra-chloro-ethylene	Benzene	Toluene	Ethyl Benzene	Other
PS-5	11/3/87 11/3/87									*
PS-17	11/2/87 11/2/87		0.42	20	2.3	4.0				
PS-18	11/2/87 11/2/87				0.27					
PS-19	11/3/87 11/3/87									*
PS-20	10/29/87 10/29/87						0.14	0.42		
PS-21	10/30/87 10/30/87			0.49	13			0.39		
PS-22	10/30/87 10/30/87			5.4	35			1.1		

---

* No volatile organic compounds detected.

ANALYSIS OF GROUND WATER SAMPLES (ppb)

Sample Location	Date Sampled; Date Tested	1,1 Di-chloro-ethylene	trans-Dichloro-ethylene	cis-Di-chloro-ethylene	Trichloro-ethylene	Tetra-chloro-ethylene	Benzene	Toluene	Ethyl Benzene	Other
PS-23	11/3/87 11/3/87	0.37	3.8	32	970	440				
PS-24	11/3/87 11/11/87	11	230	390	190,000					
PS-25	11/4/87 11/11/87	10	460	2,500	4,500					
PS-26	11/4/87 11/11/87	5.1	58	310	1,400					
PS-27	11/3/87 11/11/87	16	300	1,400	490					
PS-28	11/3/87 11/11/87	5.3	190	1,300	1,300					
PS-29	11/3/87 11/11/87	83	5,200	60,000	12,000					
PS-30	11/3/87 11/11/87	24	420	1,900	980					

ANALYSIS OF GROUND WATER SAMPLES (ppb)

Sample Location	Date Sampled; Date Tested	1,1 Di-chloro-ethylene	trans-Dichloro-ethylene	cis-Di-chloro-ethylene	Trichloro-ethylene	Tetra-chloro-ethylene	Benzene	Toluene	Ethyl Benzene	Other
PS-31	11/2/87 11/2/87				1.1			54		
PS-32	11/2/87 11/11/87		74	2,900	44					
PS-33	11/4/87 11/11/87									*
PS-34	11/3/87 11/3/87		3.2	49	1.8					
Tap water used for well development	10/29/87 10/29/87						0.38	0.92		

---

* No volatile organic compounds detected.

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: DGC-1S

Laboratory ID: 6021-06

Matrix: Water Sampled: 11/24/87 Received: 11/25/87

Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by SA Approved by

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: DCG-1B
Laboratory ID: 6021-07
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/03/87 Analyzed: 12/03/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5,000
Bromomethane	ND	µg/L	5,000
Vinyl chloride	16,000	µg/L	5,000
Chloroethane	ND	µg/L	5,000
Methylene chloride	ND	µg/L	5,000
Acetone	97,000	µg/L	50,000
Carbon disulfide	ND	µg/L	2,000
1,1-Dichloroethene	ND	µg/L	2,000
1,1-Dichloroethane	ND	µg/L	2,000
trans-1,2-Dichloroethene	23,000	µg/L	2,000
Chloroform	ND	µg/L	2,000
1,2-Dichloroethane	ND	µg/L	2,000
2-Butanone	ND	µg/L	10,000
1,1,1-Trichloroethane	ND	µg/L	2,000
Carbon tetrachloride	ND	µg/L	2,000
Vinyl acetate	ND	µg/L	10,000
Bromodichloromethane	ND	µg/L	2,000
1,2-Dichloropropane	ND	µg/L	2,000
trans-1,3-Dichloropropene	ND	µg/L	2,000
Trichloroethene	ND	µg/L	5,000
Dibromochloromethane	ND	µg/L	2,000
1,1,2-Trichloroethane	ND	µg/L	2,000
Benzene	ND	µg/L	2,000
cis-1,3-Dichloropropene	ND	µg/L	2,000
2-Chloroethyl vinyl ether	ND	µg/L	10,000
Bromoform	ND	µg/L	2,000
4-Methyl-2-pentanone	ND	µg/L	10,000
2-Hexanone	ND	µg/L	10,000
1,1,2,2-Tetrachloroethane	ND	µg/L	2,000
Tetrachloroethene	ND	µg/L	2,000
Toluene	ND	µg/L	2,000
Chlorobenzene	ND	µg/L	2,000
Ethyl benzene	ND	µg/L	2,000
Styrene	ND	µg/L	2,000
Total xylenes	ND	µg/L	2,000

ND = Not detected.

Reported by SA Approved by OB

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: DGC-2S

Laboratory ID: 6021-04

Matrix: Water   Sampled: 11/24/87   Received: 11/25/87

Authorized: 11/25/87   Prepared: 12/02/87   Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	310	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	190	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	2.6	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by SA   Approved by CB

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: DGC-2B
Laboratory ID: 6021-05
Matrix: Water
Sampled: 11/24/87
Received: 11/25/87
Authorized: 11/25/87
Prepared: 12/02/87
Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	1,000
Bromomethane	ND	µg/L	1,000
Vinyl chloride	64,000	µg/L	1,000
Chloroethane	ND	µg/L	1,000
Methylene chloride	ND	µg/L	1,000
Acetone	ND	µg/L	10,000
Carbon disulfide	ND	µg/L	400
1,1-Dichloroethene	ND	µg/L	400
1,1-Dichloroethane	ND	µg/L	400
trans-1,2-Dichloroethene	22,000	µg/L	400
Chloroform	ND	µg/L	400
1,2-Dichloroethane	ND	µg/L	400
2-Butanone	ND	µg/L	2,000
1,1,1-Trichloroethane	ND	µg/L	400
Carbon tetrachloride	ND	µg/L	400
Vinyl acetate	ND	µg/L	2,000
Bromodichloromethane	ND	µg/L	400
1,2-Dichloropropane	ND	µg/L	400
trans-1,3-Dichloropropene	ND	µg/L	400
Trichloroethene	ND	µg/L	400
Dibromochloromethane	ND	µg/L	400
1,1,2-Trichloroethane	ND	µg/L	400
Benzene	ND	µg/L	400
cis-1,3-Dichloropropene	ND	µg/L	400
2-Chloroethyl vinyl ether	ND	µg/L	2,000
Bromoform	ND	µg/L	400
4-Methyl-2-pentanone	ND	µg/L	2,000
2-Hexanone	ND	µg/L	2,000
1,1,2,2-Tetrachloroethane	ND	µg/L	400
Tetrachloroethene	ND	µg/L	400
Toluene	650	µg/L	400
Chlorobenzene	ND	µg/L	400
Ethyl benzene	ND	µg/L	400
Styrene	ND	µg/L	400
Total xylenes	ND	µg/L	400

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: X-1 (2B)
Laboratory ID: 6021-11
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Paramet	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	50
Bromomethane	ND	µg/L	50
Vinyl chloride	36,000	µg/L	50
Chloroethane	ND	µg/L	50
Methylene chloride	ND	µg/L	500
Acetone	8,600	µg/L	20
Carbon disulfide	ND	µg/L	20
1,1-Dichloroethene	34	µg/L	20
1,1-Dichloroethane	ND	µg/L	20
trans-1,2-Dichloroethene	15,000	µg/L	20
Chloroform	ND	µg/L	20
1,2-Dichloroethane	ND	µg/L	20
2-Butanone	ND	µg/L	100
1,1,1-Trichloroethane	ND	µg/L	20
Carbon tetrachloride	ND	µg/L	20
Vinyl acetate	ND	µg/L	100
Bromodichloromethane	ND	µg/L	20
1,2-Dichloropropane	ND	µg/L	20
trans-1,3-Dichloropropene	ND	µg/L	20
Trichloroethene	ND	µg/L	20
Dibromochloromethane	ND	µg/L	20
1,1,2-Trichloroethane	ND	µg/L	20
Benzene	ND	µg/L	20
cis-1,3-Dichloropropene	ND	µg/L	20
2-Chloroethyl vinyl ether	ND	µg/L	100
Bromoform	ND	µg/L	20
4-Methyl-2-pentanone	300	µg/L	100
2-Hexanone	ND	µg/L	100
1,1,2,2-Tetrachloroethane	ND	µg/L	20
Tetrachloroethene	ND	µg/L	20
Toluene	490	µg/L	20
Chlorobenzene	ND	µg/L	20
Ethyl benzene	82	µg/L	20
Styrene	ND	µg/L	20
Total xylenes	420	µg/L	20

ND = Not detected.

Reported by SA Approved by OB

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: DGC-3S
Laboratory ID: 6021-02
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	50
Acetone	ND	µg/L	2
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	10
2-Butanone	ND	µg/L	2
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	10
Vinyl acetate	ND	µg/L	2
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	10
2-Chloroethyl vinyl ether	ND	µg/L	2
Bromoform	ND	µg/L	10
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	2
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by SA Approved by OB

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: DGC-3B

Laboratory ID: 6021-03

Matrix: Water Sampled: 11/24/87 Received: 11/25/87

Authorized: 11/25/87 Prepared: 12/01/87 Analyzed: 12/01/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: DGC-4S
Laboratory ID: 6021-28
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/03/87 Analyzed: 12/03/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by SA Approved by

Acetone
Phase II & III Analytical Results

Record#	LOCID	LABORATORY	DATE	CONCENTRAT	UNITS
1	DGC-1B	ERCO	01/28/87	1500.0000	PPB
4	DGC-2B	ERCO	11/24/87	8600.0000	PPB
6	PS-24	ERCO	11/24/87	13000.0000	PPB
5	DGC-7B	ERCO	11/24/87	77000.0000	PPB
2	PS-10	ERCO	01/28/87	95000.0000	PPB
7	DGC-1B	ERCO	11/24/87	97000.0000	PPB
8	PS-35	ERCO	11/24/87	200000.0000	PPB
3	PS-3D	ERCO	01/28/87	420000.0000	PPB
11	PS-3D	ERCO	11/24/87	500000.0000	PPB
9	DGC-9B	ERCO	11/24/87	820000.0000	PPB
10	DGC-8B	ERCO	11/24/87	2000000.0000	PPB

Notes:
1. Includes all field and laboratory analyses.
2. "Not Detected" (ND) results not included.
3. Listed by increasing concentration.

Tetrachloroethylene
Phase II & III Analytical Results

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Record# LOCID       LABORATORY DATE       CONCENTRAT UNITS
      8 PS-4        PSA        12/13/86       1.1000 PPB
      9 PS-5        PSA        12/13/86       1.6000 PPB
     12 PS-8B       PSA        12/13/86       2.0000 PPB
     14 PS-12       PSA        12/13/86       2.8000 PPB
     15 PS-13       PSA        12/14/86       3.2000 PPB
     18 PS-17       PSA        11/02/87       4.0000 PPB
     11 PS-8A       PSA        12/13/86       4.2000 PPB
      4 SW-C        ERCO       11/04/87       7.1000 PPB
     16 PS-16S      PSA        12/14/86       8.0000 PPB
      6 PS-1        PSA        12/13/86      13.0000 PPB
      7 PS-2        PSA        12/13/86      37.0000 PPB
      1 PS-7        ERCO       01/28/87      40.0000 PPB
     17 PS-16D      PSA        12/14/86      40.0000 PPB
     10 PS-7        PSA        12/13/86     190.0000 PPB
     19 PS-23       PSA        11/03/87     440.0000 PPB
      3 PS-10       ERCO       01/28/87    2100.0000 PPB
      2 PS-9        ERCO       01/28/87    8900.0000 PPB
     13 PS-9        PSA        12/13/86   23000.0000 PPB
      5 PS-35       ERCO       11/24/87   32000.0000 PPB

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Notes:
1. Includes all field and laboratory analyses.
2. "Not Detected" (ND) results not included.
3. Listed by increasing concentration.

Record#	LOCID	LABORATORY	DATE	CONCENTRAT	UNITS
2035	PS-35	ERCO	11/24/87	590000.0000	PPB

Methylene Chloride
Phase II & III Analytical Results

Notes:
1. Includes all field and laboratory analyses.
2. "Not Detected" (ND) results not included.
3. Listed by increasing concentration.

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: DGC-4B
Laboratory ID: 6021-29
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/03/87 Analyzed: 12/03/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride ------------------	110	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene -------	390	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene ------------------	33	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by Stephen Andrichak Approved by

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: DGC-5B

Laboratory ID: 6033-04

Matrix: Water Sampled: 11/25/87 Received: 11/30/87

Authorized: 11/30/87 Prepared: 12/03/87 Analyzed: 12/03/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by ______ Approved by ______

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: DGC-6B
Laboratory ID: 6021-01
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/01/87 Analyzed: 12/01/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride -----------------	160	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene -------------	3.2	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene --------	70	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene -----------------	11	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by SA Approved by

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: DGC-7B
Laboratory ID: 6021-08
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/03/87 Analyzed: 12/03/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	1,300
Bromomethane	ND	µg/L	1,300
Vinyl chloride	3,000	µg/L	1,300
Chloroethane	ND	µg/L	1,300
Methylene chloride	ND	µg/L	1,300
Acetone	77,000	µg/L	13,000
Carbon disulfide	ND	µg/L	500
1,1-Dichloroethene	ND	µg/L	500
1,1-Dichloroethane	ND	µg/L	500
trans-1,2-Dichloroethene	1,900	µg/L	500
Chloroform	ND	µg/L	500
1,2-Dichloroethane	ND	µg/L	500
2-Butanone	ND	µg/L	2,500
1,1,1-Trichloroethane	ND	µg/L	500
Carbon tetrachloride	ND	µg/L	500
Vinyl acetate	ND	µg/L	2,500
Bromodichloromethane	ND	µg/L	500
1,2-Dichloropropane	ND	µg/L	500
trans-1,3-Dichloropropene	ND	µg/L	500
Trichloroethene	ND	µg/L	500
Dibromochloromethane	ND	µg/L	500
1,1,2-Trichloroethane	ND	µg/L	500
Benzene	ND	µg/L	500
cis-1,3-Dichloropropene	ND	µg/L	500
2-Chloroethyl vinyl ether	ND	µg/L	2,500
Bromoform	ND	µg/L	500
4-Methyl-2-pentanone	ND	µg/L	2,500
2-Hexanone	ND	µg/L	2,500
1,1,2,2-Tetrachloroethane	ND	µg/L	500
Tetrachloroethene	ND	µg/L	500
Toluene	ND	µg/L	500
Chlorobenzene	ND	µg/L	500
Ethyl benzene	ND	µg/L	500
Styrene	ND	µg/L	500
Total xylenes	ND	µg/L	500

ND = Not detected.

Reported by SA Approved by

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: DGC-8B
Laboratory ID: 6021-10
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	50,000
Bromomethane	ND	µg/L	50,000
Vinyl chloride	ND	µg/L	50,000
Chloroethane	ND	µg/L	50,000
Methylene chloride	ND	µg/L	50,000
Acetone	2,000,000	µg/L	500,000
Carbon disulfide	ND	µg/L	20,000
1,1-Dichloroethene	ND	µg/L	20,000
1,1-Dichloroethane	ND	µg/L	20,000
trans-1,2-Dichloroethene	360,000	µg/L	20,000
Chloroform	ND	µg/L	20,000
1,2-Dichloroethane	ND	µg/L	20,000
2-Butanone	ND	µg/L	100,000
1,1,1-Trichloroethane	ND	µg/L	20,000
Carbon tetrachloride	ND	µg/L	20,000
Vinyl acetate	ND	µg/L	100,000
Bromodichloromethane	ND	µg/L	20,000
1,2-Dichloropropane	ND	µg/L	20,000
trans-1,3-Dichloropropene	ND	µg/L	20,000
Trichloroethene	860,000	µg/L	20,000
Dibromochloromethane	ND	µg/L	20,000
1,1,2-Trichloroethane	ND	µg/L	20,000
Benzene	ND	µg/L	20,000
cis-1,3-Dichloropropene	ND	µg/L	20,000
2-Chloroethyl vinyl ether	ND	µg/L	100,000
Bromoform	ND	µg/L	20,000
4-Methyl-2-pentanone	ND	µg/L	100,000
2-Hexanone	ND	µg/L	100,000
1,1,2,2-Tetrachloroethane	ND	µg/L	20,000
Tetrachloroethene	ND	µg/L	20,000
Toluene	ND	µg/L	20,000
Chlorobenzene	ND	µg/L	20,000
Ethyl benzene	ND	µg/L	20,000
Styrene	ND	µg/L	20,000
Total xylenes	ND	µg/L	20,000

ND = Not detected.

Reported by SA Approved by

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: DGC-9B
Laboratory ID: 6021-09
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/01/87 Analyzed: 12/01/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	25,000
Bromomethane	ND	µg/L	25,000
Vinyl chloride	ND	µg/L	25,000
Chloroethane	ND	µg/L	25,000
Methylene chloride	ND	µg/L	25,000
Acetone --------------------	820,000	µg/L	250,000
Carbon disulfide	ND	µg/L	10,000
1,1-Dichloroethene	ND	µg/L	10,000
1,1-Dichloroethane	ND	µg/L	10,000
trans-1,2-Dichloroethene ---	200,000	µg/L	10,000
Chloroform	ND	µg/L	10,000
1,2-Dichloroethane	ND	µg/L	10,000
2-Butanone	ND	µg/L	50,000
1,1,1-Trichloroethane	ND	µg/L	10,000
Carbon tetrachloride	ND	µg/L	10,000
Vinyl acetate	ND	µg/L	50,000
Bromodichloromethane	ND	µg/L	10,000
1,2-Dichloropropane	ND	µg/L	10,000
trans-1,3-Dichloropropene	ND	µg/L	10,000
Trichloroethene ------------	130,000	µg/L	10,000
Dibromochloromethane	ND	µg/L	10,000
1,1,2-Trichloroethane	ND	µg/L	10,000
Benzene	ND	µg/L	10,000
cis-1,3-Dichloropropene	ND	µg/L	10,000
2-Chloroethyl vinyl ether	ND	µg/L	50,000
Bromoform	ND	µg/L	10,000
4-Methyl-2-pentanone	ND	µg/L	50,000
2-Hexanone	ND	µg/L	50,000
1,1,2,2-Tetrachloroethane	ND	µg/L	10,000
Tetrachloroethene	ND	µg/L	10,000
Toluene	ND	µg/L	10,000
Chlorobenzene	ND	µg/L	10,000
Ethyl benzene	ND	µg/L	10,000
Styrene	ND	µg/L	10,000
Total xylenes	ND	µg/L	10,000

ND = Not detected.

Reported by SA Approved by

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: DGC-10B

Laboratory ID: 6033-02

Matrix: Water Sampled: 11/25/87 Received: 11/30/87

Authorized: 11/30/87 Prepared: 12/04/87 Analyzed: 12/04/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride ------------------	820	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene --------------	90	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene ----	22,000	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene --------------	4,000	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene -------------------------	31	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene -------------------------	54	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene ------------------	5.5	µg/L	2
Styrene	ND	µg/L	2
Total xylenes -------------------	19	µg/L	2

ND = Not detected.

Reported by ____________________ Approved by ____________________

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: X-2 (10B)
Laboratory ID: 6033-03
Matrix: Water Sampled: 11/25/87 Received: 11/30/87
Authorized: 11/30/87 Prepared: 12/04/87 Analyzed: 12/04/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	500
Bromomethane	ND	µg/L	500
Vinyl chloride -----------------	770	µg/L	500
Chloroethane	ND	µg/L	500
Methylene chloride	ND	µg/L	500
Acetone	ND	µg/L	5,000
Carbon disulfide	ND	µg/L	200
1,1-Dichloroethene	ND	µg/L	200
1,1-Dichloroethane	ND	µg/L	200
trans-1,2-Dichloroethene ----	19,000	µg/L	200
Chloroform	ND	µg/L	200
1,2-Dichloroethane	ND	µg/L	200
2-Butanone	ND	µg/L	1,000
1,1,1-Trichloroethane	ND	µg/L	200
Carbon tetrachloride	ND	µg/L	200
Vinyl acetate	ND	µg/L	1,000
Bromodichloromethane	ND	µg/L	200
1,2-Dichloropropane	ND	µg/L	200
trans-1,3-Dichloropropene	ND	µg/L	200
Trichloroethene --------------	3,200	µg/L	200
Dibromochloromethane	ND	µg/L	200
1,1,2-Trichloroethane	ND	µg/L	200
Benzene	ND	µg/L	200
cis-1,3-Dichloropropene	ND	µg/L	200
2-Chloroethyl vinyl ether	ND	µg/L	1,000
Bromoform	ND	µg/L	200
4-Methyl-2-pentanone	ND	µg/L	1,000
2-Hexanone	ND	µg/L	1,000
1,1,2,2-Tetrachloroethane	ND	µg/L	200
Tetrachloroethene	ND	µg/L	200
Toluene	ND	µg/L	200
Chlorobenzene	ND	µg/L	200
Ethyl benzene	ND	µg/L	200
Styrene	ND	µg/L	200
Total xylenes	ND	µg/L	200

ND = Not detected.

Reported by ______________ Approved by OB

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: DGC-11S
Laboratory ID: 6033-01
Matrix: Water Sampled: 11/25/87 Received: 11/30/87
Authorized: 11/30/87 Prepared: 12/07/87 Analyzed: 12/07/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene --------	28	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene ----------------	6.8	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by ____________ Approved by ____________

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: PS-1

Laboratory ID: 6021-12

Matrix: Water   Sampled: 11/24/87   Received: 11/25/87

Authorized: 11/25/87   Prepared: 12/02/87   Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	500
Bromomethane	ND	µg/L	500
Vinyl chloride	ND	µg/L	500
Chloroethane	ND	µg/L	500
Methylene chloride	ND	µg/L	500
Acetone	ND	µg/L	5,000
Carbon disulfide	ND	µg/L	200
1,1-Dichloroethene	ND	µg/L	200
1,1-Dichloroethane	ND	µg/L	200
trans-1,2-Dichloroethene -----	1,100	µg/L	200
Chloroform	ND	µg/L	200
1,2-Dichloroethane	ND	µg/L	200
2-Butanone	ND	µg/L	1,000
1,1,1-Trichloroethane	ND	µg/L	200
Carbon tetrachloride	ND	µg/L	200
Vinyl acetate	ND	µg/L	1,000
Bromodichloromethane	ND	µg/L	200
1,2-Dichloropropane	ND	µg/L	200
trans-1,3-Dichloropropene	ND	µg/L	200
Trichloroethene --------------	5,700	µg/L	200
Dibromochloromethane	ND	µg/L	200
1,1,2-Trichloroethane	ND	µg/L	200
Benzene	ND	µg/L	200
cis-1,3-Dichloropropene	ND	µg/L	200
2-Chloroethyl vinyl ether	ND	µg/L	1,000
Bromoform	ND	µg/L	200
4-Methyl-2-pentanone	ND	µg/L	1,000
2-Hexanone	ND	µg/L	1,000
1,1,2,2-Tetrachloroethane	ND	µg/L	200
Tetrachloroethene	ND	µg/L	200
Toluene	ND	µg/L	200
Chlorobenzene	ND	µg/L	200
Ethyl benzene	ND	µg/L	200
Styrene	ND	µg/L	200
Total xylenes	ND	µg/L	200

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: PS-2

Laboratory ID: 6021-13

Matrix: Water Sampled: 11/24/87 Received: 11/25/87

Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	1,000
Bromomethane	ND	µg/L	1,000
Vinyl chloride	ND	µg/L	1,000
Chloroethane	ND	µg/L	1,000
Methylene chloride	ND	µg/L	1,000
Acetone	ND	µg/L	10,000
Carbon disulfide	ND	µg/L	400
1,1-Dichloroethene	ND	µg/L	400
1,1-Dichloroethane	ND	µg/L	400
trans-1,2-Dichloroethene -----	6,900	µg/L	400
Chloroform	ND	µg/L	400
1,2-Dichloroethane	ND	µg/L	400
2-Butanone	ND	µg/L	2,000
1,1,1-Trichloroethane	ND	µg/L	400
Carbon tetrachloride	ND	µg/L	400
Vinyl acetate	ND	µg/L	2,000
Bromodichloromethane	ND	µg/L	400
1,2-Dichloropropane	ND	µg/L	400
trans-1,3-Dichloropropene	ND	µg/L	400
Trichloroethene --------------	6,600	µg/L	400
Dibromochloromethane	ND	µg/L	400
1,1,2-Trichloroethane	ND	µg/L	400
Benzene	ND	µg/L	400
cis-1,3-Dichloropropene	ND	µg/L	400
2-Chloroethyl vinyl ether	ND	µg/L	2,000
Bromoform	ND	µg/L	400
4-Methyl-2-pentanone	ND	µg/L	2,000
2-Hexanone	ND	µg/L	2,000
1,1,2,2-Tetrachloroethane	ND	µg/L	400
Tetrachloroethene	ND	µg/L	400
Toluene	ND	µg/L	400
Chlorobenzene	ND	µg/L	400
Ethyl benzene	ND	µg/L	400
Styrene	ND	µg/L	400
Total xylenes	ND	µg/L	400

ND = Not detected.

Reported by SA Approved by QB

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: PS-3D
Laboratory ID: 6021-14
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	50,000
Bromomethane	ND	µg/L	50,000
Vinyl chloride	ND	µg/L	50,000
Chloroethane	ND	µg/L	50,000
Methylene chloride	ND	µg/L	100,000
Acetone --------------------	500,000	µg/L	500,000
Carbon disulfide	ND	µg/L	20,000
1,1-Dichloroethene	ND	µg/L	20,000
1,1-Dichloroethane	ND	µg/L	20,000
trans-1,2-Dichloroethene	ND	µg/L	20,000
Chloroform	ND	µg/L	20,000
1,2-Dichloroethane	ND	µg/L	20,000
2-Butanone	ND	µg/L	100,000
1,1,1-Trichloroethane	ND	µg/L	20,000
Carbon tetrachloride	ND	µg/L	20,000
Vinyl acetate	ND	µg/L	100,000
Bromodichloromethane	ND	µg/L	20,000
1,2-Dichloropropane	ND	µg/L	20,000
trans-1,3-Dichloropropene	ND	µg/L	20,000
Trichloroethene -------------	350,000	µg/L	20,000
Dibromochloromethane	ND	µg/L	20,000
1,1,2-Trichloroethane	ND	µg/L	20,000
Benzene	ND	µg/L	20,000
cis-1,3-Dichloropropene	ND	µg/L	20,000
2-Chloroethyl vinyl ether	ND	µg/L	100,000
Bromoform	ND	µg/L	20,000
4-Methyl-2-pentanone	ND	µg/L	100,000
2-Hexanone	ND	µg/L	100,000
1,1,2,2-Tetrachloroethane	ND	µg/L	20,000
Tetrachloroethene	ND	µg/L	20,000
Toluene	ND	µg/L	20,000
Chlorobenzene	ND	µg/L	20,000
Ethyl benzene	ND	µg/L	20,000
Styrene	ND	µg/L	20,000
Total xylenes	ND	µg/L	20,000

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: PS-5
Laboratory ID: 6021-15
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: PS-15
Laboratory ID: 6021-16
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by SA

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: PS-16D
Laboratory ID: 6021-17
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	2,500
Bromomethane	ND	µg/L	2,500
Vinyl chloride	ND	µg/L	2,500
Chloroethane	ND	µg/L	2,500
Methylene chloride	ND	µg/L	2,500
Acetone	ND	µg/L	25,000
Carbon disulfide	ND	µg/L	1,000
1,1-Dichloroethene	ND	µg/L	1,000
1,1-Dichloroethane	ND	µg/L	1,000
trans-1,2-Dichloroethene	ND	µg/L	1,000
Chloroform	ND	µg/L	1,000
1,2-Dichloroethane	ND	µg/L	1,000
2-Butanone	ND	µg/L	5,000
1,1,1-Trichloroethane	ND	µg/L	1,000
Carbon tetrachloride	ND	µg/L	1,000
Vinyl acetate	ND	µg/L	5,000
Bromodichloromethane	ND	µg/L	1,000
1,2-Dichloropropane	ND	µg/L	1,000
trans-1,3-Dichloropropene	ND	µg/L	1,000
Trichloroethene -------------	20,000	µg/L	1,000
Dibromochloromethane	ND	µg/L	1,000
1,1,2-Trichloroethane	ND	µg/L	1,000
Benzene	ND	µg/L	1,000
cis-1,3-Dichloropropene	ND	µg/L	1,000
2-Chloroethyl vinyl ether	ND	µg/L	5,000
Bromoform	ND	µg/L	1,000
4-Methyl-2-pentanone	ND	µg/L	5,000
2-Hexanone	ND	µg/L	5,000
1,1,2,2-Tetrachloroethane	ND	µg/L	1,000
Tetrachloroethene	ND	µg/L	1,000
Toluene	ND	µg/L	1,000
Chlorobenzene	ND	µg/L	1,000
Ethyl benzene	ND	µg/L	1,000
Styrene	ND	µg/L	1,000
Total xylenes	ND	µg/L	1,000

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: PS-20
Laboratory ID: 6021-18
Matrix: Water   Sampled: 11/24/87   Received: 11/25/87
Authorized: 11/25/87   Prepared: 12/02/87   Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: PS-21
Laboratory ID: 6021-19
Matrix: Water   Sampled: 11/24/87   Received: 11/25/87
Authorized: 11/25/87   Prepared: 12/02/87   Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	20
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: PS-24

Laboratory ID: 6021-20

Matrix: Water Sampled: 11/24/87 Received: 11/25/87

Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	1,300
Bromomethane	ND	µg/L	1,300
Vinyl chloride	ND	µg/L	1,300
Chloroethane	ND	µg/L	1,300
Methylene chloride	ND	µg/L	1,300
Acetone	13,000	µg/L	13,000
Carbon disulfide	ND	µg/L	500
1,1-Dichloroethene	ND	µg/L	500
1,1-Dichloroethane	ND	µg/L	500
trans-1,2-Dichloroethene	1,500	µg/L	500
Chloroform	ND	µg/L	500
1,2-Dichloroethane	ND	µg/L	500
2-Butanone	ND	µg/L	2,500
1,1,1-Trichloroethane	ND	µg/L	500
Carbon tetrachloride	ND	µg/L	500
Vinyl acetate	ND	µg/L	2,500
Bromodichloromethane	ND	µg/L	500
1,2-Dichloropropane	ND	µg/L	500
trans-1,3-Dichloropropene	ND	µg/L	500
Trichloroethene	310,000	µg/L	500
Dibromochloromethane	ND	µg/L	500
1,1,2-Trichloroethane	ND	µg/L	500
Benzene	ND	µg/L	500
cis-1,3-Dichloropropene	ND	µg/L	500
2-Chloroethyl vinyl ether	ND	µg/L	2,500
Bromoform	ND	µg/L	500
4-Methyl-2-pentanone	ND	µg/L	2,500
2-Hexanone	ND	µg/L	2,500
1,1,2,2-Tetrachloroethane	ND	µg/L	500
Tetrachloroethene	ND	µg/L	500
Toluene	1,200	µg/L	500
Chlorobenzene	ND	µg/L	500
Ethyl benzene	ND	µg/L	500
Styrene	ND	µg/L	500
Total xylenes	1,100	µg/L	500

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: PS-25

Laboratory ID: 6021-21

Matrix: Water   Sampled: 11/24/87   Received: 11/25/87

Authorized: 11/25/87   Prepared: 12/03/87   Analyzed: 12/03/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	1,000
Bromomethane	ND	µg/L	1,000
Vinyl chloride	ND	µg/L	1,000
Chloroethane	ND	µg/L	1,000
Methylene chloride	ND	µg/L	1,000
Acetone	ND	µg/L	10,000
Carbon disulfide	ND	µg/L	400
1,1-Dichloroethene	ND	µg/L	400
1,1-Dichloroethane	ND	µg/L	400
trans-1,2-Dichloroethene -----	3,600	µg/L	400
Chloroform	ND	µg/L	400
1,2-Dichloroethane	ND	µg/L	400
2-Butanone	ND	µg/L	2,000
1,1,1-Trichloroethane	ND	µg/L	400
Carbon tetrachloride	ND	µg/L	400
Vinyl acetate	ND	µg/L	2,000
Bromodichloromethane	ND	µg/L	400
1,2-Dichloropropane	ND	µg/L	400
trans-1,3-Dichloropropene	ND	µg/L	400
Trichloroethene --------------	6,100	µg/L	400
Dibromochloromethane	ND	µg/L	400
1,1,2-Trichloroethane	ND	µg/L	400
Benzene	ND	µg/L	400
cis-1,3-Dichloropropene	ND	µg/L	400
2-Chloroethyl vinyl ether	ND	µg/L	2,000
Bromoform	ND	µg/L	400
4-Methyl-2-pentanone	ND	µg/L	2,000
2-Hexanone	ND	µg/L	2,000
1,1,2,2-Tetrachloroethane	ND	µg/L	400
Tetrachloroethene	ND	µg/L	400
Toluene	ND	µg/L	400
Chlorobenzene	ND	µg/L	400
Ethyl benzene	ND	µg/L	400
Styrene	ND	µg/L	400
Total xylenes	ND	µg/L	400

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: PS-27

Laboratory ID: 6021-22

Matrix: Water   Sampled: 11/24/87   Received: 11/25/87

Authorized: 11/25/87   Prepared: 12/02/87   Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride -----------------	320	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene --------------	11	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene -----	1,400	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene -----------------	270	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: PS-32
Laboratory ID: 6021-23
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/03/87 Analyzed: 12/03/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	100
Bromomethane	ND	µg/L	100
Vinyl chloride	1,900	µg/L	100
Chloroethane	ND	µg/L	100
Methylene chloride	ND	µg/L	100
Acetone	ND	µg/L	1,000
Carbon disulfide	ND	µg/L	40
1,1-Dichloroethene	ND	µg/L	40
1,1-Dichloroethane	ND	µg/L	40
trans-1,2-Dichloroethene	2,000	µg/L	40
Chloroform	ND	µg/L	40
1,2-Dichloroethane	ND	µg/L	40
2-Butanone	ND	µg/L	200
1,1,1-Trichloroethane	ND	µg/L	40
Carbon tetrachloride	ND	µg/L	40
Vinyl acetate	ND	µg/L	200
Bromodichloromethane	ND	µg/L	40
1,2-Dichloropropane	ND	µg/L	40
trans-1,3-Dichloropropene	ND	µg/L	40
Trichloroethene	73	µg/L	40
Dibromochloromethane	ND	µg/L	40
1,1,2-Trichloroethane	ND	µg/L	40
Benzene	ND	µg/L	40
cis-1,3-Dichloropropene	ND	µg/L	40
2-Chloroethyl vinyl ether	ND	µg/L	200
Bromoform	ND	µg/L	40
4-Methyl-2-pentanone	ND	µg/L	200
2-Hexanone	ND	µg/L	200
1,1,2,2-Tetrachloroethane	ND	µg/L	40
Tetrachloroethene	ND	µg/L	40
Toluene	ND	µg/L	40
Chlorobenzene	ND	µg/L	40
Ethyl benzene	ND	µg/L	40
Styrene	ND	µg/L	40
Total xylenes	57	µg/L	40

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: PS-33

Laboratory ID: 6021-24

Matrix: Water Sampled: 11/24/87 Received: 11/25/87

Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	50
Acetone	ND	µg/L	2
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	10
2-Butanone	ND	µg/L	2
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	10
Vinyl acetate	ND	µg/L	2
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene ------------------------	2.1	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	10
2-Chloroethyl vinyl ether	ND	µg/L	2
Bromoform	ND	µg/L	10
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	2
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene ------------------------	8.9	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene ------------------	2.3	µg/L	2
Styrene	ND	µg/L	2
Total xylenes ------------------	17	µg/L	2

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: PS-34

Laboratory ID: 6021-25

Matrix: Water Sampled: 11/24/87 Received: 11/25/87

Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride -----------------	140	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene -------	480	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene -----------------	15	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: PS-35
Laboratory ID: 6021-26
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	13,000
Bromomethane	ND	µg/L	13,000
Vinyl chloride	ND	µg/L	13,000
Chloroethane	ND	µg/L	13,000
Methylene chloride	590,000	µg/L	13,000
Acetone	200,000	µg/L	130,000
Carbon disulfide	ND	µg/L	5,000
1,1-Dichloroethene	ND	µg/L	5,000
1,1-Dichloroethane	ND	µg/L	5,000
trans-1,2-Dichloroethene	12,000	µg/L	5,000
Chloroform	ND	µg/L	5,000
1,2-Dichloroethane	ND	µg/L	5,000
2-Butanone	ND	µg/L	25,000
1,1,1-Trichloroethane	28,000	µg/L	5,000
Carbon tetrachloride	ND	µg/L	5,000
Vinyl acetate	ND	µg/L	25,000
Bromodichloromethane	ND	µg/L	5,000
1,2-Dichloropropane	ND	µg/L	5,000
trans-1,3-Dichloropropene	ND	µg/L	5,000
Trichloroethene	600,000	µg/L	5,000
Dibromochloromethane	ND	µg/L	5,000
1,1,2-Trichloroethane	ND	µg/L	5,000
Benzene	ND	µg/L	5,000
cis-1,3-Dichloropropene	ND	µg/L	5,000
2-Chloroethyl vinyl ether	ND	µg/L	25,000
Bromoform	ND	µg/L	5,000
4-Methyl-2-pentanone	ND	µg/L	25,000
2-Hexanone	ND	µg/L	25,000
1,1,2,2-Tetrachloroethane	ND	µg/L	5,000
Tetrachloroethene	32,000	µg/L	5,000
Toluene	ND	µg/L	5,000
Chlorobenzene	ND	µg/L	5,000
Ethyl benzene	ND	µg/L	5,000
Styrene	ND	µg/L	5,000
Total xylenes	13,000	µg/L	5,000

ND = Not detected.

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HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: SW-A

Laboratory ID: 5857-01

Matrix: Water Sampled: 11/04/87 Received: 11/06/87

Authorized: 11/06/87 Prepared: 11/15/87 Analyzed: 11/15/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	11	µg/L	2
Chloroform	16	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	4.3	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	14	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by OB Approved by

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: SW-B
Laboratory ID: 5857-02
Matrix: Water Sampled: 11/04/87 Received: 11/06/87
Authorized: 11/06/87 Prepared: 11/15/87 Analyzed: 11/15/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride -----------------	5.0	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene --------	93	µg/L	2
Chloroform ----------------------	11	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane -----------	2.8	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene -----------------	97	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by ______________________ Approved by ______________________

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: SW-C
Laboratory ID: 5857-03
Matrix: Water Sampled: 11/04/87 Received: 11/06/87
Authorized: 11/06/87 Prepared: 11/15/87 Analyzed: 11/15/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	20
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene --------	35	µg/L	2
Chloroform ---------------------	4.8	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane ----------	3.6	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene -----------------	34	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene --------------	7.1	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by OB Approved by

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: Trip Blank
Laboratory ID: 6021-27
Matrix: Water Sampled: 11/24/87 Received: 11/25/87
Authorized: 11/25/87 Prepared: 12/03/87 Analyzed: 12/03/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by SA Approved by OB

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation
Client ID: TB
Laboratory ID: 6033-06
Matrix: Water Sampled: 11/25/87 Received: 11/30/87
Authorized: 11/30/87 Prepared: 12/03/87 Analyzed: 12/03/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	5
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by ____________ Approved by OB

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Dunn Geoscience Corporation

Client ID: FB

Laboratory ID: 6033-05

Matrix: Water   Sampled: 11/25/87   Received: 11/30/87

Authorized: 11/30/87   Prepared: 12/03/87   Analyzed: 12/03/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	10
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene ------------------------	2.6	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by ______________________   Approved by OB ______________________

Enseco

PRIORITY POLLUTANT VOLATILE ORGANICS

EPA Method 624 + 624/HSL List

QUALITY CONTROL

Client Name: Dunn Geoscience Corporation

Client ID: Laboratory Control Spike

Laboratory ID: 0398LCS

Matrix: Water Prepared: 11/10/87 Analyzed: 11/10/87

Parameter	% Recovery	QC Advisory Limits
1,1-Dichloroethene	91	61 - 145%
Trichloroethene	89	71 - 120%
Benzene	89	76 - 127%
Toluene	90	76 - 125%
Chlorobenzene	90	75 - 130%

Reported by ____________ Approved by ____________

Enseco

PRIORITY POLLUTANT VOLATILE ORGANICS

EPA Method 624 + 624/HSL List

QUALITY CONTROL

Client Name: Dunn Geoscience Corporation
Client ID: Laboratory Control Spike Dup.
Laboratory ID: 0411LCSD
Matrix: Water Prepared: 11/11/87 Analyzed: 11/11/87

Parameter	% Recovery	QC Advisory Limits
1,1-Dichloroethene	68	61 - 145%
Trichloroethene	79	71 - 120%
Benzene	89	76 - 127%
Toluene	85	76 - 125%
Chlorobenzene	83	75 - 130%

Reported by ______ Approved by ______

PRIORITY POLLUTANT VOLATILE ORGANICS

EPA Method 624 + 624/HSL List

QUALITY CONTROL

Client Name: Dunn Geoscience Corporation

Client ID: Laboratory Control Spike

Laboratory ID: M338LCS

Matrix: Water Prepared: 11/14/87 Analyzed: 11/14/87

Parameter	% Recovery	QC Advisory Limits
1,1-Dichloroethene	85	61 - 145%
Trichloroethene	80	71 - 120%
Benzene	99	76 - 127%
Toluene	95	76 - 125%
Chlorobenzene	92	75 - 130%

Reported by ______________ Approved by ______________

PRIORITY POLLUTANT VOLATILE ORGANICS

EPA Method 624 + 624/HSL List

QUALITY CONTROL

Client Name: Dunn Geoscience Corporation

Client ID: Laboratory Control Spike Dup.

Laboratory ID: M351LCSD

Matrix: Water Prepared: 11/14/87 Analyzed: 11/14/87

Parameter	% Recovery	QC Advisory Limits
1,1-Dichloroethene	106	61 - 145%
Trichloroethene	98	71 - 120%
Benzene	114	76 - 127%
Toluene	105	76 - 125%
Chlorobenzene	110	75 - 130%

Reported by ____________ Approved by ____________

PRIORITY POLLUTANT VOLATILE ORGANICS

EPA Method 624 + 624/HSL List

QUALITY CONTROL

Client Name: Dunn Geoscience Corporation

Client ID: Laboratory Control Spike

Laboratory ID: 0868LCS

Matrix: Water Prepared: 12/02/87 Analyzed: 12/02/87

Parameter	% Recovery	QC Advisory Limits
1,1-Dichloroethene	88	61 - 145%
Trichloroethene	92	71 - 120%
Benzene	102	76 - 127%
Toluene	95	76 - 125%
Chlorobenzene	98	75 - 130%

Reported by SA Approved by

PRIORITY POLLUTANT VOLATILE ORGANICS

EPA Method 624 + 624/HSL List

QUALITY CONTROL

Client Name: Dunn Geoscience Corporation
Client ID: Laboratory Control Spike
Laboratory ID: 0883LCS
Matrix: Water Prepared: 12/03/87 Analyzed: 12/03/87

Parameter	% Recovery	QC Advisory Limits
1,1-Dichloroethene	96	61 - 145%
Trichloroethene	101	71 - 120%
Benzene	107	76 - 127%
Toluene	101	76 - 125%
Chlorobenzene	112	75 - 130%

Reported by ______ Approved by ______

PRIORITY POLLUTANT VOLATILE ORGANICS

EPA Method 624 + 624/HSL List

QUALITY CONTROL

Client Name: Dunn Geoscience Corporation
Client ID: Laboratory Control Spike Dup.
Laboratory ID: 0894LCSD
Matrix: Water Prepared: 12/03/87 Analyzed: 12/03/87

Parameter	% Recovery	QC Advisory Limits
1,1-Dichloroethene	97	61 - 145%
Trichloroethene	85	71 - 120%
Benzene	94	76 - 127%
Toluene	94	76 - 125%
Chlorobenzene	99	75 - 130%

Reported by ______________ Approved by ______________

Enseco

PRIORITY POLLUTANT VOLATILE ORGANICS

EPA Method 624 + 624/HSL List

QUALITY CONTROL

Client Name: Dunn Geoscience Corporation
Client ID: Laboratory Control Spike Dup.
Laboratory ID: 0883LCSD
Matrix: Water Prepared: 12/03/87 Analyzed: 12/03/87

Parameter	% Recovery	QC Advisory Limits
1,1-Dichloroethene	96	61 - 145%
Trichloroethene	101	71 - 120%
Benzene	107	76 - 127%
Toluene	101	76 - 125%
Chlorobenzene	112	75 - 130%

Reported by SA Approved by OB

VOLATILE ORGANICS

Surrogate Recovery Summary

Client Name: Dunn Geoscience Corporation

Matrix: Water

Authorized: 11/25/87 Received: 11/25/87

		Surrogate Compound		
Erco ID	Client ID	d_4-1,2,-Dichloro-ethane	d_8-Toluene	p-Bromofluoro-benzene
6021-01	DGC-6B	95	99	99
6021-02	DGC-3S	97	99	100
6021-03	DGC-3B	96	99	100
6021-04	DGC-2S	100	100	100
6021-05	DGC-2B	91	107	93
6021-06	DGC-1S	99	97	102
6021-07	DGC-1B	95	106	100
6021-08	DGC-7B	98	103	101
6021-09	DGC-9B	98	100	101
6021-10	DGC-8B	99	96	102
6021-11	X-1	95	102	100
6021-12	PS-1	97	102	100
6021-13	PS-2	96	103	98
6021-14	PS-3D	100	100	104
QC Advisory Limits:		76-114%	88-110%	86-115%

Reported by SA. Approved by

VOLATILE ORGANICS

Surrogate Recovery Summary

Client Name: Dunn Geoscience Corporation
Matrix: Water
Authorized: 11/25/87 Received: 11/25/87

		Surrogate Compound		
Erco ID	Client ID	d_4-1,2,-Dichloro-ethane	d_8-Toluene	p-Bromofluoro-benzene
6021-15	PS-5	97	98	101
6021-16	PS-1S	100	100	100
6021-17	PS-16D	100	101	102
6021-18	PS-20	100	96	103
6021-19	PS-21	98	101	103
6021-20	PS-24	97	100	100
6021-21	PS-25	97	97	105
6021-22	PS-27	92	100	99
6021-23	PS-32	95	104	101
6021-24	PS-33	100	98	104
6021-25	PS-34	99	100	105
6021-26	PS-35	95	98	106
6021-27	Trip Blank	99	104	101
6021-28	DGC-4S	101	99	103
6021-29	DGC-4B	101	99	102
	QC Advisory Limits:	76-114%	88-110%	86-115%

Reported by SA Approved by

VOLATILE ORGANICS

Surrogate Recovery Summary

Client Name: Dunn Geoscience Corporation

Matrix: Water

Authorized: 11/30/87 Received: 11/30/87

		Surrogate Compound		
Erco ID	Client ID	d_4-1,2,-Dichloroethane	d_8-Toluene	p-Bromofluorobenzene
6033-01	DGC-11S	100	100	113
6033-02	DGC-10B	84	100	107
6033-03	X-2	98	98	106
6033-04	DGC-5B	99	101	103
6033-05	FB	100	100	102
6033-06	TB	100	99	104
QC Advisory Limits:		76-114%	88-110%	86-115%

Reported by

Approved by OB

Enseco

VOLATILE ORGANICS

Surrogate Recovery Summary

Client Name: Dunn Geoscience Corporation
Matrix: Water
Authorized: 11/06/87 Received: 11/06/87

		Surrogate Compound		
Erco ID	Client ID	d_4-1,2,-Dichloroethane	d_8-Toluene	p-Bromofluorobenzene
5857-01	SW-A	98	103	100
5857-02	SW-B	103	102	100
5857-03	SW-C	100	103	102
QC Advisory Limits:		76-114%	88-110%	86-115%

Reported by ______ Approved by ______

INORGANIC PARAMETERS

Client Name: DUNN GEOSCIENCE CORPORATION

Client ID: SOIL @ LOC 7B

Laboratory ID: 65087-001　Enseco ID: 6033-07

Matrix: Solid　Sampled: 11/25/87　Received: 11/30/87

Authorized: 12/02/87

Parameter	Result	Units (dry weight)	Reporting Limit	Analytical Method	Analyzed
Total Solids	83.9	%	0.1	D-2216	12/04/87
Total Organic Carbon	N.D.	%	0.02	9060	12/08/87

N.D. = Not detected

Approved by: Lindsay Breyer

INORGANIC PARAMETERS

Client Name: DUNN GEOSCIENCE CORPORATION
Client ID: 2FT-SS-1
Laboratory ID: 65053-001 Enseco ID: 5994-01
Matrix: Solid Sampled: 11/20/87 Received: 11/23/87
Authorized: 11/24/87

Parameter	Result	Units (dry weight)	Reporting Limit	Analytical Method	Analyzed
Total Solids	85.0	%	0.1	D-2216	12/08/87
Total Organic Carbon	0.16	%	0.02	9060	12/10/87

N.D. = Not detected

Approved by: Lindsay Breyer

Client Name: GE AUBURN	DGC Contact: Ed Fahrenkopf
Project No.: 2092-3-4936	Laboratory Contact: Dallas Waite
Site Location: AUBURN NY	Lab Identification: ENSECO/ERCO
	Date Report Required: Normal Turnaround
Sampler: EGF & JS	

SCIENCE CORP

Sample Identification	Date	Time	Sample Matrix	Collection Vessel	Lowering Device	#Sample Containers	Preserv.	Filter: Pore, Type	Comp. or Grab	Analysis Required	Comment
C-6B	11-24-87	1330	I	14, H	46, I	3	HgCl2	N/A	G	EPA624	
C-3S		1345				3					
C-3B		1355				3					
C-2S		1445				3					
C-2B		1455				3					
C-1S		1310				3					
C-1B		1335				3					
C-7B		1410				3					
C-9B		1550				3					
C-8B		1500				3					
K-1						3					
S-1		0950				2					
S-2		0820				1					
S-3D		1050				2					
S-5		1135				2					

	Name	Affiliation	Date	Time
elinquished by:	Ed Fahrenkopf	DGC	11-24-87	1700
eceived by:				
elinquished by:				

Received by Laboratory:

Samples Intact & Properly Preserved:

DUNN
OSCIENCE CORP

Client Name: GE Auburn
Project No.: 2092-3-4936
Site Location: Auburn, NY
Sampler: EGF & JS

DGC Contact: Ed Fahrenkopf
Laboratory Contact: Dallas Waite
Lab Identification: Enseco/ ERCO
Date Report Required: Normal Turnaround

Sample dentification	Date	Time	Sample Matrix	Collection Vessel	Lowering Device	#Sample Containers	Preserv.	Filter: Pore, Type	Comp. or Grab	Analysis Required	Comment
PS-15	11-24-87		1	14, H	46, I	2	$HgCl_2$	N/A	G	EPA 624	
PS-16 D		0955				1					
PS-20		0745				2					
PS-21		0925				2					
PS-24		0835				1					
PS-25		0840				2					
PS-27		0935				2					
PS-32		0910				2					
PS-33		0805				1					
PS-34		1040				2					
PS-35	↓	1100	↓	↓	↓	2			↓		
TRIP Blank	↓					1	↓	↓		↓	
DGC-4S		1645	1	14, H	46, I	3	↓	↓	↓	↓	
DGC-4B		1655	1	14, H	46, I	3	↓	↓	↓	↓	

	Name	Affiliation	Date	Time
Relinquished by:	Ed Fahrenkopf	DGC	11-24-87	1700
Received by:				
Relinquished by:				

Received by Laboratory:

Samples Intact & Properly Preserved:

SCIENCE CORP

Client Name: GE AUBURN
Project No.: 2092-5-321
Site Location: Powerex, Auburn, N.Y.
Sampler: R. Sutch / K. Begor

DGC Contact: Rodney Sutch, Kristen Begor
Laboratory Contact: Dallas Wait
Lab Identification: ERCO - Cambridge MA
Date Report Required: NORMAL TURNAROUND

Sample dentification	Date	Time	Sample Matrix	Collection Vessel	Lowering Device	Sample Container	Preserv.	Filter: Pore, Type	Comp. or Grab	Analysis Required	Comment
S.W-A	11/4/87		2	R	I, 46	R	—	—	G	31	
SW-B	"		2	R	I, 46	R	—	—	G	31	
SW-C	"		2	R	—	R	—	—	G	31	

	Name	Affiliation	Date	Time
elinquished by:	Rodney Sutch	DGC	11/5/87	0800
eceived by:				
elinquished by:				

Received by Laboratory:
Samples Intact & Properly Preserved:

CIENCE CORP

Client Name: GE Auburn
Project No.: 2092-5-321
Site Location: Auburn, N.Y.
Sampler: J. Scerra E. Fahrenkopk

DGC Contact: E. Fahrenkopk
Laboratory Contact: Dallas Waite
Lab Identification: ERCO
Date Report Required: NORMAL
Send reports to Rodney Sutch

Sample entification	1987 Date	Time	Sample Matrix	Collection Vessel	Lowering Device	Sample Containers	Preserv.	Filter: Pore, Type	Comp. or Grab	Analysis Required	Comment
								#			
C 11S	11-25	0840	1	14, H	46, I	3		N/A	G	EPA 624	
C 10 B	"	0830	1	14, H	46, I	3			G		
-2	"	—	1	14, H	46, I	3			G		
GC -5B	"	0925	1	14, H	46, I	3			G		
. B	"	0915				3					
B.	"					2					
@ Loc 7B	"	0935	3	27		3			G	T.O.C.	

	Name	Affiliation	Date	Time
elinquished by:	Jim Scerra	DGC	11-25-87	1500
eceived by:		DGC	11/27/87	1030
elinquished by:		DGC	11/27/87	1130
eceived by:				

Received by Laboratory:

Samples Intact & Properly Preserved:

APPENDIX H

SEE

PAPER

FILES

FOR

OVER SIZED

DOCUMENT(S)

LEGEND

⊕		**Proposed 2 inch Bedrock Monitoring Well**
◭		**Proposed Piezometer (Overburden)**
●	DGC–3S DGC–3B	2 inch Overburden Monitoring Wells 2 inch Bedrock Monitoring Wells
○	PS–16S PS–16D PS–16	1/2 inch Overburden Micro–Wells
⊕	PZ–1	Piezometer Location
△	SW–A	Surface Water Sampling Location
□	TB–A	Test Boring Location

NOTE:

MAP COMPILED FROM AERIAL PHOTOGRAPHY BY
LOCKWOOD SUPPORT SERVICES, INC.
ROCHESTER, N.Y., APRIL 24, 1982.

PLATE 12

ON	BY
EY FOR PHASE 3	KB/RS
s added	KB/RS

DUNN GEOSCIENCE CORPORATION
12 Metro Park Road
Albany, NY 12205

PHASE IV
PROPOSED WELL LOCATIONS
POWEREX, INC.
(GENERAL ELECTRIC CO.)
CITY OF AUBURN CAYUGA COUNTY, N.Y.

PROJECT MANAGER:
Rodney W. Sutch
Kristen Franz–Begor
PREPARED BY:
Kristen Franz- Begor
CHECKED BY:

DRAFTED BY:
Michael T. Maksymik
PROJECT NO.
2092–5–321
SHEET . OF .

MAP NO.
8097
DATE:
November 1987

APPENDIX I

SURFACE WATER TREATMENT

INTRODUCTION

Groundwater is believed to be discharging into the storm drainage ditch that flows to the northwest. A water sample was collected from the storm drainage ditch at a location near the western property line. This sample showed total volatile organics (VOCs) at a concentration less than 100 ug/L (see Appendix G). Analyses to confirm this concentration in water from the drainage ditch will be performed on three separate days. Grab samples will be collected at the following locations: 1) upstream of weir spillway and 2) western property line (see Plate 12, Appendix H). If a rain event does not fall within the sampling period, an additional sampling day will be scheduled for a rain event.

In order to minimize migration of VOCs via the drainage ditch, and thereby mitigate any potential off-site impacts, General Electric will treat the surface water in a manner that will substantially reduce the concentrations of VOCs in the ditch.

STORM DRAINAGE & RUNOFF

In general, all storm runoff in the vicinity of the manufacturing building flows to the drainage ditch. Storm runoff in the southern, eastern and western portions of the site travels to the catch basin that is located immediately west of the manufacturing building. Storm water then flows through a 18-inch diameter storm sewer, which discharges to the ditch located to the northwest of the manufacturing building. (Refer to Plate 2, Appendix A). The northern portion of the site drains directly to the drainage ditch. Approximately 300 feet west of the manufacturing building, a weir has been constructed across the ditch to contain any spills that may occur at the facility. The total drainage area upland of the weir structure is estimated to be 20 acres.

Weir measurements taken on April 13, 1988 indicate that the flow rate in the ditch was approximately 28 gpm. Surface runoff to the ditch was not observed at the time of the measurement, nor had it rained for three days prior to the measurement. A small pond, measuring approximately 20 feet wide by 30 feet long, is located immediately behind the weir structure. The pond is approximately 0.5 feet deep. Contaminated groundwater is believed to be discharging to the drainage ditch upgradient of the weir structure, as shown in Plates 5 and 7 of Appendix E.

TREATMENT ALTERNATIVES

In order to minimize migration of the VOCs from the site via the drainage ditch, the water flowing in the ditch will be treated. The compounds detected in the drainage ditch water are highly volatile. As the water flows through the ditch, substantial reductions in VOCs in the water are expected due to partitioning of the volatiles between the water and the atmosphere. To accelerate this process, additional aeration of the water is necessary. The following alternatives were considered:

Alternative 1:

- o Construction of a series of water dams in the ditch, such that water must cascade from level to level. Earthen berms or large stone blocks would be placed across the ditch to create cascades. Air stripping of volatile compounds would be enhanced through the cascading and increased retention time on site.

Alternative 2:

- o Installation of a mechanical aerator behind the existing weir structure. Placement of an electric-powered, floating aerator in the small pond would provide sufficient agitation to keep the pond completely mixed and aerated.

Alternative 3:

- o Installation of a diffused air system in the pond. Like the mechanical aerator, a diffused air system would keep the pond well mixed and aerated. Compressed air would be introduced to the pond through a perforated pipe or commercially available diffuser plate. This treatment alternative requires an air compressor or a supply of compressed air from the manufacturing building.

More elaborate treatment processes, such as column air stripping, adsorption onto activated carbon or physical/chemical processes were not evaluated, primarily due to the low VOC loadings and fluctuating hydraulic loads.

DESIGN CONSIDERATIONS

For selection of an interim treatment scheme, chemical and hydraulic loadings must be evaluated. Based upon weir measurements made April 13, 1988, a water flow rate of 28 gpm was calculated. At this flow rate, travel time from the pond to the western property line is estimated to be 1.5 hours. This estimate is based on the detention time of the water in the pond plus travel time in the drainage ditch.

This flow rate is assumed to be typical of spring high groundwater period for non-precipitation conditions. A rain gauge will be placed at the site and daily rainfall recorded for a two to three week period. In addition, weir measurements will be recorded for the same two or three weeks. Flow conditions measured during significant rainfall events would allow determination of the peak flow conditions.

Based upon the observed base flow of 28 gpm and an average influent concentration of 200 ug/L, the total daily VOC loading to the ditch is 31 grams. Presently there is a 50-60% reduction in VOC concentrations at the western property line. Increasing the travel time will increase VOC removals.

SELECTED TREATMENT ALTERNATIVE

The relatively low VOC loading and extremely variable hydraulic flow conditions justify a treatment system that is simple and easy to maintain. A forced air diffuser system would be cumbersome to install since a compressor and controls must be provided. Therefore, three earthen berm or stone block dams will be installed west of the weir structure. These will create small ponds, each approximately one-half to one foot deep. At 28 gpm, installation of the dams will increase the residence time in the ditch from 1.5 hours to approximately 5 hours. This is estimated to increase the removal efficiency to 90-95%.

After installation of the dams, samples collected downstream will be monitored for VOCs on two week intervals for one month. If indicated by downstream monitoring, a mechanical aerator will be installed behind the weir structure to increase VOC removal. The mechanical aerator would float on the small pond behind the weir. The electric-powered unit would agitate the pond surface, keeping the pond well mixed and aerated. Typical removal efficiencies of 90-99% are feasible through aeration alone and should be attainable during most flow conditions. During peak storm runoff conditions, removal efficiencies are reduced due to the significant dilution of VOCs by precipitation. Continued downgradient monitoring would be performed to evaluate removal efficiencies of the enhanced treatment system.