APPENDIX K

ROUX ASSOCIATES AQUIFER PERFORMANCE TEST

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AQUIFER TESTING AND ANALYTICAL MODELING INVESTIGATION AT THE UNISYS CORPORATION GREAT NECK FACILITY, GREAT NECK, NEW YORK

Great Neck Facility
Great Neck, New York

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1.0 INTRODUCTION

Roux Associates, Inc. (Roux Associates) was retained by Unisys Corporation (Unisys) to conduct aquifer testing at the Unisys Corporation Great Neck Facility, Great Neck, New York (Site). The aquifer testing consisted of the implementation of a step-drawdown (step) test, and a constant-rate (pumping) and recovery test. The step test was run on Thursday, August 2, 1990, and the pumping test was run from Monday, August 20, 1990 through Thursday, August 23, 1990. The recovery test commenced immediately with the termination (shut down) of the pumping test on Thursday, August 23, 1990 (at 10:30 a.m.) and water-level data were collected for an additional 4.5 hours after the recovery test began.

The purpose for conducting the step test was to determine the pumping rate for the pumping test. The objectives for implementing the pumping test included the following:

- providing "quantitative" results of the analysis of the time versus drawdown data collected from Monitoring Well 1MI and from Monitoring Well 12MI;

- providing qualitative information of the evaluation of the time versus drawdown data from the remaining wells at the Site; and

- using the results obtained from the analysis of the pumping test to perform an analytical capture-zone analysis (model) for Unisys Production Wells Nos. 1, 2, and 3 to assist in determining the feasibility of using these wells to contain off-site migration of constituent-impacted ground water (Roux Associates, Inc. 1990)

2.0 BACKGROUND

The Site is located in western Nassau County, near the border between Nassau County and Queens County (Figure 1). The Site encompasses an area of approximately 3,800,000 square feet (87 acres).

In the Spring of 1988, Unisys initiated a subsurface investigation at the Site, and 19 monitoring wells were installed as part of the subsurface investigation. The 19 monitoring wells were to determine ground-water elevations and direction of flow, and ground-water quality at the Site.

In the Summer of 1990, Unisys installed an additional three monitoring wells at the Site. The three new monitoring wells were for aquifer testing purposes, and to determine the saturated thickness of the Magothy aquifer beneath the Site (i.e., the bottom of the Magothy aquifer/top of the Raritan Clay contact). As part of the aquifer testing program, all 22 monitoring wells would be used to collect water-level data.

The aquifer tests were conducted to provide quantitative hydrogeologic data to characterize the flow system. Hydraulic coefficients characterizing the flow system were to be obtained from the aquifer tests, and incorporated into a capture zone analysis.

3.0 METHODOLOGY

The pumping test employed the Neuman Method (1975) for conducting a pumping test in, and analyzing pumping test data from, an anisotropic unconfined aquifer considering delayed gravity response. A description of the analytical approach is discussed in Section 5.2.1, (Neuman Delayed Gravity Response and Partial Penetration Method).

This analytical technique was chosen based upon hydrogeologic data evidenced during monitoring well drilling and installation procedures that indicate that the flow system exists under unconfined conditions. A description of the hydrogeologic conditions in and around the Site is provided in Section 4.0 (Hydrogeology). Moreover, the Neuman Method provides the flexibility of analyzing pumping test (time versus drawdown) data collected from partially penetrating wells (i.e., from wells that do not fully penetrate the entire saturated thickness of the aquifer), as is the case at the Site.

3.1 Description of Aquifer Tests

In accordance with the Roux Associates proposal to provide aquifer testing services at the Site (Roux Associates, Inc. 1990), aquifer testing consisting of a step test, and a pumping test and recovery test were implemented at the Site. The step test, and pumping and recovery tests are discussed below and in Section 5.0 (Hydraulic Coefficient Determination and Flow System Evaluation). Additional information on the implementation of these aquifer tests are provided in the Roux Associates standard operating procedures (SOPs) for conducting a step test, and for conducting a pumping test and a recovery test (Appendix A).

3.1.1 Step Test, and Pumping and Recovery Tests

A pumping test was conducted at the Site in an attempt to obtain data from which aquifer (hydraulic) parameters, including the horizontal hydraulic conductivity and vertical hydraulic conductivity (permeability), the transmissivity, the storage coefficient (elastic and water-table), and the degree of anisotropy could be calculated. These data were to be used to construct a capture zone model.

Prior to the pumping test, a step test was conducted to assess the performance characteristics of the pumping well. The step test consisted of pumping the pumping well (Unisys Production Well No. 2 [Well No. 2]) at successively greater discharge (pumping) rates for relatively short periods of time (e.g., 1-hour to 2-hour intervals). Data from the step test were used for selecting an optimum pumping rate for the pumping test.

Due to cooling water requirements of the facility it was not feasible to terminate pumping from the aquifer for an extended period of time. In recognition of this requirement and the need to establish nonpumping conditions at Pumping Well No. 2 it was decided that Pumping Well No. 3 would be pumped for cooling water requirements, and Pumping Well No. 2 would be shut down. By taking this action, quasi-steady conditions were established at Pumping Well No. 2 prior to initiating the aquifer pumping test.

Three additional monitoring wells (1ML, 12MI, and 12ML) were installed prior to undertaking the aquifer testing. The objective of these wells was to collect water-level data under pumping conditions. Quantitative water-level data could not be collected from Pumping Well Nos. 1, 2, or 3 due to well head construction and configuration of the turbine pumps. The 19 monitoring wells at the Site were also used to collect ground-water level data.

In accordance with the Groundwater Withdrawal Permit, 75 percent of the water extracted from the aquifer must be re-injected. The diffusion wells are located approximately 1000 feet "upgradient" of the pumping wells. The diffusion wells are screened in the middle of the Magothy Aquifer.

3.2 Step Test

The step test was run on Well No. 2 on Monday, August 2, 1990. Unisys Production Well No. 3 (Well No. 3) continued to pump during the step test to supply the facility with required process water. Well No. 3 reportedly pumped at a constant and continuous rate at the beginning of the step test (Wojciak, pers. comm. 1990a).

The step test consisted of pumping the pumping well at a series of increasing pumping rates for approximately 6 hours while qualitatively monitoring water levels using an air line (attached to a bicycle pump to maintain pressure in the air line). Water levels in the monitoring wells at the Site were also measured to provide preliminary information on the impact of the pumping stress. Measurements obtained during the step test included the pumping rate, the static water levels just before the test was started, the time since the pump started, the pumping or dynamic water levels during the pumping period, and the time the pump stopped.

Prior to the start of the step test, static water levels were determined with either a steel tape and chalk or an electric sounding device (m-scope). (The Roux Associates SOPs for measuring water levels with a steel tape, and for measuring water levels using a m-scope are provided in Appendix B.) In addition, synoptic rounds of water levels were measured prior to beginning the step test. Although specific wells had specific water-level measuring devices dedicated to them, all water-level measuring devices used during the pumping test (i.e., a steel tape and chalk and/or a m-scope) were compared to ensure they were measuring water levels similarly.

The pumping (discharge) rate for the test was measured using an in-line digital flow meter, from Data Instrumental Corporation, Pocasset, Massachusetts. This arrangement allows the discharge rate to be accurately and instantaneously determined. Discharged water from the pumping well was piped through the facility and recharged to the flow system through diffusion wells upgradient (and on the south side) of the Site (Figure 2).

A detailed discussion on the implementation of a step test is provided in the Roux Associates SOP for conducting a step test (Appendix A). All the data recorded during the step test are presented in Appendix C.

3.3 Pumping Test

The pumping test consisted of pumping Well No. 2 continuous rate for 72 hours (Monday, August 20, 1990 through Thursday, August 23, 1990). For reasons described in Section 5.2 (Pumping Test) Well No. 2 could not be pumped at a constant rate for the 72-hour period. Drawdown (i.e., the difference between static water levels and pumping water levels) was recorded in the monitoring wells at the Site throughout the test. Drawdown measurements were taken at times that were as close as possible to those specified in the Roux Associates' SOP for conducting a pumping test (Appendix A).

As previously stated, Well No. 2 was only equipped with an air line which would not accommodate a pressure transducer or a m-scope. Therefore, only water-level "measurements" relative to changes in pressure in the pumping well were estimated using the air line (i.e., near steady-state conditions could be determined when pressure values achieved near stabilization). Measurements required for the pumping test included the pumping rate, the relative static water levels just before the test was started, the time since the pump started, the pumping or dynamic water levels at designated intervals during the pumping period (time versus air pressure data), and the time the pump stopped. The distances between the pumping well, and the monitoring wells were either measured with a tape measure or estimated from the base map (Figure 2). All time versus drawdown data from the pumping test are presented in Appendix D.

As discussed above, static water levels and several synoptic rounds of water levels were measured prior to the beginning of the pumping test, the discharge rate for the test was measured using an in-line digital flow meter such that the discharge rate could be accurately and instantaneously determined, and discharged water from Well No. 2 was piped through the facility and recharged to the aquifer through diffusion wells upgradient (and on the south side) of the Site (Figure 2).

Drawdown in the monitoring wells was measured using several methods including: 1) calibrated steel tapes; 2) m-scopes; and 3) a pressure transducer and data logger (from Instrumentation Northwest, Inc., Redmond, Washington). The latter method was used to collect a continuous record of drawdown measurements. Regular synoptic rounds of water levels were measured in all of the monitoring wells at the Site during the pumping test with the steel tape or the m-scope, as well as being used to check the water levels being monitored by the pressure transducers and the data loggers. The manual measurements also served as a "back-up" in the event of a transducer and/or data logger failure, and/or the inability of the data logger software to convert water-level measurements into a usable form for plotting and/or input to analytical aquifer test software packages (programs).

A detailed discussion on the implementation of a pumping test is provided in the Roux Associates SOP for conducting a pumping test and a recovery test (Appendix A). All the data recorded during the pumping test are presented in Appendix D.

The data provided by the pumping test required interpretation by the Neuman (1975) method accounting for partially penetrating wells to estimate aquifer parameters. Details of the pumping test and its results are discussed in Section 5.0 (Hydraulic Coefficient Determination and Flow System Evaluation).

4.0 HYDROGEOLOGY

The principal regional aquifers of Long Island are designated the Lloyd, Magothy, Jameco, and Upper Glacial (deep to shallow, respectively). They are mainly derived from unconsolidated clastic sediments of glacial origin. The most significant aquitards (i.e., units having low hydraulic conductivity) are the Raritan Clay which overlies the Lloyd aquifer; interbedded clay and silt lenses in the Magothy deposits; and the Gardiners Clay which overlies the Jameco aquifer and locally the Magothy aquifer (McClymonds and Franke 1972).

4.1 Regional Hydrogeology

The Site is located within the glaciated part of the Atlantic Coast Plain physiographic province and lies along a line of east-trending hills known as the Harbor Hill Moraine.

Long Island is underlain by crystalline bedrock that slopes southeastward at about 65 feet per mile forming the base of the ground-water system. Overlying the bedrock are Cretaceous fluvo-deltaic and Pleistocene glacial sedimentary deposits which developed interlayered wedges of unconsolidated course clastic material and fine clay. These sedimentary wedges thicken southward forming several perched aquifers separated by clayey aquitards. Overlying these sedimentary wedges are near horizontal glacial deposits which truncate the older sedimentary units by an angular relationship and generally form the water-table aquifer throughout Nassau County (McClymonds and Franke 1972).

The Magothy Formation which comprises the Magothy aquifer is made up of mainly fine to medium quartzose sand with lenses and layers of coarse sand and sandy and solid clay. The Magothy aquifer is generally under artesian (confined) conditions throughout much of Long Island, but can be locally under water-table (unconfined) conditions. Regionally, the Magothy aquifer is encountered at land surface to 600 feet below land surface, and can be up to 1,100 feet thick in places. It is generally low to moderately permeable with specific capacities ranging from 1 gallon per minute per foot (gpm/ft) to about 30 gpm/ft, but can have high permeability locally where specific capacity can be as high as 80 gpm/ft. The Magothy aquifer is the principal aquifer for public-supply wells and water quality is generally excellent, however, high iron and salt concentrations have been encountered along the north and south shores (McClymonds and Franke 1972).

The Upper Pleistocene deposits which comprise the Upper Glacial aquifer are made up of mostly till composed of clay, sand and gravel. Boulders mainly form the Harbor Hill and Ronkonkoma terminal moraines. Outwash deposits of fine to very course quartzose sand and gravel are interbedded with till and occasionally occur with glauconitic clay. The Upper Glacial aquifer is generally under water-table (unconfined) conditions throughout Long Island. Regionally, the Upper Glacial aquifer is encountered from land surface to 50 feet below land surface, and can be up to 600 feet thick in places. Outwash deposits are generally moderately to highly permeable with specific capacities ranging from about 10 gpm/ft to more than 200 gpm/ft. Infiltration characteristics are good to excellent (McClymonds and Franke 1972).

4.2 Geology of the Site

The Magothy Formation underlying the Site is comprised of an admix of unconsolidated gravel, sand, silt, and clay deposits. Approximately 275 feet of the Magothy Formation was encountered below the Site. These sediments are interpreted as being deposited by glacial meltwater streams in outwash plains. Overall, the Magothy sediments encountered below the Site appear to become more fine-grained from bottom to top. This relationship can be inferred as signifying a retreating glacial ice-front cycle, and is indicative of decreasing hydraulic conductivity from bottom to top (Swarzenski 1963, and Anderson 1989).

The Upper Pleistocene deposits underlying the Site are composed of unconsolidated cobbles, gravel, and sand. Approximately 120 feet of Upper Pleistocene deposits were encountered below the Site. These sediments are interpreted as till deposited directly from glacial ice with little or no sorting by meltwater. Overall, the Upper Pleistocene sediments encountered below the Site appear to become more course-grained from bottom to top. This relationship can be inferred as signifying an advancing glacial ice-front cycle and is indicative of increasing hydraulic conductivity from bottom to top (Swarzenski 1963, and Anderson 1989).

4.3 Hydrology of the Site

Based upon on-site drilling activities, the Upper Glacial and Magothy aquifers are not separated by a confining unit at the Site, and therefore act, for the most part, as hydraulically connected unconfined flow system (Figure 3).

Water-level measurements taken on August 16, 1990 (Table 1) were used to construct ground-water elevation (equipotential) maps for the Upper Glacial and Magothy aquifers (Figures 5 and 6, respectively).

Ground water in the Magothy aquifer flows generally in a north-northwesterly direction below the Site (Figure 4), with a horizontal hydraulic gradient of approximately 0.002 foot/foot (ft/ft) as calculated from the water-level measurements taken August 16, 1990.

Ground water in the Upper Glacial aquifer flows generally in a northerly direction below the Site (Figure 5), with a horizontal hydraulic gradient of approximately 0.002 ft/ft as calculated from the water-level measurements taken August 16, 1990.

The estimated average hydraulic conductivity for the flow system is 384 gallons per day per square foot (gpd/ft^2), as discussed in Section 5.2.1.2 (Summary of Pumping Test Results). A representative porosity for the unconsolidated sediments of 30 percent (0.30) was obtained from Franke and Cohen (1972), and Freeze and Cherry (1979).

A ground-water flow (velocity) analysis (model) was conducted for ground water flowing beneath the Site. The analytical ground-water flow model is based on an equation to calculate ground-water velocity, which is a modified form of the Darcy equation described by Franke and Cohen (1972) as follows.

$$v_s = K_s I/n$$

where:

- v_s = the velocity of ground water along a segment of a flow line s, in feet per day (ft/day),
- K_s = the horizontal hydraulic conductivity of the aquifer along the segment of the flow line s, in gpd/ft^2
- I = the hydraulic gradient along the segment of the flow line s, in feet per feet (ft/ft), and
- n = the porosity of the aquifer, dimensionless.

Using the estimated average hydraulic conductivity for the flow system 384 gpd/ft^2, an average horizontal hydraulic gradient of 0.002 ft/ft, and a representative porosity of 30 percent (Franke and Cohen 1972, and Freeze and Cherry 1979), the estimated average ground-water velocity is calculated to be 0.34 ft/day. However, as also presented in Section 5.2.1.2 (Summary of Pumping Test Results), estimated hydraulic conductivity values range from 302 gpd/ft^2 to 502 gpd/ft^2, and result in an estimated range of ground-water velocities from 0.27 ft/day to 0.45 ft/day, respectively.

5.0 HYDRAULIC COEFFICIENT AND FLOW SYSTEM EVALUATION

The pumping test was conducted at the Site in an attempt to determine the hydraulic coefficients of transmissivity (T), horizontal hydraulic conductivity (K_r) and vertical hydraulic conductivity (K_z) and the ratio between them (i.e., the anisotropy), and storage coefficients (S [elastic storage] and Sy [water-table storage/specific yield]). Additionally, the time versus drawdown data measured in the monitoring wells at the Site were used to qualitatively evaluate the flow system responses to the pumping stress.

5.1 Step Test

The step test was run on Well No. 2 on Monday, August 2, 1990. Well No. 3 continued to pump during the step test to supply the facility with required process water.

Water levels (drawdown) in Monitoring Wells 1MI, 1MI/L, 1ML, 12MI, and 12ML (Figure 2) were measured automatically using Instrumentation Northwest, Inc. Redmond, Washington pressure transducers and data loggers, and manually using m-scopes. Manual drawdown measurements taken with dedicated m-scopes provided drawdown data from the step test for these five wells because the data logger remained in a "monitor" mode and, thus, did not record drawdown. Manual water-level measurements in the remainder of the wells at the Site (1 GU, 1GL, 2GL, 2MI, 3GL, 4GL, 4MI, 5GL, 5MI, 6GL, 7GL, 8GU, 8GL, 9GL, 10GL, 11GL, and 11MI [Figure 2]) were taken with a dedicated m-scope and a dedicated steel tape (refer to the Roux Associate SOPs for measuring water levels with a m-scope and with a steel tape [Appendix D]).

Water levels in Well No. 2 could not be quantitatively measured because there was no access for a pressure transducer or a m-scope. Instead, qualitative "measurements" were taken using an air line. However, the air line leaked and pressure had to be maintained using bicycle pump. Regardless, when the pressure reached near stabilization, it was assumed that near steady-state conditions were achieved in Well No. 2, and the pumping rate could be increased (stepped up).

Information pertaining to air-pressure data collected for Well No. 2, and the drawdown data collected from the monitoring wells are provided in Appendix C.

Based upon information by Unisys' facility personnel to Mr. R.A. Wojciak, Well No. 3 was reported to be pumping at a constant rate (Wojciak, pers. comm. 1990a). With the discharge from Well No. 3 being held constant, the step test in Well No. 2 began at 11:30 a.m. on August 2, 1990. The initial pumping rate was to be 500 gallons per minute (gpm). For the first 3 minutes of the step test, the pumping rate in Well No. 2 fluctuated between 500 gpm and 700 gpm. From 3 minutes to 60 minutes into the step test, the pumping rate fluctuated slightly (from 489 gpm to 500 gpm, with one measurement at 570 gpm), but essentially remained at 500 gpm (Table 2). Thus, the initial impacts on water levels in the monitoring wells were affected by the fluctuating pumping rate, and water-level measurements may not be representative of a pumping stress of 500 gpm.

After 60 minutes, the pumping rate was stepped up to 600 gpm. Again, the pumping rate fluctuated slightly (from 585 gpm to 612 gpm) but essentially remained at 600 gpm. The affects of the slight fluctuations in pumping rate were not likely to alter the pumping rate/water-level response relationship. This rate was maintained for 1 hour (from 60 minutes to 120 minutes into the step test) (Table 2).

An attempt was made to increase the pumping rate of Well No. 2 from 600 gpm to 700 gpm 2 hours into the step test. However, with the valve fully opened, a pumping rate of 700 gpm could not be achieved. For approximately 25 minutes (from 120 minutes to 145 minutes into the test) the pumping rate varied from 646 gpm to 697 gpm, and "averaged" 672 gpm within that 25-minute time span (Table 2).

At 2:05 p.m. (155 minutes into the test), Well No. 3 shut down and the pumping rate for Well No. 2 responded by increasing to 1,068 gpm. Because the facility requires approximately 1,000 gpm for process water (Wojciak, pers. comm. 1990b), the pumping rate for Well No. 2 could not be decreased (valved down) to the desired value of 700 gpm, and then stepped up in 100 gpm increments. Thus, the remainder of the step test (from 2:05 p.m. to 5:20 p.m.) was run at this higher rate. The pumping rate during this 195 minute interval fluctuated from 915 gpm to 1,101 gpm, and "averaged" 1,021 gpm (Table 2).

As stated above, water-level measurements were collected from all of the on-site monitoring wells. Preliminary results of the step test indicated that Monitoring Wells 1GU, 1GL, 1MI, 1MI/L, 1ML, 4MI, 5MI, 12MI, and 12ML were impacted by the pumping stress. Although there was some fluctuation in water levels, drawdown was evidenced in all nine of the wells (Appendix C). Conversely, preliminary results of the step test indicated that water levels in Monitoring Wells 2GL, 2MI, 3GL, 4GL, 5GL, 6GL, 7GL, 8GL, 8GU, 9GL, and 10GL were not affected by pumping Well No. 2. Water levels fluctuated between drawdown and recovery (i.e., increasing above static conditions), declining only several hundredths of a foot, remaining constant, or recovering throughout the step test (Appendix C).

Monitoring Wells 11GL and 11MI appeared to be impacted by something other than the pumping stress of Well No. 2. Water levels in this well cluster were essentially unaffected during the first 1.25 hours of the test, as they fluctuated between drawdown of 0.01 foot and 0.07 foot (11GL) and recovery of 0.20 foot to 0.44 foot (11MI). However, during the remainder of the step test, water levels in both wells drew down to a maximum on the order of low- to mid-40s feet. This impact is clearly not the result of pumping Well No. 2 because of the distance between Well No. 2 and Well Cluster 11 (relative to the magnitude of the impact to wells closer to Well No. 2).

Thus, of the 22 monitoring wells monitored during the step test, preliminary results indicated that as many as nine wells have been impacted enough by Well No. 2. to yield sufficient drawdown data to quantitatively analyze for hydraulic coefficients during the upcoming pumping test. Obtaining useful data for pumping test analysis would depend upon Unisys' capability to maintain the pumpage rate for Well No. 2 at a constant and continuous rate on the order of 1,000 gpm (i.e., to meet the pumpage needs of the facility and to maintain Well No. 2 pumping at that rate for 72 hours [3 days]). Maintaining a constant and continuous pumping rate needed to stress the aquifer adequately is key to establishing and maintaining relationships between the pumping stress and water-level responses (drawdown) required to analyze the pumping test data.

5.2 Pumping Test

The pumping test was conducted at the Site beginning on Monday, August 20, 1990 and ending on Thursday, August 23, 1990, lasting approximately 72 hours (3 days). Well No. 2

served as the pumping well. All 22 monitoring wells at the Site served as the water-level monitoring wells. Quantitative water-level measurements were measured in the monitoring wells throughout the duration of the pumping test, and water-level measurements/relative changes in pressure were monitored in the pumping well at the same time using the air line and bicycle pump.

The optimal pumping rate for the pumping test, which is on the order of 1,000 gpm, was determined from the step test run on Monday, August 2, 1990 (prior to the pumping test). Details of the step test were previously discussed in Section 5.1 (Step Test). The actual rate for the pumping test was approximately 950 gpm. Pumping rates fluctuated throughout the pumping test, from a low of 726 gpm to a high of 1,090 gpm; however, the majority of the pumping rates recorded apparently ranged around 950 gpm (Table 3 and Figure 6), and averaged 949.6 gpm. Thus, a pumping rate of 950 gpm was used for the Neuman analytical technique.

The fluctuating pumping rate of Well No. 2 had an adverse effect on the outcome of the test, because water levels in key monitoring wells (1MI and 12MI) fluctuated and rendered the majority of the drawdown data unanalyzable (as discussed below). Consequently, the quantification of hydraulic coefficients (also discussed below) are considered estimates at best.

For the analysis of the pumping test, the drawdown (decline in ground-water level) observed in the 22 monitoring wells (1GU, 1GL, 1MI, 1MI/L, 1ML, 2GL, 2MI, 3GL, 4GL, 4MI, 5GL, 5MI, 6GL, 7GL, 8GU, 8GL, 9GL, 10GL, 11GL, 11MI, 12MI, and 12ML) was plotted against time (Figures 7 through 28, respectively). Where pumping test site conditions and drawdown were conducive to attempt an analysis of the time versus drawdown data, pumping test analyses were performed. These criteria were met for only Monitoring Wells 1MI and 12MI (Figures 9 and 27, respectively), but only for the first 40 minutes when drawdown increased and then stabilized. After approximately 40 minutes, water levels recovered and eventually went through cyclic fluctuations resulting in unusable data for quantitative analysis. This is better evidence on the logarithmic plots of time versus drawdown for Monitoring Wells 1MI and 12MI (Figures 29 and 30, respectively), from data collected by the data logger. (These data logger data are corroborated with the manual measurements of water levels taken in Monitoring Wells 1MI and 12 MI [Figures 31 and 32, respectively]).

The data from the remaining 20 monitoring wells could not be analyzed for a variety of reasons which include the following: 1) fluctuating water levels throughout the test; 2) relative constant water levels throughout the test; and 3) recovering water levels above pretest conditions (which will be presented in detail in Section 5.2.1.1.4 [Remaining Monitoring Wells]). Additionally, logarithmic plots for the time versus drawdown data from the remaining 20 monitoring wells could not be generated as water levels rose above pretest (static) conditions (i.e., values of zero and/or negative drawdown [recovery] cannot be plotted on logarithmic paper).

During the course of the pumping test, no precipitation was recorded. Barometric pressure remained relatively constant (Appendix E); thus, water levels were not affected by the changes in barometric pressure and barometric efficiencies did not have to be calculated to correct the drawdown data for pumping test analysis (Walton 1962). (The barometer charts for August 2, 1990 [step test], and August 20, 1990 through August 23, 1990 [pumping test] were set up on 1-day charts for better resolution during the aquifer tests, while the remaining days were set up on 7-day charts to monitor pre- and post-aquifer tests pressure.)

The pumping test analytical methodology employed the Neuman analysis of pumping test data from anisotropic unconfined aquifers considering delayed gravity response and partially penetrating wells. This analysis was facilitated by the use of AQTESOLV™ (Duffield and Rumbaugh 1989), an aquifer test solving software package.

A description of the analytical technique is provided below.

5.2.1 Neuman Delayed Gravity Response and Partial Penetration Method

For the analysis of pumping test data from unconfined aquifers, the drawdowns vary at different rates from those predicted by the traditional Theis (1935) equation. When these drawdown data are plotted versus time on logarithmic paper, the data usually delineate an

S-shape curve consisting of a steep segment at early times, followed by a flat segment at intermediate times, with a return to a somewhat steeper segment at later times. The physical phenomenon that causes this behavior is known as delayed yield, delayed drainage, or delayed gravity response (Neuman 1975).

Neuman developed an analytical model for the delayed response process characterizing flow to a pumping well in an unconfined aquifer. This technique is used to determine the hydraulic properties of an anisotropic water-table aquifer from time versus drawdown data collected during a pumping test (Neuman 1975). For a detailed description of the theory and methodology employed, refer to Neuman (1975).

The Neuman method employed for the analysis of the pumping test data from the Site used the type curve matching technique whereby time versus drawdown data collected during the pumping test is matched to theoretical type curves. However, for this particular pumping test, only partially penetrating wells (test and monitoring) were available, which necessitated the use of a special set of theoretical curves to be developed for each pumping well and observation well configuration analyzed.

To facilitate the use of the Neuman analysis on time versus drawdown data from partially penetrating wells, the aquifer test analysis software package (computer program) AQTESOLV™ (Duffield and Rumbaugh 1989) was employed. AQTESOLV™ is an interactive menu-driven program that provides the user complete control over the analysis of aquifer test data. AQTESOLV™ provides the analyst with the option to interactively match type curves to aquifer test data directly on the screen while providing instantaneous quantification of the transmissivity (T) and the storage coefficients (i.e., the elastic storage coefficient [S] and the specific yield/water-table storage [S_y]) as well as the value of beta (β) corresponding to the type curve.

Prior to performing the type curve matching on the computer screen, AQTESOLV™ calculates the pumping well/observation well configuration-specific partial penetration type curves for β = 0.001 to β = 7.0 (see Neuman 1975, Figure 1 as examples of the type curves) using the equations accounting for partially penetrating wells (see Neuman 1975, Equations 26, 27, and 28). Additionally, the program automatically estimates aquifer parameters using the Marquardt nonlinear least-squares technique to provide the best match between observed and calculated water levels (using the Gauss-Newton procedure [Draper and Smith 1981] with the Marquardt modifications [Marquardt 1963]).

When the type curve option of AQTESOLV™ is used, water-level drawdown data collected from an observation well is plotted versus time on a logarithmic scale on the computer screen. If the time versus drawdown plot delineates the characteristic S-shaped curve, then the time versus drawdown data is first matched to the type B curves (see Neuman 1975, Figure 1 as examples of type B curves), and the value of β corresponding to this type curve is displayed along with the calculated values for the transmissivity and the water-table storage coefficient. For the same value of β, the time versus drawdown data is then matched to the type A curves (see Neuman 1975, Figure 1 as examples of type A curves), and the calculated values for the transmissivity and the water-table storage coefficient are displayed. The transmissivity initially obtained from the data fit to the type B curve is "fine tuned" (refined) when matched to the type A curve to be representative of the entire type curve. Thus, values for T, S, Sy and β are calculated.

If the time versus drawdown plot delineates only the initial steep segment at early times and the flat segment at intermediate times (without returning to a steep segment at later times), then the data can only be matched to the type A curve. The absence of a steep portion late in the time versus drawdown curve precludes the use of the type B curve, and, thus, no calculation of Sy is possible.

The values for the T and the Sy are calculated using the following equations from Neuman (1975)

$$T = Qs_D^*/s^*$$

and

$$S_y = Tt^*/r^2t_y^*$$

where:

T = transmissivity of the aquifer $[L^2T^{-1}]$
Q = discharge rate of the pumping well $[L^3T^{-1}]$

s_D^* = dimensionless drawdown match point value from the type B Neuman type curves, equal to $4\pi Ts/Q$

S^* = drawdown match point value from the time versus drawdown plot corresponding to the type B Neuman type curves [L]

S_y = specific yield/water-table storage coefficient [dimensionless]

t^* = time match point value from the time versus drawdown plot corresponding to the type B Neuman type curves [T]

r = radial distance from the observation well to the pumping well [L]

t_y^* = dimensionless time match point value from the type B Neuman type curves with respect to S_y, equal to Tt/S_yr^2.

The value for the S is calculated using the following equation from Neuman (1975)

$$S = Tt^*/r^2t_s^*$$

where:

T = transmissivity of the aquifer $[L^2T^{-1}]$

t^* = time match point value from the time versus drawdown plot corresponding to the Type A Neuman type curves [T]

r = radial distance from the observation well to the pumping well [L]

t_s^* = dimensionless time match point value from the type B Neuman type curves with respect to S, equal to Tt/Sr^2.

The horizontal hydraulic conductivity is calculated from the relationship that the horizontal hydraulic conductivity (K_r) is equal to the transmissivity (T) divided by the saturated thickness of the aquifer (b), i.e., $K_r = T/b$.

Finally, the degree of anisotropy and the vertical hydraulic conductivity are calculated using the following equations from Neuman (1975)

$$K_D = \beta b^2/r^2$$

and

$$K_z = K_D K_r$$

where:

K_D = degree of anisotropy, equal to K_z/K_r [dimensionless]

β = the value of beta corresponding to the type curve [dimensionless]

b	=	saturated thickness of the aquifer [L]
r	=	radial distance from the observation well to the pumping well [L]
K_z	=	vertical hydraulic conductivity of the aquifer [LT^{-1}]
K_r	=	horizontal hydraulic conductivity of the aquifer [LT^{-1}]

5.2.1.1 Pumping Test Results

The pumping test was conducted on Well No. 2 beginning on August 20, 1990 and ending on August 23, 1990 (i.e., total of approximately 4,320 minutes). At the same time Well No. 2 was turned on, Well No. 3 (which had been supplying the facility demands for process water) was turned off. Thus, Well No. 2 fulfilled a dual role of being the pumping well for the pumping test, and supplying the facility with process water.

An attempt was made by Unisys personnel to maintain the pumping rate at a constant 950 gpm. However, the pumping rate fluctuated throughout the pumping test (Table 3 and Figure 6). Also, a valve(s) was (were) reportedly inadvertently turned between approximately 1,000 minutes and 1,500 minutes into the test resulting in a fluctuation of the pumping rate between approximately 725 gpm and 1,100 gpm (DeCillis, pers. comm. 1990a).

As previously stated, no precipitation occurred during the 72-hour pumping test. Because the pumping test was conducted in an unconfined aquifer, there is no concern regarding barometric efficiency, Walton (1962). Regardless, the barometer, which remained relatively constant throughout the pumping test (Appendix E), was monitored and compared to water levels to verify unconfined aquifer conditions, and to evaluate if any relationships between barometric pressure and ground-water levels was calculated.

Of the 22 monitoring wells observed during the pumping test, water levels in only Monitoring Wells 1MI and 12MI remained below static (prepumping) levels (i.e., revealed a drawdown trend during the pumping test). However, the fluctuating pumping rate of Well No. 2 caused water levels in Monitoring Wells 1MI and 12 MI to fluctuate during the pumping test, and to eventually recover slightly and go through a cyclic drawdown and recovery phase (Figures 9 and 27, and Appendix D). This time versus drawdown relationship limited the use of these data to quantitatively calculate aquifer hydraulic coefficients, restricting the pumping test to best estimates of hydraulic coefficients.

Water levels in the remaining 20 monitoring wells either showed almost no response, continually recovered, or fluctuated between drawdown and recovery during the pumping test (Figures 7 and 8, 10 through 26, and 28, Appendix D). Thus, no pumping test analytical technique could be applied to the time versus drawdown data.

Descriptions of the results of the pumping tests analyses for Monitoring Wells 1MI and 12MI are provided in Sections 5.2.1.1.2 (Monitoring Well 1MI) and 5.2.1.1.3 (Monitoring Well 12MI), respectively. AQTESOLV™ (Duffield and Rumbaugh 1989) was used to perform the Neuman (1975) pumping test analysis to "quantify" (i.e., to provide the best estimate) the hydraulic coefficients, within the constraints of the data base.

Qualitative evaluations on the remaining 20 monitoring well are provided in Section 5.2.1.1.4 (Remaining Monitoring Wells). These data were useful in understanding the relationships between water levels on site, and on-site and off-site pumping stresses.

5.2.1.1.1 Pumping Well No. 2

As stated in Section 3.3 (Pumping Test), Well No. 2 was only equipped with an air line to monitor water levels. The air line could not accommodate a m-scope or a pressure transducer; thus, no quantitative water-level measurements could be collected using these water-level measuring devices. Moreover, the air line leaked and pressure had to be continuously maintained with a bicycle pump, and the information on the length of the air line in Well No. 2 was not available from Unisys (DeCillis, pers. comm. 1990b). Consequently, there were no time versus drawdown data available to perform a pumping test analysis for Well No. 2.

5.2.1.1.2 Monitoring Well 1MI

The time versus drawdown data recorded by the data logger for Monitoring Well 1MI is plotted on Figure 29. The water-level data recorded manually for Monitoring Well 1MI is plotted on Figure 31. It is apparent that the drawdown values measured by automated and manual techniques corroborate one another.

As evidenced on the two plots, drawdown increased from the beginning of the test (early time), followed by a flattening trend up to approximately 40 minutes (beginning of the intermediate time). From approximately 40 minutes through 700 minutes into the test, drawdown fluctuated slightly by decreasing (i.e., recovering) and increasing, and, after approximately 700 minutes, evidenced a general decreasing trend. These fluctuating and decreasing trends in the beginning of the intermediate time through the end of the pumping test, rendered the data unusable for the pumping test analytic technique. The fluctuating drawdown trend appears to corroborate well with the fluctuating pumping rate (Figures 29 and 6, respectively). Thus, in order to derive the best estimate of the hydraulic coefficients, only the first 40 minutes of data could be applied to the analytical method.

AQTESOLV™ (Duffield and Rumbaugh 1989) was used to calculate the Neuman (1975) partial penetration type curves to perform the Neuman analysis. The time and drawdown data for Monitoring Well 1MI were entered into the AQTESOLV™ program, and the option to calculate the Neuman partial penetration type curves for the type curve matching procedure was invoked. Once the type curves were calculated, a logarithmic plot of the time versus drawdown data was plotted on a personal computer (PC) monitor.

Because drawdown during the intermediate time through the end of the test fluctuated and declined, and because the drawdown data never returned to the steep drawdown trend characteristic of late time, the data could only be used to analytically estimate the T and S. Lack of steep drawdown data from late time precluded the analysis for the Sy, and the short period of intermediate time where the curve remained flat restricted the use of the analytic technique to estimate β. Thus, instead of type curve matching data to the type B curves (later data) first (Neuman 1975), the data could only be matched to the type A curves.

Once the Neuman partial penetration type curve had been chosen from the best fit of the early portion of the field data to the type A type curve, AQTESOLV™ calculated and plotted the matched curve (Figure 33). At the same time, AQTESOLV™ calculated and displayed the hydraulic coefficients of T and S. For Monitoring Well 1MI, this resulted in a T of 8.319 square feet per min (ft^2/min) (89,606 gpd/ft), and a S of 4.5249 x 10^{-4} (approximately 4.5 x 10^{-4}) (Figure 33 and Table 5). As stated previously, problems resulting from fluctuating drawdown data impeded the determination of an anisotropy ratio with any degree of confidence, and precluded any determination of Sy.

An attempt was made to corroborate the results of the type curve option of AQTESOLV™ by invoking the program's parameter estimation option. However, when all the drawdown data were used, an error message resulted and the parameter estimation algorithm stopped due to the decreasing trend (i.e., recovery) in drawdown, and when the database was reduced to only the first 40 minutes of the pumping test, there were insufficient data to yield system representative results.

Thus, a second, independent type curve match was performed in an attempt to estimate upper and lower bounds for the T and S. The second type curve match resulted in a T of 13.85 ft^2/min (149,181 gpd/ft), and a S of 6.2282×10^{-4} (approximately 6.2×10^{-4}) (Figure 34 and Table 4).

5.2.1.1.3 Monitoring Well 12MI

The time versus drawdown data recorded by the data logger for Monitoring Well 12MI is plotted on Figure 30. The water-level data recorded manually for Monitoring Well 12MI is plotted on Figure 32. It is apparent that the drawdown values measured by automated and manual methods confirm each other. The fluctuating drawdown trend appears to corroborate well with the fluctuating pumping rate (Figures 30 and 6, respectively).

As stated previously, only the first 40 minutes of the data could be used for analysis because of the fluctuating trend. The fluctuating drawdown trend appears to corroborate well with the fluctuating pumping rate (Figures 30 and 7, respectively).

Again, AQTESOLV™ (Duffield and Rumbaugh 1989) was used to calculate the Neuman (1975) partial penetration type curves to perform the Neuman analysis. The time and drawdown data for Monitoring Well 12MI were entered into the AQTESOLV™ program, and the option to calculate the Neuman partial penetration type curves for the type curve matching procedure was invoked. Once the type curves were calculated, a logarithmic plot of the time versus drawdown data was plotted on a PC monitor.

Because drawdown during the intermediate time through the end of the test fluctuated and declined, and because the drawdown data never returned to the steep drawdown trend characteristic of late time, the data could only be used to analytically estimate the T and S.

Lack of steep drawdown data from late time precluded the analysis for the Sy, and the short period of intermediate time where the curve remained flat restricted the use of the analytic technique to estimate β. Thus, instead of type curve matching data to the type B curves (later data) first (Neuman 1975), the data could only be matched to the type A curves.

Once the Neuman partial penetration type curve had been chosen from the best fit of the early portion of the field data to the type A curve, AQTESOLV™ calculated and plotted the matched curve (Figure 35). At the same time, AQTESOLV™ calculated and displayed the hydraulic coefficients of T and S. For Monitoring Well 12MI, this resulted in a T of 9.972 ft^2/min (107,410 gpd/ft), and a S of 0.006205 (approximately 0.0062) (Figure 35 and Table 4). As stated above, problems resulting from fluctuating drawdown impeded the determination of an anisotropy ratio with any degree of confidence, and precluded any determination of Sy.

Again, an attempt was made to corroborate the results of the type curve option of AQTESOLV™ by invoking the program's parameter estimation option which resulted in the following: 1) when all the drawdown data were used, an error message resulted and the parameter estimation algorithm stopped due to the decreasing trend (i.e., recovery) in drawdown; and 2) when the database was reduced to only the first 40 minutes of the pumping test, there were insufficient data to yield system representative results.

Thus, a second, independent type curve match was undertaken to try to estimate upper and lower bounds for the T and S. The second type curve resulted in almost identical results as the first type curve. A T of 10.23 ft^2/min (110,109 gpd/ft), and a S of 0.006649 approximately 0.0066) were estimated (Figure 36 and Table 4).

5.2.1.1.4 Remaining Monitoring Wells

Graphs of times versus drawdown for the remaining monitoring wells (1GU, 1GL, 1MI/L, 1ML, 2GL, 2MI, 3GL, 4GL, 4MI, 5GL, 5MI, 6GL, 7 GL, 8GU, 8GL, 9GL, 10GL, 11GL, 11MI and 12ML) are illustrated on Figures 7 and 8, 10 through 26, and 28, respectively. These data preclude the use of the Neuman method or other pumping test analytical techniques because the plots do not even define the characteristic shapes for the beginning of the drawdown curve. In fact, the data had to be plotted on a linear scale because drawdown recovered above static conditions or decreased during the pumping test (i.e., negative drawdown [water levels rising above static levels]), and data with values less than or equal to zero cannot be graphed on logarithmic paper. Thus, the data from these monitoring wells were not able to be analyzed to estimate the hydraulic coefficients, and the following discussion is a qualitative evaluation of the pumping test data from the monitoring wells.

Water levels in Monitoring Wells 1GU and 1GL (Figures 7 and 8, respectively) are reacting similarly. Water-level change in Monitoring Well 1GU remain slightly lower in magnitude than those in Monitoring Well 1GL throughout the test (0.4 foot lower at its maximum drawdown). This would be expected because Monitoring Well 1GL is screened deeper than Monitoring Well 1GU (i.e., closer to the screen of Well No. 2), and, thus, should be impacted to a greater degree. Monitoring Wells 1GU and 1GL do not appear to be responding to the pumping of Well No. 2.

Monitoring Wells 1MI/L and 1ML (Figures 10 and 11, respectively) are impacted initially within the first 100 minutes to 200 minutes with water levels lowering a maximum of 0.38 foot and 0.39 foot, respectively. Monitoring Well 12ML (Figure 28) is also impacted initially within the first 100 minutes and is reacting similarly to Monitoring Wells 1MI/L and 1ML, differing only in magnitude. Water levels in all three wells tended to fluctuate thereafter, with water levels rising above static conditions.

The plots of Monitoring Wells 2GL and 2MI (Figures 12 and 13, respectively) exhibit a similar rising water-level trend with water levels remaining above static conditions. The change in water levels in these two monitoring wells are similar in magnitude, and neither well seems to be affected by the pumping stress (Well No. 2).

In Monitoring Wells 9GL and 10GL (Figures 23 and 24, respectively), the water levels remained above static conditions throughout the test, and both wells exhibit a rising water-level trend. These wells do not appear to be impacted by the pumping of Well No. 2.

There is little fluctuation in water levels for Monitoring Wells 3GL, 4GL, 7GL, and 8GU (Figures 14, 15, 20, and 21, respectively). The fluctuations may be attributed to regional background trends. The plots for Monitoring Wells 3GL and 8GU (Figures 14 and 21, respectively) exhibit a slightly rising water-level trend whereas the plot for Monitoring Well 4GL (Figure 15) exhibits a slightly falling water-level trend. These four wells do not appear to be impacted by the pumping of Well No. 2.

Monitoring Wells 5GL, 5MI, 6GL, 11GL and 11MI, (Figures 17, 18, 19, 25, and 26, respectively) appear to be reacting similarly. Although the change in water levels differ in magnitude, they all exhibit a cyclic fluctuation with water levels rising above static conditions. These wells do not appear to be responding to the pumping stress of Well No. 2.

Water levels rose in Monitoring Well 8GL, (Figure 22) within the first 300 minutes from 1.41 feet above static conditions to 2.47 feet above static water conditions, and continued to fluctuate frequently reaching a maximum of 2.95 feet above static water conditions at approximately 2,300 minutes into the pumping test. Water levels did not fall below static conditions during the test. The initial recovery may have occurred as a result of the shut down of Well No. 3 at the start of the pumping test, as Monitoring Well 8GL is located approximately 160 feet from Well No. 3. However, the reason(s) for the relatively high degree of fluctuation (with respect to the other monitoring wells), and the fact that water levels never reached static conditions throughout the pumping test is (are) unknown. This well was not impacted by the pumping stress (Well No. 2).

Monitoring Wells 4MI and 5MI (Figures 16 and 18, respectively) appear to be reacting similarly from approximately 2,000 minutes to 4,300 minutes since the start of the pumping test. The magnitude of the change in water levels differs substantially with Monitoring Well 4MI showing the greater change in water levels. Initially, water levels in Monitoring Well 4MI (Figure 16) fell below static conditions (0.18 foot) in the first 336 minutes, and then rose to a maximum of 1.14 feet above static conditions 2,418 minutes after the start of the test. The maximum drawdown of 0.25 foot occurred 3,486 minutes after the start of the test, and following this occurrence the water levels again rose above static conditions. Initially, water levels in Monitoring Well 5MI (Figure 18) rose above static water conditions, and continued to remain above until 3,394 minutes into the test where they reach static conditions and then rose again. These wells do not appear to be reacting to the pumping of Well No. 2.

The fluctuations in water levels in these monitoring wells may be attributed to the close proximity of Long Island Jewish Hospital Well (designated Q1909, Plate 1) or to regional background trends. Well Q1909 is located approximately 1,600 feet west of Monitoring Wells 4MI and 5MI, and has a capacity of 800 gpm. The estimated elevation of the bottom of Well Q1909 is -114 feet relative to msl. The elevation of the bottom of Monitoring Well 4MI is -104.4 feet relative to msl, and the elevation of the bottom of Monitoring Well 5MI is -119.69 feet relative to msl. Thus, Well Q1909 and Monitoring Wells 4MI and 5MI are screened within the same interval and, if the monitoring wells are responding to a pumping stress, then it is possible to be that of Well Q1909.

There does not appear to be any impact on the monitoring wells from the public supply wells or the diffusion wells located within a 3-mile radius of the Site (Plate 2). The actual pumpage rates for these wells were relatively low (Table 4) for 1987 and 1988, yielding or injecting less than 449, 315 gpd (which was the maximum pumpage rate in 1987 for the Jamaica Water Supply Company Well N7445, located approximately 1,800 feet east of the Site. The public supply well having the maximum pumpage rate for 1988 was the Jamaica Water Supply Company Well N4390 (located approximately 1,800 feet east of the Site) yielding 323,287 gpd. These two supply wells are located next to each other. Public Supply Well N4390 is screened from -137 feet to -172 feet relative to msl, and Public Supply Well N7445 is screened from -268 feet to -328 feet relative to msl. Monitoring Wells 2GL, 2MI, 8GU, 8GL, and 9GL, are located approximately 2,000 feet away, and are the closest monitoring wells to the Public Supply Wells N4390 and N7445. The elevations of the screen zones for Monitoring Wells 2GL, 2MI, 8GU, 8GL, and 9GL are situated higher than the screen zones for the public supply wells, with the closest being Monitoring Well 2MI which is screened from -101.43 feet to -121.43 feet relative to msl.

In conclusion, the fluctuations in the water levels may be due to regional background trends rather than the effects of pumpage or injection. With the exception of Monitoring Well 12MI and Monitoring Well 1MI, there does not seem to be any correlation between the water-level change in the monitoring wells and the pumping of Well No. 2 at an "average" rate of 950 gpm.

5.2.1.2 Summary of Pumping Test Results

Representative estimated values for the hydraulic coefficients of the transmissivity and storage coefficient were obtained from the Neuman (1975) analysis performed on Monitoring Wells 1MI and 12MI. Estimated transmissivity values for Monitoring Well 1MI ranged from 89,606 gpd/ft to 149,181 gpd/ft (Table 5, and Figures 33 and 34, respectively), and averaged 119,394 gpd/ft. Using the equation that relates transmissivity to hydraulic conductivity and saturated thickness (i.e., T=Kb) and a saturated thickness from the water-table surface to the Magothy aquifer/Raritan Clay contact of 297 feet, estimated hydraulic conductivity values range from 302 gpd/ft^2 to 502 gpd/ft^2, respectively (Table 5), and averaged 402 gpd/ft^2. Corresponding estimated values of the storage coefficient ranged from $4.5x10^{-4}$ to $6.2x10^{-4}$, respectively (Table 5) and averaged $5.4x10^{-4}$. As previously stated, the insufficient and fluctuating drawdown data precluded the estimation of the β values with any degree of confidence, and, the β values shown on Figures 33 and 34, are considered nonrepresentative for the Magothy aquifer. Moreover, lack of drawdown data to match to the type B curves made it impossible to estimate the specific yield.

Estimated transmissivity values for Monitoring Well 12MI ranged from 107,410 gpd/ft to 110,189 gpd/ft (Table 5, and Figures 35 and 36, respectively), and averaged 108,800 gpd/ft. Using the equation T=Kb and 297 feet for the saturated thickness, estimated hydraulic conductivity values range from 362 gpd/ft^2 to 371 gpd/ft^2, respectively (Table 5), and averaged 367 gpd/ft^2. Corresponding estimated values of the storage coefficient ranged from $6.2x10^{-3}$ to $6.6x10^{-3}$, respectively (Table 5), and averaged $6.4x10^{-3}$. As stated above, the insufficient and fluctuating drawdown data precluded the estimation of the β values with any degree of confidence, and, the β values shown on Figures 35 and 36, are considered nonrepresentative for the Magothy aquifer. Moreover, lack of drawdown data to match to the type B curves made it impossible to estimate the specific yield.

Variations exhibited in the hydraulic coefficients estimated between wells are normal when analyzing field data because of the variability in the hydrogeologic conditions between a pumping well and the well being monitored. Because hydrogeologic conditions are variable (i.e., always deviate from ideal conditions) and because the pumping test integrates this variability throughout the area between the pumping well and the monitoring well, hydraulic conditions for monitoring wells situated in different directions and/or over different distances from the pumping well exhibit different hydraulic coefficients. Thus, average estimated values for the transmissivity, hydraulic conductivity, and storage coefficient within the area pumping tested are 114,097 gpd/ft (approximately 114,100 gpd/ft), 384 gpd/ft^2, and $3.5x10^{-3}$, respectively (Table 5).

5.2.1.3 Comparison of Site-Specific Data to Published Information

Based upon the borehole logs and monitoring well construction logs obtained from Unisys for drilling and monitoring well construction activities conducted at the Site (Appendix F), and ground-water elevations measured at the Site, most if not all of the saturated materials penetrated at the Site are part of the Magothy aquifer (i.e., of the 297-foot saturated thickness, approximately 262 feet to 297 feet are in the Magothy aquifer). Published values for the hydraulic conductivity of the Magothy aquifer range from approximately 200 gpd/ft^2 to 2,000 gpd/ft^2 (Isbister 1966, Lubke 1964, Lusczynski and Swarzenski 1966, and McClymonds and Franke 1972). Moreover, hydraulic conductivity values for medium, fine, and very fine sand, and sand with silt or clay layers range from 200 gpd/ft^2 to 1,000 gpd/ft^2 (McClymonds and Franke 1972).

Because the geologic logs for the monitoring wells at the Site show a predominance of sand, fine- to medium-grained, with silt and clay layers in the saturated zone (especially with increasing depth) (Appendix F), the McClymonds and Franke (1972) range of hydraulic conductivity values from 200 gpd/ft^2 to 1,000 gpd/ft^2 is apparently more representative of the Site and area within the pumping test. Thus, the average estimated hydraulic conductivity of 384 gpd/ft^2 is not considered to be unrealistic as this value falls within the lower end of the published range, and is likely to be characteristic of Site conditions based upon the available drawdown suitable for analysis of the pumping test.

5.3 Recovery Test

Recovery test data was collected following the termination of the pumping test on August 23, 1990 (Appendix D). An attempt was made to analyze the recovery test data, but the data could not be analyzed. With the possible exception of Monitoring Well 12MI, recovery data fluctuated as evidenced during the pumping test (Appendix D). These fluctuations were even occurring in the early stage of recovery, rendering early data and subsequent data unusable. Even the data for Monitoring Well 12MI, which showed an initial recovery trend, was affected by fluctuating water levels which precluded quantitative analysis. Thus, the only data available for the estimates of the transmissivity and storage coefficient were obtained from the pumping test.

6.0 CAPTURE ZONE ANALYSIS

A capture zone analysis was performed for Well Nos. 1, 2, and 3 to assess the feasibility of using these wells to contain constituent-impacted ground water on site (i.e., to prevent the off-site migration of constituent-impacted ground water).

6.1 Capture Zone Model

A preliminary evaluation of the extent of ground-water capture zones from Pumping Well Nos. 1, 2, and 3 and the potential ranges in pumping rates for those wells for these two plumes employed an analytical capture zone model as described by Todd (1980). As with all analytical models, there are inherent assumptions, and the model is constructed using idealized (simplified) hydrogeological parameters. These inherent assumptions include the following:

1. A uniform flow field, as indicated by a uniformly sloping potentiometric or water-table surface;
2. The drawdown is small in relation to the saturated thickness in a water-table aquifer;
3. The well pumps for an infinite time; and
4. The well fully penetrates the aquifer (Todd 1980).

Although the model assumptions are violated for Items 1 and 4, Item 4 is the most crucial assumption that is violated because Well Nos. 1, 2, and 3 have short well screens (approximately 30 feet) relative to the saturated thickness of the aquifer (approximately 297 feet). The results of violating this model assumption is discussed in the following section (6.2 [Results of Capture Zone Model]). Thus, the results of the analysis presented below are representative of a fully penetrating well in a uniform flow field.

The model was constructed using data collected during the previous on-site hydrogeological investigations and the hydraulic coefficient estimates obtained from pumping test results in Monitoring Wells 1MI and 12MI.

As explained by Todd (1980), the expression for the boundary of the region producing inflow to a pumping well in a uniform flow field can be derived by superposition of radial and one-dimensional flow fields to yield

$$-\frac{y}{x}=\tan(\frac{2\pi Kbi}{Q}y)$$

where:

x = rectangular coordinate (L),

y = rectangular coordinate (L),

K = hydraulic conductivity (L/T),

b = aquifer thickness (L),

i = natural piezometric slope (hydraulic gradient) (L/L),

Q = discharge rate (L^3/T).

The boundary of the region producing inflow to a pumping well is the capture zone of the pumping well.

An estimated average hydraulic conductivity of 384 gpd/ft^2 as determined from the pumping test, was used in the model. The hydraulic gradients obtained from the water-table and equipotential maps for August 16, 1990 (Figures 4 and 5, respectively) were input to the model. The hydraulic gradient for both maps was determined to be 0.002.

Aquifer saturated thicknesses in the vicinity of the pumping test was obtained from geologic logs for Monitoring Wells 1ML and 12ML (Appendix F) and ground-water elevations measured in August 1990 (Table 1). A value of 297 feet was input to the model for the saturated thickness of the flow system.

Applying the values for the coefficients listed above to the equation from Todd (1980), a range for the pumping rates of Well Nos. 1, 2, and 3 were calculated and the capture zone evaluated. The calculated pumping rates for Well Nos. 1, 2, and 3 to capture ground-water flowing off site to the north are 500 gpm (720,000 gpd) per well, for a total pumping rate of 1,500 gpm (2,160,000 gpd). The resulting capture zone is illustrated on Figure 37. However, because of the inherent assumptions in an analytical model, and the assumptions used to idealize the flow system, the calculated pumping rates for the extraction wells are not absolute values for partially penetrating well, but preliminary estimates for fully penetrating wells, which may vary from field conditions. Regardless, the calculated pumping rates provide information comparing theoretical pumping rates and field results from pumping Well No. 2 at 950 gpm during the pumping test.

6.2 Comparison Between Capture Zone Analysis and Pumping Test Results

The evaluation of the pumping test indicated that, with the exceptions of Monitoring Wells 1MI and 12MI, the remaining monitoring wells at the Site were not effected. Thus, at a pumping rate of 950 gpm for Well No. 2, and with the exception of Monitoring Well 1MI, the remaining monitoring wells in Well Cluster 1 (1GU, 1GL, 1MI/L, and 1ML) did not respond to the pumping stress. When comparing these results to those of the capture zone analysis, the following results become apparent:

1. The capture zone analysis shows that ground water throughout the 297-foot saturated thickness as far north of Well Cluster 1 is captured by pumping Well No. 2 at a rate of 500 gpm because Well No. 2 is simulated as a fully penetrating well (an inherent assumption of the model);

2. The pumping test shows that ground water throughout the 297-foot saturated thickness as far north as Well Cluster 1 is not captured by Well No. 2 pumping at a rate of 950 gpm because Well No. 2 only penetrates approximately 10 percent of the flow system (i.e., 30 feet out of 297 feet);

3. The capture zone analysis shows that violation of the assumption of a fully penetrating pumping well yields nonsystem-representative results for the hydraulic containment of ground water through the 297-foot saturated thickness;

4. The use of a partially penetrating pumping well to contain off-site flow of constituent-impacted ground water through the 297-foot saturated thickness will require pumping rates in excess of 950 gpm (or approximately 1,000 gpm) per well, for a total discharge rate in excess of 3,000 gpm; and

5. The pumpage rate to contain constituent-impacted ground water from migrating off site could be reduced by delineating the zones (i.e., depth intervals) in the aquifer that contain constituent-impacted ground water such that pumpage could be focused on hydraulic control in these zones.

7.0 SUMMARY OF FINDINGS AND CONCLUSIONS

From the hydrogeologic investigation and the capture zone modeling, the following information can be inferred:

1. The Site is located in the glaciated part of the Atlantic Coast Plain physiographic province and lies along a line of east-trending hills known as the Harbor Hill Moraine;

2. Approximately 120 feet of Upper Pleistocene unconsolidated deposits, consisting primarily of cobbles, gravel, and sand, underlie the Site;

3. Approximately 275 feet of the Magothy Formation (unconsolidated deposits), consisting primarily of fine- to medium-grained sand with silts, clays and gravel, underlie the Upper Pleistocene unconsolidated deposits;

4. The Upper Pleistocene and Magothy Formation deposits are in hydraulic connection, as no distinct aquitard (confining unit) was evidenced between these deposits;

5. The saturated thickness of the flow system beneath the Site is on the order of 300 feet, based upon a 297-foot saturated thickness at Well Clusters 1 and 12;

6. Ground water exists entirely or primarily in the Magothy aquifer, as the saturated thickness of the Upper Pleistocene deposits ranges from 0 foot to 30 feet;

7. A representative hydraulic gradient (across the Site) of 0.002 ft/ft was obtained from August 16, 1990 ground-water elevation maps;

8. Of the 22 monitoring wells observed during the August 20, 1990 through August 23, 1990 pumping test at the Site, only Monitoring Wells 1MI and 12MI yielded some data (i.e., the first 40 minutes of the test) that were applicable to a pumping test analytical technique. Water levels in the remaining 19 monitoring wells

fluctuated continuously, fell below and rose above static conditions, or remained above static conditions throughout the pumping test, which precluded the application of a pumping test analytical method to these data;

9. Estimated values for the hydraulic conductivity range from 302 gpd/ft^2 to 502 gpd/ft^2, and average 402 gpd/ft^2. These values are based upon ranges for the estimated transmissivity values of 89,606 gpd/ft to 149,181 gpd/ft obtained from the Neuman (1975) analysis of pumping test data from unconfined aquifers screened by partially penetrating wells. The estimated average transmissivity is 119,394 gpd/ft;

10. The estimated hydraulic conductivity values fall with the range of 200 gpd/ft^2 to 1,000 gpd/ft^2 reported by McClymonds and Franke (1972) for Magothy deposits consisting of medium, fine, and very fine sand, and sand with silt or clay layers, which predominate in the Magothy aquifer beneath the Site;

11. Estimated values for the storage coefficient range from 4.5×10^{-4} to 6.2×10^{-4} using the Neuman (1975) analysis of pumping test data from unconfined aquifers screened by partially penetrating wells. The estimated average storage coefficient is 5.4×10^{-4};

12. Values for β and the specific yield (water-table storage coefficient) could not be obtained using the Neuman (1975) analysis because of fluctuating water levels and recovery that occurred in Monitoring Wells 1MI and 12MI from 40 minutes since the start of the pumping test through the end of the pumping test;

13. Ground-water velocity estimates beneath the Site range from 0.27 ft/day to 0.45 ft/day, and average 0.34 ft/day;

14. An analytical capture zone analysis, which assumes that the pumping well fully penetrates the saturated thickness of the flow system, indicated that the off-site migration of constituent-impacted ground water to the north could be controlled

by pumping the Unisys Production Wells (Nos. 1,2, and 3) at a rate of 500 gpm per well, or a total of 1,500 gpm. However, the violation of this inherent assumption yielded nonsystem-representative results;

15. Because the pumping test indicated that ground-water levels in the vicinity of Well Cluster 1 were not impacted by pumping Well No. 2 at a rate of 950 gpm, the use of a partially penetrating pumping well to contain off-site flow of constituent-impacted ground water through the 297-foot saturated thickness will require pumping rates in excess of 950 gpm (approximately 1,000) per well, for a total discharge rate in excess of 3,000 gpm.

16. In an attempt to reduce the pumpage rate needed to contain other off-site migration of constituent-impacted ground water, delineation of the zones (i.e., depth intervals) in the aquifer that contain constituent-impacted ground water would focus pumpage such that these zones could be hydraulically controlled.

17. There are numerous pumping/diffusion wells located within the vicinity of the Unisys Site. The pumping and injection of ground water near the Site complicates the analysis of ground-water flow patterns.

8.0 RECOMMENDATIONS

Based on the results of the hydrogeologic investigation and analytical capture zone modeling, Roux Associates recommends the following:

1. The drilling and geophysical logging of additional boreholes at the Site to collect supplementary lithologic and hydrologic data, especially at depth (i.e., to the Magothy Formation/Raritan Clay contact), in an attempt to better define the hydrogeologic system (e.g., is the flow system one hydraulically connected system, or is [are] there a low-permeability confining zone[s]);

2. The installation of additional monitoring wells to delineate the horizontal and vertical extent of the constituent-impacted ground water. The numbers, locations, and depths of the monitoring wells should be determined based upon the results of water-quality sampling;

3. A review of all previous hydrogeologic data along with all new hydrogeologic data to refine the characterization of the hydrogeologic system, and to determine if a controlled pumping test (i.e., a separate pumping well not needed to supply the water demands of the facility) should be implemented at the Site; and

4. The construction of a detailed, three-dimensional flow and transport model to evaluate head-and-flow relationships relative to solute transport to assist in the development and design of a Site-wide ground-water remedial program, and to help guide future field investigations (e.g., the best estimates for the numbers, locations, and depths of monitoring wells both on site and off site to delineate the extent of constituent-impacted ground water).

Respectfully submitted,
ROUX ASSOCIATES, INC.

Michael A. DeCillis

Michael A. DeCillis
Principal Hydrogeologist

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Table 1. Summary of Water-Level Measurements in Monitoring Wells at the Unisys Corporation Great Neck Facility, Great Neck, New York.

		June 5, 1989		June 8, 1989		January 10, 1990	
Well Designation	Elevation of Measuring Point (feet above mean sea level)	Depth to Water (feet below measuring point)	Elevation of Water Level (feet above mean sea level)	Depth to Water (feet below measuring point)	Elevation of Water Level (feet above mean sea level)	Depth to Water (feet below measuring point)	Elevation of Water Level (feet above mean sea level)
1GU	143.77	106.07	37.70	105.84	37.93	101.73	42.04
1GL	144.41	106.69	37.72	106.57	37.84	102.45	41.96
1MI	144.39	105.65	38.74	105.88	38.51	101.85	42.54
1MI/L	144.55	--	--	--	--	101.95	42.60
1ML	*	a	a	a	a	a	a
2GL	128.35	86.40	41.95	86.25	42.10	82.48	45.87
2MI	128.57	86.61	41.96	86.46	42.11	82.67	45.90
3GL	139.50	97.96	41.54	97.83	41.67	94.05	45.45
4GL	144.81	106.21	38.60	105.88	38.93	103.37	41.44
4MI	145.10	108.50	36.60	108.29	36.81	103.54	41.56
5GL	130.32	89.85	40.47	89.79	40.53	88.01	42.31
5MI	130.31	90.48	39.83	90.37	39.94	88.40	41.91
6GL	128.30	88.12	40.18	88.00	40.30	84.26	44.04
7GL	149.76	113.72	36.04	113.51	36.25	109.92	39.84
8GU	120.42	77.58	42.84	77.39	43.03	73.67	46.75
8GL	120.32	80.06	40.26	79.92	40.40	78.82	41.50
9GL	126.94	85.40	41.54	85.23	41.71	81.51	45.43
10GL	126.03	86.36	39.67	86.19	39.84	82.35	43.68
11GL	129.02	88.38	40.64	88.21	40.81	84.32	44.70
11MI	129.39	89.23	40.16	89.05	40.34	85.14	44.25
12MI	*	a	a	a	a	a	a
12ML	*	a	a	a	a	a	a

-- Water level measurements were not obtained for Well 1MI/L on 6/5/89 or 6/8/89 because there was a pump set in the well.
a Well installation post-dates time measurements were taken
* Wells not surveyed for elevation of measuring point. Measurements left as depth to water where indicated.

Table 1. Summary of Water-Level Measurements in Monitoring Wells at the Unisys Corporation Great Neck Facility, Great Neck, New York.

		August 9, 1990		August 16, 1990	
Well Designation	Elevation of Measuring Point (feet above mean sea level)	Depth to Water (feet below measuring point)	Elevation of Water Level (feet above mean sea level)	Depth to Water (feet below measuring point)	Elevation of Water Level (feet above mean sea level)
1GU	143.77	100.46	43.31	100.40	43.37
1GL	144.41	101.15	43.26	101.10	43.31
1MI	144.39	101.41	42.98	101.39	43.00
1MI/L	144.55	105.76	38.79	101.85	42.70
1ML	*	101.85	*	102.19	*
2GL	128.35	84.38	43.97	83.53	44.82
2MI	128.57	83.73	44.84	83.84	44.73
3GL	139.50	93.63	45.87	93.59	45.91
4GL	144.81	99.39	45.42	99.16	45.65
4MI	145.10	103.32	41.78	102.59	42.51
5GL	130.32	85.00	45.32	84.97	45.35
5MI	130.31	85.66	44.65	85.62	44.69
6GL	128.30	83.04	45.26	84.01	44.29
7GL	149.76	106.45	43.31	106.36	43.40
8GU	120.42	73.69	46.73	73.85	46.57
8GL	120.32	78.12	42.20	78.30	42.02
9GL	126.94	82.98	43.96	82.04	44.90
10GL	126.03	82.44	43.59	82.59	43.44
11GL	129.02	82.33	46.69	83.67	45.35
11MI	129.39	83.26	46.13	84.67	44.72
12MI	*	89.95	*	89.95	*
12ML	*	90.58	*	90.58	*

-- Water level measurements were not obtained for Well 1MI/L on 6/5/89 or 6/8/89 because there was a pump set in the well.
a Well installation post-dates time measurements were taken
* Wells not surveyed for elevation of measuring point. Measurements left as depth to water where indicated.

Table 2. Step-Drawdown (Step) Test Data for Unisys Production Well No. 2, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate (Q), in gallons per minute (gpm)	Comments
2	8/2/90	11:30:00	0.00	25.0		No distinct Q, Q ranged from 700 gpm to 500 gpm for 3 minutes
		11:30:30	0.50	17.5		
		11:31:30	1.50	17.0		
		11:32:00	2.00	21.0		
		11:32:30	2.50	21.0		
		11:33:00	3.00		500	
		11:34:00	4.00	21.0		
		11:38:00	8.00		570	
		11:40:00	10.00		500	
		11:41:00	11.00	21.0		pumped air line
		11:43:00	13.00		498	
		11:44:00	14.00	21.0		pumped air line
		11:45:00	15.00		495	
		11:50:00	20.00	21.0	494	pumped air line
		11:54:00	24.00		501	
		11:56:00	26.00		489	
		11:58:00	28.00	21.0	495	pumped air line
		12:10:00	40.00	21.0	473	pumped air line/adjust Q to 499 gpm
		12:20:00	50.00	21.0	493	pumped air line
		12:30:00	60.00	20.0	600	pumped air line
		12:30:15	60.25	20.0		new step/increased Q to 600 gpm
		12:30:30	60.50	19.0	600	
		12:30:45	60.75	19.0		
		12:31:00	61.00	19.0		
		12:32:00	62.00	19.5	597	pumped air line
		12:37:00	67.00	19.5		pumped air line

Table 2. Step-Drawdown (Step) Test Data for Unisys Production Well No. 2, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate (Q), in gallons per minute (gpm)	Comments
2	8/2/90	12:45:00	75.00	19.5	607	pumped air line
		12:52:00	82.00	19.5	612	pumped air line
		13:12:00	102.00	19.0	593	pumped air line
		13:22:00	112.00	19.0	585	pumped air line/increased Q to 600 gpm
		13:27:00	117.00	19.0	600	pumped air line
		13:30:00	120.00	19.5		new step/increased Q to 700 gpm
		13:30:15	120.25	19.0	669	
		13:30:30	120.50	19.0		
		13:30:45	120.75	19.0	679	
		13:31:00	121.00	18.0	693	
		13:32:00	122.00	18.0	697	
		13:34:00	124.00	18.0	655	valve opened full, can't get 700 gpm
		13:35:00	125.00	18.0	674	
		13:36:00	126.00	18.0	664	
		13:37:00	127.00	18.0	669	pumped air line
		13:39:00	129.00	18.0	664	pumped air line
		13:47:00	137.00	18.0	665	pumped air line
		13:55:00	145.00	18.0	646	
		14:05:00	155.00	15.0	1068	pumped air line, Well No. 3 went down Q in Well No. 2 increased to 1,068 gpm valve opened to maximum
		14:18:00	168.00	15.0	1077	pumped air line
		14:28:00	178.00	15.0	1101	pumped air line
		14:34:00	184.00	15.5	1090	pumped air line
		14:42:00	192.00	16.0	1045	pumped air line
		14:46:00	196.00	15.5	1066	pumped air line

Table 2. Step-Drawdown (Step) Test Data for Unisys Production Well No. 2, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate (Q), in gallons per minute (gpm)	Comments
2	8/2/90	14:48:00	208.00	15.5	1087	pumped air line
		14:53:00	213.00	15.5	1093	pumped air line
		14:57:00	217.00		915	
		14:58:00	218.00		980	
		14:59:00	219.00		1000	
		15:02:00	222.00	15.5	995	pumped air line
		15:05:00	225.00		1025	
		15:31:00	251.00		1009	pumped air line
		15:40:00	260.00		995	pumped air line
		15:51:00	271.00	16.0	986	pumped air line
		15:56:00	276.00	16.0	989	pumped air line
		16:00:00	280.00	16.0	994	pumped air line
		16:06:00	286.00	15.5	1000	pumped air line
		16:08:00	288.00		978	
		16:15:00	295.00		983	
		17:20:00	360.00	15.5	992	pumped air line

Table 3. Constant-Rate (Pumping) Test Data and Recovery Test Data for Unisys Production Well No. 2, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate, in gallons per minute
2	8/20/90	8:45		25	
		9:50	2		1013
		9:52	4		955
		9:53	5	17	
		9:54	6		992
		9:57	9	16.5	981
		9:58	10		969
		9:59	11	17	974
		10:00	12	17	
		10:01	13		968
		10:02	14		974
		10:03	15	17	980
		10:05	17	17	976
		10:07	19		981
		10:08	20	17	960
		10:11	23		975
		10:12	24	17	
		10:13	25		985
		10:15	27	17	982
		10:19	31	17	975
		10:20	32	17	971
		10:22	34		991
		10:25	37		990
		10:26	38	17	935
		10:27	39		931
		10:28	40		941
		10:29	41	17	
		10:30	42		954
		10:33	45		950
		10:34	46	17	951
		10:35	47		954
		10:44	56	17	944
		10:48	60		919
		10:50	62	17	932
		10:57	69	17	926
		10:59	71		936
		11:00	72		930
		11:05	77		924
		11:08	80		928
		11:10	82	17	

Table 3. Constant-Rate (Pumping) Test Data and Recovery Test Data for Unisys Production Well No. 2, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate, in gallons per minute
2	8/20/90	11:11	83		943
		11:16	88		934
		11:17	89	17	
		11:19	91		928
		11:21	93		939
		11:25	97	17	919
		11:28	100	17	922
		11:36	108	17	938
		11:38	110		929
		11:43	115		939
		11:45	117		926
		11:50	122	17	933
		12:00	132		932
		12:04	136	17	930
		12:16	148	17	940
		12:22	154		938
		12:25	157		942
		12:40	172		949
		12:53	185	17	940
		13:40	232	16.5	990
		13:43	235		998
		14:33	285	16.5	995
		14:41	293		993
		14:55	307		994
		15:25	337		999
		15:33	345	16.5	1002
		15:54	366		983
		17:48	480	16.5	1003
		17:55	487		973
		18:30	522	16.5	965
		19:26	578		967
		19:27	579	16.5	
		20:23	635		959
		20:25	637	16.5	
		21:46	718	16	970
		22:36	768	16	961
		23:35	827	16	955
	8/21/90	0:45	897	16	956
		1:37	949	16	990
		2:35	1007	16	1080

Table 3. Constant-Rate (Pumping) Test Data and Recovery Test Data for Unisys Production Well No. 2, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate, in gallons per minute
2	8/21/90	3:40	1072	16	966
		4:38	1130	16	955
		5:36	1188	17	931
		6:32	1244	17	935
		7:34	1306	17	937
		8:36	1368	17	900
		8:55	1387		
		9:40	1432	18	750
		10:15	1467		762
		10:20	1472		726
		10:30	1482		778
		10:35	1487		781
		11:15	1527	16.5	875
		11:28	1540		947
		11:51	1563		
		12:53	1625	17	951
		13:35	1667		955
		13:53	1685	17	931
		15:40	1792	17	956
		16:52	1864	17	948
		17:52	1924	17	955
		18:45	1977	16.5	948
		19:45	2037	16.5	952
		20:45	2097	16.5	946
		21:58	2170	16.5	945
		22:58	2230	16.5	945
		23:56	2288	16.5	940
	8/22/90	0:46	2338	16.5	942
		1:58	2410	17.5	946
		2:42	2454	17.5	936
		3:59	2531	17	944
		4:43	2575	17	933
		5:58	2650	17.5	940
		6:40	2692	17	937
		7:45	2757	17	945
		8:30	2862	16.5	941
		9:55	2887	15.5	948
		11:03	2955	16.5	966
		11:45	2997	16.5	980
		13:45	3117	16	986

Table 3. Constant-Rate (Pumping) Test Data and Recovery Test Data for Unisys Production Well No. 2, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate, in gallons per minute
2	8/23/90	14:45	3177	16.5	966
		15:50	3242	16.5	972
		17:05	3317	16.5	954
		17:55	3367	16.5	963
		18:45	3417	16.5	960
		18:46	3418		878
		19:45	3477	16.5	958
		20:44	3536	16.5	961
		21:55	3607	17	954
		22:45	3657	17	951
		23:48	3720	17	950
		0:45	3777	17	945
		1:55	3847	16.5	1002
		3:10	3922	16	1090
		3:55	3967	17	962
		4:45	4017	17	982
		5:54	4086	17	955
		6:52	4144	17	960
		7:55	4207	17	967
		8:42	4254	17	947
		9:32	4304	17	953
		10:20	4352	17	952
	End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990				
2	8/23/90	10:30:15	0.25	21	0
		10:30:30	0.50	26	0
		10:30:45	0.75	25	0
		10:31	1	25	0
		10:32	2	25	0
		10:33	3	25	0
		10:34	4	25	0
		10:35	5	25	0
		11:00	30	25	0

Table 4. Public Supply Wells within a 3-Mile Radius of the Unisys Corporation Great Neck Facility, Great Neck, New York

Water District	NYSDEC Well Designation	NYSDEC Permit Number	Capacity (1)	Aquifer	Depth (2)	Pumpage 1984 (3)	Pumpage 1985 (3)	Pumpage 1986 (3)	Pumpage 1987 (3)	Pumpage 1988 (3)
Albertson	N-4327	2388	1,000	Magothy	430	60,315	67,974	50,327	140,895	95,179
	N-5947	2920	1,200	Magothy	504	123,478	245,429	440,958	426,674	516,510
Citizen Water Supply Corp.	N-22	804	1,090	Magothy	NA	80,867	143,998	117,230	68,931	83,563
	N-700	951	1,050	Glacial	NA	194,526	194,526	165,190	117,994	113,219
	N-4388	2431	1,050	Magothy	NA	76,148	288,318	292,535	231,241	185,229
	N-8342	5336	1,050	Lloyd	NA	242,047	50,131	239,999	264,324	314,960
Garden City Park	N-650	1301	700	Magothy	350	721	132	207	0	0
	N-651	1301	800	Magothy	348	719	119	198	0	0
	N-5603	2766	1,000	Magothy	452	0	0	165,951	190,616	78,294
	N-6945	3818	1,240	Magothy	514	366,924	286,181	293,075	323,269	252,928
	N-7512	4493	1,200	Magothy	380	432,828	529,856	608,313	438,221	548,921
	N-8409	5464	1,200	Magothy	405	20,758	11,740	16,298	13,798	5,293
	N-9768	7004	1,200	Magothy	477	319,055	290,378	144,672	174,594	225,679
Jamaica Water Supply Co. (Nassau)	N-14	604	1,200	Glacial	108	3,000	12,200	16,000	34,600	5,400
	N-17	1151	1,200	Glacial	100	171,100	117,500	192,000	41,800	117,100
	N-1958	1596	1,200	Lloyd	737	569,700	499,100	313,600	45,500	144,800
	N-4077	2413	1,400	Glacial	538	160,700	116,400	105,500	17,400	60,800
	N-4298	5123	400	Magothy	390	318,200	312,500	237,700	523,200	621,600
	N-4390	5123	1,400	Magothy	301	555,500	623,600	655,300	663,900	118,000

NA Not Available.
(1) Units of capacity are gallons per minute.
(2) Units of depth are feet below mean sea level.
(3) Pumpage is reported in thousands of gallons.

Table 4. Public Supply Wells within a 3-Mile Radius of the Unisys Corporation Great Neck Facility, Great Neck, New York

Water District	NYSDEC Well Designation	NYSDEC Permit Number	Capacity (1)	Aquifer	Depth (2)	Pumpage 1984 (3)	Pumpage 1985 (3)	Pumpage 1986 (3)	Pumpage 1987 (3)	Pumpage 1988 (3)
	N-7445	4327	1,200	Magothy	453	96,100	40,500	74,100	164,000	90,700
	N-7649	4643	1,200	Magothy	210	100	16,700	0	126,400	467,000
	N-7650	4643	1,200	Magothy	445	316,100	308,100	454,800	337,500	342,000
Manhasset-Lakeville (3)	N-1328	1393	1,500	Lloyd	770	290,127	383,086	397,682	397,793	325,274
	N-1618	1393	1,500	Lloyd	589	371,701	388,129	505,374	531,341	479,474
	N-1802	1515	1,050	Lloyd	750	46,187	22,522	96,590	54,517	101,137
	N-2028	1647	1,450	Magothy	610	214,426	173,929	184,809	160,787	179,417
	N-3905	1991	1,050	Magothy	259	0	0	1,608	28,645	0
	N-5099	2660	1,050	Magothy	434	310,872	411,721	22,148	0	390,228
	N-5528	2660	1,070	Magothy	515	128,577	86,761	172,768	74,349	56,389
	N-5710	2879	1,400	Magothy	390	6,062	0	0	0	0
	N-7126	3966	1,400	Magothy	829	266,996	209,966	224,669	229,656	205,967
	N-7651	4689	1,400	Magothy	573	360,189	451,301	665,896	572,307	498,475
	N-7892	4801	1,400	Magothy	455	19,051	6,514	91,196	4,039	71,153
	N-7971	4772	0	Glacial	NA	*	82,579	79,742	81,351	170,623
	N-9308	6765	1,400	Lloyd	410	45,964	89,332	98,390	87,069	138,166
Roslyn	N-4623	2502	1,050	Magothy	503	8,366	39,067	84,644	38,349	287,114
Village of Garden City	N-3881	2196	1,200	Magothy	470	212,869	96,484	97,420	0	0
	N-5163	2648	1,370	Magothy	480	212,390	143,431	158,870	119,050	136,540

NA Not Available.
(1) Units of capacity are gallons per minute.
(2) Units of depth are feet below mean sea level.
(3) Pumpage is reported in thousands of gallons.

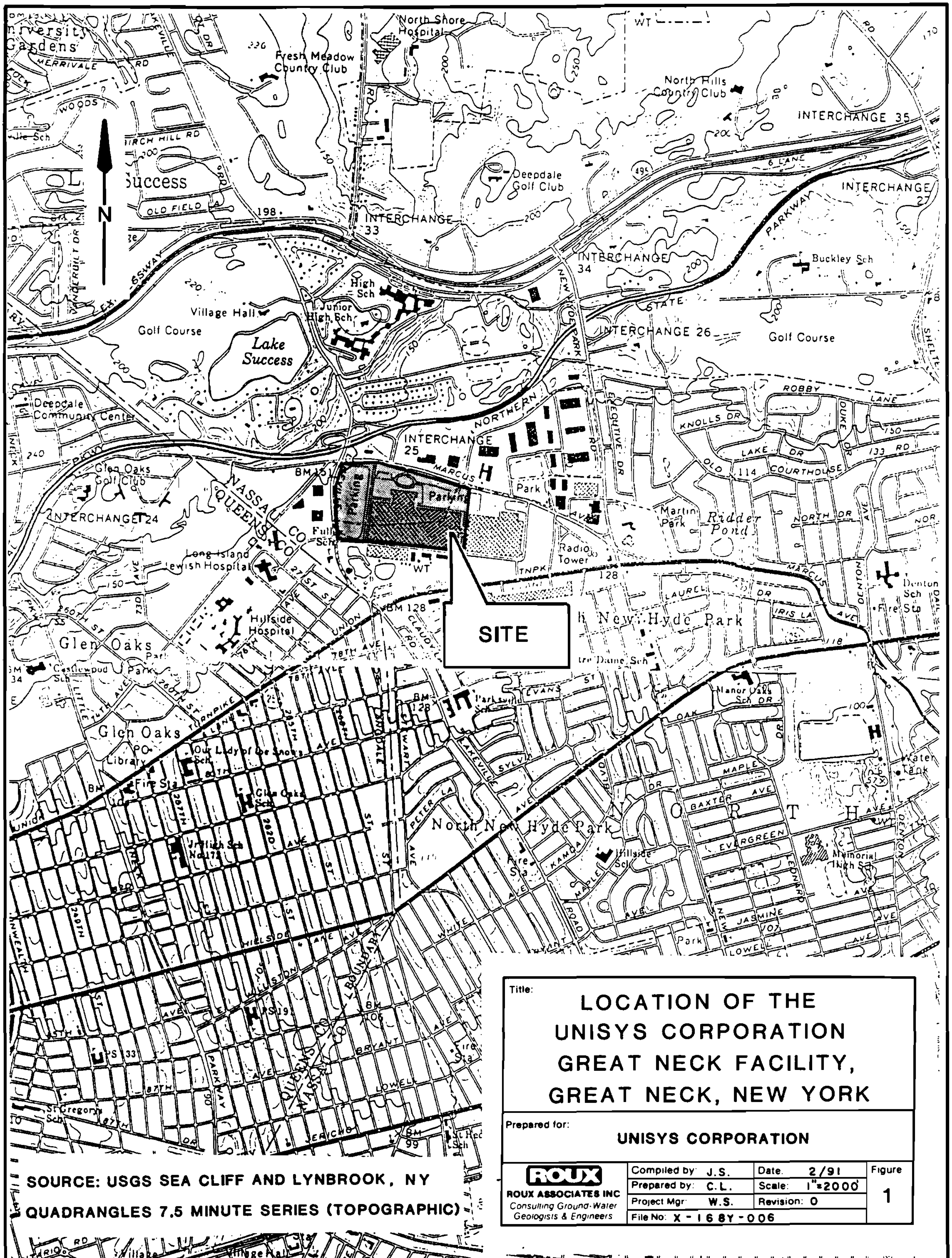
Table 4. Public Supply Wells within a 3-Mile Radius of the Unisys Corporation Great Neck Facility, Great Neck, New York

Water District	NYSDEC Well Designation	NYSDEC Permit Number	Capacity (1)	Aquifer	Depth (2)	Pumpage 1984 (3)	Pumpage 1985 (3)	Pumpage 1986 (3)	Pumpage 1987 (3)	Pumpage 1988 (3)
	N-7058	3956	1,500	Magothy	445	328,544	333,284	314,490	296,630	367,010
	N-8339	5325	1,400	Magothy	363	309,050	289,038	281,060	184,260	1,190
Village of Mineola	N-3185	804	1,000	Magothy	499	116,016	177,383	215,186	211,318	132,978
	N-8576	5642	1,000	Magothy	551	311,677	289,473	256,447	209,846	277,764

NA Not Available.
(1) Units of capacity are gallons per minute.
(2) Units of depth are feet below mean sea level.
(3) Pumpage is reported in thousands of gallons.

Table 5. Summary of the Hydraulic Coefficients from the August 20, 1990 through August 23, 1990 Pumping Test at the Unisys Corporation Great Neck Facility, Great Neck, New York.

Pumping Test Site	Monitoring Well	Method of Analysis	Transmissivity, in gallons per day per foot (gpd/ft)	Storage Coefficient	Hydraulic Conductivity, in gallons per square foot (gpd/ft^2)
Unisys Production Well No. 2	1MI	Neuman Partial Penetration (Type Curve Match 1)	89,606	4.5×10^{-4}	302
	1MI	Neuman Partial Penetration (Type Curve Match 2)	149,181	6.2×10^{-4}	502
	12MI	Neuman Partial Penetration (Type Curve Match 1)	107,410	6.2×10^{-3}	362
	12MI	Neuman Partial Penetration (Type Curve Match 2)	110,189	6.6×10^{-3}	371
Average			114,097	3.5×10^{-3}	384



Title:

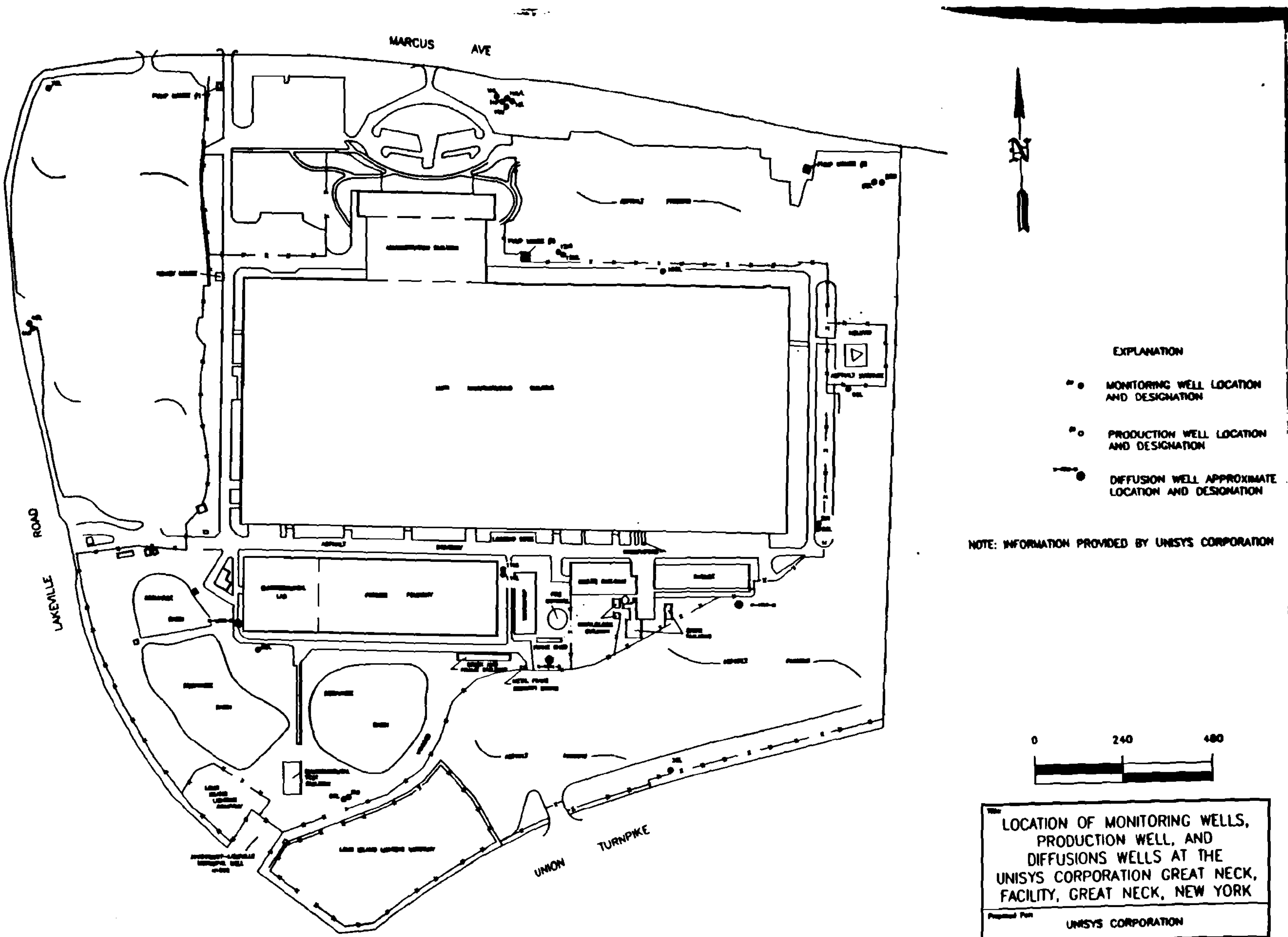
LOCATION OF THE UNISYS CORPORATION GREAT NECK FACILITY, GREAT NECK, NEW YORK

Prepared for:

UNISYS CORPORATION

ROUX ASSOCIATES INC Consulting Ground-Water Geologists & Engineers	Compiled by: J.S.	Date: 2/91	Figure
	Prepared by: C.L.	Scale: 1"=2000'	1
	Project Mgr: W.S.	Revision: 0	
	File No: X-168Y-006		

SOURCE: USGS SEA CLIFF AND LYNBROOK, NY QUADRANGLES 7.5 MINUTE SERIES (TOPOGRAPHIC)

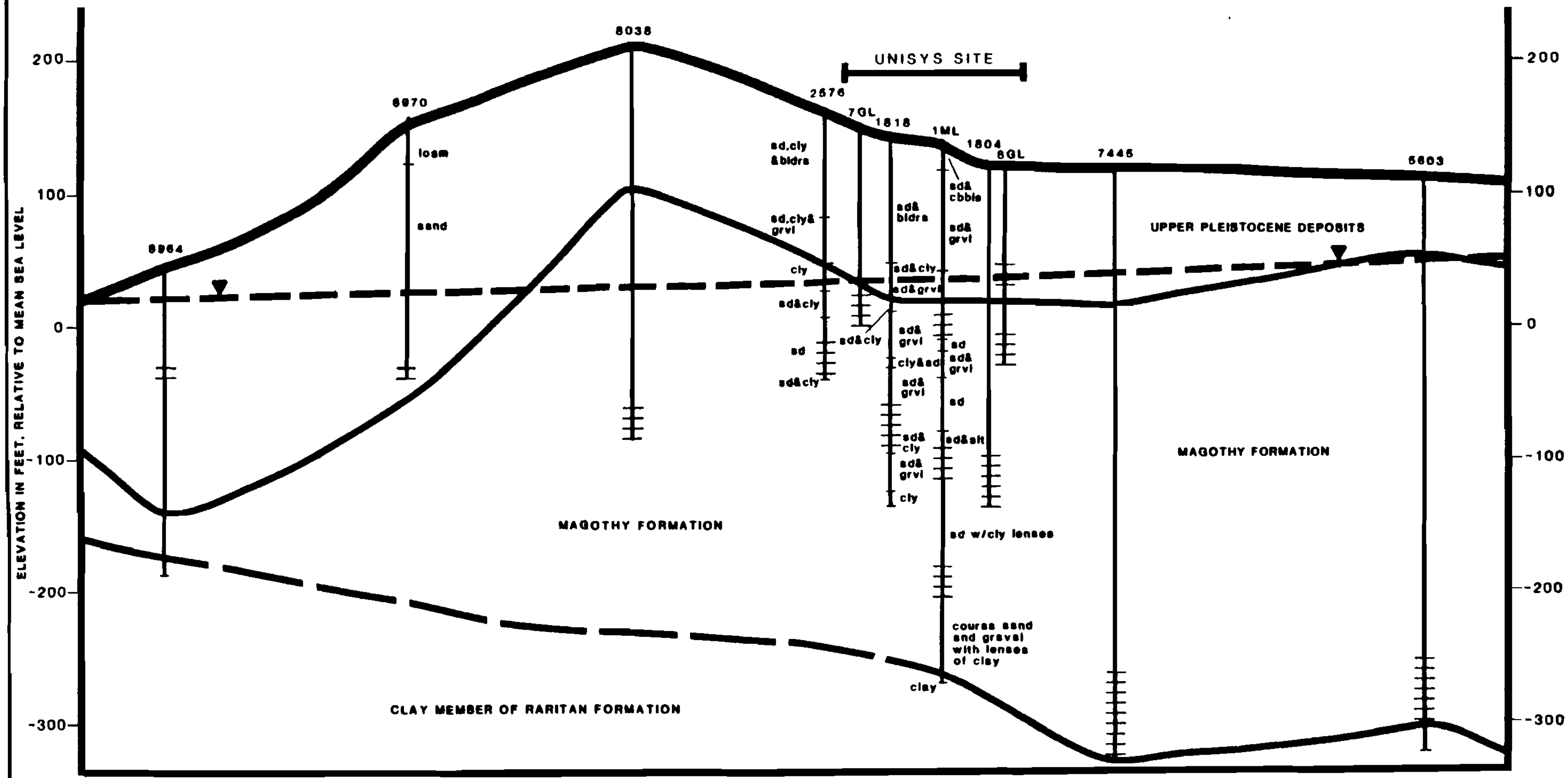


LOCATION OF MONITORING WELLS, PRODUCTION WELL, AND DIFFUSIONS WELLS AT THE UNISYS CORPORATION GREAT NECK, FACILITY, GREAT NECK, NEW YORK

UNISYS CORPORATION

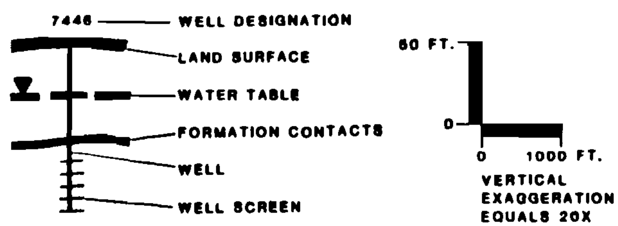
ROUX ASSOCIATES INC

Compiled by: UNISYS	Date: 2/91		FIGURE
Prepared by: C.L.	Scale: SHOWN		2
Project Mgr: M.A.D.	Revision: 0		
File No: 17504LWP			



EXPLANATION

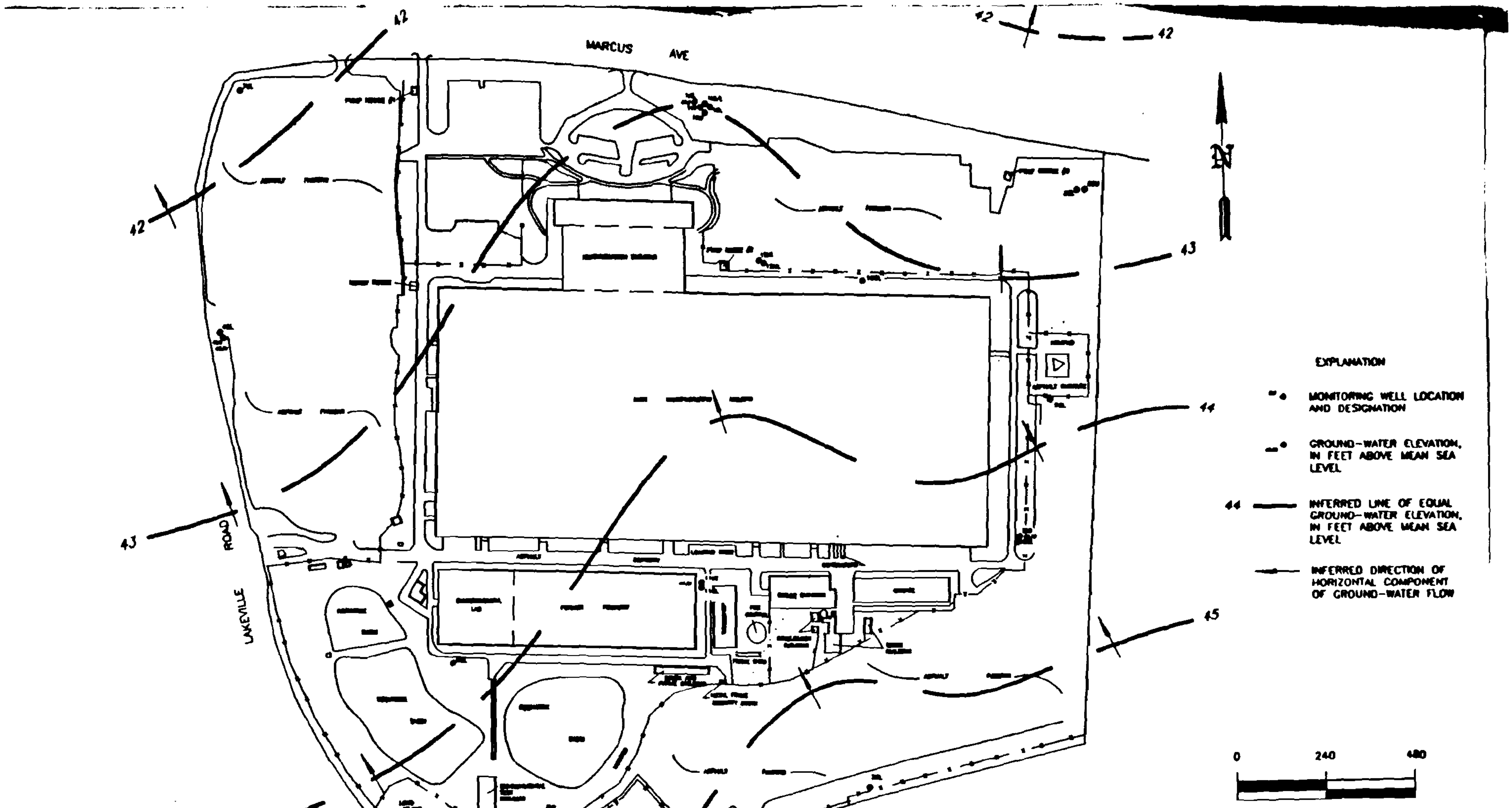
BOULDERS - bldrs
COBBLES - cbble
GRAVEL - grvl
SAND - sd
SILT - slt
CLAY - cly



REFERENCE: HYDROGEOLOGY OF THE TOWN OF NORTH HEMPSTEAD, L.I., N.Y. 1979, LONG ISLAND WATER RESOURCES BULLETIN 12.

Title	SCHEMATIC REGIONAL HYDROGEOLOGIC CROSS SECTION THROUGH UNISYS CORPORATION GREAT NECK FACILITY, GREAT NECK, NEW YORK
Prepared for	UNISYS CORPORATION

ROUX ROUX ASSOCIATES INC Consulting Ground Water Geologists & Engineers	Compiled by L.O.	Date 2/91	Figure 3
	Prepared by V.M.	Scale SHOWN	
	Project Mgr M.D.	Revision 0	
	File No 17501Y		



EQUIPOTENTIAL MAP OF THE MAGOTHY AQUIFER BASED UPON INTERMEDIATE MAGOTHY AQUIFER MONITORING WELLS, AUGUST 16, 1990, UNISYS CORPORATION GREAT NECK FACILITY, GREAT NECK, NEW YORK

UNISYS CORPORATION

ROUX

L.O. | 2/91 | SHOWN | C.R. | M.D | 0 | 17504Y

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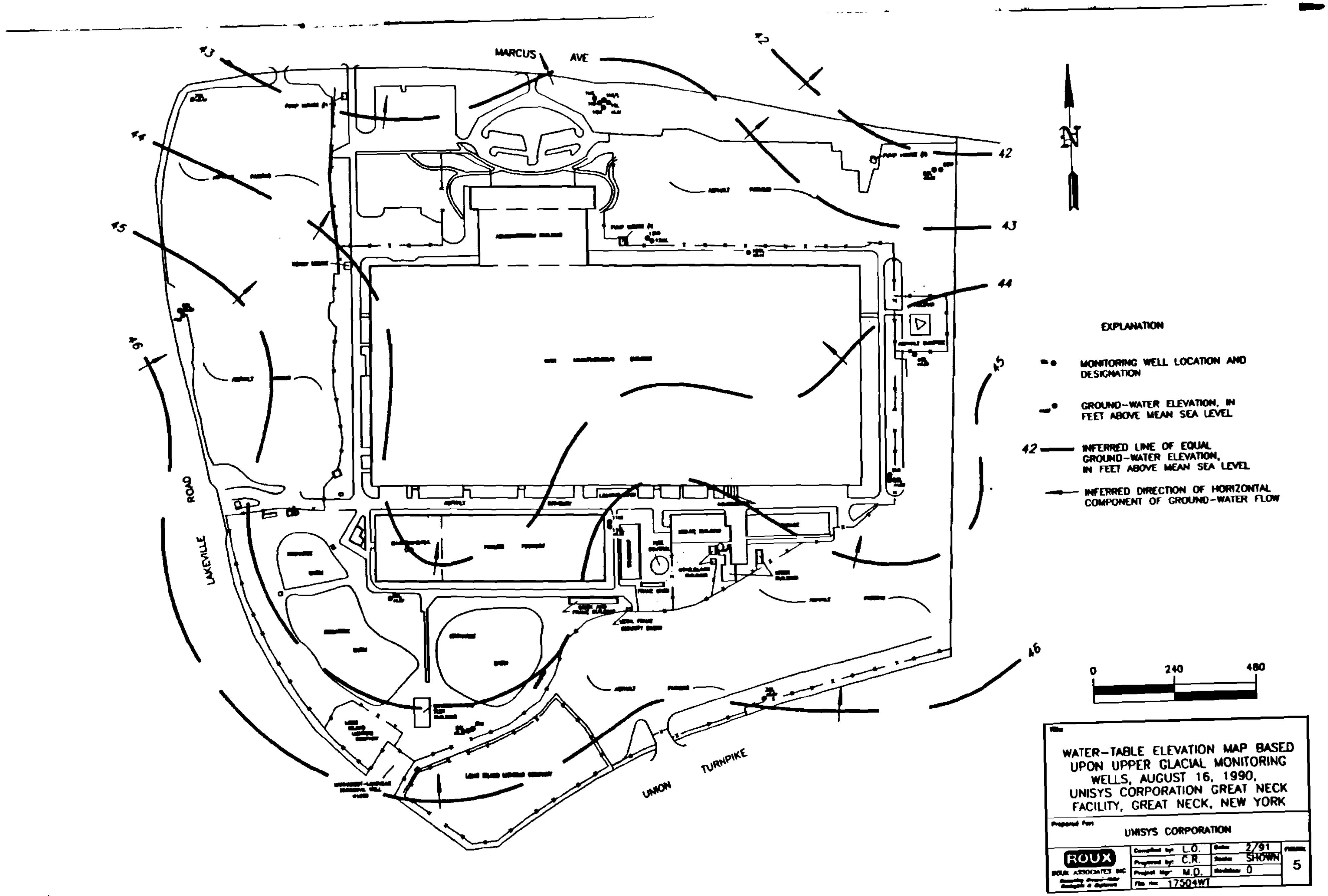

MARCUS AVE
LAKEVILLE ROAD
UNION TURNPIKE
N
42
43
44
45
46
EXPLANATION
MONITORING WELL LOCATION AND DESIGNATION
GROUND-WATER ELEVATION, IN FEET ABOVE MEAN SEA LEVEL
42 INFERRED LINE OF EQUAL GROUND-WATER ELEVATION, IN FEET ABOVE MEAN SEA LEVEL
INFERRED DIRECTION OF HORIZONTAL COMPONENT OF GROUND-WATER FLOW
0 240 480
WATER-TABLE ELEVATION MAP BASED UPON UPPER GLACIAL MONITORING WELLS, AUGUST 16, 1990, UNISYS CORPORATION GREAT NECK FACILITY, GREAT NECK, NEW YORK
UNISYS CORPORATION
ROUX
ROUX ASSOCIATES INC
L.O.
C.R.
M.D.
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2/91
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5

LINEAR PLOT OF TIME VERSUS PUMPING RATE FOR UNISYS PRODUCTION WELL NO. 2, AUGUST 20, 1990 THROUGH AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT NECK FACILITY, GREAT NECK, NEW YORK

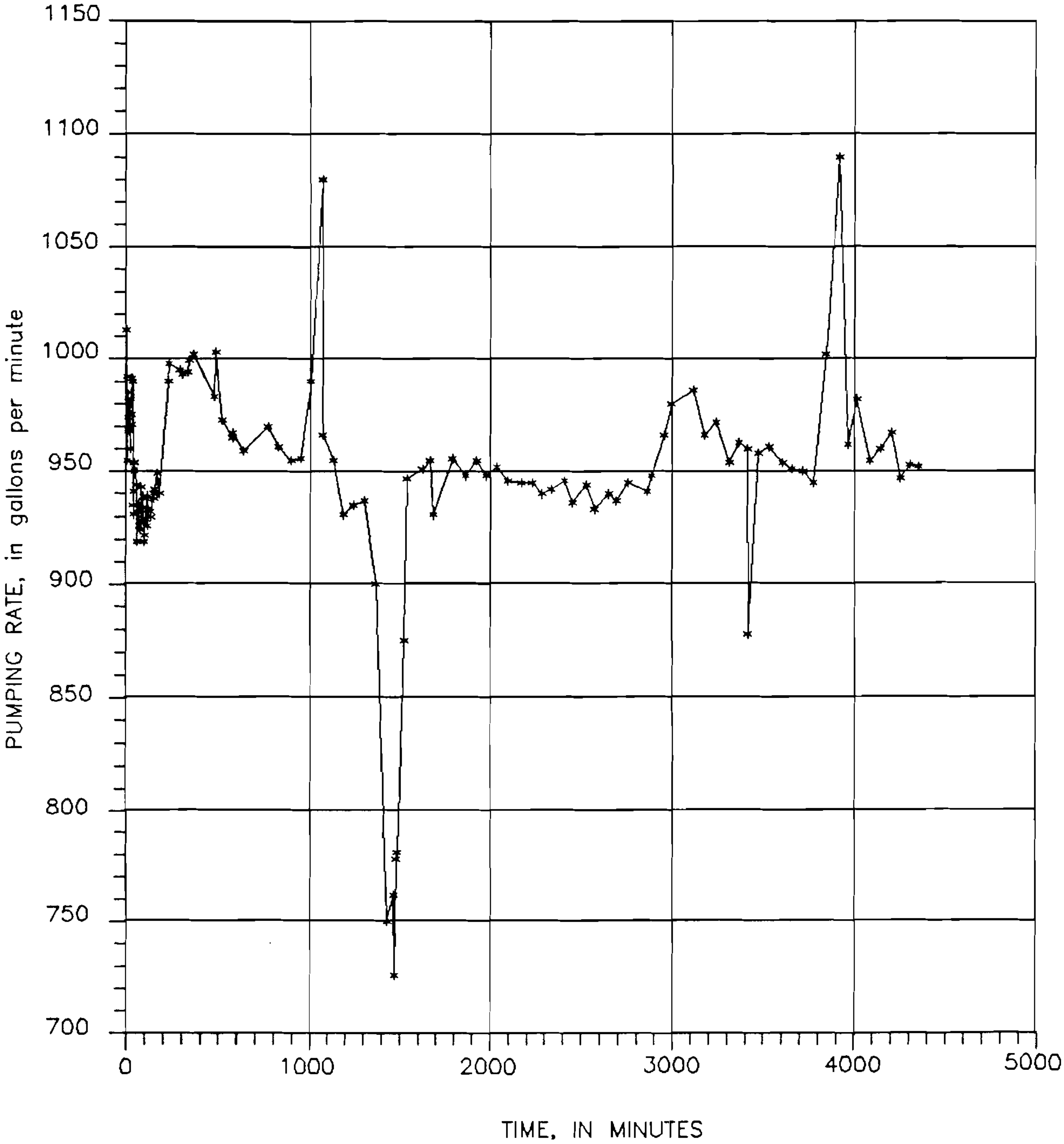


FIGURE 6

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 1GU, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

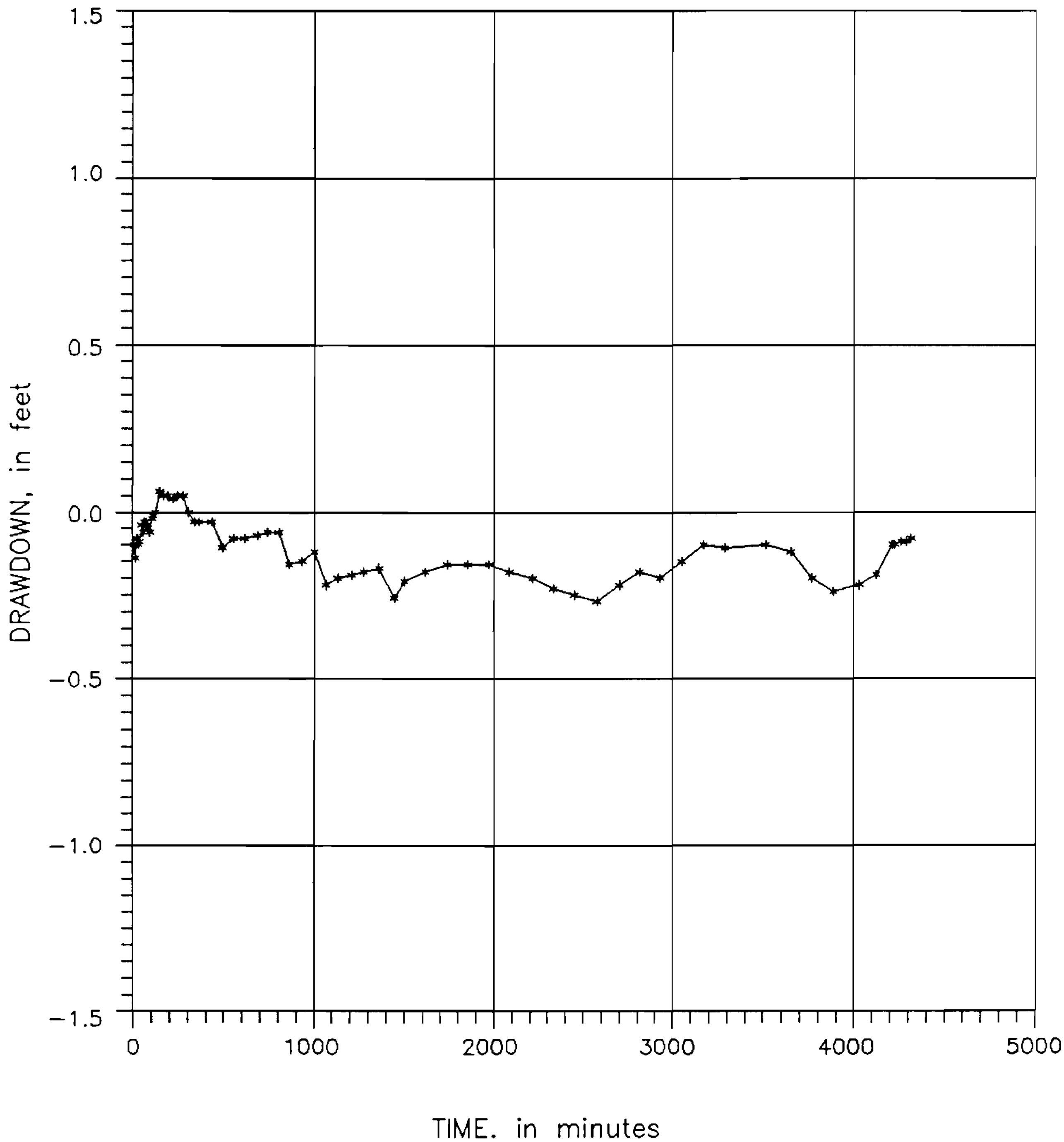


FIGURE _7__

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 1GL, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

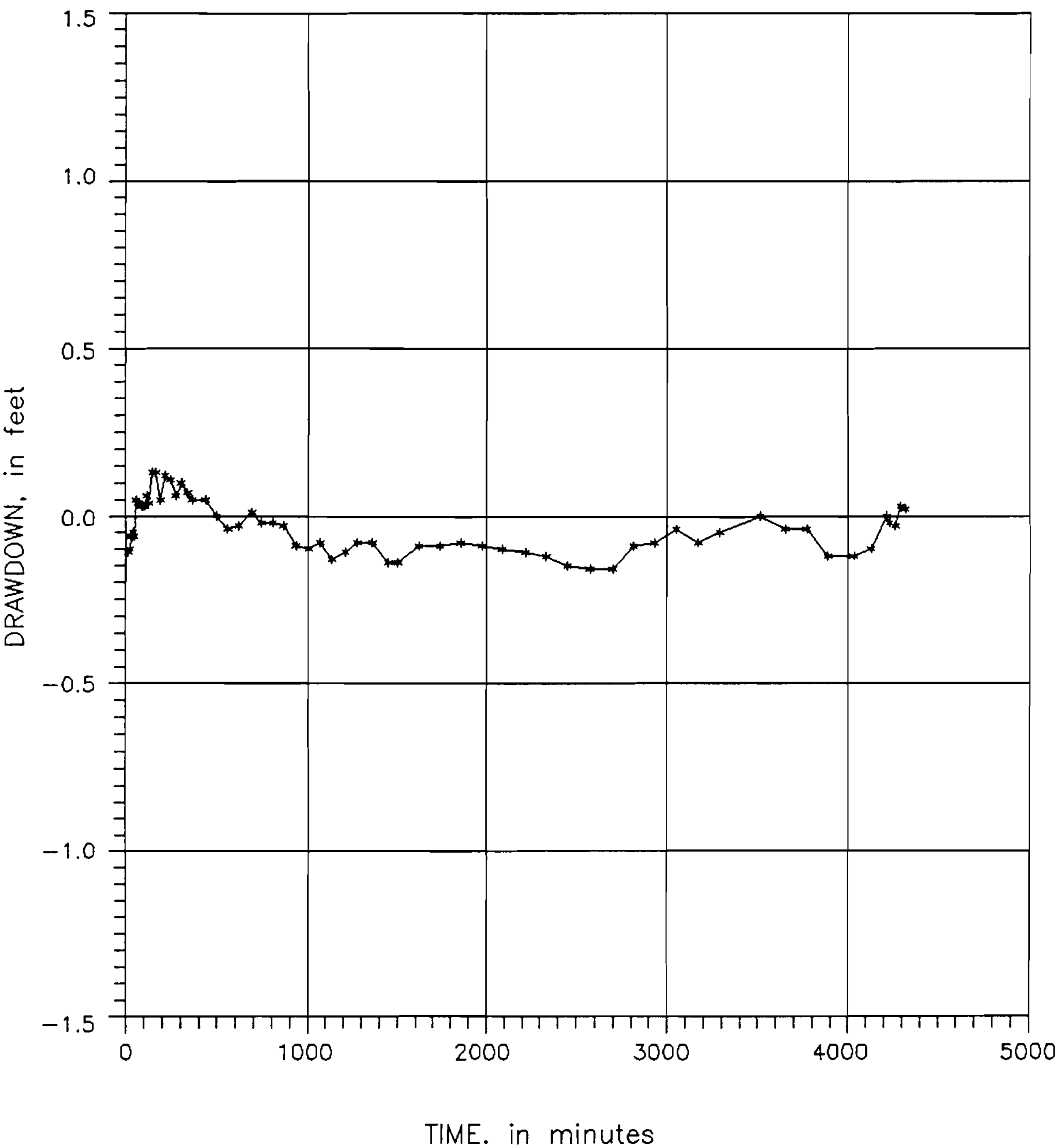


FIGURE 8

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 1MI, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

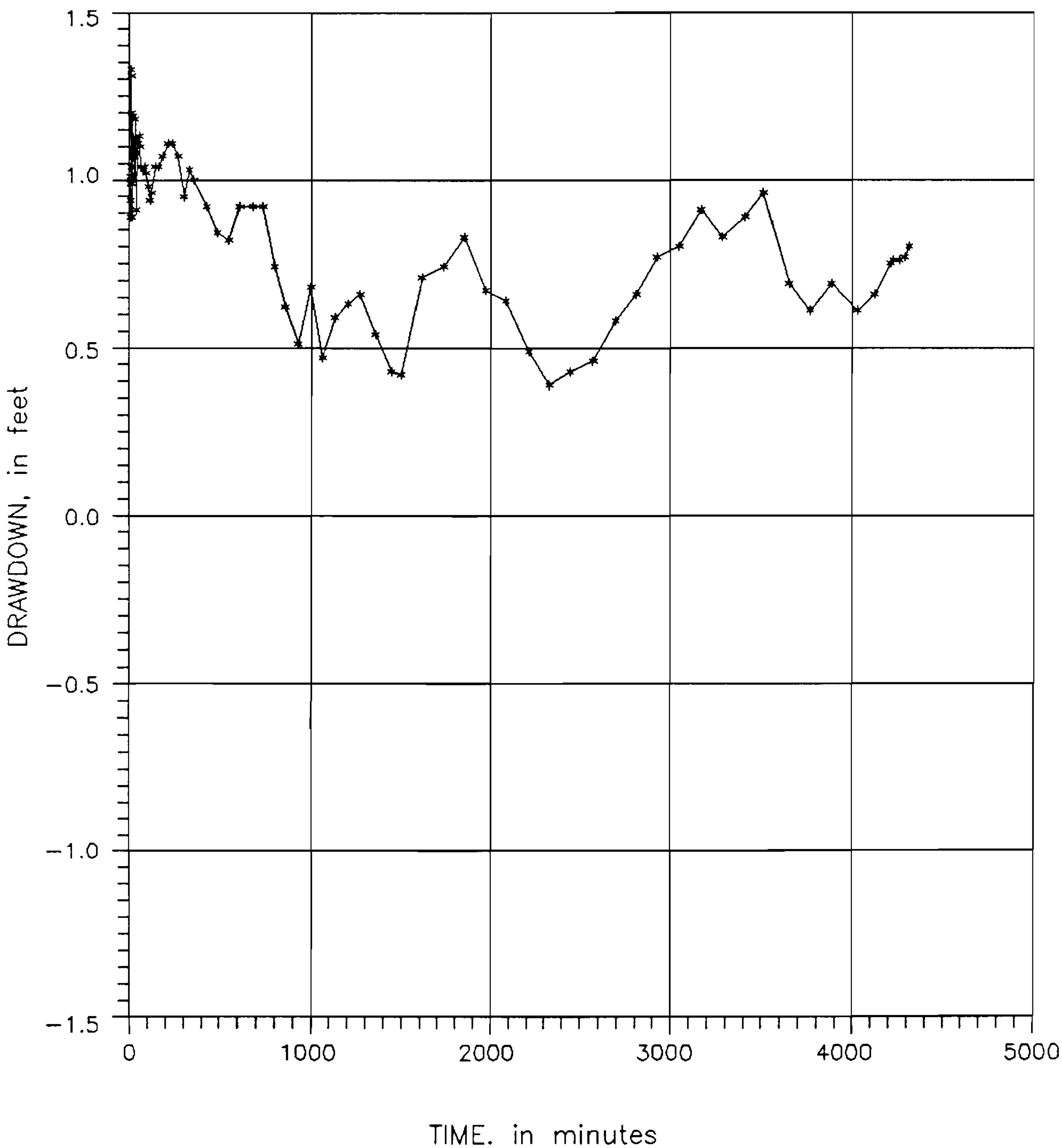


FIGURE 9

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 1MI/L, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

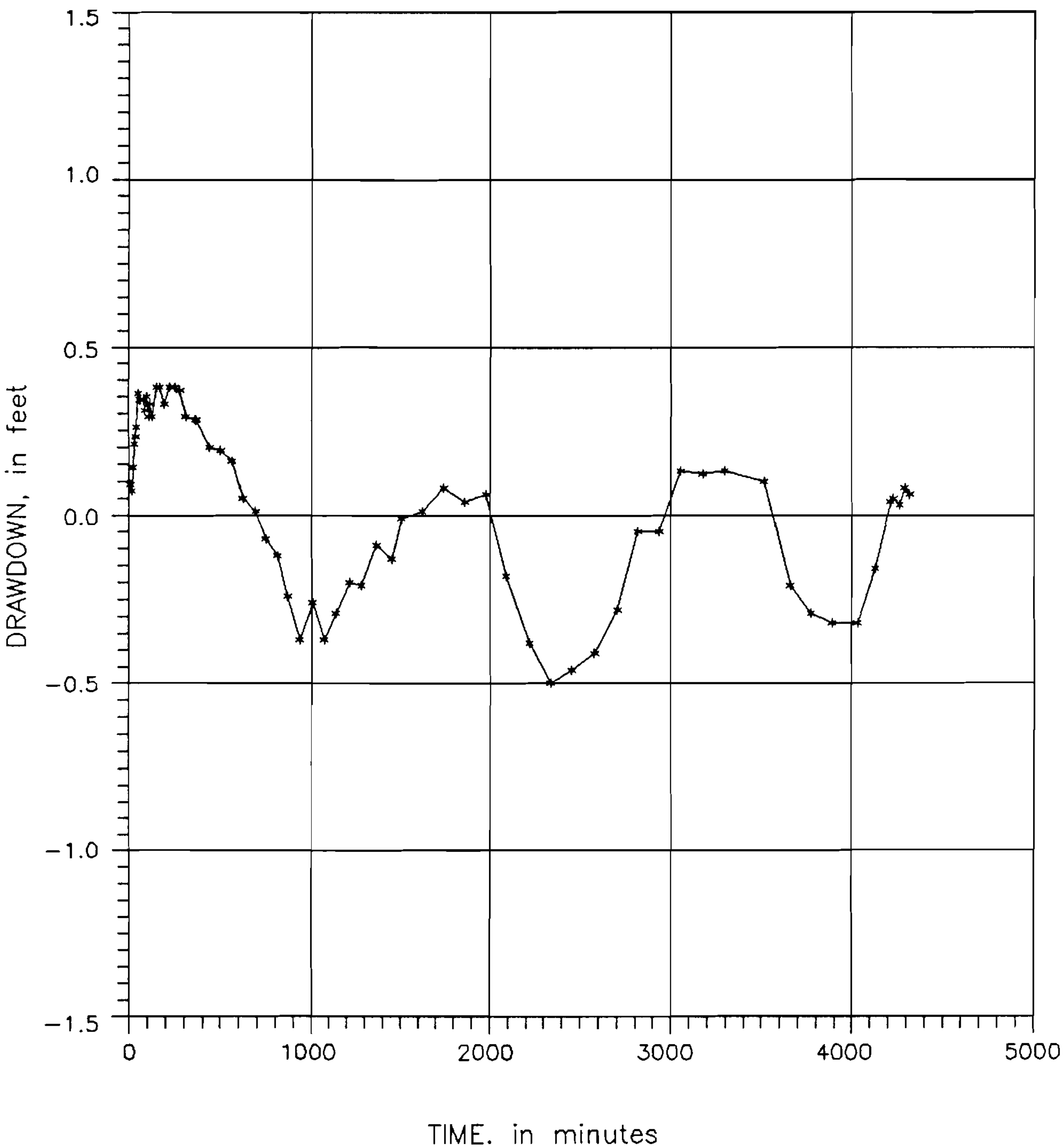


FIGURE 10

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 1ML, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

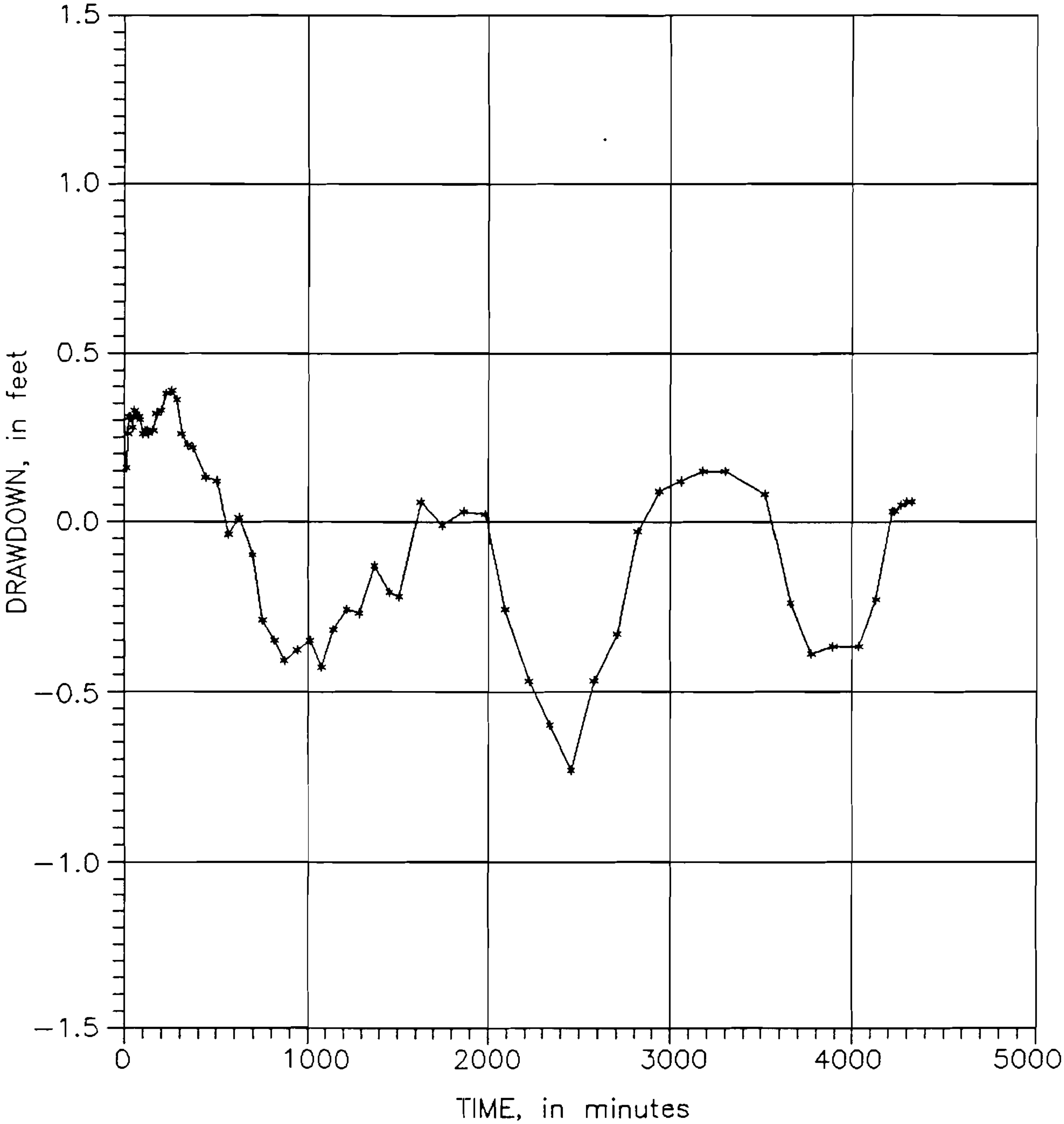


FIGURE 11

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 2GL, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

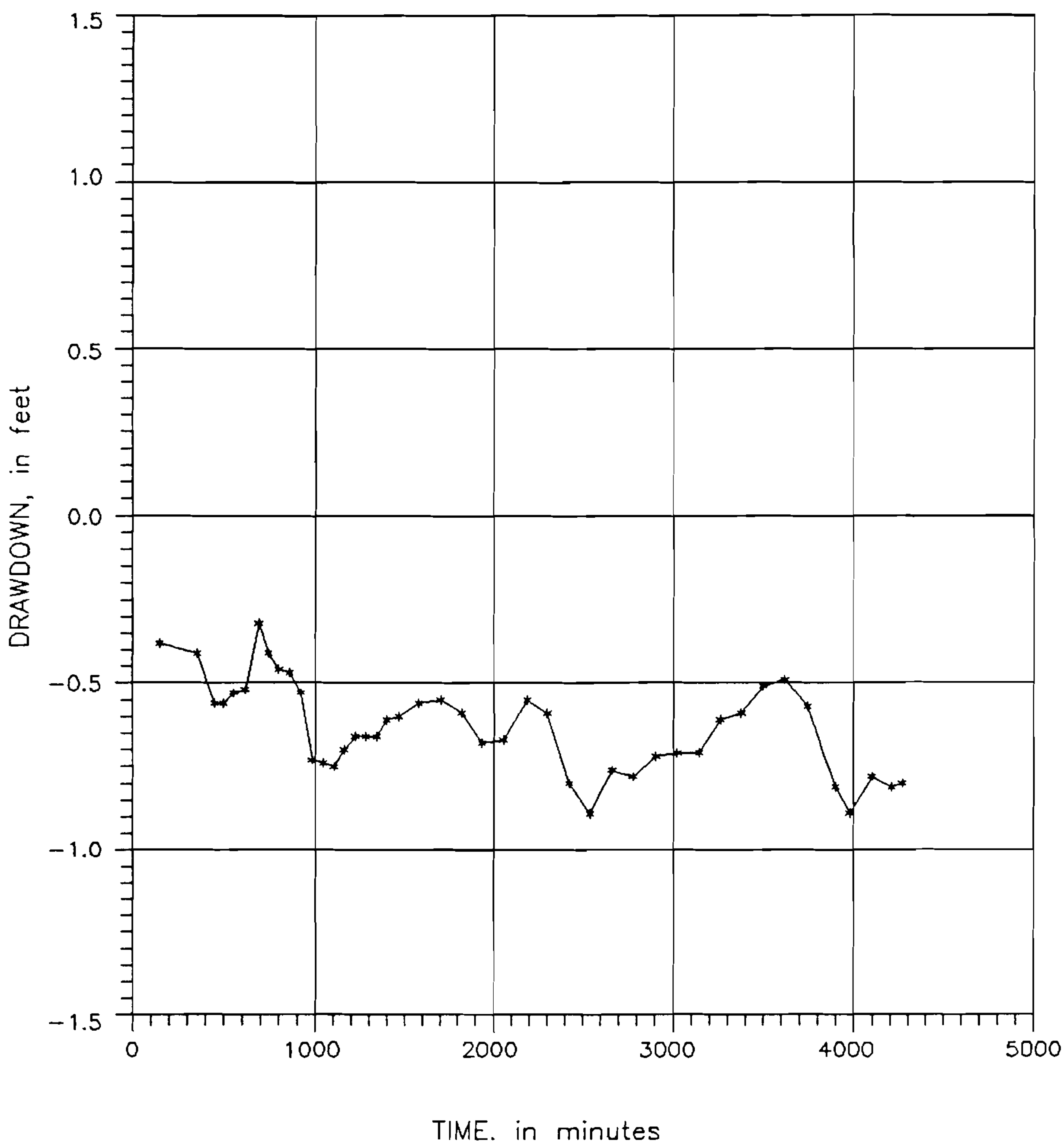


FIGURE 12

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 2MI, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

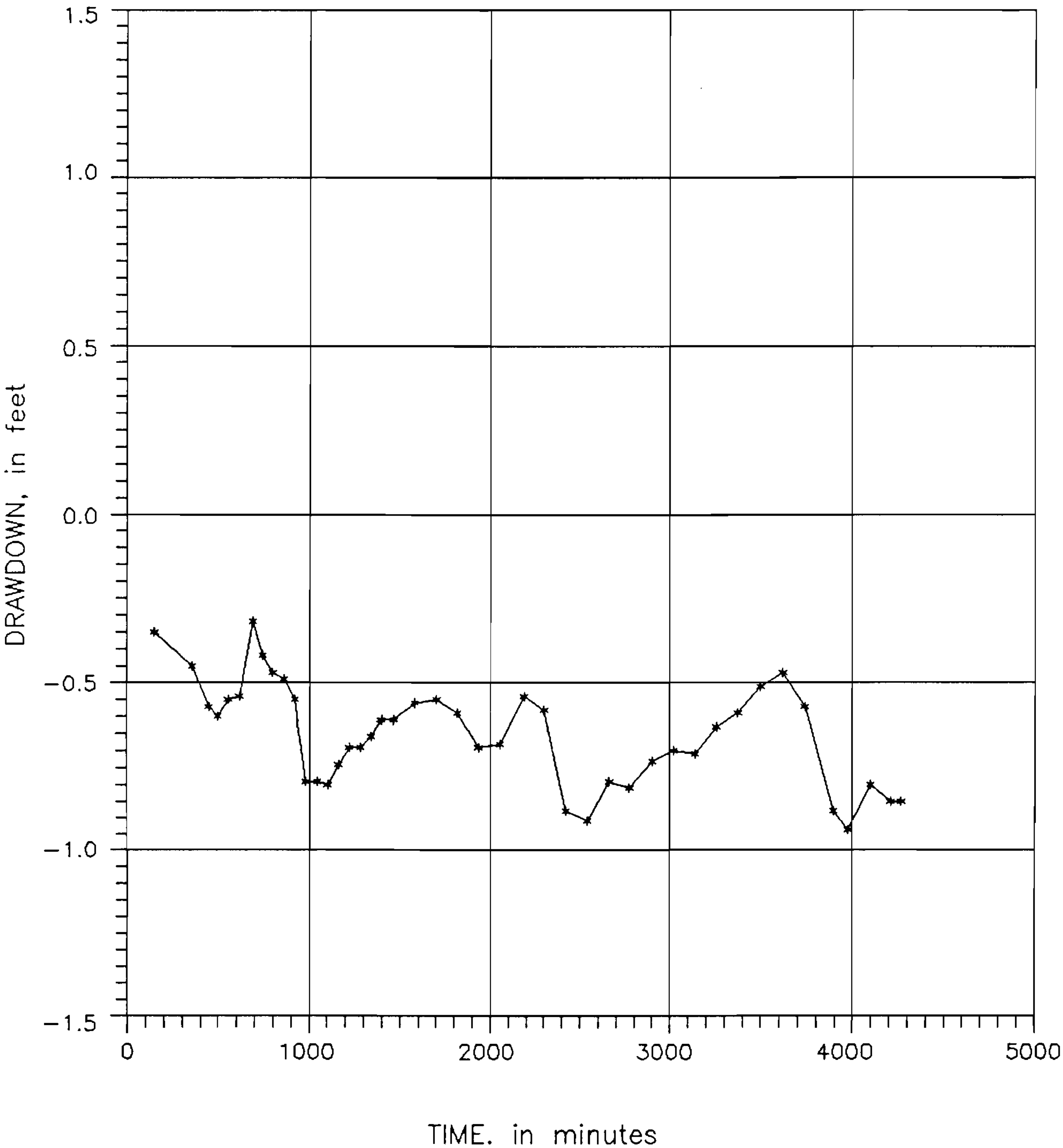


FIGURE 13

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 3GL, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

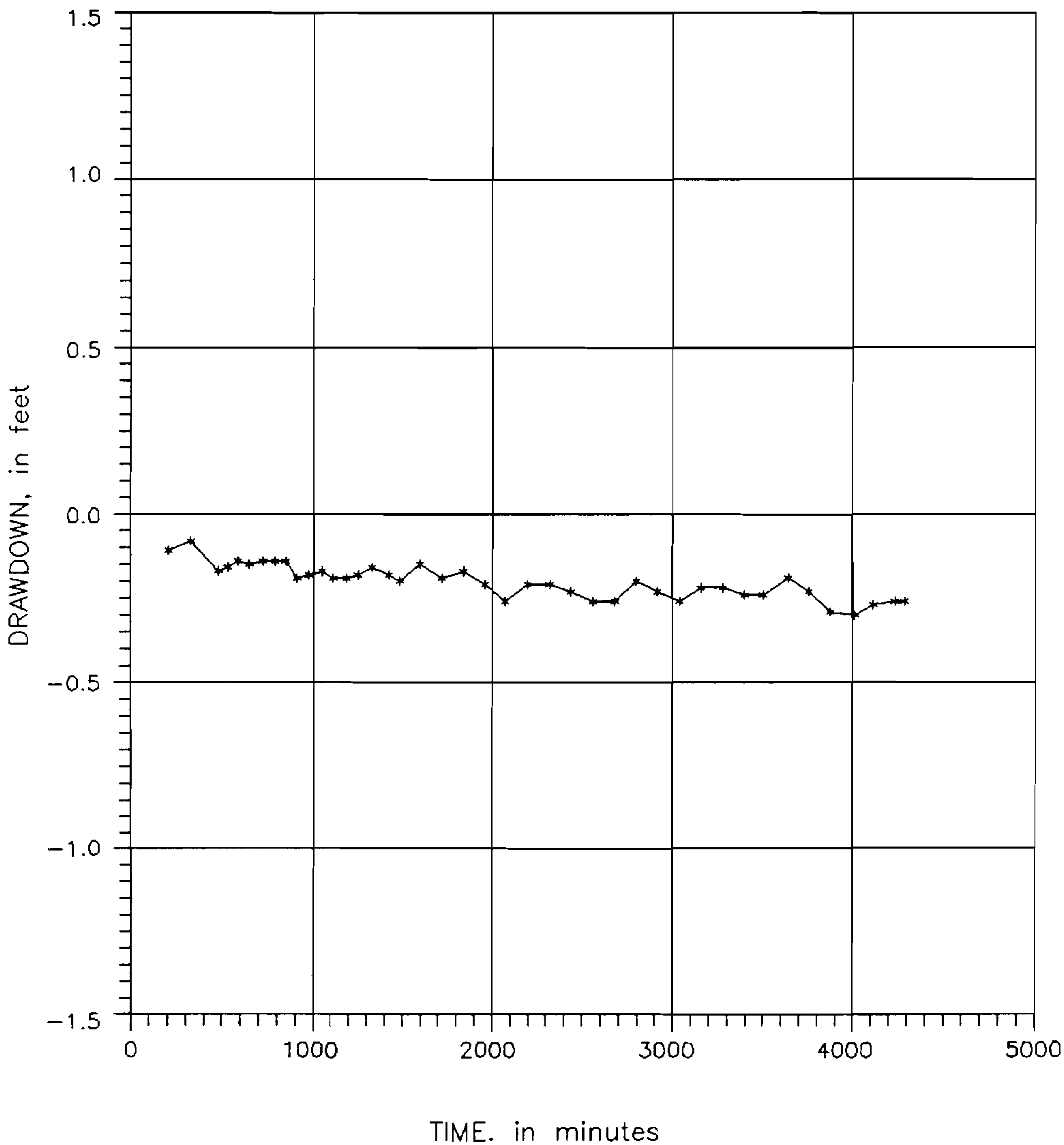


FIGURE 14

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 4GL, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

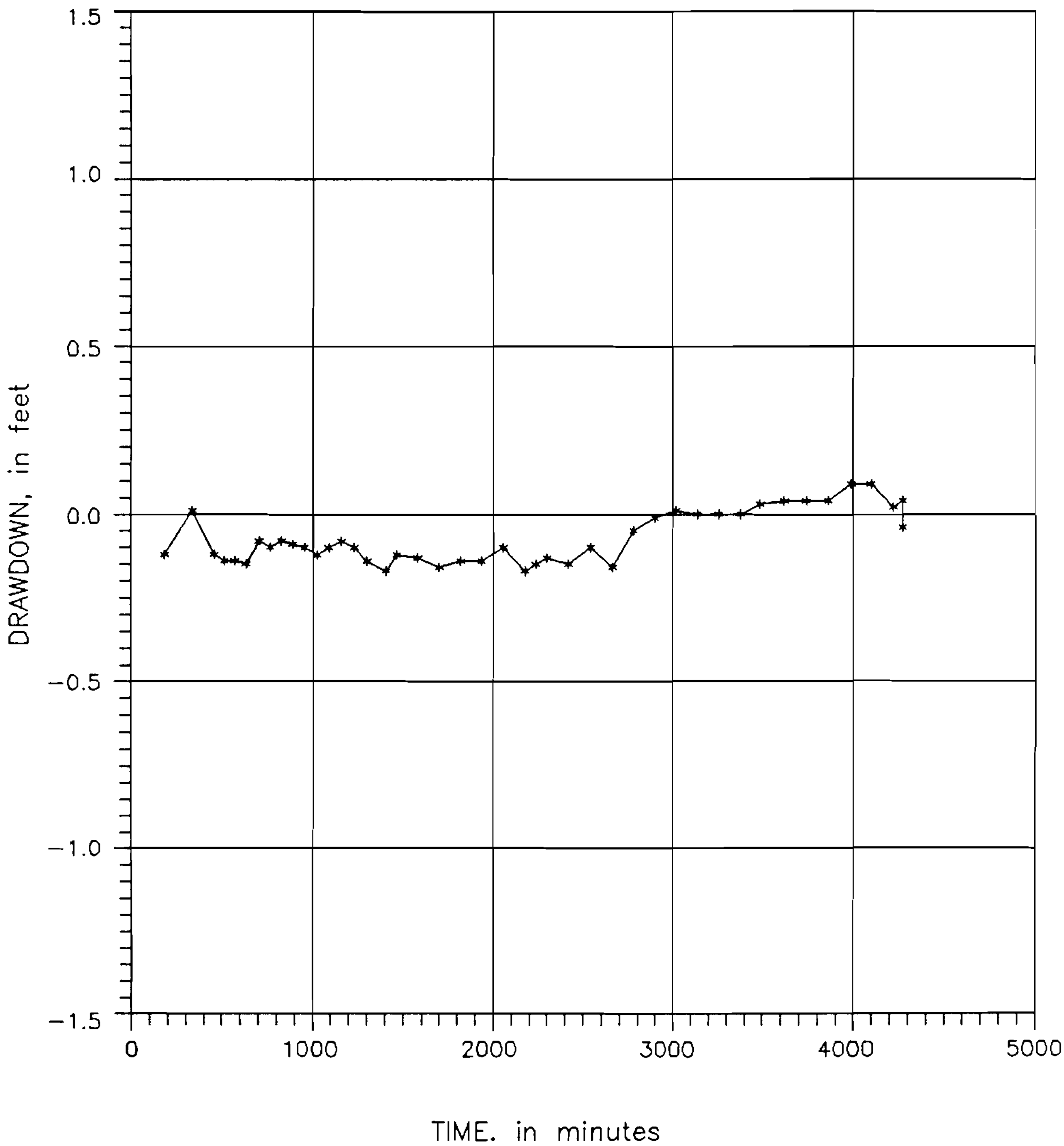


FIGURE 15

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 4MI, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

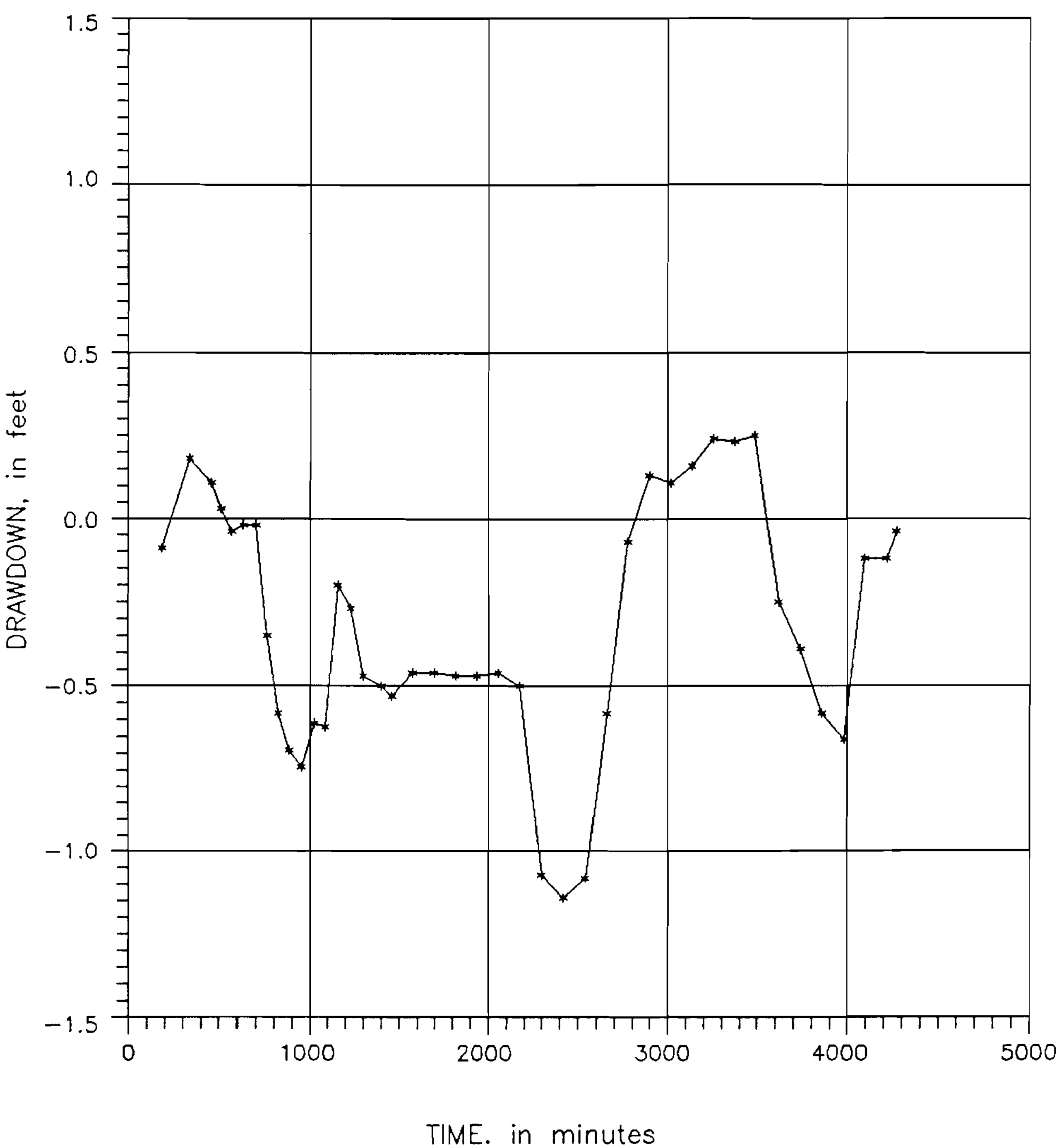


FIGURE 16

LINEAR PLOT OF TIME VERSUS DRAWDOWN FOR MONITORING WELL 5GL, AUGUST 20, 1990 THROUGH AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT NECK FACILITY, GREAT NECK, NEW YORK

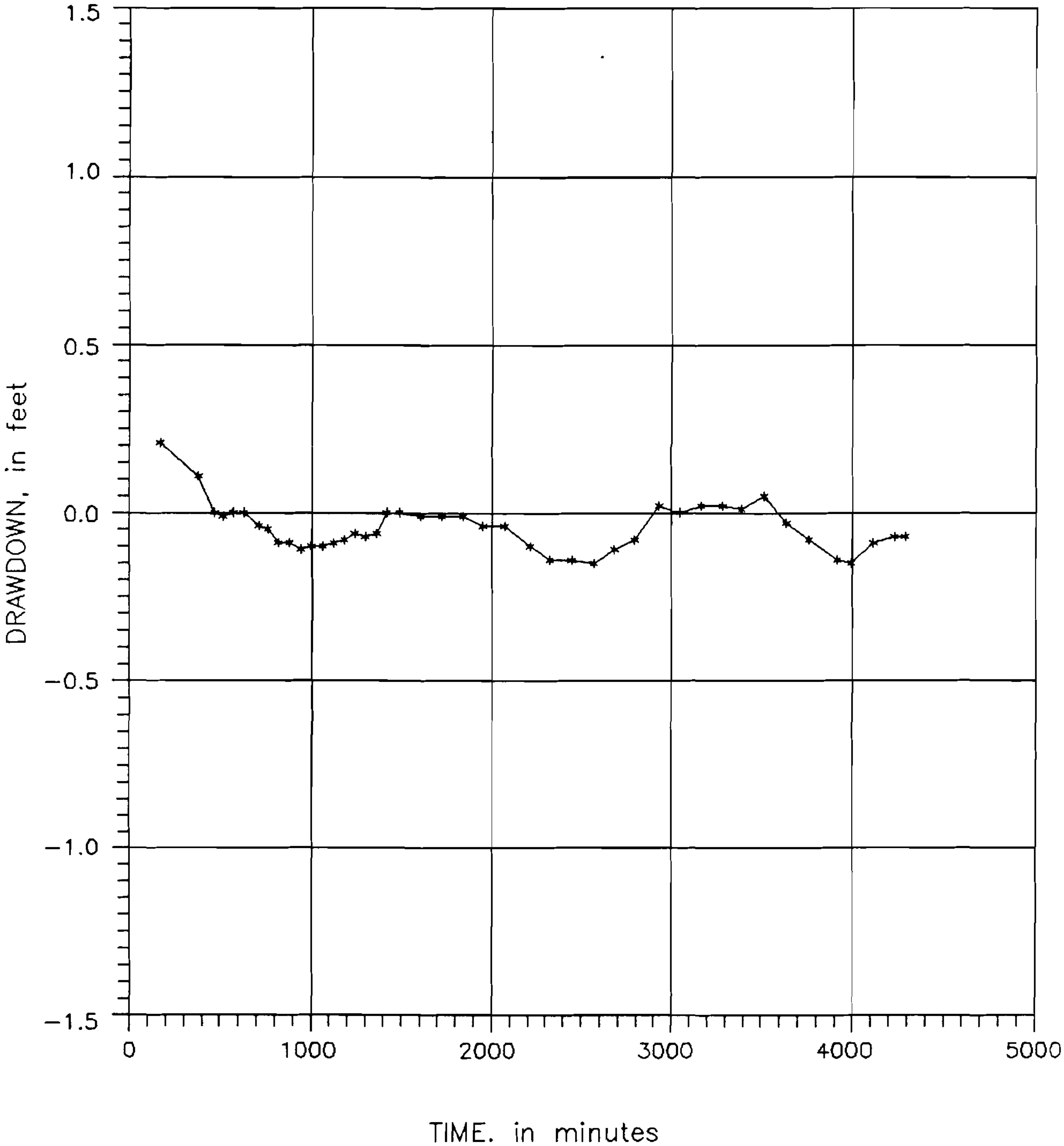


FIGURE 17

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 5MI, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

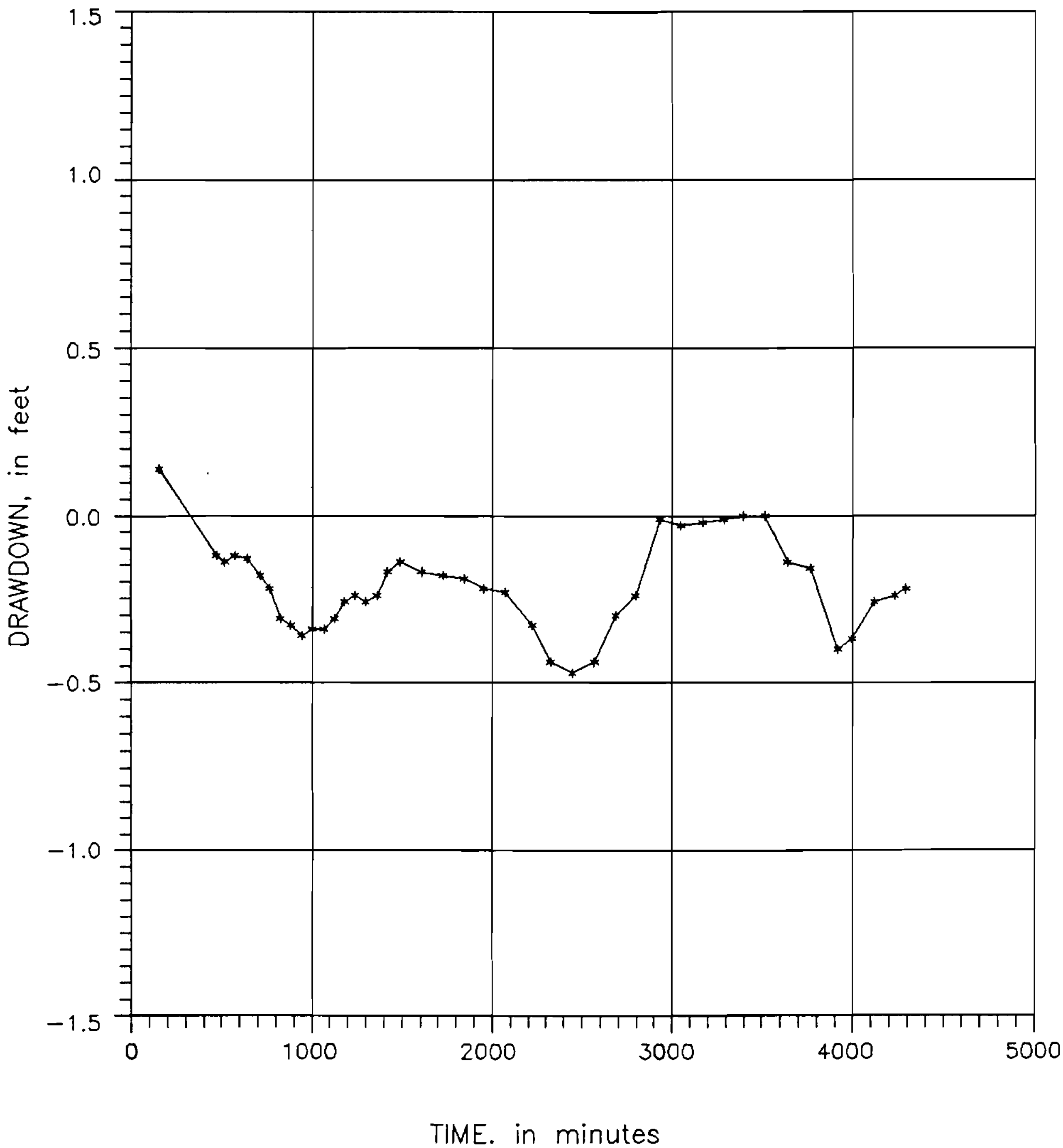


FIGURE 18

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 6GL, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

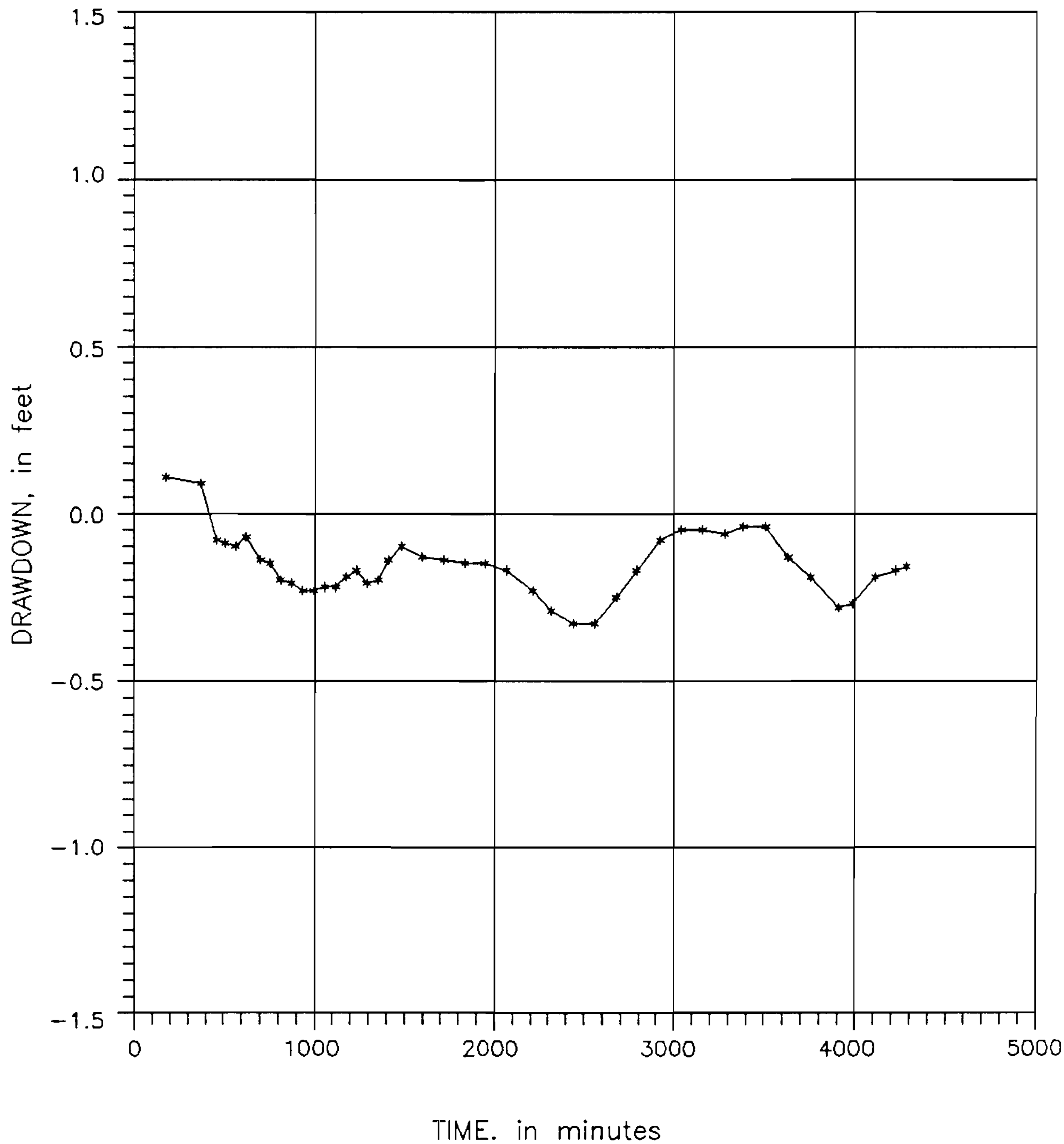


FIGURE 19

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 7GL, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

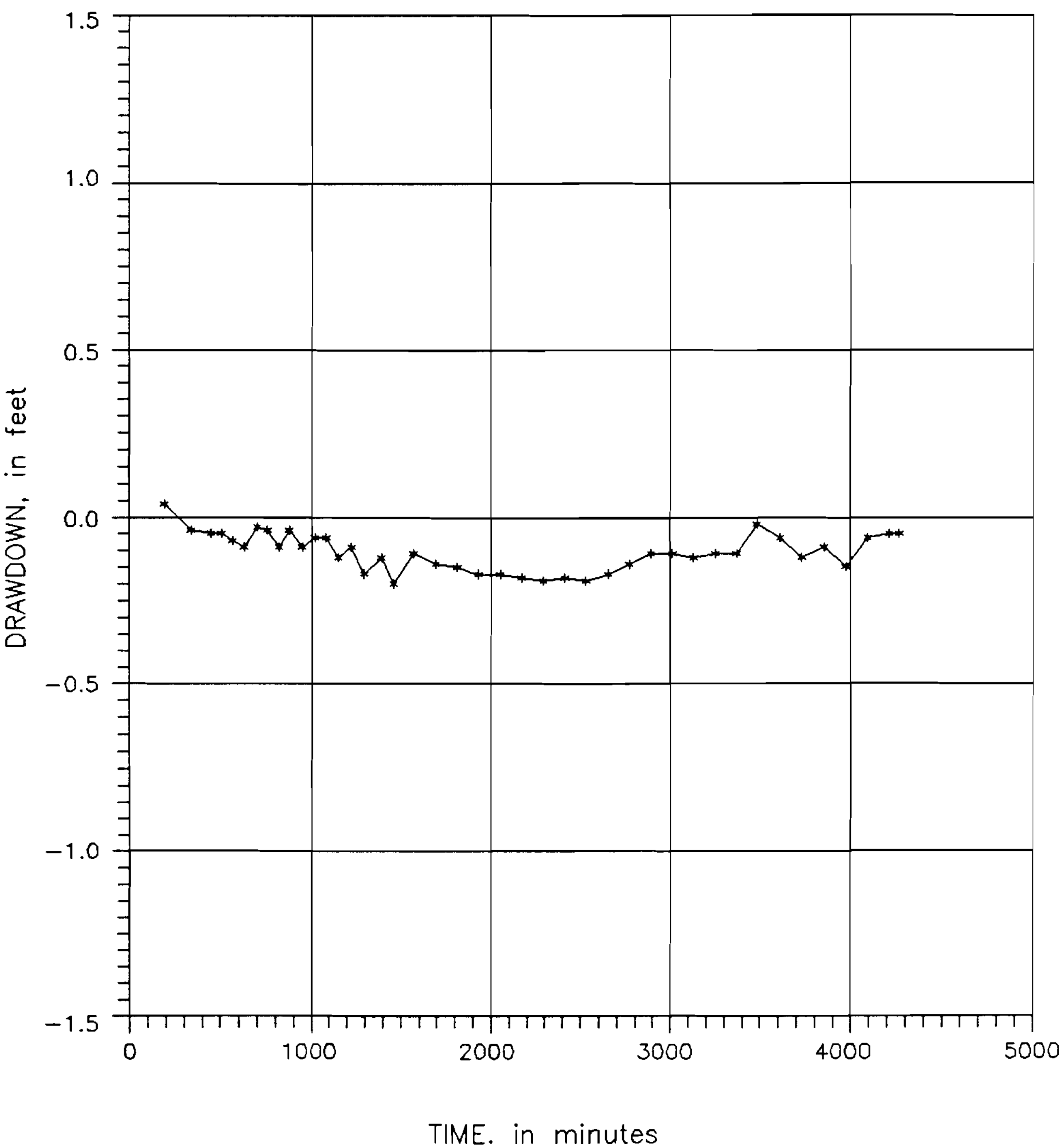


FIGURE 20

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 8GU, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

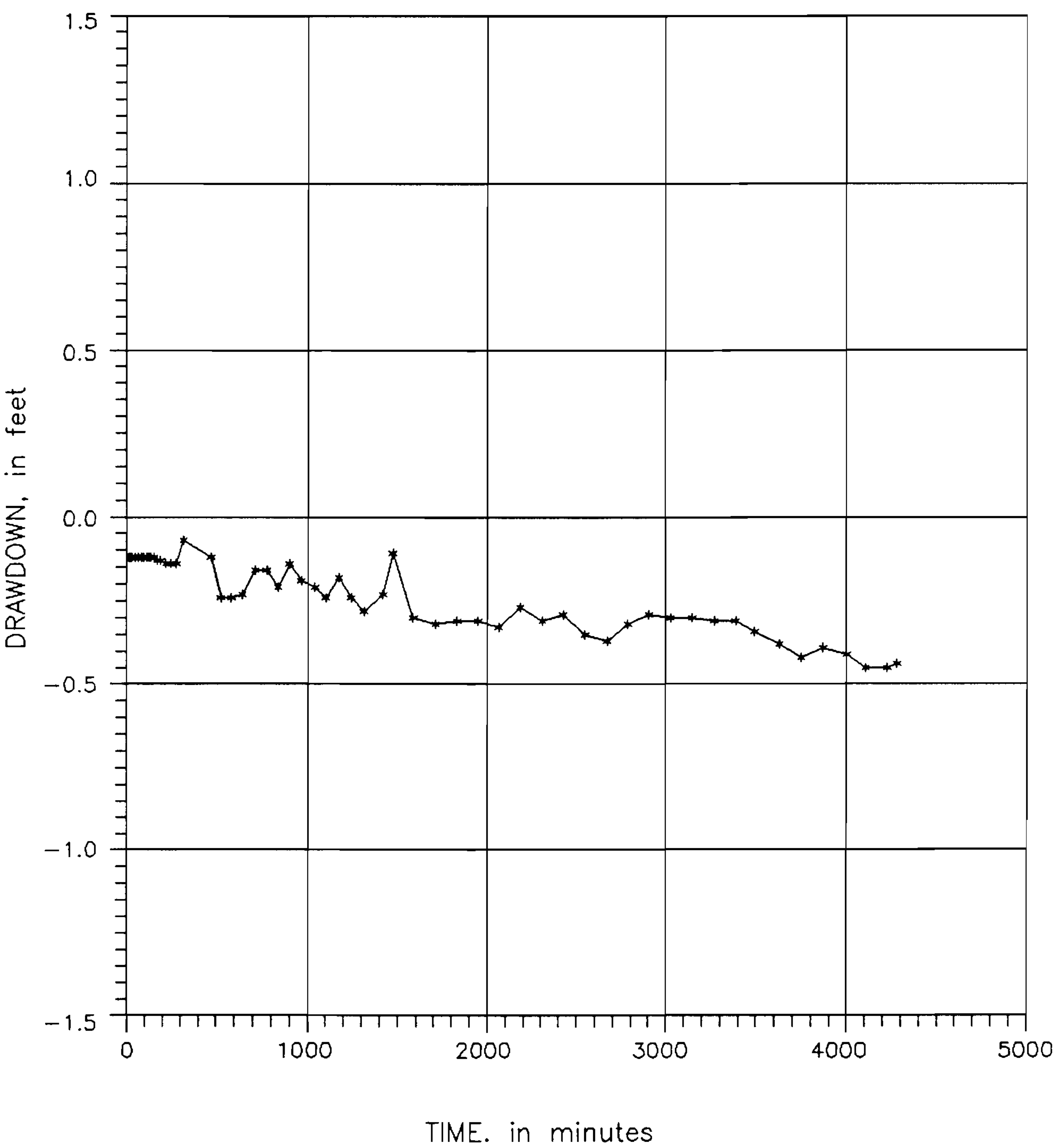


FIGURE 21

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 8GL, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

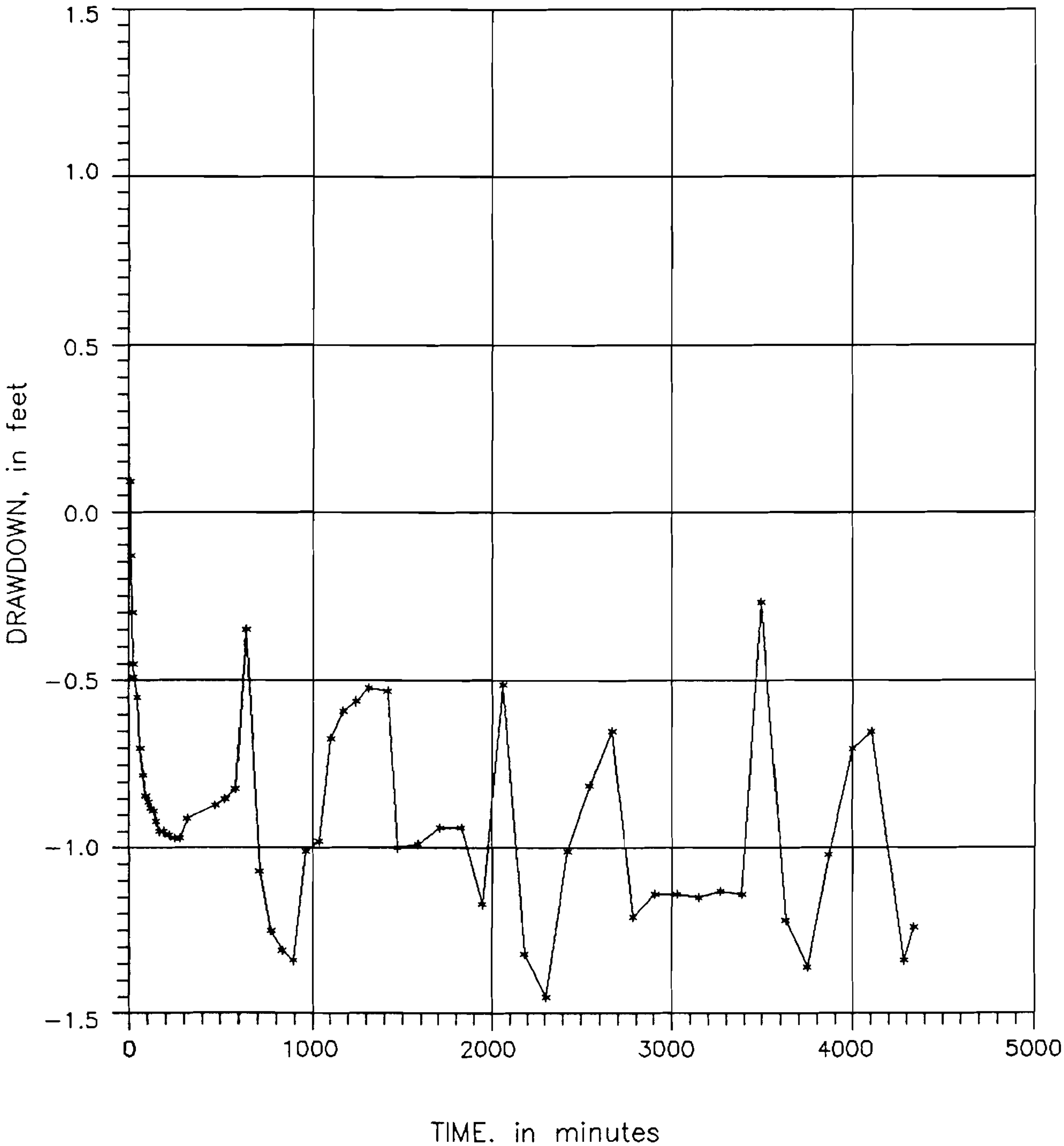


FIGURE 22

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 9GL, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

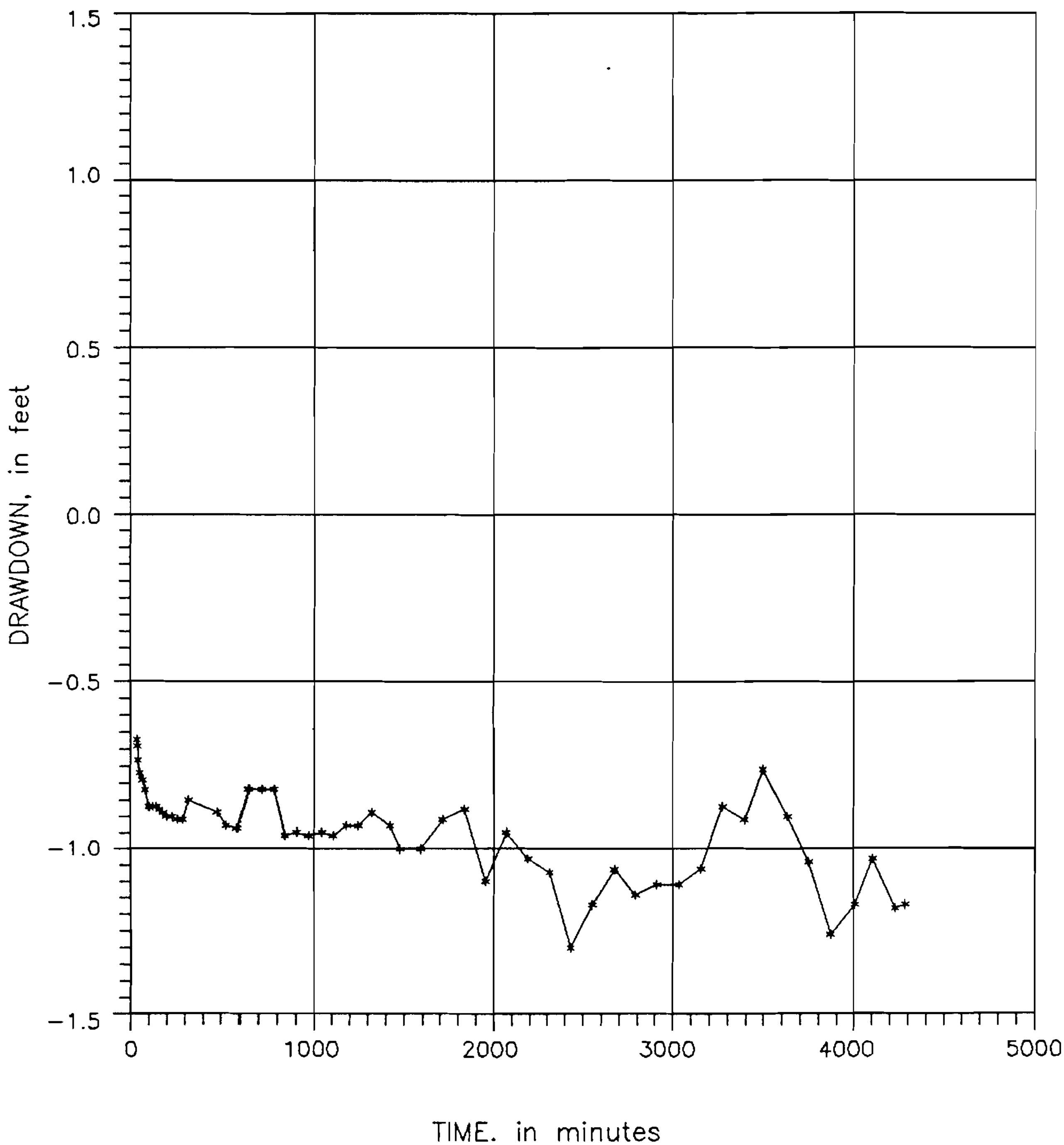


FIGURE 23

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 10GL, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

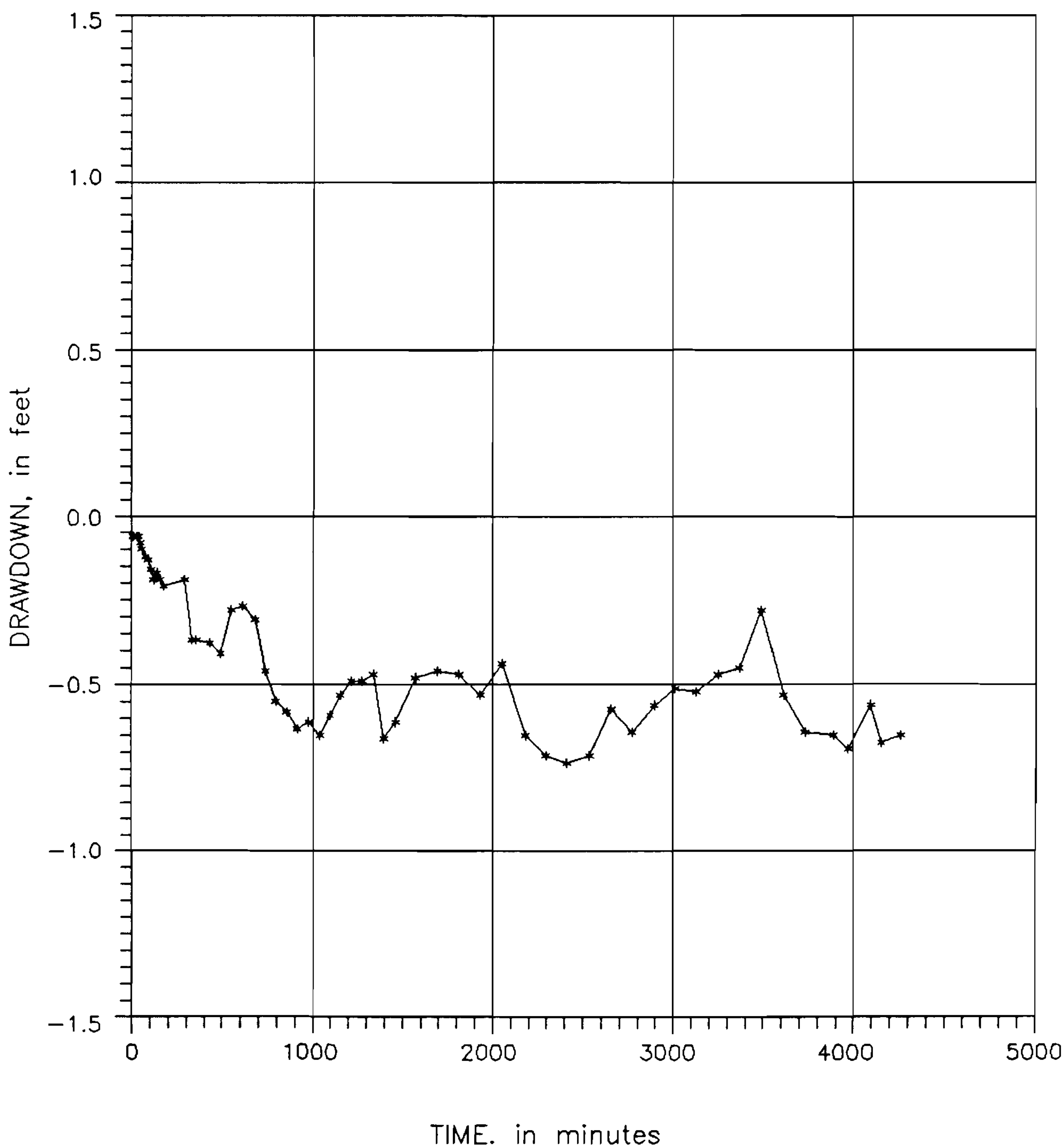


FIGURE 24

LINEAR PLOT OF TIME VERSUS DRAWDOWN FOR MONITORING WELL 11GL, AUGUST 20, 1990 THROUGH AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT NECK FACILITY, GREAT NECK, NEW YORK

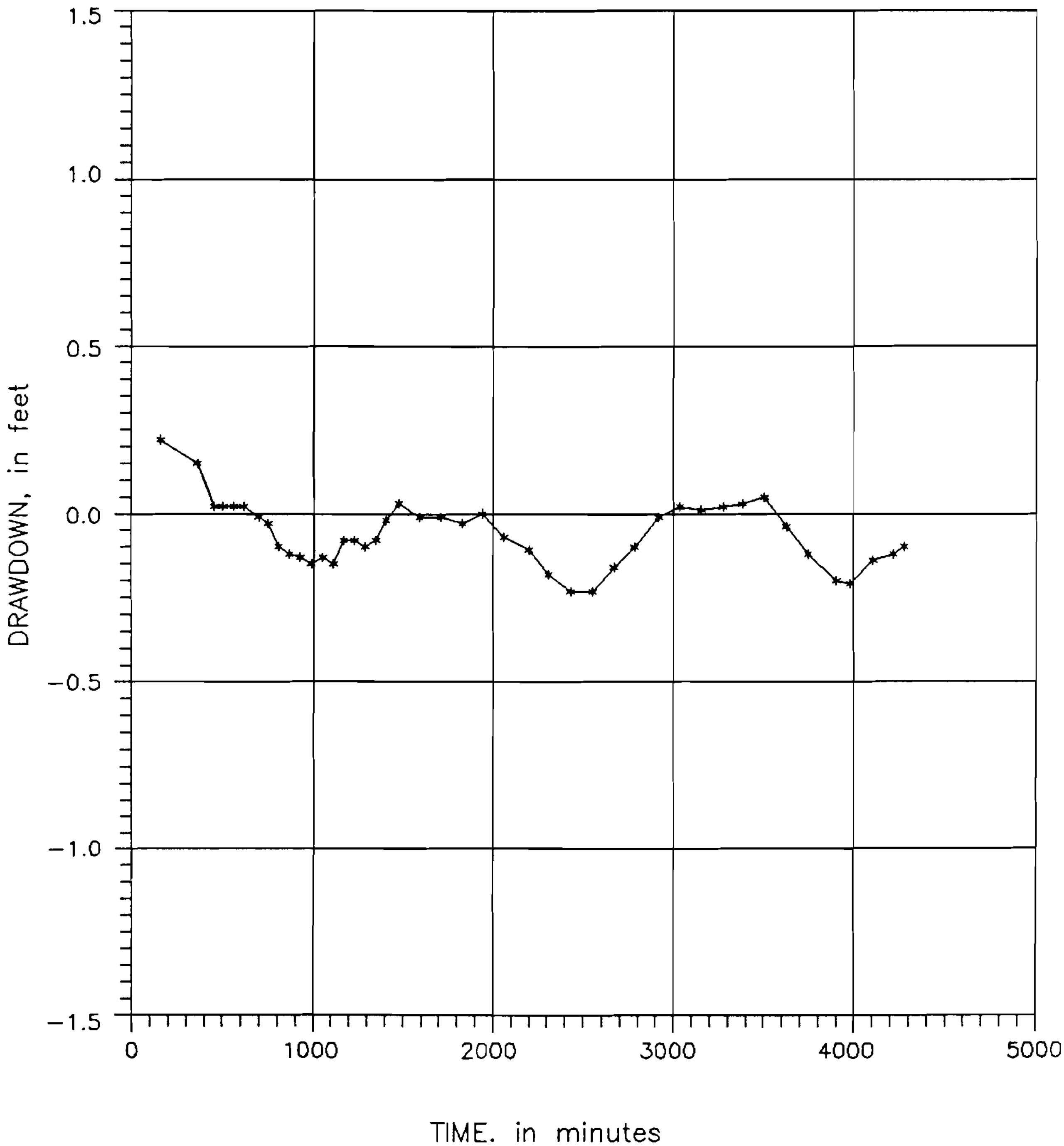


FIGURE 25

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 11MI, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT
NECK FACILITY, GREAT NECK, NEW YORK

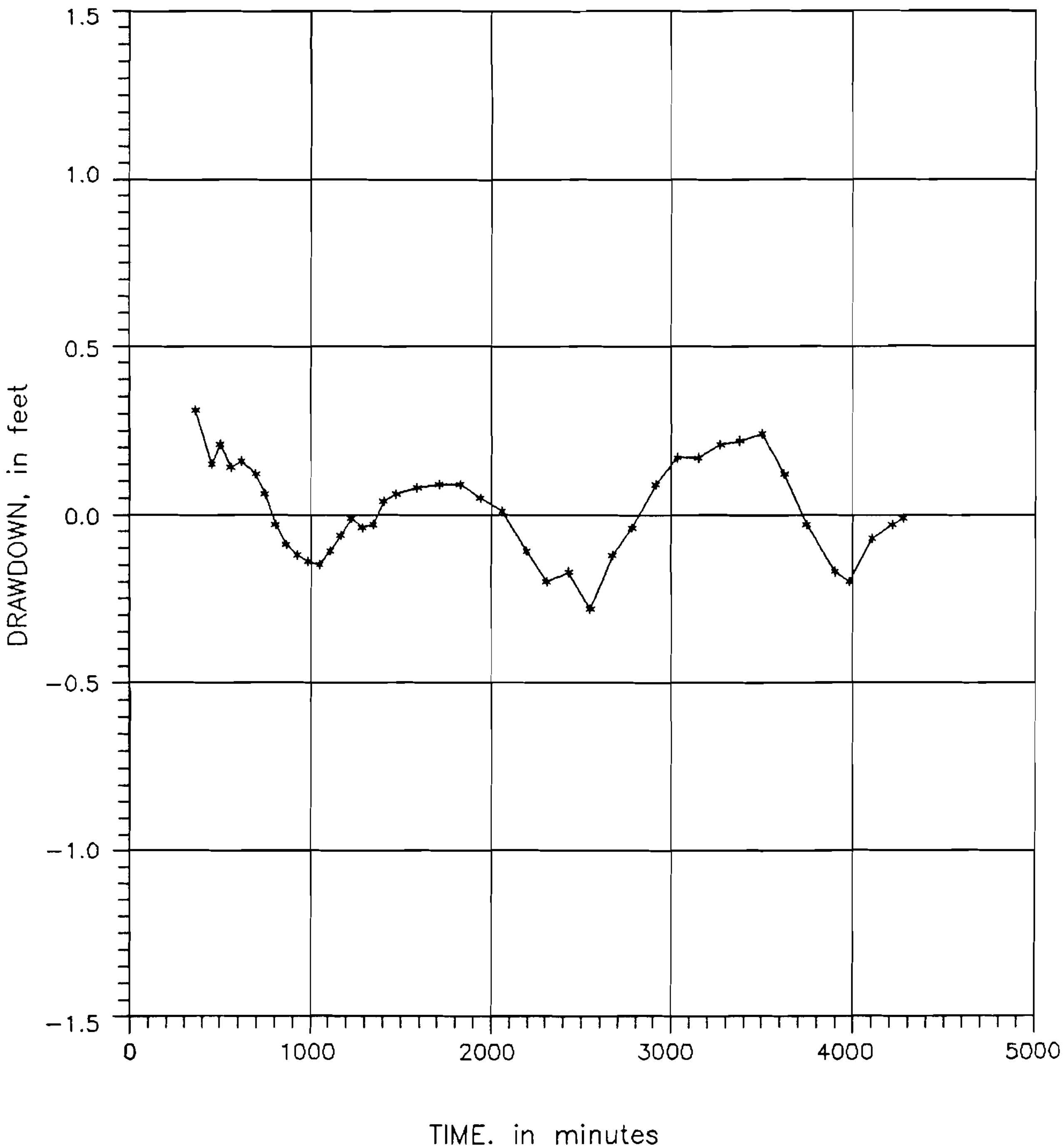


FIGURE 26

LINEAR PLOT OF TIME VERSUS DRAWDOWN
FOR MONITORING WELL 12MI, AUGUST 20, 1990 THROUGH
AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION
GREAT NECK FACILITY, GREAT NECK, NEW YORK

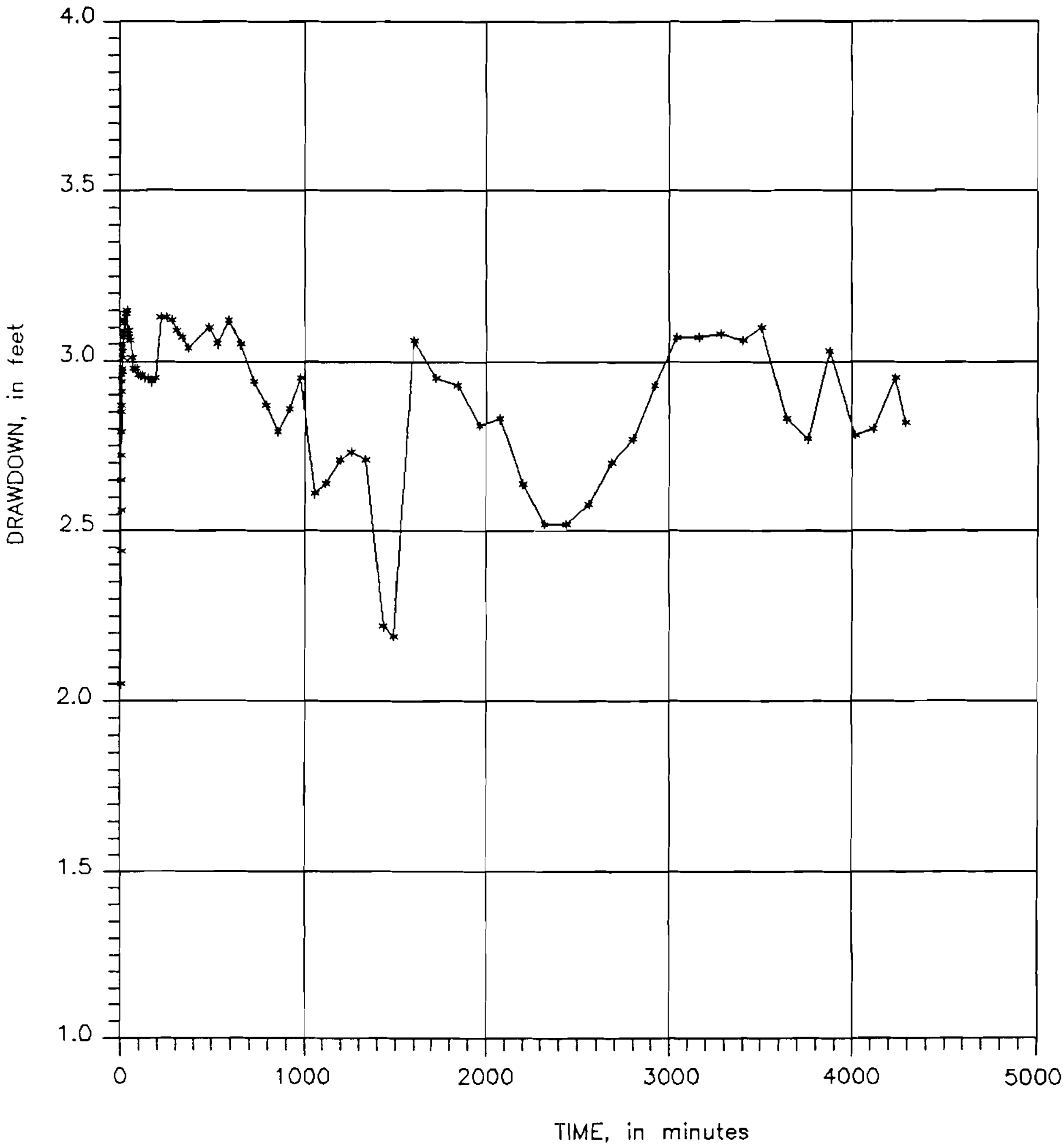


FIGURE 27

LINEAR PLOT OF TIME VERSUS DRAWDOWN FOR MONITORING WELL 12ML, AUGUST 20, 1990 THROUGH AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION GREAT NECK FACILITY, GREAT NECK, NEW YORK

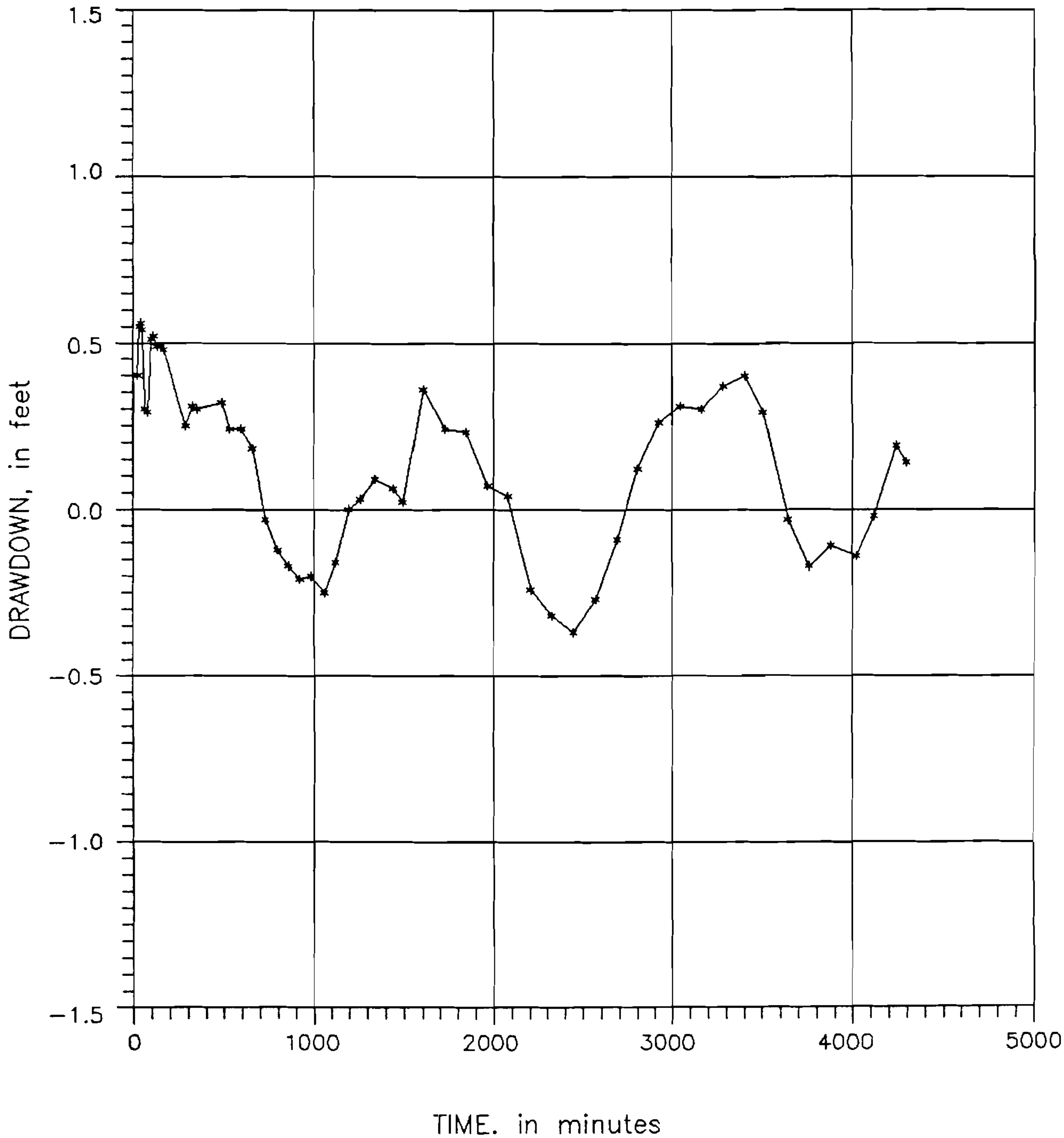


FIGURE 28

LOGARITHMIC PLOT OF TIME VERSUS DRAWDOWN AS COLLECTED FROM DATA LOGGER FOR MONITORING WELL 1MI, AUGUST 20, 1990 THROUGH AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION, GREAT NECK FACILITY, GREAT NECK, NEW YORK

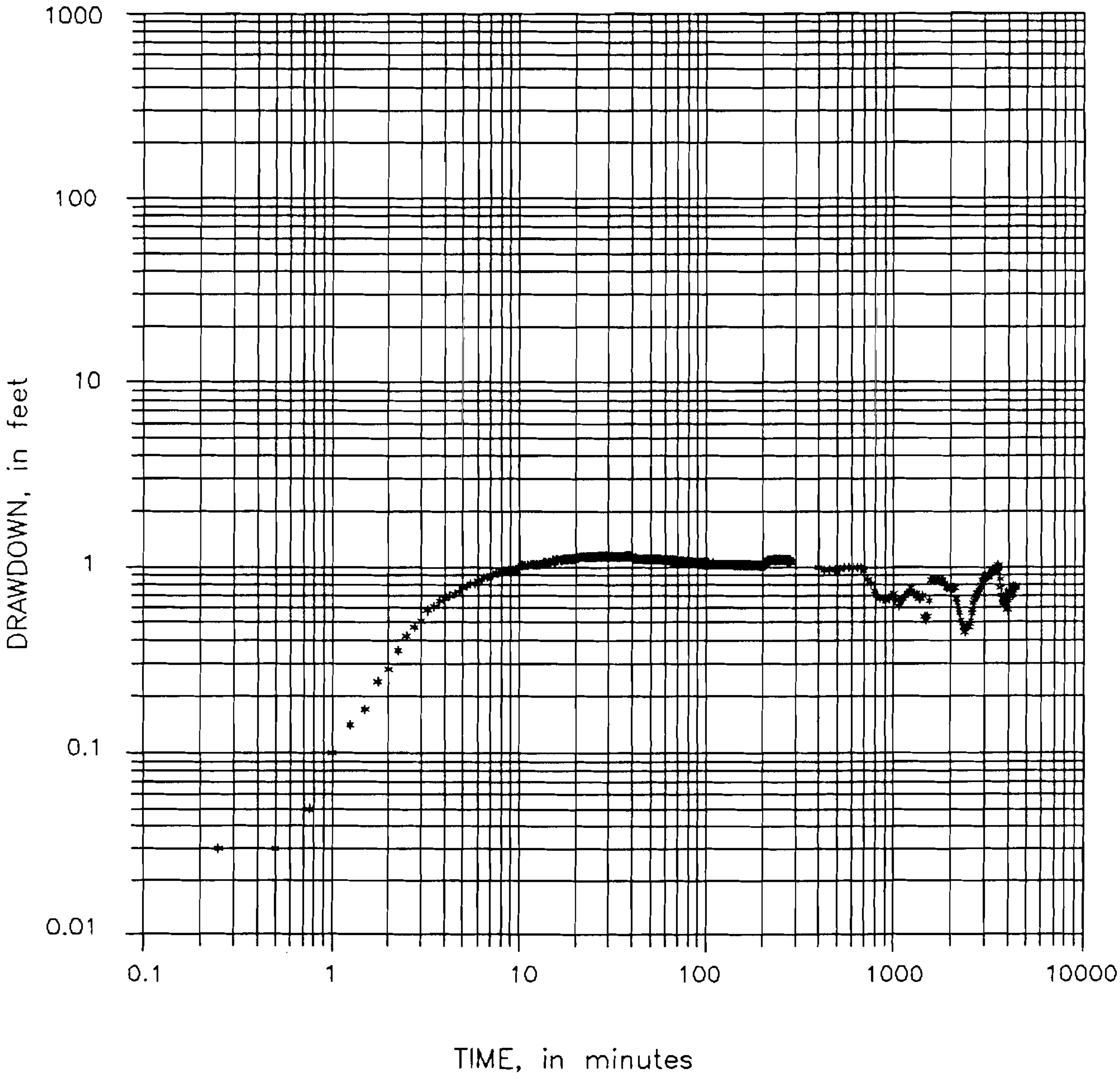


FIGURE 29

LOGARITHMIC PLOT OF TIME VERSUS DRAWDOWN AS COLLECTED FROM DATA LOGGER FOR MONITORING WELL 12MI, AUGUST 20, 1990 THROUGH AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION, GREAT NECK FACILITY, GREAT NECK, NEW YORK

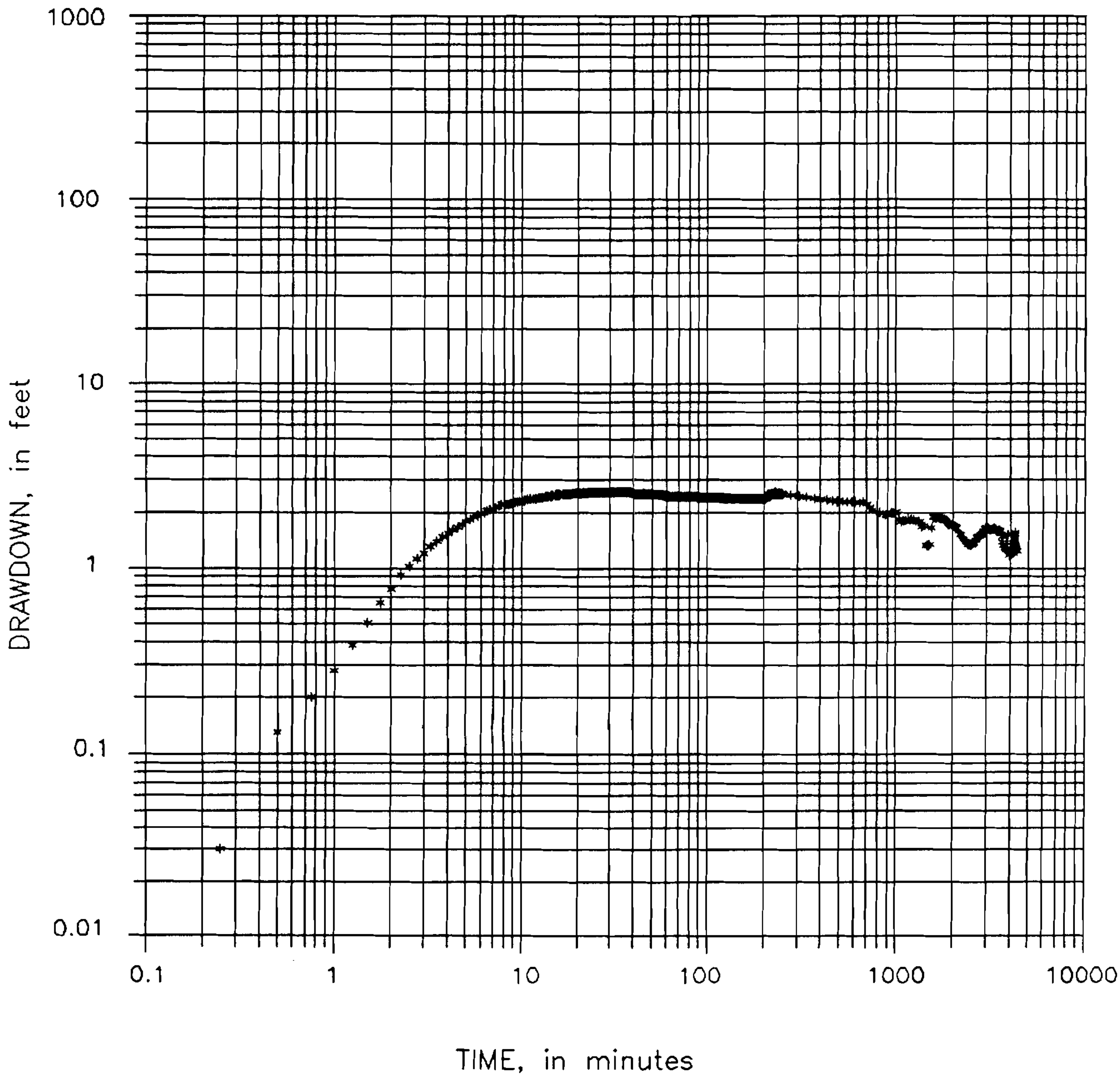


FIGURE 30

LOGARITHMIC PLOT OF TIME VERSUS DRAWDOWN AS COLLECTED MANUALLY FOR MONITORING WELL 1MI, AUGUST 20, 1990 THROUGH AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION, GREAT NECK FACILITY, GREAT NECK, NEW YORK

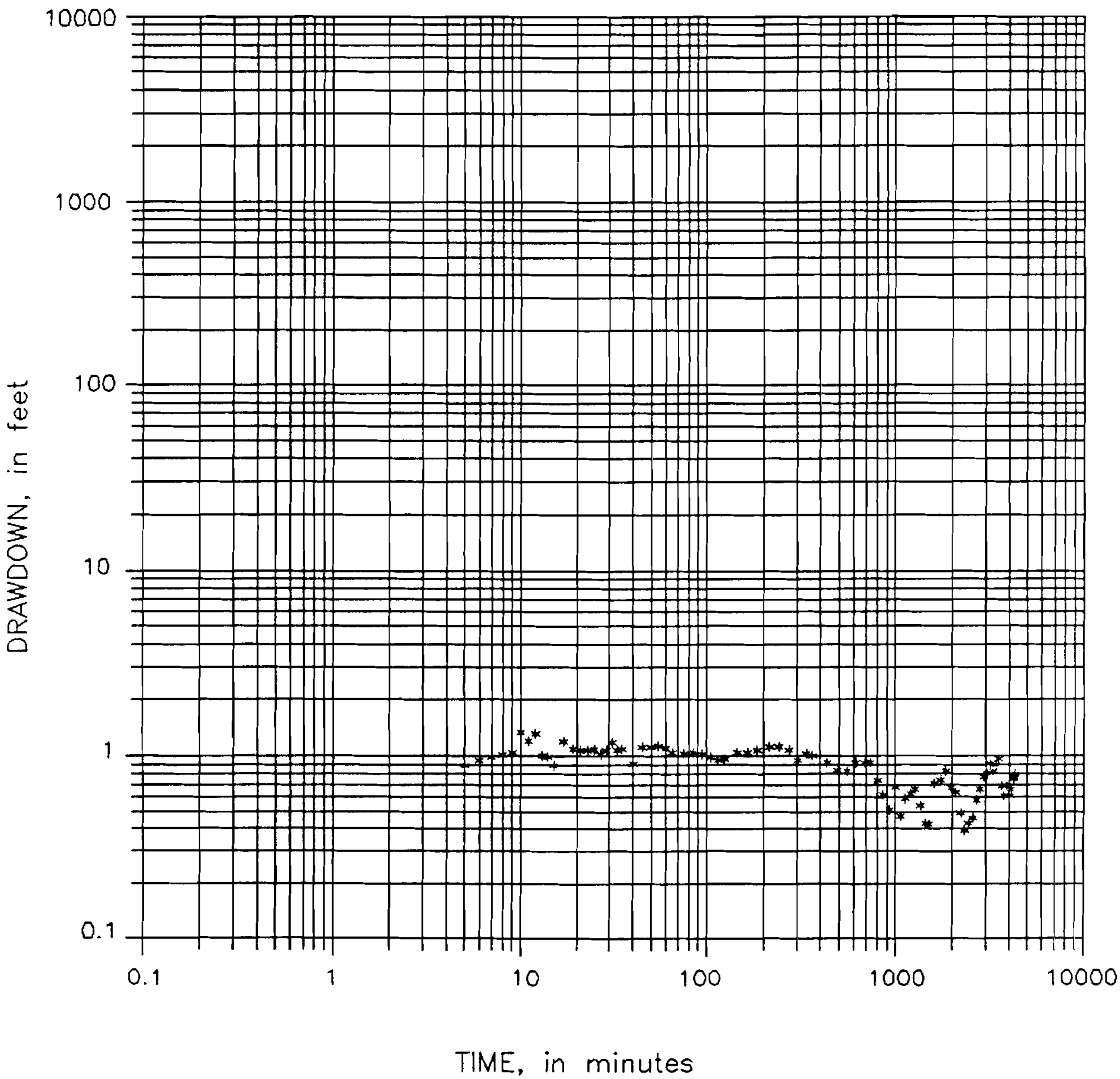


FIGURE 31

LOGARITHMIC PLOT OF TIME VERSUS DRAWDOWN AS COLLECTED MANUALLY FOR MONITORING WELL 12MI, AUGUST 20, 1990 THROUGH AUGUST 23, 1990 PUMPING TEST, UNISYS CORPORATION, GREAT NECK FACILITY, GREAT NECK, NEW YORK

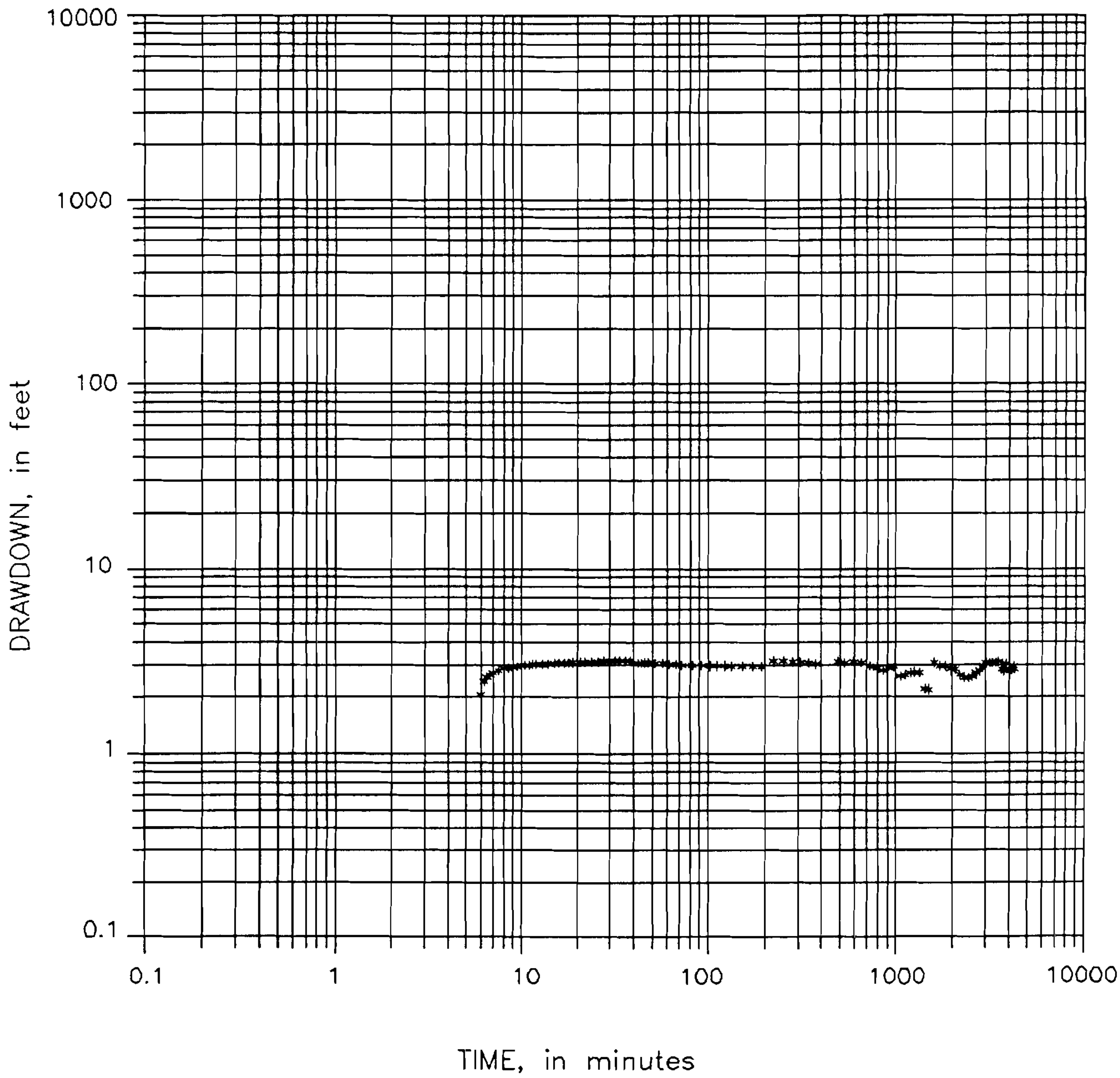


FIGURE 32

WELL 1MI

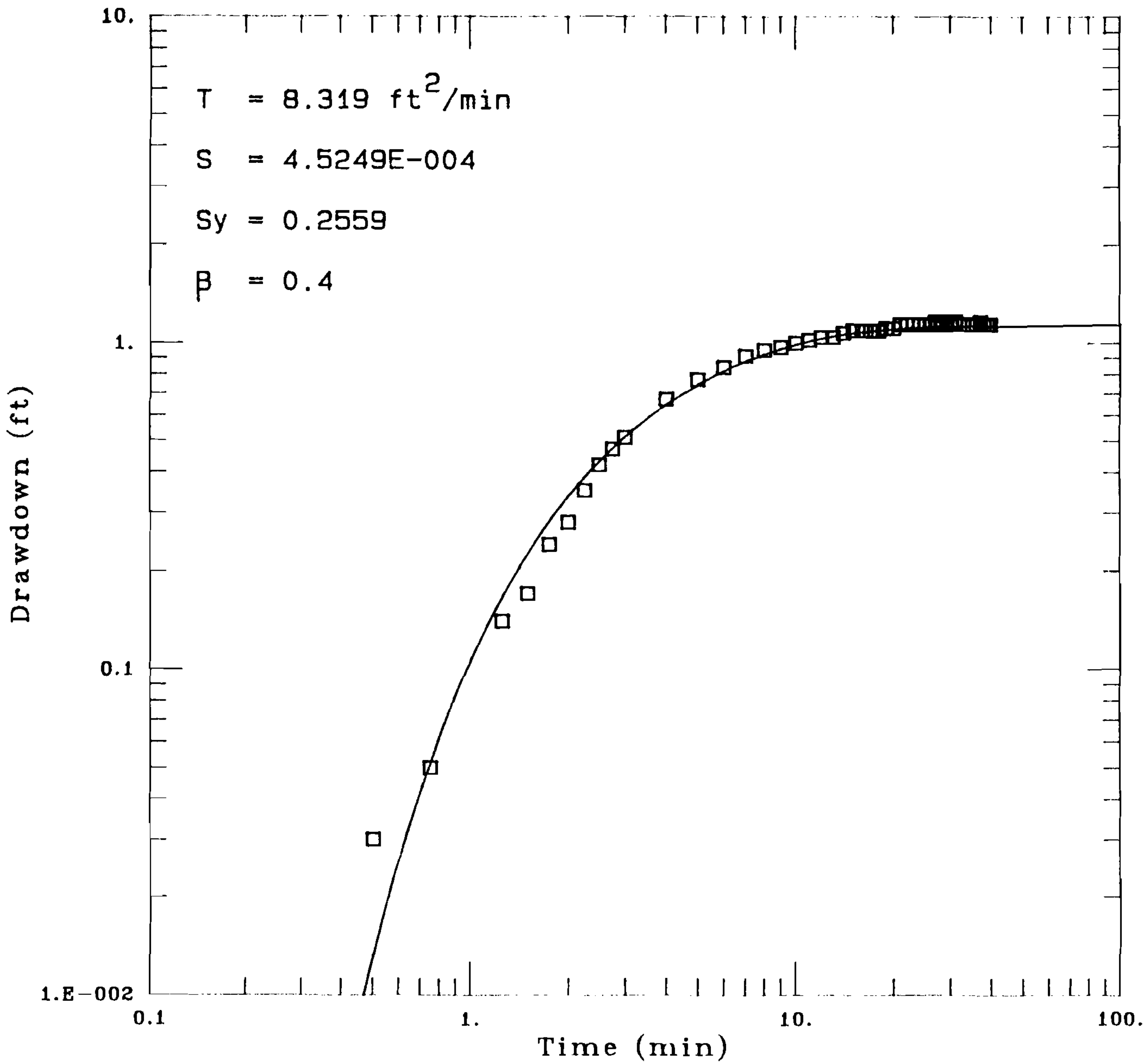


Figure 33. Logarithmic Plot Of Time Versus Drawdown For Neuman Partial Penetration Analysis Using Aqtesolv Type Curve Option, For Monitoring Well 1MI, August 20, 1990 Through August 23, 1990 Pumping Test, Unisys Corporation Great Neck Facility, Great Neck, New York(Type Curve Match 1).

WELL 1MI

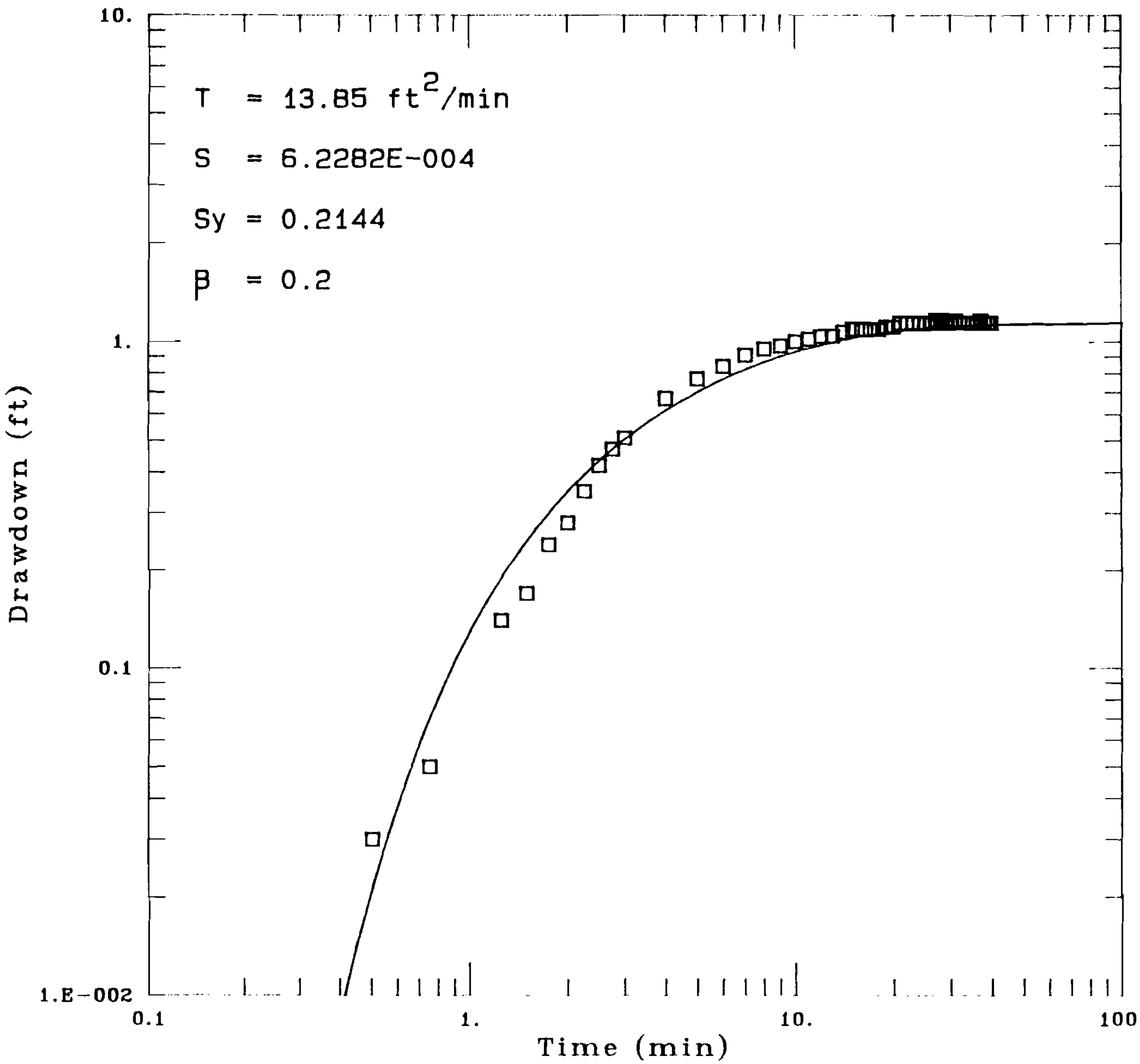


Figure 34. Logarithmic Plot Of Time Versus Drawdown For Neuman Partial Penetration Anaysis Using Aqtesolv Type Curve Option, For Monitoring Well 1MI, August 20, 1990 Through August 23, 1990, Pumping Test, Unisys Corporation Great Neck Facility, Great Neck, New York(Type Curve Match 2)

WELL 12MI

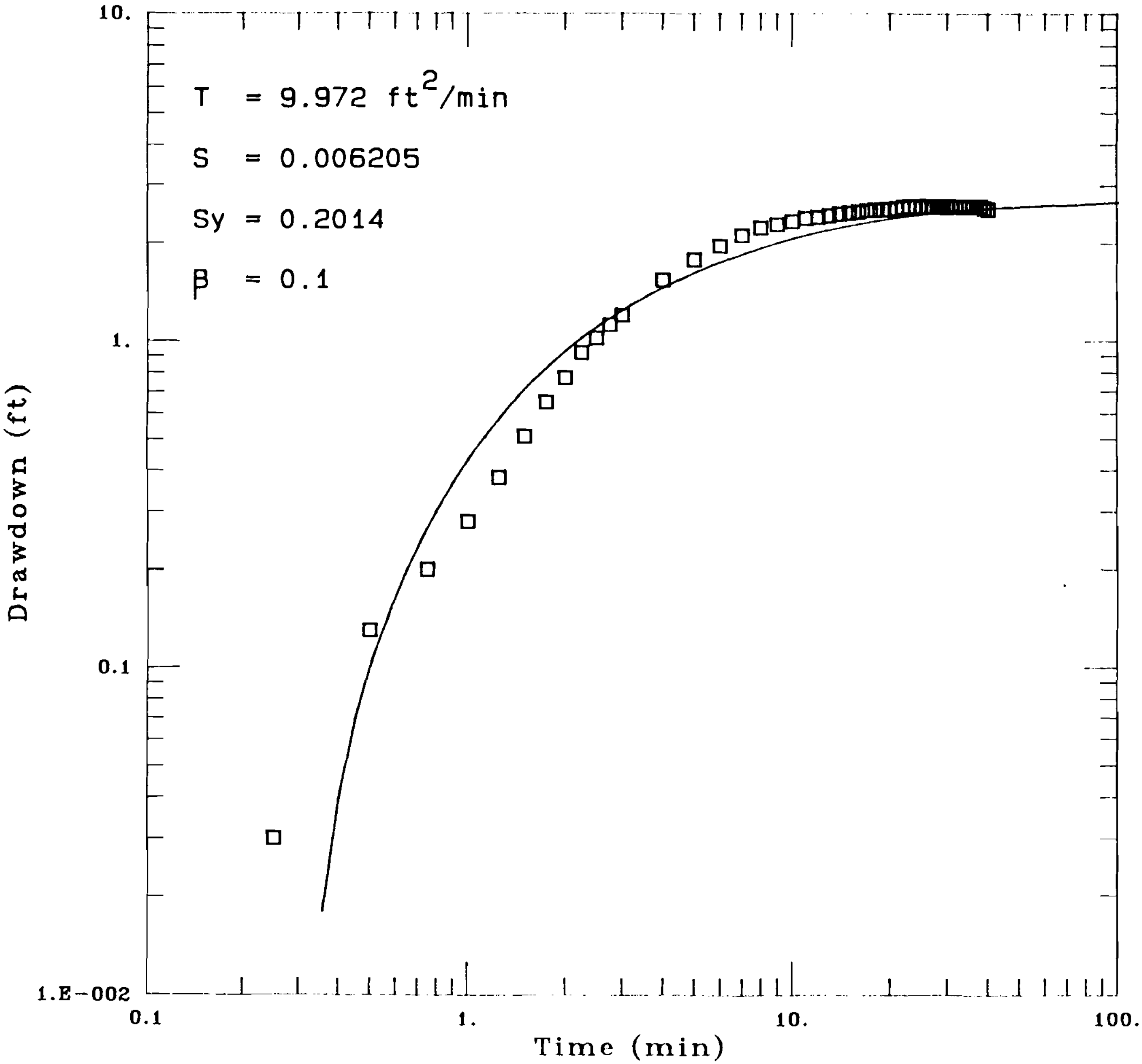


Figure 35. Logarithmic Plot Of Time Versus Drawdown for Neuman Partial Penetration Anaylsis Using Aqtesolv Type Curve Option, For Monitoring Well 12MI, August 20, 1990 Through August 23, 1990, Pumping Test, Unisys Corporation Great Neck Facility, Great Neck, New York(Type Curve Match 1)

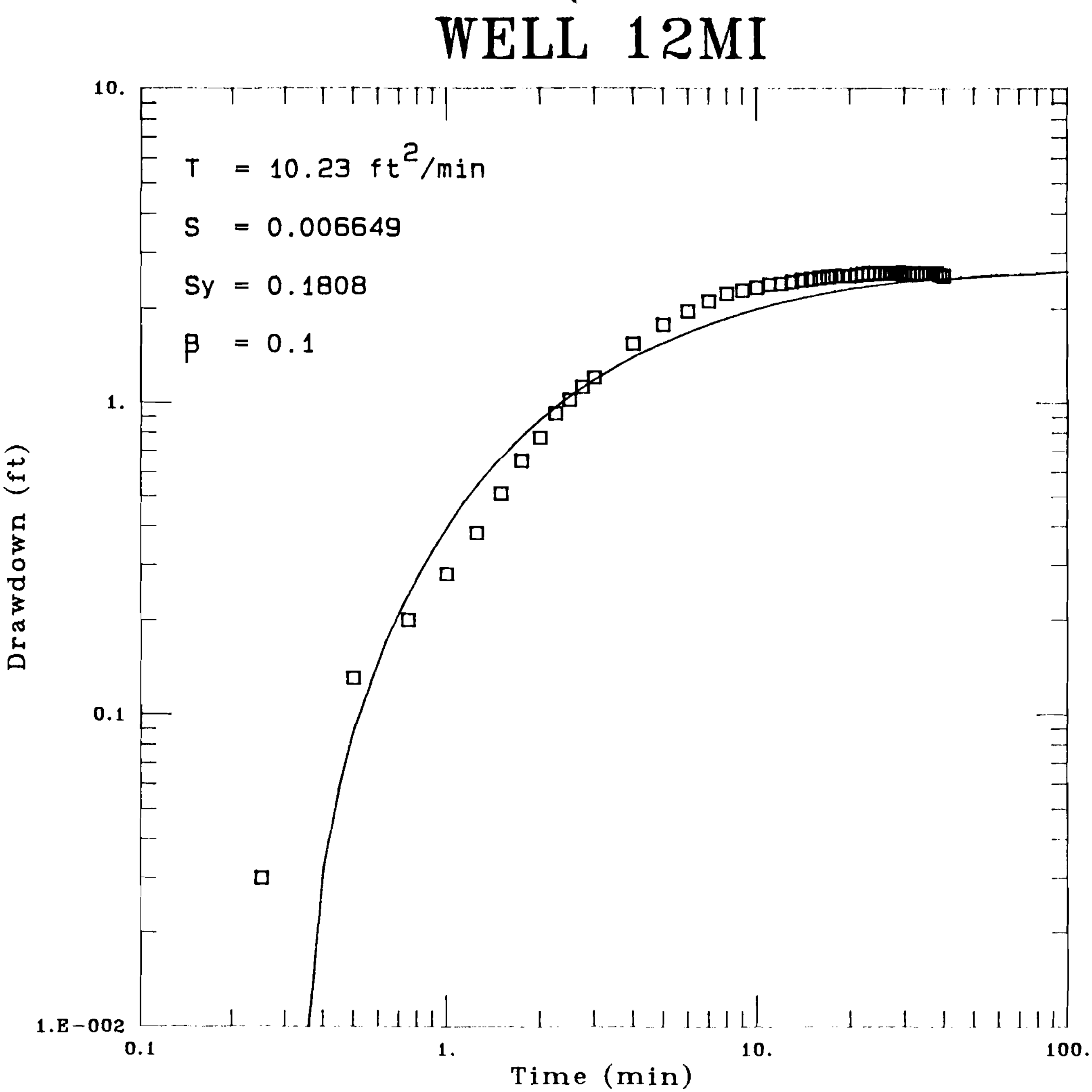
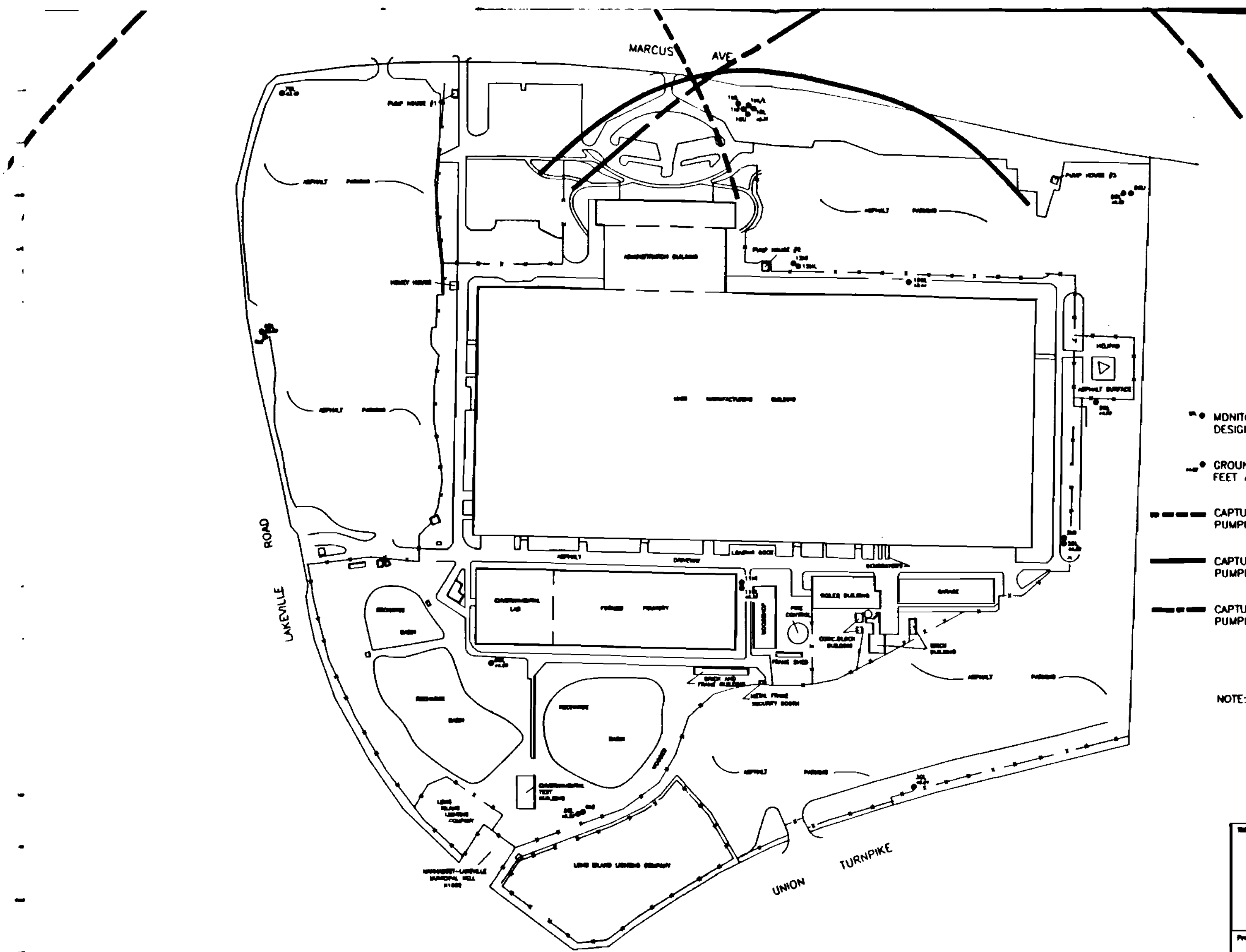


Figure 36. Logarithmic Plot Of Time Versus Drawdown For Neuman Partial Penetration Analysis Using Aqtesolv Type Curve Option For Monitoring Well 12MI, August 20, 1990 Through August 23, 1990 Pumping Test, Unisys Corporation Great Neck Facility, Great Neck, New York(Type Curve Match 2)



EXPLANATION

MONITORING WELL LOCATION AND DESIGNATION

GROUND-WATER ELEVATION, IN FEET ABOVE MEAN SEA LEVEL

CAPTURE ZONE WITH UNISYS PRODUCTION WELL NO. 3 PUMPING AT 500 GPM

CAPTURE ZONE WITH UNISYS PRODUCTION WELL NO. 2 PUMPING AT 500 GPM

CAPTURE ZONE WITH UNISYS PRODUCTION WELL NO. 3 PUMPING AT 500 GPM

NOTE: CAPTURE ZONE ANALYSES BASED UPON WELL IN A UNIFORM FLOW BY TODD (1980).

0 240 480

Title:
THEORETICAL CAPTURE ZONES FOR UNISYS PRODUCTION WELL NOS. 1,2, AND 3 PUMPING 500 GALLONS PER MINUTE PER WELL

UNISYS CORPORATION GREAT NECK FACILITY, GREAT NECK, NEW YORK

Prepared For:
UNISYS CORPORATION

ROUX
ROUX ASSOCIATES INC

Compiled by:	L.O.	Date:	2/91	FIGURE
Prepared by:	C.R.	Scale:	SHOWN	37
Project Mgr:	M.D.	Revision:	0	
File No.	17504CZ			

APPENDIX A

Standard Operating Procedures for
Conducting a Step-Drawdown Test,
and Standard Operating Procedure for
Conducting a Constant-Rate (Pumping) Test and Recovery Test.

Date: December 21, 1989

Revision Number: 0

Corporate QA/QC Manager: Michael A. DeCillis

1.0 PURPOSE

The purpose for this standard operating procedure (SOP) is to describe the methods to be used for conducting step-drawdown (step) tests. A step test is used for any, or all, of the following: 1) to select an appropriate pumping rate for a constant-rate (pumping) test; 2) to estimate long-term well yield; 3) to evaluate well efficiency; and 4) to calculate hydraulic conductivity.

Pumping is started at a low discharge rate (based on the results of well development) and is then increased in steps to stress the aquifer. It is important that the steps be of equal duration and that a fairly wide range in pumping rates be developed from the first step to the last step. Step-drawdown tests are extremely useful in bedrock wells to estimate the depth to the most productive water-bearing fracture zone and provide an indication of the well efficiency. Water-level behavior in the pumping well should be closely watched during the test. If at a second or third step, the pumping water level drops sharply and approaches the maximum available drawdown, then clearly the pumping rate has exceeded the capacity of the formation and the long-term pumping rate must be reduced accordingly.

2.0 EQUIPMENT AND MATERIALS

2.1 The following items may be needed for conducting a step-drawdown test:

a. Electronic sounding device (m-scope).

b. Steel tape (in 0.01-foot increments) and chalk (e.g., blue carpenter's).

c. Data loggers and pressure transducers.

d. Field forms (i.e., Daily Log, Pumping Test, and Well Inspection Checklist) and study notebook.

e. Rain gauge.

f. Barometer.

g. Stop watch or watch with second display/hand.

h. Pump.

i. Generator and fuel/power supply.

j. Water-level recorders (e.g., Stevens type).

k. Flashlights/illumination.

l. Stream gauge and/or tide gauge.

m. Shelter.

n. In-line flow meter and/or orifice and manometer.

o. Valve(s).

p. On-site holding tanks or tank trucks, or treatment capability.

q. Discharge line (leak free).

r. Water-quality meters (pH, conductivity, temperature).

s. Extra batteries (flashlight, meters).

t. Non-absorbent cord (e.g., polypropylene).

u. Portable personal computer (PC), appropriate cables, software, and floppy disks.

v. Five-gallon bucket.

w. Clean cloth or paper towel.

x. Non-phosphate, laboratory-grade detergent solution.

y. Distilled or deionized water and potable water.

3.0 DECONTAMINATION

3.1 Make sure all equipment that enters the well(s) is(are) decontaminated and cleaned before use. Use new, clean materials when decontamination is not appropriate (e.g., non-absorbent cord, disposable gloves). Document, and initial and date the decontamination procedures on the appropriate field form (e.g., Daily Log) and in the field notebook.

a. Decontaminate a pump by: 1) wearing disposable gloves, 2) flushing it and the discharge hose (if not disposable) with non-phosphate, laboratory-grade detergent and distilled/deionized or potable water solution, 3) rinsing with potable water, and 4) rinsing or wiping pump-related equipment (electrical lines, cables, discharge hose) with a clean cloth and potable water. If a turbine pump is used, then ensure that all materials that are set in the well or above it (well head) are steam cleaned for decontamination purposes.

b. Decontaminate a transducer and cable by: 1) wearing disposable gloves, 2) wiping transducer-related equipment (e.g., probe, cables) with a clean cloth and non-phosphate, laboratory-grade detergent solution, and 3) rinsing or wiping equipment with a clean cloth and distilled/deionized water or potable water.

c. Decontaminate a float/probe and cable (water-level recorder) by: 1) wearing disposable gloves, 2) wiping equipment with a clean cloth and non-phosphate, laboratory-grade detergent solution, and 3) rinsing or wiping equipment with a clean cloth and distilled/deionized water or potable water.

d. Decontaminate a steel measuring tape or electronic sounding device (m-scope) by: 1) wearing disposable gloves, 2) wiping water-level measurement equipment with a clean cloth and non-phosphate, laboratory-grade detergent solution, and 3) rinsing or wiping equipment with a clean cloth and distilled/deionized water or potable water.

4.0 PROCEDURE

4.1 Inspect the protective casings of the wells and the well casings, and note any items of concern such as a missing lock, or bent or damaged casing(s). Complete a Well Inspection Checklist for each well, and initial and date upon completion.

4.2 Enter all pertinent data concerning the pumping well, piezometers and/or observation wells, to be measured on the Pumping Test form, appropriate field forms (e.g. Daily Log form) and in the field notebook. Use one Pumping Test form for each well measured.

4.3 Measure water levels (the depth to water below the predetermined measuring point [MP]) in the test well, and all piezometers and/or observation wells to be monitored during the test (synoptic round of water-level measurements) to an accuracy of 0.01 foot prior to the step test. Document the water levels, and initial and date data entries. The synoptic round of water-level measurements will include wells and piezometers inside and outside of the influence (impact) of the area tested.

4.4 Sound (measure the total depth) the test well, and each observation well and/or piezometer measured in the synoptic round to an accuracy of 0.01 foot. Document the sounded depth, and initial and date data entries. Compare the sounded depth to the as-built total depth of the well/piezometer to ensure no appreciable sanding or silting (clogging) has occurred. If appreciable clogging has taken place, then the well or piezometer must be redeveloped to re-establish good hydraulic connection between the well or piezometer and the aquifer. Wells and piezometers must respond quickly to changes in water levels.

4.5 Determine if the step test is to be conducted in an area where water levels can fluctuate during the course of the test (e.g., near pumping or recharge wells, tidal influences, shallow aquifers subject to quick response to precipitation events, etc.); if so, then establish a background well(s) or piezometer(s) to measure water-level trends outside the influence of the test well. Water-level fluctuation data may be needed to correct step-test data.

4.6 Set up a rain gauge, a continuous recording barometer, and/or a continuous recording stream or tide gauge to measure, respectively, precipitation, barometric pressure, and/or surface-water elevation, if site conditions warrant monitoring these parameters (i.e., if any of these stresses have the potential to affect test results). If needed, data from these instruments will be used to correct step-test data for changes in ground-water levels associated with recharge from precipitation, barometric pressure, and/or changes in surface-water elevation.

4.7 Ensure that the pumping system selected for the test is properly installed including the power supply and leak-free discharge line complete with a valve(s), flow meter, and manometer and orifice.

4.8 Make arrangements to dispose of the pumped water in an appropriate manner. If the pumped water is contaminated, then disposal may be via treatment and discharge, trucking offsite, etc. Water that is discharged onsite must be a substantial distance from the test site to preclude adversely affecting the test (e.g., artificially recharging the aquifer during testing and influencing water levels).

4.9 Make sure that the proper transducers (data loggers) and gear ratios (water-level recorders) are used to measure the full anticipated range of drawdown in the well(s) and/or piezometer(s).

4.10 Install a precleaned transducer (which is preferred over manual measurement devices, e.g., steel tape and chalk or m-scope) in the test well, connect it to the data logger, and verify that the equipment is working. Program the data logger accordingly, using the PC and appropriate software.

4.11 Install precleaned transducers and program data loggers, and/or install precleaned floats/probes and set up recorders in select piezometers and/or observation wells to be monitored during the test (e.g., those impacted by the test, those serving as background), and verify that the equipment is working.

4.12 Synchronize all watches prior to the test (if more than one individual is involved in the test).

4.13 Begin the step test on the hour or half-hour and pump at a constant, low rate (e.g., 25 percent of the estimated capacity determined during development).

4.14 Maintain the pumping rate until the water level approaches or achieves stabilization (which usually, but not necessarily, occurs within one to four hours).

4.15 Collect water-level (drawdown) measurements to an accuracy of 0.01 foot on a specified schedule. This schedule will be established based on the response (drawdown versus time) of the well to the pumping stress.

4.16 Check the drawdown measurements obtained with the automated water-level measuring devices (on a regular basis) manually using a m-scope and/or a steel tape and chalk to an accuracy of 0.01 foot. If recorders are used, then "tick" the recorder and document the time next to each "tick" on the chart. Record this data on the Pumping Test form and in the field notebook, and initial and date data entry.

4.17 Check the discharge rate using a 5-gallon bucket and stopwatch or watch with second display/hand, the in-line flow meter and/or manometer (depending on the set-up and pumping rate) on a regular basis. Record readings and adjustments (if made) on the Pumping Test form and in the field notebook, and initial and date data entry.

4.18 Measure temperature, pH, and conductivity of discharged water on a periodic, regular basis. Record data on the Pumping Test form and the field notebook, and initial and date data entry.

4.19 Note any changes, throughout the step test, that are pertinent to the test such as changes in water color or turbidity, time and length of any temporary pump shut down, effects of any nearby pumping wells, precipitation events, etc. Document these notes on the Pumping Test form and in the field notebook, and initial and date data entry.

4.20 Increase the discharge rate incrementally after stabilization or near-stabilization is achieved and maintain the increased rate for the same length of time, if the well can sustain the increased rate. In general, four or more incremental steps follow, such as two, three, four (100 percent of the estimated capacity), and greater than four times the initial rate. The key factors are that the steps be of equal duration and that a fairly wide range in pumping rates be developed from the first step to the last.

4.21 Shut down the step test after the last step and/or the capacity of the well has been exceeded, or when sufficient data has been collected to analyze the step test. Close the valve closest to the pump as quickly as possible to prevent back flow of water into the pumping well.

4.22 Measure recovery (rise in water levels) to an accuracy of 0.01 foot until water levels return as close as possible to pretest levels. The identical measurement schedule followed for the drawdown phase should be followed during the recovery phase. Automated water-level recorders may be left in the test well and select wells/piezometers to monitor water levels for an extended period of time (one or more days) depending on the data collected or data base required. If observation wells and/or piezometers were also monitored during the step test, then collect at least one round of synoptic water-level measurements after water levels have recovered following the test.

4.23 Transfer the data to the PC, if the pressure transducer(s) and data logger were used, on a periodic basis during the test and before monitoring water levels for an extended period of time. This will prohibit loss of test data and "wrapping" (writing over) of data if the storage capacity of the data logger is exceeded.

4.24 Secure the test well, and observation wells and/or piezometers if used, after the collection of water-level data is completed (i.e., replace cap and/or cover, and lock).

4.25 Clean (decontaminate) all test equipment that came in contact with the ground water according to the appropriate protocol given in Section 3.0. Dispose of all materials that cannot be decontaminated in an appropriate manner (e.g., discharge hose, etc.).

STANDARD OPERATING PROCEDURE FOR CONDUCTING A CONSTANT-RATE (PUMPING) TEST AND RECOVERY TEST

Date: December 21, 1989

Revision Number: 0

Corporate QA/QC Manager: Michael A. DeCillis

1.0 PURPOSE

The purpose for this standard operating procedure (SOP) is to describe the methods to be used for conducting constant-rate (pumping) tests and recovery tests. Constant-rate tests are designed to measure the response of an aquifer to stress imposed on it (i.e., pumping or injection of water). In the constant-rate test, the well is pumped or recharged at a constant rate for a significant period of time, usually 24 hours or longer. Pumping tests are conducted to quantify hydraulic coefficients and characterize boundary conditions. Pumping tests can also be used to qualitatively or quantitatively evaluate the degree of hydraulic connection between and within flow systems which is particularly applicable to bedrock ground-water systems where hydraulic parameter determination may not be possible.

Drawdown is measured throughout the test at preselected time intervals to provide the data necessary to quantitatively characterize the aquifer. Automatic water-level records may be used which provide a detailed, continuous drawdown record and are periodically checked by manually measuring the water level with a steel tape and chalk or an electronic sounding device (m-scope).

Pumping tests are generally the easiest aquifer tests to interpret, and can provide the most accurate, quantitative information; thus pumping tests are favored when conditions are suitable (i.e., when hydrogeologic conditions are such that the system can sustain a properly designed constant-rate pumping test).

Measurements of water-level recovery after the pump is shutdown may be used to confirm the results of the drawdown test. Additionally, problems such as those created by a fluctuating pumping rate and corresponding drawdown measurements during the drawdown phase can be eliminated during the recovery phase (which is not effected by pumpage). Therefore, data loggers and/or the automatic recorders should remain in operation to measure the extended recovery period of the water levels to provide a suitable database in the event that recovery data analysis is undertaken.

2.0 EQUIPMENT AND MATERIALS

2.1 The following items may be needed for aquifer testing:

a. Electronic sounding device (m-scope).

b. Steel tape (in 0.01-foot increments) and chalk (e.g., blue carpenter's).

c. Data loggers and pressure transducers.

d. Field forms (i.e., Daily Log, Pumping Test, and Well Inspection Checklist) and study notebook.

e. Rain gauge.

f. Barometer.

g. Stop watch or watch with second display/hand.

h. Pump.

i. Extension cord(s) or generator and fuel/power supply.

j. Water-level recorders (e.g., Stevens type).

k. Flashlights/illumination.

l. Stream gauge and/or tide gauge.

m. Shelter.

n. In-line flow meter and/or orifice and manometer.

o. Valve(s).

p. On-site holding tanks or tank trucks, or treatment capability.

q. Discharge line (leak free).

r. Water-quality meters (pH, conductivity, temperature).

s. Extra batteries (flashlight, meters).

t. Non-absorbent cord (e.g., polypropylene).

u. Portable personal computer (PC), appropriate cables, software, and floppy disks.

v. Five-gallon bucket.

w. Clean cloth or paper towel.

x. Non-phosphate, laboratory-grade detergent solution.

y. Distilled or deionized water and potable water.

3.0 DECONTAMINATION

3.1 Make sure all equipment that enters the well(s) is(are) decontaminated and cleaned before use. Use new, clean materials when decontamination is not appropriate (e.g., non-absorbent cord, disposable gloves). Document, and initial and date the decontamination procedures on the appropriate field form (e.g., Daily Log) and in the field notebook.

a. Decontaminate a pump by: 1) wearing disposable gloves, 2) flushing it and the discharge hose (if not disposable) with non-phosphate, laboratory-grade detergent and distilled/deionized or potable water solution, 3) rinsing with potable water, and 4) rinsing or wiping pump-related equipment (electrical lines, cables, discharge hose) with a clean cloth and potable water. If a turbine pump is used, then ensure that all materials that are set in the well or above it (well head) are steam cleaned for decontamination purposes.

b. Decontaminate a transducer and cable by: 1) wearing disposable gloves, 2) wiping transducer-related equipment (e.g., probe, cables) with a clean cloth and non-phosphate, laboratory-grade detergent solution, and 3) rinsing or wiping equipment with a clean cloth and distilled/deionized water or potable water.

c. Decontaminate a float/probe and cable (water-level recorder) by: 1) wearing disposable gloves, 2) wiping equipment with a clean cloth and non-phosphate, laboratory-grade detergent solution, and 3) rinsing or wiping equipment with a clean cloth and distilled/deionized water or potable water.

d. Decontaminate a steel measuring tape or electronic sounding device (m-scope) by: 1) wearing disposable gloves, 2) wiping water-level measurement equipment with a clean cloth and non-phosphate, laboratory-grade detergent solution, and 3) rinsing or wiping equipment with a clean cloth and distilled/deionized water or potable water.

4.0 PROCEDURE

4.1 Inspect the protective casings of the wells and the well casings, and note any items of concern such as a missing lock, or bent or damaged casing(s). Complete a Well Inspection Checklist for each well, and initial and date upon completion.

4.2 Enter all pertinent data concerning the pumping well, piezometers and/or observation wells, to be measured on the Pumping Test form, appropriate field forms (e.g. Daily Log form) and the study notebook.

4.3 Measure water levels (depth to water below a predetermined measuring point [MP]) in the pumping well and all piezometers and/or observation wells (synoptic round of water-level measurements) to an accuracy of 0.01 foot at least one day prior to the pumping test. Document the water levels, and initial and date data entries. The synoptic round of water-level measurements will include wells and piezometers inside and outside of the influence (impact) of the area tested.

4.4 Sound (measure the total depth) the test well and each well and/or piezometer measured in the synoptic round to an accuracy of 0.01 foot. Document the sounded depth, and initial and date data entries. Compare the sounded depth to the as-built total well/piezometer depth to ensure no appreciable sanding or silting (clogging) has occurred. If appreciable clogging has taken place, then the well or piezometer must be redeveloped to re-establish good hydraulic connection between the well or piezometer and the aquifer. Wells and piezometers must respond quickly to changes in water levels.

4.5 Establish background wells and/or piezometers to measure water-level trends outside the influence of the pumping well.

4.6 Install precleaned transducers and program data loggers, and/or install precleaned floats/probes and set up recorders on several, select wells and/or piezometers for an extended period of time (e.g., one week) prior to the test to monitor water-level trends throughout the test area. At least two hours of readings at quarter-hour to half-hour intervals should be collected immediately prior to start-up of the test. If water levels in the aquifer are fluctuating, then more readings will be necessary. Water-level fluctuation data may be needed to correct aquifer test data.

4.7 Obtain as many pretest (nonpumping), synoptic water-level readings as possible to provide a sound background water-level data base. If available, dedicate an individual to collect continuous, synoptic water-level measurements on the day of the test, from the time of arrival onsite to the start of the test.

4.8 Set up a rain gauge onsite to measure precipitation before, during, and after the test. Monitor the rain gauge on a regular basis, particularly if the tested aquifer is shallow. If precipitation is occurring at the beginning of the test, then the test should be postponed until optimum meteorological conditions prevail and water levels, if changing, return to static conditions. If needed, precipitation data collected during the test (after start-up) will be used to correct aquifer test data affected by recharge.

4.9 Set up a continuous recording barometer onsite to measure barometric pressure before, during, and after the test. If needed, data from this instrument will be used to correct aquifer test data for changes in barometric pressure during the pumping test.

4.10 Install a stream or tide gauge to measure changes in stream stage or tidal fluctuations before, during, and after the test if the pumping test site is located near a surface-water body. If needed, this data will be used to correct aquifer test data for changes in surface-water body elevations.

4.11 Ensure that the pumping system selected for the test is properly installed including the power supply and leak-free discharge line complete with a valve(s), flow meter, or manometer and orifice.

4.12 Make arrangements to dispose of the pumped water in an appropriate manner. If the pumped water is contaminated, then disposal may be via treatment and discharge, trucking offsite, etc. Water that is discharged onsite must be a substantial distance from the test site to preclude adversely affecting the test (e.g., recharging the aquifer during testing and influencing water levels).

4.13 Make sure that the proper transducers (data loggers) and gear ratios (water-level recorders) are used to measure the full anticipated range of drawdown in the wells and/or piezometers.

4.14 Install a precleaned transducer (which is preferred over manual measurement devices, e.g., steel tape and chalk or m-scope) in the test well, connect it to the data logger, and verify that the equipment is working. Program the data logger accordingly, using the PC and appropriate software.

4.15 Install precleaned transducers and program data loggers, and/or install precleaned floats/probes and set up recorders in select piezometers and/or observation wells to be monitored during the test (e.g., those impacted by the test, those serving as background). Verify that the equipment is working.

4.16 Conduct a step-drawdown (step) test several days before the scheduled constant-rate pumping test to check the performance of the pumping well and establish the pumping rate to be used for the final test. (Refer to the SOP for conducting a step-drawn test.) Use both automatic and manual water-level measuring devices to measure water levels in the wells and record appropriate measurements on the Pumping Test form and in the field notebook. The rate chosen for the pumping test will be the maximum rate the well can produce and sustain in order to stress the aquifer as much as possible.

4.17 Set the discharge line valve(s) so they will be preset and marked for the desired pumping rate (obtained from the step test).

4.18 Check that the in-line flow meter and/or manometer is indicating that the pumping rate is the same as that selected from the step test. It is preferred to use both devices to measure and monitor discharge to provide a check and a back up.

4.19 Begin the pumping test only after the water level in the aquifer has returned to the nonpumping (static) conditions observed prior to the step test.

4.20 Check that all equipment is functioning properly before starting the test (e.g., transducers and data loggers, automated water-level recorders, m-scopes, valves in proper position, generator running properly and sufficient fuel [if needed], power supply, etc.)

4.21 Synchronize all watches prior to the test.

4.22 Begin the pumping test on the hour or half-hour and pump at a constant rate until sufficient data is collected to analyze the test (at least 24 hours or longer if needed). Some pumping tests may require several days (sometimes up to and exceeding 1 week) to collect the data needed to analyze the test.

4.23 Measure water levels (drawdown) on a specified schedule. An example of the frequency of measurements to produce a uniform plot of water-level data on a logarithmic scale follows:

Elapsed Time (minutes)	Frequency of Measurement
0 - 1	Every 15 seconds
1 - 5	Every 30 seconds
5 - 10	Every minute
10 - 30	Every 2 minutes
30 - 60	Every 5 minutes
60 - 120	Every 10 minutes
120 - 180	Every 20 minutes
180 - 360	Every 30 minutes
360 - 1,440	Every hour
1,440 - 2,880	Every 2 hours
2,880 - end of test	Every 4 hours

4.24 Check the drawdown measurements obtained with the automated water-level measuring devices (on a regular basis) manually using a m-scope and/or a steel tape and chalk to an accuracy of 0.01 foot. If a recorder is used, then "tick" recorders and document the time next to each "tick" in the chart. Manual measurements should be made as close to the established schedule as possible. However, if a reading is missed, then take a measurement as soon as possible after the scheduled reading and record the actual time. This will maintain the time versus drawdown relationship needed to analyze the test data. Record water-level data on the Pumping Test form, and initial and date data entry.

4.25 Check the discharge rate using the in-line flow meter and/or manometer on a regular basis. If adjustments have to be made to maintain the constant pumping rate, then adjust the valve. Record readings and adjustments (if made) on the Pumping Test form and the field notebook, and initial and date data entry.

4.26 Measure temperature, pH, and conductivity of discharged water on a periodic, regular basis. Record data on the Pumping Test form and in the field notebook, and initial and date data entry.

4.27 Note any changes, throughout the pumping test, that are pertinent to the test such as changes in water color or turbidity, time and length of any temporary pump shut down, effects of any nearby pumping wells, precipitation events, etc. Document these notes on the Pumping Test form and in the field notebook, and initial and date data entry.

4.28 Measure water levels in the pumping well and as many piezometers and/or wells as practical (to an accuracy of 0.01 foot) following recovery procedures if there is a shutdown, no matter how brief.

4.29 Measure water levels together during a change in personnel for at least one period of measurement to ensure consistency. Note the personnel change and time on the Pumping Test form and in the field notebook, and initial and date data entry.

4.30 Begin plotting the drawdown verses time data, when time allows, on the appropriate graph paper (semi-logarithmic and/or full logarithmic) to perform a preliminary analysis of the data for hydraulic coefficients and determine if the pumping test can be terminated or has to be extended. Correct drawdown data as needed before plotting (e.g., for dewatering, barometric efficiency, tidal fluctuations, regional trends, etc.)

4.31 Shut down the pumping test at the specified time or when sufficient data has been collected to analyze the pumping test data. Shut down should occur on the hour or half-hour so that recovery starts on the hour or half-hour.

4.32 Close the valve (closest to the pump) as quickly as possible to prevent back flow of water into the pumping well.

4.33 Measure recovery (rise in water levels) to an accuracy of 0.01 foot until water levels return as close as possible to pretest levels. The identical measurement schedule followed for the drawdown phase should be followed during the recovery phase. Automated water-level recorders should be left in select wells and/or piezometers (same ones monitored during pretest) to monitor water levels for an extended period of time (one or more days).

4.34 Collect at least one round of synoptic water-level measurements after water levels have recovered following the test.

4.35 Secure all wells and/or piezometers after the collection of water-level data is completed (i.e., replace cap and/or cover, and lock).

4.36 Clean (decontaminate) all test equipment that came in contact with the ground water according to the appropriate protocol given in Section 3.0. Dispose of all materials that cannot be decontaminated in an appropriate manner (e.g., discharge hose, etc.).

APPENDIX B

Standard Operating Procedure for
Measuring Water Levels and Sounding a Well with a Steel Tape,
and Standard Operating Procedure for Measuring Water Levels
Using an Electronic Sounding Device (M-Scope).

STANDARD OPERATING PROCEDURE FOR MEASURING WATER-LEVELS AND SOUNDING A WELL WITH A STEEL TAPE

Date: December 21, 1989 Revision Number: 0

Corporate QA/QC Manager: Michael A. DeCillis

1.0 PURPOSE

The purpose for this standard operating procedure (SOP) is to establish the guidelines for using steel measuring tapes. A steel tape is used to measure the depth to ground water below an established (surveyed) measuring point (MP) and/or to sound a well (i.e., to measure the depth of well). Measuring the depth to water (DTW) below the surveyed MP provides information for calculating ground-water elevations needed to construct ground-water elevation maps and determine the direction of ground-water flow. A well is sounded to determine the total depth of the well (i.e., to provide information regarding potential siltation problems [filling-in with sediment]). This can be used to eliminate possible confusion concerning identification of the well in cases where there are several similar, adjacent, unlabeled wells. Depth to water and sounding data can also be used to calculate the volume of standing water in the well (which is a prerequisite for purging a well before well sampling, and will be addressed in respective SOPs).

A steel tape is the preferred water-level measuring device because it is the most accurate, especially when measurements are taken under static conditions. However, this technique may be inappropriate under nonstatic (changing) conditions such as aquifer tests when water levels may be changing rapidly or when water is cascading into a well. These conditions would require the use of an electronic sounding device (refer to SOP for Measuring Water Levels using an Electronic Sounding Device (M-Scope).

2.0 DECONTAMINATION

The steel tape must be precleaned (decontaminated) using a non-phosphate, laboratory-grade solution and rinsed with copious amounts of distilled or deionized water. This process is repeated before each measurement and following the final measurement.

3.0 PROCEDURE

3.1 If the well is not vented, then remove the cap and wait several minutes for the water level to equilibrate. Take several measurements to ensure that the water level measured is in equilibrium with the aquifer (i.e., not changing substantially).

3.2 The tape will be equipped with a weight to ensure the tape is held vertically and is kept taut when lowered into the well. Measure and record the distance from the bottom of the tape to the bottom of the weight to ensure the proper depth is measured when sounding a well.

3.3 If a water-level measurement is to be taken, then apply chalk (e.g., carpenter's chalk) to the bottom few feet of the tape and lower it into the water.

3.4 The top of the tape is held at an even-foot increment at the MP. This is the "held" value, and is recorded as such.

3.5 The tape is rolled up, and the cut (i.e., the mark between the dry and wet chalk) is noted. This "wet" value is measured accurately to the nearest 0.01 foot, and is recorded as such. The difference between the "held" value and the "wet" value is the DTW.

3.6 Always remeasure at least one well, preferably the first well measured, to see if the static water level has changed (e.g., due to pumping in the area, tidal effects, etc.).

3.7 If there are previous water-level measurements available for the wells, then have these data available to compare the measurements with those just taken. Use these data to see if water levels are similar or if they have changed. If water levels have changed, then check if the changes are consistent (i.e., all up or all down) and make sense.

3.8 Water-level elevations are calculated by subtracting the DTW from the MP and a water-elevation map is constructed (contoured) on a well location map. This also provides a check to evaluate if the water levels make sense (or anomalies are evidenced). Remeasure the well(s) where anomalies are found as a check on the initial measurement(s).

3.9 If anomalies persist or water-level trends are different from the historical database, then check to see if hydrogeologic conditions and/or stresses have changed (e.g., discharge areas, pumping and/or injection wells, etc.).

3.10 If the well is being sounded (depth measured), then lower the tape to the bottom of the well and measure its length accurately from the MP to the nearest 0.01 foot. Compare the sounded depth to the as-built well construction log (diagram). This will determine if siltation has occurred and redevelopment is necessary to establish a good hydraulic connection between the well screen and the aquifer.

3.11 All pertinent data will be recorded in the field notebook and on appropriate field forms, and initialed and dated.

STANDARD OPERATING PROCEDURE FOR MEASURING WATER LEVELS USING AN ELECTRONIC SOUNDING DEVICE (M-SCOPE)

Date: December 21, 1989 Revision Number: 0

Corporate QA/QC Manager: Michael A. DeCillis

1.0 PURPOSE

The purpose for this standard operating procedure (SOP) is to establish the guidelines for using m-scopes. A m-scope is an electronic sounding device used to measure the depth to ground water below an established (surveyed) measuring point (MP). Measuring the depth to water (DTW) below the surveyed MP provides information for calculating ground-water elevations needed to construct ground-water elevation maps and determine the direction of ground-water flow.

M-scopes can be less accurate than a steel tape because the wire can kink, measurement increment marks can shift, and the tip may have been cut off and replaced without proper documentation. Thus, it is mandatory that a m-scope be calibrated before use.

2.0 DECONTAMINATION

The m-scope must be precleaned (decontaminated) using a non-phosphate, laboratory-grade solution and rinsed with copious amounts of distilled or deionized water. This process is repeated before each measurement and following the final measurement.

3.0 CALIBRATION

The m-scope must be calibrated before being used to measure water levels. Calibration is accomplished by measuring the water level with the m-scope followed by a measurement using a steel tape. This dual measurement procedure is continued until the individual is confident that measurements taken using both devices are similar and the m-scope is reliable. The calibration procedure is documented in the field notebook or on an appropriate field form, and initialed and dated.

4.0 PROCEDURE

4.1 If the well is not vented, then remove the cap and wait several minutes for the water level to equilibrate. Take several measurements to ensure that the water level measured is in equilibrium with the aquifer (i.e., not changing substantially).

4.2 The manufacturer's model must be noted because some have switches, lights, beepers, or a combination of the above.

4.3 The 1-foot or 5-foot marked intervals on the electrical line must be checked to ensure that they have not shifted, and the bottom of the probe has not been cut. Check on a periodic basis that the cord has not kinked.

4.4 The water-level measurement is taken by lowering the probe into the well until the instrument-specific detection method (e.g., light, beeper, or both) is activated by contacting the water.

4.5 The electrical line is held at the MP and, using a ruler (e.g., carpenter's folding ruler) or an engineer's scale, the distance from the "held" point to the nearest marked interval is measured. The distance measured is added to, or subtracted from, the marked interval reading. The result is the DTW.

4.6 Measurements will be taken accurately and to the nearest 0.01 foot.

4.7 Always remeasure at least one well, preferably the first well measured, to see if the static water level has changed (e.g., due to pumping in the area, tidal effects, etc.)

4.8 If there are previous water-level measurements available for the wells, then have these data available to compare the measurements with those just taken. Use these data to see if water levels are similar or if they have changed. If water levels have changed, then check if the changes are consistent (i.e., all up or all down) and make sense.

4.9 Water-level elevations are calculated by subtracting the DTW from the MP and a water-elevation map is constructed (contoured) on a well location map. This also provides a check to evaluate if the water levels make sense (or anomalies are evidenced). Remeasure the well(s) where anomalies are found as a check on the initial measurement(s).

4.10 If anomalies persist or water-level trends are different from the historical database, then check to see if hydrogeologic conditions and/or stresses have changed (e.g., discharge areas, pumping and/or injection wells, etc.).

4.11 All pertinent data will be documented in the field notebook, and initialed and dated.

APPENDIX C

August 2, 1990 Step-Drawdown Data,
Unisys Corporation Great Neck Facility, Great Neck, New York.

Table C-1. Step-Drawdown (Step) Test Data for Unisys Production Well No. 2, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate (Q), in gallons per minute (gpm)	Comments
2	8/2/90	11:30:00	0.00	25.0		No distinct Q, Q ranged from 700 gpm to 500 gpm for 3 minutes
		11:30:30	0.50	17.5		
		11:31:30	1.50	17.0		
		11:32:00	2.00	21.0		
		11:32:30	2.50	21.0		
		11:33:00	3.00		500	
		11:34:00	4.00	21.0		
		11:38:00	8.00		570	
		11:40:00	10.00		500	
		11:41:00	11.00	21.0		pumped air line
		11:43:00	13.00		498	
		11:44:00	14.00	21.0		pumped air line
		11:45:00	15.00		495	
		11:50:00	20.00	21.0	494	pumped air line
		11:54:00	24.00		501	
		11:56:00	26.00		489	
		11:58:00	28.00	21.0	495	pumped air line
		12:10:00	40.00	21.0	473	pumped air line/adjust Q to 499 gpm
		12:20:00	50.00	21.0	493	pumped air line
		12:30:00	60.00	20.0	600	pumped air line
		12:30:15	60.25	20.0		new step/increased Q to 600 gpm
		12:30:30	60.50	19.0	600	
		12:30:45	60.75	19.0		
		12:31:00	61.00	19.0		
		12:32:00	62.00	19.5	597	pumped air line
		12:37:00	67.00	19.5		pumped air line

Table C-1. Step-Drawdown (Step) Test Data for Unisys Production Well No. 2, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate (Q), in gallons per minute (gpm)	Comments
2	8/2/90	12:45:00	75.00	19.5	607	pumped air line
		12:52:00	82.00	19.5	612	pumped air line
		13:12:00	102.00	19.0	593	pumped air line
		13:22:00	112.00	19.0	585	pumped air line/increased Q to 600 gpm
		13:27:00	117.00	19.0	600	pumped air line
		13:30:00	120.00	19.5		new step/increased Q to 700 gpm
		13:30:15	120.25	19.0	669	
		13:30:30	120.50	19.0		
		13:30:45	120.75	19.0	679	
		13:31:00	121.00	18.0	693	
		13:32:00	122.00	18.0	697	
		13:34:00	124.00	18.0	655	valve opened full, can't get 700 gpm
		13:35:00	125.00	18.0	674	
		13:36:00	126.00	18.0	664	
		13:37:00	127.00	18.0	669	pumped air line
		13:39:00	129.00	18.0	664	pumped air line
		13:47:00	137.00	18.0	665	pumped air line
		13:55:00	145.00	18.0	646	
		14:05:00	155.00	15.0	1068	pumped air line, Well No. 3 went down Q in Well No. 2 increased to 1,068 gpm valve opened to maximum
		14:18:00	168.00	15.0	1077	pumped air line
		14:28:00	178.00	15.0	1101	pumped air line
		14:34:00	184.00	15.5	1090	pumped air line
		14:42:00	192.00	16.0	1045	pumped air line
		14:46:00	196.00	15.5	1066	pumped air line

Table C-1. Step-Drawdown (Step) Test Data for Unisys Production Well No. 2, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate (Q), in gallons per minute (gpm)	Comments
2	8/2/90	14:48:00	208.00	15.5	1087	pumped air line
		14:53:00	213.00	15.5	1093	pumped air line
		14:57:00	217.00		915	
		14:58:00	218.00		980	
		14:59:00	219.00		1000	
		15:02:00	222.00	15.5	995	pumped air line
		15:05:00	225.00		1025	
		15:31:00	251.00		1009	pumped air line
		15:40:00	260.00		995	pumped air line
		15:51:00	271.00	16.0	986	pumped air line
		15:56:00	276.00	16.0	989	pumped air line
		16:00:00	280.00	16.0	994	pumped air line
		16:06:00	286.00	15.5	1000	pumped air line
		16:08:00	288.00		978	
		16:15:00	295.00		983	
		17:20:00	360.00	15.5	992	pumped air line

Table C-2. Step-Drawdown (Step) Test Data for Monitoring Well 1GU, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1GU	8/2/90	8:17	pretest	100.53	NA
		11:05	pretest	100.52	NA
		11:34	4	100.51	-0.01
		11:45	15	100.55	0.03
		11:55	25	100.57	0.05
		12:06	36	100.60	0.08
		12:22	52	100.615	0.095
		12:34	64	100.62	0.10
		12:46	76	100.65	0.13
		12:58	88	100.64	0.12
		13:13	103	100.645	0.125
		13:28	118	100.65	0.13
		13:40	130	100.66	0.14
		13:54	144	100.64	0.12
		14:09	159	100.66	0.14
		14:25	175	100.68	0.16
		14:42	192	100.69	0.17
		14:57	207	100.68	0.16
		15:35	245	100.655	0.135
		15:58	268	100.655	0.135
		16:14	284	100.655	0.135
		16:29	299	100.655	0.135
		16:45	315	100.655	0.135

NA = Not applicable

Table C-3. Step-Drawdown (Step) Test Data for Monitoring Well 1GL, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1GL	8/2/90	8:13	pretest	101.25	NA
		11:07	pretest	101.23	NA
		11:32	2	101.24	0.01
		11:42	12	101.23	0
		11:57	27	101.26	0.03
		12:12	42	101.26	0.03
		12:26	56	101.31	0.08
		12:37	67	101.32	0.09
		12:48	78	101.34	0.11
		13:04	94	101.34	0.11
		13:16	106	101.37	0.14
		13:30	120	101.37	0.14
		13:43	133	101.37	0.14
		13:57	147	101.37	0.14
		14:11	161	101.38	0.15
		14:28	177	101.38	0.15
		14:45	194	101.40	0.17
		15:00	209	101.425	0.195
		15:38	247	101.39	0.16
		16:00	269	101.38	0.15
		16:18	287	101.385	0.155
		16:33	302	101.385	0.155

NA = Not applicable

Table C-4. Step-Drawdown (Step) Test Data for Monitoring Well 1MI, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1MI	8/2/90	8:20	pretest	101.43	NA
		11:01	pretest	101.42	NA
		11:40	10	102.01	0.59
		11:52	22	102.05	0.63
		12:04	34	102.08	0.66
		12:19	49	102.15	0.73
		12:32	62	102.22	0.80
		12:44	74	102.32	0.90
		12:56	86	102.34	0.92
		13:11	101	102.35	0.93
		13:23	113	102.36	0.94
		13:38	128	102.44	1.02
		13:51	141	102.47	1.05
		14:05	155	102.665	1.245
		14:22	172	102.815	1.395
		14:36	186	102.79	1.37
		14:54	204	102.775	1.355
		15:08	218	102.67	1.25
		15:32	242	102.65	1.23
		15:47	257	102.63	1.21
		15:55	265	102.61	1.19
		16:10	280	102.60	1.18
		16:27	297	102.585	1.165
		16:42	312	102.58	1.16

NA = Not applicable

Table C-5. Step-Drawdown (Step) Test Data for Monitoring Well 1MI/L, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1MI/L	8/2/90	8:27	pretest	101.81	NA
		10:56	pretest	101.92	NA
		11:36	6	101.92	0
		11:48	18	101.95	0.03
		11:59	29	102.00	0.08
		12:14	43	102.05	0.13
		12:28	57	102.09	0.17
		12:40	69	102.12	0.20
		12:50	79	102.11	0.19
		13:06	95	102.22	0.30
		13:18	107	102.25	0.33
		13:33	122	102.28	0.36
		13:46	135	102.32	0.40
		13:59	148	102.35	0.43
		14:17	166	102.38	0.46
		14:30	179	102.42	0.50
		14:48	197	102.46	0.54
		15:03	212	102.445	0.525
		15:41	250	102.46	0.54
		16:04	273	102.44	0.52
		16:21	290	102.43	0.51
		16:36	305	102.41	0.49

NA = Not applicable

Table C-6. Step-Drawdown (Step) Test Data for Monitoring Well 1ML, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1ML	8/2/90	8:23	pretest	102.25	NA
		10:58	pretest	102.25	NA
		11:38	8	102.40	0.15
		11:49	19	102.53	0.28
		12:02	24	102.57	0.32
		12:16	38	102.615	0.365
		12:30	52	102.65	0.40
		12:42	64	102.71	0.46
		12:53	75	102.72	0.47
		13:09	91	102.76	0.51
		13:21	103	102.76	0.51
		13:35	117	102.78	0.53
		13:48	130	102.81	0.56
		14:02	144	102.80	0.55
		14:20	162	102.87	0.62
		14:34	176	102.855	0.605
		14:52	194	102.84	0.59
		15:07	209	102.79	0.54
		15:44	246	102.72	0.47
		16:08	270	102.69	0.44
		16:24	286	102.68	0.43
		16:40	302	102.655	0.405

NA = Not applicable

Table C-7. Step-Drawdown (Step) Test Data for Monitoring Well 2GL, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
2GL	8/2/90	8:30	pretest	82.91	NA
		10:00	pretest	85.94	NA
		10:44	pretest	82.88	NA
		11:37	7	82.91	0.03
		12:27	57	82.95	0.07
		13:16	106	82.97	0.09
		14:40	190	82.75	-0.13
		15:25	235	82.76	-0.12

NA = Not applicable

Table C-8. Step-Drawdown (Step) Test Data for Monitoring Well 2MI, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
2MI	8/2/90	8:37	pretest	83.22	NA
		9:50	pretest	91.95	NA
		10:39	pretest	83.15	NA
		11:31	1	82.90	-0.25
		12:23	53	83.02	-0.13
		13:06	96	83.20	0.05
		14:33	183	82.86	-0.29
		15:15	225	82.77	-0.38

NA = Not applicable

Table C-9. Step-Drawdown (Step) Test Data for Monitoring Well 3GL, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
3GL	8/2/90	8:59	pretest	93.68	NA
		11:59	29	93.65	-0.03
		12:29	59	93.65	-0.03
		12:55	85	93.65	-0.03
		13:50	140	93.64	-0.04
		14:55	205	93.64	-0.04
		15:14	224	93.68	0

NA - Not applicable

Table C-10. Step-Drawdown (Step) Test Data for Monitoring Well 4GL, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
4GL	8/2/90	8:35	pretest	99.53	NA
		10:15	pretest	99.53	NA
		11:17	pretest	99.54	NA
		11:38	8	99.53	-0.01
		11:52	22	99.53	-0.01
		12:07	37	99.53	-0.01
		12:29	59	99.53	-0.01
		12:49	79	99.53	-0.01
		13:12	102	99.53	-0.01
		13:49	133	99.53	-0.01
		14:09	153	99.53	-0.01
		15:05	209	99.53	-0.01
		15:42	246	99.53	-0.01
		16:05	268	99.53	-0.01

NA = Not applicable

Table C-11. Step-Drawdown (Step) Test Data for Monitoring Well 4MI, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
4MI	8/2/90	8:27	pretest	102.88	NA
		10:10	pretest	102.88	NA
		10:41	pretest	102.88	NA
		11:46	16	102.93	0.05
		12:03	33	102.99	0.11
		12:23	53	103.00	0.12
		12:54	86	103.03	0.15
		13:13	105	103.05	0.17
		13:55	147	103.07	0.19
		14:15	167	103.10	0.22
		14:59	211	103.18	0.30
		15:36	248	103.20	0.32
		16:09	281	103.21	0.33

NA = Not applicable

Table C-12. Step-Drawdown (Step) Test Data for Monitoring Well 5GL, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
5GL	8/2/90	8:23	pretest	85.08	NA
		9:56	pretest	85.06	NA
		10:07	pretest	85.06	NA
		10:24	pretest	85.06	NA
		10:39	pretest	85.06	NA
		10:52	pretest	85.06	NA
		11:32	2	85.07	0.01
		11:45	15	85.07	0.01
		12:03	33	85.07	0.01
		12:19	49	85.07	0.01
		12:33	63	85.07	0.01
		12:45	75	85.07	0.01
		12:57	87	85.09	0.03
		13:07	97	85.08	0.02
		13:19	109	85.08	0.02
		13:32	122	85.08	0.02
		13:45	135	85.08	0.02
		14:02	152	85.08	0.02
		14:19	169	85.08	0.02
		14:41	191	85.12	0.06
		14:58	208	85.12	0.06
		15:13	223	85.13	0.07
		15:29	236	85.13	0.07
		15:45	252	85.14	0.08

NA = Not applicable

Table C-13. Step-Drawdown (Step) Test Data for Monitoring Well 5MI, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
5MI	8/2/90	8:32	pretest	85.68	NA
		10:03	pretest	85.66	NA
		10:14	pretest	85.66	NA
		10:27	pretest	85.66	NA
		10:42	pretest	85.66	NA
		11:35	5	85.67	0.01
		11:50	20	85.65	-0.01
		12:07	37	85.67	0.01
		12:22	52	85.68	0.02
		12:36	66	85.69	0.03
		12:48	78	85.70	0.04
		13:00	90	85.73	0.07
		13:10	100	85.73	0.07
		13:22	112	85.73	0.07
		13:35	125	85.73	0.07
		13:49	139	85.72	0.06
		14:05	155	85.72	0.06
		14:25	175	85.81	0.15
		14:43	193	85.84	0.18
		15:01	211	85.86	0.20
		15:16	226	85.87	0.21
		15:36	246	85.88	0.22
		15:48	258		

NA = Not applicable

Table C-14. Step-Drawdown (Step) Test Data for Monitoring Well 6GL, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
6GL	8/2/90	10:24	pretest	83.18	NA
		11:04	pretest	83.23	NA
		12:08	38	83.23	0
		12:55	85	83.21	-0.02
		14:05	155	83.21	-0.02
		15:06	216	83.36	0.13

NA = Not applicable

Table C-15. Step-Drawdown (Step) Test Data for Monitoring Well 7GL, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
7GL	8/2/90	8:46	pretest	106.66	NA
		11:28	pretest	106.66	NA
		11:33	3	106.67	0.01
		11:55	25	106.68	0.02
		12:16	46	106.68	0.02
		12:39	69	106.68	0.02
		13:00	90	106.68	0.02
		13:14	109	106.68	0.02
		14:01	151	106.68	0.02
		14:30	280	106.68	0.02
		15:25	235	106.68	0.02
		15:50	250	106.68	0.02

NA = Not applicable

Table C-16. Step-Drawdown (Step) Test Data for Monitoring Well 8GU, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
8GU	8/2/90	8:32	pretest	73.83	NA
		9:26	pretest	73.83	NA
		11:38	8	73.82	-0.01
		12:11	41	73.80	-0.03
		12:41	71	73.78	-0.05
		13:08	98	73.76	-0.07
		14:04	154	73.74	-0.09
		14:41	191	73.72	-0.11
		15:04	214	73.72	-0.11
		15:29	239	73.73	-0.10

NA = Not applicable

Table C-17. Step-Drawdown (Step) Test Data for Monitoring Well 8GL, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
8GL	8/2/90	8:22	pretest	78.29	NA
		9:24	pretest	78.35	NA
		11:33	3	78.25	-0.10
		12:08	38	78.06	-0.29
		12:38	68	77.97	-0.38
		13:05	65	78.06	-0.29
		14:01	121	77.98	-0.37
		14:38	158	76.54	-1.81
		15:01	181	76.37	-1.98
		15:25	205	76.23	-2.12

NA = Not applicable

Table C-18. Step-Drawdown (Step) Test Data for Monitoring Well 9GL, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
9GL	8/2/90	8:45	pretest	82.32	NA
		11:51	21	82.24	-0.08
		12:21	51	82.28	-0.04
		12:48	78	82.24	-0.08
		13:56	146	82.25	-0.07
		14:47	147	81.76	-0.56
		15:08	168	81.67	-0.65

NA = Not applicable

Table C-19. Step-Drawdown (Step) Test Data for Monitoring Well 10GL, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
10GL	8/2/90	8:40	pretest	82.39	NA
		11:35	5	82.47	0.08
		11:47	17	82.55	0.16
		12:00	30	82.60	0.21
		12:13	43	82.61	0.22
		12:25	55	82.61	0.22
		12:39	69	82.64	0.25
		12:51	81	82.67	0.28
		13:06	96	82.69	0.30
		13:25	115	82.70	0.31
		13:37	127	82.71	0.32
		13:50	140	82.66	0.27
		14:05	155	82.70	0.31
		14:18	168	82.51	0.12
		14:35	185	82.46	0.07
		14:48	198	82.46	0.07
		15:19	229	82.34	-0.05
		15:31	241	82.31	-0.08
		15:44	254	82.32	-0.07
		15:58	268	82.30	-0.09
		16:10	280	82.27	-0.12

NA = Not applicable

Table C-20. Step-Drawdown (Step) Test Data for Monitoring Well 11GL, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
11GL	8/2/90	8:20	pretest	83.68	NA
		10:15	pretest	83.72	NA
		10:58	pretest	83.66	NA
		11:57	27	83.73	0.07
		12:45	102	83.67	0.01
		13:30	147	129.62	45.96
		14:50	227	128.15	44.19
		15:35	272	118.30	34.64

NA = Not applicable

Table C-21. Step-Drawdown (Step) Test Data for Monitoring Well 11MI, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
11MI	8/2/90	8:13	pretest	84.67	NA
		10:07	pretest	84.61	NA
		10:54	pretest	84.95	NA
		11:52	22	84.51	-0.44
		12:39	69	84.75	-0.20
		13:57	147	105.37	20.42
		14:58	208	127.09	42.14
		15:43	253	122.50	37.55

NA = Not applicable

Table C-22. Step-Drawdown (Step) Test Data for Monitoring Well 12MI, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
12MI	8/2/90	8:46	pretest	89.84	NA
		11:33	3	90.07	0.23
		11:43	13	91.43	1.59
		11:55	25	91.49	1.65
		12:07	37	91.54	1.70
		12:20	50	91.67	1.83
		12:35	65	91.91	2.07
		12:46	76	92.04	2.20
		13:00	90	92.01	2.17
		13:16	106	92.01	2.17
		13:33	123	92.20	2.36
		13:45	135	92.29	2.45
		13:52	142	92.28	2.44
		14:13	163	92.38	2.54
		14:25	175	93.55	3.71
		14:42	192	93.04	3.20
		14:55	205	93.56	3.72
		15:25	235	93.33	3.49
		15:39	249	93.35	3.51
		15:52	262	93.23	3.39
		16:05	275	93.22	3.38
		16:32	302	93.19	3.35
		16:41	311	93.18	3.34
		16:57	327	93.20	3.36

NA = Not applicable

Table C-23. Step-Drawdown (Step) Test Data for Monitoring Well 12ML, August 2, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
12ML	8/2/90	8:55	pretest	90.46	NA
		11:31	1	90.43	-0.03
		11:40	10	90.75	0.29
		11:51	21	90.80	0.34
		12:04	34	90.88	0.42
		12:16	46	90.90	0.44
		12:30	60	90.81	0.35
		12:44	74	90.97	0.51
		12:52	82	91.00	0.54
		13:12	102	91.03	0.57
		13:31	121	91.05	0.59
		13:41	131	91.09	0.63
		13:55	145	91.11	0.65
		14:10	160	91.20	0.74
		14:22	172	91.22	0.76
		14:39	189	91.23	0.77
		14:52	202	91.18	0.72
		15:22	232	91.06	0.60
		15:35	245	91.08	0.62
		15:49	259	91.05	0.59
		16:03	273	91.03	0.57

NA = Not applicable

APPENDIX D

August 20, 1990 through August 23, 1990 Pumping Test Data,
Unisys Corporation Great Neck Facility, Great Neck, New York.

Table D-1. Constant-Rate (Pumping) Test Data and Recovery Test Data for Unisys Production Well No. 2, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate, in gallons per minute
2	8/20/90	8:45		25	
		9:50	2		1013
		9:52	4		955
		9:53	5	17	
		9:54	6		992
		9:57	9	16.5	981
		9:58	10		969
		9:59	11	17	974
		10:00	12	17	
		10:01	13		968
		10:02	14		974
		10:03	15	17	980
		10:05	17	17	976
		10:07	19		981
		10:08	20	17	960
		10:11	23		975
		10:12	24	17	
		10:13	25		985
		10:15	27	17	982
		10:19	31	17	975
		10:20	32	17	971
		10:22	34		991
		10:25	37		990
		10:26	38	17	935
		10:27	39		931
		10:28	40		941
		10:29	41	17	
		10:30	42		954
		10:33	45		950
		10:34	46	17	951
		10:35	47		954
		10:44	56	17	944
		10:48	60		919
		10:50	62	17	932
		10:57	69	17	926
		10:59	71		936
		11:00	72		930
		11:05	77		924
		11:08	80		928
		11:10	82	17	

Table D-1. Constant-Rate (Pumping) Test Data and Recovery Test Data for Unisys Production Well No. 2, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate, in gallons per minute
2	8/20/90	11:11	83		943
		11:16	88		934
		11:17	89	17	
		11:19	91		928
		11:21	93		939
		11:25	97	17	919
		11:28	100	17	922
		11:36	108	17	938
		11:38	110		929
		11:43	115		939
		11:45	117		926
		11:50	122	17	933
		12:00	132		932
		12:04	136	17	930
		12:16	148	17	940
		12:22	154		938
		12:25	157		942
		12:40	172		949
		12:53	185	17	940
		13:40	232	16.5	990
		13:43	235		998
		14:33	285	16.5	995
		14:41	293		993
		14:55	307		994
		15:25	337		999
		15:33	345	16.5	1002
		15:54	366		983
		17:48	480	16.5	1003
		17:55	487		973
		18:30	522	16.5	965
		19:26	578		967
		19:27	579	16.5	
		20:23	635		959
		20:25	637	16.5	
		21:46	718	16	970
		22:36	768	16	961
		23:35	827	16	955
	8/21/90	0:45	897	16	956
		1:37	949	16	990
		2:35	1007	16	1080

Table D-1. Constant-Rate (Pumping) Test Data and Recovery Test Data for Unisys Production Well No. 2, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate, in gallons per minute
2	8/21/90	3:40	1072	16	966
		4:38	1130	16	955
		5:36	1188	17	931
		6:32	1244	17	935
		7:34	1306	17	937
		8:36	1368	17	900
		8:55	1387		
		9:40	1432	18	750
		10:15	1467		762
		10:20	1472		726
		10:30	1482		778
		10:35	1487		781
		11:15	1527	16.5	875
		11:28	1540		947
		11:51	1563		
		12:53	1625	17	951
		13:35	1667		955
		13:53	1685	17	931
		15:40	1792	17	956
		16:52	1864	17	948
		17:52	1924	17	955
		18:45	1977	16.5	948
		19:45	2037	16.5	952
		20:45	2097	16.5	946
		21:58	2170	16.5	945
		22:58	2230	16.5	945
		23:56	2288	16.5	940
	8/22/90	0:46	2338	16.5	942
		1:58	2410	17.5	946
		2:42	2454	17.5	936
		3:59	2531	17	944
		4:43	2575	17	933
		5:58	2650	17.5	940
		6:40	2692	17	937
		7:45	2757	17	945
		8:30	2862	16.5	941
		9:55	2887	15.5	948
		11:03	2955	16.5	966
		11:45	2997	16.5	980
		13:45	3117	16	986

Table D-1. Constant-Rate (Pumping) Test Data and Recovery Test Data for Unisys Production Well No. 2, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Airline Pressure, in pounds per square inch	Pumping Rate, in gallons per minute
2	8/23/90	14:45	3177	16.5	966
		15:50	3242	16.5	972
		17:05	3317	16.5	954
		17:55	3367	16.5	963
		18:45	3417	16.5	960
		18:46	3418		878
		19:45	3477	16.5	958
		20:44	3536	16.5	961
		21:55	3607	17	954
		22:45	3657	17	951
		23:48	3720	17	950
		0:45	3777	17	945
		1:55	3847	16.5	1002
		3:10	3922	16	1090
		3:55	3967	17	962
		4:45	4017	17	982
		5:54	4086	17	955
		6:52	4144	17	960
		7:55	4207	17	967
		8:42	4254	17	947
		9:32	4304	17	953
		10:20	4352	17	952
	End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990				
2	8/23/90	10:30:15	0.25	21	0
		10:30:30	0.50	26	0
		10:30:45	0.75	25	0
		10:31	1	25	0
		10:32	2	25	0
		10:33	3	25	0
		10:34	4	25	0
		10:35	5	25	0
		11:00	30	25	0

Table D-2. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 1GU, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1GU	8/20/90	9:02		100.55	
		9:53	5	100.45	-0.10
		10:01	13	100.41	-0.14
		10:08	20	100.47	-0.08
		10:15	27	100.47	-0.08
		10:22	34	100.45	-0.10
		10:28	40	100.46	-0.09
		10:37	49	100.51	-0.04
		10:45	57	100.49	-0.06
		10:54	66	100.52	-0.03
		11:04	76	100.52	-0.03
		11:14	86	100.50	-0.05
		11:24	96	100.49	-0.06
		11:34	106	100.53	-0.02
		11:44	116	100.54	-0.01
		11:54	126	100.55	0.00
		12:17	149	100.61	0.06
		12:37	169	100.60	0.05
		13:00	192	100.60	0.05
		13:30	222	100.59	0.04
		13:57	249	100.60	0.05
		14:27	279	100.60	0.05
		14:56	308	100.55	0.00
		15:28	340	100.52	-0.03
		15:54	366	100.52	-0.03
		17:03	435	100.52	-0.03
		18:04	496	100.44	-0.11
		19:03	555	100.47	-0.08
		20:03	615	100.47	-0.08
		21:14	686	100.48	-0.07
		22:08	740	100.49	-0.06
		23:12	804	100.49	-0.06
	8/21/90	0:08	860	100.39	-0.16
		1:20	932	100.40	-0.15
		2:30	1002	100.43	-0.12
		3:34	1066	100.33	-0.22
		4:40	1132	100.35	-0.20
		5:57	1209	100.36	-0.19
		7:03	1275	100.37	-0.18
		8:28	1360	100.38	-0.17
		9:55	1447	100.29	-0.26
		10:49	1501	100.34	-0.21
		12:43	1615	100.37	-0.18
		14:45	1737	100.39	-0.16
		16:42	1854	100.39	-0.16
		18:41	1973	100.39	-0.16
		20:34	2086	100.37	-0.18
		22:44	2216	100.35	-0.20
		0:40	2332	100.32	-0.23
		2:38	2450	100.30	-0.25
		4:42	2574	100.28	-0.27
		6:47	2699	100.33	-0.22
		8:40	2812	100.37	-0.18
		10:38	2930	100.35	-0.20
		12:38	3050	100.40	-0.15

Table D-2. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 1GU, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1GU	8/22/90	14:39	3171	100.45	-0.10
		16:38	3290	100.44	-0.11
		20:22	3514	100.45	-0.10
	8/23/90	22:39	3651	100.43	-0.12
		0:35	3767	100.35	-0.20
		2:32	3884	100.31	-0.24
		4:56	4028	100.33	-0.22
		6:30	4122	100.36	-0.19
		7:59	4211	100.45	-0.10
		8:13	4225	100.45	-0.10
		8:47	4259	100.46	-0.09
		9:15	4287	100.46	-0.09
		9:43	4315	100.47	-0.08

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
1GU	8/23/90	10:30	0	100.41	0.00
		10:35	5	100.41	0.00
		10:41	11	100.38	0.03
		10:48	18	100.35	0.06
		10:53	23	100.31	0.10
		10:59	29	100.28	0.13
		11:05	35	100.30	0.11
		11:14	44	100.27	0.14
		11:19	49	100.25	0.16
		11:26	56	100.26	0.15
		11:43	73	100.26	0.15
		11:53	93	100.33	0.08
		12:05	95	100.31	0.10
		12:15	105	100.34	0.07
		12:29	119	100.31	0.10
		12:40	130	100.24	0.17
		12:54	144	100.28	0.13
		13:14	164	100.27	0.14
		13:32	182	100.29	0.12
		14:50	260	100.25	0.16

Table D-3. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 1GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1GL	8/20/90	9:05		101.19	
		9:59	11	101.08	-0.11
		10:07	19	101.09	-0.10
		10:14	26	101.13	-0.06
		10:22	34	101.13	-0.06
		10:27	39	101.14	-0.05
		10:34	46	101.13	-0.06
		10:44	56	101.24	0.05
		10:52	64	101.23	0.04
		11:02	74	101.23	0.04
		11:13	85	101.22	0.03
		11:23	95	101.22	0.03
		11:33	105	101.22	0.03
		11:43	115	101.25	0.06
		11:53	125	101.23	0.04
		12:15	147	101.32	0.13
		12:34	166	101.32	0.13
		12:58	190	101.24	0.05
		13:26	218	101.31	0.12
		13:54	246	101.30	0.11
		14:23	275	101.25	0.06
		14:54	306	101.29	0.10
		15:26	338	101.26	0.07
		15:53	365	101.24	0.05
		17:05	437	101.24	0.05
		18:05	497	101.19	0.00
		19:06	558	101.15	-0.04
		20:05	617	101.16	-0.03
		21:16	688	101.20	0.01
		22:11	743	101.17	-0.02
		23:15	807	101.17	-0.02
	8/21/90	0:11	863	101.16	-0.03
		1:22	934	101.10	-0.09
		2:33	1005	101.09	-0.10
		3:37	1069	101.11	-0.08
		4:43	1135	101.06	-0.13
		5:58	1210	101.08	-0.11
		7:06	1278	101.11	-0.08
		8:30	1362	101.11	-0.08
		9:57	1449	101.05	-0.14
		10:51	1503	101.05	-0.14
		12:46	1618	101.10	-0.09
		14:47	1739	101.10	-0.09
		16:45	1857	101.11	-0.08
		18:44	1976	101.10	-0.09
		20:36	2088	101.09	-0.10
		22:46	2218	101.08	-0.11
		0:42	2334	101.07	-0.12
		2:40	2452	101.04	-0.15
		4:44	2576	101.03	-0.16
		6:48	2700	101.03	-0.16

Table D-3. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 1GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1GL	8/22/90	8:42	2814	101.10	-0.09
		10:40	2932	101.11	-0.08
		12:40	3052	101.15	-0.04
		14:41	3173	101.11	-0.08
		16:40	3292	101.14	-0.05
		20:24	3516	101.19	0.00
		22:40	3652	101.15	-0.04
	8/23/90	0:37	3769	101.15	-0.04
		2:34	3886	101.07	-0.12
		4:58	4030	101.07	-0.12
		6:34	4126	101.09	-0.10
		8:01	4213	101.19	0.00
		8:16	4228	101.17	-0.02
		8:49	4261	101.16	-0.03
		9:17	4289	101.22	0.03
		9:45	4317	101.21	0.02

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
1GL	8/23/90	10:31	1	101.12	0.09
		10:36	6	101.12	0.09
		10:43	13	101.11	0.10
		10:49	19	101.10	0.11
		10:55	25	101.09	0.12
		11:00	30	101.07	0.14
		11:07	37	101.09	0.12
		11:15	45	101.05	0.16
		11:21	51	101.04	0.17
		11:27	57	101.03	0.18
		11:46	76	101.10	0.11
		11:56	86	101.10	0.11
		12:07	97	101.04	0.17
		12:17	107	101.05	0.16
		12:31	121	101.11	0.10
		12:41	131	101.07	0.14
		12:56	146	101.05	0.16
		13:16	166	101.08	0.13
		13:35	185	101.05	0.16
		14:52	262	100.97	0.24

Table D-4. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 1MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1MI	8/20/90	9:05		101.41	
		9:53	5	102.30	0.89
		9:54	6	102.35	0.94
		9:55	7	102.40	0.99
		9:56	8	102.42	1.01
		9:57	9	102.45	1.04
		9:58	10	102.74	1.33
		9:59	11	102.61	1.20
		10:00	12	102.72	1.31
		10:01	13	102.41	1.00
		10:02	14	102.40	0.99
		10:03	15	102.30	0.89
		10:05	17	102.60	1.19
		10:07	19	102.50	1.09
		10:09	21	102.48	1.07
		10:11	23	102.48	1.07
		10:13	25	102.50	1.09
		10:15	27	102.43	1.02
		10:17	29	102.48	1.07
		10:19	31	102.59	1.18
		10:21	33	102.48	1.07
		10:23	35	102.49	1.08
		10:28	40	102.32	0.91
		10:33	45	102.53	1.12
		10:38	50	102.52	1.11
		10:43	55	102.54	1.13
		10:48	60	102.51	1.10
		10:53	65	102.45	1.04
		11:03	75	102.44	1.03
		11:13	85	102.45	1.04
		11:23	95	102.43	1.02
		11:33	105	102.39	0.98
		11:43	115	102.35	0.94
		11:53	125	102.37	0.96
		12:13	145	102.45	1.04
		12:33	165	102.45	1.04
		12:54	186	102.48	1.07
		13:23	215	102.52	1.11
		13:50	242	102.52	1.11
		14:21	273	102.48	1.07
		14:53	305	102.36	0.95
		15:24	336	102.44	1.03
		15:50	362	102.41	1.00
		17:00	432	102.33	0.92
		18:00	492	102.25	0.84
		19:00	552	102.23	0.82
		20:00	612	102.33	0.92
		21:10	682	102.33	0.92
		22:04	736	102.33	0.92
		23:09	801	102.15	0.74
	8/21/90	0:06	858	102.03	0.62
		1:16	928	101.92	0.51
		2:26	998	102.09	0.68
		3:32	1064	101.88	0.47
		4:38	1130	102.00	0.59

Table D-4. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 1MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1MI	8/21/90	5:53	1205	102.04	0.63
		7:00	1272	102.07	0.66
		8:25	1357	101.95	0.54
		9:53	1445	101.84	0.43
		10:47	1499	101.83	0.42
		12:40	1612	102.12	0.71
		14:42	1734	102.15	0.74
		16:39	1851	102.24	0.83
		18:38	1970	102.08	0.67
		20:32	2084	102.05	0.64
		22:42	2214	101.90	0.49
	8/22/90	0:37	2329	101.80	0.39
		2:35	2447	101.84	0.43
		4:41	2573	101.87	0.46
		6:44	2696	101.99	0.58
		8:38	2810	102.07	0.66
		10:35	2927	102.18	0.77
		12:36	3048	102.21	0.80
		14:37	3169	102.32	0.91
		16:35	3287	102.24	0.83
		18:39	3411	102.30	0.89
		20:20	3512	102.37	0.96
		22:38	3650	102.10	0.69
	8/23/90	0:33	3765	102.02	0.61
		2:31	3883	102.10	0.69
		4:54	4026	102.02	0.61
		6:29	4121	102.07	0.66
		7:57	4209	102.16	0.75
		8:12	4224	102.17	0.76
		8:45	4257	102.17	0.76
		9:14	4286	102.18	0.77
		9:40	4312	102.21	0.80

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
1MI	8/23/90	10:30:00		102.20	0.00
		10:30:15	0.25	102.20	0.00
		10:30:30	0.50	102.20	0.00
		10:30:45	0.75	102.20	0.00
		10:31:00	1.00	102.20	0.00
		10:31:30	1.50	102.30	-0.10
		10:32:00	2.00	102.19	0.01
		10:32:30	2.50	101.78	0.42
		10:33:00	3.00	101.68	0.52
		10:33:30	3.50	101.62	0.58

Table D-4. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 1MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
1MI	8/23/90	10:34:00	4.00	101.56	0.64
		10:34:30	4.50	101.51	0.69
		10:35:00	5.00	101.47	0.73
		10:36:00	6.00	101.13	1.07
		10:37:00	7.00	101.42	0.78
		10:38:00	8.00	101.35	0.85
		10:39:00	9.00	101.15	1.05
		10:40:00	10.00	101.24	0.96
		10:42:00	12.00	101.21	0.99
		10:44:00	14.00	101.15	1.05
		10:46:00	16.00	101.14	1.06
		10:48:00	18.00	101.11	1.09
		10:50:00	20.00	101.10	1.10
		10:52:00	22.00	101.11	1.09
		10:54:00	24.00	101.09	1.11
		10:56:00	26.00	101.08	1.12
		10:58:00	28.00	101.07	1.13
		11:00:00	30.00	101.04	1.16
		11:05:00	35.00	101.07	1.13
		11:10:00	40.00	101.07	1.13
		11:15:00	45.00	101.07	1.13
		11:20:00	50.00	101.08	1.12
		11:25:00	55.00	101.08	1.12
		11:30:00	60.00	101.07	1.13
		11:40:00	70.00	101.10	1.10
		11:53:00	83.00	101.09	1.11
		12:02:00	92.00	101.08	1.12
		12:13:00	103.00	101.09	1.11
		12:26:00	116.00	101.15	1.05
		12:37:00	127.00	101.08	1.12
		12:50:00	140.00	101.10	1.10
		13:10:00	160.00	101.10	1.10
		13:30:00	180.00	101.13	1.07
		14:48:00	258.00	101.11	1.09

Table D-5. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 1MI/L, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1MI/L	8/20/90	9:02		101.89	
		9:55	7	101.98	0.09
		10:03	15	101.96	0.07
		10:10	22	102.03	0.14
		10:16	28	102.10	0.21
		10:23	35	102.12	0.23
		10:27	39	102.15	0.26
		10:40	52	102.25	0.36
		10:47	59	102.23	0.34
		10:51	63	102.23	0.34
		11:07	79	102.23	0.34
		11:18	90	102.20	0.31
		11:27	99	102.24	0.35
		11:37	109	102.18	0.29
		11:47	119	102.22	0.33
		11:57	129	102.18	0.29
		12:20	152	102.27	0.38
		12:39	171	102.27	0.38
		13:03	195	102.22	0.33
		13:33	225	102.27	0.38
		14:00	252	102.27	0.38
		14:28	280	102.26	0.37
		14:58	310	102.18	0.29
		15:50	362	102.17	0.28
		15:56	368	102.17	0.28
		17:08	440	102.09	0.20
		18:08	500	102.08	0.19
		19:09	561	102.05	0.16
		20:07	619	101.94	0.05
		21:18	690	101.90	0.01
		22:13	745	101.82	-0.07
		23:17	809	101.77	-0.12
	8/21/90	0:15	867	101.65	-0.24
		1:24	936	101.52	-0.37
		2:35	1007	101.63	-0.26
		3:40	1072	101.52	-0.37
		4:45	1137	101.60	-0.29
		6:01	1213	101.69	-0.20
		7:10	1282	101.68	-0.21
		8:35	1367	101.80	-0.09
		9:59	1451	101.76	-0.13
		10:53	1505	101.88	-0.01
		12:49	1621	101.90	0.01
		14:48	1740	101.97	0.08
		16:47	1859	101.93	0.04
		18:46	1978	101.95	0.06
		20:38	2090	101.71	-0.18
		22:48	2220	101.51	-0.38

Table D-5. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 1MI/L, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1MI/L	8/22/90	0:45	2337	101.39	-0.50
		2:42	2454	101.43	-0.46
		4:46	2578	101.48	-0.41
		6:52	2704	101.61	-0.28
		8:44	2816	101.84	-0.05
		10:43	2935	101.84	-0.05
		12:43	3055	102.02	0.13
		14:44	3176	102.01	0.12
		16:45	3297	102.02	0.13
		20:26	3514	101.99	0.10
		22:44	3656	101.68	-0.21
	8/23/90	0:39	3771	101.60	-0.29
		2:36	3888	101.57	-0.32
		5:00	4032	101.57	-0.32
		6:36	4128	101.73	-0.16
		8:04	4216	101.93	0.04
		8:18	4230	101.94	0.05
		8:52	4264	101.92	0.03
		9:20	4292	101.97	0.08
		9:48	4320	101.95	0.06

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
1MI/L	8/23/90	10:32	2	101.92	0.03
		10:38	8	101.83	0.12
		10:45	15	101.75	0.20
		10:50	20	101.66	0.29
		10:56	26	101.62	0.33
		11:02	32	101.55	0.40
		11:09	39	101.51	0.44
		11:16	46	101.49	0.46
		11:22	52	101.48	0.47
		11:29	59	101.47	0.48
		11:49	79	101.51	0.44
		11:58	88	101.59	0.36
		12:09	99	101.52	0.43
		12:19	109	101.57	0.38
		12:33	123	101.52	0.43
		12:44	134	101.57	0.38
		12:59	149	101.68	0.27
		13:19	169	101.63	0.32
		13:37	187	101.62	0.33
		14:53	263	101.55	0.40

Table D-6. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 1ML, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1ML	8/20/90	9:03		102.19	
		9:57	9	102.35	0.16
		10:05	17	102.45	0.26
		10:12	24	102.50	0.31
		10:18	30	102.50	0.31
		10:24	36	102.50	0.31
		10:32	44	102.47	0.28
		10:41	53	102.52	0.33
		10:49	61	102.51	0.32
		10:59	71	102.50	0.31
		11:09	81	102.50	0.31
		11:14	86	102.49	0.30
		11:29	101	102.45	0.26
		11:39	111	102.46	0.27
		11:49	121	102.46	0.27
		11:59	131	102.45	0.26
		12:22	154	102.46	0.27
		12:42	174	102.51	0.32
		13:06	198	102.52	0.33
		13:35	227	102.57	0.38
		14:03	255	102.58	0.39
		14:31	283	102.55	0.36
		15:00	312	102.45	0.26
		15:32	344	102.42	0.23
		15:58	370	102.41	0.22
		17:10	442	102.32	0.13
		18:10	502	102.31	0.12
		19:12	564	102.15	-0.04
		20:09	621	102.20	0.01
		21:21	693	102.09	-0.10
		22:17	749	101.90	-0.29
		23:21	813	101.84	-0.35
	8/21/90	0:17	869	101.78	-0.41
		1:28	940	101.81	-0.38
		2:40	1012	101.84	-0.35
		3:43	1075	101.76	-0.43
		4:49	1141	101.87	-0.32
		6:05	1217	101.93	-0.26
		7:14	1286	101.92	-0.27
		8:38	1370	102.06	-0.13
		10:01	1453	101.98	-0.21
		10:55	1507	101.97	-0.22
		12:51	1623	102.25	0.06
		14:53	1745	102.18	-0.01
		16:50	1862	102.22	0.03
		18:49	1981	102.21	0.02
		20:40	2092	101.93	-0.26
		22:52	2224	101.72	-0.47
		0:47	2339	101.59	-0.60
		2:46	2458	101.46	-0.73
		4:48	2580	101.72	-0.47
		6:54	2706	101.86	-0.33
		8:47	2819	102.16	-0.03
		10:46	2938	102.28	0.09
		12:45	3057	102.31	0.12

Table D-6. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 1ML, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
1ML	8/22/90	14:47	3179	102.34	0.15
		16:47	3299	102.34	0.15
		20:28	3520	102.27	0.08
		22:46	3658	101.95	-0.24
	8/23/90	0:41	3773	101.80	-0.39
		2:40	3892	101.82	-0.37
		5:02	4034	101.82	-0.37
		6:38	4130	101.96	-0.23
		8:05	4217	102.22	0.03
		8:20	4232	102.22	0.03
		8:54	4266	102.24	0.05
		9:23	4295	102.25	0.06
		9:50	4322	102.25	0.06

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
1ML	8/23/90	10:34	4	102.15	0.10
		10:39	9	101.93	0.32
		10:46	16	101.82	0.43
		10:52	22	101.77	0.48
		10:57	27	101.77	0.48
		11:04	34	101.77	0.48
		11:11	41	101.79	0.46
		11:18	48	101.76	0.49
		11:24	54	101.77	0.48
		11:31	61	101.78	0.47
		11:51	81	101.85	0.40
		12:00	90	101.89	0.36
		12:11	101	101.96	0.29
		12:22	112	101.95	0.30
		12:35	125	101.91	0.34
		12:45	135	101.94	0.31
		13:00	150	102.05	0.20
		13:21	171	101.96	0.29
		13:39	189	101.96	0.29
		14:54	264	101.92	0.33

Table D-7. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 2GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
2GL	8/20/90	8:46		82.70	
		12:20	152	82.32	-0.38
		15:45	357	82.29	-0.41
		17:16	448	82.14	-0.56
		18:07	499	82.14	-0.56
		19:05	557	82.17	-0.53
		20:03	615	82.18	-0.52
		21:18	690	82.38	-0.32
		22:10	742	82.29	-0.41
		23:07	799	82.24	-0.46
	8/21/90	0:07	859	82.23	-0.47
		1:09	921	82.17	-0.53
		2:10	982	81.97	-0.73
		3:14	1046	81.96	-0.74
		4:13	1105	81.95	-0.75
		5:10	1162	82.00	-0.70
		6:11	1223	82.04	-0.66
		7:11	1283	82.04	-0.66
		8:11	1343	82.04	-0.66
		9:10	1402	82.09	-0.61
		10:18	1470	82.10	-0.60
		12:10	1582	82.14	-0.56
		14:10	1702	82.15	-0.55
		16:08	1820	82.11	-0.59
		18:02	1934	82.02	-0.68
		20:04	2056	82.03	-0.67
		22:19	2191	82.15	-0.55
	8/22/90	0:11	2303	82.11	-0.59
		2:14	2426	81.90	-0.80
		4:13	2545	81.81	-0.89
		6:12	2664	81.94	-0.76
		8:05	2777	81.92	-0.78
		10:15	2907	81.98	-0.72
		12:12	3024	81.99	-0.71
		14:14	3146	81.99	-0.71
		16:10	3262	82.09	-0.61
		18:06	3378	82.11	-0.59
		20:09	3501	82.19	-0.51
		22:09	3621	82.21	-0.49
	8/23/90	0:09	3741	82.13	-0.57
		2:46	3898	81.89	-0.81
		4:04	3976	81.81	-0.89
		6:08	4100	81.92	-0.78
		7:57	4209	81.89	-0.81
		8:56	4268	81.90	-0.80

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Table D-7. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 2GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
2GL	8/23/90	11:49	79	82.34	-0.44
		13:58	208	82.45	-0.55

Table D-8. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 2MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
2MI	8/20/90	8:46		82.95	
		12:17	149	82.60	-0.35
		15:43	355	82.50	-0.45
		17:15	447	82.38	-0.57
		18:05	497	82.35	-0.60
		19:03	555	82.40	-0.55
		20:01	613	82.41	-0.54
		21:15	687	82.63	-0.32
		22:09	741	82.53	-0.42
		23:04	796	82.48	-0.47
	8/21/90	0:05	857	82.46	-0.49
		1:07	919	82.40	-0.55
		2:08	980	82.16	-0.79
		3:11	1043	82.16	-0.79
		4:10	1102	82.15	-0.80
		5:08	1160	82.21	-0.74
		6:09	1221	82.26	-0.69
		7:09	1281	82.26	-0.69
		8:09	1341	82.29	-0.66
		9:07	1399	82.34	-0.61
		10:15	1467	82.34	-0.61
		12:07	1579	82.39	-0.56
		14:07	1699	82.40	-0.55
		16:04	1816	82.36	-0.59
		18:01	1933	82.26	-0.69
		20:02	2054	82.27	-0.68
		22:17	2189	82.41	-0.54
	8/22/90	0:08	2300	82.37	-0.58
		2:10	2422	82.07	-0.88
		4:10	2542	82.04	-0.91
		6:10	2662	82.16	-0.79
		8:03	2775	82.14	-0.81
		10:12	2904	82.22	-0.73
		12:10	3022	82.25	-0.70
		14:10	3142	82.24	-0.71
		16:07	3259	82.32	-0.63
		18:04	3376	82.36	-0.59
		20:07	3499	82.44	-0.51
		22:07	3619	82.48	-0.47
	8/23/90	0:07	3739	82.38	-0.57
		2:44	3896	82.07	-0.88
		4:02	3974	82.01	-0.94
		6:06	4098	82.15	-0.80
		7:56	4208	82.10	-0.85
		8:55	4267	82.10	-0.85

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Table D-8. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 2MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
2MI	8/23/90	11:46	76	82.55	-0.45
		13:57	131	82.66	-0.56

Table D-9. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 3GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
3GL	8/20/90	8:46		93.64	
		13:15	207	93.53	-0.11
		15:15	327	93.56	-0.08
		17:50	482	93.47	-0.17
		18:39	531	93.48	-0.16
		19:35	587	93.50	-0.14
		20:35	647	93.49	-0.15
		21:49	721	93.50	-0.14
		22:56	788	93.50	-0.14
		23:55	847	93.50	-0.14
	8/21/90	0:56	908	93.45	-0.19
		2:03	975	93.46	-0.18
		3:18	1050	93.47	-0.17
		4:20	1112	93.45	-0.19
		5:34	1186	93.45	-0.19
		6:39	1251	93.46	-0.18
		7:57	1329	93.48	-0.16
		9:32	1424	93.46	-0.18
		10:34	1486	93.44	-0.20
		12:25	1597	93.49	-0.15
		14:26	1718	93.45	-0.19
		16:27	1839	93.47	-0.17
		18:27	1959	93.43	-0.21
		20:20	2072	93.38	-0.26
		22:25	2197	93.43	-0.21
	8/22/90	0:27	2319	93.43	-0.21
		2:25	2437	93.41	-0.23
		4:27	2559	93.38	-0.26
		6:28	2680	93.38	-0.26
		8:25	2797	93.44	-0.20
		10:24	2916	93.41	-0.23
		12:26	3038	93.38	-0.26
		14:26	3158	93.42	-0.22
		16:26	3278	93.42	-0.22
		18:27	3399	93.40	-0.24
		20:10	3502	93.40	-0.24
		22:26	3638	93.45	-0.19
	8/23/90	0:21	3753	93.41	-0.23
		2:20	3872	93.35	-0.29
		4:40	4012	93.34	-0.30
		6:20	4112	93.37	-0.27
		8:21	4233	93.38	-0.26
		9:15	4287	93.38	-0.26

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Table D-9. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 3GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
3GL	8/23/90	12:17	107	93.35	0.03
		14:17	227	93.34	0.04

Table D-10. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 4GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
4GL	8/20/90	8:47		99.28	
		12:53	185	99.16	-0.12
		15:26	338	99.29	0.01
		17:27	459	99.16	-0.12
		18:23	515	99.14	-0.14
		19:21	573	99.14	-0.14
		20:20	632	99.13	-0.15
		21:32	704	99.20	-0.08
		22:32	764	99.18	-0.10
		23:35	827	99.20	-0.08
	8/21/90	0:36	888	99.19	-0.09
		1:43	955	99.18	-0.10
		2:55	1027	99.16	-0.12
		3:56	1088	99.18	-0.10
		5:07	1159	99.20	-0.08
		6:19	1231	99.18	-0.10
		7:30	1302	99.14	-0.14
		9:14	1406	99.11	-0.17
		10:13	1465	99.16	-0.12
		12:08	1580	99.15	-0.13
		14:08	1700	99.12	-0.16
		16:07	1819	99.14	-0.14
		18:04	1936	99.14	-0.14
		20:05	2057	99.18	-0.10
		22:04	2176	99.11	-0.17
		23:05	2237	99.13	-0.15
	8/22/90	0:07	2299	99.15	-0.13
		2:06	2418	99.13	-0.15
		4:09	2541	99.18	-0.10
		6:10	2662	99.12	-0.16
		8:06	2778	99.23	-0.05
		10:06	2898	99.27	-0.01
		12:07	3019	99.29	0.01
		14:07	3139	99.28	0.00
		16:07	3259	99.28	0.00
		18:08	3380	99.28	0.00
		19:56	3488	99.31	0.03
		22:07	3619	99.32	0.04
	8/23/90	0:08	3740	99.32	0.04
		2:08	3860	99.32	0.04
		4:15	3987	99.37	0.09
		6:05	4097	99.37	0.09
		8:06	4218	99.30	0.02
		8:59	4271	99.32	0.04

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Table D-10. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 4GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
4GL	8/23/90	12:44	134	99.33	-0.01
		15:15	285	99.31	0.01

Table D-11. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 4MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
4MI	8/20/90	8:46		102.50	
		12:53	185	102.41	-0.09
		15:24	336	102.68	0.18
		17:25	457	102.61	0.11
		18:20	512	102.53	0.03
		19:18	570	102.46	-0.04
		20:17	629	102.48	-0.02
		21:30	702	102.48	-0.02
		22:29	761	102.15	-0.35
		23:32	824	101.92	-0.58
	8/21/90	0:32	884	101.81	-0.69
		1:40	952	101.76	-0.74
		2:52	1024	101.89	-0.61
		3:53	1085	101.88	-0.62
		5:04	1156	102.30	-0.20
		6:16	1228	102.23	-0.27
		7:28	1300	102.03	-0.47
		9:10	1402	102.00	-0.50
		10:10	1462	101.97	-0.53
		12:05	1577	102.04	-0.46
		14:04	1696	102.04	-0.46
		16:04	1816	102.03	-0.47
		18:03	1935	102.03	-0.47
		20:02	2054	102.04	-0.46
		22:02	2174	102.00	-0.50
	8/22/90	0:05	2297	101.43	-1.07
		2:06	2418	101.36	-1.14
		4:07	2539	101.42	-1.08
		6:07	2659	101.92	-0.58
		8:04	2775	102.43	-0.07
		10:04	2896	102.63	0.13
		12:05	3017	102.61	0.11
		14:04	3136	102.66	0.16
		16:04	3256	102.74	0.24
		18:04	3376	102.73	0.23
		19:54	3486	102.75	0.25
		22:04	3616	102.25	-0.25
	8/23/90	0:05	3737	102.11	-0.39
		2:05	3857	101.92	-0.58
		4:10	3982	101.84	-0.66
		6:03	4095	102.38	-0.12
		8:04	4216	102.38	-0.12
		8:57	4269	102.46	-0.04

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Table D-11. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 4MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
4MI	8/23/90	12:46	136	102.20	0.26
		15:11	281	102.38	0.08

Table D-12. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 5GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
5GL	8/20/90	8:46		84.84	
		12:37	169	85.05	0.21
		16:07	379	84.95	0.11
		17:38	470	84.84	0.00
		18:21	513	84.83	-0.01
		19:19	571	84.84	0.00
		20:15	627	84.84	0.00
		21:38	710	84.80	-0.04
		22:26	758	84.79	-0.05
		23:24	816	84.75	-0.09
	8/21/90	0:25	877	84.75	-0.09
		1:28	940	84.73	-0.11
		2:26	998	84.74	-0.10
		3:30	1062	84.74	-0.10
		4:30	1122	84.75	-0.09
		5:29	1181	84.76	-0.08
		6:26	1238	84.78	-0.06
		7:25	1297	84.77	-0.07
		8:28	1360	84.78	-0.06
		9:25	1417	84.84	0.00
		10:38	1490	84.84	0.00
		12:30	1602	84.83	-0.01
		14:30	1722	84.83	-0.01
		16:28	1840	84.83	-0.01
		18:16	1948	84.80	-0.04
		20:17	2069	84.80	-0.04
		22:41	2213	84.74	-0.10
	8/22/90	0:29	2321	84.70	-0.14
		2:32	2444	84.70	-0.14
		4:33	2565	84.69	-0.15
		6:29	2681	84.73	-0.11
		8:21	2793	84.76	-0.08
		10:36	2928	84.86	0.02
		12:35	3047	84.84	0.00
		14:34	3166	84.86	0.02
		16:34	3286	84.86	0.02
		18:20	3392	84.85	0.01
		20:24	3516	84.89	0.05
		22:24	3636	84.81	-0.03
	8/23/90	0:28	3760	84.76	-0.08
		3:01	3913	84.70	-0.14
		4:19	3991	84.69	-0.15
		6:20	4112	84.75	-0.09
		8:15	4227	84.77	-0.07
		9:15	4287	84.77	-0.07

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Table D-12. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 5GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
5GL	8/23/90	12:08	98	84.82	-0.05
		14:16	226	84.82	-0.05

Table D-13. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 5MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
5MI	8/20/90	8:46		85.58	
		12:20	152	85.72	0.14
		17:40	472	85.46	-0.12
		18:24	516	85.44	-0.14
		19:21	573	85.46	-0.12
		20:17	639	85.45	-0.13
		21:40	712	85.40	-0.18
		22:30	762	85.36	-0.22
		23:30	822	85.27	-0.31
	8/21/90	0:27	879	85.25	-0.33
		1:30	942	85.22	-0.36
		2:29	1001	85.24	-0.34
		3:33	1065	85.24	-0.34
		4:33	1125	85.27	-0.31
		5:31	1183	85.32	-0.26
		6:28	1240	85.34	-0.24
		7:27	1299	85.32	-0.26
		8:31	1363	85.34	-0.24
		9:28	1420	85.41	-0.17
		10:40	1492	85.44	-0.14
		12:34	1606	85.41	-0.17
		14:34	1726	85.40	-0.18
		16:33	1845	85.39	-0.19
		18:18	1950	85.36	-0.22
		20:20	2072	85.35	-0.23
		22:50	2222	85.25	-0.33
	8/22/90	0:33	2325	85.14	-0.44
		2:34	2446	85.11	-0.47
		4:35	2567	85.14	-0.44
		6:32	2684	85.28	-0.30
		8:23	2795	85.34	-0.24
		10:39	2931	85.57	-0.01
		12:37	3049	85.55	-0.03
		14:37	3169	85.56	-0.02
		16:37	3289	85.57	-0.01
		18:22	3394	85.58	0.00
		20:26	3518	85.58	0.00
		22:27	3639	85.44	-0.14
	8/23/90	0:31	3763	85.42	-0.16
		3:03	3915	85.18	-0.40
		4:21	3993	85.21	-0.37
		6:24	4116	85.32	-0.26
		8:17	4229	85.34	-0.24
		9:17	4289	85.36	-0.22

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Table D-13. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 5MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
5MI	8/23/90	12:07	97	85.32	0.04
		14:17	227	85.32	0.04

Table D-14. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 6GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
6GL	8/20/90	8:46		83.03	
		12:45	177	83.14	0.11
		16:01	373	83.12	0.09
		17:32	464	82.95	-0.08
		18:17	509	82.94	-0.09
		19:15	567	82.93	-0.10
		20:11	623	82.96	-0.07
		21:30	702	82.89	-0.14
		22:21	753	82.88	-0.15
		23:19	811	82.83	-0.20
	8/21/90	0:19	871	82.82	-0.21
		1:21	933	82.80	-0.23
		2:21	993	82.80	-0.23
		3:24	1056	82.81	-0.22
		4:25	1117	82.81	-0.22
		5:24	1176	82.84	-0.19
		6:20	1232	82.86	-0.17
		7:20	1292	82.82	-0.21
		8:22	1354	82.83	-0.20
		9:19	1411	82.89	-0.14
		10:32	1484	82.93	-0.10
		12:25	1597	82.90	-0.13
		14:25	1717	82.89	-0.14
		16:22	1834	82.88	-0.15
		18:12	1944	82.88	-0.15
		20:14	2066	82.86	-0.17
		22:41	2213	82.80	-0.23
	8/22/90	0:23	2315	82.74	-0.29
		2:27	2439	82.70	-0.33
		4:27	2559	82.70	-0.33
		6:24	2676	82.78	-0.25
		8:16	2788	82.86	-0.17
		10:32	2924	82.95	-0.08
		12:30	3042	82.98	-0.05
		14:29	3161	82.98	-0.05
		16:30	3282	82.97	-0.06
		18:15	3387	82.99	-0.04
		20:19	3511	82.99	-0.04
		22:20	3632	82.90	-0.13
	8/23/90	0:22	3754	82.84	-0.19
		2:56	3908	82.75	-0.28
		4:14	3986	82.76	-0.27
		6:18	4110	82.84	-0.19
		8:10	4222	82.86	-0.17
		9:10	4282	82.87	-0.16

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Table D-14. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 6GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
6GL	8/23/90	12:01	91	82.89	-0.02
		14:12	131	82.90	-0.03

Table D-15. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 7GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
7GL	8/20/90	8:52		106.42	
		13:00	192	106.46	0.04
		15:30	342	106.38	-0.04
		17:18	450	106.37	-0.05
		18:15	507	106.37	-0.05
		19:14	566	106.35	-0.07
		20:14	626	106.33	-0.09
		21:26	698	106.39	-0.03
		22:23	755	106.38	-0.04
		23:26	818	106.33	-0.09
	8/21/90	0:24	876	106.38	-0.04
		1:34	946	106.33	-0.09
		2:46	1018	106.36	-0.06
		3:49	1081	106.36	-0.06
		4:59	1151	106.30	-0.12
		6:11	1223	106.33	-0.09
		7:22	1294	106.25	-0.17
		9:00	1392	106.30	-0.12
		10:07	1459	106.22	-0.20
		12:00	1572	106.31	-0.11
		14:00	1692	106.28	-0.14
		16:00	1812	106.27	-0.15
		18:00	1932	106.25	-0.17
		20:00	2052	106.25	-0.17
		22:00	2172	106.24	-0.18
	8/22/90	0:00	2292	106.23	-0.19
		2:00	2412	106.24	-0.18
		4:00	2532	106.23	-0.19
		6:00	2652	106.25	-0.17
		8:00	2772	106.28	-0.14
		10:00	2892	106.31	-0.11
		12:00	3012	106.31	-0.11
		14:00	3132	106.30	-0.12
		16:00	3252	106.31	-0.11
		18:00	3372	106.31	-0.11
		19:51	3483	106.40	-0.02
		22:00	3612	106.36	-0.06
	8/23/90	0:00	3732	106.30	-0.12
		2:00	3852	106.33	-0.09
		4:00	3972	106.27	-0.15
		6:00	4092	106.36	-0.06
		8:00	4212	106.37	-0.05
		8:55	4267	106.37	-0.05

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Table D-15. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 7GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
7GL	8/23/90	12:38	128	106.29	0.08
		15:05	147	106.30	0.07

Table D-16. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 8GU, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
8GU	8/20/90	8:46		74.02	
		9:58	10	73.90	-0.12
		10:03	15	73.90	-0.12
		10:07	19	73.90	-0.12
		10:13	25	73.90	-0.12
		10:17	29	73.90	-0.12
		10:36	48	73.90	-0.12
		10:50	62	73.90	-0.12
		11:06	78	73.90	-0.12
		11:21	93	73.90	-0.12
		11:36	108	73.90	-0.12
		11:48	120	73.90	-0.12
		12:03	135	73.90	-0.12
		12:18	150	73.90	-0.12
		12:38	170	73.89	-0.13
		12:58	190	73.89	-0.13
		13:28	220	73.88	-0.14
		13:58	250	73.88	-0.14
		14:28	280	73.88	-0.14
		15:06	318	73.95	-0.07
		17:40	472	73.90	-0.12
		18:32	524	73.78	-0.24
		19:30	582	73.78	-0.24
		20:27	639	73.79	-0.23
		21:40	712	73.86	-0.16
		22:42	774	73.86	-0.16
		23:43	835	73.81	-0.21
	8/21/90	0:46	898	73.88	-0.14
		1:53	965	73.83	-0.19
		3:07	1039	73.81	-0.21
		4:10	1102	73.78	-0.24
		5:22	1174	73.84	-0.18
		6:33	1245	73.78	-0.24
		7:43	1315	73.74	-0.28
		9:27	1419	73.79	-0.23
		10:23	1475	73.91	-0.11
		12:15	1587	73.72	-0.30
		14:17	1709	73.70	-0.32
		16:17	1829	73.71	-0.31
		18:16	1948	73.71	-0.31
		20:12	2064	73.69	-0.33
		22:13	2185	73.75	-0.27
	8/22/90	0:17	2309	73.71	-0.31
		2:14	2426	73.73	-0.29
		4:17	2549	73.67	-0.35
		6:18	2670	73.65	-0.37
		8:15	2787	73.70	-0.32
		10:15	2907	73.73	-0.29
		12:17	3029	73.72	-0.30
		14:18	3150	73.72	-0.30
		16:18	3270	73.71	-0.31
		18:18	3390	73.71	-0.31
		20:03	3495	73.68	-0.34
		22:16	3628	73.64	-0.38

Table D-16. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 8GU, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
8GU	8/23/90	0:16	3748	73.60	-0.42
		2:16	3868	73.63	-0.39
		4:28	4000	73.61	-0.41
		6:12	4104	73.57	-0.45
		8:14	4226	73.57	-0.45
		9:07	4279	73.58	-0.44

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
8GU	8/23/90	10:31:30	1.50	73.60	-0.02
		10:33:47	3.78	73.59	-0.01
		10:36:00	6.00	73.58	0.00
		10:38:00	8.00	73.59	-0.01
		10:40:30	10.50	73.57	0.01
		10:42:30	12.50	73.58	0.00
		10:45:00	15.00	73.58	0.00
		10:47:30	17.50	73.59	-0.01
		10:49:45	19.75	73.59	-0.01
		10:51:45	21.75	73.58	0.00
		10:54:00	24.00	73.59	-0.01
		10:56:15	26.25	73.59	-0.01
		10:58:45	28.75	73.59	-0.01
		11:01:00	31.00	73.59	-0.01
		11:12:00	42.00	73.59	-0.01
		11:21:00	51.00	73.60	-0.02
		11:29:00	59.00	73.59	-0.01
		11:39:00	69.00	73.59	-0.01
		11:49:00	79.00	73.59	-0.01
		11:59:00	89.00	73.58	0.00
		12:09:00	99.00	73.59	-0.01
		12:19:00	109.00	73.58	0.00
		12:29:00	119.00	73.57	0.01
		12:39:00	129.00	73.57	0.01
		12:59:00	149.00	73.58	0.00
		13:19:00	169.00	73.58	0.00
		13:39:00	189.00	73.57	0.01
		14:42:00	252.00	73.56	0.02

Table D-17. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 8GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
8GL	8/20/90	8:46		78.49	
		9:56	8	77.08	-1.41
		10:00	12	76.86	-1.63
		10:05	17	76.69	-1.80
		10:11	23	76.54	-1.95
		10:15	27	76.50	-1.99
		10:34	46	76.44	-2.05
		10:47	59	76.29	-2.20
		11:03	75	76.21	-2.28
		11:18	90	76.15	-2.34
		11:32	104	76.13	-2.36
		11:45	117	76.11	-2.38
		12:00	132	76.10	-2.39
		12:15	147	76.07	-2.42
		12:35	167	76.04	-2.45
		12:55	187	76.04	-2.45
		13:25	217	76.03	-2.46
		13:55	247	76.02	-2.47
		14:25	277	76.02	-2.47
		15:04	316	76.08	-2.41
		17:37	469	76.12	-2.37
		18:30	522	76.14	-2.35
		19:26	578	76.17	-2.32
		20:23	635	76.64	-1.85
		21:38	710	75.92	-2.57
		22:40	772	75.74	-2.75
		23:41	833	75.68	-2.81
	8/21/90	0:43	895	75.65	-2.84
		1:51	963	75.98	-2.51
		3:03	1035	76.01	-2.48
		4:07	1099	76.32	-2.17
		5:18	1170	76.40	-2.09
		6:30	1242	76.43	-2.06
		7:40	1312	76.47	-2.02
		9:25	1417	76.46	-2.03
		10:20	1472	75.99	-2.50
		12:13	1585	76.00	-2.49
		14:14	1706	76.05	-2.44
		16:14	1826	76.05	-2.44
		18:13	1945	75.82	-2.67
		20:10	2062	76.48	-2.01
		22:11	2183	75.67	-2.82
	8/22/90	0:14	2306	75.54	-2.95
		2:12	2424	75.98	-2.51
		4:14	2546	76.18	-2.31
		6:16	2668	76.34	-2.15
		8:12	2784	75.78	-2.71
		10:13	2905	75.85	-2.64
		12:15	3027	75.85	-2.64
		14:15	3147	75.84	-2.65
		16:15	3267	75.86	-2.63
		18:15	3387	75.85	-2.64
		20:01	3493	76.72	-1.77
		22:14	3626	75.77	-2.72

Table D-17. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 8GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
8GL	8/23/90	0:13	3745	75.63	-2.86
		2:13	3865	75.97	-2.52
		4:25	3997	76.29	-2.20
		6:10	4102	76.34	-2.15
		9:12	4284	75.65	-2.84
		10:05	4337	75.75	-2.74

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
8GL	8/23/90	10:30:00	0.00	75.83	0.00
		10:32:15	2.25	75.89	-0.06
		10:34:24	4.40	76.27	-0.44
		10:36:30	6.50	76.65	-0.82
		10:38:30	8.50	76.94	-1.11
		10:41:00	11.00	77.12	-1.29
		10:43:30	13.50	77.22	-1.39
		10:46:00	16.00	77.34	-1.51
		10:48:00	18.00	77.44	-1.61
		10:50:15	20.00	77.51	-1.68
		10:52:15	22.00	77.54	-1.71
		10:54:45	24.00	77.60	-1.77
		10:57:15	26.00	77.63	-1.80
		10:59:15	28.00	77.66	-1.83
		11:02:00	32.00	77.69	-1.86
		11:10:00	40.00	77.67	-1.84
		11:19:00	49.00	77.73	-1.90
		11:27:00	57.00	77.78	-1.95
		11:37:00	67.00	77.82	-1.99
		11:47:00	77.00	77.86	-2.03
		11:57:00	87.00	77.90	-2.07
		12:07:00	97.00	77.93	-2.10
		12:17:00	107.00	77.96	-2.13
		12:27:00	117.00	78.00	-2.17
		12:37:00	127.00	78.01	-2.18
		12:57:00	147.00	78.04	-2.21
		13:17:00	167.00	78.07	-2.24
		13:37:00	187.00	78.09	-2.26
		14:40:00	250.00	78.18	-2.35

Table D-18. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 9GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
9GL	8/20/90	8:46		82.11	
		10:22	34	81.44	-0.67
		10:26	38	81.42	-0.69
		10:28	40	81.38	-0.73
		10:40	52	81.34	-0.77
		10:56	68	81.32	-0.79
		11:10	82	81.29	-0.82
		11:26	98	81.24	-0.87
		11:32	104	81.24	-0.87
		11:52	124	81.24	-0.87
		12:09	141	81.24	-0.87
		12:26	158	81.23	-0.88
		12:46	178	81.22	-0.89
		13:06	198	81.21	-0.90
		13:36	228	81.21	-0.90
		14:06	258	81.20	-0.91
		14:36	288	81.20	-0.91
		15:09	321	81.26	-0.85
		17:45	477	81.22	-0.89
		18:35	527	81.18	-0.93
		19:33	585	81.17	-0.94
		20:31	643	81.29	-0.82
		21:45	717	81.29	-0.82
		22:50	782	81.29	-0.82
		23:50	842	81.15	-0.96
	8/21/90	0:52	904	81.16	-0.95
		1:59	971	81.15	-0.96
		3:13	1045	81.16	-0.95
		4:15	1107	81.15	-0.96
		5:30	1182	81.18	-0.93
		6:36	1248	81.18	-0.93
		7:51	1323	81.22	-0.89
		9:32	1424	81.18	-0.93
		10:28	1480	81.11	-1.00
		12:20	1592	81.11	-1.00
		14:22	1714	81.20	-0.91
		16:23	1835	81.23	-0.88
		18:22	1954	81.01	-1.10
		20:17	2069	81.16	-0.95
		22:21	2193	81.08	-1.03

Table D-18. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 9GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
9GL	8/22/90	0:23	2315	81.04	-1.07
		2:23	2435	80.81	-1.30
		4:22	2554	80.94	-1.17
		6:24	2676	81.05	-1.06
		8:20	2792	80.97	-1.14
		10:20	2912	81.00	-1.11
		12:22	3034	81.00	-1.11
		14:23	3155	81.05	-1.06
		16:22	3274	81.24	-0.87
		18:23	3395	81.20	-0.91
		20:06	3498	81.35	-0.76
		22:20	3632	81.21	-0.90
	8/23/90	0:18	3750	81.07	-1.04
		2:18	3870	80.85	-1.26
		4:33	4005	80.94	-1.17
		6:14	4106	81.08	-1.03
		8:17	4229	80.93	-1.18
		9:11	4283	80.94	-1.17

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
9GL	8/23/90	11:07	37	81.48	-0.54
		11:15	45	81.57	-0.63
		11:23	53	81.59	-0.65
		11:33	63	81.62	-0.68
		11:43	73	81.64	-0.70
		11:53	83	81.67	-0.73
		12:03	93	81.70	-0.76
		12:13	103	81.71	-0.77
		12:23	113	81.74	-0.80
		12:33	123	81.75	-0.81
		12:53	143	81.76	-0.82
		13:13	163	81.77	-0.83
		13:33	183	81.79	-0.85
		14:34	244	81.88	-0.94

Table D-19. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 10GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
10GL	8/20/90	8:46		82.46	
		9:54	6	82.40	-0.06
		10:00	12	82.40	-0.06
		10:15	27	82.40	-0.06
		10:25	37	82.40	-0.06
		10:36	48	82.38	-0.08
		10:44	56	82.36	-0.10
		11:04	76	82.34	-0.12
		11:20	92	82.33	-0.13
		11:34	106	82.30	-0.16
		11:48	120	82.27	-0.19
		12:07	139	82.29	-0.17
		12:25	157	82.27	-0.19
		12:45	177	82.25	-0.21
		14:40	292	82.27	-0.19
		15:20	332	82.09	-0.37
		15:45	357	82.09	-0.37
		17:00	432	82.08	-0.38
		18:00	492	82.05	-0.41
		19:00	552	82.18	-0.28
		20:00	612	82.19	-0.27
		21:08	680	82.15	-0.31
		22:03	735	82.00	-0.46
		23:00	792	81.91	-0.55
	8/21/90	0:00	852	81.88	-0.58
		1:01	912	81.83	-0.63
		2:03	975	81.85	-0.61
		3:07	1039	81.81	-0.65
		4:05	1097	81.87	-0.59
		5:04	1156	81.93	-0.53
		6:05	1217	81.97	-0.49
		7:05	1277	81.97	-0.49
		8:06	1338	81.99	-0.47
		9:04	1396	81.80	-0.66
		10:09	1461	81.85	-0.61
		12:00	1572	81.98	-0.48
		14:00	1692	82.00	-0.46
		16:00	1812	81.99	-0.47
		18:00	1932	81.93	-0.53
		20:00	2052	82.02	-0.44
		22:11	2183	81.81	-0.65
	8/22/90	0:05	2297	81.75	-0.71
		2:01	2413	81.73	-0.73
		4:05	2537	81.75	-0.71
		6:05	2657	81.89	-0.57
		7:59	2771	81.82	-0.64
		10:05	2897	81.90	-0.56
		12:01	3013	81.95	-0.51

Table D-19. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 10GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
10GL	8/22/90	14:00	3132	81.94	-0.52
		16:00	3252	81.99	-0.47
		18:00	3372	82.01	-0.45
		20:03	3495	82.18	-0.28
		22:03	3615	81.93	-0.53
	8/23/90	0:02	3734	81.82	-0.64
		2:39	3891	81.81	-0.65
		3:58	3970	81.77	-0.69
		6:03	4095	81.90	-0.56
		7:00	4152	81.79	-0.67
		8:49	4261	81.81	-0.65

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
	8/23/90	10:30	0	81.96	0.00
		10:37	7	81.95	0.01
		10:44	14	81.98	-0.02
		10:52	22	81.95	0.01
		11:01	31	82.03	-0.07
		11:12	42	82.05	-0.09
		11:22	52	82.10	-0.14
		11:31	61	82.09	-0.13
		11:43	73	82.10	-0.14
		12:01	91	82.08	-0.12
		12:12	102	82.13	-0.17
		12:22	112	82.15	-0.19
		12:48	138	82.18	-0.22
		13:12	162	82.19	-0.23
		13:34	184	82.21	-0.25
		13:48	198	82.17	-0.21

Table D-20. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 11GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
11GL	8/20/90	8:46		83.58	
		12:28	160	83.80	0.22
		15:53	365	83.73	0.15
		17:26	458	83.60	0.02
		18:14	506	83.60	0.02
		19:10	562	83.60	0.02
		20:07	613	83.60	0.02
		21:25	697	83.57	-0.01
		22:16	748	83.55	-0.03
		23:14	806	83.48	-0.10
	8/21/90	0:14	866	83.46	-0.12
		1:15	927	83.45	-0.13
		2:16	988	83.43	-0.15
		3:20	1052	83.45	-0.13
		4:19	1111	83.43	-0.15
		5:16	1168	83.50	-0.08
		6:17	1229	83.50	-0.08
		7:16	1288	83.48	-0.10
		8:17	1349	83.50	-0.08
		9:15	1407	83.56	-0.02
		10:26	1478	83.61	0.03
		12:19	1591	83.57	-0.01
		14:19	1711	83.57	-0.01
		16:16	1828	83.55	-0.03
		18:08	1940	83.58	0.00
		20:09	2061	83.51	-0.07
		22:28	2200	83.47	-0.11
	8/22/90	0:18	2310	83.40	-0.18
		2:21	2433	83.35	-0.23
		4:21	2553	83.35	-0.23
		6:19	2671	83.42	-0.16
		8:11	2783	83.48	-0.10
		10:25	2917	83.57	-0.01
		12:23	3035	83.60	0.02
		14:23	3155	83.59	0.01
		16:25	3277	83.60	0.02
		18:12	3384	83.61	0.03
		20:15	3507	83.63	0.05
		22:15	3627	83.54	-0.04
	8/23/90	0:16	3748	83.46	-0.12
		2:51	3903	83.38	-0.20
		4:10	3982	83.37	-0.21
		6:14	4106	83.44	-0.14
		8:05	4217	83.46	-0.12
		9:04	4276	83.48	-0.10

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Table D-20. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 11GL, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
11GL	8/23/90	11:56	86	83.39	0.09
		14:04	214	83.39	0.09

Table D-21. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 11MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
11MI	8/20/90	8:46		84.55	
		15:51	363	84.86	0.31
		17:23	455	84.70	0.15
		18:10	502	84.76	0.21
		19:08	560	84.69	0.14
		20:05	617	84.71	0.16
		21:23	695	84.67	0.12
		22:14	746	84.61	0.06
		23:11	803	84.52	-0.03
	8/21/90	0:11	863	84.46	-0.09
		1:13	925	84.43	-0.12
		2:14	986	84.41	-0.14
		3:18	1050	84.40	-0.15
		4:16	1108	84.44	-0.11
		5:15	1167	84.49	-0.06
		6:15	1227	84.54	-0.01
		7:14	1286	84.51	-0.04
		8:15	1347	84.52	-0.03
		9:13	1405	84.59	0.04
		10:22	1474	84.61	0.06
		12:15	1587	84.63	0.08
		14:16	1708	84.64	0.09
		16:14	1826	84.64	0.09
		18:06	1938	84.60	0.05
		20:07	2059	84.56	0.01
		22:25	2197	84.44	-0.11
	8/22/90	0:15	2307	84.35	-0.20
		2:18	2430	84.38	-0.17
		4:18	2550	84.27	-0.28
		6:17	2669	84.43	-0.12
		8:09	2781	84.51	-0.04
		10:22	2914	84.64	0.09
		12:22	3034	84.72	0.17
		14:20	3152	84.72	0.17
		16:22	3274	84.76	0.21
		18:10	3382	84.77	0.22
		20:12	3504	84.79	0.24
		22:13	3625	84.67	0.12
	8/23/90	0:14	3746	84.52	-0.03
		2:50	3902	84.38	-0.17
		4:08	3980	84.35	-0.20
		6:12	4104	84.48	-0.07
		8:03	4215	84.52	-0.03
		9:02	4274	84.54	-0.01

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Table D-21. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 11MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
11MI	8/23/90	11:54	84	84.30	0.24
		14:05	215	84.31	0.23

Table D-22. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 12MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
12MI	8/20/90	9:10:00		89.86	
		9:54:00	6.00	91.91	2.05
		9:54:15	6.25	92.30	2.44
		9:54:30	6.50	92.42	2.56
		9:54:45	6.75	92.51	2.65
		9:55:00	7.00	92.58	2.72
		9:55:30	7.50	92.65	2.79
		9:56:00	8.00	92.71	2.85
		9:56:30	8.50	92.73	2.87
		9:57:00	9.00	92.77	2.91
		9:57:30	9.50	92.80	2.94
		9:58:00	10.00	92.82	2.96
		9:58:30	10.50	92.83	2.97
		9:59:00	11.00	92.84	2.98
		9:59:30	11.50	92.87	3.01
		10:00:00	12.00	92.89	3.03
		10:01:00	13.00	92.89	3.03
		10:02:00	14.00	92.90	3.04
		10:03:00	15.00	92.91	3.05
		10:04:00	16.00	92.93	3.07
		10:05:00	17.00	92.93	3.07
		10:06:00	18.00	92.94	3.08
		10:07:00	19.00	92.95	3.09
		10:09:00	21.00	92.98	3.12
		10:10:00	22.00	92.98	3.12
		10:12:00	24.00	92.97	3.11
		10:14:00	26.00	92.97	3.11
		10:16:00	28.00	93.00	3.14
		10:18:00	30.00	93.00	3.14
		10:20:00	32.00	93.00	3.14
		10:22:00	34.00	93.00	3.14
		10:24:00	36.00	93.00	3.14
		10:26:00	38.00	93.01	3.15
		10:28:00	40.00	92.93	3.07
		10:30:00	42.00	92.93	3.07
		10:32:00	44.00	92.94	3.08
		10:34:00	46.00	92.95	3.09
		10:36:00	48.00	92.95	3.09
		10:38:00	50.00	92.95	3.09
		10:40:00	52.00	92.93	3.07
		10:45:00	57.00	92.92	3.06
		10:50:00	62.00	92.87	3.01
		10:55:00	67.00	92.87	3.01
		11:00:00	72.00	92.84	2.98
		11:10:00	82.00	92.84	2.98
		11:20:00	92.00	92.84	2.98
		11:30:00	102.00	92.82	2.96
		11:40:00	112.00	92.82	2.96
		11:50:00	122.00	92.82	2.96
		12:00:00	132.00	92.81	2.95

Table D-22. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 12MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
12MI	8/20/90	12:20:00	152.00	92.81	2.95
		12:40:00	172.00	92.80	2.94
		13:00:00	192.00	92.81	2.95
		13:30:00	222.00	92.99	3.13
		14:00:00	252.00	92.99	3.13
		14:30:00	282.00	92.98	3.12
		15:00:00	312.00	92.95	3.09
		15:30:00	342.00	92.93	3.07
		16:00:00	372.00	92.90	3.04
		17:55:00	487.00	92.96	3.10
		18:40:00	532.00	92.91	3.05
		19:40:00	592.00	92.98	3.12
		20:42:00	654.00	92.91	3.05
		21:54:00	726.00	92.80	2.94
		23:01:00	793.00	92.73	2.87
	8/21/90	0:01:00	853.00	92.65	2.79
		1:07:00	919.00	92.72	2.86
		2:09:00	981.00	92.81	2.95
		3:25:00	1057.00	92.47	2.61
		4:25:00	1117.00	92.50	2.64
		5:44:00	1196.00	92.57	2.71
		6:44:00	1256.00	92.59	2.73
		8:04:00	1336.00	92.57	2.71
		9:43:00	1435.00	92.08	2.22
		10:39:00	1491.00	92.05	2.19
		12:32:00	1604.00	92.92	3.06
		14:32:00	1724.00	92.81	2.95
		16:33:00	1845.00	92.79	2.93
		18:32:00	1964.00	92.67	2.81
		20:26:00	2078.00	92.69	2.83
		20:33:00	2205.00	92.50	2.64
	8/22/90	0:30:00	2322.00	92.38	2.52
		2:30:00	2442.00	92.38	2.52
		4:32:00	2564.00	92.44	2.58
		6:35:00	2687.00	92.56	2.70
		8:29:00	2801.00	92.63	2.77
		10:29:00	2921.00	92.79	2.93
		12:31:00	3043.00	92.93	3.07
		14:32:00	3164.00	92.93	3.07
		16:30:00	3282.00	92.94	3.08
		18:32:00	3404.00	92.92	3.06
		20:14:00	3506.00	92.96	3.10
		22:30:00	3642.00	92.69	2.83
	8/23/90	0:26:00	3758.00	92.63	2.77
		2:24:00	3876.00	92.89	3.03
		4:45:00	4017.00	92.64	2.78
		6:22:00	4114.00	92.66	2.80
		8:25:00	4237.00	92.81	2.95
		9:18:00	4290.00	92.68	2.82

End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Table D-22. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 12MI, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
12MI	8/23/90	10:30:00		92.63	0.00
		10:30:15	0.25	92.61	0.02
		10:30:30	0.50	92.36	0.27
		10:30:45	0.75	92.00	0.63
		10:31:00	1.00	91.68	0.95
		10:31:30	1.50	91.45	1.18
		10:32:00	2.00	91.27	1.36
		10:32:30	2.50	91.09	1.54
		10:33:00	3.00	90.96	1.67
		10:33:30	3.50	90.74	1.89
		10:34:00	4.00	90.61	2.02
		10:34:30	4.50	90.49	2.14
		10:35:00	5.00	90.37	2.26
		10:35:30	5.50	90.27	2.36
		10:36:00	6.00	90.17	2.46
		10:37:00	7.00	89.97	2.66
		10:38:00	8.00	89.83	2.80
		10:39:00	9.00	89.75	2.88
		10:40:00	10.00	89.66	2.97
		10:42:00	12.00	89.61	3.02
		10:44:00	14.00	89.56	3.07
		10:46:00	16.00	89.51	3.12
		10:48:00	18.00	89.48	3.15
		10:50:00	20.00	89.45	3.18
		10:52:00	22.00	89.44	3.19
		10:54:00	24.00	89.42	3.21
		10:56:00	26.00	89.41	3.22
		10:58:00	28.00	89.41	3.22
		11:00:00	30.00	89.40	3.23
		11:05:00	35.00	89.40	3.23
		11:10:00	40.00	89.39	3.24
		11:15:00	45.00	89.39	3.24
		11:20:00	50.00	89.38	3.25
		11:25:00	55.00	89.38	3.25
		11:30:00	60.00	89.39	3.24
		11:40:00	70.00	89.39	3.24
		11:50:00	80.00	89.40	3.23
		12:00:00	90.00	89.40	3.23
		12:10:00	100.00	89.41	3.22
		12:20:00	110.00	89.42	3.21
		12:30:00	120.00	89.41	3.22
		12:50:00	140.00	89.43	3.20
		13:10:00	160.00	89.44	3.19
		13:30:00	180.00	89.44	3.19
		15:23:00	293.00	89.60	3.03

Table D-23. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 12ML, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
12ML	8/20/90	9:11		90.45	
		10:11	23	90.85	0.40
		10:21	33	91.00	0.55
		10:30	42	91.01	0.56
		10:40	52	90.99	0.54
		10:54	66	90.75	0.30
		11:10	82	90.74	0.29
		11:28	100	90.96	0.51
		11:40	112	90.97	0.52
		12:00	132	90.94	0.49
		12:18	150	90.94	0.49
		12:38	170	90.93	0.48
		14:38	290	90.70	0.25
		15:16	328	90.76	0.31
		15:40	352	90.75	0.30
		17:58	490	90.77	0.32
		18:43	535	90.69	0.24
		19:43	595	90.69	0.24
		20:44	656	90.63	0.18
		21:57	729	90.42	-0.03
		23:05	797	90.33	-0.12
	8/21/90	0:05	857	90.28	-0.17
		1:10	922	90.24	-0.21
		2:12	984	90.25	-0.20
		3:28	1060	90.20	-0.25
		4:30	1122	90.29	-0.16
		5:45	1197	90.45	0.00
		6:50	1262	90.48	0.03
		8:10	1342	90.54	0.09
		9:48	1440	90.51	0.06
		10:41	1493	90.47	0.02
		12:35	1607	90.81	0.36
		14:35	1727	90.69	0.24
		16:35	1847	90.68	0.23
		18:34	1966	90.52	0.07
		20:28	2080	90.49	0.04
		22:35	2207	90.21	-0.24
	8/22/90	0:33	2325	90.13	-0.32
		2:34	2446	90.08	-0.37
		4:38	2570	90.18	-0.27
		6:37	2689	90.36	-0.09
		8:32	2804	90.57	0.12
		10:31	2923	90.71	0.26

Table D-23. Constant-Rate (Pumping) Test Data and Recovery Test Data for Well 12ML, August 20, 1990 through August 23, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Drawdown, in feet
12ML	8/22/90	12:33	3045	90.76	0.31
		14:34	3166	90.75	0.30
		16:33	3285	90.82	0.37
		18:35	3407	90.85	0.40
		20:16	3508	90.74	0.29
		22:32	3644	90.42	-0.03
	8/23/90	0:28	3760	90.28	-0.17
		2:26	3878	90.34	-0.11
		4:49	4021	90.31	-0.14
		6:24	4116	90.43	-0.02
		8:29	4241	90.64	0.19
		9:22	4294	90.59	0.14

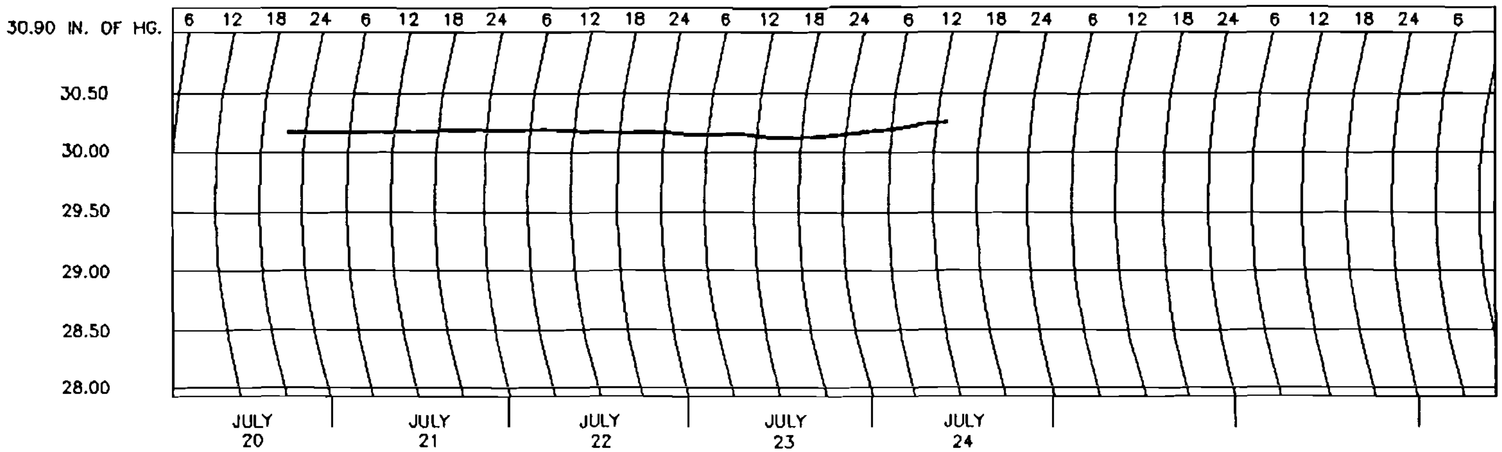
End of Pumping Test/Start of Recovery Test at 10:30 am on August 23, 1990

Well Number	Date	Time	Time, in minutes from start of test	Depth to Water, in feet	Recovery, in feet
12ML	8/23/90	10:32	2	90.59	0.00
		10:40	10	90.00	0.59
		10:48	18	90.00	0.59
		10:56	26	90.07	0.52
		11:06	36	90.07	0.52
		11:16	46	90.11	0.48
		11:27	57	90.12	0.47
		11:36	66	90.12	0.47
		11:48	78	90.14	0.45
		12:07	97	90.16	0.43
		12:17	107	90.19	0.40
		12:28	118	90.17	0.42
		12:53	143	90.20	0.39
		13:30	180	90.23	0.36
		15:21	291	90.23	0.36

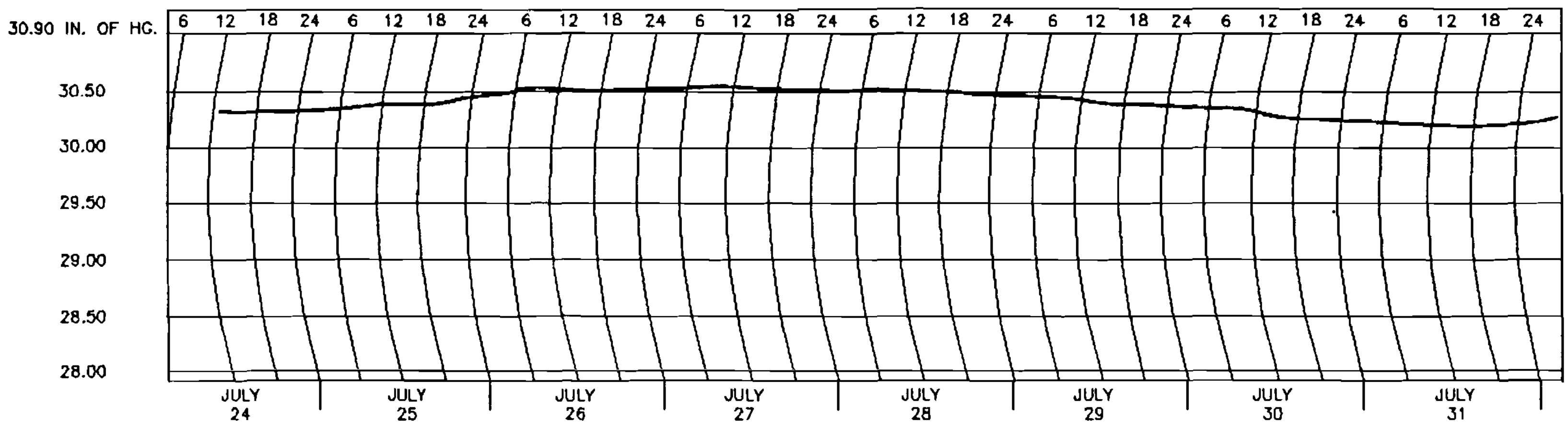
APPENDIX E

Barometric Pressure from July 20, 1990 through September 6, 1990, Unisys Corporation Great Neck Facility, Great Neck, New York.

BAROMETRIC PRESSURE AT THE UNISYS CORPORATION GREAT NECK FACILITY,
GREAT NECK, NEW YORK



BAROMETRIC PRESSURE AT THE UNISYS CORPORATION GREAT NECK FACILITY,
GREAT NECK, NEW YORK



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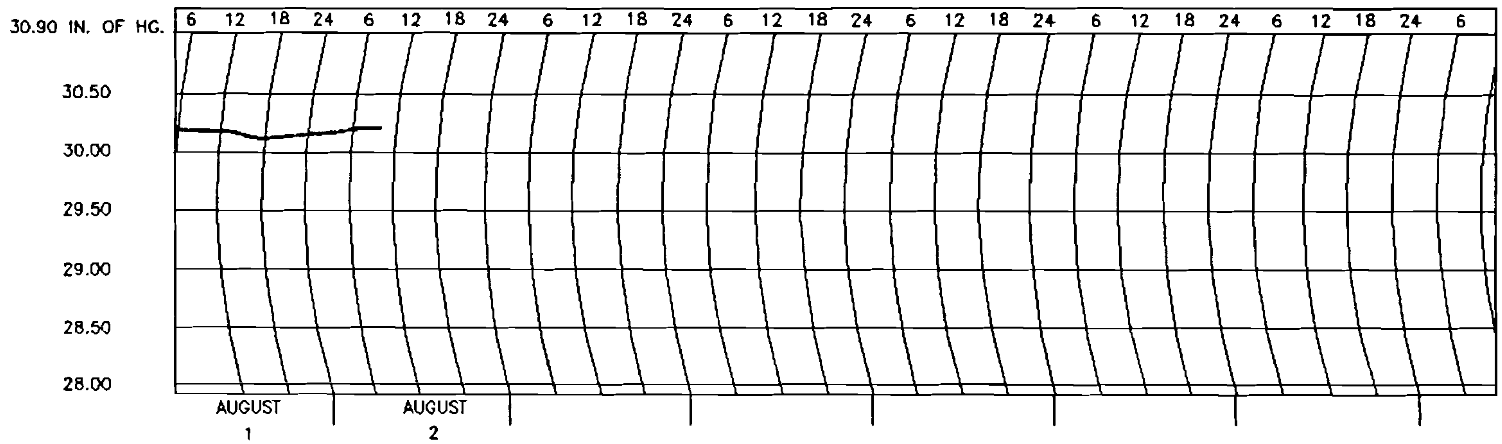
GREAT NECK, NEW YORK



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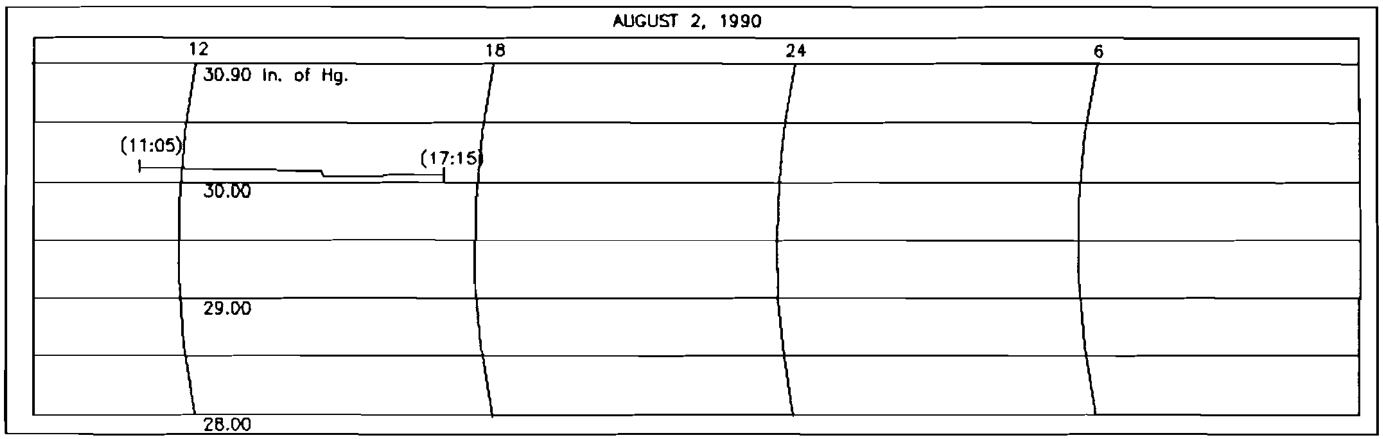
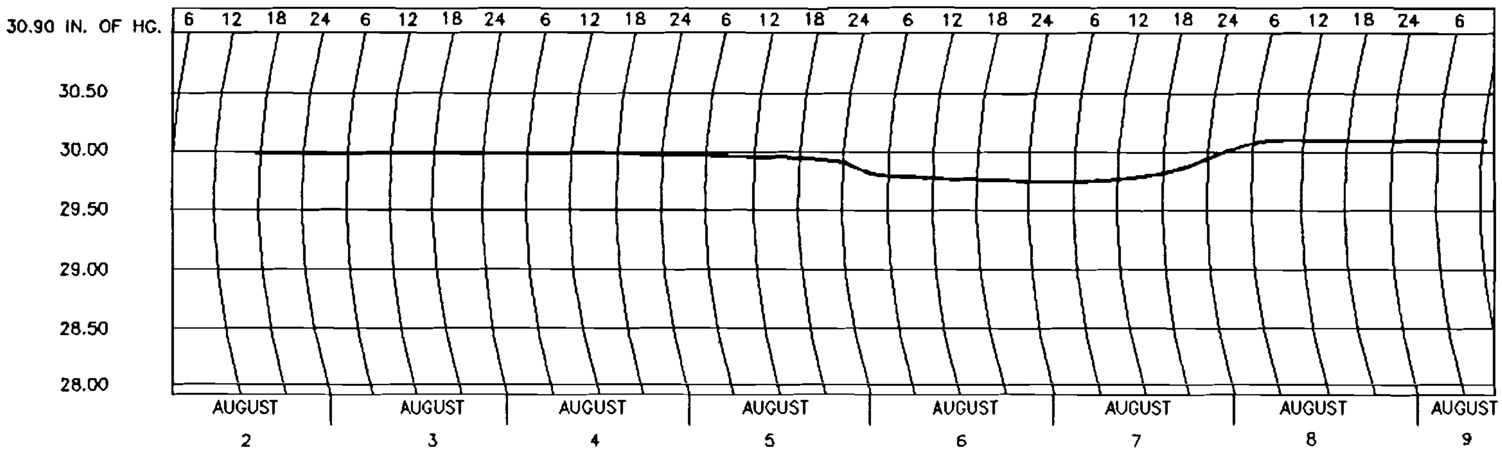
GREAT NECK, NEW YORK



BAROMETRIC PRESSURE AT THE UNISYS CORPORATION GREAT NECK FACILITY,
GREAT NECK, NEW YORK



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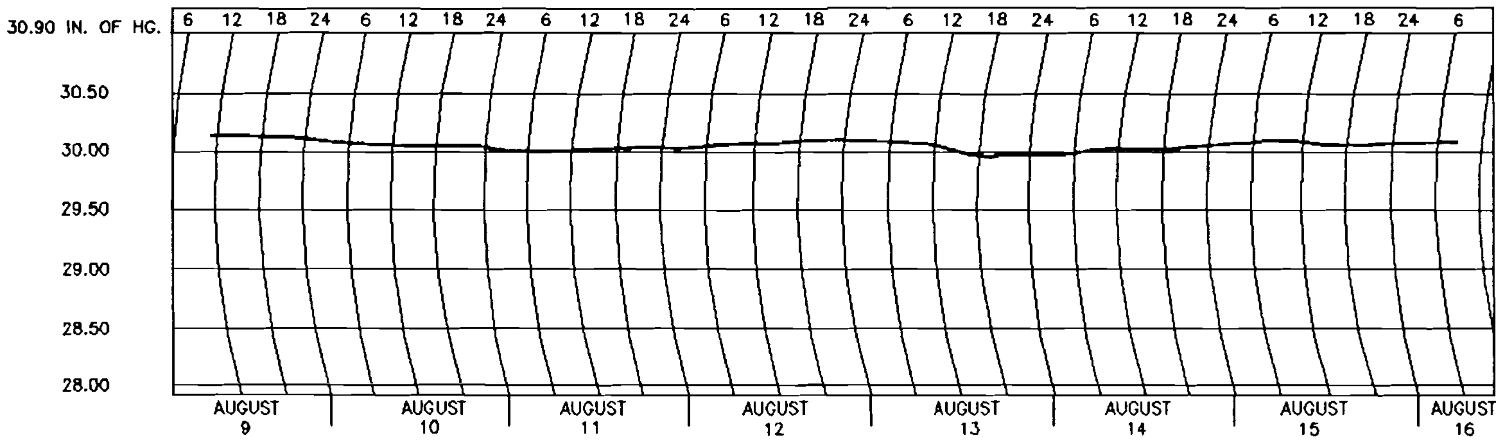
GREAT NECK, NEW YORK



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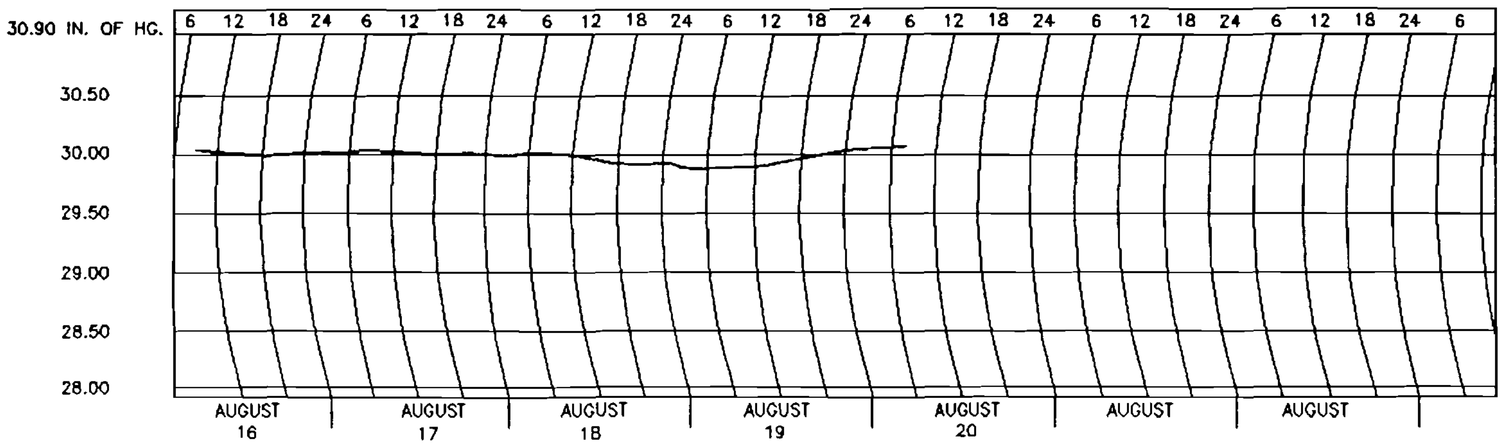
GREAT NECK, NEW YORK



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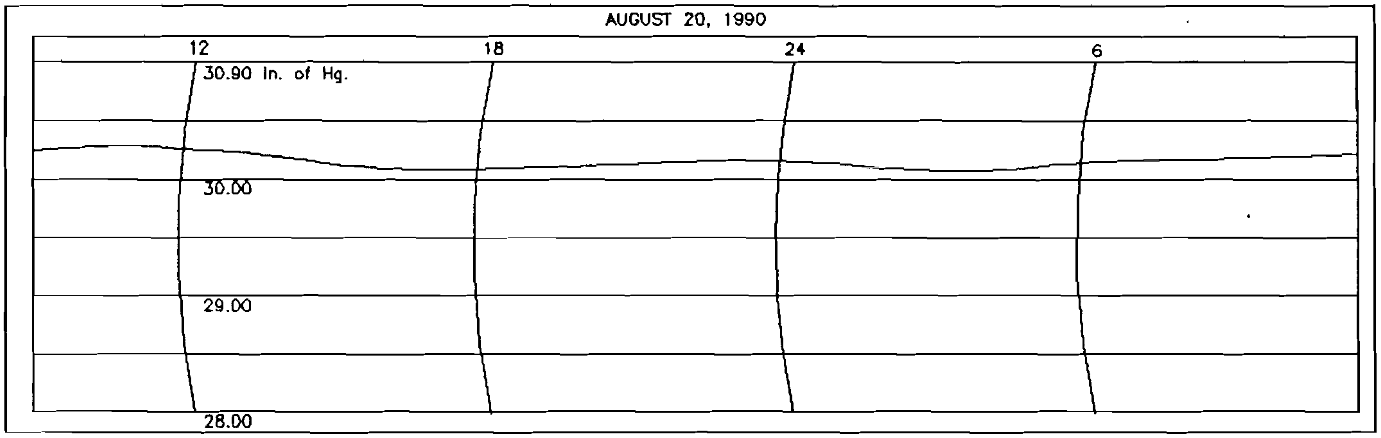
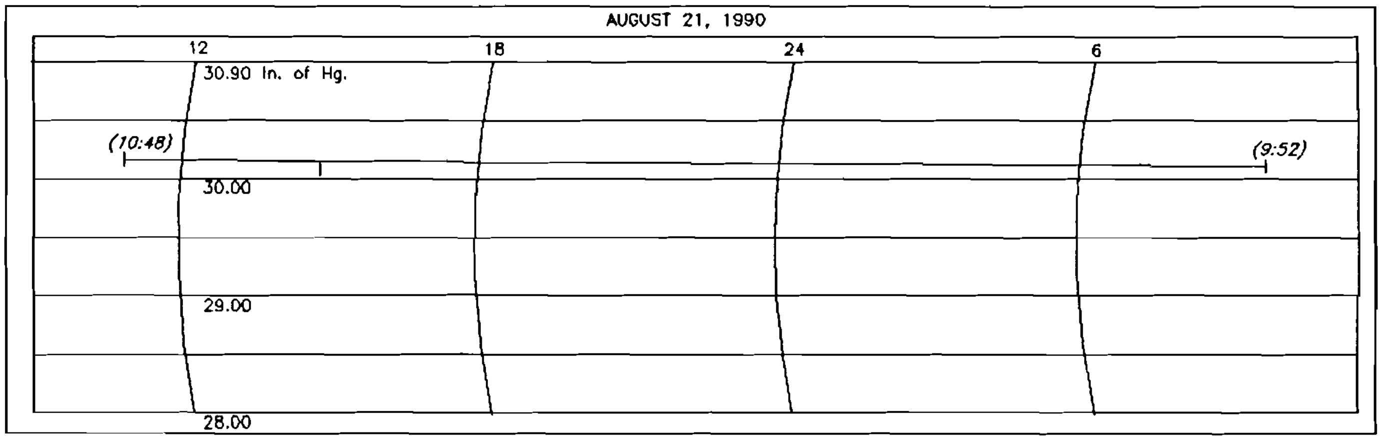
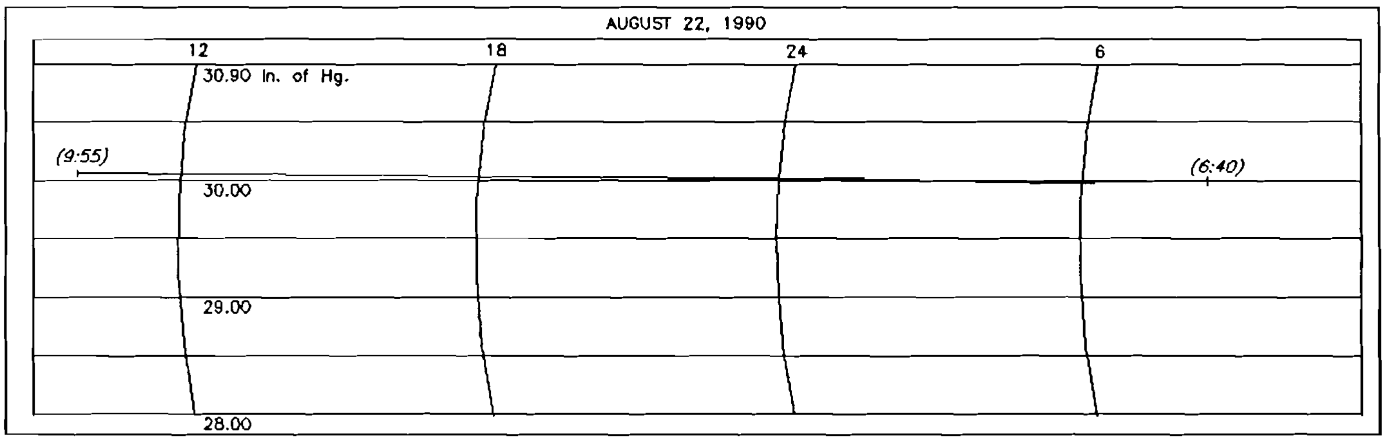
GREAT NECK, NEW YORK



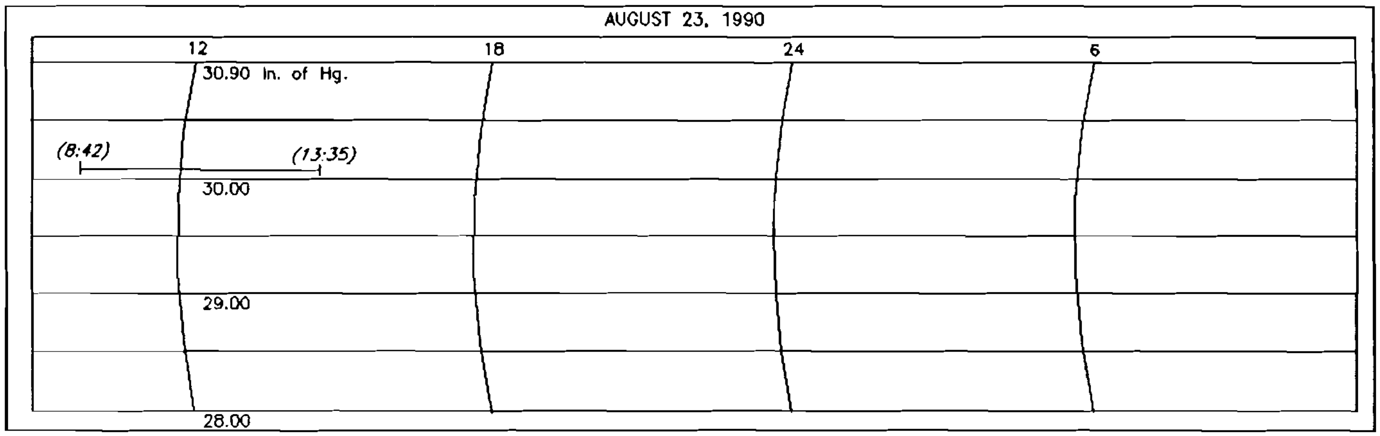
BAROMETRIC PRESSURE AT THE UNISYS CORPORATION GREAT NECK FACILITY,
GREAT NECK, NEW YORK



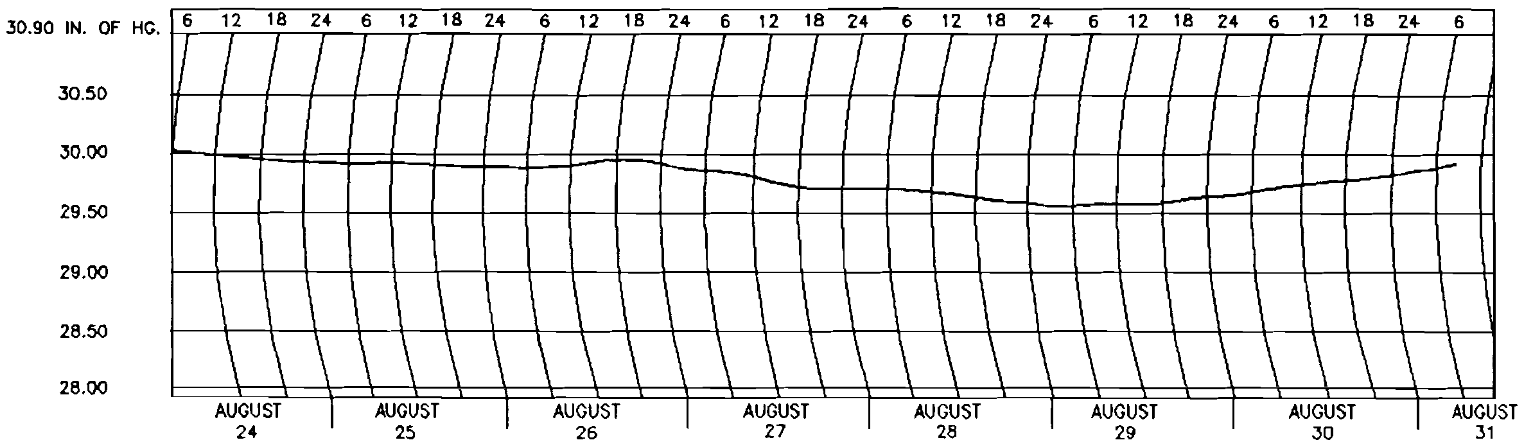
BAROMETRIC PRESSURE AT THE UNISYS CORPORATION GREAT NECK FACILITY,
GREAT NECK, NEW YORK



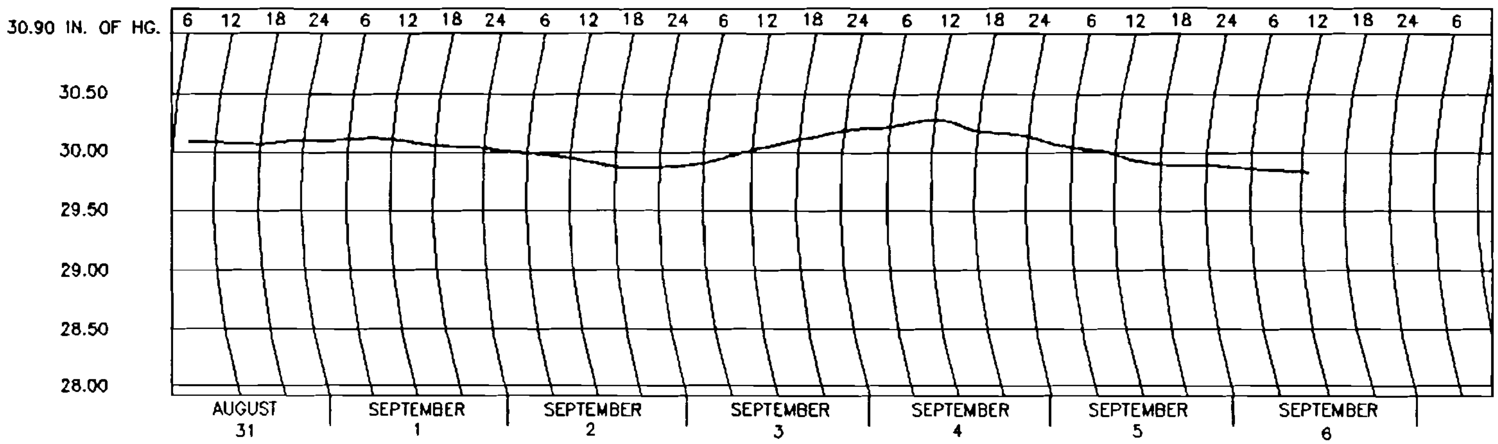
BAROMETRIC PRESSURE AT THE UNISYS CORPORATION GREAT NECK FACILITY,
GREAT NECK, NEW YORK



BAROMETRIC PRESSURE AT THE UNISYS CORPORATION GREAT NECK FACILITY,
GREAT NECK, NEW YORK



BAROMETRIC PRESSURE AT THE UNISYS CORPORATION GREAT NECK FACILITY,
GREAT NECK, NEW YORK



APPENDIX F

Borehole Core, Geologic and Well Construction Logs,
Unisys Corporation Great Neck Facility, Great Neck, New York.

WELL DESIGNATION CROSS REFERENCE CHART	
Geraghty and Miller, Inc. Well Designations	Unisys Corporation Well Designations
GM-1S	1GU
GM-1D	1GL
GM-1M	1MI
GM-1MD	1MI/L
-----	1ML
GM-2	2GL
GM-2M	2MI
GM-3	3GL
GM-4	4GL
GM-4M	4MI
GM-5	5GL
GM-5M	5MI
GM-6	6GL
GM-7	7GL
GM-8S	8GU
GM-8	8GL
GM-9	9GL
GM-10	10GL
GM-11	11GL
GM-11M	11MI
-----	12MI
-----	12ML

----- Not installed by Gergahty and Miller, Inc.

GERAGHTY & MILLER, INC.

SAMPLE/CORE LOG

BORING/WELL: GM-1M PROJECT NO: NY1230GN10 PAGE: 1 of 2

SITE LOCATION: UNISYS Great Neck, NY DRILLING STARTED: 3/29/89 DRILLING COMPLETED: 4-6-89

TOTAL DEPTH DRILLED: 240 HOLE DIAMETER: 6 TYPE OF SAMPLE/ CORING DEVICE: Split Spoon

LENGTH & DIAMETER OF CORING DEVICE: 2 FT x 2 IN. SAMPLING INTERVAL: 20 FT

LAND-SURFACE ELEVATION: ( ) SURVEYED ( ) ESTIMATED DATUM: Land Surface

DRILLING FLUID USED: Bentonite Slurry DRILLING METHOD: Mud Rotary

DRILLING CONTRACTOR: Environmental Drilling, Inc. DRILLER: Scott HELPER: Kevin

PREPARED BY: R. Eby HAMMER WEIGHT: 140 lbs HAMMER DROP: 30 inches

SAMPLE DEPTH (FT BELOW LAND SURFACE)		CORE RECVRY (FT)	BLOW COUNTS PER 6 INCHES	SAMPLE/CORE DESCRIPTION
FROM	TO			
20	22	.5	10/38/47	Sandy gravel; gravel (80%) fine to coarse subrounded to
			50/2	subangular; sand (20%) very fine to very coarse; trace
				silt, dark brown, very poorly sorted (till), cobbles.
40	41	-	50/3	No recovery, bounced on cobbles (gravelly sand &
				cobbles).
60	61	-	50/0	No recovery, bounc~~ing~~ed on cobble (gravelly sand &
				cobbles).
80	82	1.0	6/54/46/	Gravelly sand; sand (90%) mostly fine to medium, some
			39	coarse, brown; gravel (10%) fine to medium, subangular
				to subrounded; poorly sorted, cobbles.
100	101	.3	32-50/3	Gravelly sand; sand (70%) fine to very coarse, brown;
				gravel (30%) fine to medium, subrounded to subangular,
				poorly sorted.
120	121.5	1.0	37/49/	Sand (100%), fine, tan to light brown, very well sorted
			50/4	(Magothy?).
140	141	.5	57-50/3	Sand (100%), medium to fine, tan to light brown; traces
				white clay, well sorted.
160	161	.5	72-50/3	Gravelly sand; sand (90%), very fine to very coarse, tan
				to light borwn, trace of silt; gravel (10%), fine,
				subangular to subrounded, quartz; poorly sorted.
180	181	.5	100/5	Sand (100%), fine to medium, light brown/orange,
				slightly silty, very well sorted.
200	201	.5	100/5	Sand (100%), fine to medium, light whitish gray, some-

GERAGHTY & MILLER, INC.

SAMPLE/CORE LOG (Cont.d)

BORING/WELL: GM-1M PREPARED BY: R. Eby PAGE: 2 of 2

SAMPLE DEPTH (FT BELOW LAND SURFACE) FROM	TO	CORE RECVRY (FT)	BLOW COUNTS PER 6 INCHES	SAMPLE/CORE DESCRIPTION
				what silty.
220	221.5	-	23~~-~~32-	Sandy silt (100%), sand, fine to very fine whitish gray,
			50/4	soft plastic, very poor recovery.
240	241	.5	75-50/2	Sand (100%), light gray to tan~~k~~, medium to very fine,
				silty.

GERAGHTY & MILLER, INC.

SAMPLE/CORE LOG

BORING/WELL: GM-1MD PROJECT NO: NY1230GN10 PAGE: 1 of 1

SITE LOCATION: UNISYS Great Neck, NY DRILLING STARTED: 5/5/89 DRILLING COMPLETED: 5/12/89

TOTAL DEPTH DRILLED: 340 FT HOLE DIAMETER: 6 IN. TYPE OF SAMPLE/ CORING DEVICE: Split Spoon

LENGTH & DIAMETER OF CORING DEVICE: 2 FT x 2 IN. SAMPLING INTERVAL: 20 FT

LAND-SURFACE ELEVATION: ( ) SURVEYED ( ) ESTIMATED DATUM: Land Surface

DRILLING FLUID USED: Bentonite Slurry DRILLING METHOD: Mud Rotary

DRILLING CONTRACTOR: Environmental Drilling, Inc. DRILLER: Scott HELPER: Kevin

PREPARED BY: R. Eby HAMMER WEIGHT: 140 lbs HAMMER DROP: 30 inches

SAMPLE DEPTH (FT BELOW LAND SURFACE)		CORE RECVRY (FT)	BLOW COUNTS PER 6 INCHES	SAMPLE/CORE DESCRIPTION
FROM	TO			
0	240			See Sample/Core Log for Well GM-1M.
260	261	1.0	82-100/5	Sand (95%) fine to medium, some very fine, whitish gray;
				Silt (5%) tan/orange, occurs in thin layers mixed with
				sand.
280	281	.5	96-100/2	Sand (100%) fine to very fine, slightly silty, whitish
				gray with streaks of tan.
300	301	.5	57-100/3	Sand (100%) fine to very fine, silty, whitish gray with
				streaks of tan.
320	321	.5	65-100/4	Same.
340	341	.5	100/5	Sand (100%) medium with some coarse and some very
				fine, tan to light orange, clean.

R.A. Wozniak 7/12/90 (w/o Lynch)

Date 6/26/90 Day Tues Start Time 7:00 Finish Time 5:30

EDI Job. No. D-851

Rig No. 80-90

Driller T. Lynch

Helper B. Phillips

EDI
ENVIRONMENTAL DRILLING, INC.

Daily Drill Log

☐ Boring ☒ Well # 1ML

Client: Unisys

Job Name and Address: Unisys, Lake Success, L.I., N.Y.

No. of wells/borings installed today: 0

Total footage drilled today: 150'

Dia. of borehole(s): 8"

Depth of borehole(s): 150'

S.S. samples on ______ ctrs. Extra samples: ______

Type, dia., length of casing(s): ______

Length, slot of screen(s): ______

Drilling method:

☐ HSA ☒ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: ______ Well yield: ______

Today: ☐ MOB ☐ DEMOB ☒ Continue

Drill hours reg.: 8 O.T. 2 1/2

Travel hours: ______ St. by hours: ______

Man hours reg.: ______ O.T. ______

Comments/delays - explain: Started drilling hole (waited for water from (7:00-8:30)

Thomas Lynch
Driller

______
Verified Contractor

SOIL LOG

Depth	Formation
Well	
0'-22'	Sand, cobbles
22'-100'	coarse sand & gravel
100'-150'	Sand.

MATERIALS USED

Quantity	Description

R.A. Wojcik

Date 6/27/90 Day Wed Start Time 7:00 Finish Time 5:30

EDI Job. No. D-Y-851

Rig No. 80-90
Driller T Lynch
Helper B Phillips

EDI
ENVIRONMENTAL DRILLING, INC.

Daily Drill Log

☐ Boring ☒ Well # W#1ML

Client: Daisys

Job Name and Address: Daisys, Lake Success, L.I., N.Y.

No. of wells/borings installed today: 0

Total footage drilled today: 192'

Dia. of borehole(s): 8"

Depth of borehole(s): 342'

S.S. samples on ____ ctrs. Extra samples: ____

Type, dia., length of casing(s): ____

Length, slot of screen(s): ____

Drilling method:

☐ HSA ☒ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: ____ Well yield: ____

Today: ☐ MOB ☐ DEMOB ☒ Continue

Drill hours reg.: 8 O.T. 2

Travel hours: ____ St. by hours: ____

Man hours reg.: ____ O.T. ____

Comments/delays - explain: ____

Driller

Verified Contractor

SOIL LOG

Depth	Formation
W#1ML	
150-342	Sand with lenses of
	clay

MATERIALS USED

Quantity	Description

R. A. Wojciak

Date 6/28/90 Day Thur Start Time 7:00 Finish Time 8:30

EDI Job. No. NY851

Rig No. 80-90

Driller T Lynch

Helper B Phillips

EDI
ENVIRONMENTAL DRILLING, INC.

Daily Drill Log

☐ Boring ☒ Well # 1ML

Client: Unisys

Job Name and Address: Unisys, Lake Success, L.I., N.Y.

No. of wells/borings installed today: 0

Total footage drilled today: 63'

Dia. of borehole(s): 8"

Depth of borehole(s): 405'

S.S. samples on 3 ctrs. Extra samples:

Type, dia., length of casing(s):

Length, slot of screen(s):

Drilling method:

☐ HSA ☒ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: Well yield:

Today: ☐ MOB ☐ DEMOB ☒ Continue

Drill hours reg.: 8 O.T. 5 1/2

Travel hours: St. by hours:

Man hours reg.: O.T.

Comments/delays - explain: Pulled drill pipe change bit to sample. 1st sample 2 hrs 2nd + 3rd samples 1 1/2 hrs each.

Thomas Lynch
Driller

Verified Contractor

SOIL LOG

Depth	Formation
w# 1ML	
350'-396'	coarse sand + gravel with lenses of clay
396-405'	clay

MATERIALS USED

Quantity	Description

GERAGHTY & MILLER, INC.

SAMPLE/CORE LOG

BORING/WELL: GM-2M PROJECT NO: NY1230GN10 PAGE: 1 of 2

SITE LOCATION: UNISYS Great Neck, NY DRILLING STARTED: 2/27/89 DRILLING COMPLETED: 3/9/89

TOTAL DEPTH DRILLED: 240 HOLE DIAMETER: 6 TYPE OF SAMPLE/ CORING DEVICE: Split Spoon

LENGTH & DIAMETER OF CORING DEVICE: 2 FT x 2 IN. SAMPLING INTERVAL: 20 FT

LAND-SURFACE ELEVATION: ( ) SURVEYED ( ) ESTIMATED DATUM: Land Surface

DRILLING FLUID USED: Bentonite Slurry DRILLING METHOD: Mud Rotary

DRILLING CONTRACTOR: Environmental Drilling, Inc. DRILLER: Scott HELPER: Jim

PREPARED BY: R. Eby HAMMER WEIGHT: 140 lbs HAMMER DROP: 30 inches

SAMPLE DEPTH (FT BELOW LAND SURFACE) FROM	TO	CORE RECVRY (FT)	BLOW COUNTS PER 6 INCHES	SAMPLE/CORE DESCRIPTION
20	22	1.0	4-10-28-	Sand, fine to medium with some coarse, light brown, sub-
			25	rounded, clean, trace of fine gravel.
40	42	1.0	15-27-	Sand (90%), fine to medium, dark brown, gravel (10%),
			34-47	fine to medium; trace of coarse sand and silt, bottom
				2 inches clean, white medium sand with gravel.
60	62	-	11-15-	No recovery, wash.
			50/2	
80	82	.5	1-3-3-5	Sand (95%), medium to coarse, some fine, orange/tan to
				light brown; gravel (5%), fine, subangular, poorly
100	102	—	—	sorted. NO SAMPLE COULD NOT WASH HOLE CLEAN.
120	122	1.0	33-29-	Sand (90%), fine to very coarse; gravel (10%), fine,
			45-50/5	subrounded, tan to orange, poorly sorted, trace of
				silt.
140	142	1.0	14-40-	Same. Upper Glacial; less gravel <5%).
			50-50/5	
160	162	.1	21-32-	Sand (60%), fine to coarse; gravel (40%), fine, sub-
			50/3	rounded to subangular; light gray to tan. (Poor
				sample, mostly wash).
180	182	.5	42-81-	Sand (70%), fine to very coarse, slightly silty, orange/
			100/5	light brown; gravel (30%), fine to medium, subrounded,
				very poorly sorted. ~~Upper Glacial.~~
202	204	.5	17-50-	Same. Sand (~85%); gravel (15%).
			100/5	

GERAGHTY & MILLER, INC.

SAMPLE/CORE LOG (Cont.d)

BORING/WELL: GM-2M PREPARED BY: R. Eby PAGE: 2 of 2

SAMPLE DEPTH (FT BELOW LAND SURFACE) FROM	TO	CORE RECVRY (FT)	BLOW COUNTS PER 6 INCHES	SAMPLE/CORE DESCRIPTION
220	222	.3	15/48-	Same. Higher amount of medium sand.
			100/3	
240	242	.3	15/11/	Same, dark brown, silty.
			66-100/1	Same, dark brown, silty.

GERAGHTY & MILLER, INC.

SAMPLE/CORE LOG

BORING/WELL: GM-4M PROJECT NO: NY1230GN10 PAGE: 1 of 2

SITE LOCATION: UNISYS Great Neck, NY DRILLING STARTED: 3/14/89 DRILLING COMPLETED: 3/22/89

TOTAL DEPTH DRILLED: 240 HOLE DIAMETER: 6 TYPE OF SAMPLE/ CORING DEVICE: Split Spoon

LENGTH & DIAMETER OF CORING DEVICE: 2 FT x 2 IN. SAMPLING INTERVAL: 20 FT

LAND-SURFACE ELEVATION: ( ) SURVEYED ( ) ESTIMATED DATUM: Land Surface

DRILLING FLUID USED: Bentonite Slurry DRILLING METHOD: Mud Rotary

DRILLING CONTRACTOR: Environmental Drilling, Inc. DRILLER: Scott HELPER: Kevin

PREPARED BY: R. Eby HAMMER WEIGHT: 140 lbs HAMMER DROP: 30 inches

SAMPLE DEPTH (FT BELOW LAND SURFACE)		CORE RECVRY (FT)	BLOW COUNTS PER 6 INCHES	SAMPLE/CORE DESCRIPTION
FROM	TO			
20	22	.5	3/26-	Gravelly sand; sand (80%), fine to very coarse, silty,
			50/4	light brown; gravel (20%), fine to coarse, subangular
				to subrounded, poorly sorted; cobbles.
40	41	.5	24-50/5	~~Bouncing on cobble;~~ Sand (90%), mostly medium, some fine
				and coarse to very coarse, slightly silty, light
				brown; gravel (10%), fine to medium, subangular to
				subrounded, cobbles, spoon bounc~~ing at end~~ed on cobble.
60	62	-	9/8/9/13	No sample, only wash.
80	82	-	—	No sample, too much wash in hose.
100	102	.75	16/36/	Silty sand (100%), fine to very fine, tan/orange,
			60-50/3	mottled ~~with~~ layer of light and dark gray clayey silt.
120	122	.2	20/25/	Sand (100%), very fine, light gray to white, occassional
			50/5	orange stains, slightly silty (Magothy).
140	141	.1	24-50/3	Sand (100%), very fine to medium, trace of silt, tan to
				light gray.
160	161.5	1.0	23/44-	Sand (90%), fine to very fine, silty, whitish to light
			50/4	light gray with tan/orange mottling; clay (10%), gray,
				dense, plastic, cohesive, occurs in very thin layers
				(up to 1" thick).
180	181.5	1.0	23/24-	Sand (50%), very fine to medium, silty, light gray with
			50/5	with tan/orange mottling; clay (50%), dense, plastic,
				moist, cohesive, gray. Clay in layers (~~[illegible]~~ millimeter
				to several inches thick).

GERAGHTY & MILLER, INC.

SAMPLE/CORE LOG (Cont.d)

BORING/WELL: GM-4M PREPARED BY: R. Eby PAGE: 2 of 2

SAMPLE DEPTH (FT BELOW LAND SURFACE) FROM	TO	CORE RECVRY (FT)	BLOW COUNTS PER 6 INCHES	SAMPLE/CORE DESCRIPTION
200	201	.5	69-100/5	Sand (75%), fine to very fine, light gray to tan ~~color~~,
				clean; clay (25%), light gray, dense, hard, in layer
				approximately 2" thick.
220	221.5	1.0	33-40-	Sand (75%), fine to very fine, silty, light gray to
			50/5	yellow; clayey silt (25%), light gray mottled with
				red. ~~(thin layers).~~
240	241	.5	100/5	Sand (100%), medium to very fine, trace silt, light gray
				to tan.

GERAGHTY & MILLER, INC.

SAMPLE/CORE LOG

BORING/WELL: GM-5M PROJECT NO: NY1230GN10 PAGE: 1 of 1

SITE LOCATION: UNISYS Great Neck, NY DRILLING STARTED: 1/30/89 DRILLING COMPLETED: 2/7/89

TOTAL DEPTH DRILLED: 250 HOLE DIAMETER: 4 TYPE OF SAMPLE/ CORING DEVICE: Split Spoon

LENGTH & DIAMETER OF CORING DEVICE: 2 FT x 2 IN. SAMPLING INTERVAL: 20 FT

LAND-SURFACE ELEVATION: ( ) SURVEYED ( ) ESTIMATED DATUM: Land Surface

DRILLING FLUID USED: Bentonite Slurry DRILLING METHOD: Mud Rotary

DRILLING CONTRACTOR: Environmental Drilling, Inc. DRILLER: Scott HELPER: Kevin

PREPARED BY: R. Eby HAMMER WEIGHT: 140 lbs HAMMER DROP: 30 inches

SAMPLE DEPTH (FT BELOW LAND SURFACE)		CORE RECVRY (FT)	BLOW COUNTS PER 6 INCHES	SAMPLE/CORE DESCRIPTION
FROM	TO			
20	22	1.0	9/12/48/	Sand (65%), fine to very coarse, brown; gravel (35%),
			50/4	fine to medium, subrounded to subangular, poorly
				sorted.
40	42	.5	9/6/6/6	Sand (50%), fine to very coarse, brown; gravel (50%),
				fine to medium, subrounded to subangular, poorly
				sorted.
60		WASH	-	Sand: fine to very coarse with fine to medium gravel,
				occasional cobbles.
80		WASH	-	Sand: fine to very coarse; gravel, fine to medium.
100		WASH	-	Same.
120		WASH	-	Same, trace of yellow silt.
120	130	WASH	-	Clayey silt, light gray with some fine sand, plastic,
				cohesive ~~(Top of~~ Magothy~~?)~~.
140	142	1.5	55/81/	Sand (100%), fine to medium, light gray to white, minor
			72/56	tan/orange, clean, well sorted, (Magothy).
160	162	.5	10-*****	Sand (100%), fine to medium, gray with streaks of
			1200 PSI	orange, slightly silty. (*****~~10~~-hydraulic push)
185	186			Clay seam.
	220	WASH		Sand (100%), fine to very coarse, slighly silty.
	250	WASH		Same.

GERAGHTY & MILLER, INC.

SAMPLE/CORE LOG

BORING/WELL: GM-11M PROJECT NO: NY1230GN10 PAGE: 1 of 2

SITE LOCATION: UNISYS Great Neck, NY DRILLING STARTED: 4/25/89 DRILLING COMPLETED: 4/28/89

TOTAL DEPTH DRILLED: 240 HOLE DIAMETER: 6 TYPE OF SAMPLE/ CORING DEVICE: Split Spoon

LENGTH & DIAMETER OF CORING DEVICE: 2 FT x 2 IN. SAMPLING INTERVAL: 20 FT

LAND-SURFACE ELEVATION: ( ) SURVEYED ( ) ESTIMATED DATUM: Land Surface

DRILLING FLUID USED: Bentonite Slurry DRILLING METHOD: Mud Rotary

DRILLING CONTRACTOR: Environmental Drilling, Inc. DRILLER: Scott HELPER: Kevin

PREPARED BY: R. Eby HAMMER WEIGHT: 140 lbs HAMMER DROP: 30 inches

SAMPLE DEPTH (FT BELOW LAND SURFACE) FROM	TO	CORE RECVRY (FT)	BLOW COUNTS PER 6 INCHES	SAMPLE/CORE DESCRIPTION
20	22	.5	14-8-35-	Gravelly sand; sand (60%), fine to very coarse, brown,
			50/4	poorly sorted; gravel (40%), fine to
				medium subangular to subrounded.
40	42	1.0	31-32-	Clayey silt (50%), dense, dark brown; sand (40%), very
			34-48	fine to medium, gravel (10%) fine to medium, subangular; dense and very poorly
				sorted. Appears to be till.
60	61	.5	25-50/3	Sand (100%), very fine to medium with some coarse and
				very coarse, brown, poorly sorted.
80	82	-	-	No sample, too much wash in hole; could not clear.
100	101.5	.5	11-35-	Sand (100%), fine to very fine, silty, whitish gray with
			50/5	tan/orange streaks, (Magothy).
120	121	.5	33-50/5	Sand (100%), fine to medium, whitish gray with tan/
				orange streaks, silty.
140	141.5	.5	39-47-	Sand (95%), very fine to medium, silty; whitish gray
			50/5	with tan/orange streaks; silty clay (5%), gray
				(~~occurred~~ in thin layers).
160	161	1.0	31-50/5	Sand (100%), fine to very fine, whitish gray with
				streaks of orange/tan, slightly silty.
180	181	.5	36-50/3	Sand (95%), very fine to medium, whitish gray mottled
				with tan/orange; clayey silt (5%), dark gray,
				cohesive.
200	201.5	1.0	10-35-	Sand (60%), fine to very fine, tan to light gray in thin
			50/3	layers alternating color; clay (40%), light gray,

GERAGHTY & MILLER, INC.

SAMPLE/CORE LOG (Cont.d)

BORING/WELL: GM-11M PREPARED BY: R. Eby PAGE: 2 of 2

SAMPLE DEPTH (FT BELOW LAND SURFACE) FROM	TO	CORE RECVRY (FT)	BLOW COUNTS PER 6 INCHES	SAMPLE/CORE DESCRIPTION
				dense, cohesive, occurs in 1 to 2 inch layers.
220	220.5	.3	50/3	Sand (100%), very fine to medium, silty, light gray
				mottled with tan.
240	240.5	.3	100/4	Sand (100%), medium, silty, light brown, well sorted.

Date [illegible] Day [illegible] Start Time [illegible] Finish Time [illegible]

EDI Job. No. NY 851

Rig No. [illegible]
Driller SCOTT HAUGE
Helper [illegible]

EDI
ENVIRONMENTAL DRILLING, INC.

Daily Drill Log

☐ Boring ☑ Well # MW - 12

Client: [illegible]
Job Name and Address: LAKE [illegible]
RD LAKE SUCCESS NY

No. of wells/borings installed today:
Total footage drilled today: 24'
Dia. of borehole(s): 8"
Depth of borehole(s):
S.S. samples on ___ ctrs. Extra samples:
Type, dia., length of casing(s):

Length, slot of screen(s):
Drilling method:
☐ HSA ☐ Mud Rotary ☐ Air Rotary ☐ Other
Static water level: Well yield:
Today: ☐ MOB ☐ DEMOB ☑ Continue
Drill hours reg.: 8 O.T. 1
Travel hours: St. by hours:
Man hours reg.: O.T.
Comments/delays - explain: UNLOADED HAUL TRUCK. & MUD SET-UP - STARTED DRILLING AT 8:00 a.m.

USED WATER TRUCK

[signature]
Driller

[signature]
Verified Contractor

SOIL LOG

Depth	Formation
	DRILLED MW - 12
	TO 24'
	COBBLES ALL THE
	WAY TO 24'

MATERIALS USED

Quantity	Description
5	BAGS [illegible] GEL

Date 1/24/9? Day Thursday Start Time 7:00 Finish Time 5:00

EDI Job. No. NY 851

Rig No. #6

Driller Scott Haugk

Helper Alex P[illegible]

EDI
ENVIRONMENTAL DRILLING, INC.

Daily Drill Log

☐ Boring ☑ Well # MW-12

Client: Ulysses Corp.

Job Name and Address: Lakeville Rd. Lake Success N.Y.

No. of wells/borings installed today:

Total footage drilled today: 81

Dia. of borehole(s): 8"

Depth of borehole(s):

S.S. samples on ______ ctrs. Extra samples:

Type, dia., length of casing(s):

Length, slot of screen(s):

Drilling method:

☐ HSA ☑ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: Well yield:

Today: ☐ MOB ☐ DEMOB ☑ Continue

Drill hours reg.: 8 O.T. 2

Travel hours: St. by hours:

Man hours reg.: O.T.

Comments/delays - explain: Had to wait for Tom Lynch to pull his [illegible] and straighten out of hole so I could use it to straighten out my hole from [illegible] casing - top 30'

Driller: Scott A. Haugk

Verified Contractor: R. A. Wozniak

SOIL LOG

Depth	Formation
	Drilled MW-12
	from 24' - 105'
	Cobbles to 60'
	Hit small clay
	seam at 80'
	[illegible] of [illegible]
	[illegible]
	[illegible]

MATERIALS USED

Quantity	Description
	Purchased one
	water permit
	from Manhasset
	Town Water Dept
	for hydrant use
	at cost of $100.00
10	Bags Quik Gel

Date 6/29/90 Day FRIDAY Start Time 4:00 Finish Time 12:00

EDI Job. No. NY 851

Rig No. #6

Driller SCOTT HANZ

Helper GREG D'JAK

EDI
ENVIRONMENTAL DRILLING, INC.

Daily Drill Log

☐ Boring ☑ Well # MW-12

Client: UNISYS CORP.

Job Name and Address: LAKEVILLE RD, LAKE SUCCESS N.Y.

No. of wells/borings installed today:

Total footage drilled today: 135'

Dia. of borehole(s): 8"

Depth of borehole(s):

S.S. samples on ___ ctrs. Extra samples:

Type, dia., length of casing(s):

Length, slot of screen(s):

Drilling method:

☐ HSA ☑ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: Well yield:

Today: ☐ MOB ☐ DEMOB ☑ Continue

Drill hours reg.: 8 O.T.

Travel hours: St. by hours:

Man hours reg.: O.T.

Comments/delays - explain:

SOIL LOG

Depth	Formation
	DRILLED MW-12
	FROM 105' -
	240'
	HIT CLAY AT
	170' - 197'

MATERIALS USED

Quantity	Description
5	BAGS QUIK GEL

Scott G. Hanza
Driller

R. A. Wozniak
Verified Contractor

Date 7/17/90 Day Tuesday Start Time 7:30 Finish Time 4:30

EDI Job. No. 394-1

Rig No. #6

Driller Scott Hauf

Helper [illegible]

EDI
ENVIRONMENTAL DRILLING, INC.

Daily Drill Log

☐ Boring ☑ Well # MW-17

Client: [illegible] Corp

Job Name and Address: [illegible]
[illegible]

No. of wells/borings installed today:

Total footage drilled today: 10'

Dia. of borehole(s): 8"

Depth of borehole(s):

S.S. samples on ______ ctrs. Extra samples:

Type, dia., length of casing(s):

Length, slot of screen(s):

Drilling method:

☐ HSA ☑ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: ______ Well yield:

Today: ☐ MOB ☐ DEMOB ☑ Continue

Drill hours reg.: 8 O.T. 1

Travel hours: ______ St. by hours:

Man hours reg.: ______ O.T.

Comments/delays - explain: Lost 30' rod and spoon down hole - tried to fish out all afternoon.

Scott Hauf
Driller

R A Wojcik 7/20/90
Verified Contractor

SOIL LOG

Depth	Formation
	Drilled from
	240 - 250'
	Started pulling
	rods at 10:30 A.M.
	- 1 hour for
	sample 250'-252'
	(2" spoon)
	[illegible]

MATERIALS USED

Quantity	Description
2	Bags Quik Gel

Date 7/6/9[illegible] Day Friday Start Time 8:00 Finish Time 12:00

EDI Job. No. [illegible] 851

Rig No. #6

Driller Scott Hange

Helper [illegible]

EDI
ENVIRONMENTAL DRILLING, INC.

Daily Drill Log

☐ Boring ☐ Well # MW-12

Client: Unisys Corp

Job Name and Address: Lakeville Rd
Lake Success N.Y.

No. of wells/borings installed today:

Total footage drilled today: 15'

Dia. of borehole(s):

Depth of borehole(s):

S.S. samples on ______ ctrs. Extra samples:

Type, dia., length of casing(s):

Length, slot of screen(s):

Drilling method:

☐ HSA ☐ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: Well yield:

Today: ☐ MOB ☐ DEMOB ☐ Continue

Drill hours reg.: 8 O.T.

Travel hours: St. by hours:

Man hours reg.: O.T.

Comments/delays - explain: Replaced
Two hydraulic hoses

Scott Hange
Driller

R. A. Wojciak
Verified Contractor

SOIL LOG

Depth	Formation
	Moved rig off
	hole and
	grouted MW-12
	Set-up rig
	on new hole
	(MW-12)
	Drilled to 15'
	Used stabilizer
	[illegible]

[illegible]

MATERIALS USED

Quantity	Description
18	Bags cement
1	Bag bentonite
3	Bags [illegible]

Date 7/19/90 Day [illegible] Start Time 6:00 Finish Time 5:00

EDI Job. No. AIT 851

Rig No. #6

Driller Scott Hauge

Helper

EDI

ENVIRONMENTAL DRILLING, INC.

Daily Drill Log

☐ Boring ☑ Well # MW-12

Client: [illegible] Corp

Job Name and Address: [illegible]
[illegible] Lake Success [illegible]

No. of wells/borings installed today:

Total footage drilled today: 45'

Dia. of borehole(s): [illegible]

Depth of borehole(s):

S.S. samples on ______ ctrs. Extra samples:

Type, dia., length of casing(s):

Length, slot of screen(s):

Drilling method:

☐ HSA ☑ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: ______ Well yield:

Today: ☐ MOB ☐ DEMOB ☑ Continue

Drill hours reg.: 6 O.T. 2

Travel hours: ______ St. by hours:

Man hours reg.: ______ O.T.

Comments/delays - explain: HAD TO CHANGE TO STABLIZER AND BIT ON BOTTOM 3' TO DRILL THROUGH BOULDERS & COBBLES.

Scott C. Hauge
Driller

R. C. [illegible] 7/20/90
Verified Contractor

SOIL LOG

Depth	Formation
	DRILLED MW-12
	from 15 - 60'
	Fill cement
	COBBLES ON TOP
	TO 57' (SAND
	TO 60')

MATERIALS USED

Quantity	Description
2	BAGS Quik Gel

Date 7/10/90 Day TUESDAY Start Time 5:30 Finish Time 4:30

EDI Job. No. NY 951

Rig No. #6

Driller SCOTT HAUKE

Helper GREG [illegible]

EDI
ENVIRONMENTAL DRILLING, INC.

Daily Drill Log

☐ Boring ☑ Well # MW-12

Client: [illegible] CORP

Job Name and Address: GREVILLE
RD LAKE SUCCESS N.Y.

No. of wells/borings installed today:

Total footage drilled today: 150'

Dia. of borehole(s): 9"

Depth of borehole(s):

S.S. samples on ______ ctrs. Extra samples:

Type, dia., length of casing(s):

Length, slot of screen(s):

Drilling method:

☐ HSA ☑ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: Well yield:

Today: ☐ MOB ☐ DEMOB ☑ Continue

Drill hours reg.: 8 O.T. —

Travel hours: St. by hours:

Man hours reg.: O.T.

Comments/delays - explain: HAD TO CHANGE
[illegible] ON STABILIZER BACK
TO SOFT FORMATION
ALSO CHANGED FROM 4 1/2
RODS TO 4" RODS. BEFORE
STARTING TO DRILL.

Scott C. Hauke
Driller

R. A. Wojciak
Verified Contractor

SOIL LOG

Depth	Formation
	DRILLED MW-12
	FROM 60 - 210'
	HIT CLAY AT 100'
	- 112'
	(SAND, GRAVEL)
	HIT CLAY AT 182'
	- 182'
	(SAND, GRAVEL)
	TO 210'

MATERIALS USED

Quantity	Description
4	BAGS QUIK GEL

Date 7/11/90 Day [illegible] Start Time 6:00 Finish Time 6:00

EDI Job. No. NY 851

Rig No. #1

Driller [illegible]

Helper [illegible]

EDI
ENVIRONMENTAL DRILLING, INC.

Daily Drill Log

☐ Boring ☒ Well # MW-12

Client: [illegible]

Job Name and Address: [illegible] 12
[illegible] N.Y.

No. of wells/borings installed today:

Total footage drilled today: 140'

Dia. of borehole(s): 5"

Depth of borehole(s):

S.S. samples on ____ ctrs. Extra samples:

Type, dia., length of casing(s):

Length, slot of screen(s):

Drilling method:

☐ HSA ☒ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: Well yield:

Today: ☐ MOB ☐ DEMOB ☒ Continue

Drill hours reg.: 8 O.T. 3

Travel hours: St. by hours:

Man hours reg.: O.T.

Comments/delays - explain:

[illegible signature]
Driller

R.A. [illegible signature] 7/20/90
Verified Contractor

SOIL LOG

Depth	Formation
	DRILLED MW-12
	FROM 210' - 350'
	TOOK 2" SPOON
	FROM 330' - 352
	(FINE [illegible] SAND)
	1 1/2 HOURS

MATERIALS USED

Quantity	Description
5	BAGS [illegible] GEL

Date 7/12/90 Day THURSDAY Start Time 6:00 Finish Time 7:30

EDI Job. No. NY 551 Rig No. #6

EDI
ENVIRONMENTAL DRILLING, INC.

Driller SCOTT HAUGE
Helper GREG PIETAK

Daily Drill Log

☐ Boring ☑ Well # MW-12

Client: UNITED CORP

Job Name and Address: LAKE VILLE
RD. LAKE SUCCESS NY

No. of wells/borings installed today:

Total footage drilled today: 34

Dia. of borehole(s): 9"

Depth of borehole(s):

S.S. samples on ___ ctrs. Extra samples:

Type, dia., length of casing(s):

Length, slot of screen(s):

Drilling method:

☐ HSA ☑ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: Well yield:

Today: ☐ MOB ☐ DEMOB ☑ Continue

Drill hours reg.: 8 O.T. 5

Travel hours: St. by hours:

Man hours reg.: O.T.

Comments/delays - explain:

Driller

R. A. Wozniak

Verified Contractor

SOIL LOG

Depth	Formation
	DRILLED MW-12
	FROM 350' – 375
	TOOK 2" SPOON
	AT 375' - 377
	(SAND GRAVEL)
	1 1/2 HOURS TO SAMPLE
	DRILLED FROM 375'
	– 394
	TOOK 3" SHELBY
	TUBE AT 394'
	INTO CLAY.
	1 1/2 HRS TO SAMPLE

MATERIALS USED

Quantity	Description
8	BAGS QUIK GEL
	INSTALLED WELL
	AT 386 1/2
375'	4" PVC CASING
10'	4" PVC SCREEN
7	BAGS GRAVEL
1	BAG MIX –
	BENTONITE SLURRY

R. A. Wojciak

Date 7/5/90 Day Thur. Start Time 7:00 Finish Time 5:00

EDI Job. No. N.Y. 851

Rig No. 80-90

Driller T. Lynch

Helper B. Phillips

EDI
ENVIRONMENTAL DRILLING, INC.

Daily Drill Log

☐ Boring ☒ Well # 12 MI

Client: Unisys

Job Name and Address: Unisys, Lake Success, Long Island, N.Y.

No. of wells/borings installed today: 0

Total footage drilled today: 75'

Dia. of borehole(s): 8"

Depth of borehole(s): 75'

S.S. samples on ______ ctrs. Extra samples: ______

Type, dia., length of casing(s): ______

Length, slot of screen(s): ______

Drilling method:

☐ HSA ☒ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: ______ Well yield: ______

Today: ☐ MOB ☐ DEMOB ☒ Continue

Drill hours reg.: 8 O.T. 2

Travel hours: ______ St. by hours: ______

Man hours reg.: ______ O.T. ______

Comments/delays - explain: Moved onto hole + start drilling

Thomas Lynch
Driller

______
Verified Contractor

SOIL LOG

Depth	Formation
~~Wel~~	
0'-5' -	Fill
32'	Till, sandy cobbles
32'-75'	coarse Sand + gravel

MATERIALS USED

Quantity	Description

R. A. Wyciak

Date 7/6/90 Day Fri Start Time 5:00 Finish Time 1:00

EDI
ENVIRONMENTAL DRILLING, INC.

EDI Job. No. N.Y. 851

Rig No. 80-90
Driller T. Lynch
Helper B Phillips

Daily Drill Log

☐ Boring ☒ Well # 12MI

Client: Unisys

Job Name and Address: Unisys, Lake Success, Long Island, N.Y.

No. of wells/borings installed today: 0

Total footage drilled today: 132'

Dia. of borehole(s): 8"

Depth of borehole(s): 207'

S.S. samples on ______ ctrs. Extra samples: ______

Type, dia., length of casing(s): ______

Length, slot of screen(s): ______

Drilling method:

☐ HSA ☒ Mud Rotary ☐ Air Rotary ☐ Other

Static water level: ______ Well yield: ______

Today: ☐ MOB ☐ DEMOB ☒ Continue

Drill hours reg.: 8 O.T. ______

Travel hours: ______ St. by hours: ______

Man hours reg.: ______ O.T. ______

Comments/delays - explain: Continue drilling.

Thomas Lynch
Driller

______
Verified Contractor

SOIL LOG

Depth	Formation
Well	
75'-95'	coarse sand & gravel
95'-105'	gray silty clay
105'-160'	sand
160'-162'	clay
162'-168'	sand & gravel
168'-170'	clay
170'-172'	sand
172'-173'	clay
173-175	sand & lenses of clay
177'-182'	gray silty clay
182'-207'	sand.

MATERIALS USED

Quantity	Description

R. A. Wozniak

Date 7/9/90 Day Mon Start Time 7:00 Finish Time 5:30

EDI
ENVIRONMENTAL DRILLING, INC.

EDI Job. No. N-4851

Rig No. 80-90
Driller T Lynch
Helper B Phillips

Daily Drill Log

☐ Boring ☒ Well # 12MI

Client: Unisys
Job Name and Address: Unisys, Great Neck Long Island.

No. of wells/borings installed today: 1
Total footage drilled today: 48'
Dia. of borehole(s): 8"
Depth of borehole(s): 255'
S.S. samples on 1 ctrs. Extra samples:
Type, dia., length of casing(s): 245' x 4" x P.V.C.

Length, slot of screen(s): 10' x 4" x 020
Drilling method:
☐ HSA ☒ Mud Rotary ☐ Air Rotary ☐ Other
Static water level: Well yield:
Today: ☐ MOB ☐ DEMOB ☒ Continue
Drill hours reg.: 8 O.T. 3 1/2
Travel hours: St. by hours:
Man hours reg.: O.T.
Comments/delays - explain: Drilled to well depth took sample then Installed well. Delayed 1hr. because of lightening.

Thomas Lynch
Driller

Verified Contractor

SOIL LOG

Depth	Formation
Well	
207'-210'	Sand with lenses of Clay
210'-250'	coarse Sand & gravel

MATERIALS USED

Quantity	Description
Well	
24 pcs.	10' x 4" casing
1 pc.	5' x 4" casing
10'	4" x 020 Slot screen
1	Bag Bent
5	Bags Sand
1	Cap & plug

Appendix

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

2.6 ft LAND SURFACE

8 inch diameter drilled hole

Well casing, 2 inch diameter, PVC, Schedule 40

☐ Backfill
☒ Grout cement/bentonite

78 ft*

Bentonite ☐ slurry ☒ pellets
80 ft*

105 ft*

Well Screen. 2 inch diameter PVC, 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

115 ft*

115 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Unisys/NY1230GN3 Well GM-1S

Town/City Great Neck

County Nassau State New York

Permit No. N/A

Land-Surface Elevation and Datum N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 4/28 - 5/4/88

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling, Inc.

Drilling Fluid Bentonite

Development Technique(s) and Date(s)

Fluid Loss During Drilling N/A gallo

Water Removed During Development N/A gallo

Static Depth to Water ______ feet below M.

Pumping Depth to Water ______ feet below M.

Pumping Duration N/A hours

Yield ______ gpm Date ______

Specific Capacity ______ gpm/ft

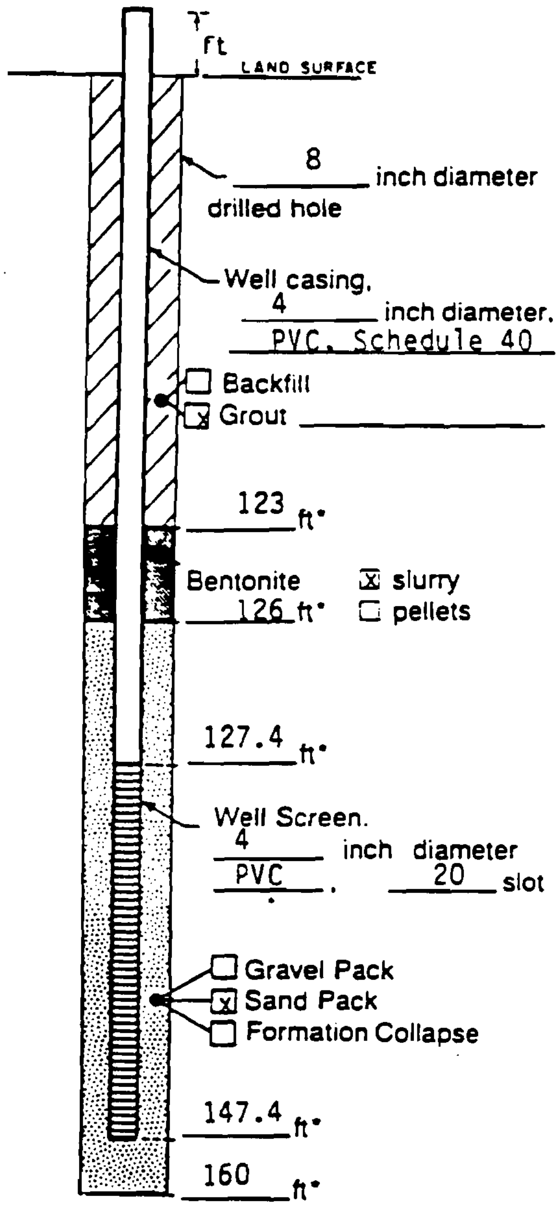
Well Purpose Monitoring Well

Remarks

Prepared by Doug Newton

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Unisys/NY1230GN1 Well GM-1

Town/City Great Neck

County Nassau State New York

Permit No. N/A

Land-Surface Elevation and Datum N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/20/88 - 5/24/88

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling, Inc.

Drilling Fluid Bentonite and potable water

Development Technique(s) and Date(s)

Fluid Loss During Drilling N/A gallo

Water Removed During Development ______ gallo

Static Depth to Water ______ feet below M.

Pumping Depth to Water ______ feet below M.

Pumping Duration ______ hours

Yield ______ gpm Date ______

Specific Capacity ______ gpm/ft

Well Purpose Monitoring Well

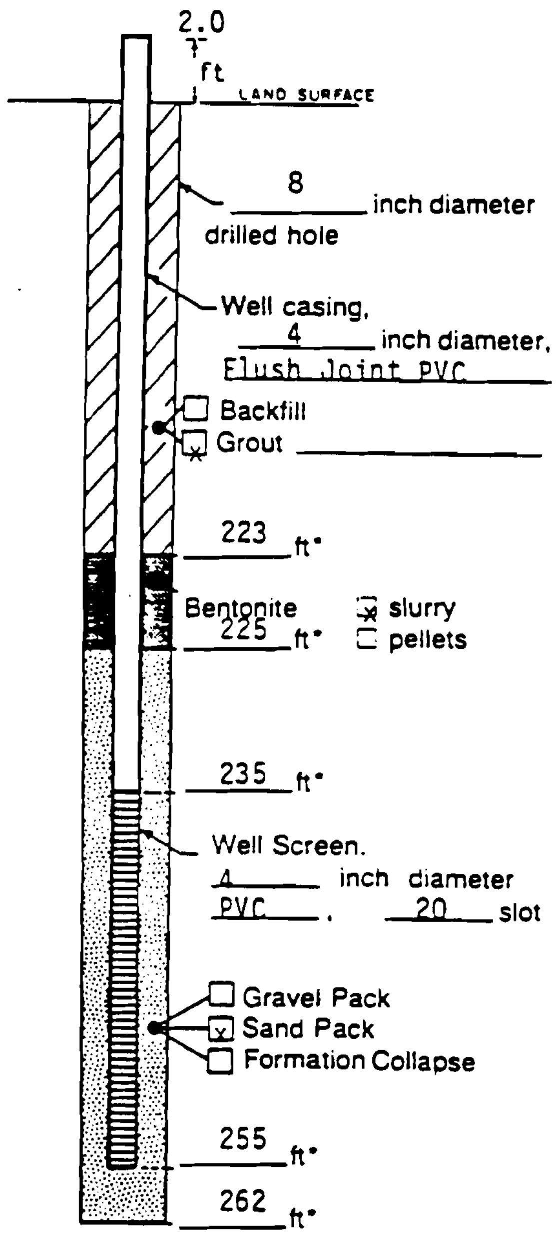
Remarks

Prepared by Doug Newton

G&M Form 05 5-87 Southprint 87 1776

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-1M

Town/City Lake Success

County Nassau State New York

Permit No. ____

Land-Surface Elevation and Datum ____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) April 10, 1989

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling, Inc.

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s)
May 30, 31, 1989 jetting and pumping with submersible pump.

Fluid Loss During Drilling ____ gallon

Water Removed During Development approximately 800 gallon

Static Depth to Water 105.6 feet below M.P.

Pumping Depth to Water 175 feet below M.P.

Pumping Duration 2 hours

Yield 7-8 gpm Date 5/31/89

Specific Capacity ____ gpm/ft

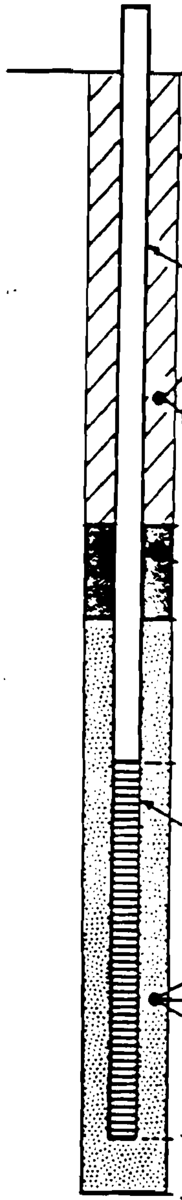
Well Purpose Monitoring Well

Remarks Finished with locking, protective standpip (Master 2402).

Prepared by Rich Eby

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)



2.3 ft LAND SURFACE

8 inch diameter drilled hole

Well casing, 4 inch diameter, Flush Joint PVC

☐ Backfill
☒ Grout

310 ft*

Bentonite ☒ slurry ☐ pellets

312 ft*

322 ft*

Well Screen. 4 inch diameter PVC, 20 slot

☐ Gravel Pack
☐ Sand Pack
☐ Formation Collapse

342 ft*

350 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-1MD

Town/City Lake Success

County Nassau State New York

Permit No.

Land-Surface Elevation and Datum ______ feet ☐ Surveyed ☐ Estimated

Installation Date(s) May 19, 1989

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling, Inc.

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s)
May 31, 1989, June 1, 6, 19, 20, 21, purged, surged, phosphate and pumped with submersible pump.

Fluid Loss During Drilling ______ gallor

Water Removed During Development N/A gallor

Static Depth to Water approximately 105 feet below M.F

Pumping Depth to Water 330 feet below M.F

Pumping Duration N/A hours

Yield 1-2 gpm Date 6/21/89

Specific Capacity ______ gpm/ft

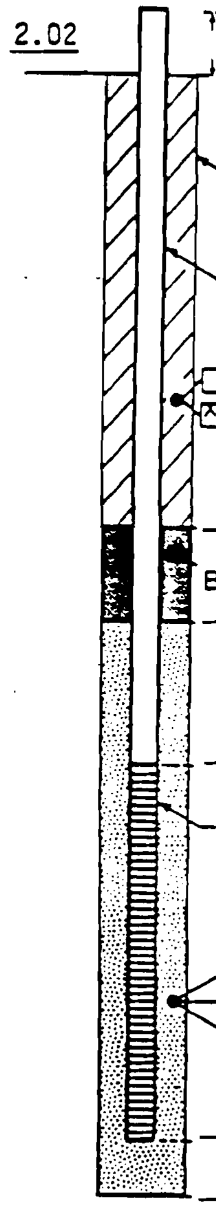
Well Purpose Monitoring Well

Remarks Finished with locking protective standpipe (Master #2402).

Prepared by Rich Eby

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)



2.02 ft LAND SURFACE

8 inch diameter drilled hole

Well casing, ~~4 inch diameter,~~ PVC, Schedule 40

☐ Backfill
☒ Grout cement/bentonite

121 ft*

Bentonite ☐ slurry ☒ pellets
123 ft*

127.38 ft*

Well Screen.
4 inch diameter
PVC, 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

147.38 ft*

150 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Unisys/NY1230GN3 Well GM-2

Town/City Great Neck

County Nassau State New York

Permit No. N/A

Land-Surface Elevation and Datum N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/10/88 - 5/12/88

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling, Inc.

Drilling Fluid

Development Technique(s) and Date(s)
5/11/88: pumped well with submersible at 7 gpm; pumpe
clear after 1.5 hours.

Fluid Loss During Drilling N/A gallo

Water Removed During Development 970 gallo

Static Depth to Water feet below M.

Pumping Depth to Water N/A feet below M.

Pumping Duration 2.5 hours

Yield 7 gpm Date

Specific Capacity gpm/ft

Well Purpose Monitoring Well

Remarks

Prepared by Doug Newton

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

2.0 ft

LAND SURFACE

8 inch diameter drilled hole

Well casing, 4 inch diameter, Flush Joint PVC

☐ Backfill
☒ Grout ______

221 ft*

Bentonite ☒ slurry ☐ pellets

224 ft*

230 ft*

Well Screen. 4 inch diameter PVC, 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

250 ft*

260 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-2M

Town/City Great Neck

County Nassau State New York

Permit No. ______

Land-Surface Elevation and Datum ______ feet ☐ Surveyed ☐ Estimated

Installation Date(s) March 13, 14

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling Inc.

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s)
Submersible pump (Q = 5 gpm)
April 11, 1989

Fluid Loss During Drilling ______ gallons

Water Removed During Development 1000 gallons

Static Depth to Water 86.6 feet below M.P.

Pumping Depth to Water 225 feet below M.P.

Pumping Duration 4 hours

Yield 4-5 gpm Date 4-11-89

Specific Capacity ______ gpm/ft

Well Purpose Monitoring Well

Remarks Finished with protective locking standpipe (master # 2402)

Prepared by R. Eby

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

2 ft LAND SURFACE

8 inch diameter drilled hole

Well casing, 4 inch diameter, PVC, Schedule 40

☐ Backfill
☒ Grout cement/bentonite

119 ft*

Bentonite ☒ slurry ☐ pellets
122 ft*

129.28 ft*

Well Screen. 4 inch diameter PVC, 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

149.28 ft* top of casing

150 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Unisys/NY1230GN3 Well GM-3

Town/City Great Neck

County Nassau State New York

Permit No. N/A

Land-Surface Elevation and Datum N/A feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/12/88 - 5/17/88

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling, Inc.

Drilling Fluid Bentonite; potable water

Development Technique(s) and Date(s)
5/20/88; 15 minutes, pumped dry.

Fluid Loss During Drilling N/A gallons

Water Removed During Development ______ gallons

Static Depth to Water ______ feet below M.P.

Pumping Depth to Water ______ feet below M.P.

Pumping Duration ______ hours

Yield ______ gpm Date ______

Specific Capacity ______ gpm/ft

Well Purpose Monitoring Well

Remarks ______

Prepared by Doug Newton

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

ft LAND SURFACE

8 inch diameter drilled hole

Well casing, 4 inch diameter, PVC

☐ Backfill
☒ Grout

121 ft*

Bentonite ☐ slurry ☐ pellets

124 ft*

130 ft*

Well Screen, 4 inch diameter PVC, .010 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

150 ft*

150 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Unisys/NY1230GN01 Well GM-4

Town/City Great Neck

County Nassau State New York

Permit No. ______

Land-Surface Elevation and Datum ______ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/24 to 5/26/88

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling, Inc.

Drilling Fluid ______

Development Technique(s) and Date(s) ______

Fluid Loss During Drilling ______ gallons

Water Removed During Development ______ gallons

Static Depth to Water ______ feet below M.P.

Pumping Depth to Water ______ feet below M.P.

Pumping Duration ______ hours

Yield ______ gpm Date ______

Specific Capacity ______ gpm/ft

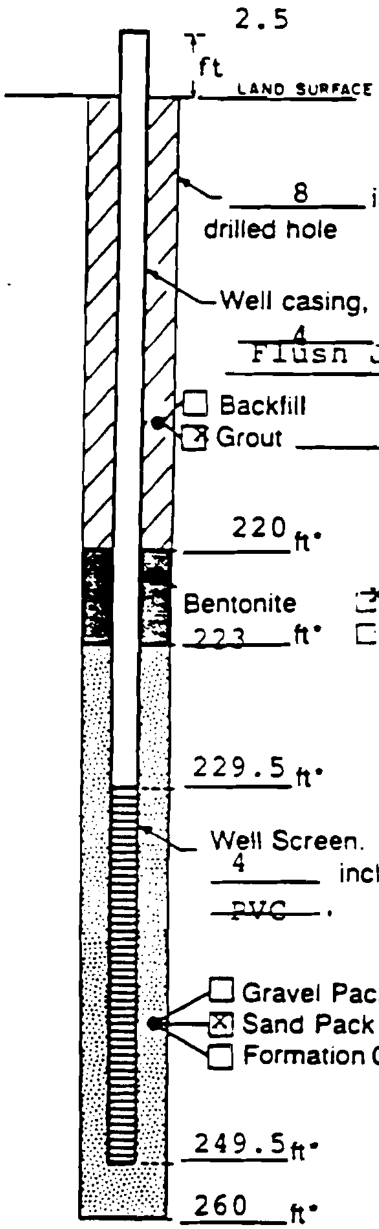
Well Purpose Monitoring Well

Remarks ______

Prepared by Neil H. Benowitz

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)



Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-4M

Town/City Lake Success

County Nassau State New York

Permit No. ____

Land-Surface Elevation and Datum ____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) March 23, 1989

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling Inc.

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s) May 30, 1989 Jetted and pumped with submersible pump

Fluid Loss During Drilling ____ gallor

Water Removed During Development 650 gallor

Static Depth to Water 108.5 feet below M.I

Pumping Depth to Water 240 feet below M.I

Pumping Duration 4½ hours

Yield 1-2 gpm Date 5/30/89

Specific Capacity ____ gpm/ft

Well Purpose Monitoring Well

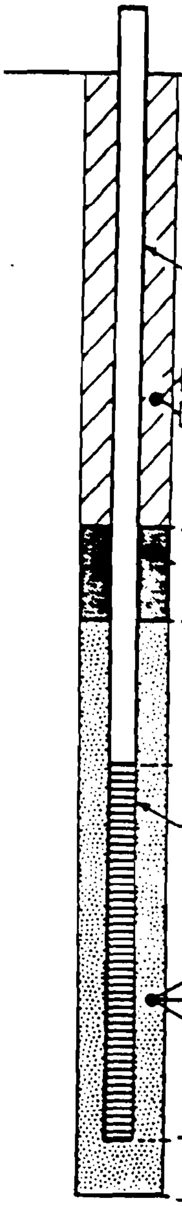
Remarks Finished with locking protective standpipe (master #2402)

Prepared by R. Eby

G&M Form 05 5-87 Southover 87-1776

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)



2.1 ft

LAND SURFACE

8 inch diameter drilled hole

Well casing, 4 inch diameter, Flush Joint PVC

☐ Backfill
☒ Grout

103 ft*

Bentonite ☒ slurry ☐ pellets

105 ft*

110 ft*

Well Screen, 4 inch diameter PVC, 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

130 ft*

135 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-5

Town/City Lake Success

County Nassau State New York

Permit No. ______

Land-Surface Elevation and Datum ______ feet ☐ Surveyed ☐ Estimated

Installation Date(s) February 15, 1989

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling Inc.

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s)
Developed with submersible pump for 1½ hours (7.5 gpm) on March 6, 1989

Fluid Loss During Drilling ______ gallons

Water Removed During Development approximately 500 gallons

Static Depth to Water 89.8 feet below M.P.

Pumping Depth to Water 100 feet below M.P.

Pumping Duration 1-1/2 hours

Yield 6-7 gpm Date 5/6/89

Specific Capacity ______ gpm/ft

Well Purpose Monitoring Well

Remarks Finished with locking protective standpipe (Master #2402).

Prepared by R. Eby

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

2.2 ft

LAND SURFACE

8 inch diameter drilled hole

Well casing, 4 inch diameter, Flush Joint PVC

☐ Backfill
☒ Grout w/ bentonite

220 ft*

Bentonite ☒ slurry ☐ pellets

222 ft*

230 ft*

Well Screen. 4 inch diameter PVC , 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

250 ft*

255 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-5M

Town/City Lake Success

County Nassau State New York

Permit No. ______

Land-Surface Elevation and Datum ______ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 2-10-89, 2-13-89

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling Inc

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s) Developed with submersible pump March 30, and April 3, 1989. Removed approximately 600 gallons.

Fluid Loss During Drilling ______ gallor

Water Removed During Development approximately 600 gallor

Static Depth to Water 90.5 feet below M.F

Pumping Depth to Water 200 feet below M.F

Pumping Duration 6 hours

Yield 2 gpm Date 4/3/89

Specific Capacity ______ gpm/ft

Well Purpose Monitoring Well

Remarks Finished with locking protecting standpipe (master #2402)

Prepared by R. Eby

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

2.0 ft LAND SURFACE

8 inch diameter drilled hole

Well casing, 4 inch diameter, Flush Joint PVC

☐ Backfill
☒ Grout

95 ft*

Bentonite ☒ slurry ☐ pellets

98 ft*

105 ft*

Well Screen, 4 inch diameter PVC, 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

125 ft*

135 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-6

Town/City Lake Success

County Nassau State New York

Permit No. ______

Land-Surface Elevation and Datum ______ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 2-23-89/2-24-89

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling Inc.

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s)
Developed with submersible pump for 1½ hours (7.5 gpm) on March 6, 1989.

Fluid Loss During Drilling ______ gallo

Water Removed During Development approximately 600 gallo

Static Depth to Water 88.1 feet below M.

Pumping Depth to Water 120 feet below M.

Pumping Duration 1½ hours

Yield 7 - 8 gpm Date 5/6/89

Specific Capacity ______ gpm/ft

Well Purpose Monitoring Well

Remarks Finished with locking protective standpipe (Master #2402).

Prepared by R. Eby

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

0.0 ft LAND SURFACE

8 inch diameter drilled hole

Well casing, 4 inch diameter, Flush Joint PVC

☐ Backfill
☒ Grout ______

121 ft*

Bentonite ☒ slurry ☐ pellets

123 ft*

129.5 ft*

Well Screen. 4 inch diameter PVC, 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

149.5 ft*

160 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-7

Town/City Lake Success

County Nassau State New York

Permit No. ______

Land-Surface Elevation and Datum ______ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 3-28-89

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling Inc.

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s)
Jetting and Submersible pump (0 3-4 gpm)

Fluid Loss During Drilling ______ gallons

Water Removed During Development 500 gallons

Static Depth to Water 113.7 feet below M.P.

Pumping Depth to Water 140 feet below M.P.

Pumping Duration 3-1/2 hours

Yield 2-3 gpm Date ______

Specific Capacity ______ gpm/ft

Well Purpose Monitoring Well

Remarks Finished with self draining flush mounted protective cover (master lock #2402)

Prepared by R. Eby

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

0.0 ft LAND SURFACE

4 inch diameter drilled hole

Well casing, 4 inch diameter, Flush Joint PVC

☐ Backfill
☒ Grout

73 ft*

Bentonite ☒ slurry ☐ pellets
75 ft*

80 ft*

Well Screen.
4 inch diameter
PVC, 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

90 ft*

92 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-8S

Town/City Lake Success

County Nassau State New York

Permit No.

Land-Surface Elevation and Datum ____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) April 19, 1989

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling Inc.

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s)
May 17, 1989 Submersible pump

Fluid Loss During Drilling ____ gallo

Water Removed During Development 500 gallo

Static Depth to Water 77.6 feet below M.

Pumping Depth to Water 85 feet below M.

Pumping Duration 4-1/2 hours

Yield 3-4 gpm Date 5/17/89

Specific Capacity ____ gpm/ft

Well Purpose Monitoring Well

Remarks Finished with self draining curb box (locking cap master #2402)

Prepared by R. Eby

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-8

Town/City Lake Success

County Nassau State ____

Permit No. ____

Land-Surface Elevation and Datum ____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) April 13, 1989

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling Inc.

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s)
May 23, 24
Jetting and submersible pump.

Fluid Loss During Drilling ____ gallo[ns]

Water Removed During Development 400-500 gallo[ns]

Static Depth to Water 80.0 feet below M.[P.]

Pumping Depth to Water 145 feet below M.[P.]

Pumping Duration 4-1/2 hours

Yield 2 gpm Date 5/24/89

Specific Capacity ____ gpm/ft

Well Purpose Monitoring Well

Remarks Finsihed with Flush Mounted self draining curb box (master lock #2402)

Prepared by R. Eby

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

0.0 ft LAND SURFACE

8 inch diameter drilled hole

Well casing, 4 inch diameter, Flush Joint PVC

☐ Backfill
☒ Grout

125 ft*

Bentonite ☒ slurry ☐ pellets
128 ft*

135 ft*

Well Screen. 4 inch diameter PVC, 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

155 ft*

157 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-9

Town/City Lake Success

County Nassau State New York

Permit No.

Land-Surface Elevation and Datum ______ feet ☐ Surveyed ☐ Estimated

Installation Date(s) April 17, 1989

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling Inc.

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s) May 23 and 24 by jetting and submersible pump (Q 3-4 gpm)

Fluid Loss During Drilling ______ gallons

Water Removed During Development approximately 400 gallons

Static Depth to Water 85.4 feet below M.P.

Pumping Depth to Water 150 feet below M.P.

Pumping Duration 4 hours

Yield 2-3 gpm Date 5/24/89

Specific Capacity ______ gpm/ft

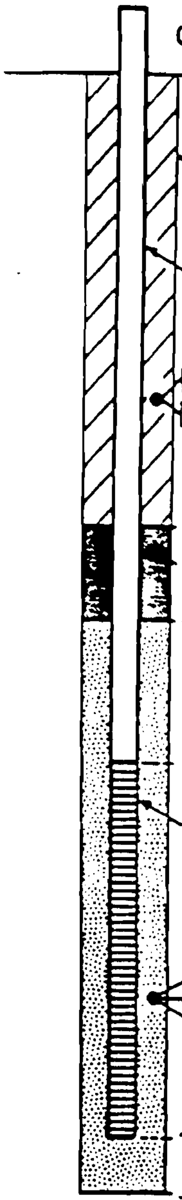
Well Purpose Monitoring Well

Remarks Finished with flush mounted self draining curb box (master #2402)

Prepared by R. Eby

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)



0 ft LAND SURFACE

8 inch diameter drilled hole

Well casing, 4 inch diameter, Flush Joint PVC

☐ Backfill
☒ Grout

103 ft*

Bentonite ☒ slurry ☐ pellets

105 ft*

111.5 ft*

Well Screen. 4 inch diameter PVC, 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

131.5 ft*

150 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-10

Town/City Lake Success

County Nassau State New York

Permit No.

Land-Surface Elevation and Datum ______ feet ☐ Surveyed ☐ Estimated

Installation Date(s) April 24, 1989

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling Inc

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s)
Jetting and pumped with submersible pump (Q = 10 - 12gpm) May 25, 1989

Fluid Loss During Drilling ______ gallor

Water Removed During Development 600 gallor

Static Depth to Water 86.4 feet below M.F

Pumping Depth to Water 130 feet below M.F

Pumping Duration 1-1/4 hours

Yield 10-12 gpm Date 5/25/89

Specific Capacity ______ gpm/ft

Well Purpose Monitoring Well

Remarks Finished with flush mounted curd, box (Master Lock #2402

Prepared by R. Eby

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

8 inch diameter drilled hole

Well casing, 4 inch diameter, Flush Joint PVC

☐ Backfill
☒ Grout

122 ft*

Bentonite ☒ slurry ☐ pellets
124 ft*

119.5 ft*

Well Screen.
4 inch diameter
PVC, 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

139.5 ft*

148 ft*

Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-11

Town/City Lake Success

County Nassau State New York

Permit No.

Land-Surface Elevation and Datum ______ feet ☐ Surveyed ☐ Estimated

Installation Date(s) May 3, 1989

Drilling Method Mud Roatary

Drilling Contractor Environmental Drilling Inc.

Drilling Fluid Bentonite Slurry

Development Technique(s) and Date(s)
Jetting and pumping with submersible pump
(May 26, 1989)

Fluid Loss During Drilling ______ gallor

Water Removed During Development approximately 400 gallor

Static Depth to Water 88.4 feet below M.I

Pumping Depth to Water 140 feet below M.I

Pumping Duration 2 1/2 hours

Yield 1-2 gpm Date 5/26/89

Specific Capacity ______ gpm/ft

Well Purpose Monitoring Well

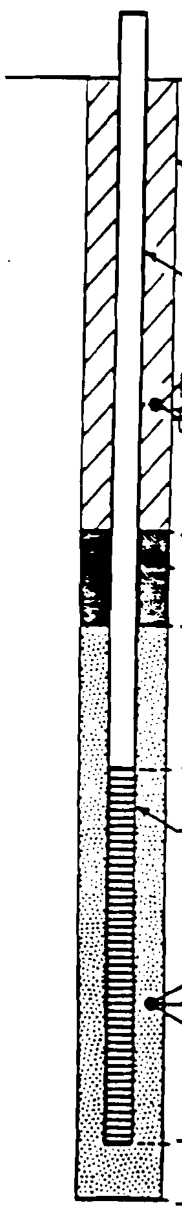
Remarks Finished with locking protective stand pipe
(Master #2402)

Prepared by R. Eby

G&M Form 05 5-87

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)



3.0 ft

LAND SURFACE

8 inch diameter drilled hole

Well casing, 4 inch diameter, Flush Joint PVC

☐ Backfill
☒ Grout

222 ft*

Bentonite ☒ slurry ☐ pellets

224 ft*

230 ft*

Well Screen. 4 inch diameter PVC, 20 slot

☐ Gravel Pack
☒ Sand Pack
☐ Formation Collapse

250 ft*

260 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project NY1230GN10 Well GM-11M

Town/City Lake Success

County Nassau State New York

Permit No. ______

Land-Surface Elevation and Datum ______ feet ☐ Surveyed ☐ Estimated

Installation Date(s) May 1, 1989

Drilling Method Mud Rotary

Drilling Contractor Environmental Drilling Inc.

Drilling Fluid Bentonite slurry

Development Technique(s) and Date(s)
May 31, 1989, June 1,2,5, jetting with water, trisodium phosphate and pumping with submersible pump

Fluid Loss During Drilling ______ gallons

Water Removed During Development approximately 600 gallons

Static Depth to Water 89.2 feet below M.P.

Pumping Depth to Water 245 feet below M.P.

Pumping Duration 10-12 hours

Yield less than 1 gpm Date 6/5/89

Specific Capacity ______ gpm/ft

Well Purpose Monitoring Well

Remarks Finished with locking protective standpipe (Master #2402)

Prepared by R. Eby

G&M Form 05 5-87

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well B-1 Project/No. UNISYS/NY1230CF1 Page 1 of 1

Site Location Great Neck, New York Drilling Started 1/13/[illegible] Drilling Completed [illegible]

Total Depth Drilled 4 feet Hole Diameter 8 inches Type of Sample/Coring Device [illegible]

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
[illegible]	7			[illegible] 3-4 ft
				[illegible] large
				[illegible] 5 [illegible]
				Terminated [illegible]
				5 attempt 4 ft : [illegible]

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well B-2 Project/No. UNISYS/NY1230CF1 Page 1 of 1

Site Location Great Neck, New York Drilling Started 3/31/88 Drilling Completed 3/31/88

Total Depth Drilled 30 feet Hole Diameter 8 inches Type of Sample/Coring Device split-spoon

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description	TIP I (PI
5	7	2	5-8-16-28	SAND (50%), orange-brown, medium to coarse, moderately sorted; gravel (15%) coarse; pebbles and small cobbles (5%); sub-rounded	0
8	10	2	16-33-27-34	8 to 9 ft; same as above 9 to 10 ft; FILL (?), pieces of granite and yellow brown cobbles embedded in clay	0
10	12	[illegible]	17-23-[illegible]	10 to 11.5 ft: CLAY, brown, many small pebbles and gravel 11.5 to 12; SAND (100%), medium to coarse, well sorted, brown	0
15	17	3"	[illegible]-13	SAND; fine to coarse, some brown, some clay, brown, granite fragments, many cobbles	0
20	[illegible]	0	--	No recovery, (cobble, [illegible]) terminated borehole	

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well B-[illegible] Project/No. UNISYS/NY1230CF1 Page 1 of 1

Site Location Great Neck, New York Drilling Started 4/4/88 Drilling Completed [illegible]

Total Depth Drilled 29 feet Hole Diameter [illegible] inches Type of Sample/Coring Device [illegible]

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
5	7	1	1-2-11-22	SAND (159%), [illegible]
				[illegible]
10	12	1	[illegible]	CLAY ([illegible]) dark brown to [illegible] brown [illegible] mottled [illegible] ([illegible]) [illegible]
15	17	.75	[illegible]	SAND [illegible]
20	22	1.0	[illegible]	SAND ([illegible]) [illegible] occasional [illegible]
25	27	1.0	[illegible]-2-16	SAND (95%) [illegible] gravel ([illegible]%) [illegible] clay (5%) [illegible] pieces of cobbles angular
29	31	0	45-50/3"	No recovery [illegible]

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well B-4 Project/No. UNISYS/NY1230CF1

Site Location Great Neck, New York Drilling Started 4/5/88 Drilling Completed 4/5/88

Total Depth Drilled 35 feet Hole Diameter 8 inches Type of Sample/Coring Device SPLIT-SPOON

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description	TIP Read (ppm)
5	7	.5	[illegible]-3	SAND (100%) [illegible]	
				[illegible] occasional [illegible] clay	
10	12	1.25	16-12-23-12	SAND (65%) dark brown grading to orange-brown,	
				fine to coarse, [illegible] sorted; clay (35%)	
				dark brown occasional [illegible] (silt?) loose	
15	17	1	14-12-50/3"	SAND [illegible] coarse light [redacted] brown [illegible]	
				sorted [illegible] (25%) fine to medium, light	
				brown, [illegible] pebbles [illegible]	
20	22	1.5	17-25-40-33	Same as above [illegible] TIP reading	[illegible]
				not as well sorted more pebbles	
25	27	1.5	25-30-[illegible]-50	SAND (100%) light brown well sorted [illegible]	4-6
				grains. [illegible] ppm TIP [illegible]	
30	32	2	25-35-40-35	31 to 31.5 ft, same as above	
				31.5 to 32 ft, SILT, dark brown, sandy, with some clay	11-3

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG (Cont.d)

Boring/Well 3-4

Page 2 of 2

Prepared By D. Newton

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
35	37	2	17-30-32-35	35 to 36.75: SAND (60%), dark brown, fine to
				coarse, poorly sorted, very silty (40%)
				36.75 to 37: SAND (100%), medium grained, light brown
				very well sorted, moist

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well B-5 Project/No. UNISYS/NY1230CF1 Page 1 of 1

Site Location Great Neck, New York Drilling Started 4/5/88 Drilling Completed 4/5/88

Total Depth Drilled 18 feet Hole Diameter 8 inches Type of Sample/Coring Device SPLIT SPOON

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
5	7	1	1-1-1-1	SAND (100%), medium brown [illegible] well sorted; occasional pebble; moist
10	12	.5	25-35-18-45	SAND (75%), fine to coarse, dark brown, poorly sorted; gravel (20%), coarse, dark brown; pebbles and broken cobbles (5%)
15	17	1.35	12-15-25-50/4"	15 to 15.4': SAND (100%), fine, with silt, black, strong odor; 15.4' to 16.25': SAND (100%), medium to coarse, [illegible] light yellow-brown; occasional pebble, some gravel
	18			Borehole terminated at 18 ft; few boulders and cobbles

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Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well B-6 Project/No. UNISYS/NY1230CF1 Page 1 of 2

Site Location Great Neck, New York Drilling Started 4/5/88 Drilling Completed 4/11/88

Total Depth Drilled 30 feet Hole Diameter 8 inches Type of Sample/Coring Device [illegible]

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
5	7	1	[illegible]	5 to 5.5' SAND (100%) fine to medium, dark brown
				clayey, moist
				5.5 to 6' SAND (100%), medium to coarse, well
				sorted, light brown to orange brown
				occasional cobbles, (3-4 inch)
7	8	—	—	Fill material, asphalt [illegible]
10	12	.75	10-20-20-50/4"	SAND and GRAVEL ([illegible]), medium brown,
				poorly sorted fine to coarse, loose
15	17	1.0	15-19-50/5"	SAND (75%) light brown to [illegible]
				very coarse, [illegible] sand (15%)
				fine to medium [illegible] loose
				gravel (10%) subrounded to well rounded, loose
				[illegible] (<1")
20	22	2.0	12-18-20-30	SAND (95%), light brown - orange-brown medium to
				coarse very well sorted, gravel (5%) [illegible]
				fine, light brown; [illegible] sand lenses

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SAMPLE/CORE LOG (Cont.d)

Boring/Well B-6

Page 2 of 2

Prepared By DJN

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
25	27	2.0	8-14-16-22	SAND (100%), light brown-tan, medium very
				well sorted, some oxidized [illegible]
				26 to 26.25 ft; dark brown silt [illegible] [illegible]
30	32	2.0	14-20-30-33	SILT (90%) dark brown, clayey, MOIST; sand (10%), fine
				dark brown well sorted thin lenses
				30.0 to 30.5; SAND (100%) medium to coarse well
				sorted, dark brown to orange-brown, wet
				Terminated borehole

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SAMPLE/CORE LOG

Boring/Well B-7 Project/No. UNISYS/NY1230CF1 Page 1 of 2

Site Location Great Neck, New York Drilling Started 4/11/88 Drilling Completed 4/11/88

Total Depth Drilled 30 feet Hole Diameter 8 inches Type of Sample/Coring Device split spoon

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
5	7	.35	2-7-50/2"	SAND (60%), dark brown, fine to coarse, poorly sorted; gravel + pebbles (40%), poorly sorted, [illegible] to light brown, angular to subrounded
10	12	1.0	7-7-7-15	SAND (95%) dark brown, coarse, well sorted, moist; pebbles (5%), dark brown, subrounded, fine; some gravel, (< 2")
15	17	2.0	8-11-20-17	SAND (70%), light brown to dark brown, coarse to medium, [illegible] sorted; gravel (30%) light brown [illegible], fine
20	22	1.5	20-30-32-33	20 to 20.5' SAND (100%), medium to coarse, bright orange-brown, well sorted 20.5 to 21.5' SAND (100%), fine to medium, light brown-tan, poor to moderately sorted; occasional gravel and small pebbles; coarsening upward

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SAMPLE/CORE LOG (Cont.d)

Boring/Well B-7

Prepared By DJN

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
25	27	1.5	15-17-33-40	SAND (100%), fine to medium, well sorted,
				tan to light brown
				25.5 to 26 ft; SILT, clayey, dark brown
				[illegible] fine sand
30	32	1.5	13-15-17-13	31 to 31 ft; SAND (100%), fine, very well sorted,
				dark brown, micaceous, with several thin
				silt layers; WET
				31 to 31.5 ft; SAND (100%), orange-brown, medium
				to [illegible], well sorted; WET
				Terminated coring

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SAMPLE/CORE LOG

Boring/Well B-8 Project/No. UNISYS/NY1230CF1 Page 1 of 2

Site Location Great Neck, New York Drilling Started 1/11/88 Drilling Completed 1/11/88

Total Depth Drilled 20 feet Hole Diameter 8 inches Type of Sample/Coring Device split-spoon

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
5	7	1.25	4-30-34-30	GRAVEL (50%) fine to medium [illegible], [illegible]
				[illegible] pebbles [illegible] broken cobbles; sand (50%)
				orange-brown to [illegible] brown fine to
				medium [illegible] sand FILL
10	12	2.0	10-25-30-50/5"	SAND (100%), medium to coarse well sorted
				tan to orange-brown
15	17	2.0	10-20-25-31	[illegible] to [illegible] same as above; dark brown to orange-brown
				[illegible] to 17' GRAVEL (75%) light brown, fine, [illegible]
				sorted; sand (25%) medium to coarse
				[illegible] brown to [illegible]-brown
20	22	2.0	2-22-22-35	20 to 20.5; SAND (100%) dark brown medium,
				[illegible] sorted
				[illegible] to 21.[illegible] GRAVEL ([illegible]) light brown [illegible]
				to [illegible], some small pebbles; sand ([illegible]%) medium
				to coarse [illegible], sorted
				[illegible] to 22.0; SAND (100%), tan to light orange
				[illegible] medium - coarse well sorted

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SAMPLE/CORE LOG (Cont.d)

Boring/Well 3-8

Prepared By DJN

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
25	27	2	18-30-40-46	SAND (100%), light brown-tan, medium to coarse, well sorted, trace of fine gravel, [illegible]
30	32	2	2-2-4-20	30 to 30.6; SAND (100%), fine, well sorted, some micaceous minerals, dark brown 30.6 to 32; SAND (100%) light orange-brown, fine to coarse, poorly sorted, silty, wet
				TERMINATED BOREHOLE

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SAMPLE/CORE LOG

Boring/Well B-9 Project/No. UNISYS/NY1230CF1 Page 1 of 2

Site Location Great Neck, New York Drilling Started 4/12/88 Drilling Completed 4/12/88

Total Depth Drilled 32 feet Hole Diameter 8 inches Type of Sample/Coring Device Split-spoon

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
5	7	1	4-20-28-22	SAND (95%), coarse, well sorted, orange-brown; gravel (5%), light brown to orange brown, subrounded to well rounded.
10	12	1.25	20-34-34-43	10 to 10.75 ft: SAND (65%), light brown to orange-brown, moderately sorted, very coarse, subrounded; pebbles (35%), moderately sorted [illegible] to [illegible] [illegible] [illegible]
				10.75 to 11.25' SAND (100%), orange-brown, coarse, well sorted
15	17	2.0	7-17-20-27	SAND (90%), light brown with some [illegible] oxidized brown, coarse to medium, well sorted; [illegible] (10%) [illegible] [illegible] [illegible] [illegible] [illegible] brown [illegible]
20	22	1.2	15-22-30-4/n	20 to 20.5 ft; GRAVEL (100%), light brown, [illegible] [illegible], fine
				[illegible] SAND (100%) orange-brown, [illegible] [illegible] [illegible]

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SAMPLE/CORE LOG (Cont.d)

Boring/Well B-9

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Prepared By DSN

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
25	27	2	16-27-33-35	25 to 26 ft; SILT (70%), dark brown, micaceous, with ~~fine~~ thin layers of fine micaceous sand (30%), clayey
				26 to 27 ft: SAND (100%), tan, medium very well sorted
30	32	2	17-27-25-20	SAND (60%), orange-brown, fine to coarse, poorly sorted; silt ~~clay~~ (40%), clayey, dark brown; grains of sand imbedded in silt
				31.6 to 32; SILT (80%), dark brown; sand (20%), fine, micaceous, imbedded in silt
				Terminated borehole

G&M Form 04 6-86 Southpoint 87-1719

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SAMPLE/CORE LOG

Boring/Well 3-10 Project/No. UNISYS/NY1230CF1 Page 1 of 1

Site Location Great Neck, New York Drilling Started 1/12/93 Drilling Completed 1/12/93

Total Depth Drilled 12 feet Hole Diameter 8 inches Type of Sample/ Coring Device split-spoon

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
5	7	.75	3-25-25-31	COBBLES [illegible] (> 5"), [illegible] [illegible]
				orange brown, poorly sorted
10	12	REFUSAL		cobbles · large gravel

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SAMPLE/CORE LOG

Boring/Well B-11 Project/No. UNISYS/NY1230CF1 Page 1 of 2

Site Location Great Neck, New York Drilling Started 4/4/95 Drilling Completed 4/4/95

Total Depth Drilled 30 feet Hole Diameter 8 inches Type of Sample/Coring Device SPLIT-SPOON

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
5	7	.75	5-8-4-5	SAND (85%), dark brown, fine to coarse, poorly sorted, [illegible] rounded and gravel (15%), rounded sub-rounded, fine
10	12	1.0	27-7-5-4	same as above, less pebbles
15	17	1.5	12-20-30-32	SAND (70%) light brown to orange-brown medium to coarse, moderately sorted, gravel (25%), coarse angular to subrounded, pebbles (5%), subrounded to rounded, iron staining
20	22	1.25	40-30-22-32	SAND ([illegible]) light brown to orange-brown, coarse, well sorted gravel (15%) medium brown; [illegible]
[illegible]	[illegible]	1.25	13-[illegible]	25 to 25.75' GRAVEL ([illegible]), orange-brown coarse; [illegible] brown medium [illegible] some pebbles

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SAMPLE/CORE LOG (Cont.d)

Boring/Well B-11

Page 2 of 2

Prepared By D. Newton

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
25	27	1.25		continued
				25.75 to 26.25: SAND (100%), medium
				well sorted dark orange-brown
30	32	1	13-23-23-23	GRAVEL (75%) fine to medium, medium brown;
				sand (20%), fine to coarse, poorly
				sorted, brown; pebbles (5%), subrounded
				Borehole terminated

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SAMPLE/CORE LOG

Boring/Well: B-12 Project/No.: UNISYS/NY1230CF1 Page 1 of 2

Site Location: Great Neck, New York Drilling Started: 4/1/88 Drilling Completed: 4/1/88

Total Depth Drilled: 30 feet Hole Diameter: 8 inches Type of Sample/Coring Device: SPLIT-SPOON

Length and Diameter of Coring Device: 2 ft x 2 in. Sampling Interval: 5 feet

Land-Surface Elev.: N/A feet ☐ Surveyed ☐ Estimated Datum: N/A

Drilling Fluid Used: None Drilling Method: Hollow-stem auger

Drilling Contractor: Environmental Drilling, Inc. Driller: S. Hague Helper: K. Kincaid

Prepared By: D. Newton Hammer Weight: 140 Hammer Drop: 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description	Tip Re[illegible] (ppm)
5	7	.25	9-6-6-7	SAND (70%), fine to [illegible], [illegible], dark brown; gravel (25%), coarse, sub-rounded pebbles (5%) trace of [illegible] brown clay	0
10	12	1	9-7-7[illegible]-42	SAND (80%), medium to coarse, dark brown to orange brown, moderately sorted, clayey, moist; gravel and pebbles (20%) coarse [illegible] to [illegible] ~~pebbles~~ trace of cobbles	0
15	17	.75	12-20-32-40	GRAVEL (90%), coarse, angular to sub-rounded pebbles (10%) sub-rounded [illegible] sand medium to coarse [illegible]	0
20	22	.75	41-41-26-32	SAND (100%), medium to coarse well sorted light-orange-brown gra[illegible] [illegible]	0
25	27	1	10-15-17-24	GRAVEL (70%) coarse sub-angular to sub-rounded sand ([illegible]) fine to coarse [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]	0

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SAMPLE/CORE LOG (Cont.d)

Boring/Well 3-12 　　　　　　　　　　　　　　　　　　Page 2 of 2

Prepared By D. M[illegible]

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
30	32	1.5	20-21-19-25	SILT, medium brown, clayey, some
				sand [illegible] silt medium to
				coarse; [illegible]

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SAMPLE/CORE LOG

Boring/Well B-13 Project/No. UNISYS/NY1230CF1 Page 1 of 2

Site Location Great Neck, New York Drilling Started 4/1/88 Drilling Completed 4/1/88

Total Depth Drilled 30 feet Hole Diameter 8 inches Type of Sample/Coring Device split-spoon sampler

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

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Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description	TI PPM
5	7	4"	4-2-2-2	SAND (80%) medium to v. coarse; gravel (10%) coarse brown; [illegible]	5
10	12	.5	18-9-10-7	SAND (95%), medium to coarse, dark brown, [illegible] [illegible]; gravel (5%), coarse; trace of small pebbles; moist;	0
15	17	1	8-8-20-50/4"	SAND (95%), medium to coarse, [illegible] brown well sorted; gravel (5%), [illegible] [illegible] [illegible]	0
20	22	2	2-27-20-[illegible]	20 to 21.7: GRAVEL (70%), coarse; [illegible] and small [illegible] (?%) [illegible] [illegible] of sand [illegible] [illegible] SAND [illegible] [illegible] well sorted [illegible] [illegible]	0
25	27	2	10-21-17-37	25 to 26 ft: SAND (100%) medium, well sorted light brown, trace of fine gravel 26 to 27 ft: GRAVEL (70%) coarse to medium [illegible] [illegible] SAND (20%), coarse to fine, [illegible] silty (10%)	0

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SAMPLE/CORE LOG (Cont.d)

Boring/Well B-13

Page 2 of 2

Prepared By D. Newton

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
30	32	0	20-40-30-30	No recovery; large cobble
				Borehole terminated

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SAMPLE/CORE LOG

Boring/Well B-11 Project/No. UNISYS/NY1230CF1 Page 1 of 2

Site Location Great Neck, New York Drilling Started 4/12/88 Drilling Completed 4/12/88

Total Depth Drilled 30 feet Hole Diameter 8 inches Type of Sample/Coring Device split-spoon

Length and Diameter of Coring Device 2 ft x 2 in. Sampling Interval 5 feet

Land-Surface Elev. N/A feet ☐ Surveyed ☐ Estimated Datum N/A

Drilling Fluid Used None Drilling Method Hollow-stem auger

Drilling Contractor Environmental Drilling, Inc. Driller S. Hague Helper K. Kincaid

Prepared By D. Newton Hammer Weight 140 Hammer Drop 30 inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
5	7	.75	10-28-28-10	GRAVEL (65%), orange-brown, moderately sorted;
				sand (35%), coarse, fine, well sorted
				occasional cobble and pebble
10	12			
10	12	1.5	14-25-50-35	SAND (75%) fine to coarse orange-brown,
				poorly sorted, many cobbles; clay (25%)
				dark brown to black
15	17	0	30-50/5"	No recovery; large cobbles
				(cobbles collected from borehole, subrounded,
				uniform size)
20	22	1	22-22-18-25	SAND (80%), light brown-tan, very coarse, well sorted;
				pebbles (10%), quartzitic, subrounded, well
				[illegible]; sand (10%) [illegible] orange-brown well sorted
25	27	2	10-27-27-30	25 to 26 ft: SAND (100%) orange-brown medium
				well sorted
				26 to 27 ft: GRAVEL (75%) light brown well
				sorted; pebbles (25%) subrounded, quartzitic,

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SAMPLE/CORE LOG (Cont.d)

Boring/Well 3-14

Prepared By DJN

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
30	32	1	12-30-50-50/3"	GRAVEL (100%), fine to medium, well sorted,
				subrounded to rounded, light brown;
				some small pebbles, trace of coarse sand