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REMEDIAL INVESTIGATION

EG&G KT AEROFAB

MISSOURI METALS SITE

OVERLAND, MISSOURI

**Volume II OF III
Appendices**

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APPENDIX A
TECHNICAL FIELD METHODS MEMORANDUM

APPENDIX A
FIELD METHODS
TECHNICAL MEMORANDUM
EG&G KT AEROFAB
MISSOURI METALS SITE
OVERLAND, MISSOURI

This memorandum presents a summary of the procedures used in conducting the remedial action investigation of the EG&G KT Aerofab/Missouri Metals site located in Overland, Missouri. The primary field activities were initiated in March 1992 and were concluded in April 1992. A shallow soil survey was conducted on July 14 and July 15, 1992. These activities were generally performed in accordance with the site-specific Remedial Investigation Work Plan, EG&G KT Aerofab/Missouri Metals, St. Louis, Missouri, and the Quality Assurance Plan, EG&G KT Aerofab/Missouri Metals, St. Louis, Missouri. These plans were developed in accordance with relevant Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) guidance documents, and information from past subsurface investigations.

The remedial action investigation provided for implementation or characterization to occur in the following areas:

- abandonment of existing damaged or ineffective monitoring wells
- drilling and logging of subsurface materials
- collection of environmental soil, rock, and groundwater samples
- hydrogeologic site survey

These areas and the associated activities are discussed in the following sections. Supporting this memorandum are the daily records kept in the site

field logbook, drilling logs, and chain-of-custodies which were produced by the Burns & McDonnell Waste Consultants, Inc. field team.

1.0 INVESTIGATION FIELD TEAM

The field team for the remedial action investigation consisted of personnel from Burns & McDonnell, a drilling subcontractor, and a land surveyor. The Burns & McDonnell field personnel included a geologist, a hydrogeologist, and an engineer. These persons were responsible for the collection of environmental samples and other data necessary for the evaluation of remedial alternatives.

The Layne-Western Company of St. Louis, Missouri provided the drilling subcontractor services for this investigation. Layne-Western mobilized two drill rigs and crews to the site to facilitate the abandonment, placement, and development of monitoring wells.

All personnel from Burns & McDonnell and the drilling subcontractor used during the field activities had current certification for work at hazardous waste sites as stipulated in 40 CFR 1910.120. Health and safety meetings were conducted daily to alert investigation personnel to site-related hazards and anticipated drilling conditions.

Land surveying services were provided by a Missouri-registered land surveyor of the Sterling Engineering and Surveying Company of Bridgeton, Missouri.

2.0 CHRONOLOGY OF INVESTIGATION

The remedial action investigation was conducted at the site during the months of March and April 1992. The following is a brief chronology of the events as they occurred on a day to day basis. The events cited are focused on data collection efforts and do not reflect meetings held with the client.

March 23 Burns & McDonnell mobilized to the site. Utilities were cleared through the various gas, water, sewer, and

electrical company representatives. The decontamination area was identified and cleared by EG&G site personnel.

- March 24 Layne-Western mobilized to the site and established the decontamination and lay-down areas. Abandoned existing Monitoring Well GMW-13.
- March 25 Abandoned existing Monitoring Well GMW-2. Drilled and sampled Soil Boring SB-1. Measured water levels in existing monitoring wells. Shipped soil samples to analytical laboratory.
- March 26 Drilled and sampled Soil Boring SB-2. Measured water levels in existing wells and the open soil borings. Shipped soil samples to analytical laboratory.
- March 27 Performed packer test of siltstone/shale interval in Soil Boring SB-2. Drilled and sampled soil boring for Monitoring Well GMW-14. Shipped soil samples to analytical laboratory.
- March 30 Abandoned Soil Borings SB-1 and SB-2. Installed Monitoring Well GMW-14. Measured water levels in existing monitoring wells.
- March 31 Redeveloped Observation Wells OW-1, OW-2, and OW-3, and Monitoring Well GMW-8. Developed Monitoring Well GMW-14. Drilled, sampled, and abandoned Soil Borings SB-3 and SB-6. Measured water levels in existing wells. Shipped soil samples to analytical and soil engineering laboratories.
- April 1 Drilled and sampled the location originally designated as Soil Boring SB-5. This boring was renamed in the field to Monitoring Well GMW-15 due to installation of monitoring well. Performed two pump tests on Monitoring Well GMW-14.

Abandoned existing Monitoring Well GMW-12. Shipped soil samples and one groundwater sample to analytical laboratory.

- April 2 Performed pump test on Monitoring Well GMW-8. Drilled and sampled Soil Boring SB-4. Purged all wells for sampling, followed by collection of all indicated groundwater samples. Shipped soil and groundwater samples to analytical laboratory.
- April 3 Performed general site clean-up. Staged DOT-approved drums used to containerize all investigation-derived wastes. Demolished decontamination pad and containerized in DOT-approved drums.
- April 6 Drilled and sampled Monitoring Well GMW-16. Performed slug test on Monitoring Well GMW-4. Measured water levels in existing wells. Mobilized Layne's Schramm T660 drill rig and crew to site. Reestablished decontamination pad for additional work.
- April 7 Drilled and sampled Monitoring Well GMW-17. Installed and developed Monitoring Well GMW-16. Demobilized Layne's CME-75 drill rig and crew. Shipped soil samples to analytical laboratory.
- April 8 Completed drilling, sampling, and installing Monitoring Well GMW-17. Performed pump test of Monitoring Well GMW-16. Sampled groundwater from Monitoring Well GMW-16 for Fe, Mg, Mn, Ca, and alkalinity. Water samples delivered to laboratory for preservation and water quality analysis.
- April 9 Drilled Monitoring Well GMW-18. Collected groundwater samples from Monitoring Well GMW-16. Staged drums used to containerize investigation-derived waste. Measured water

- levels from existing monitoring wells. Shipped groundwater samples to analytical laboratory.
- April 10 Completed drilling of Monitoring Well GMW-18. Installed Monitoring Well GMW-18. Performed general clean-up of the GMW-18 well site. Measured water levels in existing monitoring wells.
- April 13 Completed surface caps for Monitoring Wells GMW-17 and GMW-18. Developed Monitoring Wells GMW-17 and GMW-18.
- April 14 Performed pump test on Monitoring Well GMW-17. Collected groundwater samples from Monitoring Wells GMW-17 and GMW-18. Measured water levels in existing monitoring wells. Demobilized Layne's Schramm drill rig and crew from site. Shipped groundwater samples to analytical laboratory.
- April 15 Measured water levels in existing monitoring wells.
- April 16 Performed rising head slug test on Monitoring Well GMW-18. Measured water levels in existing monitoring wells. Collected groundwater for water quality and VOC analysis and submitted to the analytical laboratory. Burns & McDonnell personnel demobilized from site.
- July 14 Two Burns & McDonnell field personnel arrived at the Site to conduct surface soil sampling in the southeast property corner. Hand auger borings AS-1, AS-2, and AS-3 were completed. Two soil samples were collected from each boring.
- July 15 Completed hand auger borings AS-4, AS-5, AS-6, AS-7, AS-8, and AS-9. Two soil samples were collected from each boring. Based upon sample screening with a 10.6eV photoionization

detector, four soil samples were chosen for laboratory analysis. Burns & McDonnell personnel left the Site and hand-delivered soil samples to American Technical and Analytical Services, Inc.

3.0 FIELD PROCEDURES

3.1 DRILLING AND LOGGING OF SUBSURFACE MATERIALS

All drilling activities associated with the soil borings and monitoring well installations were observed by a Burns & McDonnell field team member. Complete drilling logs of the subsurface materials and conditions encountered were made in the field during performance of the intrusive work. Also recorded in the drilling logs are sampling times and intervals, air monitoring results, and initial monitoring well construction details. These logs are duplicated in Appendix C. Figure 2-1 in the main body of this report shows the locations for the soil borings and monitoring wells completed during this investigation.

3.1.1 AIR MONITORING

For safety purposes during drilling operations, air within the breathing zone of the field crew and in the borehole was monitored with a photoionization detector (PID). Additionally, each soil sampler was screened for volatile organic vapors with the PID immediately upon retrieval from a boring. The associated soil sample and breathing zone PID readings were recorded on the drill logs. Along with set sampling criteria, soil PID readings were considered when selecting soil samples for laboratory analysis.

3.1.2 DRILLING LOGS

Drilling logs were prepared through the observation of drilling operations and the examination and classification of soil and rock samples. Recorded on each drilling log is the number and location of each borehole or monitoring well, as well as the soil and rock descriptions and sampling information.

3.1.3 DRILLING PROCEDURES

Two drill rigs and crews were used during the performance of the intrusive work during this investigation. Five soil borings (SB-1, SB-2, SB-3, SB-4, and SB-6) and five monitoring wells (GMW-14, GMW-15, GMW-16, GMW-17, and GMW-18) were installed during this investigation. Three existing monitoring wells (GMW-2, GMW-12, and GMW-13) were abandoned during this investigation.

A Central Mine Equipment (CME) CME-75 truck-mounted auger rig was used for the drilling of all soil borings and the drilling and installation of Monitoring Wells GMW-14, GMW-15, and GMW-16. The borehole for Monitoring Well GMW-17 was initiated using the CME-75 rig, but was completed using the Schramm T660 air rig. The existing Monitoring Wells GMW-2, GMW-12, and GMW-13 were abandoned using the CME-75 rig and crew. Monitoring Well GMW-18 was drilled and installed using the Schramm T660 air rig. The air rig was employed at the site due to auger refusal by the CME-75 rig in certain subsurface strata and also due to the boring diameter requirements of Monitoring Well GMW-18.

Drilling of the boreholes for this investigation followed standard drilling practices. Hollow stem augers (HSA) were used for all soil borings and monitoring wells with the exception of Monitoring Well GMW-18 which was drilled exclusively using the Schramm T660 air rig. The HSA sections were 5-feet in length and cut a nominal 8-inch diameter bore.

To minimize cross-contamination, the following precautions were taken:

- All drilling, downhole, and sampling equipment was decontaminated prior to each use.
- All cuttings were contained as drilling progressed.
- Monitoring wells installed using the CME-75 drill rig were constructed through the hollow stem augers. Monitoring wells installed using the Schramm T660 air rig were constructed through a collar and temporary casing which served to case off the upper portion of the borehole.

4.1.4 Monitoring Well Installation

Monitoring Wells GMW-14, GMW-15, GMW-16, GMW-17, and GMW-18, were installed using 4-inch-diameter schedule 40 PVC casing and No. 10 4-inch-diameter PVC screen with 0.010-inch openings.

- GMW-14 was set 23 feet below ground surface on top of a 1.8 foot bentonite pellet plug. The lower 5 feet of well consists of screen. The filter pack surrounding the screen consists of clear, coarse, silica sand and extends 2.1 feet above the screen. A 1.9' bentonite pellet seal was placed above the sand pack. A bentonite grout seal was installed from the seal to 2.7' below ground surface. A locking, water tight cap covers the top of the well casing. A steel flush mount protective cover was cemented in place with concrete to protect the casing.
- GMW-15 was set 19.8' below ground surface with the lower 5 feet consisting of screen. The filter pack consists of clean, coarse silica sand which extends 1.8 feet above the top of the screen. A 2-foot bentonite pellet seal was placed above the sand. A bentonite grout seal was placed above the seal to 2 feet below ground surface. A 1-foot layer of neat cement was placed above the grout. A locking, water-tight cap covers the top of the well casing, and a steel protective flush mount well cover was cemented in place with concrete.
- GMW-16 was set 34.5 feet below ground surface on top of a 4.7-foot bentonite pellets plug. The lower 5 feet of the well consists of screen. The filter pack consists of clean, coarse, silica sand which extends 1 foot above the top of the screen. A 2.5-foot bentonite pellet seal was placed above the sand.

A Bentonite grout seal was placed above the seal to 2.5 feet below ground surface. A 1-foot layer of neat cement was placed above the grout. A locking, water-tight cap covers the top of the well casing and a steel flush mount protective cover was cemented in place with concrete.

- GMW-17 was set 49.7' below ground surface with the lower 10 feet consisting of screen. The filter pack consisted of clean coarse, silica sand which extends 4.3' above the top of the screen. A 3.5 foot bentonite pellet seal was placed above the sand. A bentonite grout seal was placed above the seal to 12 feet below ground surface followed by a 10-foot layer of neat cement. A locking water-tight cap covers the top of the well casing, and a steel flush mount protective cover was cemented in place with concrete.
- GMW-18 was set 33.5' below ground surface with the lower 10 feet consisting of screen. The filter pack consisted of clean coarse sand which extends 9 feet above the top of the screen. A 2-foot bentonite pellet seal lies above the filter pack. A 10-foot bentonite grout seal was placed above the seal to 2 feet below ground surface. A locking water-tight cap covers the top of the well casing, and a steel flush mount protective cover was cemented in place with concrete.

3.1.5 Monitoring Well and Borehole Abandonment

GMW-2 was abandoned by pulling 15 feet of PVC well casing and screen without damage. The hole was redrilled with a 10" hollow stem auger to 19 feet below ground surface. Neat cement was pumped into the boring with a tremie pipe from the bottom of the open bore to ground surface.

GMW-12 was abandoned by pulling 30 feet of PVC pipe consisting of 20 foot screen from the boring. The hole was redrilled using a 8-inch hollow stem auger to 30.2 feet below ground surface. Neat cement was pumped into the boring with a tremie pipe from the bottom of the open bore to ground surface.

GMW-13 was abandoned by pulling 50 feet of PVC pipe, 20 feet of which consisted of screen, from the boring. The hole was redrilled using a 10-inch hollow stem auger to 50.2 feet below ground surface. Neat cement was pumped into the boring with a tremie pipe from the bottom of the bore to ground surface.

3.2 SUBSURFACE SOIL/ROCK SAMPLING

All sampling of subsurface soil and rock was performed using decontaminated CME samplers. Each sampler consisted of a 5-foot long steel tube split lengthwise and joined using flush-threaded end cap and shoe. Each CME sampler was decontaminated by hand between samples. Samples were selected for chemical analysis based on PID readings, odor, or stain and transferred to sample jars. Sample jar headspace readings were conducted and the samples were labeled and placed in a shipping cooler.

3.3 GROUNDWATER SAMPLING

3.3.1 Well Development

Following monitoring well installation, each well was developed to remove the fines suspended in the water by the drilling process, and to establish good communication with the stratigraphic unit screened. Development progressed for each well until one (or more) of the following criteria was met:

- The pH and specific conductivity measurements stabilized.
- The well was bailed dry.
- More than three well volumes were removed.

3.3.2 GROUNDWATER SAMPLING

The following procedure was followed to conduct groundwater sampling:

- A static water level reading was taken from a reference point at the top of the PVC casing.

- The volume of water was calculated for the well.
- The pH, conductivity, and temperature was measured and recorded in the field log book.
- The well was purged of three to five well volumes by bailing with a pre-cleaned disposable bailer. A well bailed dry was considered to be purged. New nylon rope was used to lower and raise the bailer for each sampling event per well.
- After sufficient recovery, a sample was collected with the disposable bailer. The rope was handled in a manner to prevent contact with the ground or other possible sources of contamination.
- The groundwater sample was placed directly in the sample bottles following accepted protocol.
- Each bottle was decontaminated, sealed, and labeled. Each sample was then logged on chain-of-custody forms.
- Sample bottles were packed in chilled coolers and sealed. Groundwater samples were shipped by Federal Express to NDRG Laboratories, Inc. in Richardson, Texas or hand delivered to American Technical & Analytical Services, Inc. in Maryland Heights, Missouri.

3.4 HYDROGEOLOGIC SITE SURVEY

During the Remedial Investigation several methods were used to characterize the hydrogeologic properties of the subsurface materials. These methods included frequent groundwater level measurements, well slug tests, and pumping-response tests.

3.4.1 Groundwater Level Measurements

Groundwater levels were measured in existing wells at the Site throughout the Remedial Investigation from March 24, 1992 to April 16, 1992 by Burns & McDonnell field investigation personnel. Additional groundwater level measurements were taken by personnel from Burns & McDonnell's St. Louis office until May 8, 1992.

In order to avoid cross-contamination of wells, the water level indicator was rinsed thoroughly with distilled water prior to insertion into a well. When measuring the groundwater level in a well, the following information was recorded on an Observed Water Level Form: date, time, name of person making the measurement, depth to water, groundwater elevation, and any applicable remarks.

3.4.2 Single Well Tests

Slug tests were conducted on five monitoring wells at the Site. The slug tests consisted of pumping water from the wells with a Grundfos Redi-Flo2 pump and measuring groundwater recovery with a Hermit 2000 Data Logger. The five wells that were tested in this manner were GMW-3, GMW-4, GMW-8, GMW-14, GMW-17, and GMW-18.

The time-recovery data that was collected from the wells during the slug tests were analyzed with the CBP Method (Response of a Finite-Diameter Well to an Instantaneous Charge of Water; H. Cooper, J. Bredehoeft, I. Papadopoulos, USGS Water Resources Research, 1967). The calculated values for hydraulic conductivity were within a range typically associated with a silty sand or a clean sand whereas the screened materials ranged from clays to sands. This apparent overestimation of hydraulic conductivities in the clay soils likely resulted from the fact well screens were not fully submerged (GMW-8), due to the effects of partial aquifer penetration, or may reflect secondary permeability such as cracks or joints. Other data obtained during the field investigation did not confirm these high permeabilities in the clay soils.

SLUG

3.4.3 Multiple Well Tests

Pumping-response tests were conducted on four of the wells installed by BMWCI during the Remedial Investigation. These tests consisted of pumping a well with a Grundfos Redi-Flo2 pump and observing groundwater levels in two or more observation wells with a Hermit 2000 Data Logger. Before each test the pump and data logger probes were decontaminated to prevent cross-contamination of wells.

- Observed Responses to Pumping of GMW-14

In order to determine the degree of hydraulic communication between the upper clay unit and the underlying silt unit, groundwater was pumped from GMW-14 and responses were observed in OW-1 and OW-2. The criteria for formal pump test analysis were not met with the available wells because the pumping well and observation wells are not completely screened within the same stratigraphic unit.

GMW-14 was installed by Burns & McDonnell on March 30, 1992. The well has a total depth of 23.0 ft. below grade. The screened interval is 5 feet in length and extends from 17.5 feet to 22.5 feet below grade. The upper 3 feet of screen is within the upper clay and the lower portion of the screen is within a highly weathered siltstone.

Wells OW-1 and OW-2 were installed in September 1990 by Groundwater Technology, Inc. OW-1 is located 11.6 feet south of GMW-14, and OW-2 is located 5.6 feet east of GMW-14. Both observation wells have depths of approximately 14 feet and are screened in the upper clay approximately 8.5 feet above the zone screened by GMW-14.

Two pumping-response tests were conducted on April 1, 1992 to allow the degree of hydrogeologic communication between monitoring well GMW-14 and observation wells OW-1 and OW-2 to be qualitatively evaluated. The pumping-response tests

were conducted by pumping GMW-14 and observing the water level responses in wells OW-1 and OW-2. During both tests, groundwater levels at the observation wells were lowered. A water level drawdown in GMW-14 of approximately 16 feet during the first pump test caused drawdowns of 0.06 and 0.42 feet in Observation Wells OW-1 and OW-2, respectively. This evidence implies that there is some degree of hydrogeologic communication between the observation wells and GMW-14.

Rigorous application of formal pump test analysis assumptions cannot be applied because of observation well construction. The data collected from observation wells OW-1 and OW-2 was analyzed, however, to see if reasonable hydrogeologic values could be determined. Two methods were used to calculate hydraulic conductivities, including the Jacob Semi-log Method (Flow of Groundwater, Rouse, Hunter, Engineering Hydraulics, 1950), and a log-log construction technique for leaky aquifers developed by Walton (Groundwater Resource Evaluation, Walton, 1970). Hydraulic conductivities were found to be generally within a range of 1 to 100 feet per day (3.5×10^{-4} to 3.5×10^{-2} centimeters per second). These values correspond to the expected range of hydraulic conductivities for an unconsolidated silt or loess (Groundwater, Freeze and Cherry, 1979, & Basic Groundwater Hydrology, Heath, USGS WSP 2220, 1983).

• Observed Responses to Pumping of GMW-16

GMW-16 was installed by Burns & McDonnell on April 6, 1992. The well has a total depth of 34.5 feet below grade. The screened interval is 5 feet in length and extends from 29 feet to 34 feet below grade. The geology of the screened interval, proceeding downwards from top of screen, consists of 2.6 of siltstone with sand, 0.4 feet of fine to very fine sand, and 2.2 feet of clay.

On April 8, 1992, GMW-16 was pumped and groundwater measurements were taken in GMW-14, GMW-8, OW-1, OW-2, and OW-3. GMW-14 is located 6.7 feet northwest of GMW-16, and GMW-8 is located 3.4 feet southeast of GMW-16. OW-1, OW-2, and OW-3 are at distances of 6.8, 6.4, and 15.8 feet, respectively, from GMW-16.

GMW-14 was installed by Burns & McDonnell on March 30, 1992. The well has a total depth of 23.0 feet. The screened interval is 5 feet in length and extends from 17.5 feet 22.5 feet below grade. The geology penetrated by the screened interval, proceeding downwards from top of screen, consists of 3 feet of clay and 2 feet of weathered siltstone and siltstone. If the geology penetrated by GMW-16 is laterally continuous, then between the bottom of GMW-14 and the top of GMW-16's screen, there is approximately 4 feet of siltstone, 2 feet of shale, and 0.5 feet of clay.

OW-1, OW-2, OW-3, and GMW-8 were installed by Groundwater Technology, Inc. in September 1990. These wells are all approximately 14 feet deep and are screened within the upper clay unit.

When GMW-16 was pumped, the groundwater level at GMW-14 was lowered. This indicates that there exists some hydrogeologic communication between strata immediately above the shale unit and strata immediately below the shale unit. However, the amount of drawdown at GMW-14, 0.10 feet, was small compared to the drawdown at GMW-16, approximately 27 feet. The amount of vertical transmission of water through the 2 foot shale layer is estimated to be extremely low.

The groundwater levels rose at OW-1, OW-2, OW-3, and GMW-8 during the pumping-response test. These rising groundwater levels are caused by naturally-occurring groundwater

fluctuations. Since no drawdown was observed in these wells, hydrogeologic communication between the strata screened in GMW-16 and the upper clay layer cannot be inferred.

Rigorous application of formal pump test analysis assumptions cannot be applied because of observation well construction, time-drawdown data from GMW-14 was analyzed, however, to see if reasonable hydrogeologic values could be determined. The two methods used to calculate hydraulic conductivities were the Jacob Semi-log Method (Flow of Groundwater, Rouse, Hunter, Engineering Hydraulics, 1950), and a log-log construction technique for leaky aquifers developed by Walton (Groundwater Resource Evaluation, Walton, 1970). The calculated values for hydraulic conductivities were 15.6 ft/day and 4.8 ft/day (5.52×10^{-3} cm/sec and 1.7×10^{-3} cm/sec). These values fall within the predicted range for an unconsolidated silt or loess (Groundwater, Freeze and Cherry, 1979 & Basic Ground-Water Hydrology, Heath, USGS WSP 2220, 1983).

• Observed Responses to Pumping of GMW-17

GMW-17 was pumped in order to determine the degree of hydrogeologic communication between wells screened in different stratigraphic units in the vicinity of the degreaser pit. The wells used for this pumping-response tests were GMW-17, the pumping well, and GMW-5, and GMW-18, the observation wells.

GMW-17 was installed by Burns & McDonnell on April 8, 1992. The well has a depth of 49.2 feet below grade. The screened interval is 10 feet in length and extends from 38.7 feet to 48.7 feet below grade. The upper 3.7 feet of screen is within a sandy siltstone layer, and the bottom 6.3 feet of screen is within a fine-grained sandstone. A shale and clay

layer exists above the screen and has a thickness of 3.3 feet that extends from 32.8 feet to 36.1 feet below grade.

GMW-18 was installed by Burns & McDonnell on April 9, 1992. The well is located 8.9 feet northwest of GMW-17 and has a depth of 33.5 feet below grade. The screened interval is 10 feet in length and extends from 23 feet to 33 feet below grade. The screen is within a siltstone layer and above the zone screened by GMW-17.

GMW-5 is located 5.6 feet north of GMW-17 and has a measured depth of 14.7 feet. GMW-5 is screened within the upper clay layer.

A pumping-response test was conducted on April 14, 1992. Groundwater was pumped from GMW-17 at an initial rate of 0.6 gpm. After pumping at that rate for 160 minutes, no drawdown was observed in GMW-5 and GMW-18. The pump rate was then increased to over 1 gallon per minute for the duration of the test. GMW-17 sustained a maximum drawdown of approximately 18 feet during the six-hour test. The water levels at GMW-5 and GMW-18 rose during the test as a result of natural groundwater fluctuations, and were not affected by the removal of water from GMW-17.

Since no drawdown was witnessed in the observation wells screened above the silt and clay layer, it is assumed that this layer is an effective aquitard that limits the vertical transmission of groundwater. Calculations of hydraulic conductivity were not possible from the results of this pumping-response test.

- Observed Responses to Pumping of GMW-18

GMW-18 was pumped in order to determine the degree of hydrogeologic communication between wells screened within

different stratigraphic units in the vicinity of the degreaser pit. The wells used for this pumping-response test were GMW-18, the pumping well; and GMW-17 and GMW-5, the observation wells.

GMW-18 was installed by Burns & McDonnell on April 9, 1992. The well has a depth of 33.5 feet below grade. The screened interval is 10 feet in length and extends from 23 to 33 feet below grade within a siltstone layer.

GMW-17 was installed by Burns & McDonnell on April 8, 1992. The well is located 8.9 feet southeast of GMW-18 and has a total depth of 49.2 feet below grade. The screened interval is 10 (ten) feet in length and extends from 38.7 feet to 48.7 feet below grade. The upper 3.7 feet of screen is within a sandy siltstone layer, and the bottom 6.3 feet is within a fine-grained sandstone. A shale and clay layer, having a thickness of 3.3 feet, lies between the interval screened by GMW-17 and the interval screened by GMW-18.

GMW-5 is located 5.6 feet east of GMW-18 and has a measured depth of 14.7 feet. GMW-5 is screened within the upper clay layer.

A pumping-response test was conducted on April 15, 1992. Groundwater was pumped from GMW-18 and groundwater levels were observed in GMW-5 and GMW-17. During the six-hour test, the water level dropped at GMW-5 which indicates that there is some degree of hydrogeologic communication between the upper clay layer and the underlying siltstone layer. The water level rose in GMW-17 throughout the test as a result of naturally-occurring groundwater fluctuations.

Rigorous application of formal pump test analysis assumptions cannot be applied because of observation well

construction, time-drawdown data from GMW-5, however, was analyzed to see if reasonable hydrogeologic values could be determined. The two methods used to calculate hydraulic conductivities were the Jacob Semi-log Method (Flow of Groundwater, Rouse, Hunter, Engineering Hydraulics, 1950), and a log-log construction technique developed for leaky aquifers by Boulton (Groundwater Resource Evaluation, Walton, 1970). The calculated hydraulic conductivities were 1.69 feet/day and 1.1 feet/day (5.92×10^{-4} cm/sec and 3.9×10^{-4} cm/sec), respectively. These values fall within the predicted range for an unconsolidated silt or loess (Groundwater, Freeze and Cherry, 1979 & Basic Groundwater Hydrology, Heath, USGS WSP 2220, 1983).

3.5 SOIL SURVEY NEAR THE SOUTHEAST PROPERTY CORNER

On July 14 and July 15, 1992, a soil survey was conducted near the southeast property corner in order to delineate the extent of shallow soil contamination, if any, in that area. Nine borings were conducted in the following manner:

- The upper gravel layer, when present, was removed with a pick, spade, and earth drill.
- The depth of gravel was measured and recorded.
- A decontaminated hand auger was used to collect a soil sample (denoted S1) from just below the gravel and within the upper portion of clay fill.
- The soil sample was split between a zip-lock bag and a laboratory-provided sample jar.
- The sample interval was measured and recorded.
- The sample jar was placed in an ice-packed cooler.

- Fifteen minutes after sample collection, the soil sample in the zip-lock bag was screened with a 10.6 eV photoionization detector. The reading was recorded.
- The hole was advanced again with a decontaminated auger until natural soil was encountered. A sample was taken from the top of natural soil (denoted S2).
- Soil sample collection steps above were repeated.
- Soil cuttings were placed back in the hole.

4.0 SAMPLE HANDLING

All analytical and physical samples collected for this investigation were handled in a fashion to preserve sample integrity and prevent cross-contamination. Disposable latex gloves were worn by the sampling team during sampling collection and packing activities.

The following are the basic analytical sample processing and packaging steps taken in shipment preparation:

- All sample containers were decontaminated prior to processing. Containers were either wiped clean with dry paper towels or, when necessary, with paper towels wetted with deionized water.
- Each sample bottle was wrapped with bubble plastic packing or foam prior to placing in the shipping cooler.
- Each sample was recorded on chain-of-custodies prior to packing.

- Coolers were prepared by first wiping dust and dirt out with paper towels and then by sealing all openings (drain spouts, etc.) with duct tape.
- A large plastic bag was placed in the cooler to keep the sample containers dry. Cardboard dividers were used to keep the wrapped containers separated. With sample containers in place, the plastic bag was closed.
- Ice-filled "zip-lock" plastic bags were placed along the sides and top of the large plastic bag.
- Chain-of-custodies were taped, in plastic, to the top of the inside cooler lid. Each cooler was then secured with duct tape by sealing the cooler lid/body joint. A sample seal was applied and dated.

All samples being submitted to NDRC Laboratories of Richardson, Texas were shipped by overnight courier. All samples being submitted to American Technical & Analytical Services, Inc. of St. Louis, Missouri were packed as described above and hand delivered to the laboratory. Physical samples were hand delivered to Shannon & Wilson, Inc. of St. Louis, Missouri in double "zip-locked" plastic bags for sieve analyses or in Shelby tubes for permeability testing.

5.0 DECONTAMINATION AND WASTE MANAGEMENT

5.1 DECONTAMINATION

All equipment used during the remedial action investigation of the site was cleaned following rigid decontamination procedures. Two basic methods were used for all decontamination. For drilling equipment (rig, augers, etc.) high pressure hot water spray was used for decontamination. Decontamination of sampling equipment and other small items was completed in accordance with the following procedures:

- Remove all coarse material by hand.
- Scrub equipment with a brush in Alconox detergent and water solution.
- Rinse equipment with distilled water.
- Rinse with methanol.
- Rinse with deionized water.
- Allow equipment to air dry.

5.2 WASTE MANAGEMENT

Waste generated during the site investigation was placed in DOT-approved 55-gallon steel drums. Each drum was labeled for content (soil, water, etc.) and location from which the material was generated. Solid waste (plastic, construction material, etc.) was placed in separate drums and labeled. Each drum was sealed with a lid and secured with a ring and bolt. The drums were staged on-site in rows, separated by content type, for subsequent disposal by EG&G.

* * * * *

APPENDIX B
DETAILED SUMMARIES OF
PAST INVESTIGATIONS

APPENDIX B
DETAILED SUMMARIES OF PAST INVESTIGATION

1.0 INTRODUCTION

Several environmental investigations have been conducted on the MMSC property since 1988. These investigations were initiated by EG&G KT Aerofab. An environmental audit of the site was performed by O'Brien and Gere (OBG) prior to the purchase of the property from Alco. Follow-up investigations at the site have been conducted by Groundwater Technology, Inc.

Investigation summaries presented in this Appendix outline the activities and results of each investigative phase at the site.

2.0 O'BRIEN AND GERE ENVIRONMENTAL AUDIT

2.1 INTRODUCTION

An environmental audit was conducted at the site in early 1988 by O'Brien and Gere Engineers, Inc. prior to the purchase of the Missouri Metals facility by EG&G, Inc. from Alco Aerospace Company. The audit consisted of site visual inspections, installation of groundwater monitoring wells, soil and groundwater sampling and interviews with plant personnel. The purpose of the audit was to identify the existence of past, present or potential environmental concerns at the Missouri Metals Facility. Based on information obtained from the audit, a preliminary report dated March, 1988 was prepared and presented to EG&G. This section provides a summary of information presented in the O'Brien and Gere report and a technical evaluation of report data and conclusions.

2.2 IDENTIFICATION AND EVALUATION OF PLANT WASTE STREAMS

The Missouri Metal Facility was identified as a manufacturer of aircraft component parts. Stock metals (primarily stainless steel, aluminum and titanium) are formed, finished and inspected prior to shipment to aircraft manufacturers. Wastes generated during this process were reported to be waste oils generated from the hydraulic presses used to stamp and form metal parts, degreasing solvent (perchloroethene) used to clean metal parts, and sodium chromate which is used to pickle titanium component parts.

Vapor degreasing of metal parts using perchloroethylene was reportedly performed in a 12 foot deep pit. Prior to use, the perchloroethylene solvent product is stored in two 500 gallon aboveground bulk storage tanks. Spent perchloroethylene reportedly is generated at the rate of approximately 2300 kilograms per month. Waste solvent is stored in 55 gallon drums in the waste storage area prior to shipment off-site.

Sodium chromate, in sodium hydroxide solution, is used in pickling tanks to treat titanium parts. Following the sodium chromate treatment the parts were reportedly rinsed in a nitric acid and hydrofluoric acid solution bath and a water bath. The sodium chromate, acid rinse, and water rinse tanks were reportedly emptied and cleaned semi-annually. Sodium chromate wastes and tank sludge were barreled for shipment off-site to a disposal facility. Liquid acid and water wastes from the rinse tanks were discharged to the Metropolitan Sewer District following treatment. The rinse tank area reportedly was provided with spill containment controls. Waste oils generated from hydraulic press oil changes were reportedly also shipped off-site for disposal. The volume and the storage location for waste oil and oil product on-site was not discussed in the O'Brien and Gere audit report.

Management practices for the hazardous material waste streams was not evaluated in depth by the O'Brien and Gere report. However, the site investigation did include a inspection of the waste storage area and a summary of a past MDNR inspection report. During their site investigation O'Brien and Gere personnel reportedly found several waste barrels having incomplete or missing labels and some waste barrels being stored outside of the contained waste storage area. A MDNR investigation of this facility in 1987 resulted in the issuance of a RCRA Facility Inspection Report listing seven unsatisfactory features of the waste storage facility. Storage of wastes outside of a proper containment area was one of the unsatisfactory features listed in the MDNR Report of Investigation.

The audit also evaluated whether PCB or asbestos materials were being used on the site. Asbestos containing materials were identified during the site investigation.

2.3 FIELD INVESTIGATION SUMMARY

Field investigations at the site included the installation of 19 boreholes and the construction of monitoring wells in four of these boreholes. These sampling point locations are shown in Figure B-1. The monitoring well boreholes were drilled to a depth of 16.5 feet. The remaining boreholes were drilled to a depth of 5 feet. During the investigation surface and subsurface soil samples and groundwater samples were collected for analysis. Results from the soil and groundwater sampling are presented in Tables B-1, B-2, B-3, B-4 and B-5. PCBs were not detected in wipe samples collected in areas of potential PCB contamination.

2.4 DISCUSSION OF REPORT DATA

The groundwater investigation and soil boring program indicates levels of volatile organic compounds are present in groundwater and subsurface soil at the site. Two monitoring wells were placed in upgradient locations and two monitoring wells were located on the lower portion of the property. Positive levels of volatile organic compounds were detected in each of the monitoring wells. Detected levels were low in the upgradient wells GMW-1 and GMW-4 and highest in GMW-3, which is the furthest downgradient monitoring well on the site. This groundwater data suggests that past releases of volatile organic compounds have occurred on the site.

Total chromium (unfiltered) levels in the groundwater exceeded the Maximum Contaminant Level (MCL) at the upgradient well. However, the EP toxicity level of chromium, which is a filtered water sample, was much less than the MCL. As a result, the chromium in groundwater appears to be present primarily as particulates, probably associated with sediment in the groundwater sample.

Soil borings were performed primarily in the hazardous waste storage area and the degreaser area. Contamination was detected in each of the three subsurface soil samples collected from the degreaser area. Levels of contamination detected in the hazardous waste storage area were random. Low levels of volatile organic compound contamination were detected in B-7, B-13 and B-15. Contamination was not detected soil samples from nearby boreholes B-4, B-6, B-9 and B-11. Samples

UPGRADIENT WELL






GMW#1

▲ S-5

GMW #4
▲ S-4

RACK STORAGE

LEGEND

-  GROUNDWATER MONITORING WELL LOCATIONS
-  SHALLOW SOIL BORING LOCATIONS
-  SURFACE SOIL SAMPLES

GMW #

• B-15

• B-12

BLIND SUMP
HOLDING TANK

• B-14

• B-11

GMW #3

• B-10

B-15 • DRUM STORAGE

Source: O'Brien

B-1

ENVIRONMENTAL AUDIT
SAMPLING LAYOUT

EMPLOYEE OWNED
Burns & McDonnell
ENGINEERS - ARCHITECTS - CONSULTANTS

TABLE B-1

AUDIT GROUNDWATER ANALYTICAL RESULTS

Parameter	Monitoring Well Number			
	GMW #1	GMW #2	GMW #3	GMW #4
Total Chromium (ppm)	0.112	0.026	0.062	0.068
EP Toxic Chromium (ppm)	0.015	0.016	0.008	0.012
Total Organic Carbon (ppm)	17.9	7.48	6.43	4.15
Oil & Grease (ppm)	5*	5*	7.45	5*
Specific Conductivity				
pH				
Volatile Organics ⁺ (ppb)				
Perchloroethylene	0.60	15.73	115.22	--
Bromoform	--	2.59	2.36	2.33
Carbon Tetrachloride	3.30	--	--	--
Chlorobenzene	--	2.74	--	--
1,1-Dichloroethene	--	53.90	43.84	--
Trans-1,2-Dichloroethene	--	127.02	131.62	39.11
Trichloroethene	--	320.13	345.47	28.43
Bromodichloromethane	--	--	7.81	--
1,1,1-Trichloroethane	--	54.75	52.06	10.85

*Denotes less than value shown

⁺Only the detectable volatile components are shown here. For complete list, including non-detectable components, see Appendix C.

TABLE B-2

ANALYTICAL RESULTS

Parameter	Sample Description									
	B-1 3.5'-5.0'	B-2 3.5'-5.0'	B-3 2.5'-4.0'	B-4 3.0'-4.5'	B-6 3.0'-4.5'	B-7 2.5'-4.0'	B-9 2.5'-4.0'	B-11 2.5'-4.0'	B-13 3.0'-4.5'	B-15 3.5'-5.0'
Total Chromium (ppm)	13.7	11.8	26.6	26.6	18.4	16.0	13.8	35.9	26.5	14.5
EP Toxic Chromium (ppm)	0.012	0.003*	0.003*	0.016	0.006	0.010	0.010	0.009	0.018	0.011
Total Organic Carbon (ppm)	30,033	10,114	9,049	11,458	49,345	22,490	6,006	8,652	8,261	16,964
pH (S.U.)	6.72	7.68	5.80	7.77	7.90	7.47	7.14	8.01	8.22	7.90
Oil & Grease (%)	0.048	0.005	0.104	0.070	0.060	0.042	0.061	0.043	0.483	0.069
Volatiles ⁺ (ppm)										
Perchloroethylene	1.31	21.30	11.03	ND	ND	6.73	ND	ND	1.35	2.65
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.87
Trans-1,2-Dichloroethene	ND	ND	9.34	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	12.85	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.09
1,1,1-Trichloroethane	ND	0.34	ND	ND	ND	ND	ND	ND	3.89	ND

ND - Non-detectable

*Denotes less than value shown

Source: O'Brian and Gere, 1988

+Only the detectable volatile components are shown here. For a complete list, including non-detectable components, see Appendix C.

TABLE B-3

AUDIT SURFACE SOIL ANALYTICAL RESULTS

Parameter	Sample Description				
	S-1 East Drainage	S-2 East Drainage	S-3 Stained Soil	S-4 Southwest Corner	S-5 West Boundary
Total Chromium (ppm)	732	38.7	31.3	25.8	28.4
EP Toxic Chromium (ppm)	0.068	0.027	0.046	0.037	0.038
Total Organic Carbon (ppm)	99,700	141,789	594,542	40,228	148,208
pH (S.U.)	8.20	8.15	7.38	8.38	8.43
Oil & Grease (%)	13.57	1.66	20.48	0.34	0.20
Volatiles* (ppm)					
Chlorobenzene	--	3.35	--	--	--
1,2-Dichloroethane	--	1.57	--	--	--
1,1,1-Trichloroethane	--	--	2.16	--	--

*Only the detectable volatiles are shown here.
For complete list, including non-detectable components, see Appendix C.

Source: O'Brian and Gere, 1988

TABLE B-4

AUDIT OIL WIPE SAMPLE ANALYTICAL RESULTS

<u>PCB's</u> (ppm)	<u>Bldg. A-1</u>	<u>Sample</u> <u>Bldg. A-2</u>	<u>Bldg. B-1</u>	<u>Bldg. B-2</u>
Aroclor 1016	0.5*	0.5*	2.1*	0.5*
Aroclor 1221	0.5*	0.5*	2.1*	0.5*
Aroclor 1232	0.5*	0.5*	2.1*	0.5*
Aroclor 1242	0.5*	0.5*	2.1*	0.5*
Aroclor 1248	0.5*	0.5*	2.1*	0.5*
Aroclor 1254	0.5*	0.5*	2.1*	0.5*
Aroclor 1260	0.5*	0.5*	2.1*	0.5*

*Denotes less than value shown

Source: O'Brian and Gere, 1988

TABLE B-5

AUDIT ASBESTOS ANALYTICAL RESULTS

<u>Sample Description</u>	<u>Asbestos, %</u>
001 Side Door Seal - Oven 44-69	ND*
002 Bottom Door Seal - Oven 44-69	40-50% Chrysotile
003 Loose Piece from Lindbergh Oven	ND*
004 Door Insulation - Lindbergh Oven	ND*
005 Insulation Board near Hot Forms	10-20% Chrysotile
006 White Board from Unit "6"	ND*
007 Engineering Office Ceiling Tile	ND*
008 Accounting Office Ceiling Tile	ND*
009 Heat Treat Furnace - Lindbergh 10410	ND*
010 Ager Furnace Door Seal	ND*
011 Hot Press #6	ND*
012 Heat Treat Furnace 44-69-Bottom Door Seal	30-40% Chrysotile
013 Ager Air Furnace, Floor Insulation	10-20% Chrysotile, 3-5% Amosite

*ND = No asbestos detected, less than 1% if present

Source: O'Brian and Gere, 1988

were not collected from boreholes B-5, B-8, B-10, B-12 and B-14 which are also located in the hazardous waste storage area. Analytical results for the soil samples indicate that soil contamination is present in the degreaser area; however, data for the hazardous waste storage area is not conclusive. The low contaminant levels in this area may have resulted from migration of contaminants from an upgradient source or may represent isolated spill areas.

Analysis of a surface soil sample collected from a small stained soil area located west of the degreaser facilities indicated high levels of total organic carbon and oil and grease. This data suggests that past spillage of oil may have occurred in this area; however, does not indicate a significant site problem. Due to the apparent small size of the area of contaminated soil and the relatively low mobility of PAH compounds, this area of stained soil would not appear to represent an exposure concern to on-site workers or off-site residents.

Asbestos containing insulation was also identified during the site audit. The asbestos materials were not in a friable condition and reportedly did not pose an exposure concern to on-site workers or off-site residents. No PCB contaminated oils were detected during the audit investigation.

Quality assurance/quality control samples were not collected or analyzed during the site audit. No analytical data is available for duplicate samples, trip blanks, surrogate or matrix spike recovery samples to verify the accuracy of the analytical laboratory. Analytical data is assumed to be accurate; however, this assumption is not documented by QA/QC analytical data.

2.5 DATA GAPS

The site audit was intended to provide an initial evaluation of soil and groundwater contamination levels across the property. The results of the audit indicated the need to conduct further site investigations to determine the nature and extent of site contamination. The primary data gaps identified based on review of the O'Brien and Gere report are as follows:

- The audit did not evaluate or discuss hydrogeologic properties of the shallow perched groundwater system sampled during the audit.
- Soil samples obtained during the audit were select samples from shallow depths (0-5 feet). No information on the vertical extent of soil contamination is available.
- The audit report indicates that soil samples collected during the boring program which appeared to be tainted or exhibited an odor were delivered for analysis. Soil samples were apparently not collected for analysis from the boreholes B-5, B-8, B-10, B-12 and B-14. Based on the absence of analytical data it is assumed that soils from these boreholes exhibited no noticeable evidence of contamination at the time of sampling; however, the reason for the lack of analytical data is not specifically stated in the report.
- Groundwater sampling results do not indicate whether groundwater contaminant level differences exist with depth across the site.

3.0 GTI SITE CHARACTERIZATION AND SOIL GAS SURVEY

3.1 INTRODUCTION

Groundwater Technology, Inc. (GTI) was requested by EG&G in May, 1989 to perform a Site Characterization Investigation and soil gas survey at the Missouri Metals Facility. This investigation was performed by GTI after purchase of the Missouri Metals Facility by EG&G. The goal of the site characterization investigation was to confirm existing groundwater quality data, further delineate the extent and degree of soil and groundwater contamination that may have resulted from past plant operations, and to locate and characterize existing source areas. Following the performance of this project a report entitled, "Site Characterization and Soil Gas Survey at the EG&G KT Aerofab Plant, St. Louis, Missouri" dated July 20, 1989 was prepared. This section presents a summary of the information presented in the site characterization report and a technical evaluation of report data and conclusions.

3.2 SOIL GAS SURVEY

Soil gas samples were collected from 15 sampling locations within the EG&G KT Aerofab facility. The soil gas survey was performed by driving a soil gas extraction probe approximately 2.5 to 5.0 feet below the ground surface at each soil-gas sampling location, connecting a probe to an air pump and extracting an air sample from the subsurface soil through the gas extraction probe. Isoconcentration maps displaying the soil gas sampling locations, and the distribution of tetrachloroethene and trichloroethene detected in the soil gas are presented in Figures B-3 and B-4, respectively.

3.3 HYDROGEOLOGIC INVESTIGATION

An initial groundwater investigation activity at the site consisted of measuring the groundwater levels in the audit monitoring wells to assess groundwater flow direction across the site. The groundwater level measurements indicated groundwater flow within the upper portion of the perched water table is toward the south-southeast. Groundwater samples from these monitoring wells were also obtained at this time. Analytical results from the groundwater samples are presented in Tables B-6 and B-7. Each groundwater sample was analyzed for volatile organic compounds (EPA method 601/602) and for the EPA 13 Priority Pollutant Metals.

An off-site surface water sample was also collected during this investigation from concrete drainage ditch which runs south of the site. The water sample from the drainage channel was analyzed for the same parameters as the groundwater samples. Analytical results for the surface water sample are also presented in Table B-6. The exact sampling location for the off-site surface water sample is not indicated in the report, however, is assumed to be from the River Des Peres which is located approximately 2,000 feet south of the site. The River Des Peres drainage channel is briefly discussed in the site location section of the Site Characterization Report.

3.4 DATA GAPS

Based on review of the GTI Site Characterization Report the following remaining data gaps were identified:

TABLE B-6

**Groundwater VOC Results
EG&G/St. Louis**

May 18, 1989

<u>SAMPLE #</u>	<u>PCE</u>	<u>TCE</u>	<u>TRANS-1, 2-DICHLOROETHENE</u>	<u>1,1- DICHLOROETHENE</u>	<u>VINYL CHLORIDE</u>	<u>TOTAL VOC</u>
GMW-1	ND	ND	ND	ND	ND	ND
GMW-2	1.0	49	49	0.6	4.5	104.1
GMW-3	1.4	110	270	2.6	12	396.0
GMW-4	ND	0.3	3.7	ND	ND	4.0
Concrete Canal	ND	1.4	1.1	ND	ND	2.5
MDNR allowable limits for ground- water	0.8	5	NL	7	2	
EPA drinking water quality criteria	5	5	100	7	2	

Concentrations in ug/L (ppb)
PCE = Perchloroethene
TCE = Trichloroethene
ND = Below detectable limits
NL = Not Listed

Source: Groundwater Technology, Inc. Report, July 1989

TABLE B-7

Groundwater Metals Results
EG&G/St. Louis

May 18, 1989

<u>SAMPLE #</u>	<u>LEAD</u>	<u>CHROMIUM</u>	<u>ZINC</u>	<u>NICKEL</u>	<u>CADMIUM</u>	<u>COPPER</u>	<u>MERCURY</u>	<u>ARSENIC</u>
GMW-1	6	ND	70	80	0.6	ND	ND	ND
GMW-2	12	ND	100	50	7	40	ND	ND
GMW-3	616	223	3900	210	1.1	300	0.3	16
GMW-4	13	5	70	50	2.1	ND	0.2	ND
Concrete Canal	ND	ND	90	ND	ND	ND	0.6	ND
MDNR Ground Water Quality Criteria	50	50	2000	200	10	1000	2	50

Concentrations in ug/L (ppb)

NL = Not Listed

ND = Below detectable limits

Source: Groundwater Technology, Inc. Report, July 1989

- The soil gas survey provides an indication of the horizontal extent of contamination at the site in the shallow soil profile. However, this data does not indicate the vertical extent of volatile organic contaminants. The horizontal extent of contaminant migration off-site is also not known.
- The recharge characteristics of the shallow perched water table have not been evaluated for the site area.
- The site investigation did not characterize physical properties of the potentially contaminated soils. Physical characteristics of the soil, such as permeability, should be determined to define the mobility of the contaminants in the soil system.
- A sample of water from a downgradient surface water channel was collected during the site characterization, however, the significance of results or the purpose for sample collection was not described in the GTI report. The fact that the sample was collected suggests that the site may have impacted surface water quality at this downgradient location. However, the relationship between low levels of contamination detected in the River Des Peres, a local stormwater drainage channel, and the site was not discussed. Since surface water sampling from upgradient locations was not performed, it would appear that the source of contamination in the surface water sample is unknown.

4.0 GTI REPORT FOR A SUPPLEMENTAL SITE ASSESSMENT

4.1 INTRODUCTION

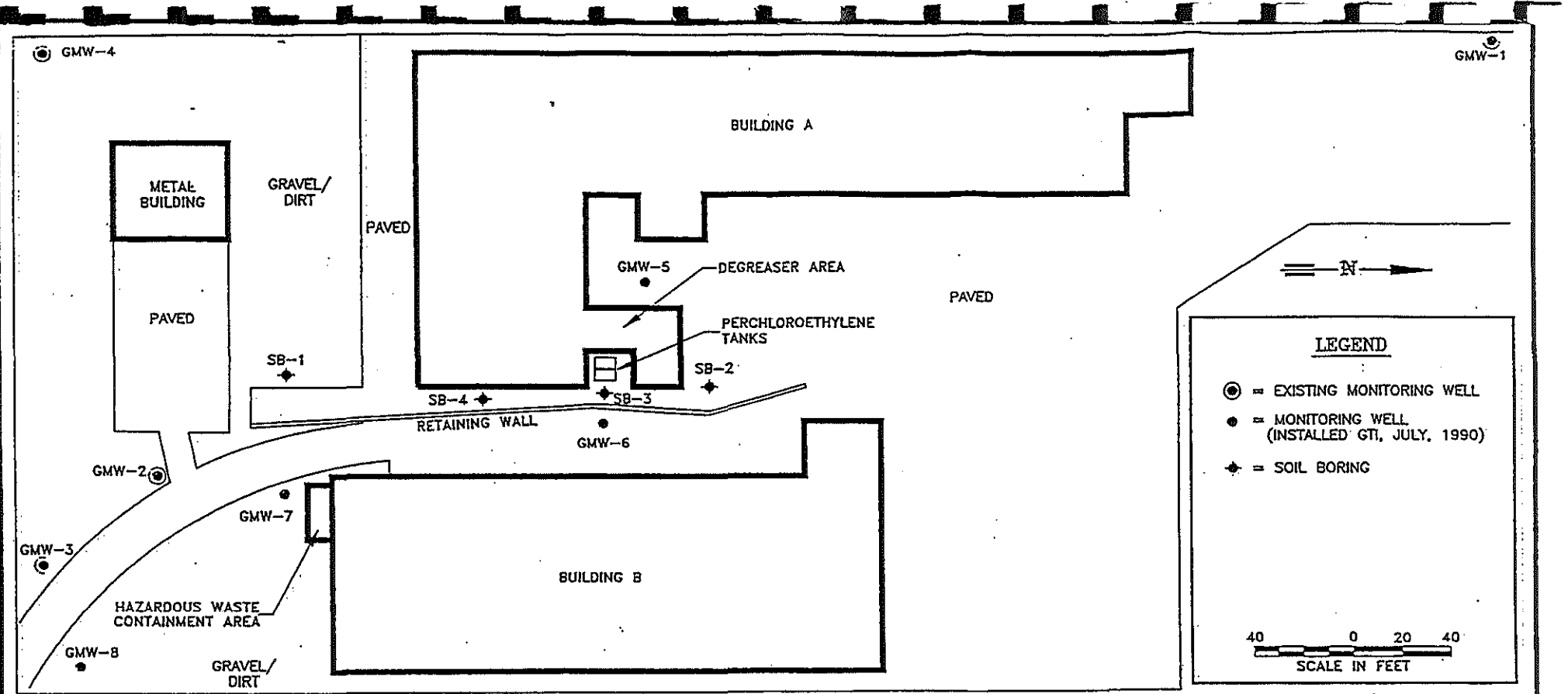
The third site investigation phase on the EG&G property was performed in July, 1990, by Groundwater Technology, Inc. (GTI). The indicated purpose of this project was to supplement site contaminant level data obtained from previous investigations through groundwater and soil sampling and analysis. The results

of this supplemental investigation were presented in a report dated January 31, 1991 and entitled, "A Report for a Supplemental Site Assessment at EG&G Aerofab Missouri Metals." This section presents a summary of information obtained during this investigation phase and a technical evaluation of the report data and conclusions.

4.2 FIELD ACTIVITIES

Based on the results of a soil gas survey at the site, it was determined that the existing O'Brien and Gere monitoring wells were not installed in suspected source areas, where contamination levels were expected to be highest. During this investigation four additional monitoring wells were installed at the site, as indicated in Figure B-2. Monitoring wells GMW-5, GMW-6, and GMW-7 are located in the vicinity of the potential site source areas; the degreaser area, tetrachloroethene storage tanks and the hazardous waste storage area, respectively. GMW-8 is located in the southeast corner of the site, near the furthest downgradient location on the property. Report text indicates that each of these monitoring wells were constructed of 4-inch diameter PVC casing; however, well logs for these wells indicate that the well casing and screens were 2 inches in diameter.

Soil samples were collected at 3-foot intervals from each borehole during installation of the monitoring wells. The one sample from each borehole having the highest organic-vapor head space reading was selected for laboratory analysis. Following installation of the monitoring wells a groundwater sample was collected from each of the existing eight monitoring wells. A second round of groundwater samples were collected from monitoring wells GMW-5, 6, 7 and 8 on October 25, 1990. The analytical results for these samples are presented in Tables B-8, B-9, B-10, B-11 and B-12. Drilling logs for Monitoring Well GMW-6 indicate that a "perc" odor and oil staining was noticeable in subsurface soil at an approximate 8 foot depth and deeper. The soil sample from this borehole which was analyzed was collected from the 6 to 9 foot depth. This depth of observed contamination would appear to be approximately near the bottom of the degreasing pit.



SOURCE: GROUNDWATER TECHNOLOGIES, INC., 1991

EMPLOYEE-OWNED
Burns & McDonnell
 ENGINEERS - ARCHITECTS - CONSULTANTS
 Kansas City, Missouri

B-2
 GTI SITE MAP

TABLE B-8

VOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS - SOILS
 PHASE II - SUPPLEMENTAL SITE ASSESSMENT
 E G & G/ST. LOUIS, MISSOURI

[Concentrations in mg/kg (ppm)]

Location	Date Sampled	Sample Depth	Trans-1,2-Dichloroethene	Tri-chloroethene	Tetra-Chloroethene
SB #1	7-17-90	6-9'	ND	ND	ND
SB #2	7-18-90	2-3'	.07	.08	.13
SB #3	7-18-90	1-3'	ND	.33	290
SB #4	7-18-90	3-6'	ND	ND	.17
GMW #5	7-18-90	3-6'	ND	ND	ND
GMW #6	7-19-90	6-9'	.23	.56	7.3
GMW #7	7-17-90	76-9'	ND	ND	ND
GMW #8	7-17-90	6-9'	.27	.10	ND
Action Level			10	80	10

ND = Non detectable

Action Level = Levels above which corrective action is required under proposed rules. Federal Register July 27, 1990, 55 FR 30863.

NOTE: Insitu concentration could be higher due to volatilization of VOCs during sample handling.

Source: Groundwater Technology, Inc. Report, January 1991

TABLE B-9

PRIORITY POLLUTANT METALS ANALYTICAL RESULTS - SOILS
 PHASE II - SUPPLEMENTAL SITE ASSESSMENT
 E G & G/ST. LOUIS, MISSOURI

[Concentrations in mg/kg (ppm)]

Location	Date Sampled	Sample Depth	Arsenic	Chromium	Copper	Lead	Nickel	Zinc
SB #1	7-17-90	6-9'	1.6	16	14	21	71	75
SB #2	7-18-90	2-3'	4.9	13	15	15	16	47
SB #3	7-18-90	1-3'	4.3	14	17	20	16	120
SB #4	7-18-90	3-6'	4.2	11	17	17	17	200
GMW #5	7-18-90	3-6'	1.2	9	8	10	10	26
GMW #6	7-19-90	6-9'	3.4	14	10	10	16	31
GMW #7	7-17-90	6-9'	8.4	23	20	120	33	54
GMW #8	7-17-90	6-9'	4.8	11	13	12	19	38
Action Level			80	400+	NL	NL	2000	NL
Selected Average for Soils*			5	100	30	10	40	50

Action Level = Levels above which corrective action is required under proposed rules. Federal Register July 27, 1990, 55 FR 30863.

= As chromium VI

= Not listed

= From Chemical Equilibria in Soils by Willard L. Lindsay, 1979.

Source: Groundwater Technology, Inc. Report, January 1991

TABLE B-10

VOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS - GROUNDWATER
 PHASE II - SUPPLEMENTAL SITE ASSESSMENT
 E G & G/ST. LOUIS, MISSOURI

July 20, 1990 (May 18, 1989)

[Concentration in ug/L (ppb)]

Location	Vinyl- Chloride	Methylene- chloride	1,1- Dichloroethene	1,1- Dichloro- ethane	trans-1,2- Dichloro- ethene	Chloroform	1,1,1- Trichloro- ethane
GMW #1	ND (ND)	ND	ND (ND)	ND	ND (ND)	ND	ND
GMW #2	6.0 (4.5)	ND	ND (0.6)	ND	43 (49)	ND	ND
GMW #3	14 (12)	ND	1.6 (2.6)	ND	100 (270)	ND	ND
GMW #4	11 (ND)	ND	1.8 (ND)	ND	110 (3.7)	ND	ND
GMW #5	760	ND	ND	ND	1,400	ND	ND
GMW #6	830	120	180	82	9,300	ND	130
MGW #7	40	ND	0.7	ND	200	6.3	ND
GMW #8	8,900	ND	ND	ND	38,000	ND	ND
MDNR	2	NL	7	NL	NL	NL	200

Source: Groundwater Technology, Inc. Report, January 1991

TABLE B-10

VOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS - GROUNDWATER
 PHASE II - SUPPLEMENTAL SITE ASSESSMENT
 E G & G/ST. LOUIS, MISSOURI

July 20, 1990 (May 18, 1989)

[Concentration in ug/L (ppb)]

Location	Trichloro-ethene	Benzene	1,1,2-Trichloro-ethane	Tetra-chloro-ethene	Toluene	Chloro-benzene	Total Xylenes	1,4-Dichloro-benzene
GMW #1	ND (ND)	ND	ND	ND (ND)	ND	ND	ND	ND
GMW #2	32 (49)	0.3	ND	ND (1.0)	ND	ND	ND	ND
GMW #3	170 (110)	0.3	ND	ND (1.4)	2.6	ND	ND	ND
GMW #4	180 (0.3)	ND	ND	ND (ND)	2.5	ND	ND	ND
GMW #5	2,000	ND	ND	6,000	ND	ND	ND	370
GMW #6	26,000	ND	ND	41,000	ND	150	ND	ND
GMW #7	4,700	0.4	1.5	11	6.9	ND	1.1	ND
GMW #8	68,000	ND	ND	ND	ND	ND	ND	ND
MDNR	5	5	NL	0.8	NL	20	NL	400

MDNR = 10 CSR 20-7.031 Water Quality Standards State of Missouri. Maximum contamination level.

NL = Not Listed

ND = Non detectable (below Practical Quantitation Limit)

Notes: The values shown represent two sampling events. The values in parentheses pertain to samples collected on May 18, 1989. All other values represent samples collected on July 20, 1990.

TABLE B-11

VOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS - GROUNDWATER
 PHASE II - SUPPLEMENTAL SITE ASSESSMENT
 E G & G/ST. LOUIS, MISSOURI

[Concentration in ug/L (ppb)]

Samples collected on October 25, 1990

Location	Vinyl-Chloride	Methylene Chloride	1,1-Dichlorethene	1,1-Dichlorethene	trans-1,2-Dichlorethene
GMW #5	2,100	ND	15	ND	4,100
MGW #6	860	26 JB	260	67	50,000
GMW #7	21	ND	2 J	ND	1,500
GMW #8	14,000	2 JB	170	ND	100,000
MDNR	2	NL	7	NL	NL

Source: Groundwater Technology, Inc. Report, July 1989

TABLE B-11

VOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS - GROUNDWATER
 PHASE II - SUPPLEMENTAL SITE ASSESSMENT
 E G & G/ST. LOUIS, MISSOURI

[Concentration in ug/L (ppb)]

Samples collected on October 25, 1990

Location	1,1,1- Trichlorethane	Trichlorethene	1,1,2- Trichloroethane	Tetra- chlorethene	Toluene
GMW #5	ND	2,700	ND	22,000	133
GMW #6	170	53,000	ND	88,000	ND
GMW #7	ND	8,200	ND	ND	ND
GMW #8	ND	65,000	30	10	130
MDNR	200	5	NL	0.8	NL

ND = Non detectable (below Practical Quantitation Limit)

MDNR = 10 CSR 20 - 7.031 Water Quality Standards, State of Missouri. Maximum contamination level.

Notes: J = Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the quantitation limit, but greater than zero, or when reporting an estimated concentration for a tentatively identified compound.

B = Indicates that the analyte was found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

TABLE B-12

PRIORITY POLLUTANT METALS ANALYTICAL RESULTS - GROUNDWATER
 PHASE II - SUPPLEMENTAL SITE ASSESSMENT
 E G & G/ST. LOUIS, MISSOURI

July 20, 1990

[Concentrations in mg/L (ppm)]

Location	Cadmium	Copper	Lead	Zinc
GMW #1	ND	.05	.007	.04
GMW #2	ND	.06	ND	.03
GMW #3	.002	.07	.005	.28
GMW #4	ND	.04	.008	.02
GMW #5	ND	.03	ND	.06
GMW #6	ND	.08	ND	.10
GMW #7	ND	.05	ND	.02
GMW #8	ND	.09	ND	.03
MCL	0.010	NL	.050	NL
MDNR	0.010	1.0	NL	2.0

ND = Non detectable

NL = Not listed

MDNR = 10 CSR 20-7.031 Water Quality Standards State of Missouri

MCL = Maximum Contaminant Levels of the National Primary Drinking Water Regulations

Source: Groundwater Technology, Inc. Report, January 1991

Four soil borings were also installed as part of this investigation at locations indicated in Figure B-2. The boreholes were drilled to depths of 4.5 to 12 feet. One soil sample from each borehole was selected for laboratory analysis. Screening of soil samples using a photoionization detector (PID) to identify samples having the highest organic-vapor head levels was used to select the potentially most contaminated soil samples for laboratory analysis.

Four vapor monitoring wells (VMP) were installed in the vicinity of the degreaser area. Each VMP was constructed of 2-inch diameter PVC casing to an approximate depth of 12.5 feet. The VMPs were utilized in a soil vent test designed to assess the permeability of the unsaturated soils at the site. During the soil vent test three organic compounds were detected in the exhaust gases from the vapor withdrawal well, GMW-5. The contaminants identified in the soil vapor and their detected level were trans-1,2-dichloroethene, 1.4 $\mu\text{g}/\text{l}$; trichloroethene, 3.8 $\mu\text{g}/\text{l}$; and tetrachloroethene, 3.3 $\mu\text{g}/\text{l}$. Pressure measurements performed during the soil vent test were reportedly hampered by pressure variations in the soil created by the operation of a large metal forming press. Based on the limited soil vent data obtained, the following soil venting conclusions were developed:

- The radius of influence for one soil vent well will be in excess of 7 feet based on direct vacuum measurements performed before test interference began.
- Since interfering positive pressure was measured at all vapor monitoring wells it appears either a widespread pressure source was creating the test interference or that the soils exhibit the ability to transmit a pressure differential over distance greater than 18 feet.
- Variability in pressure at different distances during the test are indicative of horizontal heterogeneity in the soils in and about the soil vent test area.

In September, 1990, three observation wells were constructed in the vicinity of GMW-8 for the purpose of conducting a groundwater drawdown test. The observation wells were constructed of 2-inch PVC casing and screen and installed to an approximate depth of 14 feet. After installation of the observation wells water disposal problems caused the cancellation of the pump test.

4.3 REVIEW OF EXISTING DATA

Problems with the quality of data generated were noted by the investigator, GTI, during this third phase investigation. Instances of data problems identified in the site assessment report are as follows:

- Fluctuations in pressure readings obtained from the vapor monitoring wells (WMP) hindered the performance of the soil vent test. GTI assumed the fluctuations were due to the operation of a large metal forming press in a nearby building. Operation of the press reportedly created high levels of positive pressure in the soil gas system which significantly affected pressure readings in the VMPs. As a result of these pressure fluctuations, the influence of the vapor extraction system on the subsurface soil system was not possible to distinguish.
- Although not discussed in the report text, analytical data reports indicate that the equipment rinse and trip blanks analyzed as part of this project contained several volatile organic compounds. The following VOCs were detected in each of blank samples: chloroform, bromodichloromethane, dibromochloromethane, tetrachloroethene and total xylenes. Since the same contaminants were detected at similar levels in both samples, it is assumed contamination of the blanks occurred during shipment or analysis and not during sample collection.
- Groundwater level measurements were taken on July 20, 1990, immediately after all of the monitoring wells had been installed and developed. Monitoring wells GMW-6 and GMW-8 were constructed on July 19 and July 18, respectively. At the time that water levels from each of these wells was obtained, the groundwater levels did not appear to GTI to

have fully recovered from well development activities. Based on this observation, the water levels in these wells were not utilized in development of the groundwater profile map for the site.

Other potential concerns identified through the review of this report are as follows:

- A different analytical instrument was used to analyze samples collected in July (GC) than was used to analyze samples collected during the October (GC/MS) investigation. As a result of this change in analytical technique, results from the October sampling are expected to have a higher level of accuracy.

- Duplicate groundwater samples were collected from each well during the October 25, 1990 sampling event. Two separate laboratories, Groundwater Technologies Environmental Laboratory (GTEL) and Environmental Analysis, Inc. (EAI) were utilized to analyze groundwater samples from each of the four monitoring wells sampled. The analytical data from EAI was reportedly not available to GTI when the site characterization report was prepared. Comparison of all analytical data at this time does indicate some significant differences in the analytical data. These differences are summarized as follows:
 - The GTEL analytical report for the groundwater sample from GMW-6 indicate higher levels of trichloroethene and tetrachloroethene than were reported by EAI. The levels of total volatile organic compounds (TVOCs) reported by GTEL and EAI were approximately 192 $\mu\text{g}/\text{l}$ and 107 $\mu\text{g}/\text{l}$, respectively.

 - The EAI analytical report for the groundwater sample from GMW-7 reported higher levels of total 1,2-dichloroethylene and trichloroethylene than were detected by GTEL. Levels of TVOCs reported by EAI and GTEL were approximately 102 $\mu\text{g}/\text{l}$ and 10 $\mu\text{g}/\text{l}$, respectively.

- Quality control sample results (trip blanks, equipment blanks, and method blanks) were not reported by either analytical laboratory. It is not known whether trip blanks or equipment blanks were collected during this sampling phase. Reasons for the analytical differences observed during this project phase are not documented. Surrogate spike recoveries reported by EAI did not indicate significant matrix interferences, although recoveries of 1,2-dichloroethane in the groundwater sample from GMW-5 did exceed the control range established by the laboratory.
- Data is also not provided on sample quality observed during the field sampling activities. It is, therefore, not known whether turbidity levels in the samples may have contributed to the analytical differences. Different levels of contaminated sediment in the groundwater samples could have resulted in significant differences in the analytical results.

4.4 DATA GAPS

The phase three investigation provided better definition of the horizontal extent of contamination across the EG&G property. Higher levels of contamination in the shallow groundwater were generally confirmed to exist within the area of potential contamination identified by the soil gas survey. Elevated levels of TVOCs were detected in groundwater in each of the four monitoring wells installed within the suspected plume area. Levels of contamination were highest in groundwater from GMW-6, which is located east of the degreasing area, and GMW-8, which is located near the downgradient boundary of the property. TVOC compounds were detected in soil only from monitoring well boreholes GMW-6, which is located east of the degreasing area, and GMW-8, which is located near the downgradient boundary of the property. TVOC levels in soil were highest in a soil sample from SB-03 which was located near the perchloroethylene storage tanks. Remaining data gaps are as follows:

- The vertical extent of soil and groundwater contamination on the site has not been fully evaluated.

- The migrational characteristics of the VOC contaminants have not been defined. The rate and manner of contaminant migration is assumed to be related to recharge characteristics of the shallow aquifer, the presence of zones of higher permeability soils in the subsurface and the extent of the original contaminant releases. These factors have not been defined.
- Soil data suggests that the degreaser area is a potential source of subsurface contamination. Subsurface soil contamination data which has not been obtained for the hazardous waste storage area does not conclusively indicate that this area is a source of contamination.

5.0 GTI PRELIMINARY SITE ASSESSMENT REPORT

5.1 INTRODUCTION

The fourth site investigation phase on the EG&G property was performed in December, 1990 and January, 1991, by Groundwater Technology, Inc. (GTI). The purpose of this investigation appears to have been to further evaluate the horizontal and vertical extent of groundwater contamination at the site. The results of this additional site characterization field work were presented in a report dated March 1, 1991, and entitled, "A Preliminary Site Assessment Report for EG&G KT Aerofab Missouri Metals." This report consisted of an updated draft of the January, 1991, supplemental site assessment report with information on additional site investigation activities which were performed after preparation of the previous report. This section presents a summary of the additional site information obtained during this investigation phase and a technical evaluation of report data and conclusions.

5.2 INVESTIGATION ACTIVITIES

To further evaluate the high levels of VOCs on the site, EG&G installed five additional monitoring wells, GMW-9, GMW-10, GMW-11, GMW-12 and GW-13 in December, 1990. Duplicate samples were collected from all of the monitoring wells on the site in January, 1991. A groundwater sample from each monitoring well was submitted to EAI and IEA, two separate laboratories, for analysis. Analytical data obtained from this sampling round is summarized in Table B-13.

A complete round of groundwater level measurements were also taken during the sampling event. A groundwater contour map developed by GTI based on their interpretation of the groundwater measurement levels in site monitoring wells is presented in Figure 2-9. This groundwater contour map does not consider the low water level reading obtained at GMW-5. An alternative groundwater contour map reflective of all data, which was prepared by Burns & McDonnell, is presented on Figure 2-10. The less uniform flow pattern shown in Figure 2-10 may be caused by heterogeneous subsurface soil conditions potentially at this site. A reason for not including data from GMW-5 was not provided in the GTI report.

Based on estimated hydraulic conductivities, developed from field observations of soil materials, and the site groundwater measurements an estimated groundwater flow velocity of 0.01 to 10 feet per year was calculated by GTI. Using these assumed site parameters a geostatistical model, EPS-1, was utilized to project responses expected from groundwater pumping from a recovery well installed near the waste containment area. The results of this groundwater model were presented in Figure B-3.

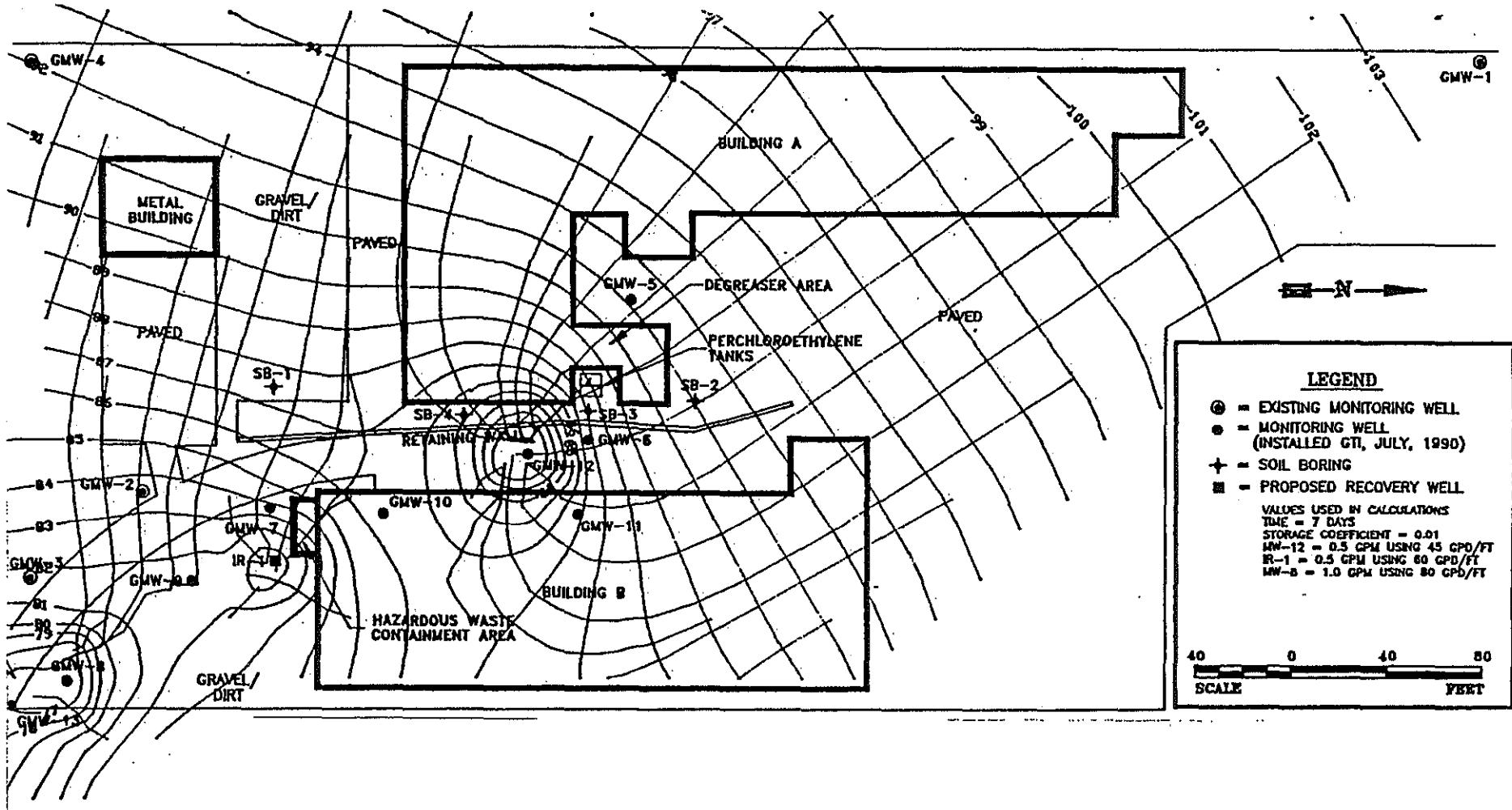
5.3 EVALUATION OF DATA

In this report GTI identified potential concerns regarding data obtained during this additional field investigation phase. The concerns identified by GTI are as follows:

- No volatile organic compounds were found by the laboratory in soil samples from SB-1, GMW-5 or GMW-7. The GTI report indicates that the absence of contamination in these samples may be due to losses during sampling handling. GTI concludes that in situ concentrations may be higher than detected due to losses of VOCs during sample collection and handling.
- Two separate laboratories, EAI and IEA, were utilized to analyze groundwater samples obtained from these wells. Both laboratories utilized GC/MS laboratory procedures to analyze volatile organic compounds; however, the two laboratories analyzed for different types

of 1,2-dichloroethene. EAI reported the total of both cis and trans-1,2-dichloroethene. IEA, however, reported only the detected level of trans-1,2-dichloroethene. Since the level of trans-1,2-dichloroethene produced as a result of the degradation of trichloroethene is expected to be significantly less than the level of cis-1,2-dichloroethene generated, the IEA analysis may underestimate significantly the level of total volatile organic compounds present in the samples. When data from both laboratories is compared, the TVOC levels detected by EAI are generally higher than were reported by IEA. At monitoring locations where high levels of 1,2-dichloroethene were present in groundwater, the differences in reported results between laboratories is large.

- Quality assurance/quality control samples were not collected or not analyzed during the remedial investigation. The GTI report indicates that field blank, equipment blank and rinse blank data may have been useful to identify the source of methylene chloride and acetone detected in the groundwater samples. These compounds are potential laboratory contaminants and may not have been present in the groundwater media at the site.
- Monitoring Wells GMW-12 and GMW-13 were installed to assess the vertical extent of contamination at the site. However, no soil samples were collected from these boreholes during monitoring well installation and both wells were installed with sandpack zones across the entire soil profile. As noted by GTI, since the screened portion of GMW-13 penetrates the majority of the aquifer, sampling data from this well does not confirm the presence of contamination at the base of the aquifer. The vertical extent of contamination in soil or groundwater was not defined by data obtained from these monitoring wells.
- Geological logs were not maintained of the material encountered during drilling of these additional monitoring wells. As a result, no data is available on the types of soils present at depth on the site or the type of bedrock material encountered. The hydrogeology section of this



Source: Groundwater Technology, Inc. Report, March 1991

EMPLOYEE - OWNED
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 ENGINEERS - ARCHITECTS - CONSULTANTS
 Kansas City, Missouri

B-3

TABLE B-13

EG&G/MISSOURI METALS
GROUNDWATER SAMPLING RESULTS
January 17, 1991
(mg/L*)

	GMW #1		GMW #2		GMW #3		GMW #4	
	Lab. 1	Lab. 2	Lab. 1	Lab. 2	Lab. 1	Lab. 2	Lab. 1	Lab. 2
Acetone	--	--	--	.058	--	--	--	--
Vinyl Chloride	--	--	--	--	.030	.013	--	--
Methylene Chloride	.075	--	.055	--	.075	--	.045	--
1,1-Dichloroethene	--	--	--	--	--	--	--	--
1,2-Dichloroethene	.050	--	.080	--	.100	--	--	--
Trans 1,2-Dichloroethene	--	--	--	--	--	--	--	--
Chloroform	.006	--	--	--	.010	--	--	--
Trichloroethene	.040	.006	.017	.025	.250	.170	.006	--
1,2,2-Trichloroethane	--	--	--	--	--	--	--	--
Tetrachloroethene	--	--	--	--	--	--	--	--
Toluene	--	--	--	.011	.008	--	--	--
1,1-Dichloroethane	--	--	--	--	--	--	--	--
1,2-Dichloroethane	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	--	--	--	--	--	--	--	--
Total Xylenes	--	--	--	--	--	--	--	--
Benzene	--	--	--	--	--	--	--	--
TVOC	.171	.006	.0152	.094	.473	.18	.051	ND
TCE/VC	N/A	N/A	N/A	N/A	8.3	13	N/A	N/A
TCE/1,2-DCE	.80	N/A	.21	N/A	2.5	N/A	N/A	N/A
Sequence of Sampling	14th	--	4th	--	13th	--	15th	--

Note 1: Only those compounds detected are listed

Note 2: Lab 1 designates EAI, Lab 2 designates IEA

TABLE B-13

EG&G/MISSOURI METALS
 GROUNDWATER SAMPLING RESULTS
 January 17, 1991
 (mg/L*)

	GMW #5		GMW #6		GMW #7		GMW #8-A	
	Lab. 1	Lab. 2	Lab. 1	Lab. 2	Lab. 1	Lab. 2	Lab. 1	Lab. 2
Acetone	--	--	--	--	--	.015	--	--
Vinyl Chloride	2.000	2.000	1.200	1.200	.300	.040	.850	8.200
Methylene Chloride	.055	--	.580	.082	.060	--	.050	--
1,1-Dichloroethene	.035	.014	.300	.250	--	--	.120	.051
1,2-Dichloroethene	5.700	--	70.000	--	.880	--	180.000	--
Trans 1,2-Dichloroethene	--	.022	--	.100	--	--	--	.170
Chloroform	.010	--	.008	--	--	--	--	--
Trichloroethene	1.100	2.000	32.000	9.600	2.500	3.900	32.000	39.000
1,2,2-Trichloroethane	.018	--	--	--	.009	--	.050	--
Tetrachloroethene	8.800	15.000	35.000	16.000	--	--	.010	.008
Toluene	.040	.033	.045	.044	--	--	.060	.064
1,1-Dichloroethane	--	--	.250	.110	--	--	--	--
1,2-Dichloroethane	--	--	.007	--	--	--	--	--
1,1,2-Trichloroethane	--	--	--	.019	--	--	--	.069
1,1,1-Trichloroethane	--	--	.055	.140	--	--	--	--
Total Xylenes	--	--	--	--	--	--	--	--
Benzene	--	--	.014	.009	--	--	--	--
TVOC	17.758	19.0	139.459	27.0	3.749	^{3.9} 39.0	213.14	47.0
TCE/VC	.550	1	26.700	8.0	8.3	975	3.760	4.8
TCE/1,2-DCE	.190	91	.450	96	2.5	N/A	.170	229
Sequence of Sampling	9th	--	10th	--	3rd	--	6th	--

Note 1: Only those compounds detected are listed

Note 2: Lab 1 designates EA1 - Lab 2 designates IEA

TABLE B-13

EG&G/MISSOURI METALS
GROUNDWATER SAMPLING RESULTS

January 17, 1991
(mg/L*)

	GMW #8-B		GMW #8-C		GMW #9		GMW #10	
	Lab. 1	Lab. 2	Lab. 1	Lab. 2	Lab. 1	Lab. 2	Lab. 1	Lab. 2
Acetone	--	--	--	--	--	--	--	--
Vinyl Chloride	5.000	5.100	7.000	7.500	.050	.052	.060	.011
Methylene Chloride	0.50	--	.100	--	.065	--	.070	--
1,1-Dichloroethene	.190	.057	.180	.073	--	--	--	--
1,2-Dichloroethene	190.000	--	80.000	--	.900	--	.060	--
Trans 1,2-Dichloroethene	--	.160	--	.120	--	--	--	--
Chloroform	.005	--	.006	--	.007	--	.005	--
Trichloroethene	45.000	61.000	30.000	45.000	4.000	9.900	.620	1.200
1,2,2-Trichloroethane	.035	--	--	--	.013	--	--	--
Tetrachloroethene	.020	.031	.120	.260	.680	1.400	.055	.110
Toluene	.080	.064	.150	--	--	--	--	--
1,1-Dichloroethane	--	--	--	--	--	--	--	--
1,2-Dichloroethane	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	--	.061	--	.053	--	--	--	--
1,1,1-Trichloroethane	--	--	--	--	--	--	--	--
Total Xylenes	--	--	--	--	--	--	--	--
Benzene	--	--	--	--	--	--	--	--
TVOC	240.38	--	117.556	--	5.715	--	.870	--
TCE/VC	9.000	--	4.290	--	--	--	--	--
TCE/1,2-DCE	.240	--	.380	--	--	--	--	--
Sequence of Sampling	7th	--	8th	--	2rd	--	5th	--

Note 1: Only those compounds detected are listed

Note 2: Lab 1 designates EAI, Lab 2 designates IEA

TABLE B-13

EG&G/MISSOURI METALS
GROUNDWATER SAMPLING RESULTS
January 17, 1991
(mg/L*)

	GMW #11		GMW #12		GMW #13	
	Lab. 1	Lab. 2	Lab. 1	Lab. 2	Lab. 1	Lab. 2
Acetone	--	1.000	--	--	--	--
Vinyl Chloride	.050	.041	1.800	1.900	.900	1.400
Methylene Chloride	.045	--	.140	--	.155	--
1,1-Dichloroethene	.035	.013	.016	.008	.085	.037
1,2-Dichloroethene	6.000	--	7.800	--	120.000	--
Trans 1,2-Dichloroethene	--	.027	--	.024	--	.140
Chloroform	--	--	.008	--	--	--
Trichloroethene	.200	.170	.170	.260	74.000	62.000
1,2,2-Trichloroethane	--	--	--	--	.090	--
Tetrachloroethene	--	--	.140	.200	6.000	3.500
Toluene	--	--	--	--	--	.006
1,1-Dichloroethane	--	--	.018	.007	--	--
1,2-Dichloroethane	--	--	--	--	--	--
1,1,2-Trichloroethane	--	--	--	--	--	.078
1,1,1-Trichloroethane	--	--	--	--	--	--
Total Xylenes	--	--	--	--	--	.005
Benzene	--	--	--	--	--	--
TVOC	6.330	--	10.092	--	201.23	--
TCE/VC	--	--	.090	--	82.000	--
TCE/1,2-DCE	--	--	.020	--	.620	--
Sequence of Sampling	1st	--	11th	--	12th	--

Note 1: Only those compounds detected are listed

Note 2: Lab 1 designates EAI, Lab 2 designates IEA

report indicates that bedrock beneath the soil profile is probably a predominantly limestone dolomitic bedrock. However, as discussed in the geology section of this report the top bedrock unit below the site is likely a shale, siltstone or sandstone of the Pleasanton Group. This bedrock system would be expected to have a much lower potential permeability than a limestone/dolomitic bedrock unit. No evaluation of the bedrock material was reportedly performed during installation of the deep monitoring wells.

5.4 DATA GAPS

Data obtained from the January investigation confirmed results from past investigations, provided additional definition of the horizontal extent of contamination, but did not identify the vertical extent of soil contamination in source areas or the presence of groundwater contamination at depth. Based on our review of site data the following data gaps have been identified.

- The vertical extent of soil and groundwater contamination on the site has not been fully evaluated.
- The migrational characteristics of the VOC contaminants have not been defined. The rate and manner of contaminant migration is assumed to be related to the recharge characteristics of the shallow aquifer, the presence of zones of higher permeability soils in the subsurface and the extent of the original contaminant releases. These conditions at the site have not been defined.
- Soil data suggests that the degreaser area is a potential source of subsurface contamination. The depth of contamination in this area has not been evaluated. Subsurface soil contamination data from the hazardous waste disposal area, another suspected source location, is limited. Groundwater data suggests that the waste storage area is not a contaminant source; however, results are not conclusive. Soil gas data has indicated that contaminant levels are potentially high in the hazardous waste storage area.

6.0 PRELIMINARY SITE ASSESSMENT SYNOPSIS

6.1 REPORT REVIEW INFORMATION

A summary of past investigation actions and results was prepared by GTI for EG&G submittal to the Missouri Department of Natural Resources (MDNR). The Groundwater Technology, Inc. report entitled, "A Synopsis of a Preliminary Site Assessment Prepared for EG&G/Missouri Metals," is dated March 20, 1991. The report contains no new data. Its apparent purpose was to provide MDNR a summary of significant findings at the site. The report contains no new analysis of data from the site; therefore, conclusions and data gaps of previous reports are not affected by this new report.

* * * * *

APPENDIX C
DRILLING LOGS

LEGEND AND NOMENCLATURE OF DRILLING LOGS

Information preceding the logs relates to pertinent project and boring descriptions, which are self-explanatory. Remaining items on drilling logs are described as follows:

- 1) DEPTH: Depth below a given reference elevation. Normally, units are in feet and are from the aforementioned ground surface, unless otherwise noted.
- 2) DESCRIPTION: Description of soil or rock material according to Unified Soil Classification. Word descriptions give principal soil constituent, other minor soil constituents, color, moisture, consistency or density, plasticity, and other appropriate material characteristics. Geologic names, where appropriate, are shown in REMARKS. A solid line denotes a stratigraphic change, a dashed line indicates the approximate location of a stratigraphic change. Rock samples are described according to lithology, color, moisture content, weathering, strength, and any discernible structure. Criteria for evaluating weathering and strength (established by the U.S. Bureau of Mines,) are as follows:

Weathering:

FR: (Fresh) No visible signs of weathering.

SW: (Slightly Weathered) Weathering (alteration) limited to the surface of major discontinuities, no weathering of rock material.

MW: (Moderately Weathered) Weathering (alteration) extends throughout the rock mass, but the rock material is not friable.















HW: (Highly Weathered) Rock is decomposed and friable, but the rock texture and structure are preserved.

XW: (Extremely Weathered) Soil material with the original texture, structure, and mineralogy of the rock completely destroyed.

- Strength: VS: (Very Strong) Rock surfaces cannot be scratched by a steel nail.
- S: (Strong) Faint scratch made with a steel nail.
- MS: (Moderately Strong) Distinct scratch trace made with a steel nail.
- W: (Weak) Slight scratch left by fingernail, material can be gouged out with steel nail.
- VW: (Very Weak) Material can be gouged out with fingernail.

3) LOG OR CLASSIFICATION:

Unified Soil Classification symbols are shown in reference to appropriate description of soil. Rock material is noted by visual symbols (referenced from Naval Facilities Engineering Command (NAVFAC) DM-7 Manual, March 1971, a U.S. Government document, with slight revision) representing rock classification, as shown below:

	SANDSTONE		SILTSTONE
	CONGLOMERATE		MUDSTONE
	COAL		DOLOMITE
	LIMESTONE		CHALK
	COMPACTION SHALE		CEMENTED SHALE
	GNEISS		SCHIST
	GRANITE		BASALT

4) BLOW COUNT: (ie: 4/7/8)

Numbers indicate the necessary blows to drive 3 six-inch increments, or part thereof, of a split barrel sampler when driven by a 140-pound hammer falling freely for 30 inches; as per ASTM D 1586. The Standard Penetration Resistance (N value) is the sum of the second and third six-inch penetrations. If the sampler is driven less than 18 inches, the N value is represented by the total resistance over the last 12 inches. If the sampler is driven less than 12 inches, logs indicate the number of blows and fraction of increment in inches actually penetrated. Note that a blow count can be listed for a California or Dames & Moore sampler, but that this is not the Standard Penetration Resistance.

5) RECOVERY & LOSS: In soil this represents the total length of soil recovered over the amount of sample penetrated. In rock this notes the percent core recovery and Rock Quality Designation (RQD).

6) SAMPLE DEPTH: A column that provides a reference to the depth below the previously mentioned reference elevation at which samples were taken.

7) BOX SAMPLE NO: In the case of rock coring, the box number and core run number are noted. For soils, the designated type and consecutively numbered sample are noted by the following letter:

SS - Split-Spoon sample, obtained by driving a 2-inch diameter split spoon according to D 1586 to retrieve penetration resistance and sample recovery.

ST - Undisturbed thin-walled tube sample (Shelby Tube) D 1587, obtained by penetration of a 3-inch diameter thin-walled tube using an open or, where indicated, fixed piston sampling head.

C - Liner tube sampler (California), obtained by penetration of a thick-walled sampler containing 2-inch diameter ring liners.

DM - Liner tube sampler (Dames & Moore), obtained by penetration of a thick-walled, split-barrel sampler containing 2½-inch diameter ring liners.

B - Bag Sample, obtained by combining disturbed auger cuttings for a large bag sample.

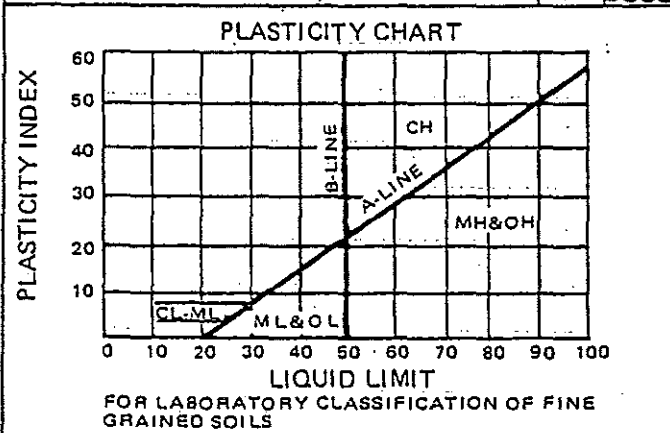
D - Disturbed Sample, obtained from auger cuttings or wash water for a small container sample.

-J - Jar Sample, obtained from any other sample method, but later placed into a jar container due to sample size or disturbance.

8) REMARKS: Pertinent observations made and noted by the inspector during drilling. These may include, but are not restricted to, type of drilling, water seepage, fluid loss, time during drilling, material formation, hole termination, pocket penetrometer readings (TSF), piezometer installation, water levels first encountered during drilling and at some time after completion of drilling, and any other pertinent information.

Unified Soil Classification System

MAJOR DIVISIONS			LETTER SYMBOL	DESCRIPTION
COARSE-GRAINED SOILS MORE THAN 50% LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS	GW	WELL-GRADED GRAVEL, GRAVEL-SAND MIXTURE
		LITTLE OR NO FINES	GP	POORLY-GRADED GRAVEL, GRAVEL-SAND MIXTURE
		GRAVELS WITH FINES	GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURE
		APPRECIABLE FINES	GC	CLAYEY-GRAVEL, GRAVEL-SAND-CLAY MIXTURE
	SAND AND SANDY SOILS	CLEAN SANDS	SW	WELL-GRADED SAND, GRAVELLY SAND
		LITTLE OR NO FINES	SP	POORLY-GRADED SAND, GRAVELLY SAND
		SANDS WITH FINES	SM	SILTY SAND, SAND-SILT MIXTURE
		APPRECIABLE FINES	SC	CLAYEY SAND, SAND-CLAY MIXTURE
FINE-GRAINED SOILS MORE THAN 50% SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	ML	SILT, CLAYEY SILT, SILTY OR CLAYEY VERY FINE SAND, SLIGHT PLASTICITY
			CL	CLAY, SANDY CLAY, SILTY CLAY, LOW TO MEDIUM PLASTICITY
			OL	ORGANIC SILTS OR SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT MORE THAN 50	MH	SILT, FINE SANDY OR SILTY SOIL WITH HIGH PLASTICITY
			CH	CLAY, HIGH PLASTICITY
			OH	ORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOIL



RELATIVE PARTICLE SIZE

BOULDER	LARGER THAN 12"
COBBLE	3" TO 12"
GRAVEL COARSE	3/4" TO 3"
FINE	4.75MM TO 3/4"
SAND COARSE	2MM TO 4.75MM
MEDIUM	0.42MM TO 2MM
FINE	0.074MM TO 0.42MM
SILTS AND CLAY	SMALLER THAN 0.074MM

RELATIVE PLASTICITY

NONPLASTIC	CANNOT ROLL INTO BALL
TRACE PLASTICITY	BARELY ROLL INTO BALL
MEDIUM PLASTIC	CAN BE ROLLED INTO BALL
HIGHLY PLASTIC	NO RUPTURE BY KNEADING

RELATIVE COMPOSITION

TRACE	0-10%
SOME	11-35%
AND/WITH	36-50%

RELATIVE MOISTURE		DENSITY	N-VALUE
DRY	POWDERY	VERY LOOSE	0-4
OAMP	BELOW PLASTIC LIMIT	LOOSE	5-10
MOIST	PL TO LL RANGE	MEDIUM	11-30
WET	ABOVE LIQUID LIMIT	DENSE	31-50
		VERY DENSE	>50

RELATIVE CONSISTENCY

VERY SOFT	< 1/4 TSF
SOFT	1/4 1/2 TSF
MEDIUM	1/2-1 TSF
STIFF	1-2 TSF
VERY STIFF	2-4 TSF
HARD	> 4 TSF

N-VALUE (BLOW COUNT) IS THE STANDARD PENETRATION RESISTANCE BASED ON THE TOTAL NUMBER OF BLOWS, USING A 140-LB HAMMER WITH 30-INCH FREE FALL, REQUIRED TO DRIVE A SPLIT-SPOON THE LAST TWO OF THREE 6-INCH DRIVE INCREMENTS. (EXAMPLE: 4/7/9, N = 7+9=16)

Drilling Log

Project Name EGGKTA						Boring No. SB-1	
Project No. 91-319-1						Page 1 of 3	
Ground Elevation 638.41			Location SOUTH OF W 1/2 OF RCRA CONTAINMENT AREA - APPROX. 20 FEET.			Total Footage 34.65 FT. (TAPED)	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
HSA	8 INCH.	21.3 FT.	13.35 FT.	4	0	31.5 FT	3/25/92 <i>SEE REMARKS</i>
Drilling Co. LAYNE WESTERN OF ST. LOUIS				Driller (s) WILLIS DURHAM & DALE MAHURIN			
Drilling Rig. CME-75				Type of Penetration Test NONE			
Date 3/25/92		To 3/25/92		Field Observer (s) PAUL CLARK & SHAWN SLATTERY			
Depth	Description		Class	Blow Count	Recov.	Sample or Box No.	Remarks
	PID USED = OVM W/ 10.6 eV LAMP BH = BORE HOLE; BZ = BREATHING ZONE S = SAMPLER Description H = HEADSPACE						
1	GRAVEL FILL, SILTY					Run 1 12:45	START 12:45 PM 3/25/92
2	CLAYEY SILT, MODERATE BROWN (5YR4/4), DAMP TO MOIST, VERY STIFF, MEDIUM PLASTICITY, TRACE ORGANICS.		CL		$\frac{3.5}{5.0}$		OVM - 12:49 PM BZ = 0.0 ppm TO 0.1 ppm
3	CLAYEY SILT, LIGHT OLIVE GRAY (5Y 5/2) DAMP, MEDIUM STIFF, MEDIUM PLASTICITY, TRACE ORGANICS.		CL				OVM - 12:48 PM BH = 0.1 ppm BZ = 0.0 ppm S = 0.0 ppm
4						CME-1	
5	SILTY CLAY, GRAYISH OLIVE (10Y4/2), DAMP, STIFF, MEDIUM PLASTICITY, WITH ORGANICS AT 4.3 TO 4.4 FT. (LEAVES, WOOD, ROOTS).		OH				
6	SILTY CLAY, GRAYISH OLIVE (10Y4/2) TO LIGHT OLIVE GRAY (5Y 5/2), DAMP, MEDIUM TO LOW PLASTICITY, SOME ORGANICS (ROOTS)		CL			Run 2 12:54	
7					$\frac{5.0}{5.0}$		OVM - 12:56 BH = 0.0 ppm BZ = 0.0 ppm S = 0.0 ppm
8	SILTY CLAY, MODERATE YELLOWISH BROWN (10YR4/4) WITH LIGHT OLIVE GRAY (5Y 5/2), DAMP TO MOIST, STIFF TO SOFT, MEDIUM PLASTICITY, TRACE ORGANICS, SMALL (1 TO 2 mm) IRON STAINS - MODERATE REDDISH BROWN (10R4/6).		CL				
9							
10						Run 3 1:26	
11							OVM - 12:27 PM BH = 0.1 ppm BZ = 0.0 ppm S = 0.0 ppm
12					$\frac{5.0}{5.0}$		
13							
14							

Drilling Log, continued

						Boring No. SB-1
Project Name EGGKTA						Page 2 of 3
Project No. 91-319-1						Date 3/25/92
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
15	SILTY CLAY, MODERATE BROWN (5Y4/4), WET EXTERIOR, MOST INTERIOR, STIFF, MEDIUM-PLASTIC, BIRD'S EYE IRON STAINS - MODERATE REDDISH BROWN (10R4/6).	CL		5.0 5.0	RUN 4 1:36	OVM - 1:46 pm BH = 0.0 ppm BZ = 0.0 ppm S = 0.0 ppm
16						
17						
18						
19	SILTY CLAY MIXED WITH GRAVEL (ROUNDED CHERT), MODERATE BROWN (5Y4/4), MOIST TO WET.	GC/CL			CME-2	
20	SILTY CLAY, MODERATE BROWN (5Y4/4) TO DARK YELLOWISH ORANGE (10YR6/6), MOIST, STIFF TO VERY STIFF, MEDIUM PLASTIC	CL			RUN 5 1:46 pm	
21	SILT, DARK YELLOWISH ORANGE (10YR6/6) BANDED WITH LIGHT OLIVE GRAY (5Y5/2), MODERATELY LITHIFIED, DISTINCT PARTING, MICACEOUS, TRACE VERY FINE SAND.	ML				OVM - BH = 0.0 ppm BZ = 0.0 ppm S = 0.0 ppm
22	SILTSTONE, DARK YELLOWISH ORANGE (10YR6/6) WITH LIGHT OLIVE GRAY BANDING (5Y5/2), WEATHERED WITH DISTINCT HORIZONTAL PARTINGS. BLACK STAIN ON SOME PARTINGS			5.0 5.0		
23	BECOMING SANDIER AT DEPTH, MICACEOUS, MOIST TO WET.					
24					CME-3 CME-4	
25					RUN 6 2:08 pm	
26						
27				5.0 5.0		OVM BH = 0.0 ppm BZ = 0.0 ppm S = 0.1 ppm
28						
29	SILTSTONE, DARK YELLOWISH ORANGE (10YR6/6), SOME LIGHT OLIVE GRAY BANDING (5Y5/2), VERY FINE SAND (SOME), EXHIBITS SHALEY PARTINGS,					
30	BLACK STAIN ON SOME PARTINGS, MICACEOUS, MOIST TO WET				RUN 7 2:34 pm	OVM BH = 9.1 (Peak) BZ = 0.0 ppm S = 0.1 ppm
31						

Drilling Log, continued

Boring No. SB - /						
Project Name EGGKTA						Page 3 of 3
Project No. 91-319-1						Date 3/25/92
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
32						← 31.5, AUGER DEPTH WITH FREE WATER AT TOP OF BORING.
33						SOMEWHAT DIFFICULT DRILLING - REQUIRE MORE DOWN PRESSURE
34	CLAY, LIGHT OLIVE GRAY (5Y 5/2) WITH DUSKY RED (5R 4/4) VERY STIFF, HIGHLY PLASTIC, VERY WET	CH				TOOK SERIES OF WATER LEVELS - SEE OBSERVATION FORMS FOR SB-1.
35	SANDY SILTSTONE, DARK YELLOW, BROWN (10 YR 6/6), VERY FINE GRAINED, SHALEY PARTINGS, BLACK STAINS ON PARTINGS, SLIGHTLY WEATHERED TD = 34.65 (TAPED)					BEGIN AUGER REMOVAL 3:13 pm 3/25/91
36						OVM 3:15 pm BH = 0.0 ppm BZ = 0.0 ppm
37						COMPLETED AUGER PULL AT 3:40 pm
38						BORING LEFT OPEN FOR WATER LEVEL OBSERVATIONS.
39						3/30/92 ABANDONED BORING BY GROUTING WITH TREMIE PIPE FROM T.D. TO GROUND SURFACE.
40						
41						
42						
43						
44						
45						
46						
47						
48						

Drilling Log

Project Name EGGKTA						Boring No. SB-2	
Project No. 91-319-1						Page 1 of 3	
Ground Elevation 638.49'			Location APPROX. 20 FT SOUTH OF CENTER OF PCRA PAD BEHIND EAST BUILDING.			Total Footage 43.5 FT. (TAPED)	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
HSA	10 INCH	20 FT.	23.5	2	0	SEE REMARKS	
Drilling Co. LAYNE WESTERN OF ST. LOUIS				Driller (s) WILLIS DURHAM & DALE MAHURIN			
Drilling Rig. CME-75				Type of Penetration Test NONE			
Date 3/26/92		To 3/26/92		Field Observer (s) PAUL CLARK & SHAWN SLATTERY			

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks
1	GRAVEL & SILT FILL	GM			RUN 1 8:07AM	START: 8:07AM 3/26/92 OVM (GRAVEL) BH = 44 ppm BZ = 0.0 ppm
2	CLAY, MODERATE YELLOWISH BROWN (10YR 4/2) WITH LIGHT OLIVE GRAY (5Y 5/2), SILTY, DAMP, VERY STIFF, MED. PLASTIC, TRACE ORGANICS	CL		3.5 5.0	CME-1	OVM S = 0.0 ppm LEL = 0% O ₂ = 20.5%
5	CLAY, OLIVE GRAY (5Y 3/2), SILTY, MED. STIFF, TRACE PLASTICITY WITH ORGANICS (LEAVES, WOOD, ROOTS) AT 4.6 TO 4.8 FT., MOIST	ML/ CL			RUN 2 8:12AM	
7	CLAY, MODERATE BROWN (5YR 4/4) WITH LIGHT OLIVE GRAY (5Y 5/2), SILTY, TRACE TO MED. PLASTIC, MED. STIFF, DAMP.			5.0 5.0		OVM BH = 0.0 ppm BZ = 0.0 ppm S = 0.0 ppm LEL/O ₂ = 0%/20.5%
8		ML/ CL				
12	CLAY, LIGHT OLIVE GRAY (5Y 5/2) WITH VERY DUSKY RED (10R 2/2) SPOTS OR STAINS, SILTY, MEDIUM TO STIFF, MEDIUM PLASTIC DAMP TO DRY.	CL		5.0 5.0	RUN 3 8:24	OVM BH = 0.0 ppm BZ = 0.0 ppm S = 0.0 ppm
13	CLAY, LIGHT OLIVE GRAY (5Y 5/2) TO YELLOWISH GRAY (5Y 7/2), MEDIUM TO STIFF, HIGHLY PLASTIC TO MEDIUM, DAMP.	CL/ CH				

Drilling Log, continued

						Boring No. SB-2
Project Name EGGKTA						Page 2 of 3
Project No. 91-319-1						Date 3/26/92
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
15						
16						
17				5.0 5.0		RUN 4 8:43 OVM BH = 0.0 ppm BZ = 0.0 ppm S = 0.0 ppm LEL/O ₂ = 0% / 20.5%
18						
19	CLAY, LIGHT OLIVE GRAY (5Y5/2) MIXED WITH COARSE SHEET GRAVEL (ROUNDED) & (ANGULAR); VERY WET	GC			CME-2	← VERY WET WITH FREE WATER IN MACRO PORES AT 18.5 FT.
20	CLAY, LIGHT OLIVE GRAY (5Y5/2) SOFT, HEAVY PARTIC CLAYEY SILT, DARK YELLOWISH ORANGE (10YR 6/6) WITH YELLOWISH GRAY (5Y7/1) BANDS, TRALE BEDDING MICAEOUS, DRY	CH ML				
21						
22	SILTSTONE, DARK YELLOWISH ORANGE (10YR 6/6) TO MODERATE YELLOWISH BROWN (10YR 5/4) WEATHERED, IRON STAINED, CLAYEY IN PART, DISTINCT PARTINGS, BLACK STAINING ON SOME PARTINGS, MICAEOUS THROUGHOUT			5.0 5.0		RUN 5 8:56 OVM BH = 0.0 ppm BZ = 0.0 ppm S = 0.0 ppm LEL/O ₂ = 0% / 20.5%
23						
24						
25						
26						
27				5.0 5.0		RUN 6 9:17 AM ← AUGERS GRINDING AT 26 FT. HIGH PRESSURE (>1800 psi) REQUIRED
28						
29	CLAY, MODERATE BROWN (5YR 4/4), WITH HARD SILTSTONE GRAVEL; VERY WET. SILTSTONE, DARK YELLOWISH ORANGE (10YR 6/6) TO MODERATE BROWN (5YR 4/4), VERY FINE SAND; MICAEOUS, WET ON NEW BREAKS.	CL/CL				OVM BH = 0.0 ppm BZ = 0.0 ppm S = 0.0 ppm
30						
31						RUN 7 11:03 AM

Drilling Log, continued

Project Name EGGKTA						Boring No. SB-2	
Project No. 91-319-1						Page 3 of 3	
Date 3/26/92							
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks	
32	SILTSTONE, MEDIUM BROWN (5YR 4/4), WITH VERY FINE SAND, CLAY LAYERS BETWEEN SOME PARTINGS, DISTINCT PARTING, MICACEOUS, NO REACTION TO HCL ACID.			5.0 5.0		OVM BH = 0.0 ppm BZ = 0.0 ppm S = 0.0 ppm	
33							
34							
35	SILTSTONE, MEDIUM BROWN (5YR 4/4), MASSIVE, VERY FINE SAND, MICACEOUS, NO REACTION TO HCL ACID.			1.0 1.0	RUN 8 11:17	← VERY HARD DRILLING AT 36 FT.	
36							
37	SILTSTONE, MEDIUM BROWN (5YR 4/4), VERY FINE SAND, MICACEOUS, NO REACTION TO HCL ACID.			4.0 4.0	RUN 9 11:48	WATERED MEASURED AT 23.81 FT BGS THROUGH AUGERS	
38							
39							
40	SAND, LIGHT OLIVE GRAY (5Y 6/2), FINE TO VERY FINE, LOOSE, VERY WET	SW					
41	CLAY, YELLOWISH GRAY (5Y 7/2) TO LIGHT OLIVE GRAY (5Y 6/2), STIFF MEDIUM TO HIGH PLASTICITY, WITH BLACK STRAINS THROUGHOUT	CL		41.2 41.8 42.5	RUN 10 12:42	PHOTO OF CLAY	
42	CLAY, YELLOWISH GRAY (5Y 7/2) TO LIGHT OLIVE GRAY (5Y 6/2) STREAKED WITH BLACK, SANDY, STIFF, MEDIUM PLASTIC, SLICKENSIDES, DRY	CL		3.0 3.0			
43	SHALE, PALE OLIVE (10Y 4/2) INDISTINCT PARTINGS, BREAKS UNEVENLY, DRY					PHOTO OF SHALE	
44	TD = 43.5 FT (TAPED)						
45						PULLED AUGERS - 2100pm	
46						3/27/92 SILTED TO 38 FT.	
47						3/30/92 ABANDONED BORING BY GROUTING TO GROUND SURFACE.	
48							

Drilling Log

Project Name EGGKTA						Boring No. SB-3	
Project No. 91-319-1						Page 1 of 2	
Ground Elevation 638.51 FT.			Location WEST SIDE OF ALLEY ROAD BY SOUTH END OF RETAINING WALL			Total Footage 24.0 FT.	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
HSA	8-INCH	22.3 FT	1.7 FT	2 CHEM 1 PHYS.	Ø	21.45 FT.	3/31/92 SEE REMARKS
Drilling Co. LAYNE WESTERN OF ST. LOUIS				Driller (s) WILLIS DUEBANK; DALE MAHURIN			
Drilling Rig. CME-75				Type of Penetration Test NONE			
Date 3/31/92		To 3/31/92		Field Observer (s) PAUL CLARK, SUKHA SUTTERY			
Depth	Description		Class.	Blow Count	Recov.	Sample or Box No.	Remarks
	<p> <i> PID USED = DVM WITH 10.6 eV LAMP, BH = BOREHOLE; BZ = BREATHING ZONE S = SAMPLER Description H = HEADSPACE </i> </p>						
1	ASPHALT				1.2 1.2	CORE BARREL BIT	START: 12:44PM 3/31/92 OVM BH = 14.6 ppm BZ = 0.0 ppm LEL = 0% O ₂ = 20.9% S = 0.0 ppm
2	SILTY CLAY, DARK YELLOWISH BROWN (10YR 4/2) TRACE GRAVEL AT TOP (FILL), MOIST, HIGHLY PLASTIC, VERY STIFF.		CH		0.6 3.8	RUN 1 12:54	
3							
4							
5							
6	CLAYEY SILT, OLIVE GRAY (5Y 5/2) ORGANICS AT 5.3 FT (LEAVES, WOOD, ROOTS), VERY WET, MEDIUM TO HIGHLY PLASTIC, MEDIUM CONSISTENCY		OL- CL			RUN 2 12:59	OVM BH = 0.0 ppm BZ = 0.0 ppm
7	SILTY CLAY, LIGHT OLIVE GRAY (5Y 5/2), DAMP TRACE TO NONPLASTIC, SOFT.		CL		3.0 5.0	CME-1	
8	SILTY CLAY, LIGHT OLIVE GRAY (5Y 5/2) WITH PINKY YELLOW (5Y 6/4) IRON STAINED IN BANDS AT TOP, "BIRDS EYE" IRON STAINS AT 10.7 FT, DAMP, SOME BIRD EYES WET WHEN BROKEN, MEDIUM PLASTIC. GRADES TO MODERATE YELLOWISH BROWN (10YR 5/4) AT 13.3 FT.		CL				SAMPLE EXPANSIVE IN SAMPLER
9							
10							
11						RUN 3 1:09	OVM BH = 0.0 ppm BZ = 0.0 ppm S = 0.0 ppm
12					5.0 5.0		
13							
14							

Drilling Log, continued

						Boring No. SB-4
Project Name EGGKTA						Page 2 of 2
Project No. 91-319-1						Date 4/2/92
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
15	<p>CLAYEY SILT, YELLOWISH GRAY (5Y7/2) STREAKED DARK YELLOWISH ORANGE (10 YR 6/6), STIFF, DRY TO DAMP, NON-PLASTIC TO TRACE PLASTIC, ROOT CASTS FROM 15 TO 16.5 FT. STRONG SOLVENT ODOR AT 18.3 FT. BECOMING WET AT 19.5 FT. VERY STIFF AT 20.3 FT. IRON STAINED THROUGHOUT</p>	ML CL		5.0 5.0	<p>RUN 4 11:20A</p>	<p>BH = 82.0 ppm RUN W/OINT CATCHER</p>
16						
17						
18						
19						
20	<p>CLAYEY SILT, TRACE CHERT GRAVEL, YELLOWISH GRAY (5Y7/2)</p>	ML		5.0 5.0	<p>CAS-9 CAS-10 RUN 5 11:36A</p>	<p>SAMPLE EXPANSIVE IN SAMPLER S = 10 ppm @ 17.2 FT</p>
21						
22	<p>SILTY CLAY, STIFF, BANDED YELLOWISH GRAY (5Y7/2) AND DARK YELLOWISH ORANGE (10 YR 6/6).</p>	CL				<p>S = 400 ppm @ 18.9 FT S = 706 ppm @ 19.2 FT STRONG SOLVENT ODOR</p>
23						
24	<p>SILTSTONE, WEATHERED, WEAK, FRIABLE, DARK YELLOWISH ORANGE (10 YR 6/6), MICA, TRACE VERY FINE SAND, DISTINCT PARTINGS</p>				<p>CAS-5</p>	<p>BH = 46.4</p>
25						
26	<p>SILTSTONE, WEAK FRIABLE, DARK YELLOWISH ORANGE (10 YR 6/6), DISTINCT PARTINGS, MICA, TRACE SAND.</p>			3.0 3.0	<p>RUN 6 11:56A</p>	<p>S = 400 ppm @ 24.3 FT SAMPLER CAME UP STEAMING S = 608 ppm FROM SWE</p>
27						
28	<p>TD = 28.0 FT (AUGER)</p>					<p>SAMPLER STEAMING S = 40 TO 100 ppm</p>
29						<p>12:19 PM 4/2/92</p>
30						<p>PULLED AUGERS & GROUTED BORING TO SURFACE WITH NEAT CEMENT. PLACED GROUT AT 1:45 PM</p>
31						<p>BH = 50.3 PPM DURING GROUTING.</p>

Drilling Log

Project Name EGGKTA						Boring No. SB-6	
Project No. 91-319-1						Page 1 of 2	
Ground Elevation 645.99 FT.			Location ADJACENT TO NORTH SIDE OF DEGREASER ENCLOSURE.			Total Footage 24.9 FT	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
HSA	8-1/4"	22.3	2.6	2	Ø	22.0 FT.	3/31/92 SEE REMARKS
Drilling Co. LAYNE WESTERN OF ST. LOUIS				Driller (s) WILLIS DURHAM, DALE MAHURIN			
Drilling Rig. CME-75				Type of Penetration Test NONE			
Date 3/31/92		To 3/31/92		Field Observer (s) PAUL CLARK, SHAWN SLATTERY			

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks
	CONCRETE				CONCRETE CORE	START 3:18 PM
1	SILTY CLAY, OLIVE GRAY (SY 3/2), FILL (GRASS, BRICK, CINDERS) AND ORGANICS (ROOTS, WOOD) MEDIUM PLASTIC, DAMP TO MOIST.	CL			RUN 1	OVM CONCRETE CORE. 6ppm STOPPED 3:28 TO CHANGE CONCRETE CORE BITS START 3:29
2					3.5	
3					CME-1	
4	CLAYEY SILT, LIGHT OLIVE GRAY (SY 5/2) TO YELLOWISH GRAY (SY 7/2), MOIST TO WET, TRACE TO MED. PLASTIC, TRACE ORGANICS (ROOTS REAT).	ML/OL				
5	SILTY CLAY, MODERATE YELLOWISH BROWN (10 YR 5/4), DAMP, TRACE TO NON PLASTIC, MED. TO STIFF.	CL			RUN 2	OVM BH = 1.5ppm BZ = 0.0ppm
6					5.0	
7					CME-2	
8					VOL TOC	
9						
10	CLAYEY SILT, MODERATE YELLOWISH BROWN (10 YR 5/4) MOTTLED WITH LIGHT OLIVE GRAY (SY 5/2) ROOT CASTS OR ANIMAL BORROWS, DAMP, TRACE TO MED. PLASTIC.	ML			RUN 3	OVM BH = 2.9 ppm BZ = 0.0 ppm S = 0.0 TO 0.4 { 10 13.2 FT S = 73.1 { 13.2 15 FT
11					5.0	
12	MOIST					
13						
14	DAMP, MODERATE YELLOWISH BROWN (10 YR 5/4) ONLY				CME-3	

Drilling Log, continued

						Boring No. SB-6
Project Name EGGKTA						Page 2 of 2
Project No. 91-319-1						Date 3/31/92
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
15						
16	SILTY CLAY, LIGHT OLIVE GRAY (5 Y 5/2) TO YELLOWISH GRAY (5 Y 7/2) MOTTLED WITH MODERATE YELLOWISH BROWN (10 YR 3/4), DAMP TO MOIST, TRACE TO MED. PLASTIC, MED. TO STIFF, TRACE ROOT CASTS, BECOMING IRON STAINED AT 17.4 FT. TRACE ROUNDED CHERT GRAVEL AT 19.3 FT.	CL		5.0 5.0	RUN 4 4:18	OVM BH = 2.9 ppm BZ = 0.0 ppm S = 1 TO 3 ppm
17						
18						
19						S = 3.0 ppm @ 18.2 To 18.7 ppm
20	SILTY CLAY, MODERATE YELLOWISH BROWN (10 YR 5/4) WITH ORANGE STAINING, VERY STIFF, DRY TO DAMP.	CL			RUN 5 4:48	OVM BH = 3.7 ppm BZ = 0.0 ppm
21						
22	SILT, YELLOWISH GRAY (5 Y 7/2), TRACE VERY FINE SAND, NONPLASTIC, DAMP TO DRY.	ML		5.0 5.0		22.0 FT - WATER
23	SILTSTONE, DARK YELLOWISH ORANGE (10 YR 4/6), VERY WEATHERED TO WEATHERED WITH DISTINCT PARTINGS, WEAK, FRILABLE, MICA ON SOME PARTINGS DAMP TO DRY.					
24						
25						
26	TO = 24.9 FT (TAPER)					STOPPED DRILLING AT 4:53 PM PULLED AUGERS AND GROUTED BORE HOLE
27						
28						
29						
30						
31						

Drilling Log

Project Name EGGKTA						Boring No. GMW-14	
Project No. 91-319-1						Page 1 of 2	
Ground Elevation 636.77 FT.			Location 5 FT WEST OF OW-2 & ±15 FT NORTH OF OW-1			Total Footage 25 FT	
Drilling Type H SA	Hole Size 10-INCH	Overburden Footage 22.2 FT	Bedrock Footage 2.8 FT	No. of Samples 5	No. Core Boxes Ø	Depth To Water 18.8	Date Measured 3/27/92 <i>SEE REMARKS</i>
Drilling Co. LAYNE WESTERN OF ST. LOUIS					Driller(s) WILLIS DURHAM, DALE MAHURIN		
Drilling Rig: CME-75					Type of Penetration Test NONE		
Date 3/27/92			To 3/30/92		Field Observer(s) PAUL CLARK, SHAWN SLATTERY		
Depth	Description		Class.	Blow Count	Recov.	Sample or Box No.	Remarks
1	GRVEL FILL, LIMESTONE GRAVEL WITH DEBRIS (GLASS) SILT & TARRY SUBSTANCE AT OPT. 1.0 FT., BLACK BITUMINOUS ODR, PLYABLE.					RUN 1 2:55	START 2:53 PM 3/27/92
2	SILT, OLIVE GRAY (SY 3/2), MOIST TO WET, MED. PLASTIC, VERY SOFT, TRACE ORGANKS (ROOTS).		ML		1.0 5.0	CME-1 18.0 ppm	OVM BH = 0.0 ppm BZ = 0.0 ppm S = 65 ppm
3							
4							
5						CME-2	OVM BH = 30.7 ppm (PEAK) BZ = 0.0 ppm
6	CLAY LIGHT OLIVE GRAY (SY 5/2), MOTTLED WITH DUSKY YELLOW (SY 4/4), MED TO HIGH PLASTIC, DAMP, SILTY.		CH			RUN 2 3:06	BH = 22.0 (CME RETR.)
7	CLAY, MODERATE YELLOWISH BROWN (10YR 5/4) WITH YELLOWISH GRAY (SY 7/2) DAMP TO DRY, TRACE PLASTICITY. IRON STAINS "BIRD EYE" FROM 7.7 FT TO 10 FT, MEDIUM PLASTIC FROM 8.1 FT TO 10 FT.		CL		5.0 5.0	CME-3	OVM BH = 77.0 ppm BZ = 0.0 ppm S = 0.0 ppm
8							
9							
10							BH = 0.0 ppm (CME RETR.)
11	CLAY, MODERATE YELLOWISH BROWN (10YR 5/4) WITH YELLOWISH GRAY (SY 7/2), DAMP TO DRY, TRACE PLASTICITY, IRON STAINS.		CL			RUN 4 3:24	
12					5.0 5.0	CME-4	OVM BH = 0.0 ppm BZ = 0.0 ppm S = 1-3 ppm on BROKEN CORE.
13							
14	CLAYEY SILT, MODERATE BROWN (5YR 4/4), LOW PLASTIC, DAMP TO DRY.		ML				

Drilling Log, continued

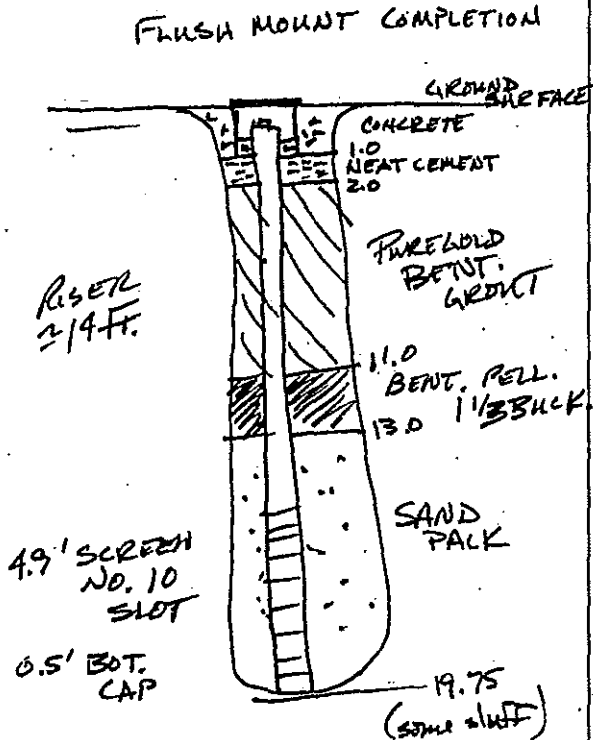
Boring No. GMK-14						
Project Name EGGKTA						Page 2 of 2
Project No. 91-319-1						Date 3/27/92
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
15	CLAY, SILTY, PALE YELLOWISH BROWN (10YR6/2) TRACE IRON STAINING, DAMP, TRACE TO MOD. PLASTIC, IRON STAINED MACRO PORES WITH WATER IN PORES.	CL				RUN 4 3:40 BH = 65 ppm (CME RET.) OVM B1 = 0.0 ppm B2 = 0.0 ppm WATER MEASURED AT 18.8 FT. SAMPLER RETRIEVED W/ SAMPLE EXPANSIVE
16						
17					5.0 5.0	
18						
19	SILTY CLAY, PALE YELLOWISH BROWN (10YR6/2), DAMP, MED. PLASTIC, TRACE GRAVEL (CHERT).	CL				
20	CLAY, SILTY, PALE YELLOWISH BROWN (10YR6/2), DAMP, TRACE TO MOD. PLASTIC, TRACE FINE SAND AND MICA, TRACE IRON STAINING	CL				BH = 19 ppm (CME RET.)
21					RUN 5 4:09	
22	SILTSTONE, HIGHLY WEATHERED, TRACE PARTICLES MODERATE BROWN (5YR4/4) WITH YELLOWISH GRAY (5Y7/2) BANDS, TRACE VERY FINE SAND & MICA, BLACK STAINS ON SOME PARTICLES, VERY HEAVY FRIABLE.				CME-5	OVM B1 = 0.0 ppm B2 = 0.0 ppm
23	SILTSTONE, MODERATE YELLOWISH BROWN (10YR5/4) MASSIVE (NO PARTICLES), SOME VERY FINE SAND AND MICA, NO REACTION TO HCL.					SAMPLER RETRIEVED W/
24				5.0 5.0		BH = 7.2 ppm (CME RET.)
25						STOPPED DRILLING 4:15 PM LOANERED MARK - LEFT AUGERS IN GROUND 3/27/92
26	TD = 25 FT (AUGERS)					3/30/92
27						8:33 BEGAN TO PULL AUGERS. OPEN HOLE OVM 14.1 ppm peak AVE: 5.5 TO 7.0 ppm
28						9:09 AM BEGAN REAMING W/ 10-INCH AUGERS
29						BH = 114.9 ppm @ 5 FT B2 = 0.0 ppm
30						
31						

Drilling Log

Project Name EGGKTA						Boring No. GMW-15	
Project No. 91-319-1						Page 1 of 2	
Ground Elevation 642.68			Location 0.5 FT EAST OF RETAINING WALL, ALIGNED WITH SOUTH WALL OF PEE TANK SHED.			Total Footage 20.0	
Drilling Type HSA	Hole Size 10-INCH	Overburden Footage 19.2	Bedrock Footage 0.8	No. of Samples 8	No. Core Boxes 0	Depth To Water 9.75 FT	Date Measured 4/2/92 <i>SEE REMARKS</i>
Drilling Co. LAYNE WESTERN OF ST. LOUIS				Driller (s) WILLIS DURHAM, DALE MAHURIN			
Drilling Rig. CME-75				Type of Penetration Test NONE			
Date 4-01-92		To 4-01-92		Field Observer (s) PAUL CLARK, SHAWN SLATTERY			
Depth	PID USED = OVM W/ 10.6 eV LAMP BH = BOREHOLE; BZ = BREATHING ZONE S = SAMPLE Description H = HEADSPACE	Class.	Blow Count	Recov.	Sample or Box No.	Remarks	
1	ASPHALT SILTY CLAY FILL, MODERATE YELLOWISH BROWN (10 YR 5/4), DEBRIS (BRK, CINDER, GLASS), CHEST COBBLES	CL			CORE BARREL 9:51 CME-1	START 9:51 AM 4/1/92 OVM BH = 17.7 ppm BZ = 0.8-2.5 ppm H = 76.9 ppm	
2	CLAYEY SILT, MODERATE YELLOWISH BROWN (10 YR 5/4), DAMP, TRACE PLASTICITY, TRACE ROOT CASTS (MICRO PORES) PORES ARE WET, SLIGHT PETROLEUM-LIKE ODOR	ML CL		3.5 3.5	RUN 1 9:59	OVM BH = 5.0 ppm BZ = 0.8-1.2 ppm	
3					CME-2	← H = 19.4 ppm	
4					CME-20	← H 134.7 ppm	
5					ST-1 10:06		
6	END: CLAYEY SILT, MOD. YELLOWISH BROWN (10 YR 5/4) WITH LIGHT OLIVE GRAY (5 Y 5/2), VERY STIFF	ML		2.0 2.0		POCKET PEN = 3.5 TSF	
7	CLAYEY SILT, MODERATE YELLOWISH BROWN (10 YR 5/4) WITH LIGHT OLIVE GRAY (5 Y 5/2) STREAKS, TRACE TO MED. PLASTIC, DAMP TO MOIST, SOLVENT ODOR, MEDIUM TO STIFF	ML		3.0 3.0	RUN 2 10:13 CME-3	← S = 150 ppm	
8					CME-4	WATER @ 9.75 FT. ← S = 200 ppm	
9					RUN 3 10:27	BH = 60.0 ppm	
10					CME-5	→ S = 60.7 ppm	
11					CME-6	→ S = 149.7 ppm	
12				5.0 5.0		→ S = 27.6 ppm	
13	CLAYEY SILT, MOD. YELLOWISH BROWN (10 YR 5/4) w/ LIGHT OLIVE GRAY (5 Y 5/2) STREAKS, TRACE TO MED. PLASTIC, DAMP TO MOIST, MEDIUM TO STIFF, IRON STAINED	ML					
14							

Drilling Log, continued

Project Name						Boring No. GMK-15	
Project No. 91-319-1						Page 2 of 2	
Date 4-1-92							
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks	
15	CLAY, LIGHT OLIVE GRAY (5Y5/2), VERY STIFF TO HARD	CH				>S = 205.6 ppm (shoe) BH = 7.2 ppm SAMPLE EXPANSIVE IN SAMPLER	
16							
17							
18	CLAY, LIGHT OLIVE GRAY (5Y5/2), VERY SOFT TO SOFT WITH GRAVEL, STRONG SOLVENT ODOR	GC					
19	CLAY, LIGHT OLIVE GRAY (5Y5/2) WITH DARK YELLOWISH ORANGE (10Y5/6), SOME MICA & IRON STAINING, GRADES TO WAXY CLAY WITH STRONG SOLVENT ODOR AND HIGHLY WEATHERED SILTSTONE WITHIN CLAY BANDS (5Y7/2)	CH			CME-7 CME-8	>S = 557 ppm	
20	SILTSTONE - HIGHLY WEATHERED, TRACE PARTINGS; SLIGHT VERY FINE SAND.						
20	SILTSTONE, LIGHT OLIVE GRAY (5Y5/2) TO YELLOWISH GRAY (5Y7/2)					11:35 STOPPED DRILLING BEGAN PULLING AUGERS	
20	TD = 19.9 FT (TAPED)	MASSIVE				DEGREASING PIT BEGAN VENTING FORCING WORK STOPPAGE	
21							
22	FLUSH MOUNT COMPLETION						
23						12:55 PM BEGAN REMOVING WITH 10-INCH AUGERS	
23						BH = 119 ppm	
24						1:55 PM BEGAN WELL INSTALLATION.	
24							
25							
25							
26							
26							
27							
27							
28							
28							
29							
29							
30							
30							
31							



Drilling Log

Project Name EGGKTA						Boring No. GMW-16	
Project No. 91-319-1						Page 1 of 3	
Ground Elevation 636.64			Location BETWEEN GMW-8 & GMW-14 ON STRAIGHT DIAGONAL LINE - SE PART OF SITE			Total Footage 39.0	
Drilling Type HSA/---	Hole Size 10-INCH	Overburden Footage 20.8	Bedrock Footage 17.36	No. of Samples 3	No. Core Boxes Ø	Depth To Water 33.42	Date Measured 4/6/92 <i>SEE REMARKS</i>
Drilling Co. LAYNE WESTERN OF ST. LOUIS				Driller (s) WILLIS DURHAM, DALE MAHURIN			
Drilling Rig. CME-75 / SHRAMM T660 - INSTALLATION				Type of Penetration Test NONE			
Date 4/6/92		To 4/7/92		Field Observer (s) PAUL CLARK, PAUL NIEBERGALL			

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks
1	GRAVEL FILL, TAR LAYER WITH GRAVEL BITUMINOUS ODOR	GC			Run 1	START 4/6/92 11:51AM OVM BH = 2.3 ppm BZ = 0.0 ppm LEL = 0% O ₂ = 20.5%
2					4.0	
3						
4						
5	SILT, OLIVE GRAY (5Y 3/2), MOIST TO WET, MED. PLASTIC, VERY SOFT, TRACE ORGANIC WET FROM 5.2 TO 7.0 FEET.	CL TO OL			Run 2	OVM BH = 1.9 ppm (CUTTINGS) BZ = 0.0
6					5.0	
7	CLAY, MODERATE YELLOWISH BROWN (10YR 5/4) WITH YELLOWISH GRAY (5Y 7/2), DAMP TO DRY, TRACE PLASTICITY	CL				OVM = 54.0 ppm
8						
9	CLAY, SILTY, MODERATE YELLOWISH BROWN (10YR 5/4) WITH SOME YELLOWISH GRAY (5Y 7/2), DAMP TO DRY, TRACE PLASTICITY, IRON STAINED BIRD'S EYE & ROOT OR BURROW CASTS	CL			Run 3	OVM BH = 0.1-0.5 ppm OVM BH = 2-3 ppm (CUTTINGS)
10					5.0	
11					5.0	
12						
13						
14						

US EPA ARCHIVE DOCUMENT

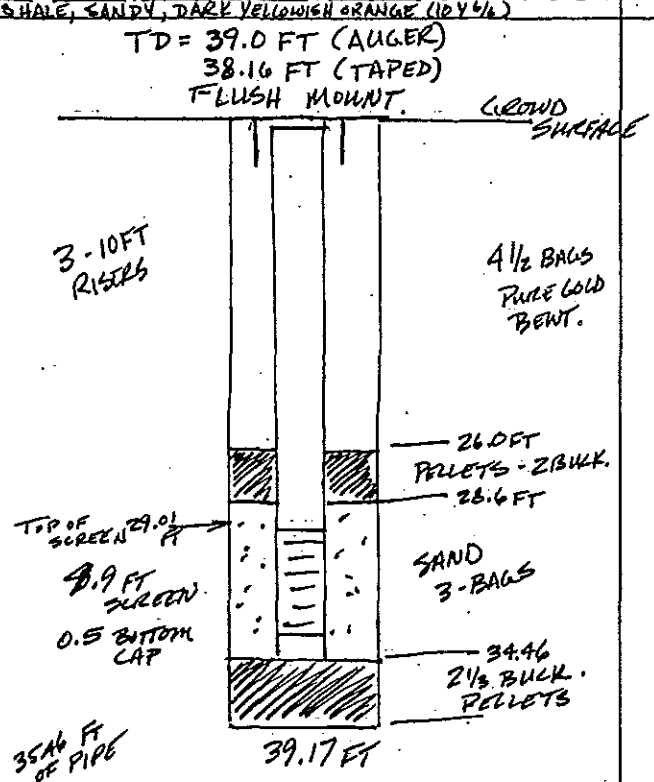
Drilling Log, continued

Project Name EGKTA						Boring No. GMW-16	
Project No. 91-319-1						Page 2 of 3	
Date 4/6/92							
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks	
15	SILTY CLAY, MODERATE YELLOWISH BROWN (10 YR 5/4) WITH YELLOWISH GRAY (5Y 7/2) MOIST, MED TO HIGHLY PLASTIC	MH			RUN 4 12:52	OVM BH = 23.0 ppm (CUTTINGS)	
16				5.0 5.0			
17						OVM S = 51.3 ppm	
18						OVM S = 53.7 ppm	
19						OVM S = 229 ppm BZ = 0.0 ppm BH = 20.5 ppm (CME RET.)	
20	CLAYEY SILT, NON PLASTIC, VERY STIFF, DAMP.	CL			RUN 5 1:02	CME-1	
21	CLAY, YELLOWISH GRAY (5Y 7/2), VERY SOFT, WITH GRAVEL, ROUNDED, CHERT AT 19.9 AND 20.7 FT.	CL-GC					
22	SILTSTONE, WEATHERED, MOD. YELLOWISH BROWN (10YR 5/4) BANDED YELLOWISH GRAY (5Y 7/2), VERY FINE GRAINED SAND, TRACE MICA, NO HCL REACTION			5.0 5.0		BAG SAMPLE FOR SIEVE ANALYSIS 21 TO 22 FT (41.3 ppm)	
23	SILTSTONE, MOD. YELLOWISH BROWN (10YR 5/4) WITH VERY FINE GRAINED SAND, TRACE TO SOME MICA, DISTINCT PARTINGS SHOWING BLACK STAINING, FRIABLE IN PART, HARD IRON-RICH LAYER AT 26.3 FT (35MM THICK).				CME-2	H = 580 ppm	
24						S = 87.3 ppm (S 40E) BZ = 0.0 ppm BH = 6.1 ppm (RET)	
25					RUN 6 1:30	S = 20-30 ppm	
26				5.0 5.0			
27	SHALE, LIGHT OLIVE-GRAY BROWN (5Y 5/6) TRACE FISSILE PARTING, MICA ON SOME PARTINGS, NO HCL REACTION.					SAMPLER RET. WET.	
28							
29	CLAY MIXED WITH SHALE GRAVEL, DARK YELLOW ORANGE (10 YR 6/6) TO LIGHT BROWN (5 YR 5/6)	GC				BH = 20.2 ppm (RET)	
30	SILTSTONE WITH SAND, MOD. YELLOWISH BROWN (10 YR 5/4), SOME MICA, DISTINCT PARTINGS.				RUN 7 1:52	CME-2	
31						MINOR MINERALIZED FRACTURE	

US EPA ARCHIVE DOCUMENT

Drilling Log, continued

Project Name EGGKTA						Boring No. GMW-16	
Project No. 91-319-1						Page 3 of 3	
Date 4/6/92							
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks	
32	SAND, FINE - VERY FINE GRAINED, VERY WET	SW					OVM S = 0.0 ppm
33	CLAY, PALE GRAY (10Y 6/2), VERY STIFF, DRY, TRACE SLICKENSIDES, TRACE BEDDING, (WEATHERED SHALE), GRADES TO SHALE AT 34.3 FT.	CL		5.0 5.0			S = 0.0 ppm WATER AT 33.4Z BZ = 0.0 ppm
34		SLICKENSIDES					S = 0.0 ppm BH = 22.1 ppm (RET)
35	SHALE, WEATHERED, PALE OLIVE (10Y 6/2) WITH GRAYISH RED (10R 4/2) AND DARK YELLOWISH ORANGE (10YR 6/6) STREAKS, SLICKENSIDES, HARD				RW 8 3:28		OVM BZ = 0.0 ppm
36				5.0 5.0			S = 0.0 ppm (ENTIRE INTERVAL)
37							
38							
39	SILT, DARK YELLOWISH BROWN (10YR 6/6), LOOSE, NON PLASTIC SHALE, SANDY, DARK YELLOWISH ORANGE (10Y 6/6)	ML					S = 0.0 ppm (SHOE) BH = 65 ppm (CME RET.)
40	TD = 39.0 FT (AUGER) 38.16 FT (TAPED) FLUSH MOUNT.						BEGAN PULLING 4 1/4 (SD) AUGERS 4:01 START 4:20 FINISH BEGAN DRILLING WITH 6 1/4 (SD) AUGERS 4:35 START 4:58 FINISH - OVM BH = 114.7 ppm CAPPED FOR HEIGHT
41							4/7/92 1:05 pm WATER LEVEL = 6.3 FT BGS BORING TAPED TO 39.17 FT. BEGAN SETTING WELL 1:10 pm COMPLETED WELL THROUGH BENT. CROWN AT 3:30 pm
42	3-10FT RISERS						
43							
44							
45	TOP OF SCREEN 29.0 FT 8.9 FT SCREEN 0.5 BOTTOM CAP						
46							
47	35 1/2 FT OF PIPE						
48							



Drilling Log

Project Name EGGKTA						Boring No. GMW-17	
Project No. 91-319-1						Page 1 of 4	
Ground Elevation 646.50				Location APPROX. 1.5 FT W OF SB-4; 8 FT NW OF DEGREASER AREA DOOR.		Total Footage 50.4	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
HSA/AIR	10-INCH	21.8	28.6	9	1		SEE REMARKS
Drilling Co. LAYNE WESTERN OF ST. LOUIS					Driller (s) WILLIS DURHAM, DALE MAHURIN		
Drilling Rig. CME-75 / SHAMM 7660					Type of Penetration Test NONE		
Date 4/7/92 To 4/8/92				Field Observer (s) PAUL CLARK, PAUL NIEBERGALL			

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks
	PID = OVM w/ 10.6 eV LAMP BH = BOREHOLE; BZ = BREATHING ZONE S = SAMPLER Description H = HEADSPACE					
	CONCRETE PAVEMENT				6046 4" CONC.	START 8:33 4/7/92
1	GRAVEL, SAND, CLAY FILL; WET, SOLVENT ODOR	GC			RUN 1 8:44 CME-1 8:55	BH = 134.1 ppm OVM 8:35 BZ = 0.0 ppm H = 1453 ppm LEL = 0% O ₂ = 20.5%
2				2.8 4.5		S = 387 ppm OVM - 8:45 ppm BZ = 0.0 ppm BH = 0.0 - 0.5 ppm PEAK 1.3 ppm
3	CLAYEY SILT, OLIVE GRAY (SY 3/2), MOIST, SOFT, SOLVENT ODOR, ORGANICS (ROOTS, FROM 2.8 TO 3.8 FT; GRASS, LEAVES, & WOOD FROM 3.8 TO 6 FT), NONPLASTIC TO TRACE PLASTICITY	OL UPPER ML LOWER				S = 124.6 ppm
4						S = 30.1 ppm BH = 74.4 ppm (RET.)
5					RUN 2 8:52	
6						
7	SILTY CLAY, MODERATE YELLOW-BROWN-GRAY BROWN (10 YR 5/4) STREAKED LIGHT OLIVE GRAY (SY 5/2), DRY TO DAMP, TRACE PLASTICITY, MEDIUM TO STIFF			5.0 5.0		S = 11.4 ppm OVM 8:58 BH = 13.5 ppm (RET.) BZ = 0.0 ppm LEL = 0% O ₂ = 20.5%
8						
9		ML				
10						S = 71.4 ppm
11					RUN 3 9:08	OVM 9:09 BH = 5.0 ppm (CUTTING)
12						BZ = 0.0 ppm
13	CLAYEY SILT, OLIVE GRAY (SY 4/1), DAMP TO MOIST, NONPLASTIC TO TRACE PLASTICITY, SOFT TO MEDIUM, SOLVENT ODOR	ML		5.0 5.0	CME-2 9:15 AM	S = 7.2 ppm H = 237.7 ppm OVM 9:11 BZ = 0.9 BH = 27.3 (RET.)
14					CME-3 9:20	S = 71.4 ppm H = 213.7 ppm

Drilling Log, continued

						Boring No. GMW-17	
Project Name EGGKTA						Page 2 of 4	
Project No. 91-319-1						Date 4/7/92	
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks	
15	CLAYEY SILT/SILTY CLAY, YELLOWISH GRAY (5Y 7/2) STREAKED DARK YELLOWISH ORANGE (10 YR 6/6), STIFF, DAMP, TRACE PLASTIC, ROOT LASTS, SOLVENT ODOR IN PART	ML				S = 53.8 ppm	
16						RUN 4 9:24	S = 23.5 ppm OVM 9:25 BH = 0.1 - 0.5 (CUTTINGS) BZ = 0.0 ppm
17					5.0 5.0		S = 7.5 ppm
18							
19							
20						S = 1.6 ppm	OVM 9:29 BH = 183.9 (RET) BZ = 0.9 ppm
21	CLAY, SILTY, YELLOWISH GRAY (5Y 7/2) WITH DARK YELLOWISH ORANGE (10 YR 6/6), VERY STIFF, DAMP, TRACE PLASTIC, IRON STAINED	CL				RUN 5 9:35	OVM 9:36 BH = 20.7 (CUTTINGS) BZ = 0.0 ppm LEL = 0% O ₂ = 20.5%
22					5.0 5.0		
23	SILTSTONE, HIGHLY WEATHERED; DARK YELLOWISH ORANGE (10 YR 6/6) CLAYEY, SOME VERY FINE SAND, TRACE PARTINGS					CME-4 9:38	H = 613 ppm S = 12.8 ppm
24							
25	SILTSTONE, DARK YELLOWISH ORANGE (10 YR 6/6) WITH FINE SAND, DISTINCT PARTINGS, NO HCL REACTION, TRACE MICA, MASSIVE IN PART, WEAK TO MEDIUM, HARDER AT 28 TO 32 FT.					CME-5 9:44	OVM-9:38 AM BH = 36.3 (RET) BZ = 0.5 ppm
26						RUN 6 9:46	S = 24.7 ppm H = 1681 ppm S = 37.2 ppm
27							OVM 9:47 BH = 74.5 (CUTTINGS) BZ = 0.5 ppm
28				5.0 5.0		SAMPLER IS WET	
29						S = 288 ppm	
30						H = 105 ppm S = 217 ppm	
31					CME-6 RUN 7 10:15	OVM 9:51 AM BH = 111.5 (RET) BZ = 0.5 ppm	

Drilling Log, continued

						Boring No. GMW-17
Project Name EGGKTA						Page 3 of 4
Project No. 91-319-1						Date 4/7/92 / 4/8/92
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
32				5.0		OVM = 10:17 BH = 4.0 ppm BZ = 1.6 ppm (BACKGROUND AMBIENT) ABOUT 1.3 ppm
33	SAND, VERY FINE, SILTY, CLAYEY, GRAYISH ORANGE (10 YR 7/4) WEATHERED.			5.0		AUGERS GRINDING 31 TO 32 FT.
34	SHALE, SILTY IMPACT, DARK YELLOWISH ORANGE (10 YR 6/6), HARD CLAY W/ SHALE GRAVEL, DARK YELLOWISH ORANGE (10 YR 6/6) HIGHLY PLASTIC				CME 7 10:25	S = 35.5 ppm H = 14.3 ppm SOFTER DRILLING SAMPLER IS WET
35	SHALE, DARK YELLOWISH ORANGE (10 YR 4/6), HARD, DISTINCT PARTINGS, IRON STAINED, WEATHERED AT TOP TO SLIGHTLY WEATHERED AT 35.9 FT, DRY TO DAMP				Run 8 10:49	S = 133.5 ppm OVM 10:22 BH = 69.2 ppm (RET)
36						S = 12.1 ppm OVM 10:50 BH = 3.5 ppm BZ = 2.3 ppm
37	SANDY SILTSTONE, DARK YELLOWISH ORANGE (10 YR 6/6) WITH PALE OLIVE (10 YR 5/2), SILT LAYERS; MOIST, DISTINCT PARTINGS, 0.5 mm FRACTURE AT 37.4 FT CLAY FILLED (CLAY IS WAXY - DARK REDDISH BROWN [10 R 3/4] FOSSIL LEAVES OR REED PIECES IN 2mm LAYERS AT 36.8 FT AND 39.8 FT.	FRACTURE		5.0		S = 7.2 ppm
38				5.0		SAMPLER IS WET
39						H = 19.9 ppm
40					CME-8 11:00	S = 58.3 ppm OVM 10:55 BH = 83.3 ppm (RET)
41	SANDY SILTSTONE, DARK YELLOWISH ORANGE (10 YR 6/6), SATURATED, DISTINCT PARTINGS TRACE FOSSIL PLANT PIECES IN VERY THIN LAYER, SANDIER ON BOTTOM OF RUN - NO HCL REACTION			2.4	Run 9 11:21	SOLVENT ODDR FROM TOP OF SPOOD. MUCK AT TOP OF BOREHOLE SAMPLER WITH FREE WATER
42				2.4		
43	SANDSTONE, MODERATE, YELLOWISH BROWN (10 YR 5/4), HARD, NO HCL REACTION, VERY FINE TO FINE GRAINED QUARTZ SAND, ROUNDED GRANS, SOME OPAQUE GRANS, TRACE SILT WITH THIN (< 1mm) SHALE INTERBEDS AT 44.9 FT AND 45.2 FT. SANDSTONE AND SHALE DO NOT PART. TRACE CROSS BEDDING AT APPROX. 46 FT. SANDSTONE IS MASSIVE.		ROD FRAC. FEET. 0.1 0.3 0.6 0.1 0.3 0.15 0.05 0.3 0.2 0.55 0.6 0.3 0.3 0.2	5.5 8.0	CME-9 11:30 Run 10 4-8-92 10:38 CORE.	H = 29.1 ppm S = 10.4 ppm AUGER REFUSAL AT 42.4 FT (RAISED RIG) PULLED CME-75 OFF HOLE DUE TO REFUSAL.
44					CORE IN BOX No. 1 - Run 10.	4/8/92 SCHRAMM T660 RIG-UP ON BORING. WATER LEVEL - 14.2 FT. BGS 8:26 AM CORE BARREL LENGTH = 12.55 FT. 10:28 AM BEGAN CORING. DRILLING W/ APPROX. 5 gallons/min water
45						
46						
47						
48						

Drilling Log, continued

Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
						Boring No. GMW-17
Project Name EGGKTA						Page 4 of 4
Project No. 91-319-1						Date 4-8-92
49						11:48 AM RETRIEVED CORE BARREL FROM BORING
50	SHALE, LIGHT OLIVE GRAY (5/8) MASSIVE, ON-COASTAL FRACTURE, CLAYEY IN BOTTOM 2-INCHES				END RUN 11:31	OVM 11:50 AM BH = 23.0 - 51.4 ppm BZ = 0.0 - 0.6 ppm
51	TD = 50.4 FT (AUGER) TAPED 48.8 FT.					12:09 PM TAPED 48.8 FT BGS.
52						OVM-CORE = 0.0 ppm AFTER RET. FROM BARREL OVM-CORE = 0.6 - 1.0 ppm ON FRESH BREAKS CORE PIECES GROVED ON ENDS WHERE BROKEN IN BARREL.
53						2:00 pm BEGAN REMAINING BORING TO 50.4 FT.
54						2:13 pm END REAM
55						2:40 pm BEGAN SETTLING MONITORING WELL
56						3:26 pm - BENTONITE SEAL IN PLACE
57						3:39 - PREPARING TO RIG DOWN.
58						4:10 pm - BEGAN GROUTING BORING WITH PUREGOLD BY TREMIE
59						4:40 pm PUREGOLD GROUT CAME UP TO 12 FT AND BEGAN TO MOVE INTO THE FORMATION
60						4:58 pm - MIXED NEAT CEMENT TO SEAL THE 12 FT ZONE.
61						PLACED 2 FT CONCRETE ON NEAT CEMENT.
62						PLACED DRUM OVER REMAINING HOLE.
63						
64						
65						

Drilling Log

Project Name EGGKTA						Boring No. 6MW-18	
Project No. 91-319-1						Page 1 of 3	
Ground Elevation 646.52 FT.			Location ADJACENT TO 6MW-17 (NW 35FF)			Total Footage 35.5'	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
Air-Rotary	1 9/16" Surface 1 1/4" inner	22'	11.5'	—	—	SEE FIELD	LOG BOOK
Drilling Co. LAYNE WESTERN OF ST. LOUIS				Driller (s) Mike Vogt, Rick Hofstetter			
Drilling Rig: Air-Rotary				Type of Penetration Test NONE			
Date 4-9-92		To 4-10-92		Field Observer (s) P. Niebergall			

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks
1	CONCRETE					Logged from wash cuttings. NO SAMPLES TAKEN. see log of 6MW-17 for sample descriptions
1	BASE ROCK					
2	Clayer silt and silty clay, olive gray, (5Y 4/1), Damp to wet, stiff					
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

Drilling Log

Project Name EGGKTA						Boring No. 6MW-18	
Project No. 91-319-1						Page 1 of 3	
Ground Elevation 646.52 FT.			Location ADJACENT TO 6MW-17 (NW 35F)			Total Footage 35.5'	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
Air-Rotary	1 9/16" Surface 1 3/4" inner	22'	11.5'	—	—	SEE FIELD	LOG BOOK
Drilling Co. LAYNE WESTERN OF ST. LOUIS				Driller (s) Mike Vogt, Rick Hofstetter			
Drilling Rig. Air-Rotary				Type of Penetration Test NONE			
Date 4-9-92 To 4-10-92				Field Observer (s) P. Niebergall			

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks
1	CONCRETE					Logged from wash cuttings. NO SAMPLES TAKEN. see log of 6MW-17 for sample descriptions.
2	BASE ROCK					
3	Clayer silt and silty clay, Olive gray, (SY 4/1), Damp to wet, stiff					
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

Drilling Log, continued

						Boring No.	6 MW-18
Project Name						EGGKTA	Page 2 of 3
Project No.						91-319-1	Date 4/9/92
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks	
15	clayey SILT and SILTY CLAY, olive gray (5Y 4/1), Damp, stiff						
16	SILT w/ clay, yellowish gray (5Y 7/2), stiff, damp						
17							
18							
19							
20							
21							
22							
23	SILT to highly weathered						
24	SILTSTONE, dark yellowish						
25	orange (10 YR 6/6), some						
26	fine sand.						
27							
28							
29							
30							
31							

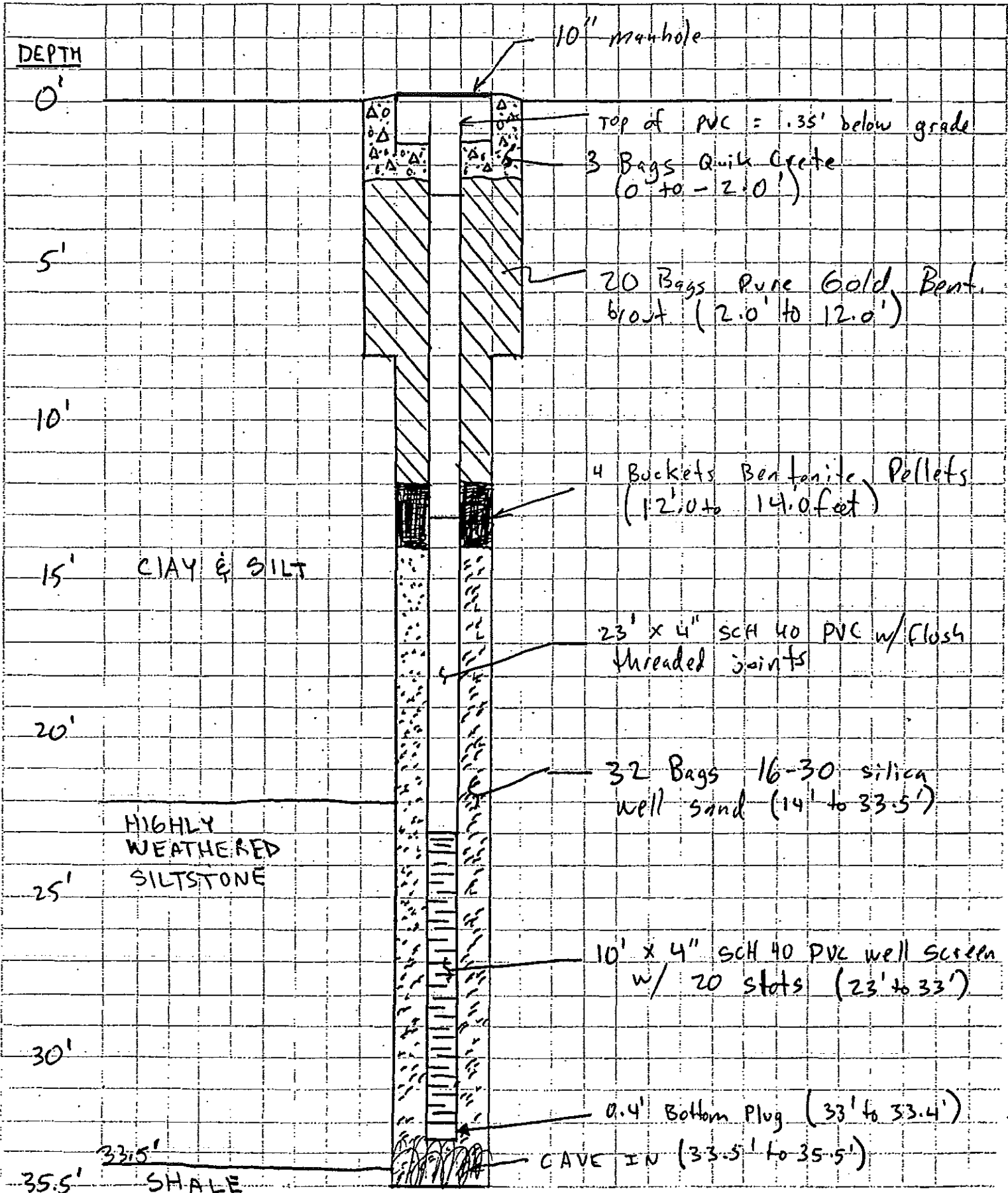
Drilling Log, continued

Boring No. GMW-18						
Page 3 of 3						
Date 4/9/92						
Project Name EGGKTA			Project No. 91-319-1			
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
32	Weathered SILTSTONE w/ fine sand, dark yellowish orange (10YR 6/6).					
33						
34						
35						
36						
36	TOTAL DEPTH = 35.5 feet					
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

COMPLETION DETAIL

6MW-18

041581 Form GCO-29



Drilling Log

Project Name EGGKTA						Boring No. GMW-2 ABANDONMENT		
Project No. 91-319-1						Page 1 of 2		
Ground Elevation			Location APPROXIMATELY 15 FT EAST OF E-W & OF SOUTH LAY DOWN AREA.			Total Footage 19		
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured	
HSA	10 IN.	19 FT	0	1	0	SEE REMARKS		
Drilling Co. LAYNE WESTERN OF ST. LOUIS				Driller (s) Willis Durham & Dale Makurin				
Drilling Rig. CME-75				Type of Penetration Test SPLIT SPOON (24-INCHES)				
Date 3/25/92		To 3/25/92		Field Observer (s) PAUL CLARK & SHAWN SLATTERY				
Depth	Description			Class.	Blow Count	Recov.	Sample or Box No.	Remarks
	<small>PID USED = OVM W/ 10.6 LAMP BH = BORE HOLE; BZ = BREATHING ZONE S = SAMPLER. H = HEADSPACE.</small>							
1	SILT, MODERATE BROWN (10 YR 5/4), WET							START: 8:30 AM 3/25/92 LOGGED FROM CUTTINGS - RAINING.
2								PULLED 15 FEET OF WELL CASING AND SCREEN WITHOUT DAMAGE.
3								OVM - 8:34 AM BH = 0.0 ppm BZ = 0.0 ppm
4	SAND & "WHITE" GROUT (BACK FILL MATERIAL)							OVM - 8:41 BH = 0.1 ppm to 0.3 ppm BZ = 0.0 ppm
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

Drilling Log, continued

						Boring No. GMW-2 ABAND.	
Project Name EGGKTA						Page 2 of 2	
Project No. 91-319-1						Date 3/25/92	
Depth	Description	Log of Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks	
15	BENTONITE CLAY AND GROUT CHIPS					OVM = 8:58 AM BH = 0.3 ppm BZ = 0.0 ppm	
16							
17							
18	SAND, CLEAN, ROUND. SILTY CLAY, MODERATE YELLOWISH BROWN (10 YR 5/4) TO DARK YELLOWISH ORANGE (10 YR 6/6), VERY STIFF, MEDIUM PLASTIC		1 2 5 6		SS-1 9:01	OVM = 9:04 AM BH = 0.3 ppm BZ = 0.0 ppm S = 0.3 ppm	
19	TD = 19 FT.					BORING WITH SOME WATER AT BOTTOM \leq 1 FOOT. SPUN AUGER TO CLEAN BORING. ABANDONED BORING BY PUMPING 17 BAGS OF HEAT CEMENT WITH TREMIE PIPE FROM BOTTOM OF OPEN BORE TO GROUND SURFACE.	
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							

Drilling Log

Project Name <i>EGGKTA</i>						Boring No. <i>GMW-12 ABANDONMENT</i>	
Project No. <i>91-319-1</i>						Page <i>1</i> of <i>2</i>	
Ground Elevation			Location <i>CENTER OF ALLEYWAY BY BMW-6</i>			Total Footage <i>30</i>	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
<i>USA</i>	<i>8"</i>	<i>NA</i>	<i>NA</i>	<i>0</i>	<i>0</i>	<i>27</i>	<i>SEE REMARKS</i>
Drilling Co. <i>LAYNE</i>				Driller (s) <i>SUNNY DUCHAM & DALE MAHURIN</i>			
Drilling Rig. <i>CME-75</i>				Type of Penetration Test <i>SPLIT SPON - 24"</i>			
Date <i>4/1/92</i>		To <i>4/1/92</i>		Field Observer (s) <i>PAUL CLARKE & SHAWL SLATTER</i>			

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks
	<i>LOWERED FROM CUTTING</i>					
1	<i>ASPHALT</i>					<i>START: 3:09 PM</i>
2	<i>CLAYEY SILT, MIXED WITH SAND, MODERATE BROWN (5 YR 3/4).</i>					<i>PULLED 30' 1" OF PVC PIPE FROM BORING. 20 FT OF SCREEN</i>
3						<i>LOWER 5 FT APPEAR TO BE SILTED IN.</i>
4						<i>OVM BH = 3.2</i>
5						
6						
7						
8						
9						
10	<i>CLAYEY SILT, MODERATE YELLOWISH BROWN (10 YR 5/4), MOIST</i>					<i>CUTTINGS VERY WET AT 10 FT</i>
11						
12						<i>OVM BH = 3.3</i>
13						
14						

Drilling Log, continued

						Boring No. Guel-12 ABAND	
Project Name						Page 2 of 2	
Project No.						Date 4/1/92	
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks	
15							
16							
17	<p>LT SILT MIXED WITH COARSE SAND, LIGHT OLIVE GRAY (5Y5/2), SLIGHT PETROELIUM STAIN, VERY WET.</p>						
18							
19							
20							<p>OUM BH = 1.8 to 0.8 ppm BB = 0.0 ppm</p>
21							
22							
23							
24							
25							
26							
27							
28							
29							
30	SILTSTONE					<div style="border: 1px solid black; padding: 5px; margin: 5px;"> <p>SPOON 30' TO 32'</p> <p>1 1/2</p> <hr/> <p>93</p> <hr/> <p>53 3.9 EXCESS</p> <hr/> <p>"REFR?"</p> </div> <p>DROVE SPOON AT 30' 3:48pm</p>	
31							

US EPA ARCHIVE DOCUMENT

Drilling Log

Project Name EGG KTA						Boring No. ABANDONMENT GMW-13	
Project No. 91-319A-003						Page 1 of 4	
Ground Elevation				Location SE CORNER OF SITE BY BACK GATE		Total Footage 50 FT.	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
ISA	10"	50 FT	—	0	0	(TOP) 7.05 FT	3/24/92
Drilling Co. LAYNE - WESTERN - ST. LOUIS				Driller (s) SWAMY DURHAM & PALE MAHURAN			
Drilling Rig. CME-75				Type of Penetration Test SPLIT SPOON (2A")			
Date 3/24/92		To 3/24/92		Field Observer (s) PAUL CLARK & SHAWN SLATTERY			
Depth	Description		Class.	Blow Count	Recov.	Sample or Box No.	Remarks
	<u>LOGGED FROM CUTTINGS</u>						
1	CONCRETE CAP WITH VALVE BOX COVER G40 & VALVE BOX.						START 11:09 3/24/92
2	SAND, DARK YELLOWISH BROWN (10YR 4/2) MOIST, MEDIUM GRAINED						DRILLED 5 FEET WITHOUT CENTER BIT - DRILLER ATTEMPTING TO PULL 2" PVC PIPE.
3							OVM BZ = < 1 ppm BH = < 1 ppm to 1.2 ppm
4							PULLED 1ST SECTION 7.25 FT. N40LE
5							OVM BZ = 0 ppm BH = 0.5 ppm FROM PIPE/SCREEN SECTION
6							11:44 AM - PULLED 20 FT OF SCREEN SECTION WHOLE
7							OVM BZ = 0 ppm BH = 0.5 ppm SCREEN = 0.5 TO 0.7 ppm.
8							11:44 AM PULLED 20-FT OF SCREEN AND BOTTOM CAP FROM BORE HOLE - WHOLE
9							SILT IN BOTTOM CAP - RED; WET; MODERATE BROWN (5YR 4/4)
10							BUM = 0.2 ppm
11							11:59 AM - BEGAN TO REAM OUT BOXING.
12							12:03 PM OVM BZ = 0 ppm BH = 0 ppm BT 25 ppm.
13							
14							

Drilling Log, continued

						Boring No. <i>GMW-13 ABAND.</i>	
Project Name <i>EGGKTA</i>						Page <i>2</i> of <i>4</i>	
Project No. <i>91-319-9-003</i>						Date <i>3/24/92</i>	
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks	
15							
16							
17							
18							
19							
20							
21							
22							
23							
24	<i>SAND, MODERATE YELLOWISH BROWN (10 YR 5/4) MEDIUM TO COARSE GRAIN, WET WET, SOME SILT, MODERATE BROWN (5 YR 4/4)</i>						
25							
26							
27							
28							
29							
30						<i>12:13 PM OUM R2 = 0.0 ppm BH = 0.5 ppm</i>	
31							

Drilling Log, continued

						Boring No. <i>GMW-13 ABAND.</i>	
Project Name <i>EGGKTA</i>						Page <i>3</i> of <i>4</i>	
Project No. <i>91-319-4-003</i>						Date <i>3/24/92</i>	
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks	
32					32		
33					33		
34					34		
35					35		
36					36		
37					37		
38					38		
39	<i>SAND, MODERATE YELLOWISH BROWN (10 YR 5/4) WET</i>				39		
40					40		
41					41		
42					42		
43					43		
44					44		
45					45	<i>QUM = 12:29 AM BZ = 0.0 ppm BH = 1.5 ppm</i>	
46					46		
47					47		
48					48		

Drilling Log, continued

						Boring No. GMM-13 ABAAD
Project Name <u>ELGKTA</u>						Page 4 of 4
Project No. <u>91-319-4-003</u>						Date <u>3/24/92</u>
Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
49	SAND, MODERATE YELLOWISH BROWN (5 YR 4/4), MEDIUM TO COARSE GRAIN					
50	SHALE, MODERATE REDDISH BROWN (10R 4/6) MOTTLED WITH MODERATE OLIVE BROWN (5 Y 4/4), NON PLASTIC, HAIRLINE FRACTURES - STAINED BLACK TO GRAYISH BLACK (N1-N2), SLIGHT SHALE PARTINGS, CLAYEY AT TOP.		50 IN 4 INCHES			OVM 12:31 PM BZ = 0.0 ppm BH = 2.0 ppm at 50 FT.
51		X X X		SS-1		
52						DROVE SPOON 1:22 PM @ 50 FT TO 50.25 FT.
53						SET UP FOR GROUTING 2:24 PM; PLACED 50 FT OF PIPE (TRENLE) IN BORING INSIDE AUGERS.
54						2:33 PM BEGIN TO REMOVE AUGERS FROM BORING.
55						4:03 PM COMPLETED PULLING AUGERS 24 BAGS NEAT CEMENT PLACED IN BORING
56						SITE WAS CLEANED OF CUTTINGS - PLACED IN 2 DRUMS
57						
58						
59						
60						
61						
62						
63						
64						
65						

APPENDIX D

WELL CONSTRUCTION DIAGRAMS

FLUSH-MOUNT PROTECTIVE COVER

LOCKING WATERTIGHT CAP

GROUND SURFACE

GROUND SURFACE ELEVATION 636.77 FT.

TOP OF CASING ELEVATION 636.51 FT.

0.3 FT.

2.7 FT. CONCRETE CAP

17.3 FT.
4-INCH ϕ
SCH. 40
PVC CASING

11.3 FT. BENTONITE GROUT

1.9 FT. BENTONITE PELLETS
(HYDRATED)

4.9 FT.
NO. 10
4-INCH ϕ
PVC WELL
SCREEN WITH
0.010-INCH
OPENINGS

7.1 FT. SILICA SAND
WELL PACK

0.5 FT. PVC BOTTOM CAP

1.8 FT. HYDRATED
BENTONITE
PELLET PLUG

BOTTOM OF WELL:
23.0 FT. BELOW GRADE

DATE INSTALLED: MARCH 30, 1992

Burns & McDonnell
Waste Consultants, Inc.
ENGINEERS - GEOLOGISTS - SOILISTS - 100% EMPLOYEE-OWNED

MONITORING WELL
CONSTRUCTION DIAGRAM
FOR GMW-14

NOT TO SCALE

FLUSH-MOUNT PROTECTIVE COVER

LOCKING WATERTIGHT CAP

GROUND SURFACE

GROUND SURFACE
ELEVATION 642.68 FT.

TOP OF CASING
ELEVATION 642.31 FT.

0.4 FT.

1.0 FT. CONCRETE CAP

1.0 FT. NEAT CEMENT

14.0 FT.
4-INCH Ø
SCH. 40
PVC CASING

9.0 FT. BENTONITE GROUT

2.0 FT. BENTONITE PELLETS
(HYDRATED)

4.9 FT.
NO. 10
4-INCH Ø
PVC WELL
SCREEN WITH
0.010-INCH
OPENINGS

6.8 FT. SILICA SAND
WELL PACK

0.5 FT. PVC BOTTOM CAP

BOTTOM OF WELL:
19.8 FT. BELOW GRADE

DATE INSTALLED: APRIL 1, 1992

Burns	Waste
&	Consultants,
McDonnell	Inc.
ENGINEERS - GEOLOGISTS - SCIENTISTS - 100% EMPLOYEE-OWNED	

MONITORING WELL
CONSTRUCTION DIAGRAM
FOR GMW-15

NOT TO SCALE

FLUSH-MOUNT PROTECTIVE COVER

LOCKING WATERTIGHT CAP

GROUND SURFACE

GROUND SURFACE ELEVATION 636.64 FT.

TOP OF CASING ELEVATION 636.31 FT.

0.3 FT.

1.5 FT. CONCRETE CAP

1.0 FT. NEAT CEMENT

28.8 FT.
4-INCH ϕ
SCH. 40
PVC CASING

23.5 FT. BENTONITE GROUT

2.5 FT. BENTONITE PELLETS
(HYDRATED)

4.9 FT.
NO. 10
4-INCH ϕ
PVC WELL
SCREEN WITH
0.010-INCH
OPENINGS

6.0 FT. SILICA SAND
WELL PACK

0.5 FT. PVC BOTTOM CAP

4.7 FT. HYDRATED
BENTONITE
PELLETS PLUG

BOTTOM OF WELL:
34.5 FT. BELOW GRADE

DATE INSTALLED: APRIL 7, 1992

Burns	Waste
&	Consultants
McDonnell	Inc.
ENGINEERS - GEOLOGISTS - SOILISTS - RISK ANALYSTS - OMBE	

MONITORING WELL
CONSTRUCTION DIAGRAM
FOR GMW-16

NOT TO SCALE

FLUSH-MOUNT PROTECTIVE COVER

LOCKING WATERTIGHT CAP

GROUND SURFACE

GROUND SURFACE
ELEVATION 646.58 FT.

TOP OF CASING
ELEVATION 646.29 FT.

0.3 FT.

2.2 FT. CONCRETE CAP

10.0 FT. NEAT CEMENT

38.4 FT.
4-INCH ϕ
SCH. 40
PVC CASING

20.0 FT. BENTONITE GROUT

3.5 FT. BENTONITE PELLETS
(HYDRATED)

10.0 FT.
NO. 10
4-INCH ϕ
PVC WELL
SCREEN WITH
0.010-INCH
OPENINGS

13.5 FT. SILICA SAND
WELL PACK

0.5 FT. PVC BOTTOM CAP

BOTTOM OF WELL:
49.2 FT. BELOW GRADE

DATE INSTALLED: APRIL 8, 1992

Burns	Waste
&	Consultants,
McDonnell	Inc.
ENGINEERS - GEOLOGISTS - SOILTESTERS - RISK-BEHALF-OWNERS	

MONITORING WELL
CONSTRUCTION DIAGRAM
FOR GMW-17

NOT TO SCALE

FLUSH-MOUNT PROTECTIVE COVER

LOCKING WATERTIGHT CAP

GROUND SURFACE

GROUND SURFACE ELEVATION 646.52 FT.

TOP OF CASING ELEVATION 646.17 FT.

0.3 FT.

2.0 FT. CONCRETE CAP

22.7 FT.
4-INCH Ø
SCH. 40
PVC CASING

10.0 FT. BENTONITE GROUT

2.0 FT. BENTONITE PELLETS
(HYDRATED)

10.0 FT.
NO. 20
4-INCH Ø
PVC WELL
SCREEN WITH
0.020-INCH
OPENINGS

19.5 FT. SILICA SAND
WELL PACK

0.5 FT. PVC BOTTOM CAP

2.0 FT. CAVE-IN

BOTTOM OF WELL:
33.5 FT. BELOW GRADE

DATE INSTALLED: APRIL 10, 1992

Burns	Waste
&	Consultants,
McDonnell	Inc.
<small>ENGINEERS - GEOLOGISTS - SOILTESTERS - RAMP EVALUATOR - CORROSION</small>	

MONITORING WELL
CONSTRUCTION DIAGRAM
FOR GMW-18

NOT TO SCALE

APPENDIX E

**FIELD PHOTOIONIZATION DETECTOR
READINGS SUMMARY**

**OVM READING FOR
BORING SB - 1
(READINGS IN PPM)**

Depth	Zone	Borehole	Sampler	Headspace
0'-5'				
0'	0.0 to 0.1			NA
0'-5'	0.0	0.1	0.0	NA
5'-10'				
5'-10'	0.0	0.0	0.0	NA
10'-15'				
10'-15'	0.0	0.1	0.0	NA
15'-20'				
15'-20'	0.0	0.0	0.0	NA
20'-25'				
20'-25'	0.0	0.0	0.0	NA
25'-30'				
25'-30'	0.0	0.0	0.1	NA
30'-35'				
30'-35'	0.0	9.1	0.1	NA
34'-65'				
34'-65'	0.0	0.0		NA

**OVM READING FOR
BORING SB - 2
(READINGS IN PPM)**

Depth	Zone	Borehole	Sampler	Headspace
0'-5'				
0'-1.5'	0.0	4.4		NA
0'-5'			0.0	NA
5'-10'				
5'-10'	0.0	0.0	0.0	NA
10'-15'				
10'-15'	0.0	0.0	0.0	NA
15'-20'				
15'-20'	0.0	0.0	0.0	NA
20'-25'				
20'-25'	0.0	0.0	0.0	NA
25'-30'				
25'-30'	0.0	0.0	0.0	NA
30'-35'				
30'-35'	0.0	0.0	0.0	NA

**OVM READING FOR
BORING SB - 3
(READINGS IN PPM)**

Depth	Zone	Borehole	Sampler	Headspace
0'-5'				
1.2'-5'	0.0	14.6	0.0	NA
5'-10'				
5'-10'	0.0	0.0		NA
10'-15'				
10'-15'	0.0	0.0	0.0	NA
15'-18'	0.0	0.0	0.0	NA
20'-25'				
20'-24'	0.0	0.0	0.0	NA

**OVM READING FOR
BORING SB - 4
(READINGS IN PPM)**

Depth	Zone	Borehole	Sampler	Headspace
0'-5'				
0'-0.6'	0.0 to 0.8	138.7	250	NA
0.6'-5'	0.5	230		NA
5'	0.0	139	0.0	NA
5'-10'				
5'-10'	0.0 to 1.2		1.0 to 10.0	NA
10'-15'				
10'		77.8		NA
10'-15'	1.5 to 13.0	127.3	23.0	NA
15'-20'				
15'		82.0		NA
17.2'			10	NA
18.9'			400	NA
19.2'			706	NA
20'-25'				
20'		46.4		NA
20'-25'	0.5	26.0		NA
24.3'			400	NA
25'			608	NA
25'-30'				
25-28'			40 to 100	NA
0-28'		50.3		NA

**OVM READING FOR
BORING SB - 6
(READINGS IN PPM)**

Depth	Zone	Borehole	Sampler	Headspace
0'-5'				
0'-0.6'			6	NA
5'-10'				
5'-10'	0.0	1.5		NA
10'-15'				
10'-15'	0.0	2.9		NA
10'-13.2'			0.0 to 0.4	NA
13.2'-15'			73.1	NA
15'-20'				
15'-20'	0.0	2.9	1.0 to 3.0	NA
18.2'			3.0 to 18.7	NA
20'-25'				
20'-25'	0.0	3.7		NA

**OVM READING FOR
BORING GMW - 14
(READINGS IN PPM)**

Depth	Zone	Borehole	Sampler	Headspace
0'-5'				
0'-5'	0.0	114.4		NA
1'-1.5'	0.0	0.0	65.0	118.0
4.8'-5'	0.0	50.7		NA
5'-10'				
5'	0.0	22.0		NA
5'-10'	0.0	77.0	0.0	NA
10'-15'				
10'		0.0		NA
10'-15'	0.0	0.0		NA
12'-12.4'			1 to 3	NA
15'-20'				
15'		65.0		NA
15'-20'		0.0		NA
20'-25'				
20'		19		NA
25'-30'				
25'		7.2		NA
0'-25'		16.1		NA

**OVM READING FOR
BORING GMW - 15
(READINGS IN PPM)**

Depth	Zone	Borehole	Sampler	Headspace
0'-5'				
0'-1.5'	0.8 to 2.5	17.7		76.9
1.5'-5'	0.8 to 1.2	5.0		NA
3.8'-4.4'				19.4 to 134.7
5'-10'				
7.8'-8'			150.0	NA
9'-9.6'		0.0	200.0	NA
10'-15'				
10'		60.0		NA
12'-12.5'			60.7	NA
13'-13.3'			144.7	NA
13.3'-14'			27.6	NA
15'-20'				
15'		7.2	205.6	NA
18.4'-18.8'			557	NA
0'-19.9'		119		NA

**OVM READING FOR
BORING GMW - 16
(READINGS IN PPM)**

Depth	Zone	Borehole	Sampler	Headspace
0'-5'				
0'-5'	0.0	2.3	0.0	NA
5'-10'				
8.2'			54.0	NA
9'		0.1 to 0.5		NA
0'-9'			0.0	NA
15'-20'				
0'-16'			0.0	NA
17'			51.3	NA
17.6'			53.7	NA
18.8'			229	NA
14'-19'	0.0	20.5		NA
20'-25'				
21.8'-22.2'				580
24'	0.0	6.1	87.3	NA
25'-30'				
24'-29'		20.2	20 to 30	NA
29.5'-29.8'			8.1	NA
29'-30'			12.3	14.7
30'-35'				
31.8'			0.0	NA
32.2'			0.0	NA
33.0'	0.0			NA
33.4'			0.0	NA
29'-34'		22.1	0.0	NA
35'-40'				
39'		65		NA
0'-39'		114.7		NA

**OVM READING FOR
BORING GMW - 17
(READINGS IN PPM)**

Depth	Zone	Borehole	Sampler	Headspace
0'-5'				
0'-0.5'		134.1		NA
0.8'-1.2'	0.0			1453
2'		0 to 0.5	387	NA
4'			124.6	NA
0'-4.7'		74.4		NA
4.7'		30.1		NA
5'-10'				
6.5'			11.4	NA
4.5'-10'	0	13.5		NA
10'-15'				
10'			71.4	NA
11.4'-11.6'	0	5.0	7.2	237.7
12.8'-13.2'			71.4	213.7
15'-20'				
15'			53.8	NA
15.5'	0.0	0.1 to 0.5	23.5	NA
17.5'			7.5	NA
19.5'				NA
20'-25'				
15'-20'	0.9	183.9		NA
20'			1.6	NA
22'-22.3'	0	30.7	12.8	613
25'-30'				
20'-25'	0.5	36.3		NA
24.6'-25'			234.7	1681
25.5'			37.2	NA
27'	0.5	74.5		NA
28.8'			288	NA
30'-35'				
25'-30'	0.5	111.5		NA
29.8'-30'			217	1105
30'-32'	1.6	4.0		NA
32.8'-33.4'			35.5	144.3
35'-40'				
30'-35'		69.2		NA
35'			133.5	NA
35.9'			12.1	NA
37.3'	2.3	3.5	7.2	NA
39.6'-39.8'		83.3	58.3	19.9
40'-45'				
40.2'				NA
40.8'				NA
41.2'				NA
42'-42.4'			10.4	29.1
45'-50'				
42.4'-50'	0-0.6	23-51.4		NA
43.8'-48'			0.0 to 1.0	NA

APPENDIX F
PUMP TEST RESULTS

APPENDIX F

PUMP TEST RESULTS SUMMARY

Pump test data obtained during the RI were analyzed using several log-log construction techniques to estimate hydraulic conductivities of the geologic materials beneath the property. Hydraulic conductivities calculated for this site are presented in Table 1. The mathematical techniques and pump test setups are described in more detail in this table. The hydraulic conductivity analyses were performed by analyzing drawdown versus time data obtained from the observation wells. Pump test curves generated from the raw site data are presented at the end of this appendix.

The geologic conditions at the site for each pump test are presented below:

- For Analysis No. 1, the geologic conditions consist of the following:
 1. GMW-14 (pumping well) has a total depth of 25 feet, and the bottom of the screen is 23 feet below the ground surface. The screen is five feet in length. The lower two feet of the screen is located in a siltstone layer, and the upper three feet of the screen is located in a clay layer.
 2. OW-2 (observation well) has a total depth of 14.5 feet, and the bottom of the screen is placed 14.5 feet below the ground surface. The screen is ten feet in length and is located in a clay layer.
- For Analysis No. 2, the geologic conditions consist of the following:
 1. Refer to Analysis No. 1 for a description of geologic conditions of pumping well GMW-14.
 2. OW-1 (observation well) has a total depth of 14 feet, and the bottom of the screen is placed 14 feet below the ground surface. The screen is ten feet in length and is located in a clay layer.
- For Analysis No. 3, the geologic conditions consist of the following:
 1. Refer to Analysis No. 1 for a description of the geologic conditions of pumping well GMW-14 and observation well OW-2.
- For Analysis No. 4, the geologic conditions consist of the following:
 1. GMW-16 (pumping well) has a total depth of 39 feet, and the bottom of the screen is 34.5 feet below the ground surface. The screen is five feet in length. The lower 2.5 feet of the screen is located in a clay layer, and the upper 2.5 feet of the screen is located in a siltstone layer. Above the layer of siltstone, there is a layer of clay and shale.

2. Refer to Analysis No. 1 for a description of the geologic conditions of observation well GMW-14.
- For Analysis No. 5, the geologic conditions consist of the following:
 1. GMW-18 (pumping well) has a total depth of 33.5 feet, and the bottom of the screen is 33 feet below the ground surface. The screen is 20 feet in length and is located in a highly weathered siltstone.
 2. GMW-5 (observation Well) has a total depth of 17.5 feet, and the bottom of the screen is 17.5 feet below the ground surface. The screen is 15 feet in length and is located in a clay layer.
 - The pump test performed at GMW-17 resulted in no observable drawdown in adjacent Monitoring Wells GMW-18 and GMW-5. As a result, a drawdown curve for these adjacent wells could not be prepared. Water level data obtained from this pump test is contained in this appendix. GMW-17 is screened within a siltstone and sandstone layer encountered at a depth of 36 feet. GMW-18 is screened within the upper siltstone layer which is separated from the sandstone layer by a three foot thick shale layer.

GMW-5 is screend totally within the loess soils.

EGGSITE.PTR

Table 1

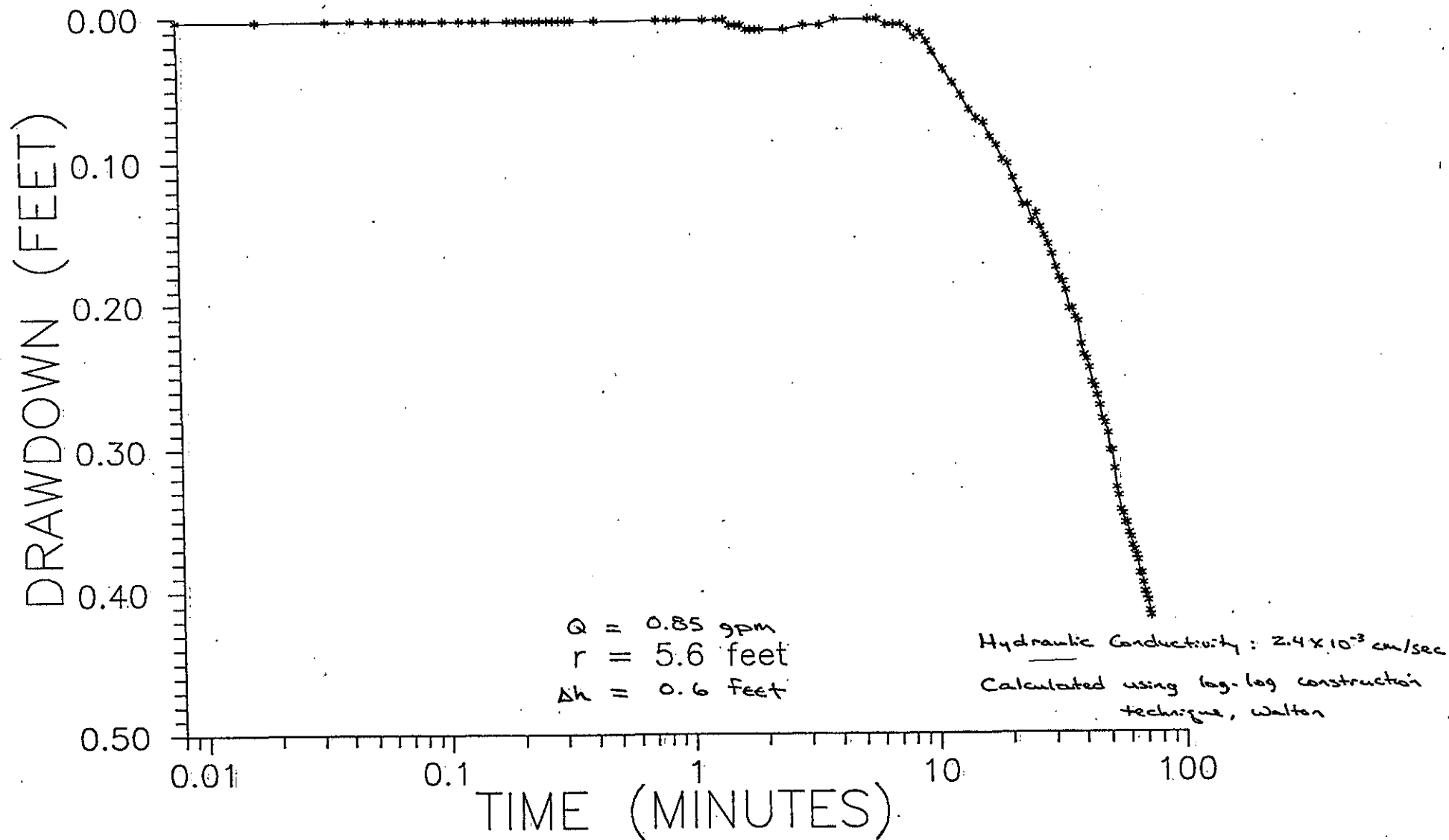
PUMP TEST RESULTS
EGGKTA SITE
ST. LOUIS, MISSOURI

Analysis No.	Pumping Well	Observation Well	Hydraulic Conductivity (cm/sec)	Material
1	GMW-14	OW-2	2.4×10^{-3}	Siltstone
2	GMW-14	OW-1	6.9×10^{-3}	Siltstone
3	GMW-14	OW-2	1.2×10^{-3}	Siltstone
4	GMW-16	GMW-14	1.7×10^{-3}	Siltstone
5	GMW-18	GMW-5	3.9×10^{-4}	Siltstone

The above hydraulic conductivities were calculated by the following noted methods:

1. A log-log construction technique developed by Walton. Leaky artisan, fully penetrating, with water released from storage in aquitard, constant-discharge, time-drawdown curves were referenced. Reference: Groundwater Resource Evaluation, Walton, 1970
2. A log-log construction technique developed by Walton. Leaky artisan, fully penetrating, without water released from storage in aquitard, constant-discharge, time-drawdown type curves were referenced. Reference: Groundwater Resource Evaluation, Walton, 1970
3. A log-log construction technique developed by Boulton. Water table, fully penetrating, constant-discharge, time-drawdown type curves were referenced. Reference: Groundwater Resource Evaluation, Walton, 1970

RESPONSE OF OW-2
 DURING PUMP TEST NO. 1 OF GMW-14
 EGGKTA - APRIL 1, 1992



Pumping Test of Well No. GMW-14 (First Test)

Project Name <u>EGG-KTA</u>	Page <u>1</u> of <u>3</u>
Project No. <u>91-319-1</u>	Date <u>4/1/92</u>
Contractor _____	Field Observer <u>P. Niebergall</u>
Discharge Measurement Method <u>Bucket and Stopwatch</u>	Q = SEE REMARKS gpm

Well Test Data

Well No. GMW-14

Elevation 636.51' r = Ø Reference Point T.O.C

Drawdown Measurement Method Water Level Indicator Static Water Level = 6.10'

Date	Time	Minutes Pump		Depth (feet)		Remarks
		On	Off	To Water	Drawdown	
4/1/92	11:48 a.m.	-	12	6.10	0	
	12:00 noon	0		6.10	0	
	12:01 p.m.	1		7.32	1.22	
	12:02	2		8.54	2.44	
	12:03	3		9.76	3.66	0.89 gpm
	12:04	4		11.00	4.90	
	12:05	5		12.04	5.94	
	12:06	6		13.04	6.94	
	12:07	7		14.02	7.92	0.76 gpm
	12:08	8		14.94	8.84	
	12:09	9		15.92	9.82	
	12:10	10		16.80	10.70	
	12:11	11		17.72	11.62	
	12:12	12		18.60	12.50	0.90 gpm
	12:13	13		19.50	13.40	
	12:14	14		20.10	14.00	
	12:15	15		20.80	14.70	
	12:16	16		21.45	15.35	0.80 gpm
	12:17	17	Ø	22.00	15.90	STOP PUMP (Well Dry)
	12:17.5		.5	21.30	15.20	
12:18		1	20.68	14.58		
12:18.5		1.5	20.45	14.35		
12:19		2	20.30	14.20		
12:19.5		2.5	20.14	14.04		
12:20		3	20.00	13.90		
12:20.5		3.5	19.87	13.77		
4/1/92	12:21 p.m.	4	19.72	13.62		

Pumping Test of Well No. GMW-14 (First Test)

Project Name	<u>EGGKTA</u>	Page	<u>2</u>	Of	<u>3</u>
Project No.	<u>91-319-1</u>	Date	<u>4/1/92</u>		
Contractor		Field Observer	<u>P. Niebergall</u>		
Discharge Measurement Method	<u>Bucket and Stopwatch</u>		<u>Q = SEE REMARKS gpm</u>		

Well Test Data

Well No. GMW-14

Elevation 636.51' r = Ø Reference Point T.O.C.

Drawdown Measurement Method Water Level Indicator Static Water Level = 6.10'

Date	Time	Minutes Pump		Depth (feet)		Remarks
		On	Off	To Water	Drawdown	
4/1/92	12:21.5 p.m.		4.5	19.60	13.50	
	12:22		5	19.47	13.37	
	12:22.5		5.5	19.33	13.23	
	12:23		6	19.20	13.10	
	12:23.5		6.5	19.05	12.95	
	12:24		7	18.93	12.83	
	12:25		8	18.69	12.58	
	12:26		9	18.46	12.36	
	12:27		10	18.25	12.15	
	12:28		11	18.04	11.94	
	12:29		12	17.78	11.68	
	12:30		13	17.52	11.42	
	12:31		14	17.30	11.20	
	12:32		15	17.06	10.96	
	12:33		16	16.83	10.73	
	12:34		17	16.60	10.50	
	12:35		18	16.39	10.28	
	12:36		19	16.18	10.08	
	12:37		20	15.96	9.86	
	12:38		21	15.76	9.66	
	12:40		23	15.36	9.26	
	12:42		25	14.98	8.88	
	12:44		27	14.62	8.52	
	12:46		29	14.29	8.19	
	12:48		31	13.96	7.86	
	12:50		33	13.64	7.54	
4/1/92	12:55 p.m.		38	12.92	6.82	

Pumping Test of Well No. GMW-14 (First Test)

Project Name <u>EGGKTA</u>		Page <u>3</u> of <u>3</u>
Project No. <u>91-319-1</u>		Date <u>4/1/92</u>
Contractor	Field Observer <u>P. Niebergall</u>	
Discharge Measurement Method <u>Bucket and Stopwatch</u>		Q = <u>SEE REMARKS</u> gpm

Well Test Data

Well No. GMW-14

Elevation 636.51' r = Ø Reference Point T.O.C.

Drawdown Measurement Method Water Level Indicator Static Water Level = 6.10'

Date	Time	Minutes Pump		Depth		Remarks
		On	Off	To Water	Drawdown	
<u>4/1/92</u>	<u>1:00 p.m.</u>		<u>43</u>	<u>12.28</u>	<u>6.18</u>	
	<u>1:05</u>		<u>48</u>	<u>11.70</u>	<u>5.60</u>	
	<u>1:20</u>		<u>63</u>	<u>10.30</u>	<u>4.20</u>	
	<u>2:05</u>		<u>108</u>	<u>7.96</u>	<u>1.86</u>	
	<u>2:35</u>		<u>138</u>	<u>7.24</u>	<u>1.14</u>	
	<u>3:05</u>		<u>168</u>	<u>6.85</u>	<u>0.75</u>	
	<u>3:20</u>		<u>183</u>	<u>6.71</u>	<u>0.61</u>	
	<u>4:05</u>		<u>228</u>	<u>6.46</u>	<u>0.36</u>	
<u>4/1/92</u>	<u>4:20 p.m.</u>		<u>243</u>	<u>6.42</u>	<u>0.32</u>	

PUMP TEST ON WELL GMW-14
EGGKTA SITE - ST. LOUIS, MISSOURI
APRIL 1, 1992

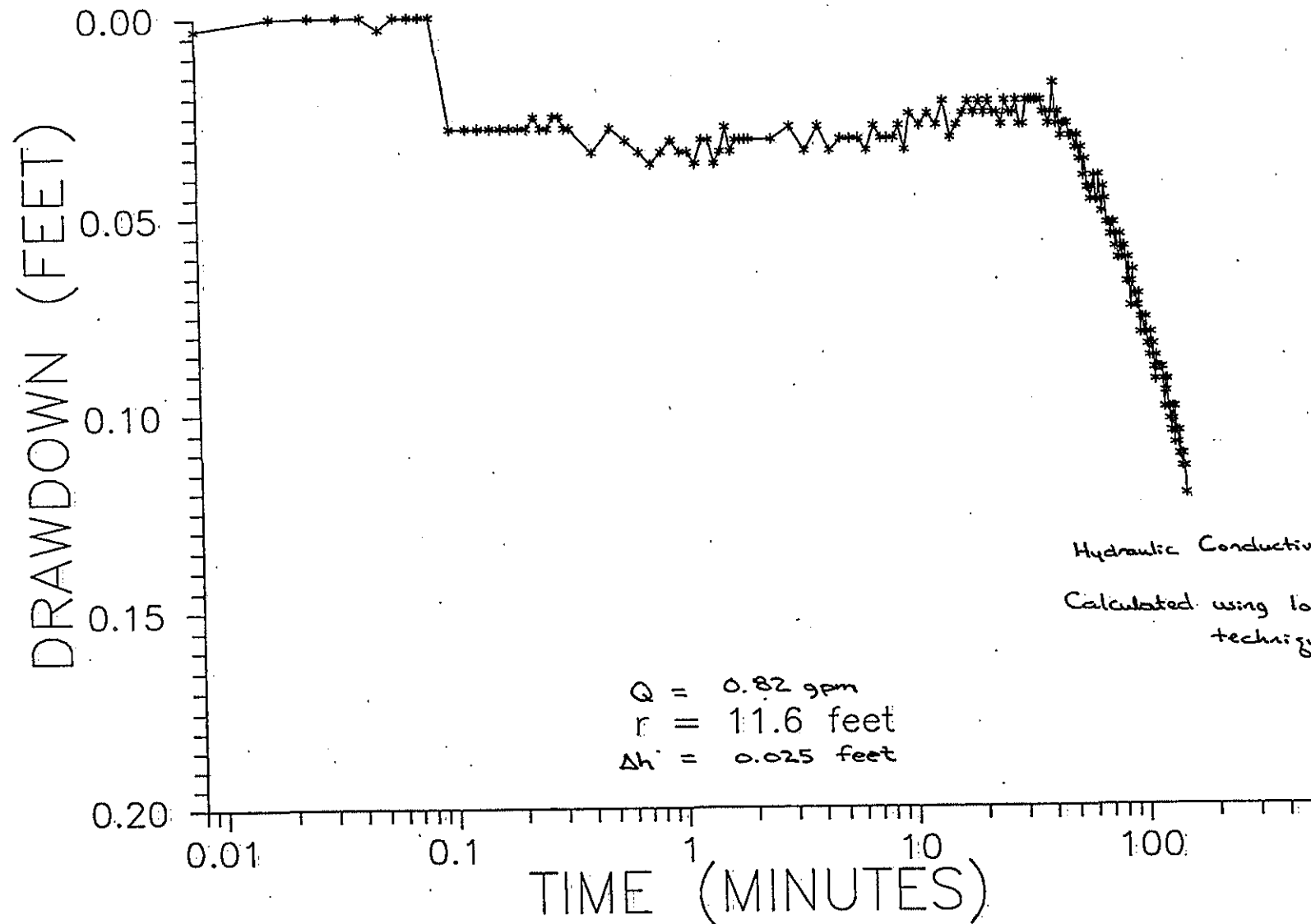
TEST 0

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>OW-1</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>OW-2</u> <u>(FEET)</u>
0.008	0.004	0.003
0.017	0.004	0.003
0.025	0.000	0.000
0.033	0.004	0.003
0.042	0.004	0.003
0.050	0.004	0.003
0.058	0.004	0.003
0.067	0.004	0.003
0.075	0.004	0.003
0.083	0.000	0.003
0.100	0.029	0.003
0.117	0.032	0.003
0.133	0.026	0.003
0.150	0.029	0.003
0.167	0.032	0.000
0.183	0.032	0.003
0.200	0.032	0.003
0.217	0.032	0.003
0.233	0.026	0.003
0.250	0.032	0.003
0.267	0.029	0.003
0.283	0.029	0.003
0.300	0.032	0.003
0.317	0.026	0.003
0.333	0.032	0.003
0.417	0.038	0.003
0.500	0.038	0.000
0.583	0.041	0.000
0.667	0.038	0.000
0.750	0.041	0.003
0.833	0.038	0.003
0.917	0.038	0.003
1.000	0.038	0.000
1.083	0.041	0.000
1.167	0.038	0.003
1.250	0.041	0.000
1.333	0.038	0.003
1.417	0.041	0.003
1.500	0.045	0.007

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>OW-1</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>OW-2</u> <u>(FEET)</u>
1.583	0.045	0.007
1.667	0.048	0.007
1.750	0.045	0.010
1.833	0.048	0.010
1.917	0.045	0.010
2.000	0.048	0.010
2.500	0.045	0.010
3.000	0.048	0.007
3.500	0.045	0.007
4.000	0.041	0.003
4.500	0.029	0.000
5.000	0.032	0.000
5.500	0.032	0.003
6.000	0.032	0.003
6.500	0.029	0.007
7.000	0.032	0.007
7.500	0.029	0.007
8.000	0.032	0.010
8.500	0.029	0.016
9.000	0.032	0.013
9.500	0.032	0.019
10.000	0.032	0.026
11.000	0.038	0.038
12.000	0.032	0.047
13.000	0.035	0.056
14.000	0.032	0.066
15.000	0.032	0.072
16.000	0.029	0.075
17.000	0.019	0.085
18.000	0.026	0.091
19.000	0.029	0.101
20.000	0.032	0.104
21.000	0.029	0.114
22.000	0.038	0.123
23.000	0.035	0.133
24.000	0.029	0.133
25.000	0.035	0.145
26.000	0.019	0.139
27.000	0.026	0.149
28.000	0.026	0.155
29.000	0.026	0.161
30.000	0.029	0.168
31.000	0.026	0.177
32.000	0.029	0.184
33.000	0.026	0.187
34.000	0.035	0.193
35.000	0.035	0.206
36.000	0.026	0.206
37.000	0.026	0.212

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>OW-1</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>OW-2</u> <u>(FEET)</u>
38.000	0.026	0.215
39.000	0.032	0.231
40.000	0.038	0.238
41.000	0.029	0.241
42.000	0.035	0.247
43.000	0.038	0.257
44.000	0.035	0.260
45.000	0.032	0.266
46.000	0.032	0.273
47.000	0.038	0.282
48.000	0.035	0.285
49.000	0.035	0.292
50.000	0.041	0.304
51.000	0.032	0.304
52.000	0.041	0.317
53.000	0.045	0.330
54.000	0.045	0.336
55.000	0.048	0.346
56.000	0.051	0.349
57.000	0.045	0.355
58.000	0.035	0.355
59.000	0.048	0.362
60.000	0.038	0.365
61.000	0.041	0.371
62.000	0.041	0.374
63.000	0.045	0.378
64.000	0.045	0.381
65.000	0.045	0.390
66.000	0.048	0.390
67.000	0.048	0.397
68.000	0.054	0.403
69.000	0.054	0.406
70.000	0.054	0.409
71.000	0.057	0.416
72.000	0.057	0.419

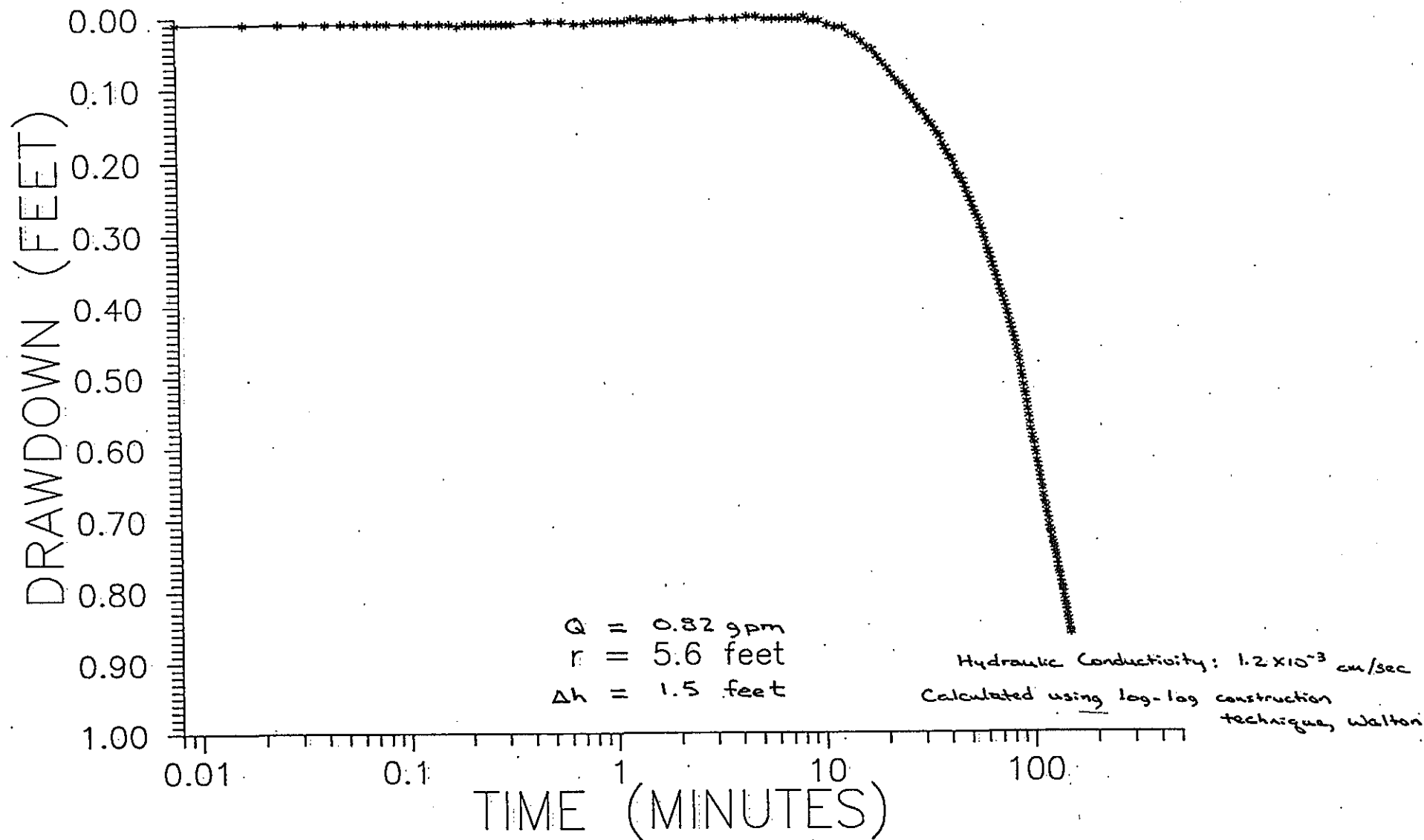
RESPONSE OF OW-1
 DURING PUMP TEST NO. 2 OF GMW-14
 EGGKTA - APRIL 1, 1992



Q = 0.82 gpm
 r = 11.6 feet
 Δh = 0.025 feet

Hydraulic Conductivity: 6.9×10^{-3} cm/sec
 Calculated using log-log construction
 technique, Walton

RESPONSE OF OW-2
 DURING PUMP TEST NO. 2 OF GMW-14
 EGGKTA - APRIL 1, 1992



Pumping Test of Well No. GMW-14 (Second Test)

Project Name <u>E G K T A</u>	Page <u>1</u> Of <u>4</u>
Project No. <u>91-319-1</u>	Date <u>4/1/92</u>
Contractor	Field Observer <u>P. Niebergall</u>
Discharge Measurement Method <u>Bucket and Stopwatch</u>	Q = <u>SEE REMARKS</u> gpm

Well Test Data

Well No. GMW-14

Elevation 636.1' r = Ø Reference Point T.O.C.

Drawdown Measurement Method Water Level Indicator Static Water Level = 6.42

Date	Time	Minutes Pump		Depth (feet)		Remarks
		On	Off	To Water	Drawdown	
4/1/92	4:20 p.m.	0		6.42	0	
	4:21	1		7.35	0.93	
	4:22	2		8.00	1.58	
	4:23	3		8.62	2.20	
	4:24	4		9.16	2.74	1.68 gpm
	4:25	5		9.70	3.28	
	4:26	6		10.12	3.70	
	4:27	7		10.65	4.23	1.43 gpm
	4:28	8		11.16	4.74	
	4:29	9		11.66	5.24	
	4:30	10		12.14	5.72	1.74 gpm
	4:31	11		12.62	6.20	
	4:32	12		12.98	6.56	
	4:33	13		13.35	6.93	1.44 gpm
	4:34	14		13.84	7.42	
	4:35	15		14.25	7.83	
	4:36	16		14.64	8.22	
	4:37	17		15.02	8.60	
	4:38	18		15.36	8.94	1.61 gpm
	4:39	19		15.70	9.28	
	4:40	20		16.00	9.58	
	4:41	21		16.20	9.78	1.28 gpm
	4:42	22		16.54	10.12	
	4:43	23		16.78	10.36	
	4:44	24		17.01	10.59	
	4:45	25		17.20	10.78	1.30 gpm
4/1/92	4:46 p.m.	26		17.40	10.98	

Pumping Test of Well No. GMW-14 (Second Test)

Project Name <u>E G K T A</u>	Page <u>2</u> of <u>4</u>
Project No. <u>91-319-1</u>	Date <u>4/1/92</u>
Contractor _____	Field Observer <u>P. Niebergall</u>
Discharge Measurement Method <u>Bucket and Stopwatch</u>	Q = <u>SEE REMARKS</u> gpm

Well Test Data

Well No. GMW-14

Elevation 636.1' r = Ø Reference Point T.O.C.

Drawdown Measurement Method Water Level Indicator Static Water Level = 6.42

Date	Time	Minutes Pump		Depth (feet)		Remarks
		On	Off	To Water	Drawdown	
4/1/92	4:47	27		17.58	11.16	
	4:48	28		17.74	11.32	
	4:49	29		17.90	11.48	1.03 gpm
	4:50	30		18.04	11.62	
	4:51	31		18.19	11.77	
	4:52	32		18.32	11.90	
	4:53	33		18.46	12.04	
	4:54	34		18.60	12.18	1.13 gpm
	4:55	35		18.70	12.28	
	4:56	36		18.80	12.38	
	4:57	37		18.84	12.46	1.00 gpm
	4:58	38		18.94	12.52	
	4:59	39		19.01	12.59	
	5:00 p.m.	40		19.06	12.64	
	5:01	41		19.10	12.68	
	5:02	42		19.14	12.72	
	5:03	43		19.18	12.76	
	5:04	44		19.22	12.80	1.22 gpm
	5:05	45		19.28	12.86	
	5:06	46		19.35	12.93	
	5:07	47		19.41	12.99	
	5:08	48		19.46	13.04	0.97 gpm
	5:09	49		19.52	13.10	
	5:10	50		19.88	13.46	
	5:11	51		19.64	13.22	
✓	5:12	52		19.68	13.26	1.11 gpm
4/1/92	5:13 p.m.	53		19.74	13.32	

Pumping Test of Well No. GMW-14 (Second Test)

Project Name <u>EGGKTA</u>	Page <u>3</u> of <u>4</u>
Project No. <u>91-314-1</u>	Date <u>4/1/92</u>
Contractor _____	Field Observer <u>P. Niebergall</u>
Discharge Measurement Method <u>Bucket and Stopwatch</u>	Q = <u>SEE REMARKS</u> gpm

Well Test Data

Well No. GMW-14

Elevation 636.1' r = Ø Reference Point T.O.C.

Drawdown Measurement Method Water Level Indicator Static Water Level = 6.42

Date	Time	Minutes Pump		Depth (feet)		Remarks
		On	Off	To Water	Drawdown	
4/1/92	5:14 p.m.	54		19.78	13.36	
	5:15 p.m.	55		19.83	13.41	
	5:16	56		19.88	13.46	
	5:17	57		19.92	13.50	0.89 gpm
	5:18	58		19.95	13.53	
	5:19	59		20.00	13.58	
	5:20	60		20.03	13.61	
	5:21	61		20.06	13.64	
	5:22	62		20.10	13.68	
	5:23	63		20.12	13.70	
	5:24	64		20.15	13.73	0.81 gpm
	5:25	65		20.17	13.75	
	5:26	66		20.20	13.78	
	5:27	67		20.22	13.80	
	5:28	68		20.24	13.82	
	5:29	69		20.26	13.84	0.98 gpm
	5:30	70		20.27	13.85	
	5:35	75		20.36	13.94	
	5:36	76		20.37	13.95	0.75 gpm
	5:40	80		20.43	14.01	0.92 gpm
	5:45	85		20.44	14.07	
	5:50	90		20.50	14.08	
	5:55	95		20.44	14.02	0.76 gpm
	6:00 p.m.	100		20.41	13.99	
	6:05	105		20.40	13.98	
	6:10	110		20.38	13.96	
4/1/92	6:15 p.m.	115		20.36	13.94	

Pumping Test of Well No. GMW-14 (Second Test)

Project Name <u>EGGTA</u>	Page <u>4</u> of <u>4</u>
Project No. <u>91-314-1</u>	Date <u>4/1/92</u>
Contractor _____	Field Observer <u>P. Niebergall</u>
Discharge Measurement Method <u>Bucket and Stopwatch</u>	Q = <u>SEE REMARKS</u> gpm

Well Test Data

Well No. GMW-14

Elevation 636.1' r = Ø Reference Point T.O.C.

Drawdown Measurement Method Water Level Indicator Static Water Level = 6.42

Date	Time	Minutes Pump		Depth (feet)		Remarks
		On	Off	To Water	Drawdown	
<u>4/1/92</u>	<u>6:20 p.m.</u>	<u>120</u>		<u>20.34</u>	<u>13.92</u>	<u>0.43 gpm</u>
	<u>6:25</u>	<u>125</u>		<u>20.33</u>	<u>13.91</u>	
	<u>6:30</u>	<u>130</u>		<u>20.32</u>	<u>13.90</u>	
	<u>6:35</u>	<u>135</u>		<u>20.32</u>	<u>13.90</u>	<u>0.70 gpm</u>
<u>4/1/92</u>	<u>6:40</u>	<u>140</u>		<u>20.32</u>	<u>13.90</u>	<u>STOP TEST</u>

Pumping Test of Well No. GMW-14 (Second Test)

Project Name <u>EGGTA</u>		Page <u>1</u> Of <u>1</u>
Project No. <u>91-319-1</u>		Date <u>4/1/92</u>
Contractor	Field Observer <u>P. Niebergall</u>	
Discharge Measurement Method <u>Bucket and Stopwatch</u>		Q = <u>SEE COMMENTS</u> gpm

Well Test Data

Well No. GMW-8
 Elevation 635.93' r = 10.14' Reference Point T.O.C.
 Drawdown Measurement Method Water Level Indicator Static = 5.90

Date	Time	Minutes Pump		Depth		Remarks
		On	Off	To Water	Drawdown	
4/1/92	4:20 pm	0		5.90	0	
	4:25	5		5.90	0	1.68 gpm
	4:26	6		5.90	0	1.43 gpm
	4:29	9		5.90	0	1.74 gpm
	4:48	28		5.90	0	1.63 gpm
	4:58	38		5.90	0	1.00 gpm
	5:00 pm	40		5.91	0.01	
	5:06	46		5.92	0.02	1.22 gpm
	5:17	57		5.92	0.02	0.89 gpm
	5:25	65		5.94	0.04	0.81 gpm
	5:30	70		5.94	0.04	0.94 gpm
	5:35	75		5.95	0.05	
	5:40	80		5.96	0.06	0.92 gpm
	5:55	95		5.98	0.08	0.76 gpm
	6:10 pm	100		5.98	0.08	
	6:20 pm	120		6.00	0.10	0.43 gpm
	6:30	130		6.02	0.12	0.70 gpm

PUMP TEST ON WELL GMW-14
EGGKTA SITE - ST. LOUIS, MISSOURI
APRIL 1, 1992

TEST 1

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>OW-1</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>OW-2</u> <u>(FEET)</u>
0.000	0.037	0.006
0.008	0.003	0.009
0.017	0.000	0.009
0.025	0.000	0.009
0.033	0.000	0.009
0.042	0.000	0.009
0.050	0.003	0.009
0.058	0.000	0.009
0.067	0.000	0.009
0.075	0.000	0.009
0.083	0.000	0.009
0.100	0.028	0.009
0.117	0.028	0.009
0.133	0.028	0.009
0.150	0.028	0.009
0.167	0.028	0.009
0.183	0.028	0.012
0.200	0.028	0.009
0.217	0.028	0.009
0.233	0.025	0.009
0.250	0.028	0.009
0.267	0.028	0.009
0.283	0.025	0.009
0.300	0.025	0.009
0.317	0.028	0.009
0.333	0.028	0.009
0.417	0.034	0.006
0.500	0.028	0.006
0.583	0.031	0.006
0.667	0.034	0.009
0.750	0.037	0.009
0.833	0.034	0.006
0.917	0.031	0.006
1.000	0.034	0.006
1.083	0.034	0.006
1.167	0.037	0.006
1.250	0.031	0.003
1.333	0.031	0.003
1.417	0.037	0.006

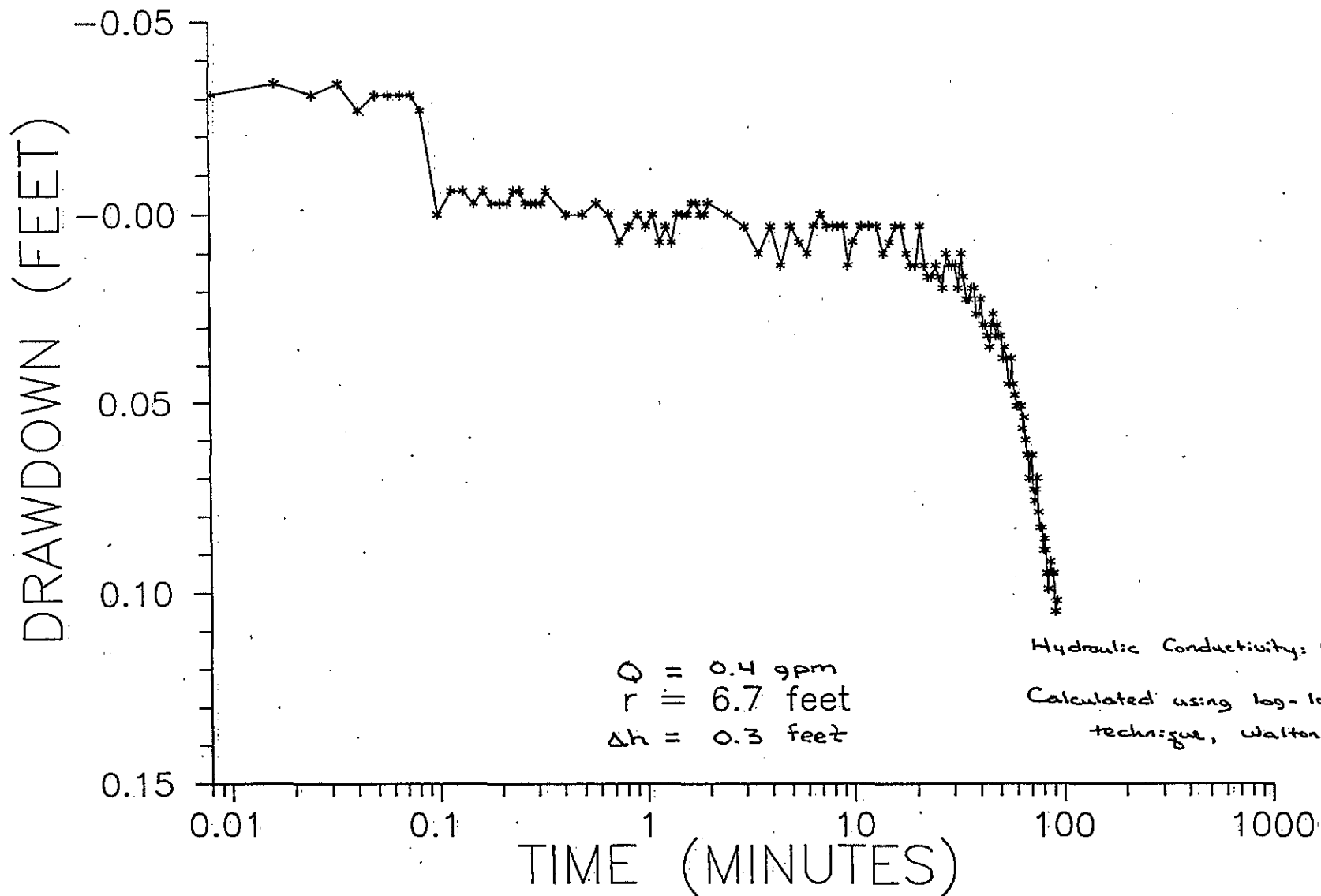
<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>OW-1</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>OW-2</u> <u>(FEET)</u>
1.500	0.034	0.006
1.583	0.028	0.003
1.667	0.034	0.006
1.750	0.031	0.006
1.833	0.031	0.003
1.917	0.031	0.003
2.000	0.031	0.006
2.500	0.031	0.003
3.000	0.028	0.003
3.500	0.034	0.003
4.000	0.028	0.003
4.500	0.034	0.000
5.000	0.031	0.000
5.500	0.031	0.003
6.000	0.031	0.003
6.500	0.034	0.003
7.000	0.028	0.003
7.500	0.031	0.003
8.000	0.031	0.003
8.500	0.031	0.000
9.000	0.028	0.006
9.500	0.034	0.006
10.000	0.025	0.006
11.000	0.028	0.012
12.000	0.025	0.015
13.000	0.028	0.015
14.000	0.022	0.025
15.000	0.031	0.028
16.000	0.028	0.035
17.000	0.025	0.044
18.000	0.022	0.047
19.000	0.025	0.057
20.000	0.022	0.066
21.000	0.025	0.073
22.000	0.022	0.082
23.000	0.025	0.089
24.000	0.025	0.095
25.000	0.028	0.101
26.000	0.022	0.108
27.000	0.025	0.114
28.000	0.025	0.120
29.000	0.022	0.127
30.000	0.028	0.133
31.000	0.028	0.136
32.000	0.022	0.143
33.000	0.022	0.149
34.000	0.022	0.152
35.000	0.022	0.159
36.000	0.022	0.165

TIME (MINUTES)	DRAWDOWN	DRAWDOWN
	OW-1 (FEET)	OW-2 (FEET)
37.000	0.022	0.168
38.000	0.025	0.178
39.000	0.025	0.184
40.000	0.028	0.190
41.000	0.025	0.197
42.000	0.018	0.197
43.000	0.028	0.206
44.000	0.025	0.216
45.000	0.031	0.222
46.000	0.028	0.222
47.000	0.028	0.228
48.000	0.028	0.235
49.000	0.031	0.241
50.000	0.031	0.248
51.000	0.031	0.254
52.000	0.034	0.260
53.000	0.031	0.267
54.000	0.037	0.273
55.000	0.034	0.279
56.000	0.041	0.283
57.000	0.037	0.292
58.000	0.044	0.298
59.000	0.044	0.305
60.000	0.047	0.311
61.000	0.044	0.321
62.000	0.041	0.327
63.000	0.047	0.333
64.000	0.047	0.340
65.000	0.041	0.346
66.000	0.047	0.352
67.000	0.050	0.359
68.000	0.044	0.365
69.000	0.047	0.372
70.000	0.053	0.378
71.000	0.053	0.384
72.000	0.053	0.387
73.000	0.056	0.394
74.000	0.053	0.400
75.000	0.053	0.406
76.000	0.059	0.413
77.000	0.056	0.419
78.000	0.062	0.426
79.000	0.062	0.432
80.000	0.056	0.438
81.000	0.062	0.445
82.000	0.059	0.451
83.000	0.059	0.457
84.000	0.062	0.464
85.000	0.068	0.473

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>OW-1</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>OW-2</u> <u>(FEET)</u>
86.000	0.062	0.480
87.000	0.068	0.489
88.000	0.074	0.499
89.000	0.068	0.505
90.000	0.065	0.515
91.000	0.071	0.524
92.000	0.071	0.530
93.000	0.074	0.540
94.000	0.074	0.550
95.000	0.071	0.559
96.000	0.081	0.569
97.000	0.077	0.578
98.000	0.077	0.588
99.000	0.077	0.594
100.000	0.081	0.597
101.000	0.081	0.607
102.000	0.077	0.613
103.000	0.084	0.623
104.000	0.084	0.629
105.000	0.087	0.635
106.000	0.081	0.642
107.000	0.081	0.648
108.000	0.087	0.654
109.000	0.084	0.661
110.000	0.090	0.670
111.000	0.093	0.677
112.000	0.087	0.683
113.000	0.090	0.686
114.000	0.090	0.693
115.000	0.090	0.699
116.000	0.090	0.705
117.000	0.090	0.712
118.000	0.090	0.718
119.000	0.090	0.721
120.000	0.093	0.728
121.000	0.100	0.734
122.000	0.096	0.737
123.000	0.093	0.743
124.000	0.096	0.747
125.000	0.093	0.753
126.000	0.100	0.756
127.000	0.103	0.763
128.000	0.100	0.769
129.000	0.106	0.775
130.000	0.106	0.778
131.000	0.100	0.782
132.000	0.103	0.788
133.000	0.109	0.794
134.000	0.100	0.798

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>OW-1</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>OW-2</u> <u>(FEET)</u>
135.000	0.106	0.801
136.000	0.106	0.807
137.000	0.106	0.813
138.000	0.109	0.817
139.000	0.112	0.823
140.000	0.106	0.826
141.000	0.112	0.832
142.000	0.115	0.839
143.000	0.112	0.842
144.000	0.115	0.848
145.000	0.112	0.852
146.000	0.115	0.858
147.000	0.122	0.861

RESPONSE OF GMW-14
 DURING PUMP TEST OF GMW-16
 EGGKTA - APRIL 8, 1992



Q = 0.4 gpm
 r = 6.7 feet
 $\Delta h = 0.3$ feet

Hydraulic Conductivity: 1.7×10^{-3}
 Calculated using log-log construction
 technique, Walton

Pumping Test of Well No. GMW-16

Project Name <u>EGGKTA</u>	Page <u>1</u> Of <u>3</u>
Project No. <u>91-314-4</u>	Date <u>4/8/92</u>
Contractor	Field Observer <u>P. Niebergall</u>
Discharge Measurement Method <u>Bucket and Stopwatch</u>	Q = <u>SEE REMARKS</u> gpm

Well Test Data

Well No. GMW-16
 Elevation 636.31' r = 0 Reference Point T.O.C.
 Drawdown Measurement Method Water Level Indicator Static: 7.85'

Date	Time	Minutes Pump		Depth (feet)		Remarks	
		On	Off	To Water	Drawdown		
4/8/92	12:40 p.m.	0		7.85	0		
	12:41 p.m.	1		9.82	1.97		
	12:42	2		10.78	2.93		
	12:43	3		11.70	3.85		
	12:44	4		12.55	4.70		
	12:45	5		13.40	5.55	0.60 gpm	
	12:46	6		14.08	6.23		
	12:47	7		14.76	6.91		
	12:48	8		15.50	7.65		
	12:49	9		16.10	8.25		
	12:50	10		16.70	8.85		
	12:51	11		17.20	9.35	0.50 gpm	
	12:52	12		17.80	9.95		
	12:53	13		18.40	10.55		
	12:54	14		18.90	11.05		
	12:55	15		19.36	11.51		
	12:56	16		19.72	11.87		
	12:57	17		20.20	12.35		
	12:58	18		20.62	12.77		
	12:59	19		20.90	13.05	0.45 gpm	
	1:01 p.m.	21		22.72	14.87		
	1:02	22		23.62	15.77		
	1:03	23		24.52	16.67		
	1:04	24		25.44	17.59	0.83 gpm	
	1:06	26		27.24	19.39		
	1:07	27		27.50	19.65		
	4/8/92	1:08 p.m.	28		27.64	19.79	

Pumping Test of Well No. GMW-16

Project Name <u>EGGKTA</u>	Page <u>2</u> Of <u>3</u>
Project No. <u>91-314-4</u>	Date <u>4/8/92</u>
Contractor	Field Observer <u>P. Niebergall</u>
Discharge Measurement Method <u>Bucket and Stopwatch</u>	Q = <u>SEE REMARKS</u> gpm

Well Test Data

Well No. GMW-16
 Elevation 636.31' r = Ø Reference Point T.O.C.
 Drawdown Measurement Method Water Level Indicator static = 7.85'

Date	Time	Minutes Pump		Depth (feet)		Remarks
		On	Off	To Water	Drawdown	
4/8/92	1:09pm.	29		27.80	19.45	
	1:10	30		-	-	
	1:11	31		28.45	20.60	
	1:12	32		28.75	20.90	
	1:13	33		29.00	21.15	
	1:14	34		29.20	21.35	
	1:15	35		-	-	
	1:16	36		29.00	21.15	
	1:17	37		29.80	21.95	
	1:18	38		-	-	
	1:19	39		-	-	0.33gpm
	1:20	40		30.30	22.45	
	1:21	41		30.44	22.59	
	1:22	42		30.58	22.73	
	1:23	43		30.72	22.87	
	1:24	44		30.82	22.97	
	1:25	45		30.90	23.05	0.30 gpm
	1:26	46		30.90	23.05	
	1:27	47		-	-	
	1:28	48		31.17	23.32	
1:29	49		-	-		
1:30	50		31.52	23.67		
1:31	51		-	-		
1:32	52		31.80	23.95		
1:34	54		32.22	24.37		
1:35	55		32.48	24.63	0.35 gpm	
4/8/92	1:37	57		32.75	24.90	

Pumping Test of Well No. GMW-16

Project Name <u>EGGKTA</u>	Page <u>3</u> of <u>3</u>
Project No. <u>91-314-4</u>	Date <u>4/8/92</u>
Contractor	Field Observer <u>P. Niebergall</u>
Discharge Measurement Method <u>Bucket and Stopwatch</u>	Q = <u>SEE REMARKS</u> gpm

Well Test Data

Well No. GMW-16
 Elevation 636.31' r = Ø Reference Point T.O.C.
 Drawdown Measurement Method Water Level Indicator static = 7.85'

Date	Time	Minutes Pump		Depth (feet)		Remarks
		On	Off	To Water	Drawdown	
4/8/92	1:39 p.m.	59		33.08	25.23	
	1:40	60		33.25	25.40	
	1:42	62		33.52	25.67	
	1:44	64		33.76	25.91	
	1:45	65		33.88	26.03	0.30 gpm
	1:47	67		-	-	
	1:48	68		-	-	
	1:49	69		34.30	26.45	
	1:50	76		34.44	26.59	0.30 gpm
	1:53	73		34.72	26.87	
	1:55	75		34.72	26.87	0.25 gpm
	1:57	77		34.72	26.87	
	2:00 p.m.	80		34.70	26.85	0.20 gpm
	2:26		26	29.16	21.31	
	2:28		28	-	-	
2:29		29	-	-		
2:31		31	28.98	21.13	pumped Dry	
4/8/92	5:39 pm	219	8.92	1.07		

Pumping Test of Well No. GMW-16

Project Name <u>EGGKTA</u>		Page <u>1</u> Of <u>1</u>
Project No. <u>91-314-4</u>		Date <u>4/8/92</u>
Contractor	Field Observer <u>P. Niebergall</u>	
Discharge Measurement Method <u>Bucket and Stopwatch</u>		Q = <u>SEE REMARKS</u> gpm

Well Test Data

Well No. 04-3

Elevation 636.57' $r =$ 15.83' Reference Point T.O.C.

Drawdown Measurement Method Water Level Indicator static = 6.06.

Date	Time	Minutes Pump		Depth (feet)		Remarks
		On	Off	To Water	Drawdown	
4/8/92	12:24 p.m.	—		6.04	0	<div style="display: flex; align-items: center;"> <div style="font-size: 2em; margin-right: 10px;">}</div> <div style="border-left: 1px solid black; border-right: 1px solid black; height: 100%; width: 10px;"></div> </div>
	12:40	0		6.08	0	
	12:53	13		6.05	-0.03	
	1:13	33		6.04	-0.04	
	1:49	69		6.05	-0.03	
	2:29	109		6.07	-0.01	pump off
4/8/92	6:28	—	236	6.12	+0.04	

PUMP TEST ON WELL GMW-16
EGGKTA SITE - ST. LOUIS, MISSOURI
APRIL 8, 1992

TEST 5

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-14</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-8</u> <u>(FEET)</u>
0:0000	0.0000	0.0000
0.0083	-0.0310	0.0000
0.0166	-0.0340	0.0000
0.0250	-0.0310	0.0000
0.0333	-0.0340	0.0000
0.0416	-0.0270	0.0000
0.0500	-0.0310	0.0000
0.0583	-0.0310	0.0000
0.0666	-0.0310	0.0000
0.0750	-0.0310	0.0030
0.0833	-0.0270	0.0030
0.1000	0.0000	0.0000
0.1166	-0.0060	0.0000
0.1333	-0.0060	0.0030
0.1500	-0.0030	0.0030
0.1666	-0.0060	0.0030
0.1833	-0.0030	0.0000
0.2000	-0.0030	0.0000
0.2166	-0.0030	0.0000
0.2333	-0.0060	0.0030
0.2500	-0.0060	0.0030
0.2666	-0.0030	0.0030
0.2833	-0.0030	0.0060
0.3000	-0.0030	0.0030
0.3166	-0.0030	0.0030
0.3333	-0.0060	0.0000
0.4166	0.0000	0.0030
0.5000	0.0000	0.0030
0.5833	-0.0030	0.0000
0.6666	0.0000	-0.0030
0.7500	0.0070	-0.0030
0.8333	0.0030	0.0000
0.9166	0.0000	0.0000
1.0000	0.0030	0.0000
1.0833	0.0000	0.0030
1.1666	0.0070	0.0000
1.2500	0.0030	0.0000
1.3333	0.0070	0.0000
1.4166	0.0000	0.0000

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-14</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-8</u> <u>(FEET)</u>
1.5000	0.0000	-0.0030
1.5833	0.0000	-0.0030
1.6666	-0.0030	0.0000
1.7500	-0.0030	-0.0060
1.8333	0.0000	-0.0030
1.9166	0.0000	-0.0060
2.0000	-0.0030	-0.0060
2.5000	0.0000	-0.0030
3.0000	0.0030	-0.0030
3.5000	0.0100	0.0000
4.0000	0.0030	-0.0030
4.5000	0.0130	-0.0060
5.0000	0.0030	-0.0100
5.5000	0.0070	-0.0100
6.0000	0.0100	-0.0030
6.5000	0.0030	0.0000
7.0000	0.0000	-0.0100
7.5000	0.0030	-0.0060
8.0000	0.0030	-0.0060
8.5000	0.0030	-0.0100
9.0000	0.0030	-0.0030
9.5000	0.0130	-0.0060
10.0000	0.0070	-0.0060
11.0000	0.0030	-0.0060
12.0000	0.0030	-0.0130
13.0000	0.0030	-0.0100
14.0000	0.0100	-0.0060
15.0000	0.0070	-0.0060
16.0000	0.0030	-0.0060
17.0000	0.0030	-0.0100
18.0000	0.0100	-0.0030
19.0000	0.0130	-0.0030
20.0000	0.0130	-0.0060
21.0000	0.0030	-0.0100
22.0000	0.0130	-0.0060
23.0000	0.0160	-0.0060
24.0000	0.0160	-0.0060
25.0000	0.0130	-0.0030
26.0000	0.0160	-0.0100
27.0000	0.0190	-0.0030
28.0000	0.0100	-0.0030
29.0000	0.0130	-0.0060
30.0000	0.0130	-0.0100
31.0000	0.0130	-0.0100
32.0000	0.0190	-0.0100
33.0000	0.0100	-0.0130
34.0000	0.0160	-0.0160
35.0000	0.0220	-0.0130
36.0000	0.0220	-0.0060

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-14</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-8</u> <u>(FEET)</u>
37.0000	0.0190	-0.0160
38.0000	0.0190	-0.0130
39.0000	0.0260	-0.0130
40.0000	0.0260	-0.0130
41.0000	0.0220	-0.0130
42.0000	0.0290	-0.0100
43.0000	0.0290	-0.0100
44.0000	0.0320	-0.0100
45.0000	0.0350	-0.0100
46.0000	0.0290	-0.0190
47.0000	0.0260	-0.0190
48.0000	0.0320	-0.0100
49.0000	0.0290	-0.0130
50.0000	0.0320	-0.0130
51.0000	0.0320	-0.0160
52.0000	0.0380	-0.0160
53.0000	0.0350	-0.0130
54.0000	0.0380	-0.0160
55.0000	0.0450	-0.0160
56.0000	0.0450	-0.0130
57.0000	0.0380	-0.0190
58.0000	0.0450	-0.0160
59.0000	0.0480	-0.0160
60.0000	0.0510	-0.0130
61.0000	0.0510	-0.0160
62.0000	0.0510	-0.0160
63.0000	0.0510	-0.0160
64.0000	0.0570	-0.0160
65.0000	0.0540	-0.0220
66.0000	0.0600	-0.0130
67.0000	0.0640	-0.0160
68.0000	0.0640	-0.0160
69.0000	0.0700	-0.0130
70.0000	0.0640	-0.0160
71.0000	0.0640	-0.0290
72.0000	0.0730	-0.0290
73.0000	0.0760	-0.0290
74.0000	0.0730	-0.0380
75.0000	0.0700	-0.0290
76.0000	0.0790	-0.0190
77.0000	0.0830	-0.0160
78.0000	0.0830	-0.0160
79.0000	0.0830	-0.0190
80.0000	0.0890	-0.0190
81.0000	0.0860	-0.0190
82.0000	0.0890	-0.0160
83.0000	0.0950	-0.0160
84.0000	0.0990	-0.0160
85.0000	0.0950	-0.0190

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-14</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-8</u> <u>(FEET)</u>
86.0000	0.0920	-0.0190
87.0000	0.0950	-0.0220
88.0000	0.0950	-0.0220
89.0000	0.0950	-0.0220
90.0000	0.1050	-0.0160
91.0000	0.1050	-0.0190
92.0000	0.1020	-0.0250

Pumping Test of Well No. GMW-17

Project Name	<u>EGGKTA</u>	Page	<u>1</u>	Of	<u>3</u>
Project No.	<u>91-31A-4</u>	Date	<u>4/14/92</u>		
Contractor		Field Observer	<u>P. Niebergall</u>		
Discharge Measurement Method	<u>Bucket and Stopwatch</u>		Q = SEE REMARKS gpm		

Well Test Data

Well No. GMW-17

Elevation 646.29' r = _____ Reference Point T.O.C.

Drawdown Measurement Method Water Level Indicator Static = 14.43'

Date	Time	Minutes Pump		Depth (feet)		Remarks
		On	Off	To Water	Drawdown	
4/14/92	10:15A	0		14.43'	0.00	
	10:16	1		15.66	1.23	
	10:17	2		16.29	1.86	
	10:18	3		16.88	2.45	
	10:19	4		17.37	2.94	
	10:20	5		17.75	3.32	Q = 0.6 gpm
	10:21	6		18.21	3.78	
	10:22	7		18.45	4.02	
	10:23	8		18.71	4.28	
	10:24	9		18.94	4.51	
	10:25	10		19.13	4.70	Q = 0.63 gpm
	10:26	11		19.32	4.89	
	10:27	12		19.47	5.04	
	10:28	13		19.62	5.19	
	10:29	14		19.72	5.29	
	10:30	15		19.84	5.41	Q = 0.63 gpm
	10:31	16		19.94	5.51	
	10:32	17		20.01	5.58	
	10:33	18		20.08	5.65	
	10:34	19		20.15	5.72	
	10:35	20		20.21	5.78	Q = 0.63 gpm
	10:36	21		20.27	5.84	
	10:37	22		20.32	5.89	
	10:38	23		20.38	5.95	
	10:39	24		20.42	5.99	
	10:40	25		20.46	6.03	Q = 0.63 gpm
4/14/92	10:41	26		20.50	6.07	

Pumping Test of Well No. GMW-17

Project Name <u>EGG KTA</u>	Page <u>2</u> Of <u>3</u>
Project No: <u>91-319-4</u>	Date <u>4/14/92</u>
Contractor	Field Observer <u>P. Niebergall</u>
Discharge Measurement Method <u>Bucket and Stopwatch</u>	Q = <u>See Remarks</u> gpm

Well Test Data

Well No. GMW-17

Elevation 646.29' r = _____ Reference Point T.O.C.

Drawdown Measurement Method Water Level Indicator

Date	Time	Minutes Pump		Depth		Remarks
		On	Off	To Water	Drawdown	
4/14/92	10:42A	27		20.54	6.11	
	10:43	28		20.57	6.14	
	10:44	29		20.59	6.16	
	10:45	30		20.62	6.19	Q = 0.63 gpm
	10:50	35		20.72	6.29	Q = 0.63 gpm
	10:55	40		20.77	6.34	Q = 0.63 gpm
	11:00	45		20.80	6.37	Q = 0.63 gpm
	11:05	50		20.85	6.42	Q = 0.63 gpm
	11:10	55		20.88	6.45	Q = 0.63 gpm
	11:15	60		20.92	6.49	Q = 0.63 gpm
	11:20	65		20.94	6.51	Q = 0.63 gpm
	11:25	70		20.95	6.52	Q = 0.63 gpm
	11:30	75		20.94	6.51	Q = 0.60 gpm
	11:35	80		20.95	6.52	Q = 0.60 gpm
	11:40	85		20.97	6.54	Q = 0.63 gpm
	11:45	90		21.01	6.58	Q = 0.63 gpm
	11:50	95		21.05	6.62	Q = 0.60 gpm
	11:55	100		21.10	6.67	Q = 0.63 gpm
	12:00P	105		21.14	6.71	Q = 0.60 gpm
	12:10	115		21.15	6.72	Q = 0.63 gpm
	12:20	125		21.16	6.73	Q = 0.60 gpm
	12:30	135		21.15	6.72	Q = 0.60 gpm
	12:45	150		21.20	6.77	
	1:00	165		21.15	6.72	Q = 0.60 gpm
	1:15	180		21.27	6.84	Increase Flow to MAX.
	1:20	185		23.50	9.07	Q = 1.5 gpm
4/14/92	1:30P	195		30.12	15.69	

Pumping Test of Well No. GMW-17

Project Name <u>EGGKTA</u>	Page <u>3</u> of <u>3</u>
Project No. <u>91-319-4</u>	Date <u>4/14/92</u>
Contractor _____	Field Observer <u>P. Niebergall</u>
Discharge Measurement Method <u>Bucket and Stopwatch</u>	Q = <u>See Remarks</u> gpm

Well Test Data

Well No. GMW-17

Elevation 646.29 r = _____ Reference Point T.O.C.

Drawdown Measurement Method Water Level Indicator

Date	Time	Minutes Pump		Depth		Remarks
		On	Off	To Water	Drawdown	
4/14/92 ↓	1:45 P	210		32.35	17.92	Q = 1.40 gpm
	2:00	225		33.00	18.57	Q = 1.38 gpm
	2:30	255		32.70	18.27	Q = 1.25 gpm
	3:00	285		31.92	17.49	Q = 1.13 gpm
	3:30	315		30.67	16.24	Q = 1.13 gpm
	3:45	330		30.15	15.72	
	4:00	345	0	30.14	15.71	PUMP OFF
4/14/92	6:15 P		135	14.19	(0.24)	

PUMP TEST ON WELL GMW-17
EGGKTA SITE - ST. LOUIS, MISSOURI
APRIL 14, 1992

TEST 6

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-18</u> <u>(FEET)</u>
0.000	0.025	0.000
0.008	0.000	-0.003
0.017	-0.003	-0.003
0.025	-0.003	0.000
0.033	-0.003	-0.003
0.042	-0.006	0.000
0.050	-0.006	-0.003
0.058	-0.003	0.000
0.067	-0.003	-0.003
0.075	-0.006	0.000
0.083	-0.006	0.000
0.100	0.025	0.000
0.117	0.022	0.000
0.133	0.025	0.000
0.150	0.022	0.000
0.167	0.025	0.000
0.183	0.022	0.000
0.200	0.025	0.000
0.217	0.022	0.000
0.233	0.025	-0.003
0.250	0.022	-0.003
0.267	0.022	-0.003
0.283	0.022	0.000
0.300	0.022	0.000
0.317	0.019	0.000
0.333	0.022	0.000
0.417	0.025	0.000
0.500	0.028	0.000
0.583	0.028	0.000
0.667	0.025	0.000
0.750	0.025	0.000
0.833	0.028	0.000
0.917	0.028	-0.003
1.000	0.025	0.000
1.083	0.022	0.000
1.167	0.025	0.000
1.250	0.025	0.000
1.333	0.025	0.000
1.417	0.025	-0.003

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-18</u> <u>(FEET)</u>
1.500	0.025	0.000
1.583	0.022	-0.003
1.667	0.025	0.006
1.750	0.025	-0.003
1.833	0.028	0.000
1.917	0.025	0.000
2.000	0.025	0.000
2.500	0.022	-0.003
3.000	0.019	-0.006
3.500	0.019	-0.003
4.000	0.019	-0.006
4.500	0.022	-0.003
5.000	0.025	-0.003
5.500	0.025	-0.003
6.000	0.025	-0.003
6.500	0.028	-0.003
7.000	0.025	-0.003
7.500	0.025	-0.003
8.000	0.022	-0.003
8.500	0.022	0.000
9.000	0.022	-0.003
9.500	0.022	0.000
10.000	0.019	-0.003
11.000	0.019	-0.003
12.000	0.019	-0.003
13.000	0.019	-0.003
14.000	0.022	0.000
15.000	0.019	-0.003
16.000	0.025	-0.003
17.000	0.025	-0.006
18.000	0.022	-0.003
19.000	0.016	-0.006
20.000	0.016	-0.003
21.000	0.022	-0.003
22.000	0.019	-0.006
23.000	0.022	-0.003
24.000	0.019	-0.003
25.000	0.019	-0.003
26.000	0.025	-0.006
27.000	0.019	-0.003
28.000	0.022	-0.003
29.000	0.016	-0.003
30.000	0.016	-0.003
31.000	0.019	-0.003
32.000	0.022	0.009
33.000	0.013	-0.003
34.000	0.019	-0.003
35.000	0.013	-0.006
36.000	0.022	-0.003

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-18</u> <u>(FEET)</u>
37.000	0.019	-0.003
38.000	0.022	-0.006
39.000	0.016	-0.003
40.000	0.022	-0.003
41.000	0.016	-0.006
42.000	0.019	-0.003
43.000	0.016	-0.003
44.000	0.019	-0.006
45.000	0.016	-0.003
46.000	0.013	-0.003
47.000	0.016	-0.006
48.000	0.019	-0.006
49.000	0.016	-0.006
50.000	0.016	-0.003
51.000	0.022	-0.006
52.000	0.019	-0.003
53.000	0.016	-0.009
54.000	0.019	-0.006
55.000	0.019	-0.006
56.000	0.016	-0.006
57.000	0.019	-0.009
58.000	0.016	-0.009
59.000	0.013	-0.012
60.000	0.010	-0.009
61.000	0.016	-0.009
62.000	0.019	-0.009
63.000	0.013	-0.009
64.000	0.016	-0.006
65.000	0.016	-0.009
66.000	0.019	-0.012
67.000	0.016	-0.012
68.000	0.019	-0.012
69.000	0.013	-0.012
70.000	0.016	-0.012
71.000	0.019	-0.012
72.000	0.022	-0.012
73.000	0.016	-0.012
74.000	0.010	-0.012
75.000	0.013	-0.012
76.000	0.007	-0.016
77.000	0.010	-0.016
78.000	0.007	-0.016
79.000	0.016	-0.016
80.000	0.013	-0.012
81.000	0.004	-0.016
82.000	0.000	-0.016
83.000	0.007	-0.012
84.000	0.007	-0.016
85.000	0.004	-0.012

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-18</u> <u>(FEET)</u>
86.000	0.013	-0.012
87.000	0.016	-0.012
88.000	0.013	-0.016
89.000	0.016	-0.016
90.000	0.010	-0.016
91.000	0.007	-0.016
92.000	0.004	-0.016
93.000	0.004	-0.019
94.000	0.007	-0.019
95.000	0.007	-0.019
96.000	0.013	-0.016
97.000	0.013	-0.019
98.000	0.004	-0.016
99.000	0.013	-0.016
100.000	0.010	-0.016
101.000	0.013	-0.019
102.000	0.016	-0.019
103.000	0.013	-0.022
104.000	0.013	-0.016
105.000	0.013	-0.016
106.000	0.013	-0.016
107.000	0.013	-0.012
108.000	0.013	-0.019
109.000	0.004	-0.016
110.000	0.004	-0.022
111.000	0.013	-0.019
112.000	0.004	-0.022
113.000	0.010	-0.022
114.000	0.000	-0.025
115.000	0.010	-0.022
116.000	0.013	-0.022
117.000	0.010	-0.025
118.000	0.016	-0.022
119.000	0.013	-0.019
120.000	0.016	-0.022
121.000	0.016	-0.022
122.000	0.010	-0.025
123.000	0.010	-0.028
124.000	-0.003	-0.028
125.000	0.010	-0.022
126.000	0.004	-0.028
127.000	0.000	-0.028
128.000	0.007	-0.028
129.000	0.000	-0.028
130.000	0.007	-0.032
131.000	0.004	-0.032
132.000	0.007	-0.028
133.000	0.004	-0.032
134.000	0.007	-0.032

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-18</u> <u>(FEET)</u>
135.000	0.004	-0.032
136.000	0.007	-0.032
137.000	0.004	-0.035
138.000	0.010	-0.032
139.000	0.010	-0.032
140.000	0.007	-0.035
141.000	0.000	-0.035
142.000	0.010	-0.035
143.000	0.000	-0.035
144.000	0.010	-0.035
145.000	0.004	-0.038
146.000	0.004	-0.041
147.000	0.004	-0.035
148.000	0.004	-0.035
149.000	0.000	-0.038
150.000	0.010	-0.038
151.000	0.004	-0.041
152.000	0.016	-0.038
153.000	0.013	-0.038
154.000	0.013	-0.038
155.000	0.013	-0.038
156.000	0.000	-0.038
157.000	0.016	-0.038
158.000	0.019	-0.038
159.000	0.013	-0.041
160.000	0.022	-0.038
161.000	0.007	-0.044
162.000	0.004	-0.047
163.000	0.013	-0.041
164.000	0.007	-0.044
165.000	0.013	-0.041
166.000	0.007	-0.047
167.000	0.007	-0.041
168.000	0.007	-0.041
169.000	0.007	-0.044
170.000	0.000	-0.044
171.000	0.007	-0.044
172.000	0.013	-0.044
173.000	0.016	-0.044
174.000	-0.003	-0.051
175.000	0.010	-0.044
176.000	0.010	-0.047
177.000	0.007	-0.047
178.000	0.010	-0.044
179.000	0.007	-0.051
180.000	0.007	-0.051
181.000	0.007	-0.051
182.000	0.007	-0.051
183.000	0.010	-0.047

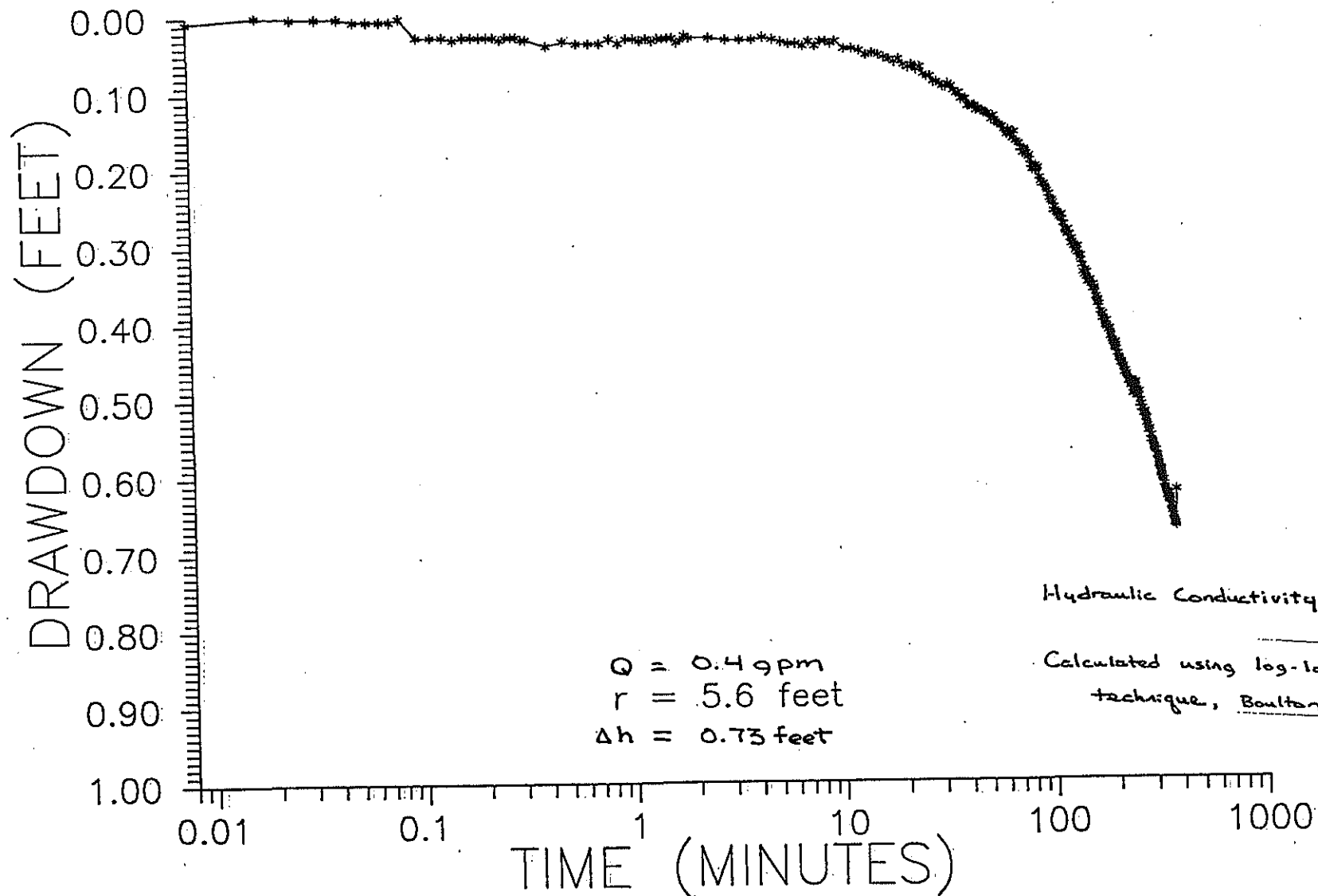
<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-18</u> <u>(FEET)</u>
184.000	0.007	-0.051
185.000	0.007	-0.051
186.000	0.013	-0.047
187.000	0.004	-0.051
188.000	0.010	-0.047
189.000	-0.003	-0.051
190.000	-0.003	-0.054
191.000	0.004	-0.051
192.000	0.007	-0.051
193.000	0.007	-0.054
194.000	0.010	-0.051
195.000	0.007	-0.051
196.000	0.013	-0.051
197.000	0.007	-0.047
198.000	0.010	-0.047
199.000	0.016	-0.044
200.000	0.007	-0.051
201.000	0.010	-0.047
202.000	0.007	-0.047
203.000	0.000	-0.044
204.000	0.004	-0.047
205.000	0.004	-0.047
206.000	0.000	-0.051
207.000	0.000	-0.051
208.000	-0.006	-0.054
209.000	0.004	-0.051
210.000	0.000	-0.047
211.000	0.004	-0.051
212.000	-0.003	-0.051
213.000	-0.006	-0.051
214.000	-0.009	-0.047
215.000	-0.003	-0.044
216.000	-0.006	-0.047
217.000	-0.003	-0.051
218.000	0.000	-0.047
219.000	-0.003	-0.051
220.000	-0.003	-0.051
221.000	0.004	-0.047
222.000	-0.003	-0.047
223.000	-0.003	-0.047
224.000	0.004	-0.047
225.000	0.007	-0.047
226.000	0.000	-0.044
227.000	-0.006	-0.047
228.000	-0.012	-0.044
229.000	-0.009	-0.044
230.000	-0.009	-0.047
231.000	-0.003	-0.051
232.000	-0.006	-0.047

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-18</u> <u>(FEET)</u>
233.000	-0.006	-0.047
234.000	-0.006	-0.051
235.000	-0.006	-0.047
236.000	0.000	-0.044
237.000	-0.006	-0.047
238.000	-0.003	-0.047
239.000	-0.006	-0.051
240.000	0.000	-0.051
241.000	0.000	-0.047
242.000	0.000	-0.047
243.000	-0.006	-0.051
244.000	-0.006	-0.054
245.000	-0.012	-0.054
246.000	-0.003	-0.051
247.000	-0.003	-0.051
248.000	-0.006	-0.051
249.000	-0.006	-0.054
250.000	-0.006	-0.054
251.000	-0.009	-0.054
252.000	-0.006	-0.054
253.000	-0.006	-0.054
254.000	-0.006	-0.057
255.000	-0.003	-0.054
256.000	-0.006	-0.054
257.000	-0.003	-0.051
258.000	0.000	-0.057
259.000	-0.006	-0.057
260.000	-0.006	-0.057
261.000	-0.009	-0.057
262.000	-0.012	-0.054
263.000	-0.012	-0.057
264.000	-0.009	-0.057
265.000	-0.006	-0.054
266.000	-0.009	-0.057
267.000	-0.009	-0.054
268.000	-0.015	-0.060
269.000	-0.009	-0.060
270.000	-0.015	-0.060
271.000	-0.018	-0.060
272.000	-0.006	-0.057
273.000	-0.018	-0.063
274.000	-0.009	-0.060
275.000	-0.018	-0.060
276.000	-0.015	-0.060
277.000	-0.018	-0.063
278.000	-0.012	-0.063
279.000	-0.012	-0.067
280.000	-0.015	-0.060
281.000	-0.009	-0.060

TIME (MINUTES)	DRAWDOWN	DRAWDOWN
	GMW-5 (FEET)	GMW-18 (FEET)
282.000	-0.022	-0.063
283.000	-0.018	-0.067
284.000	-0.018	-0.067
285.000	-0.022	-0.067
286.000	-0.025	-0.067
287.000	-0.018	-0.067
288.000	-0.018	-0.067
289.000	-0.018	-0.067
290.000	-0.012	-0.070
291.000	-0.018	-0.070
292.000	-0.015	-0.070
293.000	-0.022	-0.067
294.000	-0.022	-0.067
295.000	-0.015	-0.067
296.000	-0.018	-0.070
297.000	-0.015	-0.070
298.000	-0.022	-0.076
299.000	-0.015	-0.073
300.000	-0.015	-0.067
301.000	-0.012	-0.073
302.000	-0.025	-0.076
303.000	-0.022	-0.079
304.000	-0.018	-0.076
305.000	-0.025	-0.073
306.000	-0.025	-0.079
307.000	-0.025	-0.076
308.000	-0.025	-0.079
309.000	-0.025	-0.079
310.000	-0.022	-0.079
311.000	-0.022	-0.079
312.000	-0.025	-0.079
313.000	-0.022	-0.079
314.000	-0.022	-0.079
315.000	-0.022	-0.083
316.000	-0.022	-0.083
317.000	-0.022	-0.083
318.000	-0.028	-0.086
319.000	-0.028	-0.086
320.000	-0.025	-0.083
321.000	-0.025	-0.086
322.000	-0.025	-0.086
323.000	-0.025	-0.083
324.000	-0.028	-0.086
325.000	-0.028	-0.086
326.000	-0.028	-0.089
327.000	-0.028	-0.089
328.000	-0.025	-0.086
329.000	-0.031	-0.086
330.000	-0.031	-0.089

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-18</u> <u>(FEET)</u>
331.000	-0.028	-0.092
332.000	-0.031	-0.086
333.000	-0.022	-0.086
334.000	-0.018	-0.089
335.000	-0.018	-0.089
336.000	-0.018	-0.092

RESPONSE OF GMW-5
 DURING PUMP TEST OF GMW-18
 EGGKTA - APRIL 15, 1992



Q = 0.4 gpm
 r = 5.6 feet
 Δh = 0.73 feet

Hydraulic Conductivity: 3.9×10^{-4} cm/sec
 Calculated using log-log construction
 technique, Boulton

Pumping Test of Well No. GMW-18

Project Name <u>EGGKTA</u>		Page <u>1</u> Of <u> </u>
Project No. <u>91-319-4</u>		Date <u>4/15/92</u>
Contractor <u> </u>	Field Observer <u>P. Niebergall</u>	
Discharge Measurement Method <u>Bucket and Stopwatch</u>		Q = <u> </u> gpm

Well Test Data

Well No. GMW-18

Elevation 646.17' r = Reference Point T.O.C.

Drawdown Measurement Method Water Level Indicator Static W.L. = 14.33'

Date	Time	Minutes Pump		Depth (FEET)		Remarks
		On	Off	To Water	Drawdown	
4/15/92	10:15 A	0		14.33'	0.00	
	10:16	1		15.85	1.52	
	10:17	2		16.30	1.97	
	10:18	3		16.80	2.47	
	10:19	4		17.00	2.67	GMW-18 Total Depth = 34.5'
	10:20	5		17.34	3.01	Q = 0.50 gpm / cloudy water
	10:25	10		18.44	4.11	Q = 0.43 gpm / clear water
	10:30	15		19.08	4.75	Q = 0.40 gpm
	10:35	20		19.56	5.23	Q = 0.38 gpm
	10:40	25		19.90	5.57	Q = 0.38 gpm
	10:45	30		20.15	5.82	Q = 0.38 gpm
	10:50	35		20.33	6.00	Q = 0.38 gpm
	10:55	40		20.45	6.12	Q = 0.35 gpm
	11:00	45		20.55	6.22	Q = 0.35 gpm
	11:05	50		20.61	6.28	Q = 0.35 gpm
	11:10	55		20.68	6.35	Q = 0.35 gpm
	11:15	60		20.71	6.38	Q = 0.35 gpm
	11:20	65		20.74	6.41	Q = 0.35 gpm
	11:25	70		20.76	6.43	Q = 0.35 gpm
	11:30	75		20.82	6.49	Q = 0.35 gpm
1:35	80		20.85	6.52	Q = 0.35 gpm	
11:40	85		20.88	6.55	Q = 0.35 gpm	
11:45	90		20.92	6.59	Q = 0.35 gpm	
11:50	95		20.94	6.61	Q = 0.35 gpm	
11:55	100		20.96	6.63	Q = 0.35 gpm	
12:00 P	105		21.01	6.68	Q = 0.35 gpm	
4/15/92	12:10 P	115		21.05	6.72	Q = 0.35 gpm

Pumping Test of Well No. GMW-18

Project Name <u>EGG KTA</u>		Page <u>2</u> Of
Project No. <u>91-319-4</u>		Date <u>4/15/92</u>
Contractor	Field Observer <u>P. Niebergall</u>	
Discharge Measurement Method <u>Bucket and Stopwatch</u>		Q = <u>See Remarks</u> gpm

Well Test Data

Well No. GMW-18

Elevation 646.17' r = _____ Reference Point T.O.C

Drawdown Measurement Method Water Level Indicator

Date	Time	Minutes Pump		Depth		Remarks
		On	Off	To Water	Drawdown	
4/15/92	12:20 P	125		21.10	6.77	Q = 0.34 gpm
	12:30	135		21.14	6.81	Q = 0.34 gpm
	12:45	150		21.20	6.87	Q = 0.33 gpm
	1:00	165		21.30	6.97	Q = 0.33 gpm
	1:15	180		21.34	7.01	Q = 0.33 gpm
	1:30	195		21.42	7.09	Q = 0.33 gpm
	1:45	210		21.45	7.12	Q = 0.33 gpm
	2:00	225		21.50	7.17	Q = 0.33 gpm
	2:30	255		21.70	7.37	RAIN: 1:45-2:30 / increased flow
	2:37	262		22.05	7.72	Q = 0.50 gpm
	2:45	270		22.42	8.09	Q = 0.45 gpm
	3:00	285		23.90	9.57	Q = 0.58 gpm
	3:10	295		24.69	10.36	Q = 0.58 gpm
	3:20	305		25.20	10.87	Q = 0.58 gpm
	3:30	315		25.61	11.28	Q = 0.55 gpm
	3:40	325		25.78	11.45	Q = 0.55 gpm
	3:50	335		26.09	11.76	Q = 0.55 gpm
	4:00	345		26.37	12.04	
	4:10	355		26.64	12.31	Q = 0.55 gpm
	4/15/92	4:20 P	365		26.85	12.52
	4:30 P	Stopped Test Due to Heavy Rain Flowing into Open Wells				

PUMP TEST ON WELL GMW-18
EGGKTA SITE - ST. LOUIS, MISSOURI
APRIL 15, 1992

TEST 8

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-17</u> <u>(FEET)</u>
0.0000	0.0340	0.0030
0.0080	0.0070	0.0030
0.0170	0.0000	0.0030
0.0250	0.0030	0.0030
0.0330	0.0030	0.0030
0.0420	0.0030	0.0030
0.0500	0.0070	0.0030
0.0580	0.0070	0.0030
0.0670	0.0070	0.0030
0.0750	0.0070	0.0060
0.0830	0.0030	0.0060
0.1000	0.0280	0.0060
0.1170	0.0280	0.0030
0.1330	0.0280	0.0000
0.1500	0.0310	0.0030
0.1670	0.0280	0.0030
0.1830	0.0280	0.0060
0.2000	0.0280	0.0030
0.2170	0.0280	0.0030
0.2330	0.0280	0.0000
0.2500	0.0310	0.0060
0.2670	0.0280	0.0030
0.2830	0.0280	0.0030
0.3000	0.0280	0.0030
0.3170	0.0310	0.0030
0.3330	0.0310	0.0030
0.4170	0.0400	0.0030
0.5000	0.0340	0.0030
0.5830	0.0370	0.0000
0.6670	0.0370	0.0000
0.7500	0.0370	0.0030
0.8330	0.0310	0.0000
0.9170	0.0370	0.0000
1.0000	0.0310	0.0000
1.0830	0.0310	0.0000
1.1670	0.0340	0.0030
1.2500	0.0310	0.0030
1.3330	0.0340	0.0030
1.4170	0.0310	0.0030

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-17</u> <u>(FEET)</u>
1.5000	0.0310	0.0030
1.5830	0.0310	0.0030
1.6670	0.0310	0.0030
1.7500	0.0370	0.0030
1.8330	0.0340	0.0060
1.9170	0.0280	0.0030
2.0000	0.0310	0.0030
2.5000	0.0310	0.0030
3.0000	0.0340	0.0030
3.5000	0.0340	0.0060
4.0000	0.0340	0.0030
4.5000	0.0310	0.0000
5.0000	0.0340	0.0000
5.5000	0.0370	0.0000
6.0000	0.0400	0.0000
6.5000	0.0400	0.0000
7.0000	0.0430	0.0030
7.5000	0.0370	0.0030
8.0000	0.0430	0.0060
8.5000	0.0370	0.0000
9.0000	0.0370	0.0030
9.5000	0.0400	0.0030
10.0000	0.0370	0.0030
11.0000	0.0470	0.0030
12.0000	0.0470	0.0030
13.0000	0.0500	0.0030
14.0000	0.0560	0.0030
15.0000	0.0530	0.0030
16.0000	0.0560	0.0000
17.0000	0.0590	0.0060
18.0000	0.0620	0.0060
19.0000	0.0650	0.0060
20.0000	0.0620	0.0030
21.0000	0.0690	0.0060
22.0000	0.0720	0.0030
23.0000	0.0690	0.0060
24.0000	0.0750	0.0060
25.0000	0.0720	0.0060
26.0000	0.0810	0.0090
27.0000	0.0840	0.0090
28.0000	0.0840	0.0060
29.0000	0.0910	0.0060
30.0000	0.0910	0.0060
31.0000	0.0940	0.0060
32.0000	0.0970	0.0060
33.0000	0.0970	0.0030
34.0000	0.0940	0.0060
35.0000	0.0970	0.0030
36.0000	0.1030	0.0060

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-17</u> <u>(FEET)</u>
37.0000	0.1060	0.0030
38.0000	0.1060	0.0060
39.0000	0.1130	0.0060
40.0000	0.1130	0.0060
41.0000	0.1130	0.0030
42.0000	0.1220	0.0310
43.0000	0.1220	0.0060
44.0000	0.1220	0.0030
45.0000	0.1220	0.0060
46.0000	0.1280	0.0060
47.0000	0.1250	0.0000
48.0000	0.1280	0.0030
49.0000	0.1280	0.0060
50.0000	0.1320	0.0030
51.0000	0.1320	0.0000
52.0000	0.1320	0.0000
53.0000	0.1350	0.0030
54.0000	0.1410	0.0030
55.0000	0.1350	0.0030
56.0000	0.1410	0.0000
57.0000	0.1440	0.0030
58.0000	0.1470	0.0000
59.0000	0.1470	0.0000
60.0000	0.1500	0.0000
61.0000	0.1500	0.0030
62.0000	0.1540	0.0030
63.0000	0.1570	0.0000
64.0000	0.1600	0.0000
65.0000	0.1540	0.0000
66.0000	0.1600	-0.0030
67.0000	0.1570	0.0000
68.0000	0.1660	0.0000
69.0000	0.1570	0.0000
70.0000	0.1690	0.0030
71.0000	0.1690	0.0000
72.0000	0.1720	0.0030
73.0000	0.1720	0.0030
74.0000	0.1790	0.0410
75.0000	0.1790	0.0060
76.0000	0.1850	0.0030
77.0000	0.1790	0.0000
78.0000	0.1820	0.0030
79.0000	0.1850	0.0000
80.0000	0.1910	0.0000
81.0000	0.1880	0.0000
82.0000	0.1940	0.0000
83.0000	0.2010	0.0000
84.0000	0.2070	0.0030
85.0000	0.2040	0.0000

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-17</u> <u>(FEET)</u>
86.0000	0.2070	-0.0030
87.0000	0.2010	0.0000
88.0000	0.2070	-0.0030
89.0000	0.2040	0.0000
90.0000	0.2170	-0.0030
91.0000	0.2170	-0.0030
92.0000	0.2230	-0.0030
93.0000	0.2260	-0.0030
94.0000	0.2260	-0.0030
95.0000	0.2260	-0.0060
96.0000	0.2290	-0.0030
97.0000	0.2320	-0.0030
98.0000	0.2350	-0.0060
99.0000	0.2390	-0.0030
100.0000	0.2390	-0.0060
101.0000	0.2450	-0.0060
102.0000	0.2480	-0.0030
103.0000	0.2480	-0.0060
104.0000	0.2510	-0.0060
105.0000	0.2610	-0.0090
106.0000	0.2570	-0.0060
107.0000	0.2610	-0.0060
108.0000	0.2640	-0.0060
109.0000	0.2640	-0.0060
110.0000	0.2670	-0.0060
111.0000	0.2700	-0.0030
112.0000	0.2700	-0.0030
113.0000	0.2730	-0.0090
114.0000	0.2670	-0.0060
115.0000	0.2730	-0.0120
116.0000	0.2790	-0.0060
117.0000	0.2790	-0.0120
118.0000	0.2860	-0.0090
119.0000	0.2890	-0.0060
120.0000	0.2890	-0.0060
121.0000	0.2920	-0.0090
122.0000	0.2860	-0.0120
123.0000	0.2920	-0.0120
124.0000	0.2920	-0.0120
125.0000	0.2980	-0.0120
126.0000	0.3050	-0.0120
127.0000	0.2980	-0.0150
128.0000	0.3020	-0.0150
129.0000	0.3080	-0.0190
130.0000	0.3050	-0.0220
131.0000	0.3080	-0.0150
132.0000	0.3140	-0.0120
133.0000	0.3110	-0.0120
134.0000	0.3170	-0.0150

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-17</u> <u>(FEET)</u>
135.0000	0.3080	-0.0150
136.0000	0.3170	-0.0190
137.0000	0.3200	-0.0120
138.0000	0.3240	-0.0220
139.0000	0.3200	-0.0190
140.0000	0.3270	-0.0250
141.0000	0.3330	-0.0280
142.0000	0.3330	-0.0220
143.0000	0.3420	-0.0220
144.0000	0.3460	-0.0220
145.0000	0.3460	-0.0250
146.0000	0.3390	-0.0220
147.0000	0.3490	-0.0220
148.0000	0.3420	-0.0310
149.0000	0.3490	-0.0280
150.0000	0.3550	-0.0280
151.0000	0.3550	-0.0350
152.0000	0.3520	-0.0310
153.0000	0.3550	-0.0350
154.0000	0.3520	-0.0310
155.0000	0.3580	-0.0380
156.0000	0.3580	-0.0350
157.0000	0.3580	-0.0350
158.0000	0.3640	-0.0380
159.0000	0.3580	-0.0350
160.0000	0.3610	-0.0380
161.0000	0.3640	-0.0380
162.0000	0.3680	-0.0380
163.0000	0.3740	-0.0380
164.0000	0.3740	-0.0410
165.0000	0.3770	-0.0410
166.0000	0.3830	-0.0380
167.0000	0.3800	-0.0380
168.0000	0.3770	-0.0440
169.0000	0.3830	-0.0470
170.0000	0.3830	-0.0440
171.0000	0.3930	-0.0470
172.0000	0.3930	-0.0440
173.0000	0.3990	-0.0760
174.0000	0.4020	-0.0500
175.0000	0.3960	-0.0500
176.0000	0.4020	-0.0500
177.0000	0.4020	-0.0540
178.0000	0.4050	-0.0500
179.0000	0.4120	-0.0540
180.0000	0.4090	-0.0540
181.0000	0.4090	-0.0570
182.0000	0.4050	-0.0250
183.0000	0.4150	-0.0600

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-17</u> <u>(FEET)</u>
184.0000	0.4120	-0.0570
185.0000	0.4180	-0.0600
186.0000	0.4180	-0.0500
187.0000	0.4150	-0.0630
188.0000	0.4150	-0.0700
189.0000	0.4150	-0.0700
190.0000	0.4270	-0.0630
191.0000	0.4210	-0.0730
192.0000	0.4240	-0.0700
193.0000	0.4310	-0.0730
194.0000	0.4340	-0.0660
195.0000	0.4310	-0.0730
196.0000	0.4340	-0.0730
197.0000	0.4370	-0.0760
198.0000	0.4400	-0.0730
199.0000	0.4400	-0.0630
200.0000	0.4430	-0.0730
201.0000	0.4340	-0.0730
202.0000	0.4370	-0.0660
203.0000	0.4430	-0.0760
204.0000	0.4490	-0.0730
205.0000	0.4490	-0.0790
206.0000	0.4490	-0.0790
207.0000	0.4530	-0.0790
208.0000	0.4560	-0.0760
209.0000	0.4530	-0.0790
210.0000	0.4560	-0.0820
211.0000	0.4620	-0.0820
212.0000	0.4590	-0.0820
213.0000	0.4590	-0.0820
214.0000	0.4620	-0.0790
215.0000	0.4590	-0.0790
216.0000	0.4650	-0.0790
217.0000	0.4680	-0.0820
218.0000	0.4650	-0.0820
219.0000	0.4750	-0.0820
220.0000	0.4710	-0.0850
221.0000	0.4710	-0.0920
222.0000	0.4750	-0.0920
223.0000	0.4710	-0.0920
224.0000	0.4780	-0.0920
225.0000	0.4750	-0.0920
226.0000	0.4780	-0.0920
227.0000	0.4810	-0.0950
228.0000	0.4810	-0.0890
229.0000	0.4810	-0.0890
230.0000	0.4870	-0.0850
231.0000	0.4840	-0.0920
232.0000	0.4840	-0.0850

<u>TIME</u>	<u>DRAWDOWN</u>	<u>DRAWDOWN</u>
<u>(MINUTES)</u>	<u>GMW-5</u>	<u>GMW-17</u>
	<u>(FEET)</u>	<u>(FEET)</u>
233.0000	0.4870	-0.0890
234.0000	0.4930	-0.0850
235.0000	0.4900	-0.0850
236.0000	0.4930	-0.0790
237.0000	0.4900	-0.0790
238.0000	0.4970	-0.0790
239.0000	0.4930	-0.0790
240.0000	0.5030	-0.0790
241.0000	0.5000	-0.0790
242.0000	0.4930	-0.0790
243.0000	0.4870	-0.0760
244.0000	0.4870	-0.0790
245.0000	0.4930	-0.0730
246.0000	0.4930	-0.0760
247.0000	0.4900	-0.0790
248.0000	0.4870	-0.0790
249.0000	0.4930	-0.0790
250.0000	0.4970	-0.0820
251.0000	0.5000	-0.0820
252.0000	0.4970	-0.0850
253.0000	0.5060	-0.0850
254.0000	0.5030	-0.0820
255.0000	0.5060	-0.0890
256.0000	0.5060	-0.0850
257.0000	0.5000	-0.0850
258.0000	0.5060	-0.0850
259.0000	0.5160	-0.0890
260.0000	0.5120	-0.0890
261.0000	0.5120	-0.0890
262.0000	0.5220	-0.0890
263.0000	0.5220	-0.0890
264.0000	0.5160	-0.0890
265.0000	0.5220	-0.0890
266.0000	0.5220	-0.0890
267.0000	0.5220	-0.0950
268.0000	0.5280	-0.0920
269.0000	0.5250	-0.0890
270.0000	0.5250	-0.0950
271.0000	0.5250	-0.0920
272.0000	0.5280	-0.0950
273.0000	0.5250	-0.0950
274.0000	0.5310	-0.0890
275.0000	0.5340	-0.0890
276.0000	0.5310	-0.0920
277.0000	0.5340	-0.0890
278.0000	0.5410	-0.0920
279.0000	0.5340	-0.0920
280.0000	0.5440	-0.0980
281.0000	0.5440	-0.0980

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-17</u> <u>(FEET)</u>
282.0000	0.5440	-0.0980
283.0000	0.5500	-0.1010
284.0000	0.5470	-0.1010
285.0000	0.5500	-0.1080
286.0000	0.5470	-0.1080
287.0000	0.5470	-0.1080
288.0000	0.5560	-0.1050
289.0000	0.5560	-0.1110
290.0000	0.5560	-0.1110
291.0000	0.5630	-0.1110
292.0000	0.5560	-0.1110
293.0000	0.5630	-0.1140
294.0000	0.5630	-0.1140
295.0000	0.5630	-0.1140
296.0000	0.5660	-0.1110
297.0000	0.5660	-0.1140
298.0000	0.5720	-0.1110
299.0000	0.5690	-0.1140
300.0000	0.5720	-0.1110
301.0000	0.5750	-0.1140
302.0000	0.5720	-0.1140
303.0000	0.5750	-0.1110
304.0000	0.5750	-0.1110
305.0000	0.5820	-0.1110
306.0000	0.5820	-0.1110
307.0000	0.5750	-0.1110
308.0000	0.5850	-0.1080
309.0000	0.5820	-0.1140
310.0000	0.5820	-0.1080
311.0000	0.5940	-0.1080
312.0000	0.5940	-0.1080
313.0000	0.5910	-0.1110
314.0000	0.5970	-0.1080
315.0000	0.5970	-0.1080
316.0000	0.6040	-0.1050
317.0000	0.6070	-0.1080
318.0000	0.5970	-0.1080
319.0000	0.6000	-0.1140
320.0000	0.6000	-0.1080
321.0000	0.6040	-0.1080
322.0000	0.6100	-0.1080
323.0000	0.6070	-0.1050
324.0000	0.6100	-0.1080
325.0000	0.6130	-0.1050
326.0000	0.6130	-0.1050
327.0000	0.6190	-0.1080
328.0000	0.6130	-0.1140
329.0000	0.6190	-0.1140
330.0000	0.6230	-0.1140

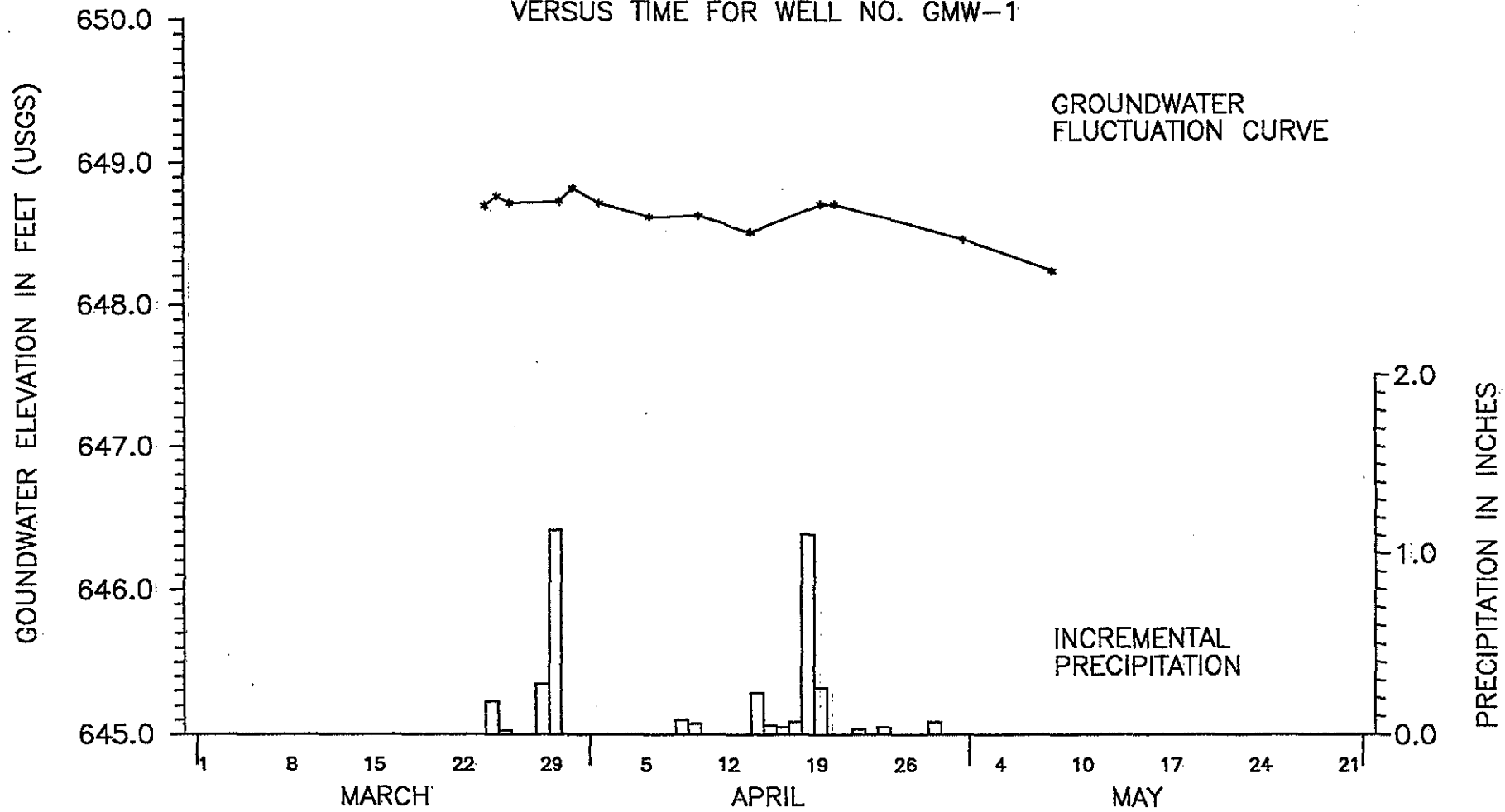
<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> <u>GMW-5</u> <u>(FEET)</u>	<u>DRAWDOWN</u> <u>GMW-17</u> <u>(FEET)</u>
331.0000	0.6190	-0.1110
332.0000	0.6260	-0.1170
333.0000	0.6230	-0.1140
334.0000	0.6260	-0.1140
335.0000	0.6260	-0.1170
336.0000	0.6290	-0.1200
337.0000	0.6290	-0.1200
338.0000	0.6350	-0.1200
339.0000	0.6290	-0.1200
340.0000	0.6290	-0.1170
341.0000	0.6320	-0.1200
342.0000	0.6290	-0.1200
343.0000	0.6380	-0.1200
344.0000	0.6350	-0.1200
345.0000	0.6410	-0.1200
346.0000	0.6380	-0.1200
347.0000	0.6410	-0.1240
348.0000	0.6380	-0.1240
349.0000	0.6410	-0.1270
350.0000	0.6350	-0.1270
351.0000	0.6410	-0.1270
352.0000	0.6410	-0.1240
353.0000	0.6480	-0.1270
354.0000	0.6480	-0.1270
355.0000	0.6510	-0.1270
356.0000	0.6510	-0.1240
357.0000	0.6510	-0.1240
358.0000	0.6540	-0.1200
359.0000	0.6510	-0.1240
360.0000	0.6540	-0.1240
361.0000	0.6510	-0.1240
362.0000	0.6600	-0.1200
363.0000	0.6600	-0.1170
364.0000	0.6600	-0.1110
365.0000	0.6600	-0.1140
366.0000	0.6630	-0.1110
367.0000	0.6700	-0.1140
368.0000	0.6670	-0.1080
369.0000	0.6670	-0.1050
370.0000	0.6700	-0.1050
371.0000	0.6700	-0.1010
372.0000	0.6700	-0.0980
373.0000	0.6730	-0.1010
374.0000	0.6700	-0.1050
375.0000	0.6260	-0.1270
376.0000	0.3640	-0.1050
377.0000	0.2950	-0.1080
378.0000	0.2610	-0.1080
379.0000	0.2610	-0.1080

<u>TIME</u> <u>(MINUTES)</u>	<u>DRAWDOWN</u> GMW-5 <u>(FEET)</u>	<u>DRAWDOWN</u> GMW-17 <u>(FEET)</u>
380.0000	0.2570	-0.1140
381.0000	0.2420	-0.1140

APPENDIX G

**WATER LEVEL GRAPHS AND
WATER LEVEL MEASUREMENT REPORTS**

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-1



Observed Water Level Readings

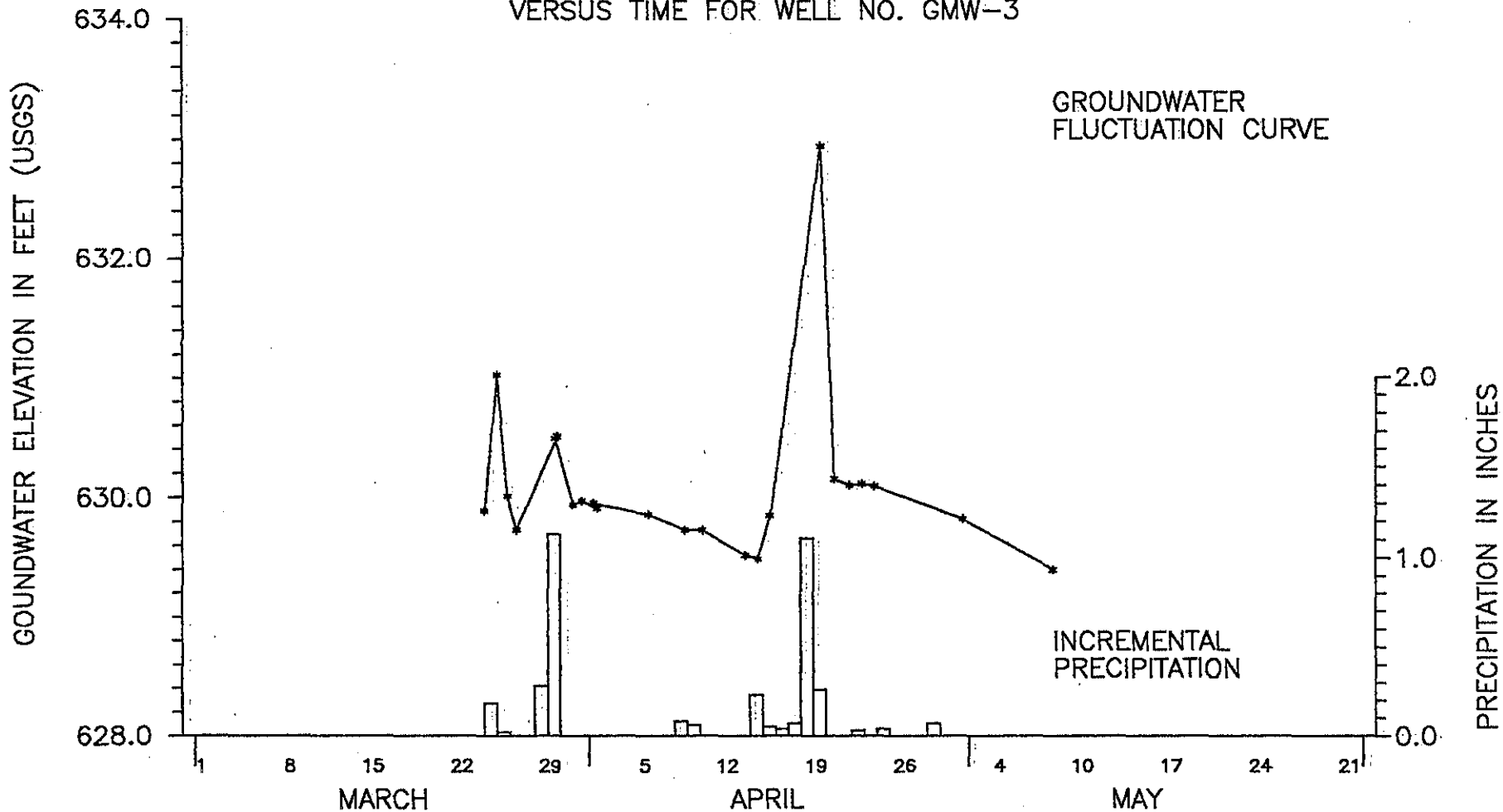
Project Name EGGKTA		Project No. 91-319-4-003		Hole No. GMW-1	
Location NW Corner of Site			Elev. Ground Surface (G.S.)		
N 597.7 EW 386.4			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 650.92'		
Date Started Drilling Hole NA		Time		Total Depth of Hole	
Date Completed Drilling Hole NA		Time		Drilling Type NA	
Date Piezometer Installed NA		Time		Total Depth of Piezometer 14.36	
				Footage Slotted NA	

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/24/92	6:10 p.m.	S. Slattery	2.23 from TOP	648.69'	14.36 TOTAL DEPTH / OUM = 0
			from		WATER IN VALVE BOX.
3/25/92	4:35 p.m.	S. Slattery	2.16' from TOP	648.76'	RAINED LAST NIGHT / TODAY
3/26/92	4:48 p.m.	P. Clark	2.21' from T.O.P.	648.71'	
3/30/92	3:41 p.m.	S. Slattery	2.20' from T.O.P.	648.72'	RAINED LAST Nig ht. : 1.13 inch
3/31/92	5:13 p.m.	S. Slattery	2.10' from T.O.P.	648.82'	
4/2/92	7:05 p.m.	P. Clark	2.21' from TOP	648.71'	
4/6/92	5:38 p.m.	P. Niebergall	2.31' from TOP	648.61'	
4/10/92	3:45 p.m.	P. Niebergall	2.30' from TOP	648.62'	Rain : 0.06 inch
4/14/92	6:10 p.m.	P. Niebergall	2.42' from TOP	648.50	
4/20/92	7:15 a.m.	J. McCleish	2' 2 5/8" from TOP	648.70'	Rain: 1.11 inch last night, 0.26 inch today
4/21/92	9:45 a.m.	J. McCleish	2' 2 5/8" from TOP	648.70'	
5/1/92	1:17 a.m.	J. McCleish	2' 5 5/8" from TOP	648.45'	
5/8/92	2:45 p.m.	J. McCleish	2' 8 2/8" from TOP	648.23'	
			from		
			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-3



Observed Water Level Readings

Project Name EGG KTA		Project No. 91-319-4-003		Hole No. GMW-3	
Location N 34.3 FW 162.5			Elev. Ground Surface (G.S.)		
			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 635.87'		
Date Started Drilling Hole NA		Time		Total Depth of Hole	
Date Completed Drilling Hole NA		Time		Drilling Type NA	
Date Piezometer Installed NA		Time		Total Depth of Piezometer 14.78	
				Footage Slotted NA	

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/24/92	6:20 p.m.	T. CLARK	5.78' from T.O.P.	629.89'	T.D = 14.78' from T.O.P. / OUM = 6.29 p.p.
3/25/92	6:05 p.m.	S. Slattery	4.85' from T.O.P.	631.02'	Water to top of plate
3/26/92	1:58 p.m.	S. Slattery	5.86' from T.O.P.	630.01'	Drilled SB-2
3/27/92	7:53 a.m.	S. Slattery	6.14' from TOP	629.73'	PRIOR to PACKER Test (SB-2)
3/27/92	11:29 a.m.	S. Slattery	6.12' from TOP	629.75'	88 min. into Packer Test
3/30/92	8:55 a.m.	S. Slattery	5.38' from T.O.P.	630.49'	RAINED LAST NIGHT: 1.13 inch
3/30/92	1:20 p.m.	S. Slattery	5.36' from T.O.P.	630.51'	Static W.L. - Bail test
"	1:31	S. Slattery	12.72' from T.O.P.	623.15'	BAILED 8 BAILERS (2 gallons)
"	1:32	S. Slattery	10.99' from T.O.P.	624.88'	ET = 1 min, Recovery = 1.73'
"	1:33	S. Slattery	10.52' from T.O.P.	625.35'	ET = 2 min, Recovery = 2.20'
"	1:34	S. Slattery	10.22' from T.O.P.	625.65'	ET = 3 min, Recovery = 2.50'
"	1:35	S. Slattery	9.99' from T.O.P.	625.88'	ET = 4 min, Recovery = 2.73'
"	1:38	S. Slattery	9.23' from T.O.P.	626.64'	ET = 7 min, Recovery = 3.49'
"	1:44	S. Slattery	8.03' from T.O.P.	627.84'	ET = 13 min, Recovery = 4.69'
3/31/92	5:45 p.m.	S. SLATTERY	5.93' from T.O.P.	629.94'	Developed CW-1, CW-2, CW-3, GMW-8, GMW-14
4/1/92	9:45 a.m.	Paul Niebergall	5.90' from TOP	629.97'	Pump Test at GMW-14

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

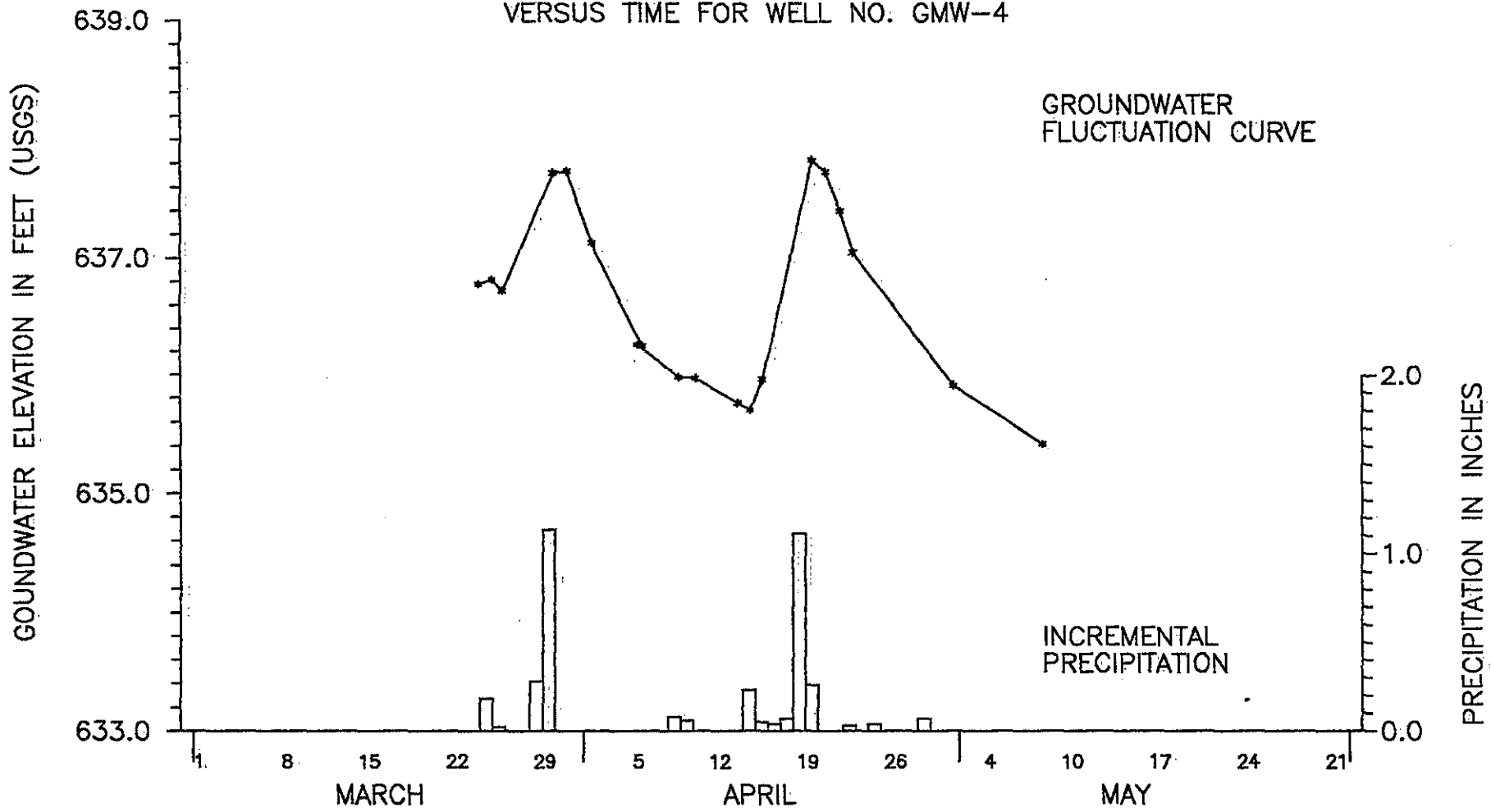
Project Name <u>EGGKTA</u>		Project No. <u>91-319-4-003</u>		Hole No. <u>GMW-3</u>	
Location			Elev. Ground Surface (G.S.)		
N <u>34.3</u> EW <u>162.5</u>			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) <u>635.87'</u>		
Date Started Drilling Hole <u>NA</u>		Time		Total Depth of Hole	
Date Completed Drilling Hole <u>NA</u>		Time		Drilling Type <u>NA</u>	
Date Piezometer Installed <u>NA</u>		Time		Total Depth of Piezometer	
				Footage Slotted	

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
4/1/92	3:12 pm	P. Niebergall	5.86' from TOP	630.01'	During Recovery Period from Pump Test at GMW-14
4/2/92	8:24 am	P. Niebergall	5.92' from TOP	629.95'	Pump Test at GMW-8
4/2/92	4:40 pm	P. Clark	5.96' from TOP	629.91'	"
4/6/92	5:56 pm	P. Niebergall	6.01' from TOP	629.86'	Drilled GMW-16
4/9/92	2:40 pm	J. McCleish	6.14' from TOP	629.73'	Pump Test at GMW-16 Rain: 0.08 inch
4/10/92	12:04 pm	P. Niebergall	6.14' from TOP	629.73'	Rain: 0.06 inch
4/14/92	8:33 am	P. Niebergall	6.35' from TOP	629.52'	
4/15/92	8:49 am	J. McCleish	6.38' from TOP	629.49'	Rain 0.23 inch
4/16/92	8:32 am	P. Niebergall	6.02' from TOP	629.85'	Rain 0.05 inch
4/20/92	8:25 am	J. McCleish	2' 11 1/8" from TOP	632.94'	Rain: Last night 1.11 inch, 0.26 inch today
4/21/92	10:25 am	J. McCleish	5' 8 5/8" from TOP	630.15'	
4/22/92	2:10 pm	J. McCleish	5' 9 2/8" from TOP	630.10'	
4/23/92	2:03 pm	J. McCleish	5' 9 1/8" from TOP	630.11'	
4/24/92	1:47 pm	J. McCleish	5' 9 3/8" from TOP	630.09'	
5/1/92	1:40 pm	J. McCleish	6' 5/8" from TOP	629.82'	
5/8/92	3:10 pm	J. McCleish	6' 5 5/8" from TOP	629.40'	

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

INCREMENTAL DAILY PRECIPITATION AND GROUNDWATER FLUCTUATION VERSUS TIME FOR WELL NO. GMW-4



Water Level Readings

Sheet 1

Project No. 91-319-4-003 Hole No. GMW-4

N <u>48.2</u> EW <u>370.4</u> Date Started Drilling Hole <u>NA</u> Time Date Completed Drilling Hole <u>NA</u> Time Date Piezometer Installed <u>NA</u> Time	Elev. Ground Surface (G.S.) Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) <u>641.6</u> Total Depth of Hole <u>NA</u> Drilling Type Total Depth of Piezometer <u>14.6' (TOP)</u> Footage Slotted <u>NA</u>
---	---

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/24/92	7:15 p.m.	S. Slattery	4.82' from T.O.P.	636.78'	14.60' Deep from T.O.P. / OUM = P.P.
3/25/92	6:07 p.m.	S. Slattery	4.78' from TOP	636.82'	
3/26/92	2:10 p.m.	S. Slattery	4.88' from T.O.P.	636.72'	
3/30/92	3:25 p.m.	S. Slattery	3.88' from T.O.P.	637.72'	RAINED LAST NIGHT: 1.13"
3/31/92	5:50 p.m.	S. Slattery	3.86' from T.O.P.	637.74'	
4/2/92	5:25 p.m.	P. Clark	4.47' from TOP	637.13'	
4/6/92	8:45 a.m.	P. Niebergall	5.34' from TOP	636.26'	Rain: 0.08 inch
4/6/92	5:56 p.m.	P. Niebergall	5.35' from TOP	636.25'	
4/9/92	3:00 p.m.	J. McCleish	5.62' from TOP	635.98'	
4/10/92	12:17 p.m.	P. Niebergall	5.63' from TOP	635.97'	Rain: 0.06 inch
4/14/92	8:35 a.m.	P. Niebergall	5.84' from TOP	635.76'	
4/15/92	8:52 a.m.	J. McCleish	5.90' from TOP	635.70'	Rain: 0.23 inch
4/16/92	8:35 a.m.	P. Niebergall	5.64' from TOP	635.96'	Rain: 0.05 inch
4/20/92	8:28 a.m.	J. McCleish	3' 9 3/8" from TOP	637.83'	1.11 inch last night Rain: 0.26 inch today
4/21/92	10:30 a.m.	J. McCleish	3' 10 9/8" from TOP	637.73	
4/22/92	2:11 p.m.	J. McCleish	4' 2 3/8" from TOP	637.40	

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

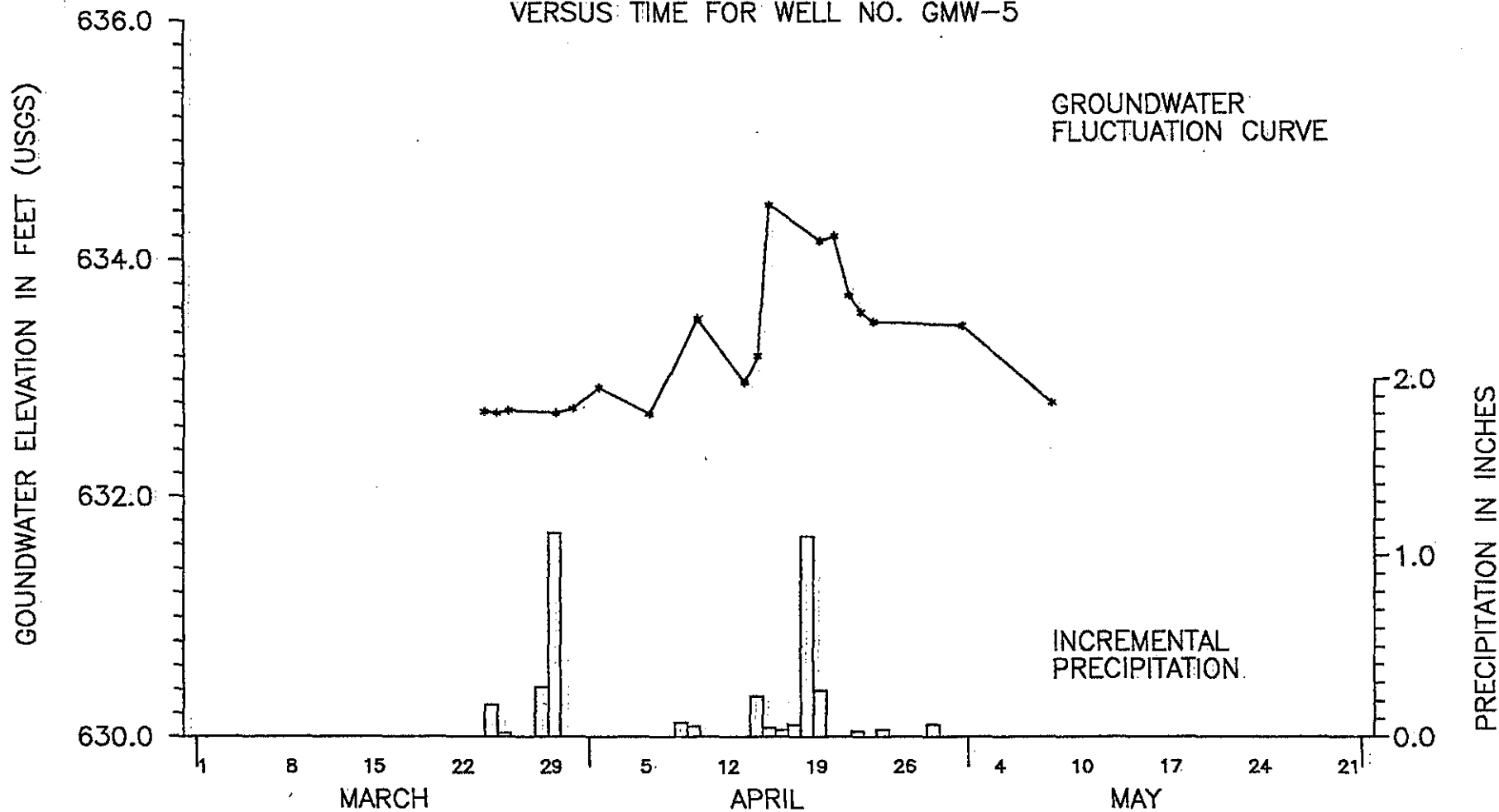
Project Name EGGKTA	Project No. 91-319-4-003	Hole No. GMW-4
Location N 48.2 EW 370.4		Elev. Ground Surface (G.S.)
Date Started Drilling Hole NA Time		Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 641.60'
Date Completed Drilling Hole NA Time		Total Depth of Hole NA Drilling Type
Date Piezometer Installed NA Time		Total Depth of Piezometer Footage Slotted

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
4/23/92	2:06 pm	J. McCleish	4' 6 5/8" from TOP	637.05'	
5/1/92	1:46 pm	J. McCleish	5' 8 2/8" from TOP	635.91'	
5/8/92	3:12 pm	J. McCleish	6' 2 1/8" from TOP	635.42'	
4/24/92		J. McCleish	4' 9 5/8" from TOP	636.80'	
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*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-5



Observed Water Level Readings

Project Name EGGKTA		Project No. 91-319-4-003		Hole No. GMW-5	
Location				Elev. Ground Surface (G.S.)	
N 279.8		E/W 284.8		Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 646.29'	
Date Started Drilling Hole NA		Time		Total Depth of Hole NA	
Date Completed Drilling Hole NA		Time		Footage Slotted	
Date Piezometer Installed NA		Time		14.77' (TOP)	

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/24/92	5:00 pm	S. Slatery	13.57 from T.O.P.	632.72'	WELL DEPTH = 14.77' / OVM = 72 ppm
3/25/92	4:43 p.m.	S. Slatery	13.58 from TOP	632.71'	RAINED LAST NIGHT & TODAY
3/26/92	2:30 p.m.	S. Slatery	13.56 from TOP	632.73'	
3/30/92	9:35 AM	S. Slatery	13.58 from T.O.P.	632.71'	RAINED LAST NIGHT
3/31/92	5:15 PM	S. Slatery	13.54 from T.O.P.	632.75'	
4/2/92	6:50 pm	P. Clark	13.36' from TOP	632.93'	Developed Gms-15
4/6/92	5:42 pm	P. Niebergall	13.59' from TOP	632.70'	Drill Gms-16 Rain: 0.02 inch
4/10/92	2:55 pm	P. Niebergall	12.78' from TOP	633.51'	Drill Gms-18 Rain: 0.06 inch
4/14/92	8:13 am	P. Niebergall	13.32' from TOP	632.97'	Develop Gms 17 & 18 Pump Test at Gms-17
4/15/92	8:30 am	J. McCleish	13.09' from TOP	633.20'	Rain: 0.23 inch
4/16/92	6:58 am	P. Niebergall	11.84' from TOP	634.45'	Pump test Gms-18 Rain 0.05 inch
4/20/92	7:30 am	J. McCleish	12' 15/8" from TOP	634.15'	Rain: 1.11 inch last night, 0.22 inch today
4/21/92	10:00 am	J. McCleish	12' 12/8" from TOP	634.19'	
4/22/92	1:46 pm	J. McClash	12' 7 1/8" from TOP	633.70'	
4/23/92	1:43 pm	J. McCleish	12' 8 6/8" from TOP	633.56'	
4/24/92	1:30 pm	J. McCleish	12' 9 6/8" from TOP	633.48'	

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

Project Name: EGGRTA		Project No. 91-319-4-003		Hole No. GMW-5	
Location			Elev. Ground Surface (G.S.)		
N 279.8		EW 284.8	Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 646.29		
Date Started Drilling Hole		Time	Total Depth of Hole		Drilling Type
Date Completed Drilling Hole		Time	Total Depth of Piezometer		Footage Slotted
Date Piezometer Installed		Time	NA		14.77' (TOP)

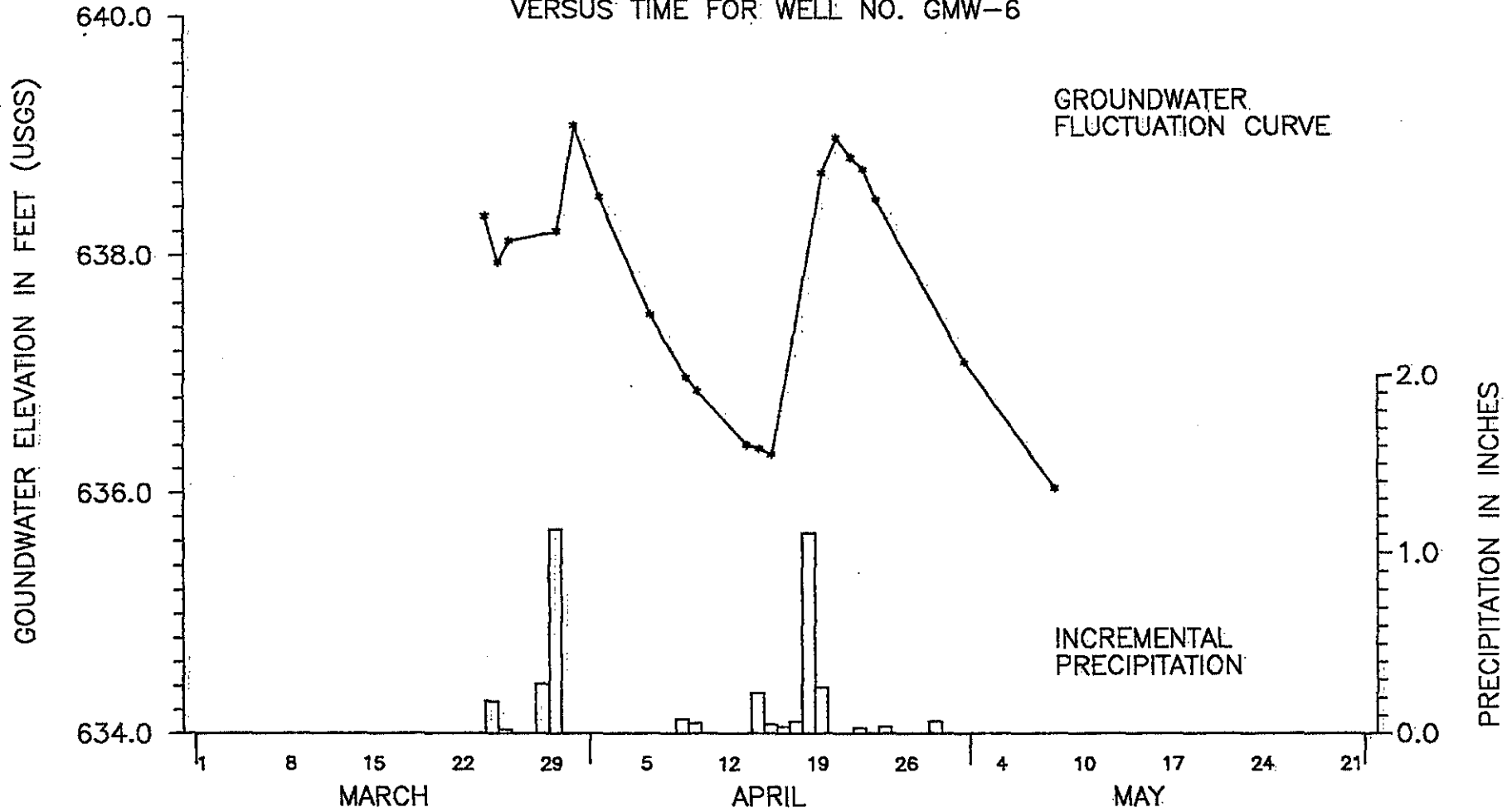
Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
5/1/92	1:23pm	J. McCleish	12'10 ¹ / ₈ " from TOP	633.45'	
5/8/92	2:46pm	J. McCleish	13'5 ⁷ / ₈ " from TOP	632.80'	
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*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

US EPA ARCHIVE DOCUMENT

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-6



Observed Water Level Readings

Project Name <u>EGG KTA</u>		Project No. <u>91-319-4-003</u>		Hole No. <u>GMW-6</u>	
Location			Elev. Ground Surface (G.S.)		
N <u>262.9</u> Ew <u>225.9</u>			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) <u>642.60</u>		
Date Started Drilling Hole <u>NA</u>		Time		Total Depth of Hole	
Date Completed Drilling Hole <u>NA</u>		Time		Drilling Type	
Date Piezometer Installed <u>NA</u>		Time		Total Depth of Piezometer <u>14.57' (T.O.P.)</u>	
				Footage Slotted	

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/24/92	5:20 p.m.	S. Slatery	4.28 from T.O.P.	638.32'	Depth 14.57 from / OUM = 237 ppm
3/25/92	5:25 p.m.	S. Slatery	4.66 from TOP	637.94'	RAINED LAST NIGHT & TODAY
3/26/92	2:40 p.m.	S. Slatery	4.48 from T.O.P.	638.12'	
3/30/92	9:15 AM	S. Slatery	4.40 from T.O.P.	638.20'	RAINED LAST NIGHT: 1.13 inches
3/31/92	5:35 PM	S. Slatery	3.52 from T.O.P.	639.08'	
4/2/92	5:55 p	P. Clark	4.12' from TOP	638.48'	Develop GMW-15
4/6/92	6:06 p	P. Niebergall	5.09' from TOP	637.51'	D:ll GMW-16
4/9/92	1:58 p	J. McCleish	5.62' from TOP	636.98'	D:ll GMW-17, Pump test GMW-16 Rain: 0.08 inch
4/10/92	11:29 a	P. Niebergall	5.73' from TOP	636.87'	D:ll GMW-18 Rain: 0.06 inch
4/14/92	8:18 a	P. Niebergall	6.19' from TOP	636.41'	Develop GMW-17 & 18 Pump test GMW-17
4/15/92	8:32 a	J. McCleish	6.22' from TOP	636.38'	Rain 0.23 inch
4/16/92	8:23 a	P. Niebergall	6.27' from TOP	636.33'	Pump test GMW-18 Rain 0.05 inch
4/20/92	7:50 am	J. McCleish	3' 11" from TOP	638.68'	Rain 0.26 inch today, 1.11 inch yesterday
4/21/92	10:02 am	J. McCleish	3' 7 1/8" from TOP	638.98'	
4/22/92	1:55 pm	J. McCleish	3' 9 1/8" from TOP	638.81'	
4/23/92	1:49 pm	J. McCleish	3' 10 5/8" from TOP	638.71'	

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

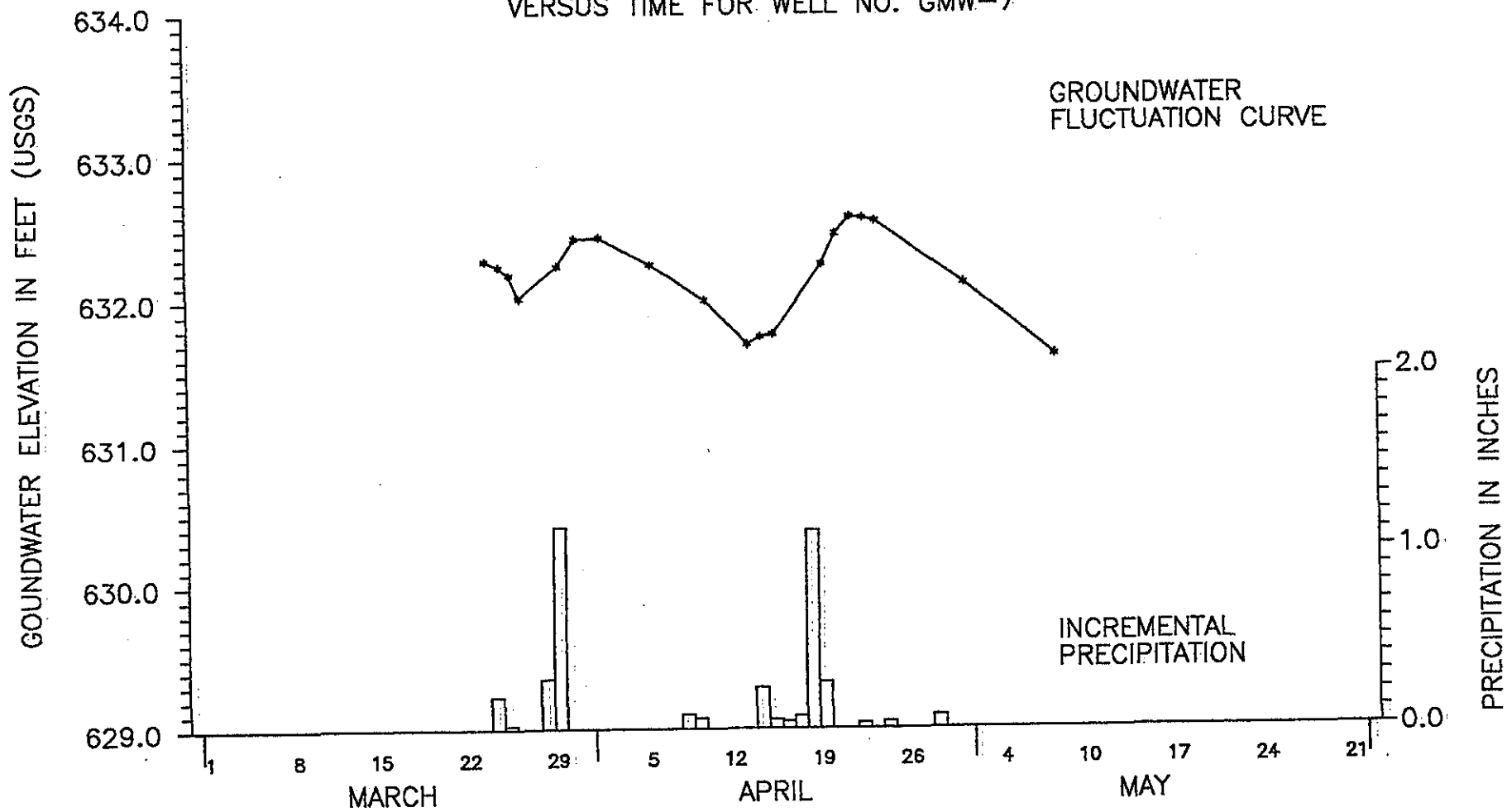
Project Name <u>EGG-KTA</u>		Project No. <u>91-319-4-003</u>		Hole No. <u>GMW-6</u>	
Location			Elev. Ground Surface (G.S.)		
N <u>262.9</u> EW <u>225.9</u>			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) <u>642.60</u>		
Date Started Drilling Hole <u>NA</u>		Time		Total Depth of Hole	
Date Completed Drilling Hole <u>NA</u>		Time		Drilling Type	
Date Piezometer Installed <u>NA</u>		Time		Total Depth of Piezometer	
				Footage Slotted	

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
<u>4/24/92</u>	<u>1:36pm</u>	<u>J. McCleish</u>	<u>4' 1 1/8" from TOP</u>	<u>638.46'</u>	
<u>5/1/92</u>	<u>1:30pm</u>	<u>J. McCleish</u>	<u>5' 5 7/8" from TOP</u>	<u>637.11'</u>	
<u>5/8/92</u>	<u>2:50pm</u>	<u>J. McCleish</u>	<u>6' 6 1/8" from TOP</u>	<u>636.04'</u>	
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			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-7



Observed Water Level Readings

Project Name <u>EGGKTA</u>		Project No. <u>91-319-4-003</u>		Hole No. <u>GMW-7 (Seven)</u>	
Location N <u>126.5</u> E/W <u>197.4</u>			Elev. Ground Surface (G.S.)		
			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) <u>638.80'</u>		
Date Started Drilling Hole <u>NA</u> Time		Total Depth of Hole <u>NA</u>		Drilling Type	
Date Completed Drilling Hole <u>NA</u> Time		Total Depth of Piezometer <u>13.20 TOP</u>		Footage Slotted	
Date Piezometer Installed <u>NA</u> Time					

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/24/92	3:55 p.m.	S. Slattery	6.52' from T.O.P.	632.28'	Depth = 13.20' from T.O.P. / OVM = 12 ppm
3/25/92	5:44 p.m.	S. Slattery	6.56' from TOP	632.24'	Rained last night
3/26/92	1:40 p.m.	S. Slattery	6.62' from T.O.P.	632.18'	
3/27/92	7:35 a.m.	S. Slattery	6.78' from T.O.P.	632.02'	PRIOR TO PACKER TEST SB.
3/27/92	11:36 a.m.	S. Slattery	6.79' from T.O.P.	632.61'	95 min. into PACKER TEST
3/30/92	9:05 AM	S. Slattery	6.56' from TOP	632.24'	RAINED LAST NIGHT = 1.13 inch
3/31/92	5:40 PM	S. Slattery	6.37' from T.O.P.	632.43'	Developed GW-1, GW-2, GW-3, GW-8, GW-14
4/2/92	5:05 p.	P. Clark	6.36' from TOP	632.44'	Pump test GW-8, Develop GW-15
4/6/92	5:54 p.m.	P. Niebergall	6.55' from TOP	632.25'	Drill GW-16
4/10/92	12:12 p.m.	P. Niebergall	6.80' from TOP	632.00'	Drill GW-18 Rain = 0.06 inch
4/14/92	8:25 a.m.	P. Niebergall	7.11' from TOP	631.69'	Develop GWs-17 & 18 Pump test GW-17
4/15/92	8:42 a.m.	J. McCleish	7.06' from TOP	631.74'	Rain: 0.23 inch
4/16/92	8:26 a.m.	P. Niebergall	7.04' from TOP	631.76'	Pump test GW-18 Rain: 0.05 inch
4/20/92	8:00 a.m.	J. McCleish	6' 6 5/8" from TOP	632.25'	Rain: Last night 1.11 inch Today 0.26 inch
4/21/92	10:15 a.m.	J. McCleish	6' 4 1/8" from TOP	632.46'	
4/22/92	2:00 p.m.	J. McCleish	6' 2 5/8" from TOP	632.58'	

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

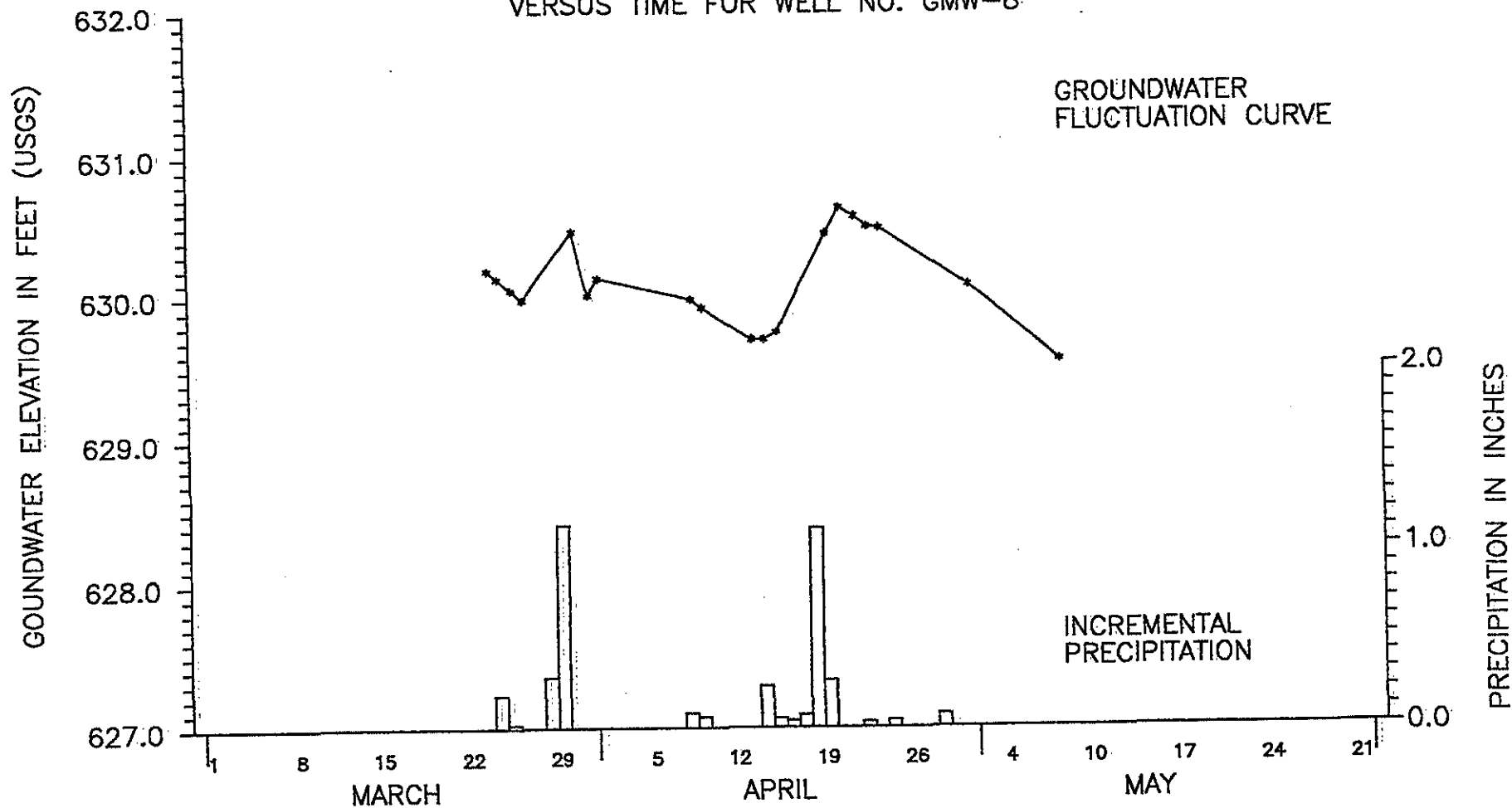
Project Name EGGKTA		Project No. 91-319-4-003		Hole No. GMW-7	
Location N 126.5 EW 197.4			Elev. Ground Surface (G.S.)		
			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 638.80'		
Date Started Drilling Hole		Time		Total Depth of Hole	
NA				NA	
Date Completed Drilling Hole		Time		Total Depth of Piezometer	
NA				13.02 TOP	
Date Piezometer Installed		Time		Footage Slotted	
NA					

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
4/23/92	1:54pm	J. McCleish	6' 2 6/8" from TOP	632.57'	
4/24/92	1:40pm	J. McCleish	6' 3" from TOP	632.55'	
5/1/92	1:32pm	J. McCleish	6' 8 2/8" from TOP	632.11'	
5/8/92	3:02pm	J. McCleish	7' 2 2/8" from TOP	631.61'	
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*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-8.



Observed Water Level Readings

Project Name EGGKTA		Project No. 91-319-4003		Hole No. GMW-8	
Location			Elev. Ground Surface (G.S.)		
N 42.0 RW 128.9			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 635.93'		
Date Started Drilling Hole		Time		Total Depth of Hole	
NA				NA	
Date Completed Drilling Hole		Time		Footage Slotted	
NA					
Date Piezometer Installed		Time		Total Depth of Piezometer	
NA				14.50. TOP	

Remarks:

Date	Time	By Whom	Depth'to Water*	W.L. Elev.	Remarks
3/24/92	3:20 p.m.	S. Slattery	5.74' from T.O.P	630.19'	DEPTH OF WELL = 14.50' from T.O.P.
3/25/92	5:57 p.m.	S. Slattery	from TOP		
3/25/92	10:00 AM	S. Slattery	5.80 from T.O.P	630.13'	PRIOR to bail test.
			from		Abandoned GMW-2, Drill SB-1
3/25/92	5:57 p.m.	S. Slattery	6.48' from TOP	629.45'	
3/26/92	10:40 a.m.	S. Slattery	5.88 from T.O.P.	630.05'	Drill SB-2
3/27/92	7:56 a.m.	S. Slattery	5.95' from TOP	629.98'	PRIOR to PACKER TEST
3/27/92	10:30 a.m.	P. Clark	5.98' from TOP	629.95'	29 min. into PACKER TEST
3/27/92	11:25 a.m.	S. Slattery	5.95 from TOP	629.98'	84 min. into Packer test.
3/29/92	8:06 a.	S. Slattery	5.47 from TOP	630.46'	Develop GW-1, GW-2, GW-3, GMW-8, GMW-14
3/31/92	5:45 p.m.	S. Slattery	8.66 from T.O.P	627.27'	After Well Development
4/1/92	3:09 p	P. Niebergall	5.93' from TOP	630.00'	During Recovery Period from Pump Test at GMW-14
4/2/92	8:25 a.	P. Niebergall	5.80' from TOP	630.13'	Pump test GMW-8
4/1/92	11:56 a.	P. Niebergall	5.92' from TOP	630.01'	
4/9/92	2:35 p	J. McLeish	5.95' from TOP	629.98'	Drill GMW-17 Pump Test GMW-16 Rain: 0.08 in.
4/10/92	11:54 a.	P. Niebergall	6.01' from TOP	629.92'	Drill GMW-18 Rain: 0.06 in.

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

Project Name EGGKTA		Project No. 91-319-4-003		Hole No. GMW-8	
Location			Elev. Ground Surface (G.S.)		
N 42.0 EW 128.9			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 635.93'		
Date Started Drilling Hole		Time		Total Depth of Hole	
NA				NA	
Date Completed Drilling Hole		Time		Total Depth of Piezometer	
NA				14.50	
Date Piezometer Installed		Time		Footage Slotted	
NA					

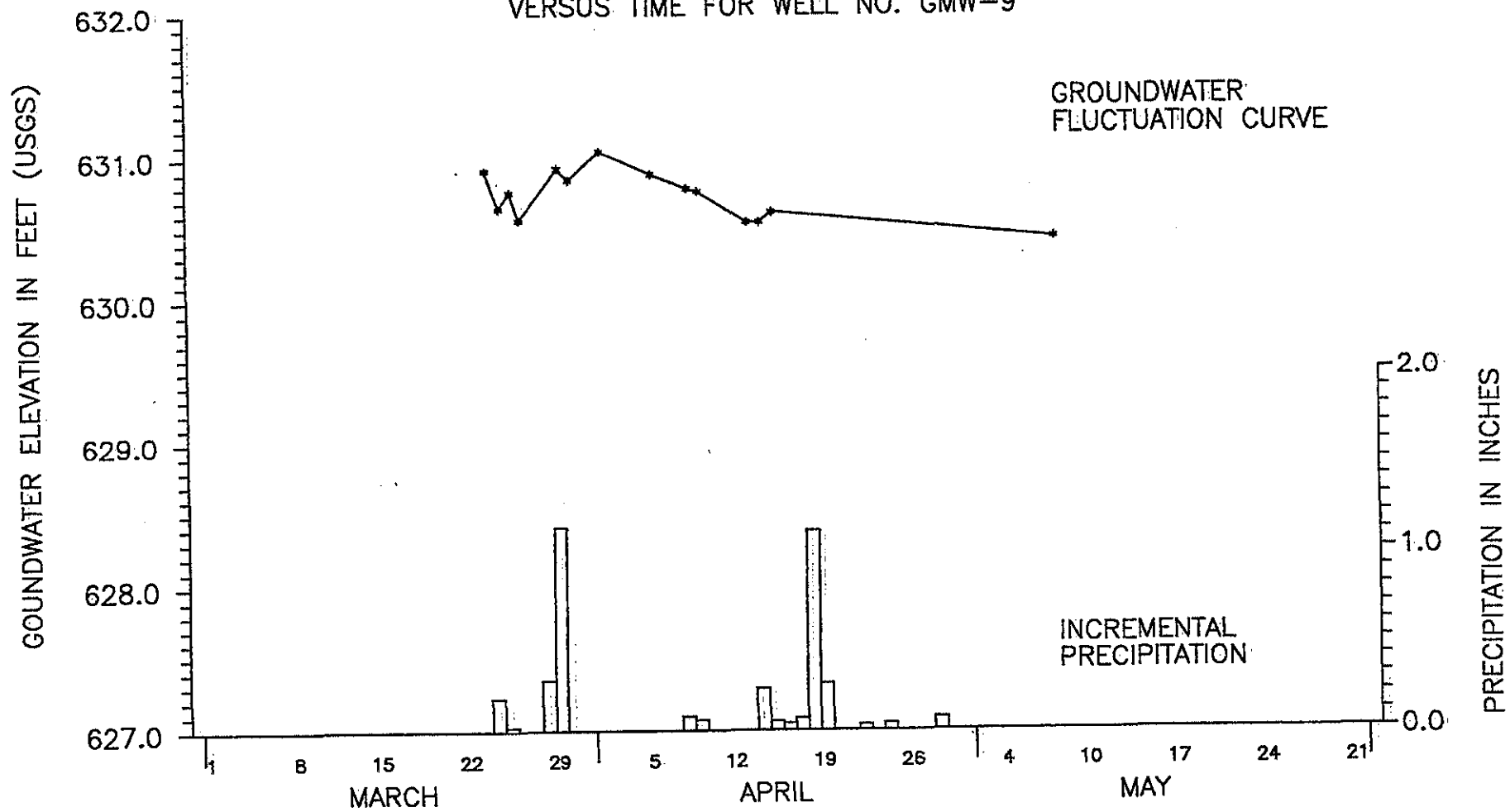
Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
4/14/92	8:31am	P. Niebergall	6.23' from TOP	629.70'	
4/15/92	8:47am	J. McCleish	6.23' from TOP	629.70'	Rain: 0.23 inch
4/16/92	8:31am	P. Niebergall	6.18' from TOP	629.75'	Rain: 0.05 inch
4/20/92	8:10 am	J. McCleish	5' 5 7/8" from TOP	630.44'	Rain: Today 0.26 inch, Yesterday 1.11 inch
4/21/92	10:23am	J. McCleish	5' 3 1/8" from TOP	630.62'	
4/22/92	2:10 pm	J. McCleish	5' 4 1/8" from TOP	630.56'	
4/23/92	2:00 pm	J. McCleish	5' 5 1/8" from TOP	630.49'	
4/24/92	1:46 pm	J. McCleish	5' 5 3/8" from TOP	630.48'	
5/1/92	1:39 pm	J. McCleish	5' 10 3/8" from TOP	630.07'	
5/8/92	3:05 pm	J. McCleish	6' 4 1/8" from TOP	629.55'	
			from		
			from		
			from		
			from		
			from		
			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

US EPA ARCHIVE DOCUMENT

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-9



Observed Water Level Readings

Project Name EGGKTA		Project No. 91-319-4-003		Hole No. GMW-9	
Location			Elev. Ground Surface (G.S.)		
N 90.6 fw 165.6			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 637.57'		
Date Started Drilling Hole NA Time		Total Depth of Hole NA		Drilling Type	
Date Completed Drilling Hole NA Time		Total Depth of Piezometer 20.20 TOP		Footage Slotted	
Date Piezometer Installed NA Time					

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/24/92	3:40 p.m.	S. Slattery	6.65' from T.O.P.	630.92'	Depth = 20.20' / OVM = 69 ppm From T.O.P.
3/25/92	5:50 p.m.	S. Slattery	6.92 from TOP	630.65'	NEAR New SB-1
3/26/92	1:50 p.m.	S. Slattery	6.80 from T.O.P.	630.77'	DRILL SB-2
3/27/92	7:40 a.m.	S. Slattery	7.00' from TOP	630.57'	PRIOR TO PACKER TEST SB-
3/27/92	10:24 a.m.	P. Clark	6.91' from TOP.	630.66'	23 minutes into Pack Test.
3/27/92	10:34 a.m.	P. Clark	6.84 from T.O.P.	630.73'	33 min. into Pack. Test
3/27/92	10:50 a.m.	S. Slattery	6.78' from T.O.P.	630.79'	50 min. into Pack Test
3/27/92	11:20 a.m.	S. Slattery	6.64 from T.O.P.	630.93'	79 min. into Packer Test
3/27/92	11:57 a.m.	S. Slattery	6.58 from T.O.P.	630.99'	116 min. into Packer Test.
3/30/92	9:00 AM	S. Slattery	6.64 from T.O.P.	630.93'	RAINED LAST NIGHT
3/31/92	5:40 AM	S. Slattery	6.72 from T.O.P.	630.85'	Develop OW-1, OW-2, OW-3, GMW-8, GMW-14
4/2/92	5:12 p.	P. Clark	6.52' from TOP	631.05'	Pump test GMW-8, Develop GMW-15,
4/6/92	6:10 p.m.	P. Niebergall	6.68' from TOP	630.89'	Drill GMW-16
4/9/92	2:45 p.	J. McCleish	6.78' from TOP	630.79'	Pump Test GMW-16 Rain: 0.02 inch
4/10/92	11:49 a.	P. Niebergall	6.80' from TOP	630.77'	Drill GMW-18 Rain 0.06 inch
4/14/92	8:28 a.	P. Niebergall	7.02' from TOP	630.55'	Develop GMW-17 & 18 Pump test GMW-17

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

Project Name EGGKTA		Project No. 91-319-4-003		Hole No. 6MW-9
Location N 90.6 EW 165.6			Elev. Ground Surface (G.S.)	
			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 637.57'	
Date Started Drilling Hole NA Time		Total Depth of Hole NA		Drilling Type
Date Completed Drilling Hole NA Time		Total Depth of Piezometer 20.2' TBP		Footage Slotted
Date Piezometer Installed NA Time				

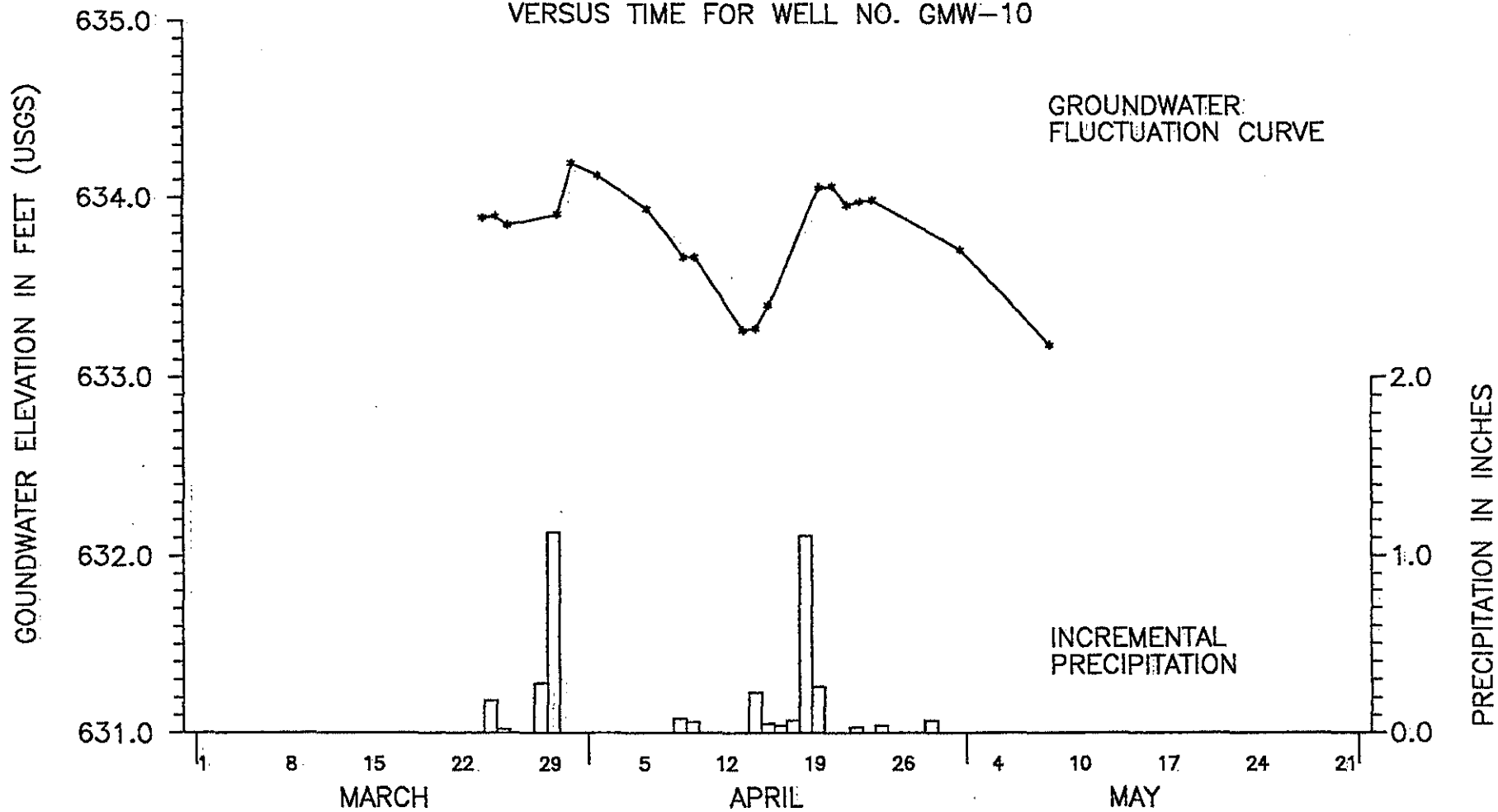
Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
4/15/92	8:57a	J. McCleish	7.02' from TOP	630.55'	Rain 0.23 inch
4/16/92	8:27a	P. Niebergall	6.95' from TOP	630.62'	Pump test 6MW-12 Rain 0.05 inch
5/8/92	3:05pm	J. McCleish	7' 1 1/2" from TOP	630.44'	
			from		
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			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

US EPA ARCHIVE DOCUMENT

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-10



Observed Water Level Readings

Project Name EGGKTA		Project No. 91-319-4-003		Hole No. GMW-10	
Location				Elev. Ground Surface (G.S.)	
N 152.6 EW 200.0				Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 643.06'	
Date Started Drilling Hole		Time		Total Depth of Hole	
Date Completed Drilling Hole		Time		Drilling Type	
Date Piezometer Installed		Time		Footage Slotted	
				NA	
				15.87 TOP	

Remarks: **INSIDE EAST BUILDING**

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/24/92	4:40 p.m.	S. Slattery	9.17' from T.O.P.	633.89'	Depth=15.87 from T.O.P./OVM=7 p.p.m.
3/25/92	5:05 p.m.	S. Slattery	9.16' from TOP	633.90'	RAINED LAST NIGHT & Today
3/26/92	4:40 p.m.	P. Clark	9.21 from TOP	633.85'	
3/30/92	4:4 3:30 PM	S. SLATTERY	9.15' from T.O.P.	633.91'	RAINED LAST Night: 1.13 inch
3/31/92	5:28 PM	S. Slattery	8.86 from T.O.P.	634.20'	
4/2/92	6:30 p.	P. Clark	8.93' from TOP	634.13'	Developed GMW-15
4/6/92	5:45 p.m.	P. Niebergall	9.12' from TOP	633.94'	Drilled GMW-16
4/9/92	2:09 p.	J. McCleish	9.39' from TOP	633.67'	Drill GMW-17 Rain: 0.08 inch
4/10/92	11:43 a.	P. Niebergall	9.39' from TOP	633.67'	Drill GMW-18 Rain: 0.06 inch
4/14/92	8:24 a.	P. Niebergall	9.80' from TOP	633.26'	Develop GMW 17-18, Pump test GMW-17
4/15/92	8:39 a.	J. McCleish	9.79' from TOP	633.27'	Rain 0.23 inch.
4/16/92	8:19 a.	P. Niebergall	9.66' from TOP	633.40'	Pump test GMW-18 Rain 0.05 inch
4/20/92	8:35 a.	J. McCleish	9'0" from TOP	634.06'	Rain: LAST NIGHT 1.11 inch, Today 0.26 inch
4/21/92	10:08 a.	J. McCleish	8' 11 7/8" from TOP	634.07'	
4/22/92	2:22 p.m.	J. McCleish	9' 1 2/8" from TOP	633.96'	
4/23/92	2:13 p.m.	J. McCleish	9' 1" from TOP	633.98'	

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

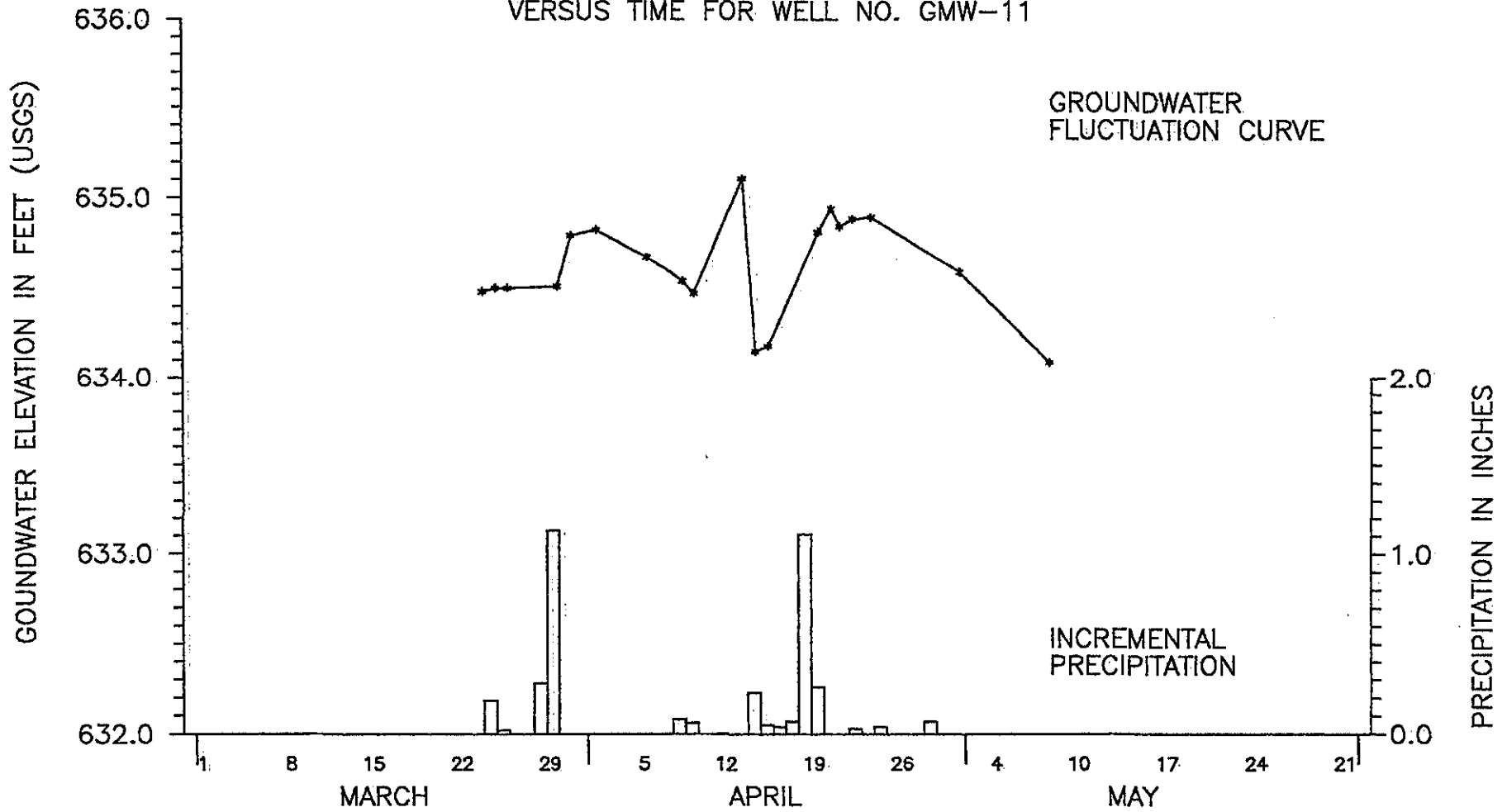
Project Name <u>EGGRTA</u>		Project No. <u>91-319-4-003</u>		Hole No. <u>GMN-10</u>	
Location			Elev. Ground Surface (G.S.)		
N <u>152.6</u>		FW <u>200.0</u>		Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) <u>643.06'</u>	
Date Started Drilling Hole		Time		Total Depth of Hole	
<u>NA</u>		<u>NA</u>		<u>NA</u>	
Date Completed Drilling Hole		Time		Footage Slotted	
<u>NA</u>		<u>NA</u>			
Date Piezometer Installed		Time		Total Depth of Piezometer	
<u>NA</u>		<u>NA</u>		<u>15.87 TOP</u>	

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
<u>4/24/92</u>	<u>1:53pm</u>	<u>J. McCleish</u>	<u>9' 7/8" from TOP</u>	<u>633.99'</u>	
<u>5/1/92</u>	<u>1:52pm</u>	<u>J. McCleish</u>	<u>9' 4 2/8" from TOP</u>	<u>633.71'</u>	
<u>5/8/92</u>	<u>3:20pm</u>	<u>J. McCleish</u>	<u>9' 10 4/8" from TOP</u>	<u>633.18'</u>	
			from		
			from		
			from		
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			from		
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			from		
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			from		
			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-11



Observed Water Level Readings

Project Name EGG KTA		Project No. 91-319-4-003		Hole No. GMW-11	
Location			Elev. Ground Surface (G.S.)		
N 203.1 E/W 196.6			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 643.15'		
Date Started Drilling Hole NA Time		Total Depth of Hole NA		Drilling Type	
Date Completed Drilling Hole NA Time		Total Depth of Piezometer 15.80 TOP		Footage Slotted	
Date Piezometer Installed NA Time					

Remarks: **INSIDE EAST BUILDING.**

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/24/92	4:45 pm	S. Slattery	8.67' from T.O.P.	634.48'	15.80' FROM T.O.P / AIM=8 ppm
3/25/92	5:10 pm	S. Slattery	8.65' from TOP	634.50'	Rained last night & today
3/26/92	4:43 pm	P. Clark	8.65' from T.O.P.	634.50'	
3/30/92	3:36 pm	S. Slattery	8.64' from T.O.P.	634.51'	RAINED last night. 1.13 inch
3/31/92	5:30 pm	S. Slattery	8.36' from TOP	634.79'	
4/2/92	6:10 pm	P. Clark	8.33' from TOP	634.82'	Developed GMW-15
4/6/92	5:46 pm	P. Niebergall	8.48' from TOP	634.67'	Drilled GMW-16
4/9/92	2:06 pm	J. McCleish	8.61' from TOP	634.54'	Drilled GMW-17 Pump test GMW-16 Rain: 0.08 in.
4/10/92	11:39 a	P. Niebergall	8.68' from TOP	634.47'	Drill GMW-18 Rain: 0.06 inch
4/14/92	8:21 a	P. Niebergall	8.04' from TOP	635.11'	Develop GMW-17 and GMW-18, Pump test GMW-17
4/15/92	8:36 a	J. McCleish	9.00' from TOP	634.15'	Rain: 0.23 inch
4/16/92	8:20 a	P. Niebergall	8.97' from TOP	634.18'	Pump test GMW-18 Rain: 0.05 inch
4/20/92	8:40 a	J. McCleish	8' 9 1/8" from TOP	634.81'	Rain: Last night 1.11 inch today 0.26 inch
4/21/92	10:10 a	J. McCleish	8' 2 1/8" from TOP	634.94'	
4/22/92	2:19 a	J. McCleish	8' 3 1/8" from TOP	634.84'	
4/23/92	2:09 a	J. McCleish	8' 3 1/8" from TOP	634.88'	

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

Project Name EGGKTA		Project No. 91-319-4-003		Hole No. GMW-11	
Location N 203.1 E/W 196.6			Elev. Ground Surface (G.S.)		
Date Started Drilling Hole NA Time			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 643.15'		
Date Completed Drilling Hole NA Time			Total Depth of Hole NA Drilling Type		
Date Piezometer Installed NA Time			Total Depth of Piezometer 15.81 TBP Footage Slotted		

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
4/24/92	1:55 pm	J. McCleish	8' 3 1/8" from TOP	634.89'	
5/1/92	1:50 pm	J. McCleish	8' 6 1/8" from TOP	634.59'	
5/8/92	3:25 pm	J. McCleish	9' 6 1/8" from TOP	634.09'	
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

US EPA ARCHIVE DOCUMENT

Observed Water Level Readings

Project Name EGG KTA		Project No. 91-319-4-003		Hole No. GMW-12	
Location CENTER OF ALLEYWAY BY GMW-6			Elev. Ground Surface (G.S.):		
N: _____ E: _____			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.):		
Date Started Drilling Hole 4/1/92		Time 3:09 PM		Total Depth of Hole 30'	
Date Completed Drilling Hole 4/1/92		Time 3:48 PM		Drilling Type HSA	
Date Piezometer Installed		Time		Total Depth of Piezometer Footage Slotted	

Remarks:
 - HAD TO CLEAN OUT BENT. PLATE IS BROKEN
 * No water indicated. Pulled out water level indicator and the tape was oily, appears to be a clear (somewhat) product. (3/24/92)
ABANDONED WELL

Date	Time	By Whom	Depth to Water* P.T.O.D.	W.L. Elev.	Remarks
3/24/92	5:45 pm.	S. Slattery	from		100m = 95
3/25/92	4:00 pm.	P. Clark	7.47' from TOP		Bailed 20 bailers ~ 5 gallons of product
3/26/92	2:25 p.m.	S. Slattery	8.46' from T.O.P		
3/30/92	9:25 AM	S. Slattery	8.3' from T.O.P		RAINED LAST NIGHT
4/01/92	12:46 p.	P. Niebergall	7'8" from TOP		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		

ABANDONED

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

Project Name EGGKTA		Project No. 91-319-4-003		Hole No. GMW-13	
Location SE CORNER OF SITE BY BACK GATE			Elev. Ground Surface (G.S.)		
N E			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.)		
Date Started Drilling Hole	3/24/92	Time	11:09A	Total Depth of Hole	Drilling Type
Date Completed Drilling Hole	3/24/92	Time	2:24P	50'	HSA
Date Piezometer Installed		Time		Total Depth of Piezometer	Footage Slotted

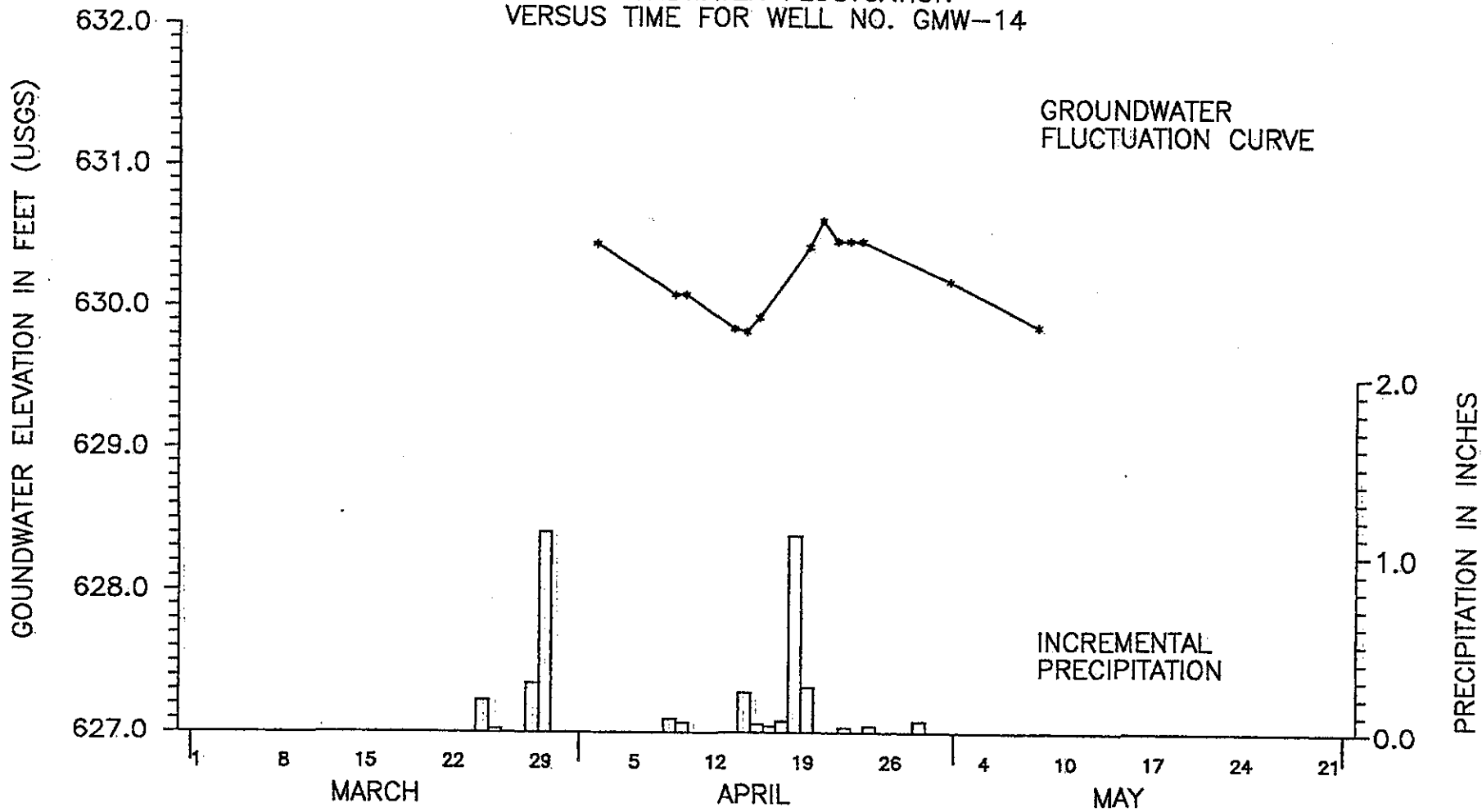
Remarks: **WELL WAS ABANDONED ON 3/24/92 @ 4:03 PM**
W/24 BAGS OF NEAT CEMENT PLACED IN BORING

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
<u>3/24/92</u>	<u>10:15am</u>	<u>P. Clark/S. Slattery</u>	<u>7.05' from TOP</u>	<u>628.19</u>	<u>Prior to Well Abandonment</u>
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		

ABANDONED

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-14



Observed Water Level Readings

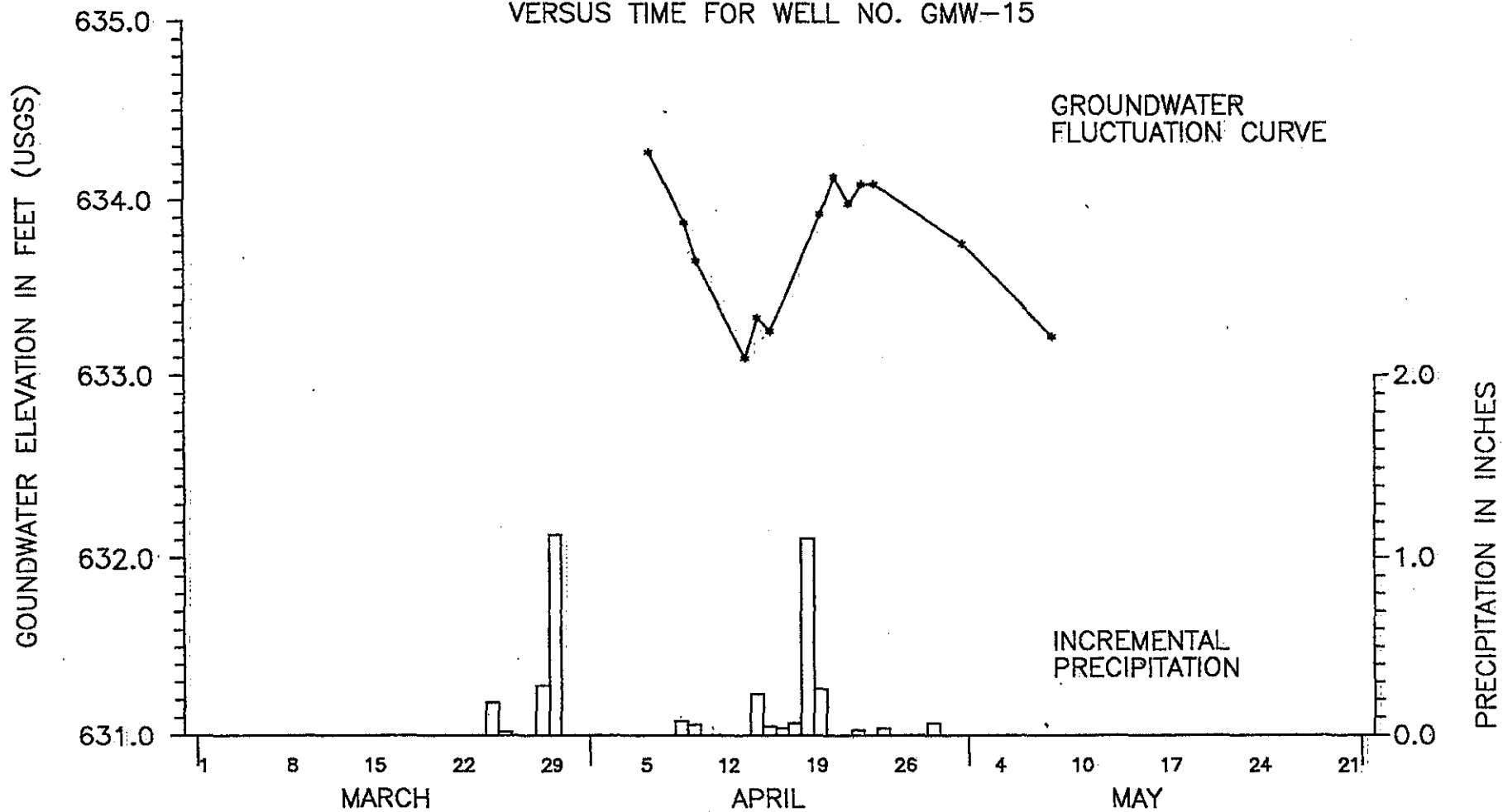
Project Name EGGKTA		Project No. 91-319-4-003		Hole No. GMW-14	
Location 5' WEST OF OW-2 + ≈ 15' NORTH OF OW-1			Elev. Ground Surface (G.S.) 636.77'		
N 53.1 RW 134.9			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 636.51'		
Date Started Drilling Hole 3/27/92		Time 2:53 P		Total Depth of Hole 25.0'	
Date Completed Drilling Hole 3/27/92		Time 4:15 P		Drilling Type Hollow Stem Auger	
Date Piezometer Installed 3/30/92		Time 9:09 A		Total Depth of Piezometer 23'	
				Footage Slotted 4' 5 1/2"	

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
4/01/92	3:20p	P. Niebergall	6.71' from TOP	629.80'	During Recovery Period from Pump Test at GMW-14
4/02/92	8:26a	P. Niebergall	11.40' from TOP	625.11'	
4/02/92	4:05p	P. Clark	6.18' from TOP	630.33'	After Pump Test on 4/2/92
4/03/92	7:48a	P. Niebergall	6.06' from TOP	630.45'	Pump test GMW-13, Developed GMW-15
4/06/92	6:00p	P. Niebergall	8.82' from TOP	627.69'	Drilled GMW-16
4/09/92	2:18p	J. McCleish	6.42' from TOP	630.09'	Pump test GMW-16 Rain: 0.08 in.
4/10/92	11:59a	P. Niebergall	6.42' from TOP	630.09'	Rain: 0.06 in.
4/14/92	8:29a	P. Niebergall	6.66' from TOP	629.85'	
4/15/92	8:45a	J. McCleish	6.68' from TOP	629.83'	Rain = 0.23 inch
4/16/92	8:29a	P. Niebergall	6.58' from TOP	629.93'	Rain: 0.05 inch
4/20/92	8:15a	J. McCleish	6' 1" from TOP	630.43'	Rain: 1.11 inch last night, 0.26 inch today.
4/21/92	10:20a	J. McCleish	5' 10 5/8" from TOP	630.62'	
4/22/92	2:06p	J. McCleish	6' 4 1/8" from TOP	630.47'	
4/23/92	1:57p	J. McCleish	6' 4 1/8" from TOP	630.47'	
4/24/92	1:45p	J. McCleish	6' 4 1/8" from TOP	630.47'	
5/1/92	1:37p	J. McCleish	6' 3 7/8" from TOP	630.19'	

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-15



Observed Water Level Readings

Project Name EGGKTA		Project No. 91-319-4-003		Hole No. GMW-15	
Location 0.5' EAST OF RETAINING WALL, ALIGNED W/ SOUTH WALL OF TANK SHEED		Elev. Ground Surface (G.S.) 642.68'			
N 250.4 E-W 230.5		Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 642.31'			
Date Started Drilling Hole 4/01/92	Time 9:51A	Total Depth of Hole 19.9'	Drilling Type Hollow Stem Auger		
Date Completed Drilling Hole 4/01/92	Time 11:35A	Total Depth of Piezometer 19.75'	Footage Slotted 4.46'		
Date Piezometer Installed 4/01/92	Time 1:55A				

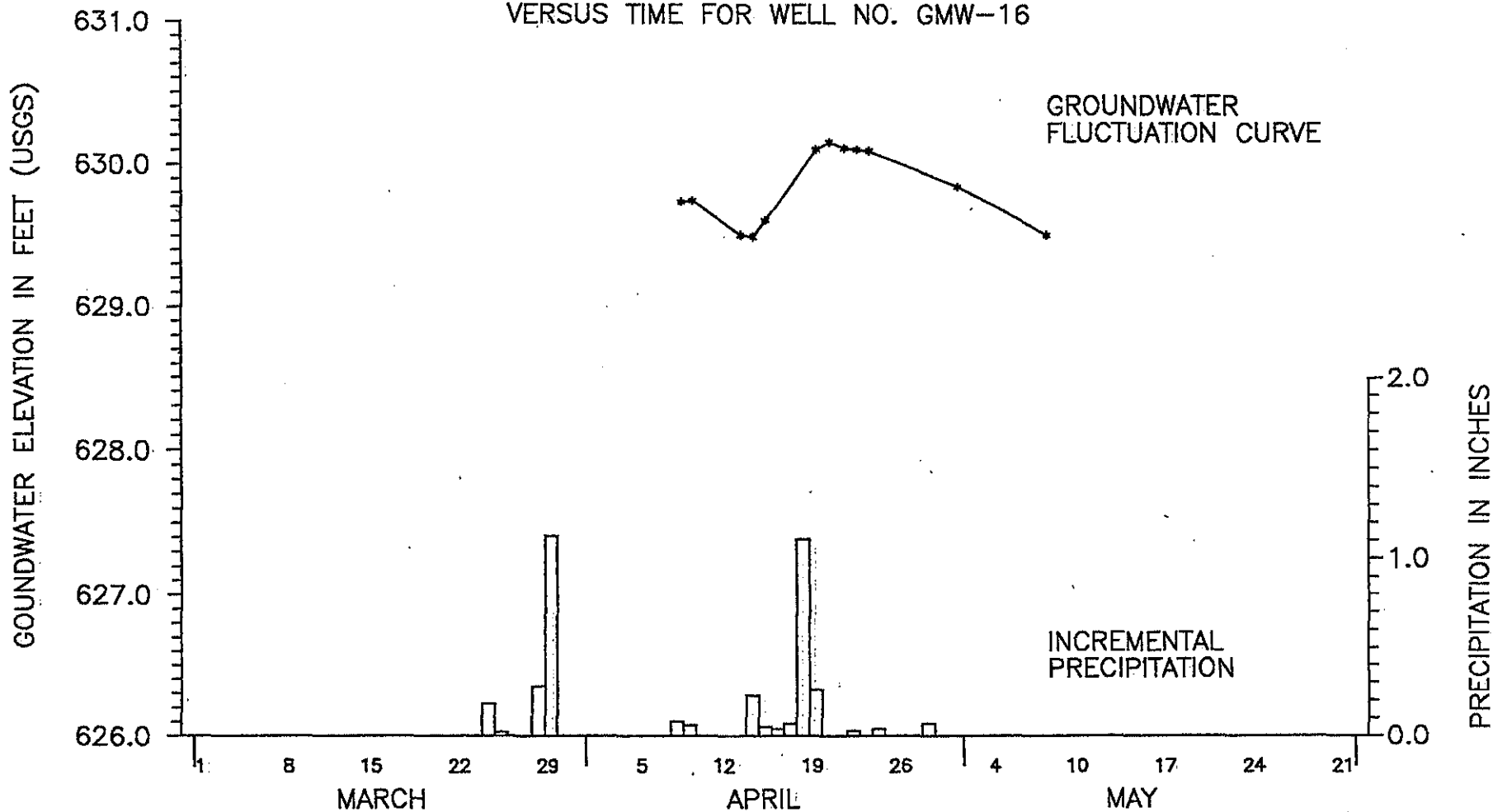
Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
4/2/92	5:40p	P. Niebergall	16.18' from TOP	626.13'	After Pump Test on 4/2/92
4/2/92	5:43p	P. Clark	16.18' from TOP	626.13'	After Pump Test on 4/2/92
4/6/92	5:52p	P. Niebergall	8.04' from TOP	634.27'	
4/9/92	2:02p	J. McCleish	8.44' from TOP	633.87'	Pump test GMW-16, Drill GMW-17 Rain 0.08 in
4/10/92	11:34a	P. Niebergall	8.66' from TOP	633.65'	Drill GMW-18 Rain = 0.06 inch
4/14/92	8:20a	P. Niebergall	9.21' from TOP	633.10'	Develop GMW-17 and 18 Pump test GMW-17
4/15/92	8:34a	J. McCleish	8.98' from TOP	633.33'	Rain 0.23 inch
4/16/92	8:25a	P. Niebergall	9.06' from TOP	633.25'	Pump test GMW-18 Rain 0.05 inch
4/20/92	8:05a	J. McCleish	8' 4 5/8" from TOP	633.92'	Rain 1.11 inch last night 0.26 inch today
4/21/92	10:03a	J. McCleish	8' 2 1/8" from TOP	634.13'	
4/22/92	1:58p	J. McCleish	8' 4" from TOP	633.98'	
4/23/92	1:51p	J. McCleish	8' 2 5/8" from TOP	634.09'	
4/24/92	1:38p	J. McCleish	8' 2 5/8" from TOP	634.09'	
5/1/92	1:31p	J. McCleish	8' 6 1/8" from TOP	633.75'	
5/8/92	3:00p	J. McCleish	9' 1 1/8" from TOP	633.22'	
			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

US EPA ARCHIVE DOCUMENT

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-16



Observed Water Level Readings

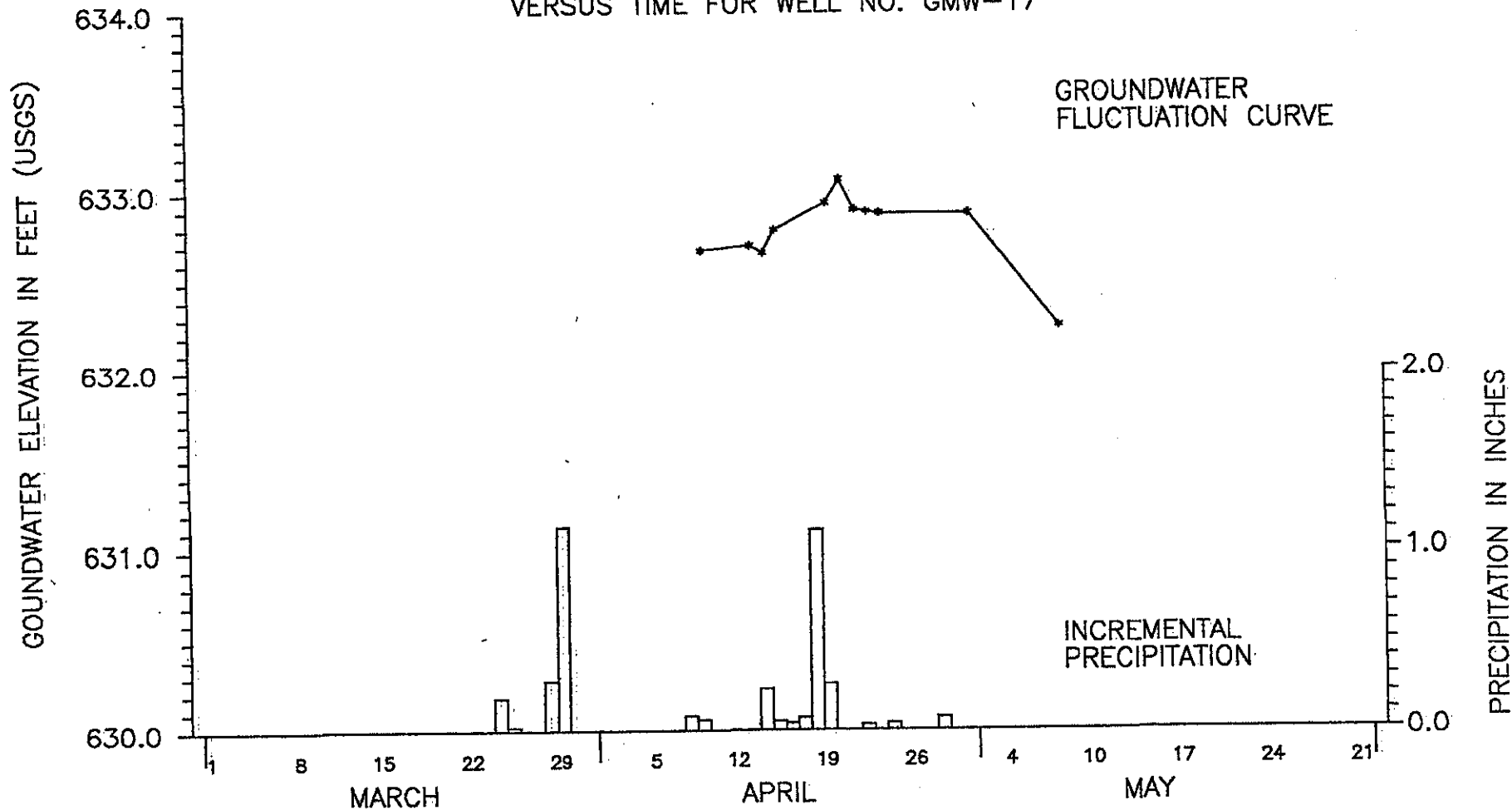
Project Name EGGKTA		Project No. 91-319-4-003		Hole No. GMW-16	
Location BETWEEN GMW-8 & GMW-14 ON STRAIGHT DIAGONAL LINE-SE PART OF SITE			Elev. Ground Surface (G.S.) 636.64'		
N 47.7 RW 131.0			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 636.31'		
Date Started Drilling Hole 4/6/92		Time 11:51 AM		Total Depth of Hole 39.0'	
Date Completed Drilling Hole 4/6/92		Time 4:58		Drilling Type Hollow Stem Auger	
Date Piezometer Installed 4/7/92		Time 3:30 PM		Total Depth of Piezometer 34.46'	
				Footage Slotted 4.98'	

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
4/08/92	12:00 noon	P. Niebergall	7.55' from TOP	628.76'	Drill GMW-17, Pump test GMW-16
4/09/92	2:20p	J. McCleish	6.57' from TOP	629.74'	Drill GMW-18 Rain: 0.08 inch
4/10/92	11:57a	P. Niebergall	6.56' from TOP	629.75'	Rain: 0.06 inch
4/14/92	8:30a	P. Niebergall	6.80' from TOP	629.51'	
4/15/92	8:46a	J. McCleish	6.81' from TOP	629.50'	Rain: 0.23 inch
4/16/92	8:30a	P. Niebergall	6.70' from TOP	629.61'	Rain: 0.05 inch
4/20/92	8:20a	J. McCleish	6' 2 3/8" from TOP	630.11'	Rain: 1.11 inch last night, 0.26 inch today
4/21/92	10:21a	J. McCleish	6' 1 6/8" from TOP	630.16'	
4/22/92	2:08p	J. McCleish	6' 2 2/8" from TOP	630.12'	
4/23/92	1:59p	J. McCleish	6' 2 3/8" from TOP	630.11'	
4/24/92	1:43p	J. McCleish	6' 2 4/8" from TOP	630.10'	
5/1/92	1:38p	J. McCleish	6' 5 4/8" from TOP	629.85'	
5/8/92	3:14p	J. McCleish	6' 9 5/8" from TOP	629.51'	
			from		
			from		
			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-17



Observed Water Level Readings

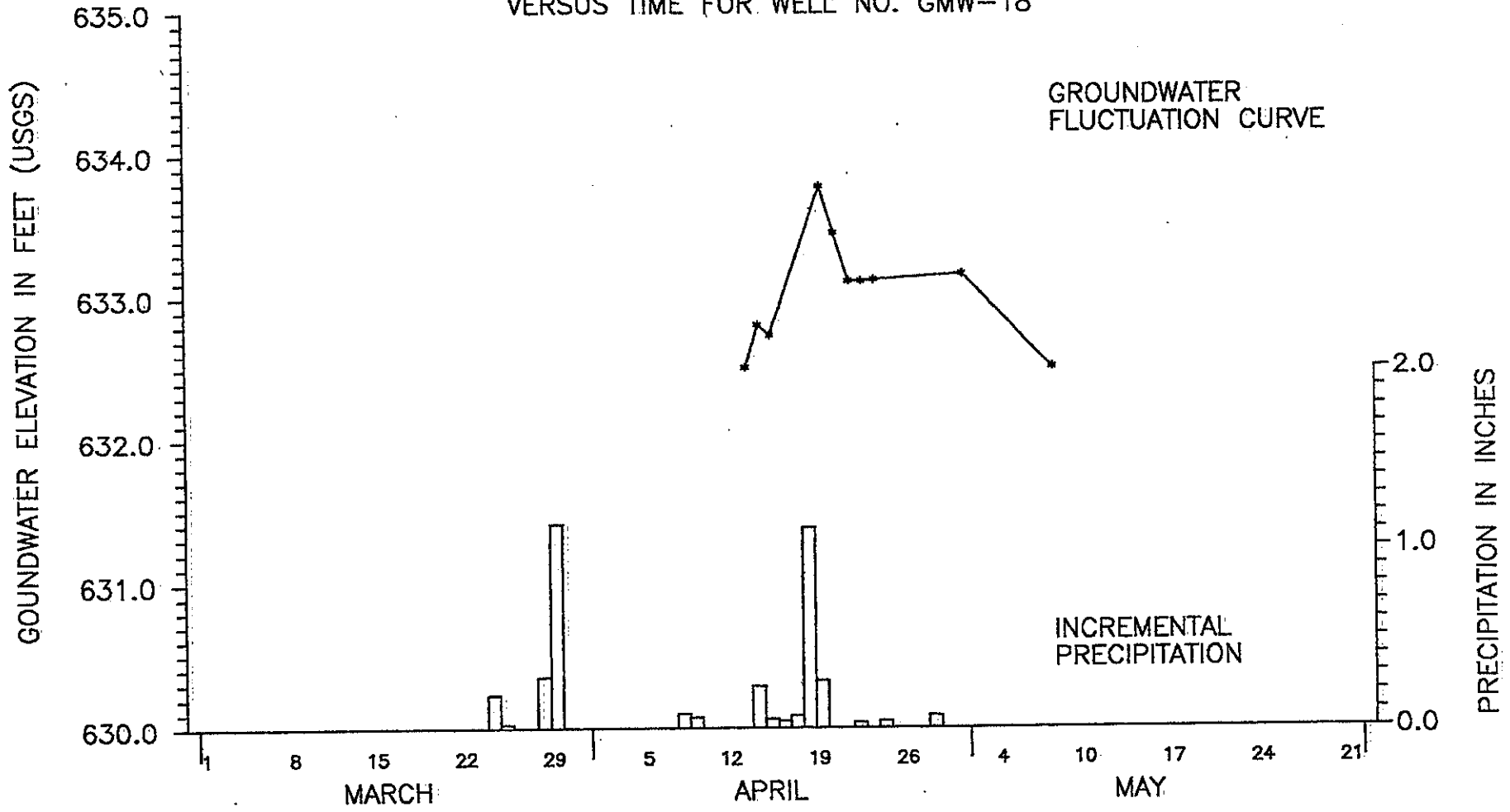
Project Name EGGKTA		Project No. 91-319-4-003		Hole No. GMW-17	
Location APPROX. 1.5' W OF SB-4 : 8' NW OF DEGREASER AREA DOOR			Elev. Ground Surface (G.S.) 646.58'		
N 274.4 E/W 283.2			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 646.29'		
Date Started Drilling Hole 4/17/92		Time 8:33 AM		Total Depth of Hole 50.4	
Date Completed Drilling Hole 4/18/92		Time 12:09 PM		Drilling Type Hollow Stem Auger	
Date Piezometer Installed 4/18/92		Time 2:40 PM		Total Depth of Piezometer 49.17'	
				Footage Slotted 10'	

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
4/10/92	11:23a	P. Niebergall	13.62' from TOP	632.67'	Drill GMW-13, Develop GMW-17 Rain: 0.06 inch
4/14/92	8:15a	P. Niebergall	13.59' from TOP	632.70'	Pump test GMW-17
4/15/92	8:26a	J. McCleish	13.63' from TOP	632.66'	Rain: 0.23 inch
4/16/92	6:57a	P. Niebergall	13.50' from TOP	632.79'	Pump test GMW-13 Rain: 0.06 inch
4/20/92	7:40a	J. McCleish	13' 4 2/8" from TOP	632.94'	Rain: 1.11 inch last night, 0.26 inch today
4/21/92	10:00a	J. McCleish	13' 2 5/8" from TOP	633.07'	
4/22/92	1:40p	J. McCleish	13' 4 5/8" from TOP	632.90'	
4/23/92	1:46p	J. McCleish	13' 4 6/8" from TOP	632.89'	
4/24/92	1:32p	J. McCleish	13' 4 7/8" from TOP	632.88'	
5/1/92	1:21p	J. McCleish	13' 4 7/8" from TOP	632.88'	
5/8/92	2:46p	J. McCleish	14' 4/8" from TOP	632.25'	
			from		
			from		
			from		
			from		
			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. GMW-18



Observed Water Level Readings

Project Name EGGKTA	Project No. 91-319-4-003	Hole No. GMW-18
Location ADJACENT TO GMW-17 (NW ≈ 5') N 279.7 E/W 290.4	Elev. Ground Surface (G.S.) 646.52	Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 646.17'
Date Started Drilling Hole 4/9/92 Time 12:25P	Total Depth of Hole 35.5'	Drilling Type Air - Rotary
Date Completed Drilling Hole 4/10/92 Time 9:00A	Total Depth of Piezometer 33'	Footage Slotted 10'
Date Piezometer Installed 4/10/92 Time 2:30P		

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
4/14/92	8:17a	P. Niebergall	13.66' from TOP	632.51'	Develop GMW-17 and GMW-18
4/15/92	9:28a	J. McCleish	13.36' from TOP	632.81'	Rain: 0.23 inch
4/16/92	6:55a	P. Niebergall	13.43' from TOP	632.74'	Pump test GMW-18 Rain: 0.06 inch
4/20/92	7:45a	J. McCleish	12' 4 5/8" from TOP	633.78'	Rain: 1.11 inch last night, 0.26 inch today
4/21/92	9:50a	J. McCleish	12' 8 5/8" from TOP	633.45'	
4/22/92	1:49p	J. McCleish	13' 5/8" from TOP	633.11'	
4/23/92	1:48p	J. McCleish	13' 5/8" from TOP	633.11'	
4/24/92	1:31p	J. McCleish	13' 5/8" from TOP	633.12'	
5/1/92	1:25p	J. McCleish	13' 11/8" from TOP	633.16'	
5/8/92	2:48p	J. McCleish	13' 7 7/8" from TOP	632.51'	
			from		
			from		
			from		
			from		
			from		
			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

US EPA ARCHIVE DOCUMENT

Observed Water Level Readings

Project Name EGGKTA		Project No. 91-319-4-003	Hole No. SB-1
Location SOUTH OF W/2 OF RCRA CONTAINMENT AREA - APPROX. 20 FEET		Elev. Ground Surface (G.S.)	
N 112.6	EW 187.1	Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 638.41 (Ground Surface)	
Date Started Drilling Hole 3/25/92	Time 12:45 P	Total Depth of Hole 34.65'	Drilling Type HSA
Date Completed Drilling Hole 3/25/92	Time 3:13 P	Total Depth of Piezometer	Footage Slotted
Date Piezometer Installed	Time		

Remarks: **3/30/92 - ABANDONED BORING BY GROUTING WITH TREMIE PIPE FROM T.D. TO GROUND SURFACE. NO PIEZOMETER INSTALLED JUST BORING.**

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/25/92	3:01 pm	S. Slattery	28.85 from TOP OF AUGER		TD = 34.29' + .36' = 34.65'
3/25/92	3:02	S. Slattery	27.82 from TOP OF AUGER		
3/25/92	3:03	S. Slattery	27.66 from "		
3/25/92	3:04	S. Slattery	27.42 from "		
3/25/92	3:05	S. Slattery	27.16 from "		
3/25/92	3:06	S. Slattery	26.85 from "		
3/26/92	11:05 a.m.	S. Slattery	7.90 from GROUND SURFACE		
			from		
			from		
			from		
			from		
			from		
			from		
			from		
			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

Project Name EGGKTA		Project No. 91-319-4-003		Hole No. DW-1	
Location			Elev. Ground Surface (G.S.)		
N 41.5 EW 133.6			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 635.72'		
Date Started Drilling Hole NA Time		Total Depth of Hole NA		Drilling Type	
Date Completed Drilling Hole NA Time		Total Depth of Piezometer 13.94 TOP		Footage Slotted	
Date Piezometer Installed NA Time					

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/27/92	9:35 a.m.	S. Slattery	5.82' from T.O.P.	629.90'	TD = 13.94' / OVM = 17ppm
3/31/92	8:00 am	S. Slattery	5.45 from TOP	630.27'	
3/31/92	10:05 AM	S. Slattery	14.05 from TOP	621.67'	After Bailed DRY
3/31/92	10:06 A	S. Slattery	13.92 from T.O.P.	621.80'	F.T. = 1 min / Recovery = .13'
3/31/92	10:07 A	S. Slattery	13.85 from T.O.P.	621.87'	= 2 min = .20'
3/31/92	10:08 A	S. Slattery	13.77 from T.O.P.	621.95'	= 3 min = .28'
3/31/92	10:09 A	S. Slattery	13.71 from T.O.P.	622.01'	= 4 min = .34'
3/31/92	10:14 A	S. Slattery	13.41 from T.O.P.	622.31'	= 9 min = .64'
4/1/92	9:50 a	Paul Niebergall	5.88' from TOP	629.84'	
4/1/92	3:10 p	Paul Niebergall	5.75' from TOP	629.97'	During Recovery Period from Pump Test at GMA-14
4/2/92	8:28 a	P. Niebergall	5.68' from TOP	630.04'	
4/1/92	11:00 a	P. Niebergall	5.78' from TOP	629.94'	After Probe was inserted in the well for Pump Test
4/9/92	2:22 p	J. McCleish	5.94' from TOP	629.78'	
5/1/92	1:42 p	J. McCleish	5' 9 5/8" from TOP	629.92'	
5/8/92	3:16 p	J. McCleish	6' 3 2/8" from TOP	629.45'	
			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

Project Name EGGKTA		Project No. 91-319-4-003		Hole No. OW-2	
Location			Elev. Ground Surface (G.S.)		
N 53.8 EW 129.1			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 636.25'		
Date Started Drilling Hole		Time	Total Depth of Hole		Drilling Type
NA			NA		
Date Completed Drilling Hole		Time	Total Depth of Piezometer		Footage Slotted
NA			14.56' TOP		
Date Piezometer Installed		Time			
NA					

Remarks:

Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/24/92	3:05 p.m.	S. Slattery	5.62' 5.65' from T.O.P.	630.63'	DEPTH = 14.56' FROM T.O.P. / OVM = 60 ppm
3/25/92	6:00 p.m.	S. Slattery	5.96' from TOP	630.29'	
3/26/92	10:50 a.m.	S. Slattery	5.76' from T.O.P.	630.49'	THERE WAS SOME OIL ON TOP OF SURF. PLATE. DRILL RIG WAS PARKED IN TO OW-1 LAST NIGHT.
			from		
			from		
3/27/92	7:52 a.m.	S. Slattery	5.94' from T.O.P.	630.31'	
3/31/92	8:07 a.m.	S. Slattery	5.43' from T.O.P.	630.82'	
4/1/92	9:55 a.	Paul Niebergall	5.86' from TOP	630.39'	
4/1/92	3:08 p.	Paul Niebergall	6.12' from TOP	630.13'	During Recovery Period from Pump Test at GMW-14
4/2/92	8:30 a.	P. Niebergall	5.79' from TOP	630.46'	
4/1/92	11:05 a.	P. Niebergall	5.78' from TOP	630.47'	After Probe was Inserted in the well for Pump Test
4/9/92	2:24 p.	J. McCluish	5.96' from TOP	630.29'	
5/1/92	1:43 p.	J. McCluish	5' 10 1/8" from T.O.P.	630.35'	
5/8/92	3:17 p.	J. McCluish	6' 4 2/8" from TOP	629.90'	
			from		
			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

Observed Water Level Readings

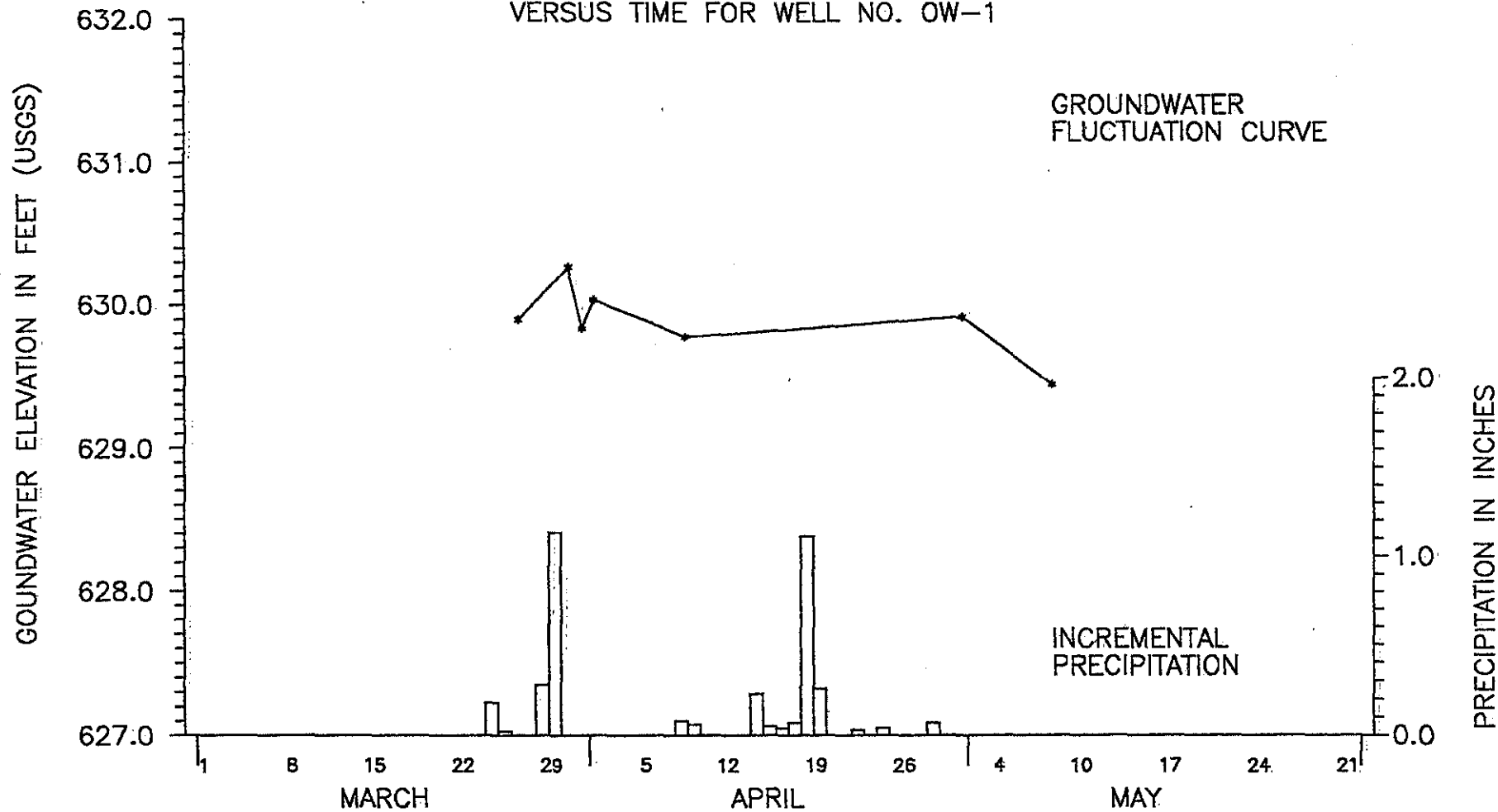
Project Name EGGKTA		Project No. 91-319-4-003		Hole No. OW-3	
Location			Elev. Ground Surface (G.S.)		
N 63.3 <i>EW</i> 128.2			Elev. Top at Pipe (T.O.P.) or Reference Point (R.P.) 636.57'		
Date Started Drilling Hole NA		Time		Total Depth of Hole NA	
Date Completed Drilling Hole NA		Time		Drilling Type	
Date Piezometer Installed NA		Time		Total Depth of Piezometer 14.40' TOP	
				Footage Slotted	

Remarks:

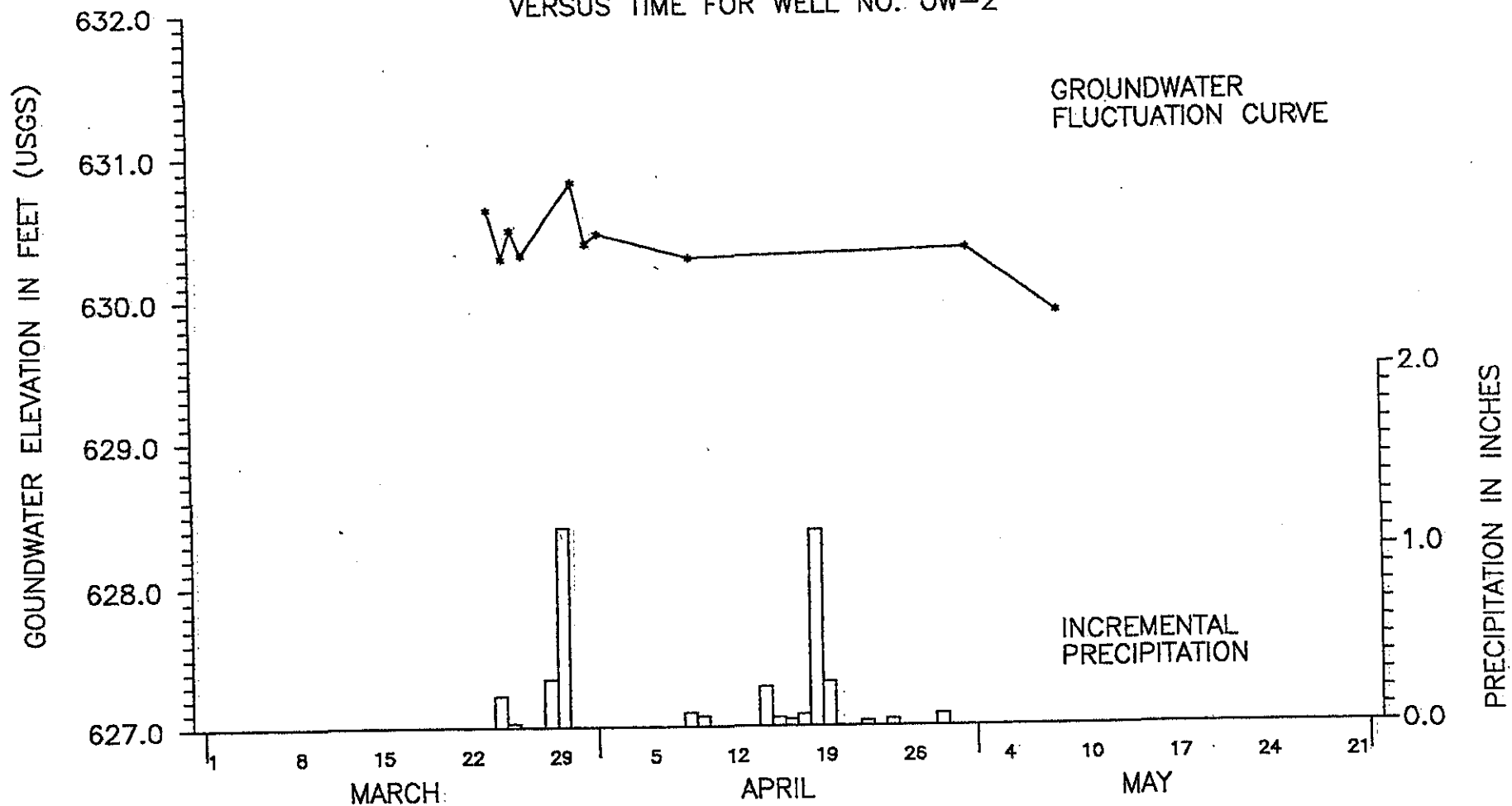
Date	Time	By Whom	Depth to Water*	W.L. Elev.	Remarks
3/24/92	3:10 p.m.	S. SLATTERY	5.78' 5.81' from T.O.P.	630.79'	Depth = 14.40' from T.O.P. / OVM = 162 ppm
3/25/92	5:55 p.m.	S. Slattery	5.84' from TOP	630.73'	
3/26/92	1:30 p.m.	S. Slattery	5.88' from T.O.P.	630.69'	
3/27/92	7:42 a.m.	S. Slattery	6.09' from TOP	630.48'	
3/31/92	8:09 a.m.	S. Slattery	5.56' from TOP	631.01'	
4/1/92	10:00 a.	Paul Niebergall	5.82' from TOP	630.75'	
4/1/92	3:07 p.	Paul Niebergall	5.90' from TOP	630.67'	During Recovery Period from Pump Test at GMU-14
4/2/92	8:31 a.	P. Niebergall	5.82' from TOP	630.75'	
4/9/92	2:30 p.	J. McCleish	6.08' from TOP	630.49'	
5/1/92	1:44 p.	J. McCleish	6' 2/8" from TOP	630.55'	
5/8/92	3:17 p.	J. McCleish	6' 5 5/8" from TOP	630.10'	
			from		
			from		
			from		
			from		
			from		

*Depth to water noted from Ground Surface (G.S.), Top of Pipe (T.O.P.), or Reference Point (R.P.).

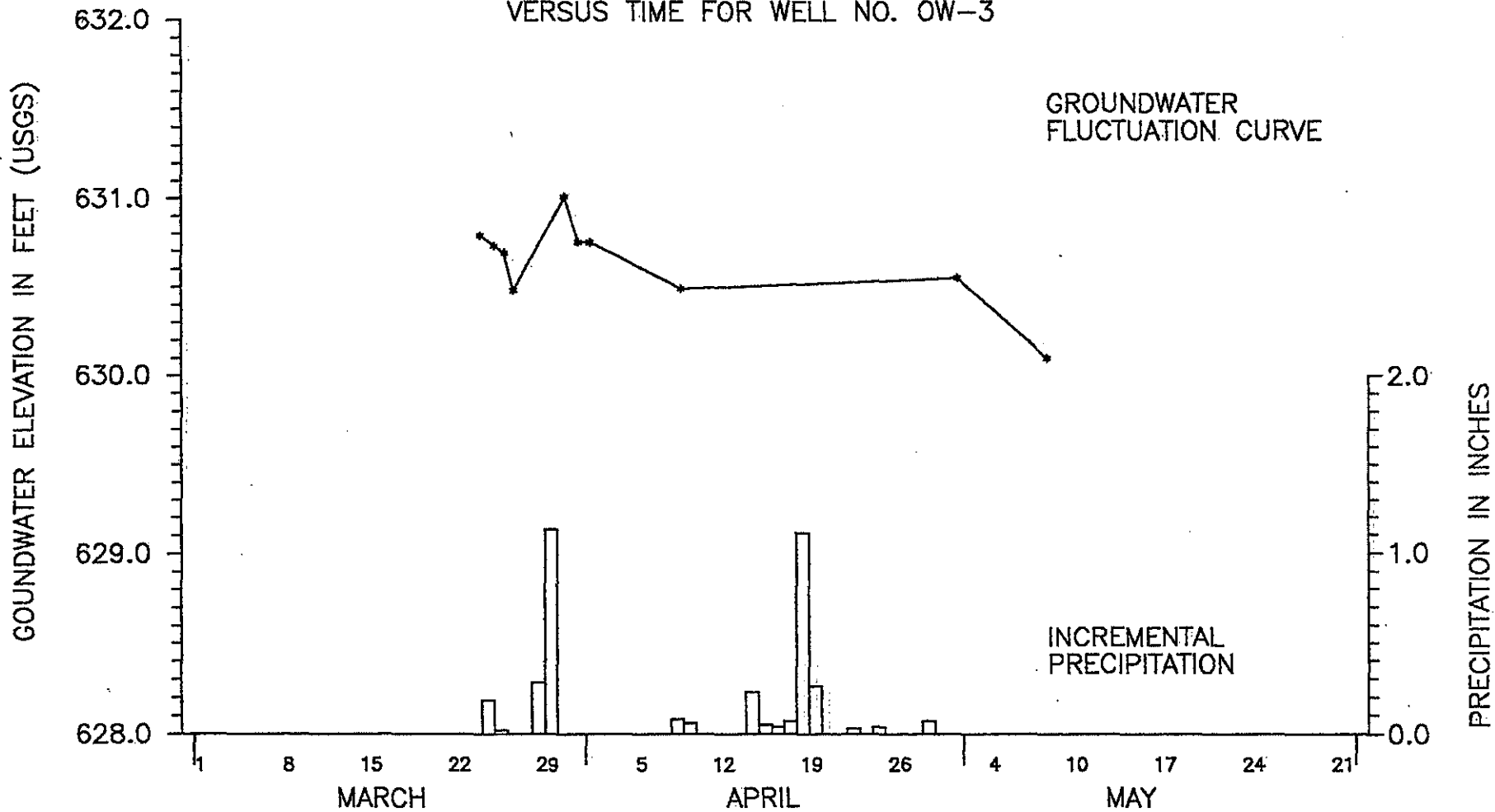
INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. OW-1



INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. OW-2



INCREMENTAL DAILY PRECIPITATION
AND GROUNDWATER FLUCTUATION
VERSUS TIME FOR WELL NO. OW-3



APPENDIX H

PHYSICAL DATA RESULTS



SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

*Over
35 Years of
Excellence*

11500 Olive Boulevard, Suite 276 • St. Louis, MO 63141-7126 • (314) 872-8170 • Fax: (314) 872-8178

May 5, 1992

M-1791-01

Burns & McDonnell
10881 Lowell
Overland Park, KS 66210

Attn: Mr. Bill Weis

Re: Laboratory Testing
EGGKTA Project

Gentlemen:

Enclosed are the results of the laboratory tests performed on EGGKTA samples delivered to our office on April 1 and 9, 1992. If you have any questions, please don't hesitate to contact me.

Very truly yours,

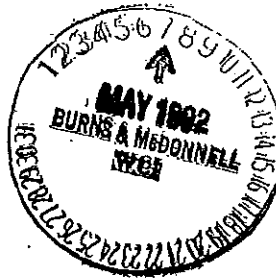
SHANNON & WILSON, INC.

Kathleen M. Ivanhoff

Kathleen M. Ivanhoff
Laboratory Supervisor

AGM:KMI/bb

Enclosures



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Senior Associate

T. Michael McMillen, P.E.
Associate

Ronald R. Nicks, P.G., C.E.G.
Associate

TRIAxIAL PERMEABILITY DATA SHEET

SHANNON & WILSON, INC

Project Burns & McDonnell Date 4/7/92

Job No. M-1797-01 Test By KMI Checked _____

Boring GMW-15 Sample ST-1 Depth 6.4'

Description _____

Preliminary Data:

Permeameter No. 11

Standpipe Vol (cc/cm) 1.291 1.262

Sample Diameter (in) 2.870

Water Content Before After

Tare No. S1 78

Sample Length (in) 2.092

Tare Wt. (g) 2.63 80.48

Sample Area (cm²) 41.74

Wet Soil + Tare (g) 92.26 508.36

Sample Volume (CC) 221.78

Dry Soil + Tare (g) 72.46 413.51

Sample Wt. (g) 427.21

Water Content (%) 28.4 28.5

Wet Density (pcf) 120.2

Porosity 0.440

Dry Density (pcf) 93.6

Pore Volume (CC) 97.58

Specific Gravity 2.68 (estimated)

Read Time day hr min	Pcell psi	Pin psi	Pout psi	Readings (cm)		Inflow PV	Outflow PV	Storage PV	Total PV	I	K cm/s
				hin	hout						
1 13 59	15	10	8	82.40	28.20					36.7	
1 17 3	15	10	8	74.60	34.60	-0.10	0.08	-0.02	-0.08	34.0	5.6E-07
3 13 25	20	15	14	64.30	29.40					19.3	
4 6 42	20	15	14	27.70	60.00	-0.48	0.40	-0.09	-0.48	7.2	1.3E-06
5 6 47	20	15	14	65.60	34.50					19.1	
5 17 5	20	15	14	43.90	54.00	-0.29	0.25	-0.03	-0.73	11.3	1.1E-06
5 17 7	20	15	14	61.20	38.90					17.4	
6 9 42	20	15	14	34.30	63.20	-0.36	0.31	0.04	1.04	7.8	1.1E-06
8 6 7	20	15	14	56.10	35.80					17.1	
8 15 34	20	15	14	38.20	53.30	-0.24	0.23	-0.01	-1.27	10.4	1.2E-06
9 10 1	20	15	14	55.30	39.10					16.3	
10 6 43	20	15	14	27.20	67.50	-0.37	0.37	0.00	1.64	5.7	1.2E-06
12 6 56	20	15	14	61.80	37.80					17.8	
12 16 42	20	15	14	45.00	54.70	-0.22	0.22	0.00	1.86	11.4	1.0E-06
13 7 9	20	15	14	60.30	38.60					17.3	
13 16 33	20	15	14	43.90	55.10	-0.22	0.21	0.00	2.07	11.1	1.1E-06

TRIAXIAL PERMEABILITY DATA SHEET

SHANNON & WILSON, INC

Project Burns & McDonnell Date 4/7/92
 Job No. M-1797-01 Test By KMI Checked _____
 Boring SB-3 Sample ST-1 Depth 19.2'

Description _____

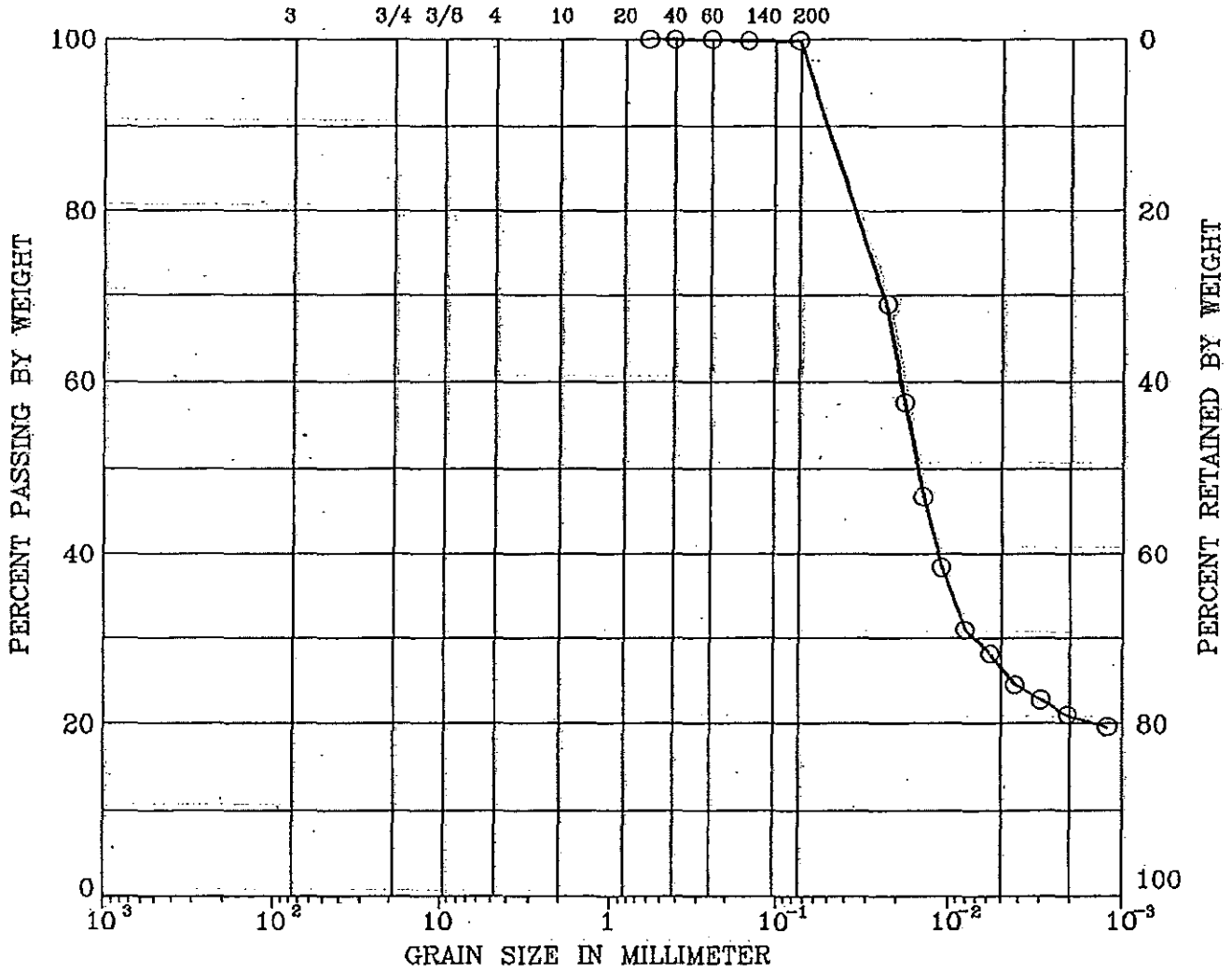
Preliminary Data:

Permeameter No. <u>10</u>	Standpipe Vol (cc/cm) <u>1.28</u> <u>1.265</u>	Inflow	Outflow
Sample Diameter (in) <u>2.880</u>	Water Content Before		
Sample Length (in) <u>2.227</u>	Tare No. <u>S2</u> <u>72</u>		
Sample Area (cm ²) <u>42.03</u>	Tare Wt. (g) <u>2.63</u> <u>85.27</u>		
Sample Volume (CC) <u>237.74</u>	Wet Soil + Tare (g) <u>88.95</u> <u>569.72</u>		
Sample Wt. (g) <u>484.39</u>	Dry Soil + Tare (g) <u>73.52</u> <u>482.89</u>		
Wet Density (pcf) <u>127.1</u>	Water Content (%) <u>21.8</u> <u>21.8</u>		
Dry Density (pcf) <u>104.4</u>	Porosity <u>0.376</u>		
Specific Gravity <u>2.68</u> (estimated)	Pore Volume (CC) <u>89.90</u>		

Read Time	Pcell	PIn	Pout	Readings (cm)		Inflow	Outflow	Storage	Total	i	K
				hin	hout						
day hr min	psi	psi	psi			PV	PV	PV	PV		cm/s
1 16 28	15	10	8	76.50	24.10					34.1	
2 15 45	15	10	8	49.50	50.70	0.39	0.38	0.01	0.38	24.7	3.3E-07
3 12 25	15	10	8	33.70	66.30	0.23	0.22	0.00	0.60	19.1	2.9E-07
3 16 47	15	10	8	30.90	69.00	0.04	0.04	0.00	0.64	18.1	2.8E-07
3 16 50	15	10	8	40.10	69.00					19.8	
4 13 53	15	10	8	28.30	80.60	0.17	0.16	0.00	0.80	15.6	2.7E-07
4 13 59	15	10	8	39.60	67.30					20.0	
5 8 41	15	10	8	28.60	78.10	0.16	0.15	0.00	0.95	16.1	2.7E-07
7 6 4	15	10	8	35.50	64.00					19.8	
7 14 54	15	10	8	30.30	69.30	0.07	0.08	0.00	1.03	18.0	2.6E-07
8 12 57	15	10	8	41.30	68.10					20.1	
9 5 51	15	10	8	31.30	78.20	0.14	0.14	0.00	1.17	16.6	2.7E-07

UNIFIED SOIL CLASSIFICATION

<i>COBBLES</i>	<i>GRAVEL</i>		<i>SAND</i>			<i>SILT OR CLAY</i>
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



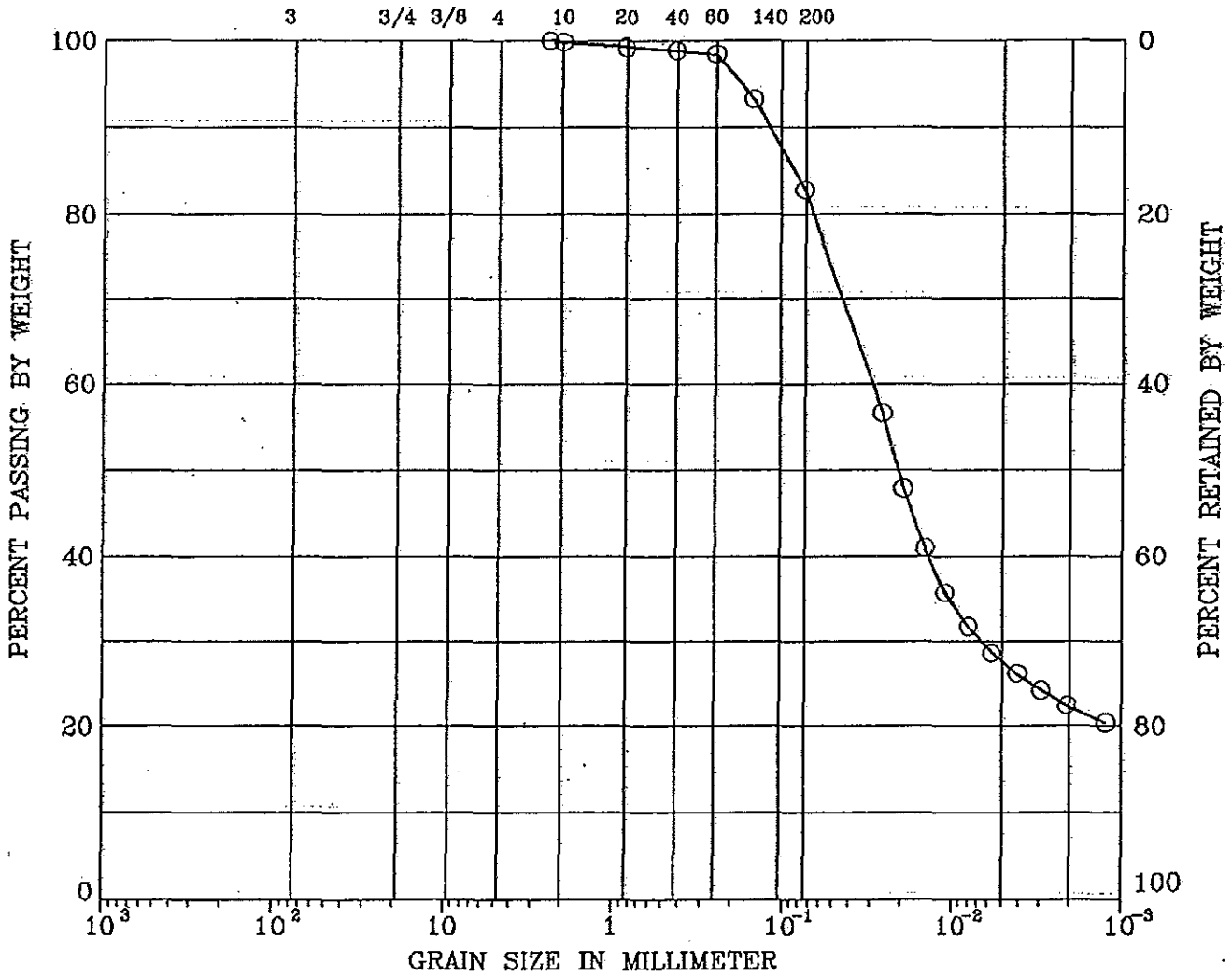
<u>SYMBOL</u>	<u>BORING</u>	<u>DEPTH (ft)</u>	<u>LL (%)</u>	<u>PI (%)</u>	<u>DESCRIPTION</u>
O	GMW15ST1	6.1			

Remark : 4/16/92

M-17971-01	Burns McDonnell - EGGTKA
Shannon & Wilson, Inc. Geotechnical Consultants	GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

<i>COBBLES</i>	<i>GRAVEL</i>		<i>SAND</i>			<i>SILT OR CLAY</i>
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



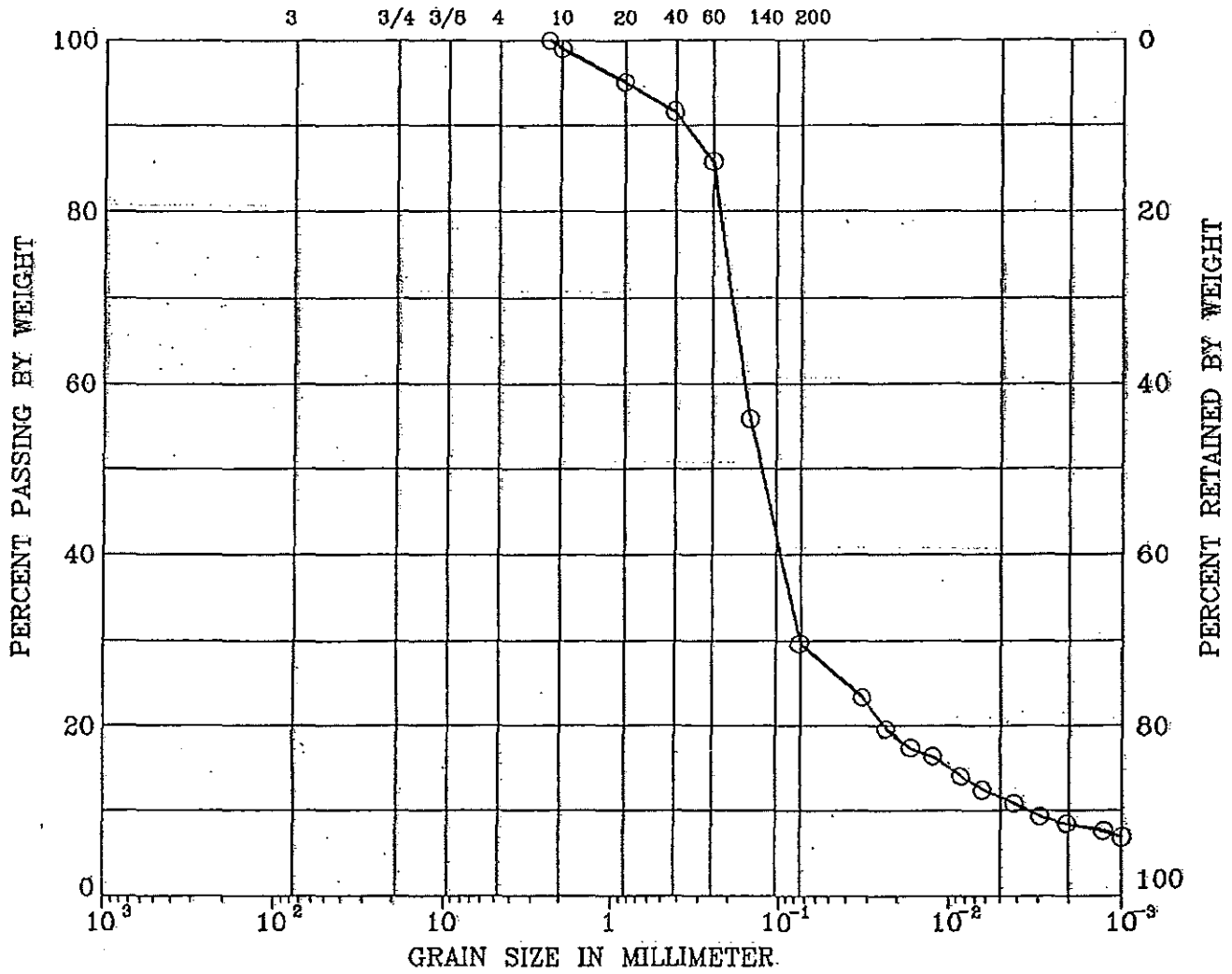
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	SB-3/ST1	19.0			

Remark : 4/16/92

M-17971-01	Burns McDonnell - EGGKTA
Shannon & Wilson, Inc. Geotechnical Consultants	GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	GMW16/G1	21-22.0			

Remark : 4/27/92

M-17971-01

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GRAIN SIZE DISTRIBUTION