

APPENDIX C-1

**SUPPLEMENTAL HYDROGEOLOGIC
INVESTIGATION REPORT**

SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION REPORT

GREGORY CANYON LANDFILL SAN DIEGO, CALIFORNIA

OCTOBER 2004

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1.0 INTRODUCTION

This report documents the installation and testing of additional groundwater monitoring wells at the proposed Gregory Canyon Landfill (GCLF) site located in northern San Diego County, California (Figure 1). GeoLogic Associates (GLA) completed the work on behalf of Gregory Canyon Limited in response to comments from the Regional Water Quality Control Board – San Diego Region (RWQCB) on the Joint Technical Document (JTD) for discharge of municipal solid waste at the proposed GCLF site submitted on April 9, 2004. In a letter dated May 28, 2004, the RWQCB noted that the following components were missing from the JTD.

1. Documentation for installation of additional groundwater monitoring wells.
2. Results of aquifer pump tests of the proposed groundwater monitoring network.
3. An acceptable demonstration that the proposed monitoring network will be able to provide the earliest detection of a release of waste constituents to groundwater from the proposed solid waste management unit at Gregory Canyon.

Project work was performed to supplement the Geologic, Hydrogeologic, and Geotechnical Investigations Report (GLA, May 2003), and to address the concerns listed above by the RWQCB. Site background information is provided in the GLA (May, 2003) report.

Well installation and testing project was completed between June and August 2004 under the supervision of a geologist registered in the State of California, and in general accordance with the well installation specifications developed by GLA for the Gregory Canyon Landfill project. The project's scope of work involved the following activities:

- Drilling and geologic logging of 11 exploratory borings using hollow-stem auger and air rotary casing hammer (ARCH) techniques;
- Logging of each bedrock boring using borehole geophysics;
- Installation of nine groundwater monitoring wells;
- Well modifications to grout up the lower portions of two open hole wells;
- Conducting aquifer testing including variable-rate, constant-rate, and slug tests;
- Evaluation of the site groundwater environment and proposed groundwater monitoring network primarily along the point of compliance;
- Preparation of this report.

Each of the field activities are described in Section 2.0 below followed by presentation of our interpretation of the field data in Section 3.0, a discussion and interpretation of the data relative to the site itself in Section 4.0 and a summary of conclusions developed from this hydrogeologic investigation in Section 5.0.

2.0 SITE ACTIVITIES

Based on discussions with RWQCB staff, GLA selected 11 locations for exploratory drilling and subsequently constructed groundwater monitoring wells in nine of these borings (Figure 2). In addition, at the request of the RWQCB, two existing wells (GLA-2 and GLA-10) were modified to include grouting up the lower portion of their open hole construction. A summary of the drilling and well construction program is summarized on Table 1. GLA supervised the drilling and monitoring well installation work from June 3 through July 22, 2004, and aquifer pumping tests were subsequently completed through August 30, 2004. Prior to mobilization, permits for well drilling and construction were obtained from the County of San Diego Department of Environmental Health. GLA met with the URS Corporation (project biologist) at Gregory Canyon on May 24, 2004 to also review the proposed drilling locations for potential biological concerns. All excavations (access roads, drill pads, and borings) were subsequently monitored by SWCA Environmental Consultants (project archeologists) for archeological artifacts that might be exposed during excavation or drilling.

2.1 DRILLING PROGRAM

Alluvial borings (Lucio-2R and SLRMWD #34R) were drilled using a CME-95 hollow-stem auger (HSA) drilling rig to excavate 8-inch nominal diameter borings. The remaining nine bedrock borings were drilled using a Speed Star-30K ARCH drilling rig to excavate 8.5-inch-diameter borings. All drilling was performed by Water Development Corporation (WDC), a California-licensed well drilling company. During drilling, grab samples were collected at regular intervals from the drill cuttings for logging of subsurface conditions. Upon retrieval, the soil samples were logged and the following items were recorded on boring logs:

- Color;
- Soil type or rock type;
- Grain size;
- Rock hardness;
- Presence of potential marker beds;
- Presence of groundwater;
- Degree of weathering or alteration;
- Unified Soil Classification; and
- Other pertinent observations.

The boring logs are provided in Attachment A. During drilling six mil-thick plastic sheeting was used to protect the ground surface near work areas. Upon completion of drilling at each location, the drilling equipment and surplus materials were removed from the site.

After reaching target depth, each bedrock boring was also logged using borehole geophysics. Geophysical logging was completed by COLOG and as described in Section 2.3.

2.1.1 Exploratory Borings

Although proposed groundwater monitoring wells GLA-3S and GLA-17 were drilled to their target depths of 80 and 500 feet below ground surface (bgs), these wells were not completed as groundwater monitoring wells. Proposed groundwater monitoring well GLA-3S was to be screened across both the saturated alluvium and bedrock above the producing zone identified in well GLA-3. However, first groundwater was encountered within the bedrock at a depth of 52 feet bgs, 16 feet below the alluvium/bedrock contact. The static water level was measured at 24 feet bgs, defining the potentiometric surface in the bedrock fracture flow system. Since completing well GLA-3S would only duplicate the groundwater monitoring capability already provided by existing wells GLA-3 and GMW-1, the borehole was abandoned following completion of borehole geophysics. Well GLA-17 was proposed to monitor groundwater along the northwestern ridge of Gregory Canyon (Plate 1), however the borehole was drilled to a total depth of 500 feet bgs and remained dry. Therefore, the borehole was abandoned following completion of borehole geophysics. Previous wells drilled on the western ridge (GMP-3 and GLA-9) were also found to be dry, or recharged only by perched water (e.g., GLA-4), suggesting that the western (tonalite) ridge of Gregory Canyon may act as a groundwater barrier.

2.1.2 Groundwater Well Modifications

At the request of the RWQCB, the bottom of two open borehole wells, GLA-10 and GLA-2, were sealed using a cement/bentonite grout slurry (Plate 2). The grout consisted of a mixture of neat, Type II (Portland) cement and bentonite powder. The bentonite was added at a rate of approximately 5% by dry weight of cement. The grout was thoroughly mixed in small batches using pressure nozzles to circulate the mixture. Water was added at a rate of approximately 10 gallons per sack of cement. The grout seal was placed using tremmie pipe and positive displacement techniques to fill the borehole annulus under pressure to the ground surface. Since well GLA-10 is a designated water level measuring station only, it was sealed to a depth of 57 feet bgs and will remain as an open hole across the bedrock section of the well. Well GLA-2, which will be included as a site groundwater monitoring well, was sealed to a depth of 103 feet bgs, and was subsequently reamed to 8.5-inches to the depth of 104 feet bgs to facilitate construction of a cased well.

2.2 MONITORING WELL CONSTRUCTION

Monitoring wells were designed and constructed in accordance with the project specifications. Well construction summary diagrams showing well construction details along with the boring logs are presented in Attachment A and summarized in Table 1.

As detailed in Attachment A, seven bedrock monitoring wells (and one well [GLA-2] that was modified) were constructed using factory-sealed, flush-threaded, 4-inch diameter schedule 40 PVC, and two alluvial wells were constructed with factory-sealed, flush threaded 2-inch diameter schedule 40 PVC casing. The wells were constructed with 20- to 50-foot-long well screens with 0.020-inch-wide, factory-milled slots. Stainless steel centralizers were placed at the top and bottom of the screen and at 40-foot intervals.

Commercial washed and graded Monterey-type sand filter pack was placed in the annular space between the borehole wall and the well screen. GLA selected #3 sand (in combination with 0.020-inch screen slots) for use as well “filter pack.” During installation, the depth to the top of the filter pack was measured periodically to verify the volume of sand in the well annulus. Filter pack sands were placed from the bottom of the boreholes to approximately 2 feet above the top of the well screen. The wells were then pre-developed by surging to settle the filter pack. Following pre-development, additional sand was placed in the annulus, as necessary, to maintain at least 2 feet of separation between the top of screen and the top of the filter pack.

A minimum 4-foot-thick layer of bentonite chips was placed in the annulus above the sand filter pack to isolate the upper grout slurry seal from the well screen section. Medium-sized bentonite chips were placed directly on top of filter pack sands. These materials were wetted (if necessary), and allowed to hydrate for not less than 60 minutes. If the bentonite seal was higher in elevation than the static water level in the well, the bentonite chips were hydrated with approximately 10 gallons of water per foot of chips. Following hydration, the depth to the top of the seal was measured to verify conformance with well design.

Following bentonite seal placement, the remainder of the annular space between the well casing and borehole wall was sealed using a cement/bentonite grout slurry. The grout consisted of a mixture of neat, Type II/V (Portland) cement and bentonite powder. The bentonite was added at a rate of approximately 5% by dry weight of cement. The grout was thoroughly mixed in small batches using pressure nozzles to circulate the mixture. Water was added at a rate of approximately 10 gallons per sack of cement. The grout seal was placed using tremie pipe and positive displacement techniques to fill the borehole annulus under pressure to 3 feet bgs.

Each monitoring well was completed with the addition of concrete from the top of the grout to the surface and a protective surface completion. A 5-foot long, 10-inch-diameter, lockable steel stand pipe with a hinged lid was embedded in a 5-foot by 5-foot square, minimum 4-inch-thick concrete pad and each monitoring well was secured with a padlock. In addition, two 4-inch-diameter, concrete-filled bollards (crash posts) were installed at wells GLA-B and GLA-G. Each bollard was installed to a depth of 2 feet below ground and extended to at least 3 feet above ground.

2.2.1 Well Development

Following construction, the new monitoring wells were developed in general accordance with the project specifications using the procedures described in the following sections. Final well development was completed for each newly installed well on July 6 and 22, 2004. Development activities typically included the following:

- Initial static water level measurement;
- Surging to remove sediment from the filter packs;
- Bailing to remove suspended solids from groundwater in well casings;
- Pumping to remove residual sediments; and
- Final static water level measurement.

Bailing and pumping were performed until waters brought to the surface were generally sediment free and “visually” clear. Pertinent development information is summarized on the monitoring well completion summaries included in Attachment A.

2.2.2 Well Survey

Nolte and Associates, a California Registered Land Surveyor determined the location (northing and easting), pad elevation, top of well monument elevation, and top of PVC well casing elevation for each new monitoring well. Units of measure were U.S. survey feet, and were determined to an accuracy of 0.03 foot (an accuracy deemed adequate for this high relief site). The top of the well monument elevation was measured at the center of the monument. The top of PVC casing elevation was measured from the north side of the casing. Well survey data are summarized on Table 2. Groundwater equipotential contours based on the new wells are presented on Plate 1.

2.3 GEOPHYSICAL LOGGING

Prior to well construction or borehole abandonment, the nine borings that were completed within bedrock were logged using borehole geophysics by COLOG, Inc. between June 11, 2004 and July 21, 2004. Borehole geophysics included the following logs:

- optical televiewer
- neutron log;
- gamma log;
- dual-induction log;
- 4pi-density log;
- water quality log (temperature, electrical conductivity).

These geophysical tools were used for fracture and feature analysis to evaluate fracture orientations and other characteristics such as aperture and mineral infilling, and identification of water producing fractures or zones. The geophysical logs are included in Attachment B and are summarized in Section 3.1.

2.4 AQUIFER TESTING PROGRAM

In response to comments from the RWQCB, GLA conducted an aquifer testing program to evaluate the hydraulic properties of the bedrock fracture flow system in Gregory Canyon and to demonstrate the extent of hydraulic interconnection in Gregory Canyon wells at the point of compliance. The program included long-term variable discharge pumping tests, long-term constant rate discharge pumping tests, and slug tests (drawdown-recovery). Pump test data are included in Attachment C.

For both variable discharge and constant rate pump tests, a Grundfos Redi-Flo 2 electric submersible pump was used (except for the test on well GLA-3 pumping test where a Grundfos 4-inch electric submersible pump was used). The pump was typically positioned between two to three feet above the well bottom. A check valve was plumbed into the discharge pipe approximately one foot above the top of the pump to prevent back-flow of pumped water. An analog totalizer was used to quantify the volume of

groundwater discharged during each test, and periodically during each test, the analog flow meter's accuracy was verified using a stop watch and five-gallon bucket. Vented pressure transducers and a digital data logger were used to measure and record the aquifer response to pumping in the test well and the observation well(s). In accordance with RWQCB discharge guidelines and based on the groundwater chemistry determined from historical water quality data from wells on the project site, water generated during the pump tests was discharged to the ground.

2.4.1 Variable Discharge Tests

Long-term variable discharge tests were performed on June 18 and 28, 2004. Figures 3 through 5 depict time-drawdown curves for the pumping wells and observations wells along with time-barometric pressure, and time-pumping rate. Each of these tests are described below, while a discussion of the overall results as they relate to the site characteristics is provided in Section 3.0.

GLA-A Test - The GLA-A variable discharge test was begun at 15:12 on June 14, 2004, and included observation wells GLA-2, GLA-D, and GLA-14 at distances of 191 feet, 315 feet, and 410 feet, respectively, from the pumping well. As shown on the time-pumping rate graph on Figure 3, the test began at an initial pumping rate of 3.0 gallons per minute (gpm), but after 496 minutes, the pumping well dewatered. Although the pumping well was allowed to recover and was restarted the pumping well dewatered again. Following a second recovery, the pump rate was adjusted so the well would not dewater, with pumping rates continued to be reduced to 1.1 gpm (the lowest functional pumping rate). The test ended at 15:16 on June 16, 2004 after about 48 hours (2884 minutes). A total of about 4,222 gallons of water was pumped from well GLA-A, and at the end of the test, drawdown in the pumping well was measured at 17.88 feet. However, there was insufficient groundwater in the fracture flow system to sustain an effective pumping test, and no clear influence from the pumping well was recognized during this test (Figure 3).

GLA-3 Test - The GLA-3 variable discharge test began at 13:04 on June 18, 2004, and included observation wells GLA-C, GLA-B and GLA-12 at distances of 240 feet, 370 feet and 545 feet, respectively, from the pumping well. Wells GMW-1 and GLA-13 were not included as observation wells for this test since they had been included previously in a pumping test conducted in 2000 (GLA, 2001). The test began at an initial pumping rate of 10 gpm using a Grundfos 4-inch electric submersible pump set approximately 50 feet off the bottom of the well. After 296 minutes, the pumping rate was increased to 12 gpm. After 1,135 minutes, the pumping rate was increased to 15 gpm, and after 1,316 minutes the pumping rate was increased to 16.7 gpm for the remainder of the test. The test ended at 7:06 on June 20, 2004 after about 42 hours (2,522 minutes). At the end of the test 35,833 gallons of water had been pumped and the drawdown in the pumping well was measured at 29.43 feet. The observed groundwater response in observation well GLA-C (the closest well to pumping well GLA-3) was erratic (e.g., increasing during much of the test) and a malfunctioning transducer is suspected. As shown on Figure 4, groundwater levels in observation well GLA-B steadily decreased (approximately 0.35 foot) over the duration of the test. However, observations in well GLA-12 initially decreased sharply

(to 120 minutes), followed by only slight response and appeared to be mimicking barometric pressure.

GLA-B Test - The GLA-B variable discharge test began at 15:02 on June 28, 2004, and included observation wells GLA-C and GLA-12 at distances of 135 feet and 200 feet, respectively, from the pumping well. It should be noted that at the time of this variable discharge test, well GLA-G (located between wells GLA-B and GLA-12) had not yet been constructed. The test began with an initial pumping rate of 1.8 gpm, but after 148 minutes, the well dewatered. The pumping well was allowed to recover for 30 minutes. Following recovery, the pump rate was lowered so the well would not dewater, with pumping rates varying from 1.3 gpm to 1.65 gpm. The test ended at 15:58 on June 29, 2004 after about 25 hours (1,498 minutes). At the end of the test about 2,179 gallons of water had been pumped and the drawdown in the pumping well was measured at 28.42 feet. As shown on Figure 5, groundwater levels in observation well GLA-C steadily decreased (approximately 0.26 foot) over the duration of the test. However, the groundwater level in well GLA-12 appears to mimic barometric pressure, with no discernable drawdown response to the pumping well.

2.4.2 Constant Rate Tests

Long-term constant rate pumping tests were performed on June 21 and July 28, 2004. Figures 6 and 7 depict time-drawdown curves for the pumping wells and observations wells along with time-barometric pressure, and time-pumping rate.

GLA-13 Test - The GLA-13 test was performed at a relatively constant rate of 4.3 gpm, beginning at 15:02 on June 28, 2004. Two observation wells GLA-D and GLA-2 were selected at distances of 172 feet and 312 feet, respectively, from the pumping well. It should be noted that at the time of this pumping test, well GLA-F had not yet been constructed. In addition, a previous test including GLA-13 and GLA-3 demonstrated communication between these two wells (GLA, 2001), and therefore, GLA-3 was not included as an observation well during this test. The test ran for about 20 hours (1,167 minutes). At the end of the test about 5,018 gallons of water had been pumped and the drawdown in the pumping well was measured at 3.89 feet. As shown on Figure 6, groundwater levels in observation well GLA-D steadily decreased (approximately 0.34 foot) over the duration of the test, while the groundwater level in GLA-2 appears to mimic barometric pressure, with no discernable responses to the pumping well.

GLA-G Test - The GLA-G test was performed at a relatively constant rate of 2.5 gpm, beginning at 15:00 on July 28, 2004. Two observation wells GLA-B and GLA-12 were selected at distances of 101 feet and 101.5 feet, respectively, from the pumping well. The test ran for about 24 hours (1,438 minutes). At the end of the test about 3,603 gallons of water had been pumped and the drawdown in the pumping well was measured at 14.0 feet. As shown on Figure 7, groundwater levels in the observation wells decreased steadily over the duration of the test. The groundwater level in GLA-B steadily decreased approximately 0.84 foot, and in GLA-12 the groundwater level decreased approximately 0.27 foot.

2.4.3 Slug Tests

After reviewing the variable rate and constant rate pump test results, and all drilling logs, it appeared that three fracture flow domains could be identified as follows (Plate 1):

- ❑ A groundwater flow barrier formed by the unweathered tonalite underlying the west ridgeline;
- ❑ A low flow zone forming an extension of the west ridgeline; and
- ❑ A maximum flow zone along the axis of Gregory Canyon in the weathered bedrock zone.

The groundwater barrier was evident in wells GLA-9, GMP-3, GLA-4, and exploratory boring GLA-17 on the upper west ridge of Gregory Canyon. The low flow zone extends north into the “saddle” area near well GLA-2 (Plate 1). As is evident in well GLA-2, groundwater recovery is very slow and aquifer pumping tests do not show a measurable response to pumping at wells GLA-A or GLA-13. Groundwater monitoring wells GLA-E and GLA-F (Plates 1 and 2) were drilled to further investigate this apparent low flow zone/groundwater barrier. While all three wells (GLA-2, GLA-E and GLA-F) have measurable groundwater, none of these wells were amenable to traditional pumping tests due to slow recovery rates. Therefore, in order to evaluate the hydraulic properties within this low flow zone, slug tests were performed instead. At each well, a bailer was used to remove the water from the borehole, and remote data recorders (In-Situ Trolls) were installed in the bottom of each well to measure recovery.

GLA-2 Slug Test - The GLA-2 slug test was performed on August 2, 2004. Prior to bailing, the water level was measured at 73.28 feet bgs. Approximately 25 gallons of water was removed from the well and the water level was measured at 93.86 feet bgs. The Troll was then lowered into the well to record the water level data. The test ran approximately 18 days (25,902 minutes). The ending water level was measured at 73.47 feet bgs, or within 98 percent of the original (approximately static) water level.

GLA-E Slug Test - The GLA-E slug test was performed on August 2, 2004. Prior to bailing the water level was measured at 99.50 feet bgs. Approximately 155 gallons of water was removed from the well and the water level was measured at 149.86 feet bgs. The Troll was then lowered into the well. The test ran approximately 27 days (39,222 minutes). The ending water level was measured at 77.93 feet bgs, nearly 100 percent of the static water level.

GLA-F Slug Test - The GLA-F slug test was performed on August 2, 2004. Prior to bailing the water level was measured at 69.58 feet bgs. Approximately 280 gallons of water were removed from the well and the water level was measured at 162.30 feet bgs. The Troll was then lowered into the well. The test ran approximately 18 days (25,782 minutes). The ending water level was measured a 69.62 feet bgs, approximately 100 percent of the static water level.

In each case, and as evident from a correlation of the producing fracture identified by an earlier COLOG geophysical survey in well GLA-2, the well data plots as a curvilinear line indicative of a draining condition created by the water cascading down the well from the water producing fracture until the water level had risen to head conditions in that fracture. Once groundwater was recharged to the fracture head elevation, the predicted straight line plot was obtained, characteristic of a recovering well.

3.0 INTERPRETATION OF THE RESULTS

The following sections provide a summary of the results obtained from the borehole excavations, geophysical logging and aquifer tests performed for this supplemental hydrogeologic investigation.

3.1 GEOPHYSICS

3.1.1 Fracture Analysis

An optical televiewer probe was used for fracture and feature analysis since it provides the highest resolution available for fracture and feature analysis in boreholes. The results from the optical televiewer probe were tabulated and graphically presented on rose diagrams and pole plots (Attachment B) to show the distribution of the fractures. On the rose diagrams, the strike azimuth and dip directions are plotted within a 20 degree segments. The following table summarizes the interpretations derived from these plots:

Well	Comments
GLA-A	Based on 28 fractures, the pole-plots show considerable scatter with a predominance of moderate to high-angle fractures. Rose diagrams show dominant northwesterly and northerly strike azimuths of 300-320 degrees and 340-360 degrees and a dominant dip direction to the west.
GLA-B	Based on 21 fractures, the pole-plots show a well defined scatter pattern in the southwest and southeast quadrants with a predominance of moderate to high-angle fractures. Rose diagrams show a dominant strike azimuth of 20-40 degrees and a dominant dip direction to the north-northeast.
GLA-C	Based in 18 fractures, the pole-plots show a well defined scatter pattern in the southeast quadrant with a predominance of moderate to high-angle fractures. Rose diagrams show two dominant northerly strike azimuths of 20-40 and 340-360 degrees with no dominant dip direction.
GLA-D	Based on 36 fractures, the pole-plots show considerable scatter with a predominance of moderate to high-angle fractures. Rose diagrams show a dominant northerly strike azimuth of 340-360 degrees with a dominant dip direction to the west.
GLA-E	Based on 29 fractures, the pole-plots show considerable scatter with a predominance of moderate to high-angle fractures. Rose diagrams show a dominant northerly strike azimuth of 300-320 degrees with a dominant dip direction to the southwest.
GLA-F	Based on 31 fractures, the pole-plots show a well defined scatter pattern concentrating in the southeast quadrant with a predominance of moderate to high-angle fractures. Rose diagrams show two dominant northeasterly to easterly strike azimuths of 20-40 and 60-80 degrees with a dominant dip direction to the northwest.
GLA-G	Based on 29 fractures, the pole-plots show a well defined scatter pattern in the southwest and northeast quadrants with a predominance of high-angle fractures. Rose diagrams show a dominant northerly strike azimuth of 0-20 degrees with a dominant dip direction to the east.
GLA-3S	The number of fractures is small (4 fractures), and the pole-plots and rose diagrams do not contain sufficient data for interpretation.

Well	Comments
GLA-17	Based on 167 fractures, the pole-plots show considerable scatter with a predominance of moderate to high-angle fractures. In addition, rose diagrams show the dominant northerly strike azimuths of 320-340 degrees with the dominant dip direction to the east.
COMPOSITE	Based on all of the fractures measured (363), the pole-plots show a well defined scatter pattern concentrating in the southwest and northeast quadrants with a predominance of moderate to high-angle fractures. In addition, rose diagrams show a dominant northerly strike azimuth of 340-360 degrees and dominant northwesterly and east dip directions.

Based on review of the recent fracture data obtained from eight boreholes with sufficient fractures for trend evaluation, the overall (composite) northerly strike azimuth between 340 and 360 degrees is generally consistent with fracture patterns identified in 12 earlier boreholes. Previous fracture data concluded that although the data may differ from point to point at any given location, there is a predominance of northerly striking fractures paralleling the axis of Gregory Canyon.

3.1.2 Geophysical Analysis

The results from the neutron, gamma, dual-induction, 4pi-density, and water quality logs were used to evaluate the character of fractures identified in the fracture analysis and possible water producing zones. Neutron logs were used to identify relative changes in hydrogen which can be correlated to water; gamma logs were used to identify weathered (clayey) intervals; dual-induction and 4pi-density logs were used to identify fractured (less dense) intervals; and the water quality logs were used to measure relative changes in temperature and electrical conductivity. The logging was helpful in describing the drilled rock section, but was not generally successful in defining specific water producing fractures or zones. However, based on the sum of geophysical analysis to date, it is apparent that groundwater flow in Gregory Canyon point of compliance wells occurs within transmissive fractures, and can be separated into two distinct zones. Groundwater in the "canyon" area (e.g., wells GLA-B, -C, and -G), occurs within the weathered bedrock, while groundwater in the western "saddle" area (e.g., wells GLA-A, GLA-D, GLA-E, and GLA-F) occurs within the unweathered bedrock and the transmissive fractures are few. This is consistent with earlier GLA observations (GLA, 1997) that identified average yield and low-yield wells. The average yield wells (wells yielding from 5 to 20 gpm) were found to be located within Gregory Canyon itself, while the low-yield wells (e.g., wells GLA-1, GLA-2, GLA-4 and dry well GLA-9) with recovery rates less than 5 gpm, are located along the western ridgeline.

3.2 AQUIFER TESTING

Long-term aquifer test data were analyzed using AquiferTest Pro, Version 3.5, numerical modeling software (Röhrich and Waterloo Hydrogeologic, 2002) to calculate aquifer hydraulic properties. A summary of the calculated hydraulic properties from the aquifer tests, including aquifer tests performed in 2000 (GLA, 2001), are presented in Table 3 and the individual calculations and plots are included in Attachment C.

3.2.1 Aquifer Classification

Using the information contained on the boring logs, geophysical logs, and well construction summary diagrams (Attachments A and B), the aquifer interval, aquifer type, and degree of well screen penetration were determined for each tested well. The results of the classification are summarized below.

Well	Depth to Water (fbgs)	Screen Interval (fbgs)	Aquifer Interval (fbgs)	Aquifer	
				Flow Condition	Screen Penetration
GLA-A	73.30	74.4-104.4	85-103	Fracture Flow	Partial
GLA-B	40.00	51.2-91.2	40-84	Fracture Flow	Partial
GLA-C	37.12	41.0-81.0	40-80	Fracture Flow	Partial
GLA-D	60.27	95.1-145.1	93-137	Fracture Flow	Partial
GLA-E	77.6	Open Hole	83-133	Fracture Flow	Partial
GLA-F	69.6	Open Hole	69-152	Fracture Flow	Partial
GLA-G	40.18	61.5-101.5	43-101	Fracture Flow	Partial
GLA-2	73.28	70.38-95.38	83-85	Fracture Flow	Partial
GLA-3	25.0	Open Hole	NA	Fracture Flow	Partial
GLA-12	37.92	32.0-52.0	NA	Fracture Flow	Partial
GLA-13	50.50	49.5-69.5	NA	Fracture Flow	Partial
GLA-14	37	35.5-55.5	NA	Fracture Flow	Partial

Note: NA – Not Available/Optical televiewer evaluation was not performed.

3.2.2 Calculated Long-Term Specific Capacity

The long-term specific capacity value was calculated for each of the tested wells and the resulting values are summarized on Table 3. The calculated values for the monitoring wells ranged from 0.06 to 1.11 gallons per minute per foot of drawdown (gpm/ft), with the range of specific capacities being generally higher for wells located in the “canyon” area.

3.2.3 Calculated Hydraulic Properties

The long-term constant rate aquifer test data were evaluated using Cooper-Jacob straight-line solution (1946), Theis-curve fitting solution (1935), and Moench Fracture Flow solution (1993). Hydraulic conductivity calculations were also completed for slug tests using Bower and Rice solution (1976) using aquifer recovery data. Plots showing the best fit for the data are presented in Attachment C. The analyses were biased toward the “middle- to late-time” portions of the data plots so as not to include data obtained during well casing and filter pack dewatering.

The calculated hydraulic conductivity (K), transmissivity (T), and storativity (S) values that were obtained from the aquifer pumping test data are summarized in Table 3 along with aquifer pumping test data obtained from wells GLA-3 and GLA-8 during the Phase 5 Supplemental Investigation (GLA, 2001). As shown on Table 3, for the recent pumping tests, the range of calculated K values ranged from 1.75E-05 to 24.6 feet/day, with K values highest in the “canyon” area (0.137 to 24.6 feet/day for the canyon wells). Bedrock transmissivity values were derived from the computed hydraulic conductivity values in the canyon wells, and aquifer thickness estimates, based in part on well tests by

COLOG summarized in Section 3.1. As shown on Table 3, transmissivity values ranged from 8.77 to 650 ft²/day. Bedrock storativity values ranged from 1.99 E-06 to 0.28.

Hydraulic properties calculated from the earlier (GLA, 2001) aquifer pumping tests at wells GLA-3 and GLA-8 are generally consistent with the more recent test data. Hydraulic conductivities calculated range from 8.96E-02 to 19.15 feet/day, a slightly broader range of values that are skewed lower by the K value calculated in upper canyon well GLA-8, but consistent with wells within the canyon area of the site as compared to the saddle wells. Bedrock transmissivity values range from 1.25 to 352 ft²/day, and bedrock storativity values range from 8.87E-08 to 0.41, which are within the range of values for these parameters and include slightly lower values than the recently tested canyon wells.

4.0 DISCUSSION

Successive investigations of Gregory Canyon begun in 1991 have added incrementally to the body of data and observations underlying a basic understanding of the site hydrogeology. The recent work described above, which is the basis of this supplemental report, similarly enables updates and revisions to that understanding. The additional observations addressed here relate to the nature of recharge derived from Gregory Mountain, the mineralization of fractures, the effect of the weathering zone on fracture flow, and the apparent flow barrier formed by the western ridgeline of Gregory Canyon.

Recharge. The influence of Gregory Mountain in terms of groundwater recharge to its adjacent areas is clear from inspection of Figure 1; no other topographic element in the area is as likely a source of recharge to Gregory Canyon. The western ridgeline of Gregory Canyon is a relatively minor topographic feature, which would contribute little to the canyon recharge even assuming hydraulic properties similar to those of Gregory Mountain. It is likely that the recharge mound below Gregory Mountain is symmetrical and elongated in a north-south orientation, reflecting the mountain's flat-topped morphology, trend and size. In addition, it is evident from air photo analysis that the leucogranodiorite underlying the mountain is cut by pronounced intersecting fractures capable of conveying precipitation below ground.

Recharge from Gregory Canyon flows via fractures below an equipotential surface to the alluvial aquifer of the San Luis Rey River. The water level in the alluvium adjacent the bedrock, which fluctuates seasonally and with climatic intervals, is the local base level of the equipotential surface. The quantity of water transmitted to the alluvial aquifer through the fractures is minor relative to the volume of water transmitted through the alluvium even in dry periods. During wet periods, whether considered on an annual or decadal basis, water levels rise in the alluvial aquifer at the mouths of adjoining canyons, and the adjacent equipotential surface expands as the bedrock's fracture system fills. At the present time of extended drought, the water level in the alluvial aquifer has dropped below the screen levels of wells at the mouth of Gregory Canyon, and the bedrock equipotential surface has similarly contracted.

Fracture Mineralization. The majority of fractures observed in downhole videos or other images are filled by mineralization. Some of these features are pegmatite dikes or veins related to intrusion of the leucogranodiorite into the tonalite host rock. However, most are younger mineral veins filling fractures of tectonic origin that cross-cut the pegmatite dikes and veins. The mineral assemblage filling the younger fractures consists of epidote, chlorite, and a probable zeolite mineral (presumably laumontite). Both fractures and mineralization are presumably related chiefly to stresses and hydrothermal activity along the Elsinore fault, located about 5½ miles to the northeast; these mineral veins. Low temperature hydrothermal zeolite assemblages are found in basement rocks along strike-slip faults elsewhere in Southern California. In fact, the name *Aqua Tibia* given to the segment of the San Luis Rey River basin where it crosses the Elsinore fault is consistent with this observation.

Weathering. Another feature of the site not previously emphasized is the weathering profile shown in the sections of Plates 2 and 3. As interpreted from drilling logs, the zone of weathering is deeper along the invert of Gregory Canyon and shallows on the sidewalls. It should be noted that weathering is different in kind from, and younger than hydrothermal mineralization. Flow apparently is enhanced even by a moderate degree of rock decomposition and mineral vein dissolution. Relatively significant water producing zones are mostly located in the weathered zone in wells near the canyon axis. In contrast, flow in unweathered rock is more limited in terms of both quantity and occurrence of producing fractures.

Flow Barrier. The sum of observations to date suggests that fracture flow below the weathered zone is limited. Four wells drilled along the west ridgeline to depths significantly below the projected equipotential surface are dry (one well, GLA 4 is recharged by a perched water condition), and other wells drilled in unweathered bedrock underlying the northern extension of the west ridgeline (in the low flow zone shown on Plates 1 and 2) recharge very slowly from relatively isolated fractures. Therefore, the west ridgeline is believed to form a groundwater flow barrier. This interpretation is included on Plate 1, which illustrates modified equipotential and water table contours based on this interpretation. Plate 1 indicates that fracture flow below the equipotential surface is west northwest from the Gregory Mountain recharge area to Gregory Canyon; occurs largely in the weathered zone; and is bounded by unweathered tonalite under the west ridgeline.

This finding supports the interpretation presented in GLA's Phase 5 Hydrogeologic Investigation Report (GLA, 1997), which stated that:

“...cores of only slightly weathered tonalite form boulder knobs throughout the western flank of Gregory Canyon. This surface observation holds true for all the wells drilled along the western ridge (GLA-1, GLA-2, GLA-4, and GLA-9), which after going through a thin interval of weathered rock encountered hard, unaltered, and very sparsely fractured tonalite. It appears, thus, that the geomorphic expression of the western ridge results from an underlying core of comparatively pristine tonalite. ... The low-yield of these wells, coupled with the observation made before regarding the hard and sparsely fractured nature of the substrate,

suggests that the western and southern ridges act as low permeability barriers along the periphery of the site.”

Hydraulic Communication. Despite relatively high fracture frequencies observed in wells and in limited outcrops there are few water-producing fractures in the Gregory Canyon boreholes and wells. Mineralization of the fracture system appears to explain the paucity of water-producing fractures. Hydraulic communication between these boreholes might be better visualized as occurring in a system of interconnected channel-ways within the mineralized vein system of the weathered zone, rather than as a system of intersecting open fractures.

Fracture flow models typically do not specifically account for mineralized fracture systems, unless the effect is accounted for by default assumptions about fracture apertures. In a discussion of fracture frequency, fracture spatial density, and connectivity of fracture networks, Renshaw (2000) suggests that for the typical range of fracture spatial densities, connectivity of fractures is on the order of 30% or less. Renshaw (2000) further notes that,

“...once a network is connected, the primary source of uncertainty in predicting the permeability of fractured rock does not arise from uncertainty in the connectedness of the network, but rather from uncertainty in the transmissivities of the individual fractures, which arises from uncertainty in the fracture apertures, state of stress, and multiphase flow effects”.

This statement suggests that there are two determinations to be made in characterizing a fracture flow network. The first is to determine if the fracture network is connected, the second is to determine the transmissive nature of the whole fracture system.

With respect to the first determination, well tests as reported herein provide direct evidence of connectivity. While it is problematic to specify the fraction of interconnections within the fracture system, especially given the complicating factors of mineralization and weathering, it is possible based on well response to drawdown to assess the relative connectivity of adjacent bedrock domains.

With respect to the second determination, system transmissivity cannot be determined from well tests on individual fractures. Thus, hydraulic calculations as presented herein serve to provide a sense of the range of parametric values related to isolated segments of individual fractures, but do not provide an estimate of the average parametric values of all fractures in the system.

Monitoring Wells. The line of wells across the mouth of Gregory Canyon inclusive of GLA-14 and GLA-12 spans two bedrock domains apparently reflecting two degrees of fracture interconnectivity. Relative to Plate 1, and as presented in the table below, those wells east of and including GLA-13 all show a response to drawdown of other wells in that group.

Well	Adjacent Well	Distance (ft.)	Communication Test Reference
GLA-12	GLA-G	101.5	GLA-G pumping test (2004)
GLA-G	GLA-B	101	GLA-G pumping test (2004)
GLA-B	GLA-C	135	GLA-B pumping test (2004)
GLA-C	GLA-3	240	GLA-3 pumping test and GLA-B pumping test (2004) ¹
GMW-1	GLA-13	200	GLA-3 pumping test (2001)
GLA-3	GMW-1	51	GLA-3 pumping test (2001)
GLA-13	GLA-D	172	GLA-13 pumping test (2004)
GLA-D	GLA-F	90	GLA-A pumping test (2004) ²
GLA-F	GLA-2	50	GLA-A pumping test (2004) ²
GLA-2	GLA-E	110	GLA-A pumping test (2004) ²
GLA-E	GLA-A	80	GLA-A pumping test (2004) ²

- 1- GLA-3 pumping test demonstrates response between GLA-3 and GLA-B at a distance of 370 feet, and the GLA-B pumping test demonstrates response between GLA-B and GLA-C.
- 2- Communication is inferred from a response in observation well GLA-D during the GLA-A pumping test, and wells GLA-E and GLA-F were completed to provide additional monitoring capabilities within the low-flow zone.

In contrast, wells west of GLA-13 (in the low flow zone) have not been shown to respond similarly. This does not suggest that the wells in the low flow zone are isolated from each other or from wells east of and including GLA-13, since the projected equipotential surface includes all of the well data. Rather it suggests that the fraction of connected fractures within the low flow zone is less than in the bedrock domain to the east, assuming no difference in the transmissivity of the fractures. While a smaller well spacing in the low flow zone could be utilized to identify a similar drawdown response, it is not necessary to place additional wells in the low flow zone to detect contaminant transport because all fractures are recharged from the same source.

The currently proposed monitoring wells are located ideally for downgradient monitoring. As a result, the groundwater flow direction is effectively parallel to this groundwater flow barrier so that groundwater flowing under the landfill footprint will be brought to the line of compliance wells. Bedrock well GLA-14 is well situated for monitoring the efficacy of the groundwater barrier. Similarly, since the two dimensional flow model performed by GLA (1995) showed that groundwater would migrate along the southern limit of the alluvial groundwater section, alluvial wells GLA-16 and SLRMWD#34R are well situated for monitoring downgradient of the point of compliance monitoring system. A more detailed discussion of the proposed groundwater monitoring system is provided below.

Groundwater Monitoring System. The following sections describe the groundwater monitoring system proposed to evaluate groundwater conditions at the GCLF in accordance with CCR Title 27 §20405, and 40 CFR 258.51 through 258.54. The monitoring system's first defense beyond the landfill liner system is the series of weathered/fractured bedrock wells proposed along the downgradient limit of the landfill or POC. All of the bedrock wells are screened across the first water bearing zone with the majority of these wells screened across the upper more weathered/fractured bedrock

zone and thus the more highly conductive portion of the fractured bedrock flow system. However, a dual detection monitoring system, which includes dedicated wells in both the alluvial and fractured bedrock groundwater systems, is proposed.

The detection monitoring program will include downgradient wells to collect representative samples of groundwater at the POC, and upgradient wells to collect samples of groundwater that are representative of background conditions. As currently proposed, with the exception of the spacing between wells GLA-14 (west of the landfill) and GLA-A, the wells are spaced about 50 to 240 feet apart, with a higher density of wells (closer spacing) along the western ridge saddle area of the site (wells GLA-A, GLA-D, GLA-E, GLA-F, and GLA-2) where there are fewer interconnected water bearing fractures. Wells GLA-14 and GLA-A, which are currently constrained by the SDCWA aqueduct easement are spaced approximately 400 feet apart. As presented herein, cross-hole testing performed following well construction demonstrates that the proposed monitoring network will be able to provide the earliest detection of a release of waste constituents to ground water from the proposed solid waste management unit at Gregory Canyon. As an additional groundwater system enhancement, each of the bedrock POC wells will be equipped with a dedicated pump and plumbed to convey groundwater to an on-site tank. In this way, a hydraulic barrier will be maintained along the POC and capture the groundwater as it flows to the POC. The detection monitoring program system is summarized in the following table.

**Gregory Canyon Landfill
Detection Monitoring Program**

Monitoring Point	Unit	Monitoring Point I.D.	Status
Groundwater Monitoring Well	Bedrock	GLA-4, GLA-5, GLA-11, GLA-18*	Background/ Cross-gradient
Groundwater Monitoring Well	Bedrock	GLA-2, GMW-1, GLA-12, GLA-13, GLA-14, GLA-A, GLA-B, GLA-C, GLA-D, GLA-E, GLA-F, and GLA-G	Compliance
Water Level Measuring Station	Bedrock	GLA-1, GLA-3, GLA-7, GLA-8, GLA-10	Not Applicable
Groundwater Monitoring Well	Alluvial	Lucio #2R	Background
Groundwater Monitoring Well	Alluvial	GMW-3	Compliance
Groundwater Monitoring Well	Alluvial	GLA-16, SLRMWD #34R	Sentry
Surface Water Station	Gregory Canyon	GCSW-2	Compliance
Surface Water Station	San Luis Rey River	SLRSW-1	Background
Surface Water Station	San Luis Rey River	SLRSW-2	Compliance

*Proposed well to be constructed.

Groundwater Monitoring Points – For the bedrock fracture flow system, POC groundwater monitoring wells include GLA-12, GLA-13, GLA-14, GLA-2, GMW-1, and GLA-A through GLA-G, as shown on Figure 2. Wells GLA-1, GLA-3, and GLA-10, will be utilized as water level measuring station and as contingency monitoring wells. In addition, though wells GLA-7 and GLA-8 are located within the future landfill footprint,

they will also continue to be used as water level measuring stations until landfill development reaches their location, at which time they will be properly abandoned.

Existing wells GLA-4, GLA-5, GLA-11, and proposed well GLA-18 (located on the east side of the landfill footprint) will be background wells. Of these wells, the only well that cannot be constructed prior to landfill operations is GLA-18. Because of the steep slopes, access to this well location is not anticipated until the landfill operations extend a significant distance up the canyon and the utility pad is constructed. Until that time, a drill rig will not be able to gain access to the area for well construction.

The water quality monitoring program will also include monitoring of the San Luis Rey River valley alluvial prism from compliance well GMW-3, Lucio Dairy well #2R (located at the Lucio Dairy near the northeastern property boundary). Wells GLA-16 and SLRMWD#34R will serve as alluvial “sentry” wells located further downgradient of the facility along the modeled groundwater flowpath (GLA, 1995). Under this monitoring program, the proposed monitoring well network will be maintained throughout the life of the landfill and through the post-closure period. Existing wells, which are not included within the monitoring network but are located within the footprint of the landfill will be properly abandoned prior to landfilling in that area. It should be noted that in the event that facility construction requires the destruction of any of these wells (e.g., a well located in the proposed ancillary facilities area), a replacement well would be constructed in the vicinity of the originally designated well.

Groundwater Sampling Procedures. The following sampling procedures provide minimum requirements that shall be followed when performing groundwater sampling at the Gregory Canyon Landfill. Depending on the location of the well two separate sampling procedures are proposed for the GCLF. As a result of the hydraulic barrier at the POC, all compliance bedrock aquifer wells will be sampled in accordance with the procedures discussed under the bedrock compliance well sampling procedures section. All other wells (alluvial and bedrock-background/cross-gradient) will be sampled in accordance with the procedures discussed under standard sampling procedures section.

Procedures to be used for groundwater sampling are outlined in the *Practical Guide for Groundwater Sampling* and *RCRA Groundwater Monitoring Technical Enforcement Guidance Document*.

Standard Purging Procedures for Sampling – Prior to collecting groundwater samples, purging of a well is necessary to provide a representative sample of groundwater that approximates formational conditions. Temperature, pH, turbidity, and EC or conductivity of the purged water are measured to evaluate whether stable conditions have been achieved. It is assumed that stability or formational conditions have been achieved when the difference between successive field indicator measurements is less than ten percent. The amount of water that must be purged from a well is a function of the stability of the measured parameters, as well as the recovery rate of the well. Purging should be performed at a sufficiently slow rate so that recharging water does not cascade in the filter pack and casing.

A well is considered to be fast recharging if groundwater levels recover to within 80 percent or more of the original static water level within two hours of purging. A minimum of one borehole volume should be purged before temperature, pH, turbidity, and EC parameters are measured in the purged water. An additional one-half borehole volume should be purged prior to re-measuring the water quality parameters. It is assumed that stability or formational conditions have been achieved when the difference between successive measurements is less than ten percent. If the values vary by more than 10 percent, additional one-half borehole volumes should be purged until temperature, pH, and EC parameters have adequately stabilize, up to a total of three borehole volumes. The well should be allowed to recharge to 80 percent of its static condition prior to sample collection.

A well is considered to be slow recharging if groundwater levels do not recover to within 80 percent or more within two hours of purging. Slow recharging wells should be purged by removing one borehole volume of water, and then allowing the well to recover for up to two hours prior to collecting samples.

A borehole volume is the amount of water contained within the casing of a well (called a casing volume) plus the water contained within the filter pack surrounding the well casing. The following equation is used to calculate the borehole volume in the screened interval of a well:

$$\text{Borehole volume (gallons)} = (7.48\pi/4)[CD^2 + P(BD^2 - CD^2)](WD - GW)$$

Where:

BD = borehole diameter (feet)

WD = well depth (feet)

CD = casing diameter (feet)

GW = depth to groundwater (feet)

P = porosity of filter pack (as a decimal)

The following equation is used to calculate the borehole volume in the unscreened interval of a well:

$$\text{Borehole volume (gallons)} = (7.48\pi/4)(CD^2)(WD - GW)$$

Where:

CD = casing diameter (feet)

WD = well depth (feet)

GW = depth to groundwater (feet)

Bedrock Compliance Well Purging Procedures for Sampling – As a result of very low flow rates in the majority of bedrock wells at the POC, a permanent dewatering condition at the POC is proposed of for the GCLF, thereby creating a hydraulic sump. To achieve a permanent dewatering condition at the POC, bedrock wells will be equipped with float sensors and electric submersible pumps. As a result, additional purging of bedrock wells at the POC is unnecessary to provide a representative sample of groundwater that approximates formational conditions. Prior to sample collection each bedrock well would be allowed to recover (no greater than 48 hours), until a sufficient volume of water enters the well to collect a sample.

5.0 CONCLUSIONS

In summary, the following conclusions can be made from the hydrogeologic conditions observed during this investigation:

- Based on exploratory boring GLA-17 and previous drilling (GLA-4, GLA-9 and GMP-3), the western tonalite ridge acts as a groundwater barrier forcing groundwater to move parallel to this boundary and down the axis of Gregory Canyon;
- Fracture analysis indicates a strong north-trending fracture orientation parallel to the axis of Gregory Canyon;
- Interpretation of boring logs indicates a thicker sequence of weathered bedrock near the axis of Gregory Canyon;
- Pumping test results indicate that the “canyon” wells provide significantly greater flow rates compared to the western “saddle” wells;
- Pumping tests conducted between the “canyon” wells (i.e., wells east of and including GLA-13) indicate hydraulic interconnections as exhibited by the response to drawdown between these wells; and
- Slug tests in the western “saddle” area indicate fewer interconnected fractures as a result of significant mineralization within fractures and a lack of weathering within the bedrock.

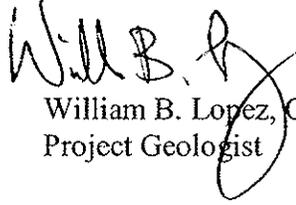
Based on these observations, groundwater is interpreted to flow north-northwest down the axis of Gregory Canyon towards the San Luis Rey River. As in previous hydrogeologic studies for the Gregory Canyon site, the hydrogeologic data support the interconnectivity of the fracture flow system across the site, albeit at a lesser degree of connectivity within the low flow zone. Since the bedrock fracture flow system is recharged from the same source, all of the proposed groundwater monitoring wells sample the same groundwater, and as a result the groundwater monitoring network will provide chemical evidence of contaminant transport along the point of compliance. Given this interpretation, the proposed groundwater monitoring network for the Gregory Canyon Landfill is adequate to monitor potential release from the site. It should be noted, that the Gregory Canyon Landfill incorporates additional monitoring capacity through the installation of a leak detection layer between the upper and lower HDPE liner systems, which will provide the earliest detection of a release from the landfill.

6.0 CLOSURE

This report is based on the data presented above and described herein. GeoLogic Associates should be notified of any conditions that differ from those described herein since this may require reevaluation of the data, conclusions, and work plan detailed above. This report has not been prepared for use by other parties or projects other than those described above. It may not contain sufficient information for other parties or purposes.

This report has been prepared in accordance with generally accepted geotechnical and hydrogeologic practices, and makes no warranties, either expressed or implied, as to the professional content and data presented herein.

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TABLES

**TABLE 1
MONITORING WELL CONSTRUCTION DATA
GREGORY CANYON LANDFILL MONITORING WELLS**

Well Number	Status	Casing Elevation (feet MSL)	Depth (in feet) To		Original Well Construction			Drilling Method	Aquifer Material			
			Bottom of Well	First Water	Static Water (feet)	Water (date)	Diameter & Material			Filter Pack	Slot Size	Screen Interval
Detection Monitoring Wells												
GLA-2	Compliance	379.39	95.4	-	75.49	8/25/04	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	70.38-95.38	Air Rotary	Bedrock
GLA-4	Background	904.99	250	103	72.84	8/25/04	5.5" Open Hole	None	NA	30-240	Dual Wall Rev. - Air	Bedrock
GLA-5	Background	927.92	195	100	39.89	8/25/04	5.5" Open Hole	None	NA	30-190	Dual Wall Rev. - Air	Bedrock
GLA-11	Background	777.32	243	231	201.20	8/25/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	202.5-242.5	Air Rotary	Bedrock
GLA-12	Compliance	345.79	53	38	39.85	8/25/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	32-52	Air Rotary	Bedrock
GLA-13	Compliance	358.15	70	58	53.00	8/25/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	49.5-69.5	Air Rotary	Bedrock
GLA-14	Compliance	334.13	56	42	40.90	8/25/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	35.5-55.5	Air Rotary	Bedrock
GLA-18 ²	Background	915 (est.)	-	-	-	-	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	To be determined	Air Rotary	Bedrock
GLA-A	Compliance	380.35	104.4	85	77.85	8/25/04	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	74.4-104.4	Air Rotary	Bedrock
GLA-B	Compliance	347.04	91.5	42	42.67	8/25/04	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	51.2-91.2	Air Rotary	Bedrock
GLA-C	Compliance	343.45	81.5	46.7	39.79	8/25/04	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	41-81	Air Rotary	Bedrock
GLA-D	Compliance	367.65	146.2	105.6	62.92	8/25/04	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	95.1-145.1	Air Rotary	Bedrock
GLA-E ³	Compliance	385 (est.)	152.9	152.8	77.6	10/9/04	Open Hole (pend. constr.)	#3 Monterey Sd.	0.020"	83-153	Air Rotary	Bedrock
GLA-F ¹	Compliance	375 (est.)	165.5	164.8	69.7	10/9/04	Open Hole (pend. constr.)	#3 Monterey Sd.	0.020"	65-165	Air Rotary	Bedrock
GLA-G	Compliance	347.58	104	85	43.25	8/25/04	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	61.15-101.15	Air Rotary	Bedrock
Lucio #2R ⁴	Background	310 (est.)	40	12.5	12.7	6/8/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	10-40	Hollow-Stem Auger	Alluvium
GMW-1	Compliance	331.36	90.5	21.25	26.8	10/9/04	5" and 4.25" Open Hole	None	NA	48-90.5	Air Rotary	Bedrock
GMW-3	Compliance	320.36	49.5	12.83	16.32	3/14/00	4" Dia. Sch. 40 PVC	2/12 Sand	0.020"	9.5-49.5	Hollow-Stem Auger	Alluvium
SLRMWD #34R ⁴	Sentry	310 (est.)	30	12.6	15.0	10/9/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	9-29	Hollow-Stem Auger	Alluvium
GLA-16	Sentry	307.54	33.5	10.6	17.22	8/25/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	9.5-29.5	Air Rotary	Alluvium
Water Level Measuring Stations (wells GLA-7 and GLA-8 will be abandoned prior to landfilling in that area)												
GLA-3 ¹	Compliance	332.02	150	-	29.08	8/25/04	Open Hole (pend. constr.)	None	NA	45-100	Air Rotary	Bedrock
GLA-1	-	343.72	300	210	41.9	8/25/04	Open Hole	None	NA	20-300	Dual Wall Rev. - Air	Bedrock
GLA-7	-	402.85	160	50	52.16	8/25/04	Open Hole	None	NA	30-160	Dual Wall Rev. - Air	Bedrock
GLA-8	-	633.11	300	86	73.78	8/25/04	Open Hole	None	NA	15-300	Dual Wall Rev. - Air	Bedrock
GLA-10	-	326.59	57	33	24.09	8/25/04	Open Hole	None	NA	50-57	Dual Wall Rev. - Air	Bedrock

Notes:

1. The bottom of existing well GLA-3 will be grouted to design depth of approximately 100 feet below ground surface once groundwater monitoring system is approved.
2. GLA-18 will be constructed once the transmission line power pole pad has been constructed and there is adequate drilling rig access to the proposed location.
3. Wells GLA-E and GLA-F had not reached static water levels during the drilling program, and therefore will be constructed as wells once the groundwater system is approved.
4. R indicates replacement constructed in vicinity of the existing groundwater monitoring well.

**TABLE 2
SITE MONITORING WELL INFORMATION
GREGORY CANYON LANDFILL**

WELL INFORMATION	GLA-1	GLA-2	GLA-3	GLA-4	GLA-5	GLA-7	GLA-8	GLA-10	GLA-11	GLA-12	GLA-13	GLA-14	GLA-16	GLA-A	GLA-B	GLA-C	GLA-D	GLA-E*	GLA-F*	GLA-G	MW-3	GMW-1	GMW-2	GMW-4	GMP-2
Elevation of Well (feet MSL):																									
Top of Well Casing	343.72	379.39	332.02	904.99	927.92	402.85	633.11	326.59	777.32	345.79	358.15	334.13	307.54	380.35	347.04	343.45	367.65	383	374	347.58	327.58	331.36	324.64	637.53	437.64
Total Depth of Well (ft.): At install	300	95	150	250	195	160	300	57.0	243	53	70	56	33.5	104	91.0	81	145	153	166	101	24.6	90	106	116	87.5
Depth of Screened Interval	20-300	70-95	45-150	30-240	30-190	30-160	15-300	50-57	202.5-242.5	32-52	49.5-69.5	35.5-55.5	9.5-29.5	74-104	51-91	41-81	95-145	80-150	80-165	61-101	?-24.6	48-90	50-106	55-116	45-87
Depth to Water (from top of well casing (ft.)):																									
12/3/1996	37.98	69.65	21.81	165.00**	41.44	33.46	62.48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.24	19.84	-	68.13
12/16/1996	37.10	69.73	23.84	149.93**	42.57	34.82	62.40	22.20	-	-	-	-	-	-	-	-	-	-	-	-	23.20	21.89	20.46	65.72	69.54
9/13/1999	39.36	70.58	25.38	70.57	41.22	37.72	64.85	23.27	-	-	-	-	-	-	-	-	-	-	-	-	24.10	23.37	21.39	68.17	72.42
3/14/2000	38.05	71.11	23.66	60.39	41.29	39.11	63.70	22.01	193.36	36.96	49.25	38.18	13.92	-	-	-	-	-	-	-	22.98	22.97	20.03	68.69	73.88
11/14-15/00	38.82	72.36	24.80	62.53	39.80	41.58	66.21	22.66	194.98	38.08	50.52	38.89	15.35	-	-	-	-	-	-	-	23.56	24.12	20.52	71.53	76.33
12/5-6/00	-	72.23	-	64.71	40.54	-	-	23.30	195.30	37.96	50.54	38.73	15.06	-	-	-	-	-	-	-	-	-	-	-	-
1/30/2001	40.25	72.99	26.78	76.25	40.55	43.43	67.86	23.05	195.72	37.98	50.55	38.58	14.91	-	-	-	-	-	-	-	-	-	-	-	-
2/26/2001	40.09	72.98	26.74	71.60	41.42	43.72	68.13	22.93	195.59	37.93	50.52	38.51	14.82	-	-	-	-	-	-	-	-	-	-	-	-
3/12/2001	39.99	72.95	26.57	70.50	40.58	43.82	67.50	22.73	195.57	37.79	50.38	38.41	14.60	-	-	-	-	-	-	-	-	-	-	-	-
4/13/2001	40.08	73.08	26.55	148.69**	40.28	43.92	67.23	22.71	195.36	37.83	50.37	38.35	14.62	-	-	-	-	-	-	-	-	-	-	-	-
5/14/2001	40.22	73.19	26.78	98.09**	40.71	44.18	67.67	23.01	196.36	37.97	50.57	38.50	14.82	-	-	-	-	-	-	-	-	-	-	-	-
6/20/2001	40.62	73.25	27.11	74.50	39.66	44.40	68.57	23.19	196.25	38.66	50.73	38.66	15.07	-	-	-	-	-	-	-	-	-	-	-	-
7/11/2001	40.63	73.43	27.24	128.18**	40.10	44.54	68.98	23.54	196.86	38.40	51.00	38.83	15.31	-	-	-	-	-	-	-	-	-	-	-	-
8/29/2001	40.80	73.62	27.56	76.72	41.13	44.95	69.67	23.68	196.74	38.64	51.24	39.05	15.69	-	-	-	-	-	-	-	-	-	-	-	-
9/5/2001	40.72	73.53	26.91	74.25	41.16	44.71	67.95	22.96	196.63	38.62	51.20	39.05	15.73	-	-	-	-	-	-	-	-	-	-	-	-
10/29/2001	40.80	73.90	27.54	75.43	41.43	45.50	70.06	23.55	196.98	38.73	51.37	39.27	16.03	-	-	-	-	-	-	-	-	-	-	-	-
11/28/2001	40.68	73.88	27.5	73.64	42.11	45.77	69.92	23.36	197.08	38.65	51.36	39.05	15.46	-	-	-	-	-	-	-	-	-	-	-	-
12/11/2001	40.55	73.25	27.37	73.06	42.25	45.80	69.80	22.49	196.62	38.55	51.18	38.89	15.20	-	-	-	-	-	-	-	-	-	-	-	-
3/29/2002	40.70	73.98	27.48	70.60	NA	46.79	70.96	23.22	197.14	38.64	51.39	38.75	14.94	-	-	-	-	-	-	-	-	-	-	-	-
8/19/2002	41.64	74.19	28.39	69.87	42.57	47.88	72.27	24.45	197.79	39.48	52.21	40.31	16.87	-	-	-	-	-	-	-	-	-	-	-	-
8/25/2004	41.90	75.49	29.08	72.84	39.89	52.16	73.78	24.09	201.20	39.85	53.00	40.90	17.22	77.85	42.67	39.79	62.92	-	-	43.25	-	-	-	-	-
10/9/2004	41.78	75.45	28.94	73.09	40.62	52.41	73.89	24.00	200.73	39.83	52.87	41.32	17.71	77.85	42.58	39.71	62.87	77.6	69.7	43.15	23.85	26.80	21.89	79.97	86.94
Elevation of Water Surface (ft. MSL):																									
12/3/1996	305.74	309.74	310.21	739.99**	886.48	369.39	570.63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	310.12	304.80	-	369.51
12/16/1996	306.62	309.66	308.18	755.06**	885.35	368.03	570.71	304.39	-	-	-	-	-	-	-	-	-	-	-	-	304.38	309.47	304.18	571.81	368.10
9/13/1999	304.36	308.81	306.64	834.42	886.70	365.13	568.26	303.32	-	-	-	-	-	-	-	-	-	-	-	-	303.48	307.99	303.25	569.36	365.22
3/14/2000	305.67	308.28	308.36	844.60	886.63	363.74	569.41	304.58	583.96	308.83	308.90	295.95	293.62	-	-	-	-	-	-	-	304.60	308.39	304.61	568.84	363.76
11/14-15/00	304.90	307.03	307.22	842.46	888.12	361.27	566.90	303.93	582.34	307.71	307.63	295.24	292.19	-	-	-	-	-	-	-	304.02	307.24	304.12	566.00	361.31
12/5-6/00	-	307.16	-	840.28	887.38	-	-	303.29	582.02	307.83	307.61	295.40	292.48	-	-	-	-	-	-	-	-	-	-	-	-
1/30/2001	303.47	306.40	305.24	828.74	887.37	359.42	565.25	303.54	581.60	307.81	307.60	295.55	292.63	-	-	-	-	-	-	-	-	-	-	-	-
2/26/2001	303.63	306.41	305.28	833.39	886.50	359.13	564.98	303.66	581.73	307.86	307.63	295.62	292.72	-	-	-	-	-	-	-	-	-	-	-	-
3/12/2001	303.73	306.44	305.45	834.49	887.34	359.03	565.61	303.86	581.75	308.00	307.77	295.72	292.94	-	-	-	-	-	-	-	-	-	-	-	-
4/13/2001	303.64	306.31	305.47	756.30**	887.64	358.93	565.88	303.88	581.96	307.96	307.78	295.78	292.92	-	-	-	-	-	-	-	-	-	-	-	-
5/14/2001	303.50	306.2	305.24	806.90**	887.21	358.67	565.44	303.58	580.96	307.82	307.58	295.63	292.72	-	-	-	-	-	-	-	-	-	-	-	-
6/20/2001	303.10	306.14	304.91	830.49	888.26	358.45	564.54	303.40	581.07	307.13	307.42	295.47	292.47	-	-	-	-	-	-	-	-	-	-	-	-
7/11/2001	303.09	305.96	304.78	776.81**	887.82	358.31	564.13	303.05	580.46	307.39	307.15	295.30	292.23	-	-	-	-	-	-	-	-	-	-	-	-
8/29/2001	302.92	305.77	304.46	828.27	886.79	357.90	563.44	302.91	580.58	307.15	306.91	295.08	291.85	-	-	-	-	-	-	-	-	-	-	-	-
9/5/2001	303.00	305.86	305.11	830.74	886.76	358.14	565.16	303.63	580.69	307.17	306.95	295.08	291.81	-	-	-	-	-	-	-	-	-	-	-	-
10/29/2001	302.92	305.49	304.48	829.56	886.49	357.35	563.05	303.04	580.34	307.06	306.78	294.86	291.51	-	-	-	-	-	-	-	-	-	-	-	-
11/28/2001	303.04	305.51	304.52	831.35	885.81	357.08	563.19	303.23	580.24	307.14	306.79	295.08	292.08	-	-	-	-	-	-	-	-	-	-	-	-
12/11/2001	303.17	306.14	304.65	831.93	885.67	357.05	563.31	304.10	580.70	307.24	306.97	295.24	292.34	-	-	-	-	-	-	-	-	-	-	-	-
3/29/2002	303.02	305.41	304.54	834.39	NA	356.06	562.15	303.37	580.18	307.15	306.76	295.38	292.60	-	-	-	-	-	-	-	-	-	-	-	-
8/19/2002	302.08	305.20	303.63	835.12	885.35	354.97	560.84	302.14	579.53	306.31	305.94	293.82	290.67	-	-	-	-	-	-	-	-	-	-	-	-
8/25/2004	301.82	303.90	302.94	832.15	888.03	350.69	559.33	302.50	576.12	305.94	305.15	293.23	290.32	302.50	304.37	303.66	304.73	-	-	304.33	-	-	-	-	-
10/9/2004	301.94	303.94	303.08	831.90	887.30	350.44	559.22	302.59	576.59	305.96	305.28	292.81	289.83	302.50	304.46	303.74	304.78	305.40	304.30	304.43	303.73	304.56	302.75	557.56	350.70

Notes:

NM - Not measured/not applicable.

*GLA-E and GLA-F - Reference elevation based on topographic map/not survey.

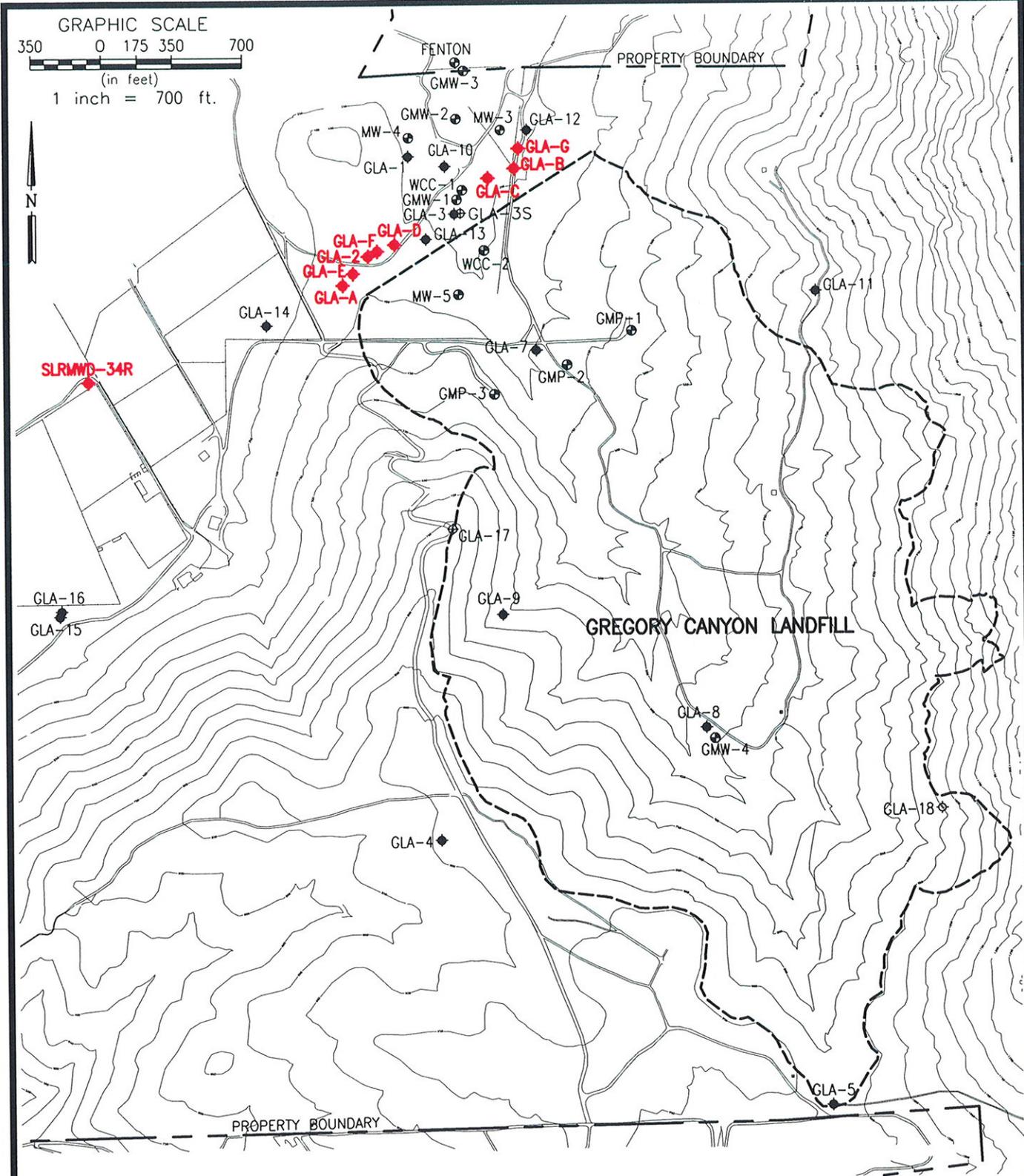
** GLA-4 - Water level had not yet recovered prior to Water level measurement.

TABLE 3
AQUIFER TEST RESULTS
GREGORY CANYON LANDFILL

Pump Test (date tested)	Well	Distance From Pumping Well (feet)	Specific Capacity (gpm/ft)	Analytical Method	Data Points	Hydraulic Conductivity (ft/day)	Transmissivity (ft ² /day)	Storativity	
GLA-G (2004)	GLA-G	1	0.18	Cooper-Jacob (time-drawdown), Confined	Middle	0.943	60.3	NC	
	GLA-G	1	0.18	Theis, Confined	Late	0.137	8.77	7.90E-03	
	GLA-G	1	0.18	Moench (fracture flow)	Late	0.369	23.6	0.053	
	GLA-B	101	0.06	Cooper-Jacob (time-drawdown), Confined	Middle-Late	3.96	254	NC	
	GLA-B	101	0.06	Cooper-Jacob (time-drawdown), Confined	Late	6	384	NC	
	GLA-B	101	0.06	Theis, Confined	Late	3.86	247	2.13E-04	
	GLA-B	101	0.06	Moench (fracture flow)	Late	3.26	208	1.99E-06	
	GLA-12	101.5	not tested	Cooper-Jacob (time-drawdown), Confined	Late	7.82	500	3.36E-03	
	GLA-12	101.5	not tested	Theis, Confined	Late	10.2	630	1.09E-03	
	GLA-12	101.5	not tested	Moench (fracture flow)	Late	7.89	505	1.95E-03	
	GLA-13 (2004)	GLA-13	1	1.11	Cooper-Jacob (time-drawdown), Confined	Late	4.79	87.7	NC
	GLA-13	GLA-13	1	1.11	Theis, Confined	Late	7.14	131	0.280
GLA-13	GLA-13	1	1.11	Moench (fracture flow)	Late	8.19	150	0.097	
GLA-3 (2000)	GLA-D	172	not tested	Cooper-Jacob (time-drawdown), Confined	Late	24.6	451	NC	
	GLA-D	172	not tested	Theis, Confined	Late	7.87	144	5.04E-03	
	GLA-D	172	not tested	Moench (fracture flow)	Late	7.87	144	4.68E-03	
	GLA-3	1	1.00	Cooper-Jacob (time-drawdown), Confined	Late	5.89	352	8.87E-08	
	GLA-3	1	1.00	Theis, Unconfined	Late	3.87	231.8	NC	
	GMW-1	51	not tested	Cooper-Jacob (time-drawdown), Confined	Late	6.26	325.4	1.28E-04	
	GMW-1	51	not tested	Theis, Unconfined	Late	6.09	316.8	NC	
	GLA-13	200	not tested	Cooper-Jacob (time-drawdown), unconfined	late	19.15	276.48	NC	
	GLA-13	200	not tested	Cooper-Jacob (time-drawdown), Confined	late	NC	273.6	NC	
	GLA-13	200	not tested	Theis, Unconfined	late	15.12	218.88	NC	
	GLA-8 (2000)	GLA-8	1	not tested	Cooper-Jacob (time-drawdown), unconfined	late	0.017	1.84	NC
	GLA-8	GLA-8	1	not tested	Cooper-Jacob (time-drawdown), Confined	late	NC	1.25	0.408
GLA-8	GLA-8	1	not tested	Cooper-Jacob (time-drawdown), unconfined	middle	0.0896	9.68	9.37E-04	
GLA-8	GLA-8	1	not tested	Cooper-Jacob (time-drawdown), Confined	middle	NC	8.50	7.63E-03	
GLA-8	GLA-8	1	not tested	Theis, unconfined	mid-late	0.0896	9.68	NC	
GMW-4	GMW-4	21	not tested	Cooper-Jacob (time-drawdown), unconfined	late	0.297	13.64	NC	
GMW-4	GMW-4	21	not tested	Cooper-Jacob (time-drawdown), Confined	late	NC	12.73	1.00E-03	
GMW-4	GMW-4	21	not tested	Cooper-Jacob (time-drawdown), unconfined	middle	0.491	22.46	NC	
GMW-4	GMW-4	21	not tested	Cooper-Jacob (time-drawdown), Confined	middle	NC	23.33	0.094	
GMW-4	GMW-4	21	not tested	Theis, unconfined	late	0.210	9.68	NC	
Bail Test (date tested)	Well	Distance From Pumping Well (feet)	Specific Capacity (gpm/ft)	Analytical Method	Data Points	Hydraulic Conductivity (ft/day)	Transmissivity (ft ² /day)	Storativity	
GLA-E (2004)	GLA-E	NA	not tested	Bower-Rice Slug/Bail	Late	3.07E-03	NC	NC	
GLA-F (2004)	GLA-F	NA	not tested	Bower-Rice Slug/Bail	Late	2.53E-03	NC	NC	
GLA-2 (2004)	GLA-2	NA	not tested	Bower-Rice Slug/Bail	Late	1.75E-05	NC	NC	

Notes:
NA - Not Applicable
NC - Not Calculated

FIGURES



GRAPHIC SCALE
 350 0 175 350 700
 (in feet)
 1 inch = 700 ft.



FIGURE 2

WELL LOCATION MAP

SUPPLEMENTAL HYDROGEOLOGIC
 INVESTIGATION REPORT
 GREGORY CANYON LANDFILL
 SAN DIEGO COUNTY, CALIFORNIA

EXPLANATION:

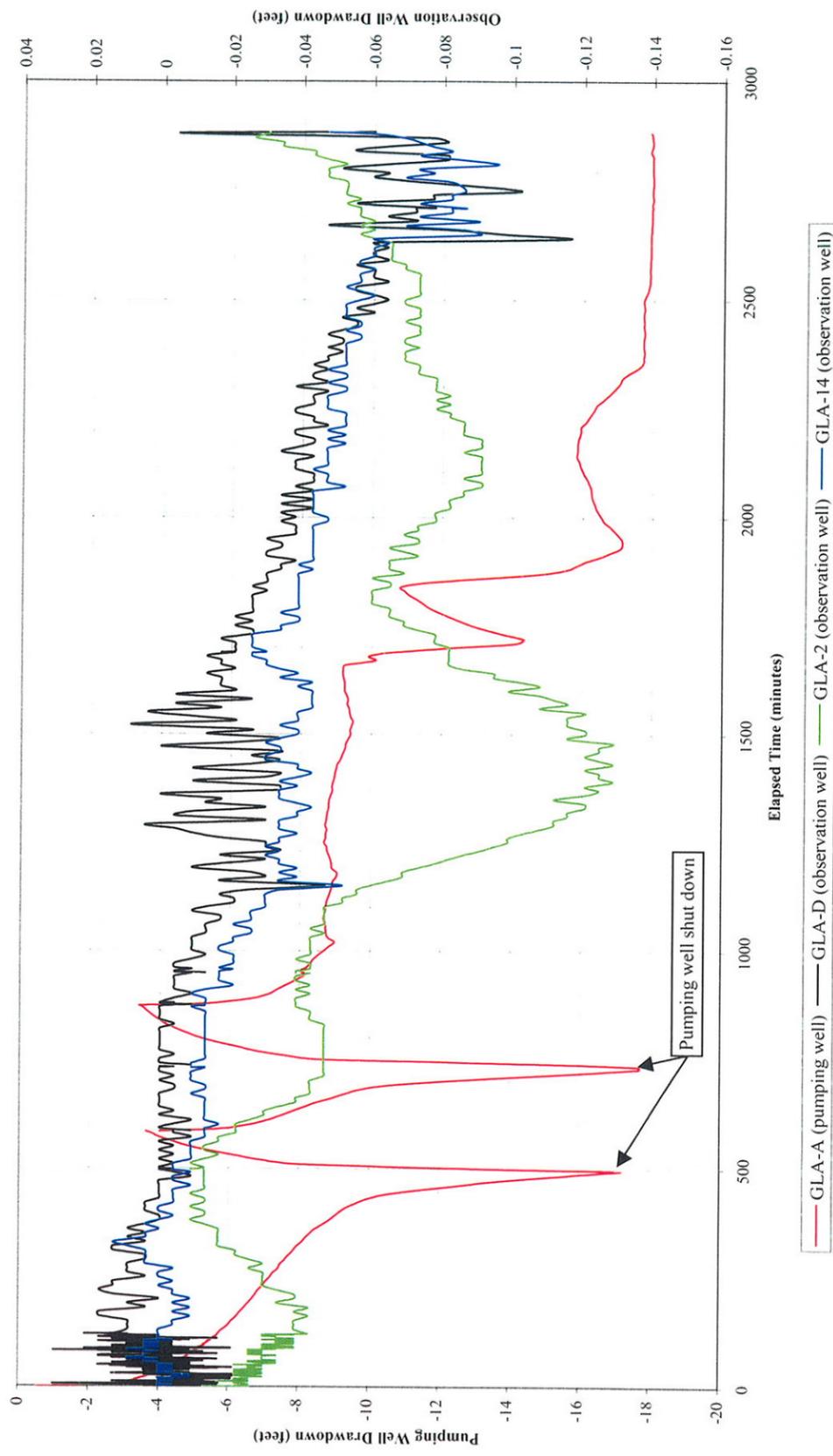
- ◆ NEW MONITORING WELL BY GLA
- ◆ MONITORING WELL BY GLA
- ⊕ EXPLORATORY BORING (GLA, 2004)
- ◇ PROPOSED MONITORING WELL
- MONITORING WELL BY OTHERS



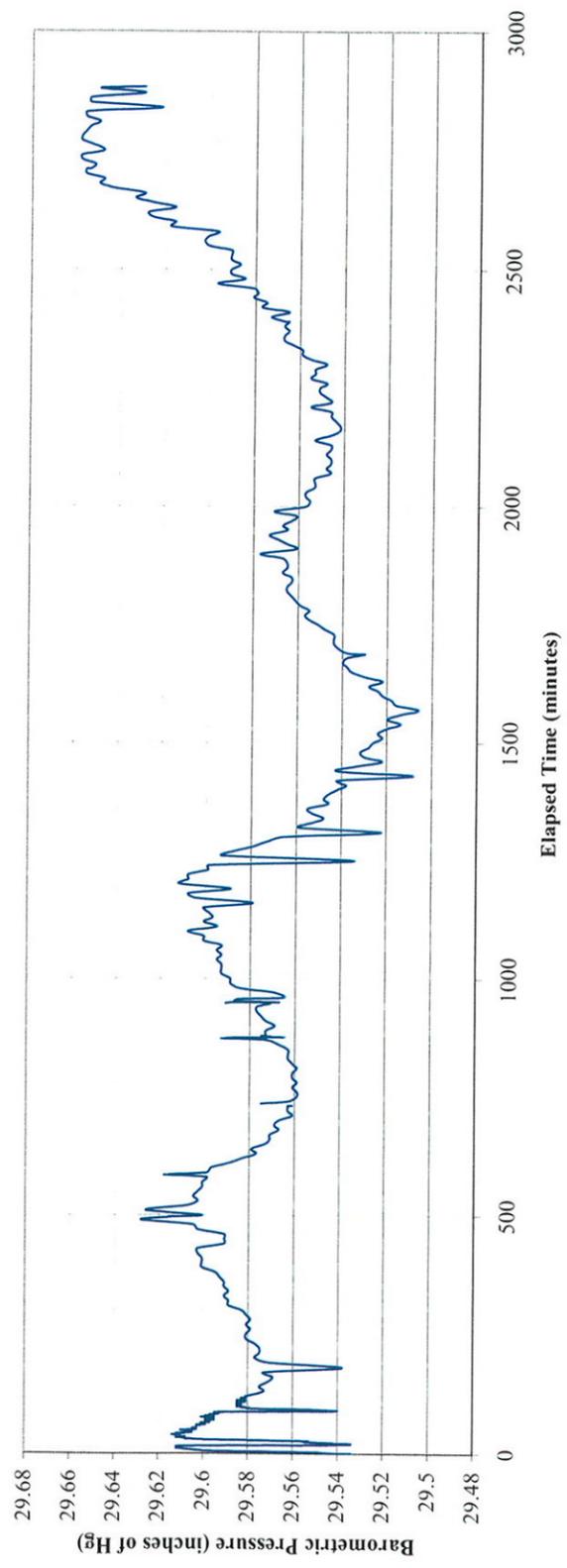
GeoLogic Associates
 Geologists, Hydrogeologists, and Engineers

DRAWN BY: VL	DATE: OCTOBER 2004	JOB NO. 9539
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Figure 3
 Aquifer Pumping Test
 Gregory Canyon
 Well GLA-A



Barometric Pressure vs Time



Pumping Rate vs Time

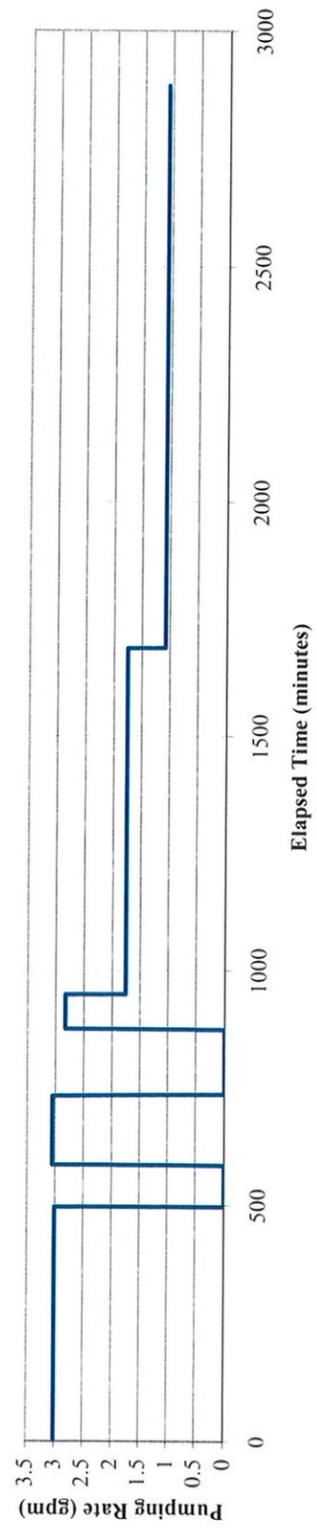


Figure 4
 Aquifer Pumping Test
 Gregory Canyon
 Well GLA-3

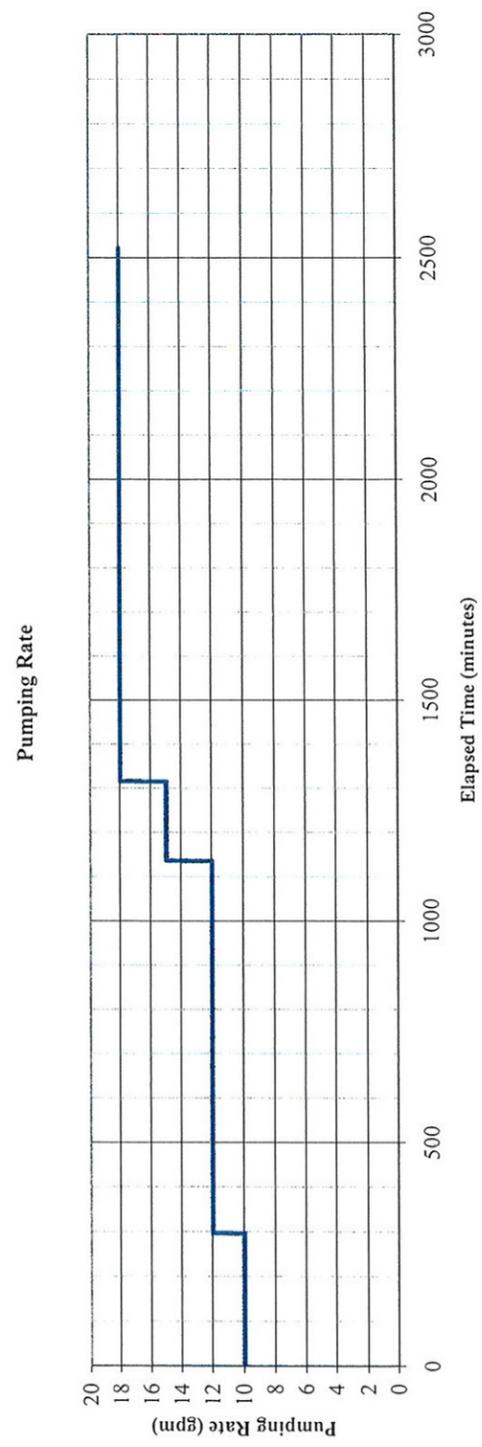
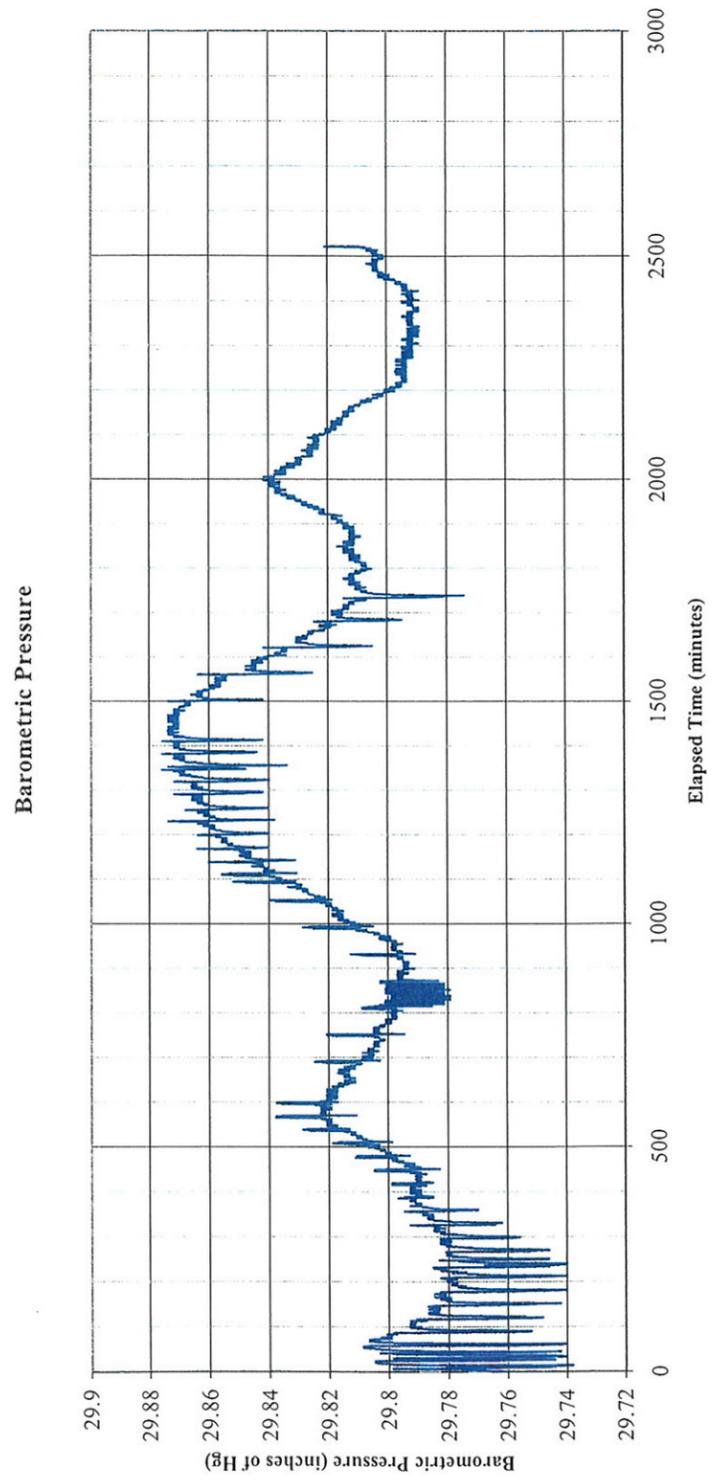
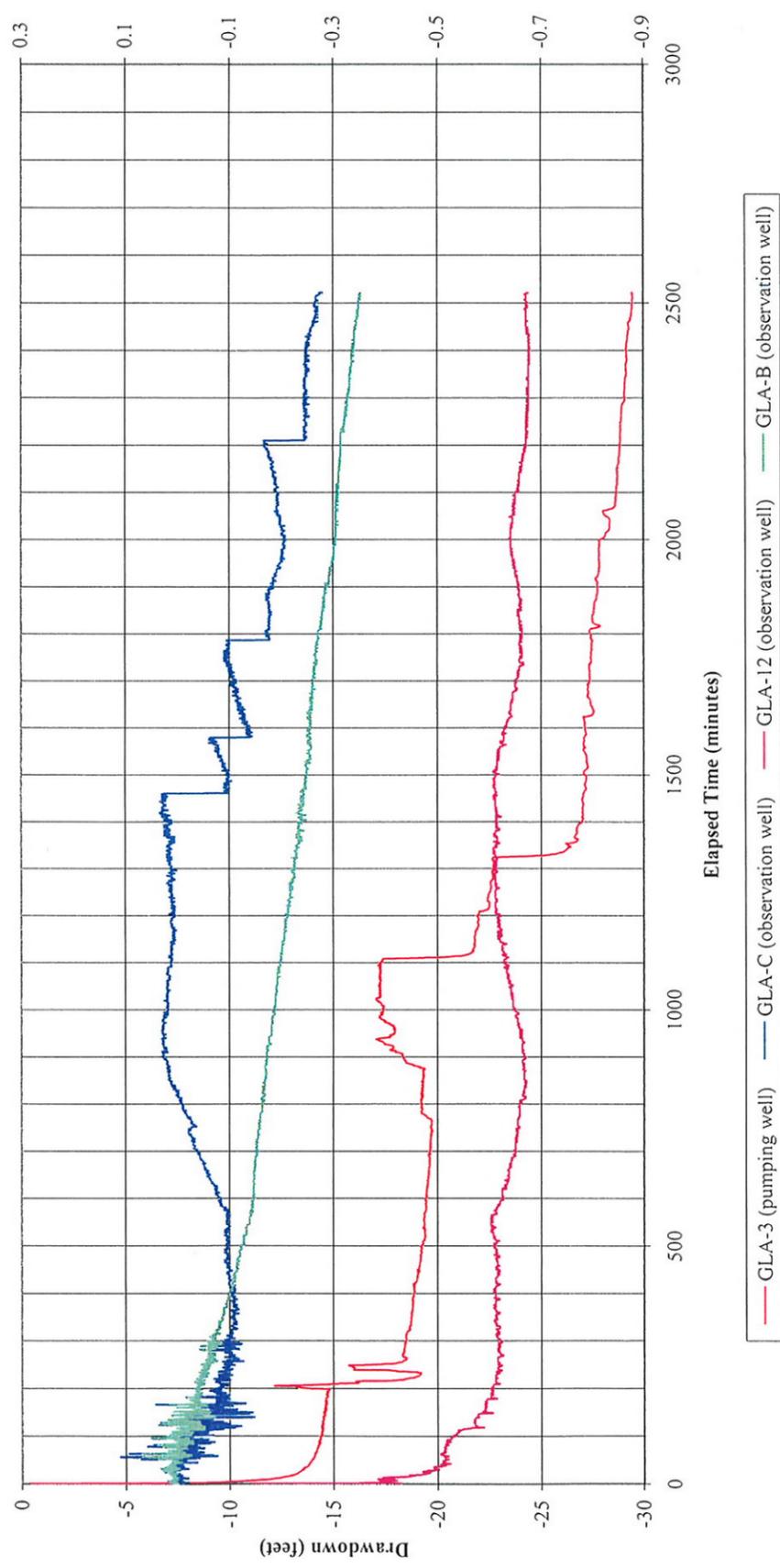


Figure 5
 Aquifer Pumping Test
 Gregory Canyon
 Well GLA-B

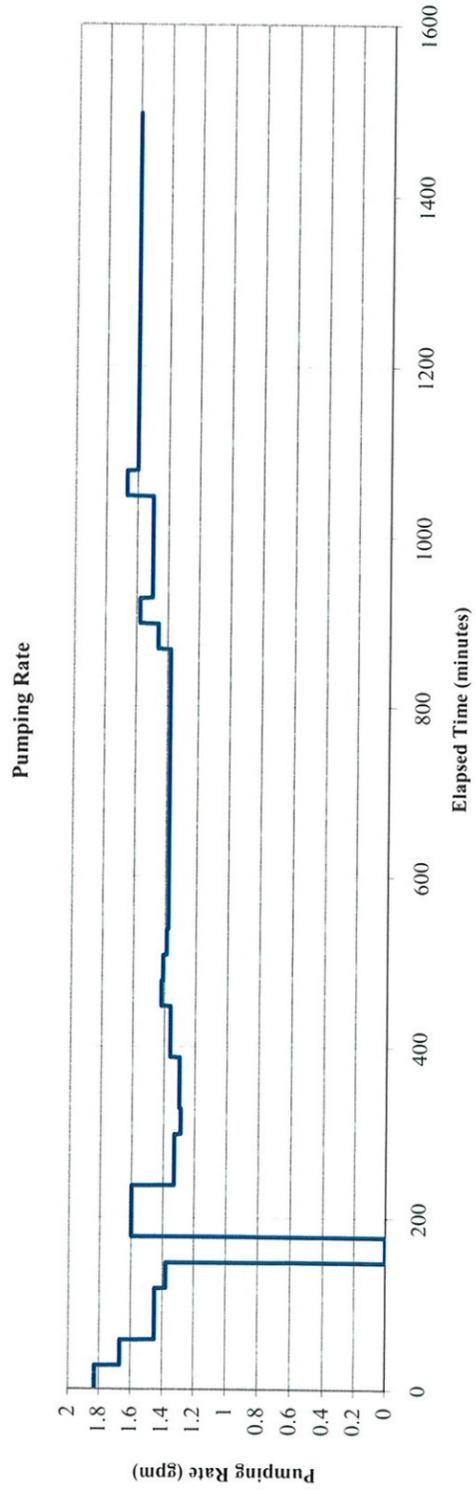
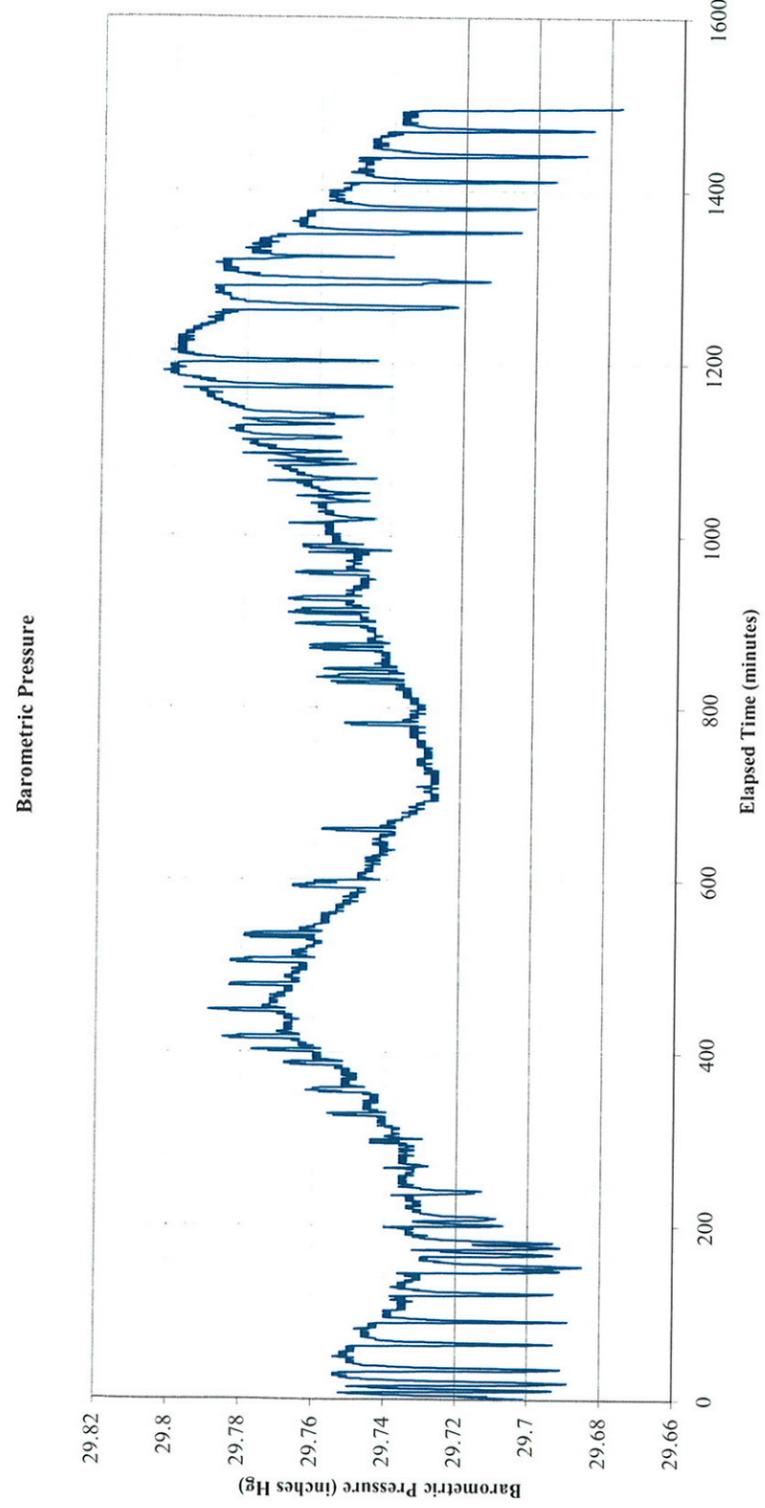
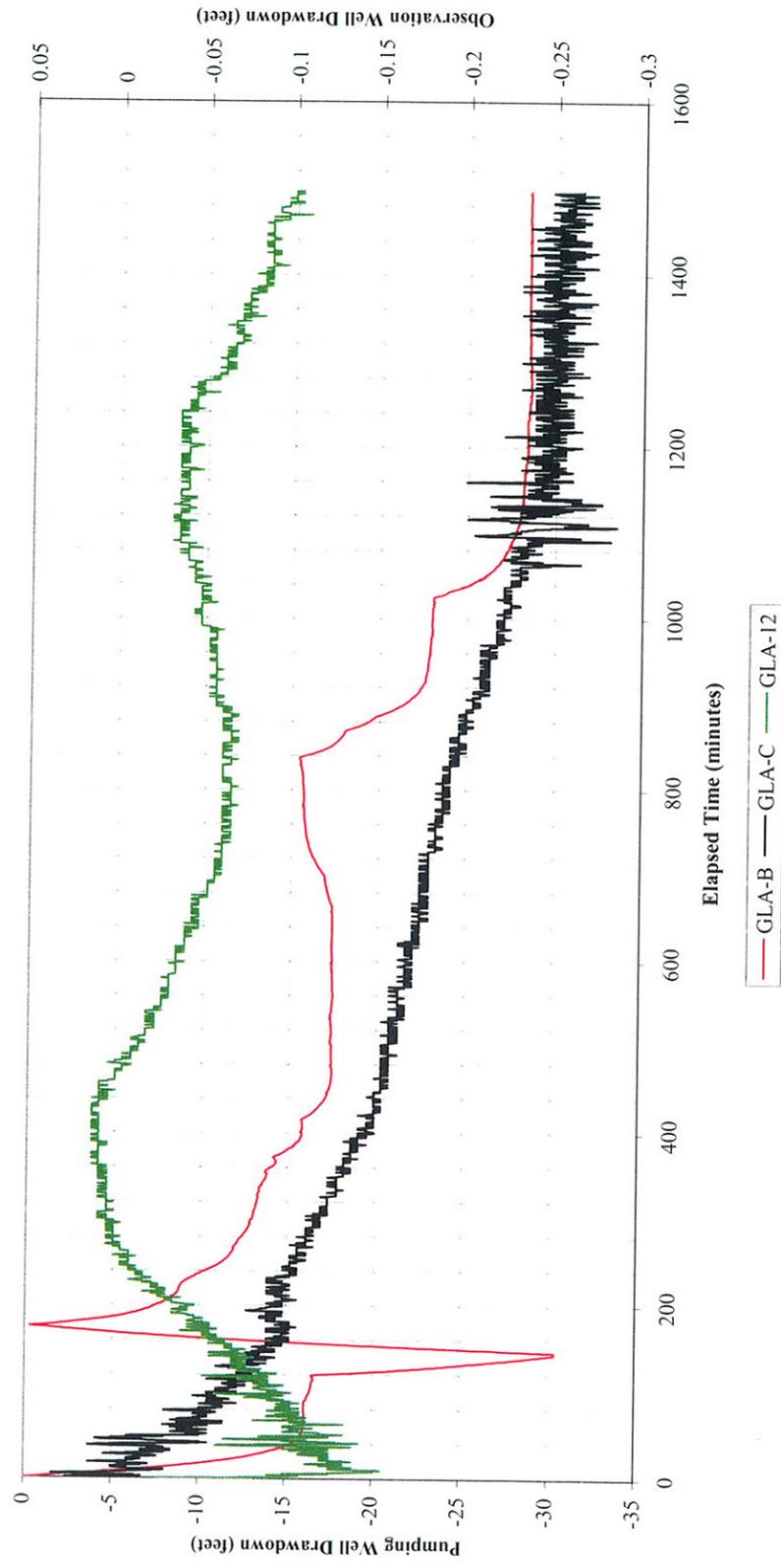
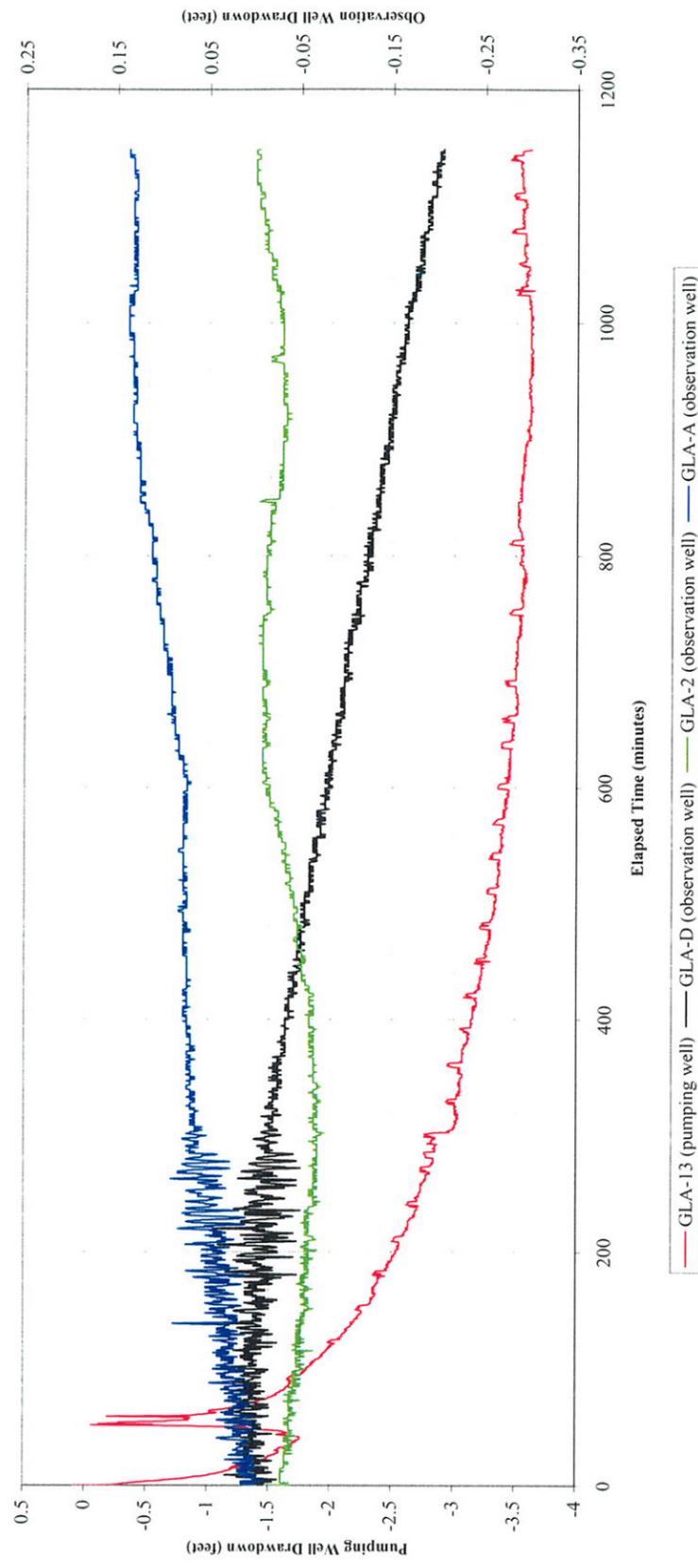
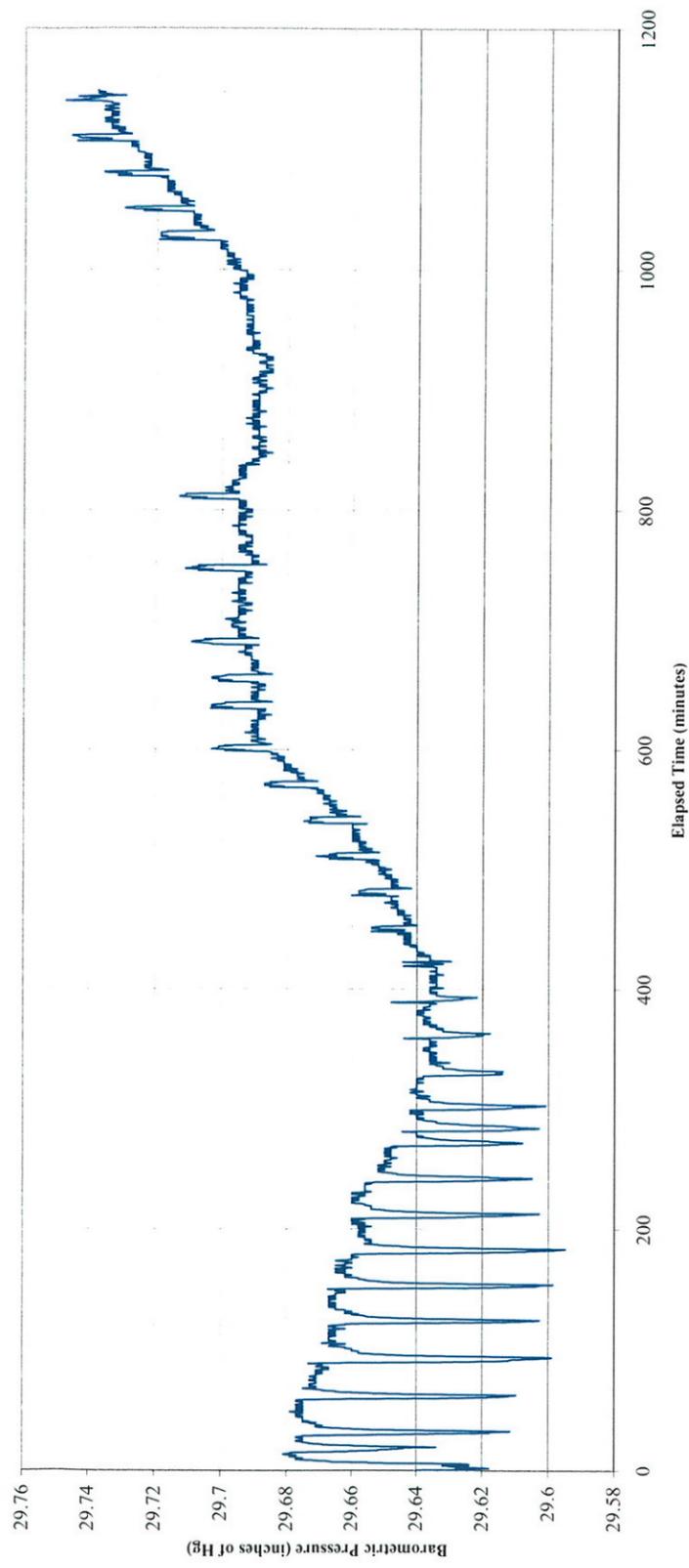


Figure 6
 Aquifer Pumping Test
 Gregory Canyon
 Well GLA-13



Barometric Pressure vs Time



Pumping Rate

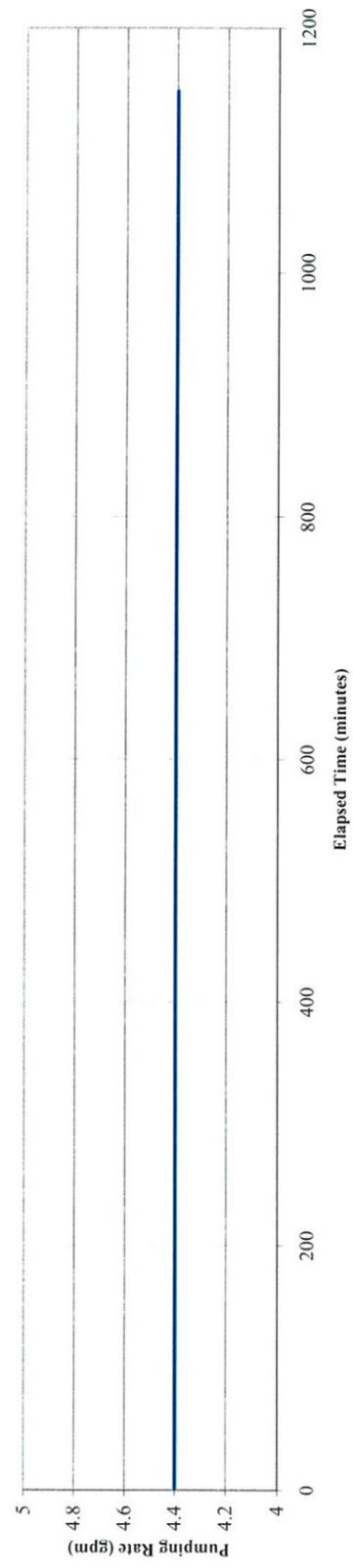
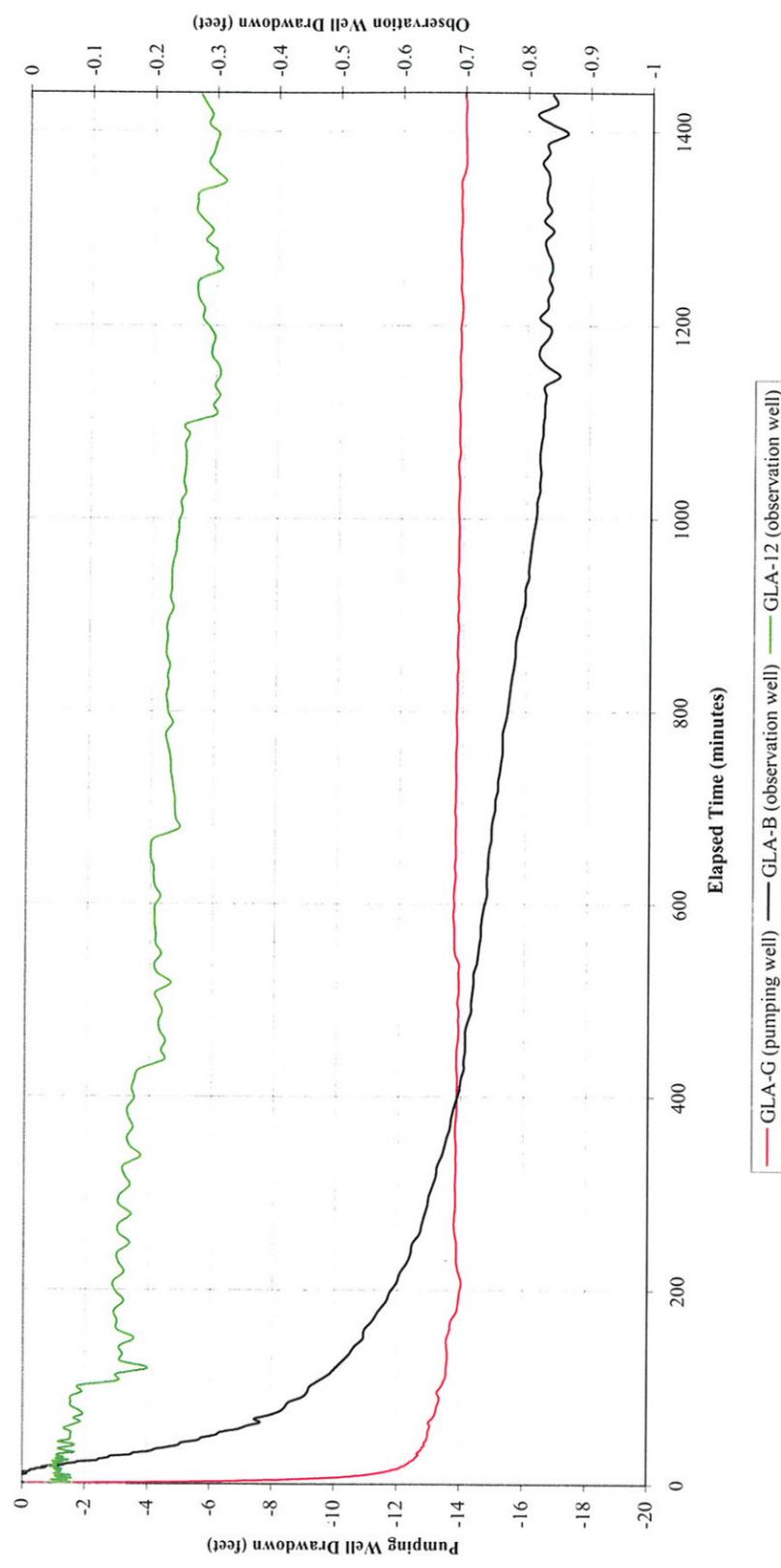
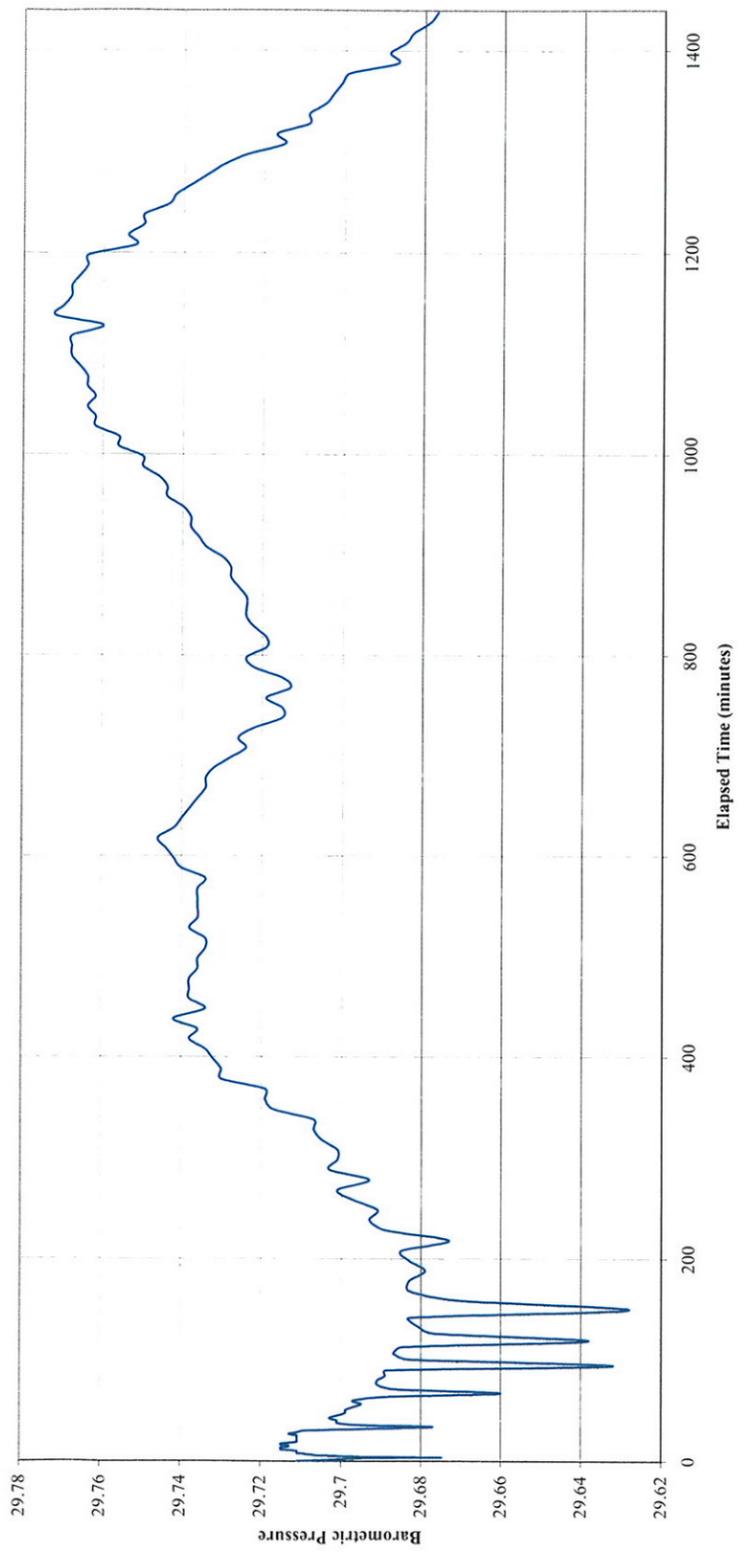


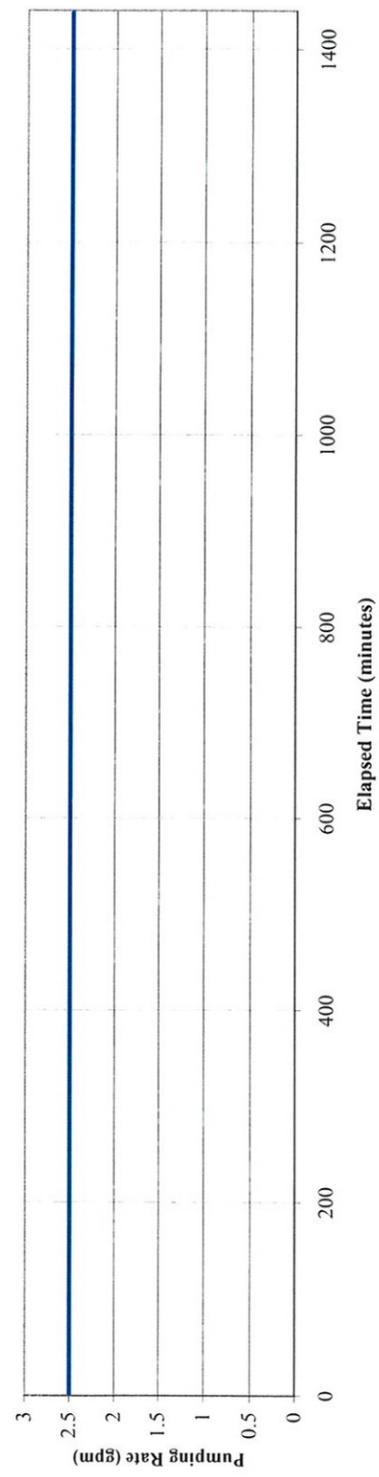
Figure 7
 Aquifer Pumping Test
 Gregory Canyon
 Well GLA-G

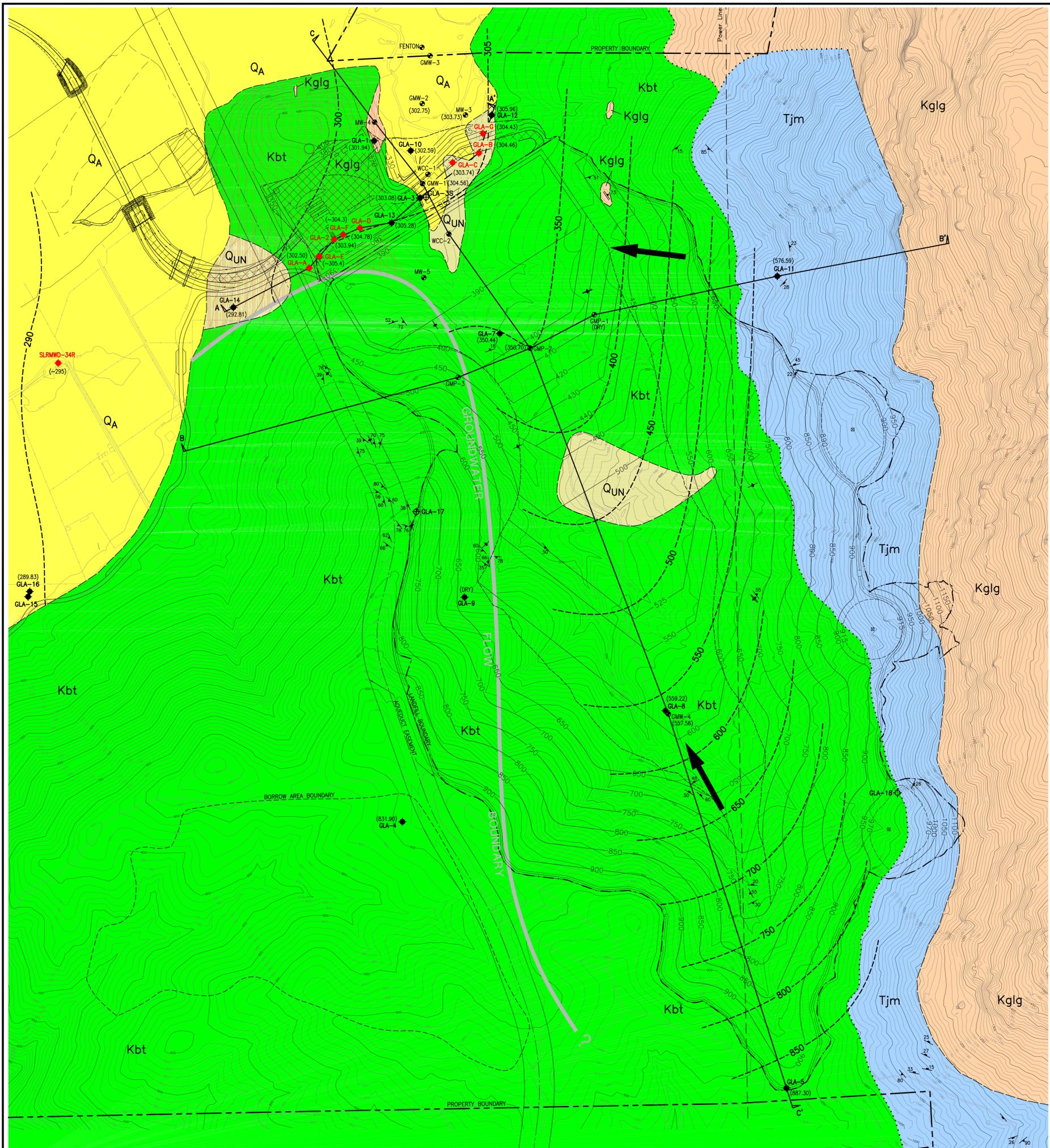


Barometric Pressure vs Time



Pumping Rate





LEGEND:

- SURFICIAL DEPOSITS (DENOTED AS Q_s ON SOME SECTIONS AND FIGURES):**
- QA** ALLUVIUM DEPOSITED AT THE MOUTH OF GREGORY CANYON CONTIGUOUS WITH THE SAN LUIS REY RIVER FLOODPLAIN. UNCONSOLIDATED DEPOSITS OF SAND, SILT AND GRAVEL WITH VARIABLE AMOUNTS OF COBBLES AND BOULDERS.
 - QUN** UNDIFFERENTIATED COLLUVIUM, SLOPE WASH, TALUS AND DEBRIS FLOW DEPOSITS THAT FORM A VENEER OVER MOST OF THE AREA SHOWN IN THE MAP. ON THE EAST FLANK OF THE CANYON THEY COMPRISE COBBLES AND BOULDERS OF LEUCOGRANDIORITE SET IN A LOCALLY CONSOLIDATED MATRIX OF SAND AND SILT. ON THE WEST FLANK OF THE CANYON THEY INCLUDE MOSTLY SAND AND SILT DERIVED FROM WEATHERED TONALITE.
- BEDROCK:**
- Kglg** GREGORY MOUNTAIN LEUCOGRANDIORITE. PHANERITIC TEXTURE WITH MEDIUM TO COARSE CRYSTALLINITY. LIGHT GRAY TO BUFF WITH LESS THAN 5% DARK MINERALS. FORMS THE CORE OF GREGORY MOUNTAIN, AND ALSO FORMS DIKES THAT CUT OLDER UNITS.
 - Kbt** BONSAILL TONALITE. PHANERITIC TEXTURE WITH MEDIUM TO COARSE CRYSTALLINITY. DARK GRAY. TYPICALLY DEEPLY WEATHERED AND FRIABLE.
 - Tjm** METAMORPHIC ROCKS. AMPHIBOLITES AND METAVOLCANIC ROCKS. IN SOME LOCATIONS WITH MIGMATITIC STRUCTURE THAT RESEMBLES GNEISSIC BANDING. APHANTIC TO PORPHYROBLASTIC TEXTURE. RELICT PORPHYRITIC TEXTURES SUGGEST A VOLCANIC PROTOLITH FOR SOME OF THE UNITS. MEDIUM TO DARK BLuish GRAY. GENERALLY MASSIVE AND HARD.

- APPROXIMATE GEOLOGIC CONTACT
- - - APPROXIMATE GEOLOGIC CONTACT OBSCURED BY SURFICIAL DEPOSITS
- ↗ STRIKE AND DIP OF FOLIATION
- ↘ STRIKE AND DIP OF JOINTS
- ↖ STRIKE AND DIP OF DIKE
- NEW GROUNDWATER MONITORING WELL BY GLA
- ◆ GROUNDWATER MONITORING WELL BY GLA
- ⊕ EXPLORATORY BORING (GLA, 2004)
- ⊖ PROPOSED GROUNDWATER MONITORING WELL
- ⊙ GROUNDWATER MONITORING WELL BY OTHERS
- (887.30) GROUNDWATER ELEVATION (OCTOBER 2004)
- - - 700 - - - PIEZOMETRIC SURFACE ELEVATION CONTOUR (OCTOBER 2004)
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER BARRIER (QUERIED WHERE UNCERTAIN OF SOUTHERN EXTENSION)
- ||||| LOW PERMEABILITY ZONE
- 700 BOTTOM GRADE CONTOURS
- A-A' B-B' C-C' LOCATION OF CROSS-SECTION.

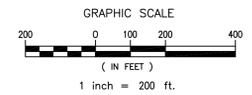
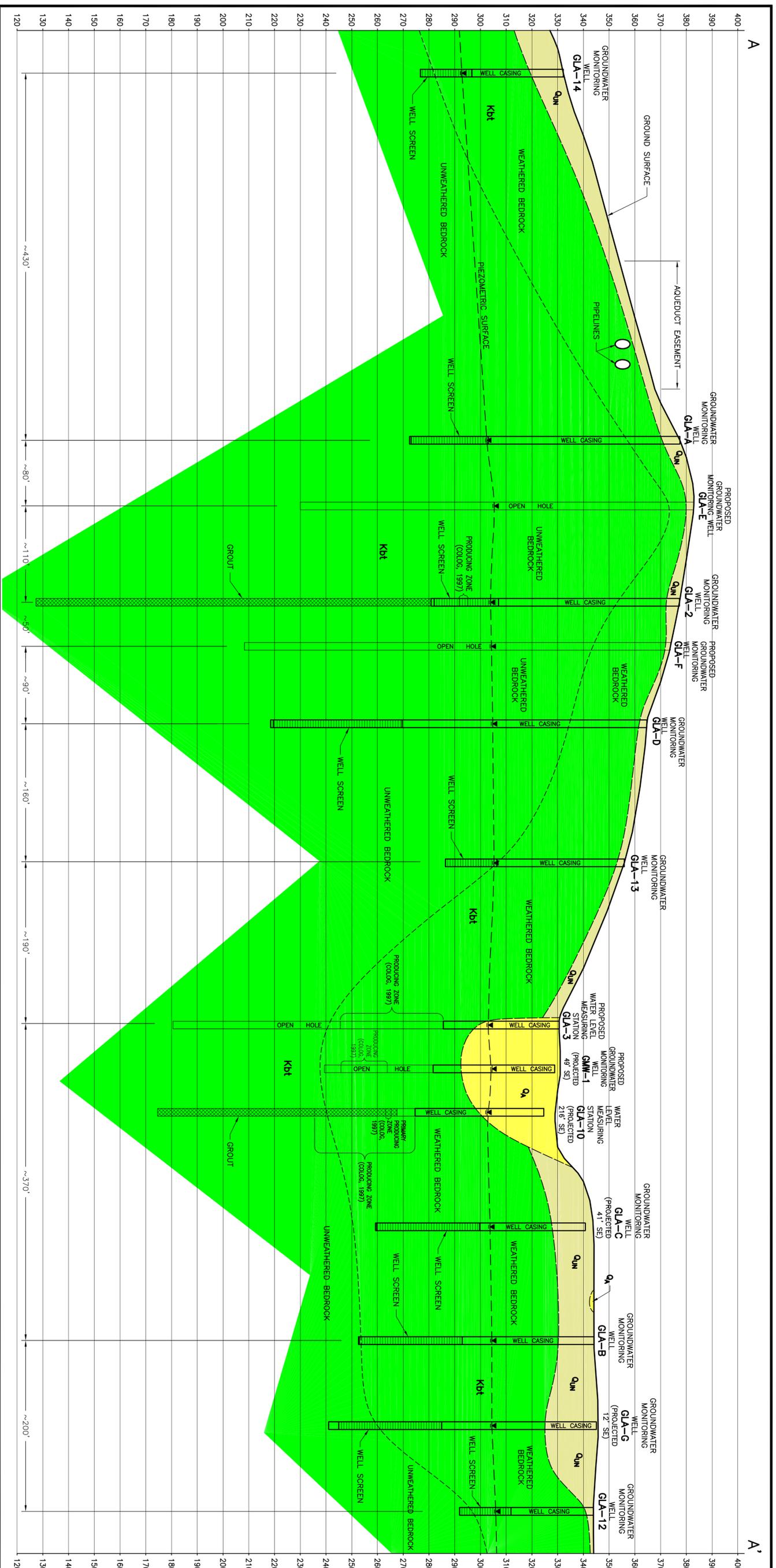


PLATE 1
HYDROGEOLOGIC MAP
SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION REPORT
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY: VL DATE: OCTOBER 2004 JOB NO: 9539



EXPLANATION:

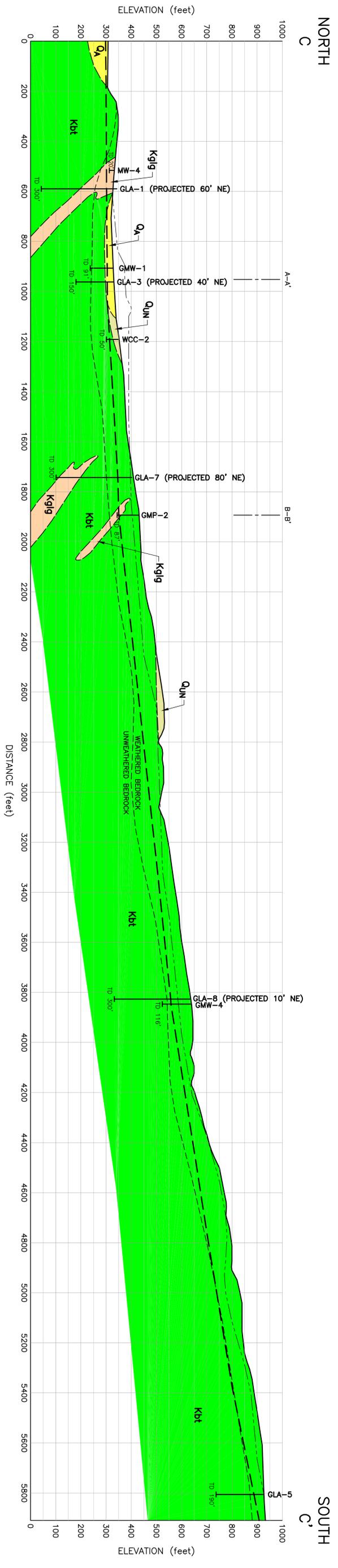
- Qa ALLUVIUM
- Qm UNDIFFERENTIATED SURFICIAL DEPOSITS INCLUDING RESIDUAL SOILS, COLLUVIUM AND LOCAL ALLUVIUM
- Kbt BEDROCK (WEATHERED AND UNWEATHERED); BONSALL TOUALTE WITH MINOR DIKES AND VEINS OF GREGORY MOUNTAIN LEUCODORANDORITE AND PEGMATITE.
- APPROXIMATE GEOLOGIC CONTACT
- APPROXIMATE PIEZOMETRIC SURFACE (10/09/04)

PROFILE SCALES:
 HORIZ.: 1" = 60'
 VERT.: 1" = 20'

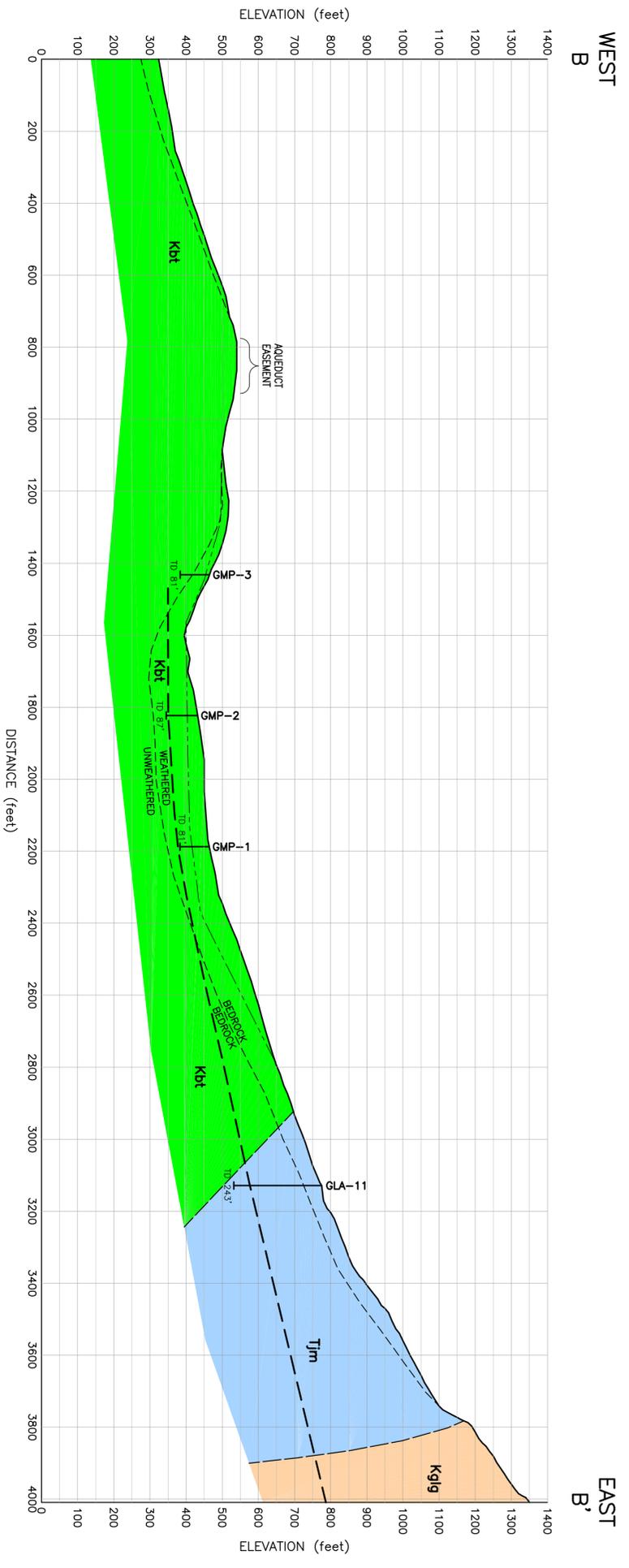
PLATE 2

DETECTION MONITORING PROGRAM
 POINT-OF-COMPLIANCE WELLS CROSS-SECTION
 SUPPLEMENTAL HYDROGEOLOGIC
 INVESTIGATION REPORT
 GREGORY CANYON LANDFILL
 SAN DIEGO COUNTY, CALIFORNIA

Geologic Associates
 Geologists, Hydrogeologists, and Engineers
 DRUMM, JR.
 OCTOBER 2004 JOB 9539



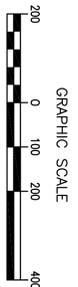
CROSS-SECTION C-C'



CROSS-SECTION B-B'

LEGEND:

- Qa** SURFICIAL DEPOSITS (DENOTED AS Q_s ON SOME SECTIONS AND FIGURES): ALLUVIUM DEPOSITED AT THE MOUTH OF GREGORY CANYON CONTIGUOUS WITH THE SAN LUIS REY FANER FLOODPLAIN, UNCONSOLIDATED DEPOSITS OF SAND, SILT AND GRAVEL WITH VARIABLE AMOUNTS OF COBBLES AND BouldERS.
 - Qun** UNDIFFERENTIATED COLLUVIUM, SloPE WASH, TALUS AND DEBRIS FLOW DEPOSITS THAT FORM A VENEER OVER MOST OF THE AREA SHOWN ON THE GEOLOGIC MAP (PLATE 1). ON THE EAST FLANK OF THE CANYON THEY COMPRISE COBBLES AND BouldERS OF LEUCOGYANDORITE SET IN A LOCALLY CONSOLIDATED MATRIX OF SAND AND SILT ON THE WEST FLANK OF THE CANYON THEY INCLUDE MOSAIC SAND AND SILT DERIVED FROM WEATHERED TONALITE.
 - Kqig** GREGORY MOUNTAIN LEUCOGYANDORITE, PANCRATIC TEXTURE WITH MEDIUM TO COARSE CRYSTALLINITY, GRAY TO BUFF WITH LESS THAN 5% DARK MINERALS, FORMS THE CORE OF GREGORY MOUNTAIN, AND ALSO FORMS BAKES OUT COBBER UNITS.
 - Kbt** BONSALL TONALITE, PANCRATIC TEXTURE WITH MEDIUM TO COARSE CRYSTALLINITY, DARK GRAY, TYPICALLY DEEPLY WEATHERED AND FRAGILE.
 - Tjm** METAMORPHIC ROCKS, AMPHIBOLITES AND METAVOLCANIC ROCKS, IN SOME LOCATIONS WITH MIGMATITE STRUCTURE THAT RESEMBLES GNEISSIC BANDING, APPEARING TO PORPHYROBLASTIC TEXTURE; RELECT PORPHYRITIC TEXTURES SUGGEST A VOLCANIC PROTOPLITH FOR SOME OF THE UNITS, MEDIUM TO DARK BRUSH GRAY, GENERALLY MASSIVE AND HARD.
- BEDROCK:**
- APPROXIMATE GEOLOGIC CONTACT
 - - - - - PIEZOMETRIC SURFACE (OCTOBER 2004)
 - - - - - PROPOSED BOTTOM GRADE
 - ┆ APPROXIMATE CONTACT BETWEEN WEATHERED AND UNWEATHERED BEDROCK
 - ┆ GROUNDWATER MONITORING WELL



ATTACHMENT A

BORING LOGS AND WELL CONSTRUCTION LOGS

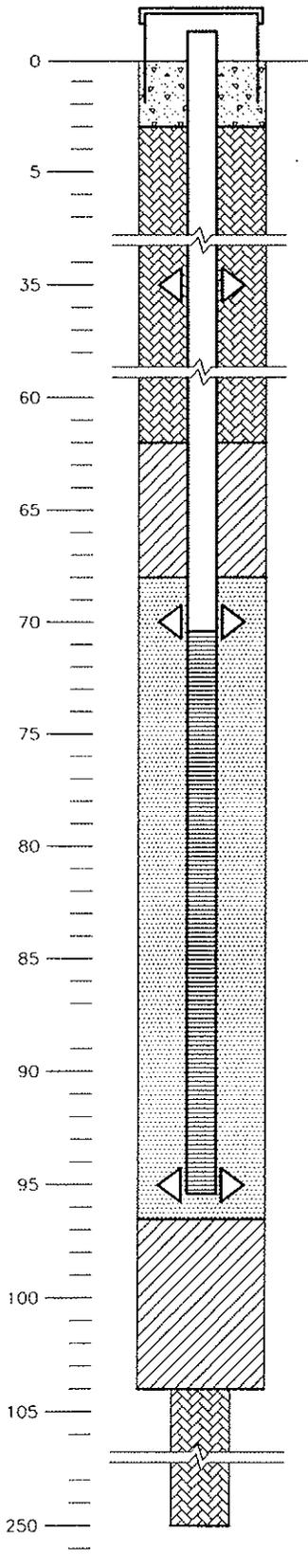
MONITORING WELL COMPLETION SUMMARY

WELL NO.: GLA-2

PAGE: 1 OF 1

JOB NO.: 9539
 PROJECT: GREGORY CANYON LANDFILL
 LOCATION: GREGORY CANYON, PALA, CA
 INSPECTOR: W. LOPEZ, CHG
 CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: 377.33
 ELEVATION TOP OF CASING: 379.39
 DATE STARTED: 6/25/04
 DATE FINISHED: 6/28/04
 TOTAL DEPTH: 95.38 feet



DRILLING SUMMARY:

Total Depth: Reamed to 104 feet
 Borehole diameter: 8-1/2"
 Driller: WDC EXPLORATION AND WELLS

Rig: SPEED STAR 30K
 Bit(s): TRI-CONE

Drilling Fluid: AIR
 Protective Casing: 9-5/8" diameter steel conductor from 0 to 20'

WELL CONSTRUCTION DETAILS:

-  Casing: 4" diameter, flush threaded, Sch. 40 PVC. (From +2.06 to 70.38 feet.)
-  Screen: 4" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 70.38 to 95.38 feet.)
-  Filter Pack: #3 Monterey type sand. (From 68 to 96.5 feet.)
-  Bentonite Seal: Medium chipped bentonite. (From 62 to 68 feet and from 96.5 to 104 feet.)
-  Grout Seal: Neat cement slurry with 5% bentonite. (From 3 to 62 feet and from 104 to 250 feet.)
-  Centralizer: Stainless steel. (At 35, 70 and 95 feet.)
-  Cement: From 0 to 3 feet.

WELL CONSTRUCTION LOG:

	Start		Finish	
	Date	Time	Date	Time
Drilling:	11/18/96	11:20	11/19/96	8:19
Coring:	-	-	-	-
Geophys. Logging:	12/12/96	-	12/12/96	-
Bottom Seal Placement: (Grout/Bentonite)	6/24/04	14:00	6/28/04	10:41
Ream:	6/25/04	15:00	6/28/04	9:00
Casing Install:	6/28/04	10:28	6/28/04	10:55
Filter Placement:	6/28/04	10:41	6/28/04	10:23
Seal Placement: (Bentonite)	6/28/04	11:03	6/28/04	11:08
Seal Placement: (Grout)	6/28/04	12:20	6/28/04	13:00

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
	Surge Block	7/06/04	11:44
Bailing	7/06/04	12:00	12:07
Pumping			
Total Gallons Removed: 10			

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. (µS/cm)	Temp (°F)

Comments:

Well was developed by surging and bailing until dry.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL (feet)	By
7/26/04	7:30	20 days after well development	-	76.58	300.75	WBL

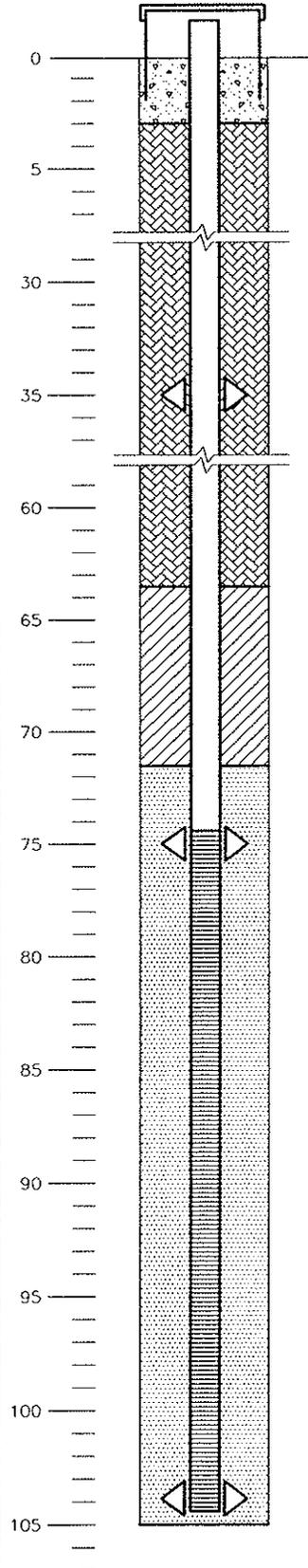
MONITORING WELL COMPLETION SUMMARY

WELL NO.: GLA-A

PAGE: 1 OF 1

JOB NO.: 9539
 PROJECT: GREGORY CANYON LANDFILL
 LOCATION: GREGORY CANYON, PALA, CA
 INSPECTOR: W. LOPEZ, CHG
 CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: 377.49
 ELEVATION TOP OF CASING: 380.35
 DATE STARTED: 7/20/04
 DATE FINISHED: 7/21/04
 TOTAL DEPTH: 104.4 feet



DRILLING SUMMARY:

Total Depth: 105 feet
 Borehole diameter: 8-1/2"
 Driller: WDC EXPLORATION AND WELLS
 Rig: SPEED STAR 30K
 Bit(s): TRI-CONE / DOWNHOLE HAMMER
 Drilling Fluid: AIR
 Protective Casing: 9-5/8" diameter steel conductor from 0 to 20'

WELL CONSTRUCTION DETAILS:

-  Casing: 4" diameter, flush threaded, Sch. 40 PVC. (From +2.86 to 74.4 feet.)
-  Screen: 4" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 74.4 to 104.4 feet.)
-  Filter Pack: #3 Monterey type sand. (From 71.5 to 105 feet.)
-  Bentonite Seal: Medium chipped bentonite. (From 63.5 to 71.5 feet.)
-  Grout Seal: Neat cement slurry with 5% bentonite. (From 3 to 63.5 feet.)
-  Centralizer: Stainless steel. (At 35, 75 and 104 feet.)
-  Cement: From 0 to 3 feet.

WELL CONSTRUCTION LOG:

	Date	Start Time	Date	Finish Time
Drilling:	6/08/04	16:50	6/09/04	9:55
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	6/11/04	7:30	6/11/04	9:15
Casing Install:	6/24/04	10:00	6/24/04	10:10
Filter Placement:	6/24/04	10:15	6/24/04	11:10
Seal Placement: (Bentonite)	6/24/04	11:10	6/24/04	11:20
Seal Placement: (Grout)	6/24/04	12:30	6/24/04	13:10

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	7/06/04	8:30	8:40
Bailing	7/06/04	8:40	9:00
Pumping	7/06/04	10:25	11:15

Total Gallons Removed: 165

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. (µs/cm)	Temp (°F)

Comments:

Well was developed by surging, bailing and pumping water until visibly clear, approximately less than 5 NTU.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL (feet)	By
6/11/04	7:15	Prior to well construction	-	75.22	302.27	WBL
7/06/04	8:25	Prior to well development	-	75.30	302.19	WBL

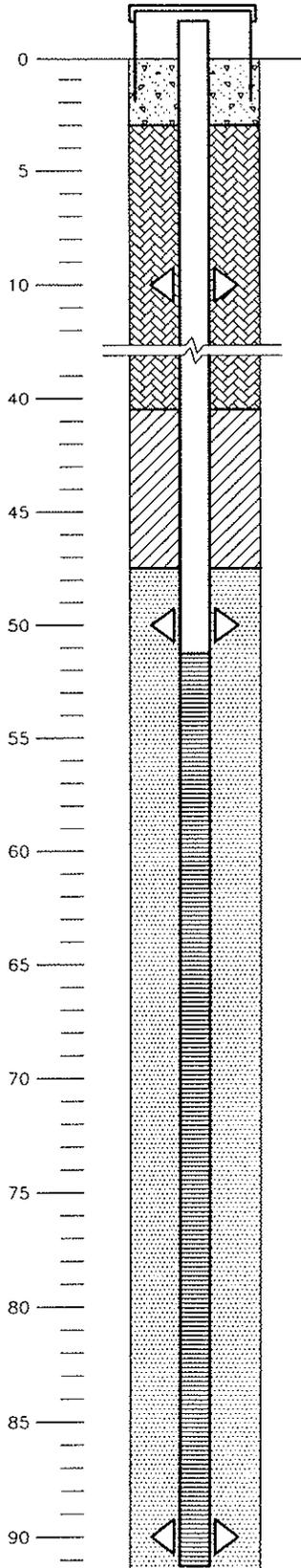
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-B**

PAGE: 1 OF 1

JOB NO.: 9539
 PROJECT: GREGORY CANYON LANDFILL
 LOCATION: GREGORY CANYON, PALA, CA
 INSPECTOR: J. HOWER, CEG
 CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: 344.14
 ELEVATION TOP OF CASING: 347.04
 DATE STARTED: 6/09/04
 DATE FINISHED: 6/23/04
 TOTAL DEPTH: 91.22 feet



DRILLING SUMMARY:

Total Depth: 91.5 feet
 Borehole diameter: 8-1/2"
 Driller: WDC EXPLORATION AND WELLS
 Rig: SPEED STAR 30K
 Bit(s): TRI-CONE / DOWNHOLE HAMMER
 Drilling Fluid: AIR
 Protective Casing: 9-5/8" diameter steel conductor from 0 to 20'

WELL CONSTRUCTION LOG:

	Date	Start Time	Date	Finish Time
Drilling:	6/09/04	15:57	6/10/04	10:49
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	6/11/04	9:30	6/11/04	11:15
Casing Install:	6/21/04	10:20	6/21/04	10:50
Filter Placement:	6/21/04	10:52	6/21/04	11:15
Seal Placement: (Bentonite)	6/21/04	11:27	6/21/04	11:38
Seal Placement: (Grout)	6/23/04	8:30	6/23/04	9:45

WELL CONSTRUCTION DETAILS:

-  Casing: 4" diameter, flush threaded, Sch. 40 PVC. (From +2.9 to 51.22 feet.)
-  Screen: 4" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 51.22 to 91.22 feet.)
-  Filter Pack: #3 Monterey type sand. (From 47.5 to 91.5 feet.)
-  Bentonite Seal: Medium chipped bentonite. (From 40.5 to 47.5 feet.)
-  Grout Seal: Neat cement slurry with 5% bentonite. (From 3 to 47 feet.)
-  Centralizer: Stainless steel. (At 10, 50 and 90 feet.)
-  Concrete: From 0 to 3 feet.

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block			
Bailing			
Pumping	6/28/04 6/29/04	15:00	16:00
Total Gallons Removed: 2400			

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. (µs/cm)	Temp (°F)

Comments:

Well was developed during pump test conducted on 6/28/04 and 6/29/04. Discharge visibly clear, less than 5 NTU.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL (feet)	By
6/11/04	8:19	Prior to well construction	-	39.70	304.44	AF
7/06/04	14:30	After well development	-	40.00	304.14	WBL

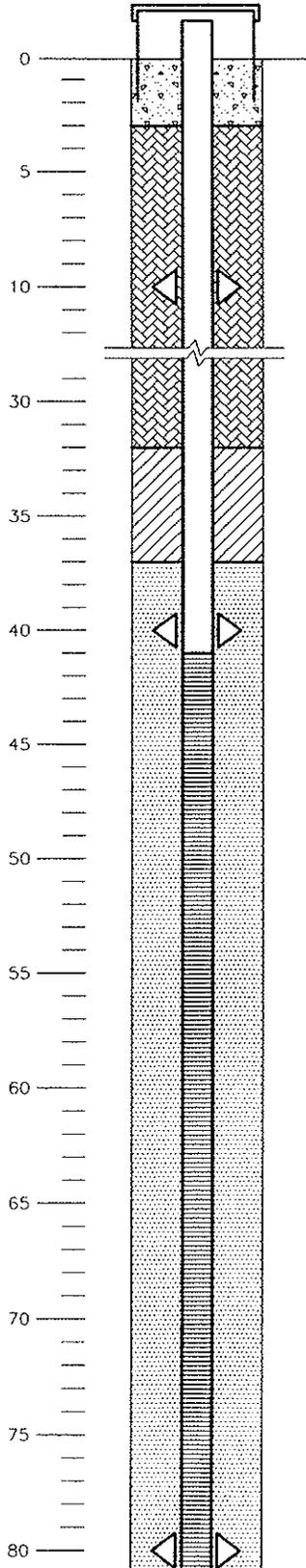
MONITORING WELL COMPLETION SUMMARY

WELL NO.: GLA-C

PAGE: 1 OF 1

JOB NO.: 9539
 PROJECT: GREGORY CANYON LANDFILL
 LOCATION: GREGORY CANYON, PALA, CA
 INSPECTOR: W. LOPEZ, CHG
 CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: 340.76
 ELEVATION TOP OF CASING: 343.45
 DATE STARTED: 6/03/04
 DATE FINISHED: 6/03/04
 TOTAL DEPTH: 81 feet



DRILLING SUMMARY:

Total Depth: 81 feet
 Borehole diameter: 8-1/2"
 Driller: WDC EXPLORATION AND WELLS
 Rig: SPEED STAR 30K
 Bit(s): TRI-CONE / DOWNHOLE HAMMER
 Drilling Fluid: AIR
 Protective Casing: 9-5/8" diameter steel conductor from 0 to 20'

WELL CONSTRUCTION DETAILS:

-  Casing: 4" diameter, flush threaded, Sch. 40 PVC. (From +2.69 to 41 feet.)
-  Screen: 4" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 41 to 81 feet.)
-  Filter Pack: #3 Monterey type sand. (From 37 to 81 feet.)
-  Bentonite Seal: Medium chipped bentonite. (From 32 to 37 feet.)
-  Grout Seal: Neat cement slurry with 5% bentonite. (From 3 to 32 feet.)
-  Centralizer: Stainless steel. (At 10, 40 and 80 feet.)
-  Concrete: From 0 to 3 feet.

WELL CONSTRUCTION LOG:

	Date	Start Time	Date	Finish Time
Drilling:	6/10/04	16:35	6/11/04	9:19
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	6/18/04	7:30	6/18/04	9:00
Casing Install:	6/21/04	13:05	6/21/04	13:35
Filter Placement:	6/21/04	13:35	6/21/04	14:05
Seal Placement: (Bentonite)	6/21/04	14:08	6/21/04	14:23
Seal Placement: (Grout)	6/23/04	10:15	6/23/04	11:30

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	7/06/04	14:15	14:28
Bailing	7/06/04	14:28	14:38
Pumping	7/06/04	14:50	PM
Total Gallons Removed: 170			

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. (µs/cm)	Temp (°F)

Comments:
 Well was developed by surging, bailing and pumping water until visibly clear, approximately less than 5 NTU.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL (feet)	By
6/12/04	15:55	Prior to well construction	-	40.14	303.31	WBL
7/06/04	14:10	Prior to well development	-	37.12	306.33	WBL

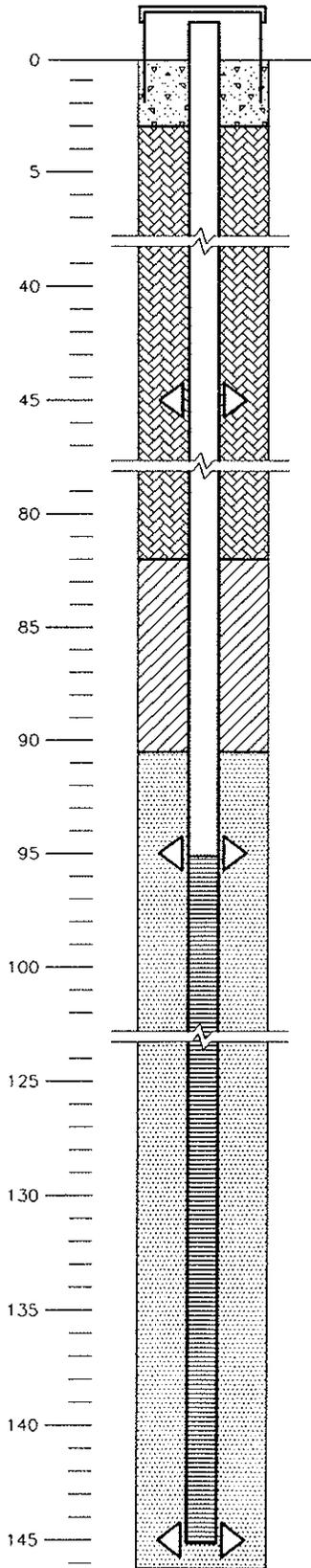
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-D**

PAGE: 1 OF 1

JOB NO.: 9539
 PROJECT: GREGORY CANYON LANDFILL
 LOCATION: GREGORY CANYON, PALA, CA
 INSPECTOR: W. LOPEZ, CHG
 CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: 364.77
 ELEVATION TOP OF CASING: 367.65
 DATE STARTED: 6/07/04
 DATE FINISHED: 6/25/04
 TOTAL DEPTH: 145.1 feet



DRILLING SUMMARY:

Total Depth: 146.2 feet
 Borehole diameter: 8-1/2"
 Driller: WDC EXPLORATION AND WELLS

Rig: SPEED STAR 30K
 Bit(s): TRI-CONE / DOWNHOLE HAMMER

Drilling Fluid: AIR

Protective Casing: 9-5/8" diameter steel conductor from 0 to 20'

WELL CONSTRUCTION DETAILS:

-  Casing: 4" diameter, flush threaded, Sch. 40 PVC. (From +2.88 to 95.1 feet.)
-  Screen: 4" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 95.1 to 145.1 feet.)
-  Filter Pack: #3 Monterey type sand. (From 90.5 to 146.2 feet.)
-  Bentonite Seal: Medium chipped bentonite. (From 82 to 90.5 feet.)
-  Grout Seal: Neat cement slurry with 5% bentonite. (From 3 to 82 feet.)
-  Centralizer: Stainless steel. (At 45, 95 and 145 feet.)
-  Cement: From 0 to 3 feet.

WELL CONSTRUCTION LOG:

	Date	Start Time	Date	Finish Time
Drilling:	6/07/04	14:25	6/08/04	8:55
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	6/11/04	13:15	6/11/04	15:15
Casing Install:	6/25/04	7:30	6/25/04	7:45
Filter Placement:	6/25/04	8:10	6/25/04	8:45
Seal Placement: (Bentonite)	6/25/04	8:45	6/25/04	8:54
Seal Placement: (Grout)	6/25/04	10:30	6/25/04	11:10

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	7/06/04	13:15	13:25
Bailing	7/06/04	13:25	13:50
Pumping			
Total Gallons Removed: 90			

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. (µs/cm)	Temp (°F)

Comments:

Well was developed by surging and bailing until dry.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL (feet)	By
6/21/04	11:30	Prior to well construction	-	59.50	305.27	WBL
7/06/04	12:15	Prior to well development	-	60.27	304.50	WBL

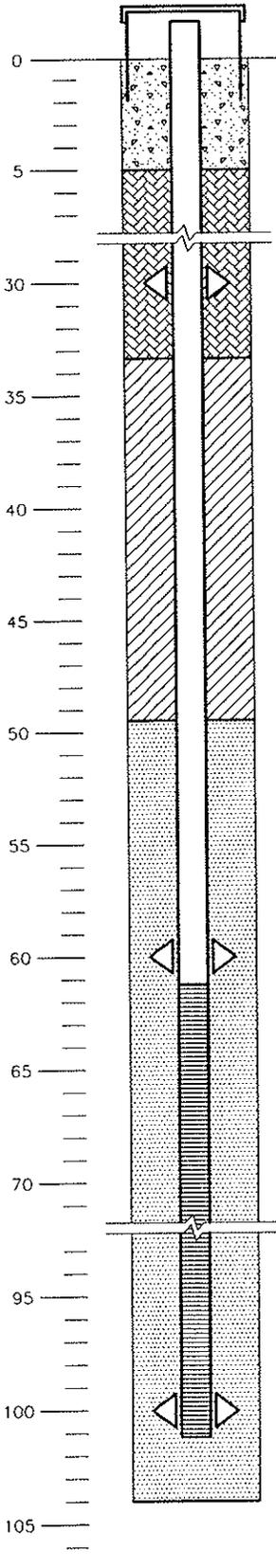
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-G**

PAGE: 1 OF 1

JOB NO.: 9539
 PROJECT: GREGORY CANYON LANDFILL
 LOCATION: GREGORY CANYON, PALA, CA
 INSPECTOR: W. LOPEZ, CHG
 CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: 345.04
 ELEVATION TOP OF CASING: 347.58
 DATE STARTED: 7/20/04
 DATE FINISHED: 7/21/04
 TOTAL DEPTH: 101.15 feet



DRILLING SUMMARY:

Total Depth: 104 feet
 Borehole diameter: 8-1/2"
 Driller: WDC EXPLORATION AND WELLS

Rig: SPEED STAR 30K
 Bit(s): TRI-CONE / DOWNHOLE HAMMER

Drilling Fluid: AIR
 Protective Casing: 9-5/8" diameter steel conductor from 0 to 20'

WELL CONSTRUCTION DETAILS:

-  Casing: 4" diameter, flush threaded, Sch. 40 PVC. (From +2.54 to 61.15 feet.)
-  Screen: 4" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 61.15 to 101.15 feet.)
-  Filter Pack: #3 Monterey type sand. (From 49.5 to 104 feet.)
-  Bentonite Seal: Medium chipped bentonite. (From 33.3 to 49.5 feet.)
-  Grout Seal: Neat cement slurry with 5% bentonite. (From 5 to 33.3 feet.)
-  Centralizer: Stainless steel. (At 30, 60 and 100 feet.)
-  Cement: From 0 to 5 feet.

WELL CONSTRUCTION LOG:

	Date	Start Time	Date	Finish Time
Drilling:	7/20/04	9:40	7/20/04	11:07
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	7/21/04	7:30	7/21/04	9:15
Casing Install:	7/21/04	10:23	7/21/04	10:45
Filter Placement:	7/21/04	10:47	7/21/04	11:42
Seal Placement: (Bentonite)	7/21/04	12:15	7/21/04	12:30
Seal Placement: (Grout)	7/21/04	15:00	7/21/04	15:30

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	7/22/04	10:15	10:25
Bailing	7/22/04	10:25	10:35
Pumping	7/22/04	11:03	17:10

Total Gallons Removed: 522

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. (µs/cm)	Temp (°F)

Comments:

Well was developed by surging, bailing and pumping water until visibly clear, approximately less then 5 NTU.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL (feet)	By
7/22/04	10:00	Prior to well development	-	40.18	304.86	WBL

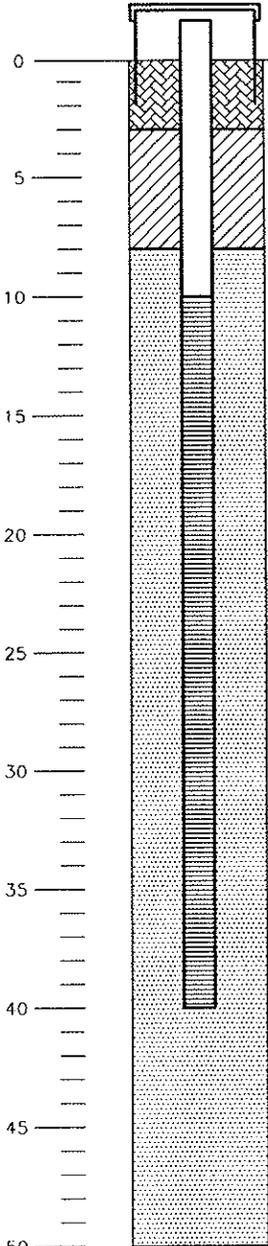
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **LUCIO-2R**

PAGE: 1 OF 1

JOB NO.: 9539
 PROJECT: GREGORY CANYON LANDFILL
 LOCATION: GREGORY CANYON, PALA, CA
 INSPECTOR: W. LOPEZ, CHG
 CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: ND
 ELEVATION TOP OF CASING: ND
 DATE STARTED: 6/03/04
 DATE FINISHED: 6/03/04
 TOTAL DEPTH: 40 feet



DRILLING SUMMARY:

Total Depth: 50 feet
 Borehole diameter: 8"
 Driller: WDC EXPLORATION AND WELLS
 Rig: CME-95
 Bit(s): BLADE BIT
 Drilling Fluid: NA
 Protective Casing: AUGER

WELL CONSTRUCTION DETAILS:

-  Casing: 2" diameter, flush threaded, Sch. 40 PVC. (From +3 to 10 feet.)
-  Screen: 2" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 10 to 40 feet.)
-  Filter Pack: #3 Monterey type sand. (From 8 to 50 feet.)
-  Bentonite Medium chipped bentonite. Seal: (From 3 to 8 feet.)
-  Concrete Seal: From 0 to 3 feet.

WELL CONSTRUCTION LOG:

	Start		Finish	
	Date	Time	Date	Time
Drilling:	6/03/04	8:33	6/03/04	9:03
Coring:	-	-	-	-
Ream:	-	-	-	-
Casing Install:	6/03/04	9:08	6/03/04	9:10
Filter Placement:	6/03/04	9:10	6/03/04	10:03
Seal Placement: (Bentonite)	6/03/04	10:03	6/03/04	10:05
Seal Placement: (Concrete)	6/03/04	10:20	6/03/04	10:45

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
	Surge Block	6/08/04	10:00
Bailing	6/08/04	10:15	10:20
Pumping	6/08/04	10:30	11:00

Total Gallons Removed: 155

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. (µs/cm)	Temp (°F)

Comments:

Well was developed by surging, bailing and pumping water until visibly clear, approximately less than 5 NTU.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL	By
6/03/04	9:10	During well construction	-	12.5	-	WBL
6/08/04	9:30	Prior to well development	-	12.7	-	WBL
6/08/04	11:00	After well development	-	12.7	-	WBL

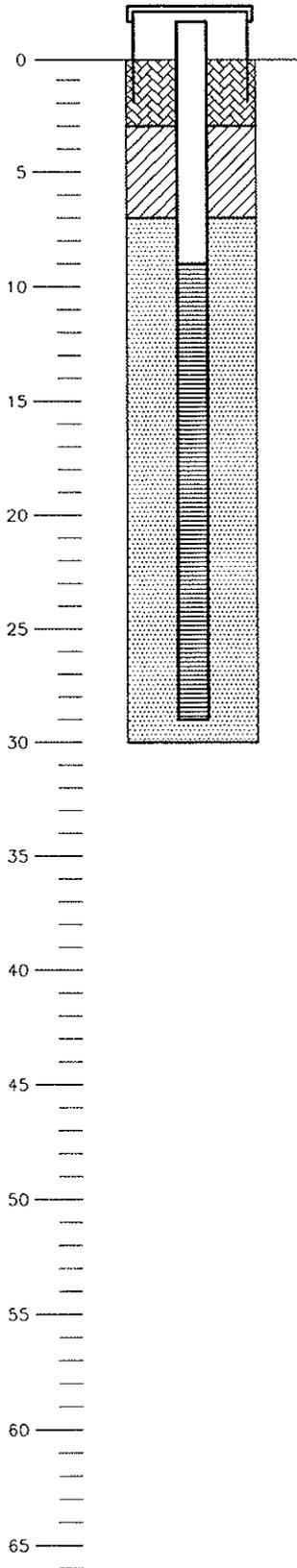
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **SLRMWD-34R**

PAGE: 1 OF 1

JOB NO.: 9539
 PROJECT: GREGORY CANYON LANDFILL
 LOCATION: GREGORY CANYON, PALA, CA
 INSPECTOR: W. LOPEZ, CHG
 CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: ND
 ELEVATION TOP OF CASING: ND
 DATE STARTED: 6/03/04
 DATE FINISHED: 6/03/04
 TOTAL DEPTH: 29 feet



DRILLING SUMMARY:

Total Depth: 30 feet
 Borehole diameter: 8"
 Driller: WDC EXPLORATION AND WELLS
 Rig: CME-95
 Bit(s): BLADE BIT
 Drilling Fluid: NA
 Protective Casing: AUGER

WELL CONSTRUCTION LOG:

	Start		Finish	
	Date	Time	Date	Time
Drilling:	6/03/04	12:20	6/03/04	12:40
Coring:	-	-	-	-
Ream:	-	-	-	-
Casing Install:	6/03/04	12:42	6/03/04	12:45
Filter Placement:	6/03/04	12:45	6/03/04	13:08
Seal Placement: (Bentonite)	6/03/04	13:08	6/03/04	13:10
Seal Placement: (Cement)	6/03/04	13:15	6/03/04	13:45

WELL CONSTRUCTION DETAILS:

-  Casing: 2" diameter, flush threaded, Sch. 40 PVC. (From +3 to 9 feet.)
-  Screen: 2" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 9 to 29 feet.)
-  Filter Pack: #3 Monterey type sand. (From 7 to 30 feet.)
-  Bentonite Seal: Medium chipped bentonite. (From 3 to 7 feet.)
-  Cement Seal: From 0 to 3 feet.

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
	Surge Block	6/08/04	11:45
Bailing	6/08/04	12:00	12:05
Pumping	6/08/04	12:15	12:45

Total Gallons Removed: 155

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. (µs/cm)	Temp (°F)

Comments:

Well was developed by surging, bailing and pumping water until visibly clear, approximately less then 5 NTU.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL	By
6/03/04	14:00	After well construction	-	12.6	-	WBL
6/08/04	11:25	Prior to well development	-	13.4	-	WBL
6/08/04	13:00	After well development	-	13.4	-	WBL

GeoLogic Associates

Boring Log

BORING NO.: GLA-17

PAGE: 1 OF 5

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: A. FYODOROVA

DATE STARTED: 6/16/04
 DATE FINISHED: 6/18/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: NA
 TOTAL DEPTH: 500 feet

TIME	DRY DENSITY (LBS./CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USGS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:48						0				WEATHERED BEDROCK: Gray to dark gray (N4-N5), fine, highly weathered, poorly indurated TONALITE. ...(5') - intermittent apolite dikes.	Damp.
8:55						10				...(10') - highly to moderately weathered, moderately indurated.	...(10') - set conductor casing to 10 feet.
9:24						20				...(15'-18') - light yellowish brown (10YR 6/4) GRANODIORITE dike with fine to coarse euhedral crystals.	Damp.
9:31						30				...(22'-23') - brown (7.5YR 5/2), fine to medium GRANODIORITE dike.	Damp.
9:36						40				...(33') - fine to medium with some iron-oxide staining.	
9:47						50				BEDROCK: Very dark gray (N3), aphanitic to fine, slightly to moderately weathered, well indurated TONALITE with some iron-oxide staining.	...(50') - inject water for dust control.
9:53						60					
10:06						70				...(69') - color change to dark grayish brown (2.5Y 4/2).	
10:16						80					
10:24						90					
10:31						100				...(96') - quartz vein.	
10:41											
10:50											

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

Boring Log

BORING NO.: GLA-17

PAGE: 2 OF 5

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: A. FYODOROVA

DATE STARTED: 6/16/04
 DATE FINISHED: 6/18/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: NA
 TOTAL DEPTH: 500 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
10:50						100					
11:09						110					
11:17						120				...(119') - fine to medium with some iron-oxide staining, slightly weathered.	
						130				...(125') - color change to pale olive (5Y 6/3); fine to coarse, moderately weathered, some iron-oxide staining.	
11:30						140				...(134') - color change to olive gray (5Y 5/2); thin apalite dike.	
11:35						150				...(150') - fine-grained.	
11:51						160					
12:18						170				...(166') - calcite veins.	
						180				...(170'-173') - pale brown (10YR 6/3) to brown (10YR 5/3), fine to coarse GRANODIORITE dike with some iron-oxide staining.	
12:36						190				...(173') - dark gray (N4) to black (N2.5), aphanitic to fine, very well indurated TONALITE with thin calcite veins.	
12:42						200					...(192'-196') - no cuttings return.
13:13										...(196') - predominately fine euhedral crystals.	
13:20											

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GeoLogic Associates

Boring Log

BORING NO.: GLA-17

PAGE: 3 OF 5

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: A. FYODOROVA

DATE STARTED: 6/16/04
 DATE FINISHED: 6/18/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: NA
 TOTAL DEPTH: 500 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
13:20						200				...same as above.	
13:53						210					
14:00						220					
						230					
14:34						240					
14:39						250					
						260					
15:13						270					
15:19						280					
15:15						290				...(290-300') - predominately ophanitic.	
6/17 7:15						300				...(300') - dark gray to gray (N4-N5), fine to medium, very well indurated TONALITE.	
7:50											
7:54											

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GeoLogic Associates

Boring Log

BORING NO.: GLA-17

PAGE: 4 OF 5

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: A. FYODOROVA

DATE STARTED: 6/16/04
 DATE FINISHED: 6/18/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: NA
 TOTAL DEPTH: 500 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
7:54						300				...(300') - dark gray to gray (N4-N5), fine to medium, very well indurated TONALITE.	
8:29						310					
8:34						320					
						330					
9:13						340					
9:23						350					
						360				...(360') - fine to ophanitic with calcite veins.	
9:58						370					
10:10						380					
11:01						390					
11:12						400					
11:49											
12:01											

CONTINUED ON NEXT PAGE

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GeoLogic Associates

Boring Log

BORING NO.: GLA-17

PAGE: 5 OF 5

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: A. FYODOROVA

DATE STARTED: 6/16/04
 DATE FINISHED: 6/18/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: NA
 TOTAL DEPTH: 500 feet

TIME	DRY DENSITY (LBS./CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
12:01						400				...same as above.	
12:18						410					
6/18 7:54						420					
8:10						430					
8:14						440					
9:03						450					
9:08						460					
9:41						470					
9:48						480					
10:16						490					
10:21						500					
11:00										Notes: 1. Total depth of boring 500 feet. 2. No groundwater encountered. 3. Borehole geophysics conducted on 6/21/04. 4. Boring abandoned with neat cement grout on 6/22/04.	

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

Boring Log

BORING NO.: GLA-3S

PAGE: 1 OF 2

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: A. FYODOROVA

DATE STARTED: 6/14/04
 DATE FINISHED: 6/15/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: 24.37 feet
 TOTAL DEPTH: 80 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USGS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:40						0			SW	YOUNGER ALLUVIUM: Dark brown (10YR 2/2) GRAVELLY SAND with COBBLES and BOULDERS. SAND is fine to medium, well graded; GRAVEL and COBBLES well rounded.	Moist.
						5				...(6') - color change to brown (7.5YR 5/4).	
8:48						10				...	Refusal on boulder, switch to Stratex.
6/15 8:33						15				...(12') - BOULDER.	
						20				...(14') - SAND is fine to coarse with volcanic COBBLES.	
						25				...(17') - increasing GRAVEL, COBBLES, and BOULDERS.	
						30			SM	OLDER ALLUVIUM: Light brown (7.5YR 6/4) SILTY SAND with scattered GRAVEL. SAND is fine to coarse, well graded.	Moist.
						35				...(26') - color change to yellow-brown (7.5YR 4/4).	Very moist
8:52						40				...	Moist.
						45				...(31') - increasing GRAVEL and COBBLES cemented with silica, well indurated.	
						50				WEATHERED BEDROCK: Olive (5Y 5/4), highly weathered with iron-oxide staining and alteration of feldspars to CLAY, medium to coarse GRANODIORITE (GRUSS).	Very moist.
9:40						55				...(37') - set conductor casing.	
9:54						60				...(41') - color change dark brown (10YR 3/3).	
						65				...(44'-47') - opalite dike, fine to coarse, well indurated.	...(44') - damp.
						70				...(47') - moderately weathered.	
10:00						75				...(49') - iron-oxide staining on fractured surfaces.	
13:29						80				...(51') - opalite vein.	...(52') - wet.

CONTINUED ON NEXT PAGE

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GeoLogic Associates

Boring Log

BORING NO.: GLA-3S

PAGE: 2 OF 2

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: A. FYODOROVA

DATE STARTED: 6/14/04
 DATE FINISHED: 6/15/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: 24.37 feet
 TOTAL DEPTH: 80 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USGS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
10:00						50					
13:29							▽			...(51') - apolite vein.	...(52') - wet.
13:31											
13:36						55					
13:42										...(58') - increasing mafic minerals.	Saturated.
13:48						60					
						65					
						70					
						75					
14:00						80					
						85				Notes: 1. Total depth of boring 80.0 feet; borehole open to 77.5 feet. 2. Groundwater first encountered at 52.0 feet on 6/15/04; static water level measured at 24.37 feet on 6/17/04. 3. Borehole geophysics performed on 6/18/04. 4. Borehole abandoned with neat cement grout on 6/23/04.	
						90					
						95					
						100					

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GeoLogic Associates

Boring Log

BORING NO.: GLA-A

PAGE: 1 OF 2

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 6/08/04
 DATE FINISHED: 6/09/04
 ELEVATION: 429575.97
 NORTHING: 1737085.44
 EASTING: 377.49

GW DEPTH: 75.12 feet
 TOTAL DEPTH: 105 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USGS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
16:50						0			SM	SOIL: Strong brown (7.5YR 4/6), fine, poorly graded SILTY SAND.	Dry.
						5					
						10				WEATHERED BEDROCK: Olive brown (2.5Y 4/3), fine, highly weathered with iron-oxide staining, poorly indurated TONALITE (GRUSS).	Slightly moist.
						15					
17:00						20				...(18') - color change to dark gray (2.5Y 4/1); moderately to slightly weathered, moderately indurated.	...(16') - set conductor casing, switch to downhole hammer.
6/07 7:15						25				BEDROCK: Black (N2.5), fine to medium, hornblend rich with quartz, moderately indurated TONALITE.	Dry.
7:22 7:32						30					
						35					
						40					
						45				...(30') - color varies from black (N2.5) to dark gray (2.5Y 4/1).	Dry.
7:55 8:23						50					
						55					
						60					

CONTINUED ON NEXT PAGE

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GeoLogic Associates

Boring Log

BORING NO.: GLA-A

PAGE: 2 OF 2

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 6/08/04
 DATE FINISHED: 6/09/04
 ELEVATION: 429575.97
 NORTHING: 1737085.44
 EASTING: 377.49

GW DEPTH: 75.12 feet
 TOTAL DEPTH: 105 feet

TIME	DRY DENSITY (LBS./CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						60			...some as above.	
8:42						65				
8:56						70				
						75	▼			
						80				
9:13						85	▽		...(83'-95') - color predominately dark gray (2.5Y 4/1); increasing quartz and feldspar.	Cuttings moist. ...(85') - first water encountered.
9:30						90				
						95				
						100				
9:55						105			Notes:	
						110			1. Total depth of boring 105 feet. 2. Groundwater first encountered at 85 feet, static water level measured at 75.12 feet on 6/11/04. 3. Borehole geophysics conducted on 6/11/04. 4. Monitoring well constructed in boring (see well completion summary).	
						115				
						120				

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

Boring Log

BORING NO.: GLA-B

PAGE: 1 OF 2

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG/A. FYODOROVA

DATE STARTED: 6/09/04
 DATE FINISHED: 6/10/04
 ELEVATION: 430149.38
 NORTHING: 1737940.66
 EASTING: 344.14

GW DEPTH: 40.66 feet
 TOTAL DEPTH: 91.5 feet

TIME	DRY DENSITY (LBS./CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
15:57						0			SM	COLLUVIUM: Dark yellowish brown (10YR 4/4), fine, poorly graded SILTY SAND.	Slightly moist.
16:00						5					
16:25						10				...(10') - grain size increase to fine to coarse with fine GRAVEL; well graded.	Moist.
16:37						15				WEATHERED BEDROCK: Light olive brown (2.5Y 5/4), fine, highly weathered with iron-oxide staining and alteration of feldspars to CLAY, poorly indurated GRANODIORITE (GRUSS).	Moist.
6/10 8:11						20				...(22-25') - color change to strong brown (7.5YR 5/6); grain size increase to fine to coarse.	
8:14						25					
8:26						30					... (26') - set conductor casing.
8:28						35					
8:35						40				...(35') - color change to olive brown (2.5Y 4/3).	Very moist.
8:41						45					...(42') - sound for water, wet at bottom of boring.
9:21						50					...(52'-60') - very moist.

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GeoLogic Associates

Boring Log

BORING NO.: GLA-B

PAGE: 2 OF 2

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG/A. FYODOROVA

DATE STARTED: 6/09/04
 DATE FINISHED: 6/10/04
 ELEVATION: 430149.38
 NORTHING: 1737940.66
 EASTING: 344.14

GW DEPTH: 40.66 feet
 TOTAL DEPTH: 91.5 feet

TIME	DRY DENSITY (LBS./CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						50					
						55					
9:30						60				...(60') - medium to coarse.	...(52'-60') - very moist.
10:12						65				...(65') - fine to medium.	...(62') - sound for water, water measured at 57.75 feet.
						70				...(71') - fine, moderately weathered.	
						75				...(76') - fine to coarse.	Moist.
10:22						80					...(80') - free water.
10:27						85					
10:49						90				UNWEATHERED BEDROCK: Gray (N5-N6), medium to coarse, very well indurated GRANODIORITE/TONALITE with euhedral crystals.	
						95				Notes:	
						100				1. Total depth of boring 91.5 feet (refusal with tri-cone bit). 2. Groundwater first encountered at 42 feet on 6/10/04; static water level measured at 40.66 feet on 6/11/04. 3. Borehole geophysics conducted on 6/11/04. 4. Groundwater monitoring well constructed in boring (see well completion summary).	

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GeoLogic Associates

Boring Log

BORING NO.: GLA-C

PAGE: 1 OF 2

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: A. FYODOROVA

DATE STARTED: 6/10/04
 DATE FINISHED: 6/11/04
 ELEVATION: 430101.73
 NORTHING: 1737809.29
 EASTING: 340.76

GW DEPTH: 40.14 feet
 TOTAL DEPTH: 81 feet

TIME	DRY DENSITY (LBS./CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
14:35						0			SM	TOPSOIL: Brown (7.5YR 4/3), fine to coarse, well graded SILTY SAND.	Dry.
						5			SM	COLLUVIUM: Strong brown (7.5YR 5/6), fine to medium, moderately graded SILTY SAND. ...(6') - well indurated.	Damp.
						10				...(10') - GRAVEL and COBBLES predominately opalite and metavolcanics.	
						15				WEATHERED BEDROCK: Strong brown (7.5YR 5/6), fine to coarse, highly weathered with alteration of feldspars to CLAY, poorly indurated GRANODIORITE (GRUSS). ...(17') - pegmatite dike. ...(18'-19') - opalite dike.	Very moist.
16:46						20				...(20') - becomes moderately weathered with slight iron-oxide staining.	
6/11 7:42						25				...(24'-25') - pegmatite dike. ...(26'-27') - diabase/mafic dike, highly weathered to CLAY.	...(26') - very moist. ...(27') - set conductor casing.
8:01						30					
8:07						35				...(33') - color change to dark grayish brown (2.5Y 4/2).	
						40					
						45					
8:14						50					...(50') - wait 30 minutes sound for water; water measured at 46.7'.
8:55											

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GeoLogic Associates

Boring Log

BORING NO.: GLA-C

PAGE: 2 OF 2

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: A. FYODOROVA

DATE STARTED: 6/10/04
 DATE FINISHED: 6/11/04
 ELEVATION: 430101.73
 NORTHING: 1737809.29
 EASTING: 340.76

GW DEPTH: 40.14 feet
 TOTAL DEPTH: 81 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:55						50					...(50') - wait 30 minutes sound for water; water measured at 46.7'.
						55				...(55'-56') - color change to olive brown (2.5Y 4/3).	
9:02						60					
9:08						65					...(63'-67') - no cuttings return.
						70				...(67') - slightly to moderately weathered.	Moist.
						75				...(75') - slightly weathered.	
9:19						80					...(72') - very moist.
						85					...(77') - wet.
						90				Notes:	
						95				1. Total depth of boring 81.0 feet; borehole open to 77.5 feet.	
						100				2. Groundwater first encountered at 46.7 feet; static water level measured at 40.14 feet on 6/11/04.	
										3. Borehole geophysics conducted on 6/18/04.	
										4. Groundwater monitoring well constructed in boring (see well completion summary).	

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GeoLogic Associates

Boring Log

BORING NO.: GLA-D

PAGE: 1 OF 3

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 6/07/04
 DATE FINISHED: 6/08/04
 ELEVATION: 429775.68
 NORTHING: 1737341.82
 EASTING: 364.77

GW DEPTH: 59.5 feet
 TOTAL DEPTH: 146.2 feet

TIME	DRY DENSITY (LBS./CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLGIC FORMATION	DESCRIPTION	COMMENTS
14:25						0		SC	SOIL:	Dark reddish brown (5YR 3/3), fine, poorly graded CLAYEY SAND.	Moist.
						5			WEATHERED BEDROCK:	Olive brown (2.5Y 4/3) to brown (10YR 4/3), fine, highly weathered with iron-oxide staining, poorly indurated TONALITE (GRUSS) with GRANODIORITE dikes composed of quartz and feldspar phenocrysts.	Slightly moist.
14:32						10					
15:00						15				...(15') - fine to medium; increasing felsic minerals.	
						20					...(18') - set conductor casing.
15:12						25				...(22') - moderately weathered with some highly weathered intervals.	
15:18						30			BEDROCK:	Brown (10YR 4/3) to black (N2.5), fine to medium, hornblend and quartz rich, moderately indurated TONALITE.	Dry.
						35					
15:30						40					Switch to downhole hammer.
16:02						45					
16:09						50				...(50') - color change to black (N2.5).	
16:15						55					
						60					...(60') - dry.

CONTINUED ON NEXT PAGE

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GeoLogic Associates

Boring Log

BORING NO.: GLA-D

PAGE: 2 OF 3

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 6/07/04
 DATE FINISHED: 6/08/04
 ELEVATION: 429775.68
 NORTHING: 1737341.82
 EASTING: 364.77

GW DEPTH: 59.5 feet
 TOTAL DEPTH: 146.2 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USGS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						60				...same as above.	...(60') - dry.
16:30						65					
16:35						70					
						75					
						80					
16:55						85					
17:05						90					
						95					
						100				...(100-110') - very well indurated.	...(98') - very moist to slightly wet cuttings.
17:50						105	▽				...(105.6') - first water encountered.
6/08						110					
7:25						115					
						120					

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GeoLogic Associates

Boring Log

BORING NO.: GLA-D

PAGE: 3 OF 3

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 6/07/04
 DATE FINISHED: 6/08/04
 ELEVATION: 429775.68
 NORTHING: 1737341.82
 EASTING: 364.77

GW DEPTH: 59.5 feet
 TOTAL DEPTH: 146.2 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS	
						120				...some as above.		
8:08						125						
8:18						130					...(130') - cuttings are damp.	
						135						
						140						
8:55						145					...(142') - very moist.	
						150				Notes: 1. Total depth of boring 146.2 feet. 2. Groundwater first encountered at 105.6 feet on 6/7/04, static water level measured at 59.5 feet on 6/21/04. 3. Borehole geophysics conducted on 6/11/04. 4. Monitoring well constructed in boring (see well completion summary).		
						155						
						160						
						165						
						170						
						175						
						180						

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GeoLogic Associates

Boring Log

BORING NO.: GLA-E

PAGE: 1 OF 3

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/14/04
 DATE FINISHED: 7/15/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: 152.80 feet
 TOTAL DEPTH: 152.85 feet

TIME	DRY DENSITY (LBS./CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLGIC FORMATION	DESCRIPTION	COMMENTS
16:58						0			SM	SOIL: Brown (7.5YR 5/4), fine to medium, poorly graded SILTY SAND.	Dry.
						5				WEATHERED BEDROCK: Brown (7.5YR 5/4) to strong brown (7.5YR 5/6), fine to medium, moderately weathered, moderately indurated TONALITE (GRUSS) with GRANODIORITE dikes.	Dry.
						10				BEDROCK: Olive brown (2.5Y 5/4), fine to coarse, well indurated, unweathered TONALITE. ...(13') - color change to dark gray (7.5YR 4/1) to (5Y 4/1).	Dry.
17:30						15					
6/15						20					...(16') - set conductor casing, switch to downhole hammer.
8:10						25					
8:13						30					
8:25						35					...(25') - slightly moist.
						40					
8:33						45					
8:39						50					...(45') - dry.
						55					
						60					
8:49											
8:51											

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GeoLogic Associates

Boring Log

BORING NO.: GLA-E

PAGE: 2 OF 3

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/14/04
 DATE FINISHED: 7/15/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: 152.80 feet
 TOTAL DEPTH: 152.85 feet

TIME	DRY DENSITY (LBS./CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USGS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:51						60				...same as above.	
8:53						65				...(65') - minor iron-oxide staining.	Dry.
9:10						70					
						75					
9:20						80				...(80') - color change to gray (N5-N6); very well indurated.	Dry.
9:27						85					
						90					
						95					
9:44						100					...(100') - dry.
9:50						105					
						110					
						115					
10:10						120					...(120') - dry.
10:28											

CONTINUED ON NEXT PAGE

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GeoLogic Associates

Boring Log

BORING NO.: GLA-E

PAGE: 3 OF 3

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/14/04
 DATE FINISHED: 7/15/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: 152.80 feet
 TOTAL DEPTH: 152.85 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
10:28						120				...same as above.	...(120') - dry.
10:52						125					
11:03						130					
						135					
						140				...(142') - well indurated.	...(140') - dry.
						145					
						150					
11:15						152.85					Stop for 2 hours, sound for water, wet at bottom of boring.
						155				Notes: 1. Total depth of boring 152.85 feet. 2. Groundwater first encountered at 152.8'. 3. Borehole geophysics conducted on 7/20/04.	
						160					
						165					
						170					
						175					
						180					

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GeoLogic Associates

Boring Log

BORING NO.: GLA-F

PAGE: 1 OF 3

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/16/04
 DATE FINISHED: 7/16/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: 164.8 feet
 TOTAL DEPTH: 165.5 feet

TIME	DRY DENSITY (LBS./CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USGS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
7:30						0		SM		SOIL: Strong brown (7.5YR 5/6), fine to medium, poorly graded SILTY SAND.	Dry.
						5				WEATHERED BEDROCK: Dark brown (7.5YR 3/4), fine to medium, highly weathered with iron-oxide staining and alteration of feldspars to CLAY, poorly indurated TONALITE (GRUSS).	Moist.
						10				Olive brown (2.5Y 4/3), fine to medium, moderately weathered, poorly to moderately indurated TONALITE.	Moist.
						15					
						20					...(17') - set conductor casing, switch to downhole hammer. ...(20') - dry.
8:05						25					
8:13						30				BEDROCK: Gray (2.5Y 4/1), fine to medium, unweathered, well indurated TONALITE.	Dry.
						35					
						40					
						45				...(45') - very well indurated.	
8:20						50					
8:26						55					
						60					

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GeoLogic Associates

Boring Log

BORING NO.: GLA-F

PAGE: 2 OF 3

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/16/04
 DATE FINISHED: 7/16/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: 164.8 feet
 TOTAL DEPTH: 165.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						60				...same as above.	
8:40						65					
8:48						70					
						75					...(75') - dry.
						80					
9:03						85					...(83') - dry.
9:09						90					
						95					
						100					
						105					...(103') - dry.
9:25						110					
9:35						115					
						120					

CONTINUED ON NEXT PAGE

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GeoLog Associates

Boring Log

BORING NO.: GLA-F

PAGE: 3 OF 3

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/16/04
 DATE FINISHED: 7/16/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: 164.8 feet
 TOTAL DEPTH: 165.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
9:55						120				...same as above.	...(123') - dry.
10:02						125					
						130					
						135					
						140					
10:24						145					
10:30						150					...(146') - very moist.
						155					
						160					
10:45						165	▽				
						170				Notes: 1. Total depth of boring 165.5 feet. 2. Groundwater first encountered at 164.8'. 3. Borehole geophysics conducted on 7/20/04.	
						175					
						180					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

Boring Log

BORING NO.: GLA-G

PAGE: 1 OF 2

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/20/04
 DATE FINISHED: 7/20/04
 ELEVATION: 430247.55
 NORTHING: 1737961.72
 EASTING: 345.04

GW DEPTH: 40.18 feet
 TOTAL DEPTH: 104 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/ GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
9:40						0			SM	COLLUVIUM: Strong brown (7.5YR 4/6), fine to coarse, well graded SILTY SAND with iron-oxide staining.	Dry.
						5					
						10				...(8') - color change to brown (7.5YR 5/4).	Moist.
						15				...(12') - color change to strong brown (7.5YR 5/6) ...(13-16') - GRANODIORITE BOULDER.	...(16') - set conductor casing.
10:13						20				WEATHERED BEDROCK: Brown (7.5YR 4/4), fine to coarse, highly weathered with iron-oxide staining and alteration of feldspars to CLAY, poorly indurated GRANODIORITE.	...(20') - switch to downhole hammer.
10:21						25				...(24') - color change to light yellowish brown (2.5Y 6/4).	
10:24						30					
10:29						35				...(35') - color change to olive brown (2.5Y 4/3) to dark grayish brown (2.5Y 4/2); moderately weathered, poorly indurated, little to no CLAY.	
						40					
10:36						45					
10:41						50					...(48') - very moist.
						55					
						60				...(60') - fine to medium.	

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GeoLogic Associates

Boring Log

BORING NO.: GLA-G

PAGE: 2 OF 2

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: AIR ROTARY
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/20/04
 DATE FINISHED: 7/20/04
 ELEVATION: 430247.55
 NORTHING: 1737961.72
 EASTING: 345.04

GW DEPTH: 40.18 feet
 TOTAL DEPTH: 104 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
10:46						60				...(60') - fine to medium.	
10:51						65				...(65'-70') - color change to pale yellow (2.5Y 7/4); medium to coarse.	...(65') - very moist to slightly wet.
						70				...(70') - color change to yellowish brown (10YR 5/8); fine to medium.	
						75					
						80					
10:56						85	▽			...(85') - color change to dark grayish brown (2.5Y 4/2); fine to coarse.	...(85') - first water encountered.
11:02						90					
						95					...(93') - slightly wet.
						100					
11:07						105				Notes:	
						110				1. Total depth of boring 104 feet. 2. Groundwater first encountered at 85 feet on 7/20/04; static water level measured at 40.18 feet on 7/22/04. 3. Borehole geophysics conducted on 7/20/04. 4. Groundwater monitoring well constructed on 7/21/04 (see well completion summary).	
						115					
						120					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

Boring Log

BORING NO.: LUC10-2R

PAGE: 1 OF 1

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: HOLLOW STEM AUGER
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 6/03/04
 DATE FINISHED: 6/03/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: 12.5 feet
 TOTAL DEPTH: 50 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:33						0			SM	ALLUVIUM: Brown (10YR 4/2), fine to coarse, well graded SILTY SAND with GRAVEL. GRAVEL is subrounded to subangular.	Slightly moist. ...(5') - moist.
8:45						5					
						10					
						15					
						20			SW	Dark gray (10YR 4/1), well graded, fine to coarse SAND with fine to medium, subrounded to subangular GRAVEL.	Wet.
8:54						25					
						30					
						35					
8:58						40					...(40') - saturated.
						45					
9:03						50				Notes: 1. Total depth of boring 50 feet. 2. Groundwater measured at 12.5 feet. 3. Groundwater monitoring well constructed on 6/3/04 (see well completion summary)	
						55					
						60					

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

Boring Log

BORING NO.: SLRMWD-34R

PAGE: 1 OF 1

JOB NO.: 9539
 SITE LOCATION: GREGORY CANYON LANDFILL
 DRILLING METHOD: HOLLOW STEM AUGER
 CONTRACTOR: WDC EXPLORATION AND WELLS
 LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 6/03/04
 DATE FINISHED: 6/03/04
 ELEVATION: ND
 NORTHING: ND
 EASTING: ND

GW DEPTH: 12.6 feet
 TOTAL DEPTH: 30 feet

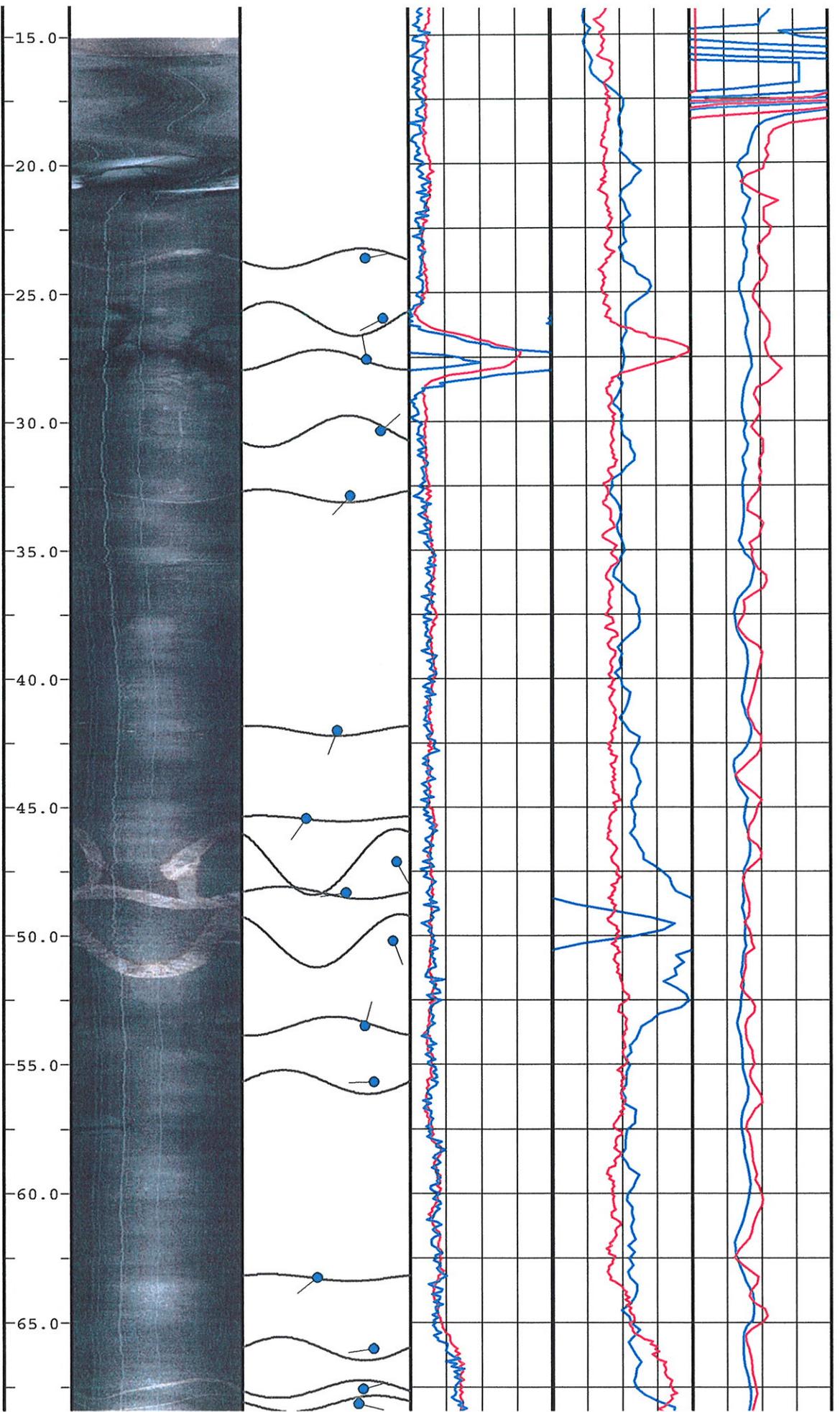
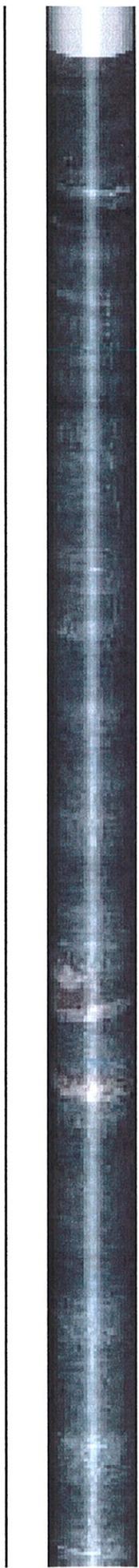
TIME	DRY DENSITY (LBS./CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
12:20						0			SM	ALLUVIUM: Yellowish brown (10YR 5/4), fine, poorly graded, micaceous SILTY SAND.	Dry.
						5					...(5') - slightly moist.
						10					
12:28						12.6				...(12') - fine to coarse with trace of fine to medium, subrounded GRAVEL.	...(14') - wet.
						20					...(20') - saturated.
						25			SW	Dark gray (10YR 4/1), fine to coarse SAND with trace of subrounded GRAVEL.	
12:40						30				Notes:	
						35				1. Total depth of boring 30 feet. 2. Groundwater measured at 12.6 feet. 3. Groundwater monitoring well constructed on 6/3/04 (see well completion summary).	
						40					
						45					
						50					
						55					
						60					

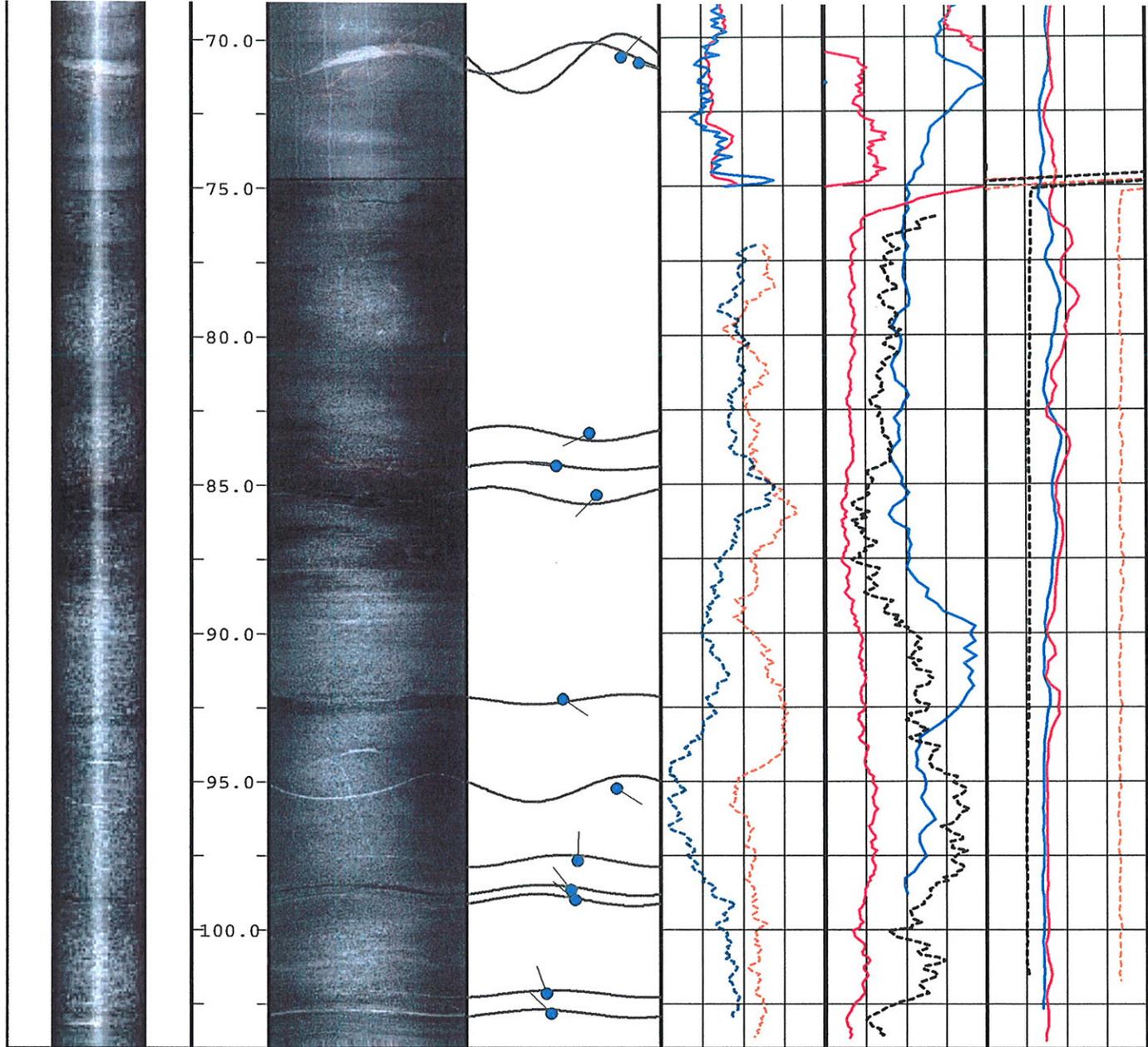
CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

ATTACHMENT B

**GEOPHYSICAL LOGS,
STEREOGRAPHIC POLE-PLOTS AND
ROSE DIAGRAMS**





4pi 15" below water	Fluid Conductivity
11000 cps 13000	1700 μ S/cm 1900
4pi 27" below water	Neutron below water
120 cps 170 25 cps 175	Fluid Temperature
19 $^{\circ}$ C 21	
Tadpole Plot	Neutron
4pi 27" spacing	Conductivity (short)
0 90 1400 cps 3400 0 cps 500 50 mS/m 200	
4pi 15" spacing	Conductivity (long)
20000 cps 40000 0 CPS 150 0 mS/m 150	

3D IMAGE LOG
180 $^{\circ}$

Depth
1in:5ft

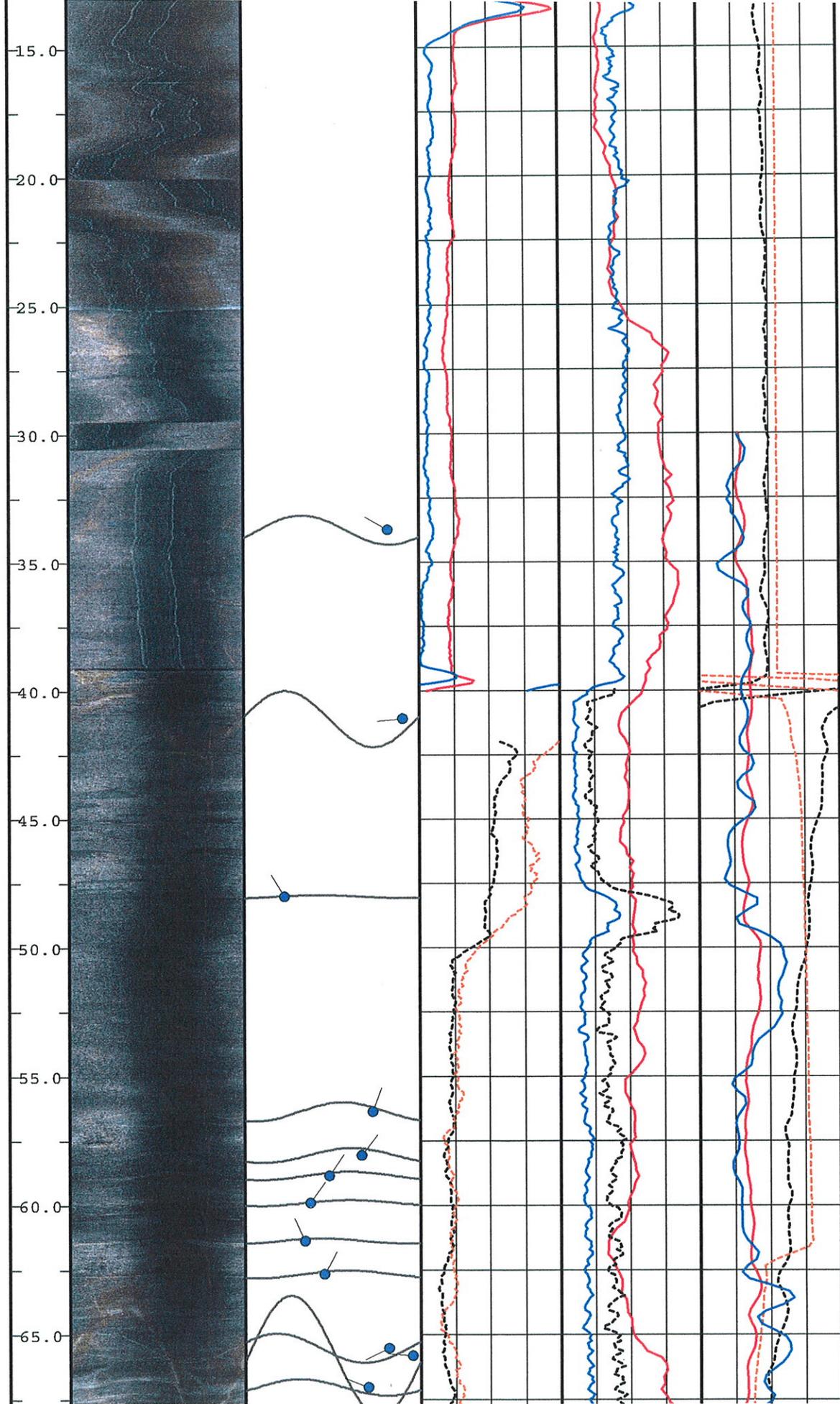
BOREHOLE VIEW
0 $^{\circ}$ 90 $^{\circ}$ 180 $^{\circ}$ 270 $^{\circ}$ 0 $^{\circ}$

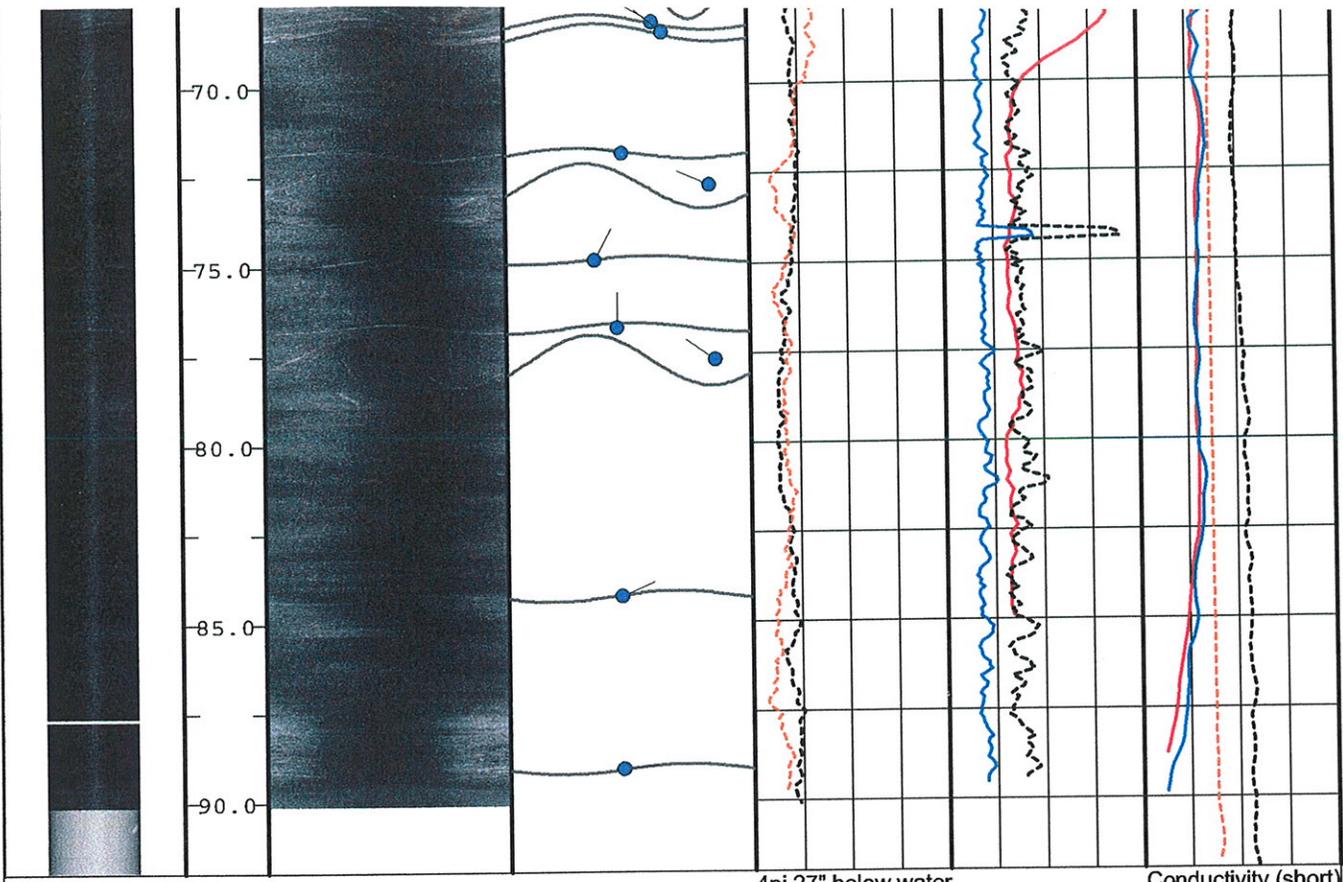
FEATURES
0 $^{\circ}$ 90 $^{\circ}$ 180 $^{\circ}$ 270 $^{\circ}$ 0 $^{\circ}$

Orientation Summary Table
Image Features
Wellbore: GLA-A
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	7.21	23.65	78.06	66.43
2	7.92	25.99	241.70	76.15
3	8.40	27.57	350.37	67.17
4	9.25	30.35	48.73	74.72
5	10.02	32.87	222.32	58.20
6	12.80	42.01	201.05	51.04
7	13.85	45.44	216.78	34.57
8	14.37	47.13	151.29	82.70
9	14.73	48.33	261.33	55.66
10	15.30	50.19	158.49	80.89
11	16.31	53.51	15.13	65.61
12	16.97	55.67	268.12	70.63
13	19.28	63.25	232.73	40.37
14	20.12	66.00	262.20	70.29
15	20.60	67.57	74.93	64.52
16	20.77	68.13	103.72	62.13
17	21.53	70.65	44.75	72.15
18	21.60	70.85	106.92	80.53
19	25.38	83.27	246.30	56.93
20	25.72	84.37	274.06	41.52
21	26.01	85.35	225.44	60.36
22	28.11	92.22	123.39	44.54
23	29.03	95.24	122.00	69.66
24	29.77	97.68	1.21	51.31
25	30.07	98.65	320.48	48.44
26	30.18	99.00	309.09	50.19
27	31.14	102.16	340.30	37.05
28	31.34	102.82	314.95	39.30

All directions are with respect to magnetic north.





4pi 27" below water	70	cps	170	Conductivity (short)	130	mS/m	160
4pi 15" below water	1400	cps	9000	Neutron below water	200	cps	40
4pi 27" spacing	1400	cps	3400	Neutron	400	cps	750
4pi 15" spacing	20000	cps	40000	Natural Gamma	150	CPS	20
				Fluid Conductivity			850
				Fluid Temperature			21

3D Image Log
180°

Depth
1in:5ft

Borehole View
0° 90° 180° 270° 0°

Tadpole Plot
Features
0° 90° 180° 270° 0°

4pi 27" spacing
1400 cps 3400 0

Neutron
400 cps 750

Fluid Conductivity
850

4pi 15" spacing
20000 cps 40000 0

Natural Gamma
150 CPS

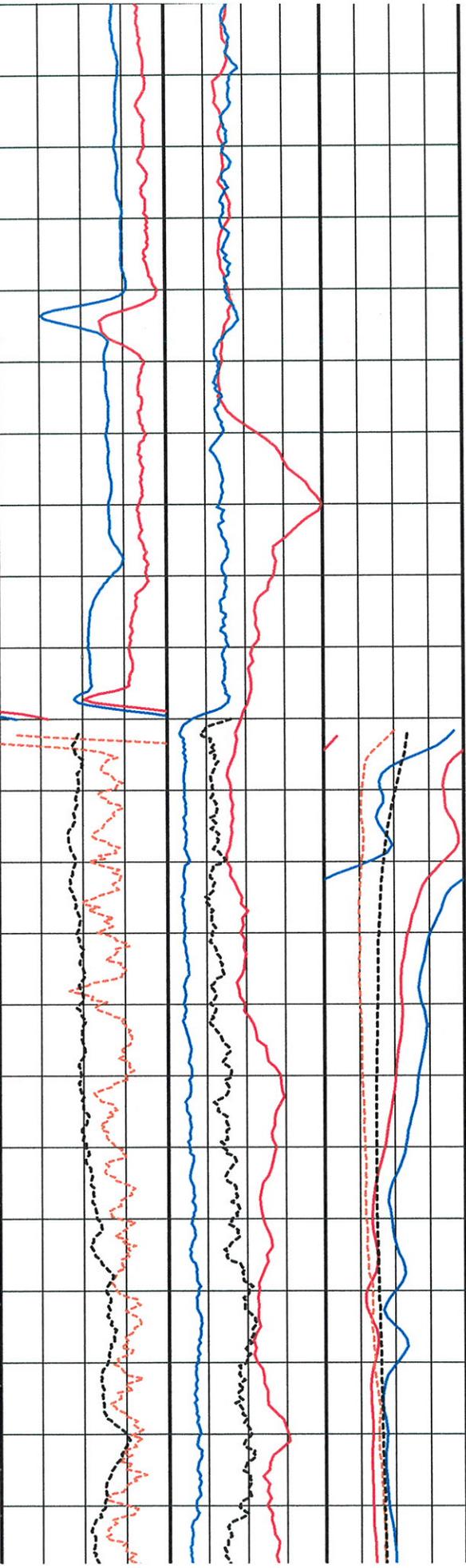
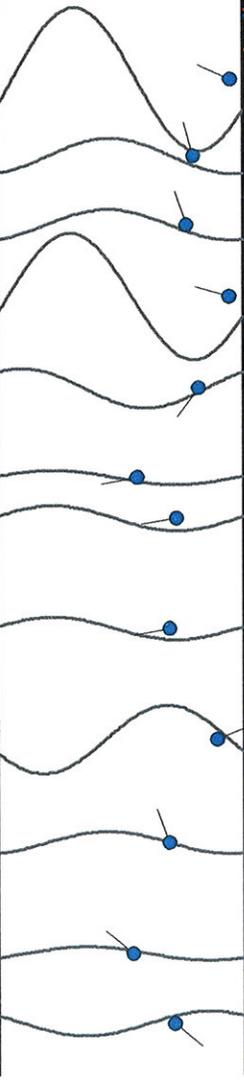
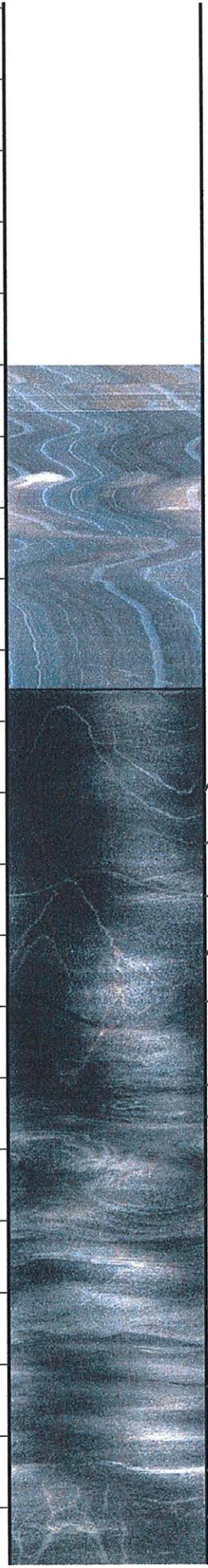
Fluid Temperature
21 °C

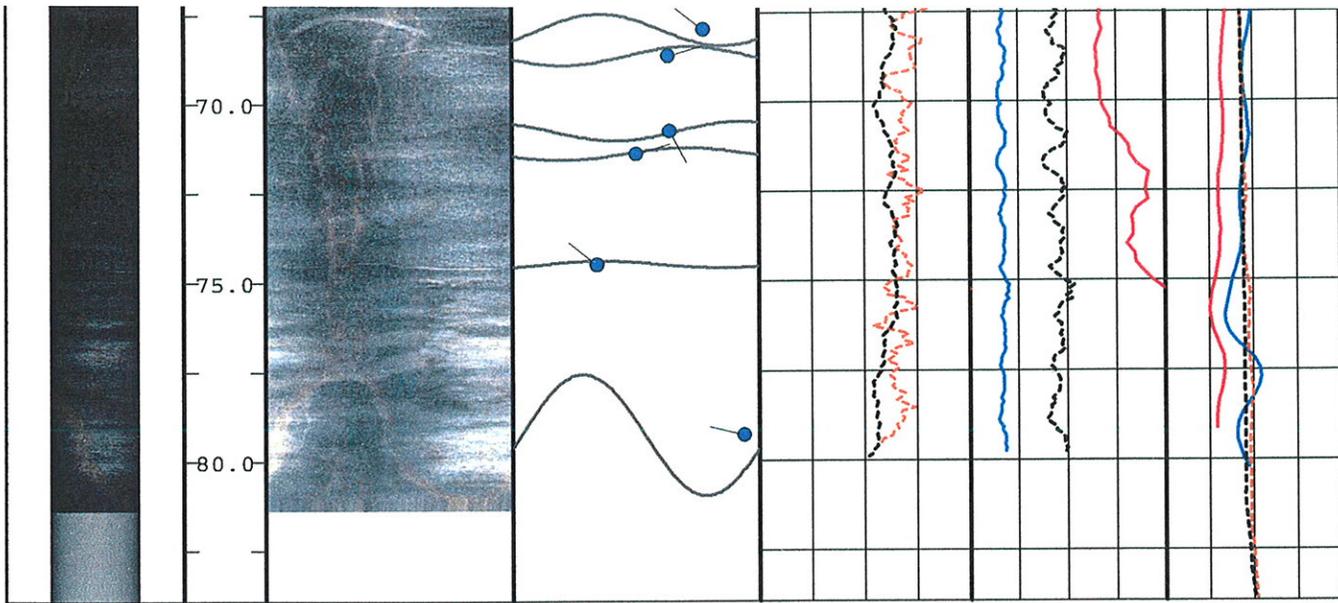
Orientation Summary Table
Image Features
Wellbore: GLA-B
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	10.27	33.71	299.60	74.05
2	12.52	41.08	264.91	81.50
3	14.62	47.98	328.94	21.01
4	17.18	56.35	20.45	65.71
5	17.69	58.04	37.73	59.94
6	17.93	58.83	33.81	43.45
7	18.25	59.87	34.60	33.90
8	18.70	61.35	335.40	30.96
9	19.09	62.63	28.51	40.86
10	19.97	65.52	244.22	73.90
11	20.06	65.80	274.29	85.98
12	20.42	67.01	291.01	63.19
13	20.79	68.22	299.50	54.93
14	20.88	68.52	310.15	58.37
15	21.91	71.87	279.93	43.31
16	22.18	72.78	293.70	75.59
17	22.81	74.85	28.77	32.46
18	23.39	76.74	0.51	40.94
19	23.67	77.66	303.59	77.06
20	25.68	84.25	66.50	41.99
21	27.15	89.09	84.01	41.99

All directions are with respect to magnetic north.

15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0





3D IMAGE LOG		Depth	BOREHOLE VIEW		TADPOLE PLOT		4pi 15" below water		Neutron below water		Fluid Conductivity		
0°	1in:5ft	0°	90°	180°	270°	0°	0°	90°	13000 cps	9000	800 μS/cm	850	
								4pi 27" spacing		Fluid Temperature			
								170 cps		70	0	20 °C	21
								4pi 15" spacing		Conductivity (short)			
								3400 cps		1400	0	150 mS/m	180
								4pi 15" spacing		Conductivity (long)			
								40000 cps		20000	0	50 mS/m	90

Orientation Summary Table
Image Features
Wellbore: GLA-C
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	11.94	39.16	293.38	85.34
2	12.59	41.32	344.26	71.77
3	13.18	43.23	341.41	69.14
4	13.79	45.24	286.55	84.72
5	14.57	47.80	216.67	73.63
6	15.33	50.31	260.65	51.03
7	15.68	51.44	261.05	65.28
8	16.62	54.53	260.65	62.92
9	17.56	57.62	67.27	80.16
10	18.43	60.48	339.97	62.49
11	19.38	63.57	309.30	49.33
12	19.97	65.52	128.16	64.36
13	20.71	67.95	307.15	70.01
14	20.93	68.67	74.81	56.86
15	21.57	70.78	151.48	57.54
16	21.77	71.41	73.39	45.23
17	22.71	74.50	307.87	30.96
18	24.16	79.27	282.32	84.48

All directions are with respect to magnetic north.

COLOG

BOREHOLE GEOPHYSICS & HYDROPHYSICS

A Division of Layne Christensen Company

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 PH: (909) 390-2833 FAX (909) 390-6097

COMPANY GEOLOGIC ASSOCIATES

WELL ID GLA-D

FIELD GREGORY CANYON

COUNTRY USA

STATE CA

LOCATION GREGORY CANYON OTHER SERVICES

WELL GLA-D

FLD GREGORY CANYON

CTY PALA

STE

FILING No

SEC

TWP

RGE

ELEVATION

ABOVE PERM. DATUM

K.B.

D.F.

G.L.

PERMANENT DATUM

LOG MEAS. FROM

DRILLING MEAS. FROM

DATE

RUN No

TYPE LOG

DEPTH-DRILLER

DEPTH-LOGGER

BTM LOGGED INTERVAL

TOP LOGGED INTERVAL

OPERATING RIG TIME

RECORDED BY

WITNESSED BY

TYPE FLUID IN HOLE

SALINITY

DENSITY

LEVEL

MAX. REC. TEMP.

20'

J. ABREAU

B. LOPEZ

RUN BOREHOLE RECORD

NO. BIT FROM TO

SIZE FROM TO

WGT. FROM TO

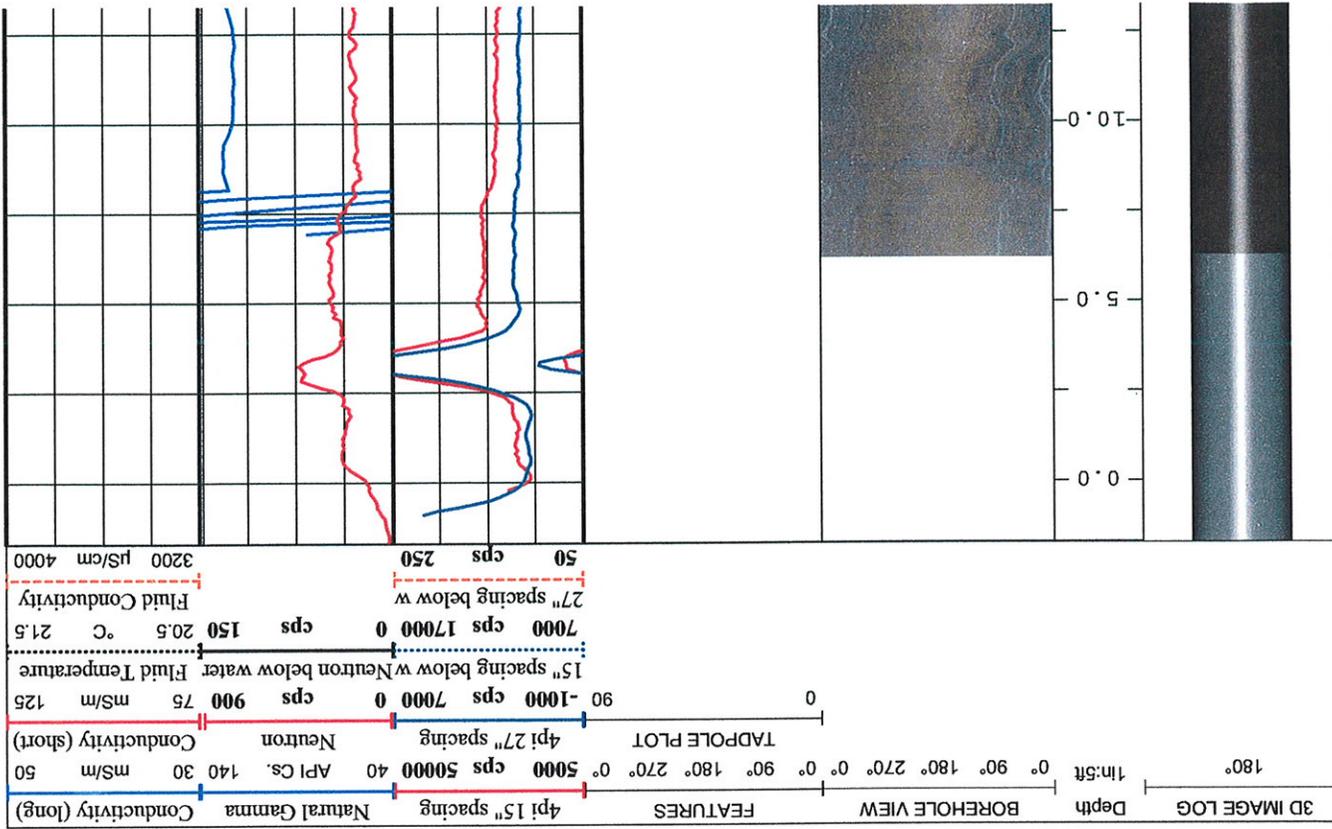
CASING RECORD

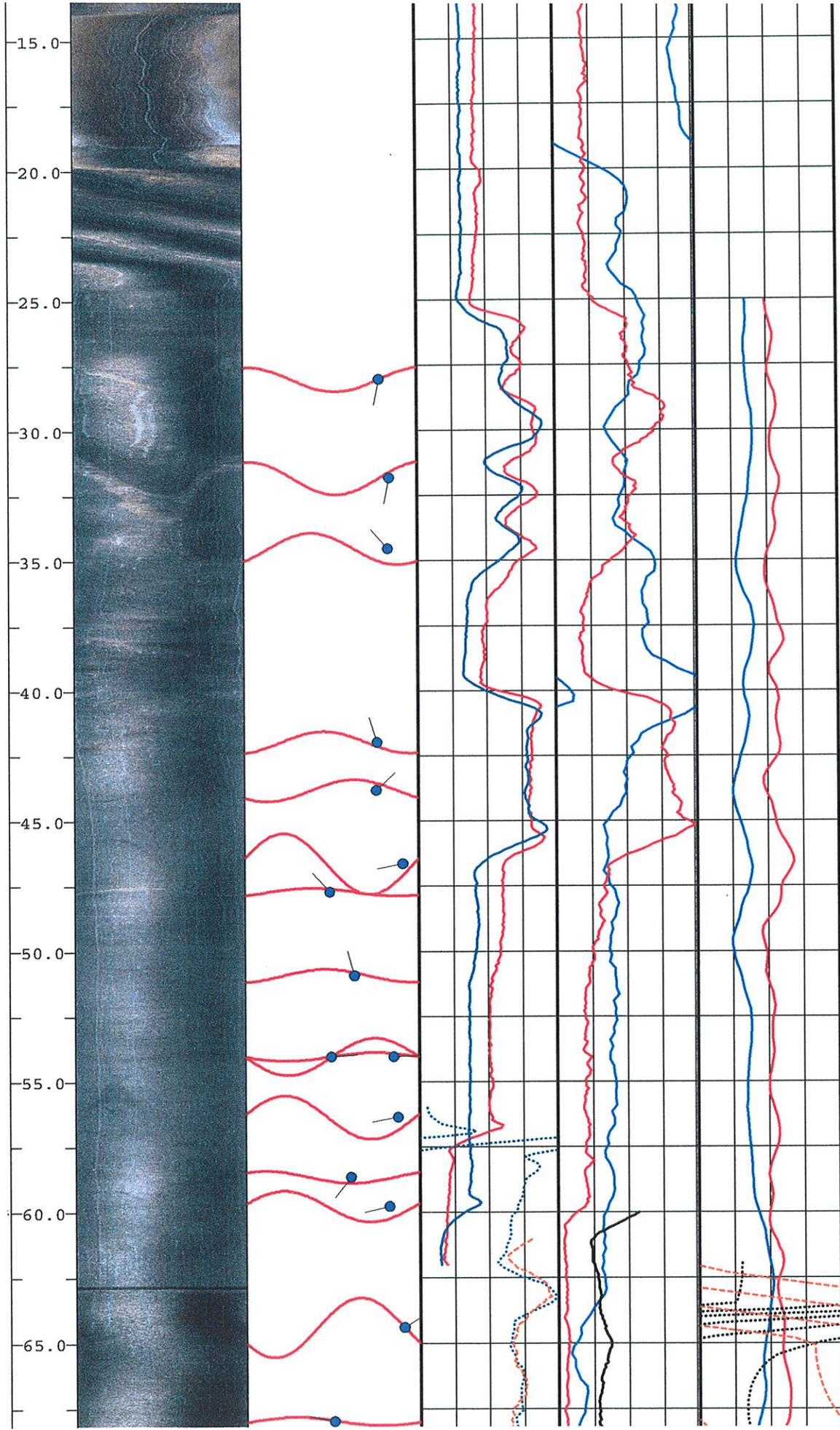
NO. BIT FROM TO

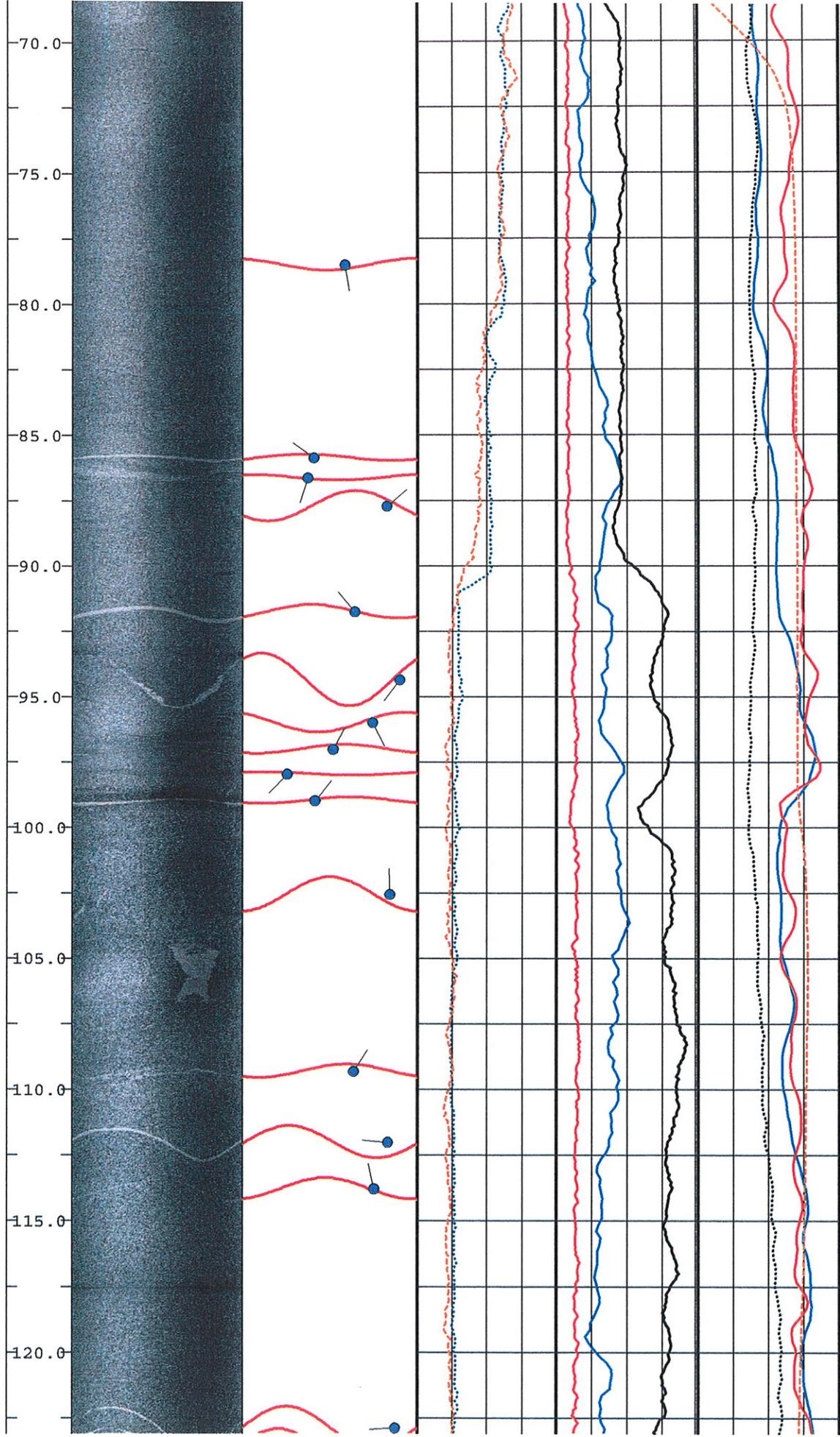
SIZE FROM TO

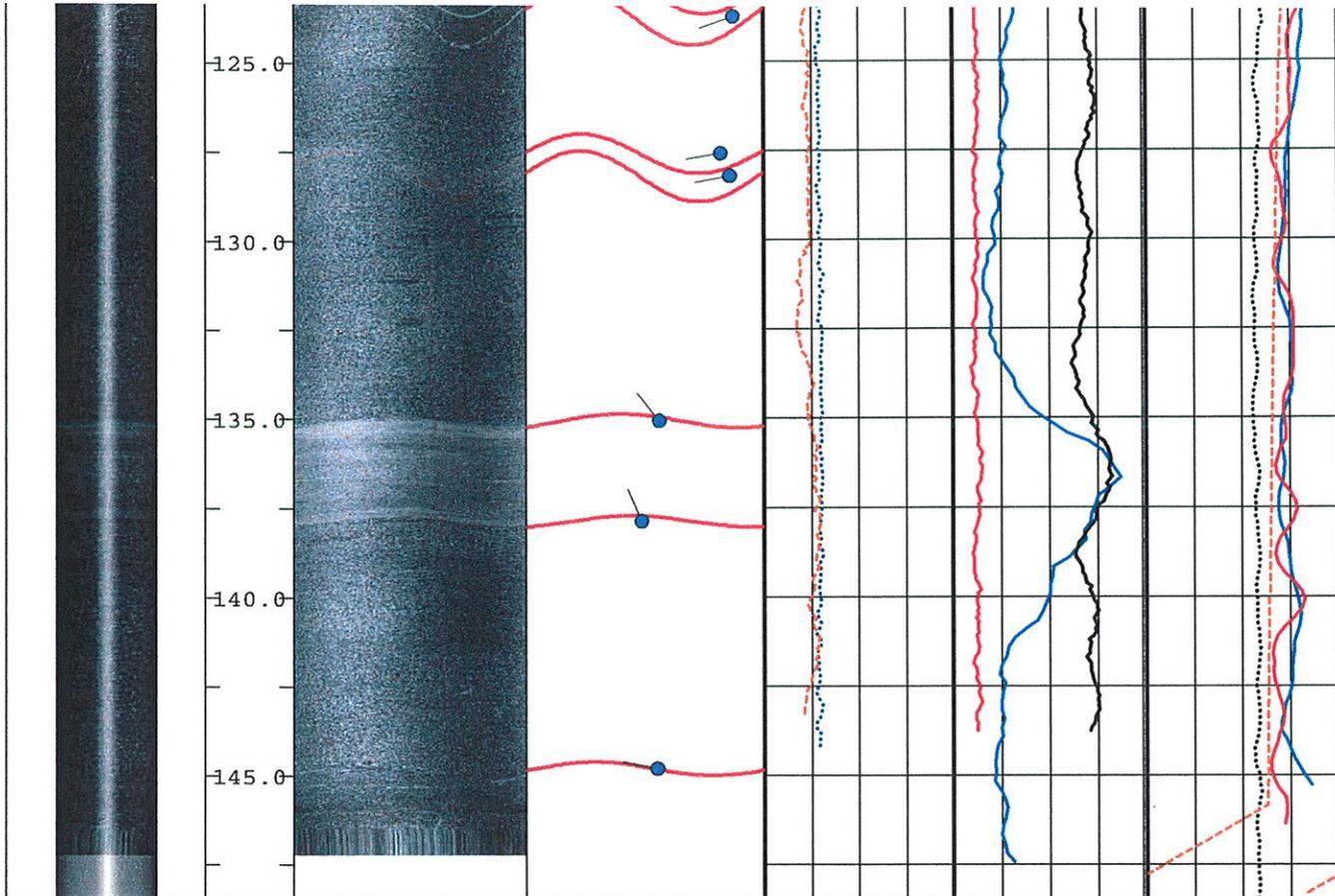
WGT. FROM TO

CASING RECORD









27" spacing below w		Fluid Conductivity	
50	cps 250	3200	μS/cm 4000
15" spacing below w		Neutron below water	
7000	cps 17000 0	cps 150	Fluid Temperature
4pi 27" spacing		Neutron	
TADPOLE PLOT		Conductivity (short)	
0	90	-1000	cps 7000 0
FEATURES		Natural Gamma	
4pi 15" spacing		Conductivity (long)	
5000	cps 50000	40	API Cs. 140
		30	mS/m 50

3D IMAGE LOG
180°

Depth
1in:5ft

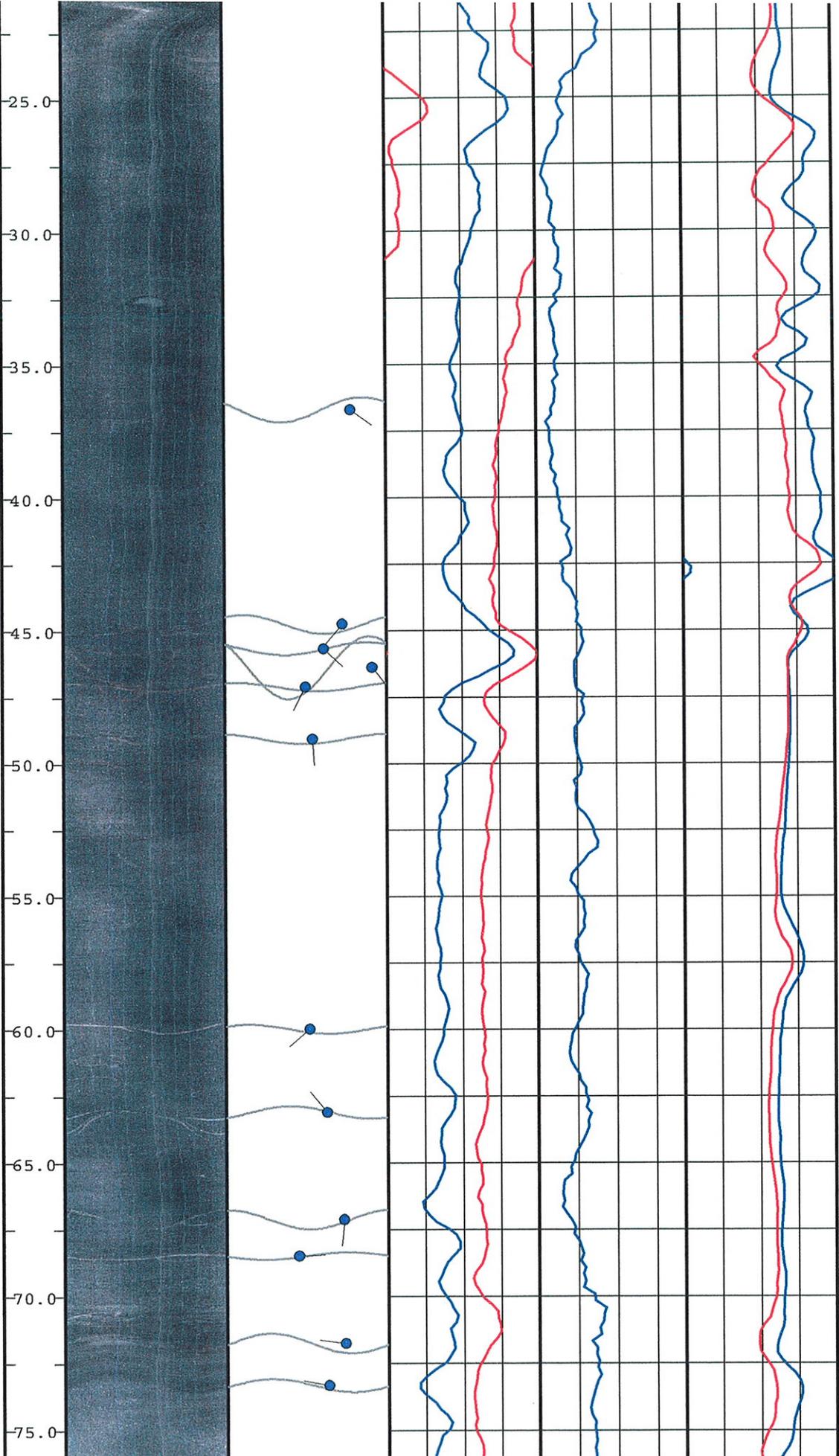
BOREHOLE VIEW
0° 90° 180° 270° 0°

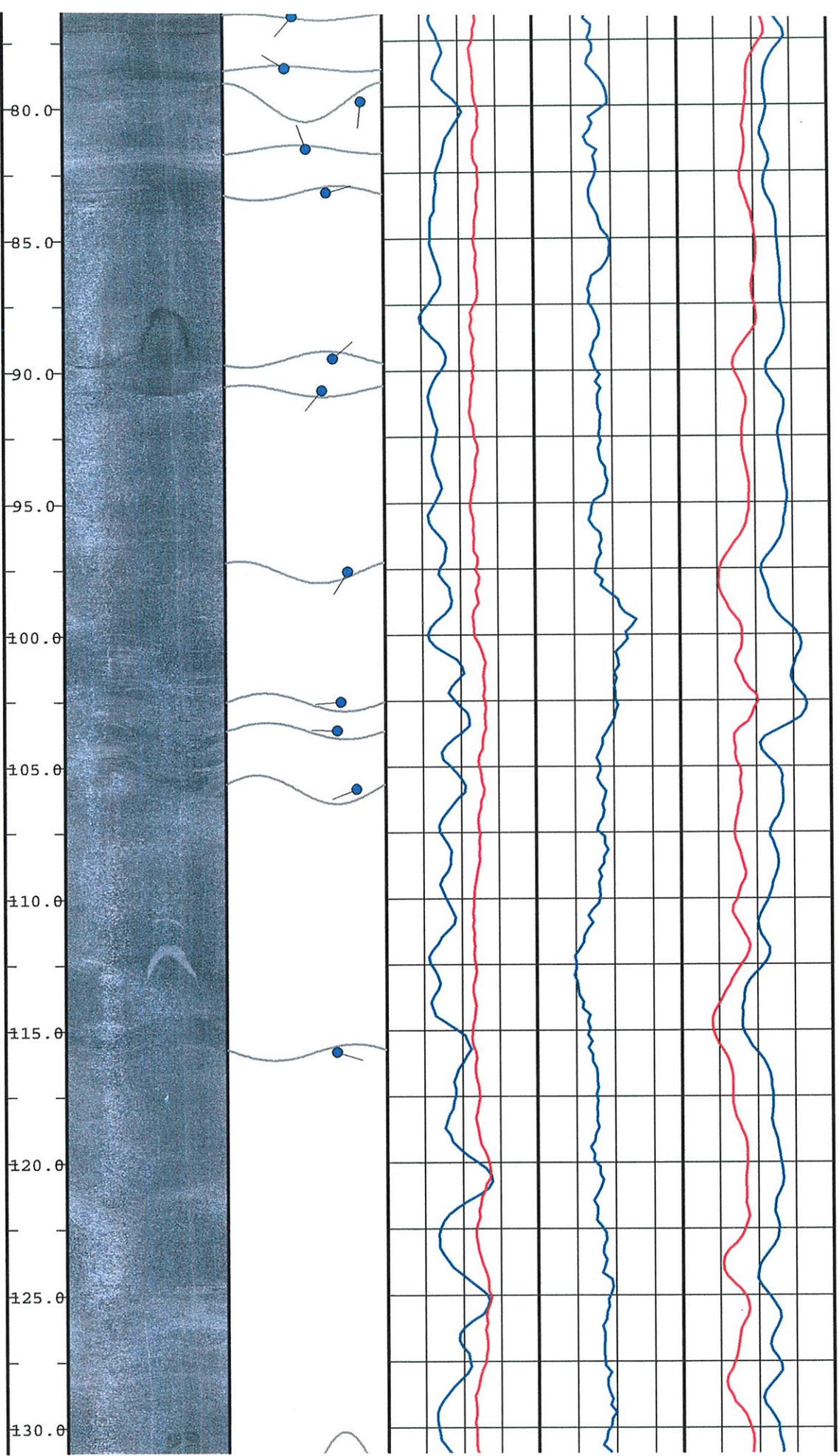
0° 90° 180° 270° 0°

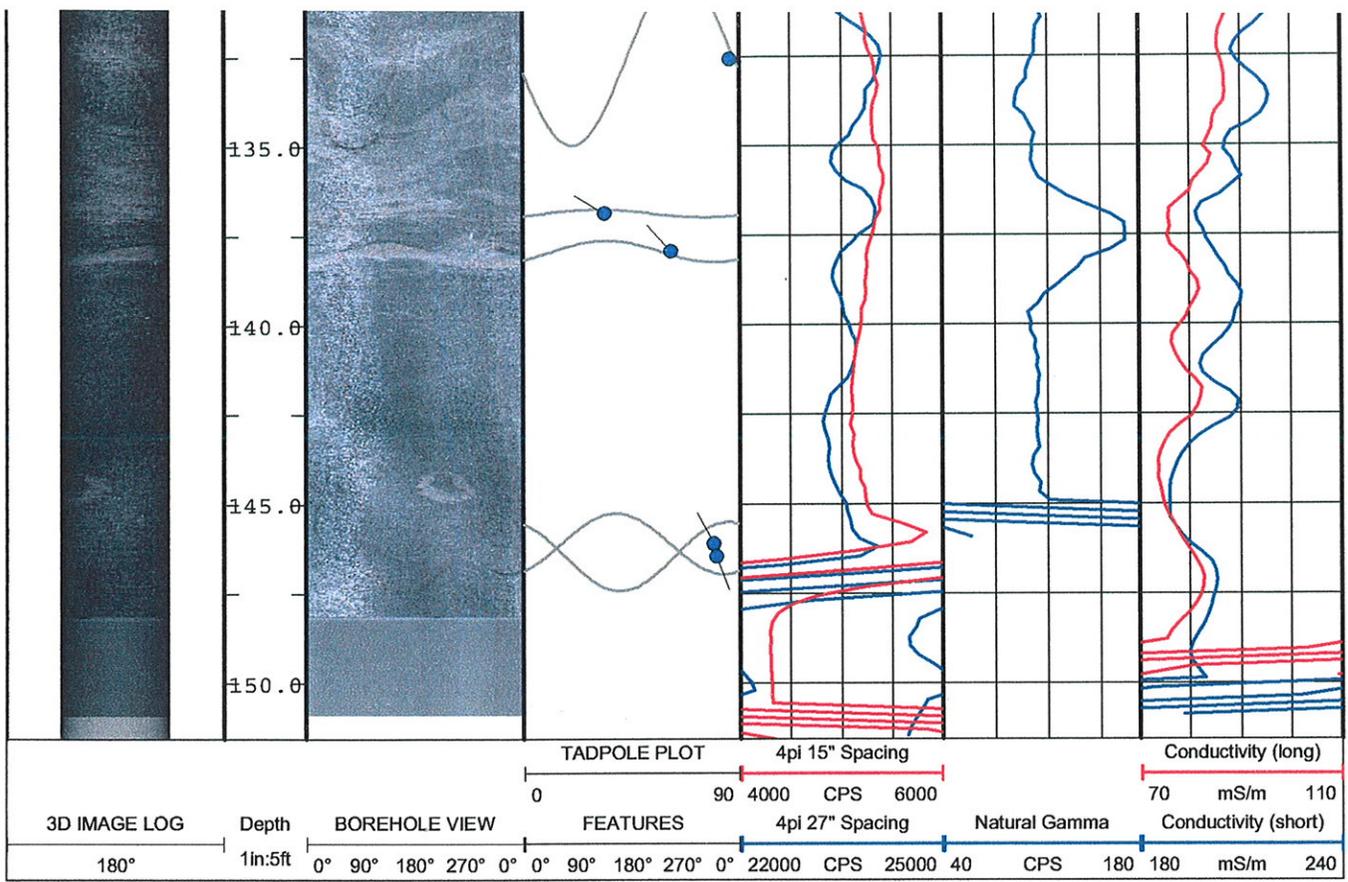
Orientation Summary Table
Image Features
Wellbore: GLA-D
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	8.54	28.03	191.13	70.67
2	9.70	31.81	191.26	75.49
3	10.52	34.53	318.86	74.91
4	12.79	41.96	343.58	68.85
5	13.35	43.81	46.15	68.36
6	14.21	46.63	258.85	82.03
7	14.54	47.70	317.19	44.19
8	15.52	50.93	345.81	56.77
9	16.47	54.02	85.90	44.54
10	16.47	54.04	88.23	77.00
11	17.18	56.35	259.91	78.90
12	17.88	58.65	219.43	54.67
13	18.21	59.76	257.98	74.48
14	19.63	64.39	57.33	81.82
15	20.72	67.97	281.61	45.57
16	23.93	78.50	171.24	52.60
17	26.17	85.87	304.96	36.65
18	26.40	86.63	196.48	33.42
19	26.73	87.71	50.15	74.24
20	27.96	91.74	319.91	57.53
21	28.76	94.35	217.95	80.76
22	29.25	95.98	152.90	66.75
23	29.57	97.00	27.80	46.56
24	29.85	97.94	224.06	22.78
25	30.17	98.97	39.20	37.09
26	31.26	102.56	358.41	75.85
27	33.31	109.30	33.08	56.93
28	34.14	112.00	274.75	74.90
29	34.68	113.77	348.31	67.71
30	37.45	122.87	268.54	78.43
31	37.72	123.74	252.12	78.56
32	38.89	127.58	261.59	73.65
33	39.07	128.19	260.76	77.14
34	41.17	135.06	320.53	50.19
35	42.02	137.86	337.09	43.63
36	44.14	144.81	281.61	49.33

All directions are with respect to magnetic north.







Orientation Summary Table
Image Features
Wellbore: GLA-E
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	11.18	36.68	125.40	70.45
2	13.63	44.72	220.30	65.40
3	13.91	45.65	132.18	54.77
4	14.13	46.35	140.50	82.05
5	14.35	47.09	207.33	44.65
6	14.95	49.05	175.72	48.44
7	18.28	59.96	230.15	46.56
8	19.23	63.09	321.64	56.10
9	20.46	67.11	184.79	65.40
10	20.87	68.46	87.60	40.03
11	21.86	71.73	277.06	66.09
12	22.34	73.30	280.43	56.52
13	23.33	76.54	221.08	39.21
14	23.93	78.50	302.20	34.84
15	24.32	79.78	184.95	77.55
16	24.86	81.57	341.08	46.56
17	25.37	83.23	74.64	57.74
18	27.28	89.50	48.73	60.95
19	27.65	90.71	221.08	54.77
20	29.74	97.58	211.78	68.74
21	31.25	102.51	267.47	64.66
22	31.57	103.59	271.36	62.78
23	32.25	105.82	248.19	73.41
24	35.30	115.81	107.04	61.89
25	40.40	132.55	81.12	86.11
26	41.72	136.87	301.43	33.90
27	42.04	137.93	317.45	61.44
28	44.53	146.10	332.27	79.03
29	44.64	146.46	159.33	80.32

All directions are with respect to magnetic north.

COLOG

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CO GEOLOGIC ASSOCIATES

WELL GLA-F
 FLD GREGORY CANYON
 CTY PALA
 STE
 FILING No

COMPANY GEOLOGIC ASSOCIATES
 WELL ID GLA-F
 FIELD PALA
 COUNTRY USA

STATE CA

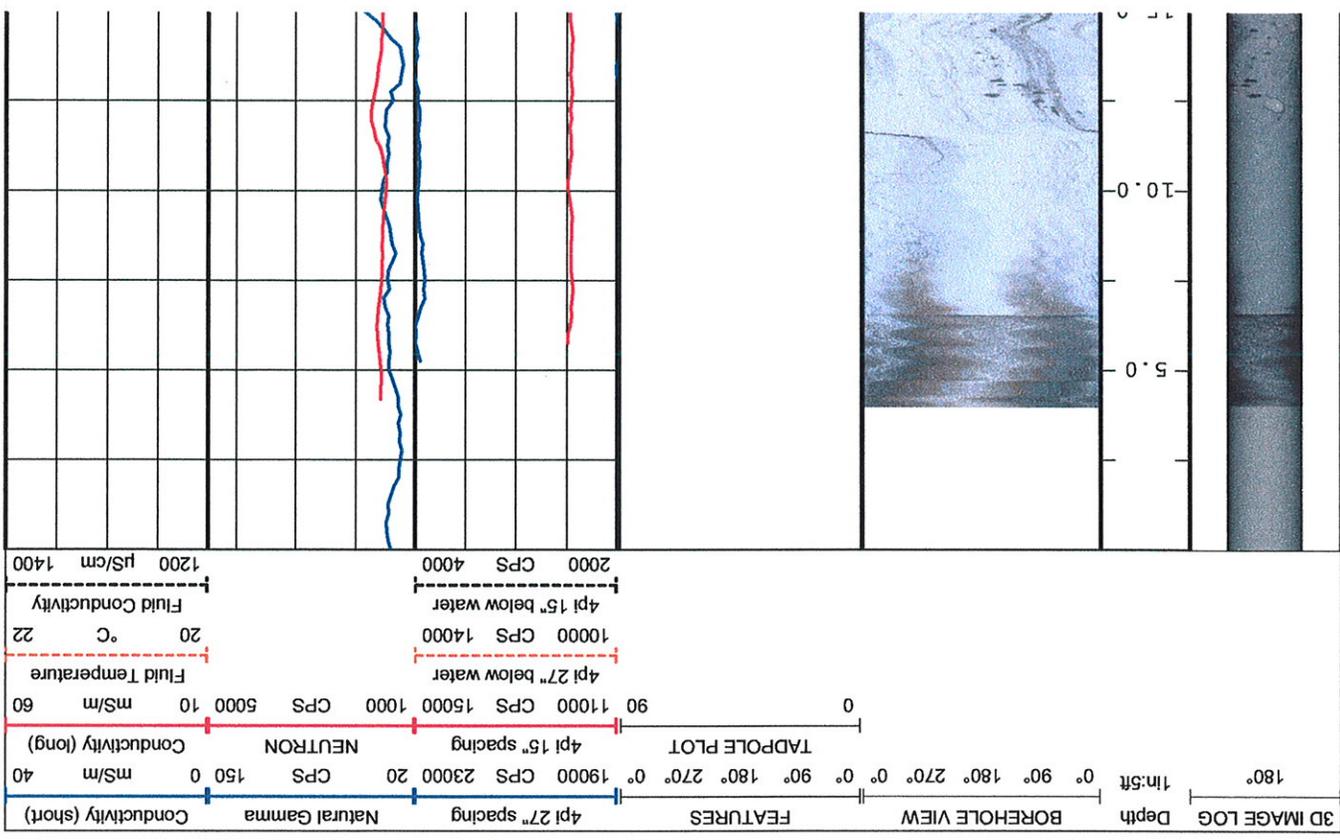
OTHER SERVICES

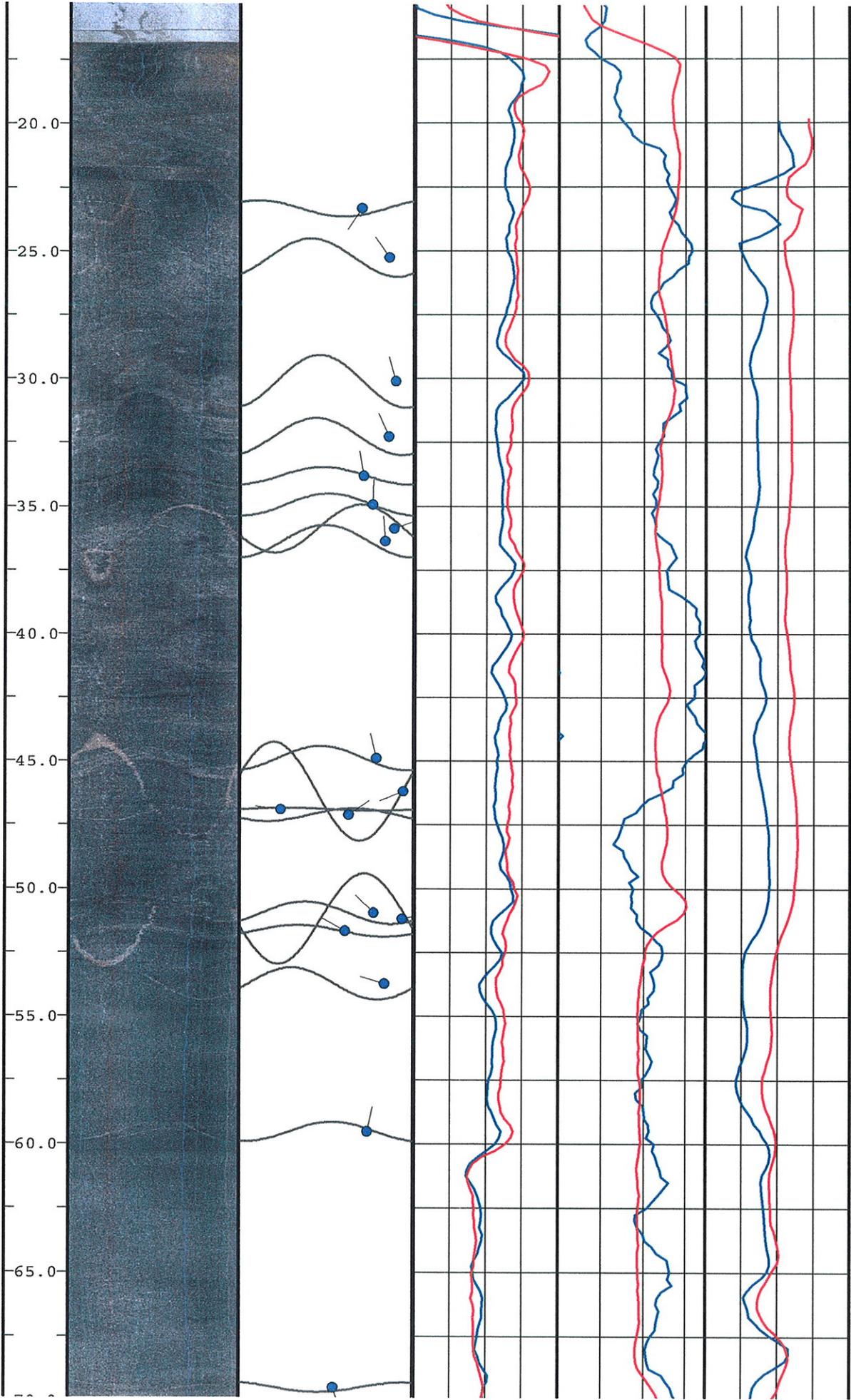
LOCATION
 GREGORY CANYON LANDFILL

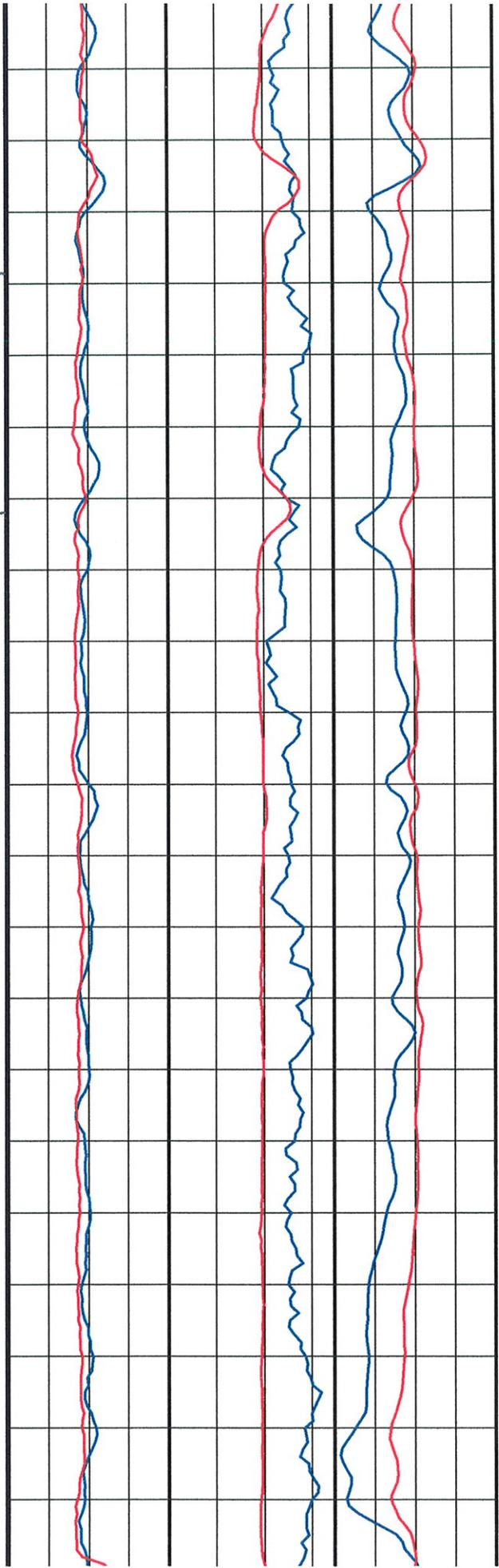
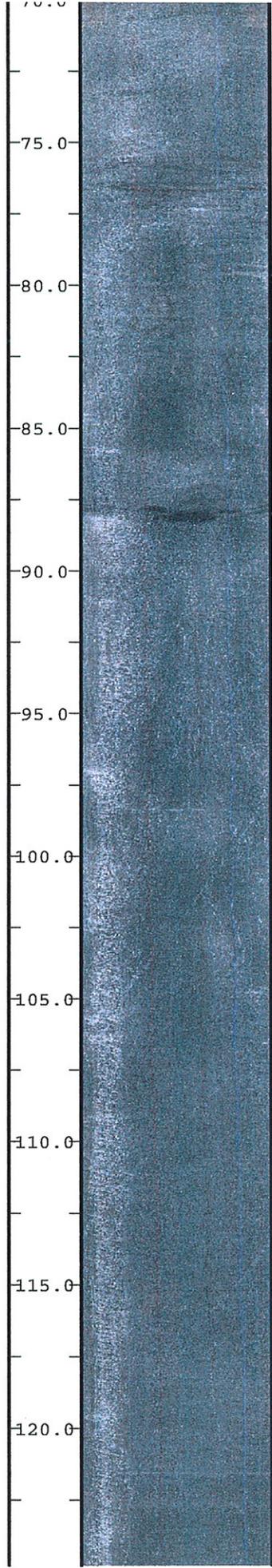
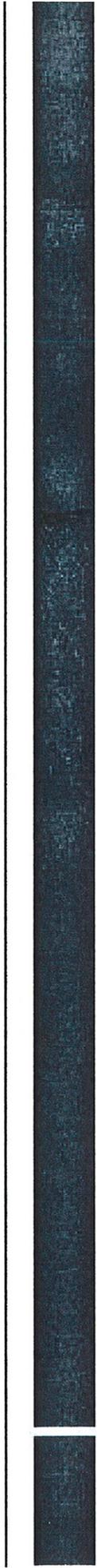
PERMANENT DATUM GROUND SURFACE ELEVATION K.B.
 LOG MEAS. FROM GROUND SURFACE ABOVE PERM. DATUM D.F.
 DRILLING MEAS. FROM GROUND SURFACE G.L.

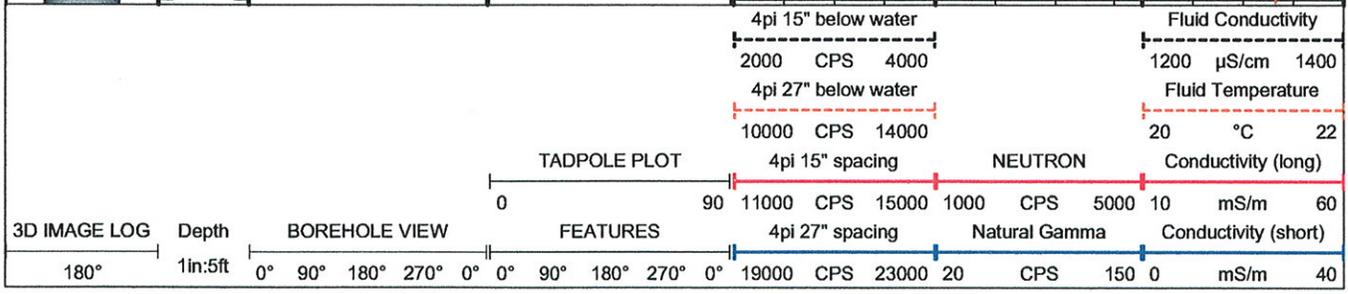
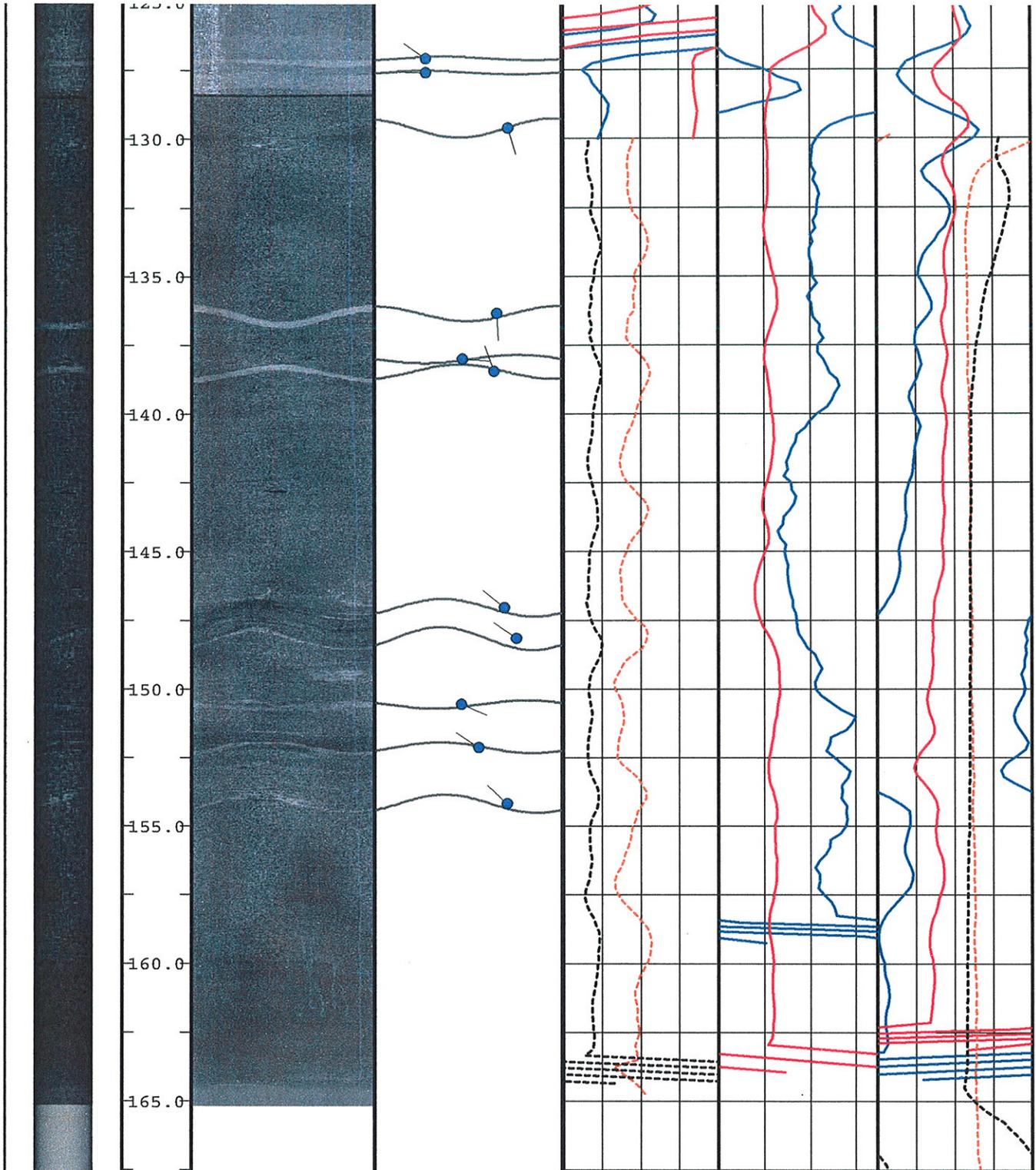
DATE	21/07/04	TYPE FLUID IN HOLE
RUN No	1	SALINITY
TYPE LOG	OPTV, NEUTRON, DENSITY	DENSITY
DEPTH-DRILLER	165'	LEVEL
DEPTH-LOGGER	165'	MAX. REC. TEMP.
BTM LOGGED INTERVAL	165'	
TOP LOGGED INTERVAL	20'	
OPERATING RIG TIME		
RECORDED BY	J. ABREAU	
WITNESSED BY	B. LOPEZ	

RUN NO.	BOREHOLE RECORD		CASING RECORD	
	FROM	TO	SIZE	WGT. FROM TO





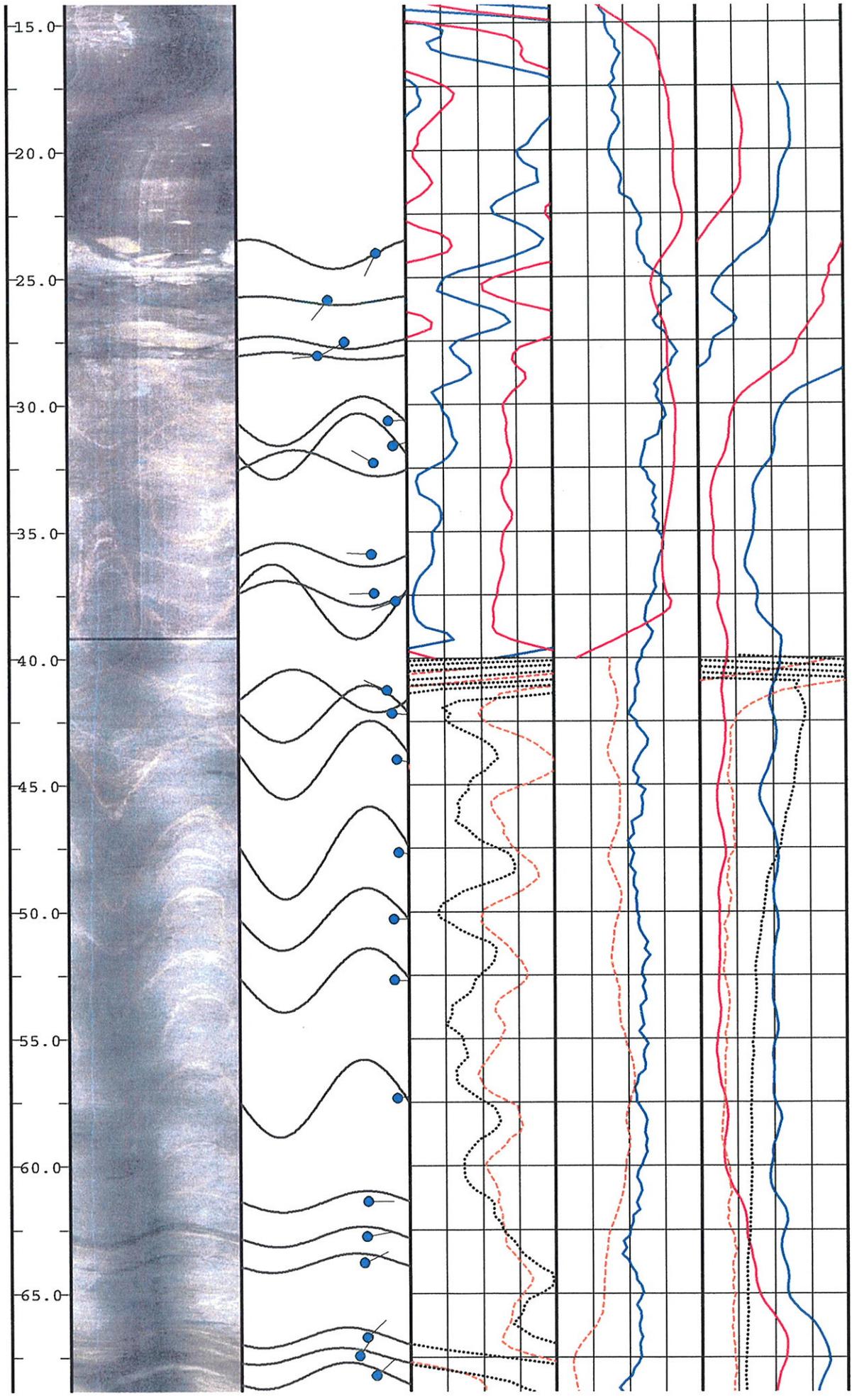


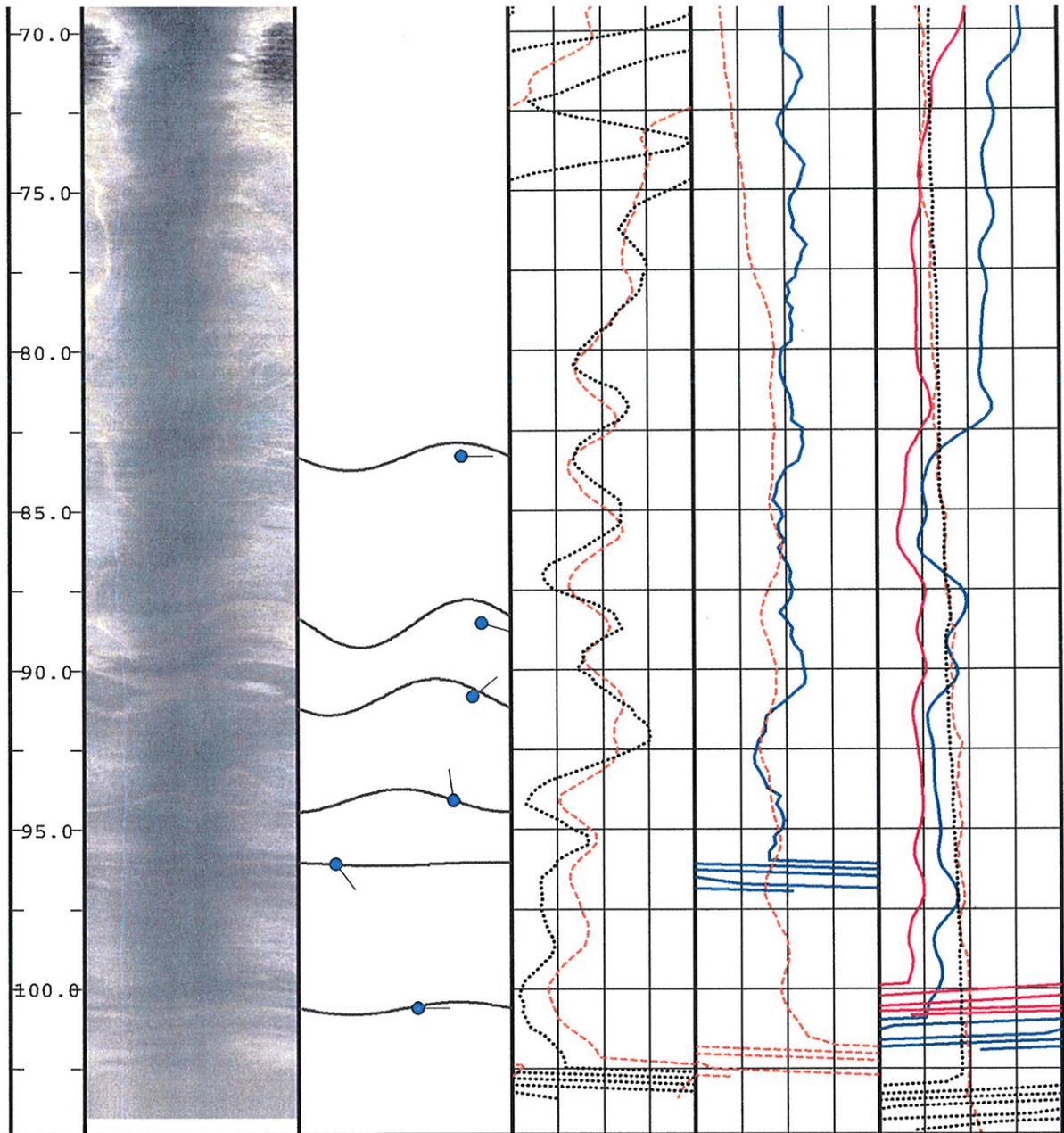


Orientation Summary Table
Image Features
Wellbore: GLA-F
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	7.11	23.33	214.25	63.06
2	7.70	25.26	325.30	77.69
3	9.17	30.10	343.78	80.93
4	9.84	32.28	336.76	77.24
5	10.31	33.81	351.37	64.30
6	10.65	34.93	2.82	69.06
7	10.93	35.86	70.17	80.07
8	11.09	36.37	355.53	75.53
9	13.68	44.89	346.96	70.96
10	14.08	46.18	248.47	85.17
11	14.29	46.89	277.32	21.01
12	14.36	47.11	55.26	56.72
13	15.53	50.94	314.84	69.73
14	15.60	51.18	78.46	84.71
15	15.75	51.67	299.95	54.77
16	16.38	53.73	286.67	75.40
17	18.14	59.51	12.96	66.49
18	21.18	69.49	161.04	48.95
19	24.30	79.74	114.97	54.77
20	26.87	88.14	215.16	50.19
21	38.73	127.07	305.68	24.51
22	38.89	127.59	272.49	24.51
23	39.51	129.61	163.25	64.41
24	41.56	136.35	176.53	58.87
25	42.06	137.99	94.45	42.37
26	42.20	138.45	341.29	57.74
27	44.81	147.03	308.40	62.78
28	45.16	148.16	304.78	68.54
29	45.89	150.55	113.16	41.6
30	46.37	152.13	303.57	50.19
31	46.99	154.18	313.23	63.89

All directions are with respect to magnetic north.





4pi 27" Below Water		Fluid Conductivity	
2100	2600	700	720
CPS		$\mu\text{S/cm}$	
4pi 15" Below Water		Neutron below water	
12000	15000	500	2500
CPS		CPS	
TADPOLE PLOT		NEUTRON	
4pi 27" Spacing		Conductivity (long)	
0	90	2000	6000
10000	13000	0	0
CPS		CPS	
4pi 15" Spacing		Natural Gamma	
25000	28000	0	150
CPS		CPS	
		Conductivity (short)	
		40	80
		mS/m	

3D IMAGE LOG
180°

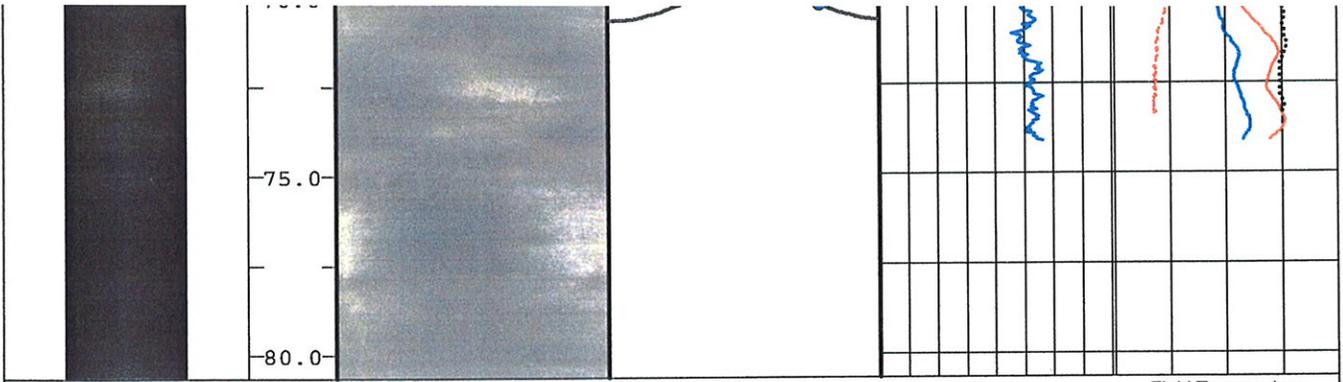
Depth
1in:5ft
BOREHOLE VIEW
0° 90° 180° 270° 0°

FEATURES
0° 90° 180° 270° 0°

Orientation Summary Table
Image Features
Wellbore: GLA-G
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	7.32	24.03	206.52	74.29
2	7.88	25.86	219.12	48.44
3	8.39	27.51	241.70	57.22
4	8.55	28.05	266.49	42.97
5	9.34	30.64	87.02	80.31
6	9.63	31.61	75.83	82.72
7	9.84	32.28	299.90	72.57
8	10.94	35.89	273.83	71.14
9	11.41	37.43	269.37	72.50
10	11.50	37.74	251.22	83.70
11	12.58	41.26	295.09	79.08
12	12.85	42.17	92.41	81.65
13	13.41	43.99	99.27	83.95
14	14.53	47.66	97.80	84.82
15	15.32	50.27	89.57	82.34
16	16.05	52.67	93.21	82.57
17	17.47	57.31	83.40	83.86
18	18.71	61.38	89.57	68.17
19	19.13	62.75	79.09	67.38
20	19.44	63.78	65.61	66.12
21	20.33	66.71	46.34	67.37
22	20.56	67.44	32.38	63.32
23	20.79	68.21	46.92	72.29
24	25.38	83.28	89.57	69.25
25	26.98	88.53	105.73	77.63
26	27.68	90.82	51.59	73.86
27	28.67	94.07	352.55	65.47
28	29.28	96.07	142.87	16.07
29	30.66	100.6	89.57	50.19

All directions are with respect to magnetic north.



Fluid Temperature
 20 °C 21
 Fluid Conductivity
 840 μ S/cm 880
 Conductivity (long)
 0 mS/m 30
 Conductivity (short)
 0 mS/m 60

TADPOLE PLOTS
 0 90

3D IMAGE LOG Depth BOREHOLE VIEW Features NGAM
 180° 1in:5ft 0° 90° 180° 270° 0° 90° 180° 270° 40 CPS 120 40 mS/m 60

Orientation Summary Table
Image Features
Wellbore: GLA-3S
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	17.67	57.97	159.91	56.97
2	19.92	65.37	343.74	72.40
3	20.76	68.11	118.34	79.34
4	21.40	70.22	7.40	70.44

All directions are with respect to magnetic north.

COLOG

BOREHOLE GEOPHYSICS & HYDROPHYSICS

A Division of Layne Christensen Company

11001 Etlwanda Ave., Fontana CA 92337
 PH: (909) 390-2833 FAX (909) 390-6097

COMPANY ROBERTSON GEOLOGGING TECHNOLOGY

WELL ID

FIELD

COUNTRY USA STATE

LOCATION

OTHER SERVICES

SEC

TWP

RGE

ERMANENT DATUM

ELEVATION

K.B.

OG MEAS. FROM

ABOVE PERM. DATUM

D.F.

RILLING MEAS. FROM

G.L.

DATE 21/06/04

TYPE FLUID IN HOLE

SALINITY

DENSITY

LEVEL

MAX. REC. TEMP.

DEPTH-DRILLER

DEPTH-LOGGER

TM LOGGED INTERVAL

OP LOGGED INTERVAL

OPERATING RIG TIME

RECORDED BY

WITNESSED BY

BOREHOLE RECORD

BIT FROM

TO

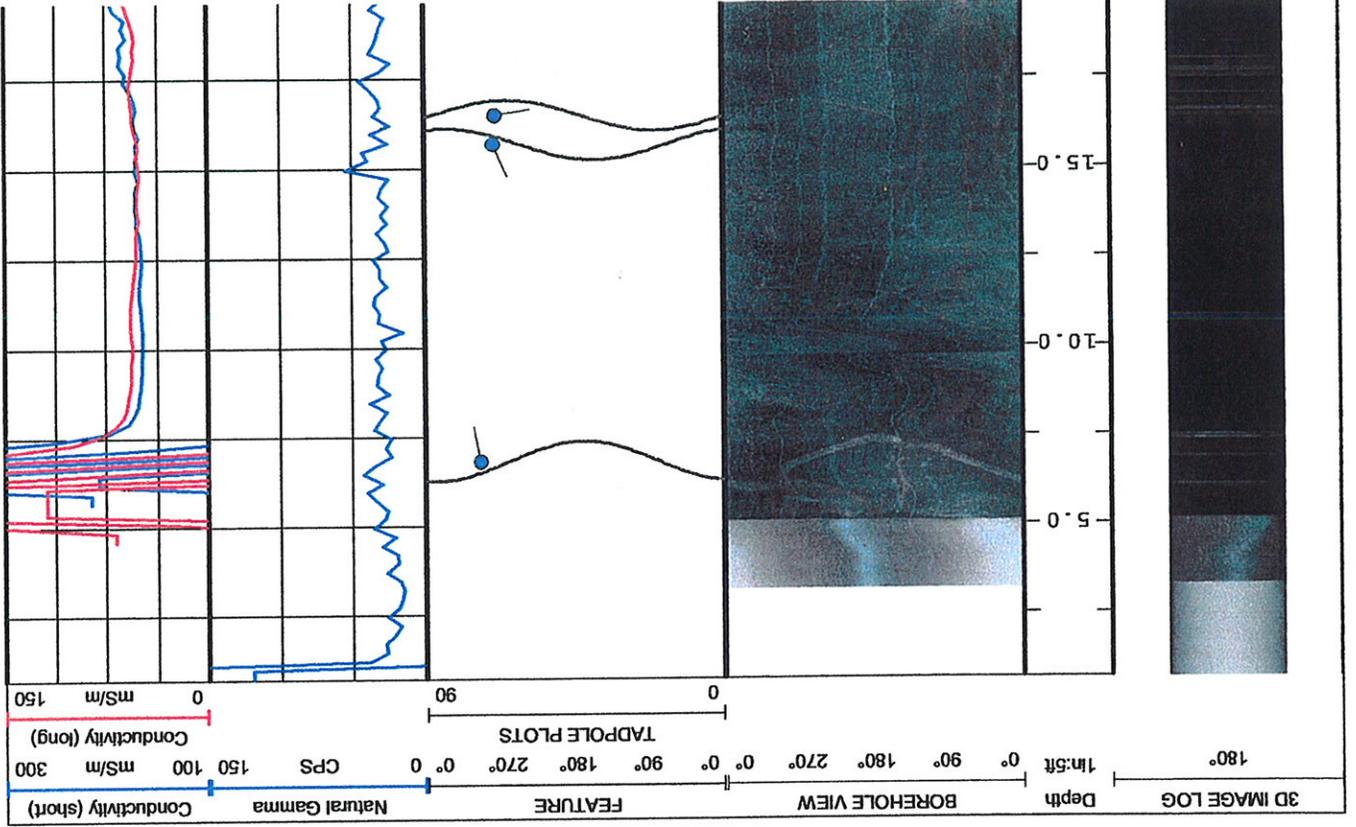
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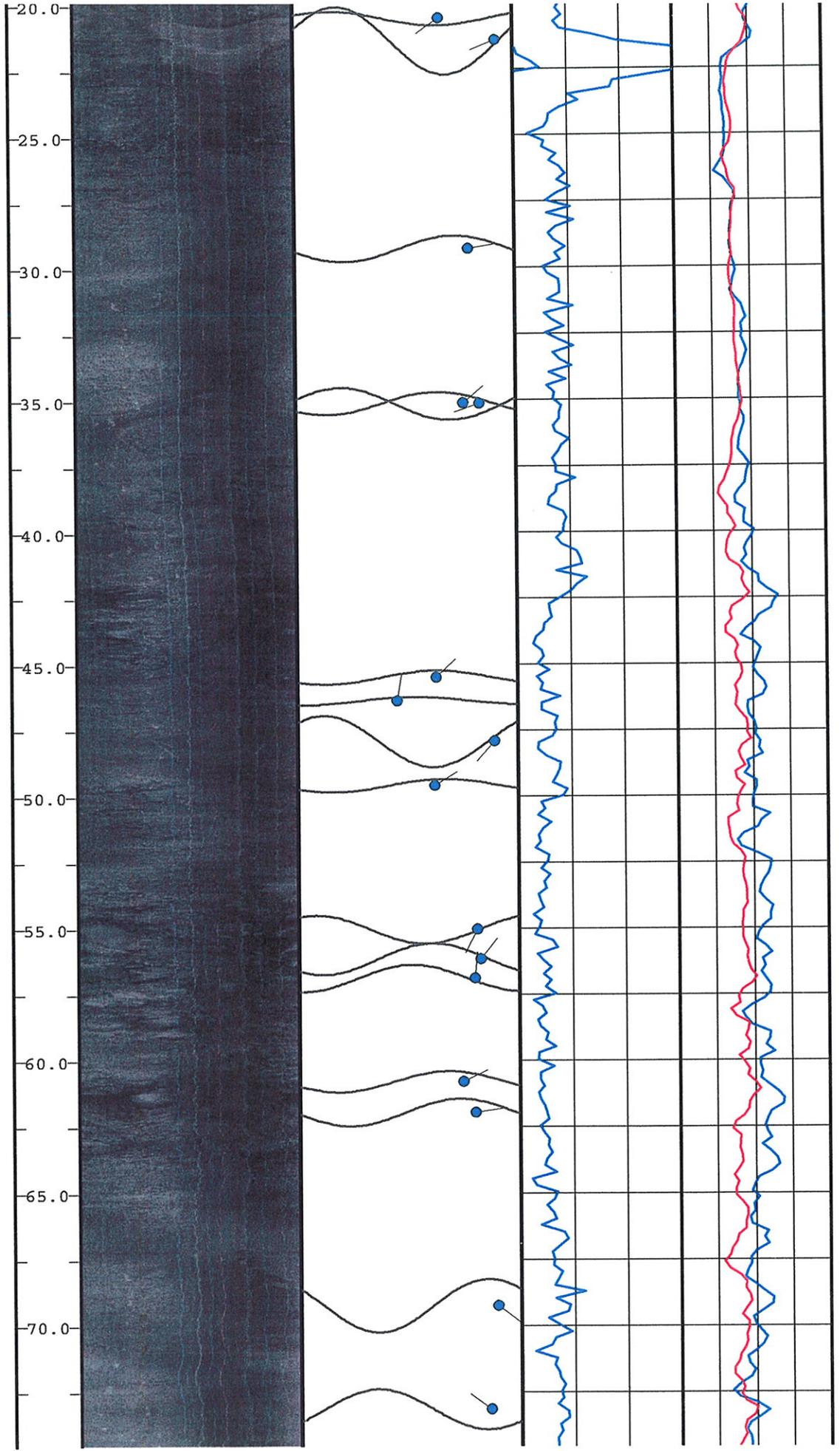
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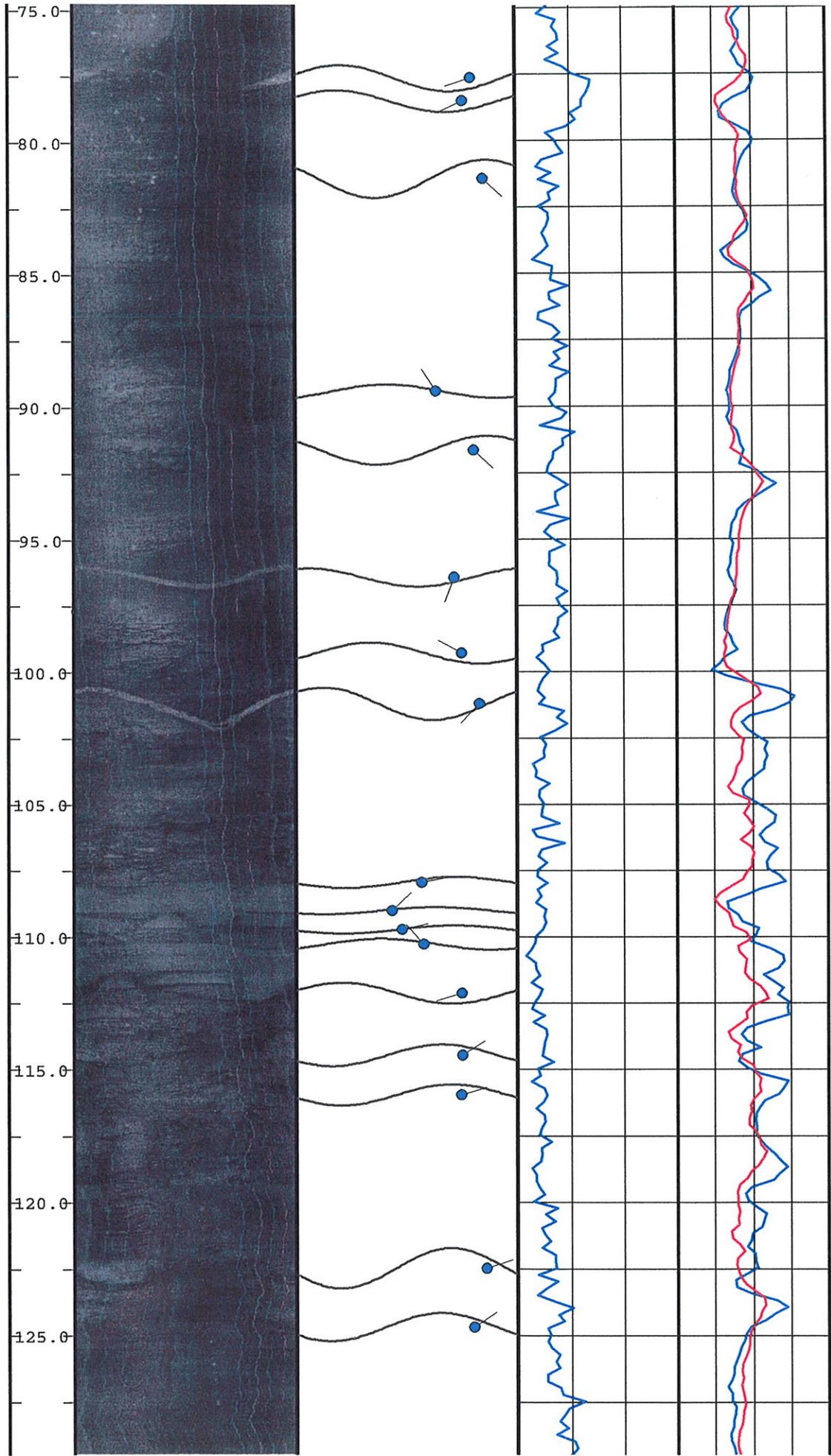
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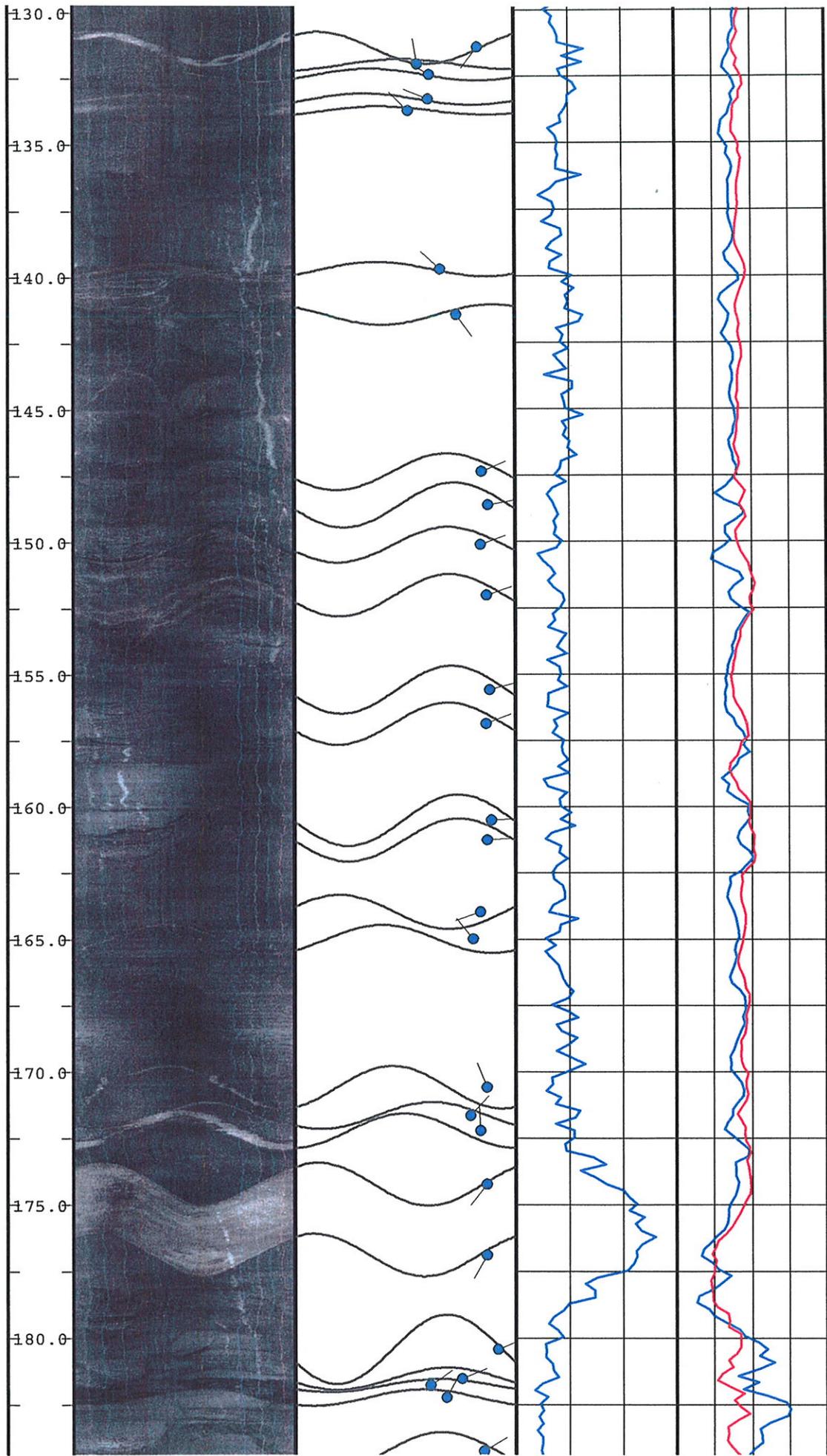
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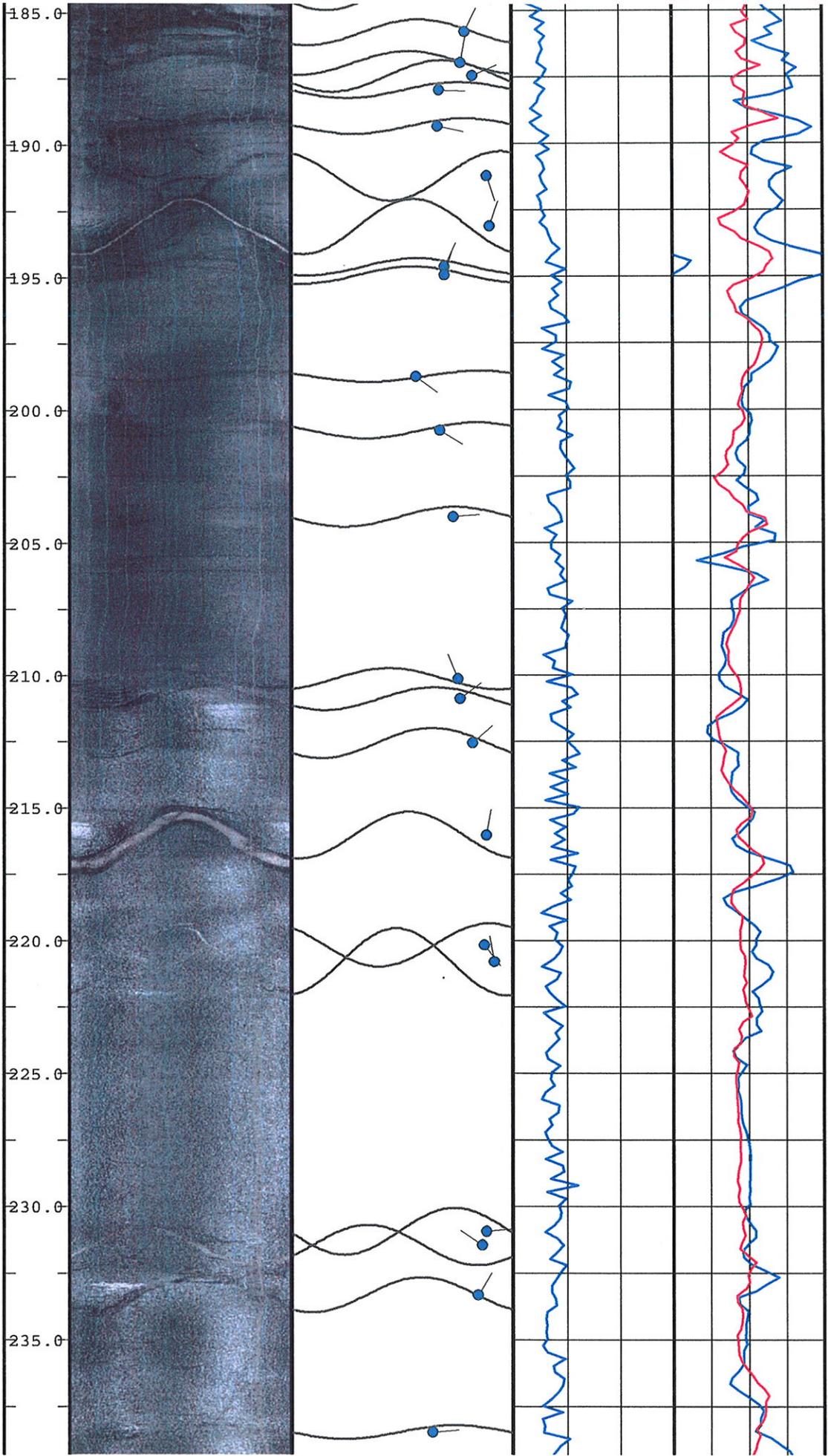
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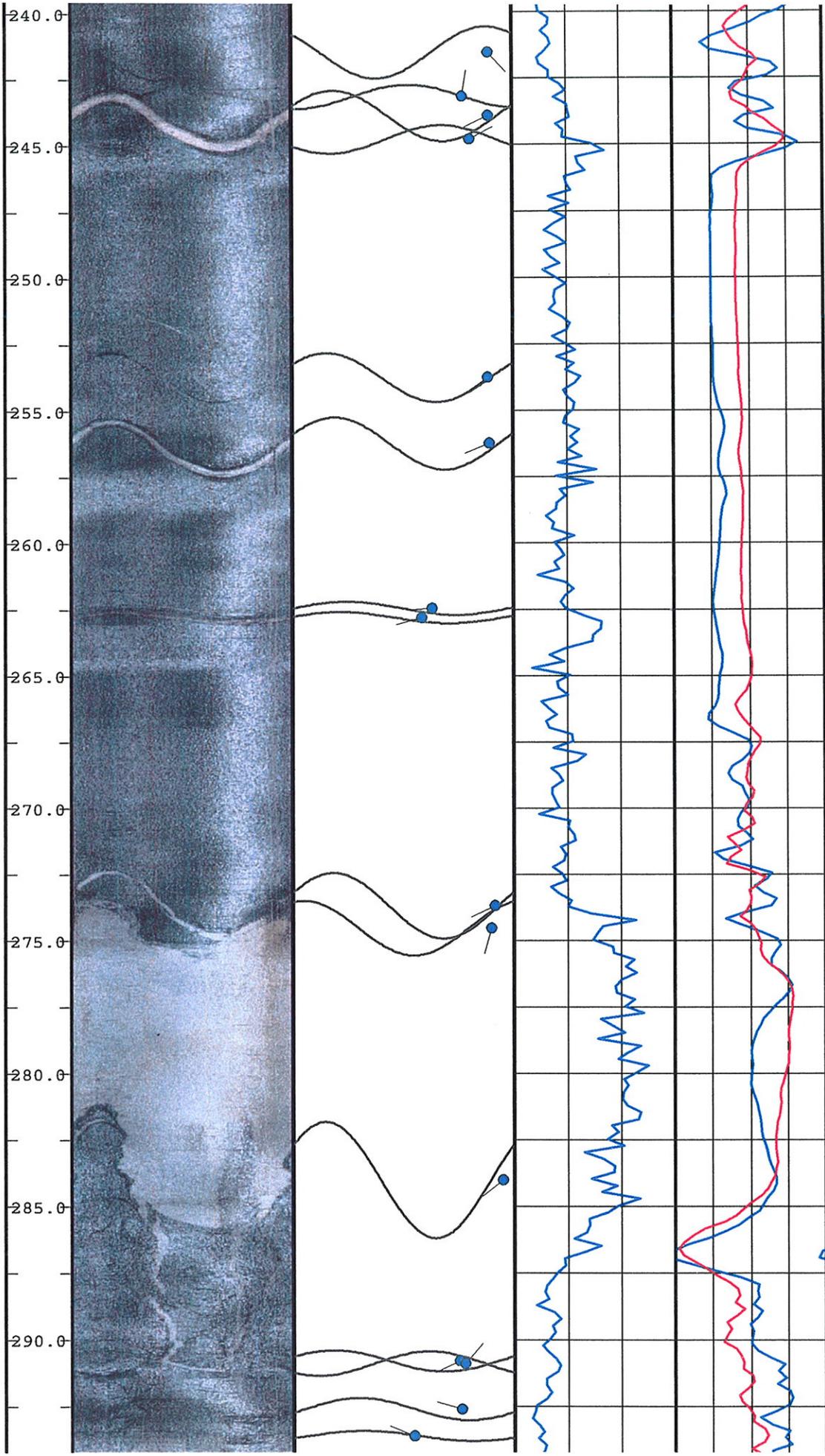


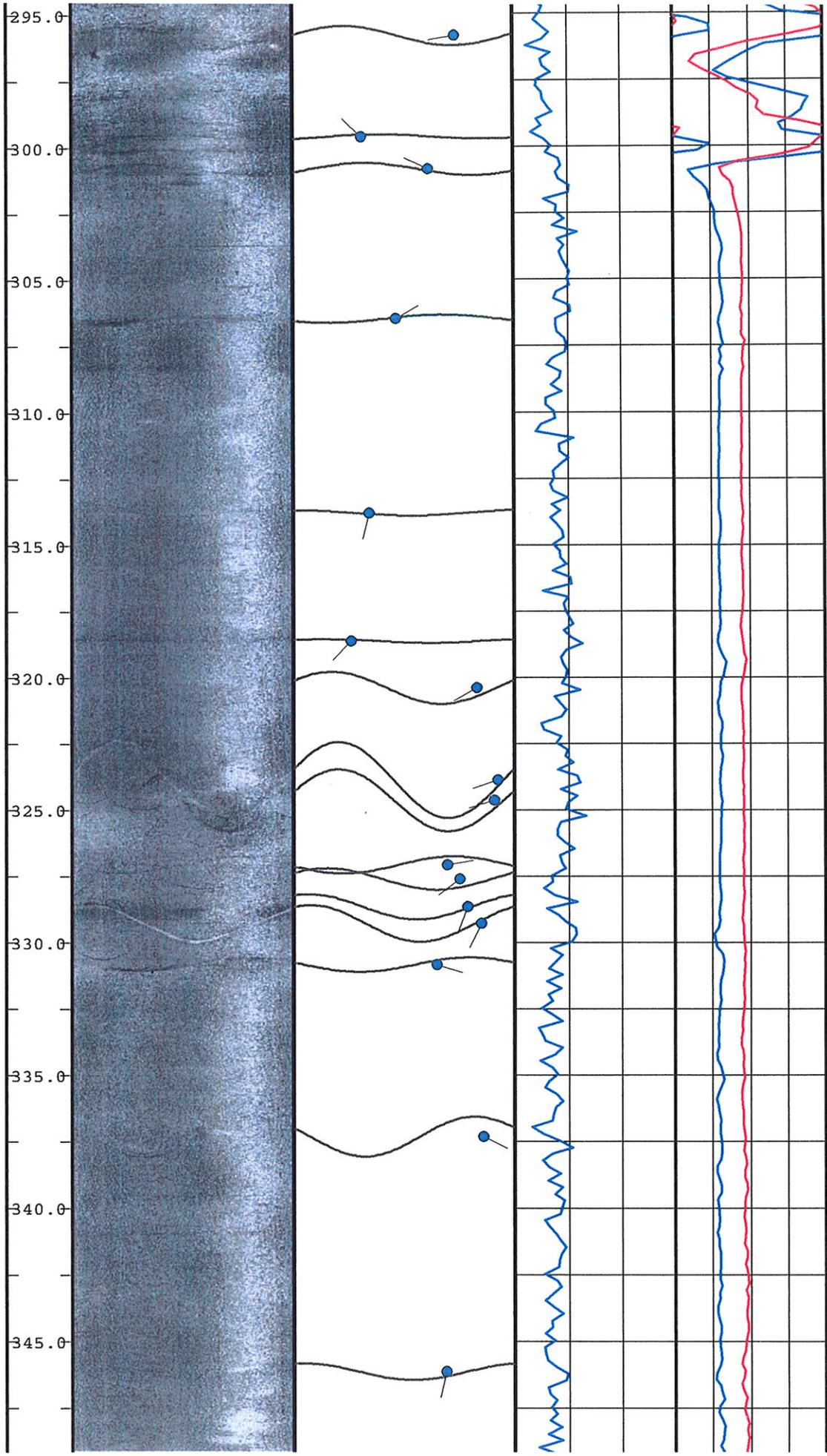


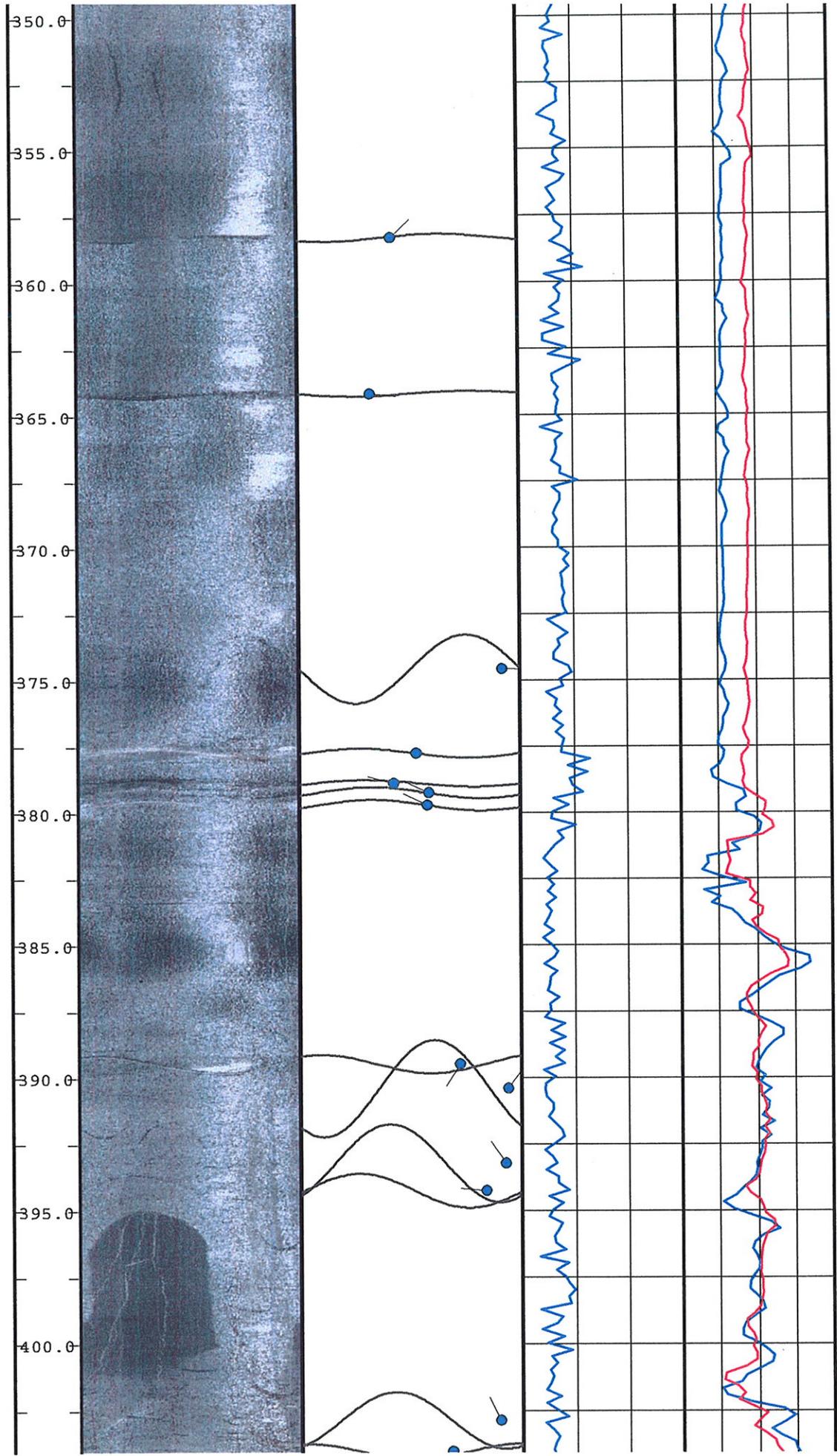


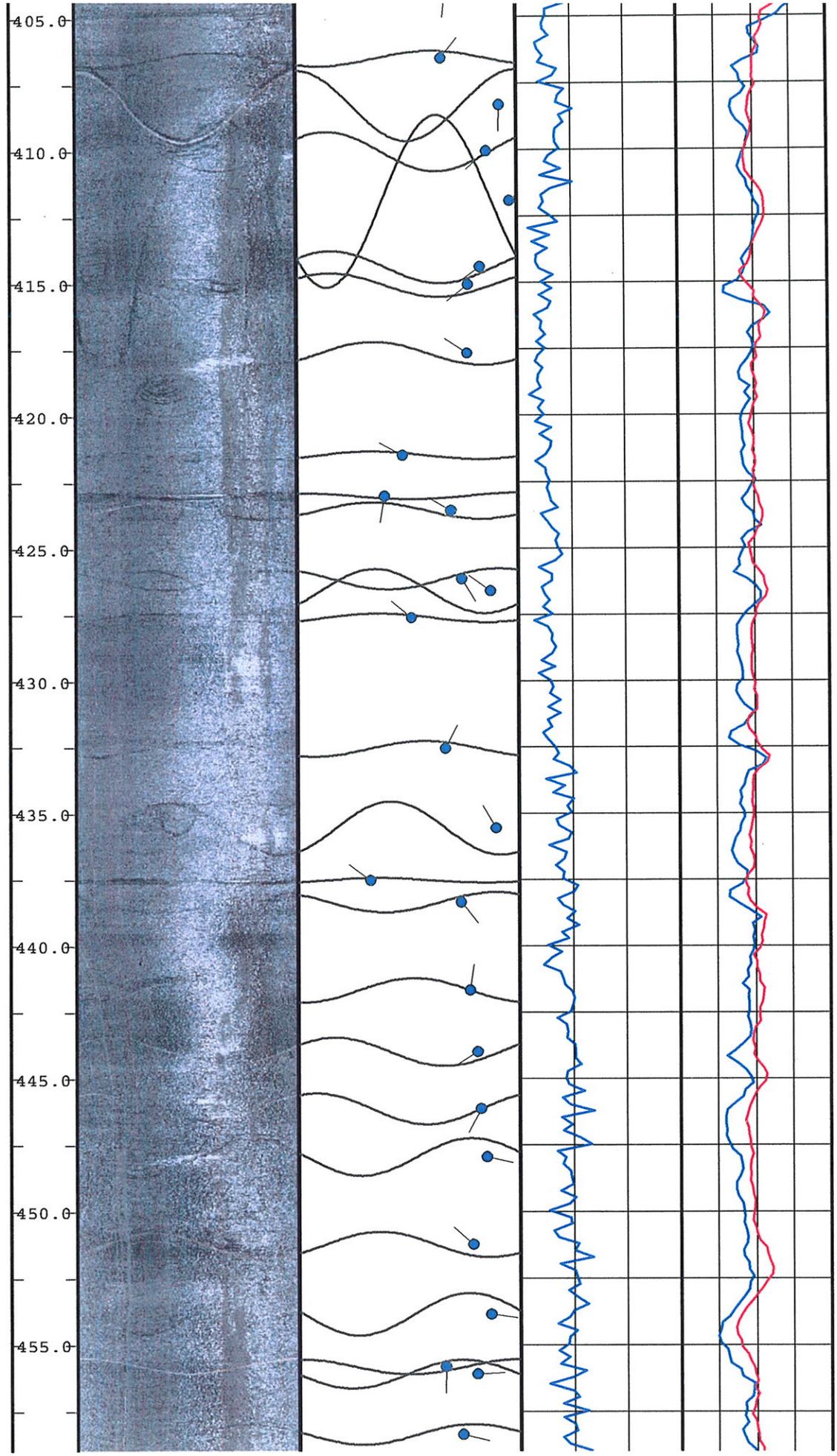


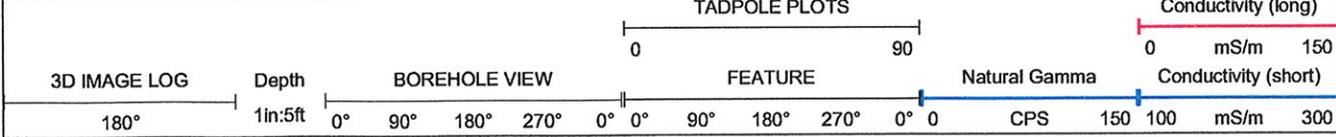
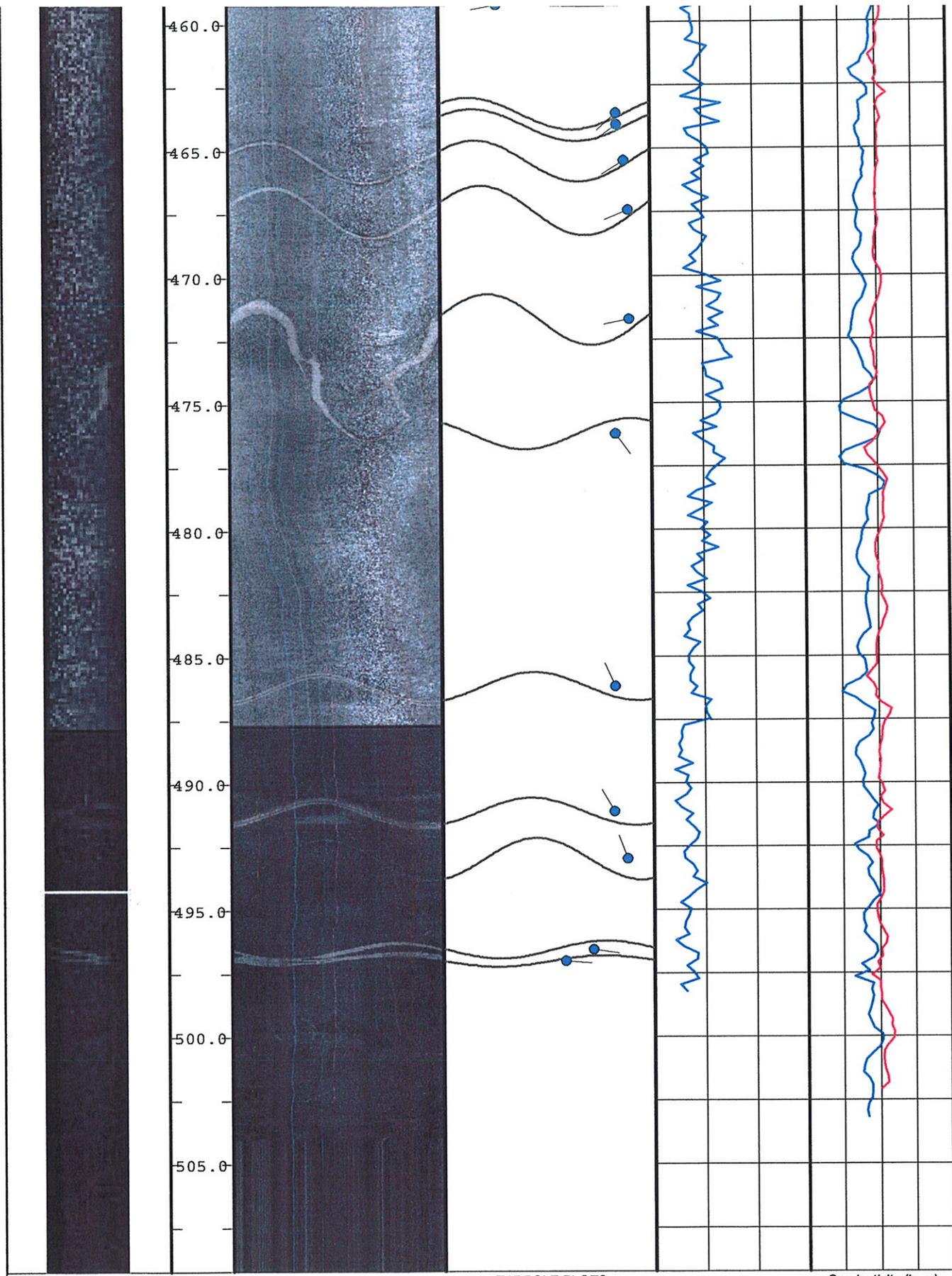












Orientation Summary Table
Image Features
Wellbore: GLA-17
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	2.07	6.80	168.93	73.60
2	4.77	15.66	335.55	69.43
3	5.02	16.47	261.65	68.83
4	6.26	20.55	235.32	59.94
5	6.53	21.41	248.35	82.83
6	8.92	29.28	80.23	71.12
7	10.70	35.11	50.30	68.63
8	10.70	35.12	251.92	75.15
9	13.86	45.47	45.77	56.86
10	14.13	46.36	8.64	40.82
11	14.60	47.89	221.52	80.52
12	15.11	49.57	58.03	55.99
13	16.77	55.02	206.28	73.14
14	17.11	56.15	38.26	74.38
15	17.33	56.87	4.50	72.07
16	18.53	60.78	64.05	67.07
17	18.89	61.96	82.39	72.11
18	21.10	69.23	127.03	80.69
19	22.29	73.13	305.52	77.81
20	23.66	77.63	252.50	72.07
21	23.92	78.49	245.95	68.63
22	24.81	81.41	131.43	76.86
23	27.26	89.42	327.98	57.59
24	27.93	91.64	132.52	72.82
25	29.39	96.42	200.09	64.76
26	30.25	99.26	300.59	67.80
27	30.84	101.19	223.88	75.10
28	32.90	107.94	80.09	51.43
29	33.22	109.00	45.71	39.21
30	33.44	109.70	77.08	43.25
31	33.61	110.27	317.89	52.16
32	34.17	112.11	254.40	67.70
33	34.88	114.45	57.23	67.98
34	35.34	115.95	73.55	67.45
35	37.33	122.46	71.91	77.69
36	38.00	124.66	56.12	72.63
37	40.05	131.39	218.09	75.23
38	40.23	132.00	351.75	50.49
39	40.36	132.40	301.39	55.50
40	40.64	133.32	292.55	55.00
41	40.77	133.75	315.16	46.76
42	42.59	139.72	313.39	59.78
43	43.11	141.44	143.20	66.29
44	44.91	147.34	68.09	76.54

All directions are with respect to magnetic north.

Orientation Summary Table
Image Features
Wellbore: GLA-17
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
45	45.30	148.61	79.79	78.98
46	45.75	150.10	69.79	76.11
47	46.34	152.02	71.91	78.32
48	47.42	155.57	75.30	79.64
49	47.81	156.86	69.48	78.28
50	48.92	160.50	86.38	80.37
51	49.15	161.24	87.02	78.59
52	49.98	163.96	251.57	75.84
53	50.29	164.98	321.06	72.97
54	51.99	170.58	338.12	78.42
55	52.32	171.64	42.37	71.89
56	52.49	172.20	356.90	75.76
57	53.10	174.21	217.05	78.51
58	53.91	176.88	209.96	78.40
59	54.99	180.41	67.23	82.83
60	55.33	181.52	67.87	68.26
61	55.41	181.78	54.91	55.31
62	55.54	182.22	28.08	61.79
63	56.15	184.22	58.28	77.09
64	56.63	185.80	26.64	70.94
65	56.98	186.95	10.74	69.35
66	57.13	187.44	65.92	74.24
67	57.30	187.98	91.92	60.45
68	57.71	189.33	101.7	59.94
69	58.27	191.19	161.28	79.85
70	58.85	193.09	18.41	81.00
71	59.31	194.6	24.94	62.58
72	59.41	194.93	17.01	62.75
73	60.57	198.73	125.74	51.03
74	61.19	200.77	121.06	60.72
75	62.19	204.02	85.74	65.98
76	64.04	210.12	338.51	67.98
77	64.27	210.86	53.1	68.90
78	64.78	212.54	48.51	73.92
79	65.84	216.02	10.33	79.48
80	67.10	220.15	141.88	78.57
81	67.29	220.78	349.96	82.61
82	70.39	230.93	84.82	79.39
83	70.54	231.43	303.83	77.79
84	71.11	233.31	31.83	76.00
85	72.68	238.44	85.11	57.54
86	73.61	241.51	137.02	80.37
87	74.12	243.16	8.66	69.64
88	74.34	243.9	246.01	80.34

All directions are with respect to magnetic north.

Orientation Summary Table
Image Features
Wellbore: GLA-17
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
89	74.61	244.78	62.22	72.66
90	77.34	253.73	234.68	79.92
91	78.10	256.22	248.09	80.54
92	79.99	262.44	267.23	56.93
93	80.10	262.79	255.91	52.69
94	83.41	273.65	245.06	82.46
95	83.67	274.5	196.17	80.98
96	86.56	284	231.82	85.69
97	88.63	290.79	244.68	67.68
98	88.66	290.88	41.09	70.10
99	89.18	292.6	286.6	68.54
100	89.49	293.6	292.73	49.24
101	90.16	295.8	261.52	66.41
102	91.32	299.61	315.16	27.97
103	91.69	300.82	294.5	55.34
104	93.41	306.46	60.29	42.01
105	95.64	313.78	192.77	30.96
106	97.11	318.61	224.23	23.57
107	97.65	320.38	241.28	74.91
108	98.71	323.85	252.3	83.51
109	98.95	324.63	252.77	82.05
110	99.69	327.07	80.43	62.78
111	99.85	327.6	233.17	67.89
112	100.17	328.64	200.85	71.14
113	100.36	329.26	205.81	76.66
114	100.84	330.83	107.02	58.69
115	102.81	337.3	115.4	77.60
116	105.50	346.13	193.67	62.52
117	109.21	358.31	46.8	38.26
118	111.00	364.17	95.11	29.42
119	114.17	374.56	90.94	82.77
120	115.13	377.73	275.96	47.52
121	115.48	378.88	284.68	38.38
122	115.59	379.23	295.32	52.60
123	115.74	379.71	295.82	52.00
124	118.71	389.47	212.36	65.05
125	118.99	390.4	37.24	84.86
126	119.85	393.21	324.71	83.63
127	120.16	394.24	274.05	75.71
128	122.79	402.85	332.83	81.27
129	123.15	404.03	184.89	61.42
130	123.92	406.55	38.51	59.42
131	124.45	408.3	180.13	83.00
132	124.98	410.04	228.38	77.74

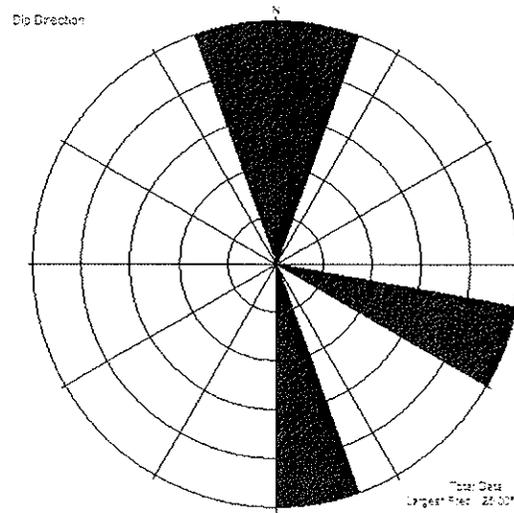
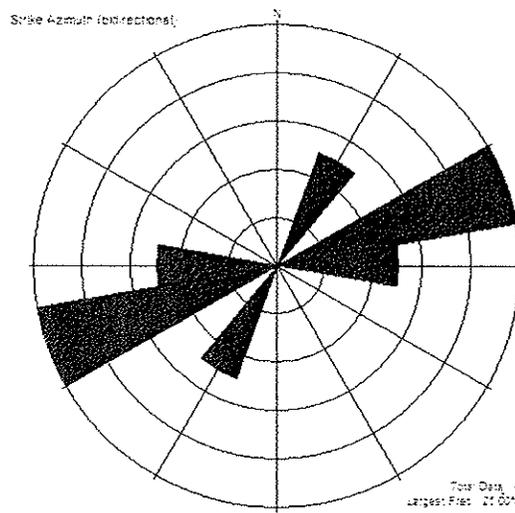
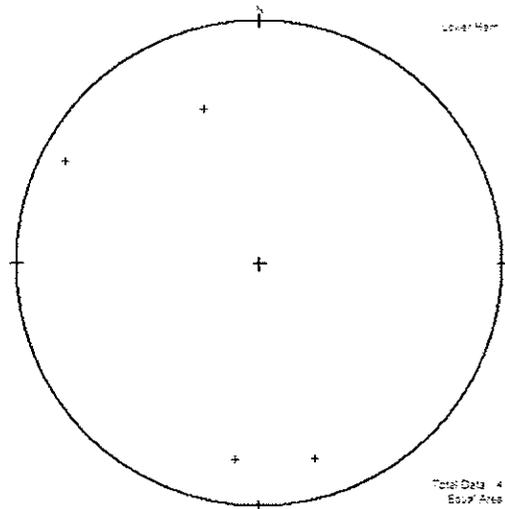
All directions are with respect to magnetic north.

Orientation Summary Table
Image Features
Wellbore: GLA-17
GREGORY CANYON
June 2004

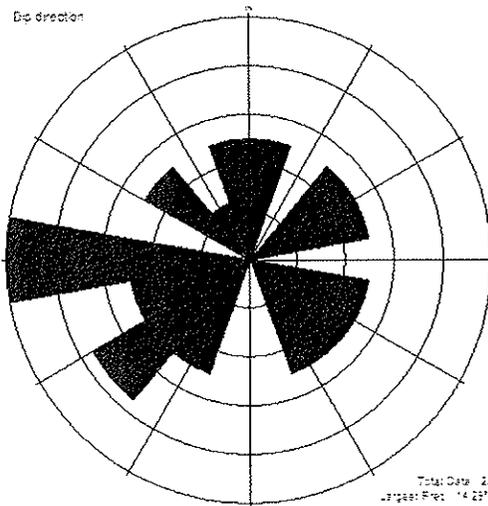
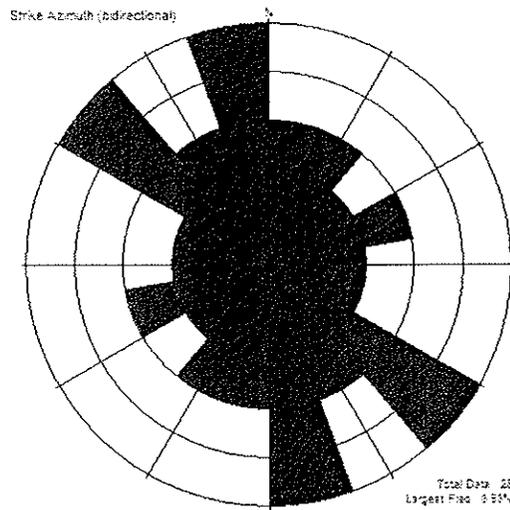
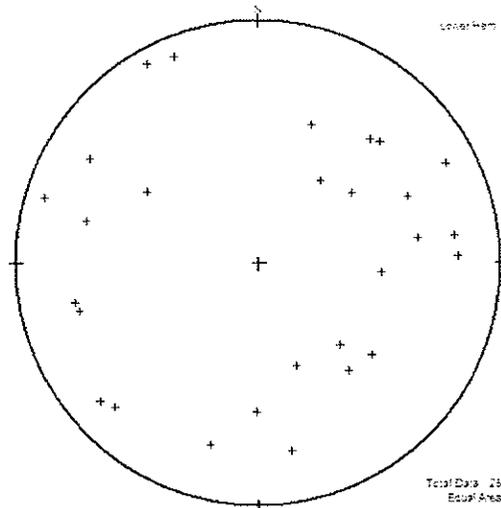
Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
133	125.55	411.91	48.7	87.09
134	126.31	414.4	234.56	74.97
135	126.51	415.06	232.49	70.20
136	127.30	417.64	303.83	69.68
137	128.46	421.47	299.15	43.11
138	128.93	423	188.98	35.74
139	129.10	423.57	299.79	62.78
140	129.89	426.14	148.3	67.07
141	130.02	426.59	305.33	78.92
142	130.34	427.61	309.79	46.56
143	131.84	432.55	25.65	60.42
144	132.76	435.56	330.05	80.79
145	133.36	437.53	306.6	29.42
146	133.61	438.36	140.94	66.43
147	134.61	441.65	8.11	70.03
148	135.33	443.98	238.5	73.04
149	135.98	446.13	208.32	74.34
150	136.53	447.94	101.79	76.81
151	137.53	451.23	311.11	71.09
152	138.33	453.84	97.36	78.23
153	138.93	455.8	180.85	59.94
154	139.01	456.07	86.38	72.73
155	139.71	458.35	102.98	66.65
156	139.99	459.27	260	24.51
157	141.30	463.59	228.09	75.62
158	141.44	464.03	234.04	75.74
159	141.87	465.46	238.28	78.80
160	142.47	467.41	248.72	80.61
161	143.77	471.69	258.72	80.77
162	145.15	476.21	143.21	74.57
163	148.18	486.17	335.74	73.86
164	149.69	491.11	330.43	73.31
165	150.26	492.97	339.09	78.78
166	151.35	496.55	97.7	64.24
167	151.49	497.01	93.64	52.54

All directions are with respect to magnetic north.

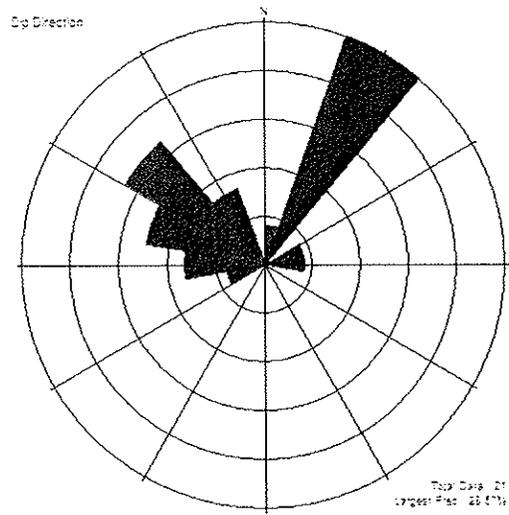
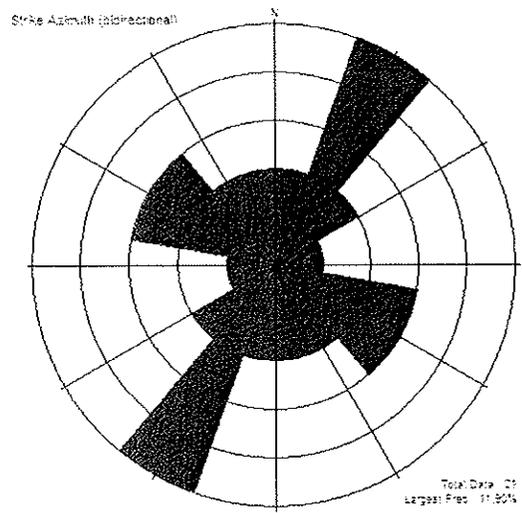
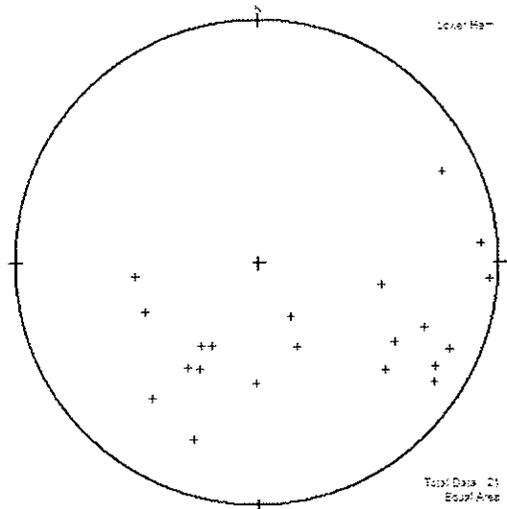
**Stereographic Pole-Plots
and Rose Diagrams
Well GLA-3S
Gregory Canyon Landfill**



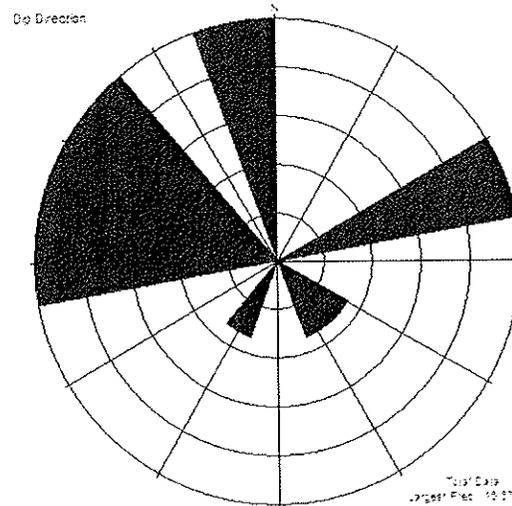
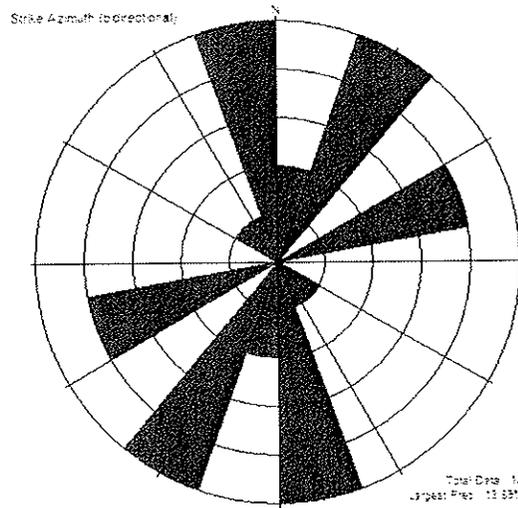
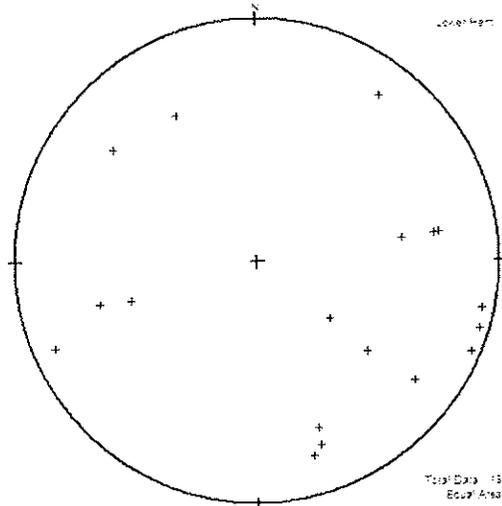
**Stereographic Pole-Plots
and Rose Diagrams
Well GLA-A
Gregory Canyon Landfill**



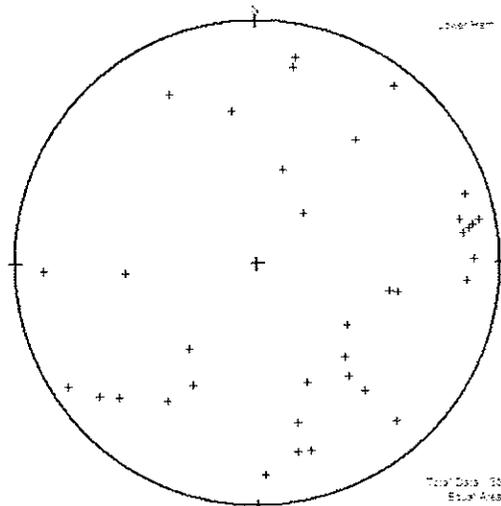
**Stereographic Pole-Plots
and Rose Diagrams
Well GLA-B
Gregory Canyon Landfill**



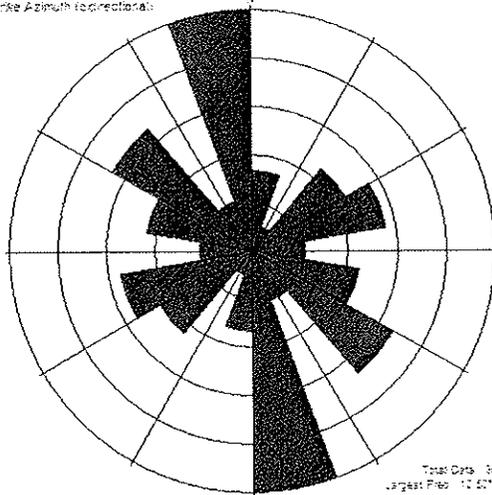
**Stereographic Pole-Plots
and Rose Diagrams
Well GLA-C
Gregory Canyon Landfill**



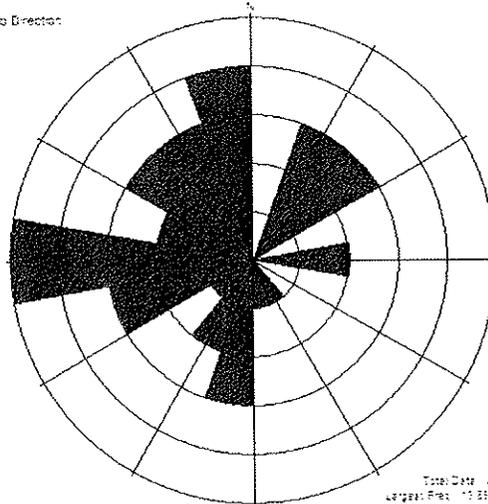
**Stereographic Pole-Plots
and Rose Diagrams
Well GLA-D
Gregory Canyon Landfill**



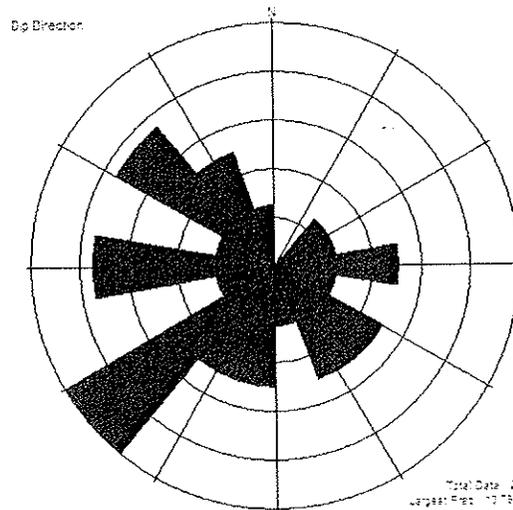
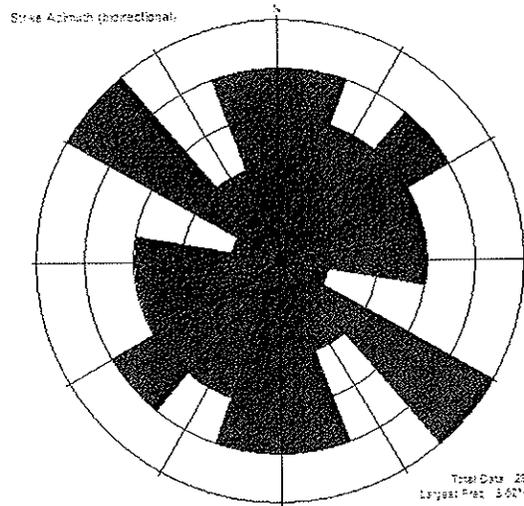
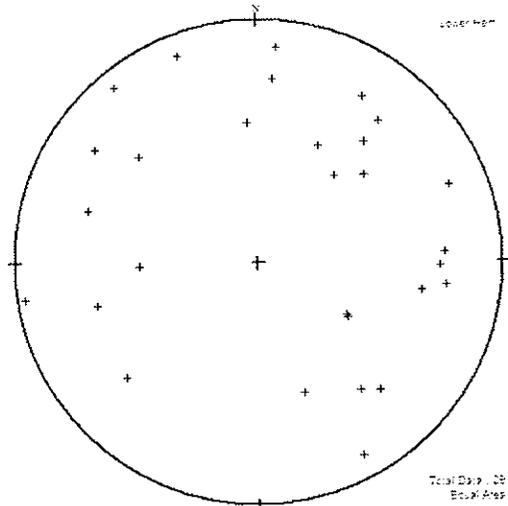
Strike Azimuth (directional)



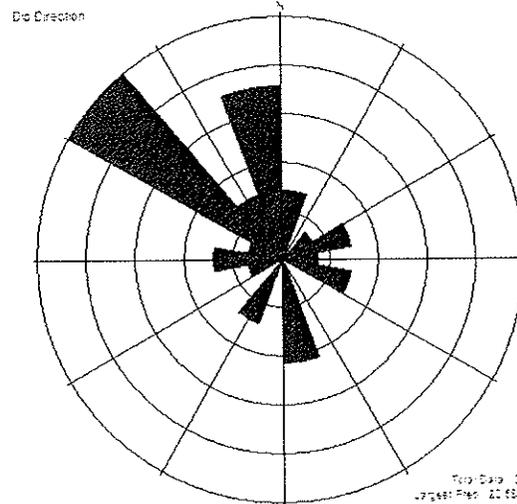
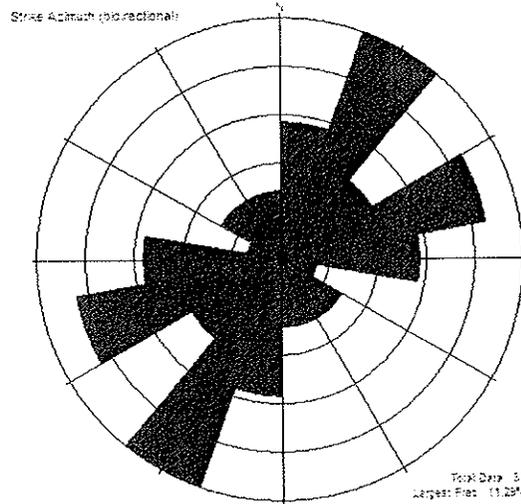
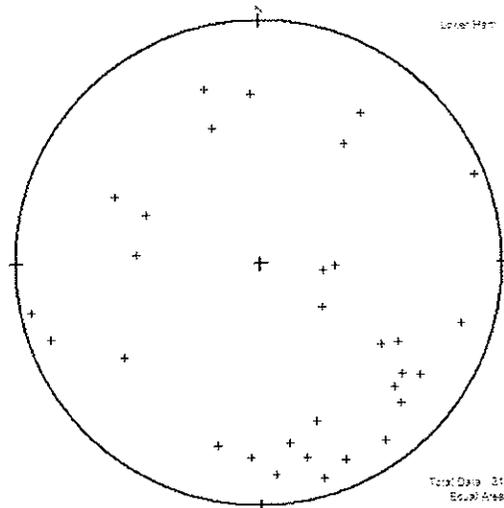
Dip Direction



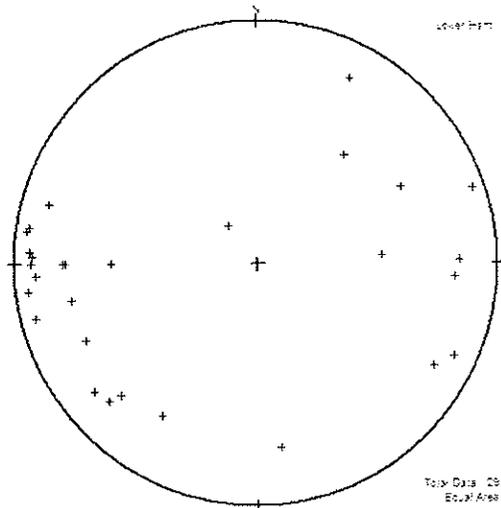
**Stereographic Pole-Plots
and Rose Diagrams
Well GLA-E
Gregory Canyon Landfill**



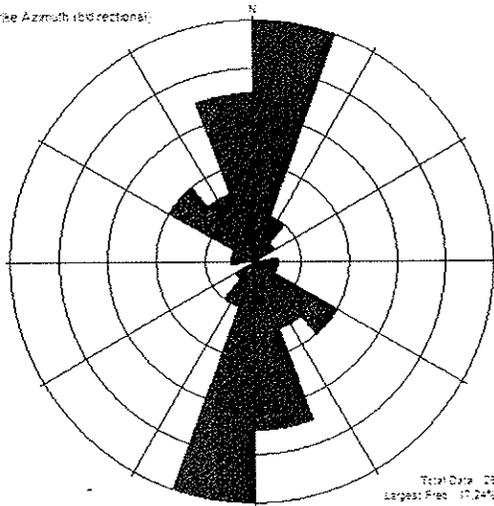
**Stereographic Pole-Plots
and Rose Diagrams
Well GLA-F
Gregory Canyon Landfill**



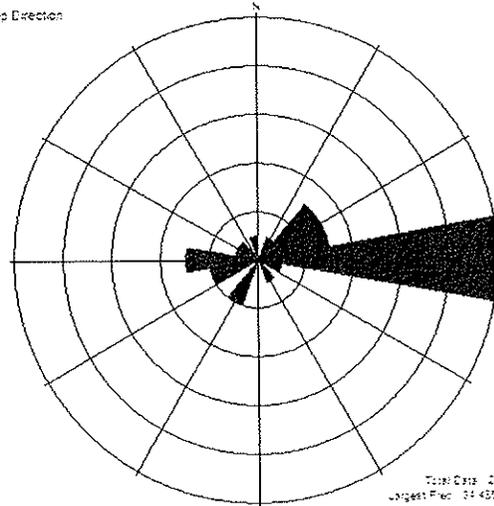
**Stereographic Pole-Plots
and Rose Diagrams
Well GLA-G
Gregory Canyon Landfill**



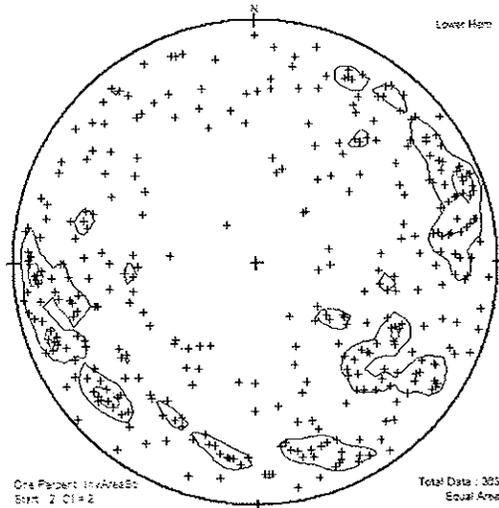
Strike Azimuth (60° direction)



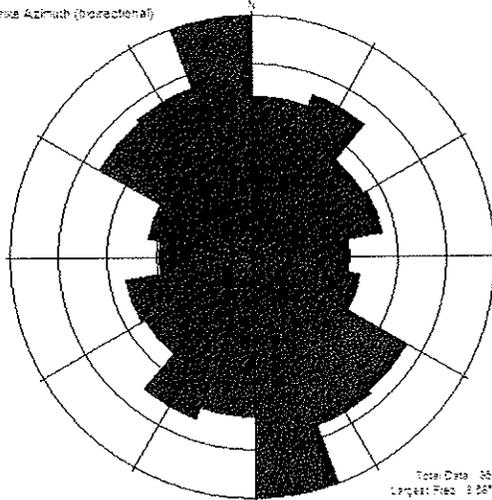
Dip Direction



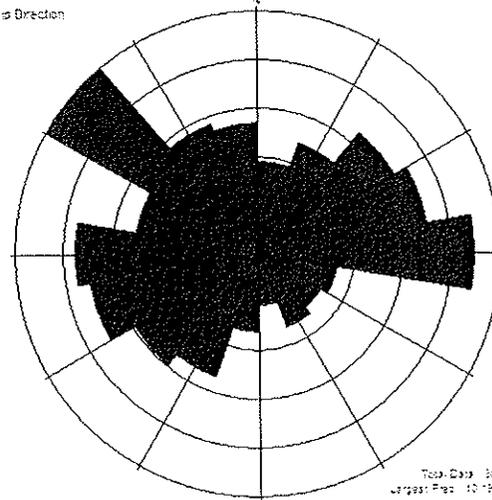
**Stereographic Pole-Plots
and Rose Diagrams
Composite of All Wells
Gregory Canyon Landfill**



Stress Azimuth (birefringent)

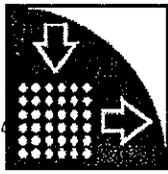


Dip Direction



ATTACHMENT C

RESULTS OF AQUIFER PUMPING TESTS



GeoLogic Associates

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91765

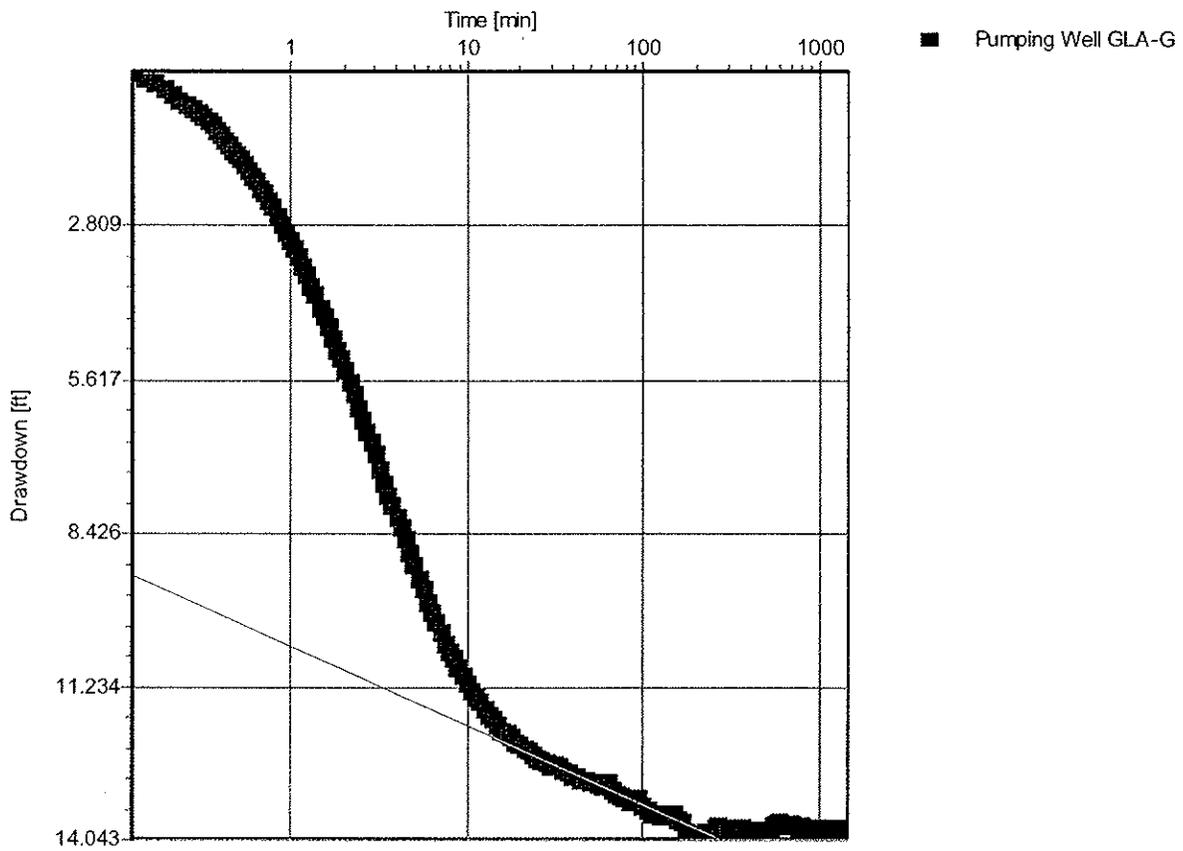
Pumping Test Analysis Report

Project: Gregory #2

Number:

Client:

Well GLA-G [Cooper-Jacob Time-Draw down]



Pumping Test: Well GLA-G

Analysis Method: Cooper-Jacob Time-Drawdown

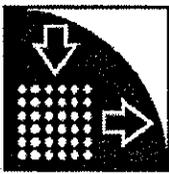
<u>Analysis Results:</u>	Transmissivity:	6.03E+1 [ft ² /d]	Conductivity:	9.43E-1 [ft/d]
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<u>Test parameters:</u>	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	Confined Aquifer	
	Screen length:	40 [ft]		
	Boring radius:	0.333 [ft]		
	Discharge Rate:	2.5 [U.S. gal/min]		

Comments:

Evaluated by:

Evaluation Date: 8/11/2004



GeoLogic Associates

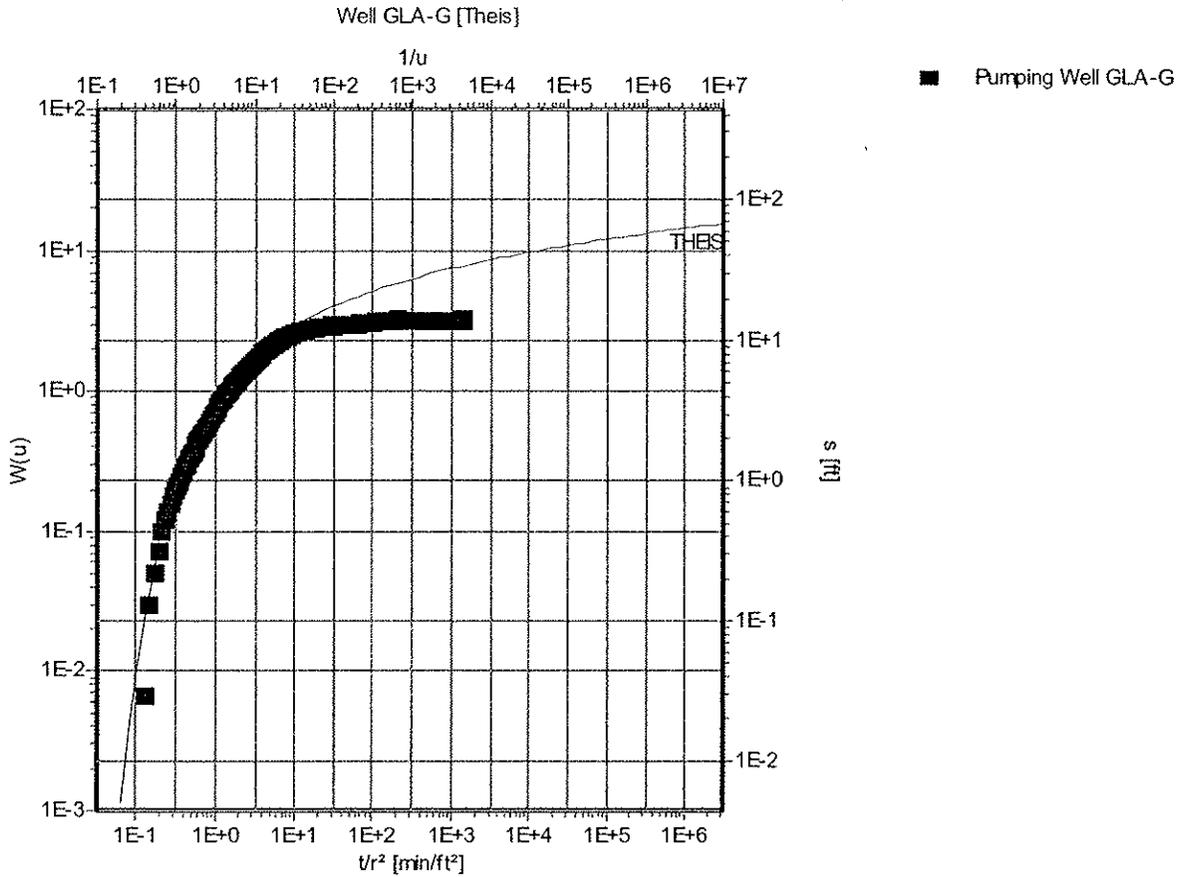
1360 Valley Vista Drive
 Diamond Bar, California
 91765

Pumping Test Analysis Report

Project: Gregory #2

Number:

Client:



Pumping Test: **Well GLA-G**

Analysis Method: **Theis**

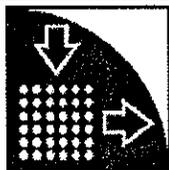
Analysis Results: Transmissivity: 8.77E+0 [ft²/d] Conductivity: 1.37E-1 [ft/d]
 Storativity: 7.90E-3

Test parameters: Pumping Well: Pumping Well GLA-G Aquifer Thickness: 64 [ft]
 Casing radius: 0.1667 [ft] Confined Aquifer
 Screen length: 40 [ft]
 Boring radius: 0.333 [ft]
 Discharge Rate: 2.5 [U.S. gal/min]

Comments:

Evaluated by:

Evaluation Date: 8/11/2004



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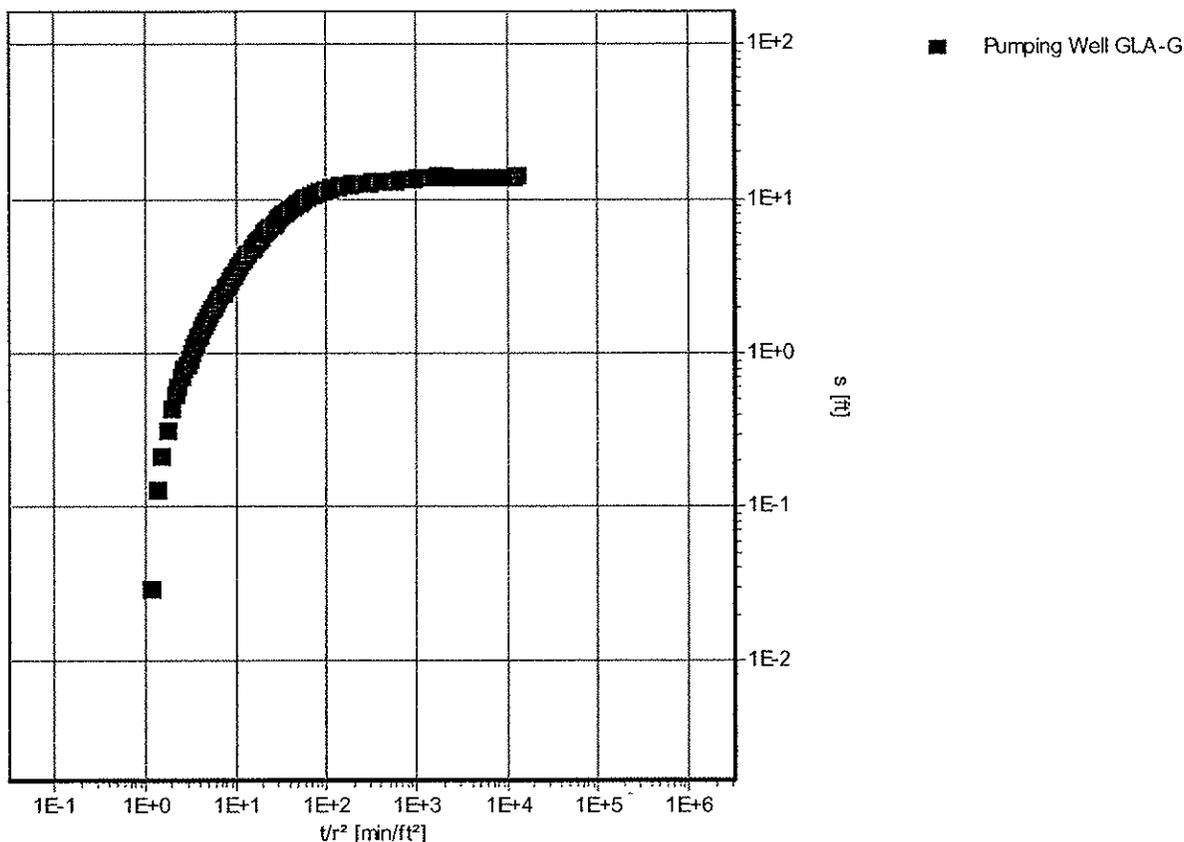
Pumping Test Analysis Report

Project: Gregory #2

Number:

Client:

Well GLA-G [Moench Fracture Flow]



Pumping Test: **Well GLA-G**

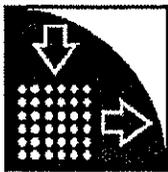
Analysis Method: **Moench Fracture Flow**

<u>Analysis Results:</u>	Transmissivity:	2.36E+1 [ft ² /d]	Conductivity:	3.69E-1 [ft/d]
	Storativity:	5.25E-2		

<u>Test parameters:</u>	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	b:	64 [ft]
	Screen length:	40 [ft]	Kv/Kh:	0.1
	Boring radius:	0.333 [ft]	C:	0.348
	Discharge Rate:	2.5 [U.S. gal/min]	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	200	K(block)/K(fracture):	0.1

Comments:

Evaluated by: Mark Vincent
 Evaluation Date: 8/11/2004



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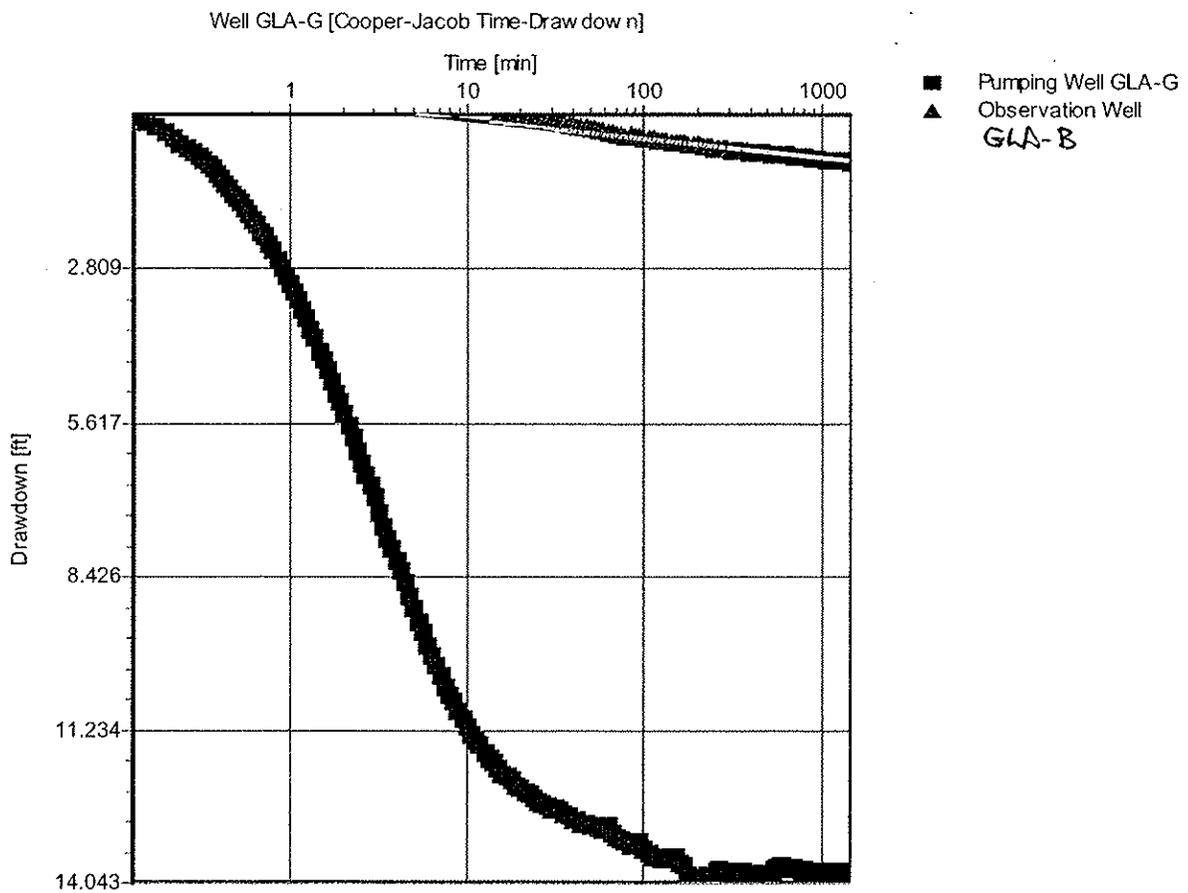
1360 Valley Vista Drive
 Diamond Bar, California
 91765

Pumping Test Analysis Report

Project: Gregory #2

Number:

Client:



Pumping Test: Well GLA-G

Analysis Method: Cooper-Jacob Time-Drawdown

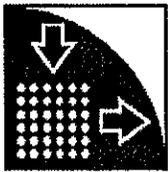
Analysis Results: Transmissivity: 2.54E+2 [ft²/d] Conductivity: 3.96E+0 [ft/d]

Test parameters: Pumping Well: Pumping Well GLA-G Aquifer Thickness: 64 [ft]
 Casing radius: 0.1667 [ft] Confined Aquifer
 Screen length: 40 [ft]
 Boring radius: 0.333 [ft]
 Discharge Rate: 2.5 [U.S. gal/min]

Comments:

Evaluated by:

Evaluation Date: 8/12/2004



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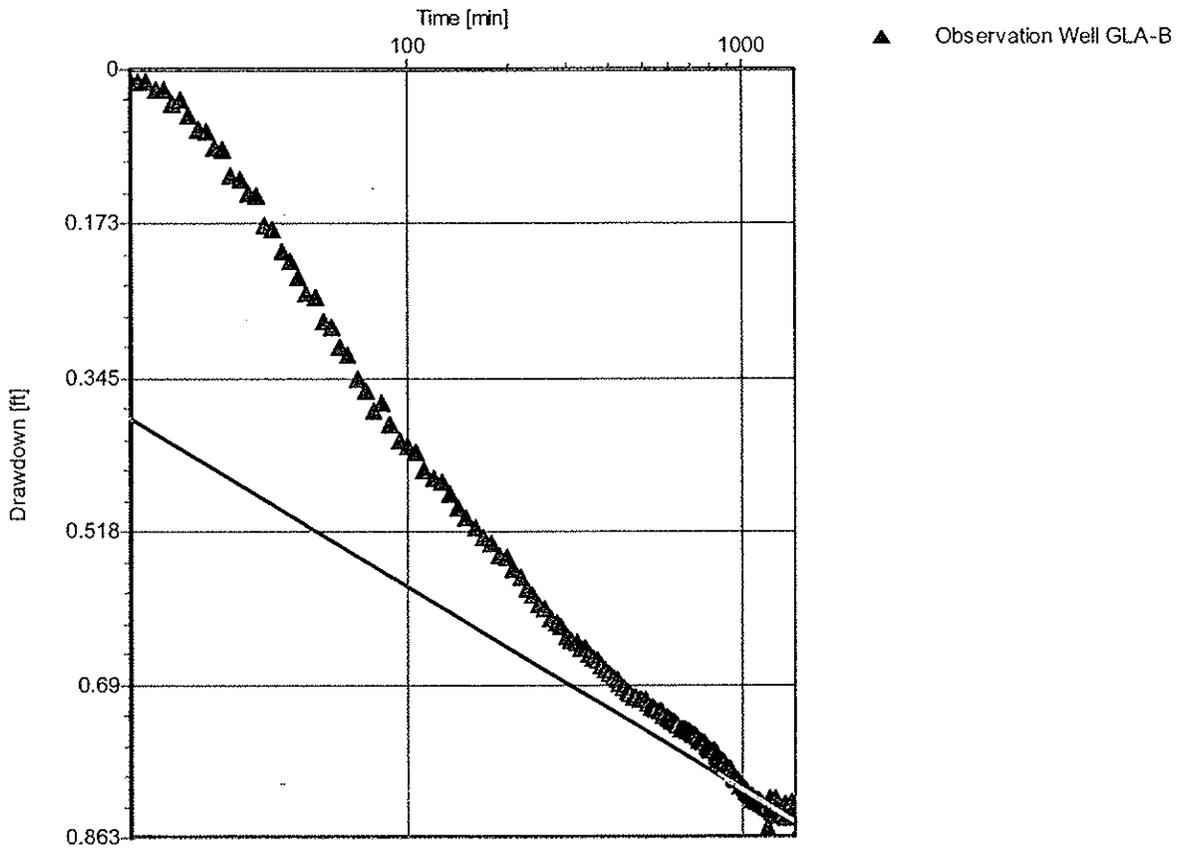
Pumping Test Analysis Report

Project: Gregory #2

Number:

Client:

Well GLA-G [Cooper-Jacob Time-Draw down]



Pumping Test: **Well GLA-G**

Analysis Method: **Cooper-Jacob Time-Drawdown**

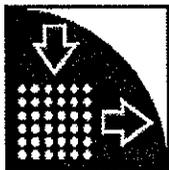
Analysis Results: Transmissivity: 3.84E+2 [ft²/d] Conductivity: 6.00E+0 [ft/d]

Test parameters: Pumping Well: Pumping Well GLA-G Aquifer Thickness: 64 [ft]
 Casing radius: 0.1667 [ft] Confined Aquifer
 Screen length: 40 [ft]
 Boring radius: 0.333 [ft]
 Discharge Rate: 2.5 [U.S. gal/min]

Comments:

Evaluated by:

Evaluation Date: 8/12/2004



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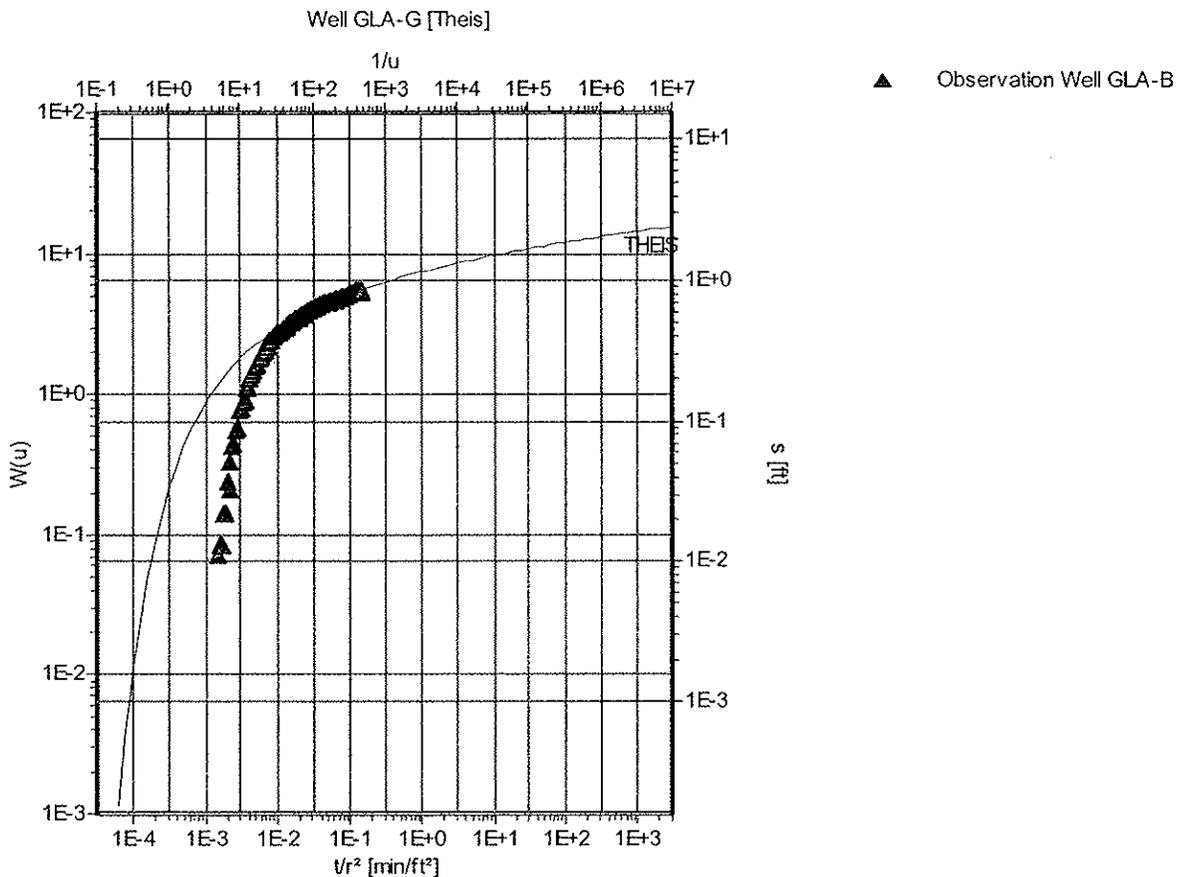
1360 Valley Vista Drive
 Diamond Bar, California
 91765

Pumping Test Analysis Report

Project: Gregory #2

Number:

Client:



Pumping Test: **Well GLA-G**

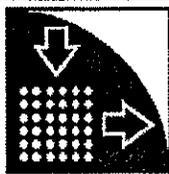
Analysis Method: **Theis**

<u>Analysis Results:</u>	Transmissivity:	2.47E+2 [ft ² /d]	Conductivity:	3.86E+0 [ft/d]
	Storativity:	2.13E-4		

<u>Test parameters:</u>	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	Confined Aquifer	
	Screen length:	40 [ft]		
	Boring radius:	0.333 [ft]		
	Discharge Rate:	2.5 [U.S. gal/min]		

Comments:

Evaluated by: Mark Vincent
 Evaluation Date: 8/12/2004



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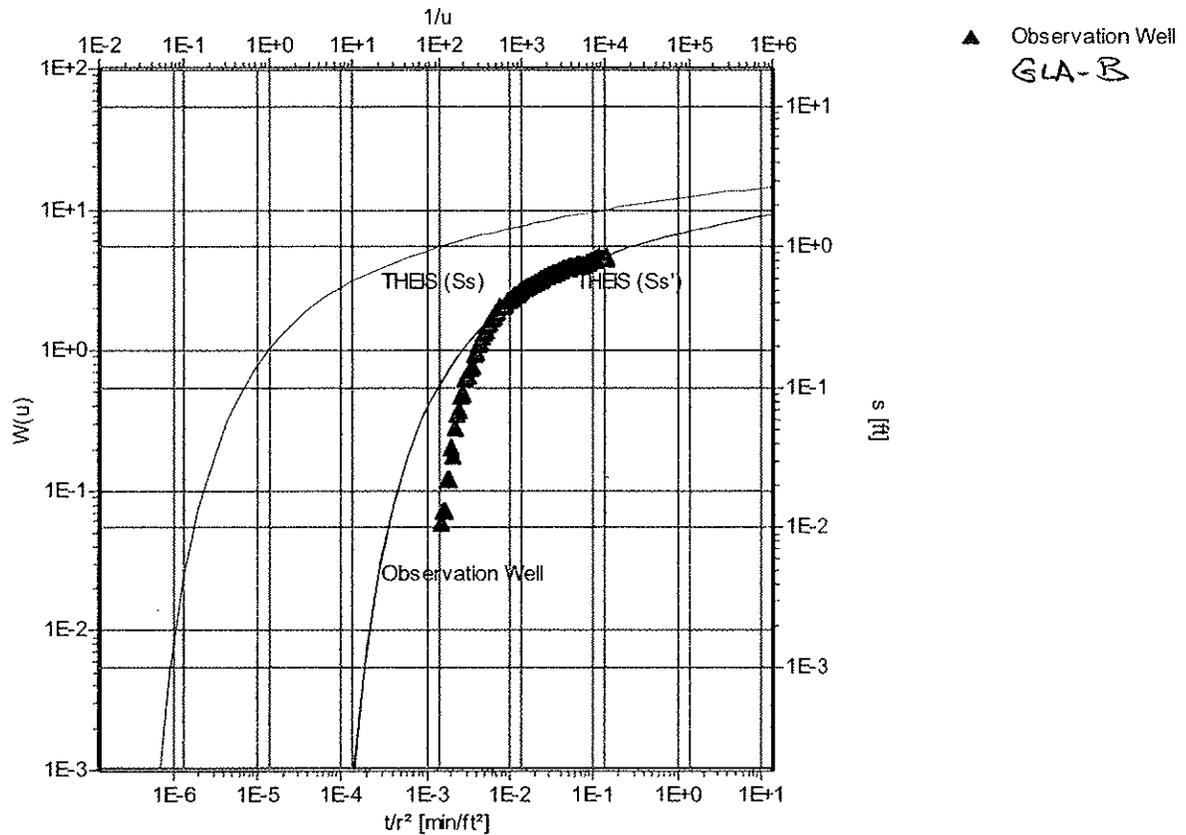
Pumping Test Analysis Report

Project: Gregory #2

Number:

Client:

Well GLA-G [Moench Fracture Flow]



Pumping Test: Well GLA-G

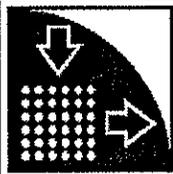
Analysis Method: Moench Fracture Flow

Analysis Results: Transmissivity: 2.08E+2 [ft²/d] Conductivity: 3.26E+0 [ft/d]
 Storativity: 1.99E-6

Test parameters: Pumping Well: Pumping Well GLA-G Aquifer Thickness: 64 [ft]
 Casing radius: 0.1667 [ft] b: 64 [ft]
 Screen length: 40 [ft] Kv/Kh: 0.1
 Boring radius: 0.333 [ft] C: 0.348
 Discharge Rate: 2.5 [U.S. gal/min] K(block)/K(Skin): 0.1
 Ss(blk)/Ss(fract): 200 K(block)/K(fracture): 0.1

Comments:

• Evaluated by:
 Evaluation Date: 8/12/2004



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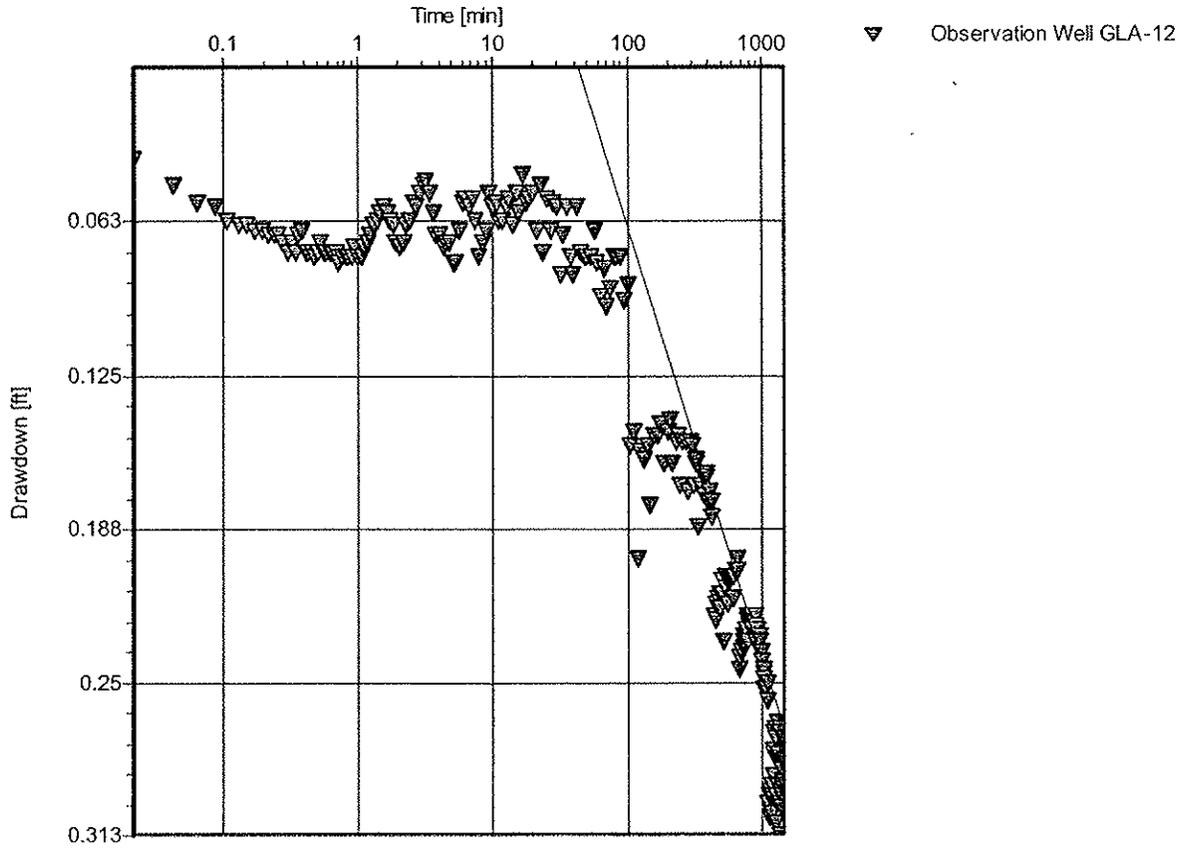
Pumping Test Analysis Report

Project: Gregory #2

Number:

Client:

Well GLA-G [Cooper-Jacob Time-Draw down]



Pumping Test: **Well GLA-G**

Analysis Method: **Cooper-Jacob Time-Drawdown**

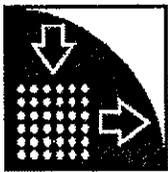
Analysis Results: Transmissivity: 5.00E+2 [ft²/d] Conductivity: 7.82E+0 [ft/d]
 Storativity: 3.36E-3

Test parameters: Pumping Well: Pumping Well GLA-G Aquifer Thickness: 64 [ft]
 Casing radius: 0.1667 [ft] Confined Aquifer
 Screen length: 40 [ft]
 Boring radius: 0.333 [ft]
 Discharge Rate: 2.5 [U.S. gal/min]

Comments:

Evaluated by:

Evaluation Date: 8/24/2004



GeoLogic Associates

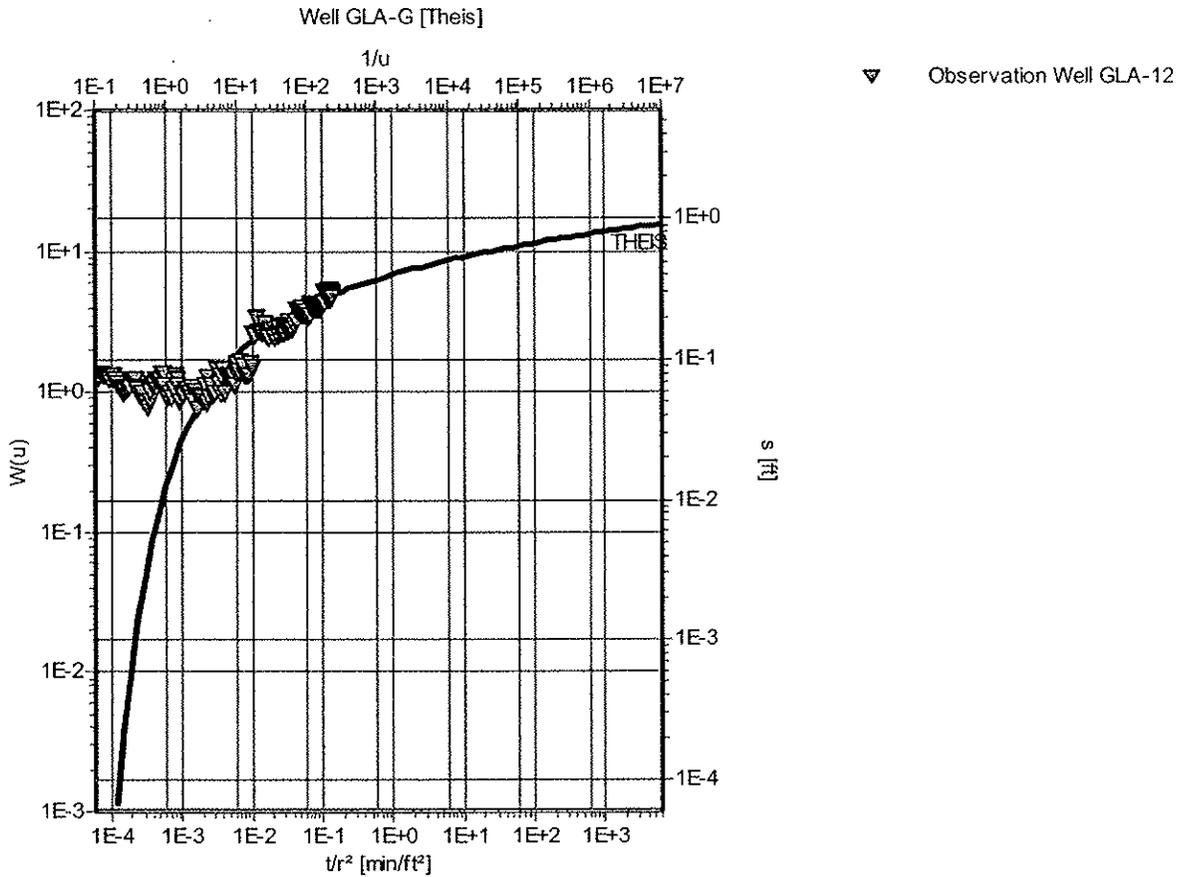
1360 Valley Vista Drive
 Diamond Bar, California
 91765

Pumping Test Analysis Report

Project: Gregory #2

Number:

Client:



Pumping Test: Well GLA-G

Analysis Method: Theis

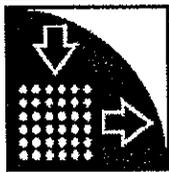
Analysis Results: Transmissivity: 6.50E+2 [ft²/d] Conductivity: 1.02E+1 [ft/d]
 Storativity: 1.09E-3

Test parameters: Pumping Well: Pumping Well GLA-G Aquifer Thickness: 64 [ft]
 Casing radius: 0.1667 [ft] Confined Aquifer
 Screen length: 40 [ft]
 Boring radius: 0.333 [ft]
 Discharge Rate: 2.5 [U.S. gal/min]

Comments:

Evaluated by:

Evaluation Date: 8/24/2004



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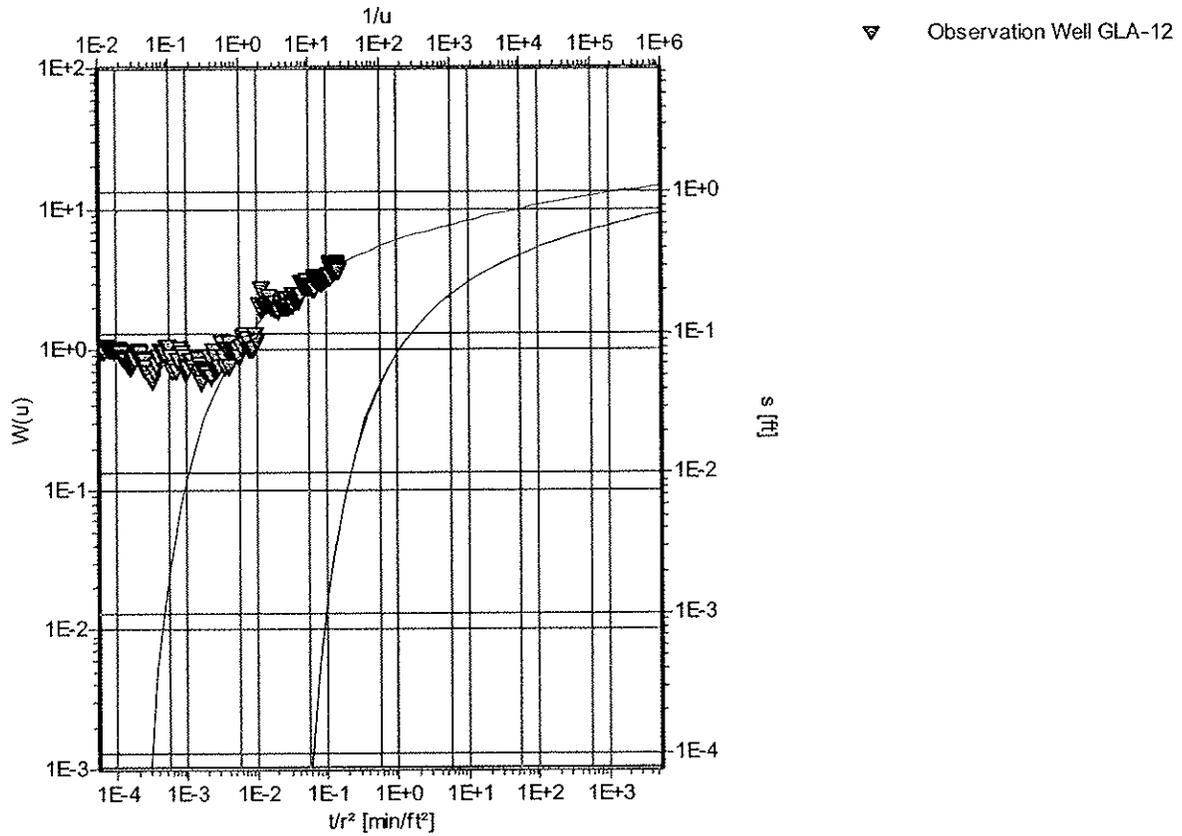
Pumping Test Analysis Report

Project: Gregory #2

Number:

Client:

Well GLA-G [Moench Fracture Flow]



Pumping Test: Well GLA-G

Analysis Method: Moench Fracture Flow

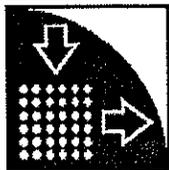
<u>Analysis Results:</u>	Transmissivity:	5.05E+2 [ft ² /d]	Conductivity:	7.89E+0 [ft/d]
	Storativity:	1.95E-3		

<u>Test parameters:</u>	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	b:	64 [ft]
	Screen length:	40 [ft]	Kv/Kh:	0.1
	Boring radius:	0.333 [ft]	C:	0.348
	Discharge Rate:	2.5 [U.S. gal/min]	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	200	K(block)/K(fracture):	0.1

Comments:

Evaluated by:

Evaluation Date: 8/24/2004



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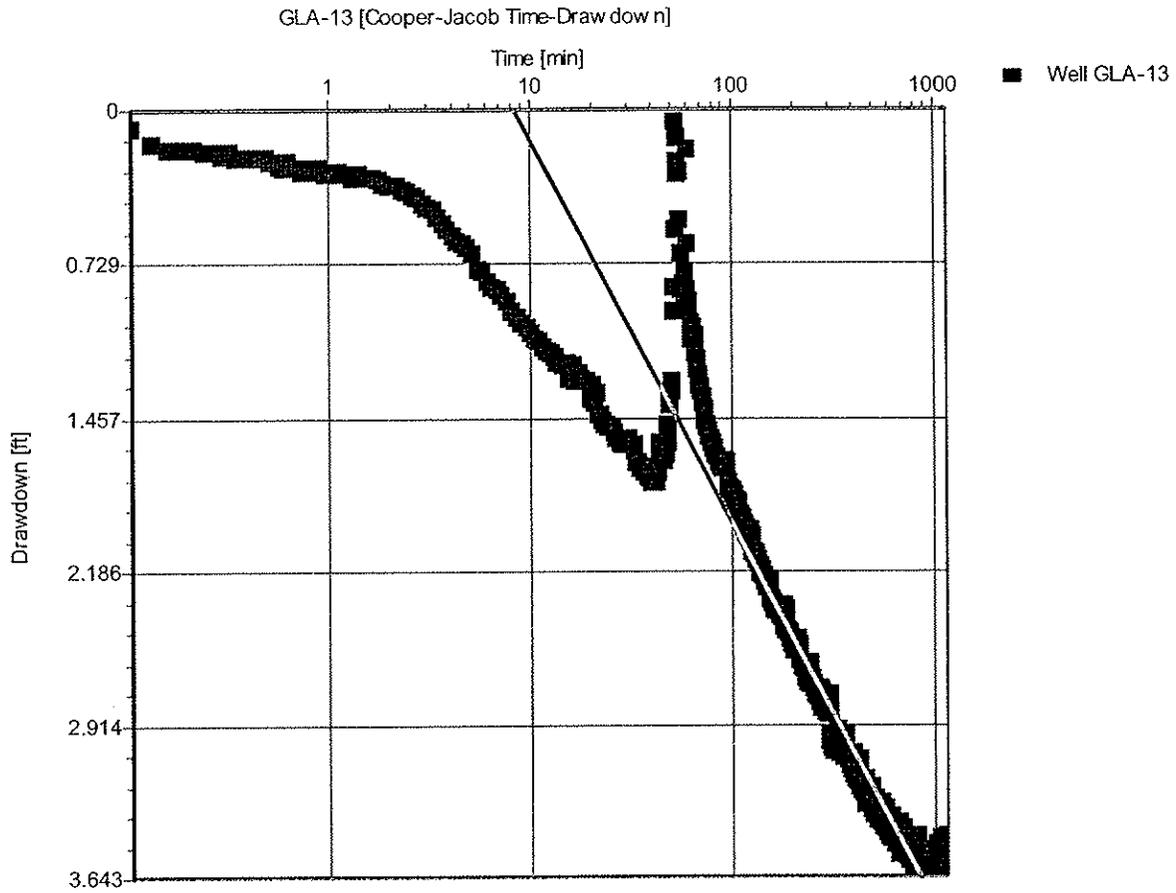
1360 Valley Vista Drive
Diamond Bar, California
91765

Pumping Test Analysis Report

Project: Gregory #3

Number:

Client:



Pumping Test: **GLA-13**

Analysis Method: **Cooper-Jacob Time-Drawdown**

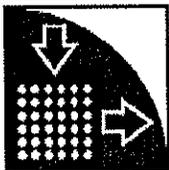
Analysis Results: Transmissivity: 8.77E+1 [ft²/d] Conductivity: 4.79E+0 [ft/d]

Test parameters: Pumping Well: Well GLA-13 Aquifer Thickness: 18.3 [ft]
Casing radius: 0.083 [ft] Confined Aquifer
Screen length: 20 [ft]
Boring radius: 0.354 [ft]
Discharge Rate: 4.5 [U.S. gal/min]

Comments: Analysis based on visual match to later part of GLA-13 pump test.

Evaluated by: Mark Vincent

Evaluation Date: 8/13/2004



GeoLogic Associates

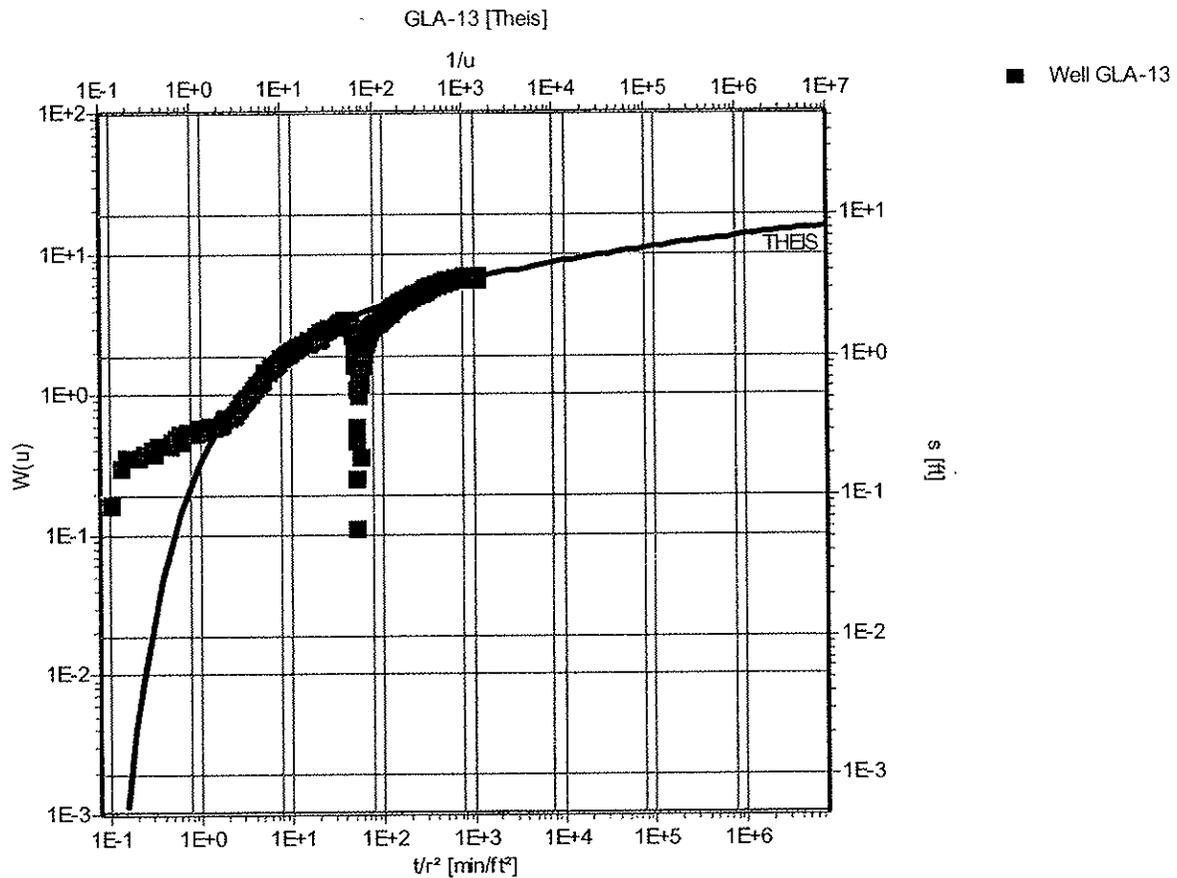
1360 Valley Vista Drive
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 91765

Pumping Test Analysis Report

Project: Gregory #3

Number:

Client:



Pumping Test: **GLA-13**

Analysis Method: **Theis**

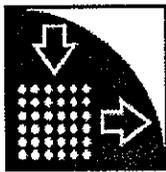
<u>Analysis Results:</u>	Transmissivity:	1.31E+2 [ft ² /d]	Conductivity:	7.14E+0 [ft/d]
	Storativity:	2.80E-1		

<u>Test parameters:</u>	Pumping Well:	Well GLA-13	Aquifer Thickness:	18.3 [ft]
	Casing radius:	0.083 [ft]	Confined Aquifer	
	Screen length:	20 [ft]		
	Boring radius:	0.354 [ft]		
	Discharge Rate:	4.5 [U.S. gal/min]		

Comments:

Evaluated by:

Evaluation Date: 8/13/2004



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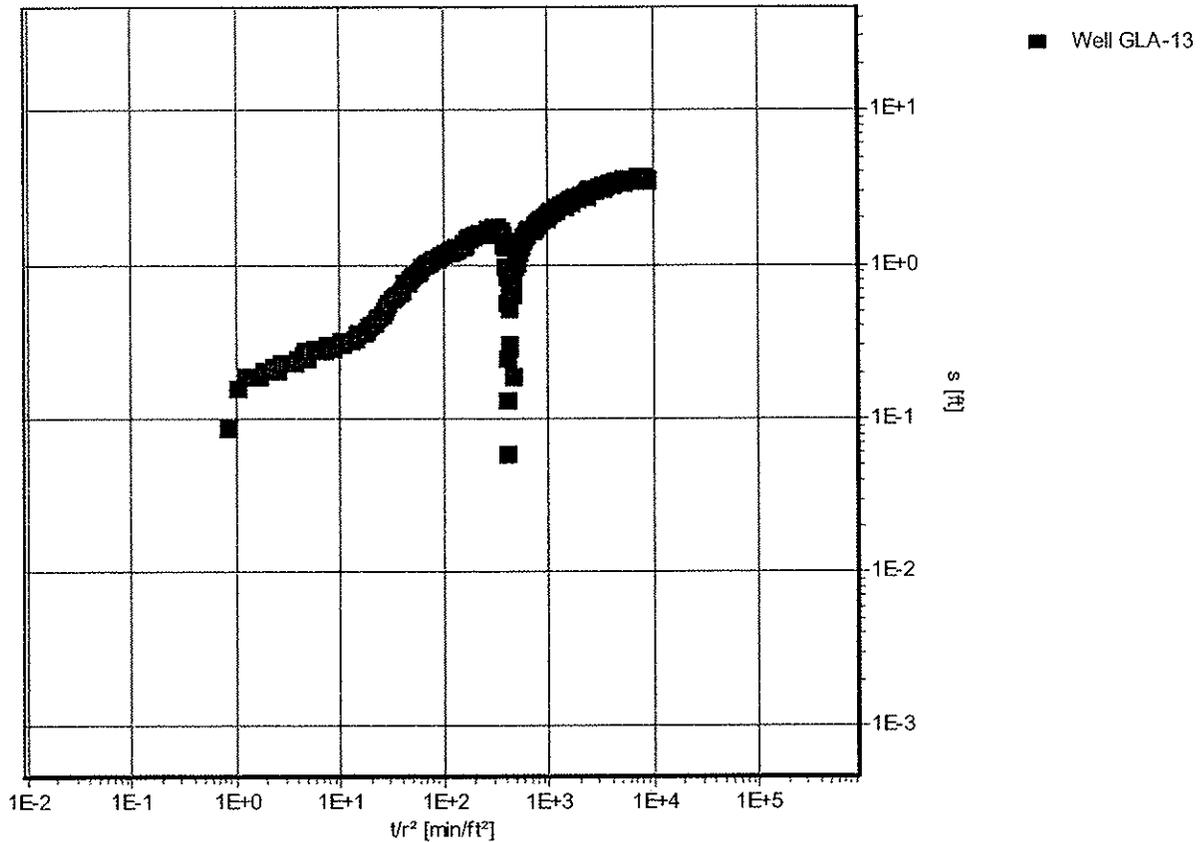
Pumping Test Analysis Report

Project: Gregory #3

Number:

Client:

GLA-13 [Moench Fracture Flow]



Pumping Test: **GLA-13**

Analysis Method: **Moench Fracture Flow**

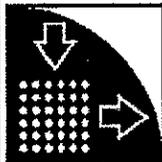
<u>Analysis Results:</u>	Transmissivity:	1.50E+2 [ft ² /d]	Conductivity:	8.19E+0 [ft/d]
	Storativity:	9.72E-2		

<u>Test parameters:</u>	Pumping Well:	Well GLA-13	Aquifer Thickness:	18.3 [ft]
	Casing radius:	0.083 [ft]	b:	18.3 [ft]
	Screen length:	20 [ft]	Kv/Kh:	0.1
	Boring radius:	0.354 [ft]	C:	0.394
	Discharge Rate:	4.5 [U.S. gal/min]	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	200	K(block)/K(fracture):	0.1

Comments:

Evaluated by:

Evaluation Date: 8/13/2004



GeoLogic Associates

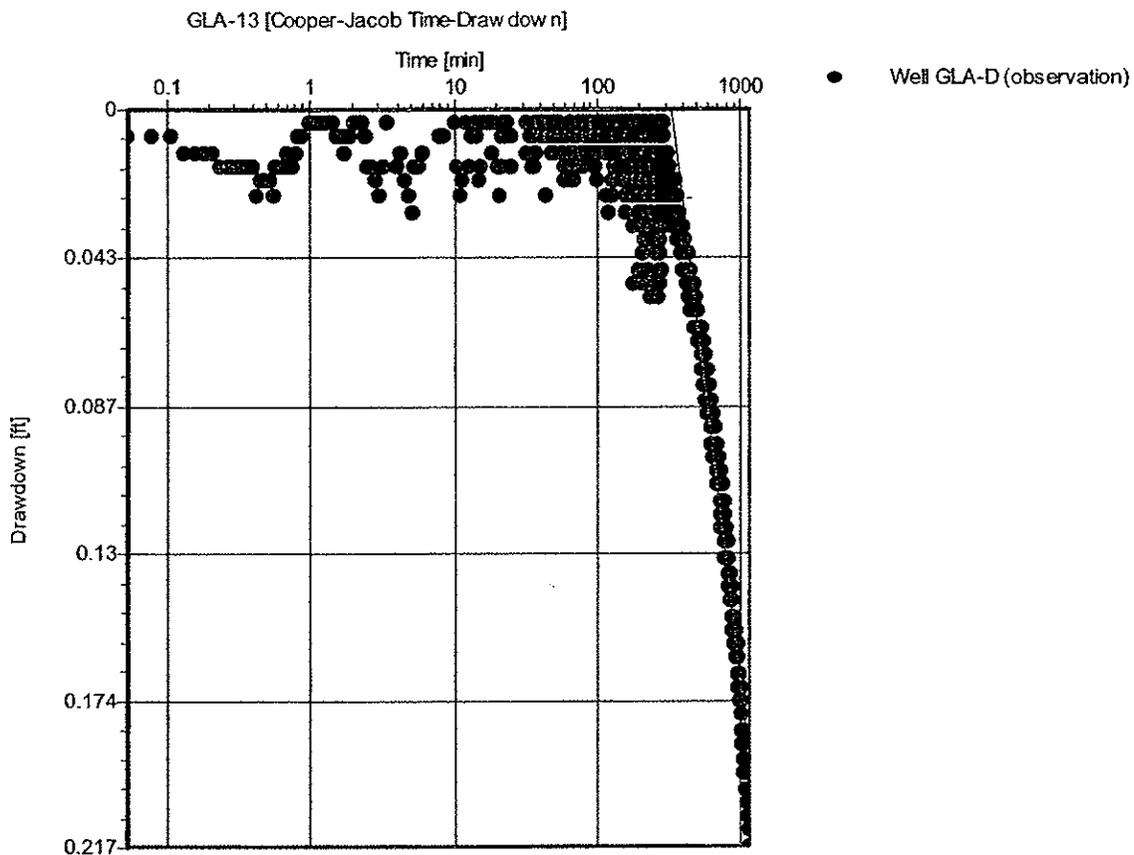
1360 Valley Vista Drive
 Diamond Bar, California
 91765

Pumping Test Analysis Report

Project: Gregory #3

Number:

Client:



Pumping Test: GLA-13

Analysis Method: Cooper-Jacob Time-Drawdown

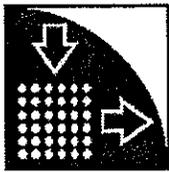
Analysis Results: Transmissivity: 4.51E+2 [ft²/d] Conductivity: 2.46E+1 [ft/d]

Test parameters: Pumping Well: Well GLA-13 Aquifer Thickness: 18.3 [ft]
 Casing radius: 0.083 [ft] Confined Aquifer
 Screen length: 20 [ft]
 Boring radius: 0.354 [ft]
 Discharge Rate: 4.5 [U.S. gal/min]

Comments:

Evaluated by:

Evaluation Date: 8/24/2004



GeoLogic Associates

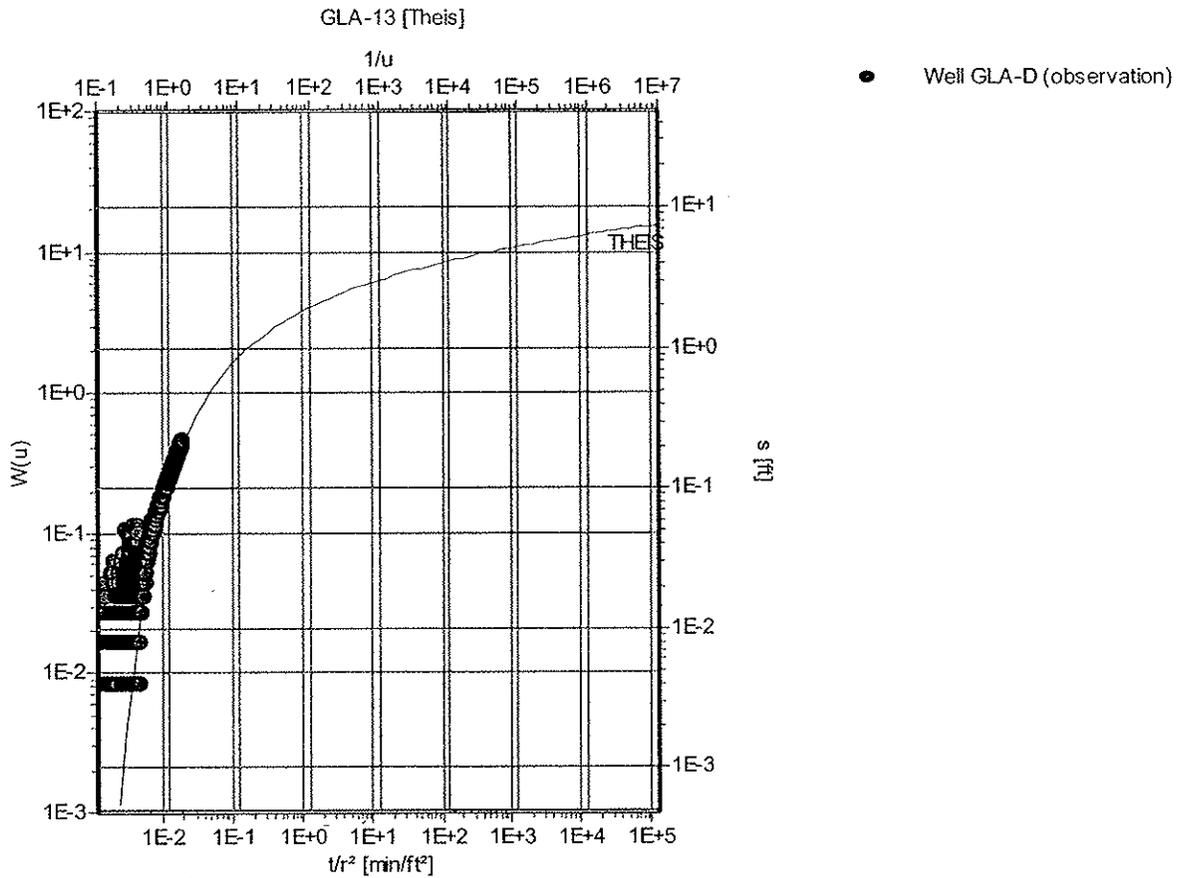
1360 Valley Vista Drive
 Diamond Bar, California
 91765

Pumping Test Analysis Report

Project: Gregory #3

Number:

Client:



Pumping Test: **GLA-13**

Analysis Method: **Theis**

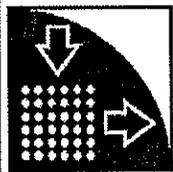
<u>Analysis Results:</u>	Transmissivity:	1.44E+2 [ft ² /d]	Conductivity:	7.87E+0 [ft/d]
	Storativity:	5.04E-3		

<u>Test parameters:</u>	Pumping Well:	Well GLA-13	Aquifer Thickness:	18.3 [ft]
	Casing radius:	0.083 [ft]	Confined Aquifer	
	Screen length:	20 [ft]		
	Boring radius:	0.354 [ft]		
	Discharge Rate:	4.5 [U.S. gal/min]		

Comments:

Evaluated by: Mark Vincent

Evaluation Date: 8/13/2004



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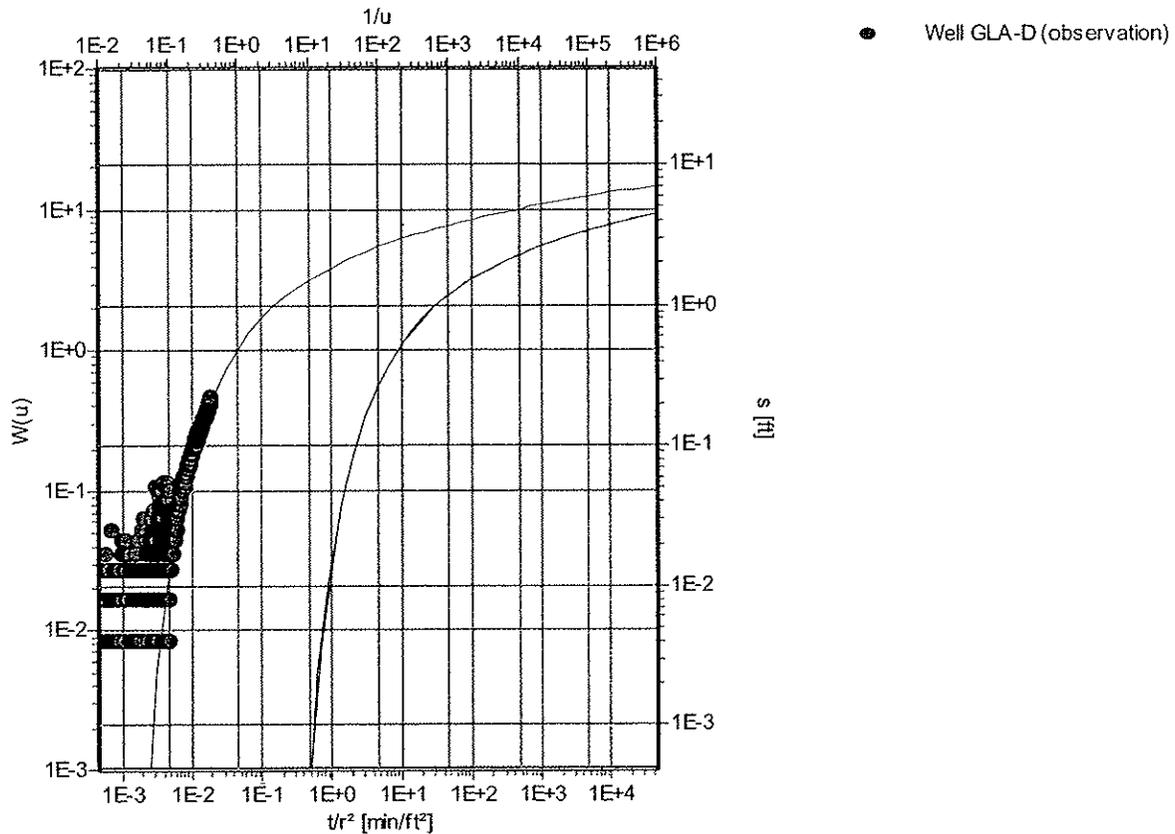
Pumping Test Analysis Report

Project: Gregory #3

Number:

Client:

GLA-13 [Moench Fracture Flow]



Pumping Test: GLA-13

Analysis Method: Moench Fracture Flow

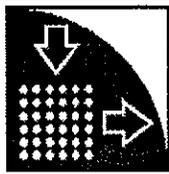
Analysis Results: Transmissivity: 1.44E+2 [ft²/d] Conductivity: 7.87E+0 [ft/d]
 Storativity: 4.68E-3

Test parameters: Pumping Well: Well GLA-13 Aquifer Thickness: 18.3 [ft]
 Casing radius: 0.083 [ft] b: 18.3 [ft]
 Screen length: 20 [ft] Kv/Kh: 0.1
 Boring radius: 0.354 [ft] C: 0.394
 Discharge Rate: 4.5 [U.S. gal/min] K(block)/K(Skin): 0.1
 Ss(blk)/Ss(fract): 200 K(block)/K(fracture): 0.1

Comments:

Evaluated by:

Evaluation Date: 8/24/2004



GeoLogic Associates

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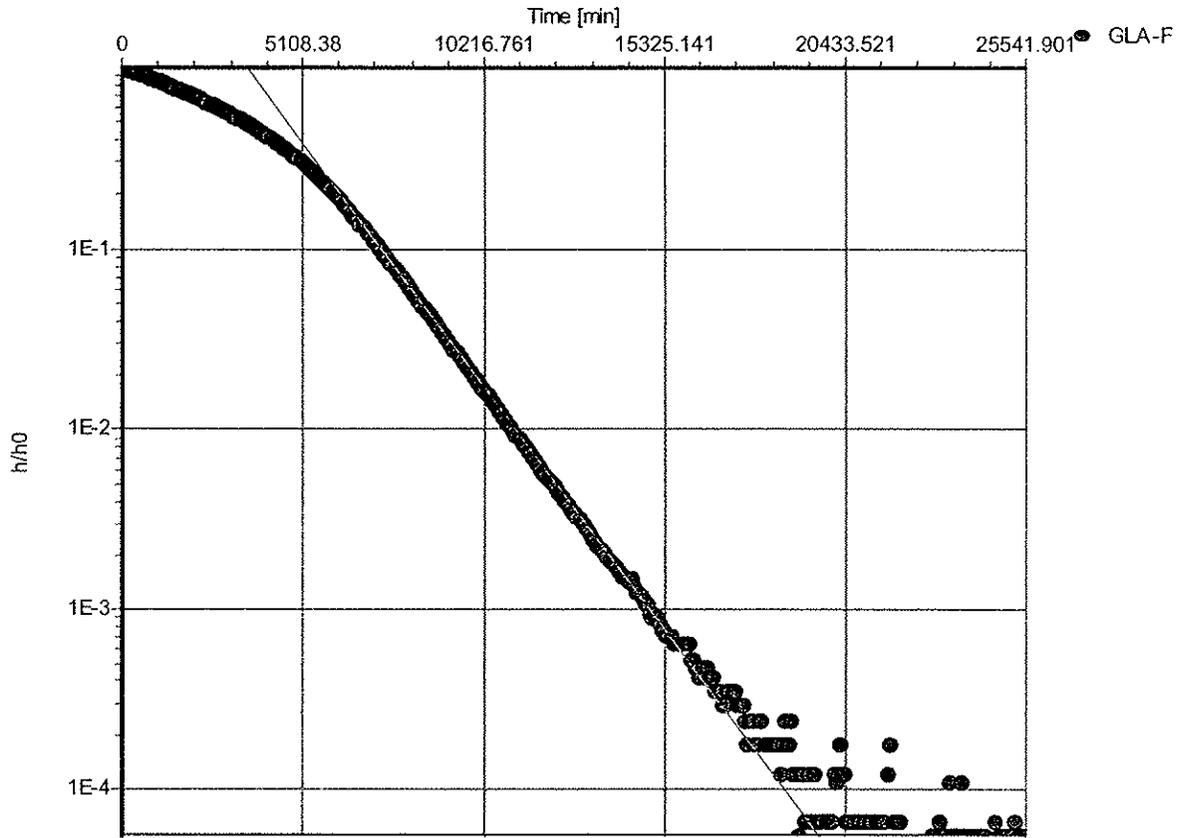
Slug Test Analysis Report

Project: Gregory #4 Bail Tests

Number:

Client: Gregory Canyon Ltd.

GLA-F [Bouwer & Rice]



Slug Test: **GLA-F**

Analysis Method: **Bouwer & Rice**

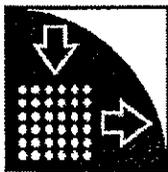
Analysis Results: Conductivity: 2.55E-3 [ft/d]

Test parameters:	Test Well:	GLA-F	Aquifer Thickness:	95.5 [ft]
	Casing radius:	0.354 [ft]	Gravel Pack Porosity (%):	25
	Screen length:	95.5 [ft]		
	Boring radius:	0.354 [ft]		
	r(eff):	0.354 [ft]		

Comments: Curve matching by user.

Evaluated by: Mark Vincent

Evaluation Date: 8/25/2004

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 Diamond Bar, California
 91765

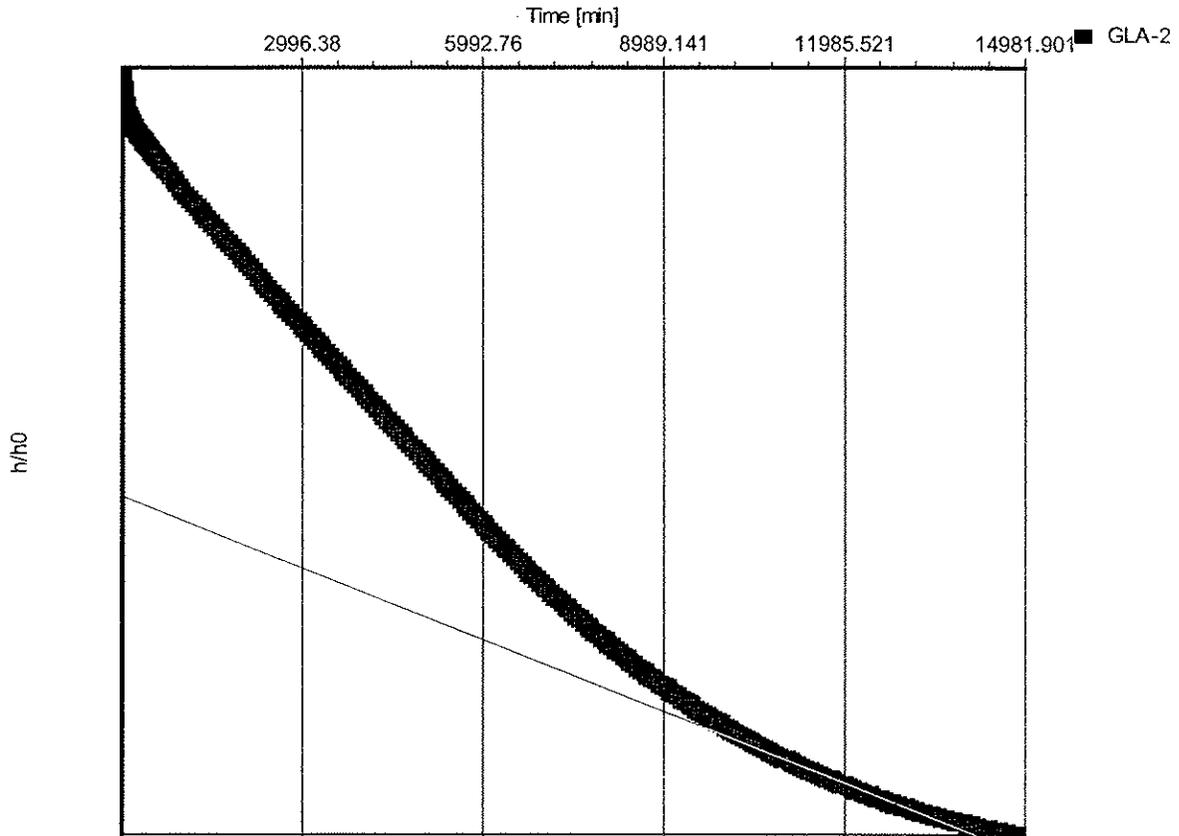
Slug Test Analysis Report

Project: Gregory #4 Bail Tests

Number:

Client: Gregory Canyon Ltd.

GLA-2x [Bouwer & Rice]

Slug Test: GLA-2xAnalysis Method: Bouwer & RiceAnalysis Results:

Conductivity: 1.75E-5 [ft/d]

Test parameters:

Test Well:	GLA-2	Aquifer Thickness:	20.5 [ft]
Casing radius:	0.167 [ft]	Gravel Pack Porosity (%)	25
Screen length:	25 [ft]		
Boring radius:	0.354 [ft]		
r(eff):	0.229 [ft]		

Comments:

Curve match by user for late part of data set.

Evaluated by: Mark Vincent

Evaluation Date: 8/25/2004