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PHASE II SOUTH FIELD INJECTION TEST DRAFT REPORT FOR OPERABLE UNIT 5 - SEPTEMBER 1996

09/27/96

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PHASE II
SOUTH FIELD INJECTION TEST REPORT FOR OPERABLE UNIT 5

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

FOR INFORMATION ONLY

OCTOBER 1996

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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Department of Energy

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SEP 27 1996

DOE-1417-96

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

SUBMITTAL OF OPERABLE UNIT 5 REMEDIAL DESIGN DELIVERABLES FOR AQUIFER RESTORATION: THE PHASE II SOUTH FIELD INJECTION TEST DRAFT REPORT AND THE DRAFT PROJECT SPECIFIC PLAN (PSP) FOR THE RESTORATION AREA VERIFICATION SAMPLING PROGRAM

This letter transmits the subject Remedial Design Deliverables for your review in accordance with the Operable Unit 5 Remedial Design Work Plan.

If you have any questions concerning this transmittal, please contact Robert Janke at (513) 648-3124 or John Kappa at (513) 648-3149.

Sincerely,

Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:Kappa

Enclosure: As Stated

Recycled and Recyclable

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PHASE II
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FOR OPERABLE UNIT 5

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
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1.0 INTRODUCTION

Groundwater extraction and treatment has been selected to restore the quality of groundwater in the Great Miami Aquifer beneath the Fernald Environmental Management Project (FEMP) (DOE 1995a). The selected remedy includes the commitment to continually evaluate the benefits of applying emerging or innovative technologies to enhance aquifer restoration. One of the technologies being evaluated is the injection of groundwater into the aquifer as a means of speeding the contaminant flushing process and shortening the total time needed to remediate the aquifer. Groundwater injection will also help maintain hydraulic control in the Great Miami Aquifer and limit the effect that pumping will have on area drawdown.

The Department of Energy's (DOE's) Office of Science and Technology (EM-50) is funding injection evaluation efforts at the FEMP. The evaluation is being conducted by the Fernald Environmental Restoration Management Corporation (FERMCO), DOE, and its commercial solution-mining industry partners. Participants included DOE-Fernald, DOE's MSE-Western Energy Technology Office (WETO), Rio Algom Inc., and In-Situ Inc. The evaluation consists of field testing (injection into a single well) to demonstrate that the hydraulics of the Great Miami Aquifer will accommodate the injection process, followed by a larger field scale demonstration (injection into several wells) to demonstrate that the remediation process can be supplemented and improved by injection. The goal of the evaluation process is to not only document the benefit of the injection process, but to deliver it as an integral working component of the cleanup remedy at the FEMP.

In October of 1995, an injection test (the South Field Injection Test) was conducted in which groundwater was extracted from the South Plume Area and injected into a well in the South Field area without undergoing any treatment process (DOE 1995b). The South Field Injection Test was conducted over a period of 72 hours at a constant injection rate of 300 gallons per minute (gpm). Figure 1-1 identifies where the South Field Injection Test was conducted. Results of the South Field injection test indicated that injection could be a viable supplement to extraction for remediation of the Great Miami Aquifer based upon the demonstrated ability of the aquifer to receive injected water (DOE 1995c). However, the test also indicated that the issue of plugging within the injection well needed to be further evaluated before a larger field scale demonstration could be attempted.

During the South Field Injection Test, South Plume groundwater that was reduced relative to iron was injected into South Field groundwater which was oxidized relative to iron resulting in the precipitation of ferric hydroxide within the injection well. The oxidizing reaction created an environment in which *Gallionella* iron bacteria could obtain energy and thrive. The *Gallionella* iron bacteria served as a catalyst to the precipitation reaction.

Iron bacteria is found almost everywhere, in both water and soil, and is particularly prevalent in the upper midwestern United States. Iron bacteria plug wells by enzymatically catalyzing the oxidation of ferrous iron to ferric iron and using the energy released from the reaction to promote the growth of thread-like slimes that serve to accumulate large amounts of ferric hydroxide. The ferric iron is drawn onto or into the mucilaginous slimy sheaths of the bacteria. Precipitation of the ferric iron coupled with the rapid growth of the iron bacteria creates a voluminous material that quickly plugs the screen pores of the well and the aquifer material surrounding the well bore (Driscoll 1986). Iron plugging interferes with the efficiency of the injection operation. If the plugging becomes excessive, the maintenance and associated costs required to control the plugging limit the intended usefulness of the injection operation.

Following the South Field injection test, a geochemical study was conducted to further evaluate the Great Miami Aquifer and the injection process. The purpose of the study was to determine the chemistry of the injection water needed to eliminate iron plugging within the injection well. It was determined through geochemical modeling (IT 1996) that injecting treated effluent from the South Plume Interim Treatment (SPIT) system into insitu South Field groundwater would not result in iron precipitate and iron bacteria plugging problems.

This report presents the results of a second injection test, called the "Phase II South Field Injection Test" in which groundwater which was treated in the SPIT system was injected into insitu groundwater in the South Field Area (DOE 1995d). Figure 1-1 identifies where the Phase II South Field Injection Test was conducted. The goal of this test was to determine if physical plugging would occur when treated water from the SPIT system was injected into the aquifer, rather than untreated water. The results of the test indicate that the cause of the plugging problem encountered during the first South Field Injection Test was properly identified and that the iron plugging in the injection well

injection well, injection appears to be a promising supplement to the FEMP groundwater remedy. A larger field scale demonstration of the application of the injection process is currently being planned.

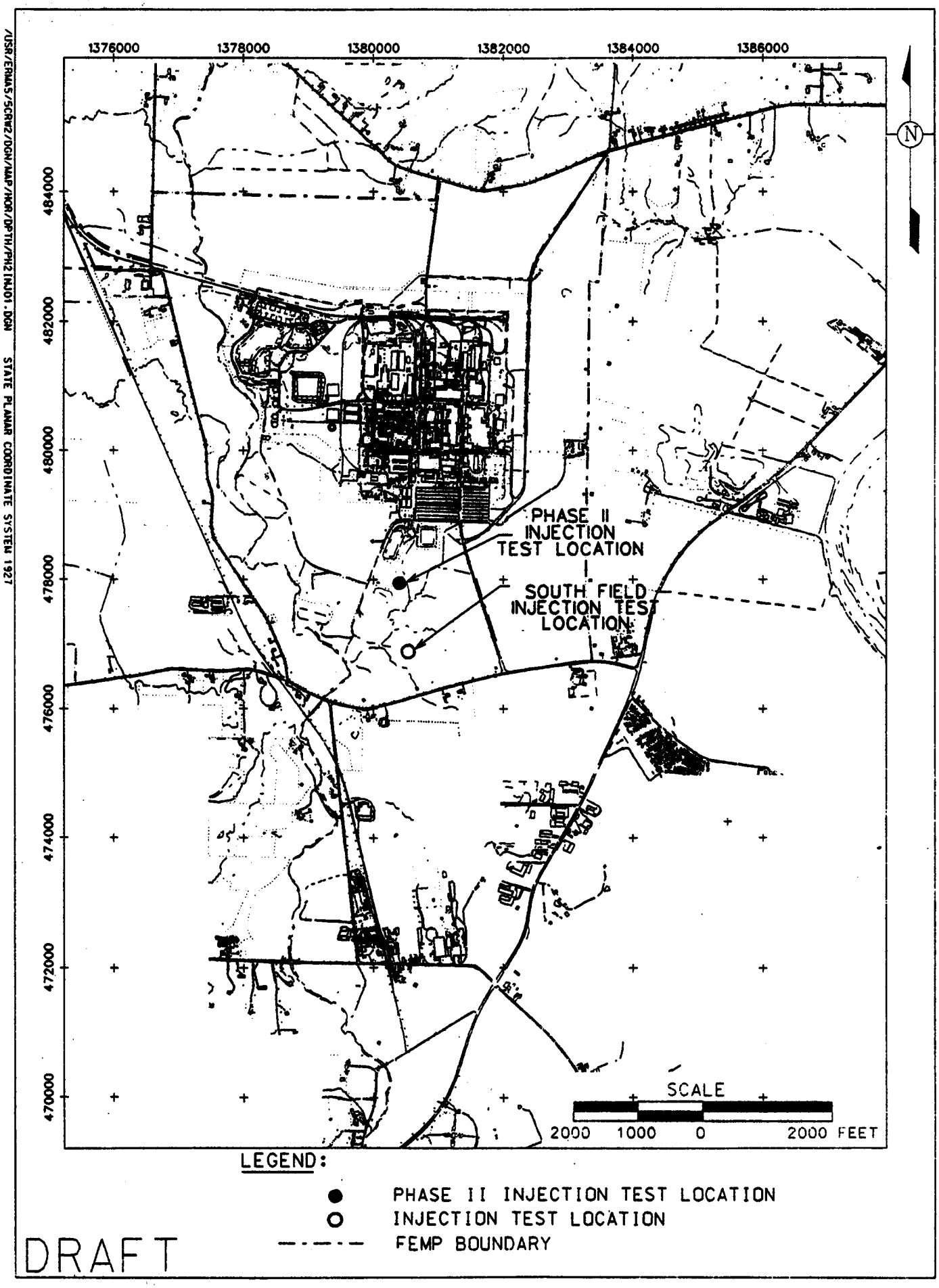

FIGURE 1-1. LOCATION OF SOUTH FIELD INJECTION TEST AND PHASE II SOUTH FIELD INJECTION TEST

2.0 GEOCHEMISTRY

Geochemical conditions within the Great Miami Aquifer were modeled using the EQ3NR/EQ6 geochemical computer code. The results are described in an IT report titled Geochemical Analysis and Modeling of Waters Injected into the Great Miami Aquifer. The report is provided in Appendix F. The following is a brief discussion of one modeling activity presented in the report.

Prior to the Phase II injection test, a groundwater sample was collected from Well 31567 and a water sample was collected from the effluent of the SPIT system. Both water samples were analyzed for the parameters listed in Table 2-1. A YSI 600 XL multiparameter water quality monitor attached to a YSI Model 610-D datalogger was used to collect in situ measurements of pH, redox potential, temperature, total dissolved solids (TDS), and dissolved oxygen. The redox potential listed in Table 2-1 is reported relative to the standard hydrogen electrode (SHE).

The data listed in Table 2-1 were used to model mixing reactions of the two waters using the EQ3/6 geochemical computer code (PC Version 7.2). EQ3/6 was developed at Lawrence Livermore National Laboratory for predicting the behavior of metals, radionuclides, and other contaminants in the natural environment. The EQ3/6 computer code is an industry-standard geochemical model that performs solubility and speciation calculations and reaction-path modeling.

For the modeling, SPIT system effluent (Eh of 414 and pH of 7.3) was mixed with groundwater from Well 31567 (Eh of 412 and pH of 7) to evaluate the potential for iron hydroxide and calcite precipitation in the screen and surrounding formation. The model predicted that no precipitate would form under these mixing conditions.

Results for iron hydroxide are shown in Figure 2-1 as iron concentration vs. mass fraction of SPIT system effluent. Values of 0 to 1 for the mass fraction of SPIT system effluent correspond to 100 percent groundwater from Well 31567 and 100 percent SPIT system effluent, respectively. An iron concentration equal to one-half the reported detection limit of 100 μg/L was assumed for the SPIT system effluent. The data plotted in Figure 2-1 indicate that calculated iron concentrations in the mixture always lie below the solubility curve for $Fe(OH)_3$. Iron hydroxide precipitate will not form unless groundwater iron concentrations rise above the solubility curve.

Conditions needed for the precipitation of calcite are also shown in Figure 2-1, which plots the concentration product of calcium and bicarbonate ions as a function of pH and mass fraction of SPIT system effluent. Observed values for the calcium and bicarbonate concentration product lie below the solubility curve for $CaCO_3$, and this indicates the mixture will not precipitate calcite. However, the data do approach the solubility curve near pH 7.3, indicating that if the pH of the SPIT system effluent is greater than 7.3, calcite precipitation is possible (but not probable according to the geochemical analyses performed) as the mixture approaches 100 percent SPIT system effluent. During the test pH in the SPIT effluent will be monitored.

TABLE 2-1

PHASE II INJECTION TEST, PRE-TEST INVESTIGATION WATER QUALITY TEST RESULTS

Analyte	Sample from Well 31567	Duplicate from Well 31567	SPIT Effluent	Detection Limits
Aluminum	ND	ND	ND	200 μg/L
Calcium	91780 μg/L	90300 μg/L	88940 μg/L	NA
Iron	123.4 μg/L	165 μg/L	ND	100 μg/L
Magnesium	23270 μg/L	23110 μg/L	22870 μg/L	NA
Manganese	355 μg/L	363 μg/L	133 μg/L	NA
Potassium	ND	ND	ND	5000 μg/L
Silicon	3632 μg/L	3841 μg/L	3862 μg/L	NA
Sodium	11020 μg/L	11450 μg/L	12420 μg/L	NA
Chloride	24.2 mg/L	24.2 mg/L	27.9 mg/L	NA
Sulfate	78.5 mg/L	81.4 mg/L	78.8 mg/L	NA
TDS	370 mg/L	402 mg/L	424 mg/L	NA
Alkalinity	ND	ND	ND	.01 N
Fluoride	0.17 mg/L	0.17 mg/L	0.20 mg/L	NA
Nitrate-nitrogen	ND	ND	ND	0.1 mg/L
Suspended Solids	26 mg/L	28 mg/L	ND	2 mg/L
Ammonia	ND	ND	ND	0.1 mg/L
Phosphate (total)	ND	ND	ND	0.1 mg/L
Uranium	26 μg/L	26 μg/L	0.2 μg/L	NA
Carbonate	ND	ND	ND	2000 μg/L
Bi/carbonate	234 mg/L	236 mg/L	250 mg/L	NA
Insitu Data:				
pH	7		7.28	NA
Redox Potential	411.7 mV		414.2 mV	NA
Temperature	11.36°C		11.60°C	NA
TDS	0.49 g/L		0.42 g/L	NA
Dissolved oxygen	0.36 mg/L		0.28 mg/L	NA

ND = non detect
NA = not applicable

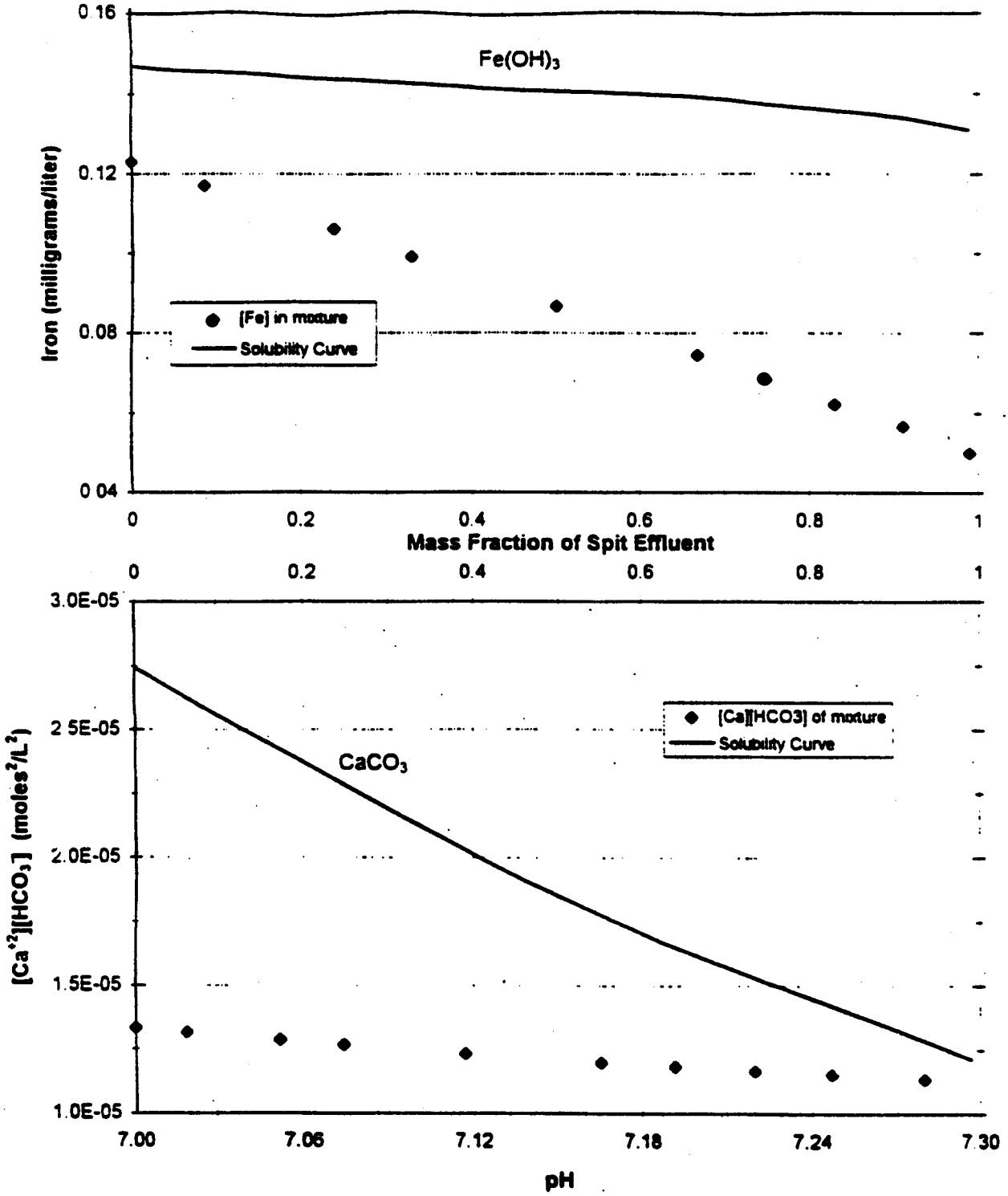

FIGURE 2-1. MIXING RESULTS FOR SPIT EFFLUENT AND GROUNDWATER IN WELL 31567

3.0 HYDROGEOLOGY OF THE PHASE II INJECTION TEST AREA

The hydrogeology of the Great Miami Aquifer and the Phase II South Field injection test area is described in detail in the Operable Unit 5 Remedial Investigation (RI) Report (DOE 1995e). What follows is a brief summary of the hydrogeology specific to the testing area.

The Phase II South Field injection test area is situated over the New Haven Trough, a large buried valley whose axis runs northeast-southwest (Figure 3-1). The floor and walls of the New Haven Trough consist of Ordovician age shale and limestone. At the injection test site the depth to bedrock is 194.5 feet below ground surface (bgs); this depth was measured when Well 31567 was drilled. During the Pleistocene, the New Haven Trough was carved into the shale and limestone bedrock, filled with sand and gravel, and capped with a layer of Wisconsin age clay-rich glacial overburden. The sand and gravel forms the matrix of a regionally extensive aquifer known as the Great Miami Aquifer. At Well 31567 the sand and gravel is 176 feet thick. The Great Miami Aquifer is unconfined, anisotropic, and heterogeneous and has been designated a sole-source aquifer.

A semiconfining clay layer divides the aquifer into an upper and lower zone beneath portions of the FEMP. This clay is present at the injection test location at a depth of approximately 135 feet bgs (Figure 3-2). The clay at the test location (Well 3065) appears to be an erosional remnant that is not contiguous with the clay layer to the west and north of the well. As documented at Well 31567 when the well was drilled, in descending order the lithology of the test area consists of: approximately 19 feet of brown and gray clay (glacial overburden), approximately 41 feet of unsaturated sand and gravel, approximately 75 feet of saturated sand and gravel, approximately 10 feet of clay, and approximately 50 feet of saturated sand and gravel. The walls of the New Haven Trough are located thousands of feet to the north and south of the test site.

There are no surface water bodies in the immediate vicinity of the test location. One intermittently flowing stream (Paddys Run) is present approximately 1000 feet to the west. The storm sewer outfall ditch is located approximately 400 feet to the east of the test area. Sections of the storm sewer outfall ditch (downstream of the test location) are in direct contact with sand and gravel in the Great Miami Aquifer and represent recharge zones to the aquifer.

Results of a pumping test conducted in Well 31550 (approximately 850 south of Well 31567) provide the best estimates of hydraulic conductivity for the injection test area (DOE 1995f). Hydraulic conductivity estimates for the injection test site range from 509 to 558 feet/day with a geometric mean of 523.6 feet/day. Estimated vertical hydraulic conductivity ranges from 31.9 to 66.6 feet/day with a geometric mean of 51.5 feet/day.

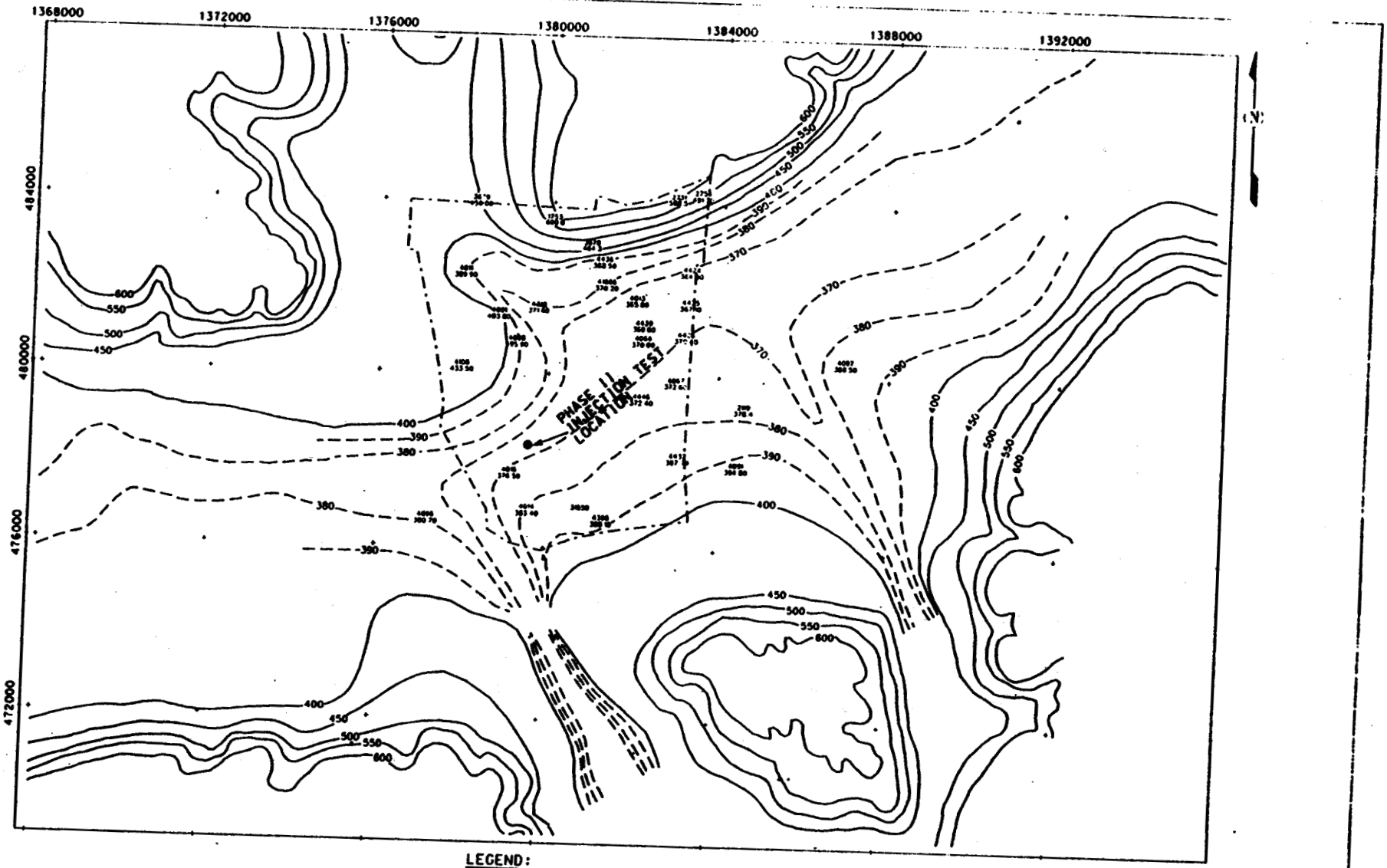

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FIGURE 3-1. BEDROCK TOPOGRAPHIC SURFACE

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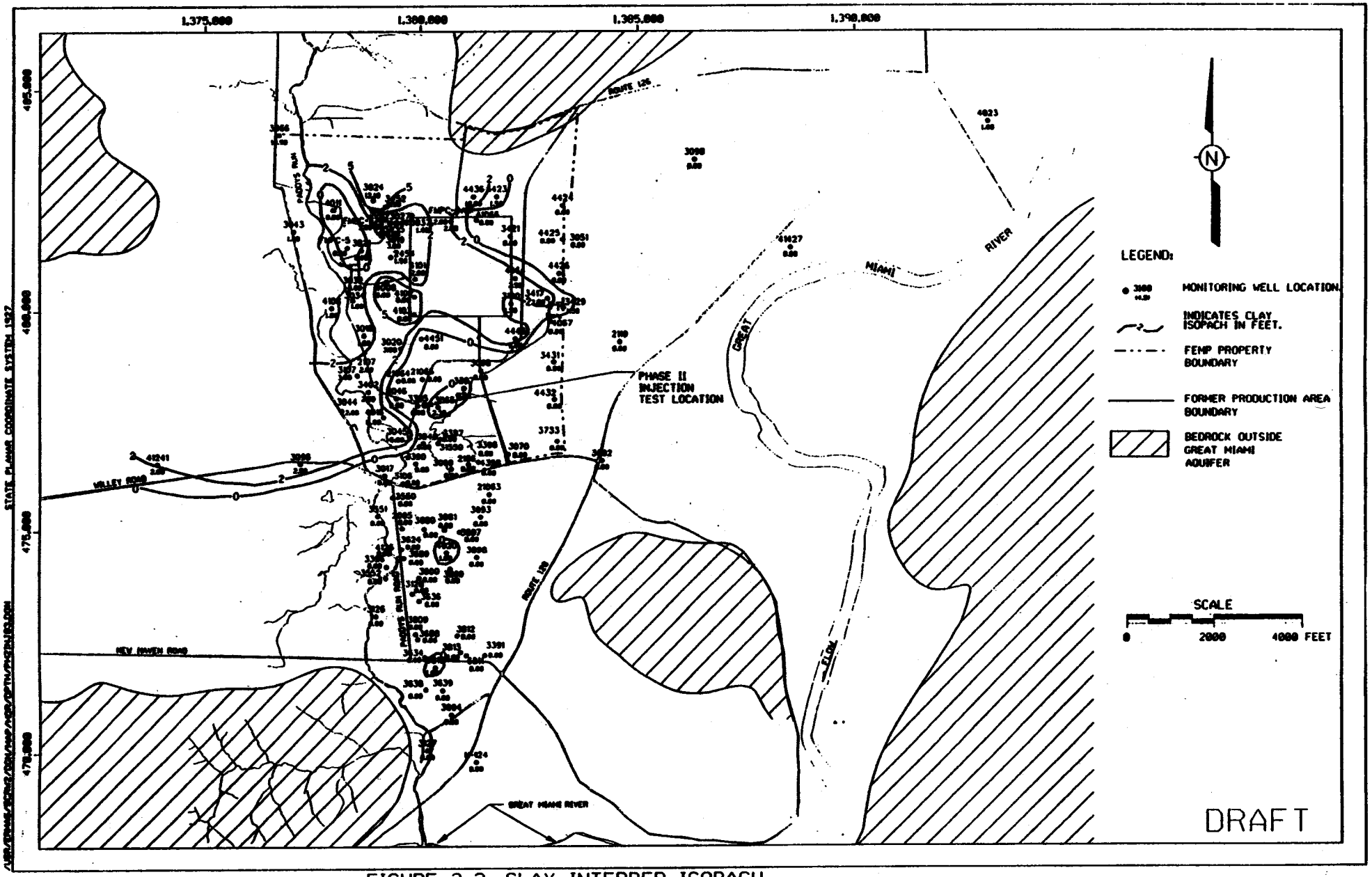


FIGURE 3-2. CLAY INTERBED ISOPACH

4.0 DESCRIPTION AND IMPLEMENTATION OF THE PHASE II TEST

The Phase II South Field Injection Test was designed to demonstrate that the iron plugging encountered in the first South Field Injection Test (DOE 1995c) resulted from the incompatible chemistries of the injected water and the insitu groundwater. During the first test, untreated South Plume groundwater was used as the source of injection water. In the Phase II test, groundwater which had been treated through the SPIT system was used as the source of injection water.

The Phase II South Field Injection Test was conducted similarly to the first South Field Injection Test. The testing program is presented below. The controlling document for the Phase II South Field Injection Test was the Addendum 1 to the Project-Specific Plan for the South Field Injection Test, Phase II Injection Test Work Plan, (DOE 1995d).

4.1 TESTING LOCATION

Because no injection wells have been installed at the FEMP, the injection test had to be conducted in an existing extraction well. The nine wells installed for the South Field Extraction System are the only on-property extraction wells that could be used for the injection test. Because treated water coming from the SPIT system was used as the source of injection water, the closest extraction well (31567) was selected as the injection well for the Phase II test. A 4-inch diameter hose was used as a temporary supply line to get injection water from the SPIT system to the injection well. Two 4-inch stainless steel groundwater monitoring wells (2065 and 3065), which are located near Well 31567, were monitored during the injection test. The location of the injection well, monitoring wells, temporary piping, and SPIT system are shown in Figure 4-1. The screen in Well 31567 is situated below the base of the well screen in monitoring Well 2065 and above the top of the well screen in monitoring Well 3065. Figure 4-2 illustrates the relative elevation of the injection well screen in relation to the elevation of the screens in monitoring Wells 2065 and 3065.

Well 31567 was installed in August of 1995. It is a 12-inch diameter, 316 stainless steel well, with a 15-foot long, 316 stainless steel Johnson continuous wire wrapped screen. The screen slot size is as follows: the upper 5 feet is 0.080 inches, the middle 5 feet is 0.110 inches, and the lower 5 feet is 0.040 inches (Table 4-1, and Figure 4-3). The well was installed using a natural completion method. An observation well is installed in the sand pack of Well 31567. The observation well is a 2-inch diameter, PVC well with a 5-foot long PVC screen. The screen slot size in the observation well is

0.020 inches. For monitoring purposes, Well 31567 is referred to as 31567-IN. The observation well is referred to as 31567-OUT.

4.2 TESTING SET-UP

A 4-inch, 150 PSI vinyl jacketed hose was used to run a temporary flow line from the SPIT system to Well 31567. Figure 4-4 is a piping schematic for the test. One downcomer was used for this test. The downcomer was constructed of 4-inch diameter, schedule 40, PVC pipe. The bottom end of the pipe was fitted with a cap that had a 1.75 inch diameter hole drilled through it. The purpose of the hole in the bottom of the pipe was to create a positive pressure in the downcomer so that cascading of the injecting water down the well could be avoided. The base of the downcomer was installed five feet below the water table and three feet above the top of the well screen.

Before, during, and after the test, Wells 31567-OUT, 31567-IN, 2065, and 3065 were equipped with an Insitu™ pressure transducers. Water level changes were measured and recorded using an Insitu™ Hermit-2000 data logger. Printouts from the data logger are provided in Appendix A. Wells 31567-OUT, 2065, and 3065 were equipped with downhole water quality probes (Hydrolab™, Model H20G). Data loggers were attached to each probe and pH, temperature, TDS, dissolved oxygen, specific conductance, and redox potential were measured and recorded. Printouts from the data loggers are provided in Appendix B.

A YSI Model 6000 water quality probe was installed in the SPIT effluent line and specific conductance, temperature, TDS, dissolved oxygen, pH, and redox potential were measured and recorded during the injection test. The printout is provided in Appendix B.

4.3 TESTING PROGRAM

The Phase II Injection Test Program consisted of the following activities:

Pre-injection Activities:

- Document if iron bacteria is present in Well 31567 prior to the start of injection.
- Document if the water quality of the groundwater in Well 31567 or SPIT system effluent has changed since the pretest investigation.

- Conduct a downhole camera survey of Well 31567 before the start of the test to document whether or not any openings in the screen appear to be plugged.

- Monitor water levels hourly in Wells 31567, 2065 and 3065 for seven days prior to injection. The water level data will be used to establish the regional trend of the aquifer prior to the start of the test.

- Monitor water quality in the SPIT system effluent and Wells 31567, 2065, and 3065 for 3 days before injection. Water quality measurements (pH, Eh, temperature, specific conductance, and dissolved oxygen) will be collected at least once a day using downhole multiparameter water quality monitors and dataloggers. Water quality data collected before the start of the injection test will document whether or not water quality conditions are stable or changing.

- Conduct a slug test in Well 31567 to establish a baseline of how easily water could be transmitted through the screen prior to injection.

Injection Activities:

- Inject treated groundwater at a rate of 200 gpm from the SPIT system into Well 31567 for a minimum of 72 hours. Monitor water level changes in Wells 31567, 2065 and 3065 using insitu transducers and dataloggers operating in a test mode. Monitor water quality changes in Wells 31567, 2065, 3065, and the SPIT effluent using Hydrolab™ and YSI™ water quality probes and dataloggers.

- Conduct a velocity profile measurement of Injection Well 31567 using a spinner tool to learn more about the way the aquifer receives injected water. This was an objective from the Phase I test that was not met due to equipment failure.

Post-injection Activities:

- Monitor water level recovery. Recovery data will be used to indicate if plugging of the screen has occurred. Rapid recovery should occur if the screen is not plugged.

- Document if the water quality of Well 31567 has changed as a result of injection.

- Document if iron bacteria is present in Well 31567 as a result of injection.

- Document if iron bacteria is present in the SPIT system effluent.

- Conduct a camera survey of Well 31567 after injection is completed. The camera survey will provide physical evidence as to whether or not the injection caused the well screen to plug.

- Conduct a slug test in Well 31567. Data collected will be compared against slug test data collected before the start of the injection test to document changes in the efficiency of the screen resulting from the injection.

4.4 IMPLEMENTATION OF THE INJECTION TEST

Implementation of the Phase II Injection test was as follows:

- Monday, March 11, 1996 - Conducted a downhole camera survey of Well 31567.
- Thursday, March 14, 1996
  - Hourly water level monitoring in Wells 31567-OUT, 31567-IN, 2065 and 3065 began using Insitu™ probes and dataloggers.
  - Water sample collected from Well 31567 and analyzed for iron bacteria.
  - Water sample collected from Well 31567 and analyzed for parameters listed in work plan.
- Tuesday, March 19, 1996 - Hourly water quality monitoring in SPIT began using YSI probes and dataloggers.
- Wednesday, March 20, 1996 - Hourly water quality monitoring in Wells 31567-OUT, 2065, and 3065 began using Hydrolab™ probes and dataloggers.
- Monday, March 25, 1996 - Five vacuum slug tests were conducted in Well 31567.
- Wednesday, March 27, 1996 - Injection of SPIT treated water into Well 31567 began at a rate of approximately 200 gpm. Flow data can be found in Appendix C.
- Wednesday, March 27, 1996 to Monday, April 1, 1996 - Twelve vertical flow profiles were conducted using the spinner tool while injection was taking place.
- Monday, April 1, 1996
  - Injection of SPIT treated water into Well 31567 stopped.
  - Recovery monitoring in Wells 31567-OUT, 31567-IN, 2065, and 3065 began.
  - Water sample collected from Well 31567 and SPIT effluent and analyzed for iron bacteria.
  - Water samples were collected from Well 31567 and the SPIT effluent and analyzed for the parameters listed in the work plan.
  - Five vacuum slug tests were conducted in Well 31567.
- Tuesday, April 2, 1996 - Hourly water quality monitoring in SPIT effluent and Wells 2065, 3065, and 31567-OUT stopped. (Due to a battery problem in the logger, water quality monitoring in Well 3065 stopped on April 1.)

- Thursday, April 4, 1996 - Recovery monitoring in Wells 31567-OUT, 31567-IN, 2065, and 3065 stopped.
- Thursday, April 18, 1996 - Conducted a downhole camera survey of Well 31567.

TABLE 4-1

WELL 31567 (#17)
WELL COMPLETION LOG

Project: South Field Extraction System
Contractor: Alliance Environmental

Date Completed: 08/24/95

Location:

West of storm sewer outfall ditch

NAD 1983 Coordinates:
N 477897.88
E 1348853.75

Installation details:

Drilling method: Cable Tool
Borehole diameter: 20 inches
Total Depth of well: 81.6 feet bgs.
Completion method: Natural

Casting:

316 Stainless Steel, sch. 10 @ midbody
12 inch diameter
Joint type: NPT Threaded

Screen:

15 feet long
316 stainless steel, sch. 10 @ midbody
Johnson continuous wire wrapped
12 inch diameter
Screen slot size:
upper 5 feet = 0.080 inch
middle 5 feet = 0.110 inch
lower 5 feet = 0.040 inch

General Lithology:

0 feet-18.5 feet	below ground surface, glacial overburden
18.5 feet-135 feet	below ground surface, sand and gravel
at 59.7 feet	below ground surface, water table
135 feet-145 feet	below ground surface, clay
145 feet-195 feet	below ground surface, sand and gravel
at 195 feet	below ground surface, bedrock

Installation Details for observation well:
Note: Installed just outside of 12 inch well screen

Total depth of observation well: 76.6 feet

Casting:

--
PVC
2 inch diameter
Joint type: Threaded

Screen:

5 feet long
PVC
2 inch diameter
Screen slot size: 0.020 inch

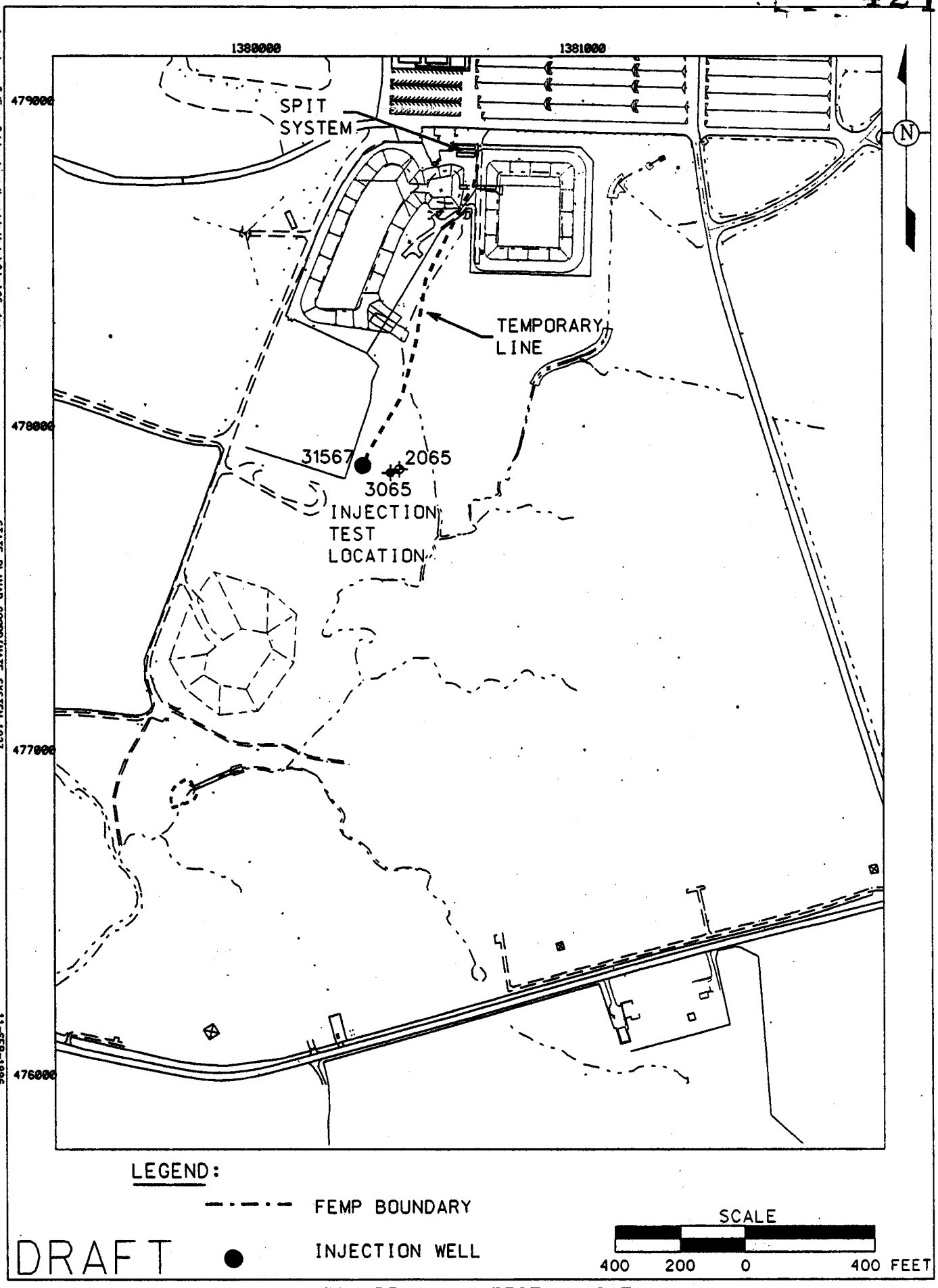
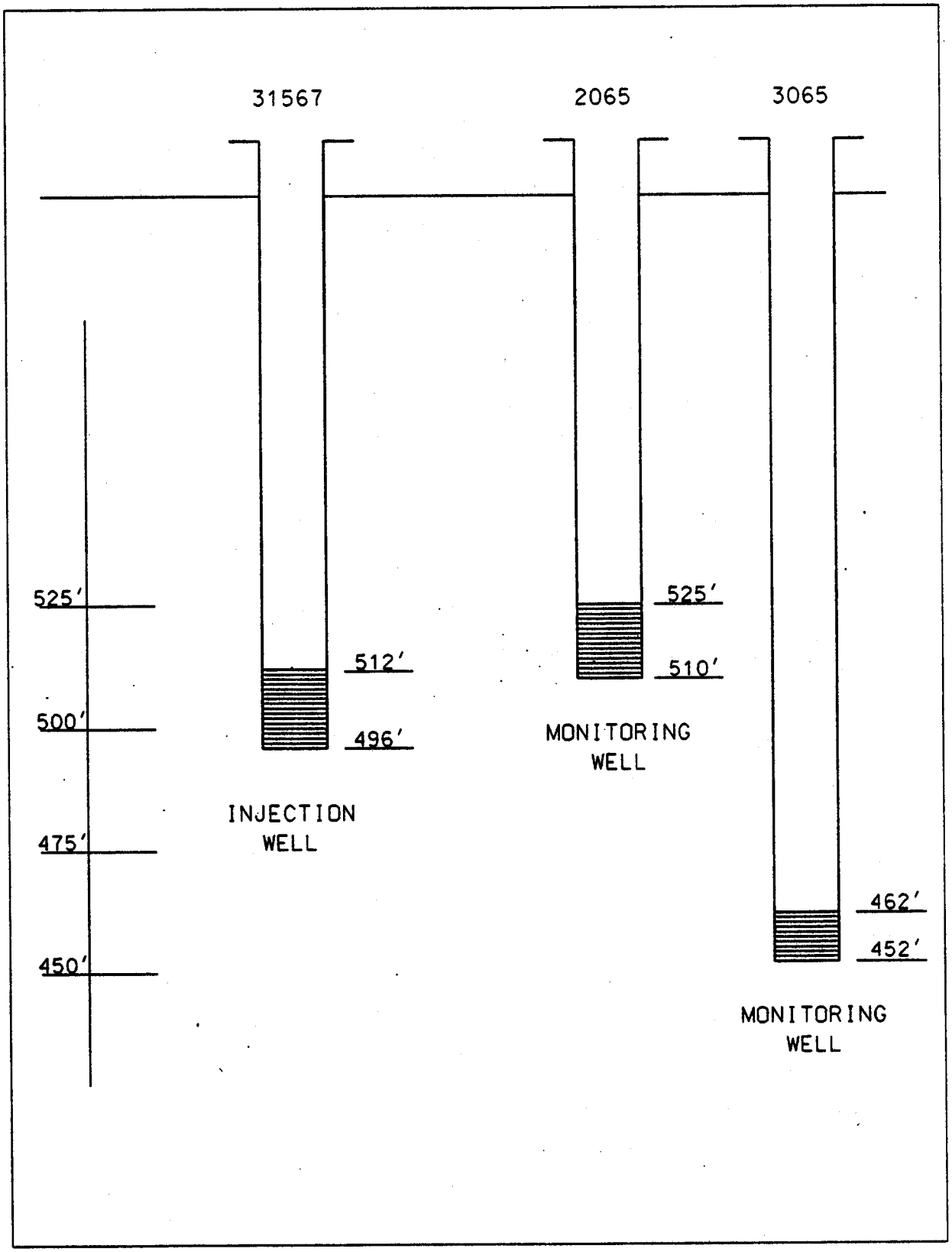


FIGURE 4-1. TEST LAYOUT



LEGEND:

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/usr/armd5/5crw2/dgn/mop/hor/dpth/c5dps025.dgn

11-SEP-1996

FIGURE 4-2. RELATIVE POSITION OF INJECTION WELL SCREEN TO MONITORING WELL SCREENS

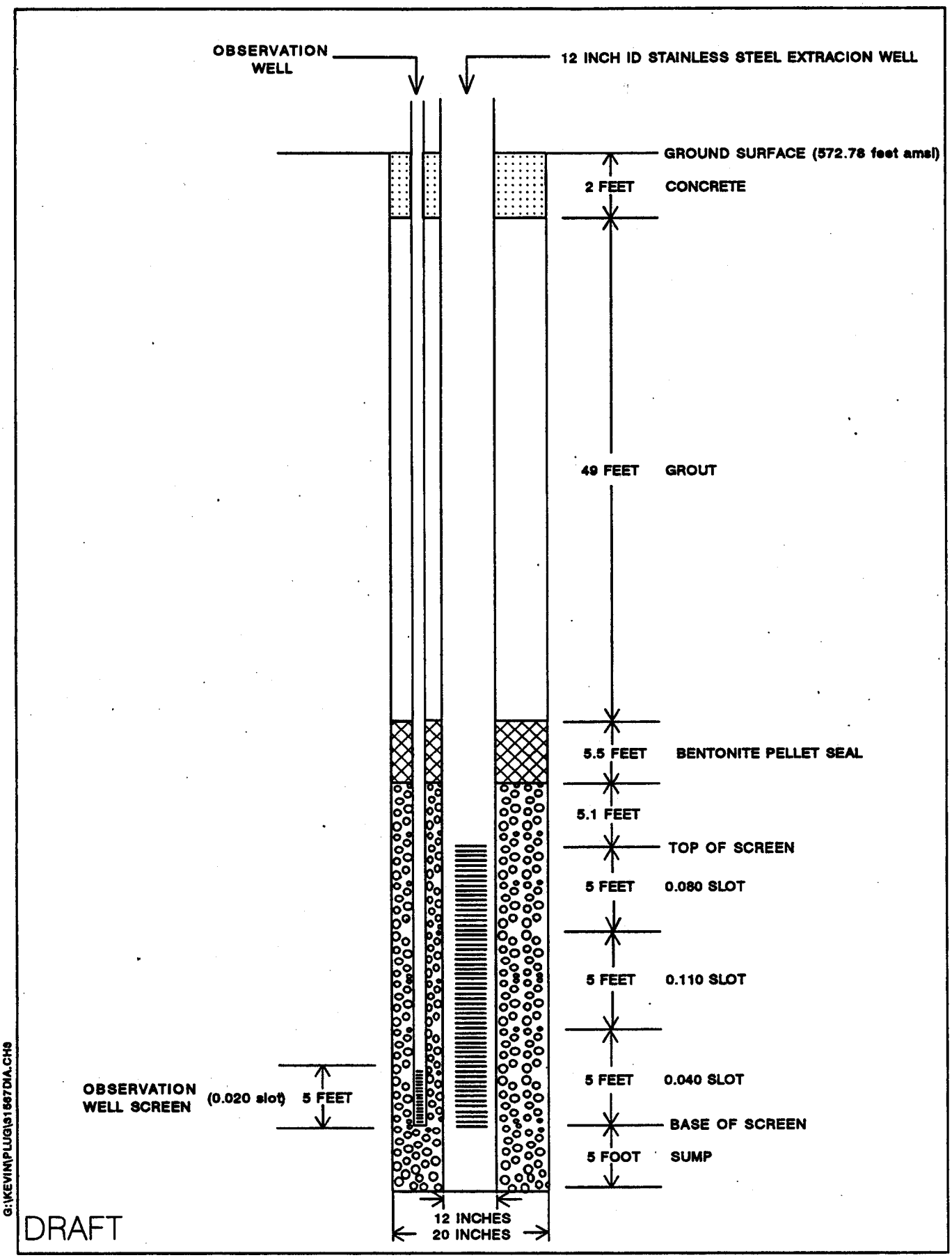
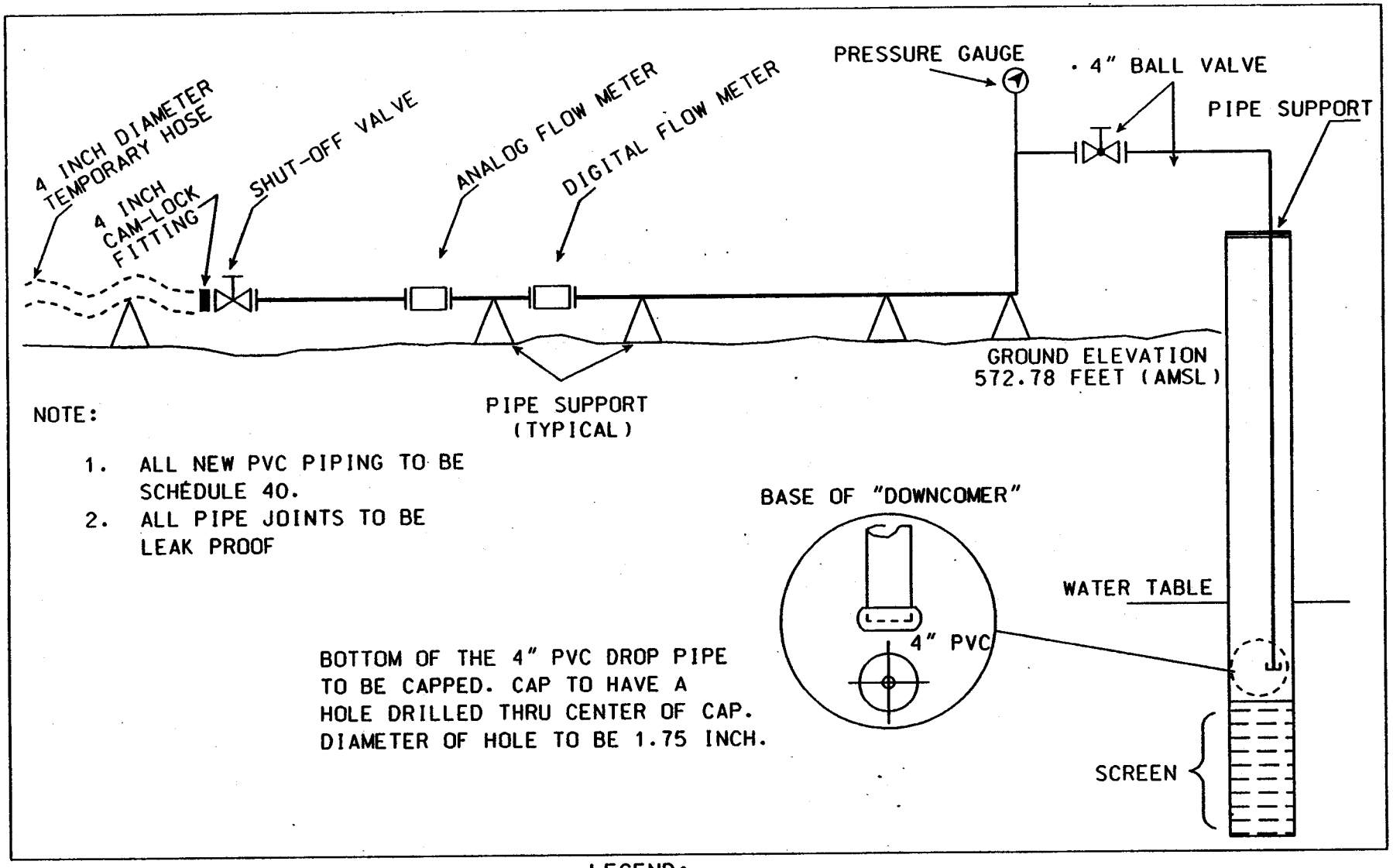


FIGURE 4-3. WELL DIAGRAM OF 31567



LEGEND:

DRAFT

FIGURE 4-4. PIPING SCHEMATIC, PHASE II INJECTION TEST

820000

/USR/ERNA5/SCRN2/DGN/MAP/HOR/DPTH/PH2INJ04.DGN

5.0 PHASE II INJECTION TEST RESULTS

5.1 WATER LEVEL MONITORING RESULTS

The objective of collecting water level data within the injection well was to record the resistance to flow within the injection well during the injection process. An increase in the resistance to flow within the injection well will result in rising water levels within the injection well and is evidence that plugging is taking place. The objective of collecting water levels in Wells 2065 and 3065 was to determine what influence injection had on the water table of the aquifer in the area surrounding the injection well. The effects that precipitation, barometric pressure, and regional water level trends have on water levels in the aquifer were considered when interpreting water level data collected during the injection period, but as explained below precipitation and barometric pressure corrections were not needed.

Precipitation

Daily average precipitation totals for the Phase II Injection test activity period (March 10, 1996, to April 4, 1996) are listed in Table 5-1. The largest recorded precipitation event (1.81 inches) was recorded on March 19, 1996 during the pre-test monitoring period. The effect that this precipitation event had on the regional water table is discussed below in the section titled "Regional Water Level Trend". During the actual injection period the largest recorded precipitation event (0.79 inches) was recorded on April 1, 1996. Injection stopped on April 1, 1996 at 8:02 am. The effect that this precipitation event had on the regional water table during the recovery monitoring period was not noticeable. Water level measurements collected during the actual injection period (March 27, 1996 to April 1, 1996) were not noticeably effected by the small amount of precipitation which was recorded.

Barometric Pressure Changes

Barometric pressures were not collected during the Phase II injection test. Past work with barometric efficiency calculations in the Great Miami Aquifer (DOE 1995f) conclude that barometric pressure has a negligible effect on water levels.

Regional Water Level Trend

Water level data collected from Wells 2065, 3065, 31567-IN, and 31567-OUT indicate that the regional water table was rising very slightly just prior to the Phase II injection test. The injection test lasted 6830 minutes. It is estimated that the regional water table rose approximately 0.1 feet over the

course of the injection period. The interpretation of approximately .1 feet of rise over the course of the injection test is subjective but believed to be conservative in that the rise may have actually been smaller. The undulating nature of the data limits a more objective determination. Details are presented below.

Figure 5-1 is a graph of water level verses elapsed time for Wells 31567-OUT and 31567-IN during the 12 days immediately preceding the injection test (March 14, 1996, through March 26, 1996). The data used to construct the graph is contained in Table A-1 of Appendix A. The graph illustrates that the water level in Well 31567-IN was essentially identical to the water level in Well 31567-OUT during this time period, with the exception of three data points taken in Well 31567-IN at an elapsed time of 15540 minutes to 15660 minutes (Table A-1). During this time, the data logger in Well 31567-IN was removed from the well to facilitate slug testing and these three readings are not correct and should be ignored.

Figure 5-2 is a plot of pre-injection water levels verses elapsed time from Well 31567-OUT, using a 0.1 vertical scale for water level. This refined scale better illustrates the undulating nature of the regional water table rise. On March 19, 1996, 1.81 inches of precipitation were recorded at the FEMP, Table 5-1. This precipitation event roughly corresponds to an elapsed monitoring time of approximately 6300 minutes. As noted in Figure 5-2, it appears that the regional water table rose and fell in response to this precipitation. An average regional water level rise was subjectively interpreted by trying to avoid the effects of this precipitation event and use the initial water level of 521.170 feet recorded at an elapsed time of zero minutes and the final water level of 521.467 feet recorded at an elapsed time of 17,100 minutes. This calculates to an increase of 1.737×10^{-5} feet per minute. Over the course of the active injection (6830 minutes) the regional water table rise, given this rate of rise, was approximately 0.12 feet.

Figure 5-3 is a graph of water level verses elapsed time for Wells 2065 and 3065 during the 12 days immediately preceding the injection test (March 14, 1996, through March 26, 1996). During this time period two different data loggers were used to record water level data. From March 14, 1996 through March 20, 1996, unit 1879 was used. Table A-2 is a printout of the data collected by this recorder. From March 20, 1996, to March 26, 1996, unit 751 was used. Table A-3 is a printout of the data collected by this recorder. The clock on unit 751 was off by one hour, as data collection actually started at 10:55 am not 9:55 am. The clock was adjusted to the correct time for the injection

test. The graph illustrates that the water level recorded in Wells 2065 and 3065 differed by approximately 0.4 feet, but behaved relatively alike, and very similar to the regional water level trend recorded in Wells 31567-OUT and 31567-IN.

Figure 5-4 is a plot of pre-injection water levels from Wells 2065 and 3065 using a 0.2-foot vertical scale. The smaller scale better illustrates the undulating nature of the regional water table rise. As noted above and in Figure 5-4, it appears that the regional water table rose and fell in response to the March 19, 1996, precipitation event. A regional water level rise was interpreted using the initial water level of 521.203 feet recorded in Well 3065 at an elapsed time of 0 minutes and a final water level of 521.511 feet recorded at an elapsed time of 17,100 minutes. This calculates out to an increase of 1.801×10^{-5} feet per minute. Over the course of the active injection (6830 minutes) the regional water table rise was approximately 0.12 feet.

Although this calculation is rough, it will serve the purpose of this test. The objective of the test is to determine if plugging can be prevented by injecting treated groundwater. It is already known through the first injection test that the water table surrounding the injection well did not exhibit excessive mounding during the injection test, indicating that the injected water was efficiently flushed away from the well and out into the aquifer. This pre-test monitoring indicates that approximately 0.12 feet of measured rise resulting from the Phase II injection activity could be caused by regional water table rise. Given the subjectiveness of the calculation the correction factor for regional water level rise during the test will be rounded off to 0.1 feet.

Injection Test Interpretations

Water level data collected during the Injection Test (March 27, 1996, through April 1, 1996) are reported in Table A-4. Plots of water level (feet above mean sea level) verses elapsed time (minutes) for Wells 31567-IN and 31567-OUT can be found in Figures 5-5 and 5-6 respectively.

The data indicate that at the start of the injection test the water level in both wells was at 521.510 feet above mean sea level (amsl). With injection, the water level in Wells 31567-IN and 31567-OUT rose approximately 2.69 feet to 524.201 feet and 524.200 feet amsl respectively. Figure 5-5 illustrates that the water table fluctuated during the initial 12 minutes of the test, probably due to turbulence within the well created by the start of injection, but then remained fairly steady at 524 feet amsl.

Approximately four times during the test, injection was stopped for 40 or 50 minutes to facilitate backwashing the filters in the SPIT system. During the injection test this occurred at the elapsed times of 1840 minutes, 3190 minutes, 4570 minutes, and 5960 minutes, Table A-4 and Figure 5-6. The drop in water level recorded in Wells 31567-IN and 31567-OUT during these backwash periods appear to be consistent. Each time the water table dropped approximately 2 feet to the 522 foot amsl elevation.

At an elapsed time of 4830 minutes, the transducer in Well 31567-IN failed, recording a water level of 514.981, Figure 5-5. This transducer was installed inside of a stilling pipe (2 inch stainless steel tubing). It was determined following the injection test, that the transducer was actually installed too deep and extended out of the bottom of the stilling pipe rather than resting inside of it. Turbulence created by the injection caused the transducer cable to rub against the bottom edge of the stilling pipe. The rubbing eventually led to the cable being cut, and the transducer failing. Fluctuating water levels recorded during the first 12 minutes of the test supports the idea that the cable and transducer were subjected to more turbulence than planned. Loss of this transducer did not effect the pumping test, as the transducer in Well 31567-OUT was still operating.

Water level data collected from Wells 2065 and 3065 during the injection test can be found in Table A-4. A plot of water level (feet amsl) verses elapsed time (minutes) is shown on Figure 5-7. The data indicate that the water level measured in both wells rose during the injection test approximately 0.473 feet. One-tenth of a foot of this rise could have been due to the regional water table rise discussed earlier in this report, therefore the injection test resulted in a maximum water level increase of approximately 0.37 feet in observation Wells 2065 and 3065. The highest water level for both wells was recorded at an elapsed time of 5940 minutes, Table A-4 and Figure 5-7. The water level in Well 2065 was measured at an elevation of 521.973 feet amsl, and the water level in Well 3065 was measured at an elevation of 522.019 feet amsl. The initial water level for Wells 2065 and 3065 respectively was 521.5 feet amsl and 521.546 feet amsl. The water level measurements recorded in Wells 2065 and 3065 indicate that the pulsing created by the four backwashing episodes discussed above was also detected and resulted in a very small (approximately 0.02- to 0.05-foot) drop in water level.

Water level data collected during the recovery monitoring period (April 1, 1996 through April 4, 1996) can be found in Table A-5. Figure 5-8 is a plot of water level (feet amsl) versus

elapsed time (minutes) for Wells 31567-OUT, 2065, and 3065. The data indicate that water levels responded very rapidly when injection was stopped. Water levels returned to within a foot of pre-injection levels within one minute (the pre-injection water level elevation was approximately 521.5 feet amsl). Post-injection water level elevations never returned to pre-injection water level elevations. This is believed to be due to the regional water table rise discussed earlier and to precipitation events which occurred on March 31 and April 1, 1996.

These results indicate that Well 31567 did not experience plugging of the well screen as was exhibited during the first injection test where water levels in the injection well rose exponentially during the test (DOE 1995c). The water level in the injection well rose approximately 2.7 feet and remained fairly stable throughout the test. The water level in monitoring Wells 2065 an 3065 rose approximately 0.37 feet. Recovery to within one-foot of pre-injection water levels took less than one minute.

5.2 GROUNDWATER QUALITY MONITORING RESULTS

Water quality data collected during the Injection Test (March 27, 1996, through April 1, 1996) are reported Appendix B. Hourly water quality measurements were collected in Wells 31567-OUT, 2065, 3065, and the SPIT system effluent. Water quality measurements included temperature, pH, specific conductance, total dissolved solids, dissolved oxygen, and redox potential.

The data indicate that water parameters throughout the test at all three location were fairly stable with the exception of dissolved oxygen. Figure 5-9 is a graph of dissolved oxygen concentration verses elapsed time for Wells 31567-OUT and 2065. Dissolved oxygen in both wells rapidly increased at the start of injection, remained fairly stable during the test, then decreased at the end of the test. Figure 5-10 is a graph of dissolved oxygen concentration verses time for monitoring Well 3065. The graph illustrates that the dissolved oxygen content of the groundwater at this depth was not effected by the injection test.

Water samples were collected from Well 31567 immediately before injection and from Well 31567 and the SPIT effluent after injection. The results are presented in Table 5-2. Compared to the pre-test investigation results (Table 2-1), the water quality immediately before the test was essentially the same as was modeled with the exception of iron and uranium. Iron was lower than modeled and uranium was higher. These changes should not impact the modeling results presented in Section 2.0.

The testing results shown in Table 5-2 indicate that the chemistry of the injection water was very similar to the chemistry of the insitu groundwater sampled in Well 31567. Because the chemistries were so similar, very little chemical change was measured during the injection test. Dissolved oxygen was the only parameter exhibiting a noticeable change as a result of injection.

The pH of the SPIT system effluent was above 7.4 throughout the entire injection period (see Table B-4). As explained in Section 2.0 of this report, geochemical modeling indicated that if the pH of the SPIT system effluent was greater than 7.3 calcite precipitation was possible. No evidence of calcite precipitation was observed as a result of the injection test even though the pH was favorable for it occurring.

5.3 SLUG TEST RESULTS

On March 25, 1996, a series of five vacuum slug tests were conducted in Well 31567 to establish pre-injection hydraulic conditions in the area immediately around the screened portion of the well. A series of five vacuum slug tests was also conducted following the injection test on April 1, 1996, to determine if any plugging or alteration of the injection well and surrounding aquifer material had occurred during the injection test. All equipment lowered into or pulled from the well was thoroughly decontaminated as per FERMCO standard operating procedures.

The vacuum slug tests utilized a sealed wellhead apparatus which allowed a vacuum to be applied to the well to displace water standing in the well casing (Figure 5-11). The vacuum slug test creates a falling head test where the water level is raised in the well to a predetermined level, held constant to obtain equilibrium conditions, and allowed to recover by releasing the vacuum through a ball valve.

The five pre-injection vacuum slug tests were conducted by securing the wellhead apparatus on the 12-inch well casing. With the wellhead apparatus installed, a static water level measurement was made using the top of the apparatus as the reference point. The water level indicator probe (Slope Indicator) was then raised exactly 5.0 feet and set in preparation for the first vacuum slug test. A five pounds per square inch (psi) rated pressure transducer (Instrumentation Northwest Model 7001) was then placed down the well and lowered into the water approximately two feet. The wellhead was then sealed and the pressure transducer lines were connected to the data logger (Campbell Scientific Model CR-21X). Once water levels stabilized in the well, the static pressure transducer reading was recorded, and a vacuum was applied to the well. The vacuum was applied

until the water level indicator signaled that the 5.0 foot rise in the water level had occurred. A small vent was then opened on the wellhead apparatus to release a portion of the vacuum, allowing the water level to stabilize at the 5.0 foot mark. The water level was held in this position for approximately five minutes to allow the aquifer to re-equilibrate. The data logger was then set to record water level changes in the well at a rate of five times per second. After the data logger was switched on, the vacuum was released through the two inch ball valve, creating a falling head test. Three of the five pre-injection tests were conducted using a 5.0 foot water level displacement. The other two pre-injection tests were conducted using a 10.0 foot water level displacement. The additional displacement adds further stress to the well and surrounding aquifer material. After completing the five-foot displacement tests, the water level indicator was raised an additional 5.0 feet to a height of 10.0 feet above the static water level. Once the water level was in position, the two 10-foot displacement tests were conducted with the same methodology as the five-foot vacuum slug tests.

Once the tests were completed, the data were transferred from the data logger to a portable computer. Once in the computer, the data were inspected to determine if the recording equipment functioned properly. Once the data were field verified, the equipment was removed from the area, allowing the injection testing to proceed.

Upon completion of the constant rate injection test, water levels in the injection well and surrounding observation wells were allowed to recover. With recovery of the aquifer water levels, a series of post injection vacuum slug tests was conducted on the injection well on April 1, 1996. For consistency and comparative reasons, the test set and methodologies were identical to that of the pre-injection tests, including three five-foot and two 10-foot displacement tests. The post injection tests were conducted to determine if the injection test had any adverse effects on the well, filter pack, and aquifer material as compared to the pre-injection slug tests.

The data set for each slug test was imported into a computer spreadsheet program for manipulation. Once the data was in a proper format, it was imported into AQTESOLV™, which is a computer program designed to interpret aquifer test data, such as slug test data on unconfined aquifers. The Bower and Rice slug test method was selected to determine the hydraulic conductivity of the material immediately around the well bore. Individual data plots created by AQTESOLV™ are presented in Appendix D. The actual data from the data logger and the transformed data showing actual elapsed

time and water level displacement are also presented in Appendix D. Table 5-3 summarizes the results of all ten slug tests.

Results of the pre- and post-vacuum slug test results indicate that the injection test did not damage the well in terms of decreased hydraulic conductivity in the well screen, surrounding filter pack, and aquifer material. The series of slug tests conducted immediately after the injection test was nearly identical to those completed before injection began. The average value of hydraulic conductivity calculated for the pre-injection tests was 298.1 feet/day, while the post-injection results averaged 296.7 feet/day. These results strongly suggest that no precipitate formed to clog the well screen and surrounding material as a result of the injection test.

5.4 VERTICAL FLOW PROFILING RESULTS

A flow profiling tool called the "spinner tool" owned by Rio Algun and retrofitted for shallow use by In-Situ, Inc. was tested at Well 31567. Figure 5-12 is a schematic diagram of the flow profiling tool. The spinner tool was used to measure vertical flow profiles in Well 31567 during the injection test. Each flow profile measurement was completed in approximately 30 minutes, and a total of 12 flow profiles were recorded at various times during the injection test. The first flow profile was done at the beginning of the injection test and the last one was measured at the end of the injection test.

The spinner tool consists of a propeller, which is free to rotate due to the vertical movement of water across the propeller blades. The number of revolutions that the propeller makes in a fixed period of time is recorded at different vertical depths within the well screen and compared against one another to determine the percentage of flow that a particular section of screen is transmitting.

For each test, the spinner tool was lowered down the well and readings were taken at one foot intervals between 60 feet and 80 feet below the top of the well casing (test type:**down**). The spinner tool was then lifted and the readings were taken at one foot intervals between 80 and 60 feet (test type:**up**).

Data collected in Well 31567 during the first flow profile (at 2:30 pm on March 27, 1996) will be used to illustrate how the spinner tool data was used to calculate flow percentages. At the top of the screen (64 feet below the top of casing (TOC)) the flow meter reading in Well 31567 was 1184 revolutions. This number of propeller revolutions was assigned a flow of 200 gallons per

minute (gpm) (the total injection flow). One foot deeper in the screen (65 feet TOC) the flow meter reading was 752 revolutions. This number of revolutions is directly proportional to a flow rate of 127.03 gpm. Subtracting 127.03 gpm from 200 gpm indicates that 72.97 gpm of flow was exiting out of the well through the upper foot of the well screen or 36.49 percent of the total injection flow. Vertical flow profiles for all twelve profile surveys can be found in Appendix E. Graphs which plot the depth as a function of flow for all twelve profile surveys can also be found in Appendix E. Below is a list of when the twelve flow profile surveys were conducted. Some flow profiles started at the top of the screen and progressed down the screen. Other flow profiles began at the base of the screen and progressed up the screen.

Profile time	Time elapsed since injection started	Test type
2:30 pm 3/27/96	30 minutes	down
3:15 pm 3/27/96	75 minutes	up
8:00 am 3/28/96	18 hours	down
8:38 am 3/28/96	18 hours 38 minutes	up
2:09 pm 3/28/96	24 hours 9 minutes	down
2:35 pm 3/28/96	24 hours 35 minutes	up
8:15 am 3/29/96	42 hours 15 minutes	down
8:38 am 3/29/96	42 hours 38 minutes	up
4:21 pm 3/30/96	74 hours 21 minutes	down
4:47 pm 3/30/96	74 hours 47 minutes	up
6:50 am 4/01/96	112 hours 50 minutes	down
7:19 am 4/01/96	113 hours 19 minutes	up

The vertical profiling results indicate that approximately 80 percent of injected fluid flowed out of the well through the top three feet of the well screen, indicating that the screen was open to the aquifer.

5.5 DOWNHOLE CAMERA SURVEY RESULTS

On March 11, 1996, a downhole video camera survey was conducted at Well 31567. The camera equipment used to monitor the well is manufactured by Wellcam Corporation, Model WC-9941. The camera measures three inches in diameter, and is designed specifically for surveying vertical pipe and boreholes.

The camera was lowered into the well at a rate of approximately one foot per second using a power winch. A video image was displayed and monitored at the surface of the well at the same time that a video tape was recorded.

The camera survey indicated that the well screen in Well 31567 had no visible sign of iron encrustation or bacterial plugging.

On April 18, 1996, a post-injection camera survey was conducted in Well 31567. The visual condition of the well and well screen was similar to the pre-injection survey conducted on March 11, 1996. No physical evidence of well plugging was noted by the survey.

5.6 GALLIONELLA AND IRON BACTERIA TESTING RESULTS

On March 14, 1996, a groundwater sample was collected from Well 31567 and sent to an off-site laboratory for an analysis of iron bacteria. On April 1, 1996, immediately following injection, a water sample was collected from Well 31567 and also from the SPIT effluent and sent to an off-site laboratory for analysis of iron bacteria. The objective of the testing was to determine if biofouling conditions were present in Well 31567 prior to injection.

The workplan for the Phase II test called for testing the SPIT system for iron bacteria before the start of injection. It was decided that this sample was unnecessary, because the SPIT effluent would not change as a result of injection. The one sample collected from the SPIT effluent following injection was sufficient for determining if iron bacteria was present in the effluent.

The results of the sampling are presented in Table 5-4. Prior to injection Well 31567 showed high counts of Aerobic Heterotrophs (20,700 Colony Forming Units per deciliter (CFU/dl)), Fungi and Yeast (21,000 CFU/dl) and Thiobacillus (120 CFU/dl). A Heterotroph requires complex organic compounds of nitrogen and carbon for metabolic synthesis. Thiobacillus is an iron bacteria that grows in the presence of oxygen. These results indicate that prior to injection, conditions in Well 31567 had the potential to promote bacterial growth.

Following injection, Well 31567 exhibited extremely elevated counts of Aerobic Heterotrophs (180,000 CFU/dl) and Gallionella iron bacteria (2,000 CFU/dl). These results lead to the conclusion

that injection did result in bacterial growth within the injection well, with iron oxidizing bacteria (Gallionella) exhibiting very high and significant counts.

Results of the sampling conducted on Effluent from the SPIT system did not show any significant Aerobic Heterotrophs but did show a presence of Sphaerotilus/Leptothrix, which is a fortuitous iron oxidizer. The results indicate the beginning of an iron oxidizing system (i.e., biofouling potential is in a very early or initial stage).

TABLE 5-1

AVERAGE DAILY PRECIPITATION TOTALS FROM MARCH 10, 1996, THROUGH APRIL 4, 1996 (IN INCHES)

Date	Inches	Status
March 10	0	
11	0	
12	0	
13	.03	
14	0	Pre-test monitoring
15	.14	Pre-test monitoring
16	.07	Pre-test monitoring
17	0	Pre-test monitoring
18	0	Pre-test monitoring
19	1.81	Pre-test monitoring
20	.18	Pre-test monitoring
21	0	Pre-test monitoring
22	0	Pre-test monitoring
23	0	Pre-test monitoring
24	.01	Pre-test monitoring
25	.17	Pre-test monitoring
26	0	Pre-test monitoring
27	0	Injection test
28	.24	Injection test
29	.02	Injection test
30	0	Injection test
31	.59	Injection test
April 1	.79	Recovery monitoring
2	0	Recovery monitoring
3	0	Recovery monitoring
4	.39	Recovery monitoring

TABLE 5-2

PHASE II INJECTION TEST: PRE-INJECTION AND POST-INJECTION WATER QUALITY RESULTS

	Pre-injection Test Results		Post-injection Test Results			
Analyte	Sample from Well 31567	Duplicate from Well 31567	Sample from Well 31567	Duplicate from Well 31567	SPIT Effluent	Detection Limits
Aluminum	233 µg/L	251 µg/L	ND	ND	ND	200 µg/L
Calcium	101400 µg/L	101600 µg/L	92270 µg/L	89690 µg/L	87200 µg/L	NA
Iron	ND	ND	ND	ND	ND	100 µg/L
Magnesium	26260 µg/L	27450 µg/L	23560 µg/L	23390 µg/L	22970 µg/L	NA
Manganese	326 µg/L	349 µg/L	ND	ND	ND	15 µg/L
Potassium	ND	ND	ND	ND	ND	5000 µg/L
Silicon	4126 µg/L	4184 µg/L	4318 µg/L	4348 µg/L	4190 µg/L	NA
Sodium	11700 µg/L	12010 µg/L	12740 µg/L	12310 µg/L	12010 µg/L	NA
Chloride	24.8 mg/L	24.8 mg/L	28.0 mg/L	28.8 mg/L	29.2 mg/L	NA
Sulfate	68.5 mg/L	75.5 mg/L	79.0 mg/L	81.8 mg/L	73.8 mg/L	NA
TDS	428 mg/L	423 mg/L	431 mg/L	434 mg/L	413 mg/L	NA
Alkalinity	198 mg/L	239 mg/L	269 mg/L	262 mg/L	257 mg/L	130 mg/L
Fluoride	0.15 mg/L	0.14 mg/L	0.17 mg/L	0.16 mg/L	0.16 mg/L	NA
Nitrate-nitrogen	0.6 mg/L	0.7 mg/L	0.3 mg/L	0.3 mg/L	0.3 mg/L	0.1 mg/L
Suspended Solids	ND	ND	123 mg/L	ND	ND	2 mg/L
Ammonia	ND	ND	ND	ND	ND	0.1 mg/L
Phosphate (Total)	ND	ND	ND	ND	ND	0.1 mg/L
Uranium	41 µg/L	41 µg/L	0.3 µg/L	0.3 µg/L	0.3 µg/L	NA
Carbonate	ND	ND	ND	ND	ND	2000 µg/L
Bicarbonate	268 mg/L	274 mg/L	260 mg/L	255 mg/L	253 mg/L	NA

TABLE 5-3

VACUUM SLUG TEST RESULTS FOR PRE- AND POST-TESTS CONDUCTED IN INJECTION WELL 31567

Slug Test Number/Displacement		Date	Hydraulic Conductivity ft/second	Hydraulic Conductivity ft/day
Pre-Injection Vacuum Slug Tests	#1 - 5.0 ft	3/25/96	0.00352	304.1
	#2 - 5.0 ft	3/25/96	0.00345	298.1
	#3 - 5.0 ft	3/25/96	0.00350	302.4
	#4 - 10.0 ft	3/25/96	0.00338	292.0
	#5 - 10.0 ft	3/25/96	0.00340	293.8
		Average	**0.00345**	**298.1**
Post-Injection Vacuum Slug Tests	#1 - 5.0 ft	4/1/96	0.00340	293.8
	#2 - 5.0 ft	4/1/96	0.00365	315.4
	#3 - 5.0 ft	4/1/96	0.00344	297.2
	#4 - 10.0 ft	4/1/96	0.00328	283.4
	#5 - 10.0 ft	4/1/96	0.00340	293.8
		Average	**0.00343**	**296.7**

TABLE 5-4

IRON BACTERIA SAMPLING RESULTS IN WELL 31567 AND SPIT EFFLUENT

	Well 31567		SPIT Effluent	Units
	Before Inj.	After Inj.		
Aerobic Heterotrophs	20,700	180,000	16	CFU/dl[a]
Anaerobic Heterotrophs	160	72	14	CFU/dl
Fungi & Yeast	21,000	4,500	90	CFU/dl
Gallionella	<1.0	2,000	48	CFU/dl
Sphaerotilus/Leptothrix	16	810	630	CFU/dl
Thiobacillus	120	<1.0	<1.0	CFU/dl
Sulfate Reducing Bacteria	1.0	50	12	CFU/dl
Sulfide/Sulfur-Oxidizing Bacteria	<1.0	36	<1.0	CFU/dl
Geobacter (iron reducing bacteria)	<1.0	<1.0	<1.0	CFU/dl

[a]CFU/dl = Colony Forming Unit per deciliter

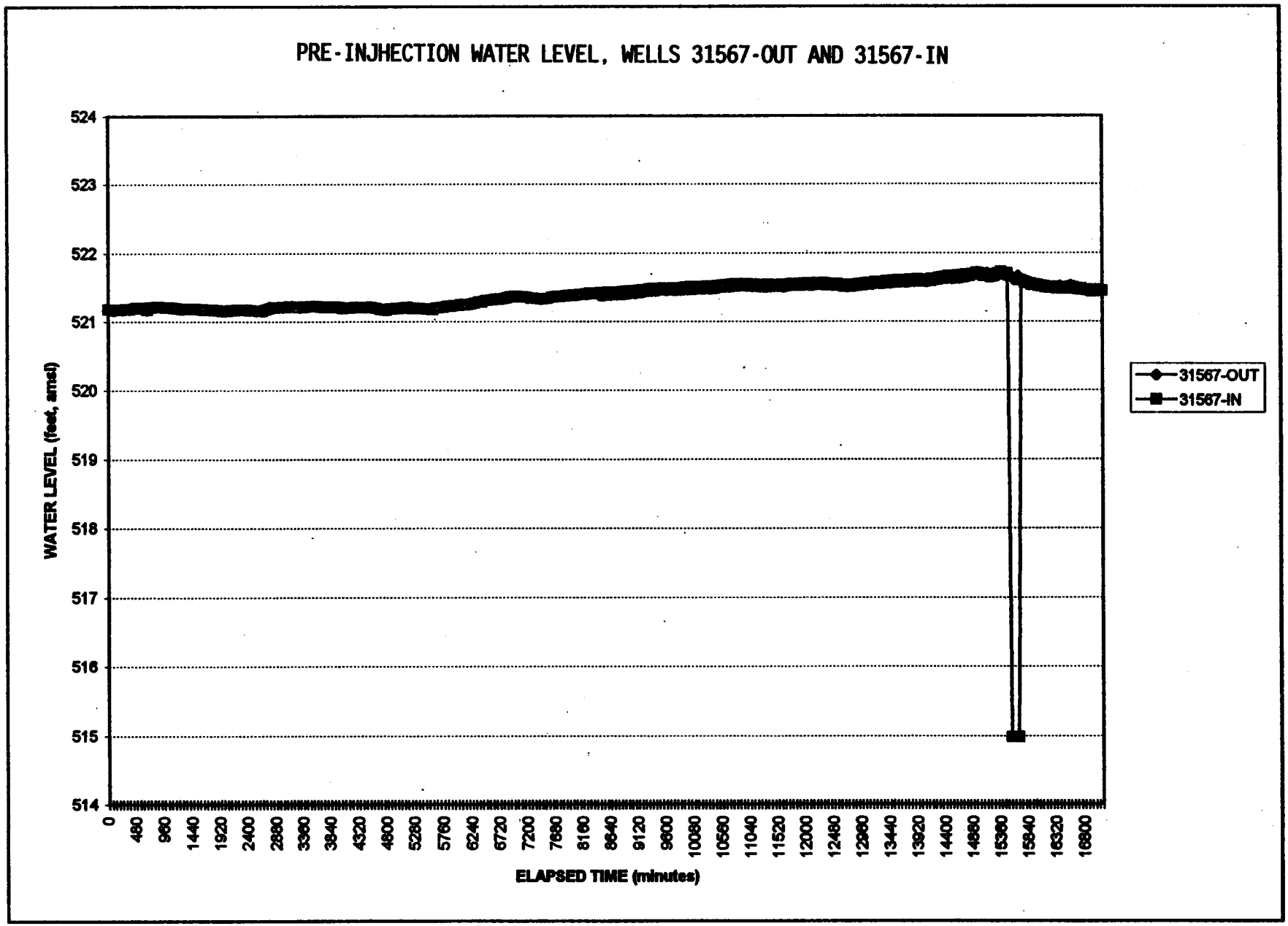


FIGURE 5-1.

000044

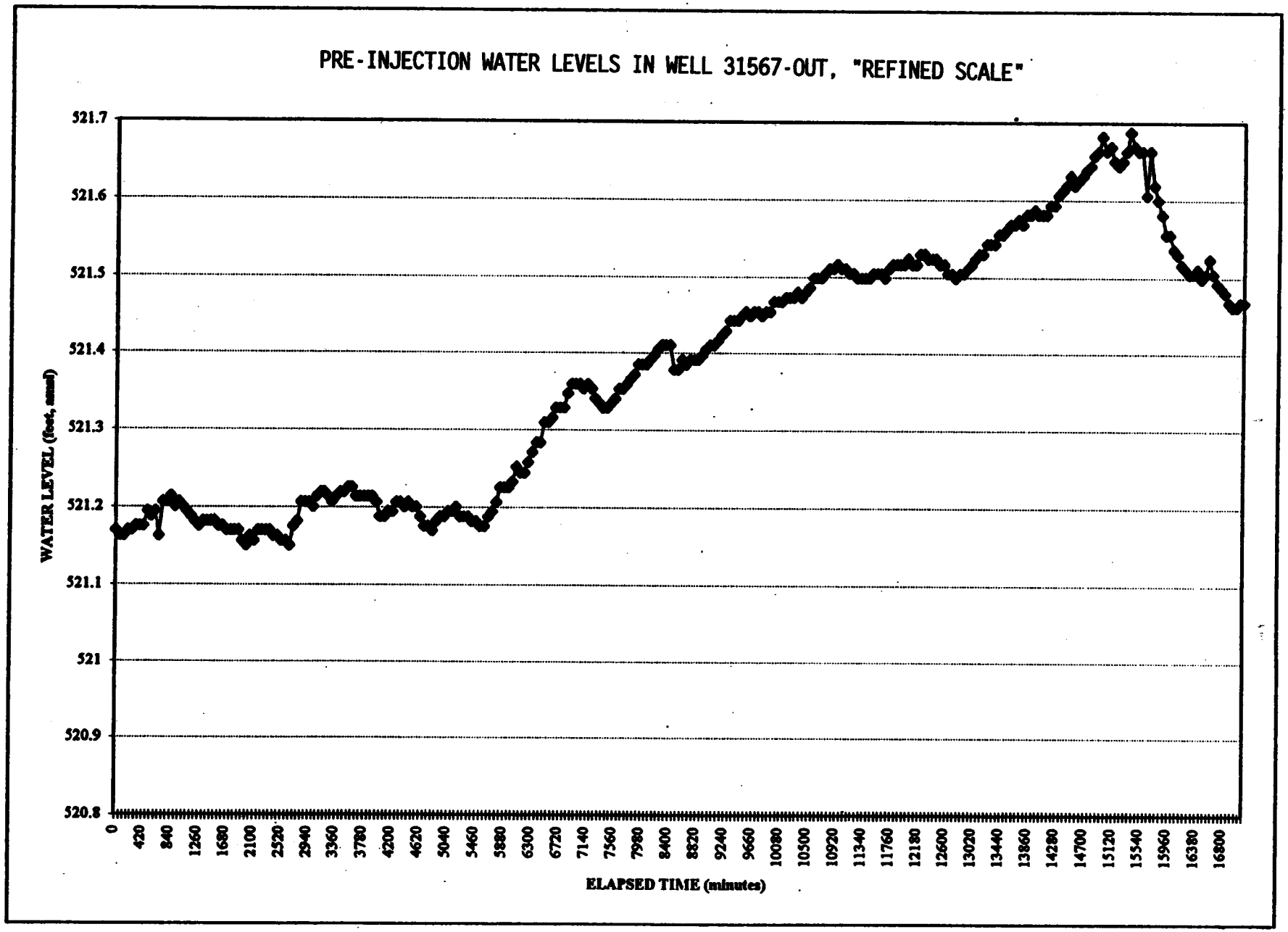

PRE-INJECTION WATER LEVELS IN WELL 31567-OUT, "REFINED SCALE"
WATER LEVEL (feet, msl)
521.7
521.6
521.5
521.4
521.3
521.2
521.1
521
520.9
520.8
0
420
840
1260
1680
2100
2520
2940
3360
3780
4200
4620
5040
5460
5880
6300
6720
7140
7560
7980
8400
8820
9240
9660
10080
10500
10920
11340
11760
12180
12600
13020
13440
13860
14280
14700
15120
15540
15960
16380
16800
ELAPSED TIME (minutes)

FIGURE 5-2.

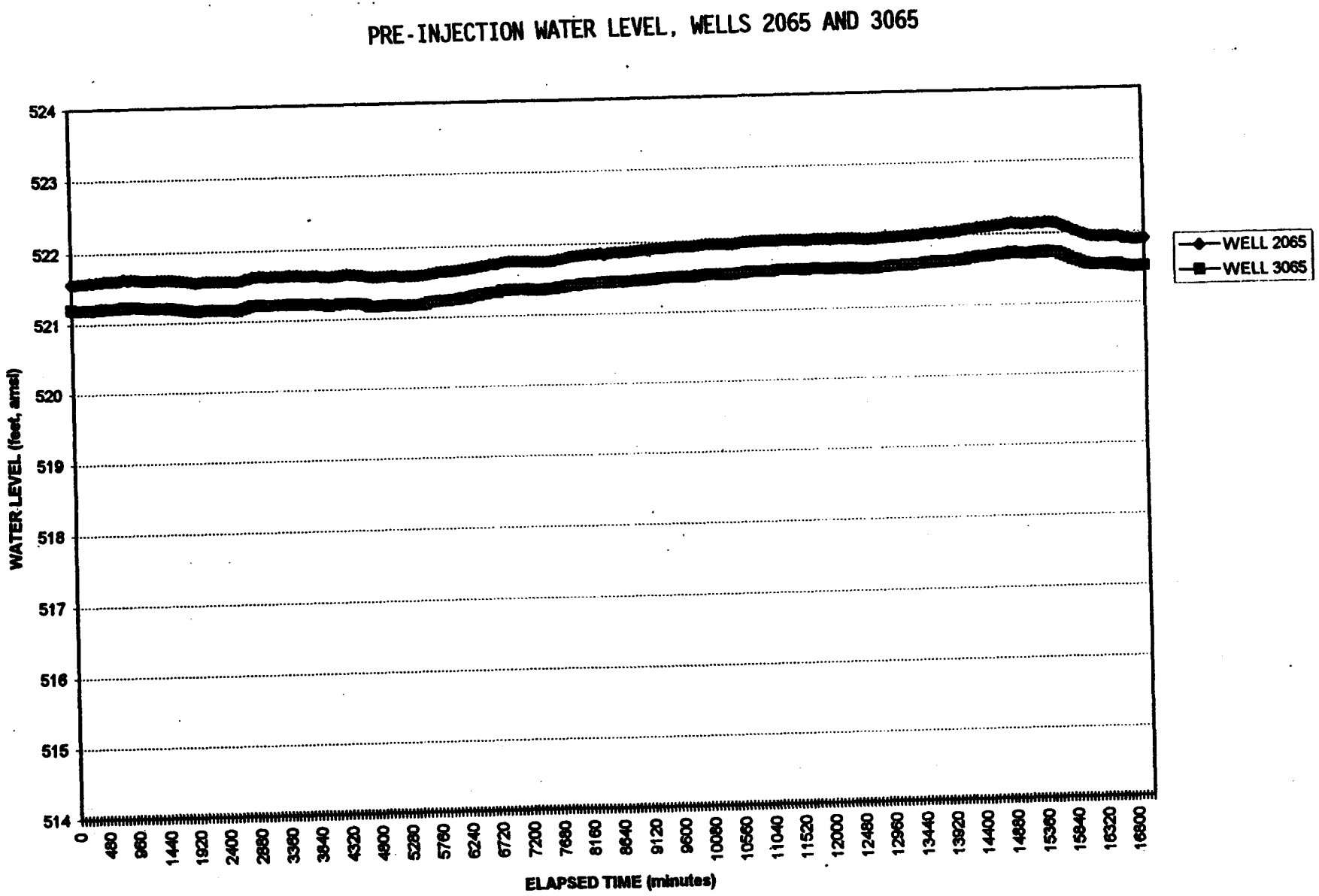

PRE-INJECTION WATER LEVEL, WELLS 2065 AND 3065
WATER LEVEL (feet, amsl)
524
523
522
521
520
519
518
517
516
515
514
0
480
960
1440
1920
2400
2880
3360
3840
4320
4800
5280
5760
6240
6720
7200
7680
8160
8640
9120
9600
10080
10560
11040
11520
12000
12480
12960
13440
13920
14400
14880
15360
15840
16320
16800
ELAPSED TIME (minutes)
WELL 2065
WELL 3065

FIGURE 5-3.

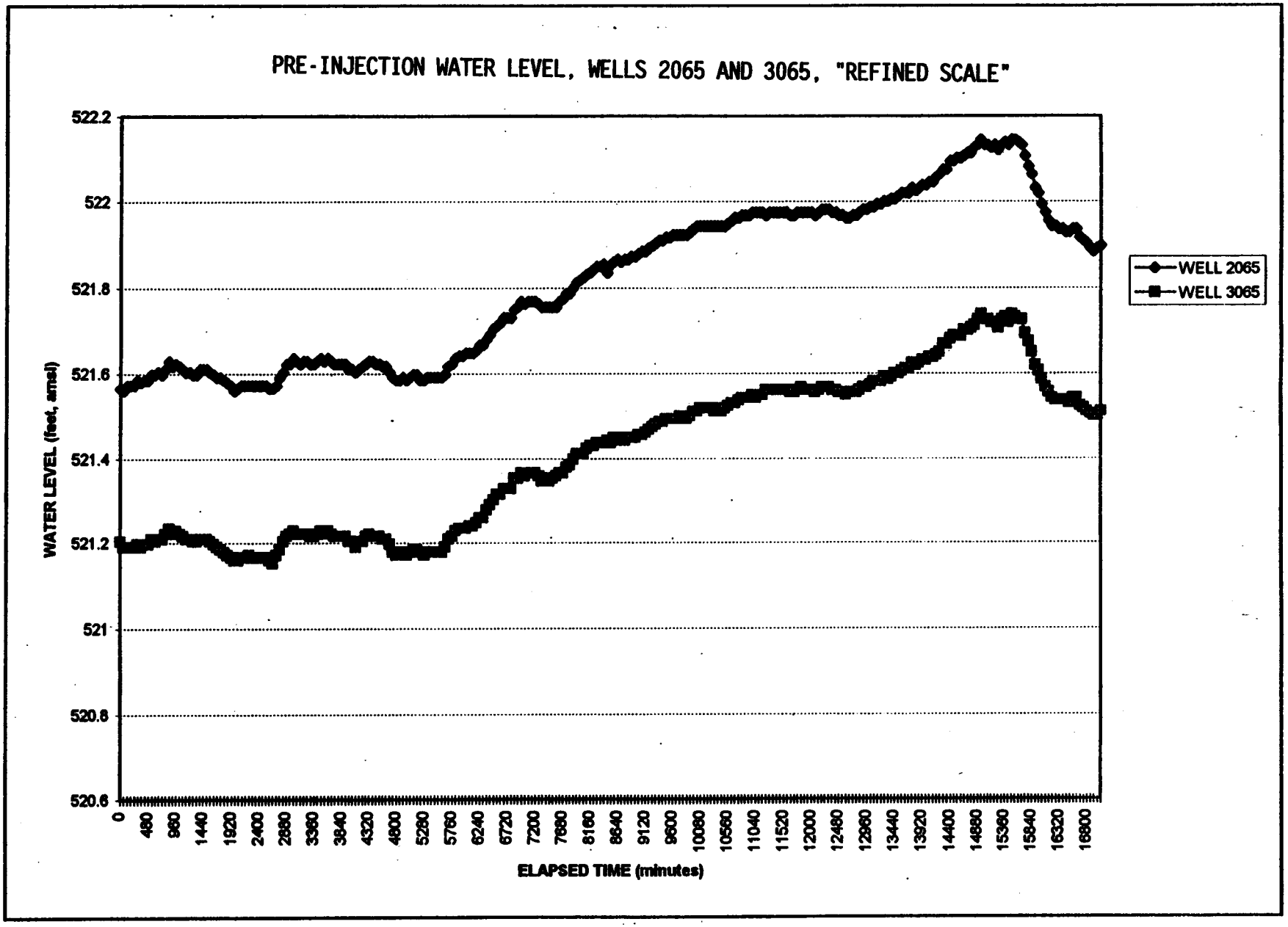

PRE-INJECTION WATER LEVEL, WELLS 2065 AND 3065, "REFINED SCALE"
WATER LEVEL (feet, amsl)
522.2
522
521.8
521.6
521.4
521.2
521
520.8
520.6
ELAPSED TIME (minutes)
0
480
960
1440
1920
2400
2880
3360
3840
4320
4800
5280
5760
6240
6720
7200
7680
8160
8640
9120
9600
10080
10560
11040
11520
12000
12480
12960
13440
13920
14400
14880
15360
15840
16320
16800
WELL 2065
WELL 3065

FIGURE 5-4.

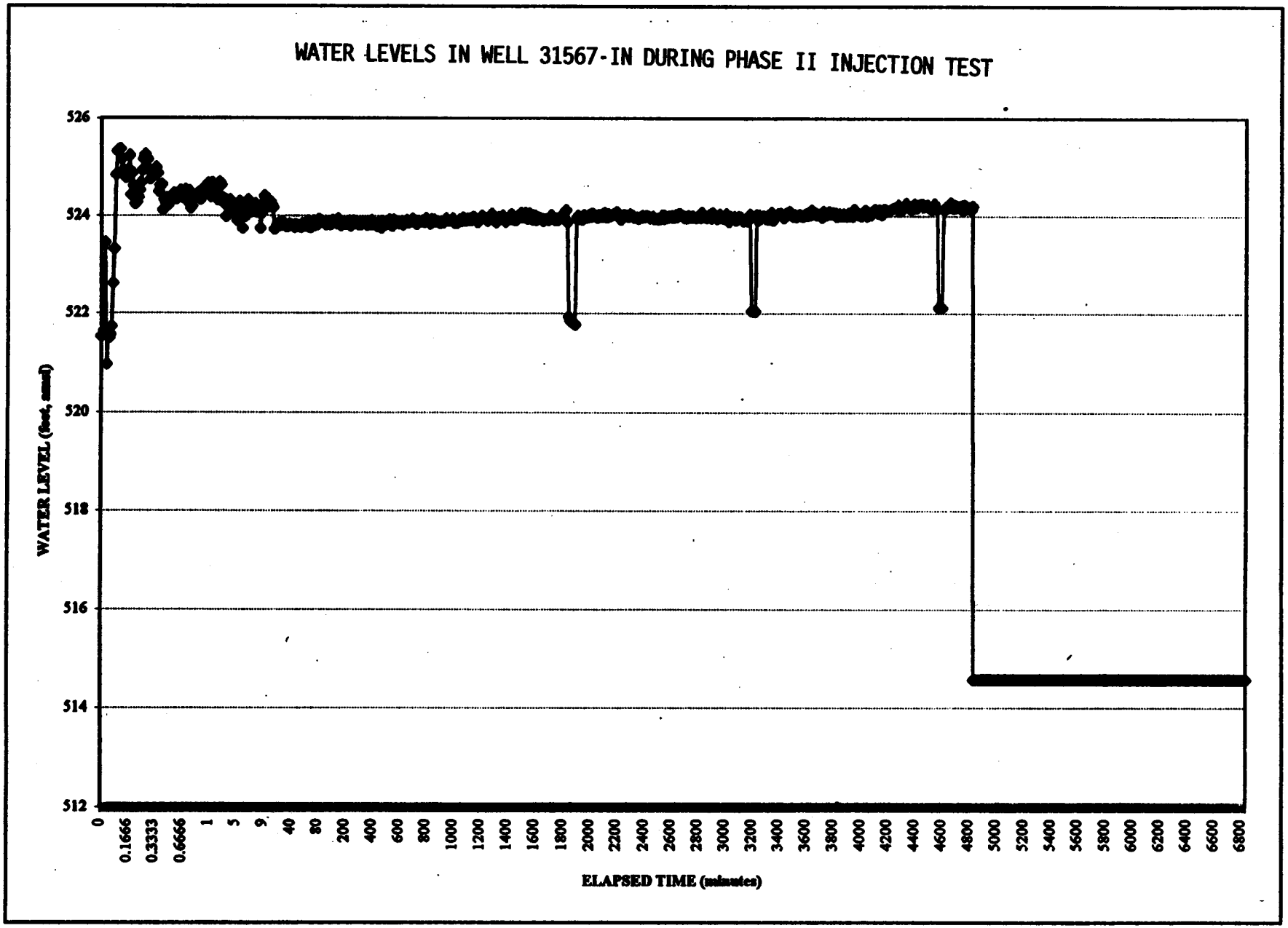


FIGURE 5-5.

000048

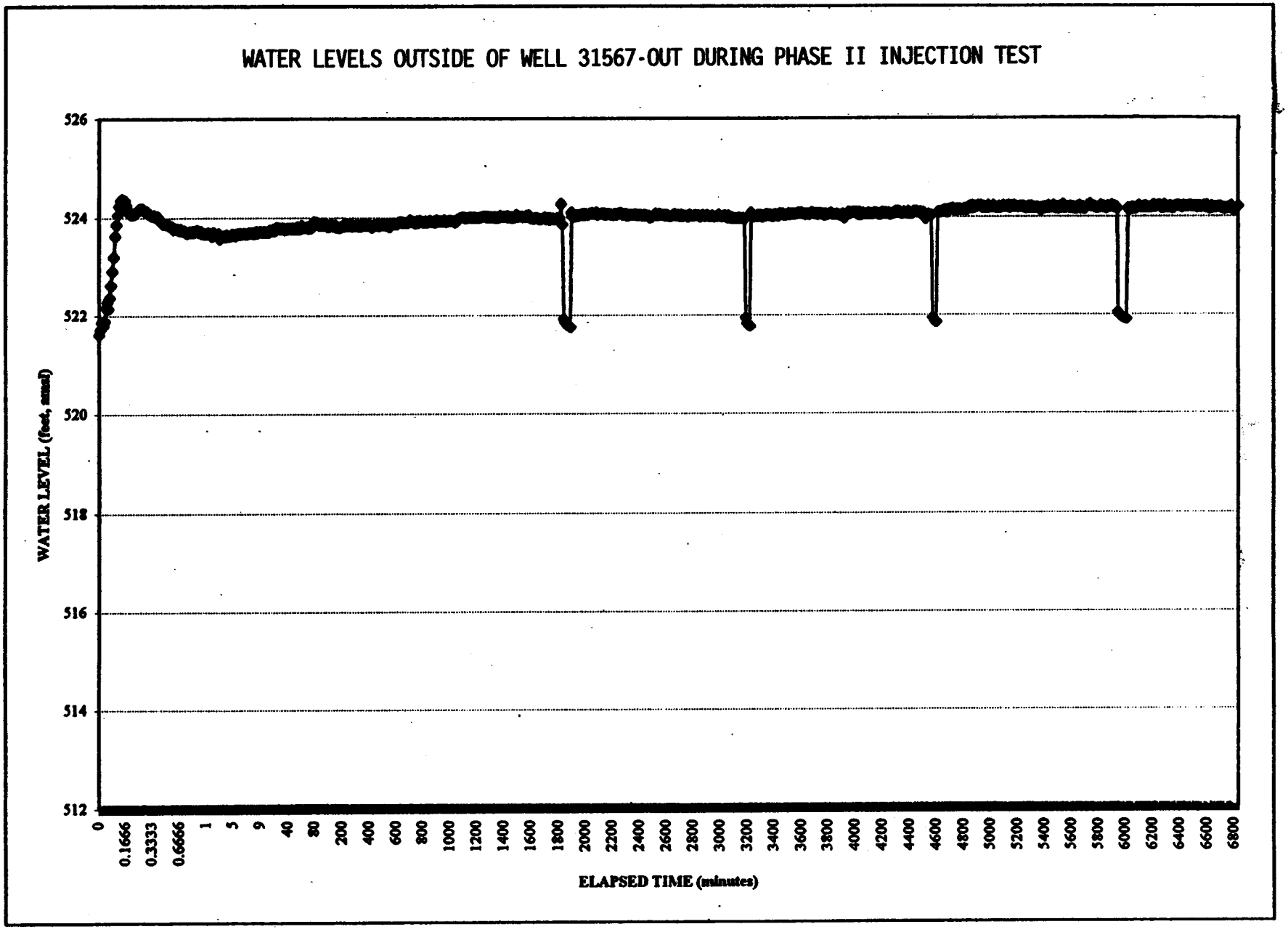

WATER LEVELS OUTSIDE OF WELL 31567-OUT DURING PHASE II INJECTION TEST
WATER LEVEL (feet, msl)
526
524
522
520
518
516
514
512
0
0.1666
0.3333
0.6666
1
5
9
40
80
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
5200
5400
5600
5800
6000
6200
6400
6600
6800
ELAPSED TIME (minutes)

FIGURE 5-6.

WATER LEVELS IN WELLS 2065 AND 3065 DURING PHASE II INJECTION TEST

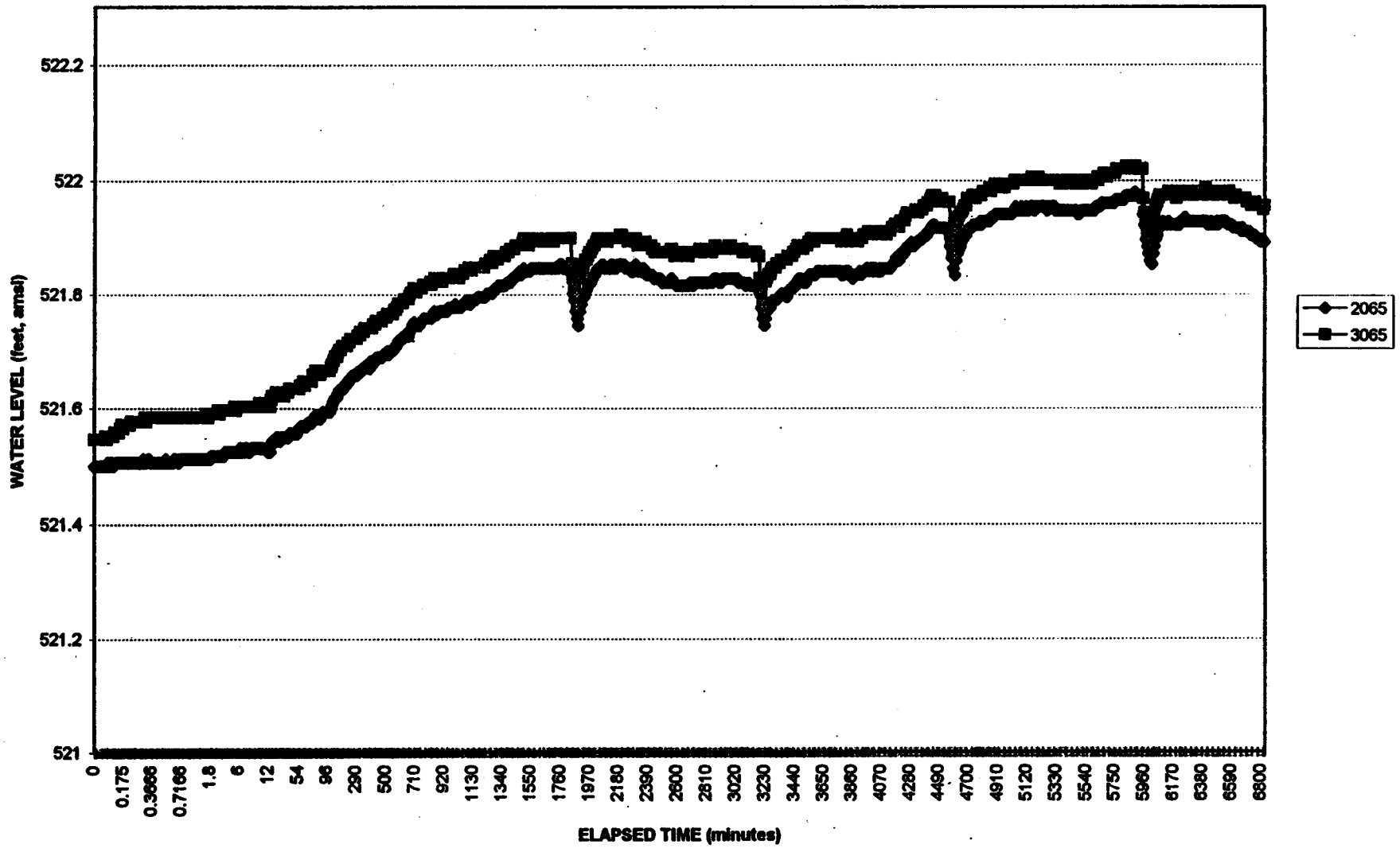


FIGURE 5-7.

WATER LEVELS IN WELLS 31567-OUT, 2065, AND 3065 DURING RECOVERY PERIOD

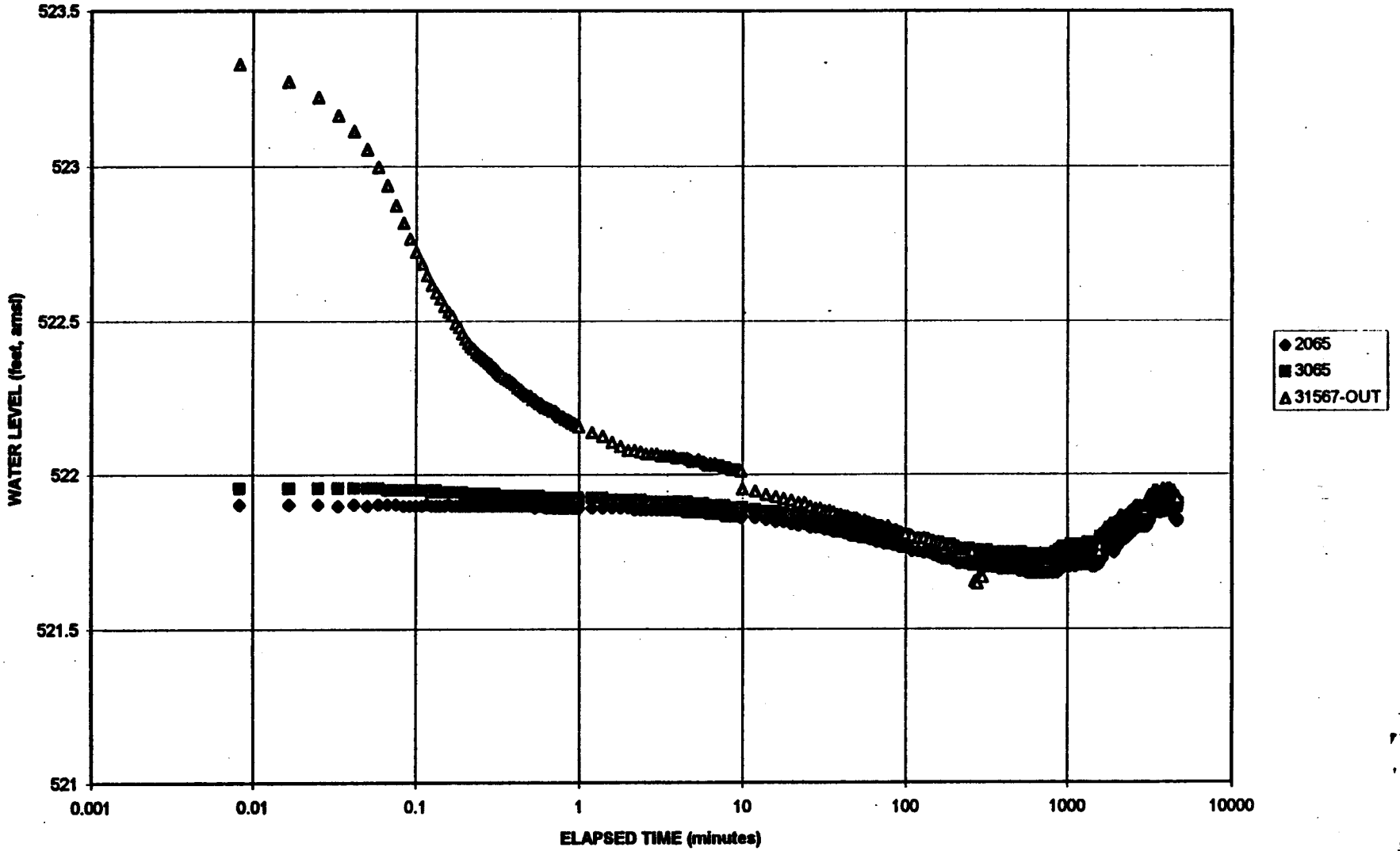


FIGURE 5-8.

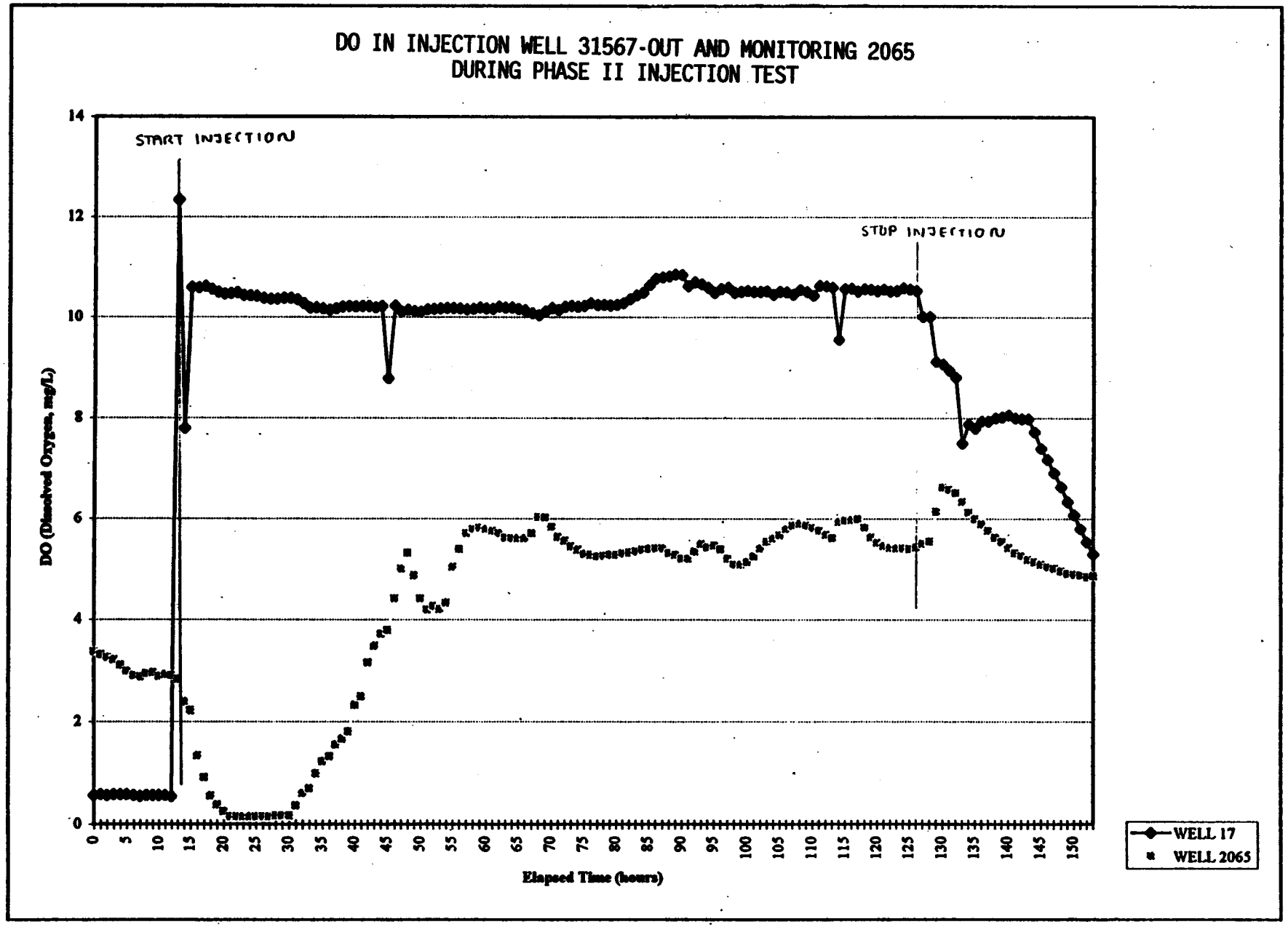

DO IN INJECTION WELL 31567-OUT AND MONITORING 2065
DURING PHASE II INJECTION TEST
START INJECTION
STOP INJECTION
DO (Dissolved Oxygen, mg/L)
Elapsed Time (hours)
WELL 17
WELL 2065

FIGURE 5-9.

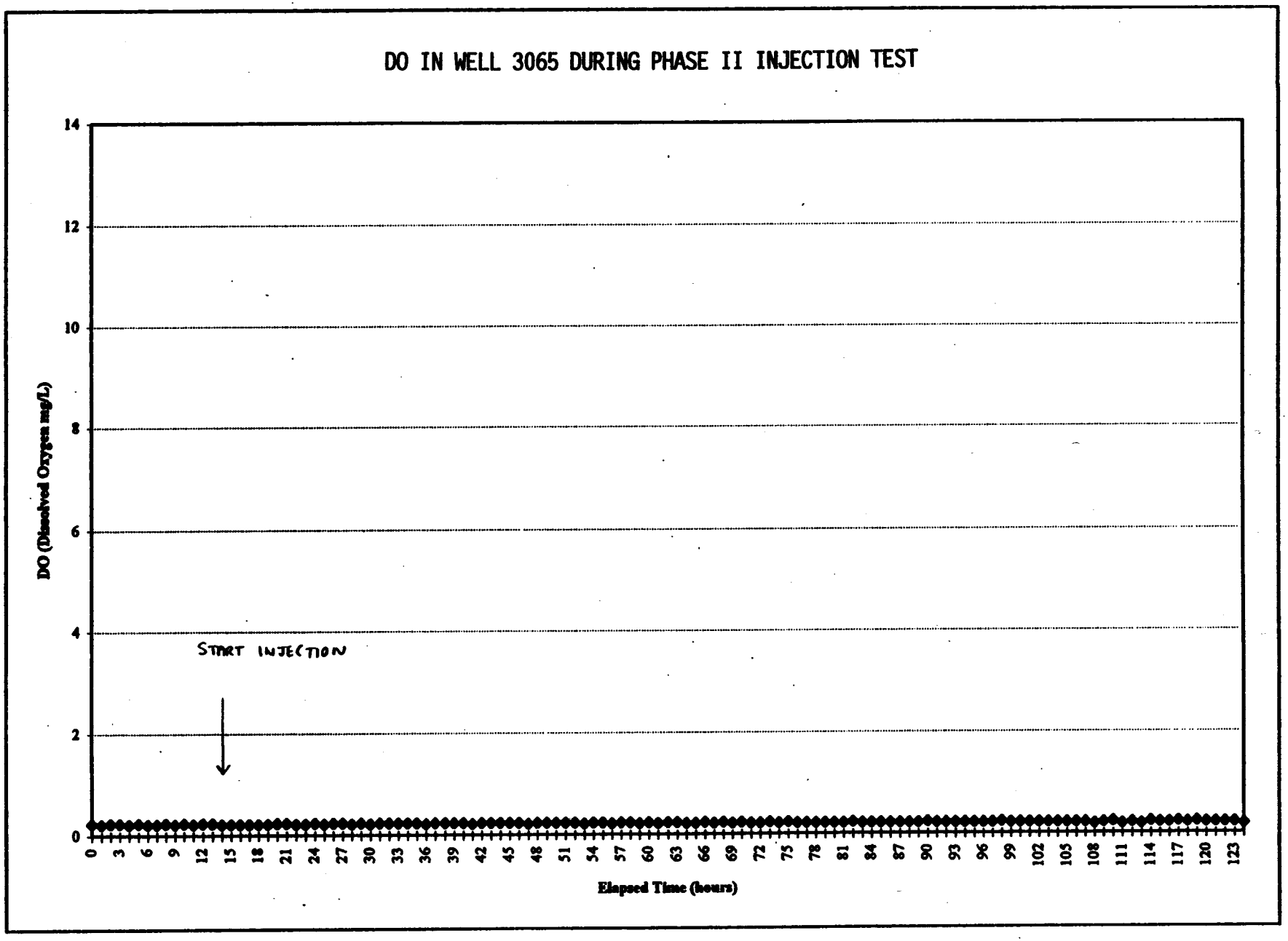

DO IN WELL 3065 DURING PHASE II INJECTION TEST
DO (Dissolved Oxygen mg/L)
0
2
4
6
8
10
12
14
START INJECTION
0 3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75 78 81 84 87 90 93 96 99 102 105 108 111 114 117 120 123
Elapsed Time (hours)

FIGURE 5-10.

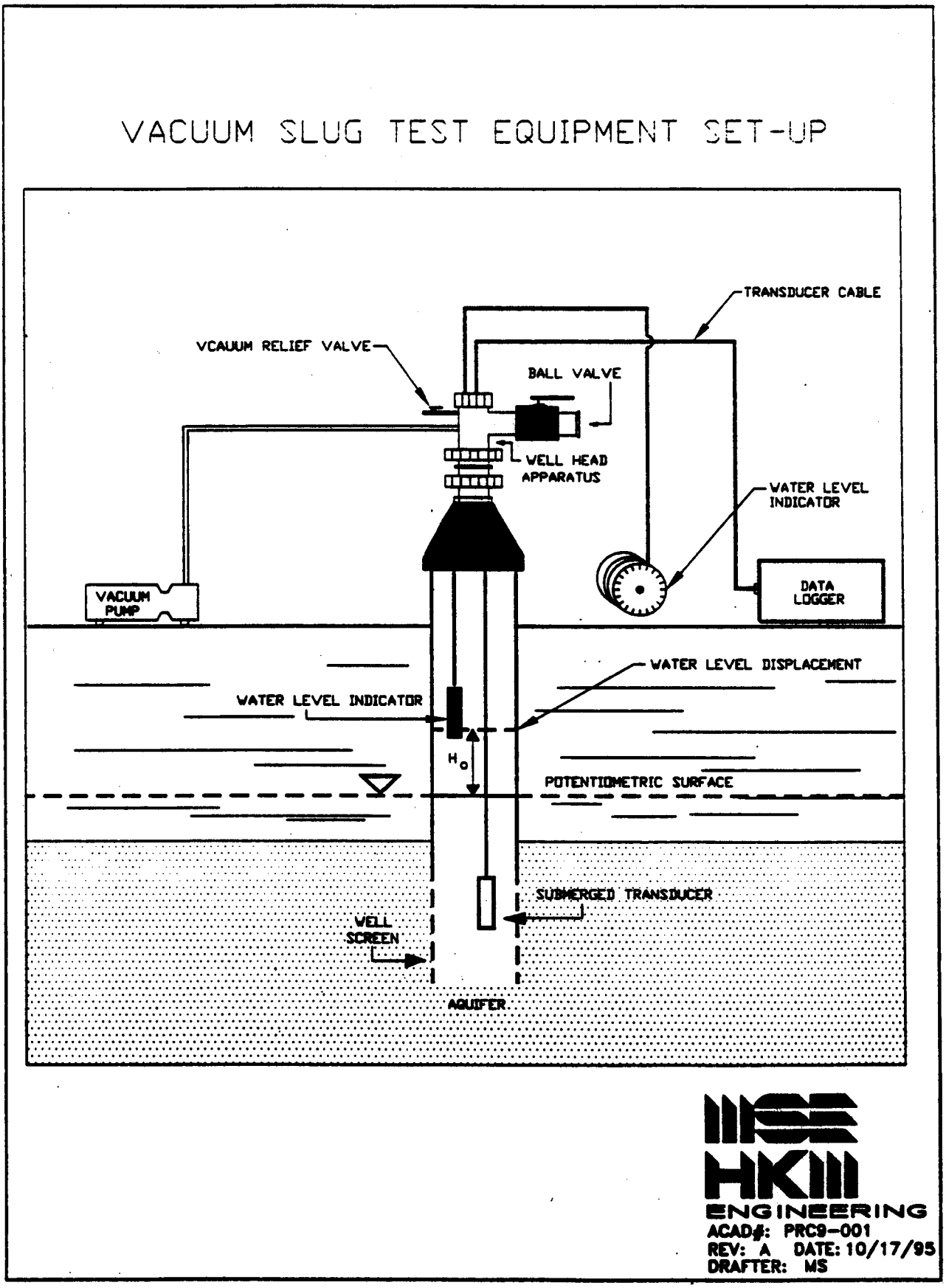
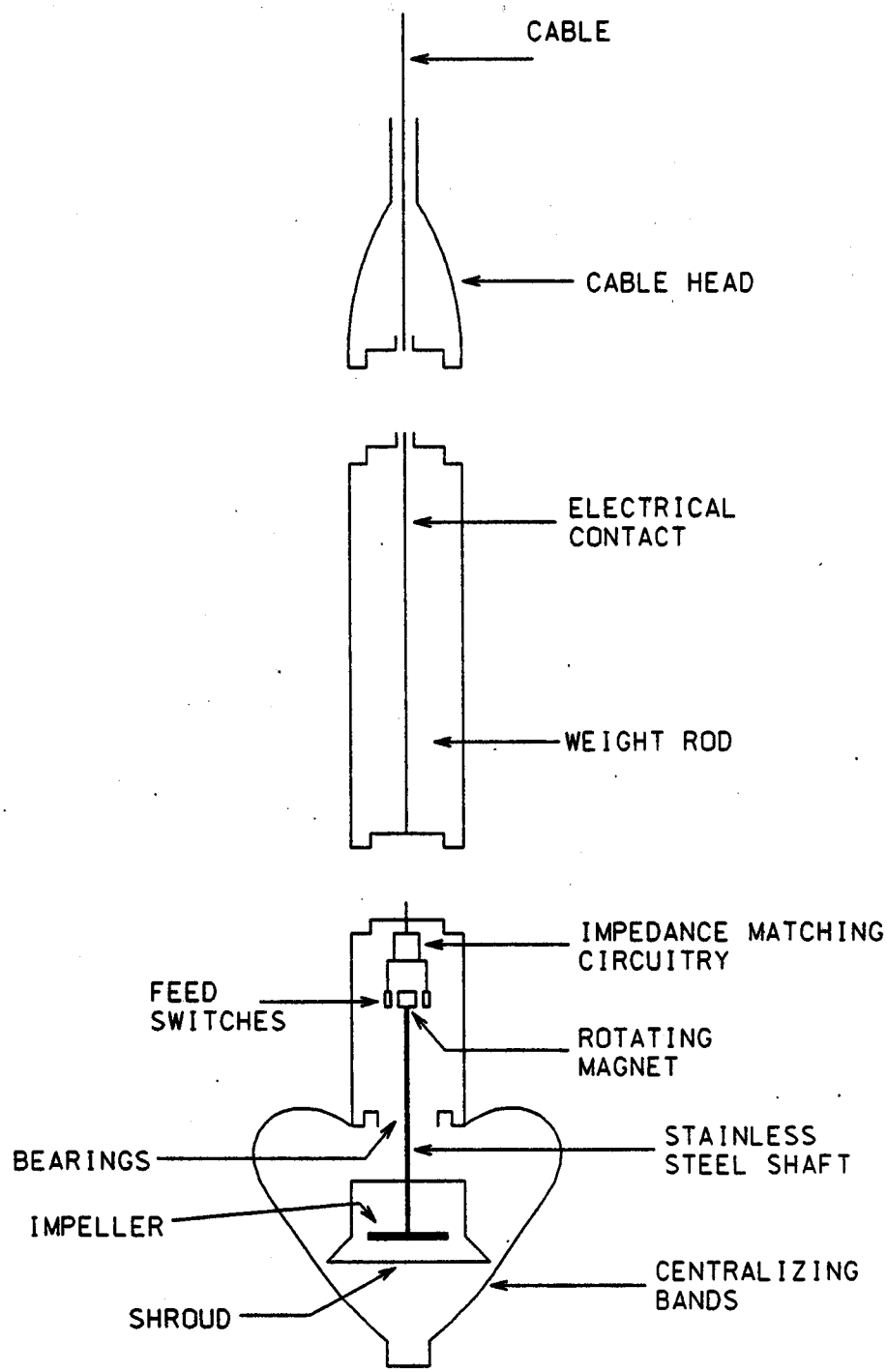


FIGURE 5-11. EQUIPMENT CONFIGURATION TO CONDUCT A VACUUM SLUG TEST



DRAFT

FIGURE 5-12. SCHEMATIC DIAGRAM OF FLOW PROFILE TOOL

/usr/armd5/5cr w2/dgn/map/hor/dptth/ph2 in 105.dgn
11-SEP-1996

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

Physical plugging of the injection well did not occur during the Phase II injection test because treated water from the SPIT system was injected into the aquifer, rather than untreated water. The Phase II Injection Test revealed that:

- Prior to injection, Well 31567 had the potential to promote bacterial growth.
- Injection resulted in bacterial growth within the injection well.
- Effluent from the SPIT exhibited initial stages of biofouling potential.

The conclusion that injecting treated water did not promote physical plugging during the test is supported by the following results:

- The water level in the injection well did not exhibit a rapid upward climb that would be associated with plugging. The water level in the injection well rose approximately 2.7 feet at the start of the test as a result of injection and remained fairly stable throughout the test.
- Water levels recovered to within one foot of pre-injection levels within 1 minute after injection had stopped indicating that the well was open to the aquifer.
- Very little chemical change occurred in the groundwater as a result of injection.
- Results of the slug testing indicated that no precipitate formed to clog the well screen and surrounding aquifer material as a result of the injection test.
- Vertical flow profiling indicated that approximately 80 percent of the injected fluid flowed freely out of the well through the top three feet of the well screen indicating that the screen was open to the aquifer.
- Camera surveys conducted after the injection test revealed no physical evidence of well plugging.

Even though injection caused bacterial growth in the injection well, physical plugging of the well screen in the injection well did not occur, and no evidence of the beginning of physical plugging was found. The conclusion is that iron bacterial growth conditions, which are natural for the Great Miami Aquifer, cannot be eliminated, but they can be controlled so that onset of physical plugging is

prolonged or reduced. This is encouraging, because it indicates that with an aggressive bacterial control program, it should be possible to maintain high injection efficiencies within the injection wells.

6.2 RECOMMENDATIONS

It is recommended that an objective of the area wide injection demonstration should be to develop an aggressive biofouling monitoring and control program for the injection system. A monitoring program needs to be developed that will track changes in water chemistry and well performance so that increases in bacterial growth can be detected and controlled before physical plugging of the well screen begins to effect injection efficiencies.

7.0 REFERENCES

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U.S. Dept. of Energy, 1995d, "South Field Pumping Test Report," DOE, Fernald Area Office, Cincinnati, OH.

APPENDIX A

WATER LEVEL DATA

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Table A-1 Pre-injection Water Levels, Wells 31567-Out and 31567-In from Thurday, March 14, 1996, to Tuesday, March 26, 1996

Table A-2 Pre-injection Water Levels, Wells 2065 and 3065, from Thrusday, March 14, 1996, to Wednesday, March 20, 1996

Table A-3 Pre-injection Water Levels, Wells 2065 and 3065, from Wednesday, March 20, 1996, to Monday, March 25, 1996

Table A-4 Water Levels During Phase II Injection Test, Wells 2065, 3065, 31567-In, and 31567-Out, from Wednesday, March 27, 1996, to Monday, April 1, 1996

Table A-5 Water Levels During Recovery from Phase II Injection Test, Wells 2065, 3065, 31567-In, and 31567-Out, from Monday, April 1, 1996, to Thursday, April 4, 1996

TABLE A-1

PRE-INJECTION WATER LEVELS
WELLS 31567-OUT AND 31567-IN
FROM THURSDAY, MARCH 14, 1996, TO TUESDAY, MARCH 26, 1996
(In Feet Above Mean Sea Level)

SE2000
Environmental Logger
03/26 12:41

Unit# 489 Test 0

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level (F)
Mode	Surface	Surface
I.D.	31567OUT	31567IN
Reference	521.170	521.170
SG	1.000	1.000
Linearity	0:096	0.112
Scale factor	20.037	19.961
Offset	0.018	0.024
Delay mSEC	50.000	50.000

Step 0 03/14 15:14:01

Elapsed Time:		
0.0000	521.170	521.176
60.0000	521.163	521.170
120.000	521.163	521.170
180.000	521.170	521.170
240.000	521.170	521.170
300.000	521.176	521.176
360.000	521.176	521.176
420.000	521.176	521.182
480.000	521.195	521.195
540.000	521.188	521.188
600.000	521.195	521.195
660.000	521.163	521.163
720.000	521.207	521.207
780.000	521.207	521.207
840.000	521.214	521.214
900.000	521.201	521.201
960.000	521.207	521.207
1020.00	521.201	521.201
1080.00	521.195	521.195
1140.00	521.188	521.188
1200.00	521.182	521.182

TABLE A-1
(Continued)

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level (F)
Mode	Surface	Surface
I.D.	31567OUT	31567IN
Elapsed Time:		
1260.00	521.176	521.176
1320.00	521.182	521.182
1380.00	521.182	521.182
1440.00	521.182	521.182
1500.00	521.182	521.182
1560.00	521.176	521.176
1620.00	521.176	521.176
1680.00	521.170	521.170
1740.00	521.170	521.170
1800.00	521.170	521.170
1860.00	521.170	521.163
1920.00	521.157	521.157
1980.00	521.151	521.151
2040.00	521.163	521.157
2100.00	521.157	521.157
2160.00	521.170	521.163
2220.00	521.170	521.163
2280.00	521.170	521.170
2340.00	521.170	521.170
2400.00	521.163	521.163
2460.00	521.163	521.157
2520.00	521.157	521.157
2580.00	521.157	521.151
2640.00	521.151	521.151
2700.00	521.176	521.170
2760.00	521.182	521.182
2820.00	521.207	521.201
2880.00	521.207	521.201
2940.00	521.207	521.201
3000.00	521.201	521.201
3060.00	521.214	521.207
3120.00	521.220	521.220
3180.00	521.220	521.214
3240.00	521.214	521.214
3300.00	521.207	521.201
3360.00	521.214	521.207
3420.00	521.220	521.220

TABLE A-1
(Continued)

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level (F)
Mode	Surface	Surface
I.D.	31567OUT	31567IN
Elapsed Time:		
3480.00	521.220	521.220
3540.00	521.226	521.220
3600.00	521.226	521.220
3660.00	521.214	521.214
3720.00	521.214	521.207
3780.00	521.214	521.214
3840.00	521.214	521.207
3900.00	521.214	521.214
3960.00	521.207	521.201
4020.00	521.188	521.188
4080.00	521.188	521.188
4140.00	521.195	521.195
4200.00	521.195	521.195
4260.00	521.207	521.201
4320.00	521.207	521.201
4380.00	521.201	521.201
4440.00	521.207	521.201
4500.00	521.201	521.201
4560.00	521.201	521.195
4620.00	521.188	521.188
4680.00	521.176	521.176
4740.00	521.176	521.170
4800.00	521.170	521.163
4860.00	521.182	521.176
4920.00	521.188	521.182
4980.00	521.188	521.182
5040.00	521.195	521.188
5100.00	521.195	521.195
5160.00	521.201	521.201
5220.00	521.188	521.182
5280.00	521.188	521.188
5340.00	521.188	521.182
5400.00	521.182	521.182
5460.00	521.182	521.176
5520.00	521.176	521.176
5580.00	521.176	521.170
5640.00	521.188	521.188

TABLE A-1
(Continued)

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level (F)
Mode	Surface	Surface
I.D.	31567OUT	31567IN
Elapsed Time:		
5700.00	521.195	521.195
5760.00	521.207	521.201
5820.00	521.226	521.220
5880.00	521.226	521.220
5940.00	521.226	521.226
6000.00	521.233	521.233
6060.00	521.252	521.245
6120.00	521.245	521.239
6180.00	521.245	521.245
6240.00	521.258	521.251
6300.00	521.271	521.264
6360.00	521.283	521.277
6420.00	521.283	521.277
6480.00	521.309	521.302
6540.00	521.309	521.308
6600.00	521.315	521.314
6660.00	521.328	521.321
6720.00	521.328	521.321
6780.00	521.328	521.327
6840.00	521.347	521.340
6900.00	521.359	521.352
6960.00	521.359	521.352
7020.00	521.359	521.359
7080.00	521.353	521.352
7140.00	521.359	521.352
7200.00	521.353	521.346
7260.00	521.340	521.333
7320.00	521.334	521.333
7380.00	521.328	521.327
7440.00	521.328	521.321
7500.00	521.334	521.327
7560.00	521.340	521.333
7620.00	521.353	521.346
7680.00	521.353	521.352
7740.00	521.359	521.359
7800.00	521.366	521.359
7860.00	521.372	521.371

TABLE A-1
(Continued)

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level (F)
Mode	Surface	Surface
I.D.	31567OUT	31567IN
Elapsed Time:		
7920.00	521.385	521.378
7980.00	521.385	521.378
8040.00	521.385	521.384
8100.00	521.391	521.390
8160.00	521.397	521.390
8220.00	521.404	521.396
8280.00	521.410	521.409
8340.00	521.410	521.403
8400.00	521.410	521.409
8460.00	521.378	521.415
8520.00	521.378	521.415
8580.00	521.391	521.422
8640.00	521.385	521.415
8700.00	521.391	521.422
8760.00	521.391	521.422
8820.00	521.391	521.428
8880.00	521.397	521.434
8940.00	521.404	521.441
9000.00	521.410	521.441
9060.00	521.410	521.441
9120.00	521.416	521.453
9180.00	521.423	521.459
9240.00	521.429	521.459
9300.00	521.442	521.472
9360.00	521.442	521.478
9420.00	521.442	521.472
9480.00	521.448	521.478
9540.00	521.454	521.485
9600.00	521.448	521.485
9660.00	521.454	521.485
9720.00	521.454	521.485
9780.00	521.448	521.485
9840.00	521.454	521.485
9900.00	521.454	521.491
9960.00	521.467	521.497
10020.0	521.467	521.504
10080.0	521.467	521.504

TABLE A-1
(Continued)

Setups:	INPUT 1	INPUT 2
Type Mode I.D.	Level (F) Surface 31567OUT	Level (F) Surface 31567IN
Elapsed Time:		
10140.0	521.473	521.504
10200.0	521.473	521.504
10260.0	521.473	521.504
10320.0	521.480	521.510
10380.0	521.473	521.510
10440.0	521.480	521.510
10500.0	521.486	521.516
10560.0	521.499	521.529
10620.0	521.499	521.529
10680.0	521.499	521.535
10740.0	521.505	521.541
10800.0	521.511	521.548
10860.0	521.511	521.541
10920.0	521.517	521.548
10980.0	521.511	521.548
11040.0	521.511	521.541
11100.0	521.505	521.541
11160.0	521.505	521.535
11220.0	521.499	521.535
11280.0	521.499	521.535
11340.0	521.499	521.535
11400.0	521.499	521.535
11460.0	521.505	521.535
11520.0	521.505	521.535
11580.0	521.505	521.535
11640.0	521.499	521.535
11700.0	521.511	521.541
11760.0	521.517	521.548
11820.0	521.517	521.548
11880.0	521.517	521.548
11940.0	521.517	521.554
12000.0	521.524	521.548
12060.0	521.517	521.554
12120.0	521.517	521.554
12180.0	521.530	521.560
12240.0	521.530	521.560
12300.0	521.524	521.560

TABLE A-1
(Continued)

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level (F)
Mode	Surface	Surface
I.D.	31567OUT	31567IN
Elapsed Time:		
12360.0	521.524	521.554
12420.0	521.524	521.548
12480.0	521.517	521.548
12540.0	521.517	521.548
12600.0	521.505	521.535
12660.0	521.505	521.535
12720.0	521.499	521.529
12780.0	521.505	521.535
12840.0	521.505	521.535
12900.0	521.511	521.541
12960.0	521.517	521.548
13020.0	521.524	521.554
13080.0	521.530	521.560
13140.0	521.530	521.560
13200.0	521.543	521.573
13260.0	521.543	521.573
13320.0	521.543	521.573
13380.0	521.555	521.586
13440.0	521.555	521.586
13500.0	521.562	521.592
13560.0	521.568	521.604
13620.0	521.568	521.598
13680.0	521.574	521.604
13740.0	521.568	521.598
13800.0	521.581	521.611
13860.0	521.581	521.611
13920.0	521.587	521.617
13980.0	521.581	521.611
14040.0	521.581	521.611
14100.0	521.581	521.611
14160.0	521.593	521.623
14220.0	521.593	521.623
14280.0	521.606	521.636
14340.0	521.612	521.642
14400.0	521.619	521.649
14460.0	521.631	521.661
14520.0	521.619	521.655

TABLE A-1
(Continued)

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level (F)
Mode	Surface	Surface
I.D.	31567OUT	31567IN
Elapsed Time:		
14580.0	521.625	521.661
14640.0	521.631	521.667
14700.0	521.638	521.674
14760.0	521.644	521.680
14820.0	521.657	521.686
14880.0	521.663	521.693
14940.0	521.682	521.712
15000.0	521.663	521.699
15060.0	521.669	521.699
15120.0	521.650	521.680
15180.0	521.644	521.667
15240.0	521.650	521.686
15300.0	521.663	521.699
15360.0	521.688	521.724
15420.0	521.669	521.705
15480.0	521.663	521.699
15540.0	521.663	514.978
15600.0	521.606	514.978
15660.0	521.663	514.978
15720.0	521.619	521.592
15780.0	521.600	521.573
15840.0	521.581	521.560
15900.0	521.555	521.529
15960.0	521.555	521.529
16020.0	521.536	521.510
16080.0	521.530	521.504
16140.0	521.517	521.491
16200.0	521.511	521.485
16260.0	521.505	521.485
16320.0	521.505	521.478
16380.0	521.511	521.478
16440.0	521.499	521.472
16500.0	521.505	521.472
16560.0	521.524	521.497
16620.0	521.505	521.478
16680.0	521.492	521.466
16740.0	521.486	521.459

TABLE A-1
(Continued)

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level (F)
Mode	Surface	Surface
I.D.	31567OUT	31567IN
Elapsed Time:		
16800.0	521.480	521.453
16860.0	521.467	521.441
16920.0	521.461	521.428
16980.0	521.461	521.434
17040.0	521.467	521.434
17100.0	521.467	521.441

TABLE A-2

PRE-INJECTION WATER LEVELS
WELLS 2065 AND 3065
FROM THURSDAY, MARCH 14, 1996, TO WEDNESDAY, MARCH 20, 1996
(In Feet Above Mean Sea Level)

SE1000C
Environmental Logger
03/21 10:45

Unit# 01879 Test 0

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level(F)
Mode	Surface	Surface
I.D.	02065	03065
Reference	521.560	521.190
Linearity	0.110	0.120
Scale factor	19.970	19.960
Offset 0.030	0.030	
Delay mSEC	50.000	50.000

Step 0 03/14 14:46:35

Elapsed Time:		
0.0000	521.566	521.203
60.0000	521.560	521.190
120.000	521.573	521.190
180.000	521.573	521.190
240.000	521.573	521.190
300.000	521.585	521.196
360.000	521.579	521.190
420.000	521.585	521.196
480.000	521.585	521.196
540.000	521.598	521.209
600.000	521.598	521.203
660.000	521.604	521.209
720.000	521.598	521.209
780.000	521.610	521.221
840.000	521.629	521.234
900.000	521.617	521.221
960.000	521.623	521.228
1020.00	521.617	521.221
1080.00	521.610	521.215
1140.00	521.604	521.209
1200.00	521.604	521.209
1260.00	521.598	521.203
1320.00	521.598	521.203
1380.00	521.610	521.209
1440.00	521.610	521.209
1500.00	521.610	521.209
1560.00	521.604	521.203
1620.00	521.598	521.196
1680.00	521.592	521.190
1740.00	521.592	521.184

TABLE A-2
(Continued)

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level(F)
Mode	Surface	Surface
I.D.	02065	03065
Elapsed Time:		
1800.00	521.585	521.177
1860.00	521.579	521.171
1920.00	521.573	521.165
1980.00	521.560	521.158
2040.00	521.566	521.158
2100.00	521.573	521.165
2160.00	521.573	521.165
2220.00	521.573	521.171
2280.00	521.573	521.165
2340.00	521.573	521.165
2400.00	521.573	521.165
2460.00	521.573	521.165
2520.00	521.573	521.165
2580.00	521.566	521.158
2640.00	521.566	521.152
2700.00	521.573	521.171
2760.00	521.592	521.184
2820.00	521.604	521.203
2880.00	521.623	521.215
2940.00	521.623	521.221
3000.00	521.636	521.228
3060.00	521.629	521.221
3120.00	521.623	521.221
3180.00	521.629	521.221
3240.00	521.629	521.221
3300.00	521.623	521.215
3360.00	521.623	521.215
3420.00	521.629	521.221
3480.00	521.636	521.228
3540.00	521.629	521.221
3600.00	521.636	521.228
3660.00	521.629	521.221
3720.00	521.623	521.215
3780.00	521.623	521.215
3840.00	521.623	521.215
3900.00	521.623	521.215
3960.00	521.610	521.203
4020.00	521.610	521.203
4080.00	521.604	521.190
4140.00	521.610	521.203
4200.00	521.617	521.203
4260.00	521.623	521.215
4320.00	521.629	521.221
4380.00	521.629	521.215
4440.00	521.623	521.215

TABLE A-2
(Continued)

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level(F)
Mode	Surface	Surface
I.D.	02065	03065
Elapsed Time:		
4500.00	521.623	521.215
4560.00	521.617	521.209
4620.00	521.617	521.209
4680.00	521.604	521.196
4740.00	521.592	521.177
4800.00	521.585	521.171
4860.00	521.585	521.171
4920.00	521.592	521.177
4980.00	521.585	521.171
5040.00	521.592	521.177
5100.00	521.598	521.184
5160.00	521.598	521.184
5220.00	521.585	521.177
5280.00	521.585	521.171
5340.00	521.592	521.177
5400.00	521.592	521.177
5460.00	521.592	521.177
5520.00	521.592	521.177
5580.00	521.592	521.177
5640.00	521.598	521.190
5700.00	521.617	521.209
5760.00	521.623	521.215
5820.00	521.636	521.228
5880.00	521.642	521.234
5940.00	521.642	521.234
6000.00	521.648	521.234
6060.00	521.648	521.240
6120.00	521.648	521.240
6180.00	521.655	521.247
6240.00	521.667	521.259
6300.00	521.667	521.259
6360.00	521.680	521.278
6420.00	521.692	521.291
6480.00	521.705	521.303
6540.00	521.711	521.316
6600.00	521.718	521.316
6660.00	521.730	521.329
6720.00	521.730	521.329
6780.00	521.730	521.329
6840.00	521.749	521.354
6900.00	521.755	521.354
6960.00	521.768	521.366
7020.00	521.762	521.360
7080.00	521.768	521.366
7140.00	521.768	521.366

TABLE A-2
(Continued)

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level(F)
Mode	Surface	Surface
I.D.	02065	03065
Elapsed Time:		
7200.00	521.768	521.366
7260.00	521.762	521.360
7320.00	521.755	521.347
7380.00	521.755	521.354
7440.00	521.755	521.347
7500.00	521.755	521.354
7560.00	521.755	521.360
7620.00	521.768	521.366
7680.00	521.774	521.366
7740.00	521.787	521.379
7800.00	521.787	521.385
7860.00	521.800	521.398
7920.00	521.812	521.410
7980.00	521.818	521.410
8040.00	521.825	521.410
8100.00	521.831	521.423
8160.00	521.837	521.429
8220.00	521.844	521.429
8280.00	521.850	521.436
8340.00	521.850	521.436
8400.00	521.856	521.436

TABLE A-3

PRE-INJECTION WATER LEVELS
WELLS 2065 AND 3065
FROM WEDNESDAY, MARCH 20, 1996, TO MONDAY, MARCH 25, 1996
(In Feet Above Mean Sea Level)

SE2000
Environmental Logger
03/26 11:56

Unit# 751 Test 0

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level (F)
Mode	Surface	Surface
I.D.	2065	3065
Reference	521.430	521.430
PSI at Ref.	2.644	1.979
SG	1.000	1.000
Linearity	0.111	0.115
Scale factor	19.968	19.961
Offset	0.029	0.026
Delay mSEC	50.000	50.000

Step 0 03/20 09:55:39

Elapsed Time:		
0.0000	521.436	521.442
60.0000	521.455	521.436
120.000	521.461	521.448
180.000	521.467	521.448
240.000	521.461	521.442
300.000	521.467	521.442
360.000	521.467	521.448
420.000	521.474	521.448
480.000	521.474	521.448
540.000	521.480	521.455
600.000	521.486	521.455
660.000	521.486	521.461
720.000	521.493	521.467
780.000	521.499	521.474
840.000	521.505	521.480
900.000	521.511	521.486
960.000	521.511	521.486
1020.00	521.518	521.493
1080.00	521.518	521.493
1140.00	521.524	521.493
1200.00	521.524	521.493
1260.00	521.524	521.499
1320.00	521.524	521.493
1380.00	521.524	521.493
1440.00	521.530	521.499
1500.00	521.537	521.511
1560.00	521.543	521.511

TABLE A-3
(Continued)

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level (F)
Mode	Surface	Surface
I.D.	2065	3065
Elapsed Time:		
4380.00	521.575	521.562
4440.00	521.581	521.568
4500.00	521.581	521.568
4560.00	521.587	521.574
4620.00	521.587	521.581
4680.00	521.593	521.581
4740.00	521.593	521.581
4800.00	521.600	521.593
4860.00	521.600	521.587
4920.00	521.606	521.593
4980.00	521.606	521.600
5040.00	521.612	521.600
5100.00	521.619	521.606
5160.00	521.619	521.612
5220.00	521.619	521.612
5280.00	521.631	521.625
5340.00	521.625	521.619
5400.00	521.631	521.625
5460.00	521.638	521.631
5520.00	521.638	521.631
5580.00	521.644	521.638
5640.00	521.644	521.638
5700.00	521.657	521.644
5760.00	521.663	521.650
5820.00	521.675	521.669
5880.00	521.675	521.669
5940.00	521.694	521.682
6000.00	521.694	521.688
6060.00	521.701	521.688
6120.00	521.701	521.688
6180.00	521.707	521.701
6240.00	521.713	521.701
6300.00	521.713	521.707
6360.00	521.726	521.713
6420.00	521.732	521.726
6480.00	521.745	521.738
6540.00	521.732	521.726
6600.00	521.732	521.726
6660.00	521.726	521.719
6720.00	521.732	521.719
6780.00	521.720	521.707
6840.00	521.732	521.726
6900.00	521.739	521.732
6960.00	521.732	521.719
7020.00	521.745	521.738
7080.00	521.745	521.732

TABLE A-3
(Continued)

Setups:	INPUT 1	INPUT 2
Type	Level (F)	Level (F)
Mode	Surface	Surface
I.D.	2065	3065
Elapsed Time:		
7140.00	521.739	521.726
7200.00	521.732	521.726
7260.00	521.707	521.694
7320.00	521.682	521.675
7380.00	521.663	521.650
7440.00	521.631	521.619
7500.00	521.619	521.606
7560.00	521.593	521.587
7620.00	521.575	521.568
7680.00	521.556	521.556
7740.00	521.543	521.543
7800.00	521.543	521.537
7860.00	521.537	521.537
7920.00	521.537	521.537
7980.00	521.530	521.537
8040.00	521.530	521.530
8100.00	521.537	521.543
8160.00	521.537	521.543
8220.00	521.518	521.524
8280.00	521.511	521.518
8340.00	521.505	521.511
8400.00	521.493	521.505
8460.00	521.486	521.499
8520.00	521.493	521.499
8580.00	521.499	521.511

TABLE A-4

WATER LEVELS DURING PHASE II INJECTION TEST
WELLS 2065, 3065, 31567-IN, AND 31567-OUT
FROM WEDNESDAY, MARCH 27, 1996, TO MONDAY, APRIL 1, 1996
(In Feet Above Mean Sea Level)

SE2000
Environmental Logger
04/02 10:22

Unit# 751 Test 3

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Reference	521.500	521.540	521.510	521.510
PSI at Ref.	2.734	2.066	1.834	3.259
SG	1.000	1.000	1.000	1.000
Linearity	0.111	0.115	0.112	0.096
Scale factor	19.968	19.961	19.961	20.037
Offset	0.029	0.026	0.024	0.018
Delay mSEC	50.000	50.000	50.000	50.000

Step 0 03/27 14:04:13

Elapsed Time:				
0.0000	521.500	521.546	521.535	521.604
0.0083	521.500	521.546	521.554	521.706
0.0166	521.500	521.546	521.642	521.858
0.0250	521.500	521.546	523.451	521.782
0.0333	521.500	521.546	520.961	521.877
0.0416	521.500	521.546	521.560	522.161
0.0500	521.500	521.546	521.503	522.282
0.0583	521.500	521.546	521.566	522.142
0.0666	521.500	521.552	521.730	522.364
0.0750	521.500	521.546	522.606	522.630
0.0833	521.506	521.552	523.319	522.909
0.0916	521.500	521.552	524.832	523.212
0.1000	521.506	521.552	525.305	523.637
0.1083	521.506	521.552	525.349	523.865
0.1166	521.500	521.552	525.362	524.074
0.1250	521.506	521.558	525.147	524.245
0.1333	521.506	521.558	524.920	524.352
0.1416	521.506	521.558	524.908	524.378
0.1500	521.506	521.558	524.763	524.359
0.1583	521.506	521.565	524.889	524.346
0.1666	521.506	521.571	524.939	524.257
0.1750	521.506	521.565	525.223	524.188
0.1833	521.506	521.571	524.422	524.150
0.1916	521.506	521.571	524.870	524.093
0.2000	521.506	521.571	524.599	524.067
0.2083	521.506	521.571	524.233	524.074

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
0.2166	521.506	521.571	524.277	524.080
0.2250	521.506	521.577	524.372	524.093
0.2333	521.506	521.577	524.517	524.124
0.2416	521.506	521.577	524.668	524.156
0.2500	521.506	521.577	524.914	524.175
0.2583	521.506	521.577	525.147	524.181
0.2666	521.506	521.577	525.242	524.181
0.2750	521.506	521.577	525.179	524.162
0.2833	521.506	521.577	525.135	524.150
0.2916	521.506	521.577	524.920	524.137
0.3000	521.512	521.577	524.731	524.118
0.3083	521.506	521.584	524.895	524.086
0.3166	521.506	521.577	524.857	524.074
0.3250	521.512	521.584	524.946	524.048
0.3333	521.512	521.584	524.977	524.042
0.3500	521.506	521.584	524.857	524.048
0.3666	521.506	521.584	524.485	524.036
0.3833	521.506	521.584	524.611	524.036
0.4000	521.506	521.584	524.630	524.023
0.4166	521.506	521.584	524.107	523.979
0.4333	521.506	521.584	524.321	523.934
0.4500	521.506	521.584	524.252	523.903
0.4666	521.506	521.584	524.359	523.884
0.4833	521.506	521.584	524.208	523.877
0.5000	521.506	521.584	524.359	523.871
0.5166	521.506	521.584	524.309	523.884
0.5333	521.512	521.584	524.328	523.865
0.5500	521.506	521.584	524.447	523.839
0.5666	521.506	521.584	524.441	523.827
0.5833	521.506	521.584	524.328	523.820
0.6000	521.506	521.584	524.384	523.770
0.6166	521.506	521.584	524.435	523.782
0.6333	521.512	521.584	524.504	523.782
0.6500	521.512	521.584	524.372	523.770
0.6666	521.512	521.584	524.378	523.757
0.6833	521.506	521.584	524.460	523.776
0.7000	521.512	521.584	524.523	523.751
0.7166	521.512	521.584	524.290	523.732
0.7333	521.512	521.584	524.492	523.744
0.7500	521.512	521.584	524.492	523.713
0.7666	521.512	521.584	524.151	523.700
0.7833	521.512	521.584	524.189	523.713
0.8000	521.512	521.584	524.328	523.725
0.8166	521.512	521.584	524.359	523.706
0.8333	521.512	521.584	524.410	523.732

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
0.8500	521.512	521.584	524.384	523.719
0.8666	521.512	521.584	524.473	523.744
0.8833	521.512	521.584	524.321	523.757
0.9000	521.512	521.584	524.473	523.719
0.9166	521.512	521.584	524.479	523.738
0.9333	521.512	521.584	524.561	523.732
0.9500	521.512	521.584	524.592	523.687
0.9666	521.512	521.584	524.574	523.687
0.9833	521.512	521.584	524.662	523.687
1.0000	521.512	521.584	524.441	523.681
1.2000	521.512	521.584	524.384	523.700
1.4000	521.512	521.590	524.668	523.694
1.6000	521.512	521.584	524.492	523.675
1.8000	521.512	521.590	524.454	523.643
2.0000	521.518	521.590	524.529	523.706
2.2000	521.518	521.590	524.315	523.662
2.4000	521.518	521.590	524.681	523.662
2.6000	521.518	521.590	524.618	523.662
2.8000	521.518	521.590	524.353	523.687
3.0000	521.518	521.596	524.346	523.586
3.2000	521.518	521.590	524.239	523.630
3.4000	521.518	521.596	523.981	523.630
3.6000	521.518	521.596	524.302	523.637
3.8000	521.518	521.596	524.157	523.624
4.0000	521.525	521.596	524.315	523.662
4.2000	521.525	521.596	524.138	523.637
4.4000	521.525	521.596	524.050	523.637
4.6000	521.525	521.596	524.189	523.649
4.8000	521.525	521.596	524.019	523.675
5.0000	521.525	521.596	523.886	523.656
5.2000	521.525	521.596	524.151	523.649
5.4000	521.525	521.603	524.283	523.675
5.6000	521.525	521.596	524.119	523.681
5.8000	521.525	521.603	523.735	523.668
6.0000	521.525	521.603	524.151	523.687
6.2000	521.531	521.603	523.974	523.675
6.4000	521.525	521.603	524.271	523.687
6.6000	521.531	521.603	524.309	523.687
6.8000	521.525	521.603	524.252	523.675
7.0000	521.531	521.603	524.164	523.681
7.2000	521.531	521.603	524.075	523.694
7.4000	521.525	521.603	524.101	523.700
7.6000	521.525	521.603	524.239	523.700
7.8000	521.531	521.603	524.063	523.694
8.0000	521.531	521.603	524.063	523.687

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
8.2000	521.531	521.603	524.176	523.706
8.4000	521.531	521.603	523.741	523.725
8.6000	521.531	521.603	524.044	523.694
8.8000	521.531	521.603	524.252	523.725
9.0000	521.531	521.609	524.403	523.725
9.2000	521.531	521.603	524.258	523.713
9.4000	521.531	521.609	524.170	523.713
9.6000	521.531	521.603	524.283	523.725
9.8000	521.531	521.609	524.283	523.719
10.0000	521.531	521.603	524.227	523.725
12.0000	521.525	521.603	524.157	523.719
14.0000	521.525	521.603	523.716	523.751
16.0000	521.537	521.615	523.741	523.744
18.0000	521.544	521.621	523.804	523.738
20.0000	521.544	521.621	523.829	523.776
22.0000	521.544	521.621	523.792	523.744
24.0000	521.550	521.628	523.798	523.801
26.0000	521.550	521.628	523.874	523.789
28.0000	521.544	521.621	523.810	523.795
30.0000	521.550	521.628	523.792	523.776
32.0000	521.550	521.628	523.766	523.795
34.0000	521.550	521.621	523.779	523.795
36.0000	521.550	521.628	523.823	523.763
38.0000	521.550	521.628	523.798	523.782
40.0000	521.550	521.628	523.804	523.795
42.0000	521.556	521.634	523.779	523.782
44.0000	521.556	521.634	523.754	523.782
46.0000	521.556	521.634	523.810	523.782
48.0000	521.556	521.634	523.779	523.789
50.0000	521.556	521.634	523.779	523.776
52.0000	521.556	521.634	523.785	523.782
54.0000	521.563	521.634	523.760	523.808
56.0000	521.563	521.634	523.829	523.770
58.0000	521.569	521.640	523.779	523.782
60.0000	521.569	521.640	523.842	523.839
62.0000	521.569	521.647	523.785	523.814
64.0000	521.569	521.640	523.892	523.801
66.0000	521.569	521.647	523.754	523.808
68.0000	521.575	521.647	523.754	523.814
70.0000	521.575	521.647	523.792	523.789
72.0000	521.575	521.647	523.886	523.795
74.0000	521.575	521.647	523.798	523.801
76.0000	521.582	521.659	523.823	523.820
78.0000	521.582	521.659	523.817	523.915
80.0000	521.588	521.666	523.918	523.903

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
82.0000	521.582	521.659	523.867	523.903
84.0000	521.588	521.659	523.886	523.877
86.0000	521.582	521.659	523.855	523.852
88.0000	521.588	521.666	523.842	523.877
90.0000	521.594	521.666	523.817	523.852
92.0000	521.594	521.666	523.842	523.877
94.0000	521.594	521.666	523.880	523.846
96.0000	521.594	521.666	523.817	523.877
98.0000	521.594	521.666	523.823	523.852
100.000	521.594	521.666	523.899	523.820
110.000	521.600	521.672	523.855	523.852
120.000	521.607	521.678	523.892	523.865
130.000	521.613	521.684	523.829	523.827
140.000	521.619	521.691	523.924	523.833
150.000	521.619	521.691	523.886	523.852
160.000	521.626	521.697	523.798	523.808
170.000	521.632	521.703	523.848	523.808
180.000	521.632	521.703	523.823	523.801
190.000	521.632	521.710	523.848	523.814
200.000	521.638	521.710	523.823	523.827
210.000	521.638	521.710	523.823	523.833
220.000	521.645	521.710	523.886	523.865
230.000	521.645	521.716	523.785	523.839
240.000	521.651	521.716	523.861	523.865
250.000	521.651	521.722	523.886	523.839
260.000	521.657	521.722	523.836	523.865
270.000	521.657	521.722	523.880	523.827
280.000	521.657	521.722	523.823	523.852
290.000	521.657	521.722	523.810	523.839
300.000	521.664	521.729	523.848	523.839
310.000	521.664	521.729	523.817	523.858
320.000	521.664	521.735	523.842	523.833
330.000	521.670	521.735	523.861	523.852
340.000	521.670	521.735	523.836	523.827
350.000	521.670	521.741	523.804	523.852
360.000	521.676	521.741	523.829	523.877
370.000	521.676	521.741	523.867	523.839
380.000	521.670	521.741	523.810	523.858
390.000	521.682	521.741	523.899	523.846
400.000	521.676	521.741	523.817	523.852
410.000	521.682	521.748	523.836	523.852
420.000	521.682	521.748	523.823	523.814
430.000	521.689	521.754	523.779	523.833
440.000	521.689	521.754	523.861	523.858
450.000	521.689	521.754	523.848	523.846

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
460.000	521.689	521.754	523.747	523.865
470.000	521.689	521.754	523.817	523.839
480.000	521.695	521.760	523.855	523.858
490.000	521.695	521.760	523.810	523.858
500.000	521.695	521.760	523.848	523.865
510.000	521.701	521.766	523.829	523.865
520.000	521.695	521.766	523.905	523.852
530.000	521.701	521.766	523.804	523.846
540.000	521.701	521.766	523.785	523.871
550.000	521.701	521.766	523.905	523.820
560.000	521.708	521.773	523.836	523.865
570.000	521.708	521.773	523.880	523.890
580.000	521.714	521.779	523.874	523.884
590.000	521.720	521.785	523.829	523.871
600.000	521.720	521.785	523.842	523.871
610.000	521.720	521.785	523.880	523.896
620.000	521.727	521.785	523.817	523.903
630.000	521.727	521.792	523.861	523.915
640.000	521.727	521.792	523.861	523.909
650.000	521.733	521.792	523.899	523.896
660.000	521.727	521.792	523.855	523.896
670.000	521.733	521.798	523.880	523.896
680.000	521.739	521.804	523.867	523.896
690.000	521.746	521.804	523.930	523.915
700.000	521.752	521.811	523.867	523.947
710.000	521.746	521.811	523.892	523.922
720.000	521.746	521.804	523.823	523.922
730.000	521.746	521.811	523.892	523.903
740.000	521.746	521.811	523.867	523.890
750.000	521.752	521.811	523.874	523.922
760.000	521.752	521.811	523.892	523.896
770.000	521.758	521.817	523.899	523.934
780.000	521.758	521.817	523.861	523.922
790.000	521.758	521.817	523.937	523.922
800.000	521.758	521.817	523.886	523.903
810.000	521.758	521.817	523.880	523.915
820.000	521.758	521.823	523.836	523.928
830.000	521.758	521.817	523.918	523.909
840.000	521.764	521.823	523.874	523.915
850.000	521.771	521.829	523.905	523.934
860.000	521.764	521.823	523.874	523.922
870.000	521.764	521.823	523.874	523.915
880.000	521.771	521.829	523.861	523.922
890.000	521.771	521.823	523.842	523.909
900.000	521.771	521.829	523.867	523.947

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
910.000	521.771	521.823	523.848	523.922
920.000	521.771	521.829	523.848	523.934
930.000	521.771	521.829	523.892	523.928
940.000	521.771	521.829	523.937	523.922
950.000	521.777	521.829	523.892	523.928
960.000	521.777	521.829	523.892	523.941
970.000	521.777	521.829	523.886	523.928
980.000	521.777	521.829	523.886	523.915
990.000	521.777	521.836	523.937	523.934
1000.00	521.783	521.836	523.855	523.934
1010.00	521.777	521.836	523.874	523.934
1020.00	521.777	521.829	523.842	523.928
1030.00	521.777	521.829	523.874	523.922
1040.00	521.777	521.836	523.918	523.909
1050.00	521.783	521.836	523.880	523.922
1060.00	521.783	521.836	523.892	523.966
1070.00	521.783	521.842	523.955	523.966
1080.00	521.790	521.842	523.899	523.991
1090.00	521.783	521.842	523.886	524.004
1100.00	521.790	521.848	523.937	524.004
1110.00	521.783	521.842	523.905	523.998
1120.00	521.790	521.842	523.937	523.979
1130.00	521.790	521.848	523.899	523.991
1140.00	521.790	521.848	523.968	524.004
1150.00	521.790	521.848	523.968	524.004
1160.00	521.796	521.848	523.899	524.004
1170.00	521.796	521.848	523.874	523.991
1180.00	521.796	521.848	523.874	523.998
1190.00	521.796	521.848	523.943	523.991
1200.00	521.796	521.848	523.968	523.991
1210.00	521.796	521.848	523.993	523.991
1220.00	521.796	521.855	523.968	524.004
1230.00	521.802	521.855	523.962	523.998
1240.00	521.802	521.855	523.924	524.010
1250.00	521.802	521.861	523.886	524.023
1260.00	521.802	521.855	523.918	524.023
1270.00	521.802	521.855	523.924	524.004
1280.00	521.809	521.867	524.031	524.023
1290.00	521.809	521.861	523.949	524.004
1300.00	521.809	521.867	523.962	524.017
1310.00	521.815	521.861	523.861	524.004
1320.00	521.815	521.867	523.962	523.998
1330.00	521.815	521.867	523.968	524.017
1340.00	521.815	521.867	523.943	523.991
1350.00	521.815	521.867	523.930	524.010

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
1360.00	521.815	521.867	523.993	523.998
1370.00	521.821	521.874	523.937	524.036
1380.00	521.821	521.874	523.867	524.017
1390.00	521.821	521.874	523.930	524.010
1400.00	521.821	521.880	523.930	524.023
1410.00	521.828	521.880	523.930	524.010
1420.00	521.828	521.880	524.025	524.036
1430.00	521.828	521.880	523.943	524.004
1440.00	521.834	521.886	523.911	524.017
1450.00	521.834	521.886	523.905	524.017
1460.00	521.834	521.886	523.974	523.991
1470.00	521.840	521.886	523.949	524.010
1480.00	521.834	521.886	523.981	523.998
1490.00	521.840	521.892	524.050	524.048
1500.00	521.846	521.899	523.962	524.017
1510.00	521.840	521.886	524.019	524.023
1520.00	521.840	521.886	524.050	524.023
1530.00	521.840	521.886	523.937	524.010
1540.00	521.840	521.892	523.943	524.010
1550.00	521.846	521.892	524.044	524.004
1560.00	521.846	521.892	523.968	524.036
1570.00	521.846	521.892	523.918	524.017
1580.00	521.846	521.899	524.000	524.042
1590.00	521.846	521.899	523.993	524.023
1600.00	521.846	521.899	523.911	523.985
1610.00	521.846	521.892	523.930	523.979
1620.00	521.846	521.892	523.955	523.972
1630.00	521.846	521.892	523.943	523.991
1640.00	521.846	521.899	523.924	523.979
1650.00	521.846	521.892	523.892	523.985
1660.00	521.846	521.899	523.924	523.966
1670.00	521.846	521.899	523.924	523.966
1680.00	521.846	521.892	523.924	523.972
1690.00	521.846	521.899	523.905	523.979
1700.00	521.846	521.899	523.974	523.998
1710.00	521.846	521.892	524.006	523.960
1720.00	521.846	521.899	523.949	523.985
1730.00	521.846	521.899	523.937	523.979
1740.00	521.846	521.899	523.905	523.953
1750.00	521.853	521.899	523.949	523.979
1760.00	521.853	521.899	523.905	523.979
1770.00	521.853	521.899	523.924	523.960
1780.00	521.846	521.899	523.962	523.960
1790.00	521.846	521.899	523.968	523.979
1800.00	521.846	521.899	524.037	523.972

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
1810.00	521.846	521.899	523.943	523.979
1820.00	521.846	521.899	524.107	524.270
1830.00	521.846	521.899	523.861	523.858
1840.00	521.834	521.855	521.932	521.915
1850.00	521.802	521.829	521.850	521.839
1860.00	521.790	521.817	521.850	521.807
1870.00	521.771	521.798	521.812	521.782
1880.00	521.758	521.785	521.806	521.763
1890.00	521.746	521.779	521.768	521.750
1900.00	521.771	521.829	523.937	524.099
1910.00	521.783	521.842	524.000	524.017
1920.00	521.796	521.848	523.930	524.010
1930.00	521.796	521.855	523.962	524.023
1940.00	521.802	521.861	523.918	524.042
1950.00	521.809	521.861	524.006	524.036
1960.00	521.815	521.867	523.962	524.055
1970.00	521.821	521.874	523.962	524.055
1980.00	521.821	521.874	523.968	524.074
1990.00	521.828	521.880	524.012	524.048
2000.00	521.834	521.886	523.974	524.067
2010.00	521.834	521.886	524.037	524.055
2020.00	521.840	521.892	524.031	524.055
2030.00	521.846	521.899	523.987	524.074
2040.00	521.846	521.899	523.987	524.080
2050.00	521.846	521.899	523.962	524.086
2060.00	521.853	521.899	524.019	524.067
2070.00	521.853	521.899	523.974	524.067
2080.00	521.846	521.899	524.012	524.099
2090.00	521.846	521.892	523.974	524.055
2100.00	521.846	521.892	524.050	524.074
2110.00	521.846	521.899	523.974	524.074
2120.00	521.846	521.899	523.968	524.067
2130.00	521.853	521.899	524.025	524.067
2140.00	521.853	521.899	523.987	524.080
2150.00	521.846	521.899	524.006	524.055
2160.00	521.846	521.899	524.006	524.067
2170.00	521.853	521.899	524.031	524.074
2180.00	521.853	521.899	524.019	524.061
2190.00	521.853	521.905	524.069	524.061
2200.00	521.853	521.905	523.981	524.055
2210.00	521.853	521.899	524.025	524.055
2220.00	521.853	521.899	523.918	524.074
2230.00	521.846	521.899	523.981	524.055
2240.00	521.846	521.899	524.012	524.074
2250.00	521.846	521.892	523.987	524.080

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
2260.00	521.846	521.892	524.000	524.086
2270.00	521.840	521.892	523.981	524.074
2280.00	521.840	521.892	523.981	524.055
2290.00	521.846	521.892	524.025	524.061
2300.00	521.853	521.899	524.006	524.067
2310.00	521.846	521.892	524.000	524.029
2320.00	521.840	521.886	523.955	524.042
2330.00	521.846	521.892	523.962	524.048
2340.00	521.840	521.892	523.968	524.048
2350.00	521.846	521.892	523.943	524.048
2360.00	521.846	521.892	523.968	524.048
2370.00	521.840	521.892	523.962	524.061
2380.00	521.834	521.886	523.993	524.048
2390.00	521.834	521.886	523.968	524.042
2400.00	521.834	521.886	523.981	524.048
2410.00	521.834	521.886	523.993	524.042
2420.00	521.834	521.880	523.974	524.042
2430.00	521.828	521.880	523.981	524.029
2440.00	521.828	521.874	523.949	524.048
2450.00	521.828	521.874	523.962	524.029
2460.00	521.828	521.874	523.981	524.036
2470.00	521.828	521.874	523.924	524.036
2480.00	521.828	521.874	523.937	523.991
2490.00	521.821	521.874	523.930	523.998
2500.00	521.821	521.874	523.949	524.036
2510.00	521.821	521.874	523.930	524.042
2520.00	521.821	521.874	523.974	524.067
2530.00	521.821	521.874	524.006	524.042
2540.00	521.821	521.874	523.943	524.042
2550.00	521.828	521.880	523.993	524.074
2560.00	521.828	521.880	523.962	524.055
2570.00	521.821	521.874	523.955	524.048
2580.00	521.821	521.867	523.987	524.055
2590.00	521.815	521.867	523.974	524.036
2600.00	521.815	521.867	524.000	524.055
2610.00	521.815	521.867	523.962	524.036
2620.00	521.815	521.867	523.981	524.036
2630.00	521.815	521.867	524.012	524.023
2640.00	521.815	521.867	523.974	524.036
2650.00	521.815	521.874	524.031	524.055
2660.00	521.815	521.874	524.031	524.061
2670.00	521.815	521.867	524.006	524.036
2680.00	521.815	521.867	523.993	524.042
2690.00	521.821	521.874	523.962	524.048
2700.00	521.821	521.874	523.981	524.023

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
2710.00	521.815	521.874	523.949	524.048
2720.00	521.821	521.874	524.000	524.023
2730.00	521.821	521.874	523.974	524.029
2740.00	521.821	521.874	523.955	524.036
2750.00	521.821	521.874	523.987	524.036
2760.00	521.821	521.880	523.968	524.017
2770.00	521.821	521.874	523.955	524.048
2780.00	521.821	521.880	523.962	524.036
2790.00	521.821	521.874	524.000	524.023
2800.00	521.821	521.874	523.974	524.036
2810.00	521.821	521.874	523.955	524.042
2820.00	521.821	521.874	524.063	524.042
2830.00	521.821	521.880	524.006	524.042
2840.00	521.821	521.874	523.987	524.036
2850.00	521.821	521.874	523.962	524.010
2860.00	521.828	521.880	523.962	524.029
2870.00	521.828	521.886	523.974	524.042
2880.00	521.828	521.880	524.025	524.023
2890.00	521.828	521.880	523.949	524.023
2900.00	521.821	521.880	524.050	524.042
2910.00	521.821	521.880	523.981	524.036
2920.00	521.828	521.880	523.987	524.017
2930.00	521.828	521.880	523.943	524.023
2940.00	521.828	521.880	523.955	524.029
2950.00	521.828	521.880	524.025	524.017
2960.00	521.828	521.880	523.962	524.010
2970.00	521.828	521.886	523.968	524.017
2980.00	521.828	521.886	523.949	524.036
2990.00	521.828	521.880	523.937	524.048
3000.00	521.828	521.880	524.031	524.023
3010.00	521.828	521.880	523.949	524.017
3020.00	521.828	521.880	523.880	524.023
3030.00	521.828	521.880	523.987	524.036
3040.00	521.821	521.880	523.949	524.029
3050.00	521.821	521.880	523.943	523.991
3060.00	521.821	521.880	523.974	524.029
3070.00	521.821	521.874	523.911	523.979
3080.00	521.821	521.874	523.918	524.004
3090.00	521.815	521.874	523.974	523.979
3100.00	521.821	521.874	523.968	523.979
3110.00	521.821	521.874	523.968	523.979
3120.00	521.815	521.874	523.930	523.972
3130.00	521.815	521.874	523.886	523.979
3140.00	521.815	521.874	523.930	523.979
3150.00	521.815	521.874	523.943	523.979

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type Mode I.D.	Level (F) Surface 2065	Level (F) Surface 3065	Level (F) Surface 31567IN	Level (F) Surface 31567OUT
Elapsed Time:				
3160.00	521.815	521.874	523.886	523.972
3170.00	521.815	521.867	524.000	523.985
3180.00	521.809	521.867	524.025	523.966
3190.00	521.802	521.829	522.052	521.934
3200.00	521.777	521.804	522.045	521.820
3210.00	521.758	521.785	522.039	521.788
3220.00	521.746	521.773	522.039	521.763
3230.00	521.758	521.823	524.019	524.093
3240.00	521.771	521.829	523.905	523.998
3250.00	521.777	521.836	524.006	524.010
3260.00	521.777	521.836	523.937	524.010
3270.00	521.783	521.842	523.974	524.010
3280.00	521.790	521.848	523.993	524.042
3290.00	521.790	521.848	523.974	524.023
3300.00	521.790	521.848	523.943	524.042
3310.00	521.790	521.855	524.000	524.004
3320.00	521.796	521.855	523.930	524.036
3330.00	521.796	521.855	523.968	524.023
3340.00	521.802	521.861	524.063	524.061
3350.00	521.802	521.861	523.911	524.042
3360.00	521.802	521.861	523.993	524.055
3370.00	521.802	521.861	523.968	524.036
3380.00	521.796	521.861	524.019	524.042
3390.00	521.802	521.867	524.037	524.010
3400.00	521.809	521.867	524.025	524.055
3410.00	521.809	521.867	524.044	524.055
3420.00	521.809	521.867	524.000	524.036
3430.00	521.815	521.874	523.962	524.023
3440.00	521.815	521.874	523.993	524.067
3450.00	521.815	521.880	524.050	524.048
3460.00	521.821	521.886	524.050	524.074
3470.00	521.828	521.886	524.082	524.042
3480.00	521.828	521.886	524.019	524.042
3490.00	521.828	521.886	524.025	524.048
3500.00	521.821	521.880	523.987	524.055
3510.00	521.821	521.886	524.012	524.067
3520.00	521.821	521.886	523.974	524.055
3530.00	521.828	521.886	524.000	524.067
3540.00	521.834	521.892	524.012	524.061
3550.00	521.834	521.892	524.019	524.061
3560.00	521.834	521.899	524.000	524.074
3570.00	521.834	521.892	523.987	524.067
3580.00	521.834	521.892	524.012	524.086
3590.00	521.834	521.899	524.037	524.080
3600.00	521.840	521.899	524.006	524.086

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
3610.00	521.840	521.899	524.063	524.067
3620.00	521.840	521.899	524.019	524.074
3630.00	521.840	521.899	524.113	524.048
3640.00	521.840	521.899	524.037	524.074
3650.00	521.840	521.899	524.075	524.074
3660.00	521.840	521.899	524.063	524.055
3670.00	521.840	521.899	524.019	524.067
3680.00	521.840	521.899	524.019	524.086
3690.00	521.840	521.899	524.037	524.080
3700.00	521.840	521.899	524.037	524.067
3710.00	521.840	521.899	523.968	524.080
3720.00	521.840	521.899	524.082	524.055
3730.00	521.840	521.899	524.019	524.080
3740.00	521.840	521.899	524.012	524.080
3750.00	521.840	521.899	524.056	524.061
3760.00	521.840	521.899	524.082	524.061
3770.00	521.840	521.899	524.037	524.042
3780.00	521.834	521.892	524.050	524.074
3790.00	521.834	521.899	524.063	524.048
3800.00	521.840	521.899	524.025	524.061
3810.00	521.840	521.899	524.050	524.067
3820.00	521.840	521.905	523.987	524.080
3830.00	521.840	521.899	524.006	524.061
3840.00	521.834	521.892	524.037	524.048
3850.00	521.834	521.892	524.006	524.061
3860.00	521.828	521.892	524.000	524.061
3870.00	521.834	521.892	524.037	524.048
3880.00	521.834	521.892	523.993	524.042
3890.00	521.834	521.899	524.025	524.036
3900.00	521.834	521.892	524.000	524.048
3910.00	521.840	521.899	524.050	524.061
3920.00	521.834	521.899	524.006	523.985
3930.00	521.840	521.899	524.044	524.017
3940.00	521.840	521.905	524.000	524.067
3950.00	521.840	521.905	524.126	524.099
3960.00	521.846	521.905	524.101	524.074
3970.00	521.846	521.911	524.031	524.086
3980.00	521.840	521.905	524.019	524.086
3990.00	521.846	521.905	524.019	524.099
4000.00	521.846	521.905	523.993	524.086
4010.00	521.840	521.905	524.031	524.099
4020.00	521.846	521.905	524.088	524.055
4030.00	521.846	521.905	524.107	524.099
4040.00	521.840	521.905	524.000	524.042
4050.00	521.840	521.905	524.075	524.048

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
4060.00	521.846	521.911	524.012	524.080
4070.00	521.840	521.905	524.019	524.061
4080.00	521.846	521.905	524.082	524.061
4090.00	521.846	521.911	524.101	524.061
4100.00	521.846	521.911	524.126	524.080
4110.00	521.846	521.905	524.113	524.061
4120.00	521.846	521.911	524.050	524.074
4130.00	521.846	521.911	524.119	524.061
4140.00	521.846	521.911	524.088	524.080
4150.00	521.853	521.918	524.025	524.080
4160.00	521.853	521.918	524.119	524.067
4170.00	521.859	521.924	524.126	524.074
4180.00	521.865	521.924	524.113	524.055
4190.00	521.865	521.924	524.088	524.055
4200.00	521.859	521.918	524.094	524.086
4210.00	521.872	521.930	524.101	524.093
4220.00	521.872	521.930	524.126	524.074
4230.00	521.872	521.930	524.151	524.080
4240.00	521.872	521.930	524.157	524.074
4250.00	521.878	521.937	524.164	524.080
4260.00	521.884	521.943	524.183	524.048
4270.00	521.884	521.943	524.220	524.067
4280.00	521.884	521.943	524.094	524.074
4290.00	521.891	521.943	524.101	524.080
4300.00	521.884	521.943	524.132	524.105
4310.00	521.884	521.943	524.164	524.093
4320.00	521.891	521.949	524.183	524.105
4330.00	521.891	521.943	524.252	524.099
4340.00	521.891	521.943	524.189	524.074
4350.00	521.897	521.949	524.170	524.074
4360.00	521.897	521.949	524.138	524.099
4370.00	521.897	521.949	524.201	524.080
4380.00	521.903	521.956	524.151	524.074
4390.00	521.903	521.956	524.239	524.105
4400.00	521.903	521.956	524.220	524.074
4410.00	521.910	521.962	524.170	524.074
4420.00	521.910	521.962	524.214	524.067
4430.00	521.916	521.968	524.227	524.112
4440.00	521.922	521.974	524.227	524.105
4450.00	521.922	521.974	524.233	524.112
4460.00	521.922	521.974	524.183	524.093
4470.00	521.916	521.968	524.201	524.086
4480.00	521.916	521.968	524.214	524.099
4490.00	521.916	521.968	524.214	524.055
4500.00	521.916	521.962	524.170	524.086

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
4510.00	521.916	521.968	524.145	524.048
4520.00	521.916	521.962	524.126	523.966
4530.00	521.916	521.962	524.151	524.042
4540.00	521.916	521.962	524.246	524.048
4550.00	521.910	521.962	524.151	524.036
4560.00	521.916	521.962	524.132	524.029
4570.00	521.884	521.905	522.121	521.934
4580.00	521.865	521.892	522.121	521.889
4590.00	521.846	521.874	522.121	521.864
4600.00	521.834	521.867	522.121	521.845
4610.00	521.859	521.911	524.132	524.093
4620.00	521.872	521.930	524.126	524.099
4630.00	521.878	521.937	524.189	524.086
4640.00	521.884	521.943	524.164	524.112
4650.00	521.891	521.943	524.176	524.112
4660.00	521.897	521.949	524.264	524.137
4670.00	521.903	521.956	524.183	524.137
4680.00	521.903	521.956	524.157	524.086
4690.00	521.910	521.968	524.220	524.143
4700.00	521.916	521.968	524.170	524.143
4710.00	521.916	521.968	524.201	524.156
4720.00	521.916	521.968	524.183	524.169
4730.00	521.922	521.974	524.183	524.156
4740.00	521.922	521.968	524.208	524.118
4750.00	521.922	521.968	524.113	524.156
4760.00	521.922	521.974	524.220	524.143
4770.00	521.922	521.974	524.208	524.156
4780.00	521.928	521.974	524.145	524.150
4790.00	521.922	521.974	524.176	524.137
4800.00	521.928	521.981	524.170	524.150
4810.00	521.928	521.981	524.126	524.169
4820.00	521.928	521.981	524.201	524.137
4830.00	521.928	521.981	514.570	524.175
4840.00	521.928	521.981	514.570	524.207
4850.00	521.928	521.987	514.570	524.213
4860.00	521.935	521.981	514.570	524.175
4870.00	521.935	521.987	514.570	524.219
4880.00	521.935	521.987	514.570	524.181
4890.00	521.941	521.993	514.570	524.200
4900.00	521.941	521.987	514.570	524.207
4910.00	521.941	521.993	514.570	524.219
4920.00	521.941	521.987	514.570	524.213
4930.00	521.941	521.987	514.570	524.219
4940.00	521.941	521.987	514.570	524.181
4950.00	521.941	521.987	514.570	524.200

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
4960.00	521.941	521.987	514.570	524.188
4970.00	521.941	521.993	514.570	524.188
4980.00	521.941	521.993	514.570	524.226
4990.00	521.941	521.993	514.570	524.194
5000.00	521.941	521.993	514.570	524.194
5010.00	521.941	521.993	514.570	524.194
5020.00	521.947	521.993	514.570	524.219
5030.00	521.947	522.000	514.570	524.194
5040.00	521.954	522.000	514.570	524.194
5050.00	521.947	522.000	514.570	524.181
5060.00	521.947	522.000	514.570	524.207
5070.00	521.947	522.000	514.570	524.188
5080.00	521.954	522.000	514.570	524.207
5090.00	521.947	522.000	514.570	524.219
5100.00	521.947	522.000	514.570	524.207
5110.00	521.954	522.000	514.570	524.207
5120.00	521.947	522.000	514.570	524.213
5130.00	521.947	522.000	514.570	524.219
5140.00	521.954	522.000	514.570	524.181
5150.00	521.954	522.006	514.570	524.213
5160.00	521.954	522.000	514.570	524.207
5170.00	521.947	522.000	514.570	524.219
5180.00	521.954	522.000	514.570	524.207
5190.00	521.954	522.000	514.570	524.200
5200.00	521.954	522.006	514.570	524.194
5210.00	521.954	522.000	514.570	524.200
5220.00	521.954	522.000	514.570	524.207
5230.00	521.954	522.000	514.570	524.207
5240.00	521.954	522.000	514.570	524.200
5250.00	521.954	522.000	514.570	524.181
5260.00	521.947	522.000	514.570	524.175
5270.00	521.954	522.000	514.570	524.188
5280.00	521.954	522.000	514.570	524.200
5290.00	521.954	522.000	514.570	524.188
5300.00	521.954	522.000	514.570	524.200
5310.00	521.954	522.000	514.570	524.188
5320.00	521.947	522.000	514.570	524.188
5330.00	521.947	522.000	514.570	524.188
5340.00	521.947	522.000	514.570	524.188
5350.00	521.947	521.993	514.570	524.181
5360.00	521.947	521.993	514.570	524.169
5370.00	521.947	521.993	514.570	524.124
5380.00	521.947	522.000	514.570	524.181
5390.00	521.947	521.993	514.570	524.175
5400.00	521.947	522.000	514.570	524.194

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
5410.00	521.947	522.000	514.570	524.175
5420.00	521.947	521.993	514.570	524.181
5430.00	521.947	522.000	514.570	524.213
5440.00	521.947	521.993	514.570	524.188
5450.00	521.947	522.000	514.570	524.181
5460.00	521.947	522.000	514.570	524.213
5470.00	521.947	521.993	514.570	524.213
5480.00	521.941	521.993	514.570	524.175
5490.00	521.941	521.993	514.570	524.194
5500.00	521.947	521.993	514.570	524.162
5510.00	521.947	522.000	514.570	524.200
5520.00	521.947	521.993	514.570	524.181
5530.00	521.947	522.000	514.570	524.200
5540.00	521.947	521.993	514.570	524.238
5550.00	521.947	522.000	514.570	524.175
5560.00	521.947	522.000	514.570	524.194
5570.00	521.947	522.000	514.570	524.194
5580.00	521.947	521.993	514.570	524.188
5590.00	521.947	522.000	514.570	524.200
5600.00	521.947	522.000	514.570	524.175
5610.00	521.954	522.000	514.570	524.194
5620.00	521.954	522.006	514.570	524.181
5630.00	521.954	522.000	514.570	524.156
5640.00	521.954	522.006	514.570	524.194
5650.00	521.960	522.006	514.570	524.200
5660.00	521.960	522.006	514.570	524.213
5670.00	521.960	522.012	514.570	524.169
5680.00	521.960	522.006	514.570	524.188
5690.00	521.960	522.006	514.570	524.194
5700.00	521.960	522.012	514.570	524.156
5710.00	521.960	522.012	514.570	524.188
5720.00	521.960	522.012	514.570	524.213
5730.00	521.960	522.012	514.570	524.219
5740.00	521.960	522.012	514.570	524.251
5750.00	521.966	522.012	514.570	524.207
5760.00	521.966	522.019	514.570	524.200
5770.00	521.966	522.019	514.570	524.207
5780.00	521.966	522.019	514.570	524.181
5790.00	521.966	522.019	514.570	524.188
5800.00	521.966	522.019	514.570	524.181
5810.00	521.966	522.019	514.570	524.194
5820.00	521.973	522.019	514.570	524.219
5830.00	521.973	522.025	514.570	524.194
5840.00	521.973	522.025	514.570	524.200
5850.00	521.973	522.019	514.570	524.194

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
5860.00	521.973	522.025	514.570	524.175
5870.00	521.973	522.019	514.570	524.200
5880.00	521.973	522.025	514.570	524.194
5890.00	521.979	522.025	514.570	524.200
5900.00	521.973	522.019	514.570	524.226
5910.00	521.973	522.019	514.570	524.194
5920.00	521.973	522.019	514.570	524.207
5930.00	521.973	522.019	514.570	524.194
5940.00	521.973	522.019	514.570	524.162
5950.00	521.941	521.968	514.570	522.041
5960.00	521.922	521.943	514.570	521.991
5970.00	521.897	521.924	514.570	521.959
5980.00	521.884	521.911	514.570	521.940
5990.00	521.872	521.899	514.570	521.921
6000.00	521.859	521.892	514.570	521.908
6010.00	521.853	521.886	514.570	521.896
6020.00	521.872	521.930	514.570	524.162
6030.00	521.884	521.943	514.570	524.131
6040.00	521.897	521.956	514.570	524.156
6050.00	521.903	521.962	514.570	524.181
6060.00	521.916	521.968	514.570	524.156
6070.00	521.916	521.974	514.570	524.175
6080.00	521.922	521.974	514.570	524.162
6090.00	521.928	521.974	514.570	524.181
6100.00	521.922	521.974	514.570	524.213
6110.00	521.922	521.974	514.570	524.200
6120.00	521.922	521.974	514.570	524.181
6130.00	521.928	521.981	514.570	524.194
6140.00	521.922	521.974	514.570	524.181
6150.00	521.922	521.974	514.570	524.200
6160.00	521.922	521.974	514.570	524.188
6170.00	521.922	521.974	514.570	524.181
6180.00	521.922	521.974	514.570	524.181
6190.00	521.922	521.968	514.570	524.188
6200.00	521.922	521.974	514.570	524.213
6210.00	521.922	521.974	514.570	524.226
6220.00	521.928	521.981	514.570	524.194
6230.00	521.928	521.981	514.570	524.207
6240.00	521.928	521.981	514.570	524.213
6250.00	521.935	521.981	514.570	524.219
6260.00	521.928	521.981	514.570	524.213
6270.00	521.928	521.981	514.570	524.175
6280.00	521.928	521.981	514.570	524.175
6290.00	521.928	521.974	514.570	524.232
6300.00	521.928	521.981	514.570	524.188

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
6310.00	521.928	521.974	514.570	524.194
6320.00	521.928	521.974	514.570	524.188
6330.00	521.928	521.981	514.570	524.207
6340.00	521.928	521.974	514.570	524.194
6350.00	521.928	521.981	514.570	524.169
6360.00	521.928	521.981	514.570	524.188
6370.00	521.928	521.981	514.570	524.207
6380.00	521.928	521.974	514.570	524.213
6390.00	521.928	521.974	514.570	524.213
6400.00	521.928	521.987	514.570	524.207
6410.00	521.928	521.981	514.570	524.200
6420.00	521.922	521.974	514.570	524.181
6430.00	521.922	521.974	514.570	524.213
6440.00	521.928	521.981	514.570	524.207
6450.00	521.922	521.974	514.570	524.194
6460.00	521.922	521.974	514.570	524.207
6470.00	521.922	521.974	514.570	524.213
6480.00	521.928	521.974	514.570	524.213
6490.00	521.922	521.974	514.570	524.200
6500.00	521.928	521.981	514.570	524.194
6510.00	521.928	521.981	514.570	524.200
6520.00	521.928	521.981	514.570	524.207
6530.00	521.928	521.974	514.570	524.181
6540.00	521.928	521.981	514.570	524.200
6550.00	521.928	521.981	514.570	524.200
6560.00	521.922	521.974	514.570	524.188
6570.00	521.922	521.981	514.570	524.200
6580.00	521.922	521.974	514.570	524.213
6590.00	521.922	521.974	514.570	524.181
6600.00	521.916	521.974	514.570	524.219
6610.00	521.916	521.968	514.570	524.181
6620.00	521.916	521.974	514.570	524.156
6630.00	521.916	521.968	514.570	524.181
6640.00	521.916	521.968	514.570	524.207
6650.00	521.916	521.968	514.570	524.175
6660.00	521.910	521.968	514.570	524.181
6670.00	521.916	521.968	514.570	524.181
6680.00	521.910	521.968	514.570	524.181
6690.00	521.910	521.968	514.570	524.194
6700.00	521.910	521.962	514.570	524.194
6710.00	521.910	521.962	514.570	524.162
6720.00	521.910	521.962	514.570	524.175
6730.00	521.903	521.956	514.570	524.150
6740.00	521.903	521.956	514.570	524.169
6750.00	521.903	521.956	514.570	524.169

TABLE A-4
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
6760.00	521.903	521.962	514.570	524.181
6770.00	521.897	521.956	514.570	524.162
6780.00	521.897	521.956	514.570	524.213
6790.00	521.897	521.956	514.570	524.188
6800.00	521.891	521.956	514.570	524.112
6810.00	521.897	521.956	514.570	524.143
6820.00	521.891	521.949	514.570	524.175
6830.00	521.891	521.956	514.570	524.200

TABLE A-5

WATER LEVELS DURING RECOVERY FROM PHASE II INJECTION TEST WELLS 2065, 3065, 31567-IN, AND 31567-OUT FROM MONDAY, APRIL 1, 1996, TO THURSDAY, APRIL 4, 1996 (In Feet Above Mean Sea Level)

SE2000
Environmental Logger
04/08 07:02

Unit# 751 Test 3

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Reference	521.500	521.540	521.510	521.510
PSI at Ref.	2.734	2.066	1.834	3.259
SG	1.000	1.000	1.000	1.000
Linearity	0.111	0.115	0.112	0.096
Scale factor	19.968	19.961	19.961	20.037
Offset	0.029	0.026	0.024	0.018
Delay mSEC	50.000	50.000	50.000	50.000

Step 1 04/01 08:02:07

Elapsed Time:				
0.0000	521.897	521.962	514.570	523.383
0.0083	521.903	521.956	514.570	523.326
0.0166	521.903	521.956	514.570	523.269
0.0250	521.903	521.956	514.570	523.219
0.0333	521.897	521.956	514.570	523.162
0.0416	521.903	521.956	514.570	523.111
0.0500	521.897	521.956	514.570	523.054
0.0583	521.903	521.956	514.570	522.997
0.0666	521.903	521.949	514.570	522.940
0.0750	521.903	521.949	514.570	522.877
0.0833	521.897	521.949	514.570	522.820
0.0916	521.897	521.949	514.570	522.769
0.1000	521.897	521.949	514.570	522.725
0.1083	521.897	521.949	514.570	522.687
0.1166	521.903	521.949	514.570	522.649
0.1250	521.897	521.943	514.570	522.617
0.1333	521.897	521.949	514.570	522.592
0.1416	521.897	521.943	514.570	522.573
0.1500	521.897	521.943	514.570	522.548
0.1583	521.903	521.943	514.570	522.529
0.1666	521.897	521.943	514.570	522.516
0.1750	521.897	521.943	514.570	522.491
0.1833	521.897	521.943	514.570	522.478
0.1916	521.897	521.943	514.570	522.459
0.2000	521.897	521.937	514.570	522.440
0.2083	521.897	521.937	514.570	522.427
0.2166	521.897	521.937	514.570	522.415
0.2250	521.897	521.937	514.570	522.408

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
0.2333	521.897	521.937	514.570	522.396
0.2416	521.897	521.937	514.570	522.389
0.2500	521.897	521.937	514.570	522.383
0.2583	521.897	521.937	514.570	522.377
0.2666	521.897	521.937	514.570	522.370
0.2750	521.897	521.937	514.570	522.364
0.2833	521.897	521.937	514.570	522.358
0.2916	521.897	521.937	514.570	522.351
0.3000	521.897	521.937	514.570	522.345
0.3083	521.897	521.930	514.570	522.339
0.3166	521.897	521.930	514.570	522.332
0.3250	521.897	521.930	514.570	522.326
0.3333	521.897	521.930	514.570	522.320
0.3500	521.897	521.930	514.570	522.313
0.3666	521.897	521.930	514.570	522.307
0.3833	521.897	521.930	514.570	522.301
0.4000	521.897	521.930	514.570	522.294
0.4166	521.897	521.930	514.570	522.282
0.4333	521.897	521.930	514.570	522.275
0.4500	521.897	521.930	514.570	522.269
0.4666	521.897	521.930	514.570	522.263
0.4833	521.897	521.930	514.570	522.256
0.5000	521.897	521.924	514.570	522.256
0.5166	521.897	521.930	514.570	522.244
0.5333	521.891	521.924	514.570	522.244
0.5500	521.897	521.930	514.570	522.237
0.5666	521.897	521.930	514.570	522.231
0.5833	521.897	521.924	514.570	522.231
0.6000	521.897	521.924	514.570	522.225
0.6166	521.891	521.924	514.570	522.218
0.6333	521.891	521.924	514.570	522.218
0.6500	521.891	521.924	514.570	522.212
0.6666	521.897	521.924	514.570	522.212
0.6833	521.891	521.924	514.570	522.206
0.7000	521.891	521.924	514.570	522.206
0.7166	521.891	521.924	514.570	522.206
0.7333	521.897	521.924	514.570	522.199
0.7500	521.891	521.924	514.570	522.193
0.7666	521.891	521.924	514.570	522.187
0.7833	521.891	521.924	514.570	522.187
0.8000	521.891	521.924	514.570	522.187
0.8166	521.891	521.924	514.570	522.180
0.8333	521.891	521.924	514.570	522.180
0.8500	521.891	521.924	514.570	522.180
0.8666	521.891	521.924	514.570	522.174
0.8833	521.891	521.924	514.570	522.174

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
0.9000	521.891	521.924	514.570	522.168
0.9166	521.891	521.924	514.570	522.168
0.9333	521.891	521.924	514.570	522.168
0.9500	521.891	521.918	514.570	522.161
0.9666	521.891	521.918	514.570	522.161
0.9833	521.891	521.924	514.570	522.161
1.0000	521.891	521.918	514.570	522.155
1.2000	521.891	521.924	514.570	522.136
1.4000	521.891	521.924	514.570	522.124
1.6000	521.891	521.918	514.570	522.105
1.8000	521.891	521.918	514.570	522.092
2.0000	521.891	521.918	514.570	522.079
2.2000	521.884	521.918	514.570	522.079
2.4000	521.884	521.918	514.570	522.073
2.6000	521.884	521.911	514.570	522.067
2.8000	521.884	521.911	514.570	522.067
3.0000	521.884	521.911	514.570	522.067
3.2000	521.884	521.911	514.570	522.060
3.4000	521.884	521.911	514.570	522.060
3.6000	521.884	521.911	514.570	522.060
3.8000	521.884	521.911	514.570	522.060
4.0000	521.884	521.911	514.570	522.054
4.2000	521.884	521.911	514.570	522.054
4.4000	521.878	521.911	514.570	522.054
4.6000	521.878	521.911	514.570	522.054
4.8000	521.878	521.905	514.570	522.048
5.0000	521.878	521.905	514.570	522.041
5.2000	521.878	521.905	514.570	522.041
5.4000	521.878	521.905	514.570	522.048
5.6000	521.878	521.905	514.570	522.041
5.8000	521.878	521.905	514.570	522.041
6.0000	521.872	521.899	514.570	522.035
6.2000	521.872	521.899	514.570	522.029
6.4000	521.872	521.899	514.570	522.035
6.6000	521.872	521.899	514.570	522.029
6.8000	521.872	521.899	514.570	522.035
7.0000	521.872	521.899	514.570	522.029
7.2000	521.872	521.899	514.570	522.029
7.4000	521.872	521.899	514.570	522.029
7.6000	521.865	521.899	514.570	522.029
7.8000	521.865	521.899	514.570	522.022
8.0000	521.865	521.892	514.570	522.022
8.2000	521.865	521.892	514.570	522.022
8.4000	521.865	521.892	514.570	522.022
8.6000	521.865	521.892	514.570	522.016
8.8000	521.865	521.892	514.570	522.016

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
9.0000	521.865	521.892	514.570	522.016
9.2000	521.865	521.892	514.570	522.016
9.4000	521.865	521.892	514.570	522.016
9.6000	521.865	521.892	514.570	522.016
9.8000	521.859	521.892	514.570	522.010
10.0000	521.865	521.892	514.570	521.953
12.0000	521.859	521.886	514.570	521.946
14.0000	521.853	521.880	514.570	521.934
16.0000	521.846	521.880	514.570	521.927
18.0000	521.846	521.874	514.570	521.921
20.0000	521.840	521.867	514.570	521.915
22.0000	521.834	521.867	514.570	521.908
24.0000	521.840	521.867	514.570	521.908
26.0000	521.828	521.861	514.570	521.896
28.0000	521.828	521.861	514.570	521.889
30.0000	521.828	521.861	514.570	521.889
32.0000	521.821	521.855	514.570	521.883
34.0000	521.821	521.855	514.570	521.883
36.0000	521.815	521.848	514.570	521.877
38.0000	521.815	521.848	514.570	521.870
40.0000	521.815	521.848	514.570	521.870
42.0000	521.809	521.842	514.570	521.864
44.0000	521.809	521.842	514.570	521.864
46.0000	521.802	521.836	514.570	521.858
48.0000	521.802	521.836	514.570	521.858
50.0000	521.802	521.836	514.570	521.858
52.0000	521.796	521.836	514.570	521.851
54.0000	521.796	521.829	514.570	521.845
56.0000	521.796	521.836	514.570	521.851
58.0000	521.796	521.829	514.570	521.845
60.0000	521.790	521.823	514.570	521.845
62.0000	521.790	521.829	514.570	521.839
64.0000	521.790	521.823	514.570	521.839
66.0000	521.783	521.823	514.570	521.832
68.0000	521.783	521.823	514.570	521.832
70.0000	521.783	521.823	514.570	521.832
72.0000	521.783	521.823	514.570	521.832
74.0000	521.777	521.817	514.570	521.826
76.0000	521.777	521.817	514.570	521.826
78.0000	521.777	521.817	514.570	521.832
80.0000	521.777	521.811	514.570	521.826
82.0000	521.777	521.811	514.570	521.820
84.0000	521.771	521.811	514.570	521.820
86.0000	521.771	521.811	514.570	521.820
88.0000	521.771	521.811	514.570	521.820
90.0000	521.771	521.804	514.570	521.813

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
92.0000	521.764	521.804	514.570	521.813
94.0000	521.764	521.804	514.570	521.813
96.0000	521.764	521.804	514.570	521.807
98.0000	521.764	521.798	514.570	521.807
100.000	521.764	521.804	514.570	521.807
110.000	521.752	521.792	514.570	521.801
120.000	521.752	521.792	514.570	521.794
130.000	521.746	521.792	514.570	521.794
140.000	521.746	521.785	514.570	521.788
150.000	521.739	521.779	514.570	521.782
160.000	521.733	521.779	514.570	521.782
170.000	521.727	521.773	514.570	521.775
180.000	521.727	521.773	514.570	521.769
190.000	521.727	521.773	514.570	521.769
200.000	521.720	521.766	514.570	521.763
210.000	521.714	521.760	514.570	521.756
220.000	521.714	521.760	514.570	521.756
230.000	521.714	521.760	514.570	521.756
240.000	521.714	521.760	514.570	521.756
250.000	521.708	521.760	514.570	521.756
260.000	521.708	521.754	514.570	521.750
270.000	521.708	521.754	514.570	521.655
280.000	521.708	521.754	514.570	521.649
290.000	521.701	521.754	514.570	521.674
300.000	521.701	521.748	514.570	521.668
310.000	521.701	521.748	514.570	521.744
320.000	521.701	521.754	514.570	521.737
330.000	521.701	521.748	514.570	521.737
340.000	521.701	521.748	514.570	521.744
350.000	521.701	521.748	514.570	521.744
360.000	521.701	521.748	514.570	521.737
370.000	521.701	521.748	514.570	521.737
380.000	521.695	521.748	514.570	521.737
390.000	521.695	521.748	514.570	521.731
400.000	521.695	521.748	514.570	521.737
410.000	521.695	521.741	514.570	521.731
420.000	521.695	521.748	514.570	521.731
430.000	521.695	521.748	514.570	521.737
440.000	521.701	521.748	514.570	521.731
450.000	521.695	521.748	514.570	521.737
460.000	521.701	521.748	514.570	521.737
470.000	521.695	521.748	514.570	521.731
480.000	521.701	521.748	514.570	521.731
490.000	521.695	521.741	514.570	521.731
500.000	521.689	521.741	514.570	521.725
510.000	521.689	521.741	514.570	521.731

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
520.000	521.695	521.748	514.570	521.725
530.000	521.689	521.741	514.570	521.725
540.000	521.689	521.735	514.570	521.725
550.000	521.689	521.741	514.570	521.725
560.000	521.682	521.735	514.570	521.718
570.000	521.682	521.735	514.570	521.718
580.000	521.682	521.735	514.570	521.718
590.000	521.682	521.735	514.570	521.725
600.000	521.682	521.729	514.570	521.725
610.000	521.682	521.735	514.570	521.718
620.000	521.689	521.741	514.570	521.725
630.000	521.682	521.735	514.570	521.725
640.000	521.682	521.735	514.570	521.725
650.000	521.689	521.735	514.570	521.725
660.000	521.682	521.735	514.570	521.718
670.000	521.682	521.735	514.570	521.725
680.000	521.682	521.741	514.570	521.725
690.000	521.682	521.735	514.570	521.725
700.000	521.682	521.735	514.570	521.725
710.000	521.682	521.735	514.570	521.725
720.000	521.682	521.741	514.570	521.725
730.000	521.682	521.735	514.570	521.725
740.000	521.682	521.735	514.570	521.725
750.000	521.682	521.735	514.570	521.725
760.000	521.682	521.741	514.570	521.725
770.000	521.682	521.735	514.570	521.725
780.000	521.682	521.741	514.570	521.725
790.000	521.682	521.741	514.570	521.725
800.000	521.682	521.741	514.570	521.725
810.000	521.682	521.741	514.570	521.725
820.000	521.682	521.741	514.570	521.725
830.000	521.682	521.741	514.570	521.725
840.000	521.682	521.741	514.570	521.731
850.000	521.689	521.748	514.570	521.731
860.000	521.682	521.741	514.570	521.731
870.000	521.689	521.748	514.570	521.731
880.000	521.689	521.748	514.570	521.737
890.000	521.695	521.754	514.570	521.737
900.000	521.689	521.754	514.570	521.737
910.000	521.695	521.754	514.570	521.744
920.000	521.695	521.760	514.570	521.744
930.000	521.701	521.760	514.570	521.750
940.000	521.701	521.766	514.570	521.750
950.000	521.701	521.766	514.570	521.750
960.000	521.701	521.760	514.570	521.750
970.000	521.701	521.766	514.570	521.750

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
980.000	521.701	521.766	514.570	521.750
990.000	521.701	521.766	514.570	521.750
1000.00	521.701	521.760	514.570	521.750
1010.00	521.701	521.760	514.570	521.744
1020.00	521.708	521.766	514.570	521.750
1030.00	521.701	521.766	514.570	521.756
1040.00	521.708	521.766	514.570	521.756
1050.00	521.708	521.773	514.570	521.756
1060.00	521.714	521.773	514.570	521.756
1070.00	521.708	521.766	514.570	521.756
1080.00	521.714	521.773	514.570	521.763
1090.00	521.708	521.766	514.570	521.756
1100.00	521.708	521.766	514.570	521.750
1110.00	521.701	521.766	514.570	521.750
1120.00	521.708	521.766	514.570	521.756
1130.00	521.708	521.766	514.570	521.756
1140.00	521.708	521.766	514.570	521.756
1150.00	521.708	521.773	514.570	521.756
1160.00	521.708	521.773	514.570	521.763
1170.00	521.708	521.773	514.570	521.763
1180.00	521.708	521.773	514.570	521.756
1190.00	521.708	521.773	514.570	521.756
1200.00	521.708	521.773	514.570	521.756
1210.00	521.708	521.773	514.570	521.756
1220.00	521.708	521.773	514.570	521.763
1230.00	521.708	521.773	514.570	521.763
1240.00	521.708	521.773	514.570	521.763
1250.00	521.714	521.773	514.570	521.763
1260.00	521.708	521.773	514.570	521.763
1270.00	521.714	521.773	514.570	521.763
1280.00	521.708	521.773	514.570	521.763
1290.00	521.708	521.773	514.570	521.763
1300.00	521.714	521.773	514.570	521.763
1310.00	521.708	521.773	514.570	521.744
1320.00	521.708	521.773	514.570	521.756
1330.00	521.714	521.779	514.570	521.769
1340.00	521.714	521.779	514.570	521.769
1350.00	521.708	521.773	514.570	521.756
1360.00	521.708	521.773	514.570	521.763
1370.00	521.708	521.773	514.570	521.763
1380.00	521.708	521.773	514.570	521.763
1390.00	521.708	521.766	514.570	521.744
1400.00	521.701	521.766	514.570	521.750
1410.00	521.701	521.766	514.570	521.750
1420.00	521.708	521.766	514.570	521.756
1430.00	521.701	521.766	514.570	521.756

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
1440.00	521.708	521.773	514.570	521.756
1450.00	521.708	521.773	514.570	521.763
1460.00	521.701	521.766	514.570	521.756
1470.00	521.708	521.773	514.570	521.744
1480.00	521.708	521.773	514.570	521.763
1490.00	521.714	521.779	514.570	521.763
1500.00	521.714	521.779	514.570	521.769
1510.00	521.708	521.779	514.570	521.763
1520.00	521.708	521.766	514.570	521.763
1530.00	521.708	521.773	514.570	521.756
1540.00	521.708	521.773	514.570	521.763
1550.00	521.714	521.773	514.570	521.750
1560.00	521.727	521.779	514.570	521.769
1570.00	521.733	521.785	514.570	514.103
1580.00	521.739	521.792	514.570	521.801
1590.00	521.739	521.798	514.570	521.807
1600.00	521.739	521.792	514.570	521.807
1610.00	521.733	521.785	514.570	521.794
1620.00	521.727	521.779	514.570	521.794
1630.00	521.733	521.785	514.570	521.801
1640.00	521.739	521.792	514.570	521.807
1650.00	521.746	521.798	514.570	521.807
1660.00	521.746	521.792	514.570	521.807
1670.00	521.746	521.798	514.570	521.813
1680.00	521.752	521.804	514.570	521.820
1690.00	521.752	521.804	514.570	521.826
1700.00	521.752	521.804	514.570	521.820
1710.00	521.752	521.804	514.570	521.820
1720.00	521.758	521.804	514.570	521.826
1730.00	521.758	521.804	514.570	521.826
1740.00	521.758	521.804	514.570	521.820
1750.00	521.758	521.804	514.570	521.820
1760.00	521.758	521.804	514.570	521.826
1770.00	521.758	521.804	514.570	521.826
1780.00	521.758	521.804	514.570	521.826
1790.00	521.764	521.811	514.570	521.832
1800.00	521.764	521.811	514.570	521.832
1810.00	521.758	521.811	514.570	521.839
1820.00	521.758	521.804	514.570	521.839
1830.00	521.764	521.811	514.570	521.839
1840.00	521.758	521.804	514.570	521.832
1850.00	521.758	521.804	514.570	521.839
1860.00	521.758	521.798	514.570	521.839
1870.00	521.758	521.804	514.570	521.839
1880.00	521.752	521.804	514.570	521.839
1890.00	521.758	521.804	514.570	521.832

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
1900.00	521.752	521.798	514.570	521.839
1910.00	521.746	521.798	514.570	521.832
1920.00	521.752	521.804	514.570	521.839
1930.00	521.758	521.804	514.570	521.839
1940.00	521.758	521.811	514.570	521.839
1950.00	521.764	521.811	514.570	521.845
1960.00	521.764	521.811	514.570	521.845
1970.00	521.764	521.811	514.570	521.845
1980.00	521.771	521.817	514.570	521.845
1990.00	521.764	521.817	514.570	521.845
2000.00	521.771	521.817	514.570	521.845
2010.00	521.764	521.817	514.570	521.845
2020.00	521.771	521.817	514.570	521.845
2030.00	521.771	521.817	514.570	521.845
2040.00	521.777	521.823	514.570	521.851
2050.00	521.783	521.829	514.570	521.858
2060.00	521.783	521.829	514.570	521.858
2070.00	521.790	521.836	514.570	521.858
2080.00	521.790	521.836	514.570	521.864
2090.00	521.790	521.836	514.570	521.864
2100.00	521.783	521.836	514.570	521.858
2110.00	521.790	521.836	514.570	521.864
2120.00	521.790	521.836	514.570	521.858
2130.00	521.783	521.829	514.570	521.858
2140.00	521.790	521.836	514.570	521.864
2150.00	521.790	521.836	514.570	521.858
2160.00	521.790	521.836	514.570	521.858
2170.00	521.790	521.836	514.570	521.858
2180.00	521.790	521.836	514.570	521.858
2190.00	521.790	521.836	514.570	521.858
2200.00	521.790	521.836	514.570	521.858
2210.00	521.790	521.836	514.570	521.858
2220.00	521.790	521.836	514.570	521.858
2230.00	521.790	521.836	514.570	521.858
2240.00	521.796	521.842	514.570	521.858
2250.00	521.796	521.842	514.570	521.864
2260.00	521.796	521.842	514.570	521.864
2270.00	521.796	521.842	514.570	521.864
2280.00	521.796	521.842	514.570	521.864
2290.00	521.802	521.848	514.570	521.864
2300.00	521.802	521.848	514.570	521.864
2310.00	521.796	521.842	514.570	521.870
2320.00	521.802	521.842	514.570	521.870
2330.00	521.802	521.848	514.570	521.870
2340.00	521.802	521.848	514.570	521.864
2350.00	521.802	521.848	514.570	521.870

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
2360.00	521.802	521.855	514.570	521.870
2370.00	521.809	521.855	514.570	521.870
2380.00	521.809	521.855	514.570	521.877
2390.00	521.809	521.855	514.570	521.870
2400.00	521.809	521.855	514.570	521.877
2410.00	521.809	521.855	514.570	521.877
2420.00	521.815	521.861	514.570	521.877
2430.00	521.815	521.855	514.570	521.877
2440.00	521.815	521.861	514.570	521.883
2450.00	521.815	521.861	514.570	521.883
2460.00	521.815	521.855	514.570	521.877
2470.00	521.815	521.861	514.570	521.883
2480.00	521.815	521.861	514.570	521.883
2490.00	521.815	521.861	514.570	521.883
2500.00	521.815	521.861	514.570	521.883
2510.00	521.815	521.867	514.570	521.883
2520.00	521.821	521.867	514.570	521.889
2530.00	521.821	521.867	514.570	521.889
2540.00	521.821	521.867	514.570	521.889
2550.00	521.828	521.874	514.570	521.889
2560.00	521.821	521.874	514.570	521.889
2570.00	521.821	521.874	514.570	521.896
2580.00	521.828	521.874	514.570	521.889
2590.00	521.828	521.874	514.570	521.889
2600.00	521.828	521.874	514.570	521.896
2610.00	521.828	521.867	514.570	521.889
2620.00	521.828	521.874	514.570	521.889
2630.00	521.828	521.874	514.570	521.889
2640.00	521.828	521.874	514.570	521.896
2650.00	521.828	521.874	514.570	521.889
2660.00	521.828	521.874	514.570	521.889
2670.00	521.828	521.874	514.570	521.896
2680.00	521.834	521.874	514.570	521.896
2690.00	521.828	521.874	514.570	521.896
2700.00	521.834	521.880	514.570	521.896
2710.00	521.828	521.874	514.570	521.896
2720.00	521.834	521.874	514.570	521.896
2730.00	521.828	521.874	514.570	521.896
2740.00	521.828	521.874	514.570	521.889
2750.00	521.834	521.880	514.570	521.896
2760.00	521.834	521.880	514.570	521.896
2770.00	521.828	521.874	514.570	521.896
2780.00	521.828	521.874	514.570	521.896
2790.00	521.834	521.880	514.570	521.896
2800.00	521.828	521.874	514.570	521.896
2810.00	521.828	521.874	514.570	521.889

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
2820.00	521.828	521.874	514.570	521.896
2830.00	521.828	521.874	514.570	521.889
2840.00	521.828	521.874	514.570	521.896
2850.00	521.828	521.874	514.570	521.889
2860.00	521.828	521.874	514.570	521.889
2870.00	521.828	521.874	514.570	521.889
2880.00	521.828	521.874	514.570	521.889
2890.00	521.828	521.874	514.570	521.889
2900.00	521.828	521.874	514.570	521.889
2910.00	521.828	521.874	514.570	521.889
2920.00	521.828	521.880	514.570	521.896
2930.00	521.828	521.874	514.570	521.889
2940.00	521.828	521.874	514.570	521.889
2950.00	521.828	521.874	514.570	521.883
2960.00	521.828	521.874	514.570	521.896
2970.00	521.828	521.874	514.570	521.896
2980.00	521.828	521.874	514.570	521.896
2990.00	521.828	521.874	514.570	521.896
3000.00	521.828	521.874	514.570	521.896
3010.00	521.834	521.880	514.570	521.896
3020.00	521.834	521.880	514.570	521.896
3030.00	521.834	521.880	514.570	521.896
3040.00	521.834	521.880	514.570	521.896
3050.00	521.840	521.886	514.570	521.902
3060.00	521.840	521.886	514.570	521.902
3070.00	521.840	521.886	514.570	521.902
3080.00	521.840	521.886	514.570	521.908
3090.00	521.846	521.892	514.570	521.908
3100.00	521.846	521.886	514.570	521.908
3110.00	521.846	521.892	514.570	521.908
3120.00	521.846	521.892	514.570	521.908
3130.00	521.853	521.892	514.570	521.915
3140.00	521.846	521.892	514.570	521.915
3150.00	521.853	521.899	514.570	521.908
3160.00	521.853	521.899	514.570	521.915
3170.00	521.853	521.899	514.570	521.921
3180.00	521.859	521.905	514.570	521.921
3190.00	521.859	521.899	514.570	521.927
3200.00	521.859	521.905	514.570	521.921
3210.00	521.859	521.905	514.570	521.921
3220.00	521.865	521.911	514.570	521.927
3230.00	521.865	521.911	514.570	521.927
3240.00	521.872	521.918	514.570	521.934
3250.00	521.872	521.918	514.570	521.934
3260.00	521.872	521.918	514.570	521.934
3270.00	521.872	521.918	514.570	521.934

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
3280.00	521.872	521.918	514.570	521.934
3290.00	521.878	521.918	514.570	521.934
3300.00	521.878	521.918	514.570	521.934
3310.00	521.872	521.918	514.570	521.934
3320.00	521.878	521.924	514.570	521.934
3330.00	521.878	521.924	514.570	521.934
3340.00	521.878	521.924	514.570	521.934
3350.00	521.878	521.924	514.570	521.946
3360.00	521.884	521.930	514.570	521.940
3370.00	521.878	521.924	514.570	521.940
3380.00	521.884	521.930	514.570	521.940
3390.00	521.884	521.924	514.570	521.940
3400.00	521.884	521.924	514.570	521.940
3410.00	521.891	521.930	514.570	521.946
3420.00	521.891	521.930	514.570	521.946
3430.00	521.884	521.930	514.570	521.940
3440.00	521.884	521.924	514.570	521.940
3450.00	521.884	521.930	514.570	521.940
3460.00	521.884	521.930	514.570	521.946
3470.00	521.884	521.930	514.570	521.946
3480.00	521.884	521.930	514.570	521.940
3490.00	521.884	521.930	514.570	521.940
3500.00	521.884	521.924	514.570	521.946
3510.00	521.884	521.924	514.570	521.934
3520.00	521.884	521.924	514.570	521.940
3530.00	521.884	521.930	514.570	521.940
3540.00	521.884	521.930	514.570	521.940
3550.00	521.884	521.924	514.570	521.940
3560.00	521.884	521.924	514.570	521.940
3570.00	521.878	521.924	514.570	521.940
3580.00	521.878	521.924	514.570	521.934
3590.00	521.878	521.924	514.570	521.934
3600.00	521.878	521.924	514.570	521.934
3610.00	521.878	521.918	514.570	521.934
3620.00	521.878	521.918	514.570	521.934
3630.00	521.878	521.918	514.570	521.934
3640.00	521.872	521.918	514.570	521.934
3650.00	521.872	521.918	514.570	521.934
3660.00	521.878	521.918	514.570	521.934
3670.00	521.878	521.918	514.570	521.934
3680.00	521.878	521.924	514.570	521.934
3690.00	521.878	521.918	514.570	521.934
3700.00	521.878	521.918	514.570	521.934
3710.00	521.878	521.924	514.570	521.940
3720.00	521.878	521.924	514.570	521.940
3730.00	521.878	521.924	514.570	521.940

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
3740.00	521.878	521.924	514.570	521.940
3750.00	521.878	521.924	514.570	521.940
3760.00	521.878	521.924	514.570	521.934
3770.00	521.884	521.930	514.570	521.940
3780.00	521.884	521.930	514.570	521.946
3790.00	521.891	521.937	514.570	521.953
3800.00	521.878	521.924	514.570	521.940
3810.00	521.878	521.924	514.570	521.940
3820.00	521.878	521.924	514.570	521.940
3830.00	521.878	521.924	514.570	521.940
3840.00	521.878	521.924	514.570	521.921
3850.00	521.878	521.924	514.570	521.934
3860.00	521.878	521.924	514.570	521.934
3870.00	521.878	521.924	514.570	521.940
3880.00	521.878	521.924	514.570	521.934
3890.00	521.878	521.924	514.570	521.940
3900.00	521.878	521.924	514.570	521.940
3910.00	521.884	521.924	514.570	521.946
3920.00	521.884	521.924	514.570	521.927
3930.00	521.884	521.924	514.570	521.946
3940.00	521.884	521.930	514.570	521.946
3950.00	521.884	521.930	514.570	521.946
3960.00	521.884	521.930	514.570	521.940
3970.00	521.884	521.930	514.570	521.946
3980.00	521.884	521.930	514.570	521.946
3990.00	521.884	521.930	514.570	521.946
4000.00	521.884	521.930	514.570	521.934
4010.00	521.884	521.930	514.570	521.946
4020.00	521.891	521.930	514.570	521.946
4030.00	521.891	521.930	514.570	521.946
4040.00	521.884	521.930	514.570	521.946
4050.00	521.891	521.930	514.570	521.953
4060.00	521.884	521.930	514.570	521.946
4070.00	521.884	521.930	514.570	521.946
4080.00	521.884	521.930	514.570	521.934
4090.00	521.884	521.930	514.570	521.946
4100.00	521.891	521.930	514.570	521.953
4110.00	521.891	521.930	514.570	521.946
4120.00	521.891	521.930	514.570	521.953
4130.00	521.891	521.930	514.570	521.946
4140.00	521.884	521.930	514.570	521.946
4150.00	521.884	521.930	514.570	521.953
4160.00	521.884	521.930	514.570	521.946
4170.00	521.884	521.930	514.570	521.946
4180.00	521.884	521.930	514.570	521.953
4190.00	521.884	521.930	514.570	521.953

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
4200.00	521.884	521.930	514.570	521.946
4210.00	521.884	521.930	514.570	521.946
4220.00	521.878	521.930	514.570	521.946
4230.00	521.878	521.930	514.570	521.946
4240.00	521.878	521.930	514.570	521.940
4250.00	521.878	521.924	514.570	521.940
4260.00	521.878	521.924	514.570	521.940
4270.00	521.878	521.924	514.570	521.940
4280.00	521.878	521.924	514.570	521.940
4290.00	521.872	521.924	514.570	521.940
4300.00	521.878	521.924	514.570	521.940
4310.00	521.872	521.924	514.570	521.940
4320.00	521.878	521.924	514.570	521.940
4330.00	521.872	521.924	514.570	521.940
4340.00	521.878	521.924	514.570	521.940
4350.00	521.872	521.924	514.570	521.946
4360.00	521.878	521.924	514.570	521.940
4370.00	521.878	521.924	514.570	521.940
4380.00	521.872	521.918	514.570	521.934
4390.00	521.872	521.924	514.570	521.934
4400.00	521.878	521.924	514.570	521.946
4410.00	521.872	521.924	514.570	521.940
4420.00	521.872	521.924	514.570	521.940
4430.00	521.865	521.918	514.570	521.934
4440.00	521.865	521.918	514.570	521.934
4450.00	521.865	521.918	514.570	521.934
4460.00	521.865	521.911	514.570	521.927
4470.00	521.865	521.911	514.570	521.927
4480.00	521.865	521.911	514.570	521.927
4490.00	521.859	521.905	514.570	521.927
4500.00	521.859	521.905	514.570	521.921
4510.00	521.859	521.905	514.570	521.921
4520.00	521.853	521.905	514.570	521.921
4530.00	521.853	521.899	514.570	521.921
4540.00	521.859	521.905	514.570	521.921
4550.00	521.859	521.905	514.570	521.927
4560.00	521.859	521.905	514.570	521.921
4570.00	521.853	521.899	514.570	521.921
4580.00	521.853	521.899	514.570	521.921
4590.00	521.846	521.899	514.570	521.915
4600.00	521.846	521.892	514.570	521.915
4610.00	521.853	521.899	514.570	521.915
4620.00	521.853	521.905	514.570	521.921
4630.00	521.846	521.899	514.570	521.921
4640.00	521.853	521.899	514.570	521.921

TABLE A-5
(Continued)

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT4
Type	Level (F)	Level (F)	Level (F)	Level (F)
Mode	Surface	Surface	Surface	Surface
I.D.	2065	3065	31567IN	31567OUT
Elapsed Time:				
4650.00	521.853	521.905	514.570	521.927
4660.00	521.853	521.905	514.570	521.921

APPENDIX B

WATER QUALITY DATA

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Table B-1 Water Quality in Well 2065, Wednesday, March 20, 1996, through Tuesday, April 2, 1996

Table B-2 Water Quality in Well 3065, Wednesday, March 20, 1996, through Monday, April 1, 1996

Table B-3 Water Quality in Well 31567-Out, Wednesday, March 20, 1996, through Tuesday, April 2, 1996

Table B-4 Water Quality of SPIT Effluent, Tuesday, March 19, 1996, through Tuesday, April 2, 1996

TABLE B-1

WATER QUALITY IN WELL 2065
WEDNESDAY, MARCH 20, 1996, THROUGH TUESDAY, APRIL 2, 1996
(Measurements Recorded Every Hour)

Log File Name: 2065
Setup Date (MMDDYY): 032096
Setup Time (HHMMSS): 115857
Starting Date (MMDDYY): 032096
Starting Time (HHMMSS): 120000
Stopping Date (MMDDYY): 123199
Stopping Time (HHMMSS): 235959
Interval (HHMMSS): 010000
Warmup: Disable

==> Follow Variable and Calibration Change(s) <==

Temperature: Centigrade
Specific Conductance/Resistivity: Specific Conductance, mS/cm, Salt, Auto range, TDS, Temperature compensated, A->Comp 1, A->Method 1
% Sat: 734.0
DO: DO, LoFlow, Salinity compensated, Oxygen-26.7K
Depth/Level: Feet, Level
Turbidity: Neph only, Auto range
Buzzer: Disable
Stirrer: Disable

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
Date (MMDDYY): 032096										
120000	10.66	6.86	0.961	0.615	29.9	3.20	291	1.01	N/A	15.7
130000	10.83	6.87	0.975	0.624	3.9	0.42	300	0.99	N/A	12.8
140000	10.88	6.88	0.975	0.624	3.6	0.38	299	1.01	N/A	12.6
150000	10.89	6.89	0.976	0.625	3.4	0.37	295	1.01	N/A	12.6
160000	10.91	6.89	0.977	0.625	3.0	0.32	291	1.02	N/A	12.5
170000	10.91	6.89	0.978	0.626	2.8	0.30	293	1.02	N/A	12.5
180000	10.89	6.89	0.978	0.626	2.7	0.28	291	1.02	N/A	12.5
190000	10.91	6.89	0.979	0.626	2.5	0.27	288	1.02	N/A	12.5
200000	10.89	6.89	0.980	0.627	2.3	0.25	284	1.02	N/A	12.5
210000	10.89	6.89	0.981	0.628	2.2	0.23	277	1.02	N/A	12.5
220000	10.91	6.90	0.983	0.629	2.2	0.23	272	1.03	N/A	12.5
230000	10.91	6.90	0.983	0.629	2.2	0.23	268	1.03	N/A	12.5
Date (MMDDYY): 032196										
000000	10.91	6.90	0.984	0.630	2.2	0.23	264	1.03	N/A	12.5
010000	10.92	6.90	0.986	0.631	2.0	0.22	262	1.04	N/A	12.5
020000	10.91	6.91	0.987	0.632	2.0	0.22	254	1.04	N/A	12.5
030000	10.89	6.91	0.988	0.633	2.3	0.25	252	1.03	N/A	12.4
040000	10.89	6.91	0.989	0.633	2.0	0.22	247	1.04	N/A	12.4
050000	10.89	6.91	0.991	0.634	2.2	0.23	238	1.03	N/A	12.4

TABLE B-1
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
060000	10.91	6.91	0.992	0.635	2.0	0.22	232	1.04	N/A	12.4
070000	10.91	6.91	0.993	0.635	2.0	0.22	227	1.05	N/A	12.4
080000	10.91	6.91	0.995	0.637	2.2	0.23	225	1.04	N/A	12.4
090000	10.89	6.91	0.996	0.637	2.0	0.22	222	1.05	N/A	12.4
100000	10.91	6.91	0.998	0.638	2.2	0.23	219	1.04	N/A	12.4
110000	10.89	6.91	0.999	0.639	2.3	0.25	217	1.04	N/A	12.5
120000	10.89	6.91	1.000	0.640	2.2	0.23	218	1.04	N/A	12.5
130000	10.89	6.91	1.001	0.641	2.2	0.23	216	1.04	N/A	12.5
140000	10.89	6.91	1.002	0.642	2.5	0.27	216	1.04	N/A	12.5
150000	10.92	6.92	1.004	0.642	2.2	0.23	216	1.05	N/A	12.5
160000	10.91	6.91	1.005	0.643	2.5	0.27	215	1.04	N/A	12.5
170000	10.91	6.91	1.007	0.644	2.3	0.25	214	1.05	N/A	12.5
180000	10.91	6.91	1.008	0.645	2.3	0.25	211	1.05	N/A	12.5
190000	10.92	6.92	1.009	0.646	2.3	0.25	210	1.06	N/A	12.5
200000	10.91	6.92	1.011	0.647	2.5	0.27	209	1.05	N/A	12.4
210000	10.91	6.92	1.013	0.648	2.3	0.25	208	1.05	N/A	12.4
220000	10.91	6.92	1.013	0.649	2.3	0.25	207	1.06	N/A	12.5
230000	10.91	6.92	1.015	0.650	2.3	0.25	206	1.06	N/A	12.4
Date (MMDDYY): 032296										
000000	10.92	6.92	1.017	0.651	2.3	0.25	206	1.06	N/A	12.4
010000	10.91	6.92	1.018	0.652	2.5	0.27	207	1.05	N/A	12.4
020000	10.91	6.92	1.020	0.653	2.5	0.27	207	1.06	N/A	12.4
030000	10.89	6.92	1.022	0.654	2.7	0.28	207	1.05	N/A	12.5
040000	10.89	6.92	1.024	0.655	2.5	0.27	206	1.05	N/A	12.4
050000	10.91	6.92	1.026	0.657	2.5	0.27	205	1.05	N/A	12.4
060000	10.91	6.92	1.029	0.658	2.5	0.27	203	1.05	N/A	12.4
070000	10.91	6.92	1.031	0.660	2.5	0.27	201	1.06	N/A	12.4
080000	10.89	6.92	1.034	0.662	2.7	0.28	202	1.05	N/A	12.4
090000	10.89	6.92	1.037	0.664	2.5	0.27	203	1.05	N/A	12.4
100000	10.91	6.92	1.039	0.665	2.5	0.27	203	1.06	N/A	12.5
110000	10.91	6.92	1.042	0.667	2.5	0.27	204	1.06	N/A	12.5
120000	10.91	6.92	1.045	0.669	2.5	0.27	204	1.06	N/A	12.5
130000	10.91	6.92	1.047	0.670	2.5	0.27	205	1.05	N/A	12.6
140000	10.92	6.93	1.049	0.671	2.6	0.28	208	1.06	N/A	12.6
150000	10.91	6.92	1.052	0.673	2.7	0.28	210	1.05	N/A	12.6
160000	10.92	6.93	1.055	0.675	2.8	0.30	211	1.06	N/A	12.6

TABLE B-1
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
170000	10.92	6.93	1.057	0.677	2.8	0.30	213	1.07	N/A	12.6
180000	10.89	6.93	1.061	0.679	3.0	0.32	216	1.06	N/A	12.5
190000	10.92	6.93	1.063	0.680	3.0	0.31	218	1.07	N/A	12.6
200000	10.91	6.93	1.065	0.682	3.3	0.35	221	1.06	N/A	12.5
210000	10.89	6.93	1.068	0.684	3.6	0.38	222	1.07	N/A	12.5
220000	10.91	6.93	1.070	0.685	3.9	0.41	225	1.07	N/A	12.5
230000	10.91	6.93	1.073	0.687	4.1	0.43	227	1.07	N/A	12.5
Date (MMDDYY): 032396										
000000	10.89	6.93	1.076	0.689	4.4	0.46	231	1.07	N/A	12.4
010000	10.91	6.93	1.079	0.690	4.5	0.48	234	1.07	N/A	12.4
020000	10.91	6.93	1.081	0.692	4.7	0.50	236	1.07	N/A	12.4
030000	10.91	6.94	1.083	0.693	5.0	0.53	239	1.08	N/A	12.4
040000	10.89	6.94	1.086	0.695	5.3	0.56	242	1.07	N/A	12.4
050000	10.92	6.94	1.088	0.696	5.6	0.60	246	1.08	N/A	12.4
060000	10.89	6.94	1.091	0.698	6.2	0.66	251	1.07	N/A	12.4
070000	10.92	6.94	1.093	0.700	6.7	0.71	257	1.09	N/A	12.4
080000	10.92	6.95	1.097	0.702	7.6	0.81	263	1.09	N/A	12.4
090000	10.92	6.95	1.099	0.703	8.7	0.93	267	1.09	N/A	12.4
100000	10.92	6.95	1.103	0.706	9.2	0.98	270	1.09	N/A	12.4
110000	10.92	6.96	1.105	0.707	9.5	1.01	273	1.09	N/A	12.5
120000	10.92	6.96	1.109	0.710	10.0	1.06	276	1.09	N/A	12.6
130000	10.91	6.96	1.112	0.712	10.6	1.13	278	1.09	N/A	12.6
140000	10.91	6.96	1.117	0.715	11.2	1.19	279	1.08	N/A	12.6
150000	10.91	6.97	1.121	0.717	11.7	1.24	280	1.08	N/A	12.6
160000	10.91	6.97	1.126	0.720	12.2	1.29	282	1.08	N/A	12.6
170000	10.91	6.97	1.130	0.723	12.5	1.33	284	1.08	N/A	12.6
180000	10.92	6.97	1.135	0.726	12.5	1.32	286	1.09	N/A	12.6
190000	10.91	6.97	1.138	0.728	12.6	1.34	287	1.08	N/A	12.6
200000	10.91	6.97	1.140	0.729	12.5	1.33	285	1.08	N/A	12.6
210000	10.92	6.97	1.144	0.732	12.3	1.31	283	1.09	N/A	12.5
220000	10.91	6.97	1.148	0.735	11.7	1.24	285	1.09	N/A	12.5
230000	10.91	6.96	1.152	0.737	11.5	1.23	288	1.08	N/A	12.5
Date (MMDDYY): 032496										
010000	10.92	6.97	1.153	0.738	10.8	1.14	287	1.09	N/A	12.5
020000	10.91	6.96	1.154	0.738	10.4	1.11	277	1.08	N/A	12.5

TABLE B-1
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
030000	10.92	6.96	1.153	0.738	9.8	1.04	268	1.09	N/A	12.5
040000	10.92	6.96	1.154	0.739	10.0	1.06	266	1.09	N/A	12.5
050000	10.92	6.96	1.154	0.739	9.8	1.04	262	1.09	N/A	12.5
060000	10.92	6.96	1.153	0.738	9.7	1.03	263	1.09	N/A	12.4
070000	10.92	6.96	1.153	0.738	9.7	1.03	271	1.09	N/A	12.4
080000	10.91	6.96	1.155	0.739	9.2	0.98	276	1.07	N/A	12.4
090000	10.91	6.96	1.155	0.739	8.9	0.94	270	1.09	N/A	12.5
100000	10.91	6.96	1.154	0.738	8.6	0.91	274	1.08	N/A	12.5
110000	10.91	6.96	1.153	0.738	8.3	0.88	277	1.07	N/A	12.5
120000	10.91	6.95	1.152	0.737	8.0	0.85	269	1.07	N/A	12.6
130000	10.91	6.94	1.152	0.737	7.8	0.83	270	1.07	N/A	12.6
140000	10.91	6.94	1.151	0.737	7.0	0.75	260	1.07	N/A	12.6
150000	10.91	6.94	1.149	0.735	6.1	0.65	255	1.06	N/A	12.7
160000	10.91	6.95	1.147	0.734	5.5	0.58	253	1.07	N/A	12.7
170000	10.91	6.95	1.144	0.732	4.5	0.48	250	1.06	N/A	12.6
180000	10.92	6.96	1.142	0.731	4.1	0.43	250	1.07	N/A	12.6
190000	10.91	6.96	1.141	0.730	3.7	0.40	247	1.07	N/A	12.6
200000	10.91	6.96	1.140	0.730	3.6	0.38	246	1.07	N/A	12.6
210000	10.89	6.96	1.140	0.729	3.3	0.35	246	1.06	N/A	12.6
220000	10.91	6.96	1.139	0.729	3.3	0.35	246	1.05	N/A	12.6
230000	10.89	6.96	1.139	0.729	2.8	0.30	247	1.05	N/A	12.6
Date (MMDDYY): 032596										
000000	10.92	6.96	1.138	0.729	2.6	0.28	246	1.06	N/A	12.5
010000	10.92	6.96	1.138	0.729	2.3	0.25	252	1.06	N/A	12.5
020000	10.91	6.96	1.138	0.728	2.5	0.27	250	1.05	N/A	12.5
030000	10.89	6.96	1.139	0.729	2.0	0.22	252	1.05	N/A	12.5
040000	10.91	6.96	1.139	0.729	2.0	0.22	250	1.05	N/A	12.5
050000	10.92	6.96	1.140	0.730	2.3	0.25	248	1.06	N/A	12.5
060000	10.91	6.96	1.142	0.731	3.1	0.33	253	1.05	N/A	12.5
070000	10.91	6.96	1.143	0.731	4.1	0.43	260	1.04	N/A	12.5
080000	10.92	6.97	1.142	0.731	5.0	0.53	264	1.05	N/A	12.5
090000	10.91	6.96	1.143	0.731	5.1	0.55	269	1.04	N/A	12.6
100000	10.91	6.96	1.143	0.732	5.1	0.55	273	1.04	N/A	12.5
110000	10.92	6.96	1.143	0.732	5.1	0.55	275	1.05	N/A	12.5
120000	10.91	6.96	1.143	0.732	6.1	0.65	278	1.04	N/A	12.5
130000	10.92	6.97	1.146	0.733	6.7	0.71	281	1.05	N/A	12.6

TABLE B-1
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
140000	10.91	6.97	1.148	0.735	7.2	0.76	285	1.05	N/A	12.5
150000	10.92	6.98	1.151	0.736	8.7	0.93	286	1.06	N/A	12.5
160000	10.92	6.98	1.154	0.739	9.5	1.01	289	1.07	N/A	12.5
170000	10.91	6.97	1.157	0.740	10.3	1.09	292	1.06	N/A	12.5
180000	10.91	7.03	1.156	0.740	22.1	2.35	288	1.07	N/A	12.5
190000	10.91	7.07	1.150	0.736	37.7	4.01	287	1.07	N/A	12.4
200000	10.91	7.09	1.150	0.736	43.4	4.61	288	1.08	N/A	12.4
210000	10.91	7.10	1.150	0.736	46.5	4.94	292	1.08	N/A	12.4
220000	10.92	7.10	1.150	0.736	48.5	5.15	295	1.09	N/A	12.4
230000	10.92	7.10	1.149	0.735	48.9	5.20	299	1.09	N/A	12.4
Date (MMDDYY): 032696										
000000	10.91	7.10	1.149	0.735	47.7	5.07	303	1.09	N/A	12.3
010000	10.91	7.10	1.147	0.734	46.6	4.96	302	1.09	N/A	12.3
020000	10.92	7.10	1.145	0.733	46.0	4.88	302	1.09	N/A	12.3
030000	10.91	7.09	1.143	0.732	45.4	4.82	302	1.09	N/A	12.3
040000	10.92	7.09	1.141	0.730	44.7	4.75	302	1.10	N/A	12.3
050000	10.92	7.08	1.140	0.730	43.3	4.60	305	1.10	N/A	12.3
060000	10.91	7.07	1.140	0.729	42.1	4.47	305	1.09	N/A	12.3
070000	10.92	7.07	1.139	0.729	40.7	4.32	306	1.11	N/A	12.3
080000	10.92	7.07	1.138	0.729	39.4	4.19	308	1.11	N/A	12.2
090000	10.92	7.07	1.137	0.728	38.8	4.12	310	1.11	N/A	12.3
100000	10.91	7.07	1.138	0.728	38.5	4.09	311	1.10	N/A	12.3
110000	10.92	7.08	1.137	0.728	38.0	4.04	312	1.11	N/A	12.3
120000	10.91	7.07	1.138	0.728	37.9	4.03	312	1.11	N/A	12.4
130000	10.91	7.07	1.139	0.729	37.7	4.01	313	1.10	N/A	12.4
140000	10.92	7.07	1.139	0.729	37.2	3.96	312	1.11	N/A	15.6
150000	10.91	7.07	1.142	0.731	37.0	3.93	312	1.10	N/A	12.4
160000	10.91	7.06	1.141	0.730	36.7	3.89	312	1.10	N/A	12.4
170000	10.91	7.06	1.143	0.731	36.0	3.83	311	1.10	N/A	12.4
180000	10.92	7.06	1.143	0.732	35.4	3.76	310	1.11	N/A	12.4
190000	10.92	7.06	1.144	0.732	34.6	3.68	312	1.12	N/A	12.4
200000	10.91	7.06	1.145	0.733	33.8	3.60	313	1.12	N/A	12.4
210000	10.92	7.06	1.147	0.734	33.0	3.51	312	1.12	N/A	12.3
220000	10.91	7.06	1.148	0.735	32.8	3.48	314	1.11	N/A	12.3
230000	10.92	7.06	1.149	0.735	32.1	3.41	315	1.12	N/A	12.3

TABLE B-1
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
Date (MMDDYY): 032796										
000000	10.91	7.05	1.150	0.736	31.7	3.36	316	1.11	N/A	12.2
010000	10.92	7.05	1.151	0.736	31.2	3.31	317	1.12	N/A	12.2
020000	10.91	7.04	1.152	0.737	30.6	3.25	315	1.11	N/A	12.2
030000	10.92	7.05	1.152	0.738	30.1	3.20	305	1.12	N/A	12.2
040000	10.91	7.04	1.154	0.738	29.2	3.10	294	1.11	N/A	12.2
050000	10.92	7.05	1.154	0.739	28.1	2.98	291	1.12	N/A	12.2
060000	10.92	7.05	1.154	0.739	27.3	2.90	292	1.12	N/A	12.2
070000	10.91	7.04	1.156	0.740	27.0	2.87	292	1.11	N/A	12.2
080000	10.91	7.04	1.157	0.740	27.6	2.93	287	1.11	N/A	12.2
090000	10.91	7.05	1.158	0.741	27.8	2.95	287	1.12	N/A	12.2
100000	10.91	7.05	1.159	0.741	27.1	2.88	286	1.12	N/A	12.2
110000	10.91	7.05	1.159	0.742	27.5	2.92	284	1.11	N/A	12.3
120000	10.91	7.05	1.159	0.742	27.3	2.90	283	1.11	N/A	12.3
130000	10.91	7.05	1.160	0.743	26.5	2.82	286	1.11	N/A	12.4
140000	10.92	7.04	1.145	0.733	22.4	2.38	299	1.12	N/A	12.4
150000	10.91	7.04	1.133	0.725	20.9	2.22	298	1.11	N/A	12.4
160000	10.92	7.05	1.111	0.711	12.6	1.34	290	1.13	N/A	12.4
170000	10.91	7.05	1.094	0.700	8.6	0.91	275	1.12	N/A	12.4
180000	10.91	7.05	1.076	0.688	5.3	0.56	265	1.12	N/A	12.4
190000	10.91	7.05	1.063	0.681	3.6	0.38	255	1.12	N/A	12.4
200000	10.91	7.05	1.054	0.675	2.3	0.25	240	1.12	N/A	12.4
210000	10.92	7.05	1.047	0.670	1.4	0.15	210	1.13	N/A	12.3
220000	10.92	7.04	1.041	0.667	1.4	0.15	232	1.13	N/A	12.3
230000	10.91	7.04	1.038	0.664	1.4	0.15	231	1.13	N/A	12.3
Date (MMDDYY): 032896										
000000	10.92	7.04	1.033	0.661	1.4	0.15	232	1.13	N/A	12.3
010000	10.91	7.04	1.031	0.660	1.4	0.15	229	1.11	N/A	12.3
020000	10.91	7.04	1.029	0.658	1.4	0.15	227	1.12	N/A	12.3
030000	10.92	7.04	1.026	0.657	1.4	0.15	222	1.12	N/A	12.3
040000	10.92	7.04	1.026	0.657	1.6	0.17	222	1.12	N/A	12.3
050000	10.91	7.04	1.027	0.657	1.6	0.17	223	1.11	N/A	12.3
060000	10.91	7.04	1.027	0.657	1.6	0.17	228	1.11	N/A	12.3
070000	10.92	7.04	1.028	0.658	3.4	0.36	233	1.12	N/A	12.3
080000	10.92	7.04	1.030	0.659	5.8	0.61	238	1.12	N/A	12.3
090000	10.92	7.04	1.034	0.662	6.5	0.70	246	1.12	N/A	12.3

TABLE B-1
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
100000	10.92	7.04	1.037	0.664	9.4	0.99	256	1.12	N/A	15.5
110000	10.92	7.05	1.041	0.666	11.5	1.23	264	1.12	N/A	15.5
120000	10.92	7.05	1.042	0.667	12.5	1.32	270	1.11	N/A	15.4
130000	10.91	7.05	1.045	0.669	14.7	1.56	276	1.11	N/A	15.4
140000	10.92	7.06	1.046	0.670	15.7	1.67	284	1.11	N/A	15.4
150000	10.92	7.05	1.047	0.670	17.0	1.81	294	1.10	N/A	15.4
160000	10.91	7.05	1.048	0.671	21.8	2.32	300	1.09	N/A	15.3
170000	10.91	7.06	1.049	0.672	23.4	2.49	305	1.09	N/A	15.4
180000	10.91	7.06	1.049	0.672	29.6	3.15	309	1.09	N/A	15.4
190000	10.91	7.06	1.050	0.672	32.6	3.47	312	1.09	N/A	15.4
200000	10.92	7.07	1.051	0.673	34.9	3.71	315	1.10	N/A	15.4
210000	10.92	7.07	1.051	0.673	35.5	3.78	314	1.10	N/A	15.4
220000	10.89	7.10	1.051	0.673	41.5	4.41	316	1.09	N/A	15.4
230000	10.91	7.11	1.051	0.673	46.9	4.99	319	1.09	N/A	15.3
Date (MMDDYY): 032996										
000000	10.91	7.10	1.052	0.673	49.9	5.31	323	1.09	N/A	15.3
010000	10.91	7.10	1.054	0.675	45.7	4.86	327	1.09	N/A	15.3
020000	10.92	7.10	1.056	0.676	41.5	4.41	326	1.10	N/A	15.3
030000	10.91	7.09	1.059	0.678	39.3	4.18	325	1.09	N/A	15.3
040000	10.92	7.08	1.061	0.679	40.1	4.26	325	1.10	N/A	15.3
050000	10.91	7.08	1.064	0.681	39.5	4.19	322	1.09	N/A	15.4
060000	10.92	7.10	1.067	0.683	40.7	4.32	317	1.10	N/A	15.3
070000	10.92	7.11	1.069	0.684	47.4	5.03	312	1.10	N/A	15.2
080000	10.92	7.11	1.071	0.685	50.7	5.38	308	1.11	N/A	15.3
090000	10.92	7.12	1.073	0.686	53.6	5.70	308	1.11	N/A	15.2
100000	10.92	7.12	1.075	0.688	54.4	5.78	307	1.11	N/A	15.2
110000	10.92	7.12	1.077	0.689	54.7	5.81	306	1.11	N/A	15.2
120000	10.92	7.12	1.080	0.691	54.4	5.78	306	1.11	N/A	15.2
130000	10.91	7.11	1.082	0.693	54.1	5.75	309	1.10	N/A	12.6
140000	10.91	7.11	1.085	0.694	53.7	5.70	311	1.10	N/A	12.5
150000	10.92	7.12	1.088	0.696	52.8	5.61	312	1.11	N/A	12.6
160000	10.91	7.12	1.091	0.698	52.7	5.60	310	1.10	N/A	12.6
170000	10.92	7.12	1.093	0.700	52.7	5.60	304	1.11	N/A	12.6
180000	10.92	7.12	1.096	0.701	52.7	5.60	301	1.11	N/A	12.6
190000	10.91	7.12	1.099	0.704	53.7	5.70	302	1.11	N/A	12.5
200000	10.91	7.13	1.102	0.705	56.8	6.03	305	1.10	N/A	12.5

TABLE B-1
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
210000	10.91	7.13	1.104	0.707	56.6	6.02	307	1.11	N/A	12.5
220000	10.91	7.13	1.107	0.708	54.9	5.83	315	1.11	N/A	12.5
230000	10.92	7.13	1.109	0.710	53.0	5.63	317	1.12	N/A	12.5
Date (MMDDYY): 033096										
000000	10.91	7.12	1.111	0.711	52.2	5.55	317	1.11	N/A	12.5
010000	10.91	7.11	1.114	0.713	51.2	5.44	315	1.11	N/A	12.5
020000	10.91	7.11	1.116	0.714	50.5	5.37	315	1.11	N/A	12.5
030000	10.91	7.11	1.119	0.716	49.8	5.29	315	1.11	N/A	12.5
040000	10.91	7.11	1.121	0.717	49.6	5.27	315	1.11	N/A	12.5
050000	10.91	7.12	1.123	0.719	49.3	5.24	314	1.12	N/A	12.5
060000	10.92	7.11	1.124	0.720	49.4	5.25	313	1.12	N/A	12.5
070000	10.92	7.11	1.126	0.721	49.6	5.27	314	1.12	N/A	12.5
080000	10.91	7.11	1.129	0.723	49.6	5.27	317	1.11	N/A	12.5
090000	10.91	7.11	1.130	0.723	49.9	5.30	317	1.11	N/A	12.5
100000	10.91	7.11	1.131	0.724	50.1	5.32	316	1.11	N/A	12.5
110000	10.91	7.11	1.133	0.725	50.2	5.34	315	1.11	N/A	12.5
120000	10.91	7.11	1.133	0.725	50.5	5.37	316	1.11	N/A	12.6
130000	10.91	7.11	1.135	0.726	50.7	5.39	314	1.10	N/A	12.6
140000	10.91	7.11	1.136	0.727	50.8	5.40	315	1.10	N/A	12.6
150000	10.91	7.10	1.137	0.728	50.8	5.40	318	1.10	N/A	12.6
160000	10.93	7.10	1.138	0.728	50.0	5.31	318	1.09	N/A	12.6
170000	10.91	7.10	1.139	0.729	49.6	5.27	323	1.09	N/A	12.6
180000	10.93	7.10	1.141	0.730	48.9	5.20	325	1.10	N/A	12.7
190000	10.92	7.11	1.141	0.730	48.9	5.20	319	1.10	N/A	12.6
200000	10.91	7.11	1.143	0.731	50.2	5.34	313	1.09	N/A	12.6
210000	10.91	7.12	1.143	0.732	51.6	5.49	320	1.09	N/A	12.6
220000	10.91	7.12	1.145	0.733	51.0	5.42	328	1.09	N/A	12.5
230000	10.93	7.10	1.146	0.734	51.4	5.46	334	1.09	N/A	12.5
Date (MMDDYY): 033196										
000000	10.93	7.10	1.148	0.735	50.7	5.38	335	1.09	N/A	12.5
010000	10.93	7.10	1.149	0.735	48.9	5.20	337	1.09	N/A	12.5
020000	10.93	7.10	1.150	0.736	47.9	5.08	338	1.09	N/A	12.5
030000	10.93	7.11	1.151	0.737	47.9	5.08	338	1.09	N/A	12.5
040000	10.93	7.11	1.152	0.737	48.3	5.13	340	1.09	N/A	12.4
050000	10.91	7.11	1.153	0.738	49.3	5.24	341	1.09	N/A	12.5

TABLE B-1
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
060000	10.93	7.11	1.154	0.738	50.8	5.40	341	1.09	N/A	12.4
070000	10.93	7.11	1.155	0.739	52.1	5.53	342	1.09	N/A	12.4
080000	10.91	7.11	1.156	0.740	52.7	5.60	338	1.09	N/A	12.4
090000	10.93	7.11	1.154	0.738	53.3	5.66	335	1.09	N/A	12.5
100000	10.91	7.12	1.153	0.738	54.4	5.78	333	1.09	N/A	12.5
110000	10.93	7.12	1.153	0.738	55.2	5.86	332	1.09	N/A	12.5
120000	10.91	7.12	1.153	0.738	55.5	5.90	331	1.09	N/A	12.5
130000	10.93	7.12	1.153	0.738	55.2	5.86	334	1.09	N/A	12.6
140000	10.93	7.12	1.153	0.738	54.7	5.81	335	1.08	N/A	12.5
150000	10.93	7.12	1.153	0.738	54.2	5.76	338	1.08	N/A	12.5
160000	10.94	7.13	1.152	0.738	53.4	5.67	341	1.09	N/A	12.5
170000	10.93	7.13	1.153	0.738	52.8	5.61	342	1.08	N/A	12.6
180000	10.93	7.13	1.154	0.738	55.8	5.93	341	1.07	N/A	12.5
190000	10.93	7.13	1.152	0.737	56.1	5.96	316	1.08	N/A	12.5
200000	10.94	7.14	1.151	0.737	56.2	5.97	323	1.09	N/A	12.5
210000	10.93	7.14	1.151	0.737	56.4	5.99	332	1.08	N/A	12.5
220000	10.94	7.14	1.151	0.737	54.8	5.82	339	1.10	N/A	12.5
230000	10.93	7.13	1.151	0.737	53.0	5.63	344	1.09	N/A	12.5
Date (MMDDYY): 040196										
000000	10.94	7.13	1.151	0.736	51.9	5.51	345	1.10	N/A	12.5
010000	10.93	7.13	1.151	0.737	51.3	5.45	342	1.09	N/A	12.4
020000	10.94	7.14	1.151	0.737	50.9	5.41	339	1.10	N/A	12.4
030000	10.93	7.13	1.152	0.737	50.8	5.40	339	1.09	N/A	12.4
040000	10.93	7.13	1.152	0.737	50.8	5.40	338	1.09	N/A	12.4
050000	10.94	7.13	1.151	0.737	50.8	5.39	342	1.11	N/A	12.4
060000	10.94	7.13	1.151	0.736	51.1	5.42	347	1.11	N/A	12.4
070000	10.93	7.13	1.152	0.737	51.7	5.50	347	1.10	N/A	12.4
080000	10.94	7.14	1.151	0.736	52.2	5.54	344	1.11	N/A	12.3
090000	10.93	7.14	1.152	0.737	57.8	6.14	338	1.10	N/A	12.4
100000	10.94	7.15	1.151	0.737	62.3	6.62	324	1.11	N/A	12.4
110000	10.94	7.16	1.150	0.736	62.0	6.58	328	1.10	N/A	12.4
120000	10.93	7.16	1.149	0.735	61.3	6.51	332	1.09	N/A	12.3
130000	10.94	7.15	1.149	0.735	59.7	6.33	336	1.11	N/A	12.4
140000	10.94	7.15	1.149	0.735	57.6	6.12	337	1.10	N/A	12.4
150000	10.94	7.15	1.149	0.735	56.4	5.99	340	1.10	N/A	12.4
160000	10.93	7.14	1.149	0.735	55.5	5.89	342	1.09	N/A	12.5

TABLE B-1
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
170000	10.94	7.14	1.149	0.735	54.2	5.76	344	1.11	N/A	12.5
180000	10.94	7.14	1.149	0.735	53.0	5.62	345	1.11	N/A	12.5
190000	10.93	7.14	1.149	0.735	52.1	5.53	346	1.10	N/A	12.5
200000	10.94	7.13	1.149	0.735	50.9	5.41	346	1.11	N/A	12.5
210000	10.93	7.13	1.149	0.735	50.0	5.31	348	1.10	N/A	12.4
220000	10.93	7.13	1.149	0.735	49.4	5.25	348	1.10	N/A	12.4
230000	10.93	7.12	1.149	0.735	48.8	5.18	351	1.10	N/A	12.3
Date (MMDDYY): 040296										
000000	10.93	7.12	1.149	0.735	48.3	5.13	352	1.10	N/A	12.4
010000	10.94	7.13	1.150	0.736	47.8	5.08	354	1.11	N/A	12.3
020000	10.93	7.12	1.150	0.736	47.4	5.03	354	1.10	N/A	12.3
030000	10.93	7.12	1.150	0.736	47.1	5.00	353	1.10	N/A	12.3
040000	10.93	7.12	1.150	0.736	46.6	4.95	350	1.10	N/A	12.3
050000	10.93	7.12	1.150	0.736	46.1	4.90	351	1.11	N/A	12.3
060000	10.93	7.12	1.150	0.736	46.0	4.88	349	1.11	N/A	12.3
070000	10.93	7.12	1.150	0.736	45.8	4.87	351	1.11	N/A	12.3
080000	10.93	7.12	1.150	0.736	45.5	4.83	354	1.11	N/A	12.3
090000	10.93	7.12	1.153	0.738	45.7	4.85	348	1.11	N/A	12.3

TABLE B-2

WATER QUALITY IN WELL 3065
WEDNESDAY, MARCH 20, 1996, THROUGH MONDAY, APRIL 1, 1996
(Measurements Recorded Every Hour)

Log File Name: 3065
Setup Date (MMDDYY): 032096
Setup Time (HHMMSS): 114017
Starting Date (MMDDYY): 032096
Starting Time (HHMMSS): 120000
Stopping Date (MMDDYY): 123199
Stopping Time (HHMMSS): 235959
Interval (HHMMSS): 010000
Warmup: Disable

==> Follow Variable and Calibration Change(s) <==

Temperature: Centigrade
Specific Conductance/Resistivity: Specific Conductance,mS/cm,Salt,Auto range, TDS,Temperature compensated,A->Comp 1,A->Method 1
% Sat: 734.0
DO: DO,LoFlow,Salinity compensated,Oxygen-26.7K
Depth/Level: Feet,Level
Turbidity: Ratio,Auto range
Buzzer: Disable
Stirrer: Enable

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
Date (MMDDYY): 032096										
120000	10.60	7.06	0.568	0.364	5.7	0.61	180	6.71	N/A	12.8
130000	10.64	7.10	0.568	0.363	3.9	0.42	167	6.71	N/A	12.5
140000	10.64	7.14	0.576	0.368	3.6	0.38	166	6.72	N/A	12.5
150000	10.64	7.15	0.608	0.389	3.4	0.36	166	6.72	N/A	12.4
160000	10.65	7.20	0.606	0.388	3.4	0.36	171	6.72	N/A	12.4
170000	10.65	7.20	0.627	0.402	3.7	0.40	170	6.73	N/A	12.4
180000	10.65	7.21	0.641	0.410	3.5	0.38	168	6.73	N/A	12.4
190000	10.65	7.21	0.638	0.408	3.5	0.38	170	6.73	N/A	12.4
200000	10.65	7.22	0.635	0.406	3.4	0.36	170	6.73	N/A	12.4
210000	10.65	7.22	0.639	0.409	3.2	0.34	170	6.74	N/A	12.4
220000	10.65	7.23	0.632	0.405	3.2	0.34	172	6.74	N/A	12.4
230000	10.65	7.24	0.630	0.403	3.2	0.34	174	6.74	N/A	12.4
Date (MMDDYY): 032196										
000000	10.65	7.25	0.629	0.403	3.2	0.34	-71	6.74	N/A	12.4
010000	10.65	7.25	0.633	0.405	3.0	0.32	-509	6.74	N/A	12.4
020000	10.65	7.26	0.631	0.404	3.0	0.32	-522	6.74	N/A	12.3
030000	10.65	7.26	0.634	0.406	3.0	0.32	-527	6.74	N/A	12.4
040000	10.65	7.27	0.633	0.405	3.0	0.32	-531	6.74	N/A	12.3
050000	10.65	7.27	0.631	0.404	3.0	0.32	-533	6.74	N/A	12.3

TABLE B-2
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
060000	10.65	7.28	0.628	0.402	3.0	0.32	-533	6.75	N/A	12.3
070000	10.65	7.29	0.626	0.401	3.0	0.32	-534	6.75	N/A	12.3
080000	10.65	7.29	0.626	0.400	3.0	0.32	-535	6.75	N/A	12.4
090000	10.65	7.29	0.623	0.399	2.8	0.30	-536	6.75	N/A	12.3
100000	10.65	7.30	0.623	0.399	2.8	0.30	-536	6.75	N/A	12.4
110000	10.65	7.30	0.624	0.399	2.8	0.30	-536	6.75	N/A	12.4
120000	10.65	7.31	0.623	0.399	2.8	0.30	-536	6.75	N/A	12.4
130000	10.65	7.31	0.623	0.399	2.8	0.30	-537	6.75	N/A	12.4
140000	10.65	7.32	0.621	0.397	2.8	0.30	-536	6.75	N/A	12.4
150000	10.65	7.32	0.619	0.396	2.8	0.30	-537	6.76	N/A	12.4
160000	10.65	7.33	0.620	0.397	2.8	0.30	-537	6.75	N/A	12.4
170000	10.65	7.33	0.618	0.396	2.8	0.30	-537	6.76	N/A	12.4
180000	10.65	7.33	0.617	0.395	2.8	0.30	-537	6.76	N/A	12.4
190000	10.65	7.34	0.616	0.394	2.8	0.30	-537	6.76	N/A	12.3
200000	10.65	7.34	0.616	0.394	2.8	0.30	-537	6.76	N/A	12.4
210000	10.65	7.35	0.614	0.393	2.7	0.29	-537	6.76	N/A	12.4
220000	10.65	7.35	0.613	0.392	2.7	0.29	-536	6.76	N/A	12.3
230000	10.65	7.35	0.613	0.392	2.7	0.29	-536	6.76	N/A	12.4
Date (MMDDYY): 032296										
000000	10.65	7.36	0.613	0.392	2.7	0.29	-537	6.76	N/A	12.3
010000	10.65	7.36	0.614	0.393	2.7	0.29	-537	6.76	N/A	12.3
020000	10.65	7.36	0.614	0.393	2.5	0.27	-537	6.76	N/A	12.3
030000	10.65	7.37	0.613	0.392	2.7	0.29	-537	6.76	N/A	12.3
040000	10.65	7.37	0.613	0.392	2.7	0.29	-537	6.76	N/A	12.3
050000	10.65	7.37	0.613	0.392	2.7	0.29	-537	6.76	N/A	12.3
060000	10.65	7.37	0.612	0.392	2.7	0.29	-537	6.76	N/A	12.3
070000	10.65	7.38	0.612	0.392	2.5	0.27	-536	6.76	N/A	12.3
080000	10.65	7.38	0.612	0.392	2.7	0.29	-536	6.76	N/A	12.3
090000	10.65	7.38	0.610	0.391	2.7	0.29	-536	6.76	N/A	12.3
100000	10.67	7.34	0.568	0.363	8.9	0.95	-252	6.76	N/A	12.4
110000	10.65	7.38	0.629	0.403	2.7	0.28	-529	6.77	N/A	12.4
120000	10.65	7.38	0.651	0.417	2.5	0.27	-534	6.77	N/A	12.4
130000	10.65	7.39	0.648	0.415	2.5	0.27	-534	6.77	N/A	12.4
140000	10.65	7.39	0.644	0.412	2.3	0.25	-534	6.77	N/A	12.4
150000	10.67	7.39	0.644	0.412	2.3	0.25	-534	6.77	N/A	12.5
160000	10.65	7.39	0.644	0.412	2.3	0.25	-534	6.77	N/A	12.5

TABLE B-2
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
170000	10.65	7.40	0.642	0.411	2.5	0.27	-534	6.77	N/A	12.5
180000	10.65	7.40	0.643	0.411	2.5	0.27	-534	6.77	N/A	12.5
190000	10.65	7.40	0.642	0.411	2.5	0.27	-535	6.77	N/A	12.5
200000	10.65	7.40	0.641	0.410	2.5	0.27	-535	6.77	N/A	12.4
210000	10.65	7.40	0.640	0.409	2.5	0.27	-535	6.78	N/A	12.4
220000	10.65	7.40	0.639	0.409	2.5	0.27	-535	6.78	N/A	12.4
230000	10.65	7.41	0.639	0.409	2.3	0.25	-536	6.78	N/A	12.3
Date (MMDDYY): 032396										
000000	10.65	7.41	0.639	0.409	2.5	0.27	-536	6.78	N/A	12.3
010000	10.65	7.41	0.639	0.409	2.3	0.25	-536	6.78	N/A	12.3
020000	10.65	7.41	0.638	0.408	2.3	0.25	-536	6.78	N/A	12.3
030000	10.65	7.41	0.638	0.408	2.5	0.27	-536	6.78	N/A	12.3
040000	10.67	7.42	0.637	0.408	2.5	0.27	-536	6.78	N/A	12.3
050000	10.65	7.42	0.636	0.407	2.3	0.25	-537	6.80	N/A	12.3
060000	10.65	7.42	0.636	0.407	2.3	0.25	-537	6.80	N/A	12.3
070000	10.65	7.43	0.635	0.406	2.3	0.25	-537	6.80	N/A	12.2
080000	10.65	7.43	0.635	0.406	2.3	0.25	-536	6.80	N/A	12.2
090000	10.65	7.43	0.633	0.405	2.3	0.25	-537	6.80	N/A	12.3
100000	10.65	7.43	0.632	0.405	2.5	0.27	-537	6.80	N/A	12.3
110000	10.67	7.43	0.632	0.405	2.1	0.23	-537	6.80	N/A	12.3
120000	10.65	7.44	0.632	0.405	2.3	0.25	-538	6.80	N/A	12.4
130000	10.67	7.44	0.632	0.405	2.3	0.25	-538	6.80	N/A	12.4
140000	10.65	7.44	0.631	0.404	2.3	0.25	-538	6.80	N/A	12.5
150000	10.65	7.44	0.631	0.404	2.3	0.25	-539	6.80	N/A	12.5
160000	10.65	7.45	0.630	0.403	2.3	0.25	-539	6.80	N/A	12.5
170000	10.65	7.45	0.629	0.403	2.1	0.23	-539	6.80	N/A	12.5
180000	10.65	7.45	0.629	0.403	2.3	0.25	-539	6.80	N/A	12.5
190000	10.65	7.45	0.629	0.403	2.1	0.23	-539	6.80	N/A	12.5
200000	10.65	7.45	0.629	0.403	2.1	0.23	-540	6.80	N/A	12.4
210000	10.65	7.46	0.629	0.403	2.3	0.25	-540	6.80	N/A	12.4
220000	10.65	7.46	0.627	0.402	2.1	0.23	-540	6.80	N/A	12.4
230000	10.65	7.46	0.628	0.402	2.1	0.23	-540	6.80	N/A	12.4
Date (MMDDYY): 032496										
000000	10.65	7.46	0.627	0.402	2.1	0.23	-540	6.80	N/A	12.4
010000	10.65	7.46	0.626	0.401	2.1	0.23	-540	6.80	N/A	12.4

TABLE B-2
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
020000	10.65	7.46	0.627	0.402	2.0	0.21	-540	6.80	N/A	12.3
030000	10.65	7.47	0.626	0.401	2.1	0.23	-540	6.80	N/A	12.3
040000	10.65	7.47	0.626	0.400	2.1	0.23	-540	6.80	N/A	12.4
050000	10.67	7.47	0.625	0.400	2.1	0.23	-540	6.80	N/A	12.3
060000	10.65	7.47	0.626	0.401	2.0	0.21	-541	6.80	N/A	12.3
070000	10.65	7.47	0.625	0.400	2.3	0.25	-541	6.80	N/A	12.3
080000	10.65	7.47	0.625	0.400	2.1	0.23	-541	6.80	N/A	12.3
090000	10.65	7.47	0.626	0.400	2.0	0.21	-541	6.80	N/A	12.4
100000	10.65	7.48	0.626	0.400	2.0	0.21	-541	6.80	N/A	12.3
110000	10.65	7.48	0.626	0.400	2.0	0.21	-541	6.80	N/A	12.4
120000	10.65	7.48	0.625	0.400	2.1	0.23	-541	6.80	N/A	12.4
130000	10.65	7.48	0.625	0.400	2.0	0.21	-541	6.78	N/A	12.5
140000	10.65	7.48	0.624	0.399	2.1	0.23	-541	6.78	N/A	12.5
150000	10.65	7.48	0.624	0.399	2.1	0.23	-541	6.78	N/A	12.5
160000	10.65	7.48	0.624	0.399	2.1	0.23	-541	6.78	N/A	12.5
170000	10.65	7.48	0.624	0.399	2.0	0.21	-541	6.77	N/A	12.5
180000	10.65	7.49	0.623	0.399	2.1	0.23	-541	6.77	N/A	12.5
190000	10.65	7.49	0.623	0.399	2.1	0.23	-541	6.77	N/A	12.5
200000	10.65	7.49	0.623	0.399	2.0	0.21	-541	6.77	N/A	12.5
210000	10.65	7.49	0.622	0.398	2.1	0.23	-542	6.77	N/A	12.4
220000	10.65	7.49	0.622	0.398	2.1	0.23	-542	6.77	N/A	12.4
230000	10.65	7.49	0.621	0.397	2.1	0.23	-542	6.77	N/A	12.4
Date (MMDDYY): 032596										
000000	10.65	7.49	0.621	0.397	2.1	0.23	-542	6.76	N/A	12.4
010000	10.65	7.49	0.621	0.397	2.1	0.23	-542	6.76	N/A	12.4
020000	10.65	7.49	0.621	0.397	2.1	0.23	-542	6.76	N/A	12.3
030000	10.65	7.49	0.620	0.397	2.1	0.23	-542	6.76	N/A	12.4
040000	10.65	7.49	0.621	0.397	2.0	0.21	-542	6.76	N/A	12.4
050000	10.65	7.49	0.621	0.397	2.1	0.23	-542	6.76	N/A	12.4
060000	10.65	7.49	0.621	0.397	2.1	0.23	-542	6.76	N/A	12.3
070000	10.65	7.49	0.620	0.397	2.1	0.23	-542	6.76	N/A	12.3
080000	10.65	7.49	0.621	0.397	2.1	0.23	-542	6.76	N/A	12.3
090000	10.65	7.50	0.620	0.397	2.1	0.23	-542	6.76	N/A	12.4
100000	10.65	7.50	0.621	0.397	2.0	0.21	-542	6.76	N/A	12.4
110000	10.65	7.50	0.620	0.397	2.1	0.23	-542	6.76	N/A	12.4
120000	10.65	7.50	0.620	0.397	2.1	0.23	-542	6.76	N/A	12.4

TABLE B-2
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
130000	10.65	7.50	0.620	0.397	2.0	0.21	-542	6.76	N/A	12.4
140000	10.65	7.50	0.620	0.397	2.0	0.21	-543	6.77	N/A	12.4
150000	10.65	7.50	0.619	0.396	2.1	0.23	-543	6.77	N/A	12.4
160000	10.65	7.50	0.619	0.396	2.1	0.23	-543	6.77	N/A	12.4
170000	10.65	7.50	0.619	0.396	2.0	0.21	-543	6.78	N/A	12.4
180000	10.65	7.50	0.619	0.396	2.1	0.23	-543	6.78	N/A	12.4
190000	10.65	7.50	0.618	0.396	2.1	0.23	-543	6.78	N/A	12.4
200000	10.65	7.50	0.619	0.396	2.0	0.21	-543	6.80	N/A	12.4
210000	10.65	7.51	0.617	0.395	2.1	0.23	-543	6.80	N/A	12.3
220000	10.65	7.51	0.618	0.396	2.0	0.21	-543	6.81	N/A	12.3
230000	10.65	7.51	0.617	0.395	2.1	0.23	-543	6.81	N/A	12.2
Date (MMDDYY): 032696										
000000	10.65	7.51	0.618	0.396	2.0	0.21	-543	6.81	N/A	12.3
010000	10.67	7.51	0.616	0.394	2.1	0.23	-543	6.81	N/A	12.3
020000	10.67	7.51	0.617	0.395	2.0	0.21	-543	6.81	N/A	12.3
030000	10.65	7.52	0.615	0.394	2.1	0.23	-543	6.81	N/A	12.2
040000	10.65	7.52	0.616	0.394	2.1	0.23	-543	6.81	N/A	12.2
050000	10.65	7.52	0.616	0.394	2.0	0.21	-543	6.81	N/A	12.3
060000	10.65	7.52	0.616	0.394	2.0	0.21	-543	6.82	N/A	12.2
070000	10.65	7.52	0.616	0.394	2.1	0.23	-543	6.82	N/A	12.2
080000	10.65	7.52	0.615	0.394	2.1	0.23	-543	6.82	N/A	12.2
090000	10.65	7.52	0.615	0.394	2.1	0.23	-543	6.83	N/A	12.3
100000	10.65	7.52	0.615	0.394	2.0	0.21	-543	6.83	N/A	12.2
110000	10.65	7.52	0.614	0.393	2.0	0.21	-543	6.83	N/A	12.2
120000	10.65	7.52	0.615	0.394	2.0	0.21	-543	6.83	N/A	12.3
130000	10.67	7.53	0.614	0.393	2.0	0.21	-543	6.83	N/A	12.3
140000	10.65	7.53	0.614	0.393	2.1	0.23	-543	6.83	N/A	12.3
150000	10.65	7.53	0.613	0.392	2.0	0.21	-543	6.83	N/A	12.3
160000	10.65	7.53	0.614	0.393	2.0	0.21	-543	6.83	N/A	12.3
170000	10.65	7.53	0.614	0.393	2.0	0.21	-543	6.83	N/A	12.4
180000	10.65	7.53	0.615	0.394	2.0	0.21	-543	6.83	N/A	12.4
190000	10.65	7.53	0.614	0.393	2.1	0.23	-543	6.83	N/A	12.4
200000	10.65	7.53	0.614	0.393	2.0	0.21	-543	6.83	N/A	12.3
210000	10.65	7.53	0.615	0.394	2.1	0.23	-543	6.83	N/A	12.3
220000	10.65	7.53	0.614	0.393	2.0	0.21	-543	6.84	N/A	12.3
230000	10.65	7.53	0.614	0.393	2.1	0.23	-543	6.83	N/A	12.2

TABLE B-2
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
Date (MMDDYY): 032796										
000000	10.65	7.53	0.614	0.393	2.1	0.23	-543	6.83	N/A	12.3
010000	10.65	7.53	0.614	0.393	2.0	0.21	-543	6.84	N/A	12.2
020000	10.67	7.53	0.613	0.392	2.1	0.23	-543	6.83	N/A	12.2
030000	10.67	7.53	0.613	0.392	2.1	0.23	-543	6.83	N/A	12.2
040000	10.67	7.53	0.613	0.392	2.0	0.21	-543	6.84	N/A	12.2
050000	10.65	7.53	0.613	0.392	2.1	0.23	-544	6.83	N/A	12.2
060000	10.65	7.53	0.613	0.392	2.0	0.21	-544	6.84	N/A	12.2
070000	10.65	7.53	0.612	0.392	2.0	0.21	-544	6.84	N/A	12.1
080000	10.65	7.54	0.613	0.392	2.1	0.23	-544	6.84	N/A	12.2
090000	10.65	7.54	0.612	0.392	2.0	0.21	-544	6.84	N/A	12.2
100000	10.65	7.54	0.612	0.392	2.1	0.23	-544	6.84	N/A	12.2
110000	10.65	7.54	0.612	0.392	2.0	0.21	-544	6.84	N/A	12.2
120000	10.65	7.54	0.611	0.391	2.1	0.23	-544	6.84	N/A	12.3
130000	10.65	7.54	0.611	0.391	2.1	0.23	-544	6.84	N/A	12.3
140000	10.67	7.54	0.611	0.391	2.0	0.21	-544	6.84	N/A	12.4
150000	10.67	7.54	0.609	0.390	2.0	0.21	-544	6.84	N/A	12.4
160000	10.67	7.54	0.610	0.391	2.0	0.21	-544	6.84	N/A	12.3
170000	10.67	7.54	0.611	0.391	2.0	0.21	-544	6.84	N/A	12.4
180000	10.67	7.54	0.612	0.392	2.0	0.21	-544	6.84	N/A	12.4
190000	10.67	7.55	0.612	0.392	2.0	0.21	-544	6.84	N/A	12.3
200000	10.67	7.55	0.611	0.391	2.1	0.23	-544	6.84	N/A	12.3
210000	10.67	7.55	0.611	0.391	2.1	0.23	-544	6.84	N/A	12.3
220000	10.67	7.56	0.612	0.392	2.0	0.21	-544	6.84	N/A	12.3
230000	10.67	7.56	0.612	0.392	2.0	0.21	-544	6.84	N/A	12.3
Date (MMDDYY): 032896										
000000	10.67	7.56	0.610	0.391	2.1	0.23	-544	6.84	N/A	12.3
010000	10.67	7.56	0.610	0.391	2.0	0.21	-544	6.84	N/A	12.2
020000	10.67	7.56	0.610	0.391	2.1	0.23	-544	6.84	N/A	12.2
030000	10.67	7.56	0.609	0.390	2.1	0.23	-544	6.84	N/A	12.2
040000	10.67	7.56	0.610	0.391	2.0	0.21	-544	6.84	N/A	12.2
050000	10.67	7.56	0.609	0.390	2.1	0.23	-544	6.84	N/A	12.2
060000	10.67	7.56	0.608	0.389	2.0	0.21	-544	6.84	N/A	12.2
070000	10.67	7.56	0.607	0.388	2.1	0.23	-544	6.83	N/A	12.2
080000	10.67	7.56	0.608	0.389	2.1	0.23	-544	6.83	N/A	12.2
090000	10.67	7.56	0.608	0.389	2.1	0.23	-544	6.83	N/A	12.2

TABLE B-2
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
100000	10.67	7.57	0.607	0.388	2.1	0.23	-545	6.83	N/A	15.5
110000	10.67	7.57	0.607	0.388	2.1	0.23	-545	6.83	N/A	15.5
120000	10.67	7.57	0.607	0.388	2.0	0.21	-545	6.83	N/A	15.5
130000	10.67	7.57	0.608	0.389	2.1	0.23	-545	6.83	N/A	15.5
140000	10.67	7.57	0.607	0.388	2.1	0.23	-545	6.83	N/A	15.5
150000	10.67	7.57	0.608	0.389	2.1	0.23	-545	6.82	N/A	15.4
160000	10.67	7.57	0.607	0.388	2.1	0.23	-545	6.82	N/A	15.5
170000	10.67	7.57	0.608	0.389	2.0	0.21	-545	6.82	N/A	15.5
180000	10.67	7.57	0.606	0.388	2.1	0.23	-545	6.82	N/A	15.4
190000	10.67	7.57	0.606	0.388	2.1	0.23	-545	6.82	N/A	15.4
200000	10.67	7.57	0.606	0.388	2.1	0.23	-545	6.82	N/A	15.4
210000	10.67	7.58	0.606	0.388	2.1	0.23	-546	6.81	N/A	15.4
220000	10.67	7.58	0.606	0.388	2.1	0.23	-546	6.81	N/A	15.4
230000	10.67	7.58	0.606	0.388	2.0	0.21	-546	6.82	N/A	15.3
Date (MMDDYY): 032996										
000000	10.67	7.58	0.605	0.387	2.1	0.23	-546	6.82	N/A	15.4
010000	10.67	7.58	0.605	0.387	2.1	0.23	-546	6.81	N/A	15.4
020000	10.67	7.58	0.607	0.388	2.1	0.23	-546	6.82	N/A	15.4
030000	10.67	7.58	0.605	0.387	2.1	0.23	-546	6.82	N/A	15.4
040000	10.67	7.58	0.606	0.388	2.1	0.23	-546	6.82	N/A	15.3
050000	10.67	7.58	0.606	0.388	2.0	0.21	-546	6.82	N/A	15.3
060000	10.67	7.58	0.605	0.387	2.1	0.23	-546	6.82	N/A	15.3
070000	10.67	7.58	0.604	0.386	2.1	0.23	-546	6.82	N/A	15.4
080000	10.67	7.58	0.606	0.388	2.0	0.21	-546	6.82	N/A	15.4
090000	10.67	7.58	0.605	0.387	2.1	0.23	-546	6.82	N/A	15.3
100000	10.67	7.58	0.604	0.386	2.1	0.23	-546	6.82	N/A	15.3
110000	10.67	7.58	0.605	0.387	2.0	0.21	-546	6.83	N/A	15.3
120000	10.67	7.58	0.606	0.388	2.1	0.23	-546	6.83	N/A	15.3
130000	10.67	7.58	0.603	0.386	2.0	0.21	-546	6.83	N/A	12.9
140000	10.67	7.58	0.605	0.387	2.1	0.23	-546	6.83	N/A	12.9
150000	10.67	7.58	0.604	0.386	2.1	0.23	-546	6.83	N/A	12.9
160000	10.67	7.58	0.604	0.386	2.0	0.21	-546	6.83	N/A	12.9
170000	10.67	7.59	0.604	0.386	2.0	0.21	-546	6.83	N/A	12.8
180000	10.67	7.59	0.605	0.387	2.1	0.23	-546	6.83	N/A	12.8
190000	10.67	7.59	0.606	0.388	2.0	0.21	-546	6.83	N/A	12.8
200000	10.67	7.58	0.605	0.387	2.1	0.23	-546	6.83	N/A	12.8

TABLE B-2
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
210000	10.67	7.59	0.606	0.388	2.0	0.21	-546	6.83	N/A	12.8
220000	10.67	7.59	0.604	0.386	2.1	0.23	-546	6.83	N/A	12.7
230000	10.67	7.59	0.605	0.387	2.0	0.21	-546	6.84	N/A	12.8
Date (MMDDYY): 033096										
000000	10.67	7.59	0.605	0.387	2.0	0.21	-546	6.83	N/A	12.8
010000	10.67	7.59	0.605	0.387	2.1	0.23	-546	6.83	N/A	12.7
020000	10.67	7.59	0.605	0.387	2.0	0.21	-546	6.83	N/A	12.7
030000	10.67	7.59	0.604	0.386	2.1	0.23	-546	6.83	N/A	12.7
040000	10.67	7.59	0.602	0.385	2.0	0.21	-546	6.83	N/A	12.7
050000	10.67	7.59	0.604	0.386	2.0	0.21	-546	6.83	N/A	12.7
060000	10.67	7.59	0.604	0.386	2.0	0.21	-546	6.84	N/A	12.7
070000	10.67	7.59	0.605	0.387	2.0	0.21	-546	6.84	N/A	12.7
080000	10.67	7.59	0.603	0.386	2.0	0.21	-546	6.83	N/A	12.7
090000	10.67	7.59	0.604	0.386	2.0	0.21	-546	6.84	N/A	12.7
100000	10.67	7.59	0.603	0.386	2.1	0.23	-546	6.84	N/A	12.7
110000	10.67	7.59	0.602	0.385	2.0	0.21	-546	6.83	N/A	12.8
120000	10.67	7.59	0.604	0.386	2.0	0.21	-546	6.83	N/A	12.8
130000	10.67	7.59	0.604	0.386	2.0	0.21	-546	6.83	N/A	12.8
140000	10.67	7.59	0.604	0.386	2.0	0.21	-547	6.83	N/A	12.9
150000	10.67	7.60	0.603	0.386	2.0	0.21	-547	6.83	N/A	12.8
160000	10.67	7.60	0.604	0.386	2.0	0.21	-547	6.82	N/A	12.9
170000	10.67	7.60	0.601	0.385	2.0	0.21	-547	6.82	N/A	12.9
180000	10.67	7.60	0.602	0.385	2.1	0.23	-547	6.82	N/A	12.9
190000	10.67	7.60	0.604	0.386	2.0	0.21	-547	6.82	N/A	12.8
200000	10.67	7.60	0.603	0.386	2.0	0.21	-547	6.82	N/A	12.8
210000	10.67	7.60	0.602	0.385	2.0	0.21	-547	6.82	N/A	12.8
220000	10.67	7.60	0.603	0.386	2.0	0.21	-547	6.82	N/A	12.8
230000	10.67	7.60	0.602	0.385	2.0	0.21	-547	6.82	N/A	12.7
Date (MMDDYY): 033196										
000000	10.67	7.60	0.603	0.386	2.0	0.21	-547	6.82	N/A	12.7
010000	10.67	7.60	0.604	0.386	2.0	0.21	-547	6.82	N/A	12.7
020000	10.67	7.60	0.603	0.386	2.1	0.23	-547	6.82	N/A	12.7
030000	10.67	7.60	0.603	0.386	2.0	0.21	-547	6.81	N/A	12.7
040000	10.67	7.60	0.602	0.385	2.0	0.21	-547	6.81	N/A	12.7
050000	10.67	7.60	0.602	0.385	2.0	0.21	-547	6.81	N/A	12.7

TABLE B-2
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
060000	10.67	7.60	0.603	0.386	2.0	0.21	-547	6.81	N/A	12.7
070000	10.67	7.60	0.603	0.386	2.0	0.21	-547	6.81	N/A	12.7
080000	10.67	7.60	0.602	0.385	2.0	0.21	-547	6.81	N/A	12.7
090000	10.67	7.60	0.603	0.386	2.0	0.21	-547	6.81	N/A	12.7
100000	10.67	7.60	0.601	0.385	2.0	0.21	-547	6.81	N/A	12.7
110000	10.67	7.60	0.603	0.386	2.0	0.21	-547	6.82	N/A	12.7
120000	10.67	7.60	0.603	0.386	1.8	0.19	-547	6.81	N/A	12.7
130000	10.67	7.60	0.602	0.385	2.0	0.21	-547	6.81	N/A	12.7
140000	10.67	7.61	0.604	0.386	2.1	0.23	-547	6.81	N/A	12.8
150000	10.67	7.61	0.603	0.386	1.8	0.19	-547	6.81	N/A	12.8
160000	10.67	7.61	0.603	0.386	2.0	0.21	-547	6.81	N/A	12.8
170000	10.67	7.61	0.602	0.385	1.8	0.19	-547	6.81	N/A	12.8
180000	10.67	7.61	0.603	0.386	2.1	0.23	-547	6.80	N/A	12.8
190000	10.67	7.61	0.603	0.386	2.0	0.21	-547	6.80	N/A	12.7
200000	10.67	7.61	0.601	0.385	2.0	0.21	-547	6.81	N/A	12.7
210000	10.67	7.61	0.601	0.385	2.1	0.23	-547	6.81	N/A	12.7
220000	10.67	7.61	0.602	0.385	2.0	0.21	-547	6.81	N/A	12.7
230000	10.67	7.61	0.602	0.385	2.1	0.23	-547	6.81	N/A	12.7
Date (MMDDYY): 040196										
000000	10.67	7.61	0.602	0.385	2.0	0.21	-547	6.82	N/A	12.7
010000	10.67	7.61	0.601	0.385	2.0	0.21	-547	6.82	N/A	12.7
020000	10.67	7.61	0.602	0.385	2.0	0.21	-547	6.82	N/A	12.7
030000	10.67	7.61	0.603	0.386	2.0	0.21	-547	6.82	N/A	12.7
040000	10.67	7.61	0.602	0.385	1.8	0.19	-547	6.82	N/A	12.6
050000$ERROR: data could not be acquired[a]										
060000$ERROR: data could not be acquired[a]										
070000$ERROR: data could not be acquired[a]										
080000$ERROR: data could not be acquired[a]										
090000$ERROR: data could not be acquired[a]										
100000$ERROR: data could not be acquired[a]										
110000$ERROR: data could not be acquired[a]										
120000	10.67	7.61	0.603	0.386	2.0	0.21	-548	6.82	N/A	12.6
130000	10.67	7.61	0.603	0.386	2.0	0.21	-548	6.82	N/A	12.6
140000	10.67	7.61	0.603	0.386	2.0	0.21	-548	6.82	N/A	12.7
150000	10.67	7.61	0.603	0.386	2.0	0.21	-548	6.82	N/A	12.6
160000	10.67	7.61	0.602	0.385	2.0	0.21	-547	6.82	N/A	12.7

TABLE B-2
(Continued)

Time HHMMSS	Temp deg C	pH Units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Depth Meters	Turb NTU	Batt Volts
170000	10.67	7.61	0.603	0.386	2.0	0.21	-547	6.82	N/A	12.7
180000	10.67	7.61	0.602	0.385	2.0	0.21	-547	6.82	N/A	12.6
190000	10.67	7.60	0.602	0.385	2.0	0.21	-547	6.82	N/A	12.6
200000	10.67	7.60	0.602	0.385	2.0	0.21	-547	6.82	N/A	12.6
210000$ERROR: data could not be acquired[a]										
220000$ERROR: data could not be acquired[a]										
230000$ERROR: data could not be acquired[a]										
Date (MMDDYY): 040296										
000000$ERROR: data could not be acquired[a]										
010000$ERROR: data could not be acquired[a]										
020000$ERROR: data could not be acquired[a]										
030000$ERROR: data could not be acquired[a]										
040000$ERROR: data could not be acquired[a]										
050000$ERROR: data could not be acquired[a]										
060000$ERROR: data could not be acquired[a]										
070000$ERROR: data could not be acquired[a]										
080000	10.67	7.60	0.602	0.385	2.0	0.21	-547	6.84	N/A	12.6
090000	10.65	7.60	0.602	0.385	2.0	0.21	-548	6.84	N/A	12.6
Recovery finished at 040296 093930										

[a]Unable to record data due to battery problems in logger.

TABLE B-3

WATER QUALITY IN WELL 31567 - OUT
WEDNESDAY, MARCH 20, 1996, THROUGH TUESDAY, APRIL 2, 1996
(Measurements Recorded Every Hour)

Log File Name: 31567.OU
Setup Date (MMDDYY): 032096
Setup Time (HHMMSS): 112852
Starting Date (MMDDYY): 032096
Starting Time (HHMMSS): 120000
Stopping Date (MMDDYY): 123199
Stopping Time (HHMMSS): 235959
Interval (HHMMSS): 010000
Warmup: Disable

==> Follow Variable and Calibration Change(s) <==

Temperature: Centigrade
Specific Conductance/Resistivity: Specific Conductance,mS/cm,Salt,Auto range,TDS,Temperature compensated,A->Comp 1,A->Method 1
% Sat: 734.0
DO: DO,LoFlow,Salinity compensated,Oxygen-26.7K
Depth/Level: Feet,Level
Turbidity: Ratio,Auto range
Buzzer: Disable
Stirrer: Enable

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/l	DO % Sat	% DO mg/l	Redox mV	Level feet	Turb NTU	Batt volts
Date (MMDDYY): 032096										
120000	10.96	7.00	0.732	0.468	12.0	1.28	292	2.36	N/A	13.0
130000	11.00	7.06	0.737	0.472	6.8	0.73	293	2.37	N/A	12.7
140000	11.01	7.06	0.754	0.483	9.8	1.04	295	2.37	N/A	12.7
150000	11.00	7.06	0.763	0.488	6.5	0.69	296	2.37	N/A	12.7
160000	11.01	7.07	0.770	0.493	5.9	0.63	296	2.38	N/A	12.7
170000	11.00	7.07	0.774	0.496	5.7	0.61	296	2.38	N/A	12.7
180000	11.01	7.07	0.778	0.498	5.5	0.59	296	2.38	N/A	12.6
190000	11.01	7.08	0.781	0.500	5.5	0.59	296	2.39	N/A	12.6
200000	11.01	7.08	0.783	0.501	5.5	0.59	295	2.39	N/A	12.6
210000	11.01	7.09	0.786	0.503	5.4	0.57	295	2.39	N/A	12.6
220000	11.01	7.09	0.788	0.504	5.5	0.59	295	2.39	N/A	12.5
230000	11.01	7.09	0.789	0.505	5.4	0.57	295	2.39	N/A	12.6
Date (MMDDYY): 032196										
000000	11.01	7.09	0.790	0.506	6.8	0.73	294	2.40	N/A	12.5
010000	11.01	7.09	0.790	0.506	6.3	0.67	294	2.40	N/A	12.5
020000	11.01	7.10	0.793	0.508	5.9	0.63	294	2.40	N/A	12.5
030000	11.01	7.10	0.793	0.508	5.9	0.63	293	2.40	N/A	12.5
040000	11.01	7.10	0.796	0.510	5.7	0.61	293	2.40	N/A	12.5
050000	11.01	7.10	0.795	0.509	5.5	0.59	293	2.40	N/A	12.5
060000	11.01	7.10	0.797	0.510	5.4	0.57	293	2.40	N/A	12.5
070000	11.01	7.11	0.796	0.510	5.0	0.53	293	2.40	N/A	12.5
080000	11.01	7.11	0.796	0.510	5.0	0.53	293	2.40	N/A	12.6
090000	11.01	7.11	0.794	0.508	4.8	0.51	292	2.41	N/A	12.6
100000	11.01	7.11	0.796	0.510	5.5	0.59	292	2.41	N/A	12.7

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/l	DO % Sat	% DO mg/l	Redox mV	Level feet	Turb NTU	Batt volts
110000	11.01	7.11	0.795	0.509	5.4	0.57	291	2.41	N/A	12.7
120000	11.01	7.12	0.797	0.510	5.0	0.53	291	2.41	N/A	12.7
130000	11.01	7.12	0.797	0.510	4.8	0.51	291	2.41	N/A	12.7
140000	11.01	7.12	0.793	0.508	4.8	0.51	291	2.41	N/A	12.7
150000	11.01	7.12	0.798	0.511	4.6	0.49	290	2.41	N/A	12.7
160000	11.01	7.12	0.797	0.510	4.1	0.43	291	2.41	N/A	12.7
170000	11.01	7.13	0.798	0.511	3.9	0.41	291	2.41	N/A	12.7
180000	11.01	7.13	0.795	0.509	4.1	0.43	290	2.41	N/A	12.7
190000	11.01	7.13	0.799	0.511	5.4	0.57	290	2.42	N/A	12.6
200000	11.01	7.13	0.797	0.510	5.4	0.57	290	2.41	N/A	12.6
210000	11.01	7.13	0.795	0.509	5.2	0.55	290	2.42	N/A	12.6
220000	11.01	7.13	0.792	0.507	5.2	0.55	289	2.42	N/A	12.6
230000	11.01	7.13	0.793	0.508	5.0	0.53	288	2.42	N/A	12.5
Date (MMDDYY): 032296										
000000	11.01	7.13	0.797	0.510	5.0	0.53	289	2.42	N/A	12.5
010000	11.00	7.13	0.797	0.510	4.4	0.47	288	2.41	N/A	12.5
020000	11.01	7.14	0.796	0.510	4.3	0.45	287	2.42	N/A	12.5
030000	11.01	7.14	0.794	0.508	4.3	0.45	287	2.42	N/A	12.5
040000	11.01	7.14	0.792	0.507	5.4	0.57	287	2.42	N/A	12.5
050000	11.01	7.14	0.795	0.509	5.4	0.57	287	2.42	N/A	12.5
060000	11.01	7.14	0.795	0.509	3.9	0.41	287	2.42	N/A	12.4
070000	11.01	7.14	0.798	0.511	3.9	0.41	287	2.42	N/A	12.4
080000	11.01	7.14	0.796	0.510	4.1	0.43	287	2.42	N/A	12.5
090000	11.01	7.15	0.794	0.508	3.7	0.39	284	2.42	N/A	12.6
100000	11.01	7.15	0.794	0.508	3.7	0.39	283	2.42	N/A	12.7
110000	11.01	7.15	0.793	0.508	4.1	0.43	281	2.42	N/A	12.7
120000	11.01	7.15	0.796	0.510	3.7	0.39	281	2.42	N/A	12.8
130000	11.01	7.15	0.793	0.508	3.7	0.39	280	2.42	N/A	12.8
140000	11.01	7.15	0.792	0.507	3.5	0.37	279	2.42	N/A	12.8
150000	11.03	7.15	0.795	0.509	3.9	0.41	278	2.42	N/A	12.8
160000	11.01	7.16	0.793	0.508	4.1	0.43	277	2.42	N/A	12.8
170000	11.03	7.16	0.792	0.507	4.3	0.45	276	2.42	N/A	12.8
180000	11.03	7.16	0.794	0.508	4.3	0.45	276	2.42	N/A	12.8
190000	11.03	7.16	0.794	0.508	4.4	0.47	277	2.43	N/A	12.7
200000	11.03	7.16	0.794	0.508	4.3	0.45	276	2.43	N/A	12.6
210000	11.03	7.16	0.794	0.508	5.4	0.57	275	2.43	N/A	12.6
220000	11.03	7.16	0.792	0.507	4.8	0.51	274	2.43	N/A	12.6
230000	11.01	7.16	0.793	0.508	4.6	0.49	274	2.43	N/A	12.5
Date (MMDDYY): 032396										
000000	11.03	7.16	0.794	0.508	5.2	0.55	273	2.43	N/A	12.5
010000	11.03	7.16	0.793	0.508	3.9	0.41	273	2.43	N/A	12.5
020000	11.03	7.17	0.793	0.508	3.7	0.39	273	2.43	N/A	12.5
030000	11.03	7.17	0.793	0.508	3.7	0.39	274	2.44	N/A	12.5
040000	11.02	7.17	0.793	0.507	3.5	0.37	273	2.44	N/A	12.5

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/l	DO % Sat	% DO mg/l	Redox mV	Level feet	Turb NTU	Batt volts
050000	11.03	7.17	0.791	0.506	3.5	0.37	272	2.44	N/A	12.4
060000	11.03	7.17	0.794	0.508	3.5	0.37	271	2.44	N/A	12.5
070000	11.03	7.17	0.792	0.507	3.3	0.35	272	2.44	N/A	12.4
080000	11.03	7.17	0.792	0.507	3.0	0.31	272	2.44	N/A	12.4
090000	11.03	7.17	0.792	0.507	3.0	0.31	271	2.44	N/A	12.6
100000	11.03	7.18	0.792	0.507	5.5	0.59	271	2.45	N/A	12.7
110000	11.03	7.18	0.793	0.508	9.1	0.96	270	2.45	N/A	12.7
120000	11.03	7.18	0.793	0.508	7.9	0.84	271	2.45	N/A	12.8
130000	11.03	7.18	0.790	0.506	8.1	0.86	270	2.45	N/A	12.8
140000	11.03	7.18	0.791	0.506	8.3	0.88	270	2.45	N/A	12.9
150000	11.03	7.18	0.791	0.506	8.9	0.94	270	2.45	N/A	12.8
160000	11.03	7.18	0.793	0.508	8.5	0.90	269	2.45	N/A	12.8
170000	11.03	7.18	0.792	0.507	8.3	0.88	268	2.45	N/A	12.8
180000	11.03	7.18	0.791	0.506	8.3	0.88	267	2.45	N/A	12.7
190000	11.03	7.19	0.790	0.506	7.9	0.84	266	2.45	N/A	12.7
200000	11.03	7.19	0.790	0.506	7.6	0.80	265	2.45	N/A	12.6
210000	11.03	7.19	0.789	0.505	7.0	0.75	265	2.45	N/A	12.6
220000	11.03	7.19	0.788	0.505	7.0	0.75	265	2.45	N/A	12.6
230000	11.03	7.19	0.789	0.505	6.5	0.69	264	2.45	N/A	12.6
Date (MMDDYY): 032496										
000000	11.03	7.19	0.789	0.505	6.5	0.69	263	2.45	N/A	12.6
010000	11.03	7.19	0.787	0.504	6.1	0.65	263	2.45	N/A	12.5
020000	11.03	7.19	0.788	0.505	6.1	0.65	262	2.45	N/A	12.6
030000	11.03	7.20	0.789	0.505	6.1	0.65	262	2.45	N/A	12.6
040000	11.03	7.20	0.789	0.505	5.9	0.63	262	2.45	N/A	12.6
050000	11.03	7.20	0.788	0.505	5.9	0.63	261	2.44	N/A	12.5
060000	11.03	7.20	0.787	0.503	5.7	0.61	261	2.45	N/A	12.5
070000	11.03	7.20	0.788	0.505	5.7	0.61	260	2.45	N/A	12.5
080000	11.03	7.20	0.788	0.505	5.7	0.61	260	2.44	N/A	12.6
090000	11.03	7.20	0.787	0.504	5.7	0.61	260	2.44	N/A	12.7
100000	11.03	7.20	0.787	0.503	5.9	0.63	259	2.44	N/A	12.7
110000	11.03	7.20	0.787	0.503	5.7	0.61	259	2.44	N/A	12.8
120000	11.03	7.20	0.786	0.503	5.7	0.61	258	2.44	N/A	12.8
130000	11.03	7.20	0.784	0.502	5.7	0.61	258	2.43	N/A	12.8
140000	11.03	7.21	0.783	0.501	5.5	0.59	259	2.43	N/A	12.8
150000	11.03	7.21	0.785	0.502	6.1	0.65	260	2.43	N/A	12.8
160000	11.03	7.21	0.784	0.502	5.9	0.63	259	2.43	N/A	12.8
170000	11.03	7.21	0.784	0.502	7.2	0.76	258	2.43	N/A	12.8
180000	11.03	7.21	0.785	0.502	5.2	0.55	255	2.43	N/A	12.8
190000	11.03	7.21	0.785	0.502	6.8	0.73	254	2.42	N/A	12.7
200000	11.01	7.21	0.784	0.502	6.7	0.71	252	2.42	N/A	12.7
210000	11.01	7.21	0.785	0.502	6.3	0.67	251	2.42	N/A	12.7
220000	11.01	7.22	0.785	0.502	5.7	0.61	251	2.42	N/A	12.7
230000	11.01	7.22	0.783	0.501	5.7	0.61	251	2.42	N/A	12.7

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/l	DO % Sat	% DO mg/l	Redox mV	Level feet	Turb NTU	Batt volts
Date (MMDDYY): 032596										
000000	11.01	7.22	0.784	0.502	5.7	0.61	251	2.42	N/A	12.7
010000	11.01	7.22	0.782	0.500	5.0	0.53	250	2.41	N/A	12.7
020000	11.01	7.22	0.782	0.500	5.5	0.59	250	2.41	N/A	12.7
030000	11.01	7.22	0.782	0.500	5.9	0.63	249	2.41	N/A	12.7
040000	11.01	7.22	0.781	0.500	4.8	0.51	250	2.42	N/A	12.7
050000	11.01	7.22	0.781	0.500	5.5	0.59	250	2.41	N/A	12.6
060000	11.01	7.22	0.781	0.500	5.2	0.55	250	2.41	N/A	12.6
070000	11.01	7.23	0.782	0.500	4.6	0.49	249	2.41	N/A	12.7
080000	11.01	7.23	0.780	0.499	4.1	0.43	249	2.41	N/A	12.6
090000	11.01	7.23	0.781	0.500	3.7	0.39	249	2.41	N/A	12.6
100000	11.01	7.23	0.762	0.488	3.7	0.39	249	2.41	N/A	12.6
110000	11.01	7.24	0.742	0.475	3.5	0.37	244	2.41	N/A	12.7
120000	11.03	7.24	0.752	0.481	3.5	0.37	242	2.41	N/A	12.7
130000	11.03	7.24	0.775	0.496	3.5	0.37	248	2.41	N/A	12.7
140000	11.03	7.24	0.778	0.498	3.5	0.37	251	2.42	N/A	12.7
150000	11.03	7.23	0.776	0.497	3.9	0.41	252	2.42	N/A	12.7
160000	11.03	7.23	0.775	0.496	3.5	0.37	253	2.42	N/A	12.6
170000	11.03	7.23	0.775	0.496	3.7	0.39	254	2.43	N/A	12.6
180000	11.03	7.23	0.774	0.495	4.6	0.49	255	2.43	N/A	12.6
190000	11.03	7.23	0.774	0.495	3.1	0.33	255	2.44	N/A	12.6
200000	11.03	7.23	0.774	0.495	3.1	0.33	255	2.44	N/A	12.6
210000	11.03	7.24	0.776	0.497	3.3	0.35	255	2.44	N/A	12.5
220000	11.03	7.24	0.777	0.497	3.3	0.35	255	2.45	N/A	12.5
230000	11.03	7.24	0.776	0.497	3.1	0.33	255	2.45	N/A	12.5
Date (MMDDYY): 032696										
000000	11.03	7.24	0.776	0.497	3.3	0.35	255	2.45	N/A	12.5
010000	11.03	7.24	0.776	0.497	3.9	0.41	255	2.45	N/A	12.5
020000	11.03	7.24	0.777	0.497	5.9	0.63	256	2.45	N/A	12.4
030000	11.03	7.24	0.777	0.497	6.7	0.71	257	2.45	N/A	12.4
040000	11.03	7.24	0.777	0.497	6.8	0.73	257	2.45	N/A	12.4
050000	11.03	7.24	0.775	0.496	6.5	0.69	256	2.45	N/A	12.4
060000	11.03	7.24	0.777	0.497	6.3	0.67	256	2.46	N/A	12.4
070000	11.03	7.24	0.776	0.497	6.1	0.65	256	2.46	N/A	12.4
080000	11.03	7.24	0.774	0.495	6.1	0.65	257	2.46	N/A	12.4
090000	11.03	7.24	0.774	0.495	5.9	0.63	258	2.47	N/A	12.4
100000	11.03	7.24	0.774	0.495	5.9	0.63	259	2.47	N/A	12.4
110000	11.03	7.24	0.775	0.496	5.7	0.61	260	2.47	N/A	12.5
120000	11.03	7.24	0.777	0.497	5.7	0.61	261	2.47	N/A	12.6
130000	11.03	7.24	0.776	0.497	5.9	0.63	261	2.47	N/A	12.6
140000	11.03	7.24	0.775	0.496	5.9	0.63	261	2.47	N/A	12.6
150000	11.03	7.24	0.775	0.496	5.7	0.61	261	2.47	N/A	12.6
160000	11.03	7.24	0.775	0.496	5.5	0.59	262	2.47	N/A	12.7
170000	11.03	7.25	0.775	0.496	5.7	0.61	262	2.47	N/A	12.7
180000	11.03	7.25	0.774	0.495	5.9	0.63	263	2.47	N/A	12.6

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/l	DO % Sat	% DO mg/l	Redox mV	Level feet	Turb NTU	Batt volts
190000	11.03	7.25	0.773	0.495	5.7	0.61	263	2.47	N/A	12.5
200000	11.03	7.25	0.774	0.495	5.4	0.57	264	2.47	N/A	12.5
210000	11.03	7.25	0.774	0.495	5.5	0.59	264	2.47	N/A	12.5
220000	11.03	7.25	0.774	0.495	5.4	0.57	265	2.47	N/A	12.4
230000	11.03	7.25	0.774	0.495	5.4	0.57	265	2.47	N/A	12.4
Date (MMDDYY): 032796										
000000	11.03	7.25	0.774	0.495	5.4	0.57	265	2.48	N/A	12.4
010000	11.03	7.25	0.775	0.496	5.5	0.59	266	2.47	N/A	12.3
020000	11.03	7.25	0.775	0.496	5.4	0.57	266	2.47	N/A	12.3
030000	11.03	7.25	0.774	0.495	5.5	0.59	267	2.47	N/A	12.3
040000	11.03	7.26	0.772	0.494	5.5	0.59	268	2.47	N/A	12.3
050000	11.03	7.26	0.773	0.495	5.5	0.59	268	2.48	N/A	12.3
060000	11.03	7.26	0.773	0.495	5.4	0.57	268	2.48	N/A	12.3
070000	11.03	7.26	0.773	0.495	5.2	0.55	268	2.48	N/A	12.3
080000	11.03	7.26	0.773	0.495	5.4	0.57	270	2.48	N/A	12.3
090000	11.03	7.26	0.772	0.494	5.4	0.57	271	2.48	N/A	12.4
100000	11.03	7.26	0.771	0.494	5.4	0.57	271	2.48	N/A	12.5
110000	11.03	7.26	0.771	0.494	5.4	0.57	272	2.48	N/A	12.6
120000	11.03	7.26	0.772	0.494	5.2	0.55	273	2.47	N/A	12.6
130000	11.63	7.44	0.680	0.435	117.7	12.33	277	2.70	N/A	12.6
140000	11.50	7.38	0.687	0.439	74.3	7.80	292	2.48	N/A	12.7
150000	11.52	7.40	0.679	0.435	100.9	10.59	293	2.71	N/A	12.7
160000	11.39	7.40	0.679	0.435	100.5	10.58	296	2.71	N/A	12.7
170000	11.29	7.40	0.680	0.435	100.6	10.61	299	2.70	N/A	12.7
180000	11.21	7.40	0.680	0.435	99.8	10.55	300	2.70	N/A	12.7
190000	11.04	7.40	0.680	0.435	99.0	10.50	302	2.71	N/A	12.6
200000	11.04	7.40	0.680	0.435	98.6	10.46	303	2.71	N/A	12.6
210000	11.02	7.40	0.679	0.435	98.6	10.47	303	2.69	N/A	12.6
220000	11.01	7.41	0.680	0.435	98.7	10.49	304	2.70	N/A	12.6
230000	11.01	7.41	0.679	0.435	98.2	10.43	306	2.71	N/A	12.5
Date (MMDDYY): 032896										
000000	11.03	7.41	0.680	0.435	98.1	10.42	306	2.71	N/A	12.5
010000	11.01	7.41	0.680	0.435	98.0	10.41	307	2.70	N/A	12.5
020000	11.00	7.41	0.680	0.435	97.7	10.38	308	2.70	N/A	12.5
030000	11.06	7.41	0.680	0.435	97.6	10.36	309	2.70	N/A	12.5
040000	11.06	7.41	0.680	0.435	97.6	10.36	309	2.70	N/A	12.5
050000	11.06	7.41	0.680	0.435	97.8	10.38	310	2.69	N/A	12.5
060000	11.00	7.41	0.679	0.435	97.7	10.38	311	2.70	N/A	12.5
070000	11.05	7.41	0.680	0.435	97.5	10.35	312	2.69	N/A	12.5
080000	11.08	7.41	0.680	0.435	96.8	10.27	312	2.70	N/A	12.5
090000	11.13	7.41	0.679	0.435	96.1	10.18	313	2.70	N/A	12.5
100000	11.08	7.41	0.680	0.435	96.1	10.19	314	2.70	N/A	15.5
110000	11.11	7.41	0.680	0.435	96.0	10.17	315	2.70	N/A	15.5
120000	11.16	7.41	0.679	0.435	95.8	10.14	316	2.69	N/A	15.5

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/l	DO % Sat	% DO mg/l	Redox mV	Level feet	Turb NTU	Batt volts
130000	11.19	7.41	0.679	0.435	96.2	10.17	317	2.69	N/A	15.5
140000	11.16	7.41	0.679	0.435	96.5	10.21	318	2.69	N/A	15.5
150000	11.24	7.41	0.679	0.435	96.7	10.22	319	2.68	N/A	15.4
160000	11.19	7.42	0.679	0.435	96.6	10.21	320	2.68	N/A	15.5
170000	11.18	7.42	0.679	0.435	96.6	10.22	321	2.67	N/A	15.5
180000	11.18	7.42	0.679	0.435	96.6	10.22	322	2.68	N/A	15.4
190000	11.16	7.42	0.679	0.435	96.3	10.19	324	2.68	N/A	15.4
200000	11.09	7.42	0.680	0.435	96.4	10.22	325	2.67	N/A	15.4
210000	11.08	7.42	0.695	0.445	82.8	8.78	333	2.45	N/A	15.4
220000	11.16	7.42	0.679	0.435	96.7	10.23	332	2.68	N/A	15.4
230000	11.11	7.42	0.680	0.435	95.4	10.11	333	2.68	N/A	15.4
Date (MMDDYY): 032996										
000000	11.09	7.42	0.680	0.435	95.7	10.14	335	2.68	N/A	15.4
010000	11.13	7.42	0.679	0.435	95.5	10.12	337	2.69	N/A	15.4
020000	11.14	7.42	0.679	0.435	95.5	10.11	339	2.68	N/A	15.4
030000	11.14	7.42	0.679	0.435	95.8	10.15	341	2.68	N/A	15.3
040000	11.09	7.42	0.680	0.435	95.8	10.16	344	2.68	N/A	15.3
050000	11.08	7.42	0.679	0.434	95.9	10.17	346	2.68	N/A	15.3
060000	11.13	7.42	0.679	0.435	96.1	10.18	349	2.69	N/A	15.3
070000	11.13	7.42	0.679	0.435	96.1	10.18	352	2.69	N/A	15.3
080000	11.14	7.42	0.679	0.435	96.0	10.17	355	2.69	N/A	15.4
090000	11.19	7.42	0.679	0.435	96.0	10.15	358	2.69	N/A	15.3
100000	11.21	7.42	0.679	0.435	96.1	10.16	362	2.69	N/A	15.3
110000	11.26	7.42	0.679	0.435	96.5	10.19	367	2.69	N/A	15.3
120000	11.32	7.42	0.679	0.434	96.4	10.17	371	2.69	N/A	15.2
130000	11.31	7.43	0.679	0.434	96.3	10.16	376	2.69	N/A	12.9
140000	11.40	7.43	0.678	0.434	97.0	10.21	381	2.69	N/A	12.7
150000	11.34	7.43	0.679	0.434	96.7	10.19	387	2.69	N/A	12.8
160000	11.26	7.43	0.679	0.435	96.5	10.19	393	2.69	N/A	12.8
170000	11.24	7.43	0.679	0.435	96.2	10.16	399	2.69	N/A	12.7
180000	11.22	7.42	0.679	0.435	95.9	10.13	405	2.69	N/A	12.7
190000	11.19	7.42	0.679	0.435	95.3	10.08	412	2.70	N/A	12.7
200000	11.19	7.42	0.679	0.435	94.9	10.04	421	2.70	N/A	12.7
210000	11.18	7.42	0.679	0.435	95.7	10.12	429	2.70	N/A	12.7
220000	11.18	7.43	0.679	0.435	96.3	10.18	436	2.70	N/A	12.7
230000	11.18	7.43	0.679	0.435	95.9	10.14	442	2.70	N/A	12.7
Date (MMDDYY): 033096										
000000	11.16	7.43	0.677	0.434	96.5	10.21	448	2.71	N/A	12.6
010000	11.16	7.43	0.678	0.434	96.7	10.23	454	2.70	N/A	12.6
020000	11.16	7.43	0.679	0.435	96.5	10.21	458	2.70	N/A	12.6
030000	11.13	7.43	0.679	0.434	96.6	10.23	464	2.70	N/A	12.6
040000	11.14	7.43	0.678	0.434	97.1	10.28	469	2.70	N/A	12.6
050000	11.13	7.43	0.679	0.434	96.8	10.25	474	2.70	N/A	12.6
060000	11.13	7.43	0.679	0.434	96.8	10.25	478	2.70	N/A	12.6

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/l	DO % Sat	% DO mg/l	Redox mV	Level feet	Turb NTU	Batt volts
070000	11.14	7.43	0.678	0.434	96.8	10.24	481	2.70	N/A	12.7
080000	11.16	7.43	0.679	0.435	96.9	10.25	485	2.70	N/A	12.6
090000	11.24	7.44	0.679	0.435	97.3	10.28	488	2.70	N/A	12.6
100000	11.44	7.44	0.678	0.434	98.5	10.36	491	2.70	N/A	12.7
110000	11.73	7.44	0.678	0.434	99.8	10.43	493	2.70	N/A	12.7
120000	11.81	7.44	0.678	0.434	100.6	10.49	494	2.70	N/A	12.7
130000	11.81	7.44	0.679	0.434	102.0	10.64	497	2.70	N/A	12.8
140000	11.81	7.44	0.678	0.434	103.3	10.77	498	2.69	N/A	12.8
150000	11.93	7.45	0.679	0.434	103.9	10.80	500	2.69	N/A	12.8
160000	11.86	7.45	0.678	0.434	103.8	10.81	501	2.68	N/A	12.8
170000	11.71	7.45	0.678	0.434	103.9	10.85	502	2.68	N/A	12.8
180000	11.45	7.45	0.678	0.434	103.2	10.84	504	2.68	N/A	12.8
190000	11.34	7.44	0.679	0.434	100.7	10.62	485	2.68	N/A	12.7
200000	11.29	7.45	0.679	0.434	101.3	10.69	505	2.69	N/A	12.8
210000	11.19	7.44	0.679	0.435	100.8	10.66	507	2.69	N/A	12.7
220000	11.18	7.44	0.678	0.434	100.1	10.59	508	2.68	N/A	12.7
230000	11.16	7.44	0.678	0.434	99.1	10.49	509	2.68	N/A	12.7
Date (MMDDYY): 033196										
000000	11.14	7.44	0.678	0.434	99.7	10.56	509	2.68	N/A	12.7
010000	11.18	7.44	0.678	0.434	100.1	10.59	510	2.68	N/A	12.6
020000	11.18	7.44	0.678	0.434	99.2	10.49	510	2.68	N/A	12.6
030000	11.18	7.44	0.677	0.434	99.4	10.51	511	2.68	N/A	12.6
040000	11.18	7.44	0.678	0.434	99.6	10.53	511	2.68	N/A	12.6
050000	11.18	7.44	0.678	0.434	99.4	10.51	512	2.68	N/A	12.6
060000	11.18	7.45	0.677	0.434	99.4	10.51	512	2.68	N/A	12.6
070000	11.22	7.45	0.678	0.434	99.5	10.52	513	2.68	N/A	12.6
080000	11.31	7.45	0.679	0.434	99.0	10.45	513	2.68	N/A	12.6
090000	11.27	7.45	0.679	0.435	99.5	10.51	514	2.68	N/A	12.6
100000	11.29	7.45	0.679	0.434	99.5	10.50	515	2.68	N/A	12.6
110000	11.35	7.45	0.679	0.434	99.2	10.45	515	2.68	N/A	12.6
120000	11.65	7.45	0.679	0.434	100.7	10.54	515	2.68	N/A	12.7
130000	11.47	7.45	0.678	0.434	100.0	10.51	516	2.68	N/A	12.7
140000	11.39	7.45	0.679	0.434	99.1	10.43	516	2.67	N/A	12.6
150000	11.52	7.45	0.678	0.434	101.3	10.63	516	2.67	N/A	12.7
160000	11.62	7.45	0.678	0.434	101.4	10.62	516	2.67	N/A	12.7
170000	11.44	7.45	0.678	0.434	100.7	10.59	517	2.67	N/A	12.7
180000	11.44	7.45	0.696	0.446	90.9	9.56	537	2.44	N/A	12.7
190000	11.31	7.45	0.678	0.434	100.1	10.56	516	2.67	N/A	12.7
200000	11.24	7.45	0.678	0.434	100.0	10.57	519	2.67	N/A	12.8
210000	11.16	7.45	0.678	0.434	99.4	10.52	519	2.67	N/A	12.7
220000	11.11	7.45	0.679	0.434	99.6	10.56	519	2.68	N/A	12.7
230000	11.03	7.45	0.678	0.434	99.4	10.55	519	2.69	N/A	12.6

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/l	DO % Sat	% DO mg/l	Redox mV	Level feet	Turb NTU	Batt volts
Date (MMDDYY): 040196										
000000	10.98	7.45	0.678	0.434	99.1	10.53	519	2.68	N/A	12.6
010000	10.95	7.45	0.678	0.434	99.2	10.55	520	2.68	N/A	12.6
020000	10.93	7.45	0.678	0.434	98.9	10.52	520	2.68	N/A	12.6
030000	10.87	7.45	0.678	0.434	98.8	10.53	520	2.68	N/A	12.6
040000	10.85	7.46	0.678	0.434	99.2	10.58	520	2.69	N/A	12.6
050000	10.77	7.45	0.677	0.433	98.8	10.55	520	2.69	N/A	12.6
060000	10.69	7.45	0.676	0.433	98.4	10.53	521	2.69	N/A	12.5
070000	10.77	7.45	0.678	0.434	93.8	10.01	520	2.69	N/A	12.5
080000	10.80	7.45	0.678	0.434	93.8	10.01	522	2.70	N/A	12.5
090000	10.80	7.45	0.694	0.444	85.4	9.12	452	2.46	N/A	12.5
100000	10.80	7.45	0.696	0.445	84.9	9.06	429	2.46	N/A	12.5
110000	10.80	7.45	0.684	0.438	83.8	8.94	510	2.46	N/A	12.5
120000	10.80	7.45	0.690	0.442	82.5	8.80	499	2.46	N/A	12.5
130000	10.80	7.44	0.683	0.437	70.3	7.50	531	2.45	N/A	12.6
140000	10.80	7.44	0.690	0.442	73.9	7.88	539	2.46	N/A	12.6
150000	10.80	7.44	0.699	0.447	73.1	7.80	541	2.46	N/A	12.6
160000	10.80	7.45	0.700	0.448	74.4	7.94	507	2.46	N/A	12.7
170000	10.80	7.44	0.700	0.448	74.4	7.94	511	2.46	N/A	12.7
180000	10.80	7.44	0.701	0.449	75.0	8.00	521	2.46	N/A	12.7
190000	10.80	7.44	0.702	0.449	75.2	8.02	531	2.46	N/A	12.7
200000	10.80	7.44	0.702	0.449	75.5	8.06	523	2.46	N/A	12.6
210000	10.80	7.45	0.702	0.449	75.0	8.00	519	2.46	N/A	12.6
220000	10.80	7.45	0.700	0.448	74.8	7.98	527	2.46	N/A	12.6
230000	10.80	7.45	0.703	0.450	74.8	7.98	538	2.47	N/A	12.5
Date (MMDDYY): 040296										
000000	10.80	7.44	0.704	0.450	72.4	7.72	537	2.46	N/A	12.5
010000	10.80	7.44	0.706	0.452	69.4	7.40	533	2.47	N/A	12.5
020000	10.80	7.44	0.707	0.452	67.2	7.17	533	2.46	N/A	12.5
030000	10.80	7.44	0.707	0.453	64.7	6.91	535	2.47	N/A	12.4
040000	10.80	7.44	0.709	0.454	62.1	6.63	538	2.47	N/A	12.4
050000	10.80	7.44	0.709	0.454	59.3	6.33	541	2.47	N/A	12.4
060000	10.80	7.44	0.711	0.455	56.9	6.07	542	2.47	N/A	12.4
070000	10.80	7.44	0.712	0.456	54.3	5.79	542	2.47	N/A	12.4
080000	10.80	7.43	0.714	0.457	51.9	5.53	542	2.47	N/A	12.4
090000	10.80	7.43	0.714	0.457	49.6	5.29	542	2.47	N/A	12.5

Recovery finished at 040296 092343

TABLE B-4

WATER QUALITY OF SPIT EFFLUENT
TUESDAY, MARCH 19, 1996, THROUGH TUESDAY, APRIL 2, 1996
(Measurements Recorded Every Hour)

Time HH:MM:SS	Temp deg C	SpCond uS/cm	TDS g/L	DO %	DO mg/L	pH	ORP mV
Date (MMDDYY): 031996							
12:00:00	11.56	688.00	0.45	7.8	0.85	7.40	207.3
13:00:00	11.56	698.00	0.45	7.5	0.82	7.41	207.9
14:00:00	11.56	669.00	0.44	7.3	0.79	7.41	203.8
15:00:00	11.55	680.00	0.44	6.9	0.75	7.41	202.1
16:00:00	11.56	680.00	0.44	6.5	0.71	7.41	205.2
17:00:00	11.55	680.00	0.44	6.2	0.67	7.41	213.3
18:00:00	11.56	704.00	0.46	6.0	0.65	7.41	202.8
19:00:00	11.54	694.00	0.45	5.8	0.63	7.41	202.3
20:00:00	11.56	682.00	0.44	5.8	0.63	7.41	205.1
21:00:00	11.56	685.00	0.44	5.7	0.62	7.42	204.0
22:00:00	11.56	690.00	0.45	5.6	0.61	7.42	201.8
23:00:00	11.56	669.00	0.44	5.5	0.60	7.42	202.5
Date (MMDDYY): 032096							
0:00:00	11.56	702.00	0.46	5.4	0.59	7.42	206.4
1:00:00	11.56	677.00	0.44	5.3	0.58	7.42	201.6
2:00:00	11.65	695.00	0.45	5.6	0.60	7.42	155.5
3:00:00	11.53	695.00	0.45	5.3	0.57	7.42	188.6
4:00:00	11.53	706.00	0.46	5.2	0.56	7.42	198.1
5:00:00	11.53	685.00	0.44	5.1	0.56	7.42	203.8
6:00:00	11.52	679.00	0.44	5.1	0.55	7.42	208.9
7:00:00	11.51	699.00	0.45	5.2	0.57	7.42	219.6
8:00:00	11.52	673.00	0.44	5.2	0.56	7.42	223.3
9:00:00	11.52	682.00	0.44	5.1	0.55	7.42	220.2
10:00:00	11.53	683.00	0.44	5.1	0.55	7.43	227.1
11:00:00	11.54	695.00	0.45	5.0	0.55	7.43	224.1
12:00:00	11.54	684.00	0.44	5.0	0.54	7.43	227.0
13:00:00	11.53	691.00	0.45	4.8	0.52	7.43	223.9
14:00:00	11.54	697.00	0.45	5.0	0.55	7.43	223.1
15:00:00	11.54	674.00	0.44	4.8	0.53	7.43	228.9
16:00:00	11.52	672.00	0.44	5.3	0.58	7.43	226.0
17:00:00	11.54	691.00	0.45	4.9	0.53	7.43	227.0
18:00:00	11.54	684.00	0.44	4.9	0.53	7.43	226.0
19:00:00	11.54	700.00	0.46	4.9	0.53	7.43	227.3
20:00:00	11.54	687.00	0.45	4.8	0.53	7.43	229.6
21:00:00	11.55	683.00	0.44	5.0	0.54	7.43	230.8
22:00:00	11.54	695.00	0.45	4.9	0.54	7.43	232.3
23:00:00	11.55	680.00	0.44	4.9	0.53	7.43	238.0

TABLE B-4
(Continued)

Time HH:MM:SS	Temp deg C	SpCond uS/cm	TDS g/L	DO %	DO mg/L	pH	ORP mV
Date (MMDDYY): 032196							
0:00:00	11.55	686.00	0.45	4.9	0.53	7.43	234.0
1:00:00	11.55	683.00	0.44	4.9	0.53	7.44	234.9
2:00:00	11.55	673.00	0.44	4.9	0.53	7.44	230.1
3:00:00	11.55	701.00	0.46	4.8	0.52	7.44	232.6
4:00:00	11.55	677.00	0.44	4.8	0.52	7.44	231.1
5:00:00	11.55	689.00	0.45	5.1	0.55	7.44	230.0
6:00:00	11.54	674.00	0.44	4.9	0.53	7.44	247.1
7:00:00	11.53	687.00	0.45	4.8	0.52	7.44	250.3
8:00:00	11.54	687.00	0.45	4.8	0.52	7.44	250.9
9:00:00	11.54	691.00	0.45	4.8	0.52	7.44	253.6
10:00:00	11.55	686.00	0.45	4.8	0.52	7.44	255.5
11:00:00	11.56	698.00	0.45	4.8	0.52	7.44	255.0
12:00:00	11.56	682.00	0.44	4.8	0.52	7.44	257.1
13:00:00	11.56	686.00	0.45	4.8	0.52	7.44	261.2
14:00:00	11.55	691.00	0.45	4.8	0.52	7.44	262.0
15:00:00	11.54	701.00	0.46	4.7	0.51	7.44	260.0
16:00:00	11.54	691.00	0.45	4.8	0.52	7.44	258.4
17:00:00	11.54	686.00	0.45	4.7	0.51	7.44	264.0
18:00:00	11.53	681.00	0.44	4.7	0.51	7.44	263.8
19:00:00	11.53	687.00	0.45	4.7	0.51	7.44	258.2
20:00:00	11.53	696.00	0.45	4.8	0.52	7.44	258.7
21:00:00	11.52	695.00	0.45	4.7	0.51	7.44	261.6
22:00:00	11.52	676.00	0.44	4.7	0.51	7.45	261.7
23:00:00	11.52	689.00	0.45	4.7	0.52	7.45	260.2
Date (MMDDYY): 032296							
0:00:00	11.52	678.00	0.44	4.7	0.51	7.45	263.0
1:00:00	11.53	688.00	0.45	4.7	0.51	7.45	263.7
2:00:00	11.53	692.00	0.45	4.6	0.50	7.45	261.5
3:00:00	11.53	690.00	0.45	4.6	0.50	7.45	264.9
4:00:00	11.58	699.00	0.46	4.6	0.49	7.45	261.9
5:00:00	11.60	692.00	0.45	4.9	0.53	7.45	200.2
6:00:00	11.55	694.00	0.45	4.6	0.50	7.45	244.4
7:00:00	11.54	681.00	0.44	4.6	0.50	7.45	249.1
8:00:00	11.53	682.00	0.44	4.5	0.49	7.45	256.4
9:00:00	11.54	682.00	0.44	4.6	0.50	7.45	261.2
10:00:00	11.55	703.00	0.46	4.6	0.50	7.45	258.1
11:00:00	11.55	699.00	0.45	4.6	0.50	7.45	259.6
12:00:00	11.56	695.00	0.45	4.5	0.49	7.45	259.2
13:00:00	11.57	686.00	0.45	4.5	0.49	7.45	262.6
14:00:00	11.56	690.00	0.45	4.5	0.49	7.45	262.5
15:00:00	11.58	699.00	0.45	4.5	0.49	7.46	260.2
16:00:00	11.58	691.00	0.45	4.5	0.49	7.46	261.8
17:00:00	11.57	694.00	0.45	4.5	0.49	7.46	264.2
18:00:00	11.57	693.00	0.45	4.5	0.49	7.46	262.8

TABLE B-4
(Continued)

Time HH:MM:SS	Temp deg C	SpCond uS/cm	TDS g/L	DO %	DO mg/L	pH	ORP mV
19:00:00	11.56	680.00	0.44	4.5	0.48	7.46	263.2
20:00:00	11.56	690.00	0.45	4.4	0.48	7.46	263.1
21:00:00	11.55	682.00	0.44	4.5	0.49	7.46	263.6
22:00:00	11.55	696.00	0.45	4.5	0.49	7.46	266.1
23:00:00	11.55	690.00	0.45	4.5	0.49	7.46	265.2
Date (MMDDYY): 032396							
0:00:00	11.54	669.00	0.44	4.5	0.48	7.46	265.8
1:00:00	11.54	700.00	0.46	4.4	0.48	7.46	267.3
2:00:00	11.54	688.00	0.45	4.4	0.48	7.46	265.5
3:00:00	11.54	698.00	0.45	4.4	0.48	7.46	266.2
4:00:00	11.54	689.00	0.45	4.4	0.48	7.46	269.1
5:00:00	11.54	675.00	0.44	4.4	0.47	7.46	264.2
6:00:00	11.54	680.00	0.44	4.4	0.47	7.46	266.3
7:00:00	11.54	695.00	0.45	4.3	0.47	7.46	269.7
8:00:00	11.54	688.00	0.45	4.3	0.47	7.46	267.9
9:00:00	11.55	692.00	0.45	4.4	0.47	7.46	269.0
10:00:00	11.56	689.00	0.45	4.3	0.47	7.46	268.2
11:00:00	11.58	678.00	0.44	4.3	0.47	7.46	270.6
12:00:00	11.58	692.00	0.45	4.3	0.47	7.46	269.7
13:00:00	11.57	687.00	0.45	4.3	0.47	7.46	272.4
14:00:00	11.58	695.00	0.45	4.5	0.49	7.47	270.6
15:00:00	11.59	696.00	0.45	4.3	0.47	7.47	271.1
16:00:00	11.58	697.00	0.45	4.3	0.47	7.47	273.9
17:00:00	11.59	695.00	0.45	4.3	0.47	7.47	273.0
18:00:00	11.58	696.00	0.45	4.3	0.47	7.47	278.7
19:00:00	11.57	695.00	0.45	4.3	0.46	7.47	274.6
20:00:00	11.57	682.00	0.44	4.3	0.46	7.47	274.1
21:00:00	11.59	693.00	0.45	4.4	0.47	7.47	189.6
22:00:00	11.56	683.00	0.44	4.3	0.47	7.47	223.5
23:00:00	11.56	697.00	0.45	4.3	0.47	7.47	235.0
Date (MMDDYY): 032496							
0:00:00	11.55	694.00	0.45	4.3	0.46	7.47	241.1
1:00:00	11.55	705.00	0.46	4.3	0.46	7.47	245.3
2:00:00	11.55	700.00	0.46	4.2	0.46	7.47	248.1
3:00:00	11.55	686.00	0.45	4.2	0.46	7.47	250.1
4:00:00	11.55	699.00	0.45	4.2	0.46	7.47	251.2
5:00:00	11.55	693.00	0.45	4.2	0.46	7.47	252.8
6:00:00	11.54	684.00	0.44	4.2	0.46	7.47	255.9
7:00:00	11.54	697.00	0.45	4.2	0.46	7.47	255.4
8:00:00	11.54	695.00	0.45	4.2	0.46	7.47	256.8
9:00:00	11.55	695.00	0.45	4.2	0.46	7.47	257.1
10:00:00	11.56	676.00	0.44	4.2	0.46	7.47	258.1
11:00:00	11.56	702.00	0.46	4.2	0.46	7.47	258.5
12:00:00	11.57	695.00	0.45	4.2	0.46	7.47	259.3

TABLE B-4
(Continued)

Time HH:MM:SS	Temp deg C	SpCond uS/cm	TDS g/L	DO %	DO mg/L	pH	ORP mV
13:00:00	11.57	687.00	0.45	4.2	0.45	7.48	260.1
14:00:00	11.58	696.00	0.45	4.2	0.45	7.48	260.7
15:00:00	11.59	688.00	0.45	4.2	0.45	7.48	260.9
16:00:00	11.59	675.00	0.44	4.1	0.45	7.48	261.9
17:00:00	11.58	702.00	0.46	4.1	0.45	7.48	262.8
18:00:00	11.57	692.00	0.45	4.1	0.45	7.48	262.5
19:00:00	11.57	699.00	0.45	4.1	0.45	7.48	265.3
20:00:00	11.58	698.00	0.45	4.1	0.45	7.48	264.7
21:00:00	11.58	699.00	0.45	4.1	0.44	7.48	265.6
22:00:00	11.57	685.00	0.44	4.1	0.44	7.48	265.8
23:00:00	11.57	696.00	0.45	4.3	0.46	7.48	265.8
Date (MMDDYY): 032596							
0:00:00	11.57	699.00	0.46	4.1	0.44	7.48	265.8
1:00:00	11.57	691.00	0.45	4.1	0.44	7.48	266.2
2:00:00	11.65	695.00	0.45	4.0	0.43	7.48	242.1
3:00:00	11.58	702.00	0.46	4.2	0.45	7.48	249.7
4:00:00	11.58	706.00	0.46	4.0	0.44	7.48	259.6
5:00:00	11.57	698.00	0.45	4.0	0.44	7.48	264.5
6:00:00	11.57	693.00	0.45	4.2	0.46	7.48	268.3
7:00:00	11.57	700.00	0.46	4.0	0.44	7.48	270.6
8:00:00	11.55	692.00	0.45	4.0	0.44	7.48	272.4
9:00:00	11.55	705.00	0.46	4.0	0.43	7.48	274.0
10:00:00	11.56	698.00	0.45	4.0	0.43	7.48	275.4
11:00:00	11.56	695.00	0.45	4.0	0.44	7.48	276.4
12:00:00	11.56	680.00	0.44	4.0	0.44	7.48	277.9
13:00:00	11.57	703.00	0.46	4.0	0.44	7.48	278.8
14:00:00	11.56	699.00	0.45	4.0	0.43	7.49	279.6
15:00:00	11.56	697.00	0.45	4.0	0.43	7.49	280.6
16:00:00	11.57	687.00	0.45	4.2	0.45	7.49	282.7
17:00:00	11.54	700.00	0.46	4.0	0.43	7.49	283.4
18:00:00	11.54	698.00	0.45	4.0	0.43	7.49	284.2
19:00:00	11.53	702.00	0.46	4.2	0.45	7.49	285.2
20:00:00	11.52	700.00	0.46	4.0	0.44	7.49	286.8
21:00:00	11.52	695.00	0.45	4.0	0.43	7.49	287.4
22:00:00	11.52	694.00	0.45	4.0	0.43	7.49	288.0
23:00:00	11.51	703.00	0.46	4.0	0.44	7.49	289.0
Date (MMDDYY): 032696							
0:00:00	11.51	698.00	0.45	4.0	0.43	7.49	290.5
1:00:00	11.52	703.00	0.46	4.1	0.45	7.49	291.3
2:00:00	11.51	703.00	0.46	4.0	0.43	7.49	292.0
3:00:00	11.55	700.00	0.46	4.0	0.43	7.49	267.2
4:00:00	11.55	703.00	0.46	4.2	0.45	7.49	278.9
5:00:00	11.50	706.00	0.46	4.0	0.44	7.49	289.4
6:00:00	11.49	703.00	0.46	4.0	0.43	7.49	297.7

TABLE B-4
(Continued)

Time HH:MM:SS	Temp deg C	SpCond uS/cm	TDS g/L	DO %	DO mg/L	pH	ORP mV
7:00:00	11.49	705.00	0.46	4.1	0.45	7.49	302.1
8:00:00	11.49	703.00	0.46	4.0	0.43	7.49	304.5
9:00:00	11.50	701.00	0.46	4.0	0.43	7.49	305.5
10:00:00	11.51	697.00	0.45	4.0	0.43	7.49	306.5
11:00:00	11.51	695.00	0.45	4.0	0.43	7.49	307.6
12:00:00	11.52	694.00	0.45	4.0	0.43	7.49	307.7
13:00:00	11.54	710.00	0.46	4.1	0.44	7.51	308.6
14:00:00	11.54	709.00	0.46	3.5	0.38	7.50	306.9
15:00:00	11.55	705.00	0.46	3.9	0.42	7.50	306.5
16:00:00	11.53	703.00	0.46	4.2	0.45	7.50	307.4
17:00:00	11.52	698.00	0.45	4.0	0.44	7.50	307.2
18:00:00	11.53	694.00	0.45	4.0	0.44	7.50	306.2
19:00:00	11.52	693.00	0.45	4.0	0.43	7.50	305.3
20:00:00	11.52	688.00	0.45	4.0	0.44	7.50	305.4
21:00:00	11.52	686.00	0.45	4.0	0.44	7.50	306.6
22:00:00	11.52	683.00	0.44	4.1	0.44	7.50	307.7
23:00:00	11.51	680.00	0.44	4.1	0.45	7.50	308.3
Date (MMDDYY): 032796							
0:00:00	11.51	677.00	0.44	4.1	0.45	7.50	309.1
1:00:00	11.51	675.00	0.44	4.1	0.45	7.50	309.5
2:00:00	11.51	675.00	0.44	4.1	0.45	7.50	309.8
3:00:00	11.51	679.00	0.44	4.0	0.43	7.50	310.3
4:00:00	11.56	679.00	0.44	4.1	0.45	7.50	303.7
5:00:00	11.48	675.00	0.44	4.3	0.47	7.50	310.5
6:00:00	11.48	701.00	0.46	4.3	0.47	7.50	314.7
7:00:00	11.06	703.00	0.46	5.1	0.56	7.51	319.0
8:00:00	11.45	699.00	0.45	4.6	0.50	7.50	320.0
9:00:00	11.45	697.00	0.45	4.6	0.50	7.50	319.5
10:00:00	11.47	693.00	0.45	4.6	0.50	7.50	320.3
11:00:00	11.36	690.00	0.45	4.4	0.48	7.50	322.0
12:00:00	11.36	687.00	0.45	4.5	0.49	7.50	321.9
13:00:00	11.07	687.00	0.45	4.5	0.50	7.50	324.1
14:00:00	11.11	687.00	0.45	4.5	0.49	7.50	324.8
15:00:00	11.48	685.00	0.45	4.5	0.49	7.51	320.2
16:00:00	11.48	682.00	0.44	4.5	0.49	7.51	317.3
17:00:00	11.51	679.00	0.44	4.6	0.50	7.51	317.5
Date (MMDDYY): 032896[a]							
Date (MMDDYY): 032996							
13:00:00	11.48	685.00	0.44	4.7	0.52	7.51	305.7
14:00:00	11.48	681.00	0.44	5.0	0.54	7.51	306.6
15:00:00	11.49	681.00	0.44	5.0	0.54	7.52	307.5
16:00:00	11.49	677.00	0.44	4.6	0.50	7.52	308.9
17:00:00	11.50	673.00	0.44	4.8	0.52	7.52	310.0

TABLE B-4
(Continued)

Time HH:MM:SS	Temp deg C	SpCond uS/cm	TDS g/L	DO %	DO mg/L	pH	ORP mV
18:00:00	11.49	692.00	0.45	4.8	0.52	7.52	309.0
19:00:00	11.49	691.00	0.45	4.8	0.52	7.52	308.2
20:00:00	11.49	695.00	0.45	4.8	0.52	7.52	298.3
21:00:00	11.49	693.00	0.45	4.8	0.52	7.52	304.9
22:00:00	11.49	691.00	0.45	4.8	0.52	7.52	308.1
23:00:00	11.49	688.00	0.45	4.7	0.51	7.52	309.9
Date (MMDDYY): 033096							
0:00:00	11.49	685.00	0.44	4.7	0.51	7.52	311.2
1:00:00	11.48	680.00	0.44	4.7	0.52	7.52	312.2
2:00:00	11.48	677.00	0.44	4.6	0.50	7.52	313.2
3:00:00	11.48	679.00	0.44	4.7	0.51	7.52	310.5
4:00:00	11.48	678.00	0.44	4.7	0.51	7.52	309.8
5:00:00	11.48	678.00	0.44	4.7	0.51	7.52	309.7
6:00:00	11.48	678.00	0.44	4.6	0.50	7.52	310.0
7:00:00	11.48	677.00	0.44	4.5	0.49	7.52	310.3
8:00:00	11.48	677.00	0.44	4.6	0.50	7.52	310.5
9:00:00	11.47	677.00	0.44	4.6	0.50	7.52	311.0
10:00:00	11.48	677.00	0.44	4.6	0.50	7.52	311.5
11:00:00	11.50	676.00	0.44	4.7	0.51	7.52	311.6
12:00:00	11.51	676.00	0.44	4.9	0.53	7.52	311.2
13:00:00	11.51	675.00	0.44	4.7	0.51	7.52	311.5
14:00:00	11.52	675.00	0.44	4.3	0.47	7.52	311.8
15:00:00	11.53	674.00	0.44	4.3	0.47	7.52	312.3
16:00:00	11.53	673.00	0.44	4.5	0.49	7.52	313.0
17:00:00	11.53	673.00	0.44	4.6	0.50	7.52	313.3
18:00:00	11.53	672.00	0.44	4.6	0.50	7.52	314.7
19:00:00	11.54	693.00	0.45	4.6	0.50	7.52	303.6
20:00:00	11.53	691.00	0.45	4.6	0.50	7.52	316.7
21:00:00	11.53	688.00	0.45	4.6	0.50	7.53	321.4
22:00:00	11.52	685.00	0.44	4.6	0.50	7.53	324.0
23:00:00	11.52	682.00	0.44	4.6	0.50	7.53	326.1
Date (MMDDYY): 033196							
0:00:00	11.51	679.00	0.44	4.6	0.50	7.53	326.7
1:00:00	11.51	708.00	0.46	4.6	0.50	7.53	327.0
2:00:00	11.51	706.00	0.46	4.6	0.49	7.53	327.9
3:00:00	11.51	704.00	0.46	4.5	0.49	7.53	328.6
4:00:00	11.51	700.00	0.46	4.6	0.50	7.53	328.8
5:00:00	11.51	700.00	0.46	4.6	0.50	7.53	328.9
6:00:00	11.51	698.00	0.45	4.5	0.49	7.53	329.0
7:00:00	11.51	694.00	0.45	4.5	0.49	7.53	328.8
8:00:00	11.51	691.00	0.45	4.6	0.50	7.53	329.4
9:00:00	11.52	683.00	0.44	4.6	0.50	7.53	329.3
10:00:00	11.52	680.00	0.44	4.7	0.52	7.53	328.1
11:00:00	11.52	676.00	0.44	4.6	0.50	7.53	328.3

TABLE B-4
(Continued)

Time HH:MM:SS	Temp deg C	SpCond uS/cm	TDS g/L	DO %	DO mg/L	pH	ORP mV
12:00:00	11.54	672.00	0.44	4.6	0.50	7.53	328.8
13:00:00	11.54	669.00	0.44	4.6	0.50	7.53	328.6
14:00:00	11.54	679.00	0.44	4.6	0.50	7.53	328.7
15:00:00	11.55	678.00	0.44	4.6	0.50	7.53	328.3
16:00:00	11.55	694.00	0.45	4.5	0.49	7.53	328.3
17:00:00	11.55	690.00	0.45	4.5	0.49	7.53	328.5
18:00:00	11.56	688.00	0.45	4.8	0.52	7.54	142.1
19:00:00	11.59	684.00	0.44	4.6	0.50	7.53	223.1
20:00:00	11.52	682.00	0.44	4.5	0.49	7.53	259.6
21:00:00	11.50	680.00	0.44	4.5	0.49	7.53	279.7
22:00:00	11.49	677.00	0.44	4.5	0.49	7.53	292.3
23:00:00	11.48	674.00	0.44	4.5	0.49	7.53	300.2
Date (MMDDYY): 040196							
0:00:00	11.47	671.00	0.44	4.5	0.49	7.53	306.2
1:00:00	11.47	667.00	0.43	4.5	0.48	7.53	310.1
2:00:00	11.46	691.00	0.45	4.5	0.49	7.53	313.1
3:00:00	11.45	703.00	0.46	4.4	0.48	7.53	314.9
4:00:00	11.45	701.00	0.46	4.3	0.47	7.53	317.0
5:00:00	11.45	700.00	0.46	4.5	0.49	7.53	318.4
6:00:00	11.45	698.00	0.45	4.5	0.49	7.53	319.5
7:00:00	11.45	697.00	0.45	4.5	0.49	7.53	319.7
8:00:00	11.46	702.00	0.46	4.6	0.50	7.53	320.0
9:00:00	11.47	702.00	0.46	4.6	0.50	7.53	318.9
10:00:00	11.47	702.00	0.46	4.6	0.50	7.53	318.9
11:00:00	11.48	702.00	0.46	4.6	0.50	7.53	318.2
12:00:00	11.49	701.00	0.46	4.7	0.51	7.53	317.7
13:00:00	11.51	699.00	0.46	4.7	0.51	7.54	320.3
14:00:00	11.51	697.00	0.45	4.7	0.51	7.54	322.7
15:00:00	11.51	693.00	0.45	4.7	0.51	7.54	324.5
16:00:00	11.53	691.00	0.45	4.7	0.51	7.54	325.6
17:00:00	11.53	692.00	0.45	4.7	0.51	7.54	326.5
18:00:00	11.51	690.00	0.45	5.0	0.54	7.54	327.3
19:00:00	11.55	687.00	0.45	4.5	0.49	7.54	327.6
20:00:00	11.55	686.00	0.45	4.9	0.53	7.54	325.8
21:00:00	11.50	684.00	0.44	4.7	0.51	7.54	332.9
22:00:00	11.50	682.00	0.44	4.7	0.51	7.54	336.0
23:00:00	11.50	680.00	0.44	4.6	0.50	7.54	337.2
Date (MMDDYY): 040296							
0:00:00	11.50	677.00	0.44	4.7	0.51	7.54	337.9
1:00:00	11.49	694.00	0.45	4.7	0.51	7.54	338.0
2:00:00	11.50	691.00	0.45	4.7	0.51	7.54	337.5
3:00:00	11.50	688.00	0.45	4.6	0.50	7.54	337.8
4:00:00	11.50	683.00	0.44	4.7	0.51	7.54	337.7
5:00:00	11.49	680.00	0.44	4.7	0.51	7.54	337.6

TABLE B-4
(Continued)

Time HH:MM:SS	Temp deg C	SpCond uS/cm	TDS g/L	DO %	DO mg/L	pH	ORP mV
6:00:00	11.49	676.00	0.44	4.7	0.51	7.54	337.7
7:00:00	11.50	673.00	0.44	4.7	0.51	7.54	337.3
8:00:00	11.50	670.00	0.44	4.7	0.51	7.54	336.8
9:00:00	11.51	667.00	0.43	4.7	0.51	7.54	336.6
10:00:00	11.53	705.00	0.46	4.7	0.51	7.54	336.4
11:00:00	11.54	704.00	0.46	4.7	0.51	7.54	335.8
12:00:00	11.54	702.00	0.46	4.6	0.50	7.54	335.3
13:00:00	11.55	700.00	0.46	4.7	0.51	7.54	335.0
14:00:00	11.55	697.00	0.45	4.8	0.52	7.54	334.7
15:00:00	11.55	694.00	0.45	4.6	0.50	7.54	334.8
16:00:00	11.56	690.00	0.45	4.6	0.50	7.55	334.7
17:00:00	11.56	698.00	0.45	4.6	0.50	7.55	334.3

[a]Unable to record data from 18:00:00 on 3/27/96 to 12:00:00 on 3/29/96 due to logger malfunction.

APPENDIX C

FLOW DATA

TABLE OF CONTENTS

Table C-1 Phase II Injection Test Injection Flow Measurements

TABLE C-1

PHASE II INJECTION TEST
INJECTION FLOW MEASUREMENTS

	SPIT Valve House Measurements		Injection Well Measurements	
Time 24 Hour Clock (Init.)	Flowrate Every Hour (gpm)	SPIT Ix 2 Discharge Pressure	Flowrate Every 2 hours (gpm)	Visually Observe Well
Started @ 1400 hrs. Date 3-27-96 Wed.				
14:00	206	12	-	-
15:00	206	12	-	-
16:00	206	11	-	-
17:00	199	11	200	OK
18:00	199	11	-	-
19:00	200	11	200	OK
20:00	199	11	-	-
21:00	196	11	200	OK
22:00	196	11	-	-
23:00	196	11	200	OK
24:00	197	11	-	-
Date 3-28-96 Thur.				
1:00	199	11	200	OK
2:00	198	11	-	-
3:00	199	11	200	OK
4:00	198	11	-	-
5:00	199	11	200	OK
6:00	198	11	-	-
7:00	195	11	200	OK
8:00	197	11	-	-
9:00	202	11	-	-
10:00	201	11	-	-
11:00	203	11	-	-
12:00	201	11	-	-
13:00	200	11	-	-
14:00	200	11	-	-
15:00	200	11	200	-
16:00	200	11	200	-
17:00	200	11	200	-
18:00	197	11	200	OK
19:00	197	11	-	-
20:00	197	11	200	-
21:00	230	-	-	-
22:00	207	12	200	OK
23:00	206	12	-	-
24:00	205	12	200	OK

TABLE C-1
(Continued)

Time 24 Hour Clock (Init.)	SPIT Valve House Measurements		Injection Well Measurements	
	Flowrate Every Hour (gpm)	SPIT Ix 2 Discharge Pressure	Flowrate Every 2 hours (gpm)	Visually Observe Well
Date 3-29-96 Fri.				
1:00	206	12	-	-
2:00	204	12	200	OK
3:00	204	12	-	-
4:00	204	12	200	OK
5:00	203	12	-	-
6:00	202	12	200	OK
7:00	201	11	-	-
8:00	202	11	-	-
9:00	202	12	-	-
10:00	202	12	-	-
11:00	202	12	-	-
12:00	202	12	-	-
13:00	202	12	-	-
14:00	201	11	-	-
15:00	203	11	-	-
16:00	203	11	-	-
17:00	200	10	-	-
18:00	198	10	200	OK
19:00	198	10	-	-
20:00	206	11	200	OK
21:00	205	11	-	-
22:00	204	11	200	OK
23:00	203	11	-	-
24:00	204	11	200	OK
Date 3-30-96 Sat.				
1:00	202	11	-	-
2:00	205	11	200	OK
3:00	203	11	-	-
4:00	204	11	200	OK
5:00	203	11	-	-
6:00	202	11	200	OK
7:00	201	11	-	-
8:00	204	11	200	OK
9:00	203	11	-	-
10:00	204	11	200	OK
11:00	203	11	-	-
12:00	204	11	200	OK
13:00	202	11	-	-
14:00	202	11	200	OK
15:00	203	11	-	-

TABLE C-1
(Continued)

Time 24 Hour Clock (Init.)	SPIT Valve House Measurements		Injection Well Measurements	
	Flowrate Every Hour (gpm)	SPIT Ix 2 Discharge Pressure	Flowrate Every 2 hours (gpm)	Visually Observe Well
16:00	203	11	200	OK
17:00	200	11	-	-
18:00	198	10	200	OK
19:00	212	12	-	-
20:00	205	12	200	OK
21:00	204	11	-	-
22:00	204	11	200	OK
23:00	205	11	-	-
24:00	203	11	200	OK
Date 3-31-96 Sun.				
1:00	204	11	-	-
2:00	203	11	200	OK
3:00	202	11	-	-
4:00	203	11	200	OK
5:00	201	11	-	-
6:00	200	11	200	OK
7:00	200	11	-	-
8:00	203	11	200	OK
9:00	203	11	-	-
10:00	203	11	200	OK
11:00	202	11	-	-
12:00	202	11	200	OK
13:00	201	11	-	-
14:00	201	11	200	OK
15:00	200	11	-	-
16:00	200	11	200	OK
17:00	200	11	-	-
18:00	216	12	200	OK
19:00	205	12	-	-
20:00	205	12	200	OK
21:00	204	12	-	-
22:00	204	12	200	OK
23:00	203	12	-	-
24:00	204	12	200	OK
Date 4-01-96 Mon.				
1:00	202	12	-	-
2:00	203	11	200	OK
3:00	204	11	-	-
4:00	204	12	200	OK
5:00	203	11	-	-

TABLE C-1
(Continued)

	SPIT Valve House Measurements		Injection Well Measurements	
Time 24 Hour Clock (Init.)	Flowrate Every Hour (gpm)	SPIT Ix 2 Discharge Pressure	Flowrate Every 2 hours (gpm)	Visually Observe Well
6:00	203	11	200	OK
7:00	201	12	-	-
8:00	205	12	-	-

APPENDIX D

SLUG TEST DATA AND RESULTS

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Table D-1	Pre-Injection Test Vacuum Slug Test #1 Well Number 31567
Table D-2	Pre-Injection Test Vacuum Slug Test #2 Well Number 31567
Table D-3	Pre-Injection Test Vacuum Slug Test #3 Well Number 31567
Table D-4	Pre-Injection Test Vacuum Slug Test #4 Well Number 31567
Table D-5	Pre-Injection Test Vacuum Slug Test #5 Well Number 31567
Table D-6	Post-Injection Test Vacuum Slug Test #1 Well Number 31567
Table D-7	Post-Injection Test Vacuum Slug Test #2 Well Number 31567
Table D-8	Post-Injection Test Vacuum Slug Test #3 Well Number 31567
Table D-9	Post-Injection Test Vacuum Slug Test #4 Well Number 31567
Table D-10	Post-Injection Test Vacuum Slug Test #5 Well Number 31567
Figure D-1	AQTESOLV Printout for Pre-Injection Vacuum Slug Test #1
Figure D-2	AQTESOLV Printout for Pre-Injection Vacuum Slug Test #2
Figure D-3	AQTESOLV Printout for Pre-Injection Vacuum Slug Test #3
Figure D-4	AQTESOLV Printout for Pre-Injection Vacuum Slug Test #4
Figure D-5	AQTESOLV Printout for Pre-Injection Vacuum Slug Test #5
Figure D-6	AQTESOLV Printout for Post-Injection Vacuum Slug Test #1
Figure D-7	AQTESOLV Printout for Post-Injection Vacuum Slug Test #2
Figure D-8	AQTESOLV Printout for Post-Injection Vacuum Slug Test #3
Figure D-9	AQTESOLV Printout for Post-Injection Vacuum Slug Test #4
Figure D-10	AQTESOLV Printout for Post-Injection Vacuum Slug Test #5

TABLE D-1

VACUUM SLUG TEST #1 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE	ACTUAL WATER
HRS/MINUTES	SECONDS	TRANSDUCER READING	TEST WAS STARTED (SECONDS)	LEVEL DISPLACEMENT (FEET)
10:44 AM	43.1	1.257	0.0	0.057
10:44 AM	43.3	1.705	0.2	0.505
10:44 AM	43.5	2.518	0.4	1.318
10:44 AM	43.7	3.443	0.6	2.243
10:44 AM	43.9	4.204	0.8	3.004
10:44 AM	44.1	4.708	1.0	3.508
10:44 AM	44.3	4.970	1.2	3.770
10:44 AM	44.5	5.037	1.4	3.837
10:44 AM	44.7	4.980	1.6	3.780
10:44 AM	44.9	4.853	1.8	3.653
10:44 AM	45.1	4.698	2.0	3.498
10:44 AM	45.3	4.541	2.2	3.341
10:44 AM	45.5	4.391	2.4	3.191
10:44 AM	45.7	4.245	2.6	3.045
10:44 AM	45.9	4.101	2.8	2.901
10:44 AM	46.1	3.961	3.0	2.761
10:44 AM	46.3	3.832	3.2	2.632
10:44 AM	46.5	3.711	3.4	2.511
10:44 AM	46.7	3.596	3.6	2.396
10:44 AM	46.9	3.490	3.8	2.290
10:44 AM	47.1	3.394	4.0	2.194
10:44 AM	47.3	3.292	4.2	2.092
10:44 AM	47.5	3.185	4.4	1.985
10:44 AM	47.7	3.096	4.6	1.896
10:44 AM	47.9	3.000	4.8	1.800
10:44 AM	48.1	2.920	5.0	1.720
10:44 AM	48.3	2.851	5.2	1.651
10:44 AM	48.5	2.773	5.4	1.573
10:44 AM	48.7	2.705	5.6	1.505
10:44 AM	48.9	2.639	5.8	1.439
10:44 AM	49.1	2.576	6.0	1.376
10:44 AM	49.3	2.517	6.2	1.317
10:44 AM	49.5	2.465	6.4	1.265
10:44 AM	49.7	2.403	6.6	1.203
10:44 AM	49.9	2.354	6.8	1.154
10:44 AM	50.1	2.304	7.0	1.104
10:44 AM	50.3	2.252	7.2	1.052
10:44 AM	50.5	2.205	7.4	1.005
10:44 AM	50.7	2.160	7.6	0.960
10:44 AM	50.9	2.121	7.8	0.921
10:44 AM	51.1	2.081	8.0	0.881
10:44 AM	51.3	2.043	8.2	0.843
10:44 AM	51.5	2.007	8.4	0.807

VACUUM SLUG TEST #1 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
10:44 AM	51.7	1.969	8.6	0.769
10:44 AM	51.9	1.935	8.8	0.735
10:44 AM	52.1	1.908	9.0	0.708
10:44 AM	52.3	1.872	9.2	0.672
10:44 AM	52.5	1.840	9.4	0.640
10:44 AM	52.7	1.810	9.6	0.610
10:44 AM	52.9	1.784	9.8	0.584
10:44 AM	53.1	1.758	10.0	0.558
10:44 AM	53.3	1.735	10.2	0.535
10:44 AM	53.5	1.712	10.4	0.512
10:44 AM	53.7	1.691	10.6	0.491
10:44 AM	53.9	1.671	10.8	0.471
10:44 AM	54.1	1.646	11.0	0.446
10:44 AM	54.3	1.626	11.2	0.426
10:44 AM	54.5	1.609	11.4	0.409
10:44 AM	54.7	1.592	11.6	0.392
10:44 AM	54.9	1.575	11.8	0.375
10:44 AM	55.1	1.559	12.0	0.359
10:44 AM	55.3	1.548	12.2	0.348
10:44 AM	55.5	1.533	12.4	0.333
10:44 AM	55.7	1.515	12.6	0.315
10:44 AM	55.9	1.503	12.8	0.303
10:44 AM	56.1	1.493	13.0	0.293
10:44 AM	56.3	1.482	13.2	0.282
10:44 AM	56.5	1.460	13.4	0.260
10:44 AM	56.7	1.454	13.6	0.254
10:44 AM	56.9	1.440	13.8	0.240
10:44 AM	57.1	1.437	14.0	0.237
10:44 AM	57.3	1.423	14.2	0.223
10:44 AM	57.5	1.414	14.4	0.214
10:44 AM	57.7	1.404	14.6	0.204
10:44 AM	57.9	1.403	14.8	0.203
10:44 AM	58.1	1.391	15.0	0.191
10:44 AM	58.3	1.378	15.2	0.178
10:44 AM	58.5	1.376	15.4	0.176
10:44 AM	58.7	1.364	15.6	0.164
10:44 AM	58.9	1.364	15.8	0.164
10:44 AM	59.1	1.357	16.0	0.157
10:44 AM	59.3	1.357	16.2	0.157
10:44 AM	59.5	1.336	16.4	0.136
10:44 AM	59.7	1.347	16.6	0.147
10:44 AM	59.9	1.331	16.8	0.131
10:45 AM	0.1	1.327	17.0	0.127

VACUUM SLUG TEST #1 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
10:45 AM	0.3	1.316	17.2	0.116
10:45 AM	0.5	1.314	17.4	0.114
10:45 AM	0.7	1.311	17.6	0.111
10:45 AM	0.9	1.303	17.8	0.103
10:45 AM	1.1	1.302	18.0	0.102
10:45 AM	1.3	1.297	18.2	0.097
10:45 AM	1.5	1.296	18.4	0.096
10:45 AM	1.7	1.292	18.6	0.092
10:45 AM	1.9	1.294	18.8	0.094
10:45 AM	2.1	1.292	19.0	0.092
10:45 AM	2.3	1.280	19.2	0.080
10:45 AM	2.5	1.287	19.4	0.087
10:45 AM	2.7	1.284	19.6	0.084
10:45 AM	2.9	1.284	19.8	0.084
10:45 AM	3.1	1.275	20.0	0.075
10:45 AM	3.3	1.273	20.2	0.073
10:45 AM	3.5	1.264	20.4	0.064
10:45 AM	3.7	1.269	20.6	0.069
10:45 AM	3.9	1.275	20.8	0.075
10:45 AM	4.1	1.257	21.0	0.057
10:45 AM	4.3	1.266	21.2	0.066
10:45 AM	4.5	1.256	21.4	0.056
10:45 AM	4.7	1.252	21.6	0.052
10:45 AM	4.9	1.250	21.8	0.050
10:45 AM	5.1	1.251	22.0	0.051
10:45 AM	5.3	1.254	22.2	0.054
10:45 AM	5.5	1.255	22.4	0.055
10:45 AM	5.7	1.252	22.6	0.052
10:45 AM	5.9	1.261	22.8	0.061
10:45 AM	6.1	1.246	23.0	0.046
10:45 AM	6.3	1.254	23.2	0.054
10:45 AM	6.5	1.249	23.4	0.049
10:45 AM	6.7	1.251	23.6	0.051
10:45 AM	6.9	1.258	23.8	0.058
10:45 AM	7.1	1.240	24.0	0.040
10:45 AM	7.3	1.218	24.2	0.018
10:45 AM	7.5	1.234	24.4	0.034
10:45 AM	7.7	1.233	24.6	0.033
10:45 AM	7.9	1.245	24.8	0.045
10:45 AM	8.1	1.241	25.0	0.041
10:45 AM	8.3	1.232	25.2	0.032
10:45 AM	8.5	1.234	25.4	0.034
10:45 AM	8.7	1.242	25.6	0.042

VACUUM SLUG TEST #1 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE	ACTUAL WATER
HRS/MINUTES	SECONDS	TRANSDUCER READING	TEST WAS STARTED (SECONDS)	LEVEL DISPLACEMENT (FEET)
10:45 AM	8.9	1.235	25.8	0.035
10:45 AM	9.1	1.245	26.0	0.045
10:45 AM	9.3	1.225	26.2	0.025
10:45 AM	9.5	1.242	26.4	0.042
10:45 AM	9.7	1.223	26.6	0.023
10:45 AM	9.9	1.227	26.8	0.027
10:45 AM	10.1	1.224	27.0	0.024
10:45 AM	10.3	1.228	27.2	0.028
10:45 AM	10.5	1.225	27.4	0.025
10:45 AM	10.7	1.228	27.6	0.028
10:45 AM	10.9	1.230	27.8	0.030
10:45 AM	11.1	1.221	28.0	0.021
10:45 AM	11.3	1.230	28.2	0.030
10:45 AM	11.5	1.225	28.4	0.025
10:45 AM	11.7	1.225	28.6	0.025
10:45 AM	11.9	1.208	28.8	0.008
10:45 AM	12.1	1.230	29.0	0.030
10:45 AM	12.3	1.220	29.2	0.020
10:45 AM	12.5	1.223	29.4	0.023
10:45 AM	12.7	1.220	29.6	0.020
10:45 AM	12.9	1.220	29.8	0.020
10:45 AM	13.1	1.220	30.0	0.020
10:45 AM	13.3	1.213	30.2	0.013
10:45 AM	13.5	1.221	30.4	0.021
10:45 AM	13.7	1.214	30.6	0.014
10:45 AM	13.9	1.224	30.8	0.024
10:45 AM	14.1	1.222	31.0	0.022
10:45 AM	14.3	1.221	31.2	0.021
10:45 AM	14.5	1.220	31.4	0.020
10:45 AM	14.7	1.222	31.6	0.022
10:45 AM	14.9	1.225	31.8	0.025
10:45 AM	15.1	1.217	32.0	0.017
10:45 AM	15.3	1.224	32.2	0.024
10:45 AM	15.5	1.223	32.4	0.023
10:45 AM	15.7	1.219	32.6	0.019
10:45 AM	15.9	1.224	32.8	0.024
10:45 AM	16.1	1.221	33.0	0.021
10:45 AM	16.3	1.217	33.2	0.017
10:45 AM	16.5	1.229	33.4	0.029
10:45 AM	16.7	1.223	33.6	0.023
10:45 AM	16.9	1.230	33.8	0.030
10:45 AM	17.1	1.224	34.0	0.024
10:45 AM	17.3	1.224	34.2	0.024

VACUUM SLUG TEST #1 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE	ACTUAL WATER
HRS/MINUTES	SECONDS	TRANSDUCER READING	TEST WAS STARTED (SECONDS)	LEVEL DISPLACEMENT (FEET)
10:45 AM	17.5	1.230	34.4	0.030
10:45 AM	17.7	1.218	34.6	0.018
10:45 AM	17.9	1.231	34.8	0.031
10:45 AM	18.1	1.221	35.0	0.021
10:45 AM	18.3	1.233	35.2	0.033
10:45 AM	18.5	1.215	35.4	0.015
10:45 AM	18.7	1.235	35.6	0.035
10:45 AM	18.9	1.228	35.8	0.028
10:45 AM	19.1	1.220	36.0	0.020
10:45 AM	19.3	1.224	36.2	0.024
10:45 AM	19.5	1.224	36.4	0.024
10:45 AM	19.7	1.223	36.6	0.023
10:45 AM	19.9	1.215	36.8	0.015
10:45 AM	20.1	1.220	37.0	0.020
10:45 AM	20.3	1.213	37.2	0.013
10:45 AM	20.5	1.220	37.4	0.020
10:45 AM	20.7	1.214	37.6	0.014
10:45 AM	20.9	1.217	37.8	0.017
10:45 AM	21.1	1.216	38.0	0.016
10:45 AM	21.3	1.214	38.2	0.014
10:45 AM	21.5	1.219	38.4	0.019
10:45 AM	21.7	1.210	38.6	0.010
10:45 AM	21.9	1.216	38.8	0.016
10:45 AM	22.1	1.216	39.0	0.016
10:45 AM	22.3	1.216	39.2	0.016
10:45 AM	22.5	1.215	39.4	0.015
10:45 AM	22.7	1.217	39.6	0.017
10:45 AM	22.9	1.216	39.8	0.016
10:45 AM	23.1	1.212	40.0	0.012
10:45 AM	23.3	1.222	40.2	0.022
10:45 AM	23.5	1.215	40.4	0.015
10:45 AM	23.7	1.218	40.6	0.018
10:45 AM	23.9	1.212	40.8	0.012
10:45 AM	24.1	1.213	41.0	0.013
10:45 AM	24.3	1.218	41.2	0.018
10:45 AM	24.5	1.219	41.4	0.019

VACUUM SLUG TEST #2 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
10:52 AM	49.5	1.225	0.0	0.025
10:52 AM	49.7	1.442	0.2	0.242
10:52 AM	49.9	2.411	0.4	1.211
10:52 AM	50.1	3.480	0.6	2.280
10:52 AM	50.3	4.284	0.8	3.084
10:52 AM	50.5	4.782	1.0	3.582
10:52 AM	50.7	5.028	1.2	3.828
10:52 AM	50.9	5.083	1.4	3.883
10:52 AM	51.1	5.012	1.6	3.812
10:52 AM	51.3	4.875	1.8	3.675
10:52 AM	51.5	4.718	2.0	3.518
10:52 AM	51.7	4.559	2.2	3.359
10:52 AM	51.9	4.404	2.4	3.204
10:52 AM	52.1	4.255	2.6	3.055
10:52 AM	52.3	4.108	2.8	2.908
10:52 AM	52.5	3.973	3.0	2.773
10:52 AM	52.7	3.844	3.2	2.644
10:52 AM	52.9	3.719	3.4	2.519
10:52 AM	53.1	3.600	3.6	2.400
10:52 AM	53.3	3.488	3.8	2.288
10:52 AM	53.5	3.381	4.0	2.181
10:52 AM	53.7	3.280	4.2	2.080
10:52 AM	53.9	3.182	4.4	1.982
10:52 AM	54.1	3.091	4.6	1.891
10:52 AM	54.3	3.003	4.8	1.803
10:52 AM	54.5	2.923	5.0	1.723
10:52 AM	54.7	2.848	5.2	1.648
10:52 AM	54.9	2.774	5.4	1.574
10:52 AM	55.1	2.704	5.6	1.504
10:52 AM	55.3	2.638	5.8	1.438
10:52 AM	55.5	2.574	6.0	1.374
10:52 AM	55.7	2.515	6.2	1.315
10:52 AM	55.9	2.456	6.4	1.256
10:52 AM	56.1	2.401	6.6	1.201
10:52 AM	56.3	2.348	6.8	1.148
10:52 AM	56.5	2.298	7.0	1.098
10:52 AM	56.7	2.251	7.2	1.051
10:52 AM	56.9	2.205	7.4	1.005

VACUUM SLUG TEST #2 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
10:52 AM	57.1	2.161	7.6	0.961
10:52 AM	57.3	2.119	7.8	0.919
10:52 AM	57.5	2.079	8.0	0.879
10:52 AM	57.7	2.041	8.2	0.841
10:52 AM	57.9	2.002	8.4	0.802
10:52 AM	58.1	1.970	8.6	0.770
10:52 AM	58.3	1.933	8.8	0.733
10:52 AM	58.5	1.900	9.0	0.700
10:52 AM	58.7	1.869	9.2	0.669
10:52 AM	58.9	1.839	9.4	0.639
10:52 AM	59.1	1.810	9.6	0.610
10:52 AM	59.3	1.782	9.8	0.582
10:52 AM	59.5	1.758	10.0	0.558
10:52 AM	59.7	1.733	10.2	0.533
10:52 AM	59.9	1.712	10.4	0.512
10:53 AM	0.1	1.693	10.6	0.493
10:53 AM	0.3	1.661	10.8	0.461
10:53 AM	0.5	1.647	11.0	0.447
10:53 AM	0.7	1.623	11.2	0.423
10:53 AM	0.9	1.605	11.4	0.405
10:53 AM	1.1	1.586	11.6	0.386
10:53 AM	1.3	1.569	11.8	0.369
10:53 AM	1.5	1.555	12.0	0.355
10:53 AM	1.7	1.544	12.2	0.344
10:53 AM	1.9	1.530	12.4	0.330
10:53 AM	2.1	1.515	12.6	0.315
10:53 AM	2.3	1.502	12.8	0.302
10:53 AM	2.5	1.492	13.0	0.292
10:53 AM	2.7	1.478	13.2	0.278
10:53 AM	2.9	1.465	13.4	0.265
10:53 AM	3.1	1.454	13.6	0.254
10:53 AM	3.3	1.443	13.8	0.243
10:53 AM	3.5	1.433	14.0	0.233
10:53 AM	3.7	1.424	14.2	0.224
10:53 AM	3.9	1.414	14.4	0.214
10:53 AM	4.1	1.406	14.6	0.206
10:53 AM	4.3	1.399	14.8	0.199
10:53 AM	4.5	1.391	15.0	0.191

VACUUM SLUG TEST #2 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
10:53 AM	4.7	1.384	15.2	0.184
10:53 AM	4.9	1.374	15.4	0.174
10:53 AM	5.1	1.366	15.6	0.166
10:53 AM	5.3	1.362	15.8	0.162
10:53 AM	5.5	1.354	16.0	0.154
10:53 AM	5.7	1.349	16.2	0.149
10:53 AM	5.9	1.339	16.4	0.139
10:53 AM	6.1	1.335	16.6	0.135
10:53 AM	6.3	1.331	16.8	0.131
10:53 AM	6.5	1.325	17.0	0.125
10:53 AM	6.7	1.319	17.2	0.119
10:53 AM	6.9	1.317	17.4	0.117
10:53 AM	7.1	1.309	17.6	0.109
10:53 AM	7.3	1.306	17.8	0.106
10:53 AM	7.5	1.301	18.0	0.101
10:53 AM	7.7	1.298	18.2	0.098
10:53 AM	7.9	1.295	18.4	0.095
10:53 AM	8.1	1.290	18.6	0.090
10:53 AM	8.3	1.289	18.8	0.089
10:53 AM	8.5	1.284	19.0	0.084
10:53 AM	8.7	1.283	19.2	0.083
10:53 AM	8.9	1.277	19.4	0.077
10:53 AM	9.1	1.276	19.6	0.076
10:53 AM	9.3	1.273	19.8	0.073
10:53 AM	9.5	1.270	20.0	0.070
10:53 AM	9.7	1.269	20.2	0.069
10:53 AM	9.9	1.267	20.4	0.067
10:53 AM	10.1	1.265	20.6	0.065
10:53 AM	10.3	1.262	20.8	0.062
10:53 AM	10.5	1.260	21.0	0.060
10:53 AM	10.7	1.257	21.2	0.057
10:53 AM	10.9	1.256	21.4	0.056
10:53 AM	11.1	1.253	21.6	0.053
10:53 AM	11.3	1.253	21.8	0.053
10:53 AM	11.5	1.248	22.0	0.048
10:53 AM	11.7	1.252	22.2	0.052
10:53 AM	11.9	1.246	22.4	0.046
10:53 AM	12.1	1.247	22.6	0.047

VACUUM SLUG TEST #2 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
10:53 AM	12.3	1.244	22.8	0.044
10:53 AM	12.5	1.244	23.0	0.044
10:53 AM	12.7	1.242	23.2	0.042
10:53 AM	12.9	1.240	23.4	0.040
10:53 AM	13.1	1.240	23.6	0.040
10:53 AM	13.3	1.240	23.8	0.040
10:53 AM	13.5	1.238	24.0	0.038
10:53 AM	13.7	1.239	24.2	0.039
10:53 AM	13.9	1.237	24.4	0.037
10:53 AM	14.1	1.235	24.6	0.035
10:53 AM	14.3	1.237	24.8	0.037
10:53 AM	14.5	1.234	25.0	0.034
10:53 AM	14.7	1.231	25.2	0.031
10:53 AM	14.9	1.232	25.4	0.032
10:53 AM	15.1	1.228	25.6	0.028
10:53 AM	15.3	1.229	25.8	0.029
10:53 AM	15.5	1.228	26.0	0.028
10:53 AM	15.7	1.229	26.2	0.029
10:53 AM	15.9	1.227	26.4	0.027
10:53 AM	16.1	1.227	26.6	0.027
10:53 AM	16.3	1.226	26.8	0.026
10:53 AM	16.5	1.227	27.0	0.027
10:53 AM	16.7	1.228	27.2	0.028
10:53 AM	16.9	1.226	27.4	0.026
10:53 AM	17.1	1.225	27.6	0.025
10:53 AM	17.3	1.225	27.8	0.025
10:53 AM	17.5	1.226	28.0	0.026
10:53 AM	17.7	1.222	28.2	0.022
10:53 AM	17.9	1.223	28.4	0.023
10:53 AM	18.1	1.221	28.6	0.021
10:53 AM	18.3	1.222	28.8	0.022
10:53 AM	18.5	1.221	29.0	0.021
10:53 AM	18.7	1.221	29.2	0.021
10:53 AM	18.9	1.221	29.4	0.021
10:53 AM	19.1	1.221	29.6	0.021
10:53 AM	19.3	1.221	29.8	0.021
10:53 AM	19.5	1.220	30.0	0.020
10:53 AM	19.7	1.221	30.2	0.021

VACUUM SLUG TEST #2 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
10:53 AM	19.9	1.219	30.4	0.019
10:53 AM	20.1	1.221	30.6	0.021
10:53 AM	20.3	1.219	30.8	0.019
10:53 AM	20.5	1.220	31.0	0.020
10:53 AM	20.7	1.218	31.2	0.018
10:53 AM	20.9	1.219	31.4	0.019
10:53 AM	21.1	1.218	31.6	0.018
10:53 AM	21.3	1.216	31.8	0.016
10:53 AM	21.5	1.217	32.0	0.017
10:53 AM	21.7	1.213	32.2	0.013
10:53 AM	21.9	1.215	32.4	0.015
10:53 AM	22.1	1.216	32.6	0.016
10:53 AM	22.3	1.210	32.8	0.010
10:53 AM	22.5	1.216	33.0	0.016
10:53 AM	22.7	1.212	33.2	0.012
10:53 AM	22.9	1.213	33.4	0.013
10:53 AM	23.1	1.215	33.6	0.015
10:53 AM	23.3	1.216	33.8	0.016
10:53 AM	23.5	1.214	34.0	0.014
10:53 AM	23.7	1.215	34.2	0.015
10:53 AM	23.9	1.215	34.4	0.015
10:53 AM	24.1	1.214	34.6	0.014
10:53 AM	24.3	1.216	34.8	0.016
10:53 AM	24.5	1.213	35.0	0.013
10:53 AM	24.7	1.215	35.2	0.015
10:53 AM	24.9	1.213	35.4	0.013
10:53 AM	25.1	1.216	35.6	0.016
10:53 AM	25.3	1.213	35.8	0.013
10:53 AM	25.5	1.214	36.0	0.014
10:53 AM	25.7	1.215	36.2	0.015
10:53 AM	25.9	1.214	36.4	0.014
10:53 AM	26.1	1.215	36.6	0.015
10:53 AM	26.3	1.215	36.8	0.015
10:53 AM	26.5	1.215	37.0	0.015
10:53 AM	26.7	1.214	37.2	0.014
10:53 AM	26.9	1.218	37.4	0.018
10:53 AM	27.1	1.210	37.6	0.010
10:53 AM	27.3	1.215	37.8	0.015

VACUUM SLUG TEST #2 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE	ACTUAL WATER
HRS/MINUTES	SECONDS	TRANSDUCER READING	TEST WAS STARTED (SECONDS)	LEVEL DISPLACEMENT (FEET)
10:53 AM	27.5	1.212	38.0	0.012
10:53 AM	27.7	1.215	38.2	0.015
10:53 AM	27.9	1.215	38.4	0.015
10:53 AM	28.1	1.215	38.6	0.015
10:53 AM	28.3	1.213	38.8	0.013
10:53 AM	28.5	1.211	39.0	0.011
10:53 AM	28.7	1.213	39.2	0.013
10:53 AM	28.9	1.213	39.4	0.013
10:53 AM	29.1	1.214	39.6	0.014
10:53 AM	29.3	1.212	39.8	0.012
10:53 AM	29.5	1.213	40.0	0.013
10:53 AM	29.7	1.213	40.2	0.013
10:53 AM	29.9	1.211	40.4	0.011
10:53 AM	30.1	1.213	40.6	0.013
10:53 AM	30.3	1.212	40.8	0.012
10:53 AM	30.5	1.213	41.0	0.013
10:53 AM	30.7	1.216	41.2	0.016
10:53 AM	30.9	1.216	41.4	0.016
10:53 AM	31.1	1.213	41.6	0.013
10:53 AM	31.3	1.211	41.8	0.011
10:53 AM	31.5	1.213	42.0	0.013
10:53 AM	31.7	1.211	42.2	0.011
10:53 AM	31.9	1.211	42.4	0.011
10:53 AM	32.1	1.211	42.6	0.011
10:53 AM	32.3	1.212	42.8	0.012
10:53 AM	32.5	1.210	43.0	0.010
10:53 AM	32.7	1.215	43.2	0.015
10:53 AM	32.9	1.209	43.4	0.009
10:53 AM	33.1	1.217	43.6	0.017
10:53 AM	33.3	1.214	43.8	0.014
10:53 AM	33.5	1.214	44.0	0.014
10:53 AM	33.7	1.214	44.2	0.014
10:53 AM	33.9	1.212	44.4	0.012
10:53 AM	34.1	1.211	44.6	0.011
10:53 AM	34.3	1.210	44.8	0.010
10:53 AM	34.5	1.213	45.0	0.013
10:53 AM	34.7	1.203	45.2	0.003
10:53 AM	34.9	1.215	45.4	0.015

VACUUM SLUG TEST #2 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
10:53 AM	35.1	1.207	45.6	0.007
10:53 AM	35.3	1.215	45.8	0.015
10:53 AM	35.5	1.215	46.0	0.015
10:53 AM	35.7	1.210	46.2	0.010

VACUUM SLUG TEST #3 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:00 AM	2.1	1.221	0.0	0.021
11:00 AM	2.3	1.771	0.2	0.571
11:00 AM	2.5	2.931	0.4	1.731
11:00 AM	2.7	3.879	0.6	2.679
11:00 AM	2.9	4.545	0.8	3.345
11:00 AM	3.1	4.929	1.0	3.729
11:00 AM	3.3	5.079	1.2	3.879
11:00 AM	3.5	5.072	1.4	3.872
11:00 AM	3.7	4.959	1.6	3.759
11:00 AM	3.9	4.81	1.8	3.610
11:00 AM	4.1	4.648	2.0	3.448
11:00 AM	4.3	4.488	2.2	3.288
11:00 AM	4.5	4.335	2.4	3.135
11:00 AM	4.7	4.187	2.6	2.987
11:00 AM	4.9	4.042	2.8	2.842
11:00 AM	5.1	3.909	3.0	2.709
11:00 AM	5.3	3.781	3.2	2.581
11:00 AM	5.5	3.659	3.4	2.459
11:00 AM	5.7	3.543	3.6	2.343
11:00 AM	5.9	3.437	3.8	2.237
11:00 AM	6.1	3.334	4.0	2.134
11:00 AM	6.3	3.242	4.2	2.042
11:00 AM	6.5	3.152	4.4	1.952
11:00 AM	6.7	3.049	4.6	1.849
11:00 AM	6.9	2.966	4.8	1.766
11:00 AM	7.1	2.883	5.0	1.683
11:00 AM	7.3	2.812	5.2	1.612
11:00 AM	7.5	2.741	5.4	1.541
11:00 AM	7.7	2.67	5.6	1.470
11:00 AM	7.9	2.607	5.8	1.407
11:00 AM	8.1	2.543	6.0	1.343
11:00 AM	8.3	2.486	6.2	1.286
11:00 AM	8.5	2.428	6.4	1.228
11:00 AM	8.7	2.375	6.6	1.175
11:00 AM	8.9	2.328	6.8	1.128
11:00 AM	9.1	2.279	7.0	1.079
11:00 AM	9.3	2.232	7.2	1.032
11:00 AM	9.5	2.185	7.4	0.985

VACUUM SLUG TEST #3 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:00 AM	9.7	2.151	7.6	0.951
11:00 AM	9.9	2.106	7.8	0.906
11:00 AM	10.1	2.064	8.0	0.864
11:00 AM	10.3	2.019	8.2	0.819
11:00 AM	10.5	1.979	8.4	0.779
11:00 AM	10.7	1.951	8.6	0.751
11:00 AM	10.9	1.914	8.8	0.714
11:00 AM	11.1	1.886	9.0	0.686
11:00 AM	11.3	1.861	9.2	0.661
11:00 AM	11.5	1.83	9.4	0.630
11:00 AM	11.7	1.802	9.6	0.602
11:00 AM	11.9	1.775	9.8	0.575
11:00 AM	12.1	1.753	10.0	0.553
11:00 AM	12.3	1.728	10.2	0.528
11:00 AM	12.5	1.704	10.4	0.504
11:00 AM	12.7	1.684	10.6	0.484
11:00 AM	12.9	1.661	10.8	0.461
11:00 AM	13.1	1.643	11.0	0.443
11:00 AM	13.3	1.623	11.2	0.423
11:00 AM	13.5	1.605	11.4	0.405
11:00 AM	13.7	1.588	11.6	0.388
11:00 AM	13.9	1.567	11.8	0.367
11:00 AM	14.1	1.556	12.0	0.356
11:00 AM	14.3	1.54	12.2	0.340
11:00 AM	14.5	1.526	12.4	0.326
11:00 AM	14.7	1.514	12.6	0.314
11:00 AM	14.9	1.503	12.8	0.303
11:00 AM	15.1	1.492	13.0	0.292
11:00 AM	15.3	1.474	13.2	0.274
11:00 AM	15.5	1.468	13.4	0.268
11:00 AM	15.7	1.46	13.6	0.260
11:00 AM	15.9	1.445	13.8	0.245
11:00 AM	16.1	1.436	14.0	0.236
11:00 AM	16.3	1.429	14.2	0.229
11:00 AM	16.5	1.418	14.4	0.218
11:00 AM	16.7	1.409	14.6	0.209
11:00 AM	16.9	1.403	14.8	0.203
11:00 AM	17.1	1.385	15.0	0.185

VACUUM SLUG TEST #3 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:00 AM	17.3	1.39	15.2	0.190
11:00 AM	17.5	1.378	15.4	0.178
11:00 AM	17.7	1.373	15.6	0.173
11:00 AM	17.9	1.365	15.8	0.165
11:00 AM	18.1	1.358	16.0	0.158
11:00 AM	18.3	1.353	16.2	0.153
11:00 AM	18.5	1.345	16.4	0.145
11:00 AM	18.7	1.34	16.6	0.140
11:00 AM	18.9	1.334	16.8	0.134
11:00 AM	19.1	1.331	17.0	0.131
11:00 AM	19.3	1.326	17.2	0.126
11:00 AM	19.5	1.318	17.4	0.118
11:00 AM	19.7	1.315	17.6	0.115
11:00 AM	19.9	1.31	17.8	0.110
11:00 AM	20.1	1.304	18.0	0.104
11:00 AM	20.3	1.301	18.2	0.101
11:00 AM	20.5	1.298	18.4	0.098
11:00 AM	20.7	1.289	18.6	0.089
11:00 AM	20.9	1.289	18.8	0.089
11:00 AM	21.1	1.289	19.0	0.089
11:00 AM	21.3	1.282	19.2	0.082
11:00 AM	21.5	1.285	19.4	0.085
11:00 AM	21.7	1.278	19.6	0.078
11:00 AM	21.9	1.28	19.8	0.080
11:00 AM	22.1	1.276	20.0	0.076
11:00 AM	22.3	1.274	20.2	0.074
11:00 AM	22.5	1.269	20.4	0.069
11:00 AM	22.7	1.269	20.6	0.069
11:00 AM	22.9	1.264	20.8	0.064
11:00 AM	23.1	1.264	21.0	0.064
11:00 AM	23.3	1.263	21.2	0.063
11:00 AM	23.5	1.263	21.4	0.063
11:00 AM	23.7	1.258	21.6	0.058
11:00 AM	23.9	1.258	21.8	0.058
11:00 AM	24.1	1.251	22.0	0.051
11:00 AM	24.3	1.248	22.2	0.048
11:00 AM	24.5	1.251	22.4	0.051
11:00 AM	24.7	1.244	22.6	0.044

VACUUM SLUG TEST #3 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:00 AM	24.9	1.247	22.8	0.047
11:00 AM	25.1	1.245	23.0	0.045
11:00 AM	25.3	1.238	23.2	0.038
11:00 AM	25.5	1.239	23.4	0.039
11:00 AM	25.7	1.233	23.6	0.033
11:00 AM	25.9	1.236	23.8	0.036
11:00 AM	26.1	1.229	24.0	0.029
11:00 AM	26.3	1.221	24.2	0.021
11:00 AM	26.5	1.227	24.4	0.027
11:00 AM	26.7	1.231	24.6	0.031
11:00 AM	26.9	1.224	24.8	0.024
11:00 AM	27.1	1.236	25.0	0.036
11:00 AM	27.3	1.209	25.2	0.009
11:00 AM	27.5	1.22	25.4	0.020
11:00 AM	27.7	1.213	25.6	0.013
11:00 AM	27.9	1.226	25.8	0.026
11:00 AM	28.1	1.218	26.0	0.018
11:00 AM	28.3	1.216	26.2	0.016
11:00 AM	28.5	1.233	26.4	0.033
11:00 AM	28.7	1.211	26.6	0.011
11:00 AM	28.9	1.225	26.8	0.025
11:00 AM	29.1	1.221	27.0	0.021
11:00 AM	29.3	1.22	27.2	0.020
11:00 AM	29.5	1.219	27.4	0.019
11:00 AM	29.7	1.222	27.6	0.022
11:00 AM	29.9	1.221	27.8	0.021
11:00 AM	30.1	1.224	28.0	0.024
11:00 AM	30.3	1.228	28.2	0.028
11:00 AM	30.5	1.231	28.4	0.031
11:00 AM	30.7	1.228	28.6	0.028
11:00 AM	30.9	1.238	28.8	0.038
11:00 AM	31.1	1.232	29.0	0.032
11:00 AM	31.3	1.229	29.2	0.029
11:00 AM	31.5	1.244	29.4	0.044
11:00 AM	31.7	1.226	29.6	0.026
11:00 AM	31.9	1.242	29.8	0.042
11:00 AM	32.1	1.237	30.0	0.037
11:00 AM	32.3	1.232	30.2	0.032

VACUUM SLUG TEST #3 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:00 AM	32.5	1.243	30.4	0.043
11:00 AM	32.7	1.234	30.6	0.034
11:00 AM	32.9	1.235	30.8	0.035
11:00 AM	33.1	1.237	31.0	0.037
11:00 AM	33.3	1.235	31.2	0.035
11:00 AM	33.5	1.228	31.4	0.028
11:00 AM	33.7	1.221	31.6	0.021
11:00 AM	33.9	1.219	31.8	0.019
11:00 AM	34.1	1.229	32.0	0.029
11:00 AM	34.3	1.226	32.2	0.026
11:00 AM	34.5	1.219	32.4	0.019
11:00 AM	34.7	1.212	32.6	0.012
11:00 AM	34.9	1.221	32.8	0.021
11:00 AM	35.1	1.226	33.0	0.026
11:00 AM	35.3	1.217	33.2	0.017
11:00 AM	35.5	1.211	33.4	0.011
11:00 AM	35.7	1.237	33.6	0.037
11:00 AM	35.9	1.216	33.8	0.016
11:00 AM	36.1	1.218	34.0	0.018
11:00 AM	36.3	1.219	34.2	0.019
11:00 AM	36.5	1.209	34.4	0.009
11:00 AM	36.7	1.208	34.6	0.008
11:00 AM	36.9	1.217	34.8	0.017
11:00 AM	37.1	1.202	35.0	0.002
11:00 AM	37.3	1.214	35.2	0.014
11:00 AM	37.5	1.199	35.4	-0.001
11:00 AM	37.7	1.205	35.6	0.005
11:00 AM	37.9	1.203	35.8	0.003
11:00 AM	38.1	1.202	36.0	0.002
11:00 AM	38.3	1.196	36.2	-0.004
11:00 AM	38.5	1.207	36.4	0.007
11:00 AM	38.7	1.211	36.6	0.011
11:00 AM	38.9	1.203	36.8	0.003
11:00 AM	39.1	1.212	37.0	0.012
11:00 AM	39.3	1.209	37.2	0.009
11:00 AM	39.5	1.218	37.4	0.018
11:00 AM	39.7	1.207	37.6	0.007
11:00 AM	39.9	1.213	37.8	0.013

VACUUM SLUG TEST #3 WELL NUMBER 31567

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.20 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:00 AM	40.1	1.206	38.0	0.006
11:00 AM	40.3	1.209	38.2	0.009
11:00 AM	40.5	1.214	38.4	0.014
11:00 AM	40.7	1.208	38.6	0.008
11:00 AM	40.9	1.209	38.8	0.009
11:00 AM	41.1	1.202	39.0	0.002
11:00 AM	41.3	1.212	39.2	0.012
11:00 AM	41.5	1.21	39.4	0.010
11:00 AM	41.7	1.205	39.6	0.005
11:00 AM	41.9	1.213	39.8	0.013
11:00 AM	42.1	1.207	40.0	0.007
11:00 AM	42.3	1.211	40.2	0.011
11:00 AM	42.5	1.206	40.4	0.006
11:00 AM	42.7	1.208	40.6	0.008
11:00 AM	42.9	1.211	40.8	0.011
11:00 AM	43.1	1.204	41.0	0.004
11:00 AM	43.3	1.21	41.2	0.010
11:00 AM	43.5	1.2	41.4	0.000
11:00 AM	43.7	1.209	41.6	0.009
11:00 AM	43.9	1.206	41.8	0.006
11:00 AM	44.1	1.21	42.0	0.010
11:00 AM	44.3	1.212	42.2	0.012

TABLE D-4

VACUUM SLUG TEST #4 WELL NUMBER 31567

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.19 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:17 AM	35.9	1.246	0.0	0.056
11:17 AM	36.1	1.398	0.2	0.208
11:17 AM	36.3	2.476	0.4	1.286
11:17 AM	36.5	4.113	0.6	2.923
11:17 AM	36.7	5.603	0.8	4.413
11:17 AM	36.9	6.783	1.0	5.593
11:17 AM	37.1	7.630	1.2	6.440
11:17 AM	37.3	8.140	1.4	6.950
11:17 AM	37.5	8.410	1.6	7.220
11:17 AM	37.7	8.480	1.8	7.290
11:17 AM	37.9	8.380	2.0	7.190
11:17 AM	38.1	8.190	2.2	7.000
11:17 AM	38.3	7.950	2.4	6.760
11:17 AM	38.5	7.680	2.6	6.490
11:17 AM	38.7	7.400	2.8	6.210
11:17 AM	38.9	7.130	3.0	5.940
11:17 AM	39.1	6.872	3.2	5.682
11:17 AM	39.3	6.620	3.4	5.430
11:17 AM	39.5	6.377	3.6	5.187
11:17 AM	39.7	6.145	3.8	4.955
11:17 AM	39.9	5.923	4.0	4.733
11:17 AM	40.1	5.712	4.2	4.522
11:17 AM	40.3	5.510	4.4	4.320
11:17 AM	40.5	5.318	4.6	4.128
11:17 AM	40.7	5.135	4.8	3.945
11:17 AM	40.9	4.958	5.0	3.768
11:17 AM	41.1	4.789	5.2	3.599
11:17 AM	41.3	4.630	5.4	3.440
11:17 AM	41.5	4.483	5.6	3.293
11:17 AM	41.7	4.343	5.8	3.153
11:17 AM	41.9	4.205	6.0	3.015
11:17 AM	42.1	4.076	6.2	2.886
11:17 AM	42.3	3.950	6.4	2.760
11:17 AM	42.5	3.832	6.6	2.642
11:17 AM	42.7	3.717	6.8	2.527
11:17 AM	42.9	3.606	7.0	2.416
11:17 AM	43.1	3.498	7.2	2.308
11:17 AM	43.3	3.397	7.4	2.207

VACUUM SLUG TEST #4 WELL NUMBER 31567

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.19 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:17 AM	43.5	3.304	7.6	2.114
11:17 AM	43.7	3.210	7.8	2.020
11:17 AM	43.9	3.121	8.0	1.931
11:17 AM	44.1	3.036	8.2	1.846
11:17 AM	44.3	2.956	8.4	1.766
11:17 AM	44.5	2.880	8.6	1.690
11:17 AM	44.7	2.805	8.8	1.615
11:17 AM	44.9	2.734	9.0	1.544
11:17 AM	45.1	2.668	9.2	1.478
11:17 AM	45.3	2.604	9.4	1.414
11:17 AM	45.5	2.545	9.6	1.355
11:17 AM	45.7	2.483	9.8	1.293
11:17 AM	45.9	2.424	10.0	1.234
11:17 AM	46.1	2.372	10.2	1.182
11:17 AM	46.3	2.323	10.4	1.133
11:17 AM	46.5	2.275	10.6	1.085
11:17 AM	46.7	2.226	10.8	1.036
11:17 AM	46.9	2.179	11.0	0.989
11:17 AM	47.1	2.139	11.2	0.949
11:17 AM	47.3	2.097	11.4	0.907
11:17 AM	47.5	2.062	11.6	0.872
11:17 AM	47.7	2.026	11.8	0.836
11:17 AM	47.9	1.987	12.0	0.797
11:17 AM	48.1	1.954	12.2	0.764
11:17 AM	48.3	1.914	12.4	0.724
11:17 AM	48.5	1.890	12.6	0.700
11:17 AM	48.7	1.859	12.8	0.669
11:17 AM	48.9	1.833	13.0	0.643
11:17 AM	49.1	1.791	13.2	0.601
11:17 AM	49.3	1.761	13.4	0.571
11:17 AM	49.5	1.734	13.6	0.544
11:17 AM	49.7	1.719	13.8	0.529
11:17 AM	49.9	1.705	14.0	0.515
11:17 AM	50.1	1.663	14.2	0.473
11:17 AM	50.3	1.650	14.4	0.460
11:17 AM	50.5	1.627	14.6	0.437
11:17 AM	50.7	1.606	14.8	0.416
11:17 AM	50.9	1.586	15.0	0.396

VACUUM SLUG TEST #4 WELL NUMBER 31567

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.19 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:17 AM	51.1	1.575	15.2	0.385
11:17 AM	51.3	1.549	15.4	0.359
11:17 AM	51.5	1.541	15.6	0.351
11:17 AM	51.7	1.524	15.8	0.334
11:17 AM	51.9	1.518	16.0	0.328
11:17 AM	52.1	1.508	16.2	0.318
11:17 AM	52.3	1.497	16.4	0.307
11:17 AM	52.5	1.480	16.6	0.290
11:17 AM	52.7	1.475	16.8	0.285
11:17 AM	52.9	1.461	17.0	0.271
11:17 AM	53.1	1.454	17.2	0.264
11:17 AM	53.3	1.446	17.4	0.256
11:17 AM	53.5	1.434	17.6	0.244
11:17 AM	53.7	1.428	17.8	0.238
11:17 AM	53.9	1.416	18.0	0.226
11:17 AM	54.1	1.409	18.2	0.219
11:17 AM	54.3	1.393	18.4	0.203
11:17 AM	54.5	1.390	18.6	0.200
11:17 AM	54.7	1.377	18.8	0.187
11:17 AM	54.9	1.374	19.0	0.184
11:17 AM	55.1	1.373	19.2	0.183
11:17 AM	55.3	1.363	19.4	0.173
11:17 AM	55.5	1.357	19.6	0.167
11:17 AM	55.7	1.349	19.8	0.159
11:17 AM	55.9	1.344	20.0	0.154
11:17 AM	56.1	1.334	20.2	0.144
11:17 AM	56.3	1.330	20.4	0.140
11:17 AM	56.5	1.323	20.6	0.133
11:17 AM	56.7	1.315	20.8	0.125
11:17 AM	56.9	1.312	21.0	0.122
11:17 AM	57.1	1.308	21.2	0.118
11:17 AM	57.3	1.301	21.4	0.111
11:17 AM	57.5	1.297	21.6	0.107
11:17 AM	57.7	1.294	21.8	0.104
11:17 AM	57.9	1.288	22.0	0.098
11:17 AM	58.1	1.284	22.2	0.094
11:17 AM	58.3	1.280	22.4	0.090
11:17 AM	58.5	1.278	22.6	0.088

VACUUM SLUG TEST #4 WELL NUMBER 31567

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.19 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:17 AM	58.7	1.270	22.8	0.080
11:17 AM	58.9	1.273	23.0	0.083
11:17 AM	59.1	1.262	23.2	0.072
11:17 AM	59.3	1.265	23.4	0.075
11:17 AM	59.5	1.261	23.6	0.071
11:17 AM	59.7	1.262	23.8	0.072
11:17 AM	59.9	1.260	24.0	0.070
11:18 AM	0.1	1.256	24.2	0.066
11:18 AM	0.3	1.256	24.4	0.066
11:18 AM	0.5	1.252	24.6	0.062
11:18 AM	0.7	1.249	24.8	0.059
11:18 AM	0.9	1.251	25.0	0.061
11:18 AM	1.1	1.246	25.2	0.056
11:18 AM	1.3	1.246	25.4	0.056
11:18 AM	1.5	1.242	25.6	0.052
11:18 AM	1.7	1.242	25.8	0.052
11:18 AM	1.9	1.237	26.0	0.047
11:18 AM	2.1	1.236	26.2	0.046
11:18 AM	2.3	1.234	26.4	0.044
11:18 AM	2.5	1.234	26.6	0.044
11:18 AM	2.7	1.236	26.8	0.046
11:18 AM	2.9	1.230	27.0	0.040
11:18 AM	3.1	1.231	27.2	0.041
11:18 AM	3.3	1.236	27.4	0.046
11:18 AM	3.5	1.229	27.6	0.039
11:18 AM	3.7	1.232	27.8	0.042
11:18 AM	3.9	1.222	28.0	0.032
11:18 AM	4.1	1.226	28.2	0.036
11:18 AM	4.3	1.230	28.4	0.040
11:18 AM	4.5	1.220	28.6	0.030
11:18 AM	4.7	1.229	28.8	0.039
11:18 AM	4.9	1.221	29.0	0.031
11:18 AM	5.1	1.221	29.2	0.031
11:18 AM	5.3	1.221	29.4	0.031
11:18 AM	5.5	1.223	29.6	0.033
11:18 AM	5.7	1.214	29.8	0.024
11:18 AM	5.9	1.220	30.0	0.030
11:18 AM	6.1	1.216	30.2	0.026

VACUUM SLUG TEST #4 WELL NUMBER 31567

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.19 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:18 AM	6.3	1.217	30.4	0.027
11:18 AM	6.5	1.218	30.6	0.028
11:18 AM	6.7	1.216	30.8	0.026
11:18 AM	6.9	1.215	31.0	0.025
11:18 AM	7.1	1.212	31.2	0.022
11:18 AM	7.3	1.221	31.4	0.031
11:18 AM	7.5	1.221	31.6	0.031
11:18 AM	7.7	1.216	31.8	0.026
11:18 AM	7.9	1.213	32.0	0.023
11:18 AM	8.1	1.216	32.2	0.026
11:18 AM	8.3	1.212	32.4	0.022
11:18 AM	8.5	1.209	32.6	0.019
11:18 AM	8.7	1.214	32.8	0.024
11:18 AM	8.9	1.207	33.0	0.017
11:18 AM	9.1	1.213	33.2	0.023
11:18 AM	9.3	1.214	33.4	0.024
11:18 AM	9.5	1.209	33.6	0.019
11:18 AM	9.7	1.211	33.8	0.021
11:18 AM	9.9	1.205	34.0	0.015
11:18 AM	10.1	1.216	34.2	0.026
11:18 AM	10.3	1.202	34.4	0.012
11:18 AM	10.5	1.209	34.6	0.019
11:18 AM	10.7	1.204	34.8	0.014
11:18 AM	10.9	1.204	35.0	0.014
11:18 AM	11.1	1.210	35.2	0.020
11:18 AM	11.3	1.201	35.4	0.011
11:18 AM	11.5	1.207	35.6	0.017
11:18 AM	11.7	1.206	35.8	0.016
11:18 AM	11.9	1.209	36.0	0.019
11:18 AM	12.1	1.207	36.2	0.017
11:18 AM	12.3	1.198	36.4	0.008
11:18 AM	12.5	1.215	36.6	0.025
11:18 AM	12.7	1.197	36.8	0.007
11:18 AM	12.9	1.201	37.0	0.011
11:18 AM	13.1	1.206	37.2	0.016
11:18 AM	13.3	1.194	37.4	0.004
11:18 AM	13.5	1.211	37.6	0.021
11:18 AM	13.7	1.201	37.8	0.011

VACUUM SLUG TEST #4 WELL NUMBER 31567

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.19 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:18 AM	13.9	1.206	38.0	0.016
11:18 AM	14.1	1.205	38.2	0.015
11:18 AM	14.3	1.201	38.4	0.011
11:18 AM	14.5	1.211	38.6	0.021
11:18 AM	14.7	1.201	38.8	0.011

TABLE D-5

VACUUM SLUG TEST #5 WELL NUMBER 31567

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.19 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:30 AM	29.9	1.272	0.2	0.082
11:30 AM	30.1	2.191	0.4	1.001
11:30 AM	30.3	3.839	0.6	2.649
11:30 AM	30.5	5.365	0.8	4.175
11:30 AM	30.7	6.616	1.0	5.426
11:30 AM	30.9	7.520	1.2	6.330
11:30 AM	31.1	8.090	1.4	6.900
11:30 AM	31.3	8.390	1.6	7.200
11:30 AM	31.5	8.480	1.8	7.290
11:30 AM	31.7	8.410	2.0	7.220
11:30 AM	31.9	8.230	2.2	7.040
11:30 AM	32.1	7.990	2.4	6.800
11:30 AM	32.3	7.730	2.6	6.540
11:30 AM	32.5	7.460	2.8	6.270
11:30 AM	32.7	7.190	3.0	6.000
11:30 AM	32.9	6.927	3.2	5.737
11:30 AM	33.1	6.671	3.4	5.481
11:30 AM	33.3	6.427	3.6	5.237
11:30 AM	33.5	6.189	3.8	4.999
11:30 AM	33.7	5.962	4.0	4.772
11:30 AM	33.9	5.748	4.2	4.558
11:30 AM	34.1	5.542	4.4	4.352
11:30 AM	34.3	5.354	4.6	4.164
11:30 AM	34.5	5.167	4.8	3.977
11:30 AM	34.7	4.988	5.0	3.798
11:30 AM	34.9	4.821	5.2	3.631
11:30 AM	35.1	4.666	5.4	3.476
11:30 AM	35.3	4.514	5.6	3.324
11:30 AM	35.5	4.367	5.8	3.177
11:30 AM	35.7	4.228	6.0	3.038
11:30 AM	35.9	4.096	6.2	2.906
11:30 AM	36.1	3.968	6.4	2.778
11:30 AM	36.3	3.848	6.6	2.658
11:30 AM	36.5	3.734	6.8	2.544
11:30 AM	36.7	3.624	7.0	2.434
11:30 AM	36.9	3.516	7.2	2.326
11:30 AM	37.1	3.416	7.4	2.226
11:30 AM	37.3	3.319	7.6	2.129

VACUUM SLUG TEST #5 WELL NUMBER 31567

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.19 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:30 AM	37.5	3.228	7.8	2.038
11:30 AM	37.7	3.141	8.0	1.951
11:30 AM	37.9	3.057	8.2	1.867
11:30 AM	38.1	2.976	8.4	1.786
11:30 AM	38.3	2.898	8.6	1.708
11:30 AM	38.5	2.825	8.8	1.635
11:30 AM	38.7	2.757	9.0	1.567
11:30 AM	38.9	2.686	9.2	1.496
11:30 AM	39.1	2.620	9.4	1.430
11:30 AM	39.3	2.557	9.6	1.367
11:30 AM	39.5	2.500	9.8	1.310
11:30 AM	39.7	2.441	10.0	1.251
11:30 AM	39.9	2.384	10.2	1.194
11:30 AM	40.1	2.331	10.4	1.141
11:30 AM	40.3	2.283	10.6	1.093
11:30 AM	40.5	2.236	10.8	1.046
11:30 AM	40.7	2.188	11.0	0.998
11:30 AM	40.9	2.143	11.2	0.953
11:30 AM	41.1	2.103	11.4	0.913
11:30 AM	41.3	2.064	11.6	0.874
11:30 AM	41.5	2.025	11.8	0.835
11:30 AM	41.7	1.990	12.0	0.800
11:30 AM	41.9	1.956	12.2	0.766
11:30 AM	42.1	1.924	12.4	0.734
11:30 AM	42.3	1.893	12.6	0.703
11:30 AM	42.5	1.861	12.8	0.671
11:30 AM	42.7	1.833	13.0	0.643
11:30 AM	42.9	1.802	13.2	0.612
11:30 AM	43.1	1.780	13.4	0.590
11:30 AM	43.3	1.756	13.6	0.566
11:30 AM	43.5	1.732	13.8	0.542
11:30 AM	43.7	1.712	14.0	0.522
11:30 AM	43.9	1.691	14.2	0.501
11:30 AM	44.1	1.667	14.4	0.477
11:30 AM	44.3	1.645	14.6	0.455
11:30 AM	44.5	1.628	14.8	0.438
11:30 AM	44.7	1.607	15.0	0.417
11:30 AM	44.9	1.591	15.2	0.401

VACUUM SLUG TEST #5 WELL NUMBER 31567

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.19 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:30 AM	45.1	1.571	15.4	0.381
11:30 AM	45.3	1.556	15.6	0.366
11:30 AM	45.5	1.542	15.8	0.352
11:30 AM	45.7	1.526	16.0	0.336
11:30 AM	45.9	1.513	16.2	0.323
11:30 AM	46.1	1.498	16.4	0.308
11:30 AM	46.3	1.487	16.6	0.297
11:30 AM	46.5	1.473	16.8	0.283
11:30 AM	46.7	1.463	17.0	0.273
11:30 AM	46.9	1.451	17.2	0.261
11:30 AM	47.1	1.441	17.4	0.251
11:30 AM	47.3	1.432	17.6	0.242
11:30 AM	47.5	1.424	17.8	0.234
11:30 AM	47.7	1.412	18.0	0.222
11:30 AM	47.9	1.404	18.2	0.214
11:30 AM	48.1	1.397	18.4	0.207
11:30 AM	48.3	1.388	18.6	0.198
11:30 AM	48.5	1.381	18.8	0.191
11:30 AM	48.7	1.372	19.0	0.182
11:30 AM	48.9	1.368	19.2	0.178
11:30 AM	49.1	1.360	19.4	0.170
11:30 AM	49.3	1.354	19.6	0.164
11:30 AM	49.5	1.347	19.8	0.157
11:30 AM	49.7	1.341	20.0	0.151
11:30 AM	49.9	1.338	20.2	0.148
11:30 AM	50.1	1.330	20.4	0.140
11:30 AM	50.3	1.326	20.6	0.136
11:30 AM	50.5	1.319	20.8	0.129
11:30 AM	50.7	1.313	21.0	0.123
11:30 AM	50.9	1.308	21.2	0.118
11:30 AM	51.1	1.305	21.4	0.115
11:30 AM	51.3	1.302	21.6	0.112
11:30 AM	51.5	1.293	21.8	0.103
11:30 AM	51.7	1.293	22.0	0.103
11:30 AM	51.9	1.289	22.2	0.099
11:30 AM	52.1	1.286	22.4	0.096
11:30 AM	52.3	1.282	22.6	0.092
11:30 AM	52.5	1.278	22.8	0.088

VACUUM SLUG TEST #5 WELL NUMBER 31567

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.19 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:30 AM	52.7	1.276	23.0	0.086
11:30 AM	52.9	1.273	23.2	0.083
11:30 AM	53.1	1.271	23.4	0.081
11:30 AM	53.3	1.270	23.6	0.080
11:30 AM	53.5	1.268	23.8	0.078
11:30 AM	53.7	1.263	24.0	0.073
11:30 AM	53.9	1.259	24.2	0.069
11:30 AM	54.1	1.259	24.4	0.069
11:30 AM	54.3	1.253	24.6	0.063
11:30 AM	54.5	1.251	24.8	0.061
11:30 AM	54.7	1.250	25.0	0.060
11:30 AM	54.9	1.248	25.2	0.058
11:30 AM	55.1	1.248	25.4	0.058
11:30 AM	55.3	1.245	25.6	0.055
11:30 AM	55.5	1.246	25.8	0.056
11:30 AM	55.7	1.243	26.0	0.053
11:30 AM	55.9	1.241	26.2	0.051
11:30 AM	56.1	1.238	26.4	0.048
11:30 AM	56.3	1.239	26.6	0.049
11:30 AM	56.5	1.236	26.8	0.046
11:30 AM	56.7	1.231	27.0	0.041
11:30 AM	56.9	1.236	27.2	0.046
11:30 AM	57.1	1.231	27.4	0.041
11:30 AM	57.3	1.233	27.6	0.043
11:30 AM	57.5	1.229	27.8	0.039
11:30 AM	57.7	1.229	28.0	0.039
11:30 AM	57.9	1.232	28.2	0.042
11:30 AM	58.1	1.230	28.4	0.040
11:30 AM	58.3	1.223	28.6	0.033
11:30 AM	58.5	1.226	28.8	0.036
11:30 AM	58.7	1.223	29.0	0.033
11:30 AM	58.9	1.222	29.2	0.032
11:30 AM	59.1	1.224	29.4	0.034
11:30 AM	59.3	1.220	29.6	0.030
11:30 AM	59.5	1.228	29.8	0.038
11:30 AM	59.7	1.218	30.0	0.028
11:30 AM	59.9	1.221	30.2	0.031
11:31 AM	0.1	1.219	30.4	0.029

VACUUM SLUG TEST #5 WELL NUMBER 31567

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.19 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:31 AM	0.3	1.219	30.6	0.029
11:31 AM	0.5	1.219	30.8	0.029
11:31 AM	0.7	1.216	31.0	0.026
11:31 AM	0.9	1.216	31.2	0.026
11:31 AM	1.1	1.215	31.4	0.025
11:31 AM	1.3	1.216	31.6	0.026
11:31 AM	1.5	1.212	31.8	0.022
11:31 AM	1.7	1.216	32.0	0.026
11:31 AM	1.9	1.210	32.2	0.020
11:31 AM	2.1	1.213	32.4	0.023
11:31 AM	2.3	1.210	32.6	0.020
11:31 AM	2.5	1.212	32.8	0.022
11:31 AM	2.7	1.213	33.0	0.023
11:31 AM	2.9	1.209	33.2	0.019
11:31 AM	3.1	1.212	33.4	0.022
11:31 AM	3.3	1.210	33.6	0.020
11:31 AM	3.5	1.212	33.8	0.022
11:31 AM	3.7	1.212	34.0	0.022
11:31 AM	3.9	1.210	34.2	0.020
11:31 AM	4.1	1.208	34.4	0.018
11:31 AM	4.3	1.211	34.6	0.021
11:31 AM	4.5	1.207	34.8	0.017
11:31 AM	4.7	1.209	35.0	0.019
11:31 AM	4.9	1.210	35.2	0.020
11:31 AM	5.1	1.206	35.4	0.016
11:31 AM	5.3	1.210	35.6	0.020
11:31 AM	5.5	1.207	35.8	0.017
11:31 AM	5.7	1.206	36.0	0.016
11:31 AM	5.9	1.212	36.2	0.022
11:31 AM	6.1	1.201	36.4	0.011
11:31 AM	6.3	1.210	36.6	0.020
11:31 AM	6.5	1.205	36.8	0.015
11:31 AM	6.7	1.211	37.0	0.021
11:31 AM	6.9	1.206	37.2	0.016
11:31 AM	7.1	1.210	37.4	0.020
11:31 AM	7.3	1.210	37.6	0.020
11:31 AM	7.5	1.205	37.8	0.015
11:31 AM	7.7	1.207	38.0	0.017

VACUUM SLUG TEST #5 WELL NUMBER 31567

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.19 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
11:31 AM	7.9	1.204	38.2	0.014
11:31 AM	8.1	1.208	38.4	0.018
11:31 AM	8.3	1.202	38.6	0.012
11:31 AM	8.5	1.197	38.8	0.007
11:31 AM	8.7	1.209	39.0	0.019
11:31 AM	8.9	1.197	39.2	0.007

VACUUM SLUG TEST #1 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:				
HRS/MINUTES	SECONDS	TRANSDUCER READING	ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
12:30PM	27.1	1.407	0.0	0.007
12:30PM	27.3	1.668	0.2	0.268
12:30PM	27.5	2.654	0.4	1.254
12:30PM	27.7	3.581	0.6	2.181
12:30PM	27.9	4.282	0.8	2.882
12:30PM	28.1	4.757	1.0	3.357
12:30PM	28.3	5.032	1.2	3.632
12:30PM	28.5	5.142	1.4	3.742
12:30PM	28.7	5.129	1.6	3.729
12:30PM	28.9	5.029	1.8	3.629
12:30PM	29.1	4.881	2.0	3.481
12:30PM	29.3	4.721	2.2	3.321
12:30PM	29.5	4.566	2.4	3.166
12:30PM	29.7	4.419	2.6	3.019
12:30PM	29.9	4.273	2.8	2.873
12:30PM	30.1	4.140	3.0	2.74
12:30PM	30.3	4.012	3.2	2.612
12:30PM	30.5	3.893	3.4	2.493
12:30PM	30.7	3.778	3.6	2.378
12:30PM	30.9	3.669	3.8	2.269
12:30PM	31.1	3.566	4.0	2.166
12:30PM	31.3	3.469	4.2	2.069
12:30PM	31.5	3.378	4.4	1.978
12:30PM	31.7	3.291	4.6	1.891
12:30PM	31.9	3.209	4.8	1.809
12:30PM	32.1	3.129	5.0	1.729
12:30PM	32.3	3.054	5.2	1.654
12:30PM	32.5	2.982	5.4	1.582
12:30PM	32.7	2.913	5.6	1.513
12:30PM	32.9	2.849	5.8	1.449
12:30PM	33.1	2.785	6.0	1.385
12:30PM	33.3	2.725	6.2	1.325
12:30PM	33.5	2.667	6.4	1.267
12:30PM	33.7	2.612	6.6	1.212
12:30PM	33.9	2.561	6.8	1.161
12:30PM	34.1	2.509	7.0	1.109
12:30PM	34.3	2.463	7.2	1.063
12:30PM	34.5	2.416	7.4	1.016
12:30PM	34.7	2.374	7.6	0.974
12:30PM	34.9	2.331	7.8	0.931
12:30PM	35.1	2.291	8.0	0.891

VACUUM SLUG TEST #1 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:30PM	35.3	2.253	8.2	0.853
12:30PM	35.5	2.216	8.4	0.816
12:30PM	35.7	2.181	8.6	0.781
12:30PM	35.9	2.148	8.8	0.748
12:30PM	36.1	2.116	9.0	0.716
12:30PM	36.3	2.085	9.2	0.685
12:30PM	36.5	2.054	9.4	0.654
12:30PM	36.7	2.026	9.6	0.626
12:30PM	36.9	1.998	9.8	0.598
12:30PM	37.1	1.971	10.0	0.571
12:30PM	37.3	1.947	10.2	0.547
12:30PM	37.5	1.924	10.4	0.524
12:30PM	37.7	1.901	10.6	0.501
12:30PM	37.9	1.879	10.8	0.479
12:30PM	38.1	1.858	11.0	0.458
12:30PM	38.3	1.838	11.2	0.438
12:30PM	38.5	1.819	11.4	0.419
12:30PM	38.7	1.801	11.6	0.401
12:30PM	38.9	1.784	11.8	0.384
12:30PM	39.1	1.767	12.0	0.367
12:30PM	39.3	1.751	12.2	0.351
12:30PM	39.5	1.737	12.4	0.337
12:30PM	39.7	1.722	12.6	0.322
12:30PM	39.9	1.710	12.8	0.31
12:30PM	40.1	1.697	13.0	0.297
12:30PM	40.3	1.683	13.2	0.283
12:30PM	40.5	1.671	13.4	0.271
12:30PM	40.7	1.660	13.6	0.26
12:30PM	40.9	1.649	13.8	0.249
12:30PM	41.1	1.640	14.0	0.24
12:30PM	41.3	1.630	14.2	0.23
12:30PM	41.5	1.620	14.4	0.22
12:30PM	41.7	1.611	14.6	0.211
12:30PM	41.9	1.603	14.8	0.203
12:30PM	42.1	1.594	15.0	0.194
12:30PM	42.3	1.588	15.2	0.188
12:30PM	42.5	1.579	15.4	0.179
12:30PM	42.7	1.572	15.6	0.172
12:30PM	42.9	1.566	15.8	0.166
12:30PM	43.1	1.557	16.0	0.157
12:30PM	43.3	1.553	16.2	0.153

VACUUM SLUG TEST #1 WELL NUMBER 31567
POST INJECTION TEST

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:30PM	43.5	1.547	16.4	0.147
12:30PM	43.7	1.539	16.6	0.139
12:30PM	43.9	1.536	16.8	0.136
12:30PM	44.1	1.530	17.0	0.13
12:30PM	44.3	1.525	17.2	0.125
12:30PM	44.5	1.519	17.4	0.119
12:30PM	44.7	1.515	17.6	0.115
12:30PM	44.9	1.511	17.8	0.111
12:30PM	45.1	1.506	18.0	0.106
12:30PM	45.3	1.502	18.2	0.102
12:30PM	45.5	1.499	18.4	0.099
12:30PM	45.7	1.495	18.6	0.095
12:30PM	45.9	1.490	18.8	0.09
12:30PM	46.1	1.489	19.0	0.089
12:30PM	46.3	1.481	19.2	0.081
12:30PM	46.5	1.482	19.4	0.082
12:30PM	46.7	1.478	19.6	0.078
12:30PM	46.9	1.473	19.8	0.073
12:30PM	47.1	1.472	20.0	0.072
12:30PM	47.3	1.471	20.2	0.071
12:30PM	47.5	1.468	20.4	0.068
12:30PM	47.7	1.464	20.6	0.064
12:30PM	47.9	1.463	20.8	0.063
12:30PM	48.1	1.462	21.0	0.062
12:30PM	48.3	1.459	21.2	0.059
12:30PM	48.5	1.457	21.4	0.057
12:30PM	48.7	1.455	21.6	0.055
12:30PM	48.9	1.453	21.8	0.053
12:30PM	49.1	1.453	22.0	0.053
12:30PM	49.3	1.451	22.2	0.051
12:30PM	49.5	1.448	22.4	0.048
12:30PM	49.7	1.445	22.6	0.045
12:30PM	49.9	1.447	22.8	0.047
12:30PM	50.1	1.444	23.0	0.044
12:30PM	50.3	1.444	23.2	0.044
12:30PM	50.5	1.441	23.4	0.041
12:30PM	50.7	1.442	23.6	0.042
12:30PM	50.9	1.438	23.8	0.038
12:30PM	51.1	1.437	24.0	0.037
12:30PM	51.3	1.435	24.2	0.035
12:30PM	51.5	1.436	24.4	0.036

VACUUM SLUG TEST #1 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:30PM	51.7	1.435	24.6	0.035
12:30PM	51.9	1.434	24.8	0.034
12:30PM	52.1	1.434	25.0	0.034
12:30PM	52.3	1.431	25.2	0.031
12:30PM	52.5	1.431	25.4	0.031
12:30PM	52.7	1.429	25.6	0.029
12:30PM	52.9	1.428	25.8	0.028
12:30PM	53.1	1.430	26.0	0.03
12:30PM	53.3	1.428	26.2	0.028
12:30PM	53.5	1.428	26.4	0.028
12:30PM	53.7	1.427	26.6	0.027
12:30PM	53.9	1.427	26.8	0.027
12:30PM	54.1	1.426	27.0	0.026
12:30PM	54.3	1.425	27.2	0.025
12:30PM	54.5	1.425	27.4	0.025
12:30PM	54.7	1.425	27.6	0.025
12:30PM	54.9	1.423	27.8	0.023
12:30PM	55.1	1.423	28.0	0.023
12:30PM	55.3	1.420	28.2	0.02
12:30PM	55.5	1.421	28.4	0.021
12:30PM	55.7	1.422	28.6	0.022
12:30PM	55.9	1.422	28.8	0.022
12:30PM	56.1	1.421	29.0	0.021
12:30PM	56.3	1.421	29.2	0.021
12:30PM	56.5	1.421	29.4	0.021
12:30PM	56.7	1.419	29.6	0.019
12:30PM	56.9	1.421	29.8	0.021
12:30PM	57.1	1.420	30.0	0.02
12:30PM	57.3	1.419	30.2	0.019
12:30PM	57.5	1.419	30.4	0.019
12:30PM	57.7	1.418	30.6	0.018
12:30PM	57.9	1.419	30.8	0.019
12:30PM	58.1	1.418	31.0	0.018
12:30PM	58.3	1.417	31.2	0.017
12:30PM	58.5	1.419	31.4	0.019
12:30PM	58.7	1.417	31.6	0.017
12:30PM	58.9	1.417	31.8	0.017
12:30PM	59.1	1.416	32.0	0.016
12:30PM	59.3	1.416	32.2	0.016
12:30PM	59.5	1.416	32.4	0.016
12:30PM	59.7	1.413	32.6	0.013

VACUUM SLUG TEST #1 WELL NUMBER 31567
POST INJECTION TEST

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:				
HRS/MINUTES	SECONDS	TRANSDUCER READING	ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
12:30PM	59.9	1.416	32.8	0.016
12:31PM	0.1	1.415	33.0	0.015
12:31PM	0.3	1.415	33.2	0.015
12:31PM	0.5	1.416	33.4	0.016
12:31PM	0.7	1.415	33.6	0.015
12:31PM	0.9	1.416	33.8	0.016
12:31PM	1.1	1.416	34.0	0.016
12:31PM	1.3	1.414	34.2	0.014
12:31PM	1.5	1.417	34.4	0.017
12:31PM	1.7	1.415	34.6	0.015
12:31PM	1.9	1.417	34.8	0.017
12:31PM	2.1	1.416	35.0	0.016
12:31PM	2.3	1.416	35.2	0.016
12:31PM	2.5	1.416	35.4	0.016
12:31PM	2.7	1.416	35.6	0.016
12:31PM	2.9	1.416	35.8	0.016
12:31PM	3.1	1.414	36.0	0.014
12:31PM	3.3	1.415	36.2	0.015
12:31PM	3.5	1.415	36.4	0.015
12:31PM	3.7	1.414	36.6	0.014
12:31PM	3.9	1.414	36.8	0.014
12:31PM	4.1	1.416	37.0	0.016
12:31PM	4.3	1.415	37.2	0.015
12:31PM	4.5	1.414	37.4	0.014
12:31PM	4.7	1.414	37.6	0.014
12:31PM	4.9	1.414	37.8	0.014
12:31PM	5.1	1.414	38.0	0.014
12:31PM	5.3	1.414	38.2	0.014
12:31PM	5.5	1.414	38.4	0.014
12:31PM	5.7	1.413	38.6	0.013
12:31PM	5.9	1.414	38.8	0.014
12:31PM	6.1	1.414	39.0	0.014
12:31PM	6.3	1.414	39.2	0.014
12:31PM	6.5	1.413	39.4	0.013
12:31PM	6.7	1.414	39.6	0.014
12:31PM	6.9	1.413	39.8	0.013
12:31PM	7.1	1.413	40.0	0.013
12:31PM	7.3	1.413	40.2	0.013
12:31PM	7.5	1.413	40.4	0.013
12:31PM	7.7	1.413	40.6	0.013
12:31PM	7.9	1.413	40.8	0.013

VACUUM SLUG TEST #1 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:31PM	8.1	1.413	41.0	0.013
12:31PM	8.3	1.413	41.2	0.013
12:31PM	8.5	1.412	41.4	0.012
12:31PM	8.7	1.411	41.6	0.011
12:31PM	8.9	1.411	41.8	0.011
12:31PM	9.1	1.411	42.0	0.011
12:31PM	9.3	1.411	42.2	0.011
12:31PM	9.5	1.411	42.4	0.011
12:31PM	9.7	1.410	42.6	0.01
12:31PM	9.9	1.411	42.8	0.011
12:31PM	10.1	1.411	43.0	0.011
12:31PM	10.3	1.411	43.2	0.011
12:31PM	10.5	1.412	43.4	0.012
12:31PM	10.7	1.411	43.6	0.011
12:31PM	10.9	1.413	43.8	0.013
12:31PM	11.1	1.411	44.0	0.011
12:31PM	11.3	1.412	44.2	0.012
12:31PM	11.5	1.413	44.4	0.013
12:31PM	11.7	1.412	44.6	0.012
12:31PM	11.9	1.413	44.8	0.013
12:31PM	12.1	1.412	45.0	0.012
12:31PM	12.3	1.413	45.2	0.013
12:31PM	12.5	1.411	45.4	0.011
12:31PM	12.7	1.411	45.6	0.011
12:31PM	12.9	1.410	45.8	0.01
12:31PM	13.1	1.411	46.0	0.011
12:31PM	13.3	1.412	46.2	0.012
12:31PM	13.5	1.411	46.4	0.011
12:31PM	13.7	1.413	46.6	0.013
12:31PM	13.9	1.411	46.8	0.011
12:31PM	14.1	1.410	47.0	0.01
12:31PM	14.3	1.411	47.2	0.011
12:31PM	14.5	1.410	47.4	0.01
12:31PM	14.7	1.410	47.6	0.01
12:31PM	14.9	1.410	47.8	0.01
12:31PM	15.1	1.410	48.0	0.01
12:31PM	15.3	1.411	48.2	0.011
12:31PM	15.5	1.408	48.4	0.008
12:31PM	15.7	1.411	48.6	0.011
12:31PM	15.9	1.410	48.8	0.01
12:31PM	16.1	1.410	49.0	0.01

VACUUM SLUG TEST #1 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:				
HRS/MINUTES	SECONDS	TRANSDUCER READING	ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
12:31PM	16.3	1.410	49.2	0.01
12:31PM	16.5	1.408	49.4	0.008
12:31PM	16.7	1.408	49.6	0.008
12:31PM	16.9	1.412	49.8	0.012
12:31PM	17.1	1.408	50.0	0.008
12:31PM	17.3	1.410	50.2	0.01
12:31PM	17.5	1.408	50.4	0.008
12:31PM	17.7	1.410	50.6	0.01
12:31PM	17.9	1.410	50.8	0.01
12:31PM	18.1	1.410	51.0	0.01
12:31PM	18.3	1.410	51.2	0.01
12:31PM	18.5	1.410	51.4	0.01
12:31PM	18.7	1.410	51.6	0.01
12:31PM	18.9	1.408	51.8	0.008
12:31PM	19.1	1.410	52.0	0.01
12:31PM	19.3	1.410	52.2	0.01
12:31PM	19.5	1.410	52.4	0.01
12:31PM	19.7	1.410	52.6	0.01
12:31PM	19.9	1.410	52.8	0.01
12:31PM	20.1	1.410	53.0	0.01
12:31PM	20.3	1.410	53.2	0.01
12:31PM	20.5	1.411	53.4	0.011
12:31PM	20.7	1.410	53.6	0.01
12:31PM	20.9	1.411	53.8	0.011
12:31PM	21.1	1.410	54.0	0.01
12:31PM	21.3	1.410	54.2	0.01
12:31PM	21.5	1.410	54.4	0.01
12:31PM	21.7	1.410	54.6	0.01
12:31PM	21.9	1.411	54.8	0.011
12:31PM	22.1	1.410	55.0	0.01
12:31PM	22.3	1.411	55.2	0.011
12:31PM	22.5	1.409	55.4	0.009
12:31PM	22.7	1.410	55.6	0.01
12:31PM	22.9	1.412	55.8	0.012
12:31PM	23.1	1.410	56.0	0.01
12:31PM	23.3	1.411	56.2	0.011
12:31PM	23.5	1.408	56.4	0.008
12:31PM	23.7	1.410	56.6	0.01
12:31PM	23.9	1.410	56.8	0.01
12:31PM	24.1	1.410	57.0	0.01
12:31PM	24.3	1.411	57.2	0.011

VACUUM SLUG TEST #1 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:31PM	24.5	1.410	57.4	0.01
12:31PM	24.7	1.411	57.6	0.011
12:31PM	24.9	1.410	57.8	0.01
12:31PM	25.1	1.411	58.0	0.011
12:31PM	25.3	1.410	58.2	0.01
12:31PM	25.5	1.411	58.4	0.011
12:31PM	25.7	1.411	58.6	0.011
12:31PM	25.9	1.408	58.8	0.008
12:31PM	26.1	1.411	59.0	0.011
12:31PM	26.3	1.407	59.2	0.007
12:31PM	26.5	1.409	59.4	0.009
12:31PM	26.7	1.409	59.6	0.009
12:31PM	26.9	1.410	59.8	0.01
12:31PM	27.1	1.410	60.0	0.01
12:31PM	27.3	1.408	60.2	0.008
12:31PM	27.5	1.410	60.4	0.01
12:31PM	27.7	1.408	60.6	0.008
12:31PM	27.9	1.410	60.8	0.01
12:31PM	28.1	1.410	61.0	0.01
12:31PM	28.3	1.410	61.2	0.01
12:31PM	28.5	1.410	61.4	0.01
12:31PM	28.7	1.408	61.6	0.008
12:31PM	28.9	1.411	61.8	0.011
12:31PM	29.1	1.410	62.0	0.01
12:31PM	29.3	1.409	62.2	0.009
12:31PM	29.5	1.411	62.4	0.011
12:31PM	29.7	1.410	62.6	0.01
12:31PM	29.9	1.410	62.8	0.01
12:31PM	30.1	1.410	63.0	0.01
12:31PM	30.3	1.411	63.2	0.011
12:31PM	30.5	1.410	63.4	0.01
12:31PM	30.7	1.411	63.6	0.011
12:31PM	30.9	1.410	63.8	0.01
12:31PM	31.1	1.410	64.0	0.01
12:31PM	31.3	1.411	64.2	0.011
12:31PM	31.5	1.409	64.4	0.009
12:31PM	31.7	1.410	64.6	0.01
12:31PM	31.9	1.410	64.8	0.01
12:31PM	32.1	1.410	65.0	0.01
12:31PM	32.3	1.411	65.2	0.011
12:31PM	32.5	1.410	65.4	0.01

VACUUM SLUG TEST #1 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:31PM	32.7	1.411	65.6	0.011
12:31PM	32.9	1.410	65.8	0.01
12:31PM	33.1	1.411	66.0	0.011
12:31PM	33.3	1.410	66.2	0.01
12:31PM	33.5	1.410	66.4	0.01
12:31PM	33.7	1.410	66.6	0.01
12:31PM	33.9	1.410	66.8	0.01
12:31PM	34.1	1.410	67.0	0.01
12:31PM	34.3	1.410	67.2	0.01
12:31PM	34.5	1.410	67.4	0.01
12:31PM	34.7	1.409	67.6	0.009
12:31PM	34.9	1.410	67.8	0.01
12:31PM	35.1	1.410	68.0	0.01
12:31PM	35.3	1.408	68.2	0.008
12:31PM	35.5	1.411	68.4	0.011
12:31PM	35.7	1.407	68.6	0.007
12:31PM	35.9	1.408	68.8	0.008
12:31PM	36.1	1.409	69.0	0.009
12:31PM	36.3	1.408	69.2	0.008
12:31PM	36.5	1.410	69.4	0.01
12:31PM	36.7	1.407	69.6	0.007
12:31PM	36.9	1.408	69.8	0.008
12:31PM	37.1	1.408	70.0	0.008
12:31PM	37.3	1.408	70.2	0.008
12:31PM	37.5	1.407	70.4	0.007
12:31PM	37.7	1.407	70.6	0.007
12:31PM	37.9	1.407	70.8	0.007
12:31PM	38.1	1.407	71.0	0.007
12:31PM	38.3	1.407	71.2	0.007
12:31PM	38.5	1.407	71.4	0.007
12:31PM	38.7	1.407	71.6	0.007
12:31PM	38.9	1.407	71.8	0.007
12:31PM	39.1	1.407	72.0	0.007
12:31PM	39.3	1.407	72.2	0.007
12:31PM	39.5	1.407	72.4	0.007
12:31PM	39.7	1.407	72.6	0.007
12:31PM	39.9	1.407	72.8	0.007
12:31PM	40.1	1.407	73.0	0.007
12:31PM	40.3	1.407	73.2	0.007
12:31PM	40.5	1.407	73.4	0.007
12:31PM	40.7	1.407	73.6	0.007

VACUUM SLUG TEST #1 WELL NUMBER 31567
POST INJECTION TEST

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:				
HRS/MINUTES	SECONDS	TRANSDUCER READING	ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
12:31PM	40.9	1.407	73.8	0.007
12:31PM	41.1	1.407	74.0	0.007

VACUUM SLUG TEST #2 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.42 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:36 PM	31.9	1.429	0.0	0.009
12:36 PM	32.1	1.465	0.2	0.045
12:36 PM	32.3	1.923	0.4	0.503
12:36 PM	32.5	2.944	0.6	1.524
12:36 PM	32.7	3.807	0.8	2.387
12:36 PM	32.9	4.437	1.0	3.017
12:36 PM	33.1	4.843	1.2	3.423
12:36 PM	33.3	5.069	1.4	3.649
12:36 PM	33.5	5.135	1.6	3.715
12:36 PM	33.7	5.093	1.8	3.673
12:36 PM	33.9	4.983	2.0	3.563
12:36 PM	34.1	4.838	2.2	3.418
12:36 PM	34.3	4.681	2.4	3.261
12:36 PM	34.5	4.530	2.6	3.110
12:36 PM	34.7	4.383	2.8	2.963
12:36 PM	34.9	4.244	3.0	2.824
12:36 PM	35.1	4.110	3.2	2.690
12:36 PM	35.3	3.985	3.4	2.565
12:36 PM	35.5	3.866	3.6	2.446
12:36 PM	35.7	3.755	3.8	2.335
12:36 PM	35.9	3.644	4.0	2.224
12:36 PM	36.1	3.542	4.2	2.122
12:36 PM	36.3	3.445	4.4	2.025
12:36 PM	36.5	3.354	4.6	1.934
12:36 PM	36.7	3.269	4.8	1.849
12:36 PM	36.9	3.186	5.0	1.766
12:36 PM	37.1	3.107	5.2	1.687
12:36 PM	37.3	3.035	5.4	1.615
12:36 PM	37.5	2.963	5.6	1.543
12:36 PM	37.7	2.895	5.8	1.475
12:36 PM	37.9	2.831	6.0	1.411
12:36 PM	38.1	2.770	6.2	1.350
12:36 PM	38.3	2.709	6.4	1.289
12:36 PM	38.5	2.653	6.6	1.233
12:36 PM	38.7	2.599	6.8	1.179
12:36 PM	38.9	2.548	7.0	1.128
12:36 PM	39.1	2.499	7.2	1.079
12:36 PM	39.3	2.452	7.4	1.032
12:36 PM	39.5	2.407	7.6	0.987
12:36 PM	39.7	2.364	7.8	0.944
12:36 PM	39.9	2.324	8.0	0.904

VACUUM SLUG TEST #2 WELL NUMBER 31567

POST INJECTION TEST

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.42 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:36 PM	40.1	2.284	8.2	0.864
12:36 PM	40.3	2.246	8.4	0.826
12:36 PM	40.5	2.209	8.6	0.789
12:36 PM	40.7	2.175	8.8	0.755
12:36 PM	40.9	2.140	9.0	0.720
12:36 PM	41.1	2.108	9.2	0.688
12:36 PM	41.3	2.078	9.4	0.658
12:36 PM	41.5	2.048	9.6	0.628
12:36 PM	41.7	2.019	9.8	0.599
12:36 PM	41.9	1.992	10.0	0.572
12:36 PM	42.1	1.965	10.2	0.545
12:36 PM	42.3	1.941	10.4	0.521
12:36 PM	42.5	1.917	10.6	0.497
12:36 PM	42.7	1.895	10.8	0.475
12:36 PM	42.9	1.872	11.0	0.452
12:36 PM	43.1	1.853	11.2	0.433
12:36 PM	43.3	1.832	11.4	0.412
12:36 PM	43.5	1.815	11.6	0.395
12:36 PM	43.7	1.797	11.8	0.377
12:36 PM	43.9	1.780	12.0	0.360
12:36 PM	44.1	1.763	12.2	0.343
12:36 PM	44.3	1.748	12.4	0.328
12:36 PM	44.5	1.734	12.6	0.314
12:36 PM	44.7	1.720	12.8	0.300
12:36 PM	44.9	1.704	13.0	0.284
12:36 PM	45.1	1.692	13.2	0.272
12:36 PM	45.3	1.680	13.4	0.260
12:36 PM	45.5	1.667	13.6	0.247
12:36 PM	45.7	1.655	13.8	0.235
12:36 PM	45.9	1.643	14.0	0.223
12:36 PM	46.1	1.635	14.2	0.215
12:36 PM	46.3	1.628	14.4	0.208
12:36 PM	46.5	1.619	14.6	0.199
12:36 PM	46.7	1.610	14.8	0.190
12:36 PM	46.9	1.603	15.0	0.183
12:36 PM	47.1	1.594	15.2	0.174
12:36 PM	47.3	1.587	15.4	0.167
12:36 PM	47.5	1.579	15.6	0.159
12:36 PM	47.7	1.573	15.8	0.153
12:36 PM	47.9	1.566	16.0	0.146
12:36 PM	48.1	1.560	16.2	0.140

VACUUM SLUG TEST #2 WELL NUMBER 31567
POST INJECTION TEST

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.42 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:36 PM	48.3	1.553	16.4	0.133
12:36 PM	48.5	1.547	16.6	0.127
12:36 PM	48.7	1.542	16.8	0.122
12:36 PM	48.9	1.536	17.0	0.116
12:36 PM	49.1	1.531	17.2	0.111
12:36 PM	49.3	1.526	17.4	0.106
12:36 PM	49.5	1.520	17.6	0.100
12:36 PM	49.7	1.516	17.8	0.096
12:36 PM	49.9	1.511	18.0	0.091
12:36 PM	50.1	1.507	18.2	0.087
12:36 PM	50.3	1.503	18.4	0.083
12:36 PM	50.5	1.499	18.6	0.079
12:36 PM	50.7	1.496	18.8	0.076
12:36 PM	50.9	1.492	19.0	0.072
12:36 PM	51.1	1.489	19.2	0.069
12:36 PM	51.3	1.485	19.4	0.065
12:36 PM	51.5	1.483	19.6	0.063
12:36 PM	51.7	1.480	19.8	0.060
12:36 PM	51.9	1.477	20.0	0.057
12:36 PM	52.1	1.474	20.2	0.054
12:36 PM	52.3	1.471	20.4	0.051
12:36 PM	52.5	1.470	20.6	0.050
12:36 PM	52.7	1.467	20.8	0.047
12:36 PM	52.9	1.465	21.0	0.045
12:36 PM	53.1	1.463	21.2	0.043
12:36 PM	53.3	1.461	21.4	0.041
12:36 PM	53.5	1.459	21.6	0.039
12:36 PM	53.7	1.457	21.8	0.037
12:36 PM	53.9	1.455	22.0	0.035
12:36 PM	54.1	1.454	22.2	0.034
12:36 PM	54.3	1.451	22.4	0.031
12:36 PM	54.5	1.451	22.6	0.031
12:36 PM	54.7	1.448	22.8	0.028
12:36 PM	54.9	1.446	23.0	0.026
12:36 PM	55.1	1.445	23.2	0.025
12:36 PM	55.3	1.445	23.4	0.025
12:36 PM	55.5	1.443	23.6	0.023
12:36 PM	55.7	1.443	23.8	0.023
12:36 PM	55.9	1.441	24.0	0.021
12:36 PM	56.1	1.440	24.2	0.020
12:36 PM	56.3	1.439	24.4	0.019

VACUUM SLUG TEST #2 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.42 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:36 PM	56.5	1.437	24.6	0.017
12:36 PM	56.7	1.437	24.8	0.017
12:36 PM	56.9	1.436	25.0	0.016
12:36 PM	57.1	1.434	25.2	0.014
12:36 PM	57.3	1.433	25.4	0.013
12:36 PM	57.5	1.433	25.6	0.013
12:36 PM	57.7	1.431	25.8	0.011
12:36 PM	57.9	1.430	26.0	0.010
12:36 PM	58.1	1.430	26.2	0.010
12:36 PM	58.3	1.429	26.4	0.009
12:36 PM	58.5	1.429	26.6	0.009
12:36 PM	58.7	1.428	26.8	0.008
12:36 PM	58.9	1.428	27.0	0.008
12:36 PM	59.1	1.426	27.2	0.006
12:36 PM	59.3	1.426	27.4	0.006
12:36 PM	59.5	1.426	27.6	0.006
12:36 PM	59.7	1.426	27.8	0.006
12:36 PM	59.9	1.425	28.0	0.005
12:37 PM	0.1	1.423	28.2	0.003
12:37 PM	0.3	1.425	28.4	0.005
12:37 PM	0.5	1.423	28.6	0.003
12:37 PM	0.7	1.423	28.8	0.003
12:37 PM	0.9	1.422	29.0	0.002
12:37 PM	1.1	1.422	29.2	0.002
12:37 PM	1.3	1.422	29.4	0.002
12:37 PM	1.5	1.420	29.6	0.000
12:37 PM	1.7	1.420	29.8	0.000
12:37 PM	1.9	1.420	30.0	0.000
12:37 PM	2.1	1.420	30.2	0.000
12:37 PM	2.3	1.419	30.4	-0.001
12:37 PM	2.5	1.419	30.6	-0.001
12:37 PM	2.7	1.419	30.8	-0.001
12:37 PM	2.9	1.419	31.0	-0.001
12:37 PM	3.1	1.419	31.2	-0.001
12:37 PM	3.3	1.419	31.4	-0.001
12:37 PM	3.5	1.419	31.6	-0.001
12:37 PM	3.7	1.419	31.8	-0.001
12:37 PM	3.9	1.418	32.0	-0.002
12:37 PM	4.1	1.419	32.2	-0.001
12:37 PM	4.3	1.418	32.4	-0.002
12:37 PM	4.5	1.416	32.6	-0.004

VACUUM SLUG TEST #2 WELL NUMBER 31567
POST INJECTION TEST

5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.42 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:37 PM	4.7	1.415	32.8	-0.005
12:37 PM	4.9	1.412	33.0	-0.008
12:37 PM	5.1	1.416	33.2	-0.004
12:37 PM	5.3	1.415	33.4	-0.005
12:37 PM	5.5	1.416	33.6	-0.004
12:37 PM	5.7	1.416	33.8	-0.004
12:37 PM	5.9	1.415	34.0	-0.005
12:37 PM	6.1	1.415	34.2	-0.005
12:37 PM	6.3	1.414	34.4	-0.006
12:37 PM	6.5	1.414	34.6	-0.006
12:37 PM	6.7	1.412	34.8	-0.008
12:37 PM	6.9	1.416	35.0	-0.004
12:37 PM	7.1	1.414	35.2	-0.006
12:37 PM	7.3	1.412	35.4	-0.008
12:37 PM	7.5	1.414	35.6	-0.006
12:37 PM	7.7	1.412	35.8	-0.008
12:37 PM	7.9	1.414	36.0	-0.006
12:37 PM	8.1	1.412	36.2	-0.008
12:37 PM	8.3	1.412	36.4	-0.008
12:37 PM	8.5	1.412	36.6	-0.008
12:37 PM	8.7	1.412	36.8	-0.008
12:37 PM	8.9	1.412	37.0	-0.008
12:37 PM	9.1	1.412	37.2	-0.008
12:37 PM	9.3	1.413	37.4	-0.007
12:37 PM	9.5	1.413	37.6	-0.007
12:37 PM	9.7	1.412	37.8	-0.008
12:37 PM	9.9	1.411	38.0	-0.009
12:37 PM	10.1	1.412	38.2	-0.008
12:37 PM	10.3	1.411	38.4	-0.009
12:37 PM	10.5	1.412	38.6	-0.008
12:37 PM	10.7	1.412	38.8	-0.008
12:37 PM	10.9	1.412	39.0	-0.008
12:37 PM	11.1	1.412	39.2	-0.008
12:37 PM	11.3	1.411	39.4	-0.009
12:37 PM	11.5	1.412	39.6	-0.008
12:37 PM	11.7	1.412	39.8	-0.008
12:37 PM	11.9	1.412	40.0	-0.008

VACUUM SLUG TEST #3 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
1242	43.9	1.401	0.0	0.001
1242	44.1	1.502	0.2	0.102
1242	44.3	2.333	0.4	0.933
1242	44.5	3.279	0.6	1.879
1242	44.7	4.016	0.8	2.616
1242	44.9	4.550	1.0	3.150
1242	45.1	4.888	1.2	3.488
1242	45.3	5.055	1.4	3.655
1242	45.5	5.095	1.6	3.695
1242	45.7	5.043	1.8	3.643
1242	45.9	4.932	2.0	3.532
1242	46.1	4.794	2.2	3.394
1242	46.3	4.644	2.4	3.244
1242	46.5	4.493	2.6	3.093
1242	46.7	4.350	2.8	2.950
1242	46.9	4.217	3.0	2.817
1242	47.1	4.087	3.2	2.687
1242	47.3	3.963	3.4	2.563
1242	47.5	3.846	3.6	2.446
1242	47.7	3.732	3.8	2.332
1242	47.9	3.624	4.0	2.224
1242	48.1	3.523	4.2	2.123
1242	48.3	3.426	4.4	2.026
1242	48.5	3.336	4.6	1.936
1242	48.7	3.251	4.8	1.851
1242	48.9	3.169	5.0	1.769
1242	49.1	3.091	5.2	1.691
1242	49.3	3.017	5.4	1.617
1242	49.5	2.946	5.6	1.546
1242	49.7	2.878	5.8	1.478
1242	49.9	2.815	6.0	1.415
1242	50.1	2.752	6.2	1.352
1242	50.3	2.694	6.4	1.294
1242	50.5	2.638	6.6	1.238
1242	50.7	2.585	6.8	1.185
1242	50.9	2.534	7.0	1.134
1242	51.1	2.486	7.2	1.086
1242	51.3	2.438	7.4	1.038
1242	51.5	2.392	7.6	0.992
1242	51.7	2.344	7.8	0.944
1242	51.9	2.303	8.0	0.903

VACUUM SLUG TEST #3 WELL NUMBER 31567
POST INJECTION TEST

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
1242	52.1	2.261	8.2	0.861
1242	52.3	2.232	8.4	0.832
1242	52.5	2.200	8.6	0.800
1242	52.7	2.165	8.8	0.765
1242	52.9	2.132	9.0	0.732
1242	53.1	2.098	9.2	0.698
1242	53.3	2.062	9.4	0.662
1242	53.5	2.039	9.6	0.639
1242	53.7	2.012	9.8	0.612
1242	53.9	1.982	10.0	0.582
1242	54.1	1.959	10.2	0.559
1242	54.3	1.934	10.4	0.534
1242	54.5	1.910	10.6	0.510
1242	54.7	1.886	10.8	0.486
1242	54.9	1.867	11.0	0.467
1242	55.1	1.845	11.2	0.445
1242	55.3	1.824	11.4	0.424
1242	55.5	1.808	11.6	0.408
1242	55.7	1.790	11.8	0.390
1242	55.9	1.774	12.0	0.374
1242	56.1	1.758	12.2	0.358
1242	56.3	1.744	12.4	0.344
1242	56.5	1.729	12.6	0.329
1242	56.7	1.714	12.8	0.314
1242	56.9	1.699	13.0	0.299
1242	57.1	1.688	13.2	0.288
1242	57.3	1.676	13.4	0.276
1242	57.5	1.664	13.6	0.264
1242	57.7	1.653	13.8	0.253
1242	57.9	1.642	14.0	0.242
1242	58.1	1.632	14.2	0.232
1242	58.3	1.624	14.4	0.224
1242	58.5	1.613	14.6	0.213
1242	58.7	1.606	14.8	0.206
1242	58.9	1.597	15.0	0.197
1242	59.1	1.589	15.2	0.189
1242	59.3	1.583	15.4	0.183
1242	59.5	1.576	15.6	0.176
1242	59.7	1.568	15.8	0.168
1242	59.9	1.562	16.0	0.162
1243	0.1	1.556	16.2	0.156

VACUUM SLUG TEST #3 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
1243	0.3	1.549	16.4	0.149
1243	0.5	1.545	16.6	0.145
1243	0.7	1.537	16.8	0.137
1243	0.9	1.531	17.0	0.131
1243	1.1	1.526	17.2	0.126
1243	1.3	1.520	17.4	0.120
1243	1.5	1.515	17.6	0.115
1243	1.7	1.512	17.8	0.112
1243	1.9	1.507	18.0	0.107
1243	2.1	1.504	18.2	0.104
1243	2.3	1.497	18.4	0.097
1243	2.5	1.495	18.6	0.095
1243	2.7	1.490	18.8	0.090
1243	2.9	1.488	19.0	0.088
1243	3.1	1.487	19.2	0.087
1243	3.3	1.482	19.4	0.082
1243	3.5	1.483	19.6	0.083
1243	3.7	1.478	19.8	0.078
1243	3.9	1.476	20.0	0.076
1243	4.1	1.474	20.2	0.074
1243	4.3	1.471	20.4	0.071
1243	4.5	1.470	20.6	0.070
1243	4.7	1.464	20.8	0.064
1243	4.9	1.466	21.0	0.066
1243	5.1	1.461	21.2	0.061
1243	5.3	1.462	21.4	0.062
1243	5.5	1.460	21.6	0.060
1243	5.7	1.458	21.8	0.058
1243	5.9	1.454	22.0	0.054
1243	6.1	1.453	22.2	0.053
1243	6.3	1.451	22.4	0.051
1243	6.5	1.452	22.6	0.052
1243	6.7	1.447	22.8	0.047
1243	6.9	1.449	23.0	0.049
1243	7.1	1.445	23.2	0.045
1243	7.3	1.443	23.4	0.043
1243	7.5	1.444	23.6	0.044
1243	7.7	1.440	23.8	0.040
1243	7.9	1.443	24.0	0.043
1243	8.1	1.438	24.2	0.038
1243	8.3	1.439	24.4	0.039

VACUUM SLUG TEST #3 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
1243	8.5	1.436	24.6	0.036
1243	8.7	1.437	24.8	0.037
1243	8.9	1.435	25.0	0.035
1243	9.1	1.435	25.2	0.035
1243	9.3	1.434	25.4	0.034
1243	9.5	1.432	25.6	0.032
1243	9.7	1.432	25.8	0.032
1243	9.9	1.431	26.0	0.031
1243	10.1	1.430	26.2	0.030
1243	10.3	1.430	26.4	0.030
1243	10.5	1.428	26.6	0.028
1243	10.7	1.428	26.8	0.028
1243	10.9	1.426	27.0	0.026
1243	11.1	1.426	27.2	0.026
1243	11.3	1.426	27.4	0.026
1243	11.5	1.425	27.6	0.025
1243	11.7	1.426	27.8	0.026
1243	11.9	1.424	28.0	0.024
1243	12.1	1.425	28.2	0.025
1243	12.3	1.423	28.4	0.023
1243	12.5	1.423	28.6	0.023
1243	12.7	1.423	28.8	0.023
1243	12.9	1.421	29.0	0.021
1243	13.1	1.421	29.2	0.021
1243	13.3	1.420	29.4	0.020
1243	13.5	1.421	29.6	0.021
1243	13.7	1.420	29.8	0.020
1243	13.9	1.420	30.0	0.020
1243	14.1	1.420	30.2	0.020
1243	14.3	1.420	30.4	0.020
1243	14.5	1.418	30.6	0.018
1243	14.7	1.418	30.8	0.018
1243	14.9	1.418	31.0	0.018
1243	15.1	1.418	31.2	0.018
1243	15.3	1.418	31.4	0.018
1243	15.5	1.418	31.6	0.018
1243	15.7	1.417	31.8	0.017
1243	15.9	1.417	32.0	0.017
1243	16.1	1.417	32.2	0.017
1243	16.3	1.417	32.4	0.017
1243	16.5	1.416	32.6	0.016

VACUUM SLUG TEST #3 WELL NUMBER 31567
POST INJECTION TEST
5.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
1243	16.7	1.415	32.8	0.015
1243	16.9	1.415	33.0	0.015
1243	17.1	1.415	33.2	0.015
1243	17.3	1.415	33.4	0.015
1243	17.5	1.415	33.6	0.015
1243	17.7	1.414	33.8	0.014
1243	17.9	1.414	34.0	0.014
1243	18.1	1.414	34.2	0.014
1243	18.3	1.414	34.4	0.014
1243	18.5	1.414	34.6	0.014
1243	18.7	1.414	34.8	0.014
1243	18.9	1.414	35.0	0.014
1243	19.1	1.414	35.2	0.014
1243	19.3	1.414	35.4	0.014
1243	19.5	1.413	35.6	0.013
1243	19.7	1.414	35.8	0.014
1243	19.9	1.413	36.0	0.013
1243	20.1	1.413	36.2	0.013
1243	20.3	1.414	36.4	0.014
1243	20.5	1.412	36.6	0.012
1243	20.7	1.412	36.8	0.012
1243	20.9	1.412	37.0	0.012
1243	21.1	1.412	37.2	0.012
1243	21.3	1.412	37.4	0.012
1243	21.5	1.412	37.6	0.012
1243	21.7	1.412	37.8	0.012
1243	21.9	1.412	38.0	0.012
1243	22.1	1.412	38.2	0.012
1243	22.3	1.412	38.4	0.012
1243	22.5	1.412	38.6	0.012
1243	22.7	1.412	38.8	0.012
1243	22.9	1.412	39.0	0.012
1243	23.1	1.411	39.2	0.011
1243	23.3	1.412	39.4	0.012
1243	23.5	1.411	39.6	0.011
1243	23.7	1.412	39.8	0.012
1243	23.9	1.411	40.0	0.011
1243	24.1	1.412	40.2	0.012
1243	24.3	1.412	40.4	0.012
1243	24.5	1.411	40.6	0.011
1243	24.7	1.412	40.8	0.012

VACUUM SLUG TEST #3 WELL NUMBER 31567
POST INJECTION TEST

5.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 1.40 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
1243	24.9	1.411	41.0	0.011
1243	25.1	1.411	41.2	0.011
1243	25.3	1.411	41.4	0.011
1243	25.5	1.411	41.6	0.011
1243	25.7	1.411	41.8	0.011
1243	25.9	1.411	42.0	0.011

VACUUM SLUG TEST #4 WELL NUMBER 31567
POST INJECTION TEST

10.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 0.89 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:56 PM	25.5	0.893	0.0	0.003
12:56 PM	25.7	0.934	0.2	0.044
12:56 PM	25.9	1.560	0.4	0.670
12:56 PM	26.1	3.025	0.6	2.135
12:56 PM	26.3	4.448	0.8	3.558
12:56 PM	26.5	5.654	1.0	4.764
12:56 PM	26.7	6.600	1.2	5.710
12:56 PM	26.9	7.290	1.4	6.400
12:56 PM	27.1	7.730	1.6	6.840
12:56 PM	27.3	7.970	1.8	7.080
12:56 PM	27.5	8.010	2.0	7.120
12:56 PM	27.7	7.910	2.2	7.020
12:56 PM	27.9	7.710	2.4	6.820
12:56 PM	28.1	7.470	2.6	6.580
12:56 PM	28.3	7.210	2.8	6.320
12:56 PM	28.5	6.942	3.0	6.052
12:56 PM	28.7	6.682	3.2	5.792
12:56 PM	28.9	6.428	3.4	5.538
12:56 PM	29.1	6.188	3.6	5.298
12:56 PM	29.3	5.959	3.8	5.069
12:56 PM	29.5	5.730	4.0	4.840
12:56 PM	29.7	5.519	4.2	4.629
12:56 PM	29.9	5.315	4.4	4.425
12:56 PM	30.1	5.120	4.6	4.230
12:56 PM	30.3	4.935	4.8	4.045
12:56 PM	30.5	4.757	5.0	3.867
12:56 PM	30.7	4.589	5.2	3.699
12:56 PM	30.9	4.426	5.4	3.536
12:56 PM	31.1	4.271	5.6	3.381
12:56 PM	31.3	4.123	5.8	3.233
12:56 PM	31.5	3.983	6.0	3.093
12:56 PM	31.7	3.851	6.2	2.961
12:56 PM	31.9	3.724	6.4	2.834
12:56 PM	32.1	3.600	6.6	2.710
12:56 PM	32.3	3.486	6.8	2.596
12:56 PM	32.5	3.378	7.0	2.488
12:56 PM	32.7	3.272	7.2	2.382
12:56 PM	32.9	3.171	7.4	2.281
12:56 PM	33.1	3.074	7.6	2.184
12:56 PM	33.3	2.981	7.8	2.091
12:56 PM	33.5	2.892	8.0	2.002

VACUUM SLUG TEST #4 WELL NUMBER 31567
POST INJECTION TEST

10.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 0.89 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:56 PM	33.7	2.808	8.2	1.918
12:56 PM	33.9	2.727	8.4	1.837
12:56 PM	34.1	2.648	8.6	1.758
12:56 PM	34.3	2.574	8.8	1.684
12:56 PM	34.5	2.502	9.0	1.612
12:56 PM	34.7	2.433	9.2	1.543
12:56 PM	34.9	2.368	9.4	1.478
12:56 PM	35.1	2.305	9.6	1.415
12:56 PM	35.3	2.246	9.8	1.356
12:56 PM	35.5	2.188	10.0	1.298
12:56 PM	35.7	2.131	10.2	1.241
12:56 PM	35.9	2.078	10.4	1.188
12:56 PM	36.1	2.026	10.6	1.136
12:56 PM	36.3	1.978	10.8	1.088
12:56 PM	36.5	1.931	11.0	1.041
12:56 PM	36.7	1.886	11.2	0.996
12:56 PM	36.9	1.843	11.4	0.953
12:56 PM	37.1	1.802	11.6	0.912
12:56 PM	37.3	1.762	11.8	0.872
12:56 PM	37.5	1.725	12.0	0.835
12:56 PM	37.7	1.690	12.2	0.800
12:56 PM	37.9	1.656	12.4	0.766
12:56 PM	38.1	1.623	12.6	0.733
12:56 PM	38.3	1.592	12.8	0.702
12:56 PM	38.5	1.563	13.0	0.673
12:56 PM	38.7	1.535	13.2	0.645
12:56 PM	38.9	1.507	13.4	0.617
12:56 PM	39.1	1.481	13.6	0.591
12:56 PM	39.3	1.456	13.8	0.566
12:56 PM	39.5	1.432	14.0	0.542
12:56 PM	39.7	1.408	14.2	0.518
12:56 PM	39.9	1.387	14.4	0.497
12:56 PM	40.1	1.365	14.6	0.475
12:56 PM	40.3	1.345	14.8	0.455
12:56 PM	40.5	1.326	15.0	0.436
12:56 PM	40.7	1.307	15.2	0.417
12:56 PM	40.9	1.290	15.4	0.400
12:56 PM	41.1	1.273	15.6	0.383
12:56 PM	41.3	1.258	15.8	0.368
12:56 PM	41.5	1.243	16.0	0.353
12:56 PM	41.7	1.229	16.2	0.339

VACUUM SLUG TEST #4 WELL NUMBER 31567
POST INJECTION TEST

10.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 0.89 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:56 PM	41.9	1.215	16.4	0.325
12:56 PM	42.1	1.203	16.6	0.313
12:56 PM	42.3	1.191	16.8	0.301
12:56 PM	42.5	1.178	17.0	0.288
12:56 PM	42.7	1.167	17.2	0.277
12:56 PM	42.9	1.156	17.4	0.266
12:56 PM	43.1	1.146	17.6	0.256
12:56 PM	43.3	1.135	17.8	0.245
12:56 PM	43.5	1.126	18.0	0.236
12:56 PM	43.7	1.117	18.2	0.227
12:56 PM	43.9	1.107	18.4	0.217
12:56 PM	44.1	1.098	18.6	0.208
12:56 PM	44.3	1.091	18.8	0.201
12:56 PM	44.5	1.083	19.0	0.193
12:56 PM	44.7	1.076	19.2	0.186
12:56 PM	44.9	1.068	19.4	0.178
12:56 PM	45.1	1.061	19.6	0.171
12:56 PM	45.3	1.055	19.8	0.165
12:56 PM	45.5	1.049	20.0	0.159
12:56 PM	45.7	1.043	20.2	0.153
12:56 PM	45.9	1.038	20.4	0.148
12:56 PM	46.1	1.032	20.6	0.142
12:56 PM	46.3	1.028	20.8	0.138
12:56 PM	46.5	1.022	21.0	0.132
12:56 PM	46.7	1.018	21.2	0.128
12:56 PM	46.9	1.013	21.4	0.123
12:56 PM	47.1	1.008	21.6	0.118
12:56 PM	47.3	1.004	21.8	0.114
12:56 PM	47.5	1.000	22.0	0.110
12:56 PM	47.7	0.996	22.2	0.106
12:56 PM	47.9	0.992	22.4	0.102
12:56 PM	48.1	0.988	22.6	0.098
12:56 PM	48.3	0.985	22.8	0.095
12:56 PM	48.5	0.982	23.0	0.092
12:56 PM	48.7	0.979	23.2	0.089
12:56 PM	48.9	0.975	23.4	0.085
12:56 PM	49.1	0.973	23.6	0.083
12:56 PM	49.3	0.970	23.8	0.080
12:56 PM	49.5	0.969	24.0	0.079
12:56 PM	49.7	0.966	24.2	0.076
12:56 PM	49.9	0.963	24.4	0.073

VACUUM SLUG TEST #4 WELL NUMBER 31567
POST INJECTION TEST
10.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 0.89 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:56 PM	50.1	0.962	24.6	0.072
12:56 PM	50.3	0.959	24.8	0.069
12:56 PM	50.5	0.957	25.0	0.067
12:56 PM	50.7	0.955	25.2	0.065
12:56 PM	50.9	0.953	25.4	0.063
12:56 PM	51.1	0.952	25.6	0.062
12:56 PM	51.3	0.949	25.8	0.059
12:56 PM	51.5	0.948	26.0	0.058
12:56 PM	51.7	0.946	26.2	0.056
12:56 PM	51.9	0.944	26.4	0.054
12:56 PM	52.1	0.942	26.6	0.052
12:56 PM	52.3	0.940	26.8	0.050
12:56 PM	52.5	0.939	27.0	0.049
12:56 PM	52.7	0.938	27.2	0.048
12:56 PM	52.9	0.936	27.4	0.046
12:56 PM	53.1	0.935	27.6	0.045
12:56 PM	53.3	0.935	27.8	0.045
12:56 PM	53.5	0.933	28.0	0.043
12:56 PM	53.7	0.932	28.2	0.042
12:56 PM	53.9	0.931	28.4	0.041
12:56 PM	54.1	0.930	28.6	0.040
12:56 PM	54.3	0.929	28.8	0.039
12:56 PM	54.5	0.928	29.0	0.038
12:56 PM	54.7	0.927	29.2	0.037
12:56 PM	54.9	0.926	29.4	0.036
12:56 PM	55.1	0.925	29.6	0.035
12:56 PM	55.3	0.925	29.8	0.035
12:56 PM	55.5	0.925	30.0	0.035
12:56 PM	55.7	0.923	30.2	0.033
12:56 PM	55.9	0.922	30.4	0.032
12:56 PM	56.1	0.920	30.6	0.030
12:56 PM	56.3	0.920	30.8	0.030
12:56 PM	56.5	0.919	31.0	0.029
12:56 PM	56.7	0.918	31.2	0.028
12:56 PM	56.9	0.918	31.4	0.028
12:56 PM	57.1	0.916	31.6	0.026
12:56 PM	57.3	0.916	31.8	0.026
12:56 PM	57.5	0.916	32.0	0.026
12:56 PM	57.7	0.916	32.2	0.026
12:56 PM	57.9	0.916	32.4	0.026
12:56 PM	58.1	0.916	32.6	0.026

VACUUM SLUG TEST #4 WELL NUMBER 31567
POST INJECTION TEST
10.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 0.89 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
12:56 PM	58.3	0.915	32.8	0.025
12:56 PM	58.5	0.911	33.0	0.021
12:56 PM	58.7	0.913	33.2	0.023
12:56 PM	58.9	0.913	33.4	0.023
12:56 PM	59.1	0.912	33.6	0.022
12:56 PM	59.3	0.911	33.8	0.021
12:56 PM	59.5	0.907	34.0	0.017
12:56 PM	59.7	0.910	34.2	0.020
12:56 PM	59.9	0.908	34.4	0.018
12:57 PM	0.1	0.904	34.6	0.014
12:57 PM	0.3	0.911	34.8	0.021
12:57 PM	0.5	0.906	35.0	0.016
12:57 PM	0.7	0.913	35.2	0.023
12:57 PM	0.9	0.905	35.4	0.015
12:57 PM	1.1	0.911	35.6	0.021
12:57 PM	1.3	0.908	35.8	0.018
12:57 PM	1.5	0.909	36.0	0.019
12:57 PM	1.7	0.909	36.2	0.019
12:57 PM	1.9	0.908	36.4	0.018
12:57 PM	2.1	0.908	36.6	0.018
12:57 PM	2.3	0.909	36.8	0.019
12:57 PM	2.5	0.911	37.0	0.021
12:57 PM	2.7	0.909	37.2	0.019
12:57 PM	2.9	0.910	37.4	0.020
12:57 PM	3.1	0.908	37.6	0.018
12:57 PM	3.3	0.910	37.8	0.020
12:57 PM	3.5	0.908	38.0	0.018
12:57 PM	3.7	0.909	38.2	0.019
12:57 PM	3.9	0.907	38.4	0.017
12:57 PM	4.1	0.909	38.6	0.019
12:57 PM	4.3	0.908	38.8	0.018
12:57 PM	4.5	0.907	39.0	0.017
12:57 PM	4.7	0.908	39.2	0.018
12:57 PM	4.9	0.907	39.4	0.017
12:57 PM	5.1	0.907	39.6	0.017
12:57 PM	5.3	0.908	39.8	0.018
12:57 PM	5.5	0.906	40.0	0.016
12:57 PM	5.7	0.906	40.2	0.016

TABLE D-10

VACUUM SLUG TEST #5 WELL NUMBER 31567
POST INJECTION TEST

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 0.91 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:				
HRS/MINUTES	SECONDS	TRANSDUCER READING	ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
1:07 PM	9.9	1.001	0.0	0.091
1:07 PM	10.1	1.101	0.2	0.191
1:07 PM	10.3	1.844	0.4	0.934
1:07 PM	10.5	3.310	0.6	2.400
1:07 PM	10.7	4.704	0.8	3.794
1:07 PM	10.9	5.878	1.0	4.968
1:07 PM	11.1	6.778	1.2	5.868
1:07 PM	11.3	7.420	1.4	6.510
1:07 PM	11.5	7.800	1.6	6.890
1:07 PM	11.7	7.990	1.8	7.080
1:07 PM	11.9	8.000	2.0	7.090
1:07 PM	12.1	7.870	2.2	6.960
1:07 PM	12.3	7.670	2.4	6.760
1:07 PM	12.5	7.410	2.6	6.500
1:07 PM	12.7	7.150	2.8	6.240
1:07 PM	12.9	6.881	3.0	5.971
1:07 PM	13.1	6.623	3.2	5.713
1:07 PM	13.3	6.375	3.4	5.465
1:07 PM	13.5	6.136	3.6	5.226
1:07 PM	13.7	5.909	3.8	4.999
1:07 PM	13.9	5.681	4.0	4.771
1:07 PM	14.1	5.474	4.2	4.564
1:07 PM	14.3	5.273	4.4	4.363
1:07 PM	14.5	5.080	4.6	4.170
1:07 PM	14.7	4.896	4.8	3.986
1:07 PM	14.9	4.722	5.0	3.812
1:07 PM	15.1	4.555	5.2	3.645
1:07 PM	15.3	4.394	5.4	3.484
1:07 PM	15.5	4.241	5.6	3.331
1:07 PM	15.7	4.096	5.8	3.186
1:07 PM	15.9	3.961	6.0	3.051
1:07 PM	16.1	3.831	6.2	2.921
1:07 PM	16.3	3.707	6.4	2.797
1:07 PM	16.5	3.587	6.6	2.677
1:07 PM	16.7	3.471	6.8	2.561
1:07 PM	16.9	3.361	7.0	2.451
1:07 PM	17.1	3.256	7.2	2.346
1:07 PM	17.3	3.155	7.4	2.245
1:07 PM	17.5	3.059	7.6	2.149
1:07 PM	17.7	2.967	7.8	2.057
1:07 PM	17.9	2.880	8.0	1.970

VACUUM SLUG TEST #5 WELL NUMBER 31567

POST INJECTION TEST

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 0.91 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
1:07 PM	18.1	2.796	8.2	1.886
1:07 PM	18.3	2.716	8.4	1.806
1:07 PM	18.5	2.638	8.6	1.728
1:07 PM	18.7	2.564	8.8	1.654
1:07 PM	18.9	2.494	9.0	1.584
1:07 PM	19.1	2.425	9.2	1.515
1:07 PM	19.3	2.360	9.4	1.450
1:07 PM	19.5	2.299	9.6	1.389
1:07 PM	19.7	2.238	9.8	1.328
1:07 PM	19.9	2.181	10.0	1.271
1:07 PM	20.1	2.126	10.2	1.216
1:07 PM	20.3	2.070	10.4	1.160
1:07 PM	20.5	2.021	10.6	1.111
1:07 PM	20.7	1.972	10.8	1.062
1:07 PM	20.9	1.925	11.0	1.015
1:07 PM	21.1	1.880	11.2	0.970
1:07 PM	21.3	1.838	11.4	0.928
1:07 PM	21.5	1.798	11.6	0.888
1:07 PM	21.7	1.758	11.8	0.848
1:07 PM	21.9	1.721	12.0	0.811
1:07 PM	22.1	1.685	12.2	0.775
1:07 PM	22.3	1.652	12.4	0.742
1:07 PM	22.5	1.620	12.6	0.710
1:07 PM	22.7	1.589	12.8	0.679
1:07 PM	22.9	1.559	13.0	0.649
1:07 PM	23.1	1.530	13.2	0.620
1:07 PM	23.3	1.502	13.4	0.592
1:07 PM	23.5	1.476	13.6	0.566
1:07 PM	23.7	1.452	13.8	0.542
1:07 PM	23.9	1.429	14.0	0.519
1:07 PM	24.1	1.407	14.2	0.497
1:07 PM	24.3	1.383	14.4	0.473
1:07 PM	24.5	1.363	14.6	0.453
1:07 PM	24.7	1.344	14.8	0.434
1:07 PM	24.9	1.324	15.0	0.414
1:07 PM	25.1	1.305	15.2	0.395
1:07 PM	25.3	1.290	15.4	0.380
1:07 PM	25.5	1.274	15.6	0.364
1:07 PM	25.7	1.257	15.8	0.347
1:07 PM	25.9	1.245	16.0	0.335
1:07 PM	26.1	1.229	16.2	0.319

VACUUM SLUG TEST #5 WELL NUMBER 31567
POST INJECTION TEST
10.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 0.91 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE	ACTUAL WATER
HRS/MINUTES	SECONDS	TRANSDUCER READING	TEST WAS STARTED (SECONDS)	LEVEL DISPLACEMENT (FEET)
1:07 PM	26.3	1.218	16.4	0.308
1:07 PM	26.5	1.204	16.6	0.294
1:07 PM	26.7	1.193	16.8	0.283
1:07 PM	26.9	1.182	17.0	0.272
1:07 PM	27.1	1.172	17.2	0.262
1:07 PM	27.3	1.161	17.4	0.251
1:07 PM	27.5	1.152	17.6	0.242
1:07 PM	27.7	1.141	17.8	0.231
1:07 PM	27.9	1.132	18.0	0.222
1:07 PM	28.1	1.122	18.2	0.212
1:07 PM	28.3	1.114	18.4	0.204
1:07 PM	28.5	1.106	18.6	0.196
1:07 PM	28.7	1.097	18.8	0.187
1:07 PM	28.9	1.090	19.0	0.180
1:07 PM	29.1	1.082	19.2	0.172
1:07 PM	29.3	1.075	19.4	0.165
1:07 PM	29.5	1.069	19.6	0.159
1:07 PM	29.7	1.061	19.8	0.151
1:07 PM	29.9	1.055	20.0	0.145
1:07 PM	30.1	1.049	20.2	0.139
1:07 PM	30.3	1.044	20.4	0.134
1:07 PM	30.5	1.038	20.6	0.128
1:07 PM	30.7	1.033	20.8	0.123
1:07 PM	30.9	1.029	21.0	0.119
1:07 PM	31.1	1.023	21.2	0.113
1:07 PM	31.3	1.020	21.4	0.110
1:07 PM	31.5	1.015	21.6	0.105
1:07 PM	31.7	1.010	21.8	0.100
1:07 PM	31.9	1.006	22.0	0.096
1:07 PM	32.1	1.002	22.2	0.092
1:07 PM	32.3	0.998	22.4	0.088
1:07 PM	32.5	0.995	22.6	0.085
1:07 PM	32.7	0.991	22.8	0.081
1:07 PM	32.9	0.988	23.0	0.078
1:07 PM	33.1	0.985	23.2	0.075
1:07 PM	33.3	0.981	23.4	0.071
1:07 PM	33.5	0.979	23.6	0.069
1:07 PM	33.7	0.976	23.8	0.066
1:07 PM	33.9	0.973	24.0	0.063
1:07 PM	34.1	0.971	24.2	0.061
1:07 PM	34.3	0.969	24.4	0.059

VACUUM SLUG TEST #5 WELL NUMBER 31567
POST INJECTION TEST
10.0 FT WATER LEVEL DISPLACEMENT
STATIC TRANSDUCER READING = 0.91 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
1:07 PM	34.5	0.967	24.6	0.057
1:07 PM	34.7	0.964	24.8	0.054
1:07 PM	34.9	0.963	25.0	0.053
1:07 PM	35.1	0.961	25.2	0.051
1:07 PM	35.3	0.958	25.4	0.048
1:07 PM	35.5	0.957	25.6	0.047
1:07 PM	35.7	0.954	25.8	0.044
1:07 PM	35.9	0.953	26.0	0.043
1:07 PM	36.1	0.951	26.2	0.041
1:07 PM	36.3	0.950	26.4	0.040
1:07 PM	36.5	0.948	26.6	0.038
1:07 PM	36.7	0.946	26.8	0.036
1:07 PM	36.9	0.945	27.0	0.035
1:07 PM	37.1	0.943	27.2	0.033
1:07 PM	37.3	0.942	27.4	0.032
1:07 PM	37.5	0.941	27.6	0.031
1:07 PM	37.7	0.940	27.8	0.030
1:07 PM	37.9	0.939	28.0	0.029
1:07 PM	38.1	0.937	28.2	0.027
1:07 PM	38.3	0.936	28.4	0.026
1:07 PM	38.5	0.936	28.6	0.026
1:07 PM	38.7	0.934	28.8	0.024
1:07 PM	38.9	0.933	29.0	0.023
1:07 PM	39.1	0.933	29.2	0.023
1:07 PM	39.3	0.931	29.4	0.021
1:07 PM	39.5	0.931	29.6	0.021
1:07 PM	39.7	0.929	29.8	0.019
1:07 PM	39.9	0.928	30.0	0.018
1:07 PM	40.1	0.928	30.2	0.018
1:07 PM	40.3	0.927	30.4	0.017
1:07 PM	40.5	0.927	30.6	0.017
1:07 PM	40.7	0.925	30.8	0.015
1:07 PM	40.9	0.925	31.0	0.015
1:07 PM	41.1	0.923	31.2	0.013
1:07 PM	41.3	0.923	31.4	0.013
1:07 PM	41.5	0.923	31.6	0.013
1:07 PM	41.7	0.922	31.8	0.012
1:07 PM	41.9	0.922	32.0	0.012
1:07 PM	42.1	0.921	32.2	0.011
1:07 PM	42.3	0.922	32.4	0.012
1:07 PM	42.5	0.921	32.6	0.011

VACUUM SLUG TEST #5 WELL NUMBER 31567
POST INJECTION TEST

10.0 FT WATER LEVEL DISPLACEMENT

STATIC TRANSDUCER READING = 0.91 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:			ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
HRS/MINUTES	SECONDS	TRANSDUCER READING		
1:07 PM	42.7	0.921	32.8	0.011
1:07 PM	42.9	0.920	33.0	0.010
1:07 PM	43.1	0.918	33.2	0.008
1:07 PM	43.3	0.919	33.4	0.009
1:07 PM	43.5	0.917	33.6	0.007
1:07 PM	43.7	0.916	33.8	0.006
1:07 PM	43.9	0.917	34.0	0.007
1:07 PM	44.1	0.916	34.2	0.006
1:07 PM	44.3	0.916	34.4	0.006
1:07 PM	44.5	0.917	34.6	0.007
1:07 PM	44.7	0.917	34.8	0.007
1:07 PM	44.9	0.914	35.0	0.004
1:07 PM	45.1	0.917	35.2	0.007
1:07 PM	45.3	0.915	35.4	0.005
1:07 PM	45.5	0.914	35.6	0.004
1:07 PM	45.7	0.916	35.8	0.006
1:07 PM	45.9	0.913	36.0	0.003
1:07 PM	46.1	0.915	36.2	0.005
1:07 PM	46.3	0.913	36.4	0.003
1:07 PM	46.5	0.914	36.6	0.004
1:07 PM	46.7	0.914	36.8	0.004
1:07 PM	46.9	0.914	37.0	0.004
1:07 PM	47.1	0.915	37.2	0.005
1:07 PM	47.3	0.911	37.4	0.001
1:07 PM	47.5	0.913	37.6	0.003
1:07 PM	47.7	0.912	37.8	0.002
1:07 PM	47.9	0.911	38.0	0.001
1:07 PM	48.1	0.912	38.2	0.002
1:07 PM	48.3	0.911	38.4	0.001
1:07 PM	48.5	0.912	38.6	0.002
1:07 PM	48.7	0.912	38.8	0.002
1:07 PM	48.9	0.912	39.0	0.002
1:07 PM	49.1	0.912	39.2	0.002
1:07 PM	49.3	0.912	39.4	0.002
1:07 PM	49.5	0.911	39.6	0.001
1:07 PM	49.7	0.911	39.8	0.001
1:07 PM	49.9	0.911	40.0	0.001
1:07 PM	50.1	0.912	40.2	0.002
1:07 PM	50.3	0.912	40.4	0.002
1:07 PM	50.5	0.911	40.6	0.001
1:07 PM	50.7	0.911	40.8	0.001

VACUUM SLUG TEST #5 WELL NUMBER 31567

POST INJECTION TEST

10.0 FT WATER LEVEL DISPLACEMENT

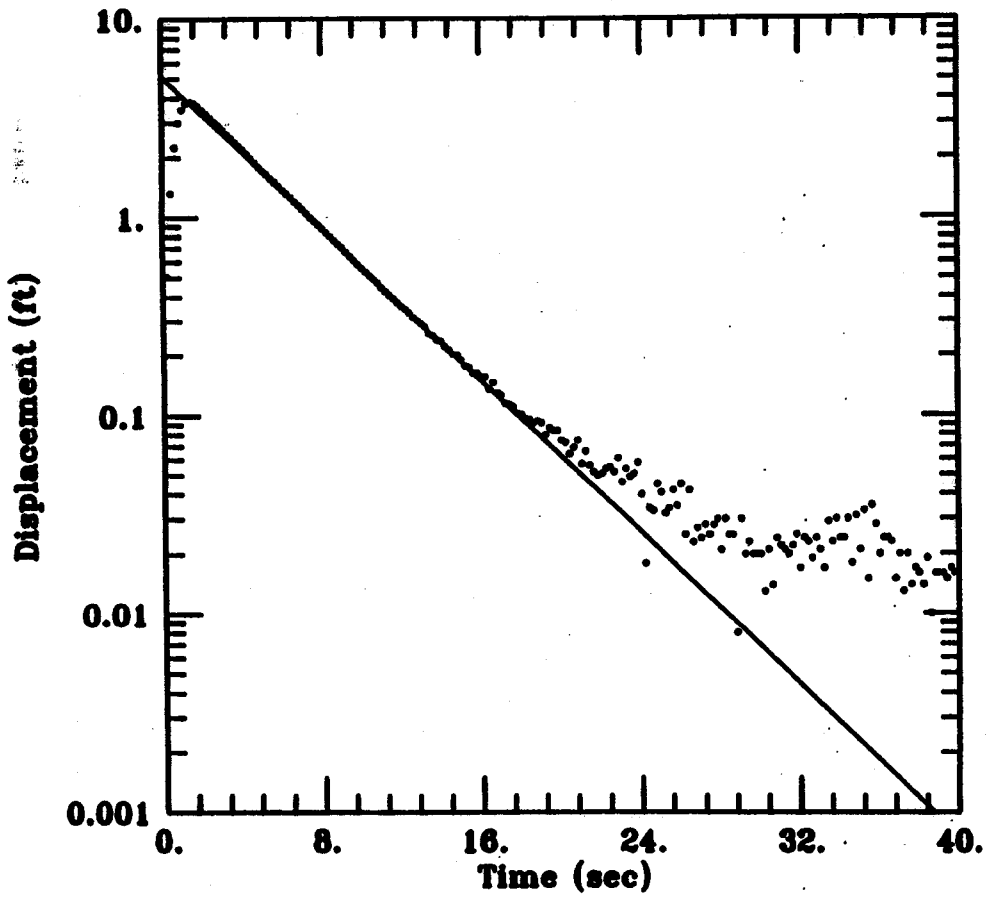
STATIC TRANSDUCER READING = 0.91 FT

RAW DATA			TRANSFORMED DATA	
DATA LOGGER TIME:				
HRS/MINUTES	SECONDS	TRANSDUCER READING	ELAPSED TIME SINCE TEST WAS STARTED (SECONDS)	ACTUAL WATER LEVEL DISPLACEMENT (FEET)
1:07 PM	50.9	0.911	41.0	0.001
1:07 PM	51.1	0.910	41.2	0.000
1:07 PM	51.3	0.910	41.4	0.000
1:07 PM	51.5	0.909	41.6	-0.001
1:07 PM	51.7	0.910	41.8	0.000
1:07 PM	51.9	0.909	42.0	-0.001
1:07 PM	52.1	0.909	42.2	-0.001
1:07 PM	52.3	0.909	42.4	-0.001
1:07 PM	52.5	0.909	42.6	-0.001
1:07 PM	52.7	0.908	42.8	-0.002
1:07 PM	52.9	0.909	43.0	-0.001
1:07 PM	53.1	0.909	43.2	-0.001
1:07 PM	53.3	0.906	43.4	-0.004
1:07 PM	53.5	0.909	43.6	-0.001
1:07 PM	53.7	0.909	43.8	-0.001
1:07 PM	53.9	0.908	44.0	-0.002
1:07 PM	54.1	0.907	44.2	-0.003
1:07 PM	54.3	0.907	44.4	-0.003
1:07 PM	54.5	0.907	44.6	-0.003
1:07 PM	54.7	0.905	44.8	-0.005
1:07 PM	54.9	0.907	45.0	-0.003
1:07 PM	55.1	0.907	45.2	-0.003
1:07 PM	55.3	0.908	45.4	-0.002
1:07 PM	55.5	0.908	45.6	-0.002
1:07 PM	55.7	0.907	45.8	-0.003
1:07 PM	55.9	0.907	46.0	-0.003
1:07 PM	56.1	0.907	46.2	-0.003
1:07 PM	56.3	0.906	46.4	-0.004
1:07 PM	56.5	0.906	46.6	-0.004
1:07 PM	56.7	0.906	46.8	-0.004
1:07 PM	56.9	0.907	47.0	-0.003
1:07 PM	57.1	0.907	47.2	-0.003

FIGURE D-1

Client: **FERMCO/DOE**	Company: **MSE, INC.**
Location: **FERNALD, OHIO**	

PRE INJECTION SLUG TEST #1 - 5.0′ DSPLM



DATA SET:
3-25TST1.AQT
05/23/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: MARCH 25, 1996
test well: WELL #31567

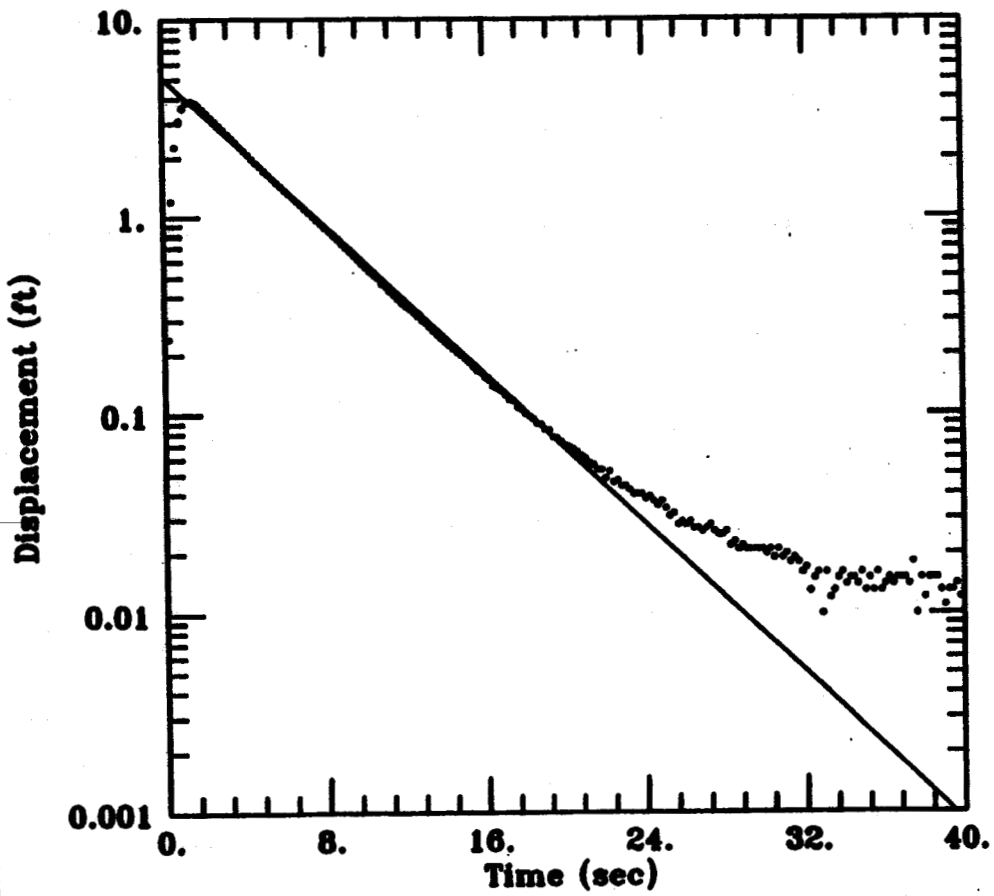
TEST DATA:
H0 = 5. ft
rc = 0.5 ft
rw = 0.83 ft
L = 15. ft
b = 130. ft
H = 26. ft

PARAMETER ESTIMATES:
K = 0.003519 ft/sec
y0 = 5.103 ft

AQTESOLV

Client: **FERMCO/DOE**	Company: **MSE, INC.**
Location: **FERNALD, OHIO**	

PRE INJECTION SLUG TEST #2 – 5.0′ DSPLM



DATA SET:
3-25TST2.AGT
05/23/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: MARCH 25, 1996
test well: WELL #31567

TEST DATA:
H0 = 5. ft
rc = 0.5 ft
rw = 0.83 ft
L = 15. ft
b = 130. ft
H = 26. ft

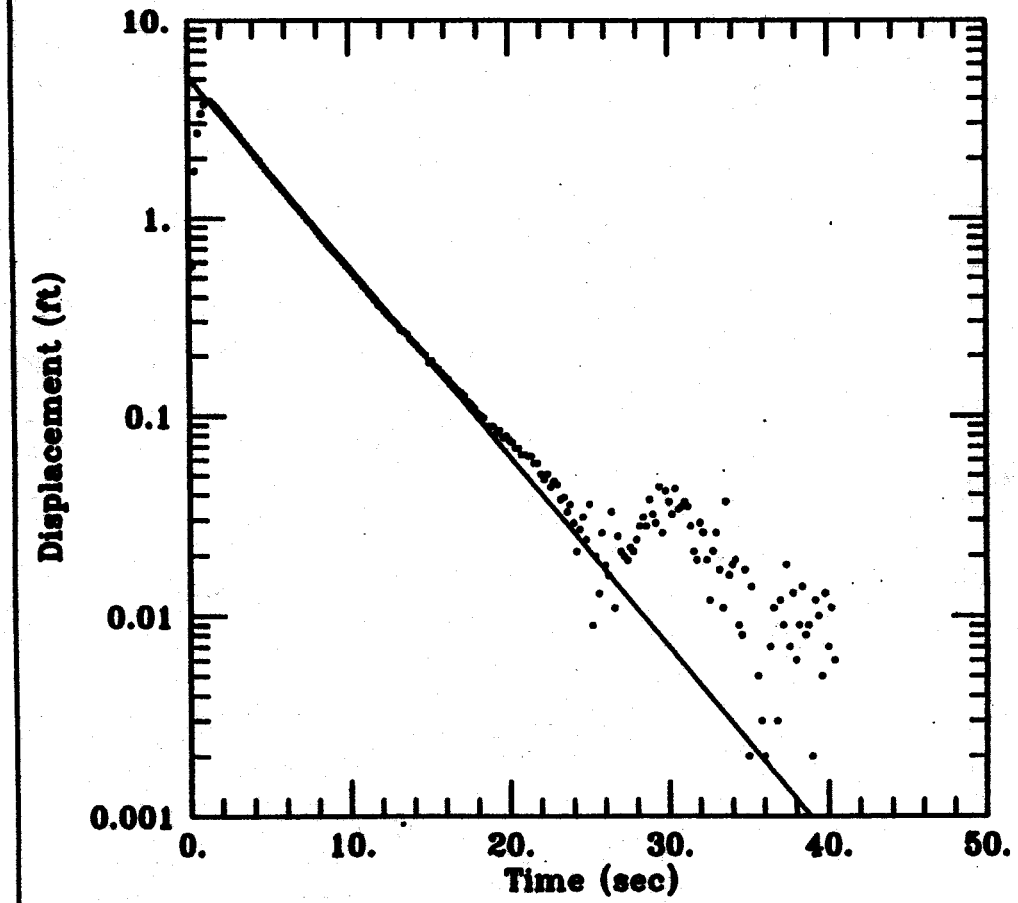
PARAMETER ESTIMATES:
K = 0.003453 ft/sec
y0 = 5.103 ft

AQTESOLV

FIGURE D-2

Client: **FERMCO/DOE**	Company: **MSE, INC.**
Location: **FERNALD, OHIO**	

PRE INJECTION SLUG TEST #3 - 5.0′ DSPLNT



DATA SET:
3-25TST3.AQT
05/23/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: 3-25-96
test well: WELL # 31567

TEST DATA:
H0 = 5. ft
rc = 0.5 ft
rw = 0.83 ft
L = 15. ft
b = 130. ft
H = 26. ft

PARAMETER ESTIMATES:
K = 0.003504 ft/sec
y0 = 5.103 ft

AQTESOLV

FIGURE D-3

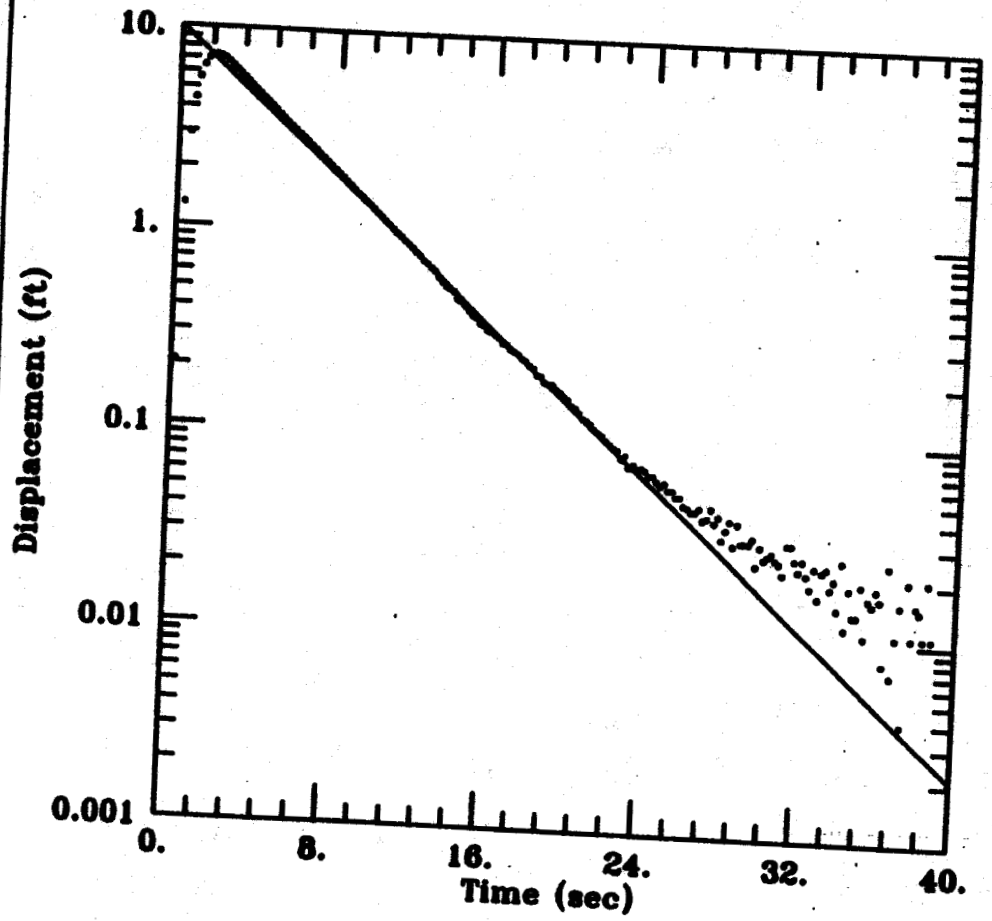
FIGURE D-4

Client: FERMCO/DOE

Company: MSE, INC

Location: FERNALD, OHIO

PRE INJECTION SLUG TEST #4 – 10.0′ DSPLD



DATA SET:
3-25TST4.AQT
05/23/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: 3-25-96
test well: WELL #31567

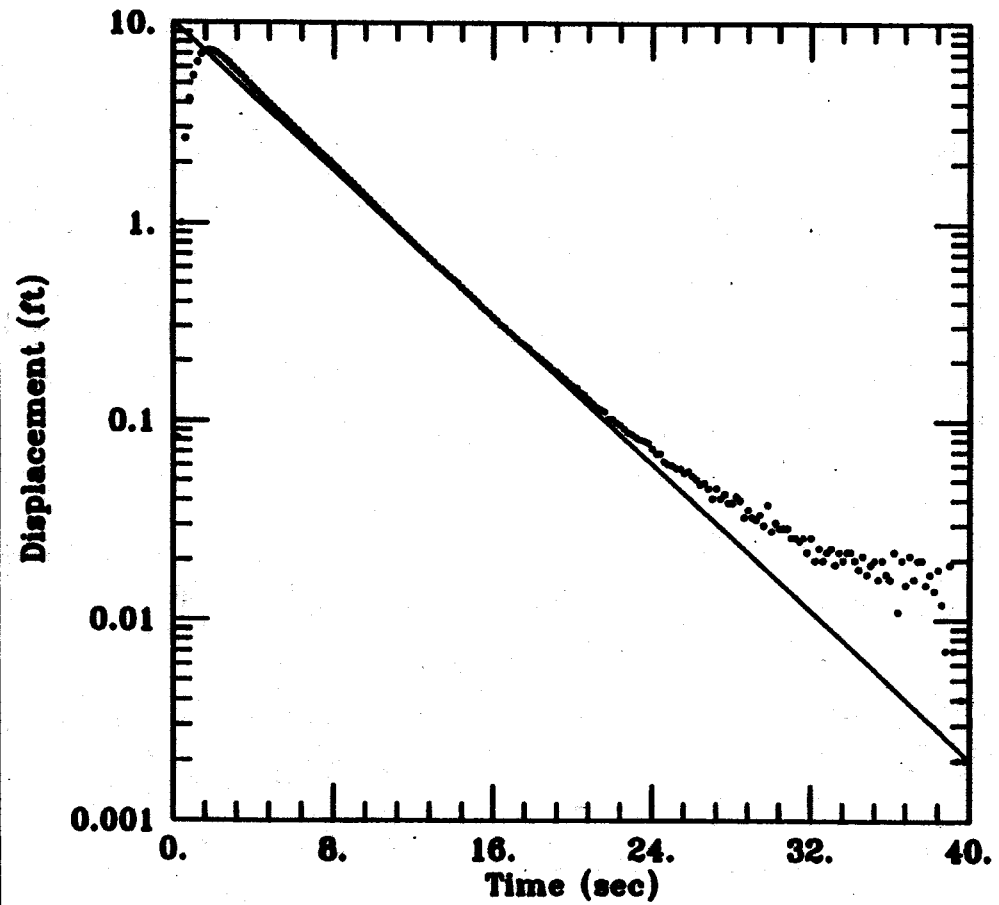
TEST DATA:
H0 = 10. ft
rc = 0.5 ft
rw = 0.83 ft
L = 15. ft
b = 130. ft
H = 25. ft

PARAMETER ESTIMATES:
K = 0.00338 ft/sec
y0 = 10.07 ft

AQTESOLV

Client: **FERMCO/DOE**	Company: **MSE, INC.**
Location: **FERNALD, OHIO**	

PRE INJECTION SLUG TEST #5 - 10.0′ DSPLD



DATA SET:
3-25TST5.AQT
05/23/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: 3-25-96
test well: WELL # 31567

TEST DATA:
H0 = 10. ft
rc = 0.5 ft
rw = 0.83 ft
L = 15. ft
b = 130. ft
H = 26. ft

PARAMETER ESTIMATES:
K = 0.0034 ft/sec
y0 = 10.07 ft

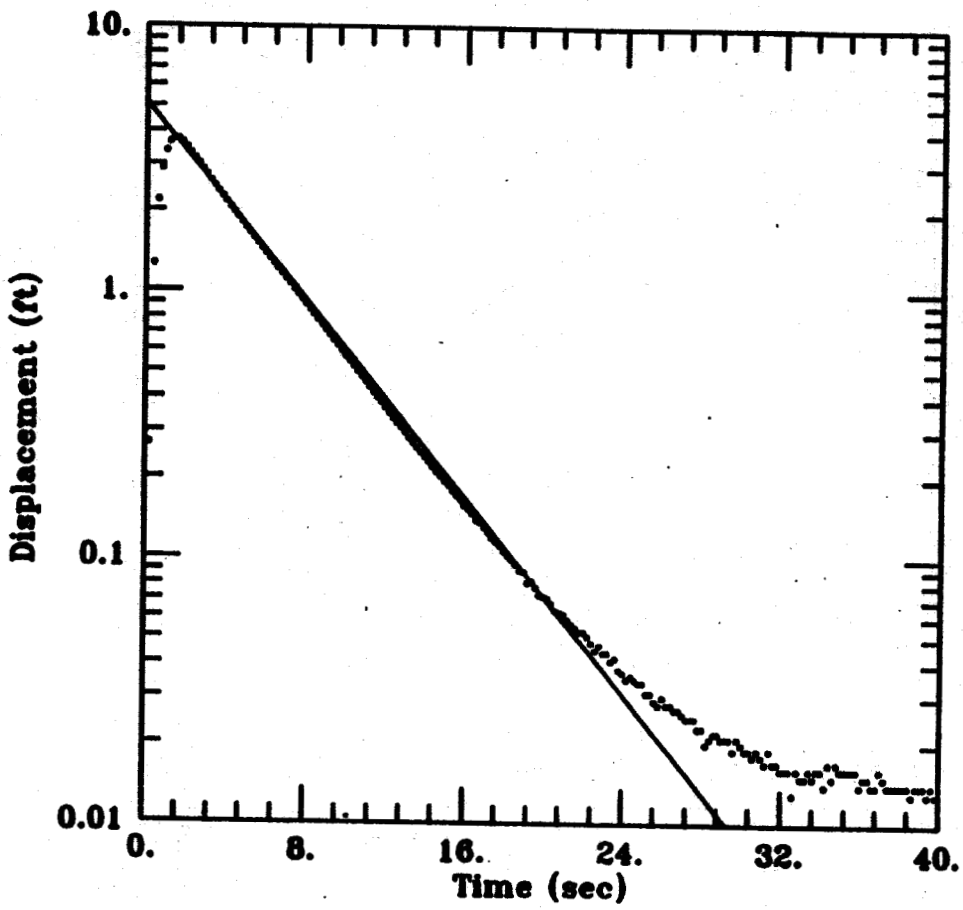
AQTESOLV

FIGURE D-5

FIGURE D-6

Client: **FERMCO/DOE**	Company: **MSE, INC**
Location: **FERNALD, OHIO**	

POST INJECTION SLUG TEST #1 – 5.0′ DSPLM



DATA SET:
4-1TEST1.AQT
05/23/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: 4/1/96
test well: WELL # 31567

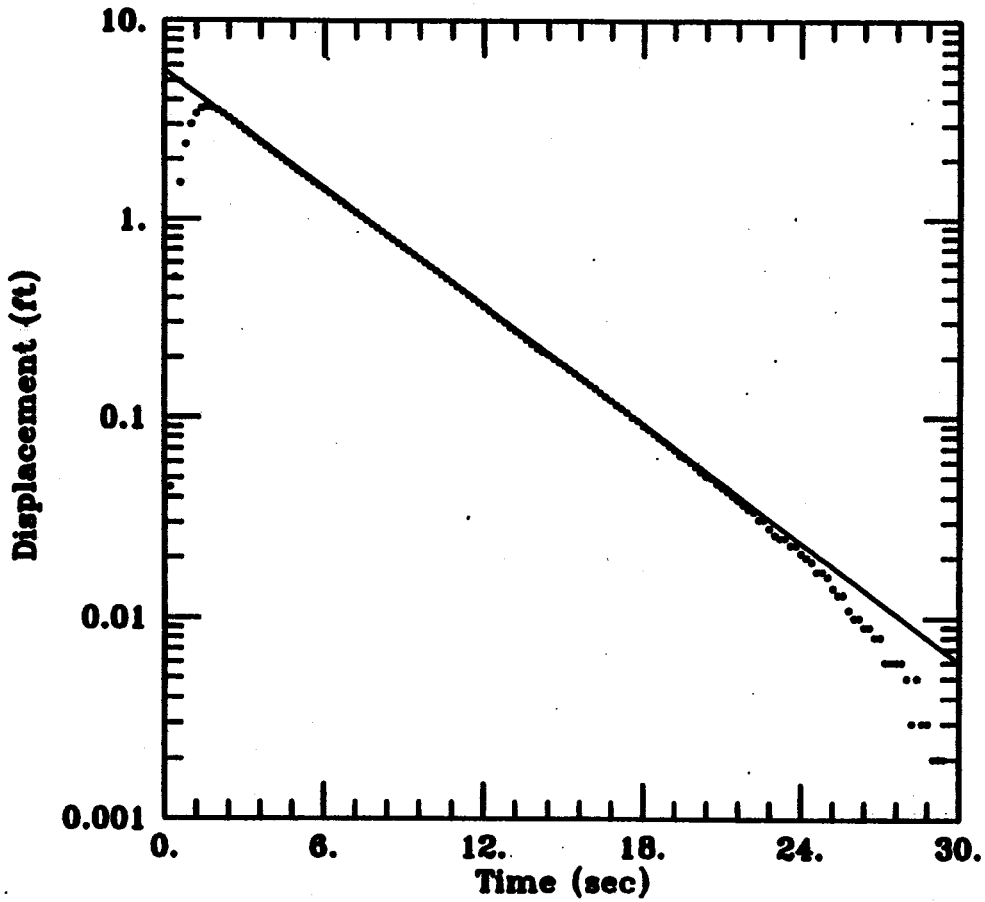
TEST DATA:
H0 = 5. ft
rc = 0.5 ft
rw = 0.83 ft
L = 15. ft
b = 130. ft
H = 26. ft

PARAMETER ESTIMATES:
K = 0.003403 ft/sec
y0 = 5.094 ft

AQTESOLV

Client: **FERMCO/DOE**	Company: **MSE, INC**
Location: **FERNALD, OHIO**	

POST INJECTION SLUG TEST #2 – 5.0′ DSPLM



DATA SET:
4-1TEST2.AQT
05/23/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: 4/1/96
test well: WELL # 31567

TEST DATA:
H0 = 5. ft
rc = 0.5 ft
rw = 0.83 ft
L = 15. ft
b = 130. ft
H = 26. ft

PARAMETER ESTIMATES:
K = 0.003646 ft/sec
y0 = 5.644 ft

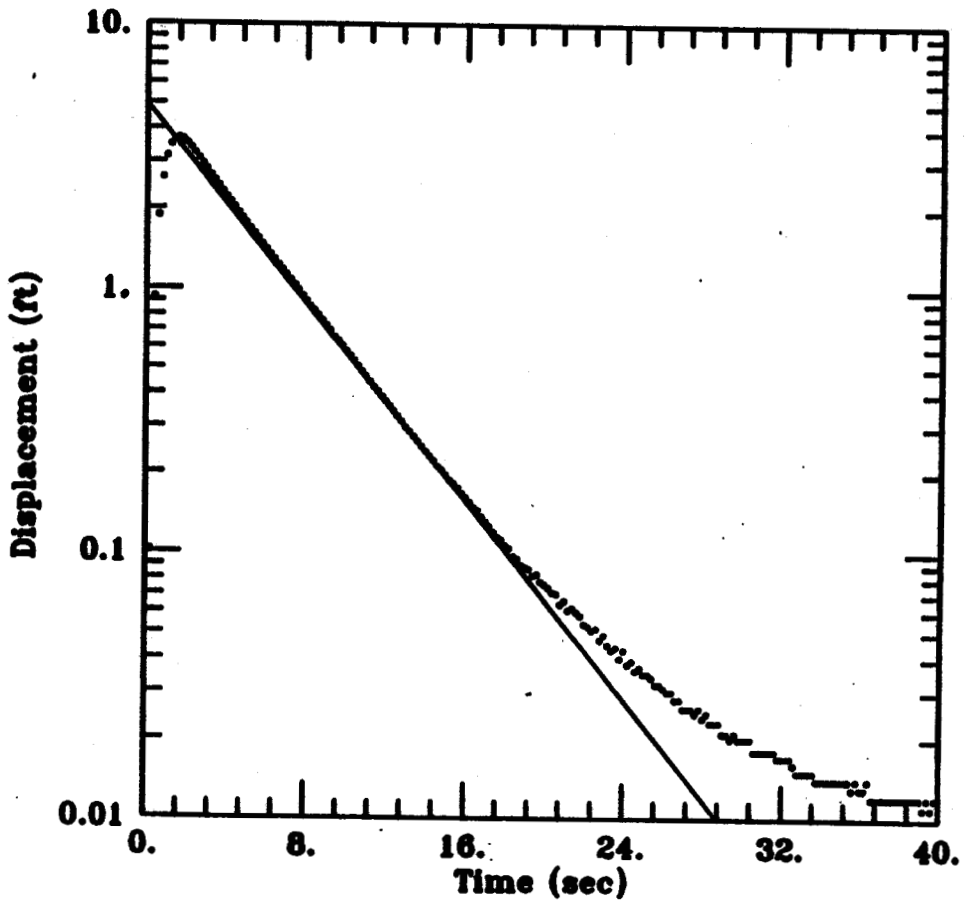
AQTESOLV

FIGURE D-7

FIGURE D-8

Client: **FERMCO/DOE**	Company: **MSE, INC**
Location: **FERNALD, OHIO**	

POST INJECTION SLUG TEST #3 – 5.0′ DSPLM



DATA SET:
4-1TEST3.AQT
05/23/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: 4/1/96
test well: WELL # 31567

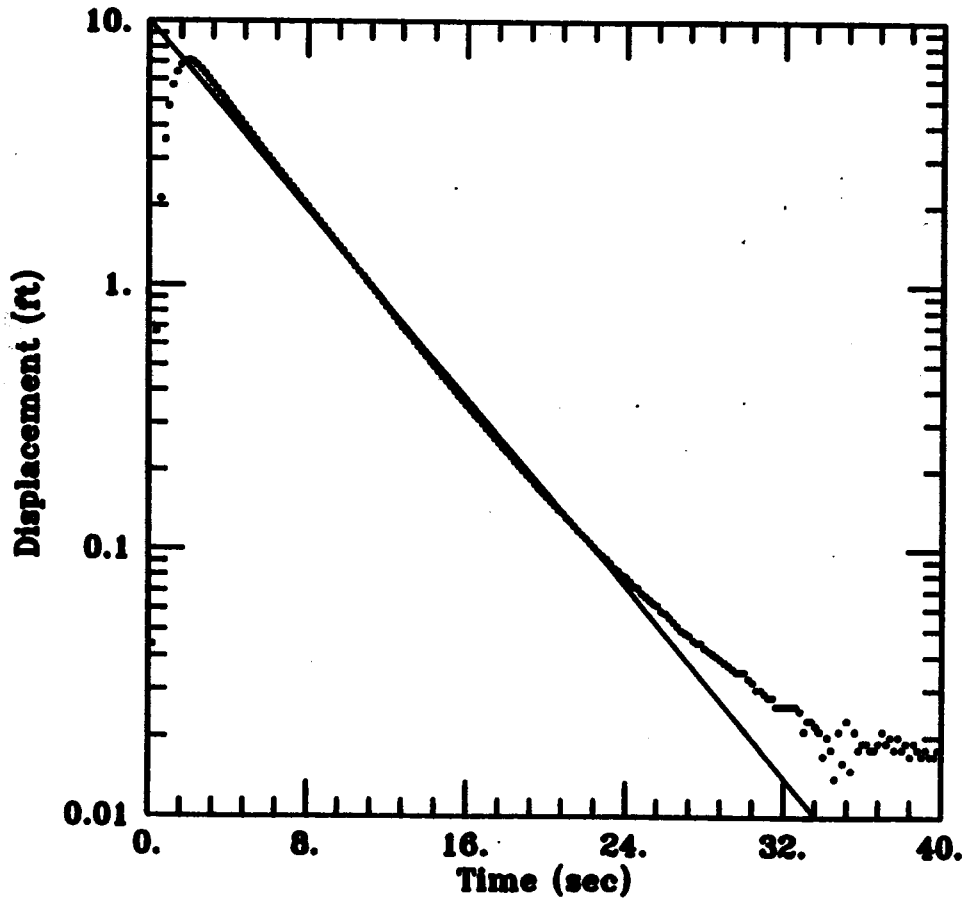
TEST DATA:
H0 = 5. ft
rc = 0.5 ft
rw = 0.83 ft
L = 15. ft
b = 130. ft
H = 26. ft

PARAMETER ESTIMATES:
K = 0.003441 ft/sec
y0 = 4.905 ft

AQTESOLV

Client: **FERMCO/DOE**	Company: **MSE, INC**
Location: **FERNALD, OHIO**	

POST INJECTION SLUG TEST #4 – 10′ DSPLM



DATA SET:
4-1TEST4.AQT
05/23/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: 4/1/96
test well: WELL # 31567

TEST DATA:
H0 = 10. ft
rc = 0.5 ft
rw = 0.83 ft
L = 15. ft
b = 130. ft
H = 26. ft

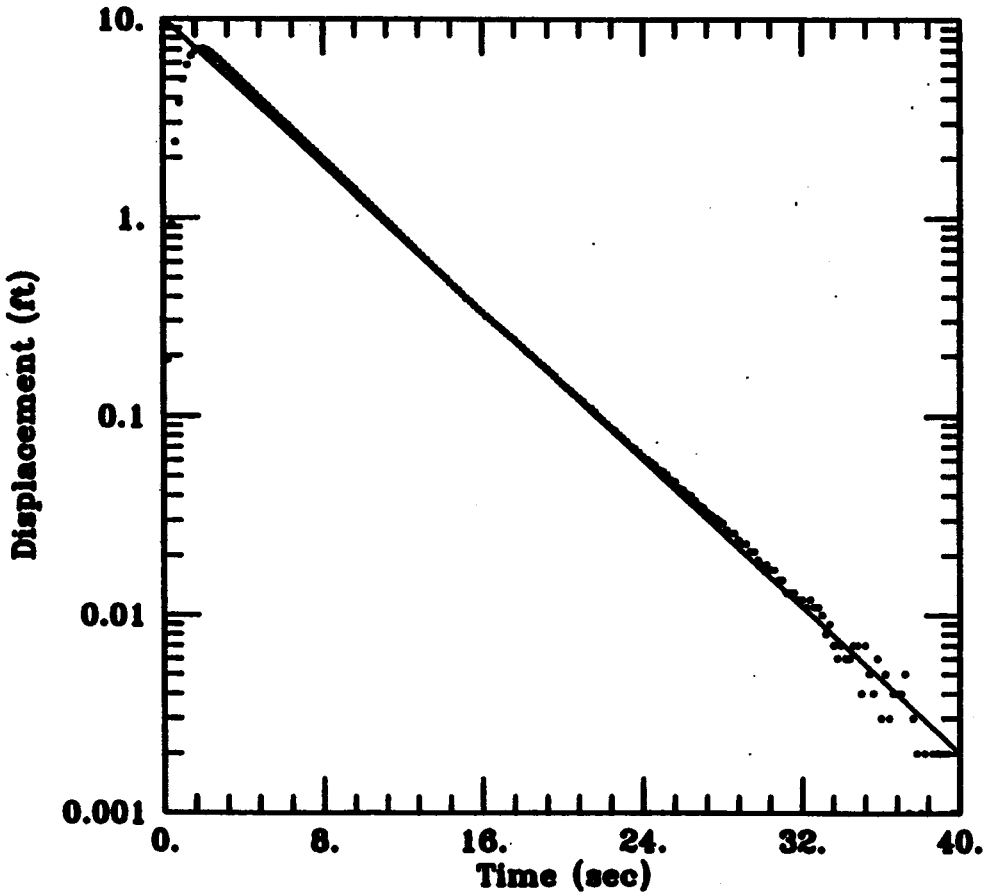
PARAMETER ESTIMATES:
K = 0.003283 ft/sec
y0 = 10.05 ft

AQTESOLV

FIGURE D-9

Client: **FERMCO/DOE**	Company: **MSE, INC**
Location: **FERNALD, OHIO**	

POST INJECTION SLUG TEST #5 – 10′ DSPLM



DATA SET:
4-1TEST5.AQT
05/23/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: 4/1/96
test well: WELL # 31567

TEST DATA:
H0 = 10. ft
rc = 0.5 ft
rw = 0.83 ft
L = 15. ft
b = 130. ft
H = 26. ft

PARAMETER ESTIMATES:
K = 0.003402 ft/sec
y0 = 10.07 ft

AQTESOLV

FIGURE D-10

APPENDIX E

VERTICAL FLOW PROFILE DATA

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TABLE E-1

VERTICAL FLOW PROFILE DATA FROM WELL 31567

(down, 2:30 pm 3/27/96)

Depth Below TOC (ft)	Flow Meter Reading	Flow Below Measurement Point (gpm)	Incremental Flow (gpm)	Percentage of Total Flow (%)
60	208			
61	473			
62	1113			
63	1092			
Top of screen				
64	1184	200.00	72.97	36.49
65	752	127.03	81.25	40.63
66	271	45.78	14.53	7.27
67	185	31.25	0	0
68	199	31.25	9.29	4.65
69	130	21.96	0.17	0.09
70	129	21.79	1.86	0.93
71	118	19.93	5.07	2.54
72	88	14.86	6.58	3.29
73	49	8.28	6.93	3.47
74	5	1.35	0	0
75	8	1.35	0	0
76	8	1.35	1.01	0.51
77	2	0.34	0.17	0.09
78	1	0.17	0	0
Bottom of screen				
79	1	0.17		
80	0	0		

TABLE E-2

VERTICAL FLOW PROFILE DATA FROM WELL 31567

(up, 3:15 pm 3/27/96)

Depth Below TOC (ft)	Flow Meter Reading	Flow Below Measurement Point (gpm)	Incremental Flow (gpm)	Percentage of Total Flow (%)
60	422			
61	575			
62	1264			
63	1116			
Top of screen				
64	1215	200.00	87.74	43.87
65	682	112.26	64.85	32.24
66	288	47.41	15.31	7.66
67	195	32.10	0	0
68	198	32.10	0	0
69	203	32.10	7.24	3.62
70	151	24.86	3.79	1.90
71	128	21.07	4.12	2.06
72	103	16.95	7.90	3.95
73	55	9.05	4.93	2.47
74	25	4.12	2.97	1.49
75	7	1.15	0.66	0.33
76	3	0.49	0.16	0.08
77	2	0.33	0.33	0.17
78	0	0	0	0
Bottom of screen				
79	1	0		
80	0	0		

TABLE E-3

VERTICAL FLOW PROFILE DATA FROM WELL 31567

(down, 8:00 am 3/28/96)

Depth Below TOC (ft)	Flow Meter Reading	Flow Below Measurement Point (gpm)	Incremental Flow (gpm)	Percentage of Total Flow (%)
60	277			
61	525			
62	1192			
63	1063			
Top of screen				
64	1098	200.00	78.14	39.07
65	669	121.86	72.86	36.43
66	269	49.00	8.74	4.37
67	221	40.26	2.56	1.28
68	207	37.70	11.65	5.83
69	143	26.05	1.46	0.73
70	135	24.59	6.38	3.19
71	100	18.21	0	0
72	113	18.21	10.01	5.01
73	45	8.20	2.19	1.10
74	33	6.01	4.01	2.01
75	11	2.00	0.54	0.27
76	8	1.46	0.37	0.19
77	6	1.09	0.73	0.37
78	2	0.36	0.36	0.18
Bottom of screen				
79	0	0		
80	0	0		

TABLE E-4

VERTICAL FLOW PROFILE DATA FROM WELL 31567

(up, 8:38 am 3/28/96)

Depth Below TOC (ft)	Flow Meter Reading	Flow Below Measurement Point (gpm)	Incremental Flow (gpm)	Percentage of Total Flow (%)
60	419			
61	452			
62	1063			
63	1035			
Top of screen				
64	1165	200.00	71.59	35.80
65	748	128.41	78.28	39.14
66	292	50.13	12.53	6.27
67	219	37.60	4.47	2.24
68	193	33.13	8.92	4.46
69	141	24.21	0	0
70	149	24.21	5.15	2.58
71	111	19.06	2.75	1.38
72	95	16.31	5.84	2.92
73	61	10.47	0	0
74	10	10.47	6.86	3.43
75	21	3.61	1.03	0.52
76	15	2.58	1.55	0.78
77	6	1.03	1.03	0.52
78	0	0	0	0
Bottom of screen				
79	0	0		
80	0	0		

TABLE E-5

VERTICAL FLOW PROFILE DATA FROM WELL 31567

(down, 2:09 pm 3/28/96)

Depth Below TOC (ft)	Flow Meter Reading	Flow Below Measurement Point (gpm)	Incremental Flow (gpm)	Percentage of Total Flow (%)
60	266			
61	512			
62	1112			
63	1103			
Top of screen				
64	1150	200.00	101.91	50.96
65	564	98.09	47.66	23.83
66	290	50.43	9.56	4.78
67	235	40.87	5.39	2.70
68	204	35.48	5.91	2.96
69	170	29.57	3.66	1.83
70	149	25.91	2.43	1.22
71	135	23.48	3.48	1.74
72	115	20.00	8.70	4.35
73	65	11.30	7.13	3.57
74	24	4.17	0.52	0.26
75	21	3.65	1.91	0.96
76	10	1.74	0.70	0.35
77	6	1.04	0.34	0.17
78	4	0.70	0.35	0.18
Bottom of screen				
79	2	0.35		
80	0	0		

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TABLE E-6

VERTICAL FLOW PROFILE DATA FROM WELL 31567

(up, 2:35 pm 3/28/96)

Depth Below TOC (ft)	Flow Meter Reading	Flow Below Measurement Point (gpm)	Incremental Flow (gpm)	Percentage of Total Flow (%)
60	290			
61	541			
62	1084			
63	1072			
Top of screen				
64	1178	200.00	90.32	45.16
65	646	109.68	53.82	26.91
66	329	55.86	14.94	7.47
67	241	40.92	7.81	3.91
68	195	33.11	5.10	2.55
69	165	28.01	3.56	1.78
70	144	24.45	2.89	1.45
71	127	21.56	3.22	1.61
72	108	18.34	5.78	2.89
73	74	12.56	4.92	2.46
74	45	7.64	3.57	1.79
75	24	4.07	2.20	1.10
76	11	1.87	0	0
77	12	1.87	1.87	0.94
78	0	0	0	0
Bottom of screen				
79	0	0		
80	0	0		

TABLE E-7

VERTICAL FLOW PROFILE DATA FROM WELL 31567

(down, 8:15 am 3/29/96)

Depth Below TOC (ft)	Flow Meter Reading	Flow Below Measurement Point (gpm)	Incremental Flow (gpm)	Percentage of Total Flow (%)
60	277			
61	525			
62	1192			
63	1063			
Top of screen				
64	1098	200.00	78.14	39.07
65	669	121.86	72.86	36.43
66	269	49.00	8.74	4.37
67	221	40.26	2.56	1.28
68	207	37.70	11.65	5.83
69	143	26.05	1.46	0.73
70	135	24.59	6.38	3.19
71	100	18.21	0	0
72	113	18.21	10.01	5.01
73	45	8.20	2.19	1.10
74	33	6.01	4.01	2.01
75	11	2.00	0.54	0.27
76	8	1.46	0.37	0.19
77	6	1.09	0.73	0.37
78	2	0.36	0.36	0.18
Bottom of screen				
79	0	0		
80	0	0		

TABLE E-8

VERTICAL FLOW PROFILE DATA FROM WELL 31567

(up, 8:38 am 3/29/96)

Depth Below TOC (ft)	Flow Meter Reading	Flow Below Measurement Point (gpm)	Incremental Flow (gpm)	Percentage of Total Flow (%)
60	419			
61	452			
62	1063			
63	1035			
Top of screen				
64	1165	200.00	71.59	35.80
65	748	128.41	78.28	39.14
66	292	50.13	12.53	6.27
67	219	37.60	4.47	2.24
68	193	33.13	8.92	4.46
69	141	24.21	0	0
70	149	24.21	5.15	2.58
71	111	19.06	2.75	1.38
72	95	16.31	5.84	2.92
73	61	10.47	6.86	3.43
74	10	3.61	0	0
75	21	3.61	1.03	0.52
76	15	2.58	1.55	0.78
77	6	1.03	1.03	0.52
78	0	0	0	0
Bottom of screen				
79	0	0		
80	0	0		

TABLE E-9

VERTICAL FLOW PROFILE DATA FROM WELL 31567

(down, 4:21 pm 3/30/96)

Depth Below TOC (ft)	Flow Meter Reading	Flow Below Measurement Point (gpm)	Incremental Flow (gpm)	Percentage of Total Flow (%)
60	429			
61	554			
62	1059			
63	1107			
Top of screen				
64	1149	200.00	94.69	47.35
65	605	105.31	55.53	27.77
66	286	49.78	10.27	5.14
67	227	39.51	11.14	5.57
68	163	28.37	0	0
69	168	28.37	4.18	2.09
70	139	24.19	4.00	2.00
71	116	20.19	2.61	1.31
72	101	17.58	6.61	3.31
73	63	10.97	7.14	3.57
74	22	3.83	1.39	0.70
75	14	2.44	1.05	0.53
76	8	1.39	0	0
77	10	1.39	1.04	0.52
78	2	0.35	0.18	0.09
Bottom of screen				
79	1	0.17		
80	0	0		

TABLE E-10

VERTICAL FLOW PROFILE DATA FROM WELL 31567

(up, 4:47 pm 3/30/96)

Depth Below TOC (ft)	Flow Meter Reading	Flow Below Measurement Point (gpm)	Incremental Flow (gpm)	Percentage of Total Flow (%)
60	275			
61	573			
62	1174			
63	949			
Top of screen				
64	1311	200.00	91.08	45.54
65	714	108.92	66.97	33.49
66	275	41.95	8.08	4.04
67	222	33.87	7.94	3.97
68	170	25.93	0.45	0.23
69	167	25.48	5.34	2.67
70	132	20.14	1.07	0.54
71	125	19.07	0.92	0.46
72	119	18.15	7.01	3.51
73	73	11.14	6.56	3.28
74	30	4.58	1.07	0.54
75	23	3.51	1.83	0.92
76	11	1.68	0.92	0.46
77	5	0.76	0	0
78	8	0.76	0.45	0.23
Bottom of screen				
79	2	0.31		
80	0	0		

TABLE E-11

VERTICAL FLOW PROFILE DATA FROM WELL 31567

(down, 6:50 am 4/1/96)

Depth Below TOC (ft)	Flow Meter Reading	Flow Below Measurement Point (gpm)	Incremental Flow (gpm)	Percentage of Total Flow (%)
60	414			
61	427			
62	1093			
63	1047			
Top of screen				
64	1084	200.00	88.56	44.28
65	604	111.44	56.83	28.42
66	296	54.61	10.70	5.35
67	238	43.91	5.16	2.58
68	210	38.75	5.36	2.68
69	181	33.39	1.84	0.92
70	171	31.55	8.67	4.34
71	124	22.88	0.19	0.10
72	123	22.69	11.80	5.90
73	59	10.89	6.65	3.33
74	23	4.24	0.92	0.46
75	18	3.32	1.29	0.65
76	11	2.03	0	0
77	12	2.03	1.66	0.83
78	2	0.37	0.37	0.19
Bottom of screen				
79	0	0		
80	0	0		

TABLE E-12

VERTICAL FLOW PROFILE DATA FROM WELL 31567

(up, 7:19 am 4/1/96)

Depth Below TOC (ft)	Flow Meter Reading	Flow Below Measurement Point (gpm)	Incremental Flow (gpm)	Percentage of Total Flow (%)
60	250			
61	546			
62	1133			
63	1043			
Top of screen				
64	1257	200.00	102.15	51.08
65	615	97.85	49.48	24.74
66	304	48.37	13.05	6.53
67	222	35.32	0	0
68	222	35.32	8.75	4.38
69	167	26.57	0.32	0.16
70	165	26.25	1.59	0.80
71	155	24.66	6.84	3.42
72	112	17.82	9.39	4.70
73	53	8.43	4.61	2.31
74	24	3.82	1.12	0.56
75	17	2.70	0	0
76	21	2.70	1.59	0.80
77	7	1.11	0.16	0.08
78	6	0.95	0.63	0.32
Bottom of screen				
79	2	0.32		
80	0	0		

Figure E-1 Vertical flow profile in well 31567 (down, 2:30 pm 3/27/96)

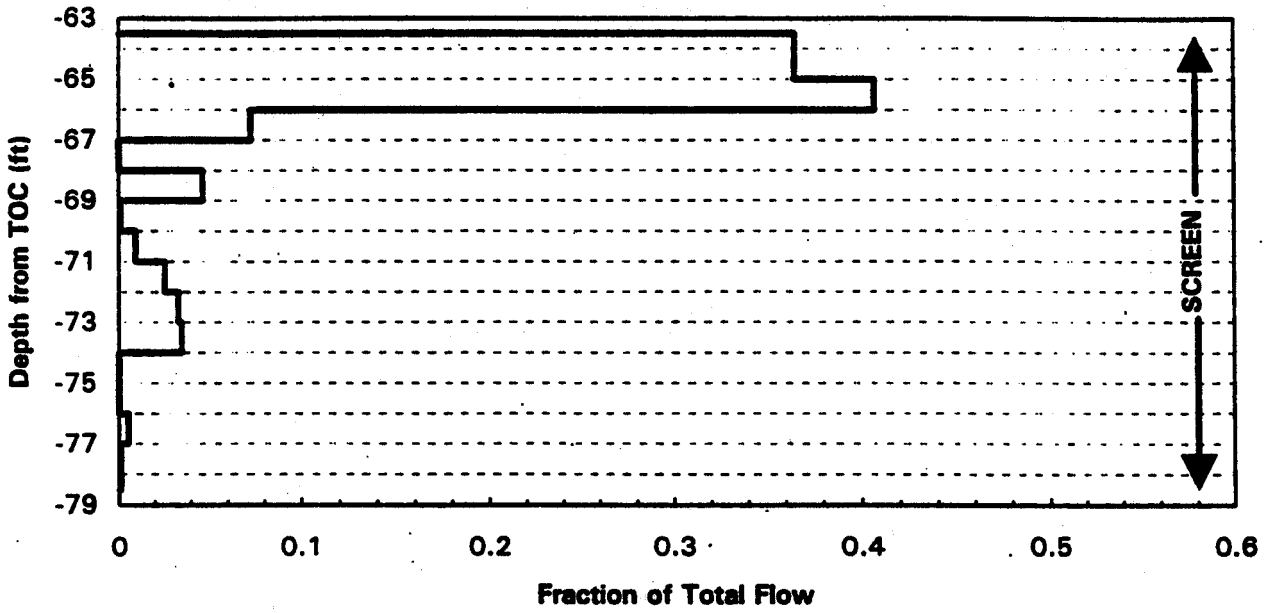
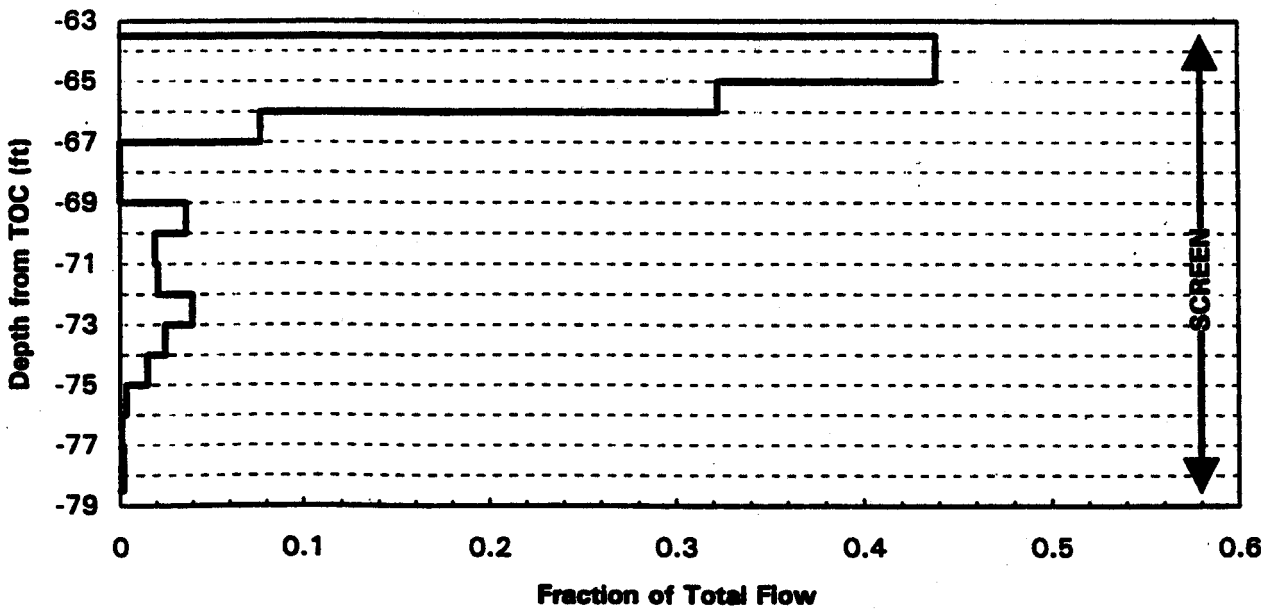
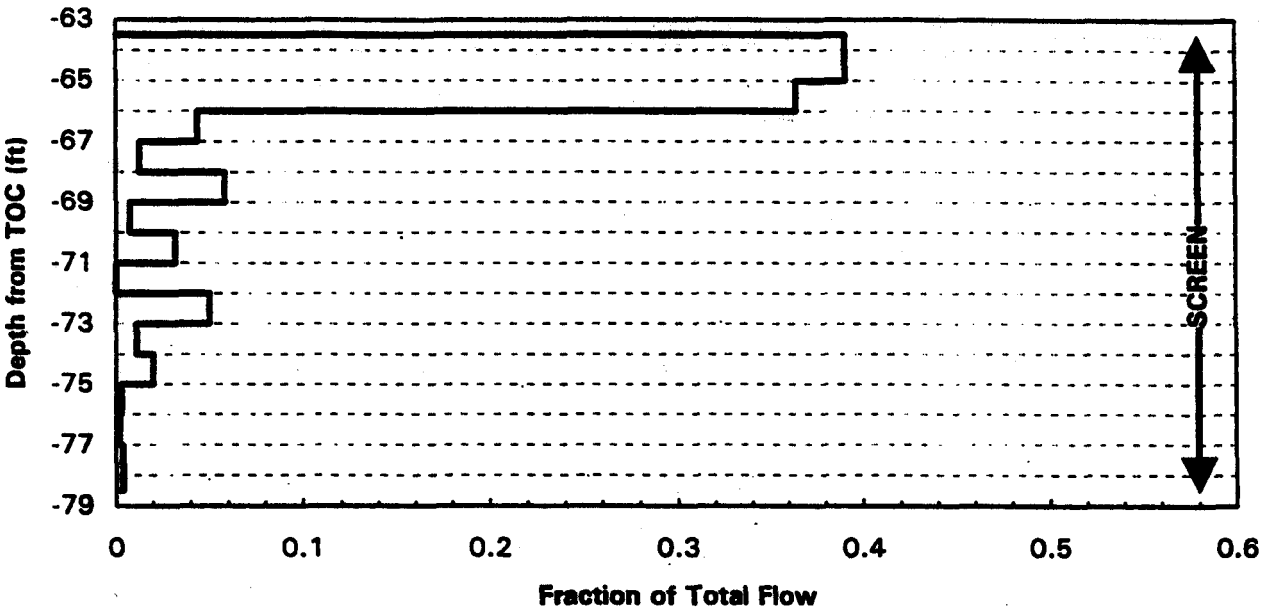


Figure E-2 Vertical flow profile in Well 31567 (up, 3:15 pm 3/27/96)



FigureE-3 Vertical flow profile in Well 31567 (down, 8:00 am 3/28/96)



FigureE-4 Vertical flow profile in Well 31567 (up, 8:38 am 3/28/96)

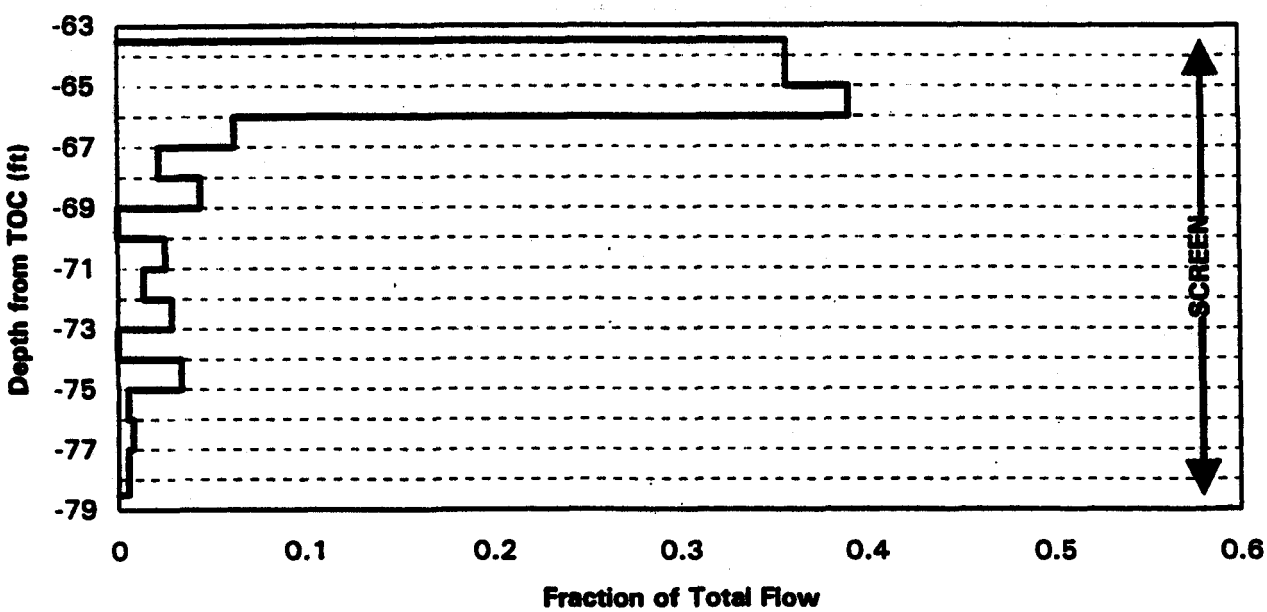


Figure E-5 Vertical flow profile in Well 31567 (down, 2:09 pm 3/28/96)

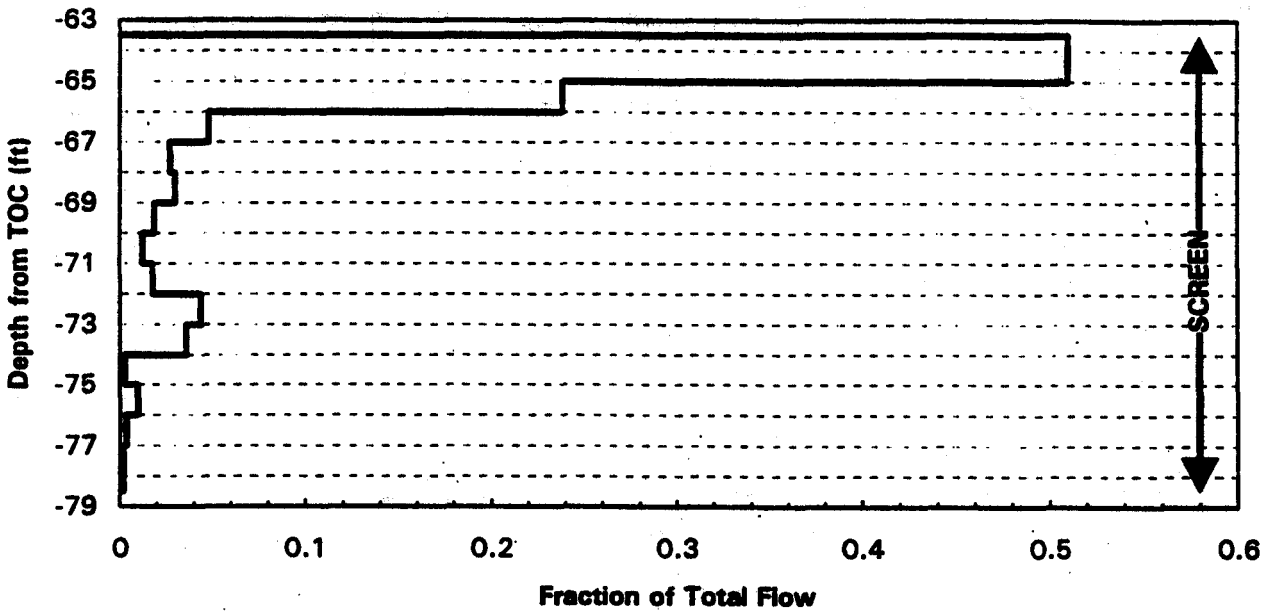


Figure E-6 Vertical profile in Well 31567 (up, 2:35 pm 3/28/96)

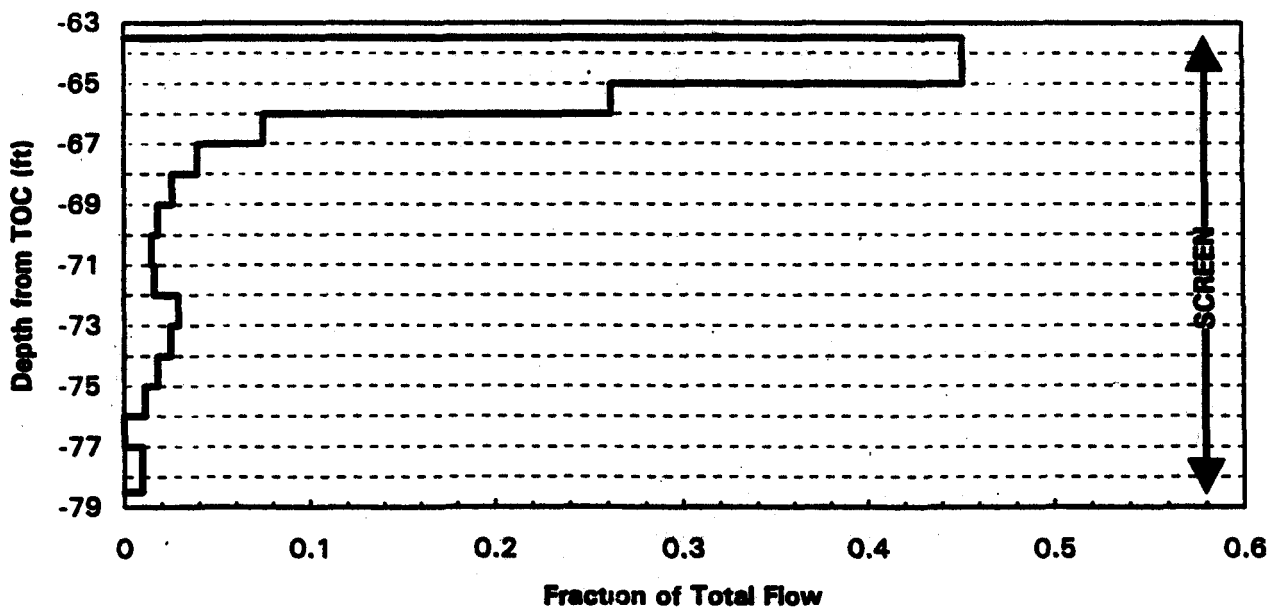


Figure E-7 Vertical flow profile in Well 31567 (down, 8:15 am 3/29/96)

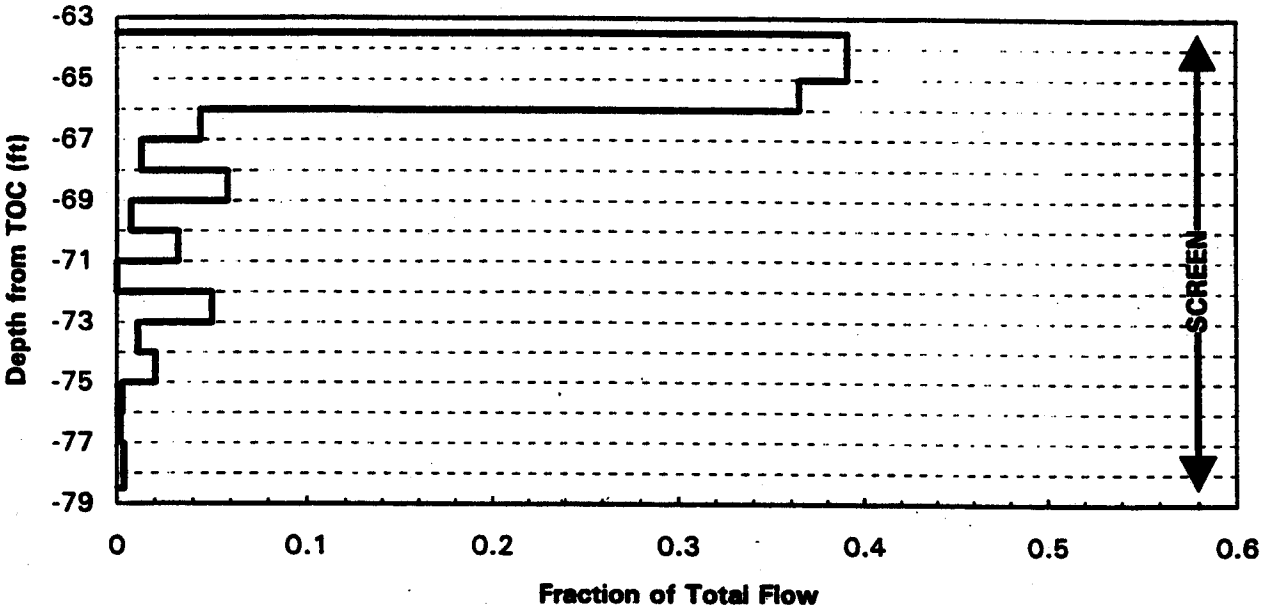


Figure E-8 Vertical flow profile in Well 31567 (up, 8:38 am 3/29/96)

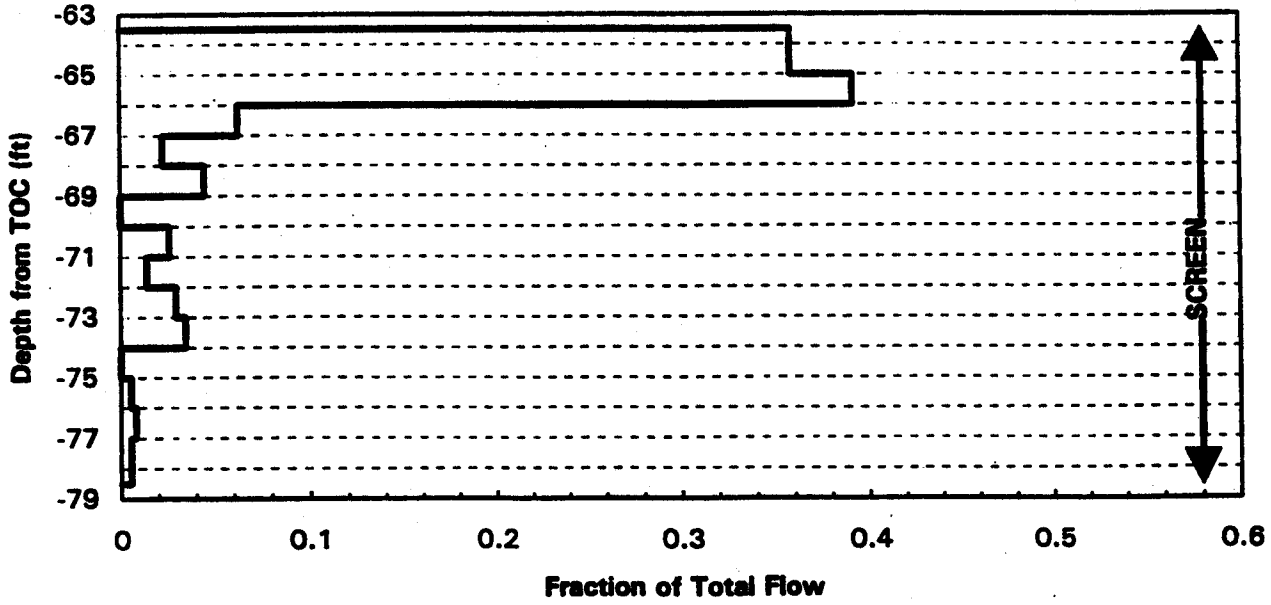


Figure E-9 Vertical flow profile in Well 31567 (down, 4:21 pm 3/30/96)

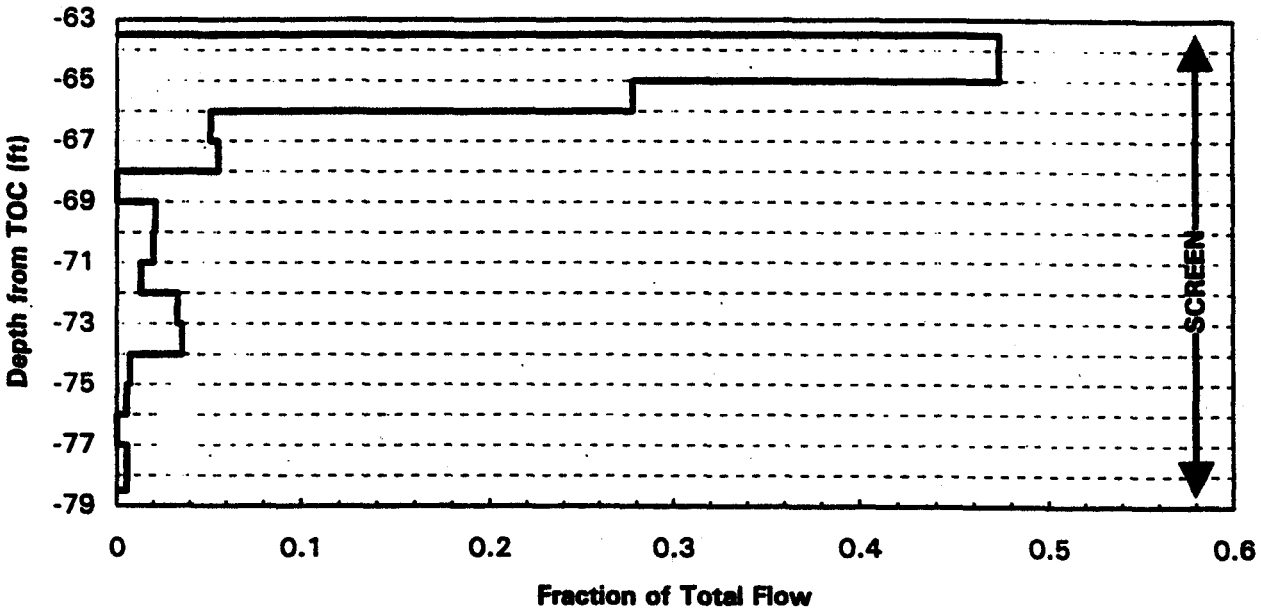


Figure E-10 Vertical flow profile in Well 31567 (up, 4:47 pm 3/30/96)

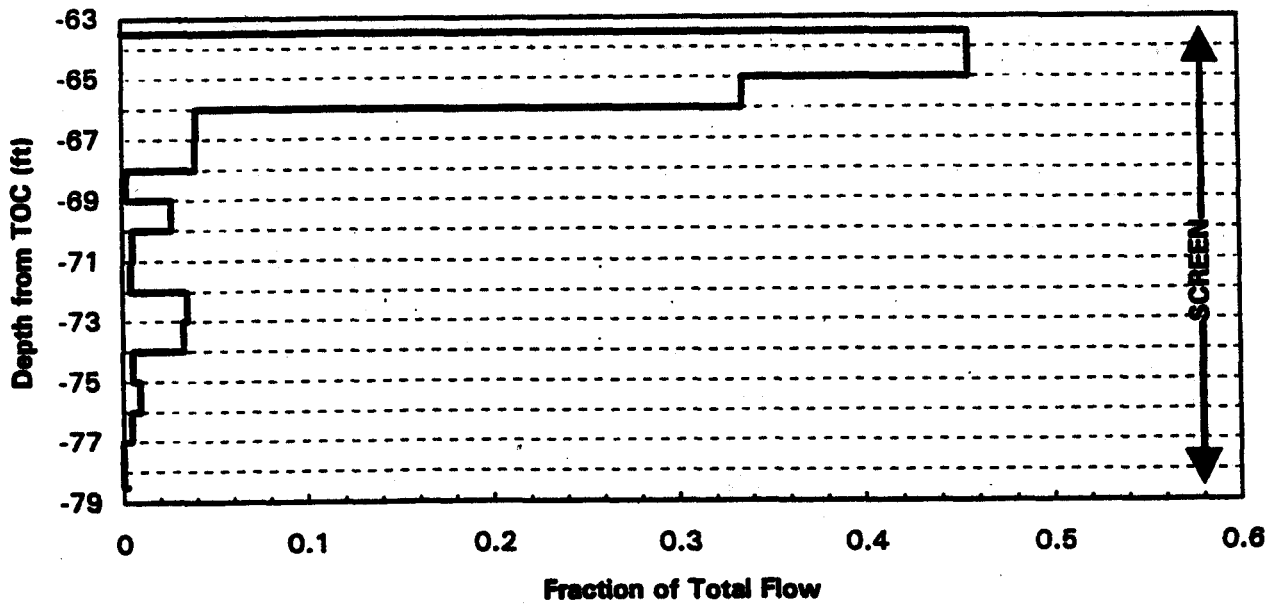


Figure E-11 Vertical flow profile in Well 31567 (down, 6:50 am 4/1/96)

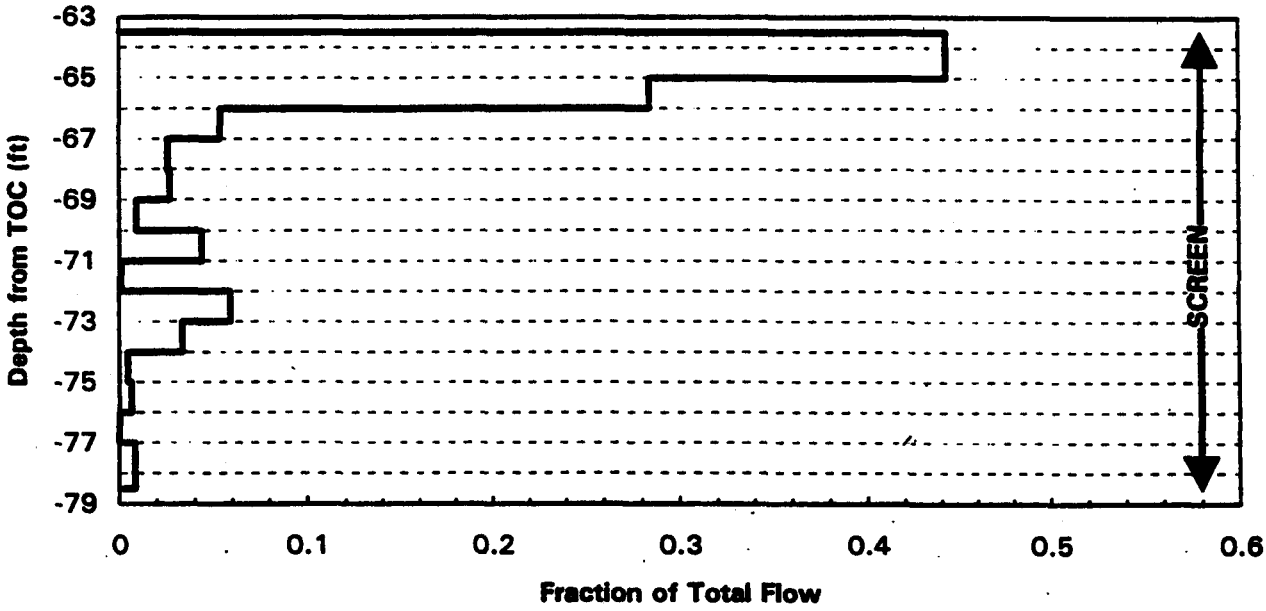
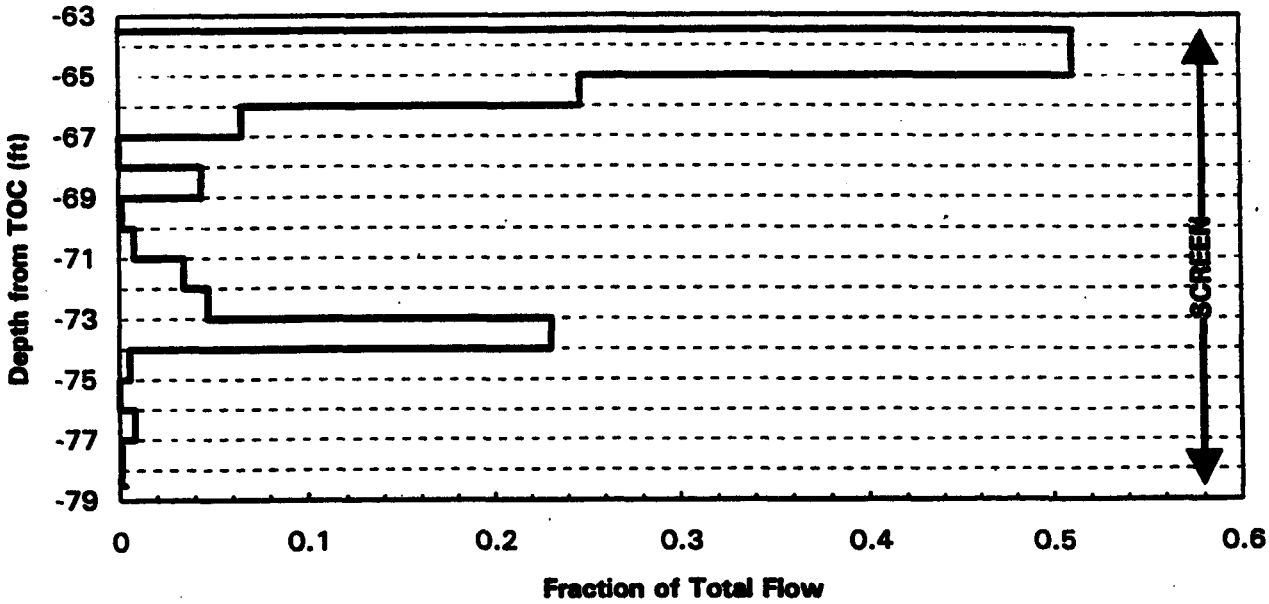


Figure E-12 Vertical flow profile in Well 31567 (up, 7:19 am 4/1/96)



Appendix F

APPENDIX F

GEOCHEMICAL ANALYSIS AND MODELING OF WATERS INJECTED INTO THE GREAT MIAMI AQUIFER (IT 1996)

GEOCHEMCIAL ANALYSIS AND MODELING OF WATERS INJECTED INTO THE GREAT MIAMI AQUIFER FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT PROJECT

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1.0 Introduction

As part of the Record of Decision (ROD) for Operable Unit (OU) 5, groundwater from the Great Miami Aquifer (GMA) will be pumped, treated to remove uranium and possibly other constituents, discharged to surface water, and injected into the GMA. This geochemical analysis evaluates potential undesirable precipitation reactions that may arise when:

- Extracted groundwater is brought to the surface,
- Groundwaters are mixed in the extraction and injection zones, and
- Lixiviants are added to the groundwater.

Extracted groundwater brought to the surface may experience carbon dioxide degassing and oxygen addition, resulting in precipitation of solids in pumps, pipes, and holding tanks. Mixing of relatively reduced and oxidized waters in the extraction and injection zones may create conditions favorable for the precipitation of iron hydroxide, which could plug well screens and decrease porosity and permeability in the GMA in the vicinity of the wells. Lixiviants commonly added to groundwater to increase the mobility and extraction of uranium during insitu mining operations may have beneficial or detrimental effects on the GMA.

Each of the above processes is analyzed in detail in the following sections. However, prior to examining each of the processes, a brief summary of geochemical conditions in the GMA is presented to provide a background and framework for ensuing discussions. All reported speciation, solubility, and mixing calculations were carried out with the EQ3/6 geochemical code (Section 7).

2.0 Geochemical Conditions in the Great Miami Aquifer

The geochemistry of the GMA is dominated by chemical equilibria involving carbonate minerals. As the composition of groundwater in the GMA is very similar to groundwater in the glacial overburden (DOE, 1994), the mineralogy of GMA sediments is expected to be similar to minerals present in the glacial overburden deposits. Mineralogical analysis of FEMP soils in the glacial overburden overlying the GMA are provided in Table 1. The glacial overburden soils contain approximately 48 percent silicate minerals, 47 percent carbonate minerals, four percent organic material, and one percent iron-oxyhydroxide minerals. Although the stated proportions of minerals in the glacial overburden may not describe GMA sediments, the types of minerals in Table 1 are expected to be present due to the similarity in groundwater compositions. The most soluble minerals listed are the carbonate minerals, and these minerals control the chemistry of groundwater in the glacial overburden and GMA. The composition and speciation of reported background constituents in GMA groundwater is given in Tables 2 and 3, respectively.

The pH of the GMA system is observed to lie between 6.8 to 7.8 in the majority of monitoring wells sampled. This pH range is buffered by calcite ($CaCO_3$) dissolution, carbon dioxide (CO_2) dissolution, and carbonic acid (H_2CO_3) dissociation. Important reactions in this system are:

$$(1)\quad CaCO_3 + H_2O \rightleftharpoons Ca^{+2} + HCO_3^- + OH^-$$

$$(2)\quad CO_2 + H_2O \rightleftharpoons H_2CO_3$$

$$(3)\quad H_2CO_3 \rightleftharpoons H^+ + HCO_3^-$$

The dissolution of calcite in water (Reaction 1) contacting air containing about 0.03 percent carbon dioxide results in an equilibrium pH of about eight. Lower pH values are generally observed in the GMA because the partial pressure of carbon dioxide (P_{CO_2}) in the soils is greater than in rainwater equilibrated with air, due to decomposition of organic debris and respiration of microorganisms. Measurements of the composition of gas samples from soils generally show P_{CO_2} from 10^{-3} to 10^{-1} atmospheres (Freeze and Cherry, 1979). The calculated P_{CO_2} for GMA groundwater is $10^{-1.7}$ atmospheres, while rainwater equilibrated with air has a P_{CO_2} of approximately $10^{-3.5}$ atmospheres. The higher P_{CO_2} in GMA groundwater drives Reaction 2 to the right to produce more carbonic acid, which dissociates immediately to release bicarbonate ion (HCO_3^-) and hydrogen ion (H^+) (Reaction 3). The large reservoir of

Table 1

Mineralogical Summary of FEMP Glacial Overburden Soil

Phase/Ideal Formula	Modal Percent[a]
Calcite $CaCO_3$	25.75 ± 11.62
Dolomite $MgCa(CO_3)_2$	20.77 ±10.53
Quartz SiO_2	18.03 ± 8.58
Feldspar $KAlSiO_3$	14.76 ± 6.49
Illite $KAl_5Si_7O_{20}(OH)_4$	9.15 ± 17.37
Corrensite $NaCaMg_8Fe_5Al_5Si_{14}O_{40}(OH)_{20}$	4.27 ± 8.30
Organic debris (humus)	3.49 ± 3.68
Chlorite $Mg_7Fe_4Al_2Si_7O_{20}(OH)_{16}$	1.13 ± 1.50
Amphibole $KCa_2Mg_2Fe_2Al_2Si_6O_{20}(OH)_4$	0.95 ± 0.72
Iron oxyhydroxide minerals $Fe(OH)_3$, $FeOOH$, Fe_2O_3	0.83 ± 0.72

[a] Average and standard deviation of 20 soil samples analyzed by McCrone Associates, Inc. (1992). Modal percent is based on the mineral area exposed on a thin section prepared for microscopic examination.

Table 2

Composition Of Groundwater Obtained From FEMP GMA Background Wells[a]

pH = 7.2
Eh = 441 mV[b]

Aluminum = 0.063 mg/L
Calcium = 98.1 mg/L
Iron = 0.4 mg/L
Potassium = 1.75 mg/L
Magnesium = 27.3 mg/L
Sodium = 18.7 mg/L
Silica = 3.1 mg/L
Bicarbonate = 400 mg/L
Chloride = 20 mg/L
Fluoride = 0.38 mg/L
Phosphate = 0.17 mg/L
Nitrate = 0.835 mg/L
Uranium = 0.0012 mg/L

[a]Background concentrations obtained from Tables 6-1, 6-2, and 6-4 in DOE, May 1994.
[b]Eh value obtained from Table 1 in Sobocinski and Myers (1991).

Table 3

Predicted Speciation Of Groundwater Obtained From FEMP GMA Background Wells

Element	Aqueous Species	Molal[a] Concentration	Molal[a] Percent
Aluminium	$Al(OH)_4^-$	2.16×10^{-6}	92.4
	$Al(OH)_3^\circ$	1.30×10^{-7}	5.56
	$Al(OH)_2^+$	3.67×10^{-8}	1.57
Calcium	Ca^{+2}	2.30×10^{-3}	93.9
	$CaHCO_3^+$	9.62×10^{-5}	3.93
	$CaSO_4^\circ$	4.54×10^{-5}	1.85
Carbon	HCO_3^-	5.57×10^{-3}	84.9
	$H_2CO_3^\circ$	8.28×10^{-4}	12.6
	$CaHCO_3^+$	9.62×10^{-4}	1.47
	$MgHCO_3^+$	4.32×10^{-5}	0.66
Chlorine	Cl^-	5.64×10^{-4}	99.9
Fluorine	F^-	1.95×10^{-6}	97.6
	MgF^+	3.13×10^{-7}	1.56
Iron	$Fe(OH)_3^\circ$	5.82×10^{-6}	81.2
	$Fe(OH)_2^+$	1.31×10^{-6}	18.2
Magnesium	Mg^{+2}	1.04×10^{-3}	92.9
	$MgHCO_3^+$	4.32×10^{-5}	3.85
	$MgSO_4^\circ$	3.43×10^{-5}	3.05
Nitrogen	N_2°	6.74×10^{-6}	100

Refer to footnote at end of table.

Table 3 *(Continued)*

Predicted Speciation of Groundwater Obtained From FEMP GMA Background Wells

Element	Aqueous Species	Molal[a] Concentration	Molal[a] Percent
Phosphorous	HPO_4^{-2}	6.26×10^{-7}	35.3
	$H_2PO_4^-$	5.00×10^{-7}	28.2
	$CaHPO_4^\circ$	3.45×10^{-7}	19.5
	$MgHPO_4^\circ$	2.37×10^{-7}	13.4
	$CaH_2PO_4^+$	1.93×10^{-8}	1.09
	$MgH_2PO_4^+$	1.63×10^{-8}	0.92
	$CaPO_4^-$	1.52×10^{-8}	0.85
Potassium	K^+	4.47×10^{-5}	99.8
Silicon	SiO_2°	5.15×10^{-5}	99.8
Sodium	Na^+	8.06×10^{-4}	99.1
	$NaHCO_3^\circ$	6.28×10^{-6}	0.77
Sulfur	SO_4^{-2}	3.71×10^{-4}	82.1
	$CaSO_4^\circ$	4.54×10^{-5}	10.1
	$MgSO_4^\circ$	3.43×10^{-5}	7.59
Uranium	$UO_2(CO_3)_3^{-4}$	2.57×10^{-9}	51.1
	$UO_2(CO_3)_2^{-2}$	2.39×10^{-9}	47.5
	$UO_2CO_3^\circ$	3.56×10^{-11}	0.71

[a]Molal is defined as moles per kilogram of water

carbonate minerals expected to be present in the GMA (Table 1) and biogenic sources of carbon dioxide allow the GMA system to be buffered between a pH of 6.8 and 7.8 by the interplay of the above three reactions.

Silicate minerals expected to be present in the GMA (e.g., quartz, feldspar, and clay minerals) have less influence on the chemistry of the infiltrating water due to their low solubilities (relative to carbonate minerals) at near neutral pH values. These minerals provide silica, potassium, sodium, aluminum, and various trace metals to the infiltrating water via dissolution and ion-exchange reactions.

The reduction/oxidation (redox) potential (Eh) of GMA groundwater has been reported to vary from 75 to 489 millivolts (mV) (Sobocinski and Myers, 1991), over the pH range of 6.5 to 7.8. These Eh values correspond to an environment that is transitional between oxidizing/reducing (i.e., 75 to 200 mV) to oxidizing (i.e., 300 to 489 mV). The cited Eh ranges correspond to oxygen partial pressures (P_{O_2}) of approximately 10^{-52} (Eh = 75 mV) and 10^{-23} (Eh = 489 mV) atmospheres at a pH of 7. Under the above Eh-pH conditions, uranium will be present in GMA groundwater in the plus six oxidation state (i.e., uranium (VI)), which is the most mobile oxidation state for uranium.

Reported Eh values for GMA groundwaters also imply that iron will be mobile as iron (II) in the transitional Eh range of 75 to 200 mV and immobile as iron (III) in the relatively oxidizing range of 300 to 450 mV. Iron concentrations in GMA groundwaters are relatively high (e.g., greater than 0.5 mg/L) in the transitional Eh range and low (e.g., less than 0.05 mg/L) in the oxidizing Eh zone. As iron (II) is oxidized to iron (III), iron precipitates (e.g., $Fe(OH)_3$) and the aqueous iron concentration is lowered. Precipitation of iron compounds in the GMA can potentially alter the hydraulic characteristics of the aquifer around extraction and injection zones. Therefore, the iron redox boundary in the GMA is important to define with respect to the location of extraction and injection zones. Additional details on iron precipitation in the GMA are discussed in Section 3.

Redox measurements recorded during a recent injection test in the South Field Area vary from 285 to 500 mV for groundwater in four injection wells in the South Field Area (31550, 31551, 31552, 31555) (DOE, 1995). These measurements were recorded every 10 minutes over a period of four days and show a continuous increase in the measured redox over this period. Additional redox measurements obtained from groundwater in four monitoring wells

in the South Plume Area (2002, 2095, 2899, 3928) varied from 420 to -391 mV (DOE, 1995). Measurements in the South Plume Area wells were obtained every 10 minutes over a period of two days and show a continuous decrease in the measured redox over this period. The negative redox values reported for monitoring wells 2002 and 3928 are the only negative redox values recorded for FEMP monitoring wells to date; although the continuous drift of ~~the~~ of the Eh measurements over the sampling interval may indicate fouling of the probe. If the initial recorded measurements form all wells are used, the Eh values agree with measurements reported by Sobocinski and Myers (1991). However, if the negative redox values are representative of groundwater in these wells, they imply uranium will be captured in this reduced groundwater by the precipitation of uranium (IV) solids (e.g., uraninite; UO_2).

3.0 Analysis of Baseline Conditions for Pump and Inject System

GMA groundwater will be pumped and reinjected in trial runs to evaluate the integrity of the system and screen out potential problems prior to placing the system on line. From a geochemical perspective, two potential problems may arise as GMA groundwater is pumped to the surface for reinjection. One scenario involves degassing of carbon dioxide and the other deals with the addition of oxygen (O_2).

As water comes in contact with the atmosphere, P_{CO_2} in the water (about $10^{-1.7}$ atm) will decrease as it equilibrates with P_{CO_2} in the atmosphere ($10^{-3.5}$ atm). As bicarbonate ion is the principal carbon specie in equilibrium with carbon dioxide in the groundwater (Table 3), the following reaction occurs as P_{CO_2} decreases in the groundwater:

$$(4)\ HCO_3^- \rightleftharpoons OH^- + CO_2$$

Reaction 4 will be driven to the right as carbon dioxide degasses from the groundwater, allowing bicarbonate ion to dissociate to hydroxide ion and additional carbon dioxide. Concomitant with carbon dioxide degassing, an increase in pH allows further dissociation of bicarbonate ion to carbonate ion and water. An increase in the concentration of carbonate ion results in precipitation of calcite, as illustrated in the following reactions:

$$(5)\ HCO_3^- + OH^- \rightleftharpoons CO_3^{-2} + H_2O$$

$$(6)\ Ca^{+2} + CO_3^{-2} \rightleftharpoons CaCO_3$$

Reactions 4 through 6 illustrate that there is potential for carbonate scale to form in pipes and pumps down line from break tanks, because GMA groundwater is saturated with calcite under ambient conditions and any increase in the carbonate ion concentration will supersaturate calcite. The potential for carbonate scale formation near and in pump hardware is greatest because an increase in temperature in these areas (due to friction) drives Reaction 4 strongly to the right, as carbon dioxide is less soluble in water as temperature increases.

A second potential problem deals with precipitation of iron hydroxide if an increase in the P_{O_2} of groundwater occurs. This case is the opposite of the above example, in that P_{O_2} is lower in the most oxidized groundwater sample obtained from the GMA (10^{-23} atm at Eh = 489 mV

and pH = 7.2) relative to P_{O_2} in the atmosphere ($10^{-0.7}$ atm). However, the problem is predicted to be limited primarily to GMA groundwaters that have observed Eh measurements below 200 mV.

At near neutral pH values and Eh values less than 200 mV, dissolved iron occurs primarily in the plus two oxidation state (i.e., iron (II)). When brought to the surface and placed in contact with the atmosphere, GMA groundwaters observed to possess these pH and Eh conditions will be subject to oxidation of iron (II) to iron (III), followed by precipitation of iron hydroxide. This process is summarized by the following reactions:

$$(7)\ 2Fe^{+2} + \tfrac{1}{2}O_2 + H_2O \rightarrow 2Fe^{+3} + 2OH^-$$

$$(8)\ Fe^{+3} + 3OH^- \rightarrow Fe(OH)_3$$

Reactions 7 and 8 occur rapidly and it is common to observe an orange to red slime on groundwater filters when waters with iron (II) are brought to the surface and filtered in the open atmosphere. As noted above, this problem is not expected to be significant for GMA groundwaters with observed Eh values greater than 200 mV. These groundwaters have iron concentrations that are an order of magnitude lower than groundwaters with Eh values less than 200 mV (Sobocinski and Myers, 1991), due to the oxidation and removal of iron when Eh values exceed about 200 mV (Reactions 7 and 8 at a pH of approximately 7).

The above two processes (CO_2 removal and O_2 addition) were simulated with a geochemical model to estimate the volume of precipitated phases that may form from GMA groundwater under two redox boundary conditions (Sobocinski and Myers, 1991):

- Eh of 75 mV ($P_{O_2} = 10^{-52}$ atm) with an iron concentration of 2 mg/L and
- Eh of 489 mV ($P_{O_2} = 10^{-23}$ atm) with an iron concentration of 0.1 mg/L.

In the computer simulation, carbon dioxide is removed from groundwater until a P_{CO_2} of $10^{-3.5}$ atm is reached, and oxygen is added to increase P_{O_2} to $10^{-1.3}$ atm (corresponding to an Eh of 800 mV, the upper bounding value for groundwater at a pH of 7). These endpoints are the most conservative conditions that may develop with respect to precipitation of solids.

Figure 1 summarizes carbon dioxide degassing and its predicted effect on the groundwater system. As P_{CO_2} drops from $10^{-1.7}$ to $10^{-3.5}$ atmospheres, pH increases from about 7.1 to 8.4

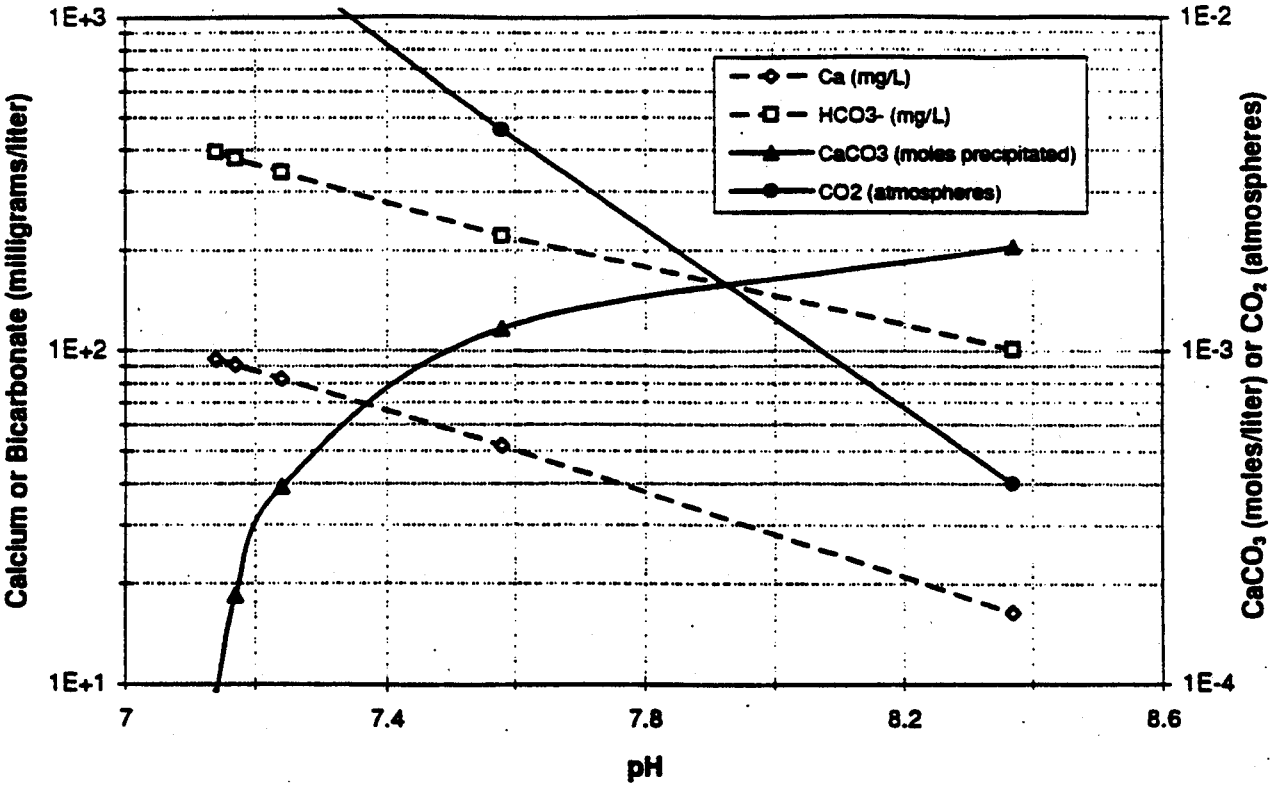

Figure 1

Results for carbon dioxide degassing of GMA groundwater.

and calcite precipitates (Reactions 4, 5, and 6), reducing the calcium and bicarbonate ion concentration in the groundwater. If P_{CO_2} is completely equilibrated with the ambient air value of $10^{-3.5}$ atm, about 2 x 10^{-3} moles of calcite are predicted to form per liter of processed groundwater. Using the molar volume of calcite (36.934 cm^3/mole) and moles of precipitate, the volume of produced precipitate is estimated as 7.4 x 10^{-2} cm^3 per liter of groundwater. Based on a nominal pump rate of 1,000 liters per minute (264 gallons/minute) per day, the potential exists for a precipitate yield that is on the order of 0.1 m^3 of calcite per day, which may be an unacceptable quantity with respect to sustaining operations. Note that this is a maximum estimate, and that the above daily yield is reduced to about one-half and one-quarter of the initial estimate if the P_{CO_2} endpoint values are $10^{-2.3}$ and $10^{-1.9}$ atm, respectively. However, this analysis suggests that even slight degassing of P_{CO_2} (e.g., $10^{-1.7}$ to $10^{-1.9}$ atm) will produce non-trivial amounts of calcite. Therefore, surface holding time and atmosphere contact time should be minimized to prevent loss of CO_2 from the groundwater.

The simulation of oxygen addition to GMA groundwater with Eh of 75 mV and an iron concentration of 2 mg/L is shown on Figure 2. To obtain oxygenated groundwater, oxygen is added at a rate to achieve P_{O_2} of $10^{-9.7}$ atm (Eh = 616 mV at pH = 8.33) when CO_2 partial pressure reaches $10^{-3.5}$ atm. Note that oxygen addition (i.e., an increase in Eh) will occur simultaneously with CO_2 degassing, resulting in the pH increase discussed for results presented on Figure 1. A pH and Eh increase provides a very favorable environment for the precipitation of iron hydroxide, as increasing pH provides hydroxide ion and rising Eh results in oxidation of iron (II) to iron (III) (Reactions 7 and 8). As oxygen is added to the groundwater, Eh rises from 75 to 150 mV over a small pH interval and iron hydroxide begins to form (Figure 2). Precipitation continues until approximately 3.5 x 10^{-5} moles of iron hydroxide is precipitated per liter of water. The formation of iron hydroxide over the pH interval of 7.2 to 7.7 consumes most of the added oxygen over this interval, resulting in a flat Eh trend that represents buffering of the oxidation potential by the iron(II)/iron (III) redox couple. However, as the iron (II) becomes depleted, excess oxygen is available to increase the Eh once again. Note that there is no significant change in the mass of iron hydroxide precipitate above the Eh and pH values of 200 mV and 7.8, respectively. This observation indicates that iron hydroxide precipitation should not be problem for GMA groundwaters possessing Eh values in excess of 200 mV, an observation supported by observed groundwater data for iron (Sobocinski and Myers, 1991) and the lack of iron hydroxide precipitate in the computer simulation run with groundwater at an Eh of 489 mV.

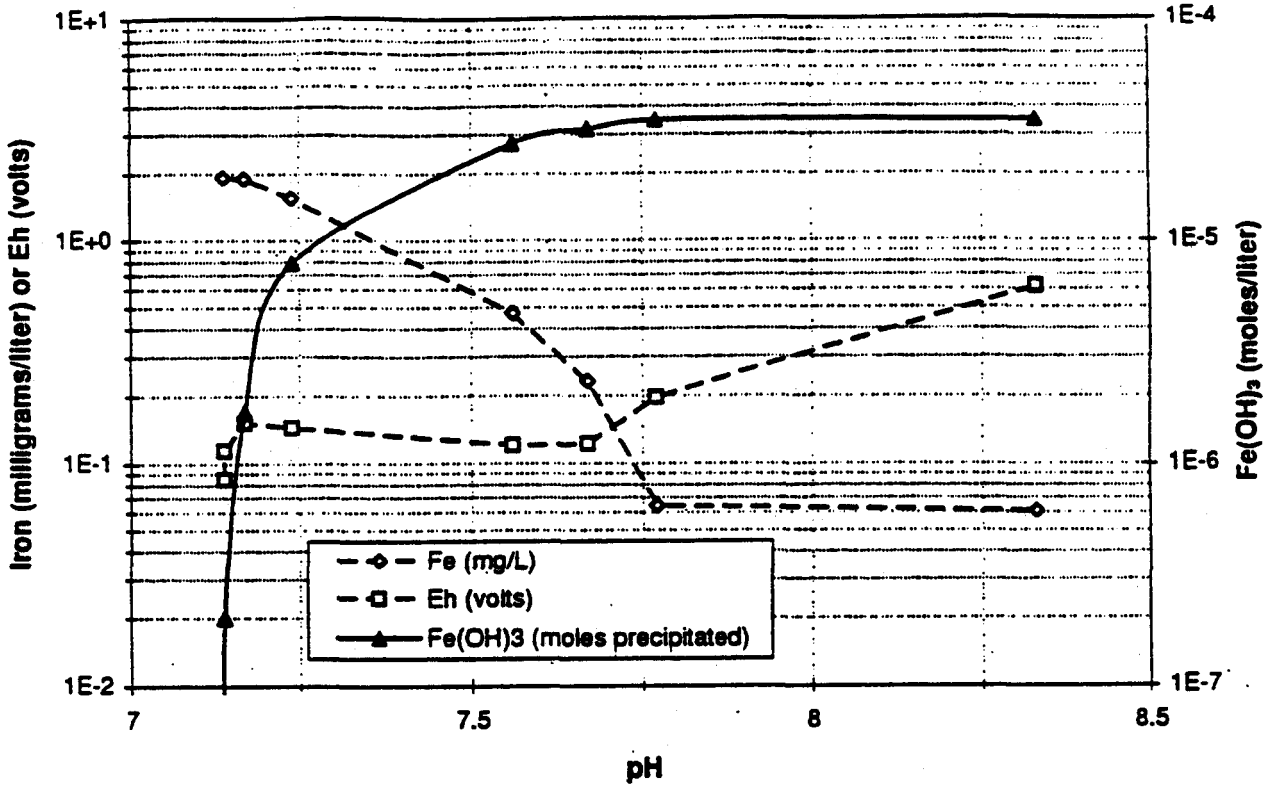

Figure 2

Results for oxygen addition to GMA groundwater.

Using the molar volume of iron hydroxide (34.36 cm^3/mole) and analogous arguments and pumping values to those used for calcite (Figure 1), the worst case scenario for GMA groundwater (i.e., Eh = 75 mV, iron = 2 mg/L) indicates a potential to produce 1.7×10^{-3} m^3 of iron hydroxide per day. This value is two orders of magnitude lower than the estimate for calcite precipitation. However, the kinetics of iron oxidation and precipitation are observed to occur nearly instantaneously when iron (II) is brought into contact with the atmosphere. Therefore, from a kinetic viewpoint, iron hydroxide has a greater potential to precipitate relative to calcite, and any atmosphere contact or holding time is likely to result in formation of iron hydroxide.

As a final note, the formation of iron hydroxide on the surface can be beneficial with respect to removal of metal constituents from solution. Arsenic and uranium form anionic complexes in GMA groundwater (e.g., AsO_2^-, AsO_2OH^{-2}, AsO_4^{-3}, $UO_2(CO_3)_2^{-2}$, $UO_2(CO_3)_3^{-4}$), and these anions are adsorbed by the positively charged surface of the iron hydroxide precipitate. Therefore, precipitation of iron hydroxide can result in lower arsenic and uranium concentrations in groundwater.

4.0 Analysis of Groundwater Mixing in Extraction and Injection Zones

Three mixing scenarios were investigated to gain insight into potential precipitation reactions that might occur in extraction and injection zones. The first scenario modeled simulates the mixing of GMA groundwater around the extraction well when deeper, more reduced groundwater (e.g., zone of 3000 series wells) is pulled up into the relatively oxidized regions of the upper GMA (e.g., zone of 2000 series wells). A second simulation mimics the October 1995 injection test in the South Field Area, where relatively reduced groundwater was extracted and injected into oxidized groundwater (DOE, 1995). The final simulation depicts the conditions for the March 1996 injection test where oxidized spit effluent is injected into oxidized regions of the GMA.

Table 4 summarizes the initial water compositions for the mixing calculations. For the first modeled scenario, groundwaters from monitoring wells (MW) 2387 and 3387 are mixed to simulate the upwelling of MW 3387 groundwater around an extraction well placed in MW 2387 groundwater. In the second scenario, reduced groundwater obtained from well MW 2002 is injected into oxidized groundwater represented by conditions at well MW 2387. The final scenario uses the spit effluent composition and mixes it with groundwater from injection well (IW) 31567. In all scenarios, ten kilograms of the water of interest (i.e., MW 3387, MW 2002, or spit effluent in Table 4) are added to 1 kilogram of MW 2387 or IW 31567 groundwater to achieve a final mass mixing ratio of 10:1 (note that 1 kilogram of groundwater corresponds to a volume of about 1 liter). As the water of interest is added to MW 2387 or IW 31567 groundwater, the mass fraction of the water of interest increases. The volume of water added is related to the mass fraction as follows: addition of 1 kilogram (liter) of the water of interest to 1 kilogram of 2387 groundwater results in a total of 2 kilograms for the mixture, which corresponds to a mass fraction of 0.5 (1÷2) for the water of interest.

Results for the first mixing scenario are illustrated on Figure 3. As the mass fraction of MW 3387 groundwater increases, pH rises from about 7.2 to 7.4, Eh decreases from 400 to 125 mV, the aqueous iron concentration rises from 0.066 to 0.51 mg/L, and iron hydroxide precipitation reaches a maximum when the mixture is one-half MW 3387 groundwater. Based on the initial conditions and results presented on Figure 3, iron hydroxide precipitation will be negligible if the mass fraction of MW 3387 groundwater is less than 0.1 or greater than 0.8. However, it is noted that groundwater extracted with a mass fraction less than 0.1

Table 4

Composition of GMA Groundwaters and Spit Effluent Used in Mixing Calculations

Parameter	Monitoring Well 2387	Monitoring Well 3387	Monitoring Well 2002	Injection Well 31567	Spit Effluent
pH (standard units)	7.2	7.6	7.3	7.0	7.28
Eh (millivolts)	400	110	175	412	414
Calcium (mg/L)	87	70	81	91.8	88.9
Iron (mg/L)	0.066	0.56	0.3	0.123	0.05[a]
Potassium (mg/L)	2.6	3.0	3.45	2.5[a]	2.5[a]
Magnesium (mg/L)	31	24	26	23.3	22.9
Sodium (mg/L)	15	10	15.4	11.0	12.4
Silica (mg/L)	6.9	4.5	4.3	3.6	3.9
Bicarbonate (mg/L)	385	236	317	234	252[b]
Chloride (mg/L)	15	26	26	24.2	27.9
Fluoride (mg/L)	0.6	0.09	0.1	0.17	0.2
Phosphate (mg/L)	0.30	0.15	0.87	0.005[a]	0.005[a]
Nitrate (mg/L)	5.9	0.38	2.1	0.22[a]	0.22[a]
Sulfate (mg/L)	82	76	71	78.5	78.8

[a] Value represents one-half of the reported detection limit.

[b] Value represents reported concentration for spit influent, as bicarbonate was not reported for spit effluent.

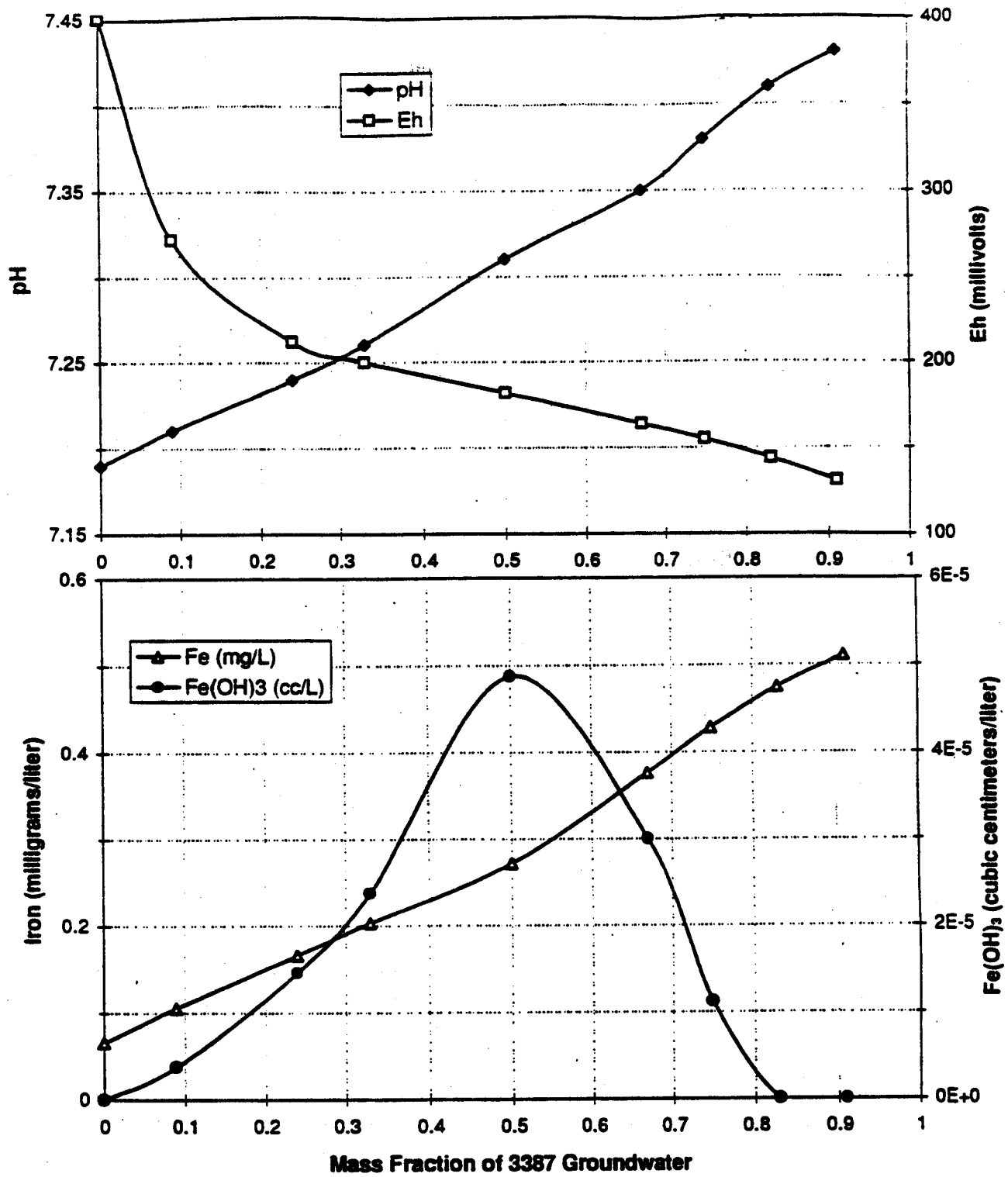

Figure 3

Mixing results for groundwaters in MW 2387 and MW 3387.

is desirable because this mixture will produce the minimum amount of iron hydroxide precipitate when brought to the surface, due to its higher Eh and lower aqueous iron values.

Figure 4 summarizes results for mixing calculations carried out to simulate the October 1995 injection test in the South Field Area. As groundwater from MW 2002 is mixed with MW 2387 groundwater pH rises from about 7.2 to 7.26, Eh decreases from about 400 to 200 mV, iron concentration rises from 0.066 to 0.165 mg/L, and iron hydroxide precipitate increases to about 8 x 10^{-4} cm^3/L. Results on Figure 4 indicate that iron hydroxide will continue to precipitate in the injection zone as the mass fraction of 2002 groundwater increases to 0.9. Between a mass fraction of 0.9 and 1.0, iron hydroxide precipitation should shut down, as the initial iron concentration and Eh and pH conditions in 2002 groundwater (Table 4) indicate iron hydroxide is unsaturated. However, the presence of atmospheric oxygen in the injection well would be sufficient to maintain saturation of iron hydroxide as the mass fraction of MW 2002 groundwater reached 1.0. Therefore, the injection of groundwater with Eh values below 200 mV should be avoided if possible.

The March 1996 injection test was simulated in Scenario 3. Spit effluent was mixed with groundwater from well 31567 under oxidizing conditions (i.e., Eh of 412 to 414 mV over the pH range of 7 to 7.3) to evaluate the potential for iron hydroxide and calcite precipitation in the screened volume of the well. No precipitate is predicted to form under these mixing conditions (Figure 5), which is in agreement with observations taken during the injection test.

Scenario 3 results for iron hydroxide (Figure 5a) are shown as iron concentration versus mass fraction of spit influent. An iron concentration equal to one-half the reported detection limit of 100 µg/L was assumed for the spit effluent (Table 4). The data plotted on Figure 5a indicate that calculated iron concentrations in the mixture always lie below the solubility curve for $Fe(OH)_3$. That is, iron hydroxide precipitate will not form unless groundwater iron concentrations rise above the solubility curve. Conditions needed for the precipitation of calcite are illustrated on Figure 5b, which plots the concentration product of calcium and bicarbonate ions as a function of pH and mass fraction of spit effluent. Observed values for the calcium and bicarbonate concentration product lie below the solubility curve for $CaCO_3$, and this indicates the mixture will not precipitate calcite. However, the data do approach the solubility curve near pH 7.3 - indicating if the pH of the spit effluent is greater than 7.3, calcite precipitation is possible as the mixture approaches 100 percent spit effluent.

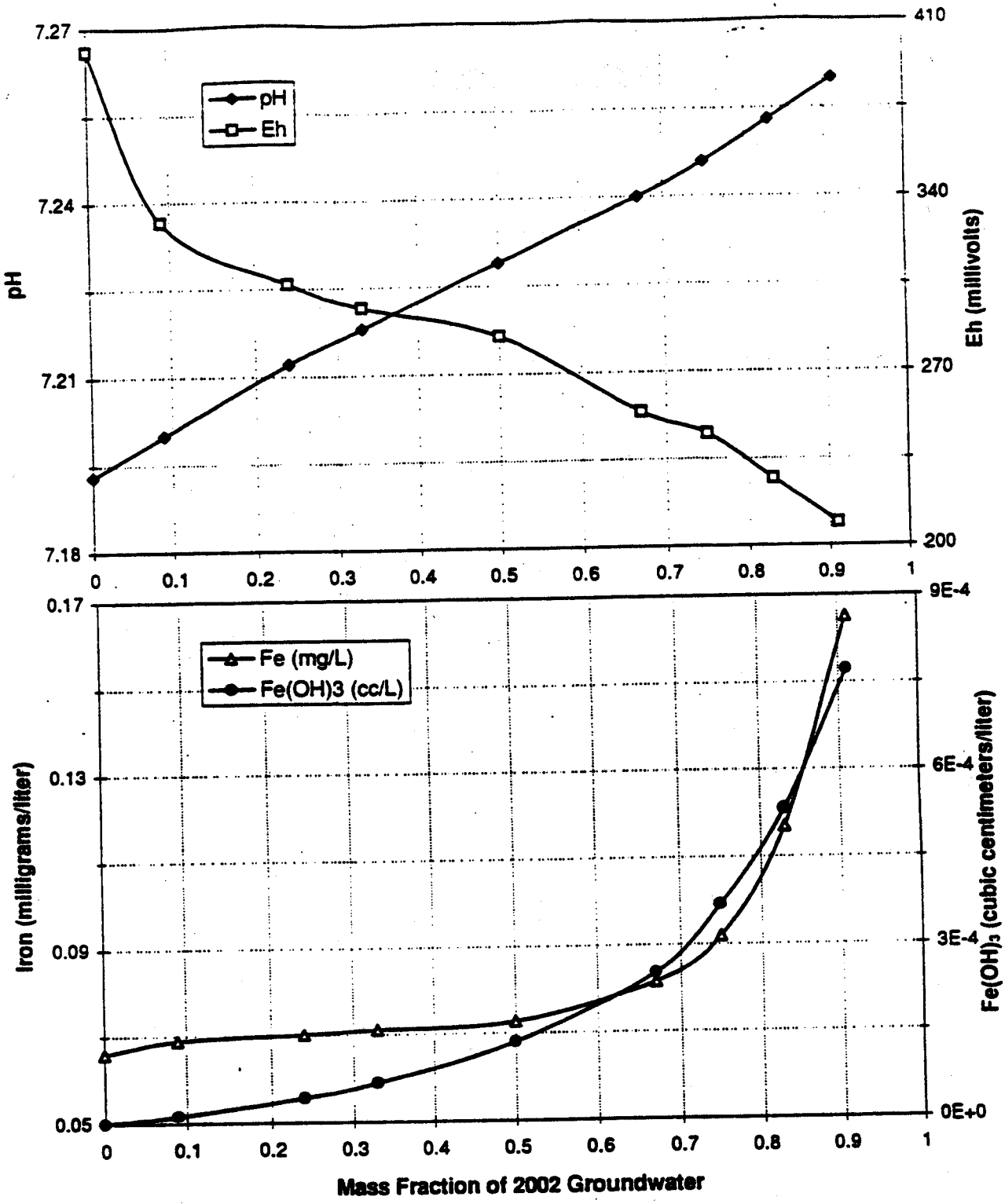

Figure 4

Mixing results for groundwaters in MW 2387 and MW 2002.

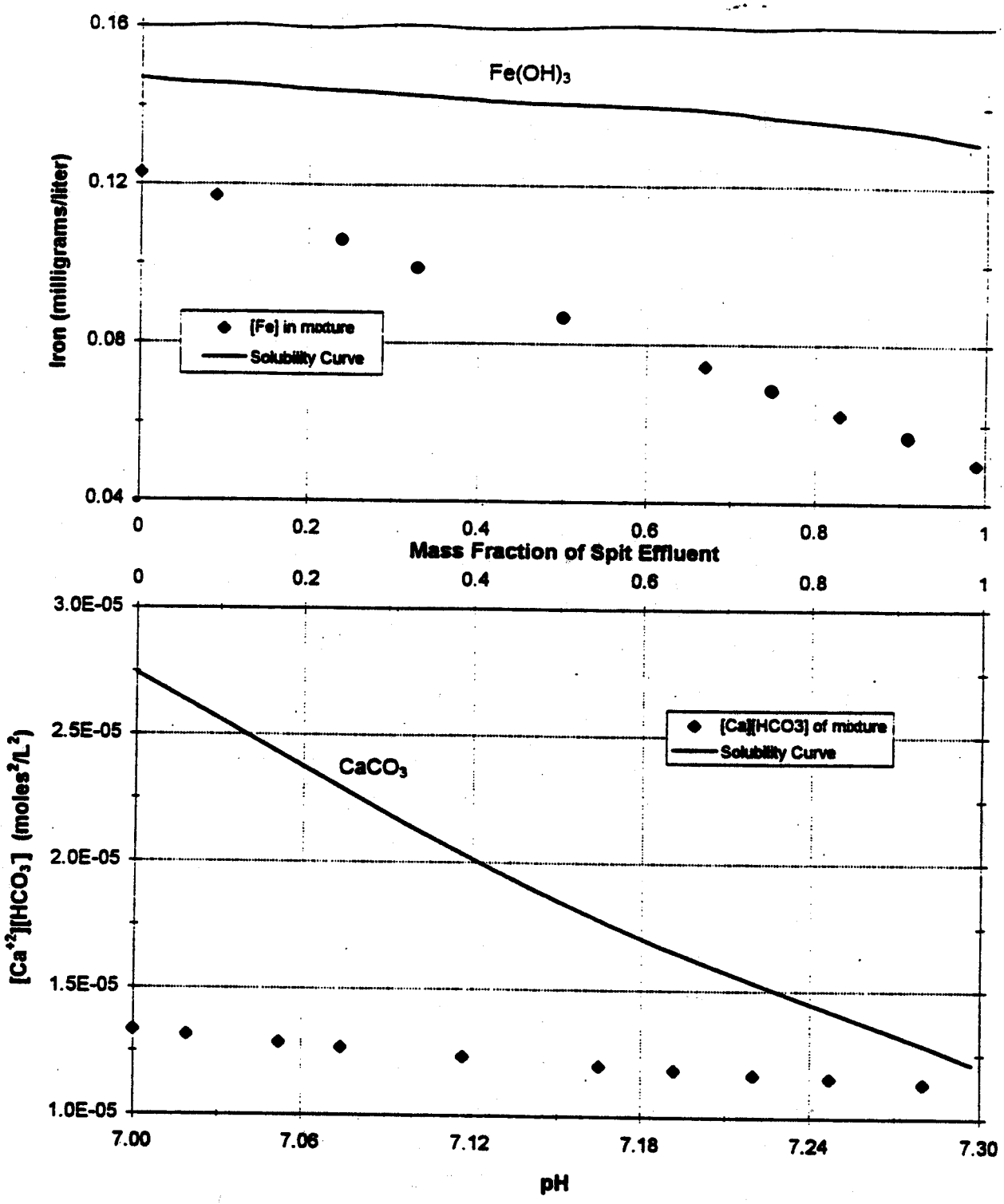

Figure 5

Mixing results for spit effluent and groundwater in IW 31567.

Several observations are noted for the iron hydroxide precipitates formed in Scenarios 1 and 2. In Scenario 1 (Figure 3), iron hydroxide precipitate reaches a peak when the mass fraction of 3387 groundwater is 0.5, whereas in Scenario 2 (Figure 4) the iron hydroxide precipitate continues to increase as the mass fraction of 2002 groundwater increases. The difference in behavior of the precipitate is tied to the initial Eh values estimated for MW 3387 and MW 2002 groundwaters, which are ~~100~~ 110 and 175 mV respectively. A lower initial Eh value for 3387 groundwater shuts off iron hydroxide precipitate when the mass fraction of MW 3387 groundwater reaches about 0.8 and the Eh value falls below 150 mV. In Scenario 2, Eh values never fall below 200 mV, which allows iron hydroxide to precipitate over the mass fraction range of 0.0 to 0.9.

Eh measurements for MW 3387 and MW 2002 groundwaters were not available for use in the modeled scenarios; and the initial values are estimated using the reported iron concentration and solubility product for iron hydroxide. To illustrate the estimation consider the composition of 3387 groundwater with pH of 7.6 and iron concentration of 0.56 mg/L (Table 4). Based on the reported pH and iron concentration, thermodynamic calculations carried out with the EQ3/6 geochemical code indicate the Eh of this groundwater cannot exceed 100 mV. That is, above 100 mV the iron concentration would be lowered by the precipitation of iron hydroxide. In a similar fashion, to avoid precipitation of iron hydroxide in 2002 groundwater, the maximum calculated Eh value is 175 mV (at pH = 7.3 and [Fe] = 0.3 mg/L; Table 4). As the predicted volume of precipitate is a strong function of the initial Eh condition of the groundwater, Eh is a critical parameter to measure for groundwaters involved in mixing in the injection and extraction zones. Therefore, results presented in Figures 3, 4, and 5 are applicable only for the initial set of conditions presented in Table 4.

Although the quantitative calculations carried out here suggest 5×10^{-5} to 8×10^{-4} cm^3 of precipitate will form in mixing Scenarios 1 and 2 (Figures 3 and 4), results for mixing Scenario 3 indicate spit effluent can be injected into oxidized portions of the GMA without formation of iron or carbonate precipitate. Therefore, proper selection of injection zones will eliminate the precipitation problem.

For Scenarios 1 and 2, it was noted that the actual volume of precipitate formed will be sensitive to initial pH, Eh, and iron concentration. Therefore, the quantities presented here are estimates given the specified initial conditions (Table 4). To put the calculated quantities

into a more meaningful form, injection well lifetime can be estimated using the precipitate volumes, injection rate (300 gal/min), and porosity of the injection zone (30 percent).

Consider a 1 m^3 area around the screened zone of an injection well where 10^{-4} cm^3 of precipitate is formed when 1 liter of injection water is mixed with 1 liter of GMA groundwater (e.g., mass fraction = 0.5 on Figure 4). Porosity in this cubic meter is 0.3 x 10^6 cm^3 (1 m^3 * 10^6 cm^3/m^3 * 0.3), and this porosity is calculated to be reduced to zero when 3 x 10^9 liters of injection water has been added to the well (0.3 x 10^6 cm^3 ÷ 10^{-4} cm^3/L). The time needed to inject 3 billion liters, assuming the stated injection rate holds and operation continues 24 hours a day, is about 5 years (3 x 10^{-9} L ÷ 3.7854 L/gal ÷ 300 gal/min ÷ 60 min/hr ÷ 24 hr/day ÷ 365.25 days/yr). If the precipitate increases to 10^{-3} cm^3 per liter of injection water, the lifetime of the well decreases to 6 months. Therefore, the consequences of iron hydroxide precipitation in the injection zone are significant and care should be taken to select injection zones compatible with the injected water (e.g., Scenario 3).

5.0 Analysis of Lixiviant Addition to Injection Waters

Lixiviants were examined in several EQ3/6 runs to investigate the feasibility of enhancing the desorption/dissolution of uranium from aquifer solids. A lixiviant is generally defined as a reagent that is added to solution to extract a constituent from a solid matrix by enhancing the desorption/dissolution of the constituent through formation of a strong aqueous complex with the lixiviant. In the mining industry, cyanide is used as a lixiviant to extract gold and silver from crushed ore, while hydrogen peroxide (H_2O_2) and sodium carbonate (Na_2CO_3) are used for insitu oxidation and extraction of uranium.

The geochemical environment of the GMA is different from subterranean regions selected for insitu uranium solution mining, primarily with respect to the oxidation state of uranium. Therefore, these two environments are briefly summarized to provide background information used to assess the effectiveness of hydrogen peroxide and sodium carbonate lixiviants in the GMA.

Insitu oxidation and extraction of uranium ores involves the dissolution of uranium solids containing uranium in the plus four oxidation state, or uranium (IV). Uraninite (UO_2) and coffinite ($USiO_4$) are two of the common minerals found in uranium ore deposits, and they are mobilized with the indicated lixiviants as follows:

$$(9)\ UO_2 + H_2O_2 + CO_3^{-2} \rightarrow UO_2CO_3^{\circ} + 2OH^-$$

$$(10)\ USiO_4 + H_2O_2 + CO_3^{-2} \rightarrow UO_2CO_3^{\circ} + SiO_2^{\circ} + 2OH^-$$

The overall reactions written above proceed in a minimum of two steps, as shown below for Reaction 11:

$$(11)\ UO_2 + H_2O_2 \rightarrow UO_2^{+2} + 2OH^-$$

$$(12)\ UO_2^{+2} + CO_3^{-2} \rightarrow UO_2CO_3^{\circ}$$

In Reaction 11, hydrogen peroxide oxidizes the uranium (IV) to uranium (VI), forming the uranyl ion. Carbonate ion provided by the highly soluble lixiviant sodium carbonate then complexes the uranyl ion to form uranyl carbonate (Reaction 12). Under the carbonate-ion concentrations employed in solution mining, uranyl carbonate will form the uranyl-decarbonate and uranyl-tricarbonate complexes as follows:

$$(13)\ UO_2CO_3^{\circ} + CO_3^{-2} = UO_2(CO_3)_2^{-2}$$

$$(14)\ UO_2(CO_3)_2^{-2} + CO_3^{-2} = UO_2(CO_3)_3^{-4}$$

At the FEMP, GMA groundwaters have measured Eh values of 75 to 489 mV (Sobocinski and Myers, 1991). Over the observed pH range of 6.5 to 7.8, these Eh measurements indicate that uranium present in GMA groundwater is in the plus six oxidation state, or uranium (VI). As noted above, uranium (VI) occurs in solution as the uranyl ion (Reaction 11). GMA groundwaters contain abundant bicarbonate ion (HCO_3^-; 256 to 525 mg/L; DOE 1994), which reacts with the uranyl ion to form the uranyl carbonate species indicated in Reactions 12, 13, and 14. However, because the GMA groundwaters plot in moderately oxidizing Eh-pH space, the uranium (IV) minerals found in ore deposits will not form. Based on the range of uranium concentrations in GMA groundwater sampled from 2000 series wells, meta-autunite ($Ca(UO_2)_2(PO_4)_2 \cdot 4H_2O$) and soddyite ($(UO_2)_2SiO_4 \cdot 2H_2O$) are the predicted uranium solids that may be present in the GMA. Both of these uranium (VI) minerals have been identified as secondary phases in soil samples obtained from the FEMP (Buck et al, 1994).

Figure 6 shows measured uranium concentrations in groundwater obtained from 2000 series wells and calculated solubility curves for meta-autunite (solid line) and soddyite in background GMA groundwater (DOE, 1994). For the meta-autunite solubility curve, a PO_4^{-3} concentration of 0.75 mg/L was used (reported range is 0.17 to 14 mg/L; DOE, 1994) and for soddyite a SiO_2° concentration of 6.63 was used (reported range 3.1 to 12 mg/L; DOE, 1994). Arrows below the solubility curves indicate the shift in the solubility curve as phosphate and silica concentrations increase in GMA groundwaters (i.e., the solubility of meta-autunite and soddyite decrease). The range of uranium concentrations in groundwater obtained from 2000 series wells can be explained in terms of meta-autunite and/or soddyite solubility curves, as these curves sweep downward when phosphate and silica concentrations increase. Therefore, these two phases will be examined with respect to the enhancement of their solubility by addition of lixiviants.

Uranium is also present in the GMA as adsorbed uranium. Unfortunately, thermodynamic data on adsorption reactions between aqueous uranium species and GMA solids are unavailable, and an evaluation analogous to the solubility analysis cannot be made. However, it is reasonable to assume that lixiviants capable of enhancing uranium mineral solubility will also enhance desorption reactions, as the same thermodynamic principles apply to both.

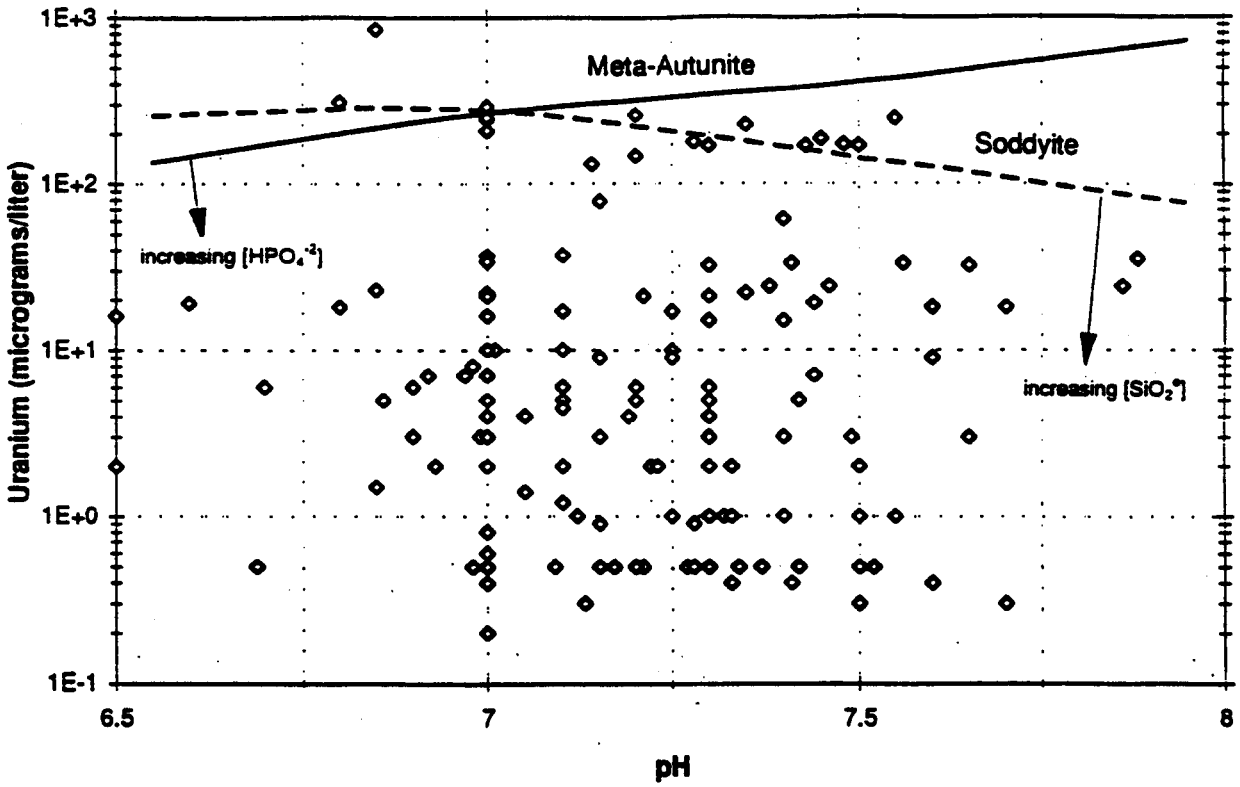

Figure 6

Solubility of meta autunite and soddyite in GMA groundwater.

Figure 7 summarizes the results for the addition of hydrogen peroxide to GMA groundwater. This lixiviant is predicted to have no effect on the solubility of meta-autunite and soddyite, as demonstrated by the invariant nature of the solubility curves as Eh (i.e., partial pressure of O_2) increases (Figure 7a). Eh increases as hydrogen peroxide is added to the groundwater up to a maximum Eh value of about 840 mV, which is the bounding upper limit for naturally occurring waters. Solubility is not enhanced by the addition of hydrogen peroxide because the GMA environment is moderately oxidizing to begin with, and greater than 99 percent of the uranium is predicted to occur in the uranium (VI) oxidation state. Therefore, unless reducing conditions can be shown to exist in the GMA with respect to the formation of uranium (IV) species, hydrogen peroxide addition will not produce increased mobility of uranium. Addition of oxygen to the GMA, rather than hydrogen peroxide, will produce results similar to those on Figure 7, as both lixiviants act to increase the Eh of the groundwater.

An additional argument against the use of hydrogen peroxide or oxygen is the increase in Eh is predicted to result in the precipitation of iron hydroxide ($Fe(OH)_3$). Figure 7b indicates that as hydrogen peroxide is added to GMA groundwater, Eh increases and iron hydroxide precipitates, coupled with a decrease in the aqueous iron concentration. Based on a molar volume of 34.36 cm^3/mole and the formation of 5.9×10^{-6} moles of iron hydroxide (Figure 7), 2.0×10^{-4} cm^3 of iron hydroxide is predicted to precipitate per liter of GMA groundwater. Note that most of the precipitate is predicted to form between an Eh of 130 and 250 mV, indicating GMA groundwaters with Eh values greater than 250 mV will not be as susceptible to this problem. Additionally, note that above an Eh of 440 mV the iron concentration stabilizes and no further precipitate is formed, indicating all iron is oxidized to iron (III) and further addition of oxygen has no effect on the iron hydroxide solubility product.

A similar analysis was conducted with sodium bicarbonate ($NaHCO_3$) to examine the effect of increased bicarbonate concentration on meta-autunite and soddyite solubility. Sodium bicarbonate was used in the simulation in place of sodium carbonate (Na_2CO_3), because the pH of GMA groundwater (about 6.8 to 7.8) lies within the stability field of bicarbonate ion. Addition of sodium carbonate to GMA groundwater would consume hydrogen ion and produce an undesirable pH increase as follows:

$$(15)\ CO_3^{-2} + H^+ = HCO_3^-$$

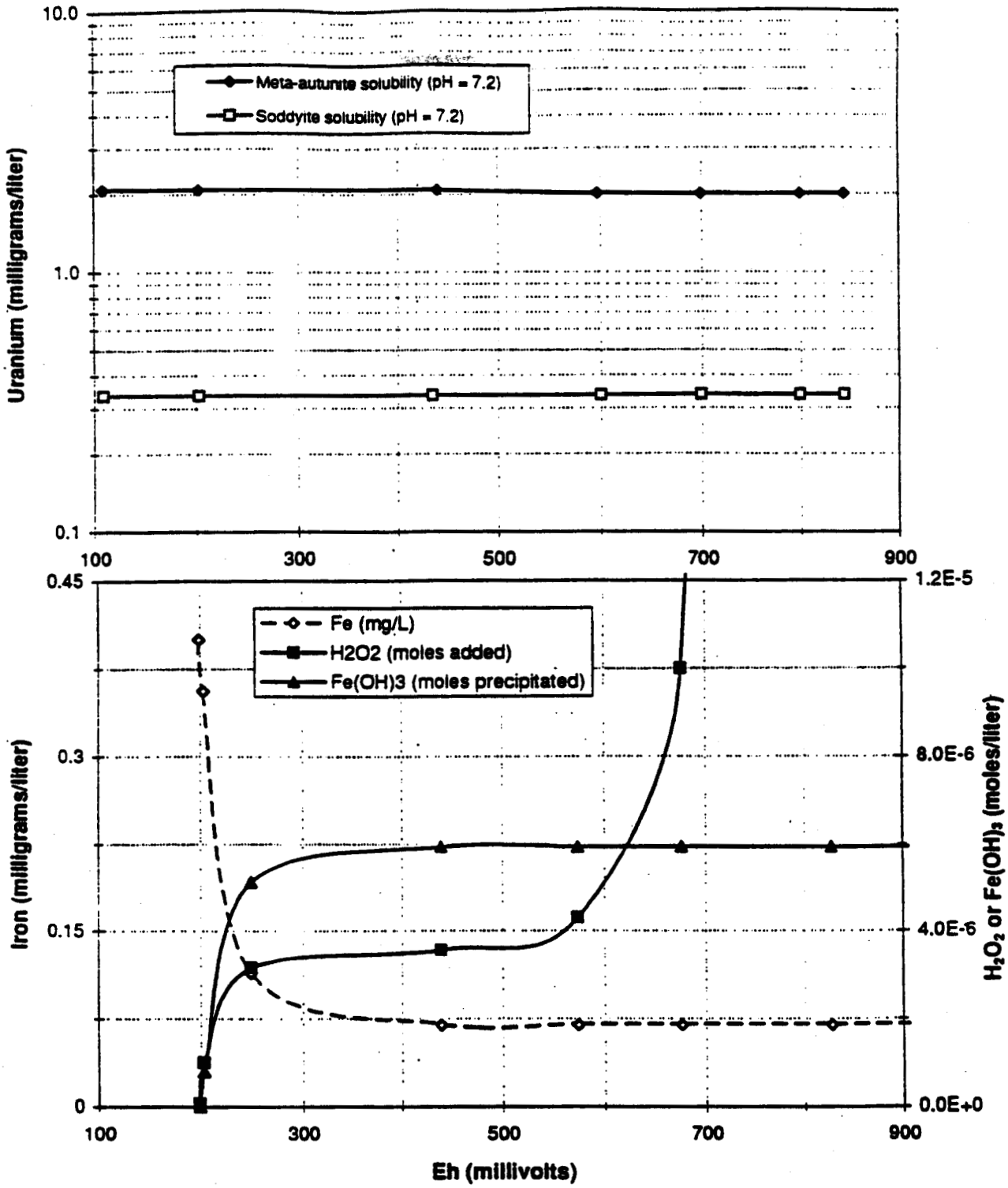

Figure 7

Results for addition of hydrogen peroxide to GMA groundwater. (a) Solubility of meta autunite and soddyite. (b) Iron hydroxide precipitation.

Reaction 15 is undesirable because GMA groundwater is in equilibrium with carbonate minerals, and an increase in pH will result in precipitation of carbonate phases (Reaction 6).

Figure 8 summarizes the results for addition of sodium bicarbonate to GMA groundwater. The solubility of meta-autunite and soddyite are increased by an order of magnitude as the background bicarbonate concentration of 400 mg/L is raised to 950 mg/L. Solubility is enhanced by the formation of uranyl-carbonate species, via Reactions 12, 13, and 14. Note that the carbonate ion in Reactions 12, 13, and 14 is provided by the increase in bicarbonate ion via the second dissociation reaction of carbonic acid (i.e., Reaction 11 reversed).

Results on Figure 8 indicate the addition of bicarbonate ion to GMA groundwater will increase the mobility of uranium in the aquifer by formation of uranyl-carbonate species. However, a negative consequence of bicarbonate addition is the precipitation of calcite. Figure 8 also charts the moles of added sodium bicarbonate, moles of precipitated calcite, and aqueous calcium concentration as a function of bicarbonate ion concentration. The addition of 1×10^{-2} moles of sodium bicarbonate to GMA groundwater drives the bicarbonate ion concentration to about 950 mg/L, resulting in the precipitation of 1.12×10^{-3} moles of calcite. Using the molar volume of calcite (36.934 cm^3/mol), about 4×10^{-2} cm^3 of calcite is estimated to form per liter of GMA groundwater, when the indicated moles of sodium bicarbonate are added. Therefore, the addition of bicarbonate or carbonate ion to the GMA groundwater is not recommended, as precipitation of calcite in the aquifer will result in decreased porosity and permeability, and hardware downline from the point of carbonate introduction will be susceptible to carbonate scale formation.

The use of carbon dioxide (CO_2) as a lixiviant was also investigated because addition of carbon dioxide will decrease pH and suppress carbonate precipitation while increasing bicarbonate concentrations. Results for the addition of carbon dioxide are given on Figure 9. Bicarbonate concentration is raised to 1,010 mg/L upon addition of 0.01 mole of carbon dioxide to a liter of groundwater. As carbon dioxide is added to the groundwater, pH falls from 7.15 to 6.1 (Reactions 2 and 3) and carbonate ion is converted to bicarbonate (Reaction 15). The consumption of carbonate ion allows Reaction 6 to reverse and calcite is dissolved, rather than precipitated. Therefore, precipitation of calcite is not a problem for carbon dioxide addition to the GMA.

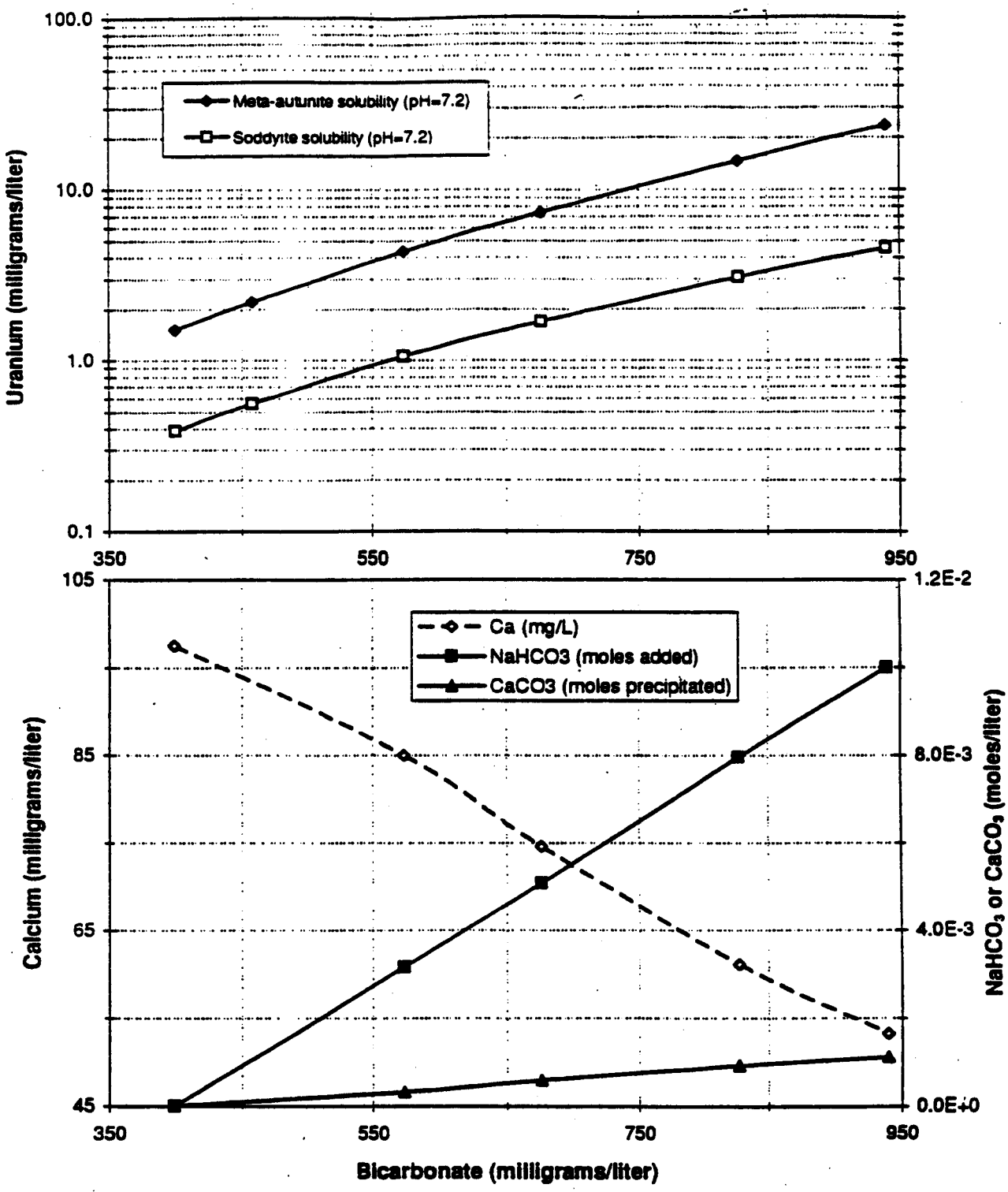

Figure 8

Results for addition of sodium bicarbonate to GMA groundwater. (a) Solubility of meta autunite and soddyite. (b) Calcite precipitation.

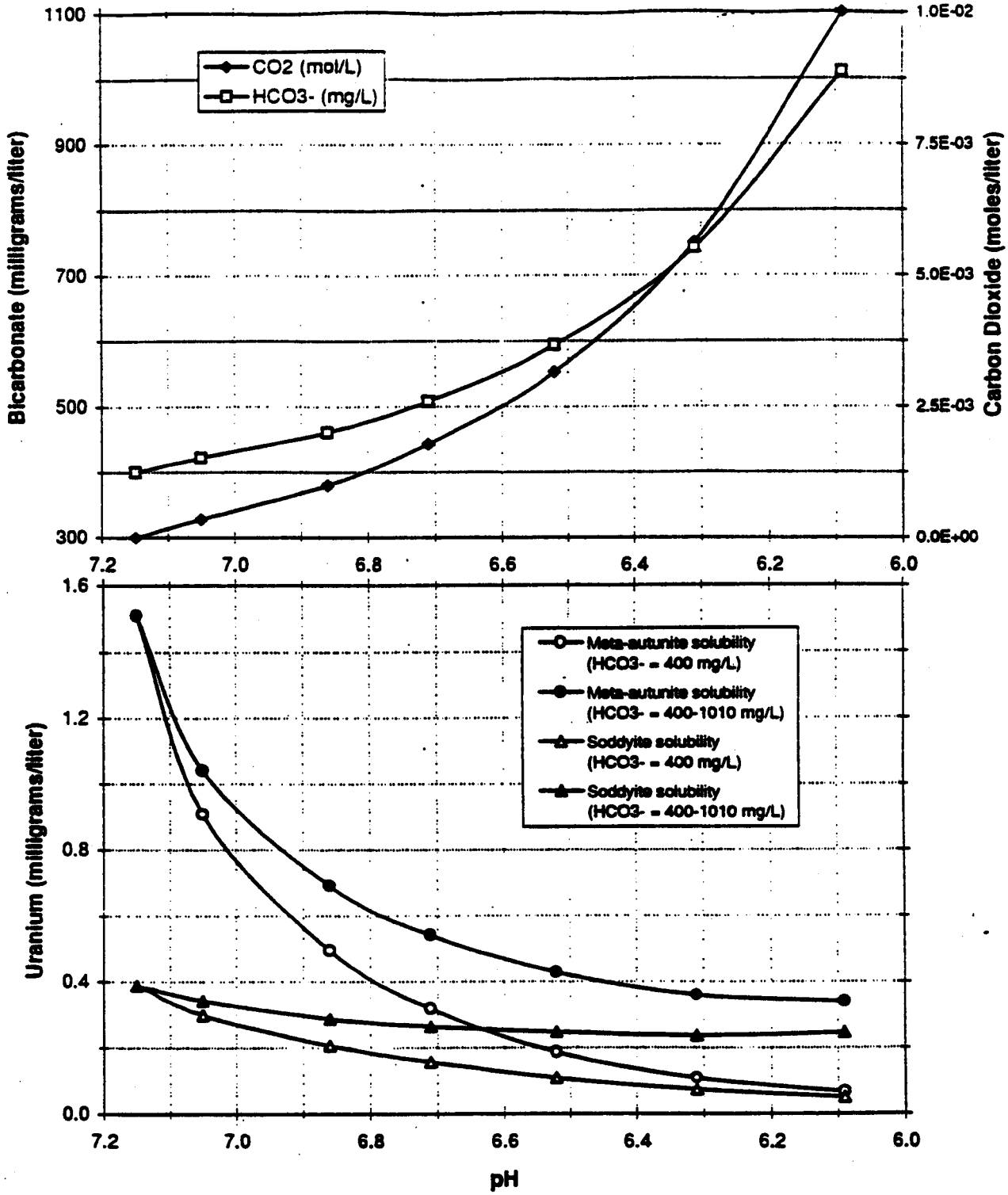

Figure 9

Results for addition of carbon dioxide to GMA groundwater. (a) Bicarbonate concentration. (b) Solubility of meta autunite and soddyite.

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Figure 9 also summarizes the trends of the meta autunite and soddyite solubility curves as carbon dioxide is added to groundwater and pH decreases. Note that the solubility curves are plotted for the baseline bicarbonate concentration of 400 mg/L (open symbols) and a companion curve which shows the effect of increasing bicarbonate concentration (400 to 1,010 mg/L). In both cases, solubility is enhanced by increasing bicarbonate concentration. Additional attention to the solubility curves also shows that the solubility of meta-autunite and soddyite is decreased as pH falls from 7.15 to 6.1. This indicates that decreasing the pH of GMA groundwater will stabilize meta-autunite and soddyite in the GMA, which may not be desirable.

However, meta-autunite and soddyite are predicted to be stable in the GMA only if the uranium concentration of GMA groundwater lies at or above the indicated solubility curves. For example, GMA groundwater at a pH of 6.3 and bicarbonate concentration of 750 mg/L requires a uranium concentration of 0.4 mg/L or greater to stabilize meta-autunite in the GMA (Figure 9). Therefore, solubility curves in Figure 9 suggest that carbon dioxide treatment of the GMA will enhance uranium mobility if the uranium concentration lies below the solubility curve. As most reported uranium concentrations in 2000 series monitoring wells are below 0.4 mg/L, carbon dioxide is predicted to be a useful lixiviant for increasing uranium mobility in the GMA.

6.0 Conclusions and Recommendations

Results presented in this report indicate that precipitation of calcite and iron hydroxide may interfere with operations of the pump-and-treat system designed for GMA groundwater. Groundwater extracted from the GMA will be brought to the surface for uranium removal by anion exchange. While residing on the surface, GMA groundwater may experience carbon dioxide degassing and addition of oxygen. Carbon dioxide degassing will lead to an increase in pH and precipitation of calcite scale, while increasing the oxygen of the groundwater results in oxidation of iron and precipitation of iron hydroxide.

The potential iron hydroxide problem noted above can reappear if groundwater mixing occurs in extraction and injection wells with the relatively oxidized and reduced groundwaters observed in the GMA. Relatively oxidized zones in the GMA (i.e., Eh greater than 200 mV) will be susceptible to iron hydroxide precipitation if extraction rates create upwelling of relatively reduced groundwater (i.e., Eh less than 150 mV) in the vicinity of the extraction well (Scenario 1). Likewise, relatively reduced groundwater that is treated to remove uranium and injected into relatively oxidized groundwater in the GMA can produce iron hydroxide precipitate if no change in redox potential occurs while the groundwater is on the surface (scenario 3). However, precipitation problems can be avoided by proper selection of Eh/pH conditions for spit effluent and the targeted injection zone (Scenario 3). Treated groundwater that is oxidized on the surface to lower iron concentration to 0.05 mg/L or less will cause no precipitate problems when injected into relatively oxidized regions of the GMA.

Lixiviant addition to enhance uranium mobility in the GMA is subject to the same problems encountered above. Addition of hydrogen peroxide or oxygen to the GMA is not predicted to increase uranium mobility, as uranium is in the plus six oxidation state in GMA groundwater. A negative consequence of hydrogen peroxide or oxygen addition is formation of iron hydroxide precipitate in moderately reducing regions of the GMA. Sodium bicarbonate or carbon dioxide addition to the GMA will enhance uranium mobility. However, GMA groundwaters are saturated with calcite and any addition of bicarbonate ion to the GMA is predicted to result in calcite precipitation and plugging of the aquifer. Calcite precipitation will not occur when carbon dioxide is added to the GMA, due to the decrease in pH that accompanies carbon dioxide addition. A consequence of carbon dioxide addition is the stabilization of meta autunite and soddyite in the GMA as pH is lowered, although most uranium concentrations in GMA groundwater are below the concentration required to saturate

meta autunite and soddyite. In conclusion, the only common lixiviant that may be useful to mobilize uranium in GMA groundwater is carbon dioxide.

Based on the analysis and conclusions reached in this report, the following recommendations are listed for consideration:

- Relatively reduced GMA groundwater extracted for treatment should be held on the surface for a time period sufficient to remove iron hydroxide precipitate.

- Injection zones should be selected in the most oxidizing portions of the GMA to eliminate iron hydroxide formation. The selected injected zones should also have groundwater pH values that are less than the pH of the injection water to minimize the potential for iron hydroxide precipitation. If the selection of suitable injection zones is not possible, addition of a reducing agent (e.g., quinhydrone) or pH adjustment to injection water is recommended prior to injection

- Hydrogen peroxide, oxygen, and sodium bicarbonate lixiviants that are commonly used to mobilize uranium for insitu mining operations are likely to cause precipitation of iron hydroxide and/or calcite in the GMA, and are not recommended as part of the pump and treat alternative. However, the use of carbon dioxide may enhance uranium mobility without precipitation problems due to its ability to raise bicarbonate concentrations while decreasing pH.

7.0 EQ3NR/EQ6 Geochemical Computer Code

7.1 Code Background

Mineral solubility calculations were performed with the EQ3/6 geochemical computer code (PC Version 7.2). EQ3/6 was developed at Lawrence Livermore National Laboratory (Wolery 1992; Wolery and Daveler 1992) for predicting the behavior of metals, radionuclides, and other contaminants in the natural environment. The EQ3/6 computer code is an industry-standard geochemical model that performs solubility and speciation (aqueous form) calculations and reaction-path modeling. These calculations involve the simultaneous solution of equations describing the mass balance of each component, mass action expressions for solubility equilibrium, oxidation/reduction reactions, and electrical balance constraint. Activity coefficients of aqueous species are approximated with the B-dot set of equations, which are valid up to the ionic strength of seawater.

The EQ3/6 code accesses a database containing the thermodynamic properties of 78 elements, 862 aqueous species, 886 minerals, and 76 gases. This database includes 57 aqueous uranium species and 160 uranium-bearing minerals, constituting the most complete database available for modeling the behavior of uranium in natural waters. EQ3/6 has been validated using standard geochemistry problems, such as the speciation of seawater (Nordstrom, 1979), basalt/seawater interactions (Bowers et al., 1985) and numerous comparisons with experimentally determined mineral solubilities (Jackson, 1988). Benchmark comparisons with the results of similar codes (e.g., PHREEQE) have been performed by INTERA (1983), Nordstrom (1979), Kincaid and Morey (1984) and Kerrisk (1981).

EQ3 is the portion of the code that calculates the initial aqueous species distribution with concentration data provided by the user and computes the saturation indices of pertinent minerals. The saturation index (SI) is defined as

$$SI = \log (iap/sp)$$

where iap is the ion activity product and sp is the solubility product of the mineral of interest. An SI of greater than zero, zero, or less than zero corresponds to a mineral that is either supersaturated, saturated, or undersaturated, respectively. After computing the speciation model, EQ3 computes a mass balance for each chemical element and charge balance and writes this information in a pickup file that is used as an input file by EQ6. EQ3 differs from

EQ6 in that EQ3 identifies minerals that are supersaturated and undersaturated, but it cannot precipitate and dissolve the pertinent minerals.

The EQ6 portion of the code performs all the calculations of EQ3 as well as reaction-path calculations. Reaction-path (chemical evolution) modeling simulates a sequence of thermodynamic equilibrium problems in reacting systems consisting of water and minerals or other solids. The reacting system may consist of water (rainwater, groundwater, surface water, etc) that migrates through, and equilibrates with, waste solids and natural minerals in compositionally distinct horizons (e.g., rainwater reacts with soil to form groundwater). The chemical evolution of the reacting system is driven by dissolution and precipitation of minerals or solids and/or by changes in temperature and pressure. Along each step of the reaction path, the EQ6 code computes the precipitation and dissolution of minerals based on mass action expressions for solubility equilibrium with water. Thus, EQ6 differs from EQ3 by allowing supersaturated minerals (SI > 0) to precipitate from solution and undersaturated minerals (SI < 0) to dissolve.

7.2 Limitations and Assumptions of Mineral Solubility Calculations

The EQ3/6 geochemical code estimates contaminant concentrations by calculating mineral solubilities in gas/liquid/solid systems. These calculations have the following limitations and assumptions:

- A limited number of organo-metal complexes can be modeled, and this can lead to low estimates of leachate concentrations for some inorganic metals.
- Ideal mineral phases are assumed to represent the actual solid phases in the soil material, and only minerals known to dissolve and precipitate at ambient temperature (15°C for GMA groundwater) are used in the calculations.
- In the absence of kinetic rate data, dissolution and precipitation kinetics are instantaneous, which can lead to concentration estimates that are too high or too low.
- Adsorption processes are not evaluated with the EQ3/6 model.
- Modeled concentrations are site-specific solubility limits, and in most cases these concentrations are the highest which can exist in solution.

The first bullet identifies a limitation associated with insufficient thermodynamic data. For example, lead and acetate ion are present in the database but the lead-acetate complex is not. As lead is known to have a strong affinity for acetate ion, the absence of data on the lead-acetate complex in the EQ3/6 database leads to estimates of lead solubility that may be too low. This is commonly observed when solubility calculations are compared to metal concentrations in toxicity characteristic leaching procedure (TCLP) extract, where acetic acid degrades into acetate ion and formation of metal-acetate complexes occurs. With respect to the second bullet, if a contaminant is present in a metastable, amorphous form rather than as a crystalline solid (i.e., a mineral), using a mineral phase for the solid will usually lead to low estimates of the contaminant concentration. This occurs because crystalline phases generally contain shorter and stronger element bonds relative to amorphous solids, and this leads to a lower solubility for the crystalline phase. In contrast to the statement in the third bullet, the dissolution of crystalline solids is rarely instantaneous or complete in the natural environment (e.g., partial dissolution of feldspar to form clay minerals), except for some highly soluble salts (e.g., NaCl), and this can lead to high estimates of contaminant concentrations. Assuming instantaneous precipitation of mineral phases can lead to low estimates of element concentrations if the mineral is difficult to nucleate and crystallize under ambient conditions in the natural environment (e.g., dolomite). Considering the fourth bullet, the calculated solubility concentrations may be too high when compared with observed element concentrations in groundwater because adsorption reactions are not considered. Adsorption reactions can substantially lower some contaminant concentrations below the calculated solubility limit (e.g., Cs^+). Finally, mineral solubility calculations will provide an estimate on the maximum concentration that can exist in solution if the mineral phases modeled are known to precipitate and dissolve under ambient conditions and colloid formation does not occur. Colloid formation leads to an increase in the apparent dissolved concentration of an element and is common for many elements, including aluminum, iron, and many actinide elements.

7.3 Uncertainty in Thermodynamic Data Used in Mineral Solubility Calculations

Thermodynamic data used in solubility calculations will vary slightly from one reported study to another. Wolery (1992) estimated that the uncertainty in thermodynamic data represented an uncertainty in the calculated saturation index (SI) (defined and discussed below) of ± 0.4 SI units. The SI uncertainty corresponds to an uncertainty in the reported aqueous concentration of ±50 percent (i.e., 50 ± 25 ppm). To assess the difference in calculated SI values based on different thermodynamic databases, analytical data on groundwater from

background well 1024 were entered into EQ3NR and MINTEQA2 (Allison et al., 1991) geochemical codes to compare the predicted SI values of minerals and the aqueous specie distribution. Results of this comparison are discussed and presented below.

Table 5 presents the input data for perched groundwater from background well 1024, a summary of the minerals that have reached or are approaching thermodynamic equilibrium, and a comparison of saturation indices for the minerals. As noted above, the saturation index is defined as the logarithm of the activity product of the ions forming the solid (e.g., Ca^{+2} and CO_3^{-2}) minus the logarithm of the mineral solubility product (i.e., SI = log (iap/sp)). When the saturation index is zero, the mineral is in thermodynamic equilibrium (i.e., iap = sp) with the solution. Saturation indices below and above zero correspond to undersaturated and supersaturated states, respectively. An undersaturated mineral will undergo dissolution and a supersaturated mineral will precipitate.

In Table 5, the saturation indices for minerals formed from the principal species in groundwater (e.g., Ca^{+2}, Mg^{+2}, CO_3^{-2}, SO_4^{-2}, etc) agree quite well (i.e., within 0.5 SI units). These minerals include calcite, gypsum, and magnesite. The saturation indices of minerals formed from trace metals (e.g., barium, lead, nickel, etc) are quite variable. That is they can compare quite well, like barite, rhodochrosite, rutherfordine, schoepite, tenorite, and witherite, or compare very poorly, such as anglesite, bunsenite, cerussite, litharge, malachite, and otavite. For lead-bearing solids, the saturation indices are 1.6 to 2 SI units greater in the EQ3/6 results. Referring to the SI definition above and using anglesite as an example, this implies that the calculated activity product for Pb^{+2} and SO_4^{-2} is 1.7 orders of magnitude greater when calculated by EQ3/6, if the solubility product is constant for EQ3/6 and MINTEQA2. Alternatively, if the solubility constants used by the codes differ by 1.7 orders of magnitude, the activity product can be identical in both codes. In general, there is some small difference in the solubility product used by each code, and most of the difference lies with the calculation of the activity product.

The value of the activity product is dependent on the number and type of aqueous species that are formed in solution. Table 6 summarizes the speciation in perched groundwater predicted by each code. When the two codes agree with respect to the speciation of an element in solution (e.g., silver, barium, calcium, etc), the saturation index for a mineral of that element agrees quite well (e.g., chlorargyrite, barite, calcite in Table 5). However, when the predicted element speciation is grossly different (e.g., cadmium, nickel, lead), the calculated saturation

Table 5

Comparison of Mineral Saturation Indices in Perched Groundwater From Well 1024

Input Data (mg/L) PGW 1024[a]	Mineral	Saturation Index[b] EQ3/6	MINTEQA2
pH = 7.2	anglesite ($PbSO_4$)	-2.45	-4.11
Eh = 350 mV	anhydrite ($CaSO_4$)	-1.97	-1.66
Ag = 3.81×10^{-3}	barite ($BaSO_4$)	0.427	0.412
Ba = 9.28×10^{-2}	bunsenite (NiO)	-4.89	-6.08
Ca = $9.83 \times 10^{+1}$	calcite ($CaCO_3$)	0.093	0.090
Cd = 3.25×10^{-3}	$CaUO_4$	-5.71	NP
Cr = 4.05×10^{-2}	cerussite ($PbCO_3$)	1.18	-0.837
Cu = 8.88×10^{-3}	chlorargyrite (AgCl)	-1.32	-1.31
K = 1.67×10^{0}	CrO_2	1.66	NP
Mg = $4.00 \times 10^{+1}$	cuprite (Cu_2O)	-7.31	NP
Mn = 1.05×10^{-1}	dolomite ($Mg_{.5}Ca_{.5}CO_3$)	1.15	-0.054
Na = $1.52 \times 10^{+1}$	fluorite (CaF_2)	-1.36	-0.454
Ni = 5.93×10^{-2}	gypsum ($CaSO_4{:}2H_2O$)	-1.69	-1.35
Pb = 3.25×10^{-2}	litharge (PbO)	-5.70	-7.34
U = 8.82×10^{-4}	magnesite ($MgCO3_4$)	-0.638	-0.638
Cl = 5.70×10^{0}	malachite ($Cu_2CO_3(OH)_2$)	-3.77	-2.87
F = 1.02×10^{0}	manganite (MnOOH)	-4.42	NP
HCO_3 = $4.25 \times 10^{+2}$	$Ni(OH)_2$	-5.14	-3.04
NO_3 = 5.00×10^{-2}	$NiCO_3$	-4.90	-6.32
PO_4 = 2.50×10^{-1}	otavite ($CdCO_3$)	-3.29	0.206
SO_4 = $8.43 \times 10^{+1}$	rhodochrosite ($MnCO_3$)	-0.976	-1.09
T = 15°C	rutherfordine (UO_2CO_3)	-5.91	-6.06
	schoepite ($UO_3{:}2H_2O$)	-5.57	-6.32
	tenorite (CuO)	-2.00	-1.89

[a]Average groundwater composition of samples taken from perched groundwater well (PGW) 1024.
[b]Saturation index is defined as the log of the activity product minus the log of the solubility product, or $\log(a_p/K_{sp})$. Values of greater than zero, zero, and less than zero indicate, respectively, supersaturated, saturated, and undersaturated conditions for the indicated solid phase in perched groundwater.
NP = solid is not present in the thermodynamic database of the indicated code.

Table 6

Comparison of Aqueous Specie Distribution in Perched Groundwater From Well 1024

Element	Aqueous Species	EQ3/6 Molal Percent[a]	MINTEQA2 Molal Percent[a]
Barium	Ba^{+2}	97.0	100
	$BaHCO_3^+$	3.0	NP
Cadmium	Cd^{+2}	100	50.9
	$CdCO_3^o$	NP	26.1
	$CdHCO_3^+$	NP	18.5
	$CdSO_4^o$	NP	3.8
	$CdCl^+$	NP	0.5
Calcium	Ca^{+2}	92.3	92.2
	$CaCO_3^o$	0.3	0.2
	$CaHCO_3^+$	4.0	2.7
	$CaSO_4^o$	3.3	4.8
Carbon	HCO_3^-	84.8	87.8
	$H_2CO_3^o$	12.5	10.0
	$CaHCO_3^+$	1.4	1.0
	$MgHCO_3^+$	0.9	0.9
	$CaCO_3^o$	0.1	0.1
Chlorine	Cl^-	99.9	99.9
Chromium	$Cr(OH)_2^+$	84.2	NP
	$Cr(OH)_3^o$	15.7	NP
	CrO_4^{-2}	0.0	87.7
	$HCrO_4^-$	0.0	12.1
	$NaCrO_4^-$	NP	0.2
Copper	$CuCO_3^o$	91.3	64.6
	Cu^{+2}	5.0	5.9
	$CuOH^+$	3.0	0.7
	$Cu(CO_3)_2^{-2}$	0.7	0.4
	$Cu(OH)_2^o$	NP	19.6
	$CuHCO_3^+$	NP	8.5
	$CuSO_4^o$	NP	0.3
Fluorine	F^-	97.3	94.5
	MgF^+	2.0	4.6
	CaF^+	0.7	0.9

Table 6

Comparison of Aqueous Specie Distribution in Perched Groundwater From Well 1024

Element	Aqueous Species	EQ3/6 Molal Percent[a]	MINTEQA2 Molal Percent[a]
Lead	Pb^{+2}	88.7	2.5
	$PbOH^{+}$	11.0	0.6
	$PbCl^{+}$	0.2	89.6
	$PbCO_3^{\circ}$	NP	5.8
	$PbHCO_3^{+}$	NP	1.1
	$Pb(CO_3)_2^{-2}$	NP	0.4
	$PbSO_4^{\circ}$	NP	
Magnesium	Mg^{+2}	90.4	91.6
	$MgSO_4^{\circ}$	5.4	4.2
	$MgHCO_3^{+}$	3.9	3.9
	$MgCO_3^{\circ}$	0.2	0.2
	MgF^{+}	0.1	0.1
Manganese	Mn^{+2}	86.4	90.7
	$MnCO_3^{\circ}$	5.8	NP
	$MnSO_4^{\circ}$	5.1	4.0
	$MnHCO_3^{+}$	2.6	5.2
Nickel	Ni^{+2}	96.4	6.0
	$NiSO_4^{\circ}$	3.6	0.3
	$NiCO_3^{\circ}$	NP	90.4
	$NiHCO_3^{+}$	NP	2.5
	$Ni(CO_3)_2^{-2}$	NP	0.8
Nitrogen	N_3^{-}	99.7	NP
	HN_3°	0.1	NP
	NO_3^{-}	0.0	100
Phosphorous	$MgP_2O_7^{-2}$	96.6	NP
	$CaP_2O_7^{-2}$	3.4	NP
	HPO_4^{-2}	0.0	38.0
	$H_2PO_4^{-}$	0.0	29.2
	$CaHPO_4^{\circ}$	0.0	15.7
	$MgHPO_4^{\circ}$	0.0	14.3
	$CaH_2PO_4^{+}$	0.0	0.9
	$MgH_2PO_4^{+}$	0.0	0.7
	$CaPO_4^{-}$	0.0	0.5
	$MgPO_4^{-}$	0.0	0.5

Table 6

Comparison of Aqueous Specie Distribution in Perched Groundwater From Well 1024

Element	Aqueous Species	EQ3/6 Molal Percent[a]	MINTEQA2 Molal Percent[a]
Potassium	K^+	99.7	99.7
	KSO_4^-	0.3	0.3
Silver	Ag^+	75.4	77.4
	$AgCl^0$	24.0	21.6
	$AgCl_2^-$	0.5	0.4
	$AgSO_4^-$	NP	0.6
Sodium	Na^+	98.9	99.6
	$NaHCO_3^0$	0.8	0.2
	$NaSO_4^-$	0.3	0.2
Sulfur	SO_4^{-2}	80.4	78.6
	$MgSO_4^0$	10.2	7.8
	$CaSO_4^0$	9.2	13.4
Uranium	$UO_2(CO_3)_3^{-4}$	52.3	21.7
	$UO_2(CO_3)_2^{-2}$	46.7	34.5
	$UO_2(HPO_4)_2^{-2}$	NP	42.7
	$UO_2CO_3^0$	0.5	1.0
	$UO_2(OH)_2^0$	0.5	NP

[a] Molal percent based on total moles of the indicated element per kilogram of water.
NP = specie is not present in the thermodynamic database of the indicated code.

index can vary by two orders of magnitude (e.g., anglesite, bunsenite, otavite in Table 5). To illustrate, consider the predicted speciation for cadmium (Table 6). The EQ3/6 code contains a single cadmium specie (Cd^{+2}), in contrast to the five cadmium species predicted to be present by MINTEQA2. In this case, the difference in speciation is due to the absence of four of the predicted MINTEQA2 species from the EQ3/6 thermodynamic database. Similarly, differences in the predicted speciation for nickel and lead also arise due to the absence of nickel and lead carbonate species in EQ3/6. Thermodynamic data present in MINTEQA2 that were not in EQ3/6 were screened to evaluate the quality of the experimental study responsible for generating the data. If the reported thermodynamic data were reproducible by at least two independent studies, the data were extracted and entered in EQ3/6 for the calculations performed for this study.

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