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TRANSMITTAL OF SOUTH FIELD PUMPING TEST REPORT

08/11/95

DOE-1336-95
DOE-FN EPAS
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REPORT

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Department of Energy
Fernald Environmental Management Project
P. O. Box 538705
Cincinnati, Ohio 45253-8705
(513) 648-3155

AUG 11 1995

DOE-1336-95

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. 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:

TRANSMITTAL OF SOUTH FIELD PUMPING TEST REPORT

This correspondence submits the enclosed South Field Pumping Test Report. The pumping test, which consisted of a step test and constant rate test, was conducted between May 3 and May 16, 1995.

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

Sincerely,

for Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Kappa

Enclosure: As Stated

Recycled and Recyclable

cc w/enc:

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

OPERABLE UNIT 5

SOUTH FIELD PUMPING TEST REPORT

AUGUST 1995

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

DRAFT

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

OPERABLE UNIT 5

SOUTH FIELD PUMPING TEST REPORT

AUGUST 1995

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

DRAFT

TABLE OF CONTENTS

Section	Page
List of Tables	ii
List of Figures	iii
1.0 Introduction	1
2.0 Hydrogeology	2
2.1 Brief Description of the Hydrogeology	2
2.2 New Data	3
2.2.1 Sieve Analysis Results	3
2.2.2 Water and Soil Testing Results and In Situ K_d Calculations	5
3.0 Aquifer Test Description	7
3.1 Design of the Test	7
3.2 Implementation of the Test	9
4.0 Step Test Results	10
5.0 Constant Rate Test Results	12
5.1 Theoretical Model and Analytical Methods Used	12
5.2 Preparation of Drawdown Data	12
5.2.1 Trends in Water Levels	13
5.2.2 Effect of Barometric Pressure	13
5.2.3 Precipitation	14
5.2.4 Decreases in Saturated Thickness	15
5.2.5 Effect of Casing Storage	16
5.3 Radius of Influence	17
5.4 Calculation of Aquifer Properties	17
6.0 Quality of Pumped Groundwater	23
7.0 Conclusion	24
8.0 References	26

Appendices

Appendix A: Construction Information for Observation Wells
Appendix B: Trends in Water Levels
Appendix C: Flow and Barometric Pressure and Rainfall Data
Appendix D: Barometric Efficiency Calculations
Appendix E: Data Logger Printouts
Appendix F: Streltsova Analysis
Appendix G: Neuman Analysis

LIST OF TABLES

2-1 Results of Sieve Analysis on Core Samples and Total Uranium Concentrations from Well 31550
2-2 Results of Sieve Analysis on Core Samples from Well 31551
2-3 Results of Sieve Analysis on Core Samples from Well 31552
2-4 Results of Sieve Analysis on Core Samples and Total Uranium Concentrations from Well 31553
2-5 Results of Sieve Analysis on Core Samples and Total Uranium Concentrations from Well 31554
2-6 Results of Sieve Analysis on Core Samples from Well 31555
2-7 Results of Sieve Analysis on Core Samples and Total Uranium Concentrations from Well 31556

4-1 Results of 400-Minute Step Test
4-2 Comparison of Drawdown within the Screen to Drawdown within the Filter Pack in Well 31550
4-3 Specific Capacity Calculations
5-1 South Field Pumping Test Observed, Water Levels, Constant-Rate Test
5-2 South Field Pumping Test Observed, Drawdown, Constant-Rate Test
5-3 South Field Pumping Test Drawdowns, Corrected for Regional Water Table Rise
5-4 Barometric Efficiency (BE) of Observation Wells 31551 Through 31556
5-5 Effect on Drawdown of Decrease in Saturated Thickness of Aquifer
5-6 Corrected Observed Drawdown Between 1000 and 6000 Minutes, Constant-Rate Test
5-7 Streltsova Results
5-8 Neuman Results
6-1 Water Quality Readings
7-1 Hydraulic Conductivity from Pumping Tests in the Great Miami Aquifer Near the FEMP

LIST OF FIGURES

1-1 Pumping Test Location at the FEMP
1-2 Proposed Well Locations for Remediation of Uranium Contamination in the Great Miami Aquifer
1-3 Location of Pumping Test in Relation to the Zonation of Modeled Hydraulic Conductivity
2-1 3-Dimensional Bedrock Configuration
2-2 Bedrock Topographic Surface
2-3 Clay Interbed Thickness Map
2-4 Pumping Test Network
2-5 Cross Section Along Axis of New Haven Trough
2-6 Cross Section Perpendicular to Axis of New Haven Trough
3-1 Well Screen Configurations
3-2 Design of Control Well 31550
3-3 Predicted Drawdown for the Control Well
4-1 Drawdown vs. Time, Step 1
4-2 Drawdown vs. Time, Step 2
4-3 Drawdown vs. Time, Step 3
4-4 Drawdown vs. Time, Step 4
5-1 Pumping Test Area Showing Existing Observation Wells
5-2 Barometric Pressure Changes during Constant-Rate Test
5-3 Weather Data during Constant-Rate Test
5-4 Radius of Influence for Constant-Rate Test

1.0 INTRODUCTION

This report presents the data and interpretations resulting from a 10,000 minute constant-rate pumping test which was conducted at the U.S. Department of Energy's (DOE) Fernald Environmental Management Project (FEMP) from May 9 to May 16, 1995. The objectives of the pumping test were to estimate and/or assess horizontal hydraulic conductivity (K_h), storage and anisotropy of the Great Miami Aquifer.

The pumping test was conducted in the south-central portion of the FEMP site, just south of the storm sewer outfall ditch (SSOD) (Figure 1-1). The Great Miami Aquifer in this area is contaminated with uranium at levels > 20 μg/L as a result of former production activities at the FEMP. A system of pumping wells has been proposed in the Operable Unit 5 Feasibility Study (FS) Report (DOE 1995a) for remediation of the uranium contamination (Figure 1-2). The design of this pumping system is based in part on the modeling exercises using a SWIFT flow and transport groundwater model (DOE 1994); hydraulic conductivity is zoned in this groundwater model to match existing pumping test data (Figure 1-3). As shown in Figure 1-3, the data described in this report will fill in an area of the model where no pumping test had been performed and the model is using a calibrated value of 638 feet/day for horizontal hydraulic conductivity. Data resulting from this pumping test will be used to assess whether the calibrated K_h in the Great Miami Aquifer groundwater model is appropriate for the South Field area.

The pumping test consisted of a 400-minute step test and a 10,000 minute constant rate pumping test. In this report the 10,000-minute constant rate test is referred to as the "CRT." The step test was conducted to determine a pumping rate for the CRT, and the CRT was conducted to determine the aquifer properties mentioned above.

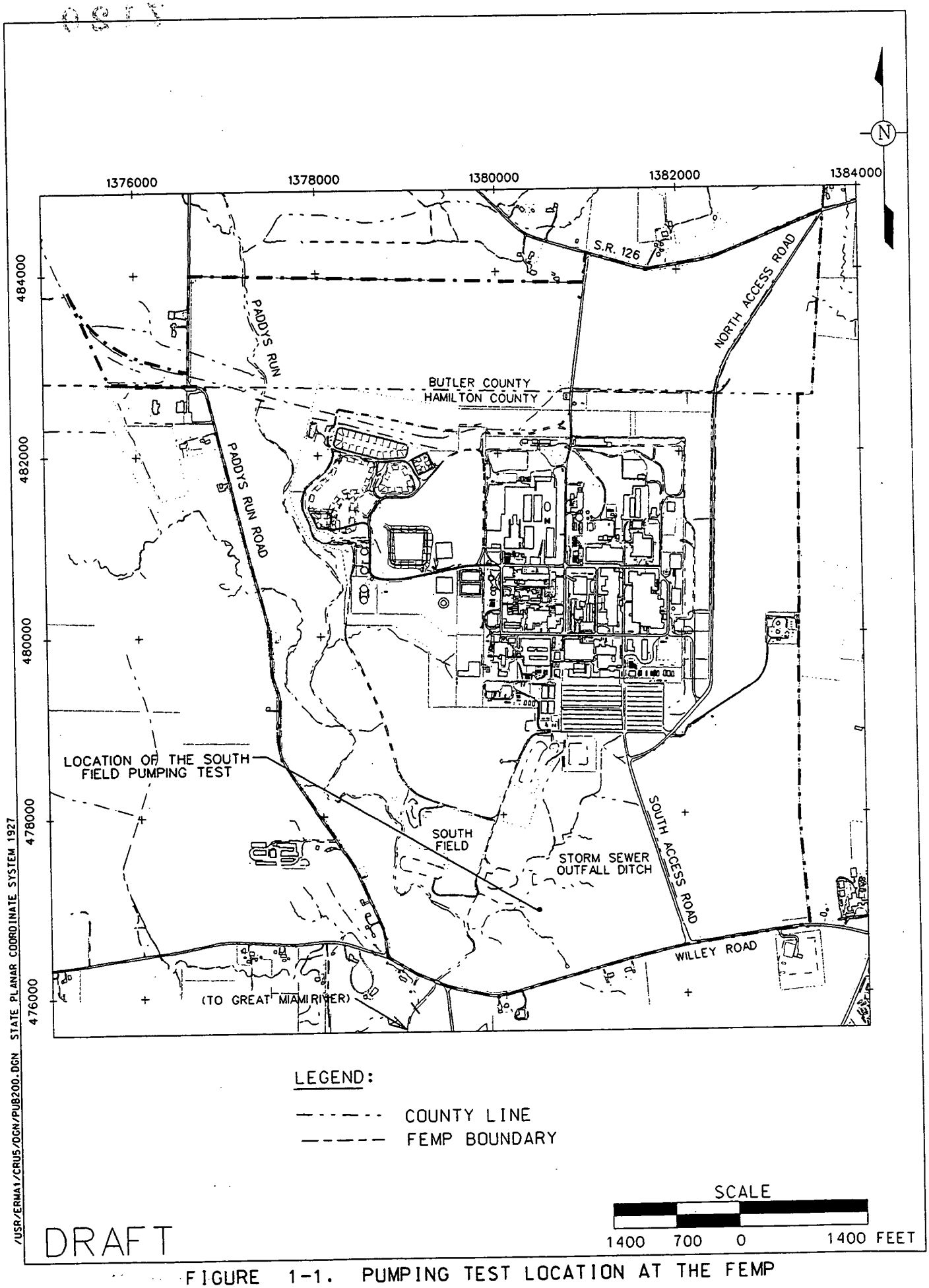

FIGURE 1-1. PUMPING TEST LOCATION AT THE FEMP

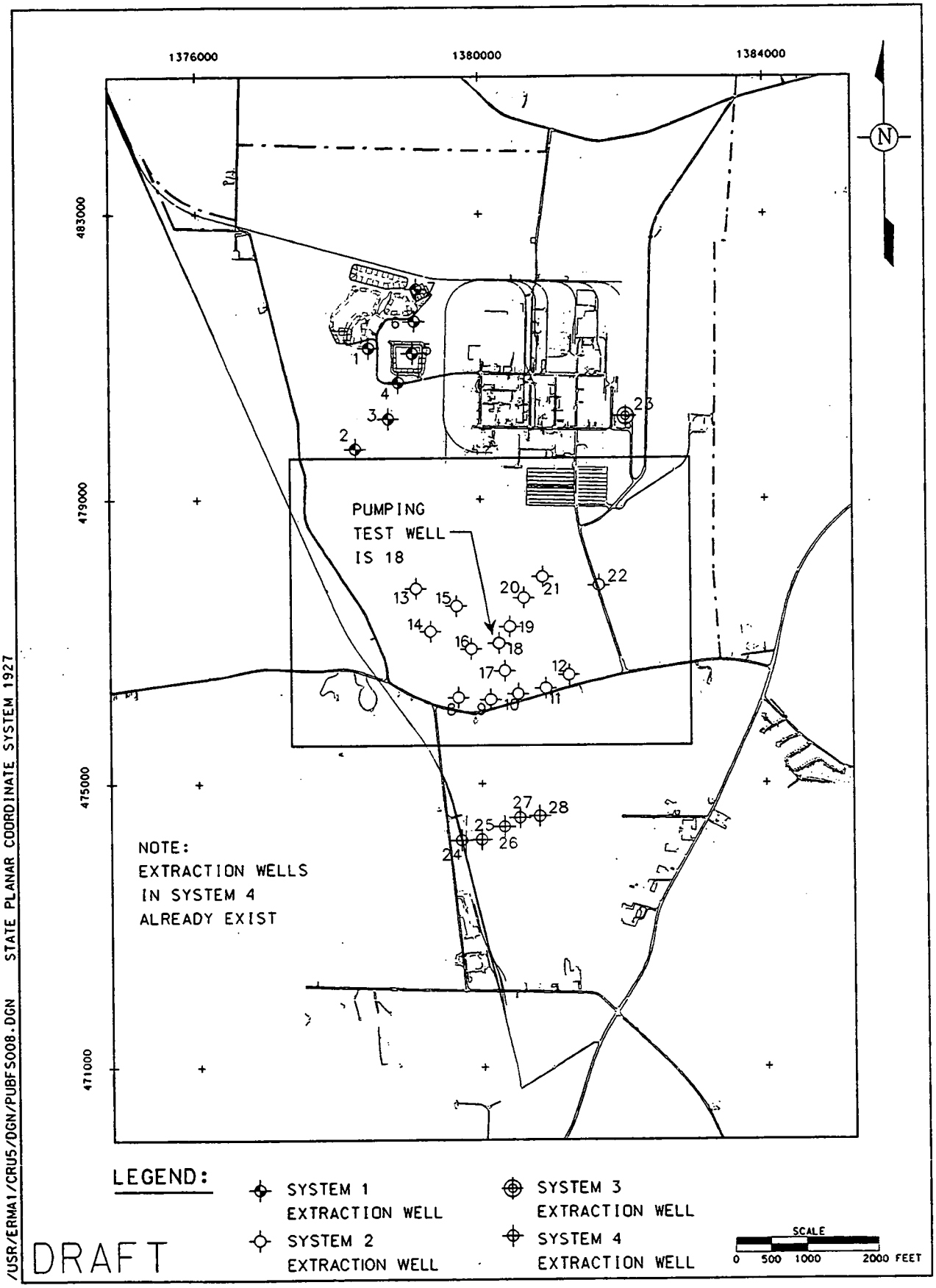

FIGURE 1-2. PROPOSED WELL LOCATIONS FOR REMEDIATION OF URANIUM CONTAMINATION IN THE GREAT MIAMI AQUIFER

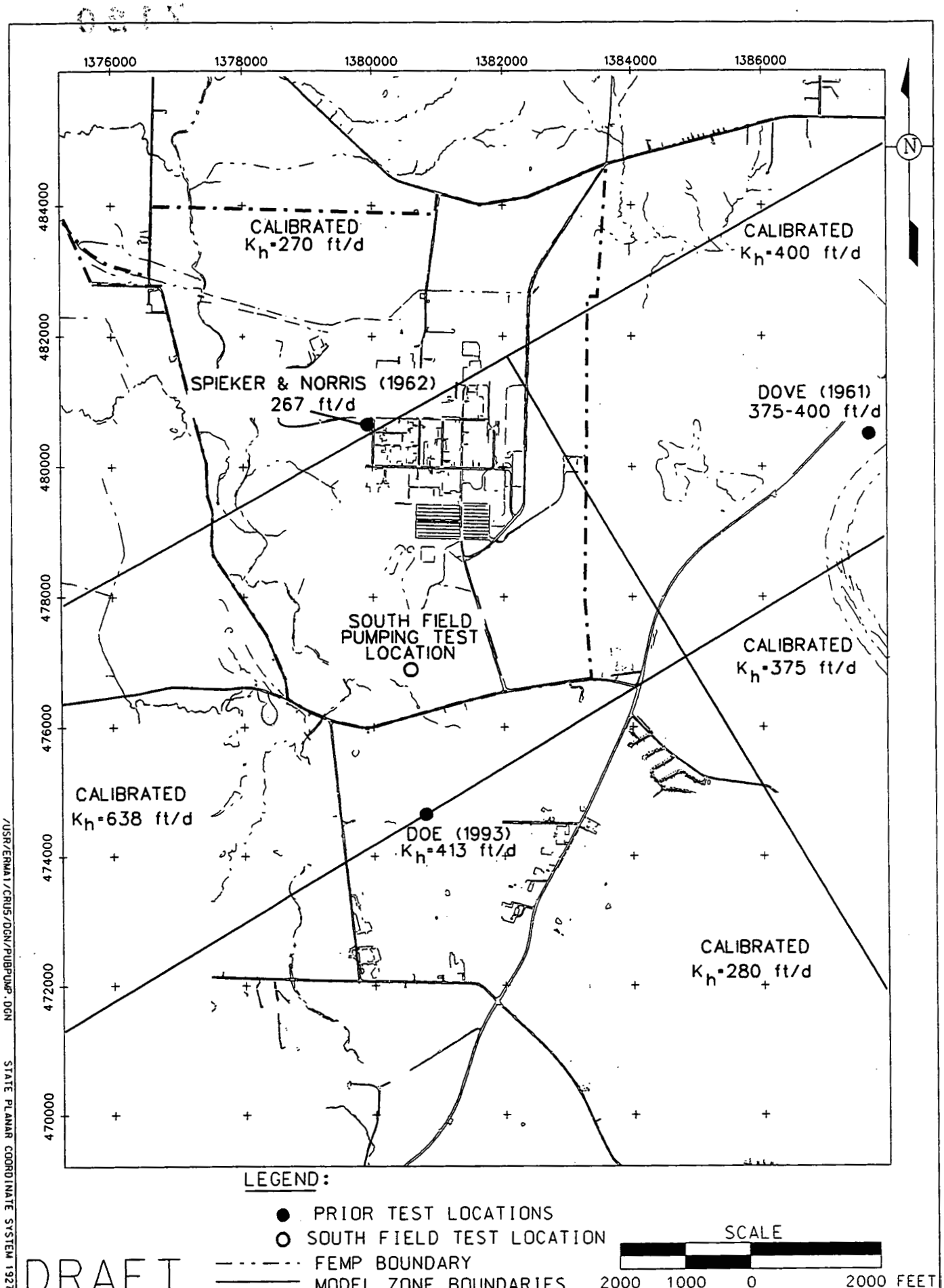

FIGURE 1-3. LOCATION OF PUMPING TEST IN RELATION TO THE ZONATION OF MODELED HYDRAULIC CONDUCTIVITY

Section 2.0

2.0 HYDROGEOLOGY

The hydrogeology of the test area is described in detail in the Operable Unit 5 Remedial Investigation (RI) Report (DOE 1995b). What follows is a brief description of the hydrogeology of the pumping test area, followed by a presentation of the new data (particle size, total uranium in groundwater, and total uranium in soil) collected during the installation of one pumping well (referred to as the control well) and six observation wells to support the pumping test. Also presented are in situ K_d estimations made based on soil and groundwater uranium concentration data.

2.1 BRIEF DESCRIPTION OF THE HYDROGEOLOGY

The pumping test area is situated over the New Haven Trough, a large buried valley whose axis runs northeast-southwest (Figures 2-1 & 2-2). The floor and walls of the New Haven Trough consist of Ordovician age shale and limestone. Drilling of Well 31550 (control well for the pumping test) indicates that at the testing location the depth to bedrock is 185 feet below the ground surface (bgs). 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 till. The sand and gravel forms the matrix of a regionally extensive aquifer known as the Great Miami Aquifer. At Well 31550 the sand and gravel is 168 feet thick. The Great Miami Aquifer is an unconfined, anisotropic, heterogeneous aquifer which has been designated a sole-source aquifer.

A semiconfining clay layer divides the aquifer into an upper and lower zone. The blue clay is not present at the test location but it is present approximately 1200 feet to the north and 900 feet to the west (Figure 2-3). As documented at Well 31550, in descending order the lithology of the test area consists of: 11.5 feet of brown clay, 6 feet of gray clay, 28.5 to 36.5 feet of unsaturated sand and gravel, and 131 to 139 feet of saturated sand and gravel (depending upon the seasonal elevation of the water table). 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 SSOD is located approximately 400 feet to the north of the test area and a tributary to the SSOD is located approximately 400 feet west of the test location. Sections of both of these surface features are in

direct contact with sand and gravel in the Great Miami Aquifer and represent recharge zones to the aquifer.

2.2 NEW DATA

Seven new wells were installed in the test area to support the pumping test (Figure 2-4), one 12-inch control well (31550) and six 2-inch observation wells (31551 through 31556). Lithologic and depositional interpretations made from the analysis of new data (continuous core and particle size) collected during the installation of these wells are consistent with hydrogeologic interpretations already presented in the Operable Unit 5 RI Report (DOE 1995b).

The control and observation wells were drilled using a rotosonic drilling rig. A continuous 4-inch diameter rotosonic core was collected down to bedrock from Wells 31550, 31553, 31554, and 31556. A continuous 4-inch diameter rotosonic core was collected from the other three observation wells down to a depth of approximately 77 feet. Each core was photographed before the extraction of samples. Although the rotosonic drilling bit extracts a continuous core, it is a disturbed core. Lithologic features for the most part were destroyed by the core extraction process which vibrated the soil from the drill bit into a plastic core sleeve. Photographs of the cores were taken to document textural variations. The cores collected from the drilling of these wells have been archived in wooden core boxes at the FEMP.

2.2.1 Sieve Analysis Results

Soil samples were taken from each rotosonic core every 10 feet, beginning at the top of the sand and gravel in the Great Miami Aquifer, and submitted to the FEMP lab for a sieve analysis. The sieve analysis was conducted according to ASTM D 422. The objectives of the sieve analyses were to select the proper size screen for the control and observation wells and to document particle size variations with depth in the test area. The results of the sieve analysis are tabulated in Tables 2-1 through 2-7.

The sieve analysis results are tabulated into three size categories according to the percent of the sample belonging to each category. A granule size is larger than 2.0 mm, sand size is larger than .076 mm but smaller than 2.0 mm, and silt/clay size is smaller than .076 mm.

Results of the sieve analysis reveal that the soil samples collected from the Great Miami Aquifer at the test location contain a very small percentage of silt/clay. The percentage of silt/clay is below 10 percent in practically all of the samples and usually below 5 percent. Well 31550 encountered three feet of a clayey silt at a depth of 141 feet. However, the clayey silt lens is discontinuous as it was not encountered in any of the other three wells drilled down to that depth (Wells 31553, 31554, 31556) and located from 150, 50 and 100 feet from Well 31550, respectively. This indicates that no apparent aquitards are present in the test area.

The percentage of granule size retained versus the percentage of sand size retained was plotted in Figure 2-5 for Wells 31554, 31550, 31551, 31552, and 31553, and in Figure 2-6 for Wells 31550, 31555, and 31556. The plots illustrate the relative change in grain-size versus depth. The results support earlier interpretations made in the Operable Unit 5 RI Report that the sediment was deposited in a highly variable energy environment, most likely a braided stream environment.

The correlation between wells running parallel to the axis of the New Haven Trough (Figure 2-5) is similar to the correlation of wells running perpendicular to the axis (Figure 2-6). The deeper, older soil is poorly graded (engineering interpretation) below a depth that correlates with the depth of the clay interbed located to the north and west of the test area. Above the predominantly sand interval the distribution of grain size is much more variable, changing back and forth from granule to sand. This depositional sequence is also shown in the correlation running perpendicular to the New Haven Trough. Younger sediment was deposited in a higher energy environment than deeper, older sediment. Evidence for a channel shift exists in Well 31556 at an elevation of approximately 430 feet amsl. For the most part, though, the deeper sands contain little granule or coarse material and very little silt/clay.

This grain-size distribution pattern in the test area represents three distinct depositional environments for the New Haven Trough. Older deposits of sand and gravel have more consistent grain sizes, indicating a fairly consistent depositional energy. The sand contains very little granule or coarse material and very little silt/clay. The outlet to this depositional system was somehow blocked allowing the water to back up in the trough, forming a lake environment and lowering the depositional energy. It was during this time that the clay interbed was deposited on top of the sand, evidenced by the clay layer which is present to the north and west of the test area. The outlet to the drainage system opened and the lake drained. Grain-size distributions indicate that the new energy of

deposition was not as consistent as it had been when the older sand was deposited. This change in depositional energy is evidenced by the apparent random criss-crossing of sand and granule-size material. The criss-crossing of the percentage lines in Figures 2-5 and 2-6 represents the braided stream deposits; the separation of the percentage lines at depth represents the earlier sand deposits. When the lake drained and more active deposition resumed, the layer of clay which had been deposited in the lake was removed in some areas by the advancing streams of new sediment. This is represented in the plots as an erosional unconformity separating the upper and lower deposits of sand and gravel.

2.2.2 Water and Soil Testing Results and In Situ K_d Calculations

During the drilling of the control well (31550) and three of the six observation wells (31553, 31554, 31556), groundwater and soil samples were collected from the Great Miami Aquifer at 10-foot intervals and tested for total uranium. The results presented in Tables 2-1, 2-4, 2-5, and 2-7 indicate that the total uranium groundwater plume (defined as concentrations greater than 20 micrograms per liter [μg/L]) at the control well is restricted to approximately the upper 21 feet of the Great Miami Aquifer, and that total uranium concentrations decrease abruptly with depth (to approximately 32 feet in Well 31553).

Total uranium concentrations in the soil contained within the 20 μg/L uranium groundwater plume range from 7 μg/g to 4 μg/g. K_d, the ratio of concentration in the soil to concentration in the groundwater, was estimated for total uranium at each pair of groundwater and soil samples collected at the same depth. A value of 1.6 μg/g was used to represent background total uranium for the Great Miami Aquifer soil. This value was determined for the Operable Unit 5 FS, (DOE 1995a, Attachment F.8.IV, pg. F.8.IV-3). Background was subtracted from each measured soil concentration before determining Kd. The results are tabulated in Tables 2-1 , 2-4, 2-5 and 2-7.

Six K_d estimates come from areas of the groundwater plume where total uranium concentrations are greater than 20 μg/L; these range from 8.14 to 209 L/kg and have a geometric mean of 23.5 L/kg. The geometric mean reported in the Operable Unit 5 FS Report for areas of the plume where the total uranium concentration is greater than 20 μg/L is 25.4 L/kg (DOE 1995a, Attachment F.8.IV, pg. F.8.IV-5). The FS values were estimated from desorptive batch tests conducted on archived soil. It has been reported (EPA 1988, pg. 3-13) that estimated values of partition coefficients are often

precise only to 3 to 5 orders of magnitude while values determined in the laboratory are generally accurate to within 1 or 2 orders of magnitude.

TABLE 2-1

RESULTS OF SIEVE ANALYSIS ON CORE SAMPLES AND TOTAL URANIUM CONCENTRATIONS FROM WELL 31550

Measured Depth (feet)	Elevation Above MSL (feet)	Lithologic Log Description	Sieve Analysis (% retained)				Total Uranium Analysis		
			Granule Size	Sand Size	Silt/Clay Size	Bar Chart	Water (ug/L)	Soil (ug/g)	K_d (L/kg)
17	552.70	Well graded sand	38.04	60.41	1.50				
27	542.70	Poorly graded med. sand	5.75	91.72	2.32				
29	540.70	Poorly graded sand	49.81	47.15	2.89				
47	522.70	Well graded sand	50.17	46.04	3.78				
57	512.70	Poorly graded med. sand	43.90	54.36	1.28				
59	510.70	Well graded gravely sand	61.73	36.61	1.43				
60	509.70	Poorly graded med. sand	6.67	89.36	3.77				
62	507.70	Well graded gravely sand	54.22	41.36	4.14				
67	502.70	Poorly graded fine sand	24.36	64.26	11.17		381.00	4.00	6.30E+00
72	497.70	Poorly graded fine sand	24.74	71.08	3.97				
77	492.70	Well graded clayey sand	41.19	49.06	9.57		16.30	5.00	2.09E+02
78	491.70	Well graded sand	68.26	29.93	1.70				
80	489.70	Poorly graded fine sand	20.52	77.46	1.75				
87	482.70	Well graded sand	48.33	45.95	5.50		1.10	4.00	2.18E+03
92	477.70	Well graded sand	42.41	56.81	0.42				
97	472.70	Well graded sand	71.15	26.23	2.06		0.60	29.00	4.57E+04
98	471.70	Well graded gravel	69.42	29.03	1.34				
102	467.70	Poorly graded med. sand	21.85	77.11	0.81				
107	462.70	Well graded sand	65.10	32.80	1.99		1.80	9.50	4.39E+03
117	452.70	Poorly graded med. sand	23.83	75.49	0.54		3.60	6.00	1.22E+03
127	442.70	Poorly graded fine sand	0.45	94.99	4.45		9.80	6.10	4.59E+02
137	432.70	Poorly graded sand	21.89	71.62	6.44		4.30	5.50	9.07E+02
141	428.70	Clayey silt	5.54	65.85	28.48		2.10	20.00	8.76E+03
157	412.70	Poorly graded med. sand	2.39	93.07	4.41		0.40	5.90	1.08E+04
167	402.70	Well graded sand	27.23	67.38	5.34		0.30	6.30	1.57E+04
177	392.70	Poorly graded sand	12.36	86.72	0.83		0.90	3.70	2.33E+03
185	384.70	Poorly graded fine sand	9.36	88.47	2.11		0.80	4.90	4.13E+03

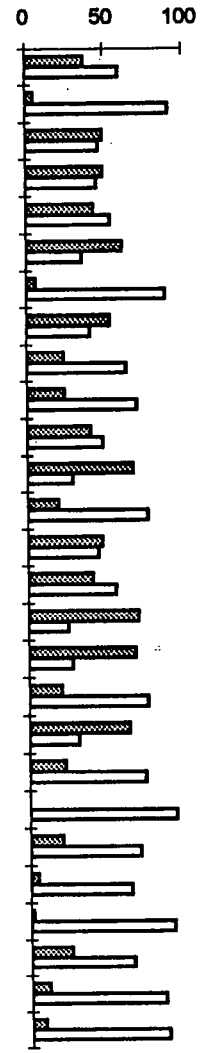

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TABLE 2-2
RESULTS OF SIEVE ANALYSIS ON CORE SAMPLES FROM WELL 31551

Measured Depth (feet)	Elevation Above MSL (feet)	Lithologic Log Description	Sieve Analysis (% Retained)				Total Uranium Analysis		
			Granule Size	Sand Size	Silt/Clay Size	Bar Chart	Water (ug/L)	Soil (ug/g)	K_d (L/Kg)
17	552.6	Silty, poorly graded fine sand	16.62	73.71	9.60				
27	542.6	Poorly graded fine sand	30.37	66.19	3.11				
37	532.6	Sandy, silty, clay	11.10	77.92	10.82				
47	522.6	Poorly graded, silty fine sand	13.38	69.61	16.88				
57	512.6	Poorly graded med. sand	11.81	83.05	4.89				
67	502.6	Poorly graded fine sand	14.26	79.31	6.31				
70	499.6	Poorly graded fine sand	8.49	89.72	1.78				
77	492.6	Poorly graded coarse sand	30.39	67.18	2.28				

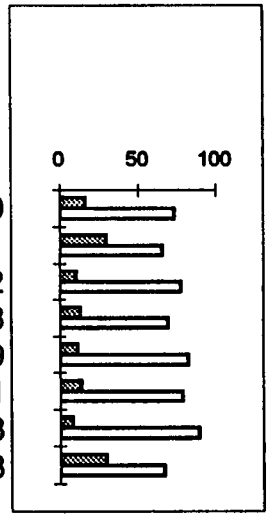

TABLE 2-3
RESULTS OF SIEVE ANALYSIS ON CORE SAMPLES FROM WELL 31552

Measured Depth (feet)	Elevation Above MSL (feet)	Lithologic Log Description	Sieve Analysis (% Retained)				Total Uranium Analysis		
			Granule Size	Sand Size	Silt/Clay Size	Bar Chart	Water (ug/L)	Soil (ug/g)	K_d (L/Kg)
17	553.98	Silty clay	26.80	72.14	0.62				
27	543.98	Poorly graded fine sand	32.61	63.49	3.31				
37	533.98	Poorly graded fine sand	1.00	89.67	8.91				
47	523.98	Poorly graded fine sand	48.55	42.30	8.76				
57	513.98	Poorly graded fine sand	37.79	58.62	2.72				
67	503.98	Poorly graded med. sand	4.55	92.29	2.76				
70	500.98	Poorly graded med. sand	43.43	53.99	2.45				
75	495.98	Poorly graded fine sand	49.06	47.34	3.28				

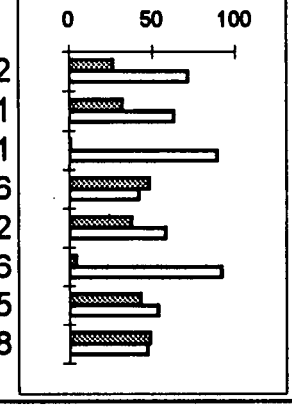

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TABLE 2-4
RESULTS OF SIEVE ANALYSIS ON CORE SAMPLES AND TOTAL URANIUM CONCENTRATIONS FROM WELL 31553

Measured Depth (feet)	Elevation Above MSL (feet)	Lithologic Log Description	Sieve Analysis (% Retained)				Total Uranium Analysis		
			Granule Size	Sand Size	Silt/Clay Size	Bar Chart	Water (ug/L)	Soil (ug/g)	K_d (L/Kg)
27	547.39	Poorly graded med. sand	42.05	56.51	1.44				
37	537.39	Poorly graded fine sand	1.69	91.54	6.77				
46	528.39	Poorly graded fine sand	0.64	93.65	5.59				
57	517.39	Sandy clay	59.42	38.04	2.42				
67	507.39	Poorly graded fine sand	40.45	57.99	1.43		187.00		
77	497.39	Poorly graded coarse sand	67.55	31.04	0.95		72.00	7.00	7.50E+01
87	487.39	Well graded sand	49.62	49.04	1.23		26.00	7.00	2.08E+02
94	480.39	Poorly graded fine sand	83.79	15.47	0.68		1.10	3.10	1.36E+03
97	477.39	Poorly graded med. sand	15.68	79.27	4.83				
105	469.39	Poorly graded med. sand	54.39	45.06	0.49		0.40	3.40	4.50E+03
106	468.39	Poorly graded fine gravel	89.70	9.73	0.34				
107	467.39	Poorly graded fine sand	40.60	56.15	3.21		4.20	3.10	3.57E+02
117	457.39	Well graded sand	52.58	45.48	1.66		16.00	4.20	1.63E+02
127	447.39	Poorly graded coarse sand	71.40	27.63	0.84		1.00	3.00	1.40E+03
137	437.39	Poorly graded fine sand	16.99	78.51	4.20		0.40	3.70	5.25E+03
147	427.39	Poorly graded med. sand	28.34	68.24	3.22		3.80	2.70	2.89E+02
157	417.39	Poorly graded fine sand	0.48	96.77	2.46		0.20	2.20	3.00E+03
167	407.39	Poorly graded med. sand	30.31	65.64	3.83		0.50	2.50	1.80E+03
177	397.39	Poorly graded med. sand	5.30	93.06	1.46		1.00	3.10	1.50E+03
187	387.39	Weathered shale	68.34	27.73	3.83		0.70	4.40	4.00E+03

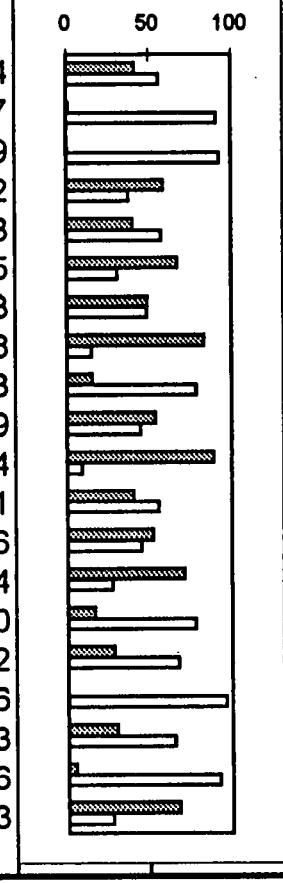

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TABLE 2-5

RESULTS OF SIEVE ANALYSIS ON CORE SAMPLES AND TOTAL URANIUM CONCENTRATIONS FROM WELL 31554

Measured Depth (feet)	Elevation Above MSL (feet)	Lithologic Log Description	Sieve Analysis (% Retained)				Total Uranium Analysis		
			Granule Size	Sand Size	Silt/Clay Size	Bar Chart	Water (ug/L)	Soil (ug/g)	K_d (L/Kg)
						0 50 100			
17	551.50	Well graded sand	40.18	53.89	5.87				
26	542.50	Poorly graded sand	20.59	75.92	3.40				
36	532.50	Poorly graded, clayey sand	8.75	87.05	4.12				
45	523.50	Poorly graded fine sand	1.29	92.84	5.78				
56	512.50	Poorly graded fine sand	40.81	55.06	4.09		343.00	7.00	1.57E+01
62	506.50	Well graded sand	28.05	69.01	2.80				
67	501.50	Poorly graded fine sand	9.64	82.36	7.86		295.00	4.00	8.14E+00
72	496.50	Well graded sand	50.06	48.18	1.60				
77	491.50	Well graded clayey sand	27.73	66.81	5.32				
82	486.50	Poorly graded coarse sand	53.14	44.36	2.48				
87	481.50	Poorly graded fine sand	27.00	63.27	9.63		0.60	5.50	6.50E+03
96	472.50	Poorly graded coarse sand	66.91	29.67	3.39		0.60	3.60	3.33E+03
105	463.50	Poorly graded med. sand	14.19	85.28	0.38		2.00	3.90	1.15E+03
117	451.50	Well graded fine sand	52.29	45.60	2.07		0.50	1.90	6.00E+02
126	442.50	Poorly graded med. sand	55.19	42.67	2.08		3.00		
137	431.50	Poorly Sorted fine clayey sand	51.29	43.56	5.17		10.90	2.20	5.50E+01
146	422.50	Poorly graded fine sand	0.10	93.27	6.50		0.20	3.00	7.00E+03
156	412.50	Poorly graded fine sand	5.53	87.04	7.28		0.30	4.00	8.00E+03
167	401.50	Poorly graded v-fine silty sand	3.55	87.33	8.88		0.40	5.00	8.50E+03
177	391.50	Poorly graded fine sand	12.87	79.31	7.62		1.10	4.00	2.18E+03
184	384.50	Well graded sand	64.49	33.80	1.46		0.40	4.00	6.00E+03

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TABLE 2-6
RESULTS OF SIEVE ANALYSIS ON CORE SAMPLES FROM WELL 31555

Measured Depth (feet)	Elevation Above MSL (feet)	Lithologic Log Description	Sieve Analysis (% Retained)				Total Uranium Analysis		
			Granule Size	Sand Size	Silt/Clay Size	Bar Chart	Water (ug/L)	Soil (ug/g)	K_d (L/Kg)
17	553.00	Well graded sand	46.23	50.95	2.50				
27	543.00	Poorly graded fine sand	21.53	74.44	3.90				
37	533.00	Poorly graded fine sand	5.81	90.26	3.80				
47	523.00	Poorly graded fine sand	45.94	51.14	2.79				
57	513.00	Well graded sand	39.02	58.02	2.73				
67	503.00	Well graded sand	61.02	37.52	1.38				
70	500.00	Poorly graded med. sand	23.00	72.90	3.84				
75	495.00	Well graded sand	25.92	69.82	4.08				

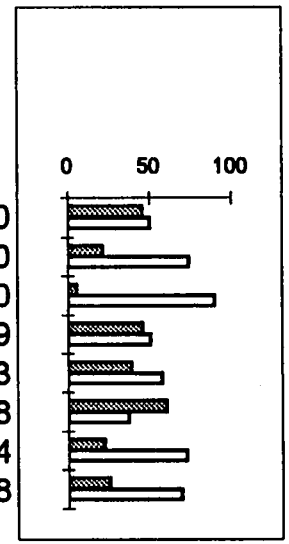
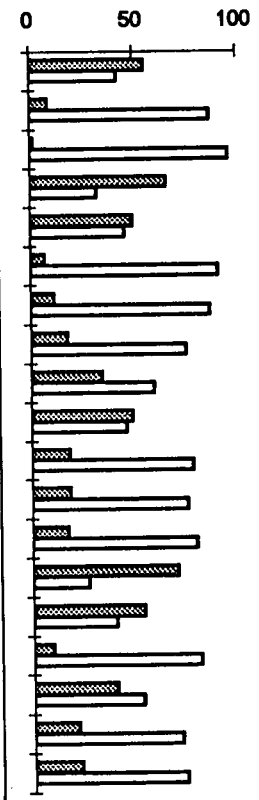


TABLE 2-7

RESULTS OF SIEVE ANALYSIS ON CORE SAMPLES AND TOTAL URANIUM CONCENTRATIONS FROM WELL 31556

Measured Depth (feet)	Elevation Above MSL (feet)	Lithologic Log Description	Sieve Analysis (% Retained)				Total Uranium Analysis		
			Granule Size	Sand Size	Silt/Clay Size	Bar Chart	Water (ug/L)	Soil (ug/g)	K_d (L/Kg)
19	551.50	Well graded sand	55.96	43.08	0.35				
27	543.50	Poorly graded fine sand	9.32	87.28	2.42				
37	533.50	Poorly graded fine sand	1.93	96.26	1.12				
47	523.50	Well graded sand	66.25	32.76	0.88				
57	513.50	Well graded sand	50.23	46.22	2.70				
67	503.50	Poorly graded med. sand	7.50	90.94	1.39		181.00	4.00	1.33E+01
72	498.50	Poorly graded med. sand	11.91	87.03	0.96			5.00	
77	493.50	Well graded sand	18.21	75.50	6.13		12.20	2.80	9.84E+01
87	483.50	Poorly graded med. sand	34.91	59.99	4.86		1.20	5.90	3.58E+03
97	473.50	Well graded sand	49.62	46.69	3.34		0.60	2.70	1.83E+03
107	463.50	Poorly graded med. sand	18.99	78.66	2.31		2.40	5.00	1.42E+03
117	453.50	Poorly graded coarse sand	19.22	75.80	4.26		1.20	3.00	1.17E+03
127	443.50	Poorly graded coarse sand	17.88	80.25	1.12		0.40	5.00	8.50E+03
137	433.50	Well graded sand	70.82	27.71	1.21		0.20	6.00	2.20E+04
147	423.50	Well graded sand	54.62	41.24	3.19		1.20	4.00	2.00E+03
157	413.50	Poorly graded med. sand	10.10	81.58	7.85		0.40	4.00	6.00E+03
167	403.50	Poorly graded fine sand	41.11	53.96	3.99		0.40	5.00	8.50E+03
177	393.50	Poorly graded med. sand	22.21	72.40	4.81		0.30	4.00	8.00E+03
181	389.50	Poorly graded med. sand	23.41	74.53	1.73		0.40	3.00	3.50E+03



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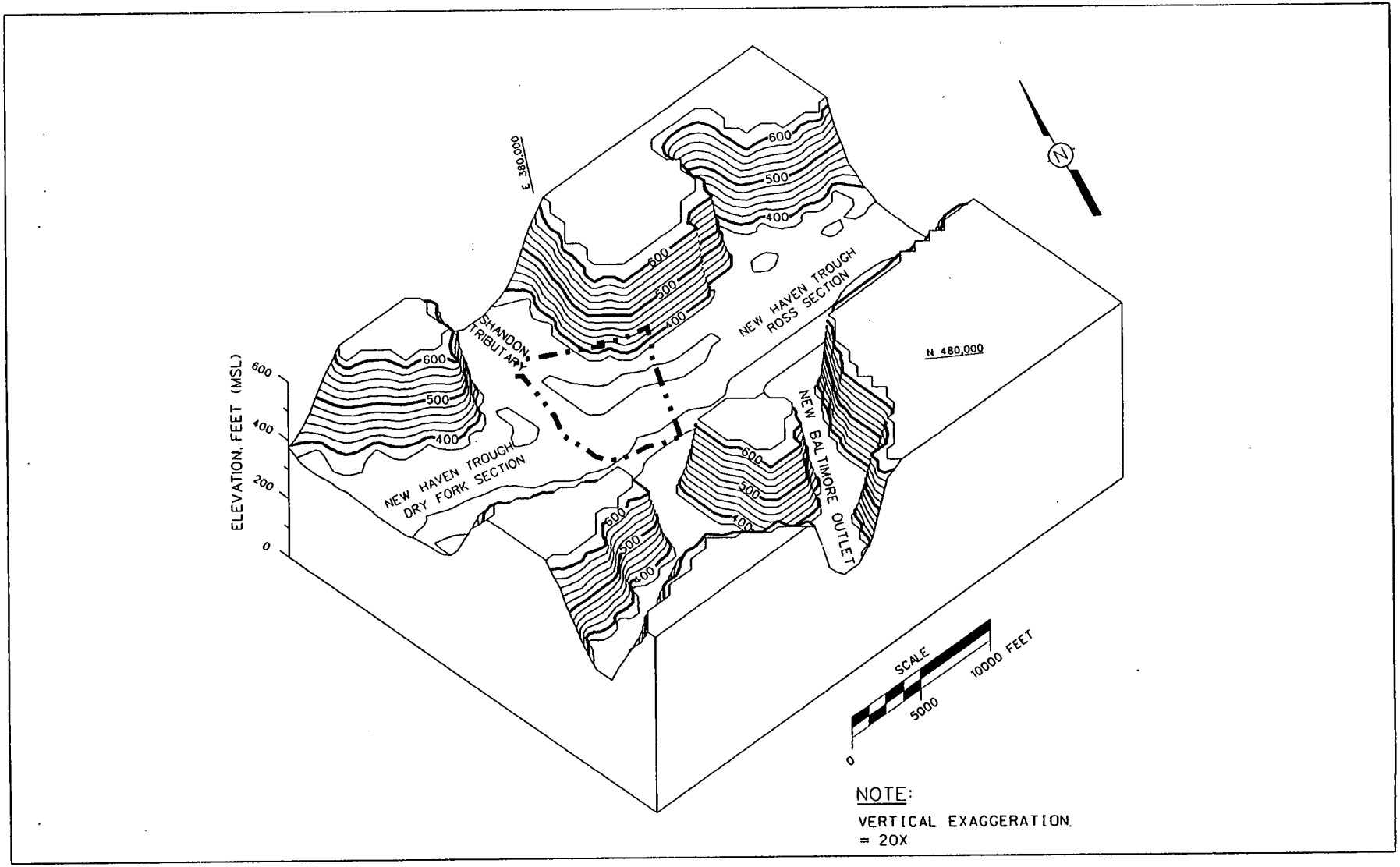

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FEMP BOUNDARY

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FIGURE 2-1. 3-DIMENSIONAL BEDROCK CONFIGURATION

/USR/ERMA1/CRU5/DGN/PUBA146.DGN

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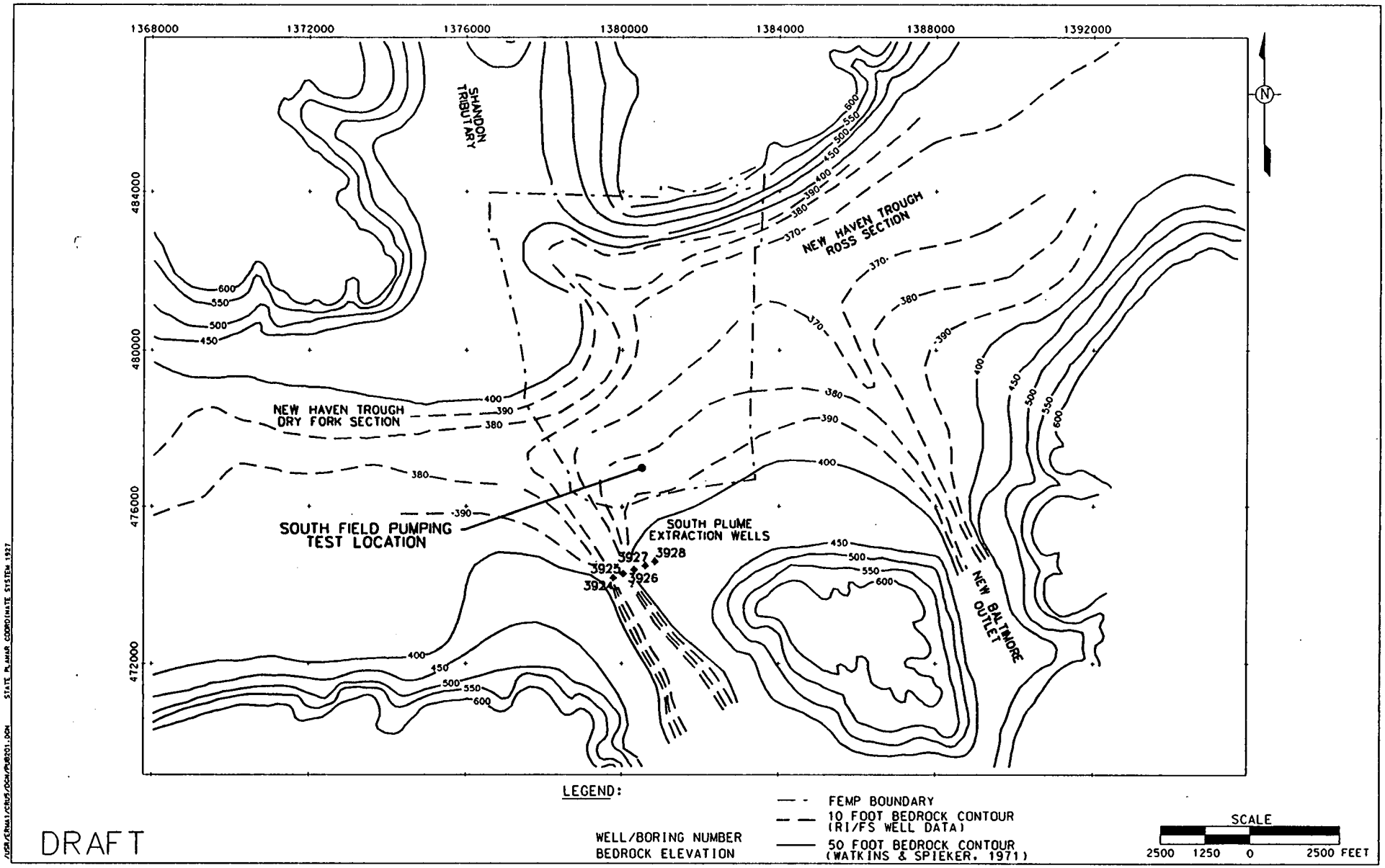

FIGURE 2-2. BEDROCK TOPOGRAPHIC SURFACE

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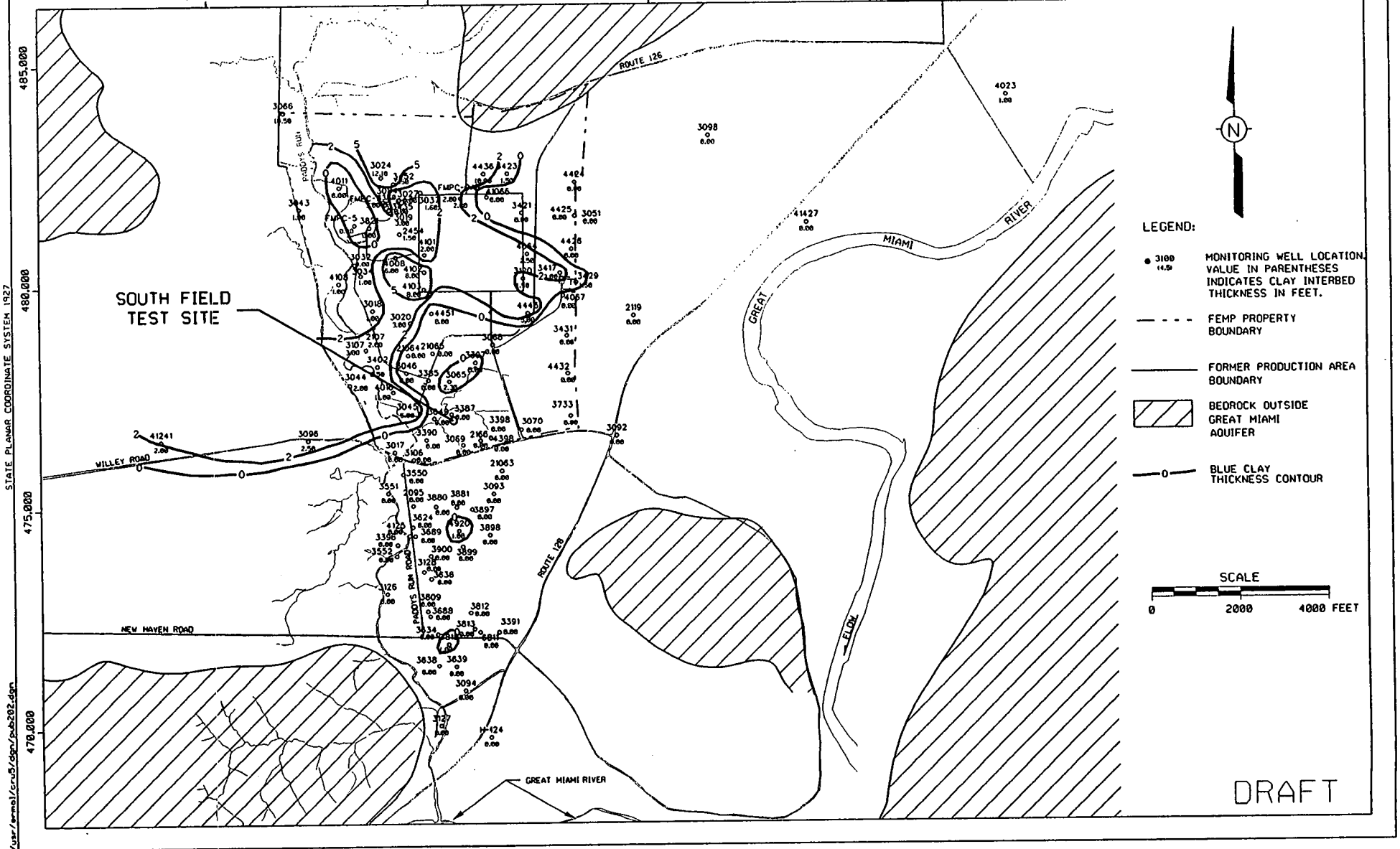

FIGURE 2-3. CLAY INTERBED THICKNESS MAP

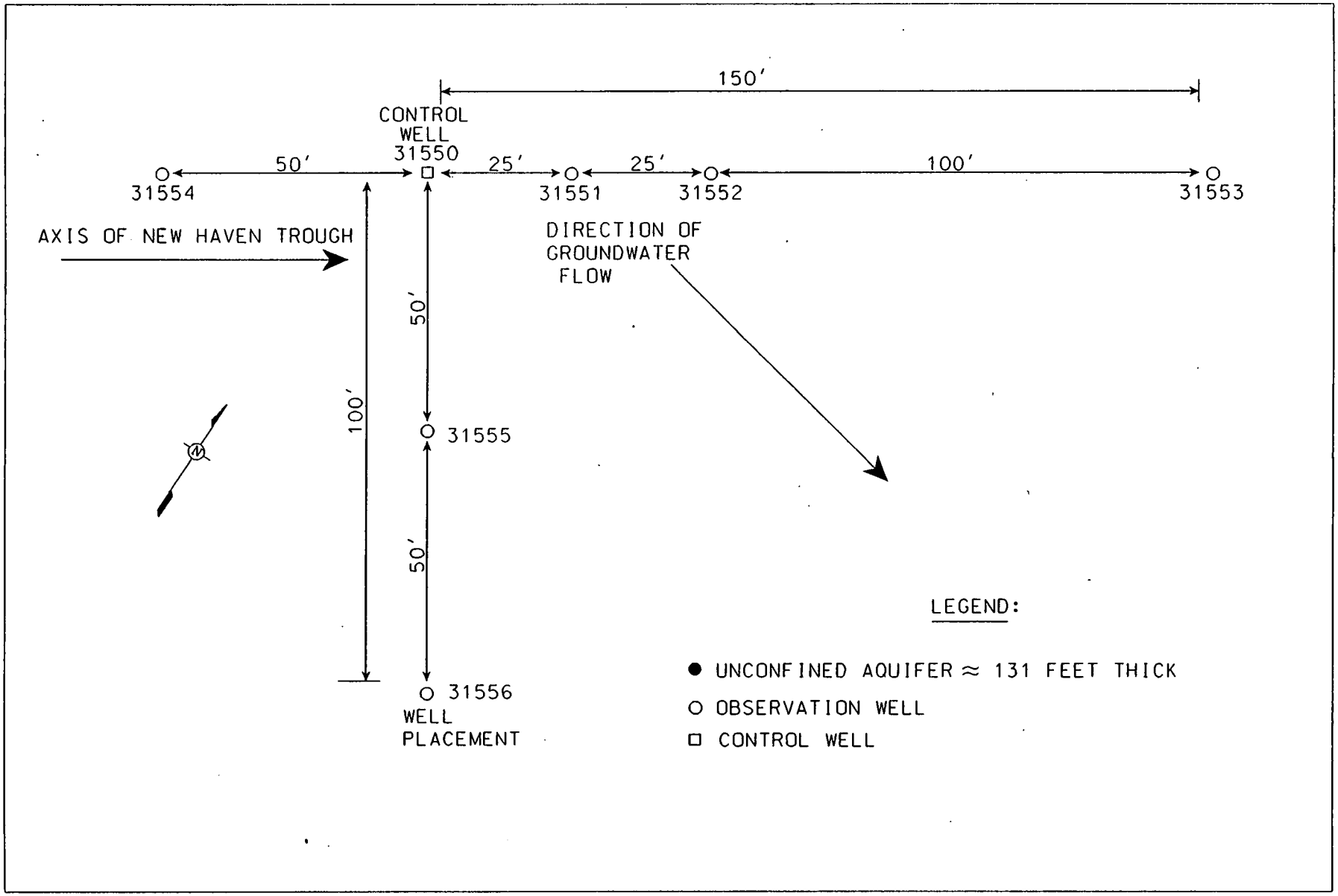

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FIGURE 2-4 PUMPING TEST NETWORK

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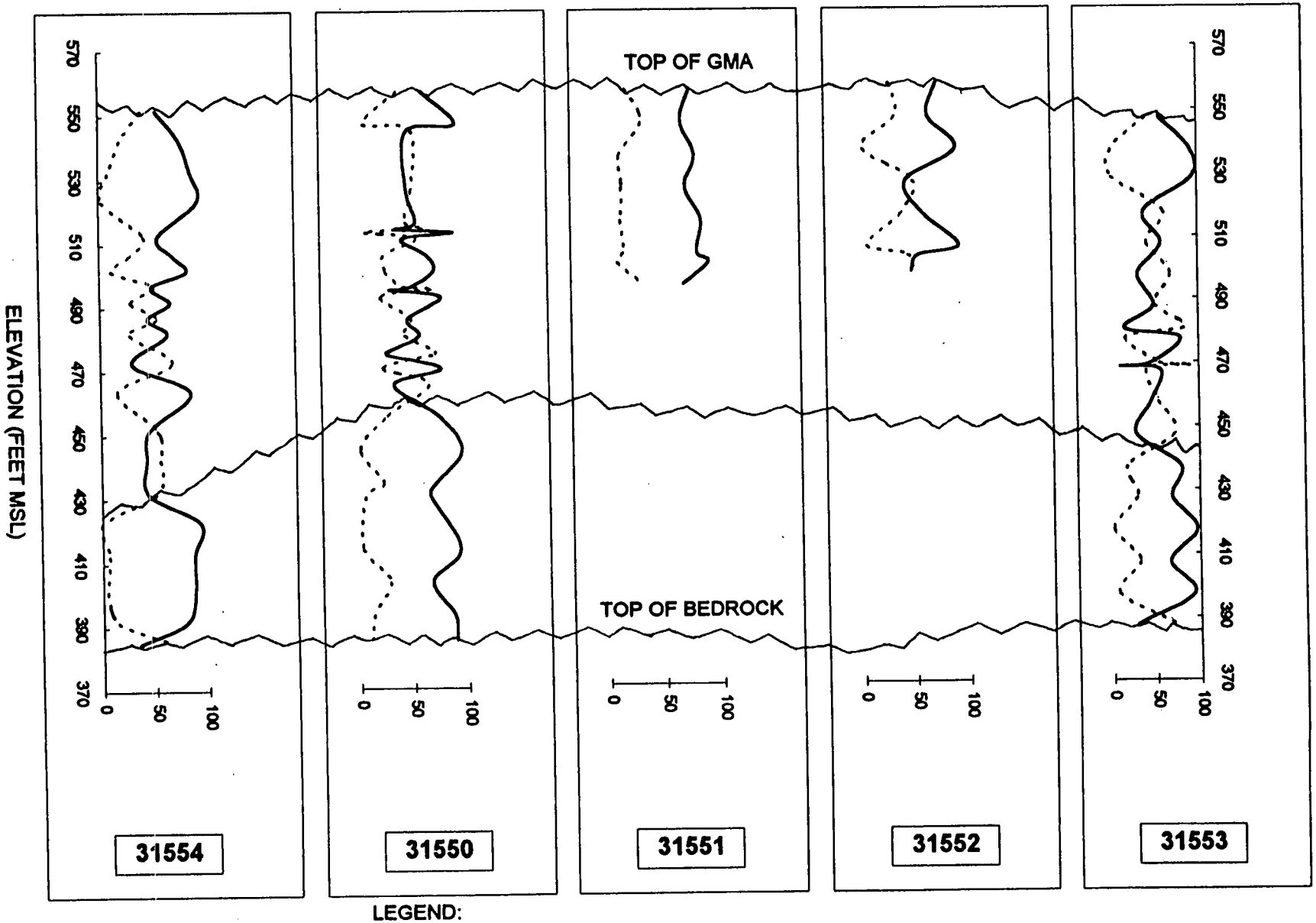

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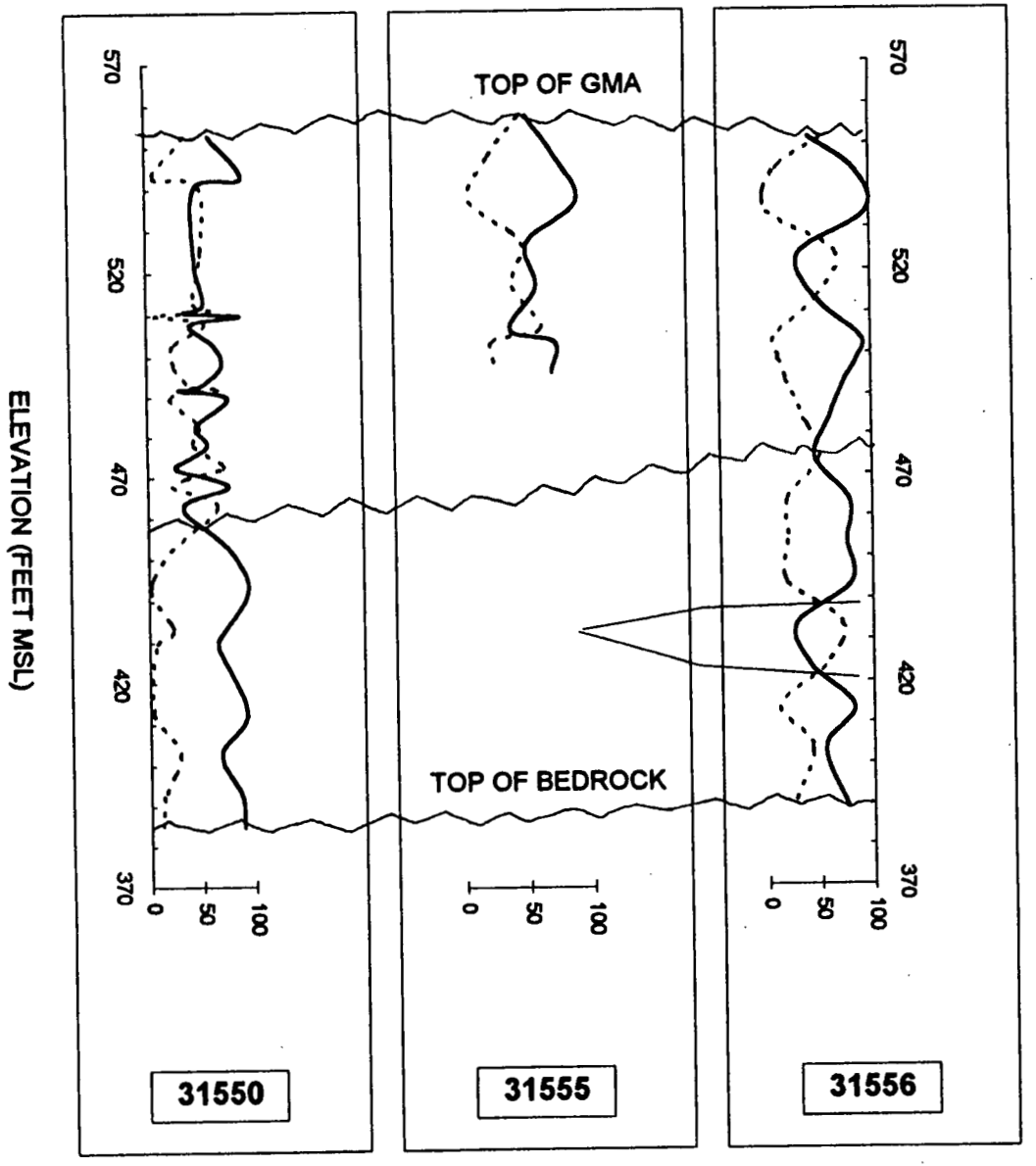
.... % RETAINED GRANULE SIZE

—— % RETAINED SAND SIZE

EROSIONAL UNCONFORMITY

FIGURE 2-5. CROSS SECTION ALONG AXIS OF NEW HAVEN TROUGH



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EROSIONAL UNCONFORMITY

FIGURE 2-6. CROSS SECTION PERPENDICULAR TO AXIS OF NEW HAVEN TROUGH

ection 3.0

3.0 AQUIFER TEST DESCRIPTION

3.1 DESIGN OF THE TEST

The objective of the South Field pumping test was to calculate and/or assess hydraulic conductivity, storage, and anisotropy of the Great Miami Aquifer. Anisotropy is a common feature in glacial outwash deposits. Aquifers that are anisotropic on both the horizontal and vertical planes exhibit three-dimensional anisotropy with principal axes of hydraulic conductivity in the vertical direction, the horizontal direction parallel to stream flows that prevailed in the past, and the horizontal direction perpendicular to those flows (Kruseman & deRidder 1989). The aquifer test was designed with this orientation in mind.

For this pumping test, a 12-inch control well was situated slightly south of the main axis of the New Haven Trough (Figure 2-2). Four 2-inch observation wells were installed along a line running parallel to the axis of the Trough (roughly 30 degrees north of east) and two 2-inch observation wells were installed along a line running perpendicular to the axis of the trough (roughly 30 degrees west of north, Figure 2-4). Parallel to the axis of the Trough should be parallel to the prevailing stream flow directions that existed when the sand and gravel was deposited.

The control well (Well 31550) was designed so that it could provide enough discharge to properly stress the aquifer for a seven-day pumping test and later be converted into an efficient extraction well for a proposed South Field extraction system. Efficient was defined by limiting the length of the screen in the well to the thickness of the total uranium plume (i.e., concentrations greater than 20 μg/L). Drawdown at the control well was predicted before the pumping test using the improved SWIFT model for the Great Miami Aquifer (SWIFT Great Miami Aquifer Model - Summary of Improvements Report, DOE 1994). The model was run to steady state with and without the control well. In the model scenarios with the control well pumping, the pumping rates varied from 200 to 1000 gpm. The predicted water table elevations with and without pumping are shown in Figure 3-3.

Modeling conducted for the Operable Unit 5 FS indicates that the proposed extraction system would produce approximately 6 feet of net drawdown (DOE 1995a, Figure F.7-109) when all extraction wells are pumping. One constraint is to keep the top of the screen in each proposed extraction well below the induced water table that results from the net drawdown of all of the wells pumping under the proposed system. This should minimize screen encrustation problems which are made worse

when screens are partially exposed above the water table. With this in mind, a 20-foot screen was installed in Well 31550, with the top of the screen set 8 feet below the seasonal water table low of approximately 516 feet amsl. This places the base of the screen at a depth of 28 to 36 feet (depending upon the seasonal elevation of the water table) and puts it in a good location to efficiently intercept the total uranium plume.

The screen slot size and completion method for the control well were selected based on sieve analysis results. Before drilling the control well, it was hoped that a natural completion could be used. Sieve analyses across the proposed target screen depth indicated that a .030-inch continuous-slot stainless steel screen would retain 60 percent of the sediment present with a natural completion method. The representative open area of a 12-inch inside diameter (ID), .030-inch, continuous-slot stainless steel screen is 77 square inches/foot (Driscoll 1986, Appendix 12.A). To calculate the screen transmitting capacity, multiply the representative open area by 0.31 (Driscoll 1986, pg. 453). The screen transmitting capacity of a 20-foot-long screen calculates out to 477.4 gpm. Previous pumping tests conducted to the west (DOE 1992) and south (DOE 1993) indicated that a transmitting capacity of up to 800 gpm is needed to adequately stress the Great Miami Aquifer for a seven-day pumping test.

A larger slot-size screen (.060 inch) and a filter pack completion was used in the control well to increase the transmitting capacity of the 20-foot-long screen and maintain an entrance velocity below .1 ft/sec. The target depth for the screen was set at an elevation of 508 feet amsl (65 feet below top of casing) to 488 feet amsl (85 feet below top of casing). The size of the filter pack material was selected from the sieve analysis using a method described in Driscoll (1986, pgs. 441-442). The result was a ratio of four parts global No. 4 sand to one part global No. 5 sand.

The six observation wells were installed so that the midpoints of their 5-foot-long screens are set at the same elevation as the midpoint of the control well (Figure 3-1). The slot size for each of the observation wells was selected based upon sieve analysis results and varied from .020 to .040 inches. Because these are observation wells, the transmitting capacity of the screen is not an issue as it was with the control well. All six of the observation wells were completed naturally. Construction information is provided in Appendix A.

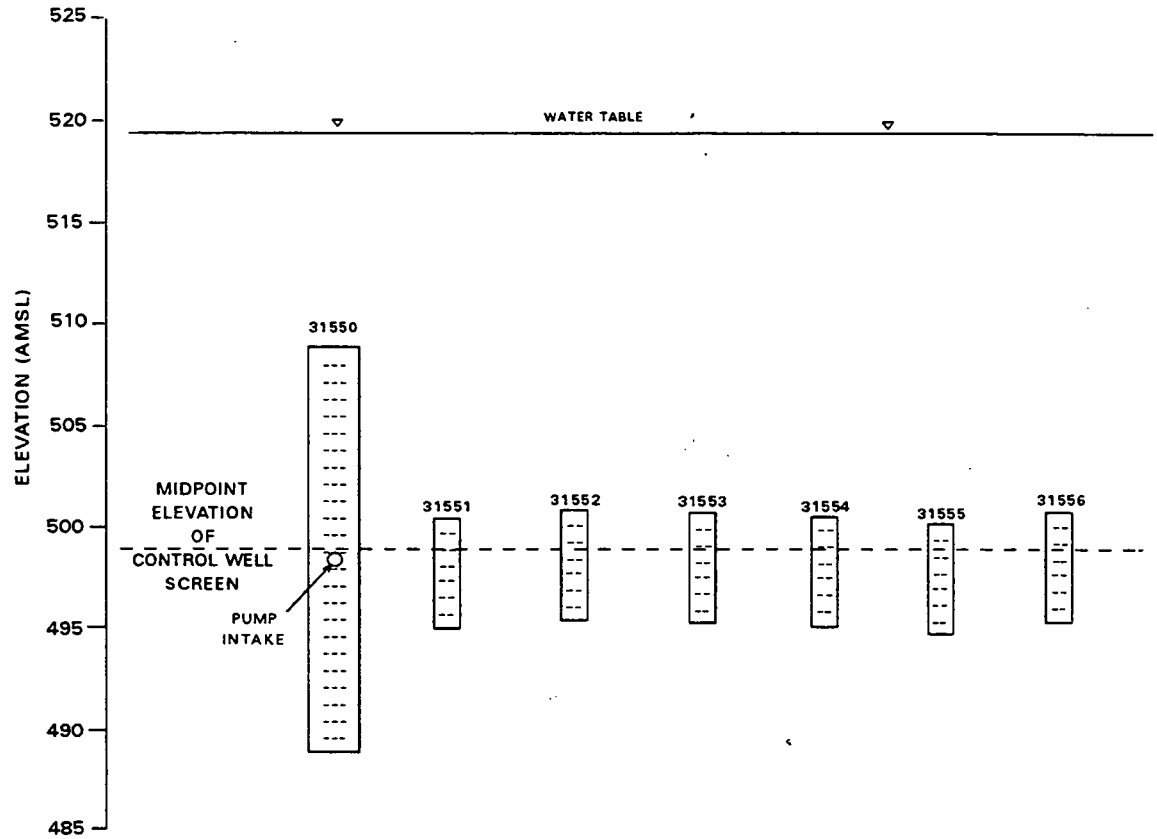
The design of the test is such that the control well is screened across 15.3 percent and the observation wells are screened across 3.8 percent of the aquifer's saturated thickness. The farthest observation well (31665) is located 150 feet from the control well (Figure 2-4).

The control well has an observation well installed outside of the well screen but within the filter pack. During the pumping test the control well was also equipped with an observation well within the well screen (Figure 3-2). The observation well inside the well screen could not be installed as deeply as planned (i.e., locate the base of the screen 5 feet above the base of the screen in the control well, approximately 493 feet amsl); the pump apparatus prevented it from being lowered past a depth of 70 feet (as measured from the top of the riser). This placed the base of the screen at an elevation of 503 feet amsl (10 feet above the planned installation depth). The pump intake was positioned at 497.06 feet amsl. The purpose of these two observation wells was to determine the efficiency of the screen. The pump was installed inside the control well so that the motor rested 5 feet above the bottom of the screen, providing circulation around the motor. The pump intake was positioned 4 feet above the motor, or 8 feet above the base of the well screen. This configuration allowed 22.4 feet of drawdown before the water table would fall below the pump intake, and 16.4 feet of drawdown before the water table would fall below the base of the screen in the observation well installed inside the control well screen.

3.2 IMPLEMENTATION OF THE TEST

A 400-minute step test (4 steps of 100 minutes each) was conducted on May 3, 1995. The objective of the step test was to determine a pumping rate for the seven-day constant-rate test (CRT) that would adequately stress the aquifer but not produce more than 22.6 feet of drawdown in the control well.

The CRT began on May 9 at 0700 hours and ended on May 16 at 1030 hours. The recovery period for the CRT was very short; within 24 hours the aquifer had recovered to pretest elevations. The last 4000 minutes of the CRT was affected by recharge due to precipitation. This is discussed further in Section 5.2.



PUMPING TEST WELL SPECIFICATIONS AND WATER TABLE INFORMATION:

WELL NUMBER	31550	31551	31552	31553	31554	31555	31556
OUTER PROTECTIVE CASING ELEVATION (FT AMSL)	573.06	572.47	573.747	577.161	570.483	571.788	573.711
DEPTH TO TOP OF SCREEN (FT)	65	71.66	72.3	76.55	70.58	71.62	72.58
TOP OF SCREEN ELEVATION (FT AMSL)	508.06	500.81	501.45	500.61	499.9	500.17	501.13
SCREEN LENGTH (FT)	20	5	5	5	5	5	5
SCREEN DIAMETER (INCHES)	12	2	2	2	2	2	2
SCREEN SLOT SIZE	0.06	0.02	0.03	0.04	0.02	0.04	0.02
WATER TABLE ELEVATION (FT AMSL)	519.618	519.521	519.502	519.441	519.543	519.482	519.455

PRETEST STATIC WATER LEVEL (FT AMSL) = 519.618
PUMP INTAKE ELEVATION (FT AMSL) = 497
FEET OF DRAWDOWN ALLOWED BEFORE PUMP INTAKE IS REACHED = 22.6

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FIGURE 3-1. WELL SCREEN CONFIGURATIONS

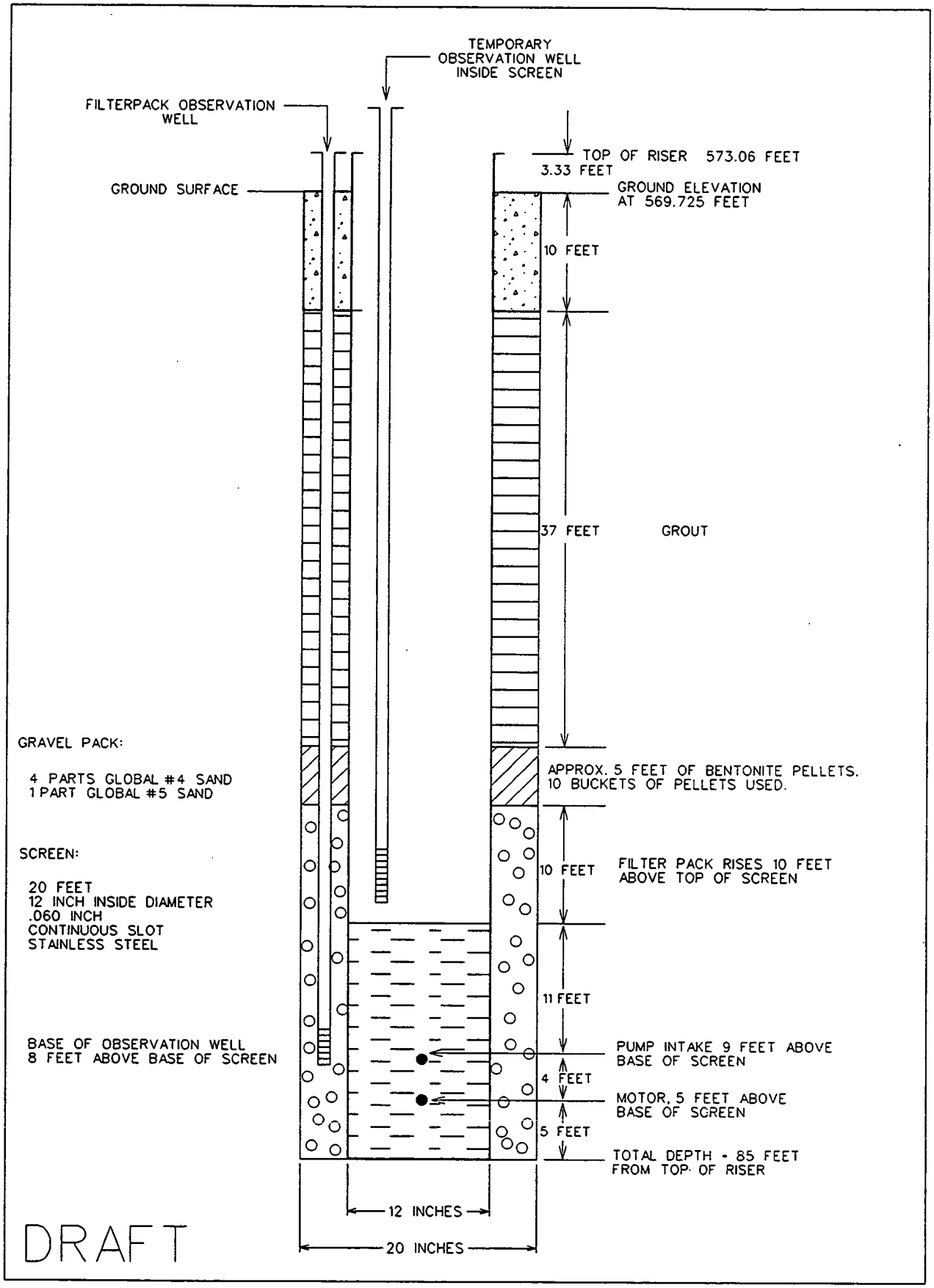

FIGURE 3-2. DESIGN OF CONTROL WELL 31550

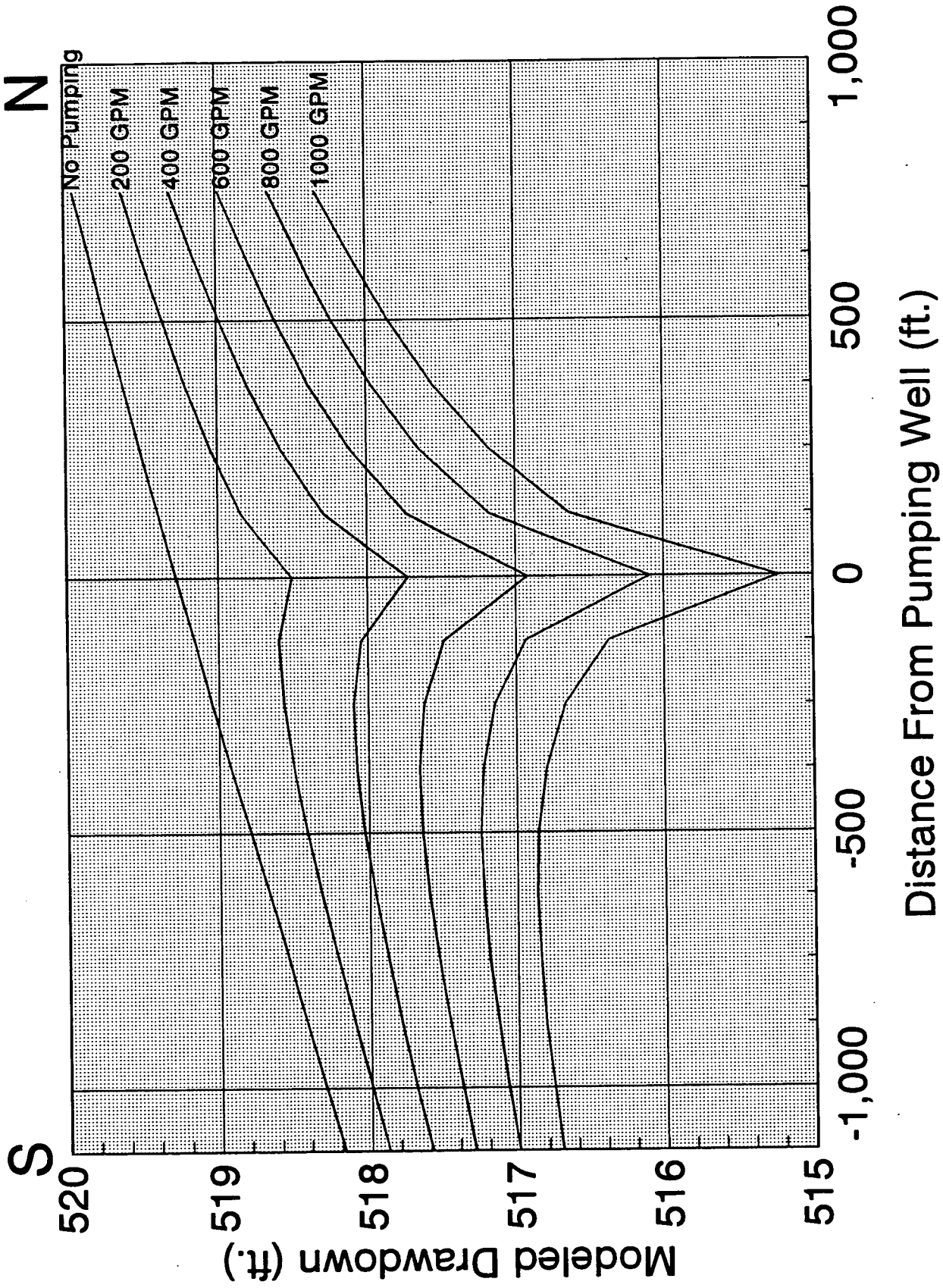

FIGURE 3-3. PREDICTED DRAWDOWN FOR THE CONTROL WELL

Section 4.0

4.0 STEP TEST RESULTS

Drawdown data collected during the step test from the observation well set in the gravel pack of Well 31550 are tabulated in Table 4-1. Semilogarithmic graphs of drawdown versus time at the control well for each step of the test are provided in Figures 4-1 to 4-4. Observation indicated that the drawdown inside and outside of the screen in the control well was nearly identical up to the time that drawdown exceeded 15.4 feet, indicating that the screen was very efficient (see Table 4-2). As explained in Section 3.1, the depth of the observation well located inside the screen was 11 feet shallower than planned because the pump apparatus prevented it from being lowered any deeper into the well.

Figure 4-1 presents drawdown data collected at the control well during the first 100 minutes of the step test when the control well was being pumped at a rate of 200 gpm. During the first minute the water level in the control well dropped approximately 20 feet in response to the initial start of the pump and adjustment of the pumping rate to 200 gpm. After approximately three minutes the drawdown had stabilized at approximately 4 feet.

Figure 4-2 presents drawdown data collected at the control well during the second 100 minutes of the step test when the control well was being pumped at a rate of 400 gpm. After approximately three minutes drawdown stabilized at about 8.5 feet.

Figure 4-3 presents drawdown data collected at the control well during the third 100 minutes of the step test when the control well was being pumped at a rate of 600 gpm. After approximately three minutes drawdown stabilized at approximately 13 feet.

Figure 4-4 presents drawdown data collected at the control well during the fourth and last step of the step test when the control well was being pumped at a rate of 800 gpm.

The semilogarithmic plots of drawdown versus time for pumping rates of 200, 400, and 600 are essentially flat (see Figures 4-1 and 4-3) which indicated that the hydraulic capacity of the aquifer was not being reached. The early increase in drawdown, with subsequent rebound at the start of each step, is contributed to pumping surges that resulted when the pumps were adjusted between steps. The plot for the 800 gpm pumping rate (Figure 4-4) is not flat. The slope produced by the last 90

minutes of observed drawdowns indicates that after seven days of pumping at 800 gpm the drawdown would be very close to 20 feet. Total drawdown in the control well at 800 gpm after 100 minutes was 18.746 feet. Observed drawdown in Well 31553 (located 150 feet from the control well) after 100 minutes of pumping at 800 gpm was .379 feet.

Based on the observed drawdown data collected during the step test a pumping rate of 700 gpm was selected for the CRT.

Specific capacity of the control well was calculated for each step of the step test according to the following equation:

$$SC = Q/S \tag{1}$$

where

Q	=	pumping rate (gpm)
S	=	observed drawdown (ft)
SC	=	specific capacity (gpm/ft)

The results are tabulated in Table 4-3. The specific capacity ranges from 49.6 gpm/ft at 200 gpm to 42.68 gpm/ft at 800 gpm.

TABLE 4-1

RESULTS OF 400-MINUTE STEP TEST
(Pretest Water Level 519.435 ft amsl)

Time (minutes)	Data Logger Output (ft) and Pumping Rate				Drawdown (ft)			
	Step 1 200 gpm	Step 2 400 gpm	Step 3 600 gpm	Step 4 800 gpm	Step 1	Step 2	Step 3	Step 4
0	519.435							
0.1	518.594	509.868	509.326	503.524	0.841	9.567	10.109	15.911
0.2	515.502	508.669	504.993	502.415	3.933	10.766	14.442	17.020
0.3	512.148	508.619	503.158	501.980	7.287	10.816	16.277	17.455
0.4	510.960	508.449	503.020	501.596	8.475	10.986	16.415	17.839
0.5	509.818	508.821	502.957	501.332	9.617	10.614	16.478	18.103
0.6	507.162	508.960	502.793	501.382	12.273	10.475	16.642	18.053
0.7	503.688	509.256	502.717	501.363	15.747	10.179	16.718	18.072
0.8	500.519	509.345	502.617	501.300	18.916	10.090	16.818	18.135
0.9	500.217	509.370	502.944	500.947	19.218	10.065	16.491	18.488
1	504.368	509.730	503.215	500.960	15.067	9.705	16.220	18.475
2	513.076	510.178	505.087	500.979	6.359	9.257	14.348	18.456
3	515.370	510.563	505.762	500.941	4.065	8.872	13.673	18.494
4	515.679	510.752	505.844	501.004	3.756	8.683	13.591	18.431
5	515.799	510.746	506.203	501.017	3.636	8.689	13.232	18.418
6	515.863	510.727	506.014	501.029	3.572	8.708	13.421	18.406
7	515.755	510.765	506.241	500.966	3.680	8.670	13.194	18.469
8	515.572	510.670	506.020	501.036	3.863	8.765	13.415	18.399
9	515.578	510.714	506.209	501.073	3.857	8.721	13.226	18.362
10	515.268	510.834	506.146	501.036	4.167	8.601	13.289	18.399
20	515.894	510.948	506.115	501.036	3.541	8.487	13.320	18.399
30	515.553	511.062	506.209	500.821	3.882	8.373	13.226	18.614
40	515.066	510.954	506.033	500.714	4.369	8.481	13.402	18.721
50	515.161	510.967	506.342	500.746	4.274	8.468	13.093	18.689
60	515.389	510.960	506.216	500.828	4.046	8.475	13.219	18.607
70	515.313	511.788	506.045	500.758	4.122	7.647	13.390	18.677
80	515.357	511.074	506.153	500.563	4.078	8.361	13.282	18.872
90	515.338	511.156	506.455	500.595	4.097	8.279	12.980	18.840
100	515.401	511.188	506.386	500.689	4.034	8.247	13.049	18.746

TABLE 4-2

COMPARISON OF DRAWDOWN WITHIN SCREEN TO DRAWDOWN WITHIN FILTER PACK IN WELL 31550

	Step 3 (600 gpm)		Step 4 (800 gpm)	
Elapsed Time (minutes)	Well 31150 Drawdown (ft)	Filter Pack Drawdown (ft)	Well 31150 Drawdown (ft)	Filter Pack Drawdown (ft)
0.1	10.163	10.109		
1	16.054	16.22		
10			16.389	18.399
50	13.533	13.093		
70	13.426	13.39		
100			16.401	18.746

TABLE 4-3

SPECIFIC CAPACITY CALCULATIONS

Step	Pumping Rate (gpm)	Incremental Drawdown (ft)	Drawdown (ft)	Specific Capacity Q/S[a] (gpm/ft)
1	200	4.034	4.034	49.6
2	400	4.213	8.247	48.5
3	600	4.802	13.049	45.98
4	800	5.697	18.746	42.68

[a]See Equation 1 for coefficient Q/S

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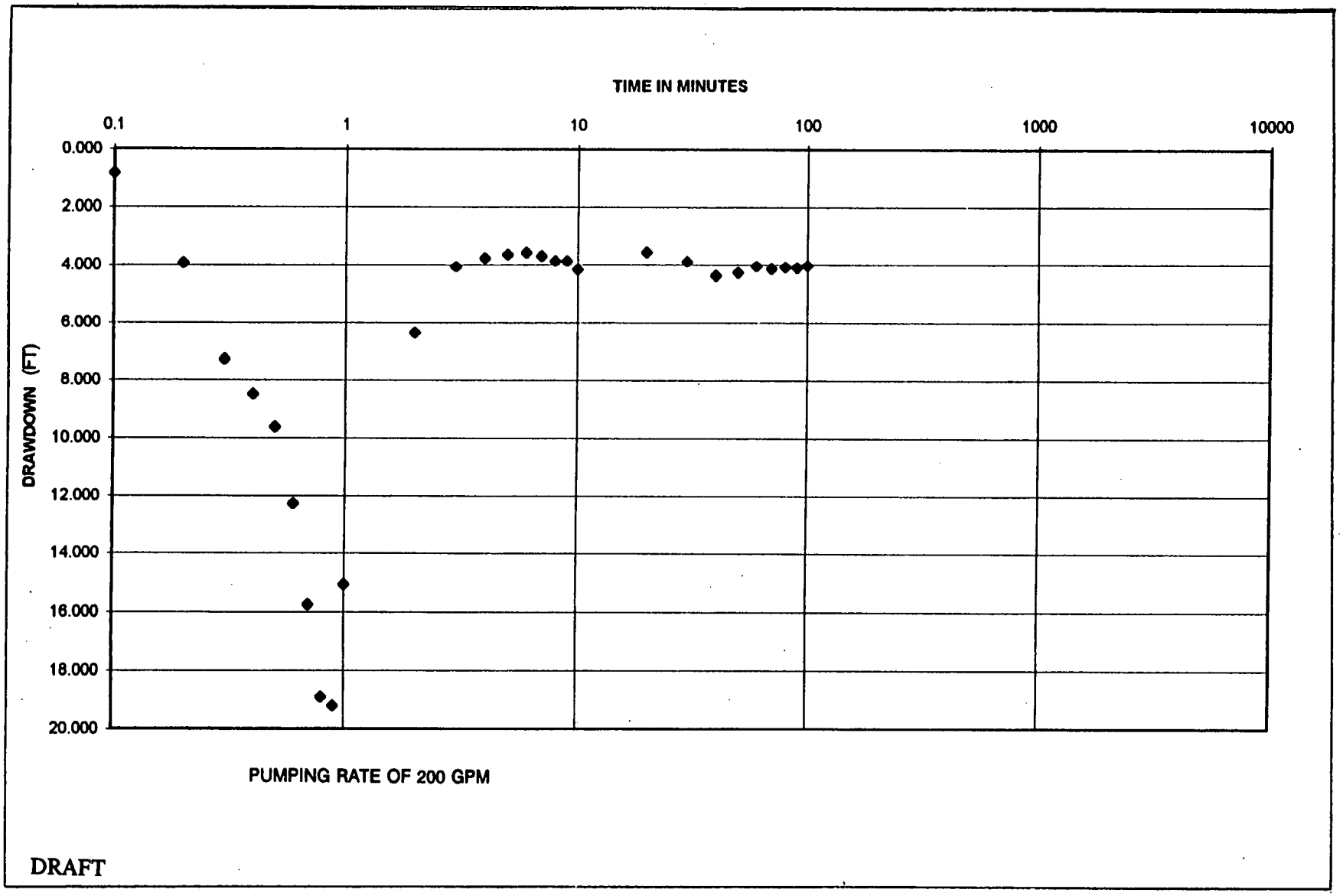

FIGURE 4-1. DRAWDOWN VS. TIME, STEP 1

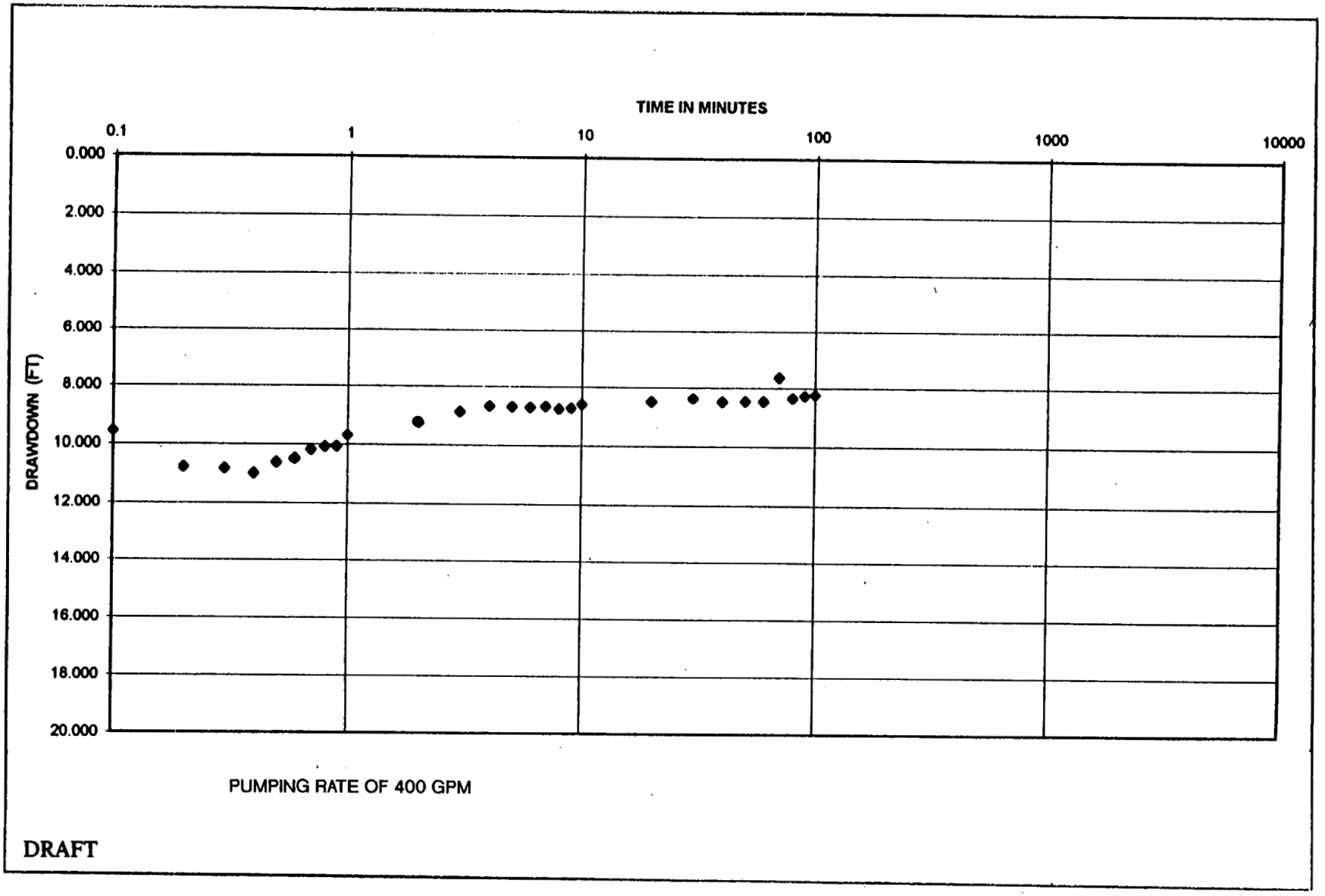

FIGURE 4-2. DRAWDOWN VS. TIME, STEP 2

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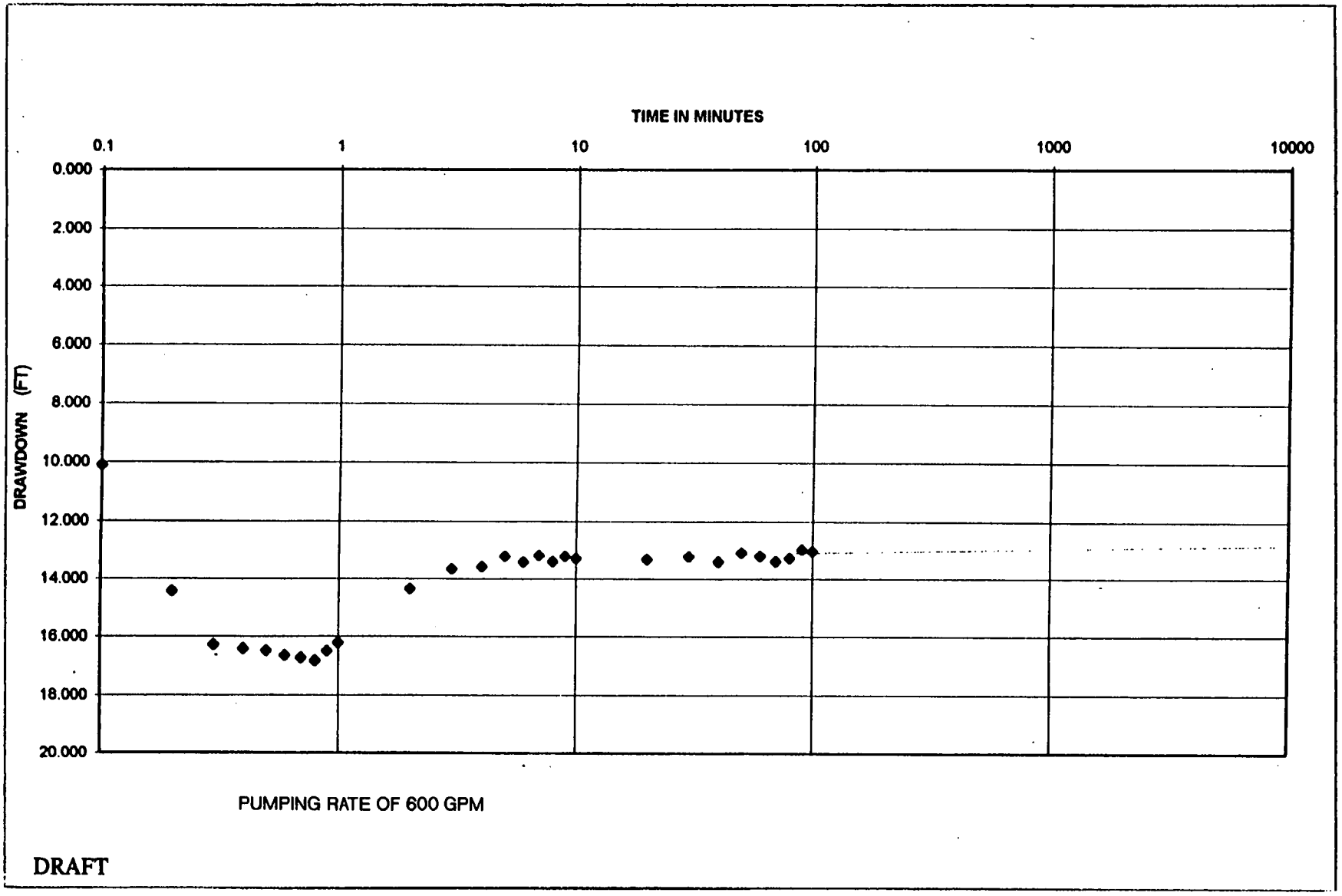


FIGURE 4-3. DRAWDOWN VS. TIME, STEP 3

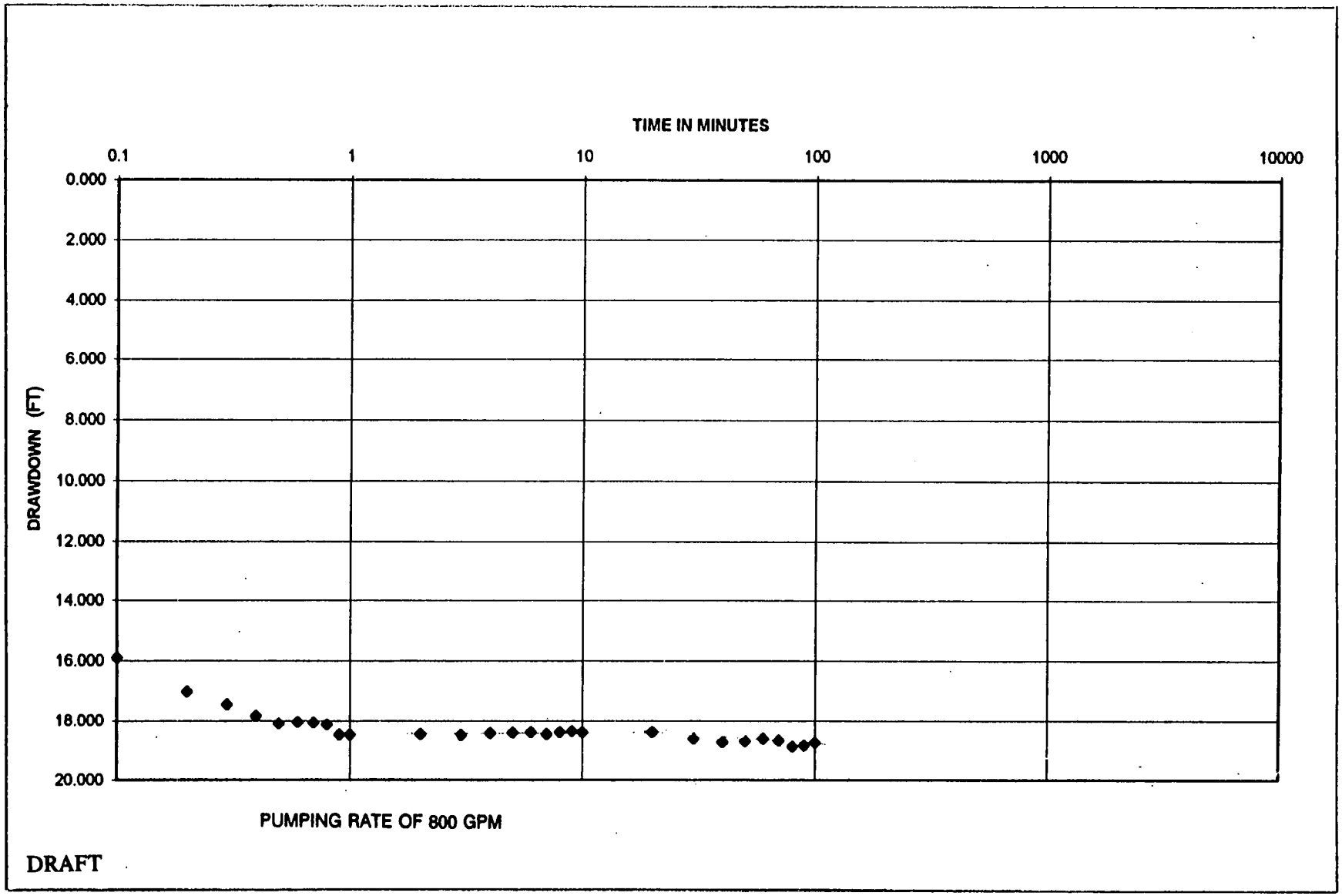


FIGURE 4-4. DRAWDOWN VS. TIME, STEP 4

5.0 CONSTANT RATE TEST RESULTS

This section begins with a discussion of the selection of suitable analytical methods (Section 5.1). Section 5.2 presents how the observed drawdown data was corrected for regional water table trends, barometric pressure changes, precipitation, decreases in saturated thickness, and casing storage before being used to calculate aquifer properties. Section 5.3 discusses the radius of influence and Section 5.4 presents the actual calculation of aquifer properties.

5.1 THEORETICAL MODEL AND ANALYTICAL METHODS USED

Given that the Great Miami Aquifer is unconfined and the control well is partially penetrating, the Streltsova (1974) and Neuman (1975) curve-fitting methods (as described in Kruseman and deRidder 1989) were selected for analysis of the constant rate pumping test data.

The theoretical model upon which the Streltsova and Neuman methods are based assumes that:

- The aquifer has a seemingly infinite areal extent
- Before pumping, the piezometric surface is horizontal (or nearly so) over the area that will be influenced by the test
- The aquifer is pumped at a constant discharge rate
- Storage in the well can be neglected
- The aquifer is homogeneous, anisotropic, and of uniform thickness over the area influenced by the pumping test
- The well does not penetrate the entire thickness of the aquifer
- The aquifer is unconfined and shows delayed water table response.

The control well used for the pumping test partially penetrates the aquifer and is screened across 15 percent of the aquifer's saturated thickness of 131 feet, with a 20-foot-long screen situated approximately 8 feet below the seasonal low water table.

5.2 PREPARATION OF DRAWDOWN DATA

Before being used to determine aquifer properties, observed drawdowns were corrected for influences not related to the pumping (i.e., regional water table trends, barometric pressure, recharge due to precipitation) and for influences related to the pumping (i.e., casing storage and decrease in saturated aquifer thickness).

The observed water levels for each major log-interval of the 10,000 minute CRT are presented in Table 5-1. The observed drawdown is presented in Table 5-2. Data logger printouts for the entire CRT are provided in Appendix E.

5.2.1 Trends in Water Levels

The water table of the Great Miami Aquifer was rising due to natural seasonal recharge before and during the CRT. The natural recharge trend was determined by monitoring the water level in nine existing groundwater wells (Figure 5-1) during April and May, and the six closest observation wells (31551 through 31556) for a three-day period just before the start of the CRT. Water level versus time line graphs are provided in Appendix B along with the tabulated data used to construct the time line graphs and a brief description of how the determination was made. The data logger printouts for Wells 31551 through 31556 for the period between 3:15 p.m. April 27 and 11:23 a.m. May 1 are provided in Appendix E.

Near the control well at the time of the test, the water table was rising approximately .03 feet/day. Over the course of the seven-day CRT natural recharge caused the regional water table near the control well to rise approximately .208 feet. Observed drawdowns, measured during the CRT, were corrected before being used to determine aquifer properties by adding in the change in water level due to natural recharge (see Table 5-3) (Kruseman & deRidder 1989, pg. 45).

The rate of recharge before the STLP test and CRT was not the same at all monitored locations. It appears to be slightly less at Wells 2434 and 2166; .02 and .01 feet/day, respectively, compared to .03 feet/day near the control well.

5.2.2 Effect of Barometric Pressure

The barometric efficiency (BE) of the six closest observation wells (31551 through 31556) was estimated using water level and barometric pressure data collected from April 27 through May 1 at the FEMP meteorological tower. The data and calculations are contained in Appendix D. All of the observation wells have calculated BEs below 20 percent, meaning that barometric pressure has a very small effect in these observation wells (see Table 5-4).

Changes in atmospheric pressure affect the elevation of the water level in a well, which is balanced between the hydrostatic pressure of the aquifer and the barometric pressure of the atmosphere. An increase in atmospheric pressure pushes down on the water table causing it to lower. A decrease in atmospheric pressure allows the water table to rise. Wells completed in confined aquifers are more

greatly affected than wells completed in unconfined aquifers. Unconfined aquifers usually transmit the pressure changes equally across the water table surface in both the aquifer and the well.

During the CRT, barometric pressure readings were collected at the control well; Figure 5-2 shows these readings. A tabulation of the barometric pressure readings collected during the CRT is contained in Appendix C. The amount of water level movement caused by barometric pressure change in the well closest to the control well, farthest away from the control well, and with the largest calculated BE was estimated as outlined below:

1. The atmospheric pressure (inches of mercury) was recorded at the time each observed drawdown measurement was taken.
2. The atmospheric pressure was converted from inches of mercury into feet of water.
3. The difference in atmospheric pressure between each observed drawdown measurement was multiplied by the calculated BE for the well.

The results of the estimation are contained in Appendix D and indicate that the change in water level caused by change in barometric pressure is very small (100s to 1000s of a foot) and therefore insignificant.

5.2.3 Precipitation

Observed drawdowns recorded during the last 4000 minutes (May 13 to 15) of the CRT were influenced by recharge due to precipitation. During the 10,000-minute CRT it rained 3.06 inches; Figure 5-3 is a graph of relevant weather data. Weather data was collected at the FEMP meteorological tower. Logarithmic plots of corrected drawdown versus time (Appendix F) indicate that recharge to the Great Miami Aquifer began to affect the observed drawdown in Observation Wells 31551 through 31556 after 6000 minutes. The drawdown trend after 6000 minutes indicates that the water level of the aquifer was rising due to recharge from precipitation. The reverse trend in drawdown after 6000 minutes is also present in plots of water level versus time for each surrounding monitoring well (Appendix B). The trend in each monitoring well is similar. Drawdown increases and nearly stabilizes up to approximately 6000 minutes into the CRT and then decreases. An elapsed time of 6000 minutes corresponds to approximately 11:00 a.m. Saturday, May 13; 1.53 inches of rain fell from the afternoon of May 13 through the morning of May 14. A daily tabulation of rainfall is provided in Appendix C, Table C-2 and Figure 5-3.

The week before the CRT was relatively dry, with only .22 inches of rainfall recorded. The .09 inches of rainfall received during the first 6000 minutes appears to have saturated conditions but did not really impact the water table in the test area. Because the test area was relatively saturated by May 13, the 1.53 inches of rainfall received over May 13 and 14 caused the water table in the test area to rise.

5.2.4 Decreases in Saturated Thickness

As pumping continues, the saturated thickness of an unconfined aquifer will decrease. Both the Neuman and Streltsova methods assume that the saturated thickness remains constant. The methods are valid, though, if 1) the saturated thickness does not decrease more than 25 percent and 2) the observed drawdown data is corrected for decreases in saturated thickness before analysis. The observed drawdown data may be corrected using an equation developed by Jacob (1944) (as presented by Dawson and Istok 1991, pg. 49; and Kruseman & de Ridder 1989, pg. 101):

$$S_{corrected} = S - \frac{S^2}{2m} \qquad (2)$$

where

$S_{corrected}$ = corrected drawdown (ft)

S = observed drawdown (ft)

m = initial saturated aquifer thickness (ft)

It is reported in Kruesman and deRidder (1989) that Jacob's correction is strictly applicable to the late-time drawdown data.

To determine how much the saturated thickness decreased during the CRT, an estimate was made for Wells 31551 through 31556 at a time of 6000 minutes, right before the aquifer began to recharge due to heavy precipitation. Table 5-5 indicates that the ratio of drawdown to initial saturated thickness of the aquifer, in any of the observation wells, does not decrease by more than .0207 and the largest percent change in observed drawdown is 1.03 percent. The largest percent change was calculated for Observation Well 31551 which is closest to the control well (25 feet away). The calculated percent change in all of the other observation wells is less than .8 percent. The decrease in saturated thickness did not decrease by more than 25 percent. The Jacob correction was applied to observed drawdowns recorded after 1000 minutes of the CRT had elapsed; however, the observed drawdowns

were first corrected for seasonal trends as noted in Table 5-6. An initial saturated thickness of 131 feet was used for the calculations.

5.2.5 Effect of Casing Storage

Groundwater that is stored in the casing is removed when pumping begins. As the water level in the casing falls, water begins to enter the casing from the surrounding aquifer. If aquifer properties are estimated using drawdown data that is influenced by casing storage, the estimates will not be representative of the surrounding aquifer. Driscoll (1986) presents equations derived by Schafer (1978) which can be used to calculate the critical time after which casing storage no longer contributes to the yield of a well.

$$tc = \frac{0.6\ (dc^2 - dp^2)}{Q/s} \qquad (3)$$

where

tc	=	time, in minutes, when casing storage becomes negligible
dc	=	inside diameter of well casing, in inches (for CRT = 12 inches)
dp	=	outside diameter of pump column pipe, in inches (for CRT = 8.625 inches)
Q/s	=	specific capacity of the well in gpm/ft of drawdown at time tc
Q	=	pumping rate in gpm
s	=	drawdown

The equation requires that the specific capacity of the pumping well be known. The specific capacity of the control well (at a pumping rate of 700 gpm, Well 31550 had 15.9 feet of drawdown) for the CRT was estimated to be 44 gpm/foot. The inside diameter of the control well is 12 inches and the outside diameter of the pipe column is 8.625 inches. Using this input and the equation by Schafer, the critical time is determined to be .95 minutes.

$$tc = \frac{0.6\ (12^2 - 8.625^2)}{44}$$

$$tc = .95 \text{ minutes}$$

Driscoll also presents an iterative estimation technique that can be used with Schafer's equation to determine a critical time when the specific capacity is not known (Driscoll 1986, pg. 232).

A drawdown value is chosen and the corresponding critical time determined. The determined critical time is substituted back into the Schafer equation and the corresponding drawdown is determined. Iterations continue until the change between iterations becomes small and the results match the actual recorded drawdown data. Using this approach the critical time is determined to be .6 minutes.

To ensure that no aquifer properties were estimated using data affected by casing storage, drawdown collected earlier than 1 minute was not used for either the Streltsova curve-matching analysis or the Neuman analysis.

5.3 RADIUS OF INFLUENCE

A 1-foot drawdown radius of influence, at an elapsed time of 6000 minutes, was determined by using corrected drawdown data from the nine surrounding wells (shown in Figure 5-4) being monitored during the CRT.

In planar view the radius of influence extends farther to the east and south than it does to the north and west. This shape may be due in part to greater recharge from precipitation in the west than in the east. The observation that recharge is greater in the west can be seen by comparing the water level trend from Well 2390 with wells farther to the east. On May 18 the test area received an additional 3.33 inches of rainfall. This rain fell after the CRT and after monitoring for recovery had ended. The rise in water elevation in Well 2390 is larger than the rise in other wells to the east, indicating that the area around Well 2390 is effected more by recharge than the areas around the other wells.

5.4 CALCULATION OF AQUIFER PROPERTIES

As was discussed in Section 5.2, the observed drawdown data was corrected for natural recharge, effects of well casing storage, and decreases in saturated thickness and assessed for barometric pressure effects and recharge due to precipitation before being used in the estimation of aquifer properties. The aquifer properties being estimated include hydraulic conductivity, storage, and anisotropy.

The Streltsova (1974) and Neuman (1975) methods were used because both methods are applicable to unconfined aquifers under unsteady state flow and partial penetration conditions.

Streltsova

The Streltsova (1974) curve-matching method was used to analyze both early time and late time data collected during the pumping test. The method considers the effects of partial penetration at both the control well and the observation wells and requires the generation of type A and B curves for the curve-matching process.

The Streltsova (1974) method uses the following equation to explain early time behavior in a partially penetrated unconfined aquifer.

$$s = \frac{Q}{4\ \pi\ K_h\ D\ (b_1/D)}\ W\ (U_A,\ B,\ b_1/D,\ b_2/D) \tag{4}$$

where

$$U_A = \frac{r^2\ S}{4\ K_h\ Dt} \tag{5}$$

and

$$B = \left[\frac{r^2}{D^2}\right]\ \frac{K_v}{K_h} \tag{6}$$

For late time behavior the following equation applies.

$$s = \frac{Q}{4\ \pi\ K_h\ D\ (b_1/D)}\ W\ (U_B,\ B,\ b_1/D,\ b_2/D) \tag{7}$$

where

$$U_B = \frac{r^2 S_Y}{4\ K_h\ Dt} \tag{8}$$

where

s	=	drawdown (ft)
S	=	storativity
S_Y	=	specific yield
Q	=	pumping rate (ft^3/day)
D	=	initial saturated thickness (ft)
b_1	=	depth to base of control well screen (ft)
b_2	=	depth to base of observation well screen (ft)
K_h	=	horizontal hydraulic conductivity (ft/day)
r	=	distance to the control well (ft)
b_1	=	depth to base of screen in control well from the water table
b_2	=	depth to base of screen in observation well from the water table

Well-function tables provided in Annex 10.3 and 10.4 of Kruseman and deRidder (1989) were used to generate type A and B curves. For this pumping test the ratio of the depth to the bottom of the control well screen from the original water table to the full saturated thickness of the aquifer (b_1/D) is 31.558 feet divided by 131 feet or .2409 (see Figure 3-1). The ratio of the depth to the bottom of the observation well screens from the original water table to the full saturated thickness of the aquifer (b_2/D) ranges from .176 to .188. The type curves with a b_1/D, and b_2/D ratio of .20 were the closest match available of the curve data supplied in the Annexes. Type curves for these depth ratios (.20) were produced and compared to log-log plots of corrected drawdown versus time (for the first 6000 minutes of the 10,000 minute CRT) for each of the six observation wells (31551 through 31556). The match points and results are tabulated in Table 5-7. The type curve data in Annex 10.4 had what was interpreted as typos in the square root of beta column identified as .05. The last five entries (1.1397, 1.3810, 1.5921, 1.8216, and 1.9744) were changed to 2.1397, 2.3810, 2.5921, 2.8216, and 2.9744. The type curves used in the curve-matching exercise, as well as the log-log plots of corrected drawdown versus time, are provided in Appendix F.

The curve-matching was accomplished by first matching the late time data to the Type B curves. Match points were selected and used to calculate horizontal hydraulic conductivity and specific yield using Equations 7 and 8. The horizontal hydraulic conductivity results range from a low of 355 feet/day in Well 31551 to a high of 525 feet/day in Well 31554. The specific yield results range from a low of .038 in Well 31554 to a high of .258 in Well 31551. Once the match points had been selected and properties calculated for the late time data, the procedure was applied to the early time data using a Type A curve with the same square root of beta value and Equations 4 and 5. The horizontal hydraulic conductivity results range from a low of 291 feet/day in Well 31551 to a high of 524 feet/day in Well 31554. The storativity results range from a low of .001 in Well 31555 to a high of .005 in Well 31551 (Table 5-7). Obtaining a match using the early time data and the Type A curves was difficult because the first 1 minute of drawdown was effected by casing storage. After the first minute, the remaining early time data are essentially linear.

Sample calculations of K_h and S_Y for Well 31554 are shown below.

$$Q = \frac{700\ gal}{\text{min}} \times \frac{ft^3}{7.48\ gal} \times \frac{1440\ \text{min}}{day} = 134{,}759\ \frac{ft^3}{day}$$

$$K_h = \frac{Q\ W_B}{4\ \pi\ (b_1/D)\ s\ D} = \frac{(134{,}759\ ft^3/d)(2.7)}{(4)(\pi)(.2409)(1.746\ ft)(131\ ft)}$$

$$K_h = 525.48 \text{ ft/day}$$

$$S_Y = \frac{4\ K_h\ Dt}{r^2\ (^1/U_B)} = \frac{4\ (525.48\ ft/day)(131\ ft)(.694\ days)}{(50\ ft)^2\ (2000)}$$

$$S_Y = .038$$

$$\frac{b_1}{D} = \frac{31.558\ ft}{131\ ft} = .2409$$

where

K_h	=	horizontal hydraulic conductivity (ft/day)
D	=	initial saturated thickness (ft)
W_B	=	well function
Q	=	discharge rate (ft^3/day)
S_Y	=	specific yield
r	=	distance to the control well (ft)
b_1	=	depth to base of control well screen (ft)
s	=	drawdown (ft)

Neuman

As reported in Kruesman & de Ridder (1989), Neuman developed a curve-fitting method based on the following equation:

$$s = \frac{Q}{4\ \pi\ K_h\ D}\ W\ (U_A\ [or\ U_B],\ B,\ S/S_Y,\ b/D,\ D,\ Z/D) \qquad (9)$$

where

$$U_A = \frac{r^2\ S}{4\ K_h\ Dt} \qquad (10)$$

and

$$U_B = \frac{r^2\ S_Y}{4\ K_h\ Dt} \qquad (11)$$

$$B = \left[\frac{r}{D}\right]^2 \frac{K_v}{K_h} \tag{12}$$

The Neuman curve-fitting method was selected for determining aquifer properties for this CRT. The analysis was performed using Version 1.1 of the AQTESOLV (Aquifer Test Solver) computer software package developed by Geraghty & Miller, Inc. The AQTESOLV solution is based on Neuman (1975).

As mentioned earlier, the control and observation wells only partially penetrate the Great Miami Aquifer. Partial penetration induces vertical flow components and causes the flow velocity in the immediate vicinity of the control well to be higher than conditions would be if the well fully penetrated the aquifer. The effect is greatest close to the control well and then decreases, becoming negligible at a distance of 1.5 to 2 times the saturated thickness of the aquifer. AQTESOLV has an option that can be used to correct for the effect caused by partial penetration. This option was used in the analysis of data from this pumping test for Observation Wells 31551 through 31556.

AQTESOLV has an automatic estimation feature that improves upon the visual curve-matching fit by using a nonlinear least-squares parameter estimation algorithm to converge on a solution which minimizes the residual error.

Observed drawdown data used in the Neuman analysis was assessed and corrected for natural recharge, recharge due to precipitation, decreases in saturated thickness, and casing storage as described in Section 5.2. AQTESOLV allows the user to apply a weighting factor to each data point and the effect of casing storage was handled using this option. The weighting factor influences how the error generated by each individual data point is considered when the program determines the quality of the current fit. Data points for the first minute of the CRT were weighted at 25 percent (casing storage affected this data making it less reliable; see Section 5.2) and data entered for the rest of the CRT (up to 6000 minutes) were weighted at 100 percent. The last 4000 minutes of the CRT was not included in the analysis because it was effected by recharge due to precipitation (see Section 5.2).

The AQTESOLV printouts and curve-match plots are provided in Appendix G. The results are tabulated in Table 5-8. K_v was calculated using the following equation which is presented in Dawson & Istok (1991, page 280, equation 19.16):

$$K_v = \frac{B K_h M^2}{r^2} \tag{13}$$

where

K_v	=	vertical component of hydraulic conductivity
K_h	=	horizontal component of hydraulic conductivity
B	=	beta
M	=	original saturated aquifer thickness
r	=	distance from the control well

Calculated horizontal hydraulic conductivity for the six observation wells ranges from 509 to 558 feet/day with a geometric mean of 523.6 feet/day. Calculated vertical hydraulic conductivity for the six observation wells ranges from 31.9 to 66.6 feet/day with a geometric mean of 51.5 feet/day. Specific yield ranges from .089 to .2, well within the reported range of .01 to .3 for unconfined aquifers (Cherry 1979, pg. 61).

TABLE 5-1

SOUTH FIELD PUMPING TEST OBSERVED WATER LEVELS, CONSTANT-RATE TEST

	Wells							
Time (minutes)	31550-I[a] (ft)	31550-O[b] (ft)	31551 (ft)	31552 (ft)	31553 (ft)	31554 (ft)	31555 (ft)	31556 (ft)
0	519.914	519.618	519.521	519.508	519.447	519.549	519.488	519.467
0.1	519.914	519.611	519.521	519.508	519.447	519.549	519.488	519.461
0.2	519.737	519.440	519.514	519.508	519.447	519.543	519.482	519.461
0.3	515.212	514.667	519.223	519.394	519.441	519.461	519.380	519.448
0.4	507.789	507.387	518.640	519.153	519.422	519.209	519.145	519.391
0.5	504.313	502.344	518.190	518.957	519.396	518.951	518.935	519.328
0.6	504.320	500.726	518.013	518.868	519.371	518.800	518.833	519.290
0.7	504.313	500.272	517.950	518.830	519.365	518.730	518.795	519.271
0.8	504.313	500.058	517.918	518.811	519.358	518.699	518.776	519.258
0.9	504.313	499.907	517.899	518.804	519.352	518.686	518.763	519.252
1	504.307	499.976	517.899	518.792	519.352	518.674	518.750	519.245
2	504.294	500.618	517.905	518.785	519.339	518.661	518.744	519.226
3	504.282	501.582	517.943	518.785	519.333	518.667	518.744	519.226
4	504.256	502.810	518.013	518.804	519.327	518.699	518.770	519.220
5	504.174	503.737	518.057	518.817	519.320	518.718	518.782	519.220
6	504.174	503.749	518.064	518.817	519.314	518.711	518.776	519.214
7	504.237	504.203	518.064	518.811	519.308	518.718	518.776	519.214
8	504.294	504.260	518.070	518.811	519.308	518.711	518.776	519.207
9	504.288	504.235	518.057	518.804	519.301	518.705	518.770	519.201
10	504.307	504.209	518.057	518.792	519.295	518.699	518.757	519.195
20	504.503	504.449	518.000	518.735	519.257	518.636	518.700	519.144
30	504.250	503.819	517.899	518.665	519.226	518.560	518.630	519.106
40	504.244	503.995	517.855	518.621	519.194	518.523	518.592	519.074
50	504.237	503.857	517.817	518.583	519.169	518.485	518.553	519.036
60	504.231	503.875	517.772	518.545	519.137	518.447	518.515	519.005
70	504.219	503.863	517.741	518.513	519.118	518.415	518.483	518.979
80	504.212	503.836	517.715	518.488	519.099	518.390	518.464	518.960
90	504.206	503.857	517.690	518.462	519.087	518.371	518.439	518.935
100	504.212	503.888	517.677	518.450	519.074	518.353	518.420	518.922
200	504.168	503.819	517.519	518.291	518.948	518.189	518.267	518.783
300	504.212	503.667	517.443	518.222	518.891	518.107	518.191	518.720
400	504.035	503.302	517.355	518.146	518.834	518.038	518.121	518.656
500	504.048	503.396	517.310	518.095	518.777	517.981	518.070	518.605
600	504.061	503.264	517.272	518.063	518.745	517.950	518.032	518.567

TABLE 5-1
(Continued)

Time (minutes)	Wells							
	31550-I[a] (ft)	31550-O[b] (ft)	31551 (ft)	31552 (ft)	31553 (ft)	31554 (ft)	31555 (ft)	31556 (ft)
700	504.035	503.434	517.241	518.032	518.714	517.912	518.000	518.563
800	504.016	503.378	517.215	517.994	518.682	517.887	517.969	518.504
900	504.004	503.189	517.177	517.968	518.657	517.849	517.943	518.479
1000	503.985	503.226	517.152	517.943	518.632	517.824	517.918	518.453
2000	503.966	503.252	517.070	517.848	518.537	517.736	517.823	518.358
3000	503.814	503.107	516.994	517.776	518.442	517.654	517.740	518.276
4000	503.827	503.126	516.981	517.753	518.436	517.648	517.727	518.270
5000	503.997	502.766	516.924	517.709	518.471	517.604	517.689	518.251
6000	503.884	502.867	516.930	517.709	518.404	517.604	517.689	518.251
7000	503.858	502.930	516.950	517.753	518.442	517.648	517.734	518.295
8000	503.877	502.577	517.020	517.778	518.480	517.685	517.753	518.327
9000	503.682	502.621	517.040	517.842	518.531	517.742	517.816	518.390
10,000	503.789	502.703	517.120	517.905	518.600	517.811	517.880	518.453

[a]Observation well inside well screen
[b]Observation well in filter pack

TABLE 5-2

SOUTH FIELD PUMPING TEST, OBSERVED DRAWDOWN, CONSTANT-RATE TEST

Time (minutes)	Wells							
	Drawdown (ft)							
	31550-I[a]	31550-O[b]	31551	31552	31553	31554	31555	31556
0								
0.1	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.006
0.2	0.177	0.178	0.007	0.000	0.000	0.006	0.006	0.006
0.3	4.702	4.951	0.298	0.114	0.006	0.088	0.108	0.019
0.4	12.125	12.231	0.881	0.355	0.025	0.340	0.343	0.076
0.5	15.601	17.274	1.331	0.551	0.051	0.598	0.553	0.139
0.6	15.594	18.892	1.508	0.640	0.076	0.749	0.655	0.177
0.7	15.601	19.346	1.571	0.678	0.082	0.819	0.693	0.196
0.8	15.601	19.560	1.603	0.697	0.089	0.850	0.712	0.209
0.9	15.601	19.711	1.622	0.704	0.095	0.863	0.725	0.215
1	15.607	19.642	1.622	0.716	0.095	0.875	0.738	0.222
2	15.620	19.000	1.616	0.723	0.108	0.888	0.744	0.241
3	15.632	18.036	1.578	0.723	0.114	0.882	0.744	0.241
4	15.658	16.808	1.508	0.704	0.120	0.850	0.718	0.247
5	15.740	15.881	1.464	0.691	0.127	0.831	0.706	0.247
6	15.740	15.869	1.457	0.691	0.133	0.838	0.712	0.253
7	15.677	15.415	1.457	0.697	0.139	0.831	0.712	0.253
8	15.620	15.358	1.451	0.697	0.139	0.838	0.712	0.260
9	15.626	15.383	1.464	0.704	0.146	0.844	0.718	0.266
10	15.607	15.409	1.464	0.716	0.152	0.850	0.731	0.272
20	15.411	15.169	1.521	0.773	0.190	0.913	0.788	0.323
30	15.664	15.799	1.622	0.843	0.221	0.989	0.858	0.361
40	15.670	15.623	1.666	0.887	0.253	1.026	0.896	0.393
50	15.677	15.761	1.704	0.925	0.278	1.064	0.935	0.431
60	15.683	15.743	1.749	0.963	0.310	1.102	0.973	0.462
70	15.695	15.755	1.780	0.995	0.329	1.134	1.005	0.488
80	15.702	15.782	1.806	1.020	0.348	1.159	1.024	0.507
90	15.708	15.761	1.831	1.046	0.360	1.178	1.049	0.532

TABLE 5-2
(Continued)

Time (minutes)	Wells							
	Drawdown (ft)							
	31550-I[a]	31550-O[b]	31551	31552	31553	31554	31555	31556
100	15.702	15.730	1.844	1.058	0.373	1.196	1.068	0.545
200	15.746	15.799	2.002	1.217	0.499	1.360	1.221	0.684
300	15.702	15.951	2.078	1.286	0.556	1.442	1.297	0.747
400	15.879	16.316	2.166	1.362	0.613	1.511	1.367	0.811
500	15.866	16.222	2.211	1.413	0.670	1.568	1.418	0.862
600	15.853	16.354	2.249	1.445	0.702	1.599	1.456	0.900
700	15.879	16.184	2.280	1.476	0.733	1.637	1.488	0.904
800	15.898	16.240	2.306	1.514	0.765	1.662	1.519	0.963
900	15.910	16.429	2.344	1.540	0.790	1.700	1.545	0.988
1000	15.929	16.392	2.369	1.565	0.815	1.725	1.570	1.014
2000	15.948	16.366	2.451	1.660	0.910	1.813	1.665	1.109
3000	16.100	16.511	2.527	1.732	1.005	1.895	1.748	1.191
4000	16.087	16.492	2.540	1.755	1.011	1.901	1.761	1.197
5000	15.917	16.852	2.597	1.799	0.976	1.945	1.799	1.216
6000	16.030	16.751	2.591	1.799	1.043	1.945	1.799	1.216
7000	16.056	16.688	2.571	1.755	1.005	1.901	1.754	1.172
8000	16.037	17.041	2.501	1.730	0.967	1.864	1.735	1.140
9000	16.232	16.997	2.481	1.666	0.916	1.807	1.672	1.077
10,000	16.125	16.915	2.401	1.603	0.847	1.738	1.608	1.014

[a]Observation well inside well screen
[b]Observation well inside filter pack

TABLE 5-3

SOUTH FIELD PUMPING TEST DRAWDOWNS CORRECTED FOR REGIONAL WATER TABLE RISE

Time (minutes)	Wells					
	31551	31552	31553	31554	31555	31556
0						
0.1	0.000	0.000	0.000	0.000	0.000	0.006
0.2	0.007	0.000	0.000	0.006	0.006	0.006
0.3	0.298	0.114	0.006	0.088	0.108	0.019
0.4	0.881	0.355	0.025	0.340	0.343	0.076
0.5	1.331	0.551	0.051	0.598	0.553	0.139
0.6	1.508	0.640	0.076	0.749	0.655	0.177
0.7	1.571	0.678	0.082	0.819	0.693	0.196
0.8	1.603	0.697	0.089	0.850	0.712	0.209
0.9	1.622	0.704	0.095	0.863	0.725	0.215
1	1.622	0.716	0.095	0.875	0.738	0.222
2	1.616	0.723	0.108	0.888	0.744	0.241
3	1.578	0.723	0.114	0.882	0.744	0.241
4	1.508	0.704	0.120	0.850	0.718	0.247
5	1.464	0.691	0.127	0.831	0.706	0.247
6	1.457	0.691	0.133	0.838	0.712	0.253
7	1.457	0.697	0.139	0.831	0.712	0.253
8	1.451	0.697	0.139	0.838	0.712	0.260
9	1.464	0.704	0.146	0.844	0.718	0.266
10	1.464	0.716	0.152	0.850	0.731	0.272
20	1.521	0.773	0.190	0.913	0.788	0.323
30	1.623	0.844	0.222	0.990	0.859	0.362
40	1.667	0.888	0.254	1.027	0.897	0.394
50	1.705	0.926	0.279	1.065	0.936	0.432
60	1.750	0.964	0.311	1.103	0.974	0.463
70	1.781	0.996	0.330	1.135	1.006	0.489

TABLE 5-3
(continued)

Time (minutes)	Wells					
	31551	31552	31553	31554	31555	31556
80	1.808	1.022	0.350	1.161	1.026	0.509
90	1.833	1.048	0.362	1.180	1.051	0.534
100	1.846	1.060	0.375	1.198	1.070	0.547
200	2.006	1.221	0.503	1.364	1.225	0.688
300	2.084	1.292	0.562	1.448	1.303	0.753
400	2.174	1.370	0.621	1.519	1.375	0.819
500	2.221	1.423	0.680	1.578	1.428	0.872
600	2.261	1.457	0.714	1.611	1.468	0.912
700	2.295	1.491	0.748	1.652	1.503	0.919
800	2.323	1.531	0.782	1.679	1.536	0.980
900	2.363	1.559	0.809	1.719	1.564	1.007
1000	2.390	1.586	0.836	1.746	1.591	1.035
2000	2.493	1.702	0.952	1.855	1.707	1.151
3000	2.589	1.794	1.067	1.957	1.810	1.253
4000	2.623	1.838	1.094	1.984	1.844	1.280
5000	2.701	1.903	1.080	2.049	1.903	1.320
6000	2.716	1.924	1.168	2.070	1.924	1.341
7000	2.717	1.901	1.151	2.047	1.900	1.318
8000	2.668	1.897	1.134	2.031	1.902	1.307
9000	2.668	1.853	1.103	1.994	1.859	1.264
10000	2.609	1.811	1.055	1.946	1.816	1.222

TABLE 5-4

BAROMETRIC EFFICIENCY (BE) OF OBSERVATION WELLS 31551 THROUGH 31556

Date/Time Measured	Net Change of Water Elevations					
	Well No.					
	31551	31552	31553	31554	31555	31556
04/29/95, 10:00 am	-0.04	-0.05	-0.05	-0.037	-0.044	-0.063
04/30/95, 03:15 am	-0.075	-0.095	-0.094	-0.081	-0.089	-0.107
▲W[a]	0.035	0.045	0.044	0.044	0.045	0.044

* * * * * * *

	Barometric Efficiency (BE)					
▲W	0.035	0.045	0.044	0.044	0.045	0.044
▲P[b,c]	0.24	0.24	0.24	0.24	0.24	0.24
BE[d]	14.6%	18.8%	18.3%	18.3%	18.8%	18.3%

[a] ▲W = Net change in water level
[b] = 4/29/95, 10:00 a.m., Barometric Pressure = 29.48 inches of mercury (Hg)
4/30/95, 03:15 a.m., Barometric Pressure = 29.27 inches of Hg
[c] ▲P = Change in barometric pressure (inches of mercury of [Hg]). Barometric pressure data collected from FEMP Meteorological Station. Conversion Factor: Inches of Hg (32°) to feet of water (39.2°) = Barometric Pressure (in Hg) 1.132957
[d] BE = ▲W/▲P

TABLE 5-5

EFFECT ON DRAWDOWN OF DECREASE IN SATURATED THICKNESS OF AQUIFER

Well Number	Distance (feet)	Observed Drawdown* (feet) at 6000 Minutes	Ratio of Drawdown to Initial Saturated Thickness of 131 Feet	Corrected Drawdown (feet) at 6000 Minutes	Percent Change in Drawdown
31551	25	2.716	0.0207	2.688	1.03
31552	50	1.924	0.0147	1.910	0.73
31553	150	1.168	0.0089	1.163	0.43
31554	50	2.070	0.0158	2.054	0.77
31555	50	1.924	0.0147	1.910	0.73
31556	100	1.341	0.0102	1.335	0.45

* Observed drawdown corrected for regional water table rise of approximately 0.21 feet/week.

TABLE 5-6

CORRECTED OBSERVED DRAWDOWN BETWEEN 1000 AND 6000 MINUTES, CONSTANT-RATE TEST

Time (minutes)	Wells											
	Corrected For Seasonal Trends (ft)						Corrected For Decrease In Saturation (ft)[a, b]					
	31551	31552	31553	31554	31555	31556	31551	31552	31553	31554	31555	31556
1000	2.390	1.586	0.836	1.746	1.591	1.035	2.368	1.576	0.833	1.734	1.581	1.031
2000	2.493	1.702	0.952	1.855	1.707	1.151	2.469	1.691	0.948	1.842	1.696	1.146
3000	2.589	1.794	1.067	1.957	1.810	1.253	2.564	1.782	1.063	1.943	1.798	1.247
4000	2.623	1.838	1.094	1.984	1.844	1.280	2.597	1.825	1.090	1.969	1.831	1.274
5000	2.701	1.903	1.080	2.049	1.903	1.320	2.673	1.889	1.076	2.033	1.889	1.313
6000	2.716	1.924	1.168	2.070	1.924	1.341	2.688	1.910	1.163	2.054	1.910	1.334
7000	2.717	1.901	1.151	2.047	1.900	1.318	2.689	1.887	1.146	2.031	1.886	1.311
8000	2.668	1.897	1.134	2.031	1.902	1.307	2.640	1.883	1.129	2.015	1.888	1.300
9000	2.668	1.853	1.103	1.994	1.859	1.264	2.641	1.840	1.099	1.979	1.846	1.258
10000	2.609	1.811	1.055	1.946	1.816	1.222	2.583	1.799	1.051	1.932	1.804	1.217

[a]Corrected using the Jacob equation; see Equation 2.
[b]Corrections for decrease in saturation were applied after other corrections had been made.

TABLE 5-7

STRELTSOVA RESULTS

Well No.	Distance from Control Well (feet)	Beta	Match Points: Well Function	Match Points: $1/U_A$, $1/U_B$[a]	Match Points: Drawdown (feet)	Match Points: Time (minutes)	Transmissivity ft^2/minute	Horizontal Hydraulic Conductivity[c] ft/day (K_h[d])	Storage[b]
Late Time Data									
31551	25	0.05	2.3	400	2.211	500	32.32	355	0.258
31552	50	0.1	2.0	1000	1.586	1000	38.99	429	0.052
31553	150	0.3	1.1	100	0.782	800	43.49	478	0.062
31554	50	0.5	2.7	2000	1.746	1000	47.81	525	0.038
31555	50	0.1	2.0	800	1.591	1000	38.86	427	0.078
31556	100	0.2	1.4	300	1.035	1000	41.81	460	0.056
Early Time Data									
31551	25	0.05	1.37	100	1.600	2.6	26.47	291	0.005
31552	50	0.1	0.79	200	0.704	4	34.69	381	0.001
31553	150	0.3	0.14	9	0.114	3	37.97	417	0.002
31554	50	0.05	1.37	100	0.888	2	47.69	524	0.002
31555	50	0.1	0.79	200	0.728	4	33.54	369	0.001
31556	100	0.2	0.31	20	0.241	3	39.77	437	0.002

[a] $1/U_A$, $1/U_B$ - see Equations 5 and 8, respectively
[b] Storage for late time data is specific yield; storage for early time data is storativity.
[c] Saturated thickness = 131 feet
[d] K_h geometric average (late time data) = 443
K_h geometric average (early time date) = 397

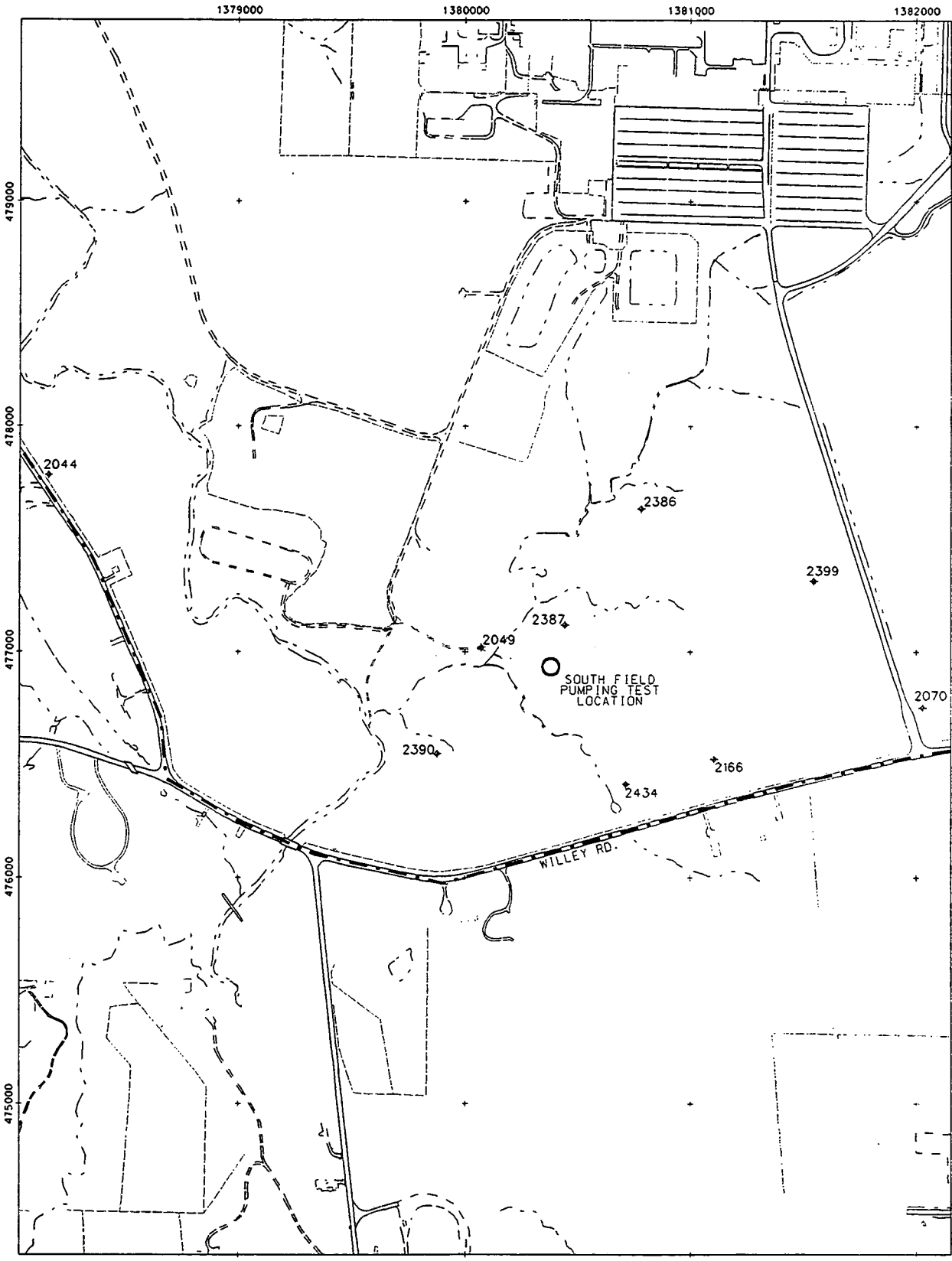
TABLE 5-8

NEUMAN RESULTS

Well Number	Distance From Well 31550 (ft)	Transmissivity (ft^2/minute)	Coefficient of Storage	Specific Yield	Beta	Vertical Hydraulic Conductivity[a] (ft/day) (K_v[b])	Horizontal Hydraulic Conductivity[a] (ft/day) (K_h[c])
31551	25	47.79	0.01659	0.204	0.004622	66.6	525
31552	50	47.35	0.008291	0.1401	0.01685	60.3	521
31553	150	50.76	0.008797	0.08918	0.07497	31.9	558
31554	50	46.34	0.009107	0.1136	0.01331	46.5	509
31555	50	46.81	0.00997	0.1434	0.01685	59.5	514
31556	100	46.92	0.005917	0.1065	0.05977	52.93	516

[a]Saturated thickness = 131 feet
[b]K_v geometric average = 51.5 (ft/day)
[c]K_h geometric average = 523.6 (ft/day)

/USR/ERMAS/SAFS1/DGN/MAP/HOR/DPTH/FSFIG7.DGN FER OU5 11/1/94 STATE PLANAR COORDINATE SYSTEM 1927



LEGEND:

O TEST LOCATION

—·—·— FEMP BOUNDARY

✦ OBSERVATION WELLS

SCALE

650 325 0 650 FEET

DRAFT

FIGURE 5.1. PUMPING TEST AREA SHOWING EXISTING OBSERVATION WELLS

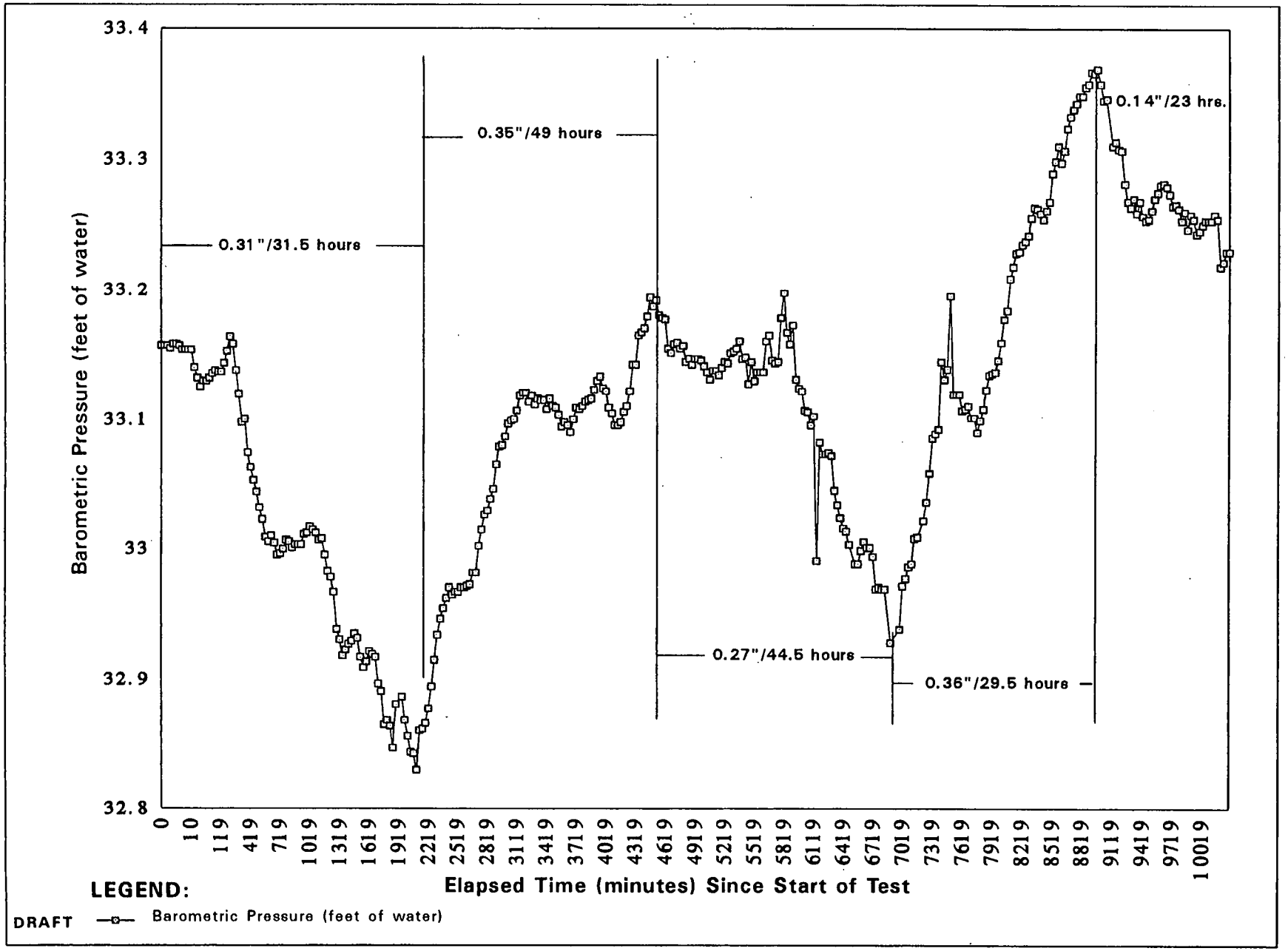


FIGURE 5-2. BAROMETRIC PRESSURE CHANGES DURING CONSTANT-RATE TEST

000068

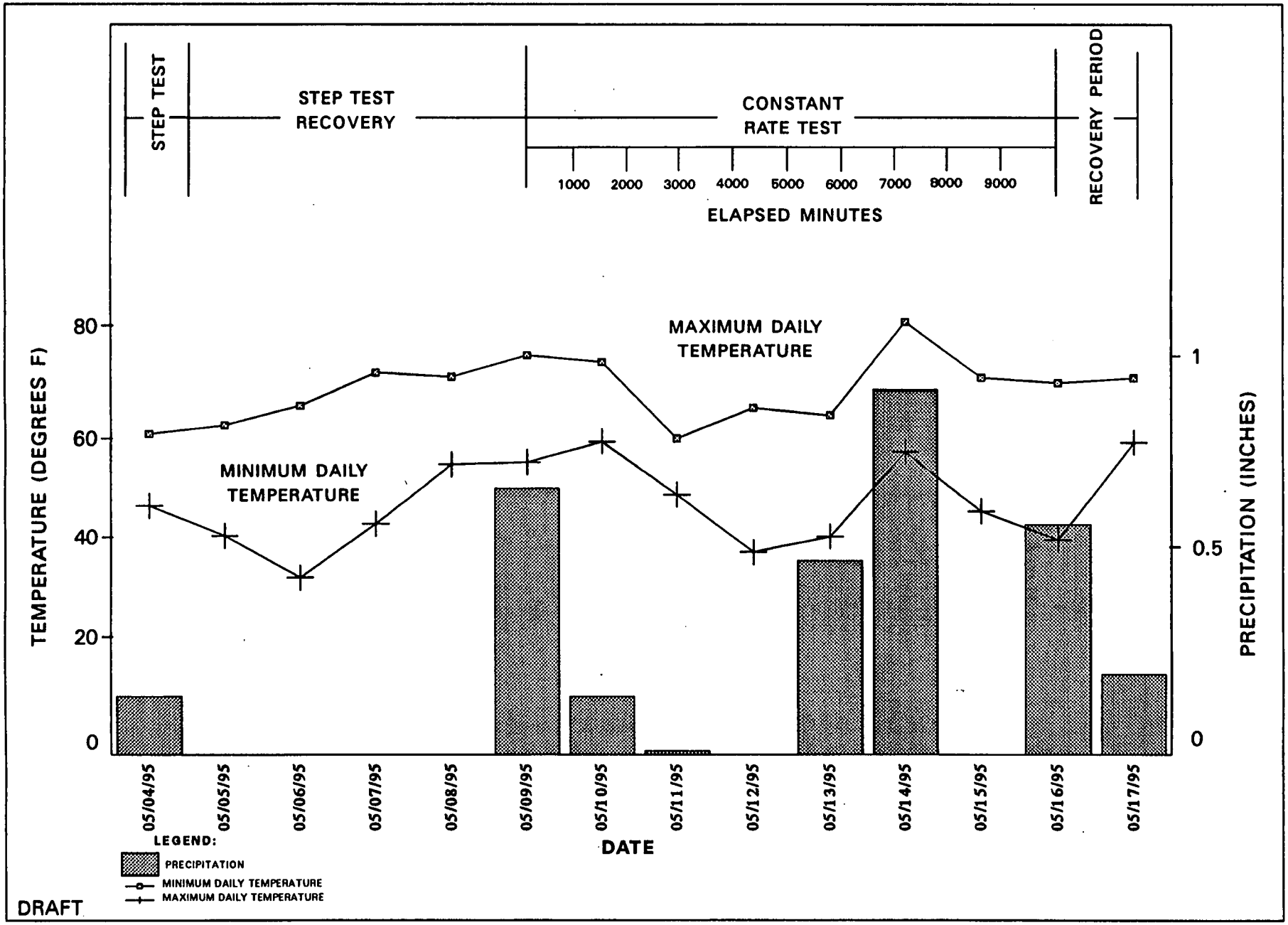
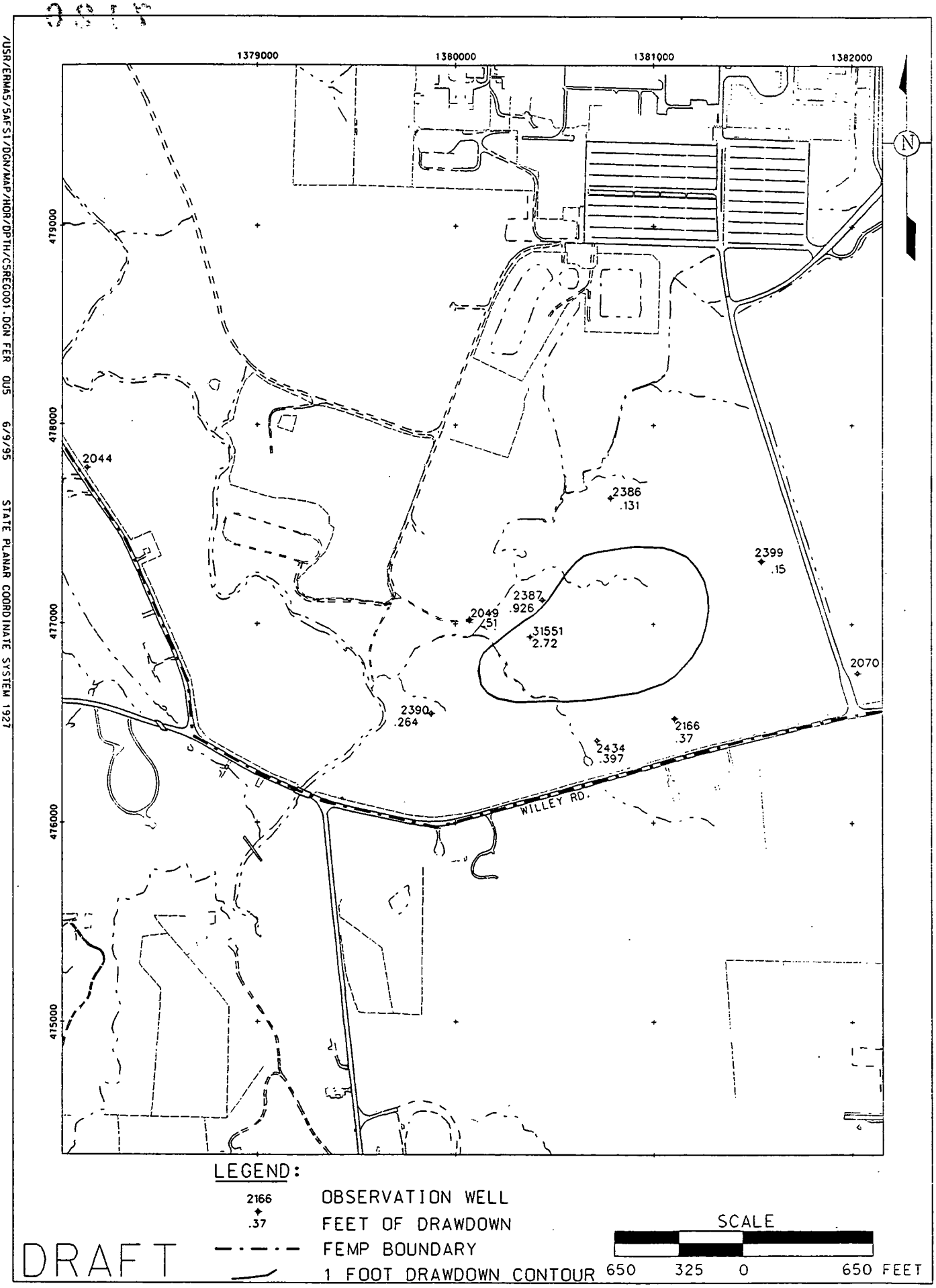


FIGURE 5-3. WEATHER DATA DURING CONSTANT-RATE TEST



/USR/ERMA5/SAFS1/DGN/MAP/HOR/DPTH/C5REG001.DGN FER OU5 6/9/95 STATE PLANAR COORDINATE SYSTEM 1927

FIGURE 5-4. RADIUS OF INFLUENCE FOR CONSTANT-RATE TEST

Section 6.0

6.0 QUALITY OF PUMPED GROUNDWATER

During the CRT, groundwater samples were collected from the discharge line every 12 hours and measured for pH, specific conductance, turbidity, dissolved oxygen, temperature, and total uranium. Total suspended solids were also measured just before the end of the CRT. Results are tabulated in Table 6-1.

Results indicate that the total uranium concentration discharged from the control well ranged between 100 and 150 μg/L. After the first four days of pumping the concentration stabilized at 130 μg/L. Assuming that the concentration of total uranium was 150 μg/L for the first four days of pumping and 130 μg/L for the remaining three days of pumping, approximately 8.8 pounds of uranium were removed from the aquifer during the CRT.

Less than 2 mg/L of total suspended solids were measured on the last day of the CRT. During the CRT pH ranged between 6.85 and 7.33 with an average of 7.07. Specific conductance (with the exclusion of one reading collected on May 13) ranged from 751 to 960 microsiemens with an average of 847 microsiemens. Dissolved oxygen ranged from 6.59 to 8.15 mg/L with an average of 6.59 mg/L.

TABLE 6-1

WATER QUALITY READINGS

Date/Time Sample Collected	pH	Specific Conductance (microsiemens)	Turbidity (NTUs[a])	Dissolved Oxygen (mg/L)	Temperature F°	Total Uranium (μg/L)	Total Suspended Solids (mg/L)
05/09/95 / 08:08	6.85	792	10	6.82	60.08	100	b
05/09/95 / 20:00	7.27	798	1	5.91	62.24	b	b
05/10/95 / 08:37	7.01	950	20	7.97	56.84	b	b
05/10/95 / 20:00	7.33	824	10	6.58	58.64	140	b
05/11/95 / 08:19	6.94	950	0	6.23	56.12	140	b
05/11/95 / 20:00	7.19	920	1	6.71	57.38	150	b
05/12/95 / 08:10	6.70	960	0	6.60	53.06	150	b
05/12/95 / 20:00	7.27	831	6	7.96	57.92	130	b
05/13/95 / 07:59	6.96	N/A	11	5.50	57.92	130	b
05/13/95 / 20:00	7.25	960	0	8.15	56.12	130	b
05/14/95 / 08:00	7.03	802	10	6.37	58.28	130	b
05/14/95 / 20:00	7.27	757	10	5.81	63.50	130	b
05/15/95 / 20:00	7.27	751	29	7.79	59.90	130	b
05/15/95 / 07:59	6.79	798	5	5.86	57.56	130	b
05/16/95 / 07:59	6.85	789	15	5.81	58.46	130	b
05/16/95 / 09:07	7.07	823	6	5.43	56.66	b	<2.0
Average =	7.07	847	8	6.59	58.17	132.3	<2.0
Maximum =	7.33	960	29	8.15	63.55	150	<2.0
Minimum =	6.85	751	0	5.43	56.12	100	<2.0

[a]NTU = nephelometric turbidity unit
[b]Not sampled

Section 7.0

500060

7.0 CONCLUSION

Information gained from this pumping test is in agreement with and supports existing hydrogeologic interpretations and groundwater modeling. The interpretation of a braided stream depositional environment was supported by the sieve analyses. The estimation of in situ K_d (geometric mean of 23.5 L/kg) was very close to previous estimates of K_d (geometric mean of 25.4 L/kg) (DOE 1995a, Attachment F.8.IV, pg. F.8.IV-5).

The major objective of the pumping test was to calculate and/or assess hydraulic conductivity, storage, and anisotropy of the Great Miami Aquifer in the vicinity of a proposed South Field extraction system. Analysis of the observed drawdown measurements collected during the CRT indicate that:

- Natural seasonal recharge during the 10,000 minute CRT was .21 feet
- Water level fluctuations in the observation and control wells due to barometric pressure changes during the CRT were insignificant
- Casing storage influenced the first minute of the CRT
- The percent change in observed drawdown due to a decrease in saturated thickness of the aquifer resulting from the CRT was less than 1.03 percent
- Recharge due to precipitation during the CRT impacted the last 4000 minutes of the 10,000-minute CRT.

Analysis of the test data using the Neuman (1975) method and the AQTESOLV computer software code provided the best estimate of hydraulic conductivity and storage. It is felt that the Neuman results are more reliable than the Streltsova results because the Streltsova type curves were not calculated for the exact partial penetration condition which existed for this test, whereas the type curves used in the Neuman analysis were calculated for the exact partial penetration conditions by the AQTESOLV program.

Hydraulic conductivity estimates for the six observation wells ranged from 509 to 558 feet/day with a geometric mean of 523.6 feet/day. These results are consistent with previous pumping test results for the area, with a reported range of 120 to 774 feet/day (Table 7-1). Estimated vertical hydraulic conductivity ranged from 31.9 to 66.6 feet/day with a geometric mean of 51.5 feet/day. Estimates of specific yield ranged from .089 to .2 and fall within the reported range for unconfined aquifers. The tight range of hydraulic conductivity indicates that horizontal hydraulic conductivity in the Great Miami Aquifer at the testing location is fairly isotropic.

Results of the pumping test indicate that the calibrated values of horizontal and vertical hydraulic conductivity used in the site groundwater model for the pumping test area are adequate. Horizontal hydraulic conductivity in Layer 1 of the SWIFT model is calibrated at 638 feet/day and in Layer 2 at 534 feet/day at the pumping test location. This averages out to a value of 586 feet/day. The geometric mean for horizontal hydraulic conductivity resulting from the pumping test is 524 feet/day. It was estimated that the model would function adequately if the value used in Layer 1 was within a range of 204 to 1831 feet/day and the value used in Layer 2 was within a range of 171 feet/day to 1533 feet/day. Operating adequately is defined as keeping the concentrations to receptors resulting from the Operable Unit 5 risk assessment modeling to within an order of magnitude of their estimated outcomes. The modeled vertical to horizontal ratio of hydraulic conductivity is 1 to 10, also in good agreement with the results of the pumping test. Based upon the results of the pumping test it is not necessary to recalibrate the SWIFT groundwater fate and transport model for hydraulic conductivity.

The average dissolved oxygen measurement from discharge water collected during the pumping test is greater than 2 mg/L. If dissolved oxygen exceeds 2 mg/L, corrosive water is indicated (Driscoll 1986, pg. 454).

TABLE 7-1

HYDRAULIC CONDUCTIVITY FROM PUMPING TESTS IN THE GREAT MIAMI AQUIFER NEAR THE FEMP

Reference	Location	Hydraulic Conductivity[a] (ft/day)	Hydraulic Conductivity[a] cm/s
Dove, 1961	SOWC Wells	375 to 400	1.3×10^{-1} to 1.4×10^{-1}
Smith, 1962	Bolton Wellfield	328	1.2×10^{-1}
Klaer and Kazmann, 1948	Bolton Wellfield	120	4.2×10^{-2}
Kazmann, 1950	SOWC Wells	318 to 369	1.1×10^{-1} to 1.3×10^{-1}
Klaer and Kazmann, 1943	Hamilton South Wellfield	313 to 324	1.1×10^{-1} to 1.1×10^{-1}
Speiker and Norris, 1962	FEMP Production Well	267	9.4×10^{-2}
Lewis, 1968	SOWC Wells	334 to 404	1.2×10^{-1} to 1.4×10^{-1}
Smith, 1960	ChemDyne - Hamilton	214 to 412	7.5×10^{-2} to 1.5×10^{-1}
DOE, 1993	Fernald - FEMP Removal Action 3	413	1.5×10^{-1}
Smith, 1962	Ross - west bank of Great Miami River	534	1.9×10^{-1}
Smith, 1960	New Miami - mouth of Four Mile Creek	774	2.7×10^{-1}

[a]Summary statistics:

Minimum K_h	=	120 ft/day	4.2×10^{-2} cm/s
Maximum K_h	=	774 ft/day	2.7×10^{-1} cm/s
Average K_h	=	386 ft/day	1.4×10^{-1} cm/s
Standard deviation	=	164 ft/day	5.8×10^{-2} cm/s

8.0 REFERENCES

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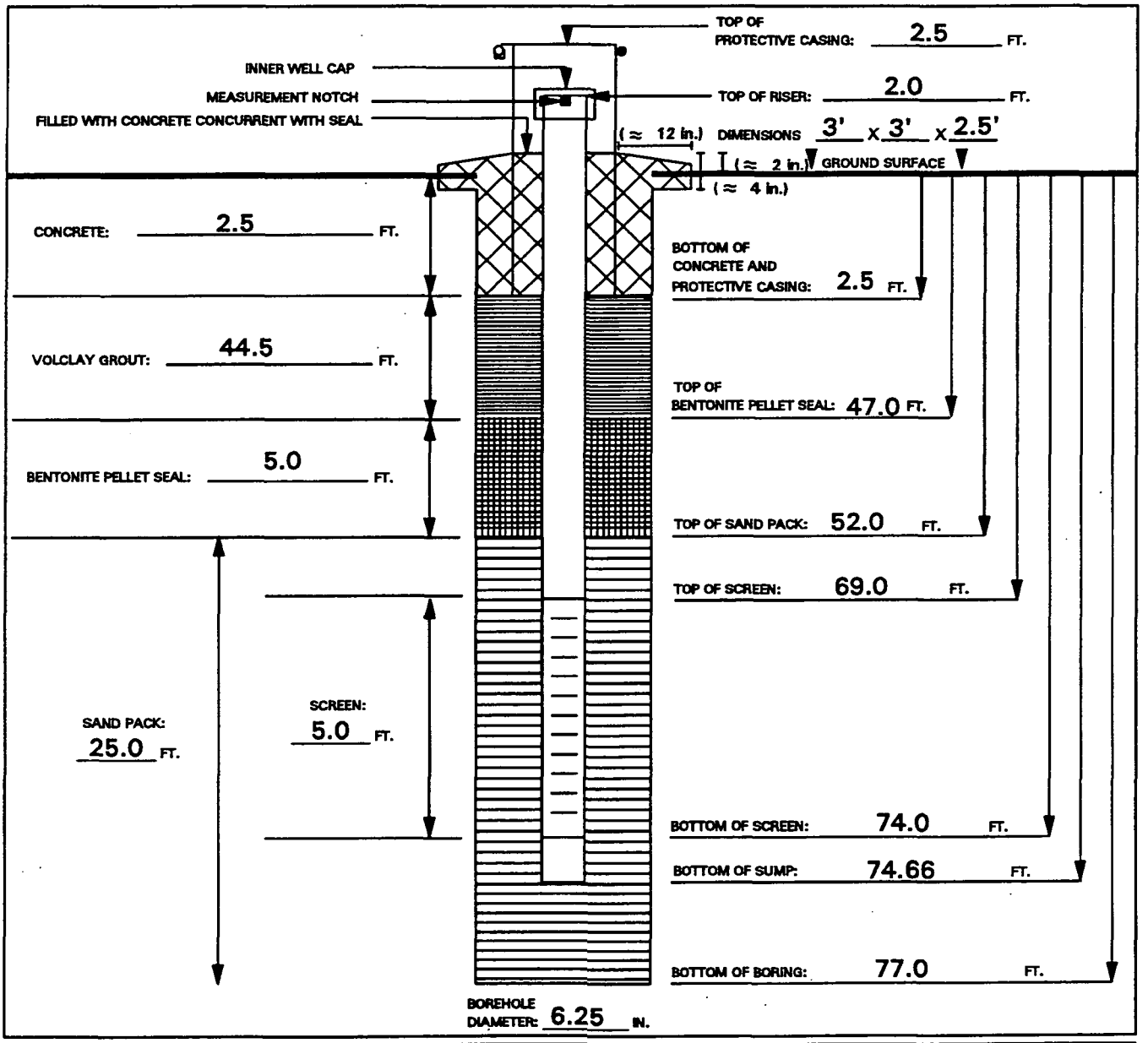
Appendix A

APPENDIX A

CONSTRUCTION INFORMATION FOR OBSERVATION WELLS

WELL NUMBER: 31551	WELL COMPLETION INFORMATION

PROJECT NAME: SOUTH FIELD PUMP TEST	PROJECT NUMBER: 50.03.32
GEOLOGIST: KEN GEIGER	DRILLING METHOD: ROTOSONIC



VOLUME AND TYPE OF GROUT USED: VOLCLAY, 200lbs.	BENTONITE PELLETS (5-GALLON BUCKETS): 100 lbs.	DEEPEST TEMPORARY DRILLING CASING PENETRATION: 77
VOLUME OF WATER LOST DURING DRILLING: 250 gal.	CASING MATERIAL: Sch 40 PVC	DRILLING CASING DIAMETER: 6.25
CASING WALL THICKNESS: Sch 40	VOLUME AND TYPE OF SAND PACK: NATURAL SAND	SCREEN MATERIAL: Sch 40
RISER / SCREEN DIAMETER: PVC 2 inch	SCREEN SLOT SIZE: 20 SLOT	SCREEN TYPE: Johnson Continuous

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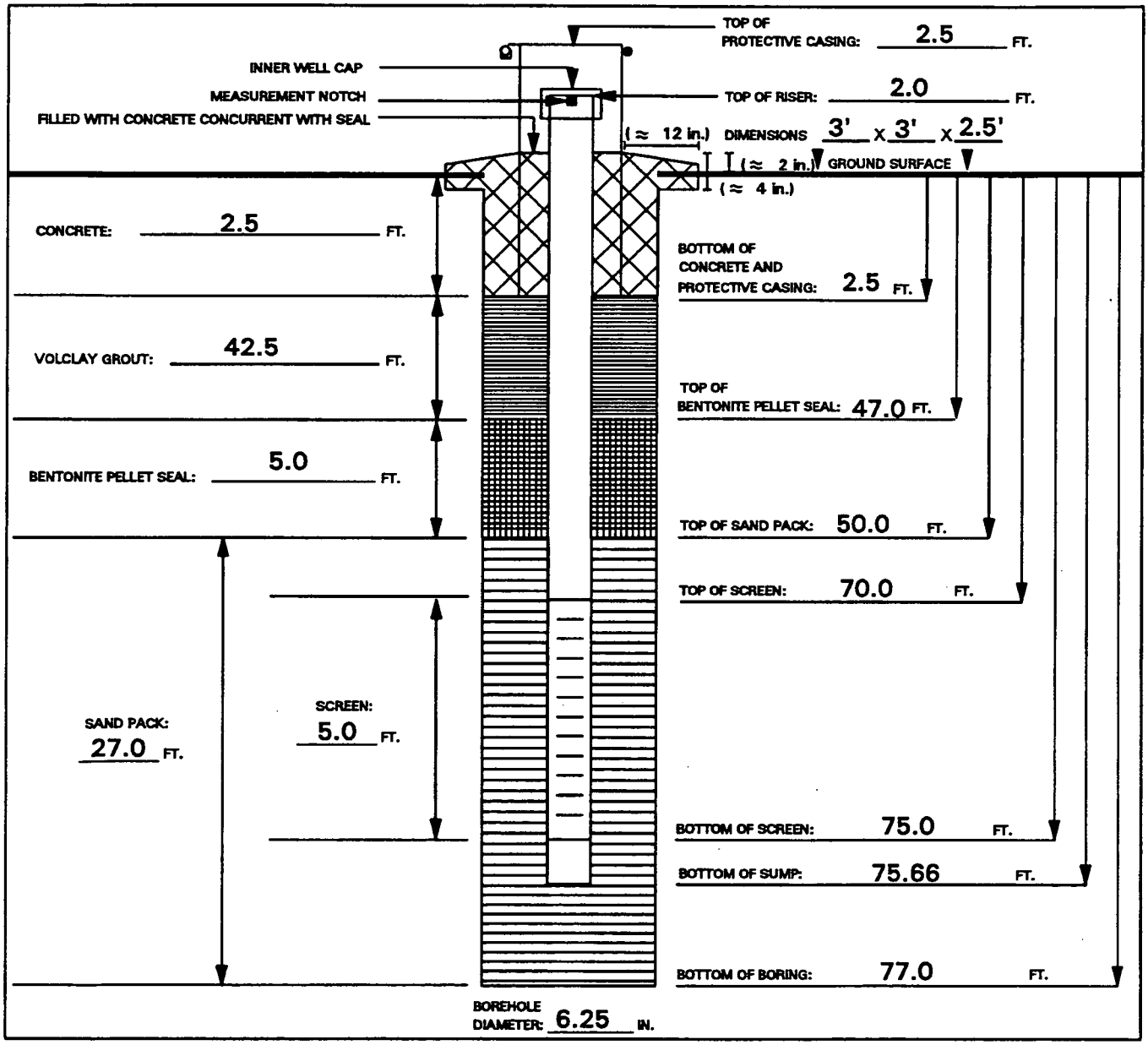
WELL NUMBER: 31552	WELL COMPLETION INFORMATION

PROJECT NAME: SOUTH FIELD PUMP TEST	PROJECT NUMBER: 50.03.32
GEOLOGIST: KEN GEIGER	DRILLING METHOD: ROTOSONIC



VOLUME AND TYPE OF GROUT USED: VOLCLAY, 200lbs.	BENTONITE PELLETS (5-GALLON BUCKETS): 100 lbs.	DEEPEST TEMPORARY DRILLING CASING PENETRATION: 77
VOLUME OF WATER LOST DURING DRILLING: 300 gal.	CASING MATERIAL: Sch 40 PVC	DRILLING CASING DIAMETER: 6.25
CASING WALL THICKNESS: Sch 40	VOLUME AND TYPE OF SAND PACK: NATURAL SAND	SCREEN MATERIAL: Sch 40
RISER / SCREEN DIAMETER: PVC 2 inch	SCREEN SLOT SIZE: 30 SLOT	SCREEN TYPE: Johnson Continuous

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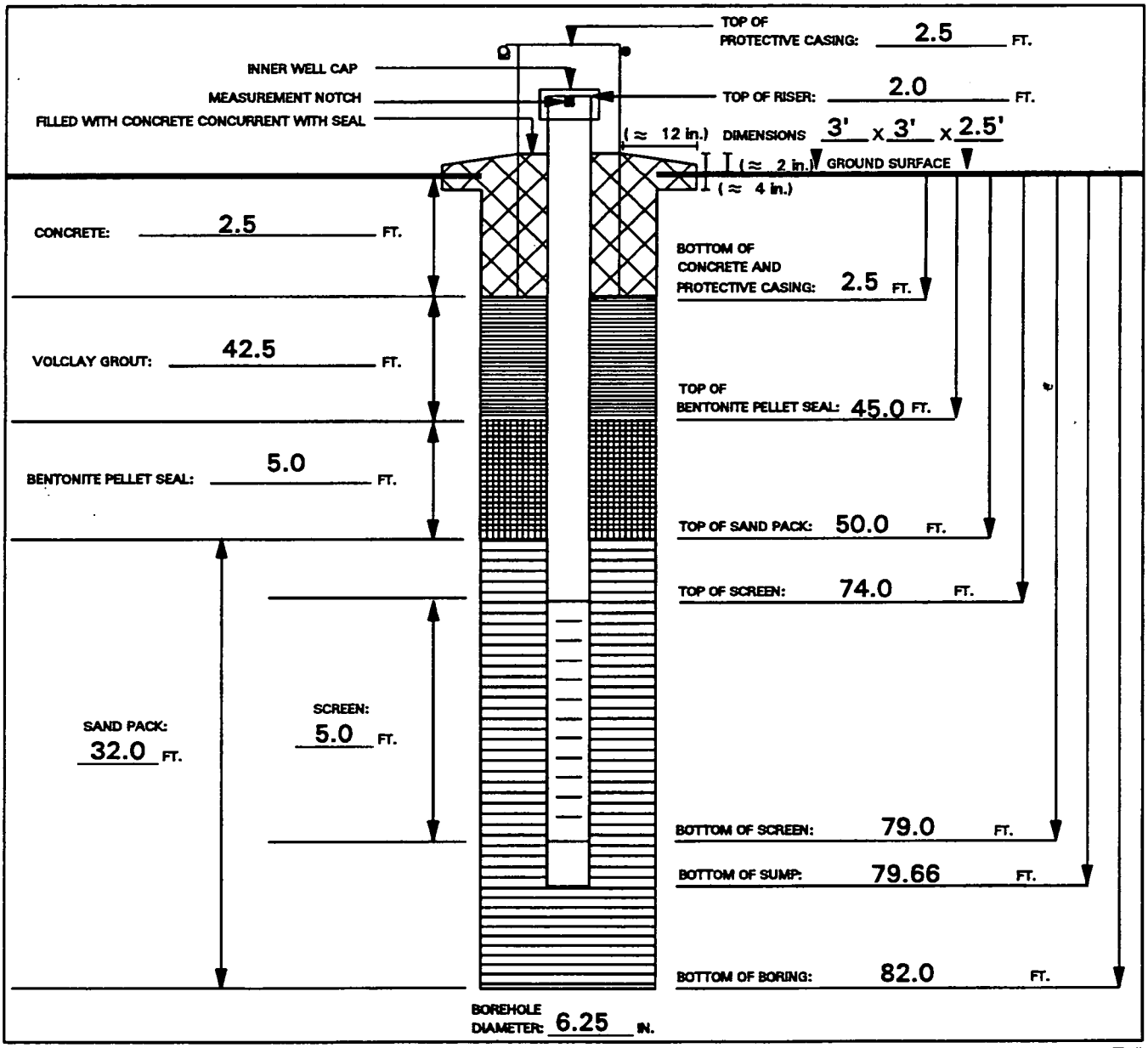
WELL NUMBER: 31553	WELL COMPLETION INFORMATION

PROJECT NAME: SOUTH FIELD PUMP TEST	PROJECT NUMBER: 50.03.32
GEOLOGIST: KEN GEIGER	DRILLING METHOD: ROTOSONIC

PILOT HOLE DRILLED TO BEDROCK, 187 FEET.



VOLUME AND TYPE OF GROUT USED: VOLCLAY, 200lbs.	BENTONITE PELLETS (5-GALLON BUCKETS): 100 lbs.	DEEPEST TEMPORARY DRILLING CASING PENETRATION: 187
VOLUME OF WATER LOST DURING DRILLING: N/A	CASING MATERIAL: Sch 40 PVC	DRILLING CASING DIAMETER: 6.25
CASING WALL THICKNESS: Sch 40	VOLUME AND TYPE OF SAND PACK: NATURAL SAND	SCREEN MATERIAL: Sch 40
RISER / SCREEN DIAMETER: PVC 2 inch	SCREEN SLOT SIZE: 40 SLOT	SCREEN TYPE: Johnson Continuous

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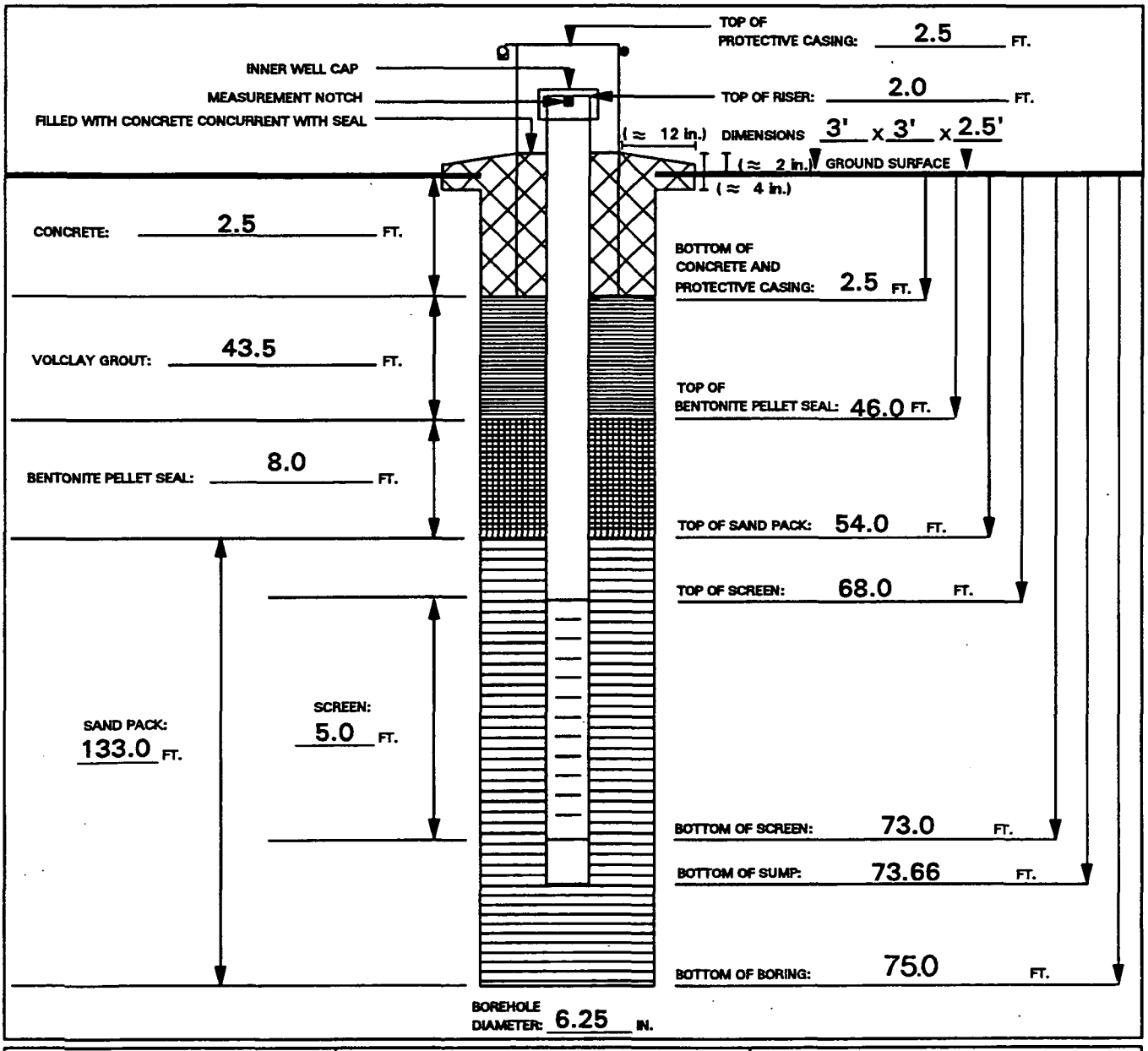
WELL NUMBER: 31554	WELL COMPLETION INFORMATION

PROJECT NAME: SOUTH FIELD PUMP TEST	PROJECT NUMBER: 50.03.32
GEOLOGIST: KEN GEIGER	DRILLING METHOD: ROTOSONIC

PILOT HOLE DRILLED TO BEDROCK, 187 FEET.



VOLUME AND TYPE OF GROUT USED: VOLCLAY, 300lbs.	BENTONITE PELLETS (5-GALLON BUCKETS): 100 lbs.	DEEPEST TEMPORARY DRILLING CASING PENETRATION: 187
VOLUME OF WATER LOST DURING DRILLING: N/A	CASING MATERIAL: Sch 40 PVC	DRILLING CASING DIAMETER: 6.25
CASING WALL THICKNESS: Sch 40	VOLUME AND TYPE OF SAND PACK: NATURAL SAND	SCREEN MATERIAL: Sch 40
RISER / SCREEN DIAMETER: PVC 2 inch	SCREEN SLOT SIZE: 20 SLOT	SCREEN TYPE: Johnson Continuous

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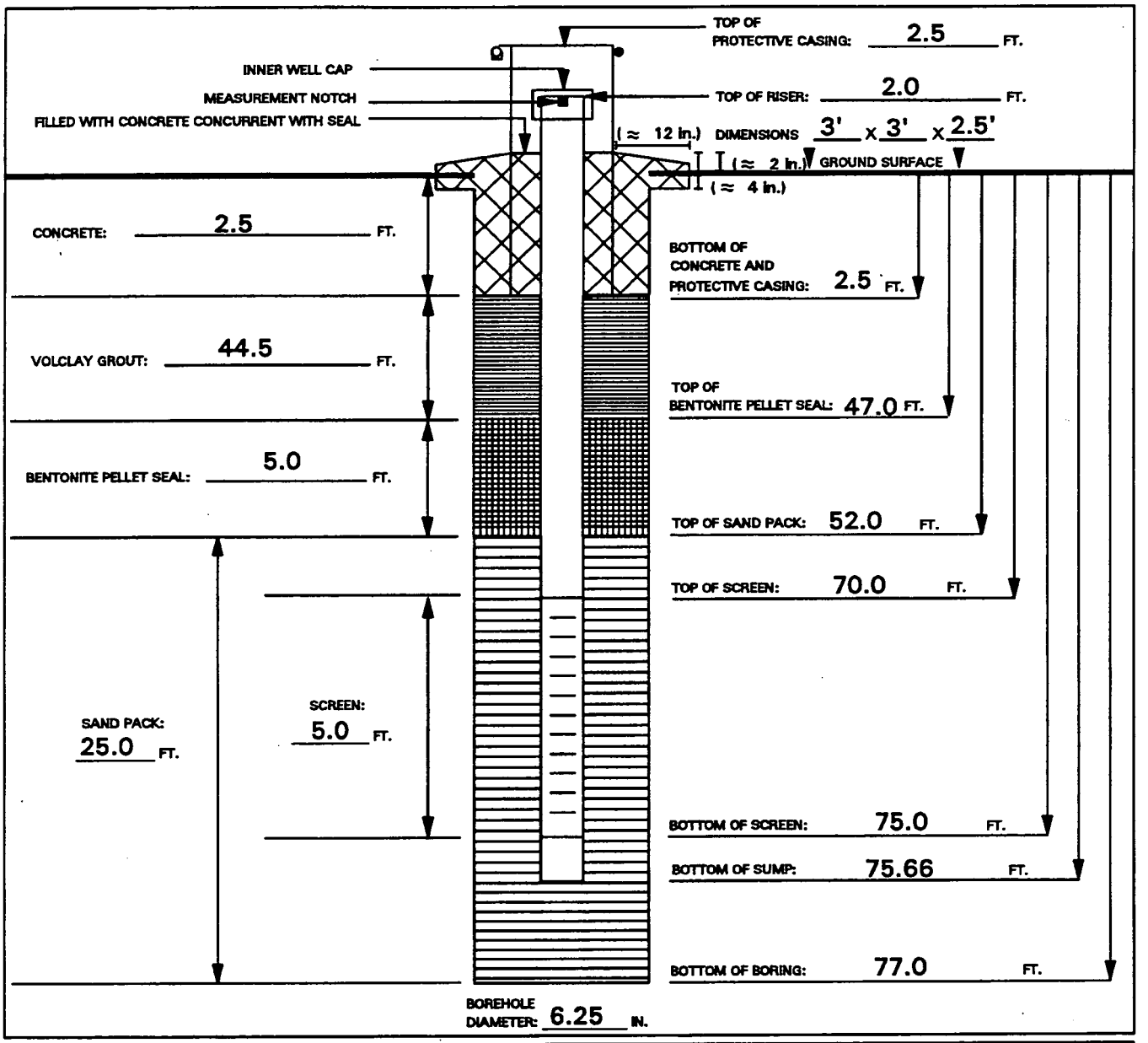
WELL NUMBER: 31555	WELL COMPLETION INFORMATION

PROJECT NAME: SOUTH FIELD PUMP TEST	PROJECT NUMBER: 50.03.32
GEOLOGIST: KEN GEIGER	DRILLING METHOD: ROTOSONIC



VOLUME AND TYPE OF GROUT USED: VOLCLAY, 200lbs.	BENTONITE PELLETS (5-GALLON BUCKETS): 100 lbs.	DEEPEST TEMPORARY DRILLING CASING PENETRATION: 77
VOLUME OF WATER LOST DURING DRILLING: 350 gallons	CASING MATERIAL: Sch 40 PVC	DRILLING CASING DIAMETER: 6.25
CASING WALL THICKNESS: Sch 40	VOLUME AND TYPE OF SAND PACK: NATURAL SAND	SCREEN MATERIAL: Sch 40
RISER / SCREEN DIAMETER: PVC 2 inch	SCREEN SLOT SIZE: 40 SLOT	SCREEN TYPE: Johnson Continuous

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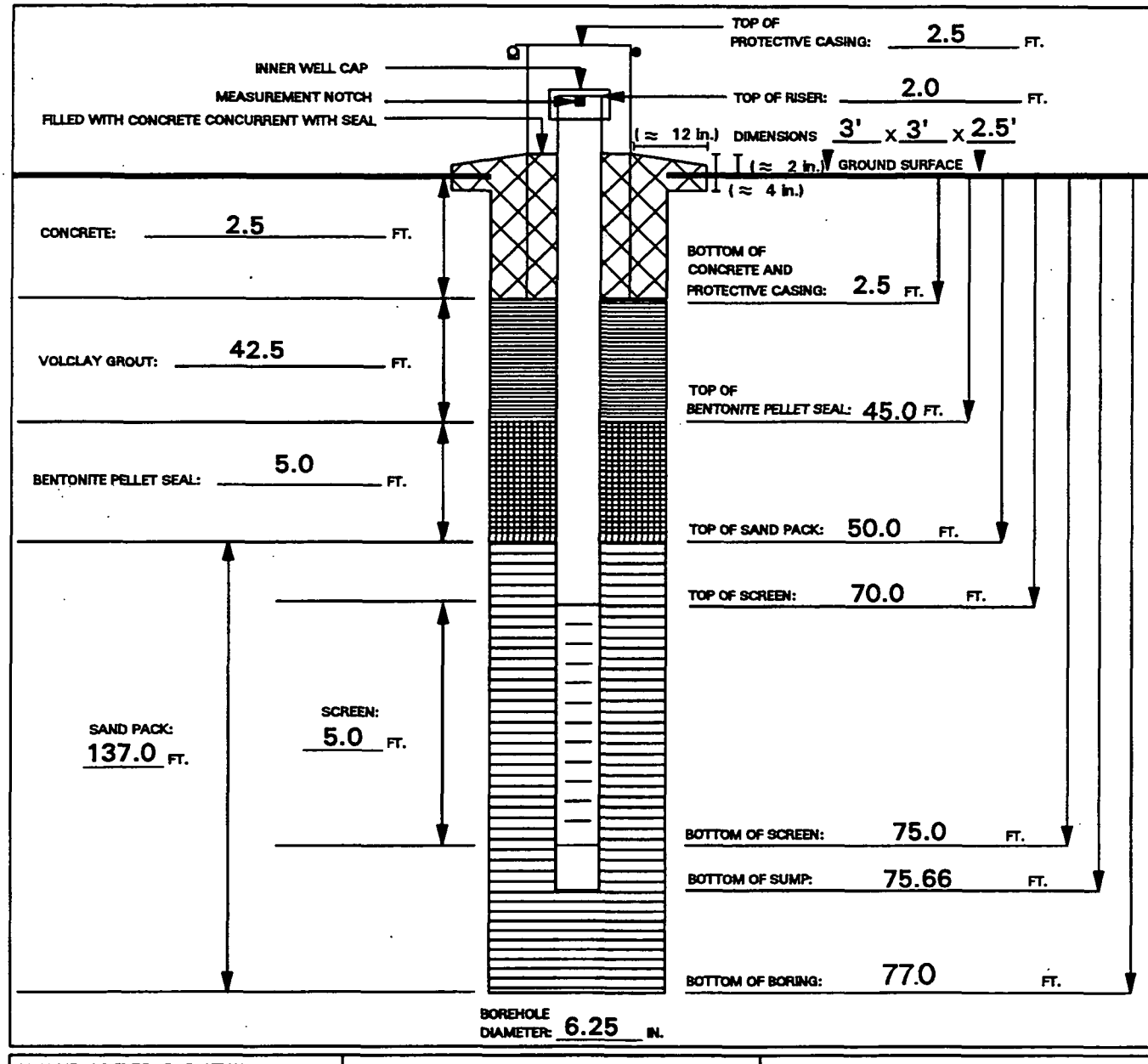
WELL NUMBER: 31556	WELL COMPLETION INFORMATION

PROJECT NAME: SOUTH FIELD PUMP TEST	PROJECT NUMBER: 50.03.32
GEOLOGIST: KEN GEIGER	DRILLING METHOD: ROTOSONIC

PILOT HOLE DRILLED TO BEDROCK, 187 FEET.



VOLUME AND TYPE OF GROUT USED: VOLCLAY, 200lbs.	BENTONITE PELLETS (5-GALLON BUCKETS): 100 lbs.	DEEPEST TEMPORARY DRILLING CASING PENETRATION: 187
VOLUME OF WATER LOST DURING DRILLING: N/A	CASING MATERIAL: Sch 40 PVC	DRILLING CASING DIAMETER: 120
CASING WALL THICKNESS: Sch 40	VOLUME AND TYPE OF SAND PACK: NATURAL SAND	SCREEN MATERIAL: Sch 40
RISER / SCREEN DIAMETER: PVC 2 inch	SCREEN SLOT SIZE: 20 SLOT	SCREEN TYPE: Johnson Continuous

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APPENDIX B

TRENDS IN WATER LEVELS

APPENDIX B

Appendix B contains the following:

- Tabulated water level readings converted from a top-of-casing reference to a water level reference, Table B-1
- Tabulated water level readings collected from the data logger for each monitoring well. The reading reported is for 0000 hours (military time) for each date listed. The reference for the readings is top of casing, Tables B-2 through B-9
- Water level versus time plots for each monitoring well using converted water level data, Figures B-1 through B-10.

The water level data reported in this appendix was collected using a Hermit 2000 or Well Sentinel data logger. The mode of operation was "top of casing" (TOC). In the TOC mode readings are referenced to the top of the well casing. Decreasing water levels correspond to increasing TOC readings and increasing water levels correspond to decreasing TOC readings. Table B-1 tabulates water levels referenced to the mean sea level elevation of the water table when the transducer and data logger were installed. The time versus water level plots were constructed with this converted data. Specific notes concerning individual monitoring wells are provided below.

Well 2386

Water levels, referenced to the TOC, are tabulated for the period 03/30/95 to 05/29/95 in Table B-2. Water levels, referenced to the initial water level, are presented in Table B-1. The water level versus time plot for Well 2386 is presented in Figure B-1. Between 05/01/95 and 05/08/95 the water table rose .227 feet or .0324 feet per day.

Well 2387

Water levels, referenced to the TOC, are tabulated for the period 03/30/95 to 06/01/95 in Table B-3. Water levels, referenced to the initial water level, are presented in Table B-1. The water level versus time plot for Well 2387 is presented in Figure B-2. Between 05/01/95 and 05/08/95 the water table rose .235 feet or .0336 feet per day.

Well 2049

Water levels, referenced to the TOC, are tabulated for the period 03/30/95 to 06/01/95 in Table B-4. Water levels, referenced to the initial water level, are presented in Table B-1. The water level versus time plot for Well 2049 is presented in Figure B-3. Between 05/01/95 and 05/08/95 the water table rose .24 feet or .0343 feet per day.

Well 2390

Water levels, referenced to the TOC, are tabulated for the period 03/30/95 to 06/01/95 in Table B-5. Water levels, referenced to the initial water level, are presented in Table B-1. The water level versus time plot for Well 2390 is presented in Figure B-4. Between 05/01/95 and 05/08/95 the water table rose .283 feet or .0404 feet per day.

Well 2434

Water levels, referenced to the TOC, are tabulated for the period 03/30/95 to 06/01/95 in Table B-6. Water levels, referenced to the initial water level, are presented in Table B-1. The water level versus time plots for Well 2434 are presented in Figures B-5a and B-5b. Figure B-5a illustrates the water levels which were recorded by the data logger. Due to the installation of some QED equipment, the transducer in well 2434 was accidently lowered on April 4 (2.193 feet) and raised on May 1 and May 4 (.275 feet and .929 feet respectively). These accidental movements were recorded by the data logger as abrupt water level changes, see Figure B-5a. In the TOC mode the datalogger interpreted the lowering of the transducer as a rise in water level and the raising of the transducer as a fall in water level.

Adjustments were made to the recorded water level data to account for the transducer displacements. Between April 4 and May 1 the water level was adjusted by 2.193 feet. Between May 1 and May 4 the water level was adjusted by .275 feet. After May 4 the water level was adjusted by 1.204 feet (.275 + .929). Figure 5-b illustrates what is thought to be a representation of the water level verses time for well 2434. Between 05/01/95 and 05/08/95 the water table rose .133 feet or .019 feet per day. This result is in agreement with Well 2166, located approximately 430 feet to the east.

Well 2166

Water levels, referenced to the TOC, are tabulated for the period 03/31/95 to 06/01/95 in Table B-7. Water levels, referenced to the initial water level, are presented in Table B-1. The water level versus

time plot for Well 2166 is presented in Figure B-6. Between 05/03/95 and 05/08/95 the water table rose .044 feet or .01 feet per day.

Well 2399

Water levels, referenced to the TOC, are tabulated for the period 03/31/95 to 06/01/95 in Table B-8. Water levels, referenced to the initial water level, are presented in Table B-1. The water level versus time plot for Well 2399 is presented in Figure B-7. Between 05/01/95 and 05/08/95 the water table rose .241 feet or .03 feet per day.

Well 2070

Water levels, referenced to the TOC, are tabulated for the period 03/31/95 to 06/01/95 in Table B-9. Water levels, referenced to the initial water level, are presented in Table B-1. The water level versus time plot for Well 2070 is presented in Figure B-8. Between 05/01/95 and 05/08/95 the water table rose .178 feet or .0254 feet per day. This well was selected for monitoring because it was felt that it was far enough away from the control well that it would not be effected by the pumping test. However, the water level data show that the constant-rate test did influence this well.

Well 2044

Water levels, referenced to the TOC, are tabulated for the period 03/31/95 to 05/01/95 in Table B-10. Water levels, referenced to the initial water level, are presented in Table B-1. The water level versus time plot for Well 2044 is presented in Figure B-9. This well was selected for monitoring because it was felt that it was far enough away from the control well that it would not be effected by the pumping test and would be a good background well. The data logger malfunctioned sometime after May 1. The unit is being sent back to the factory to see if additional data can be retrieved. The data which was collected indicates that the water level west of Paddys Run for the period 04/01 to 05/01 decreased until April 12 and then increased for the rest of the period. This decrease is much more pronounced than at any of the other monitored wells east of Paddys Run. Recharge through Paddys Run is downgradient of this well and is believed to have caused the difference between water levels east and west of Paddys Run. Because this well did exhibit a different water level trend it was not used as a background well for the pumping test as originally intended.

Well 31556

The water level versus time plot for Well 31556 is presented in Figure B-10 to represent the test area. This well is located 100 feet from the control well. The data logger printout for this well is found in Appendix E. From midnight April 27 to midnight April 28 the water table rose .045 feet per day. From midnight April 28 to midnight April 29 the water table rose .031 feet/day. From midnight April 29 to midnight April 30 the water table rose 0 feet/day. Over the three-day period the water table rose .076 feet, with an average daily rise of .025 feet per day.

TABLE B-1

WATER LEVELS REFERENCED TO INITIAL WATER TABLE

	Well Nos. and Referenced Elevations (ft amsl)								
	2386	2387	2049	2390	2434	2166	2399	2044	2070
Date	518.780	518.880	519.300	519.370	518.500	518.150	517.970	519.070	517.050
03/31/95									
04/01/95	518.761	518.849	519.243	519.282	518.462	518.124	517.959	519.049	517.044
04/02/95	518.755	518.823	519.193	519.219	518.431	518.109	517.953	519.028	517.038
04/03/95	518.717	518.779	519.129	519.143	518.393	518.086	517.938	519.011	517.050
04/04/95	518.729	518.754	519.079	519.635	520.586	518.092	517.965	518.980	516.930
04/05/95	518.609	518.665	518.997	519.547	520.484	517.978	517.828	518.980	517.057
04/06/95	518.685	518.646	518.946	519.509	520.529	518.063	517.959	518.902	516.943
04/07/95	518.616	518.602	518.896	519.459	520.459	517.978	517.860	518.902	517.031
04/08/95	518.641	518.614	518.877	519.446	520.497	518.039	517.933	518.868	516.943
04/09/95	518.591	518.570	518.839	519.421	520.446	517.970	517.857	518.850	516.873
04/10/95	518.540	518.570	518.889	519.534	520.421	517.923	517.773	518.818	516.943
04/11/95	518.622	518.640	518.965	519.629	520.510	518.010	517.848	518.783	516.892
04/12/95	518.673	518.709	519.035	519.723	520.535	517.996	517.825	518.772	516.936
04/13/95	518.679	518.709	519.073	519.774	520.567	518.034	517.854	518.790	516.981
04/14/95	518.704	518.741	519.110	519.824	520.605	518.066	517.889	518.818	517.006
04/15/95	518.729	518.785	519.148	519.862	520.643	518.103	517.921	518.831	517.063
04/16/95	518.773	518.817	519.174	519.900	520.687	518.161	517.991	518.811	517.050
04/17/95	518.773	518.811	519.174	519.894	520.674	518.150	517.979	518.833	517.057
04/18/95	518.767	518.817	519.186	519.900	520.668	518.150	517.988	518.846	517.019
04/19/95	518.799	518.842	519.230	519.950	520.668	518.132	517.965	518.887	517.019
04/20/95	518.729	518.798	519.186	519.856	520.643	518.118	517.936	518.948	517.088
04/21/95	518.799	518.811	519.136	519.730	520.649	518.156	518.025	518.933	516.961
04/22/95	518.792	518.868	519.294	519.975	520.624	518.077	517.898	518.965	517.076
04/23/95	518.874	518.982	519.388	520.038	520.731	518.185	517.999	519.054	517.107
04/24/95	518.956	519.058	519.458	520.120	520.820	518.243	518.060	519.099	517.101
04/25/95	518.956	519.083	519.508	520.196	520.846	518.257	518.046	519.132	517.145
04/26/95	518.975	519.109	519.540	520.247	520.890	518.304	518.084	519.162	517.304
04/27/95	519.064	519.147	519.565	520.303	520.966	518.420	518.235	519.158	517.190
04/28/95	519.026	519.153	519.590	520.335	520.960	518.368	518.174	519.207	517.285
04/29/95	519.064	519.178	519.603	520.360	521.023	518.437	518.258	519.192	517.335
04/30/95	519.102	519.204	519.628	520.385	521.061	518.490	518.319	519.186	517.316
05/01/95	519.070	519.191	519.628	520.398	521.061	518.478	518.287	519.223	517.671

TABLE B-1
(Continued)

	Well Nos. and Referenced Elevations (ft amsl)								
	2386	2387	2049	2390	2434	2166	2399	2044	2070
Date	518.780	518.880	519.300	519.370	518.500	518.150	517.970	519.070	517.050
05/02/95	519.114	519.267	519.679	520.448	518.593	518.368	518.432		517.551
05/03/95	519.095	519.242	519.698	520.486	518.542	518.289	518.290		517.633
05/04/95	519.158	519.312	519.754	520.536	518.599	518.347	518.374		517.671
05/05/95	519.190	519.286	519.754	520.562	517.670	518.385	518.423		517.722
05/06/95	519.228	519.369	519.811	520.612	517.727	518.440	518.461		517.741
05/07/95	519.266	519.400	519.843	520.650	517.759	518.475	518.490		517.779
05/08/95	519.297	519.426	519.868	520.681	517.797	518.522	518.528		517.849
05/09/95	519.341	518.925	519.906	520.726	517.848	518.580	518.603		517.811
05/10/95	519.196	518.576	519.609	520.663	517.683	518.446	518.528		517.735
05/11/95	519.095	518.437	519.515	520.618	517.575	518.339	518.429		517.754
05/12/95	519.070	518.386	519.470	520.600	517.544	518.321	518.429		517.773
05/13/95	519.064	518.354	519.451	520.587	517.544	518.324	518.441		517.830
05/14/95	519.089	518.367	519.464	520.625	517.563	518.362	518.490		517.728
05/15/95	519.228	518.462	519.622	520.801	517.556	518.318	518.409		517.843
05/16/95	519.259	518.563	519.691	520.852	517.664	518.431	518.525		517.976
05/17/95	519.417	519.426	519.982	520.978	517.873	518.620	518.687		517.938
05/18/95	519.531	519.717	520.228	521.198	517.981	518.670	518.676		517.988
05/19/95	520.105	520.180	521.011	522.214	518.240	518.818	518.766		518.134
05/20/95	520.187	520.498	521.283	522.283	518.551	519.050	518.923		518.331
05/21/95	520.218	520.580	521.296	522.264	518.741	519.239	519.106		518.464
05/22/95	520.181	520.555	521.232	522.163	518.804	519.332	519.201		518.692
05/23/95	520.212	520.561	521.182	522.094	518.881	519.471	519.382		518.851
05/24/95	520.282	520.586	521.163	522.069	518.938	519.582	519.515		518.908
05/25/95	520.288	520.580	521.125	522.031	518.950	519.619	519.553		518.997
05/26/95	520.401	520.656	521.226	522.157	519.001	519.657	519.620		519.142
05/27/95	520.521	520.777	521.302	522.170	519.102	519.773	519.762		519.320
05/28/95	520.660	520.865	521.346	522.220	519.210	519.933	519.945		519.320
05/29/95	520.711	520.903	521.409	522.271	519.242	519.951	519.948		519.383
05/30/95		520.973	521.491	522.378	519.305	519.991	520.354		519.466
05/31/95		521.062	521.548	522.390	519.388	520.073	520.084		519.593
06/01/95		521.106	521.567	522.416	519.470	520.209	520.206		

TABLE B-2
DATA LOGGER MEASUREMENTS
WELL 2386

MW 2386
Reference Level: 518.78
Step 0: 3/30 15:27:22
Mode: Top of Casing
512 minutes to 00:00 3/31

Date (1995)	Water Level
3/31	518.805
4/1	518.824
4/2	518.830
4/3	518.868
4/4	518.856
4/5	518.976
4/6	518.900
4/7	518.969
4/8	518.944
4/9	518.994
4/10	519.045
4/11	518.963
4/12	518.912
4/13	518.906
4/14	518.881
4/15	518.856
4/16	518.812
4/17	518.812
4/18	518.818
4/19	518.786
4/20	518.856
4/21	518.786
4/22	518.793
4/23	518.711
4/24	518.629
4/25	518.629
4/26	518.610

TABLE B-2
(continued)

MW 2386
Reference Level: 518.78
Step 0: 3/30 15:27:22
Mode: Top of Casing
512 minutes to 00:00 3/31

Date (1995)	Water Level
4/27	518.521
4/28	518.559
4/29	518.521
4/30	518.483
5/1	518.515
5/2	518.471
5/3	518.490
5/4	518.427
5/5	518.395
5/6	518.357
5/7	518.319
5/8	518.288
5/9	518.244
5/10	518.389
5/11	518.490
5/12	518.515
5/13	518.521
5/14	518.496
5/15	518.357
5/16	518.326
5/17	518.168
5/18	518.054
5/19	517.480
5/20	517.398
5/21	517.367
5/22	517.404
5/23	517.373
5/24	517.303

TABLE B-2
(continued)

MW 2386
Reference Level: 518.78
Step 0: 3/30 15:27:22
Mode: Top of Casing
512 minutes to 00:00 3/31

Date (1995)	Water Level
5/25	517.297
5/26	517.184
5/27	517.064
5/28	516.925
5/29	516.874

TABLE B-3
DATA LOGGER MEASUREMENTS
WELL 2387

MW 2387
Reference level: 518.880
Step 0: 3/30 14:31:32
Mode: Top of Casing

Date (1995)	Water Level
3/31	518.899
4/1	518.930
4/2	518.956
4/3	519.000
4/4	519.025
4/5	519.114
4/6	519.133
4/7	519.177
4/8	519.165
4/9	519.209
4/10	519.209
4/11	519.139
4/12	519.070
4/13	519.070
4/14	519.038
4/15	518.994
4/16	518.962
4/17	518.968
4/18	518.962
4/19	518.937
4/20	518.981
4/21	518.968
4/22	518.911
4/23	518.797
4/24	518.721
4/25	518.696
4/26	518.670

TABLE B-3
(continued)

MW 2387
Reference level: 518.880
Step 0: 3/30 14:31:32
Mode: Top of Casing

Date (1995)	Water Level
4/27	518.632
4/28	518.626
4/29	518.601
4/30	518.575
5/1	518.588
5/2	518.512
5/3	518.537
5/4	518.467
5/5	518.493
5/6	518.410
5/7	518.379
5/8	518.353
5/9	518.854
5/10	519.203
5/11	519.342
5/12	519.393
5/13	519.425
5/14	519.412
5/15	519.317
5/16	519.216
5/17	518.353
5/18	518.062
5/19	517.599
5/20	517.281
5/21	517.199
5/22	517.224
5/23	517.218
5/24	517.193

TABLE B-3
(continued)

MW 2387
Reference level: 518.880
Step 0: 3/30 14:31:32
Mode: Top of Casing

Date (1995)	Water Level
5/25	517.199
5/26	517.123
5/27	517.002
5/28	516.914
5/29	516.876
5/30	516.806
5/31	516.717
6/1	516.673

TABLE B-4
DATA LOGGER MEASUREMENTS
WELL 2049

MW 2049
Reference Level: 519.30
Step 0: 3/30 10:47:32
Mode: Top of Casing

Date (1995)	Water Level
3/31	519.312
4/1	519.369
4/2	519.419
4/3	519.483
4/4	519.533
4/5	519.615
4/6	519.666
4/7	519.716
4/8	519.735
4/9	519.773
4/10	519.723
4/11	519.647
4/12	519.577
4/13	519.539
4/14	519.502
4/15	519.464
4/16	519.438
4/17	519.438
4/18	519.426
4/19	519.382
4/20	519.426
4/21	519.476
4/22	519.318
4/23	519.224
4/24	519.154
4/25	519.104
4/26	519.072
4/27	519.047

TABLE B-4
(continued)

MW 2049
Reference Level: 519.30
Step 0: 3/30 10:47:32
Mode: Top of Casing

Date (1995)	Water Level
4/28	519.022
4/29	519.009
4/30	518.984
5/1	518.984
5/2	518.933
5/3	518.914
5/4	518.858
5/5	518.858
5/6	518.801
5/7	518.769
5/8	518.744
5/9	518.706
5/10	519.003
5/11	519.097
5/12	519.142
5/13	519.161
5/14	519.148
5/15	518.990
5/16	518.921
5/17	518.630
5/18	518.384
5/19	517.601
5/20	517.329
5/21	517.316
5/22	517.380
5/23	517.430
5/24	517.449
5/25	517.487
5/26	517.386

TABLE B-4
(continued)

MW 2049
Reference Level: 519.30
Step 0: 3/30 10:47:32
Mode: Top of Casing

Date (1995)	Water Level
5/27	517.310
5/28	517.266
5/29	517.203
5/30	517.121
5/31	517.064
6/1	517.045

TABLE B-5
DATA LOGGER MEASUREMENTS
WELL 2390

MW 2390
Reference Level: 519.370
Step 0: 3/30 14:49:45
Mode: Top of Casing

Date (1995)	Water Level
3/31	519.414
4/1	519.502
4/2	519.565
4/3	519.641
4/4	519.149
4/5	519.237
4/6	519.275
4/7	519.325
4/8	519.338
4/9	519.363
4/10	519.250
4/11	519.155
4/12	519.061
4/13	519.010
4/14	518.960
4/15	518.922
4/16	518.884
4/17	518.890
4/18	518.884
4/19	518.834
4/20	518.928
4/21	519.054
4/22	518.809
4/23	518.746
4/24	518.664
4/25	518.588
4/26	518.537

TABLE B-5
(continued)

MW 2390
Reference Level: 519.370
Step 0: 3/30 14:49:45
Mode: Top of Casing

Date (1995)	Water Level
4/27	518.481
4/28	518.449
4/29	518.424
4/30	518.399
5/1	518.386
5/2	518.336
5/3	518.298
5/4	518.248
5/5	518.222
5/6	518.172
5/7	518.134
5/8	518.103
5/9	518.058
5/10	518.121
5/11	518.166
5/12	518.184
5/13	518.197
5/14	518.159
5/15	517.983
5/16	517.932
5/17	517.806
5/18	517.586
5/19	516.570
5/20	516.501
5/21	516.520
5/22	516.621
5/23	516.690
5/24	516.715
5/25	516.753

TABLE B-5
(continued)

MW 2390
Reference Level: 519.370
Step 0: 3/30 14:49:45
Mode: Top of Casing

Date (1995)	Water Level
5/26	516.627
5/27	516.614
5/28	516.564
5/29	516.513
5/30	516.406
5/31	516.394
6/1	516.368

TABLE B-6
DATA LOGGER MEASUREMENTS
WELL 2434

MW 2434
Reference Level: 518.500
Step 0: 3/30 12:45:39
Mode: Top of Casing

Date (1995)	Water Level
3/31	518.513
4/1	518.551
4/2	518.582
4/3	518.620
4/4	516.427
4/5	516.529
4/6	516.484
4/7	516.554
4/8	516.516
4/9	516.567
4/10	516.592
4/11	516.503
4/12	516.478
4/13	516.446
4/14	516.408
4/15	516.370
4/16	516.326
4/17	516.339
4/18	516.345
4/19	516.345
4/20	516.370
4/21	516.364
4/22	516.389
4/23	516.282
4/24	516.193
4/25	516.167
4/26	516.123
4/27	516.047

TABLE B-6
(continued)

MW 2434
Reference Level: 518.500
Step 0: 3/30 12:45:39
Mode: Top of Casing

Date (1995)	Water Level
4/28	516.053
4/29	515.990
4/30	515.952
5/1	515.952
5/2	518.420
5/3	518.471
5/4	518.414
5/5	519.343
5/6	519.286
5/7	519.254
5/8	519.216
5/9	519.165
5/10	519.330
5/11	519.438
5/12	519.469
5/13	519.469
5/14	519.450
5/15	519.457
5/16	519.349
5/17	519.140
5/18	519.032
5/19	518.773
5/20	518.462
5/21	518.272
5/22	518.209
5/23	518.132
5/24	518.075
5/25	518.063
5/26	518.012

TABLE B-6
(continued)

MW 2434
Reference Level: 518.500
Step 0: 3/30 12:45:39
Mode: Top of Casing

Date (1995)	Water Level
5/27	517.911
5/28	517.803
5/29	517.771
5/30	517.708
5/31	517.625
6/1	517.543

TABLE B-7
DATA LOGGER MEASUREMENTS
WELL 2166

MW 2166
Reference Level: 518.150
Mode: Top of Casing

Date (1995)	Water Level
3/31	516.338
4/1	516.364
4/2	516.379
4/3	516.402
4/4	516.396
4/5	516.510
4/6	516.425
4/7	516.510
4/8	516.449
4/9	516.518
4/10	516.565
4/11	516.478
4/12	516.492
4/13	516.454
4/14	516.422
4/15	516.385
4/16	516.327
4/17	516.338
4/18	516.338
4/19	516.356
4/20	516.370
4/21	516.332
4/22	516.411
4/23	516.303
4/24	516.245
4/25	516.231
4/26	516.184
4/27	516.068

TABLE B-7
(continued)

MW 2166
Reference Level: 518.150
Mode: Top of Casing

Date (1995)	Water Level
4/28	516.120
4/29	516.051
4/30	515.998
5/1	516.010
5/2	516.120
5/3	516.199
5/4	516.141
5/5	516.103
5/6	516.048
5/7	516.013
5/8	515.966
5/9	515.908
5/10	516.042
5/11	516.149
5/12	516.167
5/13	516.164
5/14	516.126
5/15	516.170
5/16	516.057
5/17	515.868
5/18	515.818
5/19	515.670
5/20	515.438
5/21	515.249
5/22	515.156
5/23	515.017
5/24	514.906
5/25	514.869
5/26	514.831

TABLE B-7
(continued)

MW 2166
Reference Level: 518.150
Mode: Top of Casing

Date (1995)	Water Level
5/27	514.715
5/28	514.555
5/29	514.537
5/30	514.497
5/31	514.415
6/1	514.279

TABLE B-8
DATA LOGGER MEASUREMENTS
WELL 2399

MW 2399
Reference Level: 517.970
Mode: Top of Casing

Date (1995)	Water Level
3/31	517.982
4/1	517.993
4/2	517.999
4/3	518.014
4/4	517.987
4/5	518.124
4/6	517.993
4/7	518.092
4/8	518.019
4/9	518.095
4/10	518.179
4/11	518.104
4/12	518.127
4/13	518.098
4/14	518.063
4/15	518.031
4/16	517.961
4/17	517.973
4/18	517.964
4/19	517.987
4/20	518.016
4/21	517.927
4/22	518.054
4/23	517.953
4/24	517.892
4/25	517.906
4/26	517.868
4/27	517.717
4/28	517.778

TABLE B-8
(continued)

MW 2399
Reference Level: 517.970
Mode: Top of Casing

Date (1995)	Water Level
4/29	517.694
4/30	517.633
5/1	517.665
5/2	517.520
5/3	517.662
5/4	517.578
5/5	517.529
5/6	517.491
5/7	517.462
5/8	517.424
5/9	517.349
5/10	517.424
5/11	517.523
5/12	517.523
5/13	517.511
5/14	517.462
5/15	517.543
5/16	517.427
5/17	517.265
5/18	517.276
5/19	517.186
5/20	517.029
5/21	516.846
5/22	516.751
5/23	516.570
5/24	516.437
5/25	516.399
5/26	516.332
5/27	516.190

TABLE B-8
(continued)

MW 2399
Reference Level: 517.970
Mode: Top of Casing

Date (1995)	Water Level
5/28	516.007
5/29	516.004
5/30	515.598
5/31	515.868
6/1	515.746

TABLE B-9
DATA LOGGER MEASUREMENTS
WELL 2070

MW 2070
Reference Level: 517.050
Step 0: 2/6 10:45:54
Mode: Top of Casing

Date (1995)	Water Level
3/31	516.087
4/1	516.093
4/2	516.099
4/3	516.087
4/4	516.207
4/5	516.080
4/6	516.194
4/7	516.106
4/8	516.194
4/9	516.264
4/10	516.194
4/11	516.245
4/12	516.201
4/13	516.156
4/14	516.131
4/15	516.074
4/16	516.087
4/17	516.080
4/18	516.118
4/19	516.118
4/20	516.049
4/21	516.176
4/22	516.061
4/23	516.030
4/24	516.036
4/25	515.992
4/26	515.833

TABLE B-9
(continued)

MW 2070
Reference Level: 517.050
Step 0: 2/6 10:45:54
Mode: Top of Casing

Date (1995)	Water Level
4/27	515.947
4/28	515.852
4/29	515.802
4/30	515.821
5/1	515.466
5/2	515.586
5/3	515.504
5/4	515.466
5/5	515.415
5/6	515.396
5/7	515.358
5/8	515.288
5/9	515.326
5/10	515.402
5/11	515.383
5/12	515.364
5/13	515.307
5/14	515.409
5/15	515.294
5/16	515.161
5/17	515.199
5/18	515.149
5/19	515.003
5/20	514.806
5/21	514.673
5/22	514.445
5/23	514.286
5/24	514.229

TABLE B-9
(continued)

MW 2070
Reference Level: 517.050
Step 0: 2/6 10:45:54
Mode: Top of Casing

Date (1995)	Water Level
5/25	514.140
5/26	513.995
5/27	513.817
5/28	513.817
5/29	513.754
5/30	513.671
5/31	513.544
6/1	

TABLE B-10
DATA LOGGER MEASUREMENTS
WELL 2044

MW 2044
Reference Level: 519.07
Mode: Top of Casing

Date (1995)	Water Level
3/31	516.608
4/1	516.629
4/2	516.646
4/3	516.677
4/4	516.677
4/5	516.755
4/6	516.755
4/7	516.789
4/8	516.807
4/9	516.839
4/10	516.874
4/11	516.885
4/12	516.867
4/13	516.839
4/14	516.826
4/15	516.846
4/16	516.824
4/17	516.811
4/18	516.770
4/19	516.709
4/20	516.724
4/21	516.692
4/22	516.603
4/23	516.558
4/24	516.525
4/25	516.495
4/26	516.499
4/27	516.450
4/28	516.465
4/29	516.471
4/30	516.434
5/1	516.434

TABLE B-10
DATA LOGGER MEASUREMENTS
WELL 2044

MW 2044
Reference Level: 519.07
Mode: Top of Casing

Date (1995)	Water Level
3/31	516.608
4/1	516.629
4/2	516.646
4/3	516.677
4/4	516.677
4/5	516.755
4/6	516.755
4/7	516.789
4/8	516.807
4/9	516.839
4/10	516.874
4/11	516.885
4/12	516.867
4/13	516.839
4/14	516.826
4/15	516.846
4/16	516.824
4/17	516.811
4/18	516.770
4/19	516.709
4/20	516.724
4/21	516.692
4/22	516.603
4/23	516.558
4/24	516.525
4/25	516.495
4/26	516.499
4/27	516.450
4/28	516.465
4/29	516.471
4/30	516.434
5/1	516.434

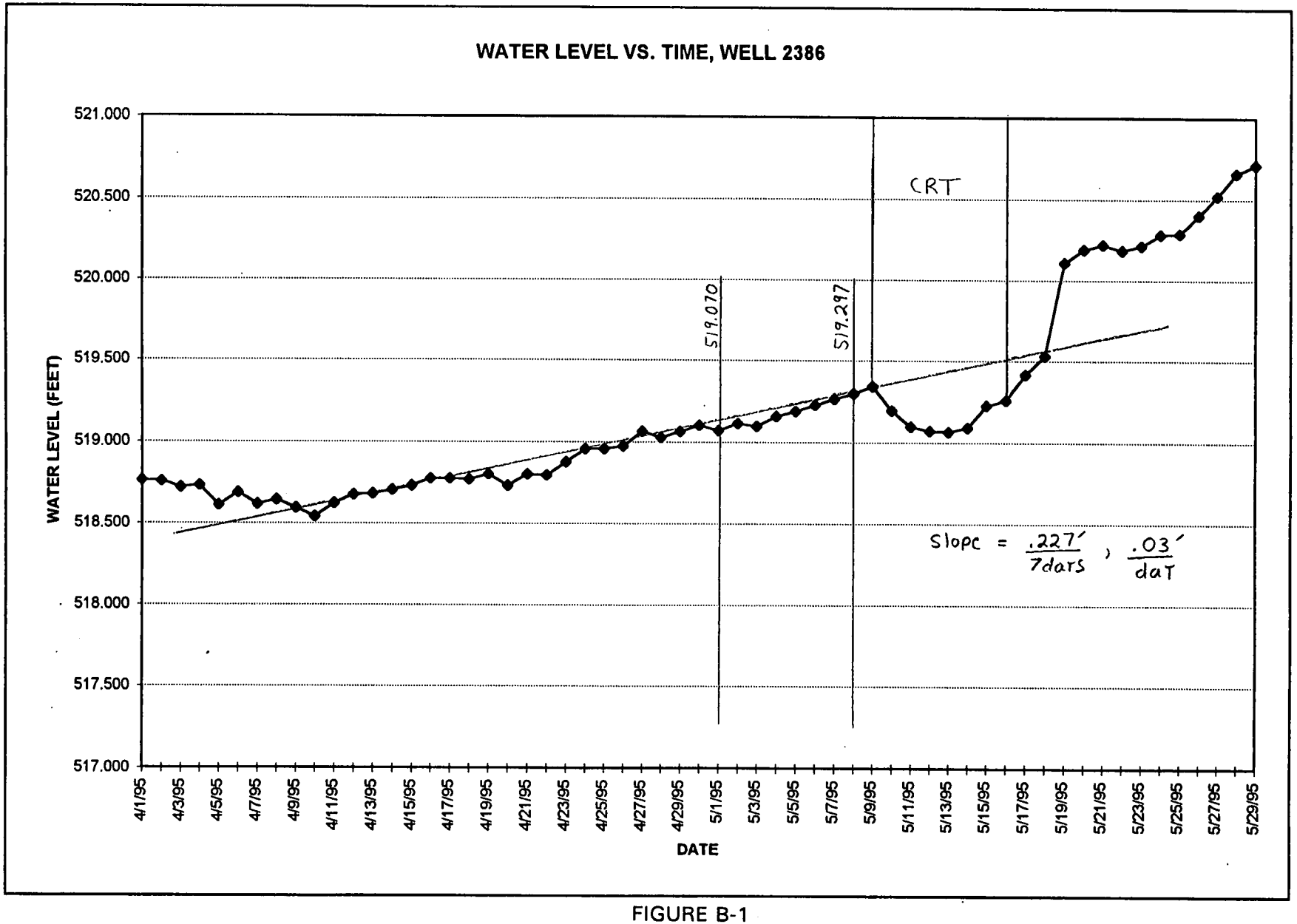


FIGURE B-1

000118

- 7120

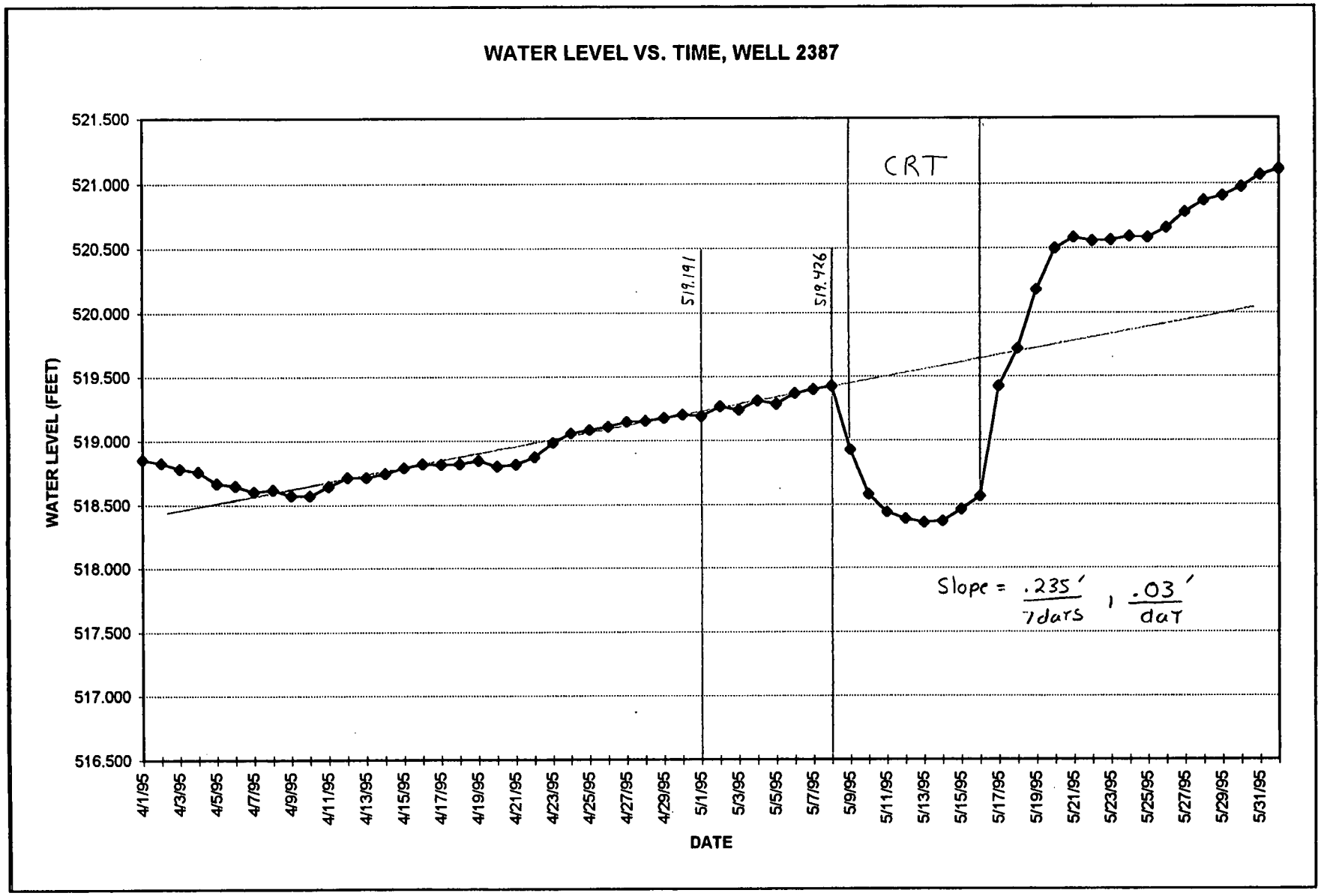


FIGURE B-2

000119

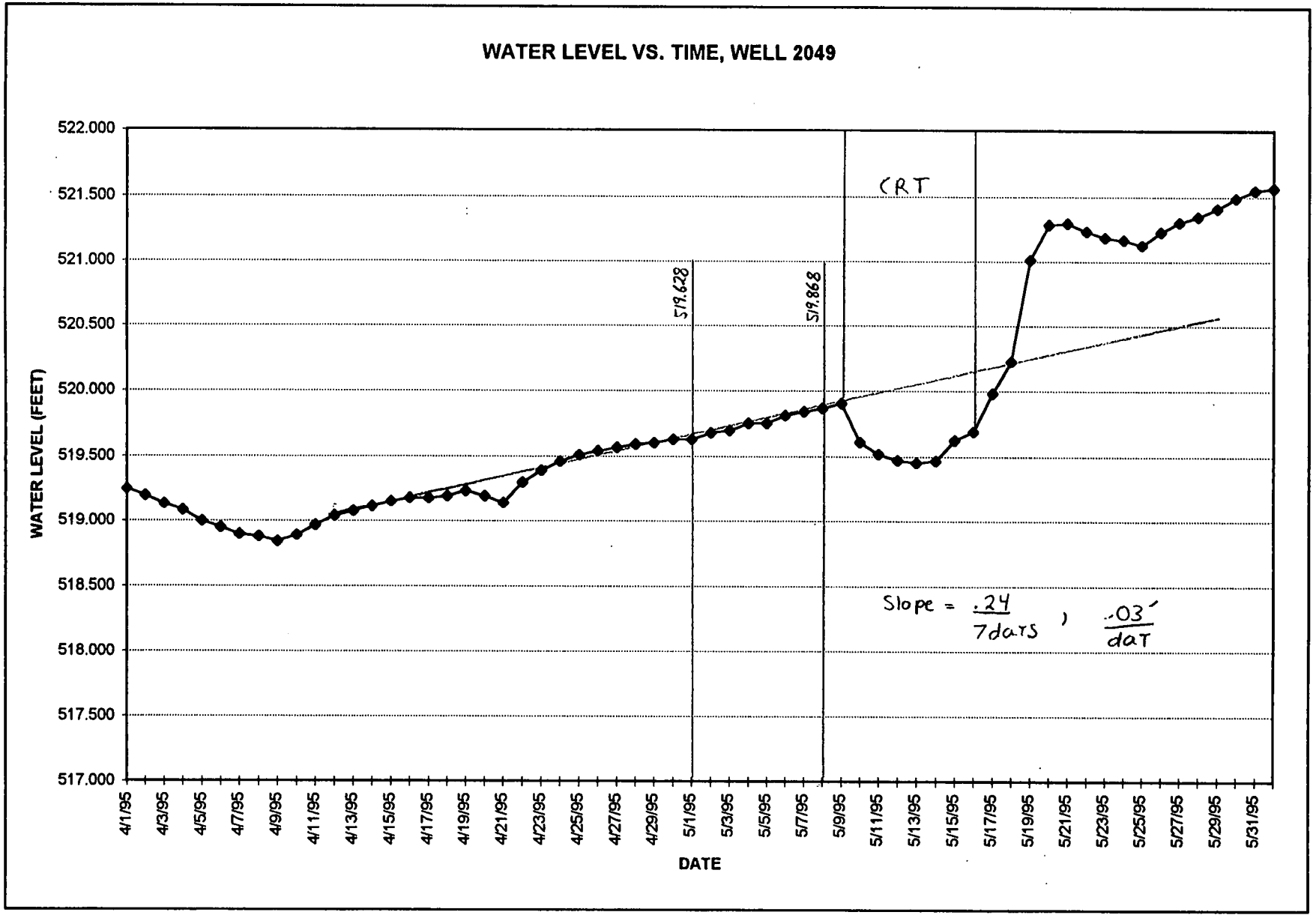

WATER LEVEL VS. TIME, WELL 2049
WATER LEVEL (FEET)
522.000
521.500
521.000
520.500
520.000
519.500
519.000
518.500
518.000
517.500
517.000
DATE
4/1/95
4/3/95
4/5/95
4/7/95
4/9/95
4/11/95
4/13/95
4/15/95
4/17/95
4/19/95
4/21/95
4/23/95
4/25/95
4/27/95
4/29/95
5/1/95
5/3/95
5/5/95
5/7/95
5/9/95
5/11/95
5/13/95
5/15/95
5/17/95
5/19/95
5/21/95
5/23/95
5/25/95
5/27/95
5/29/95
5/31/95
519.628
519.868
CRT
Slope = .24 / 7days , .03' / day

FIGURE B-3

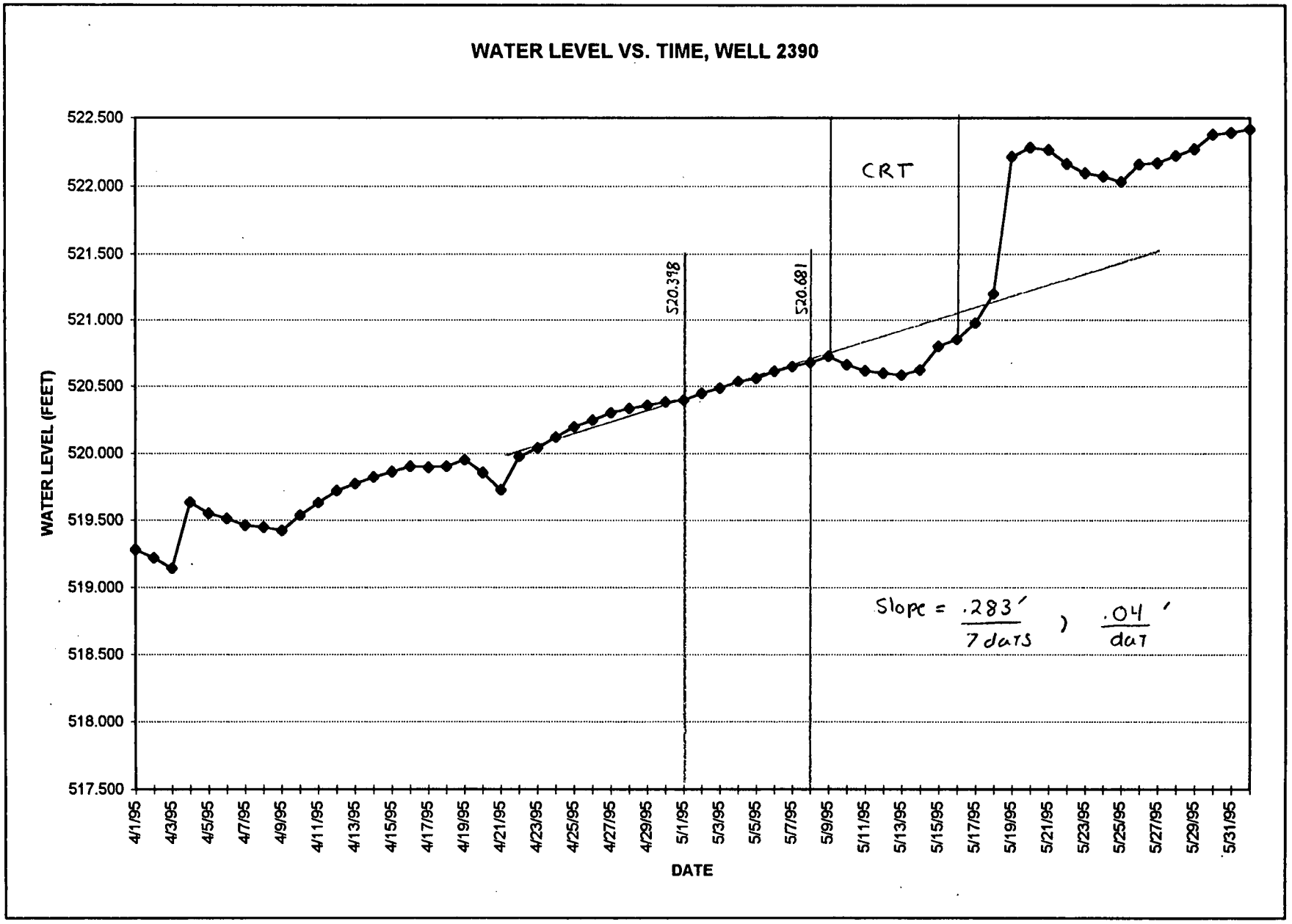


FIGURE B-4

000121

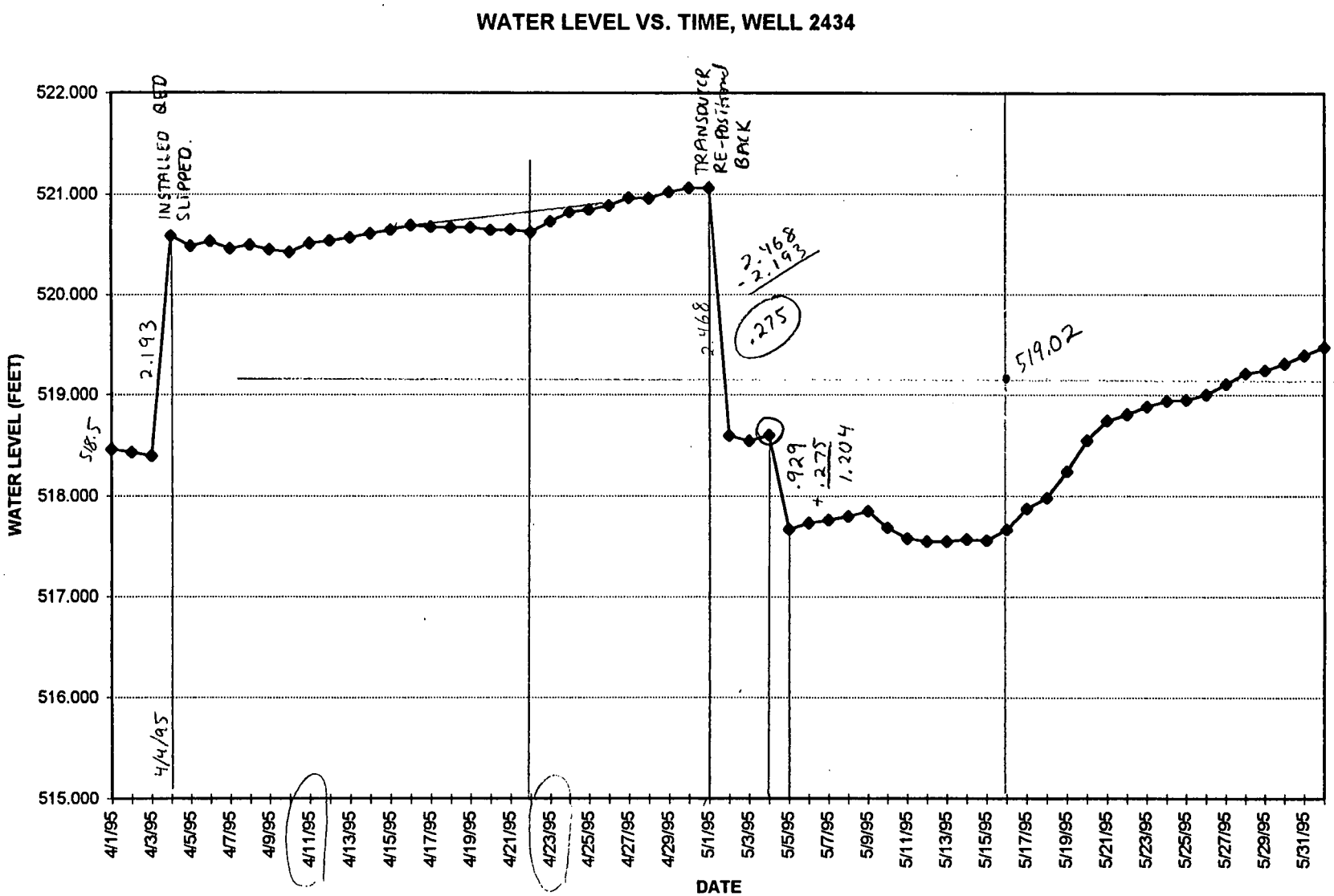

WATER LEVEL VS. TIME, WELL 2434
WATER LEVEL (FEET)
522.000
521.000
520.000
519.000
518.000
517.000
516.000
515.000
DATE
4/1/95
4/3/95
4/5/95
4/7/95
4/9/95
4/11/95
4/13/95
4/15/95
4/17/95
4/19/95
4/21/95
4/23/95
4/25/95
4/27/95
4/29/95
5/1/95
5/3/95
5/5/95
5/7/95
5/9/95
5/11/95
5/13/95
5/15/95
5/17/95
5/19/95
5/21/95
5/23/95
5/25/95
5/27/95
5/29/95
5/31/95
INSTALLED & SLIPPED.
4/4/95
2.193
518.5
TRANSDUCER RE-POSITIONED BACK
2.468
2.468
-2.193
.275
.929
+.275
1.204
519.02

FIGURE B-5a

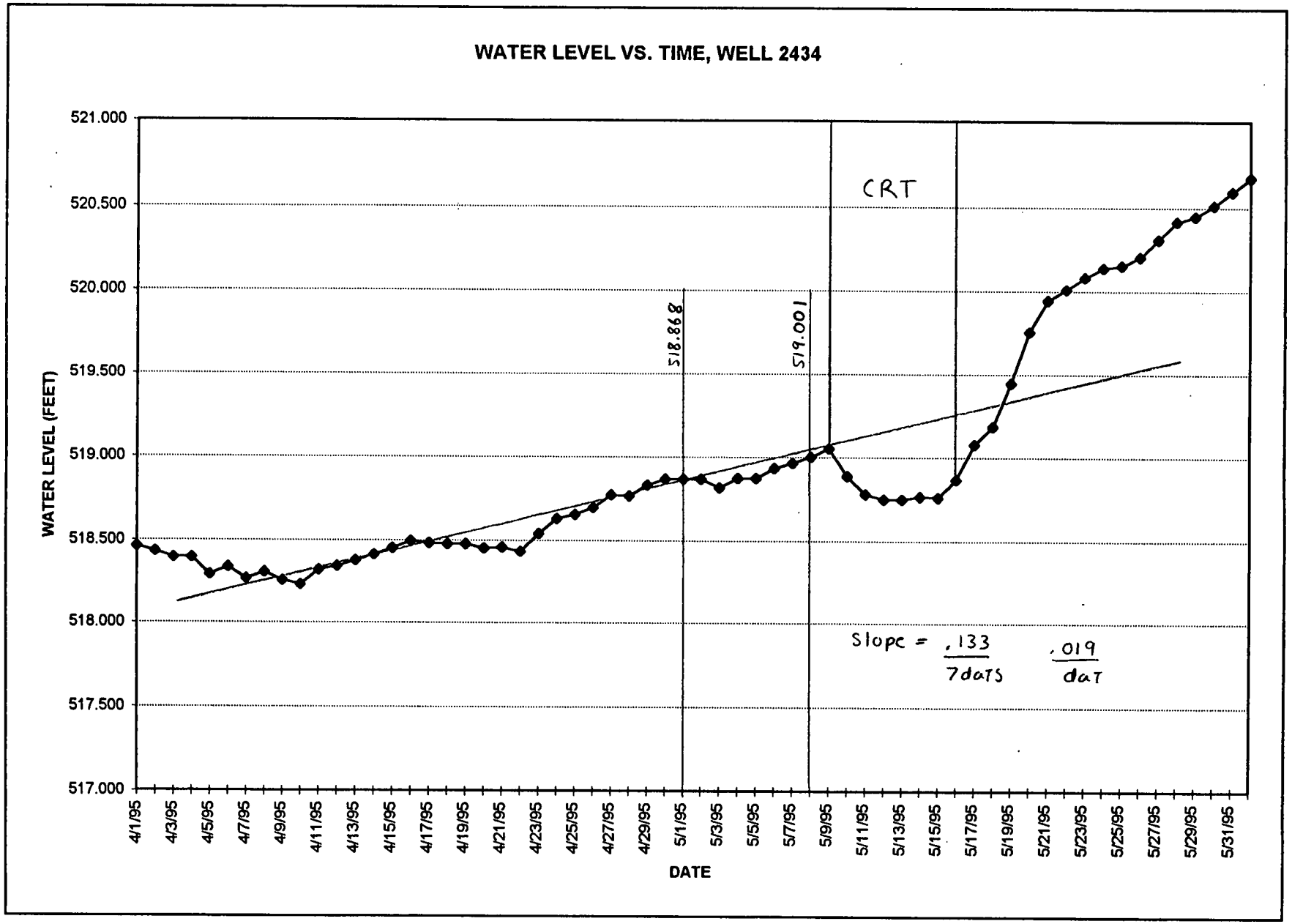


FIGURE B-5b

0001123

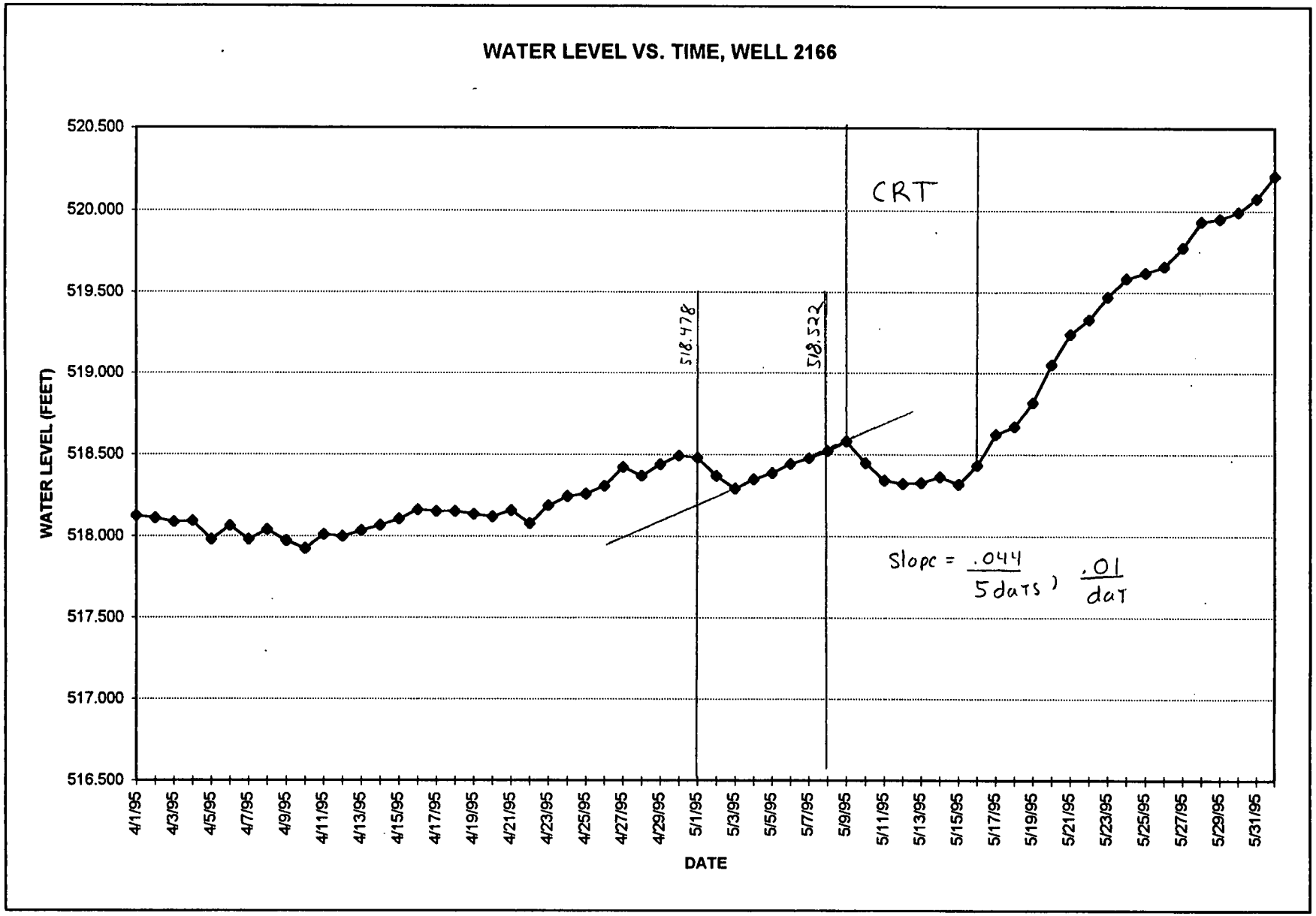

WATER LEVEL VS. TIME, WELL 2166
WATER LEVEL (FEET)
520.500
520.000
519.500
519.000
518.500
518.000
517.500
517.000
516.500
4/1/95
4/3/95
4/5/95
4/7/95
4/9/95
4/11/95
4/13/95
4/15/95
4/17/95
4/19/95
4/21/95
4/23/95
4/25/95
4/27/95
4/29/95
5/1/95
5/3/95
5/5/95
5/7/95
5/9/95
5/11/95
5/13/95
5/15/95
5/17/95
5/19/95
5/21/95
5/23/95
5/25/95
5/27/95
5/29/95
5/31/95
DATE
CRT
518.478
518.522
Slope = .044 / 5 days , .01 / day

FIGURE B-6

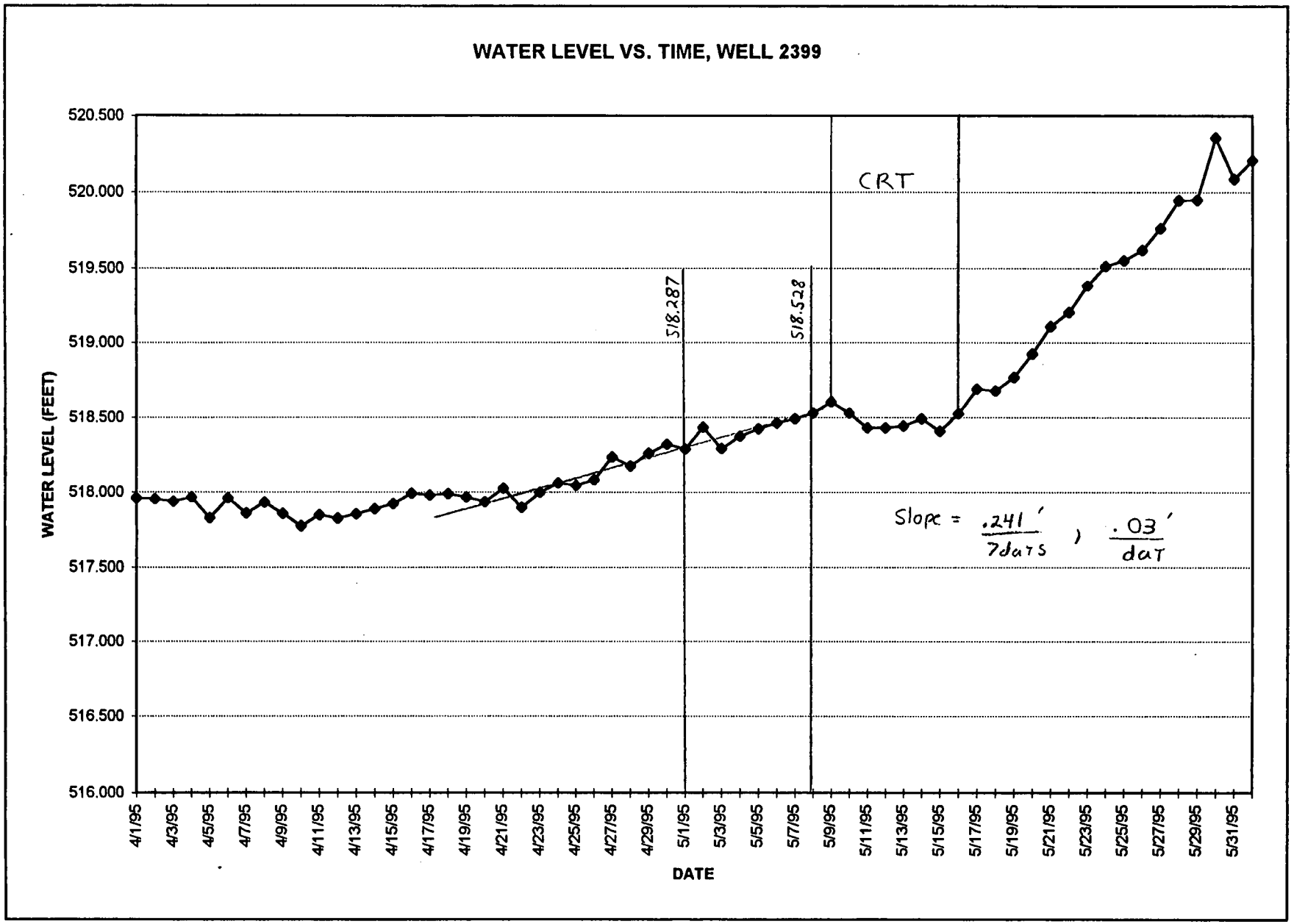

WATER LEVEL VS. TIME, WELL 2399
WATER LEVEL (FEET)
520.500
520.000
519.500
519.000
518.500
518.000
517.500
517.000
516.500
516.000
DATE
4/1/95
4/3/95
4/5/95
4/7/95
4/9/95
4/11/95
4/13/95
4/15/95
4/17/95
4/19/95
4/21/95
4/23/95
4/25/95
4/27/95
4/29/95
5/1/95
5/3/95
5/5/95
5/7/95
5/9/95
5/11/95
5/13/95
5/15/95
5/17/95
5/19/95
5/21/95
5/23/95
5/25/95
5/27/95
5/29/95
5/31/95
518.287
518.528
CRT
Slope = .241' / 7days , .03' / day

FIGURE B-7

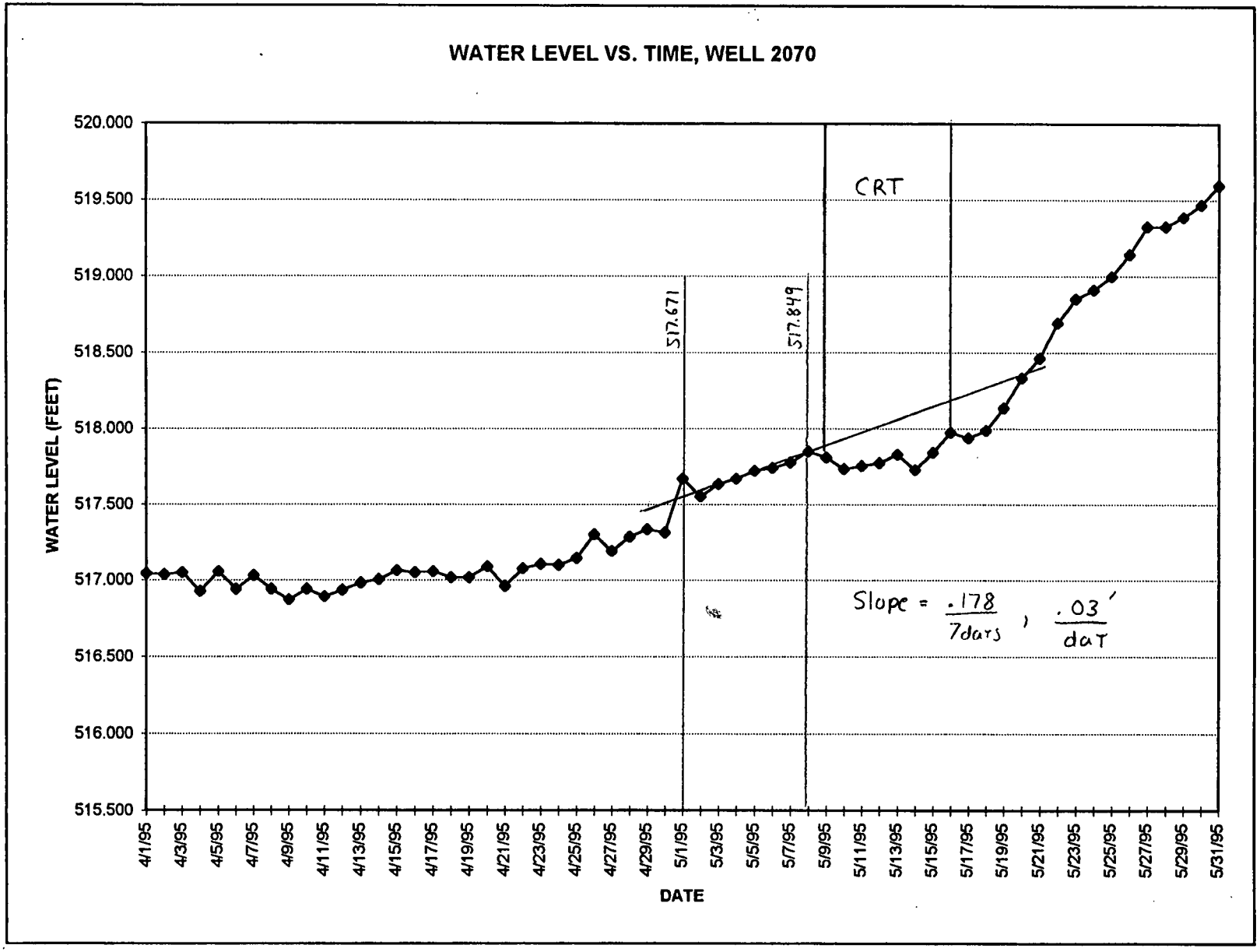

WATER LEVEL VS. TIME, WELL 2070
WATER LEVEL (FEET)
520.000
519.500
519.000
518.500
518.000
517.500
517.000
516.500
516.000
515.500
DATE
4/1/95
4/3/95
4/5/95
4/7/95
4/9/95
4/11/95
4/13/95
4/15/95
4/17/95
4/19/95
4/21/95
4/23/95
4/25/95
4/27/95
4/29/95
5/1/95
5/3/95
5/5/95
5/7/95
5/9/95
5/11/95
5/13/95
5/15/95
5/17/95
5/19/95
5/21/95
5/23/95
5/25/95
5/27/95
5/29/95
5/31/95
517.671
517.849
CRT
Slope = .178 / 7days , .03' / day

FIGURE B-8

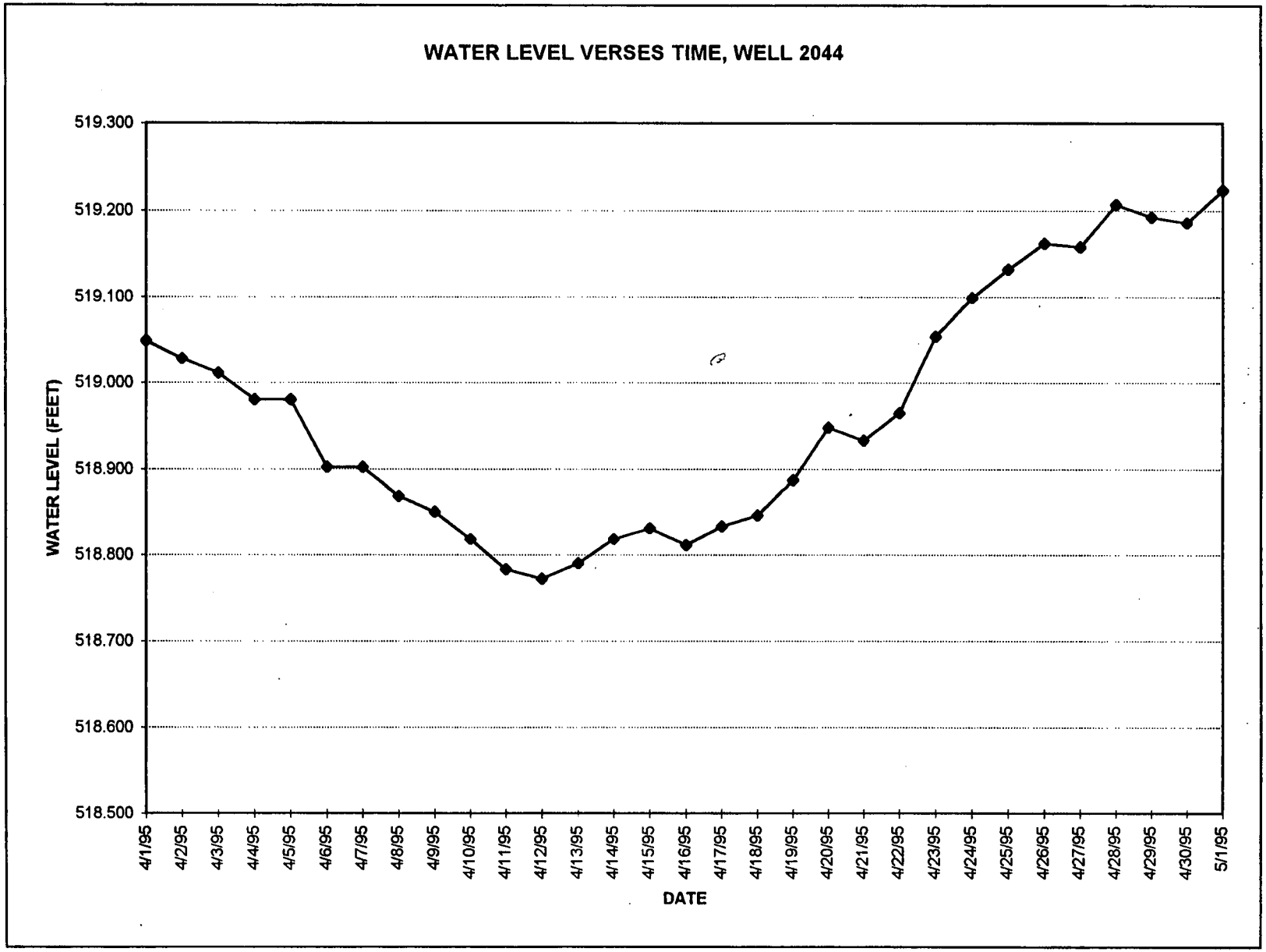


FIGURE B-9

000127

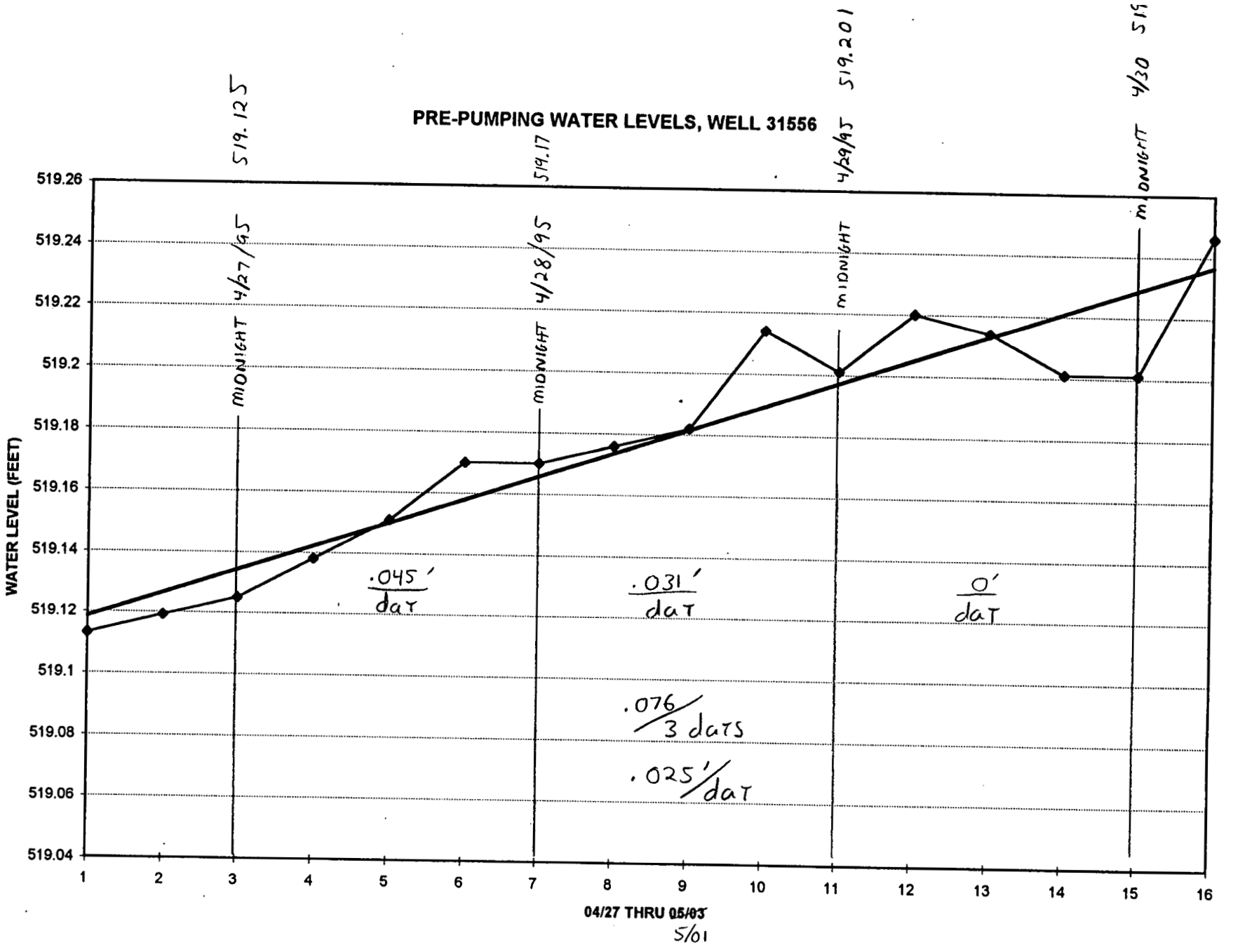


FIGURE B-10

000128

7120

Appendix C

APPENDIX C

FLOW, BAROMETRIC PRESSURE, AND RAINFALL DATA

TABLE C-1

Date	Time	Elapsed Time (Minutes)	Digital Flow (gpm)	Total Flow (Gal x 100)	Barametric Pressure (in Hg)
05/09/95	07:01	0	0	6811	29.266
	07:02	1	863	6821	29.266
	07:03	2	843	6829	29.266
	07:04	3	794	6838	29.264
	07:05	4	744	6846	29.267
	07:06	5	728	6853	29.267
	07:07	6	718	6861	29.266
	07:08	7	711	6867	29.263
	07:09	8	708	6875	29.263
	07:10	9	704	6882	29.263
	07:11	10	703	6889	29.263
	07:21	20	686	6964	29.251
	07:31	30	709	7036	29.244
	07:41	40	709	7106	29.238
	07:51	50	705	7178	29.242
	08:01	60	701	7258	29.242
	08:11	70	703	7327	29.244
	08:21	80	706	7401	29.247
	08:31	90	703	7475	29.249
	08:41	100	700	7548	29.248
	09:00	119	697	7696	29.248
	09:30	149	696	7925	29.254
	10:00	179	695	8114	29.262
	10:30	209	695	8337	29.272
	11:00	239	694	8534	29.267
	11:30	269	692	8743	29.249
	12:00	299	695	8987	29.233
	12:30	329	690	9211	29.214
	13:00	359	705	9427	29.216
	13:30	389	703	9627	29.193
	14:00	419	699	9879	29.183
	14:30	449	701	10064	29.174
	15:00	479	699	10299	29.166
	15:30	509	700	10527	29.155
	16:00	539	696	10714	29.147
	16:30	569	695	10912	29.135
	17:00	599	697	11169	29.132
	17:30	629	700	11392	29.136
	18:00	659	700	11597	29.131
	18:30	689	694	11846	29.123

TABLE C-1

Date	Time	Elapsed Time (Minutes)	Digital Flow (gpm)	Total Flow (Gal x 100)	Barametric Pressure (in Hg)
	19:00	719	692	12067	29.124
	19:30	749	701	12255	29.127
	20:00	779	692	12546	29.133
	20:30	809	695	12700	29.132
	21:00	839	697	12889	29.128
	21:30	869	695	13120	29.130
	22:00	899	696	13326	29.130
	22:30	929	697	13354	29.130
	23:00	959	696	13800	29.137
	23:30	989	698	13997	29.138
05/10/95	00:00	1019	697	14230	29.142
	00:30	1049	697	14414	29.140
	01:00	1079	696	14666	29.138
	01:30	1109	691	15080	29.133
	02:00	1139	696	14866	29.134
	02:30	1169	692	15277	29.123
	03:00	1199	692	15481	29.112
	03:30	1224	695	15705	29.108
	04:00	1259	695	15906	29.098
	04:30	1289	692	16112	29.073
	05:00	1319	693	16336	29.066
	05:30	1349	700	16549	29.055
	06:00	1379	695	16764	29.059
	06:30	1409	695	17000	29.063
	07:00	1439	698	17190	29.065
	07:30	1469	694	17412	29.070
	08:00	1499	695	17632	29.067
	08:30	1529	691	17897	29.054
	09:00	1559	692	18079	29.047
	09:30	1589	693	18273	29.051
	10:00	1619	692	18483	29.058
	10:30	1649	694	18707	29.056
	11:00	1679	693	18922	29.054
	11:30	1709	689	19140	29.036
	12:00	1739	688	19331	29.031
	12:30	1769	691	19569	29.008
	13:00	1799	693	19757	29.011
	13:30	1829	695	19989	29.007
	14:00	1859	691	20243	28.992
	14:30	1889	694	20453	29.022

TABLE C-1

Date	Time	Elapsed Time (Minutes)	Digital Flow (gpm)	Total Flow (Gal x 100)	Barametric Pressure (in Hg)
	15:00	1919			
	15:30	1949	697	20831	29.027
	16:00	1979	692	21056	29.011
	16:30	2009	693	21279	29.000
	17:00	2039	692	21505	28.989
	17:30	2069	694	21728	28.988
	18:00	2099	692	21944	28.977
	18:30	2129	694	22159	29.004
	19:00	2159	694	22385	29.005
	19:30	2189	694	22594	29.009
	20:00	2219	693	22791	29.019
	20:30	2249	692	23022	29.034
	21:00	2279	692	23170	29.052
	21:30	2309	694	23433	29.069
	22:00	2339	689	23652	29.080
	22:30	2369	690	23908	29.087
	23:00	2399	690	24129	29.094
	23:30	2429	692	24300	29.101
05/11/95	00:00	2459	692	24504	29.096
	00:30	2489	692	24740	29.098
	01:00	2519	693	24955	29.098
	01:30	2549	694	25167	29.101
	02:00	2579	693	25382	29.101
	02:30	2609	693	25599	29.102
	03:00	2639	693	25717	29.103
	03:30	2669	692	26005	29.111
	04:00	2699	689	26223	29.111
	04:30	2729	689	26434	29.129
	05:00	2759	691	26646	29.140
	05:30	2789	692	26868	29.150
	06:00	2819	692	27080	29.153
	06:30	2849	692	27294	29.161
	07:00	2879	692	27508	29.168
	07:30	2909	691	27734	29.185
	08:00	2939	694	27932	29.197
	08:30	2969	692	28170	29.198
	09:00	2999	690	28356	29.204
	09:30	3029	690	28572	29.213
	10:00	3059	688	28870	29.215
	10:30	3089	689	29018	29.216

TABLE C-1

Date	Time	Elapsed Time (Minutes)	Digital Flow (gpm)	Total Flow (Gal x 100)	Barametric Pressure (in Hg)
	11:00	3119	692	29267	29.222
	11:30	3149	687	29445	29.232
	12:00	3179	689	29664	29.234
	12:30	3209	694	29866	29.234
	13:00	3239	687	30069	29.228
	13:30	3269	687	30307	29.232
	14:00	3299	690	30506	29.226
	14:30	3329	688	30711	29.230
	15:00	3359	689	30914	29.229
	15:30	3389	692	31138	29.229
	16:00	3419	689	31369	29.223
	16:30	3449	690	31567	29.230
	17:00	3479	692	31796	29.225
	17:30	3509	694	31993	29.224
	18:00	3539	691	32233	29.219
	18:30	3569	692	32456	29.211
	19:00	3599	691	32673	29.214
	19:30	3629	692	32852	29.212
	20:00	3659	691	33104	29.207
	20:30	3689	690	33301	29.216
	21:00	3719	688	33507	29.224
	21:30	3749	688	33743	29.223
	22:00	3779	690	33948	29.225
	22:30	3809	690	34158	29.228
	23:00	3839	691	34382	29.229
	23:30	3869	691	34589	29.230
05/12/95	00:00	3899	692	34800	29.236
	00:30	3929	691	35026	29.242
	01:00	3959	689	35228	29.245
	01:30	3989	691	35445	29.237
	02:00	4019	697	35663	29.235
	02:30	4049	689	35870	29.224
	03:00	4079	691	36075	29.220
	03:30	4109	693	36301	29.212
	04:00	4139	689	36528	29.212
	04:30	4169	692	36716	29.214
	05:00	4199	690	36940	29.221
	05:30	4229	695	37148	29.225
	06:00	4259	691	37365	29.235
	06:30	4289	691	37576	29.253

TABLE C-1

Date	Time	Elapsed Time (Minutes)	Digital Flow (gpm)	Total Flow (Gal x 100)	Barametric Pressure (in Hg)
	07:00	4319	691	37790	29.253
	07:30	4349	692	38117	29.273
	08:00	4379	690	38224	29.275
	08:30	4409	691	38436	29.278
	09:00	4439	691	38642	29.286
	09:30	4469	689	38853	29.299
	10:00	4499	688	39060	29.293
	10:30	4529	689	39228	29.297
	11:00	4559	686	39524	29.287
	11:30	4589	689	39719	29.285
	12:00	4619	688	39896	29.284
	12:30	4649	690	40157	29.264
	13:00	4679	725	40355	29.261
	13:30	4709	724	40610	29.267
	14:00	4739	718	40811	29.268
	14:30	4769	718	41111	29.264
	15:00	4799	716	41284	29.266
	15:30	4829	714	41538	29.255
	16:00	4859	714	41725	29.257
	16:30	4889	713	41939	29.253
	17:00	4919	710	42156	29.257
	17:30	4949	706	42359	29.257
	18:00	4979	704	42613	29.256
	18:30	5009	707	42820	29.252
	19:00	5039	708	43051	29.248
	19:30	5069	703	43261	29.243
	20:00	5099	707	43488	29.249
	20:30	5129	706	43691	29.249
	21:00	5159	706	43887	29.246
	21:30	5189	708	44146	29.251
	22:00	5219	705	44354	29.255
	22:30	5249	704	44579	29.254
	23:00	5279	709	44899	29.261
	23:30	5309	710	45014	29.262
05/13/95	00:00	5339	703	45232	29.264
	00:30	5369	703	45454	29.269
	01:00	5399	703	45668	29.257
	01:30	5429	703	45888	29.258
	02:00	5459	703	46098	29.240
	02:30	5489	707	46329	29.255

TABLE C-1

Date	Time	Elapsed Time (Minutes)	Digital Flow (gpm)	Total Flow (Gal x 100)	Barametric Pressure (in Hg)
	03:00	5519	705	46559	29.242
	03:30	5549	700	46751	29.248
	04:00	5579	701	46972	29.248
	04:30	5609	701	47189	29.248
	05:00	5639	698	47407	29.269
	05:30	5669	700	47618	29.273
	06:00	5699	700	47838	29.256
	06:30	5729	699	48057	29.254
	07:00	5759	698	48273	29.255
	07:30	5789	700	48495	29.285
	08:00	5819	697	48708	29.302
	08:30	5849	702	48927	29.275
	09:00	5879	701	49145	29.267
	09:30	5909	704	49361	29.280
	10:00	5939	707	49572	29.243
	10:30	5969	698	49795	29.237
	11:00	5999	701	50033	29.235
	11:30	6029	703	50200	29.222
	12:00	6059	704	50500	29.221
	12:30	6089	701	50687	29.212
	13:00	6119	698	50919	29.218
	13:30	6149	704	51090	29.119
	14:00	6179	701	51330	29.200
	14:30	6209	701	51599	29.192
	15:00	6239	704	51680	29.192
	15:30	6269	708	51990	29.193
	16:00	6299	704	52225	29.191
	16:30	6329	700	52446	29.167
	17:00	6359	698	52644	29.157
	17:30	6389	706	52865	29.148
	18:00	6419	706	53087	29.141
	18:30	6449	703	53306	29.139
	19:00	6479	709	53512	29.130
	19:30	6509			
	20:00	6539	697	53965	29.117
	20:30	6569	704	54181	29.117
	21:00	6599	703	54365	29.126
	21:30	6629	704	54607	29.132
	22:00	6659	703	54808	29.128
	22:30	6689	702	55003	29.128

TABLE C-1

Date	Time	Elapsed Time (Minutes)	Digital Flow (gpm)	Total Flow (Gal x 100)	Barametric Pressure (in Hg)
	23:00	6719	700	55191	29.122
	23:30	6749	708	55461	29.100
05/14/95	00:00	6779	698	55703	29.101
	00:30	6809	695	55922	29.100
	01:00	6839	698	56135	29.100
	01:30	6869			
	02:00	6899	692	56565	29.064
	02:30	6929			
	03:00	6959			
	03:30	6989			29.073
	04:00	7019	692	57413	29.102
	04:30	7049	693		29.107
	05:00	7079			29.115
	05:30	7109	695	58076	29.117
	06:00	7139	698	58278	29.134
	06:30	7169	692	58497	29.135
	07:00	7199			
	07:30	7229	691	58925	29.146
	08:00	7259	694	59139	29.159
	08:30	7289	691	59356	29.179
	09:00	7319	692	59572	29.203
	09:30	7349	690	59769	29.206
	10:00	7379	720	59989	29.209
	10:30	7409	717	60245	29.255
	11:00	7439	714	60465	29.243
	11:30	7469	712	60670	29.250
	12:00	7499	711	60369	29.300
	12:30	7529	710	61170	29.233
	13:00	7559	710	61361	29.233
	13:30	7589	710	61585	29.233
	14:00	7619	709	61789	29.222
	14:30	7649	709	61988	29.223
	15:00	7679	709	62024	29.225
	15:30	7709	710	62463	29.217
	16:00	7739	709	62696	29.217
	16:30	7769	710	62885	29.207
	17:00	7799	709	63125	29.215
	17:30	7829	708	63350	29.223
	18:00	7859	708	63579	29.236
	18:30	7889	709	63783	29.246

TABLE C-1

Date	Time	Elapsed Time (Minutes)	Digital Flow (gpm)	Total Flow (Gal x 100)	Barametric Pressure (in Hg)
	19:00	7919	709	64026	29.247
	19:30	7949	711	64229	29.248
	20:00	7979	710	64438	29.256
	20:30	8009	710	64659	29.268
	21:00	8039	709	64871	29.284
	21:30	8069	712	65119	29.290
	22:00	8099	710	65341	29.312
	22:30	8129	708	65560	29.320
	23:00	8159	705	65777	29.329
	23:30	8189	712	66004	29.330
05/15/95	00:00	8219	712	66226	29.335
	00:30	8249	713	66447	29.337
	01:00	8279	713	66669	29.341
	01:30	8309	715	66894	29.353
	02:00	8339	713	67117	29.360
	02:30	8369	715	67338	29.359
	03:00	8399	718	67558	29.356
	03:30	8429	716	67782	29.352
	04:00	8459	710	67995	29.358
	04:30	8489	713	68218	29.364
	05:00	8519	709	68440	29.383
	05:30	8549	713	68663	29.391
	06:00	8579	713	68872	29.401
	06:30	8609	713	69106	29.390
	07:00	8639	713	69333	29.398
	07:30	8669	713	69550	29.413
	08:00	8699	711	69766	29.421
	08:30	8729	709	69987	29.426
	09:00	8759	711	70209	29.430
	09:30	8789	709	70428	29.435
	10:00	8819	712	70666	29.435
	10:30	8849	713	70875	29.441
	11:00	8879	710	71122	29.443
	11:30	8909	715	71316	29.451
	12:00	8939	710	71549	29.450
	12:30	8969	709	71741	29.453
	13:00	8999	710	71989	29.443
	13:30	9029	707	72193	29.432
	14:00	9059	708	72410	29.433
	14:30	9089	708	72639	29.410

TABLE C-1

Date	Time	Elapsed Time (Minutes)	Digital Flow (gpm)	Total Flow (Gal x 100)	Barametric Pressure (in Hg)
	15:00	9119	709	72881	29.401
	15:30	9149	706	73074	29.404
	16:00	9179	708	73324	29.399
	16:30	9209	704	73524	29.398
	17:00	9239	706	73740	29.376
	17:30	9269	702	73980	29.364
	18:00	9299	704	74184	29.360
	18:30	9329	706	74415	29.366
	19:00	9359	706	74615	29.356
	19:30	9389	710	74866	29.364
	20:00	9419	707	75054	29.354
	20:30	9449	707	75295	29.351
	21:00	9479	711	75491	29.352
	21:30	9509	708	75738	29.358
	22:00	9539	711	75959	29.366
	22:30	9569	712	76180	29.370
	23:00	9599	709	76403	29.375
	23:30	9629	710	76624	29.376
05/16/95	00:00	9659	709	76843	29.374
	00:30	9689	710	77064	29.369
	01:00	9719	707	77282	29.361
	01:30	9749	708	77506	29.362
	02:00	9779	708	77728	29.359
	02:30	9809	710	77953	29.351
	03:00	9839	708	78168	29.357
	03:30	9869	706	78399	29.345
	04:00	9899	707	78607	29.355
	04:30	9929	709	78816	29.352
	05:00	9959	705	79045	29.342
	05:30	9989	707	79253	29.344
	06:00	10019	706	79483	29.348
	06:30	10049	710	79660	29.351
	07:00	10079	710	79660	29.351
	07:30	10109	709	79862	29.351
	08:00	10139	704	80137	29.355
	08:30	10169	708	80403	29.352
	09:00	10199	708	80570	29.320
	09:30	10229	705	80800	29.323
	10:00	10259	704	81437	29.330
	10:30	10289		81449	29.330

TABLE C-2

PRECIPITATION

Date	Precipitation (Inches)
4/27	0
4/28	0
4/29	0
4/30	.16
5/1	.97
5/2	.06
5/3	0
5/4	.16
5/5	0
5/6	0
5/7	0
5/8	0
5/9	.73
5/10	.16
5/11	.01
5/12	0
5/13	.53
5/14	1.00
5/15	0
5/16	.63
5/17	.22
5/18	3.33
5/19	0
5/20	0

Appendix D

APPENDIX D

BAROMETRIC EFFICIENCY CALCULATIONS

APPENDIX D

Appendix D contains the following:

- Table D-1, 4845 minutes of tabulated barometric pressure and water level data beginning 6:00 a.m. Thursday, April 27, 1995.
- Table D-2, flowsheet that illustrates the amount of water level change caused by barometric pressure change during the constant-rate test (CRT).
- Figure D-1, a plot of barometric pressure versus time from 6:00 a.m. Thursday, April 27, 1995 to 12:00 a.m. Monday, May 1, 1995.

Barometric efficiency was determined for each observation well (31551 through 31556) using data collected between April 27 and May 1, 1995. The results are tabulated in Table 5-4. The back-up data for the calculations is provided in Table D-1. The data logger printout for the period covered by Table D-1 is provided in Appendix E.

Figure D-1 illustrates the change in barometric pressure which occurred from April 27 to May 1, 1995. As the figure illustrates, one of the larger changes took place between 10:00 a.m. April 29 and 3:15 a.m. April 30. Barometric efficiency calculations presented in Table 5-4 were calculated for this period.

Water levels reported in Table D-1 were collected using a Hermit 2000 data logger. The mode of operation was top of casing (TOC). In the TOC mode readings are referenced to the top of the well casing. Decreasing water levels correspond to increasing top of casing readings and increasing water levels correspond to decreasing top of casing readings. Rows of data used in the calculations for barometric efficiency are highlighted for easy reference.

Table D-2 tabulates how changes in barometric efficiency effected the water level during the CRT. The barometric pressure, recorded in inches of mercury (Hg), was converted to barometric pressure in inches of water. The mercury change in barometric pressure, in inches of water, was determined between 1-minute readings. The change in water level for a recorded period of time in the observation well due to barometric pressure changes is found by multiplying the barometric pressure efficiency of a well by the change in barometric pressure that occurred over the same period. The last three columns of Table D-2 contain the results of the assessment. Well 31551 is the closest

observation well, Well 31553 is the observation well farthest away from the control well, and Well 31555 is the well with the largest calculated barometric efficiency.

The results indicate that during the CRT the change in water level caused by changes in barometric pressure was very small and insignificant.

TABLE D-1

7120

DATE	TIME	DAY	BARO.	WATER LEVEL CHANGE					
			PRESS.	WELL	WELL	WELL	WELL	WELL	WELL
			(in. of Hg)	31551	31552	31553	31554	31555	31556
4/27/95	6:00	Thursday	29.22						
4/27/95	6:15	Thursday	29.22						
4/27/95	6:30	Thursday	29.22						
4/27/95	6:45	Thursday	29.22						
4/27/95	7:00	Thursday	29.22						
4/27/95	7:15	Thursday	29.22						
4/27/95	7:30	Thursday	29.22						
4/27/95	7:45	Thursday	29.22						
4/27/95	8:00	Thursday	29.22						
4/27/95	8:15	Thursday	29.22						
4/27/95	8:30	Thursday	29.22						
4/27/95	8:45	Thursday	29.22						
4/27/95	9:00	Thursday	29.22						
4/27/95	9:15	Thursday	29.23						
4/27/95	9:30	Thursday	29.23						
4/27/95	9:45	Thursday	29.23						
4/27/95	10:00	Thursday	29.24						
4/27/95	10:15	Thursday	29.24						
4/27/95	10:30	Thursday	29.25						
4/27/95	10:45	Thursday	29.25						
4/27/95	11:00	Thursday	29.27						
4/27/95	11:15	Thursday	29.28						
4/27/95	11:30	Thursday	29.29						
4/27/95	11:45	Thursday	29.29						
4/27/95	12:00	Thursday	29.3						
4/27/95	12:15	Thursday	29.3						
4/27/95	12:30	Thursday	29.31						
4/27/95	12:45	Thursday	29.31						
4/27/95	13:00	Thursday	29.31						
4/27/95	13:15	Thursday	29.32						
4/27/95	13:30	Thursday	29.32						
4/27/95	13:45	Thursday	29.32						
4/27/95	14:00	Thursday	29.33						
4/27/95	14:15	Thursday	29.34						
4/27/95	14:30	Thursday	29.34						
4/27/95	14:45	Thursday	29.35						
4/27/95	15:00	Thursday	29.35						
4/27/95	15:15	Thursday	29.35	0	-0.006	-0.012	0	0	-0.006
4/27/95	15:30	Thursday	29.35	0	-0.006	0	0	0	-0.006
4/27/95	15:45	Thursday	29.36	0.005	-0.006	0	0	0.006	-0.006
4/27/95	16:00	Thursday	29.36	0	-0.006	0	0.006	0	-0.006
4/27/95	16:15	Thursday	29.36	0	-0.006	0	0.006	0	-0.006
4/27/95	16:30	Thursday	29.36	0.005	-0.006	0	0	0.006	-0.006
4/27/95	16:45	Thursday	29.37	0	-0.006	0.006	0.006	0	-0.006
4/27/95	17:00	Thursday	29.37	0.005	0	0	0	0.006	-0.006
4/27/95	17:15	Thursday	29.37	0	-0.006	0	0	0	-0.006
4/27/95	17:30	Thursday	29.37	0	-0.006	0	0	0	-0.006
4/27/95	17:45	Thursday	29.38	0	-0.006	0	0.006	0	-0.006

TABLE D-1

DATE	TIME	DAY	BARO. PRESS. (in. of Hg)	WATER LEVEL CHANGE WELL 31551	WELL 31552	WELL 31553	WELL 31554	WELL 31555	WELL 31556
4/27/95	18:00	Thursday	29.38	0	-0.006	0	0	0	-0.006
4/27/95	18:15	Thursday	29.38	0	-0.006	0.012	0.018	0	-0.006
4/27/95	18:30	Thursday	29.38	0	-0.006	0	0	0	-0.006
4/27/95	18:45	Thursday	29.38	0	-0.006	0	0	0	-0.006
4/27/95	19:00	Thursday	29.38	-0.005	-0.012	-0.006	-0.006	0	-0.012
4/27/95	19:15	Thursday	29.38	0	-0.006	-0.006	0	0	-0.006
4/27/95	19:30	Thursday	29.39	-0.005	-0.012	-0.006	-0.006	-0.006	-0.012
4/27/95	19:45	Thursday	29.39	0	-0.012	-0.006	0	0	-0.012
4/27/95	20:00	Thursday	29.4	0	-0.006	0	0	0	-0.006
4/27/95	20:15	Thursday	29.4	0	-0.006	-0.006	0	0	-0.012
4/27/95	20:30	Thursday	29.41	0	-0.006	-0.006	0	0	-0.012
4/27/95	20:45	Thursday	29.42	0	-0.006	0	0	0	-0.006
4/27/95	21:00	Thursday	29.42	0.005	-0.006	0	0	0	-0.006
4/27/95	21:15	Thursday	29.43	0.005	-0.006	0	0	0	-0.006
4/27/95	21:30	Thursday	29.43	0.005	0	0.006	0.006	0.006	0
4/27/95	21:45	Thursday	29.43	0.005	0	0.006	0.006	0.006	0
4/27/95	22:00	Thursday	29.43	0.005	0	0.006	0.006	0.006	0
4/27/95	22:15	Thursday	29.43	0.005	0	0.006	0.006	0.006	0
4/27/95	22:30	Thursday	29.43	0.005	0	0.006	0	0.006	-0.006
4/27/95	22:45	Thursday	29.43	0.005	0	0.006	0.006	0.006	-0.006
4/27/95	23:00	Thursday	29.42	0.005	0	0.006	0.006	0.006	-0.006
4/27/95	23:15	Thursday	29.41	0.005	0	0.006	0.006	0.006	-0.006
4/27/95	23:30	Thursday	29.41	0.005	0	0.006	0.006	0	-0.006
4/27/95	23:45	Thursday	29.41	0	-0.006	0	0	0	-0.012
4/28/95	0:00	Friday	29.41	0	-0.006	0	0	0	-0.012
4/28/95	0:15	Friday	29.41	0	-0.006	0	0	-0.006	-0.012
4/28/95	0:30	Friday	29.41	0	-0.006	-0.006	0	-0.006	-0.012
4/28/95	0:45	Friday	29.41	0	-0.006	-0.006	0	-0.006	-0.012
4/28/95	1:00	Friday	29.4	-0.005	-0.012	-0.006	-0.006	-0.006	-0.019
4/28/95	1:15	Friday	29.4	-0.005	-0.012	-0.006	-0.006	-0.006	-0.019
4/28/95	1:30	Friday	29.4	-0.005	-0.012	-0.006	-0.006	-0.006	-0.019
4/28/95	1:45	Friday	29.39	-0.005	-0.012	-0.006	-0.006	-0.006	-0.019
4/28/95	2:00	Friday	29.39	-0.005	-0.012	-0.006	-0.006	-0.012	-0.019
4/28/95	2:15	Friday	29.4	-0.01	-0.019	-0.012	-0.006	-0.006	-0.019
4/28/95	2:30	Friday	29.41	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	2:45	Friday	29.41	-0.015	-0.025	-0.018	-0.012	-0.019	-0.031
4/28/95	3:00	Friday	29.4	-0.01	-0.019	-0.018	-0.012	-0.019	-0.025
4/28/95	3:15	Friday	29.41	-0.01	-0.019	-0.018	-0.012	-0.019	-0.025
4/28/95	3:30	Friday	29.42	-0.01	-0.025	-0.018	-0.012	-0.019	-0.025
4/28/95	3:45	Friday	29.42	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	4:00	Friday	29.42	-0.01	-0.019	-0.018	-0.012	-0.012	-0.025
4/28/95	4:15	Friday	29.43	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	4:30	Friday	29.43	-0.01	-0.019	-0.018	-0.012	-0.012	-0.025
4/28/95	4:45	Friday	29.43	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	5:00	Friday	29.43	-0.01	-0.019	-0.012	-0.012	-0.019	-0.025
4/28/95	5:15	Friday	29.44	-0.01	-0.019	-0.018	-0.012	-0.019	-0.025
4/28/95	5:30	Friday	29.45	-0.01	-0.019	-0.012	-0.012	-0.019	-0.025
4/28/95	5:45	Friday	29.45	-0.01	-0.019	-0.012	-0.012	-0.012	-0.025

TABLE D-1

DATE	TIME	DAY	BARO. PRESS. (in. of Hg)	WATER LEVEL CHANGE WELL 31551	WELL 31552	WELL 31553	WELL 31554	WELL 31555	WELL 31556
4/28/95	6:00	Friday	29.44	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	6:15	Friday	29.45	-0.015	-0.019	-0.018	-0.012	-0.019	-0.025
4/28/95	6:30	Friday	29.47	-0.01	-0.019	-0.012	-0.012	-0.019	-0.025
4/28/95	6:45	Friday	29.47	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	7:00	Friday	29.47	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	7:15	Friday	29.47	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	7:30	Friday	29.48	-0.01	-0.012	-0.012	-0.006	-0.012	-0.019
4/28/95	7:45	Friday	29.49	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	8:00	Friday	29.49	-0.01	-0.019	-0.006	-0.006	-0.012	-0.025
4/28/95	8:15	Friday	29.49	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	8:30	Friday	29.5	-0.01	-0.019	-0.006	-0.006	-0.012	-0.025
4/28/95	8:45	Friday	29.5	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	9:00	Friday	29.51	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	9:15	Friday	29.51	-0.01	-0.012	-0.012	-0.006	-0.012	-0.025
4/28/95	9:30	Friday	29.52	-0.01	-0.019	-0.006	-0.006	-0.012	-0.025
4/28/95	9:45	Friday	29.51	-0.01	-0.019	-0.012	-0.012	-0.012	-0.025
4/28/95	10:00	Friday	29.51	-0.01	-0.019	-0.012	-0.006	-0.012	-0.025
4/28/95	10:15	Friday	29.51	-0.015	-0.019	-0.018	-0.006	-0.012	-0.025
4/28/95	10:30	Friday	29.51	-0.015	-0.019	-0.012	-0.012	-0.019	-0.025
4/28/95	10:45	Friday	29.5	-0.015	-0.019	-0.018	-0.012	-0.019	-0.031
4/28/95	11:00	Friday	29.5	-0.015	-0.025	-0.025	-0.018	-0.019	-0.031
4/28/95	11:15	Friday	29.5	-0.015	-0.025	-0.018	-0.006	-0.019	-0.038
4/28/95	11:30	Friday	29.5	-0.02	-0.025	-0.018	-0.012	-0.025	-0.038
4/28/95	11:45	Friday	29.5	-0.015	-0.025	-0.018	-0.006	-0.019	-0.031
4/28/95	12:00	Friday	29.49	-0.02	-0.025	-0.018	-0.006	-0.025	-0.038
4/28/95	12:15	Friday	29.49	-0.02	-0.025	-0.018	-0.012	-0.025	-0.031
4/28/95	12:30	Friday	29.48	-0.02	-0.025	-0.037	-0.037	-0.025	-0.038
4/28/95	12:45	Friday	29.48	-0.02	-0.031	-0.025	-0.031	-0.025	-0.044
4/28/95	13:00	Friday	29.48	-0.02	-0.031	-0.031	-0.025	-0.025	-0.044
4/28/95	13:15	Friday	29.48	-0.025	-0.031	-0.025	-0.018	-0.025	-0.038
4/28/95	13:30	Friday	29.47	-0.025	-0.038	-0.031	-0.025	-0.031	-0.044
4/28/95	13:45	Friday	29.48	-0.02	-0.031	-0.006	0.018	-0.031	-0.038
4/28/95	14:00	Friday	29.47	-0.025	-0.038	-0.018	-0.012	-0.031	-0.044
4/28/95	14:15	Friday	29.47	-0.025	-0.038	-0.031	-0.025	-0.031	-0.044
4/28/95	14:30	Friday	29.47	-0.03	-0.038	-0.05	-0.05	-0.031	-0.044
4/28/95	14:45	Friday	29.46	-0.025	-0.031	-0.031	-0.018	-0.031	-0.044
4/28/95	15:00	Friday	29.46	-0.03	-0.038	-0.037	-0.037	-0.038	-0.05
4/28/95	15:15	Friday	29.46	-0.03	-0.038	-0.031	-0.018	-0.031	-0.044
4/28/95	15:30	Friday	29.45	-0.03	-0.044	-0.037	-0.025	-0.038	-0.05
4/28/95	15:45	Friday	29.45	-0.03	-0.044	-0.063	-0.056	-0.038	-0.057
4/28/95	16:00	Friday	29.44	-0.03	-0.044	-0.044	-0.031	-0.038	-0.05
4/28/95	16:15	Friday	29.44	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
4/28/95	16:30	Friday	29.44	-0.035	-0.044	-0.044	-0.031	-0.044	-0.057
4/28/95	16:45	Friday	29.44	-0.03	-0.044	-0.044	-0.031	-0.038	-0.05
4/28/95	17:00	Friday	29.44	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
4/28/95	17:15	Friday	29.44	-0.035	-0.044	-0.05	-0.037	-0.044	-0.057
4/28/95	17:30	Friday	29.44	-0.035	-0.044	-0.05	-0.037	-0.044	-0.057
4/28/95	17:45	Friday	29.44	-0.035	-0.044	-0.044	-0.031	-0.044	-0.057

TABLE D-1

DATE	TIME	DAY	BARO. PRESS. (in. of Hg)	WATER LEVEL CHANGE WELL 31551	WELL 31552	WELL 31553	WELL 31554	WELL 31555	WELL 31556
4/28/95	18:00	Friday	29.44	-0.035	-0.05	-0.044	-0.031	-0.044	-0.057
4/28/95	18:15	Friday	29.44	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
4/28/95	18:30	Friday	29.43	-0.035	-0.044	-0.037	-0.025	-0.038	-0.057
4/28/95	18:45	Friday	29.43	-0.035	-0.044	-0.044	-0.037	-0.038	-0.057
4/28/95	19:00	Friday	29.43	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
4/28/95	19:15	Friday	29.43	-0.035	-0.05	-0.044	-0.037	-0.044	-0.057
4/28/95	19:30	Friday	29.43	-0.035	-0.05	-0.044	-0.037	-0.044	-0.057
4/28/95	19:45	Friday	29.43	-0.035	-0.05	-0.044	-0.037	-0.044	-0.057
4/28/95	20:00	Friday	29.43	-0.035	-0.044	-0.044	-0.037	-0.038	-0.057
4/28/95	20:15	Friday	29.43	-0.035	-0.05	-0.044	-0.037	-0.044	-0.057
4/28/95	20:30	Friday	29.43	-0.035	-0.044	-0.037	-0.031	-0.038	-0.057
4/28/95	20:45	Friday	29.43	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
4/28/95	21:00	Friday	29.43	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
4/28/95	21:15	Friday	29.43	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
4/28/95	21:30	Friday	29.43	-0.035	-0.044	-0.044	-0.037	-0.038	-0.057
4/28/95	21:45	Friday	29.43	-0.03	-0.038	-0.037	-0.031	-0.038	-0.05
4/28/95	22:00	Friday	29.43	-0.035	-0.044	-0.037	-0.031	-0.038	-0.05
4/28/95	22:15	Friday	29.43	-0.035	-0.044	-0.037	-0.037	-0.038	-0.057
4/28/95	22:30	Friday	29.43	-0.03	-0.044	-0.037	-0.031	-0.038	-0.05
4/28/95	22:45	Friday	29.43	-0.03	-0.044	-0.037	-0.031	-0.038	-0.05
4/28/95	23:00	Friday	29.43	-0.035	-0.044	-0.037	-0.031	-0.038	-0.05
4/28/95	23:15	Friday	29.43	-0.035	-0.044	-0.037	-0.037	-0.038	-0.057
4/28/95	23:30	Friday	29.42	-0.035	-0.044	-0.037	-0.031	-0.038	-0.057
4/28/95	23:45	Friday	29.42	-0.035	-0.044	-0.037	-0.031	-0.038	-0.057
4/29/95	0:00	Saturday	29.42	-0.035	-0.044	-0.037	-0.031	-0.038	-0.057
4/29/95	0:15	Saturday	29.42	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
4/29/95	0:30	Saturday	29.42	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
4/29/95	0:45	Saturday	29.42	-0.035	-0.05	-0.044	-0.037	-0.044	-0.057
4/29/95	1:00	Saturday	29.42	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
4/29/95	1:15	Saturday	29.41	-0.035	-0.044	-0.044	-0.031	-0.044	-0.057
4/29/95	1:30	Saturday	29.41	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
4/29/95	1:45	Saturday	29.41	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
4/29/95	2:00	Saturday	29.41	-0.04	-0.05	-0.044	-0.037	-0.05	-0.063
4/29/95	2:15	Saturday	29.41	-0.04	-0.05	-0.044	-0.037	-0.05	-0.063
4/29/95	2:30	Saturday	29.41	-0.04	-0.05	-0.044	-0.037	-0.044	-0.063
4/29/95	2:45	Saturday	29.41	-0.04	-0.05	-0.05	-0.037	-0.044	-0.063
4/29/95	3:00	Saturday	29.41	-0.04	-0.05	-0.044	-0.037	-0.044	-0.063
4/29/95	3:15	Saturday	29.41	-0.04	-0.05	-0.05	-0.044	-0.05	-0.063
4/29/95	3:30	Saturday	29.41	-0.04	-0.05	-0.05	-0.044	-0.05	-0.063
4/29/95	3:45	Saturday	29.41	-0.04	-0.05	-0.044	-0.037	-0.044	-0.063
4/29/95	4:00	Saturday	29.41	-0.04	-0.05	-0.044	-0.044	-0.044	-0.063
4/29/95	4:15	Saturday	29.42	-0.04	-0.05	-0.044	-0.037	-0.044	-0.063
4/29/95	4:30	Saturday	29.42	-0.04	-0.05	-0.05	-0.037	-0.044	-0.063
4/29/95	4:45	Saturday	29.42	-0.035	-0.044	-0.044	-0.037	-0.044	-0.063
4/29/95	5:00	Saturday	29.41	-0.04	-0.05	-0.044	-0.037	-0.044	-0.063
4/29/95	5:15	Saturday	29.42	-0.035	-0.05	-0.044	-0.037	-0.044	-0.063
4/29/95	5:30	Saturday	29.42	-0.04	-0.05	-0.044	-0.037	-0.044	-0.063
4/29/95	5:45	Saturday	29.43	-0.04	-0.05	-0.044	-0.037	-0.05	-0.063

TABLE D-1

DATE	TIME	DAY	BARO.	WATER LEVEL CHANGE					
			PRESS.	WELL	WELL	WELL	WELL	WELL	WELL
			(in. of Hg)	31551	31552	31553	31554	31555	31556
4/29/95	6:00	Saturday	29.43	-0.04	-0.05	-0.05	-0.044	-0.05	-0.063
4/29/95	6:15	Saturday	29.43	-0.04	-0.05	-0.05	-0.044	-0.05	-0.063
4/29/95	6:30	Saturday	29.43	-0.04	-0.05	-0.05	-0.044	-0.05	-0.069
4/29/95	6:45	Saturday	29.43	-0.04	-0.05	-0.05	-0.044	-0.05	-0.063
4/29/95	7:00	Saturday	29.43	-0.04	-0.05	-0.044	-0.037	-0.044	-0.063
4/29/95	7:15	Saturday	29.44	-0.04	-0.05	-0.05	-0.044	-0.05	-0.063
4/29/95	7:30	Saturday	29.45	-0.04	-0.05	-0.05	-0.044	-0.05	-0.063
4/29/95	7:45	Saturday	29.46	-0.04	-0.05	-0.05	-0.037	-0.05	-0.069
4/29/95	8:00	Saturday	29.47	-0.045	-0.057	-0.05	-0.044	-0.057	-0.069
4/29/95	8:15	Saturday	29.47	-0.04	-0.05	-0.044	-0.037	-0.044	-0.063
4/29/95	8:30	Saturday	29.48	-0.035	-0.044	-0.037	-0.037	-0.044	-0.057
4/29/95	8:45	Saturday	29.48	-0.04	-0.044	-0.044	-0.037	-0.044	-0.063
4/29/95	9:00	Saturday	29.48	-0.04	-0.05	-0.044	-0.037	-0.05	-0.063
4/29/95	9:15	Saturday	29.49	-0.04	-0.044	-0.044	-0.037	-0.044	-0.063
4/29/95	9:30	Saturday	29.49	-0.045	-0.05	-0.044	-0.037	-0.05	-0.063
4/29/95	9:45	Saturday	29.49	-0.04	-0.05	-0.044	-0.037	-0.05	-0.063
4/29/95	10:00	Saturday	29.48	-0.04	-0.05	-0.05	-0.037	-0.044	-0.063
4/29/95	10:15	Saturday	29.48	-0.045	-0.05	-0.044	-0.044	-0.05	-0.063
4/29/95	10:30	Saturday	29.48	-0.045	-0.057	-0.05	-0.037	-0.05	-0.069
4/29/95	10:45	Saturday	29.48	-0.045	-0.057	-0.05	-0.044	-0.05	-0.069
4/29/95	11:00	Saturday	29.48	-0.045	-0.05	-0.05	-0.037	-0.05	-0.069
4/29/95	11:15	Saturday	29.47	-0.045	-0.057	-0.05	-0.044	-0.057	-0.069
4/29/95	11:30	Saturday	29.47	-0.045	-0.057	-0.056	-0.044	-0.05	-0.069
4/29/95	11:45	Saturday	29.46	-0.045	-0.057	-0.05	-0.044	-0.057	-0.076
4/29/95	12:00	Saturday	29.45	-0.05	-0.057	-0.05	-0.05	-0.057	-0.069
4/29/95	12:15	Saturday	29.44	-0.05	-0.063	-0.063	-0.044	-0.057	-0.076
4/29/95	12:30	Saturday	29.43	-0.05	-0.063	-0.063	-0.05	-0.057	-0.076
4/29/95	12:45	Saturday	29.43	-0.055	-0.069	-0.063	-0.05	-0.063	-0.082
4/29/95	13:00	Saturday	29.42	-0.055	-0.069	-0.063	-0.05	-0.063	-0.082
4/29/95	13:15	Saturday	29.41	-0.055	-0.069	-0.063	-0.044	-0.063	-0.082
4/29/95	13:30	Saturday	29.41	-0.06	-0.076	-0.075	-0.062	-0.069	-0.088
4/29/95	13:45	Saturday	29.41	-0.06	-0.069	-0.069	-0.056	-0.069	-0.088
4/29/95	14:00	Saturday	29.41	-0.055	-0.069	-0.063	-0.05	-0.063	-0.082
4/29/95	14:15	Saturday	29.4	-0.06	-0.069	-0.063	-0.056	-0.069	-0.088
4/29/95	14:30	Saturday	29.4	-0.055	-0.069	-0.069	-0.056	-0.063	-0.082
4/29/95	14:45	Saturday	29.39	-0.06	-0.069	-0.063	-0.056	-0.069	-0.088
4/29/95	15:00	Saturday	29.38	-0.065	-0.076	-0.094	-0.081	-0.076	-0.088
4/29/95	15:15	Saturday	29.37	-0.06	-0.076	-0.075	-0.062	-0.069	-0.088
4/29/95	15:30	Saturday	29.36	-0.065	-0.082	-0.082	-0.069	-0.076	-0.095
4/29/95	15:45	Saturday	29.36	-0.07	-0.082	-0.088	-0.069	-0.076	-0.095
4/29/95	16:00	Saturday	29.36	-0.06	-0.076	-0.069	-0.05	-0.069	-0.088
4/29/95	16:15	Saturday	29.36	-0.07	-0.082	-0.088	-0.075	-0.082	-0.101
4/29/95	16:30	Saturday	29.35	-0.07	-0.082	-0.094	-0.081	-0.082	-0.095
4/29/95	16:45	Saturday	29.35	-0.07	-0.082	-0.094	-0.081	-0.082	-0.101
4/29/95	17:00	Saturday	29.34	-0.065	-0.082	-0.088	-0.075	-0.076	-0.101
4/29/95	17:15	Saturday	29.34	-0.065	-0.082	-0.082	-0.075	-0.076	-0.101
4/29/95	17:30	Saturday	29.33	-0.07	-0.082	-0.082	-0.075	-0.076	-0.095
4/29/95	17:45	Saturday	29.33	-0.07	-0.082	-0.088	-0.075	-0.082	-0.101

TABLE D-1

DATE	TIME	DAY	BARO. PRESS. (in. of Hg)	WATER LEVEL CHANGE WELL 31551	WELL 31552	WELL 31553	WELL 31554	WELL 31555	WELL 31556
4/29/95	18:00	Saturday	29.33	-0.07	-0.088	-0.088	-0.075	-0.082	-0.101
4/29/95	18:15	Saturday	29.33	-0.07	-0.082	-0.082	-0.075	-0.082	-0.095
4/29/95	18:30	Saturday	29.33	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/29/95	18:45	Saturday	29.34	-0.07	-0.082	-0.082	-0.075	-0.082	-0.095
4/29/95	19:00	Saturday	29.34	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/29/95	19:15	Saturday	29.33	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/29/95	19:30	Saturday	29.33	-0.065	-0.076	-0.082	-0.069	-0.076	-0.095
4/29/95	19:45	Saturday	29.33	-0.065	-0.076	-0.075	-0.069	-0.069	-0.088
4/29/95	20:00	Saturday	29.33	-0.065	-0.082	-0.075	-0.069	-0.076	-0.095
4/29/95	20:15	Saturday	29.33	-0.065	-0.082	-0.082	-0.069	-0.076	-0.095
4/29/95	20:30	Saturday	29.33	-0.065	-0.076	-0.075	-0.069	-0.076	-0.095
4/29/95	20:45	Saturday	29.32	-0.065	-0.082	-0.082	-0.069	-0.076	-0.095
4/29/95	21:00	Saturday	29.32	-0.065	-0.076	-0.075	-0.069	-0.076	-0.095
4/29/95	21:15	Saturday	29.32	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/29/95	21:30	Saturday	29.31	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/29/95	21:45	Saturday	29.31	-0.07	-0.082	-0.082	-0.075	-0.076	-0.095
4/29/95	22:00	Saturday	29.3	-0.07	-0.088	-0.082	-0.075	-0.082	-0.101
4/29/95	22:15	Saturday	29.31	-0.07	-0.082	-0.082	-0.075	-0.076	-0.095
4/29/95	22:30	Saturday	29.3	-0.075	-0.088	-0.088	-0.075	-0.082	-0.101
4/29/95	22:45	Saturday	29.31	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/29/95	23:00	Saturday	29.32	-0.075	-0.088	-0.088	-0.075	-0.082	-0.101
4/29/95	23:15	Saturday	29.32	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/29/95	23:30	Saturday	29.32	-0.075	-0.082	-0.082	-0.075	-0.082	-0.101
4/29/95	23:45	Saturday	29.32	-0.065	-0.076	-0.075	-0.069	-0.076	-0.095
4/30/95	0:00	Sunday	29.32	-0.065	-0.076	-0.075	-0.069	-0.076	-0.088
4/30/95	0:15	Sunday	29.31	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	0:30	Sunday	29.31	-0.065	-0.076	-0.075	-0.069	-0.076	-0.095
4/30/95	0:45	Sunday	29.31	-0.07	-0.082	-0.075	-0.069	-0.076	-0.095
4/30/95	1:00	Sunday	29.31	-0.07	-0.082	-0.082	-0.075	-0.076	-0.095
4/30/95	1:15	Sunday	29.3	-0.07	-0.082	-0.075	-0.075	-0.076	-0.095
4/30/95	1:30	Sunday	29.29	-0.07	-0.082	-0.075	-0.069	-0.076	-0.095
4/30/95	1:45	Sunday	29.28	-0.07	-0.082	-0.075	-0.069	-0.076	-0.095
4/30/95	2:00	Sunday	29.27	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	2:15	Sunday	29.27	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	2:30	Sunday	29.26	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
4/30/95	2:45	Sunday	29.26	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
4/30/95	3:00	Sunday	29.27	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
4/30/95	3:15	Sunday	29.27	-0.075	-0.095	-0.094	-0.081	-0.089	-0.107
4/30/95	3:30	Sunday	29.28	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
4/30/95	3:45	Sunday	29.28	-0.075	-0.088	-0.088	-0.075	-0.082	-0.107
4/30/95	4:00	Sunday	29.28	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	4:15	Sunday	29.27	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	4:30	Sunday	29.27	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	4:45	Sunday	29.26	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	5:00	Sunday	29.26	-0.075	-0.088	-0.082	-0.081	-0.089	-0.107
4/30/95	5:15	Sunday	29.26	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
4/30/95	5:30	Sunday	29.26	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
4/30/95	5:45	Sunday	29.26	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107

TABLE D-1

DATE	TIME	DAY	BARO. PRESS. (in. of Hg)	WATER LEVEL CHANGE WELL 31551	WELL 31552	WELL 31553	WELL 31554	WELL 31555	WELL 31556
4/30/95	6:00	Sunday	29.27	-0.075	-0.088	-0.088	-0.081	-0.082	-0.107
4/30/95	6:15	Sunday	29.27	-0.08	-0.088	-0.088	-0.081	-0.089	-0.107
4/30/95	6:30	Sunday	29.27	-0.075	-0.088	-0.088	-0.081	-0.082	-0.107
4/30/95	6:45	Sunday	29.27	-0.075	-0.088	-0.088	-0.081	-0.082	-0.101
4/30/95	7:00	Sunday	29.27	-0.075	-0.088	-0.082	-0.081	-0.082	-0.101
4/30/95	7:15	Sunday	29.27	-0.075	-0.088	-0.082	-0.075	-0.082	-0.107
4/30/95	7:30	Sunday	29.27	-0.075	-0.088	-0.082	-0.081	-0.082	-0.101
4/30/95	7:45	Sunday	29.27	-0.075	-0.088	-0.082	-0.075	-0.082	-0.101
4/30/95	8:00	Sunday	29.27	-0.075	-0.088	-0.082	-0.081	-0.082	-0.101
4/30/95	8:15	Sunday	29.27	-0.075	-0.088	-0.088	-0.081	-0.082	-0.107
4/30/95	8:30	Sunday	29.27	-0.08	-0.088	-0.088	-0.081	-0.089	-0.107
4/30/95	8:45	Sunday	29.27	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
4/30/95	9:00	Sunday	29.27	-0.075	-0.088	-0.088	-0.081	-0.082	-0.107
4/30/95	9:15	Sunday	29.28	-0.075	-0.088	-0.082	-0.081	-0.089	-0.107
4/30/95	9:30	Sunday	29.28	-0.075	-0.088	-0.088	-0.081	-0.082	-0.107
4/30/95	9:45	Sunday	29.28	-0.075	-0.088	-0.082	-0.081	-0.082	-0.107
4/30/95	10:00	Sunday	29.29	-0.075	-0.088	-0.082	-0.081	-0.082	-0.101
4/30/95	10:15	Sunday	29.29	-0.075	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	10:30	Sunday	29.29	-0.075	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	10:45	Sunday	29.3	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	11:00	Sunday	29.29	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	11:15	Sunday	29.31	-0.07	-0.082	-0.075	-0.075	-0.082	-0.101
4/30/95	11:30	Sunday	29.32	-0.075	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	11:45	Sunday	29.32	-0.075	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	12:00	Sunday	29.32	-0.07	-0.082	-0.082	-0.075	-0.082	-0.101
4/30/95	12:15	Sunday	29.32	-0.06	-0.069	-0.063	-0.062	-0.063	-0.082
4/30/95	12:30	Sunday	29.32	-0.065	-0.076	-0.069	-0.069	-0.076	-0.095
4/30/95	12:45	Sunday	29.32	-0.065	-0.076	-0.069	-0.069	-0.069	-0.095
4/30/95	13:00	Sunday	29.32	-0.07	-0.076	-0.075	-0.075	-0.076	-0.101
4/30/95	13:15	Sunday	29.33	-0.07	-0.076	-0.069	-0.069	-0.076	-0.095
4/30/95	13:30	Sunday	29.33	-0.07	-0.076	-0.069	-0.069	-0.076	-0.095
4/30/95	13:45	Sunday	29.33	-0.07	-0.082	-0.075	-0.069	-0.082	-0.101
4/30/95	14:00	Sunday	29.33	-0.07	-0.076	-0.069	-0.069	-0.076	-0.095
4/30/95	14:15	Sunday	29.33	-0.07	-0.076	-0.069	-0.075	-0.076	-0.095
4/30/95	14:30	Sunday	29.33	-0.07	-0.076	-0.075	-0.069	-0.076	-0.095
4/30/95	14:45	Sunday	29.33	-0.07	-0.076	-0.069	-0.069	-0.076	-0.095
4/30/95	15:00	Sunday	29.34	-0.07	-0.076	-0.075	-0.075	-0.076	-0.095
4/30/95	15:15	Sunday	29.34	-0.07	-0.076	-0.069	-0.075	-0.076	-0.095
4/30/95	15:30	Sunday	29.34	-0.07	-0.076	-0.075	-0.069	-0.076	-0.095
4/30/95	15:45	Sunday	29.33	-0.07	-0.076	-0.069	-0.069	-0.076	-0.095
4/30/95	16:00	Sunday	29.34	-0.065	-0.076	-0.069	-0.069	-0.076	-0.095
4/30/95	16:15	Sunday	29.34	-0.065	-0.069	-0.069	-0.069	-0.069	-0.088
4/30/95	16:30	Sunday	29.35	-0.07	-0.082	-0.075	-0.075	-0.082	-0.101
4/30/95	16:45	Sunday	29.36	-0.07	-0.076	-0.075	-0.075	-0.076	-0.095
4/30/95	17:00	Sunday	29.36	-0.065	-0.069	-0.069	-0.069	-0.069	-0.095
4/30/95	17:15	Sunday	29.36	-0.065	-0.069	-0.063	-0.069	-0.069	-0.095
4/30/95	17:30	Sunday	29.36	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4/30/95	17:45	Sunday	29.36	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088

TABLE D-1

DATE	TIME	DAY	BARO.	WATER LEVEL CHANGE					
			PRESS.	WELL	WELL	WELL	WELL	WELL	WELL
			(in. of Hg)	31551	31552	31553	31554	31555	31556
4/30/95	18:00	Sunday	29.37	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4/30/95	18:15	Sunday	29.37	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4/30/95	18:30	Sunday	29.36	-0.065	-0.069	-0.063	-0.069	-0.069	-0.095
4/30/95	18:45	Sunday	29.37	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4/30/95	19:00	Sunday	29.37	-0.065	-0.069	-0.069	-0.069	-0.069	-0.088
4/30/95	19:15	Sunday	29.38	-0.065	-0.069	-0.069	-0.069	-0.069	-0.088
4/30/95	19:30	Sunday	29.38	-0.065	-0.069	-0.069	-0.069	-0.069	-0.095
4/30/95	19:45	Sunday	29.38	-0.065	-0.069	-0.063	-0.062	-0.069	-0.088
4/30/95	20:00	Sunday	29.38	-0.06	-0.063	-0.063	-0.062	-0.063	-0.088
4/30/95	20:15	Sunday	29.39	-0.06	-0.063	-0.056	-0.062	-0.063	-0.082
4/30/95	20:30	Sunday	29.39	-0.06	-0.063	-0.056	-0.062	-0.063	-0.088
4/30/95	20:45	Sunday	29.39	-0.06	-0.069	-0.063	-0.062	-0.069	-0.088
4/30/95	21:00	Sunday	29.39	-0.065	-0.063	-0.063	-0.062	-0.069	-0.088
4/30/95	21:15	Sunday	29.39	-0.06	-0.063	-0.063	-0.062	-0.063	-0.088
4/30/95	21:30	Sunday	29.39	-0.06	-0.063	-0.063	-0.062	-0.063	-0.088
4/30/95	21:45	Sunday	29.38	-0.06	-0.063	-0.063	-0.062	-0.069	-0.088
4/30/95	22:00	Sunday	29.39	-0.06	-0.063	-0.063	-0.062	-0.063	-0.088
4/30/95	22:15	Sunday	29.39	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4/30/95	22:30	Sunday	29.38	-0.065	-0.069	-0.069	-0.069	-0.069	-0.095
4/30/95	22:45	Sunday	29.38	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4/30/95	23:00	Sunday	29.38	-0.065	-0.069	-0.069	-0.069	-0.069	-0.088
4/30/95	23:15	Sunday	29.38	-0.065	-0.069	-0.069	-0.069	-0.069	-0.095
4/30/95	23:30	Sunday	29.38	-0.07	-0.076	-0.075	-0.075	-0.076	-0.101
4/30/95	23:45	Sunday	29.38	-0.07	-0.076	-0.069	-0.069	-0.076	-0.095
5/1/95	0:00	Monday	29.38	-0.065	-0.069	-0.069	-0.069	-0.069	-0.088

TABLE D-2

DATE	TIME	ELAP. TIME MIN.	BAR. PRESS INCHES Hg	BAR. PRESS FEET WATER	BAR PRESS CHANGE	WELLS		
						31551	31553	31555
						BAR. EFFICIENCIES		
						0.146	0.183	0.188
05/09/95	07:01	0	29.266	33.157				
	07:02	1	29.266	33.157	0.000	0.000	0.000	0.000
	07:03	2	29.266	33.157	0.000	0.000	0.000	0.000
	07:04	3	29.264	33.155	-0.002	0.000	0.000	0.000
	07:05	4	29.267	33.158	0.003	0.000	-0.001	-0.001
	07:06	5	29.267	33.158	0.000	0.000	0.000	0.000
	07:07	6	29.266	33.157	-0.001	0.000	0.000	0.000
	07:08	7	29.263	33.154	-0.003	0.000	0.001	0.001
	07:09	8	29.263	33.154	0.000	0.000	0.000	0.000
	07:10	9	29.263	33.154	0.000	0.000	0.000	0.000
	07:11	10	29.263	33.154	0.000	0.000	0.000	0.000
	07:21	20	29.251	33.140	-0.014	0.002	0.002	0.003
	07:31	30	29.244	33.132	-0.008	0.001	0.001	0.001
	07:41	40	29.238	33.125	-0.007	0.001	0.001	0.001
	07:51	50	29.242	33.130	0.005	-0.001	-0.001	-0.001
	08:01	60	29.242	33.130	0.000	0.000	0.000	0.000
	08:11	70	29.244	33.132	0.002	0.000	0.000	0.000
	08:21	80	29.247	33.136	0.003	0.000	-0.001	-0.001
	08:31	90	29.249	33.138	0.002	0.000	0.000	0.000
	08:41	100	29.248	33.137	-0.001	0.000	0.000	0.000
	09:00	119	29.248	33.137	0.000	0.000	0.000	0.000
	09:30	149	29.254	33.144	0.007	-0.001	-0.001	-0.001
	10:00	179	29.262	33.153	0.009	-0.001	-0.002	-0.002
	10:30	209	29.272	33.164	0.011	-0.002	-0.002	-0.002
	11:00	239	29.267	33.158	-0.006	0.001	0.001	0.001
	11:30	269	29.249	33.138	-0.020	0.003	0.004	0.004
	12:00	299	29.233	33.120	-0.018	0.003	0.003	0.003
	12:30	329	29.214	33.098	-0.022	0.003	0.004	0.004
	13:00	359	29.216	33.100	0.002	0.000	0.000	0.000
	13:30	389	29.193	33.074	-0.026	0.004	0.005	0.005
	14:00	419	29.183	33.063	-0.011	0.002	0.002	0.002
	14:30	449	29.174	33.053	-0.010	0.001	0.002	0.002
	15:00	479	29.166	33.044	-0.009	0.001	0.002	0.002
	15:30	509	29.155	33.031	-0.012	0.002	0.002	0.002
	16:00	539	29.147	33.022	-0.009	0.001	0.002	0.002
	16:30	569	29.135	33.009	-0.014	0.002	0.002	0.003
	17:00	599	29.132	33.005	-0.003	0.000	0.001	0.001
	17:30	629	29.136	33.010	0.005	-0.001	-0.001	-0.001
	18:00	659	29.131	33.004	-0.006	0.001	0.001	0.001

TABLE D-2

	18:30	689	29.123	32.995	-0.009	0.001	0.002	0.002
	19:00	719	29.124	32.996	0.001	0.000	0.000	0.000
	19:30	749	29.127	33.000	0.003	0.000	-0.001	-0.001
	20:00	779	29.133	33.006	0.007	-0.001	-0.001	-0.001
	20:30	809	29.132	33.005	-0.001	0.000	0.000	0.000
	21:00	839	29.128	33.001	-0.005	0.001	0.001	0.001
	21:30	869	29.130	33.003	0.002	0.000	0.000	0.000
	22:00	899	29.130	33.003	0.000	0.000	0.000	0.000
	22:30	929	29.130	33.003	0.000	0.000	0.000	0.000
	23:00	959	29.137	33.011	0.008	-0.001	-0.001	-0.001
	23:30	989	29.138	33.012	0.001	0.000	0.000	0.000
05/10/95	00:00	1019	29.142	33.017	0.005	-0.001	-0.001	-0.001
	00:30	1049	29.140	33.014	-0.002	0.000	0.000	0.000
	01:00	1079	29.138	33.012	-0.002	0.000	0.000	0.000
	01:30	1109	29.133	33.006	-0.006	0.001	0.001	0.001
	02:00	1139	29.134	33.008	0.001	0.000	0.000	0.000
	02:30	1169	29.123	32.995	-0.012	0.002	0.002	0.002
	03:00	1199	29.112	32.983	-0.012	0.002	0.002	0.002
	03:30	1224	29.108	32.978	-0.005	0.001	0.001	0.001
	04:00	1259	29.098	32.967	-0.011	0.002	0.002	0.002
	04:30	1289	29.073	32.938	-0.028	0.004	0.005	0.005
	05:00	1319	29.066	32.931	-0.008	0.001	0.001	0.001
	05:30	1349	29.055	32.918	-0.012	0.002	0.002	0.002
	06:00	1379	29.059	32.923	0.005	-0.001	-0.001	-0.001
	06:30	1409	29.063	32.927	0.005	-0.001	-0.001	-0.001
	07:00	1439	29.065	32.929	0.002	0.000	0.000	0.000
	07:30	1469	29.070	32.935	0.006	-0.001	-0.001	-0.001
	08:00	1499	29.067	32.932	-0.003	0.000	0.001	0.001
	08:30	1529	29.054	32.917	-0.015	0.002	0.003	0.003
	09:00	1559	29.047	32.909	-0.008	0.001	0.001	0.001
	09:30	1589	29.051	32.914	0.005	-0.001	-0.001	-0.001
	10:00	1619	29.058	32.921	0.008	-0.001	-0.001	-0.001
	10:30	1649	29.056	32.919	-0.002	0.000	0.000	0.000
	11:00	1679	29.054	32.917	-0.002	0.000	0.000	0.000
	11:30	1709	29.036	32.897	-0.020	0.003	0.004	0.004
	12:00	1739	29.031	32.891	-0.006	0.001	0.001	0.001
	12:30	1769	29.008	32.865	-0.026	0.004	0.005	0.005
	13:00	1799	29.011	32.868	0.003	0.000	-0.001	-0.001
	13:30	1829	29.007	32.864	-0.005	0.001	0.001	0.001
	14:00	1859	28.992	32.847	-0.017	0.002	0.003	0.003
	14:30	1889	29.022	32.881	0.034	-0.005	-0.006	-0.006
	15:00	1919		0.000				
	15:30	1949	29.027	32.886				

TABLE D-2

	16:00	1979	29.011	32.868	-0.018	0.003	0.003	0.003
	16:30	2009	29.000	32.856	-0.012	0.002	0.002	0.002
	17:00	2039	28.989	32.843	-0.012	0.002	0.002	0.002
	17:30	2069	28.988	32.842	-0.001	0.000	0.000	0.000
	18:00	2099	28.977	32.830	-0.012	0.002	0.002	0.002
	18:30	2129	29.004	32.860	0.031	-0.004	-0.006	-0.006
	19:00	2159	29.005	32.861	0.001	0.000	0.000	0.000
	19:30	2189	29.009	32.866	0.005	-0.001	-0.001	-0.001
	20:00	2219	29.019	32.877	0.011	-0.002	-0.002	-0.002
	20:30	2249	29.034	32.894	0.017	-0.002	-0.003	-0.003
	21:00	2279	29.052	32.915	0.020	-0.003	-0.004	-0.004
	21:30	2309	29.069	32.934	0.019	-0.003	-0.004	-0.004
	22:00	2339	29.080	32.946	0.012	-0.002	-0.002	-0.002
	22:30	2369	29.087	32.954	0.008	-0.001	-0.001	-0.001
	23:00	2399	29.094	32.962	0.008	-0.001	-0.001	-0.001
	23:30	2429	29.101	32.970	0.008	-0.001	-0.001	-0.001
05/11/95	00:00	2459	29.096	32.965	-0.006	0.001	0.001	0.001
	00:30	2489	29.098	32.967	0.002	0.000	0.000	0.000
	01:00	2519	29.098	32.967	0.000	0.000	0.000	0.000
	01:30	2549	29.101	32.970	0.003	0.000	-0.001	-0.001
	02:00	2579	29.101	32.970	0.000	0.000	0.000	0.000
	02:30	2609	29.102	32.971	0.001	0.000	0.000	0.000
	03:00	2639	29.103	32.972	0.001	0.000	0.000	0.000
	03:30	2669	29.111	32.982	0.009	-0.001	-0.002	-0.002
	04:00	2699	29.111	32.982	0.000	0.000	0.000	0.000
	04:30	2729	29.129	33.002	0.020	-0.003	-0.004	-0.004
	05:00	2759	29.140	33.014	0.012	-0.002	-0.002	-0.002
	05:30	2789	29.150	33.026	0.011	-0.002	-0.002	-0.002
	06:00	2819	29.153	33.029	0.003	0.000	-0.001	-0.001
	06:30	2849	29.161	33.038	0.009	-0.001	-0.002	-0.002
	07:00	2879	29.168	33.046	0.008	-0.001	-0.001	-0.001
	07:30	2909	29.185	33.065	0.019	-0.003	-0.004	-0.004
	08:00	2939	29.197	33.079	0.014	-0.002	-0.002	-0.003
	08:30	2969	29.198	33.080	0.001	0.000	0.000	0.000
	09:00	2999	29.204	33.087	0.007	-0.001	-0.001	-0.001
	09:30	3029	29.213	33.097	0.010	-0.001	-0.002	-0.002
	10:00	3059	29.215	33.099	0.002	0.000	0.000	0.000
	10:30	3089	29.216	33.100	0.001	0.000	0.000	0.000
	11:00	3119	29.222	33.107	0.007	-0.001	-0.001	-0.001
	11:30	3149	29.232	33.119	0.011	-0.002	-0.002	-0.002
	12:00	3179	29.234	33.121	0.002	0.000	0.000	0.000
	12:30	3209	29.234	33.121	0.000	0.000	0.000	0.000
	01:00	3239	29.228	33.114	-0.007	0.001	0.001	0.001

TABLE D-2

	01:30	3269	29.232	33.119	0.005	-0.001	-0.001	-0.001
	02:00	3299	29.226	33.112	-0.007	0.001	0.001	0.001
	02:30	3329	29.230	33.116	0.005	-0.001	-0.001	-0.001
	03:00	3359	29.229	33.115	-0.001	0.000	0.000	0.000
	03:30	3389	29.229	33.115	0.000	0.000	0.000	0.000
	04:00	3419	29.223	33.108	-0.007	0.001	0.001	0.001
	04:30	3449	29.230	33.116	0.008	-0.001	-0.001	-0.001
	05:00	3479	29.225	33.111	-0.006	0.001	0.001	0.001
	05:30	3509	29.224	33.110	-0.001	0.000	0.000	0.000
	06:00	3539	29.219	33.104	-0.006	0.001	0.001	0.001
	06:30	3569	29.211	33.095	-0.009	0.001	0.002	0.002
	07:00	3599	29.214	33.098	0.003	0.000	-0.001	-0.001
	07:30	3629	29.212	33.096	-0.002	0.000	0.000	0.000
	08:00	3659	29.207	33.090	-0.006	0.001	0.001	0.001
	08:30	3689	29.216	33.100	0.010	-0.001	-0.002	-0.002
	09:00	3719	29.224	33.110	0.009	-0.001	-0.002	-0.002
	09:30	3749	29.223	33.108	-0.001	0.000	0.000	0.000
	10:00	3779	29.225	33.111	0.002	0.000	0.000	0.000
	10:30	3809	29.228	33.114	0.003	0.000	-0.001	-0.001
	11:00	3839	29.229	33.115	0.001	0.000	0.000	0.000
	11:30	3869	29.230	33.116	0.001	0.000	0.000	0.000
05/12/95	12:00	3899	29.236	33.123	0.007	-0.001	-0.001	-0.001
	12:30	3929	29.242	33.130	0.007	-0.001	-0.001	-0.001
	13:00	3959	29.245	33.133	0.003	0.000	-0.001	-0.001
	13:30	3989	29.237	33.124	-0.009	0.001	0.002	0.002
	14:00	4019	29.235	33.122	-0.002	0.000	0.000	0.000
	14:30	4049	29.224	33.110	-0.012	0.002	0.002	0.002
	15:00	4079	29.220	33.105	-0.005	0.001	0.001	0.001
	15:30	4109	29.212	33.096	-0.009	0.001	0.002	0.002
	16:00	4139	29.212	33.096	0.000	0.000	0.000	0.000
	16:30	4169	29.214	33.098	0.002	0.000	0.000	0.000
	17:00	4199	29.221	33.106	0.008	-0.001	-0.001	-0.001
	17:30	4229	29.225	33.111	0.005	-0.001	-0.001	-0.001
	18:00	4259	29.235	33.122	0.011	-0.002	-0.002	-0.002
	18:30	4289	29.253	33.142	0.020	-0.003	-0.004	-0.004
	19:00	4319	29.253	33.142	0.000	0.000	0.000	0.000
	19:30	4349	29.273	33.165	0.023	-0.003	-0.004	-0.004
	20:00	4379	29.275	33.167	0.002	0.000	0.000	0.000
	20:30	4409	29.278	33.171	0.003	0.000	-0.001	-0.001
	21:00	4439	29.286	33.180	0.009	-0.001	-0.002	-0.002
	21:30	4469	29.299	33.195	0.015	-0.002	-0.003	-0.003
	22:00	4499	29.293	33.188	-0.007	0.001	0.001	0.001
	22:30	4529	29.297	33.192	0.005	-0.001	-0.001	-0.001

TABLE D-2

	23:00	4559	29.287	33.181	-0.011	0.002	0.002	0.002
	23:30	4589	29.285	33.179	-0.002	0.000	0.000	0.000
	00:00	4619	29.284	33.178	-0.001	0.000	0.000	0.000
	00:30	4649	29.264	33.155	-0.023	0.003	0.004	0.004
	01:00	4679	29.261	33.151	-0.003	0.000	0.001	0.001
	01:30	4709	29.267	33.158	0.007	-0.001	-0.001	-0.001
	02:00	4739	29.268	33.159	0.001	0.000	0.000	0.000
	02:30	4769	29.264	33.155	-0.005	0.001	0.001	0.001
	03:00	4799	29.266	33.157	0.002	0.000	0.000	0.000
	03:30	4829	29.255	33.145	-0.012	0.002	0.002	0.002
	04:00	4859	29.257	33.147	0.002	0.000	0.000	0.000
	04:30	4889	29.253	33.142	-0.005	0.001	0.001	0.001
	05:00	4919	29.257	33.147	0.005	-0.001	-0.001	-0.001
	05:30	4949	29.257	33.147	0.000	0.000	0.000	0.000
	06:00	4979	29.256	33.146	-0.001	0.000	0.000	0.000
	06:30	5009	29.252	33.141	-0.005	0.001	0.001	0.001
	07:00	5039	29.248	33.137	-0.005	0.001	0.001	0.001
	07:30	5069	29.243	33.131	-0.006	0.001	0.001	0.001
	08:00	5099	29.249	33.138	0.007	-0.001	-0.001	-0.001
	08:30	5129	29.249	33.138	0.000	0.000	0.000	0.000
	09:00	5159	29.246	33.134	-0.003	0.000	0.001	0.001
	09:30	5189	29.251	33.140	0.006	-0.001	-0.001	-0.001
	10:00	5219	29.255	33.145	0.005	-0.001	-0.001	-0.001
	10:30	5249	29.254	33.144	-0.001	0.000	0.000	0.000
	11:00	5279	29.261	33.151	0.008	-0.001	-0.001	-0.001
	11:30	5309	29.262	33.153	0.001	0.000	0.000	0.000
05/13/95	12:00	5339	29.264	33.155	0.002	0.000	0.000	0.000
	12:30	5369	29.269	33.161	0.006	-0.001	-0.001	-0.001
	13:00	5399	29.257	33.147	-0.014	0.002	0.002	0.003
	13:30	5429	29.258	33.148	0.001	0.000	0.000	0.000
	14:00	5459	29.240	33.128	-0.020	0.003	0.004	0.004
	14:30	5489	29.255	33.145	0.017	-0.002	-0.003	-0.003
	15:00	5519	29.242	33.130	-0.015	0.002	0.003	0.003
	15:30	5549	29.248	33.137	0.007	-0.001	-0.001	-0.001
	16:00	5579	29.248	33.137	0.000	0.000	0.000	0.000
	16:30	5609	29.248	33.137	0.000	0.000	0.000	0.000
	17:00	5639	29.269	33.161	0.024	-0.003	-0.004	-0.004
	17:30	5669	29.273	33.165	0.005	-0.001	-0.001	-0.001
	18:00	5699	29.256	33.146	-0.019	0.003	0.004	0.004
	18:30	5729	29.254	33.144	-0.002	0.000	0.000	0.000
	19:00	5759	29.255	33.145	0.001	0.000	0.000	0.000
	19:30	5789	29.285	33.179	0.034	-0.005	-0.006	-0.006
	20:00	5819	29.302	33.198	0.019	-0.003	-0.004	-0.004

TABLE D-2

	20:30	5849	29.275	33.167	-0.031	0.004	0.006	0.006
	21:00	5879	29.267	33.158	-0.009	0.001	0.002	0.002
	21:30	5909	29.280	33.173	0.015	-0.002	-0.003	-0.003
	22:00	5939	29.243	33.131	-0.042	0.006	0.008	0.008
	22:30	5969	29.237	33.124	-0.007	0.001	0.001	0.001
	23:00	5999	29.235	33.122	-0.002	0.000	0.000	0.000
	23:30	6029	29.222	33.107	-0.015	0.002	0.003	0.003
	00:00	6059	29.221	33.106	-0.001	0.000	0.000	0.000
	00:30	6089	29.212	33.096	-0.010	0.001	0.002	0.002
	01:00	6119	29.218	33.103	0.007	-0.001	-0.001	-0.001
	01:30	6149	29.119	32.991	-0.112	0.016	0.021	0.021
	02:00	6179	29.200	33.082	0.092	-0.013	-0.017	-0.017
	02:30	6209	29.192	33.073	-0.009	0.001	0.002	0.002
	03:00	6239	29.192	33.073	0.000	0.000	0.000	0.000
	03:30	6269	29.193	33.074	0.001	0.000	0.000	0.000
	04:00	6299	29.191	33.072	-0.002	0.000	0.000	0.000
	04:30	6329	29.167	33.045	-0.027	0.004	0.005	0.005
	05:00	6359	29.157	33.034	-0.011	0.002	0.002	0.002
	05:30	6389	29.148	33.023	-0.010	0.001	0.002	0.002
	06:00	6419	29.141	33.015	-0.008	0.001	0.001	0.001
	06:30	6449	29.139	33.013	-0.002	0.000	0.000	0.000
	07:00	6479	29.130	33.003	-0.010	0.001	0.002	0.002
	07:30	6509		0.000				
	08:00	6539	29.117	32.988				
	08:30	6569	29.117	32.988	0.000	0.000	0.000	0.000
	09:00	6599	29.126	32.999	0.010	-0.001	-0.002	-0.002
	09:30	6629	29.132	33.005	0.007	-0.001	-0.001	-0.001
	10:00	6659	29.128	33.001	-0.005	0.001	0.001	0.001
	10:30	6689	29.128	33.001	0.000	0.000	0.000	0.000
	11:00	6719	29.122	32.994	-0.007	0.001	0.001	0.001
	11:30	6749	29.100	32.969	-0.025	0.004	0.005	0.005
05/14/95	12:00	6779	29.101	32.970	0.001	0.000	0.000	0.000
	12:30	6809	29.100	32.969	-0.001	0.000	0.000	0.000
	13:00	6839	29.100	32.969	0.000	0.000	0.000	0.000
	13:30	6869		0.000				
	14:00	6899	29.064	32.928				
	14:30	6929		0.000				
	15:00	6959		0.000				
	15:30	6989	29.073	32.938				
	16:00	7019	29.102	32.971	0.033	-0.005	-0.006	-0.006
	16:30	7049	29.107	32.977	0.006	-0.001	-0.001	-0.001
	17:00	7079	29.115	32.986	0.009	-0.001	-0.002	-0.002
	17:30	7109	29.117	32.988	0.002	0.000	0.000	0.000

TABLE D-2

	18:00	7139	29.134	33.008	0.019	-0.003	-0.004	-0.004
	18:30	7169	29.135	33.009	0.001	0.000	0.000	0.000
	19:00	7199		0.000				
	19:30	7229	29.146	33.021				
	20:00	7259	29.159	33.036	0.015	-0.002	-0.003	-0.003
	20:30	7289	29.179	33.059	0.023	-0.003	-0.004	-0.004
	21:00	7319	29.203	33.086	0.027	-0.004	-0.005	-0.005
	21:30	7349	29.206	33.089	0.003	0.000	-0.001	-0.001
	22:00	7379	29.209	33.093	0.003	0.000	-0.001	-0.001
	22:30	7409	29.255	33.145	0.052	-0.008	-0.010	-0.010
	23:00	7439	29.243	33.131	-0.014	0.002	0.002	0.003
	23:30	7469	29.250	33.139	0.008	-0.001	-0.001	-0.001
	00:00	7499	29.300	33.196	0.057	-0.008	-0.010	-0.011
	00:30	7529	29.233	33.120	-0.076	0.011	0.014	0.014
	01:00	7559	29.233	33.120	0.000	0.000	0.000	0.000
	01:30	7589	29.233	33.120	0.000	0.000	0.000	0.000
	02:00	7619	29.222	33.107	-0.012	0.002	0.002	0.002
	02:30	7649	29.223	33.108	0.001	0.000	0.000	0.000
	03:00	7679	29.225	33.111	0.002	0.000	0.000	0.000
	03:30	7709	29.217	33.102	-0.009	0.001	0.002	0.002
	04:00	7739	29.217	33.102	0.000	0.000	0.000	0.000
	04:30	7769	29.207	33.090	-0.011	0.002	0.002	0.002
	05:00	7799	29.215	33.099	0.009	-0.001	-0.002	-0.002
	05:30	7829	29.223	33.108	0.009	-0.001	-0.002	-0.002
	06:00	7859	29.236	33.123	0.015	-0.002	-0.003	-0.003
	06:30	7889	29.246	33.134	0.011	-0.002	-0.002	-0.002
	07:00	7919	29.247	33.136	0.001	0.000	0.000	0.000
	07:30	7949	29.248	33.137	0.001	0.000	0.000	0.000
	08:00	7979	29.256	33.146	0.009	-0.001	-0.002	-0.002
	08:30	8009	29.268	33.159	0.014	-0.002	-0.002	-0.003
	09:00	8039	29.284	33.178	0.018	-0.003	-0.003	-0.003
	09:30	8069	29.290	33.184	0.007	-0.001	-0.001	-0.001
	10:00	8099	29.312	33.209	0.025	-0.004	-0.005	-0.005
	10:30	8129	29.320	33.218	0.009	-0.001	-0.002	-0.002
	11:00	8159	29.329	33.228	0.010	-0.001	-0.002	-0.002
	11:30	8189	29.330	33.230	0.001	0.000	0.000	0.000
05/15/95	12:00	8219	29.335	33.235	0.006	-0.001	-0.001	-0.001
	12:30	8249	29.337	33.238	0.002	0.000	0.000	0.000
	13:00	8279	29.341	33.242	0.005	-0.001	-0.001	-0.001
	13:30	8309	29.353	33.256	0.014	-0.002	-0.002	-0.003
	14:00	8339	29.360	33.264	0.008	-0.001	-0.001	-0.001
	14:30	8369	29.359	33.262	-0.001	0.000	0.000	0.000
	15:00	8399	29.356	33.259	-0.003	0.000	0.001	0.001

TABLE D-2

	15:30	8429	29.352	33.255	-0.005	0.001	0.001	0.001
	16:00	8459	29.358	33.261	0.007	-0.001	-0.001	-0.001
	16:30	8489	29.364	33.268	0.007	-0.001	-0.001	-0.001
	17:00	8519	29.383	33.290	0.022	-0.003	-0.004	-0.004
	17:30	8549	29.391	33.299	0.009	-0.001	-0.002	-0.002
	18:00	8579	29.401	33.310	0.011	-0.002	-0.002	-0.002
	18:30	8609	29.390	33.298	-0.012	0.002	0.002	0.002
	19:00	8639	29.398	33.307	0.009	-0.001	-0.002	-0.002
	19:30	8669	29.413	33.324	0.017	-0.002	-0.003	-0.003
	20:00	8699	29.421	33.333	0.009	-0.001	-0.002	-0.002
	20:30	8729	29.426	33.338	0.006	-0.001	-0.001	-0.001
	21:00	8759	29.430	33.343	0.005	-0.001	-0.001	-0.001
	21:30	8789	29.435	33.349	0.006	-0.001	-0.001	-0.001
	22:00	8819	29.435	33.349	0.000	0.000	0.000	0.000
	22:30	8849	29.441	33.355	0.007	-0.001	-0.001	-0.001
	23:00	8879	29.443	33.358	0.002	0.000	0.000	0.000
	23:30	8909	29.451	33.367	0.009	-0.001	-0.002	-0.002
	00:00	8939	29.450	33.366	-0.001	0.000	0.000	0.000
	00:30	8969	29.453	33.369	0.003	0.000	-0.001	-0.001
	01:00	8999	29.443	33.358	-0.011	0.002	0.002	0.002
	01:30	9029	29.432	33.345	-0.012	0.002	0.002	0.002
	02:00	9059	29.433	33.346	0.001	0.000	0.000	0.000
	02:30	9089	29.410	0.000				
	03:00	9119	29.401	33.310				
	03:30	9149	29.404	33.313	0.003	0.000	-0.001	-0.001
	04:00	9179	29.399	33.308	-0.006	0.001	0.001	0.001
	04:30	9209	29.398	33.307	-0.001	0.000	0.000	0.000
	05:00	9239	29.376	33.282	-0.025	0.004	0.005	0.005
	05:30	9269	29.364	33.268	-0.014	0.002	0.002	0.003
	06:00	9299	29.360	33.264	-0.005	0.001	0.001	0.001
	06:30	9329	29.366	33.270	0.007	-0.001	-0.001	-0.001
	07:00	9359	29.356	33.259	-0.011	0.002	0.002	0.002
	07:30	9389	29.364	33.268	0.009	-0.001	-0.002	-0.002
	08:00	9419	29.354	33.257	-0.011	0.002	0.002	0.002
	08:30	9449	29.351	33.253	-0.003	0.000	0.001	0.001
	09:00	9479	29.352	33.255	0.001	0.000	0.000	0.000
	09:30	9509	29.358	33.261	0.007	-0.001	-0.001	-0.001
	10:00	9539	29.366	33.270	0.009	-0.001	-0.002	-0.002
	10:30	9569	29.370	33.275	0.005	-0.001	-0.001	-0.001
	11:00	9599	29.375	33.281	0.006	-0.001	-0.001	-0.001
	11:30	9629	29.376	33.282	0.001	0.000	0.000	0.000
05/16/95	12:00	9659	29.374	33.279	-0.002	0.000	0.000	0.000
	12:30	9689	29.369	33.274	-0.006	0.001	0.001	0.001

TABLE D-2

	13:00	9719	29.361	33.265	-0.009	0.001	0.002	0.002
	13:30	9749	29.362	33.266	0.001	0.000	0.000	0.000
	14:00	9779	29.359	33.262	-0.003	0.000	0.001	0.001
	14:30	9809	29.351	33.253	-0.009	0.001	0.002	0.002
	15:00	9839	29.357	33.260	0.007	-0.001	-0.001	-0.001
	15:30	9869	29.345	33.247	-0.014	0.002	0.002	0.003
	16:00	9899	29.355	33.258	0.011	-0.002	-0.002	-0.002
	16:30	9929	29.352	33.255	-0.003	0.000	0.001	0.001
	17:00	9959	29.342	33.243	-0.011	0.002	0.002	0.002
	17:30	9989	29.344	33.245	0.002	0.000	0.000	0.000
	18:00	10019	29.348	33.250	0.005	-0.001	-0.001	-0.001
	18:30	10049	29.351	33.253	0.003	0.000	-0.001	-0.001
	19:00	10079	29.351	33.253	0.000	0.000	0.000	0.000
	19:30	10109	29.351	33.253	0.000	0.000	0.000	0.000
	20:00	10139	29.355	33.258	0.005	-0.001	-0.001	-0.001
	20:30	10169	29.352	33.255	-0.003	0.000	0.001	0.001
	21:00	10199	29.320	33.218	-0.036	0.005	0.007	0.007
	21:30	10229	29.323	33.222	0.003	0.000	-0.001	-0.001
	22:00	10259	29.330	33.230	0.008	-0.001	-0.001	-0.001
	22:30	10289	29.330	33.230	0.000	0.000	0.000	0.000

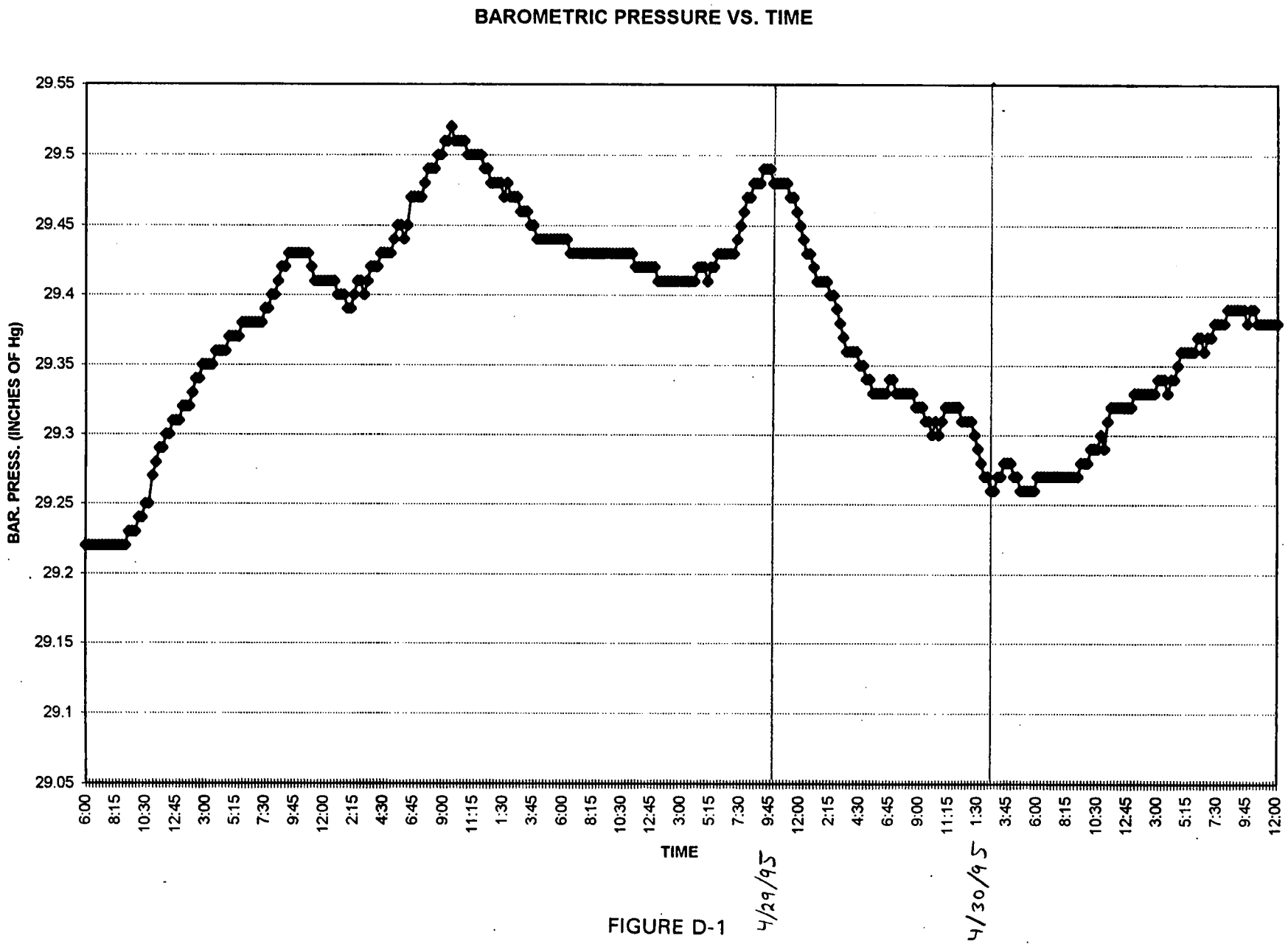

BAROMETRIC PRESSURE VS. TIME
BAR. PRESS. (INCHES OF Hg)
29.55
29.5
29.45
29.4
29.35
29.3
29.25
29.2
29.15
29.1
29.05
6:00
8:15
10:30
12:45
3:00
5:15
7:30
9:45
12:00
2:15
4:30
6:45
9:00
11:15
1:30
3:45
6:00
8:15
10:30
12:45
3:00
5:15
7:30
9:45
12:00
2:15
4:30
6:45
9:00
11:15
1:30
3:45
6:00
8:15
10:30
12:45
3:00
5:15
7:30
9:45
12:00
TIME
4/29/95
4/30/95

FIGURE D-1

Appendix E

APPENDIX E
DATA LOGGER PRINTOUTS

APPENDIX E

Appendix E contains data logger printouts for the six observation wells (31551 through 31556). Pretest monitoring occurred from April 27 to May 1, 1995. The data logger was set to the top-of-casing (TOC) mode and the reference level was zero. In this mode of operation, decreasing water levels correspond to increasing TOC readings and increasing water levels correspond to decreasing TOC readings.

Due to operator error, data from the first four steps of the Step Test (0-3) conducted on May 3, 1995 were erased; the fourth step was recovered. Results for Steps 0-3, discussed in Section 4, were reconstructed using field notes. The fourth step was the recovery period for the step test. During recovery the data logger was operating in the TOC mode, with the reference being the pretest water table elevation.

The constant-rate test (CRT) began on 05/09/95 at 7:00 a.m. At the start of the test, all of the channels on the data logger were operating in a surface mode, with the pretest water elevation used as the reference. In this mode increasing water levels correspond to increasing level readings, and decreasing water levels correspond to decreasing level readings. During a lightning storm on May 14, Channel 1 on the data logger converted to the TOC mode. It is unknown how or why this happened. Data collected on this channel was converted to the surface mode before use.

Recovery from the CRT began on 05/16/95 at 10:30 a.m. Water levels recorded for Channel 1 (Well 31551) were reported in the TOC mode. As explained above, the data logger switched modes during an electrical storm. All the rest of the channels are reported in a surface mode.

Water level data used in the analysis is tabulated in the main text of this report.

PRE-TEST MONITORING

SE2000
Environmental Logger
05/01 11:23

Unit# 558 Test 1

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4	INPUT 5	INPUT 6
Type	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)
Mode	TOC	TOC	TOC	TOC	TOC	TOC
I.D.	31551	31552	31553	31554	31555	31556
Reference	0.000	0.000	0.000	0.000	0.000	0.000
PSI at Ref.	10.016	6.794	5.163	8.113	7.706	6.723
SG	1.000	1.000	1.000	1.000	1.000	1.000
Linearity	0.000	0.127	0.127	0.141	0.117	0.103
Scale factor	16.000	20.016	19.980	19.861	20.070	20.023
Offset	4.000	0.030	-0.017	0.059	0.029	-0.031
Delay mSEC	50.000	50.000	50.000	50.000	50.000	50.000

Step 0 04/27 15:15:00

Elapsed Time	INPUT 1	INPUT 2	INPUT 3	INPUT 4	INPUT 5	INPUT 6
0.0000	0.000	-0.006	-0.012	0.000	0.000	-0.006
15.0000	0.000	-0.006	0.000	0.000	0.000	-0.006
30.0000	0.005	-0.006	0.000	0.000	0.006	-0.006
45.0000	0.000	-0.006	0.000	0.006	0.000	-0.006
60.0000	0.000	-0.006	0.000	0.006	0.000	-0.006
75.0000	0.005	-0.006	0.000	0.000	0.006	-0.006
90.0000	0.000	-0.006	0.006	0.006	0.000	-0.006
105.000	0.005	0.000	0.000	0.000	0.006	-0.006
120.000	0.000	-0.006	0.000	0.000	0.000	-0.006
135.000	0.000	-0.006	0.000	0.000	0.000	-0.006
150.000	0.000	-0.006	0.000	0.006	0.000	-0.006
165.000	0.000	-0.006	0.000	0.000	0.000	-0.006
180.000	0.000	-0.006	0.012	0.018	0.000	-0.006
195.000	0.000	-0.006	0.000	0.000	0.000	-0.006
210.000	0.000	-0.006	0.000	0.000	0.000	-0.006
225.000	-0.005	-0.012	-0.006	-0.006	0.000	-0.012
240.000	0.000	-0.006	-0.006	0.000	0.000	-0.006
255.000	-0.005	-0.012	-0.006	-0.006	-0.006	-0.012
270.000	0.000	-0.012	-0.006	0.000	0.000	-0.012
285.000	0.000	-0.006	0.000	0.000	0.000	-0.006
300.000	0.000	-0.006	-0.006	0.000	0.000	-0.012
315.000	0.000	-0.006	-0.006	0.000	0.000	-0.012
330.000	0.000	-0.006	0.000	0.000	0.000	-0.006
345.000	0.005	-0.006	0.000	0.000	0.000	-0.006
360.000	0.005	-0.006	0.000	0.000	0.000	-0.006
375.000	0.005	0.000	0.006	0.006	0.006	0.000
390.000	0.005	0.000	0.006	0.006	0.006	0.000
405.000	0.005	0.000	0.006	0.006	0.006	0.000
420.000	0.005	0.000	0.006	0.006	0.006	0.000
435.000	0.005	0.000	0.006	0.000	0.006	-0.006
450.000	0.005	0.000	0.006	0.006	0.006	-0.006
465.000	0.005	0.000	0.006	0.006	0.006	-0.006
480.000	0.005	0.000	0.006	0.006	0.006	-0.006
495.000	0.005	0.000	0.006	0.006	0.000	-0.006
510.000	0.000	-0.006	0.000	0.000	0.000	-0.012

525.000	0.000	-0.006	0.000	0.000	0.000	-0.012
540.000	0.000	-0.006	0.000	0.000	-0.006	-0.012
555.000	0.000	-0.006	-0.006	0.000	-0.006	-0.012
570.000	0.000	-0.006	-0.006	0.000	-0.006	-0.012
585.000	-0.005	-0.012	-0.006	-0.006	-0.006	-0.019
600.000	-0.005	-0.012	-0.006	-0.006	-0.006	-0.019
615.000	-0.005	-0.012	-0.006	-0.006	-0.006	-0.019
630.000	-0.005	-0.012	-0.006	-0.006	-0.006	-0.019
645.000	-0.005	-0.012	-0.006	-0.006	-0.012	-0.019
660.000	-0.010	-0.019	-0.012	-0.006	-0.006	-0.019
675.000	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
690.000	-0.015	-0.025	-0.018	-0.012	-0.019	-0.031
705.000	-0.010	-0.019	-0.018	-0.012	-0.019	-0.025
720.000	-0.010	-0.019	-0.018	-0.012	-0.019	-0.025
735.000	-0.010	-0.025	-0.018	-0.012	-0.019	-0.025
750.000	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
765.000	-0.010	-0.019	-0.018	-0.012	-0.012	-0.025
780.000	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
795.000	-0.010	-0.019	-0.018	-0.012	-0.012	-0.025
810.000	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
825.000	-0.010	-0.019	-0.012	-0.012	-0.019	-0.025
840.000	-0.010	-0.019	-0.018	-0.012	-0.019	-0.025
855.000	-0.010	-0.019	-0.012	-0.012	-0.019	-0.025
870.000	-0.010	-0.019	-0.012	-0.012	-0.012	-0.025
885.000	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
900.000	-0.015	-0.019	-0.018	-0.012	-0.019	-0.025
915.000	-0.010	-0.019	-0.012	-0.012	-0.019	-0.025
930.000	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
945.000	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
960.000	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
975.000	-0.010	-0.012	-0.012	-0.006	-0.012	-0.019
990.000	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
1005.00	-0.010	-0.019	-0.006	-0.006	-0.012	-0.025
1020.00	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
1035.00	-0.010	-0.019	-0.006	-0.006	-0.012	-0.025
1050.00	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
1065.00	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
1080.00	-0.010	-0.012	-0.012	-0.006	-0.012	-0.025
1095.00	-0.010	-0.019	-0.006	-0.006	-0.012	-0.025
1110.00	-0.010	-0.019	-0.012	-0.012	-0.012	-0.025
1125.00	-0.010	-0.019	-0.012	-0.006	-0.012	-0.025
1140.00	-0.015	-0.019	-0.018	-0.006	-0.012	-0.025
1155.00	-0.015	-0.019	-0.012	-0.012	-0.019	-0.025
1170.00	-0.015	-0.019	-0.018	-0.012	-0.019	-0.031
1185.00	-0.015	-0.025	-0.025	-0.018	-0.019	-0.031
1200.00	-0.015	-0.025	-0.018	-0.006	-0.019	-0.038
1215.00	-0.020	-0.025	-0.018	-0.012	-0.025	-0.038
1230.00	-0.015	-0.025	-0.018	-0.006	-0.019	-0.031
1245.00	-0.020	-0.025	-0.018	-0.006	-0.025	-0.038
1260.00	-0.020	-0.025	-0.018	-0.012	-0.025	-0.031
1275.00	-0.020	-0.025	-0.037	-0.037	-0.025	-0.038
1290.00	-0.020	-0.031	-0.025	-0.031	-0.025	-0.044
1305.00	-0.020	-0.031	-0.031	-0.025	-0.025	-0.044
1320.00	-0.025	-0.031	-0.025	-0.018	-0.025	-0.038
1335.00	-0.025	-0.038	-0.031	-0.025	-0.031	-0.044
1350.00	-0.020	-0.031	-0.006	0.018	-0.031	-0.038
1365.00	-0.025	-0.038	-0.018	-0.012	-0.031	-0.044
1380.00	-0.025	-0.038	-0.031	-0.025	-0.031	-0.044
1395.00	-0.030	-0.038	-0.050	-0.050	-0.031	-0.044
1410.00	-0.025	-0.031	-0.031	-0.018	-0.031	-0.044

1425.00	-0.030	-0.038	-0.037	-0.037	-0.038	-0.050
1440.00	-0.030	-0.038	-0.031	-0.018	-0.031	-0.044
1455.00	-0.030	-0.044	-0.037	-0.025	-0.038	-0.050
1470.00	-0.030	-0.044	-0.063	-0.056	-0.038	-0.057
1485.00	-0.030	-0.044	-0.044	-0.031	-0.038	-0.050
1500.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
1515.00	-0.035	-0.044	-0.044	-0.031	-0.044	-0.057
1530.00	-0.030	-0.044	-0.044	-0.031	-0.038	-0.050
1545.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
1560.00	-0.035	-0.044	-0.050	-0.037	-0.044	-0.057
1575.00	-0.035	-0.044	-0.050	-0.037	-0.044	-0.057
1590.00	-0.035	-0.044	-0.044	-0.031	-0.044	-0.057
1605.00	-0.035	-0.050	-0.044	-0.031	-0.044	-0.057
1620.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
1635.00	-0.035	-0.044	-0.037	-0.025	-0.038	-0.057
1650.00	-0.035	-0.044	-0.044	-0.037	-0.038	-0.057
1665.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
1680.00	-0.035	-0.050	-0.044	-0.037	-0.044	-0.057
1695.00	-0.035	-0.050	-0.044	-0.037	-0.044	-0.057
1710.00	-0.035	-0.050	-0.044	-0.037	-0.044	-0.057
1725.00	-0.035	-0.044	-0.044	-0.037	-0.038	-0.057
1740.00	-0.035	-0.050	-0.044	-0.037	-0.044	-0.057
1755.00	-0.035	-0.044	-0.037	-0.031	-0.038	-0.057
1770.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
1785.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
1800.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
1815.00	-0.035	-0.044	-0.044	-0.037	-0.038	-0.057
1830.00	-0.030	-0.038	-0.037	-0.031	-0.038	-0.050
1845.00	-0.035	-0.044	-0.037	-0.031	-0.038	-0.050
1860.00	-0.035	-0.044	-0.037	-0.037	-0.038	-0.057
1875.00	-0.030	-0.044	-0.037	-0.031	-0.038	-0.050
1890.00	-0.030	-0.044	-0.037	-0.031	-0.038	-0.050
1905.00	-0.035	-0.044	-0.037	-0.031	-0.038	-0.050
1920.00	-0.035	-0.044	-0.037	-0.037	-0.038	-0.057
1935.00	-0.035	-0.044	-0.037	-0.031	-0.038	-0.057
1950.00	-0.035	-0.044	-0.037	-0.031	-0.038	-0.057
1965.00	-0.035	-0.044	-0.037	-0.031	-0.038	-0.057
1980.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
1995.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
2010.00	-0.035	-0.050	-0.044	-0.037	-0.044	-0.057
2025.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
2040.00	-0.035	-0.044	-0.044	-0.031	-0.044	-0.057
2055.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
2070.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.057
2085.00	-0.040	-0.050	-0.044	-0.037	-0.050	-0.063
2100.00	-0.040	-0.050	-0.044	-0.037	-0.050	-0.063
2115.00	-0.040	-0.050	-0.044	-0.037	-0.044	-0.063
2130.00	-0.040	-0.050	-0.050	-0.037	-0.044	-0.063
2145.00	-0.040	-0.050	-0.044	-0.037	-0.044	-0.063
2160.00	-0.040	-0.050	-0.050	-0.044	-0.050	-0.063
2175.00	-0.040	-0.050	-0.050	-0.044	-0.050	-0.063
2190.00	-0.040	-0.050	-0.044	-0.037	-0.044	-0.063
2205.00	-0.040	-0.050	-0.044	-0.044	-0.044	-0.063
2220.00	-0.040	-0.050	-0.044	-0.037	-0.044	-0.063
2235.00	-0.040	-0.050	-0.050	-0.037	-0.044	-0.063
2250.00	-0.035	-0.044	-0.044	-0.037	-0.044	-0.063
2265.00	-0.040	-0.050	-0.044	-0.037	-0.044	-0.063
2280.00	-0.035	-0.050	-0.044	-0.037	-0.044	-0.063
2295.00	-0.040	-0.050	-0.044	-0.037	-0.044	-0.063
2310.00	-0.040	-0.050	-0.044	-0.037	-0.050	-0.063

2325.00	-0.040	-0.050	-0.050	-0.044	-0.050	-0.063
2340.00	-0.040	-0.050	-0.050	-0.044	-0.050	-0.063
2355.00	-0.040	-0.050	-0.050	-0.044	-0.050	-0.069
2370.00	-0.040	-0.050	-0.050	-0.044	-0.050	-0.063
2385.00	-0.040	-0.050	-0.044	-0.037	-0.044	-0.063
2400.00	-0.040	-0.050	-0.050	-0.044	-0.050	-0.063
2415.00	-0.040	-0.050	-0.050	-0.044	-0.050	-0.063
2430.00	-0.040	-0.050	-0.050	-0.037	-0.050	-0.069
2445.00	-0.045	-0.057	-0.050	-0.044	-0.057	-0.069
2460.00	-0.040	-0.050	-0.044	-0.037	-0.044	-0.063
2475.00	-0.035	-0.044	-0.037	-0.037	-0.044	-0.057
2490.00	-0.040	-0.044	-0.044	-0.037	-0.044	-0.063
2505.00	-0.040	-0.050	-0.044	-0.037	-0.050	-0.063
2520.00	-0.040	-0.044	-0.044	-0.037	-0.044	-0.063
2535.00	-0.045	-0.050	-0.044	-0.037	-0.050	-0.063
2550.00	-0.040	-0.050	-0.044	-0.037	-0.050	-0.063
2565.00	-0.040	-0.050	-0.050	-0.037	-0.044	-0.063
2580.00	-0.045	-0.050	-0.044	-0.044	-0.050	-0.063
2595.00	-0.045	-0.057	-0.050	-0.037	-0.050	-0.069
2610.00	-0.045	-0.057	-0.050	-0.044	-0.050	-0.069
2625.00	-0.045	-0.050	-0.050	-0.037	-0.050	-0.069
2640.00	-0.045	-0.057	-0.050	-0.044	-0.057	-0.069
2655.00	-0.045	-0.057	-0.056	-0.044	-0.050	-0.069
2670.00	-0.045	-0.057	-0.050	-0.044	-0.057	-0.076
2685.00	-0.050	-0.057	-0.050	-0.050	-0.057	-0.069
2700.00	-0.050	-0.063	-0.063	-0.044	-0.057	-0.076
2715.00	-0.050	-0.063	-0.063	-0.050	-0.057	-0.076
2730.00	-0.055	-0.069	-0.063	-0.050	-0.063	-0.082
2745.00	-0.055	-0.069	-0.063	-0.050	-0.063	-0.082
2760.00	-0.055	-0.069	-0.063	-0.044	-0.063	-0.082
2775.00	-0.060	-0.076	-0.075	-0.062	-0.069	-0.088
2790.00	-0.060	-0.069	-0.069	-0.056	-0.069	-0.088
2805.00	-0.055	-0.069	-0.063	-0.050	-0.063	-0.082
2820.00	-0.060	-0.069	-0.063	-0.056	-0.069	-0.088
2835.00	-0.055	-0.069	-0.069	-0.056	-0.063	-0.082
2850.00	-0.060	-0.069	-0.063	-0.056	-0.069	-0.088
2865.00	-0.065	-0.076	-0.094	-0.081	-0.076	-0.088
2880.00	-0.060	-0.076	-0.075	-0.062	-0.069	-0.088
2895.00	-0.065	-0.082	-0.082	-0.069	-0.076	-0.095
2910.00	-0.070	-0.082	-0.088	-0.069	-0.076	-0.095
2925.00	-0.060	-0.076	-0.069	-0.050	-0.069	-0.088
2940.00	-0.070	-0.082	-0.088	-0.075	-0.082	-0.101
2955.00	-0.070	-0.082	-0.094	-0.081	-0.082	-0.095
2970.00	-0.070	-0.082	-0.094	-0.081	-0.082	-0.101
2985.00	-0.065	-0.082	-0.088	-0.075	-0.076	-0.101
3000.00	-0.065	-0.082	-0.082	-0.075	-0.076	-0.101
3015.00	-0.070	-0.082	-0.082	-0.075	-0.076	-0.095
3030.00	-0.070	-0.082	-0.088	-0.075	-0.082	-0.101
3045.00	-0.070	-0.088	-0.088	-0.075	-0.082	-0.101
3060.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.095
3075.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3090.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.095
3105.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3120.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3135.00	-0.065	-0.076	-0.082	-0.069	-0.076	-0.095
3150.00	-0.065	-0.076	-0.075	-0.069	-0.069	-0.088
3165.00	-0.065	-0.082	-0.075	-0.069	-0.076	-0.095
3180.00	-0.065	-0.082	-0.082	-0.069	-0.076	-0.095
3195.00	-0.065	-0.076	-0.075	-0.069	-0.076	-0.095
3210.00	-0.065	-0.082	-0.082	-0.069	-0.076	-0.095

3225.00	-0.065	-0.076	-0.075	-0.069	-0.076	-0.095
3240.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3255.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3270.00	-0.070	-0.082	-0.082	-0.075	-0.076	-0.095
3285.00	-0.070	-0.088	-0.082	-0.075	-0.082	-0.101
3300.00	-0.070	-0.082	-0.082	-0.075	-0.076	-0.095
3315.00	-0.075	-0.088	-0.088	-0.075	-0.082	-0.101
3330.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3345.00	-0.075	-0.088	-0.088	-0.075	-0.082	-0.101
3360.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3375.00	-0.075	-0.082	-0.082	-0.075	-0.082	-0.101
3390.00	-0.065	-0.076	-0.075	-0.069	-0.076	-0.095
3405.00	-0.065	-0.076	-0.075	-0.069	-0.076	-0.088
3420.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3435.00	-0.065	-0.076	-0.075	-0.069	-0.076	-0.095
3450.00	-0.070	-0.082	-0.075	-0.069	-0.076	-0.095
3465.00	-0.070	-0.082	-0.082	-0.075	-0.076	-0.095
3480.00	-0.070	-0.082	-0.075	-0.075	-0.076	-0.095
3495.00	-0.070	-0.082	-0.075	-0.069	-0.076	-0.095
3510.00	-0.070	-0.082	-0.075	-0.069	-0.076	-0.095
3525.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3540.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3555.00	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
3570.00	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
3585.00	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
3600.00	-0.075	-0.095	-0.094	-0.081	-0.089	-0.107
3615.00	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
3630.00	-0.075	-0.088	-0.088	-0.075	-0.082	-0.107
3645.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3660.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3675.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3690.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
3705.00	-0.075	-0.088	-0.082	-0.081	-0.089	-0.107
3720.00	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
3735.00	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
3750.00	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
3765.00	-0.075	-0.088	-0.088	-0.081	-0.082	-0.107
3780.00	-0.080	-0.088	-0.088	-0.081	-0.089	-0.107
3795.00	-0.075	-0.088	-0.088	-0.081	-0.082	-0.107
3810.00	-0.075	-0.088	-0.088	-0.081	-0.082	-0.101
3825.00	-0.075	-0.088	-0.082	-0.081	-0.082	-0.101
3840.00	-0.075	-0.088	-0.082	-0.075	-0.082	-0.107
3855.00	-0.075	-0.088	-0.082	-0.081	-0.082	-0.101
3870.00	-0.075	-0.088	-0.082	-0.075	-0.082	-0.101
3885.00	-0.075	-0.088	-0.082	-0.081	-0.082	-0.101
3900.00	-0.075	-0.088	-0.088	-0.081	-0.082	-0.107
3915.00	-0.080	-0.088	-0.088	-0.081	-0.089	-0.107
3930.00	-0.075	-0.088	-0.088	-0.081	-0.089	-0.107
3945.00	-0.075	-0.088	-0.088	-0.081	-0.082	-0.107
3960.00	-0.075	-0.088	-0.082	-0.081	-0.089	-0.107
3975.00	-0.075	-0.088	-0.088	-0.081	-0.082	-0.107
3990.00	-0.075	-0.088	-0.082	-0.081	-0.082	-0.107
4005.00	-0.075	-0.088	-0.082	-0.081	-0.082	-0.101
4020.00	-0.075	-0.082	-0.082	-0.075	-0.082	-0.101
4035.00	-0.075	-0.082	-0.082	-0.075	-0.082	-0.101
4050.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
4065.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
4080.00	-0.070	-0.082	-0.075	-0.075	-0.082	-0.101
4095.00	-0.075	-0.082	-0.082	-0.075	-0.082	-0.101
4110.00	-0.075	-0.082	-0.082	-0.075	-0.082	-0.101

4125.00	-0.070	-0.082	-0.082	-0.075	-0.082	-0.101
4140.00	-0.060	-0.069	-0.063	-0.062	-0.063	-0.082
4155.00	-0.065	-0.076	-0.069	-0.069	-0.076	-0.095
4170.00	-0.065	-0.076	-0.069	-0.069	-0.069	-0.095
4185.00	-0.070	-0.076	-0.075	-0.075	-0.076	-0.101
4200.00	-0.070	-0.076	-0.069	-0.069	-0.076	-0.095
4215.00	-0.070	-0.076	-0.069	-0.069	-0.076	-0.095
4230.00	-0.070	-0.082	-0.075	-0.069	-0.082	-0.101
4245.00	-0.070	-0.076	-0.069	-0.069	-0.076	-0.095
4260.00	-0.070	-0.076	-0.069	-0.075	-0.076	-0.095
4275.00	-0.070	-0.076	-0.075	-0.069	-0.076	-0.095
4290.00	-0.070	-0.076	-0.069	-0.069	-0.076	-0.095
4305.00	-0.070	-0.076	-0.075	-0.075	-0.076	-0.095
4320.00	-0.070	-0.076	-0.069	-0.075	-0.076	-0.095
4335.00	-0.070	-0.076	-0.075	-0.069	-0.076	-0.095
4350.00	-0.070	-0.076	-0.069	-0.069	-0.076	-0.095
4365.00	-0.065	-0.076	-0.069	-0.069	-0.076	-0.095
4380.00	-0.065	-0.069	-0.069	-0.069	-0.069	-0.088
4395.00	-0.070	-0.082	-0.075	-0.075	-0.082	-0.101
4410.00	-0.070	-0.076	-0.075	-0.075	-0.076	-0.095
4425.00	-0.065	-0.069	-0.069	-0.069	-0.069	-0.095
4440.00	-0.065	-0.069	-0.063	-0.069	-0.069	-0.095
4455.00	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4470.00	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4485.00	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4500.00	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4515.00	-0.065	-0.069	-0.063	-0.069	-0.069	-0.095
4530.00	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4545.00	-0.065	-0.069	-0.069	-0.069	-0.069	-0.088
4560.00	-0.065	-0.069	-0.069	-0.069	-0.069	-0.088
4575.00	-0.065	-0.069	-0.069	-0.069	-0.069	-0.095
4590.00	-0.065	-0.069	-0.063	-0.062	-0.069	-0.088
4605.00	-0.060	-0.063	-0.063	-0.062	-0.063	-0.088
4620.00	-0.060	-0.063	-0.056	-0.062	-0.063	-0.082
4635.00	-0.060	-0.063	-0.056	-0.062	-0.063	-0.088
4650.00	-0.060	-0.069	-0.063	-0.062	-0.069	-0.088
4665.00	-0.065	-0.063	-0.063	-0.062	-0.069	-0.088
4680.00	-0.060	-0.063	-0.063	-0.062	-0.063	-0.088
4695.00	-0.060	-0.063	-0.063	-0.062	-0.063	-0.088
4710.00	-0.060	-0.063	-0.063	-0.062	-0.069	-0.088
4725.00	-0.060	-0.063	-0.063	-0.062	-0.063	-0.088
4740.00	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4755.00	-0.065	-0.069	-0.069	-0.069	-0.069	-0.095
4770.00	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4785.00	-0.065	-0.069	-0.069	-0.069	-0.069	-0.088
4800.00	-0.065	-0.069	-0.069	-0.069	-0.069	-0.095
4815.00	-0.070	-0.076	-0.075	-0.075	-0.076	-0.101
4830.00	-0.070	-0.076	-0.069	-0.069	-0.076	-0.095
4845.00	-0.065	-0.069	-0.069	-0.069	-0.069	-0.088
4860.00	-0.065	-0.076	-0.069	-0.069	-0.069	-0.095
4875.00	-0.070	-0.076	-0.069	-0.069	-0.076	-0.095
4890.00	-0.070	-0.076	-0.069	-0.069	-0.076	-0.095
4905.00	-0.065	-0.069	-0.063	-0.069	-0.069	-0.088
4920.00	-0.065	-0.069	-0.069	-0.069	-0.069	-0.095
4935.00	-0.070	-0.076	-0.075	-0.075	-0.076	-0.101
4950.00	-0.070	-0.076	-0.075	-0.075	-0.076	-0.101
4965.00	-0.075	-0.082	-0.075	-0.081	-0.082	-0.107
4980.00	-0.080	-0.088	-0.082	-0.081	-0.089	-0.107
4995.00	-0.080	-0.088	-0.088	-0.081	-0.089	-0.114
5010.00	-0.080	-0.088	-0.088	-0.081	-0.089	-0.114

5025.00	-0.085	-0.095	-0.094	-0.088	-0.095	-0.120
5040.00	-0.070	-0.076	-0.069	-0.069	-0.076	-0.095
5055.00	-0.075	-0.082	-0.075	-0.075	-0.082	-0.101
5070.00	-0.075	-0.082	-0.075	-0.075	-0.082	-0.101
5085.00	-0.075	-0.076	-0.075	-0.075	-0.082	-0.101
5100.00	-0.080	-0.088	-0.082	-0.081	-0.089	-0.114
5115.00	-0.080	-0.088	-0.088	-0.081	-0.089	-0.114
5130.00	-0.080	-0.088	-0.088	-0.081	-0.089	-0.107
5145.00	-0.080	-0.088	-0.088	-0.088	-0.089	-0.114
5160.00	-0.085	-0.088	-0.088	-0.088	-0.089	-0.114
5175.00	-0.085	-0.095	-0.088	-0.088	-0.095	-0.114
5190.00	-0.085	-0.095	-0.094	-0.094	-0.095	-0.120
5205.00	-0.100	-0.114	-0.113	-0.100	-0.108	-0.133
5220.00	-0.090	-0.101	-0.101	-0.094	-0.101	-0.126
5235.00	-0.080	-0.082	-0.082	-0.081	-0.082	-0.107
5250.00	-0.085	-0.088	-0.088	-0.088	-0.089	-0.114
5265.00	-0.080	-0.088	-0.082	-0.081	-0.089	-0.114
5280.00	-0.085	-0.095	-0.094	-0.088	-0.095	-0.120
5295.00	-0.085	-0.095	-0.094	-0.088	-0.095	-0.120
5310.00	-0.080	-0.088	-0.082	-0.081	-0.089	-0.114
5325.00	-0.080	-0.088	-0.082	-0.081	-0.089	-0.114
5340.00	-0.085	-0.088	-0.088	-0.088	-0.095	-0.114
5355.00	-0.085	-0.088	-0.088	-0.081	-0.089	-0.114
5370.00	-0.085	-0.088	-0.088	-0.081	-0.089	-0.114
5385.00	-0.090	-0.095	-0.094	-0.088	-0.095	-0.120
5400.00	-0.090	-0.101	-0.101	-0.094	-0.101	-0.126
5415.00	-0.090	-0.101	-0.101	-0.094	-0.101	-0.126
5430.00	-0.090	-0.101	-0.101	-0.094	-0.101	-0.126
5445.00	-0.100	-0.107	-0.101	-0.100	-0.108	-0.133
5460.00	-0.095	-0.101	-0.107	-0.094	-0.108	-0.126
5475.00	-0.090	-0.101	-0.094	-0.088	-0.101	-0.120
5490.00	-0.090	-0.101	-0.101	-0.094	-0.101	-0.126
5505.00	-0.100	-0.114	-0.107	-0.107	-0.114	-0.133
5520.00	-0.100	-0.114	-0.113	-0.100	-0.108	-0.139

STEP TEST - STEP 4, RECOVERY

7120

SE2000
Environmental Logger
05/08 13:41

Unit# 558 Test 0

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4	INPUT 5	INPUT 6	INPUT 7	INPUT 8
Type	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)
Mode	TOC	TOC	TOC	TOC	TOC	TOC	TOC	TOC
I.D.	31551	31552	31553	31554	31555	31556	31550IN	31550OU
Reference	519.325	519.325	519.265	519.355	519.311	519.265	519.700	519.435
PSI at Ref.	7.579	6.882	5.248	8.205	7.797	6.822	6.980	11.319
SG	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Linearity	0.106	0.127	0.127	0.141	0.117	0.103	0.115	0.114
Scale factor	20.015	20.016	19.980	19.861	20.070	20.023	20.028	19.934
Offset	-0.069	0.030	-0.017	0.059	0.029	-0.031	-0.022	0.067
Delay mSEC	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000

Step 4 05/04 14:45:03

Elapsed Time	INPUT 1	INPUT 2	INPUT 3	INPUT 4	INPUT 5	INPUT 6	INPUT 7	INPUT 8
0.0000	521.617	520.687	519.808	520.891	520.703	520.025	535.811	536.216
0.0083	521.560	520.680	519.808	520.878	520.690	520.025	535.818	537.305
0.0166	521.535	520.668	519.808	520.878	520.677	520.025	535.274	534.319
0.0250	521.478	520.642	519.808	520.865	520.658	520.018	533.727	532.837
0.0333	521.414	520.617	519.808	520.853	520.639	520.018	532.178	531.551
0.0416	521.345	520.592	519.808	520.828	520.614	520.012	530.939	530.384
0.0500	521.256	520.560	519.808	520.809	520.582	520.006	529.908	529.342
0.0583	521.174	520.528	519.802	520.784	520.556	520.006	528.909	528.421
0.0666	521.085	520.490	519.802	520.765	520.518	519.999	528.029	527.588
0.0750	521.003	520.459	519.802	520.721	520.486	519.987	527.257	526.842
0.0833	520.921	520.427	519.795	520.702	520.455	519.987	526.517	526.167
0.0916	520.857	520.402	519.795	520.670	520.423	519.974	525.896	525.554
0.1000	520.794	520.370	519.795	520.639	520.391	519.968	525.320	525.011
0.1083	520.737	520.351	519.789	520.607	520.366	519.961	524.801	524.518
0.1166	520.693	520.332	519.789	520.582	520.340	519.955	524.338	524.057
0.1250	520.642	520.313	519.783	520.551	520.321	519.949	524.003	523.633
0.1333	520.604	520.294	519.783	520.519	520.302	519.942	523.483	523.222
0.1416	520.560	520.275	519.776	520.494	520.283	519.936	523.160	522.913
0.1500	520.528	520.262	519.776	520.469	520.264	519.930	522.881	522.628
0.1583	520.490	520.237	519.770	520.450	520.251	519.923	522.596	522.350
0.1666	520.465	520.231	519.770	520.419	520.232	519.917	522.393	522.110
0.1750	520.439	520.218	519.770	520.400	520.220	519.911	522.191	521.914
0.1833	520.408	520.205	519.764	520.381	520.207	519.904	522.007	521.730
0.1916	520.389	520.186	519.764	520.368	520.194	519.904	521.848	521.579
0.2000	520.363	520.180	519.764	520.343	520.181	519.898	521.703	521.440
0.2083	520.344	520.174	519.764	520.330	520.169	519.892	521.582	521.313
0.2166	520.332	520.161	519.757	520.318	520.162	519.892	521.468	521.206
0.2250	520.313	520.155	519.757	520.305	520.156	519.885	521.373	521.111
0.2333	520.306	520.148	519.751	520.280	520.143	519.885	521.291	521.028
0.2416	520.294	520.142	519.757	520.280	520.137	519.879	521.215	520.946
0.2500	520.281	520.136	519.751	520.261	520.131	519.879	521.145	520.883
0.2583	520.268	520.129	519.751	520.249	520.124	519.879	521.082	520.826
0.2666	520.262	520.123	519.751	520.242	520.118	519.873	521.037	520.776
0.2750	520.249	520.123	519.751	520.230	520.118	519.873	520.993	520.725
0.2833	520.249	520.117	519.745	520.223	520.111	519.866	520.948	520.693

0.2916	520.243	520.110	519.745	520.223	520.105	519.866	520.917	520.649
0.3000	520.230	520.110	519.745	520.211	520.105	519.866	520.879	520.630
0.3083	520.230	520.110	519.745	520.204	520.099	519.866	520.853	520.598
0.3166	520.224	520.104	519.745	520.198	520.092	519.860	520.828	520.567
0.3250	520.224	520.104	519.738	520.192	520.099	519.860	520.809	520.554
0.3333	520.218	520.104	519.738	520.192	520.092	519.860	520.790	520.529
0.3500	520.211	520.091	519.738	520.173	520.086	519.860	520.758	520.497
0.3666	520.199	520.091	519.738	520.173	520.086	519.854	520.733	520.472
0.3833	520.192	520.085	519.732	520.160	520.080	519.854	520.714	520.459
0.4000	520.186	520.085	519.732	520.160	520.073	519.847	520.695	520.440
0.4166	520.192	520.085	519.732	520.160	520.073	519.847	520.682	520.428
0.4333	520.186	520.079	519.732	520.148	520.073	519.847	520.676	520.415
0.4500	520.180	520.079	519.726	520.142	520.067	519.847	520.663	520.409
0.4666	520.180	520.079	519.732	520.142	520.067	519.841	520.657	520.396
0.4833	520.173	520.072	519.726	520.135	520.067	519.841	520.651	520.390
0.5000	520.180	520.072	519.726	520.135	520.067	519.841	520.644	520.383
0.5166	520.173	520.072	519.726	520.129	520.061	519.841	520.638	520.383
0.5333	520.167	520.072	519.726	520.129	520.061	519.835	520.632	520.383
0.5500	520.167	520.072	519.726	520.129	520.061	519.841	520.632	520.377
0.5666	520.167	520.066	519.726	520.123	520.061	519.835	520.632	520.371
0.5833	520.167	520.066	519.726	520.129	520.054	519.841	520.625	520.364
0.6000	520.167	520.066	519.726	520.123	520.054	519.835	520.625	520.364
0.6166	520.167	520.066	519.726	520.129	520.054	519.835	520.619	520.364
0.6333	520.161	520.066	519.719	520.123	520.054	519.835	520.612	520.364
0.6500	520.167	520.060	519.719	520.116	520.054	519.835	520.612	520.352
0.6666	520.161	520.060	519.719	520.123	520.048	519.835	520.612	520.358
0.6833	520.161	520.060	519.719	520.110	520.048	519.835	520.612	520.352
0.7000	520.154	520.060	519.719	520.116	520.048	519.835	520.606	520.352
0.7166	520.161	520.060	519.719	520.110	520.048	519.835	520.606	520.345
0.7333	520.154	520.060	519.719	520.110	520.048	519.835	520.600	520.345
0.7500	520.154	520.060	519.719	520.116	520.048	519.828	520.600	520.345
0.7666	520.154	520.060	519.719	520.110	520.048	519.828	520.600	520.339
0.7833	520.154	520.060	519.719	520.110	520.042	519.828	520.593	520.339
0.8000	520.148	520.053	519.719	520.110	520.042	519.828	520.593	520.339
0.8166	520.154	520.053	519.719	520.104	520.042	519.828	520.593	520.333
0.8333	520.148	520.053	519.719	520.104	520.042	519.828	520.587	520.333
0.8500	520.148	520.053	519.719	520.104	520.042	519.828	520.587	520.326
0.8666	520.148	520.047	519.713	520.104	520.042	519.828	520.581	520.320
0.8833	520.142	520.047	519.713	520.097	520.035	519.828	520.574	520.326
0.9000	520.142	520.047	519.713	520.104	520.042	519.828	520.574	520.320
0.9166	520.142	520.047	519.713	520.104	520.035	519.828	520.568	520.314
0.9333	520.142	520.047	519.713	520.104	520.035	519.828	520.562	520.301
0.9500	520.142	520.047	519.713	520.097	520.042	519.828	520.555	520.301
0.9666	520.142	520.047	519.713	520.097	520.035	519.822	520.549	520.295
0.9833	520.142	520.047	519.713	520.091	520.035	519.822	520.543	520.288
1.0000	520.135	520.047	519.713	520.091	520.035	519.822	520.543	520.288
1.2000	520.129	520.041	519.707	520.079	520.029	519.816	520.517	520.263
1.4000	520.116	520.028	519.707	520.072	520.022	519.816	520.511	520.251
1.6000	520.116	520.028	519.700	520.072	520.022	519.809	520.505	520.244
1.8000	520.110	520.022	519.700	520.060	520.016	519.809	520.498	520.238
2.0000	520.104	520.022	519.700	520.060	520.010	519.803	520.492	520.244
2.2000	520.097	520.009	519.694	520.060	520.010	519.803	520.486	520.238
2.4000	520.097	520.009	519.694	520.047	520.003	519.803	520.486	520.225
2.6000	520.091	520.009	519.694	520.053	519.997	519.797	520.479	520.219
2.8000	520.091	520.002	519.688	520.047	519.997	519.797	520.479	520.219
3.0000	520.078	520.002	519.688	520.041	519.991	519.797	520.473	520.213
3.2000	520.085	519.996	519.688	520.035	519.991	519.797	520.473	520.206
3.4000	520.072	519.996	519.688	520.041	519.991	519.797	520.467	520.206
3.6000	520.078	519.996	519.688	520.035	519.984	519.797	520.467	520.206
3.8000	520.072	519.990	519.682	520.028	519.978	519.790	520.460	520.200

4.0000	520.072	519.983	519.682	520.028	519.978	519.784	520.454	520.200
4.2000	520.066	519.983	519.682	520.028	519.978	519.784	520.448	520.194
4.4000	520.066	519.977	519.675	520.028	519.972	519.784	520.448	520.194
4.6000	520.059	519.977	519.675	520.022	519.972	519.784	520.448	520.194
4.8000	520.053	519.977	519.682	520.022	519.972	519.784	520.441	520.187
5.0000	520.053	519.971	519.675	520.016	519.965	519.778	520.441	520.187
5.2000	520.053	519.971	519.675	520.022	519.965	519.778	520.435	520.181
5.4000	520.047	519.971	519.675	520.016	519.965	519.778	520.429	520.181
5.6000	520.047	519.964	519.675	520.009	519.959	519.778	520.429	520.175
5.8000	520.040	519.964	519.675	520.009	519.959	519.778	520.429	520.175
6.0000	520.040	519.964	519.682	520.003	519.959	519.771	520.429	520.168
6.2000	520.040	519.958	519.682	520.009	519.953	519.771	520.422	520.162
6.4000	520.040	519.958	519.675	520.003	519.953	519.771	520.422	520.162
6.6000	520.034	519.958	519.675	520.003	519.953	519.771	520.416	520.162
6.8000	520.028	519.958	519.675	520.003	519.953	519.771	520.416	520.162
7.0000	520.028	519.952	519.675	520.003	519.946	519.771	520.416	520.162
7.2000	520.028	519.952	519.675	520.003	519.946	519.765	520.410	520.156
7.4000	520.028	519.952	519.675	519.997	519.946	519.765	520.410	520.149
7.6000	520.021	519.945	519.675	520.003	519.940	519.765	520.410	520.156
7.8000	520.021	519.945	519.675	519.997	519.940	519.765	520.403	520.149
8.0000	520.021	519.945	519.675	519.990	519.940	519.765	520.403	520.143
8.2000	520.021	519.939	519.675	519.997	519.940	519.759	520.403	520.143
8.4000	520.015	519.939	519.669	519.990	519.940	519.759	520.397	520.143
8.6000	520.021	519.939	519.675	519.997	519.933	519.759	520.397	520.143
8.8000	520.009	519.939	519.669	519.990	519.933	519.759	520.397	520.137
9.0000	520.015	519.933	519.675	519.997	519.933	519.759	520.391	520.137
9.2000	520.002	519.933	519.669	519.990	519.933	519.759	520.391	520.137
9.4000	520.002	519.933	519.675	519.990	519.927	519.752	520.391	520.130
9.6000	520.002	519.933	519.669	519.997	519.927	519.752	520.391	520.130
9.8000	520.002	519.933	519.669	519.990	519.927	519.752	520.384	520.130
10.0000	520.002	519.933	519.669	519.990	519.927	519.752	520.384	520.130
12.0000	519.983	519.914	519.656	519.965	519.908	519.740	520.365	520.111
14.0000	519.964	519.895	519.644	519.953	519.895	519.727	520.340	520.092
16.0000	519.945	519.882	519.644	519.940	519.883	519.721	520.327	520.073
18.0000	519.933	519.869	519.631	519.927	519.870	519.708	520.308	520.061
20.0000	519.920	519.857	519.625	519.909	519.857	519.702	520.296	520.048
22.0000	519.907	519.844	519.618	519.902	519.844	519.695	520.283	520.035
24.0000	519.895	519.838	519.612	519.890	519.832	519.689	520.270	520.023
26.0000	519.882	519.825	519.606	519.883	519.825	519.676	520.257	520.004
28.0000	519.869	519.812	519.606	519.871	519.813	519.676	520.245	519.991
30.0000	519.857	519.806	519.599	519.865	519.806	519.670	520.232	519.985
32.0000	519.850	519.800	519.593	519.852	519.800	519.664	520.226	519.972
34.0000	519.838	519.793	519.593	519.839	519.787	519.657	520.213	519.966
36.0000	519.831	519.787	519.587	519.833	519.787	519.657	520.207	519.953
38.0000	519.825	519.774	519.587	519.827	519.775	519.651	520.200	519.947
40.0000	519.819	519.768	519.587	519.833	519.768	519.645	520.188	519.934
42.0000	519.806	519.762	519.580	519.814	519.762	519.638	520.181	519.922
44.0000	519.800	519.755	519.580	519.814	519.755	519.638	520.175	519.915
46.0000	519.787	519.749	519.574	519.802	519.749	519.632	520.162	519.909
48.0000	519.781	519.743	519.568	519.795	519.743	519.626	520.156	519.903
50.0000	519.774	519.736	519.568	519.795	519.736	519.619	520.150	519.896
52.0000	519.768	519.730	519.561	519.783	519.730	519.613	520.143	519.884
54.0000	519.762	519.724	519.561	519.776	519.724	519.613	520.131	519.877
56.0000	519.755	519.717	519.561	519.783	519.717	519.607	520.124	519.871
58.0000	519.749	519.711	519.561	519.783	519.711	519.600	520.118	519.865
60.0000	519.736	519.705	519.549	519.757	519.705	519.594	520.112	519.852
62.0000	519.730	519.698	519.536	519.751	519.698	519.594	520.105	519.846
64.0000	519.730	519.692	519.543	519.751	519.692	519.588	520.099	519.839
66.0000	519.717	519.686	519.530	519.732	519.686	519.581	520.093	519.833
68.0000	519.717	519.686	519.536	519.745	519.679	519.581	520.086	519.833

70.0000	519.705	519.673	519.524	519.726	519.673	519.575	520.080	519.820
72.0000	519.698	519.673	519.524	519.713	519.667	519.569	520.074	519.814
74.0000	519.692	519.667	519.517	519.707	519.667	519.569	520.067	519.808
76.0000	519.692	519.660	519.517	519.713	519.660	519.562	520.061	519.808
78.0000	519.686	519.660	519.517	519.713	519.654	519.562	520.055	519.801
80.0000	519.686	519.654	519.524	519.720	519.654	519.556	520.055	519.795
82.0000	519.679	519.648	519.517	519.701	519.647	519.556	520.048	519.795
84.0000	519.673	519.648	519.524	519.713	519.647	519.556	520.048	519.789
86.0000	519.673	519.648	519.530	519.720	519.647	519.550	520.042	519.782
88.0000	519.667	519.641	519.517	519.701	519.641	519.550	520.036	519.776
90.0000	519.660	519.635	519.498	519.676	519.635	519.543	520.029	519.770
92.0000	519.654	519.629	519.486	519.663	519.628	519.537	520.023	519.770
94.0000	519.654	519.629	519.498	519.688	519.628	519.537	520.023	519.770
96.0000	519.648	519.622	519.498	519.682	519.622	519.531	520.017	519.757
98.0000	519.641	519.622	519.486	519.663	519.616	519.531	520.010	519.751
100.000	519.641	519.616	519.492	519.669	519.616	519.524	520.010	519.751
120.000	519.603	519.584	519.473	519.632	519.584	519.505	519.972	519.713
140.000	519.578	519.559	519.454	519.600	519.558	519.480	519.947	519.688
160.000	519.553	519.540	519.441	519.581	519.533	519.461	519.921	519.662
180.000	519.534	519.521	519.429	519.562	519.514	519.448	519.902	519.643
200.000	519.515	519.508	519.416	519.543	519.501	519.436	519.883	519.624
220.000	519.496	519.483	519.397	519.525	519.476	519.410	519.858	519.599
240.000	519.483	519.470	519.391	519.512	519.469	519.404	519.852	519.593
260.000	519.477	519.464	519.385	519.499	519.457	519.398	519.839	519.580
280.000	519.464	519.451	519.378	519.487	519.450	519.385	519.826	519.567
300.000	519.451	519.445	519.366	519.474	519.438	519.379	519.820	519.561
320.000	519.439	519.432	519.359	519.468	519.431	519.366	519.807	519.548
340.000	519.432	519.426	519.353	519.455	519.419	519.360	519.801	519.542
360.000	519.426	519.413	519.347	519.449	519.412	519.353	519.788	519.529
380.000	519.420	519.413	519.340	519.443	519.406	519.347	519.788	519.529
400.000	519.413	519.407	519.340	519.436	519.400	519.347	519.782	519.523
420.000	519.407	519.401	519.334	519.430	519.400	519.341	519.776	519.517
440.000	519.401	519.394	519.328	519.424	519.393	519.334	519.769	519.510
460.000	519.394	519.388	519.321	519.417	519.387	519.328	519.763	519.504
480.000	519.388	519.388	519.321	519.411	519.380	519.322	519.757	519.498
500.000	519.382	519.375	519.309	519.405	519.374	519.315	519.750	519.491
520.000	519.382	519.375	519.309	519.405	519.368	519.315	519.744	519.491
540.000	519.375	519.369	519.302	519.399	519.361	519.309	519.738	519.479
560.000	519.369	519.363	519.302	519.399	519.361	519.303	519.738	519.479
580.000	519.369	519.363	519.302	519.392	519.355	519.303	519.731	519.472
600.000	519.369	519.363	519.302	519.392	519.355	519.303	519.731	519.472
620.000	519.363	519.356	519.290	519.386	519.349	519.296	519.725	519.472
640.000	519.356	519.350	519.290	519.380	519.349	519.290	519.725	519.466
660.000	519.356	519.350	519.290	519.380	519.342	519.290	519.725	519.466
680.000	519.356	519.350	519.290	519.380	519.342	519.290	519.719	519.460
700.000	519.350	519.337	519.277	519.367	519.336	519.284	519.712	519.453
720.000	519.350	519.344	519.283	519.373	519.336	519.284	519.712	519.453
740.000	519.344	519.337	519.277	519.361	519.330	519.277	519.706	519.447
760.000	519.337	519.331	519.271	519.361	519.330	519.271	519.706	519.447
780.000	519.337	519.331	519.271	519.361	519.330	519.277	519.706	519.447
800.000	519.337	519.331	519.271	519.361	519.330	519.277	519.706	519.447
820.000	519.337	519.331	519.271	519.355	519.330	519.271	519.700	519.447
840.000	519.337	519.331	519.271	519.355	519.323	519.271	519.700	519.447
860.000	519.331	519.331	519.265	519.355	519.323	519.271	519.700	519.441
880.000	519.331	519.331	519.271	519.361	519.323	519.271	519.700	519.447
900.000	519.331	519.331	519.271	519.355	519.323	519.271	519.700	519.441
920.000	519.331	519.325	519.265	519.355	519.323	519.265	519.700	519.441
940.000	519.331	519.325	519.265	519.355	519.323	519.271	519.700	519.441
960.000	519.331	519.331	519.271	519.355	519.323	519.271	519.700	519.441
980.000	519.337	519.331	519.271	519.355	519.323	519.271	519.700	519.441

1000.00	519.331	519.325	519.265	519.348	519.323	519.265	519.693	519.435
1020.00	519.331	519.331	519.271	519.355	519.323	519.271	519.700	519.441
1040.00	519.331	519.325	519.271	519.348	519.323	519.265	519.700	519.435
1060.00	519.331	519.325	519.271	519.348	519.323	519.271	519.693	519.435
1080.00	519.331	519.331	519.271	519.355	519.323	519.271	519.700	519.441
1100.00	519.331	519.325	519.271	519.348	519.317	519.265	519.693	519.435
1120.00	519.331	519.325	519.265	519.348	519.323	519.265	519.693	519.435
1140.00	519.325	519.325	519.271	519.348	519.317	519.265	519.693	519.435
1160.00	519.325	519.325	519.265	519.355	519.317	519.265	519.693	519.435
1180.00	519.325	519.318	519.265	519.348	519.317	519.258	519.687	519.428
1200.00	519.318	519.318	519.258	519.342	519.311	519.258	519.687	519.428
1220.00	519.318	519.312	519.258	519.348	519.311	519.258	519.680	519.428
1240.00	519.318	519.318	519.258	519.342	519.311	519.258	519.687	519.428
1260.00	519.325	519.318	519.265	519.348	519.317	519.258	519.687	519.428
1280.00	519.318	519.318	519.265	519.342	519.311	519.258	519.687	519.428
1300.00	519.312	519.312	519.239	519.323	519.311	519.252	519.680	519.422
1320.00	519.312	519.312	519.252	519.317	519.304	519.245	519.680	519.416
1340.00	519.312	519.312	519.271	519.355	519.304	519.252	519.680	519.422
1360.00	519.312	519.312	519.258	519.342	519.304	519.252	519.674	519.422
1380.00	519.306	519.305	519.246	519.336	519.304	519.245	519.668	519.416
1400.00	519.306	519.305	519.246	519.329	519.298	519.245	519.661	519.416
1420.00	519.306	519.305	519.252	519.336	519.298	519.245	519.661	519.416
1440.00	519.306	519.299	519.246	519.329	519.298	519.245	519.655	519.416
1460.00	519.306	519.305	519.246	519.329	519.298	519.239	519.655	519.409
1480.00	519.299	519.299	519.246	519.323	519.291	519.239	519.655	519.409
1500.00	519.299	519.293	519.239	519.323	519.291	519.239	519.655	519.409
1520.00	519.299	519.299	519.252	519.348	519.291	519.233	519.649	519.403
1540.00	519.293	519.286	519.214	519.310	519.285	519.226	519.655	519.397
1560.00	519.293	519.293	519.227	519.323	519.285	519.233	519.661	519.403
1580.00	519.293	519.293	519.252	519.329	519.285	519.233	519.661	519.403
1600.00	519.293	519.293	519.233	519.317	519.285	519.233	519.661	519.403
1620.00	519.293	519.293	519.233	519.323	519.285	519.233	519.655	519.403
1640.00	519.286	519.286	519.227	519.317	519.279	519.226	519.655	519.397
1660.00	519.293	519.293	519.227	519.310	519.285	519.226	519.661	519.403
1680.00	519.293	519.286	519.227	519.317	519.285	519.226	519.655	519.397
1700.00	519.293	519.293	519.227	519.317	519.285	519.226	519.655	519.397
1720.00	519.286	519.286	519.227	519.310	519.285	519.226	519.661	519.397
1740.00	519.286	519.286	519.227	519.310	519.279	519.226	519.655	519.397
1760.00	519.286	519.286	519.227	519.310	519.279	519.226	519.655	519.397
1780.00	519.286	519.286	519.220	519.310	519.279	519.220	519.655	519.397
1800.00	519.280	519.280	519.220	519.304	519.279	519.220	519.649	519.390
1820.00	519.286	519.286	519.227	519.310	519.279	519.226	519.655	519.397
1840.00	519.286	519.286	519.227	519.310	519.279	519.226	519.655	519.397
1860.00	519.286	519.280	519.220	519.310	519.279	519.220	519.655	519.397
1880.00	519.280	519.280	519.220	519.304	519.272	519.220	519.649	519.390
1900.00	519.280	519.280	519.220	519.304	519.272	519.220	519.649	519.390
1920.00	519.280	519.286	519.227	519.310	519.279	519.220	519.649	519.397
1940.00	519.280	519.280	519.220	519.304	519.279	519.220	519.649	519.390
1960.00	519.280	519.280	519.220	519.304	519.272	519.220	519.649	519.390
1980.00	519.274	519.274	519.214	519.304	519.272	519.214	519.642	519.384
2000.00	519.274	519.274	519.208	519.298	519.266	519.214	519.642	519.384
2020.00	519.274	519.274	519.214	519.298	519.266	519.207	519.642	519.384
2040.00	519.274	519.274	519.214	519.298	519.266	519.214	519.642	519.384
2060.00	519.274	519.274	519.214	519.298	519.266	519.214	519.642	519.384
2080.00	519.267	519.267	519.208	519.298	519.266	519.207	519.636	519.384
2100.00	519.280	519.280	519.220	519.304	519.272	519.214	519.649	519.390
2120.00	519.286	519.286	519.227	519.310	519.279	519.226	519.655	519.397
2140.00	519.280	519.280	519.220	519.304	519.272	519.214	519.642	519.390
2160.00	519.274	519.274	519.214	519.298	519.266	519.214	519.642	519.384
2180.00	519.274	519.274	519.214	519.298	519.272	519.214	519.642	519.384

2200.00	519.274	519.274	519.214	519.298	519.266	519.214	519.642	519.384
2220.00	519.280	519.280	519.220	519.304	519.272	519.220	519.649	519.390
2240.00	519.280	519.280	519.220	519.304	519.272	519.214	519.642	519.390
2260.00	519.280	519.280	519.220	519.304	519.272	519.220	519.649	519.390
2280.00	519.280	519.280	519.220	519.304	519.272	519.220	519.642	519.390
2300.00	519.274	519.280	519.220	519.304	519.272	519.214	519.642	519.384
2320.00	519.274	519.274	519.220	519.298	519.272	519.214	519.642	519.390
2340.00	519.274	519.274	519.214	519.298	519.266	519.214	519.642	519.384
2360.00	519.280	519.280	519.220	519.298	519.272	519.214	519.642	519.384
2380.00	519.274	519.274	519.220	519.298	519.272	519.214	519.642	519.384
2400.00	519.274	519.274	519.214	519.298	519.266	519.214	519.642	519.384
2420.00	519.267	519.274	519.214	519.298	519.266	519.207	519.636	519.384
2440.00	519.274	519.274	519.214	519.298	519.266	519.207	519.636	519.384
2460.00	519.267	519.274	519.214	519.298	519.266	519.207	519.636	519.384
2480.00	519.274	519.274	519.220	519.304	519.272	519.214	519.642	519.384
2500.00	519.274	519.274	519.220	519.298	519.266	519.214	519.636	519.384
2520.00	519.274	519.274	519.220	519.298	519.266	519.214	519.636	519.384
2540.00	519.274	519.274	519.220	519.298	519.272	519.214	519.642	519.384
2560.00	519.274	519.274	519.220	519.304	519.266	519.214	519.642	519.384
2580.00	519.274	519.274	519.214	519.298	519.266	519.214	519.636	519.384
2600.00	519.267	519.274	519.220	519.298	519.266	519.207	519.636	519.384
2620.00	519.267	519.267	519.214	519.292	519.266	519.207	519.636	519.378
2640.00	519.267	519.274	519.220	519.298	519.272	519.214	519.636	519.384
2660.00	519.267	519.267	519.214	519.298	519.266	519.207	519.630	519.378
2680.00	519.261	519.261	519.208	519.285	519.253	519.195	519.630	519.371
2700.00	519.261	519.261	519.201	519.292	519.253	519.201	519.630	519.371
2720.00	519.261	519.261	519.201	519.285	519.253	519.201	519.630	519.371
2740.00	519.261	519.261	519.201	519.279	519.260	519.201	519.630	519.371
2760.00	519.261	519.267	519.208	519.285	519.260	519.201	519.630	519.371
2780.00	519.261	519.261	519.208	519.292	519.253	519.195	519.623	519.371
2800.00	519.255	519.261	519.201	519.285	519.253	519.195	519.623	519.371
2820.00	519.255	519.261	519.195	519.279	519.253	519.195	519.623	519.365
2840.00	519.248	519.255	519.189	519.273	519.247	519.188	519.617	519.359
2860.00	519.255	519.255	519.201	519.292	519.247	519.188	519.617	519.365
2880.00	519.248	519.255	519.195	519.279	519.247	519.188	519.617	519.359
2900.00	519.248	519.248	519.189	519.273	519.247	519.188	519.617	519.359
2920.00	519.248	519.248	519.189	519.273	519.241	519.182	519.617	519.359
2940.00	519.236	519.242	519.182	519.266	519.234	519.176	519.604	519.352
2960.00	519.236	519.242	519.182	519.273	519.234	519.169	519.604	519.346
2980.00	519.236	519.242	519.176	519.266	519.234	519.176	519.604	519.352
3000.00	519.242	519.242	519.182	519.273	519.241	519.182	519.611	519.352
3020.00	519.236	519.242	519.182	519.266	519.234	519.176	519.604	519.352
3040.00	519.236	519.242	519.182	519.266	519.234	519.176	519.611	519.352
3060.00	519.236	519.242	519.176	519.266	519.234	519.176	519.604	519.352
3080.00	519.236	519.242	519.176	519.266	519.234	519.176	519.604	519.346
3100.00	519.229	519.236	519.170	519.254	519.228	519.169	519.598	519.346
3120.00	519.229	519.236	519.176	519.260	519.228	519.169	519.598	519.346
3140.00	519.236	519.236	519.176	519.260	519.228	519.169	519.598	519.346
3160.00	519.229	519.236	519.170	519.260	519.228	519.169	519.598	519.346
3180.00	519.236	519.236	519.176	519.260	519.228	519.169	519.598	519.346
3200.00	519.236	519.236	519.176	519.260	519.234	519.176	519.604	519.346
3220.00	519.229	519.236	519.170	519.260	519.228	519.169	519.598	519.346
3240.00	519.236	519.242	519.176	519.260	519.234	519.176	519.604	519.352
3260.00	519.229	519.236	519.176	519.260	519.234	519.176	519.598	519.346
3280.00	519.236	519.242	519.176	519.260	519.234	519.176	519.598	519.352
3300.00	519.236	519.236	519.176	519.260	519.228	519.169	519.598	519.346
3320.00	519.229	519.236	519.176	519.260	519.234	519.176	519.598	519.346
3340.00	519.229	519.236	519.176	519.260	519.228	519.169	519.592	519.346
3360.00	519.229	519.236	519.170	519.260	519.228	519.169	519.592	519.346
3380.00	519.229	519.236	519.176	519.260	519.234	519.176	519.598	519.346

3400.00	519.229	519.236	519.176	519.260	519.228	519.169	519.598	519.346
3420.00	519.229	519.236	519.176	519.260	519.228	519.169	519.598	519.346
3440.00	519.229	519.229	519.170	519.254	519.228	519.169	519.592	519.340
3460.00	519.229	519.229	519.170	519.254	519.228	519.163	519.592	519.340
3480.00	519.229	519.236	519.176	519.260	519.228	519.169	519.598	519.346
3500.00	519.229	519.236	519.170	519.260	519.228	519.169	519.592	519.346
3520.00	519.229	519.229	519.176	519.254	519.228	519.169	519.592	519.340
3540.00	519.223	519.229	519.170	519.254	519.222	519.163	519.592	519.340
3560.00	519.223	519.229	519.170	519.254	519.222	519.163	519.585	519.340
3580.00	519.223	519.229	519.170	519.254	519.228	519.163	519.592	519.340
3600.00	519.223	519.229	519.170	519.254	519.228	519.163	519.592	519.340
3620.00	519.223	519.229	519.170	519.254	519.222	519.163	519.585	519.333
3640.00	519.223	519.229	519.170	519.254	519.222	519.163	519.585	519.340
3660.00	519.223	519.229	519.170	519.254	519.222	519.163	519.592	519.340
3680.00	519.223	519.229	519.163	519.254	519.222	519.163	519.585	519.333
3700.00	519.223	519.229	519.170	519.254	519.222	519.163	519.585	519.340
3720.00	519.217	519.229	519.163	519.247	519.222	519.163	519.585	519.333
3740.00	519.223	519.229	519.170	519.247	519.222	519.163	519.592	519.340
3760.00	519.217	519.229	519.163	519.247	519.215	519.157	519.585	519.333
3780.00	519.223	519.229	519.170	519.254	519.222	519.163	519.585	519.333
3800.00	519.223	519.229	519.170	519.247	519.222	519.163	519.585	519.340
3820.00	519.229	519.236	519.176	519.254	519.228	519.169	519.592	519.346
3840.00	519.229	519.236	519.176	519.254	519.228	519.169	519.592	519.346
3860.00	519.229	519.236	519.176	519.254	519.228	519.169	519.592	519.340
3880.00	519.223	519.236	519.176	519.254	519.228	519.169	519.592	519.340
3900.00	519.229	519.236	519.182	519.260	519.228	519.169	519.592	519.346
3920.00	519.229	519.236	519.182	519.260	519.228	519.169	519.592	519.346
3940.00	519.229	519.236	519.182	519.260	519.228	519.169	519.592	519.346
3960.00	519.229	519.236	519.176	519.260	519.228	519.169	519.592	519.340
3980.00	519.223	519.229	519.176	519.254	519.222	519.163	519.585	519.340
4000.00	519.223	519.229	519.170	519.254	519.222	519.163	519.585	519.340
4020.00	519.223	519.229	519.170	519.254	519.222	519.163	519.585	519.333
4040.00	519.223	519.229	519.170	519.247	519.222	519.163	519.585	519.333
4060.00	519.217	519.223	519.163	519.247	519.215	519.157	519.579	519.333
4080.00	519.210	519.223	519.163	519.247	519.215	519.157	519.579	519.327
4100.00	519.217	519.223	519.163	519.247	519.215	519.157	519.579	519.333
4120.00	519.217	519.229	519.163	519.254	519.222	519.157	519.585	519.333
4140.00	519.217	519.223	519.163	519.254	519.222	519.157	519.579	519.333
4160.00	519.217	519.229	519.170	519.247	519.222	519.157	519.585	519.333
4180.00	519.217	519.223	519.163	519.247	519.215	519.157	519.579	519.333
4200.00	519.210	519.217	519.157	519.241	519.209	519.150	519.573	519.327
4220.00	519.210	519.217	519.163	519.241	519.209	519.150	519.573	519.321
4240.00	519.210	519.217	519.157	519.247	519.209	519.150	519.573	519.321
4260.00	519.204	519.210	519.151	519.235	519.202	519.144	519.566	519.321
4280.00	519.204	519.210	519.151	519.241	519.202	519.144	519.566	519.321
4300.00	519.198	519.210	519.151	519.235	519.202	519.144	519.566	519.314
4320.00	519.198	519.210	519.151	519.235	519.202	519.144	519.566	519.314
4340.00	519.204	519.217	519.157	519.241	519.209	519.150	519.573	519.321
4360.00	519.198	519.204	519.144	519.229	519.202	519.138	519.566	519.314
4380.00	519.198	519.204	519.144	519.229	519.196	519.138	519.560	519.314
4400.00	519.198	519.204	519.138	519.222	519.196	519.138	519.566	519.314
4420.00	519.191	519.204	519.144	519.229	519.196	519.138	519.560	519.308
4440.00	519.191	519.204	519.138	519.216	519.196	519.131	519.560	519.308
4460.00	519.191	519.198	519.125	519.216	519.190	519.131	519.560	519.308
4480.00	519.191	519.198	519.138	519.222	519.196	519.131	519.560	519.308
4500.00	519.198	519.210	519.144	519.222	519.202	519.138	519.566	519.314
4520.00	519.198	519.204	519.138	519.222	519.196	519.138	519.560	519.314
4540.00	519.191	519.204	519.138	519.216	519.196	519.138	519.560	519.314
4560.00	519.191	519.198	519.138	519.222	519.190	519.131	519.554	519.308
4580.00	519.198	519.204	519.144	519.229	519.196	519.138	519.560	519.314

4600.00	519.198	519.204	519.138	519.222	519.196	519.138	519.560	519.314
4620.00	519.191	519.198	519.132	519.216	519.190	519.131	519.554	519.308
4640.00	519.198	519.204	519.144	519.229	519.196	519.138	519.560	519.314
4660.00	519.198	519.210	519.144	519.229	519.202	519.138	519.560	519.314
4680.00	519.198	519.204	519.144	519.222	519.196	519.138	519.560	519.314
4700.00	519.204	519.210	519.151	519.229	519.202	519.144	519.566	519.321
4720.00	519.204	519.210	519.151	519.229	519.202	519.144	519.566	519.321
4740.00	519.198	519.210	519.151	519.229	519.202	519.144	519.560	519.314
4760.00	519.191	519.204	519.144	519.222	519.196	519.131	519.560	519.308
4780.00	519.204	519.210	519.151	519.229	519.202	519.144	519.566	519.314
4800.00	519.198	519.210	519.151	519.229	519.202	519.144	519.560	519.314
4820.00	519.204	519.210	519.151	519.229	519.202	519.144	519.566	519.321
4840.00	519.198	519.210	519.151	519.229	519.202	519.144	519.560	519.314
4860.00	519.198	519.210	519.144	519.229	519.202	519.138	519.560	519.314
4880.00	519.198	519.204	519.144	519.222	519.196	519.138	519.554	519.308
4900.00	519.191	519.204	519.144	519.222	519.196	519.131	519.554	519.308
4920.00	519.191	519.204	519.138	519.222	519.196	519.138	519.554	519.308
4940.00	519.191	519.198	519.138	519.222	519.190	519.131	519.554	519.308
4960.00	519.185	519.198	519.138	519.216	519.190	519.131	519.554	519.302
4980.00	519.185	519.198	519.132	519.216	519.190	519.131	519.547	519.302
5000.00	519.191	519.198	519.138	519.216	519.196	519.131	519.554	519.308
5020.00	519.185	519.191	519.132	519.216	519.183	519.125	519.547	519.302
5040.00	519.179	519.191	519.132	519.216	519.183	519.125	519.547	519.295
5060.00	519.179	519.191	519.132	519.210	519.183	519.119	519.541	519.295
5080.00	519.179	519.191	519.132	519.216	519.183	519.119	519.541	519.302
5100.00	519.191	519.198	519.138	519.216	519.190	519.131	519.554	519.308
5120.00	519.179	519.191	519.132	519.210	519.183	519.119	519.541	519.295
5140.00	519.179	519.191	519.132	519.216	519.183	519.125	519.541	519.295
5160.00	519.185	519.198	519.138	519.216	519.190	519.131	519.547	519.302
5180.00	519.185	519.198	519.132	519.216	519.190	519.125	519.547	519.302
5200.00	519.185	519.191	519.132	519.216	519.190	519.125	519.547	519.302
5220.00	519.179	519.191	519.125	519.210	519.183	519.119	519.541	519.295
5240.00	519.172	519.185	519.119	519.203	519.177	519.112	519.535	519.289
5260.00	519.185	519.191	519.132	519.210	519.183	519.125	519.541	519.302
5280.00	519.185	519.198	519.138	519.216	519.190	519.125	519.547	519.302
5300.00	519.191	519.204	519.144	519.222	519.196	519.131	519.554	519.308
5320.00	519.185	519.198	519.138	519.216	519.190	519.125	519.547	519.302
5340.00	519.179	519.191	519.132	519.210	519.183	519.119	519.541	519.295
5360.00	519.191	519.204	519.144	519.222	519.196	519.131	519.554	519.308
5380.00	519.191	519.204	519.144	519.222	519.196	519.131	519.547	519.308
5400.00	519.191	519.204	519.144	519.222	519.190	519.131	519.547	519.308
5420.00	519.191	519.204	519.138	519.216	519.190	519.131	519.554	519.308
5440.00	519.191	519.204	519.144	519.222	519.196	519.131	519.547	519.308
5460.00	519.191	519.204	519.151	519.222	519.196	519.138	519.554	519.308
5480.00	519.185	519.198	519.144	519.222	519.190	519.131	519.547	519.302
5500.00	519.191	519.204	519.144	519.222	519.196	519.138	519.554	519.308
5520.00	519.185	519.198	519.138	519.210	519.190	519.125	519.547	519.302
5540.00	519.185	519.198	519.138	519.216	519.190	519.125	519.547	519.302
5560.00	519.185	519.198	519.138	519.216	519.190	519.125	519.547	519.302
5580.00	519.179	519.191	519.132	519.210	519.183	519.125	519.541	519.295
5600.00	519.179	519.191	519.138	519.216	519.183	519.119	519.541	519.295
5620.00	519.185	519.198	519.138	519.216	519.183	519.125	519.541	519.302
5640.00	519.179	519.191	519.132	519.210	519.183	519.119	519.541	519.295
5660.00	519.172	519.185	519.125	519.210	519.177	519.112	519.535	519.289
5680.00	519.166	519.179	519.113	519.197	519.164	519.106	519.528	519.283

CONSTANT RATE TEST

SE2000
Environmental Logger
05/18 14:35

Unit# 558 Test 0

Setups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4	INPUT 5	INPUT 6	INPUT 7	INPUT 8
Type	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)
Mode	TOC	Surface	Surface	Surface	Surface	Surface	Surface	Surface
I.D.	31551	31552	31553	31554	31555	31556	31550IN	315500U
Reference	519.521	519.502	519.441	519.543	519.482	519.455	519.902	519.618
PSI at Ref.	7.664	6.956	5.322	8.285	7.868	6.899	7.066	11.399
SG	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Linearity	0.106	0.127	0.127	0.141	0.117	0.103	0.115	0.114
Scale factor	20.015	20.016	19.980	19.861	20.070	20.023	20.028	19.934
Offset	-0.069	0.030	-0.017	0.059	0.029	-0.031	-0.022	0.067
Delay mSEC	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000

Step 0 05/09 07:00:49

Elapsed Time	INPUT 1	INPUT 2	INPUT 3	INPUT 4	INPUT 5	INPUT 6	INPUT 7	INPUT 8
0.0000	519.521	519.508	519.447	519.549	519.488	519.467	519.914	519.618
0.0083	519.521	519.508	519.447	519.549	519.488	519.461	519.914	519.618
0.0166	519.521	519.508	519.447	519.543	519.488	519.467	519.914	519.618
0.0250	519.521	519.508	519.447	519.543	519.488	519.461	519.914	519.618
0.0333	519.521	519.508	519.447	519.549	519.482	519.461	519.914	519.611
0.0416	519.521	519.508	519.447	519.543	519.488	519.461	519.914	519.618
0.0500	519.521	519.508	519.447	519.543	519.488	519.467	519.914	519.618
0.0583	519.521	519.508	519.447	519.549	519.488	519.467	519.914	519.618
0.0666	519.521	519.508	519.447	519.543	519.488	519.461	519.914	519.618
0.0750	519.521	519.508	519.447	519.543	519.488	519.461	519.908	519.618
0.0833	519.521	519.508	519.447	519.549	519.488	519.461	519.914	519.611
0.0916	519.521	519.508	519.447	519.549	519.488	519.461	519.914	519.618
0.1000	519.521	519.508	519.447	519.549	519.488	519.461	519.914	519.611
0.1083	519.527	519.508	519.447	519.549	519.488	519.467	519.914	519.611
0.1166	519.521	519.502	519.447	519.543	519.488	519.461	519.914	519.611
0.1250	519.521	519.508	519.447	519.543	519.488	519.461	519.914	519.618
0.1333	519.521	519.508	519.447	519.543	519.488	519.461	519.914	519.618
0.1416	519.521	519.508	519.447	519.549	519.488	519.461	519.914	519.618
0.1500	519.521	519.508	519.447	519.549	519.488	519.461	519.914	519.618
0.1583	519.521	519.508	519.447	519.549	519.488	519.467	519.914	519.618
0.1666	519.521	519.508	519.447	519.549	519.488	519.461	519.914	519.611
0.1750	519.521	519.508	519.447	519.549	519.488	519.467	519.914	519.611
0.1833	519.521	519.508	519.447	519.549	519.488	519.461	519.882	519.459
0.1916	519.533	519.502	519.447	519.543	519.482	519.461	519.667	519.712
0.2000	519.527	519.508	519.447	519.543	519.482	519.461	519.737	519.440
0.2083	519.533	519.502	519.447	519.543	519.482	519.461	519.458	519.073
0.2166	519.559	519.495	519.447	519.536	519.482	519.467	519.261	518.985
0.2250	519.552	519.495	519.447	519.543	519.475	519.461	519.134	518.776
0.2333	519.565	519.489	519.447	519.536	519.475	519.461	518.931	518.782
0.2416	519.571	519.489	519.447	519.536	519.469	519.461	518.773	518.359
0.2500	519.628	519.476	519.447	519.517	519.462	519.461	517.714	517.366
0.2583	519.641	519.463	519.447	519.517	519.443	519.455	517.822	517.340
0.2666	519.654	519.457	519.447	519.511	519.437	519.455	517.505	517.170
0.2750	519.685	519.444	519.447	519.498	519.431	519.455	517.100	516.696
0.2833	519.749	519.425	519.447	519.486	519.418	519.455	515.947	515.368

0.2916	519.774	519.413	519.441	519.473	519.399	519.448	515.756	515.071
0.3000	519.818	519.394	519.441	519.461	519.380	519.448	515.212	514.667
0.3083	519.856	519.381	519.441	519.448	519.367	519.442	514.547	514.199
0.3166	519.907	519.362	519.441	519.423	519.348	519.442	513.679	512.835
0.3250	519.977	519.330	519.441	519.410	519.323	519.435	513.179	512.752
0.3333	520.015	519.318	519.441	519.385	519.303	519.429	512.407	511.900
0.3500	520.110	519.280	519.434	519.347	519.265	519.423	511.217	510.896
0.3666	520.217	519.235	519.428	519.297	519.221	519.410	509.926	509.312
0.3833	520.312	519.191	519.422	519.253	519.176	519.404	508.921	508.321
0.4000	520.401	519.153	519.422	519.209	519.145	519.391	507.789	507.387
0.4166	520.490	519.115	519.415	519.165	519.100	519.378	506.714	506.107
0.4333	520.578	519.077	519.415	519.114	519.056	519.366	505.558	505.161
0.4500	520.661	519.045	519.409	519.070	519.024	519.359	504.737	504.247
0.4666	520.730	519.014	519.403	519.026	518.992	519.347	504.522	503.579
0.4833	520.794	518.982	519.403	518.982	518.960	519.334	504.313	502.873
0.5000	520.851	518.957	519.396	518.951	518.935	519.328	504.313	502.344
0.5166	520.895	518.938	519.390	518.913	518.909	519.321	504.313	501.878
0.5333	520.933	518.919	519.390	518.881	518.890	519.309	504.320	501.595
0.5500	520.965	518.900	519.384	518.856	518.871	519.302	504.320	501.362
0.5666	520.990	518.887	519.384	518.837	518.859	519.296	504.313	501.078
0.5833	521.009	518.881	519.377	518.818	518.846	519.296	504.320	500.914
0.6000	521.028	518.868	519.371	518.800	518.833	519.290	504.320	500.726
0.6166	521.041	518.861	519.377	518.787	518.827	519.283	504.313	500.606
0.6333	521.053	518.855	519.371	518.768	518.814	519.283	504.313	500.562
0.6500	521.066	518.849	519.371	518.755	518.808	519.277	504.313	500.474
0.6666	521.072	518.842	519.371	518.749	518.801	519.277	504.313	500.348
0.6833	521.085	518.836	519.365	518.743	518.801	519.271	504.313	500.297
0.7000	521.091	518.830	519.365	518.730	518.795	519.271	504.313	500.272
0.7166	521.098	518.830	519.365	518.724	518.789	519.271	504.313	500.222
0.7333	521.104	518.823	519.365	518.718	518.789	519.264	504.313	500.171
0.7500	521.104	518.817	519.358	518.718	518.782	519.264	504.313	500.159
0.7666	521.110	518.817	519.365	518.711	518.782	519.264	504.313	500.115
0.7833	521.117	518.817	519.358	518.705	518.776	519.258	504.313	500.077
0.8000	521.123	518.811	519.358	518.699	518.776	519.258	504.313	500.058
0.8166	521.123	518.811	519.358	518.699	518.770	519.258	504.313	500.045
0.8333	521.129	518.811	519.358	518.692	518.770	519.258	504.313	500.027
0.8500	521.129	518.811	519.358	518.692	518.770	519.258	504.313	499.957
0.8666	521.129	518.804	519.352	518.692	518.763	519.252	504.313	499.957
0.8833	521.136	518.804	519.352	518.686	518.763	519.252	504.313	499.913
0.9000	521.142	518.804	519.352	518.686	518.763	519.252	504.313	499.907
0.9166	521.142	518.798	519.352	518.680	518.763	519.252	504.313	499.907
0.9333	521.142	518.798	519.352	518.680	518.757	519.252	504.307	499.888
0.9500	521.142	518.798	519.352	518.674	518.757	519.252	504.313	499.920
0.9666	521.142	518.798	519.352	518.680	518.757	519.252	504.307	499.957
0.9833	521.142	518.798	519.352	518.674	518.757	519.245	504.307	499.957
1.0000	521.142	518.792	519.352	518.674	518.750	519.245	504.307	499.976
1.2000	521.136	518.792	519.346	518.674	518.750	519.245	504.307	500.253
1.4000	521.148	518.785	519.346	518.661	518.744	519.239	504.307	500.209
1.6000	521.142	518.785	519.339	518.661	518.744	519.233	504.301	500.411
1.8000	521.148	518.779	519.339	518.655	518.738	519.233	504.294	500.436
2.0000	521.136	518.785	519.339	518.661	518.744	519.226	504.294	500.618
2.2000	521.136	518.779	519.339	518.655	518.738	519.226	504.288	500.663
2.4000	521.136	518.773	519.333	518.655	518.738	519.226	504.288	500.789
2.6000	521.123	518.779	519.333	518.655	518.738	519.226	504.288	501.085
2.8000	521.117	518.779	519.333	518.661	518.738	519.220	504.282	501.286
3.0000	521.098	518.785	519.333	518.667	518.744	519.226	504.282	501.582
3.2000	521.079	518.792	519.327	518.667	518.750	519.220	504.269	502.042
3.4000	521.066	518.792	519.327	518.686	518.757	519.220	504.263	502.199
3.6000	521.053	518.798	519.327	518.686	518.757	519.220	504.263	502.483
3.8000	521.034	518.804	519.320	518.692	518.763	519.220	504.256	502.653

4.0000	521.028	518.804	519.327	518.699	518.770	519.220	504.256	502.810
4.2000	521.015	518.811	519.320	518.705	518.770	519.220	504.256	502.955
4.4000	521.003	518.811	519.320	518.711	518.776	519.220	504.250	503.352
4.6000	520.996	518.817	519.320	518.711	518.782	519.220	504.187	503.459
4.8000	520.990	518.817	519.320	518.718	518.782	519.220	504.174	503.529
5.0000	520.984	518.817	519.320	518.718	518.782	519.220	504.174	503.737
5.2000	520.977	518.823	519.314	518.718	518.782	519.220	504.174	503.743
5.4000	520.977	518.817	519.314	518.718	518.782	519.220	504.181	503.768
5.6000	520.984	518.817	519.314	518.711	518.776	519.214	504.174	503.730
5.8000	520.984	518.811	519.314	518.711	518.776	519.214	504.174	503.869
6.0000	520.977	518.817	519.314	518.711	518.776	519.214	504.174	503.749
6.2000	520.977	518.817	519.314	518.711	518.776	519.214	504.181	503.945
6.4000	520.971	518.811	519.314	518.718	518.776	519.214	504.193	503.825
6.6000	520.977	518.811	519.314	518.711	518.776	519.214	504.193	503.831
6.8000	520.977	518.811	519.308	518.711	518.776	519.214	504.212	504.001
7.0000	520.977	518.811	519.308	518.718	518.776	519.214	504.237	504.203
7.2000	520.977	518.811	519.308	518.711	518.776	519.207	504.231	504.064
7.4000	520.977	518.811	519.308	518.711	518.776	519.207	504.237	504.121
7.6000	520.977	518.811	519.314	518.711	518.776	519.207	504.237	504.008
7.8000	520.977	518.811	519.308	518.711	518.770	519.207	504.263	504.083
8.0000	520.971	518.811	519.308	518.711	518.776	519.207	504.294	504.260
8.2000	520.971	518.811	519.308	518.705	518.770	519.201	504.288	504.191
8.4000	520.977	518.804	519.308	518.705	518.770	519.201	504.294	504.222
8.6000	520.977	518.804	519.301	518.705	518.770	519.201	504.282	504.329
8.8000	520.977	518.804	519.301	518.705	518.770	519.201	504.288	504.153
9.0000	520.984	518.804	519.301	518.705	518.770	519.201	504.288	504.235
9.2000	520.984	518.798	519.301	518.705	518.763	519.201	504.301	504.184
9.4000	520.977	518.798	519.301	518.705	518.763	519.195	504.294	504.228
9.6000	520.984	518.792	519.301	518.699	518.763	519.195	504.288	504.096
9.8000	520.984	518.792	519.295	518.699	518.757	519.195	504.294	504.077
10.0000	520.984	518.792	519.295	518.699	518.757	519.195	504.307	504.209
12.0000	521.009	518.779	519.289	518.680	518.744	519.182	504.294	504.096
14.0000	521.015	518.766	519.276	518.667	518.731	519.169	504.345	504.272
16.0000	521.034	518.747	519.270	518.655	518.712	519.163	504.332	504.386
18.0000	521.041	518.741	519.264	518.642	518.706	519.150	504.345	504.329
20.0000	521.041	518.735	519.257	518.636	518.700	519.144	504.503	504.449
22.0000	521.047	518.728	519.251	518.630	518.693	519.144	504.560	504.625
24.0000	521.117	518.690	519.238	518.592	518.655	519.125	504.288	503.825
26.0000	521.123	518.684	519.232	518.579	518.649	519.119	504.256	503.693
28.0000	521.129	518.671	519.226	518.573	518.636	519.112	504.250	503.932
30.0000	521.142	518.665	519.226	518.560	518.630	519.106	504.250	503.819
32.0000	521.155	518.652	519.213	518.554	518.623	519.093	504.237	503.806
34.0000	521.161	518.646	519.207	518.548	518.617	519.087	504.237	503.806
36.0000	521.167	518.640	519.207	518.541	518.604	519.087	504.244	503.756
38.0000	521.180	518.627	519.200	518.529	518.598	519.074	504.231	503.806
40.0000	521.186	518.621	519.194	518.523	518.592	519.074	504.244	503.995
42.0000	521.193	518.621	519.188	518.516	518.585	519.068	504.244	503.787
44.0000	521.193	518.614	519.188	518.510	518.579	519.062	504.250	503.907
46.0000	521.212	518.602	519.175	518.497	518.566	519.049	504.237	503.882
48.0000	521.218	518.589	519.169	518.491	518.560	519.043	504.237	503.875
50.0000	521.224	518.583	519.169	518.485	518.553	519.036	504.237	503.857
52.0000	521.231	518.576	519.162	518.478	518.547	519.030	504.237	503.863
54.0000	521.243	518.564	519.156	518.472	518.541	519.024	504.237	503.920
56.0000	521.250	518.564	519.150	518.466	518.528	519.017	504.237	503.901
58.0000	521.262	518.551	519.144	518.453	518.522	519.011	504.231	503.888
60.0000	521.269	518.545	519.137	518.447	518.515	519.005	504.231	503.875
62.0000	521.275	518.538	519.137	518.441	518.509	518.998	504.225	503.863
64.0000	521.275	518.532	519.131	518.434	518.503	518.998	504.225	503.957
66.0000	521.281	518.526	519.125	518.428	518.496	518.992	504.225	503.945
68.0000	521.294	518.519	519.118	518.422	518.490	518.986	504.225	503.806

70.0000	521.300	518.513	519.118	518.415	518.483	518.979	504.219	503.863
72.0000	521.313	518.507	519.112	518.409	518.477	518.973	504.219	503.718
74.0000	521.313	518.500	519.112	518.403	518.471	518.973	504.212	503.718
76.0000	521.319	518.494	519.106	518.397	518.471	518.967	504.212	503.699
78.0000	521.326	518.494	519.099	518.397	518.464	518.960	504.206	503.749
80.0000	521.326	518.488	519.099	518.390	518.464	518.960	504.212	503.863
82.0000	521.332	518.481	519.099	518.384	518.458	518.954	504.212	503.812
84.0000	521.338	518.481	519.093	518.378	518.452	518.948	504.212	503.749
86.0000	521.345	518.475	519.093	518.378	518.445	518.948	504.212	503.781
88.0000	521.345	518.469	519.087	518.371	518.439	518.941	504.206	503.781
90.0000	521.351	518.462	519.087	518.371	518.439	518.935	504.206	503.857
92.0000	521.357	518.456	519.080	518.365	518.433	518.935	504.206	503.819
94.0000	521.357	518.456	519.074	518.359	518.426	518.929	504.206	503.857
96.0000	521.357	518.456	519.074	518.359	518.426	518.929	504.212	504.001
98.0000	521.364	518.450	519.074	518.359	518.426	518.929	504.212	503.724
100.000	521.364	518.450	519.074	518.353	518.420	518.922	504.212	503.888
120.000	521.402	518.412	519.042	518.315	518.382	518.891	504.206	503.932
140.000	521.446	518.374	519.017	518.277	518.350	518.859	504.193	503.781
160.000	521.478	518.342	518.992	518.246	518.318	518.834	504.193	503.768
180.000	521.516	518.310	518.967	518.208	518.280	518.802	504.174	503.541
200.000	521.522	518.291	518.948	518.189	518.267	518.783	504.168	503.819
220.000	521.547	518.272	518.929	518.170	518.248	518.764	504.168	503.655
240.000	521.560	518.260	518.916	518.157	518.229	518.751	504.181	503.737
260.000	521.572	518.253	518.910	518.145	518.223	518.745	504.193	503.693
280.000	521.585	518.234	518.897	518.126	518.210	518.732	504.206	503.573
300.000	521.598	518.222	518.891	518.107	518.191	518.720	504.212	503.667
320.000	521.623	518.203	518.865	518.088	518.172	518.694	504.130	503.630
340.000	521.661	518.177	518.859	518.063	518.147	518.682	504.124	503.403
360.000	521.667	518.165	518.840	518.050	518.140	518.669	504.130	503.390
380.000	521.680	518.152	518.840	518.050	518.128	518.662	504.042	503.333
400.000	521.686	518.146	518.834	518.038	518.121	518.656	504.035	503.302
420.000	521.699	518.133	518.815	518.019	518.102	518.637	504.016	503.510
440.000	521.705	518.120	518.809	518.013	518.096	518.631	504.029	503.340
460.000	521.718	518.114	518.796	517.987	518.089	518.624	504.042	503.315
480.000	521.724	518.108	518.796	517.994	518.077	518.612	504.042	503.422
500.000	521.731	518.095	518.777	517.981	518.070	518.605	504.048	503.396
520.000	521.731	518.095	518.777	517.975	518.064	518.599	504.042	503.504
540.000	521.743	518.089	518.783	517.987	518.058	518.593	504.048	503.409
560.000	521.756	518.082	518.771	517.956	518.051	518.586	504.054	503.422
580.000	521.756	518.070	518.777	517.981	518.045	518.574	504.048	503.371
600.000	521.769	518.063	518.745	517.950	518.032	518.567	504.061	503.264
620.000	521.769	518.051	518.733	517.937	518.026	518.561	504.061	503.422
640.000	521.788	518.044	518.745	517.943	518.020	518.555	504.054	503.132
660.000	521.794	518.038	518.720	517.918	518.007	518.548	504.023	503.340
680.000	521.788	518.032	518.720	517.918	518.007	518.542	504.029	503.428
700.000	521.800	518.032	518.714	517.912	518.000	518.536	504.035	503.434
720.000	521.800	518.025	518.708	517.912	518.000	518.529	504.048	503.270
740.000	521.813	518.019	518.701	517.906	517.988	518.523	504.054	503.264
760.000	521.819	518.006	518.695	517.899	517.981	518.510	504.048	503.327
780.000	521.819	518.006	518.689	517.893	517.975	518.510	504.010	503.409
800.000	521.826	517.994	518.682	517.887	517.969	518.504	504.016	503.378
820.000	521.838	517.994	518.682	517.874	517.969	518.504	504.023	503.239
840.000	521.845	517.987	518.670	517.868	517.956	518.491	504.029	503.277
860.000	521.845	517.987	518.663	517.868	517.956	518.491	504.035	503.409
880.000	521.851	517.975	518.663	517.855	517.943	518.485	504.035	503.220
900.000	521.864	517.968	518.657	517.849	517.943	518.479	504.004	503.189
920.000	521.857	517.968	518.651	517.855	517.937	518.472	504.010	503.327
940.000	521.870	517.962	518.644	517.843	517.931	518.466	504.010	503.151
960.000	521.883	517.949	518.638	517.836	517.924	518.460	503.991	503.157
980.000	521.883	517.949	518.632	517.830	517.924	518.460	503.991	503.226

1000.00	521.889	517.943	518.632	517.824	517.918	518.453	503.985	503.226
1100.00	521.895	517.924	518.613	517.818	517.905	518.441	503.985	503.396
1200.00	521.908	517.918	518.606	517.805	517.892	518.428	503.966	503.346
1300.00	521.921	517.899	518.587	517.792	517.880	518.409	503.978	503.126
1400.00	521.933	517.892	518.581	517.786	517.867	518.403	503.985	503.176
1500.00	521.952	517.880	518.562	517.767	517.854	518.390	503.972	502.899
1600.00	521.959	517.867	518.556	517.755	517.842	518.377	503.972	503.163
1700.00	521.959	517.867	518.550	517.742	517.835	518.371	503.966	503.207
1800.00	521.959	517.867	518.556	517.755	517.835	518.371	503.966	503.207
1900.00	521.984	517.842	518.518	517.723	517.810	518.346	503.947	503.239
2000.00	521.971	517.848	518.537	517.736	517.823	518.358	503.966	503.252
2100.00	521.978	517.842	518.531	517.729	517.816	518.352	503.978	503.252
2200.00	521.997	517.823	518.505	517.717	517.797	518.333	503.941	503.144
2300.00	522.009	517.810	518.486	517.704	517.778	518.314	503.896	503.044
2400.00	522.016	517.797	518.480	517.698	517.772	518.308	503.877	503.176
2500.00	522.016	517.797	518.480	517.692	517.772	518.314	503.884	503.214
2600.00	522.035	517.791	518.474	517.685	517.765	518.308	503.890	503.170
2700.00	522.028	517.791	518.474	517.679	517.759	518.301	503.890	503.176
2800.00	522.041	517.772	518.455	517.673	517.753	518.289	503.852	503.126
2900.00	522.047	517.766	518.448	517.660	517.740	518.282	503.827	503.189
3000.00	522.047	517.766	518.442	517.654	517.740	518.276	503.814	503.107
3100.00	522.060	517.759	518.442	517.654	517.734	518.276	503.802	503.100
3200.00	522.054	517.759	518.430	517.648	517.734	518.270	503.795	503.107
3300.00	522.054	517.759	518.436	517.648	517.734	518.276	503.814	503.308
3400.00	522.066	517.753	518.442	517.641	517.727	518.270	503.814	503.144
3500.00	522.060	517.753	518.436	517.648	517.727	518.276	503.821	503.233
3600.00	522.047	517.759	518.442	517.654	517.734	518.270	503.833	503.163
3700.00	522.060	517.753	518.436	517.648	517.727	518.270	503.833	503.170
3800.00	522.054	517.759	518.436	517.654	517.734	518.270	503.827	503.119
3900.00	522.060	517.753	518.430	517.648	517.727	518.263	503.821	503.226
4000.00	522.060	517.753	518.436	517.648	517.727	518.270	503.827	503.126
4100.00	522.054	517.759	518.442	517.654	517.734	518.276	503.852	503.044
4200.00	522.066	517.753	518.436	517.648	517.727	518.270	503.852	503.094
4300.00	522.085	517.740	518.423	517.635	517.714	518.257	503.821	503.012
4400.00	522.073	517.740	518.423	517.635	517.721	518.257	503.795	503.100
4500.00	522.073	517.740	518.417	517.629	517.714	518.251	503.776	503.006
4600.00	522.079	517.734	518.392	517.604	517.708	518.251	503.783	502.949
4700.00	522.149	517.702	518.417	517.597	517.676	518.244	503.991	502.086
4800.00	522.142	517.696	518.411	517.591	517.676	518.244	503.991	502.414
4900.00	522.136	517.702	518.417	517.597	517.676	518.244	504.010	502.407
5000.00	522.117	517.709	518.417	517.604	517.689	518.251	503.997	502.766
5100.00	522.117	517.709	518.404	517.604	517.683	518.251	504.004	502.603
5200.00	522.130	517.702	518.411	517.597	517.683	518.251	503.997	502.653
5300.00	522.136	517.702	518.404	517.591	517.676	518.251	503.997	502.451
5400.00	522.117	517.709	518.411	517.604	517.689	518.251	503.985	502.615
5500.00	522.111	517.715	518.411	517.610	517.689	518.257	503.960	502.703
5600.00	522.104	517.709	518.411	517.604	517.695	518.257	503.934	502.766
5700.00	522.104	517.715	518.411	517.610	517.695	518.257	503.922	502.703
5800.00	522.117	517.702	518.392	517.591	517.676	518.238	503.865	502.792
5900.00	522.104	517.715	518.411	517.604	517.695	518.257	503.909	502.855
6000.00	522.111	517.709	518.404	517.604	517.689	518.251	503.884	502.867
6100.00	522.104	517.715	518.417	517.610	517.695	518.263	503.890	502.779
6200.00	522.104	517.715	518.411	517.604	517.689	518.251	503.846	502.924
6300.00	522.104	517.709	518.411	517.597	517.689	518.257	503.840	502.817
6400.00	522.098	517.721	518.423	517.616	517.702	518.276	503.896	502.710
6500.00	522.092	517.728	518.430	517.616	517.702	518.276	503.877	502.729
6600.00	522.098	517.715	518.417	517.610	517.695	518.270	503.871	502.792
6700.00	522.092	517.721	518.417	517.616	517.695	518.270	503.871	502.937
6800.00	522.066	517.740	518.430	517.629	517.714	518.282	503.871	502.993
6900.00	522.066	517.734	518.436	517.635	517.721	518.282	503.871	502.779

7000.00	522.054	517.753	518.442	517.648	517.734	518.295	503.858	502.930
7100.00	522.079	517.728	518.417	517.629	517.708	518.276	503.789	503.006
7200.00	522.079	517.721	518.411	517.622	517.702	518.263	503.764	502.867
7300.00	522.092	517.709	518.385	517.616	517.689	518.251	503.701	502.937
7400.00	522.149	517.683	518.385	517.585	517.657	518.238	504.010	502.414
7500.00	522.123	517.696	518.398	517.604	517.676	518.257	503.985	502.369
7600.00	522.111	517.728	518.417	517.616	517.702	518.276	503.997	502.470
7700.00	522.079	517.747	518.442	517.641	517.721	518.295	503.960	502.666
7800.00	522.060	517.759	518.467	517.666	517.734	518.308	503.934	502.558
7900.00	522.047	517.772	518.474	517.679	517.753	518.320	503.909	502.571
8000.00	522.041	517.778	518.480	517.685	517.753	518.327	503.877	502.577
8100.00	522.041	517.785	518.474	517.692	517.759	518.327	503.833	502.609
8200.00	522.035	517.791	518.486	517.685	517.765	518.339	503.808	502.653
8300.00	522.035	517.791	518.486	517.698	517.765	518.339	503.783	502.363
8400.00	522.022	517.797	518.499	517.711	517.778	518.352	503.776	502.483
8500.00	522.009	517.810	518.505	517.717	517.784	518.358	503.764	502.495
8600.00	522.003	517.816	518.512	517.723	517.791	518.365	503.738	502.735
8700.00	522.003	517.816	518.505	517.723	517.791	518.365	503.701	502.810
8800.00	521.997	517.823	518.518	517.729	517.797	518.371	503.694	502.666
8900.00	522.003	517.823	518.518	517.736	517.797	518.371	503.675	502.621
9000.00	521.978	517.842	518.531	517.742	517.816	518.390	503.682	502.621
9100.00	521.959	517.861	518.556	517.755	517.829	518.403	503.726	502.735
9200.00	521.946	517.873	518.569	517.786	517.848	518.415	503.738	502.892
9300.00	521.933	517.886	518.581	517.786	517.854	518.422	503.770	502.741
9400.00	521.927	517.886	518.581	517.792	517.861	518.428	503.770	502.634
9500.00	521.927	517.886	518.581	517.786	517.861	518.428	503.770	502.634
9600.00	521.927	517.892	518.581	517.799	517.867	518.434	503.751	502.766
9700.00	521.914	517.892	518.587	517.799	517.873	518.441	503.764	502.766
9800.00	521.914	517.899	518.594	517.805	517.873	518.447	503.776	502.691
9900.00	521.908	517.905	518.587	517.805	517.873	518.441	503.770	502.785
10000.0	521.908	517.905	518.600	517.811	517.880	518.453	503.789	502.703
10100.0	521.902	517.905	518.600	517.811	517.880	518.447	503.783	502.968
10200.0	521.895	517.911	518.600	517.811	517.886	518.453	503.795	502.659

RECOVERY, FROM CONSTANT RATE TEST

SE2000
Environmental Logger
05/18 14:25

Unit# 558 Test 0

etups:	INPUT 1	INPUT 2	INPUT 3	INPUT 4	INPUT 5	INPUT 6	INPUT 7	INPUT 8
ype	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)	Level (F)
ode	TOC	Surface	Surface	Surface	Surface	Surface	Surface	Surface
.D.	31551	31552	31553	31554	31555	31556	31550IN	31550OU
eference	519.521	519.502	519.441	519.543	519.482	519.455	519.902	519.618
SI at Ref.	7.664	6.956	5.322	8.285	7.868	6.899	7.066	11.399
G	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
inearity	0.106	0.127	0.127	0.141	0.117	0.103	0.115	0.114
cale factor	20.015	20.016	19.980	19.861	20.070	20.023	20.028	19.934
ffset	-0.069	0.030	-0.017	0.059	0.029	-0.031	-0.022	0.067
elay mSEC	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000

Step 1 05/16 10:30:10

lapsed Time	INPUT 1	INPUT 2	INPUT 3	INPUT 4	INPUT 5	INPUT 6	INPUT 7	INPUT 8
0.0000	521.876	517.924	518.613	517.824	517.899	518.466	503.802	504.562
0.0083	521.819	517.937	518.613	517.843	517.905	518.466	503.827	506.019
0.0166	521.813	517.949	518.613	517.843	517.918	518.466	505.577	506.176
0.0250	521.762	517.962	518.619	517.855	517.931	518.466	506.676	507.318
0.0333	521.705	517.981	518.613	517.868	517.950	518.466	507.656	508.416
0.0416	521.648	518.006	518.613	517.880	517.969	518.472	508.914	509.438
0.0500	521.579	518.032	518.613	517.899	517.994	518.472	510.179	510.347
0.0583	521.509	518.057	518.613	517.918	518.020	518.479	511.154	511.161
0.0666	521.433	518.089	518.619	517.943	518.051	518.485	511.995	511.875
0.0750	521.364	518.114	518.619	517.969	518.077	518.491	511.919	512.544
0.0833	521.300	518.139	518.625	517.994	518.102	518.498	513.388	513.144
0.0916	521.243	518.165	518.619	518.019	518.128	518.504	513.964	513.681
0.1000	521.186	518.190	518.625	518.044	518.153	518.510	514.464	514.167
0.1083	521.142	518.209	518.625	518.069	518.178	518.517	514.927	514.616
0.1166	521.098	518.228	518.632	518.094	518.197	518.523	515.332	515.021
0.1250	521.060	518.241	518.632	518.120	518.217	518.523	515.737	515.412
0.1333	521.022	518.260	518.632	518.145	518.229	518.529	516.086	515.754
0.1416	520.984	518.272	518.638	518.170	518.248	518.542	516.371	516.038
0.1500	520.958	518.291	518.638	518.189	518.267	518.542	516.624	516.291
0.1583	520.927	518.304	518.638	518.208	518.280	518.548	516.853	516.544
0.1666	520.901	518.317	518.638	518.227	518.293	518.555	517.055	516.746
0.1750	520.876	518.323	518.638	518.246	518.306	518.555	517.239	516.923
0.1833	520.851	518.336	518.644	518.258	518.318	518.561	517.398	517.075
0.1916	520.832	518.348	518.651	518.277	518.331	518.561	517.543	517.220
0.2000	520.813	518.355	518.651	518.296	518.331	518.567	517.670	517.340
0.2083	520.800	518.361	518.651	518.308	518.344	518.567	517.778	517.454
0.2166	520.787	518.367	518.651	518.321	518.356	518.574	517.879	517.555
0.2250	520.775	518.374	518.657	518.334	518.363	518.574	517.962	517.644
0.2333	520.762	518.380	518.657	518.340	518.363	518.580	518.038	517.720

0.2416	520.749	518.386	518.657	518.359	518.369	518.580	518.107	517.789
0.2500	520.743	518.393	518.657	518.359	518.375	518.586	518.171	517.846
0.2583	520.737	518.399	518.657	518.371	518.382	518.586	518.221	517.897
0.2666	520.724	518.399	518.663	518.378	518.388	518.586	518.272	517.948
0.2750	520.724	518.399	518.663	518.390	518.394	518.593	518.310	517.986
0.2833	520.711	518.405	518.663	518.397	518.394	518.593	518.348	518.030
0.2916	520.711	518.412	518.663	518.397	518.394	518.593	518.386	518.061
0.3000	520.699	518.418	518.663	518.403	518.401	518.593	518.412	518.093
0.3083	520.699	518.418	518.663	518.409	518.401	518.593	518.443	518.118
0.3166	520.692	518.418	518.663	518.415	518.401	518.599	518.469	518.144
0.3250	520.692	518.418	518.670	518.422	518.407	518.599	518.488	518.163
0.3333	520.686	518.418	518.676	518.428	518.414	518.599	518.507	518.182
0.3500	520.680	518.424	518.670	518.434	518.414	518.599	518.538	518.220
0.3666	520.680	518.424	518.670	518.441	518.414	518.599	518.570	518.238
0.3833	520.673	518.431	518.670	518.447	518.420	518.605	518.589	518.257
0.4000	520.667	518.437	518.670	518.447	518.420	518.605	518.608	518.283
0.4166	520.661	518.437	518.676	518.453	518.420	518.605	518.614	518.295
0.4333	520.661	518.437	518.670	518.453	518.426	518.605	518.633	518.314
0.4500	520.661	518.437	518.670	518.460	518.426	518.612	518.640	518.321
0.4666	520.661	518.443	518.670	518.460	518.426	518.612	518.652	518.333
0.4833	520.654	518.443	518.676	518.460	518.433	518.612	518.659	518.340
0.5000	520.654	518.443	518.676	518.466	518.433	518.612	518.671	518.346
0.5166	520.654	518.443	518.676	518.466	518.433	518.612	518.678	518.352
0.5333	520.648	518.443	518.676	518.466	518.439	518.612	518.678	518.352
0.5500	520.654	518.450	518.676	518.472	518.433	518.612	518.684	518.359
0.5666	520.648	518.450	518.676	518.472	518.433	518.612	518.691	518.365
0.5833	520.648	518.450	518.676	518.472	518.439	518.612	518.697	518.371
0.6000	520.648	518.443	518.676	518.472	518.439	518.618	518.697	518.365
0.6166	520.648	518.450	518.676	518.478	518.439	518.618	518.697	518.371
0.6333	520.648	518.450	518.676	518.478	518.439	518.618	518.703	518.378
0.6500	520.648	518.450	518.676	518.472	518.439	518.612	518.703	518.378
0.6666	520.642	518.450	518.676	518.478	518.439	518.618	518.710	518.378
0.6833	520.642	518.450	518.676	518.478	518.439	518.618	518.710	518.390
0.7000	520.642	518.450	518.682	518.478	518.439	518.618	518.710	518.384
0.7166	520.642	518.450	518.682	518.478	518.445	518.618	518.710	518.390
0.7333	520.642	518.450	518.682	518.485	518.445	518.618	518.716	518.397
0.7500	520.642	518.456	518.676	518.478	518.445	518.618	518.722	518.397
0.7666	520.642	518.450	518.682	518.485	518.439	518.618	518.722	518.397
0.7833	520.642	518.456	518.676	518.485	518.445	518.618	518.729	518.403
0.8000	520.635	518.450	518.682	518.485	518.445	518.624	518.729	518.403
0.8166	520.635	518.456	518.676	518.485	518.445	518.618	518.729	518.403
0.8333	520.635	518.456	518.682	518.485	518.445	518.618	518.735	518.409
0.8500	520.635	518.456	518.682	518.485	518.445	518.618	518.735	518.409
0.8666	520.635	518.456	518.682	518.485	518.445	518.618	518.741	518.416
0.8833	520.635	518.456	518.682	518.485	518.452	518.624	518.741	518.416
0.9000	520.635	518.456	518.676	518.491	518.445	518.624	518.748	518.422
0.9166	520.635	518.456	518.682	518.485	518.445	518.624	518.748	518.422
0.9333	520.629	518.456	518.682	518.485	518.445	518.618	518.748	518.422
0.9500	520.635	518.456	518.682	518.485	518.445	518.624	518.754	518.428
0.9666	520.629	518.456	518.682	518.491	518.445	518.624	518.754	518.428
0.9833	520.629	518.456	518.682	518.491	518.452	518.624	518.754	518.435
1.0000	520.629	518.462	518.682	518.491	518.445	518.624	518.760	518.435
1.2000	520.623	518.462	518.682	518.497	518.458	518.624	518.811	518.491
1.4000	520.616	518.469	518.689	518.504	518.458	518.631	518.830	518.504

1.6000	520.610	518.469	518.689	518.504	518.464	518.631	518.836	518.510
1.8000	520.604	518.475	518.689	518.504	518.464	518.631	518.836	518.517
2.0000	520.604	518.481	518.695	518.510	518.471	518.637	518.843	518.517
2.2000	520.597	518.481	518.695	518.510	518.471	518.637	518.849	518.517
2.4000	520.597	518.481	518.695	518.523	518.477	518.637	518.855	518.523
2.6000	520.597	518.488	518.695	518.523	518.477	518.637	518.855	518.523
2.8000	520.591	518.488	518.695	518.523	518.477	518.643	518.855	518.536
3.0000	520.591	518.494	518.695	518.529	518.483	518.643	518.855	518.529
3.2000	520.591	518.494	518.695	518.529	518.483	518.643	518.862	518.542
3.4000	520.585	518.500	518.701	518.529	518.483	518.643	518.868	518.542
3.6000	520.578	518.500	518.695	518.535	518.490	518.643	518.868	518.542
3.8000	520.572	518.500	518.701	518.529	518.490	518.650	518.874	518.542
4.0000	520.572	518.500	518.708	518.535	518.490	518.650	518.874	518.548
4.2000	520.572	518.507	518.701	518.535	518.490	518.650	518.874	518.548
4.4000	520.572	518.507	518.701	518.541	518.496	518.650	518.881	518.555
4.6000	520.566	518.507	518.701	518.541	518.496	518.650	518.881	518.555
4.8000	520.566	518.513	518.701	518.548	518.496	518.656	518.887	518.555
5.0000	520.566	518.513	518.708	518.548	518.503	518.656	518.887	518.555
5.2000	520.559	518.513	518.708	518.548	518.503	518.656	518.887	518.561
5.4000	520.559	518.519	518.708	518.548	518.503	518.656	518.893	518.561
5.6000	520.553	518.513	518.708	518.548	518.503	518.662	518.893	518.567
5.8000	520.553	518.519	518.708	518.554	518.509	518.662	518.893	518.567
6.0000	520.547	518.519	518.708	518.554	518.509	518.662	518.900	518.567
6.2000	520.547	518.526	518.708	518.554	518.509	518.662	518.900	518.574
6.4000	520.547	518.526	518.708	518.560	518.509	518.662	518.906	518.574
6.6000	520.540	518.532	518.714	518.560	518.515	518.662	518.906	518.580
6.8000	520.540	518.526	518.708	518.560	518.522	518.662	518.906	518.580
7.0000	520.540	518.532	518.714	518.567	518.515	518.669	518.912	518.580
7.2000	520.534	518.532	518.714	518.567	518.522	518.669	518.912	518.580
7.4000	520.534	518.538	518.714	518.567	518.522	518.669	518.912	518.586
7.6000	520.534	518.538	518.720	518.567	518.522	518.669	518.912	518.593
7.8000	520.534	518.538	518.720	518.573	518.528	518.675	518.919	518.586
8.0000	520.528	518.538	518.714	518.573	518.528	518.669	518.919	518.593
8.2000	520.528	518.538	518.720	518.573	518.528	518.675	518.925	518.593
8.4000	520.521	518.545	518.720	518.579	518.534	518.675	518.925	518.599
8.6000	520.528	518.545	518.720	518.579	518.534	518.675	518.925	518.599
8.8000	520.521	518.551	518.720	518.579	518.534	518.675	518.931	518.599
9.0000	520.521	518.551	518.720	518.579	518.534	518.675	518.931	518.605
9.2000	520.521	518.551	518.720	518.579	518.534	518.675	518.931	518.605
9.4000	520.509	518.551	518.720	518.585	518.541	518.675	518.931	518.605
9.6000	520.521	518.551	518.720	518.585	518.541	518.682	518.938	518.605
9.8000	520.515	518.551	518.720	518.579	518.541	518.675	518.938	518.605
10.0000	520.515	518.551	518.720	518.585	518.541	518.682	518.938	518.612
12.0000	520.502	518.564	518.726	518.598	518.553	518.688	518.950	518.624
14.0000	520.483	518.576	518.726	518.611	518.560	518.694	518.969	518.637
16.0000	520.464	518.595	518.739	518.623	518.579	518.707	518.988	518.656
18.0000	520.452	518.602	518.745	518.636	518.592	518.713	519.001	518.669
20.0000	520.445	518.614	518.745	518.642	518.598	518.713	519.007	518.681
22.0000	520.433	518.621	518.752	518.655	518.604	518.720	519.020	518.694
24.0000	520.420	518.633	518.752	518.661	518.617	518.726	519.033	518.707
26.0000	520.407	518.640	518.758	518.667	518.623	518.732	519.046	518.719
28.0000	520.395	518.652	518.764	518.680	518.636	518.745	519.058	518.732
30.0000	520.382	518.665	518.771	518.692	518.649	518.751	519.071	518.745
32.0000	520.369	518.671	518.777	518.705	518.655	518.758	519.084	518.757

34.0000	520.363	518.678	518.777	518.711	518.661	518.764	519.090	518.763
36.0000	520.357	518.684	518.783	518.718	518.668	518.770	519.096	518.776
38.0000	520.350	518.690	518.783	518.724	518.674	518.770	519.109	518.782
40.0000	520.344	518.697	518.783	518.730	518.681	518.777	519.115	518.789
42.0000	520.331	518.703	518.790	518.737	518.687	518.777	519.122	518.795
44.0000	520.325	518.709	518.790	518.743	518.693	518.783	519.128	518.808
46.0000	520.319	518.716	518.796	518.749	518.700	518.789	519.141	518.814
48.0000	520.306	518.728	518.802	518.762	518.712	518.796	519.147	518.827
50.0000	520.300	518.735	518.809	518.768	518.719	518.802	519.160	518.833
52.0000	520.287	518.741	518.809	518.774	518.725	518.808	519.172	518.846
54.0000	520.274	518.754	518.821	518.787	518.738	518.815	519.179	518.858
56.0000	520.268	518.760	518.828	518.793	518.744	518.827	519.191	518.865
58.0000	520.255	518.773	518.828	518.806	518.757	518.827	519.198	518.871
60.0000	520.243	518.785	518.840	518.818	518.770	518.846	519.217	518.890
62.0000	520.230	518.798	518.853	518.831	518.782	518.853	519.223	518.903
64.0000	520.224	518.798	518.853	518.831	518.782	518.859	519.229	518.909
66.0000	520.230	518.798	518.847	518.825	518.782	518.853	519.229	518.903
68.0000	520.230	518.798	518.840	518.831	518.782	518.846	519.229	518.903
70.0000	520.230	518.798	518.840	518.831	518.782	518.846	519.229	518.903
72.0000	520.224	518.804	518.847	518.837	518.782	518.853	519.236	518.915
74.0000	520.217	518.804	518.847	518.844	518.789	518.853	519.242	518.915
76.0000	520.211	518.811	518.847	518.850	518.795	518.853	519.248	518.922
78.0000	520.205	518.817	518.853	518.850	518.801	518.865	519.255	518.934
80.0000	520.198	518.823	518.853	518.862	518.808	518.865	519.261	518.941
82.0000	520.198	518.823	518.853	518.862	518.808	518.865	519.267	518.941
84.0000	520.192	518.830	518.859	518.869	518.814	518.872	519.267	518.947
86.0000	520.186	518.836	518.859	518.869	518.814	518.872	519.274	518.947
88.0000	520.179	518.842	518.865	518.881	518.827	518.878	519.280	518.960
90.0000	520.167	518.849	518.872	518.888	518.833	518.884	519.293	518.966
92.0000	520.167	518.855	518.872	518.894	518.839	518.891	519.293	518.972
94.0000	520.154	518.861	518.878	518.894	518.846	518.897	519.305	518.979
96.0000	520.148	518.868	518.884	518.907	518.846	518.903	519.312	518.985
98.0000	520.141	518.874	518.884	518.907	518.859	518.903	519.318	518.991
100.000	520.135	518.881	518.891	518.913	518.865	518.910	519.324	519.004
120.000	520.084	518.925	518.935	518.963	518.916	518.954	519.375	519.054
140.000	520.046	518.963	518.954	519.001	518.941	518.979	519.413	519.092
160.000	520.008	518.995	518.986	519.045	518.979	519.011	519.451	519.130
180.000	519.977	519.033	519.004	519.070	519.017	519.043	519.483	519.162
200.000	519.945	519.064	519.036	519.102	519.043	519.068	519.515	519.194
220.000	519.913	519.090	519.055	519.133	519.075	519.093	519.546	519.225
240.000	519.875	519.121	519.093	519.165	519.106	519.131	519.584	519.257
260.000	519.856	519.140	519.099	519.184	519.125	519.144	519.603	519.282
280.000	519.837	519.159	519.118	519.209	519.145	519.163	519.623	519.301
300.000	519.825	519.178	519.137	519.221	519.157	519.176	519.635	519.314
320.000	519.825	519.172	519.125	519.228	519.157	519.169	519.635	519.314
340.000	519.799	519.197	519.144	519.247	519.183	519.195	519.661	519.345
360.000	519.780	519.216	519.156	519.259	519.202	519.214	519.680	519.358
380.000	519.761	519.235	519.188	519.291	519.221	519.233	519.699	519.377
400.000	519.742	519.261	519.213	519.316	519.240	519.252	519.718	519.396
420.000	519.730	519.267	519.226	519.335	519.253	519.264	519.730	519.409
440.000	519.723	519.280	519.226	519.335	519.259	519.271	519.737	519.421
460.000	519.711	519.286	519.232	519.341	519.272	519.277	519.749	519.428
480.000	519.692	519.305	519.245	519.354	519.291	519.296	519.768	519.447
500.000	519.679	519.318	519.264	519.379	519.303	519.309	519.781	519.459

520.000	519.666	519.330	519.276	519.385	519.316	519.328	519.794	519.472
540.000	519.660	519.337	519.283	519.398	519.323	519.328	519.800	519.485
560.000	519.647	519.349	519.295	519.404	519.335	519.340	519.813	519.491
580.000	519.647	519.349	519.295	519.410	519.335	519.340	519.813	519.491
600.000	519.641	519.356	519.295	519.417	519.335	519.347	519.819	519.497
620.000	519.641	519.356	519.295	519.417	519.342	519.347	519.819	519.504
640.000	519.622	519.375	519.314	519.429	519.354	519.359	519.832	519.516
660.000	519.616	519.381	519.320	519.442	519.367	519.372	519.844	519.529
680.000	519.609	519.387	519.320	519.448	519.367	519.372	519.851	519.529
700.000	519.597	519.394	519.333	519.454	519.380	519.385	519.857	519.542
720.000	519.597	519.400	519.339	519.461	519.380	519.391	519.863	519.548
740.000	519.584	519.413	519.352	519.473	519.392	519.404	519.876	519.561
760.000	519.571	519.425	519.365	519.486	519.412	519.416	519.889	519.573
780.000	519.571	519.425	519.365	519.486	519.412	519.416	519.889	519.573
800.000	519.559	519.438	519.377	519.498	519.424	519.429	519.902	519.586
820.000	519.546	519.451	519.390	519.511	519.437	519.442	519.914	519.599
840.000	519.533	519.463	519.403	519.524	519.450	519.455	519.927	519.611
860.000	519.527	519.463	519.403	519.524	519.450	519.455	519.927	519.611
880.000	519.533	519.463	519.403	519.524	519.443	519.455	519.927	519.611
900.000	519.514	519.482	519.422	519.543	519.469	519.474	519.946	519.630
920.000	519.508	519.489	519.428	519.549	519.475	519.480	519.952	519.636
940.000	519.502	519.489	519.428	519.549	519.475	519.480	519.952	519.636
960.000	519.508	519.482	519.422	519.549	519.469	519.474	519.952	519.630
980.000	519.521	519.476	519.409	519.543	519.456	519.461	519.946	519.624
1000.00	519.495	519.502	519.434	519.561	519.482	519.486	519.965	519.643
1100.00	519.444	519.546	519.485	519.612	519.532	519.537	520.016	519.693
1200.00	519.451	519.546	519.478	519.612	519.526	519.531	520.009	519.693
1300.00	519.444	519.546	519.478	519.618	519.532	519.537	520.016	519.700
1400.00	519.419	519.571	519.497	519.643	519.551	519.556	520.041	519.725
1500.00	519.400	519.590	519.516	519.662	519.577	519.575	520.060	519.738

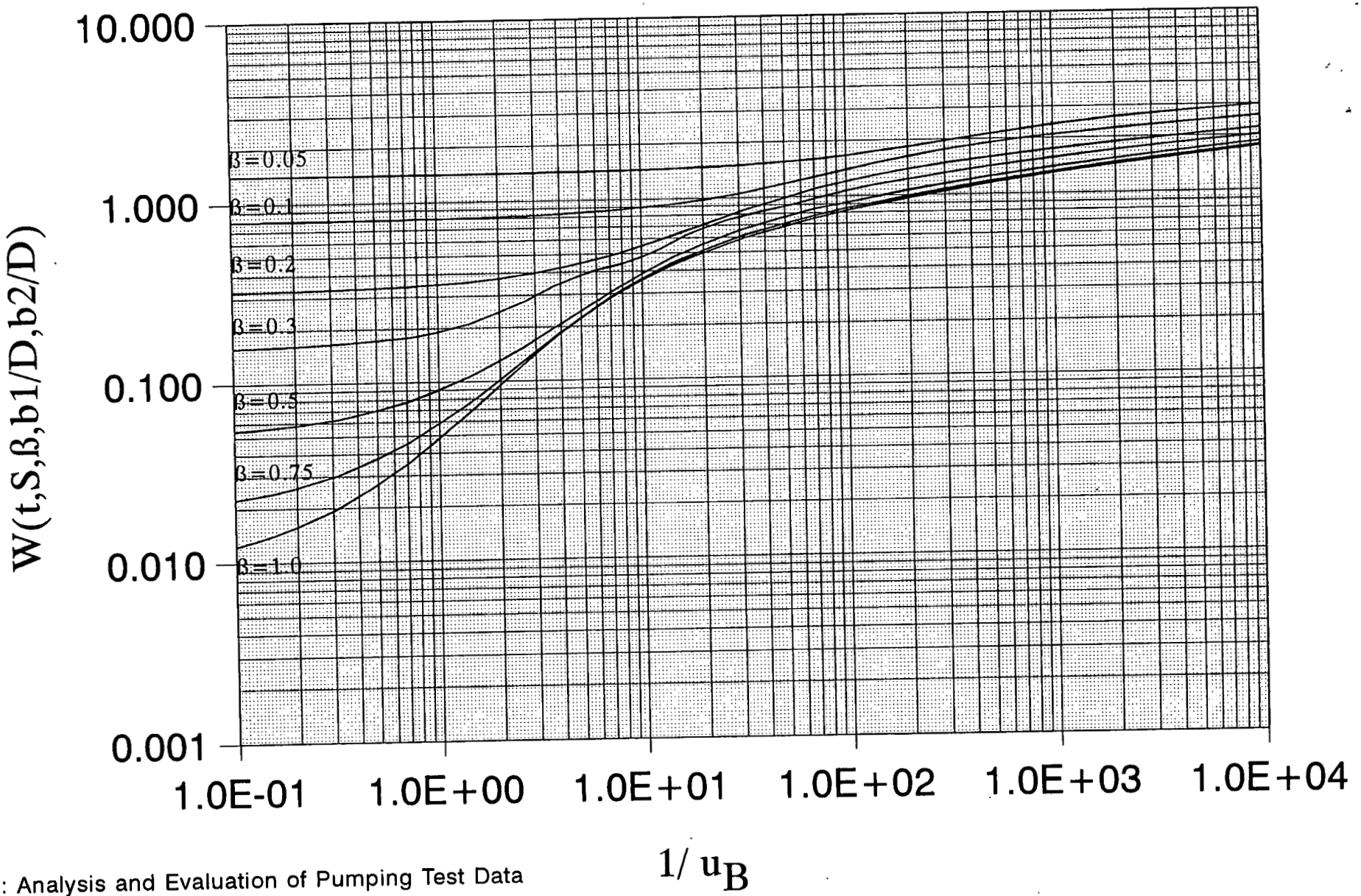
APPENDIX F
STRELTSOVA ANALYSIS

APPENDIX F

Appendix F contains the type curves and log-log plots of drawdown verses time used for the Streltsova curve-matching method. As explained in Section 5.4, curve matching was accomplished by first matching the late time data to the type B curve. The match point used is recorded on Table 5-7. The procedure outlined in Kruseman and deRidder, 1989, (pgs. 171 to 172) was followed for the match point operation.

Streltsova Type B Curves

Transient, Unconfined, Anisotropic, Partial Penetration

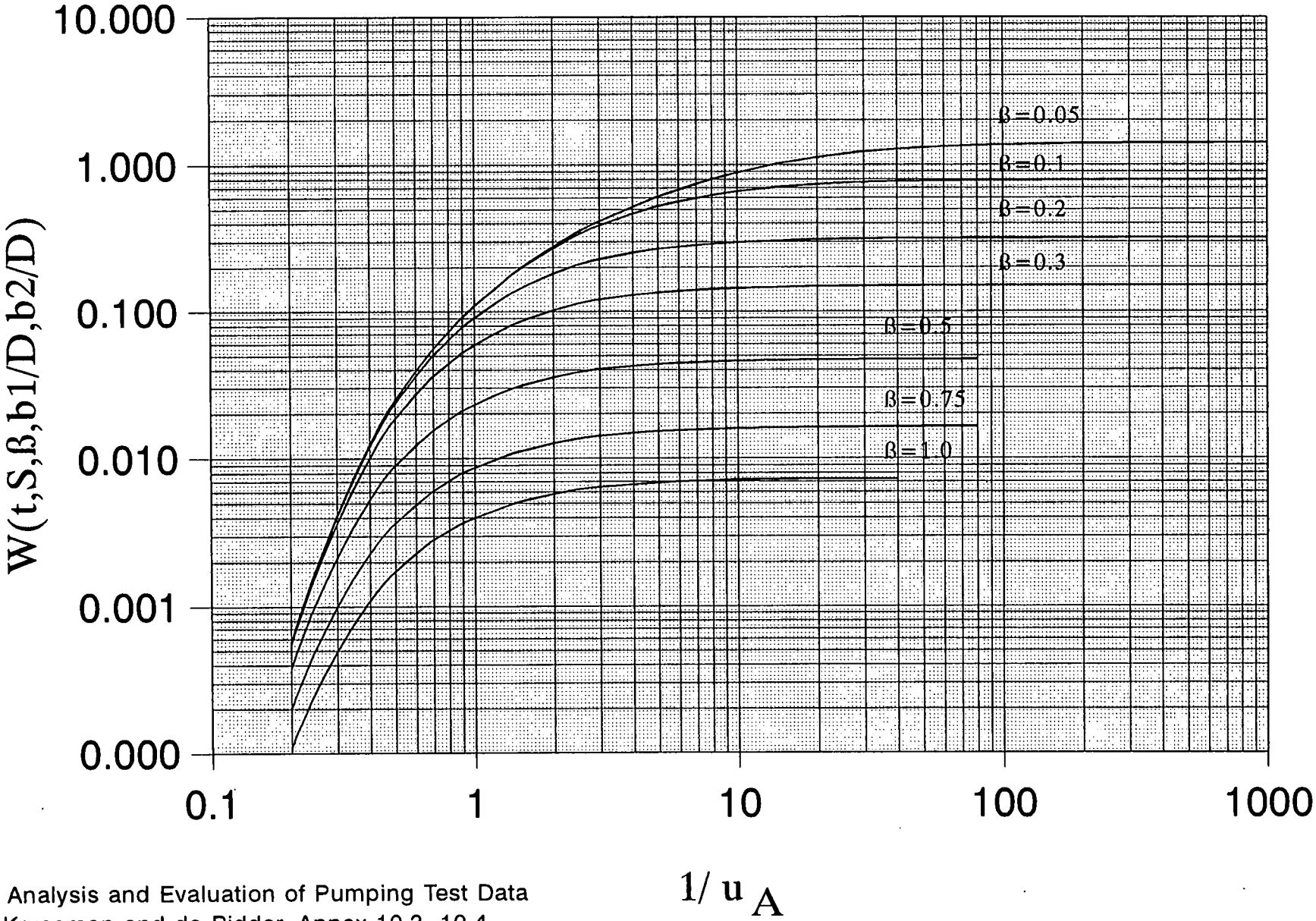


from: Analysis and Evaluation of Pumping Test Data
Kruseman and de Ridder, Annex 10.3, 10.4

000191

Streltsova Type A Curves

Transient, Unconfined, Anisotropic, Partial Penetration



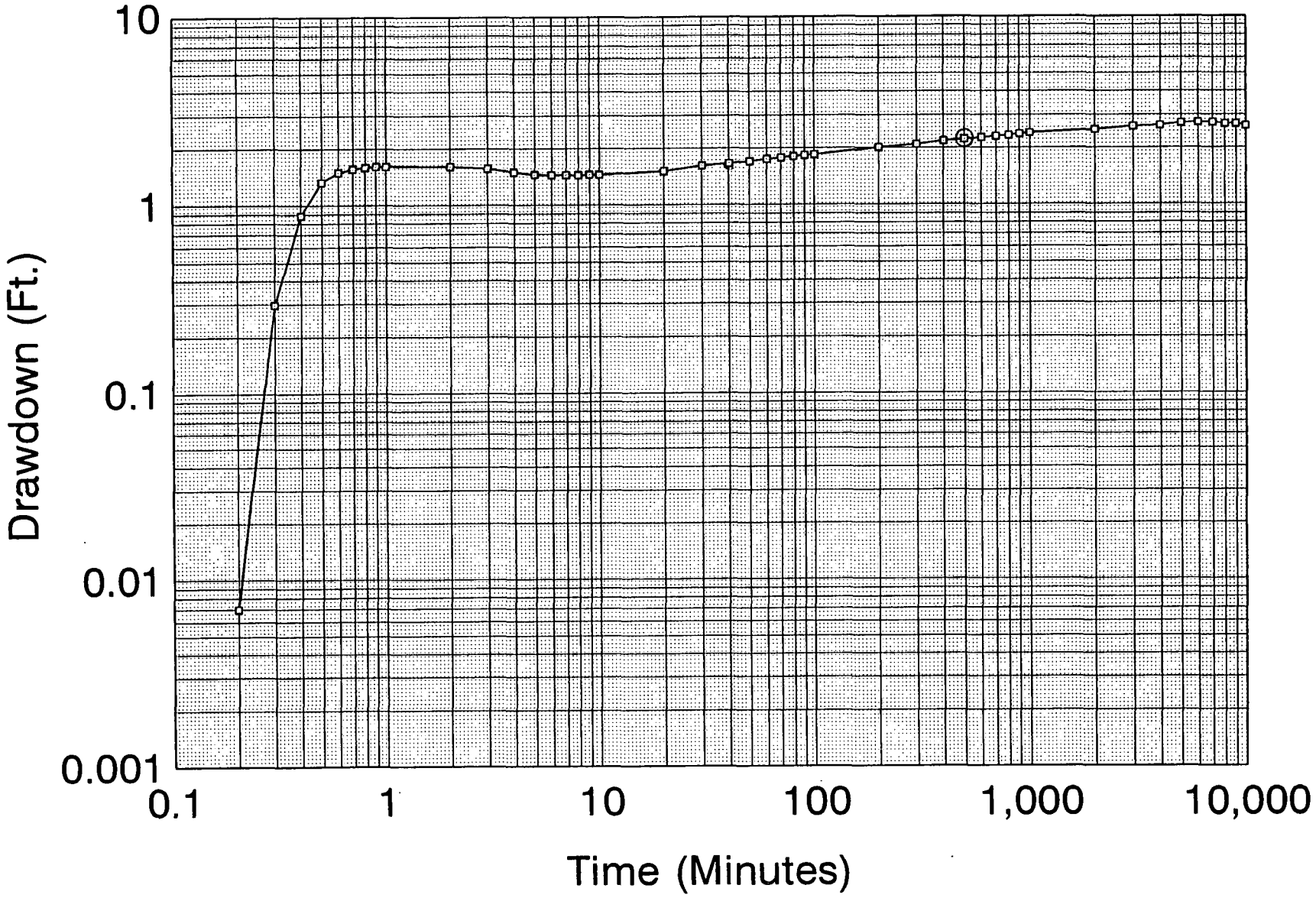
from: Analysis and Evaluation of Pumping Test Data
Kruseman and de Ridder, Annex 10.3, 10.4

000192

7120

South Field Pumping Test

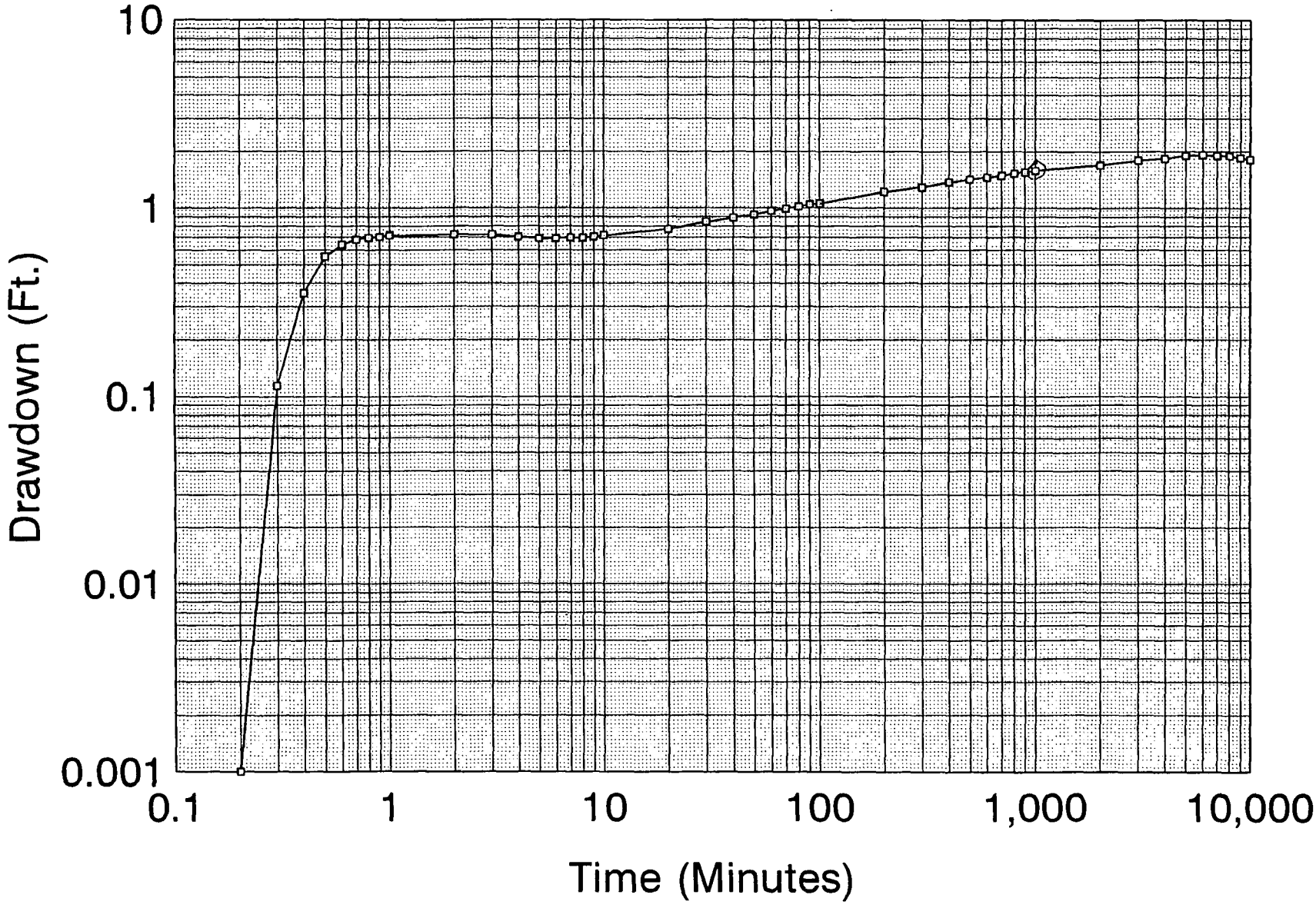
Corrected Drawdown vs. Time, Well 31551



000193

South Field Pumping Test

Corrected Drawdown vs. Time, Well 31552

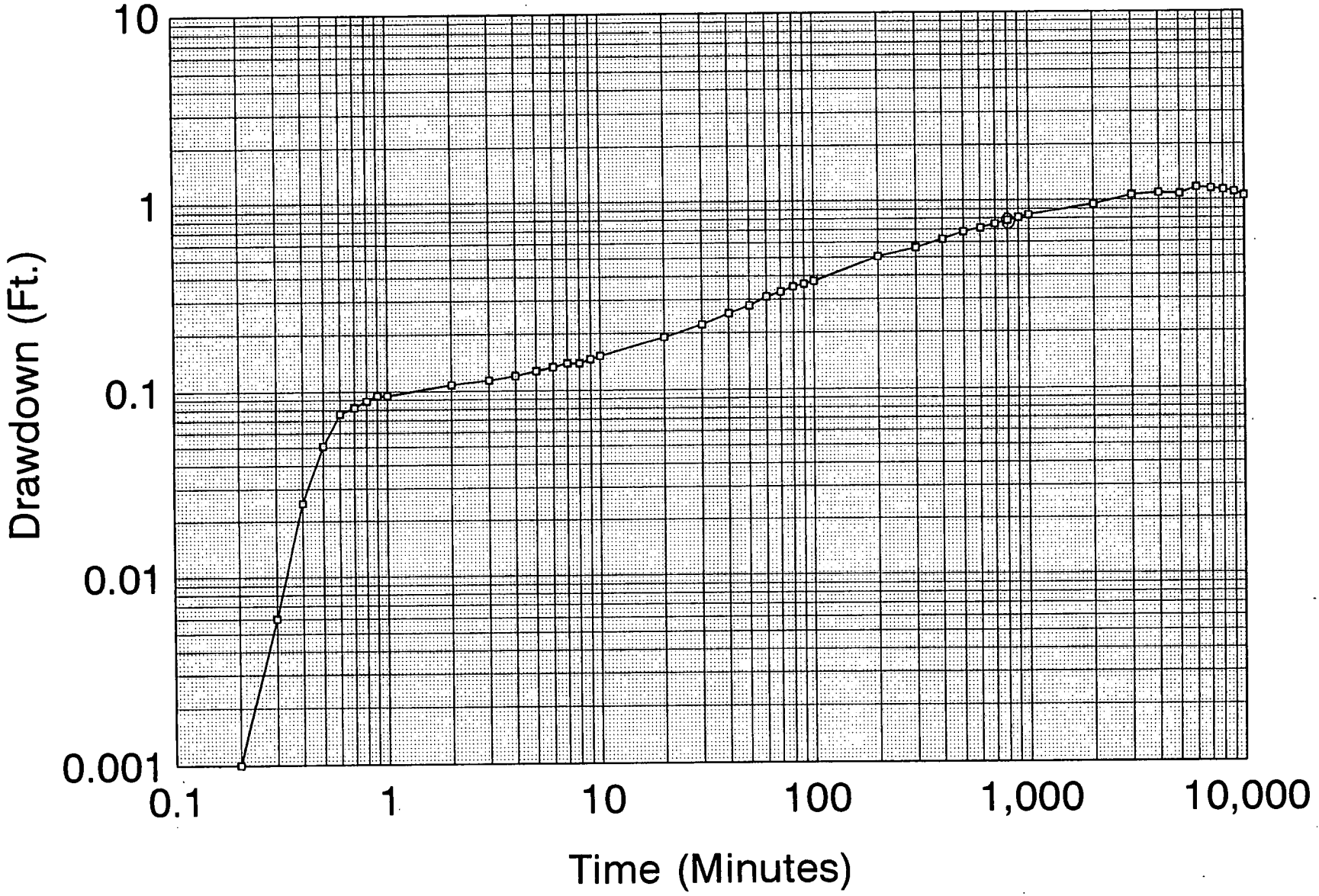


000194

7120

South Field Pumping Test

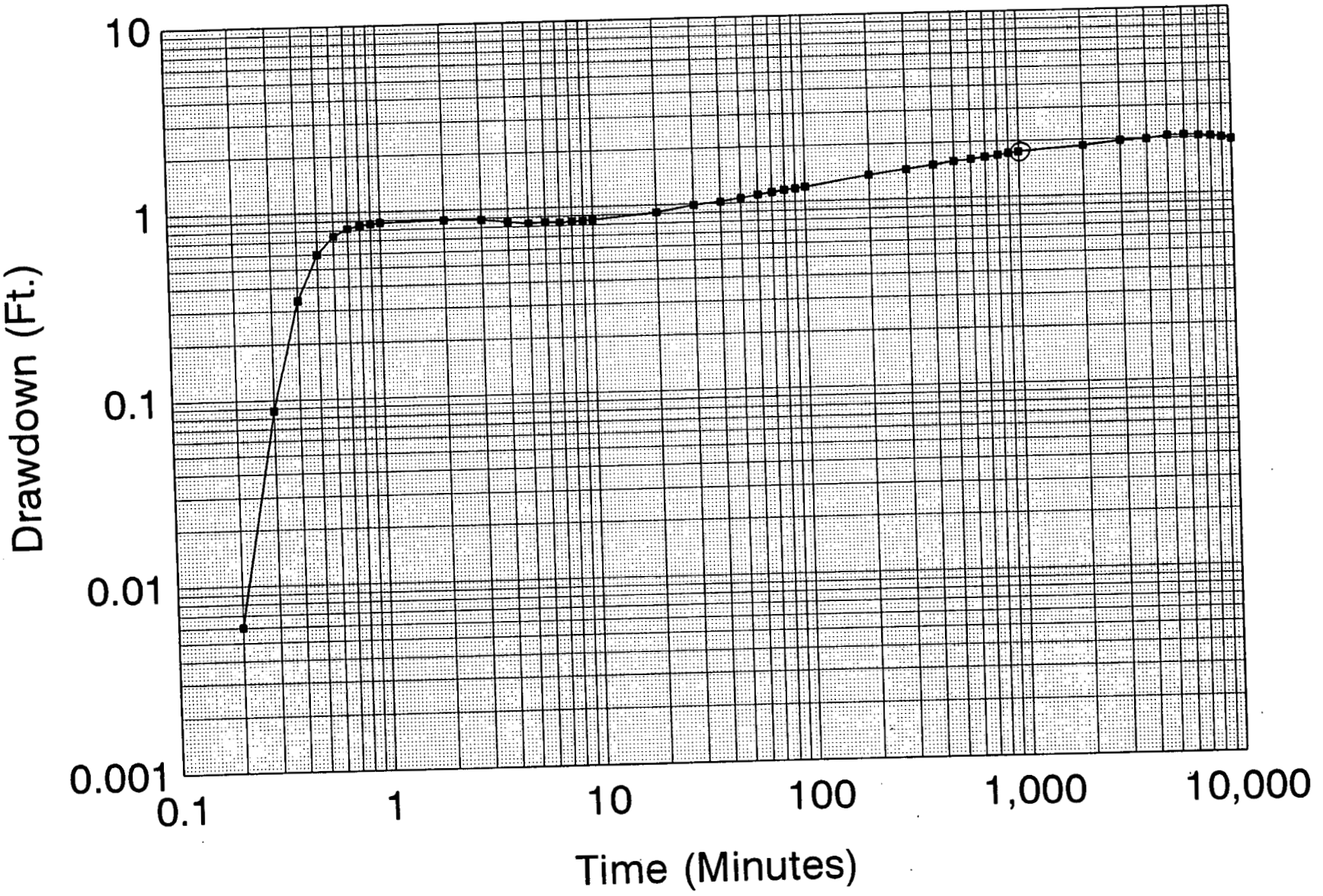
Corrected Drawdown vs. Time, Well 31553



000195

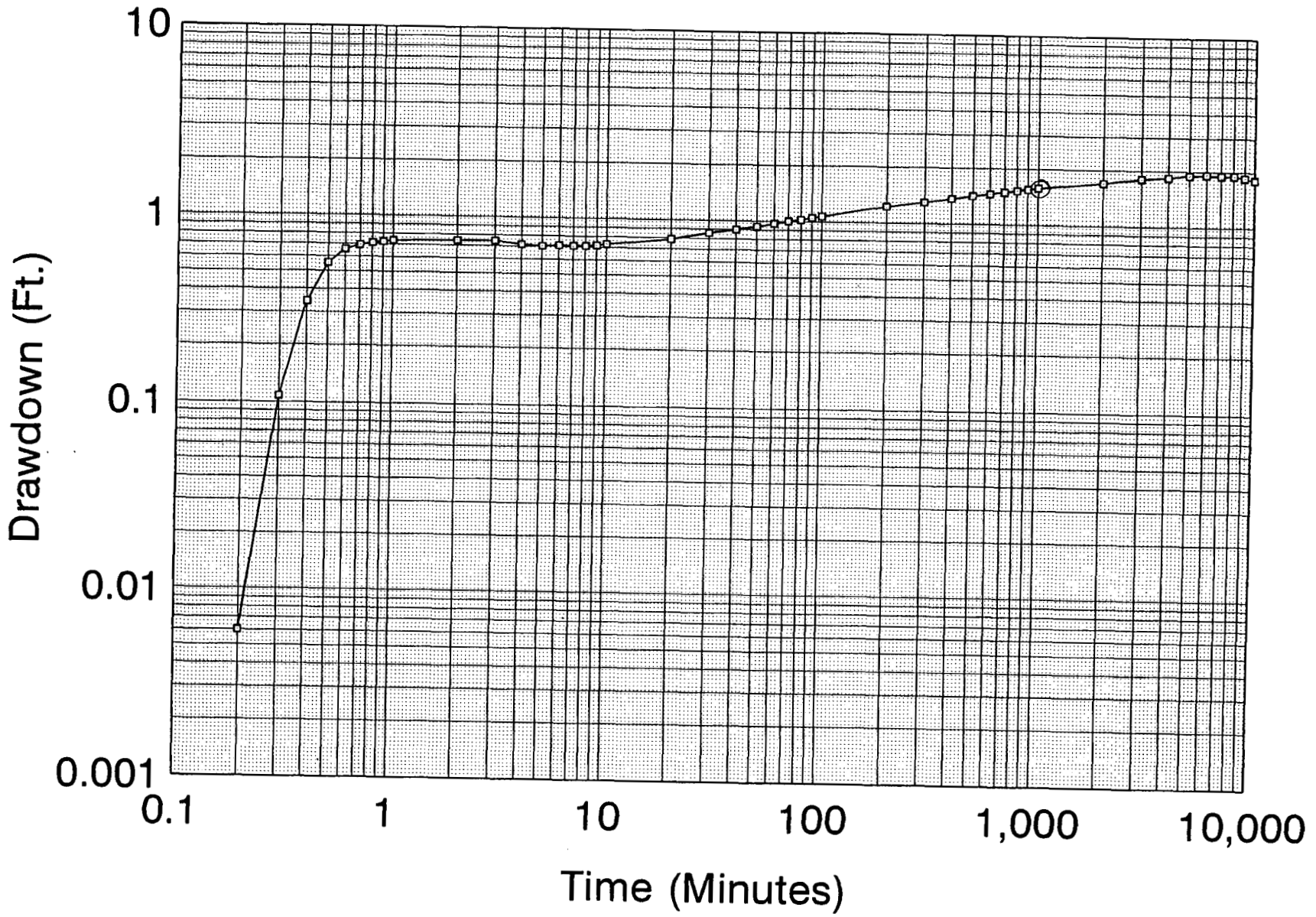
South Field Pumping Test

Corrected Drawdown vs. Time, Well 31554



South Field Pumping Test

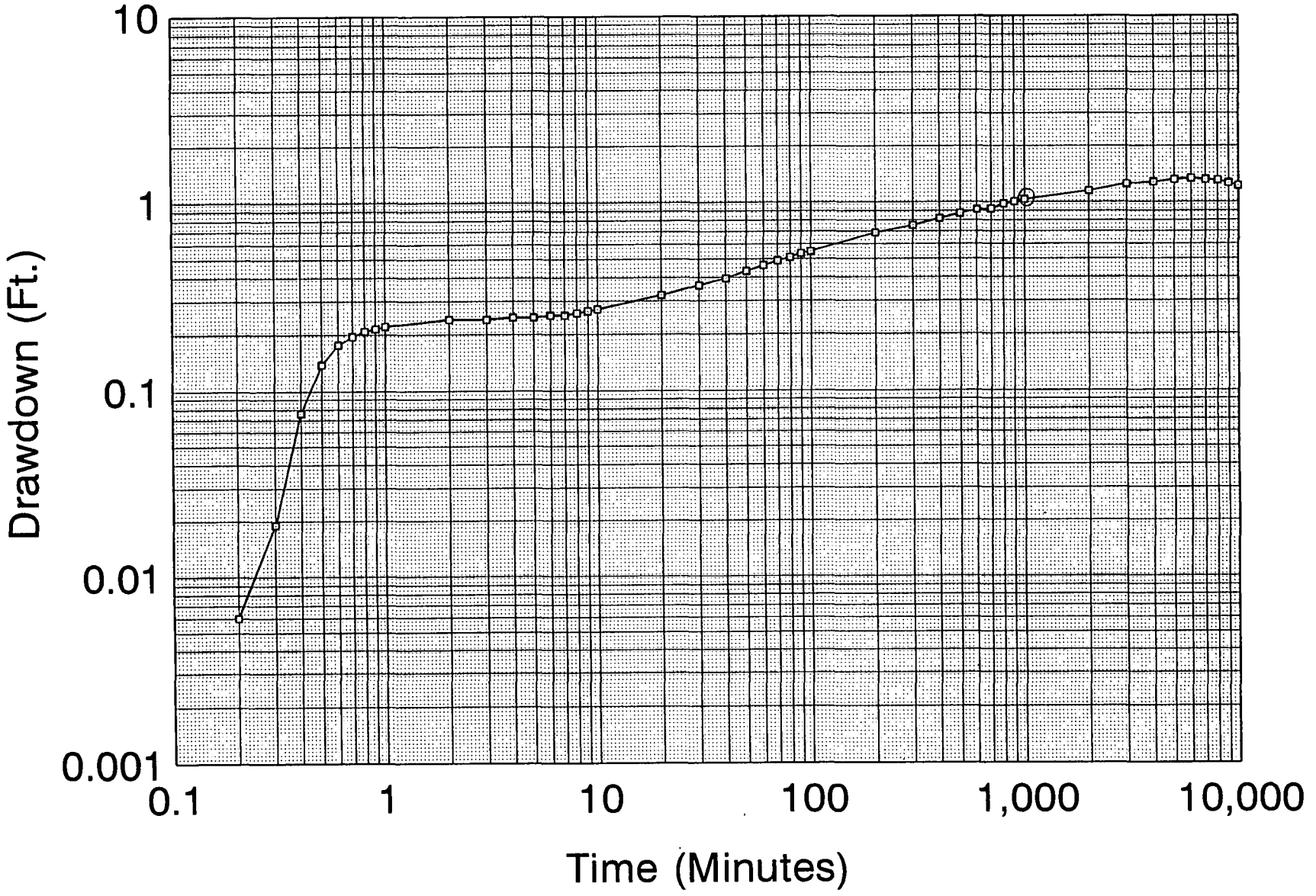
Corrected Drawdown vs. Time, Well 31555



000197

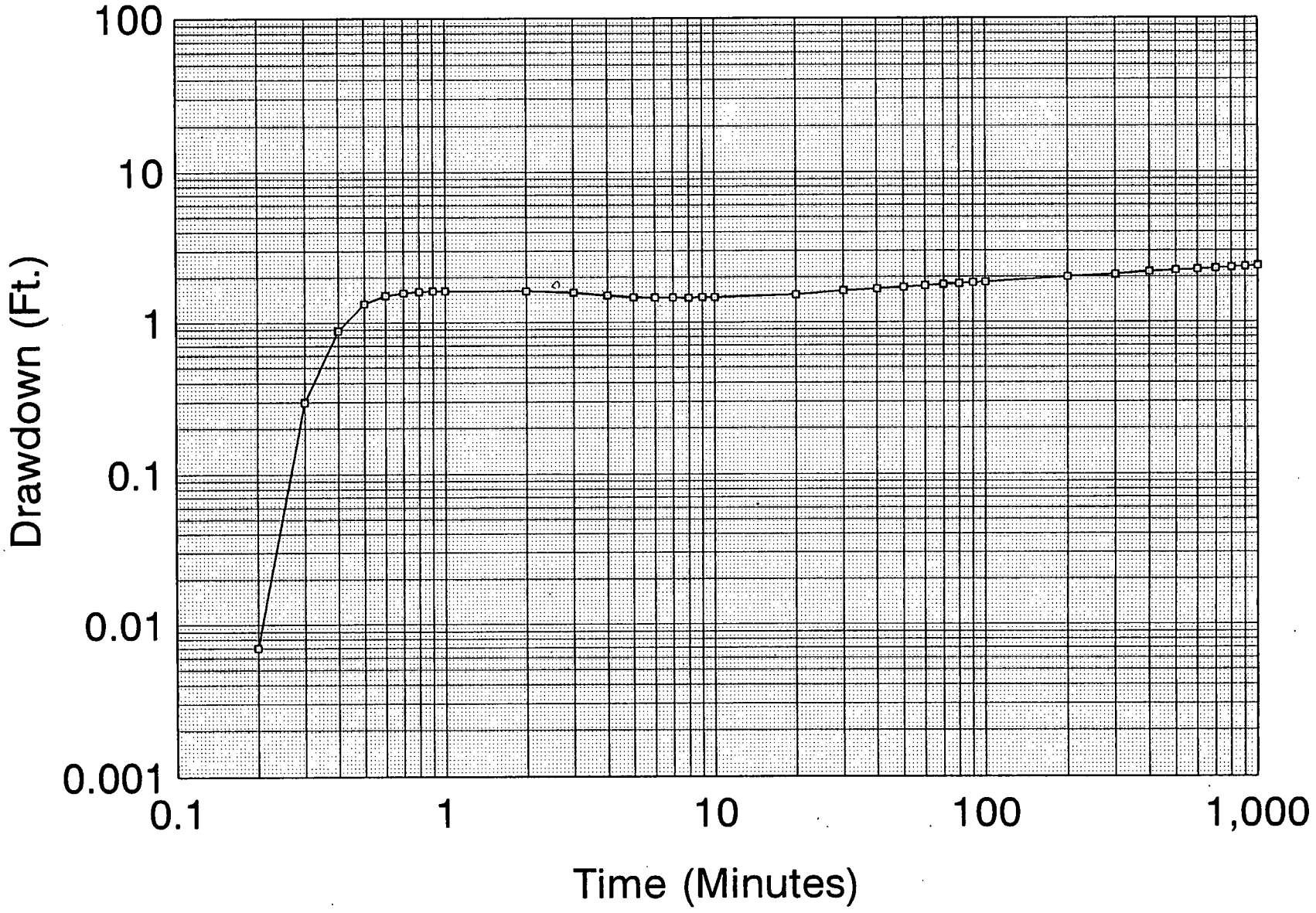
South Field Pumping Test

Corrected Drawdown vs. Time, Well 31556



South Field Pumping Test

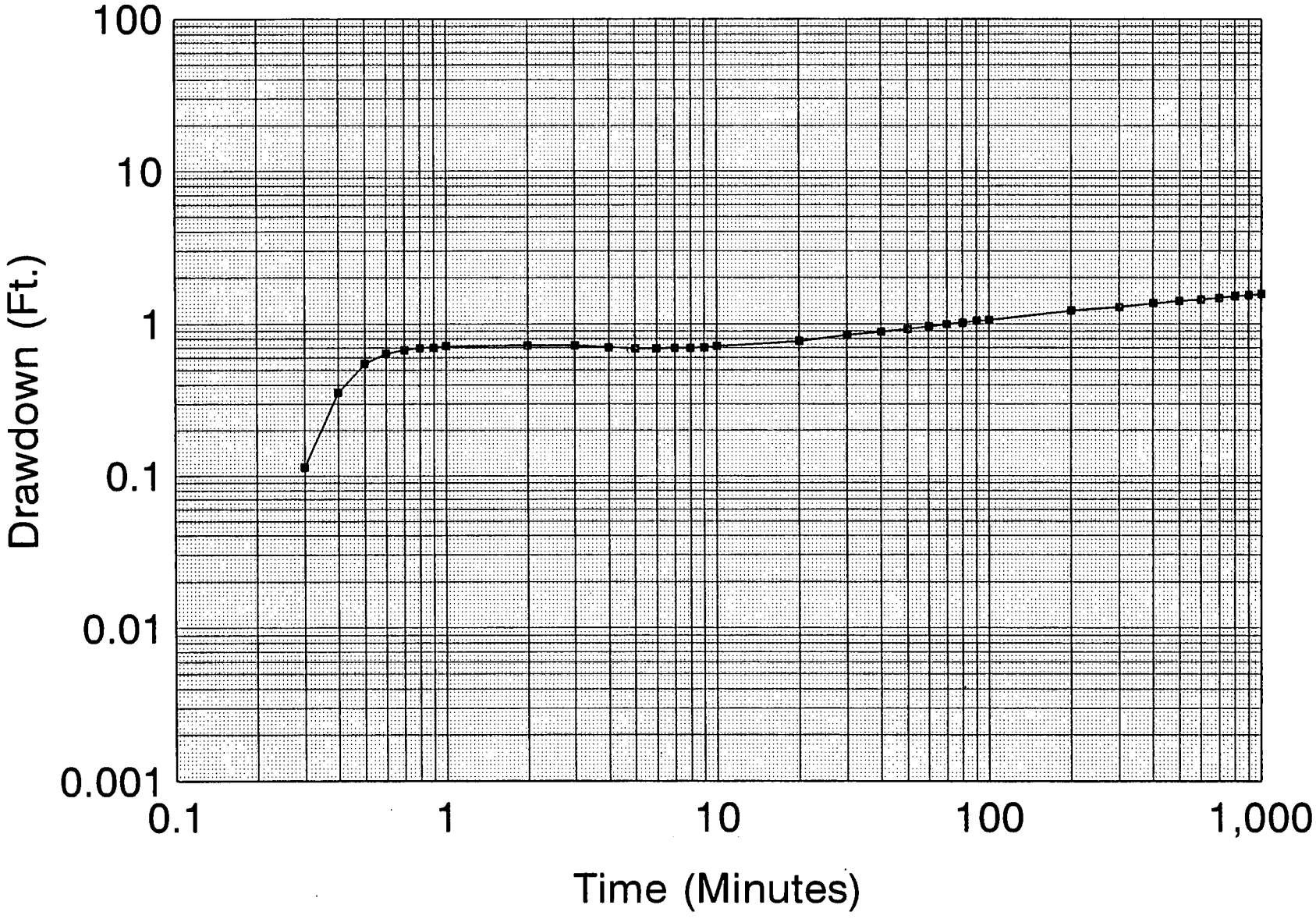
Drawdown vs. Time, Well 31551



000199

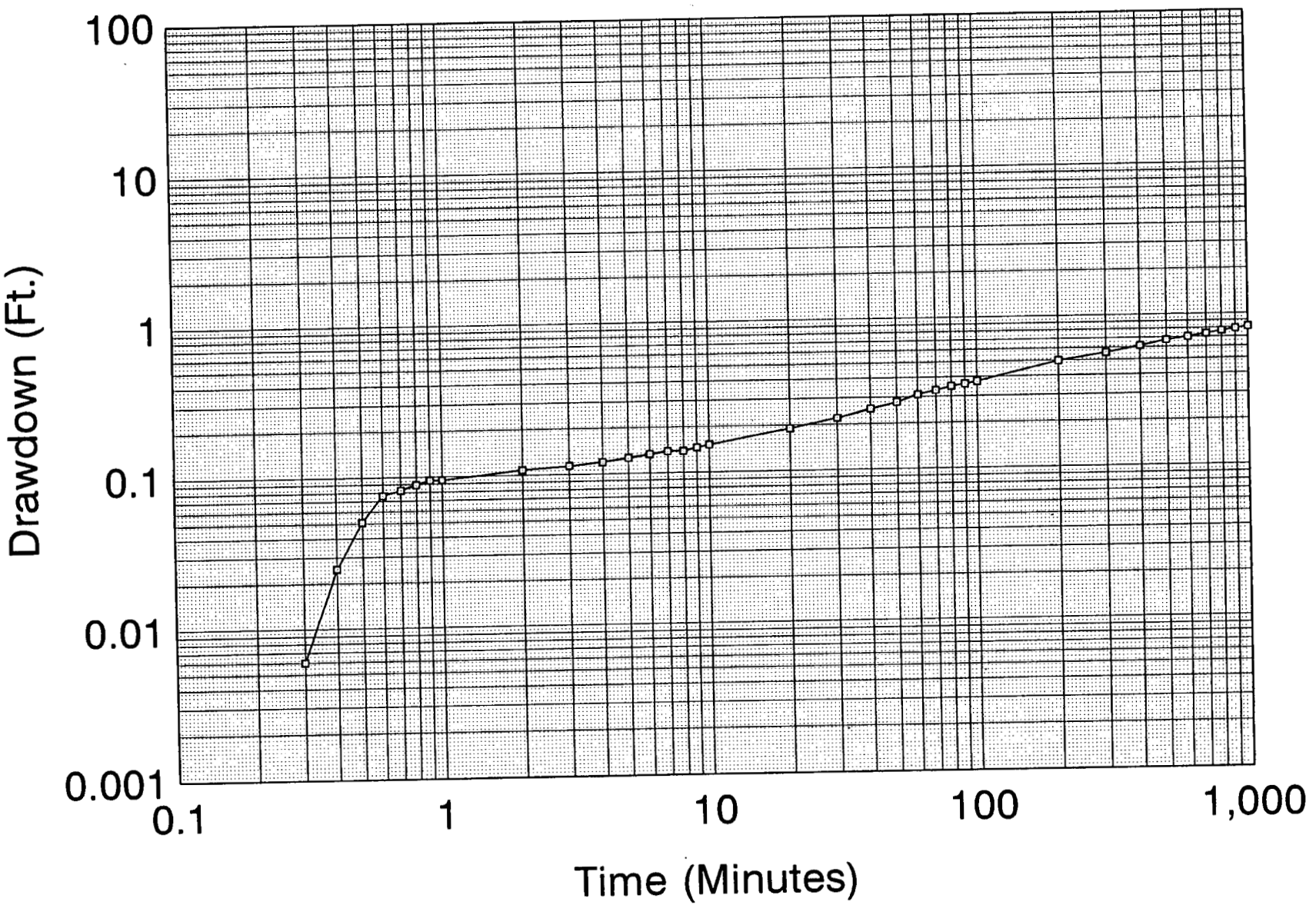
South Field Pumping Test

Drawdown vs. Time, Well 31552



South Field Pumping Test

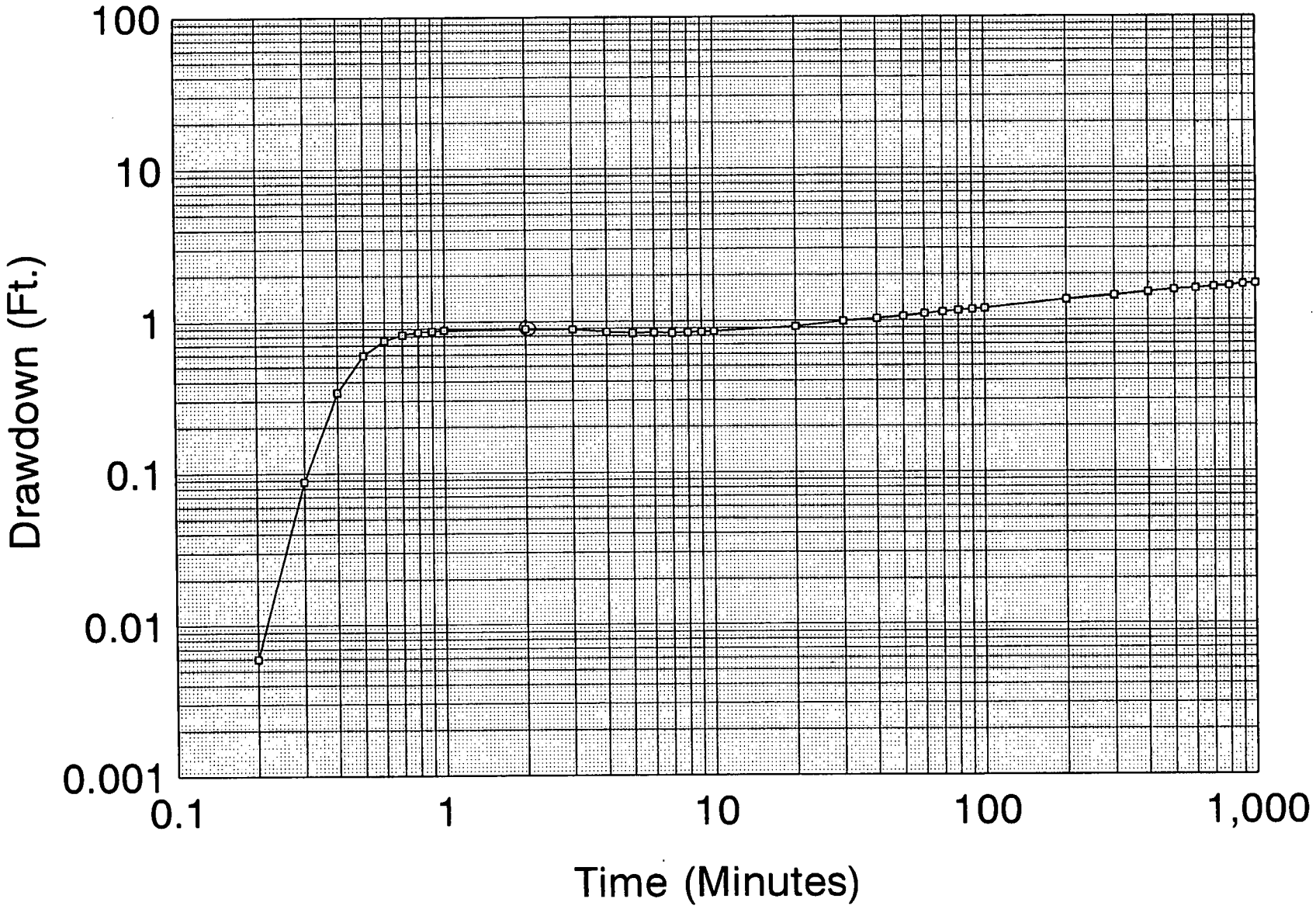
Drawdown vs. Time, Well 31553



000201

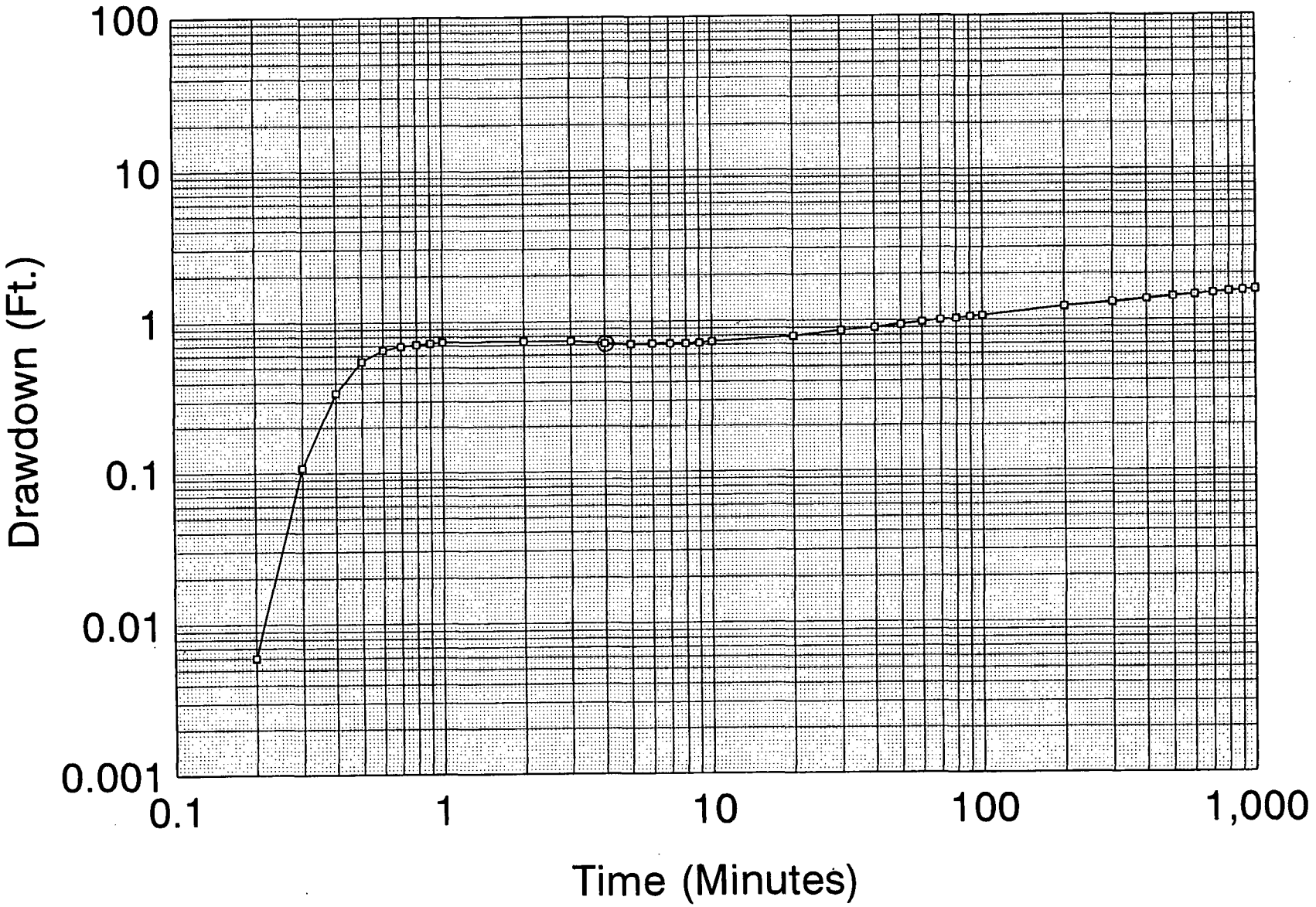
South Field Pumping Test

Drawdown vs. Time, Well 31554



South Field Pumping Test

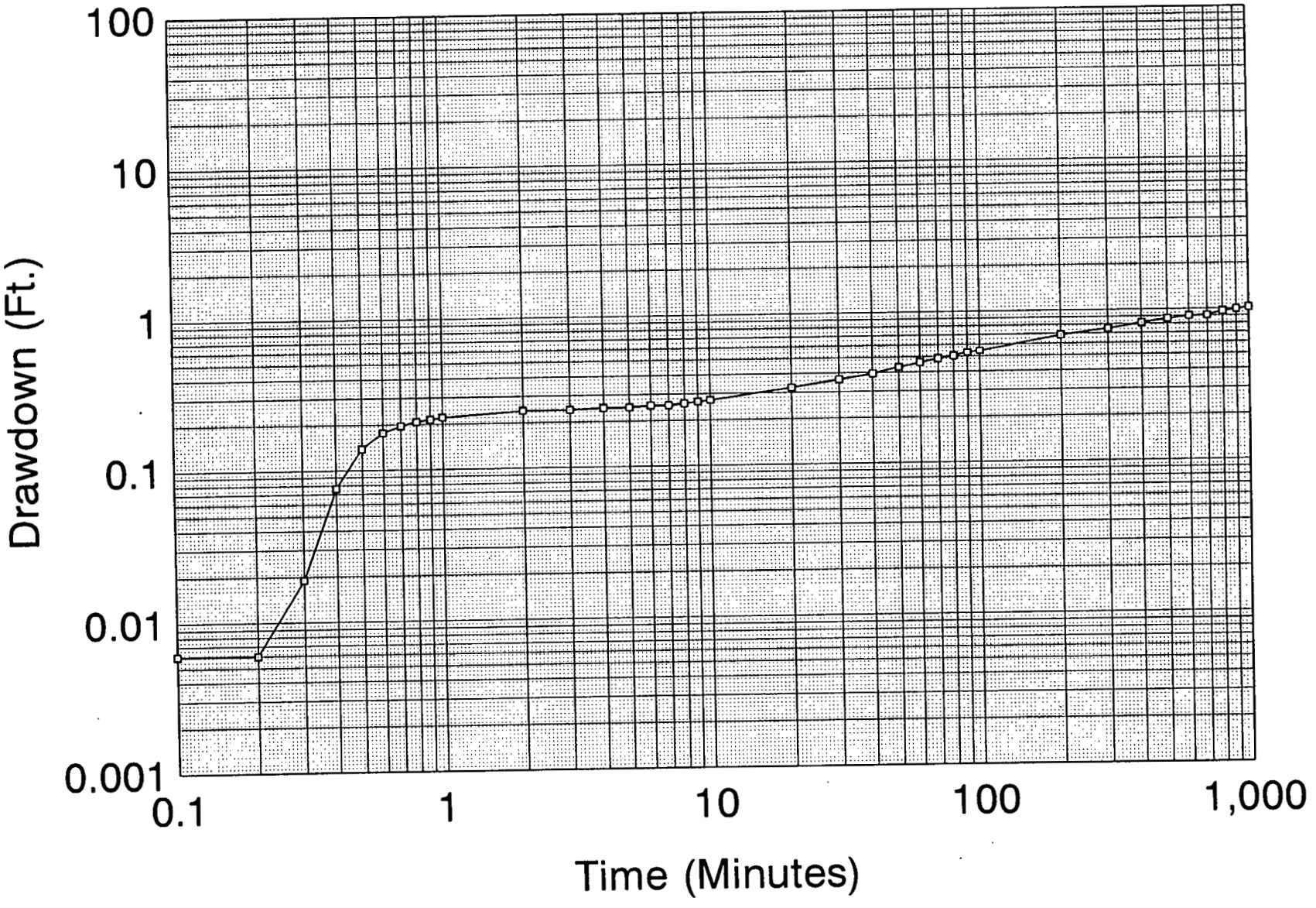
Drawdown vs. Time, Well 31555



000203

South Field Pumping Test

Drawdown vs. Time, Well 31556



Appendix F

APPENDIX G
NEUMAN ANALYSIS

APPENDIX G

Appendix G contains the AQTESOLV output solutions and program printouts for each observation well used to calculate aquifer properties.

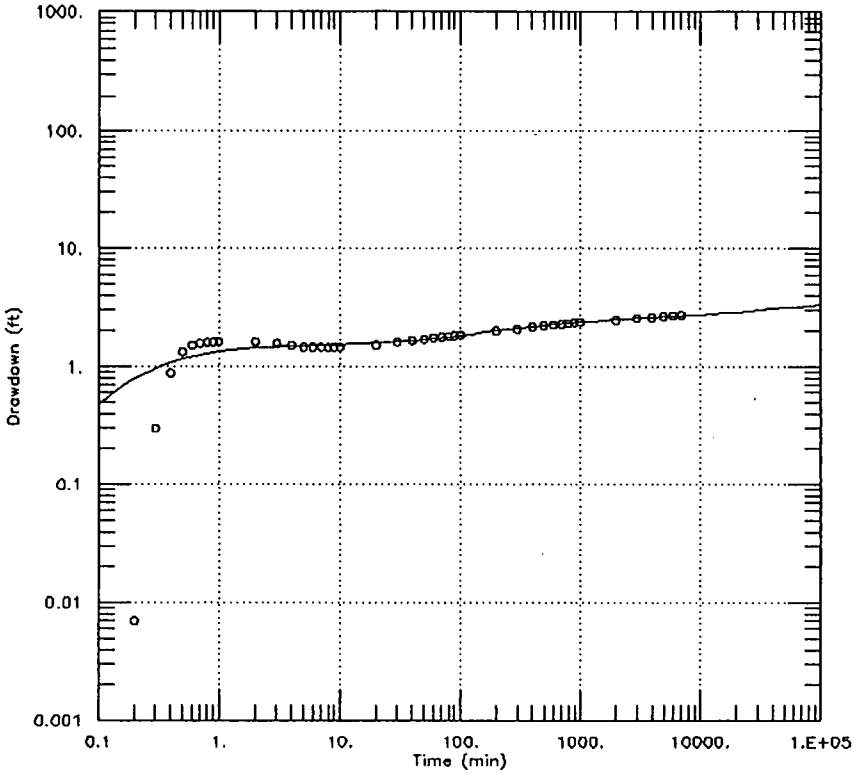
A figure illustrating the Neuman solution for each observation well is presented first. Each figure presents and compares a graph of the type curve calculated by AQTESOLV for a particular observation well (shown as a solid line) against a plot of the drawdown data verses time data collected at the same observation well. As explained in Section 5, the drawdown verses time data collected at each observation well during the pumping test was assessed and corrected for various influences before analysis.

Unlike the Streltsova curve matching method where one type curve was used to interpret the late time data, and one type curve was used to interpret the early time data, regardless of which observation well was being analyzed, the AQTESOLV program calculated a type curve for each observation well based on the unique partial penetration relationship that existed between the control and observation well during the pumping test.

A column along the right side of each figure provides information on the aquifer type, solution method, estimated parameters and input test data used in the parameter calculations. Comparison of the figures reveals that the top of screen (t.o.s.) and the bottom of screen (b.o.s.) is slightly different for each observation well.

The AQTESOLV program printout for each observation well is also provided in Appendix G. Each printout has a tabulated listing of the observed drawdown entered into the computer program, the drawdown calculated by AQTESOLV for the type curve, the residual between the observed and calculated drawdown, and the weight or importance of the data point in estimating the solution. A weight of one indicates that data point is weighed equally against the other data points in relative importance. A weight of .25 indicates that the data point only has one-fourth the relative importance of the other data points in calculating the solution

Southfield Pumping Test, Well 31551



DATA SET:
1dwcor51.dat
06/08/95

AQUIFER TYPE:
Unconfined

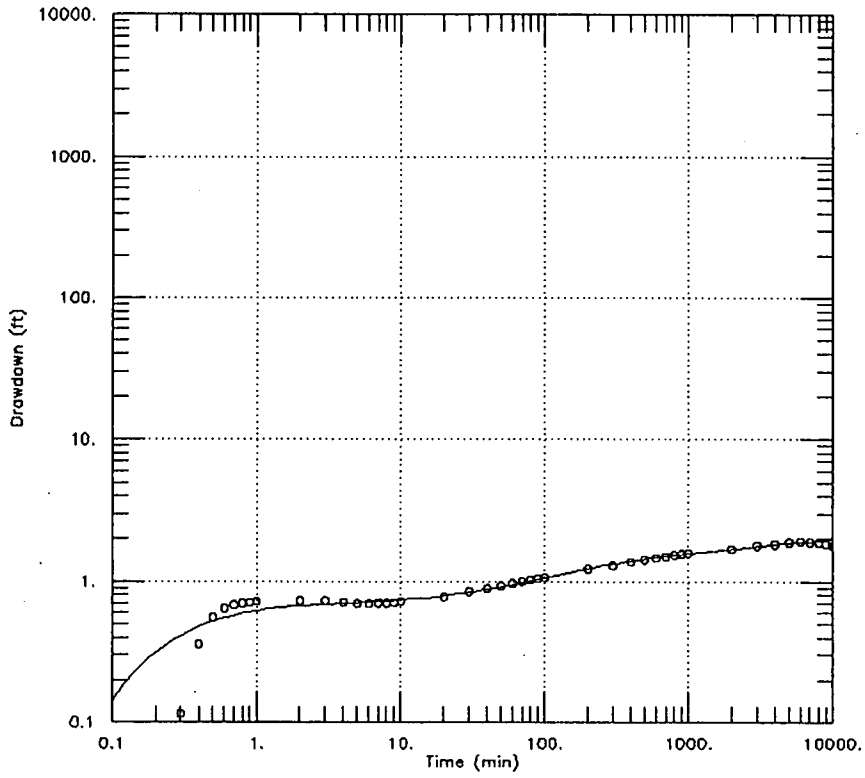
SOLUTION METHOD:
Neuman

ESTIMATED PARAMETERS:
T = 47.79 ft^2/min
S = 0.01659
Sy = 0.204
β = 0.004522

TEST DATA:
Q = 93.59 ft^3/min
r = 25. ft
b = 131. ft
TEST WELL:
t.o.s. = 11.56 ft
b.o.s. = 31.56 ft
OBS. WELL:
t.o.s. = 18.71 ft
b.o.s. = 23.71 ft

0002027

Southfield Pumping Test, Well 31552



DATA SET:
1dwcor52.dat
06/07/95

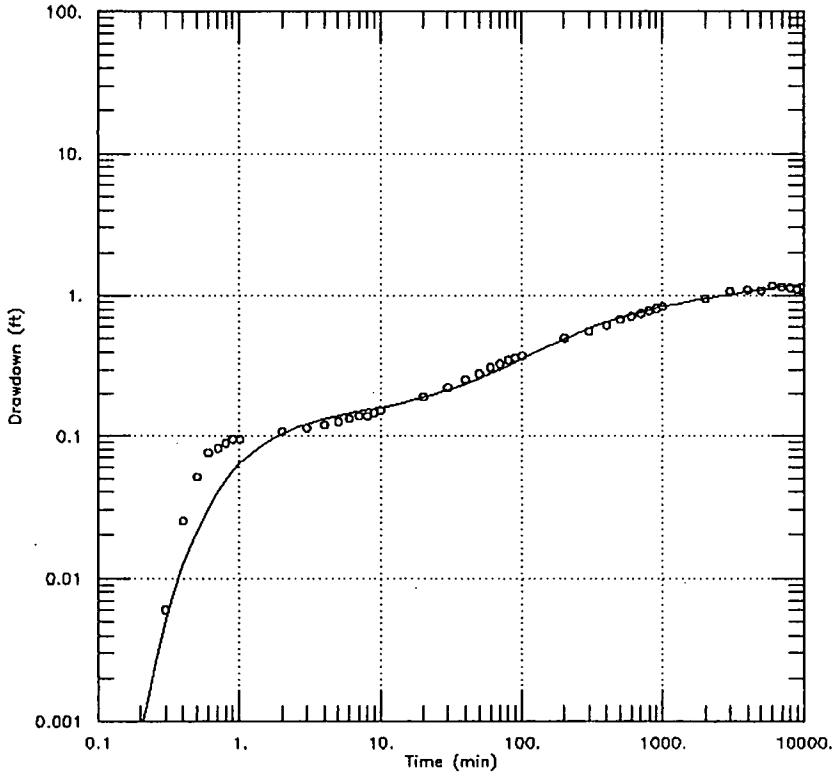
AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Neuman

ESTIMATED PARAMETERS:
T = 47.35 ft^2/min
S = 0.008291
Sy = 0.1401
β = 0.01685

TEST DATA:
Q = 93.59 ft^3/min
r = 50. ft
b = 131. ft
TEST WELL:
t.o.s. = 11.56 ft
b.o.s. = 31.56 ft
OBS. WELL:
t.o.s. = 18.05 ft
b.o.s. = 23.05 ft

Southfield Pumping Test, Well 31553



DATA SET:
1dwcor53.dat
06/08/95

AQUIFER TYPE:
Unconfined

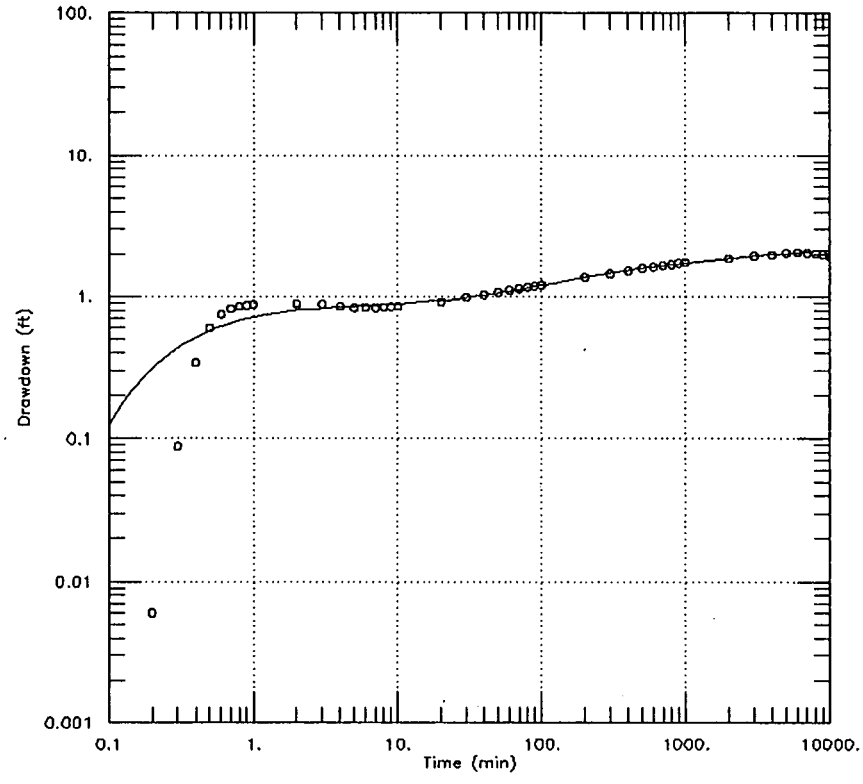
SOLUTION METHOD:
Neuman

ESTIMATED PARAMETERS:
T = 50.76 ft^2/min
S = 0.008797
Sy = 0.08918
B = 0.07497

TEST DATA:
Q = 93.59 ft^3/min
r = 150. ft
b = 131. ft
TEST WELL:
t.o.s. = 8. ft
b.o.s. = 28. ft
OBS. WELL:
t.o.s. = 15. ft
b.o.s. = 20. ft

000209

Southfield Pumping Test, Well 31554



DATA SET:
1dwcor54.dat
06/07/95

AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Neuman

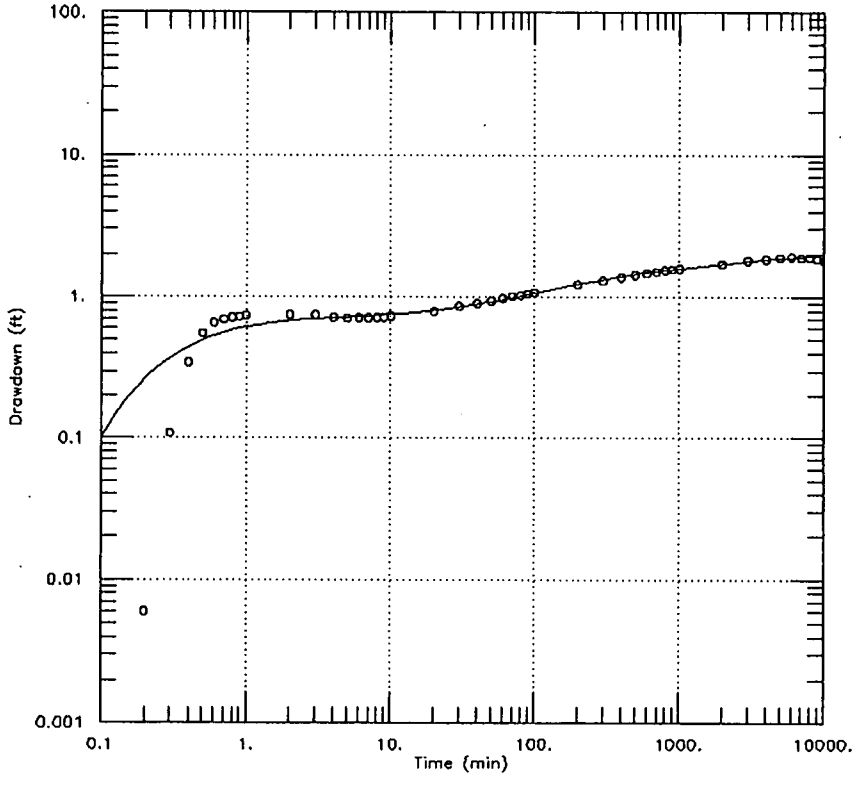
ESTIMATED PARAMETERS:
T = 46.34 ft^2/min
S = 0.009107
Sy = 0.1136
β = 0.01331

TEST DATA:
Q = 93.59 ft^3/min
r = 50. ft
b = 131. ft
TEST WELL:
t.o.s. = 11.56 ft
b.o.s. = 31.56 ft
OBS. WELL:
t.o.s. = 19.64 ft
b.o.s. = 24.64 ft

000210

7120

Southfield Pumping Test, Well 31555



DATA SET:
1dwcor55.dat
06/07/95

AQUIFER TYPE:
Unconfined

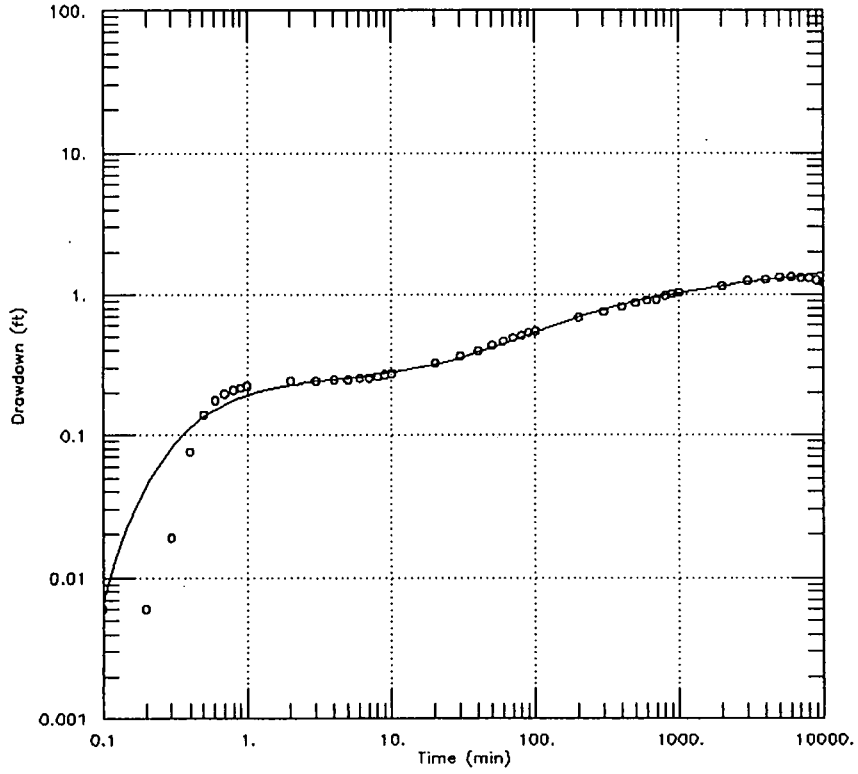
SOLUTION METHOD:
Neuman

ESTIMATED PARAMETERS:
T = 46.81 ft^2/min
S = 0.00997
Sy = 0.1434
β = 0.01685

TEST DATA:
Q = 93.59 ft^3/min
r = 50. ft
b = 131. ft
TEST WELL:
t.o.s. = 11.56 ft
b.o.s. = 31.56 ft
OBS. WELL:
t.o.s. = 19.31 ft
b.o.s. = 24.31 ft

000211

Southfield Pumping Test, Well 31556



DATA SET:
1dwcor56.dat
06/07/95

AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Neuman

ESTIMATED PARAMETERS:
T = 46.92 ft^2/min
S = 0.005917
Sy = 0.1065
β = 0.05977.

TEST DATA:
Q = 93.59 ft^3/min
r = 100. ft
b = 131. ft
TEST WELL:
t.o.s. = 11.56 ft
b.o.s. = 31.56 ft
OBS. WELL:
t.o.s. = 18.33 ft
b.o.s. = 23.33 ft

000212

7120

DW

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A Q T E S O L V

A Program for

Automatic Estimation of Aquifer Coefficients

From Aquifer Test Data

By:

Glenn M. Duffield
and
James O. Rumbaugh, III

Geraghty & Miller Modeling Group
1895 Preston White Drive, Suite 301
Reston, VA 22091

(703) 476 - 0335

A Q T E S O L V is a user-friendly program designed to analyze data from aquifer tests automatically. Aquifer coefficients for a variety of aquifer test conditions can be estimated by A Q T E S O L V , including the following:

- confined aquifers, unconfined aquifers, and leaky aquifers
- pumping tests, injection tests, recovery tests, and slug tests

Features:

- Interactive, menu-driven program design
- Nonlinear least-squares estimation of aquifer coefficients
- Statistical analysis of results
- Complete graphical display of results

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000213

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A Q T E S O L V   R E S U L T S
Version 1.10

)6/06/95 10:50:07

==

TEST DESCRIPTION

)ata set........... dw1cor51.dat
)ata set title..... Southfield Pumping Test, Well 31551

(nowns and Constants:
- No. of data points................... 42
- Pumping rate......................... 93.59
- Radius to obs. well.................. 25
- Aquifer saturated thickness......... 131

'artial Penetration Data:
- Depth of top of well screen......... 11.56
- Depth of bottom of well screen...... 31.56
- Depth of top of obs. well screen..... 11.56
- Depth of bottom of obs. well screen.. 31.56
- Hyd. conductivity ratio (Kz/Kr)..... 0.1

==

ANALYTICAL METHOD

'euman (unconfined aquifer)

==

RESULTS FROM STATISTICAL CURVE MATCHING

TATISTICAL MATCH PARAMETER ESTIMATES

		Estimate		Std. Error
T	=	4.7785E+001	+/-	1.8610E+000
S	=	1.6594E-002	+/-	5.2210E-003
Sy	=	2.0400E-001	+/-	4.2141E-002
Ã	=	4.6224E-003	+/-	4.1251E-004

NALYSIS OF MODEL RESIDUALS

esidual = calculated - observed
eighted residual = residual * weight

eighted Residual Statistics:
- Number of residuals.............. 41
- Number of estimated parameters.... 4
- Degrees of freedom............... 37
- Residual mean.................... 0.000309
- Residual standard deviation....... 0.06882
- Residual variance................ 0.004736

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.2	0.007	0.78778	-0.78078	0.25
0.3	0.298	0.96291	-0.66491	0.25
0.4	0.881	1.0755	-0.19453	0.25
0.5	1.331	1.1532	0.17775	0.25
0.6	1.508	1.2098	0.2982	0.25
0.7	1.571	1.2526	0.31841	0.25
0.8	1.603	1.2859	0.31706	0.25
0.9	1.622	1.3126	0.30944	0.25
1	1.622	1.3342	0.28777	0.25
2	1.616	1.4343	0.18173	1
3	1.578	1.4682	0.10982	1
4	1.508	1.4861	0.021933	1
5	1.464	1.498	-0.033973	1
6	1.457	1.5071	-0.050094	1
7	1.457	1.5147	-0.05773	1
8	1.451	1.5215	-0.070492	1
9	1.464	1.5277	-0.063699	1
10	1.464	1.5335	-0.069524	1
20	1.521	1.5826	-0.061617	1
30	1.623	1.6241	-0.0010574	1
40	1.667	1.6611	0.0058784	1
50	1.705	1.6949	0.010138	1
60	1.75	1.7258	0.024154	1
70	1.781	1.7545	0.026543	1
80	1.808	1.785	0.023046	1
90	1.833	1.8096	0.023366	1
100	1.846	1.8327	0.013337	1
200	2.006	2.0002	0.0057551	1
300	2.084	2.1027	-0.018725	1
400	2.174	2.1732	0.00082975	1
500	2.221	2.2254	-0.0044332	1
600	2.261	2.2663	-0.0053009	1
700	2.295	2.2996	-0.0045876	1
800	2.323	2.3271	-0.004099	1
900	2.363	2.351	0.011957	1
1000	2.368	2.372	-0.0039672	1
2000	2.469	2.5006	-0.031573	1
3000	2.563	2.5696	-0.0065592	1
4000	2.597	2.6146	-0.017592	1
5000	2.673	2.6469	0.026104	1
6000	2.688	2.672	0.015994	1

==========

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

		Estimate
T	=	4.7785E+001
S	=	1.6594E-002
Sy	=	2.0400E-001
Ā	=	4.6224E-003

7120 DW

A Q T E S O L V

A Program for Automatic Estimation of Aquifer Coefficients From Aquifer Test Data

By:

Glenn M. Duffield
and
James O. Rumbaugh, III

Geraghty & Miller Modeling Group
1895 Preston White Drive, Suite 301
Reston, VA 22091

(703) 476 - 0335

A Q T E S O L V is a user-friendly program designed to analyze data from aquifer tests automatically. Aquifer coefficients for a variety of aquifer test conditions can be estimated by A Q T E S O L V , including the following:

- confined aquifers, unconfined aquifers, and leaky aquifers
- pumping tests, injection tests, recovery tests, and slug tests

Features:

- Interactive, menu-driven program design
- Nonlinear least-squares estimation of aquifer coefficients
- Statistical analysis of results
- Complete graphical display of results

000216

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A Q T E S O L V   R E S U L T S
Version 1.10

06/07/95 08:42:

TEST DESCRIPTION

```
Data set........... 1dwcor52.dat
Data set title..... Southfield Pumping Test, Well 31552

Knowns and Constants:
   No. of data points.................. 44
   Pumping rate........................ 93.59
   Radius to obs. well................. 50
   Aquifer saturated thickness......... 131

Partial Penetration Data:
   Depth of top of well screen......... 11.56
   Depth of bottom of well screen...... 31.56
   Depth of top of obs. well screen..... 11.56
   Depth of bottom of obs. well screen.. 31.56
   Hyd. conductivity ratio (Kz/Kr)..... 0.1
```

ANALYTICAL METHOD

Neuman (unconfined aquifer)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
T =	4.7352E+001	+/-	7.3451E-001
S =	8.2912E-003	+/-	1.9512E-003
Sy =	1.4006E-001	+/-	9.8297E-003
Ã =	1.6846E-002	+/-	5.7593E-004

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

```
Weighted Residual Statistics:
   Number of residuals............... 40
   Number of estimated parameters.... 4
   Degrees of freedom................ 36
   Residual mean..................... 0.0004632
   Residual standard deviation....... 0.02567
   Residual variance................. 0.0006589
```

odel Residuals:

Time	Observed	Calculated	Residual	Weight
0.3	0.114	0.41189	-0.29789	0.25
0.4	0.355	0.47657	-0.12157	0.25
0.5	0.551	0.52014	0.030863	0.25
0.6	0.64	0.55104	0.088959	0.25
0.7	0.678	0.57483	0.10317	0.25
0.8	0.697	0.59231	0.10469	0.25
0.9	0.704	0.60605	0.097945	0.25
1	0.716	0.61712	0.098882	0.25
2	0.723	0.66753	0.055474	1
3	0.723	0.68589	0.037113	1
4	0.704	0.69709	0.0069133	1
5	0.691	0.70575	-0.014753	1
6	0.691	0.71326	-0.022261	1
7	0.697	0.72012	-0.023124	1
8	0.697	0.72657	-0.029571	1
9	0.704	0.73272	-0.02872	1
10	0.716	0.73864	-0.022638	1
20	0.773	0.79077	-0.01777	1
30	0.844	0.8358	0.0082031	1
40	0.888	0.8762	0.011797	1
50	0.926	0.91112	0.014883	1
60	0.964	0.94457	0.019425	1
70	0.996	0.97524	0.02076	1
80	1.022	1.0034	0.01855	1
90	1.048	1.0295	0.01851	1
100	1.06	1.0536	0.0063953	1
200	1.221	1.2232	-0.0022279	1
300	1.292	1.3221	-0.030142	1
400	1.37	1.3894	-0.019449	1
500	1.423	1.439	-0.015974	1
600	1.457	1.4776	-0.020641	1
700	1.491	1.5091	-0.018131	1
800	1.531	1.5356	-0.0045835	1
900	1.559	1.5583	0.00066414	1
1000	1.576	1.5783	-0.002268	1
2000	1.691	1.7056	-0.014599	1
3000	1.782	1.7741	0.0078966	1
4000	1.825	1.8222	0.0027844	1
5000	1.889	1.8595	0.029497	1
6000	1.91	1.8897	0.020255	1

==========

RESULTS FROM VISUAL CURVE MATCHING

ISUAL MATCH PARAMETER ESTIMATES

		Estimate
T	=	4.7352E+001
S	=	8.2912E-003
Sy	=	1.4006E-001
Ā	=	1.6846E-002

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

A Q T E S O L V

A Program for

Automatic Estimation of Aquifer Coefficients

From Aquifer Test Data

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<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

000219

C:\CORRECT\IMINCOR\IDWCOR53.OUT

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A Q T E S O L V   R E S U L T S
Version 1.10

06/07/95 10:03:55

TEST DESCRIPTION

```
Data set........... 1dwcor53.dat
Data set title..... SOUTHFIELD CONSTANT RATE TEST

Knowns and Constants:
   No. of data points................... 44
   Pumping rate......................... 93.59
   Radius to obs. well.................. 150
   Aquifer saturated thickness.......... 131

Partial Penetration Data:
   Depth of top of well screen......... 8
   Depth of bottom of well screen...... 28
   Depth of top of obs. well screen..... 8
   Depth of bottom of obs. well screen.. 28
   Hyd. conductivity ratio (Kz/Kr)..... 0.1
```

ANALYTICAL METHOD

Neuman (unconfined aquifer)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
T =	5.0762E+001	+/-	9.2199E-001
S =	8.7966E-003	+/-	3.0446E-003
Sy =	8.9179E-002	+/-	4.3939E-003
Ã =	7.4965E-002	+/-	5.9791E-003

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

```
Weighted Residual Statistics:
   Number of residuals............... 40
   Number of estimated parameters.... 4
   Degrees of freedom................ 36
   Residual mean..................... 0.001458
   Residual standard deviation....... 0.01916
   Residual variance................. 0.0003671
```

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.3	0.006	0.0049521	0.0010479	0.25
0.4	0.025	0.012359	0.012641	0.25
0.5	0.051	0.021386	0.029614	0.25
0.6	0.076	0.030804	0.045196	0.25
0.7	0.082	0.039857	0.042143	0.25
0.8	0.089	0.048292	0.040708	0.25
0.9	0.095	0.055994	0.039006	0.25
1	0.095	0.063001	0.031999	0.25
2	0.108	0.10446	0.0035428	1
3	0.114	0.12251	-0.008507	1
4	0.12	0.13288	-0.012881	1
5	0.127	0.13983	-0.01283	1
6	0.133	0.14515	-0.012154	1
7	0.139	0.14958	-0.010581	1
8	0.139	0.15347	-0.014475	1
9	0.146	0.15703	-0.01103	1
10	0.152	0.16036	-0.0083602	1
20	0.19	0.18866	0.0013446	1
30	0.222	0.21391	0.0080876	1
40	0.254	0.23789	0.016115	1
50	0.279	0.26036	0.018639	1
60	0.311	0.28178	0.029224	1
70	0.33	0.3022	0.0278	1
80	0.35	0.32123	0.028771	1
90	0.362	0.33982	0.022183	1
100	0.375	0.35755	0.017449	1
200	0.503	0.49724	0.0057588	1
300	0.562	0.5887	-0.026699	1
400	0.621	0.65326	-0.032263	1
500	0.68	0.70168	-0.021681	1
600	0.714	0.73841	-0.024408	1
700	0.748	0.76945	-0.021452	1
800	0.782	0.7955	-0.013497	1
900	0.809	0.81784	-0.0088448	1
1000	0.833	0.83737	-0.0043662	1
2000	0.948	0.957	-0.0090028	1
3000	1.063	1.0222	0.040832	1
4000	1.09	1.0671	0.022868	1
5000	1.076	1.1015	-0.025503	1
6000	1.163	1.1293	0.033667	1

==========

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
T =	5.0762E+001
S =	8.7966E-003
Sy =	8.9179E-002
Ã =	7.4965E-002

7120 DW

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Features:

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- Statistical analysis of results
- Complete graphical display of results

0U0222

O:\CORRECT\IMINCOR\IDWCOR54.OUT

0317

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A Q T E S O L V   R E S U L T S
Version 1.10

06/07/95 11:31:1

===

TEST DESCRIPTION

Data set........... ldwcor54.dat
Data set title..... Southfield Pumping Test, Well 31554

Knowns and Constants:
   No. of data points.................. 45
   Pumping rate........................ 93.59
   Radius to obs. well................. 50
   Aquifer saturated thickness......... 131

Partial Penetration Data:
   Depth of top of well screen......... 11.56
   Depth of bottom of well screen...... 31.56
   Depth of top of obs. well screen..... 11.56
   Depth of bottom of obs. well screen.. 31.56
   Hyd. conductivity ratio (Kz/Kr)..... 0.1

===

ANALYTICAL METHOD

Neuman (unconfined aquifer)

===

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

		Estimate		Std. Error
T	=	4.6339E+001	+/-	9.1473E-001
S	=	9.1066E-003	+/-	1.8598E-003
Sy	=	1.1361E-001	+/-	1.2796E-002
Ā	=	1.3310E-002	+/-	6.5643E-004

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
   Number of residuals................ 41
   Number of estimated parameters.... 4
   Degrees of freedom................. 37
   Residual mean...................... -0.000718
   Residual standard deviation....... 0.03428
   Residual variance.................. 0.001175

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.2	0.006	0.30872	-0.30272	0.25
0.3	0.088	0.43101	-0.34301	0.25
0.4	0.34	0.51742	-0.17742	0.25
0.5	0.598	0.57771	0.020295	0.25
0.6	0.749	0.6221	0.1269	0.25
0.7	0.819	0.65665	0.16235	0.25
0.8	0.85	0.68251	0.16749	0.25
0.9	0.863	0.7032	0.1598	0.25
1	0.875	0.72008	0.15492	0.25
2	0.888	0.79845	0.089546	1
3	0.882	0.82584	0.056161	1
4	0.85	0.84099	0.0090104	1
5	0.831	0.85163	-0.020626	1
6	0.838	0.86019	-0.022187	1
7	0.831	0.86765	-0.036646	1
8	0.838	0.87445	-0.036448	1
9	0.844	0.88082	-0.036817	1
10	0.85	0.88687	-0.036874	1
20	0.913	0.93718	-0.024178	1
30	0.99	0.98138	0.0086176	1
40	1.027	1.0208	0.0061683	1
50	1.065	1.0566	0.0084091	1
60	1.103	1.0893	0.013742	1
70	1.135	1.1193	0.015745	1
80	1.161	1.1469	0.014092	1
90	1.18	1.1725	0.0075014	1
100	1.198	1.1963	0.0017486	1
200	1.364	1.3655	-0.0014825	1
300	1.448	1.4662	-0.018195	1
400	1.519	1.5346	-0.015597	1
500	1.578	1.5851	-0.0071357	1
600	1.611	1.6247	-0.013684	1
700	1.652	1.6569	-0.0049283	1
800	1.679	1.684	-0.0050313	1
900	1.719	1.7073	0.011652	1
1000	1.734	1.7316	0.0023805	1
2000	1.842	1.8581	-0.016132	1
3000	1.943	1.9286	0.014449	1
4000	1.969	1.9781	-0.0090712	1
5000	2.033	2.0162	0.016845	1
6000	2.054	2.0466	0.0073749	1

==========

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
T =	4.6339E+001
S =	9.1066E-003
Sy =	1.1361E-001
Ã =	1.3310E-002

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A Q T E S O L V   R E S U L T S

Version 1.10

06/07/95 15:12:08

==

TEST DESCRIPTION

Data set........... 1dwcor55.dat
Data set title..... Southfield Pumping Test, Well 31555

Knowns and Constants:
- No. of data points.................. 45
- Pumping rate........................ 93.59
- Radius to obs. well................. 50
- Aquifer saturated thickness......... 131

Partial Penetration Data:
- Depth of top of well screen......... 11.56
- Depth of bottom of well screen...... 31.56
- Depth of top of obs. well screen..... 11.56
- Depth of bottom of obs. well screen.. 31.56
- Hyd. conductivity ratio (Kz/Kr)..... 0.1

==

ANALYTICAL METHOD

Neuman (unconfined aquifer)

==

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

		Estimate		Std. Error
T	=	4.6805E+001	+/-	8.0672E-001
S	=	9.9698E-003	+/-	1.9799E-003
Sy	=	1.4335E-001	+/-	1.2628E-002
Ā	=	1.6847E-002	+/-	7.1982E-004

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
- Number of residuals............... 41
- Number of estimated parameters.... 4
- Degrees of freedom................ 37
- Residual mean..................... 3.534E-005
- Residual standard deviation....... 0.02817
- Residual variance................. 0.0007933

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.2	0.006	0.26332	-0.25732	0.25
0.3	0.108	0.37302	-0.26502	0.25
0.4	0.343	0.44537	-0.10237	0.25
0.5	0.553	0.49584	0.057161	0.25
0.6	0.655	0.53269	0.12231	0.25
0.7	0.693	0.56052	0.13248	0.25
0.8	0.712	0.5831	0.1289	0.25
0.9	0.725	0.60031	0.12469	0.25
1	0.738	0.61429	0.12371	0.25
2	0.744	0.67871	0.065289	1
3	0.744	0.70143	0.04257	1
4	0.718	0.71438	0.0036211	1
5	0.706	0.72378	-0.017785	1
6	0.712	0.73158	-0.019577	1
7	0.712	0.73851	-0.026507	1
8	0.712	0.74491	-0.03291	1
9	0.718	0.75095	-0.032954	1
10	0.731	0.75673	-0.025733	1
20	0.788	0.8069	-0.018896	1
30	0.859	0.85058	0.0084233	1
40	0.897	0.88907	0.0079298	1
50	0.936	0.92407	0.011926	1
60	0.974	0.95434	0.019657	1
70	1.006	0.98381	0.022187	1
80	1.026	1.011	0.014986	1
90	1.051	1.0362	0.0148	1
100	1.07	1.0596	0.010406	1
200	1.225	1.2265	-0.0015279	1
300	1.303	1.326	-0.022971	1
400	1.375	1.3935	-0.018521	1
500	1.428	1.4434	-0.015433	1
600	1.468	1.4825	-0.014495	1
700	1.503	1.5143	-0.011349	1
800	1.536	1.5411	-0.0051185	1
900	1.564	1.564	-4.7254E-005	1
1000	1.581	1.5842	-0.003239	1
2000	1.696	1.7132	-0.017205	1
3000	1.798	1.7821	0.015918	1
4000	1.831	1.8307	0.00030671	1
5000	1.889	1.8684	0.020609	1
6000	1.91	1.899	0.010956	1

==========

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

		Estimate
T	=	4.6805E+001
S	=	9.9698E-003
Sy	=	1.4335E-001
Ã	=	1.6847E-002

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

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A Q T E S O L V   R E S U L T S
Version 1.10

06/07/95 16:28:0

==

TEST DESCRIPTION

Data set........... 1dwcor56.dat
Data set title..... Southfield Pumping Test, Well 31556

Knowns and Constants:
   No. of data points.................. 46
   Pumping rate........................ 93.59
   Radius to obs. well................. 100
   Aquifer saturated thickness......... 131

Partial Penetration Data:
   Depth of top of well screen......... 11.56
   Depth of bottom of well screen...... 31.56
   Depth of top of obs. well screen..... 11.56
   Depth of bottom of obs. well screen.. 31.56
   Hyd. conductivity ratio (Kz/Kr)..... 0.1

==

ANALYTICAL METHOD

Neuman (unconfined aquifer)

==

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
T =	4.6915E+001	+/-	5.2266E-001
S =	5.9173E-003	+/-	1.2990E-003
Sy =	1.0652E-001	+/-	4.5899E-003
Ã =	5.9771E-002	+/-	1.9317E-003

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
   Number of residuals................ 42
   Number of estimated parameters.... 4
   Degrees of freedom................ 38
   Residual mean..................... 0.0001728
   Residual standard deviation....... 0.01495
   Residual variance................. 0.0002236

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.1	0.006	0.0068123	-0.00081232	0.25
0.2	0.006	0.043616	-0.037616	0.25
0.3	0.019	0.082182	-0.063182	0.25
0.4	0.076	0.11259	-0.036589	0.25
0.5	0.139	0.13542	0.0035841	0.25
0.6	0.177	0.15288	0.024116	0.25
0.7	0.196	0.16642	0.029575	0.25
0.8	0.209	0.17732	0.031685	0.25
0.9	0.215	0.18595	0.029046	0.25
1	0.222	0.19305	0.028954	0.25
2	0.241	0.22667	0.014334	1
3	0.241	0.23968	0.0013207	1
4	0.247	0.24787	-0.00086768	1
5	0.247	0.25433	-0.0073305	1
6	0.253	0.25997	-0.0069735	1
7	0.253	0.26514	-0.012138	1
8	0.26	0.26998	-0.009982	1
9	0.266	0.27459	-0.0085943	1
10	0.272	0.27903	-0.0070296	1
20	0.323	0.31878	0.0042199	1
30	0.362	0.35376	0.0082356	1
40	0.394	0.38601	0.0079884	1
50	0.432	0.41535	0.016648	1
60	0.463	0.44315	0.019849	1
70	0.489	0.46902	0.019978	1
80	0.509	0.49313	0.015867	1
90	0.534	0.51564	0.018363	1
100	0.547	0.53668	0.010323	1
200	0.688	0.6906	-0.0026029	1
300	0.753	0.78285	-0.029852	1
400	0.819	0.84625	-0.027248	1
500	0.872	0.89335	-0.021352	1
600	0.912	0.92825	-0.016252	1
700	0.919	0.95861	-0.039612	1
800	0.98	0.98425	-0.0042466	1
900	1.007	1.0064	0.00061009	1
1000	1.031	1.0259	0.0051402	1
2000	1.146	1.1479	-0.0019324	1
3000	1.247	1.2161	0.030851	1
4000	1.274	1.2637	0.010303	1
5000	1.313	1.3002	0.012817	1
6000	1.334	1.3298	0.004236	1

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RESULTS FROM VISUAL CURVE MATCHING

ISUAL MATCH PARAMETER ESTIMATES

	Estimate
T =	4.6915E+001
S =	5.9173E-003
Sy =	1.0652E-001

Ã = 5.9771E-002

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