WATERESOURCE
consulting engineers, inc.

WINGFIELD SPRINGS
RED HAWK GOLF COURSE

WELL COMPLETION/EVALUATION REPORT

for

TEST HOLE NO. 1
TEST HOLE NO. 2/WELL NO. 2
NEW WELL NO. 3

JUNE 1999

WINGFIELD SPRINGS
RED HAWK GOLF COURSE

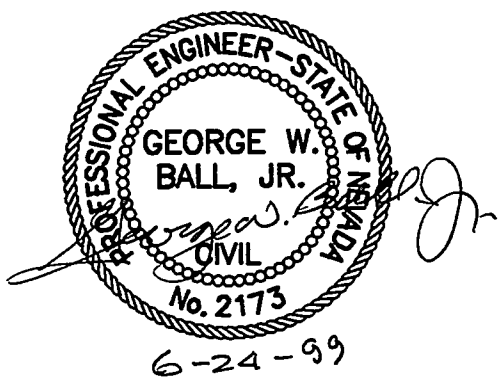
WELL COMPLETION/EVALUATION REPORTS

for

TEST HOLE NO.1
TEST HOLE NO. 2/WELL NO. 2
NEW WELL NO. 3

by

George W. Ball, Jr., P.E.
R. Brad Peters, E.I.
William A. Harrigan



JUNE 1999

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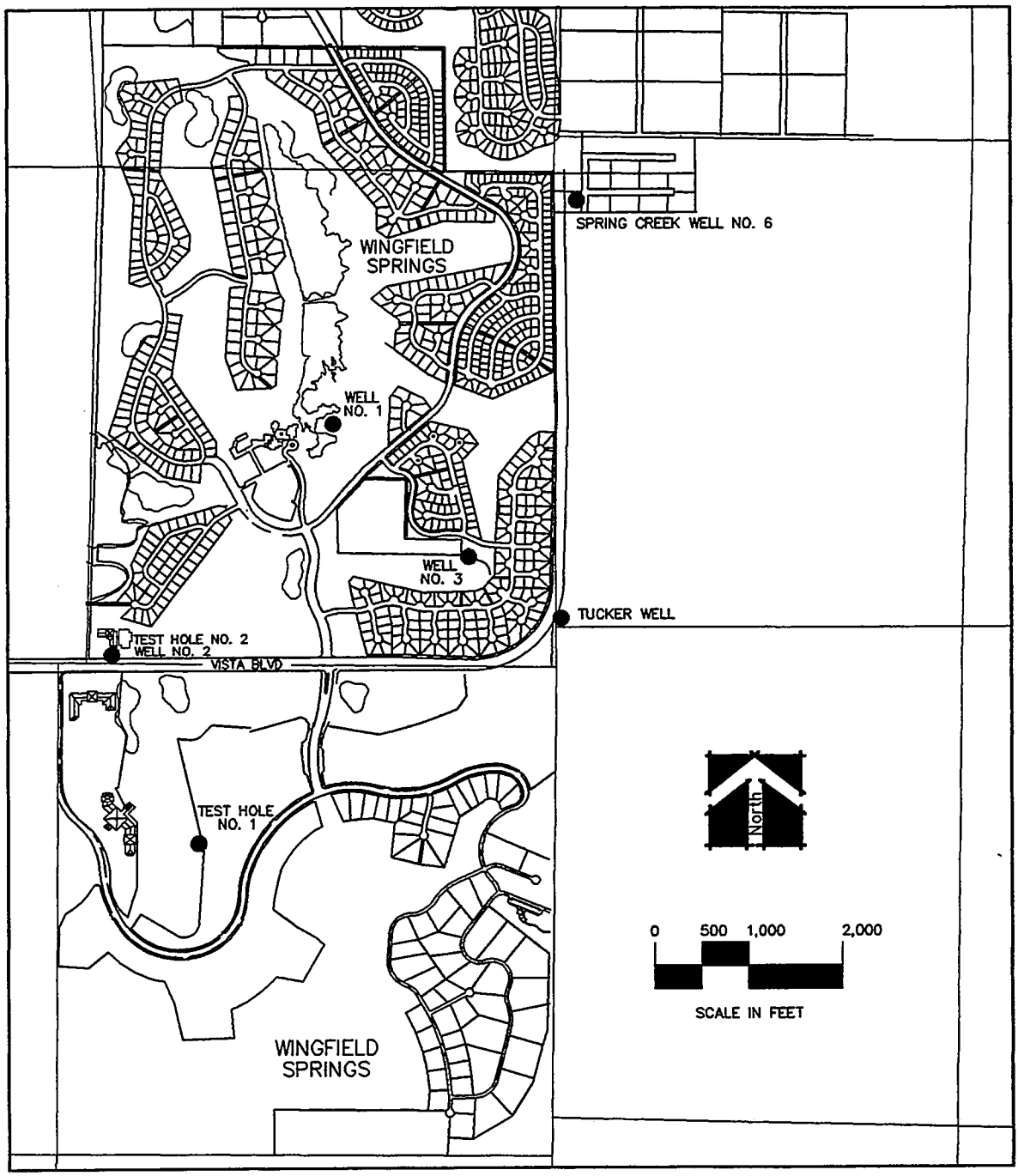
INTRODUCTION

1.1 INTRODUCTION

This report presents the results of drilling, construction and development of the Red Hawk No. 3 production well recently completed by Sargent Irrigation Company. The purpose of this project was to provide an additional water source for the Wingfield Springs' Red Hawk Golf Course.

Section 2.0 discusses the drilling of the first test hole, Test Hole No. 1. Section 3.0 discusses the drilling, construction and abandonment of the second test hole/production well (Red Hawk Well No. 2). Section 4.0 discusses the drilling and construction of Red Hawk Well No. 3. Section 4.0 also includes the analysis of the pump test data to determine aquifer characteristics and pumping influence on other wells in this general vicinity. The location of the test holes and production well is shown in Figure 1.1, page 1-2.



SOURCE: CFA

Figure 1.1

waterresource consulting engineers, inc. 750 TAHOE STREET - RENO, NEVADA - 89509	WINGFIELD SPRINGS	JOB NO. 9724.22 DATE 6-16-99 DRN. BY RBP CHK. BY GWB
DATE / REVISIONS / BY	LOCATION MAP	Figure 1.1

SECTION 2.0

RED HAWK TEST HOLE NO. 1

2.1 GEOLOGICAL SETTING

The geological setting in the immediate area consists primarily of unconsolidated alluvial deposits, mainly slope and stream wash. The consolidated rocks are tertiary volcanics consisting of basalt, andesite and pyroxene flows, pyroclastics and related intrusive phases. This formation interfingers with upper units of the earlier Alta Formation. Rock units to the west consist of Mesozoic granitic rock and Hartford Hill Rhyolite (Bonham 1969). The highly propylitized Alta Formation may be observed in road cuts at the extreme south entrance to Spanish Springs Valley.

2.2 LITHOLOGY AND TEST HOLE DRILLING

The Red Hawk Test Hole No. 1 was drilled (conventional mud rotary method) in June and July 1998, by Sargent Irrigation Co., Reno, Nevada. The test hole was drilled in the SE¼ of the NW¼ of Section 13, Township 20 North, Range 20 East, M.D.B.&M., as shown in Figure 1.1. This drilling site was selected by the owner, based on a groundwater study conducted by Kleinfelder Inc., in 1997. Featured in this report was a fracture pattern study of the immediate area and the location of four hydro-potential sites rated 1 to 4. Drilling of a 12¾-inch test hole commenced on June 29, 1998, and completed on July 8, 1998, to a total depth of 640 feet. The Well Driller's Report, which has been filed with the Nevada Division of Water Resources, is shown in Figure 2.1.

Production of water from the unconsolidated rock was not anticipated on experience and information available from several other wells located within this province, primarily due to the presence of clay. The unconsolidated sequence is represented by a partly cemented sandy loam with sub-round gravel and cobbles randomly dispersed throughout to about 45 feet. From this point, interbedded sandy clay and some sand and gravels prevail to approximately 165 feet. At this point, a transition to bedrock is considered. The transition is not easily determined in this hole and is based essentially on a predominance of angular clastic material and action of the drilling procedure, which suggested in-place fractured material.

High clay content composes an appreciable portion of the hole in rather impressive thick intervals from 115 to 635 feet, aggregating some 260 feet. Color ranges from dull white, grey, grey-green, dull brown, yellow-brown, red-brown, and sooty black. Clays in the unconsolidated strata are most likely from differential deposition of slope and stream wash while those clays present in the consolidated rock are mostly alteration products. One small level, from 499 to 502 feet, displayed a very stiff, rubbery black clay, quite like gouge created on fault plane movement. Texture varied from soft pliable sandy clays in various colors to very stiff material with lesser amounts of sandy grit. Some hard, waxy grey and brown clays were noted in clastic cuttings at various levels.

Rock elements consist of mostly dark grey basalt to some lighter grey material possibly the andesite member of this series. Minor amounts of re-silicification in the form of small quartz fragments were also observed on fracture faces. It is highly probable that several common alteration minerals may also be present. The level from 420 to 490 feet appeared slightly darker in color and more friable under bit action. Clastic recovery here indicated a more square, angular fragment shape in comparison with the upper level, 250 to 330 feet, where more or less concoidal clasts are evident. Rock member encountered at 585 to 605 feet consists of dark basalt highly

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STATE OF NEVADA
DIVISION OF WATER RESOURCES
WELL DRILLER'S REPORT

Please complete this form in its entirety in accordance with NRS 534.170 and NAC 534.340

OFFICE USE ONLY
Log No.
Permit No.
Basin

NOTICE OF INTENT NO. 36055

1. OWNER WINGFIELD SPRINGS
MAILING ADDRESS 7755 SPANISH SPRINGS ROAD
SPARKS NEVADA 89436

ADDRESS AT WELL LOCATION
HEALTH DEPT PERMIT 006194

2. LOCATION NW ¼ SE ¼ Sec. 13 T. 20 N/S R 20 E WASHOE County
PERMIT NO. W-500 (Issued by Water Resources) | 522-080-01 (Parcel No.) | RED HAWK GOLF COURSE-WINGFIELD SPRINGS (Subdivision Name)

3. WORK PERFORMED
☒ New Well ☐ Replace ☐ Recondition
☐ Deepen ☐ Abandon ☐ Other

4. PROPOSED USE
☐ Domestic ☐ Irrigation ☒ Test
☐ Municipal/Industrial ☐ Monitor ☐ Stock

5. WELL TYPE
☐ Cable ☐ Rotary ☒ RVC
☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
SAND, BROKEN ROCK		0	45	45
COBBLES, BOULDERS		45	55	10
CLAY, BROKEN ROCK,				
COBBLES		55	105	50
BROWN STICKY CLAY		105	162	57
ROCK BROWN CLAY		162	175	13
BEDROCK GREY/BROWN		175	188	13
RED/BROWN CLAY		188	238	50
GREY CLAY & SILT		238	260	32
SAND, BLACK BASALT		260	270	10
BLACK, GREY BASALT		270	310	40
CLAY, BROKEN ROCK		310	395	85
BROWN/GREY CLAY		395	419	24
BLACK ROCK, SAND, CLAY		419	498	79
GREY/GREEN CLAY, SAND		498	586	88
WHITE/GREY CLAY		586	640	54
HOLE ABANDON				
18 YARDS3 WAS PUMPED	FROM SURFACE VIA			
TREMI PIPE FROM THE BOTTOM	OF THE HOLE TO			
THE SURFACE				

Date started JUNE 26, 1998
Date completed AUGUST 17, 1998

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☐ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)

8. WELL CONSTRUCTION
Depth Drilled 640 Feet Depth Cased NONE Feet

HOLE DIAMETER (BIT SIZE)

	From	To
12 3/4 Inches	0 Feet	640 Feet
Inches	Feet	Feet
Inches	Feet	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
NONE				

Perforations:
Type perforation NONE
Size perforation
From feet to feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

Surface Seal: ☐ Yes ☐ No
Depth of Seal 640
Placement Method: ☒ Pumped ☐ Poured
Seal Type: ☐ Neat Cement ☒ Cement Grout ☐ Concrete Grout
Gravel Packed: ☐ Yes ☒ No
From feet to feet

9. WATER LEVEL
Static water level 51 feet below land surface
Artesian flow G.P.M. P.S.I.
Water temperature COOL °F Quality FAIR

10. DRILLER'S CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.
Name SARGENT IRRIGATION COMPANY (Contractor)
Address 9955 NORTH VIRGINIA STREET (Contractor)
RENO NEVADA 89506
Nevada contractor's license number issued by the State Contractor's Board 21246
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1789
Signed (By driller performing actual drilling on site or contractor)
Date AUGUST 19, 1998

FIGURE 2.1

silicified. Of interest here is the presence of iron pyrite quite visible to the naked eye. Quite conspicuous by not being present in this hole was a red to pink scoria or sinter which is quite vesicular and was the major contributor of water in the Hardy Well (Red Hawk Well No. 1) drilled in 1987. This rock is also noted in the County Well drilled in 1993. A description of drill cutting samples with depth of occurrence is presented in Table 2.1 – Lithology Log for Test Hole No. 1, pages 2-4 through 2-7. Appendix A presents the electric log of the test hole.

Drill penetration was relatively slow due to excessive clays interbedding the fractured rock zones as well as the rock itself (see Table 2.2 – Penetration Time Log for Test Hole No. 1, pages 2-8 and 2-9. Two levels, 250 feet to 320 feet and 420 feet to 490 feet, displayed fractured rock subsequently indicated by electro-logging as aquifers. Various experienced opinions interpreted the possible yield of these aquifers in the 400 gpm range. At the time, this was considered an adequate supply (Refer to page 3 of 14 of the Phase I Groundwater Feasibility Investigation conducted by Kleinfelder, Inc. for Wingfield Springs Development).

Based on evaluation of the electro-log, a well at this location was estimated to have a capacity of 300-400 gpm. Different geological features, i.e. faulting or displacement, may account for this test hole's less desirable yield estimate. Test Hole No. 1 was deemed insufficient for meeting the needs of Wingfield Springs, and was abandoned and plugged in August 1998.

TABLE 2.1

LITHOLOGY LOG FOR TEST HOLE NO. 1

DEPTH	DESCRIPTION
0-5	Moderately cemented sandy silt. Sand primarily quartz. Some sub-round gravel and cobbles.
5-15	Moderately cemented sandy silt. Few pebbles and cobbles. Some brownish discoloration. Minimum clay.
15-25	Moderately cemented sandy silt. Increase in dark sand clasts. Increase in gravel and cobbles. Some hard brown clay.
25-35	Moderately cemented sandy silt. Some angular clastic cuttings from cobbles. Some hard brown clay and soft tan clay.
35-45	Same as 25-35. Some brown silt stone.
45-55	Some tan sandy clay. Medium to coarse sand, small pebbles sub-round to 1 cm. Brown silt stone.
55-65	Brown sandy clay 30%, coarse sand. Clastic material primarily basalt with some orange and brown clasts. Few angular fragments.
65-75	Brown sandy clay 25%. Some coarse sand. Fine gravel to 1.5 cm. Some red scoria pebbles.
75-85	Brown sandy clay 20%. Coarse sand. Some fine gravel.
85-95	Brown sandy clay 20%. Course sand. Fine gravel to 50%, 1 – 2 cm. in size.
95-100	Brown stiff clay 15%. Gravel 1 – 2 cm. In size. Some course sand. Cobbles at 95 feet.
105-115	Brown stiff clay 90%. Gravel 1 – 2.5 cm.
115-125	Same as 105-115.
125-135	Yellow brown soft clay. 90%. Gravel and cobbles
135-145	Red brown soft clay. 100%. Some gritty sand.
145-155	Red brown soft clay. 100%. Some coarse sand.
155-162	Red brown soft clay. 100% some coarse sand.
162-165	Light brown sandy clay 40%. Some coarse sand. Fine gravel. Basalt and gray soft rock.
165-169	Same 162-165. Increase in fresh angular clasts.

DEPTH	DESCRIPTION
169-175	Brown soft sandy clay 15%. Grey fine gravel showing some iron oxide inclusions.
175-185	Brown soft sandy clay. Grey fine gravel with Increase in quartz. Some iron oxide.
186-188	Brown sandy clay 85%. Basalt angular clasts 1-1.5 cm.
195-205	Red brown sandy clay 50%. Clastic material to 1.5 cm. 50%
205-215	Red brown sandy clay 30%. Angular basalt clasts to 2 cm.
215-225	Dull brown sandy clay. Some sooty gray clay. 95% Few angular small clasts.
225-238	Same as 215-225.
238-242	Soft gray clay. 90%. Some sandy grit.
242-245	Soft gray clay. 20%. Gray angular clasts to 2 cm.
245-255	Soft gray clay. 10%. Gray angular clasts to 1.5 cm. Rock displays a fine ground mass with small silica phenocrysts. Some secondary silica and minor alteration.
255-260	No clay. Grey angular clasts coarse sand size.
260-265	Grey clay. 15%. Angular clasts to 1.0 cm.
265-275	Some grey clay. Grey angular clasts to 2.5 cm. Brownish tint to some silica components.
295-305	Same as 285-295.
305-315	Dull brown clay 10%. Grey angular clasts to 1.5 cm.
315-325	Brown sandy clay 60%. Grey angular clasts to 1.0 cm.
325-328	Same as 315-325.
328-335	Grey clay 20%. Grey angular clasts to 1.5 cm. Slightly more granular rock texture. Hard.
335-345	Grey clay 10%. Clasts to 1.0 cm. Hard grey clay.
345-355	Bright brown clay 90%. Clasts fine gravel size.
355-365	Tan sandy clay & grey clay. 60%. Clastic material reddish tinge to 1.0 cm. Some hard brown clay.
365-375	Brown sandy clay, some grey and yellow clays 90% small angular clasts. Coarse sand size.
375-385	Same as 365-375.

DEPTH	DESCRIPTION
385-393	Stiff brown sandy clay. 100%
393-395	Brown clay 50%. Grey rock clasts coarse sand size.
395-405	Stiff grey and brown sandy clay 95%. Clasts to 0.5 cm.
405-415	Dull grey stiff sandy clay 90%. Clasts to 0.5 cm.
415-420	Same as 405-415.
420-425	Minimal clay. Dark grey hard rock. Finer grained. Hard.
425-435	Grey clay 10%. Dark grey rock clasts to 2.5 cm.
435-445	Grey clay 10%. Dark grey clasts to 1.5 cm. Some hard waxy grey and brown clays.
445-455	Same as 435-445. Rock somewhat more friable.
455-465	Minimal clay. Dark grey clasts to 2.0 cm.
465-475	Same as 455-465.
475-479	Same as 455-465.
479-485	Minimal clay. Large fragments 1.5 to 2.5 cm. Some hard waxy brown clay.
485-495	Same as 479-485.
495-499	Same as 479-485.
499-502	Dull grey stiff clay (gouge?) 100%.
502-505	Dull grey softer clay 80%. Some small clasts.
505-515	Dull grey soft clay 95%. Few small clasts.
515-525	Dull grey soft clay 90%. Some grit and clasts.
525-527	Same as 515-525.
527-535	Dark sooty grey clay 45%. Rock clasts basalt to 1.0 cm.
535-545	Dark sooty grey clay 75%- Clasts to 1.0 cm.
545-555	Same as 535-545. Clay to 85%.
555-565	Dull deep brown clay 75%. Finer rock clasts.
565-575	Dark brown clay 70%. Rack clasts to 1.0 cm.

DEPTH	DESCRIPTION
575-580	Dull white soft clay. Some grit coarse sand size.
580-586	Dull brown stiff clay 100%.
586-593	Dull white and dull brown sandy clays with some grey clasts to 1.0 cm. Increase in silica (quartz).
593-595	Grey clay 15%. Clasts to 1.0 cm. Quartz with some basalt. Iron pyrite in quartz.
595-602	Grey green soft clay. Clasts to 2.0 cm. Basalt and quartz. Iron pyrite in quartz.
602-608	Grey green soft clay 40%. Fine clastic material basalt and quartz with iron pyrite.
608-610	Grey green clay 85%. Few small quartz and basalt clasts.
610-615	Grey green soft clay 90%. Some grit.
615-625	Grey green soft clay 95%. Some grit.
625-635	Grey green soft clay 90%. Some grit.
635-640	Grey green soft clay 75%. Coarse sand size clasts with some iron pyrite.

TABLE 2.2

PENETRATION TIME LOG FOR TEST HOLE NO. 1

DEPTH	FEET	TIME (min.)	FT./MIN.	FT./HR.
0-5	(surface stabilizer)			
5-41	36	63	0.57	34.28
41-70.30	29.30	62	0.47	28.36
70.30-99.20	28.90	110	0.26	15.76
99.20-130.20	31.00	96	0.32	19.37
130.20-159.60	29.40	99	0.30	17.82
159.60-191.85	32.25	169	0.19	11.45
191.85-220.40	28.55	101	0.28	16.96
220.40-250.95	30.55	125	0.24	19.66
250.95-270.00	19.05	185	0.10	6.18
270.00-280.75	10.75	50	0.21	12.90
280.75-311.25	30.50	106	0.29	17.26
311.25-341.85	30.60	144	0.21	12.75
341.85-370.85	29.00	109	0.27	15.96
370.85-395.00	24.15	83	0.29	17.46
395.00/401.05	6.05	30	0.20	12.10
401.50-431.10	30.05	360	0.08	5.01
431.10-436.00	4.9	112	0.09	2.63
436.00-459.10	23.10	185	0.12	7.49
459.10-488.90	29.80	182	0.16	9.83
488.90-519.45	30.55	132	0.23	13.89
519.45-535.00	15.55	88	0.18	10.60

DEPTH	FEET	TIME (min.)	FT./MIN.	FT./HR.
535.00-548.20	13.20	84	0.16	9.43
548.20-578.75	30.55	121	0.25	15.15
578.25-609.20	30.45	154	0.20	11.86
609.20-640.00	30.80	163	0.19	11.34

Total Depth: 640.00 feet
Total Time Drilling: 3113 minutes (51.88 hours)
Average Drilling Speed: 0.206 ft/min. (12.335 ft/hr.)

NOTE: Lengths of stabilizers and drill pipe varied. These units were measured when installed to maintain accuracy in depth measurements.

SECTION 3.0

RED HAWK WELL NO. 2

3.1 TEST HOLE

3.1.1 Geological Setting

The geological setting in the immediate area consists primarily of unconsolidated alluvial deposits, mainly slope and stream wash with some eolian sand. Consolidated rocks are tertiary volcanics consisting of basalt, andesite, pyroxene flows, pyroclastics and related intrusive phases. This formation interfingers with the upper units of the earlier Alta Formation. Rock units to the west consist of Mesozoic granitic rock and Hartford Hill Rhyolite (Bonham 1969). The highly propylitized Alta Formation may be observed in road cuts at the extreme south entrance to Spanish Springs Valley.

3.1.2 Lithology and Test Hole Drilling

The Red Hawk Test Hole No. 2 was drilled (conventional mud rotary method) in August and September 1998, by Sargent Irrigation Co., Reno, Nevada. The test hole was drilled in the SW¼ of the SW¼ of Section 12, Township 20 North, Range 20 East, M.D.B.&M., as shown in Figure 1.1, page 1-2. This drilling site was selected based on successful wells drilled by the former owners of the Spanish Springs Ranch and Washoe County at valley floor elevations. Drilling of a 12 ¾-inch test hole commenced on July 23, 1998, and completed on August 3, 1998, to a total depth of 730 feet. The Well Driller's Report, which has been filed with the Nevada Division of Water Resources, is shown in Figure 3.1.

The unconsolidated rocks consisted of medium to coarse sand, mostly sub-round quartz clasts with minimal clay from 0 to 40 feet. Brown clays with interbedded sand was penetrated to 150 feet. At this level, some gravels and cobbles were noted with clays predominate to 200 feet. At 200 feet, consolidated rock was encountered. This material appears to be both basalt and andesite members of the sequence, displaying fracturing and some interbedded light tan soft clays. At 370 feet, very dense red-brown clay was encountered. This persisted to 380 feet where the clay color changed to dark sooty grey, containing some fine sand. To a depth of 600 feet, clayey strata dominated, displaying a wide variety of color and texture from red to dull brown and dull greys to black. These clayey strata consistently displayed interbedded rock members. Several levels 400-410 feet, 430 to 440 feet, and 480-500 feet suggested appreciable thickness of rock. Change occurred abruptly at 600 feet where fractured rock with minimal clay was encountered. This rock displays andesitic characteristics though with larger quartz phenocrysts than the upper formation contained. Very minor amounts of black to dark green crystalline minerals were observed probably pryroxenes. At 703 feet, a marked change in formation occurred, going into a very hard, dark grey micro-crystalline pyroclastic. The transition was noted by a thin layer of red-brown, hard colloidal clay. This was penetrated to 730 feet. Some alteration minerals and re-silicification was noted throughout the consolidated rock units. A description of drill cutting samples with depth of occurrence is presented in Table 3.1 – Lithology Log for Test Hole No. 2, pages 3-3 through 3-6. The drill penetration rates are presented in Table 3.2 – Penetration Time Log for Test Hole No. 2, pages 3-7 and 3-8.

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DIVISION OF WATER RESOURCES

WELL DRILLER'S REPORT

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OFFICE USE ONLY
Log No.
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Basin

NOTICE OF INTENT NO. 37894

1. OWNER WINGFIELD SPRINGS
MAILING ADDRESS 7755 SPANISH SPRINGS ROAD
SPARKS, NEVADA 89436

ADDRESS AT WELL LOCATION RED HAWK GOLF COURSE MAINTANCE AREA

2. LOCATION SW ¼ SW ¼ Sec. 12 T 20 N/S R 20 E WASHOE County

PERMIT NO. W-500 A-HEALTH 6/96 (Issued by Water Resources) | Parcel No. | WINGFIELD SPRINGS (Subdivision Name)

3. WORK PERFORMED
☒ New Well ☐ Replace ☐ Recondition
☐ Deepen ☐ Abandon ☐ Other

4. PROPOSED USE
☐ Domestic ☐ Irrigation ☒ Test
☐ Municipal/Industrial ☐ Monitor ☐ Stock

5. WELL TYPE
☐ Cable ☐ Rotary ☒ RVC
☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
CLAY, SAND, ROCK CHIPS		0	65	65
BROWN STICKY CLAY		65	98	33
BROWN CLAY & FINE SAND		98	192	104
BASALT, ANDESITE		192	255	63
GRAVEL, BROWN CLAY		255	315	60
FRACTURED BASALT, BROWN CLAY		315	378	63
STICKY BROWN CLAY		378	499	121
BASALT ROCK-BROKEN		499	510	11
BROWN CLAY, SAND		510	550	40
BROWN CLAY, BROKEN ROCK		550	614	64
BROWN CLAY, GREEN SAND		614	635	21
SAND, BROKENROCK, CLAY		635	684	49
BROWN CLAY WITH SAND		684	698	14
GREEN, GRAYROCK, CLAY		698	703	5
GRAY, BLACK BASALT-HARD		703	730	27

Date started JULY 21, 1998
Date completed SEPTEMBER 25, 1998

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☒ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
100	200	3

8. WELL CONSTRUCTION
Depth Drilled 730 Feet Depth Cased 705 Feet

HOLE DIAMETER (BIT SIZE)

	From	To
36 Inches	0 Feet	100 Feet
24 Inches	100 Feet	210 Feet
17½ Inches	210 Feet	710 Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
30	118.6	.375	0	100
16	62.58	.375	100	210
10	28.04	.250	210	705

Perforations:
Type perforation WIRE WRAP SCREEN - JOHNSON
Size perforation .130 SLOT
From 210 feet to 370 feet
From 400 feet to 410 feet
From 420 feet to 445 feet
From 490 feet to 500 feet
From 600 feet to 700 feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 100
Placement Method: ☒ Pumped ☐ Poured
Seal Type: ☒ Neat Cement ☐ Cement Grout ☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No
From 0 feet to 705 feet

9. WATER LEVEL
Static water level 4 feet below land surface
Artesian flow G.P.M. P.S.I.
Water temperature COOL °F Quality GOOD

10. DRILLER'S CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.
Name SARGENT IRRIGATION COMPANY (Contractor)
Address 9955 NORTH VIRGINIA STREET (Contractor)
RENO, NEVADA 89506
Nevada contractor's license number issued by the State Contractor's Board 21246
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1540
Signed (By driller performing actual drilling on site or contractor)
Date OCTOBER 1, 1998

FIGURE 3.1

TABLE 3.1

LITHOLOGY LOG FOR TEST HOLE NO. 2

DEPTH	DESCRIPTION
0-10	Course to medium sand. Primarily quartz with some dark clasts. Round to sub-round.
10-20	Same as 0 to 10 feet.
20-30	Coarse to medium sand with some brown clay noted.
30-40	Coarse to medium sand with dull tan clay 15%.
40-50	Dull brown clay 100%, with minor sand content.
50-60	Same as 40 to 50 feet.
60-70	Brown soft sticky clay 100%, minor sand content.
70-80	Brown soft clay 85%. Coarse to medium sand 50% quartz and 50% dark (basalt?) clasts.
80-90	Same as 70 to 80 feet.
90-96	Same as 70 to 80 feet.
96-100	Dull soft tan clay 75%. Course to medium sand quartz 60% dark 40%.
100-104	Same as 96 to 100 feet.
104-110	Dark brown dense clay 90%. Coarse to medium sand 70% quartz 30% dark.
110-118	Light brown soft clay 90%, some sand.
118-120	Light brown soft clay 85%. Some sand. Some small angular rock fragments (basalt).
120-125	Same as 118 to 120 feet.
125-130	Dark tan soft clay 70%. Coarse to medium sand 30% quartz 70% dark. Some angular rock fragments to 1.5 cm.
130-140	Light brown clay 70%. Coarse to medium sand quartz 25% dark 75%. Few angular fragments.
140-150	Same as 130 to 140 feet, with increase in angular rock fragments.
150-155	Same as 140 to 150 feet.
155-160	Brown clay 75%. Some sand. Increase in gravel and cobbles. Fresh angular fragments to 1.0 cm. (basalt).

DEPTH	DESCRIPTION
160-170	Brown clay 60%. Some sand. Gravel and cobble. Angular fragments to 1.5 cm.
170-180	Brown clay 50%. Minimal sand. Gravel and cobbles. Angular fragments to 2.0 cm.
180-185	Same as 170 to 180 feet.
185-190	Dense tan clay 90%. Some coarse to medium sand.
190-192	Same as 185 to 190 feet.
192-200	Soft tan clay 50%. Coarse to medium sand. Gravel and cobbles. Angular fragments to 1.5 cm. (basalt and andesite).
200-210	Tan sandy clay 40%. Angular fragments to 2.5 cm. Basalt 50%, andesite 50%.
210-220	Pale tan soft clay 50%. Fractured rock primarily andesite. Fragments to 1.0 cm.
220-230	Pale tan soft clay 30%. Angular fragments to 2.0 cm. Some basalt.
230-240	Pale tan sandy clay 25%. Angular fragments to 2.5 cm. Andesite.
240-250	Pale tan clay 40%. Angular fragments to 1.0 cm. Andesite.
250-260	Light grey soft clay 35%. Fragments coarse to medium sand size. Few to 1.0 cm.
260-270	Light grey soft clay 10%. Angular fragments to 2.5 cm.
270-280	Light grey soft clay 5%. Angular fragments to 1.5 cm.
280-290	Tan clay minimal. Angular fragments to 2.0 cm.
290-300	Same as 280 to 290 feet.
300-310	Same as 280 to 290 feet.
310-320	Dull tan clay 10%. Angular fragments to 1.5 cm.
320-330	Same as 310 to 320 feet.
330-340	Dull tan clay 40%. Coarse sand to fine gravel size fragments. Few to 1.0 cm.
340-350	Same as 330 to 340 feet. (Clay 25%.)
350-360	Dull tan clay 25%. Angular fragments fine gravel size. Few to 1.5 cm.
360-370	Dull tan clay 30%. Angular fragments to 2.0 cm.
370-380	Brown very dense clay 100%. Trace amount of oxidation. Iron oxide.

DEPTH	DESCRIPTION
380-390	Dark grey sandy clay 90%. Some fine grit.
390-400	Dark sooty grey dense clay 95%. Some fine grit.
400-410	Brown and grey soft sandy clay 50%. Angular fragments to fine gravel size. (Basalt.)
410-420	Red-brown dense sandy clay, 100%.
420-430	Dull brown sandy clay, 100%.
430-440	Dull dark brown soft sandy clay 95%. Few angular fragments to 1.0 cm. Basalt.
440-450	Brown sandy clay 85%. Angular fragments course sand size to 1,0 cm.
450-460	Dull dark brown sandy clay 85%. Angular fragments to 1.5 cm.
460-470	Dull brown soft sandy clay 50%. Angular fragments to 1.0 cm.
470-480	Dark dull brown sandy clay 30%. Angular fragments to 1.0 cm. Some hard red colloidal clay clasts.
480-490	Sooty dark grey clay 25%. Coarse sand size to fine gravel angular fragments.
490-500	Sooty dark grey/black clay 20%. Angular fragments to 2.5 cm.
500-507	Dull grey/brown clay 40%. Angular fragments to 2.0 cm.
507-510	Light brown sandy clay 50%. Few fragment course sand size to 1.5 cm.
510-520	Light brown sandy clay 90%. Coarse sand size fragments.
520-530	Red/brown sandy clay 85%. Coarse sand size fragments. Few to 1.0 cm.
530-540	Dull brown clay 90%. Some coarse sand angular fragments.
540-550	Brown clay 90%. Trace oxidized material. Angular fragments coarse sand size.
550-560	Same as 540 to 550 feet.
560-570	Brown clay, some grey clay 90%. Trace oxidized material. Angular fragments coarse sand size.
570-580	Dark brown sandy clay 75%. Trace oxidized material. Angular fragments to 1.5 cm. Basalt.
580-590	Dull brown sandy clay 90%. Few angular fragments coarse sand size to 1.0 cm.
590-600	Dull grey/brown sandy clay 95%. Few angular fragments to 1.0 cm.

DEPTH	DESCRIPTION
600-601	Same as 590 to 600 feet.
601-610	Grey soft clay 10%. Fractured rock. Angular fragments to 2.5 cm. (andesite?). Coarser texture than upper (210-370 feet) formation.
610-620	Grey soft clay 10%. Angular fragments course sand size. Come appear sub-round.
620-630	Same as 610 to 620 feet. Few larger fragments.
630-640	Grey soft clay 10%. Angular fragments to 2.5 cm.
640-650	Grey soft clay 5%. Angular fragments coarse sand size to 1.5 cm.
650-660	Minimal clay. Angular fragments to 3.0 cm. Trace oxidation on cleavage faces. Some hard yellow/brown colloidal clay.
660-670	Same as 650-660 feet.
670-680	Grey soft clay 15%. Angular clasts course sand size to few 1.0 cm.
680-684	Same as 670 to 680 feet.
684-688	Grey clay 80%. Angular fragments to 1.0 cm.
688-690	Minimal clay. Angular fragments to 2.0 cm.
690-700	Minimal clay. Angular fragments to 3.0 cm.
700-703	Same as 690 to 700 feet.
703-710	Red/brown hard colloidal clay 3%. Hard, more crystalline with finer texture. Flat to concoidal fragments most fine to coarse sand size to 0.5 cm.
710-720	Same as 703 to 710 feet.
720-730	Same as 703 to 710 feet.

TABLE 3.2

PENETRATION TIME LOG FOR TEST HOLE NO. 2

DEPTH	FEET	TIME (min.)	FT./MIN.	FT./HR.
0-10	10.00	(surface stabilizer)		
10-45	35.00	120	0.29	17.50
45-74.33	29.33	206	0.14	8.54
74.33-103.33	29.00	198	0.146	8.79
103.33-134.43	31.10	162	0.19	11.52
134.43-165.48	31.05	48	0.65	38.81
165.48-194.88	29.40	146	0.20	12.08
194.88-225.38	30.50	70	0.44	26.14
225.38-255.18	29.80	82	0.36	21.80
255.18-285.78	30.60	114	0.27	16.11
285.78-316.28	30.50	97	0.31	18.87
316.28-344.28	28.00	169	0.17	9.94
344.28-374.83	30.55	146	0.21	12.55
374.83-405.38	30.55	163	0.19	11.24
405.38-435.98	30.60	141	0.22	13.02
435.98-466.58	30.55	145	0.21	12.64
466.58-495.43	29.80	138	0.215	12.95
495.43-525.13	29.70	137	0.22	13.00
525.13-555.33	30.20	130	0.23	13.94
555.33-584.73	29.40	121	0.24	14.58
584.73-613.73	29.00	147	0.19	11.83
613.73-643.78	30.05	165	0.18	10.93

DEPTH	FEET	TIME (min.)	FT./MIN.	FT./HR.
643.78-674.33	30.55	230	0.13	7.97
674.33-703.33	29.00	158	0.183	11.07
703.33-730.00	26.67	470	0.06	3.40

Total Depth: 730.00 feet
Total Time Drilling: 3703 minutes (61.72 hours)
Average Drilling Speed: 0.197 ft/min. (11.83 ft/hr.)

NOTE: Length of stabilizers and drill pipe varied. These units were measured when installed to maintain accuracy in depth measurements.

The electric log (see Appendix B.1) denoted two potential aquifers from 210 to 370 feet, and from 600 to 700 feet. Several minor zones: 410 to 420 feet, 430 to 445 feet, and 490 to 500 feet appeared worth considering. This sequence of favorable structures, 295 feet in total, was anticipated to produce a viable well in the 1000 gpm range.

3.2 PRODUCTION WELL

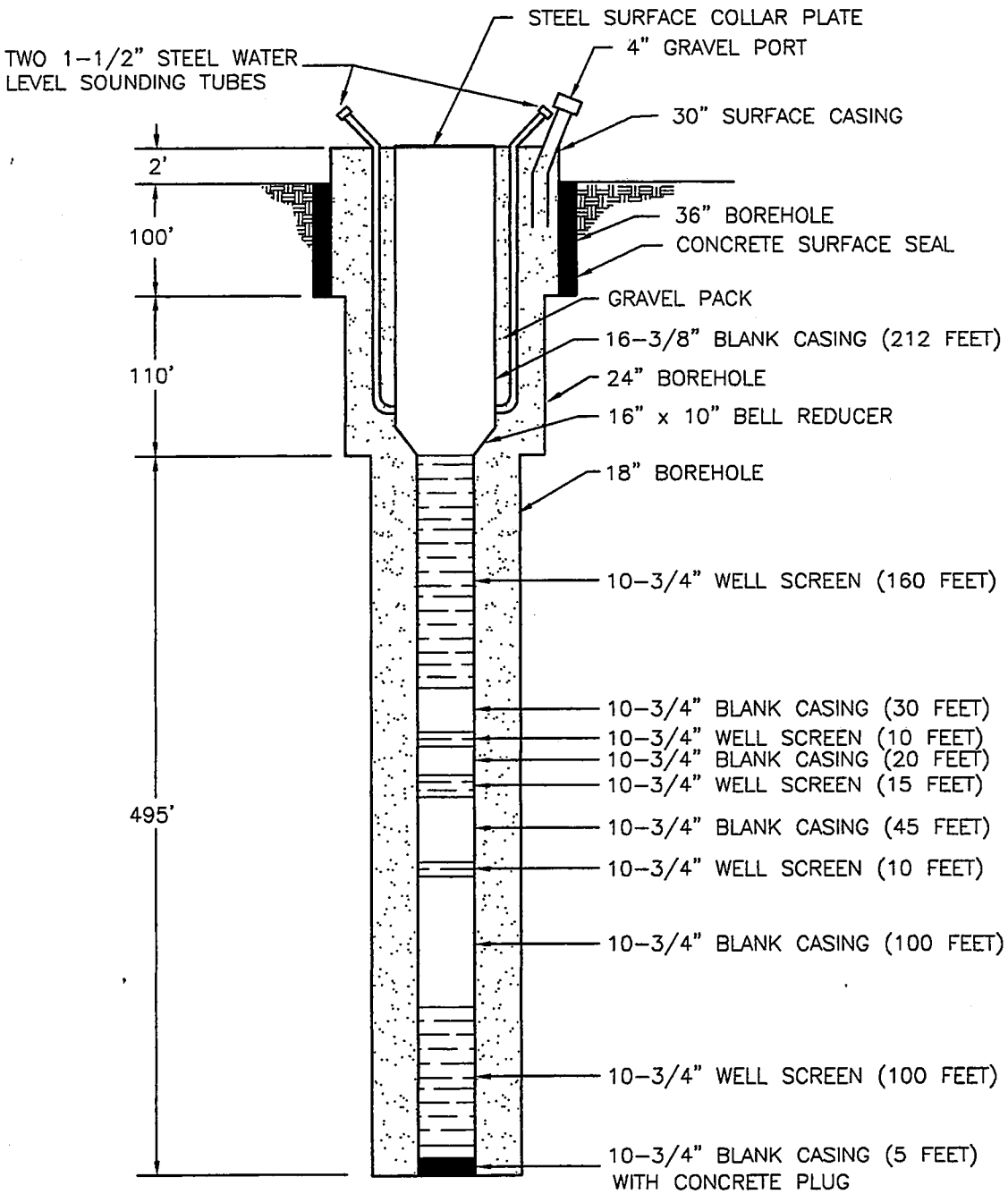
3.2.1 Well Construction

Production well construction commenced on September 1, 1998, and completed on September 2, 1998. Figure 3.2 is a diagram of the production well construction. The cement grout sanitary surface seal cements a 30-inch diameter surface casing into a 36-inch diameter borehole to a depth of 100 feet. From 100 feet to 210 feet below ground surface, the borehole is 24 inches. From 210 feet below ground surface to the total depth of the well (705 feet), the borehole is 18 inches. A 16 3/8- inch casing extends from approximately 2 feet above ground surface to 210 feet below ground surface where a bell reducer connects the 16-inch casing to alternating intervals of 10 ¾-inch blank casing and steel well screen. The steel well screen is 130 (0.130 inches) slot high-capacity continuous slot screen. The annular space between the casing and borehole is gravel-packed with a Gopher 3/8" minus gravel from the ground surface to the total depth of the well. Two 1½-inch steel water level sounding tubes were installed to a depth of 200 feet. A steel surface collar plate with a 4-inch gravel port completed the well construction.

3.2.2 Test Pumping and Analysis

Red Hawk Well No. 2 was subjected to a 4-hour pump test on September 30, 1998 (see Appendix B.2). The well was pumped at a discharge rate of 150 gpm for 45 minutes and 100 gpm for three hours. The water level was monitored for the duration of the pump test and used to calculate the drawdown with respect to time (see Figures 3.3 and 3.4, pages 3-11 and 3-12). At a constant discharge rate of 100 gpm for three hours, the well was unable to stabilize, signifying an absence of high yielding aquifers.

A waiver was requested from the Nevada Division of Water Resources to maintain this unsuccessful production well as a permanent monitoring well. The Division of Water Resources denied the request and Red Hawk Well No. 2 was permanently plugged in March 1999. A Well Driller's Report was filed for this action (see Figure 3.5, page 3-13).



NOT TO SCALE

Figure 3.2

wateresource consulting engineers, inc. 730 TAHOE STREET - RENO, NEVADA - 89509	WINGFIELD SPRINGS	JOB NO. 9724.22 DATE 8-16-99 DRN. BY RBP CHK. BY GWB
DATE / REVISIONS / BY	RED HAWK WELL NO. 2 DESIGN	Figure 3.2

FIGURE 3.3
RED HAWK NO. 2 WELL
1 HOUR CONSTANT DISCHARGE TEST
Q = 150 gpm

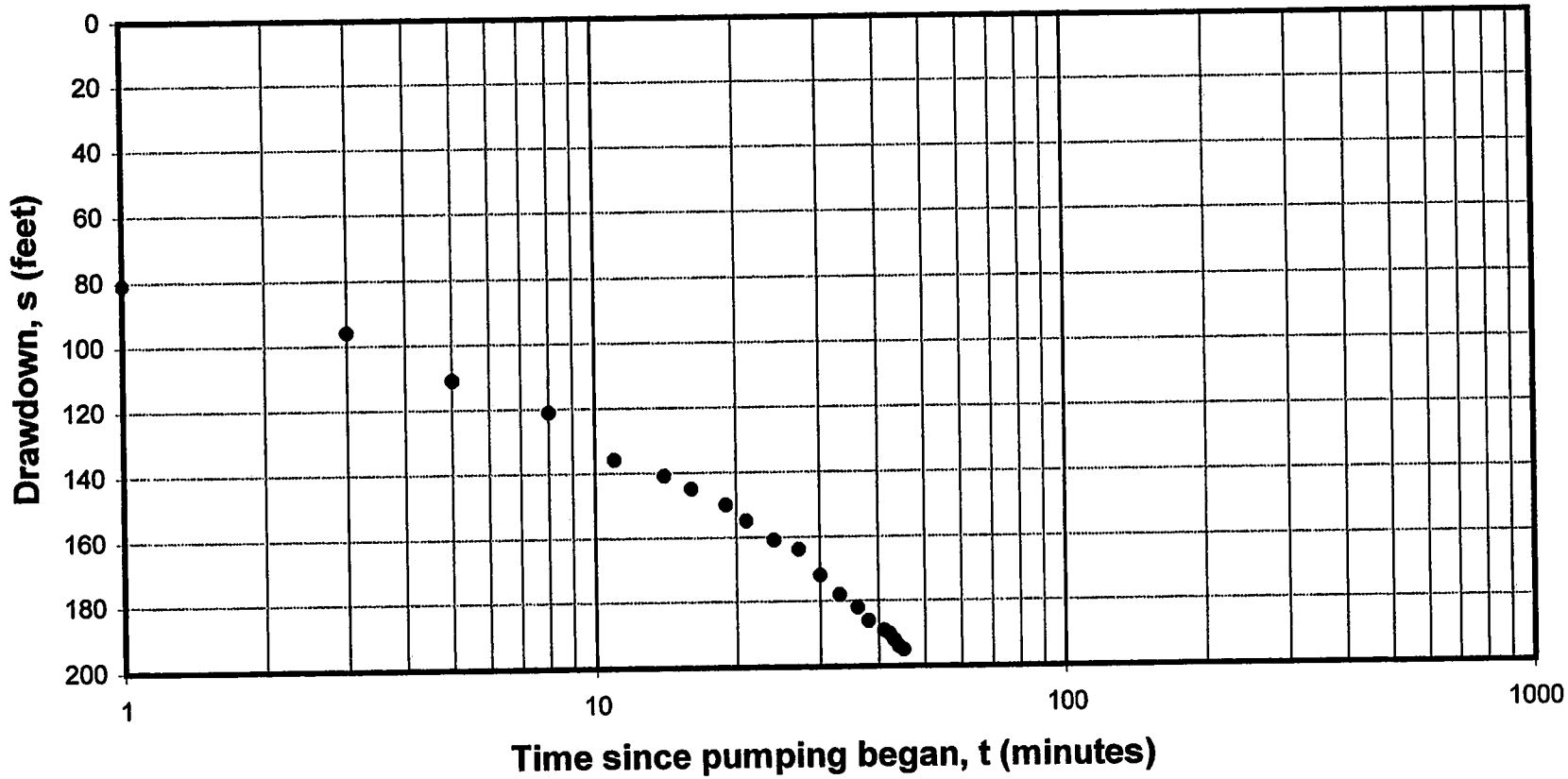
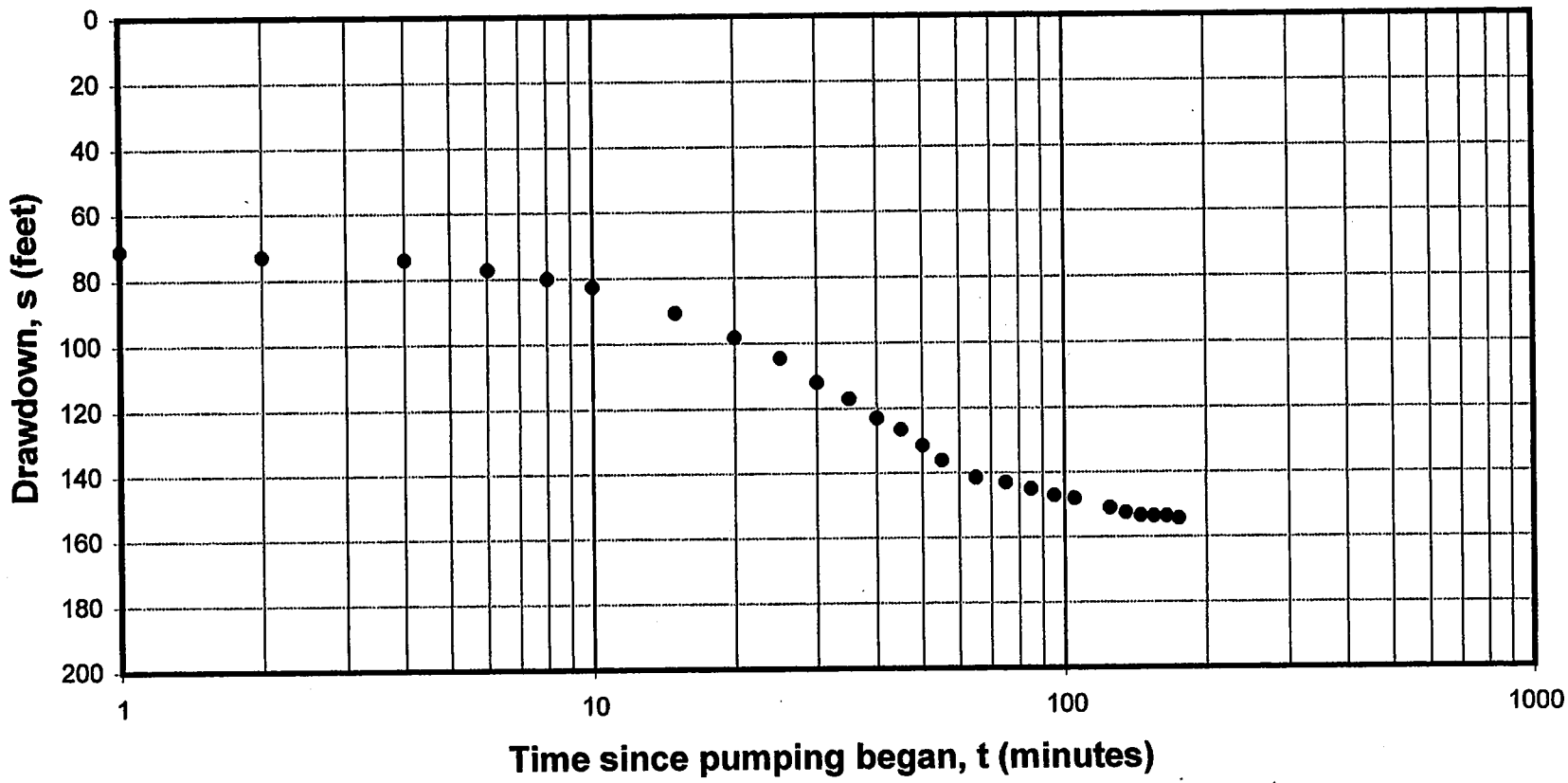


FIGURE 3.4
RED HAWK NO. 2 WELL
3 HOUR CONSTANT DISCHARGE TEST
Q = 100 gpm



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STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLER'S REPORT

Please complete this form in its entirety in accordance with NRS 534.170 and NAC 534.340

OFFICE USE ONLY
Log No.
Permit No.
Basin 85

NOTICE OF INTENT NO. 31932

1. OWNER Wingfield Springs
MAILING ADDRESS 7755 Spanish Springs Road, Sparks, NV 89436
ADDRESS AT WELL LOCATION Red Hawk Golf Course Maintance Area

2. LOCATION SW ¼ SW ¼ Sec. 12 T. 20 (N)S R. 20 E Washoe County
PERMIT NO. W-500A Health 6/96 (Issued by Water Resources) Parcel No. Wingfield Springs (Subdivision Name)

3. WORK PERFORMED: ☐ New Well ☐ Replace ☐ Recondition ☐ Deepen ☒ Abandon ☐ Other
4. PROPOSED USE: ☐ Domestic ☒ Irrigation ☐ Test ☐ Municipal/Industrial ☐ Monitor ☐ Stock
5. WELL TYPE: ☐ Cable ☒ Rotary ☐ RVC ☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
As per Tom Gallager's Direction:				
The interior of the wall was filled with 28 yards (756 sacks) of neat cement. The cement was pumped to the bottom of the well via tremie pipe. Ten foot of gravel was removed from between the 16 inch casing and the 30 inch conductor the void was then filled with 2 yards (54 sacks) of neat cement.				
Matt Dillon and Tim of NDWR witnessed the abandonment.				

Date started March 8, 19 99
Date completed March 10, 19 99

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☒ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
100	200	3 hours

8. WELL CONSTRUCTION
Depth Drilled 730 Feet Depth Cased 705 Feet

HOLE DIAMETER (BIT SIZE)

		From		To	
36	Inches	0	Feet	100	Feet
24	Inches	100	Feet	210	Feet
17½	Inches	210	Feet	710	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
30	118.6	.375	0	100
16	62.58	.375	0	210
10	28.04	.250	210	705

Perforations: Type perforation Wire Wrap Screen-Johnson
Size perforation .130 slot

From 210 feet to 370 feet
From 400 feet to 410 feet
From 420 feet to 445 feet
From 490 feet to 500 feet
From 600 feet to 700 feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal
Placement Method: ☒ Pumped ☐ Poured
Seal Type: ☒ Neat Cement ☐ Cement Grout ☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No
From 0 feet to 705 feet

9. WATER LEVEL
Static water level 4 feet below land surface
Artesian flow G.P.M. P.S.I.
Water temperature cool °F Quality good

10. DRILLER'S CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.
Name Sargent Irrigation Company (Contractor)
Address 9955 North Virginia Street (Contractor), Reno, Nevada 89506
Nevada contractor's license number issued by the State Contractor's Board 21246
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1789
Signed (Driller performing actual drilling on site or contractor)
Date 3-10-99

FIGURE 3.5

SECTION 4.0

RED HAWK WELL NO. 3

4.1 TEST HOLE

4.1.1 Geological Setting

The geological setting in the immediate area consists of deposits of slope and stream wash and eolian sand. Consolidated rocks are tertiary volcanics consisting of basalt, andesite, pyroxene flows, pyro-elastics and related intrusive phases. This formation interfingers with the upper units of the earlier Alta Formation. The basalt flows are post Truckee and Coal Valley overlying and interfingering with these formations. These flows may be dated as middle to upper Pliocene in age. The youngest flows may extend into the early Pleistocene (Lousetown Formation) which consists of predominately flows and associated intrusions of olivine basalt and pyroxene andesites. Rock units to the west of Spanish Springs Valley display Mesozoic granitic rocks and Hartford Hill Rhyolite. (Bonham, 1969) The highly propylitized members of the Alta Formation may be observed in road cuts at the extreme south entrance to Spanish Springs Valley.

4.1.2 Lithology and Test Hole Drilling

The Red Hawk Test Hole No. 3 was drilled (conventional mud rotary method) in February and March 1999, by Sargent Irrigation Co., Reno, Nevada. The test hole was drilled in the SE¼ of the SE¼ of Section 12, Township 20 North, Range 20 East, M.D.B.&M., as shown in Figure 1.1, page 1-2. This site was selected as it is between Red Hawk Well No. 1 (Hardy Well) and the Tucker Well located approximately 1150 feet to the east. These wells are lithologically similar with high specific capacities and yields of 1000 to 1500 gpm. Drilling of a 12¾-inch hole was commenced on February 25, 1999, and completed on March 2, 1999, to a total depth of 410 feet. The Well Driller's Report, which has been filed with the Nevada Division of Water Resources, is shown in Figure 4.1.

The unconsolidated rocks encountered in drilling consist of rounded fine to medium sand from 0 to 30 feet. At 30 to 40 feet, some coarser sand and tan clay is noted. Tan clays prevail from 40 to 95 feet with some fine sand included. From about 70 to 95 feet, the clays were much stiffer slowing drilling penetration to some degree. At 95 feet, consolidated rock was encountered. This rock is a reddish basalt with vesicule size to approximately 1/8" inch minus. The cuttings are angular in shape and range from coarse sand to 1.5 cm in dimension. This rock appears similar to material drilled in the Hardy Well (Red Hawk No. 1) and, by oral communication, in the Tucker Well to the east. This structure displays a high fracture characteristic, possibly due to shrinkage during cooling of relatively thin, multiple extrusive flows.

At 310 to 320 feet, a transition is evident. From this point, a fine-grained grey rock displaying feldspars and fine mafic minerals is present in the groundmass. Some re-crystallization is also suggested. This material is tentatively regarded as an andesite member of the Alta Formation. This sequence also displays an appreciable fracturing feature where drill cuttings are primarily coarse, up to 0.5 to 2.0 cm in size. At 400 feet, an increase in clay was noted, resulting in a sample from 400 to 410 feet containing about 30 – 35% dull grey/brown sandy clay.

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STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLER'S REPORT

Please complete this form in its entirety in accordance with NRS 534.170 and NAC 534.340

OFFICE USE ONLY
Log No.
Permit No.
Basin

NOTICE OF INTENT NO. 37899

1. OWNER WINGFIELD SPRINGS
MAILING ADDRESS 7755 SPANISH SPRINGS RD
SPARKS NV 89436

ADDRESS AT WELL LOCATION
POCO REY AT FUTURE PARK

2. LOCATION SE ¼ SE ¼ Sec. 12 T. 20 N/S R. 20 E. WASHOE County
PERMIT NO. W-500B/HEALTH 6272 (Issued by Water Resources) 522-010-23 (Parcel No.) WINGFIELD SPRINGS (Subdivision Name)

3. WORK PERFORMED
☒ New Well ☐ Replace ☐ Recondition
☐ Deepen ☐ Abandon ☐ Other

4. PROPOSED USE
☐ Domestic ☒ Irrigation ☐ Test
☐ Municipal/Industrial ☐ Monitor ☐ Stock

5. WELL TYPE
☐ Cable ☐ Rotary ☒ RVC
☐ Air ☐ Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
BROWN CLAY & ROCK		0	95	95
RED, BROWN ROCK		95	275	180
BLACK BASALT BROKEN		275	360	85
GRAY ANDESITE		360	409	49

Date started FEBRUARY 25, 19 99
Date completed MAY 20, 19 99

7. WELL TEST DATA
TEST METHOD: ☐ Bailer ☒ Pump ☐ Air Lift

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
1100	76	72

8. WELL CONSTRUCTION
Depth Drilled 410 Feet Depth Cased 410 Feet

HOLE DIAMETER (BIT SIZE)

		From	To
36	Inches	0 Feet	100 Feet
24	Inches	100 Feet	205 Feet
17 1/2	Inches	205 Feet	410 Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
30	118.6	.375	0	100
16	62.58	.375	0	100
16	62.58	.375	150	170
10	28.04	.250	400	410

Perforations:
Type perforation LCS WIRE WRAP SCREEN
Size perforation 130 SLOT
From 16" 100 feet to 150 feet
From 10" 170 feet to 400 feet
From ____ feet to ____ feet
From ____ feet to ____ feet
From ____ feet to ____ feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 100
Placement Method: ☒ Pumped ☐ Poured
Seal Type: ☒ Neat Cement ☐ Cement Grout ☐ Concrete Grout

Gravel Packed: ☒ Yes ☐ No
From 100 feet to 409 feet

9. WATER LEVEL
Static water level 25 feet below land surface
Artesian flow ____ G.P.M. ____ P.S.I.
Water temperature COOL °F Quality GOOD

10. DRILLER'S CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.
Name SARGENT IRRIGATION COMPANY (Contractor)
Address 9955 NORTH VIRGINIA STREET (Contractor)
RENO NEVADA 89506
Nevada contractor's license number issued by the State Contractor's Board 0021246
Nevada driller's license number issued by the Division of Water Resources, the on-site driller 1540
Signed [signature] (By driller performing actual drilling on site or contractor)
Date JUNE 15, 1999

FIGURE 4.1

Clays, other than that encountered in the unconsolidated mantle and at the 400 to 410 foot level, were conspicuously in absence. An occasional, but minimal, amount of brown to grey soft clay was noted at varying depths, but seldom exceeded 2 or 3% of the sample. The most consistent clay was a yellowish, waxy amorphous material primarily consisting of very thin patina-like layers on fracture surfaces. At intervals, a larger clast of this clay, 0.5 to 1.0 cm, was observed, but contributed an extremely small percentage of the sample content. A description of drill cutting samples with depth of occurrence is presented in Table 4.1 – Lithology Log for Test Hole No. 3, pages 4-4 and 4-5. The drill penetration rates are presented in Table 4.2 – Penetration Time Log for Test Hole No. 3, page 4-6.

The electric log (Appendix C.1) suggested the possibility of moderate to good production zones mainly from 95 to 250 feet in the basalt horizon and from 320 to 400 feet in the andesitic formation.

4.1.3 Test Well Pumping and Analysis

In March 1999, the test hole was converted to a test well for the purpose of verifying the potential of a production well. The test well design specified 6-inch casing to a depth of 350 feet (total depth of test hole is 410 feet) with a submersible pump set at 195 feet below ground surface. Perforated casing was installed at the following intervals: 100-140 feet, 200-240 feet, and 300-340 feet (see Figure 4.2, page 4-7). The test well was gravel packed with a Gopher 3/8" minus gravel and developed through air lifting.

A four-hour constant discharge pump test (300 gpm) was conducted on March 30, 1999 (see Appendix C.2). The water level was recorded through the duration of the pump test and used to derive the time-drawdown curve (see Figure 4.3, page 4-8). An estimate of the coefficient of transmissivity of 137,000 gpd/ft was calculated from the pumping data. The test was sufficient to support the drilling of a production well at this site. The 6-inch casing was removed after the pump test.

4.2 PRODUCTION WELL

4.2.1 Well Construction

Production well construction commenced on May 7, 1999, and completed in the early hours the following morning. Figure 4.4, page 4-9, is a diagram of the production well construction. The cement grout sanitary surface seal cements a 30-inch diameter surface casing into a 36-inch diameter borehole to a depth of 100 feet. From 100 feet to 175 feet below ground surface, the borehole is 24 inches. From 175 feet below ground surface to the total depth of the well (410 feet), the borehole is 18 inches. A 16 3/8-inch casing extends from approximately 2 feet above ground surface to 175 feet below ground surface with high capacity well screen in the 100-150 foot interval. At 175 feet a 5-foot blank and bell reducer connects the 16 3/8-inch casing to 225 feet of 10¾-inch high capacity well screen. The bottom of the well consists of a 10 foot section of 10¾-inch blank with a concrete plug. The well screen is 130 slot (0.130 inches) high-capacity continuous slot screen. The annular space between the casing and borehole is gravel-packed with a Gopher 3/8" minus gravel from the ground surface to the total depth of the well. Two 1½-inch steel water level sounding tubes were installed to a depth of 170 feet. A steel surface collar plate with a 4-inch gravel port completed the well construction.

TABLE 4.1
LITHOLOGY LOG FOR TEST HOLE NO. 3

DEPTH	DESCRIPTION
0-10	Fine to medium siliceous sand, round to sub-round, few small cobbles, minimal clay.
10-20	Medium to coarse sand, few small cobbles, minimal clay.
20-30	Same as 10-20 feet.
30-40	Fine to medium sand. Increase in cobbles 33 to 36 feet. Some soft tan clay (25%).
40-50	Fine to medium sand, few cobbles and pebbles, soft tan clay (60%).
50-60	Stiff tan clay (95%), few pebbles.
60-70	Same as 50-60 feet.
70-80	Stiff clay (95%), few angular basalt clasts.
80-90	Tan clay, softer (90%), sub-angular grit.
90-95	Same as 80 to 90 feet.
95-100	Minimal clay, angular fragments reddish vesicular basalt, fine ground mass contains some quartz, feldspars and biutite.
100-110	Some reddish fractured basalt, some manganese oxide patination on fracture surfaces.
110-120	Same as 100-110 feet.
120-130	Same as 100-110 feet. Somewhat harder at 125 feet.
130-140	Same as 100-110 feet.
140-150	Same as 100-110 feet. Some yellow waxy hard clay.
150-160	Some basalt, smaller cuttings, minimal clay.
160-170	Basalt, increase in vesicules, yellow-brown clay (5%), cuttings to 1.0 cm.
170-180	Basalt, sandy brown clay (10%).
180-190	Basalt, less sandy clay, yellow waxy clay.
190-200	Basalt, no clay, cutting smaller, coarse sand size.
200-210	Basalt, some white clay, as vesicule filling? Fine cuttings.

DEPTH	DESCRIPTION
210-220	Same as 200-210 feet.
220-230	Basalt, some grey with pyroxenes.
230-240	Grey fine grained basalt and red granular basalt. Possible flow contact 230-235 feet. Slower penetration, no fracturing.
240-250	Same as 230-240, with red basalt predominate.
250-260	Same as 230-240, cutting larger in size with silica from vesicules. Red mottles in grey basalt suggest possible oxidation.
260-270	Same as 250-260, with 5% yellow/orange to white chalcedony.
270-280	Same with some manganese oxide on red basalt. At 275 feet, predominately grey.
280-290	Grey hard fractured rock (andesite), cuttings flat angular to 1.0 cm. Some soft brown clay.
290-300	Grey hard rock, minute vesicules in some, some brown sandy clay, yellow hard waxy clay.
300-310	Same as 290-300 feet. Cutting larger to 1.5 cm, slightly more hard yellow waxy clay.
310-320	Grey hard rock, dull grey sandy clay, rock suggest possibly re-crystallization.
320-330	Same as 310 to 320 feet. Some grey sandy clay.
330-340	Same, some brown sandy clay and yellow hard clay on fracture surfaces.
340-350	Same fine grained grey rock, some feldspars observed on fresh fractures. Some mafic minerals present. Possibly traces of iron sulfide. Increase in observable biotite at 345 feet.
350-360	Same as 340-350 feet. Clay and manganese oxide on some fracture faces. Rock hard.
360-370	Same as 350-360 feet. Cuttings to 1.0 cm.
370-380	Same as 370-380 feet.
380-390	Some hard rock, cuttings to 1.5 cm. Faster penetration 381-386 feet, some tan clay.
390-400	Same hard rock. Increase in penetration, cuttings to 2.0 cm. Some tan/grey clay.
400-410	Some hard rock. Faster penetration with cuttings to 2.0 cm. Dull grey/brown clay (35%).

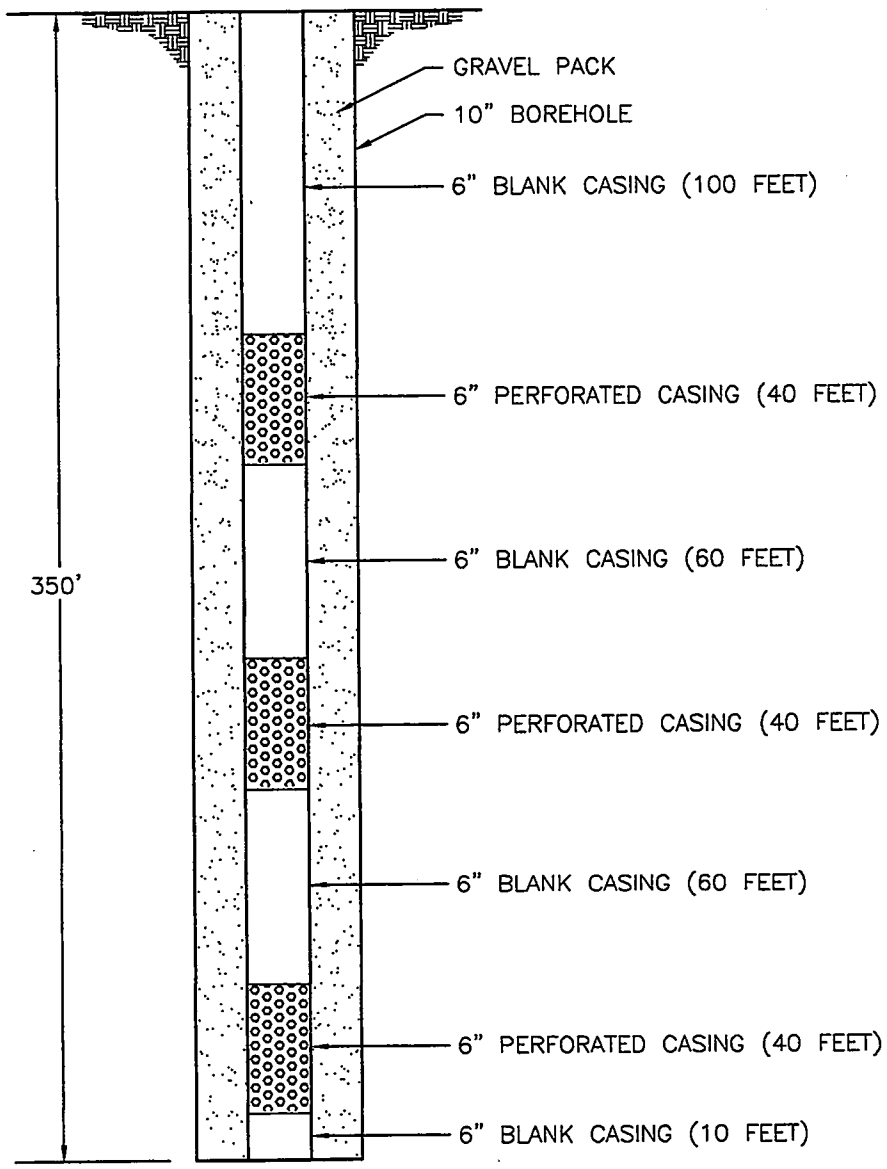
TABLE 4.2

PENETRATION TIME LOG FOR TEST HOLE NO. 3

DEPTH	FEET	TIME (min.)	FT./MIN.	FT./HR.
0-10	10.00	(spud in)		
10-41.90	31.90	78	0.409	24.54
41.90-71.43	28.93	49	0.590	35.42
71.43-100.14	29.31	108	0.271	16.28
100.14-131.14	31.00	57	0.544	32.63
131.14-159.69	28.55	46	0.621	37.24
159.69-189.72	30.03	40	0.750	45.04
189.72-219.67	29.95	73	0.410	24.62
219.67-250.92	31.25	123	0.254	15.24
250.92-282.02	31.10	54	0.576	34.55
282.02-313.82	31.80	124	0.256	15.39
313.82-345.64	31.82	140	0.227	13.64
345.64-377.24	31.60	194	0.163	9.77
377.24-408.39	31.15	118	0.264	15.84

Total Depth: 408.39 feet
Total Time Drilling: 1204 minutes (20.07 hours)
Average Drilling Speed: 0.331 ft/min. (19.853 ft/hr.)

NOTE: Length of stabilizers and drill pipe varied. Each unit was measured when installed to maintain accuracy in depth measurements.

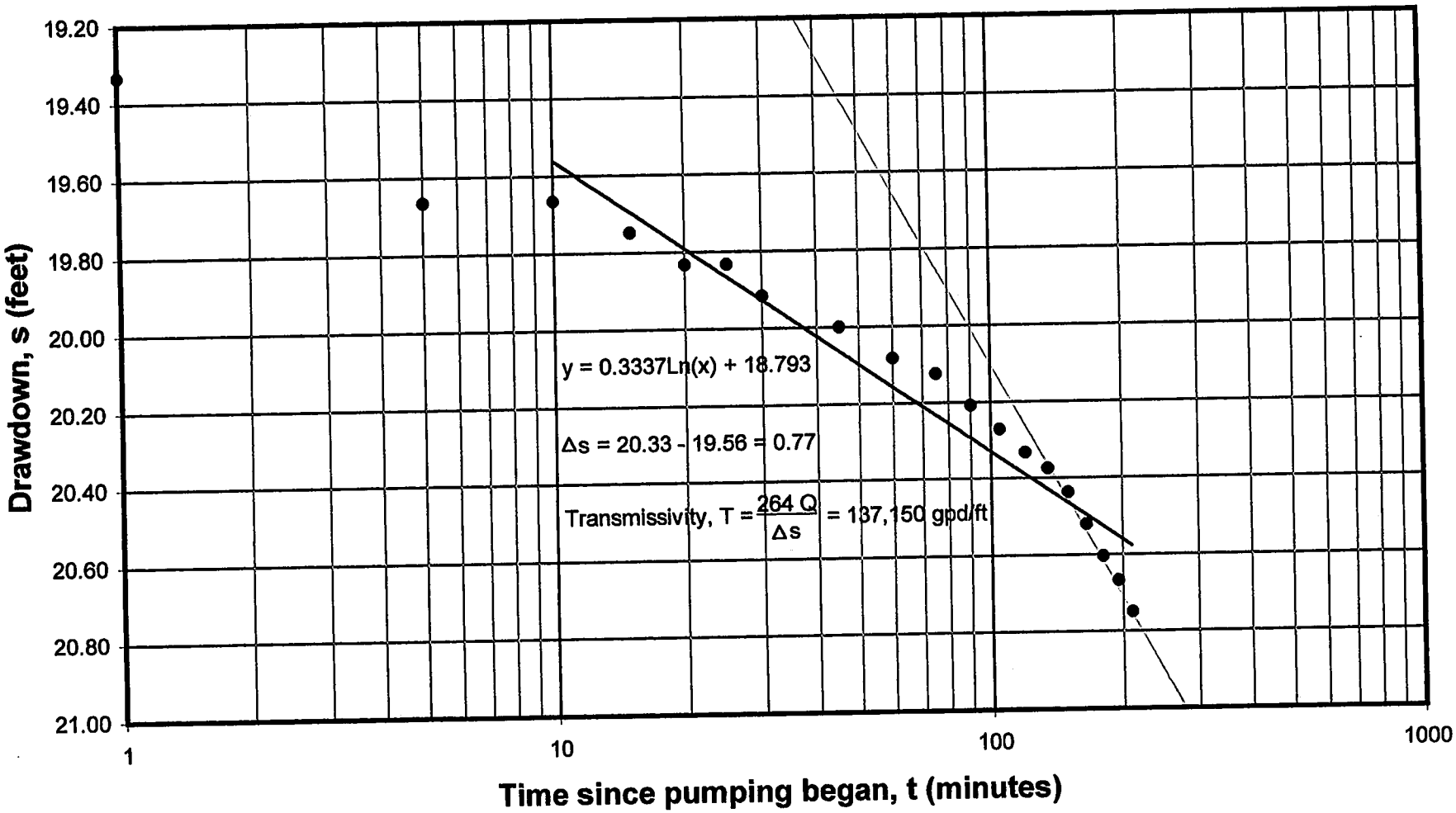


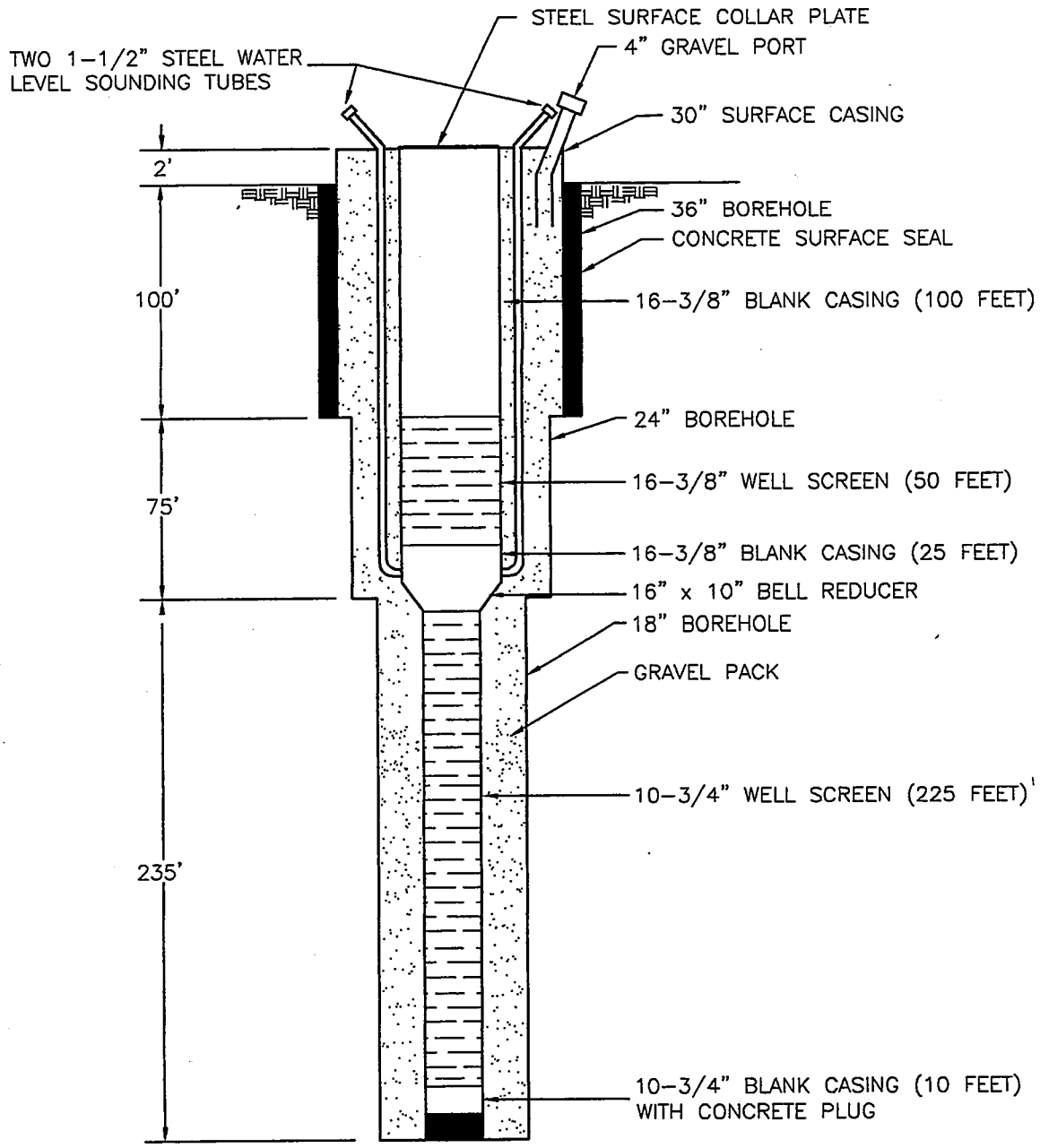
NOT TO SCALE

Figure 4.2

waterresource consulting engineers, inc. 730 TAHOE STREET - RENO, NEVADA - 89509	WINGFIELD SPRINGS	JOB NO. 9724.22 DATE 6-16-99 DRN. BY RBP CHK. BY GWB
DATE / REVISIONS / BY	RED HAWK WELL NO. 3 TEST WELL DESIGN	Figure 4.2

FIGURE 4.3
RED HAWK NO. 3 TEST WELL
4 HOUR CONSTANT DISCHARGE TEST





NOT TO SCALE

Figure 4.4

wateresource consulting engineers, inc. 730 TAHOE STREET - RENO, NEVADA - 89509	WINGFIELD SPRINGS	JOB NO. 9724.22 DATE 6-16-99 DRN. BY RBP CHK. BY GWB
DATE / REVISIONS / BY	RED HAWK WELL NO. 3 DESIGN	Figure 4.4

Following the completion of the production well construction, development efforts were performed for approximately 34 hours, consisting of jetting and air lifting. Additional well development included approximately 6 hours of pumping and surging.

4.2.2 Test Pumping and Analysis

A step drawdown test was performed on May 20, 1999 at discharge rates of 405, 800, 1090, and 1310 gpm producing the following results:

Flow, Q (gpm)	Duration (minutes)	Drawdown, s (feet)	Specific Capacity Q/s (gpm/ft)	Well Efficiency (%)
405	180	18.83	21.51	49.80
800	120	49.86	16.04	33.44
1,090	150	83.55	13.05	26.94
1,310	120	127.24	10.30	23.50

The above drawdowns had all reached an essentially stabilized level at the noted pumping rate.

Well efficiency (E) was calculated using the following formula:

$$E = \frac{1}{1 + (C/B)Q}$$

25.78 SWL
75.72
101.50 P.L.
100 FEET START OF SCREENS

The Step Test Diagram is presented in Figure 4.5 and the 12-hour step drawdown data is presented in Appendix C.3.

A 72-hour constant discharge test (1000 gpm) was initiated on May 24, 1999 (see Appendix C.4 for data). The test pump was set at a depth of 168 feet and pumped at a rate of 1,000 gpm. The static water level prior to pumping was 25.78 feet. A maximum drawdown of 75.72 feet occurred near the end of the test. The time-drawdown curve for the pumping period is presented in Figure 4.6, page 4-12.

The 72-hour pumping period was immediately followed by 24 hours of water level recovery monitoring (see Appendix C.4 for data). The Red Hawk Well No. 3 water level achieved total recovery to the original non-pumping water level of 25.78 feet in less than 21 hours. The calculated recovery graph is presented in Figure 4.7, page 4-13. A transmissivity value of 157,500 gpd/ft was determined for the Red Hawk Well No. 3 using the calculated recovery graph.

Observation data were collected at the County's Spring Creek Well No. 6, Tucker Well ("Big Well") and Wingfield Springs' Red Hawk Well No. 1 (Hardy Well) (see Appendix D for data). The time-drawdown graphs for the three observation wells are presented in Figures 4.8, 4.9 and 4.10 (pages 4-14, 4-15 and 4-16), respectively.

FIGURE 4.5
RED HAWK WELL NO. 3
STEP TEST DIAGRAM

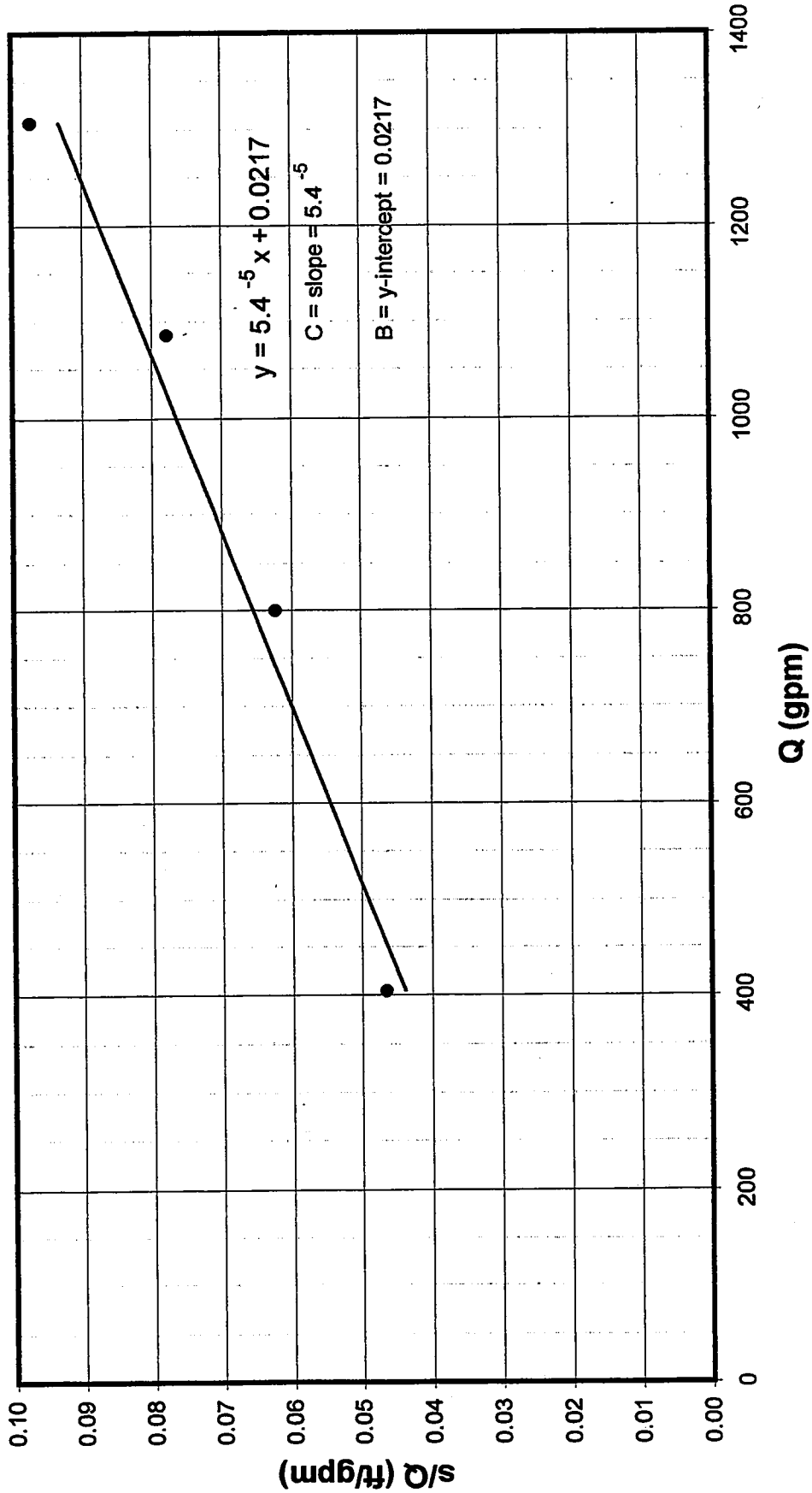


FIGURE 4.6
RED HAWK WELL NO. 3 DRAWDOWN
72-HOUR CONSTANT DISCHARGE TEST

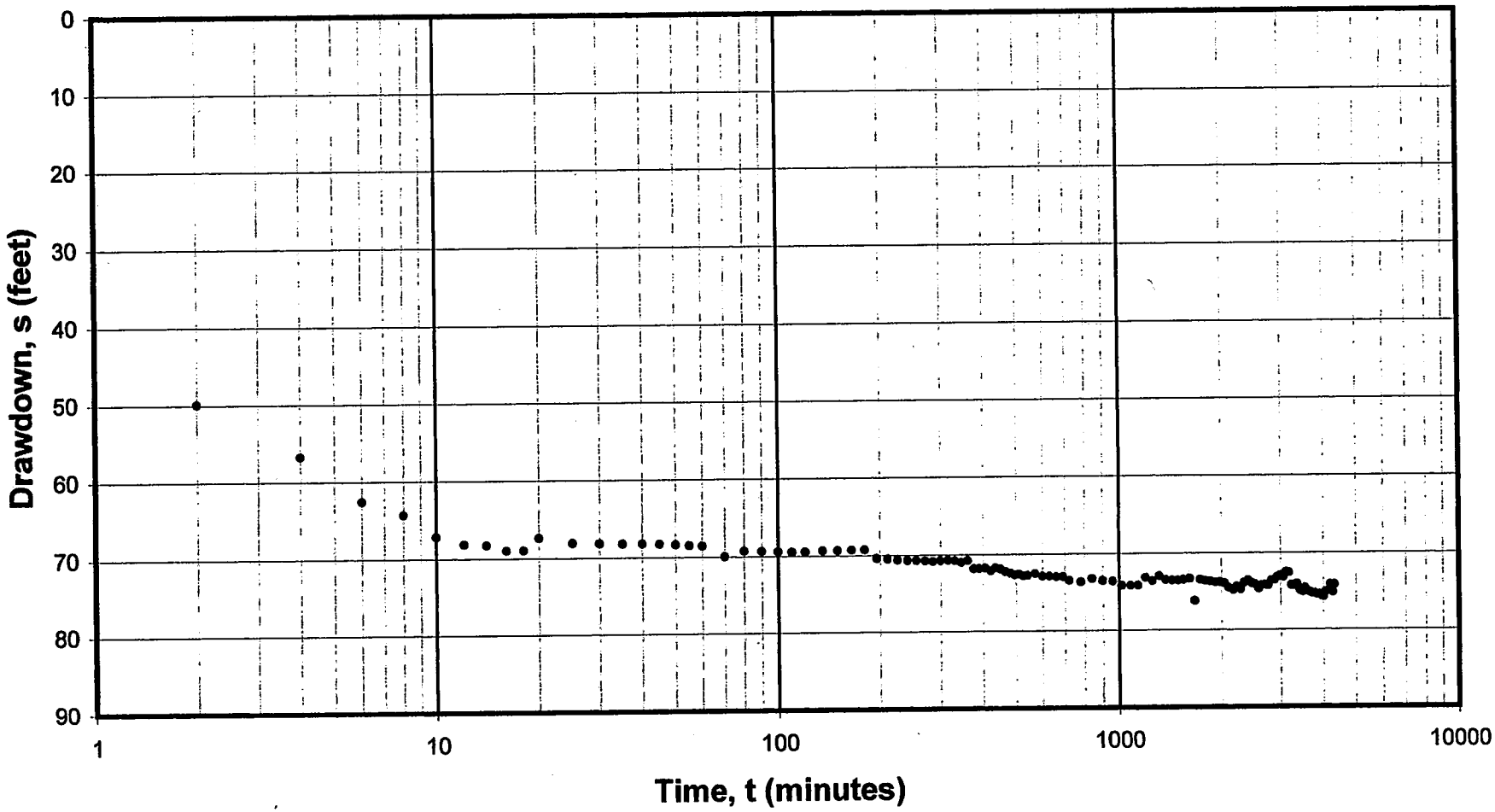


FIGURE 4.7
RED HAWK WELL NO. 3 RECOVERY
72-HOUR CONSTANT DISCHARGE TEST

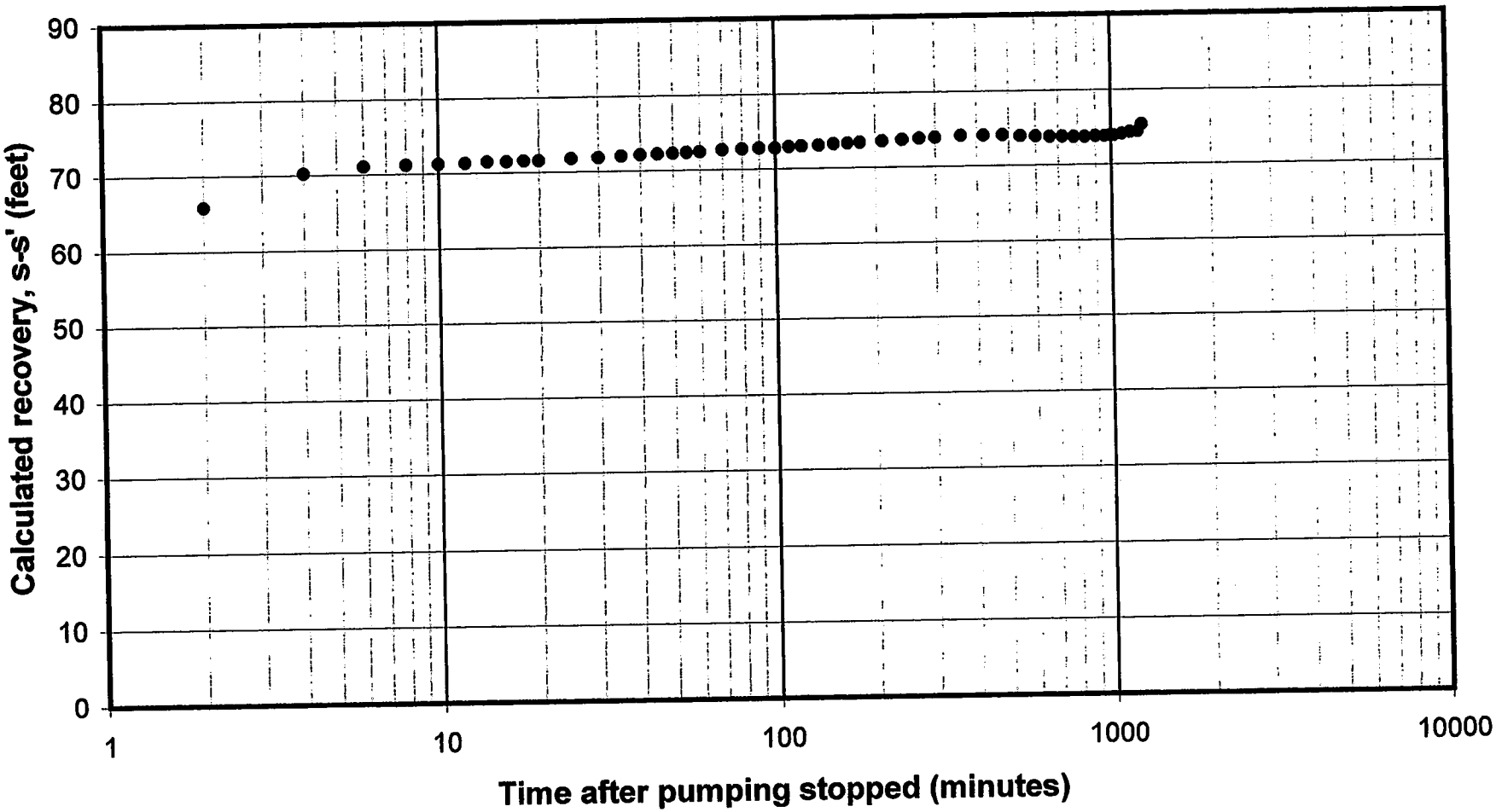


FIGURE 4.8
SPRING CREEK WELL NO. 6 DRAWDOWN
72-HOUR CONSTANT DISCHARGE TEST

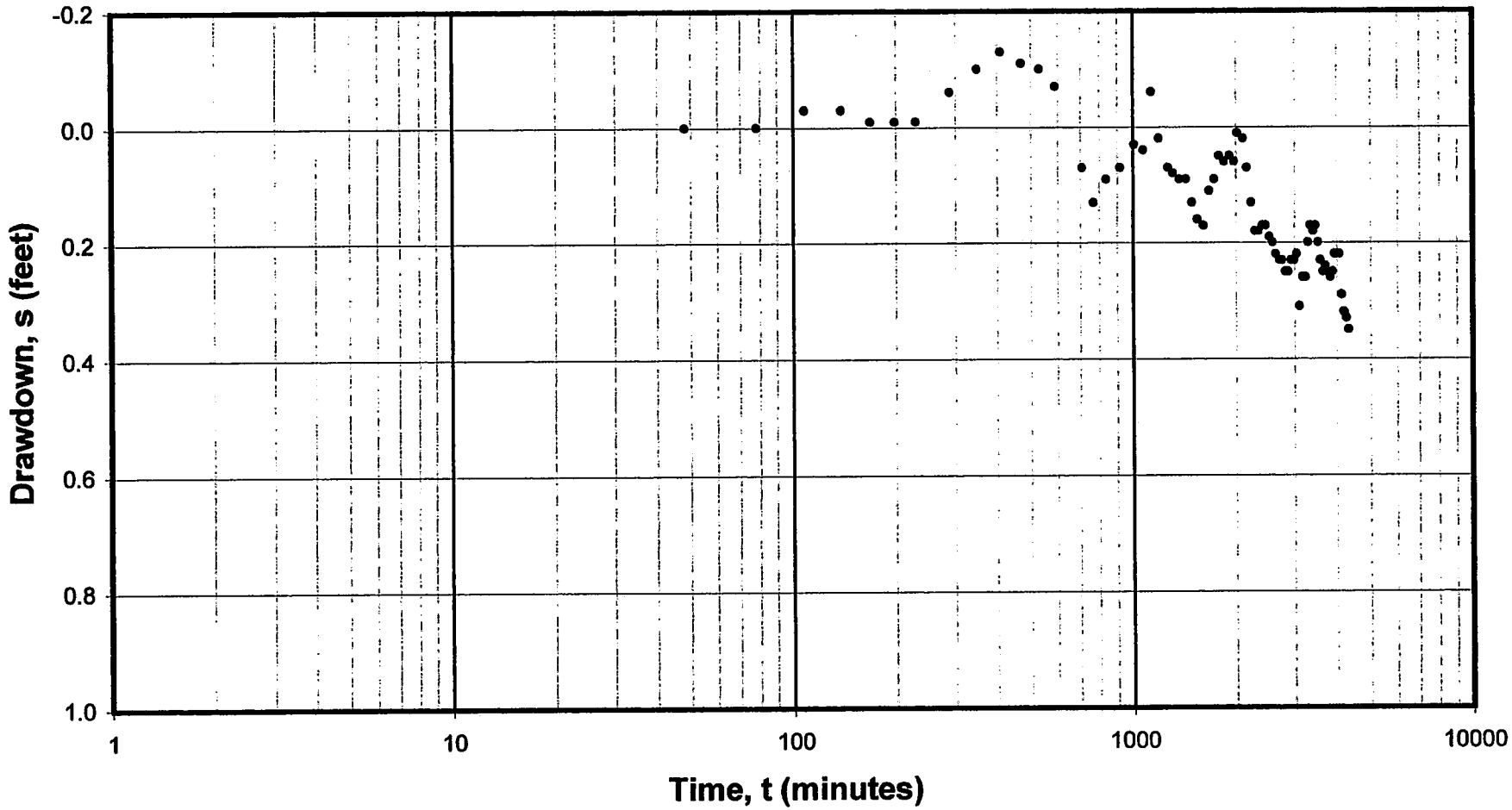


FIGURE 4.9
TUCKER WELL DRAWDOWN
72-HOUR CONSTANT DISCHARGE TEST

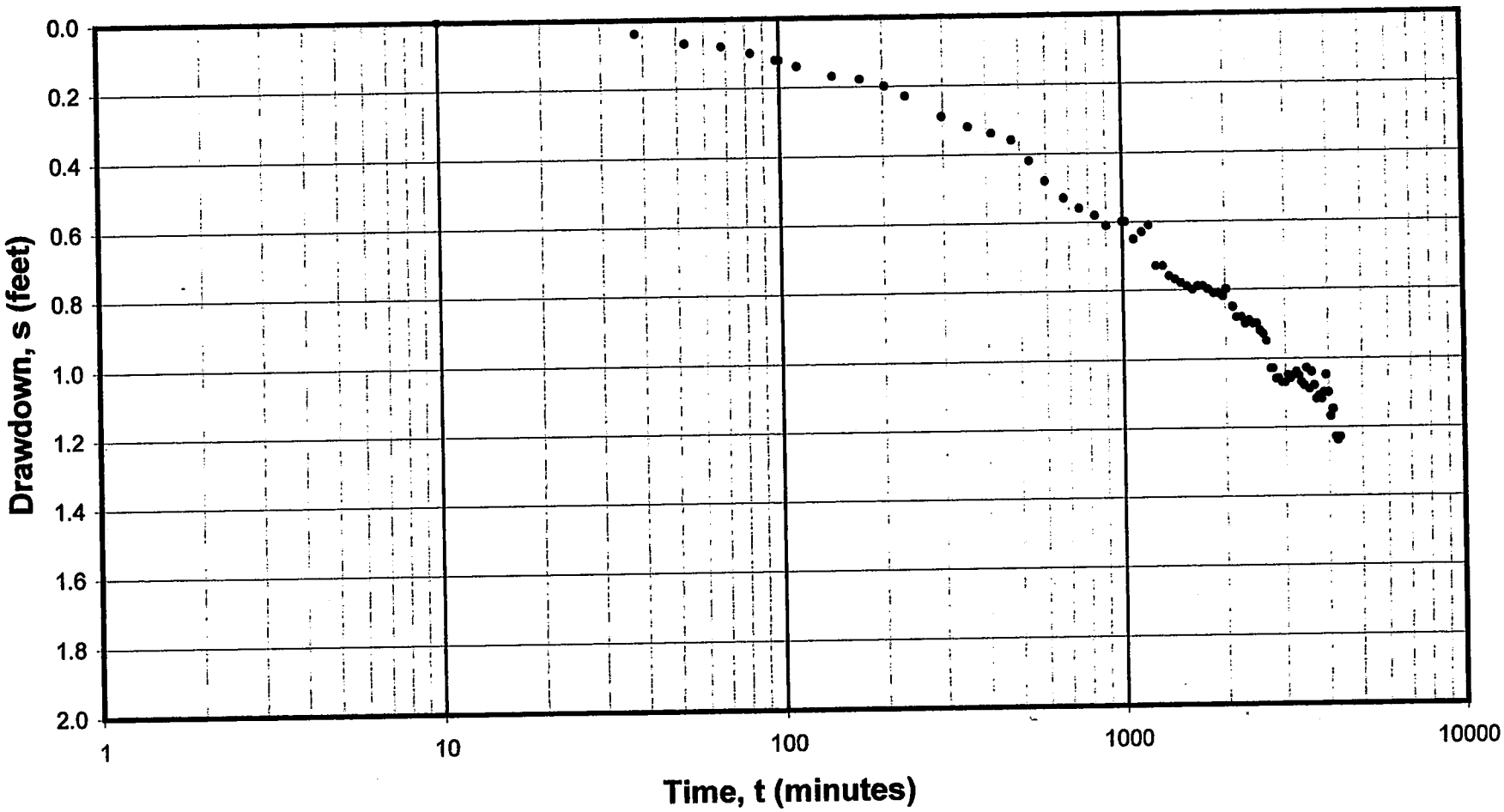
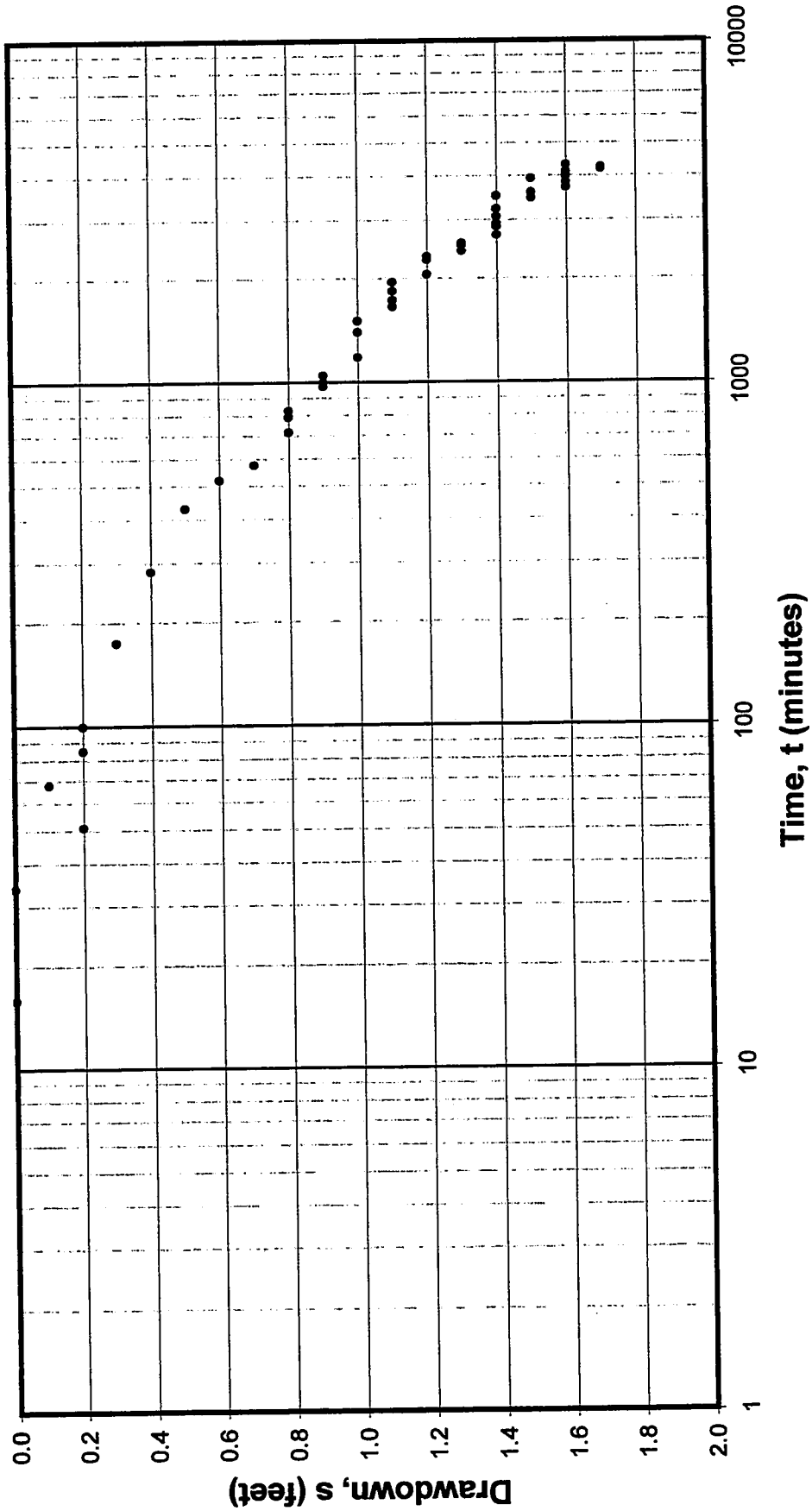


FIGURE 4.10
RED HAWK WELL NO. 1 DRAWDOWN
72-HOUR CONSTANT DISCHARGE TEST



WATERESOURCE CONSULTING ENGINEERS, INC.

The drawdowns at the conclusion of the 72-hour constant discharge test in the observation wells are as follows:

Observation Well	Maximum Drawdown (feet)	Distance from Red Hawk Well No. 3 (feet) *
Spring Creek Well No. 6	0.35	4,200
Tucker Well	1.23	1,150
Red Hawk Well No. 1	1.70	2,050

* Distances were estimated by field survey

Table 4.3 presents transmissivity and storativity values for all wells used in this analysis. Aquifer characteristics for the Tucker Well and Red Hawk Well No. 1 were determined individually using their respective time-drawdown graphs and the Jacob modification of the Theis non-equilibrium formula. For comparison, this table includes transmissivity and storativity values determined previously from the following reports:

1. Spring Creek Well No. 6 Construction and Testing Report, January 1999, County of Washoe, Department of Water Resources.

2. Aquifer Stress Test Results for the "Big Well" (referred to as Tucker), April 1988, William E. Nork, Inc.

3. Spanish Springs Ranch Well (referred to as Red Hawk Well No. 1), June 1987, Wateresource Consulting Engineers, Inc.

A distance-drawdown graph for the three wells is presented in Figure 4.11, page 4-19. Utilizing the distance-drawdown graph, a transmissivity of 318,000 gpd/ft and a storativity of 0.0033 were determined for the aquifer penetrated by the three wells. The transmissivity value agrees with previous pump test analyses performed by the County and Nork.

Considering all transmissivity and storativity values presented in Table 4.3, a transmissivity of 280,000 gpd/ft and storativity of 0.002 were selected to represent the aquifer characteristics for this general hydrogeologic area. These values were used for purposes of calculating short term and long term drawdowns within the County well and Tucker well under the influence of Red Hawk Well No. 3.

Drawdowns were estimated using the method as described in Johnson's **Groundwater and Wells** for intermittent pumping situations:

> "...the cycling well is assumed to be replaced by two imaginary wells which pump continuously without cycling. One well is assumed to pump continuously throughout the entire operating period at a rate that would produce a volume equal to the volume produced by the cycled well. The other imaginary well is assumed to pump for one pumping cycle only and at a rate equal to the difference between the actual pumping rate and that of the first imaginary well. The drawdowns in each imaginary well are determined and added together to give a reliable estimate of the drawdown in the real well."

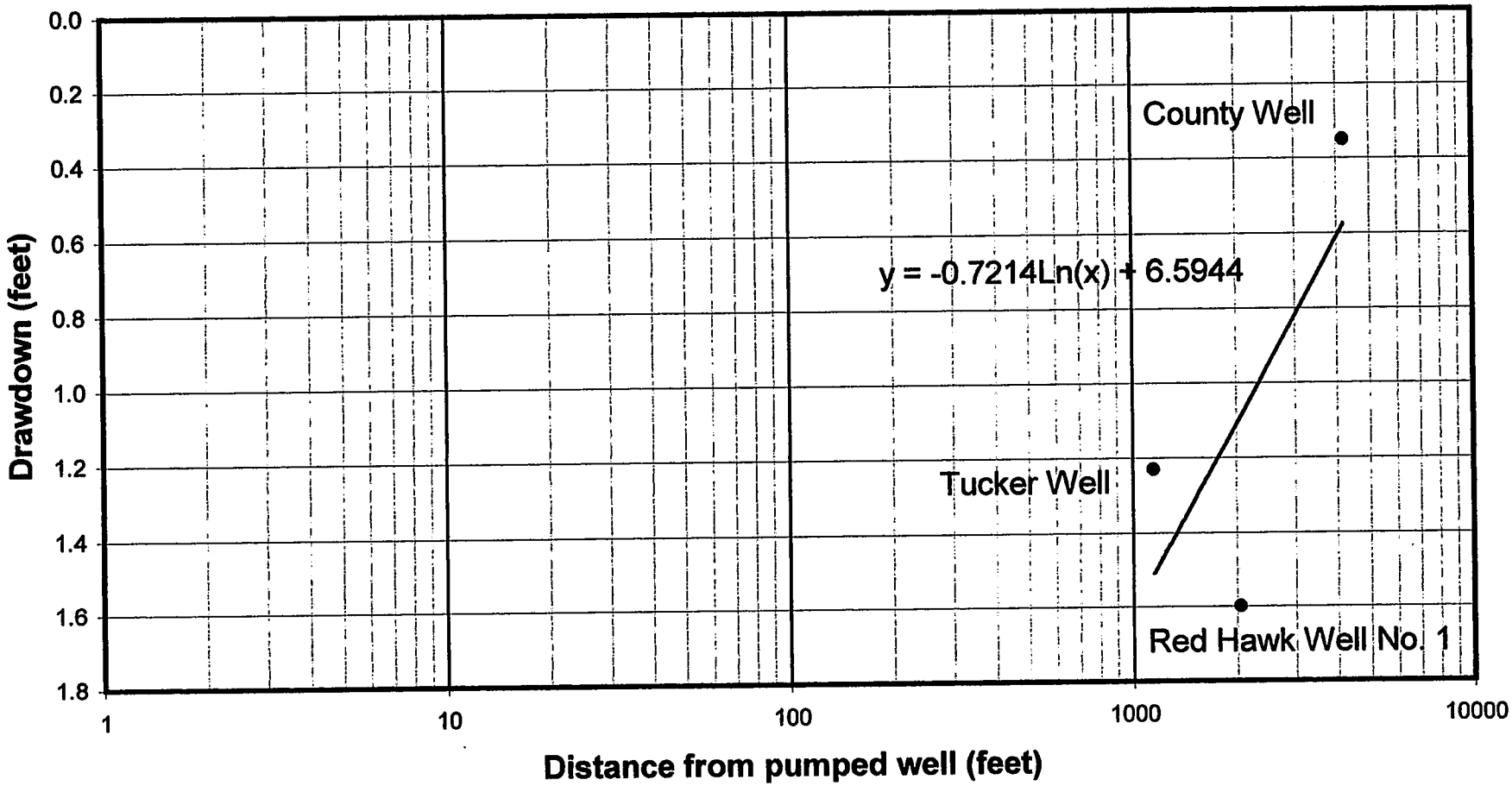
TABLE 4.3 Aquifer Characteristics: Transmissivity and Storativity

Well	WCE, 1999 [A]		County, 1999 [B]		Nork, 1988 [C]		WCE, 1987 [D]	
	T (gpd/ft)	S (unitless)	T (gpd/ft)	S (unitless)	T (gpd/ft)	S (unitless)	T (gpd/ft)	S (unitless)
Red Hawk Well No. 3	157,500 [1]	-	-	-	-	-	-	-
Red Hawk Well No. 1	369,000 [2]	0.0007 [2]	300,000	0.0050	264,000-312,000	0.00074-0.00091	120,000	0.0005
Tucker Well	452,000 [3]	0.0044 [3]	347,000-364,000	0.0010	293,000	-	-	-
Spring Creek Well No. 6	-	-	102,500	0.0030	-	-	-	-
Distance-Drawdown Method	318,000 [4]	0.0033 [4]	-	-	-	-	-	-

1. Transmissivity determined from the Calculated Recovery graph, Figure 4.7
2. Transmissivity and storativity determined from the Time-Drawdown graph, Figure 4.10
3. Transmissivity and storativity determined from the Time-Drawdown graph, Figure 4.9
4. Transmissivity and storativity determined from the Distance-Drawdown graph, Figure 4.11

A. Red Hawk Well No. 3 Well Completion/Evaluation Report
B. Spring Creek Well No. 6 Construction and Testing Report, January 1999, County of Washoe, Department of Water Resources
C. Aquifer Stress Test Results for the "Big Well" (referred to as Tucker), April 1988, William E. Nork, Inc.
D. Spanish Springs Ranch Well (referred to as Red Hawk Well No. 1), June 1987, Wateresource Consulting Engineers, Inc.

FIGURE 4.11
DISTANCE-DRAWDOWN
72-HOUR CONSTANT DISCHARGE TEST



		COUNTY WELL	TUCKER WELL
Water level prior to 72-hour pump test (feet)		32.03	32.75
Water level at end of 72-hour pump test (feet)		32.38	33.98
Max drawdown during 72-hour pump test (feet)		0.35	1.24
Red Hawk Well No. 3 pumping 588.89 AFY at 1,000 gpm (diversion rate = 2.228 cfs)			
Projected drawdown (feet)	1 year	1.18	2.04
	5 years	1.42	2.28
	10 years	1.52	2.38
Red Hawk Well No. 3 pumping 588.89 AFY at 1,645 gpm (diversion rate = 3.667 cfs)			
Projected drawdown (feet)	1 year	1.35	2.68
	5 years	1.59	2.92
	10 years	1.69	3.03

Red Hawk Well No. 3 will be pumped intermittently for a period of eight months out of the year; however, Wingfield Springs will utilize both Red Hawk Well No. 1 and No. 3 for its golf course irrigation requirements. For purposes of determining the worst case pumping impacts, we assumed that Wingfield Springs will pump their entire water right (588.89 AFY) from Red Hawk Well No. 3 over a twelve-month period. Using Theis' non-equilibrium well equation, drawdowns in the Spring Creek No. 6 Well and the Tucker Well were determined over a period of one year, five years and ten years:

Observation Well	1-year drawdown (feet)	5-year drawdown (feet)	10-year drawdown (feet)
Spring Creek Well No. 6	1.18	1.42	1.52
Tucker Well	2.04	2.28	2.38

4.2.3 Water Quality

Water samples obtained after the 72-hour constant discharge test were analyzed by Sierra Environmental Monitoring, Inc. The results of that analysis are presented in Table 4.4.

TABLE 4.4

WATER QUALITY ANALYSIS

CONSTITUENT	CONCENTRATION (mg/l)
Bicarbonate Alkalinity	90.0
Carbonate Alkalinity	2.0
Hydroxide Alkalinity	<1.0
Total Alkalinity	9.0
Total Dissolved Solids	179.0
Arsenic	<0.002
Calcium	7.7
Chloride	9.9
Fluoride	0.2
Iron	0.41
Magnesium	3.4
Manganese	0.007
Nitrate	1.9
Sodium	41.0
Sulfate	14.0
PH	8.38 (pH units)
Color Apparent	<20.0 (color units)

4.3 HYDROGEOLOGICAL DISCUSSION

Red Hawk No. 3 was pumped at a constant rate of 1000 gpm for 72 hours, recording a maximum drawdown of 75.72 feet, resulting in a specific capacity of 13.2 gallons per foot of drawdown. County Well (Spring Creek No. 6) was pumped for 220 hours at 1200 gpm with a maximum drawdown of 84.59 feet indicating a specific capacity of 14.2 gallons per foot of drawdown. Red Hawk No. 1 (Hardy Well) was tested at 800 gpm for 24 hours resulting in a maximum drawdown of 12.54 feet (excluding the artesian head) for a specific capacity of about 63 gallons per foot of drawdown. The Tucker Well was tested for 120 hours of continuous pumping at 1500 gpm, showing a maximum drawdown of 13.84 feet (excluding the artesian head), indicating a specific capacity of about 108.3 gallons per foot of drawdown.

Impact by test pumping indicates a somewhat similar pattern on the wells being observed during these tests. During the long (220 hours) test of County Well (Spring Creek No. 6), Red Hawk No. 1's static level was recorded as lowering 1.70 feet and the Tucker Well 1.50 feet. Red Hawk No. 3 had not yet been drilled. The distance here involved is about 4000 feet from County Well No. 6 in each case. During the 72 hour test of Red Hawk No. 3, Red Hawk No. 1 was lowered 1.70 feet and Tucker Well 1.24 feet, while the County Well (Spring Creek No. 6) appeared to be lowered 0.35 feet. Lateral distances involved here are 2050 feet, 1100 feet and 4200 feet, respectively. In a fairly broad sense, it appears that, with the distance, time and volumes pumped, the Red Hawk No. 3 and County Well (Spring Creek No. 6) exert a similar impact on other wells located within the bounds of the implied basaltic rock aquifer area.

All four of these wells derive their production from rock aquifers primarily consisting of basalt with elements of sinter or scoria included. The basalt displays varying degrees of vesicular features. The sinter or scoria displays characteristic porous appearing structure, but the vesicules are very small. Fracturing by localized faulting or shearing is also noted to varying degrees. The rock appears relatively thinly laminated and parting planes resulting from cooling and shrinking are evident.

The element of fracturing was evident in the Red Hawk Well No. 1 during the drilling cycle. Data is lacking on the Tucker Well, but it appears it can be safely presumed that rather excessive fracturing may have been encountered. This is predicated on the high specific capacities displayed in these wells which implies a high rate of transmissivity in the aquifer. Red Hawk Well No. 3 and probably the County Well (Spring Creek No. 6) displayed minimal degrees of intensive fracturing though coupled with parting planes and rock porosity would create a credible aquifer. Along this line, the drawdown during pumping and resulting specific capacities in these two wells is quite similar.

The thicknesses of unconsolidated material to consolidated rock varies in each well. Depth to consolidated rock in Red Hawk Well No. 1 was 100 feet; Red Hawk Well No. 3 in the range of about 200 feet; Tucker Well estimated at 70 to 80 feet and in the County Well (Spring Creek No. 6), 470 feet. This suggests that a slope in the consolidated rock formation, based on lateral distances, is declining northerly from Red Hawk No. 3 to the County Well (Spring Creek No. 6) at about 0.09 feet/foot and westerly to Red Hawk No. 1 at 0.045 feet/foot. This could be the result of an old surface feature, fault induced, or a combination of both.

The productive area penetrated by these wells is roughly a northeast quadrant of the valley bounded on the west by an inferred north trending fault to the immediate west of Wingfield Springs Development. To the south, at a distance of possibly no more than 1000 feet or so, a confining fault and rocks of a different structure (alta andesite?) is noted. The east is bounded by an extensive area of basaltic rocks which descend under the valley floor and are the contributing

source of recharge to the rock aquifer. The north limit is composed of intrusive granodiorites. This area of basaltic rocks may be said to comprise a more or less defined aquifer, probably subject to local faulting and shearing forming areas or trends of appreciable rock fracturing.

From this, it can by hypothetically concluded that Red Hawk Well No. 1 and the Tucker Well are in fault/shear zones tending to trend north-south while the Red Hawk Well No. 3 and County Well (Spring Creek No. 6) are in a less impacted block between the main fracture zones. All can be considered in the same formation and aquifer, but by virtue of test pumping the specific capacity is profoundly greater in the fracture areas. A noticeable lack of clays in the rock structure of Red Hawk No. 3 than in that of Red Hawk No. 1 may also be of significance. The appreciable amount of clays in Red Hawk No. 1 may suggest larger fracture openings and the migration of clays originating as fault gauges, at or near the well, and migrating into the larger openings.

REFERENCES

County of Washoe, Department of Water Resources, 1999, Spring Creek Well No. 6 Construction and Testing Report: County of Washoe, Department of Water Resources, Reno, Nevada.

Driscoll, Fletcher G., 1986, Groundwater and Wells, Johnson Division, St. Paul, Minnesota.

Kleinfelder, Inc., 1997, Phase 1 Groundwater Feasibility Investigation Wingfield Springs Development: Kleinfelder, Inc., Reno, Nevada, 14 pp.

Wateresource Consulting Engineers, Inc., 1987, Spanish Springs Ranch Well: Wateresource Consulting Engineers, Inc., Reno, Nevada, 19 pp.

William E. Nork, Inc., 1988, Aquifer Stress Test Results for the "Big Well": William E. Nork, Inc., Reno, Nevada.

APPENDIX A

APPENDIX A

TEST HOLE NO. 1
ELECTRIC LOG

GEO-HYDRO-DATA

INCORPORATED

GROUNDWATER LOG

COMPANY	: REDHAWK				
WELL	: WINDFIELD ~~NO.2~~ T.H. #1				
LOCATION/FIELD	: SPANISH SPRINGS				
COUNTY	: WASHOE				
STATE	: CALIFORNIA,U.S.A.				
SECTION	: N/A	TOWNSHIP	: N/A	RANGE	: N/A
DATE	: 07/01/98	PERMANENT DATUM	: G.L.	ELEVATIONS	
DEPTH DRILLER	: 650 FEET	*ELEV. PERM. DATUM*	: G.L.	*KB*	: N/A
LOG BOTTOM	: 648.38	*LOG MEASURED FROM*	: G.L.	*DF*	: N/A
LOG TOP	: -1.50	DRL MEASURED FROM	: G.L.	GL	: N/A
CASING DRILLER	: -	LOGGING UNIT	: 7		
CASING TYPE	: -	*FIELD OFFICE*	: TEHACHAPI		
CASING THICKNESS	: .	*RECORDED BY*	: DEWEY		
BIT SIZE	: 12	BOREHOLE FLUID	: CLAY/GEL	FILE	: ORIGINAL
MAGNETIC DECL.	: -	RM	: -	TYPE	: 9041A
MATRIX DENSITY	: -	RM TEMPERATURE	: -	LOG	: 4
FLUID DENSITY	: -	MATRIX DELTA T	: -	PLOT	: 1 4
NEUTRON MATRIX	: N/A	FLUID DELTA T	: -	THRESH	: 1000

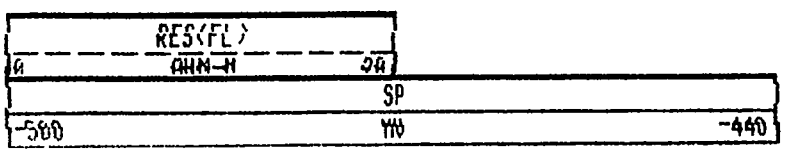
OTHER SERVICES:
INVOICE
10639
700-D

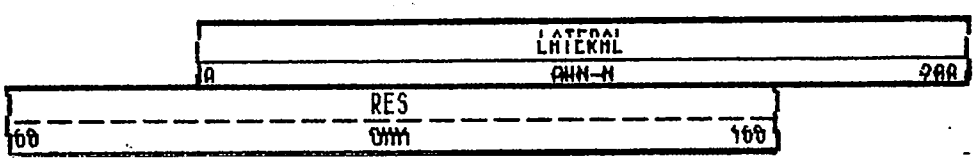
REMARKS :

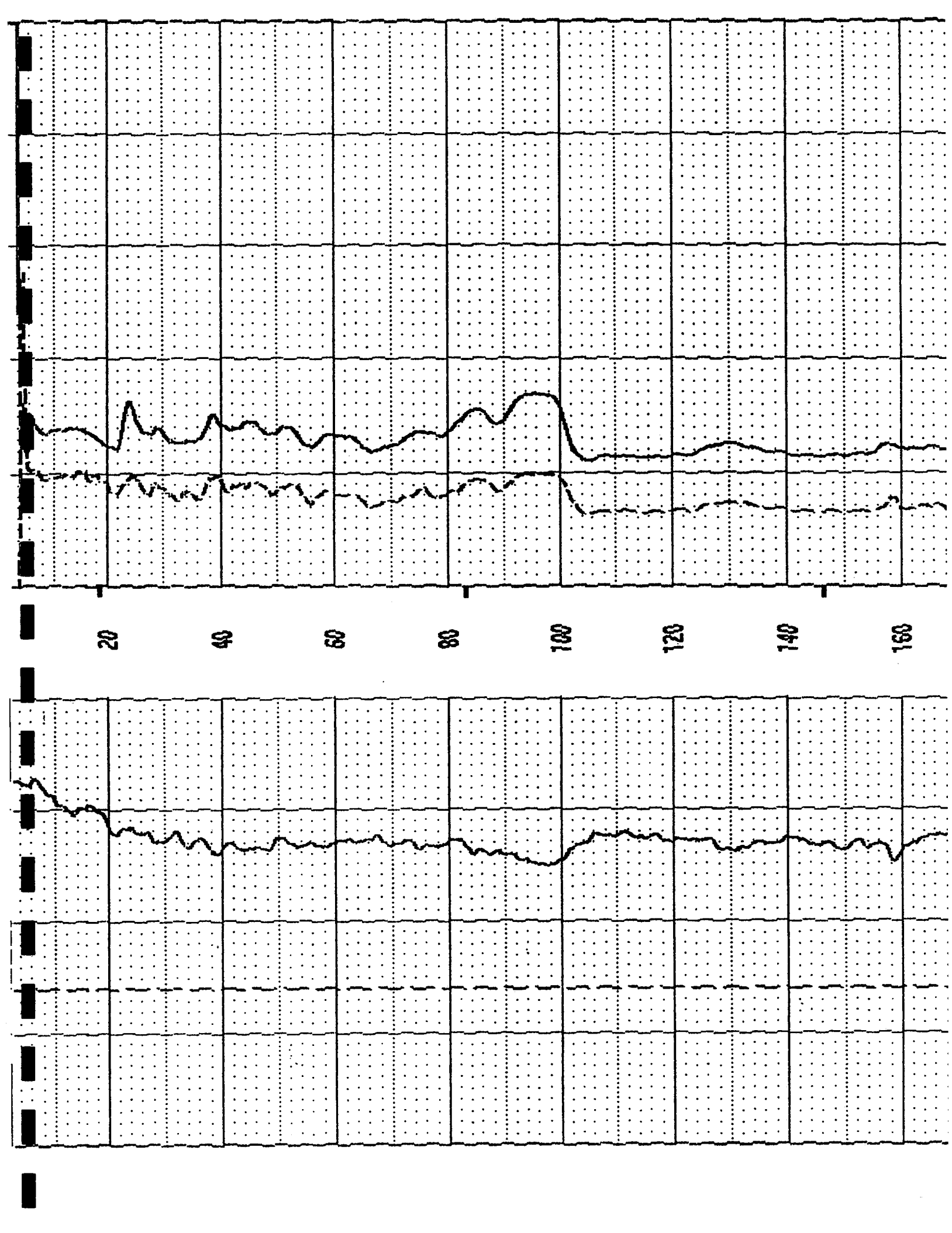
DRILL-SARGENT

CONS.-WATERESOURCE

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



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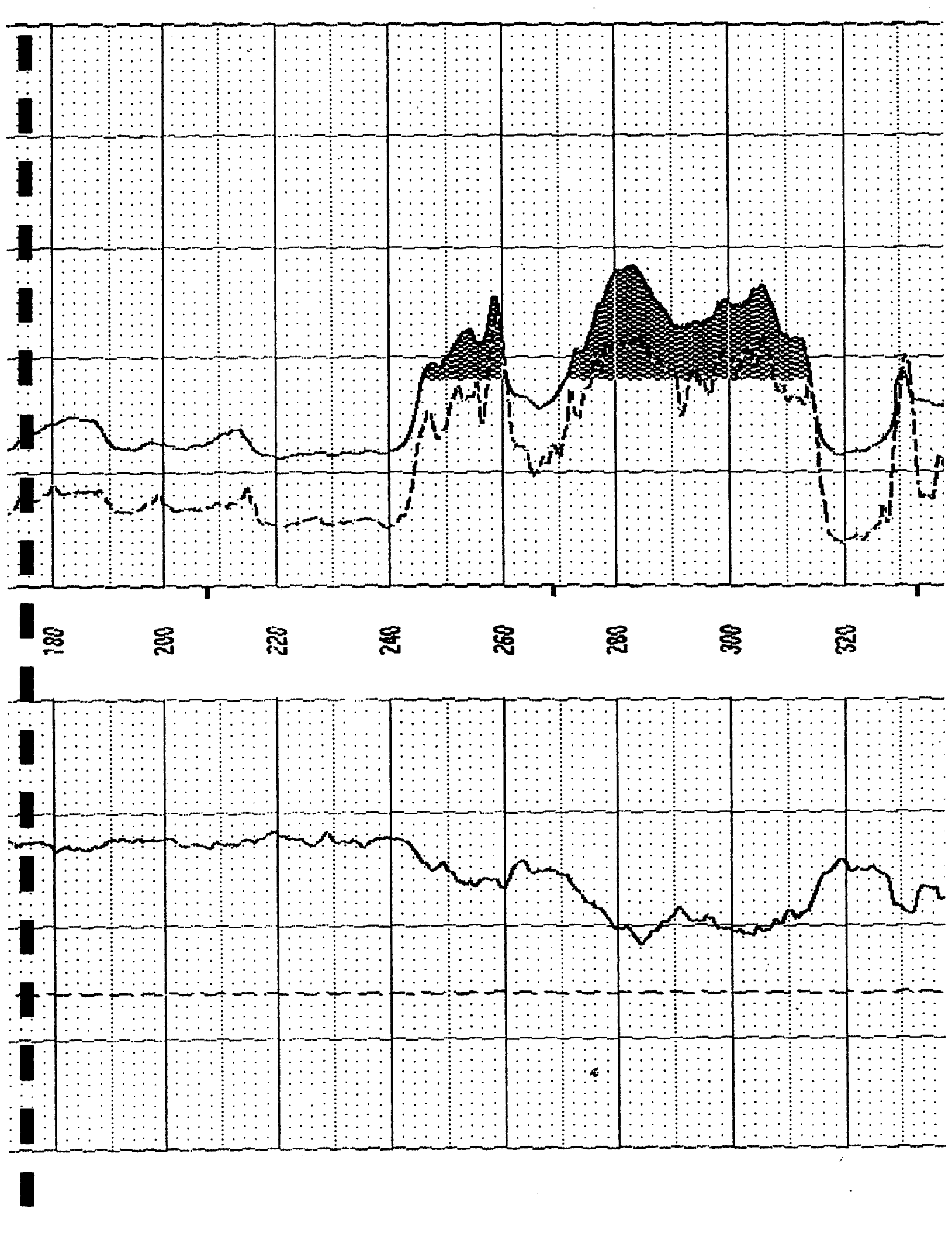
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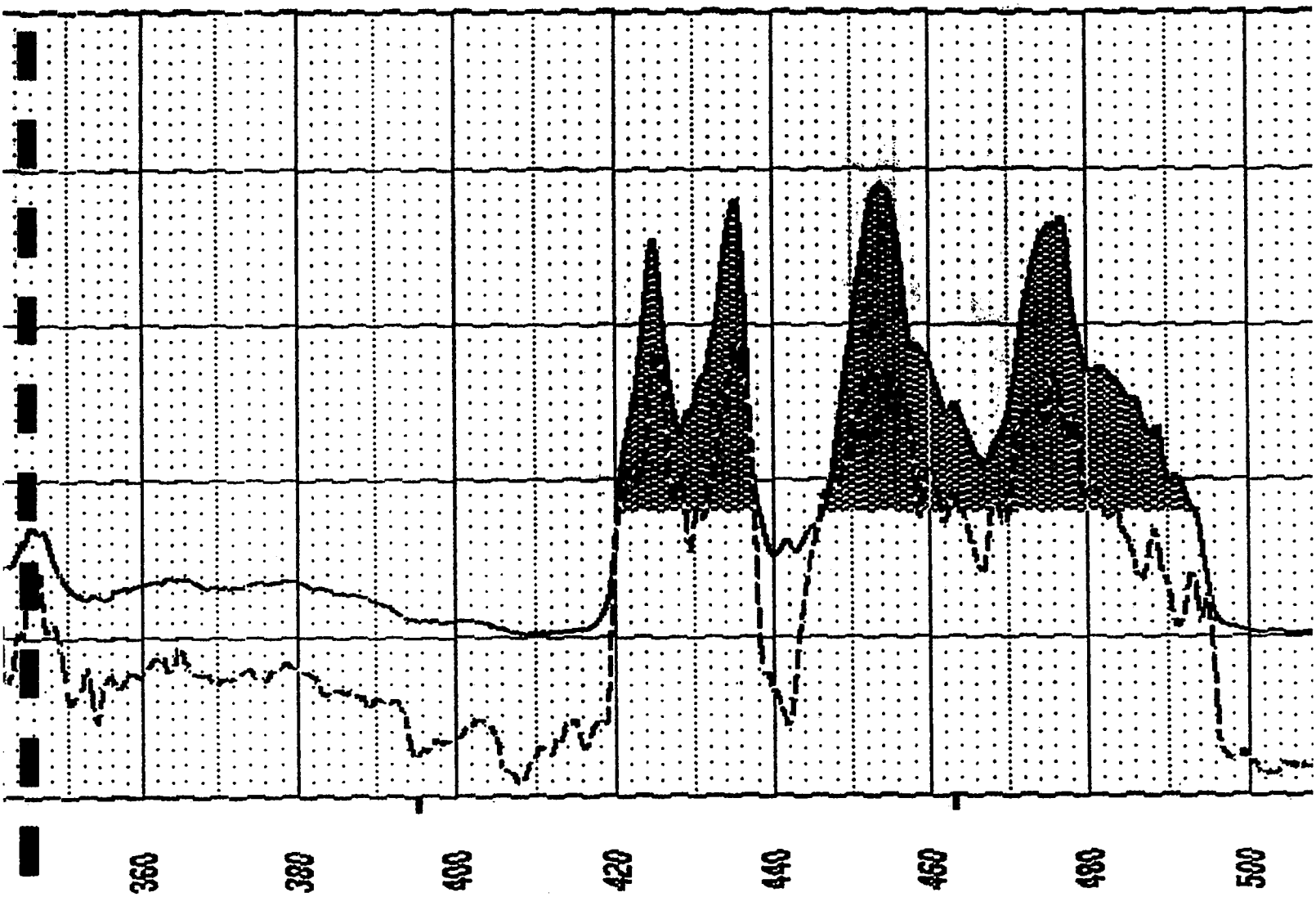
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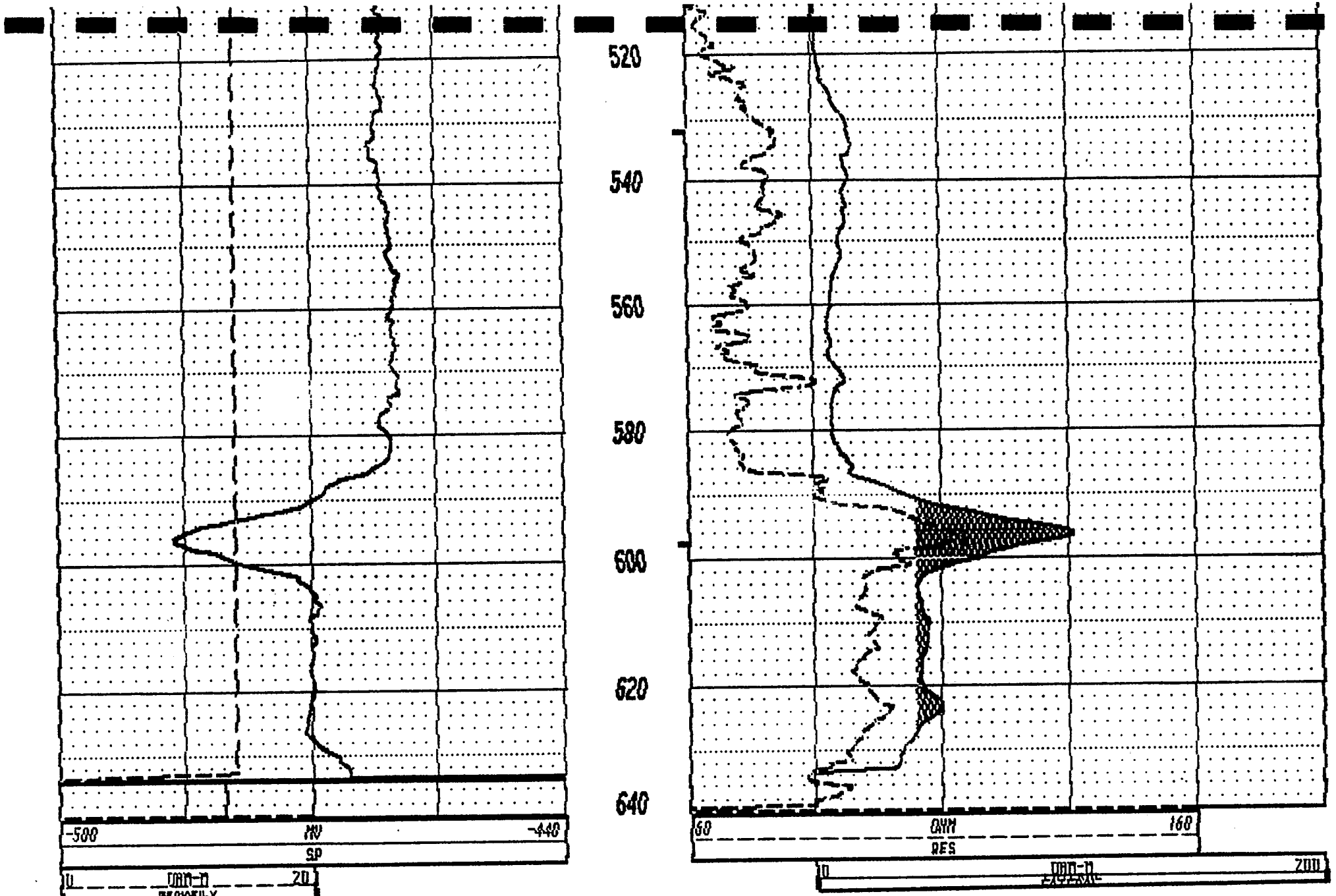
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APPENDIX B

APPENDIX B

TEST HOLE NO. 2

B.1 ELECTRIC LOG
B.2 PUMP TEST DATA

APPENDIX B.1

TEST HOLE NO. 2
ELECTRIC LOG

GEO-HYDRO-DATA

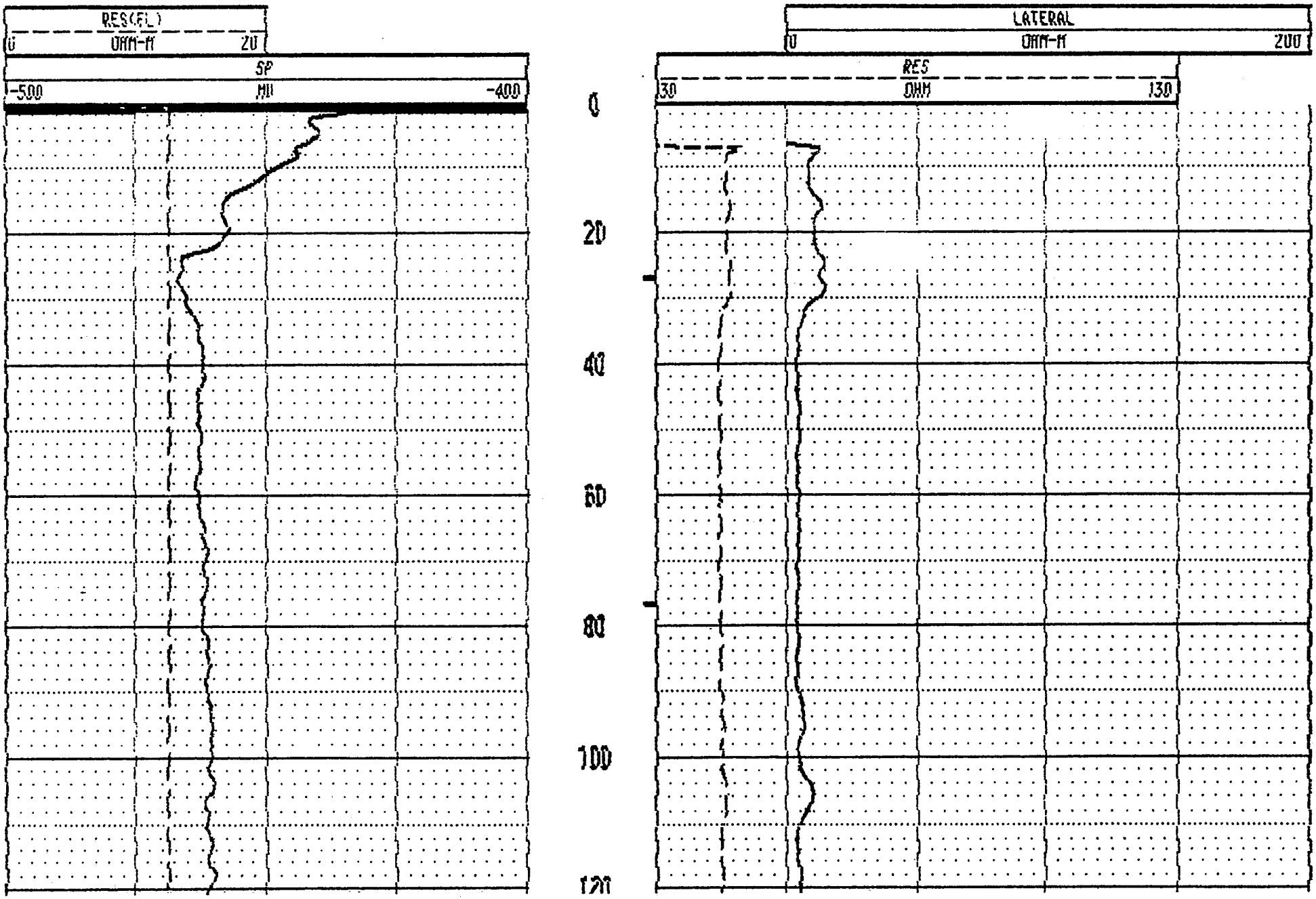
INCORPORATED

GROUNDWATER LOG

COMPANY	: WINGFIELD RED HAWK				
WELL	: T.H.#2				
LOCATION/FIELD	: SPANISH SPRINGS				
COUNTY	: WASHOE				
STATE	: NEVADA				
SECTION	: N/A	TOWNSHIP	: N/A	RANGE	: N/A
DATE	: 08/01/98	PERMANENT DATUM	: G.L.	ELEVATIONS	
DEPTH DRILLER	: 730 FEET	ELEV. PERM. DATUM:	N/A	KB	: N/A
LOG BOTTOM	: 730.30	LOG MEASURED FROM:	G.L.	DF	: N/A
LOG TOP	: 1.10	DRL MEASURED FROM:	G.L.	GL	: N/A
CASING DRILLER	: -	LOGGING UNIT	: 10		
CASING TYPE	: -	FIELD OFFICE	: CLEMENTS,CA.		
CASING THICKNESS:	-	RECORDED BY	: D.SHANHOLTZR		
BIT SIZE	: 12.250	BOREHOLE FLUID	: CLAY/GEL	FILE	: ORIGINAL
MAGNETIC DECL.	: -	RM	: -	TYPE	: 9041A
MATRIX DENSITY	: -	RM TEMPERATURE	: -	LOG	: 2
FLUID DENSITY	: -	MATRIX DELTA T	: -	PLOT	: 1 4
NEUTRON MATRIX	: N/A	FLUID DELTA T	: -	THRESH:	1000

OTHER SERVICES:
INVOICE
10656
500-D

REMARKS :
DRILL-SARGENT,RENO,NV.
WATERESOURCE-CONS.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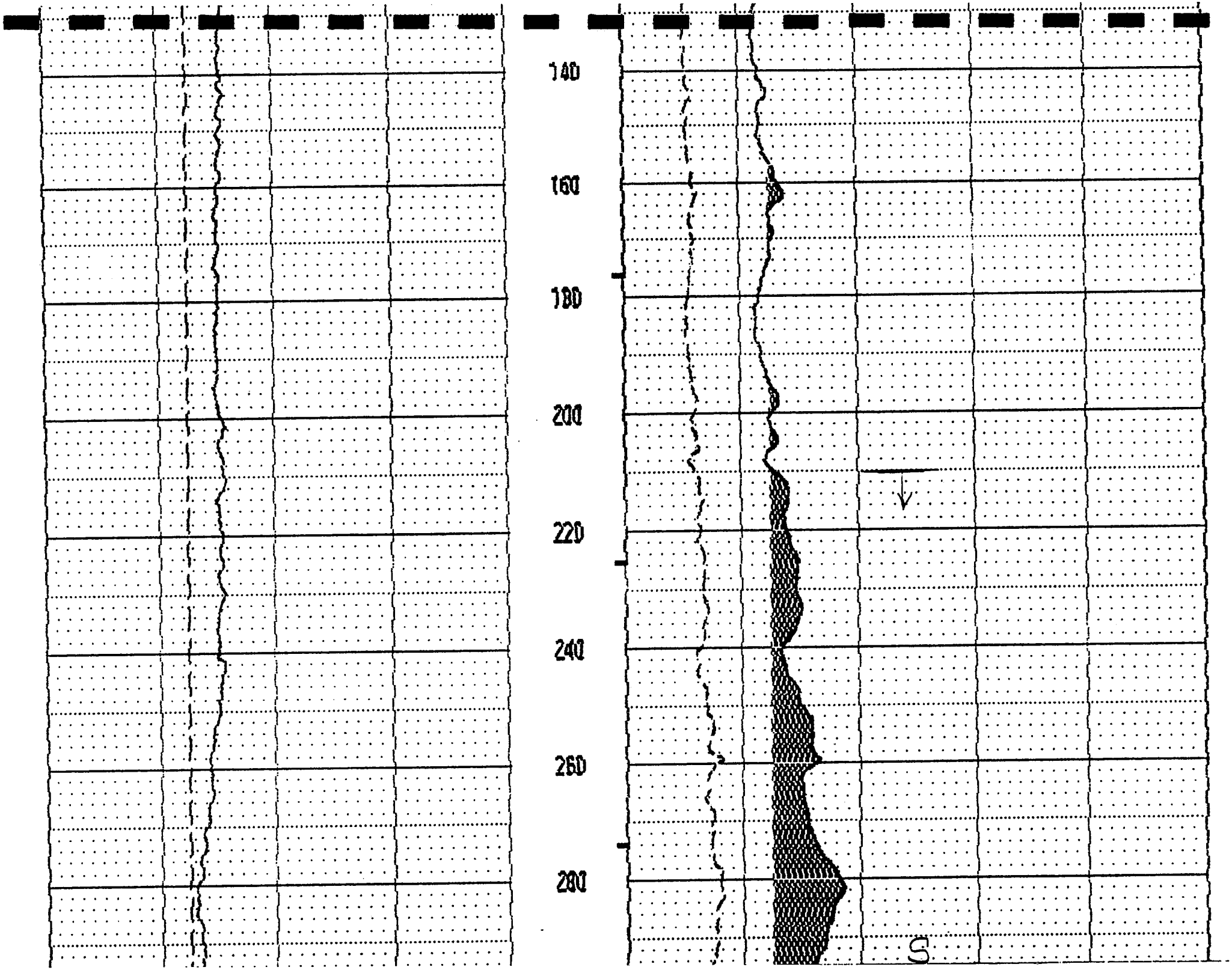
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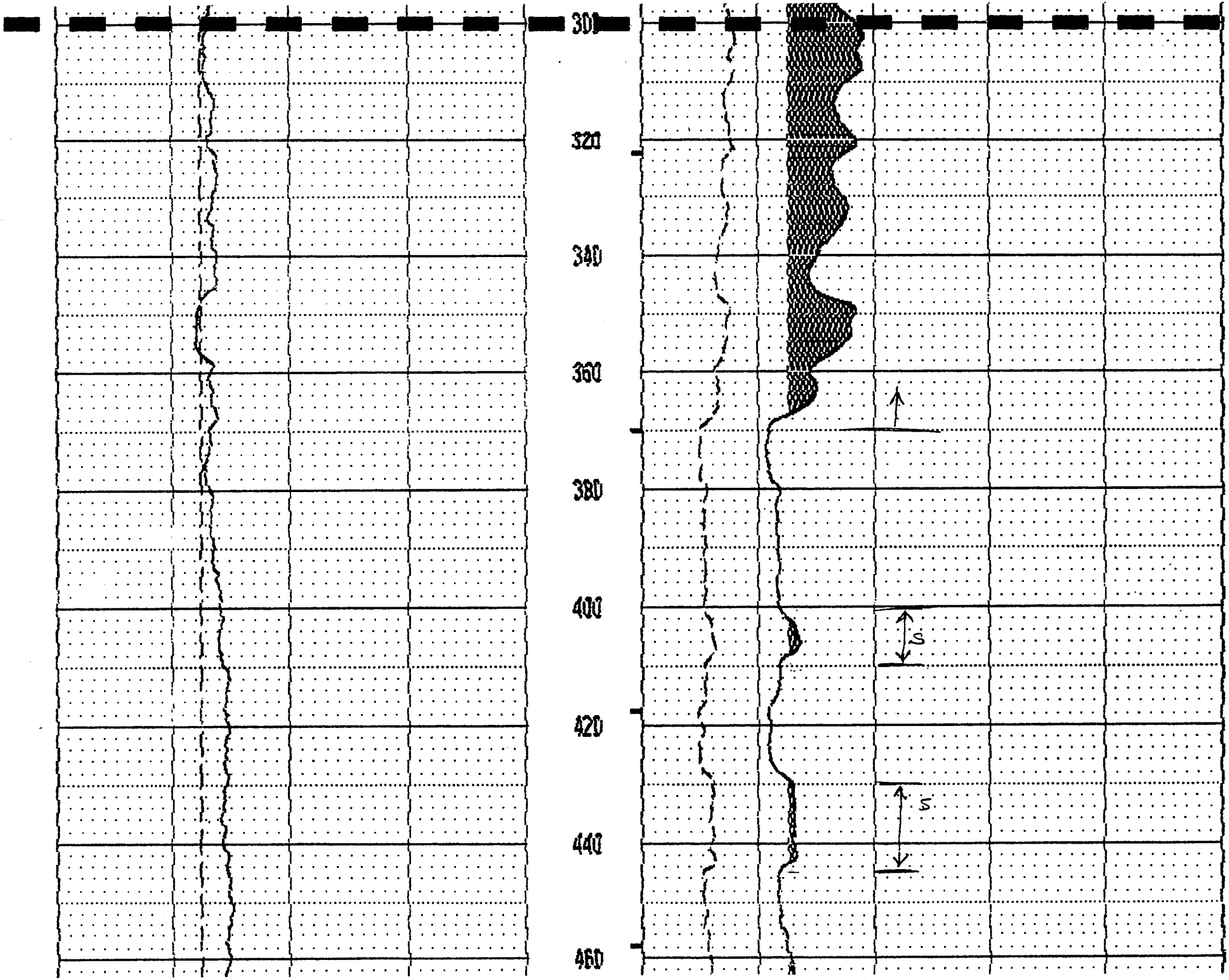
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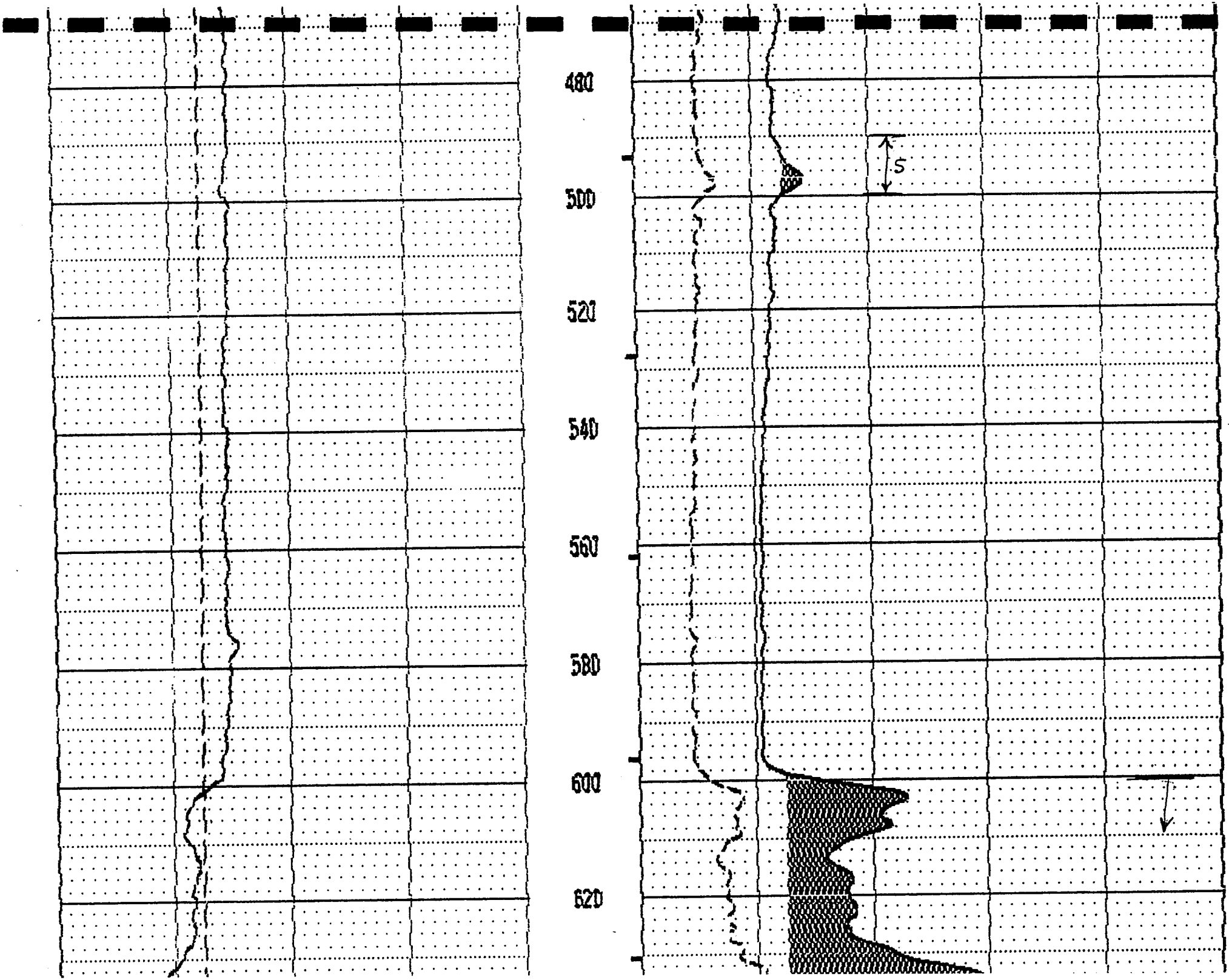
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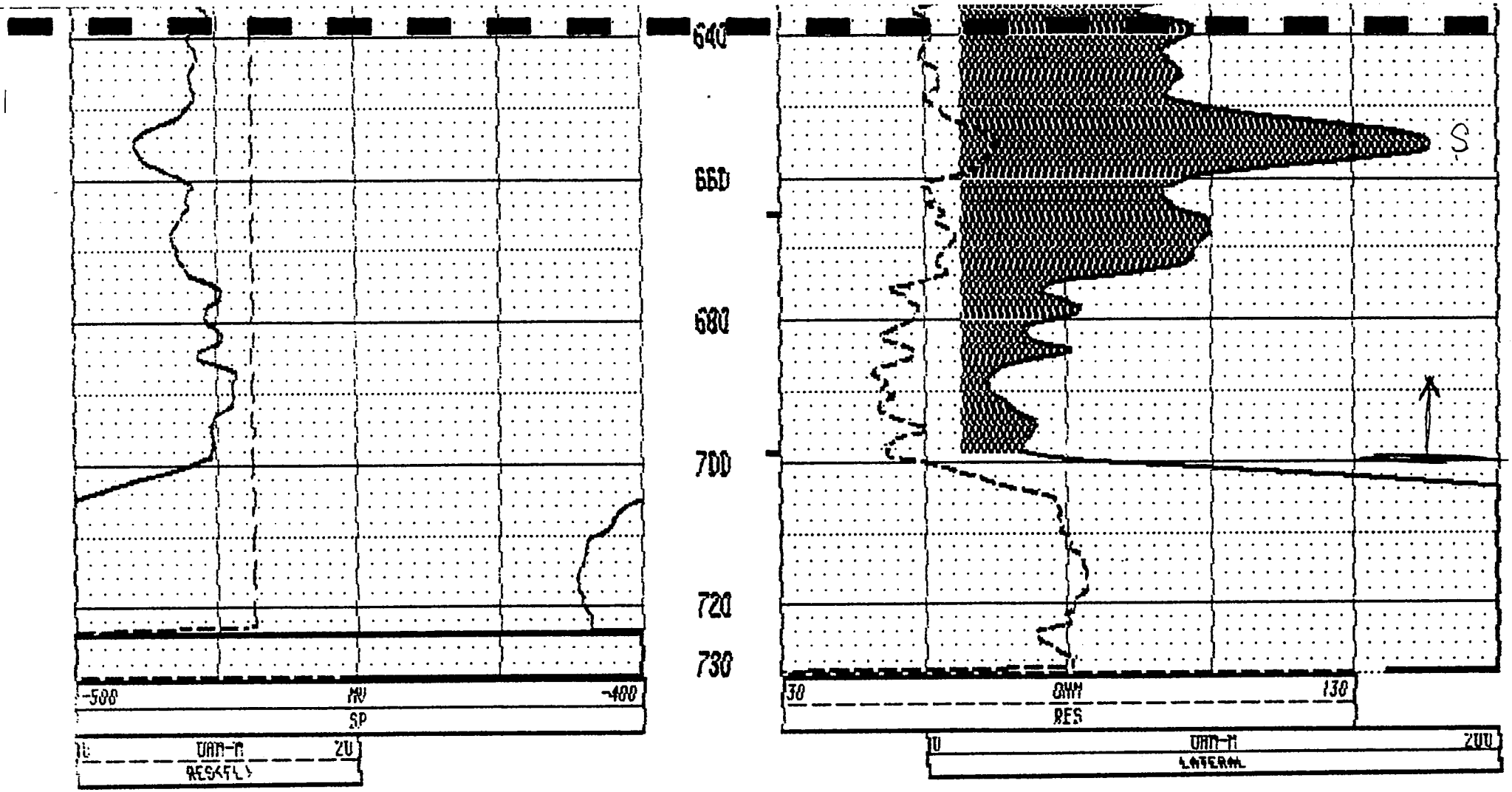
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720
730
-500
MV
-400
SP
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OHM
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RES
LATERAL

APPENDIX B.2

RED HAWK NO. 2 WELL
PUMP TEST DATA

RED HAWK NO. 2 WELL

Constant Discharge Test
September 30, 1998
Pump rate = 150 gpm
Pump depth = 200 feet
Static water level = 4 feet

Discharge = 150 gpm

Depth to Water, feet	Time Elapsed, min.	Drawdown, feet
4.0	0	0
85.0	1	81.00
100.0	3	96.00
115.0	5	111.00
125.0	8	121.00
140.0	11	136.00
145.0	14	141.00
149.0	16	145.00
154.0	19	150.00
159.0	21	155.00
165.0	24	161.00
168.0	27	164.00
176.0	30	172.00
182.0	33	178.00
186.0	36	182.00
190.0	38	186.00
193.0	41	189.00
194.0	42	190.00
196.0	43	192.00
198.0	44	194.00
199.0	45	195.00

RED HAWK NO. 2 WELL

Constant Discharge Test
September 30, 1998
Pump rate = 100 gpm
Pump depth = 200 feet
Static water level = 4 feet

Discharge = 100 gpm

Depth to Water, feet	Time Elapsed, min.	Drawdown, feet
4.0	0	0
75.0	1	71.00
77.0	2	73.00
78.0	4	74.00
81.1	6	77.10
84.0	8	80.00
86.5	10	82.50
94.5	15	90.50
102.2	20	98.20
108.6	25	104.60
116.0	30	112.00
121.0	35	117.00
127.0	40	123.00
130.6	45	126.60
135.6	50	131.60
140.2	55	136.20
145.6	65	141.60
147.1	75	143.10
149.0	85	145.00
151.1	95	147.10
152.1	105	148.10
155.0	125	151.00
156.5	135	152.50
157.4	145	153.40
157.7	155	153.70
157.7	165	153.70
158.3	175	154.30

APPENDIX C

APPENDIX C

TEST HOLE NO. 3
PRODUCTION WELL NO. 3

C.1 ELECTRIC LOG
C.2 TEST WELL 4-HOUR PUMP TEST
C.3 PRODUCTION WELL STEP TEST
C.4 PRODUCTION WELL 72-HOUR PUMP TEST AND 24-HOUR RECOVERY

APPENDIX C.1

TEST HOLE NO. 3
ELECTRIC LOG

GEO-HYDRO-DATA

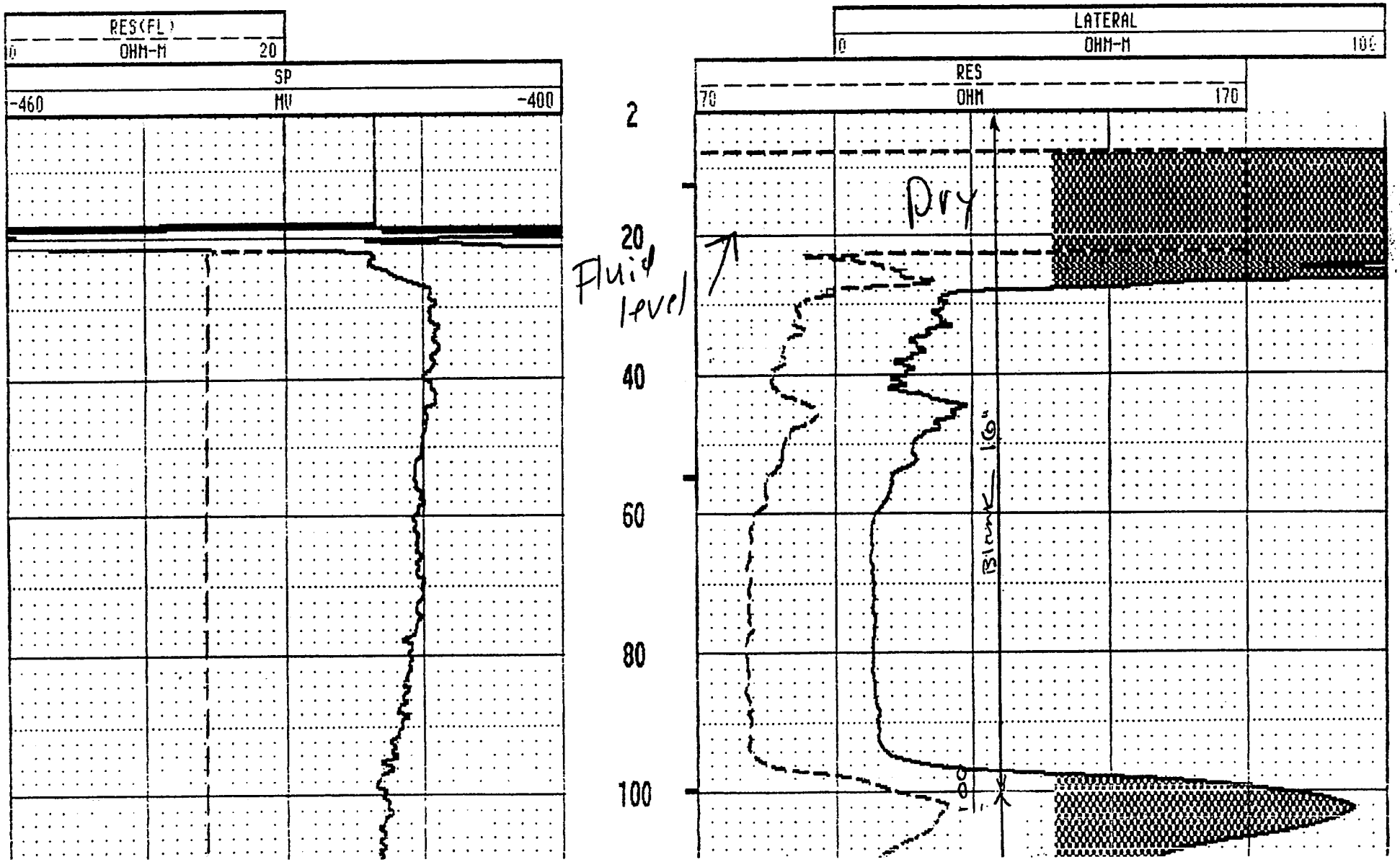
INCORPORATED

GROUNDWATER LOG

COMPANY	: WINGFIELD SPRINGS				
WELL	: REDHAWK T.H. 3				
LOCATION/FIELD	: SPANISH SPRINGS				
COUNTY	: WASHOE				
STATE	: CA.				
SECTION	: N/A	TOWNSHIP	: N/A	RANGE	: N/A
DATE	: 03/03/99	PERMANENT DATUM	: G.L.	ELEVATIONS	
DEPTH DRILLER	: 409 FEET	ELEV. PERM. DATUM	: N/A	KB	: N/A
LOG BOTTOM	: 410.40	LOG MEASURED FROM	: G.L.	DF	: N/A
LOG TOP	: 2.10	DRL MEASURED FROM	: G.L.	GL	: N/A
CASING DRILLER	: -	LOGGING UNIT	: 10		
CASING TYPE	: -	FIELD OFFICE	: CLEMENTS,CA.		
CASING THICKNESS	: -	RECORDED BY	: D.SHANHOLTZR		
BIT SIZE	: 12.250	BOREHOLE FLUID	: CLAY/GEL	FILE	: ORIGINAL
MAGNETIC DECL.	: -	RM	: -	TYPE	: 9041A
MATRIX DENSITY	: -	RM TEMPERATURE	: -	LOG	: 2
FLUID DENSITY	: -	MATRIX DELTA T	: -	PLOT	: 1 4
NEUTRON MATRIX	: N/A	FLUID DELTA T	: -	THRESH	: 1000

OTHER SERVICES:
INVOICE
10820
500-D

REMARKS :
DRILL-SARGENT
GEORGE BALL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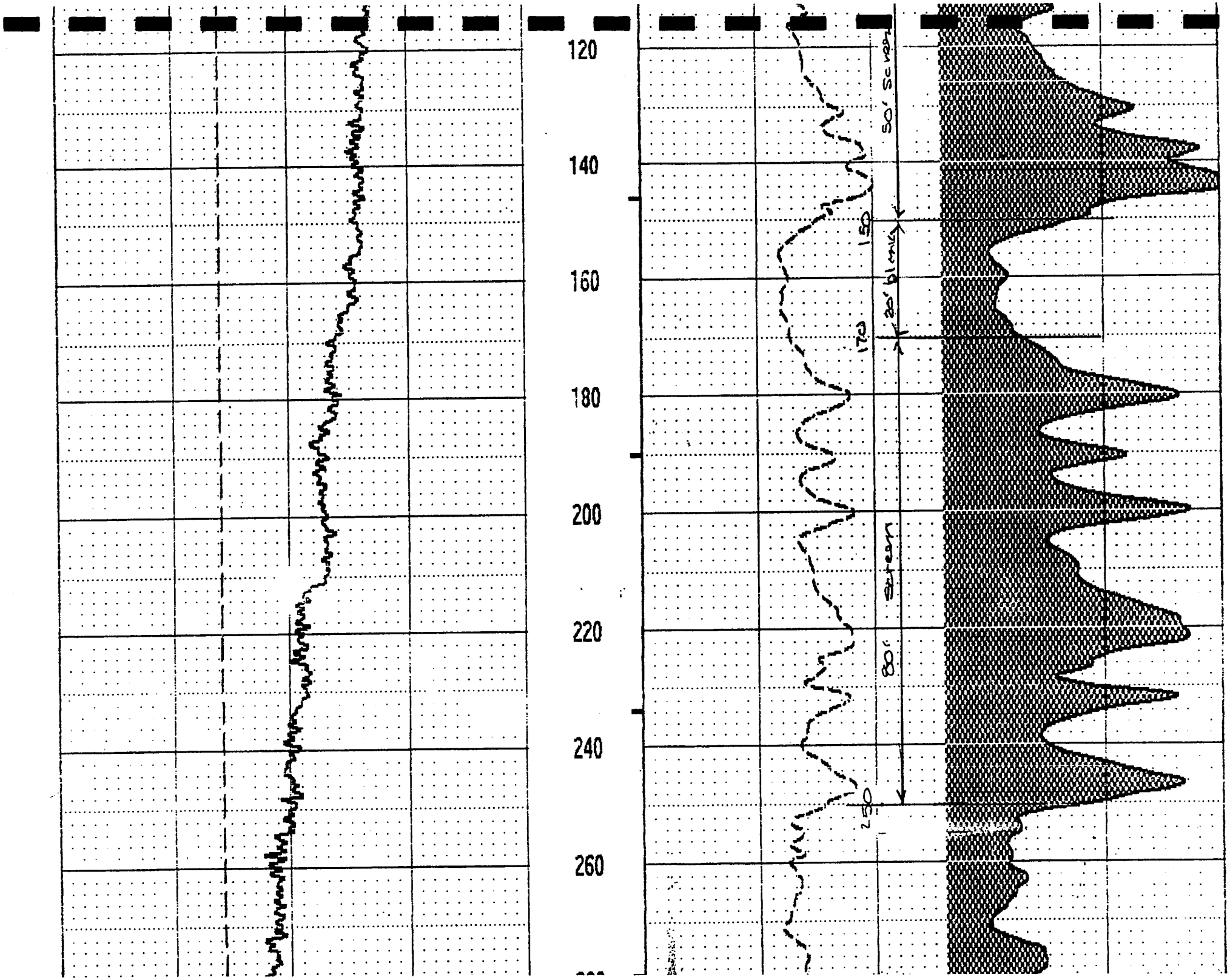
SP
-460 MV -400
LATERAL
0 OHM-M 100
RES
70 OHM 170
2
20
40
60
80
100
Dry
Fluid level
Blank 16"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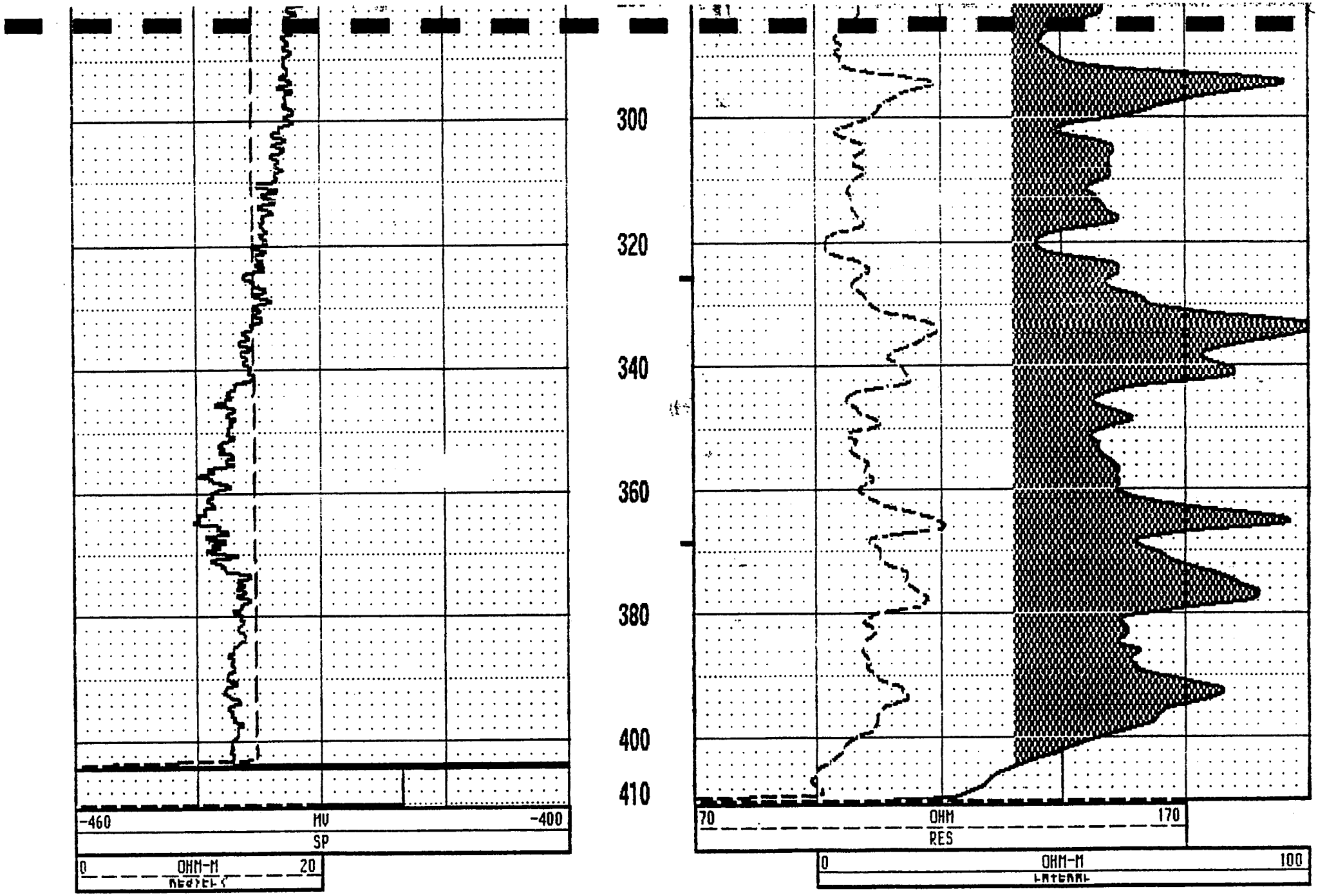
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360
380
400
410
-460
MV
-400
SP
0
OHM-M
20
70
OHM
170
RES
0
OHM-M
100

APPENDIX C.2

RED HAWK NO. 3 TEST WELL 4-HOUR PUMP TEST

RED HAWK NO. 3 TEST WELL

Constant Discharge Test
March 30, 1999
Pump depth = 195 feet
Pump rate = 300 gpm
Static water level = 25 feet

Discharge

Depth to Water, feet	Time Elapsed, min.	Drawdown, feet
25.00	0	0
44.33	1	19.33
44.67	5	19.67
44.67	10	19.67
44.75	15	19.75
44.83	20	19.83
44.83	25	19.83
44.92	30	19.92
45.00	45	20.00
45.08	60	20.08
45.13	75	20.13
45.21	90	20.21
45.27	105	20.27
45.33	120	20.33
45.38	135	20.38
45.44	150	20.44
45.52	165	20.52
45.60	180	20.60
45.67	195	20.67
45.75	210	20.75

Recovery

Depth to Water, feet	Time Elapsed, min.	Drawdown, feet
26.00	212	1.00
25.83	214	0.83
25.83	216	0.83
25.75	218	0.75
25.67	220	0.67
25.67	222	0.67
25.67	224	0.67

APPENDIX C.3

RED HAWK WELL NO. 3 STEP TEST

RED HAWK WELL NO. 3

12-hour step test
May 2ø, 1999
Pump rate = 1300 gpm
Pump depth = 168 feet
Static water level = 23.89 feet bgs

Time	Time since pumping started, t (min.)	Depth to Water (feet)	Drawdown, s (feet)	Totalizer Reading (gallons/100)
14:30	0	108.33	84.44	
14:32	2	141.61	117.72	
14:34	4	145.91	122.02	67,103
14:36	6	146.90	123.01	67,129
14:38	8	147.38	123.49	
14:40	10	148.00	124.11	67,182
14:42	12	148.00	124.11	
14:44	14	148.25	124.36	67,236
14:46	16	148.50	124.61	
14:48	18	148.47	124.58	67,288
14:50	20	148.58	124.69	
14:55	25	149.18	125.29	
15:00	30	149.16	125.27	67,443
15:05	35	149.43	125.54	
15:10	40	149.37	125.48	
15:15	45	149.63	125.74	
15:20	50	149.80	125.91	
15:25	55	149.65	125.76	
15:30	60	149.82	125.93	
15:40	70	150.22	126.33	
15:50	80	150.42	126.53	68,097
16:00	90	150.48	126.59	
16:10	100	150.57	126.68	
16:20	110	150.95	127.06	
16:30	120	151.13	127.24	68,621

RED HAWK WELL NO. 3

12-hour step test
May 20, 1999
Pump rate = 1100 gpm
Pump depth = 168 feet
Static water level = 23.89 feet bgs

Time	Time since pumping started, t (min.)	Depth to Water (feet)	Drawdown, s (feet)	Totalizer Reading (gallons/100)
12:00	0	73.75	49.86	
12:02	2	90.00	66.11	
12:04	4	98.37	74.48	65,460
12:06	6	102.65	78.76	
12:08	8	103.95	80.06	65,512
12:10	10	104.20	80.31	65,533
12:12	12	104.23	80.34	
12:14	14	104.34	80.45	
12:16	16	104.46	80.57	65,601
12:18	18	104.48	80.59	
12:20	20	104.53	80.64	
12:25	25	105.83	81.94	
12:30	30	106.02	82.13	
12:35	35	106.05	82.16	
12:40	40	106.21	82.32	
12:45	45	106.24	82.35	65,920
12:50	50	106.57	82.68	
12:55	55	106.92	83.03	
13:00	60	106.82	82.93	
13:10	70	107.00	83.11	66,189
13:20	80	107.34	83.45	
13:33	93	107.35	83.46	
13:40	100	107.41	83.52	
13:50	110	107.63	83.74	
14:00	120	107.43	83.54	
14:15	135	107.44	83.55	
14:30	150	108.33	84.44	67,046

RED HAWK WELL NO. 3

12-hour step test
May 20, 1999
Pump rate = 800 gpm
Pump depth = 168 feet
Static water level = 23.89 feet bgs

Time	Time since pumping started, t (min.)	Depth to Water (feet)	Drawdown, s (feet)	Totalizer Reading (gallons/100)
10:00	0	42.71	18.82	64,464
10:02	2	89.17	65.28	
10:04	4	71.55	47.66	
10:06	6	72.46	48.57	
10:08	8	72.70	48.81	
10:10	10	72.82	48.93	
10:12	12	72.80	48.91	
10:14	16	73.18	49.29	
10:16	16	73.00	49.11	
10:18	18	73.41	49.52	
10:20	20	73.30	49.41	
10:25	25	73.30	49.41	
10:30	30	72.90	49.01	
10:35	35	73.40	49.51	
10:40	40	73.30	49.41	
10:45	45	73.53	49.64	
10:50	50	73.42	49.53	
10:55	55	73.50	49.61	
11:00	60	73.50	49.61	
11:10	70	73.63	49.74	65,025
11:20	80	73.61	49.72	65,105
11:30	90	73.44	49.55	
11:40	100	73.60	49.71	
11:50	110	73.65	49.76	65,362
12:00	120	73.75	49.86	

RED HAWK WELL NO. 3

12-hour step test
May 20, 1999
Pump rate = 400 gpm
Pump depth = 168 feet
Static water level = 23.89 feet bgs

Time	Time since pumping started, t (min.)	Depth to Water (feet)	Drawdown, s (feet)	Totalizer Reading (gallons/100)
7:00	0	23.89	0	63,735
7:02	2	37.46	13.57	
7:04	4	37.53	13.64	
7:06	6	38.14	14.25	
7:08	8	38.21	14.32	
7:10	10	37.89	14.00	
7:12	12	38.39	14.50	
7:14	14	38.44	14.55	
7:16	16	38.50	14.61	
7:18	18	38.19	14.30	
7:20	20	39.26	15.37	
7:25	25	39.32	15.43	
7:30	30	39.34	15.45	
7:35	35	40.29	16.40	
7:40	40	40.34	16.45	
7:45	45	40.54	16.65	
7:50	50	40.44	16.55	
7:55	55	41.89	18.00	63,941
8:00	60	42.03	18.14	
8:10	70	41.02	17.13	
8:20	80	42.08	18.19	
8:30	90	42.49	18.60	64,091
8:40	100	42.38	18.49	64,134
8:50	110	42.56	18.67	
9:00	120	42.61	18.72	64,217
9:15	135	42.65	18.76	
9:30	150	42.63	18.74	
9:45	165	42.72	18.83	64,407
10:00	180	42.71	18.82	64,464

APPENDIX C.4

PRODUCTION WELL 72-HOUR PUMP TEST AND 24-HOUR RECOVERY

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet

Red Hawk Well No. 3 water level readings

Date	Time	Time since pumping started, t (min.)	Depth to water (feet)	Drawdown, s (feet)
5/24/99	9:30 AM		25.78	
Start Pump	10:12 AM	0		0.00
	10:14 AM	2	75.72	49.94
	10:16 AM	4	82.52	56.74
	10:18 AM	6	88.40	62.62
	10:20 AM	8	90.14	64.36
	10:22 AM	10	93.00	67.22
	10:24 AM	12	93.95	68.17
	10:26 AM	14	94.10	68.32
	10:28 AM	16	94.85	69.07
	10:30 AM	18	94.85	69.07
	10:32 AM	20	93.20	67.42
	10:37 AM	25	93.87	68.09
	10:42 AM	30	94.00	68.22
	10:47 AM	35	94.02	68.24
	10:52 AM	40	94.03	68.25
	10:57 AM	45	94.09	68.31
	11:02 AM	50	94.18	68.40
	11:07 AM	55	94.30	68.52
	11:12 AM	60	94.39	68.61
	11:22 AM	70	95.80	70.02
	11:32 AM	80	95.11	69.33
	11:42 AM	90	95.16	69.38
	11:52 AM	100	95.22	69.44
	12:02 PM	110	95.28	69.50
	12:12 PM	120	95.31	69.53
	12:27 PM	135	95.15	69.37
	12:42 PM	150	95.20	69.42
	12:57 PM	165	95.10	69.32
	1:12 PM	180	95.07	69.29
	1:27 PM	195	96.25	70.47
	1:42 PM	210	96.33	70.55
	1:57 PM	225	96.41	70.63
	2:12 PM	240	96.50	70.72
	2:27 PM	255	96.52	70.74
	2:42 PM	270	96.58	70.80
	2:57 PM	285	96.66	70.88
	3:12 PM	300	96.59	70.81
	3:27 PM	315	96.50	70.72
	3:42 PM	330	96.58	70.80

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet

Red Hawk Well No. 3 water level readings

Date	Time	Time since pumping started, t (min.)	Depth to water (feet)	Drawdown, s (feet)
	3:57 PM	345	96.79	71.01
	4:12 PM	360	96.60	70.82
	4:27 PM	375	97.62	71.84
	4:42 PM	390	97.66	71.88
	4:57 PM	405	97.59	71.81
	5:12 PM	420	97.90	72.12
	5:27 PM	435	97.60	71.82
	5:42 PM	450	97.70	71.92
	5:57 PM	465	98.06	72.28
	6:12 PM	480	98.27	72.49
	6:27 PM	495	98.47	72.69
	6:42 PM	510	98.43	72.65
	6:57 PM	525	98.65	72.87
	7:12 PM	540	98.57	72.79
	7:42 PM	570	98.36	72.58
	8:12 PM	600	98.71	72.93
	8:42 PM	630	98.67	72.89
	9:12 PM	660	98.74	72.96
	9:42 PM	690	98.76	72.98
	10:12 PM	720	99.25	73.47
	11:12 PM	780	99.48	73.70
5/25/99	12:12 AM	840	99.03	73.25
	1:12 AM	900	99.34	73.56
	2:12 AM	960	99.41	73.63
	3:12 AM	1020	99.98	74.20
	4:12 AM	1080	99.98	74.20
	5:12 AM	1140	100.00	74.22
	6:12 AM	1200	99.00	73.22
	7:12 AM	1260	99.39	73.61
	8:12 AM	1320	98.75	72.97
	9:12 AM	1380	99.27	73.49
	10:12 AM	1440	99.31	73.53
	11:12 AM	1500	99.32	73.54
	12:12 PM	1560	99.25	73.47
	1:12 PM	1620	99.11	73.33
	2:12 PM	1680	101.98	76.20
	3:12 PM	1740	99.29	73.51
	4:12 PM	1800	99.37	73.59
	5:12 PM	1860	99.50	73.72
	6:12 PM	1920	99.62	73.84

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet

Red Hawk Well No. 3 water level readings

Date	Time	Time since pumping started, t (min.)	Depth to water (feet)	Drawdown, s (feet)
	7:12 PM	1980	99.58	73.80
	8:12 PM	2040	99.75	73.97
	9:12 PM	2100	100.30	74.52
	10:12 PM	2160	100.58	74.80
	11:12 PM	2220	100.21	74.43
5/26/99	12:12 AM	2280	100.50	74.72
	1:12 AM	2340	99.67	73.89
	2:12 AM	2400	99.40	73.62
	3:12 AM	2460	99.78	74.00
	4:12 AM	2520	99.93	74.15
	5:12 AM	2580	100.48	74.70
	6:12 AM	2640	100.04	74.26
	7:12 AM	2700	100.00	74.22
	8:12 AM	2760	100.03	74.25
	9:12 AM	2820	99.38	73.60
	10:12 AM	2880	99.35	73.57
	11:12 AM	2940	99.00	73.22
	12:12 PM	3000	98.80	73.02
	1:12 PM	3060	98.98	73.20
	2:12 PM	3120	98.38	72.60
	3:12 PM	3180	98.42	72.64
	4:12 PM	3240	100.02	74.24
	5:12 PM	3300	100.04	74.26
	6:12 PM	3360	99.90	74.12
	7:12 PM	3420	100.65	74.87
	8:12 PM	3480	100.88	75.10
	9:12 PM	3540	100.40	74.62
	10:12 PM	3600	100.81	75.03
	11:12 PM	3660	100.93	75.15
5/27/99	12:12 AM	3720	101.13	75.35
	1:12 AM	3780	101.12	75.34
	2:12 AM	3840	101.22	75.44
	3:12 AM	3900	101.25	75.47
	4:12 AM	3960	101.42	75.64
	5:12 AM	4020	101.50	75.72
	6:12 AM	4080	100.88	75.10
	7:12 AM	4140	100.85	75.07
	8:12 AM	4200	99.95	74.17
	9:12 AM	4260	100.93	75.15
Shut off	10:12 AM	4320	100.00	74.22

RED HAWK WELL NO. 3

72-Hour Constant Discharge ~~Test~~
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet

Red Hawk Well No. 3 water level readings - RECOVERY MONITORING

Date	Time	Time since pumping stopped, t (minutes)	Depth to water (feet)
5/27/99	10:14 AM	2	34.96
	10:16 AM	4	30.56
	10:18 AM	6	29.73
	10:20 AM	8	29.54
	10:22 AM	10	29.50
	10:24 AM	12	29.42
	10:26 AM	14	29.30
	10:28 AM	16	29.25
	10:30 AM	18	29.20
	10:32 AM	20	29.20
	10:37 AM	25	29.00
	10:42 AM	30	28.94
	10:47 AM	35	28.75
	10:52 AM	40	28.65
	10:57 AM	45	28.56
	11:02 AM	50	28.50
	11:07 AM	55	28.46
	11:12 AM	60	28.37
	11:22 AM	70	28.12
	11:32 AM	80	28.07
	11:42 AM	90	28.00
	11:52 AM	100	27.97
	12:02 PM	110	27.88
	12:12 PM	120	27.80
	12:27 PM	135	27.70
	12:42 PM	150	27.57
	12:57 PM	165	27.50
	1:12 PM	180	27.42
	1:42 PM	210	27.32
	2:12 PM	240	27.18
	2:42 PM	270	27.03
	3:12 PM	300	27.00
	4:12 PM	360	26.80
	5:12 PM	420	26.80
	6:12 PM	480	26.80
	7:12 PM	540	26.96
	8:12 PM	600	27.04
	9:12 PM	660	27.16
	10:12 PM	720	27.19
	11:12 PM	780	27.25

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet

Red Hawk Well No. 3 water level readings - RECOVERY MONITORING

Date	Time	Time since pumping stopped, t (minutes)	Depth to water (feet)
5/28/99	12:12 AM	840	27.27
	1:12 AM	900	27.24
	2:12 AM	960	27.21
	3:12 AM	1020	27.15
	4:12 AM	1080	26.95
	5:12 AM	1140	26.80
	6:12 AM	1200	26.70
	7:12 AM	1260	25.31
	8:12 AM	1320	25.39
	9:12 AM	1380	25.45
	10:12 AM	1440	25.66

APPENDIX D

APPENDIX D

72-HOUR TEST
OBSERVATION WELL DATA
TUCKER WELL
SPRING CREEK NO. 6
RED HAWK WELL NO. 1

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet

Tucker Well water level readings

Date	Time	Time since pumping started, t (min.)	Depth to water (feet)	Drawdown, s (feet)
5/14/99	11:30 AM		32.79	
5/23/99	10:45 AM		32.40	
5/24/99	9:25 AM		32.75	
Start Pump	10:12 AM	0		0.00
	10:50 AM	38	32.79	0.04
	11:05 AM	53	32.82	0.07
	11:20 AM	68	32.83	0.08
	11:35 AM	83	32.85	0.10
	11:50 AM	98	32.87	0.12
	12:05 PM	113	32.89	0.14
	12:35 PM	143	32.92	0.17
	1:05 PM	173	32.93	0.18
	1:35 PM	203	32.95	0.20
	2:05 PM	233	32.98	0.23
	3:10 PM	298	33.04	0.29
	4:08 PM	356	33.07	0.32
	5:08 PM	416	33.09	0.34
	6:08 PM	476	33.11	0.36
	7:08 PM	536	33.17	0.42
	8:08 PM	596	33.23	0.48
	9:30 PM	678	33.28	0.53
	10:48 PM	756	33.31	0.56
5/25/99	12:10 AM	838	33.33	0.58
	1:15 AM	903	33.36	0.61
	3:10 AM	1018	33.35	0.60
	4:08 AM	1076	33.40	0.65
	5:10 AM	1138	33.38	0.63
	6:10 AM	1198	33.36	0.61
	7:08 AM	1256	33.48	0.73
	8:08 AM	1316	33.48	0.73
	9:08 AM	1376	33.51	0.76
	10:08 AM	1436	33.52	0.77
	11:08 AM	1496	33.53	0.78
	12:08 PM	1556	33.54	0.79
	1:08 PM	1616	33.55	0.80
	2:08 PM	1676	33.54	0.79
	3:07 PM	1735	33.54	0.79
	4:06 PM	1794	33.55	0.80
	5:08 PM	1856	33.56	0.81

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet

Tucker Well water level readings

Date	Time	Time since pumping started, t (min.)	Depth to water (feet)	Drawdown, s (feet)
	6:06 PM	1914	33.56	0.81
	7:07 PM	1975	33.57	0.82
	7:50 PM	2018	33.55	0.80
	9:10 PM	2098	33.60	0.85
	10:10 PM	2158	33.63	0.88
	11:09 PM	2217	33.63	0.88
5/26/99	12:08 AM	2276	33.65	0.90
	1:10 AM	2338	33.64	0.89
	2:08 AM	2396	33.65	0.90
	3:12 AM	2460	33.65	0.90
	4:10 AM	2518	33.67	0.92
	5:08 AM	2576	33.68	0.93
	6:10 AM	2638	33.70	0.95
	7:20 AM	2708	33.78	1.03
	8:06 AM	2754	33.78	1.03
	9:07 AM	2815	33.81	1.06
	10:08 AM	2876	33.81	1.06
	11:06 AM	2934	33.82	1.07
	12:06 PM	2994	33.82	1.07
	1:10 PM	3058	33.80	1.05
	2:08 PM	3116	33.81	1.06
	3:07 PM	3175	33.80	1.05
	4:07 PM	3235	33.79	1.04
	5:06 PM	3294	33.80	1.05
	6:06 PM	3354	33.82	1.07
	7:06 PM	3414	33.83	1.08
	7:57 PM	3465	33.78	1.03
	8:57 PM	3525	33.84	1.09
	9:56 PM	3584	33.79	1.04
	10:58 PM	3646	33.83	1.08
	11:58 PM	3706	33.87	1.12
5/27/99	1:00 AM	3768	33.86	1.11
	1:56 AM	3824	33.87	1.12
	2:58 AM	3886	33.85	1.10
	4:00 AM	3948	33.80	1.05
	5:00 AM	4008	33.85	1.10
	5:55 AM	4063	33.92	1.17
	7:00 AM	4128	33.90	1.15
	8:06 AM	4194	33.98	1.23
	9:07 AM	4255	33.99	1.24
	10:05 AM	4313	33.98	1.23

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet

Tucker Well water level readings - RECOVERY MONITORING

Date	Time	Time since pumping stopped, t (minutes)	Depth to water (feet)
5/27/99	10:20 AM	8	33.98
	10:35 AM	23	33.96
	10:50 AM	38	33.93
	11:05 AM	53	33.91
	11:20 AM	68	33.88
	11:35 AM	83	33.85
	11:50 AM	98	33.82
	12:05 PM	113	33.79
	12:33 PM	141	33.75
	1:00 PM	168	33.73
	1:35 PM	203	33.68
	2:00 PM	228	33.62
	3:05 PM	293	33.51
	4:05 PM	353	33.45
	5:06 PM	414	33.42
	6:06 PM	474	33.45
	7:06 PM	534	33.51
	8:15 PM	603	33.54
	9:05 PM	653	33.60
	10:06 PM	714	33.66
	11:05 PM	773	33.67
5/28/99	12:05 AM	833	33.71
	1:06 AM	894	33.74
	2:08 AM	956	33.78
	3:08 AM	1016	33.76
	4:05 AM	1073	33.65
	5:07 AM	1135	33.58
	6:00 AM	1188	33.50
	7:02 AM	1250	33.47
	8:00 AM	1308	33.52
	9:00 AM	1368	33.58
	10:00 AM	1428	33.63

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet
Static water level = 23.89 feet bgs

Spring Creek Well No. 6 water level readings

Date	Time	Time since pumping started, t (min.)	Depth to water (feet)	Drawdown, s (feet)
Start Pump	10:12 AM	0	32.03	0.00
	11:00 AM	48	32.03	0.00
	11:30 AM	78	32.03	0.00
	12:00 PM	108	32.00	-0.03
	12:30 PM	138	32.00	-0.03
	1:00 PM	168	32.02	-0.01
	1:30 PM	198	32.02	-0.01
	2:00 PM	228	32.02	-0.01
	3:00 PM	288	31.97	-0.06
	4:00 PM	348	31.93	-0.10
	5:00 PM	408	31.90	-0.13
	6:00 PM	468	31.92	-0.11
	7:00 PM	528	31.93	-0.10
	8:00 PM	588	31.96	-0.07
	10:00 PM	708	32.10	0.07
	11:00 PM	768	32.16	0.13
5/25/99	12:08 AM	836	32.12	0.09
	1:30 AM	918	32.10	0.07
	3:00 AM	1008	32.06	0.03
	4:00 AM	1068	32.07	0.04
	5:00 AM	1128	31.97	-0.06
	6:00 AM	1188	32.05	0.02
	7:15 AM	1263	32.10	0.07
	8:00 AM	1308	32.11	0.08
	9:00 AM	1368	32.12	0.09
	10:00 AM	1428	32.12	0.09
	11:00 AM	1488	32.16	0.13
	12:00 PM	1548	32.19	0.16
	1:00 PM	1608	32.20	0.17
	2:00 PM	1668	32.14	0.11
	3:00 PM	1728	32.12	0.09
	4:00 PM	1788	32.08	0.05
	5:00 PM	1848	32.09	0.06
	6:00 PM	1908	32.08	0.05
	7:00 PM	1968	32.09	0.06
	7:45 PM	2013	32.04	0.01
	9:00 PM	2088	32.05	0.02
	10:00 PM	2148	32.10	0.07
	11:00 PM	2208	32.16	0.13

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet
Static water level = 23.89 feet bgs

Spring Creek Well No. 6 water level readings

Date	Time	Time since pumping started, t (min.)	Depth to water (feet)	Drawdown, s (feet)
5/26/99	12:00 AM	2268	32.21	0.18
	1:00 AM	2328	32.21	0.18
	2:00 AM	2388	32.20	0.17
	3:00 AM	2448	32.20	0.17
	4:00 AM	2508	32.22	0.19
	5:00 AM	2568	32.23	0.20
	6:00 AM	2628	32.25	0.22
	7:05 AM	2693	32.26	0.23
	8:00 AM	2748	32.26	0.23
	9:00 AM	2808	32.28	0.25
	10:00 AM	2868	32.28	0.25
	11:00 AM	2928	32.26	0.23
	12:00 PM	2988	32.26	0.23
	1:00 PM	3048	32.25	0.22
	2:00 PM	3108	32.34	0.31
	3:00 PM	3168	32.29	0.26
	4:00 PM	3228	32.29	0.26
	5:00 PM	3288	32.23	0.20
	6:00 PM	3348	32.20	0.17
	7:00 PM	3408	32.21	0.18
	7:52 PM	3460	32.20	0.17
	8:50 PM	3518	32.23	0.20
	9:50 PM	3578	32.26	0.23
	10:50 PM	3638	32.28	0.25
	11:50 PM	3698	32.27	0.24
5/27/99	12:50 AM	3758	32.28	0.25
	1:50 AM	3818	32.29	0.26
	2:50 AM	3878	32.28	0.25
	3:50 AM	3938	32.25	0.22
	4:50 AM	3998	32.25	0.22
	5:50 AM	4058	32.25	0.22
	6:55 AM	4123	32.32	0.29
	8:00 AM	4188	32.35	0.32
	9:00 AM	4248	32.36	0.33
	10:00 AM	4308	32.38	0.35

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet
Static water level = 23.89 feet bgs

Spring Creek Well No. 6 water level readings - RECOVERY MONITORING

Date	Time	Time since pumping stopped, t (minutes)	Depth to water (feet)
5/27/99	10:30 AM	18	32.39
	11:00 AM	48	32.38
	11:30 AM	78	32.38
	12:00 PM	108	32.36
	12:30 PM	138	32.34
	1:05 PM	173	32.33
	1:30 PM	198	32.29
	2:06 PM	234	32.25
	3:00 PM	288	32.22
	4:00 PM	348	32.18
	5:00 PM	408	32.14
	6:00 PM	468	32.12
	7:00 PM	528	32.14
	8:10 PM	598	32.17
	9:00 PM	648	32.21
	10:00 PM	708	32.18
	11:00 PM	768	32.30
5/28/99	12:00 AM	828	32.32
	1:00 AM	888	32.33
	2:00 AM	948	32.36
	3:00 AM	1008	32.34
	4:00 AM	1068	32.32
	5:00 AM	1128	32.31
	5:55 AM	1183	32.25
	6:55 AM	1243	32.22
	7:55 AM	1303	32.20
	8:55 AM	1363	32.23
	9:55 AM	1423	32.28

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 2Ø, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet
Static water level = 23.89 feet bgs

Red Hawk Well No. 1 water level readings

Date	Time	Time since pumping started, t (min.)	Depth to water (feet)	Drawdown, s (feet)
5/23/99	10:00 AM		26.90	
	10:34 AM		27.20	
	11:09 AM		27.40	
	12:05 PM		27.50	
	12:57 PM		27.50	
	1:53 PM		27.70	
	2:10 PM		27.60	
	3:06 PM		27.70	
	3:58 PM		27.90	
	4:54 PM		27.90	
	6:08 PM		29.50	
	7:00 PM		29.50	
	7:56 PM		29.60	
	9:09 PM		29.80	
	10:01 PM		29.70	
	10:57 PM		28.50	
5/24/99	12:11 AM		28.50	
	1:02 AM		28.50	
	1:59 AM		28.50	
	2:55 AM		11.90	
	3:12 AM		7.20	
	3:29 AM		7.00	
	4:04 AM		6.70	
	5:00 AM		6.40	
	5:56 AM		6.20	
	7:05 AM		6.10	
	8:01 AM		5.90	
	8:58 AM		5.80	
Start Pump	10:07 AM		5.80	
10:12 AM	10:28 AM	16	5.70	0.00
	10:46 AM	34	5.60	0.00
	11:03 AM	51	5.80	0.20
	11:20 AM	68	5.70	0.10
	11:37 AM	85	5.80	0.20
	11:52 AM	100	5.80	0.20
	1:08 PM	176	5.90	0.30
	2:56 PM	284	6.00	0.40
	5:23 PM	431	6.10	0.50
	6:54 PM	522	6.20	0.60

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet
Static water level = 23.89 feet bgs

Red Hawk Well No. 1 water level readings

Date	Time	Time since pumping started, t (min.)	Depth to water (feet)	Drawdown, s (feet)
	7:50 PM	578	6.30	0.70
	10:12 PM	720	6.40	0.80
	11:26 PM	794	6.40	0.80
5/25/99	12:00 AM	828	6.40	0.80
	2:27 AM	975	6.50	0.90
	3:41 AM	1049	6.50	0.90
	6:03 AM	1191	6.60	1.00
	9:44 AM	1412	6.60	1.00
	11:32 AM	1520	6.60	1.00
	1:59 PM	1667	6.70	1.10
	3:08 PM	1736	6.70	1.10
	5:00 PM	1848	6.70	1.10
	6:48 PM	1956	6.70	1.10
	8:36 PM	2064	6.80	1.20
5/26/99	12:12 AM	2280	6.80	1.20
	1:08 AM	2336	6.80	1.20
	2:39 AM	2427	6.90	1.30
	4:10 AM	2518	6.90	1.30
	5:01 AM	2569	6.90	1.30
	7:28 AM	2716	7.00	1.40
	9:55 AM	2863	7.00	1.40
	11:04 AM	2932	7.00	1.40
	1:14 PM	3062	7.00	1.40
	3:58 PM	3226	7.00	1.40
	7:51 PM	3459	7.10	1.50
	8:48 PM	3516	7.00	1.40
	10:01 PM	3589	7.10	1.50
5/27/99	12:06 AM	3714	7.20	1.60
	2:12 AM	3840	7.20	1.60
	4:00 AM	3948	7.10	1.50
	4:56 AM	4004	7.20	1.60
	7:01 AM	4129	7.20	1.60
	8:14 AM	4202	7.30	1.70
	8:53 AM	4241	7.30	1.70
	10:02 AM	4310	7.20	1.60

RED HAWK WELL NO. 3

72-Hour Constant Discharge Test
May 20, 1999
Pump rate = 1000 gpm
Pump depth = 168 feet

Red Hawk Well No. 1 water level readings - RECOVERY MONITORING

Date	Time	Time since pumping stopped, t (minutes)	Depth to water (feet)
5/27/99	10:59 AM	47	7.20
	11:33 AM	81	7.10
	11:55 AM	103	7.00
	12:12 PM	120	6.90
	1:04 PM	172	6.80
	2:00 PM	228	6.70
	2:56 PM	284	6.60
	3:13 PM	301	6.50
	4:05 PM	353	6.40
	4:27 PM	375	6.40
	4:44 PM	392	17.20 *
	5:01 PM	409	29.00 *
	5:19 PM	427	29.10 *
5/28/99	2:06 AM	954	29.10 *
	2:23 AM	971	8.30
	2:40 AM	988	7.70
	3:02 AM	1010	7.40
	3:54 AM	1062	7.20
	5:07 AM	1135	7.50
	5:59 AM	1187	6.70
	6:21 AM	1209	6.60
	6:38 AM	1226	21.90 *
	6:55 AM	1243	28.00 *
	9:00 AM	1368	30.50 *

* Red Hawk Well No. 1 in operation