File: Stampmill

1506-00029

HYDROGEOLOGICAL INVESTIGATION

SUNRISE-STAMPMILL ESTATES

SECTION 8, TOWNSHIP 20 NORTH, RANGE 24 EAST

WASHOE COUNTY, NEVADA

358 6931

sea incorporated
ENGINEERS/PLANNERS

SPARKS, NEVADA
LAS VEGAS, NEVADA

TABLE OF CONTENTS

HYDROGEOLOGICAL INVESTIGATION
SUNRISE-STAMPMILL ESTATES
SECTION 8, TOWNSHIP 20 NORTH, RANGE 24 EAST
WASHOE COUNTY, NEVADA

I. INTRODUCTION

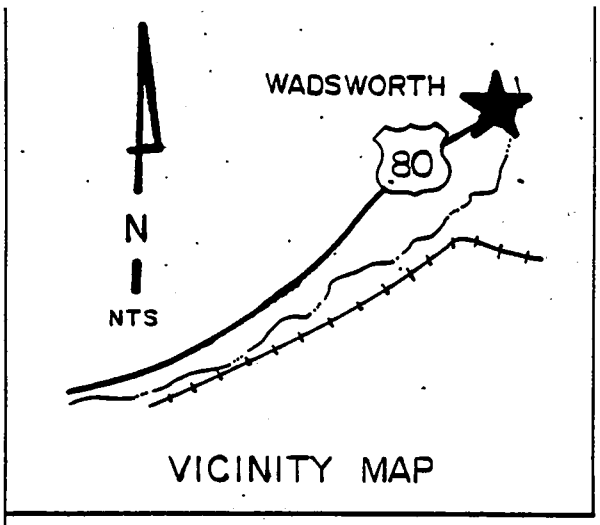
This report documents the results of test pumping of the two wells drilled for Sunrise-Stampmill Estates near Wadsworth, Nevada. The Nevada State permits for these wells are 35581 and 35582. In this report, the well drilled under Permit Number 35581 will be referred to as Well No. 1, and the well drilled under Permit No. 35582 as Well No. 2. Well No. 1 is located in the southwest quarter of the northeast quarter of Section 8, Township 20 North, Range 24 east. Well No. 2 is located in the southeast quarter of the northwest quarter of Section 8, Township 20 North, Range 24 East. The well locations are shown in Plate 1.

A short discussion of the well construction and development is included in addition to the factors describing the capabilities of the wells.

II. TEST DRILLING, WELL DESIGN, AND CONSTRUCTION

A. INTRODUCTION

Test boreholes were drilled on the site of the proposed development by the Water Development Corporation using the mud rotary method. These test boreholes were electric logged and reamed out. However, due to problems during construction, both of these original wells had to be abandoned. One of these wells was used as an observation well during



VICINITY MAP

Well B=1
WELL NO. 1

Well A=2
WELL NO. 2

A
WELL NO. 3

PLACE

OF

USE

INTERSTATE 80

N

SCALE 1"=500'

SPARKS, NEVADA
LAS VEGAS, NEVADA
SEATTLE, WASHINGTON

SUNRISE - STAMPMILL ESTATES

PROJECT NO. 585 001 794
FIGURE 1
PAGE

the testing of Wells 1 and 2. It will herein be referred to as Well No. 3. The location of Well No. 3 is shown in Plate 1. Well No. 3 will be abandoned following State of Nevada guidelines. Geologic, electric logs and Driler's logs for Well 1 are in Appendix A and in Appendix B for Well 2.

B. WELL NO. 1

A 24-inch borehole was drilled to a depth of 52 feet at the site of Well No. 1 in October, 1979. A 20-inch diameter conductor casing was installed and a sanitary seal of pumped grout constructed to a depth of 52 feet. An 18-inch borehole was then drilled to a depth of 215 feet.

Electric logs (E-logs) were used to select intervals for screening. A copy of the E-log for Well No. 1 is shown in Appendix A.

The formations encountered ranged from sands, gravels, and angular fragments of volcanic rock to clays and gravelly clays. The shallower water bearing materials appeared to consist primarily of old stream gravels while the deeper water zones may have been either fractured basalt flows or volcanic rubble fields. A geologic log of Well 1 is shown in Appendix A.

The total depth of the completed well is 200 feet. A total of 100 feet was screened using 10-inch Johnson PS irrigator screen. For the screened interval from 60 to 110 feet, 100-slot screen was used. In the deeper interval, from 145 to 195 feet, 50-slot screen was used. A 1/4-inch by 5/8-inch gravel pack was installed in the well. The top

of the casing was set about 2 feet above the ground surface. The construction of Well No. 1 is shown in Plate 2.

The formations seen at the site of Well No. 1 suggested that the shallower aquifers tapped by the well were of an unconfined to semi-unconfined nature. The deeper water bearing intervals, located beneath several feet of clay, were thought to consist of confined aquifers.

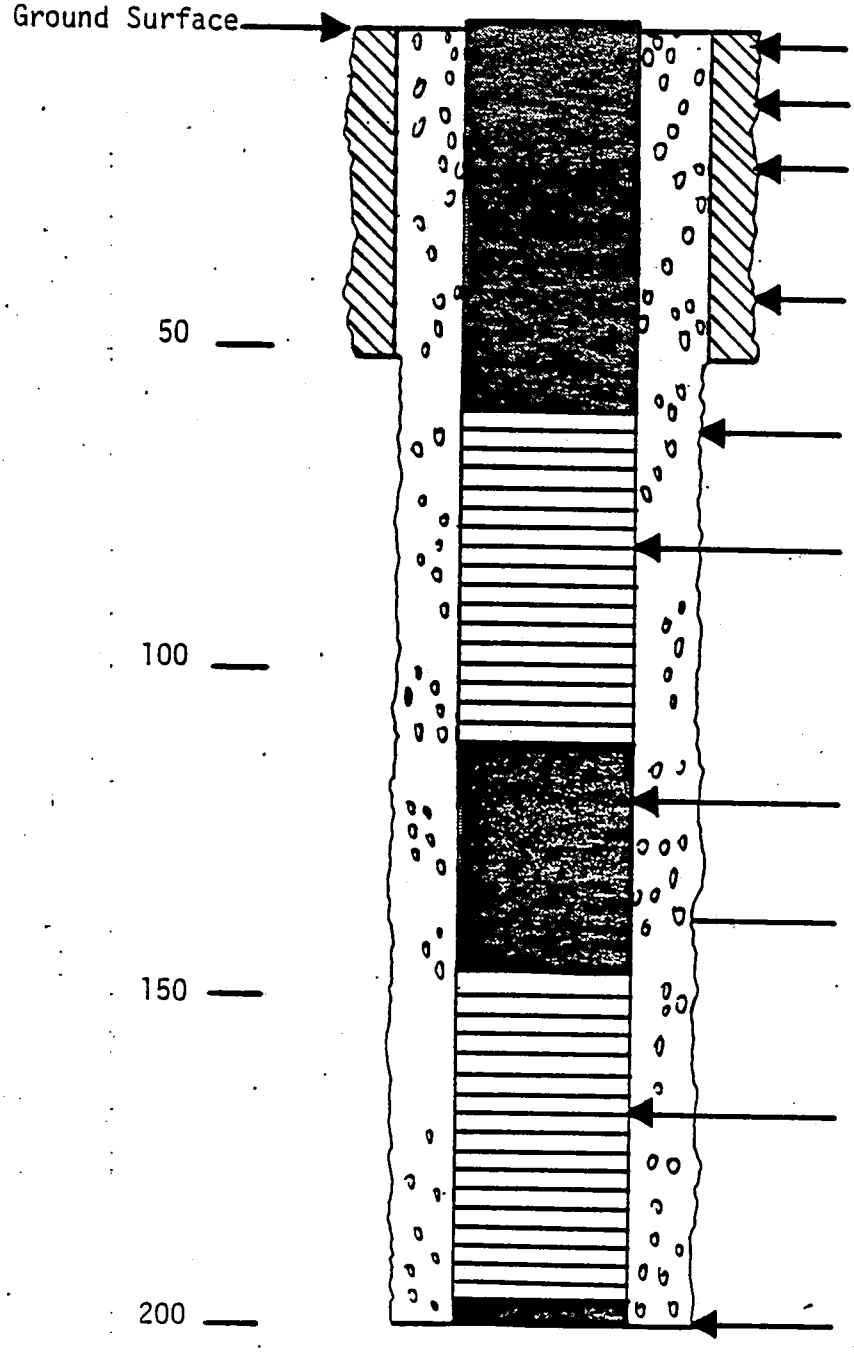
C. WELL NO. 2

A test borehole at the site of Well No. 2 was drilled to a depth of 275 feet. The geologic log is shown in Appendix B. As with Well No. 1, the formations ranged from stream gravels and sands at the shallower depths to clays and volcanic rock fragments at deeper intervals. From the test drilling, it was felt that a well constructed at the site of Well No. 2 would tap both unconfined and confined aquifers.

The electric log of this well combined with the geologic log indicated that the water bearing formations at Well No. 2 were not as permeable as those at the Well No. 1 site. The E-log for Well No. 2 is included in Appendix B.

The construction of Well No. 2 included a grouted sanitary seal emplaced outside of a 20-inch conductor casing that extended from the ground surface to a depth of 52 feet. Based largely on the E-log, it was decided to ream the test hole to 18 inches in diameter from 52 feet to a total depth of 230 feet. Ten-inch Johnson PS irrigator screen was used for intervals from 190 feet to 225 feet and from 60 feet to 105 feet. Fifty-slot screen was used for the deeper zone and

WELL CONSTRUCTION - WELL 1



0-52' 24" dia. Borehole

0-52' 24" dia. conductor casing

18.1' static water level

23.15 - static water level Apr 9, 92

0-52' sanitary seal

52-200' 18" dia. Borehole

60-110' 10" i.d. Johnson Irrigator screen, 100 slot

0-200' 10" i.d. casing

0-200' 1/4" x 5/8" gravel pac

145-195' 10" i.d. Johnson Irrigator screen, 50 slot

200' Total Depth

SCALE:
Vertical 1" = 30'
Horizontal 1" = 1'

100-slot screen for the shallower zone. A 1/4 inch by 5/8 inch gravel pack was installed. The top of the casing was set approximately 2 feet above the ground surface. The construction of Well No. 2 is shown in Plate 3.

III. WELL DEVELOPMENT AND WELL TESTING

A. INTRODUCTION

After installation of the gravel packs, the wells were developed by pumping clear water through the wells, air blowing, and velocity water jetting using glassy phosphates. The wells were further developed with a vertical turbine pump using surging and pumping techniques. When the discharge was clean and free of sediment, test pumping was begun. Well No. 1 was surged and tested before moving the pump to Well No. 2.

In the following discussion of the well testing program at Sunrise-Stampmill, these definitions apply:

Static Water Level - the depth from the ground surface to the water level in a well when it is not influenced by pumping.

Pumping Level - the level at which water stands in a well when pumping is in progress.

Drawdown - the difference between pumping level and static water level during pumping.

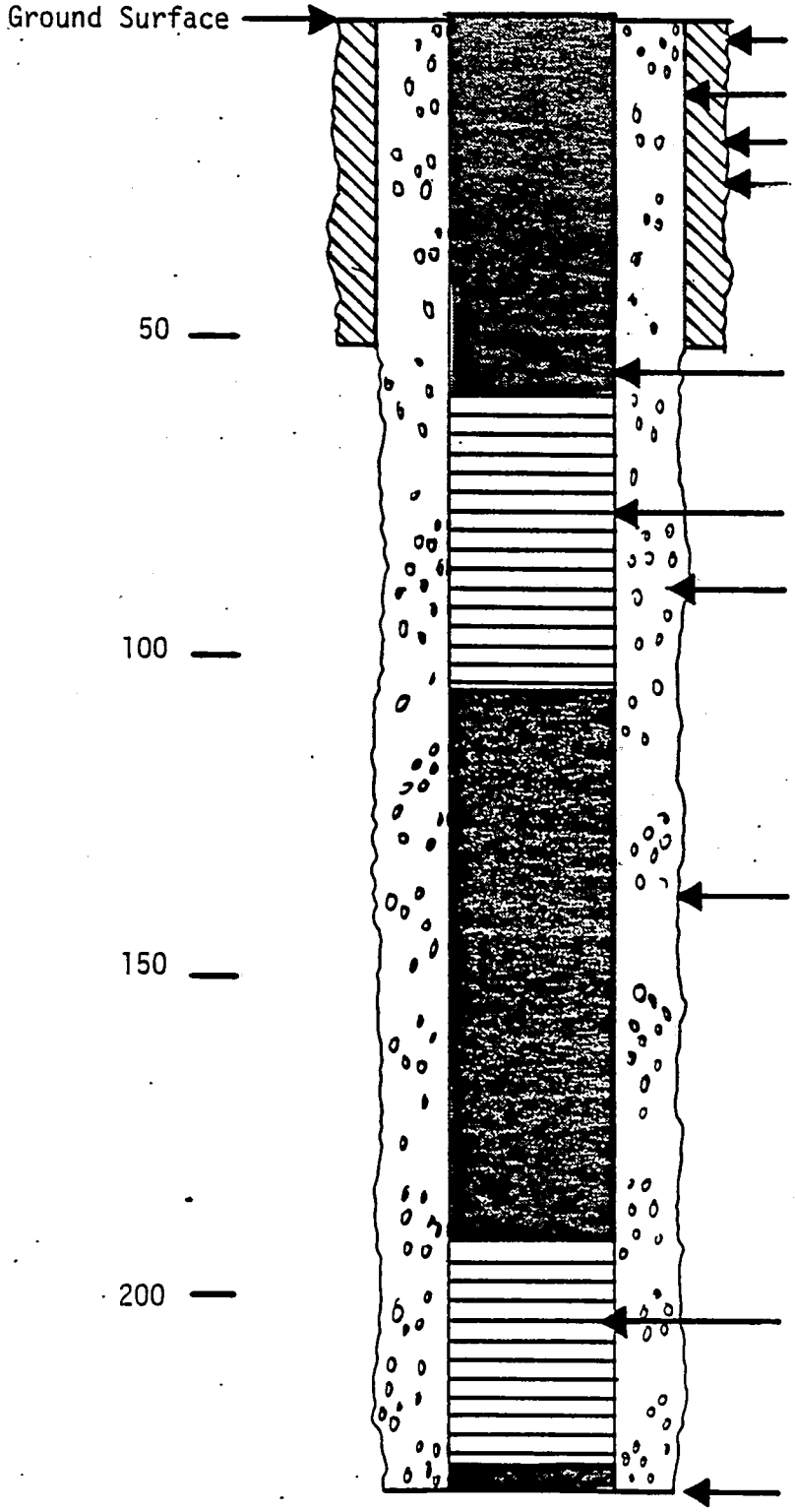
Residual Drawdown - the drawdown in a well as the water recovers after pumping has been stopped.

Specific Capacity - the instantaneous rate of yield of the well per unit of drawdown, in gallons per minute foot (gpm/ft).

Transmissivity, T - the rate at which water will flow through a vertical strip of aquifer one foot wide and extending through the full saturated thickness of the aquifer, under a hydraulic gradient of 1.00. T is measured in gallons per day per foot (gpd/ft).

Storage Coefficient, S - the volume of water released from storage in an aquifer, per unit of surface area of the aquifer per unit change in hydraulic head. S is dimensionless.

WELL CONSTRUCTION - WELL 2



0-52' 24" dia borehole

0-52' 20" dia. conductor casing

18.3' static water level

0-52' sanitary seal

23.26 static water level
4/13/92

0-230' 10" i.d. casing

60-105' 10" i.d. Johnson
Irrigator screen, 100 slot

0-230' 1/4" x 5/8" gravel pack

52-230' 18" dia. borehole

190-225' 10" i.d. Johnson
Irrigator screen, 50 slot

230' Total Depth

SCALE
Vertical 1" = 30'
Horizontal 1" = 1'

Step-Drawdown Pump Test - a test of yield of a well in which drawdown is recorded at several differnt pump rates.

Well Recovery Test - a test in which residual drawdown is recorded after pumping has stopped.

Constant Discharge Test - a test in which drawdown is recorded while pumping at a constant rate.

Two types of tests were performed on each well. Initially, a step-drawdown test consisting of four pumping rates was conducted in order to estimate the peak capacity of the well, determine an optimum pumping rate, select a pumping rate for the subsequent constant discharge test, and aid in eveluating aquifer characteristics.

A constant discharge test was conducted on both wells. Normally, a 48-hour test is required by the Washoe County Health Department in order to fully evaluate quality and quantity parameters. However, the Health Department allowed the test on Well No. 1 to be terminated after 36 hours due to mechanical difficulties encountered during the test. Well No. 2 was pumped for 48 hours.

During the step-drawdown testing, the drawdown in the pumping well was monitored closely while the water levels in observation wells were occasionally checked. No attempt was made to evaluate aquifer characteristics from the drawdown recorded during pumping; however, the Theis recovery method was used with the residual drawdown information to estimate transmissivity.

The presence of two observation wells during the testing of each well enabled the use of a variety of methods for analyzing constant discharge data. During the testing of both wells, recharge boundary effects were observed. As a consequence, the Theis nonequilibrium

method could not be applied. The recharge boundary curves developed under Stallman's method were found to provide better fits with the observation data. Despite the recharge effects, Jacob's straight-line method was found to be applicable to much of the constant-discharge data, as was the Theis Recovery Method. A thorough explanation of aquifer evaluation procedures cannot be included in this report. Complete discussions for groundwater hydraulics and the methods applied in this investigation may be found in References 1 through 7 of the accompanying bibliography.

During the tests, discharges were measured with a 4-inch orifice mounted on a 6-inch pipe. The depth to water was measured with an electric depth sounder.

Representative Time verses Drawdown graphs are shown in Appendix C.

B. WELL NO. 1

The step-drawdown test on Well No. 1 was conducted on November 29, 1979. The static water level prior to the test was 20.1 feet below the top of the casing. The test consisted of four steps each 1.5 hours long. Table 1 shows the pumping rates, drawdown readings and specific capacities of each of the steps. Plate C-1 is a graphical representation of the data.

Table 1 - Results of Step-Drawdown Test, Well No. 1

Step	Q, gpm	Drawdown, ft	Specific Capacity gpm/ft
1	260	24.8	10.5
2	295	30.3	9.7
3	320	33.6	9.5
4	386	44.6	8.7

The well recovered to within 1 foot of static level within 20 minutes and to within 0.2 feet after 2 hours. A plot of drawdown versus time for this test is shown in Plate C-1.

Wells 2 and 3 were checked occasionally to see the effect on their water levels by the test pumping. Well 2 water levels were lowered a total of 4.5 feet and Well 3 was drawn down 3.0 feet during the test.

A 36-hour constant discharge test was conducted on Well No. 1 from December 3 through December 4, 1979. Wells 2 and 3, in addition to the pumping well, were monitored consistently. The mean pump rate for the test was 322 gpm. The water level in Well No. 1 was drawn to 52.55 feet below the top of the casing (32.45 feet of drawdown) and recovered to within 0.18 feet of the static level three hours after the termination of pumping.

A listing of transmissivity and storage coefficent values computed from the data generated by these tests is shown in Table 2.

Table 2

Transmissivity (T) and Storage Coefficient (S) Values Acquired From Test Pumping of Well No. 1

Type of Test	Data Source (Well No.)	Method of Analysis	T, gpd/ft	S, Dimensionless
Step D.D	1 (Pumping Well)	Theis Recovery	30,350	-
Const. Dis.	3 (Observation)	Stallman	19,950	0.000188
Const. Dis.	2 (Observation)	Stallman	32,090	0.00012
Const. Dis.	1 (Pumping Well)	Theis Recovery	34,000	-

Plate C-2 shows the data from Well No. 2 analyzed by the Stallman method. Based on this data, it appears that a transmissivity of 30,000 gpd/ft is a reasonable value from Well No. 1. A mean storage

coefficient of about 0.00015 is also applicable. The computed storage coefficients indicate that the aquifer is confined to semi-confined.

C. WELL NO. 2

A 6-hour step-drawdown test was conducted on Well No. 2 on December 9, 1979. The test consisted of four steps, each of 1.5 hours duration. The pumping rates were 170 gpm, 250 gpm, 272 gpm, and 277 gpm. Extremely high drawdowns, such as 115 feet at 272 gpm, suggested that the well was not fully developed. A possible explanation was that the mud cake on the borehole wall was not completely removed during the development process. It was decided, therefore, to try to improve the well's performance through an acidization treatment combined with dry ice. After application, the chemicals were allowed to work overnight. They were then pumped out and another day of surging and pumping was conducted before continuing test pumping. During this process, it appeared that a portion of the mud cake had been removed.

A 4-hour step-drawdown test with pump rates of 200 gpm, 270 gpm, and 289 was performed on Well No. 2. The amount of drawdown at the conclusion of each step was, respectively, 33.3 feet, 41.8 feet, 135 feet, and 164 feet. Static water level was 20.4 feet. A plot of drawdown versus time for this test is shown in Plate C-3.

A 48-hour constant discharge test on Well No. 2 was conducted during December 17-19, 1979, at a mean pumping rate of 206 gpm. Two observations wells, Wells 1 and 3, were monitored consistently during the test. Table 3 shows the values for transmissivity and storage coef-

ficients derived from the testing of Well No. 2. Plate C-4 shows data analyzed via the Stallman method.

Based on these results, it appears that a T value of 15,000 gpd/ft is reasonable for these aquifers. As was the case with Well NO. 1, the aquifers appear to be confined to semi-confined based on a mean storage coefficient value of 0.0002.

Table 3

Transmissivity (T) and Storage Coefficient (S) Values Acquired From Test Pumping of Well No. 2

Type of Test	Data Source (Well No.)	Method of Analysis	T, gpd/ft	S, Dimensionless
Const. Dis.	3 (Observation)	Stallman	14,750	0.00032
Const. Dis.	1 (Observation)	Stallman	14,310	0.00010
Const. Dis.	2 (Pumping Well)	Jacob's	15,000	-
Const. Dis.	2 (Pumping Well)	Theis Recovery	13,640	-

IV. PROJECT DEMAND AND WELL CAPACITY

The Sunrise-Stampmill wells will serve about 261 residential units, plus some light commerical interests. The places of use are shown in Plate 1. The water from the wells will be transported to a tank to be located near the place of use. The tank is also shown in Plate 1.

Under an operating schedule in which a well is pumped for 12 hours, Well No. 1 could pump at a rate of 400 gpm before beginning to dewater aquifers. Based on the Theis method, a peak rate of approximately 600 gpm over a period of a few hours is also attainable without drawing the water to a dangerously low level.

Based on the step-drawdown data from Well No. 2, it appears that Well No. 2 can be pumped at a rate of 225 gpm for extended periods of time.

V. WATER QUALITY

During the tests, water samples from each well were collected by the Washoe County Health Department for quality analyses. The results of these tests are inclued in Appendix D. Except for a high fluoride reading on the 24-hour samples for Well No. 2, all samples met County Standards. This high reading is probably due to residual fluoride in the well from the chemical development phase.

VI. CONCLUSIONS

Test pumping of the Sunrise-Stampmill wells resulted in the following major conclusions:

1. Well No. 1 is capable of being pumped at a rate of 400 gpm for 12 hours a day before dewatering aquifers. A peak rate of 600 gpm is attainable.

2. Well No. 2 is capable of being pumped at a rate of 225 gpm for 12-hour periods.

3. The water quality in the area appears to be very good.

4. Use of the several formulas gives transmissivity values of 30,000 gpd/ft for Well No. 1 and 15,000 gpd/ft for Well No. 2.

5. A storage coefficient of 0.00015 has been determined for Well No. 1, while Well No. 2 has a storage coefficient of 0.0002.

REFERENCES

1. Bouwer, Herman, "Groundwater Hydrology", McGraw-Hill, San Francisco, 1978.

2. Davis, Stanley N. and Roger DeWiest, "Hydrogeology", John Wiley and Sons, New York, 1966.

3. Domenico, Patrick A., "Concepts and Models in Groundwater Hydrology", McGraw-Hill, San Francisco, 1972.

4. Freeze, R.A., and J.A. Cherry, "Groundwater", Prentice-Hall, Englewood Cliffs, N.J., 1979.

5. Johnson Division, UOP, "Groundwater and Wells", Saint Paul, Minnesota, 1975.

6. Kruseman, G.P. and N.A. de Ridder, "Analysis and Evaluation of Pumping Test Data", International Institute for Land Reclamation and Improvement, Bull. 11, Wageningen, The Netherlands, 1979.

7. Lohman, S.W., "Ground-Water Hydraulics", USGS Professional Paper 708, Washington, D.C., 1972.

APPENDIX A

WELL NO. 1

Geologic Log
Driller's Report
Electric Log

GEOLOGIC LOG - WELL NO. 1

Depth (feet)	Materials Descripton
0-11	Multi-colored, subrounded, fine to medium grained sand with some quartz and mica
11-18	Multi-colored, subrounded, cobbles
18-22	Brown, plastic clay
22-50	Black, red, green, and white, angular, sandy gravel
50-80	Mostly black, subangular, medium grained, clayey sand, sand is basalt rock chips; clay is slightly plastic
80-140	Brown, red, black, subangular, medium to coarse grained sands, mostly basalt rock chips; clay is gray
140-165	Black, gray, brown, medium to coarse grained, clayey sand
165-215	Gray, medium to coarse grained, angular to subangular, silty sand; sand is basaltic rock chips

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

STATE OF NEVADA
DIVISION OF WATER RESOURCES

OFFICE USE ONLY
Log No.
Permit No.
Basin

WELL DRILLERS REPORT

Please complete this form in its entirety

1. OWNER Dunmore Construction Co. ADDRESS 12344 Fair Oaks Blvd. Fair Oaks, Ca. 95628

2. LOCATION SW ¼ NE ¼ Sec. 3 T. 20 N/S R. 24 E. Washoe County
PERMIT NO. 35581 - Well #1

3. TYPE OF WORK: New Well [X] Recondition [ ] Deepen [ ] Other [ ]

4. PROPOSED USE: Domestic [X] Irrigation [ ] Test [ ] Municipal [ ] Industrial [ ] Stock [ ]

5. TYPE WELL: Cable [ ] Rotary [X] Other [ ]

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Sand and Gravel		0	18	18
Brown Cady		18	22	4
Sand and gravel		22	50	28
Sandy clay		50	70	20
Sand and gravel		70	110	40
Sandy clay		110	145	35
Coarse sand		145	165	20
Fine, silty sand		165	200	35

Date started November 10 19 79
Date completed November 14 19 79

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. ____ Draw down ____ feet ____ hours
G.P.M. ____ Draw down ____ feet ____ hours
G.P.M. ____ Draw down ____ feet ____ hours

8. WELL CONSTRUCTION
Diameter hole 18 inches Total depth 202 feet
Casing record 10 3/4 to bottom
Weight per foot 28 Thickness ¼

Diameter	From	To
10 3/4 inches	+2 feet	60 feet
10 3/4 inches	112 feet	147 feet
10 3/4 inches	197 feet	202 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes [X] No [ ] Type Pumped grout
Depth of seal 51 feet
Gravel packed: Yes [X] No [ ]
Gravel packed from 52 feet to 202 feet

Perforations:
Type perforation Johnson well screen
Size perforation 50 slot and 100 slot
From 60 feet to 112 feet
From 147 feet to 197 feet
From ____ feet to ____ feet
From ____ feet to ____ feet
From ____ feet to ____ feet

9. WATER LEVEL
Static water level ____ Feet below land surface
Flow ____ G.P.M.
Water temperature ____ ° F. Quality ____

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name The Water Development Corp.
Address P.O. Box 388, Wdld, Ca. 95695
Nevada contractor's license number 12352
Nevada driller's license number 393
Signed [signature]
Date December 28, 1979

USE ADDITIONAL SHEETS IF NECESSARY

DRILLER'S LOG - WELL NO. 1

APPENDIX B

WELL NO. 2

Geologic Log
Driller's Report
Electric Log

GEOLOGIC LOG - WELL NO. 2

Depth (feet)	Materials Descripton
0-5	Light brown, slightly silty, plastic clay
5-15	Mostly black, subangular, gravelly, medium to coarse grained sand
15-30	Black and red, subangular, fine to medium grained, silty sand with some quartz
30-45	Multi-colored, subangular to subrounded, medium to coarse grained, silty sand with some quartz
45-70	Black, tan, subangular to subrounded, sandy, clayey gravel; sand is tan, black, subrounded; clay is brown, plastic
70-85	Black, tan, subangular to subrounded, sandy, clayey gravel; sand is tan, black, subrounded; clay is brown, plastic
85-110	Brown, plastic, sandy clay; sand is black, coarse, subangular
110-180	Reddish-purple, plastic, sandy to silty clay; sand is red, medium grained, subangular
180-220	Black, red, subangular to subrounded, fine to medium grained, silty, clayey sand; clay is gray, slightly plastic
220-250	Black, red, subangular to subrounded, fine to medium grained, silty, clayey sand; clay is gray, slightly plastic
250-275	Dark brown, sandy, plastic clay; sand is mostly black, subangular, medium to coarse grained

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No. 13
Permit No.
Basin

1. OWNER Dunmore Construction Co. ADDRESS 12344 Fair Oaks Blvd. Fair Oaks, Ca. 95628

2. LOCATION SE ¼ NW ¼ Sec. 8 T. 20 N/S R. 24 E. Washoe County
PERMIT NO. 35582- Well #2

3. TYPE OF WORK: New Well ☑ Recondition ☐ Deepen ☐ Other ☐

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

5. TYPE WELL: Cable ☐ Rotary ☒ Other ☐

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Silty clay		0	5	5
Medium Coarse sand		5	15	10
Silty sand		15	45	30
Sand and gravel		45	70	25
Sand. clayey gravel		70	110	40
Sandy clay		110	130	20
Silty, clayey sand		130	225	45
Silty clay		225	230	5

8. WELL CONSTRUCTION
Diameter hole 18 inches Total depth 230 feet
Casing record 10 3/4 to bottom
Weight per foot 29 Thickness ¼

Diameter	From	To
10 3/4 inches	+2 feet	60 feet
10 3/4 inches	105 feet	190 feet
10 3/4 inches	225 feet	230 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☑ No ☐ Type Cement grout
Depth of seal 50 feet
Gravel packed: Yes ☑ No ☐
Gravel packed from 50 feet to 230 feet

Perforations:
Type perforation Johnson Well Screen
Size perforation 50 slot and 100 slot
From 60 feet to 105 feet
From 190 feet to 225 feet
From feet to feet
From feet to feet
From feet to feet

9. WATER LEVEL
Static water level Feet below land surface
Flow G.P.M.
Water temperature °F. Quality

Date started November 1 19 79
Date completed November 10 19 79

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours

10. DRILLERS CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name The Water Development Corp.
Address P.O. Box 388. Wild., Ca. 95695
Nevada contractor's license number 12952
Nevada driller's license number 793
Signed
Date November 28, 1979

USE ADDITIONAL SHEETS IF NECESSARY

DRILLER'S LOG - WELL NO. 2

APPENDIX C

TIME VERSUS DRAWDOWN GRAPHS

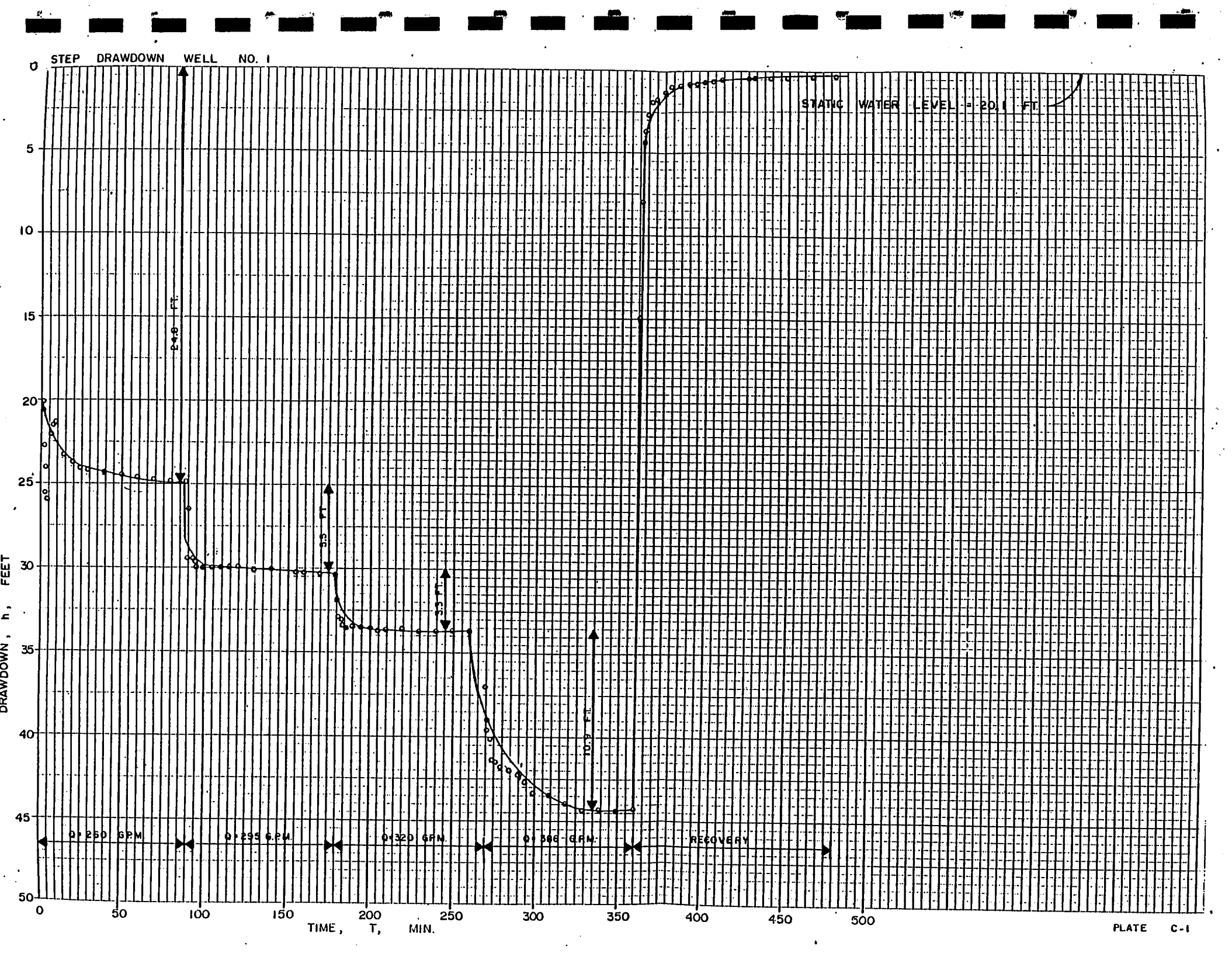

STEP DRAWDOWN WELL NO. 1
STATIC WATER LEVEL = 20.1 FT.
24.8 FT.
6.3 FT.
13.3 FT.
10.7 FT.
Q = 250 G.P.M.
Q = 295 G.P.M.
Q = 320 G.P.M.
Q = 366 G.P.M.
RECOVERY
DRAWDOWN, h, FEET
TIME, T, MIN.
0
5
10
15
20
25
30
35
40
45
50
0
50
100
150
200
250
300
350
400
450
500

PLATE C-1

NO. 340-L35 DIETZGEN GRAPH PAPER
LOGARITHMIC
3 CYCLES X 5 CYCLES

DIETZGEN CORPORATION
MADE IN U.S.A.

CONSTANT DISCHARGE TEST PUMPING WELL: NO. 1 OBSERVATION WELL: NO. 2

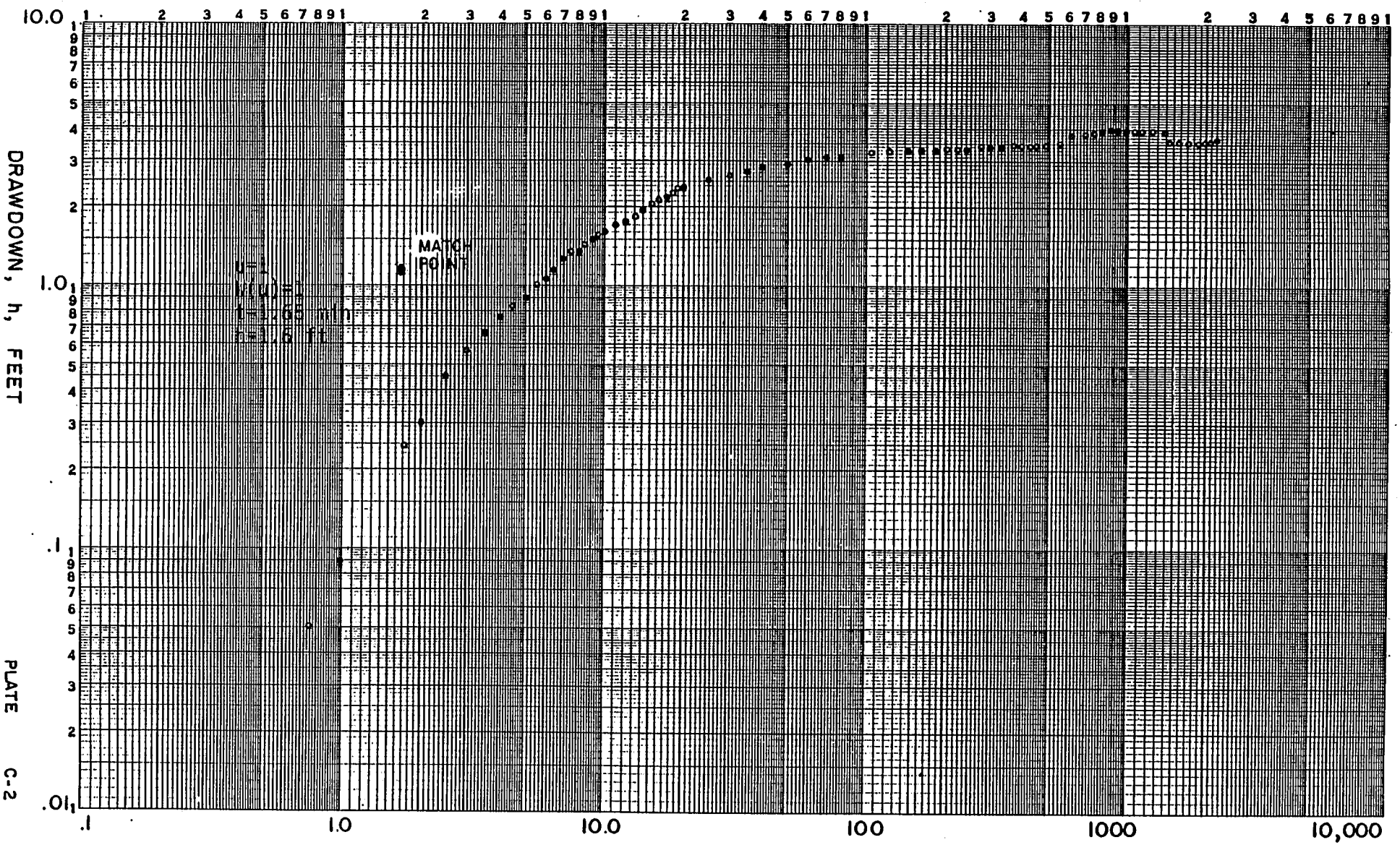
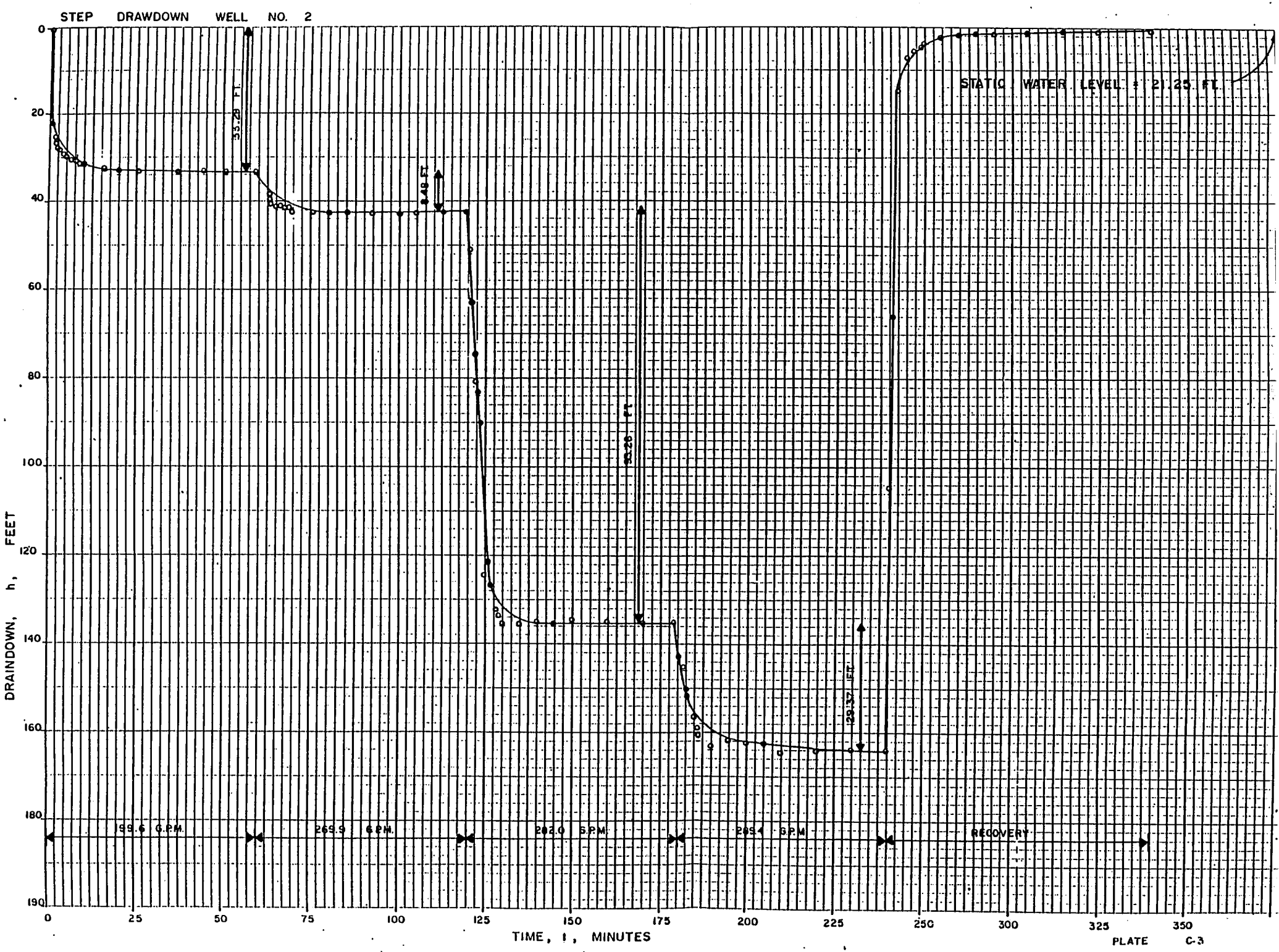


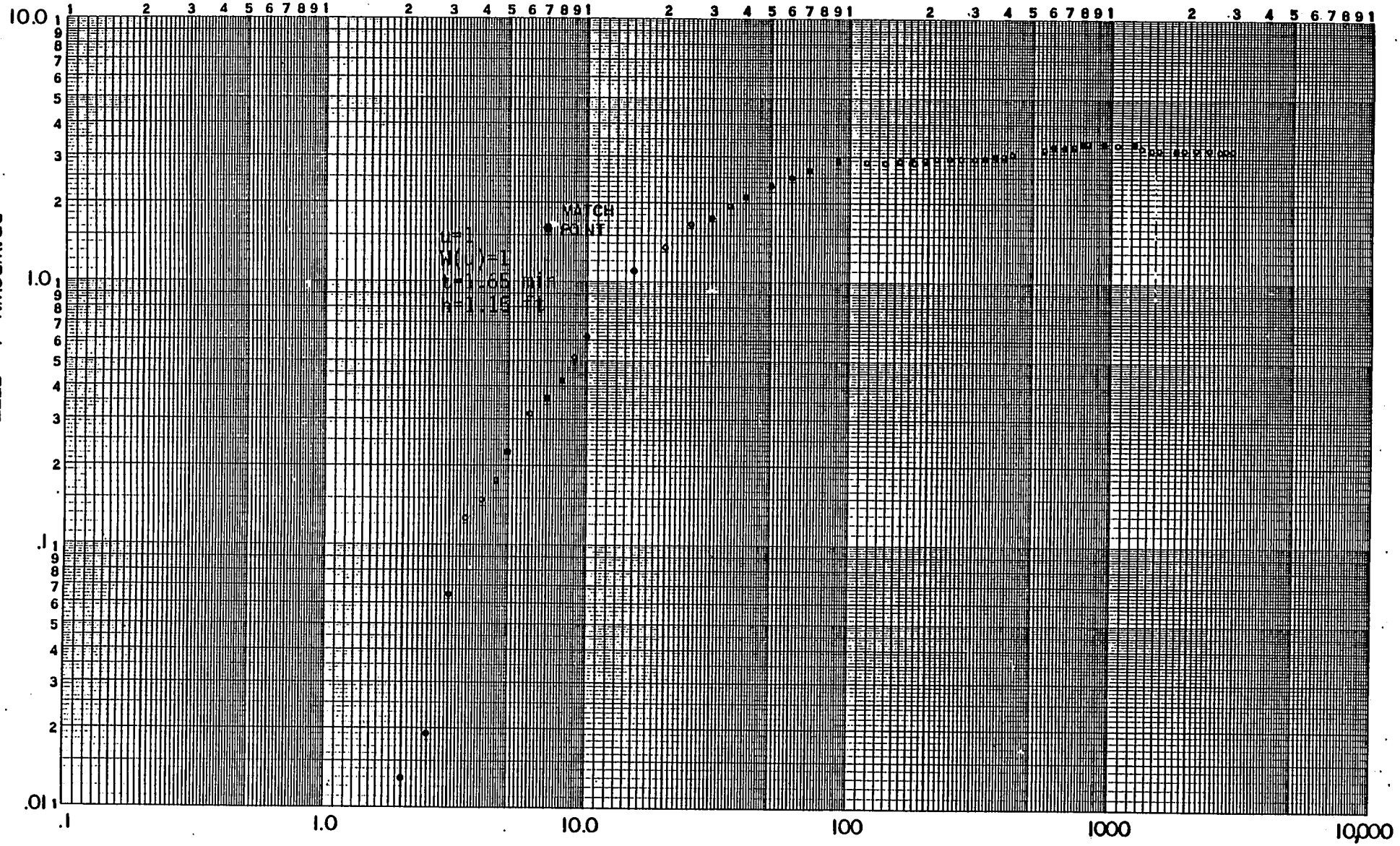
PLATE C-2


STEP DRAWDOWN WELL NO. 2
STATIC WATER LEVEL = 21.25 FT.
35.28 FT.
8.48 FT.
35.28 FT.
29.37 FT.
99.6 G.P.M.
269.9 G.P.M.
282.0 G.P.M.
269.4 G.P.M.
RECOVERY
DRAINDOWN, h, FEET
TIME, t, MINUTES
0
20
40
60
80
100
120
140
160
180
190
0
25
50
75
100
125
150
175
200
225
250
300
325
350
PLATE C-3

NO. 340-L3S DIETZGEN GRAPH PAPER
LOGARITHMIC
3 CYCLES X 5 CYCLES

DIETZGEN CORPORATION
MADE IN U.S.A.

CONSTANT DISCHARGE TEST PUMPING WELL: NO. 2 OBSERVATION WELL NO. 3



DRAWDOWN, h, FEET

TIME, t, MIN.

PLATE C-4

APPENDIX D

WATER QUALITY ANALYSES

IN TRIPLICATE
(PLEASE PRINT)

Ariaz Entrance PWS 4A

BUREAU OF LABORATORIES AND RESEARCH
NEVADA DIVISION OF HEALTH
1660 N. Virginia Street
Reno, Nevada 89503

7530

5552083

WATER CHEMISTRY:

WELL WATER: Pump should be delivering clear water before sampling.

Date sampled 12-4-79 Date submitted 12-5-79

Owner SUNRISE STAMPMILL ESTATES WELL 7-A

Report to:
Name WCDHD
Address
City State

County WA
Township 20
Range 24 Section 8
Area WADSWORTH

WATER SOURCE:
Well ✓ Spring Surface
Hot Cold Depth Ft.
Casing diameter in. depth Ft.
Now in use Yes ☐ No ☒

ROUTINE DOMESTIC ANALYSIS PLEASE CHECK BOX 370 0.31 ☒

FOR PARTIAL ANALYSIS CIRCLE CONSTITUENT DESIRED

FOR CONSTITUENTS NOT LISTED BELOW PRINT IN CONSTITUENT DESIRED IN SPACE BELOW 83

Constituent	P.P.M.	Constituent	P.P.M.	Constituent	P.P.M.	Constituent	P.P.M.	Constituent	P.P.M.
T.D.S.	290	Chloride	19	Iron	0.02	Cu	0.0	Ba	<0.25
Hardness	177	Nitrate	5.6	Manganese	0.01	MBAS	<0.1	Cd	<0.001
Calcium	41	Alkalinity	166	Color	3	Zn	0.08	Cr	<0.005
Magnesium	18	Bicarbonate	203	Turbidity	0.5			Pb	<0.005
Sodium	35	Carbonate	0	p.H.	7.86			Hg	<0.0005
Potassium	5	Fluoride	0.07					Se	<0.005
Sulfate	44	Arsenic	0.000					Ag	<0.01

WATER QUALITY MEETS THE STANDARDS SET BY THE STATE OF NEVADA DRINKING WATER REGULATIONS FOR THE CHEMICAL CONSTITUANTS REPORTED ABOVE

Remarks

12-11-79

WATER CHEMISTRY - WELL NO. 1

IN TRIPLICATE
(PLEASE PRINT)

BUREAU OF LABORATORIES AND RESEARCH
NEVADA DIVISION OF HEALTH
1660 N. Virginia Street
Reno, Nevada 89503

7530

52186

FUTURE PWS
24-HR. SAMPLE
WATER CHEMISTRY:

WELL WATER: Pump should be delivering clear water before sampling.

Date sampled 12-18-79 Date submitted

Owner SUNRISE STAMPMILL ESTATES
WELL #1

Report to:
Name WCDHD
Address
City State

County WA
Township 20
Range 24 Section 8
Area WADSWORTH

WATER SOURCE:
Well ✓ Spring Surface
Hot Cold ✓ Depth Ft.
Casing diameter 10" in depth 250' Ft.
Now in use Yes ☐ No ☐

ROUTINE DOMESTIC ANALYSIS 395 PLEASE CHECK BOX 0.44 X

FOR PARTIAL ANALYSIS CIRCLE CONSTITUENT DESIRED

FOR CONSTITUENTS NOT LISTED BELOW PRINT IN 186 CONSTITUENT DESIRED IN SPACE BELOW

Constituent	P.P.M.	Constituent	P.P.M.	Constituent	P.P.M.	Constituent	P.P.M.	Constituent	P.P.M.
T.D.S.	336	Chloride	24	Iron	0.03	Cu	0.00		
Hardness	218	Nitrate	6.3	Manganese	0.02	MBAS	0.00		
Calcium	46	Alkalinity	168	Color	3	Zn	<0.1		
Magnesium	25	Bicarbonate	205	Turbidity	0.4				
Sodium	28	Carbonate	0	p.H.	7.37				
Potassium	6	Fluoride	1.14						
Sulfate	55	Arsenic	0.000						

IN TRIPLICATE
(PLEASE PRINT)

BUREAU OF LABORATORIES AND RESEARCH
NEVADA DIVISION OF HEALTH
1660 N. Virginia Street
Reno, Nevada 89503

7530

52229

FUTURE PWS
SECOND WELL 48 HRS
WATER CHEMISTRY:

WELL WATER: Pump should be delivering clear water before sampling.

Date sampled 12-19-79 Date submitted

Owner SUNRISE STAMPMILL ESTATES
WELL #

Report to:
Name WCDHD
Address
City State

County WA
Township
Range Section
Area

WATER SOURCE:
Well ✓ Spring Surface
Hot Cold ✓ Depth Ft.
Casing diameter in depth Ft.
Now in use Yes ☐ No ☐

ROUTINE DOMESTIC ANALYSIS 397 PLEASE CHECK BOX 0.43 X

FOR PARTIAL ANALYSIS CIRCLE CONSTITUENT DESIRED

FOR CONSTITUENTS NOT LISTED BELOW PRINT IN 229 CONSTITUENT DESIRED IN SPACE BELOW

Constituent	P.P.M.	Constituent	P.P.M.	Constituent	P.P.M.	Constituent	P.P.M.	Constituent	P.P.M.
T.D.S.	301	Chloride	23	Iron	0.00	Cu	0.01	Ba	<0.25
Hardness	220	Nitrate	6.6	Manganese	0.01	MBAS	<0.1	Cd	<0.001
Calcium	47	Alkalinity	172	Color	3	Zn	0.20	Cr	<0.005
Magnesium	25	Bicarbonate	210	Turbidity	0.1			Pb	<0.05
Sodium	27	Carbonate	0	p.H.	7.93			Hg	<0.0005
Potassium	6	Fluoride	0.71					Se	<0.005
Sulfate	53	Arsenic	0.005					Ag	0.00

WATER QUALITY MEETS THE STANDARDS OF THE STATE NEVADA DRINKING

Remarks

Y.T.C

WATER CHEMISTRY - WELL NO. 2

welenco

WELL ENGINEERING SURVEYS

ELECTRIC LOG

FILING NO

COMPANY DUNMORE CONSTRUCTION CO.

WELL SUNRISE STAMPMILL NO. 1

FIELD WADSWORTH

STATE NEVADA COUNTY WASHOE

LOCATION:

SEC 8 TWP 20N RGE 24E

OTHER SERVICES

Permanent Datum: GROUND LEVEL , Elev. ____ Elev.: K.B.
Log Measured From G.L. , Ft. Above Perm. Datum D.F.
Drilling Measured From G.L. G.L.

Date	11-2-79			
Run No.	ONE			
Depth—Driller	220'			
Depth—Logger	219'			
Btm. Log Inter.	218'			
Top Log Inter.	73'			
Casing—Driller	20" @ 50'	@	@	@
Casing—Logger	–			
Bit Size	18"			
Type Fluid in Hole	GEL			
Dens. | Visc.	–			
pH | Fluid Loss	– | ml	ml	ml	ml
Source of Sample	–			
R_m @ Meas. Temp.	NA @ °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	NA @ °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	– @ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	–			
R_m @ BHT	– @ °F	@ °F	@ °F	@ °F
Time Since Circ.	2 WEEKS			
Max. Rec. Temp.	°F	°F	°F	°F
Equip. | Location	FV | BAK			
Recorded By	D. SPOON			
Witnessed By	MR. WESTHOFF			

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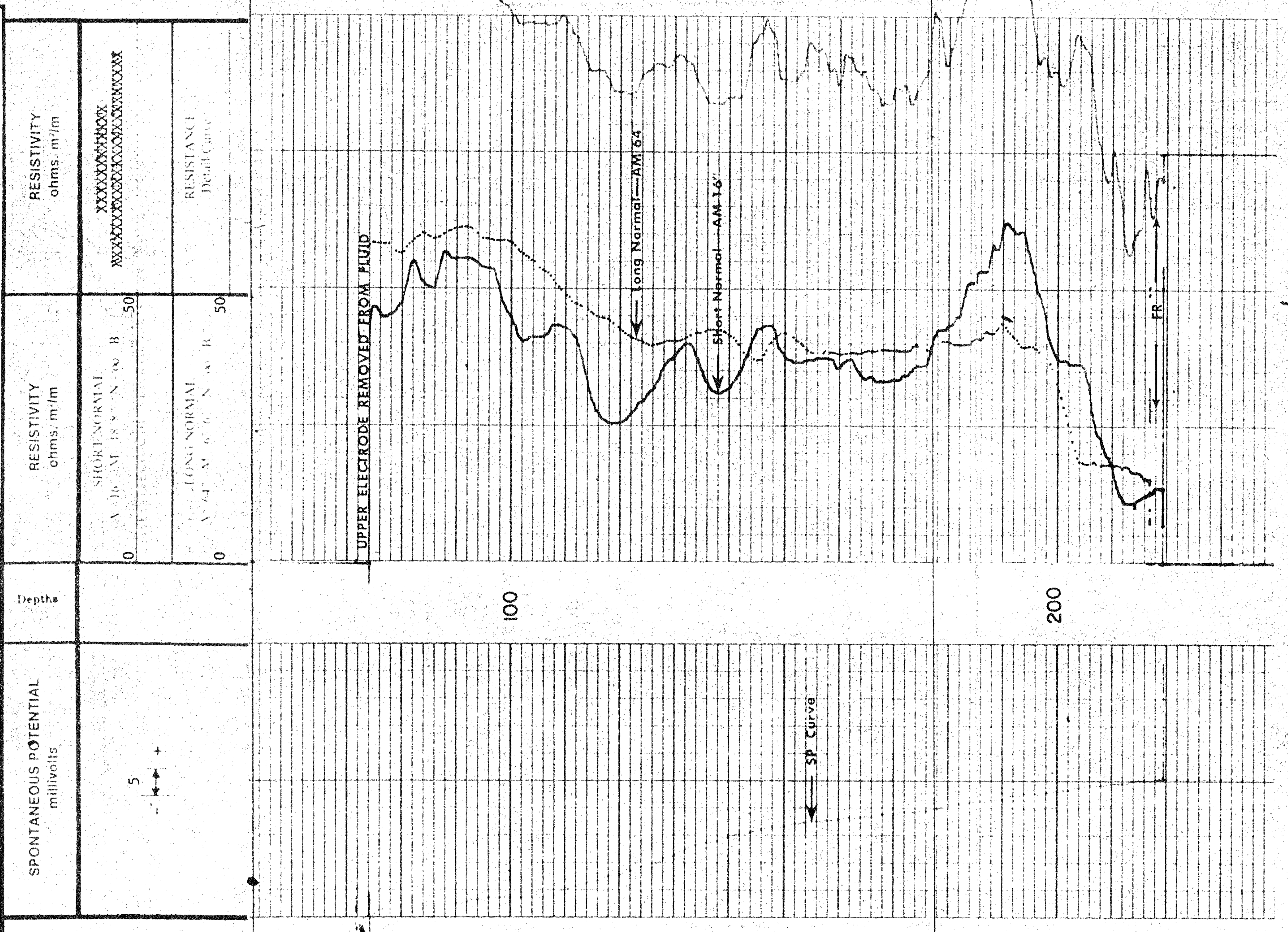
REMARKS

Type Log	Depth	Scale Changes Scale Up Hole	Scale Down Hole

Run No.	Tool Type	Equipment Data Pad Type	Tool Position	Other
ONE	E-LOG		FREE	

Changes in Mud Type or Additional Samples

Date	Sample No.	Depth—Driller	Type Fluid in Hole	Dens.	Visc.	ph	Fluid Loss	Source of Sample	R_m @ Meas. Temp.	R_{mf} @ Meas. Temp.	R_{mc} @ Meas. Temp.	Source: R_{mf} R_{mc}	R_m @ BHT	R_{mf} @ BHT	R_{mc} @ BHT
							ml		@ °F	@ °F	@ °F		@ °F	@ °F	@ °F



welenco

WELL ENGINEERING SURVEYS

ELECTRIC LOG

FILING NO

COMPANY DUNMORE CONSTRUCTION CO.

WELL SUNRISE STAMPMILL NO. 2

FIELD WADSWORTH

STATE CALIFORNIA COUNTY WASHOE

LOCATION

SEC 8 TWP 20N RGE 24E

OTHER SERVICES

Permanent Datum: GROUND LEVEL, Elev.

Log Measured From G.L., Ft. Above Perm. Datum

Drilling Measured From G.L.

Elev.: K.B.
D.F.
G.L.

Date	11-2-79			
Run No.	ONE			
Depth—Driller	275'			
Depth—Logger	247'			
Btm. Log Inter.	246'			
Top Log Inter.	80'			
Casing—Driller	- @	@	@	@
Casing—Logger	-			
Bit Size	6"			
Type Fluid in Hole	GEL			
Dens. | Visc.	-	|	|	|
pH | Fluid Loss	- | ml	| ml	| ml	| ml
Source of Sample	CIRC.			
R_m @ Meas. Temp.	29.4 @ 52 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	- @ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	M |	|	|	|
R_m @ BHT	- @ °F	@ °F	@ °F	@ °F
Time Since Circ.	2 HOURS			
Max. Rec. Temp.	- °F	°F	°F	°F
Equip. | Location	FV | BAD	|	|	|
Recorded By	D. SPOON			
Witnessed By	MR. WESTHOFF			

This Heading and Log Conform To API RP 31

Fold Here

REMARKS

Changes in Mud Type or Additional Samples															
Date	Sample No.	Depth—Driller	Type Fluid in Hole	Dens. | Visc.	ph | Fluid Loss ml	Source of Sample	R_m @ Meas. Temp.	R_{mf} @ Meas. Temp.	R_{mc} @ Meas. Temp.	Source: R_{mf} | R_{mc}	R_m @ BHT	R_{mf} @ BHT	R_{mc} @ BHT		

Scale Changes			
Type Log	Depth	Scale Up Hole	Scale Down Hole

Equipment Data				
Run No.	Tool Type	Pad Type	Tool Position	Other
ONE	E-LOG		FREE