

DAN

1506-00010

Mt Rose #3

CONSTRUCTION AND TESTING SUMMARY

MT. ROSE REPLACEMENT WELL

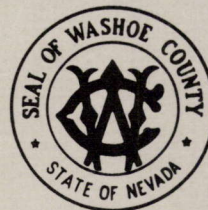
MAY, 1991

**WASHOE COUNTY**

DEPARTMENT OF PUBLIC WORKS

UTILITY DIVISION

P.O. BOX 11130 RENO, NEVADA 89520



CONSTRUCTION AND TESTING SUMMARY

MT. ROSE REPLACEMENT WELL

MAY, 1991

Prepared by:  
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## SUMMARY AND RECOMMENDATIONS

The Mt. Rose Replacement Well is constructed of 12 inch diameter casing to a total depth of 210 feet. The screened interval consists of wire wrapped well screen from 120 to 200 feet. A 10 foot blank sump pipe runs from 200 to 210 feet. A static water level of 22.81 feet was measured at the end of well development.

A step drawdown test and constant discharge test were conducted on the Replacement Well. After completion of the final step at 475 gpm, the well had an efficiency of 45%. The constant discharge test ran for 72 continuous hours at a pumping rate of 400 gpm. A drawdown of 59.52 feet with a pumping level of 81.54 feet was measured at the end of the test.

The well had a specific capacity of 6.72 gpm/ft after 72 hours of pumping. A recharge boundary in the test well was encountered 150 minutes after start of constant discharge testing. Water quality analyses show that well water constituents meet State of Nevada primary and secondary drinking water standards.

Recommended long term pumping rate for the Replacement Well is 300 gpm. The recommended pump intake setting is 110 feet. A pumping level of 77 feet is projected after 48 hours of continuous pumping at 300 gpm.

## INTRODUCTION

During the summer of 1990, Washoe County purchased Mount Rose Water Company. The water company supplies potable water to Galena Forest Estates and several homes in the Callahan Ranch area. Yields from 3 existing wells were diminishing, generating a need for additional supply. A replacement well was constructed between supply wells #2 and #3 in the existing water company well field off Shawna Lane. The Replacement Well is designed to augment existing sources in conjunction with the County owned MRSA Well #7. The locations of the Replacement Well and existing MRWC supply wells are shown in Figure 1.

Design, construction supervision, data collection and analyses were conducted by Washoe County Utility Division Hydrogeologists. Construction and testing of the Replacement Well was done by Lang Exploratory Drilling Company of Salt Lake City, Utah. The well was constructed during November and December of 1990. Pumping tests were done in January of 1991.

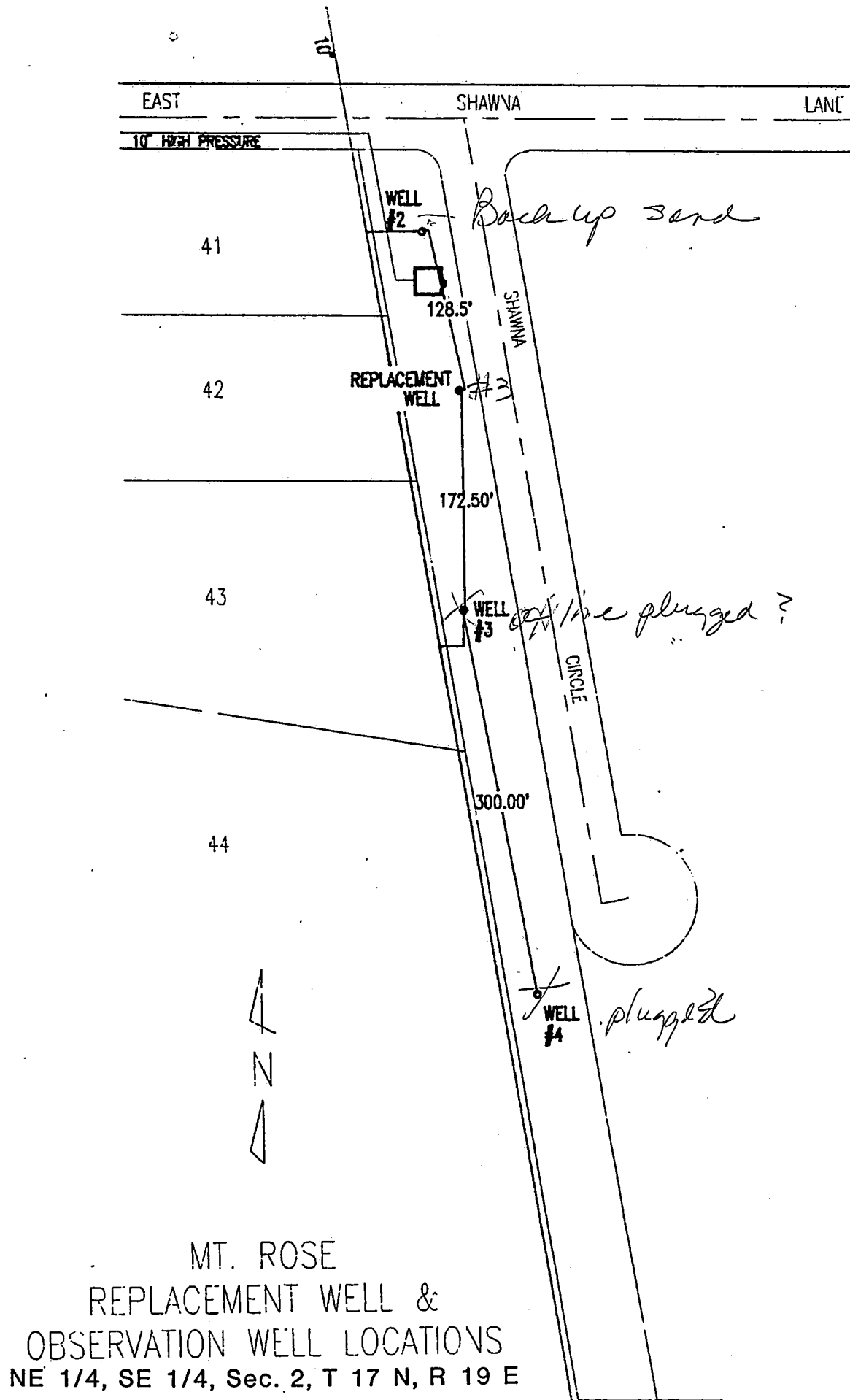


FIGURE 1



## BOREHOLE DRILLING AND LITHOLOGY

### BOREHOLE DRILLING

A 6-1/4 inch borehole was drilled from 0 to 140 feet by the dual tube flooded reverse drilling method. Formation sluffing prohibited the connection of drill column past 140 feet. Conversion to the direct rotary mud method enabled completion of the pilot hole to 340 feet. A 6-1/4 inch Lang Flat Bottom Tri-Cone carbide tooth bit was used during pilot hole drilling. Drilling was done by a Driltech DH-1 top head drive rotary rig.

The drilling fluid consisted of high yield bentonite clay with minor amounts of synthetic polymer additives. Re-circulation of drilling cuttings was prevented by an auxiliary mud tank equipped with a cyclone desander and sand shaker. Tank impellers prevented flocculation of the bentonite in the drilling fluid.

### BOREHOLE LITHOLOGY

Borehole formations consisted of moderately sorted sands and gravel from 0 to 200 feet. Grey volcanic fragments and possible fracture zones were encountered from 200 to 340 feet. Unconsolidated sands and gravels associated with a very fine grained sand lens exists between 133 and 140 feet. Borehole sluffing can be attributed to this area of the borehole. Table 1. is the geologists log of the borehole.

Borehole geophysics consisted of electric and temperature logs. Apparent resistivity was measured using short normal and long normal electrodes along with a single point resistance device. A spontaneous potential curve was included in the electric logging. Logging services were performed by Welenco of Bakersfield, California. Figure 2 is the electric log for the pilot hole.

Sieve analyses were conducted on borehole samples taken from the following intervals: 100 - 110ft., 130 -140ft. and 133 - 137ft. A screen slot size of 0.070 inch and filter pack of #6 x #12 mesh were selected from the analysis. Roscoe Moss Company of Los Angeles, Ca. performed the sieve analyses. A table of cumulative weights and percent of material retained is shown in Table 2. Grain-size distribution curves are shown in Figure 3.

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
TABLE 1  
MT. ROSE REPLACEMENT WELL  
GEOLOGIST'S LOG

---

| <u>DEPTH</u>  | <u>SAMPLE DESCRIPTION</u>                            |
|---------------|--|
| 0 - 20 Ft.    | Poorly Sorted Sand and Small Gravels                 |
| 20 - 64 Ft.   | Mixed Volcanic Sands and Gravels                     |
| 64 - 78 Ft.   | Brown, Sticky Sandy Clay                             |
| 78 - 114 Ft.  | Medium - Fine Grained Sands                          |
| 114 - 117 Ft. | Brown, Sticky Clay                                   |
| 117 - 145 Ft. | Medium - Fine Grained Sand Lenses                    |
| 145 - 198 Ft. | Angular Volcanic Fragments with Brown Clay Lenses    |
| 198 - 220 Ft. | Chatter, Cobbles, Vol. Fragments. Bedrock Contact ?  |
| 220 - 340 Ft. | Black/Grey Angular Volcanic Fragments with Fractures |



**Fold Here** **This Heading and Log Conform To API RP 31** **φ**

| SPONTANEOUS POTENTIAL<br>millivolts   | Depth | RESISTIVITY<br>ohms. m'/m              |  |
|---|-------|--|--|
|  |       | SHORT NORMAL<br>16 Inch<br>0 ————— 100 |  |
|   |       | LONG NORMAL<br>64 Inch<br>0 ..... 100  |  |



MT. ROSE REPLACEMENT WELL  
ELECTRIC LOG  
FIGURE 2

CLIENT: Dan Dragon  
PROJECT: Washoe County

TABLE 2

SIEVE ANALYSIS

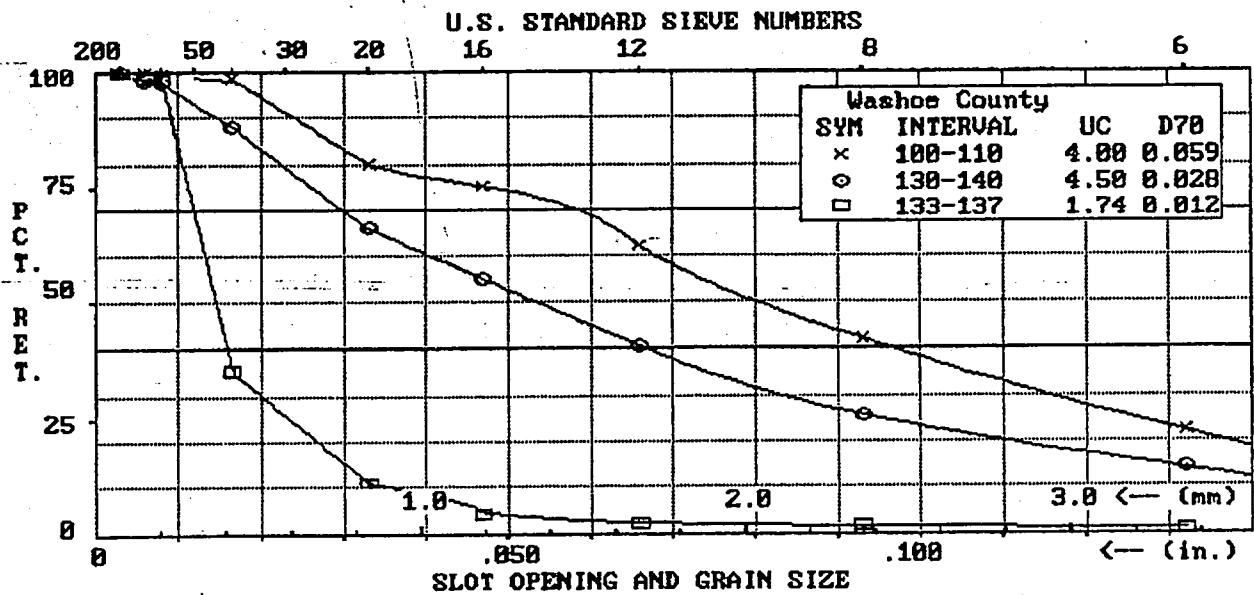
TABLE OF CUMULATIVE WEIGHTS

| MESH<br>NO. | SIZE<br>(IN) | SAMPLE  |      |         |      |         |      |
|-------------|--------------|---------|------|---------|------|---------|------|
|             |              | 100-110 |      | 130-140 |      | 133-137 |      |
|             |              | CUWT    | %RET | INWT    | %RET | INWT    | %RET |
| 3           | .263         |         |      |         |      |         |      |
| 1/4         | .250         |         |      |         |      |         |      |
| 4           | .187         |         |      |         |      |         |      |
| 6           | .132         | 89.0    | 22   | 67.0    | 14   | 3.0     | 1    |
| 8           | .093         | 79.0    | 42   | 56.0    | 26   | 2.0     | 2    |
| 12          | .066         | 79.0    | 62   | 70.0    | 41   | 2.0     | 2    |
| 16          | .047         | 54.0    | 75   | 68.0    | 55   | 6.0     | 4    |
| 20          | .033         | 19.0    | 80   | 52.0    | 66   | 20.0    | 11   |
| 30          | .023         |         |      |         |      |         |      |
| 40          | .016         | 73.0    | 98   | 106.0   | 88   | 73.0    | 35   |
| 50          | .012         |         |      |         |      |         |      |
| 70          | .008         | 4.0     | 99   | 44.0    | 97   | 189.0   | 98   |
| 100         | .006         | 1.0     | 100  | 3.0     | 98   | 1.0     | 99   |
| PAN         | .003         | 1.0     | 100  | 9.0     | 100  | 4.0     | 100  |

| %RET | SIZE  | %RET | SIZE  | %RET | SIZE  |
|------|-------|------|-------|------|-------|
| 30   | 0.116 | 30   | 0.083 | 30   | 0.020 |
| 40   | 0.097 | 40   | 0.067 | 40   | 0.016 |
| 50   | 0.080 | 50   | 0.053 | 50   | 0.015 |
| 60   | 0.068 | 60   | 0.040 | 60   | 0.013 |
| 70   | 0.059 | 70   | 0.028 | 70   | 0.012 |
| 80   | 0.033 | 80   | 0.023 | 80   | 0.010 |
| 90   | 0.024 | 90   | 0.015 | 90   | 0.009 |
| UC   | 4.00  | UC   | 4.50  | UC   | 1.74  |

Analysis by Steve Haverberg - Roscoe Moss Co.

**FIGURE 3**  
**GRAIN SIZE DISTRIBUTION CURVES**



Prepared by Steve Haverberg - Roscoe Moss Co. for Dan Dragon

## WELL CONSTRUCTION

### BOREHOLE REAMING AND CASING INSTALLATION

A 20 foot length of 41 inch surface casing was grouted in place prior to reaming the existing borehole. This was to help maintain rig stability. The 6-1/4 inch pilot hole was enlarged using a 32 inch diameter Lang Flat Bottom bit from 20 to 100 feet. A 22 inch diameter Lang Flat Bottom bit was used to ream the hole from 100 to 210 feet. The well was drilled by the dual tube flooded reverse method. Drilling operations were performed on a Lang modified top head drive rotary rig. The drilling fluid was bentonite clay which was kept clean using an auxiliary mud tank and a cyclone desander.

A 24 inch diameter conductor casing was set from + 1 to 100 feet. The conductor casing was grouted in place using neat cement. The grout was mixed on site in a mud mixer and pumped through a tremie pipe placed at the bottom of the annular space. An initial tank of cement was pumped and allowed to gel for 1 hour. The annulus was grouted in a series of lifts with each lift being allowed to strengthen prior to addition of the next.

12 inch low carbon steel production casing was installed from +2 to 210 feet. Blank steel casing was installed from +2 to 120 feet. 70 slot (0.070 inch) wire wrap well screen was installed from 120 to 200 feet. Casing and screen joints were fully butt welded. Centralizers were welded to the casing at 50 foot intervals from 50 to 210 feet. A 1 inch diameter steel sounding tube was installed in the gravel pack to a depth of 119 feet.

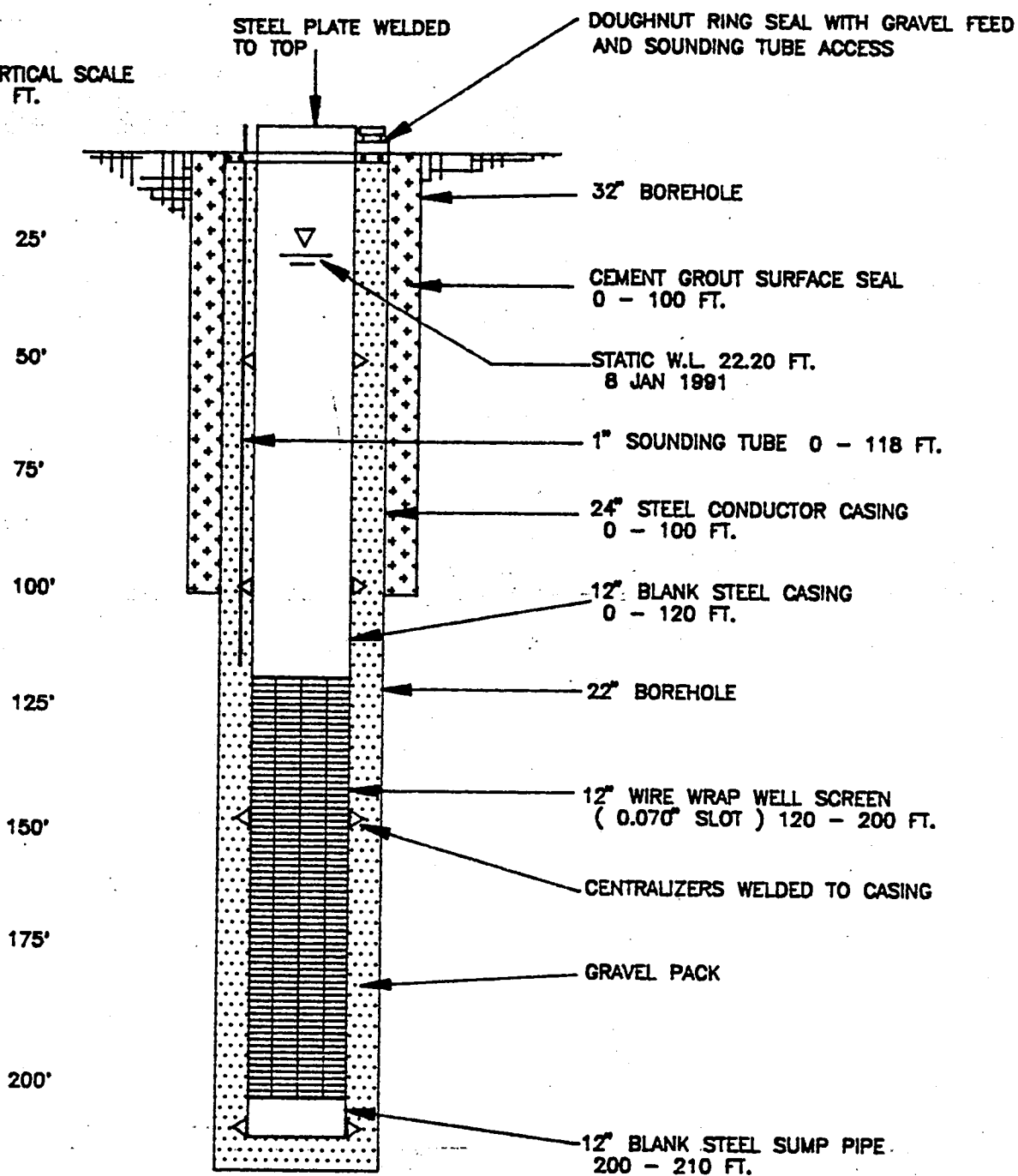
### GRAVEL PACK

The design filter pack material is a siliceous gravel referred to as Colorado silica sand. An auxiliary mixer pumping into a tremie pipe was used to place the filter pack in the annular space. Clean water was mixed and pumped with the gravel to prevent bridging. The tremie pipe was set approximately 10 feet above the bottom of the borehole. To ensure casing alignment, the production casing was held in suspension above the borehole bottom. A finalized construction diagram is shown in Figure 4.

### WELL DEVELOPMENT

The well was developed by air lifting after placement of the gravel pack. 20 foot sections were agitated by slowly rotating a jetting tool up and down the interval. Periodically, the air supply was shut off to surge the well. Air lift development lasted for 24 hours. After installation of the test pump, the well was developed by pumping for 16 hours. Surging intervals of pumping for 30 minutes and off for 5 minutes were used.

VERTICAL SCALE  
25 FT.



FINALIZED CONSTRUCTION  
MT. ROSE REPLACEMENT WELL  
DECEMBER 1991

FIGURE 4

## TEST PUMPING

### PUMPING TEST EQUIPMENT

The pump test was conducted using a line shaft turbine pump consisting of a direct drive motor and 28 stage bowl assembly. Power was supplied by a portable diesel engine. The pump bowls were set at 110 feet using a 6 inch diameter pump column.

The discharge rate was measured using a 6 inch horizontal discharge pipe with a 4 inch orifice plate. A manometer and vertical scale were used to read head of water in inches. The head measurements were used with a rating table to find discharge rates in gallons per minute. Flow rate was held constant during testing by a gate valve installed at the discharge head. A drainage ditch along Shawna Circle was used to collect well discharge during pumping.

Water levels in the test well were measured in a 1 inch PVC sounding tube to the nearest 1/100th foot. The sounding tube was set from the top of the well casing to 10 feet above the pump bowls. An electric sounder was used to measure water levels in the pumping and observation wells. A Rossum Sand Tester was installed behind the gate valve.

### PUMPING TESTS PERFORMED

The pump tests conducted and corresponding test periods for each are shown in Table 3.

Table 3.  
PUMP TESTS PERFORMED

| TEST               | DATE    | TEST<br>START<br>(hrs) | TEST<br>END<br>(hrs) | DURATION<br>(min) | DISCHARGE<br>(gpm) |
|--------------------|---------|------------------------|----------------------|-------------------|--------------------|
| Step Drawdown      | 1/7/91  | 1350                   | 1950                 | 400               | 185 to 475         |
| Constant Discharge | 1/8/91  | 1000                   | 1000                 | 4320              | 400                |
| Recovery           | 1/11/91 | 1000                   | 0800                 | 1320              | 0                  |



#### STEP DRAWDOWN TEST

The step drawdown data were analyzed according to the method of Jacob (1947). Well efficiencies were calculated using the equations:

a.  $S_w = BQ + CQ^2$

b.  $\text{Efficiency} = 1/1+(C/B)Q$

Table 4. summarizes the step drawdown data analysis:

Table 4  
STEP DRAWDOWN ANALYSIS

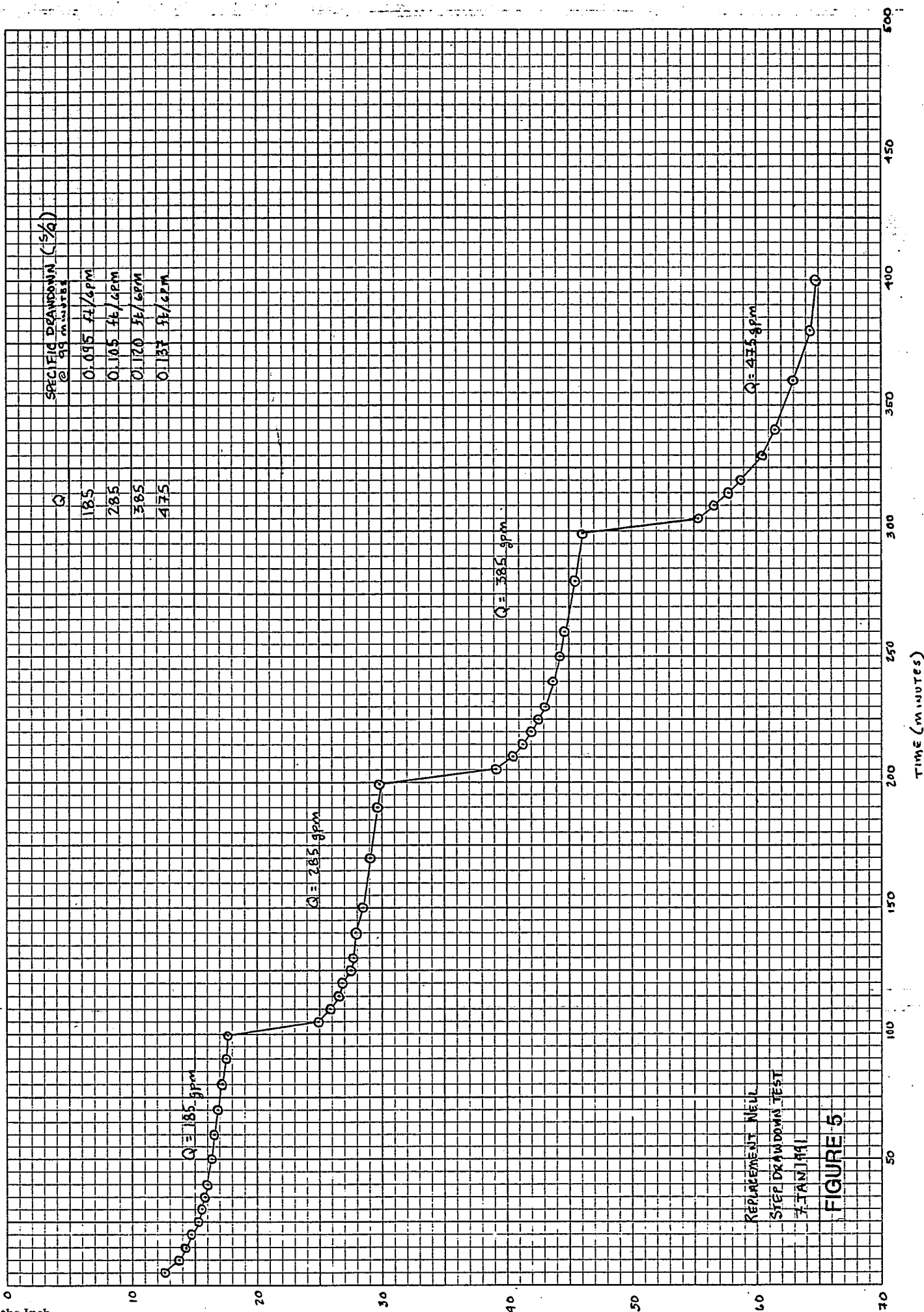
| STEP<br>(n) | WELL YIELD: Q<br>(gpm) | DURATION<br>(min) | DRAWDOWN: s<br>(feet) | Q/s<br>(gpm/ft) | EFFICIENCY<br>( % ) |
|-------------|------------------------|-------------------|-----------------------|-----------------|---------------------|
| 1           | 185                    | 100               | 17.54                 | 10.55           | 68                  |
| 2           | 285                    | 100               | 29.96                 | 9.51            | 58                  |
| 3           | 385                    | 100               | 46.10                 | 8.35            | 51                  |
| 4           | 475                    | 100               | 64.90                 | 7.32            | 45                  |

A drawdown versus time plot of the step drawdown test is shown in Figure 5. Graphic solutions for well efficiency are shown in Figures 6 and 7.

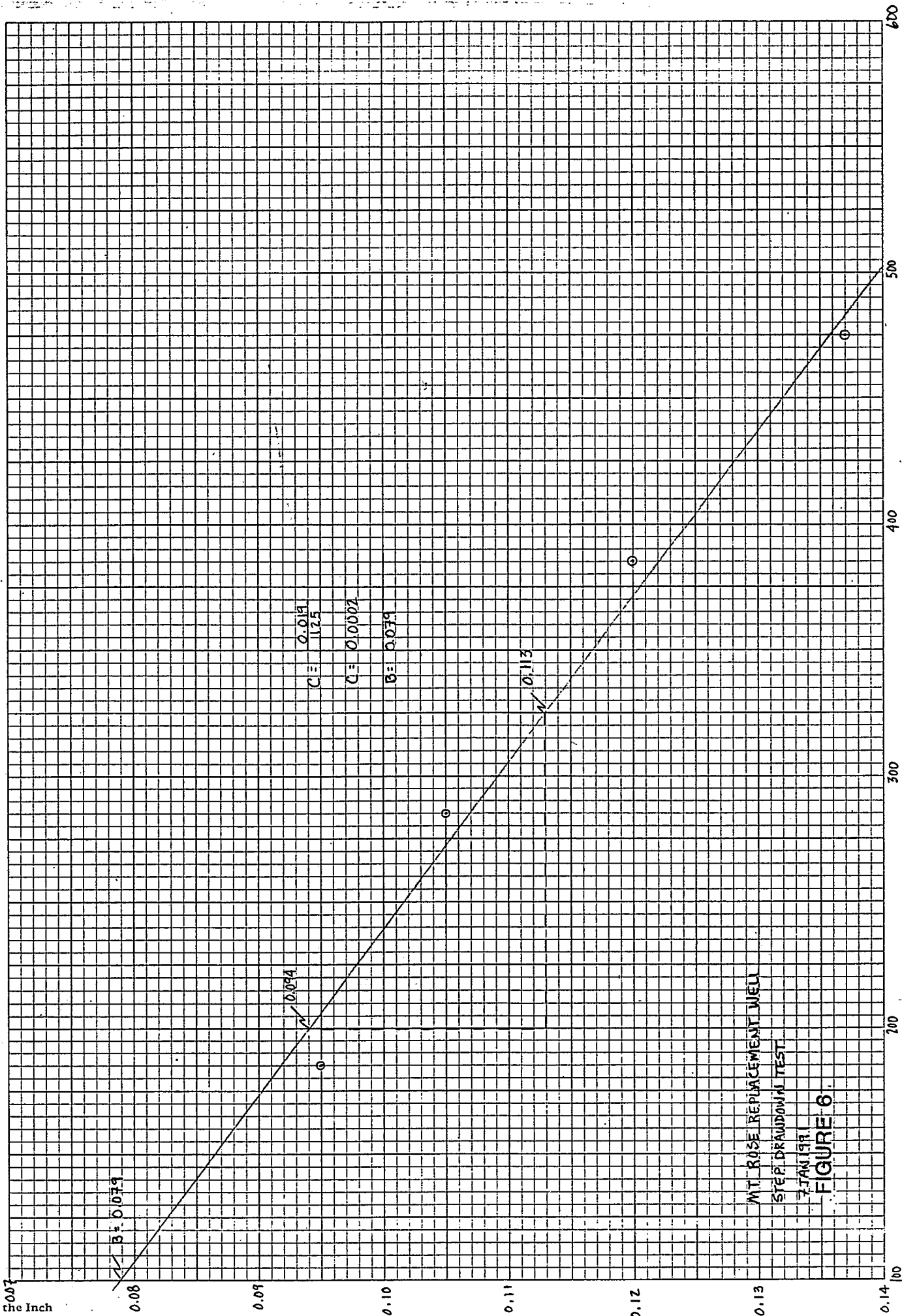
#### CONSTANT DISCHARGE TEST

The constant discharge test ran for 72 hours at a pumping rate of 400 gallons per minute. Observation data during the test was collected from MRWC wells #2 and #3. Both of these wells were anticipated to remain off for the testing period. Well #2 is located 128.5 feet north of the test well, while well #3 is located 172.5 feet to the south. The constant discharge and recovery data were analyzed using the Cooper-Jacob modification of the Theis equation.

After 48 hours, well #2 was turned on because of storage demand. The drawdown vs. time graph shows interference effects from well #2 at 3000 minutes. After 72 hours of pumping, drawdown in the test well was 59.52 feet with a pumping level of 81.54 feet. A Rossum Sand Tester was used to quantify sand production. The first 40 minutes of pumping yielded 9.0 parts per million of sand. Later samples yielded less than 5 parts per million of sand.



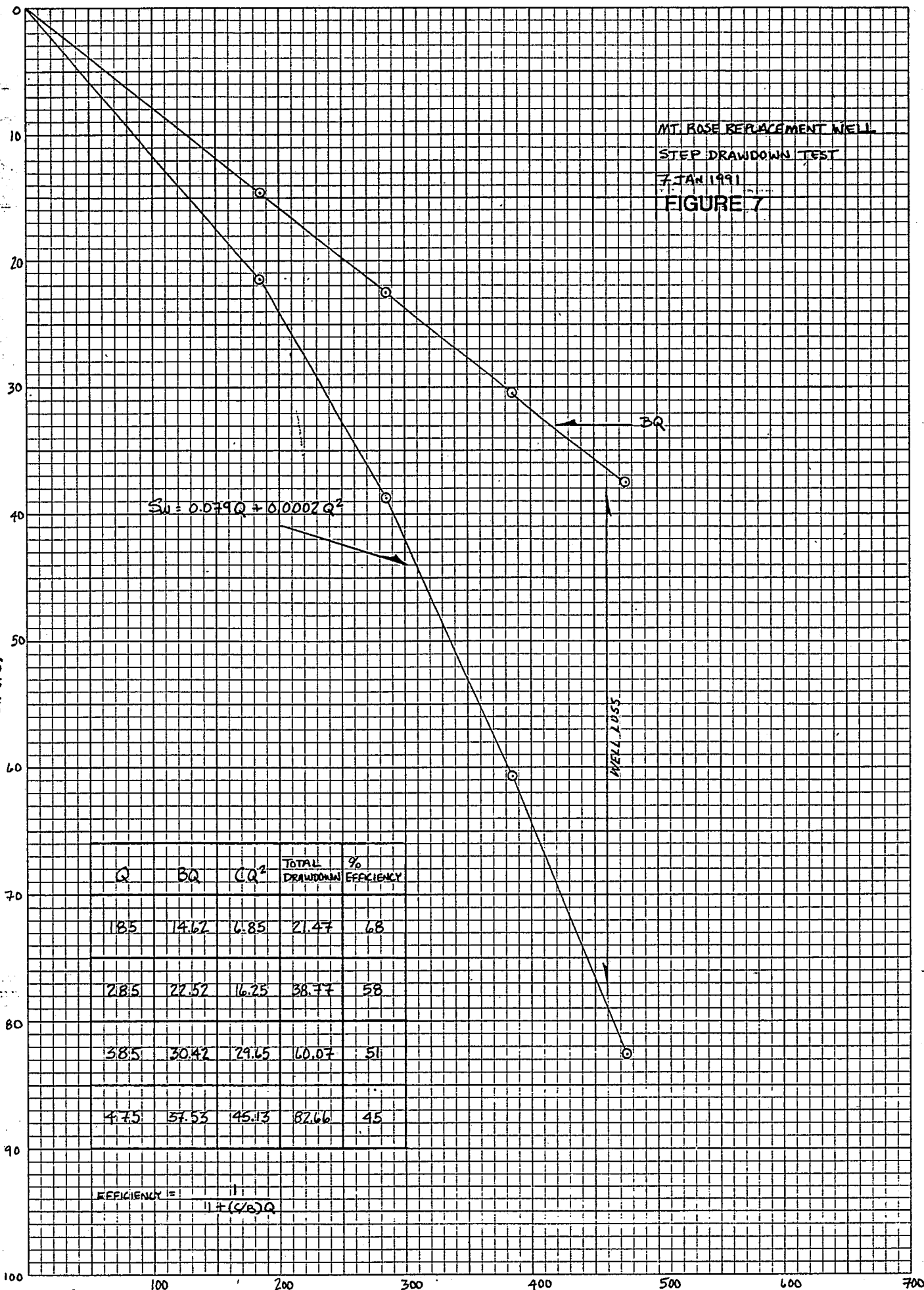
10 Squares to the Inch



MT. ROSE REPLACEMENT WELL  
STEP DRAWDOWN TEST  
7 JAN 1991  
FIGURE 6

MT. ROSE REPLACEMENT WELL  
STEP DRAWDOWN TEST  
7 JAN 1991  
FIGURE 7

TOTAL DRAWDOWN  
SW (ft.)



The constant discharge data from the test well along with borehole cutting interpretation, indicate that the contributing aquifer to the test well could be partially confined. A recharge boundary was observed in the test well after 150 minutes of pumping. Slow drainage through leaky, semi-confining layers of poorly sorted sand, gravel and clay stringers could be the reason for boundary occurrence.

Aquifer transmissivity and storage coefficient were calculated using pumping and recovery data from the test well. A transmissivity of 8500 gpd/ft and storage coefficient of 0.0025 were obtained. Time versus drawdown graphs for the test and observation wells are shown in Figures 8, 9 and 10. Residual drawdown versus  $t/t'$  graphs for the test well and MRWC Well #3 are shown in Figures 11 and 12.

#### RECOMMENDATION

We recommend that the Replacement Well be equipped at a pumping capacity of 300 gpm. The pump intake should be set at 110 feet below top of casing. The well would have a predicted pumping level of 77 feet after 48 hours of continuous pumping at 300 gpm. The above recommendations should allow for 20 years of long term pumping.

SEMI-LOGARITHMIC, 5 CYCLES X 10 TO THE INCH  
5TH LINES ACCENTED

10000

1000

100

10

20

30

40

50

60

70

DRAWDOWN (FEET)

$\Delta s$ : 6.5 FT / CYCLE

Q: 400 GPM

T: 264 Q /  $\Delta s$

T: 16,250 GPD / FT

MRWC #2 TURNED ON

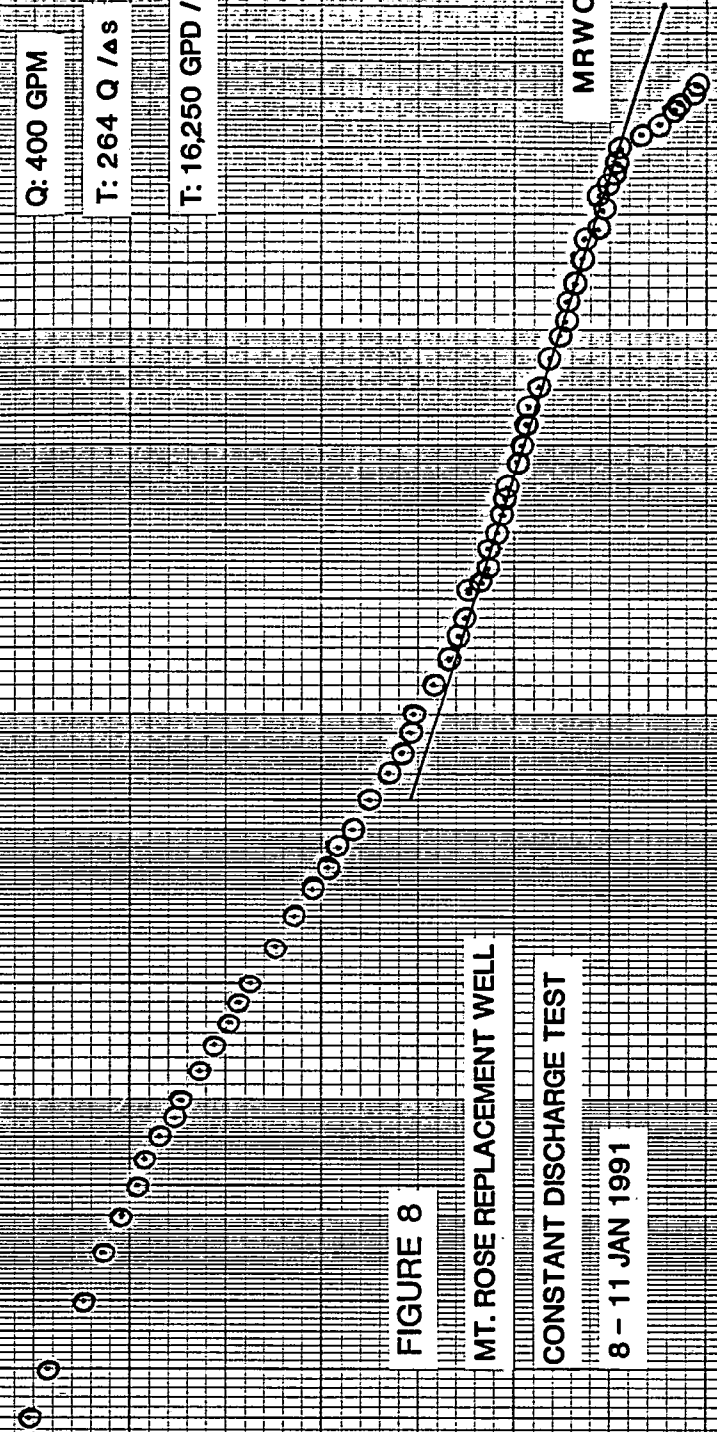
FIGURE 8

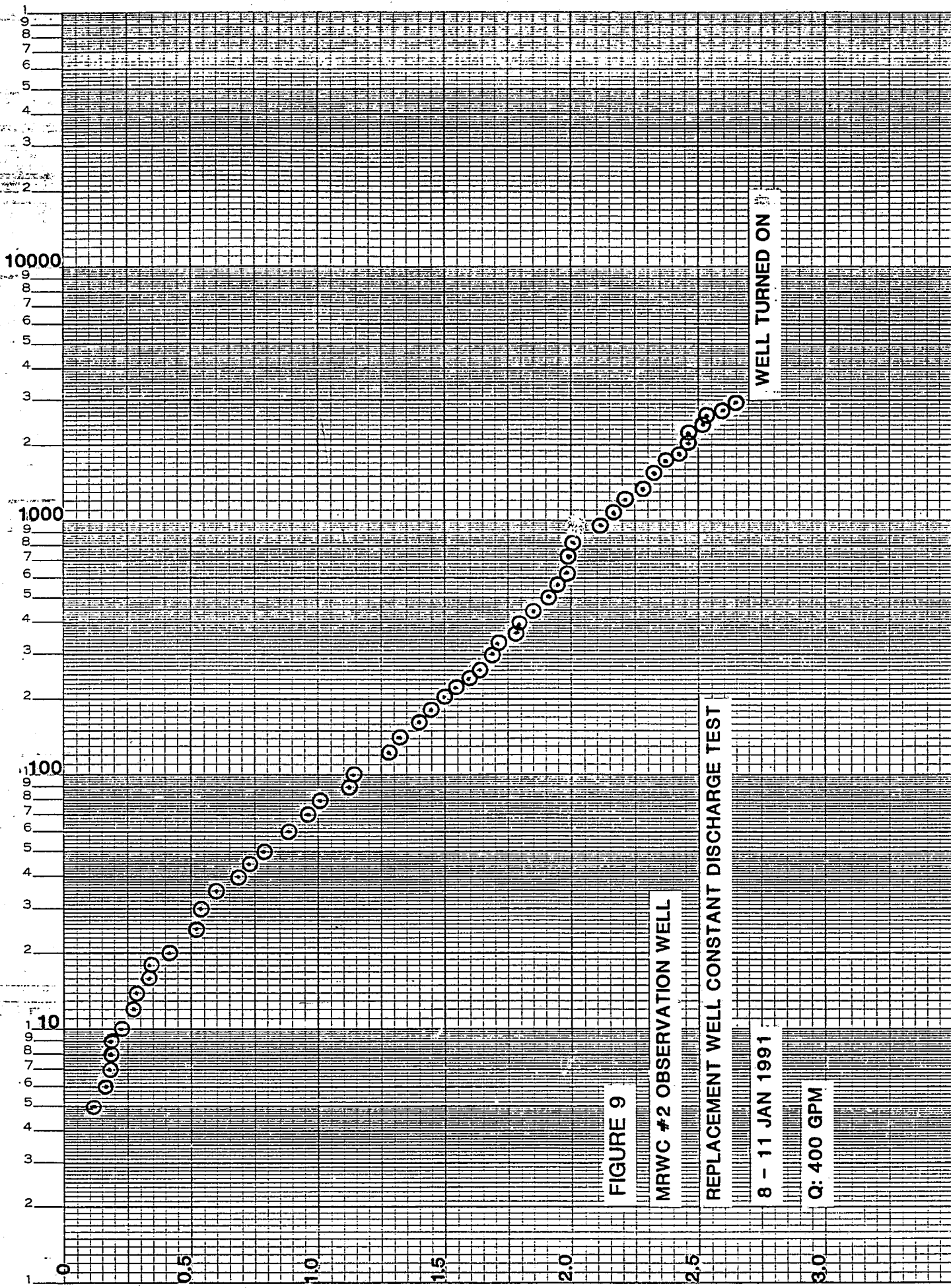
MT. ROSE REPLACEMENT WELL

CONSTANT DISCHARGE TEST

8 - 11 JAN 1991

t (MINUTES)





SEMI-LOGARITHMIC, 5 CYCLES X 10 TO THE INCH  
 5TH LINES ACCENTED

DRAWDOWN ( FEET )

t ( MINUTES )

FIGURE 9

MRWC #2 OBSERVATION WELL

REPLACEMENT WELL CONSTANT DISCHARGE TEST

8 - 11 JAN 1991

Q: 400 GPM

WELL TURNED ON



10000

1000

100

10

SEMI-LOGARITHMIC, 5 CYCLES X 10 TO THE INCH  
5TH LINES ACCENTED

DRAWDOWN ( FEET )

FIGURE 10

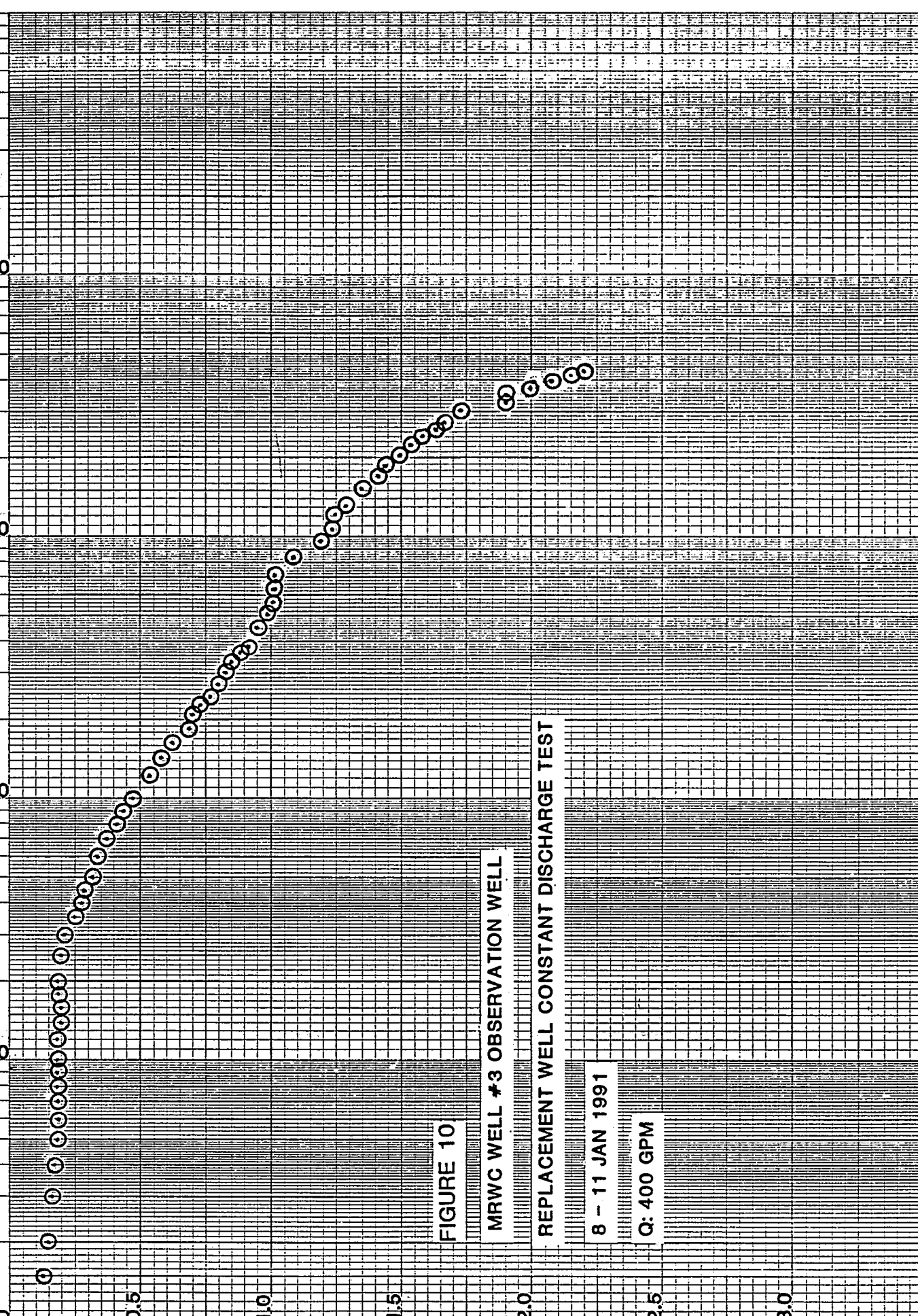
MRWC WELL #3 OBSERVATION WELL

REPLACEMENT WELL CONSTANT DISCHARGE TEST

8 - 11 JAN 1991

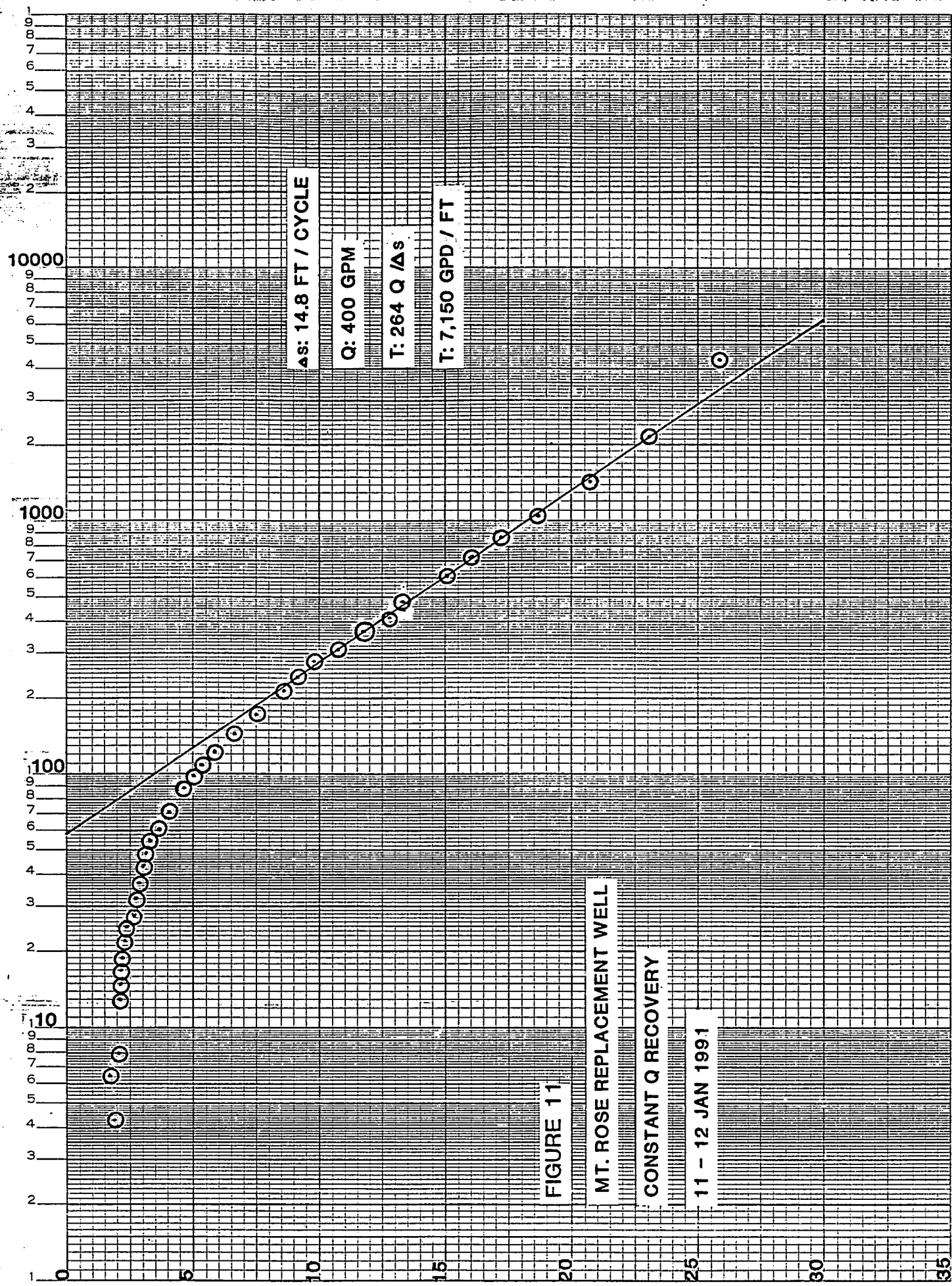
Q: 400 GPM

t ( MINUTES )





MR. REC.



SEMI-LOGARITHMIC. 5 CYCLES X 10 TO THE INCH  
5TH LINES ACCENTED

RESIDUAL DRAWDOWN ( FEET )

t / t' ( MINUTES )

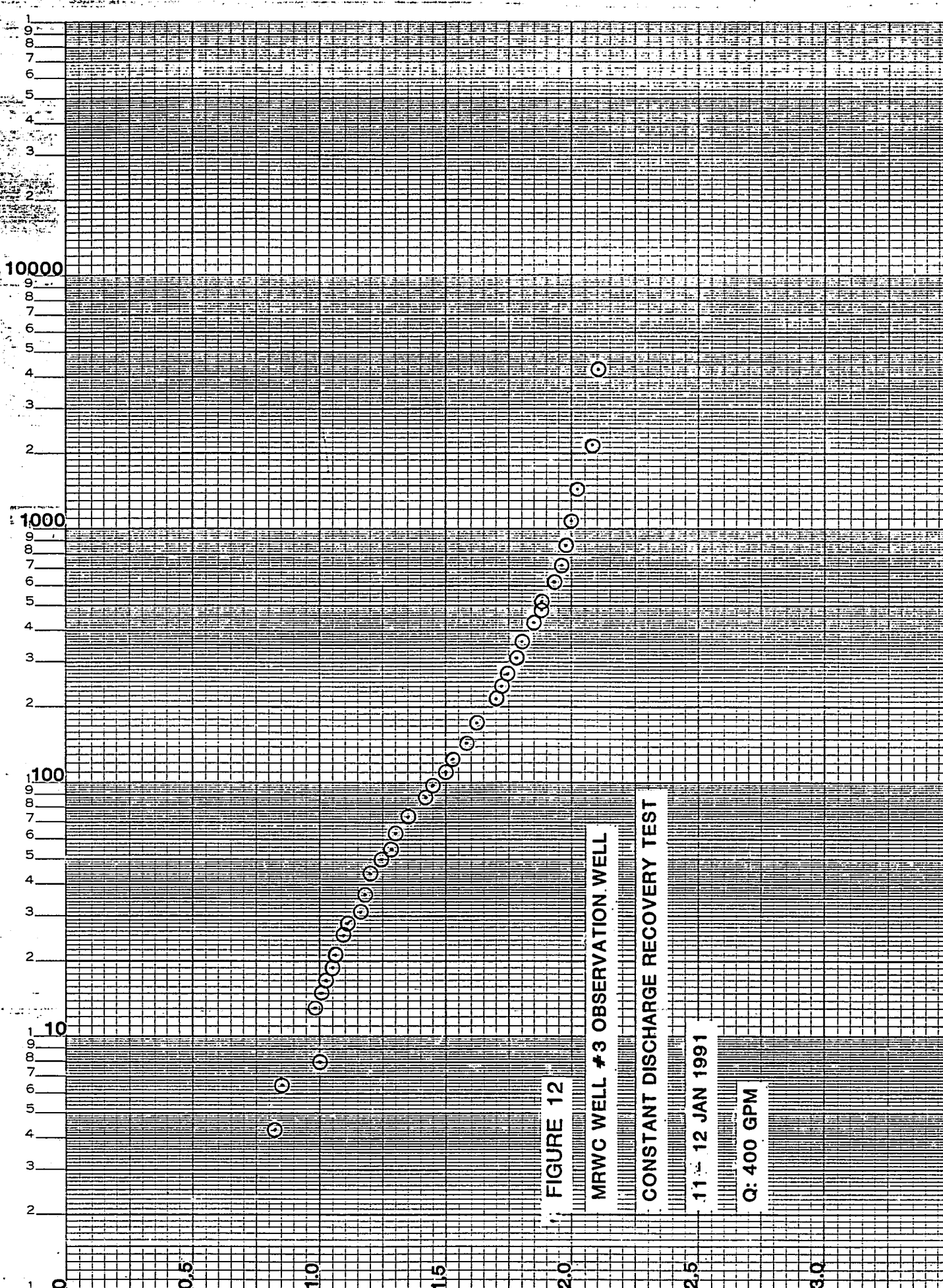


FIGURE 12

MRWC WELL #3 OBSERVATION WELL

CONSTANT DISCHARGE RECOVERY TEST

11 - 12 JAN 1991

Q: 400 GPM

## WATER QUALITY

### SAMPLING TECHNIQUE

A sample was collected for water quality analyses at the end of the 72 hour constant discharge test, prior to pump shut off. A one gallon sample was collected at the orifice plate opening on the discharge pipe in a clean plastic container. Three separate aliquots were taken from the initial sample and preserved in nitric and sulfuric acid. The samples were kept refrigerated until delivery for testing at the Nevada State Health Laboratory.

### RESULTS

The water quality analyses show that the Replacement Well will provide potable water that meets State of Nevada primary and secondary drinking water standards. Total dissolved solids in the well were measured at 162 parts per million (ppm). Well water hardness is 80 ppm and can be considered moderately hard.

A Ryznar Stability Index value of 9.1 was calculated using the following formula:

$$I = S - C - \text{pH}$$

The factors S and C are derived graphically using total dissolved solids, methyl orange alkalinity and calcium ion concentrations. The median value in the index is 7. Ryznar Stability Index values over 7 are considered corrosive with values under 7 indicating incrustation. The test well value of 9.2 in conjunction with a pH of 7.6, indicate the Replacement Well water is slightly corrosive. The water quality analyses report is found in Table 5.

1660 N. Virginia Street  
Reno, Nevada 89503

(702) 785-0335

# TABLE 5

090793

## WATER CHEMISTRY ANALYSIS

Attn: Fees may apply to some types of samples

### TYPE OF ANALYSIS:

☐ Check here for ROUTINE DOMESTIC ANALYSIS

Circle the constituents needed for PARTIAL ANALYSIS

### SAMPLING INSTRUCTIONS:

The sample submitted must be representative of the source. Spring and surface water samples should be as free of dirt and debris as possible. Wells should be pumped thoroughly before sampling, changing the water in the casing at least three times. Product water from filters should be sampled after running for about ten (10) minutes.

Sampled by TERRE SVETICH Date 1/10/91  
Owner WC UTILITY DIV Phone 785-4743  
Address PO BOX 11130  
City RENO State NV 89520

### REPORT TO:

Name SAME AS ABOVE  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_

All of the information below must be filled in or the analysis will not be performed.

State NV County WASHOE  
Township 17N Range 19E Section 2  
General Location CALLAHAN RANCH AREA  
Source Address NEAR INTERSECTION OF MILLIE LN & E SHAWNA

### REASON FOR ANALYSIS:

- ☐ Loan  
☐ Personal health reasons  
☐ Purchase of the property  
☐ Rental or sale of property  
☐ Subdivision approval  
☒ Other SDWA

### USE OF WATER:

- ☒ Domestic drinking water  
☐ Geothermal  
☐ Industrial or mining  
☐ Irrigation  
☐ Other \_\_\_\_\_  
Initials \_\_\_\_\_

### SOURCE OF WATER:

Filter ☐ Yes ☒ No Type \_\_\_\_\_  
Public ☒ Yes ☐ No Name \_\_\_\_\_  
Spring \_\_\_\_\_ Surface \_\_\_\_\_  
Well ☒ Depth 220 ft. Casing diameter 12 in.  
Hot \_\_\_\_\_ Cold ☒ Casing depth 220 ft.  
IN USE ☐ Yes ☒ No  
PUMP TEST - NEW WELL

The results below are representative only of the sample submitted to this laboratory.

### FOR LABORATORY USE ONLY

### PRINT OTHER DESIRED CONSTITUENTS BELOW

| Constituent      | ppm  | Constituent | ppm   | Constituent | ppm       | Constituent | S.U. | Constituent | ppm     |
|------------------|------|-------------|-------|-------------|-----------|-------------|------|-------------|---------|
| T.D.S. @ 103° C. | 162  | Chloride    | 4     | Iron        | 0.05      | Color       | 3    | Cd          | <0.001  |
| Hardness         | 80   | Nitrate     | 14.0  | Manganese   | 0.00      | Turbidity   | 0.5  | Cr          | <0.005  |
| Calcium          | 17   | Alkalinity  | 86    | Copper      | 0.00      | pH          | 7.60 | Ag          | <0.005  |
| Magnesium        | 9    | Bicarbonate | 105   | Zinc        | 0.00      | EC          | 219  | Hg          | <0.0005 |
| Sodium           | 9    | Carbonate   | 0     | Barium      | 0.04      |             |      | Pb          | <0.005  |
| Potassium        | 3    | Fluoride    | 0.10  | Boron       | 0.0       |             |      | Se          | <0.001  |
| Sulfate          | 2    | Arsenic     | <.003 | Silica      | 65        |             |      |             |         |
| MBAS             | <0.1 |             |       | GROSS ALPHA | <3 pCi/L  |             |      |             |         |
|                  |      |             |       | GROSS BETA  | <30 pCi/L |             |      |             |         |

See B.11  
Collected by \_\_\_\_\_  
WS I.D. \_\_\_\_\_  
SDWA—Pri \_\_\_\_\_ Sec \_\_\_\_\_  
1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_  
Date Rec'd 1/14/91 Init. PSA

Remarks MT ROSE (J. ROSE)  
NEW REPLACEMENT WELL  
(MILLIE LANE)  
52 HRS INTO A 72 HOUR  
PUMP TEST - AT 400 GPM

ppm = parts per million, milligrams per liter  
U. = Standard Units

Chemical quality meets the State of  
Nevada Drinking Water Standards

PO# 114062



APPENDIX I  
WELL DRILLER'S REPORT SUBMITTED TO THE STATE OF NEVADA,  
DEPARTMENT OF WATER RESOURCES



APPENDIX II  
PUMP TEST DATA



# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

WELL Mt Rose Replacement

☒ PUMPING / ☐ OBSERVATION WELL  
☒ PUMPING / ☐ RECOVERY DATA

PAGE 1 OF       

TYPE of PUMPING TEST Step Drawdown

HOW Q MEASURED 6 x 4" ORIFICE

M.P. for WL's PVC sounding tube elev.       

HOW WL's MEASURED       

DEPTH of PUMP/AIRLINE        wrt       

PUMPED WELL NO.       

% SUBMERGENCE: initial       ; pumping       

RADIUS of PUMPED WELL       

PUMP ON: date 7 Jan 91 time       

DISTANCE from PUMPED WELL       

PUMP OFF: date        time       

| TIME           |              |     |    |    | WATER LEVEL DATA         |                                  |             |         |       | WATER PRODUCT. |                                 | COMMENTS |
|----------------|--------------|-----|----|----|--------------------------|----------------------------------|-------------|---------|-------|----------------|---------------------------------|----------|
| t =            | at t' = 0    |     |    |    | STATIC WATER LEVEL 22.20 |                                  |             |         |       | SC             |                                 |          |
| CLOCK TIME     | ELAPSED TIME |     |    |    | READING                  | CONVERSIONS<br>or<br>CORRECTIONS | WATER LEVEL | s or s' | Q/s   | Q              | (NOTE ANY CHANGES IN OBSERVERS) |          |
|                | mins         | hrs | t  | t' |                          |                                  |             |         |       |                |                                 |          |
|                | /            |     | 1  |    | 34.0                     |                                  |             | 11.80   |       | 8"             | 185                             |          |
|                | /            |     | 2  |    | 34.45                    |                                  |             | 12.25   |       |                |                                 |          |
|                | /            |     | 3  |    | 34.50                    |                                  |             | 12.30   |       |                |                                 |          |
|                | /            |     | 4  |    | 34.50                    |                                  |             | 12.30   |       |                |                                 |          |
|                | /            |     | 5  |    | 34.82                    |                                  |             | 12.62   |       |                |                                 |          |
|                | /            |     | 6  |    | 35.08                    |                                  |             | 12.88   |       |                |                                 |          |
|                | /            |     | 7  |    | 35.26                    |                                  |             | 13.06   |       |                |                                 |          |
|                | /            |     | 8  |    | 35.52                    |                                  |             | 13.32   |       |                |                                 |          |
|                | /            |     | 9  |    | 35.72                    |                                  |             | 13.52   |       |                |                                 |          |
|                | /            |     | 10 |    | 35.90                    |                                  |             | 13.70   |       |                |                                 |          |
|                | /            |     | 12 |    | 36.16                    |                                  |             | 13.96   |       |                |                                 |          |
|                | /            |     | 14 |    | 36.47                    |                                  |             | 14.27   |       |                |                                 |          |
|                | /            |     | 16 |    | 36.70                    |                                  |             | 14.50   |       |                |                                 |          |
|                | /            |     | 18 |    | 36.90                    |                                  |             | 14.70   |       |                |                                 |          |
|                | /            |     | 20 |    | 37.04                    |                                  |             | 14.84   |       |                |                                 | Q ↑      |
|                | /            |     | 25 |    | 37.44                    |                                  |             | 15.24   |       |                |                                 |          |
|                | /            |     | 30 |    | 37.65                    |                                  |             | 15.45   |       |                |                                 | Q ↑      |
|                | /            |     | 35 |    | 38.15                    |                                  |             | 15.95   |       |                |                                 |          |
|                | /            |     | 40 |    | 38.20                    |                                  |             | 16.00   |       |                |                                 | Q ↑      |
|                | /            |     | 50 |    | 38.52                    |                                  |             | 16.32   |       |                |                                 |          |
|                | /            |     | 60 |    | 38.74                    |                                  |             | 16.54   |       |                |                                 | Q ↑      |
|                | /            |     | 70 |    | 39.10                    |                                  |             | 16.90   |       |                |                                 |          |
|                | /            |     | 80 |    | 39.40                    |                                  |             | 17.20   |       |                |                                 |          |
| 3:19           | /            |     | 96 |    | 39.68                    |                                  |             | 17.48   |       |                |                                 |          |
| 3:29           | /            |     | 99 |    | 39.74                    |                                  |             | 17.54   | 10.55 |                |                                 |          |
| STEP 2 3:30 Q↑ |              |     |    |    |                          |                                  |             |         |       |                |                                 |          |
| 3:37           | /            |     | 5  |    | 47.17                    |                                  |             | 24.97   | 11.4  | 20"            | 285                             |          |
|                | /            |     | 10 |    | 48.10                    |                                  |             | 25.90   |       |                |                                 |          |
|                | /            |     | 15 |    | 48.75                    |                                  |             | 26.55   |       |                |                                 |          |
|                | /            |     | 20 |    | 49.02                    |                                  |             | 26.82   |       |                |                                 | Q↑       |
|                | /            |     | 25 |    | 49.72                    |                                  |             | 27.52   |       |                |                                 |          |
|                | /            |     | 30 |    | 49.90                    |                                  |             | 27.70   |       |                |                                 |          |
|                | /            |     | 40 |    | 50.13                    |                                  |             | 27.93   |       |                |                                 | Q↑       |
|                | /            |     | 50 |    | 50.76                    |                                  |             | 28.56   |       | 20"            |                                 |          |
|                | /            |     | 70 |    | 51.23                    |                                  |             | 29.03   | 9.8   |                |                                 | Q↑       |
|                | /            |     | 90 |    | 51.93                    |                                  |             | 29.73   |       | 20.5"          |                                 |          |
|                | /            |     | 99 |    | 52.16                    |                                  |             | 29.96   | 9.51  |                |                                 |          |
| 1:40           | /            |     |    |    |                          |                                  |             |         |       | 37"            | 385                             | STEP 3   |
|                | /            |     | 5  |    | 61.30                    |                                  |             | 39.10   | 9.9   |                |                                 |          |
|                | /            |     | 10 |    | 62.70                    |                                  |             | 40.50   |       |                |                                 |          |





## PUMPING TEST DATA

PAGE 2 OF 2

DISTANCE from PUMPED WELL \_\_\_\_\_

PUMP OFF: date \_\_\_\_\_ time \_\_\_\_\_

[illegible]



# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

WELL Mt. Rose Replacement

PUMPING/OBSERVATION. WELL

PUMPING/RECOVERY DATA

PAGE 1 OF 2

TYPE of PUMPING TEST Constant Q

HOW Q MEASURED orifice plate 6"x4"

HOW WL's MEASURED Electric Well Sounder

PUMPED WELL NO. MT. ROSE REPLACEMENT

RADIUS of PUMPED WELL

DISTANCE from PUMPED WELL

M.P. for WL's PVC elev. \_\_\_\_\_

DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_\_

% SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_\_

PUMP ON: date 8 JAN 91 time 10:00 AM

PUMP OFF: date 11 JAN 91 time 1000

| TIME          |              |     |     |    | WATER LEVEL DATA         |         |                            |             |         | WATER PRODUCT. |     | COMMENTS                        |                  |
|---------------|--------------|-----|-----|----|--------------------------|---------|----------------------------|-------------|---------|----------------|-----|---------------------------------|------------------|
| t = at t' = 0 |              |     |     |    | STATIC WATER LEVEL 22.02 |         |                            |             |         |                |     |                                 |                  |
| CLOCK TIME    | ELAPSED TIME |     | t   | t' | t/t'                     | READING | CONVERSIONS OF CORRECTIONS | WATER LEVEL | s or s' | Q/s            | Q   | (NOTE ANY CHANGES IN OBSERVERS) |                  |
|               | mins         | hrs |     |    |                          |         |                            |             |         |                |     |                                 |                  |
|               |              |     | 1.5 |    |                          |         |                            | 47.0        | 24.98   | 16             | 40" | 400                             |                  |
|               |              |     | 2   |    |                          |         |                            | 47.90       | 25.88   |                |     |                                 |                  |
|               |              |     | 3   |    |                          |         |                            | 49.70       | 27.68   |                |     |                                 |                  |
|               |              |     | 4   |    |                          |         |                            | 50.74       | 28.72   |                |     |                                 |                  |
|               |              |     | 5   |    |                          |         |                            | 51.83       | 29.81   |                |     |                                 |                  |
|               |              |     | 6   |    |                          |         |                            | 52.32       | 30.30   |                |     |                                 |                  |
|               |              |     | 7   |    |                          |         |                            | 52.94       | 30.92   |                |     |                                 |                  |
|               |              |     | 8   |    |                          |         |                            | 53.60       | 31.58   |                |     |                                 |                  |
|               |              |     | 9   |    |                          |         |                            | 54.8        | 32.16   |                |     |                                 |                  |
|               |              |     | 10  |    |                          |         |                            | 55.90       | 32.78   |                |     |                                 |                  |
|               |              |     | 12  |    |                          |         |                            | 55.70       | 33.68   |                |     |                                 |                  |
|               |              |     | 14  |    |                          |         |                            | 56.40       | 34.38   |                |     |                                 |                  |
|               |              |     | 16  |    |                          |         |                            | 57.06       | 35.04   |                |     |                                 |                  |
|               |              |     | 18  |    |                          |         |                            | 57.70       | 35.68   |                |     |                                 |                  |
|               |              |     | 20  |    |                          |         |                            | 58.20       | 36.18   |                |     |                                 | Q↑               |
|               |              |     | 25  |    |                          |         |                            | 59.62       | 37.60   |                |     |                                 |                  |
|               |              |     | 30  |    |                          |         |                            | 60.69       | 38.67   |                |     |                                 |                  |
|               |              |     | 35  |    |                          |         |                            | 61.62       | 39.60   |                |     |                                 |                  |
|               |              |     | 40  |    |                          |         |                            | 62.30       | 40.28   |                |     |                                 | 0.70 cc RST 1043 |
|               |              |     | 45  |    |                          |         |                            | 62.94       | 40.92   |                |     |                                 |                  |
|               |              |     | 50  |    |                          |         |                            | 63.58       | 41.56   |                |     |                                 |                  |
|               |              |     | 60  |    |                          |         |                            | 64.50       | 42.48   |                |     |                                 |                  |
|               |              |     | 70  |    |                          |         |                            | 65.36       | 43.34   |                |     |                                 |                  |
|               |              |     | 80  |    |                          |         |                            | 66.04       | 44.02   |                |     |                                 |                  |
|               |              |     | 90  |    |                          |         |                            | 66.64       | 44.62   |                |     |                                 |                  |
|               |              |     | 100 |    |                          |         |                            | 67.00       | 44.98   |                |     |                                 |                  |
| 12:00         |              |     | 120 |    |                          |         |                            | 67.96       | 45.94   | 8.7            |     |                                 | E.E.             |
| 12:20         |              |     | 140 |    |                          |         |                            | 68.64       | 46.62   |                |     |                                 |                  |
| 12:40         |              |     | 160 |    |                          |         |                            | 69.08       | 47.06   |                | 40" |                                 |                  |
| 1:00          |              |     | 180 |    |                          |         |                            | 69.49       | 47.47   |                |     |                                 |                  |
| 1:20          |              |     | 200 |    |                          |         |                            | 69.64       | 47.62   |                |     |                                 | Q↑               |
| 1:40          |              |     | 220 |    |                          |         |                            | 70.12       | 48.10   |                | 41" |                                 | Q↓               |
| 2:00          |              |     | 240 |    |                          |         |                            | 70.56       | 48.54   |                |     |                                 |                  |
| 2:30          |              |     | 270 |    |                          |         |                            | 70.73       | 48.71   |                |     |                                 |                  |
| 3:00          |              |     | 300 |    |                          |         |                            | 71.08       | 49.06   |                |     |                                 | Q↑               |
| 3:30          |              |     | 330 |    |                          |         |                            | 71.38       | 49.36   |                |     |                                 |                  |
| 4:00          |              |     | 360 |    |                          |         |                            | 71.54       | 49.52   |                |     |                                 |                  |
| 4:30          |              |     | 390 |    |                          |         |                            | 71.74       | 49.72   | 8.04           | 40" |                                 |                  |
| 5:31          |              |     | 450 |    |                          |         |                            | 72.09       | 50.07   | 8.0            |     |                                 | E.E.             |



**DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION**

## PUMPING TEST DATA

WELL MT ROSE REPLACEMENT

(PUMPING)/OBSERVATION WELL  
PUMPING/RECOVERY DATA

PAGE 2 OF 2

TYPE of PUMPING TEST CONSTANT Q

HOW Q MEASURED 6" X 4" ORIFICE WEIR

M.P. for WL's PVC STILLING WELL elev. \_\_\_\_\_

HOW WL'S MEASURED: SOLNET SOUNDER

DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_\_

PUMPED WELL NO. MT. ROSE REPLACEMENT

% SUBMERGENCE: initial \_\_\_\_\_: pumping \_\_\_\_\_

RADIUS of PUMPED WELL \_\_\_\_\_

PUMP ON: date 8 JAN 90 time 1000

DISTANCE from PUMPED WELL \_\_\_\_\_

PUMP OFF: date 11 JAN 90 time 1000

[illegible]



**DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION**

## PUMPING TEST DATA

WELL Mt. Rose #2

PUMPING / OBSERVATION WELL

~~PUMPING/RECOVERY DATA~~

PAGE 1 OF 2

TYPE of PUMPING TEST Constant Q

HOW Q MEASURED Orifice plate

HOW WL's MEASURED POWERS SOUNDER

PUMPED WELL NO. MR. REPLACEMENT WELL

RADIUS of PUMPED WELL

DISTANCE from PUMPED WELL

M.P. for WL's TOP CASING elev.

DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt

% SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_\_

PUMP ON: date 8 Jan 91 time 1000

PUMP OFF: date 11 JAN 91 time 1000

| TIME<br>t = of t' = 0 |              |     |     |        | WATER LEVEL DATA<br>STATIC WATER LEVEL 25.10 (25' 1 3/4") |                            |             |            | WATER PRODUCT. |         | COMMENTS |                                 |
|-----------------------|--------------|-----|-----|--------|---|----------------------------|-------------|------------|----------------|---------|----------|---------------------------------|
| CLOCK TIME            | ELAPSED TIME |     |     | t / t' | READING   | CONVERSIONS OF CORRECTIONS | WATER LEVEL | Sors' (ft) | S (ft)         | ST      | Q        | (NOTE ANY CHANGES IN OBSERVERS) |
|                       | mins         | hrs | t   |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     | 5   |        | 25-3 5/16   | using ft & in.             |             | 51.56"     | 0.13           | (25.15) |          | 1.2" = 1.10'                    |
|                       |              |     | 6   |        | 25-3 5/8  |                            |             | 1.88"      | 0.16           |         |          |                                 |
|                       |              |     | 7   |        | 25-3 3/4  |                            |             | 2.00"      | 0.17           |         |          |                                 |
|                       |              |     | 8   |        | 25-3 7/8  |                            |             | 2.13"      | 0.18           |         |          |                                 |
|                       |              |     | 9   |        | 25-3 7/8  |                            |             | 2.13"      | 0.18           |         |          |                                 |
| 1010                  |              |     | 10  |        | 25-4 1/2  |                            |             | 2.75"      | 0.23           |         |          |                                 |
|                       |              |     | 12  |        | 25-5"   |                            |             | 3.25"      | 0.27           |         |          |                                 |
| 1014                  |              |     | 14  |        | 25-5 1/4  |                            |             | 3.50"      | 0.29           |         |          |                                 |
| 1016                  |              |     | 16  |        | 25-5 7/8  |                            |             | 4.13"      | 0.34           |         |          |                                 |
| 1018                  |              |     | 18  |        | 25-5 7/8  |                            |             | 4.13"      | 0.34           |         |          |                                 |
| 1020                  |              |     | 20  |        | 25-6 5/8  |                            |             | 4.88"      | 0.41           |         |          |                                 |
| 1025                  |              |     | 25  |        | 25-7 7/8  |                            |             | 6.13"      | 0.51           |         |          |                                 |
| 1030                  |              |     | 30  |        | 25-8 1/4"   |                            |             | 6.50"      | 0.54           |         |          |                                 |
| 1035                  |              |     | 35  |        | 25-9"   |                            |             | 7.25"      | 0.60           |         |          |                                 |
| 1040                  |              |     | 40  |        | 25-9 7/8  |                            |             | 8.13"      | 0.68           |         |          |                                 |
| 1045                  |              |     | 45  |        | 25-10 1/2   |                            |             | 8.75"      | 0.73           |         |          |                                 |
| 1050                  |              |     | 50  |        | 25-11 1/4   | 25.94                      |             | 9.50"      | 0.79           |         |          |                                 |
| 1100                  |              |     | 60  |        | 26-1 1/2"   | 26.04                      |             | 10.75"     | 0.89           |         |          |                                 |
| 1110                  |              |     | 70  |        | 26-1 3/8  | 26.11                      |             | 11.63"     | 0.96           |         |          |                                 |
| 1120                  |              |     | 80  |        | 26-2"   | 26.17                      |             |            | 1.02           |         |          |                                 |
| 1130                  |              |     | 90  |        | 26-3 1/4  | 26.27                      |             |            | 1.12           |         |          |                                 |
| 1140                  |              |     | 100 |        | 26-3 1/2  | 26.29                      |             |            | 1.14           |         |          |                                 |
| 1202                  |              |     | 122 |        | 26-5  | 26.42                      |             |            | 1.27           |         |          |                                 |
| 1222                  |              |     | 142 |        | 26-5 3/4  | 26.48                      |             |            | 1.33           |         |          |                                 |
| 1242                  |              |     | 162 |        | 26-6 5/8  | 26.55                      |             |            | 1.40           |         |          |                                 |
|                       |              |     | 182 |        | 26-7 1/4  | 26.60                      |             |            | 1.45           |         |          |                                 |
| 1323                  |              |     | 203 |        | 26-7 3/4  | 26.65                      |             |            | 1.50           |         |          |                                 |
| 1343                  |              |     | 223 |        | 26-8 1/4  | 26.69                      |             |            | 1.54           |         |          |                                 |
| 1401                  |              |     | 241 |        |   | 26.74                      |             |            | 1.59           |         |          |                                 |
| 1434                  |              |     | 274 |        |   | 26.79                      |             |            | 1.64           |         |          |                                 |
| 1504                  |              |     | 304 |        |   | 26.84                      |             |            | 1.69           |         |          |                                 |
| 1537                  |              |     | 332 |        |   | 26.87                      |             |            | 1.72           |         |          |                                 |
| 1602                  |              |     | 362 |        |   | 26.92                      |             |            | 1.77           |         |          |                                 |
| 1632                  |              |     | 392 |        |   | 26.94                      |             |            | 1.79           |         |          |                                 |
| 1728                  |              |     | 448 |        |   | 27.00                      |             |            | 1.85           |         |          | E.E.                            |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |
|                       |              |     |     |        |   |                            |             |            |                |         |          |                                 |

# WASHOE COUNTY

**DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION**

## PUMPING TEST DATA

WELL MRWC #2

~~PUMPING~~ OBSERVATION WELL

~~(PUMPING) RECOVERY DATA~~

PAGE 2 OF 2

TYPE of PUMPING TEST CONSTANT Q

HOW Q MEASURED 6" X 4" ORIFICE WEIR

M.P. for WL's TOP CASING elev. \_\_\_\_\_

HOW WL's MEASURED POWERS WELL SOUNDER

DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_\_

PUMPED WELL NO. MT. ROSE REPLACEMENT

% SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_\_

RADIUS of PUMPED WELL \_\_\_\_\_

PUMP ON: date 8 JAN 90 time 1000

DISTANCE from PUMPED WELL \_\_\_\_\_

PUMP OFF: date 11 JAN 90 time 1000

[illegible]



# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

WELL MRWC #3

PUMPING/OBSERVATION WELL

PUMPING/RECOVERY DATA

PAGE 1 OF 2

TYPE of PUMPING TEST CONSTANT Q

HOW Q MEASURED 6" X 4" ORIFICE WEIR

M.P. for WL's TOP 8" CASING elev.           

HOW WL's MEASURED SOLNIST

DEPTH of PUMP/AIRLINE            wrt           

PUMPED WELL NO. MT. ROSE REPLACEMENT WELL

% SUBMERGENCE: initial           ; pumping           

RADIUS of PUMPED WELL           

PUMP ON: date 8 JAN 91 time 1000

DISTANCE from PUMPED WELL           

PUMP OFF: date 11 JAN 91 time 1000

| TIME          |              |     |     |    | WATER LEVEL DATA         |         |                            |             | WATER PRODUCT. |   | COMMENTS                        |
|---------------|--------------|-----|-----|----|--------------------------|---------|----------------------------|-------------|----------------|---|---------------------------------|
| t = at t' = 0 |              |     |     |    | STATIC WATER LEVEL 16.02 |         |                            |             |                |   |                                 |
| CLOCK TIME    | ELAPSED TIME |     | t   | t' | t/t'                     | READING | CONVERSIONS OF CORRECTIONS | WATER LEVEL | Corrs'         | Q | (NOTE ANY CHANGES IN OBSERVERS) |
|               | mins         | hrs |     |    |                          |         |                            |             |                |   |                                 |
|               |              |     | 0   |    |                          | 16.02   |                            |             | 0              |   |                                 |
|               |              |     | 1.5 |    |                          | 16.15   |                            |             | 0.13           |   |                                 |
|               |              |     | 2   |    |                          | 16.17   |                            |             | 0.15           |   |                                 |
|               |              |     | 3   |    |                          | 16.18   |                            |             | 0.16           |   |                                 |
|               |              |     | 4   |    |                          | 16.19   |                            |             | 0.17           |   |                                 |
|               |              |     | 5   |    |                          | 16.20   |                            |             | 0.18           |   |                                 |
|               |              |     | 6   |    |                          | 16.21   |                            |             | 0.19           |   |                                 |
|               |              |     | 7   |    |                          | 16.21   |                            |             | 0.19           |   |                                 |
|               |              |     | 8   |    |                          | 16.21   |                            |             | 0.19           |   |                                 |
|               |              |     | 9   |    |                          | 16.21   |                            |             | 0.19           |   |                                 |
|               |              |     | 10  |    |                          | 16.21   |                            |             | 0.19           |   |                                 |
|               |              |     | 12  |    |                          | 16.21   |                            |             | 0.19           |   |                                 |
|               |              |     | 14  |    |                          | 16.22   |                            |             | 0.20           |   |                                 |
|               |              |     | 16  |    |                          | 16.22   |                            |             | 0.20           |   |                                 |
|               |              |     | 18  |    |                          | 16.21   |                            |             | 0.19           |   |                                 |
|               |              |     | 20  |    |                          | 16.21   |                            |             | 0.19           |   |                                 |
|               |              |     | 25  |    |                          | 16.22   |                            |             | 0.20           |   |                                 |
|               |              |     | 30  |    |                          | 16.23   |                            |             | 0.21           |   |                                 |
|               |              |     | 35  |    |                          | 16.27   |                            |             | 0.25           |   |                                 |
|               |              |     | 40  |    |                          | 16.29   |                            |             | 0.27           |   |                                 |
|               |              |     | 45  |    |                          | 16.30   |                            |             | 0.28           |   |                                 |
|               |              |     | 50  |    |                          | 16.33   |                            |             | 0.31           |   |                                 |
|               |              |     | 60  |    |                          | 16.36   |                            |             | 0.34           |   |                                 |
|               |              |     | 70  |    |                          | 16.39   |                            |             | 0.37           |   |                                 |
|               |              |     | 80  |    |                          | 16.43   |                            |             | 0.41           |   |                                 |
|               |              |     | 90  |    |                          | 16.46   |                            |             | 0.44           |   |                                 |
|               |              |     | 100 |    |                          | 16.49   |                            |             | 0.47           |   |                                 |
|               |              |     | 126 |    |                          | 16.56   |                            |             | 0.54           |   | E.G.                            |
| 1225          |              |     | 145 |    |                          | 16.60   |                            |             | 0.58           |   |                                 |
| 1226          |              |     | 166 |    |                          | 16.64   |                            |             | 0.62           |   |                                 |
| 1309          |              |     | 189 |    |                          | 16.70   |                            |             | 0.68           |   |                                 |
| 1328          |              |     | 208 |    |                          | 16.72   |                            |             | 0.70           |   |                                 |
| 1348          |              |     | 228 |    |                          | 16.75   |                            |             | 0.73           |   |                                 |
| 1401          |              |     | 241 |    |                          | 16.78   |                            |             | 0.76           |   |                                 |
| 1432          |              |     | 272 |    |                          | 16.82   |                            |             | 0.80           |   |                                 |
| 1502          |              |     | 302 |    |                          | 16.84   |                            |             | 0.82           |   |                                 |
| 1530          |              |     | 330 |    |                          | 16.87   |                            |             | 0.85           |   |                                 |
| 1600          |              |     | 360 |    |                          | 16.90   |                            |             | 0.88           |   |                                 |
| 1628          |              |     | 388 |    |                          | 16.93   |                            |             | 0.91           |   |                                 |
| 1735          |              |     | 455 |    |                          | 16.96   |                            |             | 0.94           |   |                                 |

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

WELL MRWC #3

PUMPING / OBSERVATION WELL

PUMPING RECOVERY DATA

PAGE 2 OF 2

TYPE of PUMPING TEST CONSTANT Q

HOW Q MEASURED 6" X 4" ORIFICE Weir

M.P. for WL's TOP CASING elev. \_\_\_\_\_

HOW WL's MEASURED SOLVIST SOUNDER

DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_\_

PUMPED WELL NO. MT. ROSE REPLACEMENT

% SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_\_

RADIUS of PUMPED WELL \_\_\_\_\_

PUMP ON: date 8 JAN 90 time 1600

DISTANCE from PUMPED WELL \_\_\_\_\_

PUMP OFF: date 11 JAN 90 time 1800

[illegible]



# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

WELL REPLACEMENT WELL

PUMPING/OBSERVATION WELL

PUMPING/RECOVERY DATA

PAGE 1 OF 1

TYPE of PUMPING TEST CONSTANT Q

HOW Q MEASURED 6" X 4" ORIFICE WEIR

M.P. for WL's PVC S. Well elev. \_\_\_\_\_

HOW WL's MEASURED SOLIST SOUNDER

DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_\_

PUMPED WELL NO. REPLACEMENT WELL

% SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_\_

RADIUS of PUMPED WELL \_\_\_\_\_

PUMP ON: date 8 JAN 90 time 1000

DISTANCE from PUMPED WELL \_\_\_\_\_

PUMP OFF: date 11 JAN 90 time 1000

| TIME<br>t = 4320 at t' = 0 |                             |      |      |      | WATER LEVEL DATA<br>STATIC WATER LEVEL 22.02 |                                  |                |         |  | WATER<br>PRODUCT. | COMMENTS                           |
|----------------------------|-----------------------------|------|------|------|--|----------------------------------|----------------|---------|--|-------------------|------------------------------------|
| CLOCK<br>TIME              | ELAPSED TIME<br>mins<br>hrs | t    | t'   | t/t' | READING                                      | CONVERSIONS<br>or<br>CORRECTIONS | WATER<br>LEVEL | S or S' |  | Q                 | (NOTE ANY CHANGES IN<br>OBSERVERS) |
| 0958                       |                             | 4318 |      |      | 81.54  |                                  |                |         |  | 400               | 0.4' cc RST                        |
|                            |                             | 4321 | 1    | 4321 | 47.90  |                                  | 25.88          |         |  |                   |                                    |
|                            |                             | 4322 | 2    | 2161 | 45.04  |                                  | 23.02          |         |  |                   |                                    |
|                            |                             | 4323 | 3    | 1441 | 42.60  |                                  | 20.58          |         |  |                   |                                    |
|                            |                             | 4324 | 4    | 1081 | 40.58  |                                  | 18.56          |         |  |                   |                                    |
|                            |                             | 4325 | 5    | 865  | 39.22  |                                  | 17.20          |         |  |                   |                                    |
|                            |                             | 4326 | 6    | 721  | 38.06  |                                  | 16.04          |         |  |                   |                                    |
|                            |                             | 4327 | 7    | 618  | 37.10  |                                  | 15.08          |         |  |                   |                                    |
|                            |                             | 4328 | 8    | 541  | 36.22  |                                  | 14.20          |         |  |                   |                                    |
|                            |                             | 4329 | 9    | 481  | 35.48  |                                  | 13.46          |         |  |                   |                                    |
| 1010                       |                             | 4330 | 10   | 433  | 34.80  |                                  | 12.78          |         |  |                   |                                    |
|                            |                             | 4332 | 12   | 361  | 33.67  |                                  | 11.65          |         |  |                   |                                    |
|                            |                             | 4334 | 14   | 310  | 32.68  |                                  | 10.66          |         |  |                   |                                    |
|                            |                             | 4336 | 16   | 271  | 31.84  |                                  | 9.82           |         |  |                   |                                    |
|                            |                             | 4338 | 18   | 241  | 31.17  |                                  | 9.15           |         |  |                   |                                    |
| 1020                       |                             | 4340 | 20   | 217  | 30.59  |                                  | 8.57           |         |  |                   |                                    |
| 1025                       |                             | 4345 | 25   | 174  | 29.52  |                                  | 7.50           |         |  |                   |                                    |
| 1030                       | 30                          | 4350 | 30   | 145  | 28.63  |                                  | 6.61           |         |  |                   |                                    |
| 1035                       |                             | 4355 | 35   | 124  | 27.96  |                                  | 5.94           |         |  |                   |                                    |
| 1040                       |                             | 4360 | 40   | 109  | 27.45  |                                  | 5.43           |         |  |                   |                                    |
| 1045                       |                             | 4365 | 45   | 97   | 27.03  |                                  | 5.01           |         |  |                   |                                    |
| 1050                       |                             | 4370 | 50   | 87   | 26.69  |                                  | 4.67           |         |  |                   |                                    |
| 1100                       | 0                           | 4380 | 60   | 73   | 26.09  |                                  | 4.07           |         |  |                   |                                    |
| 1110                       |                             | 4390 | 70   | 63   | 25.70  |                                  | 3.68           |         |  |                   |                                    |
| 1120                       |                             | 4400 | 80   | 55   | 25.45  |                                  | 3.43           |         |  |                   |                                    |
| 1130                       |                             | 4410 | 90   | 49   | 25.24  |                                  | 3.22           |         |  |                   |                                    |
| 1140                       |                             | 4420 | 100  | 44   | 25.05  |                                  | 3.03           |         |  |                   |                                    |
| 1200                       | 0                           | 4440 | 120  | 37   | 24.83  |                                  | 2.81           |         |  |                   |                                    |
| 1220                       |                             | 4460 | 140  | 32   | 24.66  |                                  | 2.64           |         |  |                   |                                    |
| 1240                       |                             | 4480 | 160  | 28   | 24.59  |                                  | 2.57           |         |  |                   |                                    |
| 1300                       | 0                           | 4500 | 180  | 25   | 24.51  |                                  | 2.49           |         |  |                   |                                    |
| 1330                       | 30                          | 4530 | 210  | 22   | 24.43  |                                  | 2.41           |         |  |                   |                                    |
| 1400                       | 0                           | 4560 | 240  | 19   | 24.40  |                                  | 2.38           |         |  |                   |                                    |
| 1430                       | 30                          | 4590 | 270  | 17   | 24.37  |                                  | 2.35           |         |  |                   | CURTIS SHOTS OFF PUMPS<br>BRIEFLY. |
| 1500                       | 0                           | 4620 | 300  | 15   | 24.35  |                                  | 2.33           |         |  |                   |                                    |
| 1600                       | 0                           | 4680 | 360  | 13   | 24.30  |                                  | 2.28           |         |  |                   |                                    |
| 2000                       | 0                           | 4920 | 600  | 8    | 24.20  |                                  | 2.18           |         |  |                   |                                    |
| 2300                       | 0                           | 5100 | 780  | 6.5  | 23.70  |                                  | 1.68           |         |  |                   |                                    |
| 0800                       | 0                           | 5640 | 1320 | 4.3  | 24.00  |                                  | 1.98           |         |  |                   | OIL ON PROBE                       |





# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

WELL MRWC #3

PUMPING/OBSERVATION WELL

PUMPING/RECOVERY DATA

PAGE 1 OF 2

TYPE OF PUMPING TEST CONSTANT Q

HOW Q MEASURED 6" X 4" ORIFICE WEIR

M.P. for WL's TOP CASING elev. \_\_\_\_\_

HOW WL's MEASURED SOLIST SUNDOR

DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_\_

PUMPED WELL NO. MT ROSE REPLACEMENT WELL

% SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_\_

RADIUS of PUMPED WELL \_\_\_\_\_

PUMP ON: date 8 JAN 70 time 1000

DISTANCE from PUMPED WELL \_\_\_\_\_

PUMP OFF: date 11 JAN 70 time 1000

| TIME               |              |     |      |        | WATER LEVEL DATA         |                                  |             |         |  | WATER PRODUCT. |                                 | COMMENTS |
|--------------------|--------------|-----|------|--------|--------------------------|----------------------------------|-------------|---------|--|----------------|---------------------------------|----------|
| t = 4320 at t' = 0 |              |     |      |        | STATIC WATER LEVEL 16.02 |                                  |             |         |  |                |                                 |          |
| CLOCK TIME         | ELAPSED TIME |     |      | t / t' | READING                  | CONVERSIONS<br>OR<br>CORRECTIONS | WATER LEVEL | S or S' |  | Q              | (NOTE ANY CHANGES IN OBSERVERS) |          |
|                    | mins         | hrs | t    | t'     |                          |                                  |             |         |  |                |                                 |          |
| 0958               |              |     | 4318 |        | 18.22                    |                                  |             |         |  |                |                                 |          |
| 1000               |              |     | 4320 | 0      | 18.18                    |                                  |             |         |  |                |                                 |          |
| 1001               |              |     | 4321 | 1      | 18.14                    |                                  |             | 2.12    |  |                |                                 |          |
| 1002               |              |     | 4322 | 2      | 18.10                    |                                  |             | 2.08    |  |                |                                 |          |
| 1003               |              |     | 4323 | 3      | 18.04                    |                                  |             | 2.02    |  |                |                                 |          |
| 1004               |              |     | 4324 | 4      | 18.02                    |                                  |             | 2.00    |  |                |                                 |          |
| 1005               |              |     | 4325 | 5      | 17.99                    |                                  |             | 1.97    |  |                |                                 |          |
| 1006               |              |     | 4326 | 6      | 17.98                    |                                  |             | 1.96    |  |                |                                 |          |
| 1007               |              |     | 4327 | 7      | 17.95                    |                                  |             | 1.93    |  |                |                                 |          |
| 1008               |              |     | 4328 | 8      | 17.90                    |                                  |             | 1.88    |  |                |                                 |          |
| 1009               |              |     | 4329 | 9      | 17.90                    |                                  |             | 1.88    |  |                |                                 |          |
| 1010               |              |     | 4330 | 10     | 17.86                    |                                  |             | 1.84    |  |                |                                 |          |
| 1011               |              |     | 4331 | 11     | 17.85                    |                                  |             | 1.83    |  |                |                                 |          |
| 1012               |              |     | 4332 | 12     | 17.82                    |                                  |             | 1.80    |  |                |                                 |          |
| 1013               |              |     | 4333 | 13     | 17.81                    |                                  |             | 1.79    |  |                |                                 |          |
| 1014               |              |     | 4334 | 14     | 17.80                    |                                  |             | 1.78    |  |                |                                 |          |
| 1015               |              |     | 4335 | 15     | 17.78                    |                                  |             | 1.76    |  |                |                                 |          |
| 1016               |              |     | 4336 | 16     | 17.76                    |                                  |             | 1.74    |  |                |                                 |          |
| 1017               |              |     | 4337 | 17     | 17.74                    |                                  |             |         |  |                |                                 |          |
| 1018               |              |     | 4338 | 18     | 17.74                    |                                  |             | 1.72    |  |                |                                 |          |
| 1019               |              |     | 4339 | 19     | 17.73                    |                                  |             |         |  |                |                                 |          |
| 1020               |              |     | 4340 | 20     | 17.72                    |                                  |             | 1.70    |  |                |                                 |          |
| 1025               |              |     | 4345 | 25     | 17.64                    |                                  |             | 1.62    |  |                |                                 |          |
| 1030               |              |     | 4350 | 30     | 17.60                    |                                  |             | 1.58    |  |                |                                 |          |
| 1035               |              |     | 4355 | 35     | 17.54                    |                                  |             | 1.52    |  |                |                                 |          |
| 1040               |              |     | 4360 | 40     | 17.51                    |                                  |             | 1.49    |  |                |                                 |          |
| 1045               |              |     | 4365 | 45     | 17.47                    |                                  |             | 1.45    |  |                |                                 |          |
| 1050               |              |     | 4370 | 50     | 17.44                    |                                  |             | 1.42    |  |                |                                 |          |
| 1100               |              |     | 4380 | 60     | 17.37                    |                                  |             | 1.35    |  |                |                                 |          |
| 1110               |              |     | 4390 | 70     | 17.33                    |                                  |             | 1.31    |  |                |                                 |          |
| 1120               |              |     | 4400 | 80     | 17.30                    |                                  |             | 1.28    |  |                |                                 |          |
| 1130               |              |     | 4410 | 90     | 17.26                    |                                  |             | 1.24    |  |                |                                 |          |
| 1140               |              |     | 4420 | 100    | 17.22                    |                                  |             | 1.20    |  |                |                                 |          |
| 1202               |              |     | 4442 | 122    | 17.20                    |                                  |             | 1.18    |  |                |                                 |          |
| 1222               |              |     | 4462 | 142    | 17.18                    |                                  |             | 1.16    |  |                |                                 |          |
| 1242               |              |     | 4482 | 162    | 17.13                    |                                  |             | 1.11    |  |                |                                 |          |
| 1302               |              |     | 4502 | 182    | 17.11                    |                                  |             | 1.09    |  |                |                                 |          |
| 1332               |              |     | 4532 | 212    | 17.08                    |                                  |             | 1.06    |  |                |                                 |          |
| 1402               |              |     | 4562 | 242    | 17.07                    |                                  |             | 1.05    |  |                |                                 |          |
| 1432               |              |     | 4592 | 272    | 17.04                    |                                  |             | 1.02    |  |                |                                 |          |



## PUMPING TEST DATA

WELL MRWC #3

PUMPING/OBSERVATION WELL

PUMPING RECOVERY DATA

PAGE 2 OF 2

TYPE of PUMPING TEST CONSTANT Q

HOW Q MEASURED 6" x 4" ORIFICE WEIR

M.P. for WL's T.D.C. elev. \_\_\_\_\_

HOW WL's MEASURED SOLINST SOUNDER

DEPTH of PUMP/AIRLINE \_\_\_\_\_ wrt \_\_\_\_\_

PUMPED WELL NO. MT. ROSE REPLACEMENT WELL

% SUBMERGENCE: initial \_\_\_\_\_; pumping \_\_\_\_\_

RADIUS of PUMPED WELL \_\_\_\_\_

PUMP ON: date 8 JAN 90 time 1000

DISTANCE from PUMPED WELL \_\_\_\_\_

PUMP OFF: date 11 JAN 90 time 1000

[illegible]

APPENDIX III  
VIDEO SURVEY LOG



APPENDIX IV  
COPY OF BID PROPOSAL

# BID PROPOSAL

| ITEM                            | APPROX<br>QUAN-<br>TITY | DESCRIPTION OF ITEM WITH<br>UNIT PRICE WRITTEN IN<br>WORDS   | UNIT<br>PRICES | TOTAL                 |
|---------------------------------|-------------------------|--|----------------|-----------------------|
| MOBILIZATION AND DEMOBILIZATION |                         |  |                |                       |
| 1.                              | 2                       | Mobilization and Demobil-<br>ization including all<br>materials, labor, equip-<br>ment for completion of two<br>test wells as described in Spec-<br>ifications for the lump sum<br>price of <u>One thousand</u><br><u>eight hundred</u> per well.                                | \$1,800.00     | \$3,600.00            |
| 2.                              | 3                       | Mobilization and Demobil-<br>ization including all<br>materials, labor, equip-<br>ment for completion of three<br>municipal water wells as<br>described in Specifications<br>for the lump sum price of<br><u>Two thousand four hundred</u><br><u>and fifty dollars</u> per well. | 2,450.00       | 7,350.00              |
| MOUNT ROSE TEST DRILLING        |                         |  |                |                       |
| 1.                              | 1200 LF                 | Drill minimum 8-inch<br>diameter pilot bore, Mount<br>Rose locations,<br>approximately 600 foot<br>per test hole at<br><u>Twelve dollars</u><br>per lineal foot.   | 12.00          | 14,400.00<br>7,200.00 |
| 2.                              | 2                       | Geophysical Logs of pilot<br>bores for the price of<br><u>One thousand four hundred</u><br><u>forty dollars</u> per log  | 1,440.00       | 2,880.00              |
| 3.                              | 800 ft.                 | Furnish and install 2-inch<br>diameter slotted steel pipe<br>estimate at 400 feet per test<br>hole at <u>Three dollars and</u><br><u>sixty cents</u> per foot.   | 3.60           | 2,880.00              |
| 4.                              | 400 ft.                 | Furnish and install 2-inch<br>diameter steel pipe estimated<br>at 200 feet per test hole at<br><u>One dollar and eighty cents</u><br>per foot.   | 1.80           | 720.00                |
| 5.                              | 15 yds <sup>3</sup>     | Furnish and install gravel<br>pack, estimated at 7.5 yds <sup>3</sup> per<br>test hole at <u>One hundred one</u><br><u>&amp; fifty-seven cents</u> per yd <sup>3</sup>   | 101.57         | 1,523.55              |

|    |         |  |                 |                    |
|----|---------|--|-----------------|--------------------|
| 6. | 200 ft. | Furnish and install grout sanitary seal estimated at 100 feet per test well at <u>Eleven dollars &amp; Twenty-five cents per foot.</u>   | <u>\$ 11.25</u> | <u>\$ 2,250.00</u> |
| 7. | 20 hrs. | Furnish and install necessary equipment for air-development of 2-inch diameter monitoring wells estimated at 10 hours per test well at <u>Two hundred twenty dollars</u> per hour. | <u>220.00</u>   | <u>4,400.00</u>    |

MARVIN PICOLLO SCHOOL LOCATION, PRODUCTION WELL

|    |         |   |               |                  |
|----|---------|---|---------------|------------------|
| 1. | 105 ft. | Drill 32-inch MINIMUM diameter conductor casing borehole, PICOLLO SCHOOL location, approximately 105 feet at <u>One hundred twenty-seven dollars</u> per lineal ft. | <u>127.00</u> | <u>13,335.00</u> |
| 2. | 100 ft. | Furnish and install blank 24-inch diameter conductor casing, PICOLLO SCHOOL approximately 100 feet <u>Forty-five dollars</u> per lineal ft.                         | <u>45.00</u>  | <u>4,500.00</u>  |
| 3. | 100 ft. | Furnish and install sanitary grout seal PICOLLO SCHOOL location approximately 100 feet at <u>Thirty-eight dollars</u> per lineal ft.                                | <u>38.00</u>  | <u>3,800.00</u>  |
| 4. | 250 ft. | Drill 22-inch minimum diameter production casing borehole, PICOLLO SCHOOL, Approximately 250 ft. at <u>Sixty dollars</u> per lineal ft.                             | <u>60.00</u>  | <u>15,000.00</u> |
| 5. | 150 ft. | Furnish and install 12-inch diameter blank production casing, PICOLLO SCHOOL location, approximately 150 feet at <u>Twenty-two dollars</u> per lineal ft.           | <u>22.00</u>  | <u>3,300.00</u>  |

BID PROPOSAL

| ITEM | APPROX<br>QUANTITY  | DESCRIPTION OF ITEM WITH<br>UNIT PRICE WRITTEN IN WORDS   | UNIT<br>PRICE   | TOTAL   |
|------|---------------------|---|-----------------|---|
| 6.   | 200 ft.             | Furnish and install 12-inch diameter wire-wrap well screen, PICOLLO SCHOOL location, approximately 200 feet at <u>Fifty-three dollars</u> per lineal ft.  | <u>\$ 53.00</u> | <u>\$10,600.00</u>                            |
| 7.   | 200 ft.             | Furnish and install 1-inch diameter water-level sounding tube, PICOLLO SCHOOL location, approximately 200 ft. at <u>One dollar &amp; twenty cents</u> per lineal ft.                            | <u>1.20</u>     | <u>240.00</u>                                 |
| 8.   | 35 yds <sup>3</sup> | Furnish and install design gravel pack, PICOLLO SCHOOL location, estimated 35 yds <sup>3</sup> at <u>One hundred twenty dollars</u> per yd <sup>3</sup>   | <u>120.00</u>   | <u>4,200.00</u>                               |
| 9.   | 1 ea.               | Furnish and install casing clamp and doughnut ring seal, PICOLLO SCHOOL location, for the lump sum price of <u>Five hundred twenty dollars</u> each.  | <u>520.00</u>   | <u>520.00</u>                                 |
| 10.  | 100 hrs.            | Development by bailing and swabbing, PICOLLO SCHOOL location, estimated 100 hours at <u>Two hundred twenty dollars</u> per hour   | <u>220.00</u>   | <u>22,000.00</u>                              |
| 11.  | <u>100 hrs.</u>     | Furnish, install, operate and remove necessary equipment, PICOLLO SCHOOL location, including discharge piping for development pumping estimated 100 hrs. at <u>One hundred twenty</u> per hour. | <u>120.00</u>   | <u>12,000<sup>00</sup></u><br><u>1,200.00</u> |
| 12.  | 90 hrs.             | Furnish, install, operate and remove necessary equipment, PICOLLO SCHOOL location, for test pumping at estimate 90 hours at <u>One hundred twenty dollars</u> per hour.                         | <u>120.00</u>   | <u>10,800.00</u>                              |
| 13.  | 1 ea.               | Well disinfection and capping, at the lump sum price of <u>Eight hundred dollars</u>  | <u>800.00</u>   | <u>800.00</u>                                 |



|     |       |   |                  |                  |
|-----|-------|---|------------------|------------------|
| 14. | 1 ea. | VHS video log of completed production well PICOLLO SCHOOL at the lump sum price of <u>Four hundred fifty dollars</u> per log. | \$ <u>450.00</u> | \$ <u>450.00</u> |
|-----|-------|---|------------------|------------------|

MOUNT ROSE LOCATION, PRODUCTION WELLS

|    |         |  |                 |                  |
|----|---------|--|-----------------|------------------|
| 1. | 350 ft. | Drill 8-inch minimum diameter pilot hole at MT. ROSE, Well No. 2 location, approximately 350 feet at <u>Twelve dollars</u> per lineal ft.  | <u>12.00</u>    | <u>4,200.00</u>  |
| 2. | 1 ea.   | Geophysical log of pilot bore for the price of <u>One thousand four hundred forty</u> each.  | <u>1,440.00</u> | <u>1,440.00</u>  |
| 3. | 210 ft. | Drill 32-inch MINIMUM diameter conductor casing borehole, MOUNT ROSE locations, approximately 105 feet at each site at <u>One hundred twenty seven dollars</u> per lineal ft.                          | <u>127.00</u>   | <u>26,670.00</u> |
| 4. | 200 ft. | Furnish and install blank 24-inch diameter conductor casing, MOUNT ROSE locations approximately 100 feet per site at <u>Forty-five dollars</u> per lineal ft.  | <u>45.00</u>    | <u>9,000.00</u>  |
| 5. | 200 ft. | Furnish and install sanitary grout seal MOUNT ROSE locations approximately 100 feet per site at <u>Thirty-eight dollars</u> per lineal ft.   | <u>38.00</u>    | <u>7,600.00</u>  |
| 6. | 750 ft. | Drill 22-inch minimum diameter production casing borehole, MOUNT ROSE locations, Approximately 500 ft. at Location No. 1 and 250 feet at Location No. 2 at <u>Seventy-eight dollars</u> per lineal ft. | <u>78.00</u>    | <u>58,500.00</u> |

BID PROPOSAL

| ITEM | APPROX<br>QUANTITY  | DESCRIPTION OF ITEM WITH<br>UNIT PRICE WRITTEN IN WORDS  | UNIT<br>PRICE   | TOTAL              |
|------|---------------------|--|-----------------|--------------------|
| 7.   | 500 ft.             | Furnish and install 12-inch diameter blank production casing, MOUNT ROSE locations, approximately 350 feet at Location No. 1 and 150 feet at Location No. 2 at <u>Twenty-two</u> dollars per lineal ft.            | \$ <u>22.00</u> | <u>\$11,000.00</u> |
| 8.   | 450 ft.             | Furnish and install 12-inch diameter wire-wrap well screen, MOUNT ROSE locations, approximately 250 feet at Location No. 1 and 200 feet at Location No. 2 at <u>Fifty-three dollars</u> per lineal ft.             | <u>53.00</u>    | <u>23,850.00</u>   |
| 9.   | 500 ft.             | Furnish and install 1-inch diameter water-level sounding tube, MOUNT ROSE locations, approximately 400 ft. at Location No. 1 and 150 feet at Location No. 2 at <u>One dollar &amp; twenty cents</u> per lineal ft. | <u>1.20</u>     | <u>600.00</u>      |
| 10.  | 95 yds <sup>3</sup> | Furnish and install design gravel pack, MOUNT ROSE locations, estimated 95 yds <sup>3</sup> at <u>One hundred one &amp; fifty-seven cents per yd<sup>3</sup></u>   | <u>101.57</u>   | <u>9,649.15</u>    |
| 11.  | 2 ea.               | Furnish and install casing clamp and doughnut ring seal, MOUNT ROSE locations for the price of <u>Five hundred twenty dollars</u> each.  | <u>520.00</u>   | <u>1,040.00</u>    |
| 12.  | 150 hrs.            | Development by bailing and swabbing, MOUNT ROSE locations, estimated 150 hours at <u>Two hundred twenty dollars</u> per hour   | <u>220.00</u>   | <u>33,000.00</u>   |

|     |          |   |                   |   |
|-----|----------|---|-------------------|---|
| 13. | 150 hrs. | Furnish, install, operate and<br>remove necessary equipment,<br>MOUNT ROSE locations,<br>including discharge piping<br>for development pumping.<br>Estimated 150 hours at<br><u>One hundred twenty dollars</u><br>per hour. | \$ <u>120.00</u>  | <u>18,000.00</u>                          |
| 14. | 160 hrs. | Furnish, install, operate and<br>remove necessary equipment,<br>MOUNT ROSE locations,<br>for test pumping at<br><u>One hundred twenty dollars</u><br>per hour.  | <u>120.00</u>     | <u>19,200.00</u>                          |
| 15. | (2 ea.)  | Well disinfection and capping<br>at the lump sum price of<br><u>Eight hundred dollars</u>   | ( <u>800.00</u> ) | <u>1600<sup>00</sup></u><br><u>800.00</u> |
| 16. | (2 ea.)  | VHS video logs of completed produc-<br>tion wells MOUNT ROSE Location<br>for the lump sum price of<br><u>Four hundred dollars</u><br>per log.   | ( <u>400.00</u> ) | <u>800<sup>00</sup></u><br><u>400.00</u>  |

TOTAL BID

WRITTEN IN WORDS

TOTAL

Three hundred forty-eight  
thousand, four hundred  
ninety-seven & seventy cents

367,697.70  
\$348,497.70

complete.

Name, Address and Telephone Number of Bidding Company

Lang Exploratory Drilling

2286 West 1500 South

Salt Lake City, Utah 84104

(801) 973-6667

Authorized Signature Representing Bidding Company

Randy Maye  
Contract Manager

Title