

Dragon

1506-00031

WELL CONSTRUCTION  
AND AQUIFER TESTING SUMMARY  
FOR THE  
CORRAO REPLACEMENT WELL

APRIL 1995

2 Sept 98 - Well on-line  
@ 340 gpm  
P.L. 46.6 ft below  
top of stilling well.  
~ 2.8' stick up  
from ground level.

**WASHOE COUNTY**  
DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

P.O. BOX 11130 RENO, NEVADA 89520



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AND AQUIFER TESTING SUMMARY  
FOR THE  
CORRAO REPLACEMENT WELL**

**APRIL 1995**

**Prepared by:  
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## SUMMARY AND RECOMMENDATIONS

The Corrao Replacement Well was drilled and constructed in October 1994. Two monitoring wells were drilled and constructed in March 1994. The wells are located near the intersection of Zolezzi Lane and U.S. Highway 395 in south Reno, Washoe County, Nevada (see Figure 1). The replacement well is constructed of 12-inch diameter casing to a total depth of 130 feet. The well is screened from 60 feet to 130 feet below ground. Both monitoring wells are 4 inches in diameter with total depths of 126 feet and 127 feet respectively. One monitoring well is screened from 76 feet to 126 feet below ground while the other is screened from 77 to 127 feet below ground.

Step-drawdown and constant discharge (Q) tests were completed on the replacement well in October 1994. After completing the final step test, (pumping rate of 500 gallons per minute (gpm)), the well efficiency was 90.3 percent. The constant Q test was run at a flow rate of 425 gpm for approximately 68 hours. The replacement well had a drawdown of 45.62 feet with a pumping level of 59.68 feet at the end of the constant Q test. Specific capacity of the replacement well was 9.32 gpm per foot of drawdown at the end of pumping. A recharge boundary was encountered approximately 60 minutes after initiating the constant Q test.

Ground water was sampled from the monitoring wells in March 1994 and from the replacement well at the end of the constant Q test. Results of the 1994 analyses indicate that ground water from the replacement well had arsenic at 0.055 milligrams per liter, a level exceeding the primary drinking water standard maximum contaminant level (MCL). The MCL for arsenic is 0.050 milligrams per liter. Ten additional ground water samples were collected from the replacement well over a 3 day period in March 1995. In 1995, none of the samples contained arsenic above the MCL. Iron in ground water samples collected from the monitoring wells was detected at a level exceeding the secondary drinking water standard (SMCL). The SMCL for iron is 0.30 mg/L. No other compounds were detected above primary or secondary standards.

One possible reason for the higher level of arsenic in 1994 could be the presence of suspended minerals in the ground water sample. The well produces fine sand and silt when the pumping level drops to the screened interval, as was the case when the sample was collected in 1994. Also, the 1994 sample was not filtered before analysis. All samples were collected when the pumping level was above the screened interval in 1995. However, the trend of arsenic concentration generally increased as the pumping rate increased during the 3-day period.

Based on water quality data and the presence of fine sand when the pumping level drops to the screened interval, the recommended

long term pumping rate is 330 gpm. Drawdown in the well is projected to be approximately 40 feet after 3 months of continuous pumping at this rate. Maintaining this pumping level should prevent sand production and may prevent the increase of arsenic levels, even if the static water level declines during summer months or extended periods of drought. Pumping the well at this rate may also keep the arsenic level below the MCL, according to samples results from 1995.

## INTRODUCTION

This report describes well drilling and aquifer testing for the Corrao Replacement Well. Two monitoring wells were constructed in addition to the replacement well. The wells are located near the intersection of U.S. 395 South and Zolezzi Lane in south Reno, Washoe County, Nevada (Figure 1). Screen type for the replacement well was selected after a sand (sieve) analysis was completed on a core sample collected at the well site. Ground water samples were collected from each well after installation and development. Ground water samples were analyzed for inorganic and organic compounds at three laboratories. The replacement well was also tested for sand content during pumping tests using a Rossum sand tester. Step-drawdown and constant discharge (Q) pumping tests were performed to determine aquifer characteristics. The step-drawdown test ran for 400 minutes at 4 different flow rates. The constant Q test was run continuously for approximately 68 hours. Recovery data were obtained after completion of the pumping test.

## BOREHOLE DRILLING AND WELL CONSTRUCTION FOR CORRAO REPLACEMENT WELL AND MONITORING WELLS

Monitoring wells 1 and 2 were drilled and constructed by Nevada Drilling, Inc. in March 1994. Drilling and construction of the replacement well was also completed by Nevada Drilling in October 1994. Locations of the three wells are shown in Figure 2. Monitoring well 1 is approximately 23 feet from the replacement well. Monitoring well 2 is approximately 800 feet from the replacement well. State plane coordinates of the three wells are:

Corrao Replacement Well - N 1,702,435.84 E 169,423.53

Corrao Monitoring Well 1 - N 1,702,449.59 E 169,442.53

Corrao Monitoring Well 2 - N 1,703,089.07 E 169,841.60

Boreholes for the wells were drilled by the direct rotary method with continuous circulation of a bentonite drilling fluid (mud rotary). The bentonite fluid was passed through a shaker device before recirculation through the borehole. Monitoring well boreholes were drilled with a 9 $\frac{1}{4}$ -inch diameter bit. The replacement well borehole was drilled with a 17 $\frac{1}{4}$ -inch diameter bit.

Table 1 outlines borehole depths, well diameters, well casing and screen lengths, depth of screen placement, and lengths of sanitary grout seals and gravel pack.

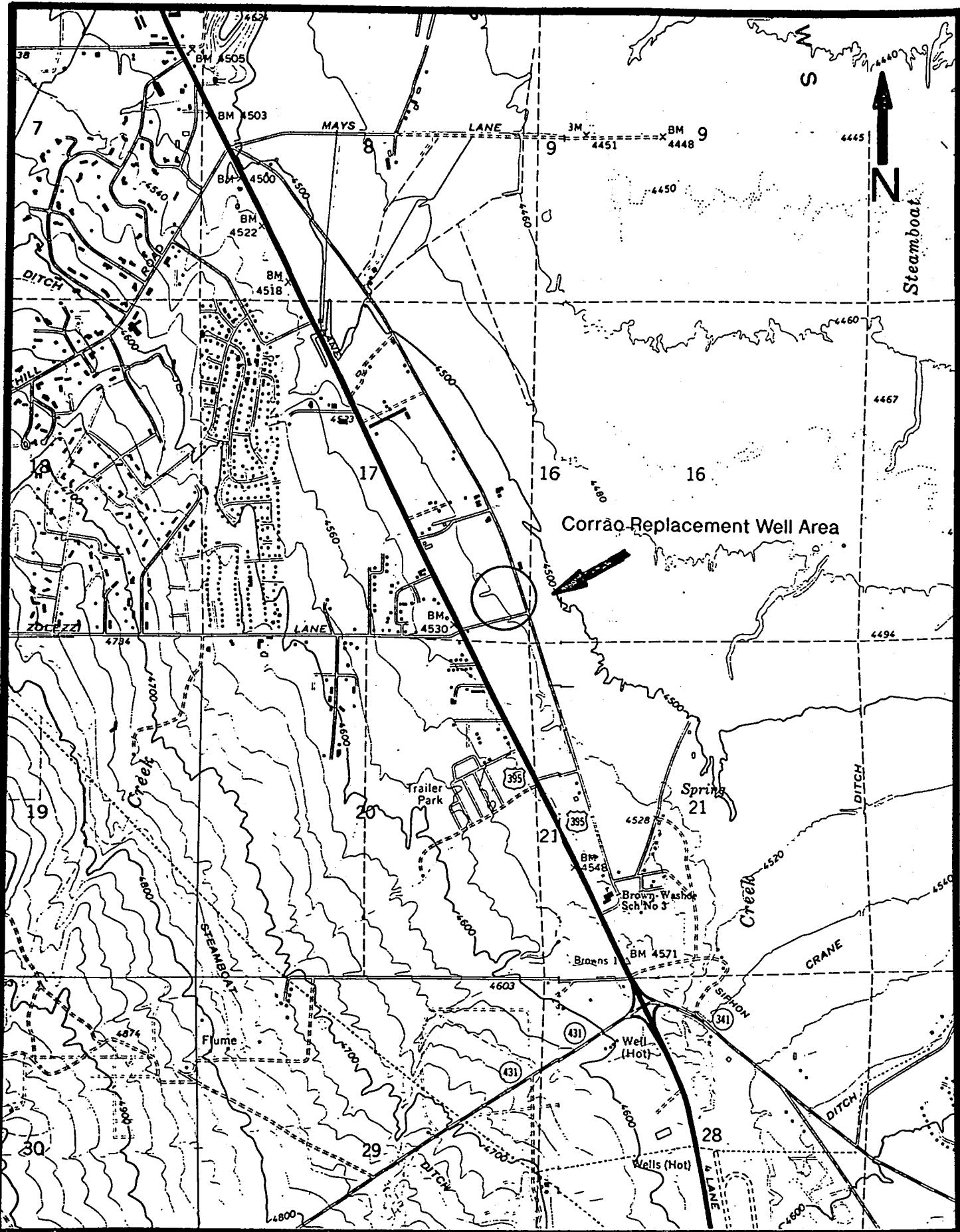


FIGURE 1. GENERAL LOCATION MAP OF CORRAO REPLACEMENT WELL SITE.

N

TEST WELL  
N 1,703,089.07  
E 169,841.60

N 10°11'47" W - 1009.19'

TEST WELL  
N 1,702,449.59  
E 169,442.53

LN. (NEW)

CORRAO WELL  
N 1,702,435.84  
E 169,423.53

S 64°05'48" E  
233.75

N 76°48'43" E  
247.53

ZOLEZZI LANE

N 58°31'06" W - 677.43'  
N 60°19'30" W - 686.80'

N 88°10'18" W

FIGURE 2. SITE MAP OF CORRAO REPLACEMENT WELL.

TABLE 1. SUMMARY OF BOREHOLE DRILLING AND WELL CONSTRUCTION-CORRAO REPLACEMENT WELL AND MONITORING WELLS.

	Replacement Well	Monitoring Well 1	Monitoring Well 2
borehole length (feet) -	130	126	135
borehole diameter (inches) -	18	10	10
casing diameter (inches) -	12	4	4
casing interval (feet) -	+2 to 60 feet below ground	+4 to 76 feet below ground	+3 to 77 feet below ground
screen interval (feet) -	60 to 130	76 to 126	77 to 127
seal interval (feet) -	0 to 55	0 to 55	0 to 55
gravel pack interval (feet) -	55 to 130	55 to 126	5 to 127

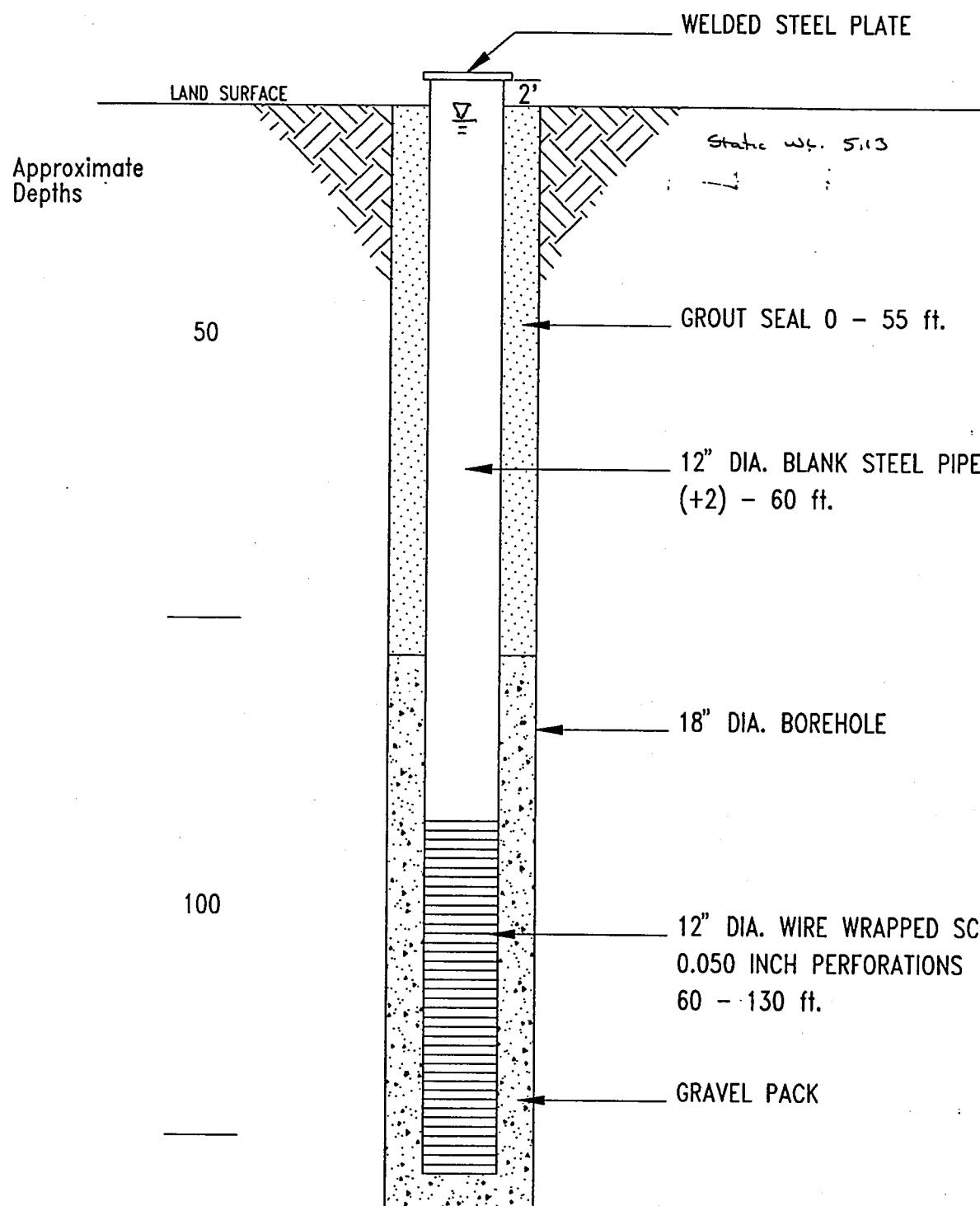
Copies of well drilling reports are included in Appendix I.

Screen type for the replacement well is wire wrapped with 0.050-inch perforations. Results of the sieve analysis, used to determine the perforation size, are included in Appendix II. Screen perforations for the monitoring wells are saw cut and spaced 3 inches in length with 3/32-inch widths. Gravel pack was placed in the annular space between the well screen and borehole with a tremie pipe. The tremie pipe was place near the bottom of the borehole then raised slowly while gravel was fed into the annular space to prevent bridging. The grout sanitary seal was placed using the same method. Figures 3, 4, and 5 detail the as-built designs of the replacement and monitoring wells.

#### WELL DEVELOPMENT

All wells were developed by the air lift method. Each well was periodically air lifted, allowed to recover with no air lifting, then air lifted again. Each monitoring well was developed for approximately 8 hours. The replacement well was air lifted for approximately 60 hours in order to remove as much fine sand as possible. The replacement well was also pumped for approximately 13 hours before starting the step and constant Q tests to further develop the well.

CORRAO REPLACEMENT WELL  
FINAL CONSTRUCTION DIAGRAM



CORRAO MONITORING WELL 1  
FINAL CONSTRUCTION DIAGRAM

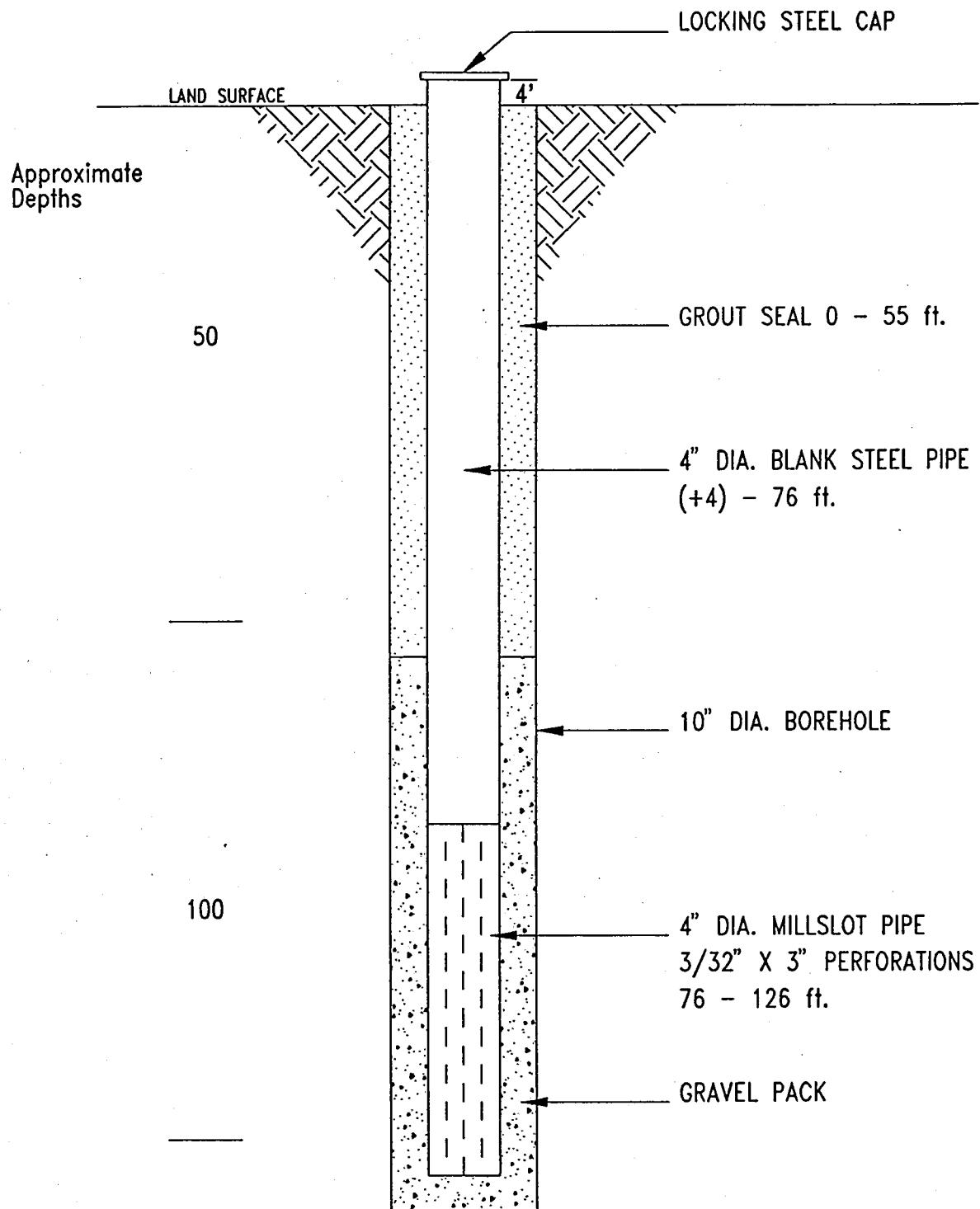


FIGURE 4. CONSTRUCTION DIAGRAM FOR CORRAO MONITORING WELL 1.

CORRAO MONITORING WELL 2  
FINAL CONSTRUCTION DIAGRAM

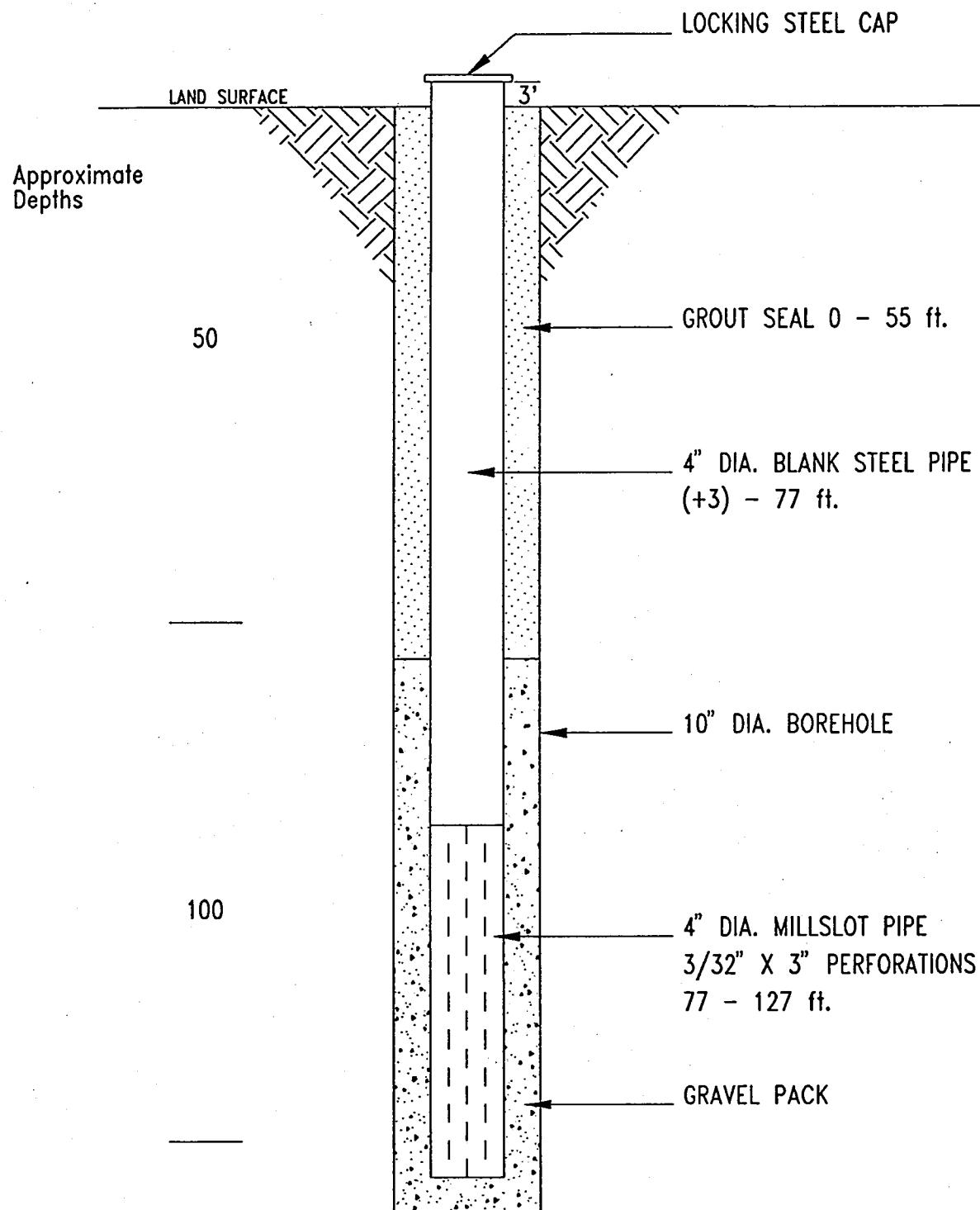


FIGURE 5. CONSTRUCTION DIAGRAM FOR CORRAO MONITORING WELL 2.

## AQUIFER TESTS

Aquifer tests help obtain hydraulic parameters of an aquifer which are used to predict the long-term yield of production wells. Goals of the aquifer tests on the Corrao replacement well were to:

- 1) Determine the pumping levels of the well at different discharge rates;
- 2) Determine the aquifer's hydraulic conductivity and storativity;
- 3) Determine if any aquifer recharge or no-flow boundaries exist near the well; and,
- 4) Use the results of the aquifer tests to design a production well that will maintain a pumping level above the top of the screened interval, even if the well is pumped continuously over a long period of time (several months).

### Aquifer Testing Equipment and Setup

A Grundfos 40 horsepower submersible pump was installed in the replacement well for the step-drawdown and constant Q tests. A trailer-mounted diesel generator was the power source for the pump. The pump intake was set at 90 feet below ground surface. Static water level was approximately 14 feet below ground surface before start-up of the step-drawdown test. Discharge rates were measured with an orifice weir. The weir consisted of a 6-inch diameter horizontal discharge pipe, a 4-inch diameter orifice plate, and a manometer. Flow rates were adjusted with a gate valve. Figure 6 shows the setup of the orifice weir and gate valve. The Rossum sand tester was located near the elbow connection of the well head and horizontal discharge pipe where the discharge water becomes turbulent.

Discharge water was channeled away from the pumping well through a trench. The trench carried water approximately 200 feet downgradient from the pumping well before being dispersed on the ground.

Water levels were measured in the pumping well and two monitoring wells with electric (battery-operated) water level indicators. Water levels were measured to within 0.01-foot.

### Summary of Aquifer Tests

Types and duration of the pumping tests completed for the Corrao Replacement Well are summarized in Table 2.

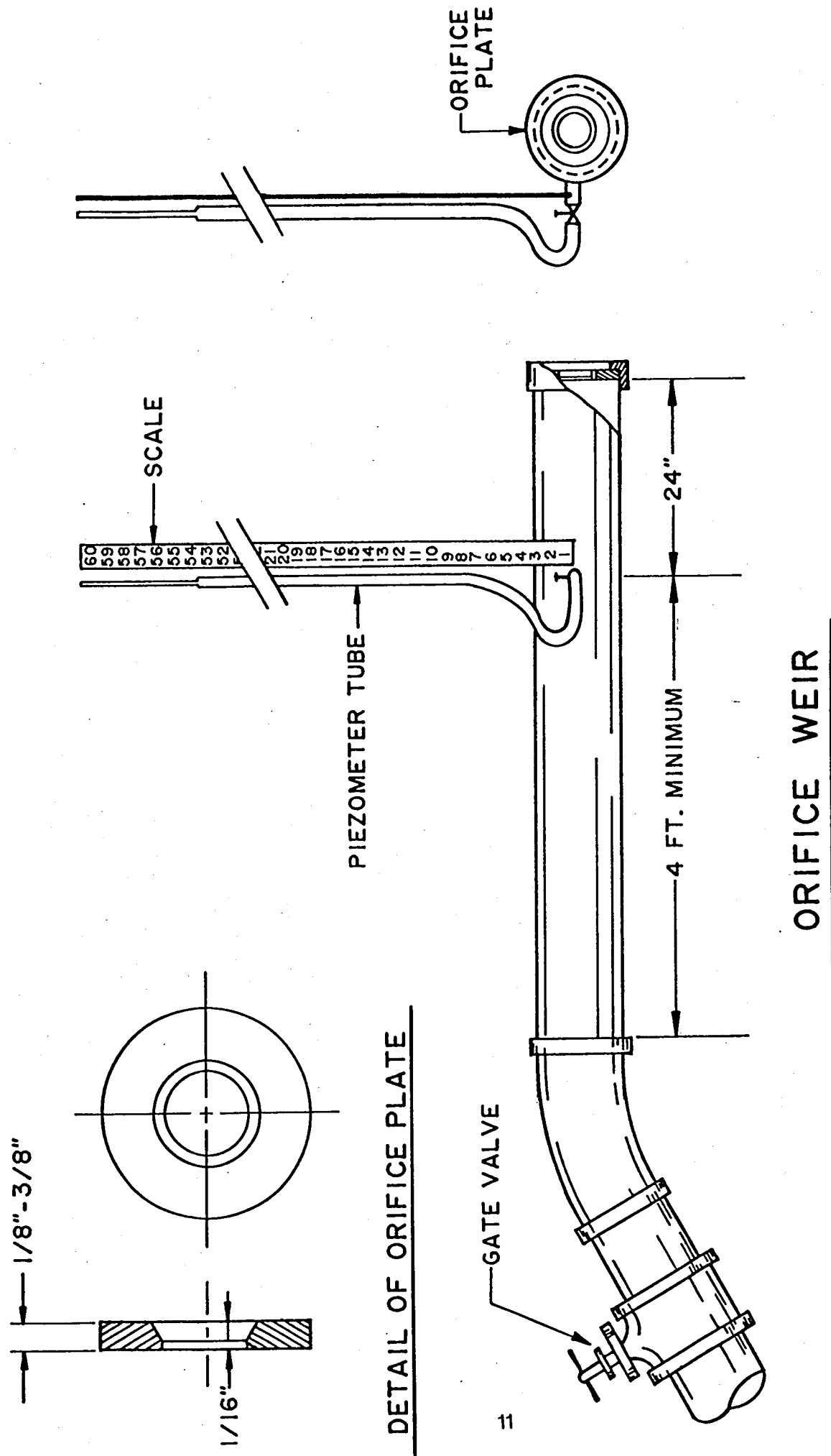


FIGURE 6. DIAGRAM OF ORIFICE WEIR AND GATE VALVE.

TABLE 2. SUMMARY OF AQUIFER TESTS PERFORMED FOR THE CORRAO REPLACEMENT WELL PROJECT.

TEST TYPE	DATE	START TIME	END TIME	DURATION (minutes)	DISCHARGE RATES
Step-Drawdown	10/26/94	0900	1540	400	200, 300, 400, 500
Constant Q	10/27/94- 10/30/94	1230	0800	4050	425
Recovery	10/30/94	0800	1330	330	-

Discharge rates are in gallons per minute (gpm).

The step-drawdown test was performed to determine pumping levels, well yield, specific capacity, and well efficiency for the replacement well at different discharge rates. Information from the step-drawdown test was used to select a discharge rate for the constant Q test. The constant Q and recovery tests were completed to determine aquifer parameters such as transmissivity, hydraulic conductivity, storativity, and boundary effects. Copies of field data sheets with time-drawdown and recovery data are included in Appendix III.

#### AQUIFER TEST DATA ANALYSIS

Step-drawdown data were analyzed according to the method of Jacob (1947). Table 3 summarizes the step-drawdown data for the pumping well.

TABLE 3. STEP-DRAWDOWN DATA AND CALCULATED SPECIFIC CAPACITIES AND SPECIFIC DRAWDOWNS FOR CORRAO REPLACEMENT WELL.

Step Number (n)	Well Yield ( $Q_n$ )	Drawdown @ 100 Minutes ( $S_n$ )	Specific Capacity ( $Q_n/S_n$ )	Specific Drawdown ( $S_n/Q_n$ )
1	200	13.95	14.34	0.0698
2	300	29.97	10.01	0.0999
3	400	40.67	9.84	0.1017
4	500	50.67	9.87	0.1013

$Q_n$  = gallons per minute (gpm)

$S_n$  = feet (ft)

$Q_n/S_n$  = gpm/ft

$S_n/Q_n$  = ft/gpm

Well efficiencies (E) were calculated by plotting specific drawdowns versus Q to determine values of B and C from the plotted data. Well efficiency is then calculated using the equation

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

Formation loss and well loss are calculated using the equation

$$Sw = BQ + CQ^2 \text{ where,}$$

BQ is the formation loss, and  
CQ<sup>2</sup> is the well loss.

Figure 7 shows the drawdown versus time data on a semi-log graph for the step-drawdown data. Values of E and Sw are summarized in Figures 8 and 9.

#### AQUIFER PARAMETERS

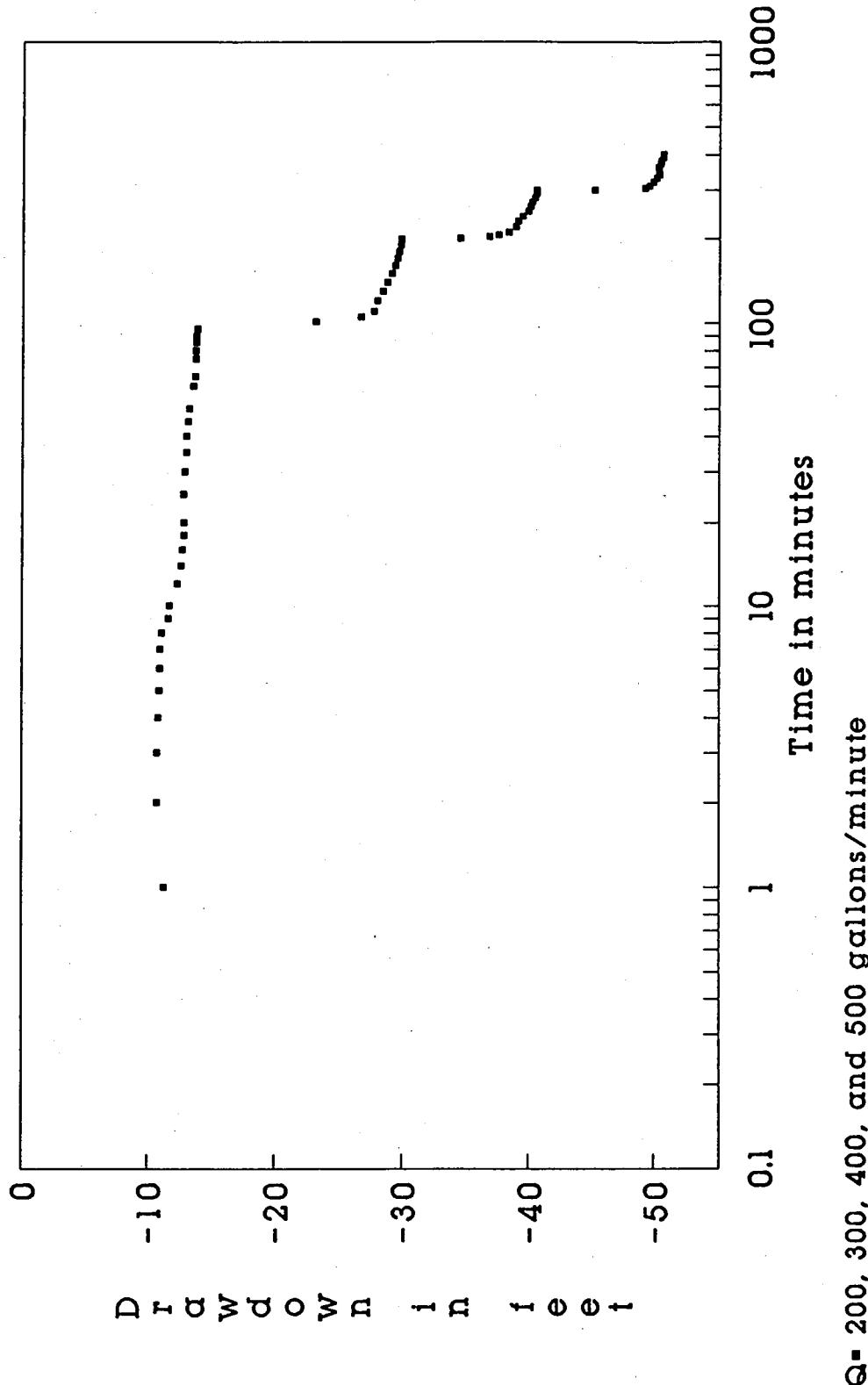
Transmissivity and storativity are used for analysis of well hydraulics in confined aquifers where flow is presumed to be two dimensional and horizontal.

Transmissivity (T) is the parameter representing the rate that water moves through a cross-sectional width of an aquifer. T values are the product of aquifer hydraulic conductivity (k) and aquifer thickness (b), or  $T = kb$ .

T values are needed to estimate well yield and drawdown, and are expressed as gallons per day per foot of drawdown (gallons/day\*foot) in this report. T values for the Corrao Replacement well were estimated using the Cooper-Jacob straight line (graphical) method and the software program Well Hydraulics Interpretation Program (WHIP). Table 4 summarizes the T values obtained from these two methods. Both drawdown and recovery data were evaluated to estimate T.

Storativity is the aquifer parameter representing the volume of water that an aquifer releases from storage per unit surface area of aquifer per unit decline in hydraulic head perpendicular to that surface.

**STEP-DRAWDOWN DATA - CORRAO REPLACEMENT**  
**WELL - Variable Discharge ( $Q$ ) Rates**  
October 26, 1994



**FIGURE 7. GRAPH OF STEP-DRAWDOWN DATA FOR CORRAO REPLACEMENT WELL.**

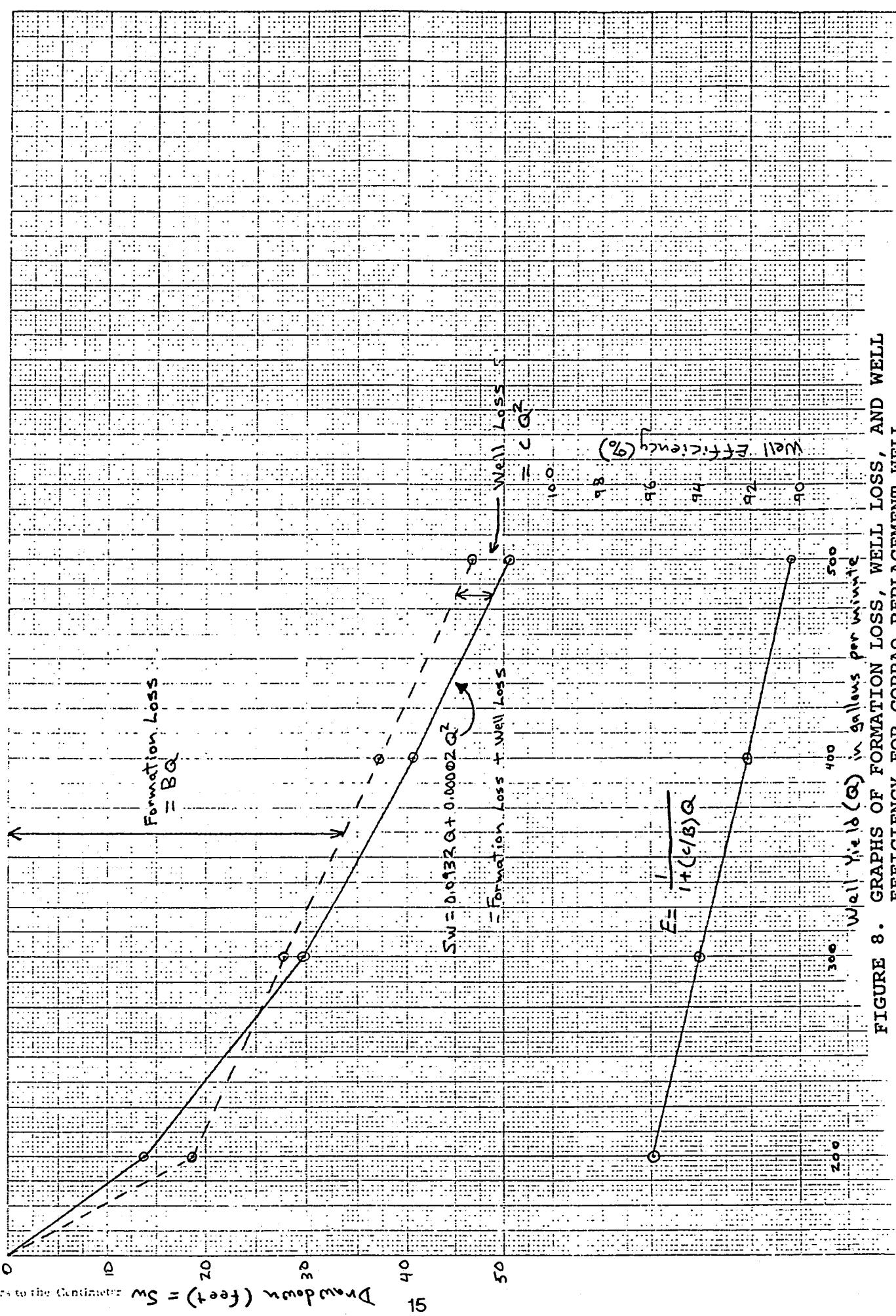


FIGURE 8. GRAPHS OF FORMATION LOSS, WELL LOSS, AND WELL EFFICIENCY FOR CORRAO REPLACEMENT WELL.

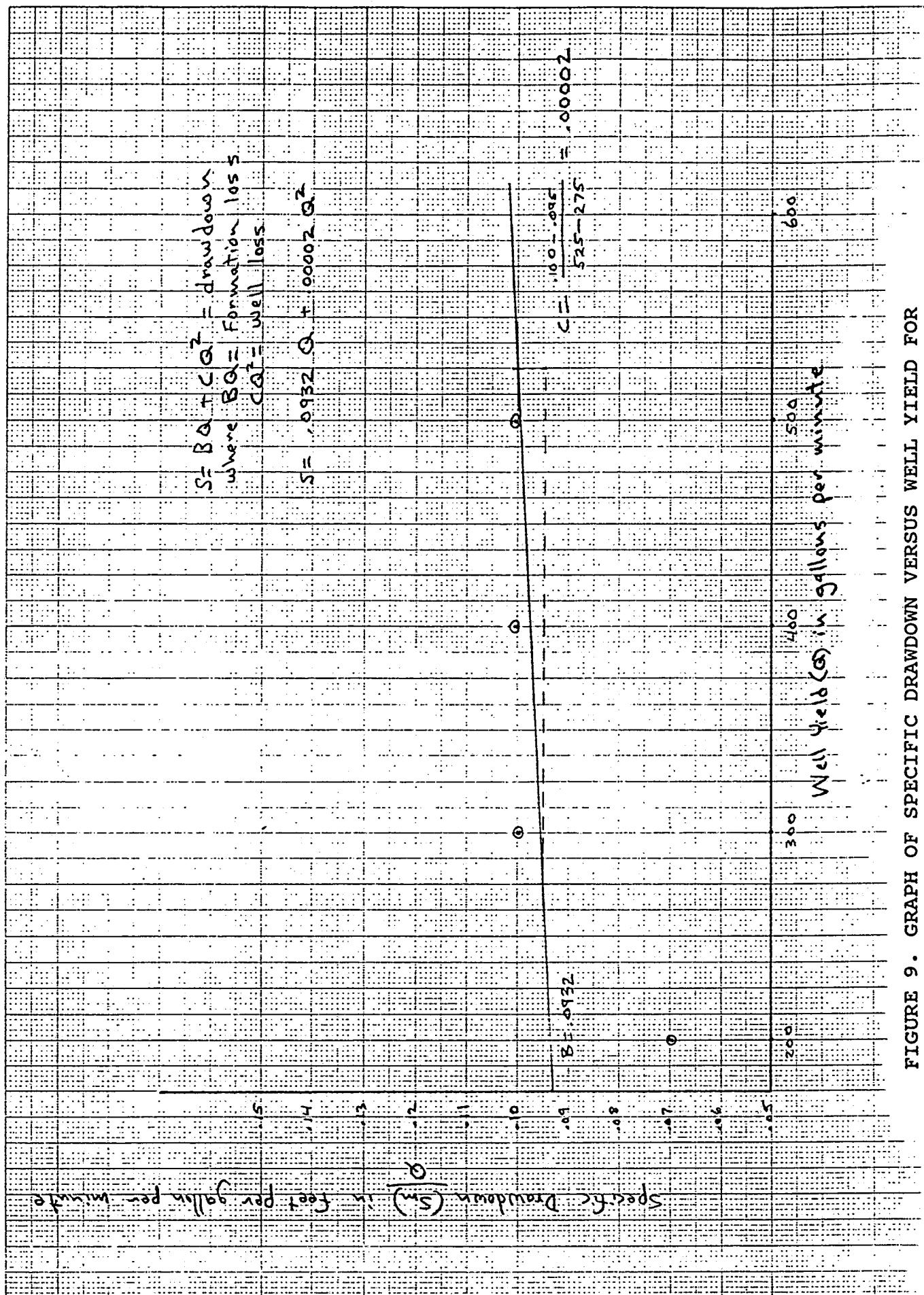


FIGURE 9. GRAPH OF SPECIFIC DRAWDOWN VERSUS WELL YIELD FOR

The equation to determine storativity is

$$S = \frac{(0.3Tt_o)}{r^2}$$

where,

T is transmissivity in gallons/day\*foot;  
t<sub>o</sub> is time when Cooper-Jacob straight line has zero drawdown;  
and,  
r is the distance from the pumping well to the monitoring well.

Table 4 includes the computed storativity values for the Corrao Replacement well aquifer tests.

TABLE 4. SUMMARY OF TRANSMISSIVITY AND STORATIVITY VALUES  
ESTIMATED FROM CORRAO REPLACEMENT WELL CONSTANT DISCHARGE AND  
RECOVERY DATA.

WELL I.D.	GRAPHICAL T	WHIP T	GRAPHICAL S	WHIP S
Replacement well	14,600 (dd) 16,029 (rec)	18,550 (dd)	-	-
Monitoring well 1	19,300 (dd) 17,262 (rec)	17,727 (dd)	.000114 (dd)	.000276 (dd)
Monitoring well 2	29,400 (dd) 32,057 (rec)	15,985 (dd)	.000255 (dd)	.000125 (dd)

T = gallons/day\*foot

s = no units

dd = value derived from drawdown data

rec = value derived from recovery data

Figures 10 through 15 are graphs with drawdown and recovery data for each well measured during the constant Q and recovery tests.

#### WATER QUALITY

One ground water sample was collected from the replacement well in October 1994. Ten additional samples were collected from the replacement well over a 3 day period in March 1995. Ground water from the well contained arsenic above the primary drinking water standard maximum contaminant level (MCL) in 1994. The MCL for arsenic is 0.05 milligrams per liter (mg/L) or parts per million (ppm). None of the samples contained arsenic above the MCL in 1995. Figure 14 is a graph showing the arsenic levels in relation to the pumping rates for samples collected in 1995. Table 5 summarizes the laboratory results for arsenic.

DRAWDOWN DATA - CORRAO REPLACEMENT WELL  
Constant Discharge (Q) Test  
October 27 - 30, 1994

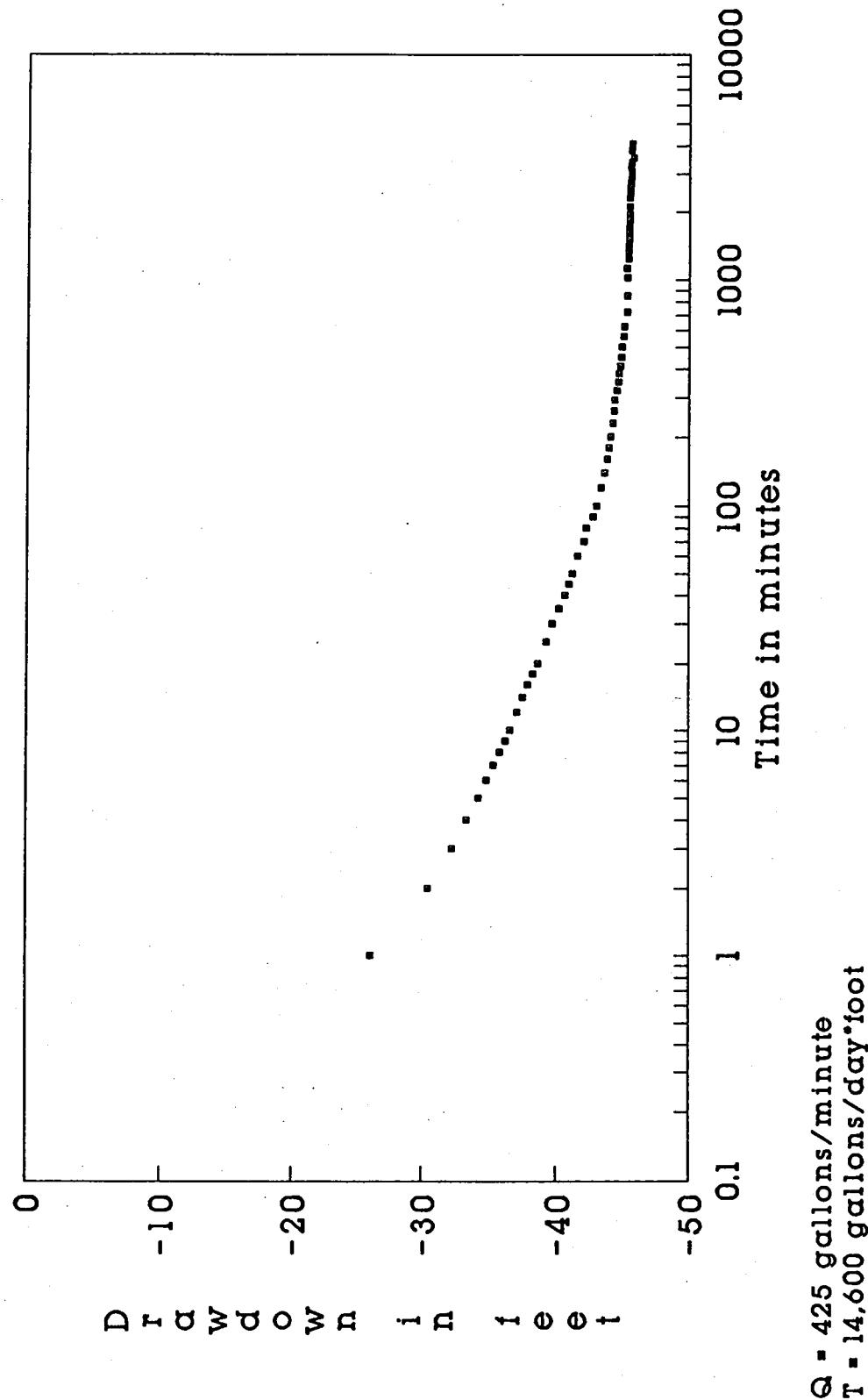


FIGURE 10. GRAPH OF CONSTANT DISCHARGE TEST DRAWDOWN DATA FOR CORRAO REPLACEMENT WELL.

DRAWDOWN DATA - CORRAO MONITORING WELL 1  
Constant Discharge (Q) Test  
October 27 - 30, 1994

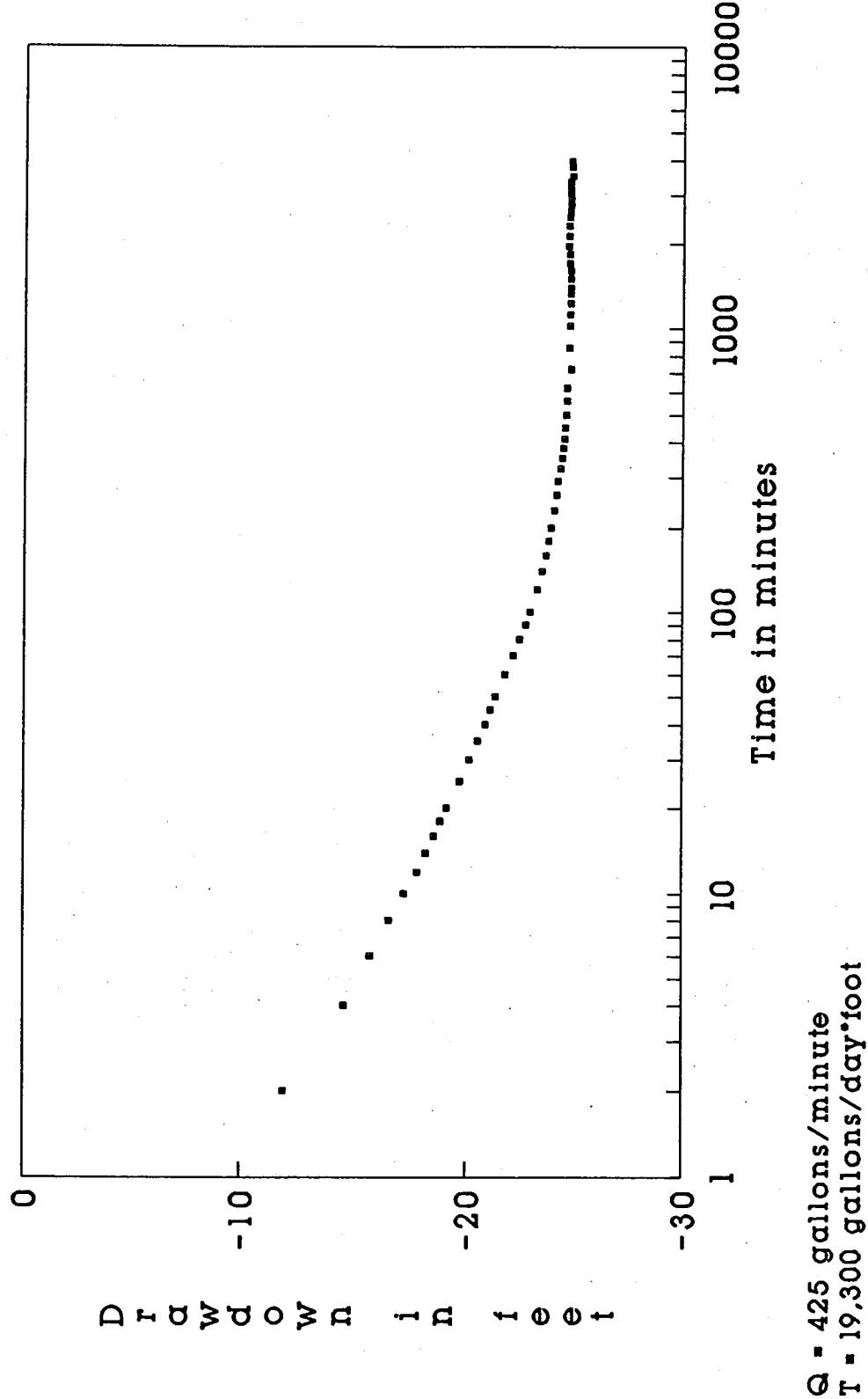


FIGURE 11. GRAPH OF CONSTANT DISCHARGE TEST DRAWDOWN DATA FOR CORRAO MONITORING WELL 1.

DRAWDOWN DATA - CORRAO MONITORING WELL 2  
Constant Discharge (Q) Test  
October 27 - 30, 1994

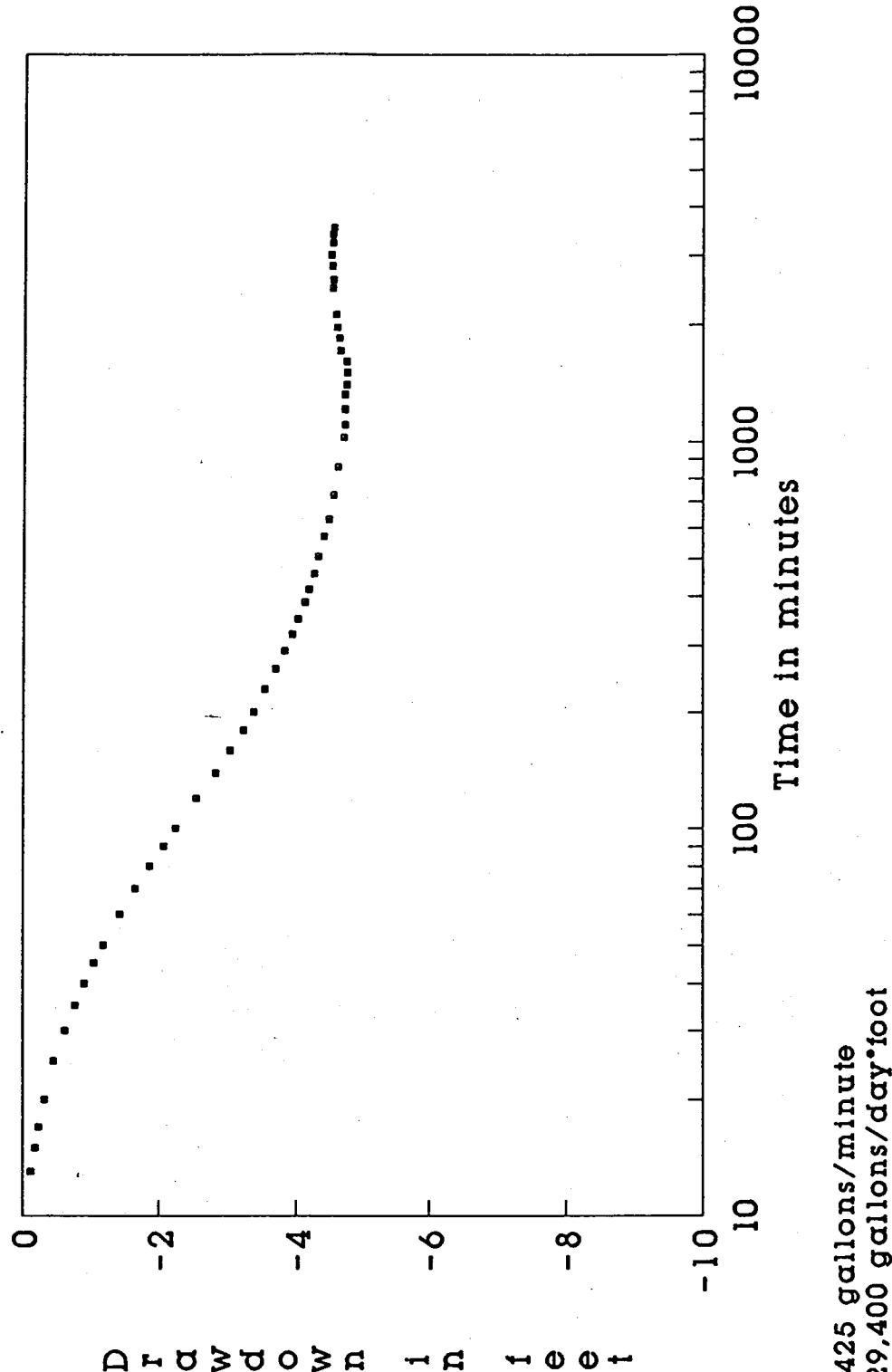


FIGURE 12. GRAPH OF CONSTANT DISCHARGE TEST DRAWDOWN DATA FOR CORRAO MONITORING WELL 2.

$$Q = 425 \text{ gallons/minute}$$
$$T = 29,400 \text{ gallons/day*foot}$$

**RECOVERY DATA - CORRAO REPLACEMENT WELL**  
Constant Discharge (Q) Recovery Test  
October 30, 1994

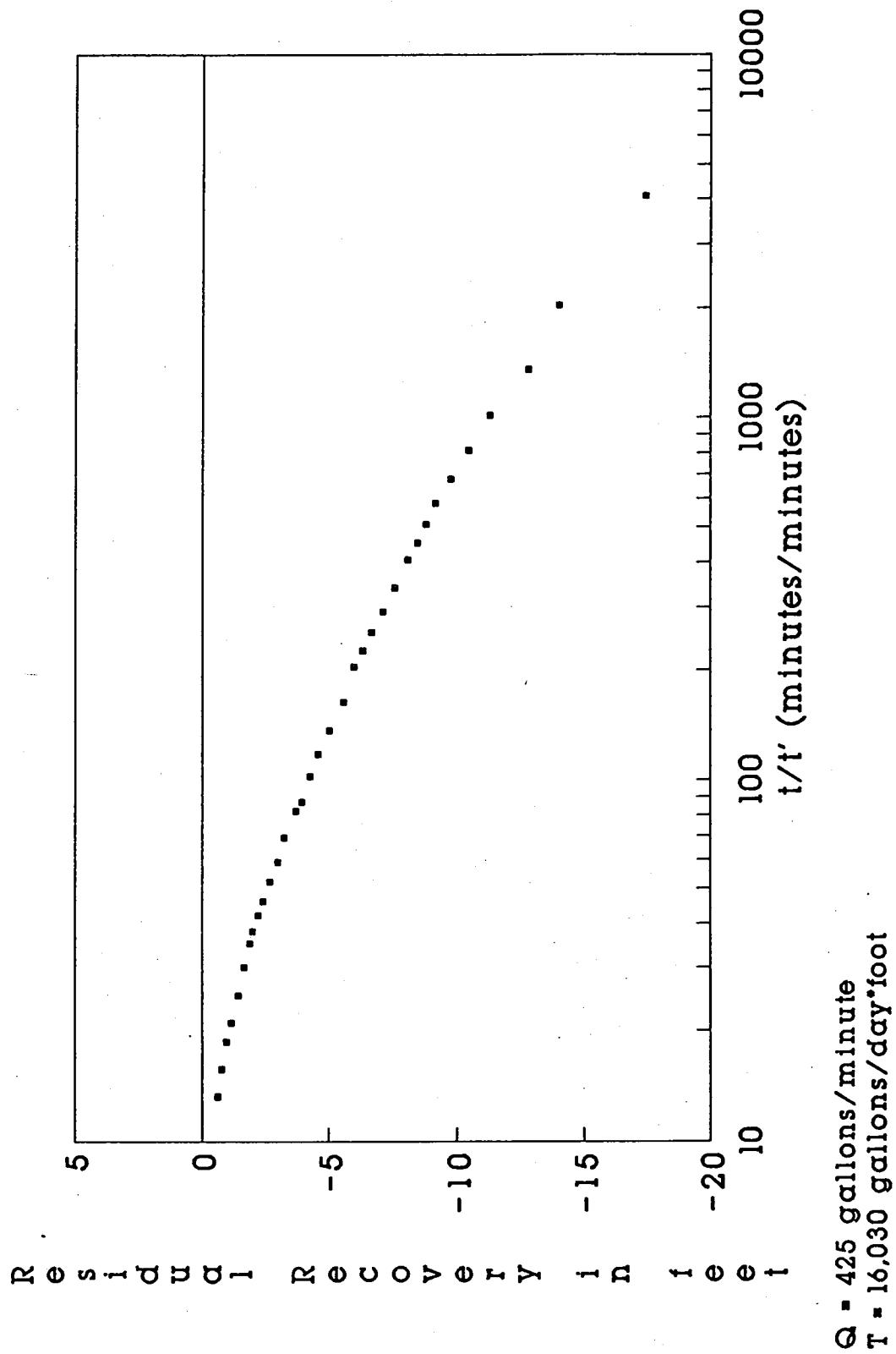
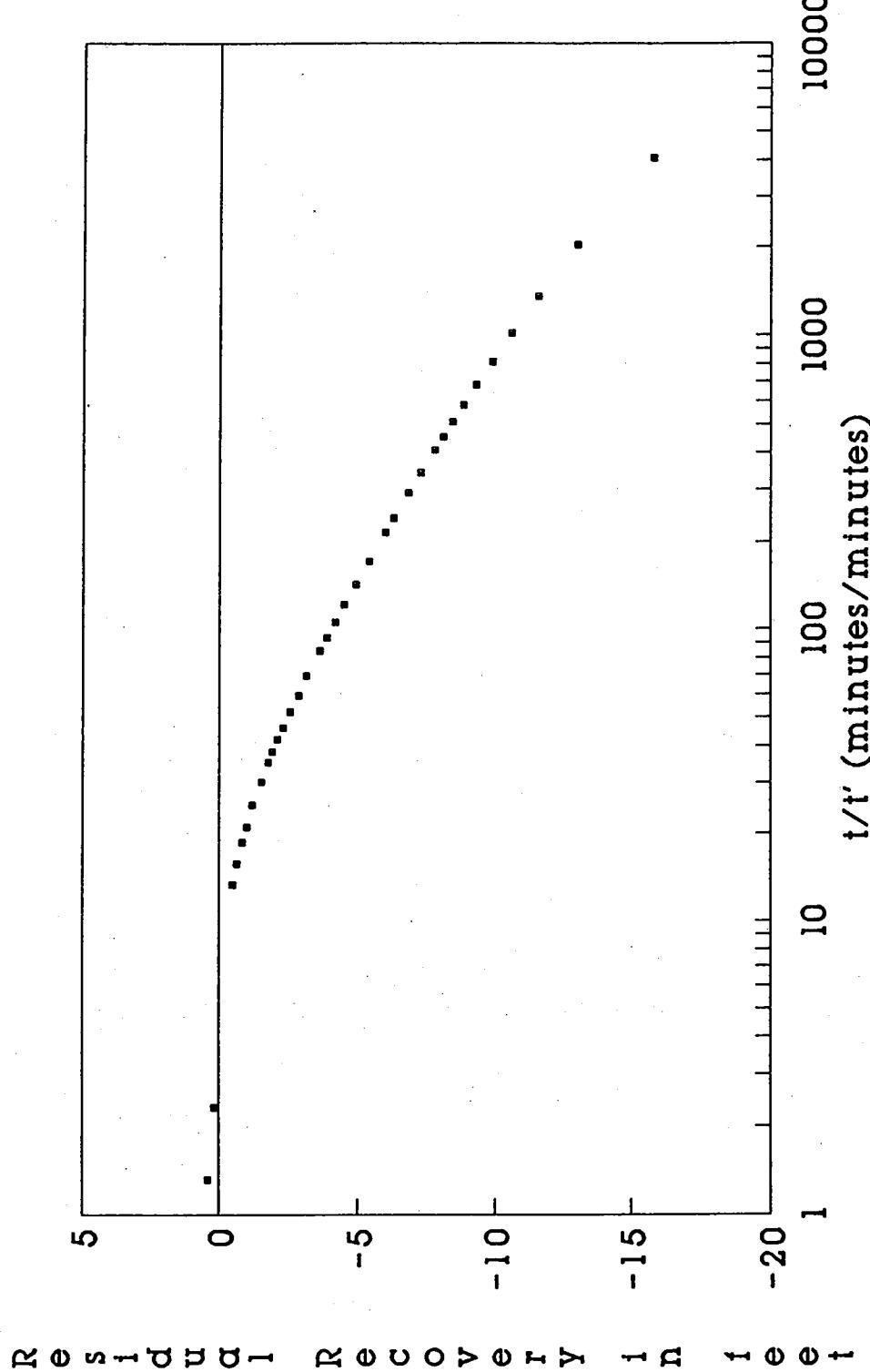


FIGURE 13. GRAPH OF CONSTANT DISCHARGE TEST RECOVERY DATA FOR CORRAO REPLACEMENT WELL.

RECOVERY DATA - CORRAO MONITORING WELL 1  
Constant Discharge (Q) Recovery Test  
October 30, 1994



$Q = 425 \text{ gallons/minute}$   
 $T = 17,262 \text{ gallons/day} \cdot \text{foot}$

FIGURE 14. GRAPH OF CONSTANT DISCHARGE TEST RECOVERY DATA FOR CORRAO MONITORING WELL 1.

**RECOVERY DATA - CORRAO MONITORING WELL 2**  
Constant Discharge (Q) Recovery Test  
October 30, 1994

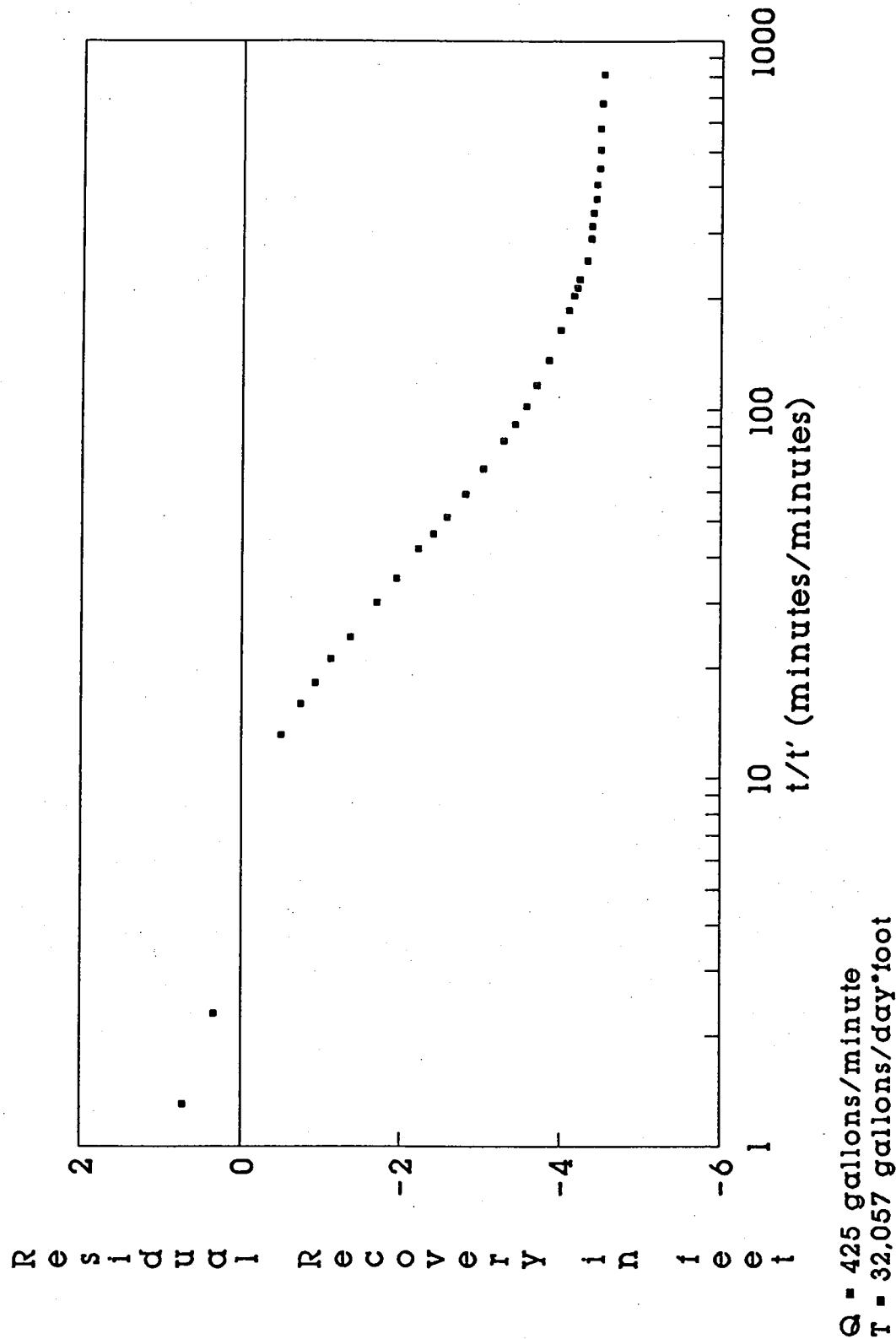
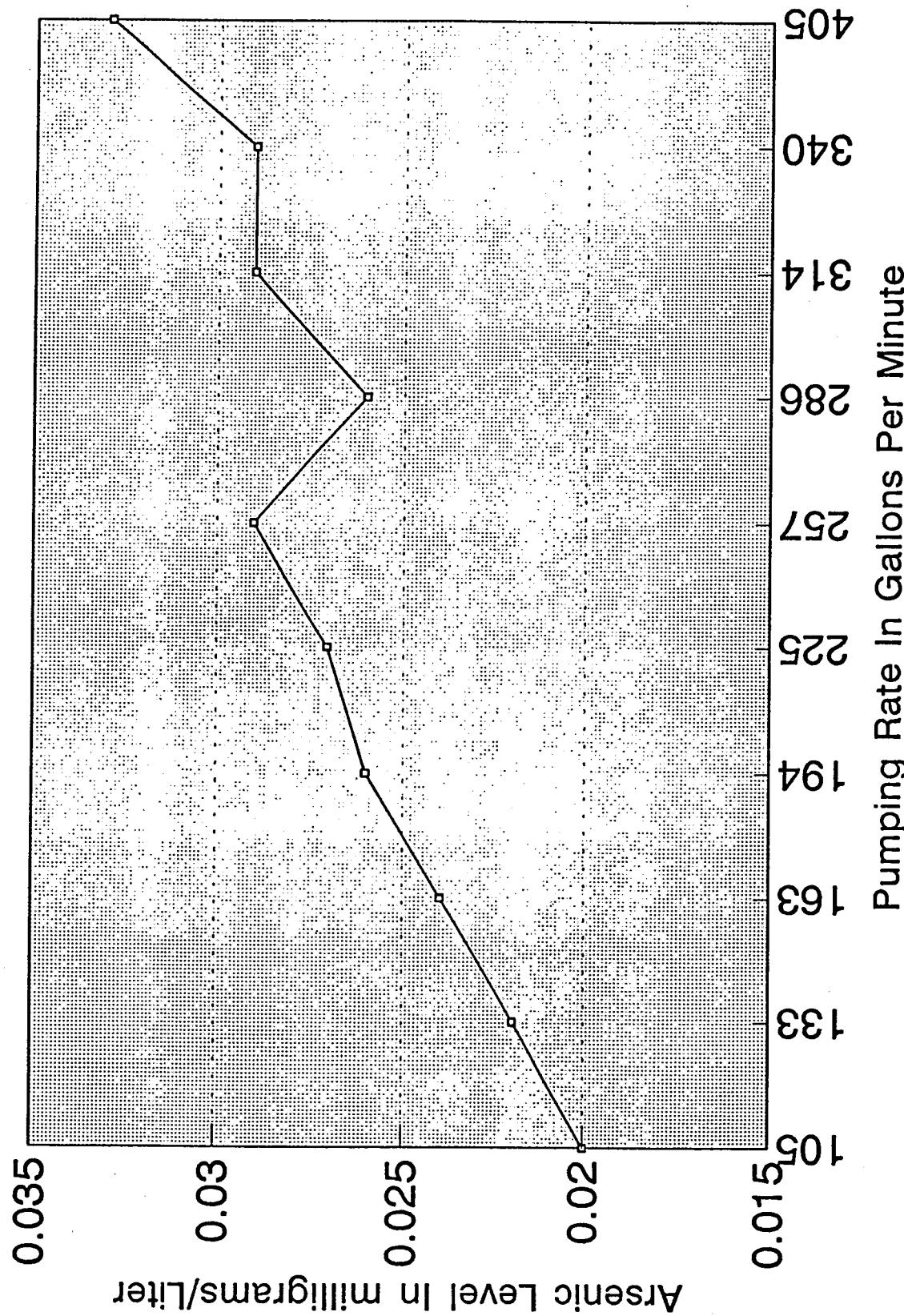


FIGURE 15. GRAPH OF CONSTANT DISCHARGE TEST RECOVERY DATA FOR CORRAO MONITORING WELL 2.

# Corrao Replacement Well

## Arsenic Data



(samples collected over 3-day period in March 1995)

FIGURE 16. GRAPH OF ARSENIC LEVELS VERSUS PUMPING RATE FOR GROUND WATER SAMPLES COLLECTED FROM CORRAO REPLACEMENT WELL IN MARCH 1995.

TABLE 5. SUMMARY OF LABORATORY RESULTS FOR ARSENIC ANALYSES,  
CORRAO REPLACEMENT WELL AND MONITORING WELLS.

WELL I.D.	SAMPLE DATE	SAMPLE TIME	FLOW RATE (gpm)	ARSENIC LEVEL (mg/L)
Monitoring Well 1	03/11/94	1145	-	0.013
Monitoring Well 2	03/11/94	1045	-	0.023
Replacement Well	10/30/94	0800	425	0.055
	03/28/95	1800	105	0.020
	03/29/95	0100	133	0.022
		0800	163	0.024
		1500	194	0.026
		2200	225	0.027
		0500	257	0.029
	03/30/95	1200	286	0.026
		1900	314	0.029
		0200	340	0.029
	03/31/95	1100	405	0.033

One possible reason for the higher level of arsenic in 1994 could be the presence of suspended minerals in the ground water sample. The well produces fine sand and silt when the pumping level drops to the screened interval, as was the case when the sample was collected in 1994. Also, the 1994 sample was not filtered before analysis. All samples were collected when the pumping level was above the screened interval in 1995. However, arsenic levels generally increased as the pumping rate increased. Ground water samples from the replacement well did not contain any other compounds above drinking water standards.

Water quality samples were collected from the 2 monitoring wells in March 1994. Water from the monitoring wells contained iron above the secondary drinking water standard maximum contaminant level (SMCL) which is 0.3 mg/L. SMCLs correspond to aesthetic properties of water and are not an indication of a health risk. Water samples from the monitoring wells were not filtered in the field. Thus, a possible source of the iron could be rust flakes from the well casing. Rust build-up would be greater in the monitoring wells since they were pumped less than the replacement well before sampling. No other compounds were detected above

primary or secondary standards. Appendix IV contains laboratory and field data sheets, and chain-of-custody forms for water samples collected during the Corrao Replacement well project.

## CONCLUSIONS AND RECOMMENDATIONS

Water quality data from 1994 reveal that ground water pumped from the replacement well can contain arsenic above the MCL. However, water samples did not contain arsenic above the MCL in 1995. The well also produces sand when the pumping level drops down to the screened interval. Figure 17 shows approximate drawdown curves for several pumping rates based on pumping data from the constant Q test. Based on these curves and the WHIP program, the recommended pumping rate for the Corrao Replacement well is 330 gpm. This pumping rate will keep the pumping level above the well screen even over extended periods of use. Based on water quality data from 1995, pumping the well at 330 gpm may also keep the arsenic levels below the current primary drinking water standard MCL. Water samples should be analyzed frequently so the arsenic level can be closely monitored. It may be necessary to treat replacement well water or mix the water with other water containing less arsenic in the future.

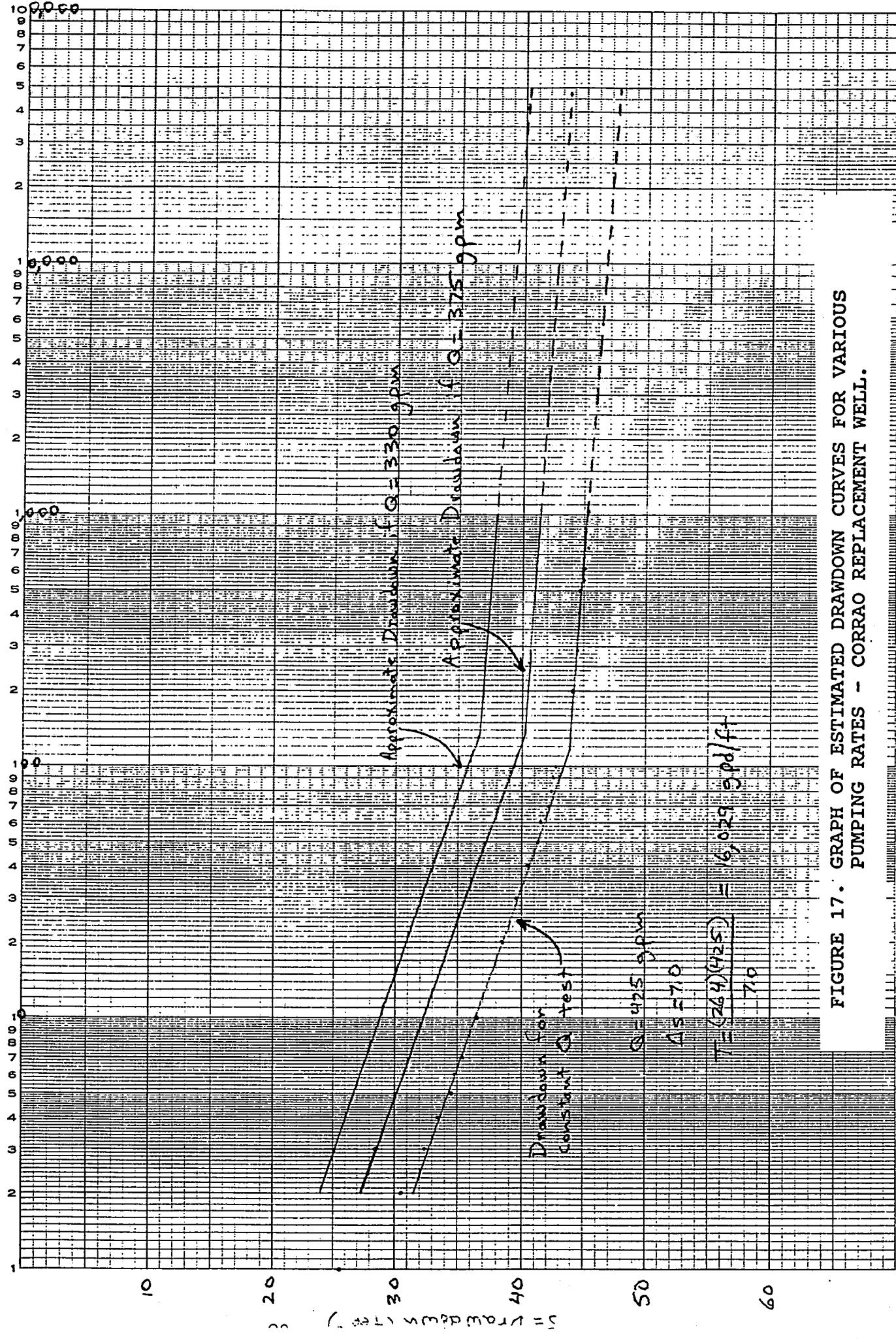
$t = \text{time (minutes)}$ 

FIGURE 17. GRAPH OF ESTIMATED DRAWDOWN CURVES FOR VARIOUS PUMPING RATES - CORRAO REPLACEMENT WELL.

**APPENDIX I**

**WELL DRILLING REPORTS FOR CORRAO REPLACEMENT  
WELL AND MONITORING WELLS**

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

**STATE OF NEVADA  
DIVISION OF WATER RESOURCES**

**OFFICE USE ONLY**

Log No.....  
Permit No.....  
Basin.....

**PRINT OR TYPE ONLY  
DO NOT WRITE ON BACK**

## **WELL DRILLER'S REPORT**

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

**NOTICE OF INTENT NO 26691**

1. OWNER WASHOE COUNTY UTILITIES		ADDRESS AT WELL LOCATION ZONE: + 01D 395 S.	
MAILING ADDRESS BOX 11130		NONE Corrao Replation, well	
RENO, NEVADA 89520			
2. LOCATION SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 17 T. 18 N S R 20 E		WASHOE County	
PERMIT NO. 59331 / W-395		NONE	
Issued by Water Resources		Parcel No.	Subdivision Name

3. WORK PERFORMED	4. PROPOSED USE	5. WELL TYPE
<input checked="" type="checkbox"/> New Well <input type="checkbox"/> Replace <input type="checkbox"/> Recondition <input type="checkbox"/> Deepen <input type="checkbox"/> Abandon <input type="checkbox"/> Other _____	<input type="checkbox"/> Domestic <input type="checkbox"/> Irrigation <input type="checkbox"/> Test <input checked="" type="checkbox"/> Municipal/Industrial <input type="checkbox"/> Monitor <input type="checkbox"/> Stock	<input type="checkbox"/> Cable <input checked="" type="checkbox"/> Rotary <input type="checkbox"/> RVC <input type="checkbox"/> Air <input type="checkbox"/> Other _____

Date started 10/6, 1994  
Date completed 10/17, 1994

---

#### 7. WELL TEST DATA

**10. DRILLER'S CERTIFICATION**  
This well was drilled under my supervision and the report is true to the best of my knowledge.

Name NEVADA DRILLING, Inc  
Contractor  
Address 75 LEWERS CREEK Rd

Nevada contractor's license number  
issued by the State Contractor's Board 13697A

Nevada driller's license number issued by the  
Division of Water Resources, the on-site driller 1790

Signed Joseph F. Leisch  
by driller performing actual drilling on site or continuous

Date 12/12/94

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

STATE OF NEVADA  
DIVISION OF WATER RESOURCES

OFFICE USE ONLY

Log No. ....  
Permit No. ....  
Basin....

PRINT OR TYPE ONLY  
DO NOT WRITE ON BACK

WELL DRILLER'S REPORT  
Please complete this form in its entirety in  
accordance with NRS 534.170 and NAC 534.340

1. OWNER WASHOE CNTY UTILITIES

MAILING ADDRESS Box 11130  
RENO, NV 89520

2. LOCATION SE 1/4 SE 1/4 Sec. 17 T. 10

PERMIT NO. 59331/W-395

Issued by Water Resources

Parcel No.

ADDRESS AT WELL LOCATION Nevada 395 S

M-2 (A) (Monitoring Well)

\* next to pumping well

Q/S R 20 E WASHOE NA County

Subdivision Name

3. WORK PERFORMED

- New Well    Replace    Recondition  
 Deepen    Abandon    Other

4. PROPOSED USE

- Domestic    Irrigation    Test  
 Municipal/Industrial    Monitor    Stock

5. WELL TYPE

- Cable    Rotary    RVC  
 Air    Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
PASTURE LOAM		0	1	1
MIXED DG THIN CLAYS, SAND, GRAYE				
FEW COBBLES	X	1	130	129

8. WELL CONSTRUCTION

Depth Drilled 130 Feet Depth Cased 130 Feet

HOLE DIAMETER (BIT SIZE)

9 1/8 From 0 To 130 Inches Feet  
Inches Feet  
Inches Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
<u>7 1/2</u>	<u>60</u>	<u>1 1/4</u>	<u>+2</u>	<u>130</u>

Perforations:

Type perforation SAWCUT  
Size perforation 3 1/2 X 3 1/2

From 80 feet to 130 feet  
From ..... feet to ..... feet

Surface Seal:  Yes  No

Depth of Seal 60

Seal Type:  
 Neat Cement  
 Cement Grout  
 Concrete Grout

Placement Method:  Pumped  
 Poured

Gravel Packed:  Yes  No

From 60 feet to 130 feet

9. WATER LEVEL

Static water level 12 feet below land surface

Artesian flow No G.P.M. ? P.S.I.

Water temperature COLD °F Quality ?

10. DRILLER'S CERTIFICATION

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

Name NEVADA DRILL INC  
Contractor

Address 75 LEWERS CRK RD  
Contractor  
CARSON CITY, NV 89704

Nevada contractor's license number  
issued by the State Contractor's Board

Nevada driller's license number issued by the  
Division of Water Resources, the on-site driller.

Signed Joe Lenzek  
By driller performing actual drilling on site or contractor

Date 4/11/94

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

**STATE OF NEVADA  
DIVISION OF WATER RESOURCES**

**OFFICE USE ONLY**

**Log No.**

Permit No

Basin.

**PRINT OR TYPE ONLY  
DO NOT WRITE ON BACK**

## **WELL DRILLER'S REPORT**

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

**NOTICE OF INTENT NO 2669**

1. OWNER	WASHOE County UTILITIES	ADDRESS AT WELL LOCATION	NONE
MAILING ADDRESS	Box 11130	M-1 (Monitoring Well Z)	
	RENO NV 89520	* Next to Fire Station	
2. LOCATION	SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 17 T. 18	NSR 20 E WASHOE	County
PERMIT NO.	59331 / W-395	NA	NA
Issued by	Water Resources	Parcel No.	Subdivision Name

3.	WORK PERFORMED	4.	PROPOSED USE	5.	WELL TYPE
<input checked="" type="checkbox"/> New Well <input type="checkbox"/> Deepen	<input type="checkbox"/> Replace <input type="checkbox"/> Abandon	<input type="checkbox"/> Recondition <input type="checkbox"/> Other.....	<input type="checkbox"/> Domestic <input type="checkbox"/> Municipal/Industrial	<input type="checkbox"/> Irrigation <input checked="" type="checkbox"/> Monitor	<input type="checkbox"/> Test <input type="checkbox"/> Stock
				<input type="checkbox"/> Air	<input checked="" type="checkbox"/> Rotary <input type="checkbox"/> Other.....
				<input type="checkbox"/> Cable	<input type="checkbox"/> RVC

From	80	feet to	130	feet
From		feet to		feet
From		feet to		feet
From		feet to		feet
From		feet to		feet
Surface Seal:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Seal Type:	
Depth of Seal	60 FT		<input checked="" type="checkbox"/>	Neat Cement
Placement Method:	<input checked="" type="checkbox"/> Pumped		<input type="checkbox"/>	Cement Grout
			<input type="checkbox"/>	Concrete Grout
Gravel Packed:	<input checked="" type="checkbox"/> Yes		<input type="checkbox"/> No	
From	60	feet to	130	feet
9. WATER LEVEL				
Static water level	2	feet below land surface		
Artesian flow	G.P.M.	P.S.I.		
Water temperature	COLD °F	Quality	?	
10. DRILLER'S CERTIFICATION				

Date started	MARCH 3	, 1994
Date completed	MARCH 3	, 1994
7. WELL TEST DATA		
TEST METHOD:	<input type="checkbox"/> Bailer <input type="checkbox"/> Pump <input checked="" type="checkbox"/> Air Lift	
G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
100±		8
Nevada contractor's license number issued by the State Contractor's Board		
Nevada driller's license number issued by the Division of Water Resources, the on-site driller		
Signed <u>Joe Leisch</u> By driller performing actual drilling on site or contractor		
Date 4/1/94		

### Cerro #2 (Monitoring Well #1)

- 0 - 14' Coarse Granitic sand with coarse volcanic sand to small volcanic gravel.
- 14 - 18' Andesite volcanic gravel / granite with dolomite / brown coarse subangular volcanic sand. 2-5% dry tan clay. Change.
- 18 - 32' Coarse granitic and weathered volcanic sand with 10-20% small angular black/grey volcanic gravel. Fast flowing.
- 32 - 40' Granitic sand with 5-10% volcanic gravel and 30% tan semi-sticky clay. Most volcanic gravel @ 40'.
- 40 - 55' Coarse granitic / volcanic sand + subangular with minor volcanic gravel.
- 50' ↑ in volcanic gravel to 40% sand 40% gravel
- 50-55' gravel lenses
- 55 - 75' Volcanic / granitic sand with 10% sand + tan clay and minor gravel. Rich in volcanic (erratic) gravel) volcanic → 70' Slight ↑ in gravel and clay.
- 75 - 80' Medium-grained. Granitic / volcanic subangular sand moderately sorted. Sieve ↑ in size above 80' no coarse sand
- 80 - 102' Coarse granitic sand with coarse volcanic sand and small gravel. Ditch charter. 70% gravel sand 30% volcanic gravel ~ 90'.
- 90-93' Coarse sand with minor clay lenses.
- 95-105' same as 80-90' f in volcanic gravel.

### C2 Lith Log (Monitoring Well #1)

- 102-122' Granitic / volcanic sand, subangular to subrounded, moderately sorted. Coarse - medium laminae.
- 110' 2-5% sticky tan clay. 110-120' same with 10% tan clay.
- 122-135' Tan slick clay with small - pebbles volcanic gravel. T.D. 50% clay. Drill banding.
- 130 - 135' 20% clay with volcanic debris gravel / sand.
- Construction:
- 50 ft 4" slotted pipe - bottom "bullet" cap
- 80 ft 4" blank (74')
- 3 feet stickup
- TO 126'
- 1.5 yds gravel
- TOP of gravel @ 55'.
- Up 25 bags cement.

2 MARCH 1994

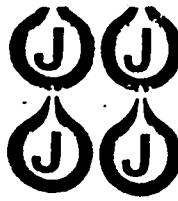
(Monitoring Well #2)

0900 - Started Drilling Curaçao Test. Well No. 1  
(North side, next to Fire station)

0 - 10	- silty sandy, dark topsoil
10 - 20	- medium to coarse sand with fine sand interbedded. Mixture of angular to subangular volcanic and granitic fragments
20 - 30	SAME, Coarser sand, small gravels
30 - 40	SAME
40 - 50	SAME Rapid Drilling
50 - 60	SAME "
60 - 70	Increasing fine sand, less gravel
<u>70 - 80</u>	Mostly very fine silty sand - Rapid Drilling
<u>80 - 90</u>	SAME Very soft, Rapid Drilling
90 - 93	SAME
93 - 100	Coarse gravel, less sand, slower drilling but still fairly rapid mixed Volcanic, granites
100 - 125	SAME

**APPENDIX II**

**SAND ANALYSIS OF CORE SAMPLE  
FROM CORRAO REPLACEMENT WELL**



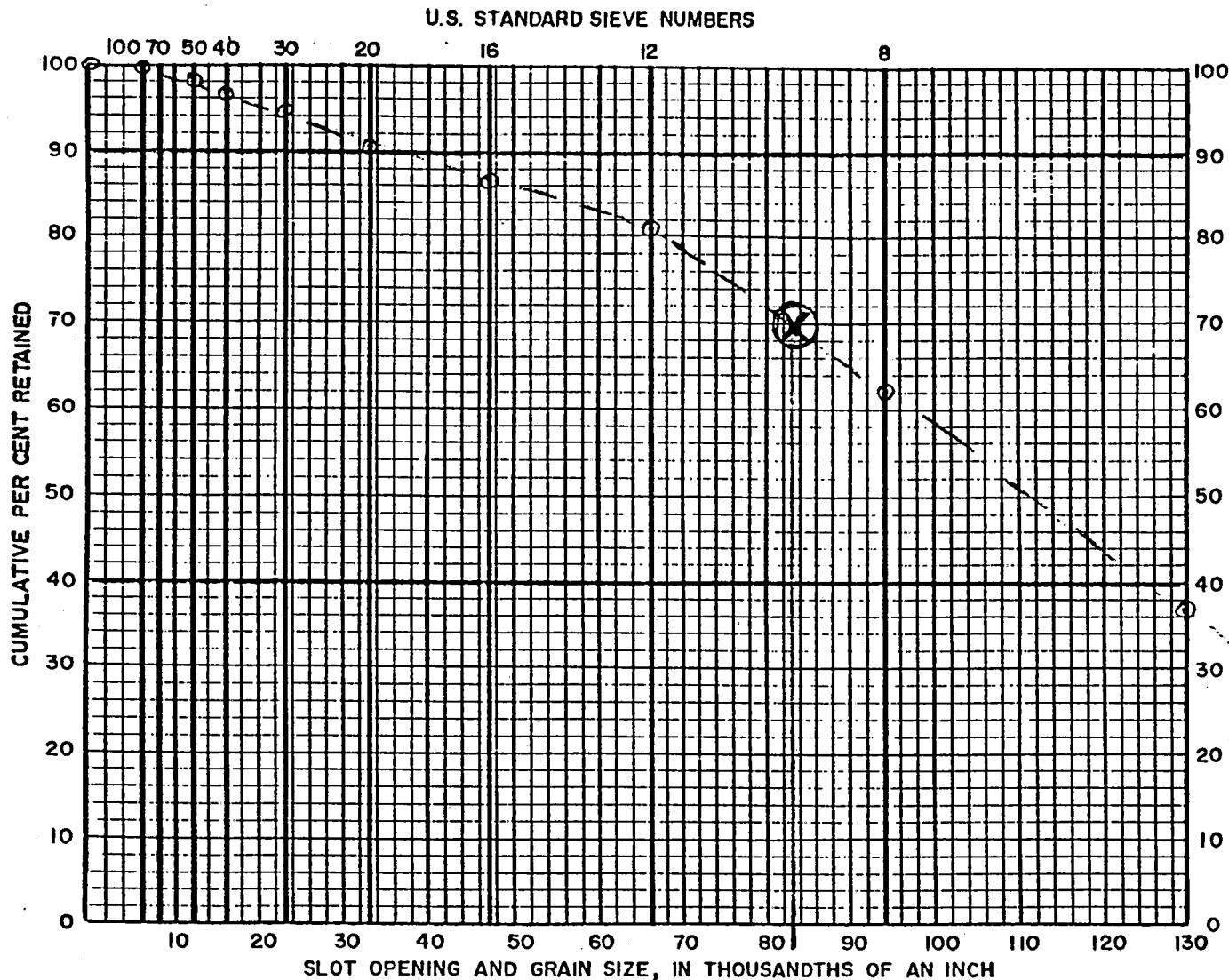
**Johnson** Division  
 P.O. Box 3118 • St. Paul, Minnesota 55165  
 Telephone 612-636-3900 • Telex 29-7451  
**UOP** Inc.

# SAND ANALYSIS

(FINE)

MAILING ADDRESS: P.O. BOX 3118  
 ST. PAUL, MINNESOTA • 55165

Sample sent in by JOE LEISEK (882 - 1475 + or 887 - 1975)  
 Town (54-619) State \_\_\_\_\_ Zip \_\_\_\_\_ Date 3-16-74  
 From well of CORLAD  
 Remarks: 80-90 FEET



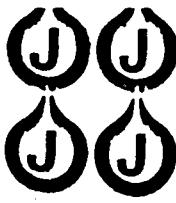
U.S. SIEVE NO.	SIEVE OPENING INCHES	SIEVE OPENING MM.	CUMULATIVE % RETAINED
6	.132	3.36	26
8	.094	2.38	206
12	.066	1.68	146
16	.047	1.19	352
20	.033	.84	168
30	.023	.60	460
40	.016	.42	490
50	.012	.30	514
70	.008	.21	536
100	.006	.15	549
150			557

Notes:  $70 \frac{1}{2}$  size = 0.063 in.  
 $6 \times 0.063 = 0.498$  in  
 $\therefore \frac{3}{8}$  gravel ( $\frac{1}{4} - \frac{1}{2}$  mix)

Recommended Slot Opening: \_\_\_\_\_

Recommended Screen: Dia. \_\_\_\_\_ in. Length \_\_\_\_\_ ft.

By: Weller



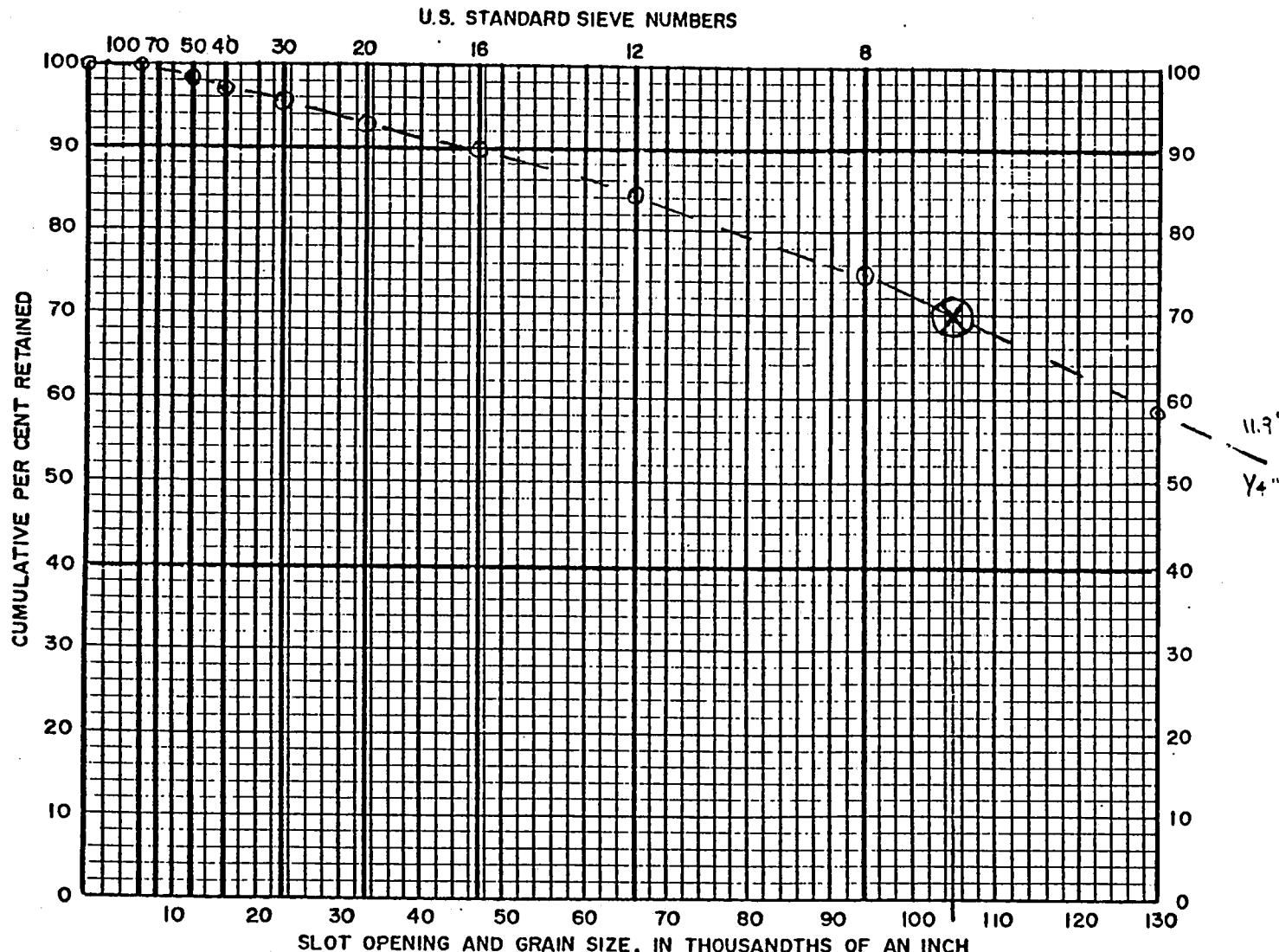
**Johnson** Division  
 P.O. Box 3118 • St. Paul, Minnesota 55165  
 Telephone 612-636-3900 • Telex 29-7451  
**UOP** Inc.

# SAND ANALYSIS

(FINE)

MAILING ADDRESS: P.O. BOX 3118  
 ST. PAUL, MINNESOTA 55165

Sample sent in by JOE LETSEK (883-1975 + or 887-1975)  
 Town M4-619 State \_\_\_\_\_ Zip \_\_\_\_\_ Date 3-16-74  
 From well of CORNAO  
 Remarks: 70 - 80 FEET



U.S. SIEVE NO.	SIEVE OPENING		CUMULATIVE % RETAINED		
	INCHES	MM.	64	64	11.9
6	.132	3.36	250	314	58.3
8	.094	2.38	90	404	75.0
12	.066	1.68	50	454	84.2
16	.047	1.19	30	484	89.8
20	.033	0.84	18	502	93.1
30	.023	0.60	14	516	95.7
40	.016	0.42	8	524	97.2
50	.012	0.30	5	529	98.1
70	.008	0.21	—	—	—
100	.006	0.15	6	535	99.3
PMJ			4	539	100.0

Notes: 70% size = 0.105 in.  
6 x 0.105 = 0.63 in  
∴ 5/8 gravel (1/2 - 3/4 mix)

Recommended Slot Opening: \_\_\_\_\_

Recommended Screen: Dia. \_\_\_\_\_ in. Length \_\_\_\_\_ ft.

By: Wen

**APPENDIX III**

**AQUIFER TEST DRAWDOWN AND RECOVERY FIELD DATA  
SHEETS FOR CORRAO REPLACEMENT WELL AND  
MONITORING WELLS**

# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

TYPE of PUMPING TEST Step Test

HOW Q MEASURED sacrifice weir

HOW WL's MEASURED electric sounder

PUMPED WELL NO. replacement well

RADIUS of PUMPED WELL

DISTANCE from PUMPED WELL

WELL Corran Replacement Well

PUMPING/OBSERVATION WELL

PUMPING/RECOVERY DATA

PAGE 1 OF 2

M.P. for WL's top of sounding elev.

DEPTH of PUMP/AIRLINE tube wrt

% SUBMERGENCE: initial ; pumping

PUMP ON: date 10/26/94 time 0900

PUMP OFF: date 10/26/94 time 1540

CLOCK TIME	ELAPSED TIME min hrs	TIME at t=0		WATER LEVEL DATA				WATER PRODUCT.	COMMENTS (NOTE ANY CHANGES IN OBSERVERS)
		t	t/1'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'		
0855									* 200 gpm 130 psi = 9.5"
0901	1			25.42		11.37			
0902	2			24.88		10.83			
0903	3			24.86		10.81			
0904	4			24.97		10.92			
0905	5			25.04		10.99			
0906	6			25.06		11.01			
0907	7			25.09		11.04			
0908	8			25.23		11.18		↑	
0909	9			25.73		11.68			sand = .03 c @ 10 min
0910	10			25.82		11.77			
0912	12			26.46		12.41			
0914	14			26.75		12.70			
0916	16			26.85		12.80			
0918	18			26.97		12.92			
0920	20			26.97		12.92			sand = .11 c @ 20 min.
0925	25			26.95		12.90			
0930	30			27.02		12.97			
0935	35			27.15		13.10			
0940	40			27.16		13.11			sand = .20 c @ 40 min.
0945	45			27.28		13.23	QT		
0950	50			27.40		13.35	QT		
1000	60			27.70		13.65			
1005	65			27.81		13.76			
1015	75			27.86		13.81			
1020	80			27.86		13.81			
1025	85			27.91		13.96			
1030	90			27.91		13.86			
1035	95			28.00		13.95			
1040	100								
1041	101			37.23		23.18			* 04300 gpm 95 psi = 22"
1045	105			40.81		26.76			
1050	110			41.82		27.77			
1100	120			42.09		28.04			
1110	130			42.56		28.51			sand = 1.3 @ 125 min.
1120	140			42.88		28.83			sand = 3.2 @ 145 min
1130	150			43.25		29.20	QT		
1140	160			43.51		29.46			
1150	170			43.70		29.65			sand = 3.8 @ 170 min.

# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

WELL Corral Replacement well

PUMPING/OBSERVATION WELL

PUMPING/RECOVERY DATA

PAGE 2 OF 2

TYPE OF PUMPING TEST Step Test

HOW Q MEASURED orifice weir

M.P. for WL's top of soundings elev.

HOW WL'S MEASURED electric sounder

DEPTH of PUMP/AIRLINE tube wrt

PUMPED WELL NO. 7 Replacement well

% SUBMERGENCE: initial ; pumping

RADIUS OF PUMPED WELL

PUMP ON: date 10/26/94 time 0900

DISTANCE from PUMPED WELL

PUMP OFF: date 10/26/94 time 1540

TIME $t =$ $t' = t - t_0$			WATER LEVEL DATA STATIC WATER LEVEL 14.05					WATER PRODUCT.	COMMENTS
CLOCK TIME	ELAPSED TIME mins hrs	READING	CONVERSIONS & CORRECTIONS	WATER LEVEL	S or S'		Q	(NOTE ANY CHANGES IN OBSERVERS)	
1210		190		43.97			29.92		$\text{Sand} = 3.9 @ 1210$
1219		199		44.02			29.97		
1220		200		48.69			34.64	*	$(+500 \text{ gpm}) 73 \text{ psi} = 40''$
1222		202		51.00			36.95		
1225		205		51.69			37.64		
1230		210		52.49			38.44		
1240		220		53.06			39.01		
1250		230		53.26			39.21		
1300		240		53.60			39.55	Q↑	$\text{Sand} = 4.2 @ 1300 \text{ restart}$ $@ 1305$
1310		250		54.06			40.01		
1320		260		54.22			40.17		$\text{Sand} = .08 @ 1320$
1330		270		54.34			40.29		
1340		280		54.59			40.54		
1350		290		54.72			40.67		
1359		299		54.72			40.67	Q↑	$\text{Sand} = .12 @ 1359$
1400	30 0	59.25	≈ screens	45.70				*	$500 \text{ gpm} = 30 \text{ psi} = 63''$
1405	305	63.26		49.21					
1410	310	63.62		49.57					
1420	320	63.93		49.88					
1430	330	64.21		50.16					$\text{Sand} = 1.5 @ 1430$
1440	340	64.45		50.40					
1450	350	64.37		50.32					
1500	360	64.32		50.27					3.1 @ 15:05
1510	370	64.53		50.48					
1520	380	64.58		50.53					
1530	390	64.75		50.70					
1540	400	64.72		50.67					$125 \text{ GPM}$ $0.1 \text{ cc} @ 1:30$
	3	55.80							$0.1 \text{ min to 10 min}$
 @ 425 gpm start									
	1	#1 Sand .07		#2 1	.03				
	2		0.12	mid 3	:05				
	3		0.15	5	0.07				
	5		0.18	10	0.09				
	10		0.28						
	15		0.33						

# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

WELL Corraso Replacement W-

PUMPING/OBSERVATION WELL

PUMPING/RECOVERY DATA

PAGE 1 OF 2

TYPE of PUMPING TEST Constant Q

HOW Q MEASURED 6x4 orifice manometer

HOW WL's MEASURED electric sounder

PUMPED WELL NO. replacement well

RADIUS of PUMPED WELL

DISTANCE from PUMPED WELL

M.P. for WL's top of sounding elev.

DEPTH of PUMP/AIRLINE tube wrt

% SUBMERGENCE: initial ; pumping

PUMP ON: date 10/27/94 time 1230

PUMP OFF: date 10/30/94 time 0800

TIME $t =$ at $t' = 0$			WATER LEVEL DATA STATIC WATER LEVEL 14.06'				WATER PRODUCT.	COMMENTS
CLOCK TIME	ELAPSED TIME mins hrs	$t$	$t'$	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'	
1230		0		14.06				425 = 60 psi;
1231		1		40.24		26.18		.20 sand 1 min.
1232		2		44.58		30.52	45"	
1233		3		46.38		32.32		.21 @ 3 min
1234		4		47.48		33.42		
1235		5		48.36		34.30		.40 @ 5 min.
1236		6		48.96		34.90		
1237		7		49.47		35.41		sand .52 @ 7 min
1238		8		49.92		35.86		
1239		9		50.34		36.28		.55 @ 9 min.
1240		10		50.67		36.61		.57 @ 10 min
1242		12		51.18		37.12		
1244		14		51.60		37.54		.60 @ 14 min.
1246		16		52.01		37.95	Q↑	
1248		18		52.36		38.30		
1250		20		52.74		38.68		.60 @ 20 min.
1255		25		53.38		39.32		
1300		30		53.82		39.76		
1305		35		54.30		40.24	Q↑	
1310		40		54.72		40.66		
1315		45		55.04		40.98		sand .61 @ 45 min
1320		50		55.28		41.22		
1330		60		55.66		41.60		
1340		70		56.12		42.06		
1350		80		56.28		42.22	Q↑	
1400		90		56.82		42.76		sand .61 @ 90 min.
1410		100		57.04		42.98		
1430		120		57.40		43.34		Started generator @ 1420 off @ 1500
1450		140		57.64		43.58		sand .62 @ 140 min.
1510		160		57.84		43.78		
1530		180		57.98		43.92		
1550		200		58.10		44.04		
1620		230		58.26		44.20		
1650		260		58.36		44.30		
1720		290		58.40		44.34	Q↑	
1750		320		58.58		44.52		
1820		350		58.70		44.64		
1850		380		58.76		44.70		
1920		410		58.84		44.78		Replaced Sand Tube

# **WASHOE COUNTY**

**DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION**

## PUMPING TEST DATA

WELL CORR Replacement well

PUMPING OBSERVATION WELL

### **PUMPING RECOVERY DATA**

PAGE 2 OF 2

TYPE of PUMPING TEST Constant Q

HOW Q MEASURED

HOW W.I.'S MEASURED electric sounder

PUMPED WELL NO. replacement well

#### RADIUS of PUMPED WiFi

DISTANCE from PUMPED WELL

M.P. for WL's top of sound rug glow

DEPTH of PUMP/AIRLINE

24. ENDNOTE (if any)

% SUBMERGENCE: initial \_\_\_\_\_; pur

PUMP ON : date 10/27/94 time 1230

PUMP OFF: date 10/30/94 time 0800

Digitized by srujanika@gmail.com

**WATER**      **COMME**

# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

TYPE of PUMPING TEST Constant Q

HOW Q MEASURED 6x4 orifice - manometer

HOW WL's MEASURED electric Sounder

PUMPED WELL NO. replacement well

RADIUS of PUMPED WELL

DISTANCE from PUMPED WELL

Corral

WELL Monitoring Well /

PUMPING / OBSERVATION WELL

PUMPING / RECOVERY DATA

PAGE 1 OF 2

M.P. for WL's top of casing elev.

DEPTH of PUMP/AIRLINE wrt

% SUBMERGENCE: initial ; pumping

PUMP ON: date 10/27/94 time 1230

PUMP OFF: date 10/30/94 time 0800

CLOCK TIME	ELAPSED TIME min hrs	TIME $t =$ at $t' = 0$		WATER LEVEL DATA				WATER PRODUCT.	COMMENTS (NOTE ANY CHANGES IN OBSERVERS)
		$t$	$t'$	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'		
1230									
		2		25.42				12.03	
		4		28.08				14.69	
		6		29.22				15.83	
		8		30.03				16.64	
		10		30.68				17.29	
		12		31.26				17.87	
		14		31.66				18.27	
		16		32.00				18.61	
		18		32.29				18.90	
		20		32.56	22.40	38.09		19.17	
		25		33.14	0E30	38.13		19.75	
1300	30			33.57				20.18	
1305	35			33.96				20.57	
1310	40			34.31				20.92	
1315	45			34.54				21.15	
1320	50			34.77				21.38	
1330	60			35.18				21.79	
1340	70			35.56				22.17	
1350	80			35.84				22.45	
1400	90			36.12				22.73	
1410	100			36.34				22.95	
1430	120			36.65				23.26	
1450	140			36.88				23.49	
1510	160			37.06				23.67	
1530	180			37.20				23.81	
1550	200			37.30				23.91	
1620	230			37.44	.			24.05	
1650	260			37.54				24.15	
1720	290			37.60	"			24.21	
1750	320			37.71				24.32	
1820	350			37.79				24.40	
1850	380			37.84				24.45	
1920	410			37.89				24.50	
2000	450			37.92				24.53	
2050	500			37.96				24.57	
2150	560			38.00				24.61	
2250	620			38.00				24.61	
2300	720			38.17				24.78	

# **WASHOE COUNTY**

**DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION**

## PUMPING TEST DATA

## WELL Corros Monitoring Well 1

PUMPING / OBSERVATION WELL

PUMPING RECOVERY DATA

PAGE 2 OF 2

TYPE of PUMPING TEST Constant Q

HOW Q MEASURED - 644 orifice

## HOW WL's MEASURED electric sounder

PUMPED WELL NO replacement well

RADIUS of PLUMBED WELL

DISTANCE from BUMPER WELL

M.P. for WL's ~~top of casing~~ elev.

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

% SUBMERGENCE : initial : RUMI

% SUBMERGENCE: initial \_\_\_\_\_; pumping  
PUMPS ON: 11:10/22/2014; off: 13:30

PUMP ON : date 10/27/01 time 1230

PUMP OFF : date 10/30/94 time 0800

**WATER**

# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

WELL CORRAO Monitoring Well 2

PUMPING/OBSERVATION WELL

PUMPING/RECOVERY DATA

PAGE 1 OF 2

TYPE OF PUMPING TEST CONSTANT Q

HOW Q MEASURED ORIFICE WEIR

HOW WL's MEASURED ELECTRIC SONDE

PUMPED WELL NO. replacement well

RADIUS of PUMPED WELL

DISTANCE from PUMPED WELL

M.P. for WL's Top of casing elev.

DEPTH of PUMP/AIRLINE wrt

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

PUMP ON: date 12/30/94 time 12:30 P

PUMP OFF: date 10/30/94 time 0800

CLOCK TIME	TIME at t'=0			WATER LEVEL DATA					WATER PRODUCT.	COMMENTS
	CLOCK TIME	ELAPSED TIME	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'	Q			
		mins hrs	t	t'						(NOTE ANY CHANGES IN OBSERVERS)
12:26										
12:43			13	5.25				0.12		
			15	5.31				0.18		
			17	5.36				0.23		
			20	5.45				0.32		
			25	5.58				0.45		
			30	5.75				0.62		
			35	5.90				0.77		
			40	6.04				0.91		
			45	6.18				1.05		
			50	6.32				1.19		
			60	6.57				1.44		
			70	6.80				1.67		
			80	7.01				1.88		
			90	7.21				2.08		
			100	7.38				2.25		
2:30			120	7.67				2.54		
2:50			140	7.95				2.82		
3:10			160	8.16				3.03		
3:30			180	8.36				3.23		
3:50			200	8.51				3.38		
1620			230	8.68				3.55		
1650			260	8.84				3.71		
1720			290	8.97				3.84		
1750			320	9.08				3.95		
1820			350	9.17				4.04		
1855			385	9.21				4.14		
1925			415	9.33				4.20		
2005			455	9.40				4.27		
2055			505	9.46				4.33		
2200			570	9.55				4.42		
2300			630	9.62				4.49		
0035			725	9.69				4.56		
0245			855	9.76				4.63		
0535			1025	9.84				4.71		
0700			1110	9.86				4.73		
0850	110		1220	9.86				4.73		
1635	105		1325	9.86				4.73		
1150	75		1400	9.88				4.75		

# **WASHOE COUNTY**

**DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION**

## PUMPING TEST DATA

TYPE of PUMPING TEST Constant Q

HOW Q MEASURED  $6 \times 4$  orifice

HOW WL's MEASURED electric sounder

PUMPED WELL NO. replacement well

**RADIUS OF PUMPED WELL**

DISTANCE from PUMPED WELL

WELL Corrao Monitoring Well 2

PUMPING OBSERVATION WELL

**PUMPING RECOVERY DATA**

PAGE 2 OF 2

M.P. for WL's top of casing elev.

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

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

PUMP ON : date 10/27/94 time 1230

PUMP OFF : date 10/30/94 time 0800

PUMP OFF : date 10/20/11 time 10:00 AM

# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

TYPE of PUMPING TEST Recovery Test

HOW Q MEASURED \_\_\_\_\_

HOW WL's MEASURED electric sounder

PUMPED WELL NO. replacement well

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

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

WELL LARRY Replacement well

PUMPING/OBSERVATION WELL

PUMPING/RECOVERY DATA

PAGE 1 OF 1

M.P. for WL's top of sounding elev.

DEPTH of PUMP/AIRLINE tube wrt

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

PUMP ON: date 10/27/94 time 1230

PUMP OFF: date 10/30/94 time 0800

TIME $t = 4:50$ at $t' = 0$				WATER LEVEL DATA STATIC WATER LEVEL 14.66				WATER PRODUCT.	COMMENTS
CLOCK TIME	ELAPSED TIME	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'	Q	(NOTE ANY CHANGES IN OBSERVERS)		
min hrs	hrs	'	' / '						
0700		4050		59.68		45.62			
0701		4051	1 4051	31.52		17.46			
0702		4052	2 2026	28.10		14.04			
0703		4053	3 1351	26.88		12.82			
		4054	4 1013	25.34		11.28			
		4055	5 811	24.52		10.46			
		4056	6 676	23.84		9.78			
		4057	7 580	23.22		9.16			
		4058	8 507	22.86		8.80			
		4059	9 451	22.53		8.57			
0810	0:60	4060	10 406	22.14		8.38			
		4062	12 339	21.64		7.58			
		4064	14 290	21.18		7.2			
		4066	16 254	20.74		6.68			
		4068	18 226	20.40		6.24			
		4070	20 204	20.06		6.00			
		4075	25 163	19.66		5.20			
		4080	30 136	19.10		5.14			
0835		4085	35 117	18.66		4.60			
0840	0740	4090	40 102	18.36		4.30			
		4097	47 87	18.04		3.98			
		4100	50 82	17.80		3.74	91.8% recovery		
		4110	60 69	17.34		3.28	92.8% recovery		
		4120	70 59	17.08		3.02	93.4% recovery		
		4130	80 52	16.76		2.70	94.1% recovery		
		4140	90 46	16.50		2.44	94.7% recovery		
		4150	100 42	16.30		2.24	95.1% recovery		
		4160	110 38	16.08		2.02			
		4170	120 35	15.96		1.90	95.8% recovery		
1020		4190	140 30	15.73		1.67			
502		4220	170 25	15.50		1.44	96.3% recovery		
203		4250	200 21	15.23		1.17	97.4% recovery		
503		4280	230 18.6	15.03		0.97	97.9%		
354		4325	275 15.7	14.84		0.78	98.3%		
305		4380	330 13.3	14.70		0.44	98.6%		
		No access							

# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

TYPE of PUMPING TEST Recovery Test

HOW Q MEASURED -

HOW WL's MEASURED electric sounder

PUMPED WELL NO. replacement well

RADIUS of PUMPED WELL  

DISTANCE from PUMPED WELL  

Covrao  
WELL Monitor Well 1

PUMPING/OBSERVATION WELL

PUMPING/RECOVERY DATA

PAGE 1 OF 1

M.P. for WL's top of casing elev.

DEPTH of PUMP/AIRLINE   wrt  

% SUBMERGENCE: initial  ; pumping  

PUMP ON: date 10/27/94 time 1230

PUMP OFF: date 10/30/94 time 0800

CLOCK TIME	TIME			WATER LEVEL DATA				WATER PRODUCT	(NOTE ANY CHANGES IN OBSERVERS)
	$t = \text{at } t' = 0$			STATIC WATER LEVEL	13.39	CONVERSIONS & CORRECTIONS	WATER LEVEL		
CLOCK TIME	ELAPSED TIME	mins	hrs	$t$	$t'$	READING	S or S'	Q	
0800				4050		38.15		24.76	
				0.87		32.1			
				4051	1.0	4051 29.18		15.79	
				1.5		27.56			
				4052	2.0	2026 26.38		12.99	
				2.5		25.56			
				4053	3.0	1351 24.75		11.56	
				4054	4.0	1014 23.91		10.60	
				4055	5.0	811 23.28		9.89	
				4056	6.0	676 22.70		9.31	
				4057	7.0	580 22.24		8.85	
				4058	8.0	507 21.89		8.45	
				4059	9.0	451 21.50		8.11	
				4060	10.0	406 21.20		7.81	
				4061	12	339 20.69		7.30	
				4062	14	290 20.76		6.87	
				4063	17	239 19.73		6.34	
				4064	19	214 19.44		6.05	
				4065	24	170 18.84		5.45	
				4066	29	141 18.35		4.96	
				4067	34	120 17.94		4.55	
				4068	39	105 17.61		4.22	
0844				4069	44	93 17.32		3.93	
				4070	49	84 17.06		3.67	
0900				4110	60	69 16.59		3.20	87.1% recovery
0910				4120	70	59 16.30		2.91	88.3% recovery
0920				4130	80	52 16.00		2.61	89.5% recovery
0930				4140	90	46 15.74		2.35	90.5% recovery
0940				4150	100	42 15.53		2.14	91.4% recovery
0950				4160	110	38 15.34		1.95	
1000				4170	120	35 15.19		1.80	92.7% recovery
1020				4190	140	30 14.93		1.54	
50				4220	170	25 14.61		1.22	95.1% recovery
20				4250	200	21 14.41		1.02	95.9% recovery
50				4280	230	18.6 14.21		0.85	96.6%
35				4315	275	15.7 14.06		0.67	97.3
30				4380	330	13.3 13.90		0.51	
1115				7125	3075	2.3 13.25		-0.14	100.6%
1500				15990	11,940	1.34 13.02		-0.37	

# WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION

## PUMPING TEST DATA

TYPE of PUMPING TEST Recovery

HOW Q MEASURED -

HOW WL's MEASURED electric sounder/tape measure

PUMPED WELL NO. replacement well

RADIUS of PUMPED WELL -

DISTANCE from PUMPED WELL -

*Corrao*  
WELL Monitor Well Z

PUMPING / OBSERVATION WELL

PUMPING / RECOVERY DATA

PAGE 1 OF 1

M.P. for WL's top of casing elev.

DEPTH of PUMP/AIRLINE - wrt -

% SUBMERGENCE: initial -; pumping -

PUMP ON: date 10/27/94 time 1230

PUMP OFF: date 10/30/94 time 0800

CLOCK TIME	TIME		WATER LEVEL DATA				WATER PRODUCT.	(NOTE ANY CHANGES IN OBSERVERS)
	at t=0	t =	STATIC WATER LEVEL	5.13	S or S'	Q		
CLOCK TIME	ELAPSED TIME	t =	READING	CONVERSIONS OF CORRECTIONS	WATER LEVEL	S or S'	Q	(NOTE ANY CHANGES IN OBSERVERS)
mins hrs	hrs	t	t'					
0800	4050	0	9.66		4.53			
	4055	5	8.11	9.64	4.51			
	4056	6	6.76	9.62	4.49			
	4057	.7	5.79	9.60	4.47			
	4058	8	5.07	9.60	4.47			
	4059	9	4.51	9.59	4.46			
0810	4060	10	4.06	9.56	4.43			
	4061	11	3.69	9.55	4.42			
	4062	12	3.38	9.52	4.39			
	4063	13	3.12	9.50	4.37			
	4064	14	2.90	9.49	4.36			
	4066	16	2.54	9.44	4.31			
	4069	18	2.26	9.35	4.22			new reading
	4069	19	2.14	9.32	4.19			
0820	4070	20	2.03	9.28	4.15			
	4072	22	1.85	9.22	4.09			
	4075	25	1.63	9.12	3.99			
0830	4080	30	1.36	8.98	3.85			
	4085	35	1.17	8.83	3.70			
	4090	40	1.02	8.70	3.57			
	4095	45	9.1	8.56	3.43			
	4100	50	8.2	8.42	3.29			
0900	4110	60	6.9	8.17	3.04			
	4120	70	5.9	7.95	2.82			
	4130	80	5.1	7.72	2.59			
	4140	90	4.6	7.55	2.42			
	4150	100	4.2	7.36	2.23			
1000	4170	120	3.5	7.08	1.95			
	4190	140	3.0	6.83	1.70			
53 2	4223	173	2.4	6.50	1.37			70% n...n
25 3	4255	205	2.1	6.26	1.13			78% n...n
55 3	4285	235	1.82	6.06	0.93			79.5% n...n
30 4	4320	270	1.6	5.88	0.75			
35 5	4385	335	1.1	5.64	0.51			88.7%
11/1/94 1100	7110	3060	2.3	4.80	-0.33			107.3%
11/1/94 1500			1.3	4.42	-0.71			

**APPENDIX IV**

**WATER QUALITY DATA FOR GROUND WATER SAMPLES FROM  
CORRAO REPLACEMENT WELL AND MONITORING WELLS**



Laboratory  
Analysis Report



Sierra  
Environmental  
Monitoring, Inc.

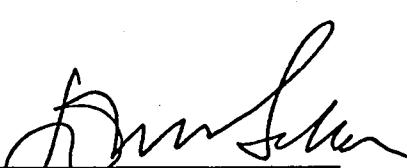
WASHOE COUNTY UTILITY DIV.  
DAN DRAGAN  
P.O. BOX 11130  
RENO NV 89520

Date : 3/14/94  
Client : WAS-314  
Taken by: WASHOE CTY-EVANS/VANHOOZ  
Report : 10179  
PO# : 138994

Page: 1

Sample	Collected Date	Time	ALKALINITY MG/L CACO3	COLOR C.U.	PH S.U.	TOTAL DISSOL. SOLIDS MG/L	NITRATE-N MG/L	ARSENIC MG/L
CORRAO WELL #1	3/11/94	10:45	140B	<5	6.90	221	0.5	0.023
CORRAO WELL #2	3/11/94	11:45	92B	<5	6.76	230	0.7	0.013
Sample	Collected Date	Time	BARIUM MG/L	CALCIUM MG/L	COPPER MG/L	IRON MG/L	MAGNESIUM MG/L	MANGANESE MG/L
CORRAO WELL #1	3/11/94	10:45	0.04	5.8	<0.02	0.98	2.0	0.02
CORRAO WELL #2	3/11/94	11:45	0.04	8.3	<0.02	0.60	2.7	0.01
Sample	Collected Date	Time	POTASSIUM MG/L	SODIUM MG/L	ZINC MG/L	CHLORIDE MG/L	FLUORIDE MG/L	SULFATE MG/L
CORRAO WELL #1	3/11/94	10:45	7.0	44	0.03	4.7	<0.1	7.9
CORRAO WELL #2	3/11/94	11:45	5.9	28	<0.02	3.5	<0.1	7.8
Sample	Collected Date	Time	MBAS MG/L					
CORRAO WELL #1	3/11/94	10:45	<0.05					
CORRAO WELL #2	3/11/94	11:45	<0.05					

Approved By:

  
This report is applicable only to the sample received by the laboratory. The liability of the laboratory is limited to the amount paid for this report. This report is for the exclusive use of the client to whom it is addressed and upon the condition that the client assumes all liability for the further distribution of the report or its contents.

IN TRIPPLICATE  
(PLEASE PRINT OR TYPE)

## NEVADA STATE HEALTH LABORATORY

NEVADA DIVISION OF HEALTH

1660 N. Virginia Street  
Reno, Nevada 89503

(702) 688-1335

Sample ID: Corrao Replacement

Well

117108

## WATER CHEMISTRY ANALYSIS:

Attn: Fees may apply to some types of samples.

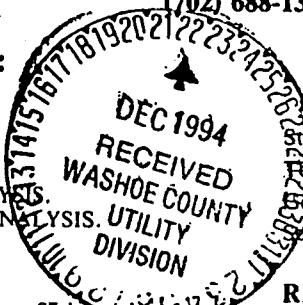
## TYPE OF ANALYSIS:

 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 R Van Hoozer Date 10/30/94  
Owner Washoe County Phone 856-7300  
Address Box 11130  
City Reno State NV

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

State Nevada County Washoe  
Township 18A Range 20 NE Section 17  
General Location  
Source Address

## REASON FOR ANALYSIS:

- Loan  
 Personal health reasons  
 Purchase of the property  
 Rental or sale of property  
 Subdivision approval  
 Other.....

## 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 130 ft. Casing diameter 12 in.  
Hot..... Cold  Casing depth 130 ft.

IN USE  Yes  No

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

Constituent	201 ppm	0.80 Constituent	FOR LABORATORY USE ONLY 13.2 ppm	5.3 Constituent	0.0	-1190 ppm	117106 Constituent	S.U.	PRINT OTHER DESIRED CONSTITUENTS BELOW
T.D.S. @ 103° C.	192	Chloride	7	Iron	0.02	Color	5	Cd	<0.001
Hardness	30	Nitrate -N	0.7	Manganese	0.00	Turbidity	0.2	Cr	<0.005
Calcium	7	Alkalinity	106	Copper	0.01	pH	7.65	Pb	<0.005
Magnesium	3	Bicarbonate	129	Zinc	0.00	EC	239	Hg	<0.005
Sodium	41	Carbonate	0	Barium		SI020C -1.01	Se	<0.001	
Potassium	5	Fluoride	0.17	Boron	0.4				
Sulfate	8	Arsenic	0.055	Silica	28	RECEIVED	DEC 16 1994	Ag	<0.005
GROSS ALPHA	13 pCi/L	MBAS	1.0						
GROSS BETA	4 pCi/L								

BUREAU OF HEALTH  
PROTECTIVE SERVICES  
Carson City

Fee \$7  
Collected by \_\_\_\_\_  
PWS I.D. \_\_\_\_\_  
DWA-Pri. \_\_\_\_\_ Sec. \_\_\_\_\_  
1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

Date Rec'd Init.  
pm = parts per million, milligrams per liter  
S.U. = Standard Units

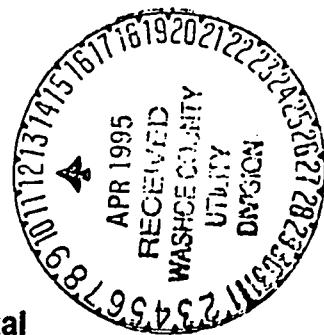
Remarks

12/17/94 arsenic = 0.05 ppm  
93/94

CIRCLED ITEMS EXCEED STATE OF NEVADA  
DRINKING WATER STANDARDS.  
THE ITEMS ARE:

KR

Laboratory  
Analysis Report



WASHOE COUNTY UTILITY DIV.  
DAN DRAGAN  
P.O. BOX 11130  
RENO NV 89520

Sierra  
Environmental  
Monitoring, Inc.

Date : 4/10/95  
Client : WAS-314  
Taken by: CLIENT  
Report : 12760  
PO# : 147203

Page: 1

Sample	Collected Date	Time	ARSENIC AA HYDRIDE MG/L	BORON ICP MG/L	CHLORIDE MG/L	Q ppm		
SAMPLE #033095C6	3/30/95	:	0.029	0.5	6.4	257		
SAMPLE #032995C5	3/29/95	:	0.027	0.5	6.2	225		
SAMPLE #032995C4	3/29/95	:	0.026	0.5	6.9	194		
SAMPLE #032995C3	3/29/95	:	0.024	0.4	6.1	163		
SAMPLE #032995C2	3/29/95	:	0.022	0.5	5.9	133		
SAMPLE #032895C1	3/28/95	:	0.020	0.5	6.0	105		
SAMPLE #033095C7	3/30/95	:	0.026	0.2	6.7	286		
SAMPLE #033095C8	3/30/95	:	0.029	0.3	6.6	314		
SAMPLE #033195C9	3/31/95	:	0.029	0.3	6.7	340		
SAMPLE #033195C10	3/31/95	:	0.033	0.3	6.9	405		

Approved By:

This report is applicable only to the sample received by the laboratory. The liability of the laboratory is limited to the amount paid for this report. This report is for the exclusive use of the client to whom it is addressed and upon the condition that the client assumes all liability for the further distribution of the report or its contents.

1135 Financial Blvd.

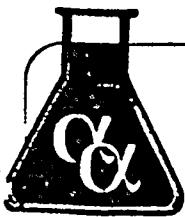
Reno, NV 89502

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William F. Pillsbury

John C. Seher  
Manager



# Alpha Analytical, Inc.

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(208) 336-4145

Las Vegas, Nevada  
(702) 386-6717

## ANALYTICAL REPORT

Washoe County Utility Division  
P.O. Box 11130  
Reno, NV 89520

Job #: 143874  
Phone: 856-7300  
Attn: Randy Vanhoozer

Sampled: 10/30/94 Received: 10/31/94 Analyzed: 11/03/94  
Alpha Analytical Number: WCU103194-01  
Client I.D. Number: Corroco Replace Well

**Report of GC/MS Analysis for  
SDWA VOLATILES PLUS LISTS 1 AND 3  
UNREGULATED COMPOUNDS  
EPA\_524.2**

Compound	Concentration ug/L	Detection Limit	Compound	Concentration ug/L	Detection Limit
<b>8 Regulated Volatile Organic Compounds (VOC's) (Phase I)</b>					
1. Benzene	ND	0.50 ug/L	28. Chloroform	ND	0.50 ug/L
2. Vinyl Chloride	ND	0.50 ug/L	29. Chloromethane	ND	0.50 ug/L
3. Carbon tetrachloride	ND	0.50 ug/L	30. o-Chlorotoluene	ND	0.50 ug/L
4. 1,2-Dichloroethane	ND	0.50 ug/L	31. p-Chlorotoluene	ND	0.50 ug/L
5. Trichloroethylene	ND	0.50 ug/L	32. Dibromomethane	ND	0.50 ug/L
6. p-Dichlorobenzene	ND	0.50 ug/L	33. m-Dichlorobenzene	ND	0.50 ug/L
7. 1,1-Dichloroethylene	ND	0.50 ug/L	34. 1,1-Dichloroethane	ND	0.50 ug/L
8. 1,1,1-Trichloroethane	ND	0.50 ug/L	35. 1,1-Dichloropropene	ND	0.50 ug/L
<b>10 Regulated Volatile Organic Compounds (VOC's) (Phase II)</b>					
9. cis-1,2-Dichloroethylene	ND	0.50 ug/L	36. 1,3-Dichloropropene	ND	0.50 ug/L
10. 1,2-Dichloropropane	ND	0.50 ug/L	37. e,z-1,3-Dichloropropene	ND	0.50 ug/L
11. Ethylbenzene	ND	0.50 ug/L	38. 2,2-Dichloropropane	ND	0.50 ug/L
12. Monochlorobenzene	ND	0.50 ug/L	39. 1,1,1,2-Tetrachloroethane	ND	0.50 ug/L
13. o-Dichlorobenzene	ND	0.50 ug/L	40. 1,1,2,2-Tetrachloroethane	ND	0.50 ug/L
14. Styrene	ND	0.50 ug/L	41. 1,2,3-Trichloropropane	ND	0.50 ug/L
15. Tetrachloroethylene	ND	0.50 ug/L	List 3 - Monitoring Required at State Discretion		
16. Toluene	ND	0.50 ug/L	42. Bromochloromethane	ND	0.50 ug/L
17. trans-1,2-Dichloroethylene	ND	0.50 ug/L	43. n-Butylbenzene	ND	0.50 ug/L
18. Xylenes (total)	ND	0.50 ug/L	44. Dichlorodifluoromethane	ND	0.50 ug/L
<b>3 Regulated Volatile Organic Compounds (VOC's) (Phase V)</b>					
19. Dichloromethane	ND	0.50 ug/L	45. Fluorotrifluoromethane	ND	0.50 ug/L
20. 1,1,2-Trichloroethane	ND	0.50 ug/L	46. Hexachlorobutadiene	ND	0.50 ug/L
21. 1,2,4-Trichlorobenzene	ND	0.50 ug/L	47. Isopropylbenzene	ND	0.50 ug/L
<b>List 1 - Unregulated Compounds - All Systems</b>					
22. Bromobenzene	ND	0.50 ug/L	48. p-Isopropyltoluene	ND	0.50 ug/L
23. Bromodichloromethane	ND	0.50 ug/L	49. Naphthalene	ND	0.50 ug/L
24. Bromoform	ND	0.50 ug/L	50. n-Propylbenzene	ND	0.50 ug/L
25. Bromomethane	ND	0.50 ug/L	51. sec-Butylbenzene	ND	0.50 ug/L
26. Chlorodibromomethane	ND	0.50 ug/L	52. tert-Butylbenzene	ND	0.50 ug/L
27. Chloroethane	ND	0.50 ug/L	53. 1,2,3-Trichlorobenzene	ND	0.50 ug/L
<b>ND - Not Detected</b>					

Approved By:

*Roger L. Scholl*  
Roger L. Scholl, Ph.D.  
Laboratory Director

Date: 11/4/94



# ENVIRONMENTAL

## ANALYTICAL CHEMISTS

November 15, 1994

LAB No: SP 406665-1

Alpha Analytical  
255 Glendale Avenue, Suite 21  
Sparks , NV 89431

RE: Organic Analysis  
Matrix: Ground Water

Sampling Site: WCU103194-01  
Sample Description: Corrao Replacement Well  
Sampled by :  
Container : Amber Glass TFE-Cap  
Preservatives:

Sampled : October 30, 1994  
Received : November 1, 1994  
Extracted : November 2, 1994  
Analyzed : November 3, 1994  
QA/QC ID# : SP 94110200I

### EPA METHOD 525

CONSTITUENT	SAMPLE DLR ug/L	MCL ug/L	SAMPLE RESULTS ug/L	LAB DLR ug/L	BLANK RESULTS ug/L
Benzo(a)pyrene	0.02	0.2	ND	0.02	ND
Hexachlorocyclopentadiene	0.1	50	ND	0.1	ND
bis(2-Ethylhexyl)adipate	0.6	400	ND	0.6	ND
bis(2-Ethylhexyl)phthalate	0.6	4	ND	0.6	ND
SURROGATE	AR	SAMPLE % REC		LAB AR	BLANK % REC.
Perylene-d12	50-150	96		50-150	94

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)  
ug/L = Micrograms Per Liter (ppb) ND = Not Detected at or above the DLR. AR = Acceptable Range  
♦ = DLR adjusted because of dilutions, concentrations, or limited sample.

If you have any questions, please call.

FGL ENVIRONMENTAL

Kelly A. Dunnahoo, B.S.  
Organic Laboratory Manager

KAD/DHN:tld

Darrell H. Nelson, B.S.  
Laboratory Director



# ENVIRONMENTAL

## ANALYTICAL CHEMISTS

November 16, 1994

LAB No: SP 406665-1

Alpha Analytical  
255 Glendale Avenue, Suite 21  
Sparks , NV 89431

RE: Organic Analysis  
Matrix: Ground Water

Sampling Site: WCU103194-01

Sample Description: Corrao Replacement Well  
Sampled by :  
Container : VOA  
Preservatives: Monochloroacetic Buf

Sampled : October 30, 1994  
Received : November 1, 1994  
Extracted : N/A  
Analyzed : November 7, 1994  
QA/QC ID# : SP 94110700A

### EPA METHOD 531

CONSTITUENT	SAMPLE DLR ug/L	MCL ug/L	SAMPLE RESULTS ug/L	LAB DLR ug/L	BLANK RESULTS ug/L
Aldicarb Sulfone	0.8	3	ND	0.8	ND
Aldicarb Sulfoxide	0.5	3	ND	0.5	ND
Oxymal	2	200	ND	2	ND
Methomyl	5	---	ND	5	ND
3-Hydroxycarbofuran	10	---	ND	10	ND
Aldicarb	0.5	3	ND	0.5	ND
Carbofuran	0.9	18	ND	0.9	ND
Carbaryl	5	---	ND	5	ND

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)  
ug/L = Micrograms Per Liter (ppb) ND = Not Detected at or above the DLR.

\* = DLR adjusted because of dilutions, concentrations, or limited sample.

If you have any questions, please call.

FGL ENVIRONMENTAL

Kelly A. Dunnahoo, B.S.  
Organic Laboratory Manager

Darrell H. Nelson, B.S.  
Laboratory Director

KAD/DHN:tld



# ENVIRONMENTAL

## ANALYTICAL CHEMISTS

November 15, 1994

LAB No: SP 406665-1

Alpha Analytical  
255 Glendale Avenue, Suite 21  
Sparks , NV 89431

RE: Organic Analysis  
Matrix: Ground Water

Sampling Site: WCU103194-01

Sample Description: Corrao Replacement Well      Sampled : October 30, 1994  
Sampled by :    Received : November 1, 1994  
Container : Amber Glass                                      Extracted : N/A  
Preservatives: Na<sub>2</sub>S2O<sub>3</sub>    Analyzed : November 9, 1994  
    QA/QC ID# : SP 94110900A

### EPA METHOD 547

CONSTITUENT	SAMPLE DLR ug/L	MCL ug/L	SAMPLE RESULTS ug/L	LAB DLR ug/L	BLANK RESULTS ug/L
Glyphosate	6	700.0	ND	6	ND

DLR = Detection Limit for Reporting Purposes. MCL = Maximum Contaminant Level (--- indicates none determined.)  
ug/L = Micrograms Per Liter (ppb)    ND = Not Detected at or above the DLR.  
♦ = DLR adjusted because of dilutions, concentrations, or limited sample.

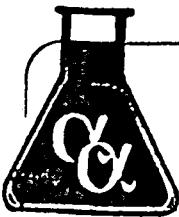
See attached report for QA/QC data. If you have any questions, please call.

FGL ENVIRONMENTAL

Kelly A. Dunnahoo, B.S.  
Organic Laboratory Manager

Darrell H. Nelson, B.S.  
Laboratory Director

KAD/DHN:tld



## Alpha Analytical, Inc.

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(208) 336-4145

Las Vegas, Nevada  
(702) 386-7747

### Analytical Report For The Phase II National Primary Drinking Water Regulated and Unregulated Synthetic Organic Compounds

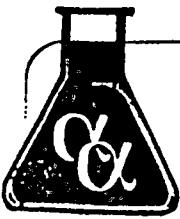
Client ID: Corroco Replace Well Washoe County Utilities  
Lab ID: WCU103194-01 P.O. Box 11130  
Sampled: 10/30/94 Reno NV 89520  
Received: 10/31/94 Attn: Randy Vanhoozer  
Analyzed: 11/05/94

Regulated Compounds	Concentration ug/L	Detection Limit ug/L	EPA Method
Alachlor	ND	0.20	505
Aldrin	ND	0.20	505
Atrazine	ND	0.10	505
Chlordane (Technical)	ND	0.20	505
Dieldrin	ND	0.20	505
Endrin	ND	0.01	505
Heptachlor	ND	0.04	505
Heptachlor Epoxide	ND	0.02	505
Hexachlorobenzene	ND	0.10	505
Hexachlorocyclopentadiene	ND	0.10	505
Lindane	ND	0.02	505
Methoxychlor	ND	0.10	505
Aroclor-1016 (Screen)	ND	0.08	505
Aroclor-1221 (Screen)	ND	20	505
Aroclor-1232 (Screen)	ND	0.50	505
Aroclor-1242 (Screen)	ND	0.30	505
Aroclor-1248 (Screen)	ND	0.10	505
Aroclor-1254 (Screen)	ND	0.10	505
Aroclor-1260 (Screen)	ND	0.20	505
Toxaphene	ND	1.0 -	505

ND - Not Detected

Approved By:

*Roger L. Scholl*  
Roger L. Scholl, Ph.D.  
Laboratory Director  
Date: 11/16/94



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(406) 587-4445

Las Vegas, Nevada  
(702) 866-6717

## Analytical Report For The Phase II National Primary Drinking Water Regulated and Unregulated Synthetic Organic Compounds

Client ID: Corroco Replace Well Washoe County Utilities  
Lab ID: WCU103194-01 P.O. Box 11130  
Sampled: 10/30/94 Reno NV 89520  
Received: 10/31/94 Attn: Randy Vanhoozer  
Analyzed: 11/03-14/94

Regulated Compounds	Concentration ug/L	Detection Limit ug/L	EPA Method
Butachlor	ND	1.0	507
Dalepon	ND	1.0	515.1
1,2-Dibromoethane	ND	0.01	504
1,2-Dibromo-3-Chloropropane	ND	0.02	504
Dicamba	ND	1.0	515.1
Dinoseb	ND	0.20	515.1
Endothall	ND	9	548
Metolachlor	ND	1.0	507
Metrribuzin	ND	1.0	507
Pentachlorophenol	ND	0.04	515.1
Picloram	ND	0.10	515.1
Propachlor	ND	1.0	507
2,4-D	ND	0.10	515.1
2,4,5-TP (Silvex)	ND	0.20	515.1
Simazine	ND	0.07	507

ND - Not Detected

Approved By:

Roger L. Scholl, Ph.D.  
Laboratory Director

Date: 11/16/94



DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION  
John M. Collins, Chief Sanitary Engineer

Observation Well B

CORRAO #1

Job. No. \_\_\_\_\_

Date \_\_\_\_\_

## Well Sampling Field Record Form

Well Identification	C1			
Casing Size	4"			
Cap Type (footnote A)				
Well Depth	125'			
Gallons of Prime H <sub>2</sub> O Used				
Purge Method	Pump			
Purge Rate	6 gpm			
Purge Time				
Purge Duration				
Volume Purged				
Depth to Water Level	1.33' ABL			
Depth to Liquid Level				
Floating Product (Y or N)				
Floating Product Sampling Method				
Water Sampling Method				
Time of Sampling	0950	1005	1025	1035
Quantity of Sample				
Type of Preservative (footnote B)				
Field Filtering (Y or N)				
pH	7.29	7.04	7.09	7.09
Conductivity	268	.226	.220	.219
Sample Temperature (°F)	16.6 °C	15.8 °C	15.9 °C	15.6 °C
Ambient Temperature (°F)	15.0			
Turbidity	135	12	4	4
Dissolved Oxygen (mg/l) Salinity	0.01	0.00	0.00	0.00
Observers to Sampling Event	0.01% 2.90 - 1.57      0.65 gls/ft      130 x .65 = 85 gallons x 3 = 255 gallons			
Type and Color of Sample Containers	255 / 6 gpm = 43 min			
Equipment Decontamination Procedures				
Disposal Method for Purge Water				
Split Samples With				
Field Observations				
Sampled By				

Footnote A: 1. Standard Threaded Cap  
2. Vented Threaded Cap  
3. Threaded, Locking Plug  
4. Threaded Cap with Hasp  
5. Flush Mount Locking Cap

Footnote B: 1. Refrigeration  
2. Nitric Acid, HNO<sub>3</sub>  
3. Sulfuric Acid, H<sub>2</sub>SO<sub>4</sub>  
4. Hydrochloric Acid: HCl  
5. Sodium Hydroxide: NaOH



DEPARTMENT OF PUBLIC WORKS  
UTILITY DIVISION  
John M. Collins, Chief Sanitary Engineer

Observation Well A

Corrao #2

Job No. \_\_\_\_\_

Date \_\_\_\_\_

## Well Sampling Field Record Form

Stick up = 3.0'

Well Identification	C 2							
Casing Size								
Cap Type (footnote A)								
Well Depth	130							
Gallons of Prime H <sub>2</sub> O Used								
Purge Method	Pump							
Purge Rate	6 gpm							
Purge Time								
Purge Duration	40 min							
Volume Purged								
Depth to Water Level	9.94							
Depth to Liquid Level								
Floating Product (Y or N)								
Floating Product Sampling Method								
Water Sampling Method	Pump							
Time of Sampling	1050	1110	1125	1135				
Quantity of Sample								
Type of Preservative (footnote B)								
Field Filtering (Y or N)								
pH	7.86	6.84	6.78	6.77				
Conductivity	.203	.175	.175	.173				
Sample Temperature (°F)	15.6 °C	15.2 °C	15.1 °C	15.0 °C				
Ambient Temperature (°F)	11.0 °C							
Turbidity	141	7	2	2				
Dissolved Oxygen (mg/l) / SALINITY	0.00	0.00	0.00	0.00				

Observers to Sampling Event \_\_\_\_\_

Type and Color of Sample Containers \_\_\_\_\_

Equipment Decontamination Procedures \_\_\_\_\_

Disposal Method for Purge Water \_\_\_\_\_

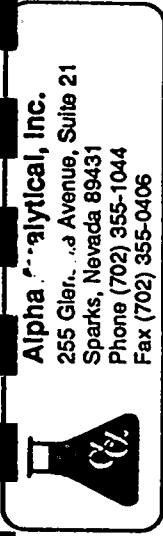
Split Samples With \_\_\_\_\_

Field Observations \_\_\_\_\_

Sampled By \_\_\_\_\_

- Footnote A:
1. Standard Threaded Cap
  2. Vented Threaded Cap
  3. Threaded, Locking Plug
  4. Threaded Cap with Hasp
  5. Flush Mount Locking Cap

- Footnote B:
1. Refrigeration
  2. Nitric Acid, HNO<sub>3</sub>
  3. Sulfuric Acid, H<sub>2</sub>SO<sub>4</sub>
  4. Hydrochloric Acid: HCl
  5. Sodium Hydroxide: NaOH



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Fax (702) 355-0406

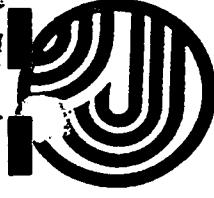
**CHAIN OF CUSTODY RECORD**

### Note

Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

\*Key: AQ - Aqueous      SO - Soil      WA - Waste      OT - Other

## CHAIN OF CUSTODY RECORD



Client Name <u>Washoe County Util</u>		PO #	<u>138994</u>	Analyses Required
Address				
City, State, Zip		Report Attention		
Date Sampled	Time Sampled	Type * See Key Below	Sampled by	Number of Containers
3/19/94	1645	1	<u>Conrad #1</u>	
	1145	"	<u>Conrad #2</u>	
<i>Permit No. 2001</i>				
Signature	Print Name	Company	Date	Time
<u>John D. Vailhozer</u>	<u>Randall G. Vailhozer</u>	<u>Washoe County Utility Div.</u>	<u>3/19/94</u>	<u>1332</u>
Relinquished by				
Received by				
Relinquished by				
Received by Laboratory	<u>R. Rock</u>	<u>S.E.M.</u>	<u>3-19-94</u>	<u>1330</u>

Note:

Samples are discarded 60 days after results are reported unless other arrangements are made.  
Hazardous samples will be returned to client or disposed of at client expense.

**SIERRA ENVIRONMENTAL MONITORING, INC**  
 47 Glen Carran Circle  
 Sparks, Nevada 89431  
 (702) 356-3868 • FAX (702) 358-8037

- Key: AQ-Aqueous SO-Soil WA-Waste OT-Other
- Drinking Water Bacteria
- Compliance
- Non Compliance



## CHAIN OF CUSTODY RECORD

Client Name WPSHDE COUNTY UTILITIES D.J.				PO # 147203	Analyses Required	
				Phone # 856 - 7300		
Address P.O. Box 11130 City, State, Zip RENO, NV 89502				Report Attention DAN DRAGAN		
Sampled by D. Dragon				Number of Containers		
Date Sampled	Time Sampled	Type See Key Below	Sample Description			
30 Mar 1200	1900	"	Water	2		
30 Mar 0200	"	"		2		
31 Mar 1030	"	"		2		
Cylinders Discard						
Signature Relinquished by Dan Dragon				Print Name L. ANSE RT		
Received by L. Ansert				Company Washoe County SER		
Relinquished by				Date 3/31/95		
Received by Laboratory				Time 1:20		

**SIERRA ENVIRONMENTAL MONITORING, INC**  
 1135 Financial Boulevard  
 Reno, Nevada 89502  
 (702) 857-2400 • FAX (702) 857-2404

Note:  
 Samples are discarded 60 days after results are reported unless other arrangements are made.  
 Hazardous samples will be returned to client or disposed of at client expense.

- Key: AC-Aqueous SO-Soil WA-Waste OT-Other
- Drinking Water Bacteria  Compliance  Non Compliance