1506-00013

OLD WASHOE ESTATES
NEW PRODUCTION WELL

DECEMBER - JANUARY 1994

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS

UTILITY DIVISION

P.O. BOX 11130 RENO, NEVADA 89520

OLD WASHOE ESTATES
NEW PRODUCTION WELL

DECEMBER - JANUARY 1994

WASHOE COUNTY UTILITY DIVISION
DEPARTMENT OF PUBLIC WORKS
1195-B CORPORATE BLVD
PO BOX 11130
RENO, NEVADA 89520

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EXECUTIVE SUMMARY

The Old Washoe Estates' water system currently delievers water that exceeds secondary drinking water standards for iron and manganese. Fluoride is also nearing the limit. An exploratory test hole was drilled in an attempt to locate a water source that met drinking water standards. Figure 1 shows this location. A test hole was drilled to 300 feet which encountered good quality water and sufficient quantity. This borehole was then redrilled and an eight inch diameter production well was constructed.

A ten day pumping test was conducted in order to assess the long term production capacity, water quality changes or the potential thereof. This well is located in a hard rock (andesite) aquifer. During pumping, the cone of depression reached a recharge boundary, determined to be an alluvial aquifer. Impacts on a nearby domestic well were also measured. Water quality met all State and Federal drinking water standards.

It is recommended that this well be equipped to pump 150 gpm. Hydraulic measurements indicate that moderate to heavy pumping of this well on a long term basis may cause water quality degradation. Therefore, annual production should be limited to 16 MGA (49 AFA).

DRILLING OPERATIONS

Through a low bid process, Fredrick Pump and Well Drilling was awarded a drilling contract to drill and construct five test wells on the St. James' property located to the west and one test well for the Old Washoe Estates water system. The objective of this test well was to locate a ground water source of 50-100 gpm with quality that met all drinking water standards.

An Ingorsall Rand TH-60 drilling rig was used for this project. Tricone bits were used to drill a 10 inch nominal borehole. The borehole was drilled to 300 feet using air rotary drilling methods. Utility Division personnel supervised the drilling operations and performed the lithologic sampling. Samples were collected throughout the borehole, logged and bagged at ten foot intervals. Borehole geophysical logs (electric, caliper, and gamma) were conducted by Century Geophysical Corp. (Appendix 1).

When the borehole had been drilled to 300 feet, a short, air lift flow test was conducted at 140 gpm for one hour. A water sample was collected for iron, manganese, fluoride and arsenic analysis, which when analyzed, met drinking water standards. It was decided to proceed with a production well rather than a four inch test well as the production capability of the test well was promising. Also, the cost savings would be substantial. A 10 inch

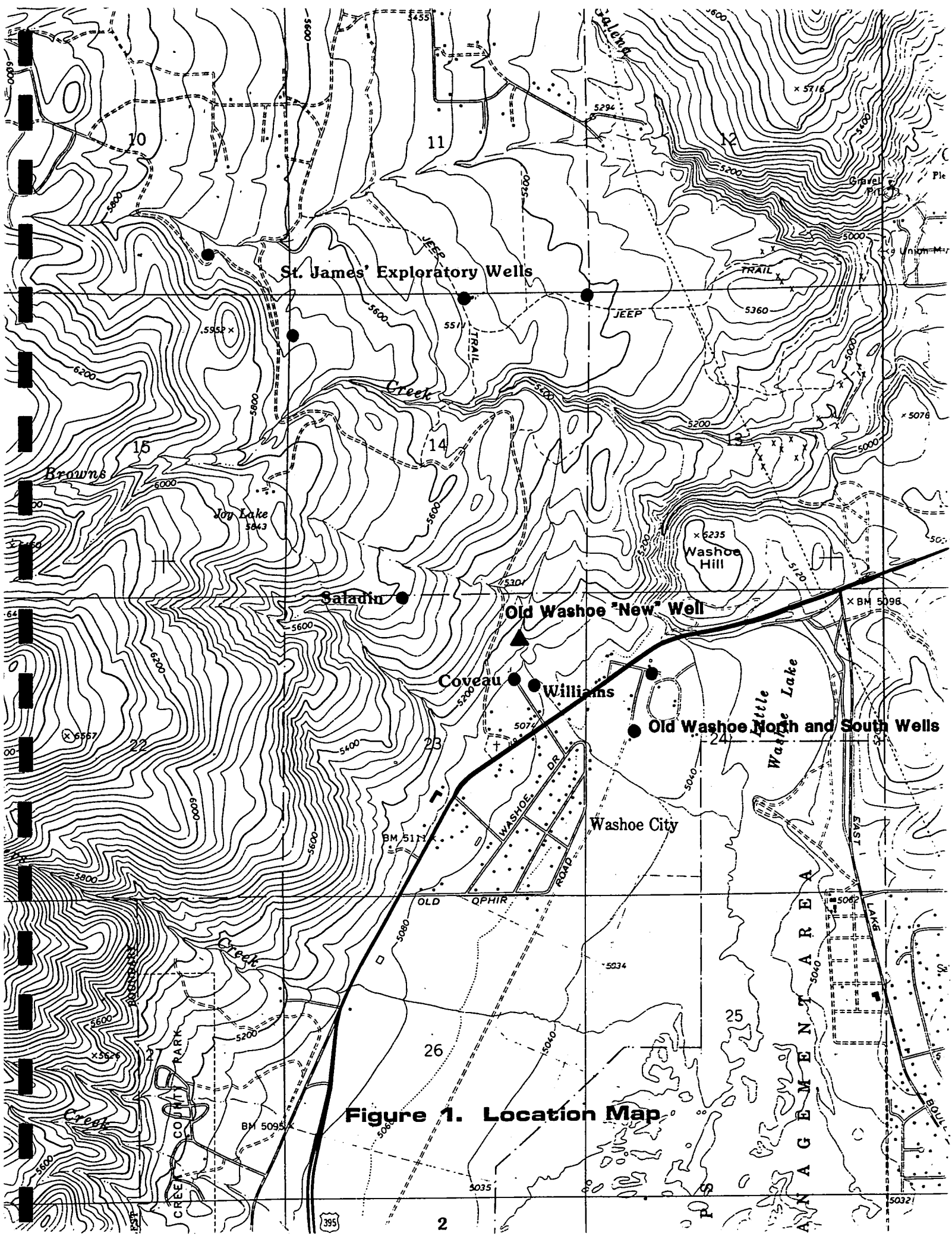


Figure 1. Location Map

borehole was reamed to 15 inches with air to 300 feet. Due to formation cave-in, the 8 inch casing was only installed to a depth of 270 feet.

DESCRIPTION OF LITHOLOGY

Table 1 is a lithologic log of the borehole. Mixed, unconsolidated colluvium was encountered to a depth of 40 feet. Sandy silts (red to purple to grey and then red) were drilled to 160 feet. From 160 to 170 feet a reddish black, altered volcanic was drilled. From 170 to 300 feet a competent, grey andesite, typical of Kate Peak, was drilled. From 280 to 300 there are minor zones of an alteration of the andesite. This zone proved to be unstable as fine grained sand filled the borehole immediately after pullback of the drilling tools. This zone is depicted on the caliper log (Appendix 1).

Table 1
Lithologic Log

Feet	Lithology
000-020	silt, sand and gravel
020-040	silt and sand
040-060	red to purple silt, dry
060-090	grey silt and sand
090-160	red silt and sand, water zone at 100 feet
160-170	grades to reddish black to black fractured andesite
170-260	grey andesite, fractured, unaltered
260-300	grey andesite w/ zones of alteration

Electrical resistivities were generally between 60 and 100 ohm-m, decreasing with depth. Between 160 and 190 feet the natural gamma logs shows an anomaly from 50 to 160 counts. The caliper log indicates a zone of wash out between 280 and 300 feet. Water production began at approximately 100 feet and increased with depth. A very promising production zone occurs from 270-300 feet.

PRODUCTION WELL CONSTRUCTION

Figure 2 is a construction diagram for the production well. The test hole was rebored to 15 inches to a depth of 300 (cave-in effectively made it a 272 foot borehole). The bottom of the well has a two foot bullnose and welded cap. Then 0.25 inch wall x 80 feet of 8.625 inch, 50 slot Houston "low carbon free flow" wire wrap screen was installed from 190 feet to 270 feet. Blank, black steel casing was then installed to surface. The gravel pack consisted of 1/4" x 1/8", washed and clean, siliceous gravel and was tremmied. A 100 foot grout seal was then tremmied. Finally, since the borehole was drilled with air, six hours of air-lift development proved to be sufficient.

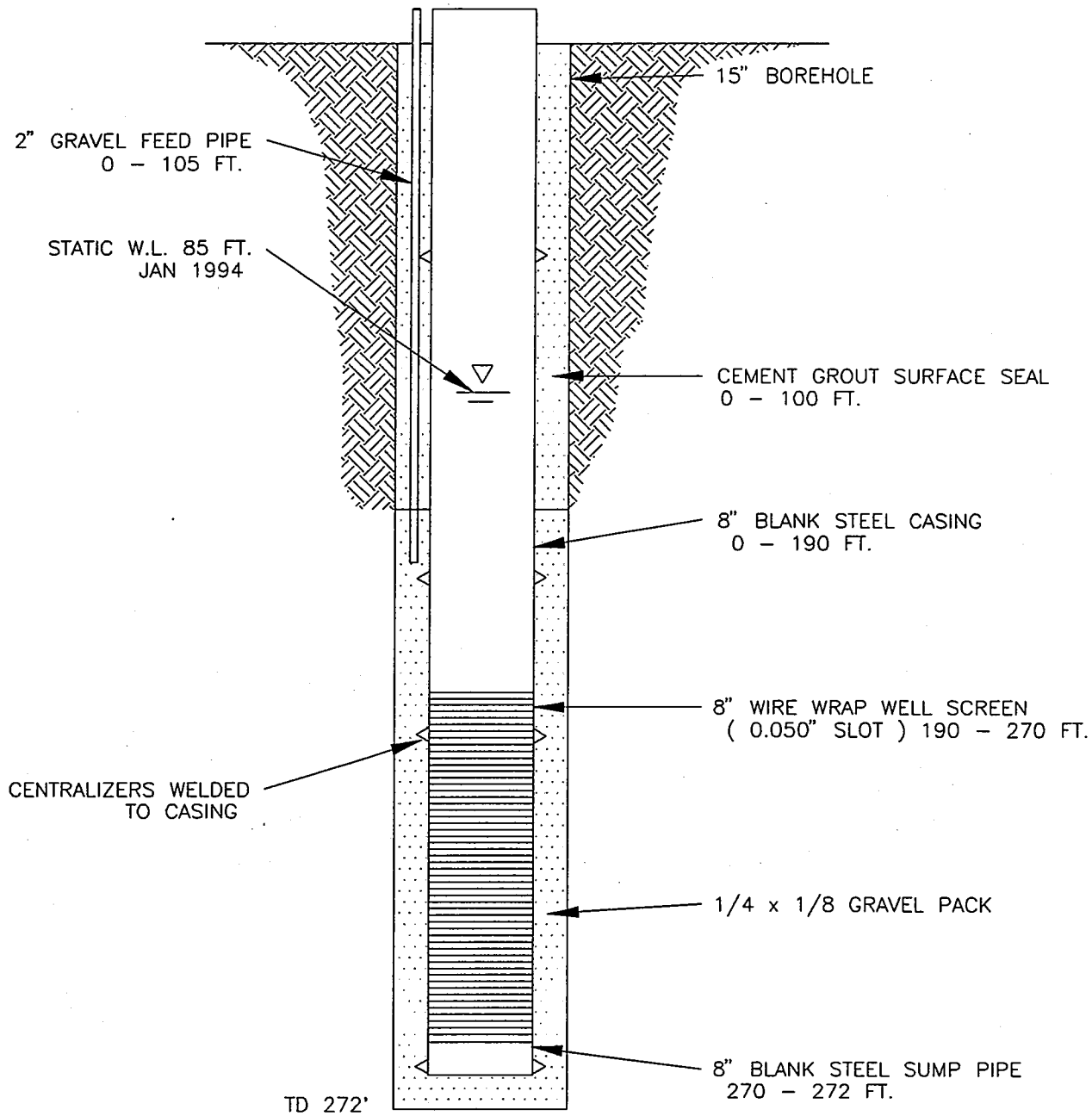


Figure 2. Production Well Construction Diagram

WELL TESTING

A three step test was conducted followed by a ten day constant discharge test. Graphical representations of the step test and calculations are presented in figures 3, 4 and 5. The step test consisted of pumping the well at 100 minute intervals at 114, 161 and 205 gpm. Specific capacities were 2.4, 2.0 and 1.7 gal/ft of drawdown, respectively. From figure 5 it is illustrated that most of the drawdown is a result of the well construction. However, it has been our experience that hardrock aquifer losses are often manifested as well losses. Regardless, the overall efficiency of the well is 44% at a pumping rate of 150 gpm. Also, the well does not produce any sand in the discharge as sampled by a Rossum Sand Tester.

A constant discharge test was conducted at an approximate pumping rate of 177 gpm. The goal was to pump for ten days in order to determine well performance, aquifer parameter estimation, identification of aquifer boundaries and, more importantly, to determine if changes in water quality occured. Generator failure occured frequently. In order to compensate well recovery periods during those failures (the longest nonpumping period was 31 hours), the pumping test lasted twelve days. Periodic water quality measurements and samples were taken and no remarkable changes occured (Appendix 3).

Figure 6 is the time vs. drawdown curve. Please note that small differences in the pumping rate had a large influence on the pumping level. The transmissivity of the andesite is identified on the curve from 10 to 300 minutes. At approximately 300 minutes, a recharge boundary becomes apparent as the rate of decline flattens (despite the flucuations in the pumping level caused by small changes in flow rate). This boundary is most likely the alluvial aquifer located 100 feet to the south.

The Coveau domestic well (see figure 1), located 600 feet to the southeast, was monitored and 1.5 feet of drawdown was observed to have resulted from the pumping test (figure 7). Drawdown in this well attributed to the production well began at approximately 300 minutes. This alluvial well is approximately 95 feet deep. A short term pumping test estimated a transmissivity of 4,000 gpd/ft (see appendix 4 for pumping test data).

Based on this information a transmissivity of 6,000 gpd/ft of drawdown (using the Cooper-Jacob Modified Nonequilibrium equation) and a storage coefficient of 0.0009 was calculated for the andesite aquifer. Recovery from the pumping test was immediate in that 96% of the drawdown was recovered in the first ten minutes (figure 8). Appendix 5 contains the field data from these tests.

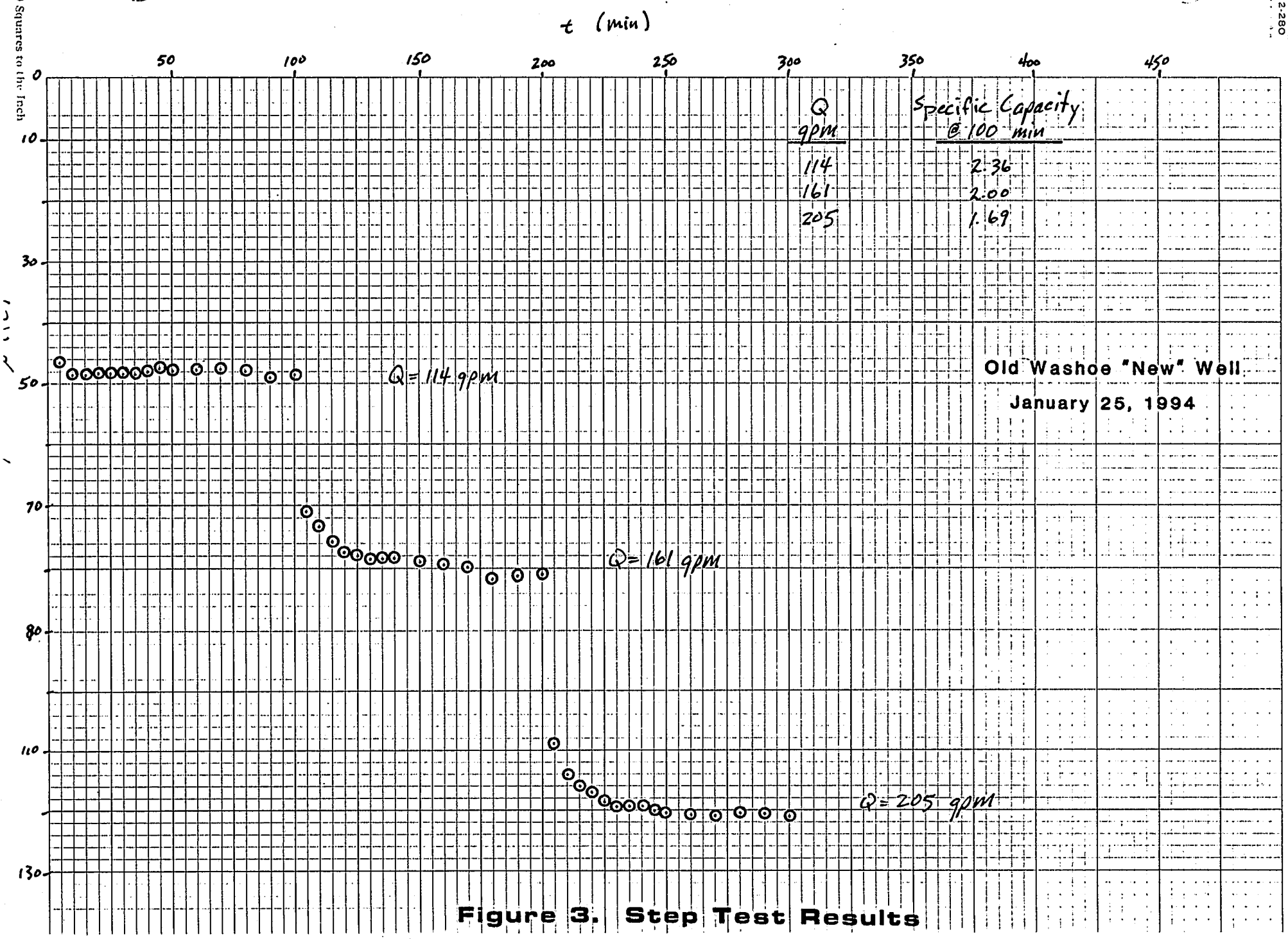


Figure 3. Step Test Results

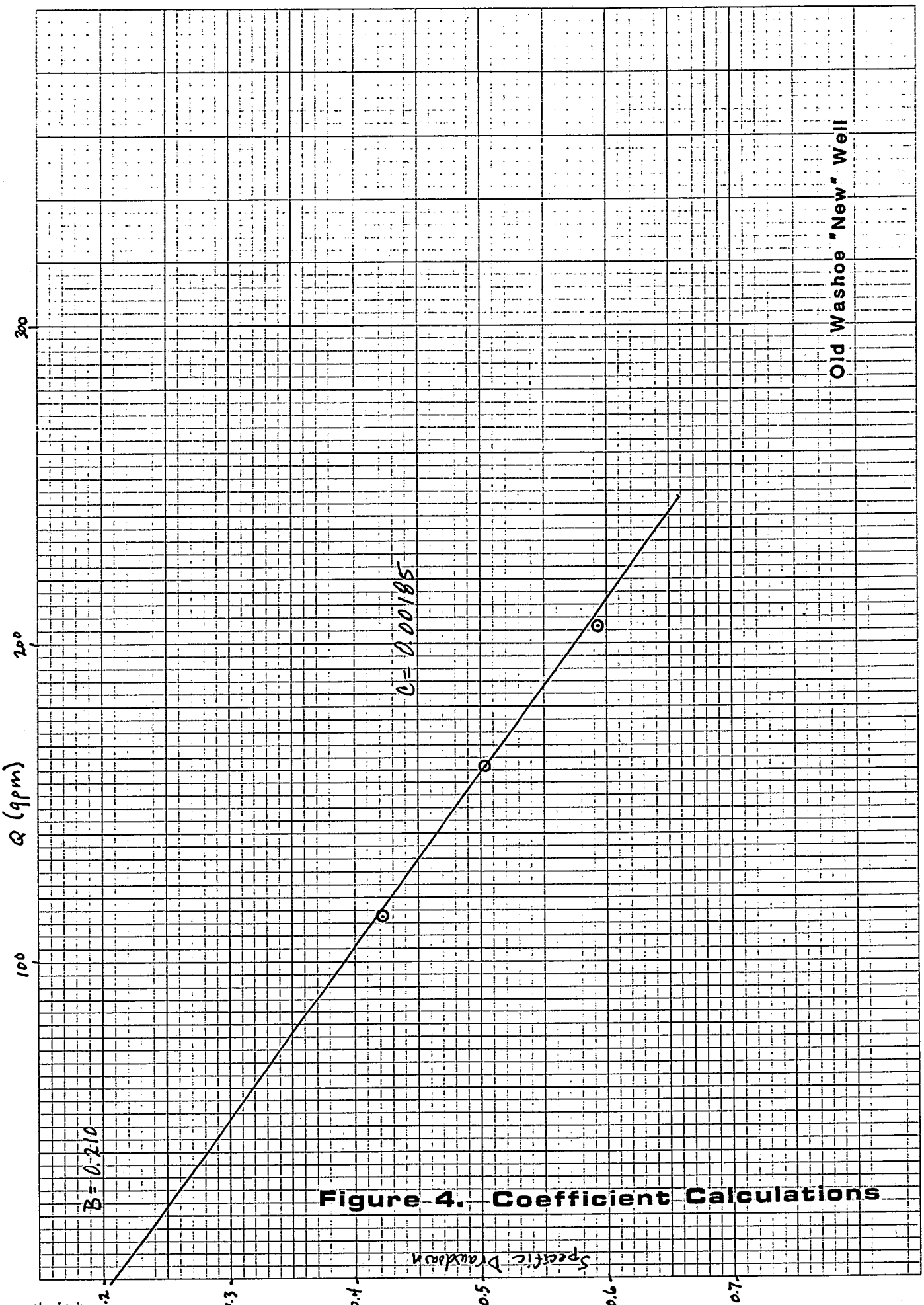
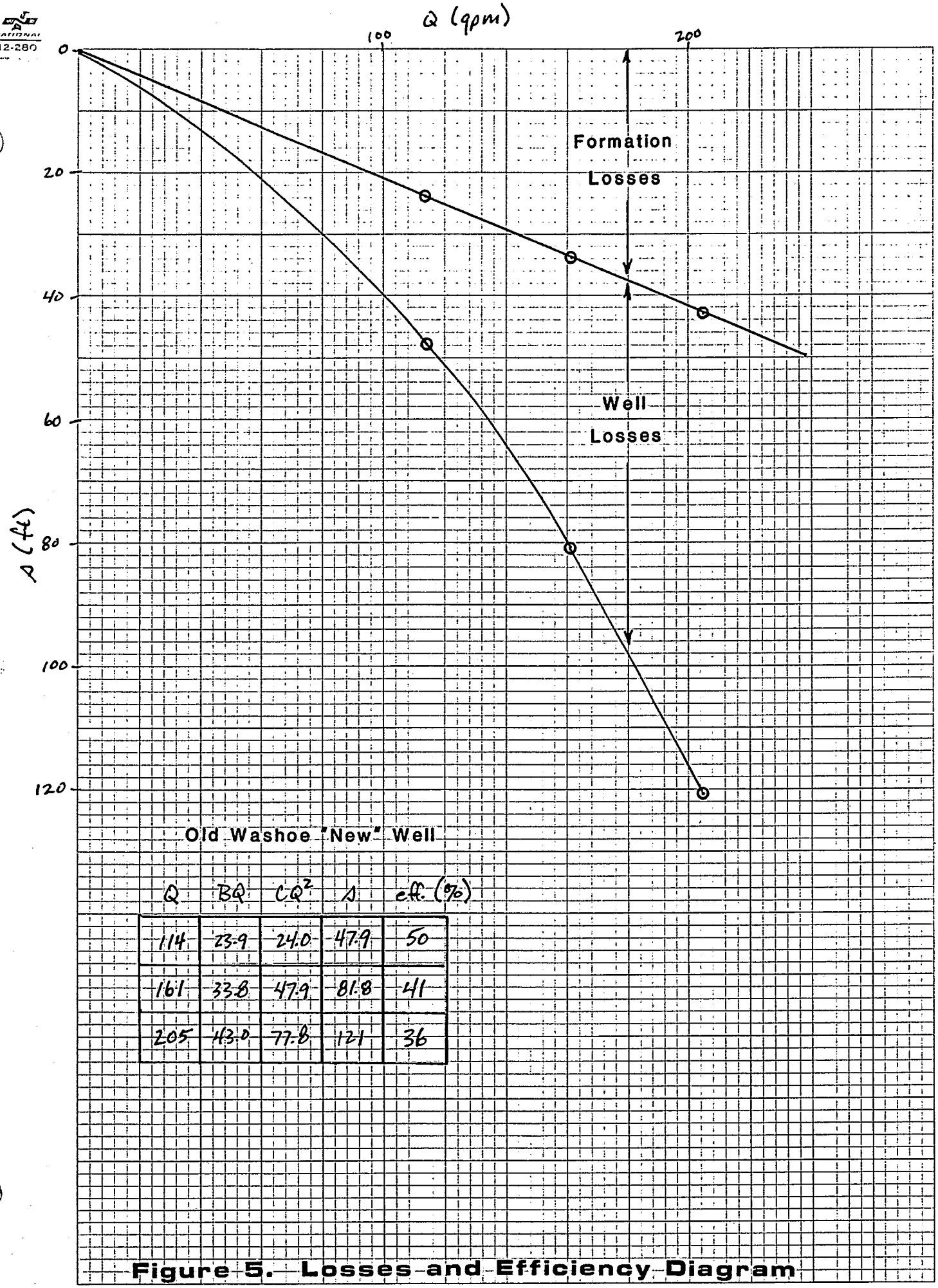


Figure 4. Coefficient Calculations



Old Washoe "New" Well

Q	BQ	CQ^2	s	eff. (%)
114	23.9	24.0	47.9	50
161	33.8	47.9	81.8	41
205	43.0	77.8	121	36

Figure 5. Losses and Efficiency Diagram

10 Squares to the Inch

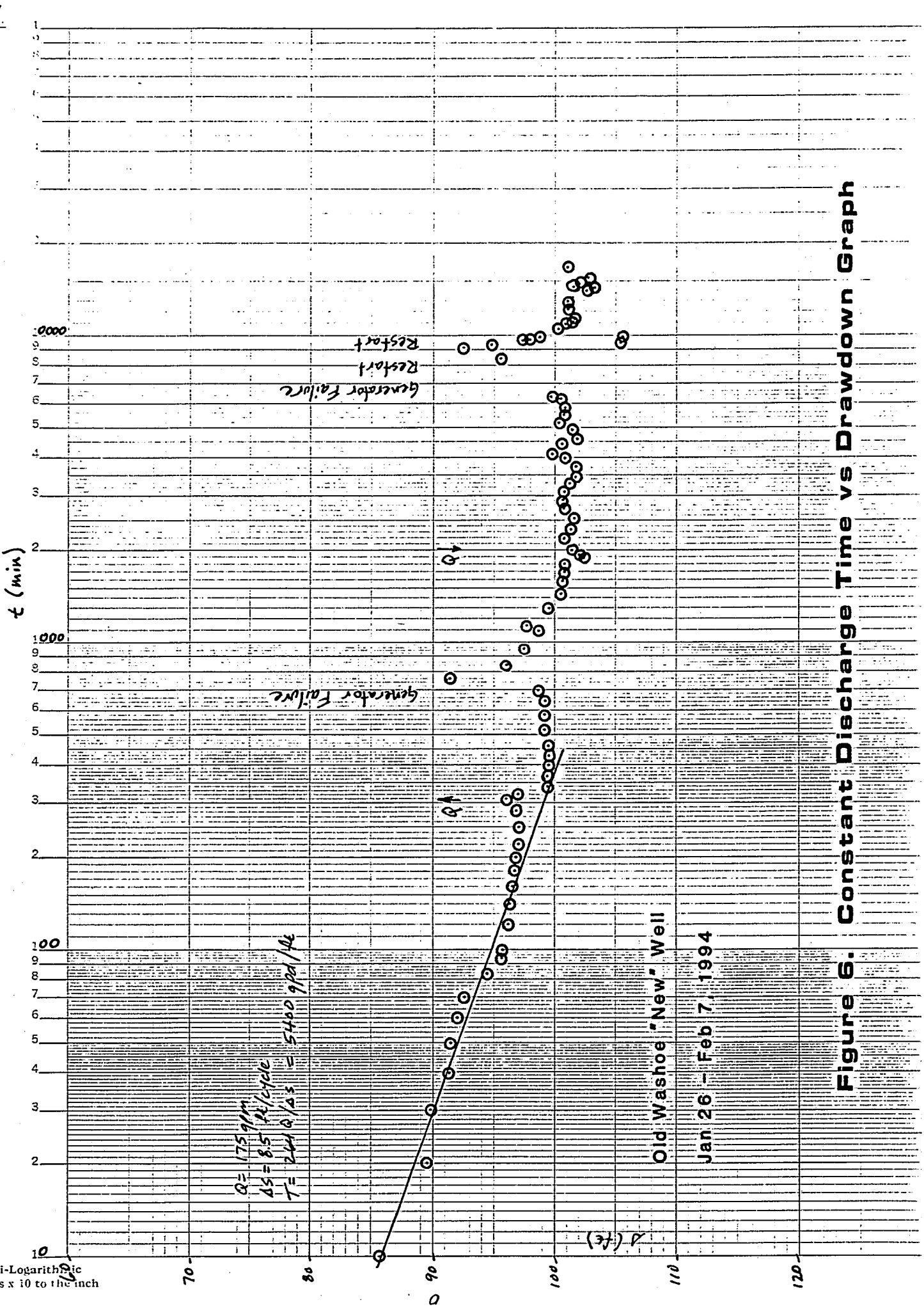


Figure 6. Constant Discharge Time vs Drawdown Graph
Old Washoe "New" Well
Jan 26 - Feb 7, 1994
t (min)
s (ft)
Q = 175 gpm
ΔS = 8.5 ft/cycle
T = 2400 Q/ΔS = 5400 gpd/ft
Generator Failure
Restart
Restart
Generator Failure
Semi-Logarithmic
4 Cycles x 10 to the inch

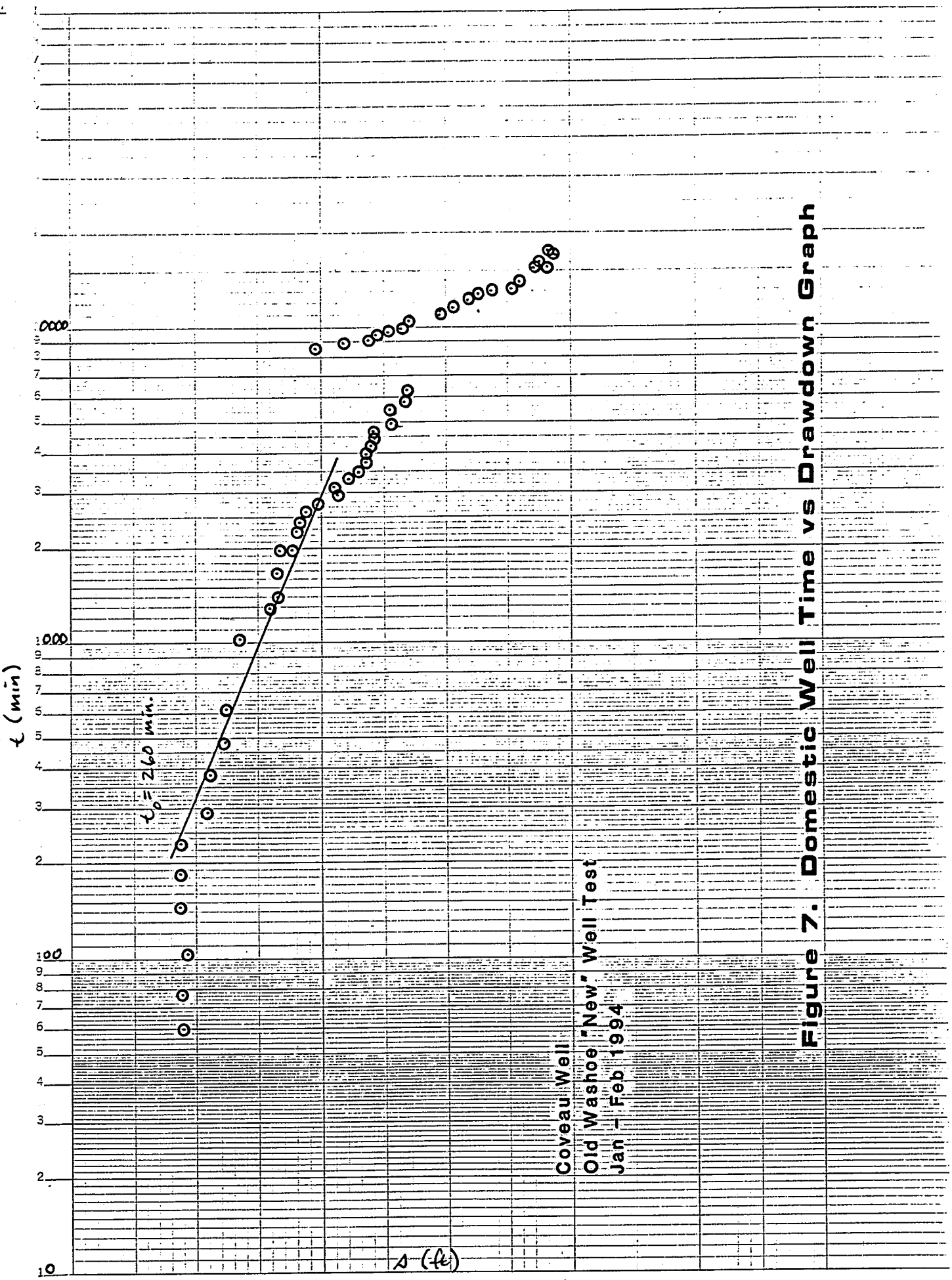


Figure 7. Domestic Well Time vs Drawdown Graph

Semi-Logarithmic
4 Cycles x 10 to the inch

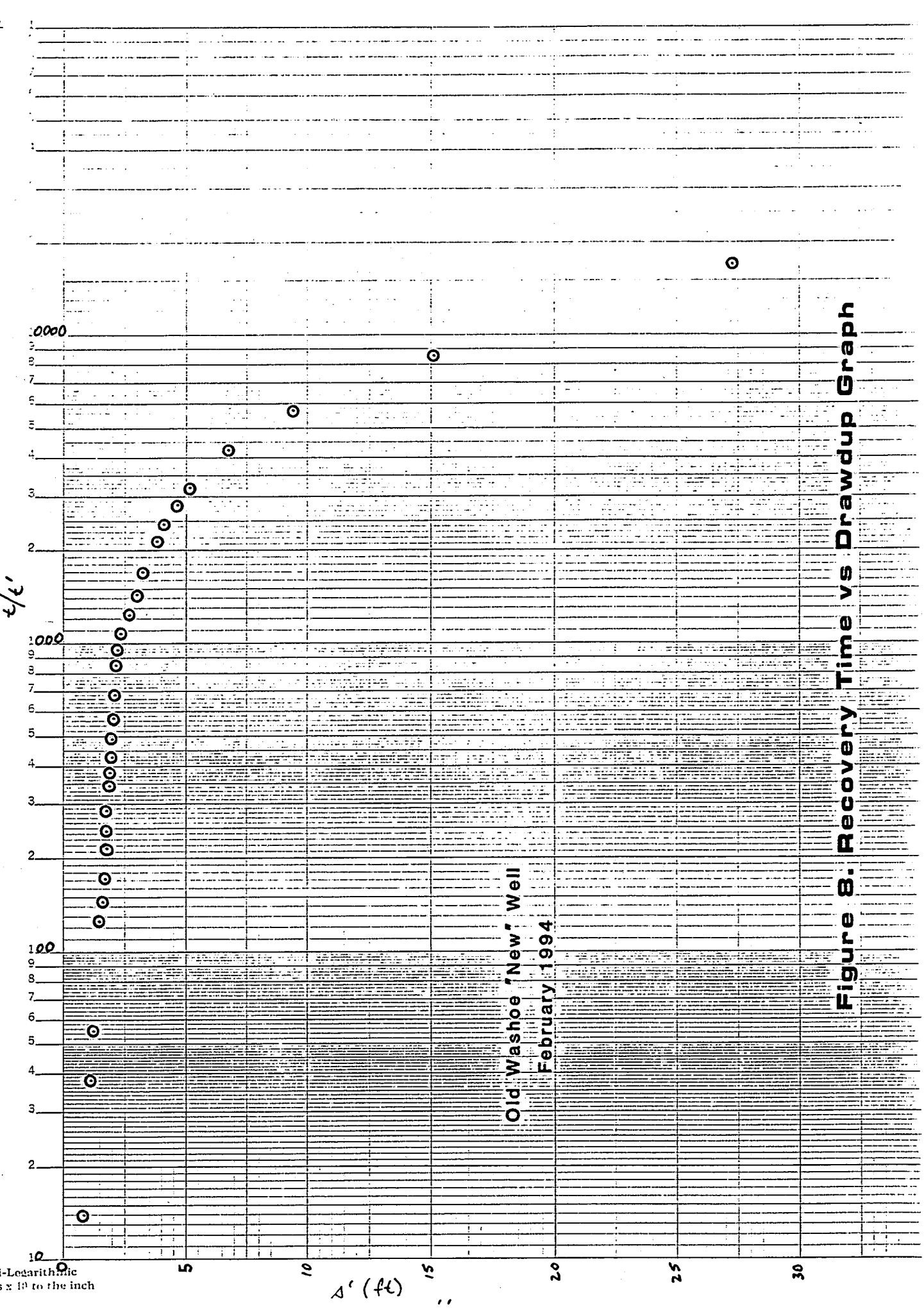


Figure 8: Recovery Time vs Drawdup Graph
Old Washoe "New" Well
February 1994
t/t'
Δ' (ft)
Semi-Logarithmic
4 Cycles x 10 to the inch

WATER QUALITY

Water quality analysis indicates that this water meets all state and federal drinking water standards. The water is a calcium-bicarbonate water. The total dissolved solids (TDS) is 217 ppm on average. Iron, manganese, fluoride and arsenic are well within limits. Table 2 lists the quality analysis taken during this testing period and other domestic wells (see figure 1).

Table 2
Water Quality Analysis
(ppm)

Date	TDS	Fe	Mn	As	F	SO4
Production Well						
12/16/93	NA	0.15	0.03	0.006	0.2	NA
01/27/94	267	0.08	<0.01	<0.005	0.2	5
02/03/94	198	0.03	<0.01	<0.005	0.2	4
02/07/94	185	0.05	<0.01		0.2	
Williams' well						
08/24/93	NA	0.30	0.12	NA	2.66	NA
Coveau well						
02/17/94	199	0.50	0.34	<0.005	1.5	6
Saladin well						
08/24/93	202	0.02	0.00	<0.003	0.16	2

CONCLUSIONS

This eight inch diamter well has sufficient capacity to meet the water requirements of the Old Washoe Estates Subdivision. The pumping test indicates that a recharge boundary stabilizes the pumping level in the well. This boundary is most likely the alluvial aquifer located approximately 100 feet to the east of the production well. Consequently, there are adequate, long term water resources for production requirements.

Water quality is a concern in this area of Washoe Valley. Reported areal water quality shows specific problems with iron, manganese, and fluoride. For example, the Mark Williams' domestic well (see figure 1), located 830 feet to the east of the production well, exceeds drinking water standards for iron, manganese and fluoride. These waters are associated with the valley floor. The production well is located in an aquifer upgradient from the valley floor and it is inferred that ground water flows from this aquifer to the valley floor sediments. Given that a hydraulic response was seen in the Coveaux domestic well, "overpumpage" of this production well has the potential to induce the migration of poor quality

water to the production well. Until more rigorous analysis is undertaken, a limitation should be placed on the annual pumpage of this production well.

RECOMMENDATION

It is recommended that this well be equipped to pump 150 gpm. This production well should not be used to supply more than 60 residential hookups or approximately 16 MGA (49 AFA). The following should be used for pump design.

Pumping rate	150 gpm
Pumping level	160 feet
Specific capacity	2.0 gpm/ft
Well diameter	8.12 inches
Pump intake setting	185 feet
Top of screen	190 feet

It is important that throughout the life of this well, regular water quality monitoring should be implimented at this well and the Coveau domestic well. This will provide a basis for assessing whether or not poor quality water is migrating to the production wells.

REFERENCES

Driscoll, Fletcher G., 1986. Groundwater and Wells. Johnson Filtration Systems, Inc., 2nd edition. 1089 p.

APPENDICES

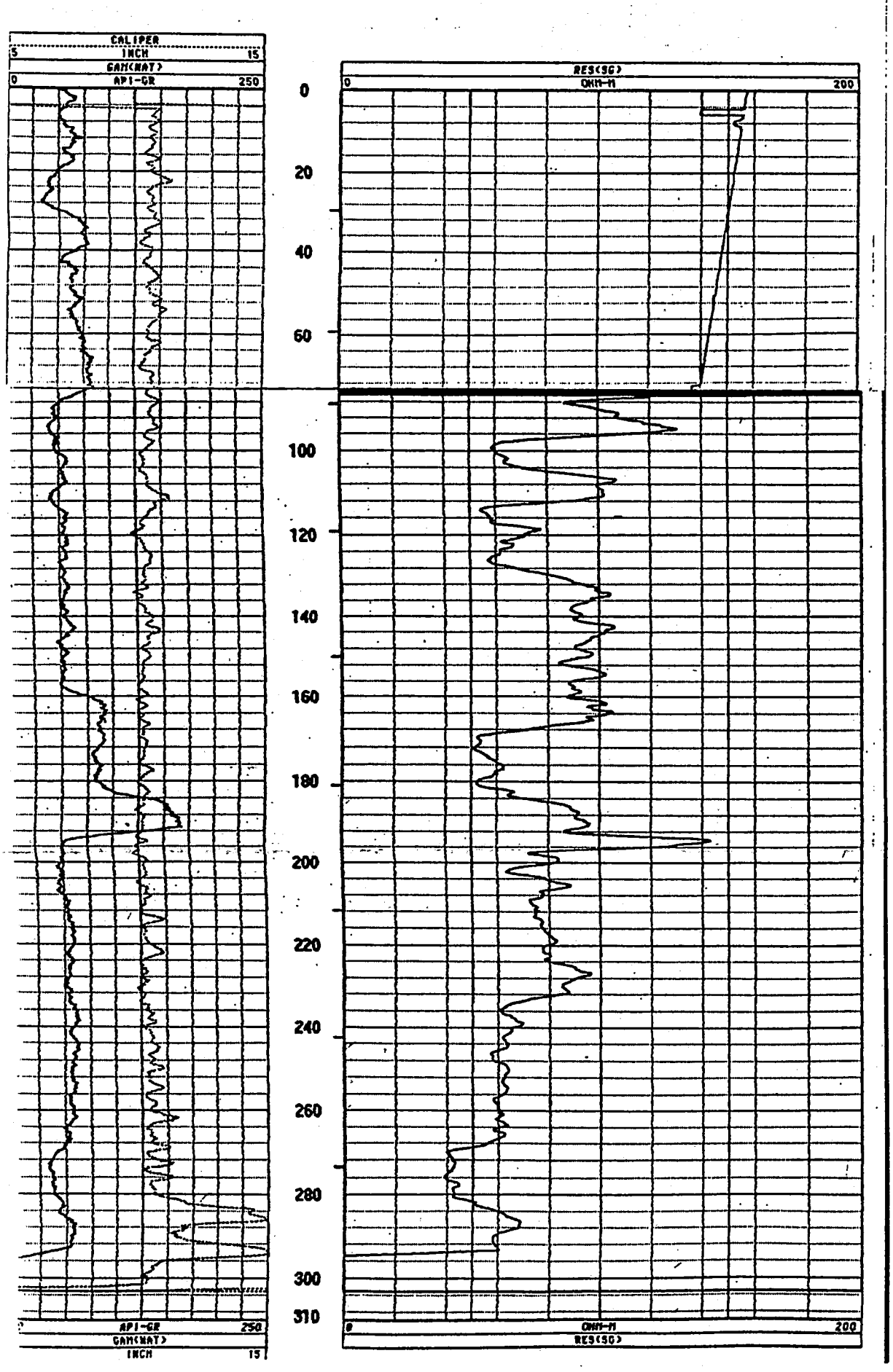
1. Geophysical Logs
2. Well Drillers Reports
3. Water Quality Reports
4. Coveau Pumping Test data
5. Production Well Pumping Test data

Century GEOPHYSICAL CORP.

OLD WASHO ESTATES

COMPANY	: FREDRICK DRILLING			OTHER SERVICES:	
WELL	: OLD WASHO ESTATES				
LOCATION/FIELD	: BEHIND CATTLEMANS				
COUNTY	: WASHOE				
STATE	: NEVADA				
SECTION	:	TOWNSHIP	:	RANGE	:
DATE	: 12/17/93	PERMANENT DATUM	:	ELEVATIONS	
DEPTH DRILLER	: 300	ELEV.-PERM. DATUM:	---	KB	:
LOG BOTTOM	: 303.30	LOG MEASURED FROM:	T.O.C.	DF	:
LOG TOP	: -3.30	DRL MEASURED FROM:	GL	GL	:
CASING DRILLER	: 20	LOGGING UNIT	: 9302		
CASING TYPE	: STEEL	FIELD OFFICE	: LAS VEGAS		
CASING THICKNESS	: .195	RECORDED BY	: R.FEDERWISCH		
BIT SIZE	: 9.8	BOREHOLE FLUID	: H20	FILE	: ORIGINAL
MAGNETIC DECL.	: 14.5	RM	:	TYPE	: 9835AA
MATRIX DENSITY	:	RM TEMPERATURE	:	LOG	: 7
FLUID DENSITY	:	MATRIX DELTA T	:	PLOT	: WASHO 3
NEUTRON MATRIX	:	FLUID DELTA T	:	THRESH	: 500000
REMARKS	:				

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



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

PRINT OR TYPE ONLY
DO NOT WRITE ON BACK

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLER'S REPORT

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

OFFICE USE ONLY
Log No.
Permit No.
Basin

NOTICE OF INTENT NO.

1. OWNER Washoe County
MAILING ADDRESS P.O. Box 11130
Reno, Nev. 89520

ADDRESS AT WELL LOCATION
(Cattleman's well)

2. LOCATION ¼ ¼ Sec. T N/S R E Washoe County

PERMIT NO. 34738/46604 (Issued by Water Resources) | 46-080-06 (Parcel No.) | 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
sands and silts		000	160	
andesite		160	300	

FEB 1994
RECEIVED
WASHOE COUNTY
UTILITY
DIVISION

Date started 12-13, 1993
Date completed 1-19, 1994

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

G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
100	185	6 hrs.

8. WELL CONSTRUCTION
Depth Drilled 300 Feet Depth Cased 272 Feet

HOLE DIAMETER (BIT SIZE)

	From	To
15 Inches	0 Feet	300 Feet
Inches	Feet	Feet
Inches	Feet	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
8		.250	0	190
8		screen	190	270
8		.250	270	272

Perforations:
Type perforation Agri-screen
Size perforation .050
From 190 feet to 270 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

Surface Seal: ☒ Yes ☐ No
Depth of Seal 100'
Placement Method: ☐ Pumped ☒ Poured

Seal Type:
☐ Neat Cement
☐ Cement Grout
☒ Concrete Grout

Gravel Packed: ☐ Yes ☐ No
From 100 feet to 300 feet

9. WATER LEVEL
Static water level 85 feet below land surface
Artesian flow G.P.M. P.S.I.
Water temperature °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 Fredrick Pump &&Well Drilling (Contractor)
Address P.O. Box 335 (Contractor)
Jackson, CA 95642

Nevada contractor's license number issued by the State Contractor's Board 0036313

Nevada driller's license number issued by the Division of Water Resources the on-site driller 1476

Signed (By driller performing actual drilling on site or contractor)
Date 2-2-94

(Rev. 3-91)

USE ADDITIONAL SHEETS IF NECESSARY

(O)-627

IN TRIPLICATE
(PLEASE PRINT OR TYPE)

94 FEB -7 PM 2:06

NEVADA STATE HEALTH LABORATORY
NEVADA DIVISION OF HEALTH
1660 N. Virginia Street
Reno, Nevada 89503
(702) 688-1335

110382

WATER CHEMISTRY ANALYSIS:

Attn: Fees may apply to some types of samples.

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

TYPE OF ANALYSIS:

☑ Check here for ROUTINE DOMESTIC ANALYSIS.
Circle the constituents needed for PARTIAL ANALYSIS.

PWS
COMM
2526.

State NV County WASHOE
Township 17N Range 19E Section 33
General Location WASHOE VALLEY
Source Address OFF OF JOY LAKE RD
APN - 19-46-080-06

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 TERRI SVETICH Date 2/7/94
Owner WASHOE CO Phone 785-4713
Address POBox 11130
City RENO State NV

REASON FOR ANALYSIS:

OLD WASHOE EST. NEW WELL

- ☐ 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 PUMP TEST
- Initials

POTENTIAL PUBLIC WATER SUPPLY WELL

REPORT TO:

Name TERRI SVETICH / WASHOE CO UTILITY DIV
Address POBox 11130 1195 B CORPORATE BLVD
City RENO
State NV Zip 89520

SOURCE OF WATER:

Filter ☐ Yes ☑ No
Public ☐ Yes ☑ No
Spring
Well ✓ Depth 270 ft.
Hot Cold ✓
IN USE ☑ Yes ☐ No

Type GW
Name WASHOE NEW WELL
Surface
Casing diameter in.
Casing depth ft.

10 DAY PUMP TEST

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

FOR LABORATORY USE ONLY

Constituent	ppm	Constituent	ppm	Constituent	ppm	Constituent	S.U.
T.D.S. @ 103° C.	185	Chloride	10	Iron	0.05	Color	3
Hardness	93	Nitrate -N	0.2	Manganese	0.00	Turbidity	0.2
Calcium	19	Alkalinity	138	Copper	0.00	pH	7.96
Magnesium	11	Bicarbonate	168	Zinc	0.01	EC	267
Sodium	23	Carbonate	0	Barium	0.03	SI@20C	-0.14
Potassium	4	Fluoride	0.20	Boron	0.0		
Sulfate	3	Arsenic	0.004	Silica	66		

-0.1711 239 0.69 31.0 6.8 -244 110382

MBAS K01

Gross Alpha 4 pCi/l
Gross Beta 5 pCi/l

RECEIVED
MAR 29 1994
...TH PROTECTION SERVICES

PRINT OTHER DESIRED CONSTITUENTS BELOW

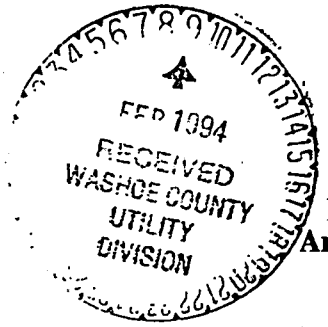
Constituent	ppm
Cd	<0.001
Cr	<0.005
Ag	<0.005
Hg	<0.0005
Pb	<0.005
Se	<0.001

Fee
Collected by
PWS I.D. N/A 2/11/94
SDWA—Pri. Sec.
1st 2nd 3rd
Date Rec'd Init.

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

Remarks Sig 3/24/94 KTR
Sig 3/16/94
CHEMICAL QUALITY MEETS THE STATE OF NEVADA DRINKING WATER STANDARDS
DP

O-1561 (Rev. 4-92)



Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

WASHOE COUNTY UTILITY DIV.
MIKE WIDMER
P.O. BOX 11130
RENO NV 89520

Date : 2/08/94
Client : WAS-314
Taken by: W.C.U.D.-MIKE WIDMER
Report : 9912
PO# : 3604

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
OWE #1	1/27/94	16:30	139B	<5	7.39	267	0.6N	<0.005

Sample	Collected Date	Time	BARIUM MG/L	CALCIUM MG/L	COPPER MG/L	IRON MG/L	MAGNESIUM MG/L	MANGANESE MG/L
OWE #1	1/27/94	16:30	0.03	18	<0.02	0.08	11	<0.01

Sample	Collected Date	Time	POTASSIUM MG/L	SODIUM MG/L	ZINC MG/L	CHLORIDE MG/L	FLUORIDE MG/L	SULFATE MG/L
OWE #1	1/27/94	16:30	5.4	22	0.02	7	0.2	5

Sample	Collected Date	Time	MBAS MG/L
OWE #1	1/27/94	16:30	<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.

William F. Pillsbury
President

47 Glen Carran Circle
Sparks, Nevada 89431
Phone (702) 356-3868
FAX (702) 356-8037

John C. Seher
Chemist

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

WASHOE COUNTY UTILITY DIV.
MIKE WIDMER
P.O. BOX 11130
RENO NV 89520

Date : 2/11/94
Client : WAS-314
Taken by: WASHOE COUNTY-M.WIDMER
Report : 9964
PO# : 3605

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
OWE 2	2/03/94	17:30	138B	<5	7.05	198	1.5N	<0.005

Sample	Collected Date	Time	BARIUM MG/L	CALCIUM MG/L	COPPER MG/L	IRON MG/L	MAGNESIUM MG/L	MANGANESE MG/L
OWE 2	2/03/94	17:30	0.03	18	<0.02	0.03	11	<0.01

Sample	Collected Date	Time	POTASSIUM MG/L	SODIUM MG/L	ZINC MG/L	CHLORIDE MG/L	FLUORIDE MG/L	SULFATE MG/L
OWE 2	2/03/94	17:30	5.3	22	0.02	8	0.2	4

Sample	Collected Date	Time	MBAS MG/L
OWE 2	2/03/94	17:30	<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.

47 Glen Carran Circle
Sparks, Nevada 89431
Phone (702) 356-3868
FAX (702) 356-8037

William F. Pillsbury
President

John C. Seher
Chemist

Sierra Environmental Monitoring, Inc.

47 Glen Carran Circle
Sparks, NV 89431
(702) 356-3868

Laboratory Analysis Report

Date : 12/17/93
Report : 9669
Client : WAS-314 PO#:
Taken by : WASHOE COUNTY UTIL.-M. WIDMER
Name : WASHOE COUNTY UTILITY DIV.
Address : P.O. BOX 11130
City/St/Zip: RENO NV 89520

Sample	Collected Date	Collected Time	ARSENIC MG/L	IRON MG/L	MANGANESE MG/L	FLUORIDE MG/L		
OLD WASHOE ESTATES NEW WELL	12/16/93	15:00	0.006	0.15	0.03	0.2		

Approved By: _____

IN TRIPLICATE
(PLEASE PRINT OR TYPE)

046-060-19

NEVADA STATE HEALTH LABORATORY

NEVADA DIVISION OF HEALTH
1660 N. Virginia Street
Reno, Nevada 89503
(702) 688-1335

106463

WATER CHEMISTRY ANALYSIS:

Attn: Fees may apply to some types of samples.

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 23
General Location NW WASHOE VALLEY
Source Address 19 SOUTH WIND DR

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 TERRI SVETICH Date 8/24/93
Owner JIM SALADIN Phone
Address 19 SOUTH WIND DR
City CARSON CITY State NV

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

REPORT TO:

Name TERRI SVETICH / WC UTILITY DIV
Address PO BOX 11130
City RENO
State NV Zip 89520

SOURCE OF WATER:

Filter ☐ Yes ☑ No
Public ☐ Yes ☑ No
Spring
Well ✓ Depth 570 ft.
Hot Cold ✓
IN USE ☑ Yes ☐ No

Type GROUNDWATER
Name
Surface
Casing diameter in.
Casing depth ft.

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

FOR LABORATORY USE ONLY: 0.1134 | 245 | 0.71 | 30.9 | 7.5 | 367.3 | 106463

Constituent	ppm	Constituent	ppm	Constituent	ppm	Constituent	S.U.
T.D.S. @ 103° C.	202	Chloride	0	Iron	0.02	Color	3
Hardness	111	Nitrate -N	0.4	Manganese	0.00	Turbidity	0.2
Calcium	23	Alkalinity	150	Copper	0.10	pH	7.51
Magnesium	13	Bicarbonate	183	Zinc	0.15	EC	283
Sodium	20	Carbonate	0	Barium	0.07	SI@20C	-0.20
Potassium	4	Fluoride	0.16	Boron	0.0		
Sulfate	2	Arsenic	<.003	Silica	66		

PRINT OTHER DESIRED CONSTITUENTS BELOW

Constituent	ppm

RECEIVED
OCT 15 1993
HEALTH PROTECTION SERVICES

CHEMICAL QUALITY MEETS THE STATE OF NEVADA DRINKING WATER STANDARDS.

Fee 20- BILLED
Collected by 8/27/93 QM
PWS I.D.
SWA—Pri. Sec.
Is 2nd 3rd
Date Rec'd 8/24/93 Init.

Remarks

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

IN TRIPLICATE
(PLEASE PRINT OR TYPE)

NEVADA STATE HEALTH LABORATORY
NEVADA DIVISION OF HEALTH
1660 N. Virginia Street
Reno, Nevada 89503
(702) 688-1335

106475

WATER CHEMISTRY ANALYSIS:

Attn: Fees may apply to some types of samples.

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 23
General Location WASHOE VALLEY
Source Address 355 US 395 - CARSON CIT

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 TERRI SVETICH Date 8/24/93
Owner MARK WILLIAMS Phone
Address 355 W HWY 395
City CARSON CITY State NV

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

REPORT TO:

Name TERRI SVETICH
Address POBOX 11130
City RENO
State NV Zip 89520

SOURCE OF WATER:

Filter ☐ Yes ☑ No
Public ☐ Yes ☑ No
Spring
Well ✓ Depth ? ft.
Hot Cold ✓
IN USE ☑ Yes ☐ No

Type GROUNDWATER
Name
Surface
Casing diameter in.
Casing depth ft.

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

FOR LABORATORY USE ONLY

Constituent	ppm	Constituent	ppm	Constituent	ppm	Constituent	S.U.
T.D.S. @ 103° C.		Chloride		Iron	0.30	Color	
Hardness		Nitrate –N		Manganese	0.12	Turbidity	
Calcium		Alkalinity		Copper		pH	
Magnesium		Bicarbonate		Zinc		EC	
Sodium		Carbonate		Barium		SI@20C	
Potassium		Fluoride	2.66	Boron			
Sulfate		Arsenic					

106475

PRINT OTHER DESIRED CONSTITUENTS BELOW

Constituent	ppm

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

RECEIVED
OCT 15 1993
HEALTH PROTECTION SERVICES

Fee 19-BILLED
Collected by 8/27/93 CM
WS I.D.
SDWA—Pri. Sec.
1st 2nd 3rd
Date Rec'd 8/24/93 Init. T

Remarks
fluoride secondary
(aesthetic) std. = 2.0 ppm
Eng 9-16
T

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

O-1561 (Rev. 4-92)

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

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

Date : 3/03/94
Client : WAS-314
Taken by: WASHOE UTILITY-D. DRAGAN
Report : 10035
PO# : 003610

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
COVEAU WELL	2/17/94	10:00	117B	5	7.68	199	<0.1N	<0.005

Sample	Collected Date	Time	BARIUM MG/L	CALCIUM MG/L	COPPER MG/L	IRON MG/L	MAGNESIUM MG/L	MANGANESE MG/L
COVEAU WELL	2/17/94	10:00	0.08	12	<0.02	0.50	5.8	0.34

Sample	Collected Date	Time	POTASSIUM MG/L	SODIUM MG/L	ZINC MG/L	CHLORIDE MG/L	FLUORIDE MG/L	SULFATE MG/L
COVEAU WELL	2/17/94	10:00	3.6	32	<0.02	5	1.5	6

Sample	Collected Date	Time	MBAS MG/L
COVEAU WELL	2/17/94	10:00	<0.05

Drinking Water Standards

IRON 0.30
MANGANESE 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 paic 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.

47 Glen Carran Circle
Sparks, Nevada 89431
Phone (702) 356-3868
FAX (702) 356-8037

William F. Pillsbury
President

John C. Seher
Chemist

WASHOE COUNTY

Water Quality

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Old Washoe
~~PUMPING~~ / OBSERVATION WELL
PUMPING / RECOVERY DATA
PAGE 1 OF 2

TYPE of PUMPING TEST Constant Discharge
HOW Q MEASURED orifice plate, manometer
HOW WL's MEASURED actat 1000'
PUMPED WELL NO. _____
RADIUS of PUMPED WELL _____
DISTANCE from PUMPED WELL _____

M.P. for WL's _____ elev. _____
DEPTH of PUMP/AIRLINE _____ wrt _____
% SUBMERGENCE: initial _____ ; pumping _____
PUMP ON: date 1-26-94 time 0900
PUMP OFF: date 2-7-94 time 1000

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins/hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'			Q	(NOTE ANY CHANGES IN OBSERVERS)
1/26 1230					pH=	7.18 cond = .260		Turb = 1		Temp = 16.3		salinity = .01
1650					pH=	7.41 COND = .250		Turb = 1		Temp = 16.2		SALINITY = .00
1920					pH=	7.31 COND = .250		Turb = 0		Temp 16.3		SALINITY .00
2140					pH=	7.41 COND = .246		Turb = 0		Temp 16.5		SALINITY = .00
1/27 0930					"	7.38 "	.249	"	0	"	16.5	" = .00
1300						7.55	.249				16.7	
1630						7.28	.247		0		16.6	0.00
2030						7.38	.247		0		16.6	0.00
1/28 0130						7.25	.249		0		16.1	0.00
0420						7.34	.247	DO .99	0		15.9	0.0
0900						7.34	.246		0		16.3	0.0
1245						7.28	.246		0		16.7	0.0
1620						7.32	.247		0		16.8	.00
1820						7.36	.249		0		16.6	
2200						7.33	.245				16.6	
1/29 1700						7.39 7.37	.250	—	0		16.9	.00
2100						7.38	.249		0		16.5	.00
1/30 0230						7.38	.246		0		16.1	.00
0930						7.38	.247		0		15.8	.00
1300						7.41	.246				16.4	
1800						7.38	.246				16.5	
1/31 1200						7.25	.258		0		15.3	00
1500						7.27	.255		0		16.4	0
2130						7.20	.257		0		15.5	0
2/1 1115						7.29	.254		0		16.7	0
2/2 1400						7.30	.257				17.3	
2/3 2000						7.25	.257				17.2	
2330						7.30	.255				16.9	
2/4 0730						7.23	.254				16.1	
1400						7.21	.253				16.9	
2050						7.31	.250				17.0	
						7.28	.250				16.3	
2/5 1015						7.34	.254				16.6	
												RECAL & NEW BATTERY
1630						7.23	.263				17.4	SAL = 0.01
1800						7.28	.253				17.2	SAL 0.00
2/6 0700						7.28	.251				15.8	
1200						7.33	.256				16.9	
1600						7.32	.248				17.6	

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Old Washoe
PUMPING / OBSERVATION WELL
PUMPING / RECOVERY DATA
PAGE 2 OF 2

TYPE of PUMPING TEST Constant Discharge
HOW Q MEASURED orifice plate, manometer
HOW WL's MEASURED steel tape
PUMPED WELL NO. _____
RADIUS of PUMPED WELL _____
DISTANCE from PUMPED WELL _____

M.P. for WL's _____ elev. _____
DEPTH of PUMP/AIRLINE _____ wrt _____
% SUBMERGENCE: initial _____ ; pumping _____
PUMP ON: date 1-26-94 time 1900
PUMP OFF: date 2-7-94 time 1000

TIME t = at t' = 0					WATER LEVEL DATA STATIC WATER LEVEL					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins / hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'			Q	(NOTE ANY CHANGES IN OBSERVERS)
					PH	Cond	Temp					
2130					7.26	0.249	16.7					
0715					7.22	0.247	15.9					
1700					7.28	0.247	15.8					
1900					7.27	0.246	17.2					
2230					7.38	0.249	16.4					
0800					7.13	0.249	15.8					

JTIL-16

WASHOE COUNTY

"To Protect and To Serve"

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

1195-B CORPORATE BOULEVARD
POST OFFICE BOX 11130
RENO, NEVADA 89520
PHONE: (702) 785-4743
FAX #: (702) 785-4378

21 March 1994

Mr. Edmund Coveau Jr.
397 US 395 N.
Carson City, Nevada 89704

Dear Mr. Coveau,

Enclosed are copies of the test pumping and water quality tests I ran on your well. The results show you have a good domestic well in terms of yield, long term reliability and water quality.

The only constituents that exceed recommended limits are Iron and Manganese. I wrote the limits on the quality report data sheet. Iron and Manganese are not harmful at these levels but, as you well know, can be tasted and cause significant staining problems.

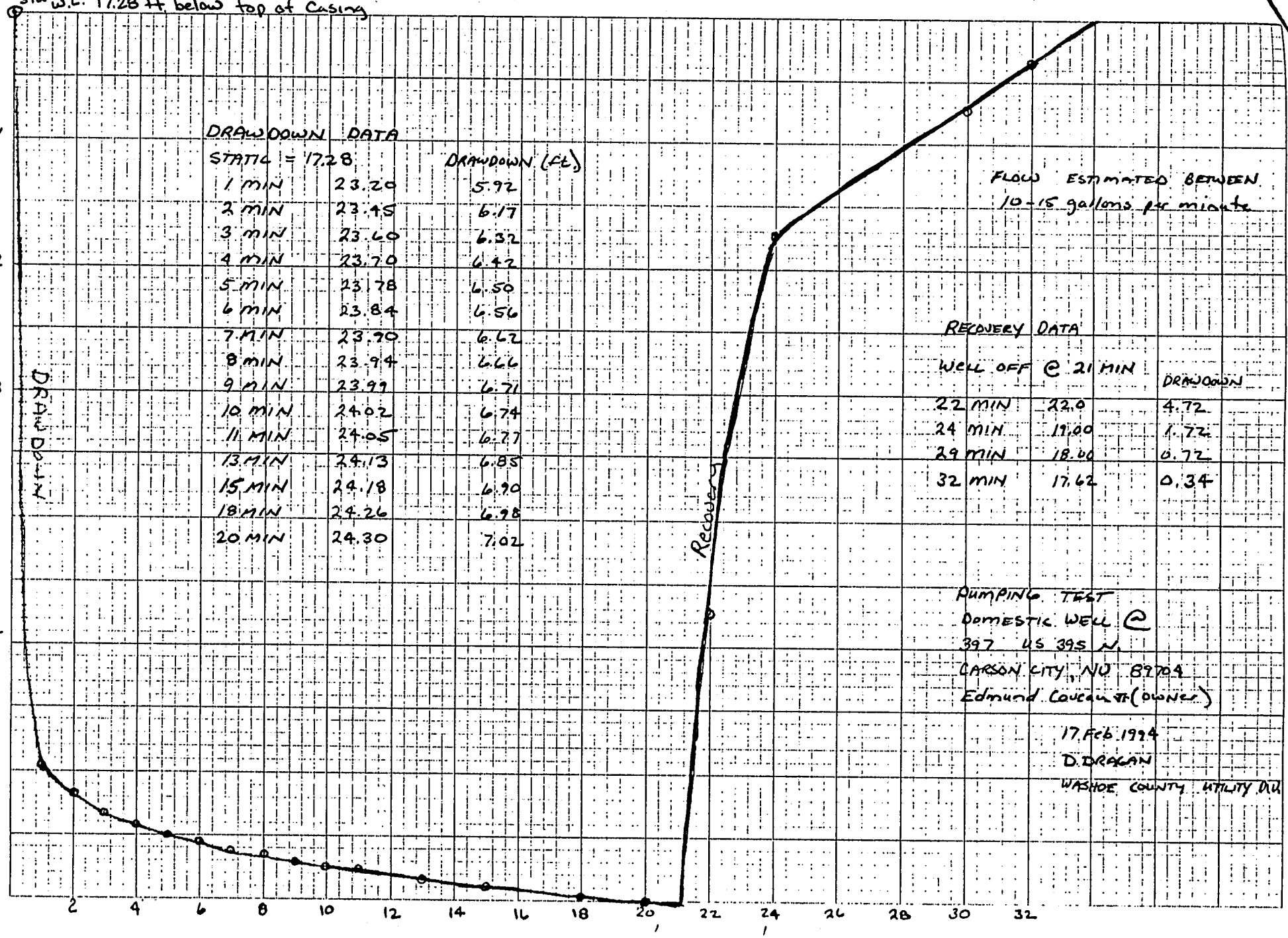
Thank you very much for allowing us to use your well as a monitoring well during our test pump. We will continue to monitor it periodically and will send you data periodically. Please call me at 785-4743 if you have any questions or comments.

Sincerely,

Dan Dragan
Hydrogeologist

DCD/dcd

10 Squares to the Inch



DRAWDOWN DATA

STATIC = 17.28

		DRAWDOWN (ft)
1 MIN	23.20	5.92
2 MIN	23.45	6.17
3 MIN	23.60	6.32
4 MIN	23.70	6.42
5 MIN	23.78	6.50
6 MIN	23.84	6.56
7 MIN	23.90	6.62
8 MIN	23.94	6.66
9 MIN	23.99	6.71
10 MIN	24.02	6.74
11 MIN	24.05	6.77
13 MIN	24.13	6.85
15 MIN	24.18	6.90
18 MIN	24.26	6.98
20 MIN	24.30	7.02

FLOW ESTIMATED BETWEEN 10-15 gallons per minute

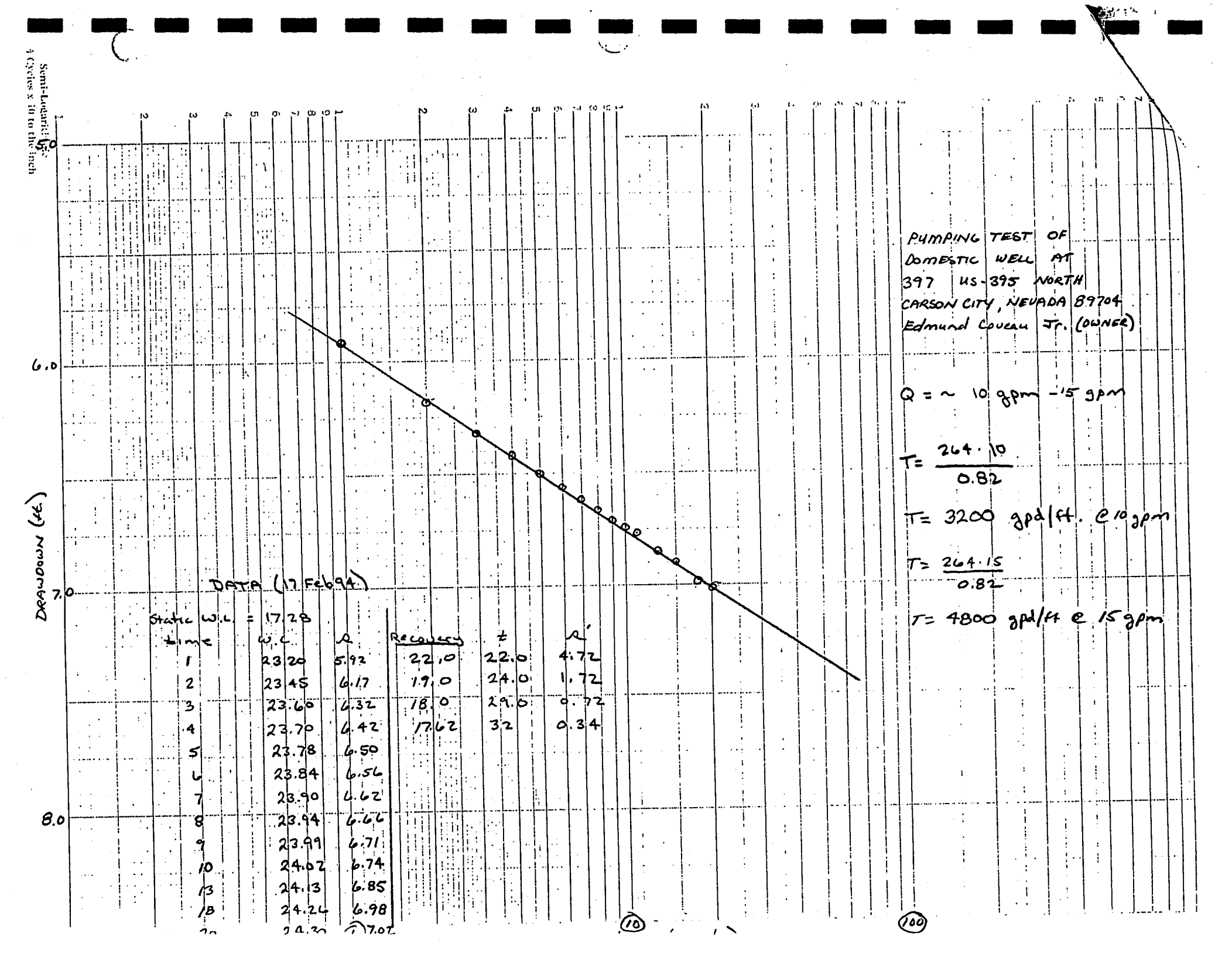
RECOVERY DATA

WELL OFF @ 21 MIN

		DRAWDOWN
22 MIN	22.0	4.72
24 MIN	19.00	1.72
29 MIN	18.00	0.72
32 MIN	17.62	0.34

PUMPING TEST
DOMESTIC WELL @
397 US 395 N.
CARSON CITY, NV 89704
Edmund Coucault (owner)

17 Feb 1994
D. DRAGAN
WASHOE COUNTY UTILITY DIV.



time	W.L	s	Recovery	t	s'
1	23.20	5.92	22.10	22.0	4.72
2	23.45	6.17	19.10	24.0	1.72
3	23.60	6.32	18.0	29.0	0.72
4	23.70	6.42	17.62	32	0.34
5	23.78	6.50			
6	23.84	6.56			
7	23.90	6.62			
8	23.94	6.66			
9	23.99	6.71			
10	24.02	6.74			
13	24.13	6.85			
18	24.24	6.98			
20	24.30	7.01			

17 Feb 94

Pumping test

Domestic Well

8-10 am

Edmund Covelli JC

397 US 395 N

CARSON CITY NV 89704

STATIC	17.28			
	23.2	1 min	5.92	
	23.45	2 min	6.17	
	23.60	3 min	6.32	
	23.70	4 min	6.42	
	23.78	5 min	6.50	
	23.84	6 min	6.56	LOST IRON TASTE SINCE OUR PUMPING TEST
	23.90	7 min	6.62	
	23.94	8 min	6.66	
	23.99	9 min	6.71	
	24.02	10 min	6.74	24.30 1.3 gl/m/ft
	24.05	11 min	6.77	17.28
	24.13	13 min	6.85	7.02 30
	24.18	15 min	6.90	
	24.26	18 min	6.98	
	24.30	20 min	7.02	

	22.0	22	4.72	42
	19.1	~~29~~ 23:50	1.72	21
	18.0	29.36	0.72	21
	17.62	32.00	0.34	21

collected sample & delivered to Sierra Environmental Monitoring

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Old Washoe Estates
(PUMPING) / OBSERVATION WELL
PUMPING / RECOVERY DATA
PAGE 1 OF 3

TYPE of PUMPING TEST Step drawdown
HOW Q MEASURED orifice 4x3
HOW WL's MEASURED actat 1000'
PUMPED WELL NO. Old Washoe Estates
RADIUS of PUMPED WELL 84
DISTANCE from PUMPED WELL

M.P. for WL's top 3/4" elev.
DEPTH of PUMP/AIRLINE 235 intakewrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date 1-25-94 time 0945
PUMP OFF: date 1-25-94 time 1450

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 86.58					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins / hrs	t	t'	t / t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'		in.	Q	(NOTE ANY CHANGES IN OBSERVERS)
0945		0			–							
		1			–							
		2			–							
		3			134.75			48.25		8"	114	gate valve
		4			133.66			47.16				fluctuates Q
		5			133.11			46.61				
		6			133.25			46.75				
		7			134.15			47.65				
		8			133.80			47.30				
		9			134.76			48.26				
		10			135.00			48.50		8"	114	
		12			134.90			48.40				
		14			135.00			48.50				
		16			134.64			48.14				
		18			135.03			48.53		8"	114	
		20			134.51			48.01				
		25			134.70			48.20				
		30			134.59			48.09				
		35			134.57			48.07		8"	114	
		40			134.51			48.01				
		45			133.91			47.41		<8"		Q↓
		50			134.33			47.83				
		60			134.25			47.75		≤8"		fluctuating Q
		70			133.93			47.43		<8"		Q↓
		80			134.45			47.95				
		90			135.20			48.70		8"		Q ok
		100			134.75			48.25		8"		Q↑ to 16"
		1			157.25			70.75		16"		
		2			156.75			69.25				
		3			157.73			71.23		16"		
		4			158.54			72.04				Q↑
		5			159.30			72.80		16"		
		6			160.00			73.50		16"		
		7			160.49			73.99				
		8			160.82			74.32				
		9			161.23			74.73				
		10			161.71			75.21		16"		

JTIL-18

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Old Washoe
PUMPING / OBSERVATION WELL
PUMPING / RECOVERY DATA
PAGE 2 OF 3

TYPE of PUMPING TEST STEP DRAWDOWN
HOW Q MEASURED orifice 3x4
HOW WL's MEASURED Actat 10001
PUMPED WELL NO. OLD WASHOE Estates
RADIUS of PUMPED WELL 8"
DISTANCE from PUMPED WELL

M.P. for WL's top 3/4" PVC elev.
DEPTH of PUMP/AIRLINE 235' intake wrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date 1-25-94 time 940
PUMP OFF: date 1-25-94 time 1450

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 86.50					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins / hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'		In.	gpm Q	(NOTE ANY CHANGES IN OBSERVERS)
		12			162.11			75.61		16"	161	
		14			162.42			75.92		<16		Q↑
		16			163.25			76.75		≥16		Q↓
		18			163.77			77.27		16		
		20			164.02			77.52		16	161	
		25			164.62			78.12				
		30			165.00			78.50		16	161	
		35			165.00			78.50		16		
		40			165.00			78.50		16		Q ok, steady
		50			165.25			78.75		<16		Q↑
		60			166.26			79.76		16	161	
		70			166.49			79.99		16		
		80			168.32			81.82		16		
		90			167.33			80.83		≥16		
		100			167.19			80.69				
		1			179.68			93.18		26"	205	
		2			185.63			99.13				
		3			189.08			102.58		26		
		4			191.80			105.30				
		5			195.24			108.74		≥26	205	Q↑
		6			197.45			110.95				
		7			198.48			111.98		26		
		8			199.24			112.74				Q↑
		9			200.08			113.58				
		10			200.78			114.28		26"		
		12			201.58			115.08				
		14			202.46			115.96		26		
		16			202.96			116.46				
		18			203.50			117.00				
		20			203.43			116.93		26		
		25			205.00			118.50				
		30			205.77			119.27				
		35			206.19			119.69		26		
		40			206.10			119.60				
		45			206.47			119.97				
		50			206.26			119.76		26	205	
		60			207.16			120.66				

JTIL-16

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Old Washoe
PUMPING / OBSERVATION WELL
PUMPING / RECOVERY DATA
PAGE 3 OF 3

TYPE of PUMPING TEST STEP DRAWDOWN
HOW Q MEASURED Orifice 4x3
HOW WL's MEASURED Actat 1000'
PUMPED WELL NO. Old Washoe Estates
RADIUS of PUMPED WELL 8"
DISTANCE from PUMPED WELL

M.P. for WL's 3/4" PVC elev.
DEPTH of PUMP/AIRLINE 235 ft wrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date 1-25-94 time 940
PUMP OFF: date 1-25-94 time 14:45

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 86.50					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins/hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'		in	Q	(NOTE ANY CHANGES IN OBSERVERS)
		70			207.43			120.93		26		
		80			207.11			120.61		≤26	205	Q↑
		90			207.22			120.72				
1445		100			207.95			121.45		26		

JTIL-16

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Old Washoe
(PUMPING) / OBSERVATION WELL
(PUMPING) / RECOVERY DATA
PAGE 1 OF 5

TYPE of PUMPING TEST Constant Discharge
HOW Q MEASURED Manometer — M.P. for WL's T.O.C — elev. ____
HOW WL's MEASURED Electric Sounder — DEPTH of PUMP/AIRLINE ____ — wrt ____
PUMPED WELL NO. ____ — % SUBMERGENCE: initial ____ ; pumping ____
RADIUS of PUMPED WELL 8" casing — PUMP ON: date 1/26/94 time 10:00 Am *Restart @12:
DISTANCE from PUMPED WELL ____ — PUMP OFF: date 2-7-94 time 0940

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 86.60					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins / hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	(s) or s'		h"	Q	(NOTE ANY CHANGES IN OBSERVERS)
1001		1			150.87			64.27				
		2			160.31			73.71				
		3			167.79			81.19				
		5			170.51			83.91				
		6			173.36			86.76				
		7			173.67			87.02				
		8			174.34			87.74				
		9			174.68			88.08				
		10			174.59			87.99		20"	Q↑	
		12			176.50			89.90				
		14			176.92			90.32				
		16			177.17			90.57				
		18			177.78			91.18				
		20			178.08			91.48				
		22			177.80			91.20			Q↑	
		25			178.40			91.80				
1030	30 —	30			178.74			92.14		20"	Q↑	ADJUST PACKING NUT ON GATE VALVE
		35			179.75			93.15				
		40			180.23			93.63				
		45			180.25			93.65				
		50			180.00			93.40				
		55			180.15			93.55				
	11	60				PUMP APPARATUS STOPS						
12:20	START	(Restart)				NEW STATIC	86.83					
X	X	X	X	X	X	X	X	X	X	X	X	RESTART
12:25		5			168.64			81.81		20"		
		10			172.62			85.79				
		12			174.64			87.81				
		15			175.90			89.07				
		18			176.32			89.49				
		20			176.29			89.46				
		25			176.14			89.31				
		30			176.50			89.67				Q↑
		35			177.31			90.48				
		40			178.43			91.60				
		45			178.18			91.35				
		50			178.18			91.35		20"		
		60			178.85			92.02				
		70			179.42			92.59				

JTIL-16

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Old Washoe
~~PUMPING~~/OBSERVATION WELL
~~PUMPING~~/RECOVERY DATA
PAGE 2 OF 5

TYPE of PUMPING TEST CONSTANT Q
HOW Q MEASURED orifice & manometer
HOW WL's MEASURED Actat
PUMPED WELL NO.
RADIUS of PUMPED WELL 8"
DISTANCE from PUMPED WELL

M.P. for WL's T.O.C. elev.
DEPTH of PUMP/AIRLINE wrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date 1/26/94 time 12:20
PUMP OFF: date 2-7-94 time 0940

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 8683 and 88.18					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins/hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'			Q	(NOTE ANY CHANGES IN OBSERVERS)
	/	94			182.62			95.79		20"	175	
	/	100			182.69			95.86				
	/	120			182.98			96.15				
2:40 P	/	140			183.13			96.30		20"		
3:00 P	/	160			183.26			96.43				
3:20 P	3 /	180			183.59			96.76				
340 P	/	200			183.63			96.80			175	
4:00 P	/	220			183.78			96.95				
430	10 / 4	250			183.73			96.90				
5:00	40 / 4	280			183.68			96.85				E.E.
530	10 / 5	310			182.79			95.96			Q↑	MANOMETER WENT TO 19 1/2" AFTER ATTEMPTING FOR FREE FLOW
6:00	/	340			186.32			99.49		19¼-19½		AIR ENTRAINED IN TUBE
6:30	/	370			186.24			99.41		20½"		
7:00	/	400			186.29			99.46		19¼"		MANOMETER TRAPS AIR WHEN LAID DOWN TO PAVEMENT
7:30	/	430			186.35			99.52		20¼"		FREEZING. AT 7:30 GOT ALL AIR OUT.
8:00	/	460			186.29			99.46		20¼-20½"		
9:00	/	520			185.96			99.13				
10:00	/	580			186.03			99.20				
2300	/	640			186.02			99.19		20"		Filled Generator ≈ 30 gallons
2400	/	700			185.27			98.44				
0017	/	2			98.51	generator began to cut out - start recovery						
	/	4			91.51							
	/	6			89.94							
	/	8			89.26							
	/	10			88.75							
	/	15			88.18*	use as static						
0035	/	0			171.24	generator begins to run smooth				20"		
0050	/	15			176.63			88.45		20¼"		
0100	/	25	760		177.98			89.80		20"	Q↑	
0105	/	30			178.15			89.97		20"	Q↑	
0115	/	40			179.23			91.05		20"	Q↑	
0125	/	50			179.25			91.07		20"	Q↑	
0135	/	60			180.29			92.11		20"	Q↑	
0155	/	80			180.62			92.44		20"	Q↑	
0215	/	100	835		182.80			94.62	95.97			
0305	/	150	885		181.07			92.89		20"	Q↑	
0410	/	215	950		184.30			96.12	97.47	20"	Q↑	
0515	/	280	1015		185.88			97.70		20"	Q ok	!! Fueled generator
0630	/	355	1090		185.42			97.24	98.59	20"		
	/											

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WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL old Washoe
~~PUMPING~~/OBSERVATION WELL
~~PUMPING~~/RECOVERY DATA
PAGE 3 OF 5

TYPE of PUMPING TEST Q-constant
HOW Q MEASURED orifice & manometer
HOW WL's MEASURED Actat
PUMPED WELL NO. _____
RADIUS of PUMPED WELL 8"
DISTANCE from PUMPED WELL _____

M.P. for WL's T.O.C. elev. _____
DEPTH of PUMP/AIRLINE _____ wrt _____
% SUBMERGENCE: initial _____ ; pumping _____
PUMP ON: date 1/26/94 time 0035
PUMP OFF: date 2-7-94 time 0945

TIME t =		ELAPSED TIME			WATER LEVEL DATA STATIC WATER LEVEL 88.18 →			S or S' ↓ 86.837		WATER PRODUCT.		COMMENTS
CLOCK TIME	at t'=0 mins/hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL				Q	(NOTE ANY CHANGES IN OBSERVERS)
1/27 0805		450	1185		184.36			96.18	97.53			Joe w/ Owen Bros. stops will return @ noon w/ fuel
0855		500	1235		183.44			95.26	96.61	20¼"	Q↑	
0945		550	1285		186.51			98.33	99.68	20"		Q↑ @ 1000
1035		600	1335		187.61			99.43	100.78	20¼"		
1125		650	1385		187.41			99.23	100.58	20"		
1220		705	1440		187.35				100.52	20"		MW, Joe fuels
1330			1510		187.35				100.52	20"		Quality
1430			1570		187.45				100.62	∈20"		
1530			1630		187.51				100.68	20"		
1630		965	1690		187.62				100.79	20"		Quality, fueled
1830			1810		187.65				100.82	20"		
1930			1870		189.04				102.21	20½		Q↓ ↑↓, man. running
2030			1930		188.87				102.04	≤20¼		Quality
2100			1960		188.21				101.38	≥20		
2130			1990		188.12				101.29	20¼		fuel
1/28 0100			2200		187.61				100.78	20¼		
0405			2385		187.98				101.15	20¼		
0435					—				—	—		Fuel (8 Light Brs on fuel gage)
0700			2560		188.14				101.31	20⅛		FUELED @ 0830 BY OPUMP
1010			2750		187.54				100.71	20¼-⅓	Q↑	EE
1300			2920		187.51				100.68	20¼		QUALITY @ 1245
1600			3,100		187.50				100.67	20¼"		Quality @ 1620 Q:
1900			3280		188.03				101.20	20¼-20½"		QUALITY @ 1820 (FILLED @ 0130 ON
2200			3460		188.52				101.69	"		fueled, Quality, MW
1/29 2400			3580		188.55				101.72	"		
0250			3750		188.50				101.67	"		fueled
0640			3980		187.66				100.83	20"		0830 Joe brings fuel/fills
0940			4160		186.80				99.97	19¾-20"	Q↑	Q↑ @ 1145 too
1400			4420		187.52				100.69	19½"	Q↑	Filled gen @ 1630 was ½ full ≅ 15 gp = use 150 gp
1800			4660		188.77				101.94	20½"-21"		
1000 2200			4900		188.09				101.26	20¼"		EE FUELED @ 1015
1/30 0200			5140		187.25				100.42	19½-20"	Q↑	
0700			5440		187.43				100.60	19½"	Q↑	ADJUST Q @ 0615
1000			5620		187.75				100.92	20		MW
1300			5800		187.66				100.83	20		
1600			5980		187.53				100.70	20		
1900			6160		187.35				100.52	20		

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WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Old Washoe Estates
(PUMPING / OBSERVATION WELL)
(PUMPING / RECOVERY DATA)
PAGE 4 OF 5

TYPE of PUMPING TEST Constant Q
HOW Q MEASURED orifice 4x3
HOW WL's MEASURED Actat 1000
PUMPED WELL NO. _____
RADIUS of PUMPED WELL 8"
DISTANCE from PUMPED WELL _____

M.P. for WL's T.O.C. elev. _____
DEPTH of PUMP/AIRLINE _____ wrt _____
% SUBMERGENCE: initial _____ ; pumping _____
PUMP ON: date 1-26-94 time 1220
PUMP OFF: date 2-7-94 time 0945

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 86.83					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins/hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'		in	Q	(NOTE ANY CHANGES IN OBSERVERS)
1/30 1900		6160			187.35			100.52		20		
2200		6340			186.67			99.84		20"		Fuel full @ 10:15 P
						DIED @ ~ 215						
						RESTART @		2:25				ADDED OIL / OPEN
												DOOR
						SOUNDER BATTERY DEAD				DROVE TO CC		
										TO GET BATTERIES		
						BACK AT	0347	ENGINE OFF				
												RESTART @ 0900 ↑ Q
1/31 0400		6700			88.62			1.79		22"	190	TO 190 gpm on 22"
2/1 0910		8450			182.40			95.57				NEW GEN HOLDS 17 gallons.
1200		8620	6 DAYS		192.14			105.31		22-22¼		H_2O Quality. Fuel @ 1330
1630		8890			192.25			105.42		21¾-22¼		Fuel @ 6:15 ½ full
[illegible]					[illegible]							Generator starts switch @ 6:00 60-48 Hz.
												Generator stops @ 8:15 Restart @ 845. Fuel @ 9:15
2200		9100			179.16			92.33		≥20		MW Q↑ (16")
2/2 0310		9410			181.83			95.00		≥20		Q↑ (17") fueled
0540		9560			184.07			97.24		≥20		Q↑ (17½") fueled
0830		9730			184.92			98.09				Fueled Q↑ (17½") → 18½"
1200		9940			185.53			98.70				Fuel @ 3:30
1700		10360			187.27			100.44				18"
2000		10540			187.30			100.47				TOPPED OF FUEL @ 5:30
2/3 2400		10780			187.66			100.83		20-20½		FUEL @ 2345
0400		11020			188.10			101.27		20½		Q↓
0800		11260			188.17			101.34				FUEL @ 0830
1100		11440			187.85			101.02		≥20¼		MW
1400		11620			187.98			101.15		~20½		MW, Quality
1700		11800			188.07			101.24		~20½		fueled 1620, sample
2000		11980			187.85			101.02		~20¼		
2135		12075			187.96			101.13		20¼		Fuel @ 2140
2/4 0200		12340			190.00			103.17				Fuel @ 0140
0700		12640			188.88			102.05		20½		FUEL @ 0800
1200		12940			187.95			101.12		20¼		Q↑ FUG @ 3:30
1700		13240			188.31			101.48		20¼		EE
2/5 0210		13790			189.47			102.64		20½		Fuel @ 0200
0700		14080			189.98			103.15				FUEL @ 0900

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WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL OLD WASHOE
~~PUMPING~~/OBSERVATION WELL
~~PUMPING~~/RECOVERY DATA
PAGE 5 OF 5

TYPE of PUMPING TEST CONSTANT Q
HOW Q MEASURED 4X3 ORIFICE WEIR
HOW WL's MEASURED ACTAT ELECTRIC SOUNDER
PUMPED WELL NO.
RADIUS of PUMPED WELL 8"
DISTANCE from PUMPED WELL

M.P. for WL's T.O.C. elev.
DEPTH of PUMP/AIRLINE wrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date 1-26-94 time 1220
PUMP OFF: date 2-7-94 time 0945

	TIME t = at t'=0				WATER LEVEL DATA STATIC WATER LEVEL 86.83					WATER PRODUCT.		COMMENTS
	CLOCK TIME	ELAPSED TIME mins/hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'		Q	(NOTE ANY CHANGES IN OBSERVERS)
2/5	1230		14410			188.42			101.59			FUEL @ 3:30
	1830		14770			188.79			101.96	20½		
2/6	1200		15100			188.95			102.12	20½		MW fueled
	0410		15350			189.14			102.31	20½		
	0700		15520			189.60			102.77	20½		fueled
	1430		15970			188.10			101.27	20¼		Fuel @ 3:00 pm
	1900		16240			188.47			101.64			
	2215		16435			188.46			101.63	20	Q+	fueled @ 2230
2/7	0400		16780			188.80			101.97	20½		fueled
	0942		17122			189.10			102.27			

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WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Old Washoe New Well
(PUMPING)/OBSERVATION WELL
PUMPING/(RECOVERY DATA)
PAGE 1 OF 1

TYPE of PUMPING TEST Constant Q Recovery Test
HOW Q MEASURED Solinst Electric Sounder — M.P. for WL's T.O.C. — elev. ____
HOW WL's MEASURED " — DEPTH of PUMP/AIRLINE ____ wrt ____
PUMPED WELL NO. Old Washoe Estates — % SUBMERGENCE: initial ____ ; pumping ____
RADIUS of PUMPED WELL ____ — PUMP ON: date JAN 27, 1994 time 1220
DISTANCE from PUMPED WELL ____ — PUMP OFF: date FEB 7, 1994 time 0945

TIME t = 17125 at t' = 0					WATER LEVEL DATA STATIC WATER LEVEL 86.83					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins/hrs	t	(t')	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or (S')			Q	(NOTE ANY CHANGES IN OBSERVERS)
0945		17125	0									
0946		17126	1	17126	114.15			27.32				68.5% RECOVERED
		17127	2	8563	101.95			15.12				
0948		17128	3	5709	96.31			9.48				
		17129	4	4282	93.40	95 - 1.60		6.57				
0950		17130	5	3426	92.00			5.17				
		17131	6	2855	91.48			4.65				
		17132	7	2447	90.94			4.11				
		17133	8	2142	90.60			3.77				
0955		17135	10	1714	90.13			3.30				96%
0957		17137	12	1428	89.83			3.00				
0959		17139	14	1224	89.52			2.69				
1001		17141	16	1071	89.29	90 - 0.71		2.46				
1003		17143	18	952	89.13	90 - 0.87		2.30				
1005		17145	20	857	89.07	90 - 0.93		2.24				
1010		17150	25	686	88.99	90 - 1.01		2.16				
1015		17155	30	572	88.91	90 - 1.09		2.08				
1020		17160	35	490	88.86	90 - 1.14		2.03				
1025		17165	40	429	88.83	90 - 1.17		2.00				97.7% RECOVERY
1030		17170	45	382	88.77	90 - 1.23		1.94				
1035		17175	50	344	88.74	90 - 1.26		1.91				97.8% REC
1045		17185	60	286	88.67	90 - 1.33		1.84				
1055		17195	70	246	88.60	90 - 1.40		1.77				
1105		17205	80	215	88.56	90 - 1.44		1.73				
1125		17225	100	172	88.51	90 - 1.49		1.68				
1145		17245	120	144	88.46	90 - 1.54		1.63				
1205		17265	140	123	88.38	90 - 1.62		1.55				98.2% REC
1500		17,440	315	55	88 05			1.22				
1730		17590	465	38	88.00			1.17				
2/8 0745		18445	1320	14	87.79			0.96				99%
1730		19030	1905	10	87.80			0.97				
2/9 0740		19880	2755	7.2	87.70			0.87				

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WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Coveau Well
PUMPING / OBSERVATION WELL
~~PUMPING~~ / RECOVERY DATA
PAGE 1 OF 2

TYPE of PUMPING TEST Constant Q
HOW Q MEASURED orifice manometer
HOW WL's MEASURED Actot
PUMPED WELL NO. Old Washoe Estates "New"
RADIUS of PUMPED WELL 8"
DISTANCE from PUMPED WELL 600'

M.P. for WL's T.O.C. elev. ~~35~~ 35'
DEPTH of PUMP/AIRLINE ~~30~~ wrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date 1/26/94 time 0945 1220
PUMP OFF: date 2-7-94 time 0940

TIME t = at t'=0					WATER LEVEL DATA STATIC WATER LEVEL 16.48					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins/hrs	t	t'	t / t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	S or S'			Q	(NOTE ANY CHANGES IN OBSERVERS)
0930					16.48							
		12			16.50			.02				
		24			16.46			-.02				
		40			16.42			-.06				
		64			16.50			.02				
					FIRST TEST OFF @			11:00 AM		60 min		
					RESTART							
		→60			16.42			-.06				
		77			16.42			-.06				
		105			16.44			-.04				
		145			16.42			-.06				
3.25		185			16.42			-.06				
4.10		230			16.42			-.06				
5:12		292			16.53			+.05				
6:40		380			16.54			.06				
8:20		480			16.61			.13				
2230		610	610		16.60			.12				
1/27 0530			1030		16.66			.18				
0915			1285		16.78			.30				
1130			1390		16.80			.32				
1620		1680	1680		16.80			.32				
2135			1995		16.86			.38				lights out before 9pm
0120			2220		16.87			.39				
0920			2400		16.89			.41				
0735			2595		16.92			.44				
1020			2760		16.97			.49				EE
1310			2930		17.04			.56				
1610			3110		17.03			.55				
1915			3295		17.09			.61				
2015			3475		17.13			.65				MW
1/29 0300			3760		17.15			.67				
0630			3970		17.14			.66				
1030			4210		17.18			.70				RV
1430			4450		17.19			.71				
1830			4690		17.19			.71				
2230			4930		17.25			.77				WELL WAS RECOVERING ~17.4 ↓
1/30 0230			5170		17.22			.74				
0645			5425		17.22			.74				

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WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS
UTILITY DIVISION

PUMPING TEST DATA

WELL Coveaux Domestic
PUMPING / OBSERVATION WELL
PUMPING / RECOVERY DATA
PAGE 2 OF 2

TYPE of PUMPING TEST Constant Q
HOW Q MEASURED
HOW WL's MEASURED Solinst Electric Sounder
PUMPED WELL NO. Old Washoe Replacement Well
RADIUS of PUMPED WELL 8"
DISTANCE from PUMPED WELL 1600'

M.P. for WL's T.O.C. elev.
DEPTH of PUMP/AIRLINE wrt
% SUBMERGENCE: initial ; pumping
PUMP ON: date 1-26-94 time 1220
PUMP OFF: date 2-7-94 time 0940

TIME t =		at t'=0			WATER LEVEL DATA STATIC WATER LEVEL 16.48					WATER PRODUCT.		COMMENTS
CLOCK TIME	ELAPSED TIME mins / hrs	t	t'	t/t'	READING	CONVERSIONS or CORRECTIONS	WATER LEVEL	s or s'			Q	(NOTE ANY CHANGES IN OBSERVERS)
1315		5815			17.31			0.83				
2130		6310			17.32			0.84				
1210		8630			16.96			0.48				
1640		8900			17.06			0.58				
2010		9110			17.17			0.69				
0315		9415			17.20			0.72				
0535		9555			17.25			0.77				lites on
10:10		9830			17.30			0.82				
1415		10075			17.32			0.84				
1710		10370			17.33			0.85				
2010		10550			17.33			0.85				
0015		10795			17.44			0.96				
0415		11035			17.45			0.97				
0830		11290			17.62	WELL RECOVERING FROM ~20' — 17.6'		1.14				
1105		11445			17.51			1.03				
1545		11725			17.52			1.04				
2130		12160			17.58			1.10				
0700		12730			17.61			1.13				
1215		12955			17.66			1.18				
1720		13260			17.74			1.26				
2200		13540			17.79			1.31				
0700		14080			17.78			1.30				
1400		14500			17.79			1.31				
1930		14830			17.86			1.38				WELL WAS RECOVERING
0007		15107			17.85			1.37				
0405		15345			17.85			1.37				
0900		15640			17.90			1.42				
1400		15940			17.86			1.38				
1900		16240			17.85			1.37				
2205		16425			17.92			1.44				
0415		16795			17.92			1.44				
0930		17110			17.90			1.42				START RECOVERY @ 0945
1130		17230	105	170	17.87			1.39				
1730		17590	465	38	17.72			1.24				
0800		18460	1335	14	17.63			1.15				
1715					17.70							
1600					17.00							
0750					17.76							

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