

1506-00085

# THIEL ENGINEERING CONSULTANTS

## FALCON CAPITAL DOMESTIC WELL PUMPING TEST REPORT

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CIVIL ENGINEERING • WATER RESOURCES • WATER RIGHTS  
SURVEYING • LAND USE PLANNING



FALCON CAPITAL DOMESTIC WELL  
PUMPING TEST REPORT

PREPARED FOR:  
FALCON CAPITAL, LLC.

PREPARED BY:  
TEC 1, INC.  
500 DAMONTE RANCH PARKWAY, SUITE 1056  
RENO, NV 89521  
(775) 352-7800  
FAX: (775) 352-7929

MARCH, 2003

# FALCON CAPITAL DOMESTIC WELL PUMPING TEST REPORT

## Introduction

The Falcon Capital Domestic Well is located on the northwest side of Washoe Valley, Washoe County, Nevada. The location is in NW $\frac{1}{4}$ , NE $\frac{1}{4}$ , Section 23, Township 17 North, Range 19 East, Mount Diablo Baseline and Meridian. The attached Site Map shows this well location.

The Falcon Capital Well is an 8" diameter, 695' deep well. This well was drilled from January 8, 2003 to February 11, 2003 (see attached well log).

The purpose of performing a step drawdown pumping test (48-hour test) at the Falcon Capital Domestic Well was to determine the well capacity and its potential and provide data for the evaluation of the potential impact from future pumping.

## Well Testing Procedures

- Static water level (SWL) before test: 246.83 feet below the land surface.
- Pump set at 600 ft below the land surface for the testing.
- Step-drawdown test run on February 24-26, 2003.
- Test consisted of two steps, with last step being pumped at a higher rate than the first step. Both steps lasted 24 hours.
- Average pumping rates approximately (totalizing meter malfunctioning): 200 gpm for the first step and 250 gpm for the second step.
- Water level at the pumping well was monitored at time intervals sufficient to monitor the water level changes; specific water level monitoring data is included in the Appendix.
- Water level at another well (Washoe County Old Washoe Well) southeast of the pumping well at a distance of approximately 980 ft was also monitored. The drawdown at end of the 48-hour test at this monitoring well is approximately 0.5 ft. It is not known whether the Washoe County well was pumped during the pumping test time period. However, during the first 4 hours of the pumping test, the Washoe County well was not pumped and the drawdown at the Washoe County well is 0.1 ft.
- Water Quality sampling at 4 hour after the test began.
- Test results (See attached test results and calculations)

*perls - 290-690*

*How was flow measured?*

*Never got W.Q.*

## Testing Results and Discussion

### Step Drawdown Test

- Drawdown varied from approximately 46.17 feet at 200 gpm to 67.71 feet at the end of Step 2 at 250 gpm. The specific capacity ranged from approximately 4.33 to 3.69 gallon per minute per foot of drawdown (gpm/ft).
- The specific capacity results show that specific capacity varies with the pumping rate. The higher the pumping rate, the lower the specific capacity. This is due to the fact that the well has a lower efficiency at a higher pumping rate.

### Unsteady Drawdown Test (Early Portion of the First Step and Recovery)

- The drawdown vs. time curve attached indicates that the drawdown stabilized at approximate 1080 minutes at a pumping rate of approximately 200 gpm.
- Aquifer parameters estimated from the unsteady test and the recovery data based on the Theis solution are as follows:

Parameter	Pumping	Recovery
Transmissivity (T: ft <sup>2</sup> /day)	1252	26422
Storage Coefficient (S)	0.00021	2.7791E-217

\*The straight-line method (Jacob's) was used.

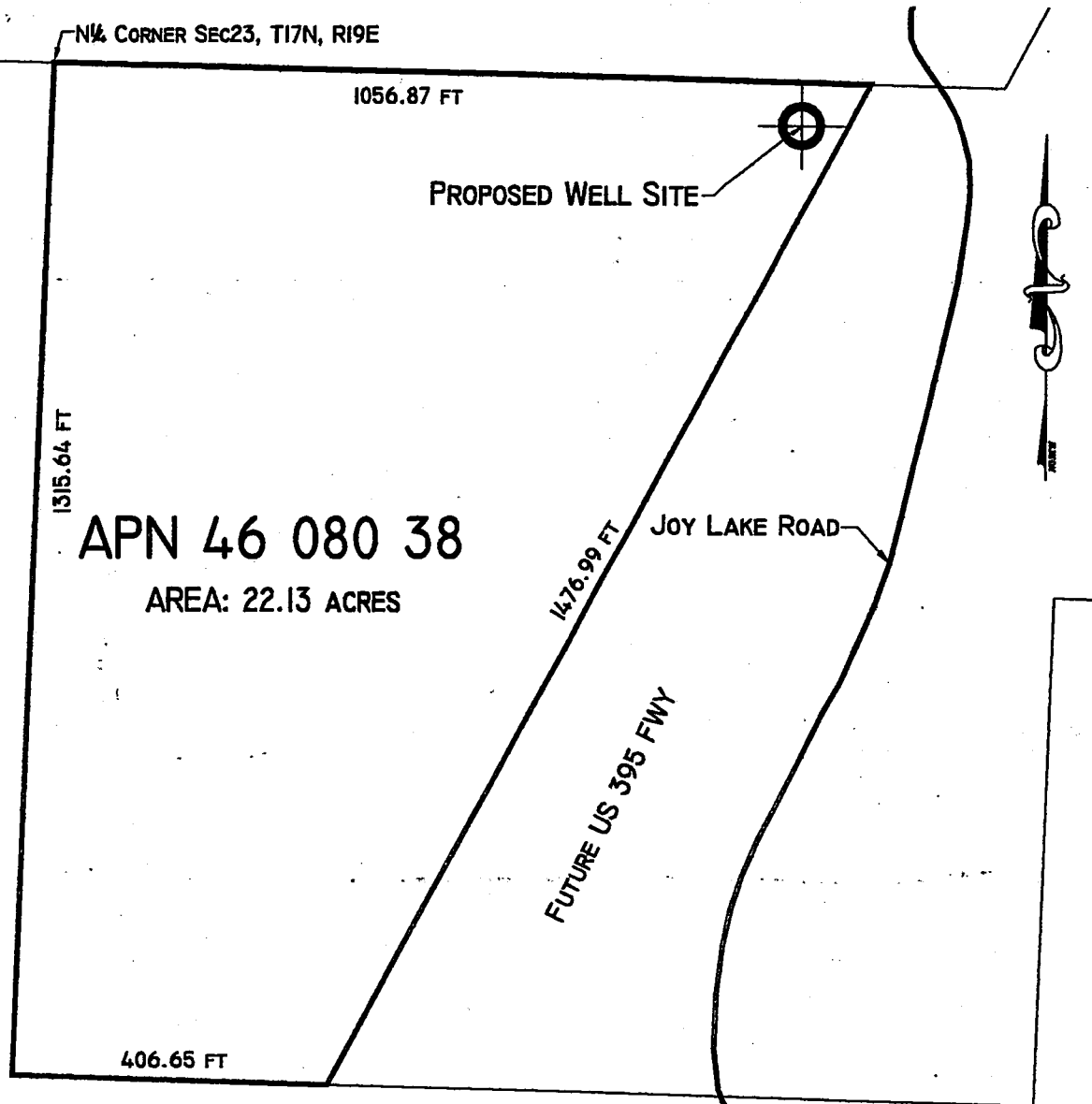
- The recovery data was influenced by the water in the pump pipe, therefore, the result is not as good as the data from the pumping portion.

### Recommendations:

- Based on the testing results it is recommended that the sustainable pumping rate be 600 gpm with the pump set at 600 ft deep. *Can a 600 gpm pump fit in an 8" well?*
- No water quality recommendations can be made at this time. Water quality data will be available in approximately 30 days. The water temperature is approximately 75° F. (?)

Appendix:

- Location map
- Well Log
- Calculations
- Pumping Test Data Logs



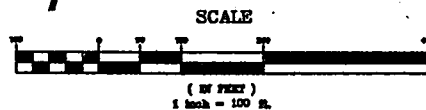
APPLICANT NAME: Falcon Capital LLC

APPLICANT ADDRESS: P.O. Box 456, Zephyr Cove, NV 89445

APPLICANT DAYTIME TELEPHONE NUMBER: (775) 352 7800

**NOTE:**

1. There is not any existing well, on-site sewage disposal system, community sewage collection or disposal system within 200 ft of the proposed well site.
2. There is no proposed on-site sewage disposal system.
3. There is not any public water system available.
4. There is no existing or proposed water supply lines.
5. There is no existing or proposed structures on site.
6. There is no existing or proposed drainage improvements.
7. There is not any watercourse (rivers, streams, ditches) and/or drainage channel within 200 ft of the well site.
8. There is not any surface water (rivers, streams, ponds, lakes, springs) within ¼ mile of well site.



December 12, 2002



**PLOT**  
**SHOWING PROPOSED DOMESTIC**  
**WELL LOCATION**  
**IN WASHOE VALLEY**

WASHOE COUNTY

NEVADA



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

office use only

Log No.....

Permit No.....

Basin.....

NOTICE OF INTENT NO 49914

1. OWNER **Falcon Capital LLC**  
MAILING ADDRESS **500 Damonte Rch Pkwy #1056**  
**Reno NV 89521**

ADDRESS AT WELL LOCATION

**Joy Lake Road**

2. Location **NW 1/4 NE 1/4 Sec 23 T 17N R 19E**  
PERMIT NO. **PARCEL NO. 046-080-38**

SUBDIVISION NAME

**Washoe County**

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 ☒ Mud

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
Clay & boulders.		0	95	95
Red clay.		95	111	16
Black rock.		111	117	6
Volcanic.		117	143	26
Red clay.		143	160	17
Lost Circulation.		160	310	150
Black Rock.		310	360	50
Lost Circulation		360	437	77
Volcanic & clay.		437	673	236
Rock.		673	690	17
Clay.		690	695	5

8. WELL CONSTRUCTION

Depth Drilled **695** feet Depth Cased **695** feet

HOLE DIAMETER (BIT SIZE)

From	To
12 1/4 inches	0 feet 695 feet
inches	feet feet
inches	feet feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
<b>8 5/8</b>	<b>16.94</b>	<b>188</b>	<b>+1 1/2</b>	<b>695</b>

Perforations::

Type Perforation **Factory**

Size perforation **3/32 x 3"**

From **290** feet to **690** feet

From feet to feet

From feet to feet

From feet to feet

From feet to feet

Surface Seal ☒ YES No Seal Type:

Depth of Seal **100** feet Neat Cement

**Pumped** ☒ **Poured** ☒ ☒ Cement Grout

Concrete Grout

Gravel Packed: Yes No

From **100** feet to **695** feet

9. WATER LEVEL

Static water level **270** feet below land surface

Artesian flow **0** GPM **0** P.S.I.

Water Temperature **68** Degrees F Quality

Date started **1-8 -03**  
Date completed **2-11 -03**

7. WELL TEST DATA

TEST METHOD:	Bailer	Pump	x	Air Lift
G.P.M.	Draw Down (Feet Below Static)	Time (hours)		
4	80	<b>10 HR</b>		
100	230			
250	420			

## 10. DRILLER'S CERTIFICATION

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

Name **McKay Drilling, Inc.**  
**2290 Pioneer Drive**  
**Reno, NV 89509**

NV Contractors No. **14170**  
NV Driller's Lic (on site) **2121**

Signed

By driller performing actual drilling on site or contractor

Date **2-13 -03**

# **48-Hour Drawdown Test (Feb. 24~26, 2003)** **Falcon Capital Domestic Well**

Step	Time	Time Interval (Minutes)	Total Combined Time (Minutes)	Depth to Water (Ft.)	Totalizer Reading (Gal.)	S (Ft.)	Flow Rate (GPM.)	Remarks or Notes
1	10:10:40	0.0		246.83	26	0		Q=200gpm
1		1.0	1.0	275.00		28.17		2/24/2003
1		1.0	2.0	278.92		32.08	200	2/24/2003
1		1.0	3.0	281.92		35.08	200	2/24/2003
1		1.0	4.0	284.08		37.25	200	2/24/2003
1		1.0	5.0	285.08		38.25	200	2/24/2003
1		1.0	6.0	286.00		39.17	200	2/24/2003
1		2.0	8.0	287.67		40.83	200	2/24/2003
1		2.0	10.0	287.92	46	41.08	200	2/24/2003
1		10.0	20.0	288.58		41.75	200	2/24/2003
1		10.0	30.0	288.83		42.00	200	2/24/2003
1		10.0	40.0	289.08		42.25	200	2/24/2003
1		10.0	50.0	289.25		42.42	200	2/24/2003
1	11:10:40	10.0	60.0	289.29		42.46	200	2/24/2003
1	11:30:40	20.0	80.0	289.75		42.92	200	2/24/2003
1	11:50:40	20.0	100.0	290.00		43.17	200	2/24/2003
1	12:10:40	20.0	120.0	290.00		43.17	200	2/24/2003
1	12:40:40	30.0	150.0	290.13		43.29	200	2/24/2003
1	13:10:40	30.0	180.0	290.67		43.83	200	2/24/2003
1	13:40:40	30.0	210.0	290.83		44.00	200	2/24/2003
1	14:10:40	30.0	240.0	290.79	486	43.96	200	2/24/2003
1	15:10:40	60.0	300.0	291.08		44.25	200	2/24/2003
1	16:10:40	60.0	360.0	291.92	Not working	45.08	200	2/24/2003
1	17:10:40	60.0	420.0	293.17	properly	46.33	200	2/24/2003
1	18:10:40	60.0	480.0	293.00	for	46.17	200	2/24/2003
1	19:10:40	60.0	540.0	292.00	the rest	45.17	200	2/24/2003
1	20:10:40	60.0	600.0	292.00		45.17	200	2/24/2003
1	21:10:40	60.0	660.0	292.00		45.17	200	2/24/2003
1	22:10:40	60.0	720.0	292.00		45.17	200	2/24/2003
1	23:10:40	60.0	780.0	292.00		45.17	200	2/24/2003
1	0:10:40	60.0	840.0	292.00		45.17	200	2/25/2003
1	1:10:40	60.0	900.0	292.00		45.17	200	2/25/2003
1	2:10:40	60.0	960.0	292.54		45.71	200	2/25/2003
1	3:10:40	60.0	1020.0	292.67		45.83	200	2/25/2003
1	4:10:40	60.0	1080.0	292.67		45.83	200	2/25/2003
1	5:10:40	60.0	1140.0	292.75		45.92	200	2/25/2003
1	6:10:40	60.0	1200.0	292.67		45.83	200	2/25/2003
1	7:10:40	60.0	1260.0	292.67		45.83	200	2/25/2003
1	8:10:40	60.0	1320.0	292.75		45.92	200	2/25/2003
1	9:10:40	60.0	1380.0	292.83		46.00	200	2/25/2003
2	10:10:40	60.0	1440.0	292.92		46.08	250	Q=250 gmp
2	11:10:40	60.0	1500.0	314.92		68.08	250	2/25/2003
2	12:10:40	60.0	1560.0	314.33		67.50	250	2/25/2003
2	13:10:40	60.0	1620.0	312.33		65.50	250	2/25/2003
2	14:10:40	60.0	1680.0	313.67		66.83	250	2/25/2003
2	15:10:40	60.0	1740.0	313.83		67.00	250	2/25/2003
2	16:10:40	60.0	1800.0	313.92		67.08	250	2/25/2003



2	17:10:40	60.0	1860.0	314.00		67.17	250	2/25/2003
2	18:10:40	60.0	1920.0	314.00		67.17	250	2/25/2003
2	19:10:40	60.0	1980.0	314.00		67.17	250	2/25/2003
2	20:10:40	60.0	2040.0	314.00		67.17	250	2/25/2003
2	21:10:40	60.0	2100.0	314.00		67.17	250	2/25/2003
2	22:10:40	60.0	2160.0	314.00		67.17	250	2/25/2003
2	23:10:40	60.0	2220.0	314.00		67.17	250	2/25/2003
2	0:10:40	60.0	2280.0	314.00		67.17	250	2/26/2003
2	1:10:40	60.0	2340.0	314.00		67.17	250	2/26/2003
2	2:10:40	60.0	2400.0	314.00		67.17	250	2/26/2003
2	3:10:40	60.0	2460.0	314.00		67.17	250	2/26/2003
2	4:10:40	60.0	2520.0	314.00		67.17	250	2/26/2003
2	5:10:40	60.0	2580.0	314.00		67.17	250	2/26/2003
2	6:10:40	60.0	2640.0	314.54		67.71	250	2/26/2003
2	7:10:40	60.0	2700.0	314.54		67.71	250	2/26/2003
2	8:10:40	60.0	2760.0	314.54		67.71	250	2/26/2003
2	9:10:40	60.0	2820.0	314.54		67.71	250	2/26/2003
2	10:10:40	60.0	2880.0	313.50		66.67	250	2/26/2003

#### Aquifer Parameter Estimation (Jacob's Method)

ds= 5.63 ft  
 Q= 200 gpm 0.4456 cfs  
 t0= 0.000012 min

2.3/(4\*3.14159)= 0.183028339

T= 0.014 sqft/s  
 1251.6 sqft/day

r 0.33 ft  
 S 0.00021

#### Step Drawdown Calculation

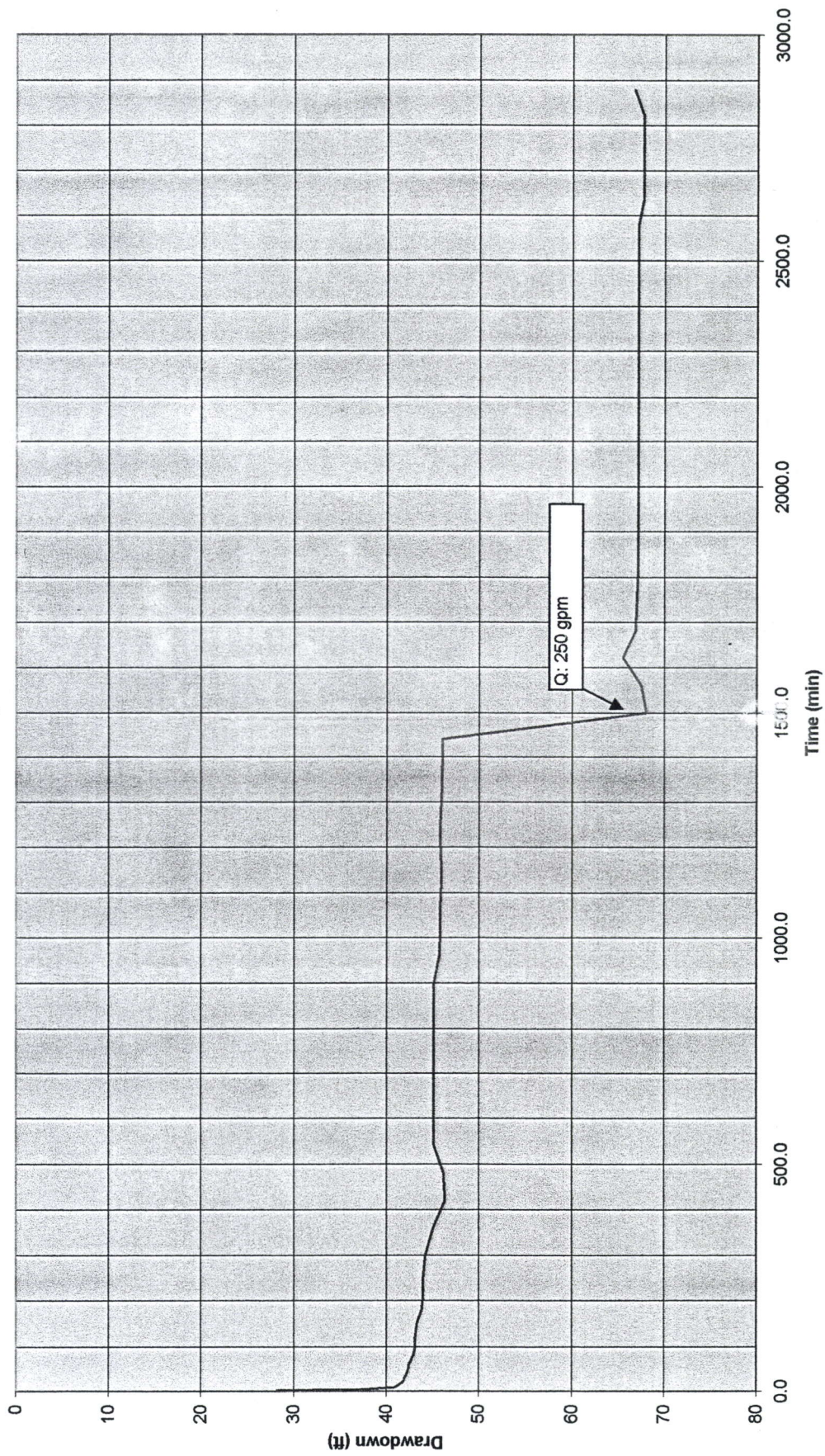
Q		
gpm	s/Q=Y	s (ft)
200	0.230833333	46.17
250	0.270826667	67.71

$$Y=0.0007999xQ+0.07086$$

cfs	gpm		Drawdown (ft)	Depth (ft)
1	448.88	0.429919112	193.0	439.8
1.2	538.656	0.501730934	270.3	517.1
1.5	673.32	0.609448668	410.4	657.2

0.8911068	400	0.39082	156.3	403.2
1.1138834	500	0.47081	235.4	482.2
1.3366601	600	0.5508	330.5	577.3

48-HR DRAWDOWN TEST DATA (Feb. 24~26, 2003)  
Falcon Capital Domestic Well





Drawdown (ft)

Time (min)

$t_0=0.00001$  min

$Q=200$  gpm

$DS=5.63$  ft

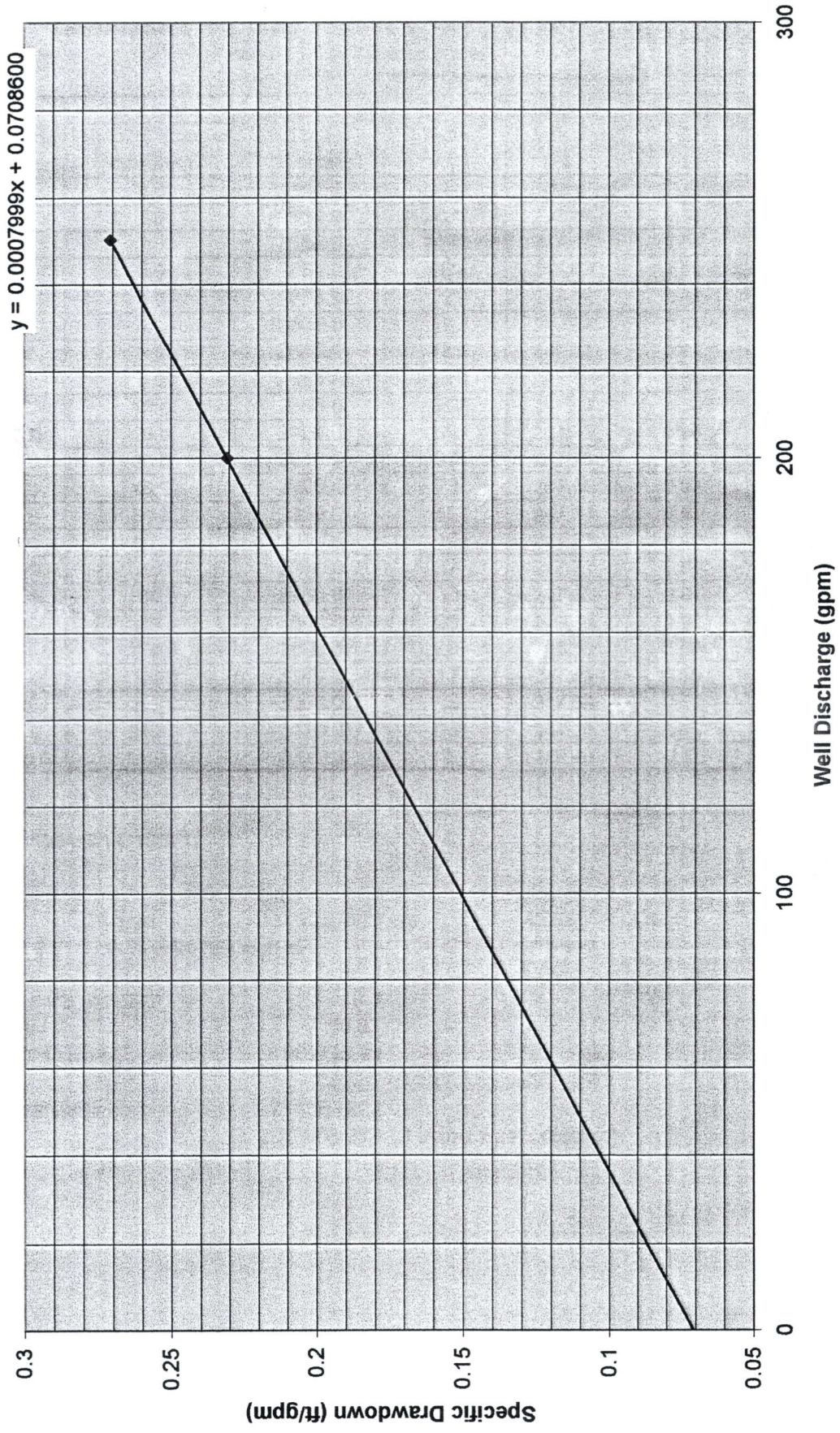
 $t_0 = 0.00001 \text{ min}$  $Q = 200 \text{ gpm}$ 

DS=5.63 ft

Drawdown (ft)



**Step-Drawdown Test (February 24 & 26, 2003)**  
**Falcon Capital Domestic Well**



**Recovery Following 48-Hour Drawdown Test (Feb. 24-27, 2003)**  
**Falcon Capital Domestic Well**

Step	Time	Time Interval (Minutes)	Time Since Pumping Stopped (Minutes)	Total Combined Time (Minutes)	Time Ratio	Depth to Water (Ft.)	Drawdown S (Ft.)	Remarks or Notes
Recov.	10:10:40	—	0.0	2880.0	—	313.5	66.67	2/26/2003
Recov.		1.0	1.0	2881.0	2881	247.67	0.84	
Recov.		1.0	2.0	2882.0	1441	247.67	0.84	
Recov.		1.0	3.0	2883.0	961	247.67	0.84	
Recov.		1.0	4.0	2884.0	721	247.67	0.84	
Recov.		1.0	5.0	2885.0	577	247.67	0.84	
Recov.		1.0	6.0	2886.0	481	247.67	0.84	
Recov.		2.0	8.0	2888.0	361	247.67	0.84	
Recov.		2.0	10.0	2890.0	289	247.67	0.84	
Recov.		10.0	20.0	2900.0	145	247.79	0.96	
Recov.		10.0	30.0	2910.0	97	247.79	0.96	
Recov.		10.0	40.0	2920.0	73	247.75	0.92	
Recov.		10.0	50.0	2930.0	59	247.73	0.90	
Recov.		10.0	60.0	2940.0	49	247.73	0.90	
Recov.		20.0	80.0	2960.0	37	247.71	0.88	
Recov.		20.0	100.0	2980.0	30	247.67	0.84	
Recov.		20.0	120.0	3000.0	25	247.66	0.83	
Recov.		30.0	150.0	3030.0	20	247.66	0.83	
Recov.		30.0	180.0	3060.0	17	247.58	0.75	
Recov.		30.0	210.0	3090.0	15	247.54	0.71	
Recov.		30.0	240.0	3120.0	13	247.50	0.67	
Recov.		1200.0	1440.0	4320.0	3	247.40	0.57	

$$T = 2.3 \cdot Q / (4 \cdot 3.14159 \cdot DS)$$

DS = 0.3  
 Average Q = 225 gpm      0.501247549 cfs      43307.79 cf/day  
 T = 0.305808102 sqft/s      26421.82 sqft/day

$$2.3 \cdot Q / (4 \cdot 3.14159 \cdot 26 \cdot T) = 0.3$$

$$S_{\text{-stop}} = 66.67$$

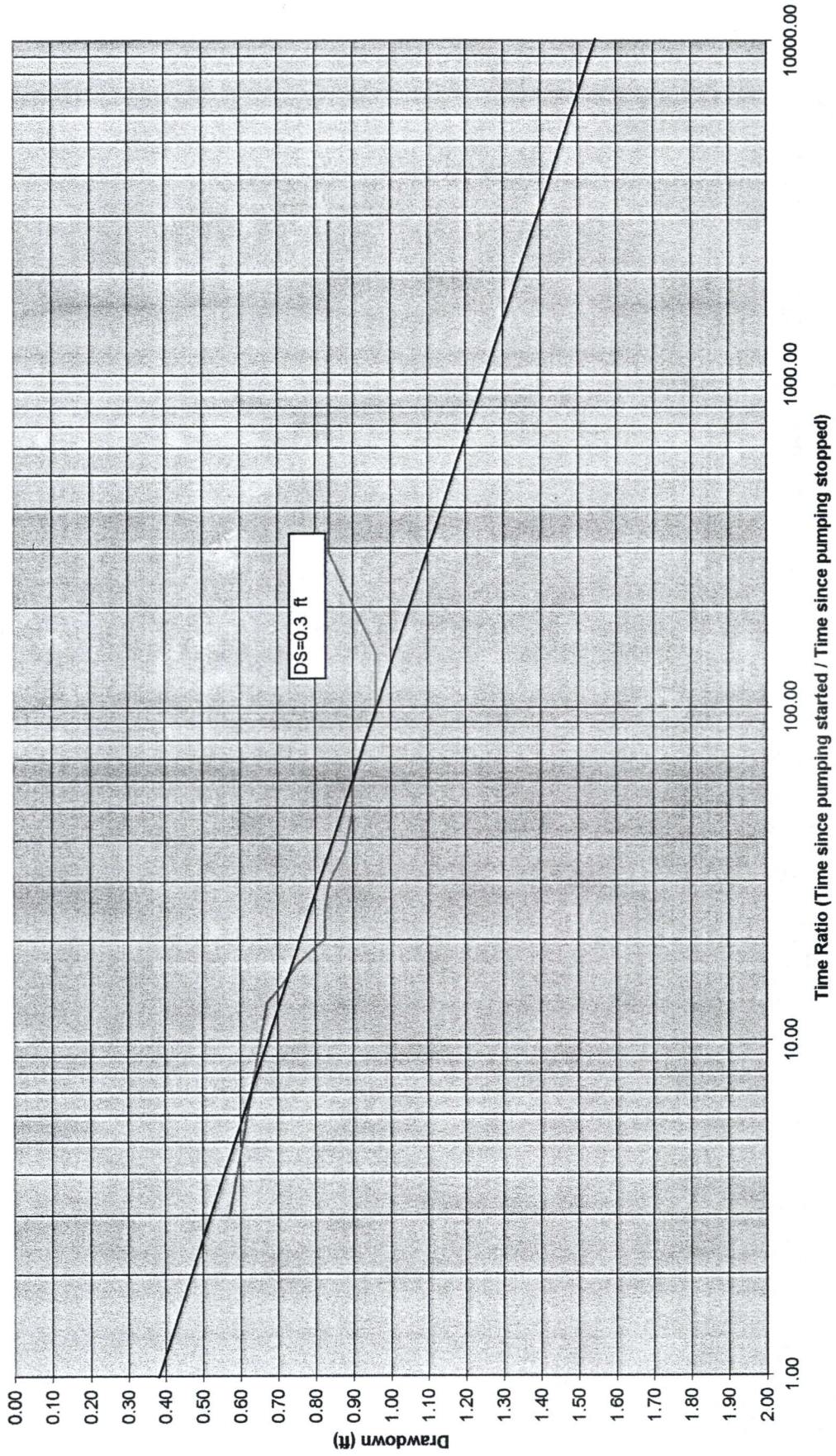
$$2.25 \cdot T \cdot t_{\text{-stop}} = 118898.19$$

$$118898.19 / S = 1.7113E+222$$

$$S = 2.7791E-217 \text{ (S is too small, discard)}$$



RECOVERY FOLLOWING 48-HR DRAWDOWN TEST DATA (Feb. 24-27, 2003)  
Falcon Capital Domestic Well







CIVIL  
ENGINEERING  
CONSULTANTS

500 Damonte Ranch Parkway, Suite 1056  
Reno, Nevada 89521  
Ph: (775) 352-7800 Fx: (775) 352-7929

TO: **Dan Dragon, Wtr Resource Manager**  
**Washoe County Water Resources**  
**4930 Energy Way**  
**Reno, NV 89502**

RECEIVED  
JAN 09 2007  
WASHOE COUNTY  
DEPT. OF WATER RESOURCES

## LETTER OF TRANSMITTAL

DATE	1/8/2007	JOB NUMBER	Serpa005
Re:	<b>Serpa - Joy Lake Road Well</b>		

WE ARE SENDING YOU

- ☐ Shop Drawings  
☐ Copy of Letter

- ☒ Attached  
☐ Prints  
☐ Change Order

- ☐ Under Separate cover via \_\_\_\_\_ the following items:  
☐ Plans ☐ Samples ☐ Specifications  
☐ \_\_\_\_\_

COPIES	DATE	DESCRIPTION
1	2/5/2003	E-Log of 8" well off Joy Lake Road - John Serpa
1	3/25/2003	Water Quality Results for well off Joy Lake Road - John Serpa

THESE ARE TRANSMITTED as checked below:

☐ Mail

☐ Overnight

☒ Hand Delivered

☐ For approval

☐ Approved as submitted

☐ Resubmit \_\_\_\_\_ copies for approval

☒ For your use

☐ Approved as noted

☐ Submit \_\_\_\_\_ copies for distribution

☐ As requested

☐ Returned for corrections

☐ Return \_\_\_\_\_ for corrected prints

☐ For review and comment

☐ \_\_\_\_\_

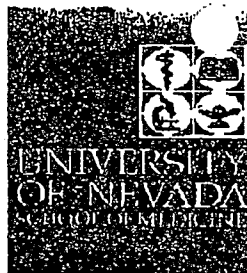
Dan: Thanks for meeting with us today regarding John Serpa's well off of Joy Lake Road. I am forwarding copies of the E-Log and water quality data taken from the well in 2003. These are for your review. Please call me if you have any questions.

Received by
Agency
Date

Copy to: File

Signed  Gregory M. Bilyeu

Lab ID: 158772 Sampled: 2/24/03  
 Sample Type: SDWA Received: 2/24/03



Nevada State Health Laboratory  
 1660 N. Virginia St  
 Reno, Nevada 89503-1783  
 (775) 688-1335  
 FAX: (775) 688-1460

## SAMPLE INFORMATION

Township: 17N Range: 19E  
 Section: 23  
 General Location: APN 46 080 38  
 Source Address: JOY LAKE RD-WASHOE VALLEY

## REPORT TO

Name: GREGORY M BILYEU  
 Company:  
 Address: 500 DAMONTE RANCH PARKWAY #10  
 City: RENO  
 State: NV Zip: 89521

## OWNER

Name: FALCON CAPITAL LLC  
 Address: PO BOX 456  
 City: ZEPHYR COVE  
 State: NV Zip: 89448

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

Result	Reporting Limit	Results in ppm	Reporting Limit
<b>ROUTINE DOMESTIC: in ppm</b>			
TDS @			
180 Deg. C:	188	10	
Hardness:	99	N/A	
Calcium:	23	5	
Magnesium:	10	5	
Sodium:	22	5	
Potassium:	3	5	
Sulfate:	7	5	
Chloride:	1	5	
Nitrate as N*:	0.1	0.1	
Alkalinity:	142	10	
Bicarbonate:	173	N/A	
Carbonate:	0	N/A	
Fluoride:	0.12	0.1	
Arsenic:	< 0.003	0.003	
Iron:	0.32	0.05	
Manganese:	0.01	0.02	
Copper:	0.00	0.02	
Zinc:	0.01	0.05	
Barium:	0.05	0.02	
Boron:	0.0	0.1	
Silica:	59	1	
Color:	3 SU	3 SU	
Turbidity:	3.9 NTU	0.4 NTU	
pH:	8.27 SU	N/A	
EC:	300 SU	15 SU	
SI @ 20 deg. C:	0.26	N/A	
temp at time of pH	20.8	deg. C	
<b>TRACE METALS:</b>			
Cadmium:		0.001	
Chromium:		0.001	
Lead:		0.001	
Mercury:		0.0005	
Selenium:		0.001	
Silver:		0.001	
Antimony:		0.001	
Beryllium:		0.001	
Nickel:		0.001	
Thallium:		0.0005	
<b>OTHER:</b>			
MEAS:		0.1	
Nitrite-N:		0.01	
Cyanide:		0.005	
BOD:		2	
COD:		10	
Kjeldahl-N:		0.1	
Ortho-P:		0.01	
Total-P:		0.01	
Aluminum:		0.02	
Ammonia:		0.1	
<b>RADIOCHEMISTRY: pCi/l pCi/l</b>			
Gross Alpha:		3	
Gross Beta:		3	
Uranium:			

ppm = parts per million, milligrams per liter

S.U. = Standard Units

\*Nitrate is reported as Nitrate + Nitrite as N  
 Remarks: Trace metal reporting limits (excluding mercury) reflect undiluted sample, multiply reporting limit by \_\_\_\_\_ for this sample.

SL 3/21/03

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RESULTS REPORTED

MAR 25 2003

WASHOE CITY

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

