

# WELL CONSTRUCTION AND AQUIFER TESTING OF SPRING VALLEY RANCH EXPLORATION WELL No. 5

Prepared for

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Prepared by

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June 17, 2004



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# **1. INTRODUCTION**

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## **1.1. Background**

SunCor Development Company is evaluating development potential for the Spring Valley Ranch property located northwest of Boise, Idaho. The property consists of more than 30,000 acres located in Ada, Gem, and Boise Counties. The ultimate population within the primary development areas could be as high as 30,000 residents, based on 11,300 dwelling units with an assumed 2.7 occupants per dwelling unit (approximate Idaho average). The initial phase of the project will likely consist of less than 1,000 homes in a core area located along Highway 55 in Spring Valley.

Scanlan Engineering's participation with water development began in June 2002 (Table 1) with an initial assessment of water development potential. This led to the construction of four exploration wells in Spring Valley and South Fork Willow Creek Valley. Conclusions from the construction and testing of these wells were presented in April 2003. Since that time SunCor Development has authorized an additional six exploration and test production wells (Table 1). This report, prepared by SPF Water Engineering, LLC (formerly Scanlan Engineering), presents data, results, and conclusions from the drilling, construction, and testing of Exploration Well No. 5. Concurrent construction and testing of Exploration Wells Nos. 6, 7, 8, 9, and 10, Test Production Well No. 10, analysis of the Sandy Hill aquifer testing, and analysis of hydrologic conditions in the western portion of Spring Valley Ranch are being presented under separate cover.

## **1.2. Purpose and Objectives**

The purpose of the hydrologic analyses described in this report was to identify and evaluate potential water supplies for the Spring Valley Ranch area. The specific objective of this investigation was to drill and test one additional well in the initial Village Area (Figure 1) to evaluate water supply potential in this area (SVR 1 and SVR 4 were previously drilled in the Village Area).

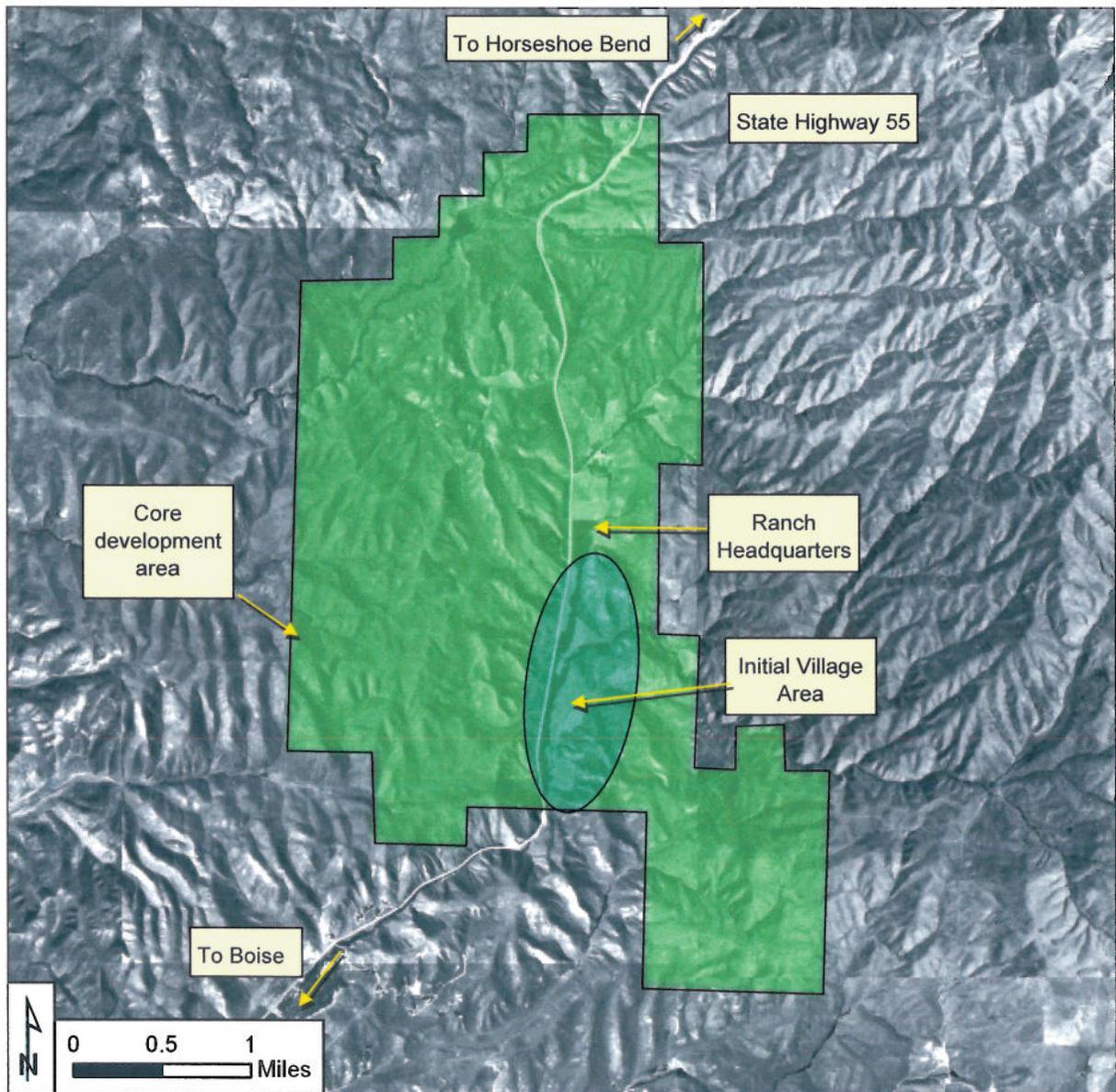


Figure 1: Spring Valley Ranch core development area.

Date	Item
July 2002	Scanlan Engineering submits letter report suggesting Initial Phase water supply target of approximately 2 million gallons per day (1,400 gpm), which would be adequate for peak-day domestic and landscape irrigation for approximately 1,000 homes. Exploration drilling was recommended to explore for ground water supplies located in the close proximity to initial development areas and in the western portion of the property in Big Gulch.
November 2002	Exploration Well SVR 1 (8-inch x 445 feet total depth, 50 gpm, 100 feet drawdown) completed and tested in Spring Valley; Exploration Well SVR 2 (8-inch x 840 feet total depth, 50 gpm, 160 feet drawdown) completed and tested in South Fork Willow Creek Valley
December 2002	Exploration Well SVR 3 (8-inch x 970 feet total depth) completed west of Spring Valley at Sandy Hill. Aquifer zone above 290 feet tested (165 gpm, 3 feet drawdown).
February - March 2003	Exploration Well SVR 4 (8-inch x 1,220 feet total depth) completed in Spring Valley. Aquifer zone from 240 to 290 feet test pumped for 24 hours (80 gpm, 200 feet drawdown).
April 2003	<p>Scanlan Engineering report on the construction and testing of exploration wells SVR 1 through SVR 4 concluded that</p> <ol style="list-style-type: none"> <li>1. A productive coarse-grained sand aquifer (i.e., the "Sandy Hill Aquifer") is present in the highlands approximately ¼ mile west of the Spring Valley Ranch buildings. The aquifer appeared to extend over an area of less than one square mile. Additional investigation was recommended. Arsenic concentration exceeded future drinking water standards. Otherwise, water quality is excellent.</li> <li>2. Testing of Exploration Well SVR 1, SVR 4, and the Ranch Irrigation Well indicated that aquifer conditions along the Highway 55 corridor (i.e., "Spring Valley Aquifer") through Spring Valley are not conducive to development of high capacity wells. Sustainable yield from the Spring Valley Aquifer was deemed questionable. Water quality meets primary drinking water standards, but aesthetic quality is poor due to high concentrations of iron, manganese, and hydrogen sulfide.</li> <li>3. The Hillside Spring in Spring Valley could be considered for water supply purposes (with treatment for arsenic). Alternatively, the discharge from the spring could be captured and pumped back to the vicinity of Exploration Well SVR 3 for Sandy Hill Aquifer recharge purposes. Discharge from the spring (currently 50 gpm) is likely to be impacted by pumping from the Sandy Hill Aquifer.</li> <li>4. Suspected aquifers in the Big Gulch and Little Gulch areas are anticipated to be productive and sustainable, and should be targeted as part of the ultimate water supply for the project. Water quality from low-capacity stockwater wells in Big Gulch and Little Gulch is excellent.</li> <li>5. Wells in Big Gulch and Little Gulch areas were suggested as possible sources of recharge for the Sandy Hill Aquifer, allowing the Sandy Hill Aquifer to be recharged during low-demand winter months. Recharged water could be recovered from Sandy Hill Aquifer wells during high demand summer months</li> </ol>
January 2004	Exploration Well SVR 5 (6-inch x 440 feet) constructed in Spring Valley and test pumped at 75 gpm for 24 hours with 60 feet of drawdown
February - March 2004	Exploration Well SVR 6 (8-inch x 740 feet) constructed in Big Gulch and test pumped at 350 gpm for 24 hours with 3 feet of drawdown
March 2004	Test Production Well TPW-1 (16-inch x 290 feet) constructed for aquifer testing and future municipal production purposes at Sandy Hill Aquifer; Exploration Well SVR 7 (8-inch x 810 feet) constructed in lower Big Gulch
April 2004	Exploration Well SVR 8 (6-inch x 141 feet) constructed for exploration and water level observation purposes at Sandy Hill Aquifer; 3-day pumping test of TPW 1 at 2,000 gpm and 17 feet drawdown with observation at SVR 3, SVR 8, and Hillside Spring; 22-hour test of SVR 7 at 500 gpm and 30 feet drawdown
June 2004	Drilling of SVR 9 (8-inch x 805 feet; Little Gulch) and SVR 10 (8-inch; upper Big Gulch)

Table 1: Water development history, Spring Valley Ranch.

### 1.3. Scope of Work

Work conducted as part of this investigation included the following tasks:

6. Develop final well design for Exploration Well No. 5; coordinate well drilling and construction with drilling contractor.
7. Negotiate with the Idaho Department of Water Resources for well drilling permit, abandonment bond, and other permitting items.
8. Provide inspection and supervision of drilling activities, including logging of drill cuttings, inspection and certification of surface seal installation, and other tasks as needed.
9. Provide supervision of test pumping activities by contractor. Measure observation well water levels and spring flow. Collect and submit water samples for water quality analyses.
10. Provide documentation of exploration well drilling and aquifer testing results. Include conclusions and any recommendations for further investigation.

## 2. WELL CONSTRUCTION

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SVR 5 is located in SW ¼, NE ¼, Section 18, T5N, R1E, approximately 1,200 feet east of Highway 55 in the Spring Valley Ranch core development area (Figure 2). The purpose of the well is to provide definition of local stratigraphy and explore for water-bearing zones in the southern portion of the Spring Valley Ranch core development area. The location of this well was selected by SunCor personnel.

### 2.1. Construction

SVR 5 (IDWR Tag No. 0030891) was drilled by Adamson Pump and Drilling (Nampa, ID) between January 20 and 22, 2004, using the air-rotary method. A 10-inch diameter borehole was drilled to a depth of 38 feet, and a 6-inch steel casing was then set to the same depth. The annular space between the 10-inch borehole and 6-inch casing was sealed with bentonite chips. A 6-inch open borehole was then drilled through the upper casing to a total depth of 440 feet.

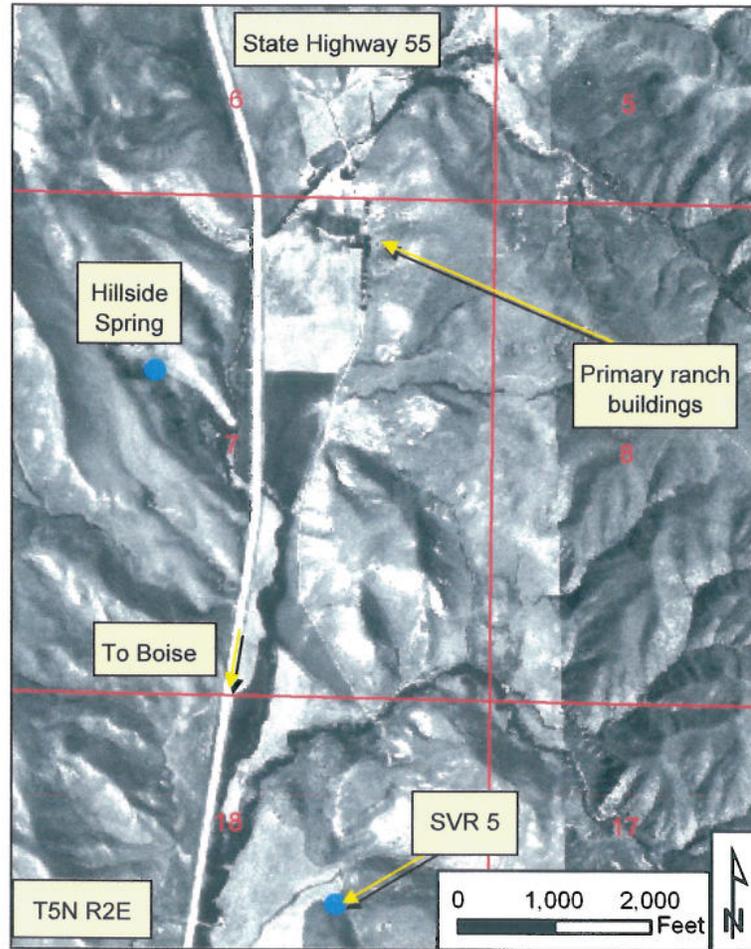


Figure 2: Location of SVR 5.

Well cuttings from the uppermost 160 feet were described as volcanic tuff and tuffaceous sediments (see Appendix A, Geologic Log.). From approximately 160 feet through approximately 430 feet, the borehole encountered a variety of tuffaceous sediments, talc or soapstone, breccia or rubble, and latite fragments, with a small zone (possibly a boulder) of decomposed granitic material from 320 to 330 feet. Decomposed granite was again encountered from 430 to 443 feet.

Water-producing zones were indicated (see driller's report, Appendix A) from 42 to 81 feet, 98 to 102 feet, and 142 to 170 feet. The bottom 20 feet appeared to penetrate decomposed granitic materials, which were not noted as water-producing.

Upon reaching total depth, the contractor air-lift pumped for approximately 15 minutes. The discharge from the borehole carried substantial decomposed granite and drilling foam, suggesting that the bottom of the borehole was unstable, but was not contributing significant flow (due to the continued presence of drilling foam). The driller began pulling the drill string from the hole and noted that the hole was "tight," suggesting that the borehole was collapsing. Air-lift pumping was then resumed from

140 feet depth. The air-lift flow rate was similar to the flow rate produced while airlifting from the bottom of the borehole, but the flow quickly cleared. Air-lift pumping continued for one hour at a pumping rate of approximately 60 to 80 gpm. Upon removal of the drill string from the well, the borehole was sounded and found to have collapsed or bridged at 147 feet. These observations further suggest that most of the encountered flow was from zones in the upper borehole. The static water level in the well was noted at 22.5 feet below ground surface.

## **2.2. Well Test**

Aquifer pumping and recovery tests were conducted following well completion and development. The static water level at the beginning of the pumping test was 23 feet below the top of the well casing. The well was pumped at a rate of approximately 75 gpm for approximately 24 hours with a maximum drawdown of 60 feet. Recovery measurements continued for another 24 hours to a final water level of approximately 29 feet (6 feet short of the initial static water level). The drawdown test yielded a transmissivity value of 2,475 gallons per day per foot (gpd/ft) based on the Jacob straight-line method.

## **2.3. Water Chemistry**

Water samples were collected from SVR 5 for limited water quality analyses. Results are summarized in Table 2; full results are provided in Appendix A. The results indicated elevated iron and manganese concentrations (0.86 and 0.31 ppm, respectively) that, if used for the municipal supply, may require treatment for aesthetic reasons.

## **3. DISCUSSION**

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Results of drilling and test pumping of Exploration Well SVR 5 suggest that the potential for municipal production at this site is low. A properly completed production well at this site would likely produce a sustainable yield of less than 50 gpm. Short-term yields from two or more wells completed in the aquifer will exceed 100 gpm, but the long-term sustainability from this area may be less than 100 gpm. The questionable sustainability is reflected in the incomplete water-level recovery following test pumping. The incomplete water-level recovery suggests a limited aquifer area, which is consistent with local geology.

Water quality appears to be acceptable for public water system use, although the water is undesirable from an aesthetic perspective due to high concentrations of iron and manganese. Because of low yield and aesthetic water quality issues, additional ground water development for public water system use at this location is not currently recommended. The well or aquifer may have limited development potential for non-

potable uses such as irrigation, although staining of concrete or structures may be a problem if the water is used for landscape irrigation.

Constituent	Maximum Contaminant Level (MCL)	Secondary Maximum Contaminant Level (SMCL)	Source
			SVR 5 Levels
<b>Date</b>			<b>2/5/2004</b>
Arsenic	0.01*		0.008
Ammonia			0.12
Antimony	0.006		<0.005
Barium	2		0.05
Beryllium	0.004		<0.005
Bicarbonate			71.3
Cadmium	0.005		<0.0005
Calcium			15.8
Chloride		250	3
Chromium	0.1		<0.002
Fluoride	4	2	0.42
Hardness			48.4
Iron		0.3	0.86
Magnesium			3.26
Manganese		0.05	0.31
Mercury	0.002		<0.0002
Nickel			<0.02
Nitrate	10		<0.20
Nitrite	1		<0.01
Potassium			4.9
Sodium			15.3
Sulfate		250	9
Sulfide			<0.05
TDS		500	176
Thallium	0.002		<0.002
<b>Field Parameters</b>			
Temp (°F)			58-60
SC umhos/cm			180-185
pH		6.5-8.5	6.5 -7.2
* Standard goes into effect on January 23, 2006			

Table 2: Selected water quality parameters, SVR 5.

## 4. RELATED INVESTIGATIONS

Efforts are currently underway to evaluate water supplies in the western portion of Spring Valley Ranch and the Sandy Hill Aquifer. Highly transmissive aquifers are

present in those areas that could be developed for municipal purposes. Results and conclusions from those investigations are being provided under separate cover.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

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The following conclusions were drawn from well construction and aquifer testing described above.

1. Aquifers in the Spring Valley area penetrated by SVR 5 would probably provide enough water for small-scale local uses, but do not represent a high-yield municipal water supply.
2. A full scan of water quality parameters required for public water system uses was not done. However, analysis of basic chemistry parameters suggest water that is adequate for municipal use, although some treatment may be required for aesthetic reasons.
3. Additional ground water development in this area is not recommended because of apparent limited supply.

### Document Info:

Filename: SVR5 Report (final).doc  
File Size: 4369920 bytes  
Last edited: 6/17/2004  
Pages: 12

**APPENDIX A  
SUPPLEMENTARY DATA  
SPRING VALLEY RANCH EXPLORATION WELL  
SVR 5**

- Well Drillers Report
- Lithologic Log and Construction Diagram
- Test Pumping Data
- Water Quality Laboratory Reports
- Drilling Permit



**DRILLING OF SPRING VALLEY EXPLORATION WELL SVR 5  
JANUARY 20, 2004  
ADAMSON PUMP AND DRILLING  
air-rotary method; note gray drilling foam in the foreground**

IDAHO DEPARTMENT OF WATER RESOURCES  
**WELL DRILLER'S REPORT**

Office Use Only  
Well ID No. 809802  
Inspected by \_\_\_\_\_  
Twp \_\_\_\_\_ Rge \_\_\_\_\_ Sec \_\_\_\_\_  
1/4 \_\_\_\_\_ 1/4 \_\_\_\_\_ 1/4 \_\_\_\_\_  
Lat: \_\_\_\_\_ Long: \_\_\_\_\_

1. WELL TAG NO. D 0030891  
DRILLING PERMIT NO. \_\_\_\_\_  
Water Right or Injection Well No. \_\_\_\_\_

2. OWNER:  
Name Spring Valley Development LLC  
Address 483 E. Riverside Dr  
City  Eagle  State Id Zip 83616

3. LOCATION OF WELL by legal description:  
You must provide address or Lot, Blk, Sub. or Directions to well.  
Twp. 5 North  or South   
Rge. 2 East  or West   
Sec. 18 1/4 SW 1/4 SE 1/4  
Gov't Lot \_\_\_\_\_  
County Ada State \_\_\_\_\_  
Lat: \_\_\_\_\_ Long: \_\_\_\_\_  
Address of Well Site 1/4 mile east of Hwy 55  
City  Eagle

(Give at least name of road + Distance + Road or landmark)  
Lt. \_\_\_\_\_ Blk. \_\_\_\_\_ Sub. Name \_\_\_\_\_

4. USE:  
 Domestic  Municipal  Monitor  Irrigation  
 Thermal  Injection  Other Test

5. TYPE OF WORK check all that apply (Replacement etc.)  
 New Well  Modify  Abandonment  Other \_\_\_\_\_

6. DRILL METHOD:  
 Air Rotary  Cable  Mud Rotary  Other \_\_\_\_\_

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
<u>Bentonite</u>	<u>0</u>	<u>38</u>	<u>1050</u>	<u>over bore</u>

Was drive shoe used?  Y  N Shoe Depth(s) 38'  
Was drive shoe seal tested?  Y  N How? \_\_\_\_\_

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
<u>6"</u>	<u>12</u>	<u>38</u>	<u>2.0</u>	<u>Steel</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Length of Headpipe \_\_\_\_\_ Length of Tailpipe \_\_\_\_\_  
Packer  Y  N Type \_\_\_\_\_

9. PERFORATIONS/SCREENS PACKER TYPE

Perforation Method \_\_\_\_\_  
Screen Type & Method of Installation None

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						<input type="checkbox"/>	<input type="checkbox"/>

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

225 ft. below ground Artesian pressure \_\_\_\_\_ lb.  
Depth flow encountered \_\_\_\_\_ ft. Describe access port or control devices: well cap

12. WELL TESTS:

Pump  Bailor  Air  Flowing Artesian  
Yield gal/min. 85 Drawdown \_\_\_\_\_ Pumping Level 140' Time 1 hour  
Water Temp. 58° Bottom hole temp. \_\_\_\_\_  
Water Quality test or comments: Iron .5 PH 7.5  
Depth first Water Encounter 42'

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
"	0	10	brown soil & clay		
"	10	22	hard brown clay		
"	22	38	brown clay & granit pcs		
6	38	42	blue clay		
"	42	80	dark blue clay		Y
"	80	81	fractured clay		X
"	81	98	blue clay		
"	98	102	fractured clay		X
"	102	110	blue clay		
"	110	114	green hard clay		
"	114	121	dark blue clay		
"	121	142	black rock/Lake		
"	142	145	black & red rock		X
"	145	170	green & multi-color material		X
"	170	175	green & brown clay		
"	175	206	tan clay turning to ash		
"	206	218	dark gray rock		
"	218	260	greenish & multi colored ash		
"	260	280	white ash material		
"	280	290	cemented gravel		
"	290	330	tan very hard clay rocks		
"	330	400	clayish decmp. granit		
"	400	420	Pea size conglomerate - all colors		
"	420	430	granit pcs		
"	430	440	granit pcs		
			Bridged off at 147'		

RECEIVED

MAR 01 2004

WATER RESOURCES  
WESTERN REGION

Depth 440' (Measurable)  
Date: Started 1.30.04 Completed 1.22.04

14. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Adamsen Pump & Drilling Firm No. 457  
Principal Driller Steve Adamsen Date 1.29.04  
and  
Driller or Operator Steve Adamsen Date 1.29.04  
Operator I \_\_\_\_\_ Date \_\_\_\_\_

Principal Driller and Rig Operator Required.  
Operator I must have signature of Driller/Operator II.

## Exploration Hole SVR 5 Spring Valley Ranch

Drilled by: Adamson Pump and Drilling. Logged by: C. Feast / T. Scanlan Geophysical logs by: Not logged Fluid level when logged: n/a Casing when logged: n/a	Drilled Dates: Drilling Method: Air Rotary Borehole size: 6" (nom.) 0 - 443 ft.	Depth Drilled: 443 ft Depth Logged: n/a Static WL: ~ 20 ft. bgl	Location: Ada County, Idaho T5N, R2E, SW1/4, SE1/4, Sec 18 GL. Elevation: ~ 3240 ft. msl.
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Depth (ft)	Geologic log from rotary cuttings	Symb. Log	Pt. Res. (Ohms)	Natural Gamma (CPS)	Well Construction
No geophysical logs					
0	Top soil over clay, soft, sticky with coarse qtz. sand grains, med. brown.				
10	Tuff, brown with white and black clasts, well cemented, hard.				
20	Tuffaceous sand. Qtz. sand is coarse with dark brown, hard tuff frags.				
30	Tuff, well cemented, hard, dark brown.				
40					
50					
60					
70	Tuffaceous sediments, mix of hard, dark, medium and greenish brown tuff frags, occ rounded qtz grain.				
80					
90					
100					
110	Tuff, well cemented, hard, light and dark brown.				
120					
130					
140	Tuff, well cemented, hard, grayish brown, black staining on fracture faces.				
150					
160	Talc or Soapstone, med-soft, greasy, mottled white and gray				
170	Breccia or rubble, variety of aphanitic rock types in various colors from light to dark brown, clayey				
180	As above but more gray, less clay				
190	As above, greenish gray, hard chips				
200	As above, white tuff, with occasional pale green and red frags., hard chips				
210	As above, white and pale green frags.				
220	As above, light and dark brown frags.				
230	As above, brown and light green frags.				
240					
250	Clay, white with multicolor welded tuff frags,				
260					
270	Tuffaceous sediments, mix of gray and dark brown tuff frags, occ white qtz and feldspar grains.				
280					
290	Clay, white with multicolor welded tuff frags,				
300	Tuffaceous sediments, pinkish brown tuff frags, white qtz and feldspar grains.				
310	Tuffaceous sediments as above, gray.				
320	Decomposed granite, boulder? white to gray, qtz, feldspar, biotite				
330	Latite? Gray, aphanitic, med-hard.				
340	Clay, white with pale brown aphanitic frags.				
350	Breccia or rubble, variety of aphanitic rock types in various colors from light to dark brown, changes from brownish to gray				
360					

## Exploration Hole SVR 5 Spring Valley Ranch

Drilled by: Adamson Pump and Drilling. Logged by: C. Feast / T. Scanlan Geophysical logs by: Not logged Fluid level when logged: n/a Casing when logged: n/a	Drilled Dates: Drilling Method: Air Rotary Borehole size: 6" (nom.) 0 - 443 ft.	Depth Drilled: 443 ft Depth Logged: n/a Static WL: ~ 20 ft. bgl	Location: Ada County, Idaho T5N, R2E, SW1/4, SE1/4, Sec 18 GL. Elevation: ~ 3240 ft. msl.
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Depth (ft)	Geologic log from rotary cuttings	Symb. Log	Pt. Res (Ohms)	Natural Gamma (CPS)	Well Construction
No geophysical logs					
370	Clay, yellowish brown, multi-color lith frags.				
380	Sand, med grained, granite mineralogy, tuff or weathered latite frags.				
390					
400	Fault gouge? highly weathered latite or tuff, gray, very soft and friable, silt size				
410	Sand, fine grained, angular, gray, granite minerals (qtz, feldspar, biotite) occ green aphanitic-xtaline frag.				
420	Dike? dark brown, med-hard, aphanitic with large, clear-white mica flakes.				
430	Decomposed granite, Grus?, white-gray, sub-angular qtz, feldspar and biotite.				
440	Bottom of hole at 443 ft.				
450					

**AQUIFER TEST DATA**

**Well No.:** Spring Valley Ranch, Test Well SVR 5

**Q=75 gpm, t = 24 hours**

Test conducted by: Scanlan Engineering; Feast Geosciences; Adamson Pump and Drilling Co.

Flow measured by: bucket and stopwatch

Water levels measured by: Well sounder      Water level measure point: Top of 1" poly tube

MP Elevation: 4.0 ft agl      Static WL (ft bmp): 22.97

Pump on: 02/04/04 10:30      Pump off: 02/05/04 10:37

Date	Time	t (mins)	t/t'	Water Level Data				Comments
				Ref (ft.)	Measure (in.)	WL (ft bmp)	Drawdown (feet)	
02/04/04	10:10	-				23.0		Static water level
02/04/04	10:30	0				23.0	0.0	Start test, Q = 86 gpm
02/04/04	10:31	1				58.50	35.5	
02/04/04	10:34	4				62.29	39.3	Q = 35 ?????
02/04/04	10:35	5				62.08	39.1	
02/04/04	10:37	7				63.38	40.4	?????
02/04/04	10:39	9				65.00	42.0	Q=75 gpm by bucket
02/04/04	10:42	12				66.73	43.8	
02/04/04	10:44	14				66.73	43.8	
02/04/04	10:46	16				67.28	44.3	
02/04/04	10:48	18				68.90	45.9	
02/04/04	10:51	21				68.68	45.7	
02/04/04	10:54	24				69.33	46.4	
02/04/04	10:57	27				71.39	48.4	
02/04/04	11:00	30				72.15	49.2	Q=75
02/04/04	11:05	35				72.04	49.1	
02/04/04	11:10	40				69.66	46.7	Q=75
02/04/04	11:15	45				69.66	46.7	
02/04/04	11:23	53				69.77	46.8	
02/04/04	11:30	60				70.42	47.4	
02/04/04	11:35	65				70.85	47.9	T=18
02/04/04	11:45	75				71.39	48.4	
02/04/04	11:55	85				71.93	49.0	Q=75
02/04/04	12:00	90				72.37	49.4	
02/04/04	12:15	105				72.04	49.1	SC 190, T=57F
02/04/04	12:30	120				72.15	49.2	
02/04/04	13:00	150				72.80	49.8	
02/04/04	13:30	180				73.78	50.8	
02/04/04	14:00	210				74.43	51.5	
02/04/04	14:30	240				75.51	52.5	
02/04/04	15:00	270				76.16	53.2	sample @ 1530
02/04/04	15:30	300				76.92	53.9	T 60.2F, ph=7.25, SC=180
02/04/04	16:00	330				77.24	54.3	
02/04/04	16:30	360				77.89	54.9	
02/04/04	17:00	390				78.27	55.3	
02/04/04	17:30	420				78.54	55.6	
02/04/04	18:05	455				78.77	55.8	
02/04/04	18:30	480				79.04	56.1	checked flow
02/04/04	19:00	510				79.17	56.2	water very clear
02/04/04	19:30	540				79.40	56.4	
02/04/04	20:00	570				79.63	56.7	
02/04/04	20:34	604				79.94	57.0	checked flow w bucket, stop watch
02/04/04	21:00	630				79.99	57.0	very little change
02/04/04	21:30	660				80.03	57.1	
02/04/04	22:00	690				80.17	57.2	
02/05/04	22:30	720				80.30	57.3	
02/05/04	23:00	750				80.48	57.5	
02/05/04	23:30	780				80.71	57.7	
02/05/04	0:00	810				80.75	57.8	checked flow, water clear
02/05/04	0:30	840				80.93	58.0	
02/05/04	1:00	870				81.07	58.1	
02/05/04	1:30	900				81.25	58.3	
02/05/04	2:00	930				81.34	58.4	
02/05/04	2:30	960				81.43	58.5	
02/05/04	3:00	990				81.57	58.6	
02/05/04	3:30	1020				81.79	58.8	checked flow
02/05/04	4:00	1050				81.88	58.9	
02/05/04	4:30	1080				82.24	59.3	
02/05/04	5:00	1110				82.33	59.4	
02/05/04	5:30	1140				82.42	59.5	
02/05/04	6:00	1170				82.60	59.6	
02/05/04	6:30	1200				82.42	59.5	
02/05/04	7:00	1230				82.47	59.5	
02/05/04	7:30	1260				82.33	59.4	
02/05/04	8:00	1290				82.29	59.3	
02/05/04	8:30	1320				82.33	59.4	

**AQUIFER TEST DATA**

**Well No.:** Spring Valley Ranch, Test Well SVR 5

**Q=75 gpm, t = 24 hours**

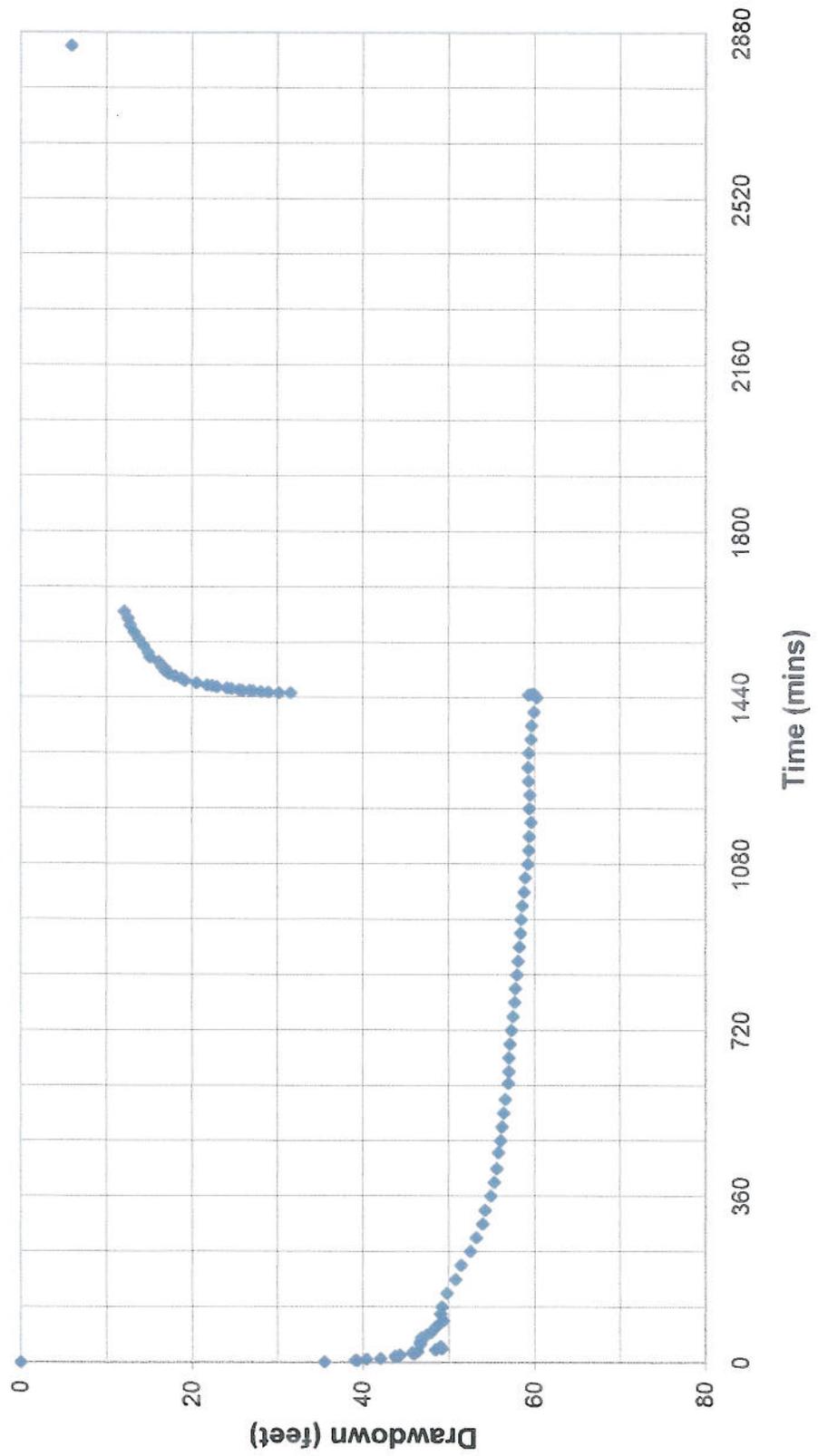
Test conducted by: Scanlan Engineering; Feast Geosciences; Adamson Pump and Drilling Co.								
Flow measured by: bucket and stopwatch								
Water levels measured by: Well sounder      Water level measure point: Top of 1" poly tube								
MP Elevation: 4.0 ft agl			Static WL (ft bmp): 22.97					
Pump on: 02/04/04 10:30		Pump off: 02/05/04 10:37						
Date	Time	t (mins)	t/t'	Water Level Data				Comments
				Ref (ft.)	Measure (in.)	WL (ft bmp)	Drawdown (feet)	
02/05/04	9:00	1350				82.60	59.6	T=14.4C,ph=6.46,EC/SC=184.4/147.9
02/05/04	9:30	1380				82.69	59.7	
02/05/04	10:00	1410				82.97	60.0	
02/05/04	10:30	1440				83.28	60.3	
02/05/04	10:37	1447				83.28	59.4	
Begin Recovery, pump off at: 02/05/04 10:37								
02/05/04	10:38	1448	1448			59.90	59.7	
02/05/04	10:39	1449	725			56.47	60.0	
02/05/04	10:40	1450	483			54.54	31.6	
02/05/04	10:41	1451	363			53.16	30.2	
02/05/04	10:42	1452	290			51.93	29.0	
02/05/04	10:43	1453	242			51.05	28.1	
02/05/04	10:44	1454	208			50.15	27.2	
02/05/04	10:45	1455	182			49.72	26.8	
02/05/04	10:46	1456	162			48.93	26.0	
02/05/04	10:47	1457	146			48.52	25.6	
02/05/04	10:49	1459	122			47.62	24.7	
02/05/04	10:51	1461	104			47.08	24.1	
02/05/04	10:53	1463	91			45.95	23.0	
02/05/04	10:55	1465	81			45.42	22.5	
02/05/04	10:57	1467	73			44.77	21.8	
02/05/04	11:02	1472	59			43.54	20.6	
02/05/04	11:07	1477	49			42.19	19.2	
02/05/04	11:12	1482	42			41.76	18.8	
02/05/04	11:17	1487	37			41.03	18.1	
02/05/04	11:22	1492	33			40.33	17.4	
02/05/04	11:27	1497	30			39.90	16.9	
02/05/04	11:32	1502	27			39.90	16.9	
02/05/04	11:37	1507	25			39.45	16.5	
02/05/04	11:47	1517	22			39.10	16.1	
02/05/04	11:57	1527	19			38.07	15.1	
02/05/04	12:07	1537	17			37.92	14.9	
02/05/04	12:22	1552	15			37.35	14.4	
02/05/04	12:37	1567	13			36.79	13.8	
02/05/04	12:52	1582	12			36.26	13.3	
02/05/04	13:07	1597	11			35.77	12.8	
02/05/04	13:22	1612	10			35.51	12.5	
02/05/04	13:37	1627	9			35.08	12.1	
02/06/04	10:00	2850	2			28.92	6.0	
Notes and Comments: Pump at 131 ft.; 25-hp submersible SWL ~ +2 ft gl.								

# Drawdown and Recovery

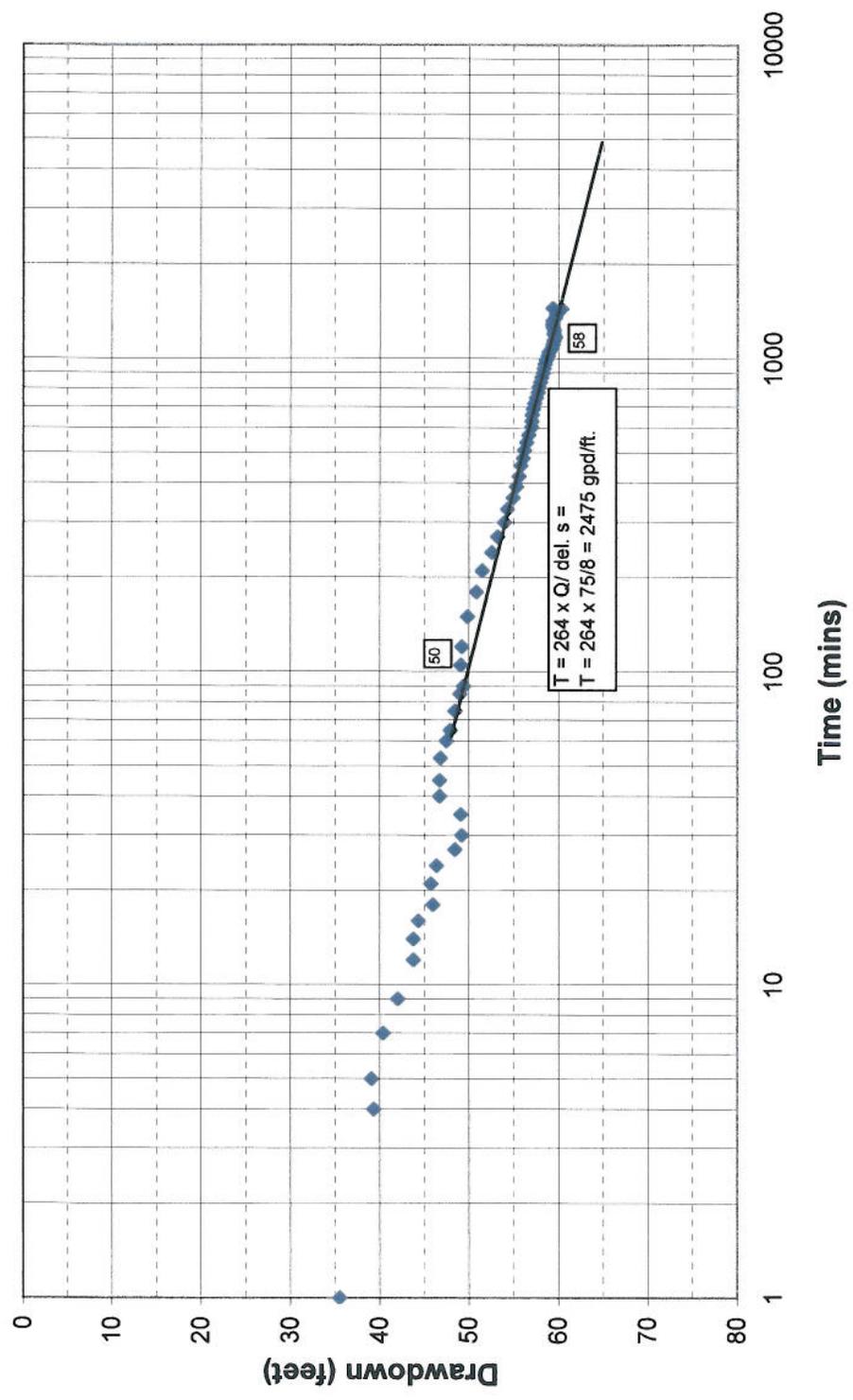
Spring Valley Ranch

Test Well SVR 5, Q = 75 gpm)

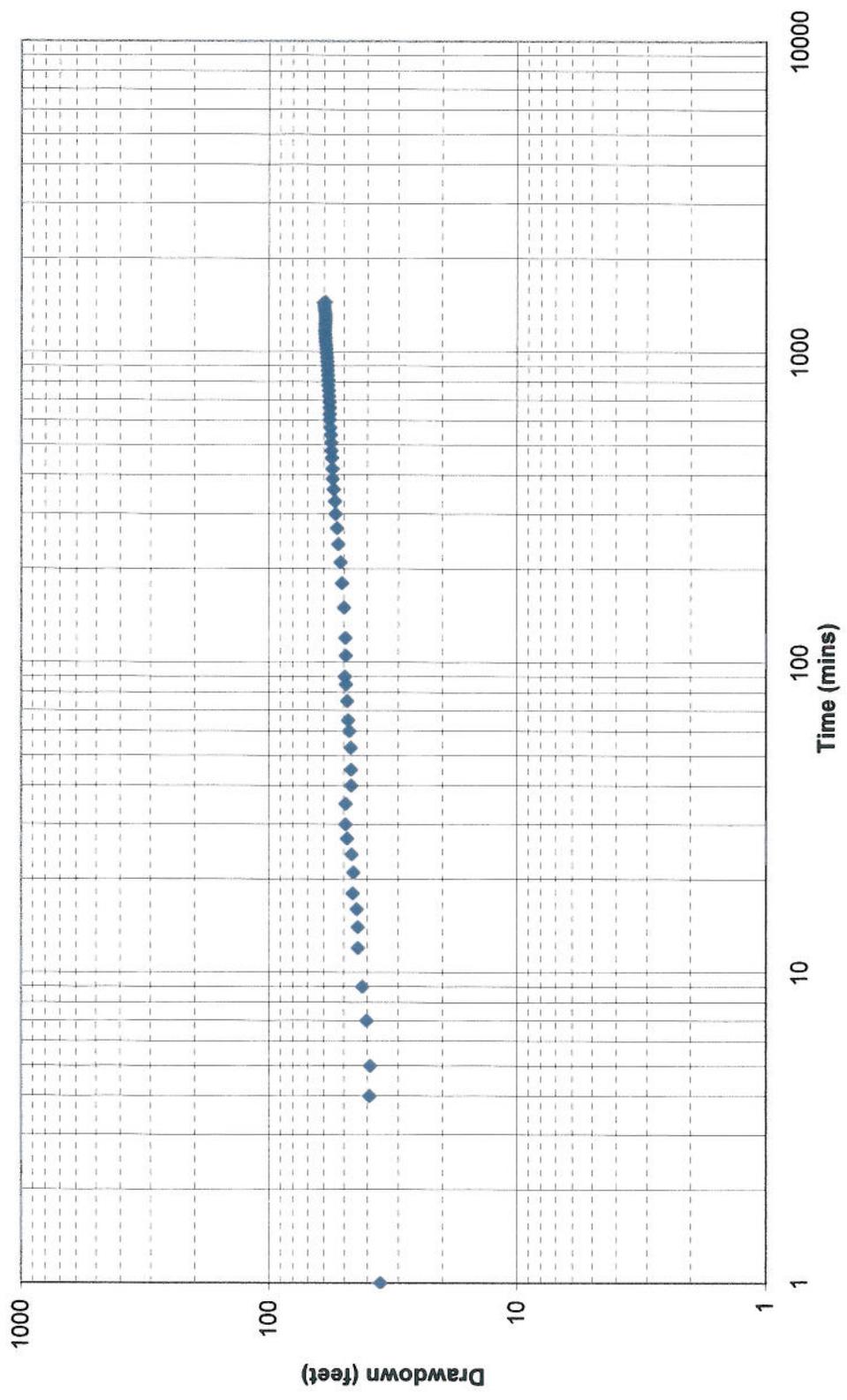
Test date: 2/4-2/16/04



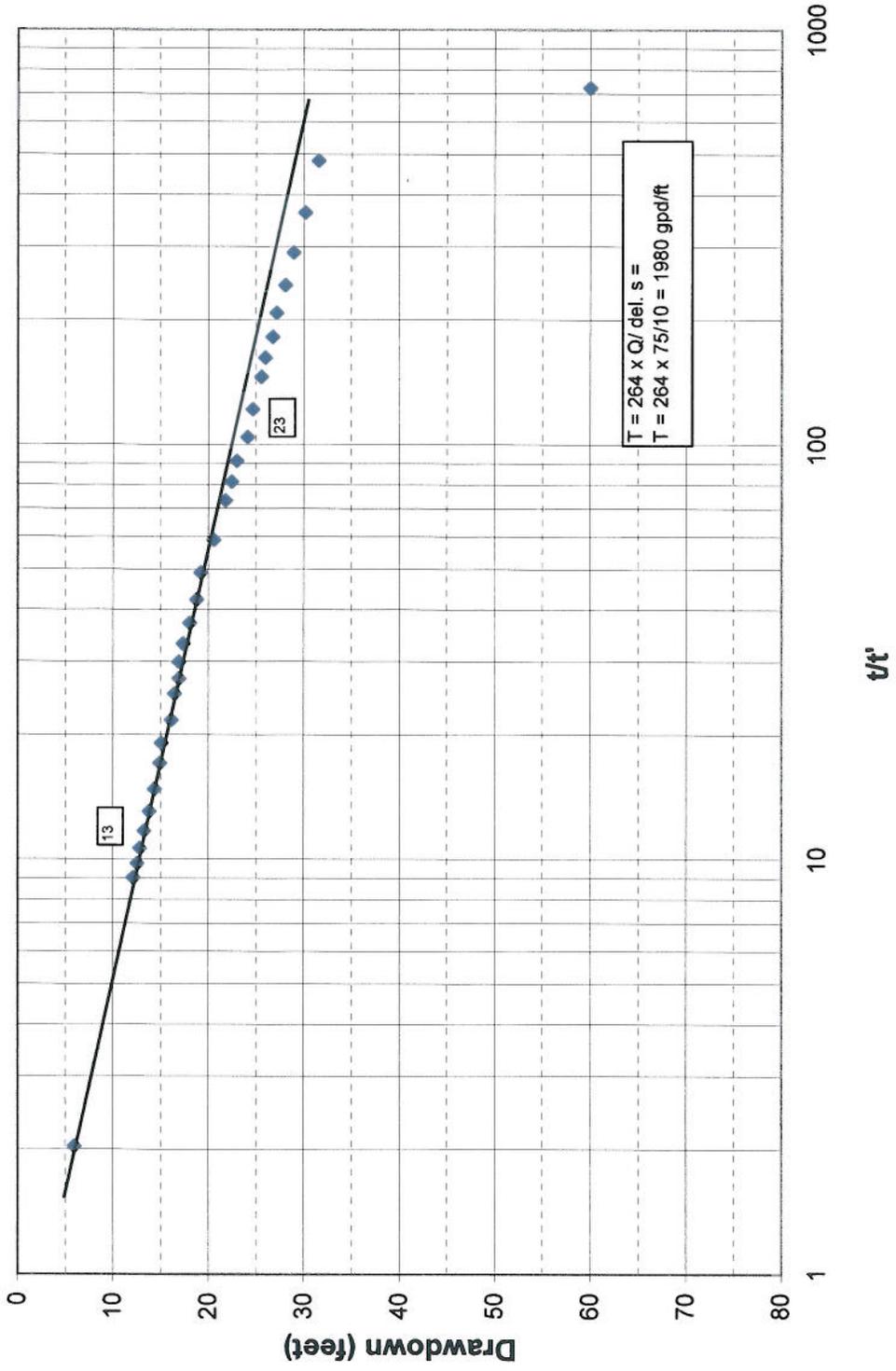
**Time - Drawdown**  
Spring Valley Ranch  
Test Well SVR 5, Q = 75 gpm  
Test date: 2/4-2/6/2004



**Time - Drawdown**  
Spring Valley Ranch  
Test Well SVR 5, Q = 75 gpm  
Test date: 2/4-2/6/04



**Time - Recovery**  
Spring Valley Ranch  
Test Well SVR 5, Q = 75 gpm  
Test date: 2/4-2/6/04





# Analytical Laboratories, Inc.

1804 N. 33rd Street  
Boise, Idaho 83703  
Phone (208) 342-5515

Attn: TERRY SCANLAN  
SCANLAN ENGINEERING  
600 E RIVER PARK LA STE 105  
BOISE, ID 83706

Collected By: C FEAST  
Submitted By: C FEAST

Source of Sample:

PROJECT: SPRING VALLEY RANCH SVR5 GROUNDWATER

Time of Collection: 15:25  
Date of Collection: 2/5/2004  
Date Received: 2/5/2004  
Report Date: 3/2/2004

PWS:

## Laboratory Analysis Report

Sample Number: 0403745

SAMPLES FILTERED IN FIELD W/ 0.45 U FILTER.

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Antimony Furnace	0.006	<0.005	mg/L	0.005	SM 3113 B	2/19/2004	DMB
Arsenic Furnace	0.05	0.008	mg/L	0.003	SM 3113 B	2/18/2004	DMB
Barium, Ba	2	0.05	mg/L	0.05	EPA 200.7	2/13/2004	JH
Beryllium Furnace	0.004	<0.0005	mg/L	0.0005	SM 3113 B	2/19/2004	DMB
Calcium, Ca	UR	15.8	mg/L	0.10	EPA 200.7	2/18/2004	JH
Chromium Furnace	0.1	<0.002	mg/L	0.002	SM 3113 B	2/13/2004	DMB
Iron, Fe	UR	0.86	mg/L	0.05	EPA 200.7	2/9/2004	JH
Magnesium, Mg	UR	3.26	mg/L	0.10	EPA 200.7	2/18/2004	JH
Manganese, Mn	UR	0.31	mg/L	0.05	EPA 200.7	2/9/2004	JH
Mercury, Hg	0.002	<0.0002	mg/L	0.0002	EPA 245.1	2/19/2004	SS
Nickel, Ni	UR	<0.02	mg/L	0.02	EPA 200.7	2/12/2004	JH
Potassium, K	UR	4.9	mg/L	0.5	EPA 200.7	2/18/2004	JH
Sodium, Na	UR	15.3	mg/L	0.10	EPA 200.7	2/18/2004	JH
Thallium Furnace	0.002	<0.002	mg/L	0.002	SM 3113 B	2/20/2004	DMB
Cadmium Furnace	0.005	<0.0005	mg/L	0.0005	SM 3113 B	2/27/2004	DMB
Ammonia Direct (as N)	UR	0.12	mg/L	0.04	EPA 350.1	2/12/2004	WW
Nitrate (as N)	10	<0.20	mg/L	0.20	EPA 300.0	2/9/2004	WW
Nitrite (as N)	1.00	<0.01	mg/L	0.01	EPA 353.2	2/6/2004	WW
Bicarbonate		71.3	mg/L		SM 2320	2/9/2004	WW

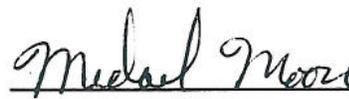
MCL = Maximum Contamination Level  
MDL = Method/Minimum Detection Limit  
UR = Unregulated

# Laboratory Analysis Report

Sample Number: 0403745

SAMPLES FILTERED IN FIELD W/ 0.45 U FILTER.

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Chloride, Cl	UR	3	mg/L	1	EPA 300.0	2/12/2004	WW
Fluoride, F	4.0	0.42	mg/L	0.10	EPA 300.0	2/9/2004	WW
Sulfate, SO <sub>4</sub>	UR	9	mg/L	1	EPA 300.0	2/12/2004	WW
Hardness	UR	48.4	mg/L	5.0	SM 2340	2/10/2004	ARR
Sulfide, Dissolved (as H <sub>2</sub> S)		<0.05	mg/L	0.05	SM 4500-S2 D	2/6/2004	RG
Total Dissolved Solids	UR	176	mg/L	15	EPA 160.1	2/7/2004	RG

  
\_\_\_\_\_

Thank you for choosing Analytical Laboratories for your testing needs.

If you have any questions concerning this report,

please contact: **Michael Moore**

Well # SE 10F3

Printed 12/30/2003  
Drilling Permit No. 809802  
Well Tag No. D0030891  
Well ID # 380534  
Water Right No.  
Receipt # W031188  
Approved Date 12/22/2003

STATE OF IDAHO  
DEPARTMENT OF WATER RESOURCES  
DRILLING PERMIT

Relationship: Applicant  
Name: SPRING VALLEY DEVELOPMENT LLC  
Address: 485 EAST RIVERSIDE DR  
EAGLE ID 83816

Phone: (208)939-0343

Proposed Well Location: Township 05N, Range 02E, Section 18, SW, SE NE  
COUNTY GEM Sub Name SPRING VALLEY  
Ada

Street Address of Well Site: 1/4 MILE EAST OF HWY 55  
Eagle EMMETT ID

Proposed Use of Well: Test

Well Construction Information:

- A. New Well
- B. Proposed Surface Diameter: 6 Inches. Proposed Depth 500 Feet.
- C. Anticipated Bottom Hole Temperature: 85F and less

Construction Start Date: Dec 22 2003

Anticipated Well Drilling Company: ADAMSON PUMP & DRILLING (No. 457)

Applicant's Signature: See original Apl. Date 12/14/03

Title: RW

Well ID # 380534

### Well Tag No. D0030891

#### ACTION OF THE DEPARTMENT OF WATER RESOURCES

This permit is Approved on Monday, December 22, 2003.

1. This drilling permit is valid for two (2) months from the approval date for the start of construction and is valid for one (1) year from the approval date for completion of the well unless an extension has been granted.
2. This permit does not constitute an approval of the local Health District or the Idaho Department of Environmental Quality which may be required prior to construction of this well. The local Health District should be contacted for septic tank/drainfield locations. Domestic wells must not be drilled closer than 100 ft. from any drainfield and 50 ft. from any septic tank. Public Water Supply wells must not be drilled closer than 100 ft. from any drainfield or septic tank.
3. The well shall be constructed by a driller currently licensed in the state of Idaho who must maintain a copy of the drilling permit at the drilling site.
4. Approval of this drilling permit does not authorize trespass on the land of another party.
5. This permit does not constitute other local, county, state or federal approvals that may be required for construction of a well.
6. This drilling permit does not represent a right to divert and use the water of the State of Idaho. If the well being drilled is associated with approved water rights(s) use of the well must comply with conditions of said water right(s).
7. If a bottom hole temperature of 85 Degrees F (29.44 °C) or greater is encountered, well construction shall cease and the well driller and the well owner shall contact the Department of Water Resources immediately.
8. Idaho Code, S 55-2201 - 55-2210 requires the applicant and/or its contractors to contact "Dig-Line" (Dig-Line is a one-call center for utility notification) not less than 2 working days prior to the start of any excavation for this project. The "Dig-Line" Number for this location is 1-800-342-1565.
9. The well tag for the drilling permit/start card shall be securely and permanently attached to the well casing through welding or by the use of four closed end domed stainless steel pop rivets. The tag attachment will be done at the time of completion of the well, and prior to removing the drill rig from the drill site.
10. This drilling permit has been approved for construction or drilling of an exploratory well intended to be used for collecting geologic, hydrologic or water quality data.
11. No water shall be produced from this well or any fluid injected into this well without specific written authorization from the Department.
12. Any surface casing installed in this well shall not exceed 8 inches nominal diameter.
13. All casing strings installed in this well shall be sealed their entire length with approved seal material and by positive means of placement unless otherwise authorized by this drilling permit.
14. A drilling prospectus including a schematic diagram and construction narrative describing all pertinent features of the well including drilling methods, seal material and placement methods, casing schedules and specifications shall be submitted for review by the department and attached to this drilling permit prior to the start of construction.
15. No casing installed in this well shall be drilled and driven through multiple aquifers, unless it is completely removed and the borehole is properly sealed or the casing is perforated at appropriate intervals and pressure grouted with approved grout. Drilling and driving casing may be allowed above the water table or where multiple aquifers are

Well ID # 3805-1

3 of 3

not encountered provided that the casing is sealed as required by administrative rules.

16. This well shall be properly plugged in accordance with a plan approved by the department at least 30 days prior to the expiration of the bond.

17. The bond secured for abandonment of this well shall be valid for the entire time the well remains open. The Department will give the well owner 60 days notice prior to the expiration of the bond that the well must be properly plugged. If the well owner has not properly plugged the well at least 30 days prior to the expiration of the bond, the Director may commence action to attach the bond and hire a licensed driller to properly plug the well.

18. Drilling of this well shall not commence until the Department has received a document from the surety company or bank stating that the bond is in full force and effect and the Department has determined the amount of the bond is sufficient.

19. This drilling permit is not valid unless the well owner has secured a bond in favor of the Director in an amount sufficient for proper plugging and abandonment of this well. The bond shall remain in effect and accessible by the Director until this well is plugged. The bond amount for this well shall be at least \$3500.

  
Signature of Authorized Dept. Representative

Sr WR Agent  
Title