WELL CONSTRUCTION AND AQUIFER TESTING IN THE SANDY HILL AREA OF SPRING VALLEY RANCH

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Executive Summary

SunCor Development Company is evaluating development potential for the Spring Valley Ranch property located northwest of Boise, Idaho. The analysis described in this report focused on evaluating potential ground water production from the Sandy Hill Aquifer. The Sandy Hill Aquifer is an aquifer of limited areal extent near the proposed Core Development Area.

The aquifer had been initially identified by an exploration well constructed in November, 2002. Two additional wells were constructed in the aquifer as part of this project, and were used to conduct two multi-day aquifer tests.

Based on the results of these tests, we conclude that the Sandy Hill Aquifer represents a highly productive but volume-limited resource. Use of the water from this aquifer for public water supply purposes would require treatment for arsenic. With treatment, the Sandy Hill Aquifer appears to represent an initial source of water for the first phase of project development. Aquifer Storage and Recovery (ASR) represents a way in which to enhance and sustain production from this aquifer.

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1. INTRODUCTION

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 (SVR 1, SVR 2, SVR 3, and SVR 4) in Spring 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 SVR 8 and Test Production Well TPW 1. Concurrent construction and testing of Exploration Wells SVR 5, SVR 6, SVR 7, SVR 9, and SVR 10, 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 general objective was to evaluate potential production from the Sandy Hill Aquifer. Specific objectives of this investigation included the following:

1. Drill and construct a test production well in the Sandy Hill Aquifer.
2. Drill an additional exploration and monitoring well in the Sandy Hill Aquifer area.
3. Conduct a multi-well, multi-day aquifer test to evaluate aquifer characteristics in the Sandy Hill Aquifer.
4. Present results from well construction and aquifer testing.

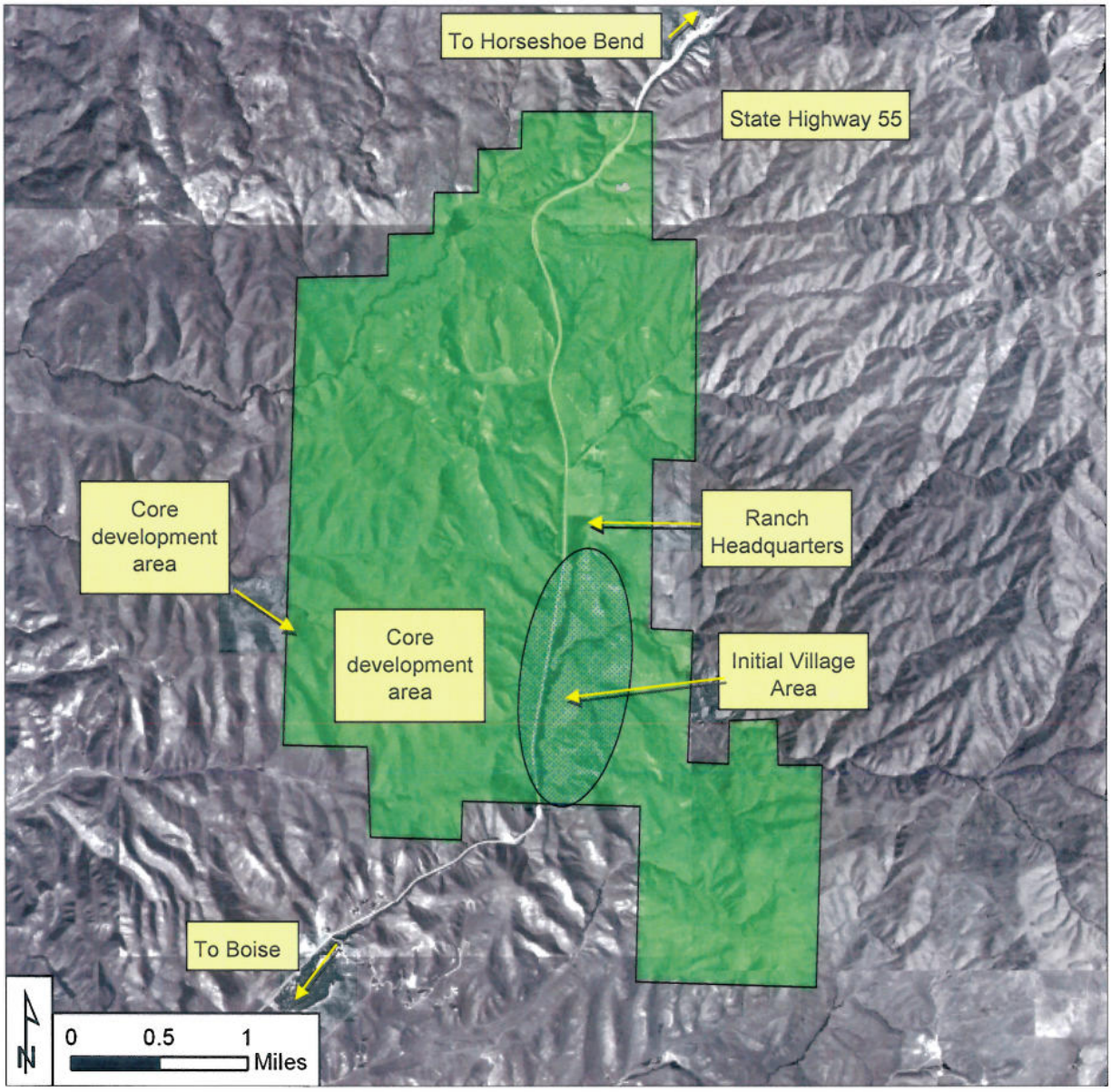

Figure 1: Spring Valley Ranch core development area.

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	Scanlan Engineering report on the construction and testing of exploration wells SVR 1 through SVR 4 concluded that 1. A productive coarse-grained sand aquifer (i.e., the "Sandy Hill Aquifer") is present in the highlands approximately ¾ 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. 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. 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. 4. Suspected aquifers in the Big Gulch and Little Gulch areas are anticipated to be productive and more 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. 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
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:

1. Develop well designs for Exploration Well No. 8 (SVR 8) and Test Production Well No. 1 (TPW 1); coordinate well drilling and construction with drilling contractors.
2. Negotiate with the Idaho Department of Water Resources for well drilling permits, abandonment bonds, and other permitting items.
3. Provide inspection and supervision of drilling activities, including logging of drill cuttings, inspection and certification of surface seal installation, and other tasks as needed.
4. Conduct a multi-day pumping test of the Sandy Hill Aquifer. 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.
5. Provide documentation of exploration well drilling and aquifer testing results. The report will include data, conclusions, and any recommendations for further investigation.

2. WELL CONSTRUCTION

This section describes the drilling and construction of wells TPW 1 and SVR 8. These wells are located in the Sandy Hill area, approximately one mile east of the primary ranch buildings (Figure 2).

The purpose of TPW 1 was to serve as a pumping well for a multi-day aquifer test to better characterize the Sandy Hill Aquifer. The completed well may also be utilized as a source of water supply for a future public water system to serve the Spring Valley Ranch Project. The well targeted the same coarse-grained sand sediments (Figure 3) that were encountered by SVR 3 (Scanlan Engineering, April, 2003). TPW 1 is located in the SE ¼, SE ¼ of Section 1 in T5N R1W, approximately 2/3 mile west of Highway 55, and approximately 150 feet east of Exploration Well SVR 3 (Figure 2).

Exploration Well SVR 8 was constructed approximately 1/2 mile west of Highway 55. It is located in the SW ¼, SW ¼ of Section 6 in T5N R1E, approximately 1,000 feet east of Test Production Well TPW 1. The ground surface elevation at the well site is approximately 110 feet lower than at SVR 3 and TPW 1. The purpose of this well was to help determine the lateral extent of the Sandy Hill Aquifer, provide an additional observation point during the Sandy Hill Aquifer test (see Section 3), and to serve as a long-term observation point during the development of the Sandy Hill Aquifer.

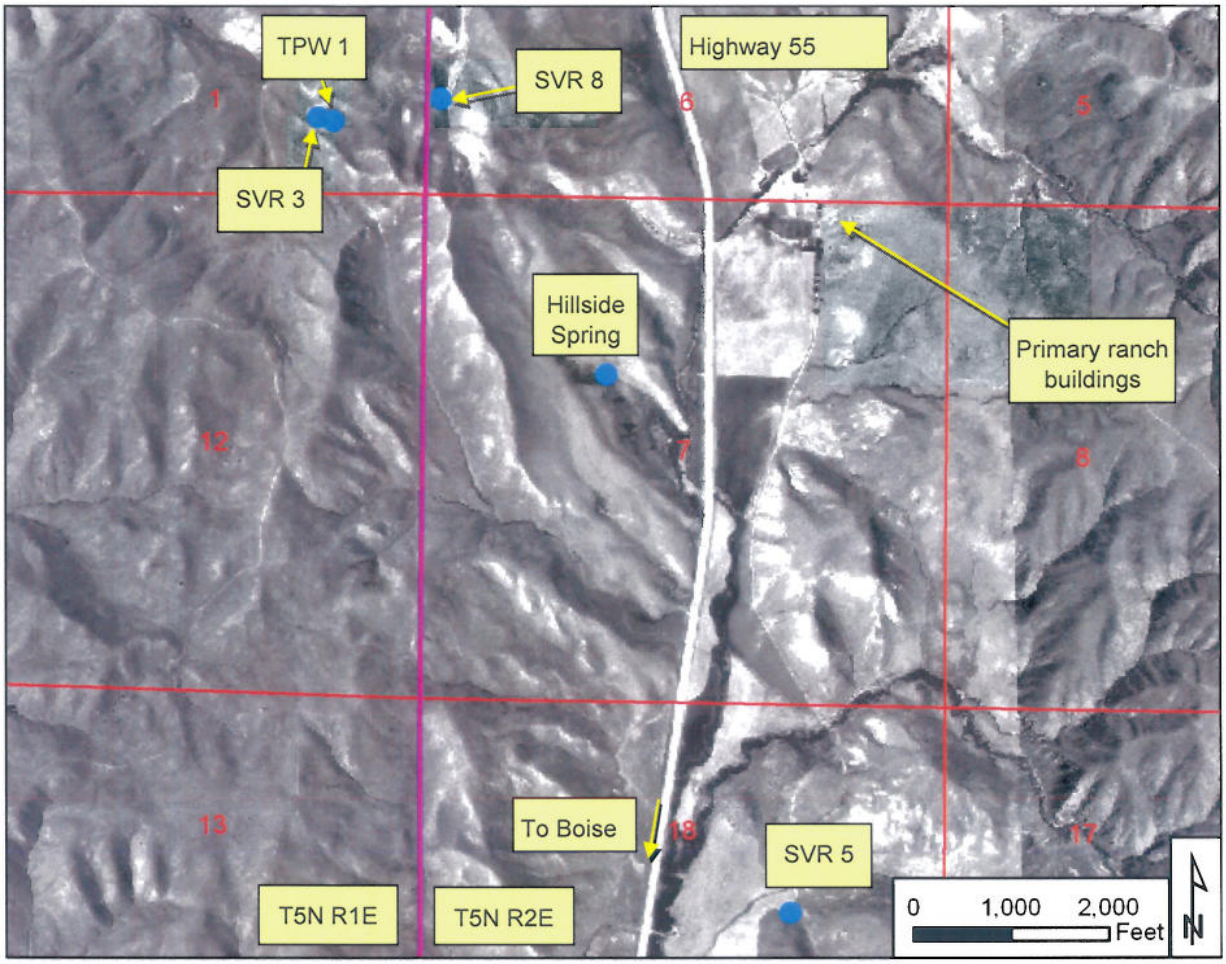

Figure 2: Locations of Exploration Wells SVR 5 and SVR 8 and Test Production Well TPW 1.

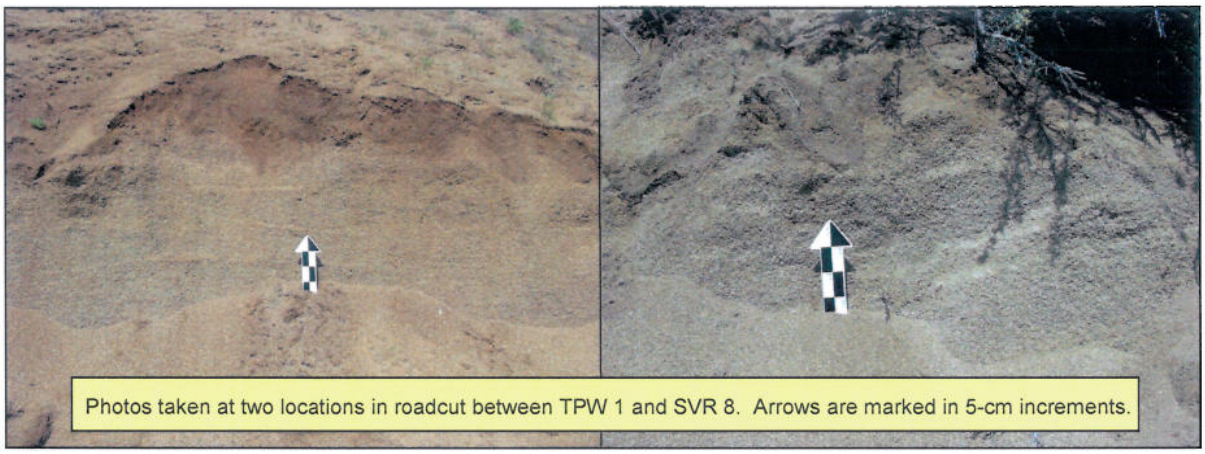

Figure 3: Sediments similar to those in Sandy Hill Aquifer.

2.1. Test Production Well TPW 1

2.1.1. Construction

Test Production Well TPW 1 was drilled and constructed between March 25 and March 30, 2004, by Riverside, Inc. (Parma, Idaho). TPW 1 (IDWR Tag No. 0030890) was drilled with a 24-inch diameter borehole to a depth of 292 feet using the reverse circulation rotary method (Appendix A). The borehole penetrated fine, medium, and coarse sands to a depth of 290 feet. The bottom 2 feet (290 to 292 feet) penetrated by the borehole were observed as dark-gray tuffaceous clay. A more detailed lithologic description of this area is provided as part of the Exploration Well SVR 3 well log (Scanlan Engineering, April, 2003).

The well was completed to public water system standards[1], with 16-inch (0.375-inch wall) welded steel casing to a depth of 238 feet, and with 16-inch diameter 40-slot (0.040-inch slot spacing) stainless-steel well screen from 238 to 292 feet. Pea gravel (3/8-inch) was placed as filter pack in the borehole annulus outside of the well screen (from the bottom of the borehole up to a depth 230 feet). The remaining annular space between ground surface and filter pack (from ground surface to a depth of 230 feet) was sealed with 37,500 lbs of bulk bentonite chips contained in 2,500-lb bags (15 bags). Placement of the entire well seal was observed and documented by Mike Martin, EIT (SPF Water Engineering, LLC); a portion of the well seal installation was also observed by Rob Whitney (IDWR). Each bag was poured through standing water at carefully controlled rates. Upon emptying of each bag, a sinker bar and tag line was used to tag the top of the seal. No bridging was detected during installation of the seal.

A 1.5-inch access port was installed in the above ground portion of the well casing to facilitate water level measurements. The static water level following well completion and development was 177 feet below the top of the access port.

2.1.2. Chemistry

Water quality parameters (e.g., specific conductance, temperature) were measured during the test pumping of TPW 1 (see Section 3). Samples were collected and analyzed for potential drinking water contaminants, including primary and secondary inorganic constituents, volatile organic compounds (VOCs), synthetic organic compounds (SOCs), radiological parameters, and coliform bacteria. Results are summarized in Table 2 and Appendix A and discussed in Section 3.3.4.

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[1] http://www2.state.id.us/adm/adminrules/rules/idapa58/0108.pdf

Constituent	Maximum Contaminant Level (MCL) (µg/l)	Secondary Maximum Contaminant Level (SMCL) (µg/l)	Analysis Results (*Results from SVR 3 and Hillside Spring are provided for comparison - see Scanlan Engineering, April, 2003)		
			TPW 1 (µg/l)	SVR 3* (µg/l)	Hillside* Spring (µg/l)
Date			**4/16/2004**	**12/18/2002**	**12/18/2002**
Arsenic	0.01**		0.023	0.038	0.021
Ammonia			<0.04	<0.04	<0.04
Antimony	0.006		<0.005	<0.005	<0.005
Barium	2		<0.05	<0.05	<0.05
Beryllium	0.004		<0.0005	<0.0005	<0.0005
Bicarbonate				50.4	66.2
Cadmium	0.005		<0.0005		
Calcium			40.6	12.9	22.2
Chloride		250	<1	2	3
Chromium	0.1		<0.002	<0.002	<0.002
Fluoride	4	2	0.36	0.27	0.33
Hardness			110	41.8	67.7
Iron		0.3	0.06	0.06	<0.05
Magnesium			4.37	2.54	3.53
Manganese		0.05	0.10	<0.05	<0.05
Mercury	0.002		<0.0002	<0.0002	<0.0002
Nickel			<0.02	<0.02	<0.02
Nitrate	10		<0.01	0.63	1.59
Nitrite	1		<0.20	<0.01	<0.01
Potassium			5.2	4.4	4.4
Sodium			10.2	9.72	9.52
Sulfate		250	26	11	17
Sulfide			<0.05	<0.05	<0.05
TDS		500	218	116	120
Thallium	0.002		<0.002	<0.002	<0.002
coliform bacteria			absent		
Field Parameters					
Temp. (°C)			14.8	13.4	13.8
Temp (°F)			58.6	56.1	56.8
SC umhos/cm			251	138	188
EC umhos/cm			202	108	145
PH		6.5-8.5	7.1 (lab value)	7.46	7.56

**Current standard is 0.050 µg/l; standard will change to 0.010 µg/l on January 26, 2006.

Table 2: Selected water quality parameters, TPW 1.

2.2. Exploration Well SVR 8

2.2.1. Construction

SVR 8 (IDWR Tag No. 0031220) was drilled by Adamson Pump and Drilling on April 12, 2004, using the air-rotary method. The uppermost 20 feet was drilled to a 10-inch diameter with a 10-inch temporary surface casing. A 6-inch steel casing was then drilled and driven to a depth of 141 feet. A 5-inch diameter screen with 0.040-inch openings was installed from 136 to 141 feet, with an 11-foot headpipe and packer extending upward into the well casing, and the 6-inch casing was then pulled back to 133 feet to expose the well screen. A bentonite surface seal was installed as the upper temporary casing was removed. The well was then developed by air-lift pumping at an estimated production rate of 100 gpm. A driller's report and other information for this well are included in Appendix B. Static water level following completion was approximately 65 feet below ground surface.

2.2.2. Chemistry

Water quality parameters were not analyzed in this well because the well was not test pumped.

3. Sandy Hill Aquifer Test

3.1. Introduction

Aquifer testing was conducted in the Sandy Hill Aquifer following completion of the Test Production Well TPW 1 and SVR 8. These tests consisted of an initial step-rate pumping test, a constant-rate pumping test, and a recovery test. TPW 1 was utilized as the pumping well.

This section outlines methods and results of these tests and provides discussion based on the analysis of test results.

3.2. Test Methods and Equipment

The first test consisted of development pumping and a nominal 1.5-hour step-rate test conducted on April 12, 2004.

The second test was a 3-day constant-rate pumping test with a design production rate of approximately 2,000 gpm, followed by a 4-day recovery test. The constant-rate pumping test began April 14, 2004, at 10:47 A.M. and ended on April 17, 2004, at 10:05 A.M. The actual pump-discharge rate for the first ten minutes of pumping was

approximately 600 gpm and was approximately 2,050 gpm for the remainder of the test.

The recovery test began when the pump was turned off (April 17, 2004 at 10:05 A.M.). Measurements were taken in TPW 1, SVR 3, and SVR 8 through April 21, 2004.

The pumping tests were conducted with a line-shaft turbine pump installed in TPW 1, powered by a direct-drive diesel engine. Personnel and equipment for the pumping test were provided by Riverside, Inc. Discharge was routed across a small divide through a 12-inch pipeline to the South Fork of Willow Creek to avoid seepage loss through the coarse-grained surface sands found in the vicinity of the pumping well (Figure 4). Discharge was estimated based on measured backpressure in a 10-inch discharge pipe upstream of an 8-inch circular orifice.

Water levels were monitored in the pumping well (TPW 1) and observation wells SVR 3 and SVR 8. Water levels were measured in TPW 1 with an electric-probe sounder through dedicated 1/2-inch tubing (Figure 5) that extended into the well to within a few feet of the pump. The purpose of the dedicated line was to reduce measurement fluctuations caused by turbulence within the well and by pump lubricants. Water levels in monitoring wells SVR 3 and SVR 8 were monitored by electric-probe sounders and Stevens Type F chart recorders (Figure 5).

The primary Spring Valley spring ("Hillside Spring") and several nearby seeps are thought to represent discharge points to the Sandy Hill Aquifer. A portion of the spring discharge (about 5 to 15 gpm) is piped to the ranch for stockwater and domestic uses. The remainder of the spring flow (approximately 50 gpm) discharges through a pipe at a cattle trough. Discharge rates from the pipe at the cattle trough were monitored during the pumping and recovery tests using a bucket and stopwatch (Figure 6).

Several storms passed through the area during the aquifer testing period. Changes in barometric pressure can influence water levels in confined aquifers (Fetter, 1994; Freeze and Cherry, 1979; U.S. Department of the Interior - Bureau of Reclamation, 1985). Barometric fluctuations were apparent during the aquifer tests, despite the lack of apparent confining zones in the lithologic profile observed during well construction. Barometric corrections were made to water-level measurements using barometric data from Gowen Field (airport) in Boise.

3.3. Results

3.3.1. Step-Rate Pumping Test

Pumping rates during the step-rate tests were approximately 850 gpm, 2,000 gpm, and 2,340 gpm. Each step was maintained for approximately 30 minutes. Maximum drawdown was 16.6 feet.

Specific capacities at the end of the three steps ranged from 120 gpm/ft to 150 gpm/ft. The range in specific capacities suggests that there may have been some inaccuracy in flow measurement. The lowest specific capacity was at the 850 gpm rate. Therefore, the data do not suggest a significant decrease in well efficiency at higher discharge rates.

3.3.2. Constant-Rate Pumping Test and Recovery

The pumping well (TPW 1) produced approximately 2,050 gpm for a period of approximately 71 hours. The total pumping drawdown in TPW 1 was approximately 17 feet. Upon cessation of pumping, the water level in the well recovered to within 8 feet of static water level in two minutes, and to within 1.16 feet of the pre-test static water level approximately 40 hours after the pump was turned off.

The close observation well (SVR3, 150 feet to the west) had 1.0 foot of drawdown during the test. Water levels in the well recovered to within 0.7 foot of the static level one day after the pump was turned off. Water levels did not recover further during the subsequent days of recovery measurements.

The distant observation well (SVR 8, located 1,000 feet to the east of TPW 1) experienced 0.6 foot of drawdown during the test. Water levels in this well were 0.8 foot below that static level at the end of the recovery test. The apparent continued decline can be explained by changes in barometric pressure (see Section 3.3.3).

Water levels in all three wells were approximately 0.5 feet below pre-test static water levels 8 weeks after the test.

There was no noticeable change in observed discharge from the Hillside Spring in Spring Valley during the pumping or recovery tests.

3.3.3. Barometric Efficiency

Changes in atmospheric pressure can cause changes in ground water levels in confined or semi-confined aquifers. A decrease in atmospheric pressure can lead to an increase in water levels, and vice versa. No apparent confining zone was observed in the lithologic profile of these wells. Nonetheless, barometric effects were clearly observed in the observation well water level data (see drawdown plots in Appendix C). Barometric effects were not analyzed in the pumping well because drawdown caused by pumping would overwhelm any changes in water levels caused by barometric variations.

Barometric efficiency is defined by the ratio of water level change in a well to a change in barometric pressure. The barometric efficiency of the SVR 3 and SVR 8 wells was estimated to be approximately 58%. This indicates that a change of 1 inch (of water) in barometric pressure results in a 0.58-inch change in water level in the well. Thus, changes in barometric pressure explained some of the fluctuations in water levels observed during the course of the aquifer tests.

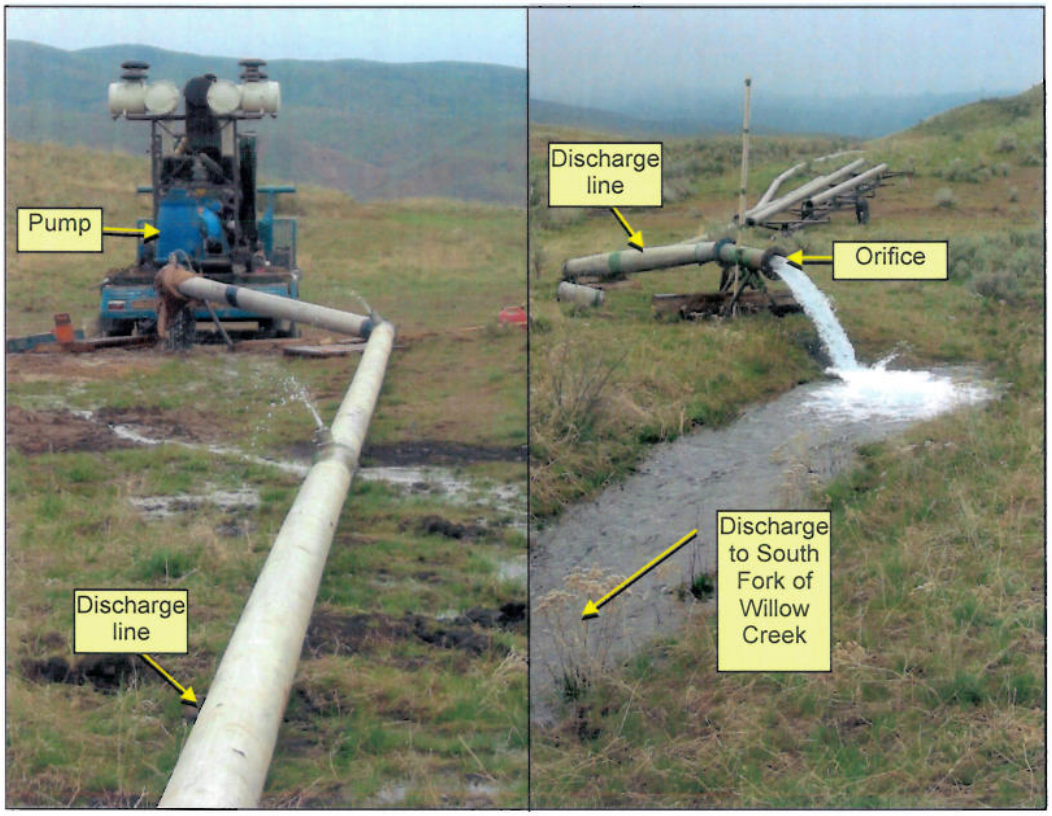


Figure 4: Pump, diesel motor, and discharge line at TPW 1

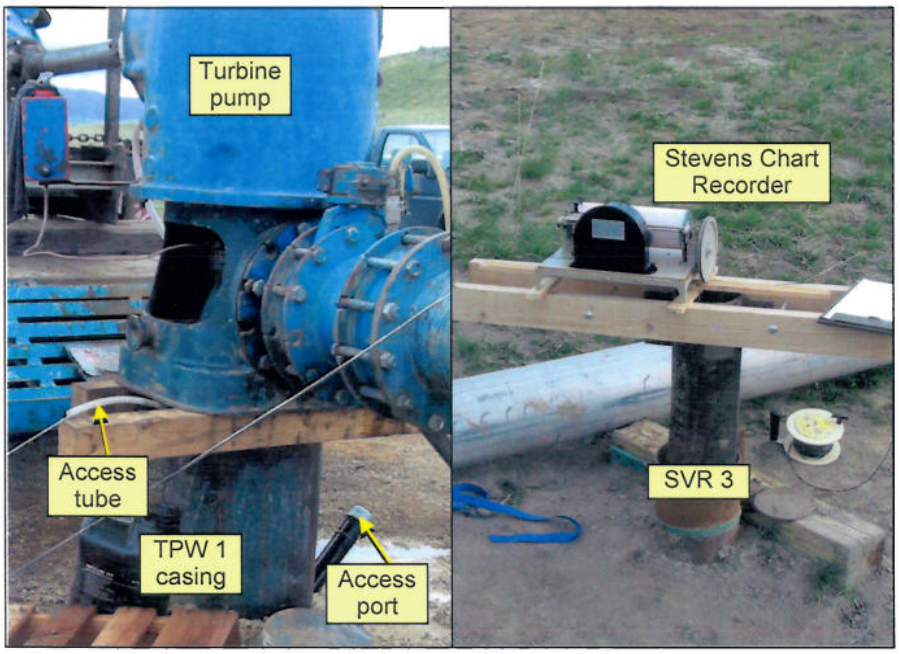


Figure 5: Measuring equipment at TPW 1 and SVR 3.

Figure 6: Hillside Spring discharge.

3.3.4. Water Quality

Results of water quality testing are provided in Table 2 and Appendix A. At the time of report preparation, laboratory (Analytical Laboratories, Inc.) results for radiological constituents were not available. When received, these analyses will be forwarded to SunCor.

The quality of water produced from TPW 1 is good in all respects except for arsenic and manganese. The manganese concentration in water from TPW 1 (0.10 ppm) exceeded the secondary standard (primarily aesthetic) of 0.05 ppm. Samples from TPW 1, SVR 3, and Hillside Spring contained levels of arsenic (0.023 ppm, 0.038 ppm, and 0.021 ppm, respectively) that do not meet the future standard of 0.01 ppm (this standard will be effective on January 23, 2006). Arsenic speciation (Appendix A) suggests that approximately one-half of the arsenic is in the oxidized form.

Several observations can be made from the water quality data in Table 2. First, concentrations in TPW 1, SVR 3, and SVR 8 are generally similar, reflecting similar aquifer conditions. However, the sample from TPW 1 had somewhat higher concentrations of total dissolved solids (TDS), calcium, and manganese, and a lesser concentration of nitrate, than samples from SVR 3 and Hillside Spring. The presence of manganese and the absence of nitrate in the water from TPW 1 suggest that the groundwater produced from the well is slightly anaerobic (i.e., reduced). In contrast, the sample from nearby SVR 3 (and the Hillside Spring) had no detectable manganese, but a contained detectable nitrate, suggesting aerobic (i.e., oxidized) conditions. These differences might be explained based on the well construction. TPW 1 has screens that tap the aquifer below a depth of 240 feet. SVR 3 taps the aquifer above 240 feet. The water in the lower portion of the aquifer tapped by TPW 1 may be influenced by a very slow circulation rate, or by recharge from underlying or adjacent fine-grained sediments. In contrast, the upper portion of the aquifer tapped

by SVR 3 may show influence of recharge from precipitation or surface sources. Furthermore, the similarities in chemistry between SVR 3 and the Hillside Spring (4,000 feet apart), may suggest a horizontal flow regime through the upper portion of the aquifer. The differences in chemistry between SVR 3 and TPW 1 (150 feet apart) suggest that there is not an active vertical flow path through the aquifer in the vicinity of TPW 1.

4. Discussion

The Sandy Hill Aquifer has been identified as a possible water supply source for the proposed Spring Valley Ranch development. The purpose of this effort was to evaluate potential production capacity from the Sandy Hill Aquifer.

4.1. Production Levels

Aquifer testing of the Sandy Hill Aquifer indicates high production capacity but limited areal extent. The total extraction volume over the 3-day pumping test was approximately 27 acre-feet (9 million gallons). Aquifer water levels did not fully recover following the aquifer test.

The drawdown trend in all three wells a few hours after start or end of pumping is generally linear (except for minor fluctuations that appear to be related to barometric pressure changes). The linear trend is an indication that the Sandy Hill Aquifer responds as a bounded reservoir, which is consistent with our conceptual model of this aquifer having limited areal extent.

Assuming that this amount of pumping (approximately 27 acre-feet) resulted in an average, uniform depletion of 0.75 foot, the aquifer has a capacity of approximately 35 acre-feet (11.5 million gallons) per foot of decline. However, the estimated capacity per foot of decline could be substantially less if the aquifer dimensions decrease as water levels decline, which is likely. In other words, the "sides" of the reservoir are probably not vertical and, as a result, the horizontal cross-sectional area of the aquifer probably decreases with depth.

4.2. Aquifer Area

A gross estimate of total aquifer area can be made based on an assumed specific aquifer yield (i.e., the ratio of the volume of water released from aquifer storage per unit surface area of aquifer per unit decline in the water table) and the estimated production per foot of aquifer decline. If one assumes 35-acre-foot extraction per 1-

foot aquifer depletion, and a specific yield value for the Sandy Hill Aquifer of 0.20, then it might be inferred that the aquifer covers approximately 175 acres.

4.3. Potential Water Supply

The aquifer has a saturated thickness of approximately 110 feet at the pumping well site. If we assume that the entire aquifer area has a saturated thickness of at least 50 feet, and that each additional foot of aquifer decline (up to 50 feet) would produce an additional 35 acre-feet of water, then the recoverable storage in the uppermost 50 feet of aquifer storage might be approximately 1,750 acre-feet (575 million gallons). Furthermore, if one assumes an annual use rate of 0.5 acre-feet per customer, the exploitable storage volume in the uppermost 50 feet of the Sandy Hill Aquifer might provide 3,500 "customer years" of supply. In other words, given these assumptions, the water currently stored in the upper 50 feet of the aquifer might support 350 homes for ten years, or 700 homes for five years. After the storage volume is depleted, another source of supply would need to be developed to serve the project. This analysis is highly speculative, as aquifer dimensions and aquifer yields per foot of decline in the uppermost 50 feet of the aquifer are unknown.

Although the long-term sustainability of the resource is limited under high rate pumping conditions, the potential short-term yields from wells tapping the aquifer are very high. Concurrent operation of several wells, each producing at rates in excess of 2,000 gpm, is feasible.

4.4. Effect of Natural Recharge

The average recharge to the aquifer appears to be in excess of 95 acre feet (31 million gallons annually), based on an average annual discharge rate from the Hillside Spring in Spring Valley of approximately 60 gpm (95 acre feet annually). Depletion of aquifer storage by pumping will either have (1) little effect on spring flow if the spring flow occurs as leakage from the base of the aquifer or (2) substantial effect on spring flow if the flow occurs as discharge from the top of the aquifer.

Estimated ground surface elevations (based on USGS 7.5 minute quad map elevations) for the three Sandy Hill Aquifer wells are shown in Table 3. Differences in water levels among TPW 1, SVR 3, and SVR 8 probably reflect errors in estimating ground surface elevations. However, the difference between the averages of the water levels in these three wells (3,420 feet) is about 40 feet above the estimated spring elevation. This suggests that the flow to the spring would continue despite aquifer extractions (although probably at a diminished rate) until water levels are drawn down to near the spring elevation. Annual natural recharge could partially offset depletions to the aquifer caused by pumping (depending on withdrawals rates), effectively increasing the exploitable supply from the aquifer.

Assuming that the recharge that discharges from the Hillside Spring can be captured by lowering the water level in the aquifer, the sustainable yield from the aquifer would be in excess of 95 acre feet per year. For purposes of discussion, a 100 acre foot per year annual yield could probably be obtained without further water level decline after flow from the spring is essentially stopped. This amount of water is adequate to support approximately 200 homes (0.5 acre feet annually per home) without significant water conservation. With water conservation, the aquifer might reliably supply 300 homes into the future.

Location	Estimated Ground Surface Elevation (ft)*	Measured Static Depth to Water (ft)	Estimated Ground Water Elevation (ft)
Hillside Spring	3,380	- -	3,380
TPW 1	3,600	179	3,421
SVR 3	3,600	175	3,425
SVR 8	3,480	67	3,413
* Based on interpolated USGS elevation data.			

Table 3: Estimated ground water elevations at Hillside Spring, TPW 1, SVR 3, and SVR 8.

4.5. Potential Application of Aquifer Storage and Recovery (ASR)

With aquifer recharge, the Sandy Hill Aquifer could serve as a reservoir capable of meeting large seasonal demand peaks. For instance, if the aquifer was recharged for 7 months from fall to spring at an average rate of 2,000 gpm from another water source, the water could be withdrawn for 5 months from spring to fall at an average rate of 2,800 gpm to meet seasonal demand peaks. Furthermore, the peak rates at which the water could be withdrawn could easily exceed 5,000 gpm. If utilized as an ASR facility, the Sandy Hill Aquifer could potentially serve several thousand customers. An ASR project will require a reliable source of water for annual recharge purposes.

Potential sources of water for managed recharge include ground water from the western portion of Spring Valley Ranch (see Section 4.7), surface water from Spring Valley Creek, South Fork Willow Creek, or the Payette River, or municipal supplies from the Hidden Springs and/or northeast Eagle area.

4.6. Water Quality for Municipal Purposes

Results of water quality testing from TPW 1, SVR 3, and the Hillside Spring (Table 2 and Appendix A) suggest that at a minimum, water from the Sandy Hill Aquifer will require treatment for arsenic to meet future public drinking water standards. The 0.10 mg/L manganese concentration in TPW 1 may require treatment for aesthetic reasons (i.e., to minimize staining). It is possible that an active Aquifer Storage and Recovery strategy would result in decreased arsenic and/or manganese concentrations over time.

4.7. Related Investigations

An effort is currently underway to evaluate water supplies in the western portion of Spring Valley Ranch. A large, highly transmissive aquifer appears to be present in an area between Big Gulch and Willow Creek. Another transmissive aquifer has been identified in lower Big Gulch. Water from these sources may be available for development in the western portion of the Spring Valley Ranch, direct use in the core development area, or for recharge of the Sandy Hill Aquifer. However, elevated arsenic concentrations in ground water from this area may require treatment of this water prior to municipal use. Results and conclusions from the investigation of water resources in the western portion of Spring Valley Ranch are being provided under separate cover.

5. Conclusions and Recommendations

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

1. The Sandy Hill Aquifer represents a highly productive but volume-limited resource.
2. If not artificially recharged, the sustainable production from the Sandy Hill Aquifer will support 200 to 300 homes.
3. As an interim water supply prior to bringing in a recharge source, the aquifer might supply 500 homes for five to ten years with aquifer water level decline of up to 50 feet.
4. Sandy Hill Aquifer water would require treatment for municipal uses because of elevated arsenic concentrations. With treatment, the Sandy Hill Aquifer appears to represent an initial source of water for the first phase of project development.
5. Extensive extraction of ground water from the Sandy Hill Aquifer will likely result in a decline in Hillside Spring discharge.

6. Managed recharge of the Sandy Hill Aquifer from other sources will increase the amount of water available for extraction from the aquifer. If an adequate source of recharge could be developed, the Sandy Hill aquifer could potentially meet the peak season water demands for several thousand homes.
7. Potential sources of water for managed recharge (or direct use) in the Sandy Hill area include (1) one or more aquifers in the western portion of the Spring Valley Ranch or (2) municipal water provided by United Water Idaho (by pipeline via the Dry Creek valley) or surface water from Spring Valley Creek, South Fork Willow Creek, or the Payette River.

The following recommendations should be considered:

1. Conduct geologic mapping of the Sandy Hill Aquifer area to (1) better define the areal extent of the aquifer, (2) identify geologic controls on natural aquifer discharge, and (3) delineate recharge areas. Establishing the areal extent of the aquifer would help in refining water supply estimates from the Sandy Hill Aquifer. Delineating recharge areas would help quantify aquifer recharge and may influence development planning (so as to protect aquifer water quality).
2. Conduct additional exploration drilling to help determine aquifer characteristics (i.e., aquifer thickness, sediment characteristics, etc). This information would assist in refining estimates of supply, the extent of possible aquifer drawndown under various extraction scenarios, and the capacity for potential aquifer recharge.
3. Begin to evaluate potential treatment options for Sandy Hill aquifer water. Pilot testing of arsenic treatment would provide a basis for designing subsequent larger-scale treatment options.
4. Install a transducer and datalogger into SVR 8 to accurately monitor water levels. The purpose of the automated monitoring would be to observe water level fluctuations (corrected for barometric effects) during the course of a year. This information would be used to evaluate aquifer recharge and discharge characteristics, which could be used to evaluate capacity for withdrawals and capacity for ASR. SVR 8 is recommended for monitoring water levels because it appears to respond similarly to SVR 3 and TPW 1 and because the depth to water is less (requiring vented cable for the transducer).

   A constant water level throughout the year might suggest that aquifer levels are effectively controlled by current aquifer discharge points. This would limit the amount of artifical recharge that could be added without simply increasing discharge (rather than increasing aquifer storage). Detailed water level recordings would be used to describe seasonal water level patterns.
5. Install a more accurate means of measuring flow in the Hillside Spring. A flowmeter installed upstream of the point at which water is split between the primary ranch buildings and the Hillside Spring would give (1) instantaneous flow readings and (2) total flow values between readings. This flow information would indicate whether flow is constant

APPENDIX A: SUPPLEMENTARY DATA – SPRING VALLEY RANCH EXPLORATION WELL SVR 8

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No. 812970
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0031220
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name SunCor Idaho, LLC
Address 485 E. Riverside Dr, Suite 300
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. 6 ____ 1/4 (10 acres) SW 1/4 (40 acres) SW 1/4 (160 acres)
Gov't Lot ____ County Ada
Lat: : : Long: : :
Address of Well Site 1/2 mile west of Hwy 55
City Eagle
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name Spring Valley Ranch

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
Bentonite	0	20	800#	over bore

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 133'
Was drive shoe seal tested? ☐ Y ☒ N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+2	133	250	Steel	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe 11' Length of Tailpipe
Packer ☒ Y ☐ N Type K. Packer

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method
Screen Type & Method of Installation

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
136	141	.040		5"	SS	☐	☐
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
62' ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices: well cap

12. WELL TESTS:
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
100+			.5 hour

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments:
Depth first Water Encounter 80'

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
10	0	20	sand		
6	20	40	sand & clay pcs		
"	40	80	big sand		
"	80	141	big sand	X	

RECEIVED
APR 19 2004
WATER RESOURCES
WESTERN REGION

Completed Depth 141' (Measurable)
Date: Started 4.12.04 Completed 4.12.04

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 Adamson Pump & Drill Firm No. 457
Principal Driller Dave Adamson Date 4.14.04
and
Driller or Operator II Andy Paye Date 4.14.04
Operator I ____ Date ____
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

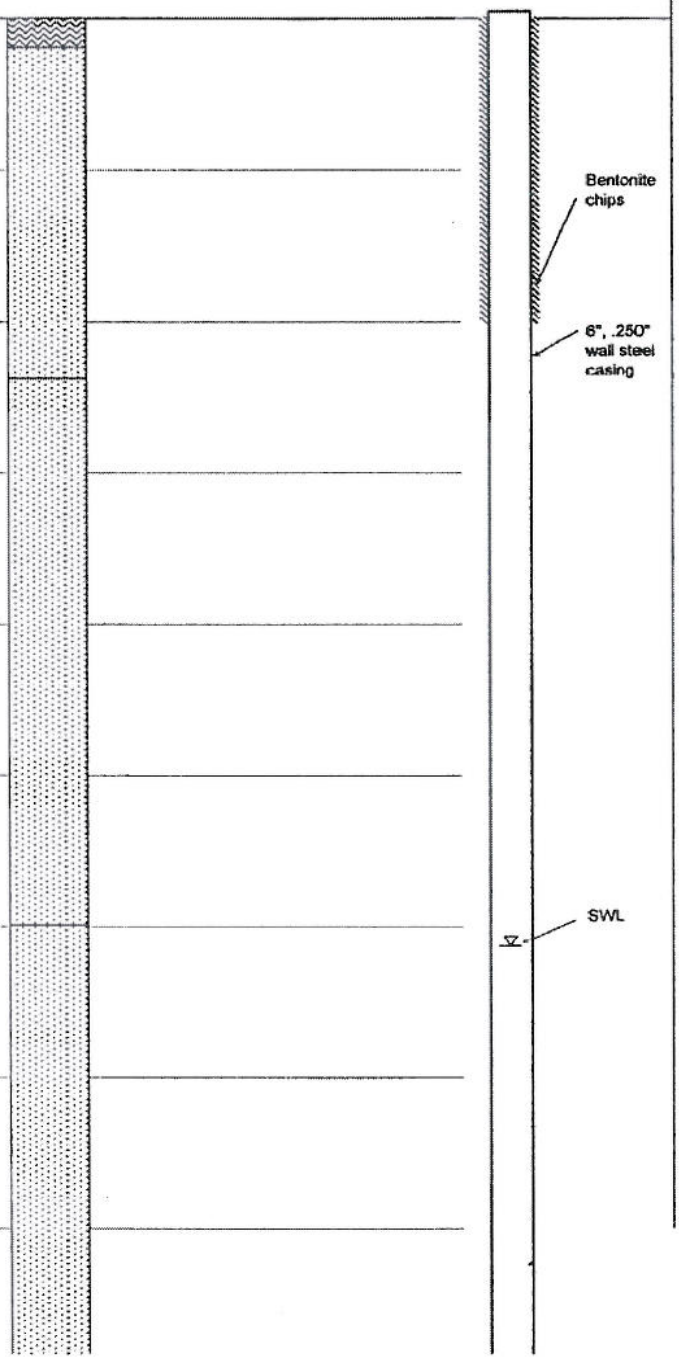
Exploration Hole SVR 8 (Observation Well)

Spring Valley Ranch

Drilled by: Adamson Pump and Drilling	Drilled Dates: 4/12/04	Depth Drilled: 141 ft	Location: Ada County, Idaho
Logged by: C. Feast/T. Scanlan	Drilling Method: Air Rotary	Depth Logged:	T5N, R2E, SW 1/4, SW 1/4, Sect 6
Geophysical logs by:	Borehole size: 6" (nom.)	Static WL: ~65 ft. bgl	GL Elevation: ~ 3480 ft. msl.
Fluid level when logged:			
Casing when logged:			

Depth (ft)	Geologic log from rotary cuttings
0	Topsoil, dark brown, clayey over coarse sand
10	Sand, Cs-vCs, medium brown, clean, ang-subang, qtz, feldspar & granite, white, clear and yellow grains, minor biotite
20	Sand as above, clean, coarse, medium brown
30	Sand, clean, very coarse, primarily angular to subangular quartz, light brown.
40	Sand as above, light brown.
50	Sand as above, light brown.
60	Sand as above, clean, some yellowish brown iron oxide, yellowish brown
70	Sand as above, clean, some yellowish brown iron oxide, yellowish brown

Symb. Log



Exploration Hole SVR 8 (Observation Well)

Spring Valley Ranch

Drilled by: Adamson Pump and Drilling
Logged by: C. Feast/T. Scanlan
Geophysical logs by:
Fluid level when logged:
Casing when logged:

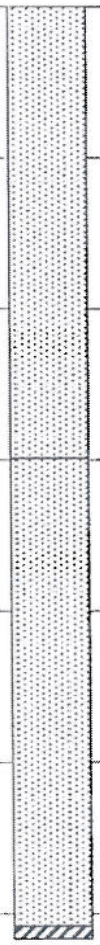
Drilled Dates: 4/12/04
Drilling Method: Air Rotary
Borehole size: 8" (nom.)

Depth Drilled: 141 ft
Depth Logged:
Static WL: ~65 ft. bgl

Location: Ada County, Idaho
T5N, R2E, SW 1/4, SW 1/4, Sect 6
GL Elevation: ~ 3480 ft. msl.

Depth (ft)	Geologic log from rotary cuttings
80	Sand as above, clean, some yellowish brown iron oxide, yellowish brown
90	Sand as above, clean, some yellowish brown iron oxide, yellowish brown
100	Sand as above, clean, yellowish brown iron oxide, yellowish brown
110	Sand as above, clean, less iron than above, pale yellow-brown.
120	Sand as above, clean, less iron than above, pale yellow-brown.
130	Sand as above, clean, less iron than above, pale yellow-brown.
140	Sand as above to 141, dark gray tuff @ 141
150	

Symb. Log



Well Construction

Printed 04/12/2004
Drilling Permit No. 812970
Well Tag No. D0031220
Well ID # 383677
Water Right No.
Receipt # W031511
Approved Date 04/12/2004
Well #8E

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
DRILLING PERMIT

Relationship: Applicant
Name: SUNCOR IDAHO LLC
Address: 485 EAST RIVERSIDE DR SUITE 300
EAGLE ID 83616

Phone: (208)939-0343

Proposed Well Location: Township 05N, Range 02E, Section 6, SW, SW
COUNTY ADA Sub Name SPRING VALLEY RANCH WELL #8E

Street Address of Well Site: 1/2 MILE WEST OF HWY 55
EAGLE ID

Proposed Use of Well: Test

Well Construction Information:

A. New Well
B. Proposed Surface Diameter: 6 Inches. Proposed Depth 200 Feet.
C. Anticipated Bottom Hole Temperature: 85F and less

Construction Start Date: Apr 12 2004

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

Applicant's Signature: __See original application_____ Date ___4/10/01_____

Well Tag No. D0031220

ACTION OF THE DEPARTMENT OF WATER RESOURCES

This permit is Approved on Monday, April 12, 2004.

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 oC) 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 1-800-342-1585
9. Please be advised that this drilling permit should be considered and treated as a preliminary permit. If you are in disagreement with this preliminary permit you have fourteen (14) days of the service date of this permit to petition the Idaho Department of Water Resources for reconsideration, pursuant to Section 67-5243, Idaho Code.
10. 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.
11. 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.
12. No water shall be produced from this well or any fluid injected into this well without specific written authorization from the Department.
13. Any surface casing installed in this well shall not exceed 8 inches nominal diameter.
14. 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.
15. 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.
16. 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

Well Tag ID D0031220

and driving casing may be allowed above the water table or where multiple aquifers are not encountered provided that the casing is sealed as required by administrative rules.

17. 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.

18. 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 he expiration of the bond, the Director may commence action to attached the bond and hire a licensed driller to properly plug the well.

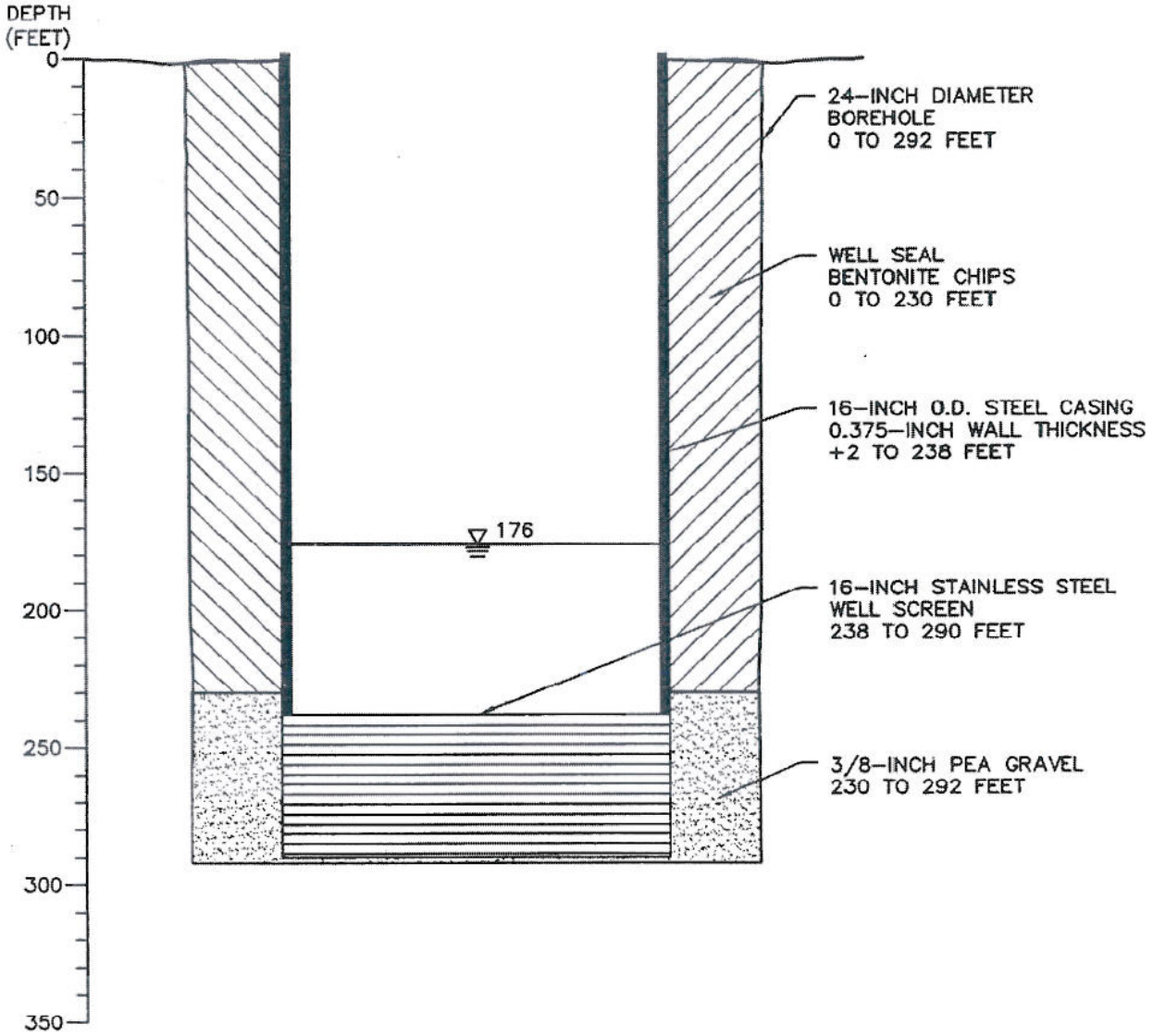
19. Drilling of this well shall not commence until the Department has received a document from the surety company or bank stating that the bond is in full force and effect and the Department has determined the amount of the bond is sufficient.

20. 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 the 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 $1,500.

Signature of Authorized Dept Representative

Sr WR Agent
Title

APPENDIX B: SUPPLEMENTARY DATA – SPRING VALLEY RANCH TEST PRODUCTION WELL TPW 1



"As-Built"

PROFESSIONAL ENGINEER
REGISTERED
6266
6/18/04
STATE OF IDAHO
TERRY M. SCANLAN

SPF Water Engineering, LLC
water resource consultants
600 East River Park Lane, Suite 105, Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156

TEST PRODUCTION WELL #1
SANDY HILL AQUIFER
SPRING VALLEY RANCH

SCALE: NTS
DRAWN BY: SDC

FIGURE 1

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No. 809807
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0030890
DRILLING PERMIT NO.
Water Right or Injection Well No.

2. OWNER:
Name Duncan Idaho LLC
Address 485 E. Riverside Drive Suite 300
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. 1 East ☒ or West ☐
Sec. 1, ____ 1/4 SW 1/4 SE 1/4
Gov't Lot ____ County Ada
Lat: : : Long: : :
Address of Well Site 1/2 mile West of Spring Valley Ranch City Eagle
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 reverse

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
5% Bentonite	0	220	18.75 yd	dry pour

Was drive shoe used? ☐Y ☒N Shoe Depth(s)
Was drive shoe seal tested? ☐Y ☐N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
10"	+2	238	.375	steel	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe
Packer ☐Y ☐N Type

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method
Screen Type & Method of Installation Johnson ss wire wrap

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
238	290	.040		10"	SST	☒	☐
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
3/8 pea gravel	220	292	10.5 yd	dry pour

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
178' ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices:
1½" access port

12. WELL TESTS:
☒ Pump ☐ Bailor ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
2000 gpm	18'	196	72 Hrs

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments:
Depth first Water Encounter ____

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
24	0	2	top soil		
	2	38	Coarse sand		
	38	52	med. sand		
	52	82	coarse sand w/some clay mixed @ 72'-82'		
	82	134	fine to med sand & Brn clay		
	134	227	coarse sand		
	227	292	gray clay w/coarse sand @ 227'-289		

RECEIVED
MAY 21 2004
WATER RESOURCES
WESTERN REGION

Completed Depth 292' (Measurable)
Date: Started 3-25-04 Completed 3-30-04

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 Riverside Inc Firm No. 333
Principal Driller ____ Date ____
and
Driller or Operator II ____ Date 4-20-04
Operator I ____ Date ____
Principal Driller and Rig Operator *Required*.
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

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

Attn: TERRY SCANLAN, P.E.,P.G.
S P F WATER ENGINEERING, LLC
600 E RIVER PARK LN STE 105
BOISE, ID 83706

Collected By: M MARTIN
Submitted By: M MARTIN

Source of Sample:
TPW1

Time of Collection: 10:15
Date of Collection: 4/16/2004
Date Received: 4/16/2004
Report Date: 5/13/2004

PWS:

Laboratory Analysis Report

Sample Number: 0411667

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Molybdenum, Mo		<0.05	mg/L	0.05	EPA 200.7	4/27/2004	JH
Vanadium, V		<0.05	mg/L	0.05	EPA 200.7	4/30/2004	JH
Barium, Ba	2	<0.05	mg/L	0.05	EPA 200.7	4/19/2004	JH
Cadmium Furnace	0.005	<0.0005	mg/L	0.0005	SM 3113 B	5/9/2004	DMB
Chromium Furnace	0.1	<0.002	mg/L	0.002	SM 3113 B	4/27/2004	JH
Selenium Furnace	0.05	<0.005	mg/L	0.005	SM 3113 B	4/26/2004	JH
Nickel, Ni	UR	<0.02	mg/L	0.02	EPA 200.7	4/19/2004	JH
Antimony Furnace	0.006	<0.005	mg/L	0.005	SM 3113 B	4/1/2004	DMB
Beryllium Furnace	0.004	<0.0005	mg/L	0.0005	SM 3113 B	5/10/2004	DMB
Thallium Furnace	0.002	<0.002	mg/L	0.002	SM 3113 B	5/10/2004	DMB
Arsenic Furnace	0.05	0.023	mg/L	0.005	SM 3113 B	4/23/2004	JH
Sodium, Na	UR	10.2	mg/L	0.10	EPA 200.7	4/21/2004	JH
Mercury, Hg	0.002	<0.0002	mg/L	0.0002	EPA 245.1	4/22/2004	SS
Aluminum, Al	UR	<0.10	mg/L	0.10	EPA 200.7	4/27/2004	JH
Calcium, Ca	UR	40.6	mg/L	0.10	EPA 200.7	4/21/2004	JH
Copper, Cu	UR	<0.01	mg/L	0.01	EPA 200.7	4/19/2004	JH

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

Laboratory Analysis Report

Sample Number: 0411667

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Iron, Fe	UR	0.06	mg/L	0.05	EPA 200.7	4/19/2004	JH
Magnesium, Mg	UR	4.37	mg/L	0.10	EPA 200.7	4/21/2004	JH
Manganese, Mn	UR	0.10	mg/L	0.05	EPA 200.7	4/19/2004	JH
Potassium, K	UR	5.2	mg/L	0.5	EPA 200.7	4/21/2004	JH
Silica	UR	62.1	mg/L	0.25	EPA 200.7	4/27/2004	JH
Silver, Ag	UR	<0.005	mg/L	0.005	EPA 272.1	4/28/2004	JH
Zinc, Zn	UR	<0.005	mg/L	0.005	EPA 200.7	4/19/2004	JH
Lead Furnace		0.009	mg/L	0.005	SM 3113 B	4/26/2004	JH
Arsenic Speciation A		0.020	mg/L	0.005	SM 3113B	5/5/2004	DMB
These data indicate that approximately half of the arsenic is in the oxidized form.							
Arsenic Speciation B		0.023	mg/L	0.005	SM 3113B	5/5/2004	DMB
These data indicate that approximately half of the arsenic is in the oxidized form.							
Arsenic Speciation C		0.011	mg/L	0.005	SM 3113B	5/5/2004	DMB
These data indicate that approximately half of the arsenic is in the oxidized form.							
Corrosivity	UR	-0.77			Langelier	5/13/2004	WW
Calculation was based on room temperature since no temperature was provided at the time of sampling.							
Nitrite (as N)	1.00	<0.01	mg/L	0.01	EPA 353.2	4/16/2004	ARR
Nitrate (as N)	10	<0.20	mg/L	0.20	EPA 300.0	4/16/2004	WW
Total Phosphate (as P)		0.07	mg/L	0.05	EPA 365.4	4/28/2004	KDH
Ammonia Direct (as N)	UR	<0.04	mg/L	0.04	EPA 350.1	4/19/2004	WW
Ethylene Dibromide	0.05	<0.02	ug/L	0.02	EPA 504	4/27/2004	KWH
1,2-Dibromo-3-chloropropane	0.20	<0.02	ug/L	0.02	EPA 504	4/27/2004	KWH
Bis(2-ethylhexyl)adipate	400	<0.50	ug/L	0.5	EPA 506	4/28/2004	KWH
Bis(2-ethylhexyl)phthalate	6.00	0.93	ug/L	0.91	EPA 506	4/28/2004	KWH
Alachlor	2.00	<0.50	ug/L	0.5	EPA 508.1	4/27/2004	KWH
Aldrin	UR	<0.02	ug/L	0.02	EPA 508.1	4/27/2004	KWH
Atrazine	3.00	<0.14	ug/L	0.14	EPA 508.1	4/27/2004	KWH
Butachlor	UR	<0.40	ug/L	0.4	EPA 508.1	4/27/2004	KWH
gamma-BHC (Lindane)	0.20	<0.02	ug/L	0.02	EPA 508.1	4/27/2004	KWH
Dieldrin	UR	<0.02	ug/L	0.02	EPA 508.1	4/27/2004	KWH
Endrin	0.20	<0.01	ug/L	0.01	EPA 508.1	4/27/2004	KWH

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

Laboratory Analysis Report

Sample Number: 0411667

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Heptachlor	0.40	<0.04	ug/L	0.04	EPA 508.1	4/27/2004	KWH
Heptachlor epoxide	0.20	<0.02	ug/L	0.02	EPA 508.1	4/27/2004	KWH
Hexachlorobenzene	1.00	<0.10	ug/L	0.1	EPA 508.1	4/27/2004	KWH
Hexachlorocyclopentadiene	50.0	<0.10	ug/L	0.1	EPA 508.1	4/27/2004	KWH
Metribuzin	UR	<0.40	ug/L	0.4	EPA 508.1	4/27/2004	KWH
Methoxychlor	40.0	<0.10	ug/L	0.1	EPA 508.1	4/27/2004	KWH
Metolachlor	UR	<0.40	ug/L	0.4	EPA 508.1	4/27/2004	KWH
Propachlor	UR	<0.05	ug/L	0.05	EPA 508.1	4/27/2004	KWH
Simazine	4.00	<0.07	ug/L	0.07	EPA 508.1	4/27/2004	KWH
Chlordane(Total)	2.00	<0.02	ug/L	0.02	EPA 508.1	4/27/2004	KWH
Toxaphene	3.00	<1.00	ug/L	1	EPA 508.1	4/27/2004	KWH
Total PCB	0.50	<0.10	ug/L	0.1	EPA 508.1	4/27/2004	KWH
Benzene	5	<0.5	ug/L	0.03	EPA 524.2	4/22/2004	CBO
Dalapon	200	<0.11	ug/L	0.11	EPA 515.1	4/21/2004	KWH
Carbon tetrachloride	5	<0.5	ug/L	0.01	EPA 524.2	4/22/2004	CBO
Dicamba	UR	<0.20	ug/L	0.2	EPA 515.1	4/21/2004	KWH
Chlorobenzene	100	<0.5	ug/L	0.02	EPA 524.2	4/22/2004	CBO
2,4-Dichlorophenoxyacetic acid (2,4-D)	70.0	<0.14	ug/L	0.14	EPA 515.1	4/21/2004	KWH
1,2-Dichlorobenzene	600	<0.5	ug/L	0.03	EPA 524.2	4/22/2004	CBO
Dinoseb	7.0	<0.20	ug/L	0.2	EPA 515.1	4/21/2004	KWH
1,4-Dichlorobenzene	75	<0.5	ug/L	0.03	EPA 524.2	4/22/2004	CBO
Pentachlorophenol	1.00	<0.05	ug/L	0.05	EPA 515.1	4/21/2004	KWH
Picloram	500	<0.17	ug/L	0.17	EPA 515.1	4/21/2004	KWH
1,2-Dichloroethane	5	<0.5	ug/L	0.02	EPA 524.2	4/22/2004	CBO
1,1-Dichloroethene	7	<0.5	ug/L	0.07	EPA 524.2	4/22/2004	CBO
Silvex (	50.0	<0.04	ug/L	0.04	EPA 515.1	4/21/2004	KWH
cis-1,2-Dichloroethene	70	<0.5	ug/L	0.01	EPA 524.2	4/22/2004	CBO
trans-1,2-Dichloroethene	100	<0.5	ug/L	0.07	EPA 524.2	4/22/2004	CBO
1,2-Dichloropropane	5	<0.5	ug/L	0.01	EPA 524.2	4/22/2004	CBO
Ethylbenzene	700	<0.5	ug/L	0.05	EPA 524.2	4/22/2004	CBO
Styrene	100	<0.5	ug/L	0.02	EPA 524.2	4/22/2004	CBO
Tetrachloroethene	5	<0.5	ug/L	0.03	EPA 524.2	4/22/2004	CBO

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Laboratory Analysis Report

Sample Number: 0411667

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Toluene	1000	<0.5	ug/L	0.05	EPA 524.2	4/22/2004	CBO
1,2,4-Trichlorobenzene	70	<0.5	ug/L	0.02	EPA 524.2	4/22/2004	CBO
1,1,1-Trichloroethane	200	<0.5	ug/L	0.02	EPA 524.2	4/22/2004	CBO
1,1,2-Trichloroethane	200	<0.5	ug/L	0.04	EPA 524.2	4/22/2004	CBO
Trichloroethene	5	<0.5	ug/L	0.01	EPA 524.2	4/22/2004	CBO
Vinyl chloride	2	<0.5	ug/L	0.03	EPA 524.2	4/22/2004	CBO
Bromodichloromethane	----	<0.5	ug/L	0.02	EPA 524.2	4/22/2004	CBO
Bromoform	----	<0.5	ug/L	0.4	EPA 524.2	4/22/2004	CBO
Chloroform	----	<0.5	ug/L	0.02	EPA 524.2	4/22/2004	CBO
Dibromochloromethane	----	<0.5	ug/L	0.03	EPA 524.2	4/22/2004	CBO
Xylene, Total	10000	<0.5	ug/L	0.05	EPA 524.2	4/22/2004	CBO
Dichloromethane	5	<0.5	ug/L	0.02	EPA 524.2	4/22/2004	CBO
Methyl-tert-butylether	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
1,1-Dichloroethane	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
1,1-Dichloropropene	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
1,2,3-Trichloropropane	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
1,1,1,2-Tetrachloroethane	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
1,1,2,2-Tetrachloroethane	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
1,3-Dichloropropene (cis&trans)	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
1,3-Dichloropropane	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
2,2-Dichloropropane	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
Bromobenzene	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
Bromomethane	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
Chloroethane	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
Chloromethane	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
Dibromomethane	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
2-Chlorotoluene	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
4-Chlorotoluene	UR	<0.5	ug/L	0.2	EPA 524.2	4/22/2004	CBO
Aldicarb	6.0	<2.0	ug/L	2	EPA 531.1	4/23/2004	KWH
Aldicarb sulfone	6.0	<2.0	ug/L	2	EPA 531.1	4/23/2004	KWH
Aldicarb sulfoxide	6.0	<2.0	ug/L	2	EPA 531.1	4/23/2004	KWH
Carbaryl	UR	<2.0	ug/L	2	EPA 531.1	4/23/2004	KWH

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Laboratory Analysis Report

Sample Number: 0411667

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Carbofuran	40.0	<0.2	ug/L	0.2	EPA 531.1	4/23/2004	KWH
3-Hydroxycarbofuran	UR	<1.5	ug/L	1.5	EPA 531.1	4/23/2004	KWH
Methomyl	UR	<2.0	ug/L	2	EPA 531.1	4/23/2004	KWH
Oxamyl	200	<0.4	ug/L	0.4	EPA 531.1	4/23/2004	KWH
Glyphosate	700	<9.2	ug/L	9.2	EPA 547	4/19/2004	KWH
Endothall	100	<7.6	ug/L	7.6	EPA 548.1	4/28/2004	KWH
Diquat	20.0	<0.6	ug/L	0.6	EPA 549.2	4/26/2004	KWH
Benzo(a)pyrene	0.20	<0.03	ug/L	0.03	EPA 550.1	4/28/2004	KWH
Turbidity		<0.5	NTU	0.5	EPA 180.1	4/16/2004	ARR
Hardness	UR	110	mg/L	5.0	SM 2340	4/23/2004	ARR
Chloride, Cl	UR	<1	mg/L	1	EPA 300.0	4/21/2004	WW
Sulfate, SO4	UR	26	mg/L	1	EPA 300.0	4/21/2004	WW
Fluoride, F	4.0	0.36	mg/L	0.10	EPA 300.0	4/22/2004	WW
Alkalinity	UR	113	mg/L Ca		EPA 310.1	4/23/2004	ARR
Cyanide, Total	0.20	<0.005	mg/L	0.005	SM 4500-CN E	4/23/2004	ARR
pH	UR	7.1	S.U.		EPA 150.1	4/16/2004	ARR
Sulfide, Dissolved (as H2S)		<0.05	mg/L	0.05	SM 4500-S2 D	4/19/2004	RG
Total Dissolved Solids	UR	218	mg/L	25	EPA 160.1	4/20/2004	RG
Total Suspended Solids		<3	mg/L	3	EPA 160.2	4/20/2004	RG

MCL = Maximum Contamination Level
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UR = Unregulated

Thank you for choosing Analytical Laboratories for your testing needs.

If you have any questions concerning this report,

please contact **Michael Moore**

LAB FEDERAL ID#: **ID00020**	LAB SAMPLE #: **0411667**
DATE LAB REC'D SAMPLE: 4/16/2004	DATE REPORTED BY LAB: 5/13/2004
COMPLIANCE SAMPLE ☐ YES ☐ NO	REPLACEMENT SAMPLE ☐
COLLECTION DATE: 4/16/2004	COLLECTION TIME: (24 hour clock) 10:15
SAMPLE TYPE: CO-confirmation ☐ RP-repeat ☐ RT-routine ☐ DU-duplicate ☐ SP-special ☐ Other	
PWS#:	PWS NAME: S P F WATER ENGINEERING, LLC
SAMPLING POINT/LOCATION: TPW1	TAG #/FACILITY ID:
COLLECTOR'S NAME: M MARTIN	CONTACT PHONE # (208) 383-4140

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PUBLIC DRINKING WATER SYSTEM INORGANIC CHEMICAL (IOC) ANALYSIS REPORT:

Phase II

FRDS	Contaminant Name	Result*	Method	MCL*	MDL*	Analysis Date	Analyst
1010	Barium	ND	EPA 200.7	2	0.05	4/19/2004	JH
1015	Cadmium	ND	SM 3113 B	0.005	0.0005	5/9/2004	DMB
1020	Chromium	ND	SM 3113 B	0.1	0.002	4/27/2004	JH
1035	Mercury	ND	EPA 245.1	0.002	0.0002	4/22/2004	SS
1038	Ttl(N02/N03)	---		10			
1040	Nitrate	ND	EPA 300.0	10	0.2	4/16/2004	WW
1041	Nitrite	ND	EPA 353.2	1.0	0.01	4/16/2004	ARR
1045	Selenium	ND	SM 3113 B	0.05	0.005	4/26/2004	JH
1024	Cyanide	ND	SM 4500-C	0.2	0.005	4/23/2004	ARR

Phase V

FRDS	Contaminant Name	Result*	Method	MCL*	MDL*	Analysis Date	Analyst
1085	Thallium	ND	SM 3113 B	0.002	0.002	5/10/2004	DMB
1075	Beryllium	ND	SM 3113 B	0.004	0.0005	5/10/2004	DMB
1074	Antimony	ND	SM 3113 B	0.006	0.005	4/1/2004	DMB
1036	Nickel	ND	EPA 200.7	n/a	0.02	4/19/2004	JH

Other IOCs

FRDS	Contaminant Name	Result*	Method	MCL*	MDL*	Analysis Date	Analyst
1052	Sodium	10.2	EPA 200.7	n/a	0.1	4/21/2004	JH
1025	Fluoride	0.36	EPA 300.0	4.0	0.1	4/22/2004	WW
1005	Arsenic	0.023	SM 3113 B	0.05	0.005	4/23/2004	JH

Secondary IOCs (optional)

FRDS	Contaminant Name	Result*	Method	MCL*	MDL*	Analysis Date	Analyst
1050	Silver	ND	EPA 272.1	0.1	0.005	4/28/2004	JH
1049	Silica, As SiO2	---					
1042	Potassium	5.2	EPA 200.7		0.5	4/21/2004	JH
1032	Manganese	0.10	EPA 200.7	0.05	0.05	4/19/2004	JH
1031	Magnesium	4.37	EPA 200.7		0.1	4/21/2004	JH
1028	Iron	0.06	EPA 200.7	0.3	0.05	4/19/2004	JH
1027	Hydrogen Sulfide	ND	SM 4500-S		0.05	4/19/2004	RG
1022	Copper	ND	EPA 200.7	1.0	0.01	4/19/2004	JH
1017	Chloride	ND	EPA 300.0	250	1	4/21/2004	WW
1016	Calcium	40.6	EPA 200.7		0.1	4/21/2004	JH
1003	Ammonia as N	ND	EPA 350.1		0.04	4/19/2004	WW
1002	Aluminum	ND	EPA 200.7	0.05-	0.1	4/27/2004	JH

FRDS	Contaminant Name	Result*	Method	MCL*	MDL*	Analysis Date	Analyst
2905	Surfactants	---					
1997	Langlier Index	---					
1930	Dissolved Solids	218	EPA 160.1	500	25	4/20/2004	RG
1927	Alkalinity as CaC03	113	EPA 310.1			4/23/2004	ARR
1926	Conductivity uS/cm	---					
1925	pH	7.1	EPA 150.1	6.5-8.		4/16/2004	ARR
1920	Odor (Threshold #)	---		3			
1915	Hardness as CaC03	110	SM 2340		5	4/23/2004	ARR
1905	Color	---		15c.u.			
1095	Zinc	ND	EPA 200.7	5	0.005	4/19/2004	JH
1055	Sulfate	26	EPA 300.0	250	1	4/21/2004	WW

*Reported in mg/L unless otherwise noted
ND = Not detected within sensitivity of instrument
--- = No analysis performed
MDL = Method detection limit

TERRY SCANLAN, P.E.,P.G.
S P F WATER ENGINEERING, LLC
600 E RIVER PARK LN STE 105
BOISE, ID, 83706

05/18/04
Signature of Laboratory Supervisor — Date

LAB FEDERAL ID#: ID00020	LAB SAMPLE #: 0411667
DATE LAB REC'D SAMPLE: 4/16/2004	DATE REPORTED BY LAB: 5/13/2004
COMPLIANCE SAMPLE: YES NO	REPLACEMENT SAMPLE
COLLECTION DATE: 4/16/2004	COLLECTION TIME: (24 hour clock) 10:15
SAMPLE TYPE: CO-confirmation RP-repeat RT-routine DU-duplicate SP-special Other	
PWS#:	PWS NAME: S P F WATER ENGINEERING, LLC
SAMPLING POINT/LOCATION: TPW1	TAG #/FACILITY ID:
COLLECTOR'S NAME: M MARTIN	CONTACT PHONE #: (208) 383-4140

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PUBLIC DRINKING WATER SYSTEM SYNTHETIC ORGANIC CHEMICAL (SOC) ANALYSIS REPORT:

FRDS	Contaminant Name	Result*	Method	MCL*	MDL*	Analysis Date	Analyst	FRDS	Contaminant Name	Result*	Method	MCL*	MDL*	Analysis Date	Analyst
2046	Carbofuran	ND	EPA 531.1	40	0.2	4/23/2004	KWH	2959	Chlordane	ND	EPA 508.1	2.0	0.02	4/27/2004	KWH
2042	Hexachlorocyclopentadiene	ND	EPA 508.1	50	0.1	4/27/2004	KWH	2946	EDB	ND	EPA 504	0.05	0.02	4/27/2004	KWH
2041	Dinoseb	ND	EPA 515.1	7	0.2	4/21/2004	KWH	2931	DBCP	ND	EPA 504	0.2	0.02	4/27/2004	KWH
2040	Picloram	ND	EPA 515.1	500	0.17	4/21/2004	KWH	2383	PCBs	ND	EPA 508.1	0.5	0.1	4/27/2004	KWH
2037	Simazine	ND	EPA 508.1	4.0	0.07	4/27/2004	KWH	2326	Pentachlorophenol	ND	EPA 515.1	1	0.05	4/21/2004	KWH
2036	Oxamyl	ND	EPA 531.1	200	0.4	4/23/2004	KWH	2306	Benzo[a]pyrene	ND	EPA 550.1	0.2	0.03	4/28/2004	KWH
2035	Di(2-ethylhexyl)adipate	ND	EPA 506	400	0.5	4/28/2004	KWH	2298	Di(2-ethylhexyl)phthalate	0.93	EPA 506	6.0	0.91	4/28/2004	KWH
2034	Glyphosate	ND	EPA 547	700	9.2	4/19/2004	KWH	2274	Hexachlorobenzene	ND	EPA 508.1	1.0	0.1	4/27/2004	KWH
2033	Endothall	ND	EPA 548.1	100	7.6	4/28/2004	KWH	2110	2,4,5-TP	ND	EPA 515.1	50	0.04	4/21/2004	KWH
2032	Diquat	ND	EPA 549.2	20	0.6	4/26/2004	KWH	2105	2,4-D	ND	EPA 515.1	70	0.14	4/21/2004	KWH
2031	Dalapon	ND	EPA 515.1	200	0.11	4/21/2004	KWH	2067	Heptachlor epoxide	ND	EPA 508.1	0.2	0.02	4/27/2004	KWH
2020	Toxaphene	ND	EPA 508.1	3.0	1	4/27/2004	KWH	2066	Heptachlor	ND	EPA 508.1	0.4	0.04	4/27/2004	KWH
2015	Methoxychlor	ND	EPA 508.1	40.0	0.1	4/27/2004	KWH	2051	Alachlor	ND	EPA 508.1	2.0	0.5	4/27/2004	KWH
2010	Lindane	ND	EPA 508.1	0.2	0.02	4/27/2004	KWH	2050	Atrazine	ND	EPA 508.1	3.0	0.14	4/27/2004	KWH
2005	Endrin	ND	EPA 508.1	2.0	0.01	4/27/2004	KWH								

*Reported in ug/L unless otherwise noted
ND = Not detected within sensitivity of instrument

--- = No analysis performed
MDL = Method detection limit

Signature of Laboratory Supervisor

5-19-04
Date

TERRY SCANLAN, P.E.,P.G.
S P F WATER ENGINEERING, LLC
600 E RIVER PARK LN STE 105
BOISE, ID, 83706

LAB FEDERAL ID#: ID00020	LAB SAMPLE #: 0411667
DATE LAB REC'D SAMPLE: 4/16/2004	DATE REPORTED BY LAB: 5/13/2004
COMPLIANCE SAMPLE ☐ YES ☐ NO	REPLACEMENT SAMPLE ☐
COLLECTION DATE: 4/16/2004	COLLECTION TIME: 10:15 (24 hour clock)
SAMPLE TYPE: RT-routine ☐ CO-conformation ☐ DU-duplicate ☐ RP-repeat ☐ SP-special ☐ Other	
PWS#:	PWS NAME: S P F WATER ENGINEERING, LLC
SAMPLING POINT/LOCATION: TPW1	TAG #/FACILITY ID:
COLLECTOR'S NAME: M MARTIN	CONTACT PHONE # (208) 383-4140

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PUBLIC DRINKING WATER SYSTEM VOLATILE ORGANIC CHEMICAL (VOC) ANALYSIS REPORT:

METHOD: EPA 524.2 | ANALYSIS DATE: 4/22/2004 | ANALYST: CBO

FRDS	Contaminant Name	Result*	MCL*	MDL*
2378	1,2,4-Trichlorobenzene	ND	70.0	0.02
2380	cis-1,2-Dichloroethylene	ND	70.0	0.01
2950	Trihalomethanes - Total	---	100.0	
2941	Chloroform	ND		0.02
2942	Bromoform	ND		0.4
2943	Bromodichloromethane	ND		0.02
2944	Dibromochloromethane	ND		0.03
2955	Xylenes - Total	ND	10000	0.05
2964	Dichloromethane	ND	5.0	0.02
2969	p-Dichlorobenzene	ND	75.0	0.03
2968	o-Dichlorobenzene	ND	600.0	0.03
2976	Vinyl chloride	ND	2.0	0.03
2977	1,1-Dichloroethylene	ND	7.0	0.07

FRDS	Contaminant Name	Result*	MCL*	MDL*
2979	trans-1,2-Dichloroethylene	ND	100.0	0.07
2980	1,2-Dichloroethane	ND	5.0	0.02
2981	1,1,1-Trichlcroethane	ND	200.0	0.02
2982	Carbon Tetrachloride	ND	5.0	0.01
2983	1,2-Dichloropropane	ND	5.0	0.01
2984	Trichloroethylene	ND	5.0	0.01
2985	1,1,2-Trichloroethane	ND	200.0	0.04
2987	Tetrachloroethylene	ND	5.0	0.03
2989	Monochlorobenzene	ND	100.0	0.02
2990	Benzene	ND	5.0	0.03
2991	Toluene	ND	1000.0	0.05
2992	Ethylbenzene	ND	700.0	0.05
2996	Styrene	ND	100.0	0.02

*Reported in ug/L unless otherwise noted
ND = Not detected at or above 0.5 ug/L

--- = No analysis performed
MDL = Method detection limit

TERRY SCANLAN, P.E.,P.G.
S P F WATER ENGINEERING, LLC
600 E RIVER PARK LN STE 105
BOISE, ID, 83706

Signature of Laboratory Supervisor — Date 5-19-03

SAMPLE TYPE CODE
S - Routine Sample
P - Repeat sample (at original tap)
E - Enforcement (chain of custody)
U - Upstream repeat
D - Downstream repeat
X -Other Repeat
W - Untreated
V - Invalidated by Lab
C - Construction / Special

ANALYTICAL LABORATORIES, INC.

ID00020
1804 N. 33rd Street
Boise, Idaho 83703
1-800-574-5773
1-208-342-5515
www.analyticallaboratories.com

X Public Water Supply Private Water Supply Other_____

NAME OF WATER SYSTEM	COUNTY	PWS

REPORT RESULTS TO:

TERRY SCANLAN
SCANLAN ENGINEERING
600 E RIVER PARK LN STE 105
BOISE, ID 83706

DATE RECEIVED	4/16/2004
TIME RECEIVED	10:15
DATE ANALYZED	4/16/2004
TIME ANALYZED	17:00
IF RETEST, ORIGINAL SAMPLE DATE	

SEND ADDITIONAL COPIES TO:

Phone	(208) 383-4140	Ext	Fax	(208) 383-4156	email	CHILLED 10 C	X YES	NO

COLLECTED BY: M MARTIN TRANSPORTED BY: M MARTIN

SAMPLE TYPE	COLLECTION DATE/TIME	Sampling Location	Cl res	TOTAL COLIFORMS SM 9223	FECAL COLIFORMS SM 9221	*E. COLI* SM 9223	HPC SM 9215
S	4/16/2004 10:15	LAB# 0411666 TPW1	–	ABSENCE		ABSENCE	

REMARKS:

ANALYST: LM

ANALYTICAL METHODS

Total Coliforms

SM 9222 Membrane Filter Technique, Parts 909 and 909A, Standard Methods....16th ed.,1985

SM 9221 Multiple Tube Fermentation , Parts 908 and 908A, and 908B, Standard Methods....16th

SM 9223 MMO-MUG Test Per 40 CFR141.21(f)(3)(IV)

HPC

Pour Plate, Part 907, Standard Methods..., 16th ed., 1

Fecal Coliforms

Membrane Filter Technique, Parts 908C., Standard Methods....16th ed.,1985

Membrane Filter Technique, Parts 909 and 909A, Standard Methods....16th ed.,1985

E. coli

MUG Test Per 141.214(x)(7) and 40 CFR 141.21(f)(6)(III)

Analytical Laboratories, Inc.

Laboratory Supervisor

Jenny Hill

PT1

Printed 01/23/2004
Drilling Permit No. 809801
Well Tag No. D0030890
Well ID # 380533
Water Right No.
Receipt # W031188
Approved Date 01/26/2004

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
DRILLING PERMIT

Relationship: Applicant
Name: SPRING VALLEY DEVELOPMENT LLC
Address: 485 EAST RIVERSIDE DR
EAGLE ID 83616

Phone: (208)939-0343

Proposed Well Location: Township 05N, Range 01E, Section 1, SW, SE
COUNTY ADA

Street Address of Well Site: 1/2 MILE WEST OF SPRING VALLEY RANCH
EAGLE ID

Proposed Use of Well: Test

Well Construction Information:

A. New Well
B. Proposed Surface Diameter: 16 Inches. Proposed Depth 300 Feet.
C. Anticipated Bottom Hole Temperature: 85F and less

Construction Start Date: Jan 31 2004

Anticipated Well Drilling Company: RIVERSIDE INC (No. 333)

Applicant's Signature: Robert G. Taunton Date 1/23/04

Title: General Manager

PT 1

Well ID # 380533

Well Tag No. D0030890

ACTION OF THE DEPARTMENT OF WATER RESOURCES

This permit is Approved on Monday, January 26, 2004.

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. If a bottom hole temperature of 85 Degrees F or greater is encountered, well construction shall cease and the well driller shall contact the Department of Water Resources immediately.

7. Idaho Code, S 55-2201 - 55-2210 requires the applicant and/or it's 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 1-800-342-1585.

8. 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.

9. This drilling permit is approved for the construction of a Production Test Well intended to be used for determining sufficiency of water supply and evaluating the effect of pumping on a regional or local aquifer system.

10. Prior to diverting any water from this well, the well owner shall execute and sign a Memorandum of Understanding (MOU) with the Department. A pump test plan shall be submitted for review and approval by the Department. Pump testing of this well is limited to a quantity and duration specifically authorized by the Department.

11. Diversion and use of water from this well for purposes other than an approved pump test is not authorized unless the well owner has obtained a valid water right listing the well as a point of diversion.

12. Approval of this drilling permit does not suggest any intent by the Department to approve or process a water right application that would authorize use from this well.

PT 1

13. A drilling prospectus including a schematic diagram and construction narrative describing all pertinent features of the well including drilling methods, seal materials, placement methods, casing schedules and specifications shall be submitted for review by the Department.

14. Casing installed in this well shall not be driven through multiple aquifers unless it is properly sealed or the casing is perforated at appropriate intervals and pressure grouted with approved grout. "Drill and Drive" methods of installing casing may be allowed above the water table or where multiple aquifers are not encountered provided that the casing is sealed as required by administrative rules.

15. 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 or until the well owner has obtained a valid water right authorizing use from the well.

16. 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.

17. The well owner hereby assumes all risks associated with constructing this well prior to obtaining a water right authorizing use from the well. If this well is not ultimately approved for use, the Department may order proper abandonment of the well.

18. The bond amount for this well shall be $ 6,960.00

John F Westra Western Regional Manager.

Signature of Authorized Dept. Representative Title

SCANNED
JAN 26 2004

RECEIVED
JAN 15 2004
WATER RESOURCES
WESTERN REGION

PT 1

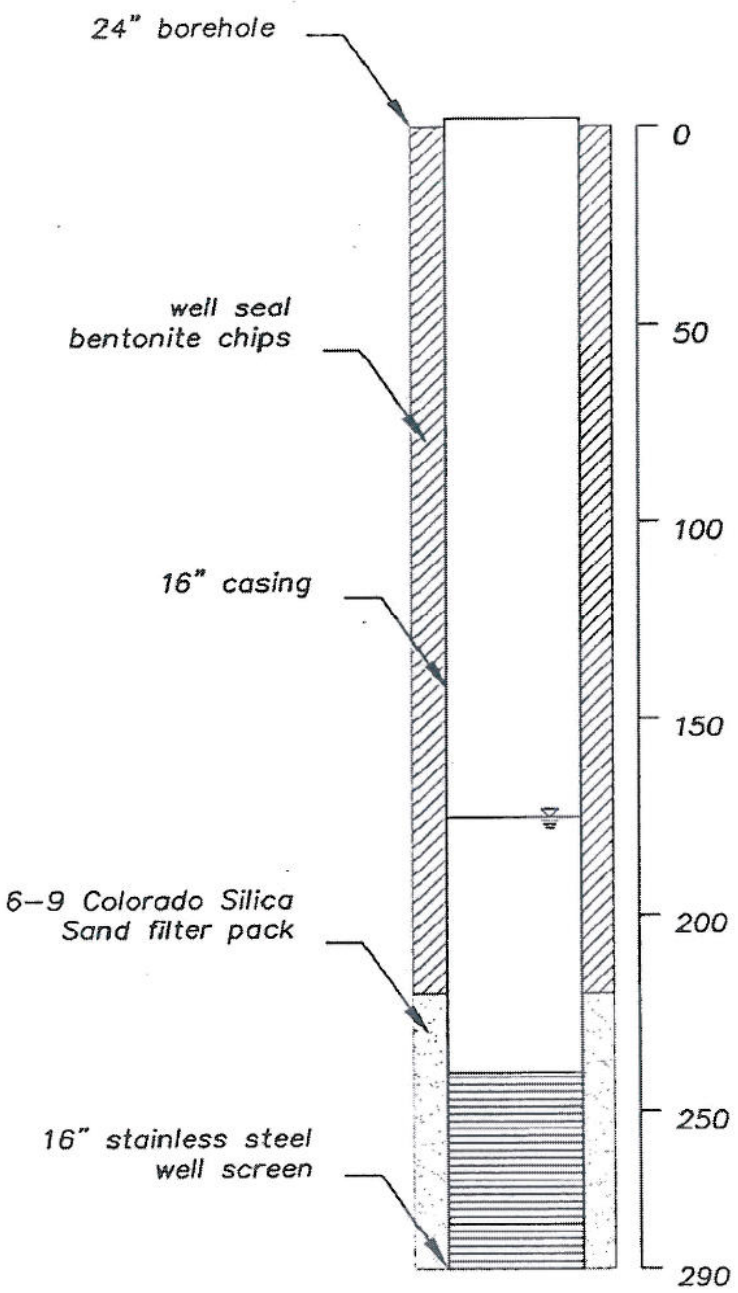


Figure 1

Test Production Well #1

Sandy Hill Aquifer

Spring Valley Ranch

SCANLAN ENGINEERING

APPENDIX C: SUPPLEMENTARY DATA – SANDY HILL AQUIFER TEST

PUMPING WELL TPW 1

SANDY HILL AQUIFER TEST - PUMPING WELL (TPW 1) DATA

Well No: TPW1, Spring Valley Ranch Qave = 2050 gpm

Test conducted by: SPF Water Engineering, LLC and Riverside, Inc diesel-drive turbine pump , 10-inch column, 14-inch bowls

Flow measured by: Orifice (8x10) and manometer

Water level measured by: well sounder Water level measure point: top of tube

MP Elev: 1.43' atoc Static DTW: 179.27' mp

Pump on: 4/14/04 10:47:26 Pump off: 4/17/04 10:05

Date	Time	t [min]	t' [min]	t/t'	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
04/14/04	10:15:00				179.25			pre test static measurements
04/14/04	10:32:35				179.29			pre test static measurements
04/14/04	10:34:06				179.25			pre test static measurements
04/14/04	10:35:24				179.25			pre test static measurements
04/14/04	10:45:20				179.30			pre test static measurements
04/14/04	10:46:50				179.30			pre test static measurements
04/14/04	10:47:26	0.0				0.00	0.00	pump on at 600 gpm +/-
04/14/04	10:48:05	0.65			182.40	3.13	3.13	
04/14/04	10:48:40	1.23			181.45	2.18	2.18	sounder reading fluctuating; oil in tube? Pulled and
04/14/04	10:49:40	2.23			182.50	3.23	3.23	re-inserted
04/14/04	10:55:40	8.23			184.00	4.73	4.73	increased rpm; rate up to 2,000 gpm
04/14/04	10:57:30	10.07			188.00	8.73	8.73	
04/14/04	10:57:55	10.48			189.00	9.73	9.73	
04/14/04	10:58:30	11.07			189.40	10.13	10.13	
04/14/04	10:59:00	11.57			190.00	10.73	10.73	
04/14/04	10:59:42	12.27			190.10	10.83	10.83	
04/14/04	11:00:01	12.58			190.40	11.13	11.13	
04/14/04	11:00:45	13.32			190.70	11.43	11.43	
04/14/04	11:01:15	13.82			190.50	11.23	11.23	
04/14/04	11:01:45	14.32			190.60	11.33	11.33	
04/14/04	11:02:45	15.32			190.90	11.63	11.63	
04/14/04	11:03:45	16.32			190.55	11.28	11.28	
04/14/04	11:05:00	17.57			190.70	11.43	11.43	
04/14/04	11:06:25	18.98			191.00	11.73	11.73	rpm = ~1050
04/14/04	11:07:40	20.23			191.05	11.78	11.78	
04/14/04	11:09:45	22.32			191.37	12.10	12.10	orifice tube fluctuating 43 - 48" ~2000gpm
04/14/04	11:12:30	25.07			191.89	12.62	12.62	
04/14/04	11:14:45	27.32			192.00	12.73	12.73	sounder has baseline reading of 15 miliamps, pegs
04/14/04	11:16:16	28.83			192.01	12.74	12.74	to 20 w/ contact in water
04/14/04	11:18:20	30.90			192.15	12.88	12.88	Riverside began taking measurements, some SPF
04/14/04	11:21:30	34.07			192.25	12.98	12.98	measurements throughout duration of test
04/14/04	11:22:40	35.23			192.30	13.03	13.03	
04/14/04	11:25:30	38.07			192.54	13.27	13.27	
04/14/04	11:30:00	43			192.40	13.13	13.14	
04/14/04	11:32:30	45			192.41	13.14	13.15	
04/14/04	11:35:00	48			192.50	13.23	13.24	
04/14/04	11:45:00	58			192.58	13.31	13.32	
04/14/04	11:50:00	63			192.65	13.38	13.39	
04/14/04	11:56:00	69			192.70	13.43	13.44	
04/14/04	12:13:00	86			192.90	13.63	13.64	
04/14/04	12:31:00	104			192.87	13.60	13.61	
04/14/04	12:53:00	126			193.02	13.75	13.76	
04/14/04	13:15:00	148			193.08	13.81	13.82	
04/14/04	13:30:00	163			193.12	13.85	13.87	orifice tube ~45"
04/14/04	13:47:00	180			193.19	13.92	13.94	
04/14/04	14:00:00	193			193.24	13.97	13.99	
04/14/04	14:15:00	208			193.26	13.99	14.01	
04/14/04	14:30:00	223			193.30	14.03	14.07	
04/14/04	14:45:00	238			193.32	14.05	14.09	orifice tube ~45"
04/14/04	15:00:00	253			193.33	14.06	14.10	
04/14/04	15:15:00	268			193.39	14.12	14.16	
04/14/04	15:30:00	283			193.41	14.14	14.19	
04/14/04	15:45:00	298			193.42	14.15	14.20	
04/14/04	16:15:00	328			193.43	14.16	14.21	
04/14/04	17:02:00	375			193.55	14.28	14.34	T=14.8C, SC/EC=259.0/207.6
04/14/04	17:13:00	386			193.61	14.34	14.40	T=14.4C, SC/EC=254.0/202.3
04/14/04	17:38:00	411			193.53	14.26	14.33	T=14.6C, SC/EC=251.0/201.0

Date	Time	t [min]	t' [min]	t/t'	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
04/14/04	18:30:00	463			194.00	14.73	14.81	T=14.7C, SC/EC=250.9/201.5
04/14/04	19:00:00	493			193.87	14.60	14.68	
04/14/04	19:30:00	523			193.85	14.58	14.67	
04/14/04	20:00:00	553			193.92	14.65	14.74	
04/14/04	20:30:00	583			193.70	14.43	14.52	
04/14/04	21:00:00	613			194.00	14.73	14.82	
04/14/04	21:30:00	643			194.15	14.88	14.98	
04/14/04	22:00:00	673			194.23	14.96	15.06	
04/14/04	22:30:00	703			194.25	14.98	15.10	
04/14/04	23:00:00	733			194.27	15.00	15.12	
04/14/04	23:30:00	763			194.33	15.06	15.18	
04/15/04	0:00:00	793			194.30	15.03	15.15	
04/15/04	0:30:00	823			194.30	15.03	15.14	
04/15/04	1:00:00	853			194.40	15.13	15.24	
04/15/04	1:30:00	883			194.40	15.13	15.23	
04/15/04	2:00:00	913			194.45	15.18	15.28	
04/15/04	2:30:00	943			194.55	15.28	15.38	
04/15/04	3:00:00	973			194.40	15.13	15.23	
04/15/04	3:30:00	1003			194.40	15.13	15.23	
04/15/04	4:00:00	1033			194.55	15.28	15.38	
04/15/04	4:30:00	1063			194.55	15.28	15.37	
04/15/04	5:00:00	1093			194.60	15.33	15.42	
04/15/04	5:30:00	1123			194.60	15.33	15.37	
04/15/04	6:00:00	1153			194.65	15.38	15.42	
04/15/04	6:30:00	1183			194.55	15.28	15.30	
04/15/04	7:00:00	1213			194.80	15.53	15.55	
04/15/04	7:30:00	1243			194.65	15.38	15.39	
04/15/04	8:00:00	1273			194.83	15.56	15.57	
04/15/04	8:30:00	1303			195.00	15.73	15.73	
04/15/04	9:00:00	1333			195.01	15.74	15.74	
04/15/04	9:30:00	1363			195.00	15.73	15.72	
04/15/04	10:00:00	1393			195.02	15.75	15.74	
04/15/04	10:30:00	1423			195.01	15.74	15.73	
04/15/04	11:00:00	1453			195.00	15.73	15.72	
04/15/04	11:30:00	1483			195.00	15.73	15.73	
04/15/04	12:00:00	1513			195.00	15.73	15.73	
04/15/04	12:30:00	1543			195.00	15.73	15.73	
04/15/04	13:00:00	1573			195.00	15.73	15.73	
04/15/04	13:30:00	1603			194.85	15.58	15.59	
04/15/04	14:00:00	1633			195.00	15.73	15.74	
04/15/04	14:30:00	1663			195.00	15.73	15.75	
04/15/04	15:00:00	1693			195.00	15.73	15.75	
04/15/04	15:30:00	1723			195.00	15.73	15.75	
04/15/04	16:00:00	1753			195.00	15.73	15.75	
04/15/04	16:30:00	1783			195.00	15.73	15.76	
04/15/04	17:00:00	1813			195.00	15.73	15.76	
04/15/04	17:30:00	1843			195.00	15.73	15.76	
04/15/04	18:00:00	1873			195.00	15.73	15.76	
04/15/04	18:30:00	1903			195.00	15.73	15.76	
04/15/04	19:00:00	1933			195.00	15.73	15.76	
04/15/04	19:30:00	1963			195.00	15.73	15.76	
04/15/04	20:00:00	1993			195.25	15.98	16.01	
04/15/04	20:30:00	2023			195.25	15.98	16.00	
04/15/04	21:00:00	2053			195.25	15.98	16.00	
04/15/04	21:30:00	2083			195.30	16.03	16.05	
04/15/04	22:00:00	2113			195.25	15.98	16.00	
04/15/04	22:30:00	2143			195.30	16.03	16.04	
04/15/04	23:00:00	2173			195.35	16.08	16.09	
04/15/04	23:30:00	2203			195.40	16.13	16.13	
04/16/04	0:00:00	2233			195.45	16.18	16.18	
04/16/04	1:00:00	2293			195.30	16.03	16.03	
04/16/04	1:30:00	2323			195.30	16.03	16.03	
04/16/04	2:00:00	2353			195.35	16.08	16.08	
04/16/04	2:30:00	2383			195.50	16.23	16.23	
04/16/04	3:00:00	2413			195.35	16.08	16.08	

Date	Time	t [min]	t' [min]	t/t'	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
04/16/04	3:30:00	2443			195.25	15.98	15.98	
04/16/04	4:00:00	2473			195.30	16.03	16.03	
04/16/04	4:30:00	2503			195.50	16.23	16.23	
04/16/04	5:00:00	2533			195.30	16.03	16.03	
04/16/04	5:30:00	2563			195.30	16.03	16.03	
04/16/04	6:00:00	2593			195.35	16.08	16.08	
04/16/04	6:30:00	2623			195.30	16.03	16.03	
04/16/04	7:00:00	2653			195.40	16.13	16.13	
04/16/04	7:30:00	2683			195.30	16.03	16.03	
04/16/04	8:00:00	2713			195.40	16.13	16.12	
04/16/04	8:30:00	2743			195.65	16.38	16.37	
04/16/04	9:00:00	2773			195.55	16.28	16.26	
04/16/04	9:30:00	2803			195.57	16.30	16.28	
04/16/04	10:00:00	2833			195.67	16.40	16.39	
04/16/04	10:30:00	2863			195.55	16.28	16.27	
04/16/04	11:00:00	2893			195.55	16.28	16.28	
04/16/04	11:30:00	2923			195.55	16.28	16.28	
04/16/04	12:00:00	2953			195.60	16.33	16.34	
04/16/04	12:30:00	2983			195.50	16.23	16.24	
04/16/04	13:00:00	3013			195.56	16.29	16.31	
04/16/04	13:30:00	3043			195.51	16.24	16.26	
04/16/04	14:00:00	3073			195.50	16.23	16.27	
04/16/04	14:30:00	3103			195.45	16.18	16.22	
04/16/04	15:00:00	3133			195.50	16.23	16.29	
04/16/04	15:30:00	3163			195.60	16.33	16.39	
04/16/04	16:00:00	3193			195.50	16.23	16.29	
04/16/04	16:30:00	3223			195.50	16.23	16.29	
04/16/04	17:00:00	3253			195.60	16.33	16.39	
04/16/04	17:30:00	3283			195.65	16.38	16.44	
04/16/04	18:00:00	3313			195.60	16.33	16.41	
04/16/04	18:30:00	3343			195.70	16.43	16.51	
04/16/04	19:00:00	3373			195.45	16.18	16.26	
04/16/04	19:30:00	3403			195.40	16.13	16.21	
04/16/04	20:00:00	3433			195.30	16.03	16.11	
04/16/04	20:30:00	3463			195.32	16.05	16.13	
04/16/04	21:00:00	3493			195.40	16.13	16.20	
04/16/04	21:30:00	3523			195.45	16.18	16.25	
04/16/04	22:00:00	3553			195.54	16.27	16.33	
04/16/04	22:30:00	3583			195.50	16.23	16.29	
04/16/04	23:00:00	3613			195.50	16.23	16.30	
04/16/04	23:30:00	3643			195.42	16.15	16.22	
04/17/04	0:00:00	3673			195.92	16.65	16.72	
04/17/04	0:30:00	3703			195.85	16.58	16.65	
04/17/04	1:00:00	3733			195.78	16.51	16.58	
04/17/04	1:30:00	3763			195.90	16.63	16.70	
04/17/04	2:00:00	3793			195.75	16.48	16.55	
04/17/04	2:30:00	3823			195.63	16.36	16.43	
04/17/04	3:00:00	3853			195.87	16.60	16.68	
04/17/04	3:30:00	3883			195.75	16.48	16.56	
04/17/04	4:00:00	3913			195.68	16.41	16.49	
04/17/04	4:30:00	3943			195.88	16.61	16.69	
04/17/04	5:00:00	3973			196.01	16.74	16.81	
04/17/04	5:30:00	4003			195.70	16.43	16.50	
04/17/04	6:00:00	4033			195.70	16.43	16.50	
04/17/04	6:30:00	4063			195.70	16.43	16.50	
04/17/04	7:00:00	4093			195.70	16.43	16.48	
04/17/04	7:30:00	4123			196.01	16.74	16.79	
04/17/04	8:00:00	4153			196.03	16.76	16.80	
04/17/04	8:30:00	4183			196.01	16.74	16.78	
04/17/04	9:00:00	4213			196.04	16.77	16.81	
04/17/04	9:30:00	4243			196.02	16.75	16.79	
04/17/04	10:00:00	4273			195.97	16.70	16.74	SPF measurements
04/17/04	10:04:00	4277			195.97	16.70	16.74	
04/17/04	10:05:00	4278	0		195.97	16.70	16.74	pump off; begin recovery test
04/17/04	10:05:30	4278	0.50	8556	188.70	9.43	9.47	

Date	Time	t [min]	t' [min]	t/t'	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
04/16/04	3:30:00	2443			195.25	15.98	15.98	
04/16/04	4:00:00	2473			195.30	16.03	16.03	
04/16/04	4:30:00	2503			195.50	16.23	16.23	
04/16/04	5:00:00	2533			195.30	16.03	16.03	
04/16/04	5:30:00	2563			195.30	16.03	16.03	
04/16/04	6:00:00	2593			195.35	16.08	16.08	
04/16/04	6:30:00	2623			195.30	16.03	16.03	
04/16/04	7:00:00	2653			195.40	16.13	16.13	
04/16/04	7:30:00	2683			195.30	16.03	16.03	
04/16/04	8:00:00	2713			195.40	16.13	16.12	
04/16/04	8:30:00	2743			195.65	16.38	16.37	
04/16/04	9:00:00	2773			195.55	16.28	16.26	
04/16/04	9:30:00	2803			195.57	16.30	16.28	
04/16/04	10:00:00	2833			195.67	16.40	16.39	
04/16/04	10:30:00	2863			195.55	16.28	16.27	
04/16/04	11:00:00	2893			195.55	16.28	16.28	
04/16/04	11:30:00	2923			195.55	16.28	16.28	
04/16/04	12:00:00	2953			195.60	16.33	16.34	
04/16/04	12:30:00	2983			195.50	16.23	16.24	
04/16/04	13:00:00	3013			195.56	16.29	16.31	
04/16/04	13:30:00	3043			195.51	16.24	16.26	
04/16/04	14:00:00	3073			195.50	16.23	16.27	
04/16/04	14:30:00	3103			195.45	16.18	16.22	
04/16/04	15:00:00	3133			195.50	16.23	16.29	
04/16/04	15:30:00	3163			195.60	16.33	16.39	
04/16/04	16:00:00	3193			195.50	16.23	16.29	
04/16/04	16:30:00	3223			195.50	16.23	16.29	
04/16/04	17:00:00	3253			195.60	16.33	16.39	
04/16/04	17:30:00	3283			195.65	16.38	16.44	
04/16/04	18:00:00	3313			195.60	16.33	16.41	
04/16/04	18:30:00	3343			195.70	16.43	16.51	
04/16/04	19:00:00	3373			195.45	16.18	16.26	
04/16/04	19:30:00	3403			195.40	16.13	16.21	
04/16/04	20:00:00	3433			195.30	16.03	16.11	
04/16/04	20:30:00	3463			195.32	16.05	16.13	
04/16/04	21:00:00	3493			195.40	16.13	16.20	
04/16/04	21:30:00	3523			195.45	16.18	16.25	
04/16/04	22:00:00	3553			195.54	16.27	16.33	
04/16/04	22:30:00	3583			195.50	16.23	16.29	
04/16/04	23:00:00	3613			195.50	16.23	16.30	
04/16/04	23:30:00	3643			195.42	16.15	16.22	
04/17/04	0:00:00	3673			195.92	16.65	16.72	
04/17/04	0:30:00	3703			195.85	16.58	16.65	
04/17/04	1:00:00	3733			195.78	16.51	16.58	
04/17/04	1:30:00	3763			195.90	16.63	16.70	
04/17/04	2:00:00	3793			195.75	16.48	16.55	
04/17/04	2:30:00	3823			195.63	16.36	16.43	
04/17/04	3:00:00	3853			195.87	16.60	16.68	
04/17/04	3:30:00	3883			195.75	16.48	16.56	
04/17/04	4:00:00	3913			195.68	16.41	16.49	
04/17/04	4:30:00	3943			195.88	16.61	16.69	
04/17/04	5:00:00	3973			196.01	16.74	16.81	
04/17/04	5:30:00	4003			195.70	16.43	16.50	
04/17/04	6:00:00	4033			195.70	16.43	16.50	
04/17/04	6:30:00	4063			195.70	16.43	16.50	
04/17/04	7:00:00	4093			195.70	16.43	16.48	
04/17/04	7:30:00	4123			196.01	16.74	16.79	
04/17/04	8:00:00	4153			196.03	16.76	16.80	
04/17/04	8:30:00	4183			196.01	16.74	16.78	
04/17/04	9:00:00	4213			196.04	16.77	16.81	
04/17/04	9:30:00	4243			196.02	16.75	16.79	
04/17/04	10:00:00	4273			195.97	16.70	16.74	SPF measurements
04/17/04	10:04:00	4277			195.97	16.70	16.74	
04/17/04	10:05:00	4278	0		195.97	16.70	16.74	pump off; begin recovery test
04/17/04	10:05:30	4278	0.50	8556	188.70	9.43	9.47	

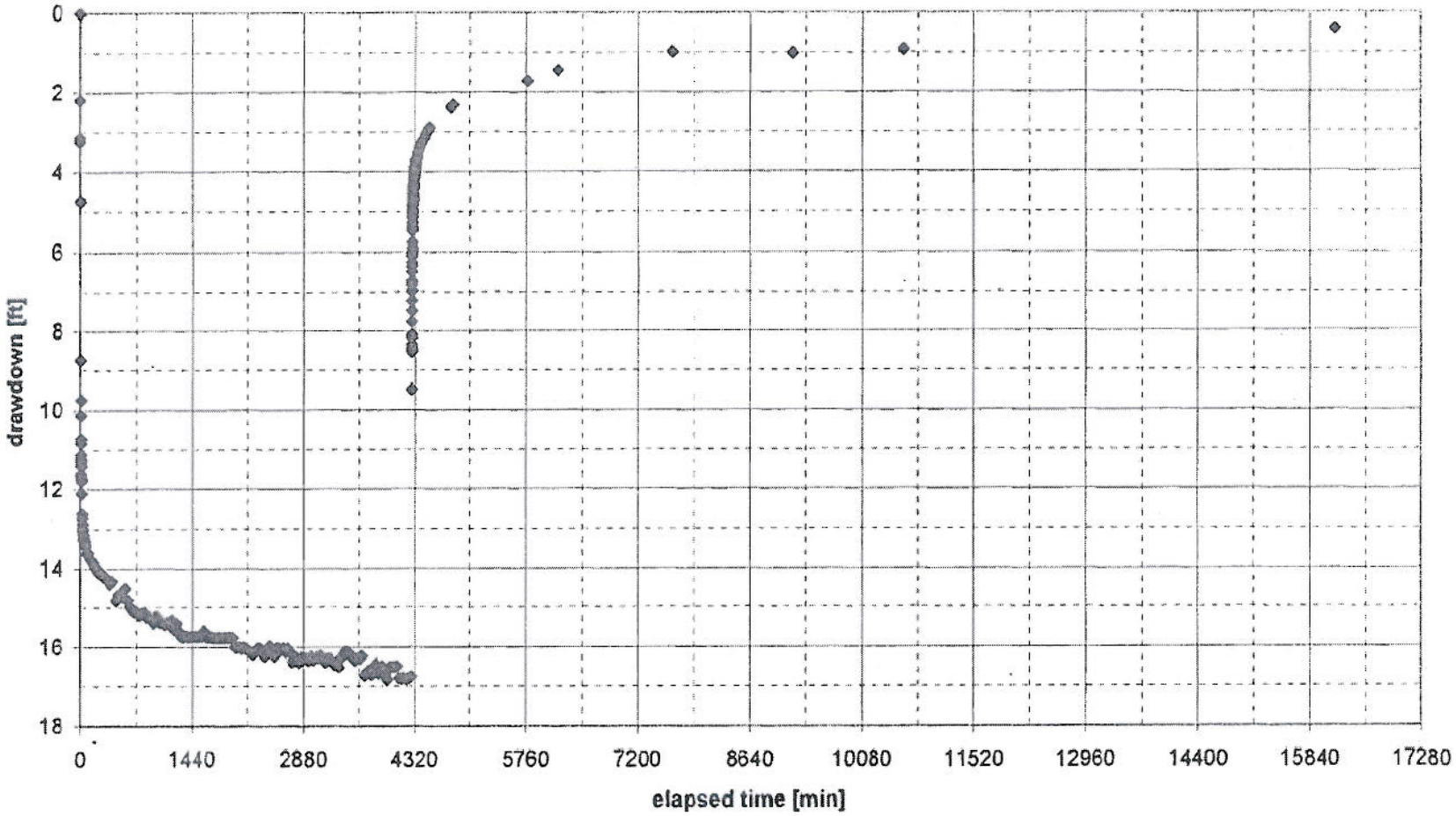
Date	Time	t [min]	t' [min]	t/t'	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
04/17/04	10:05:39	4278	0.65	6582	187.40	8.13	8.17	
04/17/04	10:05:52	4278	0.87	4937	187.32	8.05	8.09	
04/17/04	10:06:09	4279	1.15	3721	187.75	8.48	8.52	
04/17/04	10:06:26	4279	1.43	2985	187.65	8.38	8.42	
04/17/04	10:06:43	4279	1.72	2493	187.70	8.43	8.47	
04/17/04	10:06:58	4280	1.97	2176	187.57	8.30	8.34	
04/17/04	10:07:18	4280	2.30	1861	187.32	8.05	8.09	
04/17/04	10:07:45	4280	2.75	1556	187.00	7.73	7.77	
04/17/04	10:08:03	4281	3.05	1403	186.70	7.43	7.47	
04/17/04	10:08:23	4281	3.38	1265	186.70	7.43	7.47	
04/17/04	10:08:43	4281	3.72	1152	186.45	7.18	7.22	
04/17/04	10:08:55	4281	3.92	1093	186.20	6.93	6.97	
04/17/04	10:09:13	4282	4.22	1015	186.06	6.79	6.83	
04/17/04	10:09:33	4282	4.55	941	185.96	6.69	6.73	
04/17/04	10:09:55	4282	4.92	871	185.95	6.68	6.72	
04/17/04	10:10:16	4283	5.27	813	185.71	6.44	6.48	
04/17/04	10:10:36	4283	5.60	765	185.59	6.32	6.36	
04/17/04	10:10:57	4284	5.95	720	185.50	6.23	6.27	
04/17/04	10:11:15	4284	6.25	685	185.33	6.06	6.10	
04/17/04	10:11:32	4284	6.53	656	185.27	6.00	6.04	
04/17/04	10:11:56	4285	6.93	618	185.25	5.98	6.02	
04/17/04	10:12:21	4285	7.35	583	185.12	5.85	5.89	
04/17/04	10:12:37	4285	7.62	563	185.18	5.91	5.95	
04/17/04	10:13:00	4286	8.00	536	185.00	5.73	5.77	
04/17/04	10:13:26	4286	8.43	508	184.67	5.40	5.44	
04/17/04	10:13:59	4287	8.98	477	184.70	5.43	5.47	
04/17/04	10:14:24	4287	9.40	456	184.61	5.34	5.38	
04/17/04	10:14:56	4288	9.93	432	184.52	5.25	5.29	
04/17/04	10:15:14	4288	10.2	419	184.38	5.11	5.15	
04/17/04	10:15:38	4288	10.6	403	184.50	5.23	5.27	
04/17/04	10:16:19	4289	11.3	379	184.35	5.08	5.12	
04/17/04	10:16:37	4289	11.6	369	184.27	5.00	5.04	
04/17/04	10:16:55	4289	11.9	360	184.20	4.93	4.97	
04/17/04	10:17:19	4290	12.3	348	184.23	4.96	5.00	
04/17/04	10:17:40	4290	12.7	339	184.17	4.90	4.94	
04/17/04	10:17:56	4291	12.9	332	184.20	4.93	4.97	
04/17/04	10:18:19	4291	13.3	322	184.08	4.81	4.85	
04/17/04	10:18:40	4291	13.7	314	184.06	4.79	4.83	
04/17/04	10:18:58	4292	14.0	307	184.03	4.76	4.80	
04/17/04	10:19:14	4292	14.2	302	183.97	4.70	4.74	
04/17/04	10:19:48	4292	14.8	290	183.92	4.65	4.69	
04/17/04	10:20:15	4293	15.3	281	183.96	4.69	4.73	
04/17/04	10:21:04	4294	16.1	267	183.87	4.60	4.64	
04/17/04	10:21:52	4294	16.9	255	183.88	4.61	4.65	
04/17/04	10:22:19	4295	17.3	248	183.87	4.60	4.64	
04/17/04	10:22:48	4295	17.8	241	183.81	4.54	4.58	
04/17/04	10:23:28	4296	18.5	233	183.78	4.51	4.55	
04/17/04	10:24:02	4297	19.0	226	183.69	4.42	4.46	
04/17/04	10:24:35	4297	19.6	219	183.65	4.38	4.42	
04/17/04	10:25:04	4298	20.1	214	183.67	4.40	4.44	
04/17/04	10:25:27	4298	20.5	210	183.59	4.32	4.36	
04/17/04	10:26:08	4299	21.1	203	183.62	4.35	4.39	
04/17/04	10:26:49	4299	21.8	197	183.60	4.33	4.37	
04/17/04	10:27:19	4300	22.3	193	183.56	4.29	4.33	
04/17/04	10:27:45	4300	22.8	189	183.53	4.26	4.30	
04/17/04	10:28:10	4301	23.2	186	183.54	4.27	4.31	
04/17/04	10:28:30	4301	23.5	183	183.65	4.38	4.42	
04/17/04	10:28:58	4302	24.0	179	183.53	4.26	4.30	
04/17/04	10:29:30	4302	24.5	176	183.51	4.24	4.28	
04/17/04	10:30:15	4303	25.3	170	183.37	4.10	4.14	
04/17/04	10:31:00	4304	26.0	166	183.43	4.16	4.20	
04/17/04	10:32:00	4305	27.0	159	183.40	4.13	4.17	
04/17/04	10:32:45	4305	27.8	155	183.38	4.11	4.15	
04/17/04	10:33:32	4306	28.5	151	183.35	4.08	4.12	
04/17/04	10:34:45	4307	29.8	145	183.32	4.05	4.09	

Date	Time	t [min]	t' [min]	t/t'	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
04/17/04	10:35:00	4308	30	144	183.34	4.07	4.11	
04/17/04	10:36:00	4309	31	139	183.33	4.06	4.10	
04/17/04	10:37:00	4310	32	135	183.26	3.99	4.03	
04/17/04	10:38:00	4311	33	131	183.28	4.01	4.05	
04/17/04	10:39:00	4312	34	127	183.27	4.00	4.04	
04/17/04	10:40:00	4313	35	123	183.25	3.98	4.02	
04/17/04	10:41:00	4314	36	120	183.19	3.92	3.96	
04/17/04	10:42:00	4315	37	117	183.16	3.89	3.93	
04/17/04	10:43:00	4316	38	114	183.15	3.88	3.92	
04/17/04	10:44:00	4317	39	111	183.10	3.83	3.87	
04/17/04	10:45:00	4318	40	108	183.14	3.87	3.91	
04/17/04	10:46:00	4319	41	105	183.14	3.87	3.91	
04/17/04	10:47:00	4320	42	103	183.16	3.89	3.93	
04/17/04	10:49:00	4322	44	98	183.09	3.82	3.86	
04/17/04	10:50:00	4323	45	96	183.10	3.83	3.87	
04/17/04	10:53:00	4326	48	90	183.06	3.79	3.83	
04/17/04	10:56:00	4329	51	85	183.00	3.73	3.77	
04/17/04	10:59:00	4332	54	80	182.92	3.65	3.69	
04/17/04	11:02:00	4335	57	76	182.93	3.66	3.70	
04/17/04	11:05:00	4338	60	72	182.91	3.64	3.68	
04/17/04	11:10:00	4343	65	67	182.88	3.61	3.65	
04/17/04	11:15:00	4348	70	62	182.84	3.57	3.61	
04/17/04	11:20:00	4353	75	58	182.80	3.53	3.57	
04/17/04	11:25:00	4358	80	54	182.76	3.49	3.53	
04/17/04	11:30:00	4363	85	51	182.73	3.46	3.51	
04/17/04	11:35:00	4368	90	49	182.70	3.43	3.48	
04/17/04	11:40:00	4373	95	46	182.67	3.40	3.45	
04/17/04	11:45:00	4378	100	44	182.64	3.37	3.42	
04/17/04	11:50:00	4383	105	42	182.61	3.34	3.39	
04/17/04	11:55:00	4388	110	40	182.59	3.32	3.37	
04/17/04	12:00:00	4393	115	38	182.57	3.30	3.35	
04/17/04	12:05:00	4398	120	37	182.53	3.26	3.31	
04/17/04	12:15:00	4408	130	34	182.48	3.21	3.26	
04/17/04	12:25:00	4418	140	32	182.44	3.17	3.22	
04/17/04	12:35:00	4428	150	30	182.40	3.13	3.19	
04/17/04	12:45:00	4438	160	28	182.37	3.10	3.16	
04/17/04	12:55:00	4448	170	26	182.36	3.09	3.15	
04/17/04	13:05:00	4458	180	25	182.28	3.01	3.07	
04/17/04	13:15:00	4468	190	24	182.24	2.97	3.03	
04/17/04	13:25:00	4478	200	22	182.21	2.94	3.00	
04/17/04	13:35:00	4488	210	21	182.18	2.91	2.99	
04/17/04	13:45:00	4498	220	20	182.14	2.87	2.95	
04/17/04	13:55:00	4508	230	20	182.11	2.84	2.92	
04/17/04	14:05:00	4518	240	19	182.08	2.81	2.89	
04/17/04	18:45:00	4798	520	9	181.54	2.27	2.37	
04/17/04	18:55:00	4808	530	9	181.51	2.24	2.34	
04/17/04	19:05:00	4818	540	9	181.50	2.23	2.33	
04/18/04	11:05:00	5778	1500	4	180.88	1.61	1.71	
04/18/04	17:42:00	6175	1897	3	180.60	1.33	1.43	
04/19/04	18:14:00	7647	3369	2	180.25	0.98	1.00	
04/20/04	20:06:00	9199	4921	2	180.30	1.03	1.02	
04/21/04	19:40:00	10613	6335	2	180.16	0.89	0.92	
04/25/04	16:22:00	16175	11897	1	179.85	0.58	0.39	questionable measurement, oil/water interference
06/08/04	18:00:00				179.9			177.65' below access port

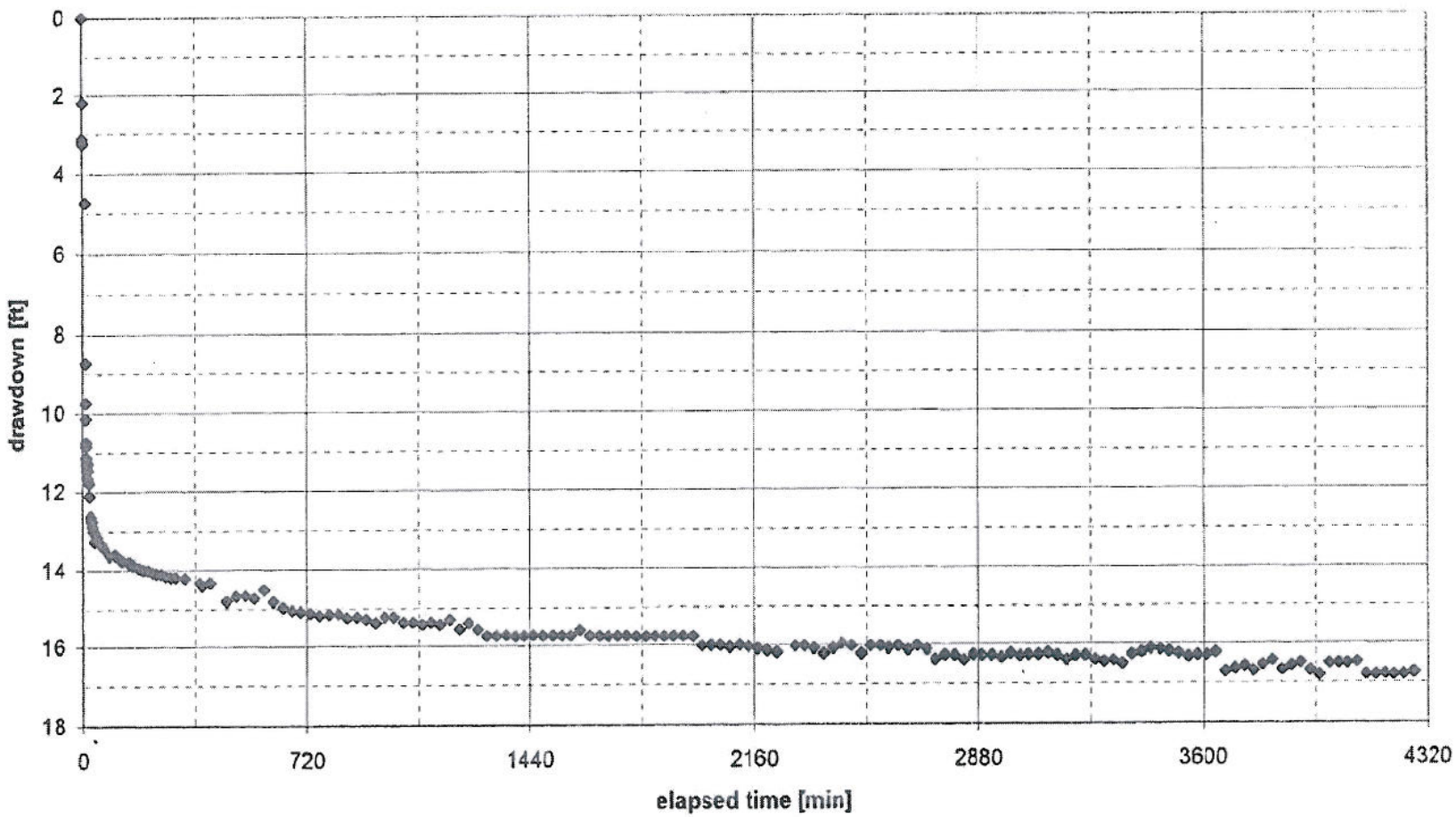
Drawdown and Recovery
Test Production Well 1, Qave = 2050 gpm

Spring Valley Ranch

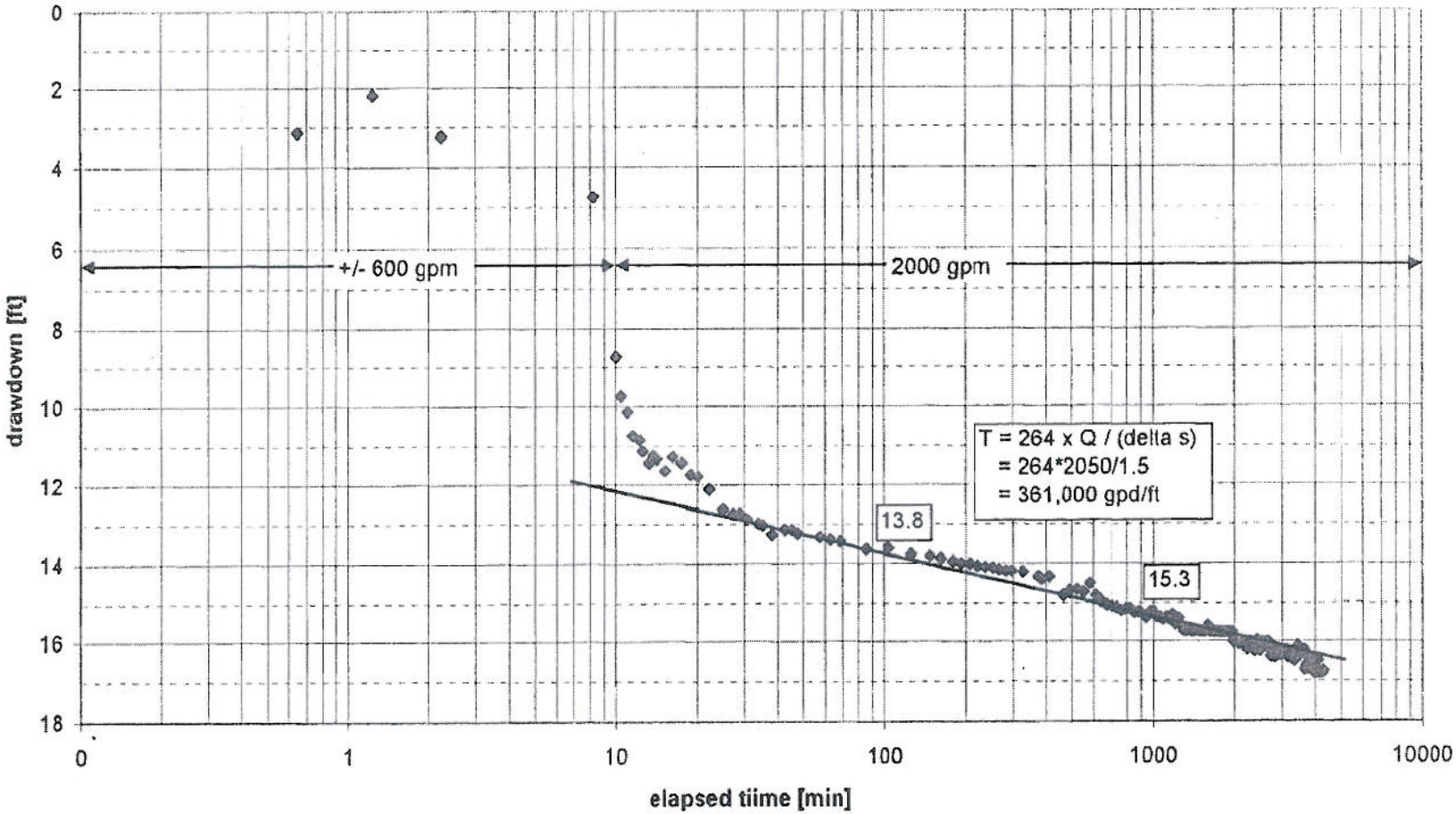
Test date: April 14-25,2004



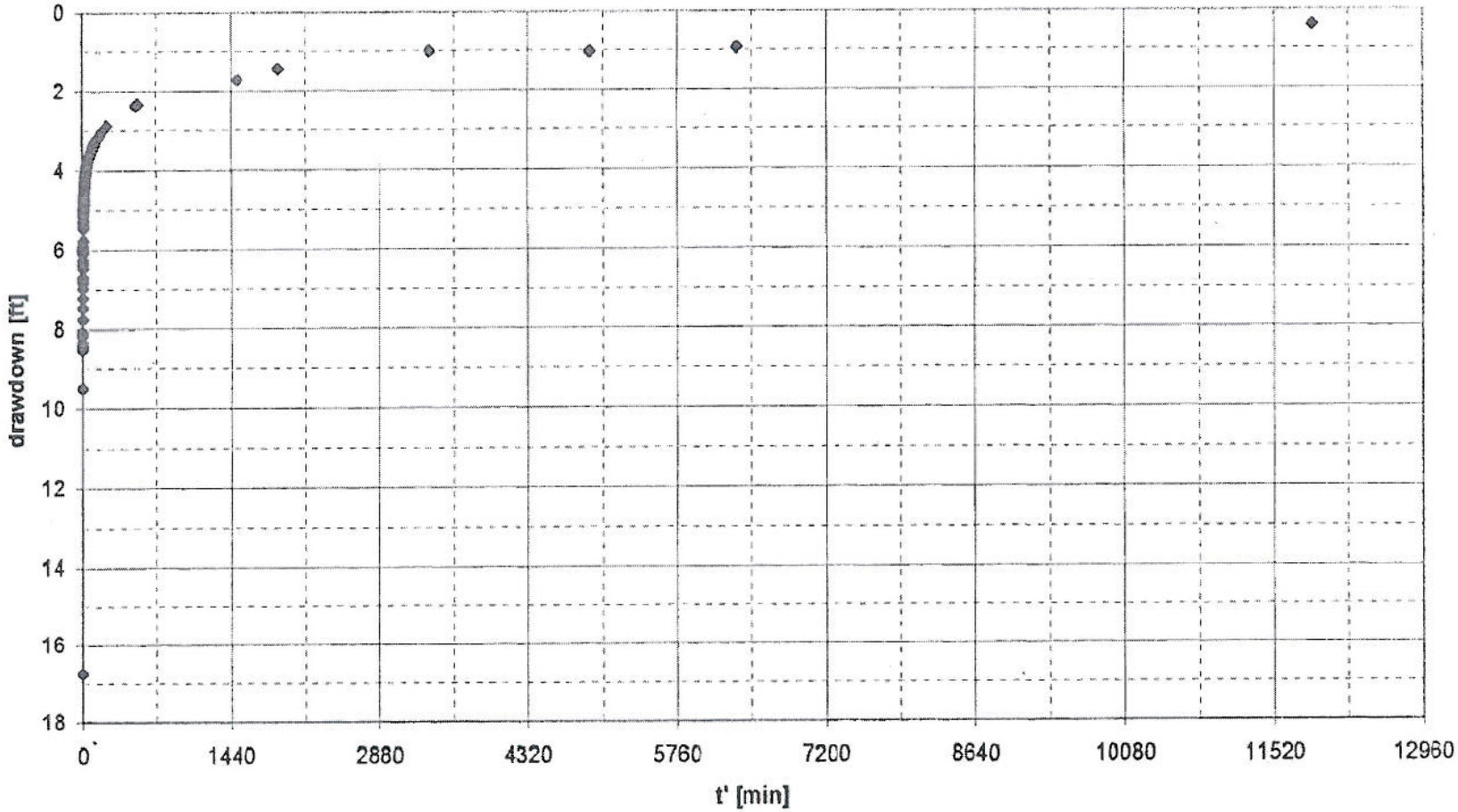
Drawdown
Test Production Well 1, Qave = 2050 gpm
Spring Valley Ranch
Test Date: April 14-25, 2004



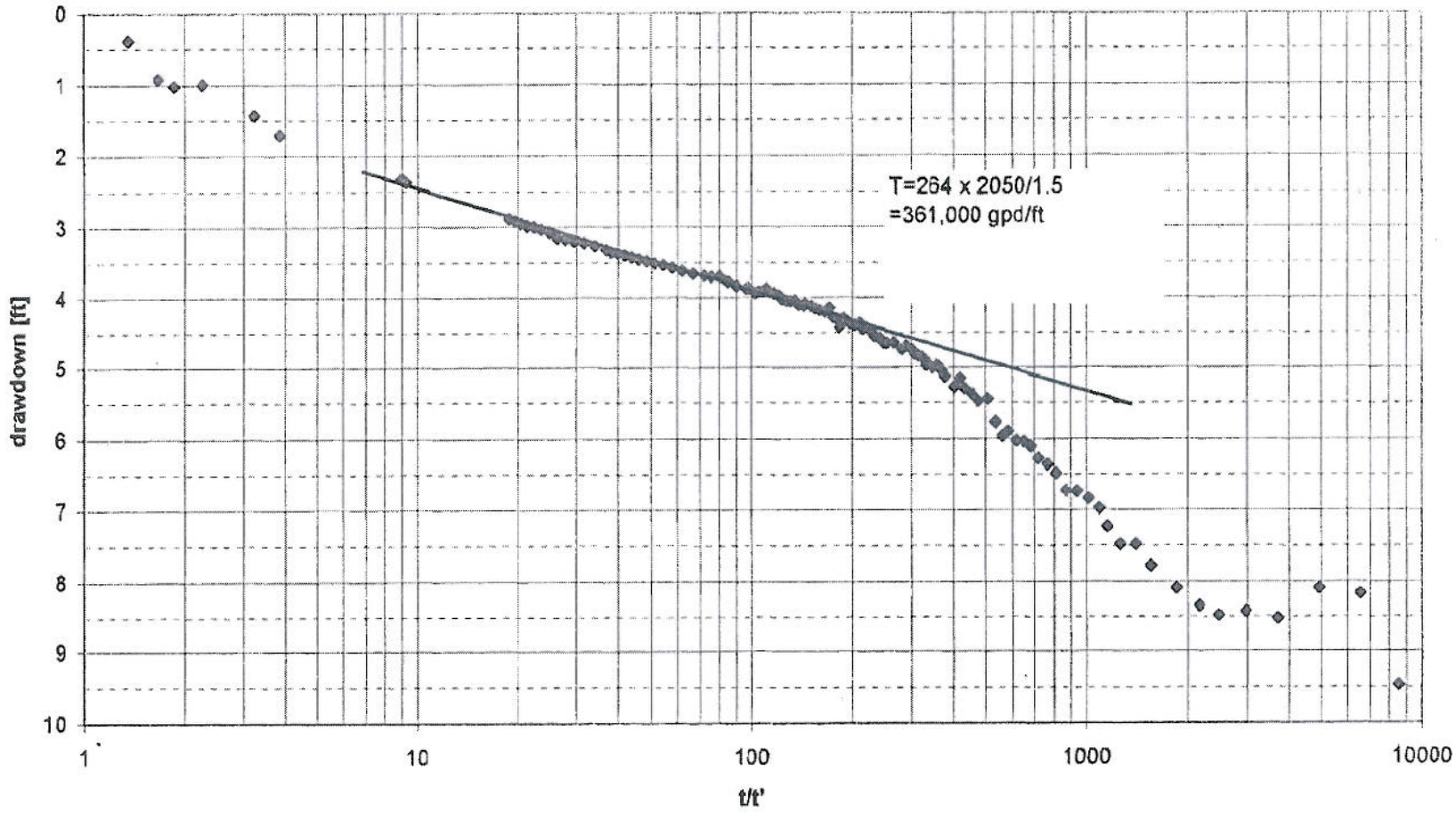
Time - Drawdown
Test Production Well 1, Qave = 2050 gpm
Spring Valley Ranch
Test Date: April 14-25, 2004



Recovery
Test Production Well 1, Qave = 2050 gpm
Spring Valley Ranch
Test Date: April 14-25, 2004



Time - Recovery
Test Production Well 1, Qave = 2050 gpm
Spring Valley Ranch
Test Date: April 14-25, 2004



TPW 1 STEP-RATE PUMPING TEST

Well No: TPW1, Spring Valley Ranch
Test conducted by: SPF Water Engineering, LLC and Riverside, Inc
Flow measured by: Orifice (10 x 8) and manometer
Water level measured by: well sounder Water level measure point: top of tube
MP Elev: 1.43' atoc Static DTW: 179.10' mp
Pump on: 4/12/04 14:44 Pump off: 4/12/04 17:00

Date	Time	t [min]	DTW [ft]	Drawdown [ft]	Comments
04/12/04	14:22:00			-	
04/12/04	14:24:00			-	begin development pumping
04/12/04	14:28:00		189.00	9.90	
04/12/04	14:32:00		189.00	9.90	
04/12/04	14:42:00				clearing no sand
04/12/04	14:46:00				increased Q
04/12/04	14:47:00		194.00	14.90	
04/12/04	14:53:00				1300-1500 gpm
04/12/04	14:56:00		193.11	14.01	19" clear, increase
04/12/04	15:01:00				54", 2200+/-
04/12/04	15:02:00				60", 2340 +/-
04/12/04	15:06:00		200.56	21.46	
04/12/04	15:33:00		206.00	26.90	58"
04/12/04	15:40:00		201.00	21.90	2350 gpm
04/12/04	15:56:00				off, start to surge for 5 mins
04/12/04	16:01:00		195.00	15.90	2380gpm
04/12/04	16:08:00				off
04/12/04	16:15:00	0	182.65	3.55	begin step rate test
04/12/04	16:19:00	4	185.75	6.65	850 gpm
04/12/04	16:23:00	8	185.90	6.80	850 gpm
04/12/04	16:28:00	13	186.14	7.04	850 gpm
04/12/04	16:30:00	15	186.05	6.95	850 gpm
04/12/04	16:31:00	16			increase rate to 2,000 gpm
04/12/04	16:33:00	18	190.50	11.40	1980 gpm
04/12/04	16:35:00	20	191.28	12.18	2000 gpm
04/12/04	16:37:00	22	191.85	12.75	2000 gpm
04/12/04	16:41:00	26	192.13	13.03	2000 gpm
04/12/04	16:44:00	29	192.29	13.19	2000 gpm
04/12/04	16:45:00	30			increase rate to 2,340 gpm
04/12/04	16:46:00	31	194.52	15.42	2340gpm
04/12/04	16:50:00	35	195.34	16.24	2340 gpm
04/12/04	16:54:00	39	195.62	16.52	2340 gpm
04/12/04	16:58:00	43	195.72	16.62	2340 gpm
04/12/04	17:00:00	45	195.70	16.60	off
04/12/04	17:29:00	74	180.02	0.92	

OBSERVATION WELL SVR8

SANDY HILL AQUIFER TEST - OBSERVATION WELL SVR 8

Well No: SVR 8, observation well for TPW1 aquifer test
Test conducted by: SPF Water Engineering, LLC and Riverside, Inc
Flow measured by: NA
Water level measured by: Stevens chart recorder Water level measure point: top of casing
MP Elev: Static DTW: 66.70' mp
Pump on: 4/14/04 10:47:26 Pump off: 4/17/04 10:05

Date	Time	t [min]	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
4/14/2004	10:00		66.70			static
4/14/2004	11:00	13	66.70	0.00	0.01	
4/14/2004	11:30	43	66.70	0.00	0.01	
4/14/2004	12:00	73	66.70	0.00	0.01	
4/14/2004	12:30	103	66.70	0.00	0.02	
4/14/2004	13:00	133	66.69	-0.01	0.01	
4/14/2004	13:30	163	66.69	-0.01	0.02	measurements taken from Stevens
4/14/2004	14:00	193	66.69	-0.01	0.02	chart recorder, verified with well
4/14/2004	14:30	223	66.68	-0.02	0.03	sounder
4/14/2004	15:00	253	66.68	-0.02	0.03	
4/14/2004	15:30	283	66.69	-0.01	0.04	
4/14/2004	16:00	313	66.68	-0.02	0.03	
4/14/2004	16:30	343	66.68	-0.02	0.04	
4/14/2004	17:00	373	66.68	-0.02	0.04	
4/14/2004	17:30	403	66.68	-0.02	0.05	
4/14/2004	18:00	433	66.68	-0.02	0.05	
4/14/2004	18:30	463	66.68	-0.02	0.07	
4/14/2004	19:00	493	66.68	-0.02	0.07	
4/14/2004	19:30	523	66.68	-0.02	0.07	
4/14/2004	20:00	553	66.68	-0.02	0.07	
4/14/2004	21:00	613	66.68	-0.02	0.07	
4/14/2004	22:00	673	66.69	-0.01	0.10	
4/14/2004	23:00	733	66.69	-0.01	0.11	
4/15/2004	0:00	793	66.69	-0.01	0.11	
4/15/2004	1:00	853	66.70	0.00	0.11	
4/15/2004	2:00	913	66.72	0.02	0.13	
4/15/2004	3:00	973	66.73	0.03	0.14	
4/15/2004	4:00	1033	66.74	0.04	0.14	
4/15/2004	5:00	1093	66.76	0.06	0.15	
4/15/2004	6:00	1153	66.77	0.07	0.12	
4/15/2004	7:00	1213	66.82	0.12	0.15	
4/15/2004	8:00	1273	66.84	0.14	0.15	
4/15/2004	9:00	1333	66.86	0.16	0.16	
4/15/2004	10:00	1393	66.86	0.16	0.15	
4/15/2004	11:00	1453	66.87	0.17	0.16	
4/15/2004	12:00	1513	66.87	0.17	0.17	
4/15/2004	13:00	1573	66.87	0.17	0.18	
4/15/2004	14:00	1633	66.87	0.17	0.18	
4/15/2004	15:00	1693	66.87	0.17	0.19	
4/15/2004	16:00	1753	66.87	0.17	0.20	
4/15/2004	17:00	1813	66.87	0.17	0.20	
4/15/2004	18:00	1873	66.87	0.17	0.20	

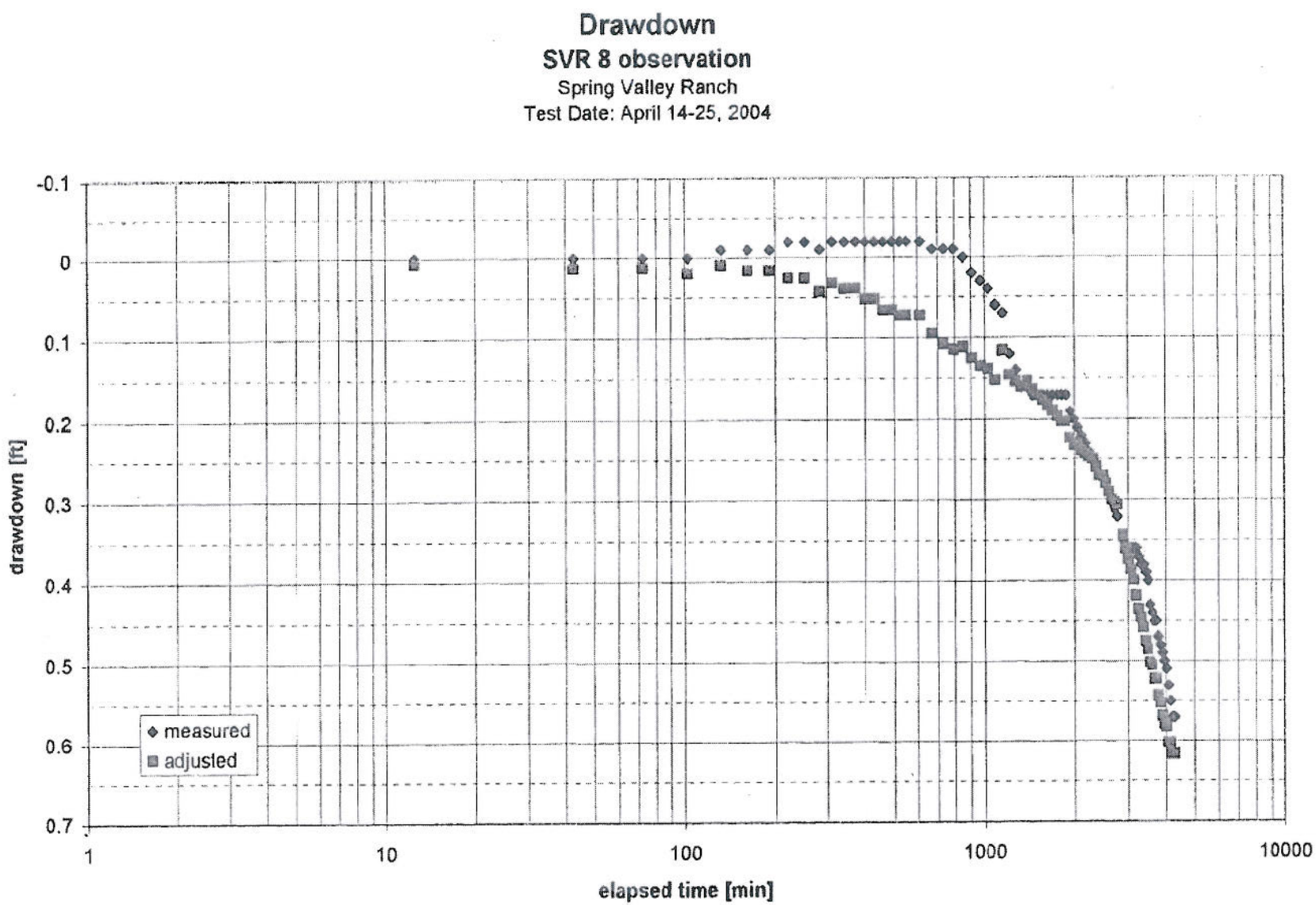
Date	Time	t [min]	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
4/15/2004	19:00	1933	66.89	0.19	0.22	
4/15/2004	20:00	1993	66.90	0.20	0.23	
4/15/2004	21:00	2053	66.91	0.21	0.23	
4/15/2004	22:00	2113	66.92	0.22	0.24	
4/15/2004	23:00	2173	66.93	0.23	0.24	
4/16/2004	0:00	2233	66.94	0.24	0.25	
4/16/2004	1:00	2293	66.95	0.25	0.25	
4/16/2004	2:00	2353	66.96	0.26	0.26	
4/16/2004	3:00	2413	66.97	0.27	0.27	
4/16/2004	4:00	2473	66.97	0.27	0.27	
4/16/2004	5:00	2533	66.98	0.28	0.28	
4/16/2004	6:00	2593	66.99	0.29	0.29	
4/16/2004	7:00	2653	67.00	0.30	0.30	
4/16/2004	8:00	2713	67.01	0.31	0.30	
4/16/2004	9:00	2773	67.02	0.32	0.31	
4/16/2004	11:00	2893	67.05	0.35	0.34	
4/16/2004	12:00	2953	67.06	0.36	0.36	
4/16/2004	13:00	3013	67.06	0.36	0.37	
4/16/2004	14:00	3073	67.06	0.36	0.39	
4/16/2004	15:00	3133	67.06	0.36	0.40	
4/16/2004	16:00	3193	67.06	0.36	0.42	
4/16/2004	17:00	3253	67.07	0.37	0.44	
4/16/2004	18:00	3313	67.08	0.38	0.45	
4/16/2004	19:00	3373	67.08	0.38	0.46	
4/16/2004	20:00	3433	67.09	0.39	0.48	
4/16/2004	21:00	3493	67.10	0.40	0.49	
4/16/2004	22:00	3553	67.13	0.43	0.50	
4/16/2004	23:00	3613	67.14	0.44	0.51	
4/17/2004	0:00	3673	67.15	0.45	0.52	
4/17/2004	1:00	3733	67.15	0.45	0.52	
4/17/2004	2:00	3793	67.17	0.47	0.54	
4/17/2004	3:00	3853	67.18	0.48	0.55	
4/17/2004	4:00	3913	67.19	0.49	0.57	
4/17/2004	5:00	3973	67.20	0.50	0.58	
4/17/2004	6:00	4033	67.21	0.51	0.58	
4/17/2004	7:00	4093	67.23	0.53	0.60	
4/17/2004	8:00	4153	67.25	0.55	0.60	
4/17/2004	9:00	4213	67.27	0.57	0.62	
4/17/2004	10:00	4273	67.27	0.57	0.62	
4/17/2004	11:00	4333	67.28	0.58	0.63	
4/17/2004	12:00	4393	67.29	0.59	0.64	
4/17/2004	13:00	4453	67.29	0.59	0.64	
4/17/2004	14:00	4513	67.29	0.59	0.66	
4/17/2004	15:00	4573	67.29	0.59	0.67	
4/17/2004	16:00	4633	67.29	0.59	0.68	
4/17/2004	17:00	4693	67.29	0.59	0.68	
4/17/2004	18:00	4753	67.29	0.59	0.69	
4/17/2004	19:11	4824	67.29	0.59	0.70	
4/17/2004	20:00	4873	67.28	0.58	0.69	
4/17/2004	21:00	4933	67.29	0.59	0.70	

Date	Time	t [min]	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
4/17/2004	22:00	4993	67.30	0.60	0.69	
4/17/2004	23:00	5053	67.32	0.62	0.71	
4/18/2004	0:00	5113	67.32	0.62	0.71	
4/18/2004	1:00	5173	67.32	0.62	0.70	
4/18/2004	2:00	5233	67.33	0.63	0.70	
4/18/2004	3:00	5293	67.33	0.63	0.69	
4/18/2004	4:00	5353	67.35	0.65	0.71	
4/18/2004	5:00	5413	67.36	0.66	0.71	
4/18/2004	6:00	5473	67.37	0.67	0.70	
4/18/2004	7:00	5533	67.39	0.69	0.71	
4/18/2004	8:00	5593	67.40	0.70	0.70	
4/18/2004	9:00	5653	67.41	0.71	0.68	
4/18/2004	10:00	5713	67.42	0.72	0.68	
4/18/2004	10:58	5771	67.42	0.72	0.67	
4/18/2004	12:00	5833	67.42	0.72	0.67	
4/18/2004	13:00	5893	67.41	0.71	0.66	
4/18/2004	14:00	5953	67.41	0.71	0.66	
4/18/2004	15:00	6013	67.41	0.71	0.66	
4/18/2004	16:00	6073	67.40	0.70	0.66	
4/18/2004	17:00	6133	67.40	0.70	0.67	
4/18/2004	17:37	6170	67.40	0.70	0.67	
4/18/2004	18:00	6193	67.39	0.69	0.66	
4/18/2004	19:00	6253	67.39	0.69	0.66	
4/18/2004	20:00	6313	67.39	0.69	0.66	
4/18/2004	21:00	6373	67.42	0.72	0.67	
4/18/2004	22:00	6433	67.42	0.72	0.67	
4/18/2004	23:00	6493	67.42	0.72	0.68	
4/19/2004	0:00	6553	67.42	0.72	0.68	
4/19/2004	1:00	6613	67.42	0.72	0.68	
4/19/2004	2:00	6673	67.42	0.72	0.69	
4/19/2004	3:00	6733	67.42	0.72	0.69	
4/19/2004	4:00	6793	67.39	0.69	0.66	
4/19/2004	5:00	6853	67.39	0.69	0.66	
4/19/2004	6:00	6913	67.39	0.69	0.67	
4/19/2004	7:00	6973	67.39	0.69	0.66	
4/19/2004	8:00	7033	67.39	0.69	0.66	
4/19/2004	9:00	7093	67.40	0.70	0.66	
4/19/2004	10:00	7153	67.41	0.71	0.66	
4/19/2004	11:00	7213	67.41	0.71	0.66	
4/19/2004	12:00	7273	67.42	0.72	0.67	
4/19/2004	13:00	7333	67.41	0.71	0.68	
4/19/2004	14:00	7393	67.41	0.71	0.68	
4/19/2004	15:00	7453	67.41	0.71	0.70	
4/19/2004	16:00	7513	67.39	0.69	0.70	
4/19/2004	17:00	7573	67.38	0.68	0.70	
4/19/2004	18:00	7633	67.39	0.69	0.71	
4/19/2004	19:00	7693	67.39	0.69	0.72	
4/19/2004	20:00	7753	67.40	0.70	0.72	
4/19/2004	21:00	7813	67.40	0.70	0.72	
4/19/2004	22:00	7873	67.41	0.71	0.73	

Date	Time	t [min]	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
4/19/2004	23:00	7933	67.41	0.71	0.73	
4/20/2004	0:00	7993	67.41	0.71	0.73	
4/20/2004	1:00	8053	67.41	0.71	0.73	
4/20/2004	2:00	8113	67.43	0.73	0.75	
4/20/2004	3:00	8173	67.42	0.72	0.75	
4/20/2004	4:00	8233	67.41	0.71	0.75	
4/20/2004	5:00	8293	67.40	0.70	0.75	
4/20/2004	6:00	8353	67.40	0.70	0.75	
4/20/2004	7:00	8413	67.40	0.70	0.73	
4/20/2004	8:00	8473	67.45	0.75	0.74	
4/20/2004	9:00	8533	67.46	0.76	0.75	
4/20/2004	10:00	8593	67.46	0.76	0.74	
4/20/2004	11:00	8653	67.46	0.76	0.73	
4/20/2004	12:00	8713	67.46	0.76	0.74	
4/20/2004	13:00	8773	67.46	0.76	0.76	
4/20/2004	14:00	8833	67.44	0.74	0.75	
4/20/2004	15:00	8893	67.44	0.74	0.76	
4/20/2004	16:00	8953	67.44	0.74	0.73	
4/20/2004	17:00	9013	67.44	0.74	0.75	
4/20/2004	18:00	9073	67.44	0.74	0.75	
4/20/2004	19:30	9163	67.45	0.75	0.75	
4/20/2004	20:00	9193	67.45	0.75	0.74	
4/20/2004	21:00	9253	67.45	0.75	0.75	
4/20/2004	22:00	9313	67.45	0.75	0.76	
4/20/2004	23:00	9373	67.45	0.75	0.76	
4/21/2004	0:00	9433	67.45	0.75	0.76	
4/21/2004	1:00	9493	67.45	0.75	0.76	
4/21/2004	2:00	9553	67.45	0.75	0.76	
4/21/2004	3:00	9613	67.44	0.74	0.76	
4/21/2004	4:00	9673	67.43	0.73	0.75	
4/21/2004	5:00	9733	67.43	0.73	0.76	
4/21/2004	6:00	9793	67.43	0.73	0.76	
4/21/2004	7:00	9853	67.43	0.73	0.76	
4/21/2004	8:00	9913	67.43	0.73	0.76	
4/21/2004	9:00	9973	67.43	0.73	0.76	
4/21/2004	10:00	10033	67.43	0.73	0.78	
4/21/2004	11:00	10093	67.43	0.73	0.78	
4/21/2004	12:00	10153	67.42	0.72	0.79	
4/21/2004	13:00	10213	67.41	0.71	0.79	
4/21/2004	14:00	10273	67.44	0.74	0.79	
4/21/2004	15:00	10333	67.44	0.74	0.79	
4/21/2004	16:00	10393	67.43	0.73	0.80	
4/21/2004	17:00	10453	67.43	0.73	0.78	
4/21/2004	18:00	10513	67.44	0.74	0.79	
4/21/2004	19:00	10573	67.44	0.74	0.79	
4/21/2004	20:00	10633	67.45	0.75	0.78	
4/21/2004	21:00	10693	67.46	0.76	0.78	
4/21/2004	22:00	10753	67.47	0.77	0.78	
4/21/2004	23:00	10813	67.47	0.77	0.78	
4/22/2004	0:00	10873	67.48	0.78	0.78	

Date	Time	t [min]	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
4/22/2004	1:00	10933	67.48	0.78	0.77	
4/22/2004	2:00	10993	67.48	0.78	0.76	
4/22/2004	3:00	11053	67.48	0.78	0.75	
4/22/2004	4:00	11113	67.49	0.79	0.74	
4/22/2004	5:00	11173	67.49	0.79	0.74	
4/22/2004	6:00	11233	67.50	0.80	0.73	
4/22/2004	7:00	11293	67.51	0.81	0.72	
4/22/2004	8:00	11353	67.52	0.82	0.71	
4/22/2004	9:00	11413	67.52	0.82	0.71	
4/22/2004	10:00	11473	67.52	0.82	0.71	
4/22/2004	11:00	11533	67.52	0.82	0.71	
4/22/2004	12:00	11593	67.52	0.82	0.71	
4/22/2004	13:00	11653	67.51	0.81	0.70	
4/22/2004	14:00	11713	67.50	0.80	0.69	
4/22/2004	15:00	11773	67.50	0.80	0.69	
4/22/2004	16:00	11833	67.49	0.79	0.69	
4/22/2004	17:00	11893	67.48	0.78	0.68	
4/22/2004	18:00	11953	67.48	0.78	0.67	
4/22/2004	19:00	12013	67.48	0.78	0.67	
4/22/2004	20:00	12073	67.49	0.79	0.67	
4/22/2004	21:00	12133	67.50	0.80	0.67	
4/22/2004	22:00	12193	67.50	0.80	0.67	
4/22/2004	23:00	12253	67.50	0.80	0.66	
4/23/2004	0:00	12313	67.49	0.79	0.65	
4/23/2004	1:00	12373	67.49	0.79	0.63	
4/23/2004	2:00	12433	67.50	0.80	0.64	
4/23/2004	3:00	12493	67.50	0.80	0.64	
4/23/2004	4:00	12553	67.50	0.80	0.64	
4/23/2004	5:00	12613	67.50	0.80	0.63	
4/23/2004	6:00	12673	67.50	0.80	0.63	
4/23/2004	7:00	12733	67.50	0.80	0.62	
4/23/2004	8:00	12793	67.50	0.80	0.62	
4/23/2004	9:00	12853	67.50	0.80	0.62	
4/23/2004	10:00	12913	67.49	0.79	0.62	
4/23/2004	11:00	12973	67.49	0.79	0.63	
4/23/2004	12:00	13033	67.47	0.77	0.63	
4/23/2004	13:00	13093	67.45	0.75	0.62	
4/23/2004	14:00	13153	67.44	0.74	0.63	
4/23/2004	15:00	13213	67.43	0.73	0.63	
4/23/2004	16:00	13273	67.42	0.72	0.63	
4/23/2004	17:00	13333	67.42	0.72	0.64	
4/23/2004	18:00	13393	67.41	0.71	0.65	
4/23/2004	19:00	13453	67.40	0.70	0.65	
4/23/2004	20:00	13513	67.40	0.70	0.66	
4/23/2004	21:00	13573	67.41	0.71	0.66	
4/23/2004	22:00	13633	67.42	0.72	0.66	
4/23/2004	23:00	13693	67.43	0.73	0.65	
4/24/2004	0:00	13753	67.43	0.73	0.64	
4/24/2004	1:00	13813	67.45	0.75	0.64	
4/24/2004	2:00	13873	67.46	0.76	0.65	

Date	Time	t [min]	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
4/24/2004	3:00	13933	67.46	0.76	0.64	
4/24/2004	4:00	13993	67.46	0.76	0.63	
4/24/2004	5:00	14053	67.47	0.77	0.64	
4/24/2004	6:00	14113	67.47	0.77	0.63	
4/24/2004	7:00	14173	67.48	0.78	0.63	
4/24/2004	8:00	14233	67.49	0.79	0.63	
4/24/2004	9:00	14293	67.49	0.79	0.63	
4/24/2004	10:00	14353	67.49	0.79	0.63	
4/24/2004	11:00	14413	67.49	0.79	0.63	
4/24/2004	12:00	14473	67.49	0.79	0.63	
4/24/2004	13:00	14533	67.48	0.78	0.63	
4/24/2004	14:00	14593	67.47	0.77	0.63	
4/24/2004	15:00	14653	67.46	0.76	0.63	
4/24/2004	16:00	14713	67.45	0.75	0.63	
4/24/2004	17:00	14773	67.45	0.75	0.63	
4/24/2004	18:00	14833	67.45	0.75	0.63	
4/24/2004	19:00	14893	67.45	0.75	0.63	
4/24/2004	20:00	14953	67.45	0.75	0.63	
4/24/2004	21:00	15013	67.45	0.75	0.62	
4/24/2004	22:00	15073	67.46	0.76	0.62	
4/24/2004	23:00	15133	67.46	0.76	0.62	
4/25/2004	0:00	15193	67.46	0.76	0.61	
4/25/2004	1:00	15253	67.47	0.77	0.61	
4/25/2004	2:00	15313	67.47	0.77	0.60	
4/25/2004	3:00	15373	67.47	0.77	0.60	
4/25/2004	4:00	15433	67.48	0.78	0.60	
4/25/2004	5:00	15493	67.48	0.78	0.59	
4/25/2004	6:00	15553	67.48	0.78	0.58	
4/25/2004	7:00	15613	67.48	0.78	0.58	
4/25/2004	8:00	15673	67.49	0.79	0.58	
4/25/2004	9:00	15733	67.49	0.79	0.57	
4/25/2004	10:00	15793	67.49	0.79	0.57	
4/25/2004	11:00	15853	67.50	0.80	0.58	
4/25/2004	12:00	15913	67.50	0.80	0.58	

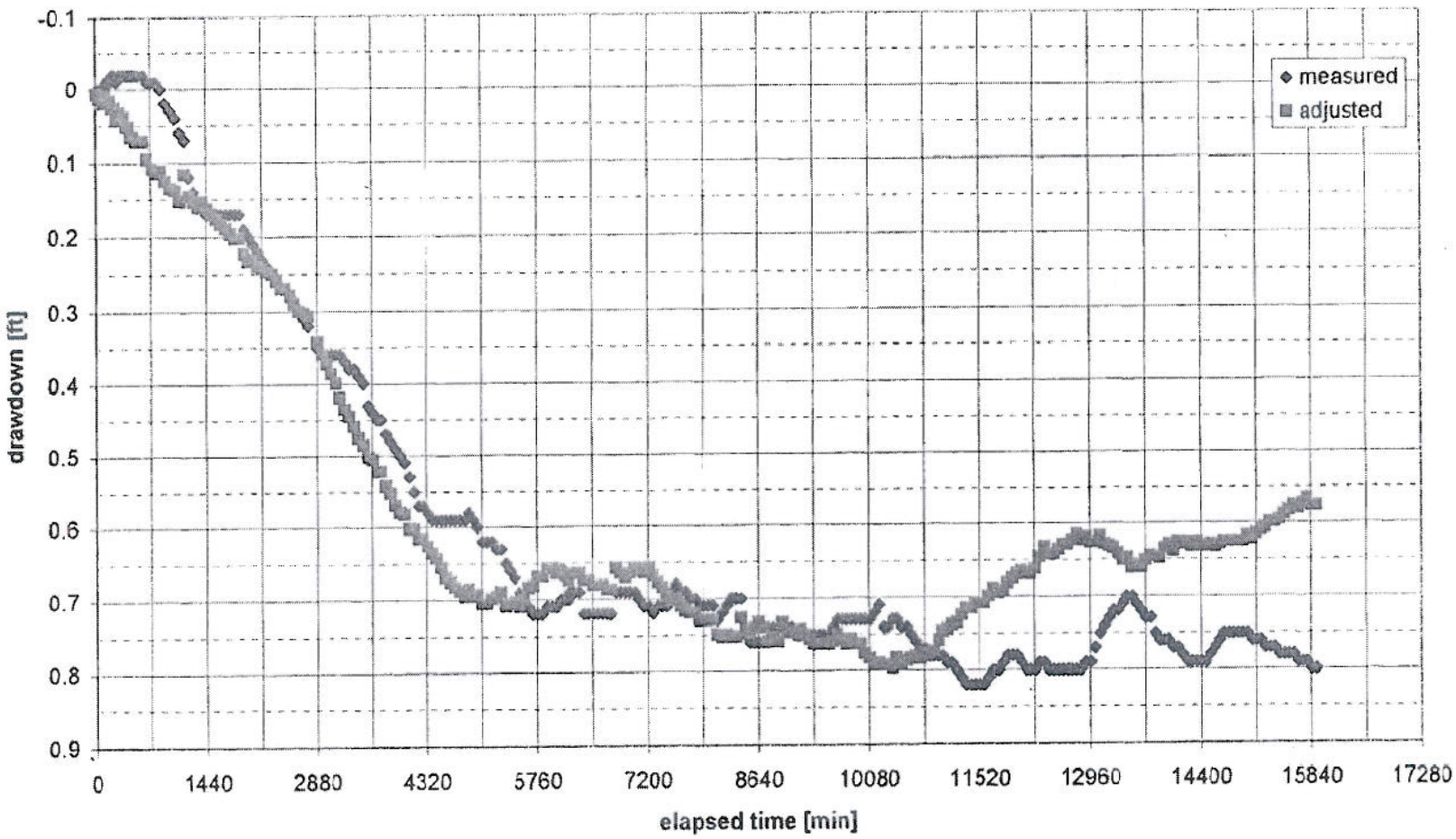

Drawdown
SVR 8 observation
Spring Valley Ranch
Test Date: April 14-25, 2004
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
drawdown [ft]
1
10
100
1000
10000
elapsed time [min]
measured
adjusted

Drawdown and Recovery

SVR 8 Observation

Spring Valley Ranch

Test Date: April 14-25, 2004



OBSERVATION WELL SVR3

SANDY HILL AQUIFER TEST - OBSERVATION WELL SVR3

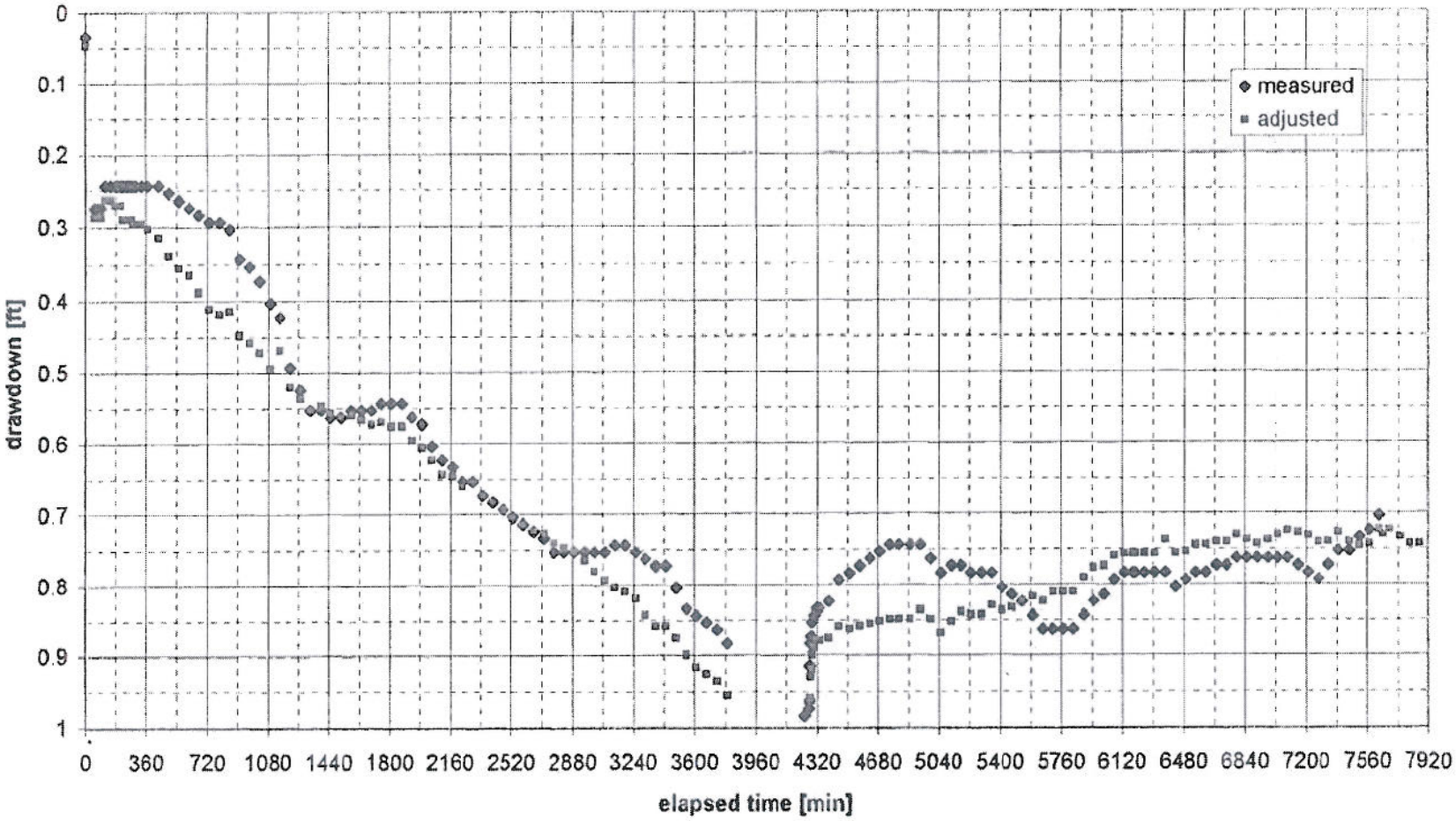
Well No: SVR 3, observation well for TPW1 aquifer test						
Test conducted by: SPF Water Engineering, LLC and Riverside, Inc						
Flow measured by: NA						
Water level measured by: Stevens chart recorder			Water level measure point: top of casing			
MP Elev:	Static DTW: 175.38' mp					
Pump on: 4/14/04 10:47:26			Pump off: 4/17/04 10:05			
Date	Time	t [min]	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
4/14/2004	10:48	0	0.00	0.00	0.00	
4/14/2004	10:49	1	175.41	0.03	0.05	
4/14/2004	11:40	52	175.65	0.27	0.29	
4/14/2004	11:44	56	175.65	0.27	0.29	
4/14/2004	11:55	67	175.65	0.27	0.29	measurements taken from Stevens
4/14/2004	12:00	72	175.65	0.27	0.29	chart recorder, verified with well
4/14/2004	12:05	77	175.65	0.27	0.29	sounder
4/14/2004	12:16	88	175.65	0.27	0.29	
4/14/2004	12:25	97	175.65	0.27	0.29	
4/14/2004	12:48	120	175.62	0.24	0.26	
4/14/2004	13:20	152	175.62	0.24	0.26	
4/14/2004	13:49	181	175.62	0.24	0.27	
4/14/2004	14:01	193	175.62	0.24	0.27	
4/14/2004	14:17	209	175.62	0.24	0.27	
4/14/2004	14:32	224	175.62	0.24	0.29	
4/14/2004	14:48	240	175.62	0.24	0.29	
4/14/2004	15:01	253	175.62	0.24	0.29	
4/14/2004	15:17	269	175.62	0.24	0.29	
4/14/2004	15:31	283	175.62	0.24	0.30	
4/14/2004	15:46	298	175.62	0.24	0.30	
4/14/2004	16:17	329	175.62	0.24	0.30	
4/14/2004	16:57	369	175.62	0.24	0.30	
4/14/2004	18:00	432	175.62	0.24	0.32	
4/14/2004	19:00	492	175.63	0.25	0.34	
4/14/2004	20:00	552	175.64	0.26	0.36	
4/14/2004	21:00	612	175.65	0.27	0.37	
4/14/2004	22:00	672	175.66	0.28	0.39	
4/14/2004	23:00	732	175.67	0.29	0.41	
4/15/2004	0:00	792	175.67	0.29	0.42	
4/15/2004	1:00	852	175.68	0.30	0.42	
4/15/2004	2:00	912	175.72	0.34	0.45	
4/15/2004	3:00	972	175.73	0.35	0.46	
4/15/2004	4:00	1032	175.75	0.37	0.47	
4/15/2004	5:00	1092	175.78	0.40	0.50	
4/15/2004	6:00	1152	175.80	0.42	0.47	
4/15/2004	7:00	1212	175.87	0.49	0.52	
4/15/2004	8:00	1272	175.90	0.52	0.54	
4/15/2004	9:00	1332	175.93	0.55	0.55	
4/15/2004	10:00	1392	175.93	0.55	0.55	
4/15/2004	11:00	1452	175.94	0.56	0.56	
4/15/2004	12:00	1512	175.94	0.56	0.56	
4/15/2004	13:00	1572	175.93	0.55	0.56	

Date	Time	t [min]	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
4/15/2004	14:00	1632	175.93	0.55	0.57	
4/15/2004	15:00	1692	175.93	0.55	0.57	
4/15/2004	16:00	1752	175.92	0.54	0.57	
4/15/2004	17:00	1812	175.92	0.54	0.58	
4/15/2004	18:00	1872	175.92	0.54	0.58	
4/15/2004	19:00	1932	175.94	0.56	0.60	
4/15/2004	20:00	1992	175.95	0.57	0.61	
4/15/2004	21:00	2052	175.98	0.60	0.62	
4/15/2004	22:00	2112	176.00	0.62	0.64	
4/15/2004	23:00	2172	176.01	0.63	0.65	
4/16/2004	0:00	2232	176.03	0.65	0.66	
4/16/2004	1:00	2292	176.03	0.65	0.65	
4/16/2004	2:00	2352	176.05	0.67	0.67	
4/16/2004	3:00	2412	176.06	0.68	0.68	
4/16/2004	4:00	2472	176.07	0.69	0.69	
4/16/2004	5:00	2532	176.08	0.70	0.70	
4/16/2004	6:00	2592	176.09	0.71	0.71	
4/16/2004	7:00	2652	176.10	0.72	0.72	
4/16/2004	8:00	2712	176.11	0.73	0.73	
4/16/2004	9:00	2772	176.13	0.75	0.74	
4/16/2004	10:00	2832	176.13	0.75	0.75	
4/16/2004	11:00	2892	176.13	0.75	0.75	
4/16/2004	12:00	2952	176.13	0.75	0.77	
4/16/2004	13:00	3012	176.13	0.75	0.78	
4/16/2004	14:00	3072	176.13	0.75	0.79	
4/16/2004	15:00	3132	176.12	0.74	0.80	
4/16/2004	16:00	3192	176.12	0.74	0.81	
4/16/2004	17:00	3252	176.13	0.75	0.82	
4/16/2004	18:00	3312	176.14	0.76	0.84	
4/16/2004	19:00	3372	176.15	0.77	0.86	
4/16/2004	20:00	3432	176.15	0.77	0.86	
4/16/2004	21:00	3492	176.18	0.80	0.88	
4/16/2004	22:00	3552	176.21	0.83	0.90	
4/16/2004	23:00	3612	176.22	0.84	0.92	
4/17/2004	0:00	3672	176.23	0.85	0.93	
4/17/2004	1:00	3732	176.24	0.86	0.94	
4/17/2004	2:00	3792	176.26	0.88	0.96	
4/17/2004	9:34	4246	176.36	0.98	1.03	
4/17/2004	10:00	4272	176.35	0.97	1.02	
4/17/2004	10:03	4275	176.34	0.96	1.01	
4/17/2004	10:06	4278	176.29	0.91	0.96	
4/17/2004	10:09	4281	176.26	0.88	0.93	
4/17/2004	10:12	4284	176.25	0.87	0.92	
4/17/2004	10:15	4287	176.25	0.87	0.92	
4/17/2004	10:19	4291	176.23	0.85	0.90	
4/17/2004	10:30	4302	176.22	0.84	0.89	
4/17/2004	10:45	4317	176.21	0.83	0.88	
4/17/2004	11:00	4332	176.21	0.83	0.88	
4/17/2004	12:00	4392	176.20	0.82	0.88	
4/17/2004	13:00	4452	176.17	0.79	0.86	

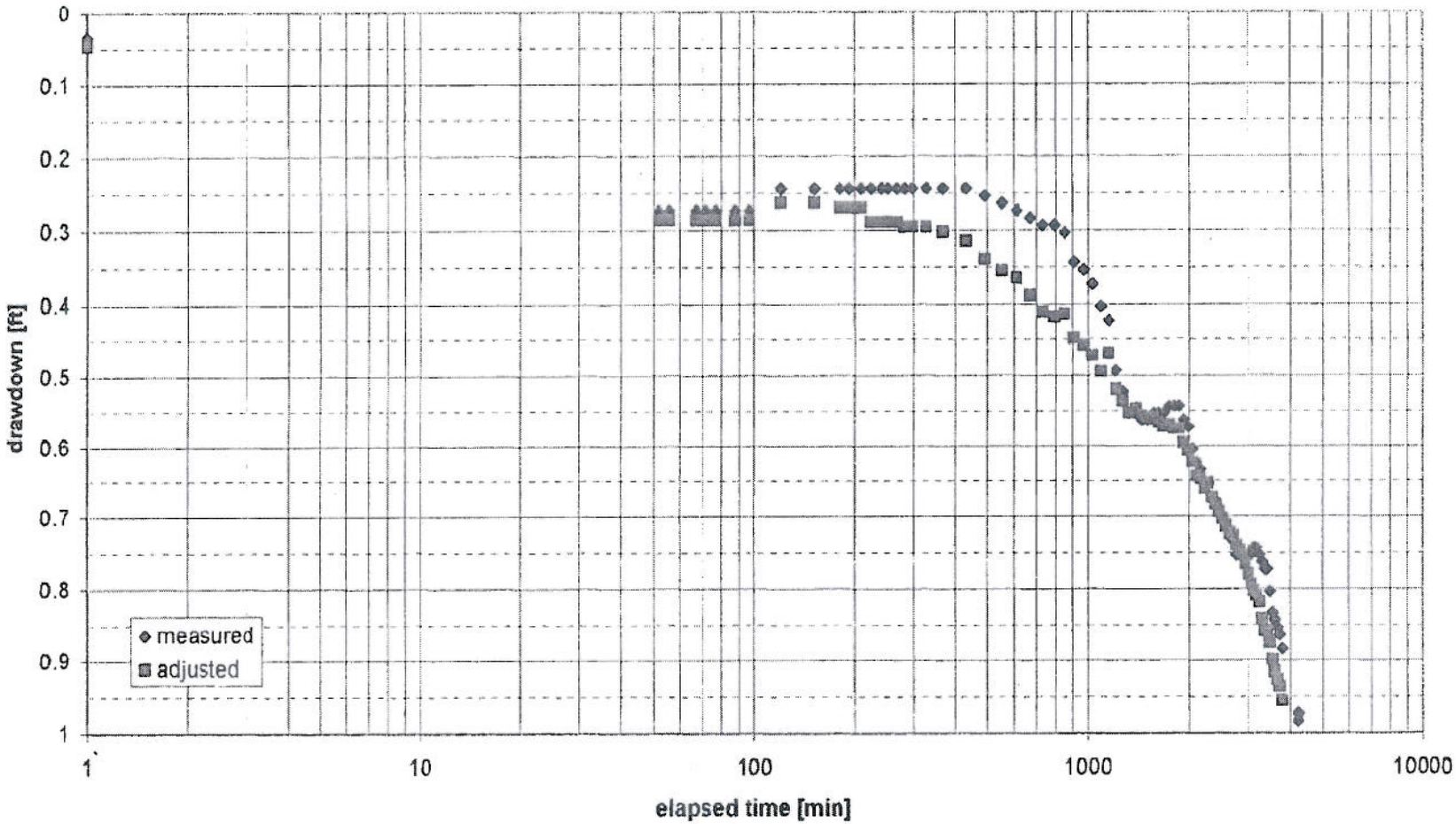
Date	Time	t [min]	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
4/17/2004	14:00	4512	176.16	0.78	0.86	
4/17/2004	15:00	4572	176.15	0.77	0.86	
4/17/2004	16:00	4632	176.14	0.76	0.86	
4/17/2004	17:00	4692	176.13	0.75	0.85	
4/17/2004	18:00	4752	176.12	0.74	0.85	
4/17/2004	18:50	4802	176.12	0.74	0.85	
4/17/2004	20:00	4872	176.12	0.74	0.85	
4/17/2004	21:00	4932	176.12	0.74	0.84	
4/17/2004	22:00	4992	176.14	0.76	0.85	
4/17/2004	23:00	5052	176.16	0.78	0.87	
4/18/2004	0:00	5112	176.15	0.77	0.85	
4/18/2004	1:00	5172	176.15	0.77	0.84	
4/18/2004	2:00	5232	176.16	0.78	0.84	
4/18/2004	3:00	5292	176.16	0.78	0.84	
4/18/2004	4:00	5352	176.16	0.78	0.83	
4/18/2004	5:00	5412	176.18	0.80	0.84	
4/18/2004	6:00	5472	176.19	0.81	0.83	
4/18/2004	7:00	5532	176.20	0.82	0.82	
4/18/2004	8:00	5592	176.22	0.84	0.82	
4/18/2004	9:00	5652	176.24	0.86	0.82	
4/18/2004	10:00	5712	176.24	0.86	0.81	
4/18/2004	11:00	5772	176.24	0.86	0.81	
4/18/2004	12:00	5832	176.24	0.86	0.81	
4/18/2004	13:00	5892	176.22	0.84	0.79	
4/18/2004	14:00	5952	176.20	0.82	0.78	
4/18/2004	15:00	6012	176.19	0.81	0.77	
4/18/2004	16:00	6072	176.17	0.79	0.76	
4/18/2004	17:00	6132	176.16	0.78	0.76	
4/18/2004	17:48	6180	176.16	0.78	0.76	
4/18/2004	18:00	6192	176.16	0.78	0.76	
4/18/2004	19:00	6252	176.16	0.78	0.76	
4/18/2004	20:00	6312	176.16	0.78	0.76	
4/18/2004	21:00	6372	176.16	0.78	0.74	
4/18/2004	22:00	6432	176.18	0.80	0.76	
4/18/2004	23:00	6492	176.17	0.79	0.75	
4/19/2004	0:00	6552	176.16	0.78	0.74	
4/19/2004	1:00	6612	176.16	0.78	0.74	
4/19/2004	2:00	6672	176.15	0.77	0.74	
4/19/2004	3:00	6732	176.15	0.77	0.74	
4/19/2004	4:00	6792	176.14	0.76	0.73	
4/19/2004	5:00	6852	176.14	0.76	0.74	
4/19/2004	6:00	6912	176.14	0.76	0.74	
4/19/2004	7:00	6972	176.14	0.76	0.74	
4/19/2004	8:00	7032	176.14	0.76	0.73	
4/19/2004	9:00	7092	176.14	0.76	0.72	
4/19/2004	10:00	7152	176.15	0.77	0.73	
4/19/2004	11:00	7212	176.16	0.78	0.73	
4/19/2004	12:00	7272	176.17	0.79	0.74	
4/19/2004	13:00	7332	176.15	0.77	0.74	
4/19/2004	14:00	7392	176.13	0.75	0.73	

Date	Time	t [min]	DTW [ft]	Drawdown [ft]	BE Drawdown [ft]	Comments
4/19/2004	15:00	7452	176.13	0.75	0.74	
4/19/2004	16:00	7512	176.11	0.73	0.75	
4/19/2004	17:00	7572	176.10	0.72	0.74	
4/19/2004	18:00	7632	176.08	0.70	0.72	
4/19/2004	18:22	7654	176.08	0.70	0.73	
4/19/2004	19:00	7692	176.08	0.70	0.72	
4/19/2004	20:00	7752	176.09	0.71	0.73	
4/19/2004	21:00	7812	176.10	0.72	0.74	
4/19/2004	22:00	7872	176.10	0.72	0.74	
4/19/2004	23:00	7932	176.10	0.72	0.74	
4/20/2004	0:00	7992	176.10	0.72	0.74	
4/20/2004	1:00	8052	176.10	0.72	0.74	
4/20/2004	2:00	8112	176.11	0.73	0.77	
4/20/2004	3:00	8172	176.11	0.73	0.77	
4/20/2004	5:00	8292	176.08	0.70	0.76	
4/20/2004	6:00	8352	176.08	0.70	0.76	
4/20/2004	7:00	8412	176.07	0.69	0.72	
4/20/2004	8:00	8472	176.13	0.75	0.75	
4/20/2004	9:00	8532	176.16	0.78	0.77	
4/20/2004	10:00	8592	176.16	0.78	0.76	
4/20/2004	11:00	8652	176.17	0.79	0.77	
4/20/2004	12:00	8712	176.16	0.78	0.76	
4/20/2004	13:00	8772	176.16	0.78	0.78	
4/20/2004	14:00	8832	176.13	0.75	0.77	
4/20/2004	15:00	8892	176.12	0.74	0.76	
4/20/2004	16:00	8952	176.12	0.74	0.74	
4/20/2004	17:00	9012	176.12	0.74	0.75	
4/20/2004	18:00	9072	176.12	0.74	0.75	
4/20/2004	19:00	9132	176.12	0.74	0.74	
4/20/2004	20:12	9204	176.12	0.74	0.74	
4/20/2004	21:00	9252	176.12	0.74	0.74	
4/20/2004	22:00	9312	176.12	0.74	0.75	
4/20/2004	23:00	9372	176.11	0.73	0.75	
4/21/2004	0:00	9432	176.11	0.73	0.75	
4/21/2004	1:00	9492	176.11	0.73	0.75	
4/21/2004	2:00	9552	176.11	0.73	0.75	
4/21/2004	3:00	9612	176.09	0.71	0.73	
4/21/2004	4:00	9672	176.10	0.72	0.74	
4/21/2004	12:00	10152	176.08	0.70	0.78	
4/21/2004	13:00	10212	176.06	0.68	0.76	
4/21/2004	14:00	10272	176.08	0.70	0.76	
4/21/2004	15:00	10332	176.10	0.72	0.78	
4/21/2004	16:00	10392	176.10	0.72	0.79	
4/21/2004	17:00	10452	176.09	0.71	0.77	
4/21/2004	17:00	10452	176.09	0.71	0.77	
4/21/2004	19:07	10579	176.11	0.73	0.78	
6/18/2004			175.96			

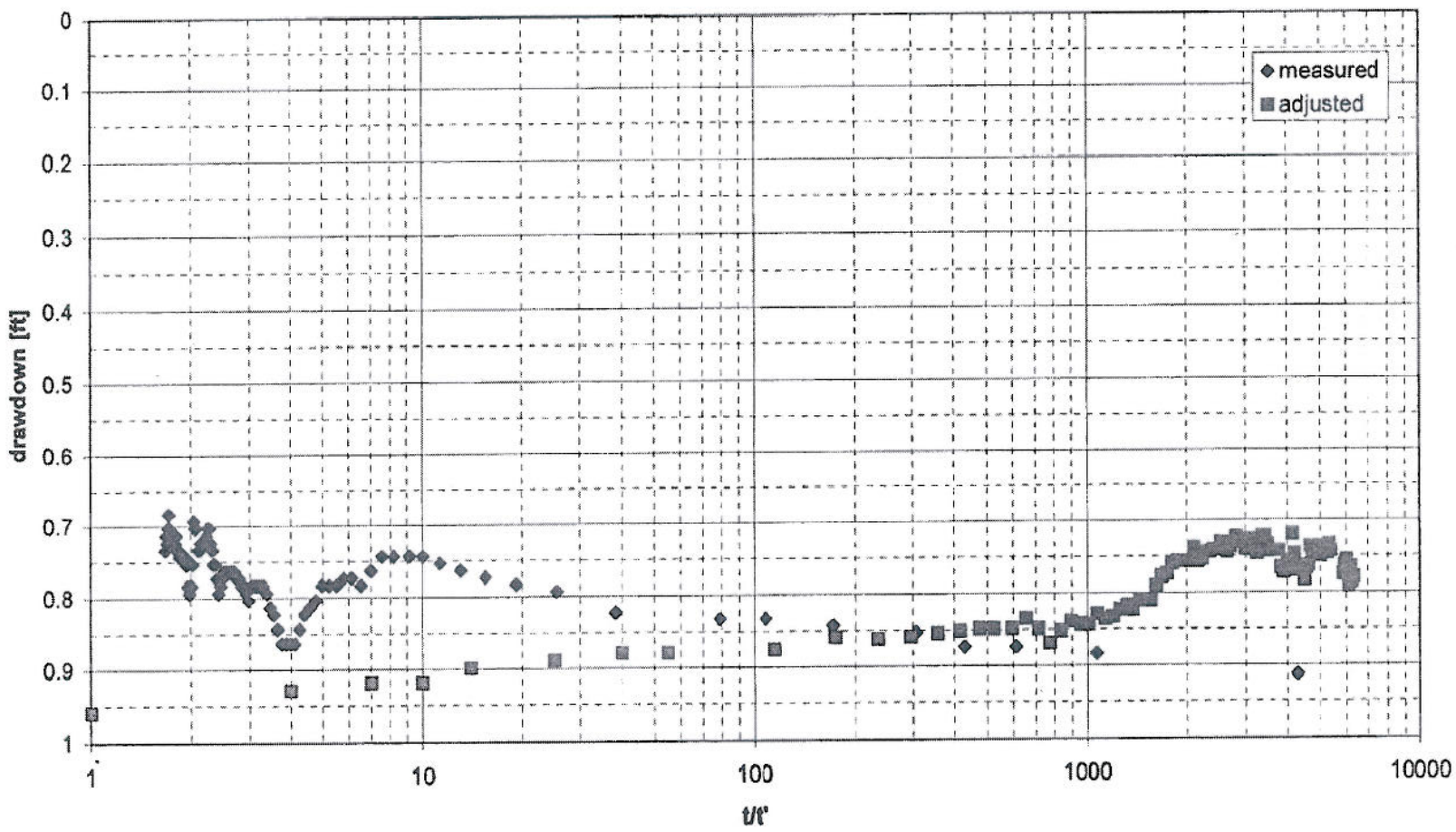
Drawdown and Recovery
SVR 3 Observation
Spring Valley Ranch
Test Date: April 14-21, 2004



Time - Drawdown
SVR 3 Observation
Spring Valley Ranch
Test Date: Arpil 14-21, 2004



Recovery
SVR 3 Observation
Spring Valley Ranch
Test Date: April 14-21, 2004



TPW1 STEP TEST - OBSERVATION WELL SVR 3

Well No: SVR 3, Spring Valley Ranch

Test conducted by: SPF Water Engineering, LLC and Riverside, Inc

Flow measured by: Orifice and manometer

Water level measured by: well sounder Water level measure point: top of tube

MP Elev: Static DTW: 175.29' mp

Pump on: 4/12/04 14:44 Pump off: 4/12/04 17:00

Date	Time	t [min]	DTW [ft]	Drawdown [ft]	Comments
04/12/04	11:18:00		175.3		
04/12/04	14:18:00		175.28		
04/12/04	14:32:00		175.35	0.06	
04/12/04	14:46:00		175.38	0.09	
04/12/04	15:08:00		175.6	0.31	
04/12/04	15:33:00		175.6	0.31	
04/12/04	15:55:00		175.6	0.31	
04/12/04	16:23:00		175.45	0.16	
04/12/04	16:38:00		175.53	0.24	
04/12/04	16:49:00		175.56	0.27	
04/12/04	16:56:00		175.6	0.31	
04/12/04	17:29:00		175.3	0.01	

HILLSIDE SPRING

TPW1 AQUIFER TEST - SPRING DISCHARGE MEASUREMENTS

Site: Sandy Hill Spring Qave = 2000 gpm

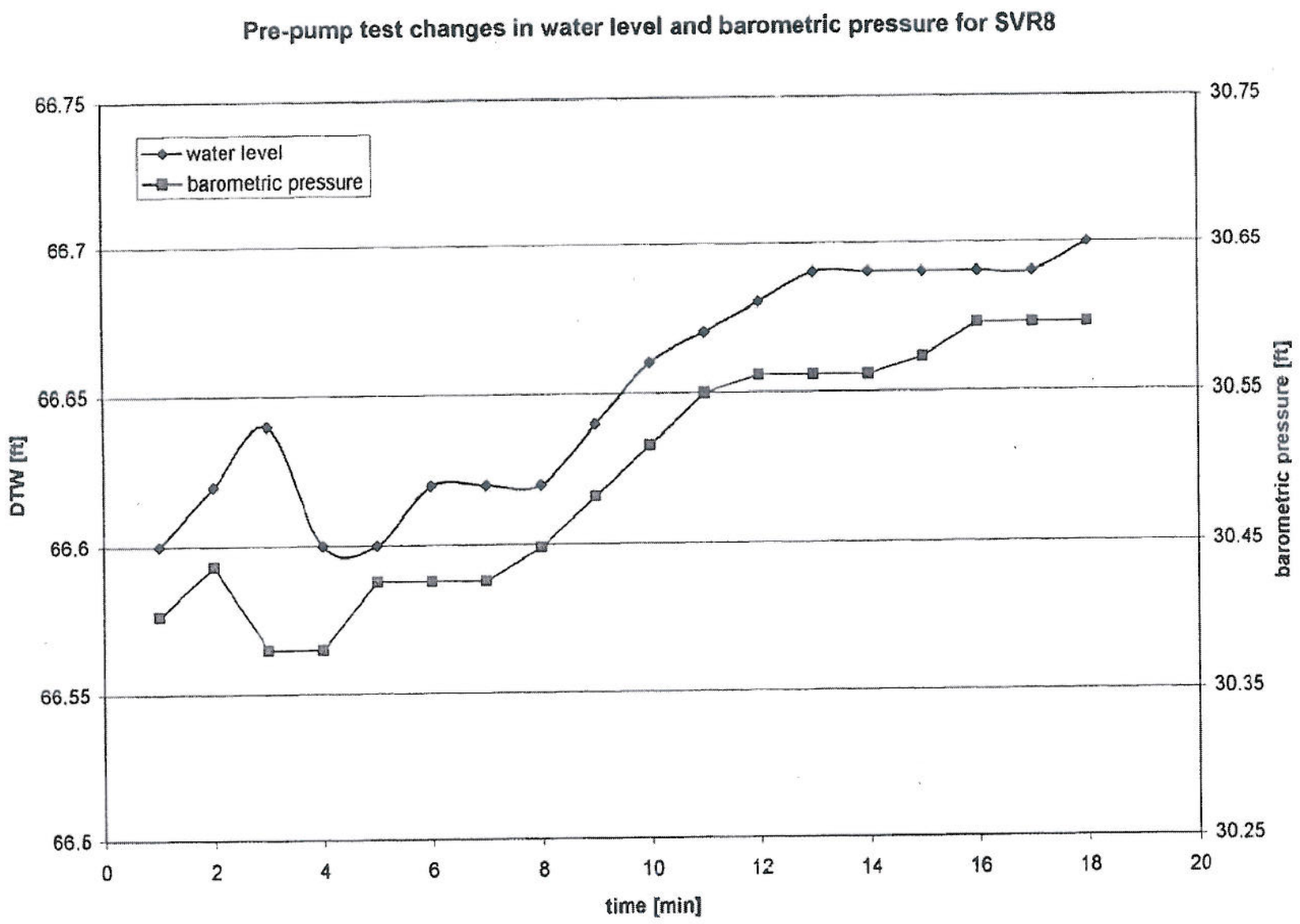
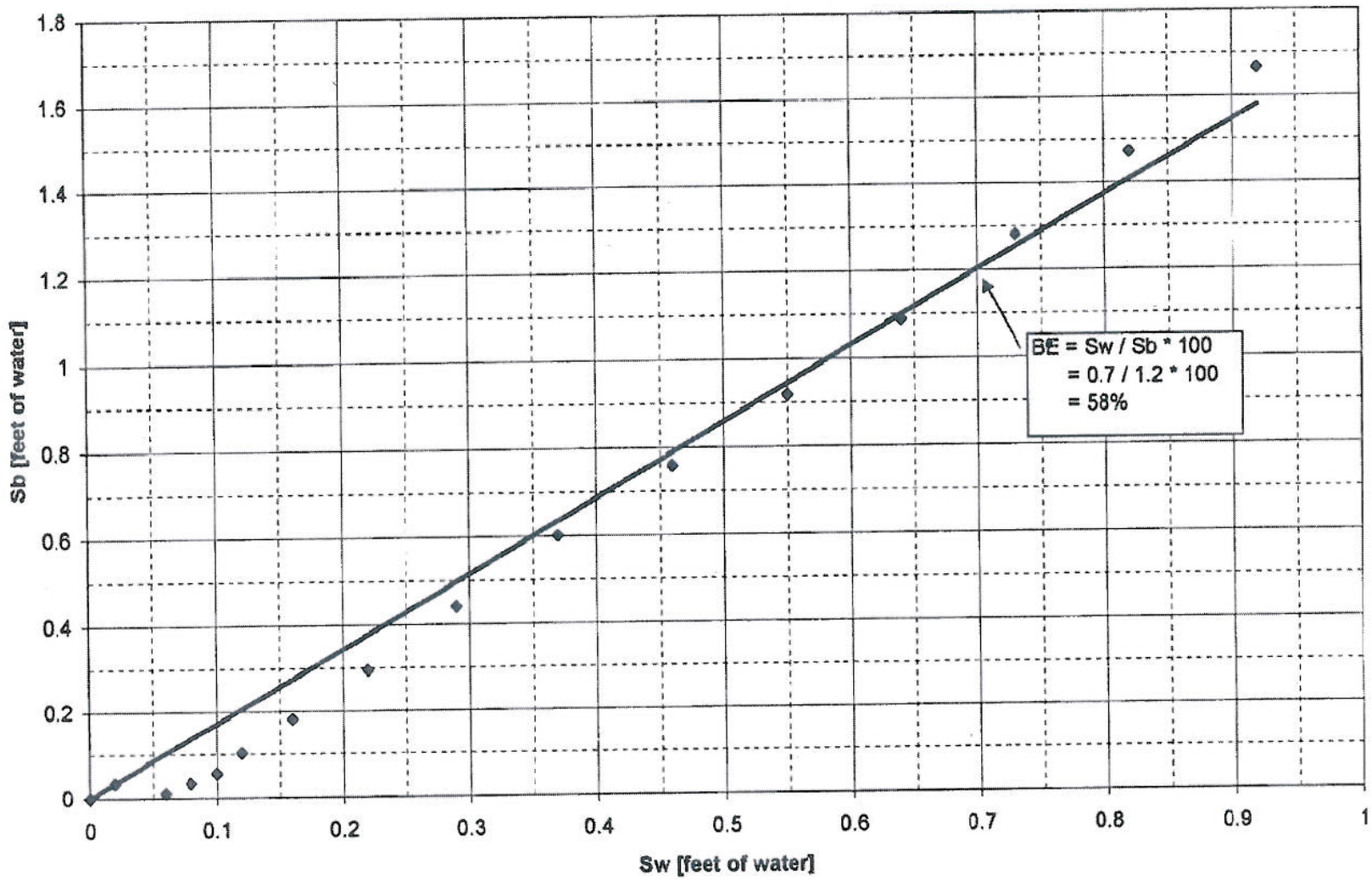
Test conducted by: SPF Water Engineering, LLC

Flow measured by: 6 gallon bucket and stop watch

Pump on: 4/14/04 10:47:26 Pump off: 4/17/04 10:05

Date	Time	t [min]	Q [gpm]	Comments
04/14/04	9:45	7.1	51	
04/14/04	13:30	7.1	51	
04/14/04	18:00	6.6	55	
04/15/04	20:50	6.8	53	
04/16/04	11:30	8.1	44	
04/16/04	11:30	8.1	44	
04/18/04	18:10	6.6	55	
04/21/04	20:25	7.0	51	

BAROMETRIC DATA


Pre-pump test changes in water level and barometric pressure for SVR8
water level
barometric pressure
DTW [ft]
barometric pressure [ft]
time [min]
66.75
66.7
66.65
66.6
66.55
66.5
30.75
30.65
30.55
30.45
30.35
30.25
0
2
4
6
8
10
12
14
16
18
20

Relationship Between Barometric Pressure and Water Level