BW-8

Aquifer Testing Report

2009

November 20, 2009

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Mr. Jim Griswold
New Mexico Oil Conservation Division
Environmental Bureau
1220 South St. Francis Drive
Santa Fe, NM 87505-4225

Re: Recovery Well Installation and Pump Test Report

Dear Mr. Griswold:

On behalf of PAB Services, Inc., Daniel B. Stephens & Associates, Inc. (DBS&A) is pleased to submit the enclosed Recovery Well Installation and Pumping Test Report for the Salty Dog brine station located in Lea County, New Mexico. The report documents field activities conducted at the site in November 2009 in partial fulfillment of the requirements set forth in Section 15 of the New Mexico Oil Conservation Division (OCD) Settlement Agreement & Stipulated Revised Final Order (Order), dated August 6, 2008.

Please don't hesitate to call me at (505) 353-9130 if you have any questions or require additional information.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.

Michael D. McVey
Senior Hydrogeologist

Enclosures

cc: James Millett, PAB Services Inc.

Recovery Well Installation and Pump Test Report Salty Dog Brine Station Lea County, New Mexico

Prepared for New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division, Environmental Bureau

November 20, 2009

Daniel B. Stephens & Associates, Inc.

6020 Academy NE, Suite 100 • Albuquerque, New Mexico 87109

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1. Introduction

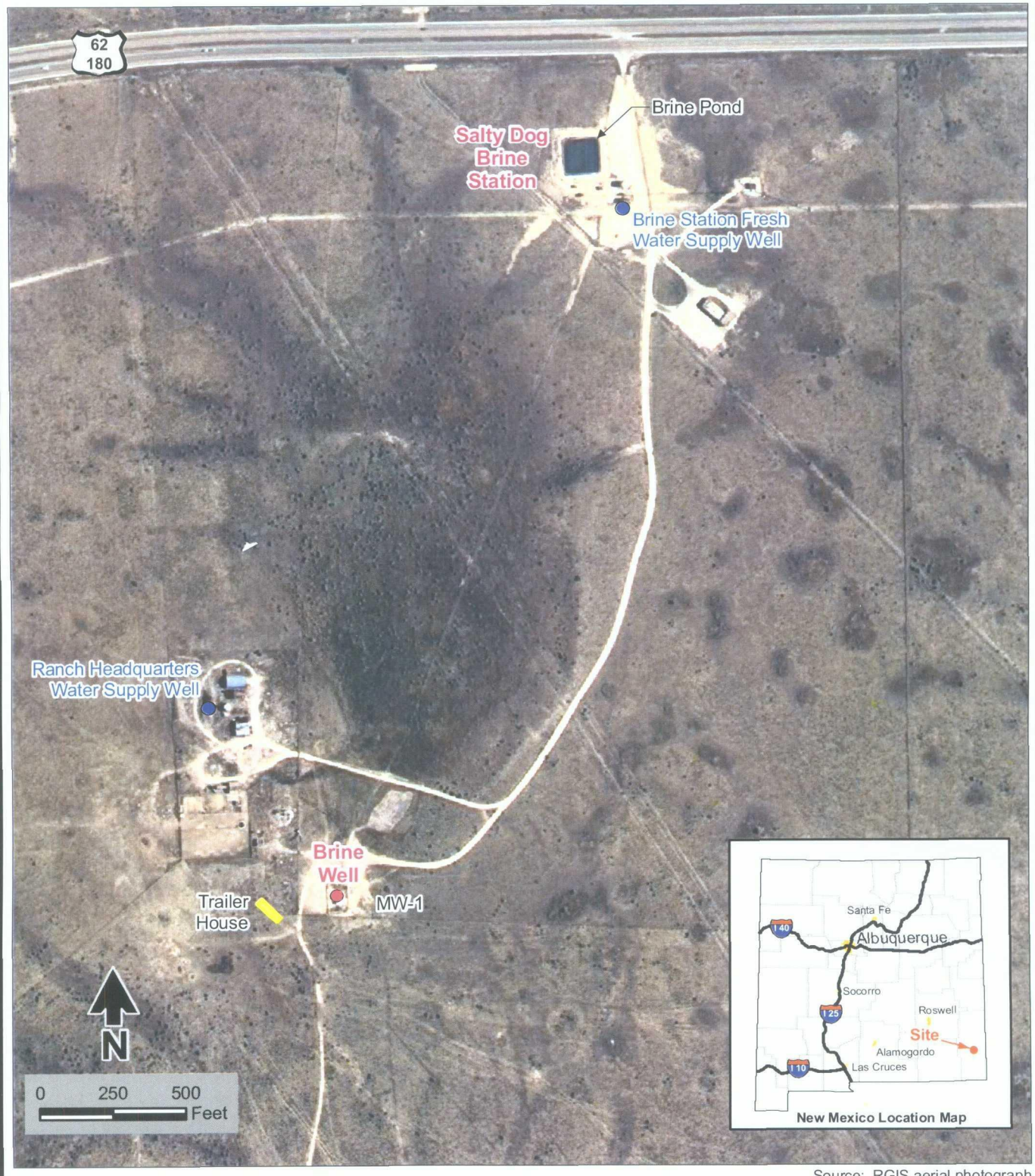
Daniel B. Stephens & Associates, Inc. (DBS&A) has prepared this recovery well installation and pumping test report for submission to the New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division (OCD) on behalf of PAB Services, Inc. (PAB) for the Salty Dog brine station (Site). The Site is located in Lea County in southeastern New Mexico, approximately 12 miles west of Hobbs on the south side of the Hobbs/Carlsbad Highway (Figure 1). Formally, the Site is located in the J Unit of Section 5, Township 19 South, Range 36 East. This report summarizes field activities conducted at the Site in November 2009.

1.1 Background

On May 18, 2008, OCD issued Administrative Compliance Order (ACO) ACO 2008-02 to Mr. Peter Bergstein (d/b/a Salty Dog, Inc.) (OCD, 2008a). After issuance of the ACO, OCD and Mr. Bergstein engaged in settlement discussions to resolve the outstanding issues addressed by the ACO. The OCD and Mr. Bergstein agreed to a Settlement Agreement & Stipulated Revised Final Order (Order), NM-OCD 2008-2A (OCD, 2008b), for the purpose of resolving the violations outlined in the ACO.

The Order requires Mr. Bergstein to complete certain actions to address environmental compliance-related issues at the Site in accordance with milestone deliverable dates agreed upon by the OCD and Salty Dog, Inc. Specifically, the Order requires Salty Dog to address contamination resulting from documented releases in 1999, 2002, and 2005, as well as releases at the brine pond and brine loading/unloading area (brine pond area).

The ACO provides a description of each of these releases (OCD, 2008b). The 1999 release was caused by a hole in the casing of the Salty Dog brine well and resulted in contamination of the fresh water well on Snyder Ranches, adjacent to the Site. The 2002 release was caused by a leaking tank in the vicinity of the brine well, and the 2005 release was caused by a rupture in the brine supply pipeline. The 2002 and 2005 releases were noted to have entered a fresh water playa located just north of the brine well (OCD, 2008b).



Source: RGIS aerial photograph dated July 2005

Explanation

- Water supply well

S:/PROJECTS/ES08.0118.01_SALTY_DOG_INC/GIS/MXDS/SITE_LOCATION_MAP.MXD 900211

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11/20/2009
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SALTY DOG BRINE STATION
Site Location Map
Figure 1

1.2 Previous Work Conducted by DBS&A at the Site

To date, DBS&A has performed the following activities at the Site under contract to PAB: (1) groundwater monitoring, (2) preparation of a Comprehensive Site Plan, (3) removal of the brine pond, and (4) monitor well installation and groundwater monitoring. Each of these activities is summarized below.

1.2.1 Groundwater Monitoring

In June 2008, DBS&A collected groundwater samples from existing monitor wells PMW-1 and MW-1 through MW-6, and from the ranch headquarters water supply well and the brine station fresh water supply (DBS&A, 2008a). Laboratory results showed that, since the wells were last sampled by employees of Salty Dog in May 2008, chloride concentrations increased in six of the seven existing groundwater monitor wells (PMW-1 and MW-1 through MW-5) and in the brine station fresh water well. In six of the nine samples collected (PMW-1, MW-2 through MW-5, and the brine station fresh water supply well), chloride concentrations exceeded the New Mexico Water Quality Control Commission (NMWQCC) standard of 250 mg/L.

The groundwater monitoring results indicated that the extent of the chloride groundwater plume beneath the brine pond area in the northern portion of the Site had not been delineated. In addition, the monitoring results indicated that the cross-gradient extent of the chloride groundwater plume at the brine well area in the southern portion of the Site had not been delineated. Complete details and findings of the groundwater monitoring event are reported in the Groundwater Monitoring Report submitted to PAB on July 15, 2008 (DBS&A, 2008b).

1.2.2 Comprehensive Site Plan

In September 2008, DBS&A submitted a Comprehensive Site Plan (Plan) (DBS&A, 2008b) to OCD addressing the requirements set forth in Section 15 of the Order (OCD, 2008b). The Plan presented a proposed project schedule and individual specifications/proposals for addressing the environmental compliance-related issues at the Site and formed the basis for future

investigation, characterization, and remediation of the Site. The OCD approved the Plan on September 17, 2008.

1.2.3 Brine Pond Removal

In October 2008, the brine pond located in the northern portion of the Site was removed in accordance with the Order (OCD, 2008b). Employees of Salty Dog pumped all of the aqueous brine from the pond into aboveground frac tanks located on-site. A trackhoe was then used to excavate the accumulated salt from the interior of the pond. The excavated salt was loaded into sealed bins and dump trucks and transported to Sundance Services, Inc. (Sundance) in Eunice, New Mexico for disposal. After the salt was removed from the pond interior, the underlying liner was removed and an additional 6 inches of the clay beneath the liner was excavated. The liner and soil excavated from beneath the liner were transported to Sundance for disposal. A total of 2,128 cubic yards of salt and contaminated soil were hauled to Sundance for disposal.

DBS&A completed soil sampling beneath the former brine pond and in the former brine loading area located on the east side of the pond in November 2008. A total of 76 composite soil samples were submitted for chloride analysis using U.S. Environmental Protection Agency (EPA) method 300.0. Of those samples, 61 were collected from depths of 4 feet below ground surface (ft bgs) or less and 15 were collected from depths greater than 4 ft bgs. Excavation to depths greater than 3 to 4 ft bgs was limited in most cases by the presence of caliche in the shallow subsurface.

Laboratory results indicated significant concentrations of chloride in the shallow interval (0 to 4 ft bgs) beneath the former brine pond and brine loading area. Although the number of samples collected at depths greater than 4 ft bgs was limited, there was no noticeable difference in chloride concentration between the shallower (0 to 4 ft bgs) and deeper (4 to 8 ft bgs) samples.

Complete details and findings of the brine pond excavation and soil sampling soil are reported in the Closure Report, Brine Pond and Loading Area submitted to the OCD on December 3, 2008 (DBS&A, 2008c).

1.2.4 Monitor Well Installation and Groundwater Monitoring

In March and April 2009, DBS&A completed a field investigation at the Site to determine the magnitude and extent of impacts to soil and groundwater from the 1999, 2002, 2005, and the brine pond area releases (DBS&A, 2008d). The investigation was performed in accordance with the requirements of the Order and Sections 3.1, 3.2, and 3.3 of the Plan (DBS&A, 2008b).

The Order (OCD, 2008b) identified three areas of primary concern (AOPCs) requiring investigation and/or further delineation of the extent of contamination: (1) the brine pond area, (2) the brine well, and (3) the playa. To address the AOPCs and groundwater quality at the Site, DBS&A completed a field investigation program that included the installation of nine groundwater monitor wells and two nested wells. DBS&A also instituted an analytical program to assess the likely contaminants of concern (COCs) in soil and groundwater at the Site.

The soil investigation program included the installation of 11 soil borings, all of which were later completed as monitor wells to assess groundwater quality. These included 6 soil borings installed at the brine pond area in the northern portion of the Site, four soil borings installed downgradient at the brine well area in the southern portion of the Site, and one soil boring installed in the fresh water playa lake located just north of the brine well. A total of 89 soil samples were submitted for chloride analysis from the 11 soil borings. The samples collected from the boring installed in the fresh water playa lake were also analyzed for total petroleum hydrocarbons (TPH).

Chloride concentrations in soil were generally below the OCD standard of 500 mg/kg. Three borings installed downgradient and east of the brine pond and brine loading/unloading areas, however, contained chloride concentrations in excess of 500 mg/kg in two or more samples.

TPH results from soil samples submitted from the playa lake boring showed TPH concentrations exceeding the New Mexico Environment Petroleum Storage Tank Bureau action level of 100 mg/kg in the 20- to 22-ft bgs sample.

The groundwater investigation included the installation of nine monitor wells and two nested wells and the collection of groundwater samples for chloride analysis. The sample collected

from the playa lake well was also analyzed for TPH. The monitor and nested wells were completed at predetermined locations as specified in Sections 3.1 and 3.2 of the Plan (DBS&A, 2008b). The locations specified in the Plan were selected to delineate the extent of the chloride groundwater plume at the brine pond area and the cross-gradient extent of the chloride plume resulting from the 1999 release at the brine well, and to determine if groundwater beneath the playa lake was impacted as a result of the 2002 and 2005 releases. A total of 21 groundwater samples were submitted for laboratory analysis: 15 samples from the newly installed monitor wells and 6 from the existing monitor wells.

Complete details and findings of the soil and groundwater investigation are reported in the Monitor Well Installation and Groundwater Monitoring Report submitted to the OCD on September 18, 2009 (DBS&A, 2009).

1.3 Purpose

The purpose of the November 2009 recovery well installation and pumping tests was to determine aquifer characteristics at the brine pond and brine well areas that will be used in the design of a remedial approach to address chloride-contaminated groundwater at the Site. The field activities were performed in accordance with the requirements of the Order (OCD, 2008b) and with Sections 3.1 and 3.4 of the Plan (DBS&A, 2008b). This report constitutes the second of three milestone deliverables: (1) Monitor Well Installation and Ground Water Monitoring report, submitted to the OCD on September 17, 2009 (2) this Recovery Well Installation and Pump Test report, and (3) a Conceptual Remedial Design Report to be submitted in December 2009.

1.4 Project Scope

The Order (OCD, 2008b) requires that two recovery wells be installed at the Site: one well at the brine pond area in the northern portion of the Site and one well at the brine well area in the southern portion of the Site. The Order also specifies that aquifer pumping tests be conducted on each recovery well to demonstrate the aquifer characteristics.

To meet these requirements, DBS&A installed one recovery well southeast of PMW-1 at the brine pond area and one recovery well southeast of MW-3 at the brine well area. Once the recovery wells were completed, DBS&A performed pumping tests on each of the wells to determine aquifer characteristics. Sections 2 and 3 of this report detail the installation of the recovery wells and the pumping tests conducted on the two recovery wells. Section 4 provides DBS&A's summary and conclusions regarding the pump test results.

2. Well Installation

On November 7 and 8, 2009, DBS&A installed two recovery wells (RW-1 and RW-2) at the Site as detailed in Sections 2.1 and 2.2. Drilling was performed by Harrison & Cooper of Lubbock, Texas, a New Mexico licensed drilling company, using air and mud rotary drilling technologies. The wells were constructed in accordance with the New Mexico Environment Department Ground Water Quality Bureau Monitoring Well Construction Guidelines, Revision 1.0, dated July 2008. Field notes recorded during drilling and installation of the wells are provided in Appendix A. Photographic documentation is included in Appendix B.

All field work was performed under the supervision of a licensed professional geologist. Soil cuttings were used to describe the subsurface lithology. Soil boring logs showing the subsurface geology at each location are provided in Appendix C. No soil samples were collected during drilling for laboratory analysis. Investigation-derived waste was stockpiled on Visqueen and properly disposed of at a licensed facility following completion of the field investigation.

2.1 Well Locations and Completion Depths

The analytical results from the April 2009 sampling of the two nested wells were used to determine the appropriate screen intervals for the recovery wells so that hydrogeologic characteristics from the appropriate portion of the aquifer where future remedial efforts will be focused can be determined during the pump tests. Each of the recovery wells was screened in the most contaminated portions of the aquifer based on existing chloride density gradients as determined during the April 2009 sampling.

2.1.1 RW-1

Recovery well RW-1 was installed to a total depth of 83 ft bgs, approximately 40 feet downgradient of monitor well PMW-1 (Figure 2; Appendix B, Photographs 1 and 2), where the previously reported chloride concentration of 11,000 mg/L was noted. PMW-1 is located approximately 25 feet downgradient of the former brine pond and brine loading/unloading area.

Explanation

- Recovery well
- Monitor well

Source: Google Earth aerial photograph dated September 2002

SALTY DOG BRINE STATION

Brine Pond Area
Location of Recovery Well RW-1

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11/20/2009
JN ES08.0118.01

Figure 2

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RW-1 was constructed of 20 feet of 6-inch-diameter, 0.030-inch slot, flush-threaded, machine-cut, Schedule 80 (SCH 80) polyvinyl chloride (PVC) well screen with a 2-foot sump. Blank 6-inch-diameter, SCH 80 PVC casing extended to approximately 3 feet above the ground surface. The screen was placed from 60 to 80 ft bgs, with approximately 5 feet of screen above the water table and 15 feet below. The filter pack consisted of 8-16 silica sand, placed using a tremie pipe, extending from the bottom of the boring to approximately 5 feet above the well screen. A 10-foot-thick bentonite chip seal (hydrated) was then placed above the sand pack, and the annular space above the bentonite seal was filled with a cement/bentonite grout to the surface. The wells were completed aboveground with a protective steel well vault and a 3-foot by 3-foot by 4-inch-thick concrete pad and bollards at each corner. The well construction diagram for RW-1 is provided in Appendix C.

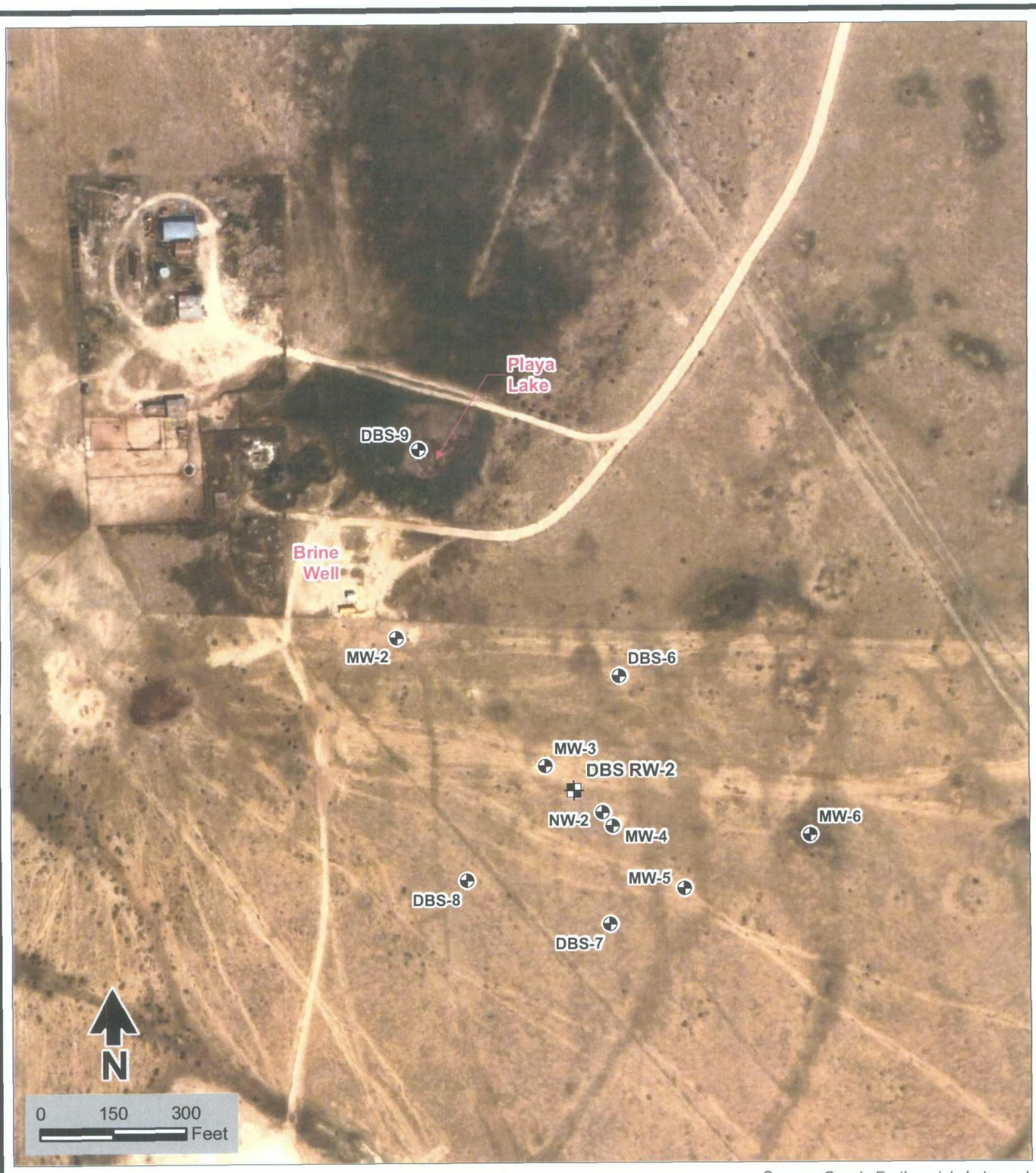
2.1.2 RW-2

Recovery well RW-2 was installed to the redbeds (base of the Ogallala Formation) at approximately 155 ft bgs. The well location is approximately 75 feet downgradient of monitor well MW-3 (Figure 3; Appendix B, Photographs 3 and 4), where a chloride concentration of 17,000 mg/L was reported. MW-3 is located approximately 500 feet downgradient of the brine well.

RW-2 was constructed of 40 feet of 6-inch-diameter, 0.030-inch slot, flush-threaded, machine-cut, SCH 80 PVC well screen with a 2-foot sump. Blank 6-inch-diameter, SCH 80 PVC casing extended to approximately 3 feet above the ground surface. The screen was placed from approximately 110 to 150 ft bgs. The well was then completed in the same manner as well RW-1 (Section 2.1.1). The well construction diagram for RW-2 is provided in Appendix C.

2.2 Well Development and Surveying

After completion, each of the newly installed recovery wells was developed by pumping until temperature, pH, and conductivity stabilized and turbidity was reduced to the extent practicable (Appendix A).



Explanation

- Recovery well
- Monitor well

Source: Google Earth aerial photograph dated September 2002

SALTY DOG BRINE STATION

Playa Lake and Brine Well Area
Location of Recovery Well RW-2

Daniel B. Stephens & Associates, Inc.
11/20/2009 JN ES08.0118.01

Figure 3

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Due to the short timetable for submission of this report, a survey of the newly installed recovery wells has not yet been completed. The top of casing elevations and the x-y coordinates of each well will be surveyed as soon as the surveyor is available, and DBS&A will submit the survey results to the OCD when they are completed.

3. Pumping Tests

On November 9 and 10, 2009, DBS&A performed step pumping tests on recovery wells RW-1 and RW-2. The objectives of the tests were to determine hydraulic property values for the regional aquifer in the vicinity of the recovery wells and to assess recovery well performance. The hydraulic property values and well performance results will subsequently be used to design a remedial approach for chloride-contaminated groundwater at the Site. Hydraulic properties estimated from analyzing pumping test data generally include aquifer transmissivity and storativity for confined aquifers or specific yield for unconfined aquifers.

During the pumping tests, the recovery wells were pumped at successive greater rates with nearby monitor wells serving as observation wells. DBS&A measured water levels using both water level probes (manual) and pressure transducers (automated). A totalizing flow meter was used to monitor flow rates. Periodic adjustments were made to a flow valve in order to maintain and increase pumping rates during each test. Once pumping stopped, water level recovery was monitored until the water level in the pumping well returned to at least 90 percent of the maximum drawdown value. Data collected during each step test is provided in Appendix D.

DBS&A analyzed data from the two step tests using AQTESOLV for Windows (Version 4.01 Professional). AQTESOLV is distributed by HydroSOLVE, Inc. and contains a comprehensive suite of standard and published analytical solutions for determining aquifer properties from pumping and slug tests. When analyzing the pumping test data, a specific yield of 15 percent was assumed based on published values of specific yield for the Ogallala aquifer (Blandford et al., 2008; Nativ and Smith, 1987). This was done to reduce the number of parameters solved for during the analyses; consequently, the analyses were performed to determine well efficiency and aquifer transmissivity. Table 1 summarizes the pumping test results. Complete analyses are provided in Appendix E.

Sections 3.1 and 3.2 discuss and present results from the two step tests. Each test is designated by the name of the pumping well.

Table 1. Results of Step Pumping Tests
Salty Dog Brine Station, Lea County, New Mexico

Pumping Well	Observation Well	Transmissivity (ft^2/d)	Assumed Aquifer Thickness (feet)	Hydraulic Conductivity (ft/d)	Analysis Method
RW-01	RW-01	23	15	1.5	Theis analysis of recovery data
		500	15	33	Theis step test analysis
	PMW-01	No influence due to pumping at observation wells			Not applicable
	NW-01(s)				
	NW-01(m)				
	NW-01(d)				
RW-02	RW-02	3,300	90	37	Theis step test analysis
	NW-02(d) MW-03 MW-04 MW-05	630	90	7.0	Theis analysis of recovery
	NW-02(d) MW-03 MW-04 MW-05	750	90	8.3	Distance-drawdown analysis

ft^2/d = Square feet per day
ft/d = Feet per day

3.1 Test RW-1

3.1.1 Field Approach

Well RW-1 was initially pumped at an average rate of 2.9 gallons per minute (gpm) for 45 minutes. The pumping rate was then increased to 4.6 gpm (average) for an additional 56 minutes. The entire pumping duration was 1 hour and 45 minutes. A third step was not attempted, as it would have likely caused the well to go dry.

Water levels at the pumping well (RW-1) were monitored both manually and with a pressure transducer. Monitor well PMW-1 and nested wells NW-1(s), NW-1(m), and NW-1(d), located approximately 100 and 130 feet, respectively, from the pumping well, were manually monitored as observation wells. Recovery well RW-1 is screened across the water table as are wells PMW-1 and NW-1(s). Wells NW-1(m) and NW-1(d) are screened at deeper depths below the water table. Total drawdown in the pumping well (RW-1) was 4.7 feet at the end of the first step and 9.5 feet at the end of the second step. Water levels at the observation wells remained steady throughout the test, varying by only up to 0.02 foot. Consequently, observation well data were not analyzed to estimate hydraulic property values.

3.1.2 Analysis and Results

Pumping well (well RW-1) data were analyzed by fitting Theis solutions to the data (Appendix E). Both the step drawdown and recovery data were analyzed. The transmissivity values determined from these analyses are 500 and 23 square feet per day (ft^2/d), respectively (Table 1). Well efficiency determined from analysis of the step drawdown data is 53 percent.

At a pumping well, analysis of recovery data generally provides a better estimate of aquifer transmissivity than analysis of drawdown data due to head losses in the drawdown data caused by pumping. Therefore, the transmissivity estimated from the recovery data is expected to be more representative of aquifer conditions. The hydraulic conductivity value calculated from the transmissivity estimated from the recovery data (23 ft^2/d) and an assumed aquifer thickness of

15 feet (the saturated portion of the RW-1 screen below the static water table) is 1.5 feet per day (ft/d).

3.2 Test RW-2

3.2.1 Field Approach

Well RW-2 was pumped at three successively greater pumping rates during the test. The pumping rates and duration of each pumping period were 23.6 gpm for 15 minutes, 37.8 gpm for 1 hour and 45 minutes, and 39.4 gpm for 3 hours and 11 minutes. The entire pumping duration was 5 hours and 20 minutes. The pumping intensity of the last step was likely limited by the 1-inch diameter of the discharge line and single-phase power supplied by the generator. Well RW-2 is expected to maintain higher pumping rates than those tested, as drawdown at the end of the last step stabilized to approximately 23 feet and the well still had 62 feet of available drawdown. Based on pumping performance during the step test, a maximum pumping rate of more than 100 gpm seems likely.

Water levels at the pumping well (RW-2) were monitored both manually and with a pressure transducer. The wells manually monitored as observation wells were MW-3, MW-4, MW-5 and NW-2(d), located 74.0, 113.7, 301.2 and 75.8 feet, respectively, from the pumping well. The well screen of RW-2 is 40 feet long and placed approximately 51 feet below the static water table. Observation wells MW-4, MW-5 and NW-2(d) are screened at similar levels as the pumping well. Completion information for well MW-3, installed by a previous consultant, is not available, but the well is assumed to be screened at a similar level as the pumping well. Total drawdown in the pumping well at the end of each of the three steps was 12, 22, and 23 feet. Total drawdown at each observation well at the end of the last pumping step was 2.5 feet (MW-3), 2.4 feet (MW-4), 0.6 feet (MW-5), and 3.2 feet (NW-2[d]).

3.2.2 Analysis and Results

Pumping well (RW-2) data were analyzed by fitting a Theis solution to the step drawdown data (Appendix E). The transmissivity and well efficiency values determined from this analysis are 3,300 ft^2/d and 60 percent, respectively (Table 1).

Observation well data were analyzed by fitting a Theis solution to the recovery data and using a distance-drawdown approach (Appendix E). For the distance-drawdown approach, drawdown values were selected from near the end of the last pumping step for each of the four observation wells. Near the end of the third step, drawdown at the pumping and observation wells had stabilized (Appendix D).

Transmissivity values determined from the two methods are similar. The transmissivity calculated based on analysis of the recovery data is 630 ft^2/d, and the transmissivity calculated using the distance-drawdown approach is 750 ft^2/d (Table 1). The hydraulic conductivity value calculated from the average transmissivity determined from the two analyses (690 ft^2/d) and an aquifer thickness of 90 feet (the aquifer thickness at the pumping well before pumping) is 7.7 ft/d.

The distance-drawdown approach was also used to determine well efficiency at the pumping well. This was accomplished by fitting a regression line to the drawdown data and then extrapolating the line back toward the outside radius of the RW-2 well borehole (Appendix E). The well efficiency calculated from this approach is 49 percent, less than the 60 percent efficiency determined from the step test analysis.

4. Summary and Conclusions

Previous field investigation and groundwater sampling has shown that two separate chloride plumes exist at the Site. These findings are documented in other reports submitted to the OCD by DBS&A (2008a, 2009). One plume is located in the northern portion of the Site at the brine pond area and one in the southern portion of the Site downgradient of the brine well.

Under the current scope of work detailed in this report, DBS&A installed two 6-inch recovery wells, RW-1 and RW-2, at the Site and completed pumping tests on each of the newly installed recovery wells. RW-1 was installed at the brine pond area and RW-2 was installed at the brine well area. The objectives of the step pumping tests were to determine hydraulic property values for the regional aquifer in the vicinity of the recovery wells and to assess recovery well performance. This information will ultimately be used to design a remedial approach for addressing the two chloride contaminant plumes at the Site.

A reasonable estimate of aquifer transmissivity in the area of RW-1 is 23 ft^2/d based on an analysis of pumping well recovery data. Well RW-1 has a 20-foot screen that is placed across the water table. Pumping from RW-1 appears to be limited to rates of less than 10 gpm without the well quickly pumping dry. The low pumping rate is likely due to the limited amount of available drawdown and relatively lower permeability of Ogallala formation sediments at the water table, where sediments appear to be cemented by calcium carbonate. Greater production rates are expected to be achievable at deeper depths, where permeabilities are likely to increase based on results from the RW-2 step test. Analysis of step drawdown data shows that the well efficiency of RW-1 is approximately 53 percent.

Estimated aquifer transmissivity in the area of RW-2 is 690 ft^2/d. This result was determined by averaging values generated from analysis of observation well recovery data and from a distance-drawdown approach. Well RW-2 has a 40-foot screen located at the base of the regional aquifer. Available drawdown at this well is approximately 85 feet. The deeper Ogallala formation sediments at RW-2 are not cemented like the shallower sediments at RW-1. The well efficiency of RW-2 is between 49 and 60 percent.

DBS&A recommends that these results of the pumping tests conducted on RW-1 and RW-2 be used to develop a conceptual remedial design for addressing the two chloride plumes at the Site. The data generated from the pumping tests will be used to calculate capture zones for each recovery well and travel times for water to reach the wells. Optimal pumping rates will be determined to allow for efficient capture and pumping of the chloride plumes based on the site-specific aquifer parameters. Using the data generated from the capture zone analysis, DBS&A will develop a remedial approach that uses recovery wells RW-1 and RW-2, and additional recovery wells if necessary, to remediate the chloride groundwater plumes at the Site.

References

Blandford, T.N., M. Kuchanur, A. Standen, R.K. Ruggiero, K.C. Calhoun, P. Kirby, and G. Shah. 2008. *Groundwater availability model of the Edwards-Trinity (High Plains) Aquifer in Texas and New Mexico.* Contract report by Daniel B. Stephens & Associates, Inc. to the Texas Water Development Board.

Daniel B. Stephens & Associates, Inc. (DBS&A). 2008a. *Groundwater monitoring report, Salty Dog Brine Station, Lea County, New Mexico.* Prepared for PAB Services, Inc., Lubbock, Texas. July 15, 2008.

DBS&A. 2008b. *Comprehensive site plan, Salty Dog Brine Station, Lea County, New Mexico.* Prepared for the New Mexico Energy, Minerals, and Natural Resources Department, Oil Conservation Division, Environmental Bureau, Santa Fe, New Mexico. September 5, 2008

DBS&A. 2008c. *Closure report, brine pond and loading area, Salty Dog Brine Station, Lea County, New Mexico.* Prepared for the New Mexico Energy, Minerals, and Natural Resources Department, Oil Conservation Division, Environmental Bureau, Santa Fe, New Mexico. December 3, 2008.

DBS&A. 2009. *Monitor well installation and groundwater monitoring report, Salty Dog Brine Station, Lea County, New Mexico.* Prepared for the New Mexico Energy, Minerals, and Natural Resources Department, Oil Conservation Division, Environmental Bureau, Santa Fe, New Mexico. September 18, 2009.

State of New Mexico Oil Conservation Division (OCD). 2008a. Notification of Compliance/Enforcement Action - Administrative Compliance Order, ACO 2008-02. Directed to Pieter Bergstein d/b/a Salty Dog, Inc. (OGRID 184208). May 20, 2008.

OCD. 2008b. State of New Mexico Oil Conservation Division, Constituent Agency of the Water Quality Control Commission In the Matter of Pieter Bergstein d/b/a "Salty Dog, Inc., (OGRID 184208), Settlement Agreement and Stipulated Revised Final Order NM-OCD 2008-2A. August 6, 2008.

Nativ, R. and D.A. Smith. 1987. Hydrogeology and geochemistry of the Ogallala aquifer, Southern High Plains. *Journal of Hydrology* 91:217-253.

Appendix A

Field Notes

11/04/08 ES08.0118.01 C. NGAM, M. MCKEY

SAMPLE TIME	SAMPLE ID	DEPTH (ft)
1701	N90E210	0-2
1706	N60E210	0-3
1707	N30E210	0-3
1709	N30E240	0-3
1715	N60E240	0-2
1720	N90E240	0-2
1724	N120E240	0-2
1731	N150E240	0-2
1734	N180E240	0-2

TOTAL SAMPLES COLLECTED = 76

N0E210 AND N0E240 WERE NOT SAMPLED BECAUSE THEY WERE CLOSE TO A ~~FRESH~~ H_2O TANK. N0E210 WAS ALSO LOCATED ON A ~~CONCRETE PATH~~ LOADING PAD

~~1750 OFFSITE 11/04/08 C. NGAM~~

SOME SOIL SAMPLES COULD NOT BE COLLECTED BELOW 2', 3', AND 4' AT SOME LOCATIONS BECAUSE THE BACKHOE COULD NOT PENETRATE THE BEDROCK. 76 SAMPLES COLLECTED.

1750 OFFSITE.

C. NGAM
11/04/08

Drought ES08.0118.01 PH4 11/7/09

SATURDAY NOVEMBER 7, 2009

weather: fair ; 41°F

0615 On site to install recovery wells
mob equipment to RW-2

0640 H2S meeting (Chlorides, cattle, weather)

0700 start drilling with air rotary rig TH-60
bit: 9 7/8 button bit (~~Created~~ mud rotary @ 50')

0701 Break surface RW-2

0727 Drilled to 10' ; very hard drilling (caliche)

0730 Set 5' of surface casing

0755 Drilled to 23' ; encounter sandstone (23'-25')

~~0758~~ 0758 at 25' back in sand/caliche

0805 Drilled to 30' ; 33'-35' = sand ; at 39' sand

~~0819~~ 0819 (SM) ~~0828~~ Drilled to 40'

0833 Drilled to 50' moist sand

start drilling w/ mud @ 50' (CMT-55 (SM) Polymer ; Kelco Oil Field G. Tokyo ; Houston/TX CHAMBER CO.)

0845 Drilled to 60'

0902 Drilled to 70'

0911 Drilled to 80'

0921 Drilled to 90'

0929 PHOTO 100_0128 view east : Rig TH-60 Drilling RW-2 Air rotary/mud ; sampling cuttings w/ strainer from T (surface) casing.

11/07/09	ES08.0118.01 PH4	LRough4	LRough4
0929	Drilled to 100'		
0938	Drilled to 110'		
0942	Drilled to 120'		1236
0952	Drilled to 130'		
0956	Drilled to 140'		1243
1010	Drilled to 150'; Red Bed formation @150'. @150'		1310
1015	Drilled to 155' = TD; circulate mud to clean out cuttings		1315
1035	Call Mike McVay w/ status report; HCI used glue to connect sump and endcap. Agreed to cut the endcap off and get another endcap in Hobbs.		1345 1350
1055	Trip out drill rods @ 11/10/09 while waiting for the endcap. Prep to trip in 6" PVC SCH80 casing.		1445
	-10' Well screen measures 14.4 per joint 9.75-1 @ 11/10/09.		
	4 x 10'-joints = 39' (0.030" slotted screen)		
	- endcap + sump = 1.8' (stainless steel screws)		1435
	- Blank casing measures @ 20.0' and 9.75'		1445
			1453
1115	OPEN Borehole RW-2 = 153' bgs		1456
1130	Start RW-2 casing assembly		1457
1157	Tag inside PVC casing 1.60' (Cmd. sub)		
1200	set endcap @ 152' (151.8')		1458
1205	Install annular material: Cement		

ES08.0118.01 PH4 11/07/09

(Colorado) 8/16 silica sand; ||||-|||| |||| |||| |||| Total 30 x 50 lbs sacks

Install bentonite after tagging top of sand 105' (3/8" medium PDS bentonite chips)

Tag top of bentonite @ 95' bgs (5 x 50 lbs)

set tremie pipe @ 80' bgs.

mix bentonite cement grout: 5-6 gal H2O / 94 lbs Portland cement; 5-6% bentonite

Pump grout / mix grout in batches

Total: 15 x 60 lbs Portland cement

Cut PVC stick up to 3' above ground surface.

Start site clean-up and mob to RW-1 at the water tanks location

Set up on RW-1 (3' east of proposed site)

Ingersoll-Rand Rig TH-60 with 9 7/8 button bit Cair rotary (mud rotary)

Handauger 0-1 to refusal (large rocks)

Start drilling @ 1' bgs

Drilled to 10'; caliche @ 8'

Drilled to 20'

Prepare to set T-casing and rig up for the 9 7/8" button bit

PHOTO 100_0129 rig ready to set T-casing (surface casing) and connect 9 7/8" button bit; borehole RW-1

11/07/09 ES08.0118.01 PH4 LRought

1459 PHOTO 100-130 view NE: Drilling RW-1 with TH-60 air/mud rotary rig.

1532 Drilled to 30'

Drilled to 40'; at 32' very hard sandstone

1602 Drilled to 45'; at 43' soft C sand)

1605 Prepare for mud rotary drilling; set up mud pit

1617 Shut down rig and secure site

1630 check on status @ RW-2. Pump has been tripped in for well development. Needs to be wired in the morning.

1650 Leave site

Luana Rought 11/09/2009

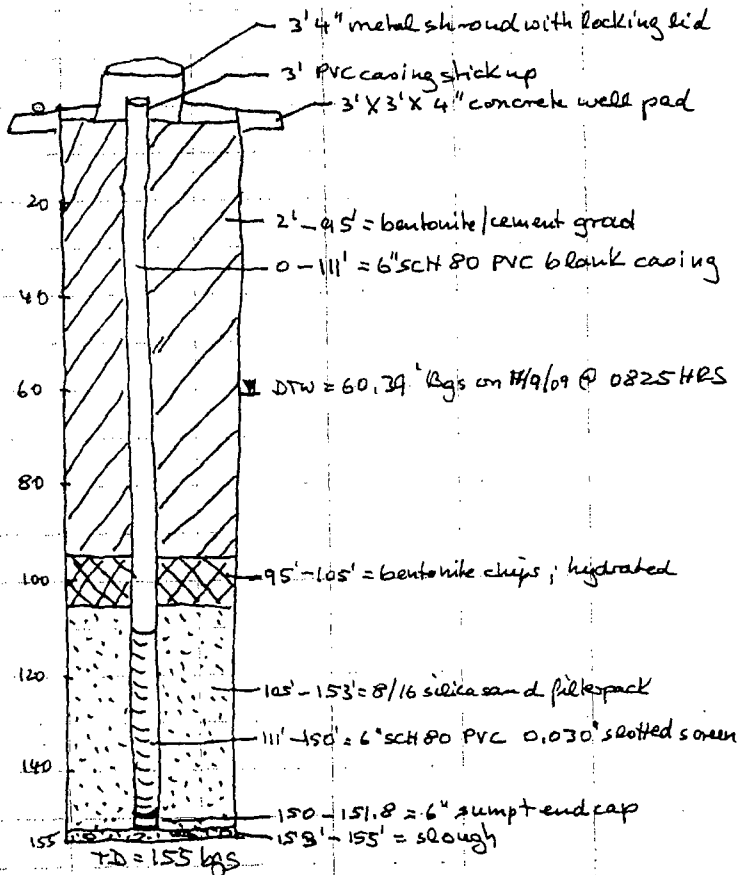
LRought ES08.0118.01 PH4 11/07/09

WELL SCHEMATIC RW-2

Drill Co: Harrison & Cooper, Inc

Drill Rig: 1 Ingersoll-Rand TH-60
9 7/8 Button Bit

Geologist: Luana Rought; completed: 11/8/09



ALL DATA BGS - NOT TO SCALE

11/08/09 ES08.0118.01 PH4 LRought

SUNDAY NOVEMBER 08, 2009

weather: partly cloudy; fog; 47°F

0625 On site to continue drilling, recovery well inst. + well development

0630 HCI – crew on site

0635 H&S meeting (pinchpoints, STF's, overheads, people)

0640 Crew sets up to continue drilling with mud (Polymer; Kelco Oil Field Group CA Huber Co.); Houston, TX).

0643 Continue drilling @ 45' RW-1 4/16/09

0647 Drilled to 50'; at 47' sandstone+caliche

0655 Drilled to 60'; at 57' brown sand

0657 Drilled to 65'; at +/- 64' base in ss+caliche

0705 Drilled to 70'; still in ss+caliche

0712 Drilled to 80'; still in ss+caliche

0714 Drilled to 83' bgs = TD of RW-1 circulate water/mud to clean out cuttings

0729 Trip out casing

0740 PHOTO 100-131 RW-1: install casing

0741 Assemble RW-1 6" SCH80 PVC casing: 20' 0.030" slotted screen w/ endcap (connected with stainless steel screws; 65' blank casing

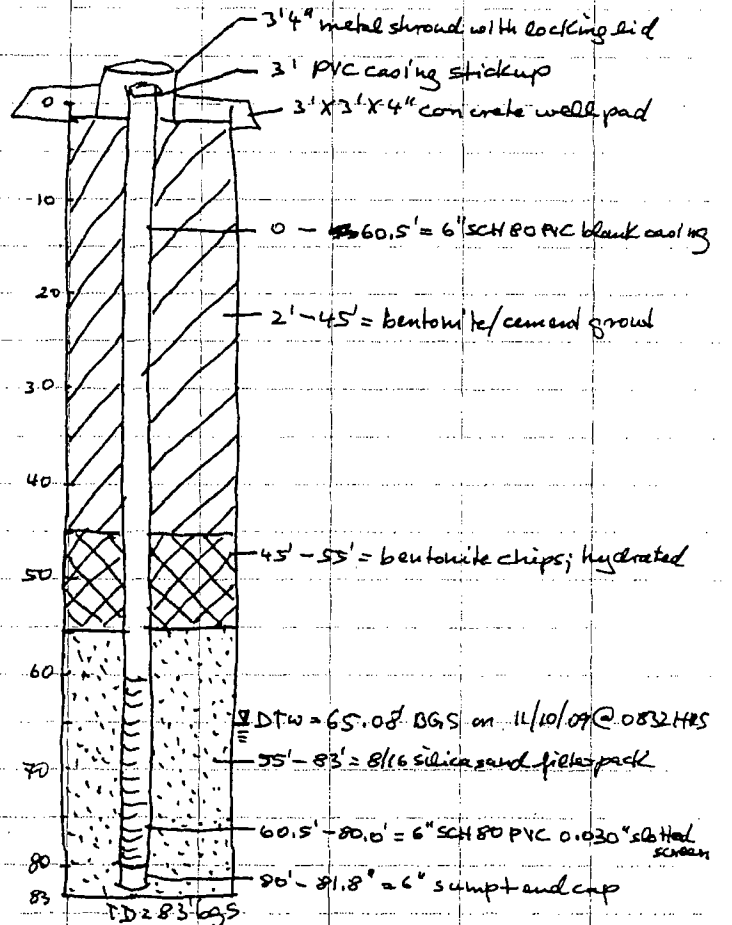
LRought ES08.0118.01 PH4 11/08/09

WELL SCHEMATIC RW-1

Drill Co: Harrison & Cooper, Inc

Drill Rig: Ingersoll-Rand TH-60; bit 9 7/8" O.D

Geologist: L. Rought; Completed: 11/8/09



ALL DATA BGS – NOT TO SCALE

11/08/09 ESO8.0118.01 PH 4 LRought

Tag length of casing inside the casing pw set bottom of well @ 82' w/ 2.5 stickup

0800 Install annular material: 8/16 silica sand (Carmeuse/Colorado) ~~HH HH HH HH~~ (1 X 50 lbs

0812 Install 3/8 bentonite chips (PDS Bentonite Plug): 5 bags; tag top of bentonite @ 45' bgs; hydrated

0811 Tagged top of sand @ 55' bgs

0820 ~~Exchange~~ Add to 5' risers ~~to 4 to 6 risers~~ and cut casing to a 3' stickup.

0825 Drive to Rw-2 for well development while crew prepares to mix and pump bentonite/cement grout.

Well Development Rw-2

Goulds, 5HP (33 gpm), set @ 150' bgs

Calibrate YSI-63 (S/N)

pH 7.00/7.01 pH 4.0/4.02

Measure EC calibr. Sol'n YSI 3167 (1000 µs/cm @ 25°C); Meter reads 1001 µs/cm @ 25°C

Rw-2: DTW = 62.45' TOC (3' stickup)

0836 Start pumping Rw-1

well TD = 155' TOC; DTW = 62.45 (3' stickup)

1CV = 155' - 62.45' = 92.55' X .15 = 138.8 gal in a 6" well.

LRought ESO8.0118.01 PH 4 11/08/09

Rw-2 Well Development Parameters

TIME	Q (+/-) (cal) Total	pH	SpC µS/cm	T (°C)	COMMENTS
0836	initial	7.34	3162	19.1	turbid/cloudy ~40 gpm
0840	160	7.14	4335	19.5	cloudy; 40 gpm DTW = 88' TOC
0848	480	6.79	10280	19.6	cloudy; 40 gpm
0852	—	—	—	—	DTW = 88' TOC
0854	720	6.76	11640	19.5	slightly cloudy ~50 gpm
0857	870	6.75	12480	19.5	as above DTW = 87.85 TOC
0903	1170	6.77	12930	19.4	as above
0909	1470	6.82	13410	19.2	~50 gpm as above swabbed screen twice
0918	1920	6.86	13570	19.1	~50 gpm; clear
0919	—	—	—	—	DTW = 87.72' TOC
0923	2170	6.82	15140	19.3	clear; ~50 gpm
0926	2320	6.85	15520	19.2	as above
0930	2520	6.88	15790	19.2	as above
0936	2820	6.89	15750	19.3	as above
0940	3020	6.91	16080	19.2	DTW 87.70' TOC as above

0944 Parameters are stable; pumped approximately 3250 gal out of Rw-2. Linear verifies that 3000 gal H2O pumped are sufficient to remove the polymers from the annular well

0945 Stop pumping after approximately 23 CV's

0950 Crew completed Rw-1 w/ bentonite/cement grout (5% bentonite): 8 X 60 lbs Portland used.

11/08/09 ES08.0118.01 PH4 Weight Drought

1000 Pulling pump from RW-1 and set 8"x8" ~~the~~ metal shroud. Leave 4" space between TOC (PVC) and top of metal shroud. (There is an additional 4" space inside the shroud lid). Excavate for a 3'X3'X4' well pad and pour concrete; set 4 bollards

1035 Development crew is setting pump in RW-2 ; Grouls pump (5HP; 30gpm) 1 ft off bottom @ 81' bgs. ~~&~~ static DTW has not yet been established.

1058 DTW is about 38' TOC (above static)

1059 start pumping RW-1 for development

TIME	@	total gal	pH	SpC (uS/cm)	T(°C)	COMMENTS
1059	initial		7.74	5820	21.9	slightly turbid, cloudy
1103	+/- 40		8.12	5850	21.6	10 gpm, WL dropping; 10gpm cloudy, slightly turbid
1106	+/- 70		8.12	5890	21.5	cloudy; 10 gpm (+/-)
1108	+/- 90		8.11	5880	21.5	4gpm (3' stickup) DTW = 76.45' TOC
1113	+/- 110		7.88	5970	22.9	WL +/- steady @ 4gpm cloudy
1118	+/- 130		7.73	6060	23.6	DTW = 76.15' TOC cloudy; 3.5 gpm
1125	+/- 155		7.63	6590	24.0	cloudy 6gpm; DI
1128	—		—	—	—	DTW = 76.50' TOC
1131	—		—	—	—	DTW = 76.95' TOC
1135	+/- 215		7.70	5820	23.6	4gpm; slightly cloudy
1145	+/- 255		7.60	6580	24.0	clear; DTW = 74' TOC
1146	shut off pump to let WL recover					

ES08.0118.01 PH4 11/08/09

wait for WL to recovery

RW-1 (stickup = 3.0) DTW = 68.50' TOC

DTW = 68.15' TOC

swabb well screen w/ surgeblock installed below the pump.

Continue to pump the RW-1

RW-1 well development parameters

TIME	Q (gpm)	Tidal eff	pH	SpC (uS/cm)	T(°C)	COMMENTS
1200	260		7.63	8690	23.3	turbid, cloudy 5gpm
1207	300		—	—	—	WL @ 71.5' TOC
1212	—		7.41	8020	22.3	shut off pump/swabb cloudy, turbid
1219	—		—	—	—	1219 start pump WL @ 68'; cloudy
7221	—		7.66	6560	22.3	DTW cloudy; 3gpm
1226	—		—	—	—	DTW = 72.0' TOC
1227	—		7.57	7140	24.2	slightly cloudy
1230	+/- 335		—	—	—	clear; shut off pump
1243	—		—	—	—	DTW = 65' TOC; swabb
1246	+/- 340		7.58	9660	22.2	start pumping
1250	+/- 355		7.59	8070	23.2	cloudy
1255	+/- 380		7.62	7330	23.3	clear shut off pump
1304	—		6.54	9880	21.9	DTW = 68' cloudy swabb, pump
1310	—		6.50	9210	22.4	cloudy
1313	—		6.82	8570	22.3	slightly cloudy
1314	+/- 400		—	—	—	DTW = 71' TOC clear; stop pump
1323	—		—	—	—	swabb, then pump

11/08/09 ES08.0118.01 PH.4 Leased

RW-1 Well development parameters, continued

TIME	Q (gal) total	pH	spC (µS/cm) RTC	T (°F)	COMMENTS
1326	+/- 405	7.45	10460	21.5	cloudy pump slightly cloudy
1328	415	7.49	9200	22.0	
1330	425	7.45	8960	21.7	as above
1332	435	7.49	9300	21.8	as above
1335	+/- 450	7.47	9900	21.9	clear
1336	+/- 455 @ 11/8/09 455	—	—	—	shut off pump

parameters are stable; pumped approximately 455 gal from RW-1 = approx. 1.5 CV's. According to driller 400 gal extracted is sufficient to remove the polymers.

1340 Pull pump RW-1

1353 Prepare the well pad w/ backhoe and set a 3'X3'X4' form around RW-1, Put 4 bollards at the corners.

1412 PHOTO 100_132 view North > RW-2 w/ shroud and bollards.

1425 PHOTO 100_133 view North > Completing well pad w/ bollards RW-1 @ 11/9/09 and well shroud RW-1

1440 Finished well surface completion RW-1. Crew starts loading equipment. Still waiting for frac tanks which should have been here @ 14:00 HRS

1525 Frac tank (500 barrel) on site and in place.

1555 Leave site

11/08/2008 Pg 12 of 15

Leased Purchased ES08.0118.01 PH4 11/09/09

MONDAY NOVEMBER 9, 2009

weather: Fog; drizzling rain; 54°F

0750 On site to perform pump tests on new wells RW-1 and RW-2.

0805 H&S Meeting (STF's, people, weather)

HCI crew putting together pumps: Goulds pump 75 GS 50; 5 HP (same for both wells)

0825 RW-2 DTW = 63.39' TOC (3.0' stickup)

Crew sets pump in RW-2

0835 Measure WL's in surrounding wells

TIME	WELL ID	DTW (ft) TOC
0840	DBS-NW-2-S	63.52
	DBS-NW-2-M	63.56
	DBS-NM-2D	63.68

0840 Larry Squires on site to inquire about our work (Snyder Ranches, Inc. PO Box 774, Hobbs, NM 89240; office: (505) 393-7544, res: (505) 393-3574)

0858	MW #4	62.70'
0905	MW #5	61.01'
0910	MW #3	62.82
0942	RW-2	63.30
0954	RW-2	63.32

1700 Completed pump test RW-2

1730 Leave site

11/09/2009 Pg 13 of 15

(18) Salty Dog

11/10/09 ES08.0118.01 PH4

TUESDAY NOVEMBER 10, 2009

weather; partly cloudy; 49°F

0745 On site to continue pumptests RW-1, RW-2

0750 H&S meeting (STF's, people, overheads)

0755 HCI continues to pull pump from RW-2. A tank-truck pumps the trak tank and measure distances:

NOTE

DBS-NW-2 to RW-2 = 75.8'

RW-2 to MW#3 = 74.0'

0825 Mob to RW-1

0832 RW-1: DTW = 68.08' TOC (3.0' stickup)

RW-1: TD = 85.40' TOC (3.0' stickup)

Screen: 63'-83' TOC

Sump: 83-85' TOC

0845 Call James Millet (Salty Dog P.M.)

0846 to report a tear in the southernmost of the two water tanks +/- 40" below the top of the tank. Water is leaking out

HCI crew is setting the pump for the pumptest in RW-1: Goulds pump 75 GS 50 (5HP); pump intake @ 82' TOC

0850 Gauge surrounding MW water levels (see pumping data sheets)

PMW-1 and NW-1 s are the observation wells for the pumptest.

J. Kyarbo / J. Rought

Salty Dog (19)

ES08.0118.01 PH 4 11/10/09

Start pumptest w/ 1gpm, then step up to 2gpm and 3gpm, 4gpm

1113 The trak tank has been picked up.

1320 The pumptest has been completed

Leave site

James Rough 11-10-2009

Appendix B

Photographic Documentation

1. Location of recovery well RW-1 at the brine pond area (view to the north).

2. Completed recovery well RW-1 at the brine pond area (view to the north).

3. Installation of recovery well RW-2 at the brine well area (view to the south).

4. Completed recovery well RW-2 at the brine well area (view to the north).

Appendix C

Soil Boring Logs and Well Completion Diagrams

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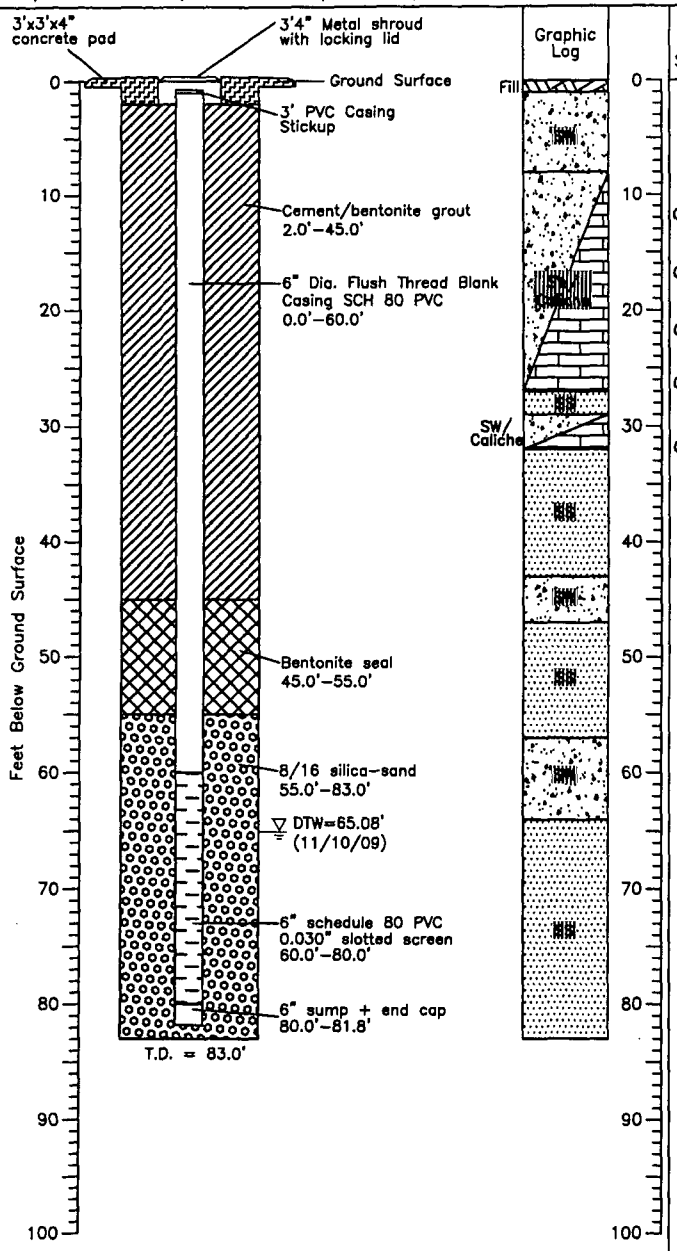
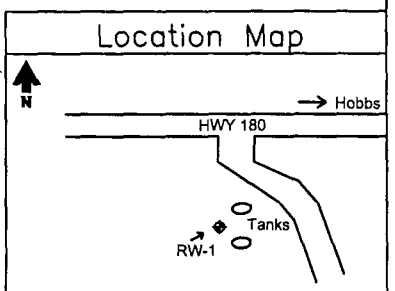


USCS Symbol	Comments and Lithology
SW	Fill, brown (7.5YR 5/4). Sand, brown (7.5YR 4/4), very fine to coarse sand with some organic matter, very moist.
SW	Sand, brown (7.5YR 4/4), same as above; at 8–feet encounter very fine to coarse sand with caliche, light brown (7.5YR 6/4), hard, damp (caprock).
SW/ Caliche	Sand, pink (7.5YR 7/4), very fine to medium sand, cemented with secondary carbonate=caliche, indurated (calcrete), poorly sorted, subangular, hard consistency, dry/damp.
SW/ Caliche	Sand, pink (7.5YR 7/4), same as above.
SW/ Caliche	Sand, light brown (7.5YR 6/4), same as above.
SW/ Caliche	Sand, pink (7.5YR 7/4), same as above; at 27 to 29–feet encounter very hard sandstone, silica; at 29–feet encounter sand again, caliche, moderately indurated.
SS	
SW/ Caliche	Sand, pink (7.5YR 7/4), same as above; at 32–feet encounter well indurated sandstone, dry.
SS	Sandstone, pink (7.5YR 7/4), fine–grained and very hard, dry; at 38–feet color changes to light brown.
SS	Sandstone, light brown (7.5YR 6/4), fine–grained, silica cemented, very hard, dry; at 43–feet encounter light brown sand (sugar sand), very fine to medium size, subrounded, damp; start drilling with mud at 40–feet.
SW	Sand, light brown (7.5YR 6/4), wet, same as above; at 47–feet encounter more sandstone.
SS	Sandstone, light brown (7.5YR 6/4), wet, very hard sandstone, cemented with silica, subrounded quartz grains, millimeter size fragments of chert in cuttings.
SS	Sandstone, light brown (7.5YR 6/4), wet, same as above; at 57–feet encounter light brown sand.
SW	Sand; light brown (7.5YR 6/4) wet,fine to medium sugar sand, subrounded; at 64–feet encounter sandstone, same as above.
SS	Sandstone, light brown (7.5YR 6/4), wet, same as above, mostly sandstone with occasional stringers of sand, very hard.
SS	Sandstone, light brown (7.5YR 6/4), wet, same as above.
SS	Sandstone, very pale brown (10YR 8/2), wet, same as above, contains abundant millimeter size fragments of chert(?), not quite as hard as above.
SS	Sandstone, light brown (7.5YR 6/4), wet, hard sandstone.



Geologist: L. Rought
Driller: Harvison & Cooper, Inc.
Date completed: 11/08/09

Drilling method: Air/mud Rotary
Drilling rig: Ingersoll–Rand TH–60
Bit diameter: 9–7/8"

SALTY DOG BRINE STATION

Well Completion Diagram and Geologic Log: RW-1

Daniel B. Stephens & Associates, Inc.
11–19–09
JN ES08.0118.04

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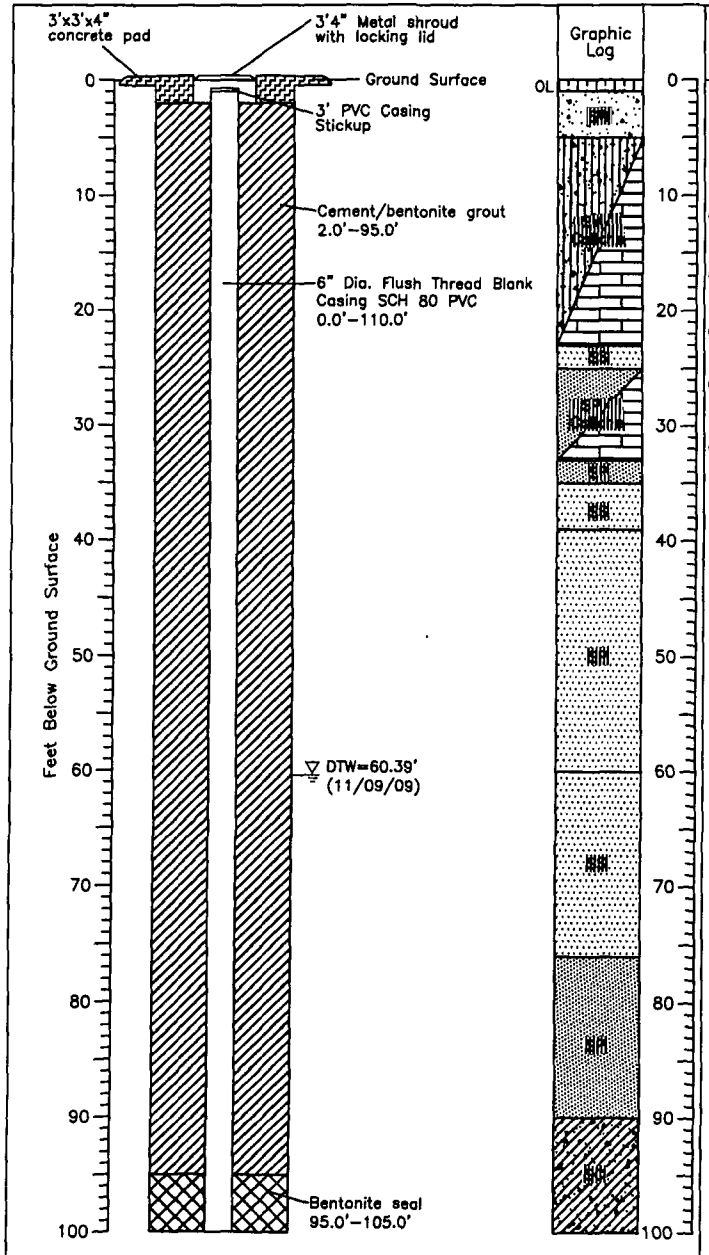

USCS Symbol	Comments and Lithology
OL	Topsoil to 1–foot depth, brown (10YR 5/3), silt to sand with 25% gravel fragments, damp; at 1–foot encounter sand/caliche, pinkish gray (7.5YR 7/2), indurated (=calcrete) strong hydrochloric acid reaction.
SW	
SM/ Caliche	Silty sand/caliche, very pale brown (10YR 7/3), silt to medium sand, secondary carbonate (caliche), poorly sorted, hard consistency, calcrete, dry (caprock).
SM/ Caliche	Silty sand/caliche, very pale brown (10YR 7/3), same as above.
SM/ Caliche	Silty sand/caliche, very pale brown (10YR 7/3), same as above.
SM/ Caliche	Silty sand/caliche, very pale brown (10YR 7/3), same as above; at 23 to 25–feet sandstone, cemented with silica (no hydrochloric acid reaction), reddish brown (5YR 5/3), well indurated, dry.
SS	
SP/ Caliche	Sand/caliche, very pale brown (10YR 8/2), very fine to fine sand, mixed with caliche, strong hydrochloric acid reaction, trace silt and trace medium sand, well sorted, hard consistency, dry.
SS	
SP/ Caliche	Sand/caliche, pink (7.5YR 8/3), same as above; at 33 to 35–feet encounter very fine to fine subrounded sand, light brown (7.5YR 6/4), trace medium sand.
SP	
SS	Sandstone, reddish brown (5YR 5/3), sandstone cemented with silica, very hard, dry; at 39–feet encounter sand again.
SP	Sand, light brown (7.5YR 6/4), very fine to fine sand, trace medium sand, well sorted, subrounded, soft consistency, "sugar sand", damp.
SP	Sand, light brown (7.5YR 6/4), same as above; drill with mud starting at 50–feet.
SP	Sand, light brown (7.5YR 6/4 wet), same as above.
SP	Sand, light brown (7.5YR 6/4 wet), same as above.
SS	Sand; light brown (7.5YR 6/4) wet,fine to medium sugar sand, subrounded; at 64–feet encounter sandstone, same as above.
SS	Sandstone, very pale brown (10YR 8/3 wet), same as above.
SS	Sandstone, very pale brown (10YR 8/3 wet), same as above.
SS	Sandstone, very pale brown (10YR 8/3 wet), same as above with 5% chert–like fragments; at 76–feet encounter fine to trace medium sand of same color with trace chert–like fragments.
SP	Sand, light brown (7.5YR 6/4 wet), fine to trace medium sand ("sugar sand"), well sorted, subrounded, trace chert–like fragments.
SP	Sand, light brown (7.5YR 6/4 wet), same as above.
SC	Clayey sand, reddish brown (5YR 5/4 wet), very fine to medium sand and clay, poorly sorted, soft consistency, low plasticity.
SC	Clayey sand, reddish brown (5YR 5/4 wet), same as above.

Geologist: L. Rought
Driller: Harvison & Cooper, Inc.
Date completed: 11/08/09

Drilling method: Air/mud Rotary
Drilling rig: Ingersoll–Rand TH–60
Bit diameter: 9–7/8"

SALTY DOG BRINE STATION

Well Completion Diagram and Geologic Log: RW-2

Daniel B. Stephens & Associates, Inc.
11–19–09
JN ES08.0118.04

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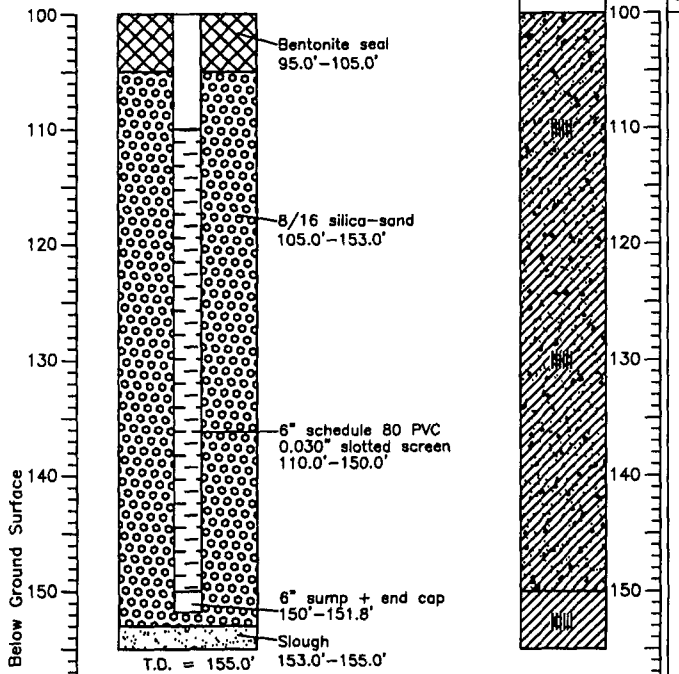
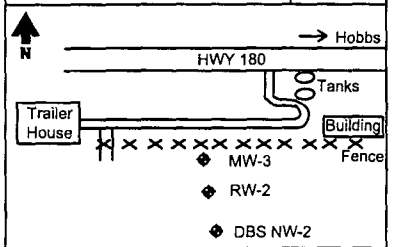


USCS Symbol	Comments and Lithology
SC	Clayey sand, reddish brown (5YR 5/4 wet), same as above.
SC	Clayey sand, reddish brown (5YR 5/4 wet), same as above.
SC	Clayey sand, reddish brown (5YR 5/4 wet), same as above.
SC	Clayey sand, reddish brown (5YR 5/4 wet), same as above.
SC	Clayey sand, reddish brown (5YR 5/4 wet), same as above.
SC	Clayey sand, reddish brown (5YR 5/4 wet), same as above.
SC	Clayey sand, reddish brown (5YR 5/4 wet), same as above.
SC	Clayey sand, reddish brown (5YR 5/4), very fine to medium sand and clay, poorly sorted, low plasticity, soft consistency.
SC	Clayey sand, reddish brown (5YR 5/4), same as above.
SC	Clayey sand, reddish brown (5YR 5/4), same as above, medium plasticity.
CL	Red bed formation, weak red (2.5YR 5/3), mudstone/siltstone, 10–15% of 2 to 5–millimeter diameter pebbles (subrounded).

Location Map



Geologist: L. Rought
Driller: Harvison & Cooper, Inc.
Date completed: 11/08/09

Drilling method: Air/mud Rotary
Drilling rig: Ingersoll–Rand TH–60
Bit diameter: 9–7/8"

SALTY DOG BRINE STATION

Well Completion Diagram and Geologic Log: RW-2

Daniel B. Stephens & Associates, Inc.
11–19–09
JN ES08.0118.04

Appendix D

Pumping Test Data

Report Date:	11/10/2009 12:12
Report User Name:	362
Report Computer Na	XPFM4629

Log File Properties

File Name	RW-01 Step Test 2009-11-10 09-40-43.wsl
Create Date	11/10/2009 12:11

Device Properties

Device	Level TROLL® 500
Site	RW-01
Device Name	
Serial Number	116410
Firmware Version	2.02

Log Configuration

Log Name	RW-01 Step Test
Created By	362
Computer Name	XPFM4629
Application	WinSitu.exe
Application Version	5.6.1.8
Create Date	########
Notes Size(bytes)	4096
Type	Fast Linear
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop	No Stop Time
Interval	Days: 0 Hours: 00 Mins: 00 Secs: 30

Level Reference Settings At Log Creation

Level Measurement Mo	Depth
Specific Gravity	0.999

Log Notes:

Date and Time	Note
11/10/2009 9:40	Manual Start Command
11/10/2009 9:40	User Note: "Downloading log - Used Batt: 13% Memory: 6% User: 362"
11/10/2009 10:21	User Note: "Downloading log - Used Batt: 13% Memory: 6% User: 362"
11/10/2009 11:18	User Note: "Downloading log - Used Batt: 13% Memory: 6% User: 362"
11/10/2009 11:33	User Note: "Downloading log - Used Batt: 13% Memory: 6% User: 362"
11/10/2009 12:10	User Note: "Downloading log - Used Batt: 13% Memory: 6% User: 362"
11/10/2009 12:11	Manual Stop Command

Log Data:
Record Count 303

Date and Time	Elapsed Time Seconds		Sensor: Pre SN#: 11641 Pressure (P	Sensor: Pre SN#: 11641 Temperatu	Sensor: Pres 100G SN#: 116410 Depth (ft)
11/10/2009 9:40		0	4.808	18.683	11.101
11/10/2009 9:40		30	4.811	18.687	11.109
11/10/2009 9:41		60	4.812	18.69	11.11
11/10/2009 9:41		90	4.81	18.687	11.105
11/10/2009 9:42		120	4.811	18.687	11.109
11/10/2009 9:42		150	4.814	18.687	11.116
11/10/2009 9:43		180	4.811	18.689	11.109
11/10/2009 9:43		210	4.813	18.686	11.113
11/10/2009 9:44		240	4.813	18.687	11.112
11/10/2009 9:44		270	4.816	18.688	11.12
11/10/2009 9:45		300	4.817	18.686	11.122
11/10/2009 9:45		330	4.813	18.689	11.112
11/10/2009 9:46		360	4.81	18.686	11.107
11/10/2009 9:46		390	4.817	18.686	11.123
11/10/2009 9:47		420	4.814	18.684	11.115
11/10/2009 9:47		450	4.813	18.694	11.112
11/10/2009 9:48		480	4.811	18.7	11.108
11/10/2009 9:48		510	4.807	18.704	11.099
11/10/2009 9:49		540	4.812	18.706	11.11
11/10/2009 9:49		570	4.816	18.708	11.12
11/10/2009 9:50		600	2.782	18.713	6.424
11/10/2009 9:50		630	2.658	18.714	6.138
11/10/2009 9:51		660	2.607	18.717	6.02
11/10/2009 9:51		690	2.623	18.726	6.055
11/10/2009 9:52		720	2.626	18.743	6.064
11/10/2009 9:52		750	2.642	18.771	6.101
11/10/2009 9:53		780	2.646	18.81	6.11
11/10/2009 9:53		810	2.665	18.85	6.154
11/10/2009 9:54		840	2.665	18.899	6.154
11/10/2009 9:54		870	2.682	18.944	6.193
11/10/2009 9:55		900	2.681	18.985	6.19
11/10/2009 9:55		930	2.714	19.033	6.267
11/10/2009 9:56		960	2.71	19.096	6.257
11/10/2009 9:56		990	2.738	19.139	6.323
11/10/2009 9:57		1020	2.742	19.183	6.33
11/10/2009 9:57		1050	2.727	19.227	6.298
11/10/2009 9:58		1080	2.746	19.254	6.341
11/10/2009 9:58		1110	2.768	19.277	6.392
11/10/2009 9:59		1140	2.745	19.299	6.339
11/10/2009 9:59		1170	2.769	19.328	6.394

11/10/2009 10:00	1200	2.758	19.358	6.369
11/10/2009 10:00	1230	2.792	19.398	6.447
11/10/2009 10:01	1260	2.802	19.419	6.469
11/10/2009 10:01	1290	2.814	19.449	6.498
11/10/2009 10:02	1320	2.807	19.475	6.481
11/10/2009 10:02	1350	2.823	19.5	6.518
11/10/2009 10:03	1380	2.818	19.532	6.507
11/10/2009 10:03	1410	2.793	19.565	6.449
11/10/2009 10:04	1440	2.812	19.619	6.494
11/10/2009 10:04	1470	2.821	19.663	6.513
11/10/2009 10:05	1500	2.797	19.697	6.459
11/10/2009 10:05	1530	2.83	19.72	6.534
11/10/2009 10:06	1560	2.83	19.735	6.534
11/10/2009 10:06	1590	2.827	19.744	6.527
11/10/2009 10:07	1620	2.792	19.743	6.447
11/10/2009 10:07	1650	2.837	19.746	6.552
11/10/2009 10:08	1680	2.818	19.741	6.507
11/10/2009 10:08	1710	2.81	19.748	6.489
11/10/2009 10:09	1740	2.809	19.764	6.487
11/10/2009 10:09	1770	2.804	19.773	6.475
11/10/2009 10:10	1800	2.835	19.782	6.546
11/10/2009 10:10	1830	2.826	19.805	6.526
11/10/2009 10:11	1860	2.838	19.821	6.554
11/10/2009 10:11	1890	2.819	19.835	6.51
11/10/2009 10:12	1920	2.809	19.826	6.486
11/10/2009 10:12	1950	2.829	19.831	6.533
11/10/2009 10:13	1980	2.82	19.846	6.512
11/10/2009 10:13	2010	2.817	19.843	6.505
11/10/2009 10:14	2040	2.8	19.845	6.465
11/10/2009 10:14	2070	2.82	19.848	6.512
11/10/2009 10:15	2100	2.811	19.837	6.49
11/10/2009 10:15	2130	2.823	19.825	6.518
11/10/2009 10:16	2160	2.825	19.805	6.523
11/10/2009 10:16	2190	2.815	19.796	6.5
11/10/2009 10:17	2220	2.802	19.794	6.47
11/10/2009 10:17	2250	2.823	19.79	6.519
11/10/2009 10:18	2280	2.805	19.791	6.476
11/10/2009 10:18	2310	2.813	19.787	6.494
11/10/2009 10:19	2340	2.814	19.788	6.497
11/10/2009 10:19	2370	2.826	19.774	6.525
11/10/2009 10:20	2400	2.809	19.755	6.485
11/10/2009 10:20	2430	2.813	19.754	6.495
11/10/2009 10:21	2460	2.809	19.755	6.486
11/10/2009 10:21	2490	2.795	19.771	6.454
11/10/2009 10:22	2520	2.812	19.779	6.494
11/10/2009 10:22	2550	2.832	19.802	6.54
11/10/2009 10:23	2580	2.819	19.824	6.508

11/10/2009 10:23	2610	2.817	19.841	6.505
11/10/2009 10:24	2640	2.805	19.85	6.476
11/10/2009 10:24	2670	2.798	19.855	6.461
11/10/2009 10:25	2700	2.804	19.857	6.473
11/10/2009 10:25	2730	2.811	19.861	6.49
11/10/2009 10:26	2760	2.802	19.861	6.469
11/10/2009 10:26	2790	2.821	19.852	6.513
11/10/2009 10:27	2820	2.796	19.848	6.456
11/10/2009 10:27	2850	2.819	19.866	6.51
11/10/2009 10:28	2880	2.799	19.898	6.463
11/10/2009 10:28	2910	2.807	19.929	6.482
11/10/2009 10:29	2940	2.799	19.955	6.464
11/10/2009 10:29	2970	2.798	19.971	6.46
11/10/2009 10:30	3000	2.814	19.993	6.497
11/10/2009 10:30	3030	2.804	20.021	6.474
11/10/2009 10:31	3060	2.812	20.032	6.492
11/10/2009 10:31	3090	2.808	20.039	6.483
11/10/2009 10:32	3120	2.793	20.049	6.45
11/10/2009 10:32	3150	2.802	20.054	6.469
11/10/2009 10:33	3180	2.801	20.047	6.467
11/10/2009 10:33	3210	2.808	20.031	6.484
11/10/2009 10:34	3240	2.785	20.016	6.431
11/10/2009 10:34	3270	2.805	20.011	6.477
11/10/2009 10:35	3300	2.805	20.023	6.478
11/10/2009 10:35	3330	2.793	20.032	6.449
11/10/2009 10:36	3360	2.782	20.026	6.423
11/10/2009 10:36	3390	2.789	20.022	6.439
11/10/2009 10:37	3420	2.774	20.021	6.404
11/10/2009 10:37	3450	2.253	20.008	5.201
11/10/2009 10:38	3480	1.743	19.987	4.024
11/10/2009 10:38	3510	1.547	19.926	3.572
11/10/2009 10:39	3540	1.391	19.822	3.211
11/10/2009 10:39	3570	1.242	19.724	2.868
11/10/2009 10:40	3600	1.128	19.637	2.604
11/10/2009 10:40	3630	1.055	19.562	2.436
11/10/2009 10:41	3660	1.011	19.491	2.335
11/10/2009 10:41	3690	0.97	19.434	2.24
11/10/2009 10:42	3720	0.947	19.389	2.186
11/10/2009 10:42	3750	0.901	19.351	2.08
11/10/2009 10:43	3780	0.883	19.318	2.039
11/10/2009 10:43	3810	0.858	19.296	1.981
11/10/2009 10:44	3840	0.838	19.278	1.935
11/10/2009 10:44	3870	0.815	19.269	1.881
11/10/2009 10:45	3900	0.797	19.259	1.841
11/10/2009 10:45	3930	0.794	19.256	1.833
11/10/2009 10:46	3960	0.782	19.249	1.805
11/10/2009 10:46	3990	0.764	19.242	1.764

11/10/2009 10:47	4020	0.754	19.234	1.742
11/10/2009 10:47	4050	0.746	19.225	1.723
11/10/2009 10:48	4080	0.732	19.219	1.69
11/10/2009 10:48	4110	0.719	19.209	1.659
11/10/2009 10:49	4140	0.718	19.205	1.657
11/10/2009 10:49	4170	0.708	19.2	1.634
11/10/2009 10:50	4200	0.698	19.195	1.611
11/10/2009 10:50	4230	0.7	19.192	1.617
11/10/2009 10:51	4260	0.692	19.194	1.598
11/10/2009 10:51	4290	0.685	19.198	1.582
11/10/2009 10:52	4320	0.671	19.198	1.55
11/10/2009 10:52	4350	0.672	19.197	1.552
11/10/2009 10:53	4380	0.676	19.203	1.561
11/10/2009 10:53	4410	0.677	19.204	1.564
11/10/2009 10:54	4440	0.668	19.202	1.543
11/10/2009 10:54	4470	0.671	19.205	1.549
11/10/2009 10:55	4500	0.671	19.211	1.55
11/10/2009 10:55	4530	0.673	19.221	1.555
11/10/2009 10:56	4560	0.676	19.231	1.56
11/10/2009 10:56	4590	0.68	19.242	1.569
11/10/2009 10:57	4620	0.683	19.255	1.578
11/10/2009 10:57	4650	0.664	19.257	1.533
11/10/2009 10:58	4680	0.676	19.262	1.561
11/10/2009 10:58	4710	0.67	19.262	1.548
11/10/2009 10:59	4740	0.677	19.264	1.564
11/10/2009 10:59	4770	0.669	19.269	1.545
11/10/2009 11:00	4800	0.673	19.28	1.554
11/10/2009 11:00	4830	0.667	19.288	1.54
11/10/2009 11:01	4860	0.671	19.296	1.549
11/10/2009 11:01	4890	0.679	19.298	1.569
11/10/2009 11:02	4920	0.672	19.302	1.551
11/10/2009 11:02	4950	0.68	19.301	1.569
11/10/2009 11:03	4980	0.676	19.303	1.561
11/10/2009 11:03	5010	0.671	19.3	1.55
11/10/2009 11:04	5040	0.684	19.306	1.579
11/10/2009 11:04	5070	0.671	19.312	1.549
11/10/2009 11:05	5100	0.677	19.312	1.564
11/10/2009 11:05	5130	0.672	19.316	1.551
11/10/2009 11:06	5160	0.687	19.316	1.585
11/10/2009 11:06	5190	0.685	19.321	1.581
11/10/2009 11:07	5220	0.684	19.325	1.58
11/10/2009 11:07	5250	0.683	19.326	1.578
11/10/2009 11:08	5280	0.68	19.324	1.571
11/10/2009 11:08	5310	0.678	19.324	1.566
11/10/2009 11:09	5340	0.677	19.319	1.562
11/10/2009 11:09	5370	0.679	19.318	1.567
11/10/2009 11:10	5400	0.686	19.317	1.584

11/10/2009 11:10	5430	0.684	19.313	1.58
11/10/2009 11:11	5460	0.684	19.315	1.58
11/10/2009 11:11	5490	0.688	19.317	1.589
11/10/2009 11:12	5520	0.679	19.317	1.567
11/10/2009 11:12	5550	0.681	19.319	1.571
11/10/2009 11:13	5580	0.679	19.324	1.568
11/10/2009 11:13	5610	0.689	19.319	1.591
11/10/2009 11:14	5640	0.692	19.319	1.598
11/10/2009 11:14	5670	0.683	19.316	1.577
11/10/2009 11:15	5700	0.682	19.312	1.575
11/10/2009 11:15	5730	0.685	19.316	1.581
11/10/2009 11:16	5760	0.689	19.324	1.592
11/10/2009 11:16	5790	0.691	19.327	1.595
11/10/2009 11:17	5820	0.686	19.325	1.584
11/10/2009 11:17	5850.058	0.69	19.324	1.593
11/10/2009 11:18	5880	0.689	19.311	1.592
11/10/2009 11:18	5910	0.689	19.31	1.59
11/10/2009 11:19	5940	0.691	19.311	1.595
11/10/2009 11:19	5970	0.691	19.31	1.596
11/10/2009 11:20	6000	0.686	19.309	1.583
11/10/2009 11:20	6030	0.689	19.304	1.59
11/10/2009 11:21	6060	0.69	19.303	1.593
11/10/2009 11:21	6090	0.691	19.309	1.595
11/10/2009 11:22	6120	0.692	19.314	1.598
11/10/2009 11:22	6150	0.693	19.316	1.601
11/10/2009 11:23	6180	0.699	19.31	1.614
11/10/2009 11:23	6210	0.684	19.306	1.58
11/10/2009 11:24	6240	0.683	19.304	1.577
11/10/2009 11:24	6270	0.685	19.304	1.581
11/10/2009 11:25	6300	0.693	19.3	1.599
11/10/2009 11:25	6330	0.693	19.302	1.599
11/10/2009 11:26	6360	0.692	19.3	1.597
11/10/2009 11:26	6390	0.694	19.303	1.603
11/10/2009 11:27	6420	0.693	19.299	1.6
11/10/2009 11:27	6450	0.69	19.298	1.594
11/10/2009 11:28	6480	0.688	19.297	1.589
11/10/2009 11:28	6510	0.684	19.299	1.579
11/10/2009 11:29	6540	0.688	19.292	1.589
11/10/2009 11:29	6570	0.691	19.288	1.595
11/10/2009 11:30	6600	0.69	19.286	1.592
11/10/2009 11:30	6630	0.684	19.287	1.58
11/10/2009 11:31	6660	1.206	19.289	2.784
11/10/2009 11:31	6690	1.702	19.308	3.93
11/10/2009 11:32	6720	2.129	19.331	4.916
11/10/2009 11:32	6750	2.504	19.364	5.782
11/10/2009 11:33	6780	2.808	19.421	6.485
11/10/2009 11:33	6810	3.07	19.465	7.088

11/10/2009 11:34	6840	3.304	19.503	7.628
11/10/2009 11:34	6870	3.503	19.54	8.088
11/10/2009 11:35	6900	3.683	19.591	8.504
11/10/2009 11:35	6930	3.826	19.635	8.834
11/10/2009 11:36	6960	3.94	19.673	9.097
11/10/2009 11:36	6990	4.042	19.712	9.332
11/10/2009 11:37	7020	4.134	19.754	9.545
11/10/2009 11:37	7050	4.213	19.783	9.728
11/10/2009 11:38	7080	4.286	19.814	9.897
11/10/2009 11:38	7110	4.342	19.849	10.026
11/10/2009 11:39	7140	4.396	19.873	10.15
11/10/2009 11:39	7170	4.442	19.891	10.257
11/10/2009 11:40	7200	4.482	19.909	10.348
11/10/2009 11:40	7230	4.514	19.934	10.423
11/10/2009 11:41	7260	4.549	19.951	10.504
11/10/2009 11:41	7290	4.571	19.977	10.555
11/10/2009 11:42	7320	4.593	19.993	10.604
11/10/2009 11:42	7350	4.616	20.01	10.657
11/10/2009 11:43	7380	4.635	20.02	10.703
11/10/2009 11:43	7410	4.649	20.029	10.734
11/10/2009 11:44	7440	4.676	20.031	10.796
11/10/2009 11:44	7470	4.687	20.034	10.822
11/10/2009 11:45	7500	4.694	20.039	10.838
11/10/2009 11:45	7530	4.708	20.042	10.872
11/10/2009 11:46	7560	4.71	20.041	10.875
11/10/2009 11:46	7590	4.726	20.038	10.912
11/10/2009 11:47	7620	4.738	20.032	10.941
11/10/2009 11:47	7650	4.738	20.027	10.94
11/10/2009 11:48	7680	4.751	20.021	10.969
11/10/2009 11:48	7710	4.756	20.02	10.983
11/10/2009 11:49	7740	4.756	20.011	10.981
11/10/2009 11:49	7770	4.766	20.002	11.005
11/10/2009 11:50	7800	4.764	19.997	10.999
11/10/2009 11:50	7830	4.777	19.987	11.029
11/10/2009 11:51	7860	4.78	19.977	11.037
11/10/2009 11:51	7890	4.786	19.974	11.051
11/10/2009 11:52	7920	4.782	19.968	11.041
11/10/2009 11:52	7950	4.786	19.966	11.051
11/10/2009 11:53	7980	4.79	19.96	11.06
11/10/2009 11:53	8010	4.797	19.953	11.077
11/10/2009 11:54	8040	4.797	19.948	11.077
11/10/2009 11:54	8070	4.806	19.943	11.098
11/10/2009 11:55	8100	4.801	19.942	11.086
11/10/2009 11:55	8130	4.804	19.932	11.093
11/10/2009 11:56	8160	4.811	19.928	11.109
11/10/2009 11:56	8190	4.813	19.922	11.113
11/10/2009 11:57	8220	4.812	19.918	11.111

11/10/2009 11:57	8250	4.816	19.915	11.121
11/10/2009 11:58	8280	4.815	19.912	11.117
11/10/2009 11:58	8310	4.812	19.906	11.111
11/10/2009 11:59	8340	4.82	19.904	11.13
11/10/2009 11:59	8370	4.824	19.901	11.138
11/10/2009 12:00	8400	4.825	19.9	11.141
11/10/2009 12:00	8430	4.823	19.893	11.137
11/10/2009 12:01	8460	4.82	19.891	11.129
11/10/2009 12:01	8490	4.82	19.887	11.13
11/10/2009 12:02	8520	4.825	19.878	11.141
11/10/2009 12:02	8550	4.828	19.874	11.147
11/10/2009 12:03	8580	4.83	19.871	11.152
11/10/2009 12:03	8610	4.827	19.866	11.145
11/10/2009 12:04	8640	4.83	19.861	11.152
11/10/2009 12:04	8670	4.831	19.855	11.156
11/10/2009 12:05	8700	4.829	19.853	11.151
11/10/2009 12:05	8730	4.827	19.846	11.145
11/10/2009 12:06	8760	4.834	19.845	11.161
11/10/2009 12:06	8790	4.831	19.842	11.154
11/10/2009 12:07	8820	4.833	19.836	11.159
11/10/2009 12:07	8850	4.836	19.83	11.166
11/10/2009 12:08	8880	4.84	19.824	11.177
11/10/2009 12:08	8910	4.842	19.821	11.179
11/10/2009 12:09	8940	4.837	19.818	11.169
11/10/2009 12:09	8970	4.841	19.815	11.178
11/10/2009 12:10	9000	4.844	19.816	11.185
11/10/2009 12:10	9030	4.845	19.816	11.186
11/10/2009 12:11	9060	4.839	19.812	11.173

Pumping Test Data Sheet

Daniel B. Stephens & Associates, Inc.

Sheet 1 of 3

Project Name: Salty Dog Step Test Pumping Well: RW-01

Date	Time	Rate (gpm)	Depth to Water (ft)	Elapsed Time (min)	Drawdown (feet)	Comments
11/10/09	0837	0	68.08			Static, before pump install
			68.05	00:00		from toc @0940
	0950		68.05	00:00	start-up	Screen 63-83'
			73.05	01:00		H20 bearing
			73.19	02:00		
			73.08	03:00		
			73.08	04:00		
			72.96	05:00		
			72.93	06:00		
			72.80	07:00		
			72.81	08:00		
			72.80	09:00		
			72.78	10:00		
			72.72	12:00		
			72.69	14:00		
			72.69	16:00		
			72.69	18:00		
			72.69	20:00		
			72.70	25:00		
			72.71	30:00		
			72.72	35:00		
			72.74	40:00		
			72.74	45:00		4gpm
			72.77	46:00		
			74.10	48:00		
			75.62	49:00		
			76.40	50:00		
V 11/10/09			76.74	51:00		

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Project Name: Salty Dog step Test Pumping Well: RO-01

Date	Time	Rate (gpm)	Depth to Water (ft)	Elapsed Time (min)	Drawdown (feet)	Comments
11/10/04			76.93	52:00		
			77.08	53:00		
			77.20	54:00		
			77.28	55:00		
			77.35	56:00		
			77.40	57:00		
			77.45	58:00		
			77.49	59:00		
			77.53	60:00		
			77.58	61:00		
			77.61	63:00		
			77.60	65:00		
			77.61	67:00		
			77.61	69:00		
			77.61	71:00		
			77.60	75:00		
			77.60	80:00		
			77.58	85:00		
			77.57	90:00		
			77.56	95:00		
			77.57	100:00		
			77.57	101:00		Stop pump / RECOVERY
			75.04	102:00		
			73.25	103:00		
			71.98	104:00		
			71.00	105:00		
			70.32	106:00		
↓ 11/10/04			69.81	107:00		

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Pumping Test Data Sheet

Daniel B. Stephens & Associates, Inc.

Sheet 3 of 3

Project Name: Salty Dog Step Test Pumping Well: RW-01

Date	Time	Rate (gpm)	Depth to Water (ft)	Elapsed Time (min)	Drawdown sec (feet)	Comments
11/10/09			69.37	108:00		
			69.15	109:00		
			68.92	110:00		
			68.74	111:00		
			68.62	112:00		
			68.51	113:00		
			68.43	114:00		
			68.36	115:00		
			68.26	117:00		
			68.20	119:00		
			68.15	121:00		
			68.11	123:00		
			68.09	125:00		
			68.07	127:00		
			68.05	130:00		
			68.02	135:00		
11/10/09						

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Pumping Test Data Sheet

Daniel B. Stephens & Associates, Inc.

Sheet 1 of 1

Project Name: Sulfur Dog Step Test Observation Well: PMW-01

Date	Time	Depth to Water (ft)	Elapsed Time (min)	Drawdown (feet)	Comments
11/10/09	0855	67.55			Static, measured @ toc
Start @ 9:50					
	1007	67.47			
	1011	67.47			
	1031	67.47			
2nd Step @	1035				
	~~67.47~~	~~DBA~~			
1108		67.47			
1122		67.47			
~~1125~~		~~63.91~~	~~DBA~~		

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Pumping Test Data Sheet

Daniel B. Stephens & Associates, Inc.

Sheet 1 of 1

Project Name: Salty Dog Step Test Observation Well: NW-01(S)

Date	Time	Depth to Water (ft)	Elapsed Time (min)	Drawdown (feet)	Comments
11/10/09	0904	63.95			Static @ toc. Middle
					TD = 73.95' & horizontal toc.
Start	@ 9:50				probe sitting @ TD.
	0954	63.91			
	1001	63.91			
	1014	63.91			
	1029	63.91			
2nd	Step 10:35				
	1047	63.91			
	1105	63.91			
	1125	63.91			

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Pumping Test Data Sheet

Daniel B. Stephens & Associates, Inc.

Sheet 1 of 1

Project Name: Salty Dog Step Test Observation Well: NW-01(m)

Date	Time	Depth to Water (ft)	Elapsed Time (min)	Drawdown (feet)	Comments
11/10/05	0910	63.32			Static @ toc
Start @ 950					TD - 120.92' clean @ base (PCoBe); south stick-up.
1017		63.33			
1027		63.33			
2nd Step 10:35					
1049		63.34			
1104		63.34			
1127		63.33			

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Pumping Test Data Sheet

Daniel B. Stephens & Associates, Inc.

Sheet 1 of 1

Project Name: Salty Dog Step Test Observation Well: MW-01(d)

Date	Time	Depth to Water (ft)	Elapsed Time (min)	Drawdown (feet)	Comments
11/10/09	0917	62.71			Static e. toc
Start	e 9:50				TD-170.91'; probe clear.
	1018	62.71			
	1026	62.71			
2nd	Step 1035				
	1050	62.71			
	1103	62.70			
	1128	62.70			

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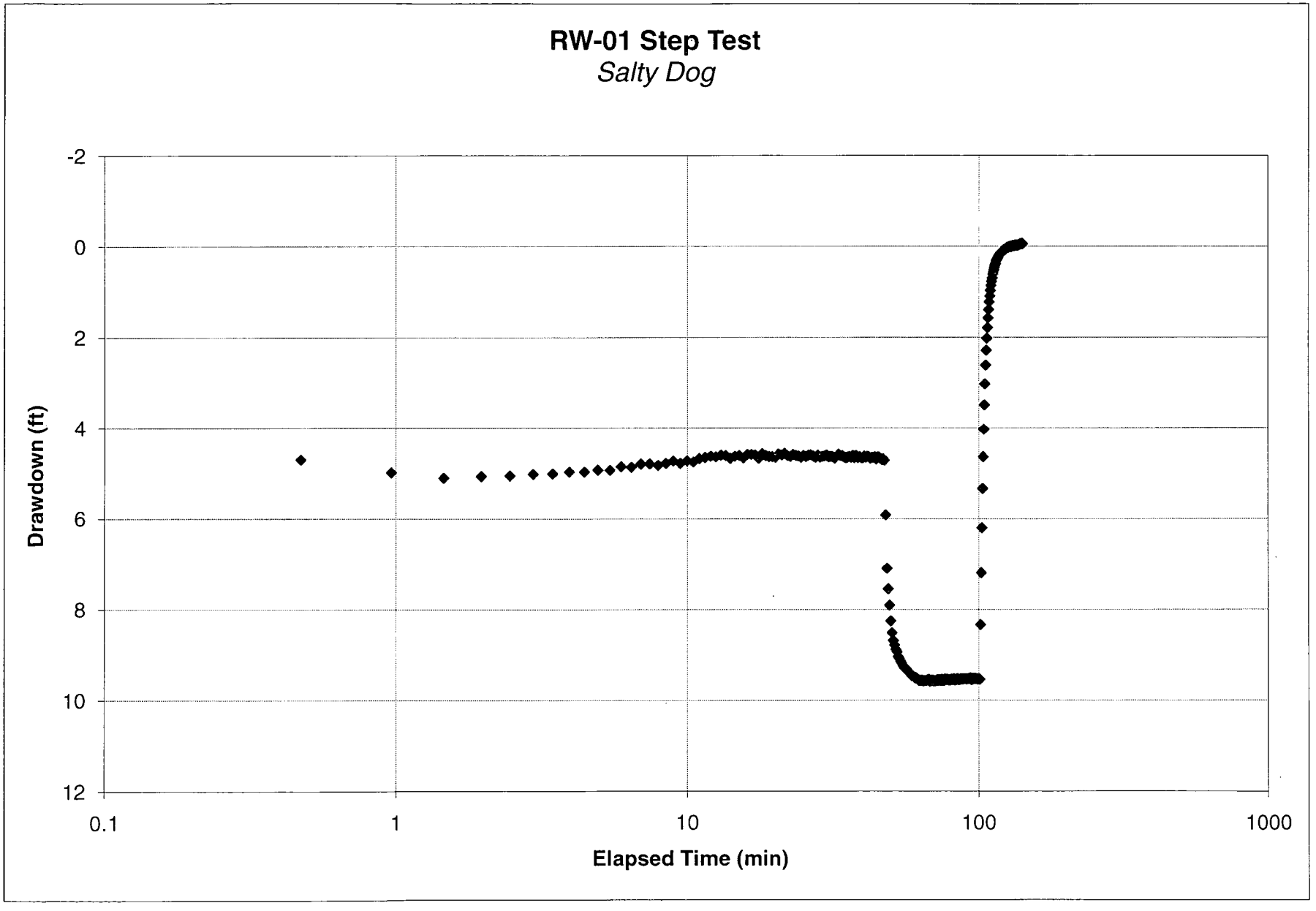
RW-01 Step Test
Salty Dog
-2
0
2
4
6
8
10
12
Drawdown (ft)
0.1
1
10
100
1000
Elapsed Time (min)

Report Date:	11/9/2009 16:57
Report User Name:	362
Report Computer Nam	XPFM4629

Log File Properties

File Name	RW-02 Step Test 2009-11-09 09-52-27.wsl
Create Date	11/9/2009 16:57

Device Properties

Device	Level TROLL® 500
Site	RW-02
Device Name	
Serial Number	116410
Firmware Version	2.02

Log Configuration

Log Name	RW-02 Step Test
Created By	362
Computer Name	XPFM4629
Application	WinSitu.exe
Application Version	5.6.1.8
Create Date	11/9/2009 9:51
Notes Size(bytes)	4096
Type	Fast Linear
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop	No Stop Time
Interval	Days: 0 Hours: 00 Mins: 00 Secs: 30

Level Reference Settings At Log Creation

Level Measurement Mode	Depth
Specific Gravity	0.999

Log Notes:

Date and Time	Note
11/9/2009 9:51	Manual Start Command
11/9/2009 9:52	User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 9:57	User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 10:21	User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 10:28	User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 10:43	User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 10:52	User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 11:05	User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"

11/9/2009 11:16 User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 11:37 User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 12:16 User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 12:36 User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 13:30 User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 14:38 User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 15:10 User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 16:47 User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 16:48 User Note: "Downloading log - Used Batt: 13% Memory: 3% User: 362"
11/9/2009 16:56 Manual Stop Command

Log Data:
Record Count 852

Date and Time	Elapsed Time Seconds		Sensor: Pres 100G SN#: 116410 Pressure (PSI)	Sensor: Pre SN#: 11641 Temperatu	Sensor: Pre SN#: 11641 Depth (ft)
11/9/2009 9:51		0	36.642	19.165	84.605
11/9/2009 9:51		30	36.643	19.168	84.608
11/9/2009 9:52		60	36.64	19.17	84.6
11/9/2009 9:52		90	36.639	19.168	84.597
11/9/2009 9:53		120.086	36.641	19.187	84.602
11/9/2009 9:53		150.102	36.64	19.191	84.6
11/9/2009 9:54		180	36.647	19.189	84.618
11/9/2009 9:54		210.134	36.641	19.197	84.602
11/9/2009 9:55		240.119	36.651	19.202	84.625
11/9/2009 9:55		270.119	36.639	19.199	84.598
11/9/2009 9:56		300.136	36.641	19.202	84.604
11/9/2009 9:56		330.12	36.644	19.205	84.609
11/9/2009 9:57		360.105	36.645	19.205	84.612
11/9/2009 9:57		390	36.643	19.205	84.609
11/9/2009 9:58		420	36.639	19.187	84.597
11/9/2009 9:58		450.121	36.648	19.202	84.62
11/9/2009 9:59		480.121	36.638	19.201	84.597
11/9/2009 9:59		510.138	36.644	19.206	84.611
11/9/2009 10:00		540.123	33.084	19.198	76.39
11/9/2009 10:00		570.107	30.676	19.174	70.83
11/9/2009 10:01		600.139	29.881	19.144	68.994
11/9/2009 10:01		630.14	29.857	19.124	68.939
11/9/2009 10:02		660.124	30.052	19.111	69.389
11/9/2009 10:02		690.124	30.502	19.105	70.428
11/9/2009 10:03		720.141	30.978	19.095	71.527
11/9/2009 10:03		750.125	31.186	19.086	72.008
11/9/2009 10:04		780.126	31.269	19.075	72.199
11/9/2009 10:04		810.142	31.304	19.064	72.281
11/9/2009 10:05		840.142	31.32	19.054	72.316

11/9/2009 10:05	870.127	31.343	19.042	72.37
11/9/2009 10:06	900.127	31.348	19.035	72.383
11/9/2009 10:06	930.142	31.353	19.026	72.394
11/9/2009 10:07	960.127	31.356	19.018	72.399
11/9/2009 10:07	990.112	31.357	19.018	72.403
11/9/2009 10:08	1020.143	31.342	19.013	72.369
11/9/2009 10:08	1050.128	31.343	19.008	72.37
11/9/2009 10:09	1080.128	31.342	19.003	72.368
11/9/2009 10:09	1110.129	31.329	19.002	72.337
11/9/2009 10:10	1140.145	31.327	18.999	72.334
11/9/2009 10:10	1170.129	31.325	19	72.328
11/9/2009 10:11	1200.114	31.304	18.995	72.279
11/9/2009 10:11	1230.13	31.307	18.997	72.287
11/9/2009 10:12	1260.13	31.296	18.995	72.262
11/9/2009 10:12	1290.131	31.307	18.992	72.287
11/9/2009 10:13	1320.131	31.296	18.995	72.261
11/9/2009 10:13	1350.148	31.305	18.99	72.282
11/9/2009 10:14	1380.132	31.295	18.989	72.259
11/9/2009 10:14	1410.116	31.287	18.988	72.242
11/9/2009 10:15	1440.133	30.234	18.988	69.81
11/9/2009 10:15	1470.133	28.752	18.986	66.386
11/9/2009 10:16	1500.134	28.102	18.984	64.886
11/9/2009 10:16	1530.135	27.782	18.984	64.147
11/9/2009 10:17	1560.15	27.556	18.987	63.626
11/9/2009 10:17	1590.135	27.442	18.987	63.362
11/9/2009 10:18	1620.136	27.379	18.989	63.217
11/9/2009 10:18	1650.136	27.333	18.985	63.111
11/9/2009 10:19	1680.136	27.347	18.986	63.142
11/9/2009 10:19	1710.137	27.32	18.984	63.081
11/9/2009 10:20	1740.138	27.31	18.979	63.057
11/9/2009 10:20	1770	27.305	18.964	63.046
11/9/2009 10:21	1800	27.298	18.965	63.031
11/9/2009 10:21	1830	27.297	18.959	63.027
11/9/2009 10:22	1860	27.276	18.957	62.979
11/9/2009 10:22	1890	27.277	18.955	62.982
11/9/2009 10:23	1920	27.297	18.955	63.028
11/9/2009 10:23	1950	27.269	18.952	62.962
11/9/2009 10:24	1980	27.268	18.951	62.961
11/9/2009 10:24	2010	27.27	18.949	62.965
11/9/2009 10:25	2040	27.232	18.946	62.877
11/9/2009 10:25	2070	27.232	18.947	62.878
11/9/2009 10:26	2100	27.215	18.945	62.839
11/9/2009 10:26	2130	27.218	18.945	62.846
11/9/2009 10:27	2160	27.218	18.941	62.845
11/9/2009 10:27	2190	27.226	18.941	62.864
11/9/2009 10:28	2220	27.218	18.941	62.846
11/9/2009 10:28	2250	27.219	18.939	62.847

11/9/2009 10:29	2280	27.212	18.945	62.832
11/9/2009 10:29	2310	27.219	18.94	62.849
11/9/2009 10:30	2340	27.21	18.938	62.827
11/9/2009 10:30	2370	27.206	18.938	62.818
11/9/2009 10:31	2400	27.205	18.939	62.815
11/9/2009 10:31	2430	27.198	18.936	62.799
11/9/2009 10:32	2460	27.205	18.935	62.817
11/9/2009 10:32	2490	27.189	18.934	62.779
11/9/2009 10:33	2520	27.212	18.932	62.832
11/9/2009 10:33	2550	27.203	18.935	62.812
11/9/2009 10:34	2580	27.179	18.934	62.756
11/9/2009 10:34	2610	27.187	18.93	62.775
11/9/2009 10:35	2640	27.192	18.93	62.786
11/9/2009 10:35	2670	27.186	18.932	62.772
11/9/2009 10:36	2700	27.165	18.93	62.722
11/9/2009 10:36	2730	27.158	18.93	62.708
11/9/2009 10:37	2760	27.178	18.93	62.753
11/9/2009 10:37	2790	27.151	18.93	62.691
11/9/2009 10:38	2820	27.164	18.927	62.721
11/9/2009 10:38	2850	27.152	18.932	62.694
11/9/2009 10:39	2880	27.163	18.928	62.719
11/9/2009 10:39	2910	27.159	18.926	62.71
11/9/2009 10:40	2940	27.148	18.929	62.683
11/9/2009 10:40	2970	27.181	18.926	62.76
11/9/2009 10:41	3000	27.181	18.923	62.76
11/9/2009 10:41	3030	27.175	18.924	62.745
11/9/2009 10:42	3060	27.151	18.924	62.691
11/9/2009 10:42	3090	27.176	18.922	62.749
11/9/2009 10:43	3120	27.183	18.918	62.766
11/9/2009 10:43	3150	27.157	18.924	62.706
11/9/2009 10:44	3180	27.168	18.923	62.731
11/9/2009 10:44	3210	27.165	18.926	62.724
11/9/2009 10:45	3240	27.169	18.923	62.733
11/9/2009 10:45	3270	27.167	18.924	62.729
11/9/2009 10:46	3300	27.148	18.922	62.684
11/9/2009 10:46	3330	27.156	18.923	62.703
11/9/2009 10:47	3360	27.152	18.922	62.693
11/9/2009 10:47	3390	27.138	18.92	62.661
11/9/2009 10:48	3420	27.144	18.919	62.674
11/9/2009 10:48	3450	27.135	18.919	62.653
11/9/2009 10:49	3480	27.134	18.918	62.651
11/9/2009 10:49	3510	27.134	18.919	62.652
11/9/2009 10:50	3540	27.135	18.918	62.654
11/9/2009 10:50	3570	27.144	18.915	62.674
11/9/2009 10:51	3600	27.124	18.919	62.628
11/9/2009 10:51	3630	27.127	18.919	62.635
11/9/2009 10:52	3660	27.13	18.918	62.643

11/9/2009 10:52	3690	27.132	18.919	62.647
11/9/2009 10:53	3720	27.123	18.916	62.626
11/9/2009 10:53	3750	27.133	18.918	62.648
11/9/2009 10:54	3780	27.121	18.917	62.621
11/9/2009 10:54	3810	27.134	18.915	62.651
11/9/2009 10:55	3840	27.12	18.914	62.619
11/9/2009 10:55	3870	27.123	18.914	62.626
11/9/2009 10:56	3900	27.117	18.912	62.612
11/9/2009 10:56	3930	27.126	18.917	62.632
11/9/2009 10:57	3960	27.119	18.918	62.616
11/9/2009 10:57	3990	27.108	18.912	62.591
11/9/2009 10:58	4020	27.112	18.913	62.601
11/9/2009 10:58	4050	27.118	18.914	62.614
11/9/2009 10:59	4080	27.13	18.912	62.642
11/9/2009 10:59	4110	27.131	18.913	62.644
11/9/2009 11:00	4140	27.121	18.91	62.623
11/9/2009 11:00	4170	27.127	18.914	62.636
11/9/2009 11:01	4200	27.125	18.91	62.631
11/9/2009 11:01	4230	27.124	18.91	62.63
11/9/2009 11:02	4260	27.118	18.91	62.615
11/9/2009 11:02	4290	27.127	18.909	62.635
11/9/2009 11:03	4320	27.124	18.911	62.629
11/9/2009 11:03	4350	27.128	18.908	62.638
11/9/2009 11:04	4380	27.139	18.908	62.662
11/9/2009 11:04	4410	27.15	18.911	62.688
11/9/2009 11:05	4440	27.148	18.907	62.684
11/9/2009 11:05	4470	27.137	18.914	62.659
11/9/2009 11:06	4500	27.139	18.91	62.663
11/9/2009 11:06	4530	27.145	18.913	62.676
11/9/2009 11:07	4560	27.132	18.913	62.648
11/9/2009 11:07	4590	27.121	18.91	62.621
11/9/2009 11:08	4620	27.134	18.911	62.652
11/9/2009 11:08	4650	27.115	18.91	62.607
11/9/2009 11:09	4680	27.128	18.913	62.638
11/9/2009 11:09	4710	27.131	18.91	62.644
11/9/2009 11:10	4740	27.109	18.911	62.595
11/9/2009 11:10	4770	27.094	18.91	62.559
11/9/2009 11:11	4800	27.098	18.91	62.568
11/9/2009 11:11	4830	27.107	18.909	62.59
11/9/2009 11:12	4860	27.125	18.91	62.631
11/9/2009 11:12	4890	27.13	18.912	62.643
11/9/2009 11:13	4920	27.128	18.906	62.637
11/9/2009 11:13	4950	27.123	18.908	62.625
11/9/2009 11:14	4980	27.116	18.909	62.61
11/9/2009 11:14	5010	27.132	18.909	62.646
11/9/2009 11:15	5040	27.135	18.907	62.654
11/9/2009 11:15	5070	27.118	18.91	62.614

11/9/2009 11:16	5100	27.135	18.909	62.653
11/9/2009 11:16	5130	27.132	18.901	62.647
11/9/2009 11:17	5160	27.151	18.902	62.691
11/9/2009 11:17	5190	27.123	18.9	62.627
11/9/2009 11:18	5220	27.14	18.902	62.665
11/9/2009 11:18	5250	27.118	18.899	62.614
11/9/2009 11:19	5280	27.121	18.897	62.621
11/9/2009 11:19	5310	27.138	18.897	62.66
11/9/2009 11:20	5340	27.125	18.901	62.63
11/9/2009 11:20	5370	27.116	18.901	62.611
11/9/2009 11:21	5400	27.13	18.896	62.642
11/9/2009 11:21	5430	27.11	18.896	62.595
11/9/2009 11:22	5460	27.123	18.899	62.626
11/9/2009 11:22	5490	27.1	18.897	62.574
11/9/2009 11:23	5520	27.133	18.898	62.65
11/9/2009 11:23	5550	27.127	18.897	62.635
11/9/2009 11:24	5580	27.1	18.897	62.574
11/9/2009 11:24	5610	27.132	18.895	62.647
11/9/2009 11:25	5640	27.135	18.896	62.653
11/9/2009 11:25	5670	27.109	18.898	62.594
11/9/2009 11:26	5700	27.131	18.895	62.644
11/9/2009 11:26	5730	27.126	18.893	62.632
11/9/2009 11:27	5760	27.126	18.895	62.632
11/9/2009 11:27	5790	27.119	18.894	62.617
11/9/2009 11:28	5820	27.114	18.9	62.606
11/9/2009 11:28	5850	27.124	18.896	62.63
11/9/2009 11:29	5880	27.144	18.891	62.674
11/9/2009 11:29	5910	27.114	18.897	62.606
11/9/2009 11:30	5940	27.165	18.893	62.724
11/9/2009 11:30	5970	27.128	18.895	62.638
11/9/2009 11:31	6000	27.125	18.892	62.63
11/9/2009 11:31	6030	27.153	18.894	62.695
11/9/2009 11:32	6060	27.15	18.895	62.688
11/9/2009 11:32	6090	27.124	18.889	62.629
11/9/2009 11:33	6120	27.112	18.892	62.6
11/9/2009 11:33	6150	27.137	18.892	62.658
11/9/2009 11:34	6180	27.136	18.892	62.657
11/9/2009 11:34	6210	27.109	18.893	62.593
11/9/2009 11:35	6240	27.129	18.893	62.641
11/9/2009 11:35	6270	27.14	18.889	62.664
11/9/2009 11:36	6300	27.113	18.893	62.604
11/9/2009 11:36	6330	27.126	18.892	62.634
11/9/2009 11:37	6360	27.106	18.891	62.588
11/9/2009 11:37	6390	27.11	18.893	62.596
11/9/2009 11:38	6420	27.107	18.891	62.59
11/9/2009 11:38	6450	27.103	18.895	62.58
11/9/2009 11:39	6480	27.097	18.895	62.566

11/9/2009 11:39	6510	27.13	18.891	62.642
11/9/2009 11:40	6540	27.112	18.894	62.6
11/9/2009 11:40	6570	27.133	18.895	62.649
11/9/2009 11:41	6600	27.107	18.893	62.589
11/9/2009 11:41	6630	27.118	18.891	62.615
11/9/2009 11:42	6660	27.136	18.892	62.656
11/9/2009 11:42	6690	27.136	18.892	62.657
11/9/2009 11:43	6720	27.126	18.889	62.634
11/9/2009 11:43	6750	27.112	18.893	62.6
11/9/2009 11:44	6780	27.128	18.888	62.638
11/9/2009 11:44	6810	27.125	18.889	62.63
11/9/2009 11:45	6840	27.104	18.888	62.582
11/9/2009 11:45	6870	27.093	18.889	62.556
11/9/2009 11:46	6900	27.1	18.889	62.574
11/9/2009 11:46	6930	27.102	18.889	62.578
11/9/2009 11:47	6960	27.118	18.888	62.614
11/9/2009 11:47	6990	27.106	18.889	62.586
11/9/2009 11:48	7020	27.106	18.888	62.587
11/9/2009 11:48	7050	27.117	18.886	62.613
11/9/2009 11:49	7080	27.115	18.887	62.607
11/9/2009 11:49	7110	27.118	18.885	62.615
11/9/2009 11:50	7140	27.134	18.887	62.651
11/9/2009 11:50	7170	27.13	18.886	62.643
11/9/2009 11:51	7200	27.114	18.885	62.606
11/9/2009 11:51	7230	27.14	18.888	62.666
11/9/2009 11:52	7260	27.135	18.887	62.655
11/9/2009 11:52	7290	27.132	18.884	62.646
11/9/2009 11:53	7320	27.128	18.885	62.637
11/9/2009 11:53	7350	27.125	18.885	62.631
11/9/2009 11:54	7380	27.132	18.885	62.646
11/9/2009 11:54	7410	27.131	18.886	62.645
11/9/2009 11:55	7440	27.132	18.888	62.648
11/9/2009 11:55	7470	27.122	18.887	62.623
11/9/2009 11:56	7500	27.1	18.885	62.573
11/9/2009 11:56	7530	27.137	18.888	62.659
11/9/2009 11:57	7560	27.147	18.887	62.682
11/9/2009 11:57	7590	27.131	18.884	62.644
11/9/2009 11:58	7620	27.155	18.883	62.701
11/9/2009 11:58	7650	27.116	18.885	62.61
11/9/2009 11:59	7680	27.133	18.886	62.649
11/9/2009 11:59	7710	27.122	18.884	62.624
11/9/2009 12:00	7740	27.022	18.885	62.394
11/9/2009 12:00	7770	26.869	18.885	62.041
11/9/2009 12:01	7800	26.801	18.887	61.883
11/9/2009 12:01	7830	26.773	18.884	61.819
11/9/2009 12:02	7860	26.731	18.884	61.722
11/9/2009 12:02	7890	26.734	18.885	61.727

11/9/2009 12:03	7920	26.716	18.886	61.686
11/9/2009 12:03	7950	26.714	18.885	61.681
11/9/2009 12:04	7980	26.715	18.882	61.684
11/9/2009 12:04	8010	26.727	18.885	61.711
11/9/2009 12:05	8040	26.726	18.884	61.709
11/9/2009 12:05	8070	26.723	18.884	61.702
11/9/2009 12:06	8100	26.711	18.881	61.675
11/9/2009 12:06	8130	26.703	18.882	61.656
11/9/2009 12:07	8160	26.713	18.883	61.68
11/9/2009 12:07	8190	26.725	18.884	61.708
11/9/2009 12:08	8220	26.715	18.882	61.684
11/9/2009 12:08	8250	26.69	18.882	61.627
11/9/2009 12:09	8280	26.732	18.881	61.723
11/9/2009 12:09	8310	26.701	18.883	61.652
11/9/2009 12:10	8340	26.687	18.882	61.619
11/9/2009 12:10	8370	26.71	18.882	61.671
11/9/2009 12:11	8400	26.69	18.883	61.627
11/9/2009 12:11	8430	26.699	18.877	61.647
11/9/2009 12:12	8460	26.693	18.884	61.634
11/9/2009 12:12	8490	26.687	18.88	61.618
11/9/2009 12:13	8520	26.715	18.881	61.685
11/9/2009 12:13	8550	26.702	18.878	61.655
11/9/2009 12:14	8580	26.716	18.879	61.685
11/9/2009 12:14	8610	26.708	18.88	61.667
11/9/2009 12:15	8640	26.705	18.88	61.66
11/9/2009 12:15	8670	26.708	18.88	61.667
11/9/2009 12:16	8700	26.709	18.886	61.669
11/9/2009 12:16	8730	26.719	18.883	61.693
11/9/2009 12:17	8760	26.71	18.888	61.673
11/9/2009 12:17	8790	26.724	18.887	61.705
11/9/2009 12:18	8820	26.738	18.884	61.738
11/9/2009 12:18	8850	26.752	18.884	61.77
11/9/2009 12:19	8880	26.733	18.884	61.726
11/9/2009 12:19	8910	26.701	18.884	61.652
11/9/2009 12:20	8940	26.707	18.882	61.666
11/9/2009 12:20	8970	26.696	18.881	61.64
11/9/2009 12:21	9000	26.693	18.883	61.633
11/9/2009 12:21	9030	26.696	18.879	61.639
11/9/2009 12:22	9060	26.69	18.881	61.627
11/9/2009 12:22	9090	26.709	18.881	61.669
11/9/2009 12:23	9120	26.698	18.879	61.646
11/9/2009 12:23	9150	26.701	18.881	61.653
11/9/2009 12:24	9180	26.723	18.883	61.702
11/9/2009 12:24	9210	26.703	18.878	61.656
11/9/2009 12:25	9240	26.695	18.877	61.639
11/9/2009 12:25	9270	26.686	18.875	61.617
11/9/2009 12:26	9300	26.7	18.874	61.649

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11/9/2009 12:27	9360	26.683	18.879	61.61
11/9/2009 12:27	9390	26.695	18.877	61.639
11/9/2009 12:28	9420	26.684	18.878	61.614
11/9/2009 12:28	9450	26.691	18.877	61.628
11/9/2009 12:29	9480	26.685	18.877	61.615
11/9/2009 12:29	9510	26.697	18.876	61.641
11/9/2009 12:30	9540	26.689	18.879	61.623
11/9/2009 12:30	9570	26.689	18.878	61.625
11/9/2009 12:31	9600	26.701	18.876	61.651
11/9/2009 12:31	9630	26.695	18.876	61.637
11/9/2009 12:32	9660	26.685	18.879	61.615
11/9/2009 12:32	9690	26.708	18.875	61.668
11/9/2009 12:33	9720	26.688	18.877	61.623
11/9/2009 12:33	9750	26.704	18.876	61.659
11/9/2009 12:34	9780	26.702	18.875	61.654
11/9/2009 12:34	9810	26.692	18.875	61.632
11/9/2009 12:35	9840	26.696	18.873	61.639
11/9/2009 12:35	9870	26.703	18.878	61.655
11/9/2009 12:36	9900	26.695	18.871	61.637
11/9/2009 12:36	9930	26.722	18.872	61.7
11/9/2009 12:37	9960	26.702	18.874	61.654
11/9/2009 12:37	9990	26.699	18.872	61.647
11/9/2009 12:38	10020	26.691	18.872	61.628
11/9/2009 12:38	10050	26.697	18.871	61.644
11/9/2009 12:39	10080	26.69	18.872	61.627
11/9/2009 12:39	10110	26.703	18.869	61.657
11/9/2009 12:40	10140	26.721	18.872	61.698
11/9/2009 12:40	10170	26.708	18.869	61.669
11/9/2009 12:41	10200	26.723	18.87	61.703
11/9/2009 12:41	10230	26.712	18.869	61.677
11/9/2009 12:42	10260	26.721	18.871	61.697
11/9/2009 12:42	10290	26.702	18.873	61.655
11/9/2009 12:43	10320	26.708	18.872	61.668
11/9/2009 12:43	10350	26.725	18.871	61.706
11/9/2009 12:44	10380	26.728	18.866	61.715
11/9/2009 12:44	10410	26.734	18.869	61.727
11/9/2009 12:45	10440	26.757	18.872	61.78
11/9/2009 12:45	10470	26.773	18.868	61.819
11/9/2009 12:46	10500	26.754	18.869	61.775
11/9/2009 12:46	10530	26.738	18.869	61.738
11/9/2009 12:47	10560	26.74	18.872	61.741
11/9/2009 12:47	10590	26.745	18.87	61.753
11/9/2009 12:48	10620	26.736	18.871	61.732
11/9/2009 12:48	10650	26.725	18.868	61.708
11/9/2009 12:49	10680	26.723	18.867	61.703
11/9/2009 12:49	10710	26.744	18.868	61.751

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11/9/2009 12:50	10770	26.733	18.868	61.725
11/9/2009 12:51	10800	26.728	18.872	61.715
11/9/2009 12:51	10830	26.728	18.867	61.715
11/9/2009 12:52	10860	26.734	18.871	61.729
11/9/2009 12:52	10890	26.729	18.868	61.715
11/9/2009 12:53	10920	26.727	18.869	61.712
11/9/2009 12:53	10950	26.732	18.866	61.723
11/9/2009 12:54	10980	26.741	18.869	61.743
11/9/2009 12:54	11010	26.736	18.869	61.732
11/9/2009 12:55	11040	26.736	18.866	61.733
11/9/2009 12:55	11070	26.74	18.869	61.742
11/9/2009 12:56	11100	26.753	18.864	61.771
11/9/2009 12:56	11130	26.744	18.868	61.752
11/9/2009 12:57	11160	26.747	18.869	61.758
11/9/2009 12:57	11190	26.747	18.866	61.759
11/9/2009 12:58	11220	26.752	18.868	61.77
11/9/2009 12:58	11250	26.757	18.866	61.781
11/9/2009 12:59	11280	26.741	18.867	61.745
11/9/2009 12:59	11310	26.728	18.866	61.714
11/9/2009 13:00	11340	26.735	18.869	61.73
11/9/2009 13:00	11370	26.724	18.871	61.704
11/9/2009 13:01	11400	26.727	18.869	61.712
11/9/2009 13:01	11430	26.713	18.865	61.679
11/9/2009 13:02	11460	26.708	18.867	61.668
11/9/2009 13:02	11490	26.723	18.866	61.704
11/9/2009 13:03	11520	26.727	18.866	61.711
11/9/2009 13:03	11550	26.715	18.864	61.684
11/9/2009 13:04	11580	26.719	18.869	61.694
11/9/2009 13:04	11610	26.727	18.866	61.713
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11/9/2009 13:05	11670	26.726	18.864	61.709
11/9/2009 13:06	11700	26.721	18.865	61.698
11/9/2009 13:06	11730	26.735	18.867	61.73
11/9/2009 13:07	11760	26.727	18.867	61.713
11/9/2009 13:07	11790	26.715	18.867	61.684
11/9/2009 13:08	11820	26.733	18.867	61.726
11/9/2009 13:08	11850	26.742	18.863	61.746
11/9/2009 13:09	11880	26.727	18.868	61.712
11/9/2009 13:09	11910	26.744	18.863	61.75
11/9/2009 13:10	11940	26.734	18.864	61.729
11/9/2009 13:10	11970	26.708	18.864	61.668
11/9/2009 13:11	12000	26.731	18.861	61.721
11/9/2009 13:11	12030	26.736	18.867	61.733
11/9/2009 13:12	12060	26.734	18.865	61.728
11/9/2009 13:12	12090	26.738	18.866	61.738
11/9/2009 13:13	12120	26.713	18.863	61.679

11/9/2009 13:13	12150	26.728	18.867	61.713
11/9/2009 13:14	12180	26.728	18.864	61.715
11/9/2009 13:14	12210	26.724	18.866	61.706
11/9/2009 13:15	12240	26.73	18.867	61.718
11/9/2009 13:15	12270	26.738	18.864	61.736
11/9/2009 13:16	12300	26.729	18.867	61.717
11/9/2009 13:16	12330	26.739	18.864	61.739
11/9/2009 13:17	12360	26.731	18.868	61.722
11/9/2009 13:17	12390	26.759	18.865	61.786
11/9/2009 13:18	12420	26.773	18.862	61.818
11/9/2009 13:18	12450	26.751	18.859	61.767
11/9/2009 13:19	12480	26.735	18.863	61.731
11/9/2009 13:19	12510	26.733	18.862	61.727
11/9/2009 13:20	12540	26.744	18.864	61.751
11/9/2009 13:20	12570	26.74	18.867	61.741
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11/9/2009 13:21	12630	26.73	18.865	61.718
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11/9/2009 13:22	12690	26.72	18.863	61.695
11/9/2009 13:23	12720	26.735	18.864	61.73
11/9/2009 13:23	12750	26.737	18.863	61.735
11/9/2009 13:24	12780	26.731	18.863	61.722
11/9/2009 13:24	12810	26.731	18.866	61.722
11/9/2009 13:25	12840	26.737	18.861	61.734
11/9/2009 13:25	12870	26.739	18.863	61.739
11/9/2009 13:26	12900	26.725	18.862	61.708
11/9/2009 13:26	12930	26.741	18.864	61.743
11/9/2009 13:27	12960	26.745	18.861	61.754
11/9/2009 13:27	12990	26.737	18.863	61.734
11/9/2009 13:28	13020	26.742	18.863	61.746
11/9/2009 13:28	13050	26.731	18.861	61.721
11/9/2009 13:29	13080	26.732	18.864	61.724
11/9/2009 13:29	13110	26.731	18.865	61.722
11/9/2009 13:30	13140	26.764	18.862	61.796
11/9/2009 13:30	13170.112	26.762	18.858	61.793
11/9/2009 13:31	13200	26.757	18.865	61.78
11/9/2009 13:31	13230	26.771	18.864	61.813
11/9/2009 13:32	13260	26.767	18.867	61.803
11/9/2009 13:32	13290	26.775	18.864	61.822
11/9/2009 13:33	13320	26.772	18.864	61.815
11/9/2009 13:33	13350	26.752	18.865	61.77
11/9/2009 13:34	13380	26.742	18.863	61.746
11/9/2009 13:34	13410	26.735	18.865	61.73
11/9/2009 13:35	13440	26.729	18.865	61.715
11/9/2009 13:35	13470	26.757	18.862	61.782
11/9/2009 13:36	13500	26.734	18.864	61.728
11/9/2009 13:36	13530	26.735	18.862	61.73

11/9/2009 13:37	13560	26.738	18.863	61.737
11/9/2009 13:37	13590	26.728	18.859	61.714
11/9/2009 13:38	13620	26.725	18.862	61.707
11/9/2009 13:38	13650	26.748	18.862	61.76
11/9/2009 13:39	13680	26.715	18.863	61.683
11/9/2009 13:39	13710	26.735	18.86	61.729
11/9/2009 13:40	13740	26.742	18.86	61.746
11/9/2009 13:40	13770	26.736	18.861	61.733
11/9/2009 13:41	13800	26.738	18.86	61.738
11/9/2009 13:41	13830	26.746	18.86	61.755
11/9/2009 13:42	13860	26.753	18.863	61.771
11/9/2009 13:42	13890	26.743	18.86	61.748
11/9/2009 13:43	13920	26.74	18.862	61.743
11/9/2009 13:43	13950	26.725	18.859	61.707
11/9/2009 13:44	13980	26.739	18.861	61.739
11/9/2009 13:44	14010	26.712	18.861	61.677
11/9/2009 13:45	14040	26.721	18.861	61.699
11/9/2009 13:45	14070	26.725	18.86	61.707
11/9/2009 13:46	14100	26.722	18.862	61.7
11/9/2009 13:46	14130	26.755	18.861	61.777
11/9/2009 13:47	14160	26.732	18.864	61.724
11/9/2009 13:47	14190	26.73	18.863	61.718
11/9/2009 13:48	14220	26.732	18.861	61.723
11/9/2009 13:48	14250	26.748	18.865	61.76
11/9/2009 13:49	14280	26.716	18.86	61.687
11/9/2009 13:49	14310	26.727	18.863	61.711
11/9/2009 13:50	14340	26.738	18.86	61.737
11/9/2009 13:50	14370	26.73	18.863	61.718
11/9/2009 13:51	14400	26.723	18.861	61.702
11/9/2009 13:51	14430	26.726	18.859	61.71
11/9/2009 13:52	14460	26.718	18.861	61.691
11/9/2009 13:52	14490	26.718	18.86	61.692
11/9/2009 13:53	14520	26.699	18.86	61.646
11/9/2009 13:53	14550	26.71	18.859	61.673
11/9/2009 13:54	14580	26.717	18.86	61.688
11/9/2009 13:54	14610	26.724	18.861	61.705
11/9/2009 13:55	14640	26.717	18.86	61.688
11/9/2009 13:55	14670	26.721	18.861	61.699
11/9/2009 13:56	14700	26.725	18.86	61.706
11/9/2009 13:56	14730	26.714	18.86	61.682
11/9/2009 13:57	14760	26.727	18.859	61.712
11/9/2009 13:57	14790	26.719	18.861	61.693
11/9/2009 13:58	14820	26.732	18.86	61.724
11/9/2009 13:58	14850	26.718	18.857	61.69
11/9/2009 13:59	14880	26.727	18.86	61.711
11/9/2009 13:59	14910	26.722	18.859	61.701
11/9/2009 14:00	14940	26.723	18.859	61.702

11/9/2009 14:00	14970	26.741	18.862	61.744
11/9/2009 14:01	15000	26.707	18.859	61.667
11/9/2009 14:01	15030	26.721	18.859	61.697
11/9/2009 14:02	15060	26.721	18.861	61.698
11/9/2009 14:02	15090	26.727	18.86	61.712
11/9/2009 14:03	15120	26.716	18.86	61.686
11/9/2009 14:03	15150	26.716	18.859	61.687
11/9/2009 14:04	15180	26.71	18.86	61.672
11/9/2009 14:04	15210	26.705	18.861	61.66
11/9/2009 14:05	15240	26.72	18.859	61.696
11/9/2009 14:05	15270	26.708	18.859	61.669
11/9/2009 14:06	15300	26.705	18.857	61.661
11/9/2009 14:06	15330	26.71	18.862	61.673
11/9/2009 14:07	15360	26.705	18.862	61.661
11/9/2009 14:07	15390	26.699	18.859	61.647
11/9/2009 14:08	15420	26.721	18.858	61.698
11/9/2009 14:08	15450	26.705	18.86	61.66
11/9/2009 14:09	15480	26.724	18.862	61.705
11/9/2009 14:09	15510	26.725	18.858	61.707
11/9/2009 14:10	15540	26.724	18.858	61.705
11/9/2009 14:10	15570	26.727	18.862	61.712
11/9/2009 14:11	15600	26.722	18.858	61.7
11/9/2009 14:11	15630	26.714	18.861	61.682
11/9/2009 14:12	15660	26.704	18.859	61.659
11/9/2009 14:12	15690	26.72	18.861	61.695
11/9/2009 14:13	15720	26.716	18.859	61.687
11/9/2009 14:13	15750	26.72	18.861	61.697
11/9/2009 14:14	15780	26.721	18.857	61.699
11/9/2009 14:14	15810	26.727	18.859	61.712
11/9/2009 14:15	15840	26.739	18.86	61.739
11/9/2009 14:15	15870	26.709	18.857	61.671
11/9/2009 14:16	15900	26.74	18.857	61.743
11/9/2009 14:16	15930	26.718	18.859	61.691
11/9/2009 14:17	15960	26.704	18.86	61.658
11/9/2009 14:17	15990	26.721	18.857	61.698
11/9/2009 14:18	16020	26.738	18.858	61.736
11/9/2009 14:18	16050	26.723	18.856	61.704
11/9/2009 14:19	16080	26.718	18.858	61.69
11/9/2009 14:19	16110	26.717	18.857	61.689
11/9/2009 14:20	16140	26.733	18.858	61.725
11/9/2009 14:20	16170	26.715	18.857	61.683
11/9/2009 14:21	16200	26.72	18.857	61.697
11/9/2009 14:21	16230	26.72	18.858	61.696
11/9/2009 14:22	16260	26.714	18.859	61.682
11/9/2009 14:22	16290	26.727	18.855	61.711
11/9/2009 14:23	16320	26.731	18.856	61.721
11/9/2009 14:23	16350	26.711	18.858	61.675

11/9/2009 14:24	16380	26.706	18.857	61.662
11/9/2009 14:24	16410	26.711	18.858	61.674
11/9/2009 14:25	16440	26.708	18.855	61.668
11/9/2009 14:25	16470	26.713	18.858	61.678
11/9/2009 14:26	16500	26.717	18.858	61.688
11/9/2009 14:26	16530	26.717	18.859	61.689
11/9/2009 14:27	16560	26.721	18.86	61.698
11/9/2009 14:27	16590	26.736	18.857	61.732
11/9/2009 14:28	16620	26.702	18.857	61.654
11/9/2009 14:28	16650	26.718	18.857	61.69
11/9/2009 14:29	16680	26.723	18.858	61.703
11/9/2009 14:29	16710	26.731	18.859	61.72
11/9/2009 14:30	16740	26.725	18.857	61.707
11/9/2009 14:30	16770	26.708	18.859	61.667
11/9/2009 14:31	16800	26.713	18.858	61.679
11/9/2009 14:31	16830	26.712	18.858	61.677
11/9/2009 14:32	16860	26.706	18.86	61.662
11/9/2009 14:32	16890	26.712	18.855	61.678
11/9/2009 14:33	16920	26.722	18.855	61.7
11/9/2009 14:33	16950	26.713	18.855	61.678
11/9/2009 14:34	16980	26.723	18.858	61.703
11/9/2009 14:34	17010	26.731	18.858	61.721
11/9/2009 14:35	17040	26.712	18.856	61.677
11/9/2009 14:35	17070	26.708	18.857	61.669
11/9/2009 14:36	17100	26.741	18.859	61.745
11/9/2009 14:36	17130	26.722	18.857	61.701
11/9/2009 14:37	17160	26.72	18.859	61.696
11/9/2009 14:37	17190	26.725	18.858	61.707
11/9/2009 14:38	17220	26.746	18.856	61.755
11/9/2009 14:38	17250	26.735	18.858	61.731
11/9/2009 14:39	17280	26.699	18.863	61.647
11/9/2009 14:39	17310	26.716	18.861	61.687
11/9/2009 14:40	17340	26.711	18.86	61.675
11/9/2009 14:40	17370	26.709	18.859	61.67
11/9/2009 14:41	17400	26.734	18.858	61.728
11/9/2009 14:41	17430	26.69	18.861	61.625
11/9/2009 14:42	17460	26.7	18.859	61.648
11/9/2009 14:42	17490	26.712	18.859	61.677
11/9/2009 14:43	17520	26.692	18.857	61.632
11/9/2009 14:43	17550	26.705	18.86	61.661
11/9/2009 14:44	17580	26.709	18.858	61.669
11/9/2009 14:44	17610	26.692	18.859	61.63
11/9/2009 14:45	17640	26.692	18.859	61.632
11/9/2009 14:45	17670	26.702	18.86	61.654
11/9/2009 14:46	17700	26.694	18.855	61.635
11/9/2009 14:46	17730	26.684	18.858	61.612
11/9/2009 14:47	17760	26.692	18.859	61.632

11/9/2009 14:47	17790	26.68	18.856	61.603
11/9/2009 14:48	17820	26.702	18.856	61.654
11/9/2009 14:48	17850	26.697	18.857	61.642
11/9/2009 14:49	17880	26.7	18.854	61.65
11/9/2009 14:49	17910	26.704	18.855	61.659
11/9/2009 14:50	17940	26.703	18.856	61.656
11/9/2009 14:50	17970	26.683	18.857	61.611
11/9/2009 14:51	18000	26.693	18.855	61.633
11/9/2009 14:51	18030	26.702	18.857	61.654
11/9/2009 14:52	18060	26.689	18.857	61.624
11/9/2009 14:52	18090	26.693	18.859	61.633
11/9/2009 14:53	18120	26.699	18.857	61.647
11/9/2009 14:53	18150	26.697	18.858	61.643
11/9/2009 14:54	18180	26.684	18.855	61.612
11/9/2009 14:54	18210	26.691	18.857	61.629
11/9/2009 14:55	18240	26.696	18.856	61.639
11/9/2009 14:55	18270	26.7	18.859	61.65
11/9/2009 14:56	18300	26.681	18.859	61.606
11/9/2009 14:56	18330	26.694	18.855	61.636
11/9/2009 14:57	18360	26.689	18.853	61.623
11/9/2009 14:57	18390	26.683	18.856	61.611
11/9/2009 14:58	18420	26.687	18.858	61.618
11/9/2009 14:58	18450	26.681	18.855	61.607
11/9/2009 14:59	18480	26.659	18.859	61.555
11/9/2009 14:59	18510	26.688	18.859	61.621
11/9/2009 15:00	18540	26.694	18.857	61.636
11/9/2009 15:00	18570	26.684	18.856	61.613
11/9/2009 15:01	18600	26.664	18.857	61.566
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11/9/2009 15:02	18660	26.671	18.855	61.583
11/9/2009 15:02	18690	26.672	18.856	61.585
11/9/2009 15:03	18720	26.687	18.853	61.62
11/9/2009 15:03	18750	26.679	18.855	61.602
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11/9/2009 15:04	18810	26.679	18.857	61.601
11/9/2009 15:05	18840	26.695	18.856	61.637
11/9/2009 15:05	18870	26.679	18.857	61.602
11/9/2009 15:06	18900	26.687	18.854	61.62
11/9/2009 15:06	18930	26.674	18.858	61.589
11/9/2009 15:07	18960	26.693	18.854	61.634
11/9/2009 15:07	18990	26.69	18.855	61.625
11/9/2009 15:08	19020	26.699	18.857	61.647
11/9/2009 15:08	19050	26.68	18.858	61.604
11/9/2009 15:09	19080	26.673	18.854	61.586
11/9/2009 15:09	19110	26.687	18.855	61.619
11/9/2009 15:10	19140	26.682	18.857	61.609
11/9/2009 15:10	19170	26.681	18.848	61.606

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11/9/2009 15:12	19260	26.68	18.853	61.602
11/9/2009 15:12	19290	26.678	18.852	61.599
11/9/2009 15:13	19320	26.677	18.854	61.597
11/9/2009 15:13	19350	26.686	18.853	61.618
11/9/2009 15:14	19380	26.682	18.852	61.609
11/9/2009 15:14	19410	26.69	18.852	61.626
11/9/2009 15:15	19440	26.695	18.852	61.638
11/9/2009 15:15	19470	26.703	18.852	61.655
11/9/2009 15:16	19500	26.687	18.856	61.62
11/9/2009 15:16	19530	26.688	18.853	61.622
11/9/2009 15:17	19560	26.688	18.85	61.622
11/9/2009 15:17	19590	26.693	18.85	61.633
11/9/2009 15:18	19620	26.706	18.852	61.663
11/9/2009 15:18	19650	26.702	18.851	61.653
11/9/2009 15:19	19680	26.705	18.853	61.66
11/9/2009 15:19	19710	26.696	18.855	61.641
11/9/2009 15:20	19740	29.881	18.854	68.994
11/9/2009 15:20	19770	32.83	18.858	75.804
11/9/2009 15:21	19800	34.189	18.858	78.941
11/9/2009 15:21	19830	34.851	18.865	80.469
11/9/2009 15:22	19860	35.21	18.877	81.298
11/9/2009 15:22	19890	35.433	18.881	81.813
11/9/2009 15:23	19920	35.563	18.893	82.114
11/9/2009 15:23	19950	35.666	18.899	82.352
11/9/2009 15:24	19980	35.746	18.908	82.537
11/9/2009 15:24	20010	35.818	18.916	82.703
11/9/2009 15:25	20040	35.872	18.922	82.827
11/9/2009 15:25	20070	35.909	18.928	82.913
11/9/2009 15:26	20100	35.951	18.929	83.009
11/9/2009 15:26	20130	35.992	18.939	83.104
11/9/2009 15:27	20160	36.024	18.94	83.179
11/9/2009 15:27	20190	36.058	18.943	83.257
11/9/2009 15:28	20220	36.085	18.947	83.32
11/9/2009 15:28	20250	36.11	18.952	83.377
11/9/2009 15:29	20280	36.132	18.952	83.427
11/9/2009 15:29	20310	36.154	18.953	83.478
11/9/2009 15:30	20340	36.173	18.952	83.521
11/9/2009 15:30	20370	36.186	18.959	83.553
11/9/2009 15:31	20400	36.199	18.959	83.583
11/9/2009 15:31	20430	36.215	18.96	83.62
11/9/2009 15:32	20460	36.244	18.96	83.686
11/9/2009 15:32	20490	36.262	18.959	83.729
11/9/2009 15:33	20520	36.265	18.964	83.735
11/9/2009 15:33	20550	36.286	18.963	83.784
11/9/2009 15:34	20580	36.296	18.965	83.806

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11/9/2009 15:35	20640	36.316	18.969	83.853
11/9/2009 15:35	20670	36.333	18.967	83.891
11/9/2009 15:36	20700	36.337	18.97	83.901
11/9/2009 15:36	20730	36.336	18.968	83.898
11/9/2009 15:37	20760	36.352	18.969	83.936
11/9/2009 15:37	20790	36.367	18.968	83.97
11/9/2009 15:38	20820	36.375	18.97	83.988
11/9/2009 15:38	20850	36.382	18.969	84.006
11/9/2009 15:39	20880	36.385	18.973	84.012
11/9/2009 15:39	20910	36.4	18.975	84.047
11/9/2009 15:40	20940	36.411	18.978	84.072
11/9/2009 15:40	20970	36.415	18.975	84.082
11/9/2009 15:41	21000	36.418	18.975	84.088
11/9/2009 15:41	21030	36.417	18.976	84.085
11/9/2009 15:42	21060	36.425	18.977	84.105
11/9/2009 15:42	21090	36.433	18.975	84.122
11/9/2009 15:43	21120	36.429	18.975	84.112
11/9/2009 15:43	21150	36.446	18.978	84.152
11/9/2009 15:44	21180	36.453	18.977	84.168
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11/9/2009 15:45	21240	36.455	18.977	84.172
11/9/2009 15:45	21270	36.463	18.977	84.191
11/9/2009 15:46	21300	36.457	18.977	84.178
11/9/2009 15:46	21330	36.472	18.978	84.213
11/9/2009 15:47	21360	36.468	18.975	84.203
11/9/2009 15:47	21390	36.48	18.979	84.232
11/9/2009 15:48	21420	36.485	18.977	84.244
11/9/2009 15:48	21450	36.479	18.98	84.228
11/9/2009 15:49	21480	36.494	18.975	84.265
11/9/2009 15:49	21510	36.498	18.98	84.273
11/9/2009 15:50	21540	36.493	18.984	84.261
11/9/2009 15:50	21570	36.501	18.981	84.28
11/9/2009 15:51	21600	36.504	18.979	84.286
11/9/2009 15:51	21630	36.508	18.977	84.297
11/9/2009 15:52	21660	36.511	18.979	84.304
11/9/2009 15:52	21690	36.501	18.978	84.279
11/9/2009 15:53	21720	36.509	18.982	84.299
11/9/2009 15:53	21750	36.522	18.978	84.327
11/9/2009 15:54	21780	36.523	18.977	84.331
11/9/2009 15:54	21810	36.529	18.979	84.344
11/9/2009 15:55	21840	36.529	18.98	84.344
11/9/2009 15:55	21870	36.532	18.98	84.35
11/9/2009 15:56	21900	36.53	18.978	84.347
11/9/2009 15:56	21930	36.534	18.98	84.355
11/9/2009 15:57	21960	36.535	18.981	84.357
11/9/2009 15:57	21990	36.534	18.979	84.355

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11/9/2009 15:58	22050	36.541	18.982	84.373
11/9/2009 15:59	22080	36.54	18.979	84.37
11/9/2009 15:59	22110	36.547	18.982	84.386
11/9/2009 16:00	22140	36.545	18.982	84.381
11/9/2009 16:00	22170	36.549	18.979	84.39
11/9/2009 16:01	22200	36.538	18.977	84.365
11/9/2009 16:01	22230	36.539	18.978	84.368
11/9/2009 16:02	22260	36.551	18.98	84.395
11/9/2009 16:02	22290	36.555	18.979	84.404
11/9/2009 16:03	22320	36.556	18.983	84.406
11/9/2009 16:03	22350	36.56	18.976	84.416
11/9/2009 16:04	22380	36.556	18.983	84.406
11/9/2009 16:04	22410	36.558	18.981	84.412
11/9/2009 16:05	22440	36.554	18.98	84.403
11/9/2009 16:05	22470	36.56	18.98	84.417
11/9/2009 16:06	22500	36.553	18.979	84.399
11/9/2009 16:06	22530	36.556	18.98	84.407
11/9/2009 16:07	22560	36.568	18.98	84.435
11/9/2009 16:07	22590	36.558	18.977	84.411
11/9/2009 16:08	22620	36.563	18.979	84.423
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11/9/2009 16:09	22680	36.573	18.978	84.446
11/9/2009 16:09	22710	36.573	18.982	84.447
11/9/2009 16:10	22740	36.574	18.978	84.448
11/9/2009 16:10	22770	36.57	18.983	84.438
11/9/2009 16:11	22800	36.574	18.982	84.449
11/9/2009 16:11	22830	36.578	18.98	84.456
11/9/2009 16:12	22860	36.577	18.982	84.456
11/9/2009 16:12	22890	36.582	18.98	84.468
11/9/2009 16:13	22920	36.581	18.98	84.463
11/9/2009 16:13	22950	36.577	18.979	84.456
11/9/2009 16:14	22980	36.573	18.98	84.446
11/9/2009 16:14	23010	36.58	18.982	84.462
11/9/2009 16:15	23040	36.584	18.982	84.472
11/9/2009 16:15	23070	36.579	18.981	84.46
11/9/2009 16:16	23100	36.573	18.977	84.446
11/9/2009 16:16	23130	36.584	18.979	84.471
11/9/2009 16:17	23160	36.583	18.981	84.47
11/9/2009 16:17	23190	36.587	18.98	84.478
11/9/2009 16:18	23220	36.587	18.984	84.477
11/9/2009 16:18	23250	36.578	18.983	84.458
11/9/2009 16:19	23280	36.582	18.979	84.466
11/9/2009 16:19	23310	36.575	18.984	84.451
11/9/2009 16:20	23340	36.587	18.981	84.479
11/9/2009 16:20	23370	36.589	18.979	84.482
11/9/2009 16:21	23400	36.589	18.983	84.482

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11/9/2009 16:22	23460	36.59	18.983	84.486
11/9/2009 16:22	23490	36.597	18.981	84.502
11/9/2009 16:23	23520	36.592	18.985	84.49
11/9/2009 16:23	23550	36.591	18.982	84.487
11/9/2009 16:24	23580	36.591	18.982	84.488
11/9/2009 16:24	23610	36.592	18.982	84.49
11/9/2009 16:25	23640	36.598	18.98	84.504
11/9/2009 16:25	23670	36.593	18.983	84.493
11/9/2009 16:26	23700	36.592	18.983	84.49
11/9/2009 16:26	23730	36.59	18.983	84.486
11/9/2009 16:27	23760	36.591	18.985	84.488
11/9/2009 16:27	23790	36.596	18.983	84.498
11/9/2009 16:28	23820	36.588	18.983	84.48
11/9/2009 16:28	23850	36.598	18.982	84.503
11/9/2009 16:29	23880	36.59	18.985	84.486
11/9/2009 16:29	23910	36.596	18.98	84.498
11/9/2009 16:30	23940	36.602	18.984	84.513
11/9/2009 16:30	23970	36.596	18.982	84.498
11/9/2009 16:31	24000	36.6	18.984	84.507
11/9/2009 16:31	24030	36.601	18.983	84.511
11/9/2009 16:32	24060	36.598	18.986	84.503
11/9/2009 16:32	24090	36.599	18.983	84.505
11/9/2009 16:33	24120	36.59	18.984	84.485
11/9/2009 16:33	24150	36.599	18.987	84.506
11/9/2009 16:34	24180	36.593	18.984	84.493
11/9/2009 16:34	24210	36.596	18.982	84.5
11/9/2009 16:35	24240	36.604	18.984	84.517
11/9/2009 16:35	24270	36.591	18.984	84.488
11/9/2009 16:36	24300	36.601	18.982	84.511
11/9/2009 16:36	24330	36.603	18.984	84.516
11/9/2009 16:37	24360	36.597	18.984	84.501
11/9/2009 16:37	24390	36.601	18.987	84.512
11/9/2009 16:38	24420	36.602	18.985	84.513
11/9/2009 16:38	24450	36.596	18.984	84.5
11/9/2009 16:39	24480	36.604	18.984	84.517
11/9/2009 16:39	24510	36.601	18.987	84.51
11/9/2009 16:40	24540	36.607	18.984	84.524
11/9/2009 16:40	24570	36.604	18.986	84.518
11/9/2009 16:41	24600	36.599	18.986	84.506
11/9/2009 16:41	24630	36.605	18.984	84.519
11/9/2009 16:42	24660	36.605	18.986	84.521
11/9/2009 16:42	24690	36.607	18.986	84.524
11/9/2009 16:43	24720	36.604	18.986	84.517
11/9/2009 16:43	24750	36.606	18.984	84.521
11/9/2009 16:44	24780	36.608	18.985	84.528
11/9/2009 16:44	24810	36.608	18.986	84.528

11/9/2009 16:45	24840	36.605	18.986	84.521
11/9/2009 16:45	24870	36.607	18.987	84.525
11/9/2009 16:46	24900	36.594	18.985	84.495
11/9/2009 16:46	24930	36.603	18.985	84.515
11/9/2009 16:47	24960	36.603	18.984	84.515
11/9/2009 16:47	24990.076	36.604	19.003	84.518
11/9/2009 16:48	25020.091	36.604	19.003	84.518
11/9/2009 16:48	25050	36.609	18.986	84.53
11/9/2009 16:49	25080	36.605	18.989	84.52
11/9/2009 16:49	25110	36.609	18.987	84.528
11/9/2009 16:50	25140	36.599	18.987	84.507
11/9/2009 16:50	25170	36.608	18.989	84.526
11/9/2009 16:51	25200	36.609	18.988	84.529
11/9/2009 16:51	25230	36.611	18.987	84.534
11/9/2009 16:52	25260	36.608	18.988	84.526
11/9/2009 16:52	25290	36.608	18.987	84.527
11/9/2009 16:53	25320	36.612	18.988	84.535
11/9/2009 16:53	25350	36.61	18.987	84.531
11/9/2009 16:54	25380	36.61	18.984	84.531
11/9/2009 16:54	25410	36.606	18.989	84.523
11/9/2009 16:55	25440	36.614	18.988	84.541
11/9/2009 16:55	25470	36.611	18.987	84.535
11/9/2009 16:56	25500	36.599	18.988	84.506
11/9/2009 16:56	25530	36.61	18.987	84.532

Pumping Test Data Sheet

Daniel B. Stephens & Associates, Inc.

Sheet 1 of 3

Project Name: Salty Dog Step Test Pumping Well: BW-02

Date	Time	Rate (gpm)	Depth to Water (ft)	Elapsed Time (min)	Drawdown (feet)	Comments
11/9/09	0835		63.39			Static; 3' stickup
	0952		63.30			TD = 155' from stickup.
	0954		63.32	00:00		~~[illegible]~~ Start up 10gpm
	1001		77.63	1:00		~~[illegible]~~ 50.51511.7
			78.55	2:00		
			76.58	3:00		
			75.49	4:00		
			75.27	5:00		
			75.24	6:00		
			75.21	7:00		
			75.24	8:00		
			75.26	9:00		
			75.31	10:00		
			75.34	12:00		
			75.37	14:00		15min hr to test stepup to 40gpm 75.38@15:00
			~~83.58~~ 82.12	15:00 16:00		
			83.78	~~17:00 18:00~~		
			84.41	~~19:00~~ 18:00		
			84.57	19:00		
			84.61	20:00		
			84.63	21:00		
			84.69	22:00		
			84.70	23:00		
			84.73	24:00		
			84.77	25:00		
			84.82	26:00		
			84.83	28:00		
11/9/09			84.86	30:00		

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Project Name: Salty Dog Step Test Pumping Well: RW-02

Date	Time	Rate (gpm)	Depth to Water (ft)	Elapsed Time (min)/sec	Drawdown (feet)	Comments
11/9/09			84.87	32:00		40gpm
			84.89	34:00		
			84.99	38:00		
			84.93	42:00		
			84.97	45:00		
			85.03	50:00		
			85.05	55:00		
			85.05	61:00		
			85.01	65:00		pH=6.67; T=19.5°C; SpC(ATC)=17140 µs/cm
			85.09	70:00		
			85.06	75:00		
			85.06	80:00		
			85.05	90:00		
			85.06	100:00		
			85.06	110:00		
			85.06	120:00		at 120 min step up to ?? gpm
			85.74	121:00		
			85.93	122:00		
			85.98	123:00		
			85.99	124:00		
			85.99	125:00		
			85.99	126:00		
			86.02	130:00		
			86.01	135:00		pH=6.70; T=19.6°C; SpC(ATC)=17300 µs/cm
			86.06	145:00		
			86.04	155:00		
V			85.96	170:00		
11/9/09			85.98	185:00		

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Pumping Test Data Sheet

Daniel B. Stephens & Associates, Inc.

Sheet 3 of 3

Project Name: Salty Dog Step Test Pumping Well: RW-02

Date	Time	Rate (gpm)	Depth to Water (ft)	Elapsed Time (min)	Drawdown (feet)	Comments
11/9/09			85.90	210:00		
			86.00	240:00		
			85.99	270:00		pH=6.67 T=19.8°C; SpC=16740 µS/cm
			86.11	300:00		
			86.06	315:00		
			86.06	320:00		shutoff pump/RECOVERY
			70.16	321:00		
			66.55	322:00		
			65.69	323:00		
			65.22	324:00		
			64.92	325:00		
			64.72	326:00		
			~~64.53~~ NM	327:00		
			~~64.31~~ 64.43	328:00		
			64.31	329:00		
			64.21	330:00		
			64.07	332:00		
			63.93	334:00		
			63.83	336:00		
			63.76	338:00		
			63.71	340:00		
			63.56	345:00		
			63.47	350:00		
			63.40	356:00		
			63.31	371:00		
			63.28	383:00		
			63.26	394:00		
↓ 11/9/09						

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24 steps

Pumping Test Data Sheet

Daniel B. Stephens & Associates, Inc.

75.8' to pwell

Sheet 1 of 1

Project Name: Salty Dog Step Test

Observation Well: NW-2D

Date	Time	Depth to Water (ft)	Elapsed Time (min)	Drawdown (feet)	Comments
11/9/09	0849	63.68			static; measured above toc
	1032	66.41			@ ~ 40.35 gpm (2nd step)
	1038	66.52			"
	1054	66.67			"
	1121	66.72			"
	1147	66.73			"
	1239	66.85			@ ~ 40 gpm (3rd step) (2nd step)
	1308	66.83			
	1338	66.83			
	1403	66.84			
	1433	66.83			
	1503	66.85			@ ~ 40 gpm (3rd step
	1522	66.81			Recovery
	1526	65.41			
	1527	65.23			
	1528	65.11			
	1529	64.92			
	1530	64.88			
	1540	64.24			
	1547	64.06			
	1555	63.84			
	1608	63.72			
	1616	63.69			
	1624	63.67			
	1642	63.64			
	1650	63.64			Recovery

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Pumping Test Data Sheet

Daniel B. Stephens & Associates, Inc.

74.0' to Q well

Sheet 1 of 1

Project Name: Salty Dog Step Test Observation Well: MW-03

Date	Time	Depth to Water (ft)	Elapsed Time (min)	Drawdown (feet)	Comments
11/9/09	9:11	62.82			Static, measured @ toc
	10:35	65.06			@ ~40.35 gpm (2nd step)
	10:56	65.22			"
	11:52	65.26			" (2nd step)
	12:37	65.35			@ 40 gpm (3rd step)
	13:07	65.34			
	13:36	65.32			
	14:01	65.34			
	14:32	65.33			
	15:01	65.35			@ 40 gpm (3rd step)
	15:38	63.31			Recovery
	15:47	63.03			
	15:51	62.96			
	15:58	62.90			
	16:12	62.84			
~~16:16~~	~~63.69~~				(RPA)
	16:21	62.81			
	16:31	62.80			
	16:43	62.80			Recovery

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Pumping Test Data Sheet

Daniel B. Stephens & Associates, Inc. 36 steps

Sheet 1 of 1

Project Name: Salty Dog Step Test Observation Well: MW-04

Date	Time	Depth to Water (ft)	Elapsed Time (min)	Drawdown (feet)	Comments
11/9/09	9:01	62.70			Static measured @ log
	10:39	64.80			@ ~40 gpm (2nd step)
	10:58	64.94			" (2nd step)
	11:54	65.01			" (2nd step)
	12:42	65.07			@ 40 gpm (3rd step)
	13:09	65.06			
	13:39	65.05			
	14:05	65.06			
	14:35	65.06			
	15:05	65.07			@ 40 gpm (3rd step)
	15:24	64.53			Recovery
	15:32	63.58			
	15:42	63.13			
	15:50	62.98			
	16:03	62.77			
	16:15	62.73			
	16:28	62.69			
	16:39	62.67			
	16:48	62.67			Recovery

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Pumping Test Data Sheet

Daniel B. Stephens & Associates, Inc.

36 steps @ distance to MW-04

Sheet 1 of 1

Project Name: Salty Dog Step Test

Observation Well: MW-05

Date	Time	Depth to Water (ft)	Elapsed Time (min)	Drawdown (feet)	Comments
11/9/09	9:06	~~60.~~61.01			Static, measured above TOC
	11:56	61.60			@ ~~40~~ 35 gpm (2nd step)
	12:44	61.60			@ 40 gpm (3rd step)
	13:12	61.61			
	13:42	61.62			
	14:08	61.61			
	14:37	61.62			
	15:07	61.61			@ 40 gpm (3rd step)
	15:35	61.44			Recovery
	15:44	61.27			
	15:52	61.19			
	16:01	61.10			
	16:06	61.08			
	16:14	61.07			
	16:18	61.06			
	16:25	61.04			
	16:36	61.03			
	16:47	61.03			Recovery

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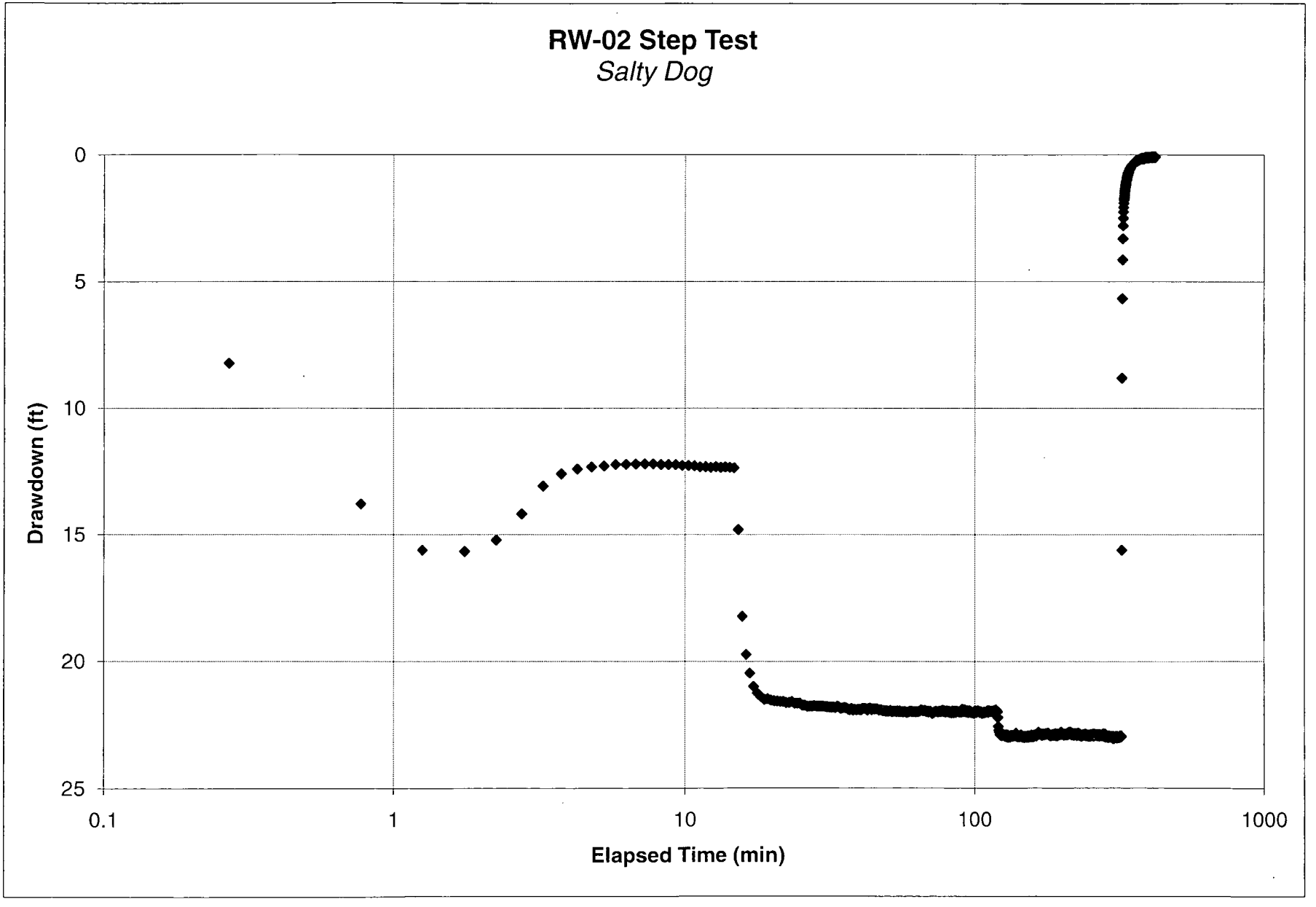
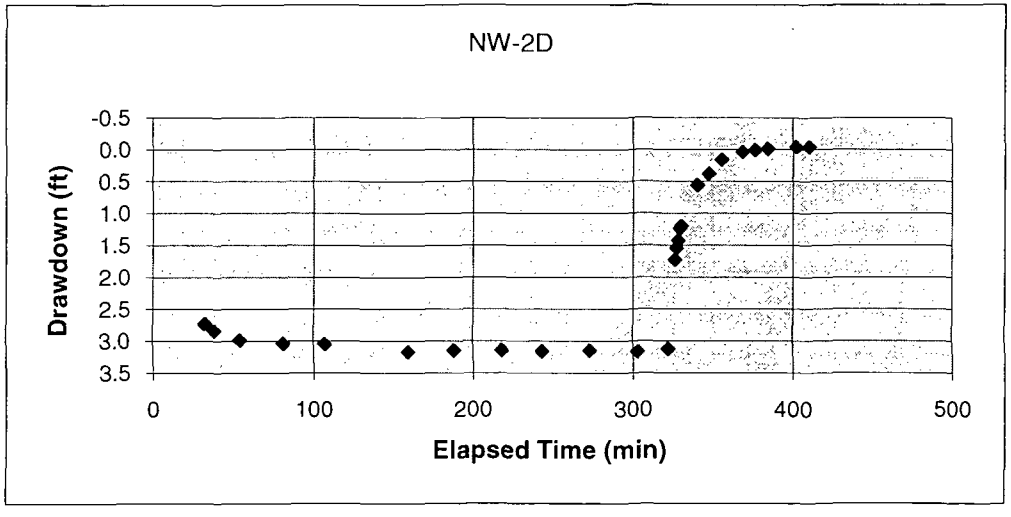

RW-02 Step Test
Salty Dog
Drawdown (ft)
0
5
10
15
20
25
0.1
1
10
100
1000
Elapsed Time (min)

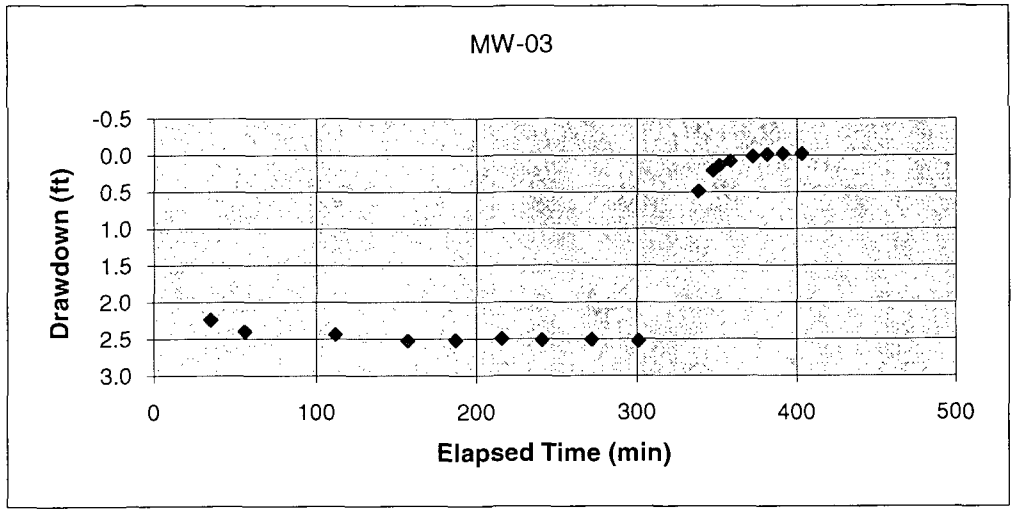
Time	DTW_ft	Elapsed_min	Drawdown_ft	
8:49	63.68			Static, start at 10:00
10:32	66.41	32	2.73	2nd step
10:38	66.52	38	2.84	
10:54	66.67	54	2.99	
11:21	66.72	81	3.04	
11:47	66.73	107	3.05	
12:39	66.85	159	3.17	3rd step
13:08	66.83	188	3.15	
13:38	66.83	218	3.15	
14:03	66.84	243	3.16	
14:33	66.83	273	3.15	
15:03	66.85	303	3.17	
15:22	66.81	322	3.13	Recovery
15:26	65.41	326	1.73	
15:27	65.23	327	1.55	
15:28	65.11	328	1.43	
15:29	64.92	329	1.24	
15:30	64.88	330	1.20	
15:40	64.24	340	0.56	
15:47	64.06	347	0.38	
15:55	63.84	355	0.16	
16:08	63.72	368	0.04	
16:16	63.69	376	0.01	
16:24	63.67	384	-0.01	
16:42	63.64	402	-0.04	
16:50	63.64	410	-0.04	

10:00



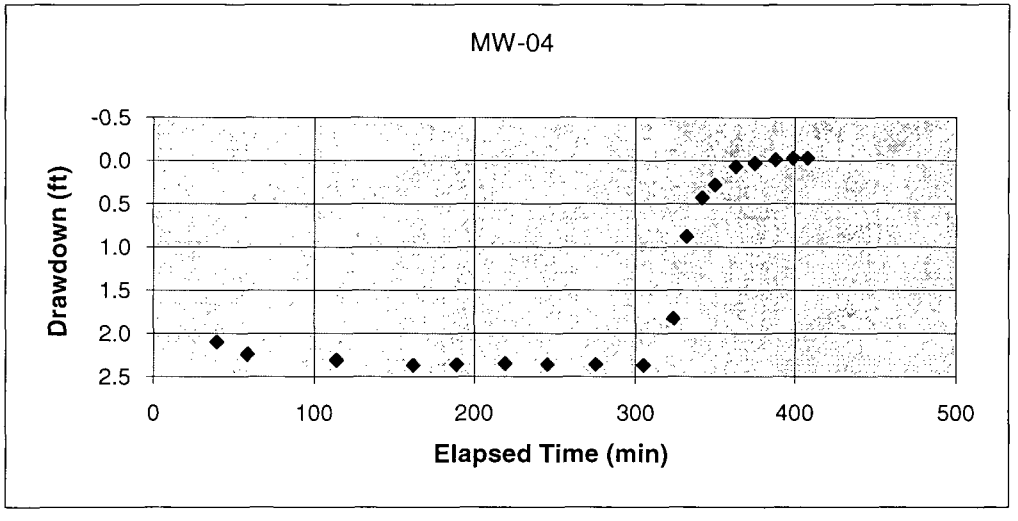
Time	DTW_ft	Elapsed_min	Drawdown_ft	
9:11	62.82			Static, start at 10:00
10:35	65.06	35	2.24	2nd step
10:56	65.22	56	2.40	
11:52	65.26	112	2.44	
12:37	65.35	157	2.53	3rd step
13:07	65.34	187	2.52	
13:36	65.32	216	2.50	
14:01	65.34	241	2.52	
14:32	65.33	272	2.51	
15:01	65.35	301	2.53	
15:38	63.31	338	0.49	Recovery
15:47	63.03	347	0.21	
15:51	62.96	351	0.14	
15:58	62.90	358	0.08	
16:12	62.84	372	0.02	
16:21	62.81	381	-0.01	
16:31	62.80	391	-0.02	
16:43	62.80	403	-0.02	

10:00



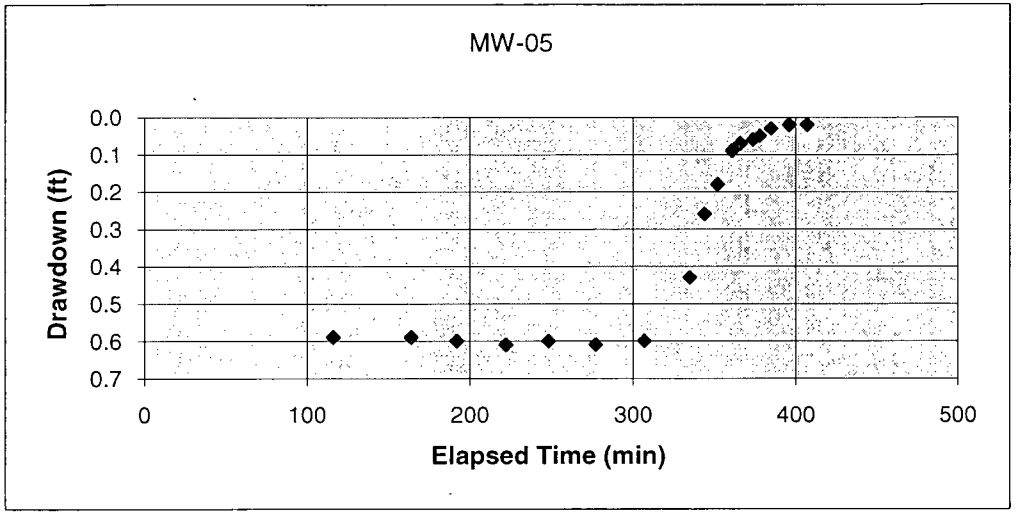
Time	DTW_ft	Elapsed_min	Drawdown_ft	
9:01	62.70			Static, start at 10:00
10:39	64.80	39	2.1	2nd step
10:58	64.94	58	2.24	
11:54	65.01	114	2.31	
12:42	65.07	162	2.37	3rd step
13:09	65.06	189	2.36	
13:39	65.05	219	2.35	
14:05	65.06	245	2.36	
14:35	65.06	275	2.36	
15:05	65.07	305	2.37	
15:24	64.53	324	1.83	Recovery
15:32	63.58	332	0.88	
15:42	63.13	342	0.43	
15:50	62.98	350	0.28	
16:03	62.77	363	0.07	
16:15	62.73	375	0.03	
16:28	62.69	388	-0.01	
16:39	62.67	399	-0.03	
16:48	62.67	408	-0.03	

10:00



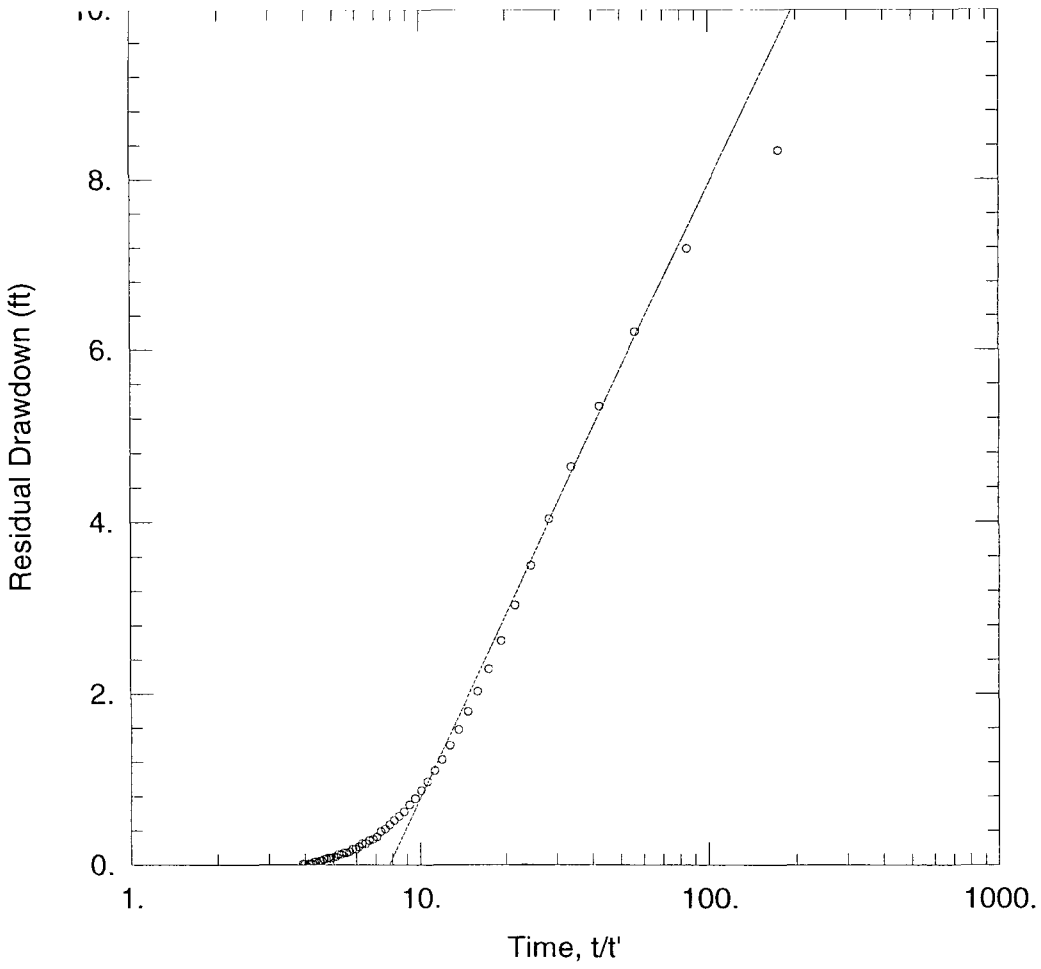
Time	DTW_ft	Elapsed_min	Drawdown_ft	
9:06	61.01			Static, start at 10:00
11:56	61.60	116	0.59	2nd step
12:44	61.60	164	0.59	3rd step
13:12	61.61	192	0.60	
13:42	61.62	222	0.61	
14:08	61.61	248	0.60	
14:37	61.62	277	0.61	
15:07	61.61	307	0.60	
15:35	61.44	335	0.43	Recovery
15:44	61.27	344	0.26	
15:52	61.19	352	0.18	
16:01	61.10	361	0.09	
16:06	61.08	366	0.07	
16:14	61.07	374	0.06	
16:18	61.06	378	0.05	
16:25	61.04	385	0.03	
16:36	61.03	396	0.02	
16:47	61.03	407	0.02	

10:00



Appendix E

Pumping Test Results



WELL TEST ANALYSIS

Data Set: S:\...\RW-01_Recovery.AQT
Date: 11/14/09 Time: 11:47:12

PROJECT INFORMATION

Company: DBS&A
Client: Salty Dog
Project: ES06.0118.01
Location: Salty Dog
Test Well: RW-01
Test Date: 11/10/09

AQUIFER DATA

Saturated Thickness: 80. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-01	0	0

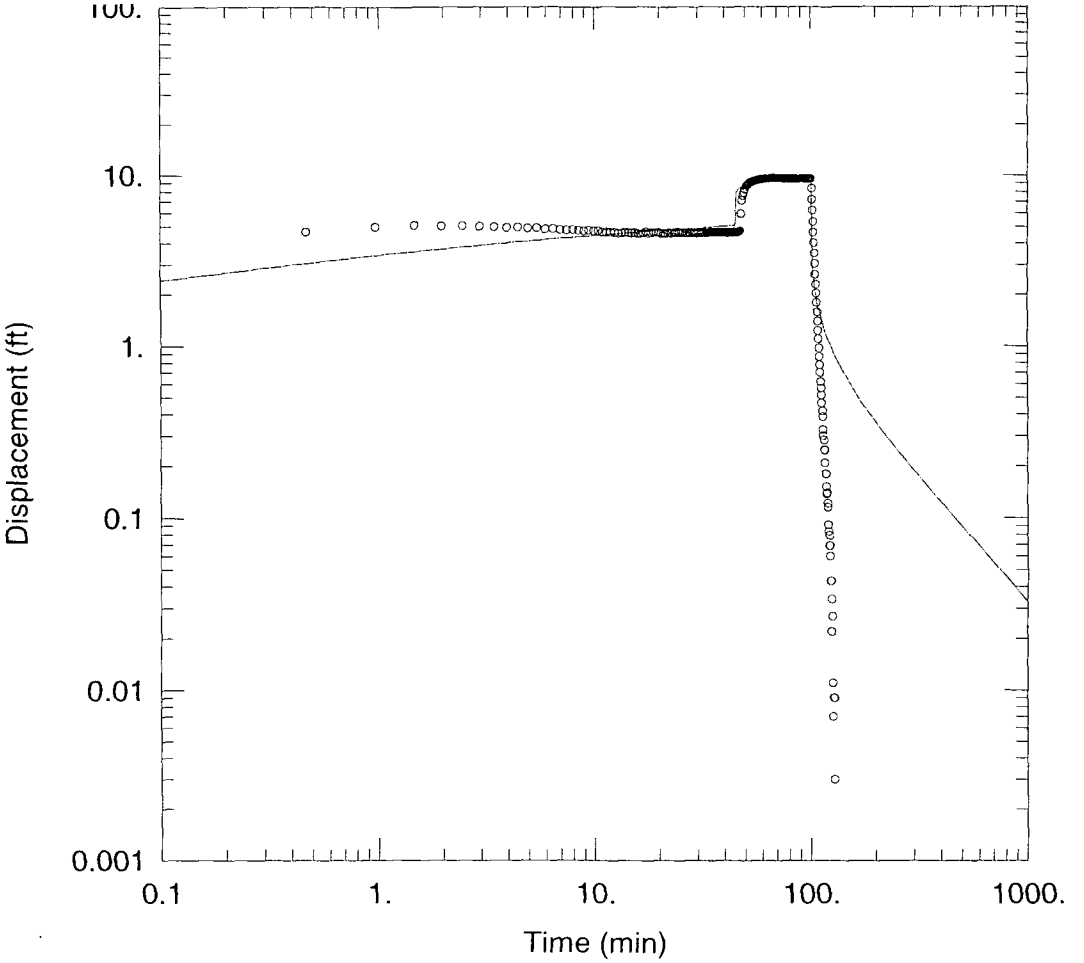
Observation Wells

Well Name	X (ft)	Y (ft)
◦ RW-01	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 22.66 ft^2/day S/S' = 7.787



WELL TEST ANALYSIS

Data Set: S:\...\RW-01_StepTest.AQT
Date: 11/14/09 Time: 11:49:46

PROJECT INFORMATION

Company: DBS&A
Client: Salty Dog
Project: ES06.0118.01
Location: Salty Dog
Test Well: RW-01
Test Date: 11/10/09

AQUIFER DATA

Saturated Thickness: 80. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-01	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
◦ RW-01	0	0

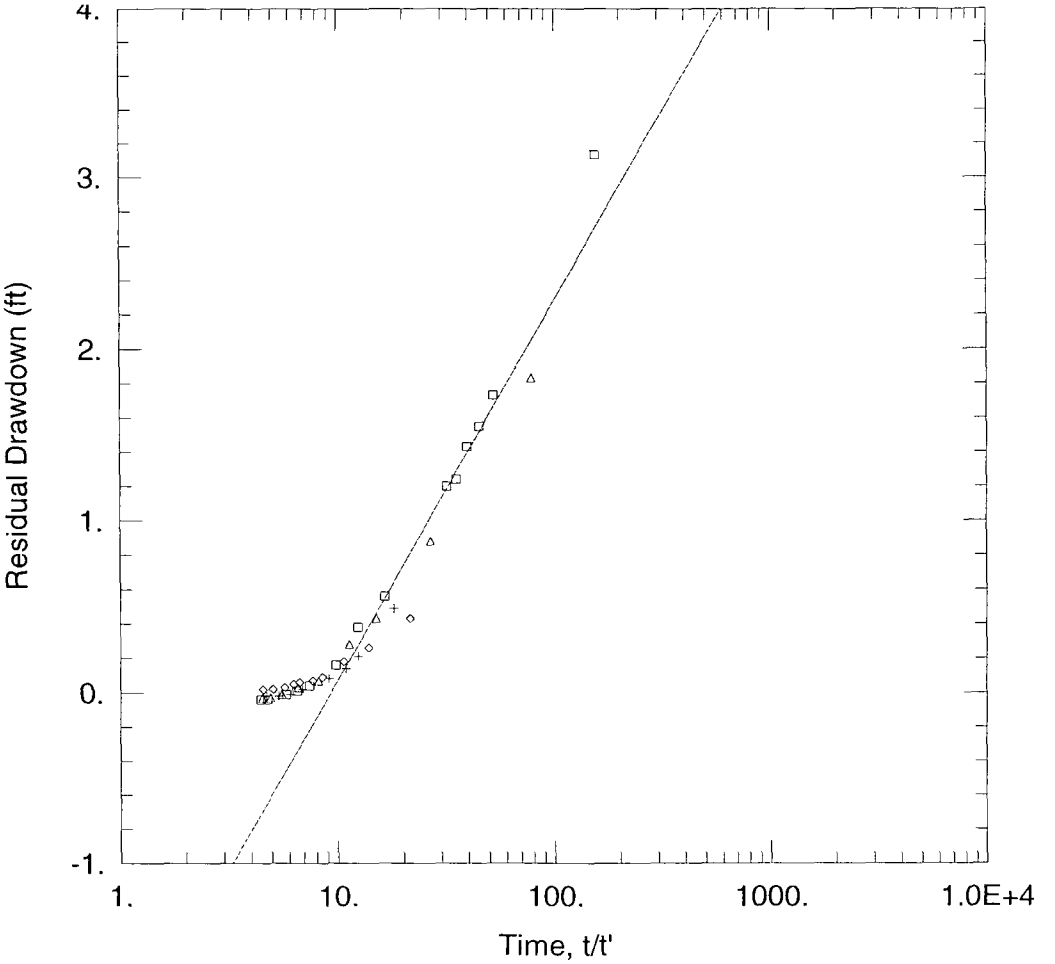
SOLUTION

Aquifer Model: Confined
Solution Method: Theis (Step Test)

T = 500.2 ft^2/day
S = 0.15
Sw = 0.6842
C = 7.605 min^2/ft^5
P = 2.

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 5.851Q + 7.605Q^{2.}$
W.E. = 52.6% (Q from last step)



WELL TEST ANALYSIS

Data Set: S:\...\RW-02_ObsWells.AQT
Date: 11/14/09 Time: 11:51:30

PROJECT INFORMATION

Company: DBS&A
Client: Salty Dog
Project: ES06.0118.01
Location: Salty Dog
Test Well: RW-02
Test Date: 11/09/09

AQUIFER DATA

Saturated Thickness: 108. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-02	0	0

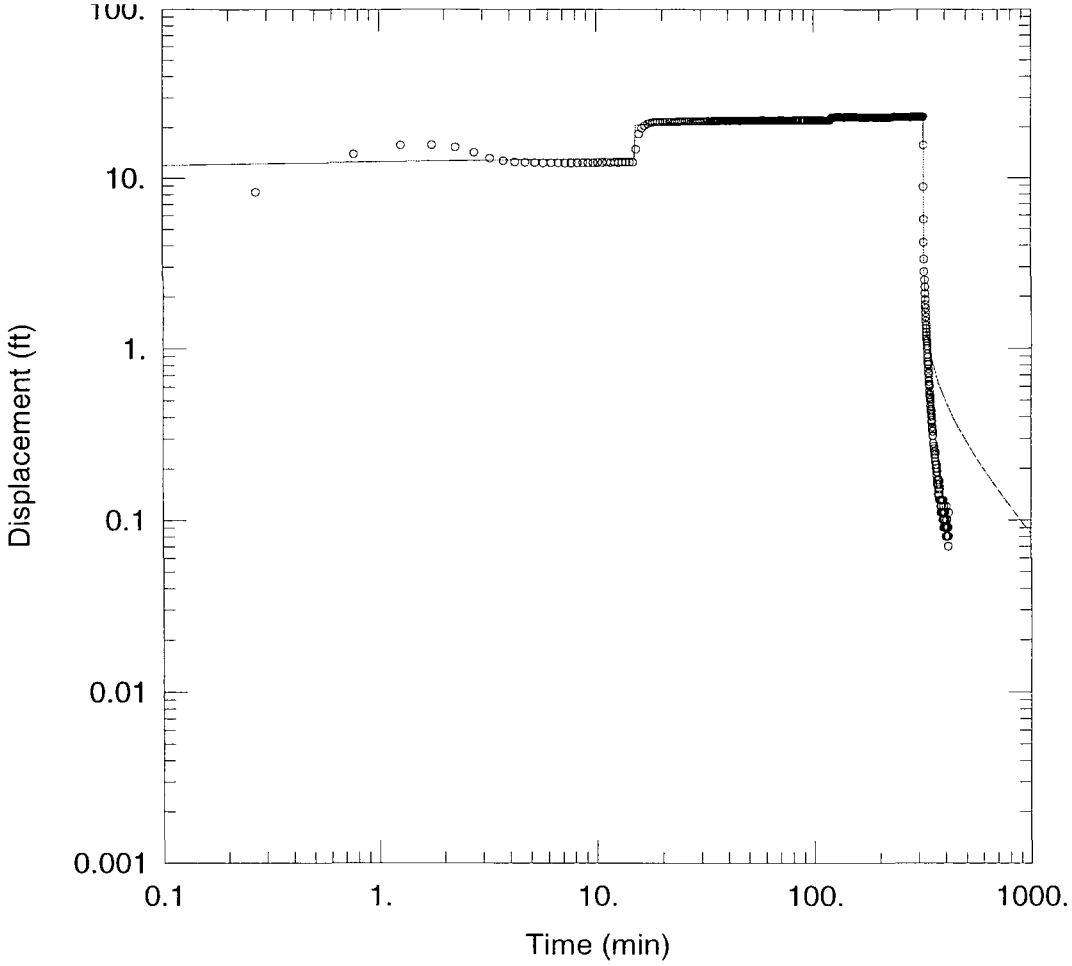
Observation Wells

Well Name	X (ft)	Y (ft)
□ NW-2D	0	75.8
+ MW-03	0	74
△ MW-04	0	113.7
◇ MW-05	0	301.2

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 628.4 ft^2/day S/S' = 9.298



WELL TEST ANALYSIS

Data Set: S:\...\RW-02_StepTest.AQT
Date: 11/14/09 Time: 11:52:14

PROJECT INFORMATION

Company: DBS&A
Client: Salty Dog
Project: ES06.0118.01
Location: Salty Dog
Test Well: RW-02
Test Date: 11/09/09

AQUIFER DATA

Saturated Thickness: 90. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RW-02	0	0

Observation Wells

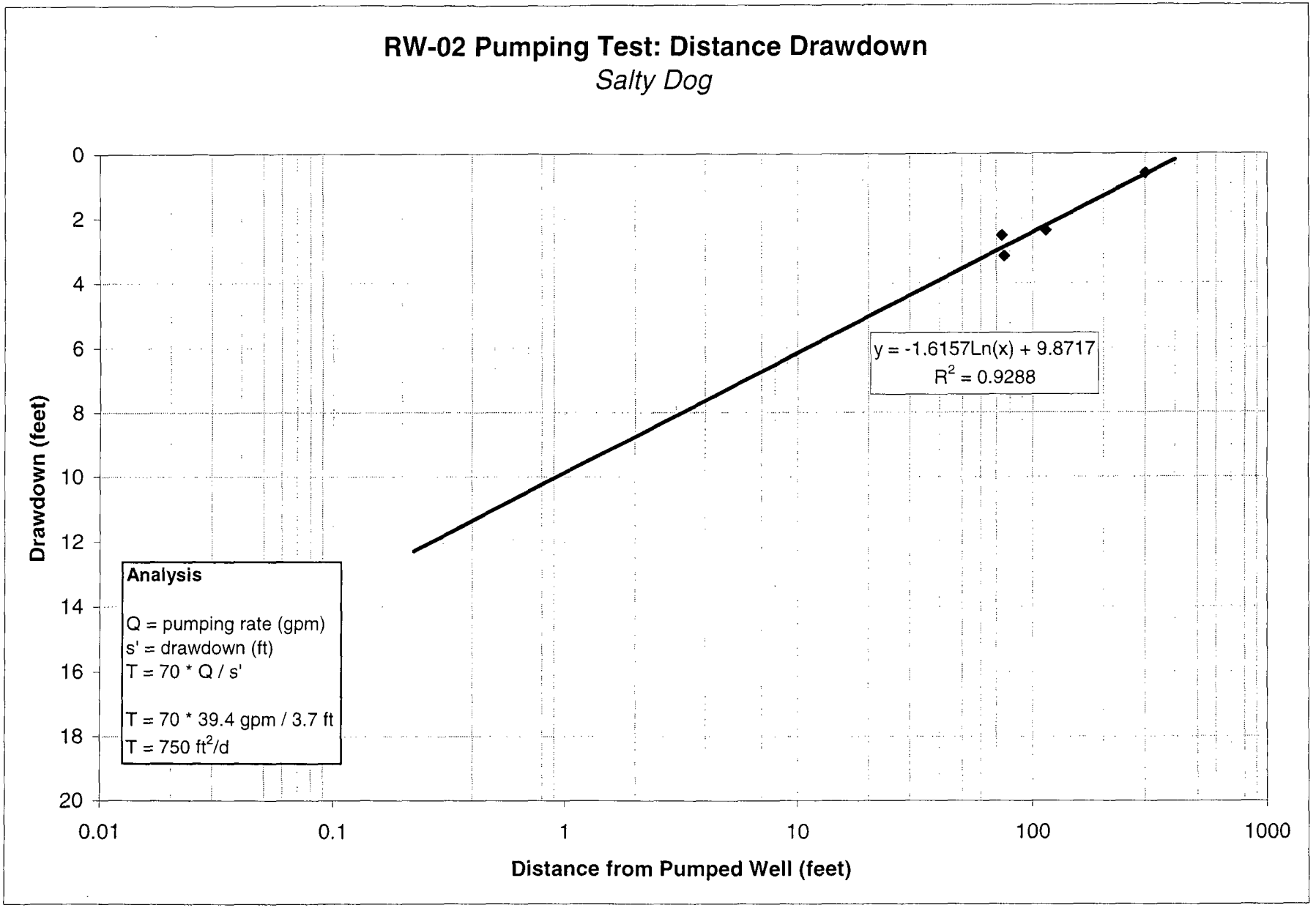
Well Name	X (ft)	Y (ft)
◦ RW-02	0	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis (Step Test)

T = 3309.6 ft^2/day
S = 0.15
Sw = 21.74
C = 0.01726 min^2/ft^5
P = 2.

Step Test Model: Jacob-Rorabaugh
$s(t) = 3.896Q + 0.01726Q^{2.}$
Time (t) = 1. min Rate (Q) in cu. ft/min
W.E. = 59.97% (Q from last step)


RW-02 Pumping Test: Distance Drawdown
Salty Dog
Drawdown (feet)
0
2
4
6
8
10
12
14
16
18
20
0.01
0.1
1
10
100
1000
Distance from Pumped Well (feet)
y = -1.6157Ln(x) + 9.8717
R2 = 0.9288
Analysis
Q = pumping rate (gpm)
s' = drawdown (ft)
T = 70 * Q / s'
T = 70 * 39.4 gpm / 3.7 ft
T = 750 ft2/d