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Date: August 29, 2008
Refer To: EP2008-0417

James P. Bearzi, Bureau Chief
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New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
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Subject: Submittal of the Well R-33 Rehabilitation and Conversion Summary Report

Dear Mr. Bearzi:

Enclosed please find two hard copies with electronic files of the Well R-33 Rehabilitation and Conversion Summary Report.

If you have any questions, please contact Ardyth Simmons at (505) 665-3935 (asimmons@lanl.gov) or David Gregory at (505) 667-5808 (dgregory@doeal.gov).

Sincerely,

Susan G. Stiger, Associate Director
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Los Alamos National Laboratory

Sincerely,

David R. Gregory, Project Director
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SCANNED

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Enclosures: 1) Two hard copies with electronic files – Well R-33 Rehabilitation and Conversion Summary Report (EP2008-0417)

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LA-UR-08-4696
August 2008
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R-33 Well Conversion and Rehabilitation Summary Report

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Prepared by the Environmental Programs Directorate

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LA-UR-08-4696
EP2008-0417

R-33 Well Conversion and Rehabilitation Summary Report

August 2008

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CONTENTS

1.0 INTRODUCTION 1

2.0 REHABILITATION ACTIVITIES 1

2.1 Barcad Sampling System Removal 1
2.2 Video Logging Results 2
2.3 Redevelopment of Screens 1 and 2 2
2.4 Specific Capacity Testing 3
2.5 Dedicated Sampling System Installation 4
2.6 Water-Quality Conditions in June 2008 5
2.6.1 Sample Collection Field Preparation and Analytical Techniques 5
2.6.2 Field Parameters 6
2.6.3 Analytical Results 6
2.6.4 Well Screen Analysis 9
2.6.5 Geochemical Comparison of Barcad and Pumping-Test Samples 10

3.0 DEVIATIONS FROM WORK PLAN 10

4.0 CONCLUSIONS 10

5.0 REFERENCES 11

Figures

Figure 1.0-1 Well R-33 final rehabilitation and conversion configuration 13
Figure 2.1-1 Atlas Topco TH60 rig used for retrieving Barcad sampling system from R-33 14
Figure 2.1-2 R-33 fishing operations during January 2008 15
Figure 2.1-3 Tip of fishing tool at R-33 with retrieved Barcad tubing 16
Figure 2.1-4 Fishing tool at R-33 with retrieved Barcad tubing 17
Figure 2.1-5 Extraction of Barcad sampling system components from R-33 18
Figure 2.6-1 Field parameters measured at R-33 screen 1 from 2005 to June 2008 19
Figure 2.6-2 Field parameters measured at R-33 screen 2 from 2005 to June 2008 19
Figure 2.6-3 Sample sequence versus dissolved concentrations of total carbonate alkalinity, chloride (Cl), sulfate (SO_4), nitrate plus nitrite(N) (NO_2+NO_3-N), and nitrate(N) (NO_3-N) during characterization sampling using Barcad equipment and pumping tests conducted in June 19, 2008, at R-33 screen 1 20
Figure 2.6-4 Sample sequence versus dissolved concentrations of total carbonate alkalinity, chloride (Cl), sulfate (SO_4), nitrate plus nitrite(N) (NO_2+NO_3-N), and nitrate(N) (NO_3-N) during characterization sampling using Barcad equipment and pumping tests conducted in June 2008 at R-33 screen 2 20
Figure 2.6-5 Sample sequence versus dissolved concentrations of sodium (Na), calcium (Ca), potassium (K), and magnesium (Mg) during characterization sampling using Barcad equipment and pumping tests conducted in June 2008 at R-33 screen 1 21
Figure 2.6-6 Sample sequence versus dissolved concentrations of sodium (Na), calcium (Ca), potassium (K), and magnesium (Mg) during characterization sampling using Barcad equipment and pumping tests conducted in June 2008 at R-33 screen 2 21

Figure 2.6-7 Sample sequence versus dissolved and total concentrations of iron (Fe), manganese (Mn), nickel (Ni), and zinc (Zn) during characterization sampling using Barcad equipment and pumping tests conducted in June 2008 at R-33 screen 1 22

Figure 2.6-8 Sample sequence versus dissolved and total concentrations of iron (Fe), manganese (Mn), nickel (Ni), and zinc (Zn) during characterization sampling using Barcad equipment and pumping tests conducted in June 2008 at R-33 screen 2 22

Tables

Table 2.2-1 Video Logging Results Summary of Video Camera Runs 23

Table 2.2-2 Well Observations Run #4 (February 5, 2008) Summary of Observations 23

Table 2.4-1 R-33 Screens 1 and 2 Pumping Results 23

Table 2.6-1 Sampling for the R-33 Well Rehabilitation and Conversion Project 24

Table 2.6-2 Field Parameters Measured at R-33 Screen 1 25

Table 2.6-3 Field Parameters Measured at R-33 Screen 2 26

Appendixes

Appendix A Analytical Data Results

Appendix B Evaluation of Water Quality Using Well Screen Analysis Methodology

Appendix C Video Logging (on DVD included with this document)

1.0 INTRODUCTION

This report provides a summary of the work performed and the results of rehabilitating and converting well R-33 from a dual-screen Barcad sampling system to a dual-screen Baski sampling system. Plans for R-33 conversion were presented in the "Work Plan for R-Well Rehabilitation and Replacement, Revision 2" (LANL 2007, 098119) that was approved by the New Mexico Environment Department (NMED) on August 20, 2007 (NMED 2007, 098182). The R-33 borehole was drilled as a characterization well potentially suitable for monitoring at the confluence of Tensite and Mortandad Canyons. The borehole was drilled to a total depth (TD) of 1140 ft using conventional air-rotary, fluid-assisted air-rotary, and reverse circulation air-rotary methods and was completed with two screened intervals in the regional aquifer: screen 1 from 995.5 to 1018.5 ft and screen 2 from 1112.4 to 1122.3 ft (Figure 1.0-1). A dedicated Barcad sampling system was installed in the well after completion.

The results of the well screen analysis for R-33 (LANL 2007, 096330) indicated that as of December 2006, screens 1 and 2 both passed 89% of the assessment tests for the most recent sample; composite scores were 89% for screen 1 and 90% for screen 2, giving high confidence in the stability of the groundwater parameters over time. It should be noted that in 2006 the packer separating the screens was determined to have been inflated improperly, so earlier samples provided a composite groundwater quality at the lower screen. This situation was corrected, and discrete samples have been collected since the last quarter of 2006. In spite of the fairly high well screen analysis scores, Los Alamos National Laboratory (LANL or the Laboratory) decided to use only one type of sampling system in dual-screen wells. A sampling system evaluation (Koch and Pearson 2007, 096372) ranked the Baski system as the best out of five types of sampling systems evaluated. For this reason, a Baski dual-port system utilizing a single submersible pump was installed for long-term sampling of screens 1 and 2 at R-33.

The activities performed as part of the R-33 rehabilitation included removing the Barcad sampling system, redeveloping screens 1 and 2, conducting specific capacity testing and sampling at screens 1 and 2, and installing a dedicated sampling system in accordance with the work plan approved by NMED (2007, 098182). No well screen abandonment activity took place at R-33.

2.0 REHABILITATION ACTIVITIES

Well rehabilitation and conversion activities at R-33 included removing the Barcad sampling system, redeveloping both screens, conducting specific capacity testing of both screens, and collecting water samples for analysis. These activities are described in the following sections.

2.1 Barcad Sampling System Removal

The basic components of the Barcad sampling system include two tubing bundles, a packer inflation tube, two fiber optic transducer lines, and a 1/8-in. stainless-steel support line. During the initial attempt to remove the system between December 18, 2007, and January 7, 2008, the sampling system became stuck and could not be retrieved. Extreme care was exercised in pulling so as not to exceed the tensile strength of any of the components of the system. A strain gauge was used so the pulling strength could be monitored and controlled. The packer was determined to be deflating, and nitrogen was used to inflate and deflate the packer repeatedly in the event that one side of the packer surface had adhered to the well sidewall and would not unseat. Potable water was also used above the inflated packer to apply downward pressure to help unseat it while simultaneously deflating the unit. On January 4, 2008, one of the tubing bundle pairs separated at 233 ft. By video logging it was determined that the separation occurred at a splice in the tubing lines. The system was worked in the manner described above until January 7, 2008,

when the 1/8-in. stainless-steel cable separated. The packer was still operational and was reinflated until additional equipment could be mobilized to the site for fishing operations.

Fishing operations were conducted from January 29 to February 5, 2008. An Atlas Copco TH60 rig (Figure 2.1-1) was mobilized to the site to perform fishing activities. Additionally, a suite of fishing tools was subcontracted from Weatherford International, Inc., along with a company representative to direct and operate the fishing tools (Figures 2.1-2 through 2.1-4). Video runs #2 and #3 were conducted during fishing operations to confirm the depth to the top of Barcad tubing/equipment. On February 5, 2008, the stainless-steel Barcad pump components (Figure 2.1-5) were extracted from the well. Video run #4 occurred on February 5, 2008, and confirmed that all Barcad components were removed from the R-33 well. On February 8, 2008, a temporary packer was set between screens 1 and 2 to prevent cross flow of groundwater between screen intervals until redevelopment activities began.

Redevelopment was halted in February because of the Endangered Species Act exclusion from the area. The exclusion ended on April 28, 2008, but redevelopment activities did not begin until June because of delays in fabricating the Baski sampling system.

2.2 Video Logging Results

Four downhole video camera runs were conducted in the R-33 well from January 4, to February 5, 2008 (Table 2.2-1). The Laboratory's geophysical trailer and camera were used to conduct all of the video logging operations. The first three video runs were conducted to help facilitate the fishing activities associated with removal of the Barcad sampling system. Therefore, end depths of these runs are indicative of the location of the top of the remaining Barcad system in the well at that time. The final video run, #4, included with this report (Appendix C), documents the complete removal of the Barcad system from the well, current screen conditions, screen locations, TD of the well, and composite static water level (SWL). This information is summarized in Table 2.2-2. Overall, water clarity was good to very good and provided good visibility of the screened intervals. The video documents that no Barcad equipment was left in the well at the completion of fishing operations. A well log DVD is included with this report as Appendix C.

2.3 Redevelopment of Screens 1 and 2

Well development of screens 1 and 2 consisted of three activities: (1) swabbing and bailing, (2) high velocity jetting with simultaneous pumping, and (3) final purge pumping and sampling.

Screen 2 was developed first to minimize the contribution of production water from screen 1 during the jetting/pumping of screen 2. The screen 2 SWL was more than 30 ft lower than that of screen 1; thus, the effective drawdown on screen 1 exceeded that applied to screen 2 by more than 30 ft whenever the well was pumped. This amount indicated that during simultaneous pumping and jetting of either screen, most of the water produced from the well came from screen 1. To maximize the production share from screen 2 during the jetting of screen 2, these steps were conducted before redeveloping and further improving the contribution of screen 1.

Initially, screen 2 was swabbed using a surge block built by sandwiching a 4-in.-outside-diameter nylon disk between two metal plates. The surge block was connected to a heavy weight so effective swabbing was accomplished in both the upward and downward directions. Swabbing consisted of running the tool both upward and downward numerous round trips through the screen. Following swabbing, extensive bailing was performed to remove debris from the sump beneath screen 2.

Following swabbing and bailing, high-velocity jetting was performed on screen 2. Jetting occurred in two steps. Because of the limited sump depth in R-33 (3.7 ft beneath the bottom of screen 2), simultaneous jetting and pumping of screen 2 using a submersible pump was limited to the top 6 ft of the 10-ft screen. This limitation was because the length of pump bowls and motor beneath the jetting tool extended a few feet up into the screen, even when the bottom end of the motor was run to the bottom of the sump. To ensure complete coverage of screen 2 by jetting, it was first jetted (without simultaneous pumping) from the surface by pumping clean, potable water through a drop pipe and jetting tool. The jetting tool included four nozzles, each 7/64 in. in diameter. The jetting pressure at the nozzles was approximately 470 pounds per square inch (psi). Jetting from the surface in this manner was performed for about 1 h and was followed by an additional bailing step to remove accumulated sediment from the sump.

After the initial jetting step, a follow-up procedure of simultaneous jetting and pumping was performed using a 10-HP 23-gal./min submersible pump. The jetting tool above the pump incorporated four nozzles, each 1/16 in. in diameter. The restricted nozzle size was selected to divert most of the pumped water to the surface, thus ensuring that some contribution would be obtained from screen 2, despite the significant contribution from screen 1. Jetting/pumping was performed initially using a 3/4-in. hose at the surface to discharge the water. The small diameter hose created about 50 psi backpressure on the pump, resulting in a downhole jetting pressure of about 490 psi. Jetting with this configuration was performed for about 1 h.

To further increase the flow rate to the surface (and the yield contribution from screen 2), the 3/4-in. discharge hose was replaced with a 2-in. hose to eliminate excess backpressure on the pump. The result was an increased flow rate at the surface and a reduction in the downhole jetting pressure to about 440 psi. Jetting/pumping using this configuration was carried out for an additional 45 min.

After screen 2 was developed, swabbing, bailing, and jetting operations were repeated on screen 1. First, screen 1 was swabbed in the same manner as screen 2. Following swabbing, bailing was performed to remove accumulated sediment from the well sump.

Finally, simultaneous jetting and pumping was performed on screen 1 using the 10-HP submersible pump. Four 5/64-in. diameter nozzles were used in the jetting tool. Use of the 2-in. discharge line at the surface resulted in a downhole jetting pressure of about 440 psi. Jetting and simultaneous pumping of screen 1 continued for about 2 h.

Following development operations, extensive purging of R-33 was performed to (1) remove antecedent cross flow between screen 1 and screen 2, (2) serve as final well development cleanup, (3) provide specific capacity data to evaluate the effectiveness of well development, and (4) provide water samples for chemical analysis.

2.4 Specific Capacity Testing

Specific capacity testing of screens 1 and 2 was performed by installing a shrouded 4-in. submersible pump with inflatable packers above and below the pump to isolate the tested zone. A pressure transducer was installed between the pump and bottom packer to collect water-level data for specific capacity determination.

Specific capacity data were recorded so postdevelopment yields could be compared with those obtained during hydraulic testing of R-33 in 2004 when the well was completed. Table 2.4-1 summarizes the comparison of original and postdevelopment specific capacities.

According to the table, the original screen 1 specific capacity was 0.355 gal./min/ft of drawdown at a discharge rate of 3.3 gal./min. The postdevelopment test was conducted at a similar discharge rate to achieve a valid comparison with the original performance. As shown in the table, at 3.34 gal./min, the postdevelopment specific capacity was 0.373 gal./min/ft. This value was about 5% greater than the original—a modest improvement.

The original specific capacity of screen 2 was 0.129 gal./min/ft at a discharge rate of 12.9 gal./min. It was not possible to achieve this discharge rate with the test pump used in the postdevelopment testing. The maximum screen 2 yield using the pump installed following development was 4.77 gal./min. As shown in Table 2.4-1, at this discharge rate, the observed drawdown was 24.0 ft, while the recovery following pump shutoff was 26.0 ft. The discrepancy between these values could be attributed to ongoing operation of nearby Los Alamos County well PM-5, which obscured the water-level data collected from screen 2. If the average observed head change (25.0 ft) is used, the computed specific capacity of screen 2 was 0.191 gal./min/ft, representing a 48% increase over the original specific capacity of 0.129 gal./min/ft. It is possible this percentage value somewhat overstates the improvement in yield. The reduced discharge rate in the postdevelopment test (4.77 gal./min) likely resulted in less turbulent flow than what occurred in the original test at 12.9 gal./min, thereby somewhat biasing the specific capacity comparison. Nevertheless, it is likely that the development efforts were highly effective in screen 2.

2.5 Dedicated Sampling System Installation

A Baski-fabricated dual-valve submersible pump sampling system was installed between June 20 and June 22, 2008. On June 23, the system was tested by monitoring water levels with the transducers installed and inflating/deflating the packer and pumping from each zone while monitoring the transducer responses at the surface. Inspection of the data indicated that the upper access port valve (APV) was not closing. On June 24, higher pressures were used to attempt to close the upper APV without success. On June 26, the entire system was pulled and inspected. As a result of the inspection, it was determined that a leak at the top of the pump shroud accounted for the response observed from the transducer data. Repairs could not be made in the field, so the entire shroud and pump were shipped to the manufacturer for repairs. Repairs were completed by the manufacturer on June 29. On June 30, the temporary packer was pulled and the refurbished Baski system reinstalled. The system installation was completed on July 1, and testing was completed on July 2 without any observed leaks or valve problems.

The dual-valve system (Figure 1.0-1) consists of a Grundfos electrical submersible pump and stainless-steel shroud, an inflatable Baski custom-bulkhead, double-mandrel packer and two APV valves. The packers are constructed of stainless-steel and vulcanized Viton. The Grundfos pump/shroud was set at 1056.26 to 1063.54 ft below ground surface (bgs). The upper APV intake is set at 1067.01 to 1067.33 ft bgs; the lower APV intake is set at 1110.78 to 1111.10 ft bgs. The discharge pipe for the Grundfos pump consists of custom-fabricated, high-strength 1-in. threaded/coupled Type 304 stainless-steel, nonannealed material meeting the requirements of American Society for Testing and Materials Standard A554 and having a wall thickness about 15% to 20% greater than Schedule 40 pipe. The threaded ends and couplings conform to 1-in. American Petroleum Institute thread design with 10 threads per inch. Two dedicated 1-in. flush threaded polyvinyl chloride transducer tubes were installed with the sampling system. Both transducer tubes are installed directly above the submersible pump/shroud. The upper transducer tube terminates with a 6-in. machine-slotted screen with 0.010-in. slots. The lower transducer tube terminates with a bottom cap that holds a 0.25-in. nylon tube, which extends through the packer to monitor water levels in the lower screen interval. The transducer tubes, packer inflation tube, and Grundfos pump motor electrical cable are banded to the 1-in. stainless pump column at 10-ft intervals with stainless bands.

2.6 Water-Quality Conditions in June 2008

Table 2.6-1 shows the sample collection objectives for R-33 screens 1 and 2 during the 2008 specific capacity testing and the constituents measured in the field and laboratory.

2.6.1 Sample Collection Field Preparation and Analytical Techniques

A total of 26 primary groundwater samples were collected during two specific capacity tests conducted at R-33 screen 1 (13 samples) and screen 2 (13 samples) during June 2008. Field parameters consisting of pH, turbidity, dissolved oxygen (DO), temperature, specific conductance (SC), and oxidation-reduction potential (ORP) were measured using a flow-through cell (Geotech) during sample collection. Measurements for the different field parameters recorded during sampling at R-33 screens 1 and 2 are provided in Tables 2.6-2 and 2.6-3, respectively. Field pH and temperature were measured using a Beckman (model 255) meter, and DO was measured using a WTW (model OXI-330I) instrument. Specific conductance and noncorrected ORP were measured using a HACH Sension-5 meter and a Thermoelectron Corp. (Russell RL 060P model) instrument, respectively.

Four equipment rinsate blanks (GW33-08-13291 and GW33-08-13292, filtered; and GW33-08-13243 and GW33-08-13244, nonfiltered) and two field blanks (GW33-08-13288 and GW13-08-13265) were collected during the June 2008 pumping or aquifer performance tests. Groundwater samples were collected every 5 min during the initial 25 min of the pumping test conducted at R-33 screen 1 (Table 2.6-2). The frequency of sample collection at screen 1 decreased to every 10 min from 25 to 55 min during the pumping test, and every 30 min from 55 to 115 min, and a final sample was collected at 175 min. The total duration of pumping at screen 1 was 175 min (2.92 h). Groundwater samples were collected every 5 min during the initial 25 min of the pumping test conducted at R-33 screen 2 (Table 2.6-3). The frequency of sample collection at screen 2 decreased to every 10 min from 25 to 55 min during pumping, every 30 min from 55 to 145 min, and a final sample was collected at 290 min. The total duration of the pumping test at screen 2 was 173 min (2.88 h). Groundwater samples were collected using a submersible pump consisting of a stainless-steel discharge pipe equipped with a standard retrofitted submersible pump. The discharge rate varied from 3.27 to 3.34 gal./min and from 4.75 to 4.77 gal./min during the aquifer performance tests conducted at R-33 screens 1 and 2, respectively.

Twenty-six primary and two duplicate groundwater samples were filtered before analyses for metals, trace elements, and major cations and anions. Aliquots of samples collected from R-33 screens 1 and 2 were filtered through 0.45-µmeter (µm) Geotech disposable filters. The same numbers of nonfiltered primary and duplicate groundwater samples were also analyzed for major cations, trace elements, and metals. Samples were acidified with analytical-grade nitric acid to a pH of 2.0 or less for metal and major cation analyses. Two field blanks (GW33-08-13288 and GW33-08-13265) were analyzed for the above constituents. Nonfiltered samples collected for total sulfide analysis were preserved with a buffer consisting of sodium hydroxide, ethylenediaminetetraacetic acid (EDTA), and ascorbic acid. Samples collected for total organic carbon (TOC) analysis were not filtered or acidified.

Chemical analyses of screening-groundwater samples were performed at the Laboratory's Earth and Environmental Sciences Group 6 (EES-6) laboratory. EES-6 analyzed groundwater samples using techniques specified in the U.S. Environmental Protection Agency (EPA) SW-846 Manual. Total carbonate alkalinity was measured using standard titration techniques. Ion chromatography (IC) was the method used for bromide, chloride, fluoride, nitrate, nitrite, oxalate, chlorate, perchlorate, phosphate, and sulfate analyses. Groundwater samples will be analyzed for perchlorate in the future. Previous analytical results for perchlorate at R-33 screens 1 and 2 have shown that concentrations of this trace oxyanion ranged between 0.36 and 0.42 µg/L (LANL 2007, 096330) and require analysis by liquid chromatography-mass spectrometry–mass spectrometry. Total sulfide was determined by ion selective electrode with a

detection limit of 0.010 mg/L. Inductively coupled (argon) plasma optical emission spectroscopy (ICPOES) was used for analyses of aluminum, calcium, iron, magnesium, potassium, silica, and sodium. Antimony, arsenic, barium, beryllium, boron, cadmium, cesium, chromium, cobalt, copper, lead, lithium, manganese, mercury, molybdenum, nickel, rubidium, selenium, silver, thallium, thorium, tin, vanadium, uranium, and zinc were analyzed by inductively coupled (argon) plasma mass spectrometry (ICPMS). The precision limits (analytical error) for major ions and trace elements were generally less than ±10% using ICPOES and ICPMS. Total organic carbon was measured using a total carbon-organic carbon analyzer.

2.6.2 Field Parameters

During the June 2008 pumping test conducted at R-33 screen 1, field parameters were measured on 17 groundwater samples pumped from R-33 screen 1. The results are provided in Table 2.6-2 and Table A-1 of Appendix A and are shown in Figure 2.6-1. Field pH varied from 7.42 to 7.66; temperature fluctuated from 22.7°C to 24.0°C. Specific conductance varied slightly from 137.2 to 138.6 microSiemens per centimeter (μS/cm), and DO generally increased from 5.0 to 5.5 mg/L. Turbidity varied from 2.06 to 5.30 nephelometric turbidity units (NTUs) (Table 2.6-2, Figure 2.6-1). One turbidity measurement for screen 1 exceeded 5 NTUs. Noncorrected ORP measurements varied from +184 to +214 millivolts (mV) during the June 2008 pumping test at R-33 screen 1. Groundwater pumped from R-33 screen 1 is relatively oxidizing based on the noncorrected, positive ORP and DO measurements.

Field parameters were measured on 17 groundwater samples pumped from R-33 screen 2; the results are provided in Tables 2.6-3 and A-2 (Appendix A) and are also shown in Figure 2.6-2. Field pH varied slightly from 7.67 to 7.70, temperature varied from 22.7°C to 23.3°C during the June 2008 pumping test, SC slightly varied from 136.7 to 137.2 μS/cm, and DO varied from 4.78 to 5.24 mg/L. Turbidity fluctuated from 1.65 to 2.88 NTUs during pumping (Table 2.6-3, Figure 2.6-2). Noncorrected ORP measurements varied from +216 to +235 mV during the pumping test at R-33 screen 2. Groundwater pumped from R-33 screen 2 is relatively oxidizing based on the noncorrected, positive ORP and DO measurements.

Dissolved oxygen, pH, ORP, SC, turbidity, and temperature were consistent during the June 2008 pumping test conducted at R-33 screens 1 and 2 (Figures 2.6-1 and 2.6-2). Field-measured pH and noncorrected ORP values show some variation during previous Barcad sampling conducted from 2005 to 2007 (LANL 2007, 096330). Specific conductance was generally lower during Barcad sampling in comparison to field measurements taken at R-33 screens 1 and 2 during the June 2008 pumping test. Turbidity was consistently less during previous Barcad sampling in comparison to field measurements taken during the June 2008 pumping test. Concentrations of DO were similar during both Barcad sampling and the June 2008 pumping test. Surface-atmospheric conditions strongly influenced temperature measurements made during previous Barcad sampling at R-33 screens 1 and 2.

2.6.3 Analytical Results

Analytical results for groundwater samples collected during June 2008 aquifer performance testing at R-33 screens 1 and 2 are provided in Appendix A, Tables A-1 and A-2. Charge balance errors for total cations and anions in nonfiltered samples were generally less than ±5%. Total carbonate alkalinity was only measured on nonfiltered samples, resulting in excess milliequivalence of cations for the filtered samples. Therefore, charge balance calculations for filtered samples were not used in this report. The low turbidity values of less than 5 NTUs do not significantly affect charge balance errors for the nonfiltered samples.

Figures 2.6-3 and 2.6-4 show concentration trends of dissolved anions for R-33 screens 1 and 2, respectively, analyzed during both Barcad sampling and the June 2008 pumping tests. Dissolved chloride showed small variations in concentration during the June 2008 pumping tests for both screens, with

slightly higher concentrations of this anion measured in screen 1. A higher degree of variability in dissolved chloride concentrations is observed during Barcad sampling conducted at R-33 screens 1 and 2 (Figures 2.6-3 and 2.6-4). Concentrations of total carbonate alkalinity did not vary significantly during the June 2008 pumping tests conducted at R-33 screens 1 and 2. Concentrations of total carbonate alkalinity show more variability during the previous Barcad sampling at R-33 screens 1 and 2.

Dissolved concentrations of sulfate were consistent during the June 2008 pumping tests conducted at this well (Figures 2.6-3 and 2.6-4). Slightly higher dissolved concentrations of sulfate, however, were measured in groundwater samples collected from R-33 screen 1 on June 19, 2008 (Figure 2.6-3). Dissolved concentrations of sulfate varied from 3.30 to 3.62 mg/L and from 2.89 to 3.11 mg/L in samples collected from R-33 screens 1 and 2, respectively (Figures 2.6-3 and 2.6-4, Tables A-1 and A-2). Background mean, median, and maximum concentrations of dissolved sulfate are 3.61, 2.83, and 8.63 mg/L, respectively, within the regional aquifer (LANL 2007, 095817).

Concentrations of total sulfide were less than analytical detection (0.010 mg/L), suggesting that sulfate reduction was not significant during the June 2008 pumping tests (Tables A-1 and A-2). Concentrations of TOC varied from 0.64 to 0.92 milligram carbon per liter (mgC/L) and from 0.60 to 1.0 mgC/L in groundwater samples collected from R-33 screens 1 and 2, respectively, during the June 2008 pumping tests (Tables A-1 and A-2). These low concentrations of TOC strongly suggest that residual drilling fluid effects are absent at R-33 screens 1 and 2.

Dissolved concentrations of nitrate(N) varied from 0.623 to 0.656 mg/L during the June 2008 pumping test conducted at R-33 screen 1 (Figure 2.6-3, Table A-1). Dissolved concentrations of nitrate(N) generally increased from 0.385 to 0.511 mg/L during the 2008 pumping test conducted at R-33 screen 2 (Figure 2.6-4, Table A-2). Concentrations of this solute were lower during the previous Barcad sampling at R-33 screens 1 and 2 (LANL 2007, 096330). Background mean, median, and maximum concentrations of dissolved nitrate plus nitrite(N) are 0.33, 0.31, and 1.05 mg/L, respectively, within the regional aquifer (LANL 2007, 095817).

Figures 2.6-5 and 2.6-6 show concentration trends of dissolved cations for R-33 screens 1 and 2, respectively, analyzed during both Barcad sampling and the June 2008 pumping tests. Calcium and sodium are the dominant cations present in the regional aquifer at R-33 screens 1 and 2. During the June 2008 pumping tests, dissolved concentrations of calcium ranged from 10.9 to 11.3 mg/L and from 10.3 to 11.1 mg/L at screens 1 and 2, respectively (Figures 2.6-5 and 2.6-6). Dissolved concentrations of calcium generally show small variations in groundwater samples collected during these pumping tests. Slightly higher concentrations of calcium are evident during Barcad sampling at R-33 screen 2, whereas lower concentrations of dissolved calcium were measured during the same time period at screen 1 (Figures 2.6-5 and 2.6-6) (LANL 2007, 096330).

Dissolved concentrations of sodium ranged from 10.3 to 10.8 mg/L and from 10.7 to 11.2 mg/L at screens 1 and 2, respectively, during the June 2008 pumping tests (Figures 2.6-5 and 2.6-6, Tables A-1 and A-2). Slightly higher concentrations of dissolved sodium were measured during Barcad sampling at R-33 screens 1 and 2 (Figures 2.6-5 and 2.6-6) (LANL 2007, 096330).

Total dissolved concentrations of iron varied from 0.05 to 0.08 mg/L during the June 2008 pumping test conducted at R-33 screen 1 (Figure 2.6-7, Table A-1). The ratio of total iron in nonfiltered samples to total dissolved iron in groundwater samples collected from R-33 screen 1 remained fairly constant during pumping on June 19, 2008, suggesting that relatively oxidizing conditions were established as the pumping test progressed. Concentrations of this solute were much higher (up to 1 mg/L) and varied considerably during Barcad sampling conducted at R-33 screen 1 (LANL 2007, 096330). Background

mean, median, and maximum concentrations of total dissolved iron are 0.0193, 0.095, and 0.147 mg/L, respectively, within the regional aquifer (LANL 2007, 095817).

Total dissolved concentrations of manganese varied from 0.003 to 0.006 mg/L during the June 2008 pumping test conducted at R-3 screen 1 (Figure 2.6-7, Table A-1). As with iron, the ratio of total manganese in nonfiltered samples to total dissolved manganese in groundwater samples collected from R-33 screen 1 was constant, providing additional evidence that oxidizing conditions were established as the 2008 pumping test progressed. Concentrations of this solute were higher during previous Barcad sampling at R-33 screen 1 (LANL 2007, 096330). Background mean, median, and maximum concentrations of total dissolved manganese are 0.0076, 0.001, and 0.124 mg/L, respectively, within the regional aquifer (LANL 2007, 095817).

Figure 2.6-7 shows total and dissolved concentrations of nickel and zinc measured at R-33 screen 1 during Barcad sampling and the June 2008 pumping test. Dissolved concentrations of nickel ranged between 1 and 170 μg/L (0.001 and 0.170 mg/L) during the previous Barcad sampling and sharply decreased to 0.001 mg/L (1 μg/L) during the June 2008 pumping test (Table A-1). The same concentrations of total and dissolved nickel (0.001 mg/L) were also measured during the June 2008 pumping test conducted at R-33 screen 1 (Figure 2.6-7). Dissolved concentrations of zinc ranged between 2 and 40 μg/L (0.002 and 0.040 mg/L) during the previous Barcad sampling and increased in concentration to between 0.080 and 0.140 mg/L (80 and 140 μg/L) during the June 2008 pumping test (Table A-1). Background mean, median, and maximum concentrations of total dissolved zinc are 0.00308, 0.00145, and 0.032 mg/L, respectively, within the regional aquifer (LANL 2007, 095817). Concentrations of total zinc exceeded concentrations of dissolved zinc during the June 2008 pumping test conducted at R-33 screen 1, suggesting particulate zinc is present either as a separate phase or adsorbed onto suspended material possibly consisting of hydrous ferric oxide (HFO) and/or clay minerals (Figure 2.6-7). Total concentrations of aluminum and iron exceed dissolved concentrations of these two metals in groundwater at R-33, suggesting the presence of clay minerals and HFO.

Total dissolved concentrations of iron varied from 0.04 to 0.06 mg/L during the June 2008 pumping test conducted at R-33 screen 2 (Figure 2.6-8, Table A-2). The ratio of total iron in nonfiltered samples to total dissolved iron in groundwater samples collected from R-33 screen 2 also remained constant during pumping, suggesting that oxidizing conditions were established as the pumping test progressed. Concentrations of this solute were much higher (up to 0.92 mg/L) and varied widely during earlier Barcad sampling conducted at R-33 screen 2 (LANL 2007, 096330).

Total dissolved concentrations of manganese varied from 0.001 to 0.004 mg/L during the June 2008 pumping test conducted at R-33 screen 2 (Figure 2.6-8, Table A-2). As with manganese concentrations at screen 1, the ratio of total manganese in nonfiltered samples to total dissolved manganese in groundwater samples collected from R-33 screen 2 also remained constant during the June 2008 pumping test. Concentrations of this solute were slightly higher during previous Barcad sampling conducted at R-33 screen 2 (LANL 2007, 096330).

Figure 2.6-8 shows total and dissolved concentrations of nickel and zinc measured at R-33 screen 2 during Barcad sampling and the June 2008 pumping test. Concentrations of total and dissolved nickel were 0.001 mg/L during the June 2008 pumping test conducted at R-33 screen 2 (Figure 2.6-8). Dissolved concentrations of zinc ranged between 2 and 39 μg/L (0.002 and 0.039 mg/L) during previous Barcad sampling. Dissolved concentrations of zinc range from 0.015 and 0.035 mg/L (15 and 35 μg/L) during the June 2008 pumping test (Table A-2). Concentrations of total and dissolved zinc were similar during the June 2008 pumping test conducted at R-33 screen 2.

Two nonfiltered rinsate blanks collected from the discharge pipe consisting of stainless steel used during the June 2008 pumping tests conducted at R-33 screens 1 and 2 have concentrations of total manganese and iron of 0.021 and 0.002 mg/L and 0.10 and 0.040 mg/L, respectively (Tables A-1 and A-2). Concentrations of total dissolved manganese and iron in filtered rinsate blanks were 0.017 and 0.003 and 0.030 and 0.050 mg/L, respectively. Other metals and trace elements detected in the nonfiltered rinsate blanks include aluminum, boron, chromium, copper, lead, and zinc (Tables A-1 and A-2). Total concentrations of copper, chromium, and lead in one or two of the nonfiltered rinsate samples were 0.010 mg/L or less. Total concentrations of several metals/trace elements exceeded 0.010 mg/L in one or two samples, including aluminum (0.019 and 0.026 mg/L), boron (0.015 and 0.008 mg/L), and zinc (0.022 and 0.020 mg/L) (Tables A-1 and A-2). The two field blanks consisting of deionized water did not show elevated concentrations of metals and major ions (Tables A-1 and A-2).

2.6.4 Well Screen Analysis

Previous Results

The analytical results obtained from sampling of well R-33 screens 1 and 2 were evaluated for representativeness and reliability, following geochemical protocols established by the Laboratory (LANL 2007, 096330) and approved by NMED. Groundwater samples previously collected from R-33 screen 1 during eight sampling rounds have scores varying from 81% to 100%, with an average score of 92% (LANL 2007, 096330). The test scores for the Barcad samples collected from R-33 screen 1 from 2005 to 2007 varied over time with two to five analytes or general indicators per sampling event failing the geochemical criteria, consisting of 29 to 34 individual tests. Analytes that did not meet the well screen criteria during one or more sampling rounds conducted at R-33 screen 1 from 2005 to 2007 included ORP, chloride, total Kjeldahl nitrogen (TKN), iron, nickel, and TOC (LANL 2007, 096330).

Groundwater samples previously collected from R-33 screen 2 during nine sampling rounds conducted from 2005 to 2007 have scores varying from 92.5% to 100%, with an average score of 97% (LANL 2007, 096330). The test scores for the Barcad samples collected from R-33 screen 2 varied over time with two to five analytes or general indicators per sampling event failing the geochemical criteria, consisting of 28 to 35 individual tests. Analytes that did not meet the well screen criteria during one or more sampling rounds conducted at R-33 screen 2 included turbidity, total carbonate alkalinity, chloride, TKN, iron, molybdenum, and nickel (LANL 2007, 096330).

Updated Well Screen Analysis

The analytical results of the Laboratory well screen analysis using analytical results collected during the June 2008 pumping tests conducted at R-33 screens 1 and 2 are provided in Tables B-1 and B-2, respectively, of Appendix B. Four filtered and nonfiltered sample pairs collected from R-33 screen 1 (GW33-08-13293 and GW33-08-13245; GW33-08-13297 and GW33-08-13249; GW33-08-13301 and GW33-08-13253; and GW33-08-13305 and GW33-08-13257) were selected for the well screen analysis presented in this section. Four filtered and nonfiltered sample pairs collected from R-33 screen 2 (GW33-08-13312 and GW33-08-13267; GW33-08-13316 and GW33-08-1327; GW33-08-13320 and GW33-08-13275; and GW33-08-13324 and GW33-08-13279) also were selected for the well screen analysis presented in this section. (In each pair, the first sample is filtered and the second unfiltered.) These selected samples provide excellent coverage of samples analyzed during the 2008 pumping tests.

Groundwater samples analyzed from well R-33 screen 1 during the June 2008 pumping test have scores of 97% consisting of 35 criteria (Table B-1) for 13 primary samples. Concentrations of dissolved zinc exceed the upper threshold limit of 40 μg/L in all samples collected from screen 1. Groundwater samples analyzed from well R-33 screen 2 during the June 2008 pumping test have scores of 100% consisting of 35 criteria (Table B-2) for 13 primary samples.

Well screen tests for four criteria were not applicable in the updated analysis for R-33 screens 1 and 2 for the following reasons.

- Groundwater samples were not analyzed for acetone, TKN, and ammonia.
- The analytical detection limitation for perchlorate made it not applicable to the well screen analysis. Perchlorate was analyzed by using the IC method, which has a method detection limit greater than 0.002 to 0.005 mg/L, depending on sample-specific anion concentration.

2.6.5 Geochemical Comparison of Barcad and Pumping-Test Samples

A geochemical comparison of multiple analytes was performed on the R-33 screens 1 and 2 samples to evaluate sampling methodologies using Barcad equipment and a submersible pump. This comparison included analytical results for nine and eight previous Barcad sampling events for R-33 screens 1 and 2, respectively. The Barcad sampling events were conducted from June 27, 2005, to November 8, 2007 (R-33 screen 1) and from June 24, 2005, to November 19, 2007 (R-33 screen 2); two pumping tests were conducted in June 2008. Concentrations of dissolved calcium, chloride, sodium, sulfate, iron, manganese, and nickel were generally higher and show more variability in samples collected using Barcad equipment in comparison to those collected during the two June 2008 pumping tests. Concentrations of total and dissolved zinc in groundwater samples collected from screen 1, however, exceed those measured during Barcad sampling. Energetic purging or pumping of R 33 screens 1 and 2 allowed groundwater outside of the filter pack to be sampled, providing more representative groundwater samples. Groundwater at R-33 screens 1 and 2 is relatively oxidizing, based on positive, noncorrected ORP measurements, measurable DO (greater than 2 mg/L), and dissolved concentrations of iron and manganese generally less than 70 and 5 μg/L, respectively. Concentrations of TOC less than 1 mgC/L also support oxidizing conditions dominating at the well.

3.0 DEVIATIONS FROM WORK PLAN

The only deviation from the planned activities involved schedule delays. First, removal of the Barcad system was complicated by the need to use specialized equipment to extract the stuck tubing from the well. Further delays ensued because of the Endangered Species Act exclusion from the area. Additional delays occurred because of difficulties in installing the permanent Baski system.

4.0 CONCLUSIONS

The sampling system in well R-33 was successfully changed from a Barcad to a Baski system. The well remains as a dual-screen well. The redevelopment specific capacity testing at screen 1 showed a modest (5%) improvement over the pretest specific capacity. The computed specific capacity of screen 2 was 0.191 gal./min/ft. This value represented a 48% increase over the original specific capacity of 0.129 gal./min/ft. It is possible this percentage value somewhat overstates the improvement in yield. Nevertheless, it is likely that the development efforts were highly effective in screen 2.

The water-quality conditions at R-33 are excellent. All but one of the turbidity values measured during the June 2008 pumping tests were less than 5 NTUs. Total sulfide was less than detection (0.010 mg/L) in all samples. Dissolved concentrations of major ions and trace metals, excluding zinc in samples collected from screen 1, do not exceed their respective maximum background values at R-33 screens 1 and 2.

Groundwater samples analyzed from well R-33 screen 1 during the June 2008 pumping test have an average well screen analysis score of 97%. Concentrations of dissolved zinc exceed 40 μg/L, the upper limit of one of the test criteria. Zinc detected at concentrations exceeding the background value does not imply that the quality of water samples has been compromised because of adsorption by bentonite or newly formed minerals. Zinc, as an indicator, only indicates the possibility of adsorption at concentrations significantly lower than the background value. Groundwater samples analyzed from well R-33 screen 2 during the June 2008 pumping test have an average well screen analysis score of 100%. Overall, the well screen scores improved at both screens as a result of well redevelopment but more significantly at screen 1, as screen 2 already scored an average 97%.

A geochemical comparison of selected analytes was performed on the R-33 screens 1 and 2 samples to evaluate sampling methodologies using Barcad equipment and a submersible pump. Concentrations of dissolved calcium, chloride, sulfate, sodium, iron, manganese, nickel, and zinc (excluding screen 1) were generally higher and more variable in samples using Barcad equipment compared with those collected during the two pumping tests conducted in June 2008. Energetic purging or pumping of R-33 screens 1 and 2 allowed groundwater outside of the filter pack to be sampled, providing more representative groundwater samples.

The overall conclusion is that redevelopment activities improved both the specific capacity and the representativeness of groundwater chemistry or water quality at R-33 screens 1 and 2.

5.0 REFERENCES

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID number. This information is also included in text citations. ER ID numbers are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; EPA, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

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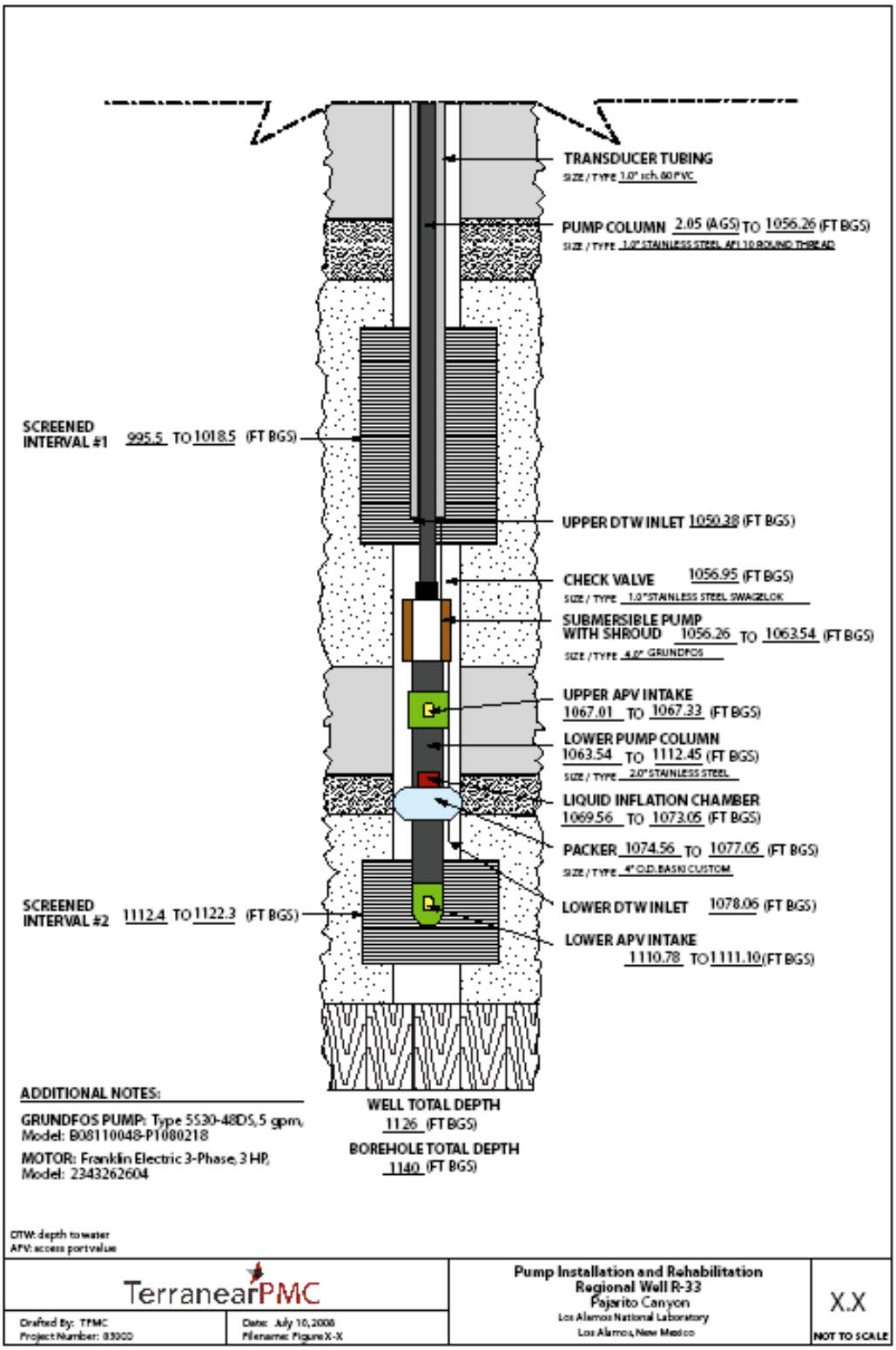

Figure 1.0-1 Well R-33 final rehabilitation and conversion configuration

Figure 2.1-1 Atlas Topco TH60 rig used for retrieving Barcad sampling system from R-33

Figure 2.1-2 R-33 fishing operations during January 2008

Figure 2.1-3 Tip of fishing tool at R-33 with retrieved Barcad tubing

Figure 2.1-4 Fishing tool at R-33 with retrieved Barcad tubing

Figure 2.1-5 Extraction of Barcad sampling system components from R-33

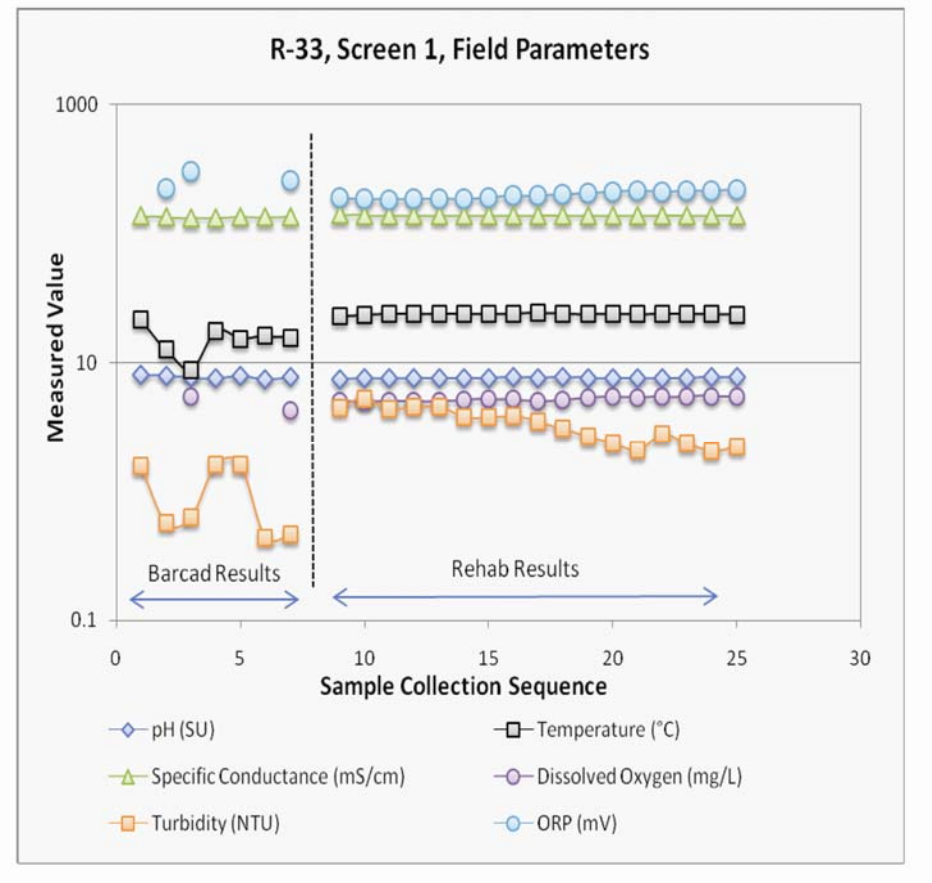

Figure 2.6-1 Field parameters measured at R-33 screen 1 from 2005 to June 2008

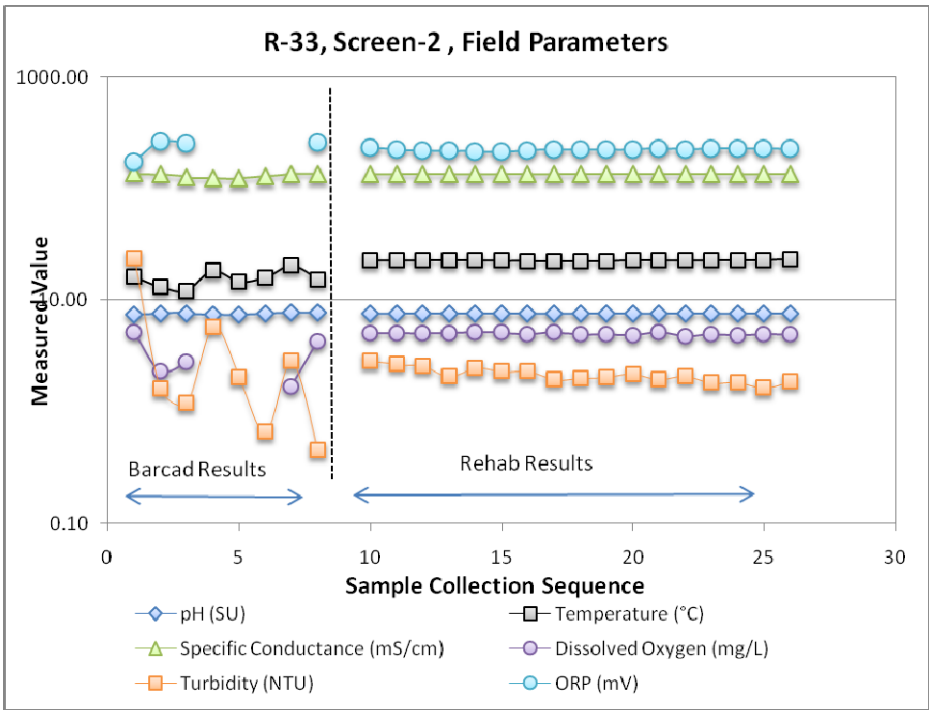

Figure 2.6-2 Field parameters measured at R-33 screen 2 from 2005 to June 2008

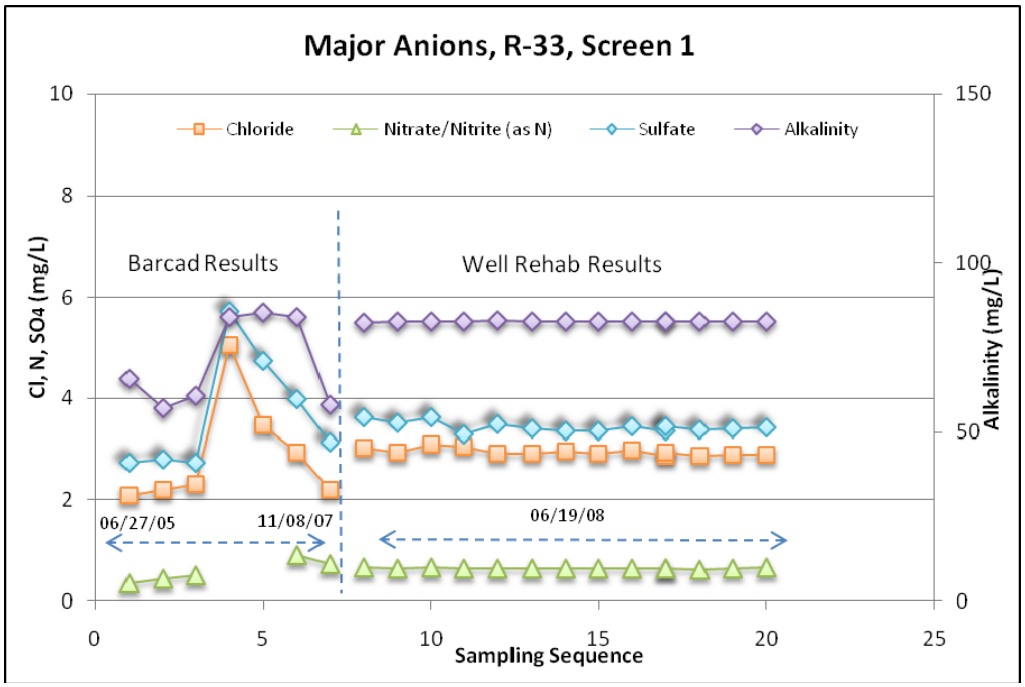

Figure 2.6-3 **Sample sequence versus dissolved concentrations of total carbonate alkalinity, chloride (Cl), sulfate (SO_4), nitrate plus nitrite(N) (NO_2+NO_3-N), and nitrate(N) (NO_3-N) during characterization sampling using Barcad equipment and pumping tests conducted in June 19, 2008, at R-33 screen 1**

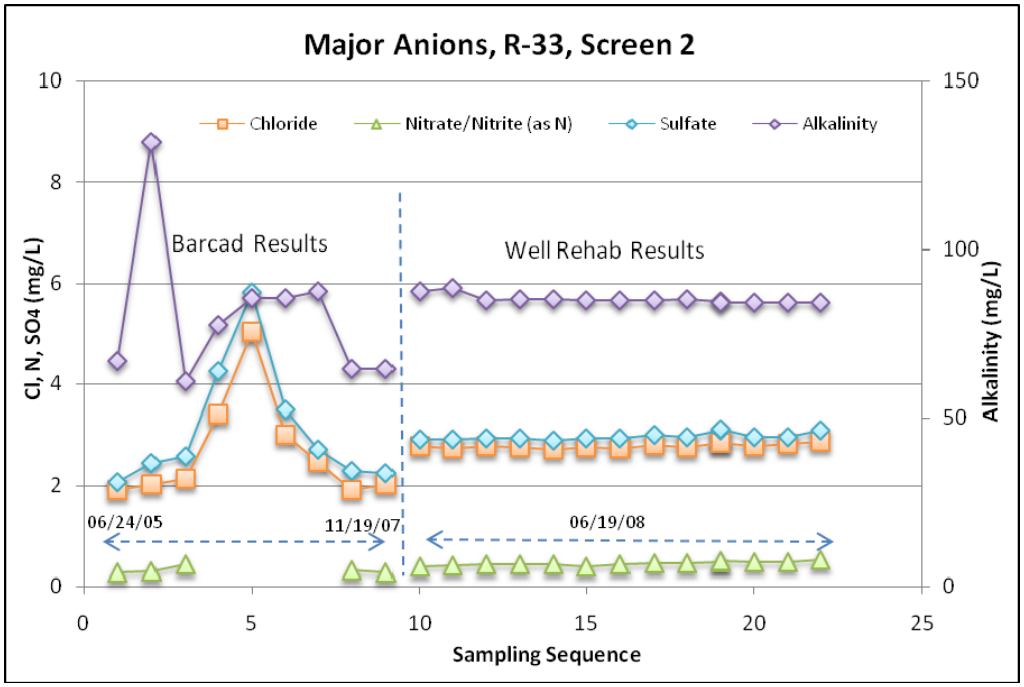

Figure 2.6-4 **Sample sequence versus dissolved concentrations of total carbonate alkalinity, chloride (Cl), sulfate (SO_4), nitrate plus nitrite(N) (NO_2+NO_3-N), and nitrate(N) (NO_3-N) during characterization sampling using Barcad equipment and pumping tests conducted in June 2008 at R-33 screen 2**

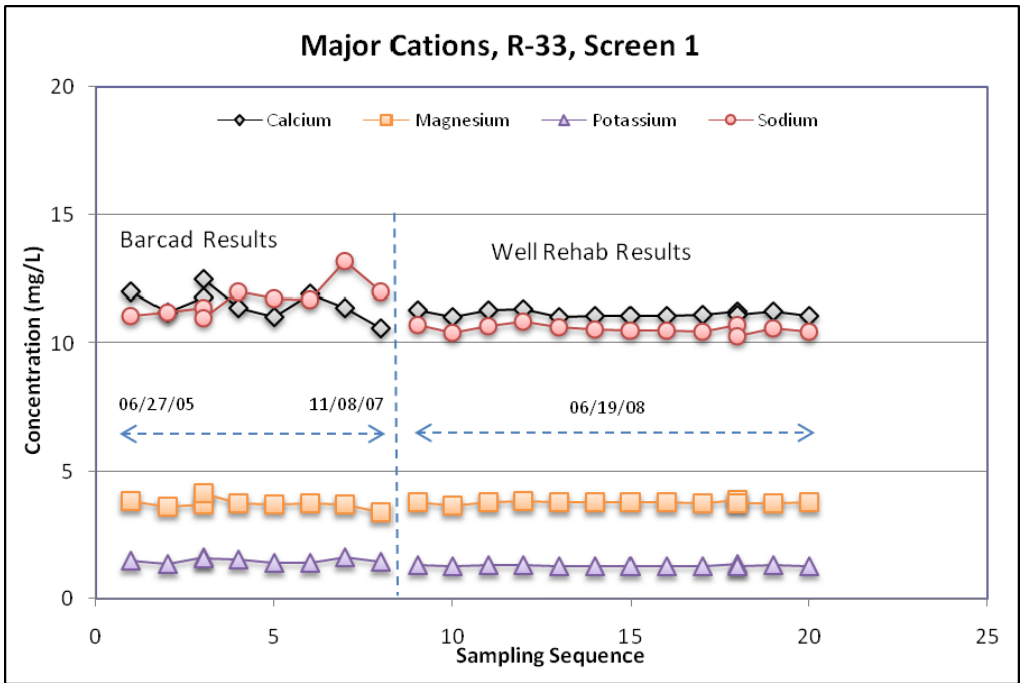

Figure 2.6-5 **Sample sequence versus dissolved concentrations of sodium (Na), calcium (Ca), potassium (K), and magnesium (Mg) during characterization sampling using Barcad equipment and pumping tests conducted in June 2008 at R-33 screen 1**

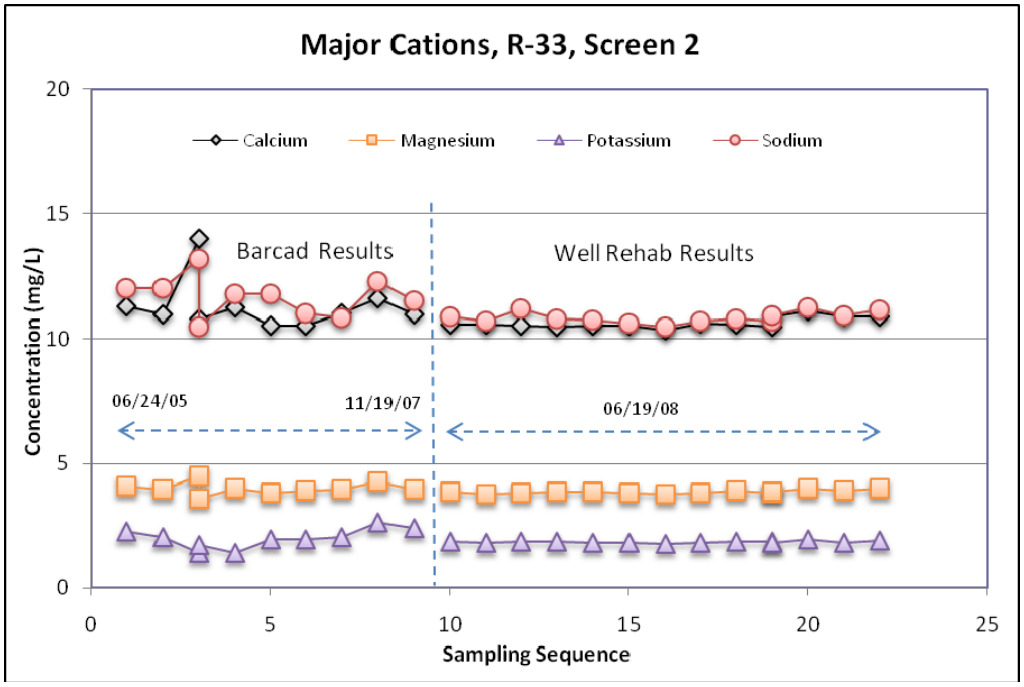

Figure 2.6-6 **Sample sequence versus dissolved concentrations of sodium (Na), calcium (Ca), potassium (K), and magnesium (Mg) during characterization sampling using Barcad equipment and pumping tests conducted in June 2008 at R-33 screen 2**

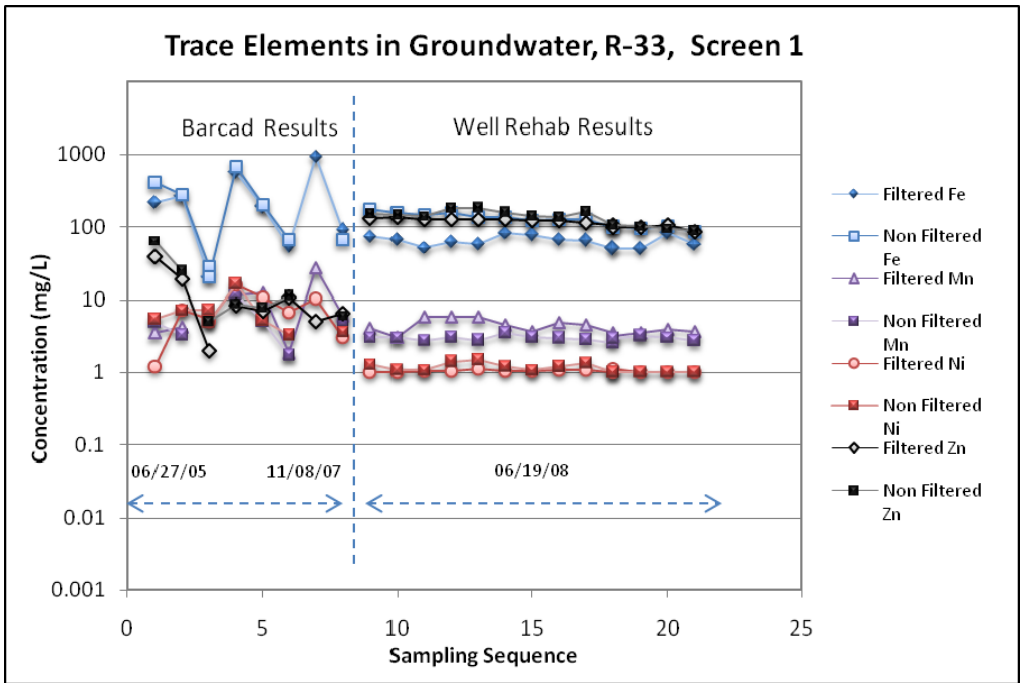

Figure 2.6-7 **Sample sequence versus dissolved and total concentrations of iron (Fe), manganese (Mn), nickel (Ni), and zinc (Zn) during characterization sampling using Barcad equipment and pumping tests conducted in June 2008 at R-33 screen 1**

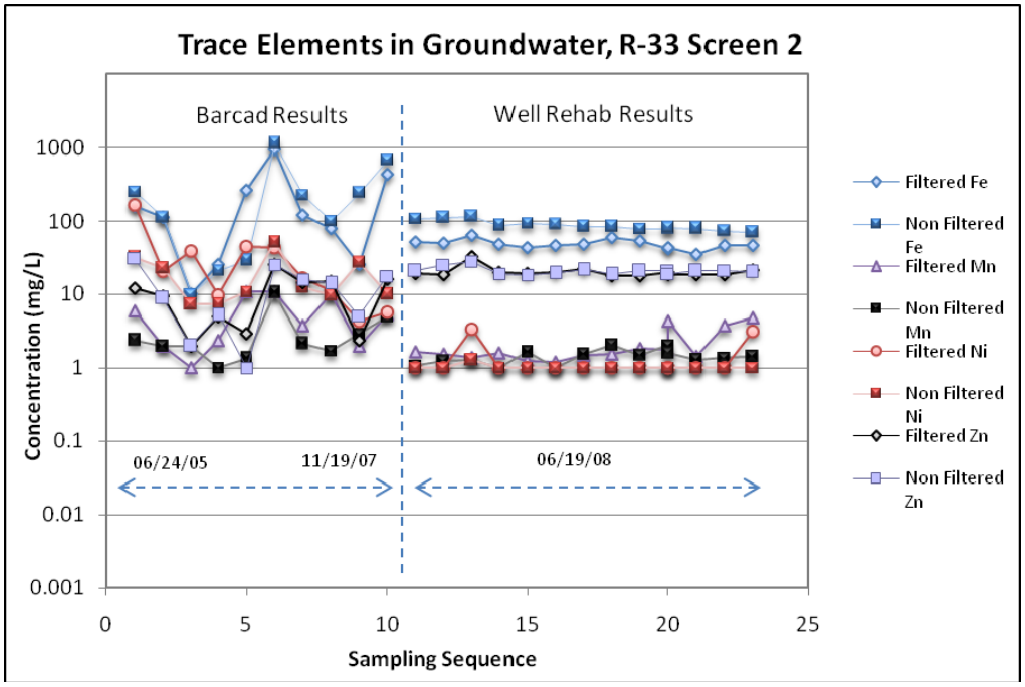

Figure 2.6-8 **Sample sequence versus dissolved and total concentrations of iron (Fe), manganese (Mn), nickel (Ni), and zinc (Zn) during characterization sampling using Barcad equipment and pumping tests conducted in June 2008 at R-33 screen 2**

Table 2.2-1
Video Logging Results Summary of Video Camera Runs

Run #	Date	Run Depths[a]	
		Start	End
#1[b]	1/4/08	0 ft	233 ft
#2	2/1/08	0 ft	665 ft
#3	2/5/08	38 ft	974 ft
#4	2/5/08	0 ft	1128 ft 8 in.

[a] Datum = Top of protective steel casing.
[b] No video recorded.

Table 2.2-2
Well Observations Run #4 (February 5, 2008) Summary of Observations

	Depth to[a]		Remarks
	Top	Bottom	
SWL	987 ft 6 in.	n/a[b]	Composite
Screen #1	1000 ft 3 in.	1022 ft 9 in.	Wire-wrap; visibility very good; screen slot intervals clean
Screen #2	1117 ft	1127 ft	Wire-wrap; visibility good; screen slot intervals partially occluded
TD	1128 ft 8 in.	n/a	Sediment in bottom of sump

[a] Datum = Top of protective steel casing.
[b] n/a = Not applicable.

Table 2.4-1
R-33 Screens 1 and 2 Pumping Results

Date	Zone	Pumping Rate (gal./min)	Head Change (ft)	Specific Capacity (gal./min/ft)
Baseline Data from 2004				
12/2/2004	Screen 1	3.3	9.3	0.355
11/16/2004	Screen 2	12.9	100.1	0.129
Postdevelopment Data from 2008				
6/19/2008	Screen 1	3.34	8.95	0.373
6/19/2008	Screen 2*	4.77	Drawdown: 24.0	
			Recovery: 26.0	
			Average: 25.0	0.191

* Pumping and recovery response obscured by operation of PM-5.

Table 2.6-1
Sampling for the R-33 Well Rehabilitation and Conversion Project

Process/Step	Purpose	Sample Collection	Field Parameters	Frequency/Number of Samples
Remove Barcad system	Prepare well for rehabilitation	None	None	None
Run camera survey	Evaluate screens 1 and 2 conditions	DVD/VHS tape	None	0 to 1126 ft
Jet screens 1 and 2	Redevelop screens1 and 2	None	None	None
Swab screens 1 and 2	Redevelopment	None	None	None
Pump screen 1 and screen 2 from isolated screens to evaluate groundwater chemistry and screen performance	Measure specific capacity and assess water quality from isolated screens during sustained pumping	Collect performance suite (see description below)	pH, ORP temperature (T), SC, DO, and turbidity	Every 5 min for first 30 min; 10 min for next 30 min; 30 min for minimum 3 h; each hour until end of specific capacity test (25 performance suite samples per screen).
Install Baski dual submersible pump sample system	Long-term sampling	None	None	None
Performance measurement, after submersible pump installment	Test effects of rehabilitation	Sample 1 mo after installation; full suite analysis. Followed by semiannual monitoring, per "2007 Interim Facility-Wide Groundwater Monitoring Plan" (IFGMP) (LANL 2007, 096665) requirements and schedule.	pH, ORP, T, SC, DO, turbidity	Refer to the IFGMP for analytes and sampling schedule

Notes: Performance suite: Sulfide (not filtered), TOC (not filtered), metals and cations (filtered and nonfiltered), alkalinity (nonfiltered), and anions (including perchlorate, nonfiltered), from the EES-6 laboratory. Full analytical suite: Refer to the 2007 IFGMP (LANL 2007, 096665) watershed analytical suites (volatile organic compounds, semivolatile organic compounds, general inorganic chemicals [including alkalinity], metals, radionuclides, tritium, stable isotopes of hydrogen, oxygen, and nitrogen). Full analytical suite samples will be collected after the Baski dual sampling system is installed.

Table 2.6-2
Field Parameters Measured at R-33 Screen 1

Time (mo-day-yr-hr)	pH (SU)[a]	Temperature (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	ORP (mV)
Barcad Field Parameter Measurements						
06/27/05	8.00	21.5	138.3	—[b]	1.56	-20
09/14/05	7.91	12.5	135.6	06/19/08	0.57	223
02/16/06	7.75	8.8	131.7	5.52	0.63	306
10/31/06	7.50	17.5	132.0	—	1.60	—
03/13/07	7.82	15.3	135.3	—	1.61	—
06/12/07	7.37	16.0	133.4	—	0.44	—
11/08/07	7.76	15.5	135.2	4.28	0.46	260
Rehabilitation Field Parameter Measurements						
06/19/08 15:34	7.42	22.7	138.6	4.99	4.50	+191
06/19/08 15:39	7.50	23.3	137.9	5.00	5.30	+185
06/19/08 15:44	7.56	23.6	137.9	5.00	4.41	+184
06/19/08 15:49	7.61	23.7	137.8	5.00	4.56	+185
06/19/08 15:54	7.63	23.7	137.7	5.05	4.51	+187
06/19/08 15:59	7.64	23.7	137.6	5.18	3.81	+186
06/19/08 16:09	7.65	23.9	137.5	5.20	3.79	+191
06/19/08 16:19	7.66	23.8	137.5	5.25	3.84	+198
06/19/08 16:29	7.65	24.0	137.4	5.02	3.52	+196
06/19/08 16:44	7.66	23.8	137.6	5.16	3.06	+200
06/19/08 16:59	7.65	23.6	137.5	5.36	2.66	+207
06/19/08 17:14	7.63	23.6	137.5	5.43	2.35	+211
06/19/08 17:29	7.64	23.5	137.3	5.41	2.08	+213
06/19/08 17:44	7.64	23.5	137.2	5.42	2.81	+211
06/19/08 17:59	7.65	23.5	137.3	5.51	2.36	+213
06/19/08 18:14	7.66	23.5	137.3	5.50	2.06	+214
06/19/08 18:29	7.66	23.3	137.5	5.51	2.24	+218

Note: No hourly Barcad data available.

[a] SU = Standard unit.

[b] — = Not analyzed.

Table 2.6-3
Field Parameters Measured at R-33 Screen 2

Time (mo-day-yr-hr)	pH (SU)	Temperature (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	ORP (mV)
Barcad Field Parameter Measurements						
06/24/05	7.47	16.52	140.0	5.25	24.1	176
09/15/05	7.70	13.3	134.7	2.33	1.62	266
02/14/06	7.71	12.2	128.8	2.80	1.20	257
07/05/06	7.53	18.5	126.2	—*	5.86	—
11/01/06	7.48	14.8	124.7	—	2.05	—
03/13/07	7.67	15.9	129.4	—	0.67	—
08/30/07	7.81	20.5	136.7	1.70	2.88	—
11/19/07	7.76	15.5	135.2	4.28	0.46	260
Rehabilitation Field Parameter Measurements						
06/19/08 09:03	7.69	22.8	136.8	5.14	2.88	+235
06/19/08 09:08	7.68	22.9	136.7	5.15	2.73	+228
06/19/08 09:13	7.68	22.9	136.7	5.10	2.62	+223
06/19/08 09:18	7.68	22.9	136.9	5.11	2.11	+220
06/19/08 09:23	7.68	22.9	136.8	5.23	2.49	+218
06/19/08 09:28	7.68	22.9	136.7	5.23	2.32	+216
06/19/08 09:38	7.68	22.7	136.8	4.98	2.33	+223
06/19/08 09:48	7.68	22.7	136.8	5.24	1.98	+224
06/19/08 09:58	7.67	22.7	136.8	4.99	2.02	+225
06/19/08 10:17	7.67	22.7	136.8	5.00	2.06	+225
06/19/08 10:32	7.68	22.8	136.8	4.90	2.21	+228
06/19/08 10:47	7.68	22.9	136.8	5.19	1.97	+229
06/19/08 11:02	7.69	23.0	136.8	4.78	2.12	+228
06/19/08 11:17	7.70	23.0	136.8	4.97	1.84	+230
06/19/08 11:32	7.70	23.1	137.0	4.88	1.84	+231
06/19/08 11:47	7.70	23.2	137.0	5.03	1.65	+232
06/19/08 12:00	7.70	23.3	137.2	5.00	1.90	+230

Note: No hourly Barcad data available.
* — = Not analyzed.

Appendix A

Analytical Data Results

Table A-1
Laboratory-Measured Analytical Results for R-33 Screen 1

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Field Prep	ER/RRES-WQH	pH	Temperature C	Specific Conductance (umho/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	ORP (mV)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	F	08-1341	—*	—	—	—	—	—
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	F	08-1431	—	—	—	—	—	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	UF	08-1342	—	—	—	—	—	—
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	UF	08-1342	—	—	—	—	—	—
GW33-08-13293	1	15:34	6/19/2008	6/20/2008	F	No COC	—	—	—	—	—	—
GW33-08-13245	1	15:34	6/19/2008	6/20/2008	UF	No COC	7.42	22.7	138.6	4.99	4.5	191
GW33-08-13294	1	15:39	6/19/2008	6/20/2008	F	No COC	—	—	—	—	—	—
GW33-08-13246	1	15:39	6/19/2008	6/20/2008	UF	No COC	7.5	23.3	137.9	5	5.3	185
GW33-08-13295	1	15:44	6/19/2008	6/20/2008	F	No COC	—	—	—	—	—	—
GW33-08-13247	1	15:44	6/19/2008	6/20/2008	UF	No COC	7.56	23.6	137.9	5	4.41	184
GW33-08-13296	1	15:49	6/19/2008	6/20/2008	F	No COC	—	—	—	—	—	—
GW33-08-13248	1	15:49	6/19/2008	6/20/2008	UF	No COC	7.61	23.7	137.8	5	4.56	185
GW33-08-13297	1	15:54	6/19/2008	6/20/2008	F	No COC	—	—	—	—	—	—
GW33-08-13249	1	15:54	6/19/2008	6/20/2008	UF	No COC	7.63	23.7	137.7	5.05	4.51	187
GW33-08-13298	1	15:59	6/19/2008	6/20/2008	F	No COC	—	—	—	—	—	—
GW33-08-13250	1	15:59	6/19/2008	6/20/2008	UF	No COC	7.64	23.7	137.6	5.18	3.81	186
GW33-08-13299	1	16:09	6/19/2008	6/20/2008	F	No COC	—	—	—	—	—	—
GW33-08-13251	1	16:09	6/19/2008	6/20/2008	UF	No COC	7.65	23.9	137.5	5.2	3.79	191
GW33-08-13300	1	16:19	6/19/2008	6/20/2008	F	No COC	—	—	—	—	—	—
GW33-08-13252	1	16:19	6/19/2008	6/20/2008	UF	No COC	7.66	23.8	137.5	5.25	3.84	198
GW33-08-13301	1	16:29	6/19/2008	6/20/2008	F	No COC	—			—	—	—
GW33-08-13253	1	16:29	6/19/2008	6/20/2008	UF	No COC	7.65	24	137.4	5.02	3.52	196
GW33-08-13302	1	16:59	6/19/2008	6/20/2008	F	No COC	—	—	—	—	—	—
GW33-08-13311	1	16:59	6/19/2008	6/20/2008	F	No COC	—	—	—	—	—	—
GW33-08-13254	1	16:59	6/19/2008	6/20/2008	UF	No COC	7.65	23.6	137.5	5.36	2.66	207
GW33-08-13266	1	16:59	6/19/2008	6/20/2008	UF	No COC	—	—	—	—	—	—
GW33-08-13303	1	17:29	6/19/2008	6/20/2008	F	No COC	—	—	—	—	—	—
GW33-08-13255	1	17:29	6/19/2008	6/20/2008	UF	No COC	7.64	23.5	137.3	5.41	2.08	213
GW33-08-13304	1	17:59	6/19/2008	6/20/2008	F	No COC	—				—	—
GW33-08-13256	1	17:59	6/19/2008	6/20/2008	UF	No COC	7.65	23.5	137.3	5.51	2.36	213
GW33-08-13265	FB	17:59	6/19/2008	6/20/2008	UF	No COC	—	—	—	—	—	—
GW33-08-13305	1	18:29	6/19/2008	6/20/2008	F	No COC	—	—	—	—		
GW33-08-13257	1	18:29	6/19/2008	6/20/2008	UF	No COC	7.66	23.3	137.5	5.51	2.24	218

* — = Not measured.

Table A-1
Laboratory-Measured Analytical Results for R-33 Screen 1

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Ag rslt (ppm)	Al rslt (ppm)	stdev (Al)	As rslt (ppm)	stdev (As)	B rslt (ppm)	stdev (B)	Ba rslt (ppm)	stdev (Ba)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.001	0.010	0.000	0.0002	—	0.004	0.000	0.002	0.001
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.001	0.044	0.001	0.0002	—	0.002	0.000	0.001	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.001	0.019	0.001	0.0002	0.0000	0.015	0.000	0.003	0.000
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.001	0.026	0.000	0.0002	0.0000	0.008	0.001	0.004	0.000
GW33-08-13293	1	15:34	6/19/2008	6/20/2008	0.001	0.016	0.000	0.0006	0.0001	0.037	0.001	0.033	0.000
GW33-08-13245	1	15:34	6/19/2008	6/20/2008	0.001	0.053	0.001	0.0008	0.0001	0.015	0.000	0.033	0.001
GW33-08-13294	1	15:39	6/19/2008	6/20/2008	0.001	0.012	0.000	0.0007	0.0000	0.027	0.000	0.032	0.001
GW33-08-13246	1	15:39	6/19/2008	6/20/2008	0.001	0.020	0.001	0.0008	0.0001	0.014	0.000	0.033	0.000
GW33-08-13295	1	15:44	6/19/2008	6/20/2008	0.001	0.013	0.000	0.0007	0.0000	0.022	0.000	0.033	0.000
GW33-08-13247	1	15:44	6/19/2008	6/20/2008	0.001	0.034	0.001	0.0007	0.0001	0.013	0.000	0.030	0.001
GW33-08-13296	1	15:49	6/19/2008	6/20/2008	0.001	0.014	0.000	0.0007	0.0000	0.020	0.000	0.033	0.000
GW33-08-13248	1	15:49	6/19/2008	6/20/2008	0.001	0.074	0.001	0.0010	0.0002	0.012	0.001	0.031	0.001
GW33-08-13297	1	15:54	6/19/2008	6/20/2008	0.001	0.016	0.000	0.0007	0.0000	0.017	0.000	0.032	0.000
GW33-08-13249	1	15:54	6/19/2008	6/20/2008	0.001	0.030	0.000	0.0010	0.0004	0.011	0.001	0.030	0.000
GW33-08-13298	1	15:59	6/19/2008	6/20/2008	0.001	0.015	0.000	0.0007	0.0001	0.016	0.001	0.032	0.000
GW33-08-13250	1	15:59	6/19/2008	6/20/2008	0.001	0.026	0.000	0.0008	0.0002	0.022	0.001	0.031	0.000
GW33-08-13299	1	16:09	6/19/2008	6/20/2008	0.001	0.014	0.000	0.0007	0.0000	0.015	0.000	0.032	0.000
GW33-08-13251	1	16:09	6/19/2008	6/20/2008	0.001	0.015	0.001	0.0007	0.0001	0.022	0.000	0.032	0.000
GW33-08-13300	1	16:19	6/19/2008	6/20/2008	0.001	0.013	0.000	0.0007	0.0000	0.016	0.000	0.032	0.000
GW33-08-13252	1	16:19	6/19/2008	6/20/2008	0.001	0.015	0.000	0.0008	0.0002	0.018	0.000	0.030	0.000
GW33-08-13301	1	16:29	6/19/2008	6/20/2008	0.001	0.012	0.000	0.0007	0.0001	0.014	0.000	0.032	0.000
GW33-08-13253	1	16:29	6/19/2008	6/20/2008	0.001	0.053	0.000	0.0010	0.0003	0.015	0.000	0.029	0.000
GW33-08-13302	1	16:59	6/19/2008	6/20/2008	0.001	0.010	0.000	0.0007	0.0001	0.046	0.001	0.032	0.001
GW33-08-13311	1	16:59	6/19/2008	6/20/2008	0.001	0.010	0.000	0.0006	0.0000	0.019	0.00	0.031	0.000
GW33-08-13254	1	16:59	6/19/2008	6/20/2008	0.001	0.037	0.001	0.0007	0.0000	0.012	0.00	0.028	0.001
GW33-08-13266	1	16:59	6/19/2008	6/20/2008	0.001	0.041	0.001	0.0007	0.0000	0.011	0.00	0.031	0.000
GW33-08-13303	1	17:29	6/19/2008	6/20/2008	0.001	0.008	0.000	0.0007	0.0000	0.026	0.00	0.031	0.001
GW33-08-13255	1	17:29	6/19/2008	6/20/2008	0.001	0.041	0.001	0.0007	0.0000	0.028	0.00	0.030	0.001
GW33-08-13304	1	17:59	6/19/2008	6/20/2008	0.001	0.015	0.000	0.0007	0.0000	0.024	0.000	0.031	0.000
GW33-08-13256	1	17:59	6/19/2008	6/20/2008	0.001	0.032	0.000	0.0007	0.0000	0.028	0.001	0.030	0.001
GW33-08-13265	FB	17:59	6/19/2008	6/20/2008	0.001	0.003	0.000	0.0000	0.0000	0.002	—	0.001	—
GW33-08-13305	1	18:29	6/19/2008	6/20/2008	0.001	0.011	0.000	0.0007	0.0000	0.020	0.001	0.031	0.001
GW33-08-13257	1	18:29	6/19/2008	6/20/2008	0.001	0.027	0.000	0.0007	0.0000	0.021	0.000	0.030	0.000

* — = Not measured.

Table A-1
Laboratory-Measured Analytical Results for R-33 Screen 1

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Be rslt (ppm)	Br(-) ppm	TOC rslt (ppm)	Ca rslt (ppm)	stdev (Ca)	Cd rslt (ppm)	Cl(-) ppm	Co rslt (ppm)	stdev (Co)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.001	0.01 (U)	—	0.82	0.01	0.001	0.19	0	—
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.001	0.01 (U)	—	0.16	0.01	0.001	0.24	0	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.001	—	12.83	0.92	0.01	0.001	—	0	—
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.001	—	1.55	0.21	0.01	0.001	—	0	—
GW33-08-13293	1	15:34	6/19/2008	6/20/2008	0.001	0.04	—	11.3	0.0	0.001	3.02	0	—
GW33-08-13245	1	15:34	6/19/2008	6/20/2008	0.001		0.92	11.7	0.0	0.001	—	0	—
GW33-08-13294	1	15:39	6/19/2008	6/20/2008	0.001	0.04	—	11.0	0.0	0.001	2.93	0	—
GW33-08-13246	1	15:39	6/19/2008	6/20/2008	0.001	—	0.82	11.7	0.0	0.001	—	0	—
GW33-08-13295	1	15:44	6/19/2008	6/20/2008	0.001	0.04	—	11.3	0.1	0.001	3.09	0.002	0.000
GW33-08-13247	1	15:44	6/19/2008	6/20/2008	0.001	—	0.76	11.7	0.1	0.001	—	0	
GW33-08-13296	1	15:49	6/19/2008	6/20/2008	0.001	0.07	—	11.3	0.0	0.001	3.05	0.002	0.000
GW33-08-13248	1	15:49	6/19/2008	6/20/2008	0.001	—	0.91	11.2	0.0	0.001	—	0	—
GW33-08-13297	1	15:54	6/19/2008	6/20/2008	0.001	0.04	—	11.0	0.0	0.001	2.91	0.002	0.000
GW33-08-13249	1	15:54	6/19/2008	6/20/2008	0.001	—	0.73	11.5	0.1	0.001	—	0	—
GW33-08-13298	1	15:59	6/19/2008	6/20/2008	0.001	0.04	—	11.1	0.0	0.001	2.92	0.001	0.000
GW33-08-13250	1	15:59	6/19/2008	6/20/2008	0.001	—	0.70	11.4	0.1	0.001	—	0	—
GW33-08-13299	1	16:09	6/19/2008	6/20/2008	0.001	0.07	—	11.1	0.0	0.001	2.96	0	—
GW33-08-13251	1	16:09	6/19/2008	6/20/2008	0.001	—	0.82	11.4	0.1	0.001	—	0	—
GW33-08-13300	1	16:19	6/19/2008	6/20/2008	0.001	0.04	—	11.1	0.0	0.001	2.91	0.001	0.000
GW33-08-13252	1	16:19	6/19/2008	6/20/2008	0.001	—	0.74	11.4	0.0	0.001	—	0	—
GW33-08-13301	1	16:29	6/19/2008	6/20/2008	0.001	0.07	—	11.1	0.1	0.001	2.98	0.001	0.000
GW33-08-13253	1	16:29	6/19/2008	6/20/2008	0.001	—	0.70	11.4	0.0	0.001	—	0	—
GW33-08-13302	1	16:59	6/19/2008	6/20/2008	0.001	0.04	—	11.3	0.0	0.001	2.87	0	—
GW33-08-13311	1	16:59	6/19/2008	6/20/2008	0.001	0.06	—	11.1	0.1	0.001	2.94	0	—
GW33-08-13254	1	16:59	6/19/2008	6/20/2008	0.001	—	0.76	11.5	0.1	0.001	—	0	—
GW33-08-13266	1	16:59	6/19/2008	6/20/2008	0.001	—	0.64	11.0	0.0	0.001	—	0	—
GW33-08-13303	1	17:29	6/19/2008	6/20/2008	0.001	0.04	—	11.2	0.0	0.001	2.86	0	—
GW33-08-13255	1	17:29	6/19/2008	6/20/2008	0.001	—	0.83	11.0	0.1	0.001	—	0	—
GW33-08-13304	1	17:59	6/19/2008	6/20/2008	0.001	0.04	—	11.1	0.1	0.001	2.90	0	—
GW33-08-13256	1	17:59	6/19/2008	6/20/2008	0.001	—	0.74	11.0	0.0	0.001	—	0	—
GW33-08-13265	FB	17:59	6/19/2008	6/20/2008	0.001	0.01 (U)	0.64	0.01	—	0.001	0.03	0	—
GW33-08-13305	1	18:29	6/19/2008	6/20/2008	0.001	0.04	—	10.9	0.0	0.001	2.89	0	—
GW33-08-13257	1	18:29	6/19/2008	6/20/2008	0.001		0.71	10.8	0.0	0.001	—	0	—

* — = Not measured.

Table A-1
Laboratory-Measured Analytical Results for R-33 Screen 1

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Alk-CO3 rslt (ppm)	Cr rslt (ppm)	stdev (Cr)	Cs rslt (ppm)	Cu rslt (ppm)	F(-) ppm	Fe rslt (ppm)	stdev (Fe)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	—	0.007	0.000	0.001	0.008	0.06	0.03	0.00
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	—	0.001	—	0.001	0	0.01 (U)	0.05	0.00
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.8 (U)	0.010	0.000	0.001	0.009	—	0.10	0.00
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.8 (U)	0.001	—	0.001	0.001	—	0.04	0.00
GW33-08-13293	1	15:34	6/19/2008	6/20/2008	—	0.004	0.000	0.001	0	0.24	0.07	0.00
GW33-08-13245	1	15:34	6/19/2008	6/20/2008	0.8 (U)	0.006	0.001	0.001	0		0.17	0.00
GW33-08-13294	1	15:39	6/19/2008	6/20/2008	—	0.005	0.000	0.001	0	0.24	0.07	0.00
GW33-08-13246	1	15:39	6/19/2008	6/20/2008	0.8 (U)	0.006	0.001	0.001	0	—	0.16	0.00
GW33-08-13295	1	15:44	6/19/2008	6/20/2008		0.005	0.000	0.001	0	0.25	0.05	0.00
GW33-08-13247	1	15:44	6/19/2008	6/20/2008	0.8 (U)	0.005	0.000	0.001	0	—	0.14	0.00
GW33-08-13296	1	15:49	6/19/2008	6/20/2008	—	0.005	0.000	0.001	0	0.24	0.06	0.00
GW33-08-13248	1	15:49	6/19/2008	6/20/2008	0.8 (U)	0.007	0.002	0.001	0.001	—	0.16	0.00
GW33-08-13297	1	15:54	6/19/2008	6/20/2008	—	0.005	0.000	0.001	0	0.24	0.06	0.00
GW33-08-13249	1	15:54	6/19/2008	6/20/2008	0.8 (U)	0.008	0.002	0.001	0.001	—	0.14	0.00
GW33-08-13298	1	15:59	6/19/2008	6/20/2008	—	0.004	0.000	0.001	0	0.24	0.08	0.00
GW33-08-13250	1	15:59	6/19/2008	6/20/2008	0.8 (U)	0.007	0.002	0.001	0.001	—	0.13	0.00
GW33-08-13299	1	16:09	6/19/2008	6/20/2008	—	0.005	0.000	0.001	0	0.23	0.08	0.00
GW33-08-13251	1	16:09	6/19/2008	6/20/2008	0.8 (U)	0.006	0.001	0.001	0.002	—	0.12	0.00
GW33-08-13300	1	16:19	6/19/2008	6/20/2008	—	0.005	0.000	0.001	0.004	0.23	0.07	0.00
GW33-08-13252	1	16:19	6/19/2008	6/20/2008	0.8 (U)	0.006	0.002	0.001	0	—	0.13	0.00
GW33-08-13301	1	16:29	6/19/2008	6/20/2008	—	0.004	0.001	0.001	0	0.23	0.06	0.00
GW33-08-13253	1	16:29	6/19/2008	6/20/2008	0.8 (U)	0.008	0.002	0.001	0.001	—	0.12	0.00
GW33-08-13302	1	16:59	6/19/2008	6/20/2008	—	0.005	0.000	0.001	0	0.23	0.05	0.00
GW33-08-13311	1	16:59	6/19/2008	6/20/2008	—	0.005	0.000	0.001	0.002	0.27	0.05	0.00
GW33-08-13254	1	16:59	6/19/2008	6/20/2008	0.8 (U)	0.005	0.000	0.001	0.001	—	0.10	0.00
GW33-08-13266	1	16:59	6/19/2008	6/20/2008	0.8 (U)	0.005	0.000	0.001	0	—	0.10	0.00
GW33-08-13303	1	17:29	6/19/2008	6/20/2008	—	0.005	0.000	0.001	0	0.23	0.05	0.00
GW33-08-13255	1	17:29	6/19/2008	6/20/2008	0.8 (U)	0.004	0.001	0.001	0		0.09	0.00
GW33-08-13304	1	17:59	6/19/2008	6/20/2008	—	0.005	0.000	0.001	0	0.23	0.08	0.00
GW33-08-13256	1	17:59	6/19/2008	6/20/2008	0.8 (U)	0.005	0.000	0.001	0.001	—	0.10	0.00
GW33-08-13265	FB	17:59	6/19/2008	6/20/2008	0.8 (U)	0.001	—	0.001	0	0.01 (U)	0.01	—
GW33-08-13305	1	18:29	6/19/2008	6/20/2008	—	0.005	0.000	0.001	0	0.23	0.06	0.00
GW33-08-13257	1	18:29	6/19/2008	6/20/2008	0.8 (U)	0.005	0.000	0.001	0	—	0.08	0.00

* — = Not measured.

Table A-1
Laboratory-Measured Analytical Results for R-33 Screen 1

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Alk-CO3+HCO3 rslt (ppm)	Hg rslt (ppm)	K rslt (ppm)	stdev (K)	Li rslt (ppm)	Mg rslt (ppm)	stdev (Mg)	Mn rslt (ppm)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	—	0.00005	0.14	0.00	0.001	0.14	0.00	0.017
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	—	0.00005	0.04	0.00	0.001	0.01	—	0.003
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0 (U)	0.00005	0.25	0.00	0.001	0.17	0.00	0.021
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0 (U)	0.00005	0.03	0.00	0.001	0.02	0.00	0.002
GW33-08-13293	1	15:34	6/19/2008	6/20/2008	—	0.00005	1.35	0.01	0.023	3.80	0.02	0.004
GW33-08-13245	1	15:34	6/19/2008	6/20/2008	82.5	0.00005	1.37	0.01	0.023	3.90	0.01	0.003
GW33-08-13294	1	15:39	6/19/2008	6/20/2008	—	0.00005	1.29	0.00	0.022	3.68	0.01	0.003
GW33-08-13246	1	15:39	6/19/2008	6/20/2008	82.8	0.00005	1.37	0.02	0.023	3.93	0.02	0.003
GW33-08-13295	1	15:44	6/19/2008	6/20/2008	—	0.00005	1.33	0.00	0.023	3.79	0.03	0.006
GW33-08-13247	1	15:44	6/19/2008	6/20/2008	82.8	0.00005	1.25	0.02	0.020	3.60	0.05	0.003
GW33-08-13296	1	15:49	6/19/2008	6/20/2008	—	0.00005	1.32	0.01	0.023	3.83	0.02	0.006
GW33-08-13248	1	15:49	6/19/2008	6/20/2008	82.8	0.00005	1.26	0.01	0.021	3.65	0.02	0.003
GW33-08-13297	1	15:54	6/19/2008	6/20/2008	—	0.00005	1.29	0.00	0.022	3.77	0.03	0.006
GW33-08-13249	1	15:54	6/19/2008	6/20/2008	83.1	0.00005	1.20	0.01	0.020	3.53	0.02	0.003
GW33-08-13298	1	15:59	6/19/2008	6/20/2008	—	0.00005	1.28	0.00	0.022	3.79	0.03	0.005
GW33-08-13250	1	15:59	6/19/2008	6/20/2008	82.8	0.00005	1.31	0.01	0.024	3.77	0.01	0.004
GW33-08-13299	1	16:09	6/19/2008	6/20/2008	—	0.00005	1.28	0.01	0.022	3.81	0.02	0.004
GW33-08-13251	1	16:09	6/19/2008	6/20/2008	82.9	0.00005	1.28	0.01	0.023	3.77	0.05	0.003
GW33-08-13300	1	16:19	6/19/2008	6/20/2008	—	0.00005	1.28	0.01	0.022	3.79	0.03	0.005
GW33-08-13252	1	16:19	6/19/2008	6/20/2008	82.8	0.00005	1.25	0.00	0.022	3.66	0.03	0.003
GW33-08-13301	1	16:29	6/19/2008	6/20/2008	—	0.00005	1.27	0.00	0.021	3.77	0.01	0.005
GW33-08-13253	1	16:29	6/19/2008	6/20/2008	82.8	0.00005	1.22	0.02	0.021	3.57	0.04	0.003
GW33-08-13302	1	16:59	6/19/2008	6/20/2008	—	0.00005	1.36	0.01	0.025	3.86	0.01	0.003
GW33-08-13311	1	16:59	6/19/2008	6/20/2008	—	0.00005	1.28	0.01	0.023	3.75	0.02	0.003
GW33-08-13254	1	16:59	6/19/2008	6/20/2008	82.7	0.00005	1.17	0.02	0.020	3.45	0.03	0.003
GW33-08-13266	1	16:59	6/19/2008	6/20/2008	82.7	0.00005	1.32	0.02	0.022	3.81	0.03	0.003
GW33-08-13303	1	17:29	6/19/2008	6/20/2008	—	0.00005	1.32	0.01	0.024	3.77	0.02	0.003
GW33-08-13255	1	17:29	6/19/2008	6/20/2008	83.0	0.00005	1.37	0.01	0.024	3.81	0.01	0.003
GW33-08-13304	1	17:59	6/19/2008	6/20/2008	—	0.00005	1.30	0.00	0.023	3.78	0.01	0.004
GW33-08-13256	1	17:59	6/19/2008	6/20/2008	82.9	0.00005	1.34	0.01	0.023	3.80	0.02	0.003
GW33-08-13265	FB	17:59	6/19/2008	6/20/2008	0 (U)	0.00005	0.01	—	0.001	0.01	—	0.001
GW33-08-13305	1	18:29	6/19/2008	6/20/2008	—	0.00005	1.27	0.02	0.023	3.75	0.03	0.004
GW33-08-13257	1	18:29	6/19/2008	6/20/2008	82.8	0.00005	1.31	0.00	0.022	3.76	0.03	0.003

* — = Not measured.

Table A-1
Laboratory-Measured Analytical Results for R-33 Screen 1

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Mo rslt (ppm)	Na rslt (ppm)	stdev (Na)	Ni rslt (ppm)	NO2(ppm)	NO2-N rslt	NO3 ppm	NO3-N rslt
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.001	0.45	0.00	0.004	0.01	0.003 (U)	0.21	0.049
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.001	0.31	0.01	0.001	0.01	0.003 (U)	0.05	0.010
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.001	0.47	0.01	0.005	—	—	—	—
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.001	0.32	0.00	0.001	—	—	—	—
GW33-08-13293	1	15:34	6/19/2008	6/20/2008	0.001	10.7	0.0	0.001	0.01	0.003 (U)	2.90	0.656
GW33-08-13245	1	15:34	6/19/2008	6/20/2008	0.001	10.8	0.0	0.001	—	—	—	—
GW33-08-13294	1	15:39	6/19/2008	6/20/2008	0.001	10.4	0.0	0.001	0.01	0.003 (U)	2.84	0.641
GW33-08-13246	1	15:39	6/19/2008	6/20/2008	0.001	10.9	0.1	0.001	—	—	—	—
GW33-08-13295	1	15:44	6/19/2008	6/20/2008	0.001	10.7	0.1	0.001	0.01	0.003 (U)	2.88	0.650
GW33-08-13247	1	15:44	6/19/2008	6/20/2008	0.001	10.0	0.1	0.001	—	—	—	—
GW33-08-13296	1	15:49	6/19/2008	6/20/2008	0.001	10.8	0.1	0.001	0.01	0.003 (U)	2.79	0.629
GW33-08-13248	1	15:49	6/19/2008	6/20/2008	0.001	10.1	0.0	0.001	—	—	—	—
GW33-08-13297	1	15:54	6/19/2008	6/20/2008	0.001	10.6	0.1	0.001	0.01	0.003 (U)	2.82	0.636
GW33-08-13249	1	15:54	6/19/2008	6/20/2008	0.001	9.80	0.08	0.001	—	—	—	—
GW33-08-13298	1	15:59	6/19/2008	6/20/2008	0.001	10.5	0.1	0.001	0.01	0.003 (U)	2.83	0.638
GW33-08-13250	1	15:59	6/19/2008	6/20/2008	0.001	10.4	0.0	0.001	—	—	—	—
GW33-08-13299	1	16:09	6/19/2008	6/20/2008	0.001	10.5	0.0	0.001	0.01	0.003 (U)	2.83	0.640
GW33-08-13251	1	16:09	6/19/2008	6/20/2008	0.001	10.2	0.1	0.001	—	—	—	—
GW33-08-13300	1	16:19	6/19/2008	6/20/2008	0.001	10.5	0.0	0.001	0.01	0.003 (U)	2.81	0.635
GW33-08-13252	1	16:19	6/19/2008	6/20/2008	0.001	10.0	0.1	0.001	—	—	—	—
GW33-08-13301	1	16:29	6/19/2008	6/20/2008	0.001	10.4	0.1	0.001	0.01	0.003 (U)	2.84	0.641
GW33-08-13253	1	16:29	6/19/2008	6/20/2008	0.001	9.73	0.05	0.001	—	—	—	—
GW33-08-13302	1	16:59	6/19/2008	6/20/2008	0.001	10.7	0.1	0.001	0.01	0.003 (U)	2.84	0.640
GW33-08-13311	1	16:59	6/19/2008	6/20/2008	0.001	10.3	0.0	0.001	0.01	0.003 (U)	2.82	0.637
GW33-08-13254	1	16:59	6/19/2008	6/20/2008	0.001	9.48	0.12	0.001	—	—	—	—
GW33-08-13266	1	16:59	6/19/2008	6/20/2008	0.001	11.0	0.1	0.001	—	—	—	—
GW33-08-13303	1	17:29	6/19/2008	6/20/2008	0.001	10.6	0.0	0.001	0.01	0.003 (U)	2.76	0.623
GW33-08-13255	1	17:29	6/19/2008	6/20/2008	0.001	11.1	0.0	0.001	—	—	—	—
GW33-08-13304	1	17:59	6/19/2008	6/20/2008	0.001	10.4	0.0	0.001	0.01	0.003 (U)	2.87	0.648
GW33-08-13256	1	17:59	6/19/2008	6/20/2008	0.001	11.0	0.1	0.001	—	—	—	—
GW33-08-13265	FB	17:59	6/19/2008	6/20/2008	0.001	0.06	0.00	0.001	0.01	0.003 (U)	0.01	0.002 (U)
GW33-08-13305	1	18:29	6/19/2008	6/20/2008	0.001	10.3	0.0	0.001	0.01	0.003 (U)	2.90	0.656
GW33-08-13257	1	18:29	6/19/2008	6/20/2008	0.001	10.9	0.1	0.001	—	—	—	—

* — = Not measured.

Table A-1
Laboratory-Measured Analytical Results for R-33 Screen 1

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	C2O4 rslt (ppm)	Pb rslt (ppm)	stdev (Pb)	pH (Lab)	PO4(-3) rslt (ppm)	Rb rslt (ppm)	stdev (Rb)	S2- rslt (ppm)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.01	0.0005	0.0000	—	0.01 (U)	0.001	—	—
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.01	0.0002	—	—	0.01 (U)	0.001	—	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	—	0.0011	0.0000	6.72	—	0.001	—	0.01
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	—	0.0002	—	5.58	—	0.001	—	0.01
GW33-08-13293	1	15:34	6/19/2008	6/20/2008	0.01	0.0005	0.0000	—	0.04	0.003	0.000	—
GW33-08-13245	1	15:34	6/19/2008	6/20/2008	—	0.0009	0.0002	7.64	—	0.003	0.001	0.01
GW33-08-13294	1	15:39	6/19/2008	6/20/2008	0.01	0.0005	0.0000	—	0.05	0.003	0.000	—
GW33-08-13246	1	15:39	6/19/2008	6/20/2008	—	0.0008	0.0001	7.65	—	0.003	0.001	0.01
GW33-08-13295	1	15:44	6/19/2008	6/20/2008	0.01 (U)	0.0004	0.0000	—	0.05	0.003	0.000	—
GW33-08-13247	1	15:44	6/19/2008	6/20/2008	—	0.0009	0.0000	7.70	—	0.003	0.000	0.01 (U)
GW33-08-13296	1	15:49	6/19/2008	6/20/2008	0.01 (U)	0.0004	0.0000	—	0.05	0.003	0.000	—
GW33-08-13248	1	15:49	6/19/2008	6/20/2008	—	0.0011	0.0002	7.73	—	0.004	0.001	0.01 (U)
GW33-08-13297	1	15:54	6/19/2008	6/20/2008	0.01 (U)	0.0003	0.0000	—	0.04	0.003	0.000	—
GW33-08-13249	1	15:54	6/19/2008	6/20/2008	—	0.0010	0.0004	7.73	—	0.004	0.001	0.01 (U)
GW33-08-13298	1	15:59	6/19/2008	6/20/2008	0.01 (U)	0.0004	0.0000	—	0.04	0.003	0.000	—
GW33-08-13250	1	15:59	6/19/2008	6/20/2008	—	0.0009	0.0002	7.75	—	0.003	0.001	0.01(U)
GW33-08-13299	1	16:09	6/19/2008	6/20/2008	0.01 (U)	0.0005	0.0000	—	0.04	0.003	0.000	—
GW33-08-13251	1	16:09	6/19/2008	6/20/2008	—	0.0007	0.0001	7.67	—	0.003	0.000	0.01 (U)
GW33-08-13300	1	16:19	6/19/2008	6/20/2008	0.01 (U)	0.0004	0.0000	—	0.04	0.003	0.000	—
GW33-08-13252	1	16:19	6/19/2008	6/20/2008	—	0.0008	0.0002	7.68	—	0.003	0.001	0.01 (U)
GW33-08-13301	1	16:29	6/19/2008	6/20/2008	0.01 (U)	0.0004	0.0000	—	0.04	0.003	0.000	—
GW33-08-13253	1	16:29	6/19/2008	6/20/2008	—	0.0009	0.0003	7.71	—	0.004	0.001	0.01 (U)
GW33-08-13302	1	16:59	6/19/2008	6/20/2008	0.01 (U)	0.0003	0.0000	—	0.04	0.003	0.000	—
GW33-08-13311	1	16:59	6/19/2008	6/20/2008	0.01 (U)	0.0003	0.0000	—	0.05	0.003	0.000	—
GW33-08-13254	1	16:59	6/19/2008	6/20/2008	—	0.0005	0.0000	7.73	—	0.003	0.000	0.01 (U)
GW33-08-13266	1	16:59	6/19/2008	6/20/2008	—	0.0005	0.0000	7.79	—	0.003	0.000	0.01 (U)
GW33-08-13303	1	17:29	6/19/2008	6/20/2008	0.01 (U)	0.0004	0.0000	—	0.03	0.003	0.000	
GW33-08-13255	1	17:29	6/19/2008	6/20/2008	—	0.0005	0.0000	7.75	—	0.003	0.000	0.01 (U)
GW33-08-13304	1	17:59	6/19/2008	6/20/2008	0.01 (U)	0.0004	0.0000	—	0.05	0.003	0.000	—
GW33-08-13256	1	17:59	6/19/2008	6/20/2008	—	0.0005	0.0000	7.78	—	0.003	0.000	0.01 (U)
GW33-08-13265	FB	17:59	6/19/2008	6/20/2008	0.01 (U)	0.0001	0.0000	5.24	0.01 (U)	0.001	—	0.01 (U)
GW33-08-13305	1	18:29	6/19/2008	6/20/2008	0.01 (U)	0.0004	0.0000	—	0.05	0.003	0.000	—
GW33-08-13257	1	18:29	6/19/2008	6/20/2008	—	0.0005	0.0000	7.79	—	0.003	0.000	0.01 (U)

* — = Not measured.

Table A-1
Laboratory-Measured Analytical Results for R-33 Screen 1

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Sb rslt (ppm)	Se rslt (ppm)	Si rslt (ppm)	stdev (Si)	SiO2 rslt (ppm)	stdev (SiO2)	Sn rslt (ppm)	SO4(-2) rslt (ppm)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.001	0.001	0.04	0.00	0.08	0.00	0.001	1.37
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.001	0.001	0.03	0.00	0.06	0.00	0.001	0.07
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.001	0.001	0.03	0.00	0.06	0.01	0.001	—
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.001	0.001	0.02	0.00	0.04	0.00	0.001	—
GW33-08-13293	1	15:34	6/19/2008	6/20/2008	0.001	0.001	35.9	0.2	76.9	0.4	0.001	3.62
GW33-08-13245	1	15:34	6/19/2008	6/20/2008	0.001	0.001	37.2	0.1	79.55	0.11	0.001	—
GW33-08-13294	1	15:39	6/19/2008	6/20/2008	0.001	0.001	35.1	0.1	75.1	0.2	0.001	3.52
GW33-08-13246	1	15:39	6/19/2008	6/20/2008	0.001	0.001	37.6	0.5	80.5	1.1	0.001	—
GW33-08-13295	1	15:44	6/19/2008	6/20/2008	0.001	0.001	36.3	0.2	77.6	0.5	0.001	3.62
GW33-08-13247	1	15:44	6/19/2008	6/20/2008	0.001	0.001	34.4	0.5	73.6	1.0	0.001	—
GW33-08-13296	1	15:49	6/19/2008	6/20/2008	0.001	0.001	36.7	0.2	78.6	0.4	0.001	3.30
GW33-08-13248	1	15:49	6/19/2008	6/20/2008	0.001	0.001	34.8	0.2	74.4	0.5	0.001	—
GW33-08-13297	1	15:54	6/19/2008	6/20/2008	0.001	0.001	35.9	0.1	76.8	0.2	0.001	3.49
GW33-08-13249	1	15:54	6/19/2008	6/20/2008	0.001	0.001	33.1	0.4	70.9	0.8	0.001	—
GW33-08-13298	1	15:59	6/19/2008	6/20/2008	0.001	0.001	35.8	0.1	76.6	0.1	0.001	3.40
GW33-08-13250	1	15:59	6/19/2008	6/20/2008	0.001	0.001	35.3	0.2	75.6	0.5	0.001	—
GW33-08-13299	1	16:09	6/19/2008	6/20/2008	0.001	0.001	35.9	0.1	76.8	0.2	0.001	3.35
GW33-08-13251	1	16:09	6/19/2008	6/20/2008	0.001	0.001	35.3	0.1	75.5	0.3	0.001	—
GW33-08-13300	1	16:19	6/19/2008	6/20/2008	0.001	0.001	35.8	0.2	76.7	0.5	0.001	3.35
GW33-08-13252	1	16:19	6/19/2008	6/20/2008	0.001	0.001	34.3	0.3	73.4	0.7	0.001	—
GW33-08-13301	1	16:29	6/19/2008	6/20/2008	0.001	0.001	35.7	0.1	76.5	0.1	0.001	3.44
GW33-08-13253	1	16:29	6/19/2008	6/20/2008	0.001	0.001	33.5	0.7	71.8	1.5	0.001	—
GW33-08-13302	1	16:59	6/19/2008	6/20/2008	0.001	0.001	36.3	0.1	77.7	0.1	0.001	3.36
GW33-08-13311	1	16:59	6/19/2008	6/20/2008	0.001	0.001	35.1	0.1	75.0	0.3	0.001	3.44
GW33-08-13254	1	16:59	6/19/2008	6/20/2008	0.001	0.001	32.7	0.5	70.0	1.1	0.001	—
GW33-08-13266	1	16:59	6/19/2008	6/20/2008	0.001	0.001	36.0	0.4	77.0	0.8	0.001	—
GW33-08-13303	1	17:29	6/19/2008	6/20/2008	0.001	0.001	35.6	0.3	76.2	0.5	0.001	3.37
GW33-08-13255	1	17:29	6/19/2008	6/20/2008	0.001	0.001	36.0	0.6	77.0	1.3	0.001	—
GW33-08-13304	1	17:59	6/19/2008	6/20/2008	0.001	0.001	35.3	0.1	75.5	0.2	0.001	3.39
GW33-08-13256	1	17:59	6/19/2008	6/20/2008	0.001	0.001	35.6	0.1	76.2	0.3	0.001	—
GW33-08-13265	FB	17:59	6/19/2008	6/20/2008	0.001	0.001	0.01	—	0.02	—	0.001	0.01 (U)
GW33-08-13305	1	18:29	6/19/2008	6/20/2008	0.001	0.001	35.3	0.5	75.5	1.1	0.001	3.43
GW33-08-13257	1	18:29	6/19/2008	6/20/2008	0.001	0.001	35.6	0.1	76.3	0.1	0.001	—

* — = Not measured.

Table A-1
Laboratory-Measured Analytical Results for R-33 Screen 1

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Sr rslt (ppm)	stdev (Sr)	Th rslt (ppm)	Ti rslt (ppm)	Tl rslt (ppm)	U rslt (ppm)	stdev (U)	V rslt (ppm)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.003	0.000	0.001	0.002	0.001	0.0002	—	0.001
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.001	—	0.001	0.002	0.001	0.0002	—	0.001
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.004	0.000	0.001	0.002	0.001	0.0002	—	0.001
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.003	0.000	0.001	0.002	0.001	0.0002	—	0.001
GW33-08-13293	1	15:34	6/19/2008	6/20/2008	0.047	0.000	0.001	0.002	0.001	0.0011	0.0000	0.006
GW33-08-13245	1	15:34	6/19/2008	6/20/2008	0.047	0.000	0.001	0.002	0.001	0.0012	0.0002	0.007
GW33-08-13294	1	15:39	6/19/2008	6/20/2008	0.044	0.000	0.001	0.002	0.001	0.0011	0.0000	0.006
GW33-08-13246	1	15:39	6/19/2008	6/20/2008	0.048	0.001	0.001	0.002	0.001	0.0012	0.0002	0.007
GW33-08-13295	1	15:44	6/19/2008	6/20/2008	0.046	0.000	0.001	0.002	0.001	0.0011	0.0000	0.005
GW33-08-13247	1	15:44	6/19/2008	6/20/2008	0.044	0.001	0.001	0.002	0.001	0.0012	0.0001	0.006
GW33-08-13296	1	15:49	6/19/2008	6/20/2008	0.046	0.000	0.001	0.002	0.001	0.0012	0.0000	0.005
GW33-08-13248	1	15:49	6/19/2008	6/20/2008	0.044	0.001	0.001	0.002	0.001	0.0016	0.0003	0.008
GW33-08-13297	1	15:54	6/19/2008	6/20/2008	0.045	0.000	0.001	0.002	0.001	0.0011	0.0000	0.006
GW33-08-13249	1	15:54	6/19/2008	6/20/2008	0.043	0.000	0.001	0.002	0.001	0.0017	0.0006	0.009
GW33-08-13298	1	15:59	6/19/2008	6/20/2008	0.045	0.000	0.001	0.002	0.001	0.0012	0.0000	0.005
GW33-08-13250	1	15:59	6/19/2008	6/20/2008	0.045	0.000	0.001	0.002	0.001	0.0013	0.0004	0.007
GW33-08-13299	1	16:09	6/19/2008	6/20/2008	0.045	0.000	0.001	0.002	0.001	0.0012	0.0000	0.006
GW33-08-13251	1	16:09	6/19/2008	6/20/2008	0.046	0.000	0.001	0.002	0.001	0.0012	0.0002	0.007
GW33-08-13300	1	16:19	6/19/2008	6/20/2008	0.045	0.000	0.001	0.002	0.001	0.0012	0.0000	0.006
GW33-08-13252	1	16:19	6/19/2008	6/20/2008	0.044	0.001	0.001	0.002	0.001	0.0013	0.0003	0.007
GW33-08-13301	1	16:29	6/19/2008	6/20/2008	0.044	0.000	0.001	0.002	0.001	0.0011	0.0000	0.005
GW33-08-13253	1	16:29	6/19/2008	6/20/2008	0.042	0.000	0.001	0.002	0.001	0.0017	0.0006	0.008
GW33-08-13302	1	16:59	6/19/2008	6/20/2008	0.046	0.001	0.001	0.002	0.001	0.0012	0.0000	0.006
GW33-08-13311	1	16:59	6/19/2008	6/20/2008	0.044	0.000	0.001	0.002	0.001	0.0012	0.0000	0.005
GW33-08-13254	1	16:59	6/19/2008	6/20/2008	0.041	0.001	0.001	0.002	0.001	0.0012	0.0000	0.006
GW33-08-13266	1	16:59	6/19/2008	6/20/2008	0.046	0.000	0.001	0.002	0.001	0.0012	0.0000	0.005
GW33-08-13303	1	17:29	6/19/2008	6/20/2008	0.045	0.000	0.001	0.002	0.001	0.0011	0.0000	0.005
GW33-08-13255	1	17:29	6/19/2008	6/20/2008	0.047	0.000	0.001	0.002	0.001	0.0012	0.0001	0.005
GW33-08-13304	1	17:59	6/19/2008	6/20/2008	0.045	0.000	0.001	0.002	0.001	0.0011	0.0000	0.005
GW33-08-13256	1	17:59	6/19/2008	6/20/2008	0.046	0.000	0.001	0.002	0.001	0.0012	0.0000	0.006
GW33-08-13265	FB	17:59	6/19/2008	6/20/2008	0.001	0.000	0.001	0.002	0.001	0.0002	—	0.001
GW33-08-13305	1	18:29	6/19/2008	6/20/2008	0.044	0.000	0.001	0.002	0.001	0.0012	0.0000	0.005
GW33-08-13257	1	18:29	6/19/2008	6/20/2008	0.046	0.000	0.001	0.002	0.001	0.0011	0.0000	0.005

* — = Not measured.

Table A-1
Laboratory-Measured Analytical Results for R-33 Screen 1

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	stdev (V)	Zn rslt (ppm)	stdev (Zn)	TDS (ppm)	Cations	Anions	Balance	Status
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	—	0.019	0.000	3.6	0.1	#VALUE!	#VALUE!	—
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	—	0.018	0.000	1.1	0.0	#VALUE!	#VALUE!	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	—	0.022	0.000	2.1	0.09	0.00	0.98	ClO4 to be analyzed
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	—	0.020	0.001	0.7	0.03	0.00	0.94	ClO4 to be analyzed
GW33-08-13293	1	15:34	6/19/2008	6/20/2008	0.000	0.128	0.005	114.3	1.4	#VALUE!	Not applicable	—
GW33-08-13245	1	15:34	6/19/2008	6/20/2008	0.001	0.150	0.019	190.3	1.42	1.35	0.02	ClO4 to be analyzed
GW33-08-13294	1	15:39	6/19/2008	6/20/2008	0.000	0.135	0.001	111.5	1.3	#VALUE!	Not applicable	—
GW33-08-13246	1	15:39	6/19/2008	6/20/2008	0.001	0.146	0.020	191.7	1.43	1.36	0.02	ClO4 to be analyzed
GW33-08-13295	1	15:44	6/19/2008	6/20/2008	0.000	0.127	0.003	115.0	1.4	#VALUE!	Not applicable	—
GW33-08-13247	1	15:44	6/19/2008	6/20/2008	0.000	0.139	0.014	183.4	1.35	1.36	0.00	ClO4 to be analyzed
GW33-08-13296	1	15:49	6/19/2008	6/20/2008	0.000	0.127	0.000	115.7	1.4	#VALUE!	Not applicable	—
GW33-08-13248	1	15:49	6/19/2008	6/20/2008	0.002	0.179	0.038	184.0	1.34	1.36	-0.01	ClO4 to be analyzed
GW33-08-13297	1	15:54	6/19/2008	6/20/2008	0.000	0.126	0.002	113.5	1.4	#VALUE!	Not applicable	—
GW33-08-13249	1	15:54	6/19/2008	6/20/2008	0.003	0.182	0.052	180.6	1.33	1.36	-0.01	ClO4 to be analyzed
GW33-08-13298	1	15:59	6/19/2008	6/20/2008	0.000	0.126	0.006	113.1	1.4	#VALUE!	Not applicable	—
GW33-08-13250	1	15:59	6/19/2008	6/20/2008	0.002	0.158	0.034	185.8	1.37	1.36	0.00	ClO4 to be analyzed
GW33-08-13299	1	16:09	6/19/2008	6/20/2008	0.000	0.121	0.000	113.3	1.4	#VALUE!	Not applicable	—
GW33-08-13251	1	16:09	6/19/2008	6/20/2008	0.001	0.141	0.028	185.4	1.36	1.36	0.00	ClO4 to be analyzed
GW33-08-13300	1	16:19	6/19/2008	6/20/2008	0.000	0.120	0.002	113.1	1.4	#VALUE!	Not applicable	—
GW33-08-13252	1	16:19	6/19/2008	6/20/2008	0.001	0.136	0.031	182.9	1.35	1.36	0.00	ClO4 to be analyzed
GW33-08-13301	1	16:29	6/19/2008	6/20/2008	0.001	0.114	0.010	113.0	1.4	#VALUE!	Not applicable	—
GW33-08-13253	1	16:29	6/19/2008	6/20/2008	0.002	0.163	0.049	181.0	1.33	1.36	-0.01	ClO4 to be analyzed
GW33-08-13302	1	16:59	6/19/2008	6/20/2008	0.000	0.105	0.001	114.7	1.4	#VALUE!	Not applicable	—
GW33-08-13311	1	16:59	6/19/2008	6/20/2008	0.000	0.097	0.001	111.4	1.4	#VALUE!	#VALUE!	—
GW33-08-13254	1	16:59	6/19/2008	6/20/2008	0.000	0.105	0.006	178.6	1.31	1.36	Not applicable	ClO4 to be analyzed
GW33-08-13266	1	16:59	6/19/2008	6/20/2008	0.000	0.105	0.002	187.3	1.38	1.36	0.01	ClO4 to be analyzed
GW33-08-13303	1	17:29	6/19/2008	6/20/2008	0.000	0.097	0.000	112.8	1.4	#VALUE!	Not applicable	—
GW33-08-13255	1	17:29	6/19/2008	6/20/2008	0.000	0.100	0.000	187.7	1.39	1.36	0.01	ClO4 to be analyzed
GW33-08-13304	1	17:59	6/19/2008	6/20/2008	0.000	0.106	0.003	111.9	1.4	#VALUE!	Not applicable	—
GW33-08-13256	1	17:59	6/19/2008	6/20/2008	0.000	0.093	0.001	186.6	1.38	1.36	0.01	ClO4 to be analyzed
GW33-08-13265	FB	17:59	6/19/2008	6/20/2008	—	0.001	—	0.2	0.00	0.00	0.57	ClO4 to be analyzed
GW33-08-13305	1	18:29	6/19/2008	6/20/2008	0.000	0.086	0.004	111.6	1.3	#VALUE!	Not applicable	—
GW33-08-13257	1	18:29	6/19/2008	6/20/2008	0.000	0.088	0.005	186.2	1.36	1.36	0.00	ClO4 to be analyzed

* — = Not measured.

Table A-2
Laboratory-Measured Analytical Results for R-33 Screen 2

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Field Prep	ER/RRES-WQH	pH	Temperature C	Specific Conductance (umho/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	F	08-1341	—*	—	—	—	—
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	F	08-1431	—	—	—	—	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	UF	08-1342	—	—	—	—	—
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	UF	08-1342	—	—	—	—	—
GW33-08-13312	2	9:03	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13267	2	9:03	6/19/2008	6/19/2008	UF	08-1394	7.69	22.8	136.8	5.14	2.88
GW33-08-13313	2	9:08	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13268	2	9:08	6/19/2008	6/19/2008	UF	08-1394	7.68	22.9	136.7	5.15	2.73
GW33-08-13314	2	9:13	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13269	2	9:13	6/19/2008	6/19/2008	UF	08-1394	7.68	22.9	136.7	5.1	2.62
GW33-08-13315	2	9:18	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13270	2	9:18	6/19/2008	6/19/2008	UF	08-1394	7.68	22.9	136.9	5.11	2.11
GW33-08-13316	2	9:23	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13271	2	9:23	6/19/2008	6/19/2008	UF	08-1394	7.68	22.9	136.8	5.23	2.49
GW33-08-13317	2	9:28	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13272	2	9:28	6/19/2008	6/19/2008	UF	08-1394	7.68	22.9	136.7	5.23	2.32
GW33-08-13318	2	9:38	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13273	2	9:38	6/19/2008	6/19/2008	UF	08-1394	7.68	22.7	136.8	4.98	2.33
GW33-08-13319	2	9:48	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13274	2	9:48	6/19/2008	6/19/2008	UF	08-1394	7.68	22.7	136.8	5.24	1.98
GW33-08-13320	2	9:58	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13275	2	9:58	6/19/2008	6/19/2008	UF	08-1394	7.67	22.7	136.8	4.99	2.02
GW33-08-13321	2	10:32	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13322	2	10:32	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13276	2	10:32	6/19/2008	6/19/2008	UF	08-1394	7.68	22.8	136.8	4.9	2.21
GW33-08-13287	2	10:32	6/19/2008	6/19/2008	UF	08-1394	—	—	—	—	—
GW33-08-13288	FB	10:32	6/19/2008	6/19/2008	UF	08-1394	—	—	—	—	—
GW33-08-13332	2	11:02	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13277	2	11:02	6/19/2008	6/19/2008	UF	08-1394	7.69	23	136.8	4.78	2.12
GW33-08-13323	2	11:32	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13278	2	11:32	6/19/2008	6/19/2008	UF	08-1394	7.7	23.1	137	4.88	1.84
GW33-08-13324	2	12:00	6/19/2008	6/19/2008	F	08-1395	—	—	—	—	—
GW33-08-13279	2	12:00	6/19/2008	6/19/2008	UF	08-1394	7.7	23.3	137.2	5	1.9

* — = Not measured.

Table A-2
Laboratory-Measured Analytical Results for R-33 Screen 2

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	ORP (mV)	Ag rslt (ppm)	Al rslt (ppm)	stdev (Al)	As rslt (ppm)	stdev (As)	B rslt (ppm)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	—	0.001	0.010	0.000	0.0002	—	0.004
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	—	0.001	0.044	0.001	0.0002	—	0.002
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	—	0.001	0.019	0.001	0.0002	—	0.015
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	—	0.001	0.026	0.000	0.0002	—	0.008
GW33-08-13312	2	9:03	6/19/2008	6/19/2008	—	0.001	0.014	0.000	0.0008	0.0000	0.035
GW33-08-13267	2	9:03	6/19/2008	6/19/2008	235	0.001	0.116	0.001	0.0008	0.0001	0.020
GW33-08-13313	2	9:08	6/19/2008	6/19/2008	—	0.001	0.010	0.000	0.0007	0.0000	0.024
GW33-08-13268	2	9:08	6/19/2008	6/19/2008	228	0.001	0.111	0.001	0.0007	0.0000	0.019
GW33-08-13314	2	9:13	6/19/2008	6/19/2008	—	0.001	0.055	0.000	0.0011	0.0004	0.020
GW33-08-13269	2	9:13	6/19/2008	6/19/2008	223	0.001	0.132	0.009	0.0009	0.0001	0.016
GW33-08-13315	2	9:18	6/19/2008	6/19/2008	—	0.001	0.009	0.000	0.0008	0.0000	0.018
GW33-08-13270	2	9:18	6/19/2008	6/19/2008	220	0.001	0.095	0.003	0.0007	0.0000	0.011
GW33-08-13316	2	9:23	6/19/2008	6/19/2008	—	0.001	0.012	0.000	0.0007	0.0000	0.014
GW33-08-13271	2	9:23	6/19/2008	6/19/2008	218	0.001	0.112	0.000	0.0008	0.0001	0.012
GW33-08-13317	2	9:28	6/19/2008	6/19/2008	—	0.001	0.013	0.000	0.0008	0.0001	0.014
GW33-08-13272	2	9:28	6/19/2008	6/19/2008	216	0.001	0.093	0.003	0.0008	0.0001	0.012
GW33-08-13318	2	9:38	6/19/2008	6/19/2008	—	0.001	0.013	0.000	0.0009	0.0001	0.013
GW33-08-13273	2	9:38	6/19/2008	6/19/2008	223	0.001	0.083	0.001	0.0008	0.0002	0.012
GW33-08-13319	2	9:48	6/19/2008	6/19/2008	—	0.001	0.023	0.000	0.0008	0.0000	0.013
GW33-08-13274	2	9:48	6/19/2008	6/19/2008	224	0.001	0.080	0.001	0.0007	0.0000	0.013
GW33-08-13320	2	9:58	6/19/2008	6/19/2008	—	0.001	0.011	0.000	0.0007	0.0000	0.014
GW33-08-13275	2	9:58	6/19/2008	6/19/2008	225	0.001	0.072	0.001	0.0008	0.0001	0.018
GW33-08-13321	2	10:32	6/19/2008	6/19/2008	—	0.001	0.014	0.000	0.0008	0.0001	0.025
GW33-08-13322	2	10:32	6/19/2008	6/19/2008	—	0.001	0.016	0.001	0.0007	0.0000	0.027
GW33-08-13276	2	10:32	6/19/2008	6/19/2008	228	0.001	0.076	0.002	0.0009	0.0002	0.020
GW33-08-13287	2	10:32	6/19/2008	6/19/2008	—	0.001	0.076	0.001	0.0008	0.0001	0.015
GW33-08-13288	FB	10:32	6/19/2008	6/19/2008	—	0.001	0.001	—	0.0002	—	0.002
GW33-08-13332	2	11:02	6/19/2008	6/19/2008	—	0.001	0.011	0.000	0.0007	0.0000	0.018
GW33-08-13277	2	11:02	6/19/2008	6/19/2008	228	0.001	0.077	0.001	0.0008	0.0001	0.016
GW33-08-13323	2	11:32	6/19/2008	6/19/2008	—	0.001	0.014	0.000	0.0007	0.0000	0.022
GW33-08-13278	2	11:32	6/19/2008	6/19/2008	231	0.001	0.065	0.001	0.0008	0.0001	0.016
GW33-08-13324	2	12:00	6/19/2008	6/19/2008	—	0.001	0.013	0.000	0.0007	0.0000	0.018
GW33-08-13279	2	12:00	6/19/2008	6/19/2008	230	0.001	0.057	0.001	0.0008	0.0002	0.016

* — = Not measured.

Table A-2
Laboratory-Measured Analytical Results for R-33 Screen 2

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	stdev (B)	Ba rslt (ppm)	stdev (Ba)	Be rslt (ppm)	Br(-) ppm	TOC rslt (ppm)	Ca rslt (ppm)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.000	0.002	0.001	0.001	0.01 (U)	—	0.82
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.000	0.001	—	0.001	0.01 (U)	—	0.16
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.000	0.003	0.000	0.001	—	12.83	0.92
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.001	0.004	0.000	0.001	—	1.55	0.21
GW33-08-13312	2	9:03	6/19/2008	6/19/2008	0.000	0.035	0.000	0.001	0.07	—	10.6
GW33-08-13267	2	9:03	6/19/2008	6/19/2008	0.000	0.033	0.000	0.001	—	0.89	10.9
GW33-08-13313	2	9:08	6/19/2008	6/19/2008	0.001	0.034	0.000	0.001	0.07	—	10.6
GW33-08-13268	2	9:08	6/19/2008	6/19/2008	0.001	0.036	0.002	0.001	—	0.63	11.0
GW33-08-13314	2	9:13	6/19/2008	6/19/2008	0.000	0.028	0.001	0.001	0.07	—	10.5
GW33-08-13269	2	9:13	6/19/2008	6/19/2008	0.001	0.035	0.002	0.001	—	0.57	10.9
GW33-08-13315	2	9:18	6/19/2008	6/19/2008	0.000	0.034	0.000	0.001	0.07	—	10.5
GW33-08-13270	2	9:18	6/19/2008	6/19/2008	0.001	0.028	0.001	0.001	—	0.70	10.9
GW33-08-13316	2	9:23	6/19/2008	6/19/2008	0.000	0.034	0.000	0.001	0.07	—	10.5
GW33-08-13271	2	9:23	6/19/2008	6/19/2008	0.000	0.031	0.001	0.001	—	0.65	11.1
GW33-08-13317	2	9:28	6/19/2008	6/19/2008	0.000	0.034	0.000	0.001	0.07	—	10.5
GW33-08-13272	2	9:28	6/19/2008	6/19/2008	0.001	0.032	0.000	0.001	—	0.65	11.0
GW33-08-13318	2	9:38	6/19/2008	6/19/2008	0.000	0.034	0.000	0.001	0.07	—	10.3
GW33-08-13273	2	9:38	6/19/2008	6/19/2008	0.001	0.030	0.001	0.001	—	0.60	10.8
GW33-08-13319	2	9:48	6/19/2008	6/19/2008	0.000	0.034	0.000	0.001	0.07	—	10.6
GW33-08-13274	2	9:48	6/19/2008	6/19/2008	0.001	0.032	0.000	0.001	—	0.61	11.2
GW33-08-13320	2	9:58	6/19/2008	6/19/2008	0.000	0.034	0.000	0.001	0.07	—	10.6
GW33-08-13275	2	9:58	6/19/2008	6/19/2008	0.001	0.032	0.000	0.001	—	0.67	11.0
GW33-08-13321	2	10:32	6/19/2008	6/19/2008	0.001	0.034	0.000	0.001	0.07	—	10.5
GW33-08-13322	2	10:32	6/19/2008	6/19/2008	0.001	0.034	0.000	0.001	0.07	—	10.9
GW33-08-13276	2	10:32	6/19/2008	6/19/2008	0.000	0.032	0.001	0.001	—	1.00	11.0
GW33-08-13287	2	10:32	6/19/2008	6/19/2008	0.000	0.036	0.001	0.001	—	0.76	10.9
GW33-08-13288	FB	10:32	6/19/2008	6/19/2008	—	0.001	—	0.001	0.01 (U)	0.55	0.04
GW33-08-13332	2	11:02	6/19/2008	6/19/2008	0.000	0.034	0.000	0.001	0.07	—	11.1
GW33-08-13277	2	11:02	6/19/2008	6/19/2008	0.000	0.031	0.001	0.001	—	0.75	11.1
GW33-08-13323	2	11:32	6/19/2008	6/19/2008	0.000	0.034	0.001	0.001	0.07	—	10.9
GW33-08-13278	2	11:32	6/19/2008	6/19/2008	0.000	0.032	0.001	0.001	—	0.68	11.1
GW33-08-13324	2	12:00	6/19/2008	6/19/2008	0.001	0.034	0.000	0.001	0.07	—	10.9
GW33-08-13279	2	12:00	6/19/2008	6/19/2008	0.001	0.034	0.001	0.001	—	0.70	10.8

* — = Not measured.

Table A-2
Laboratory-Measured Analytical Results for R-33 Screen 2

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	stdev (Ca)	Cd rslt (ppm)	Cl(-) ppm	Co rslt (ppm)	Alk-CO3 rslt (ppm)	Cr rslt (ppm)	stdev (Cr)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.01	0.001	0.19	0	—	0.007	0.000
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.01	0.001	0.24	0	—	0.001	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.01	0.001	—	0	0.8	0.010	0.000
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.01	0.001	—	0	0.8	0.001	—
GW33-08-13312	2	9:03	6/19/2008	6/19/2008	0.0	0.001	2.78	0	—	0.005	0.000
GW33-08-13267	2	9:03	6/19/2008	6/19/2008	0.1	0.001	—	0	0.8	0.005	0.001
GW33-08-13313	2	9:08	6/19/2008	6/19/2008	0.1	0.001	2.74	0	—	0.005	0.000
GW33-08-13268	2	9:08	6/19/2008	6/19/2008	0.1	0.001	—	0	0.8	0.005	0.000
GW33-08-13314	2	9:13	6/19/2008	6/19/2008	0.0	0.001	2.77	0	—	0.008	0.003
GW33-08-13269	2	9:13	6/19/2008	6/19/2008	0.0	0.001	—	0	0.8 (U)	0.006	0.001
GW33-08-13315	2	9:18	6/19/2008	6/19/2008	0.0	0.001	2.76	0	—	0.005	0.001
GW33-08-13270	2	9:18	6/19/2008	6/19/2008	0.0	0.001	—	0	0.8 (U)	0.005	0.000
GW33-08-13316	2	9:23	6/19/2008	6/19/2008	0.0	0.001	2.71	0	—	0.005	0.000
GW33-08-13271	2	9:23	6/19/2008	6/19/2008	0.1	0.001	—	0	0.8 (U)	0.005	0.000
GW33-08-13317	2	9:28	6/19/2008	6/19/2008	0.1	0.001	2.75	0	—	0.005	0.001
GW33-08-13272	2	9:28	6/19/2008	6/19/2008	0.1	0.001	—	0	0.8 (U)	0.005	0.001
GW33-08-13318	2	9:38	6/19/2008	6/19/2008	0.1	0.001	2.74	0	—	0.006	0.001
GW33-08-13273	2	9:38	6/19/2008	6/19/2008	0.1	0.001	—	0	0.8 (U)	0.005	0.001
GW33-08-13319	2	9:48	6/19/2008	6/19/2008	0.0	0.001	2.80	0	—	0.005	0.000
GW33-08-13274	2	9:48	6/19/2008	6/19/2008	0.1	0.001	—	0	0.8 (U)	0.005	0.000
GW33-08-13320	2	9:58	6/19/2008	6/19/2008	0.1	0.001	2.74	0	—	0.005	0.000
GW33-08-13275	2	9:58	6/19/2008	6/19/2008	0.1	0.001	—	0	0.8 (U)	0.005	0.001
GW33-08-13321	2	10:32	6/19/2008	6/19/2008	0.0	0.001	2.84	0	—	0.005	0.000
GW33-08-13322	2	10:32	6/19/2008	6/19/2008	0.1	0.001	2.85	0.002	—	0.005	0.000
GW33-08-13276	2	10:32	6/19/2008	6/19/2008	0.1	0.001	—	0	0.8 (U)	0.006	0.001
GW33-08-13287	2	10:32	6/19/2008	6/19/2008	0.0	0.001	—	0	0.8 (U)	0.005	0.001
GW33-08-13288	FB	10:32	6/19/2008	6/19/2008	0.01	0.001	0.01 (U)	0	0.8 (U)	0.001	—
GW33-08-13332	2	11:02	6/19/2008	6/19/2008	0.1	0.001	2.78	0	—	0.005	0.000
GW33-08-13277	2	11:02	6/19/2008	6/19/2008	0.1	0.001	—	0	0.8 (U)	0.006	0.001
GW33-08-13323	2	11:32	6/19/2008	6/19/2008	0.1	0.001	2.82	0.002	—	0.005	0.000
GW33-08-13278	2	11:32	6/19/2008	6/19/2008	0.0	0.001	—	0	0.8 (U)	0.006	0.001
GW33-08-13324	2	12:00	6/19/2008	6/19/2008	0.2	0.001	2.87	0.002	—	0.005	0.000
GW33-08-13279	2	12:00	6/19/2008	6/19/2008	0.0	0.001	—	0	0.8 (U)	0.006	0.001

* — = Not measured.

Table A-2
Laboratory-Measured Analytical Results for R-33 Screen 2

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Cs rslt (ppm)	Cu rslt (ppm)	stdev (Cu)	F(-) ppm	Fe rslt (ppm)	stdev (Fe)	Alk-CO3+HCO3 rslt (ppm)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.001	0.008	0.000	0.06	0.03	0.00	—
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.001	0	—	0.01 (U)	0.05	0.00	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.001	0.009	0.000	—	0.10	0.00	0 (U)
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.001	0.001	0.000	—	0.04	0.00	0 (U)
GW33-08-13312	2	9:03	6/19/2008	6/19/2008	0.001	0	—	0.23	0.05	0.00	—
GW33-08-13267	2	9:03	6/19/2008	6/19/2008	0.001	0	—	—	0.11	0.00	87.6
GW33-08-13313	2	9:08	6/19/2008	6/19/2008	0.001	0	—	0.23	0.05	0.00	—
GW33-08-13268	2	9:08	6/19/2008	6/19/2008	0.001	0	—	—	0.11	0.01	88.5
GW33-08-13314	2	9:13	6/19/2008	6/19/2008	0.001	0	—	0.23	0.06	0.00	—
GW33-08-13269	2	9:13	6/19/2008	6/19/2008	0.001	0	—	—	0.12	0.01	85.1
GW33-08-13315	2	9:18	6/19/2008	6/19/2008	0.001	0	—	0.23	0.05	0.00	—
GW33-08-13270	2	9:18	6/19/2008	6/19/2008	0.001	0	—	—	0.09	0.00	85.3
GW33-08-13316	2	9:23	6/19/2008	6/19/2008	0.001	0	—	0.23	0.04	0.00	—
GW33-08-13271	2	9:23	6/19/2008	6/19/2008	0.001	0	—	—	0.09	0.00	85.2
GW33-08-13317	2	9:28	6/19/2008	6/19/2008	0.001	0	—	0.23	0.05	0.00	—
GW33-08-13272	2	9:28	6/19/2008	6/19/2008	0.001	0	—	—	0.09	0.00	85.0
GW33-08-13318	2	9:38	6/19/2008	6/19/2008	0.001	0.002	0.000	0.23	0.05	0.00	—
GW33-08-13273	2	9:38	6/19/2008	6/19/2008	0.001	0	—	—	0.08	0.00	85.0
GW33-08-13319	2	9:48	6/19/2008	6/19/2008	0.001	0	—	0.23	0.06	0.00	—
GW33-08-13274	2	9:48	6/19/2008	6/19/2008	0.001	0.001	0.000	—	0.09	0.00	85.0
GW33-08-13320	2	9:58	6/19/2008	6/19/2008	0.001	0	—	0.23	0.05	0.00	—
GW33-08-13275	2	9:58	6/19/2008	6/19/2008	0.001	0	—	—	0.08	0.00	85.1
GW33-08-13321	2	10:32	6/19/2008	6/19/2008	0.001	0	—	0.23	0.04	0.00	—
GW33-08-13322	2	10:32	6/19/2008	6/19/2008	0.001	0	—	0.23	0.04	0.00	—
GW33-08-13276	2	10:32	6/19/2008	6/19/2008	0.001	0	—	—	0.08	0.00	84.6
GW33-08-13287	2	10:32	6/19/2008	6/19/2008	0.001	0	—	—	0.08	0.00	84.4
GW33-08-13288	FB	10:32	6/19/2008	6/19/2008	0.001	0	—	0.01 (U)	0.01	—	0 (U)
GW33-08-13332	2	11:02	6/19/2008	6/19/2008	0.001	0	—	0.23	0.04	0.00	—
GW33-08-13277	2	11:02	6/19/2008	6/19/2008	0.001	0	—	—	0.08	0.00	84.2
GW33-08-13323	2	11:32	6/19/2008	6/19/2008	0.001	0	—	0.23	0.05	0.00	—
GW33-08-13278	2	11:32	6/19/2008	6/19/2008	0.001	0	—	—	0.07	0.00	84.2
GW33-08-13324	2	12:00	6/19/2008	6/19/2008	0.001	0.013	0.001	0.23	0.05	0.00	—
GW33-08-13279	2	12:00	6/19/2008	6/19/2008	0.001	0	—	—	0.07	0.00	84.2

* — = Not measured.

Table A-2
Laboratory-Measured Analytical Results for R-33 Screen 2

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Hg rslt (ppm)	K rslt (ppm)	stdev (K)	Li rslt (ppm)	stdev (Li)	Mg rslt (ppm)	stdev (Mg)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.00005	0.14	0.00	0.001	—	0.14	0.00
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.00005	0.04	0.00	0.001	—	0.01	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.00005	0.25	0.00	0.001	—	0.17	0.00
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.00005	0.03	0.00	0.001	—	0.02	0.00
GW33-08-13312	2	9:03	6/19/2008	6/19/2008	0.00005	1.85	0.01	0.022	0.000	3.84	0.02
GW33-08-13267	2	9:03	6/19/2008	6/19/2008	0.00005	1.74	0.01	0.019	0.000	3.59	0.04
GW33-08-13313	2	9:08	6/19/2008	6/19/2008	0.00005	1.82	0.02	0.021	0.000	3.76	0.03
GW33-08-13268	2	9:08	6/19/2008	6/19/2008	0.00005	1.93	0.09	0.022	0.001	3.99	0.16
GW33-08-13314	2	9:13	6/19/2008	6/19/2008	0.00005	1.85	0.01	0.021	0.000	3.82	0.02
GW33-08-13269	2	9:13	6/19/2008	6/19/2008	0.00005	1.91	0.12	0.021	0.002	3.98	0.23
GW33-08-13315	2	9:18	6/19/2008	6/19/2008	0.00005	1.84	0.00	0.021	0.000	3.84	0.02
GW33-08-13270	2	9:18	6/19/2008	6/19/2008	0.00005	1.51	0.04	0.016	0.001	3.19	0.10
GW33-08-13316	2	9:23	6/19/2008	6/19/2008	0.00005	1.84	0.01	0.021	0.000	3.85	0.02
GW33-08-13271	2	9:23	6/19/2008	6/19/2008	0.00005	1.71	0.01	0.018	0.000	3.54	0.04
GW33-08-13317	2	9:28	6/19/2008	6/19/2008	0.00005	1.82	0.01	0.021	0.000	3.82	0.01
GW33-08-13272	2	9:28	6/19/2008	6/19/2008	0.00005	1.71	0.04	0.018	0.000	3.58	0.07
GW33-08-13318	2	9:38	6/19/2008	6/19/2008	0.00005	1.79	0.01	0.021	0.000	3.76	0.02
GW33-08-13273	2	9:38	6/19/2008	6/19/2008	0.00005	1.85	0.01	0.023	0.000	3.83	0.03
GW33-08-13319	2	9:48	6/19/2008	6/19/2008	0.00005	1.83	0.01	0.021	0.000	3.82	0.03
GW33-08-13274	2	9:48	6/19/2008	6/19/2008	0.00005	1.95	0.01	0.025	0.000	3.95	0.03
GW33-08-13320	2	9:58	6/19/2008	6/19/2008	0.00005	1.85	0.01	0.021	0.000	3.89	0.01
GW33-08-13275	2	9:58	6/19/2008	6/19/2008	0.00005	1.70	0.02	0.021	0.000	3.56	0.04
GW33-08-13321	2	10:32	6/19/2008	6/19/2008	0.00005	1.86	0.02	0.024	0.000	3.84	0.02
GW33-08-13322	2	10:32	6/19/2008	6/19/2008	0.00005	1.84	0.01	0.022	0.000	3.87	0.01
GW33-08-13276	2	10:32	6/19/2008	6/19/2008	0.00005	1.79	0.05	0.022	0.001	3.73	0.09
GW33-08-13287	2	10:32	6/19/2008	6/19/2008	0.00005	1.94	0.04	0.024	0.000	4.08	0.06
GW33-08-13288	FB	10:32	6/19/2008	6/19/2008	0.00005	0.01	—	0.001	—	0.01	—
GW33-08-13332	2	11:02	6/19/2008	6/19/2008	0.00005	1.95	0.01	0.022	0.000	3.99	0.02
GW33-08-13277	2	11:02	6/19/2008	6/19/2008	0.00005	1.71	0.05	0.021	0.001	3.57	0.07
GW33-08-13323	2	11:32	6/19/2008	6/19/2008	0.00005	1.84	0.01	0.022	0.000	3.88	0.04
GW33-08-13278	2	11:32	6/19/2008	6/19/2008	0.00005	1.77	0.03	0.021	0.000	3.68	0.04
GW33-08-13324	2	12:00	6/19/2008	6/19/2008	0.00005	1.89	0.00	0.022	0.000	3.97	0.02
GW33-08-13279	2	12:00	6/19/2008	6/19/2008	0.00005	1.81	0.02	0.022	0.000	3.83	0.04

* — = Not measured.

Table A-2
Laboratory-Measured Analytical Results for R-33 Screen 2

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Mn rslt (ppm)	Mo rslt (ppm)	Na rslt (ppm)	stdev (Na)	Ni rslt (ppm)	stdev (Ni)	NO2(ppm)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.017	0.001	0.45	0.00	0.004	0.000	0.01
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.003	0.001	0.31	0.01	0.001	—	0.01
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.021	0.001	0.47	0.01	0.005	0.000	—
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.002	0.001	0.32	0.00	0.001	—	—
GW33-08-13312	2	9:03	6/19/2008	6/19/2008	0.002	0.001	10.9	0.1	0.001	—	0.01
GW33-08-13267	2	9:03	6/19/2008	6/19/2008	0.001	0.001	10.7	0.1	0.001	—	—
GW33-08-13313	2	9:08	6/19/2008	6/19/2008	0.002	0.001	10.7	0.1	0.001	—	0.01
GW33-08-13268	2	9:08	6/19/2008	6/19/2008	0.001	0.001	11.8	0.5	0.001	—	—
GW33-08-13314	2	9:13	6/19/2008	6/19/2008	0.001	0.001	11.2	0.0	0.003	0.001	0.01
GW33-08-13269	2	9:13	6/19/2008	6/19/2008	0.001	0.001	11.5	0.7	0.001	0.000	—
GW33-08-13315	2	9:18	6/19/2008	6/19/2008	0.002	0.001	10.8	0.1	0.001	—	0.01
GW33-08-13270	2	9:18	6/19/2008	6/19/2008	0.001	0.001	9.2	0.2	0.001	—	—
GW33-08-13316	2	9:23	6/19/2008	6/19/2008	0.001	0.001	10.8	0.0	0.001	—	0.01
GW33-08-13271	2	9:23	6/19/2008	6/19/2008	0.002	0.001	10.4	0.1	0.001	—	—
GW33-08-13317	2	9:28	6/19/2008	6/19/2008	0.001	0.001	10.6	0.1	0.001	—	0.01
GW33-08-13272	2	9:28	6/19/2008	6/19/2008	0.001	0.001	10.5	0.2	0.001	—	—
GW33-08-13318	2	9:38	6/19/2008	6/19/2008	0.001	0.001	10.5	0.0	0.001	—	0.01
GW33-08-13273	2	9:38	6/19/2008	6/19/2008	0.002	0.001	10.6	0.0	0.001	—	—
GW33-08-13319	2	9:48	6/19/2008	6/19/2008	0.002	0.001	10.7	0.1	0.001	—	0.01
GW33-08-13274	2	9:48	6/19/2008	6/19/2008	0.002	0.001	11.9	0.1	0.001	—	—
GW33-08-13320	2	9:58	6/19/2008	6/19/2008	0.002	0.001	10.8	0.1	0.001	—	0.01
GW33-08-13275	2	9:58	6/19/2008	6/19/2008	0.001	0.001	10.2	0.1	0.001	—	—
GW33-08-13321	2	10:32	6/19/2008	6/19/2008	0.002	0.001	10.7	0.0	0.001	—	0.01
GW33-08-13322	2	10:32	6/19/2008	6/19/2008	0.004	0.001	10.9	0.1	0.001	—	0.01
GW33-08-13276	2	10:32	6/19/2008	6/19/2008	0.002	0.001	10.8	0.2	0.001	—	—
GW33-08-13287	2	10:32	6/19/2008	6/19/2008	0.002	0.001	11.8	0.2	0.001	—	—
GW33-08-13288	FB	10:32	6/19/2008	6/19/2008	0.001	0.001	0.02	0.00	0.001	—	0.01
GW33-08-13332	2	11:02	6/19/2008	6/19/2008	0.001	0.001	11.2	0.1	0.001	—	0.01
GW33-08-13277	2	11:02	6/19/2008	6/19/2008	0.001	0.001	10.4	0.2	0.001	—	—
GW33-08-13323	2	11:32	6/19/2008	6/19/2008	0.004	0.001	10.9	0.1	0.001	—	0.01
GW33-08-13278	2	11:32	6/19/2008	6/19/2008	0.001	0.001	10.7	0.1	0.001	—	—
GW33-08-13324	2	12:00	6/19/2008	6/19/2008	0.005	0.001	11.1	0.1	0.003	0.000	0.01
GW33-08-13279	2	12:00	6/19/2008	6/19/2008	0.001	0.001	11.1	0.1	0.001	—	—

* — = Not measured.

Table A-2
Laboratory-Measured Analytical Results for R-33 Screen 2

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	NO2-N rslt	NO3 ppm	NO3-N rslt	C2O4 rslt (ppm)	Pb rslt (ppm)	stdev (Pb)	pH (Lab)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.003 (U)	0.21	0.049	0.01 (U)	0.0005	0.0000	—
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.003 (U)	0.05	0.010	0.01 (U)	0.0002	—	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	—	—	—	—	0.0011	0.0000	6.72
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	—	—	—	—	0.0002	—	5.58
GW33-08-13312	2	9:03	6/19/2008	6/19/2008	0.003 (U)	1.70	0.385	0.01 (U)	0.0002	—	—
GW33-08-13267	2	9:03	6/19/2008	6/19/2008	—	—	—	—	0.0003	0.0000	7.74
GW33-08-13313	2	9:08	6/19/2008	6/19/2008	0.003 (U)	1.83	0.414	0.01 (U)	0.0002	—	—
GW33-08-13268	2	9:08	6/19/2008	6/19/2008	—	—	—	—	0.0002	0.0000	7.67
GW33-08-13314	2	9:13	6/19/2008	6/19/2008	0.003 (U)	1.84	0.416	0.01 (U)	0.0005	0.0002	—
GW33-08-13269	2	9:13	6/19/2008	6/19/2008	—	—	—	—	0.0004	0.0001	7.67
GW33-08-13315	2	9:18	6/19/2008	6/19/2008	0.003 (U)	1.92	0.434	0.01 (U)	0.0002	0.0000	—
GW33-08-13270	2	9:18	6/19/2008	6/19/2008	—	—	—	—	0.0003	0.0000	7.71
GW33-08-13316	2	9:23	6/19/2008	6/19/2008	0.003 (U)	1.85	0.418	0.01 (U)	0.0002	—	—
GW33-08-13271	2	9:23	6/19/2008	6/19/2008	—	—	—	—	0.0002	0.0000	7.73
GW33-08-13317	2	9:28	6/19/2008	6/19/2008	0.003 (U)	1.72	0.387	0.01 (U)	0.0002	—	—
GW33-08-13272	2	9:28	6/19/2008	6/19/2008	—	—	—	—	0.0003	0.0000	7.73
GW33-08-13318	2	9:38	6/19/2008	6/19/2008	0.003 (U)	1.90	0.430	0.01 (U)	0.0002	—	—
GW33-08-13273	2	9:38	6/19/2008	6/19/2008	—	—	—	—	0.0002	0.0000	7.75
GW33-08-13319	2	9:48	6/19/2008	6/19/2008	0.003 (U)	1.97	0.444	0.01 (U)	0.0002	—	—
GW33-08-13274	2	9:48	6/19/2008	6/19/2008	—	—	—	—	0.0002	0.0000	7.77
GW33-08-13320	2	9:58	6/19/2008	6/19/2008	0.003 (U)	2.00	0.451	0.01 (U)	0.0002	—	—
GW33-08-13275	2	9:58	6/19/2008	6/19/2008	—	—	—	—	0.0002	0.0000	7.77
GW33-08-13321	2	10:32	6/19/2008	6/19/2008	0.003 (U)	2.06	0.466	0.01 (U)	0.0002	0.0000	—
GW33-08-13322	2	10:32	6/19/2008	6/19/2008	0.003 (U)	2.19	0.495	0.01 (U)	0.0002	0.0000	—
GW33-08-13276	2	10:32	6/19/2008	6/19/2008	—	—	—	—	0.0002	0.0000	7.82
GW33-08-13287	2	10:32	6/19/2008	6/19/2008	—	—	—	—	0.0002	—	7.86
GW33-08-13288	FB	10:32	6/19/2008	6/19/2008	0.003 (U)	0.01	0.002 (U)	0.01 (U)	0.0002	—	5.81
GW33-08-13332	2	11:02	6/19/2008	6/19/2008	0.003 (U)	2.11	0.477	0.01 (U)	0.0002	—	—
GW33-08-13277	2	11:02	6/19/2008	6/19/2008	—	—	—	—	0.0002	0.0000	7.82
GW33-08-13323	2	11:32	6/19/2008	6/19/2008	0.003 (U)	2.11	0.476	0.01 (U)	0.0002	—	—
GW33-08-13278	2	11:32	6/19/2008	6/19/2008	—	—	—	—	0.0002	0.0000	7.85
GW33-08-13324	2	12:00	6/19/2008	6/19/2008	0.003 (U)	2.26	0.511	0.01 (U)	0.0003	0.0000	—
GW33-08-13279	2	12:00	6/19/2008	6/19/2008	—	—	—	—	0.0003	0.0001	7.87

* — = Not measured.

Table A-2
Laboratory-Measured Analytical Results for R-33 Screen 2

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	PO4(-3) rslt (ppm)	Rb rslt (ppm)	stdev (Rb)	S2- rslt (ppm)	Sb rslt (ppm)	Se rslt (ppm)	Si rslt (ppm)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.01 (U)	0.001	—	—	0.001	0.001	0.04
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.01 (U)	0.001	—	—	0.001	0.001	0.03
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	—	0.001	—	0.01 (U)	0.001	0.001	0.03
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	—	0.001	—	0.01 (U)	0.001	0.001	0.02
GW33-08-13312	2	9:03	6/19/2008	6/19/2008	0.05	0.005	0.000	—	0.001	0.001	37.2
GW33-08-13267	2	9:03	6/19/2008	6/19/2008	—	0.005	0.000	0.01 (U)	0.001	0.001	34.5
GW33-08-13313	2	9:08	6/19/2008	6/19/2008	0.06	0.005	0.000	—	0.001	0.001	36.7
GW33-08-13268	2	9:08	6/19/2008	6/19/2008	—	0.005	0.000	0.01 (U)	0.001	0.001	38.0
GW33-08-13314	2	9:13	6/19/2008	6/19/2008	0.06	0.007	0.003	—	0.001	0.001	36.5
GW33-08-13269	2	9:13	6/19/2008	6/19/2008	—	0.006	0.001	0.01 (U)	0.001	0.001	38.0
GW33-08-13315	2	9:18	6/19/2008	6/19/2008	0.05	0.005	0.000	—	0.001	0.001	37.1
GW33-08-13270	2	9:18	6/19/2008	6/19/2008	—	0.004	0.000	0.01 (U)	0.001	0.001	30.1
GW33-08-13316	2	9:23	6/19/2008	6/19/2008	0.06	0.005	0.000	—	0.001	0.001	37.2
GW33-08-13271	2	9:23	6/19/2008	6/19/2008	—	0.004	0.000	0.01 (U)	0.001	0.001	38.0
GW33-08-13317	2	9:28	6/19/2008	6/19/2008	0.04	0.005	0.001	—	0.001	0.001	37.1
GW33-08-13272	2	9:28	6/19/2008	6/19/2008	—	0.005	0.001	0.01 (U)	0.001	0.001	34.1
GW33-08-13318	2	9:38	6/19/2008	6/19/2008	0.06	0.006	0.001	—	0.001	0.001	36.6
GW33-08-13273	2	9:38	6/19/2008	6/19/2008	—	0.005	0.001	0.01 (U)	0.001	0.001	36.9
GW33-08-13319	2	9:48	6/19/2008	6/19/2008	0.06	0.005	0.000	—	0.001	0.001	37.2
GW33-08-13274	2	9:48	6/19/2008	6/19/2008	—	0.004	0.000	0.01 (U)	0.001	0.001	37.1
GW33-08-13320	2	9:58	6/19/2008	6/19/2008	0.06	0.005	0.000	—	0.001	0.001	37.5
GW33-08-13275	2	9:58	6/19/2008	6/19/2008	—	0.005	0.000	0.01 (U)	0.001	0.001	37.8
GW33-08-13321	2	10:32	6/19/2008	6/19/2008	0.05	0.005	0.000	—	0.001	0.001	37.1
GW33-08-13322	2	10:32	6/19/2008	6/19/2008	0.06	0.004	0.000	—	0.001	0.001	37.0
GW33-08-13276	2	10:32	6/19/2008	6/19/2008	—	0.005	0.001	0.01 (U)	0.001	0.001	35.1
GW33-08-13287	2	10:32	6/19/2008	6/19/2008	—	0.005	0.000	0.01 (U)	0.001	0.001	38.3
GW33-08-13288	FB	10:32	6/19/2008	6/19/2008	0.01 (U)	0.001	—	0.01 (U)	0.001	0.001	0.01
GW33-08-13332	2	11:02	6/19/2008	6/19/2008	0.06	0.004	0.000	—	0.001	0.001	37.9
GW33-08-13277	2	11:02	6/19/2008	6/19/2008	—	0.005	0.001	0.01 (U)	0.001	0.001	37.6
GW33-08-13323	2	11:32	6/19/2008	6/19/2008	0.03	0.005	0.000	—	0.001	0.001	37.3
GW33-08-13278	2	11:32	6/19/2008	6/19/2008	—	0.005	0.001	0.01 (U)	0.001	0.001	34.5
GW33-08-13324	2	12:00	6/19/2008	6/19/2008	0.06	0.005	0.000	—	0.001	0.001	38.3
GW33-08-13279	2	12:00	6/19/2008	6/19/2008	—	0.005	0.001	0.01 (U)	0.001	0.001	36.3

* — = Not measured.

Table A-2
Laboratory-Measured Analytical Results for R-33 Screen 2

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	stdev (Si)	SiO2 rslt (ppm)	stdev (SiO2)	Sn rslt (ppm)	SO4(-2) rslt (ppm)	Sr rslt (ppm)	stdev (Sr)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.00	0.08	0.00	0.001	1.37	0.003	0.000
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.00	0.06	0.00	0.001	0.07	0.001	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.00	0.06	0.01	0.001	—	0.004	0.000
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.00	0.04	0.00	0.001	—	0.003	0.000
GW33-08-13312	2	9:03	6/19/2008	6/19/2008	0.1	79.7	0.3	0.001	2.91	0.044	0.000
GW33-08-13267	2	9:03	6/19/2008	6/19/2008	0.5	73.8	1.0	0.001	—	0.042	0.001
GW33-08-13313	2	9:08	6/19/2008	6/19/2008	0.2	78.5	0.4	0.001	2.91	0.043	0.001
GW33-08-13268	2	9:08	6/19/2008	6/19/2008	1.5	81.4	3.2	0.001	—	0.046	0.002
GW33-08-13314	2	9:13	6/19/2008	6/19/2008	0.2	78.0	0.5	0.001	2.94	0.053	0.000
GW33-08-13269	2	9:13	6/19/2008	6/19/2008	2.2	81.3	4.7	0.001	—	0.045	0.003
GW33-08-13315	2	9:18	6/19/2008	6/19/2008	0.1	79.3	0.3	0.001	2.94	0.044	0.000
GW33-08-13270	2	9:18	6/19/2008	6/19/2008	0.8	64.5	1.8	0.001	—	0.036	0.001
GW33-08-13316	2	9:23	6/19/2008	6/19/2008	0.4	79.5	0.9	0.001	2.89	0.044	0.000
GW33-08-13271	2	9:23	6/19/2008	6/19/2008	0.2	81.2	0.3	0.001	—	0.041	0.000
GW33-08-13317	2	9:28	6/19/2008	6/19/2008	0.3	79.4	0.7	0.001	2.92	0.043	0.000
GW33-08-13272	2	9:28	6/19/2008	6/19/2008	0.8	72.9	1.8	0.001	—	0.041	0.001
GW33-08-13318	2	9:38	6/19/2008	6/19/2008	0.2	78.4	0.4	0.001	2.93	0.043	0.000
GW33-08-13273	2	9:38	6/19/2008	6/19/2008	0.2	79.0	0.4	0.001	—	0.038	0.000
GW33-08-13319	2	9:48	6/19/2008	6/19/2008	0.3	79.7	0.6	0.001	3.00	0.044	0.000
GW33-08-13274	2	9:48	6/19/2008	6/19/2008	0.3	79.3	0.6	0.001	—	0.051	0.000
GW33-08-13320	2	9:58	6/19/2008	6/19/2008	0.1	80.2	0.2	0.001	2.96	0.044	0.000
GW33-08-13275	2	9:58	6/19/2008	6/19/2008	0.1	80.8	0.3	0.001	—	0.040	0.000
GW33-08-13321	2	10:32	6/19/2008	6/19/2008	0.2	79.3	0.3	0.001	3.08	0.044	0.000
GW33-08-13322	2	10:32	6/19/2008	6/19/2008	0.3	79.2	0.7	0.001	3.11	0.045	0.000
GW33-08-13276	2	10:32	6/19/2008	6/19/2008	0.5	75.1	1.1	0.001	—	0.043	0.001
GW33-08-13287	2	10:32	6/19/2008	6/19/2008	0.5	81.9	1.0	0.001	—	0.046	0.001
GW33-08-13288	FB	10:32	6/19/2008	6/19/2008	—	0.02	—	0.001	0.01 (U)	0.001	—
GW33-08-13332	2	11:02	6/19/2008	6/19/2008	0.1	81.1	0.2	0.001	2.96	0.046	0.000
GW33-08-13277	2	11:02	6/19/2008	6/19/2008	0.3	80.5	0.7	0.001	—	0.041	0.001
GW33-08-13323	2	11:32	6/19/2008	6/19/2008	0.2	79.9	0.5	0.001	2.97	0.045	0.000
GW33-08-13278	2	11:32	6/19/2008	6/19/2008	0.5	73.8	1.1	0.001	—	0.042	0.001
GW33-08-13324	2	12:00	6/19/2008	6/19/2008	0.2	81.9	0.4	0.001	3.09	0.046	0.000
GW33-08-13279	2	12:00	6/19/2008	6/19/2008	0.5	77.7	1.0	0.001	—	0.044	0.001

* — = Not measured.

Table A-2
Laboratory-Measured Analytical Results for R-33 Screen 2

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Th rslt (ppm)	Ti rslt (ppm)	Tl rslt (ppm)	U rslt (ppm)	stdev (U)	V rslt (ppm)	stdev (V)
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.001	0.002	0.001	0.0002	—	0.001	—
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.001	0.002	0.001	0.0002	—	0.001	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.001	0.002	0.001	0.0002	—	0.001	—
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.001	0.002	0.001	0.0002	—	0.001	—
GW33-08-13312	2	9:03	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0000	0.006	0.000
GW33-08-13267	2	9:03	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0001	0.006	0.001
GW33-08-13313	2	9:08	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0011	0.0000	0.006	0.000
GW33-08-13268	2	9:08	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0000	0.005	0.000
GW33-08-13314	2	9:13	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0017	0.0006	0.009	0.004
GW33-08-13269	2	9:13	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0014	0.0002	0.007	0.001
GW33-08-13315	2	9:18	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0002	0.007	0.001
GW33-08-13270	2	9:18	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0001	0.005	0.000
GW33-08-13316	2	9:23	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0000	0.006	0.000
GW33-08-13271	2	9:23	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0011	0.0001	0.006	0.000
GW33-08-13317	2	9:28	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0002	0.006	0.001
GW33-08-13272	2	9:28	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0002	0.006	0.000
GW33-08-13318	2	9:38	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0013	0.0001	0.007	0.001
GW33-08-13273	2	9:38	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0013	0.0002	0.006	0.001
GW33-08-13319	2	9:48	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0000	0.006	0.000
GW33-08-13274	2	9:48	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0000	0.005	0.000
GW33-08-13320	2	9:58	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0011	0.0000	0.005	0.000
GW33-08-13275	2	9:58	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0001	0.006	0.001
GW33-08-13321	2	10:32	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0000	0.006	0.000
GW33-08-13322	2	10:32	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0011	0.0000	0.006	0.000
GW33-08-13276	2	10:32	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0014	0.0002	0.007	0.001
GW33-08-13287	2	10:32	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0012	0.0001	0.006	0.001
GW33-08-13288	FB	10:32	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0002	—	0.001	—
GW33-08-13332	2	11:02	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0011	0.0000	0.005	0.000
GW33-08-13277	2	11:02	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0013	0.0002	0.007	0.001
GW33-08-13323	2	11:32	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0011	0.0000	0.005	0.000
GW33-08-13278	2	11:32	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0013	0.0002	0.007	0.001
GW33-08-13324	2	12:00	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0011	0.0000	0.005	0.000
GW33-08-13279	2	12:00	6/19/2008	6/19/2008	0.001	0.002	0.001	0.0013	0.0001	0.007	0.001

* — = Not measured.

Table A-2
Laboratory-Measured Analytical Results for R-33 Screen 2

Sample ID	Screen	Time Sampled	Date Sampled	Date Received	Zn rslt (ppm)	stdev (Zn)	TDS (ppm)	Cations	Anions	Balance	Status
GW33-08-13291	EQB	12:50	6/11/2008	6/12/2008	0.019	0.000	3.6	0.1	#VALUE!	#VALUE!	—
GW33-08-13292	EQB	12:50	6/11/2008	6/12/2008	0.018	0.000	1.1	0.0	#VALUE!	#VALUE!	—
GW33-08-13243	EQB	12:50	6/11/2008	6/12/2008	0.022	0.000	2.9	0.09	0.03	0.52	ClO4 to be analyzed
GW33-08-13244	EQB	12:50	6/11/2008	6/12/2008	0.020	0.001	1.5	0.03	0.03	0.00	ClO4 to be analyzed
GW33-08-13312	2	9:03	6/19/2008	6/19/2008	0.019	0.001	114.8	1.4	#VALUE!	Not applicable	—
GW33-08-13267	2	9:03	6/19/2008	6/19/2008	0.021	0.002	189.5	1.35	1.47	-0.04	ClO4 to be analyzed
GW33-08-13313	2	9:08	6/19/2008	6/19/2008	0.019	0.001	113.4	1.4	#VALUE!	Not applicable	—
GW33-08-13268	2	9:08	6/19/2008	6/19/2008	0.025	0.000	199.8	1.44	1.48	-0.01	ClO4 to be analyzed
GW33-08-13314	2	9:13	6/19/2008	6/19/2008	0.033	0.013	113.7	1.4	#VALUE!	Not applicable	—
GW33-08-13269	2	9:13	6/19/2008	6/19/2008	0.028	0.003	195.2	1.43	1.40	0.01	ClO4 to be analyzed
GW33-08-13315	2	9:18	6/19/2008	6/19/2008	0.020	0.002	114.5	1.4	#VALUE!	Not applicable	—
GW33-08-13270	2	9:18	6/19/2008	6/19/2008	0.019	0.000	174.9	1.25	1.40	-0.06	ClO4 to be analyzed
GW33-08-13316	2	9:23	6/19/2008	6/19/2008	0.019	0.002	114.6	1.4	#VALUE!	Not applicable	—
GW33-08-13271	2	9:23	6/19/2008	6/19/2008	0.018	0.000	193.5	1.34	1.40	-0.02	ClO4 to be analyzed
GW33-08-13317	2	9:28	6/19/2008	6/19/2008	0.020	0.003	114.1	1.4	#VALUE!	Not applicable	—
GW33-08-13272	2	9:28	6/19/2008	6/19/2008	0.019	0.002	185.1	1.35	1.40	-0.02	ClO4 to be analyzed
GW33-08-13318	2	9:38	6/19/2008	6/19/2008	0.022	0.002	113.0	1.3	#VALUE!	Not applicable	—
GW33-08-13273	2	9:38	6/19/2008	6/19/2008	0.021	0.004	191.5	1.37	1.40	-0.01	ClO4 to be analyzed
GW33-08-13319	2	9:48	6/19/2008	6/19/2008	0.018	0.000	115.1	1.4	#VALUE!	Not applicable	—
GW33-08-13274	2	9:48	6/19/2008	6/19/2008	0.019	0.000	193.5	1.45	1.40	0.02	ClO4 to be analyzed
GW33-08-13320	2	9:58	6/19/2008	6/19/2008	0.018	0.000	115.6	1.4	#VALUE!	Not applicable	—
GW33-08-13275	2	9:58	6/19/2008	6/19/2008	0.021	0.002	192.8	1.33	1.40	-0.02	ClO4 to be analyzed
GW33-08-13321	2	10:32	6/19/2008	6/19/2008	0.020	0.001	114.8	1.4	#VALUE!	Not applicable	—
GW33-08-13322	2	10:32	6/19/2008	6/19/2008	0.018	0.001	115.4	1.4	#VALUE!	Not applicable	—
GW33-08-13276	2	10:32	6/19/2008	6/19/2008	0.021	0.003	187.4	1.38	1.39	0.00	ClO4 to be analyzed
GW33-08-13287	2	10:32	6/19/2008	6/19/2008	0.019	0.002	195.4	1.45	1.39	0.02	ClO4 to be analyzed
GW33-08-13288	FB	10:32	6/19/2008	6/19/2008	0.001	—	0.2	0.00	0.00	0.80	ClO4 to be analyzed
GW33-08-13332	2	11:02	6/19/2008	6/19/2008	0.018	0.000	117.8	1.4	#VALUE!	Not applicable	—
GW33-08-13277	2	11:02	6/19/2008	6/19/2008	0.021	0.003	191.8	1.35	1.38	-0.01	ClO4 to be analyzed
GW33-08-13323	2	11:32	6/19/2008	6/19/2008	0.018	0.001	115.9	1.4	#VALUE!	Not applicable	—
GW33-08-13278	2	11:32	6/19/2008	6/19/2008	0.021	0.003	185.5	1.37	1.38	0.00	ClO4 to be analyzed
GW33-08-13324	2	12:00	6/19/2008	6/19/2008	0.021	0.001	118.7	1.4	#VALUE!	Not applicable	—
GW33-08-13279	2	12:00	6/19/2008	6/19/2008	0.020	0.002	189.6	1.39	1.38	0.00	ClO4 to be analyzed

* — = Not measured.

Appendix B

Evaluation of Water Quality Using
Well Screen Analysis Methodology

Table B-1
Results of Well Screen Analysis for R-33 Screen 1

Well	Port Depth (ft)	Scr #	Sample Collection Date	Sample ID	Tritium (pCi/L)	Modern Water?	3H Plume?	Field pH		Low pH?	High pH?	Test Gen-1	Alkalinity (mg/L CaCO3)		Test Gen-2	Turbidity (NTU)	Test Gen-3	Acetone (ug/L)	Test B1	NH3-N (mg/L)	Test B2	TKN (mg/L)	Test B3	TOC (mg/L)	Lab Qual Code	Test B4	Ba ug/L	Test D3	Test E1	Ca mg/L
						pCi/L >UL 1	pCi/L >UL 17			SU >LL 6.4	SU <UL 9.0				mg/L <UL 157		NTU <UL 5		ug/L <UL 5		mg/L <UL 0.05		mg/L <UL 0.46			mg/L <UL 1.37		ug/L >LL 1.4	ug/L <UL 57	
R-33	996	1	19-Jun-08	GW33-08-13293, GW33-08-13245	ND[a]	ND	ND	7.42	Fld	Yes	Yes	P	83	NF	P	4.5	P	ND	ND	ND	ND	ND	ND	0.9	NF	P	33	P	P	11.3
R-33	996	1	19-Jun-08	GW33-08-13297, GW33-08-13249	ND	ND	ND	7.63	Fld	Yes	Yes	P	83	NF	P	4.51	P	ND	ND	ND	ND	ND	ND	0.7	NF	P	32	P	P	11.0
R-33	996	1	19-Jun-08	GW33-08-13301, GW33-08-13253	ND	ND	ND	7.65	Fld	Yes	Yes	P	83	NF	P	3.52	P	ND	ND	ND	ND	ND	ND	0.7	NF	P	32	P	P	11.1
R-33	996	1	19-Jun-08	GW33-08-13305, GW33-08-13257	ND	ND	ND	7.66	Fld	Yes	Yes	P	83	NF	P	2.24	P	ND	ND	ND	ND	ND	ND	0.7	NF	P	32	P	P	10.9

[a] ND = No data.
[b] — = No drilling flags assigned.

Table B-1
Results of Well Screen Analysis for R-33 Screen 1

Well	Port Depth (ft)	Scr #	Sample Collection Date	Sample ID	Test E2a	Test E2b	Test E2	Cl mg/L	Test A1	F mg/L	Test A2	Mg mg/L	Test E3	NO3-N mg/L	Test Gen-5	Test C10	ORP	Test C3	DO	Test C11	ClO4 ug/L	Lab Qual Code	Test Gen-4	Test C7	PO4-P	UOM	Test A6	Na mg/L	Molar ratio Na/Cl	Test A4	SO4 mg/L
					mg/L >LL 4.3	mg/L <UL 42	Within range		mg/L <UL 3.6		mg/L <UL 0.57		mg/L <UL 4.2		<UL 0. 89	mg/L >LL 0.01		mV >LL 0		mg/L >LL 2			<UL 0.5	ug/L >LL 0.22	Threshold as P 0.34		mg/L P <UL 0.08			mg/L <UL 25	
R-33	996	1	19-Jun-08	GW33-08-13293, GW33-08-13245	Yes	Yes	P	3.0	P	0.24	P	3.80	P	0.656	P	P	191	P	5.0	P	<5	U	DL	DL	0.04	g/L as PO	P	10.7	3.6	P	3.6
R-33	996	1	19-Jun-08	GW33-08-13297, GW33-08-13249	Yes	Yes	P	2.9	P	0.24	P	3.77	P	0.636	P	P	187	P	5.1	P	<5	U	DL	DL	0.04	g/L as PO	P	10.6	3.6	P	3.5
R-33	996	1	19-Jun-08	GW33-08-13301, GW33-08-13253	Yes	Yes	P	3.0	P	0.23	P	3.77	P	0.641	P	P	196	P	5.0	P	<5	U	DL	DL	0.04	g/L as PO	P	10.4	3.5	P	3.4
R-33	996	1	19-Jun-08	GW33-08-13305, GW33-08-13257	Yes	Yes	P	2.9	P	0.23	P	3.75	P	0.656	P	P	218	P	5.5	P	<5	U	DL	DL	0.05	g/L as PO	P	10.3	3.6	P	3.4

[a] ND = No data.
[b] — = No drilling flags assigned.

Table B-1
Results of Well Screen Analysis for R-33 Screen 1

Well	Port Depth (ft)	Scr #	Sample Collection Date	Sample ID	Test C1	Test A5	Sulfide	Lab Qual Code	Test C2	B ug/L	Test A1	Cr (F) ug/L	Test Gen-6	Test C9	Cr (NF) ug/L	Test F3	Ratio Cr (NF/F)	Test F4	Fe (F) ug/L	Test C5	Fe (NF) ug/L	Test F1	Ratio Fe(NF/F)	Test F2	Mn (F) ug/L	Test C6	Ni (F) ug/L	Test F5	Sr ug/L	Test D2	Test E3
					mg/L >LL 1.7	mg/L <UL 7.2			mg/L <UL 0.01		<UL 38.77		<UL 5.75	ug/L >LL 0.39		ug/L <UL 10		Ratio <UL 5		ug/L <UL 147		ug/L <UL 1270		Ratio <UL 10		ug/L <UL 124		ug/L <UL 50		ug/L >LL 44	ug/L <UL 540
R-33	996	1	19-Jun-08	GW33-08-13293, GW33-08-13245	P	P	0.01	U	P	37	P	4.0	P	P	6.0	P	1.5	NA	70	P	170	Yes	2.4	P	4	P	1	P	47	P	P
R-33	996	1	19-Jun-08	GW33-08-13297, GW33-08-13249	P	P	0.01	U	P	17	P	5.0	P	P	8.0	P	1.6	NA	60	P	140	Yes	2.3	P	6	P	1	P	45	P	P
R-33	996	1	19-Jun-08	GW33-08-13301, GW33-08-13253	P	P	0.01	U	P	14	P	4.0	P	P	8.0	P	2.0	NA	60	P	120	Yes	2.0	P	5	P	1	P	44	P	P
R-33	996	1	19-Jun-08	GW33-08-13305, GW33-08-13257	P	P	0.01	U	P	20	P	5.0	P	P	5.0	P	1.0	NA	60	P	80	Yes	1.3	P	4	P	1	P	44	P	P

[a] ND = No data.
[b] — = No drilling flags assigned.

Table B-1
Results of Well Screen Analysis for R-33 Screen 1

Well	Port Depth (ft)	Scr #	Sample Collection Date	Sample ID	U ug/L	Test C8	Test D1	Test E5	V ug/L	Test C4	Zn ug/L	Test D4	Test F6	Tests Passed	Tests Failed	Total Tests With P/Fail Outcome	% Pass	Is 3H Detected?	General Indicators						
						ug/L >LL 0.06	ug/L >LL 0.06	ug/L <UL 1.9		>LL 2.27		ug/L >LL 0.4	ug/L <UL 40						Mod water 3H UL=1	Gen-1 In pH range	Gen-2 Alk UL=52	Gen-3 Turb UL=5	Gen-4 ClO4 UL=0.5	Gen-5 NO3-N UL=0.89	Gen-6 Cr UL=5.75
R-33	996	1	19-Jun-08	GW33-08-13293, GW33-08-13245	1.1	P	P	P	6	P	128	P	F	34	1	35	97	ND	ND	P	P	P	DL	P	P
R-33	996	1	19-Jun-08	GW33-08-13297, GW33-08-13249	1.1	P	P	P	6	P	126	P	F	34	1	35	97	ND	ND	P	P	P	DL	P	P
R-33	996	1	19-Jun-08	GW33-08-13301, GW33-08-13253	1.1	P	P	P	5	P	114	P	F	34	1	35	97	ND	ND	P	P	P	DL	P	P
R-33	996	1	19-Jun-08	GW33-08-13305, GW33-08-13257	1.2	P	P	P	5	P	86	P	F	34	1	35	97	ND	ND	P	P	P	DL	P	P

[a] ND = No data.
[b] — = No drilling flags assigned.

Table B-1
Results of Well Screen Analysis for R-33 Screen 1

Well	Port Depth (ft)	Scr #	Sample Collection Date	Sample ID	Category A Inorganic Indicators						Category B Organic Indicators				Category C1 Redox (SO4)			Category C2 Redox (Fe/Mn)						Category C3 Redox (NO3)		
					A1 B UL=39	A2 Cl UL=3.6	A3 Na UL=24.5	A4 SO4 UL=7.2	A5 F UL=0.5	A6 PO4 UL=3.4	B1 Ace 5	B2 NH3 0.05	B3 TKN 0.35	B4 TOC 1.37	C1 SO4 LL=1.65	C2 S UL=0.01	C3 ORP LL=0	C4 V LL=2.27	C5 Fe UL=14	C6 Mn UL=124	C7 ClO4 LL=0.2	C8 U LL=0.06	C9 Cr LL=0.39	C10 NO3-N LL=0.01	C11 DO LL=2	D1 U LL=0.06
R-33	996	1	19-Jun-08	GW33-08-13293, GW33-08-13245	P	P	P	P	P	P	ND*	ND	ND	P	P	P	P	P	P	P	DL	P	P	P	P	P
R-33	996	1	19-Jun-08	GW33-08-13297, GW33-08-13249	P	P	P	P	P	P	ND	ND	ND	P	P	P	P	P	P	P	DL	P	P	P	P	P
R-33	996	1	19-Jun-08	GW33-08-13301, GW33-08-13253	P	P	P	P	P	P	ND	ND	ND	P	P	P	P	P	P	P	DL	P	P	P	P	P
R-33	996	1	19-Jun-08	GW33-08-13305, GW33-08-13257	P	P	P	P	P	P	ND	ND	ND	P	P	P	P	P	P	P	DL	P	P	P	P	P

[a] ND = No data.
[b] — = No drilling flags assigned.

Table B-1
Results of Well Screen Analysis for R-33 Screen 1

Well	Port Depth (ft)	Scr #	Sample Collection Date	Sample ID	Category D Adsorption				Category E Carbonate Mineralogy						Category F Metal Corrosion						Categories under Which Drilling Flags Are to Be Assigned					
					D2 Sr LL=44	D3 Ba LL=4.9	D4 Zn LL=0.4	E1 Ba UL=57	E2a Ca LL=4.3	E2b Ca UL=42	E2 Ca In	E3 Mg UL=4.2	E4 Sr UL=540	E5 U UL=1.90	F1 FeT UL=500	F2 FeR UL=10	F3 CrT UL=10	F4 CrR UL=5	F5 Ni UL=50	F6 Zn UL=40	A	B	C	D	E	F
R-33	996	1	19-Jun-08	GW33-08-13293, GW33-08-13245	P	P	P	P	P	P	P	P	P	P	No	P	P	NA	P	F	_[b]	—	—	—	—	—
R-33	996	1	19-Jun-08	GW33-08-13297, GW33-08-13249	P	P	P	P	P	P	P	P	P	P	No	P	P	NA	P	F	—	—	—	—	—	—
R-33	996	1	19-Jun-08	GW33-08-13301, GW33-08-13253	P	P	P	P	P	P	P	P	P	P	No	P	P	NA	P	F	—	—	—	—	—	—
R-33	996	1	19-Jun-08	GW33-08-13305, GW33-08-13257	P	P	P	P	P	P	P	P	P	P	No	P	P	NA	P	F	—	—	—	—	—	—

[a] ND = No data.
[b] — = No drilling flags assigned.

Table B-2
Results of Well Screen Analysis for R-33 Screen 2

Well	Port Depth (ft)	Scr #	Sample Collection Date	Sample ID	Tritium (pCi/L)	Modern Water?	3H Plume?	Field pH		Low pH?	High pH?	Test Gen-1	Alkalinity (mg/L CaCO3)	Test Gen-2	Turbidity (NTU)	Test Gen-3	Acetone (ug/L)	Test B1	NH3-N (mg/L)	Test B2	TKN (mg/L)	Test B3	TOC (mg/L)	Lab Qual Code	Test B4	Ba ug/L	Test D3	Test E1
						pCi/L >UL 1	pCi/L >UL 17			SU >LL 6.4	SU <UL 9.0			mg/L <UL 157		NTU <UL 5		ug/L <UL 5		mg/L <UL 0.05		mg/L <UL 0.46			mg/L <UL 1.37		ug/L >LL 1.4	ug/L <UL 57
R-33	1112	2	19-Jun-08	GW33-08-13312, GW33-08-13267	NDa	ND	ND	7.69	Fld	Yes	Yes	P	87.6 NF	P	2.88	P	ND	ND	ND	ND	ND	ND	0.9	NF	P	35	P	P
R-33	1112	2	19-Jun-08	GW33-08-13316, GW33-08-13271	ND	ND	ND	7.68	Fld	Yes	Yes	P	85.2 NF	P	2.49	P	ND	ND	ND	ND	ND	ND	0.7	NF	P	34	P	P
R-33	1112	2	19-Jun-08	GW33-08-13320, GW33-08-13275	ND	ND	ND	7.67	Fld	Yes	Yes	P	85.1 NF	P	2.02	P	ND	ND	ND	ND	ND	ND	0.7	Nf	P	34	P	P
R-33	1112	2	19-Jun-08	GW33-08-13324, GW33-08-13279	ND	ND	ND	7.70	Fld	Yes	Yes	P	84.2 NF	P	1.9	P	ND	ND	ND	ND	ND	ND	0.7	NF	P	34	P	P

[a] ND = No data.
[b] — = No drilling flags assigned.

Table B-2
Results of Well Screen Analysis for R-33 Screen 2

Well	Port Depth (ft)	Scr #	Sample Collection Date	Sample ID	Ca mg/L	Test E2a	Test E2b	Test E2	Cl mg/L	Test A1	F mg/L	Test A2	Mg mg/L	Test E3	NO3-N mg/L	Test Gen-5	Test C10	ORP	Test C3	DO	Test C11	ClO4 ug/L	Lab Qual Code	Test Gen-4	Test C7	PO4-P	UOM	Test A6	Na mg/L	Molar ratio Na/Cl	Test A4
						mg/L >LL 4.3	mg/L <UL 42	Within range		mg/L <UL 3.6		mg/ <UL 0.57		mg/L <UL 4.2		<UL 0. 89	mg/L >LL 0.01		mV >LL 0		mg/L >LL 2			<UL 0.5	ug/L >LL 0.22	Threshold as P 0.34		mg/L P <UL 0.08			mg/L <UL 25
R-33	1112	2	19-Jun-08	GW33-08-13312, GW33-08-13267	10.6	Yes	Yes	P	2.8	P	0.23	P	3.84	P	0.385	P	P	235	P	5.1	P	<5	U	DL	DL	0.05	mg/L as PO4	P	10.9	3.9	P
R-33	1112	2	19-Jun-08	GW33-08-13316, GW33-08-13271	10.5	Yes	Yes	P	2.7	P	0.23	P	3.85	P	0.418	P	P	218	P	5.2	P	<5	U	DL	DL	0.06	mg/L as PO4	P	10.8	4.0	P
R-33	1112	2	19-Jun-08	GW33-08-13320, GW33-08-13275	10.6	Yes	Yes	P	2.7	P	0.23	P	3.89	P	0.451	P	P	225	P	5.0	P	<5	U	DL	DL	0.06	mg/L as PO4	P	10.8	3.9	P
R-33	1112	2	19-Jun-08	GW33-08-13324, GW33-08-13279	10.9	Yes	Yes	P	2.9	P	0.23	P	3.97	P	0.511	P	P	230	P	5.0	P	<5	U	DL	DL	0.06	mg/L as PO4	P	11.1	3.9	P

[a] ND = No data.
[b] — = No drilling flags assigned.

Table B-2
Results of Well Screen Analysis for R-33 Screen 2

Well	Port Depth (ft)	Scr #	Sample Collection Date	Sample ID	SO4 mg/L	Test C1	Test A5	Sulfide	Lab Qual Code	Test C2	B ug/L	Test A1	Cr (F) ug/L	Test Gen-6	Test C9	Cr (NF) ug/L	Test F3	Ratio Cr (NF/F)	Test F4	Fe (F) ug/L	Test C5	Fe (NF) ug/L	Test F1	Ratio Fe(NF/F)	Test F2	Mn (F) ug/L	Test C6	Ni (F) ug/L	Test F5	Sr ug/L
						mg/L >LL 1.7	mg/L <UL 7.2			mg/L <UL 0.01		<UL 38.77		<UL 5.75	ug/L >LL 0.39		ug/L <UL 10		Ratio <UL 5		ug/L <UL 147		ug/L <UL 1270		Ratio <UL 10		ug/L <UL 124		ug/L <UL 50	
R-33	1112	2	19-Jun-08	GW33-08-13312, GW33-08-13267	2.9	P	P	0.01	U	P	35	P	5.0	P	P	5.0	P	1.0	NA	50	P	110	Yes	2.2	P	2	P	1	P	44
R-33	1112	2	19-Jun-08	GW33-08-13316, GW33-08-13271	2.9	P	P	0.01	U	P	14	P	5.0	P	P	5.0	P	1.0	NA	40	P	90	Yes	2.3	P	1	P	1	P	44
R-33	1112	2	19-Jun-08	GW33-08-13320, GW33-08-13275	3.0	P	P	0.01	U	P	14	P	5.0	P	P	5.0	P	1.0	NA	50	P	80	Yes	1.6	P	2	P	1	P	44
R-33	1112	2	19-Jun-08	GW33-08-13324, GW33-08-13279	3.1	P	P	0.01	U	P	18	P	5.0	P	P	6.0	P	1.2	NA	50	P	70	Yes	1.4	P	5	P	3	P	46

[a] ND = No data.
[b] — = No drilling flags assigned.

Table B-2
Results of Well Screen Analysis for R-33 Screen 2

Well	Port Depth (ft)	Scr #	Sample Collection Date	Sample ID	Test D2	Test E3	U ug/L	Test C8	Test D1	Test E5	V ug/L	Test C4	Zn ug/L	Test D4	Test F6	Tests Passed	Tests Failed	Total Tests With P/Fail Outcome	% Pass	Is 3H detected?	General Indicators						
					ug/L >LL 44	ug/L <UL 540		ug/L >LL 0.06	ug/L >LL 0.06	ug/L <UL 1.9		>LL 2.27		ug/L >LL 0.4	ug/L <UL 40						Mod Water 3H UL=1	Gen-1 In pH range	Gen-2 Alk UL=52	Gen-3 Turb UL=5	Gen-4 ClO4 UL=0.5	Gen-5 NO3-N UL=0.89	Gen-6 Cr UL=5.75
R-33	1112	2	19-Jun-08	GW33-08-13312, GW33-08-13267	P	P	1.2	P	P	P	6	P	19	P	P	35	0	35	100	ND	ND	P	P	P	DL	P	P
R-33	1112	2	19-Jun-08	GW33-08-13316, GW33-08-13271	P	P	1.2	P	P	P	6	P	19	P	P	35	0	34	100	ND	ND	P	P	P	DL	P	P
R-33	1112	2	19-Jun-08	GW33-08-13320, GW33-08-13275	P	P	1.1	P	P	P	5	P	18	P	P	35	0	35	100	ND	ND	P	P	P	DL	P	P
R-33	1112	2	19-Jun-08	GW33-08-13324, GW33-08-13279	P	P	1.1	P	P	P	5	P	21	P	P	35	0	35	100	ND	ND	P	P	P	DL	P	P

[a] ND = No data.
[b] — = No drilling flags assigned.

Table B-2
Results of Well Screen Analysis for R-33 Screen 2

Well	Port Depth (ft)	Scr #	Sample Collection Date	Sample ID	Category A Inorganic Indicators						Category B Organic Indicators				C1 Redox (SO4)			C2 Redox (Fe/Mn)						Category C3 Redox (NO3)		
					A1 B UL=39	A2 Cl UL=3.6	A3 Na UL=24.5	A4 SO4 UL=7.2	A5 F UL=0.5	A6 PO4 UL=3.4	B1 Ace 5	B2 NH3 0.05	B3 TKN 0.35	B4 TOC 1.37	C1 SO4 LL=1.65	C2 S UL=0.01	C3 ORP LL=0	C4 V LL=2.27	C5 Fe UL=14	C6 Mn UL=124	C7 ClO4 LL=0.2	C8 U LL=0.06	C9 Cr LL=0.39	C10 NO3-N LL=0.01	C11 DO LL=2	D1 U LL=0.06
R-33	1112	2	19-Jun-08	GW33-08-13312, GW33-08-13267	P	P	P	P	P	P	ND*	ND	ND	P	P	P	P	P	P	P	DL	P	P	P	P	P
R-33	1112	2	19-Jun-08	GW33-08-13316, GW33-08-13271	P	P	P	P	P	P	ND	ND	ND	P	P	P	P	P	P	P	DL	P	P	P	P	P
R-33	1112	2	19-Jun-08	GW33-08-13320, GW33-08-13275	P	P	P	P	P	P	ND	ND	ND	P	P	P	P	P	P	P	DL	P	P	P	P	P
R-33	1112	2	19-Jun-08	GW33-08-13324, GW33-08-13279	P	P	P	P	P	P	ND	ND	ND	P	P	P	P	P	P	P	DL	P	P	P	P	P

[a] ND = No data.
[b] — = No drilling flags assigned.

Table B-2
Results of Well Screen Analysis for R-33 Screen 2

Well	Port Depth (ft)	Scr #	Sample Collection Date	Sample ID	Category D Adsorption				Category E Carbonate Mineralogy						Category F Metal Corrosion					Categories under Which Drilling Flags Are to Be Assigned					
					D2 Sr LL=44	D3 Ba LL=4.9	D4 Zn LL=0.4	E1 Ba UL=57	E2a Ca LL=4.3	E2b Ca UL=42	E2 Ca In	E3 Mg UL=4.2	E4 Sr UL=540	E5 U UL=1.90	F1 FeT UL=500	F2 FeR UL=10	F3 CrT UL=10	F4 CrR UL=5	F5 Ni UL=50	A	B	C	D	E	F
R-33	1112	2	19-Jun-08	GW33-08-13312, GW33-08-13267	P	P	P	P	P	P	P	P	P	P	No	P	P	NA	P	_[b]	—	—	—	—	—
R-33	1112	2	19-Jun-08	GW33-08-13316, GW33-08-13271	P	P	P	P	P	P	P	P	P	P	No	P	P	NA	P	—	—	—	—	—	—
R-33	1112	2	19-Jun-08	GW33-08-13320, GW33-08-13275	P	P	P	P	P	P	P	P	P	P	No	P	P	NA	P	—	—	—	—	—	—
R-33	1112	2	19-Jun-08	GW33-08-13324, GW33-08-13279	P	P	P	P	P	P	P	P	P	P	No	P	P	NA	P	—	—	—	—	—	—

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[b] — = No drilling flags assigned.

Appendix C

Video Logging (on DVD included with this report)

TO VIEW THE VIDEO THAT ACCOMPANIES THIS DOCUMENT, PLEASE CALL THE HAZARDOUS WASTE BUREAU AT 505-476-6000 TO MAKE AN APPOINTMENT