LA-UR-07-7341
October 2007
EP2007-0688

Well R-32 Rehabilitation and Conversion Summary Report

Los Alamos
NATIONAL LABORATORY
EST.1943

Prepared by the Environmental Programs Directorate

LA-UR-07-7341
EP2007-0688

Well R-32 Rehabilitation and Conversion Summary Report

October 2007

Responsible project leader:

Printed Name	Signature	Title	Organization	Date
Ardyth Simmons		Project Leader	Environmental Programs	10/31/07

Responsible LANS representative:

Printed Name	Signature	Title	Organization	Date
Susan G. Stiger		Associate Director	Environmental Programs	10/31/07

Responsible DOE representative:

Printed Name	Signature	Title	Organization	Date
David R. Gregory		Project Director	DOE-LASO	10/31/07

CONTENTS

Figures

Tables

Appendixes

1.0 INTRODUCTION

This report provides a summary of the work performed and the results of rehabilitating and converting well R-32 to a single-screen well. Plans for R-32 conversion were presented in the 'Work Plan for R-Well Rehabilitation and Replacement, Rev. 2 (LANL 2007, 098119) that was approved by the New Mexico Environment Department (NMED) on August 20, 2007 (NMED 2007, 098182). The R-32 well was drilled to a total depth of 1008 ft using fluid-assisted air-rotary and conventional mud-rotary techniques and was completed in August 2002 with three screened intervals in the regional aquifer: screen 1 from 867.5 ft to 875.2 ft; screen 2 from 931.8 ft. to 934.9 ft; and screen 3 from 972.9 ft to 980.6 ft. A dedicated Westbay sampling system was installed in the well after completion.

The results of the well screen analysis for R-32 (LANL 2007, 096330) indicated that as of December 2006, screen 1 was very good, passing >90% of the assessment tests, screen 2 was not rated, and screen 3 passed 60% to 80% of the tests. Screen 2 was not rated because it was only intended and used for pressure readings. Because of these results, it was planned that the lower two screens would be abandoned, and a submersible pump would be installed for long-term sampling of the uppermost screen (screen 1).

2.0 REHABILITATION ACTIVITIES (SCOPE)

The activities performed as part of the R-32 rehabilitation and conversion included removing the Westbay sampling system, video logging of the well, abandoning screens 2 and 3, hydraulic testing to measure the specific capacity of screen 1, collecting water samples for laboratory analysis, and installing the submersible pump (pending) in accordance with the work plan approved by NMED (LANL 2007, 098119) (NMED 2007, 098182). These activities are described in the following subsections.

2.1 Retrieval of Westbay Sampling System

The Westbay MP55 sampling system was retrieved between September 17 and September 18, 2007. A Westbay technical representative was on-site to lead the retrieval operations. All Westbay components were successfully removed from the well. The Westbay Retrieval Report is presented in Appendix A. The Retrieval Report describes field operations in detail and documents field measurements recorded in association with the retrieval process.

2.2 Video Logging

A downhole video camera was run in the R-32 well on September 19, 2007, to document current screen conditions and verify screen locations, total working depth of the well, and composite static water level before backfilling and development activities. Los Alamos National Laboratory's (the Laboratory's) geophysical trailer and camera were used to complete video logging from the surface to the total depth of the well. Ground surface was used as the datum for all video depth measurements. Static water level in the well at the time of logging was recorded at 785.5 ft below ground surface (bgs).Observed screen depths, static water level (SWL), and total well depth are noted in Table 2.2-1. Overall, water clarity was very good and provided excellent visibility of the screened intervals. All three screen intervals were observed to be in excellent condition; screen 1 was the best of the three screens. A well log DVD is included with this report as Appendix B.

2.3 Screen Abandonment and Well Conversion

Screens 2 and 3 at R-32 were abandoned between September 20 and 24, 2007. Details of abandonment materials and placement are presented in Figure 2.3-1. Filter-grade 10/20 silica sand was used as the primary backfill material through the screened intervals. The 10/20 sand was installed from the total depth (TD) of the well at 1002.0 to 968.0 ft bgs. Finer 20/40 filter-grade silica sand was installed above the 10/20 sand from 968.0 to 959.4 ft bgs. The finer 20/40 sand serves as a transition interval to keep the cement from flowing into the coarser 10/20 sand. All of the backfill sand was installed with a tremie pipe while running a small volume of potable water to carry the sand into place. A Portland cement seal was installed above the fine transition sand from 946.5 to 959.4 ft bgs between screens 2 and 3. Cement was emplaced using a wire line dump bailer. The dump bailer allowed discrete placement of a calculated volume of cement while minimizing impacts to the well screen by fugitive cement. The cement was allowed to cure overnight (approximately 14 h) before proceeding with the next sand interval. A second interval of 10/20 sand was installed through the screened interval at screen 2 from 926.6 to 946.5 ft bgs. This was followed by a fine transitional 20/40 sand from 920.6 to 926.6 ft bgs. A second neat-cement seal was then installed between screens 1 and 2 from 910.1 to 920.6 ft bgs. The cement was allowed to cure overnight before proceeding with final abandonment activities.

Before a final interval of sand was placed above the upper cement seal, purging was conducted to remove any cement-impacted waters resulting from seal placement. A Laboratory-owned submersible pump was used for initial purging; however, problems with the pump were encountered after purging approximately 300 gal. The pump was removed from the well, and the exact cause of the problems could not be determined because the pump functioned properly when tested at ground surface. As an alternative to pumping, bailing was implemented to complete the purging process. The bailer was run inside a 3-in. diameter conductor pipe that was run from just above ground surface to just above the cement plug. The conductor pipe was deployed into the well to isolate screen 1 from the bailing process and prevent any fugitive cement-impacted water from contacting the screen. Approximately 180 gal. was removed in 53 trips with the bailer. A final interval of 10/20 sand was installed from 895.1 to 910.1 ft bgs above the cement seal to help isolate the upper cement plug. The final sand interval was placed on September 29, 2007.

2.4 Specific Capacity Testing

A short specific capacity testing was performed on screen 1 to establish hydraulic response to pumping. The test pumping consisted of installing an inflatable packer above the screen to eliminate casing storage effects. A pressure transducer was installed in that interval as well. Plans called for 1 h of equilibration time, pumping the isolated interval for a minimum of 3 h, and allowing a minimum of 3 h of recovery following pumping. Actual testing exceeded these requirements, including several short-duration tests followed by two long-duration (10.5 h) tests during the water-sampling effort. Based on the anticipated capacity of R-32 screen 1, a pump with a capacity of less than 5 gal./min was used for the testing.

During testing, water-level data were collected using the down-hole pressure transducer to capture the pumping and recovery response. The recorded data were intended to provide information on the specific capacity of the permanent sampling zone.

In addition, the data obtained can support hydraulic analysis of the aquifer in which screen 1 is placed. A detailed hydraulic analysis of the data is, however, beyond the scope of the well rehabilitation project. The current discussion is limited to presenting the specific capacity results with general comments and observations. However, the data will be archived and available for examination if a rigorous analysis of site hydraulics is needed.

Several brief pumping events occurred on September 30 from which specific capacity was determined. Subsequently, more extended pumping was performed on October 9 and again on October 10.

On September 30, screen 1 was pumped initially at 2.36 gal./min for 69 min from 12:44 p.m. to 1:53 p.m. The resulting drawdown was 33.51 ft, making the specific capacity 0.0704 gal./min/ft of drawdown. Following a recovery period of 187 min, the zone was pumped at 1.64 gal./min for 65 min from 5:00 p.m. to 6:05 p.m. The resulting drawdown was 22.17 ft, making the specific capacity 0.0740 gal./min/ft. The slightly higher specific capacity was attributed to a modest reduction in turbulent flow associated with the reduced discharge rate. At 6:05 p.m., the pumping rate was increased and maintained near 2.38 gal./min until 7:00 p.m., extending the period of continuous pumping to 120 min. The drawdown at the end of this pumping episode was 33.28 ft, making the specific capacity 0.0715 gal./min/ft. Table 2.4-1 summarizes the respective pumping rates, pumping times, observed drawdown, and specific capacity values.

After correcting electrical problems that interfered with continuous pump operation, screen 1 was purged for extended periods on October 9 and 10. Pumping on October 9 occurred at 2.32 gal./min for 630 min from 8:00 a.m. until 6:30 p.m. The resulting drawdown was 36.64 ft, making the specific capacity 0.0633 gal./min/ft. On October 10, the well was pumped at 2.26 gal./min for 630 min from 7:30 a.m. to 6:00 p.m. The resulting drawdown was 35.33 ft, resulting in a similar specific capacity of 0.0640 gal./min/ft. These results are included in Table 2.4-1.

The only other hydraulic data previously available from screen 1 consisted of an injection test performed after well installation using isolation packers. That test showed an injection rate of 4.73 gal./min with a head buildup of 55.8 ft, for a specific capacity of 0.085 gal./min/ft—greater than the specific capacities measured during the pumping effort. It is unusual for the injection capacity of a well to exceed the pumping capacity because of aeration and other clogging effects associated with injection. It is possible that the isolation packers used during the injection test may have allowed some fluid bypass so that some of the injected fluid actually flowed into screens 2 and 3.

Of note was that the specific capacities declined significantly with increased pumping time. The specific capacities after 10 h of pumping were about 10% lower than those after about an hour of pumping. While common in many hydrogeologic settings, this effect is unusual for wells on the plateau. In most of the R wells, partial penetration effects (vertical growth of the cone of depression) result in a flattening of the drawdown curve after a short pumping period, with little increase in drawdown over time and therefore little falloff in specific capacity.

The greater than normal decline in specific capacity was attributed to steadily increasing drawdown throughout the pumping period. For typical aquifers, when this effect is seen in the drawdown data, it also should be seen in the recovery response curve, that is, recovery response should mirror pumping response. However, in R-32, the recovery data did not show the steady and significant change in water level over time that was observed during pumping. This is highly unusual and not readily explainable without a detailed analysis of the data.

One possible explanation of the unusual response observed in R-32 is a spatially limited permeable aquifer zone (aquifer boundaries) that is not well connected to the greater regional aquifer. Consistent with this, after each of the extended pumping periods, the water levels failed to recover to the prepumping levels. For example, after the October 9 pumping period of 630 min, the water level recovered to a position about 0.35 ft short of the original static level and then stopped recovering altogether. Likewise, after the October 10 pumping period of 630 min, recovery fell about 0.4 ft short of the starting point with no further rebound of levels.

This very unusual response tentatively suggests that the pumped zone may be hydraulically isolated from the greater regional aquifer. It is notable that the static water level for screen 1 is 10 ft higher than the

levels measured in screens 2 and 3, suggesting hydraulic separation between screen 1 and screens 2 and 3. Also of note is that the background data recorded in screen 1 show no discernible response to municipal pumping in the area, consistent with hydraulic isolation from the main regional aquifer.

2.5 Screen 1 Water Quality

2.5.1 Sample Collection, Field Preparation, and Analytical Techniques

A total of 21 groundwater samples were collected during the specific capacity test conducted at R-32 screen 1 from October 9 (20 samples) to October 11, 2007 (1 sample). 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 of the field parameters recorded during the specific capacity test are provided in Table 2.5-1. 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 ORP were measured using a HACH Sension-5 meter and a Thermoelectron Corp. (Russell RL 060P Model) instrument, respectively. Groundwater samples were collected every 5 min during the initial 25 min of the pumping test. The frequency of sample collection decreased to every 10 min from 25 to 55 min during the test and to every 30 min during the remainder of the test (6.08 h) conducted on October 9, 2007. A final sample was collected on October 11, 2007. Groundwater samples were collected from a submersible pump consisting of a mild-steel discharge pipe equipped with a standard retrofitted submersible pump. The discharge rate was approximately 2.3 gal./min during the test.

Groundwater samples were filtered before analysis for metals, trace elements, and major cations and anions. Aliquots of samples collected from R-32 screen 1 were filtered through 0.45-µmeter Geotech disposable filters. Samples were acidified with analytical-grade nitric acid to a pH of 2.0 or less for metal and major cation analyses. Samples collected for TOC analysis were not filtered.

Chemical analyses of screening-groundwater samples were performed at the Laboratory's Earth and Environmental Sciences Group 6 (EES-6) laboratory. Groundwater samples were analyzed using techniques specified in the U.S. Environmental Protection Agency SW-846 Manual. Total carbonate alkalinity was measured using standard titration techniques. Ion chromatography was the analytical method for bromide, chloride, fluoride, nitrate, nitrite, oxalate, chlorate, perchlorate, phosphate, and sulfate. The instrument detection limits for perchlorate were 0.001 and 0.0005 parts per million (ppm). Inductively coupled (argon) plasma optical emission spectroscopy (ICPOES) was used for analyses of calcium, magnesium, potassium, silica, and sodium. Aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, cesium, chromium, cobalt, copper, iron, 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.

2.5.2 Field Parameters

Field pH and groundwater temperature varied from 8.04 to 8.20 and from 20.8 to 23.2°C, respectively, during the specific capacity test conducted at R-32 screen 1 (Table 2.5-1). Specific conductance and DO varied from 161.5 to 167.1 microSiemens per centimeter (µS/cm) and 1.08 to 1.41 mg/L, respectively. Screen 1 is completed within the Cerros del Rio basalt, and low DO measurements less than 2 mg/L are considered to be typical of groundwater in contact with ferrous-iron rich glass and minerals concentrated within the basalt. All measurements of turbidity were less than 5 nephelometric turbidity units (NTU) (Table 2.5-1). Noncorrected ORP measurements decreased from +175 to –58 millivolts (mV) during the

pumping test in which groundwater was initially overall oxidizing. Geochemical factors influencing the change in ORP are discussed in Section 2.5.4.

2.5.3 Analytical Results

Analytical results for groundwater samples collected during aquifer performance testing at R-32 screen 1 are provided in Appendix C. Charge balance errors for dissolved cations and anions were generally less than ±10% for complete analyses of inorganic solutes provided in Appendix C. Calcium and total carbonate alkalinity are the dominant solutes present in the regional aquifer at R-32 screen 1. Concentrations of dissolved calcium and total alkalinity varied from 15.4 to 17.8 ppm (or mg/L) and from 67.3 to 99.7 mg$CaCO_3$/L, respectively. Dissolved concentrations of calcium and total carbonate alkalinity at R-32 screen 1 are within geochemical screening criteria for calcium (8.66 to 24.1 mg/L) and total carbonate alkalinity (<105 mg$CaCO_3$/L) (LANL 2007, 096330). Dissolved concentrations of chloride and sulfate varied from 4.21 to 4.81 ppm and from 4.24 to 8.09 ppm, respectively, during the pumping test (Appendix C). Dissolved concentrations of chloride and sulfate exceed geochemical screening criteria for chloride (<3.75 mg/L) and sulfate (0.8 to 6.22 mg/L) (LANL 2007, 096330). Dissolved concentrations of nitrate(N) and magnesium varied from 0.974 to 1.029 ppm and from 4.35 to 4.82 ppm, respectively, during the pumping test (Appendix C). Chloride, nitrate(N), and sulfate are considered to be influenced by predrilling site conditions, including leachate migration from former sewage lagoons upgradient of R-32.

Dissolved concentrations of barium, boron, and manganese at R-32 screen 1 (Appendix C) typically are within background distributions for the regional aquifer (LANL 2007, 095817). Dissolved concentrations of arsenic, nickel, lead, total chromium, copper, selenium, strontium, uranium, vanadium, and zinc at R-32 screen 1, when detected, are within background distributions for the regional aquifer (LANL 2007, 095817). Dissolved concentrations of manganese and zinc varied from 0.015 to 0.027 ppm and from 0.013 to 0.029 ppm, respectively (Appendix C). Dissolved concentrations of manganese and zinc were corrected for contamination in the deionized water-equipment blank as part of the well screen analysis.

2.5.4 Well Screen Analysis

Previous Results

Analytical results obtained from sampling well R-32 screen 1 were evaluated for representativeness and reliability, following geochemical protocols established by the Laboratory (LANL 2007, 096330) and approved by NMED (2007, 098182). Groundwater samples were collected from this Westbay-equipped well from 2004 to 2006. R-32 screen 1 passed the Laboratory well screen analysis with overall scores ranging from 89% to 97% (LANL 2007, 096330). The test scores improved over time with only 1, 2, or 4 analytes or general indicators per sampling event failing the geochemical criteria, consisting of 33, 34, and 36 individual tests. The analytes that did not meet the well screen criteria in the revised well screen analysis (LANL 2007, 096330) included magnesium (five results), barium (two results), chromium (two results), nickel (one result), ammonia (one result), and one of the general indicators, pH (one result) (LANL 2007, 096330).

Well Screen Analysis of R-32 Screen 1 During Pumping Test

Groundwater samples analyzed from well R-32 screen 1 during the pumping test passed the well screen analysis consisting of 21 criteria (Table 2.5-2) with scores ranging from 85.7% to 95.2% for 21 samples. Analytical results for six groundwater samples collected from R-32 screen 1 were evaluated against screening criteria. Five samples collected at the beginning (11:00 a.m.) and during (11:55 a.m., 2:55 p.m., 5:00 p.m., and 6:00 p.m.) the pumping test conducted on October 9, 2007, were selected for this updated

well screen analysis. The last sample collected at the conclusion of the pumping test on October 11, 2007 (1:05 p.m.), was also included in this evaluation. Negative ORP values (12 measurements), DO concentrations less than 2 mg/L (23 measurements), and excessive concentrations of dissolved manganese (1 sample) and molybdenum (1 sample) exceeding Laboratory background caused several samples to fail some criteria of the well screen analysis (Table 2.5-2). The samples collected at 11:00 a.m., 11:55 a.m., 2:55 p.m., 5:00 p.m., and 6:00 p.m. on October 9, 2007, had test scores of 95.2%, 95.2%, 90.5%, 85.7%, and 90.5%, respectively. These samples did not meet the criteria for DO, ORP, and/or dissolved manganese. The sample collected at 1:05 p.m. on October 11, 2007, had a test score of 90.5% and did not meet the well screen criteria for ORP and DO.

Well screen tests for seven criteria were not included in the updated analysis either because groundwater samples were not analyzed (acetone, total Kjeldahl nitrogen [TKN], and ammonia), or the tests were not applicable because of site conditions unrelated to drilling (nitrate, chloride, and sulfate). Well R-32 is downgradient of inactive sewage lagoons in Technical Area 18, and it is likely that leachate migration caused elevated above background concentrations of nitrate, chloride, and sulfate. Perchlorate was analyzed by using the IC method, which does not have a maximum detection limit (MDL) less than the 0.001 ppm required for the well screen analysis. Perchlorate, therefore, was not included in the updated well screen analysis.

Iron and TOC contamination in the deionized water-equipment blank is evident from analytical results provided in Appendix C. The blank contained 0.80 ppm of dissolved iron, 1.12 mgC/L of TOC, and 0.005 ppm of dissolved manganese (Appendix C). Test criteria for iron and TOC were not applied to this well screen analysis due to contamination in the blank sample.

The criteria for iron concentrations in nonfiltered samples and the iron ratio of nonfiltered to filtered samples relevant to potential well screen corrosion at R-32 screen 1 were not included in this analysis because of iron dissolution resulting from corrosion of the mild-steel discharge pipe used during groundwater sampling. Dissolved iron concentrations ranged from 0.45 to 1.04 ppm or mg/L during sampling (Appendix C).

Figure 2.5-1 shows concentrations of dissolved iron versus noncorrected ORP measurements for groundwater samples collected at R-32 screen 1. The positive ORP values measured in the field decreased from +175 to +2.0 mV from 11:00 a.m. to 12:55 p.m. on October 9, 2007 (Table 2.5-1), with dissolved iron concentrations increasing from 0.46 to 0.73 ppm (Appendix C). The ORP measurements became negative as concentrations of dissolved iron increased during the remainder of the pumping test. During the pumping test, ferrous iron was the dominant form of total dissolved iron, and concentrations of iron were very similar in filtered and nonfiltered samples (Appendix C). It is likely that the oxidation-reduction (redox) couple, $Fe(OH)_3/Fe^{2+}$ is controlling ORP measurements taken at R-32 screen 1, which results from corrosion of the mild-steel discharge pipe and is not reflective of in situ redox conditions within the regional aquifer. This redox couple is both reversible and electrochemically active (Langmuir 1997, 056037).

A geochemical evaluation was conducted to compare sampling methodologies of selected analytes and of pH obtained during a sampling event that was conducted at R-32 screen 1 on December 13, 2006, using Westbay equipment and on October 9 and 11, 2007, during the pumping test. Figure 2.5-2 shows that similar pH values and TOC concentrations were observed during the two sampling events. Concentrations of TOC were generally less than 1 mgC/L in samples collected during the pumping test. Dissolved concentrations of magnesium and nitrate(N) shown in Figure 2.5-3 compared very well during the Westbay sampling event and pumping test. Higher dissolved concentrations of both chloride and sulfate, shown in Figure 2.5-3, however, were measured in the final groundwater sample collected during the pumping test. Figure 2.5-4 shows similar concentrations of dissolved barium, chromium, manganese,

nickel, and zinc during sampling conducted on December 13, 2006, and the more recent pumping test. Dissolved concentrations of manganese and zinc were higher in the final sample collected during the pumping test (Figure 2.5-4) in comparison to the Westbay sampling event.

3.0 DEVIATIONS FROM WORK PLAN

With the exception of pump installation (see below), no deviations to the work plan have occurred. The work plan indicated that if the results indicated that the chemistry degraded below 90% tests passed, when subjected to the well screen analysis criteria, then the screen would undergo rehabilitation steps (jetting, surging, etc.). If the results ranged from 90% to 100%, no rehabilitation actions would be needed. In this case, the next step would be installation of the submersible pump. Because the results of the well screen analysis for R 32-screen 1 fell within the range of previous results, no further rehabilitation of the screen was indicated.

R-32 will be outfitted with a single environmentally retrofitted 4-in. submersible pump with a 1-in. stainless pump column. The submersible pump will be a Grundfos Model 5S20-39DS. The 1-in. drop pipe will consist of threaded schedule 40 Type 304 stainless-steel pipe, meeting the requirements of the American Society for Testing and Materials Standard A 312. The threaded ends and couplings will conform to 1-in. National Pipe Taper design with eight threads per inch. The thread design will be American Petroleum Institute 10 round nonupset casing threads. The depth of the pump intake depends on hydraulic data collected during aquifer testing. A dedicated 1-in. polyvinyl chloride transducer tube will be installed with and banded to the pump column. As of the submittal of this report, the custom-made Baski K-packer has not been received. Receipt is anticipated in early November. Therefore, all activities associated with well rehabilitation and conversion, with the exception of pump installation, have been completed. Pump installation will be scheduled upon receipt of the Baski K-packer, and the well should be operational for the December watershed sampling event.

4.0 CONCLUSIONS

- The Westbay sampling system was removed successfully. In addition, screens 2 and 3 successfully isolated from screen 1.
- The video log indicated that water clarity was very good overall and provided excellent visibility of the screened intervals. All three screen intervals were observed to be in excellent condition; screen 1 is the best of the three screens.
- The unusual response of the specific capacity test tentatively suggests that the pumped zone at screen 1 may be hydraulically isolated from the greater regional aquifer. It is notable that the static water level for screen 1 is 10 ft higher than the levels measured in screens 2 and 3, suggesting hydraulic separation between screen 1 and screens 2 and 3. Also of note is that the historical background data recorded in screen 1 showed no discernible response to municipal pumping in the area, consistent with hydraulic isolation from the main regional aquifer.
- Groundwater samples analyzed from well R-32 screen 1 during the pumping test passed the well screen analysis consisting of 21 criteria (Table 2.5-2) with scores ranging from 85.7% to 95.2% for 21 samples. This is within the range of previous samples subjected to the well screen analysis methodology.
- Well screen tests for seven criteria were not included in the updated analysis either because groundwater samples were not analyzed (acetone, TKN, and ammonia) or the tests were not applicable because of site conditions unrelated to drilling (nitrate, chloride, and sulfate). Chloride, nitrate(N), and sulfate are considered to be influenced by predrilling site conditions including

leachate migration from former sewage lagoons upgradient of R-32. Perchlorate was analyzed by using the IC method, which does not have a MDL less than the 0.001 ppm required for the well screen analysis. Perchlorate, therefore, was not included in the updated well screen analysis.

- Test criteria for iron and TOC were not applied to this well screen analysis due to contamination in the blank sample. The criteria for iron concentrations in nonfiltered samples and the iron ratio of nonfiltered to filtered samples relevant to potential well screen corrosion at R-32 screen 1 were not included in this analysis because of iron dissolution resulting from corrosion of the mild-steel discharge pipe used during groundwater sampling. It is likely that the oxidation-reduction (redox) couple, $Fe(OH)_3/Fe^{2+}$ is controlling ORP measurements taken at R-32 screen 1, which results from corrosion of the mild-steel discharge pipe and is not reflective of in situ redox conditions within the regional aquifer.
- Dissolved concentrations of manganese and zinc were higher in the final sample collected during the pumping test (Figure 2.5-4) in comparison to the Westbay sampling event.
- All planned activities were completed successfully except for the installation of the submersible pump, which will be installed when the custom-made Baski K-packer arrives.

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; the U.S. Environmental Protection Agency, 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.

Langmuir, D., 1997. *Aqueous Environmental Geochemistry*, Prentice Hall, Inc., Upper Saddle River, New Jersey. (Langmuir 1997, 056037)

LANL (Los Alamos National Laboratory), May 2007. "Groundwater Background Investigation Report, Revision 3," Los Alamos National Laboratory document LA-UR-07-2853, Los Alamos, New Mexico. (LANL 2007, 095817)

LANL (Los Alamos National Laboratory), May 2007. "Well Screen Analysis Report, Revision 2," Los Alamos National Laboratory document LA-UR-07-2852, Los Alamos, New Mexico. (LANL 2007, 096330)

LANL (Los Alamos National Laboratory), July 2007. "Work Plan for R-Well Rehabilitation and Replacement, Revision 2," Los Alamos National Laboratory document LA-UR-07-5087, Los Alamos, New Mexico. (LANL 2007, 098119)

NMED (New Mexico Environment Department), August 20, 2007. "Approval of the Workplan for R-Well Rehabilitation and Replacement, Revision 2," New Mexico Environment Department letter to D. Gregory (DOE LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED HWB), Santa Fe, New Mexico. (NMED 2007, 098182)

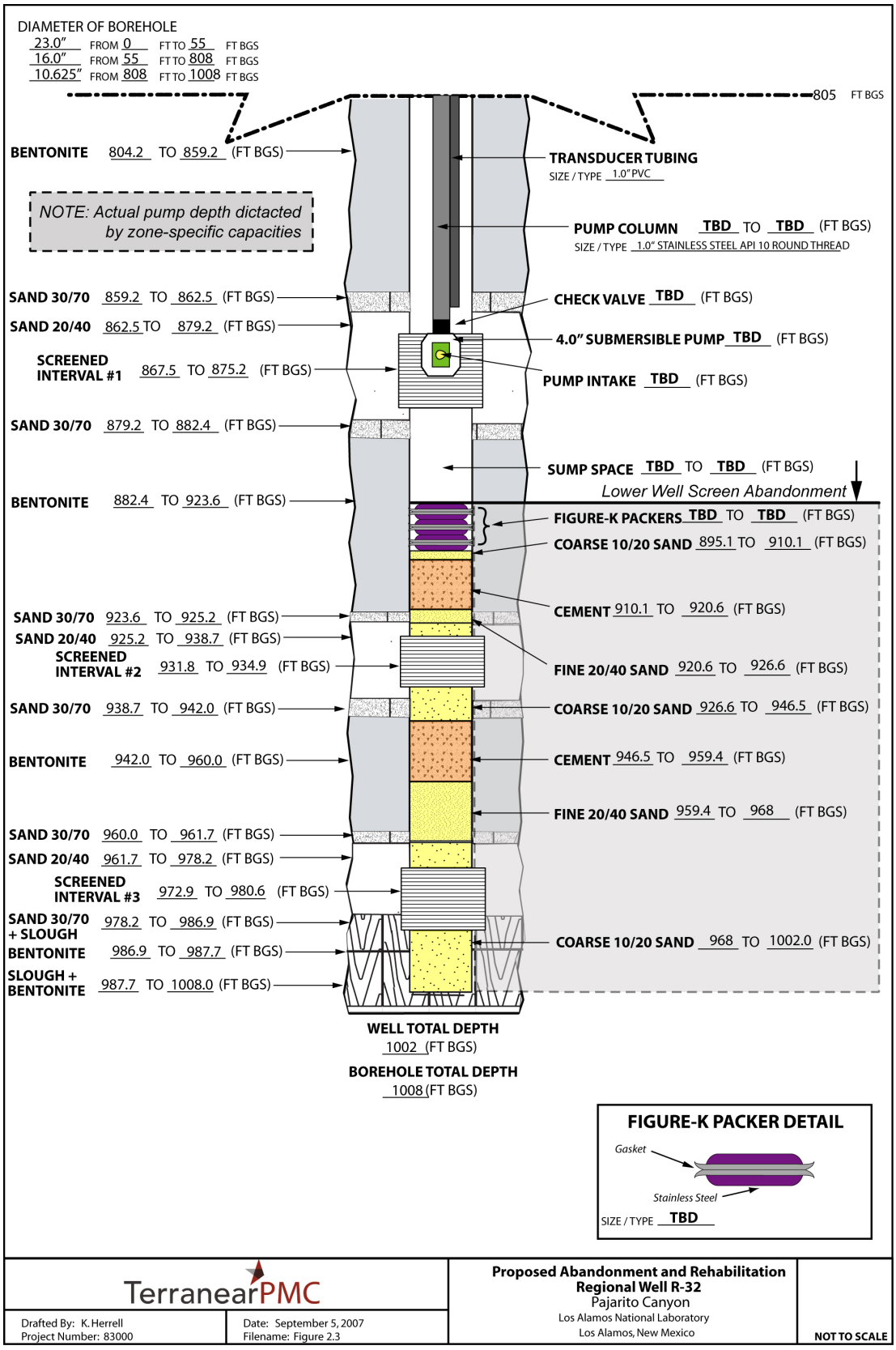


Figure 2.3-1 Well R-32 proposed rehabilitation and conversion configuration

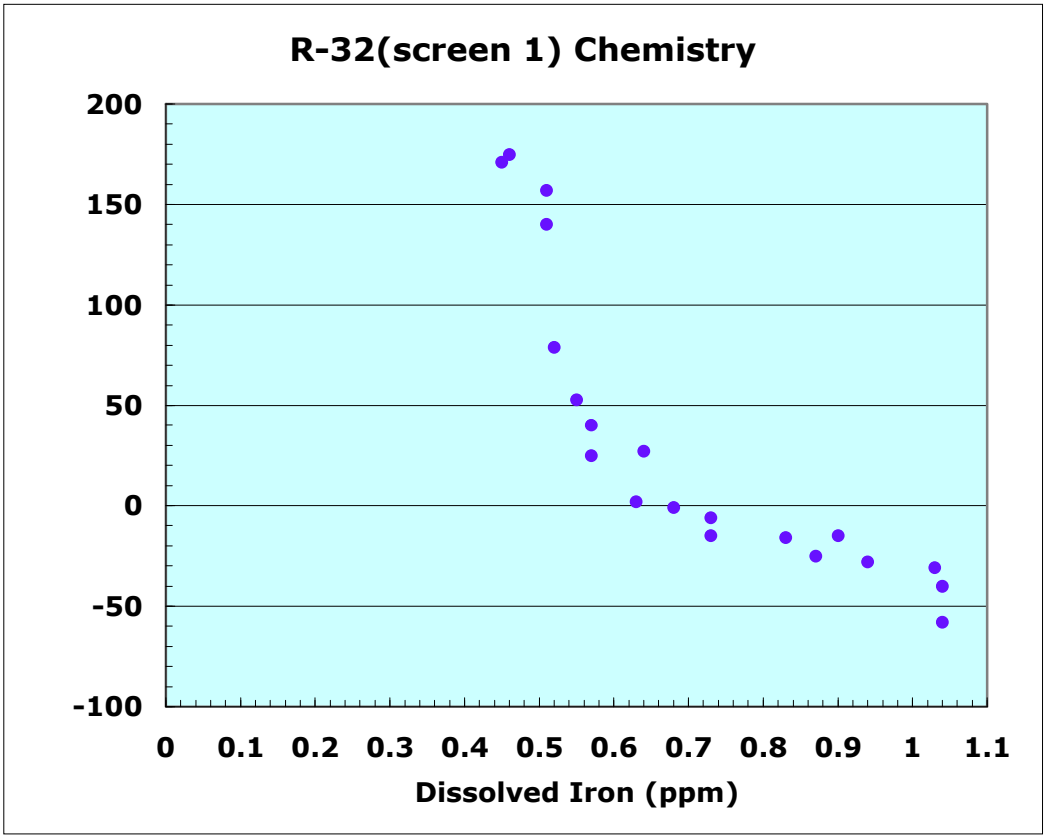


Figure 2.5-1 Concentrations of dissolved iron versus uncorrected ORP measurements taken at R-32 screen 1

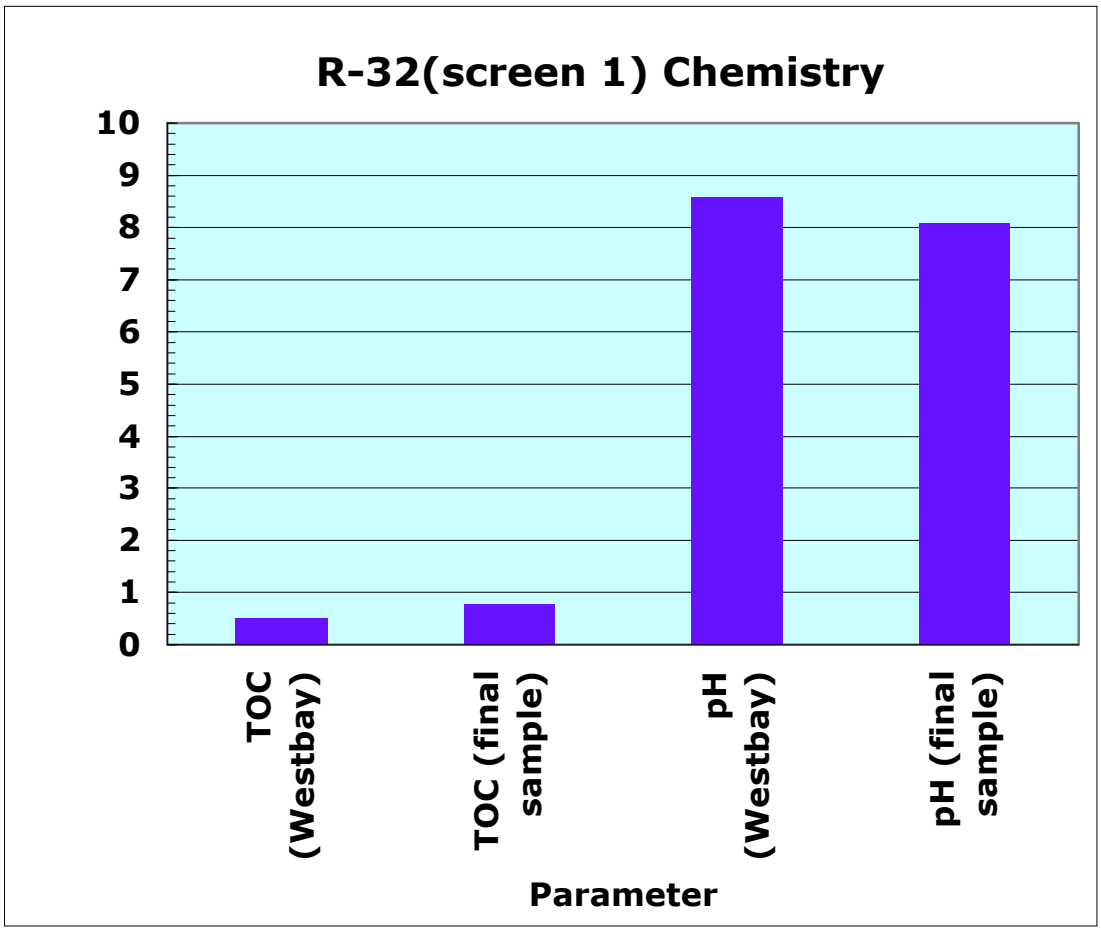


Figure 2.5-2 **Comparison of pH and TOC concentrations during sampling of R-32 screen 1 using Westbay equipment on December 13, 2006, and the pumping test conducted on October 9 through 11, 2007**

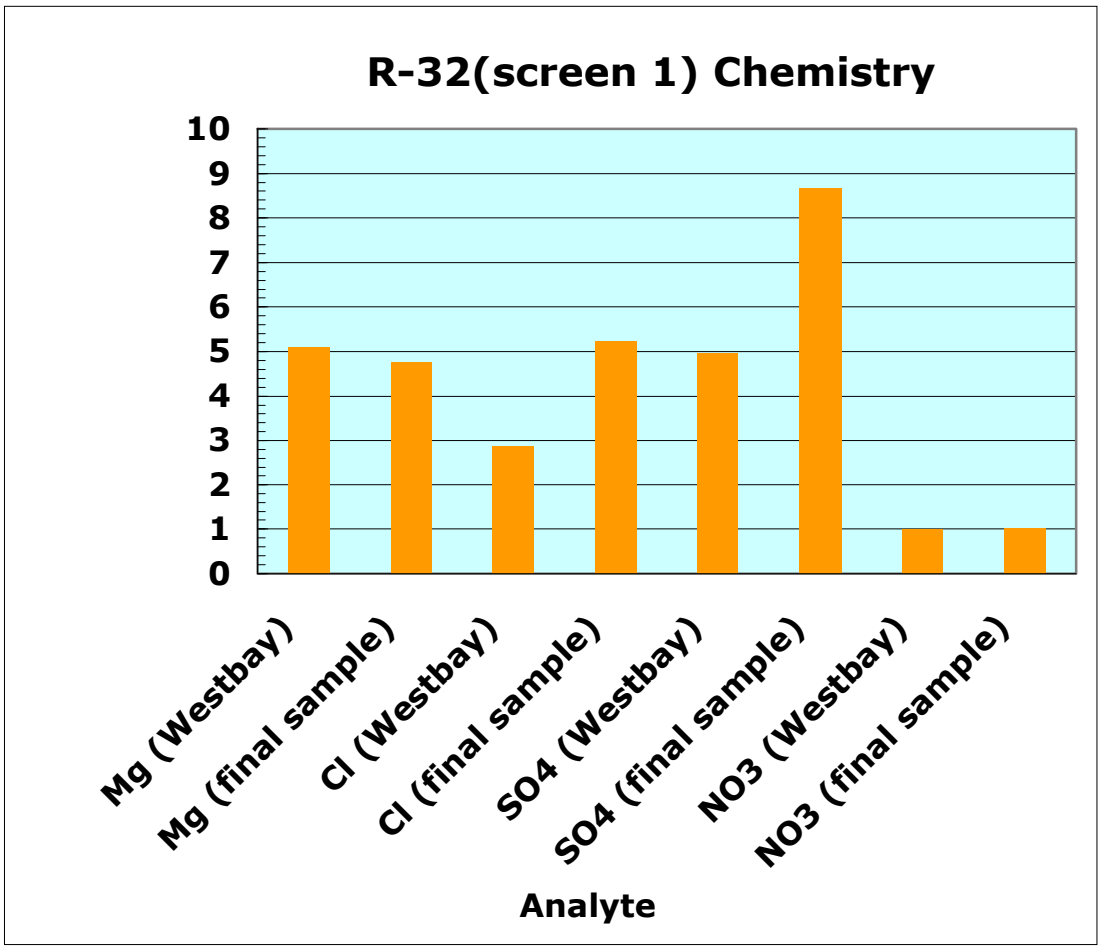


Figure 2.5-3 **Comparison of dissolved concentrations of magnesium (Mg), chloride (Cl), sulfate (SO_4), and nitrate (NO_3)-N during sampling of R-32 screen 1 using Westbay equipment on December 13, 2006, and the pumping test conducted on October 9 through 11, 2007**

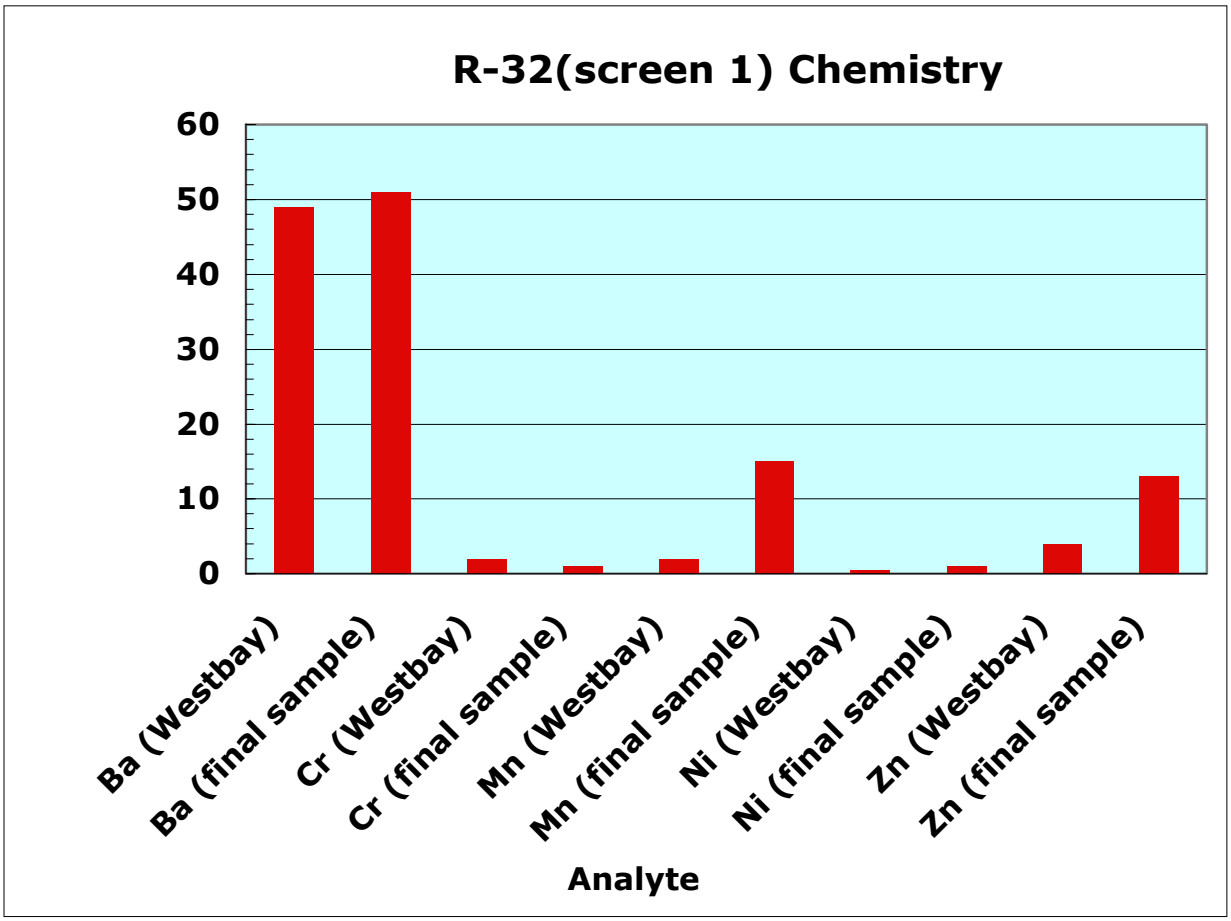


Figure 2.5-4 **Comparison of dissolved concentrations of barium (Ba), chromium (Cr), manganese (Mn), nickel (Ni), and zinc (Zn) during sampling of R-32 screen 1, using Westbay equipment, on December 13, 2006, and a pumping test conducted October 9 through 11, 2007**

Table 2.2-1
Video Log Data and Observations

	Depth to		Remarks
	Top	Bottom	
SWL	785 ft 5 in.	na*	Composite
Screen #1	867 ft 2 in.	874 ft 4 in.	Pipe-based; visibility excellent; screen interval very clean.
Screen #2	931 ft 5 in.	934 ft	Pipe-based; visibility good; screen interval very clean.
Screen #3	972 ft 3 in.	979 ft 4 in.	Pipe-based; visibility good; screen interval clean.
Total Depth	1000 ft 1 in.	na	Minor sediment in bottom of sump.

*na = Not available.

Table 2.4-1
R-32 Screen 1 Pumping Results

Date	Pumping Rate (gal./min)	Drawdown (ft)	Pumping Time (min)	Specific Capacity (gal./min/ft)
9/30/07	2.36	33.51	69	0.0704
9/30/2007	1.64	22.17	65	0.0740
9/30/2007	2.38	33.28	120	0.0715
10/9/2007	2.32	36.64	630	0.0633
10/10/2007	2.26	35.33	630	0.0640

Table 2.5-1
Field Parameters Measured at R-32 Screen 1 on October 9 and 11, 2007

Time (yr-mo-d-h)	pH (SU*)	Temperature (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	ORP (mV)
0710091100	8.04	20.8	167.0	1.34	1.16	+175
0710091105	8.14	20.8	166.5	1.16	0.89	+171
0710091110	8.16	20.9	165.9	1.25	0.43	+157
0710091115	8.18	21.0	165.8	1.25	0.80	+140
0710091120	8.19	21.2	165.6	1.08	0.68	+104
0710091125	8.20	20.8	165.2	1.24	0.74	+79
0710091135	8.19	20.8	165.1	1.25	0.75	+53
0710091145	8.18	21.7	165.8	1.19	0.69	+25
0710091155	8.19	21.8	164.5	1.21	0.77	+40
0710091225	8.16	22.8	163.3	1.22	0.67	+27
0710091255	8.15	23.0	163.1	1.25	0.65	+2
0710091325	8.14	23.2	162.5	1.29	0.81	-1
0710091355	8.12	23.0	163.5	1.25	0.73	-6
0710091425	8.11	23.2	162.4	1.24	0.79	-15
0710091455	8.09	23.1	162.1	1.33	0.75	-16
0710091530	8.08	22.9	161.4	1.39	1.80	-25
0710091600	8.08	22.6	162.1	1.27	0.79	-15
0710091630	8.07	22.1	161.6	1.35	0.73	-28
0710091700	8.07	21.7	161.5	1.36	0.75	-31
0710091730	8.06	21.1	162.0	1.35	1.01	-40
0710091800	8.05	20.8	162.3	1.37	0.88	-58
0710111255	7.86	22.5	168.6	1.44	0.81	-20
0710111305	8.07	22.5	167.1	1.41	0.77	-37

*SU = Standard unit.

Table 2.5-2
Summary of Test Results of the Well Screen Analysis for R-32 Screen 1

Test Criterion (with value)	Number of Passed Samples	Number of Failed Samples
pH (6.94–8.07)	21	0
Total Carbonate Alkalinity (<105 mg $CaCO_3$/L)	21	0
Turbidity (<5 NTU)	21	0
Total Organic Carbon	n/a*	n/a
Ba (F) (<70 μg/L)	21	0
Ca (F) (8.66–24.1 mg/L)	21	0
Cl (F) (<3.75 mg/L)	n/a	n/a
F (F) (<0.53 mg/L)	21	0
Mg (F) (<4.81 mg/L)	21	0
NO_3(N) (F) (>0.1 mg/L)	n/a	n/a
ORP (mV) (>0 mV)	11	10
DO (mg/L) (>2 mg/L)	0	21 (all samples)
ClO_4 (>0.17 μg/L)	n/a	n/a
PO_4(P) (F) (<0.3 mg/L)	21	0
Na (<28.55 mg/L)	21	0
SO_4 (F) (0.8–6.22 mg/L)	n/a	n/a
Total Sulfide (<0.01 mg/L)	21	0
Cr (F) (>1 μg/L)	21	0
Cr (NF) (<10 μg/L)	21	0
Cr Ratio (NF/F) (<5)	21	0
Fe (F) (<0.102 mg/L)	n/a	n/a
Mn (F) (<16 μg/L)	20	1
Mo (F) (<4 μg/L)	20	1
Ni (F) (<2 μg/L)	21	0
Sr (F) (44.88–179.8 μg/L)	21	0
U (F) (<0.2 μg/L)	21	0
Zn (F) (1.0–40.0 μg/L)	21	0

* n/a = Not applicable. Not applicable for total organic carbon due to predrilling site condition. Not applicable for ClO_4 because perchlorate was analyzed by ion chromatography at EES-6 with a method detection limit of 1 μg/L. Not applicable for iron because dissolved iron (ferrous iron) was detected in the equipment-deionized water blank at a concentration of 0.80 ppm or mg/L. (See the tables in Appendix C.) See text for discussion.

Appendix A

Westbay Retrieval Report

Schlumberger Water Services USA Inc.
2520 Venture Oaks Way, Suite 430
Sacramento, CA 95833
Tel: (916) 329-9199
Fax (916) 329-9191

Schlumberger
WATER SERVICES

October 15, 2007
WB777

Mr. Steven White
Terranear PMC, LLC
1911 Central Avenue, 2nd Floor,
Los Alamos, NM, 87544-2385
USA

Subject: Retrieval Report for Westbay System Well R-32 at Los Alamos National Laboratory

Dear Mr. White:

This report summarizes the work carried out by Westbay Instruments Inc. related to retrieval of the Westbay System casing components from LANL well R-32 near Los Alamos, NM. This work was carried out under Terranear PMC, LLC (TPMC) Task Order No. 001 dated September 7, 2007, under Subcontract Agreement No. 0001.

Westbay technical services representative Mr. Dave Larssen was on site for the retrieval tasks from September 13 to 19, 2007. The Westbay MP55 System completion previously installed in LANL well R-32 was successfully retrieved.

We look forward to working with you in the future. Please call if you have any questions or comments.

Yours truly,

Dave Larssen

Dave Larssen

Westbay Instruments Inc.

a Schlumberger Company

Encl.: Retrieval Report for Westbay System well: R-32

If there are any questions regarding this report, please cotact a Westbay specialist by e-mail at westbay@slb.com or by telephone at 1-800-663-8770.

Westbay Instruments Inc.
3480 Gilmore Way, Suite 110
Burnaby, BC V5G 4Y1
Canada
Tel. (604) 430-4272
Fax (604) 430-3538

Schlumberger
WATER SERVICES

RETRIEVAL REPORT

Westbay System Monitoring Well: R-32

Los Alamos, NM

Prepared for:

Terranear PMC
1911 Central Ave, 2nd Floor
Los Alamos, NM
87544-2385
USA

Prepared by:

Westbay Instruments Inc.
WB777

October 15, 2007

CONTENTS:

APPENDIX

1. Introduction

This report and the attached Appendix document the technical services carried out by Westbay Instruments Inc. under Terranear PMC, LLC (TPMC) Task Order No. 001 dated September 7, 2007, under Subcontract Agreement No. 0001. The Westbay MP55 System completion previously installed in LANL well R-32 was retrieved.

Westbay technical services representative Mr. Dave Larssen was on site for the retrieval tasks from September 13 to 19, 2007. The work was supervised by Mr. A. Crowder and Mr. S. White of TPMC. This report documents the retrieval tasks and related QA checks.

2. Westbay Casing Retrieval

The monitoring well had previously been installed as indicated below. The well installation was described in a Westbay Installation Report dated February 21, 2003.

(Note: all depths are with respect to ground surface. The monitoring well depth reference point was ground level as defined by a brass survey marker set in a concrete pad at the well.

Table 1, Summary of MP Well Installation

Monitoring Well No.	Installation Date	Westbay Casing Length (ft)	No. Screens	No. Packers	Open Hole Depth to Water (ft)
R-32	2003	998	3	9	Approx. 831 ft

The Westbay casing was retrieved according to the procedure described in the following sections.

2.1 Pre-Deflation Profile

A pre-deflation pressure profile was carried out at the well prior to deflating the packers to confirm the proper operation and position of measurement ports and to confirm the present water levels inside and outside the well. The data confirmed that the ports operated properly. The data for the pre-deflation profile are shown on Figure 1 in the Appendix and on the pre-deflation Field Data and Calculation Sheet.

Based on the information from this profile it was determined that the water level inside the Westbay System casing (about 831 ft) was below the water levels in the three (3) screened intervals (777.8 ft, 788.3 ft and 787.7 ft respectively). Therefore, the water level did not require adjustment before the procedure for deflation of the packers could begin.

2.2 Deflation of the Westbay Packers

The Westbay Model 0625 Packer Tool was deployed in the well on September 17, 2007. Drinking water purchased locally was used for operation of the packer deflation equipment. All of the packers in the well were successfully deflated. After deflation the packer valves were left in the Open

position. The field data for deflation of each packer are shown on the MP55 Packer Deflation Field Records and Packer Deflation graphs in the Appendix.

2.3 Retrieval of Westbay Casing Components

Prior to retrieval of the Westbay System a post-deflation profile of fluid levels was measured. The head differences observed across each packer in the pre-deflation profile (Figure 1 in the Appendix) were no longer present. The fluid pressure distribution was hydrostatic at an approximate depth of 782.5 ft below ground level, thus indicating that none of the packers were sealed inside the well.

The bottom Westbay Pumping Port at 978.5 ft depth was opened to allow the water levels inside and outside the Westbay casing to equilibrate.

The Westbay System casing was lifted from the well. The tensile load applied to the Westbay casing was measured by means of a load gauge provided by Westbay. The retrieved Westbay System items and the load during lifting were recorded on a Casing Retrieval Log. The maximum applied lifting load was 1550 lb, comparable to the maximum load during original installation of 1700 lb. A copy of the log is included in the Appendix.

All of the installed Westbay System casing components were successfully retrieved from the well. A list of the retrieved items is shown on the second page of the Casing Retrieval Log.

Each retrieved casing component was set aside on a rack. Plastic protective caps supplied by Westbay were put on each end for protection against damage during handling. Decontamination, cleaning, inspection, packaging and transport to LANL storage were to be done by others after de-mobilization of the Westbay representative from the site.

APPENDIX 1

Monitoring Well R-32

Casing Retrieval Log

Company: Los Alamos National Lab
Well: R32
Site: LANL
Project: Hydrogeology Study

Job No: WB777
Author: GG/DL

Well Information

Reference Datum: Ground Level
Elevation of Datum: 0.00 ft.
MP Casing Top: 0.00 ft.
MP Casing Length: 998.45 ft.

Borehole Depth: 1002.00 ft.
Borehole Inclination: vertical
Borehole Diameter: 5.00 in.

Well Description:
Plastic MP55
Other References:
Pipe-based wire-wrapped screens.
BF and screens after LANL 09/30/02
All depths from meas'd lengths

File Information

File Name: R32.WWD
Report Date: Wed Sep 12 16:54:58 2007

File Date: Jan 20 11:09:17 2003

Comments

Retrieval: monitor load, check tally sheet, check S/N's.
: Blue caps on both ends.
: No inspection, no removal of O-rings,
: No Decon.

Dave Larssen.
19 Sept 2007.

Log Information

Borehole condition confirmed.	(method)_____	Date: _____
MP well design & preparation.	By: _____	Date: _____
MP well design checked.	By: _____	Date: _____
MP well and borehole approved to install.	By: _____	Date: _____

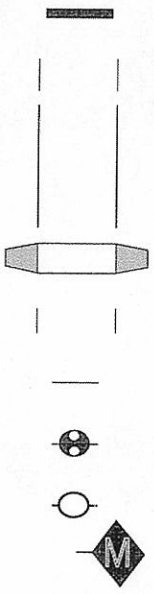
Casing Retrieval Log
Los Alamos National Lab

Job No: WB777
Well: R32

Legend

(Qty) MP Components

(Library - WD Library 7/27/00)



(2) 0603 - MP55 End Plug

(12) 0601M15 - MP55 Casing, 1.5 m, PVC

(90) 0601M30 - MP55 Casing, 3.0 m, PVC

(9) 0612 - MP55 Packer, Stiffened, SS

(3) 0601M10 - MP55 Casing, 1.0 m, PVC

(103) 0602 - MP55 Regular Coupling

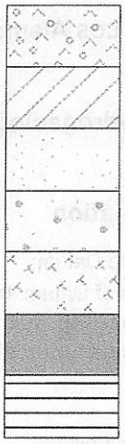
(11) 0605 - MP55 Measurement Port

(2) 0607 - MP55 Hydraulic Pumping Port

(6) 0608 - MP55 Magnetic Location Collar

Geology

Backfill/Casing



Concrete

Bentonite

Sand Fine

Sand Coarse

Native / Cave

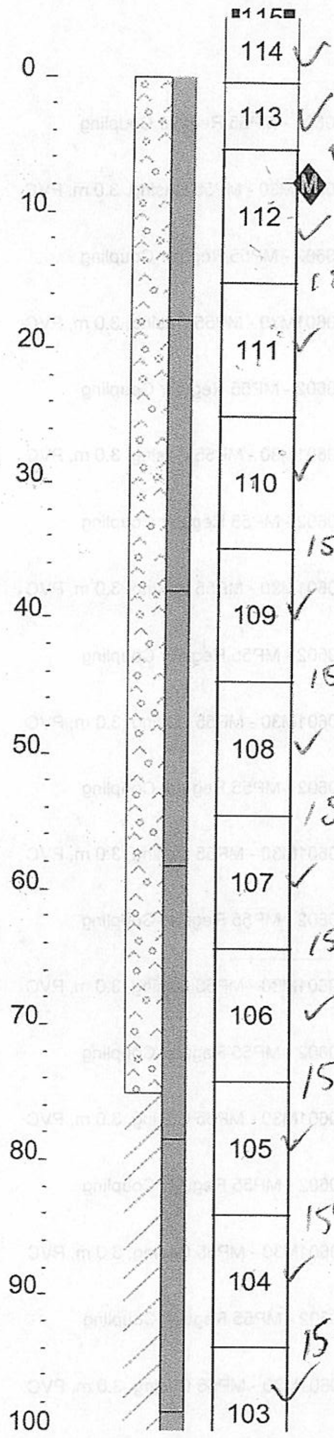
Stainless Steel

Well Screen

Casing Retrieval Log
Los Alamos National Lab

Job No: WB777
Well: R32

Scale Feet | Geology/ Fill | MP Casing | Comments



1520 hr start lifting Load = 1550 lb + TOP 55 Regular coupling

1550 lb

1550 lb

1550 lb

1550 lb.

1525 lb.

1525 lb

1540 lb

1540 lb

1550 lb

Retrieved OK	MP Casing Description
✓	0602 - MP55 Regular Coupling (x2)
✓	0601M15 - MP55 Casing, 1.5 m, PVC (x2)
✓	0602 - MP55 Regular Coupling
✓	0601M30 - MP55 Casing, 3.0 m, PVC
✓	0602 - MP55 Regular Coupling
✓	0601M30 - MP55 Casing, 3.0 m, PVC
✓	0602 - MP55 Regular Coupling
✓	0601M30 - MP55 Casing, 3.0 m, PVC
✓	0602 - MP55 Regular Coupling
✓	0601M30 - MP55 Casing, 3.0 m, PVC
✓	0602 - MP55 Regular Coupling
✓	0601M30 - MP55 Casing, 3.0 m, PVC
✓	0602 - MP55 Regular Coupling
✓	0601M30 - MP55 Casing, 3.0 m, PVC
✓	0602 - MP55 Regular Coupling
✓	0601M30 - MP55 Casing, 3.0 m, PVC
✓	0602 - MP55 Regular Coupling
✓	0601M30 - MP55 Casing, 3.0 m, PVC
✓	0602 - MP55 Regular Coupling
✓	0601M30 - MP55 Casing, 3.0 m, PVC
✓	0602 - MP55 Regular Coupling
✓	0601M30 - MP55 Casing, 3.0 m, PVC

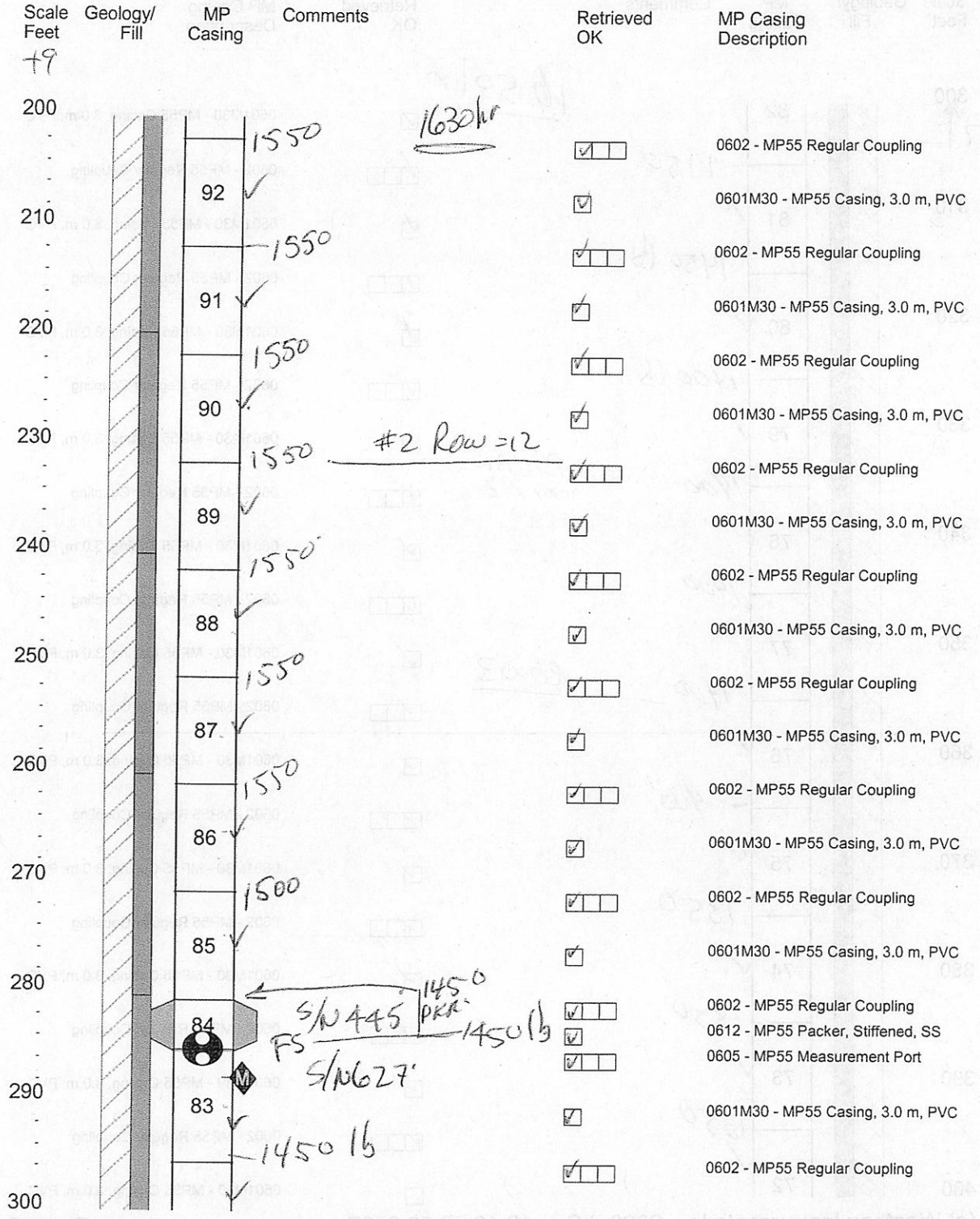
Casing Retrieval Log
Los Alamos National Lab

Job No: WB777
Well: R32

Scale Feet	Geology/ Fill	MP Casing	Comments	Retrieved OK	MP Casing Description
100			Broken lock wire. 1550 lb 1610 hr	☑	0602 - MP55 Regular Coupling
110		102 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			—1550 lb — FIRST ROW	☑	0602 - MP55 Regular Coupling
120		101 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			× ~~FIRST ROW [illegible] STACK.~~	☑	0602 - MP55 Regular Coupling
130		100 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1550'	☑	0602 - MP55 Regular Coupling
140		99 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1550	☑	0602 - MP55 Regular Coupling
150		98 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1550	☑	0602 - MP55 Regular Coupling
160		97 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1550'	☑	0602 - MP55 Regular Coupling
170		96 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1550	☑	0602 - MP55 Regular Coupling
180		95 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1550	☑	0602 - MP55 Regular Coupling
190		94 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1550	☑	0602 - MP55 Regular Coupling
200		93 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC

Casing Retrieval Log
Los Alamos National Lab

Job No: WB777
Well: R32



Casing Retrieval Log
Los Alamos National Lab

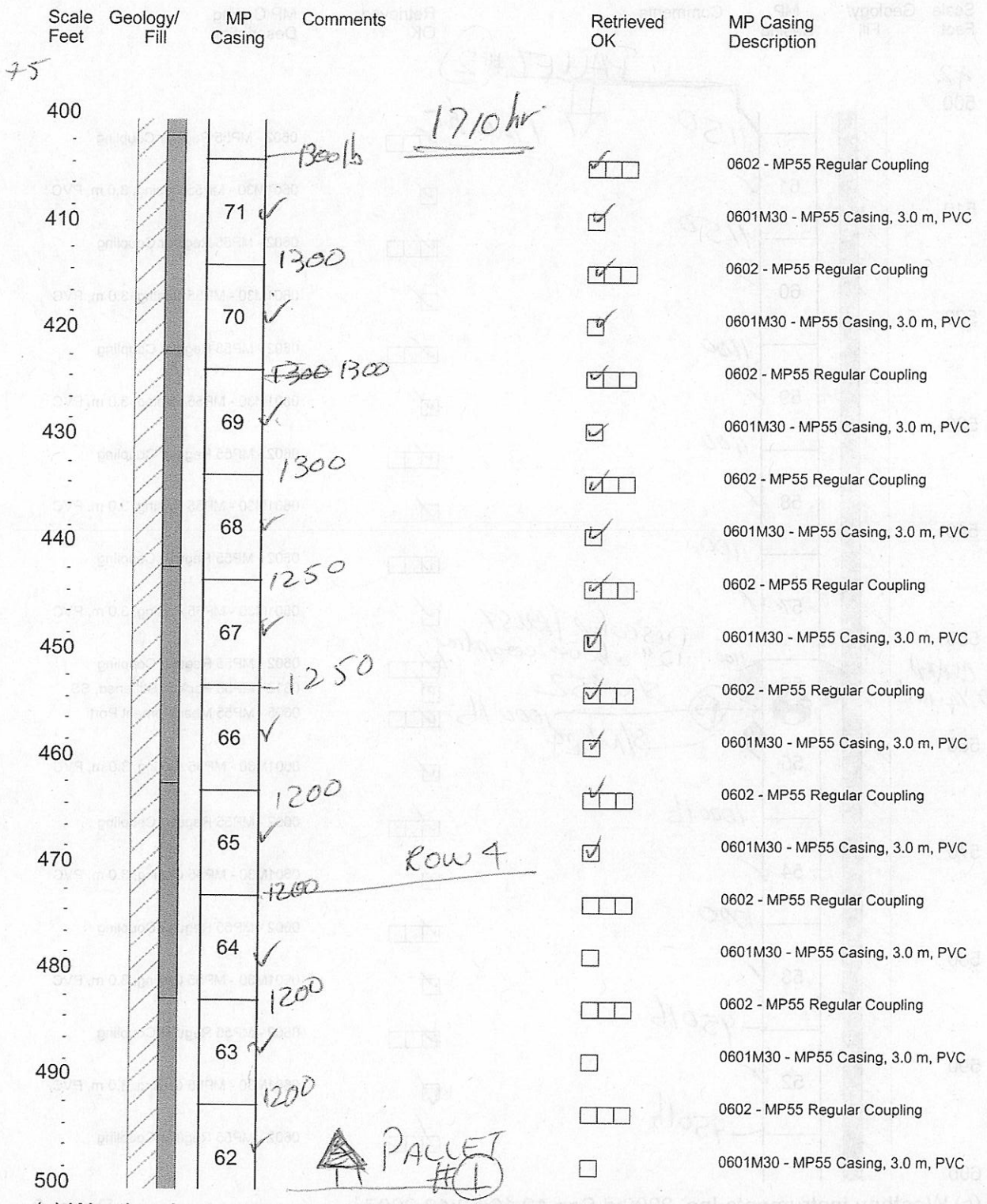
Job No: WB777
Well: R32

16 50hr

Scale Feet	Geology/ Fill	MP Casing	Comments	Retrieved OK	MP Casing Description
300 +7'		82		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1450	☑☐☐	0602 - MP55 Regular Coupling
310		81 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1450 lb	☑☐☐	0602 - MP55 Regular Coupling
320		80 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1400 lb	☑☐☐	0602 - MP55 Regular Coupling
330		79 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1400 BREAK TIME	☑☐☐	0602 - MP55 Regular Coupling
340		78 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1400	☑☐☐	0602 - MP55 Regular Coupling
350		77 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1400 Row 3	☑☐☐	0602 - MP55 Regular Coupling
360		76 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1400	☑☐☐	0602 - MP55 Regular Coupling
370		75 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1350	☑☐☐	0602 - MP55 Regular Coupling
380		74 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1350	☑☐☐	0602 - MP55 Regular Coupling
390		73 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
			1350 ✓	☑☐☐	0602 - MP55 Regular Coupling
400		72		☐	0601M30 - MP55 Casing, 3.0 m, PVC

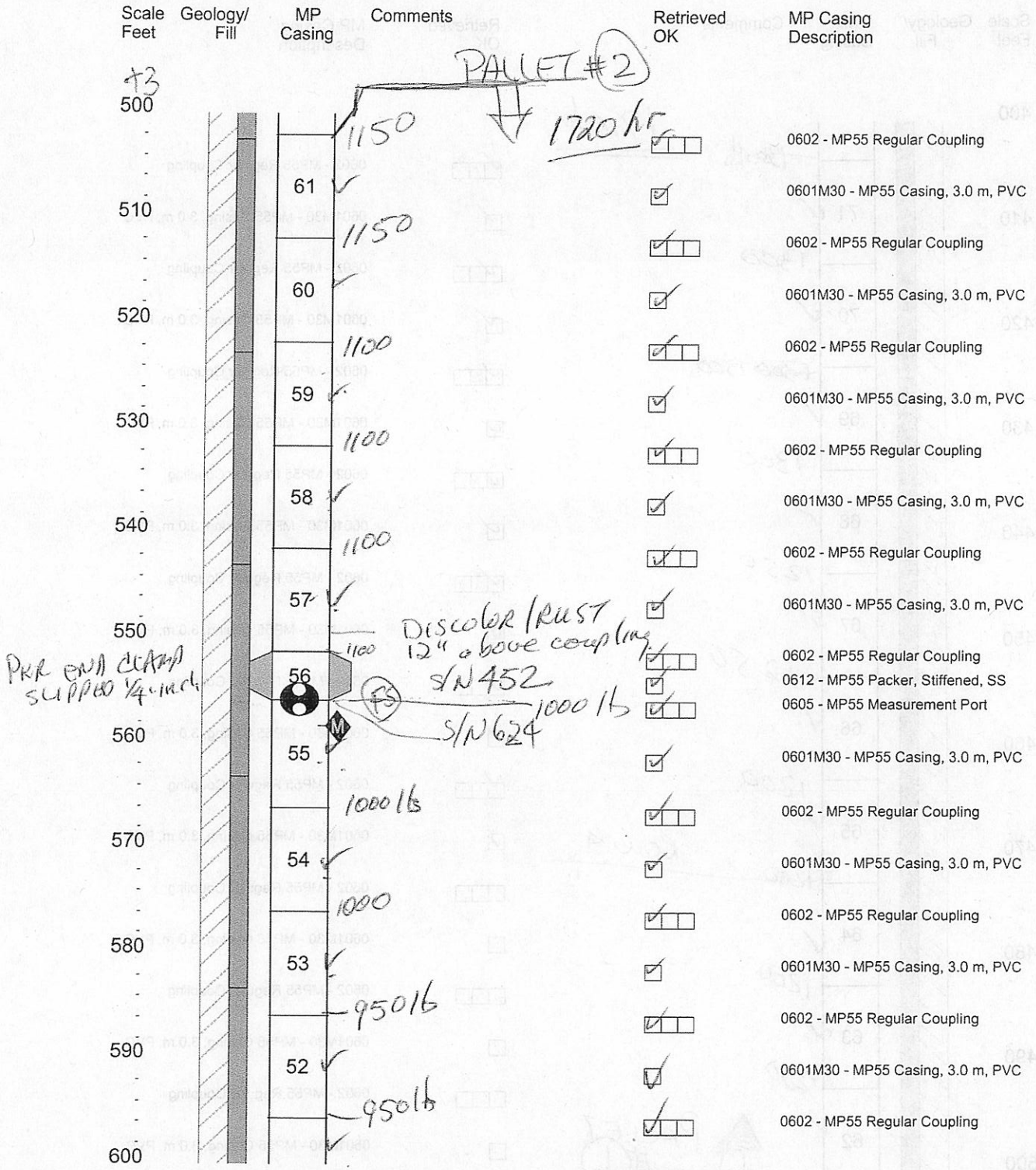
Casing Retrieval Log
Los Alamos National Lab

Job No: WB777
Well: R32



Casing Retrieval Log
Los Alamos National Lab

Job No: WB777
Well: R32



Casing Retrieval Log
Los Alamos National Lab

Job No: WB777
Well: R32

Scale Feet	MP Casing	Comments	Retrieved OK	MP Casing Description
+10		1745 hr		
600	51	✓ (+10)	✓	0601M30 - MP55 Casing, 3.0 m, PVC
		950 lb	✓	0602 - MP55 Regular Coupling
610	50	✓	✓	0601M30 - MP55 Casing, 3.0 m, PVC
		900 lb	✓	0602 - MP55 Regular Coupling
620	49	✓	✓	0601M30 - MP55 Casing, 3.0 m, PVC
		900 lb Row #1	✓	0602 - MP55 Regular Coupling
630	48	✓	✓	0601M30 - MP55 Casing, 3.0 m, PVC
		850 lb	✓	0602 - MP55 Regular Coupling
640	47	✓	✓	0601M30 - MP55 Casing, 3.0 m, PVC
		850 lb	✓	0602 - MP55 Regular Coupling
650	46	✓	✓	0601M30 - MP55 Casing, 3.0 m, PVC
		850 lb	✓	0602 - MP55 Regular Coupling
660	45	✓	✓	0601M30 - MP55 Casing, 3.0 m, PVC
		850 lb	✓	0602 - MP55 Regular Coupling
670	44	✓	✓	0601M30 - MP55 Casing, 3.0 m, PVC
		800 lb	✓	0602 - MP55 Regular Coupling
680	43	✓	✓	0601M30 - MP55 Casing, 3.0 m, PVC
		800 lb	✓	0602 - MP55 Regular Coupling
690	42	✓	✓	0601M30 - MP55 Casing, 3.0 m, PVC
		800	✓	0602 - MP55 Regular Coupling
700	41	✓	☐	0601M30 - MP55 Casing, 3.0 m, PVC

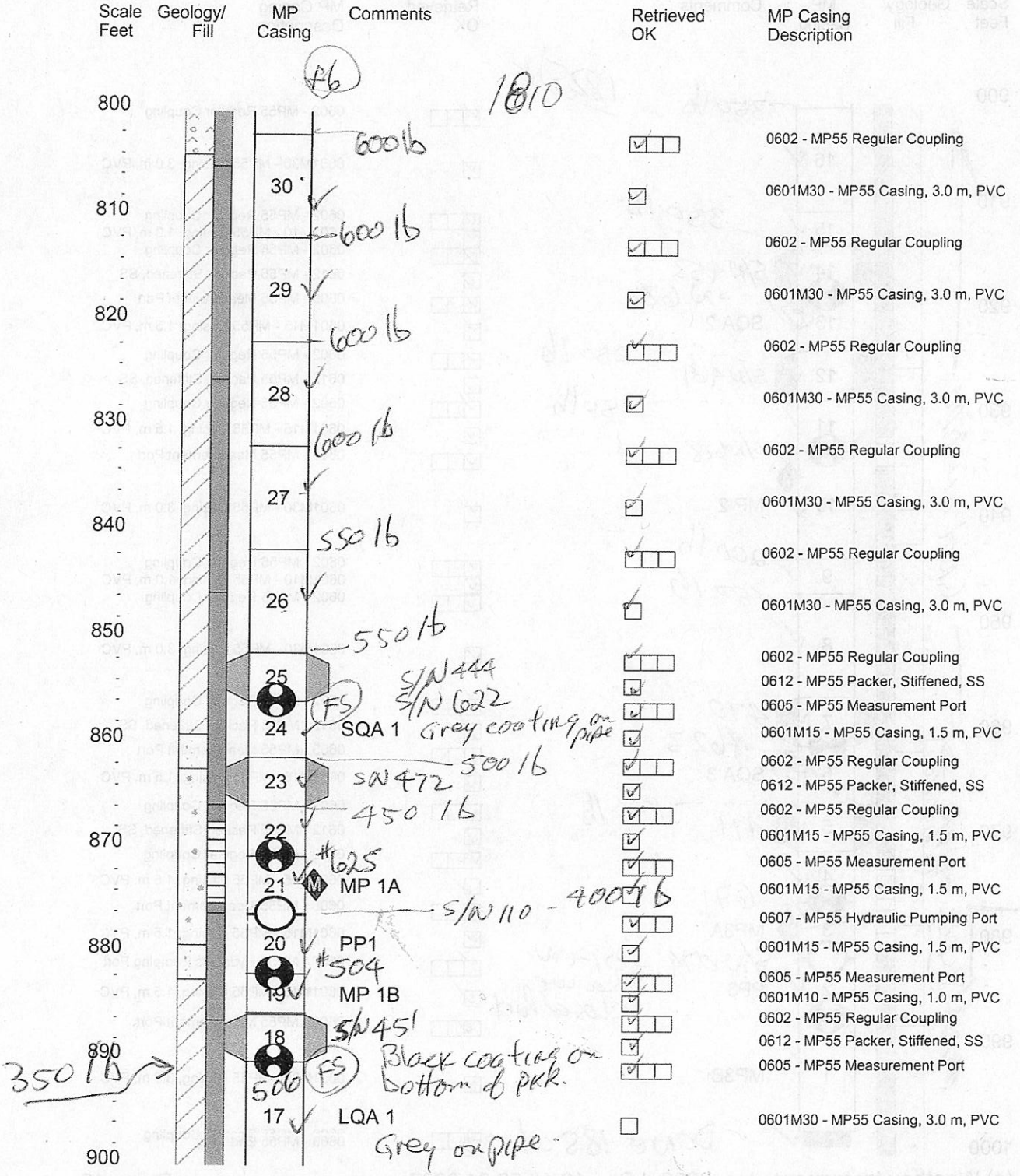
Casing Retrieval Log
Los Alamos National Lab

Job No: WB777
Well: R32

Scale Feet	MP Casing	Comments	Retrieved OK	MP Casing Description
700	(48)			
		800 lb	☑	0602 - MP55 Regular Coupling
710	40 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
		750 lb	☑	0602 - MP55 Regular Coupling
720	39 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
		750 lb 1800 hr	☑	0602 - MP55 Regular Coupling
730	38 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
		750 Rods (8)	☑	0602 - MP55 Regular Coupling
740	37 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
		750 ↑ Row (2)	☑	0602 - MP55 Regular Coupling
750	36 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
		700 lb	☑	0602 - MP55 Regular Coupling
760	35 ✓		☑	0601M30 - MP55 Casing, 3.0 m, PVC
		700 lb	☑	0602 - MP55 Regular Coupling
770	34 ✓		☐	0601M30 - MP55 Casing, 3.0 m, PVC
		700 lb RUSTY RING	☐	0602 - MP55 Regular Coupling
780	33 ✓	2ft down from top	☐	0601M30 - MP55 Casing, 3.0 m, PVC
		650 lb	☐	0602 - MP55 Regular Coupling
790	32 ✓	Gritty joint.	☐	0601M30 - MP55 Casing, 3.0 m, PVC
		650 lb	☐	0602 - MP55 Regular Coupling
800	31		☐	0601M30 - MP55 Casing, 3.0 m, PVC

Casing Retrieval Log
Los Alamos National Lab

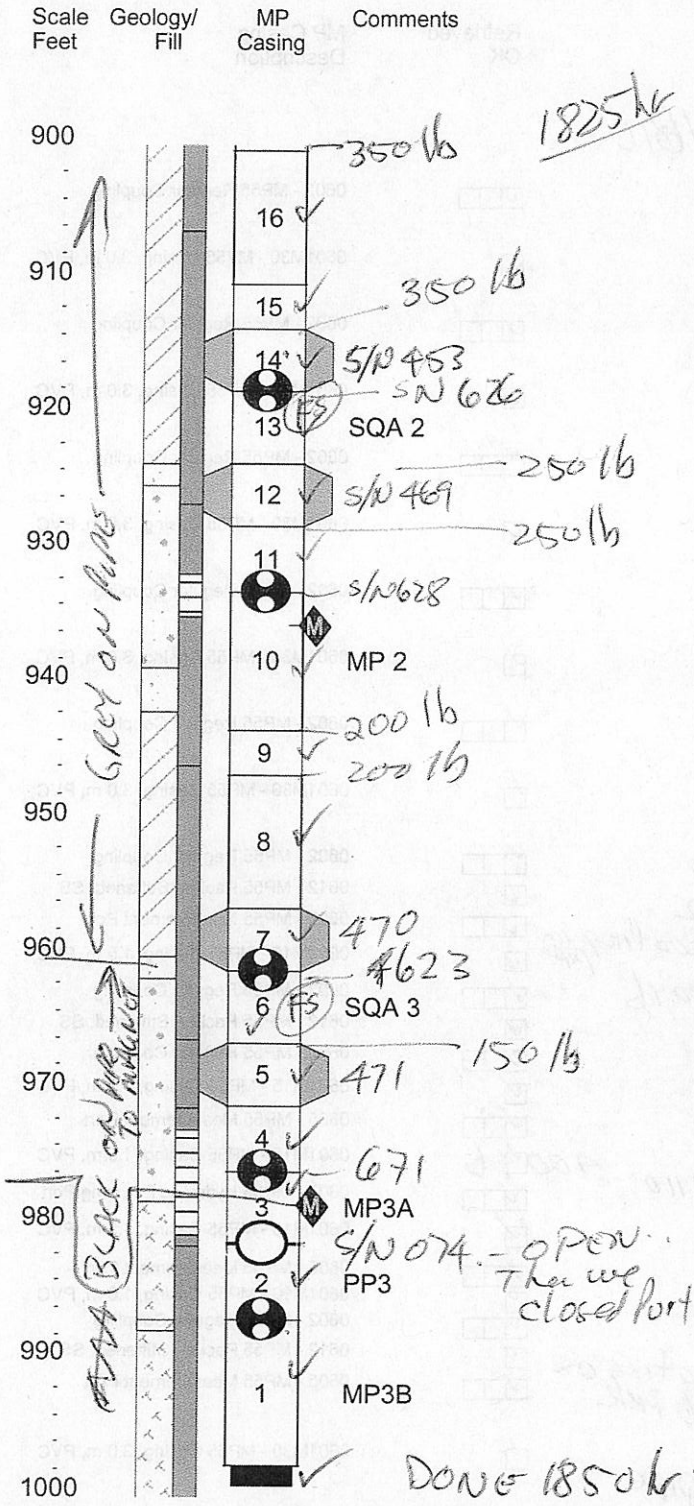
Job No: WB777
Well: R32



 Printed Wed Sep 12 16:53:14 2007

Casing Retrieval Log
Los Alamos National Lab

Job No: WB777
Well: R32

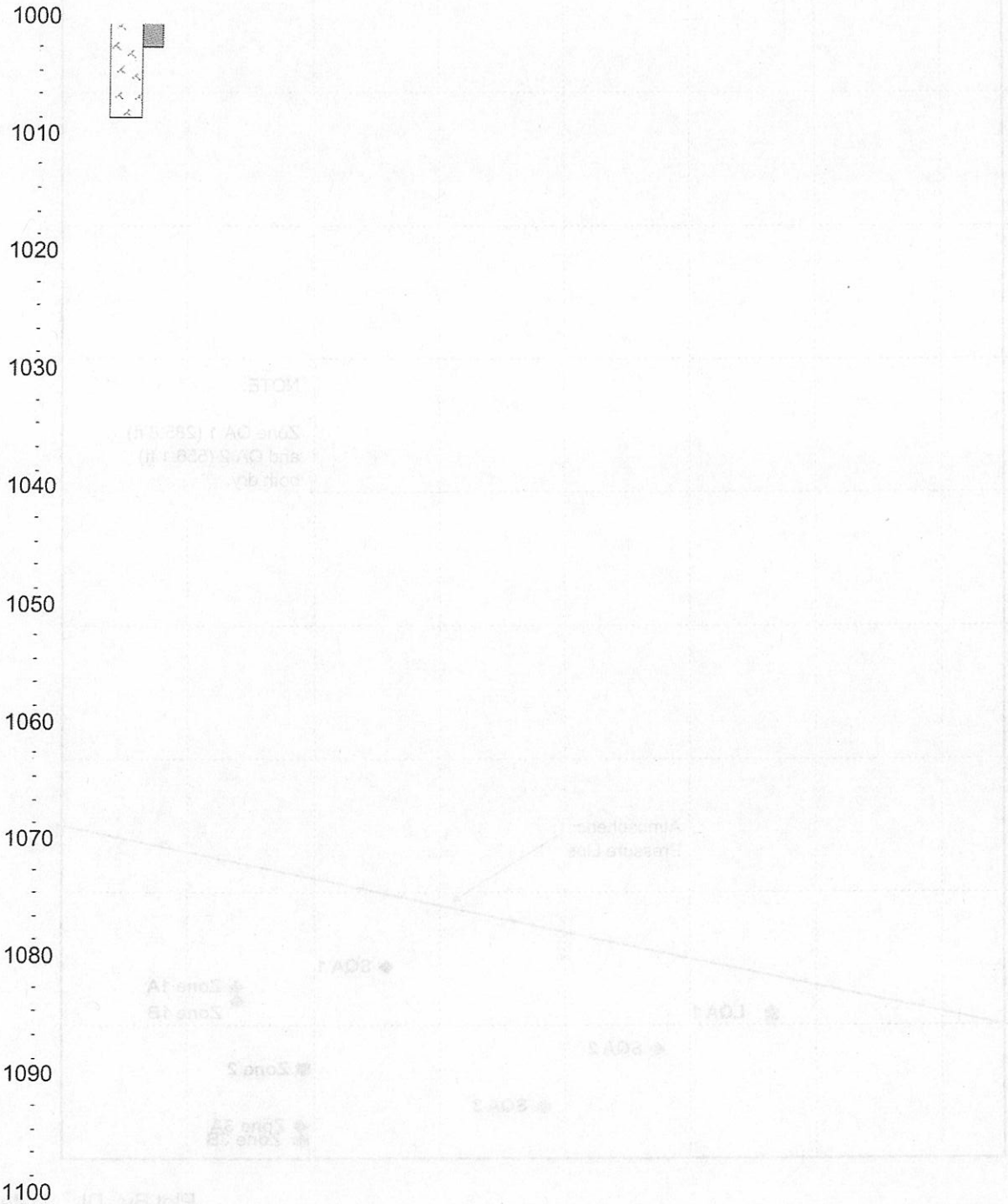


 Printed Sep 12 16:53:21 2007

Note Black/grey on pipe, but not on ports
Ports remain white.

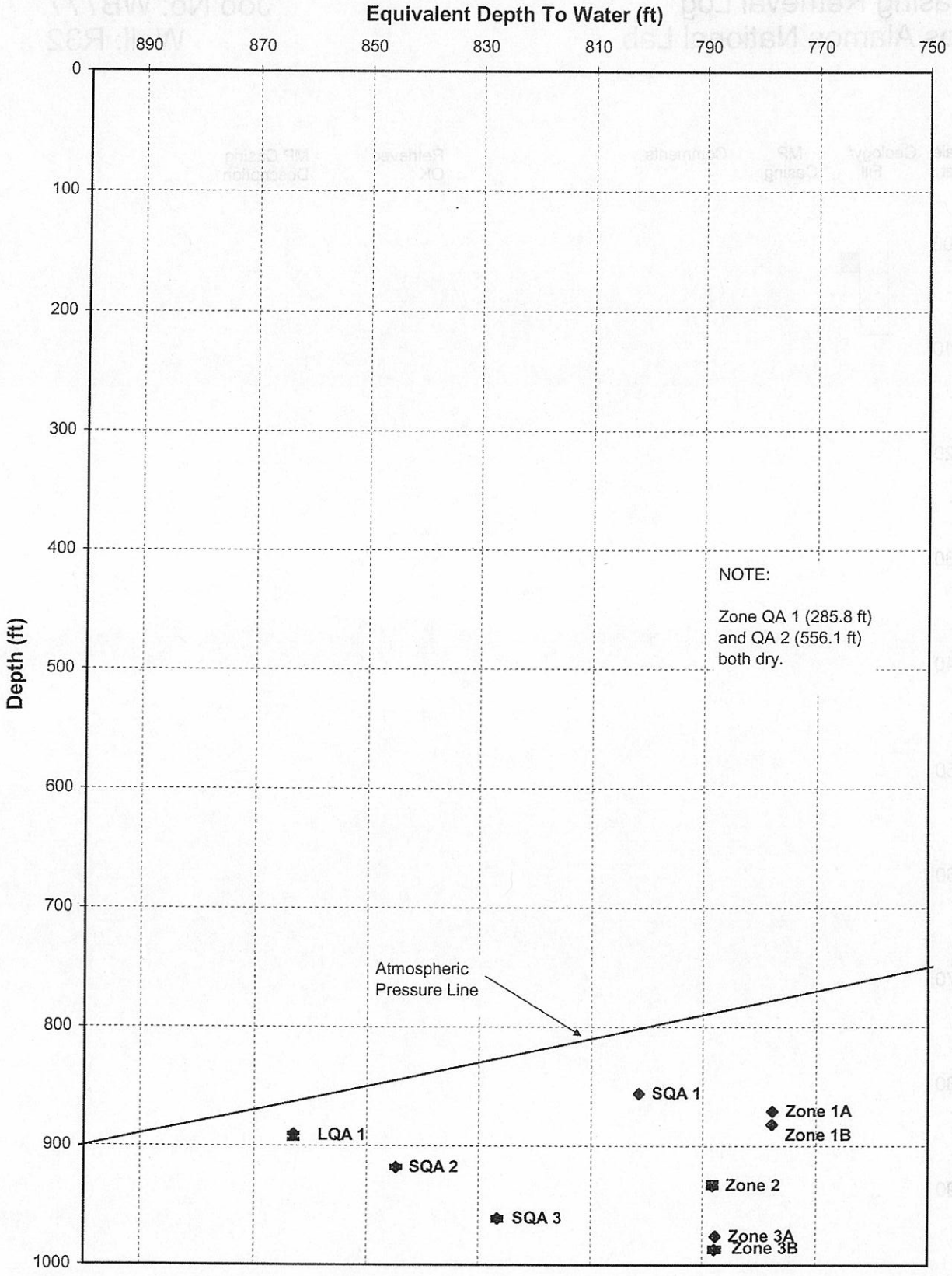
Casing Retrieval Log
Los Alamos National Lab

Job No: WB777
Well: R32



Piezometric Profile:
Monitoring Well: R-32

Profile Date:September 17, 2007
Comments:Pre-Deflation



Client:TPMC
Site: Los Alamos NM
Datum:Ground Surface

Figure 1

Plot By: DL Date: 25/09/07
Checked By:____Date:____
Westbay Project:WB 777
Piezometric Pressures--WB777 - R32.xls

Westbay Instruments Inc.
A Schlumberger Company

Piezometric Pressures/Levels
Field Data and Calculation Sheet

Datum: GL | Probe Type: EMS | Client: Terranear PMC | Date: 17 Sept 2007
Elev. G.S.: | Serial No.: 1764 | Job No.: WB777 | Well No.: R32
Height of MP above G.S.: 3.29 ft. | Probe Range: 0 to 2000 | Location: Los Alamos NM
Elev. top of MP Casing: | Weather: Overcast | MP Casing Type: MP55
Reference Elevation: Survey Pin in concrete pad | Atm. Pressure: 11.28psi/20.1°C | Operator: DL
Ambient Reading (Patm) (Pressure, Temperature, time) Start: 0940hr | Finish: 1114hr/11.28psi/17.80°C

Port No.	Port Depth From Log (ft)	Port Depth From Cable (ft)	Port Elev. ( )	Fluid Pressure Readings: Inside Casing (P1)	Outside Casing (P2)	Inside Casing (P1)	Temp. (C)	Time H:M:S	Pressure Head Outside Port (psi ft) H = (P2-Patm)/w	Piez. Level Outside Port ( ) Dz = Dp - H	Comments
3B	987.1	987.2		79.00	97.62		21.21	1006			
					97.65	78.99	21.23	1007		787.9	DTW 830.9
3A	976.0	976.1		74.24	92.89		21.28	1012	188.3	787.7	
					92.90	74.24	21.27	1013			
SQA3	961.1	961.2		67.79	69.62		—	1017	134.6	826.5	
					69.59	67.80	21.22	1018			
2	933.1	933.2		55.63	74.05		—	1021	144.8	788.3	
					74.08	55.63	20.99	1027			
SQA2	918.2	918.3		49.12	43.15		20.94	1029	73.5	844.7	
					43.13	49.16	20.88	1030			
LQA1	890.3	890.4		36.98	23.15		20.74	1033	27.4	862.9	
					23.10	36.97	20.68	1034			
1B	881.9	882.1		33.38	56.40		20.59	1036	104.1	777.8	
					56.40	33.40	20.55	1037			

Westbay Instruments Inc.
A Schlumberger Company

Piezometric Pressures/Levels
Field Data and Calculation Sheet

Datum: _____ Probe Type: _____ Client: _____ Date: 17 SEPT 2007

Elev. G.S.: _____ Serial No.: _____ Job No.: _____ Well No.: R32

Height of MP above G.S.: _____ Probe Range: 0 to _____ Location: _____

Elev. top of MP Casing: _____ Weather: _____ MP Casing Type: _____

Reference Elevation: _____ Atm. Pressure: _____ Operator: DL

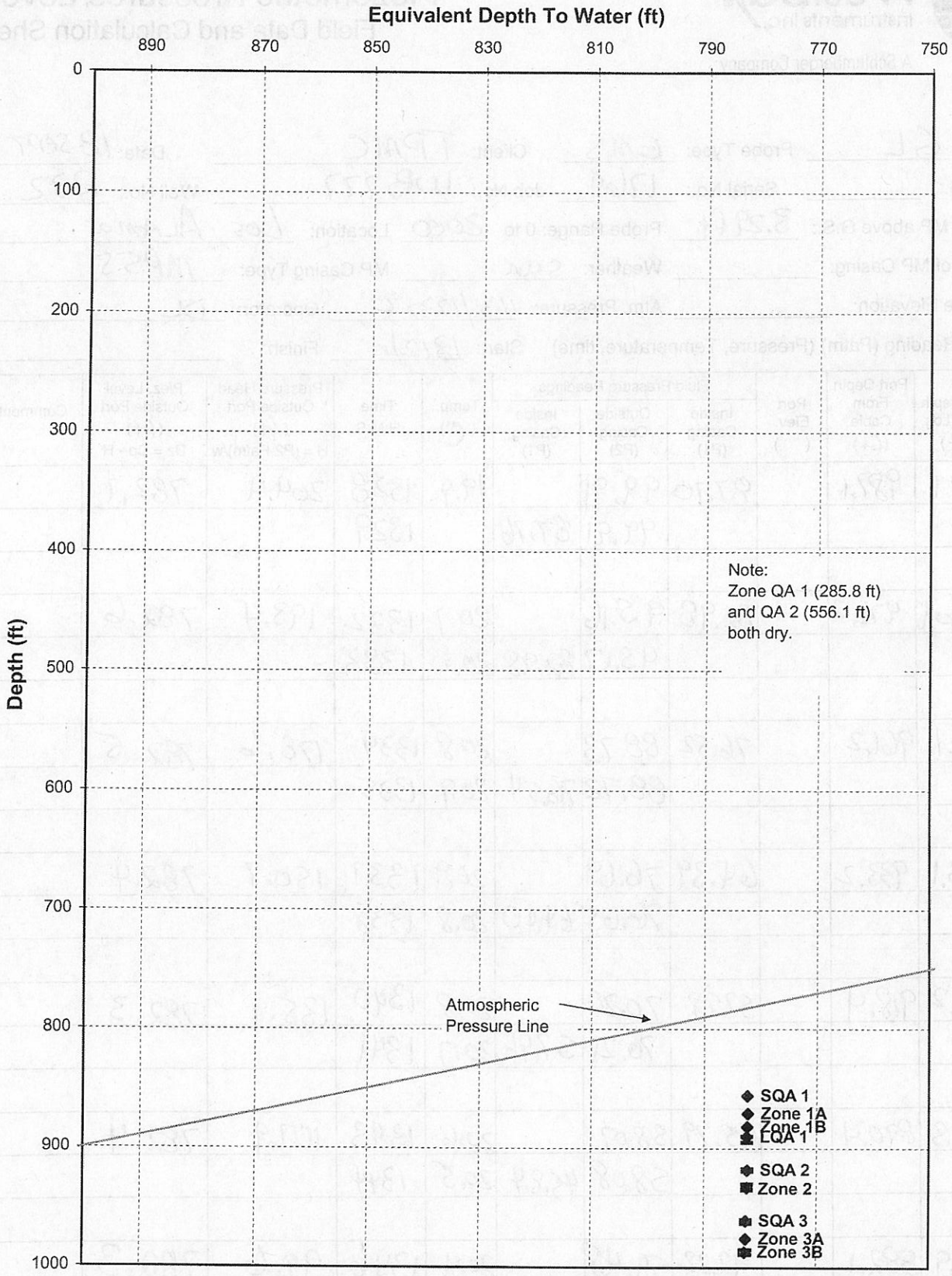
Ambient Reading (Patm) (Pressure, Temperature, time) Start: _____ Finish: _____

Port No.	Port Depth From Log (ft)	Port Depth From Cable (ft)	Port Elev. ( )	Fluid Pressure Readings: Inside Casing (P1)	Outside Casing (P2)	Inside Casing (P1)	Temp. (C)	Time H:M:S	Pressure Head Outside Port (ft) H = (P2-Patm)/w	Piez. Level Outside Port (ft) Dz = Dp - H	Comments
1A	870.9	871.1		~~33.40~~							
				28.62	51.67		20.46	1040	93.19	777.7	
					51.67	28.63	20.43	1041			
SGA1	856.1	856.3		22.14	34.95		20.35	1043	54.6	801.5	
					34.99	22.15	20.31	1044			
GA2	556.1	556.3		11.5	11.44		19.81	1052			
					11.43	11.52	19.63	1053			
GA1	285.8	285.9		11.37	11.40		18.37	1109			
					11.40	11.37	—	1110			
0	ATMOS			11.28			17.80	1114 hr			

25/05/00 WHB

Piezometric Profile
Monitoring Well: R-32

Profile Date:September 18, 2007
Comments:Post-Deflation Profile



Client:Shell Frontier Oil Gas
Site:Colorado
Datum:Ground Surface

Figure 2

Plot By: DL Date: 25/09/07
Checked By:____ Date:____
Westbay Project:WB 849
Piezometric Pressures--WB777 - R32.xls

Westbay Instruments Inc.
A Schlumberger Company

Piezometric Pressures/Levels
Field Data and Calculation Sheet

Datum: GL | Probe Type: EMS | Client: TPMC | Date: 18 SEPT 07
Elev. G.S.: | Serial No.: 1764 | Job No.: WB777 | Well No.: R32
Height of MP above G.S.: 3.29 ft | Probe Range: 0 to 2000 | Location: Los Alamos
Elev. top of MP Casing: | Weather: sun | MP Casing Type: MP55
Reference Elevation: | Atm. Pressure: 11.3/17.3 °C | Operator: DL
Ambient Reading (Patm) (Pressure, Temperature, time) Start: 1312hr | Finish:

Port No.	Port Depth From Log (Ft)	Port Depth From Cable (Ft)	Port Elev. ( )	Fluid Pressure Readings: Inside Casing (P1)	Outside Casing (P2)	Inside Casing (P1)	Temp. (°C)	Time H:M:S	Pressure Head Outside Port (Ft) H = (P2-Patm)/w	Piez. Level Outside Port (Ft) Dz = Dp - H	Comments
3B	987.1	987.1		87.70	99.91		19.9	1328	204.4	782.7	
					99.91	87.76		1329			
3A	976.0	976.0		82.98	95.16		20.7	1332	193.4	782.6	
					95.17	82.98	20.8	1333			
SQA3	961.1	961.2		76.52	88.73		20.8	1334	178.6	782.5	
					88.72	76.54	20.9	1335			
2	933.1	933.2		64.39	76.64		20.9	1337	150.7	782.4	
					76.65	64.40	20.8	1338			
SQA2	918.2	918.4		57.98	70.20		20.8	1340	135.9	782.3	
					70.21	57.96	20.7	1341			
LQA1	890.3	890.4		45.79	58.07		20.6	1343	107.9	782.4	
					58.08	45.84	20.5	1344			
1B	881.9	882.1		42.22	54.48		20.4	1346	99.6	782.3	
					54.45	42.23	20.4	1347			

Westbay Instruments Inc.
A Schlumberger Company

Piezometric Pressures/Levels
Field Data and Calculation Sheet

Datum: _____ Probe Type: _____ Client: TPMC Date: 19 SEPT 2007

Elev. G.S.: _____ Serial No.: _____ Job No.: WB777 Well No.: R32

Height of MP above G.S.: _____ Probe Range: 0 to _____ Location: _____

Elev. top of MP Casing: _____ Weather: _____ MP Casing Type: _____

Reference Elevation: _____ Atm. Pressure: _____ Operator: DL

Ambient Reading (Patm) (Pressure, Temperature, time) Start: _____ Finish: _____

Port No.	Port Depth From Log (ft)	Port Depth From Cable (ft)	Port Elev. ( )	Fluid Pressure Readings: Inside Casing (P1)	Fluid Pressure Readings: Outside Casing (P2)	Fluid Pressure Readings: Inside Casing (P1)	Temp. (C)	Time H:M:S	Pressure Head Outside Port (ft) H = (P2-Patm)/w	Piez. Level Outside Port (ft) Dz = Dp - H	Comments
1A	870.9	871.1		32.45	49.74		20.3	1349	88.7	782.2	
					49.74	37.46	20.3	1350			
SQA1	856.1	856.2		30.94	43.26		20.3	1352	73.7	782.4	
					43.29		20.2	1353			
QA2	556.1	556.2		~~31.00~~			~~20.2~~	~~1354~~			
				11.56	11.56		19.8	1401			
					11.54	11.54	19.7	1402			
QA1	285.8	285.7		11.42	11.46		18.7	1411			
					11.46	11.44	18.5	1412			
0	ATMOS			11.29			17.2	1424			

Schlumberger WATER SERVICES

MP55 Packer Inflation Field Record

Project: WB777	Client: Terranear	By: DL	Date: 17 Sept 2007
Location: Los Alamos	Well No. R-32	Borehole Diameter: 4.5 inch	
Packer No. BT-1	Depth: 0	Computer Data File: R32R_BT1 .WDF	
Inf-Tool No. 2321	Vent Tool No. 1764	Volume Pumped: _____	Vol Returned _____
H-B Valve: (P_H) 380	Offset (P_V). -0-	Confirm Venting (Vent Tool Data) (Y/N) _____	
Vent Tool Pressure (Shoe Out, P_O) _____		Final Inf'n Vol: _____	Final Press: _____ (P_F)
Comments: _____		Calc'd Element Pressure ($P_F + P_V - P_O$) _____	
		Confirm Pkr Valve Closed (Yes/No): _____	

Software Reminder
I = Inflate, O = Off, C = Close

Pumping Information

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
3.6	0	11.57	11.25	1352		Start recording
3.6	0	12.5	11.24	1353		SHOE OUT
						Pump to 700
4.2	710	12.6	11.24	1354:30	1	TUB → INF
						Check for leaks
4.2	710	434	11.24	1359	2	No leaks, TUB → C
4.2	710	11.6	11.2	1400		No leaks
4.2	210	11.6	11.2	1404	3	VENT UNO, SHOE IN
3.7	0	11.6	11.2	1408	4	END.

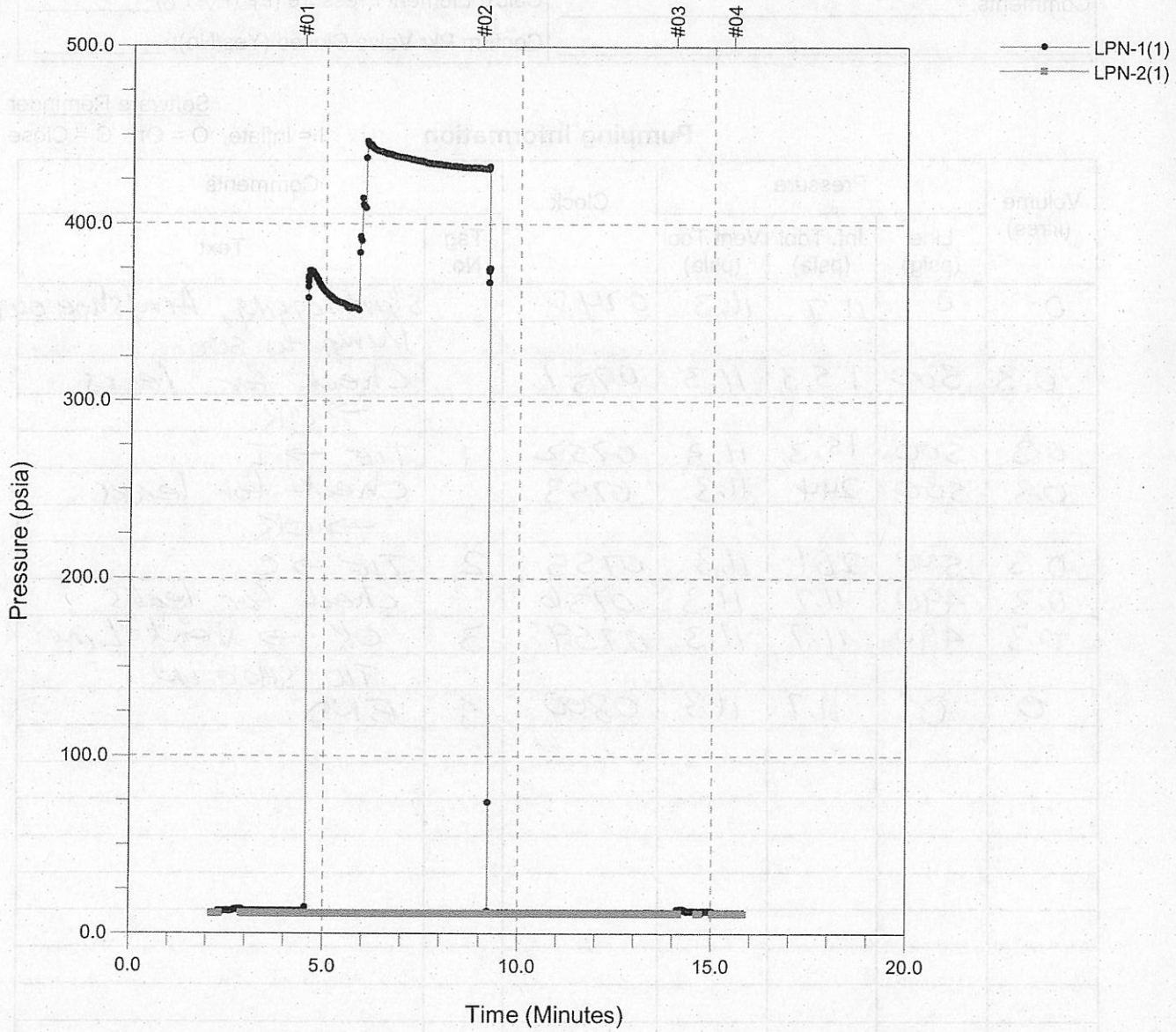
Packer Deflation

Company: Terranear PMC
Site: Los Alamos
Project: LANL Well Retrieval
Description: Plastic MP55
Well: R-32
WB project: WB777
Comment: Blank Test

Packer: BT-1
Packer Depth: Ground Surface

Plot By: DL Date: Sept 25/07

Checked By:_____ Date:_____



TZero: Mon Sep 17 20:50:00 2007

Report Date: Tue Sep 25 13:49:15 2007

R32R_BT1.WDF

Page _____ of _____

Schlumberger WATER SERVICES

MP55 Packer Deflation Field Record

Project: WB 777	Client: TPMC	By: DL	Date: Sept 18, 2007
Location: Los Alamos	Well No. R32	Borehole Diameter:	
Packer No. BT	Depth: 0	Computer Data File: R32R-BT2	.WDF
Inf-Tool No. 2321	Vent Tool No. 1764	Volume Pumped:	Vol Returned
H-B Valve: (P_H) 380 psi	Offset (P_V).	Confirm Venting (Vent Tool Data) (Y/N)	
Vent Tool Pressure (Shoe Out, P_O)		Final Inf'n Vol:	Final Press: (P_F)
Comments:		Calc'd Element Pressure ($P_F + P_V - P_O$)	
		Confirm Pkr Valve Closed (Yes/No):	

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	11.7	11.3	0748	-	start logging, Arm/shoe out.
						Pump to 500
0.3	500	15.3	11.3	0751		Check for leaks
						→ OK.
0.3	500	15.3	11.3	0752	1	TIE → I
0.3	500	244	11.3	0753		Check for leaks
						→ OK.
0.3	500	261	11.3	0755	2	TIE → C
0.3	490	11.7	11.3	0756		check for leaks
0.3	490	11.7	11.3	0759	3	OK → Vent Line.
						TIE SHOE IN
0	0	11.7	11.3	0800	4	END

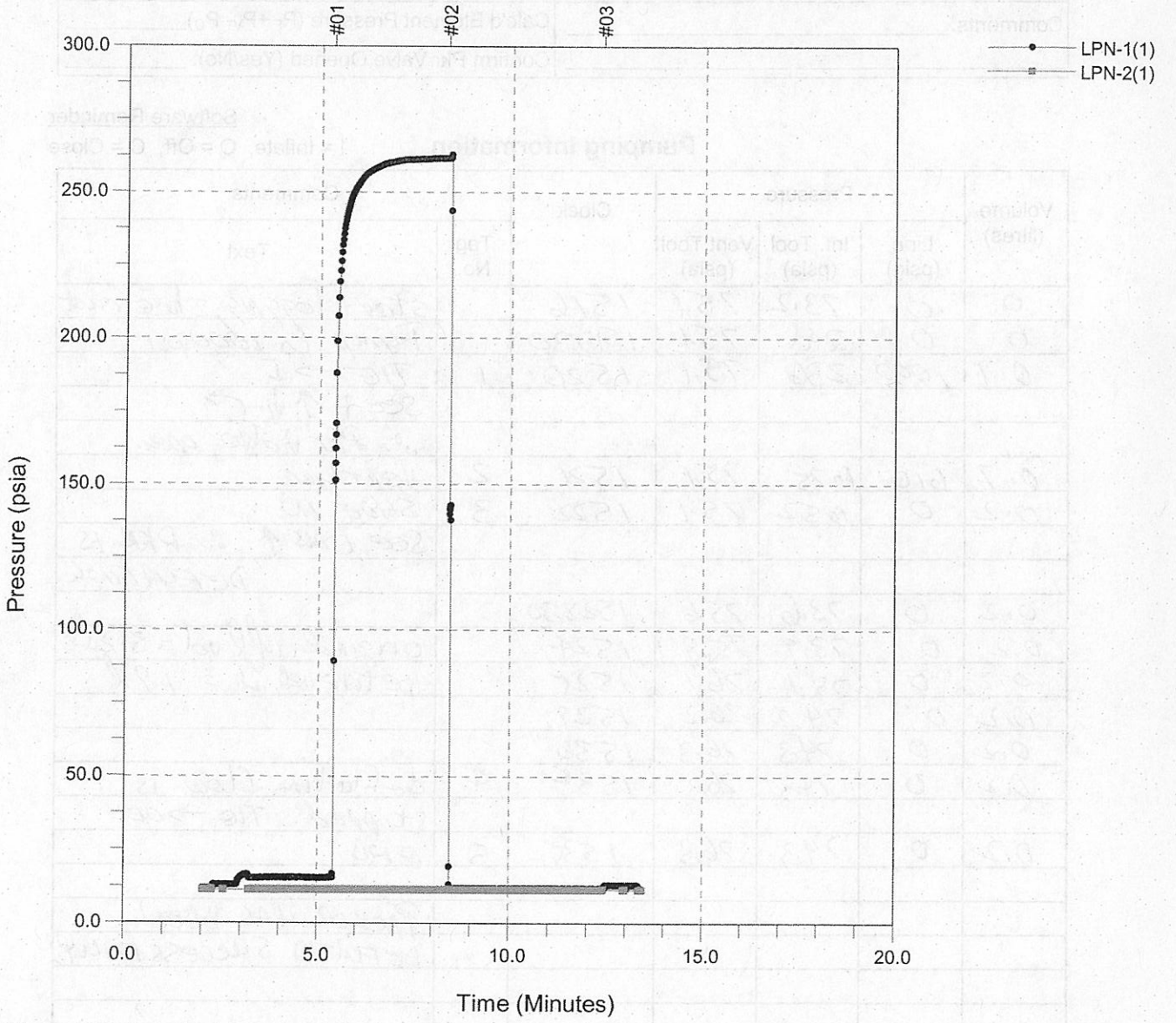
Packer Deflation

Company: Terranear PMC
Site: Los Alamos NM
Project: LANL Well Retrieval
Description: Plastic MP55
Well: R-32
WB project: WB777
Comment: Blank Test

Packer: BT-2
Packer Depth: Ground Surface

Plot By: DL Date: Sept 25/07

Checked By:_____ Date:_____



TZero: Tue Sep 18 14:46:40 2007

Report Date: Tue Sep 25 13:53:08 2007

R32R_BT2.WDF

Westbay Instruments Inc.

MP55 Packer Deflation Field Record

Project: WB 777 Client: TPMC	By: D. Larssen Date: 17 SEPT 2007
Location: Los Alamos Well No. R-32	Borehole Diameter: 4.5 inch
Packer No. MP5 Depth: 966.5 FT	Computer Data File: R32R_MP5 .WDF
Inf-Tool No. 2321 Vent Tool No. 1764	Volume Pumped:_____ Vol Returned_____
H-B Valve: (P_H) 380 Offset (P_V). 0	Confirm Venting (Vent Tool Data) (Y/N) _____
Vent Tool Pressure (Shoe Out, P_O) _____	Final Inf'n Vol:_____ Final Press:_____ (P_F)
Comments:_____	Calc'd Element Pressure ($P_F + P_V - P_O$)_____
_____	Confirm Pkr Valve Opened (Yes/No): _____

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	73.2	75.1	1516		start logging, shoe out
0	0	241	75.1	1517:30		Pump to 1000 psi
0.7	1000	236	75.1	1520	1	TIE → I
						see P ↑↓ ↱
						∴ PKR valve open.
0.7	610	607.5	75.1	1521	2	Vent line
0.2	0	605.2	75.1	1522	3	SHOE IN.
						See EMS ↑ ∴ PKR IS
						DEFLATING.
0.2	0	73.6	75.6	1522:30		
0.2	0	73.9	75.9	1524		original infl vol = 3.2 l
0.2	0	74.1	76.1	1525		retrieved vol = 1.9 l
0.2	0	74.2	76.2	1527		
0.2	0	74.3	76.3	1530		
0.2	0	74.3	76.3	1534	4	deflation flow is
						stopped. TIE → OFF
0.2	0	74.3	76.3	1535	5	END
						PACKER HAS BEEN
						DEFLATED SUCCESSFULLY.

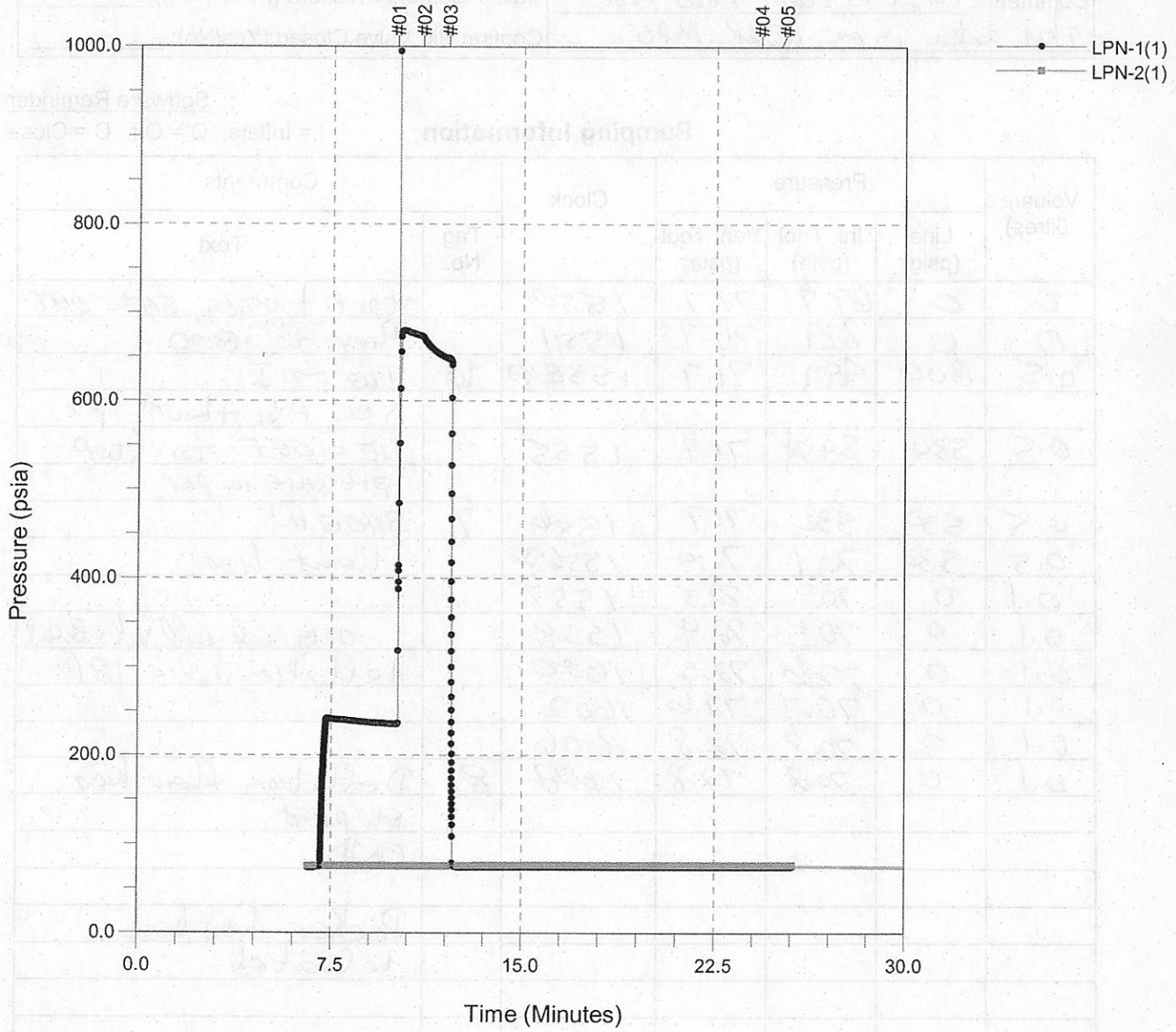
Packer Deflation

Company: Terranear PMC
Site: Los Alamos, NM
Project: LANL Well Retrieval
Description: Plastic MP55
Well: R-32
WB project: WB777
Comment:

Packer: MP-5
Packer Depth: 966.5 ft

Plot By: DL Date: Sept 25/07

Checked By:_____ Date:_____



TZero: Mon Sep 17 22:10:00 2007

Report Date: Tue Sep 25 13:59:00 2007

R32R_MP5.WDF

Page _____ of _____

Schlumberger WATER SERVICES

MP55 Packer Deflation Field Record

Project: WB 777 Client: TPMC	By: D. L. Date: 17 SEPT 2007
Location: Los Alamos Well No. R-32	Borehole Diameter: 4.5 inch.
Packer No. MP7 Depth: 956.5	Computer Data File: R32R_MP7 .WDF
Inf-Tool No. 2321 Vent Tool No. 1764	Volume Pumped: _____ Vol Returned _____
H-B Valve: (P_H) 380 Offset (P_V). 0	Confirm Venting (Vent Tool Data) (Y/N) _____
Vent Tool Pressure (Shoe Out, P_O) _____	Final Inf'n Vol: _____ Final Press: _____ (P_F)
Comments: Forgot to start new FILE. This data is on R32R_MP5.	Calc'd Element Pressure ($P_F + P_V - P_O$) _____
	Confirm Pkr Valve Closed (Yes/No): _____

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	69.7	71.7	1550	-	start logging, SHOE OUT.
0	0	379	71.7	1551		Pump to 800
0.5	800	497	71.7	1554:30	6	TIE → I
						See PV then ↑, ↑
0.5	530	545	71.7	1555	-	TIE = OFF to stop
						pressure in PKR.
0.5	530	532	71.7	1556	7	SHOE IN
0.5	530	70.1	71.9	1556:30		Vent line.
0.1	0	703	72.3	1557		
0.1	0	70.5	72.4	1558		original infl Vol = 3.4 l
0.1	0	70.6	72.5	1600		deflation Vol = 1.9 l
0.1	0	70.7	72.6	1602		
0.1	0	70.8	72.8	1606		
0.1	0	70.8	72.8	1609	8	Deflation flow has
						stopped.
						END.
						Packer has been
						deflated.

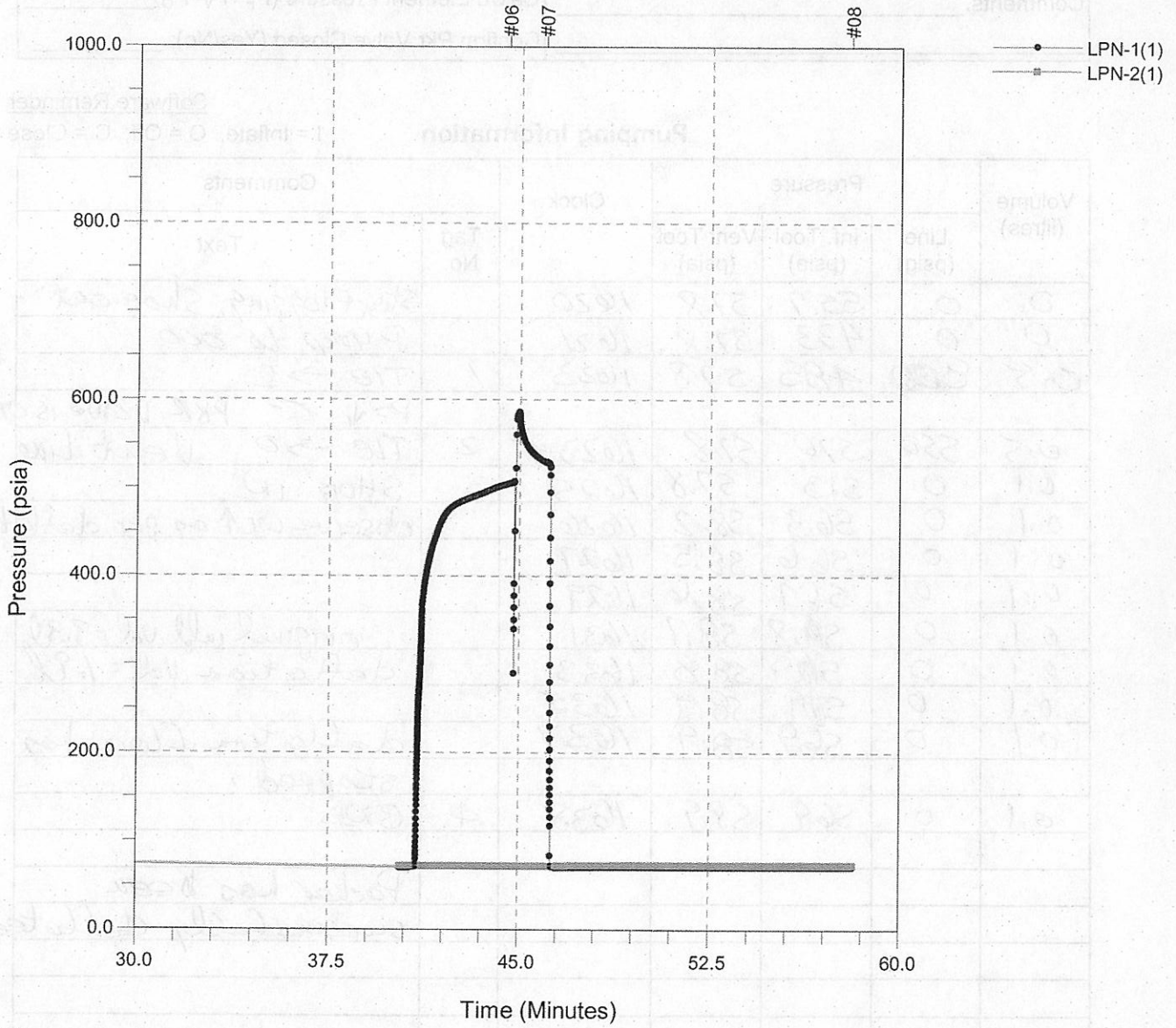
Packer Deflation

Company: Terranear PMC
Site: Los Alamos, NM
Project: LANL Well Retrieval
Description: Plastic MP55
Well: R-32
WB project: WB777
Comment:

Packer: MP-7
Packer Depth: 956.5

Plot By:_____ Date:_____

Checked By:_____ Date:_____



TZero: Mon Sep 17 22:10:00 2007

Report Date: Tue Sep 25 14:02:04 2007

R32R_MP5.WDF

Schlumberger WATER SERVICES

MP55 Packer Deflation Field Record

Project: WB 777 Client: TPMC	By: DL Date: 17 SEPT 2007
Location: Los Alamos Well No. R-32	Borehole Diameter: 4.5 inch
Packer No. MP12 Depth: 923.6	Computer Data File: R32RMP12 .WDF
Inf-Tool No. 2321 Vent Tool No. 1764	Volume Pumped: _____ Vol Returned _____
H-B Valve: (P_H) 380 Offset (P_V). 0	Confirm Venting (Vent Tool Data) (Y/N) _____
Vent Tool Pressure (Shoe Out, P_O) _____	Final Inf'n Vol: _____ Final Press: _____ (P_F)
Comments: _____	Calc'd Element Pressure ($P_F + P_V - P_O$) _____
_____	Confirm Pkr Valve Closed (Yes/No): _____

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	55.9	57.8	1620		Start logging, Shoe out
0	0	433	57.8	1621		Pump to 800
0.5	800	495	57.8	1623	1	TIE → I
						P↓, C, PKR Valve is open!
0.5	550	570	57.8	1623-15	2	TIE → O Vent Line
0.1	0	513	57.8	1625	3	SHOE IN
0.1	0	56.3	58.2	1626		observe wt ↑ as pkr deflates
0.1	0	56.6	58.5	1627		
0.1	0	56.7	58.6	1629		
0.1	0	56.8	58.7	1631		original infl vol = 3.3l
0.1	0	56.9	58.8	1633		deflation vol = 1.9l
0.1	0	56.9	58.9	1635		
0.1	0	56.9	58.9	1637		deflation flow has
						stopped.
0.1	0	56.9	58.9	1638	4	END
						Packer has been
						successfully deflated.

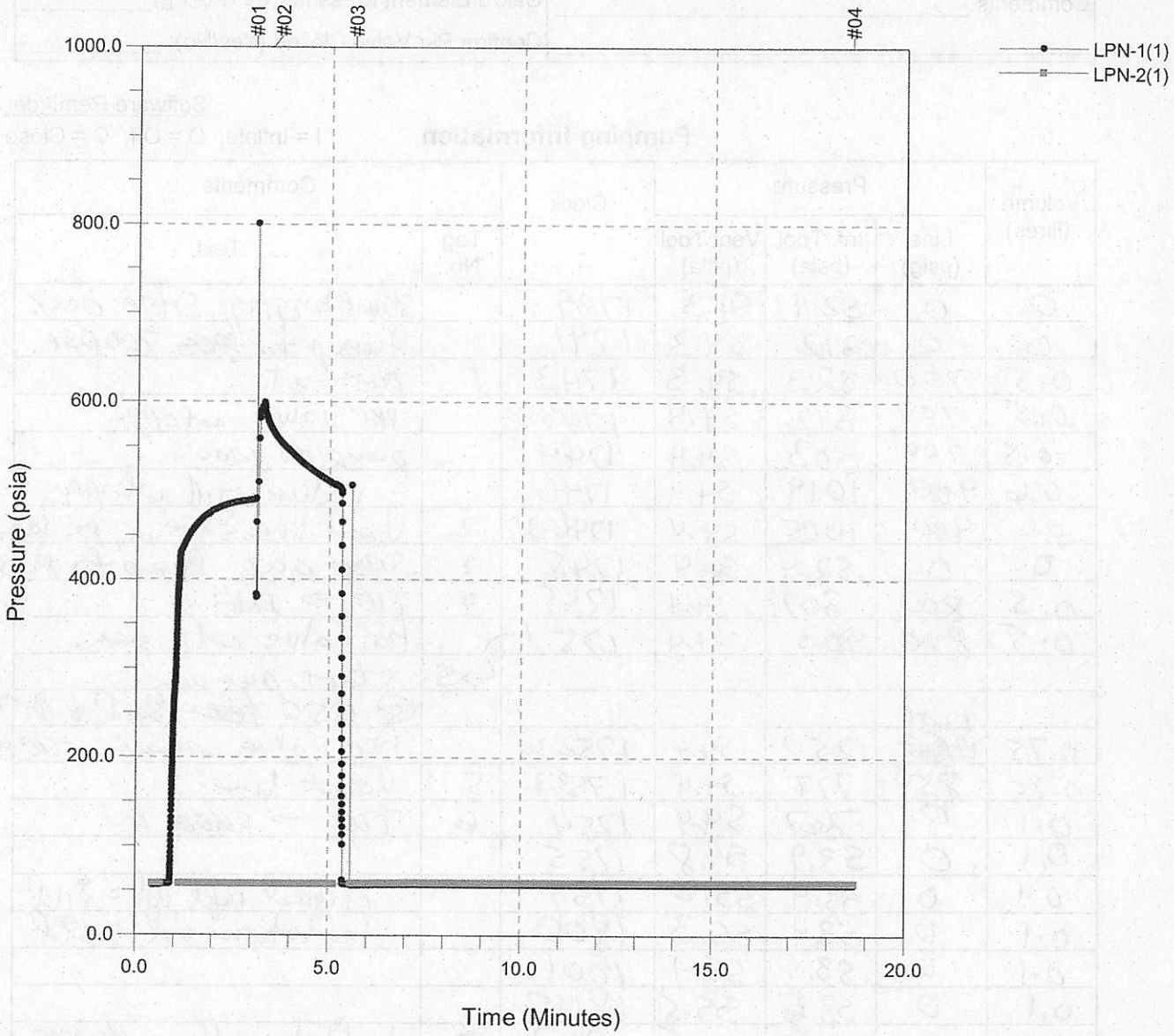
Packer Deflation

Company: Terranear PMC
Site: Los Alamos, NM
Project: LANL Well Retrieval
Description: Plastic MP55
Well: R-32
WB project: WB777
Comment:

Packer: MP 12
Packer Depth: 923.6 ft

Plot By: DL Date: 25 Sept 2007

Checked By:_____ Date:_____



TZero: Mon Sep 17 23:20:00 2007

Report Date: Tue Sep 25 14:04:33 2007

R32RMP12.WDF

Schlumberger WATER SERVICES

MP55 Packer Deflation Field Record

Project: WB777	Client: TPMC	By: DL	Date: 17 SEPT 2007
Location: Los Alamos	Well No. R-32	Borehole Diameter: 4.5 inch	
Packer No. MP14	Depth: 913.6 ft.	Computer Data File: R32RMP14	.WDF
Inf-Tool No. 2321	Vent Tool No. 1764	Volume Pumped: _____	Vol Returned _____
H-B Valve: (P_H) ~~850~~ 380psi	Offset (P_V). _____	Confirm Venting (Vent Tool Data) (Y/N) _____	
Vent Tool Pressure (Shoe Out, P_O) _____		Final Inf'n Vol: _____	Final Press: _____ (P_F)
Comments: _____		Calc'd Element Pressure ($P_F + P_V - P_O$) _____	
		Confirm Pkr Valve Closed (Yes/No): _____	

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	52.4	54.3	1739		start logging, SHOE OUT.
0	0	312	54.3	1741		Pump to ~~800~~ 700psi
0.5	700	323	54.3	1743	1	TIE → I
0.5	700	812	54.4	1743:30		PKr valve not open
0.5	700	803	54.4	1744		pump to 1000
0.6	900	1019	54.4	1746		- valve still not open
0.6	900	1015	54.4	1746:30	2	Vent line, shoe, in, re land.
0	0	52.4	54.4	1748	3	SHOE OUT, Pump to 800
0.5	800	307	54.4	1749	4	TIE → INF
0.5	800	903	54.4	1751		Pkr valve not open.
					5	start pumping
	1200					@ 1250 ~~TIE~~ - See PV 1C
0.75	~~1000~~	1250	54.4	1752:30		Pkr valve opened - TIE off
0.25	850	777	54.4	1753:30	5	Vent line:
0.1	0	767	54.4	1754	6	TIE → SHOE IN
0.1	0	53.9	54.8	1755		
0.1	0	53.4	55.2	1757		original infl vol = 3.1l
0.1	0	53.4	55.3	1800		deflation vol = 1.9l
0.1	0	53.5	55.4	1801		
0.1	0	53.5	55.5	1802		
0.1	0	53.5	55.5	1803	7	deflation flow stopped
						END
						Packer has been deflated.

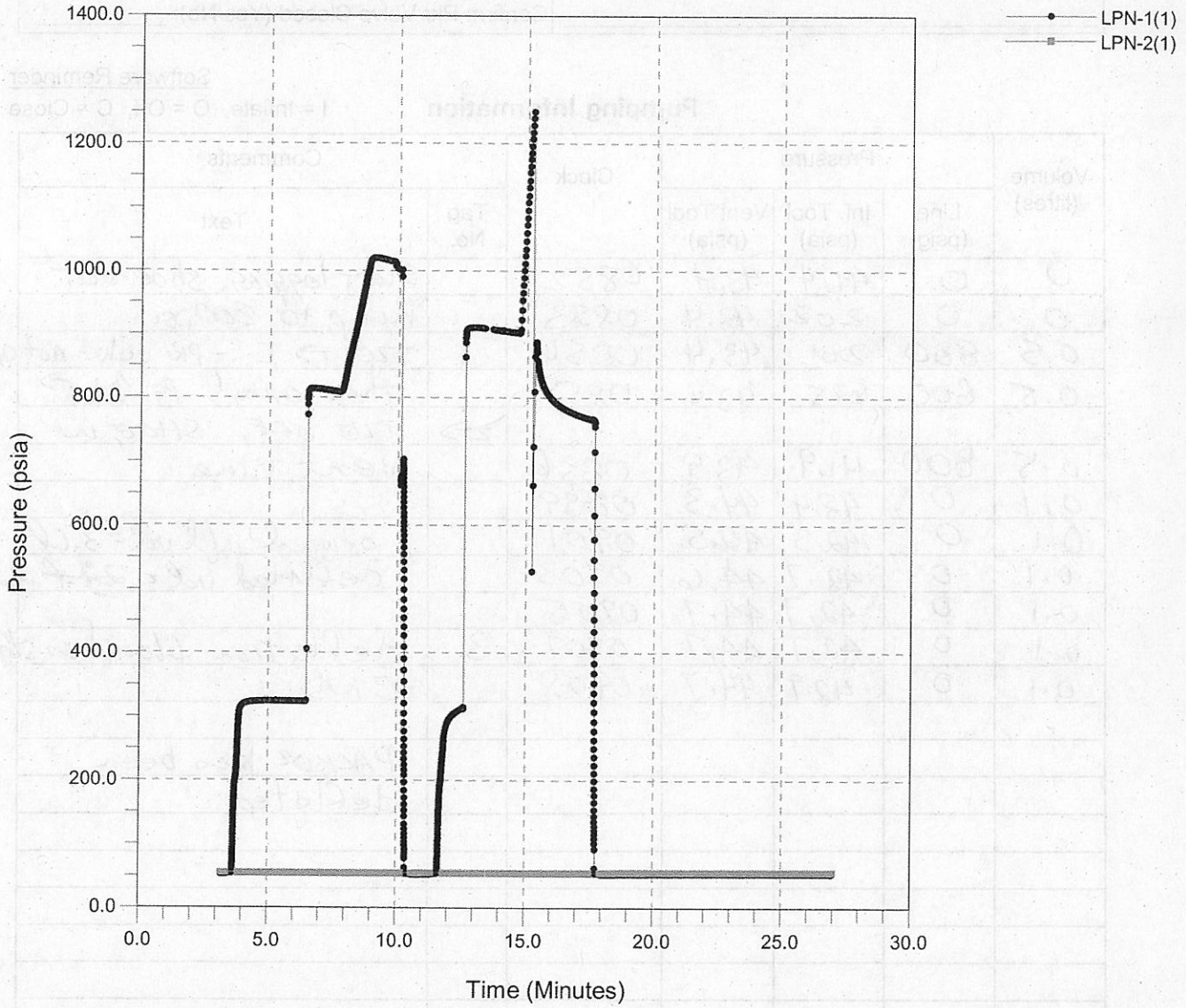
Packer Deflation

Company: Terranear PMC
Site: Los Alamos NM
Project: LANL Well Retrieval
Description: Plastic MP55
Well: R-32
WB project: WB777
Comment:

Packer: MP14
Packer Depth: 913.6 ft

Plot By: DL Date: Sept 25/07

Checked By:_____ Date:_____



TZero: Tue Sep 18 00:36:40 2007

Report Date: Tue Sep 25 14:05:53 2007

R32RMP14.WDF

Page _____ of _____

Schlumberger WATER SERVICES

MP55 Packer Deflation Field Record

Project: WB777	Client: TPMC	By: DL	Date: 18 Sept 2007
Location: Los Alamos	Well No. R-32	Borehole Diameter: 4.5 inch	
Packer No. MP18	Depth: 885.7	Computer Data File: R32R MP18 .WDF	
Inf-Tool No. 2321	Vent Tool No. 1764	Volume Pumped: _____	Vol Returned _____
H-B Valve: (P_H) 380psi	Offset (P_V). _____	Confirm Venting (Vent Tool Data) (Y/N) _____	
Vent Tool Pressure (Shoe Out, P_O) _____		Final Inf'n Vol: _____	Final Press: _____ (P_F)
Comments: _____		Calc'd Element Pressure ($P_F + P_V - P_O$) _____	
		Confirm Pkr Valve Closed (Yes/No): _____	

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	41.4	43.4	0852		Start logging, shoe out.
0	0	202	43.4	0853		Pump to 800psi
0.5	800	201	43.4	0854	1	TIG → I – PKr valve not open
0.5	800	625	43.4	0855		then open!, P: ↑↓↑
					2	TIE OFF, SHOE IN
0.5	800	41.9	43.9	0856		vent Line.
0.1	0	42.4	44.3	0859		
0.1	0	42.5	44.5	0901		original infl vol = 3.1 l
0.1	0	42.7	44.6	0903		deflated vol = ~~2.7~~ 2.3 l
0.1	0	42.7	44.7	0905		
0.1	0	42.7	44.7	0907	3	deflation flow has stopped
0.1	0	42.7	44.7	0908		END
						PACKER has been
						deflated.

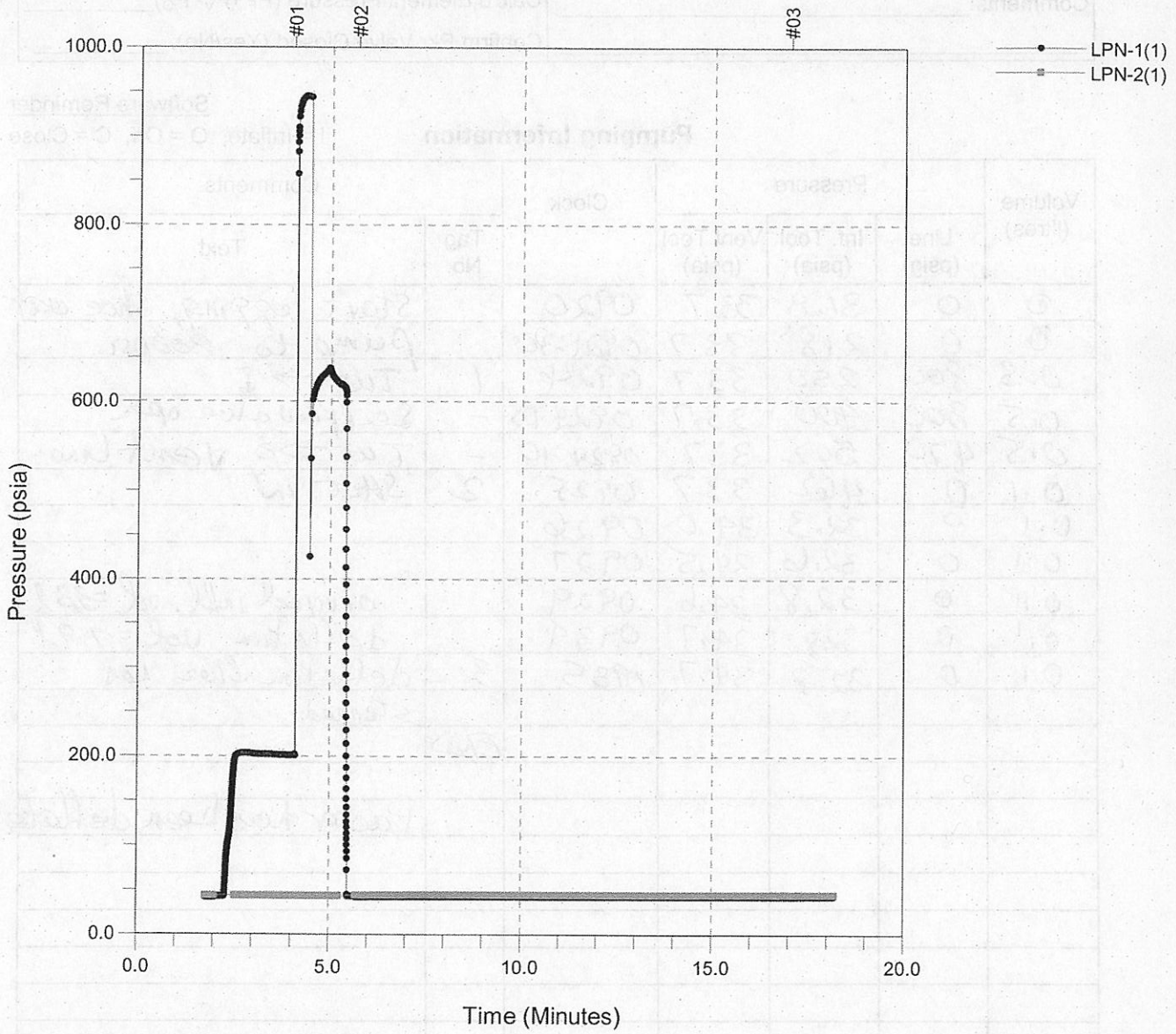
Packer Deflation

Company: Terranear PMC
Site: Los Alamos NM
Project: LANL Well Retrieval
Description: Plastic MP55
Well: R-32
WB project: WB777
Comment:

Packer: MP 18
Packer Depth: 885.7 ft

Plot By: DL Date: Sept 25/07

Checked By:_____ Date:_____



TZero: Tue Sep 18 15:50:00 2007

Report Date: Tue Sep 25 14:07:09 2007

R32RMP18.WDF

Schlumberger WATER SERVICES

MP55 Packer Deflation Field Record

Project: WB777 Client: TPMC	By: DL Date: 18 Sept 2007
Location: Los Alamos Well No. R-32	Borehole Diameter: 4.5 inch
Packer No. MP23 Depth: 861.0	Computer Data File: R32RMP23 .WDF
Inf-Tool No. 2321 Vent Tool No. 1764	Volume Pumped: _____ Vol Returned _____
H-B Valve: (P_H) 380psi Offset (P_V). _____	Confirm Venting (Vent Tool Data) (Y/N) _____
Vent Tool Pressure (Shoe Out, P_O) _____	Final Inf'n Vol: _____ Final Press: _____ (P_F)
Comments: _____	Calc'd Element Pressure ($P_F + P_V - P_O$) _____
_____	Confirm Pkr Valve Closed (Yes/No): _____

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	31.8	33.7	0920		Start logging, Shoe out
0	0	218↑	33.7	0921:30		Pump to 800psi
0.5	800	250	33.7	0924	1	TW → I
0.5	800	400	33.7	0924:05	-	Seal Pkr valve open
0.5	470	502	33.7	0924:10	-	TW → O, Vent Line
0.1	0	462	33.7	0925	2	SHOE IN
0.1	0	32.3	34.0	0926		
0.1	0	32.6	34.5	0927		
0.1	0	32.8	34.6	0929		original infl. vol = 3.3 l
0.1	0	32.8	34.7	0934		deflation vol = 1.9 l
0.1	0	32.8	34.7	0935	3	deflation flow has stopped-
					END	
						Packer has been deflated.

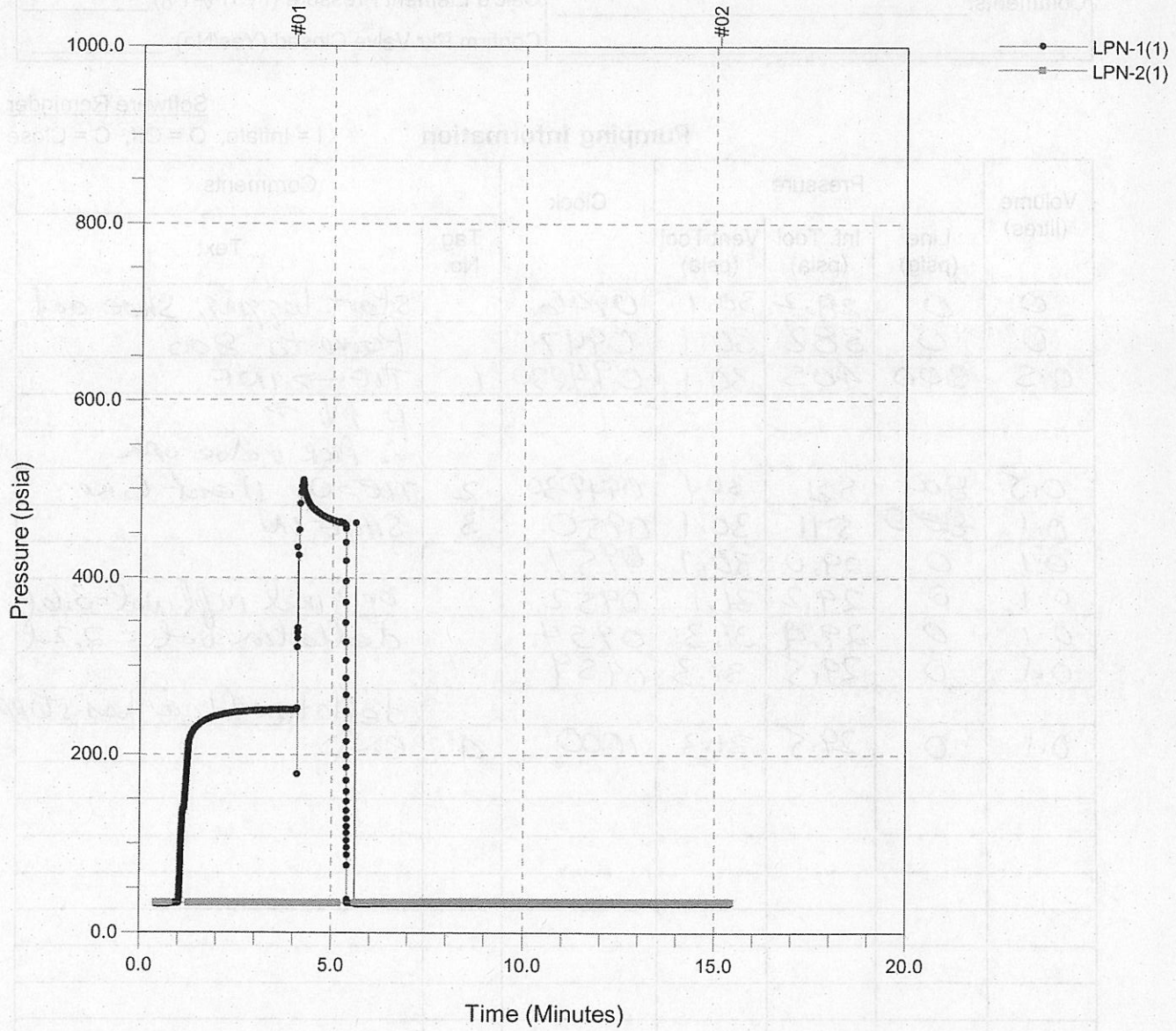
Packer Deflation

Company: Terranear PMC
Site: Los Alamos NM
Project: LANL Well Retrieval
Description: Plastic MP55
Well: R-32
WB project: WB777
Comment:

Packer: MP 23
Packer Depth: 861.0 ft

Plot By: DL Date: Sept 25/07

Checked By:_____ Date:_____



TZero: Tue Sep 18 16:20:00 2007

Report Date: Tue Sep 25 14:18:13 2007

R32RMP23.WDF

Page _____ of _____

Schlumberger WATER SERVICES

MP55 Packer Deflation Field Record

Project: WB777	Client: TPMC	By: DL	Date: 18 SEPT 2007
Location: Los Alamos	Well No. R32	Borehole Diameter: 4.5 inch	
Packer No. MP25	Depth: 851.5	Computer Data File: R32RMP25.WDF	
Inf-Tool No. 2321	Vent Tool No. 1764	Volume Pumped: _____	Vol Returned _____
H-B Valve: (P_H) 380psi	Offset (P_V). _____	Confirm Venting (Vent Tool Data) (Y/N) _____	
Vent Tool Pressure (Shoe Out, P_O) _____		Final Inf'n Vol: _____	Final Press: _____ (P_F)
Comments: _____		Calc'd Element Pressure ($P_F + P_V - P_O$) _____	
		Confirm Pkr Valve Closed (Yes/No): _____	

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	28.2	30.1	0946		start logging, Shoe out
0	0	382	30.1	0947		Pump to 800
0.5	800	405	30.1	0948:30	1	TIE → INF
						P ↑↓ ↗
						∴ PKR Valve open
0.5	800	521	30.1	0949:30	2	TIE=0, Vent Line.
0.1	~~800~~	511	30.1	0950	3	SHOE IN
0.1	0	29.0	30.7	0951		
0.1	0	29.2	31.1	0952		original infl vol=3.6l
0.1	0	29.4	31.3	0954		deflation vol = 2.2l
0.1	0	29.5	31.3	0959		
						deflation flow has stopped.
0.1	0	29.5	31.3	1000	4	END

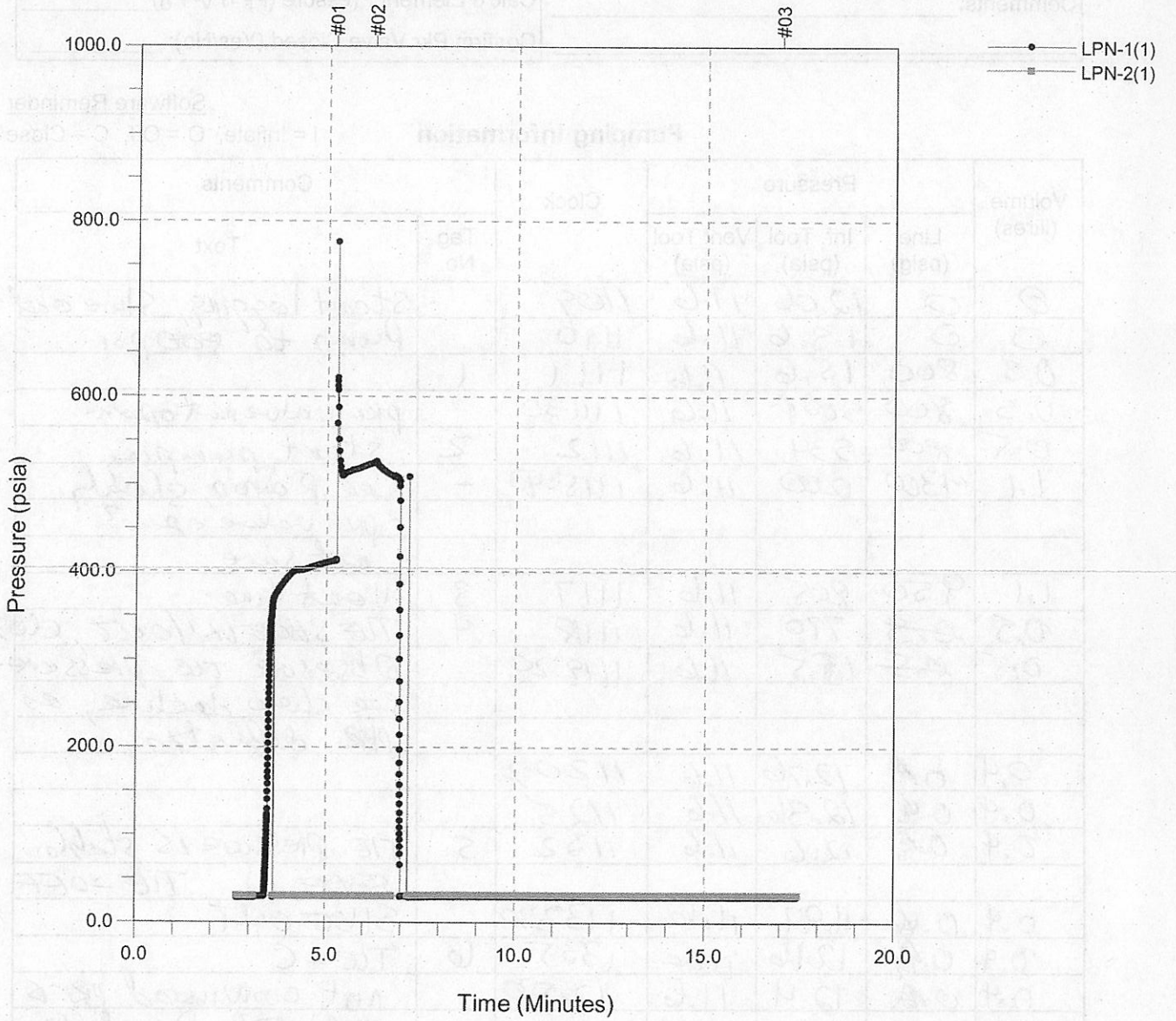
Packer Deflation

Company: Terranear PMC
Site: Los alamos NM
Project: LANL Well Retrieval
Description: Plastic MP55
Well: R-32
WB project: WB777
Comment:

Packer: MP 25
Packer Depth: 851.5 ft

Plot By: DL Date: Sept 25/07

Checked By:_____ Date:_____



TZero: Tue Sep 18 16:43:20 2007

Report Date: Tue Sep 25 14:19:30 2007

R32RMP25.WDF

Schlumberger WATER SERVICES

MP55 Packer Deflation Field Record

Project: WB777 Client: TPMC	By: DL Date: 18 sept 2007
Location: Los Alamos Well No. R32	Borehole Diameter: 4.5 inch
Packer No. MP56 Depth: 551.5 ft	Computer Data File: R32R MP56 .WDF
Inf-Tool No. 2321 Vent Tool No. 1764	Volume Pumped: _____ Vol Returned _____
H-B Valve: (P_H) 380 psi Offset (P_V). _____	Confirm Venting (Vent Tool Data) (Y/N) _____
Vent Tool Pressure (Shoe Out, P_O) _____	Final Inf'n Vol: _____ Final Press: _____ (P_F)
Comments: _____	Calc'd Element Pressure ($P_F + P_V - P_O$) _____
_____	Confirm Pkr Valve Closed (Yes/No): _____

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	12.06	11.6	1109		Start logging, Shoe out.
0	0	15.6	11.6	1110		Pump to 800 psi
0.5	800	15.6	11.6	1111	1	
0.5	800	500↑	11.6	111130		pkr valve not open.
0.5	800	534	11.6	1112	2	start pumping
1.1	~1300	1200	11.6	1115:40	—	See P drop, slowly.
						- pkr valve open?.
						not sure.
1.1	950	805	11.6	1117	3	Vent line.
0.5	~~0.5~~	770	11.6	1118	4	TIE SHOE IN/OUT, CLOSE
0.5	~~0.5~~	15.5	11.6	1119:20		Observe the pressure.
						See slow decline, as
						PKR deflates.
0.4	0.4	12.76	11.6	1120:30		
0.4	0.4	12.56	11.6	1125		
0.4	0.4	12.6	11.6	1132	5	TIE pressure is stable.
						SHOE IN TIE = OFF
0.4	0.4	11.97	11.6	1133:30		SHOE OUT.
0.4	0.4	12.16	11.6	1335	6	TIE = C
0.4	0.4	12.4	11.6	1335:30		not convinced pkr is
						deflated. Decide to
						Pump water in. TIE = I
0.4	0.4	12.5	11.6	1337	7	~~Tie~~ Start pump

Schlumberger WATER SERVICES

MP55 Packer Deflation
Field Record Part 2

Project: WB777 Well No. R32 Packer No. MP56 Date: 18 Sept 2007

Software Reminder
I = Inflate, O = Off, C = Close

Pumping Information

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
1.0	160	32.4	11.6	1139	8	
1.5	200	61.5	11.6	1140:45	9	
1.75	550	340	11.6	1141:45	10	TIE=0, STOP Pump
						Looks like normal infl'n
						took 1.45 - 0.4 = 1.05 l.
						∴ PKr valve is open
1.75	460	330	11.6	1145	11	VENT LINE
1.45	0	328	11.6	1146:40	12	TIE SHOE IN
						- let pkr vent/deflate
						Conclusion:
						Pkr deflated,
						defl vol ~ 1 liter
1.45	0	12.0	11.6	1148	13	END

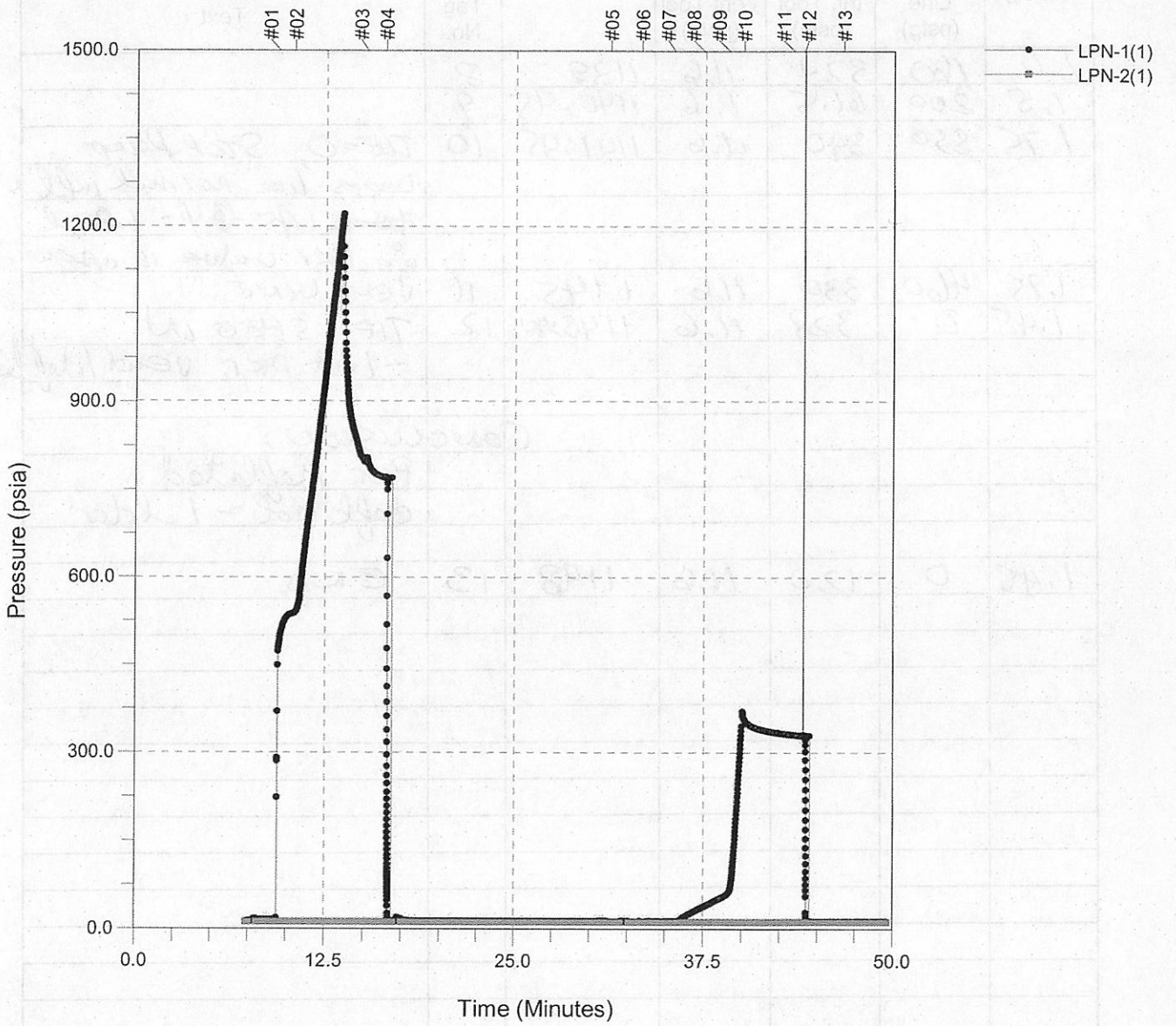
Packer Deflation

Company: Terranear PMC
Site: Los Alamos NM
Project: LANL Well Retrieval
Description: Plastic MP55
Well: R-32
WB project: WB777
Comment:

Packer: MP 56
Packer Depth: 551.5 ft

Plot By: DL Date: Sept 25/07

Checked By:_____ Date:_____



TZero: Tue Sep 18 18:01:40 2007

Report Date: Tue Sep 25 14:12:32 2007

R32RMP56.WDF

Page _____ of _____

Schlumberger WATER SERVICES

MP55 Packer Deflation Field Record

Project: WB777	Client: TPMC	By: DL	Date: 18 SEPT 2007
Location: Los Alamos	Well No. R32	Borehole Diameter: 4.5 inch.	
Packer No. MP84	Depth: 281.2	Computer Data File: R32 MP84 .WDF	
Inf-Tool No. 2321	Vent Tool No. 1764	Volume Pumped: _____	Vol Returned _____
H-B Valve: (P_H) 380 psi	Offset (P_V). _____	Confirm Venting (Vent Tool Data) (Y/N) _____	
Vent Tool Pressure (Shoe Out, P_O) _____		Final Inf'n Vol: _____	Final Press: _____ (P_F)
Comments: _____		Calc'd Element Pressure ($P_F + P_V - P_O$) _____	
		Confirm Pkr Valve Closed (Yes/No): _____	

Software Reminder

Pumping Information I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
1.0	0	12.0	11.7	1207:30		Start logging, shoe out
1.0	0	18.3	11.7	1209		Pump to ~~1000~~ 1200
1.7	1200	18.3	11.7	1210	1	TIE = I
		max 380				seep ↑↓↳
						∴ Pkr valve open.
1.7	270	69	11.7	12 11:20	2	Vent line.
1.5	0	69	11.7	1212:30	3	TIE = O, C
1.5	0	69	11.7	1213	4	TIE = C
1.5	0	35	11.7	1213:30		
1.5	0	22	11.7	1214		See TIE + P ↓ slowly
1.5	0	15	11.7	1214:30		as Pkr deflates.
1.5	0	12.9	11.7	1215		flow thru TIE,
1.5	0	12.6	11.7	1216		
1.5	0	12.6	11.7	1218		TIE = P. Stable, flow stopped
1.5	0	12.6	11.7	1220	5	TIE SHOE CN
1.5	0	12.0	11.7	1220:30		END.
						CONCLUSION:
						PACKER IS DEFLATED.

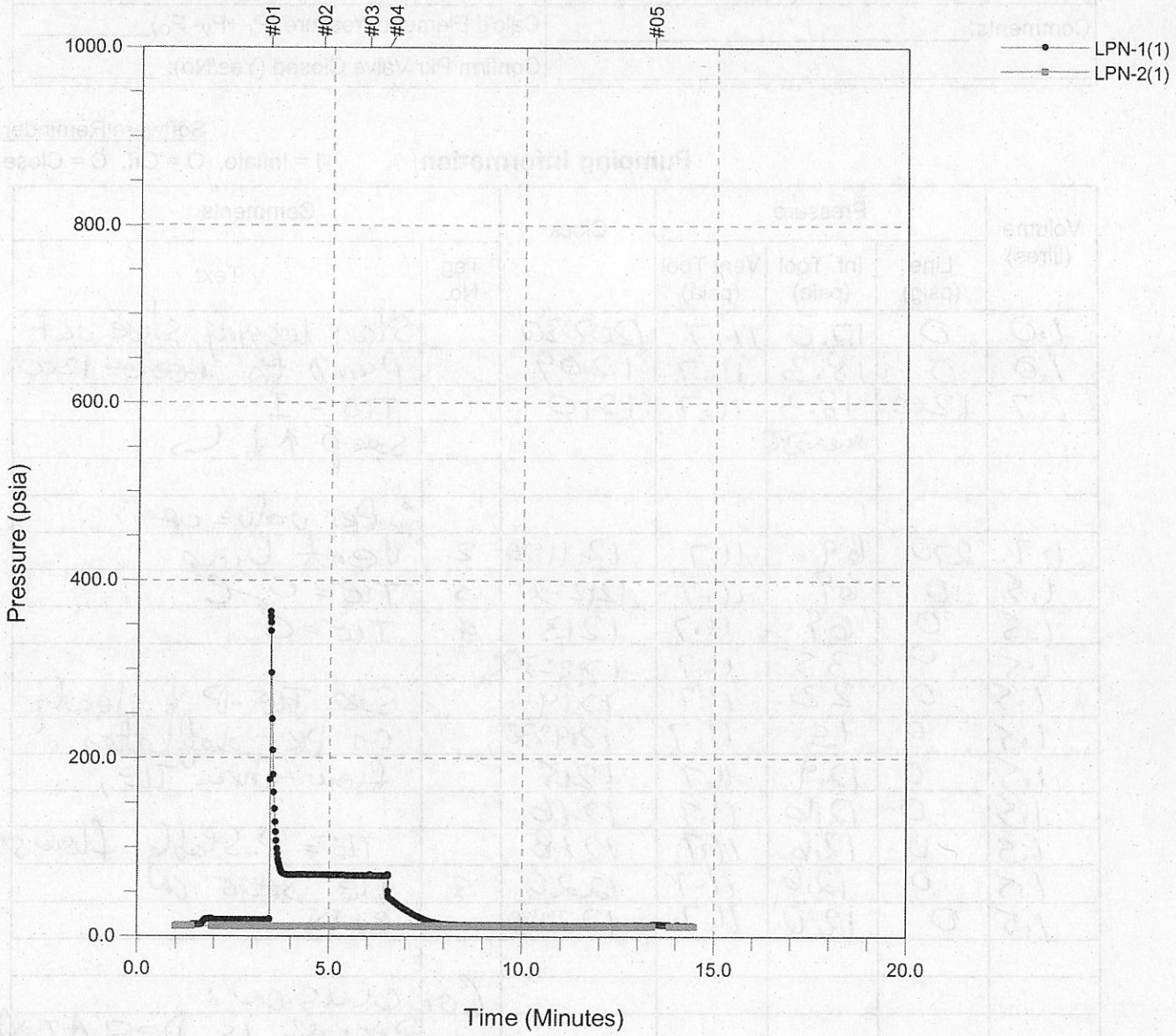
Packer Deflation

Company: Terranear PMC
Site: Los Alamos NM
Project: LANL Well Retrieval
Description: Plastic MP55
Well: R-32
WB project: WB777
Comment:

Packer: MP84
Packer Depth: 281.2 ft

Plot By: DL Date: Sept 25/07

Checked By:_____ Date:_____



TZero: Tue Sep 18 19:06:40 2007

Report Date: Tue Sep 25 14:20:54 2007

R32RMP84.WDF

Appendix B

R-32 Well Log
(on DVD included with this document)

Appendix C

Analytical Data Results

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	Time	pH	Temp	Cond	Diss O2	Turb	ORP	Ag rslt
EF07090G32R161	10/9/2007	WG-07709-EE	11:00	8.04	20.8	167	1.34	1.16	175	0.001
EU07090G32R161	10/9/2007	WG-07709-EE								0.001
EF07090G32R162	10/9/2007	WG-07713-EE	11:05	8.14	20.8	166.5	1.16	0.89	171	0.001
EU07090G32R162	10/9/2007	WG-07713-EE								0.001
EF07090G32R163	10/9/2007	WG-07714-EE	11:10	8.16	20.9	165.9	1.25	0.43	157	0.001
EU07090G32R163	10/9/2007	WG-07714-EE								0.001
EF07090G32R164	10/9/2007	WG-07715-EE	11:15	8.18	21	165.8	1.25	0.80	140	0.001
EU07090G32R164	10/9/2007	WG-07715-EE								0.001
EF07090G32R165	10/9/2007	WG-07716-EE	11:20	8.19	21.2	165.6	1.08	0.68	104	0.001
EU07090G32R165	10/9/2007	WG-07716-EE								0.001
EF07090G32R166	10/9/2007	WG-07717-EE	11:25	8.20	20.8	165.2	1.24	0.74	79	0.001
EU07090G32R166	10/9/2007	WG-07717-EE								0.001
EF07090G32R167	10/9/2007	WG-07718-EE	11:35	8.19	20.8	165.1	1.25	0.75	53	0.001
EU07090G32R167	10/9/2007	WG-07718-EE								0.001
EF07090G32R168	10/9/2007	WG-07719-EE	11:45	8.18	21.7	165.8	1.19	0.69	25	0.001
EU07090G32R168	10/9/2007	WG-07719-EE								0.001
EF07090G32R110	10/9/2007	WG-07856-EE	11:55	8.19	21.8	164.5	1.21	0.77	40	0.001
EU07090G32R110	10/9/2007	WG-07856-EE								0.001
EF07090G32R120	10/9/2007	WG-07856-EE	11:55	8.19	21.8	164.5	1.21	0.77	40	0.001
EU07090G32R120	10/9/2007	WG-07856-EE								0.001
EU07090G32R101-FB	10/9/2007	WG-07856-EE	11:55	8.19	21.8	164.5	1.21	0.77	40	0.001
EF07090G32R169	10/9/2007	WG-07720-EE	12:25	8.16	22.8	163.3	1.22	0.67	27	0.001
EU07090G32R169	10/9/2007	WG-07720-EE								0.001
EF07090G32R170	10/9/2007	WG-07721-EE	12:55	8.15	23	163.1	1.25	0.65	2	0.001
EU07090G32R170	10/9/2007	WG-07721-EE								0.001
EF07090G32R171	10/9/2007	WG-07725-EE	13:25	8.14	23.2	162.5	1.29	0.81	-1	0.001
EU07090G32R171	10/9/2007	WG-07725-EE								0.001
EF07090G32R172	10/9/2007	WG-07731-EE	13:55	8.12	23	163.5	1.25	0.73	-6	0.001
EU07090G32R172	10/9/2007	WG-07731-EE								0.001
EF07090G32R173	10/9/2007	WG-07732-EE	14:25	8.11	23.2	162.4	1.24	0.79	-15	0.001
EU07090G32R173	10/9/2007	WG-07732-EE								0.001
EF07090G32R174	10/9/2007	WG-07733-EE	14:55	8.09	23.1	162.1	1.33	0.75	-16	0.001
EU07090G32R174	10/9/2007	WG-07733-EE								0.001
EF07090G32R110a	10/9/2007	WG-07855-EE	16:00	8.08	22.6	162.1	1.27	0.79	-15	0.001
EU07090G32R110a	10/9/2007	WG-07855-EE								0.001
EF07090G32R120a	10/9/2007	WG-07855-EE	16:00	8.08	22.6	162.1	1.27	0.79	-15	0.001
EU07090G32R120a	10/9/2007	WG-07855-EE								0.001
EF07090G32R175	10/9/2007	WG-07734-EE	17:00	8.07	21.7	161.5	1.36	0.75	-31	0.001
EU07090G32R175	10/9/2007	WG-07734-EE								0.001
EF07090G32R176	10/9/2007	WG-07735-EE	18:00	8.05	20.8	162.3	1.37	0.88	-58	0.001
EU07090G32R176	10/9/2007	WG-07735-EE								0.001
EF07090G32R177	10/11/2007	WG-07736-EE	13:05	8.07	22.5	167.1	1.41	0.77	-37	0.001
EU07090G32R177	10/11/2007	WG-07736-EE								0.001
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	17:15	---	---	---	---	---	---	0.001

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	stdev (Ag)	Al rslt	stdev (Al)	As rslt	stdev (As)	B rslt	stdev (B)	Ba rslt
EF07090G32R161	10/9/2007	WG-07709-EE		0.006	0.000	0.001	0.000	0.010	0.001	0.048
EU07090G32R161	10/9/2007	WG-07709-EE		0.010	0.000	0.001	0.000	0.002	0.000	0.047
EF07090G32R162	10/9/2007	WG-07713-EE		0.007	0.000	0.001	0.000	0.002		0.048
EU07090G32R162	10/9/2007	WG-07713-EE		0.009	0.000	0.001	0.000	0.002		0.050
EF07090G32R163	10/9/2007	WG-07714-EE		0.007	0.000	0.001	0.000	0.005	0.001	0.050
EU07090G32R163	10/9/2007	WG-07714-EE		0.008	0.000	0.001	0.000	0.002		0.048
EF07090G32R164	10/9/2007	WG-07715-EE		0.005	0.000	0.001	0.000	0.002		0.048
EU07090G32R164	10/9/2007	WG-07715-EE		0.012	0.000	0.001	0.000	0.002		0.049
EF07090G32R165	10/9/2007	WG-07716-EE		0.006	0.000	0.001	0.000	0.002		0.047
EU07090G32R165	10/9/2007	WG-07716-EE		0.008	0.000	0.001	0.000	0.002		0.048
EF07090G32R166	10/9/2007	WG-07717-EE		0.017	0.000	0.001	0.000	0.002		0.047
EU07090G32R166	10/9/2007	WG-07717-EE		0.009	0.000	0.001	0.000	0.002		0.048
EF07090G32R167	10/9/2007	WG-07718-EE		0.006	0.000	0.001	0.000	0.002		0.048
EU07090G32R167	10/9/2007	WG-07718-EE		0.008	0.000	0.001	0.000	0.044	0.000	0.047
EF07090G32R168	10/9/2007	WG-07719-EE		0.006	0.000	0.001	0.000	0.025	0.000	0.047
EU07090G32R168	10/9/2007	WG-07719-EE		0.011	0.000	0.001	0.000	0.020	0.001	0.046
EF07090G32R110	10/9/2007	WG-07856-EE		0.006	0.000	0.001	0.000	0.020	0.001	0.049
EU07090G32R110	10/9/2007	WG-07856-EE		0.008	0.000	0.001	0.000	0.016	0.000	0.046
EF07090G32R120	10/9/2007	WG-07856-EE		0.006	0.000	0.001	0.000	0.017	0.001	0.049
EU07090G32R120	10/9/2007	WG-07856-EE		0.008	0.000	0.001	0.000	0.015	0.000	0.045
EU07090G32R101-FB	10/9/2007	WG-07856-EE		0.003	0.000	0.000		0.009	0.000	0.001
EF07090G32R169	10/9/2007	WG-07720-EE		0.005	0.000	0.001	0.000	0.015	0.000	0.045
EU07090G32R169	10/9/2007	WG-07720-EE		0.004	0.000	0.001	0.000	0.011	0.001	0.044
EF07090G32R170	10/9/2007	WG-07721-EE		0.002	0.000	0.001	0.000	0.003	0.000	0.044
EU07090G32R170	10/9/2007	WG-07721-EE		0.007	0.000	0.001	0.000	0.002		0.044
EF07090G32R171	10/9/2007	WG-07725-EE		0.005	0.000	0.001	0.000	0.002		0.040
EU07090G32R171	10/9/2007	WG-07725-EE		0.009	0.000	0.001	0.000	0.002		0.041
EF07090G32R172	10/9/2007	WG-07731-EE		0.009	0.000	0.001	0.000	0.002		0.044
EU07090G32R172	10/9/2007	WG-07731-EE		0.010	0.000	0.001	0.000	0.002		0.043
EF07090G32R173	10/9/2007	WG-07732-EE		0.007	0.000	0.001	0.000	0.002		0.043
EU07090G32R173	10/9/2007	WG-07732-EE		0.013	0.000	0.001	0.000	0.002		0.042
EF07090G32R174	10/9/2007	WG-07733-EE		0.006	0.000	0.001	0.000	0.043	0.001	0.042
EU07090G32R174	10/9/2007	WG-07733-EE		0.009	0.000	0.001	0.000	0.024	0.000	0.042
EF07090G32R110a	10/9/2007	WG-07855-EE		0.005	0.000	0.001	0.000	0.018	0.001	0.040
EU07090G32R110a	10/9/2007	WG-07855-EE		0.007	0.000	0.001	0.000	0.015	0.000	0.037
EF07090G32R120a	10/9/2007	WG-07855-EE		0.006	0.000	0.001	0.000	0.017	0.001	0.043
EU07090G32R120a	10/9/2007	WG-07855-EE		0.009	0.000	0.001	0.000	0.016	0.001	0.043
EF07090G32R175	10/9/2007	WG-07734-EE		0.008	0.000	0.001	0.000	0.015	0.001	0.042
EU07090G32R175	10/9/2007	WG-07734-EE		0.006	0.000	0.001	0.000	0.013	0.000	0.039
EF07090G32R176	10/9/2007	WG-07735-EE		0.005	0.000	0.001	0.000	0.013	0.001	0.041
EU07090G32R176	10/9/2007	WG-07735-EE		0.009	0.000	0.001	0.000	0.013	0.000	0.041
EF07090G32R177	10/11/2007	WG-07736-EE		0.006	0.000	0.001	0.000	0.047	0.001	0.044
EU07090G32R177	10/11/2007	WG-07736-EE		0.010	0.000	0.001	0.000	0.026	0.001	0.043
EU07090G32R101-EQB	10/11/2007	WG-07852-EE		0.004	0.000	0.0002		0.016	0.000	0.002

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	stdev (Ba)	Be rslt	stdev (Be)	Br(-) ppm	Br(-) (U)	TOC rslt	TOC (U)
EF07090G32R161	10/9/2007	WG-07709-EE	0.001	0.001		0.05			
EU07090G32R161	10/9/2007	WG-07709-EE	0.000	0.001				1.68	
EF07090G32R162	10/9/2007	WG-07713-EE	0.000	0.001		0.05			
EU07090G32R162	10/9/2007	WG-07713-EE	0.000	0.001				0.77	
EF07090G32R163	10/9/2007	WG-07714-EE	0.001	0.001		0.05			
EU07090G32R163	10/9/2007	WG-07714-EE	0.000	0.001				0.93	
EF07090G32R164	10/9/2007	WG-07715-EE	0.000	0.001		0.05			
EU07090G32R164	10/9/2007	WG-07715-EE	0.000	0.001				0.73	
EF07090G32R165	10/9/2007	WG-07716-EE	0.000	0.001		0.04			
EU07090G32R165	10/9/2007	WG-07716-EE	0.000	0.001				0.66	
EF07090G32R166	10/9/2007	WG-07717-EE	0.000	0.001		0.05			
EU07090G32R166	10/9/2007	WG-07717-EE	0.000	0.001				0.78	
EF07090G32R167	10/9/2007	WG-07718-EE	0.000	0.001		0.05			
EU07090G32R167	10/9/2007	WG-07718-EE	0.000	0.001				0.98	
EF07090G32R168	10/9/2007	WG-07719-EE	0.000	0.001		0.05			
EU07090G32R168	10/9/2007	WG-07719-EE	0.001	0.001				0.35	
EF07090G32R110	10/9/2007	WG-07856-EE	0.001	0.001		0.06			
EU07090G32R110	10/9/2007	WG-07856-EE	0.001	0.001				0.28	
EF07090G32R120	10/9/2007	WG-07856-EE	0.001	0.001		0.06			
EU07090G32R120	10/9/2007	WG-07856-EE	0.001	0.001				0.95	
EU07090G32R101-FB	10/9/2007	WG-07856-EE		0.001		0.01	U	0.91	
EF07090G32R169	10/9/2007	WG-07720-EE	0.000	0.001		0.06			
EU07090G32R169	10/9/2007	WG-07720-EE	0.001	0.001				0.77	
EF07090G32R170	10/9/2007	WG-07721-EE	0.000	0.001		0.06			
EU07090G32R170	10/9/2007	WG-07721-EE	0.000	0.001				0.69	
EF07090G32R171	10/9/2007	WG-07725-EE	0.001	0.001		0.06			
EU07090G32R171	10/9/2007	WG-07725-EE	0.001	0.001				0.61	
EF07090G32R172	10/9/2007	WG-07731-EE	0.000	0.001		0.06			
EU07090G32R172	10/9/2007	WG-07731-EE	0.000	0.001				0.66	
EF07090G32R173	10/9/2007	WG-07732-EE	0.000	0.001		0.06			
EU07090G32R173	10/9/2007	WG-07732-EE	0.000	0.001				0.59	
EF07090G32R174	10/9/2007	WG-07733-EE	0.000	0.001		0.06			
EU07090G32R174	10/9/2007	WG-07733-EE	0.000	0.001				0.54	
EF07090G32R110a	10/9/2007	WG-07855-EE	0.001	0.001		0.06			
EU07090G32R110a	10/9/2007	WG-07855-EE	0.000	0.001				0.55	
EF07090G32R120a	10/9/2007	WG-07855-EE	0.000	0.001		0.06			
EU07090G32R120a	10/9/2007	WG-07855-EE	0.001	0.001				0.54	
EF07090G32R175	10/9/2007	WG-07734-EE	0.001	0.001		0.05			
EU07090G32R175	10/9/2007	WG-07734-EE	0.000	0.001				0.50	
EF07090G32R176	10/9/2007	WG-07735-EE	0.001	0.001		0.06			
EU07090G32R176	10/9/2007	WG-07735-EE	0.000	0.001				0.49	
EF07090G32R177	10/11/2007	WG-07736-EE	0.000	0.001		0.06			
EU07090G32R177	10/11/2007	WG-07736-EE	0.000	0.001				0.79	
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.000	0.001		0.01	U	1.12	

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	Ca rslt	stdev (Ca)	Cd rslt	stdev (Cd)	Cl(-) ppm	Cl(-) (U)	ClO3(-) ppm
EF07090G32R161	10/9/2007	WG-07709-EE	16.6	0.1	0.001		4.21		0.0010
EU07090G32R161	10/9/2007	WG-07709-EE	16.3	0.1	0.001				
EF07090G32R162	10/9/2007	WG-07713-EE	16.3	0.1	0.001		4.21		0.0010
EU07090G32R162	10/9/2007	WG-07713-EE	16.9	0.1	0.001				
EF07090G32R163	10/9/2007	WG-07714-EE	16.1	0.0	0.001		4.24		0.0010
EU07090G32R163	10/9/2007	WG-07714-EE	17.6	0.2	0.001				
EF07090G32R164	10/9/2007	WG-07715-EE	17.2	0.1	0.001		4.21		0.0010
EU07090G32R164	10/9/2007	WG-07715-EE	17.8	0.1	0.001				
EF07090G32R165	10/9/2007	WG-07716-EE	17.2	0.1	0.001		4.15		0.0010
EU07090G32R165	10/9/2007	WG-07716-EE	17.0	0.2	0.001				
EF07090G32R166	10/9/2007	WG-07717-EE	16.8	0.1	0.001		4.20		0.0010
EU07090G32R166	10/9/2007	WG-07717-EE	17.5	0.1	0.001				
EF07090G32R167	10/9/2007	WG-07718-EE	16.9	0.1	0.001		4.21		0.0010
EU07090G32R167	10/9/2007	WG-07718-EE	17.3	0.1	0.001				
EF07090G32R168	10/9/2007	WG-07719-EE	16.9	0.1	0.001		4.24		0.0010
EU07090G32R168	10/9/2007	WG-07719-EE	17.4	0.1	0.001				
EF07090G32R110	10/9/2007	WG-07856-EE	17.7	0.1	0.001		4.24		0.0010
EU07090G32R110	10/9/2007	WG-07856-EE	17.8	0.0	0.001				
EF07090G32R120	10/9/2007	WG-07856-EE	17.4	0.1	0.001		4.20		0.0010
EU07090G32R120	10/9/2007	WG-07856-EE	17.8	0.1	0.001				
EU07090G32R101-FB	10/9/2007	WG-07856-EE	0.10	0.01	0.001		0.01	U	0.0005
EF07090G32R169	10/9/2007	WG-07720-EE	17.1	0.1	0.001		4.21		0.0010
EU07090G32R169	10/9/2007	WG-07720-EE	16.8	0.2	0.001				
EF07090G32R170	10/9/2007	WG-07721-EE	15.6	0.1	0.001		4.24		0.0010
EU07090G32R170	10/9/2007	WG-07721-EE	16.3	0.0	0.001				
EF07090G32R171	10/9/2007	WG-07725-EE	16.3	0.1	0.001		4.18		0.0010
EU07090G32R171	10/9/2007	WG-07725-EE	16.4	0.1	0.001				
EF07090G32R172	10/9/2007	WG-07731-EE	16.1	0.1	0.001		4.21		0.0010
EU07090G32R172	10/9/2007	WG-07731-EE	16.3	0.1	0.001				
EF07090G32R173	10/9/2007	WG-07732-EE	16.7	0.1	0.001		4.16		0.0010
EU07090G32R173	10/9/2007	WG-07732-EE	16.3	0.1	0.001				
EF07090G32R174	10/9/2007	WG-07733-EE	16.1	0.1	0.001		4.14		0.0010
EU07090G32R174	10/9/2007	WG-07733-EE	16.0	0.1	0.001				
EF07090G32R110a	10/9/2007	WG-07855-EE	16.2	0.1	0.001		4.74		0.0010
EU07090G32R110a	10/9/2007	WG-07855-EE	16.5	0.1	0.001				
EF07090G32R120a	10/9/2007	WG-07855-EE	16.3	0.1	0.001		4.81		0.0010
EU07090G32R120a	10/9/2007	WG-07855-EE	16.5	0.1	0.001				
EF07090G32R175	10/9/2007	WG-07734-EE	16.0	0.0	0.001		4.80		0.0010
EU07090G32R175	10/9/2007	WG-07734-EE	16.2	0.2	0.001				
EF07090G32R176	10/9/2007	WG-07735-EE	15.6	0.1	0.001		4.80		0.0010
EU07090G32R176	10/9/2007	WG-07735-EE	15.4	0.0	0.001				
EF07090G32R177	10/11/2007	WG-07736-EE	16.1	0.2	0.001		4.42		0.0010
EU07090G32R177	10/11/2007	WG-07736-EE	15.9	0.1	0.001				
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.67	0.00	0.001		0.20		0.0005

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	ClO3(-) (U)	Co rslt	stdev (Co)	Alk-CO3 rslt	ALK-CO3 (U)	Cr rslt	stdev (Cr)
EF07090G32R161	10/9/2007	WG-07709-EE	U	0.001		6.29		0.002	0.000
EU07090G32R161	10/9/2007	WG-07709-EE		0.001		6.29		0.002	0.000
EF07090G32R162	10/9/2007	WG-07713-EE	U	0.002	0.000	5.64		0.002	0.000
EU07090G32R162	10/9/2007	WG-07713-EE		0.001		5.64		0.002	0.000
EF07090G32R163	10/9/2007	WG-07714-EE	U	0.001		27.3		0.002	0.000
EU07090G32R163	10/9/2007	WG-07714-EE		0.001		27.3		0.002	0.000
EF07090G32R164	10/9/2007	WG-07715-EE	U	0.001		0.8	U	0.002	0.000
EU07090G32R164	10/9/2007	WG-07715-EE		0.001		0.8	U	0.002	0.000
EF07090G32R165	10/9/2007	WG-07716-EE	U	0.001		6.33		0.002	0.000
EU07090G32R165	10/9/2007	WG-07716-EE		0.001		6.33		0.002	0.000
EF07090G32R166	10/9/2007	WG-07717-EE	U	0.001		6.20		0.001	0.000
EU07090G32R166	10/9/2007	WG-07717-EE		0.001		6.20		0.002	0.000
EF07090G32R167	10/9/2007	WG-07718-EE	U	0.001		4.70		0.002	0.000
EU07090G32R167	10/9/2007	WG-07718-EE		0.001		4.70		0.002	0.000
EF07090G32R168	10/9/2007	WG-07719-EE	U	0.001		28.1		0.002	0.001
EU07090G32R168	10/9/2007	WG-07719-EE		0.001		28.1		0.002	0.000
EF07090G32R110	10/9/2007	WG-07856-EE	U	0.001		28.3		0.003	0.001
EU07090G32R110	10/9/2007	WG-07856-EE		0.001		28.3		0.004	0.002
EF07090G32R120	10/9/2007	WG-07856-EE	U	0.001		6.20		0.003	0.001
EU07090G32R120	10/9/2007	WG-07856-EE		0.001		6.20		0.003	0.001
EU07090G32R101-FB	10/9/2007	WG-07856-EE	U	0.001		0.8	U	0.001	
EF07090G32R169	10/9/2007	WG-07720-EE	U	0.001		20.7		0.003	0.002
EU07090G32R169	10/9/2007	WG-07720-EE		0.001		20.7		0.004	0.002
EF07090G32R170	10/9/2007	WG-07721-EE	U	0.001		27.7		0.004	0.001
EU07090G32R170	10/9/2007	WG-07721-EE		0.001		27.7		0.002	0.001
EF07090G32R171	10/9/2007	WG-07725-EE	U	0.001		0.8	U	0.003	0.001
EU07090G32R171	10/9/2007	WG-07725-EE		0.001		0.8	U	0.003	0.001
EF07090G32R172	10/9/2007	WG-07731-EE	U	0.001		6.31		0.001	0.000
EU07090G32R172	10/9/2007	WG-07731-EE		0.001		6.31		0.002	0.000
EF07090G32R173	10/9/2007	WG-07732-EE	U	0.001		0.8	U	0.002	0.000
EU07090G32R173	10/9/2007	WG-07732-EE		0.001		0.8	U	0.002	0.000
EF07090G32R174	10/9/2007	WG-07733-EE	U	0.001		6.41		0.001	0.000
EU07090G32R174	10/9/2007	WG-07733-EE		0.001		6.41		0.001	0.000
EF07090G32R110a	10/9/2007	WG-07855-EE	U	0.001		0.8	U	0.002	0.000
EU07090G32R110a	10/9/2007	WG-07855-EE		0.001		0.8	U	0.002	0.000
EF07090G32R120a	10/9/2007	WG-07855-EE	U	0.001		0.8	U	0.002	0.000
EU07090G32R120a	10/9/2007	WG-07855-EE		0.001		0.8	U	0.002	0.000
EF07090G32R175	10/9/2007	WG-07734-EE	U	0.004	0.000	0.8	U	0.001	0.000
EU07090G32R175	10/9/2007	WG-07734-EE		0.001		0.8	U	0.002	0.000
EF07090G32R176	10/9/2007	WG-07735-EE	U	0.001		0.8	U	0.002	0.000
EU07090G32R176	10/9/2007	WG-07735-EE		0.001		0.8	U	0.001	0.000
EF07090G32R177	10/11/2007	WG-07736-EE	U	0.001		0.8	U	0.002	0.000
EU07090G32R177	10/11/2007	WG-07736-EE		0.001		0.8	U	0.002	0.000
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	U	0.001				0.001	

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	Cs rslt	stdev (Cs)	Cu rslt	stdev (Cu)	F(-) ppm	F(-) (U)	Fe rslt
EF07090G32R161	10/9/2007	WG-07709-EE	0.001		0.001		0.34		0.46
EU07090G32R161	10/9/2007	WG-07709-EE	0.001		0.002	0.000			0.47
EF07090G32R162	10/9/2007	WG-07713-EE	0.001		0.001		0.33		0.45
EU07090G32R162	10/9/2007	WG-07713-EE	0.001		0.001				0.53
EF07090G32R163	10/9/2007	WG-07714-EE	0.001		0.001		0.35		0.51
EU07090G32R163	10/9/2007	WG-07714-EE	0.001		0.001				0.51
EF07090G32R164	10/9/2007	WG-07715-EE	0.001		0.001		0.33		0.51
EU07090G32R164	10/9/2007	WG-07715-EE	0.001		0.001				0.54
EF07090G32R165	10/9/2007	WG-07716-EE	0.001		0.001		0.32		0.52
EU07090G32R165	10/9/2007	WG-07716-EE	0.001		0.001				0.55
EF07090G32R166	10/9/2007	WG-07717-EE	0.001		0.001		0.34		0.55
EU07090G32R166	10/9/2007	WG-07717-EE	0.001		0.001				0.57
EF07090G32R167	10/9/2007	WG-07718-EE	0.001		0.001		0.33		0.57
EU07090G32R167	10/9/2007	WG-07718-EE	0.001		0.001				0.57
EF07090G32R168	10/9/2007	WG-07719-EE	0.001		0.001		0.34		0.57
EU07090G32R168	10/9/2007	WG-07719-EE	0.001		0.001				0.59
EF07090G32R110	10/9/2007	WG-07856-EE	0.001		0.001		0.33		0.64
EU07090G32R110	10/9/2007	WG-07856-EE	0.001		0.002	0.001			0.61
EF07090G32R120	10/9/2007	WG-07856-EE	0.001		0.001	0.000	0.33		0.63
EU07090G32R120	10/9/2007	WG-07856-EE	0.001		0.001				0.61
EU07090G32R101-FB	10/9/2007	WG-07856-EE	0.001		0.001		0.01	U	0.01
EF07090G32R169	10/9/2007	WG-07720-EE	0.001		0.001		0.34		0.68
EU07090G32R169	10/9/2007	WG-07720-EE	0.001		0.002	0.001			0.66
EF07090G32R170	10/9/2007	WG-07721-EE	0.001		0.001		0.33		0.73
EU07090G32R170	10/9/2007	WG-07721-EE	0.001		0.001				0.73
EF07090G32R171	10/9/2007	WG-07725-EE	0.001		0.001		0.33		0.73
EU07090G32R171	10/9/2007	WG-07725-EE	0.001		0.001				0.76
EF07090G32R172	10/9/2007	WG-07731-EE	0.001		0.001		0.33		0.83
EU07090G32R172	10/9/2007	WG-07731-EE	0.001		0.001				0.86
EF07090G32R173	10/9/2007	WG-07732-EE	0.001		0.001		0.33		0.87
EU07090G32R173	10/9/2007	WG-07732-EE	0.001		0.001				0.88
EF07090G32R174	10/9/2007	WG-07733-EE	0.001		0.001		0.33		0.90
EU07090G32R174	10/9/2007	WG-07733-EE	0.001		0.001				0.92
EF07090G32R110a	10/9/2007	WG-07855-EE	0.001		0.001		0.39		0.94
EU07090G32R110a	10/9/2007	WG-07855-EE	0.001		0.001				0.88
EF07090G32R120a	10/9/2007	WG-07855-EE	0.001		0.001	0.000	0.40		1.03
EU07090G32R120a	10/9/2007	WG-07855-EE	0.001		0.001	0.000			1.02
EF07090G32R175	10/9/2007	WG-07734-EE	0.001		0.001		0.38		1.04
EU07090G32R175	10/9/2007	WG-07734-EE	0.001		0.001	0.000			0.97
EF07090G32R176	10/9/2007	WG-07735-EE	0.001		0.001		0.38		1.04
EU07090G32R176	10/9/2007	WG-07735-EE	0.001		0.001				1.07
EF07090G32R177	10/11/2007	WG-07736-EE	0.001		0.001		0.35		0.85
EU07090G32R177	10/11/2007	WG-07736-EE	0.001		0.001	0.000			0.89
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.001		0.001		0.01	U	0.80

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	stdev (Fe)	Alk-CO3+HCO3 rslt	ALK-CO3+HCO3 (U)	Hg rslt	stdev (Hg)	K rslt
EF07090G32R161	10/9/2007	WG-07709-EE	0.01	93.6		0.00005		1.63
EU07090G32R161	10/9/2007	WG-07709-EE	0.00	93.6		0.00005		1.60
EF07090G32R162	10/9/2007	WG-07713-EE	0.00	91.2		0.00005		1.58
EU07090G32R162	10/9/2007	WG-07713-EE	0.00	91.2		0.00005		1.56
EF07090G32R163	10/9/2007	WG-07714-EE	0.00	69.5		0.00005		1.65
EU07090G32R163	10/9/2007	WG-07714-EE	0.00	69.5		0.00005		1.60
EF07090G32R164	10/9/2007	WG-07715-EE	0.00	97.0		0.00005		1.60
EU07090G32R164	10/9/2007	WG-07715-EE	0.00	97.0		0.00005		1.63
EF07090G32R165	10/9/2007	WG-07716-EE	0.00	90.4		0.00005		1.57
EU07090G32R165	10/9/2007	WG-07716-EE	0.00	90.4		0.00005		1.56
EF07090G32R166	10/9/2007	WG-07717-EE	0.00	90.3		0.00005		1.57
EU07090G32R166	10/9/2007	WG-07717-EE	0.01	90.3		0.00005		1.67
EF07090G32R167	10/9/2007	WG-07718-EE	0.00	92.2		0.00005		1.63
EU07090G32R167	10/9/2007	WG-07718-EE	0.01	92.2		0.00005		1.77
EF07090G32R168	10/9/2007	WG-07719-EE	0.00	67.4		0.00005		1.68
EU07090G32R168	10/9/2007	WG-07719-EE	0.01	67.4		0.00005		1.64
EF07090G32R110	10/9/2007	WG-07856-EE	0.01	67.9		0.00005		1.78
EU07090G32R110	10/9/2007	WG-07856-EE	0.01	67.9		0.00005		1.69
EF07090G32R120	10/9/2007	WG-07856-EE	0.01	90.3		0.00005		1.71
EU07090G32R120	10/9/2007	WG-07856-EE	0.01	90.3		0.00005		1.63
EU07090G32R101-FB	10/9/2007	WG-07856-EE		0	U	0.00005		0.01
EF07090G32R169	10/9/2007	WG-07720-EE	0.00	74.5		0.00005		1.66
EU07090G32R169	10/9/2007	WG-07720-EE	0.02	74.5		0.00005		1.79
EF07090G32R170	10/9/2007	WG-07721-EE	0.01	67.3		0.00005		1.70
EU07090G32R170	10/9/2007	WG-07721-EE	0.00	67.3		0.00005		1.67
EF07090G32R171	10/9/2007	WG-07725-EE	0.00	95.1		0.00005		1.63
EU07090G32R171	10/9/2007	WG-07725-EE	0.01	95.1		0.00005		1.63
EF07090G32R172	10/9/2007	WG-07731-EE	0.01	88.6		0.00005		1.72
EU07090G32R172	10/9/2007	WG-07731-EE	0.01	88.6		0.00005		1.73
EF07090G32R173	10/9/2007	WG-07732-EE	0.01	94.9		0.00005		1.83
EU07090G32R173	10/9/2007	WG-07732-EE	0.00	94.9		0.00005		1.72
EF07090G32R174	10/9/2007	WG-07733-EE	0.00	88.2		0.00005		1.79
EU07090G32R174	10/9/2007	WG-07733-EE	0.01	88.2		0.00005		1.74
EF07090G32R110a	10/9/2007	WG-07855-EE	0.01	98.3		0.00005		1.70
EU07090G32R110a	10/9/2007	WG-07855-EE	0.01	98.3		0.00005		1.59
EF07090G32R120a	10/9/2007	WG-07855-EE	0.02	94.1		0.00005		1.86
EU07090G32R120a	10/9/2007	WG-07855-EE	0.02	94.1		0.00005		1.87
EF07090G32R175	10/9/2007	WG-07734-EE	0.02	94.2		0.00005		1.79
EU07090G32R175	10/9/2007	WG-07734-EE	0.01	94.2		0.00005		1.65
EF07090G32R176	10/9/2007	WG-07735-EE	0.02	94.2		0.00005		1.70
EU07090G32R176	10/9/2007	WG-07735-EE	0.01	94.2		0.00005		1.69
EF07090G32R177	10/11/2007	WG-07736-EE	0.01	99.7		0.00005		1.84
EU07090G32R177	10/11/2007	WG-07736-EE	0.00	99.7		0.00005		1.74
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.01			0.00005		0.11

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	stdev (K)	Li rslt	stdev (Li)	Mg rslt	stdev (Mg)	Mn rslt	stdev (Mn)
EF07090G32R161	10/9/2007	WG-07709-EE	0.02	0.027	0.000	4.64	0.05	0.015	0.000
EU07090G32R161	10/9/2007	WG-07709-EE	0.01	0.026	0.000	4.54	0.01	0.016	0.000
EF07090G32R162	10/9/2007	WG-07713-EE	0.01	0.026	0.000	4.53	0.02	0.019	0.000
EU07090G32R162	10/9/2007	WG-07713-EE	0.02	0.026	0.000	4.55	0.04	0.017	0.000
EF07090G32R163	10/9/2007	WG-07714-EE	0.01	0.028	0.000	4.59	0.03	0.016	0.000
EU07090G32R163	10/9/2007	WG-07714-EE	0.00	0.026	0.000	4.44	0.02	0.016	0.000
EF07090G32R164	10/9/2007	WG-07715-EE	0.01	0.026	0.000	4.52	0.05	0.015	0.000
EU07090G32R164	10/9/2007	WG-07715-EE	0.02	0.027	0.000	4.60	0.03	0.016	0.000
EF07090G32R165	10/9/2007	WG-07716-EE	0.00	0.026	0.000	4.40	0.03	0.016	0.000
EU07090G32R165	10/9/2007	WG-07716-EE	0.01	0.026	0.000	4.43	0.03	0.016	0.000
EF07090G32R166	10/9/2007	WG-07717-EE	0.02	0.026	0.000	4.47	0.04	0.016	0.000
EU07090G32R166	10/9/2007	WG-07717-EE	0.03	0.028	0.000	4.63	0.06	0.016	0.000
EF07090G32R167	10/9/2007	WG-07718-EE	0.01	0.027	0.000	4.57	0.03	0.016	0.000
EU07090G32R167	10/9/2007	WG-07718-EE	0.03	0.029	0.000	4.51	0.06	0.017	0.000
EF07090G32R168	10/9/2007	WG-07719-EE	0.01	0.028	0.000	4.51	0.03	0.016	0.000
EU07090G32R168	10/9/2007	WG-07719-EE	0.04	0.027	0.001	4.40	0.06	0.016	0.000
EF07090G32R110	10/9/2007	WG-07856-EE	0.04	0.029	0.001	4.81	0.07	0.017	0.000
EU07090G32R110	10/9/2007	WG-07856-EE	0.03	0.027	0.001	4.55	0.08	0.017	0.000
EF07090G32R120	10/9/2007	WG-07856-EE	0.04	0.027	0.000	4.68	0.11	0.018	0.000
EU07090G32R120	10/9/2007	WG-07856-EE	0.03	0.026	0.000	4.46	0.09	0.016	0.000
EU07090G32R101-FB	10/9/2007	WG-07856-EE	0.00	0.001		0.01		0.001	
EF07090G32R169	10/9/2007	WG-07720-EE	0.01	0.026	0.000	4.53	0.02	0.017	0.000
EU07090G32R169	10/9/2007	WG-07720-EE	0.05	0.028	0.001	4.54	0.11	0.016	0.000
EF07090G32R170	10/9/2007	WG-07721-EE	0.01	0.028	0.000	4.54	0.02	0.017	0.000
EU07090G32R170	10/9/2007	WG-07721-EE	0.00	0.027	0.000	4.49	0.01	0.017	0.000
EF07090G32R171	10/9/2007	WG-07725-EE	0.02	0.026	0.000	4.35	0.04	0.016	0.000
EU07090G32R171	10/9/2007	WG-07725-EE	0.02	0.026	0.000	4.27	0.04	0.016	0.000
EF07090G32R172	10/9/2007	WG-07731-EE	0.01	0.028	0.000	4.56	0.02	0.017	0.000
EU07090G32R172	10/9/2007	WG-07731-EE	0.01	0.028	0.000	4.55	0.02	0.017	0.000
EF07090G32R173	10/9/2007	WG-07732-EE	0.01	0.029	0.000	4.66	0.07	0.018	0.000
EU07090G32R173	10/9/2007	WG-07732-EE	0.01	0.028	0.000	4.53	0.04	0.017	0.000
EF07090G32R174	10/9/2007	WG-07733-EE	0.01	0.028	0.000	4.56	0.03	0.018	0.000
EU07090G32R174	10/9/2007	WG-07733-EE	0.01	0.028	0.000	4.55	0.05	0.017	0.000
EF07090G32R110a	10/9/2007	WG-07855-EE	0.03	0.027	0.000	4.41	0.08	0.017	0.000
EU07090G32R110a	10/9/2007	WG-07855-EE	0.03	0.025	0.000	4.07	0.06	0.015	0.000
EF07090G32R120a	10/9/2007	WG-07855-EE	0.05	0.030	0.001	4.82	0.09	0.018	0.001
EU07090G32R120a	10/9/2007	WG-07855-EE	0.05	0.030	0.001	4.78	0.12	0.018	0.000
EF07090G32R175	10/9/2007	WG-07734-EE	0.04	0.029	0.001	4.66	0.11	0.027	0.001
EU07090G32R175	10/9/2007	WG-07734-EE	0.03	0.026	0.000	4.25	0.07	0.016	0.000
EF07090G32R176	10/9/2007	WG-07735-EE	0.03	0.028	0.000	4.54	0.08	0.018	0.000
EU07090G32R176	10/9/2007	WG-07735-EE	0.01	0.028	0.000	4.51	0.01	0.017	0.000
EF07090G32R177	10/11/2007	WG-07736-EE	0.00	0.029	0.000	4.75	0.01	0.017	0.000
EU07090G32R177	10/11/2007	WG-07736-EE	0.00	0.028	0.000	4.65	0.03	0.016	0.000
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.00	0.001		0.14	0.00	0.005	0.000

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	Mo rslt	stdev (Mo)	Na rslt	stdev (Na)	Ni rslt	stdev (Ni)	NO2(ppm)
EF07090G32R161	10/9/2007	WG-07709-EE	0.003	0.000	10.5	0.2	0.001		0.01
EU07090G32R161	10/9/2007	WG-07709-EE	0.005	0.000	10.6	0.1	0.001	0.000	
EF07090G32R162	10/9/2007	WG-07713-EE	0.004	0.000	10.5	0.0	0.001	0.000	0.01
EU07090G32R162	10/9/2007	WG-07713-EE	0.003	0.000	10.3	0.1	0.001		
EF07090G32R163	10/9/2007	WG-07714-EE	0.002	0.000	10.8	0.1	0.001		0.01
EU07090G32R163	10/9/2007	WG-07714-EE	0.003	0.000	10.4	0.0	0.001		
EF07090G32R164	10/9/2007	WG-07715-EE	0.002	0.000	10.5	0.0	0.001		0.01
EU07090G32R164	10/9/2007	WG-07715-EE	0.003	0.000	10.9	0.1	0.001	0.000	
EF07090G32R165	10/9/2007	WG-07716-EE	0.002	0.000	10.3	0.1	0.002	0.000	0.01
EU07090G32R165	10/9/2007	WG-07716-EE	0.003	0.000	10.2	0.0	0.003	0.000	
EF07090G32R166	10/9/2007	WG-07717-EE	0.003	0.000	10.4	0.1	0.001		0.01
EU07090G32R166	10/9/2007	WG-07717-EE	0.003	0.000	10.9	0.2	0.001		
EF07090G32R167	10/9/2007	WG-07718-EE	0.003	0.000	10.6	0.1	0.001		0.01
EU07090G32R167	10/9/2007	WG-07718-EE	0.003	0.000	11.1	0.2	0.001	0.000	
EF07090G32R168	10/9/2007	WG-07719-EE	0.002	0.000	10.8	0.0	0.001	0.000	0.01
EU07090G32R168	10/9/2007	WG-07719-EE	0.002	0.000	10.5	0.2	0.002	0.000	
EF07090G32R110	10/9/2007	WG-07856-EE	0.002	0.000	11.7	0.2	0.001	0.000	0.01
EU07090G32R110	10/9/2007	WG-07856-EE	0.003	0.000	11.0	0.1	0.003	0.001	
EF07090G32R120	10/9/2007	WG-07856-EE	0.002	0.000	11.3	0.2	0.002	0.001	0.01
EU07090G32R120	10/9/2007	WG-07856-EE	0.002	0.000	10.8	0.1	0.002	0.001	
EU07090G32R101-FB	10/9/2007	WG-07856-EE	0.001		0.19	0.00	0.001		0.01
EF07090G32R169	10/9/2007	WG-07720-EE	0.002	0.000	10.9	0.0	0.002	0.001	0.01
EU07090G32R169	10/9/2007	WG-07720-EE	0.002	0.000	11.0	0.2	0.003	0.001	
EF07090G32R170	10/9/2007	WG-07721-EE	0.002	0.000	10.5	0.1	0.002	0.001	0.01
EU07090G32R170	10/9/2007	WG-07721-EE	0.003	0.000	10.4	0.0	0.002	0.000	
EF07090G32R171	10/9/2007	WG-07725-EE	0.002	0.000	10.0	0.1	0.001	0.000	0.01
EU07090G32R171	10/9/2007	WG-07725-EE	0.002	0.000	10.1	0.1	0.002	0.000	
EF07090G32R172	10/9/2007	WG-07731-EE	0.002	0.000	10.8	0.1	0.001		0.01
EU07090G32R172	10/9/2007	WG-07731-EE	0.002	0.000	10.8	0.1	0.001		
EF07090G32R173	10/9/2007	WG-07732-EE	0.002	0.000	11.5	0.1	0.001		0.01
EU07090G32R173	10/9/2007	WG-07732-EE	0.002	0.000	10.9	0.0	0.001	0.000	
EF07090G32R174	10/9/2007	WG-07733-EE	0.002	0.000	11.1	0.0	0.001		0.01
EU07090G32R174	10/9/2007	WG-07733-EE	0.002	0.000	10.9	0.1	0.001		
EF07090G32R110a	10/9/2007	WG-07855-EE	0.002	0.000	10.8	0.1	0.001		0.01
EU07090G32R110a	10/9/2007	WG-07855-EE	0.002	0.000	10.1	0.1	0.001	0.000	
EF07090G32R120a	10/9/2007	WG-07855-EE	0.002	0.000	11.8	0.2	0.001		0.01
EU07090G32R120a	10/9/2007	WG-07855-EE	0.002	0.000	11.9	0.2	0.001	0.000	
EF07090G32R175	10/9/2007	WG-07734-EE	0.002	0.000	11.5	0.2	0.002	0.000	0.01
EU07090G32R175	10/9/2007	WG-07734-EE	0.002	0.000	10.5	0.1	0.001	0.000	
EF07090G32R176	10/9/2007	WG-07735-EE	0.002	0.000	10.8	0.2	0.002	0.000	0.01
EU07090G32R176	10/9/2007	WG-07735-EE	0.002	0.000	10.7	0.1	0.002	0.000	
EF07090G32R177	10/11/2007	WG-07736-EE	0.002	0.000	12.1	0.1	0.001	0.000	0.01
EU07090G32R177	10/11/2007	WG-07736-EE	0.002	0.000	11.8	0.0	0.002	0.000	
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.001		0.93	0.01	0.001		0.01

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	NO2-N rslt	NO2-N (U)	NO-3 ppm	NO-3-N rslt	NO-3-N (U)	C2O4 rslt	C2O4 (U)
EF07090G32R161	10/9/2007	WG-07709-EE	0.003	U	4.43	1.000		0.01	U
EU07090G32R161	10/9/2007	WG-07709-EE							
EF07090G32R162	10/9/2007	WG-07713-EE	0.003	U	4.48	1.011		0.01	U
EU07090G32R162	10/9/2007	WG-07713-EE							
EF07090G32R163	10/9/2007	WG-07714-EE	0.003	U	4.45	1.006		0.01	U
EU07090G32R163	10/9/2007	WG-07714-EE							
EF07090G32R164	10/9/2007	WG-07715-EE	0.003	U	4.48	1.012		0.01	U
EU07090G32R164	10/9/2007	WG-07715-EE							
EF07090G32R165	10/9/2007	WG-07716-EE	0.003	U	4.41	0.995		0.01	U
EU07090G32R165	10/9/2007	WG-07716-EE							
EF07090G32R166	10/9/2007	WG-07717-EE	0.003	U	4.42	0.998		0.01	U
EU07090G32R166	10/9/2007	WG-07717-EE							
EF07090G32R167	10/9/2007	WG-07718-EE	0.003	U	4.38	0.988		0.01	U
EU07090G32R167	10/9/2007	WG-07718-EE							
EF07090G32R168	10/9/2007	WG-07719-EE	0.003	U	4.41	0.995		0.01	U
EU07090G32R168	10/9/2007	WG-07719-EE							
EF07090G32R110	10/9/2007	WG-07856-EE	0.003	U	4.49	1.014		0.01	U
EU07090G32R110	10/9/2007	WG-07856-EE							
EF07090G32R120	10/9/2007	WG-07856-EE	0.003	U	4.51	1.017		0.01	U
EU07090G32R120	10/9/2007	WG-07856-EE							
EU07090G32R101-FB	10/9/2007	WG-07856-EE	0.003	U	0.01	0.002	U	0.01	U
EF07090G32R169	10/9/2007	WG-07720-EE	0.003	U	4.31	0.974		0.01	U
EU07090G32R169	10/9/2007	WG-07720-EE							
EF07090G32R170	10/9/2007	WG-07721-EE	0.003	U	4.51	1.017		0.01	U
EU07090G32R170	10/9/2007	WG-07721-EE							
EF07090G32R171	10/9/2007	WG-07725-EE	0.003	U	4.47	1.010		0.01	U
EU07090G32R171	10/9/2007	WG-07725-EE							
EF07090G32R172	10/9/2007	WG-07731-EE	0.003	U	4.49	1.014		0.01	U
EU07090G32R172	10/9/2007	WG-07731-EE							
EF07090G32R173	10/9/2007	WG-07732-EE	0.003	U	4.45	1.004		0.01	U
EU07090G32R173	10/9/2007	WG-07732-EE							
EF07090G32R174	10/9/2007	WG-07733-EE	0.003	U	4.43	1.000		0.01	U
EU07090G32R174	10/9/2007	WG-07733-EE							
EF07090G32R110a	10/9/2007	WG-07855-EE	0.003	U	4.38	0.989		0.01	U
EU07090G32R110a	10/9/2007	WG-07855-EE							
EF07090G32R120a	10/9/2007	WG-07855-EE	0.003	U	4.56	1.029		0.01	U
EU07090G32R120a	10/9/2007	WG-07855-EE							
EF07090G32R175	10/9/2007	WG-07734-EE	0.003	U	4.55	1.026		0.01	U
EU07090G32R175	10/9/2007	WG-07734-EE							
EF07090G32R176	10/9/2007	WG-07735-EE	0.003	U	4.55	1.027		0.01	U
EU07090G32R176	10/9/2007	WG-07735-EE							
EF07090G32R177	10/11/2007	WG-07736-EE	0.003	U	4.49	1.014		0.01	U
EU07090G32R177	10/11/2007	WG-07736-EE							
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.003	U	0.03	0.007		0.01	U

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	Pb rslt	stdev (Pb)	pH	PO4(-3) rslt	PO4(-3) (U)	Rb rslt	stdev (Rb)
EF07090G32R161	10/9/2007	WG-07709-EE	0.0003	0.0000	8.18	0.02		0.003	0.000
EU07090G32R161	10/9/2007	WG-07709-EE	0.0027	0.0001	8.18			0.003	0.000
EF07090G32R162	10/9/2007	WG-07713-EE	0.0015	0.0000	8.13	0.01		0.003	0.000
EU07090G32R162	10/9/2007	WG-07713-EE	0.0007	0.0000	8.13			0.003	0.000
EF07090G32R163	10/9/2007	WG-07714-EE	0.0002	0.0000	8.12	0.02		0.003	0.000
EU07090G32R163	10/9/2007	WG-07714-EE	0.0011	0.0000	8.12			0.003	0.000
EF07090G32R164	10/9/2007	WG-07715-EE	0.0002		8.11	0.02		0.003	0.000
EU07090G32R164	10/9/2007	WG-07715-EE	0.0008	0.0000	8.11			0.003	0.000
EF07090G32R165	10/9/2007	WG-07716-EE	0.0003	0.0000	8.14	0.01		0.003	0.000
EU07090G32R165	10/9/2007	WG-07716-EE	0.0011	0.0001	8.14			0.003	0.000
EF07090G32R166	10/9/2007	WG-07717-EE	0.0003	0.0000	8.12	0.02		0.003	0.000
EU07090G32R166	10/9/2007	WG-07717-EE	0.0007	0.0000	8.12			0.003	0.000
EF07090G32R167	10/9/2007	WG-07718-EE	0.0003	0.0000	8.10	0.01		0.003	0.000
EU07090G32R167	10/9/2007	WG-07718-EE	0.0012	0.0000	8.10			0.003	0.000
EF07090G32R168	10/9/2007	WG-07719-EE	0.0003	0.0001	8.11	0.02		0.004	0.001
EU07090G32R168	10/9/2007	WG-07719-EE	0.0005	0.0001	8.11			0.004	0.001
EF07090G32R110	10/9/2007	WG-07856-EE	0.0005	0.0001	8.07	0.01	U	0.005	0.001
EU07090G32R110	10/9/2007	WG-07856-EE	0.0025	0.0009	8.07			0.006	0.002
EF07090G32R120	10/9/2007	WG-07856-EE	0.0008	0.0003	8.13	0.01	U	0.006	0.002
EU07090G32R120	10/9/2007	WG-07856-EE	0.0012	0.0003	8.13			0.005	0.001
EU07090G32R101-FB	10/9/2007	WG-07856-EE	0.0002		5.91	0.01	U	0.001	
EF07090G32R169	10/9/2007	WG-07720-EE	0.0003	0.0002	8.10	0.01	U	0.006	0.002
EU07090G32R169	10/9/2007	WG-07720-EE	0.0026	0.0009	8.10			0.006	0.002
EF07090G32R170	10/9/2007	WG-07721-EE	0.0003	0.0001	8.11	0.01		0.006	0.002
EU07090G32R170	10/9/2007	WG-07721-EE	0.0012	0.0002	8.11			0.004	0.001
EF07090G32R171	10/9/2007	WG-07725-EE	0.0002		8.02	0.01		0.004	0.000
EU07090G32R171	10/9/2007	WG-07725-EE	0.0009	0.0002	8.02			0.005	0.001
EF07090G32R172	10/9/2007	WG-07731-EE	0.0002		8.02	0.02		0.003	0.000
EU07090G32R172	10/9/2007	WG-07731-EE	0.0004	0.0000	8.02			0.003	0.000
EF07090G32R173	10/9/2007	WG-07732-EE	0.0002		8.03	0.01	U	0.003	0.000
EU07090G32R173	10/9/2007	WG-07732-EE	0.0005	0.0000	8.03			0.004	0.000
EF07090G32R174	10/9/2007	WG-07733-EE	0.0002		8.01	0.01	U	0.003	0.000
EU07090G32R174	10/9/2007	WG-07733-EE	0.0003	0.0000	8.01			0.003	0.000
EF07090G32R110a	10/9/2007	WG-07855-EE	0.0002		7.99	0.02		0.004	0.000
EU07090G32R110a	10/9/2007	WG-07855-EE	0.0004	0.0000	7.99			0.003	0.000
EF07090G32R120a	10/9/2007	WG-07855-EE	0.0002		7.99	0.02		0.004	0.000
EU07090G32R120a	10/9/2007	WG-07855-EE	0.0005	0.0000	7.99			0.004	0.000
EF07090G32R175	10/9/2007	WG-07734-EE	0.0003	0.0000	7.99	0.02		0.003	0.000
EU07090G32R175	10/9/2007	WG-07734-EE	0.0003	0.0000	7.99			0.004	0.000
EF07090G32R176	10/9/2007	WG-07735-EE	0.0002		8.00	0.01		0.003	0.000
EU07090G32R176	10/9/2007	WG-07735-EE	0.0003	0.0000	8.00			0.003	0.000
EF07090G32R177	10/11/2007	WG-07736-EE	0.0002		8.07	0.01	U	0.004	0.000
EU07090G32R177	10/11/2007	WG-07736-EE	0.0002	0.0000	8.07			0.003	0.000
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.0002	0.0000		0.01	U	0.001	

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	S2- rslt	S2- (U)	Sb rslt	stdev (Sb)	Se rslt	stdev (Se)	Si rslt
EF07090G32R161	10/9/2007	WG-07709-EE			0.001		0.001		30.5
EU07090G32R161	10/9/2007	WG-07709-EE	0.006	U	0.001		0.001		29.4
EF07090G32R162	10/9/2007	WG-07713-EE			0.001		0.001		29.5
EU07090G32R162	10/9/2007	WG-07713-EE	0.006	U	0.001		0.001		29.8
EF07090G32R163	10/9/2007	WG-07714-EE			0.001		0.001		30.1
EU07090G32R163	10/9/2007	WG-07714-EE	0.006	U	0.001		0.001		29.4
EF07090G32R164	10/9/2007	WG-07715-EE			0.001		0.001	0.000	29.9
EU07090G32R164	10/9/2007	WG-07715-EE	0.006	U	0.001		0.001	0.000	30.7
EF07090G32R165	10/9/2007	WG-07716-EE			0.001		0.001		29.2
EU07090G32R165	10/9/2007	WG-07716-EE	0.006	U	0.001		0.001		29.6
EF07090G32R166	10/9/2007	WG-07717-EE			0.001		0.001		29.6
EU07090G32R166	10/9/2007	WG-07717-EE	0.006	U	0.001		0.001		30.7
EF07090G32R167	10/9/2007	WG-07718-EE			0.001		0.001		30.1
EU07090G32R167	10/9/2007	WG-07718-EE	0.006	U	0.001		0.001		30.1
EF07090G32R168	10/9/2007	WG-07719-EE			0.001		0.001	0.000	30.3
EU07090G32R168	10/9/2007	WG-07719-EE	0.006	U	0.001		0.001	0.000	29.0
EF07090G32R110	10/9/2007	WG-07856-EE			0.001		0.002	0.001	31.9
EU07090G32R110	10/9/2007	WG-07856-EE	0.006	U	0.001		0.002	0.001	30.0
EF07090G32R120	10/9/2007	WG-07856-EE			0.001		0.002	0.001	31.0
EU07090G32R120	10/9/2007	WG-07856-EE	0.006	U	0.001		0.002	0.001	29.2
EU07090G32R101-FB	10/9/2007	WG-07856-EE	0.006	U	0.001		0.001		0.17
EF07090G32R169	10/9/2007	WG-07720-EE			0.001		0.002	0.001	30.2
EU07090G32R169	10/9/2007	WG-07720-EE	0.006	U	0.001		0.003	0.001	29.9
EF07090G32R170	10/9/2007	WG-07721-EE			0.001		0.003	0.001	30.2
EU07090G32R170	10/9/2007	WG-07721-EE	0.006	U	0.001		0.001	0.000	29.8
EF07090G32R171	10/9/2007	WG-07725-EE			0.001		0.001	0.000	28.7
EU07090G32R171	10/9/2007	WG-07725-EE	0.006	U	0.001		0.002	0.001	28.4
EF07090G32R172	10/9/2007	WG-07731-EE			0.001		0.001		30.4
EU07090G32R172	10/9/2007	WG-07731-EE	0.006	U	0.001		0.001		30.0
EF07090G32R173	10/9/2007	WG-07732-EE	0.006	U	0.001		0.001		31.2
EU07090G32R173	10/9/2007	WG-07732-EE	0.006	U	0.001		0.001		30.3
EF07090G32R174	10/9/2007	WG-07733-EE			0.001		0.001		30.4
EU07090G32R174	10/9/2007	WG-07733-EE	0.006	U	0.001		0.001		30.2
EF07090G32R110a	10/9/2007	WG-07855-EE			0.001		0.001		29.7
EU07090G32R110a	10/9/2007	WG-07855-EE	0.006	U	0.001		0.001		27.4
EF07090G32R120a	10/9/2007	WG-07855-EE			0.001		0.001		32.2
EU07090G32R120a	10/9/2007	WG-07855-EE	0.006	U	0.001		0.001		32.3
EF07090G32R175	10/9/2007	WG-07734-EE			0.001		0.001		31.5
EU07090G32R175	10/9/2007	WG-07734-EE	0.006	U	0.001		0.001	0.000	28.9
EF07090G32R176	10/9/2007	WG-07735-EE			0.001		0.001	0.000	30.3
EU07090G32R176	10/9/2007	WG-07735-EE	0.006	U	0.001		0.001		30.1
EF07090G32R177	10/11/2007	WG-07736-EE			0.001		0.001	0.000	31.0
EU07090G32R177	10/11/2007	WG-07736-EE	0.006	U	0.001		0.001		30.4
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.006	U	0.001		0.001		1.20

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	stdev (Si)	SiO2 rslt	stdev (SiO2)	Sn rslt	stdev (Sn)	SO4(-2) rslt	Sr rslt
EF07090G32R161	10/9/2007	WG-07709-EE	0.1	65.2	0.2	0.001	0.000	7.24	0.092
EU07090G32R161	10/9/2007	WG-07709-EE	0.2	62.8	0.3	0.012	0.000		0.090
EF07090G32R162	10/9/2007	WG-07713-EE	0.2	63.2	0.4	0.009	0.000	4.24	0.090
EU07090G32R162	10/9/2007	WG-07713-EE	0.4	63.7	0.9	0.003	0.000		0.089
EF07090G32R163	10/9/2007	WG-07714-EE	0.4	64.5	0.8	0.001	0.000	7.26	0.092
EU07090G32R163	10/9/2007	WG-07714-EE	0.1	63.0	0.2	0.005	0.000		0.089
EF07090G32R164	10/9/2007	WG-07715-EE	0.1	64.1	0.2	0.001		7.20	0.089
EU07090G32R164	10/9/2007	WG-07715-EE	0.3	65.8	0.6	0.004	0.000		0.092
EF07090G32R165	10/9/2007	WG-07716-EE	0.3	62.4	0.6	0.001	0.000	7.21	0.088
EU07090G32R165	10/9/2007	WG-07716-EE	0.0	63.4	0.0	0.004	0.000		0.087
EF07090G32R166	10/9/2007	WG-07717-EE	0.2	63.4	0.3	0.002	0.000	7.21	0.088
EU07090G32R166	10/9/2007	WG-07717-EE	0.7	65.8	1.5	0.004	0.000		0.093
EF07090G32R167	10/9/2007	WG-07718-EE	0.1	64.5	0.1	0.002	0.000	7.19	0.089
EU07090G32R167	10/9/2007	WG-07718-EE	0.2	64.3	0.4	0.007	0.000		0.090
EF07090G32R168	10/9/2007	WG-07719-EE	0.3	64.9	0.7	0.001	0.000	7.18	0.090
EU07090G32R168	10/9/2007	WG-07719-EE	0.6	62.1	1.4	0.002	0.000		0.086
EF07090G32R110	10/9/2007	WG-07856-EE	0.4	68.3	0.9	0.001	0.000	0.04	0.095
EU07090G32R110	10/9/2007	WG-07856-EE	0.5	64.3	1.1	0.005	0.000		0.089
EF07090G32R120	10/9/2007	WG-07856-EE	0.6	66.3	1.3	0.001	0.000	7.25	0.092
EU07090G32R120	10/9/2007	WG-07856-EE	0.3	62.4	0.7	0.003	0.000		0.087
EU07090G32R101-FB	10/9/2007	WG-07856-EE	0.00	0.37	0.00	0.001		7.15	0.001
EF07090G32R169	10/9/2007	WG-07720-EE	0.2	64.6	0.5	0.001		7.12	0.088
EU07090G32R169	10/9/2007	WG-07720-EE	0.6	63.9	1.3	0.004	0.000		0.088
EF07090G32R170	10/9/2007	WG-07721-EE	0.3	64.6	0.6	0.001		7.15	0.088
EU07090G32R170	10/9/2007	WG-07721-EE	0.1	63.7	0.2	0.003	0.000		0.088
EF07090G32R171	10/9/2007	WG-07725-EE	0.4	61.3	0.9	0.001		7.06	0.083
EU07090G32R171	10/9/2007	WG-07725-EE	0.1	60.8	0.1	0.001	0.000		0.082
EF07090G32R172	10/9/2007	WG-07731-EE	0.1	65.1	0.2	0.001		7.12	0.087
EU07090G32R172	10/9/2007	WG-07731-EE	0.3	64.2	0.5	0.001	0.000		0.088
EF07090G32R173	10/9/2007	WG-07732-EE	0.2	66.9	0.5	0.001		7.08	0.089
EU07090G32R173	10/9/2007	WG-07732-EE	0.1	64.8	0.2	0.001			0.088
EF07090G32R174	10/9/2007	WG-07733-EE	0.2	65.0	0.4	0.001		7.06	0.087
EU07090G32R174	10/9/2007	WG-07733-EE	0.1	64.6	0.3	0.001			0.086
EF07090G32R110a	10/9/2007	WG-07855-EE	0.1	63.6	0.1	0.001		7.86	0.083
EU07090G32R110a	10/9/2007	WG-07855-EE	0.5	58.7	1.0	0.001			0.077
EF07090G32R120a	10/9/2007	WG-07855-EE	0.5	68.8	1.2	0.001		7.99	0.091
EU07090G32R120a	10/9/2007	WG-07855-EE	0.8	69.0	1.7	0.001			0.090
EF07090G32R175	10/9/2007	WG-07734-EE	0.9	67.3	2.0	0.001		8.06	0.086
EU07090G32R175	10/9/2007	WG-07734-EE	0.2	61.8	0.3	0.001			0.079
EF07090G32R176	10/9/2007	WG-07735-EE	0.6	64.8	1.3	0.001		8.09	0.084
EU07090G32R176	10/9/2007	WG-07735-EE	0.2	64.5	0.5	0.001			0.083
EF07090G32R177	10/11/2007	WG-07736-EE	0.4	66.3	0.8	0.001		8.02	0.088
EU07090G32R177	10/11/2007	WG-07736-EE	0.3	65.1	0.6	0.001			0.086
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.01	2.57	0.02	0.001		0.02	0.002

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	stdev (Sr)	Th rslt	stdev (Th)	Ti rslt	stdev (Ti)	Tl rslt	stdev (Tl)
EF07090G32R161	10/9/2007	WG-07709-EE	0.000	0.001		0.002		0.001	
EU07090G32R161	10/9/2007	WG-07709-EE	0.001	0.001		0.002		0.001	
EF07090G32R162	10/9/2007	WG-07713-EE	0.000	0.001		0.002		0.001	
EU07090G32R162	10/9/2007	WG-07713-EE	0.001	0.001		0.002		0.001	
EF07090G32R163	10/9/2007	WG-07714-EE	0.001	0.001		0.002		0.001	
EU07090G32R163	10/9/2007	WG-07714-EE	0.001	0.001		0.002		0.001	
EF07090G32R164	10/9/2007	WG-07715-EE	0.000	0.001		0.002		0.001	
EU07090G32R164	10/9/2007	WG-07715-EE	0.000	0.001		0.002		0.001	
EF07090G32R165	10/9/2007	WG-07716-EE	0.001	0.001		0.002		0.001	
EU07090G32R165	10/9/2007	WG-07716-EE	0.001	0.001		0.002		0.001	
EF07090G32R166	10/9/2007	WG-07717-EE	0.001	0.001		0.002		0.001	
EU07090G32R166	10/9/2007	WG-07717-EE	0.002	0.001		0.002		0.001	
EF07090G32R167	10/9/2007	WG-07718-EE	0.000	0.001		0.002		0.001	
EU07090G32R167	10/9/2007	WG-07718-EE	0.001	0.001		0.002		0.001	
EF07090G32R168	10/9/2007	WG-07719-EE	0.001	0.001		0.002		0.001	
EU07090G32R168	10/9/2007	WG-07719-EE	0.002	0.001		0.002		0.001	
EF07090G32R110	10/9/2007	WG-07856-EE	0.002	0.001		0.002		0.001	
EU07090G32R110	10/9/2007	WG-07856-EE	0.002	0.001		0.002		0.001	
EF07090G32R120	10/9/2007	WG-07856-EE	0.002	0.001		0.002		0.001	
EU07090G32R120	10/9/2007	WG-07856-EE	0.001	0.001		0.002		0.001	
EU07090G32R101-FB	10/9/2007	WG-07856-EE		0.001		0.002		0.001	
EF07090G32R169	10/9/2007	WG-07720-EE	0.000	0.001		0.002		0.001	
EU07090G32R169	10/9/2007	WG-07720-EE	0.002	0.001		0.002		0.001	
EF07090G32R170	10/9/2007	WG-07721-EE	0.001	0.001		0.002		0.001	
EU07090G32R170	10/9/2007	WG-07721-EE	0.000	0.001		0.002		0.001	
EF07090G32R171	10/9/2007	WG-07725-EE	0.001	0.001		0.002		0.001	
EU07090G32R171	10/9/2007	WG-07725-EE	0.001	0.001		0.002		0.001	
EF07090G32R172	10/9/2007	WG-07731-EE	0.001	0.001		0.002		0.001	
EU07090G32R172	10/9/2007	WG-07731-EE	0.001	0.001		0.002		0.001	
EF07090G32R173	10/9/2007	WG-07732-EE	0.001	0.001		0.002		0.001	
EU07090G32R173	10/9/2007	WG-07732-EE	0.000	0.001		0.002		0.001	
EF07090G32R174	10/9/2007	WG-07733-EE	0.000	0.001		0.002		0.001	
EU07090G32R174	10/9/2007	WG-07733-EE	0.001	0.001		0.002		0.001	
EF07090G32R110a	10/9/2007	WG-07855-EE	0.002	0.001		0.002		0.001	
EU07090G32R110a	10/9/2007	WG-07855-EE	0.000	0.001		0.002		0.001	
EF07090G32R120a	10/9/2007	WG-07855-EE	0.002	0.001		0.002		0.001	
EU07090G32R120a	10/9/2007	WG-07855-EE	0.001	0.001		0.002		0.001	
EF07090G32R175	10/9/2007	WG-07734-EE	0.002	0.001		0.002		0.001	
EU07090G32R175	10/9/2007	WG-07734-EE	0.001	0.001		0.002		0.001	
EF07090G32R176	10/9/2007	WG-07735-EE	0.001	0.001		0.002		0.001	
EU07090G32R176	10/9/2007	WG-07735-EE	0.001	0.001		0.002		0.001	
EF07090G32R177	10/11/2007	WG-07736-EE	0.001	0.001		0.002		0.001	
EU07090G32R177	10/11/2007	WG-07736-EE	0.000	0.001		0.002		0.001	
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.000	0.001		0.002		0.001	

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	U rslt	stdev (U)	V rslt	stdev (V)	Zn rslt	stdev (Zn)	TDS (ppm)
EF07090G32R161	10/9/2007	WG-07709-EE	0.0008	0.0000	0.004	0.000	0.019	0.001	215
EU07090G32R161	10/9/2007	WG-07709-EE	0.0009	0.0000	0.004	0.000	0.038	0.002	196
EF07090G32R162	10/9/2007	WG-07713-EE	0.0008	0.0000	0.004	0.000	0.029	0.000	207
EU07090G32R162	10/9/2007	WG-07713-EE	0.0009	0.0000	0.004	0.000	0.033	0.000	195
EF07090G32R163	10/9/2007	WG-07714-EE	0.0009	0.0000	0.004	0.000	0.021	0.000	212
EU07090G32R163	10/9/2007	WG-07714-EE	0.0008	0.0000	0.004	0.000	0.030	0.000	195
EF07090G32R164	10/9/2007	WG-07715-EE	0.0009	0.0000	0.005	0.000	0.017	0.000	213
EU07090G32R164	10/9/2007	WG-07715-EE	0.0009	0.0000	0.005	0.000	0.030	0.001	199
EF07090G32R165	10/9/2007	WG-07716-EE	0.0009	0.0000	0.004	0.000	0.019	0.000	209
EU07090G32R165	10/9/2007	WG-07716-EE	0.0009	0.0000	0.004	0.000	0.026	0.001	194
EF07090G32R166	10/9/2007	WG-07717-EE	0.0009	0.0000	0.004	0.000	0.019	0.001	210
EU07090G32R166	10/9/2007	WG-07717-EE	0.0009	0.0000	0.004	0.000	0.025	0.001	198
EF07090G32R167	10/9/2007	WG-07718-EE	0.0009	0.0000	0.005	0.000	0.019	0.001	212
EU07090G32R167	10/9/2007	WG-07718-EE	0.0009	0.0000	0.004	0.000	0.026	0.001	197
EF07090G32R168	10/9/2007	WG-07719-EE	0.0012	0.0002	0.006	0.001	0.018	0.000	211
EU07090G32R168	10/9/2007	WG-07719-EE	0.0011	0.0002	0.006	0.001	0.021	0.001	192
EF07090G32R110	10/9/2007	WG-07856-EE	0.0013	0.0003	0.007	0.002	0.019	0.002	211
EU07090G32R110	10/9/2007	WG-07856-EE	0.0017	0.0006	0.009	0.003	0.025	0.001	196
EF07090G32R120	10/9/2007	WG-07856-EE	0.0016	0.0005	0.009	0.003	0.020	0.001	215
EU07090G32R120	10/9/2007	WG-07856-EE	0.0014	0.0002	0.007	0.002	0.023	0.002	195
EU07090G32R101-FB	10/9/2007	WG-07856-EE	0.0002		0.001		0.001		9
EF07090G32R169	10/9/2007	WG-07720-EE	0.0017	0.0007	0.009	0.004	0.018	0.001	211
EU07090G32R169	10/9/2007	WG-07720-EE	0.0017	0.0005	0.009	0.003	0.022	0.000	194
EF07090G32R170	10/9/2007	WG-07721-EE	0.0016	0.0006	0.009	0.004	0.014	0.000	209
EU07090G32R170	10/9/2007	WG-07721-EE	0.0011	0.0002	0.006	0.001	0.024	0.000	193
EF07090G32R171	10/9/2007	WG-07725-EE	0.0012	0.0002	0.006	0.001	0.013	0.001	207
EU07090G32R171	10/9/2007	WG-07725-EE	0.0014	0.0003	0.007	0.001	0.019	0.000	190
EF07090G32R172	10/9/2007	WG-07731-EE	0.0009	0.0000	0.004	0.000	0.014	0.001	211
EU07090G32R172	10/9/2007	WG-07731-EE	0.0010	0.0000	0.005	0.000	0.019	0.000	194
EF07090G32R173	10/9/2007	WG-07732-EE	0.0010	0.0000	0.005	0.000	0.017	0.000	214
EU07090G32R173	10/9/2007	WG-07732-EE	0.0009	0.0000	0.005	0.000	0.018	0.001	195
EF07090G32R174	10/9/2007	WG-07733-EE	0.0009	0.0000	0.004	0.000	0.013	0.000	210
EU07090G32R174	10/9/2007	WG-07733-EE	0.0009	0.0000	0.004	0.000	0.016	0.001	194
EF07090G32R110a	10/9/2007	WG-07855-EE	0.0008	0.0000	0.004	0.000	0.014	0.000	214
EU07090G32R110a	10/9/2007	WG-07855-EE	0.0009	0.0000	0.004	0.000	0.015	0.001	191
EF07090G32R120a	10/9/2007	WG-07855-EE	0.0009	0.0000	0.004	0.000	0.015	0.001	218
EU07090G32R120a	10/9/2007	WG-07855-EE	0.0009	0.0000	0.004	0.000	0.017	0.001	200
EF07090G32R175	10/9/2007	WG-07734-EE	0.0009	0.0000	0.004	0.000	0.017	0.001	215
EU07090G32R175	10/9/2007	WG-07734-EE	0.0008	0.0000	0.004	0.000	0.015	0.000	191
EF07090G32R176	10/9/2007	WG-07735-EE	0.0009	0.0000	0.004	0.000	0.014	0.001	212
EU07090G32R176	10/9/2007	WG-07735-EE	0.0009	0.0000	0.004	0.000	0.020	0.004	193
EF07090G32R177	10/11/2007	WG-07736-EE	0.0009	0.0000	0.004	0.000	0.013	0.001	220
EU07090G32R177	10/11/2007	WG-07736-EE	0.0008	0.0000	0.003	0.000	0.016	0.001	201
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.0002		0.001		0.001		6

SAMPLE ID	DATE RECEIVED	ER/RRES-WQH	Cations	Anions	Balance	Status	
EF07090G32R161	10/9/2007	WG-07709-EE	1.72	2.10	-0.10	completed	
EU07090G32R161	10/9/2007	WG-07709-EE	---	---	---	completed	
EF07090G32R162	10/9/2007	WG-07713-EE	1.69	1.98	-0.08	completed	
EU07090G32R162	10/9/2007	WG-07713-EE	---	---	---	completed	
EF07090G32R163	10/9/2007	WG-07714-EE	1.70	2.41	-0.17	completed	
EU07090G32R163	10/9/2007	WG-07714-EE	---	---	---	completed	
EF07090G32R164	10/9/2007	WG-07715-EE	1.73	1.98	-0.07	completed	
EU07090G32R164	10/9/2007	WG-07715-EE	---	---	---	completed	
EF07090G32R165	10/9/2007	WG-07716-EE	1.71	2.05	-0.09	completed	
EU07090G32R165	10/9/2007	WG-07716-EE	---	---	---	completed	
EF07090G32R166	10/9/2007	WG-07717-EE	1.70	2.05	-0.09	completed	
EU07090G32R166	10/9/2007	WG-07717-EE	---	---	---	completed	
EF07090G32R167	10/9/2007	WG-07718-EE	1.73	2.03	-0.08	completed	
EU07090G32R167	10/9/2007	WG-07718-EE	---	---	---	completed	
EF07090G32R168	10/9/2007	WG-07719-EE	1.73	2.40	-0.16	completed	
EU07090G32R168	10/9/2007	WG-07719-EE	---	---	---	completed	
EF07090G32R110	10/9/2007	WG-07856-EE	1.84	2.27	-0.10	completed	
EU07090G32R110	10/9/2007	WG-07856-EE	---	---	---	completed	
EF07090G32R120	10/9/2007	WG-07856-EE	1.80	2.05	-0.07	completed	
EU07090G32R120	10/9/2007	WG-07856-EE	---	---	---	completed	
EU07090G32R101-FB	10/9/2007	WG-07856-EE	0.01	0.18	-0.85	completed	
EF07090G32R169	10/9/2007	WG-07720-EE	1.75	2.27	-0.13	completed	
EU07090G32R169	10/9/2007	WG-07720-EE	---	---	---	completed	
EF07090G32R170	10/9/2007	WG-07721-EE	1.66	2.39	-0.18	completed	
EU07090G32R170	10/9/2007	WG-07721-EE	---	---	---	completed	
EF07090G32R171	10/9/2007	WG-07725-EE	1.65	1.94	-0.08	completed	
EU07090G32R171	10/9/2007	WG-07725-EE	---	---	---	completed	
EF07090G32R172	10/9/2007	WG-07731-EE	1.70	2.02	-0.09	completed	
EU07090G32R172	10/9/2007	WG-07731-EE	---	---	---	completed	
EF07090G32R173	10/9/2007	WG-07732-EE	1.77	1.94	-0.05	completed	
EU07090G32R173	10/9/2007	WG-07732-EE	---	---	---	completed	
EF07090G32R174	10/9/2007	WG-07733-EE	1.71	2.02	-0.08	completed	
EU07090G32R174	10/9/2007	WG-07733-EE	---	---	---	completed	
EF07090G32R110a	10/9/2007	WG-07855-EE	1.69	2.03	-0.09	completed	re named
EU07090G32R110a	10/9/2007	WG-07855-EE	---	---	---	completed	re named
EF07090G32R120a	10/9/2007	WG-07855-EE	1.78	1.97	-0.05	completed	re named
EU07090G32R120a	10/9/2007	WG-07855-EE	---	---	---	completed	re named
EF07090G32R175	10/9/2007	WG-07734-EE	1.73	1.97	-0.06	completed	
EU07090G32R175	10/9/2007	WG-07734-EE	---	---	---	completed	
EF07090G32R176	10/9/2007	WG-07735-EE	1.67	1.97	-0.08	completed	
EU07090G32R176	10/9/2007	WG-07735-EE	---	---	---	completed	
EF07090G32R177	10/11/2007	WG-07736-EE	1.77	2.05	-0.07	completed	
EU07090G32R177	10/11/2007	WG-07736-EE	---	---	---	completed	
EU07090G32R101-EQB	10/11/2007	WG-07852-EE	0.09	---	---	completed	