UIC - I - __8-0__

EPA FALL-OFF TEST PLAN

(WDW-3)

DATE:

2008 - Present

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Friday, October 26, 2012 1:24 PM
To: Schultz, Michele (Michele.Schultz@hollyfrontier.com)
Cc: Sanchez, Daniel J., EMNRD; Jones, William V., EMNRD; VonGonten, Glenn, EMNRD; Dade, Randy, EMNRD
Subject: FW: WDW-1, 2 & 3 Fall-Off Test (FOT) Plan

Micki:

OCD has completed its review of the most recently submitted FOT Plan under Navajo Refining Company's (NRC) cover letter dated August 27, 2012.

Observations and/or Comments:

1) OCD recently determined that for the NRC's 3 Class I (NH) Injection Wells that it will stagger the frequency of well FOTs to be performed at least once every 3 years per well in order to allow either 1 well FOT per year or the option to perform 1 well FOT on all 3 wells at least every 3 years.
2) Page 3 Section III: Only one OCD approved Fall-Off Test Plan (FOTP) is required and OCD currently acknowledges the original FOTP as the official version in place to date.
3) Page 10 #4b: NRC appears to be decreasing the injection rate to minimize the total volume of injection fluid required to complete a well FOT and possibly to demonstrate a minimum pressure differential in the injection zone of 100 psig is achieved during any given FOT.

   There is a calculation along with historical FOT flow rate and volume information for NRC to estimate the minimum volume of injection fluid needed at each well location to achieve a pseudo steady-state injection rate and achieve a radial flow condition before pump shut-off and FOT monitoring. NRC and OCD should be working to determine the actual injection zone capacity and not attempting to engineer FOTs to achieve minimum pressure differential criteria. However, any other reason for minimizing the total volume of injected fluid is not valid.

Requirements:

1) Page 11 #7: Bottom hole gauges shall be emplaced and monitored in offset wells during well FOTs if NRC wishes to prove Section XI is true. Otherwise, please remove Section XI. OCD discussions with subsurface well experts indicates that due to the spatial distance and hydrogeological variability between NRC wells and site-specific injection zones, installation of bottom hole pressure gauges would likely not prove interconnection between NRC wells.
2) Page 12 #10: WDWs were recently stimulated with acid in coiled tubing. Please confirm that a C-103 Sundry Notice was submitted to the OCD for approval in advance of the well work.
3) Page 13 #15: FOTs shall not be designed to achieve the minimum 100 psig pressure differential. The FOT should demonstrate the actual maximum pressure differential from pressure buildup through injection into the injection zone. The FOT should demonstrate the actual injection zone ability to receive injected fluids.
4) Page 20 #5: Same as No. 3 above.
5) Page 22 #4: The "h" injection interval value used for each well during the FOT shall be based on the footage of the perforated injection interval(s) per well. If NRC disagrees, could you please provide the h values and basis for using a different "h" value per well for FOT calculations.
6) Page 23 #2a: Please change the OCD Permit per well designations to reflect the following: WDW-1 UICI-8; WDW-2 UICI-8-1; and WDW-3 UICI-8-0.
7) Page 29d&e: Combine the plot to include actual surface and bottom hole pressure readings vs injection rate before, during FOT monitoring.

8) Page 30 #20: Raw data available to the OCD for a minimum of 3 years. OCD has requested electronic raw data from the 2011 WDW-1, 2 & 3 FOTs, but has not received the data. Please submit the data to the OCD within the next two weeks or by COB Tuesday November 13, 2012.
9) Page 31 Section XI: Please remove this section from the FOT Plan, unless NRC wishes to demonstrate injection zone interconnection between wells with bottom hole gauges in all NRC wells (injection and offset) during individual well FOTs.

Questions:

1) OCD understands why the offset wells are shut-in during each well FOT (only 1 pipeline without bypasses from refinery to all 3 wells; however, the OCD would like to know why bottom hole gauges are not placed in offset wells to prove Section XI is in fact correct? OCD does not concur with Section XI as stated and has provided documentation to NRC on this matter before.
2) The P*(false extrapolated P value) vs. P_{1hour} (extrapolated P value after one hour): OCD is not sure what these values represent, but are wondering if these are actual pump pressure value readings associated with the well FOT. Each injection well should be equipped with independent surface and bottom hole pressure gauges to record the actual pressure before, during and after pump shut-off. Reliance on a pump pressure gauge to record surface and/or bottom hole pressure readings is not acceptable to the OCD. Please clarify what these values actually represent and from what specific pressure gauge that the recording is being made?

Conclusions:

1) NRC already has an OCD approved original FOT Plan (Plan); however, if NRC wishes to update the Plan, OCD requires a resubmittal of the most recent submitted FOT Plan and/or addendum pages addressing the above where applicable in order for the OCD to consider approval of a new Plan.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM
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Oil Conservation Division, Environmental Bureau
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"Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of the Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at
http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental

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From: Chavez, Carl J, EMNRD
Sent: Thursday, October 25, 2012 11:05 AM
To: Schultz, Michele (Michele.Schultz@hollyfrontier.com)
Subject: WDW-1, 2 & 3 Fall-Off Test (FOT) Plan

Micki:

I'm currently reviewing the FOT Plan under your cover letter dated August 27, 2012.

I happened to notice on Page 3 Section III "Developing a Test Plan" that a Test Plan must be developed annually. This is not correct. Once Navajo Refining Company LLC (NRC) has an approved Test Plan (which it does), it must follow it for future FOTs.

The FOT Plan may be revised if approved by the OCD.

Consequently, the OCD will review the FOT Plan. I am curious as to how this FOT Plan differs from the original approved version? The OCD has recently determined that for NRC's Class I (NH) Injection Wells that it will stagger the frequency of FOTs for each its 3 wells to be performed at least once every 3 years per well in order to allow one per year to be tested. I presume that NRC has the option to perform 1 FOT every 3 years on its 3 wells too if that works…..? FOT Plan that I am reviewing depicts annual FOTs at each well location….. Also, Mr. Holder recently informed me that NRC will conduct FOTs on all 3 wells this year to assess their current condition and is referenced in the FOT Plan…..

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM
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"Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of the Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at
http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental

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August 27, 2012

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505

FEDEX

RE: Fall Off Test Plan
Navajo Refining Company
Disposal Wells WDW-1, WDW-2, WDW-3

Carl,

Enclosed, please find two copies of our 2012 Pressure Fall Off (PFO) Plan for our injection wells. We plan to implement these tests on approximately September 9-16 for WDW-1, October 1-7 for WDW-2 and October 22-28 for WDW-3. We also plan to run Annulus Pressure Tests (APT) for all three wells on September 10. The actual field work dates may differ from those stated above as they are dependent on equipment availability.

If there are any questions concerning this submission, please email me at michelle.schultz@hollyfrontier.com or call me at 575-746-5281.

Sincerely,

Micki Schultz

Micki Schultz, P.E., CHMM
Environmental Specialist

Electronic cc: MGM, REB, MWH, RAC, AMS, MLS

Env. File: REF.ART.12-4.B.04.A
2012-08-27 Fall Off Test Plan Injection Wells

SUBSURFACE

DEVELOPMENT AND IMPLEMENTATION OF PRESSURE FALL-OFF TEST PLAN FOR NAVAJO REFINING WASTE DISPOSAL WELLS 1 (WDW-1 MEWBOURNE), WELL 2 (WDW-2 CHUKKA), AND WELL 3 (WDW-3 GAINES)

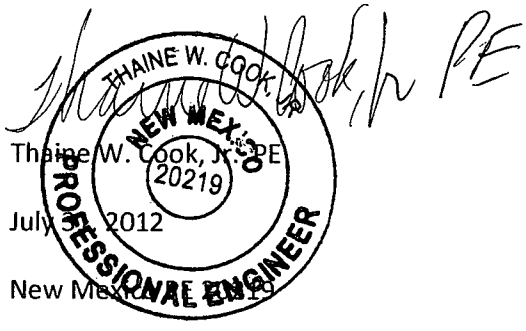
NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO
PROJECT NO. 70D6835

TEST PLAN SUBMITTED:
AUGUST 2012

SUBSURFACE TECHNOLOGY, INC.
6925 PORTWEST DR., STE. 110
HOUSTON, TEXAS 77024
pfh@subsurfacegroup.com

To whom it may concern:

I Thane Walter Cook, Jr PE certify that the engineering materials contained herein have been prepared by personnel under my supervision. I have met the requirements of NMSA 1978 61-23-3 (definition of responsible charge) with respect to these materials. I have personally reviewed the content and made any calculations and changes needed.



Thaine W. Cook, Jr. PE

July 5, 2012

New Mexico [illegible]

New Mexico Oil Conservation Division
UIC Class I Well Fall-Off Test Guidance with Temperature Survey
(December 3, 2007)

REVISED 2012 TESTING PROCEDURE
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EXHIBITS

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Well No. 1 (Mewbourne)
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EXHIBIT 5: Historical Data 2010 and 2011 Falloff Test Results
Well No. 1 (Mewbourne)
Well No. 2 (Chukka)
Well No. 3 (Gaines)
EXHIBIT 6: Changes to 2011 Test Plan

New Mexico Oil Conservation Division
UIC Class I Well Fall-Off Test Guidance

Why does a fall-off test need to be performed?

From New Mexico Oil Conservation Division (OCD) Guidance Document.

Fall-off testing is a pressure transient test conducted on injection well formations to assess individual well conditions. The test provides the state regulatory agency with the necessary information to assess the validity of requested or existing injection well permit conditions and satisfy the permitting objective of protecting underground sources of drinking water (USDW). The test may also provide information about reservoir and completion characteristics such as transmissibility, skin factor, bottom-hole injection pressure, reservoir static pressure, and geologic boundaries.

In addition to the state UIC regulatory requirements, Federal UIC regulations in 40 CFR Part 146 have monitoring requirements applying to both Class I hazardous and nonhazardous injection wells that include annual fall-off testing. Specifically, Part 146 regulations state "the Director shall require monitoring of the pressure build up in the injection zone annually, including at a minimum, a shutdown of the well for a time sufficient to conduct a valid observation of the pressure fall-off curve" (§146.13 (Non-hazardous)/§ 146.68 (Hazardous). In the case of Class II wells, the regulations may not directly require that a fall-off test be conducted, but under 40 CFR 146.8(f), EPA or the state agency delegated UIC Class II program primacy can require additional testing such as a fall-off test on individual injection wells to ensure protection of USDW's.

Essentials of Fall-Off (PFO) Testing.

From New Mexico Oil Conservation Division (OCD) Guidance Document.

A fall-off test is a pressure transient test involving shutting in an injection well and measuring the wellbore pressure decline versus time after radial flow conditions are achieved and well established in the preceding injection period. It is analyzed using the same pressure transient techniques for oil and gas well pressure build up and drawdown tests. The fall-off period is a replay of the preceding injection period, but is typically less noisy since no injection occurs while the well's pressure change is measured, similar to the pressure build up period in a production well.

Fall-off test data analysis can provide valuable information about both the condition of the wellbore itself and the nature of the reservoir the well injects into. For example, the skin factor parameter obtained from a fall-off test analysis can indicate whether completion damage exists and provide justification for a well stimulation or remedial treatment. The signature of the derivative may also provide insight into the well's completion, for example a negative half slope indicating spherical flow may be caused from wellbore fill or the well's completion. A properly designed fall-off may also provide

information about natural fractures or geologic boundaries in the reservoir. The test analysis provides a determination of reservoir transmissibility which can be utilized to predict the relationship between reservoir pressure and injection rate, critical to designing appropriate UIC permit conditions. Recommended published technical references on fall-off testing methodology include Society of Petroleum Engineers (SPE) Monographs Volumes 1 and 5 as well as SPE Textbook Series Volumes 1 and 9.

For more detailed information about the basis, recommended calculations, and procedures for fall-off tests, the reader is referred to the US EPA internet URLs provided below:

USEPA Fall-Off Test Course
http://www.epa.gov/safewater/dwa/electronic/presentations/uic/2003nutsbolts-notebook.pdf

EPA Region 6 Fall-off Guidelines
http://www.epa.gov/region6/water/swp/uic/guideline.pdf

OCD UIC FALL-OFF TEST GUIDANCE

SECTION I – Purpose

The purpose of a fall-off test is to identify injection interval or wellbore problems and injection interval characteristics. The permittee is responsible for developing a testing procedure which will generate adequate data for a meaningful analysis.

SECTION II - Regulatory Citation

Pursuant to all applicable parts of the Water Quality Control Commission (WQCC) Regulations 20.6.2 NMAC and more specifically 20.6.2.3104 - 20.6.2.3999 discharge permit, and 20.6.2.5000-.5299 Underground Injection Control, the Oil Conservation Division (OCD), the OCD UIC Permit requires monitoring of the pressure build up in the injection zone at least annually, including at a minimum, shut down of the well for a time sufficient to conduct a valid observation of the pressure fall-off. This test is known as the formation pressure fall-off test.

In accordance with the above statement "OCD UIC Permit requires monitoring of the pressure build up in the injection zone at least annually, including at a minimum, shut down of the well for a **time sufficient to conduct a valid observation of the pressure fall-off.**", historical data shows that a 30 hour shut down time is sufficient to conduct a valid observation of the pressure falloff. This can be seen in the historical data acquired from the 2010 and 2011 falloff test data (Exhibit V). Any data obtained after 30 hours was inconclusive in determining the reservoir parameters and the flow regime beyond 30 hours could not be identified.

SECTION III - Developing a Test Plan

A plan for conducting the test shall be submitted to OCD for review and approval prior to conducting the test. Plan approval shall be obtained from OCD prior to commencing the test. The plan shall include a proposed schedule. The test plan must address all items listed in the Sections V through IX of this document.

The Test Plan addresses these requirements and includes the requirements of Section V through IX below.

Proposed Procedure Considerations

The following is a proposed test procedure for Well No. 1 (Mewbourne), Well No. 2 (Chukka), and Well No. 3 (Gaines). The volumes and rates were determined from historical data collected during the previous fall-off testing. The rates, wellhead pressures, and bottom-hole pressure will be recorded throughout the procedure. An analysis will be completed using Pan System © pressure transient analysis software. An estimate of the tank volumes associated with the injection/fall-off periods are included at the end of the procedure. The reports for each well will be constructed according to Section IX in this test plan. All other considerations have been addressed in the following Sections, IV through IX.

Procedure

The general procedure for testing each individual well is to inject into the test well for a period of 30 hours, with the two offset wells shut-in. Following the 30 hour injection period, the test well will be shut-in and the pressure fall-off monitored for 30 hours. The two offset Navajo wells will remain shut-in during the fall-off portion of the testing.

1. Navajo Refining is to maintain a constant injection rate into the disposal well for a minimum of 30 hours prior to testing. The approximate anticipated rates for each well are:

Well No. 1 (Mewbourne)	maximum of 260 gpm (8,914 bpd)
Volume injected 30 hours	11,143 bbls;
Well No. 2 (Chukka)	maximum of 175 gpm (6000 bpd)
Volume injected 30 hours	7,500 bbls;
Well No. 3 (Gaines)	maximum of 300 gpm (10,286 bpd)
Volume injected 30 hours	12,857 bbls.

The injection period used for the determination of the total volume of fluid needed for the injection portion of the testing was 30 hours. The volume is determined from the time it takes to reach radial flow in the reservoir fluid as a function of radius of investigation.

These rates are based on historical information gathered after an acid stimulation and after the completion of the wells. The rates are estimates based on averages. The initial well system consisted of two wells and a third well was added in 2007.

The waste fluid will be used during the testing. Samples of the waste fluid should be gathered periodically for viscosity and density determination. Injection rates, pressure, and time will be recorded and submitted to Subsurface for fall-off analysis. The viscosity and density data should be included. If necessary, the flow rate will be controlled at the wing valve. The general procedure is to open the wing valve wide open and let the pump pressure control the flow rate. This will maximize the flow to the well at a steady rate with only one (1) well open in the three (3) well system.

Adequate waste storage has been accounted for using the storage tank located at the refinery. The tank holds 65,000 bbls. The working volume of the tank is 85% of the total capacity. Tank bottom is calculated at 18 % of the total capacity of the tank. The initial volume for the tank prior to starting the testing was calculated as follows:

Well No. 1 (Mewbourne)

Total Waste Fluid Gain for the Test Period	35,486 bbls
Total Waste Fluid Loss to Well No. 1 for the Test Period	11,143 bbls
Total Waste Fluid Generated	46,629 bbls
Initial Tank Fill Tank 1 (65,000 bbls)	12,000 bbls
Final Tank Fill Tank 1 (65,000 bbls)	33,857 bbls

Well No. 2 (Chukka)

Total Waste Fluid Gain for the Test Period	39,129 bbls
Total Waste Fluid Loss to Well No. 2 for the Test Period	7,500 bbls
Total Waste Fluid Generated	46,629 bbls
Initial Tank Volume Tank 1 (65,000 bbls)	12,000 bbls
Final Tank Volume Tank 1 (65,000 bbls)	17,500 bbls

Well No. 3 (Gaines)

Total Waste Fluid Gain for the Test Period	33,771 bbls
Total Waste Fluid Loss to Well No. 3 for the Test Period	12,857 bbls
Total Waste Fluid Generated	46,628 bbls
Initial Tank Fill Tank 1 (65,000 bbls)	12,000 bbls
Final Tank Fill Tank 1 (65,000 bbls)	32,143 bbls

Confirmation of the injection rate and volumes will be provided by the continuous monitoring system at the plant. The plant has the ability to continuously monitor flow rates, wellhead pressures, annulus pressures, filter pod differential pressures, line pressures, and tank levels. Pressures and temperatures will be confirmed via

data memory logging gauges. The recording time on the gauges will be set at minimum of 10-second intervals. The surface pressure gauge data can be downloaded to ascertain the status of the fall-off testing at any time during the fall-off segment of the procedure. The surface pressure memory gauge will be attached to a tee just above the crown valve.

1A. Install a 5000 psi digital quartz memory pressure gauge on the wellhead. Drop tandem 8000 psi sapphire memory gauges into the wellbore and tag fill. Pull the memory gauges up to the top of the perforations. Correlate depths from the wellhead at ground level to kelly bushing height as the reference depth. The top of the perforations for each well are as follows:

Well No. 1 (Mewbourne):	7924 feet RKB;
Well No. 2 (Chukka):	7570 feet RKB;
Well No. 3 (Gaines):	7660 feet RKB.

Monitor injection pressure for one hour after placement of wellhead pressure gauge to ensure stabilization. Be sure to synchronize the time on the wellhead gauge and bottom-hole gauge and calibrate to the monitoring computer time. Discontinue injection into the test well and block well in near the wellhead by closing the wing valve and the motorized gate valve. The well should be blocked in as carefully and quickly as possible so as to avoid creating a water hammer effect in the wellbore.

Each wellhead consists of a crown valve, wing valve, and master valve. The crown valves on Well No. 1 and Well No. 2 are two-inch ball valves and the crown valve on Well No. 3 is a four-inch gate valve. The wells will be shut-in via the four-inch wing valves and the motorized gate valves.

1B. Monitor the pressure fall-off for minimum of 30 hours. The testing fall-off segment was extended to include a full 30 hour fall-off period for conservative reasons. The 30 hour injection falloff period was determined based on data collected during the 2010 and 2011 falloff testing. The 2010 and 2011 falloff data clearly show that radial flow has been reached by the end of the 30-hour period and any data collected after the 30-hour period was not able to be analyzed and contained no intrinsic value (Exhibit 5).

1C. At the end of the fall-off period, discontinue the pressure fall-off test. Tag the bottom of the fill and pull out of the wellbore, slowly with the downhole surface read out and memory gauges making gradient stops every 1000 feet to surface.

2. After completing the survey, return the well to Navajo.

The following schedule is proposed after approval of test plan:

Testing of Well No. 1 (Mewbourne) on the second week of September 2012.
Testing of Well No. 2 (Chukka) on the first week of October 2012;
Testing of Well No. 3 (Gaines) on the third week of October 2012;
An annulus pressure test will be performed on WDW-1, WDW-2, and WDW-3 prior to falloff testing during the second week of September 2012.

Testing Rates

The estimated maximum rates into each test well are as follows:

Well No. 1 (Mewbourne)	260 gpm (8,914 bpd)
Well No. 2 (Chukka)	175 gpm (6,000 bpd)
Well No. 3 (Gaines)	300 gpm (10,286 bpd)

This assumes the maximum pressure is 785 psig at the wellhead and can be maintained for 30 hours, and the total generated waste fluid flow rate from the plant processes is 510 gpm. Using the two holding tanks at the plant, the proposed schedules are based on starting tank volumes as described below.

It is assumed the working capacities of the tanks are 85% of their total capacities. Tank 1 has a total capacity of 65,000 bbls and a working capacity of 55,250 bbls. It is also assumed that minimum volume for Tank 1 is 11,700 bbls or 18% of its capacity. All calculations were based on the 85% operating capacity of each tank using minimum volume levels.

Well No. 1 (Mewbourne)

The general procedure for testing Well No. 1 would be to inject into Well No. 1 for a period of 30 hours with Well No. 2 and Well No. 3 shut-in. Following the 30-hour injection period Well No. 1 will be shut-in for 30 hours with Well No. 2 and Well No. 3 shut-in. In the first 30 hours, only Well No. 1 will be operating at its full rate. After the injection period is completed, all three wells will be shut-in for 30 hours. The excess volume generated by the plant will be stored in the holding tank at the plant.

Estimated Well Test Rates

HOURS	24	6	24	10
Total Fluid	**510**	**510**	510	510
Well 1 Mewbourne Test Rates (gpm)	**260**	**260**	0	0
Well 2 Chukka Test Rates (gpm)	0	0	0	0
Well 3 Gaines Test Rates (gpm)	0	0	0	0

Total Waste Fluid Gain for the Test Period	35,486 bbls
Total Waste Fluid Loss to Well No. 1 for the Test Period	11,143 bbls
Total Waste Fluid Generated	46,629 bbls

Well No. 2 (Chukka)

The general procedure for testing Well No. 2 would be to inject into Well No. 2 for a period of 30 hours, with Well No. 1 and Well No. 3 shut-in. Following the 30-hour injection period, Well No. 2 will be shut-in for 30 hours, with Well No. 1 and Well No. 3 shut-in. For the first 30 hours, only Well No. 2 will be operating at its full rate. For the next 30 hours, all three (3) wells will be shut-in. The excess volume generated by the plant will be stored in the holding tank at the plant.

HOURS	24	6	24	10
Total Fluid	510	510	510	510
Well 1 Mewbourne Test Rates (gpm)	0	0	0	0
Well 2 Chukka Test Rates (gpm)	**175**	**175**	0	0
Well 3 Gaines Test Rates (gpm)	0	0	0	0

Total Waste Fluid Gain for the Test Period	39,129 bbls
Total Waste Fluid Loss to Well No. 2 for the Test Period	7,500 bbls
Total Waste Fluid	46,629 bbls

Well No. 3 (Gaines)

The general procedure for testing Well No. 3 would be to inject into Well No. 3 for a period of 30 hours with Well No. 1 and Well No. 2 shut-in. Following the 30-hour injection period, Well No. 3 will be shut-in for 30 hours, with Well No. 1 and Well No. 2 shut-in. For the first 30 hours, only Well No. 3 will be operating at its full rate. For the next 30 hours all three (3) wells will be shut-in. The excess volume generated by the plant will be stored in the holding tank at the plant.

HOURS	24	6	24	10
Total Fluid	510	510	510	510
Well 1 Mewbourne Test Rates (gpm)	0	0	0	0
Well 2 Chukka Test Rates (gpm)	0	0	0	0
Well 3 Gaines Test Rates (gpm)	**300**	**300**	0	0

Total Waste Fluid Gain for the Test Period	33,771 bbls
Total Waste Fluid Loss to Well No. 3 for the Test Period	12,857 bbls
Total Waste Fluid	46,628 bbls

SECTION IV - Scheduling of Test and Report

The schedule for the test must be mutually agreed upon between OCD and the permittee so that OCD has the opportunity to witness the test. The operator should submit a summary report to OCD within 30 days of test completion.

It is currently estimated that the Test Plan will be submitted to OCD for approval the end of August 2012. Subsequently, after approval, the field work will be performed in September and October. The report will be submitted 30 days thereafter for each individual well.

SECTION V - General Test Operational Considerations

A successful fall-off test involves consideration of numerous factors of which most are under the control of the permittee. These include but are not limited to the following:

1. Confirmation of a constant injection rate can be maintained in the test well during the injectivity portion of the test.

   The injection rate of the injectate fluid will be maintained by throttling the flow with the wellhead wing valves and nearby injectate flow line valves or other control system.

2. The injection rate is sufficient to produce a measurable pressure build-up that will result in valid test data.

   These injection rates or equivalent conditions will be maintained to insure a 100 psi pressure differential. Historically, the reservoir has produced greater than 100 psi on previous testing after the maximum injection rate has been achieved.

3. Consideration for using the normal waste liquid during the injectivity portion of the test, unless the waste will be corrosive to the down-hole pressure gauge.

   The normal injectate will be maintained throughout the test period.

4. Calculating the total volume of injection fluid needed for the injectivity portion of the test.

   a. Arrange for additional fluids and storage of such fluid.

      It is not anticipated any additional fluids, other than the liquid waste injectate, will be needed.

   b. Reduce the injection rate to reduce the total fluid requirement.

      Every effort will be made to maintain the injection rate required for a successful pressure fall-off test as well as the disposal rate required to maintain refinery operation. (see procedure)

5. Sustaining a constant injection rate after installing the pressure gauges to allow stabilization of the gauges prior to initiating the fall-off test. A three day period is recommended, but adjustments may be made because rates have previously been stabilized or historical test results indicate a lesser time is adequate.

A constant injection rate will be maintained throughout the required three day build up period. Historically, for the 2010 and 2011 falloff testing, 30 hours is sufficient time to adequately perform a falloff analysis of the reservoir. In Exhibit 5 the 2010 and 2011 falloff tests show that the data obtained after the 30 hour period was inconclusive in determining reservoir parameters and was not able to analyze. The data after 30 hours had added no intrinsic value to the reservoir determination.

6. Ensuring adequate waste storage is available for the duration of the fall-off test.

   The need for additional storage is not anticipated at the well site. The refinery facility storage tank will be used. One tank holds 65,000 bbls.

7. Shutting in offset wells completed in the same formation as the test well prior to the test. If impractical, then maintaining stable measured injection rates into the offset injection wells prior to and during the fall-off test.

   We plan to inject into one well at a constant rate for the 30-hour build up period. After the 30-hour period, all three (3) wells will be shut-in for the 30-hour pressure fall-off period. However, if this method is not feasible, it will be necessary to maintain constant injection rates into the offset injection wells during each of the PFO Tests on WDW-1, 2 & 3. This will allow us to maintain constant injection rates into WDW-1 & 2 when WDW-3 is shut-in, constant injection rates into WDW-2 & 3 when WDW-1 is shut-in and constant injection rates into WDW-1 & 3 when WDW-2 is shut-in.

8. Installing a crown valve on the well prior to starting the injectivity portion of the test so the well does not have to be shut-in to install the pressure gauges. Running both memory gauges in the hole through a lubricator installed into the crown valve for safety.

   All three wells have crown valves.

9. Locating the shut-in valve, ceasing flow to the well at or near the wellhead to minimize the wellbore storage in the well. Shut-in must be accomplished as instantaneously as possible to prevent erratic pressure behavior during the shut-in caused by the rate fluctuations.

   All three wells have wing valves or nearby injectate flow line valves that will be used to shut-in each well for the required PFO Test period. If necessary, other controllers will be implemented from the control room.

10. Evaluating the condition of the well, including wellbore fill, junk in the hole or wellbore damage, which may increase the length of shut-in time needed for the well to obtain a valid fall-off test and therefore also necessitate a longer injectivity period.

    All three wells were recently treated with a Coiled Tubing/HCl acid stimulation utilizing a sonic pulse tool in 2012. There was no wellbore fill across the perforated interval.

11. Using a surface readout down-hole pressure gauge and tandem down-hole memory electronic pressure gauges, one of which is surface readout capable, with a pressure resolution level of 0.0002% of the gauge's full pressure range. Gauge pressure range should exceed the maximum pressure expected during the testing with the larger the percentage of the gauge pressure range utilized, the better.

    The previously approved memory gauges used on these wells were sapphire gauges with an accuracy of 0.025% full scale (FS) or 0.01% of the reading and will have a resolution of 0.0003%. The pressure range of the gauges is from 0-10,000 psi. This gauge is a typical bottom-hole memory gauge with the best accuracy available in the area.

12. Maintaining a test operations log throughout the fall-off test and submitting the log as part of the test report. The log should list all key test events, dates, and times. For example, the time the gauges were activated, run in the well and placed on bottom as well their setting depths. Synchronization of times and events is especially important in tests involving multiple wells.

    A field supervisor will be present throughout the testing period and all operating system control room monitors will be active and creating the aforementioned log.

13. If available, monitoring test progress with appropriate plots at the well site to insure valid test data is obtained and problematic tests can be identified and aborted.

    Where applicable, this requirement will be implemented. A surface pressure logging gauge will be installed on the wellhead.

14. Configuring the test gauges to obtain pressure data more frequently in the early portion of the test when the rate of pressure decline is greater, if the memory capacity of the gauge is limited. Memory capacity of the gauge should allow for a 10-day total recording time interval, unless a shorter test time is sufficient based on prior testing or appropriate test design calculations. Larger time

increments may be used to obtain data later in the test when the rate of pressure decline is less. The recording frequency of the gauges and overall length of test should be set based on results of previous tests or test design calculations.

Based on previous testing, a 10-second to 15-second interval will be adequate.

15. Using the injection facility pump if capable of maintaining a constant injection rate at the desired pre-fall-off test rate. If an alternate pump is needed, design the pump to operate as smoothly as possible at the desired constant rate. If feasible, design the test for a constant injection rate to cause a minimum of 100 psi differential pressure between the final injection and shut-in pressures.

    The injection facility pump will be used to maintain the appropriate injection rate and differential pressure requirement.

SECTION VI. Background Information

Acquisition of the following information is recommended for the planning, design, and analysis of the fall-off test.

1. Current wellbore schematic (Exhibit 4)

    a. Size and type of injection tubing (include type of internal coating, if applicable)

    - Well No. 1: 4 ½", 11.6 lb/ft, N-80, SMLS, R3, LT&C, set at 7,879'
    - Well No. 2: 3 ½", 9.2 lb/ft, J-55, SMLS, NUE 10 rd, set at 7,528'
    - Well No. 3: 4 ½", 11.6 lb/ft, J-55, LT&C, set at 7568'

    b. Packer depth

    - Well No. 1: 7,879', July 1998
    - Well No. 2: 7,528', May 1999
    - Well No. 3: 7,575', October 2006

    c. Tubing length including the depth of any seating or profile nipples, and the last date tubing was run. When tubing was originally installed.

    - Well No. 1: 7879'
    - Well No. 2: 7528'
    - Well No. 3: 7575'

d. Size, type, and depth of casings

- Well No. 1: Surface Casing-13 3/8", 48 lb/ft, J-55, ST&C, set at 390'
  Intermediate Casing-9 5/8", 36 lb/ft, J-55, ST&C, set at 2,555'
  Protection Casing-7", 29 lb/ft, N-80, LT&C: 9094' to 7031'; 7", 29 lb/ft, P-110, LT&C: 7031' to 5845'; 7", 26 lb/ft, P-110, LT&C: 5845' to surface
- Well No. 2: Surface Casing-8 5/8", 32 lb/ft, set at 1,995'
  Protection Casing-5 ½", 17 lb/ft, L-80, LT&C: 8869' to surface
- Well No. 3: Surface Casing-13 3/8" set at 400', 54.5 lb/ft,J-55, LT&C
  Intermediate Casing-9 5/8" set at 2,600',36 lb/ft, J-55, ST&C
  Protection Casing-7" set at 9450', 26lb/ft N-80 & 29 lb/ft P-110

e. Cement tops with method of determining the top of cement

- Well No. 1: On July 12, 1998, 9 5/8" protection casing was set from 2548' to the surface. It was confirmed that a continuous column of cement with good bonding characteristics behind the 9 5/8" protection casing from 2548' to 400'. The hydraulic coupling was lost above 400' and the tool would not respond.

  Exhibit 3.3.1-2 shows the intermediate casing is 9 5/8", 36 lb/ft, J-55, that was set in a 12 ¼" open hole at 2,555' and cemented to the surface with 800 sacks of Class C Lite containing ½ lb/sack floccule, 2 lb/sack Gilsonite and 12% salt, followed by 200 sacks of Class C containing 2% Calcium Chloride. With 133 sacks of lead cement circulated to the surface, the volume of cement placed behind pipe approximated the estimated annular hole volume, which was based on an average hole diameter of 14"

  On July 13, 1998 a cement bond log was run from 2548' to 580'. The log indicated an apparent cement compressive strength of 4,300 psi and bond index calculations ranged from 25% to 100% and averaged 72%.

- Well No. 2: On May 9, 1999, a bond log was performed within the 9 5/8" protection casing from 1910' to the surface. It was confirmed that a continuous column of cement with good bonding characteristics behind the 9 5/8" protection casing from 1910' to 116'. The hydraulic coupling was lost above 400' and the tool would not respond.

Exhibit 2.2-2 shows the 8 5/8" surface casing was originally set in an 11" open hole to a depth of 1955' (KB) and cemented to surface using 700 sacks of Class 'H' cement with 2% gel and 100 sacks of Class 'H' neat. A total of 200 sacks of cement were recorded circulated to surface. The calculated volume between an 11" and 8 5/8" casing is (0.2407 ft^3 per ft X 1955') 471 ft^3. The volume of cement pumped is (1.18 ft^3 per sack X 800 sacks) 944 ft^3 for an excess of 473 ft^3 or 400 sacks circulated to surface. The calculated volume of cement and apparent volume of actual cement pumped indicated excess cement was circulated to surface. (Re-entry and Completion report for Well No. 2)

- Well No. 3: On October 13, 2006, a CBL/VDL revealed cement had not been circulated to the surface behind the 7" protective casing, as was indicated in the state records. The top of cement (TOC) behind the 7" protective casing was located at 900' and the cement bond quality was poor down to 1200'. There were indications on the log that a micro-annulus may be present from 2662' to 2160', from 4876' to 5372', and from 6750' to 7600'. The CBL indicated there was good bonding between the 7" casing and the cement to isolate the injection interval. (Re-entry and Completion report for Well No. 3)

f. Top and bottom perforation/completion depths including the size of perforation holes and date perforated

- Well No. 1: Upper Zone – 7924'-7942', 7974'-8030', 8050'-8056', 8066'-8080', 8118'-8127', 8132'-8140', 8160'-8164', 8170'-8188'.
- Lower Zone – 8220'-8254', 8260'-8270', 8280'-8302', 8360'-8366', 8370'-8378', 8400'-8410', 8419'-8423', 8430'-8446', 8460'-8464', 8470'-8476'.
- Well No. 2: Zone 1 – 7570'-7620', 7676'-7736'
- Zone 2 – 7826'-7834', 7858'-7880', 7886'-7904', 7916'-7936', 7944'-7964', 7990'-8042', 8096'-8116', 8191'-8201', 8304'-8319', 8395'-8399'.

- Well No. 3: Original Open Perforations – 7676'-7698'
  New Upper Perforations – 7660'-8450'
  New Lower Perforations – 8540'-8620'

- Average hole sizes are approximately ½-inch in diameter.

g. Total depth, plug back depth, and the most recent depth to wellbore fill and date measured

- Well No. 1: TD-10,200', PBTD-9004',
- Well No. 2: TD-10,372', PBTD-8770'
- Well No. 3: TD-10,119', PBTD-9022'

h. Location of the pressure measuring tool during the test

- Well No. 1: 7924'
- Well No. 2: 7570'
- Well No. 3: 7660'

2. Copy of an electric log encompassing the completed interval

   Exhibit 3 (Appendix J - 2008 Annual Report)

3. Copy of relevant portions of any porosity log used to estimate formation porosity

   Exhibit 3 (Figure: 2.0-2 – 2008 Annual Report)

4. PVT Data

   a. Estimation of formation fluid and reservoir rock compressibility

      3.6×10^{-6} 1/psi

   b. Formation fluid viscosity with reference temperature

      0.72 cp at 112° F

   c. Formation fluid specific gravity/density with reference temperature

      8.6 ppg at 112° F

      This data may or may not be available since it will not exist for older wells when the regulations did not require it. When necessary, it will be estimated.

5. Injection fluids

   a. Description of fluids injected
   b. Injection fluid specific gravity/density with reference temperature
   c. Injection fluid compressibility
   d. Injection fluid viscosity with reference temperature

- Petroleum Refinery Waste Analytical Data for all three wells (See Exhibit 4)

6. Daily rate history data for a minimum of one month preceding the fall-off test

   The daily rate history will be provided with fall-off test report.

7. Cumulative injection into the formation from test well and offset wells

   The total injection volumes for each well will be included in final reports.

8. Pressure gauges

   a. Description of the down-hole surface pressure readout or memory gauge

      The memory gauges that will be used for each well are sapphire gauges with an accuracy of 0.025% full scale (FS) or 0.01% of the reading and will have a resolution of 0.0003% (FS). The pressure range of the gauges will be from 0-10,000 psi. These are typical bottom-hole memory gauges with the best accuracy available in the area. The gauges will be lowered to the top of the injection interval at 7924 feet in Mewbourne Well No. 1, 7820 feet in Chukka Well No. 2, and 7660 feet in Gaines Well No. 3. The recording period will be set to record pressures at a minimum of every 10 seconds.

   b. List the full range, accuracy and resolution of the gauges

      - +/-0.025% F.S. + 0.01% of reading
      - Will also provide a data specification sheet of gauges that were used to run the fall-off with each well report.

   c. A calibration certificate showing date the gauges were last calibrated

      Current calibration certificates for the gauges used in each well will be provided with final reports.

9. One mile Area of Review (AOR)

   a. Identification of wells located within the one mile AOR

      Exhibit 3 (Table VII)

   b. Ascertaining the status of wells within the one mile AOR

      Exhibit 3 (Table VIII)

c. Providing details on any offset producers and injectors completed in the same injection interval

Area of Review (AOR) lists all wells. The only wells that will affect the PFO Test are Navajo's current injection wells. These wells will be referred to as offset wells. These wells and the controlled rates are referenced in the general procedure. An update to the AOR will be included in each well report.

10. Geology

a. Description of the geologic environment of the injection interval

The proposed injection zones are porous carbonates of the lower portion of the Wolfcamp Formation and the Cisco and Canyon Formations. The Lower Wolfcamp is the shallowest porous unit in the proposed injection interval. The Wolfcamp Formation consists of light brown to tan, fine to medium-grained, fossiliferous limestone with variegated shale interbeds.

The Cisco Formation of the Northwest Shelf is described as consisting of uniform, light-colored, chalky, fossiliferous limestone interbedded with variegated shales. Cisco, at the edge of the Permian basin, is also described as consisting of biothermal (mound) reefs composed of thick, porous, coarse-grained dolomites. Locally, the Cisco consists of porous dolomite that is 745' thick in the Chukka Well No. 2, 650' thick in Mewbourne Well No. 1, and 720' thick in Gaines Well No. 3.

The Canyon Formation consists of white to tan to light brown fine grained, chalky, fossiliferous limestone with gray and red shale interbeds.

In summary, permeability values in the injection zone from producing fields in the region range up to 200 md. However, based on test data for the Mewbourne Well No. 1, Chukka Well No. 2, and Gaines Well No. 3, permeability values as high as 2733 md or higher occur in intervals in the injection zone. All three share the same injection interval.

b. Discussion on the presence of pinchouts, channels, and faults, if applicable.

N/A

c. Providing a portion of a relevant structure map, if necessary.

N/A

SECTION VII. Conducting the Fall-off Test

The following are recommended procedures for conducting the fall-off test. Alternative procedures that will produce valid test results and satisfy the requirements of OCD and the regulations will be considered by the OCD.

We anticipate additional analysis may be performed to confirm these results. If same zone injection is confirmed, it may be beneficial to annually run PFO tests on one well instead of all three for different (probably longer) periods of time.

1. Install a digital surface recorder, connected to a rate meter and a digital surface transducer, capable of adequately measuring surface injection rates and wellhead injection pressures during the test.

   Digital pressure recorders (Sapphire or other similar gauges) will be located just above the perforated interval and on the wellhead. Injection rates will be monitored with the normal operation instrumentation. Historically the wellhead pressures will fall to zero psig at some point during the falloff segment of the testing depending upon the weight of the waste fluid at the time of the testing. The plant has the ability to record rates and wellhead pressure through flow meters and pressure indicating gauges at each well site. The instrumentation is connected to the plant by RTU and wireless transmitters.

2. Confirm the constant pre-fall-off test injection rate is maintained prior to the fall-off.

   The rate will be maintained through plant monitoring and flow equipment for each well.

3. Confirm pressure gauges have stabilized prior to shutting in the well for the fall-off test.

   For each well, the gauges will remain on bottom for one hour to stabilize. This should be sufficient for pressure gauge stabilization.

4. Following installation of the bottom-hole pressure gauges and surface recorders, regulate injection to the stabilized designated pre-fall-off test injection rate that will result in a sufficiently sized pressure increase (above shut-in pressure) on the wellhead. If the injection rate was stabilized prior to running the down-hole gauges and the gauge installation did not disrupt the injection rate, monitoring the gauge for a minimum of one hour may be sufficient for verifying that the bottom-hole pressure is stabilized prior to initiating the fall-off test.

   As indicated in 2 & 3 of the above section, every effort will be made to comply with this requirement.

5. The injection rate shall be high enough and continuous for a period of time sufficient to produce a pressure build up that will result in valid test data. The injection rate shall result in a pressure build up such that a semi-log straight line can be determined from the Horner plot or other appropriate semi-log plot. The injection rate shall be the maximum injection rate that can be feasibly maintained constantly, in order to maximize pressure changes in the formation and provide valid test results, but not exceeding the daily injection pressure and volume limit of the UIC Permit.

   We anticipate a pressure build up of 100 psi or greater will be maintained during critical portions of the pressure fall off testing for each well.

6. Confirm the liquid injection density is held relatively constant during the injectivity portion of the test by periodically measuring one or more of the following:

   a. Density
   b. Chloride concentration
   c. Total dissolved solids concentration
   d. Conductivity
   e. pH

   Samples of the injectate for each well will be taken and where possible, analyzed before shut-in.

7. The surface readout down-hole pressure gauge must be located at or near the top of the injection interval, unless previous testing indicates a more appropriate location.

   The down-hole digital pressure gauges will be located at the top of the perforations at the following depths.

   - Well No. 1: 7924'
   - Well No. 2: 7570'
   - Well No. 3: 7660'

8. If the stabilization injection period is interrupted for any reason and for any length of time, the stabilization injection period must be restarted, unless superposition analysis can be applied and valid test results obtained.

   If the testing is interrupted as stated above the test will be shut down and restarted from the beginning for any one of the well test on wells 1 through 3.

9. The well must be shut-in at the wellhead or as near as feasible to the wellhead to minimize wellbore storage and after flow.

The PFO test well(s) will be shut-in utilizing the wing valve on the wellhead or the nearby injectate flow line valve.

10. The well shut-in must be accomplished as instantaneously as possible to prevent erratic pressure behavior during the test.

    Every effort will be made to shut-in the PFO test well instantaneously.

11. Following shut-in at the well, shut-in relevant tubing valves to ensure complete shut-in of the well. Bottom-hole shut-in is preferred to surface shut-in, but not required. Shut-in the well with no disturbances for at least seven days or other approved time period as determined from previous tests results or the test design.

    Previous testing on each one of the wells has indicated only 30-hour shut-in period is necessary. Historically during the 2009 and 2010 falloff test the data obtained after the 30-hour period could not be analyzed. Exhibit 5 contains the 2010 and 2011 falloff data and analysis and clearly shows that radial flow was achieved before the end of the 30-hour period. The data obtained after the 30-hour period is highly scattered and banded indicating that the limit of the gauge resolution had been reached making the data unusable for analysis. The log-log plots for 2010 and 2011 clearly show that radial flow has been achieved before the end of a 30-hour shut-in period.

12. Upon completion of the test, tag fill depth with gauges, pull out bottom-hole gauges making stops every 1000 feet for 5-minutes to obtain gradient data, rig down, and resume normal injection into the well as needed.

    The absence of fill across the perforations will be confirmed before starting the PFO testing and if necessary reconfirmed prior to the gradient stop portion of the PFO tests for each well.

13. The fall-off portion of the test must be conducted for a length of time sufficient to reach radial flow, i.e., the pressure is no longer influenced by wellbore storage or skin effects and enough data points lie within the infinite acting period that the semi-log straight line is well developed. A log-log with derivative plot should be prepared during the fall-off to verify radial flow is occurring.

    This requirement has been considered during PFO Test Plan development and implemented into the general procedure for each well.

SECTION VIII - Evaluation of the Test Results

A licensed professional who is knowledgeable in the methods of pressure transient test analysis, must evaluate and summarize the test results. The following information and evaluations shall be provided in the test report:

1. A log-log plot with a derivative diagnostic plot shall be used to identify flow regimes.

2. The wellbore storage portion and infinite acting portion of the test shall be identified on the plot. Type curves shall be used to verify results.

3. A Horner plot or other appropriate semi-log plot must be used to calculate the kh/u product and to determine P*. The wellbore storage and infinite acting portions of the test should be identified on the plot. An expanded semi-log plot containing the entire infinite acting portion must be reproduced to permit a closer inspection of the semi-log slope and any data fluctuations. The slope used to calculate the transmissibility (kh/u) and to determine P* must be drawn on both semi-log plots.

4. The "h" value (injection interval thickness) used in the analysis must be agreed upon between OCD and the permittee. For formations with characteristics such as fracture- controlled karst reservoirs with porosity and permeability influenced by basement structural patterns and sub aerial exposure, the entire thickness of the injection interval should be considered. A reliable literature value can be used if site specific data is not available.

5. The viscosity used in analyzing the test shall be that of the liquid through which the pressure transient was propagating during the infinite acting portion of the test. The information used to determine the viscosity shall be provided. Distance estimates to the waste front may also be needed.

6. Any test that was not shut-in long enough to develop an infinite acting period, or cannot be properly analyzed for transmissibility (kh/u) from the semi-log plot, should be rerun using a procedure that will result in valid test results, unless other arrangements have been made with OCD.

7. All equations and assumptions used in the analysis shall be provided with the appropriate parameters substituted into the equations.

8. A plot of the temperature data shall be provided for review. Any temperature anomalies shall be noted to determine if they correspond to pressure anomalies since the temperature compensation mechanism of the pressure gauge may be influenced by temperature fluctuations.

9. Explain any anomalous pressure data responses. Investigate any potential physical causes for the anomaly in addition to potential reservoir response characteristics.

   Navajo will comply with these requirements in the test results for each well.

SECTION IX - Report Components

Include the following information in the report to the OCD in Santa Fe - Attention environmental Bureau of the Division (see address under OCD contacts listed in the Contacts Section). The information in the report includes general information, an overview of the test, analysis of the test data, summary of the results and a comparison of the results with previous test results and UIC permit parameters. Submit the report to OCD within 30 days of test completion.

1. Facility information
   a. Name: Navajo Refining Company (Subsidiary of Holly Corporation)
   b. Location: Highway 82 East, Artesia, New Mexico 88211
   c. Operator's OGRD number: 94081

   The above Data will be included in the report for each well.

2. Well information:

   a. OCD UIC Permit number authorizing injection

      - Well No. 1: UIC-CLI-008-1
      - Well No. 2: UIC-CLI-008-2
      - Well No. 3: UIC-CLI-008-3

   b. Well classification

      - Well No. 1: Class I Non Hazardous
      - Well No. 2: Class I Non Hazardous
      - Well No. 3: Class I Non Hazardous

   c. Well name and number

      - WDW-1 (Mewbourne)
      - WDW-2 (Chukka)
      - WDW-3 (Gaines

d. API number

- Well No. 1: 30-015-27592
- Well No. 2: 30-015-20894
- Well No. 3: 30-015-26575

e. Legal location

- Well No. 1: 660 FSL, 2310-FEL, Sect 31 T17S R28E
- Well No. 2: 1980 FNL, 660-FWL, Sect 12 T18S R27E
- Well No. 3: 790 FSL, 2250-FWL, Sect 1 T18S R27E

3. Current wellbore schematic as described in Section VI

   Current wellbore schematics will be attached and presented as figures for each well report. A copy of the well schematic for each well can be found in Exhibit 4.

4. Copy of an electric log encompassing the completed interval

   A copy of an electric log encompassing the completed interval will be attached and presented as exhibits for each well report.

5. Copy of relevant portions of any porosity log used to estimate formation porosity

   A copy of porosity logs used to estimate formation porosity will be attached and presented as exhibits for each well report.

6. PVT data of the formation and injection fluid as described in Section VI

   a. Estimation of formation fluid and reservoir rock compressibility
      3.6×10^{-6} 1/psi
   b. Formation fluid viscosity with reference temperature
      0.72 cp at 112° F
   c. Formation fluid specific gravity/density with reference temperature
      8.6 ppg at 112° F

7. Daily rate history data for a minimum of one month preceding the fall-off test

   The daily rate history will be provided with fall-off test report for each well.

8. Cumulative injection into the formation from test well and offset wells

   Current cumulative volumes will be provided in the test report for each well.

9. Pressure gauges

   a. Describe the type of down-hole surface pressure readout gauge used including manufacturer and type

      The memory gauges that will be used are sapphire gauges that will have an accuracy of 0.025% full scale (FS) or 0.01% of the reading and will have a resolution of 0.0003% (FS). The pressure range of the gauges will be from 0-10,000 psi. These are typical bottom hole memory gauges with the best accuracy available in the area. The gauges will be lowered to the top of the injection interval at 7924 feet in Mewbourne Well No. 1, 7820 feet in Chukka Well No. 2, and 7660 feet in Gaines Well No. 3. The recoding period will be set to record pressures at a minimum of every 10 seconds for each well.

   b. List the full range, accuracy and resolution of the gauge

      - +/-0.025% F.S. + 0.01% of reading
      - Will also provide a data specification sheet of gauges that were used to run the fall-off with report for each well.

   c. Provide the manufacturer's recommended frequency of calibration and a calibration certificate showing date the gauge was last calibrated.

      Current calibration certificates will be provided with final report for each well.

10. One mile Area of Review (AOR)

   a. Identify wells located within the one mile AOR

      Exhibit 3 (Table VII)

   b. Ascertain the status of wells within the one-mile AOR

      Exhibit 3 (Table VIII)

   c. Provide details on any offset producers and injectors completed in the same injection interval

      Area of Review (AOR) lists all wells. The only wells that will affect the PFO Test are Navajo's well(s). These wells and the controlled rates are referenced in the procedure for each well.

11. Geology

a. Describe geologic environment of the injection interval.

The proposed injection zones are porous carbonates of the lower portion of the Wolfcamp Formation and the Cisco and Canyon Formations. The Lower Wolfcamp is the shallowest porous unit in the proposed injection interval. The Wolfcamp Formation consists of light brown to tan, fine to medium-grained, fossiliferous limestone with variegated shale interbeds.

The Cisco Formation of the Northwest Shelf is described as consisting of uniform, light-colored, chalky, fossiliferous limestone interbedded with variegated shales. Cisco, at the edge of the Permian basin, is also described as consisting of biothermal (mound) reefs composed of thick, porous, coarse-grained dolomites. Locally, the Cisco consists of porous dolomite that is 745 feet thick in the Chukka Well No. 2, 650 feet thick in Mewbourne Well No. 1, and 720 feet thick in Gaines Well No. 3.

The Canyon Formation consists of white to tan to light brown, fine grained, chalky, fossiliferous limestone with gray and red shale interbeds.

In summary, permeability values in the injection zone from producing fields in the region range up to 200 md. However, based on test data for the Mewbourne Well No. 1, Chukka Well No. 2, and Gaines Well No. 3, permeability values as high as 2733 md or higher occur in intervals in the injection zone. Each well report will include a short description of the injection interval as described above.

b. Discuss the presence of geologic features, i.e., pinchouts, channels, and faults, if applicable.

N/A

c. Provide a portion of a relevant structure map, if necessary.

N/A

12. Offset wells

(Area of Review lists all wells within the AOR. The AOR was updated in 2011 and the only wells that will affect the PFO Test are the Navajo injection wells. These wells and controlled rates will be referenced in the procedure and accounted for in the analysis if necessary.)

a. Identify the distance between the test well and any offset wells completed in the same injection interval
b. Report the status of the offset wells during both the injection and shut-in portions of the test
c. Describe the impact, if any, the offset wells had on the test

13. Chronological listing of the daily testing activities (operations log)

A chronology of field activities will be included in each well report with a minimum of the following items:

a. Date of the test
b. Time of the injection period
c. Type of injection fluid
d. Final injection pressure and temperature prior to shutting in the well
e. Total shut-in time
f. Final static pressure and temperature at the end of the fall-off portion of the test

14. Describe the location of the shut-in valve used to cease flow to the well for the shut-in portion of the test.

Each well will be shut-in with a 4-inch gate valve: one at the wellhead and one at the filter pods. The valves will be locked out and tagged out.

15. Provide each of the following; including the equations used to calculate each, the equations with the appropriate parameters substituted in them, description of parameters used in calculations with references as to how the values were derived:

a. Radius of test investigation

$$r_{waste} = \left[\frac{0.13368\ V}{\pi\ h\ \varphi}\right]^{1/2}$$

b. Time to beginning of the infinite acting portion of the test

$$t_{waste} = 948\ \frac{\varphi\ \mu_{waste}\ c_t\ r^2_{waste}}{k}$$

c. Slope or slopes determined from the semi-log plot

Determined from Pan Systems V3.5 © Horner or Superposition Plot

d. The value for transmissibility (kh/u)

$$\frac{k\,h}{\mu} = 162.6\,\frac{q_{last}\,B}{m}$$

e. Permeability (k)

$$k = \frac{k\,h}{h}$$

f. Skin factor (s)

$$s = 1.151\left[\frac{p_{wf} - p_{1hr}}{m} - \log\left[\frac{k}{\phi\,\mu\,c_t\,r_w^2}\right] + 3.23\right]$$

g. Pressure drop due to skin (ΔPskin)

ΔPskin = 0.869ms

h. Flow efficiency ((Pwf-ΔPskin-Pstatic)/ (Pwf-Pstatic))

i. Flow capacity (kh) or mobility thickness

$$k\,h = \left(\frac{k\,h}{\mu}\right)\mu_{res}$$

j. $P_{1\,hour}$ (extrapolated pressure at one hour)

Determined from Pan Systems© V3.5, which is the extrapolated straight line at one hour on the Horner Plot.

16. Explain any pressure or temperature anomaly

Any pressure and temperature anomalies will be explained in the report for each well.

17. Describe the test results

a. Discuss if the test reached radial flow or if it was dominated by wellbore storage or another type of flow regime.

Will be determined from Log-Log Plot

b. Describe the reservoir results as homogeneous or heterogeneous explaining how this was determined.

Note: Initial assumption will be homogeneous reservoir in semi-steady state flow. An explanation will be included in the well reports.

18. Provide the following graphs:

The following graphs will be provided by the Pan System V3.5 © and will include the identifiable flow regemes on each plot, which will be included in each well report.

a. Cartesian plot of pressure and temperature versus time
b. Cartesian plot of injection rate versus time
c. Log-log and derivative plots with the flow regions identified

i. Identify the wellbore storage period
ii. Identify the radial flow period in.
iii. Identify any other relevant flow regimes
iv. Semi-log plot and expanded semi-log plot (typically Horner plots)
v. Identify the flow regions on each
vi. Draw the semi-log straight line
vii. Identify the P* (false extrapolated pressure)
viii. Calculate $P_{1\ hour}$ (extrapolated pressure at one hour)

d. Plot of the digital surface rates and pressures from the surface pressure gauge

Subsurface will attach a data logging surface gauge to the wellhead to generate data and plot. Navajo will provide the rates from there flow meters. This will be included in the well report for each well. As a note, historically the wellhead pressure at some point in time during the pressure falloff will go to zero and then on a vacuum.

e. Plot of digital pressures and times from the bottom hole gauges

Data will be provided from down-hole gauges for plot. The plots for each well will be generated by the Pan Systems© V3.5 software.

f. Complete injection rate history plot (injection rate and wellhead pressure vs. calendar time)

Injection rate history will be provided in Pan System © Report for each well.

g. Current Hall plot with explanation for any changes to the slope of this plot

Explanation will be provided in report for each well.

19. Comparison of permeability (k), transmissibility (kh/u), skin (s), false extrapolated pressure (P*), and depth to fill with the same values determined from fall-off tests previously conducted in the well.

A table will be provided comparing the results from previous testing with the report for each well.

20. A statement that the raw test data generated by the test will be kept on file by the permittee for a period of not less than 3 years and will be made available to OCD upon request during this time period. The raw test data need not be submitted to OCD unless requested.

Navajo will comply with this and a table of acquired pressure, rate, and analytical data will be included with the report for each well.

SECTION X – Contacts

OCD Contacts:

Mr. Carl Chavez
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1220 S. St. Francis Drive
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Mr. William Jones
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, NM 87505
Phone: 505-476-3448
E-mail: william.jones@state.nm.us

USEPA Contacts:

Mr. Ken Johnson
USEPA Region 6 (6WQ-SG)
1445 Ross Avenue
Dallas, TX 75202-2733
Phone: 214-665-8473
E-mail: Johnson. ken-e@epa.gov

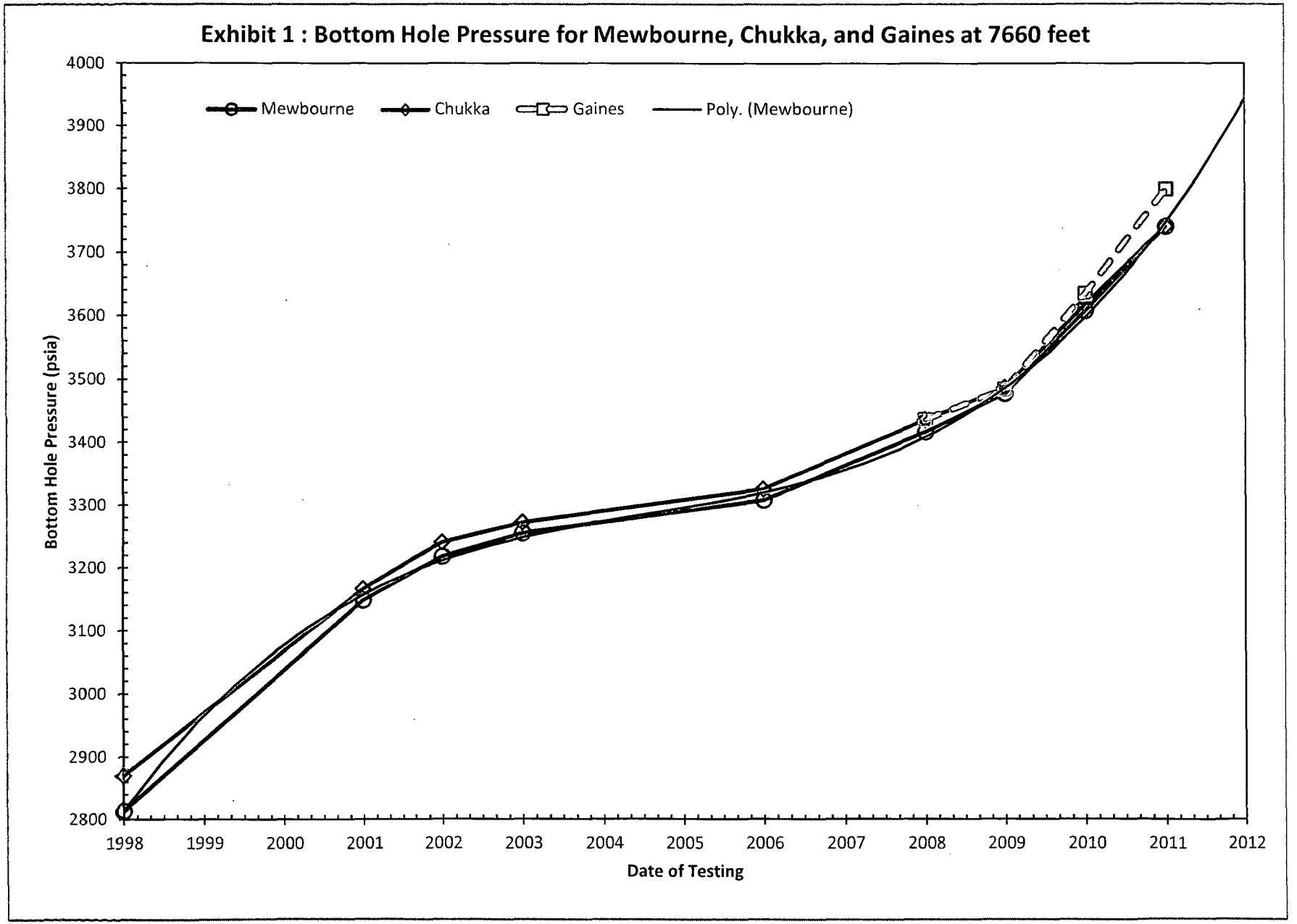
Ms. Susan Lopez McKenzie
USEPA Region 6 (6WQ-SG)
1445 Ross Avenue
Dallas, TX 75202-2733
Phone: 214-665-7198
E-mail: lopez.susan@epa.gov

SECTION XI – Additional Information

As a result of the falloff testing done in 2008 and 2009 it appears that all three of the wells may be in communication to some degree. Pressure communication between the wells indicates that the reservoir is continuous with similar properties at each wellbore. Exhibit 1 contains a chart and tables with historical pressures for all 3 wells. On the chart, the trend appears to show that the addition of the Gaines well in 2007 to the injection interval resulted in an increase in pressure in the Mewbourne and Chukka wells. This would also indicate pressure communication between the wells.

EXHIBIT 1





70D6835/Navajo/Exhibit 1

EXHIBIT 2

SUBSURFACE

EXHIBIT 2

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25184 InstrumentID: VOA2

LCS Sample ID: VLCSW-1210 Test Code: SW8260 Units: µg/L Analysis Date: 12/10/04 13:50
Client ID: Run ID: VOA2_041210A SeqNo: 586931 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	53.94	5.0	50	0	108	75.2-120	0			
1,1,2,2-Tetrachloroethane	53.63	5.0	50	0	107	72.4-121	0			
1,1,2-Trichloroethane	52.21	5.0	50	0	104	80-120	0			
1,1-Dichloroethane	51.53	5.0	50	0	103	76.9-120	0			
1,1-Dichloroethene	54.08	5.0	50	0	108	72.6-123	0			
1,2-Dichloroethane	51.67	5.0	50	0	103	80-120	0			
2-Butanone	119.9	10	100	0	120	69-131	0			
2-Chloroethyl vinyl ether	113.4	10	100	0	113	60-135	0			
2-Hexanone	121.4	10	100	0	121	55.6-126	0			
4-Methyl-2-pentanone	118.2	10	100	0	118	67.4-121	0			
Acetone	109.7	10	100	0	110	64.4-140	0			
Benzene	51.72	5.0	50	0	103	80-120	0			
Bromodichloromethane	51.04	5.0	50	0	102	80-120	0			
Bromoform	55.31	5.0	50	0	111	77.9-121	0			
Bromomethane	53.52	5.0	50	0	107	63.3-137	0			
Carbon disulfide	101.4	10	100	0	101	74.1-123	0			
Carbon tetrachloride	51.52	5.0	50	0	103	74.7-120	0			
Chlorobenzene	48.09	5.0	50	0	96.2	80-120	0			
Chloroethane	50.53	5.0	50	0	101	74.7-126	0			
Chloroform	50.64	5.0	50	0	101	80-120	0			
Chloromethane	49.38	5.0	50	0	98.8	64.5-132	0			
cis-1,3-Dichloropropene	50.36	5.0	50	0	101	80-120	0			
Dibromochloromethane	53.13	5.0	50	0	106	80-120	0			
Ethylbenzene	53.38	5.0	50	0	107	80-120	0			
m,p-Xylene	103.8	10	100	0	104	80-120	0			
Methylene chloride	48.39	10	50	0	96.8	76.2-120	0			
Styrene	53.58	5.0	50	0	107	80-120	0			
Tetrachloroethene	53.39	5.0	50	0	107	68.5-130	0			
Toluene	52.27	5.0	50	0	105	80-120	0			
trans-1,3-Dichloropropene	54.85	5.0	50	0	110	80-120	0			
Trichloroethene	54.11	5.0	50	0	108	78.9-120	0			
Vinyl acetate	115.6	10	100	0	116	62.4-133	0			
Vinyl chloride	52.09	2.0	50	0	104	72.7-128	0			
Xylenes, Total	152.9	15	150	0	102	80-120	0			
Surr: 1,2-Dichloroethane-d4	45.28	5.0	50	0	90.6	71-126	0			
Surr: 4-Bromofluorobenzene	45.14	5.0	50	0	90.3	74-125	0			
Surr: Dibromofluoromethane	43.25	5.0	50	0	86.5	73-126	0			
Surr: Toluene-d8	46.04	5.0	50	0	92.1	75-125	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
/ork Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: **R25184** InstrumentID: **VOA2**

MS Sample ID: **0412122-01AMS** Test Code: **SW8260** Units: **µg/L** Analysis Date: **12/10/04 15:31**

Client ID: Run ID: **VOA2_041210A** SeqNo: **586934** Prep Date: DF: **100**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	4798	500	5000	0	96	75.2-120	0			
1,1,2,2-Tetrachloroethane	3949	500	5000	0	79	72.4-121	0			
1,1,2-Trichloroethane	4942	500	5000	0	98.8	80-120	0			
1,1-Dichloroethane	4844	500	5000	0	96.9	76.9-120	0			
1,1-Dichloroethene	4755	500	5000	0	95.1	72.6-123	0			
1,2-Dichloroethane	4962	500	5000	0	99.2	80-120	0			
2-Butanone	11580	1,000	10000	0	116	69-131	0			
2-Chloroethyl vinyl ether	8304	1,000	10000	0	83	60-135	0			
2-Hexanone	11630	1,000	10000	0	116	55.6-126	0			
4-Methyl-2-pentanone	11200	1,000	10000	0	112	67.4-121	0			
Acetone	10640	1,000	10000	0	106	64.4-140	0			
Benzene	4919	500	5000	0	98.4	80-120	0			
Bromodichloromethane	4991	500	5000	0	99.8	80-120	0			
Bromoform	5184	500	5000	0	104	77.9-121	0			
Bromomethane	4562	500	5000	0	91.2	63.3-137	0			
Carbon disulfide	9132	1,000	10000	0	91.3	74.1-123	0			
Carbon tetrachloride	4713	500	5000	0	94.3	74.7-120	0			
Chlorobenzene	4596	500	5000	0	91.9	80-120	0			
Chloroethane	4625	500	5000	0	92.5	74.7-126	0			
Chloroform	8788	500	5000	4602	83.7	80-120	0			
Chloromethane	4632	500	5000	0	92.6	64.5-132	0			
cis-1,3-Dichloropropene	4838	500	5000	0	96.8	80-120	0			
Dibromochloromethane	4989	500	5000	0	99.8	80-120	0			
Ethylbenzene	5104	500	5000	0	102	80-120	0			
m,p-Xylene	9965	1,000	10000	0	99.6	80-120	0			
Methylene chloride	4625	1,000	5000	0	92.5	76.2-120	0			
Styrene	5121	500	5000	0	102	80-120	0			
Tetrachloroethene	5010	500	5000	0	100	68.5-130	0			
Toluene	4924	500	5000	0	98.5	80-120	0			
trans-1,3-Dichloropropene	5349	500	5000	0	107	80-120	0			
Trichloroethene	5895	500	5000	0	118	78.9-120	0			
Vinyl acetate	1690	1,000	10000	0	16.9	62.4-133	0			S
Vinyl chloride	4609	200	5000	0	92.2	72.7-128	0			
Xylenes, Total	14660	1,500	15000	0	97.7	80-120	0			
Surr: 1,2-Dichloroethane-d4	4231	500	5000	0	84.6	71-126	0			
Surr: 4-Bromofluorobenzene	4306	500	5000	0	86.1	74-125	0			
Surr: Dibromofluoromethane	4042	500	5000	0	80.8	73-126	0			
Surr: Toluene-d8	4389	500	5000	0	87.8	75-125	0			

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J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

03-Sep-08

Aaron Strange
Navajo Refining Company
PO Box 159
Artesia, NM 88211

Tel: (575) 746-5468
Fax: (505) 746-5421

Re: Injection Well Quarterly

Work Order : 0808447

Dear Aaron,

ALS Laboratory Group received 2 samples on 8/20/2008 08:55 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Laboratory Group and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Laboratory Group. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 36.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Jaylynn F Thibault

Electronically approved by: Glenda H. Ramos

Jaylynn F Thibault

Certificate No: T104704231-08-TX

ALS Laboratory Group

Date: 03-Sep-08

Client: Navajo Refining Company
Project: Injection Well Quarterly
Work Order: 0808447

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0808447-01	Injection Well	Water		8/19/2008 11:30	8/20/2008 08:55	☐

ALS Laboratory Group *Date: 03-Sep-08*

Client:	Navajo Refining Company
Project:	Injection Well Quarterly
Work Order:	0808447

Case Narrative

pH sample (Injection Well) holding time had expired prior to request for analysis.

Batch 31577 Metals (sample 0808511-02MS/MSD) unrelated sample.

Batch R67271 Volatiles (sample 0808627-06MS/MSD) unrelated sample.

ALS Laboratory Group

Date: *03-Sep-08*

Client: Navajo Refining Company
Project: Injection Well Quarterly — **Work Order:** 0808447
Sample ID: Injection Well — **Lab ID:** 0808447-01
Collection Date: 8/19/2008 11:30 AM — **Matrix:** WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ICP METALS, TOTAL - SW6020A			SW6020		Prep Date: 8/25/2008	Analyst: ALR
Aluminum	0.447		0.0100	mg/L	1	8/25/2008 09:21 PM
Arsenic	0.116		0.00500	mg/L	1	9/2/2008 03:31 PM
Barium	0.0187		0.00500	mg/L	1	8/25/2008 09:21 PM
Beryllium	ND		0.00200	mg/L	1	8/25/2008 09:21 PM
Boron	0.163		0.0200	mg/L	1	8/25/2008 09:21 PM
Cadmium	ND		0.00200	mg/L	1	8/25/2008 09:21 PM
Calcium	68.7		0.500	mg/L	1	8/25/2008 09:21 PM
Chromium	ND		0.00500	mg/L	1	9/2/2008 03:31 PM
Cobalt	ND		0.00500	mg/L	1	9/2/2008 03:31 PM
Copper	ND		0.00500	mg/L	1	8/25/2008 09:21 PM
Iron	0.240		0.200	mg/L	1	8/25/2008 09:21 PM
Lead	ND		0.00500	mg/L	1	8/25/2008 09:21 PM
Magnesium	27.1		0.200	mg/L	1	8/25/2008 09:21 PM
Manganese	0.0478		0.00500	mg/L	1	9/2/2008 03:31 PM
Molybdenum	0.0577		0.00500	mg/L	1	8/25/2008 09:21 PM
Nickel	0.00528		0.00500	mg/L	1	8/25/2008 09:21 PM
Potassium	13.0		0.200	mg/L	1	8/25/2008 09:21 PM
Selenium	0.339		0.00500	mg/L	1	9/2/2008 03:31 PM
Silver	ND		0.00500	mg/L	1	8/25/2008 09:21 PM
Sodium	985		20.0	mg/L	100	8/26/2008 04:20 PM
Vanadium	ND		0.00500	mg/L	1	9/2/2008 03:31 PM
Zinc	0.0369		0.00500	mg/L	1	8/25/2008 09:21 PM
SEMIVOLATILE ORGANICS BY GC/MS			SW8270		Prep Date: 8/22/2008	Analyst: ACN
1,2,4-Trichlorobenzene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
2,4,5-Trichlorophenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
2,4,6-Trichlorophenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
2-Methylnaphthalene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
2-Methylphenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
2-Nitroaniline	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
2-Nitrophenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
3&4-Methylphenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
3-Nitroaniline	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
4-Nitroaniline	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
4-Nitrophenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Acenaphthene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Acenaphthylene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Aniline	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Anthracene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
a - Not accredited
S - Spike Recovery outside accepted recovery limits
P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time
n - Not offered for accreditation

ALS Laboratory Group

Date: *03-Sep-08*

Client: Navajo Refining Company
Project: Injection Well Quarterly
Sample ID: Injection Well
Collection Date: 8/19/2008 11:30 AM

Work Order: 0808447
Lab ID: 0808447-01
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Benz(a)anthracene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Benzidine	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Hexachloroethane	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Indeno(1,2,3-cd)pyrene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Isophorone	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
N-Nitrosodi-n-propylamine	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
N-Nitrosodimethylamine	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
N-Nitrosodiphenylamine	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Naphthalene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Nitrobenzene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Pentachlorophenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Phenanthrene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Phenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Pyrene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Surr: 2,4,6-Tribromophenol	*80.5*		*42-124*	*%REC*	1	8/26/2008 09:58 PM
Surr: 2-Fluorobiphenyl	*56.9*		*48-120*	*%REC*	1	8/26/2008 09:58 PM
Surr: 2-Fluorophenol	*43.8*		*20-120*	*%REC*	1	8/26/2008 09:58 PM
Surr: 4-Terphenyl-d14	*75.2*		*51-135*	*%REC*	1	8/26/2008 09:58 PM
Surr: Nitrobenzene-d5	*50.8*		*41-120*	*%REC*	1	8/26/2008 09:58 PM
Surr: Phenol-d6	*50.8*		*20-120*	*%REC*	1	8/26/2008 09:58 PM
VOLATILES BY GC/MS			**SW8260**			Analyst: PC
1,1,1-Trichloroethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
1,1,2,2-Tetrachloroethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
1,1,2-Trichloroethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
1,1-Dichloroethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
1,1-Dichloroethene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
1,2-Dichloroethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
2-Butanone	ND		0.10	mg/L	10	8/28/2008 03:56 PM
2-Chloroethyl vinyl ether	ND		0.10	mg/L	10	8/28/2008 03:56 PM
2-Hexanone	ND		0.10	mg/L	10	8/28/2008 03:56 PM
4-Methyl-2-pentanone	ND		0.10	mg/L	10	8/28/2008 03:56 PM
Acetone	ND		0.10	mg/L	10	8/28/2008 03:56 PM
Benzene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Bromodichloromethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Bromoform	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Bromomethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Carbon disulfide	ND		0.10	mg/L	10	8/28/2008 03:56 PM
Carbon tetrachloride	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Chlorobenzene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Chloroethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
a - Not accredited
S - Spike Recovery outside accepted recovery limits
P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time
n - Not offered for accreditation

ALS Laboratory Group

Date: *03-Sep-08*

Client: Navajo Refining Company
Project: Injection Well Quarterly — **Work Order:** 0808447
Sample ID: Injection Well — **Lab ID:** 0808447-01
Collection Date: 8/19/2008 11:30 AM — **Matrix:** WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Chloroform	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Chloromethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
cis-1,3-Dichloropropene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Dibromochloromethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Ethylbenzene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
m,p-Xylene	ND		0.10	mg/L	10	8/28/2008 03:56 PM
Methylene chloride	ND		0.10	mg/L	10	8/28/2008 03:56 PM
Styrene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Tetrachloroethene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Toluene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
trans-1,3-Dichloropropene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Trichloroethene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Vinyl acetate	ND		0.10	mg/L	10	8/28/2008 03:56 PM
Vinyl chloride	ND		0.020	mg/L	10	8/28/2008 03:56 PM
Xylenes, Total	ND		0.15	mg/L	10	8/28/2008 03:56 PM
Surr: 1,2-Dichloroethane-d4	*106*		*70-125*	*%REC*	10	8/28/2008 03:56 PM
Surr: 4-Bromofluorobenzene	*93.3*		*72-125*	*%REC*	10	8/28/2008 03:56 PM
Surr: Dibromofluoromethane	*105*		*71-125*	*%REC*	10	8/28/2008 03:56 PM
Surr: Toluene-d8	*102*		*75-125*	*%REC*	10	8/28/2008 03:56 PM
CYANIDE, REACTIVE			**SW-846**			Analyst: **HN**
Reactive Cyanide	ND		40.0	mg/Kg	1	8/22/2008
SULFIDE, REACTIVE			**SW-846**			Analyst: **HN**
Reactive Sulfide	ND		40.0	mg/Kg	1	8/22/2008
ANIONS BY ION CHROMATOGRAPHY			**E300**			Analyst: **PV**
Chloride	**492**		**10.0**	**mg/L**	20	8/20/2008 06:07 PM
Sulfate	**1,490**		**50.0**	**mg/L**	100	8/20/2008 06:30 PM
Surr: Selenate (surr)	*98.5*		*85-115*	*%REC*	100	8/20/2008 06:30 PM
Surr: Selenate (surr)	*100*		*85-115*	*%REC*	20	8/20/2008 06:07 PM
ALKALINITY			**SM2320B**			Analyst: **MAM**
Alkalinity, Bicarbonate (As CaCO3)	**179**		**5.00**	**mg/L**	1	8/21/2008 05:30 PM
Alkalinity, Carbonate (As CaCO3)	ND		5.00	mg/L	1	8/21/2008 05:30 PM
Alkalinity, Hydroxide (As CaCO3)	ND		5.00	mg/L	1	8/21/2008 05:30 PM
Alkalinity, Total (As CaCO3)	**179**		**5.00**	**mg/L**	1	8/21/2008 05:30 PM
CONDUCTIVITY			**E120.1**			Analyst: **MAM**
Specific Conductance	**4,710**		**1.00**	**µmhos/cm**	1	8/22/2008 04:00 PM
PH			**SW9040**			Analyst: **RPM**
pH	**7.29**	H	**0.100**	**pH units**	1	8/20/2008 04:00 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
a - Not accredited
S - Spike Recovery outside accepted recovery limits
P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time
n - Not offered for accreditation

ALS Laboratory Group

Date: *03-Sep-08*

Client:	Navajo Refining Company		
Project:	Injection Well Quarterly	**Work Order:**	0808447
Sample ID:	Injection Well	**Lab ID:**	0808447-01
Collection Date:	8/19/2008 11:30 AM	**Matrix:**	WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TOTAL DISSOLVED SOLIDS			E160.1			Analyst: KKP
Total Dissolved Solids (Residue, Filterable)	3,620		10.0	mg/L	1	8/20/2008 04:00 PM

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	P - Dual Column results percent difference > 40%
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	H - Analyzed outside of Hold Time.
	a - Not accredited	n - Not offered for accreditation

ALS Laboratory Group

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

Date: *03-Sep-08*

QC BATCH REPORT

Batch ID: **31577** Instrument ID **ICPMS02** Method: **SW6020**

MBLK Sample ID: **MBLKW1-082508-31577** Units: **mg/L** Analysis Date: **8/25/2008 09:08 PM**
Client ID: Run ID: **ICPMS02_080825A** SeqNo: **1476311** Prep Date: **8/25/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.009435	0.010								J
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.050								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Copper	ND	0.0050								
Iron	ND	0.20								
Lead	ND	0.0050								
Magnesium	ND	0.20								
Molybdenum	ND	0.0050								
Nickel	ND	0.0050								
Potassium	ND	0.20								
Silver	ND	0.0050								
Sodium	ND	0.20								
Zinc	0.00199	0.0050								J

MBLK Sample ID: **MBLKW1-082508-31577** Units: **mg/L** Analysis Date: **8/26/2008 06:06 PM**
Client ID: Run ID: **ICPMS02_080826A** SeqNo: **1477419** Prep Date: **8/25/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	ND	0.0050								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Manganese	ND	0.0050								
Selenium	ND	0.0050								
Vanadium	ND	0.0050								

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E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: 31577 Instrument ID ICPMS02 Method: SW6020

LCS Sample ID: MLCSW1-082508-31577 Units: mg/L Analysis Date: 8/25/2008 09:14 PM
Client ID: Run ID: ICPMS02_080825A SeqNo: 1476312 Prep Date: 8/25/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.05241	0.010	0.05	0	105	80-120	0			
Barium	0.04958	0.0050	0.05	0	99.2	80-120	0			
Beryllium	0.04832	0.0020	0.05	0	96.6	80-120	0			
Boron	0.9602	0.050	1	0	96	80-120	0			
Cadmium	0.05195	0.0020	0.05	0	104	80-120	0			
Calcium	4.85	0.50	5	0	97	80-120	0			
Copper	0.04442	0.0050	0.05	0	88.8	80-120	0			
Iron	4.997	0.20	5	0	99.9	80-120	0			
Lead	0.04998	0.0050	0.05	0	100	80-120	0			
Magnesium	4.729	0.20	5	0	94.6	80-120	0			
Molybdenum	0.05009	0.0050	0.05	0	100	80-120	0			
Nickel	0.04845	0.0050	0.05	0	96.9	80-120	0			
Potassium	4.876	0.20	5	0	97.5	80-120	0			
Silver	0.04927	0.0050	0.05	0	98.5	80-120	0			
Sodium	4.708	0.20	5	0	94.2	80-120	0			
Zinc	0.05174	0.0050	0.05	0	103	80-120	0			

LCS Sample ID: MLCSW1-082508-31577 Units: mg/L Analysis Date: 8/26/2008 06:12 PM
Client ID: Run ID: ICPMS02_080826A SeqNo: 1477420 Prep Date: 8/25/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.05269	0.0050	0.05	0	105	80-120	0			
Chromium	0.05122	0.0050	0.05	0	102	80-120	0			
Cobalt	0.05196	0.0050	0.05	0	104	80-120	0			
Manganese	0.0518	0.0050	0.05	0	104	80-120	0			
Selenium	0.05144	0.0050	0.05	0	103	80-120	0			
Vanadium	0.05104	0.0050	0.05	0	102	80-120	0			

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E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: **31577** Instrument ID **ICPMS02** Method: **SW6020**

MS Sample ID: **0808511-02BMS** Units: **mg/L** Analysis Date: **8/27/2008 02:01 PM**

Client ID: Run ID: **ICPMS02_080827A** SeqNo: **1477992** Prep Date: **8/25/2008** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.05404	0.020	0.05	0.007596	92.9	80-120	0			
Arsenic	0.05388	0.010	0.05	0.002166	103	80-120	0			
Barium	0.09094	0.010	0.05	0.03702	108	80-120	0			
Beryllium	0.04818	0.0040	0.05	0.0002298	95.9	80-120	0			
Boron	2.136	0.10	1	1.157	97.9	80-120	0			
Cadmium	0.05082	0.0040	0.05	0.0002848	101	80-120	0			
Calcium	287.2	1.0	5	278.8	168	80-120	0			SO
Chromium	0.05212	0.010	0.05	0.0006506	103	80-120	0			
Cobalt	0.05068	0.010	0.05	0.0002952	101	80-120	0			
Copper	0.05728	0.010	0.05	0.00864	97.3	80-120	0			
Iron	5.116	0.40	5	0.2318	97.7	80-120	0			
Lead	0.0531	0.010	0.05	0.001542	103	80-120	0			
Magnesium	133.9	0.40	5	126.4	152	80-120	0			SO
Manganese	0.05614	0.010	0.05	0.00613	100	80-120	0			
Molybdenum	0.06142	0.010	0.05	0.009076	105	80-120	0			
Nickel	0.0536	0.010	0.05	0.00507	97.1	80-120	0			
Potassium	12.93	0.40	5	8.01	98.4	80-120	0			
Selenium	0.0552	0.010	0.05	0.002548	105	80-120	0			
Silver	0.04754	0.010	0.05	-0.0003784	95.8	80-120	0			
Sodium	171.2	0.40	5	164.6	131	80-120	0			SO
Vanadium	0.05928	0.010	0.05	0.007996	103	80-120	0			
Zinc	0.1101	0.010	0.05	0.06128	97.7	80-120	0			

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: **31577** Instrument ID **ICPMS02** Method: **SW6020**

MSD Sample ID: **0808511-02BMSD** Units: **mg/L** Analysis Date: **8/27/2008 02:27 PM**
Client ID: Run ID: **ICPMS02_080827A** SeqNo: **1478014** Prep Date: **8/25/2008** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.05314	0.020	0.05	0.007596	91.1	80-120	0.05404	1.68	15	
Arsenic	0.05368	0.010	0.05	0.002166	103	80-120	0.05388	0.372	15	
Barium	0.08932	0.010	0.05	0.03702	105	80-120	0.09094	1.8	15	
Beryllium	0.04804	0.0040	0.05	0.0002298	95.6	80-120	0.04818	0.291	15	
Boron	2.114	0.10	1	1.157	95.7	80-120	2.136	1.04	15	
Cadmium	0.0507	0.0040	0.05	0.0002848	101	80-120	0.05082	0.236	15	
Calcium	284.4	1.0	5	278.8	112	80-120	287.2	0.98	15	O
Chromium	0.04898	0.010	0.05	0.0006506	96.7	80-120	0.05212	6.21	15	
Cobalt	0.04924	0.010	0.05	0.0002952	97.9	80-120	0.05068	2.88	15	
Copper	0.05714	0.010	0.05	0.00864	97	80-120	0.05728	0.245	15	
Iron	5.212	0.40	5	0.2318	99.6	80-120	5.116	1.86	15	
Lead	0.05296	0.010	0.05	0.001542	103	80-120	0.0531	0.264	15	
Magnesium	132.6	0.40	5	126.4	125	80-120	133.9	1.01	15	SO
Manganese	0.05514	0.010	0.05	0.00613	98	80-120	0.05614	1.8	15	
Molybdenum	0.06142	0.010	0.05	0.009076	105	80-120	0.06142	0	15	
Nickel	0.05416	0.010	0.05	0.00507	98.2	80-120	0.0536	1.04	15	
Potassium	13.05	0.40	5	8.01	101	80-120	12.93	0.924	15	
Selenium	0.04946	0.010	0.05	0.002548	93.8	80-120	0.0552	11	15	
Silver	0.04836	0.010	0.05	-0.0003784	97.5	80-120	0.04754	1.71	15	
Sodium	171.5	0.40	5	164.6	138	80-120	171.2	0.21	15	SO
Vanadium	0.05814	0.010	0.05	0.007996	100	80-120	0.05928	1.94	15	
Zinc	0.1117	0.010	0.05	0.06128	101	80-120	0.1101	1.44	15	

DUP Sample ID: **0808511-02BDUP** Units: **mg/L** Analysis Date: **8/26/2008 03:38 PM**
Client ID: Run ID: **ICP7500_080826A** SeqNo: **1477167** Prep Date: **8/25/2008** DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	312.2	25	0	0	0	0-0	289	7.7	25	
Magnesium	140.6	10	0	0	0	0-0	136.3	3.11	25	
Sodium	181	10	0	0	0	0-0	175.8	2.94	25	

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U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: **31577** Instrument ID **ICPMS02** Method: **SW6020**

DUP Sample ID: **0808511-02BDUP** Units: **mg/L** Analysis Date: **8/27/2008 01:48 PM**

Client ID: Run ID: **ICPMS02_080827A** SeqNo: **1477928** Prep Date: **8/25/2008** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.006054	0.020	0	0	0	0-0	0.007596	0	25	J
Arsenic	ND	0.010	0	0	0	0-0	0.002166	0	25	
Barium	0.03874	0.010	0	0	0	0-0	0.03702	4.54	25	
Beryllium	ND	0.0040	0	0	0	0-0	0.0002298	0	25	
Boron	1.2	0.10	0	0	0	0-0	1.157	3.68	25	
Cadmium	ND	0.0040	0	0	0	0-0	0.0002848	0	25	
Chromium	ND	0.010	0	0	0	0-0	0.0006506	0	25	
Cobalt	ND	0.010	0	0	0	0-0	0.0002952	0	25	
Copper	0.008378	0.010	0	0	0	0-0	0.00864	0	25	J
Iron	0.241	0.40	0	0	0	0-0	0.2318	0	25	J
Lead	ND	0.010	0	0	0	0-0	0.001542	0	25	
Manganese	0.00617	0.010	0	0	0	0-0	0.00613	0	25	J
Molybdenum	0.009256	0.010	0	0	0	0-0	0.009076	0	25	J
Nickel	0.005284	0.010	0	0	0	0-0	0.00507	0	25	J
Potassium	8.234	0.40	0	0	0	0-0	8.01	2.76	25	
Selenium	ND	0.010	0	0	0	0-0	0.002548	0	25	
Silver	ND	0.010	0	0	0	0-0	-0.0003784	0	25	
Vanadium	0.008804	0.010	0	0	0	0-0	0.007996	0	25	J
Zinc	0.06038	0.010	0	0	0	0-0	0.06128	1.48	25	

The following samples were analyzed in this batch: 0808447-01B

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: 31556 Instrument ID SV-5 Method: SW8270

MBLK Sample ID: SBLKW3-080822-31556 Units: µg/L Analysis Date: 8/26/2008 03:21 PM

Client ID: Run ID: SV-5_080826B SeqNo: 1477746 Prep Date: 8/22/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	ND	5.0								
2,4,5-Trichlorophenol	ND	5.0								
2,4,6-Trichlorophenol	ND	5.0								
2-Methylnaphthalene	ND	5.0								
2-Methylphenol	ND	5.0								
2-Nitroaniline	ND	5.0								
2-Nitrophenol	ND	5.0								
3&4-Methylphenol	ND	5.0								
3-Nitroaniline	ND	5.0								
4-Nitroaniline	ND	5.0								
4-Nitrophenol	ND	5.0								
Acenaphthene	ND	5.0								
Acenaphthylene	ND	5.0								
Aniline	ND	5.0								
Anthracene	ND	5.0								
Benz(a)anthracene	ND	5.0								
Benzidine	ND	5.0								
Hexachloroethane	ND	5.0								
Indeno(1,2,3-cd)pyrene	ND	5.0								
Isophorone	ND	5.0								
N-Nitrosodi-n-propylamine	ND	5.0								
N-Nitrosodimethylamine	ND	5.0								
N-Nitrosodiphenylamine	ND	5.0								
Naphthalene	ND	5.0								
Nitrobenzene	ND	5.0								
Pentachlorophenol	ND	5.0								
Phenanthrene	ND	5.0								
Phenol	ND	5.0								
Pyrene	ND	5.0								
Surr: 2,4,6-Tribromophenol	*67.43*	5.0	*100*	0	*67.4*	*42-124*	0			
Surr: 2-Fluorobiphenyl	*72.06*	5.0	*100*	0	*72.1*	*48-120*	0			
Surr: 2-Fluorophenol	*60.11*	5.0	*100*	0	*60.1*	*20-120*	0			
Surr: 4-Terphenyl-d14	*81.01*	5.0	*100*	0	*81*	*51-135*	0			
Surr: Nitrobenzene-d5	*73.36*	5.0	*100*	0	*73.4*	*41-120*	0			
Surr: Phenol-d6	*64.98*	5.0	*100*	0	*65*	*20-120*	0			

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E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: **31556** Instrument ID **SV-5** Method: **SW8270**

LCS Sample ID: **SLCSW3-080822-31556** Units: µg/L Analysis Date: **8/26/2008 03:49 PM**
Client ID: Run ID: **SV-5_080826B** SeqNo: **1477747** Prep Date: **8/22/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	34.72	5.0	50	0	69.4	50-120	0			
2,4,5-Trichlorophenol	77.01	5.0	100	0	77	50-120	0			
2,4,6-Trichlorophenol	75.15	5.0	100	0	75.1	50-120	0			
2-Methylnaphthalene	35.59	5.0	50	0	71.2	55-120	0			
2-Methylphenol	76.58	5.0	100	0	76.6	50-120	0			
2-Nitroaniline	38.37	5.0	50	0	76.7	55-120	0			
2-Nitrophenol	74.18	5.0	100	0	74.2	55-120	0			
3&4-Methylphenol	114.7	5.0	150	0	76.5	55-120	0			
3-Nitroaniline	34.11	5.0	50	0	68.2	40-120	0			
4-Nitroaniline	36.62	5.0	50	0	73.2	50-120	0			
4-Nitrophenol	79.01	5.0	100	0	79	45-120	0			
Acenaphthene	36.95	5.0	50	0	73.9	55-120	0			
Acenaphthylene	36.28	5.0	50	0	72.6	55-120	0			
Aniline	29.52	5.0	50	0	59	30-120	0			
Anthracene	38.39	5.0	50	0	76.8	55-120	0			
Benz(a)anthracene	36.89	5.0	50	0	73.8	55-120	0			
Benzidine	22.62	5.0	50	0	45.2	10-120	0			
Hexachloroethane	33.94	5.0	50	0	67.9	55-120	0			
Indeno(1,2,3-cd)pyrene	40.02	5.0	50	0	80	55-120	0			
Isophorone	41	5.0	50	0	82	55-120	0			
N-Nitrosodi-n-propylamine	36.91	5.0	50	0	73.8	50-120	0			
N-Nitrosodimethylamine	34.52	5.0	50	0	69	45-120	0			
N-Nitrosodiphenylamine	36.2	5.0	50	0	72.4	55-120	0			
Naphthalene	35.86	5.0	50	0	71.7	55-120	0			
Nitrobenzene	36.23	5.0	50	0	72.5	55-120	0			
Pentachlorophenol	82.21	5.0	100	0	82.2	55-120	0			
Phenanthrene	35.76	5.0	50	0	71.5	55-120	0			
Phenol	77.28	5.0	100	0	77.3	50-120	0			
Pyrene	38.67	5.0	50	0	77.3	55-120	0			
Surr: 2,4,6-Tribromophenol	*75.53*	5.0	*100*	0	*75.5*	*42-124*	0			
Surr: 2-Fluorobiphenyl	*75.37*	5.0	*100*	0	*75.4*	*48-120*	0			
Surr: 2-Fluorophenol	*69.51*	5.0	*100*	0	*69.5*	*20-120*	0			
Surr: 4-Terphenyl-d14	*79.92*	5.0	*100*	0	*79.9*	*51-135*	0			
Surr: Nitrobenzene-d5	*74.24*	5.0	*100*	0	*74.2*	*41-120*	0			
Surr: Phenol-d6	*73.1*	5.0	*100*	0	*73.1*	*20-120*	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
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U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: **31556** Instrument ID **SV-5** Method: **SW8270**

MS Sample ID: **0808511-02CMS** Units: µg/L Analysis Date: **8/26/2008 04:46 PM**

Client ID: Run ID: **SV-5_080826B** SeqNo: **1477749** Prep Date: **8/22/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	33.46	5.0	50	0	66.9	50-120	0			
2,4,5-Trichlorophenol	75.07	5.0	100	0	75.1	50-120	0			
2,4,6-Trichlorophenol	73.33	5.0	100	0	73.3	50-120	0			
2-Methylnaphthalene	35.68	5.0	50	0	71.4	55-120	0			
2-Methylphenol	77.57	5.0	100	0	77.6	50-120	0			
2-Nitroaniline	37.45	5.0	50	0	74.9	55-120	0			
2-Nitrophenol	75.45	5.0	100	0	75.4	55-120	0			
3&4-Methylphenol	115.5	5.0	150	0	77	55-120	0			
3-Nitroaniline	30.01	5.0	50	0	60	40-120	0			
4-Nitroaniline	37.96	5.0	50	0	75.9	50-120	0			
4-Nitrophenol	76.56	5.0	100	0	76.6	45-120	0			
Acenaphthene	35.71	5.0	50	0	71.4	55-120	0			
Acenaphthylene	35.78	5.0	50	0	71.6	55-120	0			
Aniline	26.28	5.0	50	0	52.6	30-120	0			
Anthracene	37.89	5.0	50	0	75.8	55-120	0			
Benz(a)anthracene	35.95	5.0	50	0	71.9	55-120	0			
Benzidine	26.85	5.0	50	0	53.7	10-120	0			
Hexachloroethane	33.96	5.0	50	0	67.9	55-120	0			
Indeno(1,2,3-cd)pyrene	38.84	5.0	50	0	77.7	55-120	0			
Isophorone	41.18	5.0	50	0	82.4	55-120	0			
N-Nitrosodi-n-propylamine	37.63	5.0	50	0	75.3	50-120	0			
N-Nitrosodimethylamine	34.99	5.0	50	0	70	45-120	0			
N-Nitrosodiphenylamine	36.46	5.0	50	0	72.9	55-120	0			
Naphthalene	35.13	5.0	50	0	70.3	55-120	0			
Nitrobenzene	35.47	5.0	50	0	70.9	55-120	0			
Pentachlorophenol	80.62	5.0	100	0	80.6	55-120	0			
Phenanthrene	36.14	5.0	50	0	72.3	55-120	0			
Phenol	76.73	5.0	100	0	76.7	50-120	0			
Pyrene	37.91	5.0	50	0	75.8	55-120	0			
Surr: 2,4,6-Tribromophenol	*72.83*	5.0	*100*	0	*72.8*	*42-124*	0			
Surr: 2-Fluorobiphenyl	*68.96*	5.0	*100*	0	*69*	*48-120*	0			
Surr: 2-Fluorophenol	*66.08*	5.0	*100*	0	*66.1*	*20-120*	0			
Surr: 4-Terphenyl-d14	*75.78*	5.0	*100*	0	*75.8*	*51-135*	0			
Surr: Nitrobenzene-d5	*70.47*	5.0	*100*	0	*70.5*	*41-120*	0			
Surr: Phenol-d6	*70.07*	5.0	*100*	0	*70.1*	*20-120*	0			

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: **31556** Instrument ID **SV-5** Method: **SW8270**

MSD Sample ID: **0808511-02CMSD** Units: **µg/L** Analysis Date: **8/26/2008 05:15 PM**

Client ID: Run ID: **SV-5_080826B** SeqNo: **1477750** Prep Date: **8/22/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	34.31	5.0	50	0	68.6	50-120	33.46	2.52	20	
2,4,5-Trichlorophenol	74.68	5.0	100	0	74.7	50-120	75.07	0.523	20	
2,4,6-Trichlorophenol	74.48	5.0	100	0	74.5	50-120	73.33	1.56	20	
2-Methylnaphthalene	35.49	5.0	50	0	71	55-120	35.68	0.532	20	
2-Methylphenol	75.01	5.0	100	0	75	50-120	77.57	3.35	20	
2-Nitroaniline	37.64	5.0	50	0	75.3	55-120	37.45	0.502	20	
2-Nitrophenol	74.39	5.0	100	0	74.4	55-120	75.45	1.41	20	
3&4-Methylphenol	110.4	5.0	150	0	73.6	55-120	115.5	4.5	20	
3-Nitroaniline	29.11	5.0	50	0	58.2	40-120	30.01	3.05	20	
4-Nitroaniline	36.67	5.0	50	0	73.3	50-120	37.96	3.43	20	
4-Nitrophenol	74.08	5.0	100	0	74.1	45-120	76.56	3.28	20	
Acenaphthene	36.41	5.0	50	0	72.8	55-120	35.71	1.94	20	
Acenaphthylene	36.19	5.0	50	0	72.4	55-120	35.78	1.14	20	
Aniline	26.16	5.0	50	0	52.3	30-120	26.28	0.454	20	
Anthracene	38.25	5.0	50	0	76.5	55-120	37.89	0.937	20	
Benz(a)anthracene	36.41	5.0	50	0	72.8	55-120	35.95	1.25	20	
Benzidine	23.27	5.0	50	0	46.5	10-120	26.85	14.3	20	
Hexachloroethane	33.42	5.0	50	0	66.8	55-120	33.96	1.6	20	
Indeno(1,2,3-cd)pyrene	39.46	5.0	50	0	78.9	55-120	38.84	1.6	20	
Isophorone	40.61	5.0	50	0	81.2	55-120	41.18	1.39	20	
N-Nitrosodi-n-propylamine	36.2	5.0	50	0	72.4	50-120	37.63	3.89	20	
N-Nitrosodimethylamine	34.97	5.0	50	0	69.9	45-120	34.99	0.0437	20	
N-Nitrosodiphenylamine	36.26	5.0	50	0	72.5	55-120	36.46	0.562	20	
Naphthalene	35.01	5.0	50	0	70	55-120	35.13	0.338	20	
Nitrobenzene	35.59	5.0	50	0	71.2	55-120	35.47	0.322	20	
Pentachlorophenol	82.71	5.0	100	0	82.7	55-120	80.62	2.57	20	
Phenanthrene	36.31	5.0	50	0	72.6	55-120	36.14	0.474	20	
Phenol	74.67	5.0	100	0	74.7	50-120	76.73	2.71	20	
Pyrene	38.78	5.0	50	0	77.6	55-120	37.91	2.28	20	
Surr: 2,4,6-Tribromophenol	*75.82*	5.0	*100*	0	*75.8*	*42-124*	72.83	*4.02*	*20*	
Surr: 2-Fluorobiphenyl	*76.92*	5.0	*100*	0	*76.9*	*48-120*	68.96	*10.9*	*20*	
Surr: 2-Fluorophenol	*70.84*	5.0	*100*	0	*70.8*	*20-120*	66.08	*6.96*	*20*	
Surr: 4-Terphenyl-d14	*82.48*	5.0	*100*	0	*82.5*	*51-135*	75.78	*8.47*	*20*	
Surr: Nitrobenzene-d5	*74.59*	5.0	*100*	0	*74.6*	*41-120*	70.47	*5.68*	*20*	
Surr: Phenol-d6	*73.62*	5.0	*100*	0	*73.6*	*20-120*	70.07	*4.94*	*20*	

The following samples were analyzed in this batch: 0808447-01D

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: **R67271** Instrument ID **VOA1** Method: **SW8260**

MBLK Sample ID: **VBLKW-082808-R67271** Units: **µg/L** Analysis Date: **8/28/2008 11:58 AM**

Client ID: Run ID: **VOA1_080828A** SeqNo: **1480001** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	ND	5.0								
1,1,2,2-Tetrachloroethane	ND	5.0								
1,1,2-Trichloroethane	ND	5.0								
1,1-Dichloroethane	ND	5.0								
1,1-Dichloroethene	ND	5.0								
1,2-Dichloroethane	ND	5.0								
2-Butanone	ND	10								
2-Chloroethyl vinyl ether	ND	10								
2-Hexanone	ND	10								
4-Methyl-2-pentanone	ND	10								
Acetone	ND	10								
Benzene	ND	5.0								
Bromodichloromethane	ND	5.0								
Bromoform	ND	5.0								
Bromomethane	ND	5.0								
Carbon disulfide	ND	10								
Carbon tetrachloride	ND	5.0								
Chlorobenzene	ND	5.0								
Chloroethane	ND	5.0								
Chloroform	ND	5.0								
Chloromethane	ND	5.0								
cis-1,3-Dichloropropene	ND	5.0								
Dibromochloromethane	ND	5.0								
Ethylbenzene	ND	5.0								
m,p-Xylene	ND	10								
Methylene chloride	ND	10								
Styrene	ND	5.0								
Tetrachloroethene	ND	5.0								
Toluene	ND	5.0								
trans-1,3-Dichloropropene	ND	5.0								
Trichloroethene	ND	5.0								
Vinyl acetate	ND	10								
Vinyl chloride	ND	2.0								
Xylenes, Total	ND	15								
Surr: 1,2-Dichloroethane-d4	*53.86*	5.0	*50*	0	*108*	*70-125*		0		
Surr: 4-Bromofluorobenzene	*52.67*	5.0	*50*	0	*105*	*72-125*		0		
Surr: Dibromofluoromethane	*53.07*	5.0	*50*	0	*106*	*71-125*		0		
Surr: Toluene-d8	*52.33*	5.0	*50*	0	*105*	*75-125*		0		

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R67271 Instrument ID VOA1 Method: SW8260

LCS Sample ID: VLCSW-082808-R67271 Units: µg/L Analysis Date: 8/28/2008 11:06 AM
Client ID: Run ID: VOA1_080828A SeqNo: 1479999 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	48.42	5.0	50	0	96.8	80-120	0			
1,1,2,2-Tetrachloroethane	47.22	5.0	50	0	94.4	72-120	0			
1,1,2-Trichloroethane	48.36	5.0	50	0	96.7	80-120	0			
1,1-Dichloroethane	49.74	5.0	50	0	99.5	76-120	0			
1,1-Dichloroethene	49.09	5.0	50	0	98.2	73-124	0			
1,2-Dichloroethane	48.21	5.0	50	0	96.4	78-120	0			
2-Butanone	95.73	10	100	0	95.7	58-132	0			
2-Chloroethyl vinyl ether	96.27	10	100	0	96.3	74-120	0			
2-Hexanone	93.29	10	100	0	93.3	61-130	0			
4-Methyl-2-pentanone	92.5	10	100	0	92.5	65-127	0			
Acetone	85.83	10	100	0	85.8	59-137	0			
Benzene	46.72	5.0	50	0	93.4	73-121	0			
Bromodichloromethane	46.81	5.0	50	0	93.6	80-120	0			
Bromoform	47.28	5.0	50	0	94.6	79-120	0			
Bromomethane	58.96	5.0	50	0	118	66-137	0			
Carbon disulfide	90.45	10	100	0	90.4	68-141	0			
Carbon tetrachloride	47.05	5.0	50	0	94.1	75-124	0			
Chlorobenzene	48.28	5.0	50	0	96.6	80-120	0			
Chloroethane	49.6	5.0	50	0	99.2	76-121	0			
Chloroform	48.58	5.0	50	0	97.2	80-120	0			
Chloromethane	44.24	5.0	50	0	88.5	67-123	0			
cis-1,3-Dichloropropene	45.99	5.0	50	0	92	80-120	0			
Dibromochloromethane	48.32	5.0	50	0	96.6	80-120	0			
Ethylbenzene	48.09	5.0	50	0	96.2	80-120	0			
m,p-Xylene	97.7	10	100	0	97.7	78-121	0			
Methylene chloride	46.2	10	50	0	92.4	65-133	0			
Styrene	50.75	5.0	50	0	101	80-120	0			
Tetrachloroethene	47.81	5.0	50	0	95.6	79-120	0			
Toluene	47.84	5.0	50	0	95.7	80-120	0			
trans-1,3-Dichloropropene	46.15	5.0	50	0	92.3	80-120	0			
Trichloroethene	46.02	5.0	50	0	92	80-120	0			
Vinyl acetate	91.99	10	100	0	92	67-139	0			
Vinyl chloride	46.39	2.0	50	0	92.8	70-127	0			
Xylenes, Total	147.9	15	150	0	98.6	80-120	0			
Surr: 1,2-Dichloroethane-d4	*54.64*	5.0	*50*	0	*109*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*54.98*	5.0	*50*	0	*110*	*72-125*	0			
Surr: Dibromofluoromethane	*52.57*	5.0	*50*	0	*105*	*71-125*	0			
Surr: Toluene-d8	*53.14*	5.0	*50*	0	*106*	*75-125*	0			

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lient: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R67271 Instrument ID VOA1 Method: SW8260

MS Sample ID: 0808627-06AMS Units: µg/L Analysis Date: 8/28/2008 03:03 PM

Client ID: Run ID: VOA1_080828A SeqNo: 1480008 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	45.92	5.0	50	0	91.8	80-120	0			
1,1,2,2-Tetrachloroethane	49.08	5.0	50	0	98.2	72-120	0			
1,1,2-Trichloroethane	48.76	5.0	50	0	97.5	80-120	0			
1,1-Dichloroethane	48.06	5.0	50	0	96.1	76-120	0			
1,1-Dichloroethene	43.76	5.0	50	0	87.5	73-124	0			
1,2-Dichloroethane	49.42	5.0	50	0	98.8	78-120	0			
2-Butanone	102.5	10	100	0	103	58-132	0			
2-Chloroethyl vinyl ether	ND	10	100	0	0	74-120	0			S
2-Hexanone	107.8	10	100	0	108	61-130	0			
4-Methyl-2-pentanone	105.3	10	100	0	105	65-127	0			
Acetone	100.7	10	100	3.737	97	59-137	0			
Benzene	46.44	5.0	50	0	92.9	73-121	0			
Bromodichloromethane	49.65	5.0	50	0	99.3	80-120	0			
Bromoform	49.32	5.0	50	0	98.6	79-120	0			
Bromomethane	52.71	5.0	50	0	105	66-137	0			
Carbon disulfide	86.56	10	100	0	86.6	68-141	0			
Carbon tetrachloride	45	5.0	50	0	90	75-124	0			
Chlorobenzene	46.09	5.0	50	0	92.2	80-120	0			
Chloroethane	43.6	5.0	50	0	87.2	76-121	0			
Chloroform	47.89	5.0	50	0	95.8	80-120	0			
Chloromethane	38.28	5.0	50	0	76.6	67-123	0			
cis-1,3-Dichloropropene	48.35	5.0	50	0	96.7	80-120	0			
Dibromochloromethane	50.05	5.0	50	0	100	80-120	0			
Ethylbenzene	46.95	5.0	50	0.1866	93.5	80-120	0			
m,p-Xylene	92.79	10	100	1.119	91.7	78-121	0			
Methylene chloride	46.72	10	50	0	93.4	65-133	0			
Styrene	44.75	5.0	50	0	89.5	80-120	0			
Tetrachloroethene	42.94	5.0	50	0	85.9	79-120	0			
Toluene	47.05	5.0	50	1.586	90.9	80-120	0			
trans-1,3-Dichloropropene	47.75	5.0	50	0	95.5	80-120	0			
Trichloroethene	46.39	5.0	50	0	92.8	80-120	0			
Vinyl acetate	102.3	10	100	0	102	67-139	0			
Vinyl chloride	41.12	2.0	50	0	82.2	70-127	0			
Xylenes, Total	138	15	150	1.119	91.3	80-120	0			
Surr: 1,2-Dichloroethane-d4	*54.66*	5.0	*50*	0	*109*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*55.17*	5.0	*50*	0	*110*	*72-125*	0			
Surr: Dibromofluoromethane	*55.4*	5.0	*50*	0	*111*	*71-125*	0			
Surr: Toluene-d8	*53.05*	5.0	*50*	0	*106*	*75-125*	0			

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: **R67271** Instrument ID **VOA1** Method: **SW8260**

MSD Sample ID: **0808627-06AMSD** Units: µg/L Analysis Date: **8/28/2008 03:29 PM**

Client ID: Run ID: **VOA1_080828A** SeqNo: **1480009** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	41.94	5.0	50	0	83.9	80-120	45.92	9.07	20	
1,1,2,2-Tetrachloroethane	53.17	5.0	50	0	106	72-120	49.08	8.01	20	
1,1,2-Trichloroethane	50.71	5.0	50	0	101	80-120	48.76	3.92	20	
1,1-Dichloroethane	46.4	5.0	50	0	92.8	76-120	48.06	3.51	20	
1,1-Dichloroethene	41.39	5.0	50	0	82.8	73-124	43.76	5.59	20	
1,2-Dichloroethane	48.13	5.0	50	0	96.3	78-120	49.42	2.64	20	
2-Butanone	112.5	10	100	0	113	58-132	102.5	9.3	20	
2-Chloroethyl vinyl ether	ND	10	100	0	0	74-120	0	0	20	S
2-Hexanone	111.1	10	100	0	111	61-130	107.8	2.99	20	
4-Methyl-2-pentanone	112.2	10	100	0	112	65-127	105.3	6.35	20	
Acetone	108.2	10	100	3.737	104	59-137	100.7	7.13	20	
Benzene	45.28	5.0	50	0	90.6	73-121	46.44	2.53	20	
Bromodichloromethane	46.83	5.0	50	0	93.7	80-120	49.65	5.84	20	
Bromoform	50.69	5.0	50	0	101	79-120	49.32	2.75	20	
Bromomethane	52.06	5.0	50	0	104	66-137	52.71	1.24	20	
Carbon disulfide	85.97	10	100	0	86	68-141	86.56	0.686	20	
Carbon tetrachloride	39.27	5.0	50	0	78.5	75-124	45	13.6	20	
Chlorobenzene	45.26	5.0	50	0	90.5	80-120	46.09	1.8	20	
Chloroethane	44.84	5.0	50	0	89.7	76-121	43.6	2.79	20	
Chloroform	46.93	5.0	50	0	93.9	80-120	47.89	2.04	20	
Chloromethane	36.88	5.0	50	0	73.8	67-123	38.28	3.71	20	
cis-1,3-Dichloropropene	47.49	5.0	50	0	95	80-120	48.35	1.8	20	
Dibromochloromethane	50.22	5.0	50	0	100	80-120	50.05	0.344	20	
Ethylbenzene	46.01	5.0	50	0.1866	91.7	80-120	46.95	2.02	20	
m,p-Xylene	91.92	10	100	1.119	90.8	78-121	92.79	0.938	20	
Methylene chloride	46.42	10	50	0	92.8	65-133	46.72	0.647	20	
Styrene	47.71	5.0	50	0	95.4	80-120	44.75	6.41	20	
Tetrachloroethene	40.18	5.0	50	0	80.4	79-120	42.94	6.65	20	
Toluene	47.34	5.0	50	1.586	91.5	80-120	47.05	0.612	20	
trans-1,3-Dichloropropene	47.04	5.0	50	0	94.1	80-120	47.75	1.5	20	
Trichloroethene	43.51	5.0	50	0	87	80-120	46.39	6.39	20	
Vinyl acetate	101.4	10	100	0	101	67-139	102.3	0.936	20	
Vinyl chloride	38.99	2.0	50	0	78	70-127	41.12	5.32	20	
Xylenes, Total	139.1	15	150	1.119	92	80-120	138	0.743	20	
Surr: 1,2-Dichloroethane-d4	*51.43*	5.0	*50*	0	*103*	*70-125*	54.66	*6.1*	*20*	
Surr: 4-Bromofluorobenzene	*53.63*	5.0	*50*	0	*107*	*72-125*	55.17	*2.83*	*20*	
Surr: Dibromofluoromethane	*53.49*	5.0	*50*	0	*107*	*71-125*	55.4	*3.51*	*20*	
Surr: Toluene-d8	*54.15*	5.0	*50*	0	*108*	*75-125*	53.05	*2.05*	*20*	

The following samples were analyzed in this batch: 0808447-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R66876 Instrument ID WetChem Method: SW9040

LCS Sample ID: WLCSW1-082008-R66876 Units: pH units Analysis Date: 8/20/2008 04:00 PM

Client ID: Run ID: WETCHEM_080820G SeqNo: 1472036 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	6.04	0.10	6	0	101	90-110	0			

DUP Sample ID: 0808447-01CDUP Units: pH units Analysis Date: 8/20/2008 04:00 PM

Client ID: Injection Well Run ID: WETCHEM_080820G SeqNo: 1472039 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	7.32	0.10	0	0	0	0-0	7.29	0.411	20	H

The following samples were analyzed in this batch: 0808447-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

lient: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R66965 Instrument ID WetChem Method: SM2320B

MBLK Sample ID: WBLKW1-082108-R66965 Units: mg/L Analysis Date: 8/21/2008 05:30 PM

Client ID: Run ID: WETCHEM_080821I SeqNo: 1473296 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	ND	5.0								
Alkalinity, Carbonate (As CaCO3)	ND	5.0								
Alkalinity, Hydroxide (As CaCO3)	ND	5.0								
Alkalinity, Total (As CaCO3)	ND	5.0								

LCS Sample ID: WLCSW1-082108-R66965 Units: mg/L Analysis Date: 8/21/2008 05:30 PM

Client ID: Run ID: WETCHEM_080821I SeqNo: 1473297 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	1011	5.0	1000	0	101	80-120	0			
Alkalinity, Total (As CaCO3)	1011	5.0	1000	0	101	80-120	0			

DUP Sample ID: 0808436-02DDUP Units: mg/L Analysis Date: 8/21/2008 05:30 PM

Client ID: Run ID: WETCHEM_080821I SeqNo: 1473318 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	357	5.0	0	0	0	0-0	359	0.559	20	
Alkalinity, Carbonate (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	20	
Alkalinity, Hydroxide (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	20	
Alkalinity, Total (As CaCO3)	357	5.0	0	0	0	0-0	359	0.559	20	

The following samples were analyzed in this batch: 0808447-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R67012 Instrument ID ICS3000 Method: E300

MBLK Sample ID: WBLKW1-082008-R67012 Units: mg/L Analysis Date: 8/20/2008 11:47 AM

Client ID: Run ID: ICS3000_080820A SeqNo: 1474281 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	0.50								
Sulfate	ND	0.50								
Surr: Selenate (surr)	*5.084*	0.10	*5*	0	*102*	*85-115*	0			

LCS Sample ID: WLCSW1-082008-R67012 Units: mg/L Analysis Date: 8/20/2008 12:10 PM

Client ID: Run ID: ICS3000_080820A SeqNo: 1474282 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	19.88	0.50	20	0	99.4	90-110	0			
Sulfate	19.89	0.50	20	0	99.5	90-110	0			
Surr: Selenate (surr)	*4.925*	0.10	*5*	0	*98.5*	*85-115*	0			

MS Sample ID: 0808436-03DMS Units: mg/L Analysis Date: 8/20/2008 01:46 PM

Client ID: Run ID: ICS3000_080820A SeqNo: 1474286 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	79.05	0.50	10	71.12	79.3	80-120	0			SEO
Sulfate	68.28	0.50	10	60.14	81.4	80-120	0			EO
Surr: Selenate (surr)	*4.676*	0.10	*5*	0	*93.5*	*85-115*	0			

DUP Sample ID: 0808436-03DDUP Units: mg/L Analysis Date: 8/20/2008 01:22 PM

Client ID: Run ID: ICS3000_080820A SeqNo: 1474285 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	69.26	0.50	0	0	0	0-0	71.12	2.65	20	E
Sulfate	59.16	0.50	0	0	0	0-0	60.14	1.64	20	E
Surr: Selenate (surr)	*4.502*	0.10	*5*	0	*90*	*85-115*	4.576	*1.63*	*20*	

The following samples were analyzed in this batch: 0808447-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

lient: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R67013 Instrument ID Balance1 Method: E160.1 (Dissolve)

MBLK Sample ID: **BLANK-R67013** Units: **mg/L** Analysis Date: **8/20/2008 04:00 PM**
Client ID: Run ID: **BALANCE1_080820E** SeqNo: **1474298** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	ND	10								

LCS Sample ID: **LCS-R67013** Units: **mg/L** Analysis Date: **8/20/2008 04:00 PM**
Client ID: Run ID: **BALANCE1_080820E** SeqNo: **1474300** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	1038	10	1000	0	104	85-115	0			

DUP Sample ID: **0808424-02ADUP** Units: **mg/L** Analysis Date: **8/20/2008 04:00 PM**
Client ID: Run ID: **BALANCE1_080820E** SeqNo: **1474292** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	1508	10	0	0	0	0-0	1488	1.34	20	

The following samples were analyzed in this batch: 0808447-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

lient: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R67035 Instrument ID WetChem Method: E120.1

MBLK Sample ID: **WBLKW1-082208-R67035** Units: µmhos/cm Analysis Date: **8/22/2008 04:00 PM**
Client ID: Run ID: **WETCHEM_080822C** SeqNo: **1474821** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	ND	1.0								

LCS Sample ID: **WLCSW1-082208-R67035** Units: µmhos/cm Analysis Date: **8/22/2008 04:00 PM**
Client ID: Run ID: **WETCHEM_080822C** SeqNo: **1474822** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	1420	1.0	1413	0	100	80-120	0			

DUP Sample ID: **0808333-01CDUP** Units: µmhos/cm Analysis Date: **8/22/2008 04:00 PM**
Client ID: Run ID: **WETCHEM_080822C** SeqNo: **1474836** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	711	1.0	0	0	0	0-0	716	0.701	20	

DUP Sample ID: **0808447-01CDUP** Units: µmhos/cm Analysis Date: **8/22/2008 04:00 PM**
Client ID: **Injection Well** Run ID: **WETCHEM_080822C** SeqNo: **1474837** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	4690	1.0	0	0	0	0-0	4710	0.426	20	

The following samples were analyzed in this batch: 0808447-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

☐ ALS Laboratory Group
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

Chain of Custody Form

☐ ALS Laboratory Group
3352 128th Ave.
Holland, MI 49424-9263
Tel: +1 616 399 6070
Fax: +1 616 399 6185

Page 1 of 1

ALS Project Manager:

ALS Work Order #: 0808L-7

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Injection Well Qrtly	A	VOC (8260) Select
Work Order		Project Number		B	SVOC (8270) Select
Company Name	Navajo Refining Company	Bill-to Company	Navajo Refining Company	C	Total Metals (6020/7000) Select
Send Report To	Aaron Strange	Invoice Attn	Aaron Strange	D	RCI Profile
Address	P.O. Box 159	Address	P.O. Box 159	E	Anions (300) Cl, SO4
				F	Alkalinity
City/State/Zip	Artesia, NM 88211	City/State/Zip	Artesia, NM 88211	G	pH
Phone	(505) 748-3311	Phone	(505) 748-3311	H	Conductivity
Fax	(505) 746-5421	Fax	(505) 746-5421	I	TDS
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	Injection Well	8/19/08	1130	L	Y	9	X	X	X	X	X	X	X	X	X		
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Aaron Strange

Shipment Method: Fed Ex

Required Turnaround Time: (Check Box) ☑ Std 10 WK Days ☐ 5 WK Days ☐ Other ☐ 2 WK Days ☐ 24 Hour

Results Due Date:

	Date	Time		
Relinquished by: Aaron Strange	8/19/08	1615	Received by:	Notes: 10 Day TAT.
Relinquished by:	8/20/08	8:55	Received by (Laboratory):	Cooler ID: / Cooler Temp:
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	

QC Package: (Check One Box Below)
- ☑ Level II Std QC
- ☐ Level III Std QC/Raw Data
- ☐ Level IV SW846/CLP
- ☐ Other
- ☐ TRRP Checklist
- ☐ TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Laboratory Group.
2. Unless otherwise agreed in a formal contract, services provided by ALS Laboratory Group are expressly limited to the terms and conditions stated on the reverse.

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ALS Group USA, Corp.

Sample Receipt Checklist

Client Name: NAVAJO REFINING

Date/Time Received: 8/20/2008 08:55

Work Order Number 0808447

Received by: RSZ

Checklist completed by [signature] 8.2008
Signature Date

Reviewed by Initials [signature] Date 8/20/08

Matrix: water

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes	☑	No ☐	Not Present	☐
Custody seals intact on shipping container/cooler?	Yes	☑	No ☐	Not Present	☐
Custody seals intact on sample bottles?	Yes	☐	No ☐	Not Present	☑
Chain of custody present?	Yes	☑	No ☐		
Chain of custody signed when relinquished and received?	Yes	☑	No ☐		
Chain of custody agrees with sample labels?	Yes	☑	No ☐		
Samples in proper container/bottle?	Yes	☑	No ☐		
Sample containers intact?	Yes	☑	No ☐		
Sufficient sample volume for indicated test?	Yes	☑	No ☐		
All samples received within holding time?	Yes	☑	No ☐		
Container/Temp Blank temperature in compliance?	Yes	☑	No ☐		
Temperature(s)/Thermometer(s):	0.6c		002		
Cooler(s)/Kit(s):	0394				
Water - VOA vials have zero headspace?	Yes	☑	No ☐	No VOA vials submitted	☐
Water - pH acceptable upon receipt?	Yes	☑	No ☐	N/A	☐

Adjusted? Checked by

Login Notes: Trip blank not on COC--logged in without analysis.

Client contacted: Date contacted: Person contacted

Contacted by: Regarding:

Comments:

Corrective Action

PURCHASE ORDER

The following number must appear on all related correspondence, shipping papers, and invoices:

P.O. NUMBER: 10-2114565

To: ALS Laboratory Group
3352 128th Ave.
Holland, MI 494249263
Ph: (616) 399-6070 Fax: (616) 399-6185

Bill To: **ALS Group USA, Corp.**
10450 Stancliff Rd, Suite 210
Houston, TX 77099
TEL 281-530-5656 FAX 281-530-5887

Ship To: ALS Laboratory Group
10450 Stancliff Rd, Suite 210

Houston, Texas 77099-4338
TEL (281) 530-5656 FAX (281) 530-5887

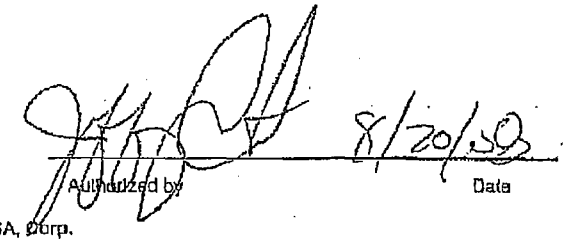
Acct #:

P.O. DATE	REQUISITIONER	Ship VIA	Department	TERMS
8/20/2008	rsanchez	UPS		NET 30

Item	Catalog No.	QTY	Unit Price	Total Price
Reactive Cyanide		2	$24.50	$49.00
Reactive Sulfide		2	$24.50	$49.00

Sales Tax:	$0.00
Shipping/Handling:	$0.00
Other:	$0.00
OrderAmount:	$98.00

Comments: 0808447



Authorized by Date

Subcontractor:
ALS Laboratory Group
3352 128th Ave.
Holland, MI 49424

TEL: (616) 399-6070
FAX: (616) 399-6185
Acct #:

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Date: 20-Aug-08
COC ID: 6639
Due Date 01-Sep-08

Customer Information		Project Information		Parameter/Method Request for Analysis
Purchase Order		Project Name	0808447	A Cyanide, Reactive (SW-846)
Work Order		Project Number		B Sulfide, Reactive (SW-846)
Company Name	ALS Group USA, Corp.	Bill To Company	ALS Group USA, Corp.	C
Send Report To	Jeffrey L Croston	Inv Attn	Accounts Payable	D
Address	10450 Stancliff Rd, Suite 210	Address	10450 Stancliff Rd, Suite 210	E
				F
City/State/Zip	Houston, Texas 77099-4338	City/State/Zip	Houston, Texas 77099-4338	G
Phone	(281) 530-5656	Phone	(281) 530-5656	H
Fax	(281) 530-5887	Fax	(281) 530-5887	I
eMail Address	jeff.croston@alsenviro.com	eMail CC	glenda.ramos@alsenviro.com	J

Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
0808447-01E (Injection Well)	Water	8/19/2008 11:30	(1) 1LPNEAT	X	X								

Comments:

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
					Std
Relinquished by:	Date/Time	Received by:	Date/Time		
	8/20/08				

ALS Laboratory Group

Date: 22-Aug-08

Client: ALS Laboratory Group
Project: 0808447
Work Order: 0808386

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0808386-01	0808447-01E	Water		8/19/2008 11:30	8/21/2008 14:10	☐

ALS Laboratory Group

Date: *22-Aug-08*

Client:	ALS Laboratory Group		
Project:	0808447	**Work Order:**	0808386
Sample ID:	0808447-01E	**Lab ID:**	0808386-01
Collection Date:	8/19/2008 11:30 AM	**Matrix:**	WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CYANIDE, REACTIVE			**EPA 7.3.3.2**			Analyst: **DB**
Cyanide, Reactive	ND		40.0	mg/Kg	1	8/22/2008
SULFIDE, REACTIVE			**EPA 7.3.4.2**			Analyst: **DB**
Sulfide, Reactive	ND		40.0	mg/Kg	1	8/22/2008

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	P - Dual Column results percent difference > 40%
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	H - Analyzed outside of Hold Time

ALS Laboratory Group

Client: ALS Laboratory Group
Work Order: 0808386
Project: 0808447

Date: *22-Aug-08*

QC BATCH REPORT

Batch ID: **R61249** Instrument ID **WETCHEM** Method: **EPA 7.3.4.2**

MBLK Sample ID: **WBLKS1-082208** Units: **mg/Kg** Analysis Date: **8/22/2008**

Client ID: Run ID: **WETCHEM_080822C** SeqNo: **1018085** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide, Reactive	ND	40								

The following samples were analyzed in this batch: 0808386-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked

S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%

B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: ALS Laboratory Group
Work Order: 0808386
Project: 0808447

QC BATCH REPORT

Batch ID: R61250 Instrument ID WETCHEM Method: EPA 7.3.3.2

MBLK Sample ID: WBLKS1-082208 Units: mg/Kg Analysis Date: 8/22/2008
Client ID: Run ID: WETCHEM_080822D SeqNo: 1018091 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	ND	40								

LCS Sample ID: WLCSS1-082208 Units: mg/Kg Analysis Date: 8/22/2008
Client ID: Run ID: WETCHEM_080822D SeqNo: 1018092 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	278.9	40	250	0	112	75-125	0			

LCSD Sample ID: WLCSDS1-082208 Units: mg/Kg Analysis Date: 8/22/2008
Client ID: Run ID: WETCHEM_080822D SeqNo: 1018100 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	278.9	40	250	0	112	75-125	278.9	0	35	

MS Sample ID: 0808386-01A MS Units: mg/Kg Analysis Date: 8/22/2008
Client ID: 0808447-01E Run ID: WETCHEM_080822D SeqNo: 1018096 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	249.6	40	250	0	99.8	50-150	0			

MSD Sample ID: 0808386-01A MSD Units: mg/Kg Analysis Date: 8/22/2008
Client ID: 0808447-01E Run ID: WETCHEM_080822D SeqNo: 1018097 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	249.6	40	250	0	99.8	50-150	249.6	0	35	

The following samples were analyzed in this batch: 0808386-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

0808386

Subcontractor:
ALS Laboratory Group
3352 128th Ave.
Holland, MI 49424
TEL: (616) 399-6070
FAX: (616) 399-6185
Acct #:

CHAIN-OF-CUSTODY RECORD

Date: 20-Aug-08
COC ID: 6639
Due Date 01-Sep-08

Customer Information		Project Information		Parameter/Method Request for Analysis
Purchase Order		Project Name	0808447	A Cyanide, Reactive (SW-846)
Work Order		Project Number		B Sulfide, Reactive (SW-846)
Company Name	ALS Group USA, Corp.	Bill To Company	ALS Group USA, Corp.	C
Send Report To	Jeffrey L Croston	Inv Attn	Accounts Payable	D
Address	10450 Stancliff Rd, Suite 210	Address	10450 Stancliff Rd, Suite 210	E
				F
City/State/Zip	Houston, Texas 77099-4338	City/State/Zip	Houston, Texas 77099-4338	G
Phone	(281) 530-5656	Phone	(281) 530-5656	H
Fax	(281) 530-5887	Fax	(281) 530-5887	I
eMail Address	jeff.croston@alsenviro.com	eMail CC	glenda.ramos@alsenviro.com	J

Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
0808447-01E (Injection Well)	Water	8/19/2008 11:30	(1) 1LPNEAT	X	X								

Comments:

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
Relinquished by:	Date/Time	Received by:	Date/Time		
	8/20/08		8/21/8 2:10p		Std

ALS Laboratory Group

Sample Receipt Checklist

Client Name ELAB-HOU

Date/Time Received: 8/21/2008 14:10

Work Order Number 0808386

Received by: ARB

Checklist completed by _____ 8/21/8
Signature Date

Reviewed by _____ 8/22/08
Initials Date

Matrix: Water

Carrier name: UPS

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	3.1 C		
Cooler(s)/Kit(s):			
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐

Adjusted? _____ Checked by _____

Login Notes:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

_____

_____

Corrective Action _____

_____

_____

3 of 5

UPS Next Day Air Saver®

Shipping Document

WEIGHT 35

DIMENSIONAL WEIGHT

LARGE PACKAGE

Saver

SHIPMENT FROM

UPS ACCOUNT NO. 698174

REFERENCE NUMBER

SUB CONTRACT

RICHARD SANCHEZ TELEPHONE 281-530-5656

ALS LABORATORY GROUP

1450 STANCLIFF RD STE # 210

HOUSTON TX 77099

DELIVER TO

RECEIVING TELEPHONE 616-399-6070

ALS LABORATORY GROUP

3352 128TH AVE

HOLLAND MI 49424

MI 495

1Z 698 174 23 1005

SHIPMENT ID NUMBER 6981 747B B97

(URC v.72.5A 10/2007)
0201952542609 1/07 S

United Parcel Service, Louisville, KY

CUSTODY SEAL

Seal Broken By: AB

Date: 8/21/08

Time: 1400

Date: 8-20-08

Name: R. SANCHEZ

Company: ALS

ALS Laboratory Group
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel +1 281 530 5656

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25184 InstrumentID: VOA2

MSD Sample ID: 0412122-01AMSD Test Code: SW8260 Units: µg/L Analysis Date: 12/10/04 15:56
Client ID: Run ID: VOA2_041210A SeqNo: 586935 Prep Date: DF: 100

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	4901	500	5000	0	98	75.2-120	4798	2.14	20	
1,1,2,2-Tetrachloroethane	3673	500	5000	0	73.5	72.4-121	3949	7.23	20	
1,1,2-Trichloroethane	5074	500	5000	0	101	80-120	4942	2.63	20	
1,1-Dichloroethane	4943	500	5000	0	98.9	76.9-120	4844	2.02	20	
1,1-Dichloroethene	4860	500	5000	0	97.2	72.6-123	4755	2.18	20	
1,2-Dichloroethane	5155	500	5000	0	103	80-120	4962	3.81	20	
2-Butanone	11480	1,000	10000	0	115	69-131	11580	0.868	20	
2-Chloroethyl vinyl ether	8419	1,000	10000	0	84.2	60-135	8304	1.37	20	
2-Hexanone	11740	1,000	10000	0	117	55.6-126	11630	0.973	20	
4-Methyl-2-pentanone	11100	1,000	10000	0	111	67.4-121	11200	0.93	20	
Acetone	11240	1,000	10000	0	112	64.4-140	10640	5.48	20	
Benzene	5163	500	5000	0	103	80-120	4919	4.82	20	
Bromodichloromethane	5176	500	5000	0	104	80-120	4991	3.63	20	
Bromoform	5440	500	5000	0	109	77.9-121	5184	4.82	20	
Bromomethane	4925	500	5000	0	98.5	63.3-137	4562	7.66	20	
Carbon disulfide	9210	1,000	10000	0	92.1	74.1-123	9132	0.851	20	
Carbon tetrachloride	4749	500	5000	0	95	74.7-120	4713	0.763	20	
Chlorobenzene	4736	500	5000	0	94.7	80-120	4596	3.01	20	
Chloroethane	4762	500	5000	0	95.2	74.7-126	4625	2.92	20	
Chloroform	9470	500	5000	4602	97.4	80-120	8788	7.47	20	
Chloromethane	4892	500	5000	0	97.8	64.5-132	4632	5.45	20	
cis-1,3-Dichloropropene	5058	500	5000	0	101	80-120	4838	4.44	20	
Dibromochloromethane	5191	500	5000	0	104	80-120	4989	3.97	20	
Ethylbenzene	5207	500	5000	0	104	80-120	5104	1.99	20	
m,p-Xylene	10210	1,000	10000	0	102	80-120	9965	2.46	20	
Methylene chloride	4799	1,000	5000	0	96	76.2-120	4625	3.7	20	
Styrene	5332	500	5000	0	107	80-120	5121	4.03	20	
Tetrachloroethene	5155	500	5000	0	103	68.5-130	5010	2.85	20	
Toluene	5106	500	5000	0	102	80-120	4924	3.63	20	
trans-1,3-Dichloropropene	5390	500	5000	0	108	80-120	5349	0.761	20	
Trichloroethene	6591	500	5000	0	132	78.9-120	5895	11.2	20	S
Vinyl acetate	613	1,000	10000	0	6.13	62.4-133	1690	0	20	JS
Vinyl chloride	4832	200	5000	0	96.6	72.7-128	4609	4.73	20	
Xylenes, Total	15030	1,500	15000	0	100	80-120	14660	2.5	20	
Surr: 1,2-Dichloroethane-d4	4254	500	5000	0	85.1	71-126	4231	0.551	20	
Surr: 4-Bromofluorobenzene	4444	500	5000	0	88.9	74-125	4306	3.16	20	
Surr: Dibromofluoromethane	4082	500	5000	0	81.6	73-126	4042	0.978	20	
Surr: Toluene-d8	4509	500	5000	0	90.2	75-125	4389	2.69	20	

The following samples were analyzed in this batch: 0412005-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
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CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: **R24953** InstrumentID: **WetChem**

LCS Sample ID: **WLCSW1-120104** Test Code: **E150.1** Units: **pH units** Analysis Date: **12/01/04 0:00**
Client ID: Run ID: **WETCHEM_041201B** SeqNo: **581999** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	6.06	0.10	6	0	101	85-115	0			

DUP Sample ID: **0412005-01CDUP** Test Code: **E150.1** Units: **pH units** Analysis Date: **12/01/04 0:00**
Client ID: **Inj Wells** Run ID: **WETCHEM_041201B** SeqNo: **582003** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	7.17	0.10	0	0	0	0-0	7.19	0.279	20	

The following samples were analyzed in this batch: 0412005-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25032 InstrumentID: WetChem

MBLK Sample ID: WBLKW1-120304 Test Code: E120.1 Units: µmhos/cm Analysis Date: 12/03/04 0:00
Client ID: Run ID: WETCHEM_041203B SeqNo: 583600 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	ND	1.0								

LCS Sample ID: WLCSW1-120304 Test Code: E120.1 Units: µmhos/cm Analysis Date: 12/03/04 0:00
Client ID: Run ID: WETCHEM_041203B SeqNo: 583601 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	142	1.0	141.2	0	101	80-120	0			

DUP Sample ID: 0412005-01CDUP Test Code: E120.1 Units: µmhos/cm Analysis Date: 12/03/04 0:00
Client ID: Inj Wells Run ID: WETCHEM_041203B SeqNo: 583639 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	6390	1.0	0	0	0	0-0	6350	0.628	20	

The following samples were analyzed in this batch: 0412005-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25042 InstrumentID: WetChem

MBLK Sample ID: WBLKW1-120304 Test Code: E160.1 Units: mg/L Analysis Date: 12/03/04 0:00
Client ID: Run ID: WETCHEM_041203D SeqNo: 583929 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	ND	10								

LCS Sample ID: WLCSW1-120304 Test Code: E160.1 Units: mg/L Analysis Date: 12/03/04 0:00
Client ID: Run ID: WETCHEM_041203D SeqNo: 583930 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	992	10	1000	0	99.2	80-120		0		

DUP Sample ID: 0412038-01EDUP Test Code: E160.1 Units: mg/L Analysis Date: 12/03/04 0:00
Client ID: Run ID: WETCHEM_041203D SeqNo: 583942 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	21880	10	0	0	0	0-0	21420	2.12	20	

The following samples were analyzed in this batch: 0412005-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25082 InstrumentID: WetChem

MBLK Sample ID: WBLKW1-120604 Test Code: E310.1 Units: mg/L Analysis Date: 12/06/04 0:00
Client ID: Run ID: WETCHEM_041206F SeqNo: 584614 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	ND	5.0								
Alkalinity, Carbonate (As CaCO3)	ND	5.0								
Alkalinity, Hydroxide (As CaCO3)	ND	5.0								
Alkalinity, Total (As CaCO3)	ND	5.0								

LCS Sample ID: WLCSW1-120604 Test Code: E310.1 Units: mg/L Analysis Date: 12/06/04 0:00
Client ID: Run ID: WETCHEM_041206F SeqNo: 584615 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	1000	5.0	0	0.9809	0	0-0	0			
Alkalinity, Carbonate (As CaCO3)	ND	5.0	0	0	0	0-0	0			
Alkalinity, Hydroxide (As CaCO3)	ND	5.0	0	0	0	0-0	0			
Alkalinity, Total (As CaCO3)	1000	5.0	1000	0	100	80-120	0			

LCSD Sample ID: WLCSDW1-12060 Test Code: E310.1 Units: mg/L Analysis Date: 12/06/04 0:00
Client ID: Run ID: WETCHEM_041206F SeqNo: 584638 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	961	5.0	0	0.9809	0	0-0	1000	3.98	0	
Alkalinity, Carbonate (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	0	
Alkalinity, Hydroxide (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	0	
Alkalinity, Total (As CaCO3)	961	5.0	1000	0	96.1	80-120	1000	3.98	20	

DUP Sample ID: 0411319-04CDUP Test Code: E310.1 Units: mg/L Analysis Date: 12/06/04 0:00
Client ID: Run ID: WETCHEM_041206F SeqNo: 584625 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	284	5.0	0	0	0	0-0	275	3.22	20	
Alkalinity, Carbonate (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	20	
Alkalinity, Hydroxide (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	20	
Alkalinity, Total (As CaCO3)	284	5.0	0	0	0	0-0	275	3.22	20	

The following samples were analyzed in this batch: 0412005-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

LIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: **R25133** InstrumentID: **IC201**

MBLK Sample ID: **WBLKW1-120804** Test Code: **E300** Units: **mg/L** Analysis Date: **12/09/04 0:01**
Client ID: Run ID: **IC201_041208A** SeqNo: **585675** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	0.50								
Sulfate	ND	1.0								
Surr: Dichloroacetic acid (surr)	4.97	0.10	5	0	99.4	80-120	0			

LCS Sample ID: **WLCSW1-120804** Test Code: **E300** Units: **mg/L** Analysis Date: **12/09/04 0:29**
Client ID: Run ID: **IC201_041208A** SeqNo: **585676** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	8.79	0.50	10	0	87.9	80-120	0			
Sulfate	9.07	1.0	10	0	90.7	80-120	0			
Surr: Dichloroacetic acid (surr)	5.03	0.10	5	0	101	80-120	0			

LCSD Sample ID: **WLCSDW1-12080** Test Code: **E300** Units: **mg/L** Analysis Date: **12/09/04 0:58**
Client ID: Run ID: **IC201_041208A** SeqNo: **585677** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	8.72	0.50	10	0	87.2	80-120	8.79	0.8	20	
Sulfate	9.25	1.0	10	0	92.5	80-120	9.07	1.97	20	
Surr: Dichloroacetic acid (surr)	5.07	0.10	5	0	101	80-120	5.03	0.792	20	

MS Sample ID: **0412109-01EMS** Test Code: **E300** Units: **mg/L** Analysis Date: **12/08/04 21:38**
Client ID: Run ID: **IC201_041208A** SeqNo: **585655** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	45.15	0.50	10	34.02	111	75-125	0			
Sulfate	25.12	1.0	10	14.39	107	75-125	0			
Surr: Dichloroacetic acid (surr)	5.04	0.10	5	0	101	80-120	0			

MSD Sample ID: **0412109-01EMSD** Test Code: **E300** Units: **mg/L** Analysis Date: **12/08/04 22:07**
Client ID: Run ID: **IC201_041208A** SeqNo: **585696** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	45.28	0.50	10	34.02	113	75-125	45.15	0.288	20	
Sulfate	25.1	1.0	10	14.39	107	75-125	25.12	0.0796	20	
Surr: Dichloroacetic acid (surr)	4.93	0.10	5	0	98.6	80-120	5.04	2.21	20	

ND - Not Detected at the Reporting Limit
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B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

LIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: **R25133** InstrumentID: **IC201**

DUP Sample ID: **0412109-01EDUP** Test Code: **E300** Units: **mg/L** Analysis Date: **12/08/04 17:50**

Client ID: Run ID: **IC201_041208A** SeqNo: **585641** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	33.91	0.50	0	0	0	0-0	34.02	0.324	20	
Sulfate	14.43	1.0	0	0	0	0-0	14.39	0.278	20	
Surr: Dichloroacetic acid (surr)	5.04	0.10	5	0	101	80-120	5.04	0	20	

The following samples were analyzed in this batch: 0412005-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

e-Lab Analytical, Inc.
10450 Stancliff Rd. #210
Houston, Texas 77099
(Tel) 281.530.5656
(Fax) 281.530.5887

Chain of C tody Form

Page ____ of ____

e-Lab Analytical, Inc.
3352 128th Avenue
Holland, Michigan 49424
(Tel) 616.399.6070
(Fax) 616.399.6185

e-Lab Project Manager:

e-Lab Work Order #: 41005

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Injection Wells	A	VOC 8260
Work Order		Project Number		B	SVOC 8270
Company Name	Navajo Refining Company	Bill To Company	Navajo Refining Company	C	Total Metals 6020
Send Report To	Jeff Byrd	Invoice Attn	Jeff Byrd	D	RCI Profile
Address	PO Box 159	Address	PO Box 159	E	Anions: (Cl, SO4)
				F	Alkalinity
City/State/Zip	Artesia, NM 88211	City/State/Zip	Artesia, NM 88211	G	pH
Phone	(505) 748-3311	Phone	(505) 748-3311	H	Conductivity
Fax	(505) 746-5421	Fax	(505) 746-5421	I	TDS
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	Inj Well	11/30	0730	C	-	10	X	X	X	X	X	X	X	X	X		
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s): Please Print & Sign: [signature]

Shipment Method: FedEx

Required Turnaround Time: (Check Box) ☐ STD 10 WK Days ☐ 5 WK Days ☐ 2 WK Days ☐ 24 Hour ☐ Other Std TAT

Results Due Date:

Relinquished by: [signature]	Date: 11/30	Time: 0730	Received by:	Notes:		
Relinquished by:	Date:	Time:	Received by (Laboratory):	e-Lab Cooler ID:	Cooler Temp:	QC Package: (Check One Box Below) ☑ Level II Std QC ☐ Level III Std QC/Raw Data ☐ Level IV SW846/CLP ☐ Other ____ ☐ TRRP CheckList ☐ TRRP Level IV
Logged by (Laboratory):	Date: 12/1/04	Time: 0905	Checked by (Laboratory):			

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to e-Lab Analytical, Inc.

Copyright 2004 by e-Lab Analytical, Inc.

e-Lab Analytical, Inc.

Sample Receipt Checklist

Client Name NAVAJO REFINING | Date/Time Received: 12/1/2004 9:05:00 AM

Work Order Number 0412005 | Received by: FSM

Checklist completed by [signature] 12/1/04 (Signature / Date) | Reviewed by [initials] 12/2/04 (Initials / Date)

Matrix: W | Carrier name FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	3.2c	002	
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐

Adjusted? _____ Checked by [initials]

Login Notes:

Any No and/or NA (not applicable) response must be detailed in the comments section below.

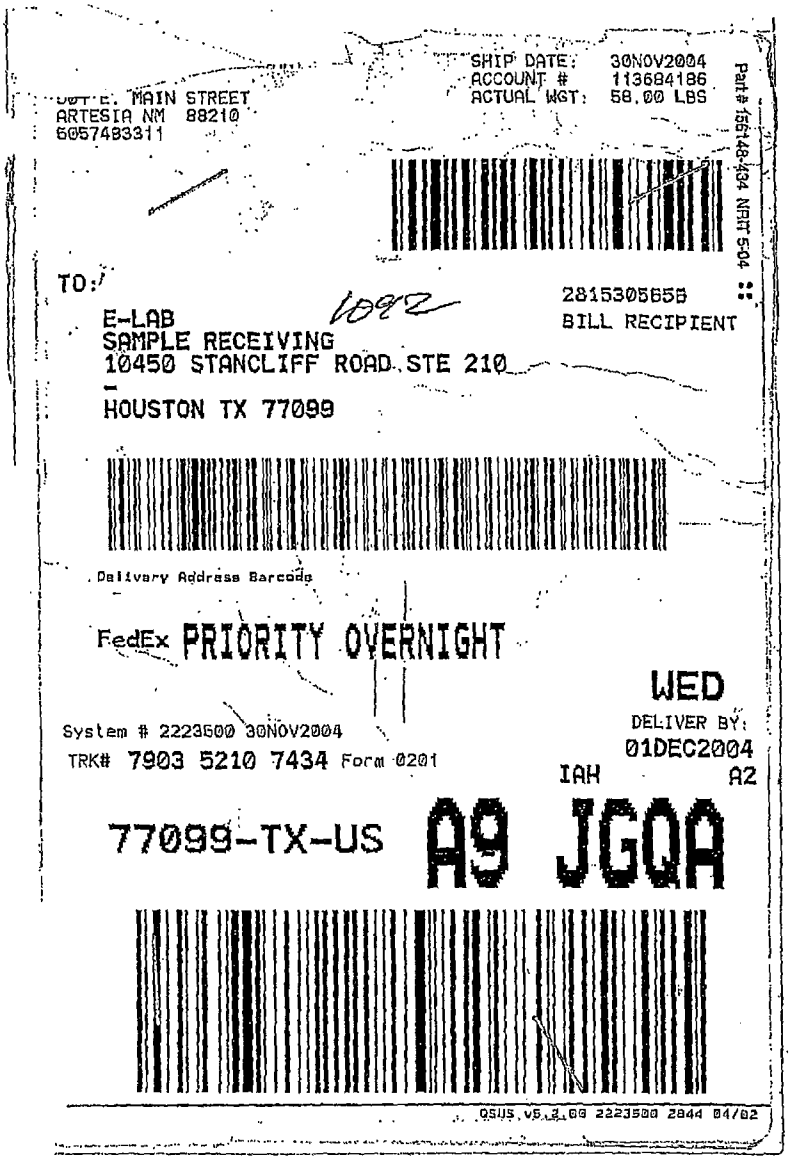
Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

W.O.# 0412005



SHIP DATE: 30NOV2004
ACCOUNT #: 113684186
ACTUAL WGT: 58.00 LBS

Part # 156148-434 NRNT 504

[illegible] MAIN STREET
ARTESIA NM 88210
6057483311

TO:

E-LAB
SAMPLE RECEIVING
10450 STANCLIFF ROAD STE 210
HOUSTON TX 77099

1092

2815305658
BILL RECIPIENT

Delivery Address Barcode

FedEx PRIORITY OVERNIGHT

WED
DELIVER BY:
01DEC2004

System # 2223600 30NOV2004
TRK# 7903 5210 7434 Form 0201

IAH A2

77099-TX-US A9 JGQA

QSUS v5.2.00 2223600 2844 04/02

e-Lab Analytical, Inc

Date: *December 10, 2004*

CLIENT: e-Lab Analytical, Inc
Project: 0412005
Work Order: **0412024**

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0412024-01	0412005-01E	Water		11/30/2004 07:30	12/2/2004 10:00	☐

e-Lab Analytical, Inc

Date: *December 10, 2004*

CLIENT: e-Lab Analytical, Inc
Project: 0412005
Work Order: 0412024

Lab ID: 0412024-01A
Client Sample ID: 0412005-01E
Collection Date: 11/30/2004 7:30:00 AM
Matrix: WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
CYANIDE, REACTIVE			**EPA 7.3.3.2**			Analyst: BAT
Cyanide, Reactive	ND	0.0300		mg/Kg	1	12/2/2004
FLASHPOINT, P-M CLOSED-CUP			**ASTM D93**			Analyst: KAE
Flashpoint, P-M Closed-cup	>196			°F	1	12/6/2004
SULFIDE, REACTIVE			**EPA 7.3.4.2**			Analyst: BAT
Sulfide, Reactive	ND	40.0		mg/Kg	1	12/2/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time

-Lab Analytical, Inc

CLIENT: e-Lab Analytical, Inc
Work Order: 0412024
Project: 0412005

Date: *Dec 10 2004*

QC BATCH REPORT

Batch ID: R25689 InstrumentID: WETCHEM

MBLK Sample ID: WBLKW1-041202 Test Code: EPA 7.3.4.2 Units: mg/Kg Analysis Date 12/02/04 0:00

Client ID: Run ID: WETCHEM_041202H SeqNo: 381679 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide, Reactive	ND	40								

The following samples were analyzed in this batch: 0412024-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

LIENT: e-Lab Analytical, Inc
Work Order: 0412024
Project: 0412005

QC BATCH REPORT

Batch ID: R25698 InstrumentID: WETCHEM

MBLK Sample ID: WBLKW1-041202 Test Code: EPA 7.3.3.2 Units: mg/Kg Analysis Date 12/02/04 0:00
Client ID: Run ID: WETCHEM_041202I SeqNo: 381814 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	ND	0.030								

LCS Sample ID: WLCSW1-041202 Test Code: EPA 7.3.3.2 Units: mg/Kg Analysis Date 12/02/04 0:00
Client ID: Run ID: WETCHEM_041202I SeqNo: 381815 Prep Date: DF: 2500

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	449.2	75	922	0	48.7	5-100		0		

The following samples were analyzed in this batch: 0412024-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: e-Lab Analytical, Inc
Work Order: 0412024
Project: 0412005

QC BATCH REPORT

Batch ID: R25762 InstrumentID: WETCHEM

LCS Sample ID: WLCSW1-120304 Test Code: ASTM D93 Units: °F Analysis Date 12/06/04 0:00
Client ID: Run ID: WETCHEM_041206G SeqNo: 382883 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Flashpoint, P-M Closed-cup	83	0	81	0	102	97-103	0	0	0	

The following samples were analyzed in this batch: 0412024-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

04/2024

Subcontractor:
e-Lab Analytical, Inc.
3352 128th Ave.
Holland, MI 49424
TEL: (616) 399-6070
FAX: (616) 399-6185
Acct #:

CHAIN-OF-CUSTODY RECORD

Date: Dec 01, 2004
COC ID: 2225
Due Date: 12/13/2004

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order	2107246	Project Name	0412005	A	Cyanide, Reactive (SW-846)
Work Order		Project Number		B	Sulfide, Reactive (SW-846)
Company Name	e-Lab Analytical, Inc.	Bill To Company	e-Lab Analytical, Inc.	C	Flashpoint (SW1010)
Send Report To	Jeffrey L. Cruston	Inv Attn	Accounts Payable	D	
Address	10450 Stancliff Rd, Suite 210	Address	10450 Stancliff Rd, Suite 210	E	
				F	
City/State/Zip	Houston, Texas 77099-4338	City/State/Zip	Houston, Texas 77099-4338	G	
Phone	(281) 530-5656	Phone	(281) 530-5656	H	
Fax	(281) 530-5887	Fax	(281) 530-5887	I	
eMail Address				J	

Sample ID	Matrix	Collection Date	Bottle	A	B	C	D	E	F	G	H	I	J
0412005-01E (Inj Wells)	Water	11/30/2004 7:30	(1) 1LPNEAT	X	X	X							

Comments:

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
	12/1/04 1125		12-2-04 10:00		Std
Relinquished by:	Date/Time	Received by:	Date/Time		

7

Signature | Date | Initials | Date

Matrix: Carrier name: UPS

Shipping container/cooler in good condition?	Yes	☑	No ☐	Not Present	☐
Custody seals intact on shipping container/cooler?	Yes	☑	No ☐	Not Present	☐
Custody seals intact on sample bottles?	Yes	☐	No ☐	Not Present	☑
Chain of custody present?	Yes	☑	No ☐		
Chain of custody signed when relinquished and received?	Yes	☑	No ☐		
Chain of custody agrees with sample labels?	Yes	☑	No ☐		
Samples in proper container/bottle?	Yes	☑	No ☐		
Sample containers intact?	Yes	☑	No ☐		
Sufficient sample volume for indicated test?	Yes	☑	No ☐		
All samples received within holding time?	Yes	☑	No ☐		
Container/Temp Blank temperature in compliance?	Yes	☑	No ☐		
Temperature(s)/Thermometer(s):	2.0C				
Water - VOA vials have zero headspace?	Yes	☐	No ☐	No VOA vials submitted	☑
Water - pH acceptable upon receipt?	Yes	☑	No ☐	N/A	☐

Adjusted? _____ Checked by

Login Notes

Any No and/or NA (not applicable) response must be detailed in the comments section below.

Client contacted: _____ Date contacted: _____ Person contacted: _____

Contacted by: _____ Regarding: _____

Comments: _____

_____

_____

Corrective Action: _____

_____

_____

UPS Next Day Air Saver

Shipping Document

SHIPMENT FROM

ACCOUNT NO.

REFERENCE NUMBER

DELIVERY TO

Saver

1P

1P

UPS Next Day Air Saver 1P

United Parcel Service, Louisville, KY

e-Lab, Inc.
10450 Stancliff Rd. Suite 210
Houston, Texas 77099
Tel. 281.530.5656
Fax. 281.530.5387

CUSTODY SEAL

Date:

Time:

Name:

Company:

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

17-Dec-08

Aaron Strange
Navajo Refining Company
PO Box 159
Artesia, NM 88211

Tel: (575) 746-5468
Fax: (575) 746-5421

Re: Injection Wells

Work Order : **0812122**

Dear Aaron,

ALS Laboratory Group received 1 sample on 12/4/2008 10:10 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Laboratory Group and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Laboratory Group. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 17.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

JayLynn F Thibault

Electronically approved by: Glenda H. Ramos

JayLynn F Thibault
Project Manager

ACCREDITED IN ACCORDANCE WITH nelac

Certificate No: T104704231-08-TX

ALS Laboratory Group

Date: 17-Dec-08

Client: Navajo Refining Company
Project: Injection Wells
Work Order: 0812122

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0812122-01	Effluent To Inj. Wells	Water		12/3/2008 15:25	12/4/2008 10:10	☐

ALS Laboratory Group

Date: *17-Dec-08*

Client: Navajo Refining Company
Project: Injection Wells
Sample ID: Effluent To Inj. Wells
Collection Date: 12/3/2008 03:25 PM

Work Order: 0812122
Lab ID: 0812122-01
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY			SW7470		Prep Date: 12/15/2008	Analyst: JCJ
Mercury	ND		0.000200	mg/L	1	12/15/2008 06:37 PM
METALS			SW6020		Prep Date: 12/8/2008	Analyst: ALR
Arsenic	0.103		0.00500	mg/L	1	12/9/2008 02:09 AM
Cadmium	ND		0.00200	mg/L	1	12/9/2008 02:09 AM
Chromium	ND		0.00500	mg/L	1	12/9/2008 02:09 AM
Copper	ND		0.00500	mg/L	1	12/9/2008 02:09 AM
Lead	ND		0.00500	mg/L	1	12/9/2008 02:09 AM
Molybdenum	0.0843		0.00500	mg/L	1	12/9/2008 02:09 AM
Nickel	0.00662		0.00500	mg/L	1	12/9/2008 02:09 AM
Selenium	0.653		0.0500	mg/L	10	12/10/2008 04:06 PM
Silver	ND		0.00500	mg/L	1	12/9/2008 02:09 AM
Zinc	0.0624		0.00500	mg/L	1	12/9/2008 02:09 AM
BOD			SM5210 B		Prep Date: 12/5/2008	Analyst: DM
Biochemical Oxygen Demand	48.4		2.00	mg/L	1	12/5/2008 03:00 PM
CYANIDE			M4500CN E&G			Analyst: KKP
Cyanide	0.0580		0.0200	mg/L	1	12/11/2008 03:00 PM
Cyanide, Amenable to Chlorination	ND		0.0200	mg/L	1	12/11/2008 03:00 PM
AMMONIA AS N			SM4500 NH3-B-F			Analyst: KKP
Nitrogen, Ammonia (as N)	24.3		0.625	mg/L	25	12/10/2008 01:00 PM
OIL AND GREASE			E1664			Analyst: MAM
Oil and Grease	6.00		2.00	mg/L	1	12/12/2008 03:00 PM
PHENOLICS			E420.1			Analyst: DM
Phenolics, Total Recoverable	0.665		0.0500	mg/L	1	12/15/2008 03:15 PM
TOTAL KJELDAHL L NITROGEN			M4500 NH3 D			Analyst: RPM
Nitrogen, Total Kjeldahl	28.2		1.00	mg/L	1	12/8/2008 07:00 AM
TOTAL SUSPENDED SOLIDS			M2540D			Analyst: TDW
Suspended Solids (Residue, Non-Filterable)	60.0		2.00	mg/L	1	12/8/2008 09:00 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
a - Not accredited
S - Spike Recovery outside accepted recovery limits
P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time
n - Not offered for accreditation

ALS Laboratory Group

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

Date: *17-Dec-08*

QC BATCH REPORT

Batch ID: **33311** Instrument ID **ICPMS02** Method: **SW6020**

MBLK Sample ID: **MBLKW3-120808-33311** Units: **mg/L** Analysis Date: **12/9/2008 02:22 PM**

Client ID: Run ID: **ICPMS02_081209A** SeqNo: **1555470** Prep Date: **12/8/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	ND	0.0050								
Cadmium	ND	0.0020								
Chromium	ND	0.0050								
Copper	ND	0.0050								
Lead	ND	0.0050								
Molybdenum	ND	0.0050								
Nickel	ND	0.0050								
Selenium	ND	0.0050								
Silver	ND	0.0050								
Zinc	0.002495	0.0050								J

LCS Sample ID: **MLCSW3-120808-33311** Units: **mg/L** Analysis Date: **12/9/2008 02:28 PM**

Client ID: Run ID: **ICPMS02_081209A** SeqNo: **1555471** Prep Date: **12/8/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.05244	0.0050	0.05	0	105	80-120	0			
Cadmium	0.05188	0.0020	0.05	0	104	80-120	0			
Chromium	0.0506	0.0050	0.05	0	101	80-120	0			
Copper	0.04657	0.0050	0.05	0	93.1	80-120	0			
Lead	0.0509	0.0050	0.05	0	102	80-120	0			
Molybdenum	0.05101	0.0050	0.05	0	102	80-120	0			
Nickel	0.05078	0.0050	0.05	0	102	80-120	0			
Selenium	0.05401	0.0050	0.05	0	108	80-120	0			
Silver	0.05068	0.0050	0.05	0	101	80-120	0			
Zinc	0.05208	0.0050	0.05	0	104	80-120	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: 33311 Instrument ID ICPMS02 Method: SW6020

MS Sample ID: 0812117-01CMS Units: mg/L Analysis Date: 12/9/2008 02:54 PM

Client ID: Run ID: ICPMS02_081209A SeqNo: 1555475 Prep Date: 12/8/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.05294	0.0050	0.05	0.001126	104	80-120	0			
Cadmium	0.0503	0.0020	0.05	0.0001897	100	80-120	0			
Chromium	0.05013	0.0050	0.05	0.001399	97.5	80-120	0			
Copper	0.04434	0.0050	0.05	0.0008793	86.9	80-120	0			
Lead	0.05066	0.0050	0.05	0.0005488	100	80-120	0			
Molybdenum	0.05264	0.0050	0.05	0.002014	101	80-120	0			
Nickel	0.04974	0.0050	0.05	0.004183	91.1	80-120	0			
Selenium	0.06171	0.0050	0.05	0.009191	105	80-120	0			
Silver	0.04861	0.0050	0.05	0.00006999	97.1	80-120	0			
Zinc	0.05362	0.0050	0.05	0.007323	92.6	80-120	0			

MSD Sample ID: 0812117-01CMSD Units: mg/L Analysis Date: 12/9/2008 03:00 PM

Client ID: Run ID: ICPMS02_081209A SeqNo: 1555476 Prep Date: 12/8/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.05573	0.0050	0.05	0.001126	109	80-120	0.05294	5.13	15	
Cadmium	0.04992	0.0020	0.05	0.0001897	99.5	80-120	0.0503	0.758	15	
Chromium	0.0525	0.0050	0.05	0.001399	102	80-120	0.05013	4.62	15	
Copper	0.04488	0.0050	0.05	0.0008793	88	80-120	0.04434	1.21	15	
Lead	0.0503	0.0050	0.05	0.0005488	99.5	80-120	0.05066	0.713	15	
Molybdenum	0.05296	0.0050	0.05	0.002014	102	80-120	0.05264	0.606	15	
Nickel	0.04983	0.0050	0.05	0.004183	91.3	80-120	0.04974	0.181	15	
Selenium	0.06479	0.0050	0.05	0.009191	111	80-120	0.06171	4.87	15	
Silver	0.04952	0.0050	0.05	0.00006999	98.9	80-120	0.04861	1.85	15	
Zinc	0.05265	0.0050	0.05	0.007323	90.7	80-120	0.05362	1.83	15	

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: **33311** Instrument ID **ICPMS02** Method: **SW6020**

DUP Sample ID: **0812117-01CDUP** Units: **mg/L** Analysis Date: **12/9/2008 02:41 PM**

Client ID: Run ID: **ICPMS02_081209A** SeqNo: **1555473** Prep Date: **12/8/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.00128	0.0050	0	0	0	0-0	0.001126	0	25	J
Cadmium	ND	0.0020	0	0	0	0-0	0.0001897	0	25	
Chromium	0.001442	0.0050	0	0	0	0-0	0.001399	0	25	J
Copper	0.001068	0.0050	0	0	0	0-0	0.0008793	0	25	J
Lead	ND	0.0050	0	0	0	0-0	0.0005488	0	25	
Molybdenum	0.002052	0.0050	0	0	0	0-0	0.002014	0	25	J
Nickel	0.002117	0.0050	0	0	0	0-0	0.004183	0	25	J
Selenium	0.008773	0.0050	0	0	0	0-0	0.009191	4.65	25	
Silver	ND	0.0050	0	0	0	0-0	0.00006999	0	25	
Zinc	0.007153	0.0050	0	0	0	0-0	0.007323	2.35	25	

The following samples were analyzed in this batch: 0812122-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: 33455 Instrument ID Mercury Method: SW7470

MBLK Sample ID: GBLKW2-121508-33455 Units: mg/L Analysis Date: 12/15/2008 05:31 PM
Client ID: Run ID: MERCURY_081215C SeqNo: 1559517 Prep Date: 12/15/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020								

LCS Sample ID: GLCSW2-121508-33455 Units: mg/L Analysis Date: 12/15/2008 05:33 PM
Client ID: Run ID: MERCURY_081215C SeqNo: 1559518 Prep Date: 12/15/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00495	0.00020	0.005	0	99	85-115	0			

MS Sample ID: 0812097-01BMS Units: mg/L Analysis Date: 12/15/2008 06:12 PM
Client ID: Run ID: MERCURY_081215C SeqNo: 1559840 Prep Date: 12/15/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00517	0.00020	0.005	-0.000028	104	85-115	0			

MSD Sample ID: 0812097-01BMSD Units: mg/L Analysis Date: 12/15/2008 06:14 PM
Client ID: Run ID: MERCURY_081215C SeqNo: 1559843 Prep Date: 12/15/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00525	0.00020	0.005	-0.000028	106	85-115	0.00517	1.54	20	

DUP Sample ID: 0812097-01BDUP Units: mg/L Analysis Date: 12/15/2008 06:10 PM
Client ID: Run ID: MERCURY_081215C SeqNo: 1559837 Prep Date: 12/15/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020	0	0	0	0-0	-0.000028	0	20	

The following samples were analyzed in this batch: 0812122-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: **33290** Instrument ID **WetChem** Method: **SM5210 B**

MBLK Sample ID: **WBLKW1-120508-33290** Units: **mg/L** Analysis Date: **12/5/2008 01:00 PM**
Client ID: Run ID: **WETCHEM_081210E** SeqNo: **1556302** Prep Date: **12/5/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Biochemical Oxygen Demand	ND	2.0								

LCS Sample ID: **WLCSW1-120508-33290** Units: **mg/L** Analysis Date: **12/5/2008 01:00 PM**
Client ID: Run ID: **WETCHEM_081210E** SeqNo: **1556303** Prep Date: **12/5/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Biochemical Oxygen Demand	193.3	2.0	198	0	97.6	85-115	0			

LCSD Sample ID: **WLCSDW1-120508-33290** Units: **mg/L** Analysis Date: **12/5/2008 01:00 PM**
Client ID: Run ID: **WETCHEM_081210E** SeqNo: **1556307** Prep Date: **12/5/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Biochemical Oxygen Demand	192.8	2.0	198	0	97.4	85-115	0			

DUP Sample ID: **0812114-01HDUP** Units: **mg/L** Analysis Date: **12/5/2008 01:00 PM**
Client ID: Run ID: **WETCHEM_081210E** SeqNo: **1556306** Prep Date: **12/5/2008** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Biochemical Oxygen Demand	982.8	20	0	0	0	0-0	985.8	0.305	20	

The following samples were analyzed in this batch: 0812122-01B

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: R70944 Instrument ID WetChem Method: M4500 NH3 D

MBLK	Sample ID: WBLKW1-120808-R70944				Units: mg/L			Analysis Date: 12/8/2008 07:00 AM			
Client ID:		Run ID: WETCHEM_081208C			SeqNo: 1554324		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Nitrogen, Total Kjeldahl	ND	1.0									

LCS	Sample ID: WLCSW1-120808-R70944				Units: mg/L			Analysis Date: 12/8/2008 07:00 AM			
Client ID:		Run ID: WETCHEM_081208C			SeqNo: 1554325		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Nitrogen, Total Kjeldahl	20.2	1.0	20	0	101	80-120	0				

MS	Sample ID: 0812027-02IMS				Units: mg/L			Analysis Date: 12/8/2008 07:00 AM			
Client ID:		Run ID: WETCHEM_081208C			SeqNo: 1554329		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Nitrogen, Total Kjeldahl	20	1.0	20	1.526	92.4	75-125	0				

DUP	Sample ID: 0812027-02IDUP				Units: mg/L			Analysis Date: 12/8/2008 07:00 AM			
Client ID:		Run ID: WETCHEM_081208C			SeqNo: 1554328		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Nitrogen, Total Kjeldahl	1.516	1.0	0	0	0	0-0	1.526	0.657	20		

The following samples were analyzed in this batch: 0812122-01G

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: R70952 Instrument ID Balance1 Method: M2540D

MBLK	Sample ID: BLANK-R70952					Units: mg/L			Analysis Date: 12/8/2008 09:00 PM	
Client ID:		Run ID: BALANCE1_081208A			SeqNo: 1554423		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Suspended Solids (Residue, Non-Fi	ND	2.0								

LCS	Sample ID: LCS-R70952					Units: mg/L			Analysis Date: 12/8/2008 09:00 PM	
Client ID:		Run ID: BALANCE1_081208A			SeqNo: 1554424		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Suspended Solids (Residue, Non-Fi	94	2.0	100	0	94	78-120	0			

DUP	Sample ID: 0812145-01ADUP					Units: mg/L			Analysis Date: 12/8/2008 09:00 PM	
Client ID:		Run ID: BALANCE1_081208A			SeqNo: 1554417		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Suspended Solids (Residue, Non-Fi	70	2.0	0	0	0	0-0	69	1.44	20	

The following samples were analyzed in this batch: 0812122-01D

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: **R71045** Instrument ID **UV-2450** Method: **SM4500 NH3-**

MBLK Sample ID: **WBLKW1-121008-R71045** Units: **mg/L** Analysis Date: **12/10/2008 01:00 PM**
Client ID: Run ID: **UV-2450_081210A** SeqNo: **1556194** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (as N)	ND	0.025								

LCS Sample ID: **WLCSW1-121008-R71045** Units: **mg/L** Analysis Date: **12/10/2008 01:00 PM**
Client ID: Run ID: **UV-2450_081210A** SeqNo: **1556195** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (as N)	0.192	0.025	0.2	0	96	80-120	0			

MS Sample ID: **0812086-01BMS** Units: **mg/L** Analysis Date: **12/10/2008 01:00 PM**
Client ID: Run ID: **UV-2450_081210A** SeqNo: **1556201** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (as N)	0.363	0.025	0.2	0.176	93.5	80-120	0			

DUP Sample ID: **0812086-01BDUP** Units: **mg/L** Analysis Date: **12/10/2008 01:00 PM**
Client ID: Run ID: **UV-2450_081210A** SeqNo: **1556200** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (as N)	0.173	0.025	0	0	0	0-0	0.176	1.72	20	

The following samples were analyzed in this batch: 0812122-01G

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: R71097 Instrument ID UV-2450 Method: M4500CN E&

MBLK Sample ID: WBLKW1-121108-R71097 Units: mg/L Analysis Date: 12/11/2008 03:00 PM

Client ID: Run ID: UV-2450_081211A SeqNo: 1557039 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide	ND	0.020								
Cyanide, Amenable to Chlorination	ND	0.020								

LCS Sample ID: WLCSW1-121108-R71097 Units: mg/L Analysis Date: 12/11/2008 03:00 PM

Client ID: Run ID: UV-2450_081211A SeqNo: 1557040 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide	0.193	0.020	0.2	0	96.5	80-120	0			

MS Sample ID: 0812191-01BMS Units: mg/L Analysis Date: 12/11/2008 03:00 PM

Client ID: Run ID: UV-2450_081211A SeqNo: 1557050 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide	0.185	0.020	0.2	0.001	92	80-120	0			

DUP Sample ID: 0812191-01BDUP Units: mg/L Analysis Date: 12/11/2008 03:00 PM

Client ID: Run ID: UV-2450_081211A SeqNo: 1557049 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide	ND	0.020	0	0	0	0-0	0.001	0	20	
Cyanide, Amenable to Chlorination	ND	0.020	0	0	0	0-0	0	0	0	

The following samples were analyzed in this batch: 0812122-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: **R71172** Instrument ID **WetChem** Method: **E1664**

MBLK Sample ID: **WBLKW1-121208-R71172** Units: mg/L Analysis Date: **12/12/2008 03:00 PM**
Client ID: Run ID: **WETCHEM_081212F** SeqNo: **1558390** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	ND	2.0								

LCS Sample ID: **WLCSW1-121208-R71172** Units: mg/L Analysis Date: **12/12/2008 03:00 PM**
Client ID: Run ID: **WETCHEM_081212F** SeqNo: **1558391** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	36.3	2.0	40	0	90.8	80-120	0			

DUP Sample ID: **0812073-02BDUP** Units: mg/L Analysis Date: **12/12/2008 03:00 PM**
Client ID: Run ID: **WETCHEM_081212F** SeqNo: **1558402** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	2.5	2.0	0	0	0	0-0	3	18.2	20	

The following samples were analyzed in this batch: 0812122-01E

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: R71220 Instrument ID UV-2450 Method: E420.1

MBLK Sample ID: WBLKW1-121508-R71220 Units: mg/L Analysis Date: 12/15/2008 03:15 PM
Client ID: Run ID: UV-2450_081215A SeqNo: 1559301 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phenolics, Total Recoverable	ND	0.050								

LCS Sample ID: WLCSW1-121508-R71220 Units: mg/L Analysis Date: 12/15/2008 03:15 PM
Client ID: Run ID: UV-2450_081215A SeqNo: 1559302 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phenolics, Total Recoverable	0.519	0.050	0.5	0	104	80-120	0			

MS Sample ID: 0812219-01BMS Units: mg/L Analysis Date: 12/15/2008 03:15 PM
Client ID: Run ID: UV-2450_081215A SeqNo: 1559316 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phenolics, Total Recoverable	0.53	0.050	0.5	0.021	102	80-120	0			

DUP Sample ID: 0812219-01BDUP Units: mg/L Analysis Date: 12/15/2008 03:15 PM
Client ID: Run ID: UV-2450_081215A SeqNo: 1559315 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phenolics, Total Recoverable	0.028	0.050	0	0	0	0-0	0.021	0	20	J

The following samples were analyzed in this batch: 0812122-01F

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

e-Lab Analytical, Inc.
10450 Stancliff Rd. #210
Houston, Texas 77099
(Tel) 281.530.5656
(Fax) 281.530.5887

Chain of Custody Form

Page 1 of 1

The Chain of Custody is a Legal Document. All information must be completed accurately.

e-Lab Analytical, Inc.
3352 128th Avenue
Holland, Michigan 49424
(Tel) 616.399.6070
(Fax) 616.399.6185

e-Lab Project Manager:

e-Lab Work Order: 08122

Customer Information		Project Information		Parameter/Method Request for Analysis
Purchase Order		Project Name	Injection Wells	A
Work Order		Project Number		B
Company Name	Navajo Refining Co	Bill To Company		C
Send Report To	Aaron Strange	Invoice Attn		D
Address	P.O. Box 159	Address		E
				F
City/State/Zip	Artesia NM 88210	City/State/Zip		G
Phone	575-748-3311	Phone		H
Fax	575-746-5421	Fax		I
e-Mail Address		e-Mail Address		J

No.	Sample Description	Date	Time	Matrix	Pres.	Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	Effluent To Inj. Wells	12/3/08	1525	L	Y	7	X										
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Aaron Strange

Shipment Method: Fed Ex

Required Turnaround Time: (Check Box) ☐ STD-10 Wk Days ☐ 5 Wk Days ☐ 2 Wk Days ☐ 24 Hour ☐ Other

Results Due Date:

Relinquished by:	Date:	Time:	Received by:	Notes:
Aaron Strange	12/3/08	1615		
Relinquished by:	Date:	Time:	Received by (Laboratory): 12/4/08 1010	

e-Lab Analytical Cooler ID:

Trip Blank Number:

QC Package: (Check One Box Below)
☐ Level II Std QC ☐ TRRP Checklist
☐ Level III Std QC/Raw Data ☐ TRRP Level IV
☐ Level IV SW846/CLP
☐ Other

Logged by (Laboratory): Date: Time:

Checked by (Laboratory):

Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-Na2S2O3 6-NaHSO4 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to e-Lab Analytical, Inc.
2. Unless otherwise agreed in a formal contract, services provided by e-Lab Analytical, Inc. are expressly limited to the terms and conditions stated on the reverse.

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ALS Laboratory Group

Sample Receipt Checklist

Client Name: NAVAJO REFINING

Date/Time Received: 12/4/2008 10:10

Work Order Number 0812122

Received by: RNG

Checklist completed by [signature] Signature 12/5/08 Date

Reviewed by [initials] Initials Date 12/7/08

Matrix: Water

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ✓	No	Not Present
Custody seals intact on shipping container/cooler?	Yes ✓	No	Not Present
Custody seals intact on sample bottles?	Yes	No	Not Present ✓
Chain of custody present?	Yes ✓	No	
Chain of custody signed when relinquished and received?	Yes ✓	No	
Chain of custody agrees with sample labels?	Yes ✓	No	
Samples in proper container/bottle?	Yes ✓	No	
Sample containers intact?	Yes ✓	No	
Sufficient sample volume for indicated test?	Yes ✓	No	
All samples received within holding time?	Yes ✓	No	
Container/Temp Blank temperature in compliance?	Yes ✓	No	
Temperature(s)/Thermometer(s):	3.3c	002	
Cooler(s)/Kit(s):			
Water - VOA vials have zero headspace?	Yes	No	No VOA vials submitted ✓
Water - pH acceptable upon receipt?	Yes ✓	No	N/A

Adjusted? Checked by

Login Notes:

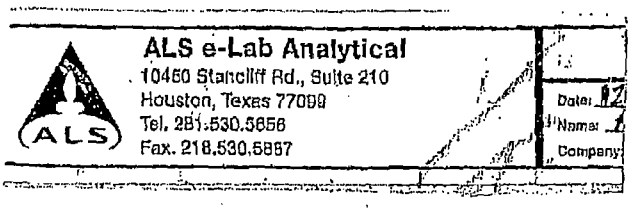
Client contacted: Date contacted: Person contacted

Contacted by: Regarding:

Comments:

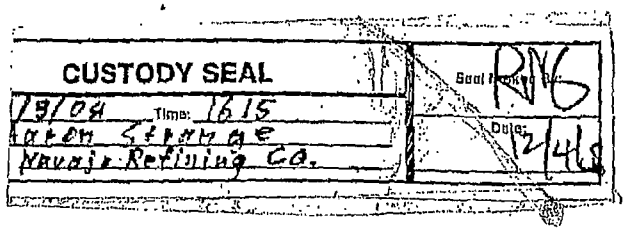
Corrective Action

WO# 08121122



ALS e-Lab Analytical
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. 281.530.5656
Fax. 218.530.5887

Date: 12
Name:
Company:



CUSTODY SEAL

Seal #: RNG

Date: 12/4/8

Time: 1615

Waterstrange

Navajo Refining Co.

e-Lab Analytical, Inc.

10450 Stancliff Rd, Suite 210 Houston, Texas 77099-4338 281-530-5656 Fax 281-530-5887

July 23, 2004

Darrell Moore
Navajo Refining Company
P.O. Box 159
Artesia, New Mexico 88211

Tel: (505) 746-5281
Fax: (505) 746-5421

Re: Injection Wells

Work Order : **0407074**

Dear Darrell Moore,

e-Lab Analytical, Inc. received 2 samples on 7/8/2004 8:40:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by e-Lab Analytical, Inc. and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by e-Lab Analytical, Inc. The total number of pages in this report is 38.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Jeffrey L Croston

Electronically approved by: Patrina A. Dathorne

Jeffrey L Croston

e-Lab Analytical, Inc.

Date: *July 23, 2004*

CLIENT: Navajo Refining Company
Project: Injection Wells
Work Order: 0407074

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0407074-01	Inj Wells	Water		7/7/2004 09:00	7/8/2004 08:40	☐
0407074-02	Trip Blank	Water		7/7/2004	7/8/2004 08:40	☐

e-Lab Analytical, Inc. **Date:** *July 23, 2004*

CLIENT:	Navajo Refining Company
Project:	Injection Wells
Work Order:	0407074

Case Narrative

Semivolatile (sample Inj. Wells) Surrogates were outside of control limits due to a matrix interference. Sample was re-extracted and re-analyzed and surrogates recoveries were confirmed.

Batch 9539 Metals MS/MSD was an unrelated sample.

e-Lab Analytical, Inc.

Date: *July 23, 2004*

CLIENT:	Navajo Refining Company	**Client Sample ID:**	Inj Wells
Work Order:	0407074	**Collection Date:**	7/7/2004 9:00:00 AM
Project:	Injection Wells		
Lab ID:	0407074-01	**Matrix:**	WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
MERCURY, TOTAL		SW7470			Prep Date: 7/17/2004	Analyst: JCJ
Mercury	ND	0.000200		mg/L	1	7/17/2004 6:08:25 PM
ICP METALS, TOTAL		SW6020			Prep Date: 7/9/2004	Analyst: ALR
Aluminum	0.556	0.100		mg/L	10	7/9/2004 10:24:00 PM
Arsenic	0.171	0.0500		mg/L	10	7/9/2004 10:24:00 PM
Barium	0.0354	0.0100		mg/L	2	7/23/2004 2:11:00 PM
Beryllium	ND	0.00400		mg/L	2	7/23/2004 12:23:00 AM
Boron	0.240	0.200		mg/L	10	7/9/2004 10:24:00 PM
Cadmium	ND	0.00200		mg/L	2	7/23/2004 2:11:00 PM
Calcium	216	25.0		mg/L	50	7/9/2004 9:39:00 PM
Chromium	0.00818	0.00400		mg/L	2	7/23/2004 12:23:00 AM
Cobalt	ND	0.00400		mg/L	2	7/23/2004 12:23:00 AM
Copper	0.00655	0.00400		mg/L	2	7/23/2004 12:23:00 AM
Iron	4.42	0.400		mg/L	2	7/23/2004 12:23:00 AM
Lead	ND	0.0100		mg/L	2	7/23/2004 2:11:00 PM
Magnesium	34.1	2.00		mg/L	10	7/9/2004 10:24:00 PM
Manganese	0.116	0.0100		mg/L	2	7/23/2004 12:23:00 AM
Molybdenum	ND	0.0100		mg/L	2	7/23/2004 12:23:00 AM
Nickel	0.0195	0.0100		mg/L	2	7/23/2004 12:23:00 AM
Potassium	24.9	0.400		mg/L	2	7/23/2004 12:23:00 AM
Selenium	0.432	0.0500		mg/L	10	7/9/2004 10:24:00 PM
Silver	ND	0.0100		mg/L	2	7/23/2004 2:11:00 PM
Sodium	1,580	10.0		mg/L	50	7/9/2004 9:39:00 PM
Vanadium	ND	0.0100		mg/L	2	7/23/2004 12:23:00 AM
Zinc	0.0677	0.0100		mg/L	2	7/23/2004 12:23:00 AM
SEMIVOLATILE ORGANICS BY GC/MS		SW8270			Prep Date: 7/12/2004	Analyst: HV
1,2,4-Trichlorobenzene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
2,4,5-Trichlorophenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
2,4,6-Trichlorophenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
2-Methylnaphthalene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
2-Methylphenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
2-Nitroaniline	ND	12		µg/L	1	7/15/2004 1:53:00 AM
2-Nitrophenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
3-Nitroaniline	ND	12		µg/L	1	7/15/2004 1:53:00 AM
4-Methylphenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
4-Nitroaniline	ND	12		µg/L	1	7/15/2004 1:53:00 AM
4-Nitrophenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Acenaphthene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Acenaphthylene	ND	12		µg/L	1	7/15/2004 1:53:00 AM

Qualifiers:

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P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time

e-Lab Analytical, Inc.

Date: *July 23, 2004*

CLIENT:	Navajo Refining Company	**Client Sample ID:**	Inj Wells
Work Order:	0407074	**Collection Date:**	7/7/2004 9:00:00 AM
Project:	Injection Wells		
Lab ID:	0407074-01	**Matrix:**	WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
Aniline	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Anthracene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Benz(a)anthracene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Benzidine	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Hexachloroethane	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Indeno(1,2,3-cd)pyrene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Isophorone	ND	12		µg/L	1	7/15/2004 1:53:00 AM
N-Nitrosodi-n-propylamine	ND	12		µg/L	1	7/15/2004 1:53:00 AM
N-Nitrosodimethylamine	ND	12		µg/L	1	7/15/2004 1:53:00 AM
N-Nitrosodiphenylamine	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Naphthalene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Nitrobenzene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Pentachlorophenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Phenanthrene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Phenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Pyrene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Surr: 2,4,6-Tribromophenol	28.6	39-153	S	%REC	1	7/15/2004 1:53:00 AM
Surr: 2-Fluorobiphenyl	45.7	40-147		%REC	1	7/15/2004 1:53:00 AM
Surr: 2-Fluorophenol	12.1	21-110	S	%REC	1	7/15/2004 1:53:00 AM
Surr: 4-Terphenyl-d14	40.9	39-141		%REC	1	7/15/2004 1:53:00 AM
Surr: Nitrobenzene-d5	40.8	37-140		%REC	1	7/15/2004 1:53:00 AM
Surr: Phenol-d6	7.92	11-100	S	%REC	1	7/15/2004 1:53:00 AM
VOLATILES BY GC/MS		**SW8260**				Analyst: PC
1,1,1-Trichloroethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
1,1,2-Trichloroethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
1,1-Dichloroethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
1,1-Dichloroethene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
1,2-Dichloroethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
2-Butanone	16	10		µg/L	1	7/19/2004 2:58:00 PM
2-Chloroethyl vinyl ether	ND	10		µg/L	1	7/19/2004 2:58:00 PM
2-Hexanone	ND	10		µg/L	1	7/19/2004 2:58:00 PM
4-Methyl-2-pentanone	ND	10		µg/L	1	7/19/2004 2:58:00 PM
Acetone	87	10		µg/L	1	7/19/2004 2:58:00 PM
Benzene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Bromodichloromethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Bromoform	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Bromomethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Carbon disulfide	ND	10		µg/L	1	7/19/2004 2:58:00 PM
Carbon tetrachloride	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM

Qualifiers:

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B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

P - Dual Column results percent difference > 40%

E - Value above quantitation range

H - Analyzed outside of Hold Time

e-Lab Analytical, Inc.

Date: *July 23, 2004*

CLIENT:	Navajo Refining Company	**Client Sample ID:**	Inj Wells
Work Order:	0407074	**Collection Date:**	7/7/2004 9:00:00 AM
Project:	Injection Wells		
Lab ID:	0407074-01	**Matrix:**	WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
Chlorobenzene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Chloroethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Chloroform	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Chloromethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
cis-1,3-Dichloropropene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Dibromochloromethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Ethylbenzene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
m,p-Xylene	ND	10		µg/L	1	7/19/2004 2:58:00 PM
Methylene chloride	ND	10		µg/L	1	7/19/2004 2:58:00 PM
Styrene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Tetrachloroethene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Toluene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
trans-1,3-Dichloropropene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Trichloroethene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Vinyl acetate	ND	10		µg/L	1	7/19/2004 2:58:00 PM
Vinyl chloride	ND	2.0		µg/L	1	7/19/2004 2:58:00 PM
Xylenes, Total	ND	15		µg/L	1	7/19/2004 2:58:00 PM
Surr: 1,2-Dichloroethane-d4	85.9	71-126		%REC	1	7/19/2004 2:58:00 PM
Surr: 4-Bromofluorobenzene	93.8	74-125		%REC	1	7/19/2004 2:58:00 PM
Surr: Dibromofluoromethane	89.3	73-126		%REC	1	7/19/2004 2:58:00 PM
Surr: Toluene-d8	89.9	75-125		%REC	1	7/19/2004 2:58:00 PM
FLASHPOINT		**SW1010**				Analyst: MAG
Ignitability	>200	50		°F	1	7/16/2004
CYANIDE, REACTIVE		**SW-846**				Analyst: MAG
Reactive Cyanide	ND	0.0300		mg/L	1	7/16/2004
SULFIDE, REACTIVE		**SW-846**				Analyst: MAG
Reactive Sulfide	ND	40.0		mg/L	1	7/16/2004
ANIONS BY ION CHROMATOGRAPHY		**E300**				Analyst: MG
Chloride	992	50.0		mg/L	100	7/13/2004 3:25:00 AM
Sulfate	2,270	100		mg/L	100	7/13/2004 3:25:00 AM
Surr: Dichloroacetic acid (surr)	107	80-120		%REC	100	7/13/2004 3:25:00 AM
ALKALINITY		**E310.1**				Analyst: HDO
Alkalinity, Bicarbonate (As CaCO3)	157	5.00		mg/L	1	7/12/2004
Alkalinity, Carbonate (As CaCO3)	ND	5.00		mg/L	1	7/12/2004
Alkalinity, Hydroxide (As CaCO3)	ND	5.00		mg/L	1	7/12/2004
Alkalinity, Total (As CaCO3)	157	5.00		mg/L	1	7/12/2004
CONDUCTIVITY		**E120.1**				Analyst: HDO
Specific Conductance	7,200	1.00		µmhos/cm	1	7/12/2004

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e-Lab Analytical, Inc.

Date: *July 23, 2004*

CLIENT:	Navajo Refining Company	**Client Sample ID:**	Inj Wells
Work Order:	0407074	**Collection Date:**	7/7/2004 9:00:00 AM
Project:	Injection Wells		
Lab ID:	0407074-01	**Matrix:**	WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
PH			E150.1			Analyst: LMD
pH	6.92	0.100		pH units	1	7/8/2004
TOTAL DISSOLVED SOLIDS			E160.1			Analyst: LMD
Total Dissolved Solids (Residue, Filterable)	4,960	10.0		mg/L	1	7/8/2004

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	P - Dual Column results percent difference > 40%
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	H - Analyzed outside of Hold Time

Batch ID: 9539 InstrumentID: ICP4500

MBLK Sample ID: MBLKW3-070904 Test Code: SW6020 Units: mg/L Analysis Date: 07/09/04 21:25

Client ID: Run ID: ICP4500_040709A SeqNo: 505844 Prep Date: 7/9/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.003459	0.010								J
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Copper	ND	0.0050								
Iron	ND	0.20								
Lead	ND	0.0050								
Magnesium	ND	0.20								
Manganese	ND	0.0050								
Molybdenum	ND	0.0050								
Nickel	ND	0.0050								
Potassium	ND	0.20								
Selenium	ND	0.0050								
Silver	ND	0.0050								
Sodium	ND	0.20								
Vanadium	ND	0.0050								
Zinc	ND	0.0050								

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O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9539 InstrumentID: ICP4500

LCS Sample ID: MLCSW3-070904 Test Code: SW6020 Units: mg/L Analysis Date: 07/09/04 21:29
Client ID: Run ID: ICP4500_040709A SeqNo: 505845 Prep Date: 7/9/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.04844	0.010	0.05	0	96.9	79-126	0			
Arsenic	0.04768	0.0050	0.05	0	95.3	80-121	0			
Barium	0.04274	0.0050	0.05	0	85.5	79.8-119	0			
Beryllium	0.04529	0.0020	0.05	0	90.6	78.9-120	0			
Boron	0.4936	0.020	0.5	0	98.7	80-120	0			
Cadmium	0.04849	0.0020	0.05	0	97	79.1-119	0			
Calcium	4.804	0.50	5	0	96.1	80-121	0			
Chromium	0.04798	0.0050	0.05	0	96	79.3-121	0			
Cobalt	0.04761	0.0050	0.05	0	95.2	82-121	0			
Copper	0.04535	0.0050	0.05	0	90.7	83-121	0			
Iron	4.902	0.20	5	0	98	80-120	0			
Lead	0.04454	0.0050	0.05	0	89.1	80-118	0			
Magnesium	5.139	0.20	5	0	103	80-120	0			
Manganese	0.04778	0.0050	0.05	0	95.6	82-119	0			
Molybdenum	0.04486	0.0050	0.05	0	89.7	84.6-115	0			
Nickel	0.04723	0.0050	0.05	0	94.5	85-120	0			
Potassium	4.953	0.20	5	0	99.1	80-120	0			
Selenium	0.0466	0.0050	0.05	0	93.2	79.2-118	0			
Silver	0.04787	0.0050	0.05	0	95.7	83-117	0			
Sodium	5.081	0.20	5	0	102	82.4-120	0			
Vanadium	0.04735	0.0050	0.05	0	94.7	82.1-119	0			
Zinc	0.04587	0.0050	0.05	0	91.7	83-118	0			

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CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9539 InstrumentID: ICP4500

MS Sample ID: 0407028-83CMS Test Code: SW6020 Units: mg/L Analysis Date: 07/10/04 0:14
Client ID: Run ID: ICP4500_040709A SeqNo: 505874 Prep Date: 7/9/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.05038	0.010	0.05	0.002733	95.3	79-126	0			
Arsenic	0.04968	0.0050	0.05	0.003932	91.5	80-121	0			
Barium	0.07232	0.0050	0.05	0.02595	92.7	79.8-119	0			
Beryllium	0.0509	0.0020	0.05	0.0005094	101	78.9-120	0			
Boron	0.623	0.020	0.5	0.09092	106	80-120	0			
Cadmium	0.04574	0.0020	0.05	0.0003332	90.8	79.1-119	0			
Calcium	90.82	0.50	5	84.69	123	80-121	0			SEO
Chromium	0.04515	0.0050	0.05	0	90.3	79.3-121	0			
Cobalt	0.04827	0.0050	0.05	0.004039	88.5	82-121	0			
Copper	0.04228	0.0050	0.05	0.0009502	82.7	83-121	0			S
Iron	5.002	0.20	5	0.2496	95	80-120	0			
Lead	0.04748	0.0050	0.05	0	95	80-118	0			
Magnesium	28.5	0.20	5	23.83	93.4	80-120	0			O
Manganese	0.1942	0.0050	0.05	0.1499	88.6	82-119	0			
Molybdenum	0.04699	0.0050	0.05	0	94	84.6-115	0			
Nickel	0.05298	0.0050	0.05	0.01094	84.1	85-120	0			S
Potassium	7.353	0.20	5	2.353	100	80-120	0			
Selenium	0.046	0.0050	0.05	0.003609	84.8	79.2-118	0			
Silver	0.04262	0.0050	0.05	0	85.2	83-117	0			
Sodium	164.1	0.20	5	161.8	46	82.4-120	0			SEO
Vanadium	0.0482	0.0050	0.05	0.0006576	95.1	82.1-119	0			
Zinc	0.04617	0.0050	0.05	0.004682	83	83-118	0			S

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CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9539 InstrumentID: ICP4500

MSD Sample ID: 0407028-83CMSD Test Code: SW6020 Units: mg/L Analysis Date: 07/10/04 0:19
Client ID: Run ID: ICP4500_040709A SeqNo: 505875 Prep Date: 7/9/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.05215	0.010	0.05	0.002733	98.8	79-126	0.05038	3.45	15	
Arsenic	0.04869	0.0050	0.05	0.003932	89.5	80-121	0.04968	2.01	15	
Barium	0.07266	0.0050	0.05	0.02595	93.4	79.8-119	0.07232	0.469	15	
Beryllium	0.05198	0.0020	0.05	0.0005094	103	78.9-120	0.0509	2.1	15	
Boron	0.6325	0.020	0.5	0.09092	108	80-120	0.623	1.51	15	
Cadmium	0.04625	0.0020	0.05	0.0003332	91.8	79.1-119	0.04574	1.11	15	
Calcium	93.55	0.50	5	84.69	177	80-121	90.82	2.96	15	SEO
Chromium	0.04685	0.0050	0.05	0	93.7	79.3-121	0.04515	3.7	15	
Cobalt	0.04998	0.0050	0.05	0.004039	91.9	82-121	0.04827	3.48	15	
Copper	0.04371	0.0050	0.05	0.0009502	85.5	83-121	0.04228	3.33	15	
Iron	5.13	0.20	5	0.2496	97.6	80-120	5.002	2.53	15	
Lead	0.0471	0.0050	0.05	0	94.2	80-118	0.04748	0.804	15	
Magnesium	30.14	0.20	5	23.83	126	80-120	28.5	5.59	15	SO
Manganese	0.2008	0.0050	0.05	0.1499	102	82-119	0.1942	3.34	15	
Molybdenum	0.04735	0.0050	0.05	0	94.7	84.6-115	0.04699	0.763	15	
Nickel	0.05422	0.0050	0.05	0.01094	86.6	85-120	0.05298	2.31	15	
Potassium	7.483	0.20	5	2.353	103	80-120	7.353	1.75	15	
Selenium	0.04327	0.0050	0.05	0.003609	79.3	79.2-118	0.046	6.12	15	
Silver	0.04351	0.0050	0.05	0	87	83-117	0.04262	2.07	15	
Sodium	173.9	0.20	5	161.8	242	82.4-120	164.1	5.8	15	SEO
Vanadium	0.04997	0.0050	0.05	0.0006576	98.6	82.1-119	0.0482	3.61	15	
Zinc	0.04806	0.0050	0.05	0.004682	86.8	83-118	0.04617	4.01	15	

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E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9539 InstrumentID: ICP4500

DUP Sample ID: 0407028-83CDUP Test Code: SW6020 Units: mg/L Analysis Date: 07/10/04 0:09
Client ID: Run ID: ICP4500_040709A SeqNo: 505873 Prep Date: 7/9/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.002615	0.010	0	0	0	0-0	0.002733	0	25	J
Arsenic	0.003323	0.0050	0	0	0	0-0	0.003932	0	25	J
Barium	0.026	0.0050	0	0	0	0-0	0.02595	0.192	25	
Beryllium	0.000439	0.0020	0	0	0	0-0	0.0005094	0	25	J
Boron	0.08249	0.020	0	0	0	0-0	0.09092	9.72	25	
Cadmium	0.0002675	0.0020	0	0	0	0-0	0.0003332	0	25	J
Chromium	ND	0.0050	0	0	0	0-0	0.0003544	0	25	
Cobalt	0.003999	0.0050	0	0	0	0-0	0.004039	0	25	J
Copper	0.001006	0.0050	0	0	0	0-0	0.0009502	0	25	J
Iron	0.2425	0.20	0	0	0	0-0	0.2496	2.89	25	
Lead	ND	0.0050	0	0	0	0-0	0.0001737	0	25	
Magnesium	22.32	0.20	0	0	0	0-0	23.83	6.54	25	
Manganese	0.1501	0.0050	0	0	0	0-0	0.1499	0.133	25	
Molybdenum	ND	0.0050	0	0	0	0-0	0.0005272	0	25	
Nickel	0.01059	0.0050	0	0	0	0-0	0.01094	3.25	25	
Potassium	2.237	0.20	0	0	0	0-0	2.353	5.05	25	
Selenium	ND	0.0050	0	0	0	0-0	0.003609	0	25	
Silver	ND	0.0050	0	0	0	0-0	0.0001129	0	25	
Vanadium	0.0005641	0.0050	0	0	0	0-0	0.0006576	0	25	J
Zinc	0.00462	0.0050	0	0	0	0-0	0.004682	0	25	J

DUP Sample ID: 0407028-83CDUP Test Code: SW6020 Units: mg/L Analysis Date: 07/12/04 20:25
Client ID: Run ID: ICP4500_040712A SeqNo: 506283 Prep Date: 7/9/2004 DF: 10

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	85.98	5.0	0	0	0	0-0	85.98	0	25	
Sodium	175.6	2.0	0	0	0	0-0	175.6	0	25	

The following samples were analyzed in this batch: 0407074-01B

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9641 InstrumentID: Mercury

MBLK Sample ID: GBLKW1-071704 Test Code: SW7470 Units: mg/L Analysis Date: 07/17/04 17:39
Client ID: Run ID: MERCURY_040717C SeqNo: 509754 Prep Date: 7/17/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020	0	0	0	0-0	0			

LCS Sample ID: GLCSW1-071704 Test Code: SW7470 Units: mg/L Analysis Date: 07/17/04 17:41
Client ID: Run ID: MERCURY_040717C SeqNo: 509755 Prep Date: 7/17/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00503	0.00020	0.005	0	101	83-115	0			

LCSD Sample ID: GLCSDW1-071704 Test Code: SW7470 Units: mg/L Analysis Date: 07/17/04 17:43
Client ID: Run ID: MERCURY_040717C SeqNo: 509756 Prep Date: 7/17/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00506	0.00020	0.005	0	101	83-115	0.00503	0.595	20	

MS Sample ID: 0407082-18CMS Test Code: SW7470 Units: mg/L Analysis Date: 07/17/04 17:50
Client ID: Run ID: MERCURY_040717C SeqNo: 509759 Prep Date: 7/17/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00482	0.00020	0.005	-0.000006	96.5	83-115	0			

MSD Sample ID: 0407082-18CMSD Test Code: SW7470 Units: mg/L Analysis Date: 07/17/04 17:51
Client ID: Run ID: MERCURY_040717C SeqNo: 509760 Prep Date: 7/17/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00484	0.00020	0.005	-0.000006	96.9	83-115	0.00482	0.414	20	

DUP Sample ID: 0407082-18CDUP Test Code: SW7470 Units: mg/L Analysis Date: 07/17/04 17:48
Client ID: Run ID: MERCURY_040717C SeqNo: 509758 Prep Date: 7/17/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020	0	0	0	0-0	-0.000006	0	20	

The following samples were analyzed in this batch: 0407074-01B

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
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E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9560 InstrumentID: SV-2

MBLK Sample ID: SBLKW1-040712 Test Code: SW8270 Units: µg/L Analysis Date: 07/13/04 15:58
Client ID: Run ID: SV-2_040713A SeqNo: 507356 Prep Date: 7/12/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
2-Nitroaniline	ND	10								
2-Nitrophenol	ND	10								
3-Nitroaniline	ND	10								
4-Methylphenol	ND	10								
4-Nitroaniline	ND	10								
4-Nitrophenol	ND	10								
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Benz(a)anthracene	ND	10								
Benzidine	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	10								
Isophorone	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodimethylamine	ND	10								
N-Nitrosodiphenylamine	ND	10								
Naphthalene	ND	10								
Nitrobenzene	ND	10								
Pentachlorophenol	ND	10								
Phenanthrene	ND	10								
Phenol	ND	10								
Pyrene	ND	10								
1,4-Dichlorobenzene-d4	40	0								
Acenaphthene-d10	40	0								
Chrysene-d12	40	0								
Naphthalene-d8	40	0								
Perylene-d12	40	0								
Phenanthrene-d10	40	0								
Surr: 2,4,6-Tribromophenol	82.25	10	100	0	82.2	39-153	0			
Surr: 2-Fluorobiphenyl	78.39	10	100	0	78.4	40-147	0			
Surr: 2-Fluorophenol	33.79	10	100	0	33.8	21-110	0			
Surr: 4-Terphenyl-d14	84.32	10	100	0	84.3	39-141	0			
Surr: Nitrobenzene-d5	70.65	10	100	0	70.7	37-140	0			
Surr: Phenol-d6	18.81	10	100	0	18.8	11-100	0			

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CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9560 InstrumentID: SV-2

LCS Sample ID: SLCSW1-040712 Test Code: SW8270 Units: µg/L Analysis Date: 07/13/04 16:29
Client ID: Run ID: SV-2_040713A SeqNo: 507357 Prep Date: 7/12/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	31.26	10	50	0	62.5	50-115	0			
2,4,5-Trichlorophenol	86.7	10	100	0	86.7	68-128	0			
2,4,6-Trichlorophenol	85.39	10	100	0	85.4	66-125	0			
2-Methylnaphthalene	34.79	10	50	0	69.6	47-122	0			
2-Methylphenol	61.44	10	100	0	61.4	51-115	0			
2-Nitroaniline	46.51	10	50	0	93	64-128	0			
2-Nitrophenol	76.92	10	100	0	76.9	60-119	0			
3-Nitroaniline	44.47	10	50	0	88.9	61-118	0			
4-Methylphenol	81.14	10	150	0	54.1	44-115	0			
4-Nitroaniline	44.56	10	50	0	89.1	61-123	0			
4-Nitrophenol	29.12	10	100	0	29.1	17-100	0			
Acenaphthene	40.9	10	50	0	81.8	68-115	0			
Acenaphthylene	40.88	10	50	0	81.8	67-116	0			
Aniline	32.02	10	50	0	64	40-130	0			
Anthracene	43.56	10	50	0	87.1	70-129	0			
Benz(a)anthracene	42.22	10	50	0	84.4	55-131	0			
Benzidine	30.17	10	50	0	60.3	10-115	0			
Hexachloroethane	30.87	10	50	0	61.7	46-115	0			
Indeno(1,2,3-cd)pyrene	48.4	10	50	0	96.8	42-123	0			
Isophorone	39.55	10	50	0	79.1	63-117	0			
N-Nitrosodi-n-propylamine	42.61	10	50	0	85.2	67-115	0			
N-Nitrosodimethylamine	21.15	10	50	0	42.3	28-115	0			
N-Nitrosodiphenylamine	46.31	10	50	0	92.6	72-144	0			
Naphthalene	33.4	10	50	0	66.8	52-115	0			
Nitrobenzene	38.35	10	50	0	76.7	65-115	0			
Pentachlorophenol	70.64	10	100	0	70.6	65-123	0			
Phenanthrene	41.84	10	50	0	83.7	69-119	0			
Phenol	23.79	10	100	0	23.8	16-115	0			
Pyrene	40.12	10	50	0	80.2	51-130	0			
Surr: 2,4,6-Tribromophenol	87.89	10	100	0	87.9	39-153	0			
Surr: 2-Fluorobiphenyl	82.26	10	100	0	82.3	40-147	0			
Surr: 2-Fluorophenol	40.23	10	100	0	40.2	21-110	0			
Surr: 4-Terphenyl-d14	86.41	10	100	0	86.4	39-141	0			
Surr: Nitrobenzene-d5	75.5	10	100	0	75.5	37-140	0			
Surr: Phenol-d6	23.26	10	100	0	23.3	11-100	0			

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E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9560 InstrumentID: SV-2

LCSD Sample ID: SLCSDW1-040712 Test Code: SW8270 Units: µg/L Analysis Date: 07/13/04 16:59
Client ID: Run ID: SV-2_040713A SeqNo: 507358 Prep Date: 7/12/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	31.58	10	50	0	63.2	50-115	31.26	1.01	30	
2,4,5-Trichlorophenol	87.3	10	100	0	87.3	68-128	86.7	0.685	30	
2,4,6-Trichlorophenol	86.39	10	100	0	86.4	66-125	85.39	1.16	30	
2-Methylnaphthalene	33.56	10	50	0	67.1	47-122	34.79	3.61	30	
2-Methylphenol	60.16	10	100	0	60.2	51-115	61.44	2.11	30	
2-Nitroaniline	47.23	10	50	0	94.5	64-128	46.51	1.53	30	
2-Nitrophenol	75.92	10	100	0	75.9	60-119	76.92	1.32	30	
3-Nitroaniline	40.62	10	50	0	81.2	61-118	44.47	9.05	30	
4-Methylphenol	81.3	10	150	0	54.2	44-115	81.14	0.188	30	
4-Nitroaniline	42.15	10	50	0	84.3	61-123	44.56	5.54	30	
4-Nitrophenol	30.34	10	100	0	30.3	17-100	29.12	4.08	30	
Acenaphthene	39.88	10	50	0	79.8	68-115	40.9	2.52	30	
Acenaphthylene	39.7	10	50	0	79.4	67-116	40.88	2.93	30	
Aniline	31.01	10	50	0	62	40-130	32.02	3.2	30	
Anthracene	42.13	10	50	0	84.3	70-129	43.56	3.34	30	
Benz(a)anthracene	41.72	10	50	0	83.4	55-131	42.22	1.2	30	
Benzidine	28.39	10	50	0	56.8	10-115	30.17	6.06	30	
Hexachloroethane	29.4	10	50	0	58.8	46-115	30.87	4.89	30	
Indeno(1,2,3-cd)pyrene	44.19	10	50	0	88.4	42-123	48.4	9.1	30	
Isophorone	38.71	10	50	0	77.4	63-117	39.55	2.15	30	
N-Nitrosodi-n-propylamine	41.17	10	50	0	82.3	67-115	42.61	3.43	30	
N-Nitrosodimethylamine	22.1	10	50	0	44.2	28-115	21.15	4.41	30	
N-Nitrosodiphenylamine	44.6	10	50	0	89.2	72-144	46.31	3.77	30	
Naphthalene	32.74	10	50	0	65.5	52-115	33.4	1.99	30	
Nitrobenzene	38.2	10	50	0	76.4	65-115	38.35	0.387	30	
Pentachlorophenol	72.91	10	100	0	72.9	65-123	70.64	3.15	30	
Phenanthrene	40.12	10	50	0	80.2	69-119	41.84	4.2	30	
Phenol	24.22	10	100	0	24.2	16-115	23.79	1.79	30	
Pyrene	40.25	10	50	0	80.5	51-130	40.12	0.331	30	
Surr: 2,4,6-Tribromophenol	86.61	10	100	0	86.6	39-153	87.89	1.46	30	
Surr: 2-Fluorobiphenyl	81.97	10	100	0	82	40-147	82.26	0.35	30	
Surr: 2-Fluorophenol	39.11	10	100	0	39.1	21-110	40.23	2.82	30	
Surr: 4-Terphenyl-d14	85.17	10	100	0	85.2	39-141	86.41	1.45	30	
Surr: Nitrobenzene-d5	75.33	10	100	0	75.3	37-140	75.5	0.231	30	
Surr: Phenol-d6	23.6	10	100	0	23.6	11-100	23.26	1.46	30	

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E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9560 InstrumentID: SV-2

MS Sample ID: 0407082-18DMS Test Code: SW8270 Units: µg/L Analysis Date: 07/13/04 18:00
Client ID: Run ID: SV-2_040713A SeqNo: 507360 Prep Date: 7/12/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	38.77	11	53.19	0	72.9	50-115	0			
2,4,5-Trichlorophenol	91.48	11	106.4	0	86	68-128	0			
2,4,6-Trichlorophenol	92.28	11	106.4	0	86.7	66-125	0			
2-Methylnaphthalene	39.59	11	53.19	0	74.4	47-122	0			
2-Methylphenol	68.77	11	106.4	0	64.6	51-115	0			
2-Nitroaniline	49.37	11	53.19	0	92.8	64-128	0			
2-Nitrophenol	82.66	11	106.4	0	77.7	60-119	0			
3-Nitroaniline	39.84	11	53.19	0	74.9	61-118	0			
4-Methylphenol	95.14	11	159.6	0	59.6	44-115	0			
4-Nitroaniline	41.31	11	53.19	0	77.7	61-123	0			
4-Nitrophenol	36.34	11	106.4	0	34.2	17-100	0			
Acenaphthene	46.9	11	53.19	0	88.2	68-115	0			
Acenaphthylene	42.53	11	53.19	0	80	67-116	0			
Aniline	31.51	11	53.19	0	59.2	40-130	0			
Anthracene	45.14	11	53.19	0	84.9	70-129	0			
Benz(a)anthracene	44.52	11	53.19	0	83.7	55-131	0			
Benzidine	24.16	11	53.19	0	45.4	10-115	0			
Hexachloroethane	42.45	11	53.19	0	79.8	46-115	0			
Indeno(1,2,3-cd)pyrene	49.91	11	53.19	0	93.8	42-123	0			
Isophorone	41.24	11	53.19	0	77.5	63-117	0			
N-Nitrosodi-n-propylamine	46.57	11	53.19	0	87.5	67-115	0			
N-Nitrosodimethylamine	26.9	11	53.19	0	50.6	28-115	0			
N-Nitrosodiphenylamine	47.19	11	53.19	0	88.7	72-144	0			
Naphthalene	37.95	11	53.19	0	71.4	52-115	0			
Nitrobenzene	42.36	11	53.19	0	79.6	65-115	0			
Pentachlorophenol	71.64	11	106.4	0	67.3	65-123	0			
Phenanthrene	43.67	11	53.19	0	82.1	69-119	0			
Phenol	29.8	11	106.4	0	28	16-115	0			
Pyrene	41.73	11	53.19	0	78.4	51-130	0			
Surr: 2,4,6-Tribromophenol	88.29	11	106.4	0	83	39-153	0			
Surr: 2-Fluorobiphenyl	88.06	11	106.4	0	82.8	40-147	0			
Surr: 2-Fluorophenol	46.77	11	106.4	0	44	21-110	0			
Surr: 4-Terphenyl-d14	88.44	11	106.4	0	83.1	39-141	0			
Surr: Nitrobenzene-d5	81.74	11	106.4	0	76.8	37-140	0			
Surr: Phenol-d6	27.76	11	106.4	0	26.1	11-100	0			

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E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9560 InstrumentID: SV-2

MSD Sample ID: 0407082-18DMSD Test Code: SW8270 Units: µg/L Analysis Date: 07/13/04 18:30
Client ID: Run ID: SV-2_040713A SeqNo: 507361 Prep Date: 7/12/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	38.35	11	53.19	0	72.1	50-115	38.77	1.09	30	
2,4,5-Trichlorophenol	95.8	11	106.4	0	90.1	68-128	91.48	4.61	30	
2,4,6-Trichlorophenol	92.06	11	106.4	0	86.5	66-125	92.28	0.244	30	
2-Methylnaphthalene	39.08	11	53.19	0	73.5	47-122	39.59	1.29	30	
2-Methylphenol	70.25	11	106.4	0	66	51-115	68.77	2.12	30	
2-Nitroaniline	48.77	11	53.19	0	91.7	64-128	49.37	1.21	30	
2-Nitrophenol	83.64	11	106.4	0	78.6	60-119	82.66	1.17	30	
3-Nitroaniline	37.37	11	53.19	0	70.3	61-118	39.84	6.4	30	
4-Methylphenol	94.8	11	159.6	0	59.4	44-115	95.14	0.358	30	
4-Nitroaniline	38.45	11	53.19	0	72.3	61-123	41.31	7.17	30	
4-Nitrophenol	36.01	11	106.4	0	33.8	17-100	36.34	0.923	30	
Acenaphthene	47.64	11	53.19	0	89.6	68-115	46.9	1.56	30	
Acenaphthylene	42.64	11	53.19	0	80.2	67-116	42.53	0.255	30	
Aniline	31.17	11	53.19	0	58.6	40-130	31.51	1.09	30	
Anthracene	45.61	11	53.19	0	85.7	70-129	45.14	1.04	30	
Benz(a)anthracene	45.17	11	53.19	0	84.9	55-131	44.52	1.48	30	
Benzidine	18.51	11	53.19	0	34.8	10-115	24.16	26.6	30	
Hexachloroethane	40.74	11	53.19	0	76.6	46-115	42.45	4.12	30	
Indeno(1,2,3-cd)pyrene	50.25	11	53.19	0	94.5	42-123	49.91	0.68	30	
Isophorone	42.87	11	53.19	0	80.6	63-117	41.24	3.88	30	
N-Nitrosodi-n-propylamine	46.44	11	53.19	0	87.3	67-115	46.57	0.281	30	
N-Nitrosodimethylamine	25.12	11	53.19	0	47.2	28-115	26.9	6.83	30	
N-Nitrosodiphenylamine	47.79	11	53.19	0	89.8	72-144	47.19	1.25	30	
Naphthalene	38.24	11	53.19	0	71.9	52-115	37.95	0.757	30	
Nitrobenzene	42.83	11	53.19	0	80.5	65-115	42.36	1.09	30	
Pentachlorophenol	81.78	11	106.4	0	76.9	65-123	71.64	13.2	30	
Phenanthrene	44.03	11	53.19	0	82.8	69-119	43.67	0.831	30	
Phenol	29.65	11	106.4	0	27.9	16-115	29.8	0.497	30	
Pyrene	42.44	11	53.19	0	79.8	51-130	41.73	1.71	30	
Surr: 2,4,6-Tribromophenol	93.87	11	106.4	0	88.2	39-153	88.29	6.12	30	
Surr: 2-Fluorobiphenyl	87.34	11	106.4	0	82.1	40-147	88.06	0.818	30	
Surr: 2-Fluorophenol	46.17	11	106.4	0	43.4	21-110	46.77	1.28	30	
Surr: 4-Terphenyl-d14	90.02	11	106.4	0	84.6	39-141	88.44	1.78	30	
Surr: Nitrobenzene-d5	80.82	11	106.4	0	76	37-140	81.74	1.14	30	
Surr: Phenol-d6	27.76	11	106.4	0	26.1	11-100	27.76	0.011	30	

The following samples were analyzed in this batch: 0407074-01D

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: **R21831** InstrumentID: **VOA2**

MBLK Sample ID: **VBLKW-0719** Test Code: **SW8260** Units: µg/L Analysis Date: **07/19/04 11:33**

Client ID: Run ID: **VOA2_040719A** SeqNo: **510670** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	ND	5.0								
1,1,2,2-Tetrachloroethane	ND	5.0								
1,1,2-Trichloroethane	ND	5.0								
1,1-Dichloroethane	ND	5.0								
1,1-Dichloroethene	ND	5.0								
1,2-Dichloroethane	ND	5.0								
2-Butanone	ND	10								
2-Chloroethyl vinyl ether	ND	10								
2-Hexanone	ND	10								
4-Methyl-2-pentanone	ND	10								
Acetone	ND	10								
Benzene	ND	5.0								
Bromodichloromethane	ND	5.0								
Bromoform	ND	5.0								
Bromomethane	ND	5.0								
Carbon disulfide	ND	10								
Carbon tetrachloride	ND	5.0								
Chlorobenzene	ND	5.0								
Chloroethane	ND	5.0								
Chloroform	ND	5.0								
Chloromethane	ND	5.0								
cis-1,3-Dichloropropene	ND	5.0								
Dibromochloromethane	ND	5.0								
Ethylbenzene	ND	5.0								
m,p-Xylene	ND	10								
Methylene chloride	ND	10								
Styrene	ND	5.0								
Tetrachloroethene	ND	5.0								
Toluene	ND	5.0								
trans-1,3-Dichloropropene	ND	5.0								
Trichloroethene	ND	5.0								
Vinyl acetate	ND	10								
Vinyl chloride	ND	2.0								
Xylenes, Total	ND	15								
Surr: 1,2-Dichloroethane-d4	42.27	5.0	50	0	84.5	71-126		0		
Surr: 4-Bromofluorobenzene	43.71	5.0	50	0	87.4	74-125		0		
Surr: Dibromofluoromethane	43.99	5.0	50	0	88	73-126		0		
Surr: Toluene-d8	44.34	5.0	50	0	88.7	75-125		0		

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U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21831 InstrumentID: VOA2

LCS Sample ID: VLCSW-0719 Test Code: SW8260 Units: µg/L Analysis Date: 07/19/04 10:42
Client ID: Run ID: VOA2_040719A SeqNo: 510669 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	49.5	5.0	50	0	99	75.2-120	0			
1,1,2,2-Tetrachloroethane	47.64	5.0	50	0	95.3	72.4-121	0			
1,1,2-Trichloroethane	49.05	5.0	50	0	98.1	80-120	0			
1,1-Dichloroethane	40.8	5.0	50	0	81.6	76.9-120	0			
1,1-Dichloroethene	42.24	5.0	50	0	84.5	72.6-123	0			
1,2-Dichloroethane	50.08	5.0	50	0	100	80-120	0			
2-Butanone	98.22	10	100	0	98.2	69-131	0			
2-Chloroethyl vinyl ether	99.78	10	100	0	99.8	60-135	0			
2-Hexanone	109.7	10	100	0	110	55.6-126	0			
4-Methyl-2-pentanone	105.7	10	100	0	106	67.4-121	0			
Acetone	110	10	100	0	110	64.4-140	0			
Benzene	47.36	5.0	50	0	94.7	80-120	0			
Bromodichloromethane	49.67	5.0	50	0	99.3	80-120	0			
Bromoform	52.48	5.0	50	0	105	77.9-121	0			
Bromomethane	46.73	5.0	50	0	93.5	63.3-137	0			
Carbon disulfide	81.78	10	100	0	81.8	74.1-123	0			
Carbon tetrachloride	50.26	5.0	50	0	101	74.7-120	0			
Chlorobenzene	48.77	5.0	50	0	97.5	80-120	0			
Chloroethane	46	5.0	50	0	92	74.7-126	0			
Chloroform	46.23	5.0	50	0	92.5	80-120	0			
Chloromethane	43.9	5.0	50	0	87.8	64.5-132	0			
cis-1,3-Dichloropropene	51.24	5.0	50	0	102	80-120	0			
Dibromochloromethane	50.88	5.0	50	0	102	80-120	0			
Ethylbenzene	49.39	5.0	50	0	98.8	80-120	0			
m,p-Xylene	98.82	10	100	0	98.8	80-120	0			
Methylene chloride	41.13	10	50	0	82.3	76.2-120	0			
Styrene	50.69	5.0	50	0	101	80-120	0			
Tetrachloroethene	51.64	5.0	50	0	103	68.5-130	0			
Toluene	48.46	5.0	50	0	96.9	80-120	0			
trans-1,3-Dichloropropene	52.38	5.0	50	0	105	80-120	0			
Trichloroethene	50.2	5.0	50	0	100	78.9-120	0			
Vinyl acetate	106.1	10	100	0	106	62.4-133	0			
Vinyl chloride	46.69	2.0	50	0	93.4	72.7-128	0			
Xylenes, Total	148.4	15	150	0	98.9	80-120	0			
Surr: 1,2-Dichloroethane-d4	40.65	5.0	50	0	81.3	71-126	0			
Surr: 4-Bromofluorobenzene	46.15	5.0	50	0	92.3	74-125	0			
Surr: Dibromofluoromethane	41.66	5.0	50	0	83.3	73-126	0			
Surr: Toluene-d8	45.05	5.0	50	0	90.1	75-125	0			

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CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21831 InstrumentID: VOA2

MS Sample ID: 0407154-01AMS Test Code: SW8260 Units: µg/L Analysis Date: 07/19/04 14:05
Client ID: Run ID: VOA2_040719A SeqNo: 510672 Prep Date: DF: 250

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	12140	1,200	12500	0	97.1	75.2-120	0			
1,1,2,2-Tetrachloroethane	11150	1,200	12500	0	89.2	72.4-121	0			
1,1,2-Trichloroethane	12470	1,200	12500	0	99.8	80-120	0			
1,1-Dichloroethane	11610	1,200	12500	0	92.9	76.9-120	0			
1,1-Dichloroethene	9668	1,200	12500	0	77.3	72.6-123	0			
1,2-Dichloroethane	12100	1,200	12500	0	96.8	80-120	0			
2-Butanone	24170	2,500	25000	0	96.7	69-131	0			
2-Chloroethyl vinyl ether	23350	2,500	25000	0	93.4	60-135	0			
2-Hexanone	28460	2,500	25000	0	114	55.6-126	0			
4-Methyl-2-pentanone	26920	2,500	25000	0	108	67.4-121	0			
Acetone	28630	2,500	25000	0	115	64.4-140	0			
Benzene	12840	1,200	12500	1617	89.8	80-120	0			
Bromodichloromethane	12110	1,200	12500	0	96.9	80-120	0			
Bromoform	12900	1,200	12500	0	103	77.9-121	0			
Bromomethane	10540	1,200	12500	0	84.3	63.3-137	0			
Carbon disulfide	21710	2,500	25000	0	86.8	74.1-123	0			
Carbon tetrachloride	15530	1,200	12500	3701	94.7	74.7-120	0			
Chlorobenzene	17760	1,200	12500	6761	88	80-120	0			
Chloroethane	11150	1,200	12500	0	89.2	74.7-126	0			
Chloroform	27960	1,200	12500	16690	90.2	80-120	0			
Chloromethane	11340	1,200	12500	0	90.7	64.5-132	0			
cis-1,3-Dichloropropene	12280	1,200	12500	0	98.3	80-120	0			
Dibromochloromethane	12560	1,200	12500	0	101	80-120	0			
Ethylbenzene	12120	1,200	12500	0	97	80-120	0			
m,p-Xylene	24660	2,500	25000	0	98.7	80-120	0			
Methylene chloride	11050	2,500	12500	251	86.4	76.2-120	0			
Styrene	12310	1,200	12500	0	98.5	80-120	0			
Tetrachloroethene	12830	1,200	12500	307.5	100	68.5-130	0			
Toluene	11740	1,200	12500	0	93.9	80-120	0			
trans-1,3-Dichloropropene	12720	1,200	12500	0	102	80-120	0			
Trichloroethene	13050	1,200	12500	382.7	101	78.9-120	0			
Vinyl acetate	16340	2,500	25000	0	65.4	62.4-133	0			
Vinyl chloride	11910	500	12500	0	95.2	72.7-128	0			
Xylenes, Total	36910	3,800	37500	0	98.4	80-120	0			
Surr: 1,2-Dichloroethane-d4	10910	1,200	12500	0	87.3	71-126	0			
Surr: 4-Bromofluorobenzene	12050	1,200	12500	0	96.4	74-125	0			
Surr: Dibromofluoromethane	10810	1,200	12500	0	86.5	73-126	0			
Surr: Toluene-d8	11660	1,200	12500	0	93.3	75-125	0			

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CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21831 InstrumentID: VOA2

MSD Sample ID: 0407154-01AMSD Test Code: SW8260 Units: µg/L Analysis Date: 07/19/04 14:33
Client ID: Run ID: VOA2_040719A SeqNo: 510673 Prep Date: DF: 250

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	12300	1,200	12500	0	98.4	75.2-120	12140	1.31	20	
1,1,2,2-Tetrachloroethane	11100	1,200	12500	0	88.8	72.4-121	11150	0.381	20	
1,1,2-Trichloroethane	12660	1,200	12500	0	101	80-120	12470	1.46	20	
1,1-Dichloroethane	10890	1,200	12500	0	87.2	76.9-120	11610	6.37	20	
1,1-Dichloroethene	10340	1,200	12500	0	82.7	72.6-123	9668	6.67	20	
1,2-Dichloroethane	12510	1,200	12500	0	100	80-120	12100	3.41	20	
2-Butanone	25510	2,500	25000	0	102	69-131	24170	5.39	20	
2-Chloroethyl vinyl ether	23900	2,500	25000	0	95.6	60-135	23350	2.29	20	
2-Hexanone	29060	2,500	25000	0	116	55.6-126	28460	2.07	20	
4-Methyl-2-pentanone	27690	2,500	25000	0	111	67.4-121	26920	2.82	20	
Acetone	28630	2,500	25000	0	115	64.4-140	28630	0.0181	20	
Benzene	13310	1,200	12500	1617	93.5	80-120	12840	3.55	20	
Bromodichloromethane	12400	1,200	12500	0	99.2	80-120	12110	2.29	20	
Bromoform	13180	1,200	12500	0	105	77.9-121	12900	2.16	20	
Bromomethane	11380	1,200	12500	0	91	63.3-137	10540	7.65	20	
Carbon disulfide	22610	2,500	25000	0	90.4	74.1-123	21710	4.08	20	
Carbon tetrachloride	16060	1,200	12500	3701	98.9	74.7-120	15530	3.35	20	
Chlorobenzene	18250	1,200	12500	6761	91.9	80-120	17760	2.71	20	
Chloroethane	11550	1,200	12500	0	92.4	74.7-126	11150	3.48	20	
Chloroform	27240	1,200	12500	16690	84.4	80-120	27960	2.59	20	
Chloromethane	11380	1,200	12500	0	91.1	64.5-132	11340	0.38	20	
cis-1,3-Dichloropropene	12670	1,200	12500	0	101	80-120	12280	3.12	20	
Dibromochloromethane	12910	1,200	12500	0	103	80-120	12560	2.71	20	
Ethylbenzene	12480	1,200	12500	0	99.8	80-120	12120	2.91	20	
m,p-Xylene	25180	2,500	25000	0	101	80-120	24660	2.07	20	
Methylene chloride	10390	2,500	12500	251	81.1	76.2-120	11050	6.19	20	
Styrene	12620	1,200	12500	0	101	80-120	12310	2.5	20	
Tetrachloroethene	13110	1,200	12500	307.5	102	68.5-130	12830	2.1	20	
Toluene	12160	1,200	12500	0	97.3	80-120	11740	3.54	20	
trans-1,3-Dichloropropene	12790	1,200	12500	0	102	80-120	12720	0.554	20	
Trichloroethene	13550	1,200	12500	382.7	105	78.9-120	13050	3.73	20	
Vinyl acetate	16770	2,500	25000	0	67.1	62.4-133	16340	2.6	20	
Vinyl chloride	11890	500	12500	0	95.1	72.7-128	11910	0.11	20	
Xylenes, Total	37950	3,800	37500	0	101	80-120	36910	2.78	20	
Surr: 1,2-Dichloroethane-d4	10830	1,200	12500	0	86.7	71-126	10910	0.714	20	
Surr: 4-Bromofluorobenzene	12050	1,200	12500	0	96.4	74-125	12050	0.0324	20	
Surr: Dibromofluoromethane	11040	1,200	12500	0	88.3	73-126	10810	2.07	20	
Surr: Toluene-d8	11800	1,200	12500	0	94.4	75-125	11660	1.17	20	

The following samples were analyzed in this batch: 0407074-01A

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J - Analyte detected below quantitation limits
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CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21602 InstrumentID: WetChem

LCS Sample ID: WLCSW1-070804 Test Code: E150.1 Units: pH units Analysis Date: 07/08/04 0:00
Client ID: Run ID: WETCHEM_040708A SeqNo: 504779 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	6.04	0.10	6	0	101	85-115	0			

DUP Sample ID: 0407074-01CDUP Test Code: E150.1 Units: pH units Analysis Date: 07/08/04 0:00
Client ID: Inj Wells Run ID: WETCHEM_040708A SeqNo: 504783 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	6.91	0.10	0	0	0	0-0	6.92	0.145	20	

The following samples were analyzed in this batch: 0407074-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21620 InstrumentID: WetChem

MBLK Sample ID: WBLKW1-070804 Test Code: E160.1 Units: mg/L Analysis Date: 07/08/04 0:00
Client ID: Run ID: WETCHEM_040708F SeqNo: 505164 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	ND	10								

LCS Sample ID: WLCSW1-070804 Test Code: E160.1 Units: mg/L Analysis Date: 07/08/04 0:00
Client ID: Run ID: WETCHEM_040708F SeqNo: 505165 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	1058	10	1000	0	106	80-120	0			

DUP Sample ID: 0407068-01EDUP Test Code: E160.1 Units: mg/L Analysis Date: 07/08/04 0:00
Client ID: Run ID: WETCHEM_040708F SeqNo: 505171 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	25900	10	0	0	0	0-0	25620	1.07	20	

The following samples were analyzed in this batch: 0407074-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21657 InstrumentID: WetChem

MBLK Sample ID: WBLKW-071204 Test Code: E310.1 Units: mg/L Analysis Date: 07/12/04 0:00
Client ID: Run ID: WETCHEM_040712B SeqNo: 506101 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	ND	5.0								
Alkalinity, Carbonate (As CaCO3)	ND	5.0								
Alkalinity, Hydroxide (As CaCO3)	ND	5.0								
Alkalinity, Total (As CaCO3)	ND	5.0								

LCS Sample ID: WLCSW1-071204 Test Code: E310.1 Units: mg/L Analysis Date: 07/12/04 0:00
Client ID: Run ID: WETCHEM_040712B SeqNo: 506102 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	980.7	5.0	0	0.9806	0	0-0	0			
Alkalinity, Carbonate (As CaCO3)	ND	5.0	0	0	0	0-0	0			
Alkalinity, Hydroxide (As CaCO3)	ND	5.0	0	0	0	0-0	0			
Alkalinity, Total (As CaCO3)	980.7	5.0	1000	0	98.1	80-120	0			

DUP Sample ID: 0407076-01BDUP Test Code: E310.1 Units: mg/L Analysis Date: 07/12/04 0:00
Client ID: Run ID: WETCHEM_040712B SeqNo: 506130 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	421.7	5.0	0	0	0	0-0	421.7	0	20	
Alkalinity, Carbonate (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	20	
Alkalinity, Hydroxide (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	20	
Alkalinity, Total (As CaCO3)	421.7	5.0	0	0	0	0-0	421.7	0	20	

The following samples were analyzed in this batch: 0407074-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: **R21661** InstrumentID: **WetChem**

MBLK Sample ID: **WBLKW1-071204** Test Code: **E120.1** Units: **µmhos/cm** Analysis Date: **07/12/04 0:00**
Client ID: Run ID: **WETCHEM_040712D** SeqNo: **506172** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	ND	1.0								

LCS Sample ID: **WLCSW1-071204** Test Code: **E120.1** Units: **µmhos/cm** Analysis Date: **07/12/04 0:00**
Client ID: Run ID: **WETCHEM_040712D** SeqNo: **506173** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	1440	1.0	1409	0	102	80-120	0			

DUP Sample ID: **0407074-01CDUP** Test Code: **E120.1** Units: **µmhos/cm** Analysis Date: **07/12/04 0:00**
Client ID: **Inj Wells** Run ID: **WETCHEM_040712D** SeqNo: **506175** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	7190	1.0	0	0	0	0-0	7200	0.139	20	

The following samples were analyzed in this batch: 0407074-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21698 InstrumentID: IC201

MBLK Sample ID: WBLKW1-071204 Test Code: E300 Units: mg/L Analysis Date: 07/12/04 23:08
Client ID: Run ID: IC201_040712B SeqNo: 506929 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	0.50								
Sulfate	ND	1.0								
Surr: Dichloroacetic acid (surr)	5.26	0.10	5	0	105	80-120		0		

LCS Sample ID: WLCSW1-071204 Test Code: E300 Units: mg/L Analysis Date: 07/12/04 23:37
Client ID: Run ID: IC201_040712B SeqNo: 506930 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.89	0.50	10	0	98.9	80-120		0		
Sulfate	10.41	1.0	10	0	104	80-120		0		
Surr: Dichloroacetic acid (surr)	5.58	0.10	5	0	112	80-120		0		

LCSD Sample ID: WLCSW1DUP-071 Test Code: E300 Units: mg/L Analysis Date: 07/13/04 0:05
Client ID: Run ID: IC201_040712B SeqNo: 506931 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.9	0.50	10	0	99	80-120		0		
Sulfate	10.43	1.0	10	0	104	80-120		0		
Surr: Dichloroacetic acid (surr)	5.6	0.10	5	0	112	80-120		0		

MS Sample ID: 0407016-02AMS Test Code: E300 Units: mg/L Analysis Date: 07/13/04 1:31
Client ID: Run ID: IC201_040712B SeqNo: 506934 Prep Date: DF: 100

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	3695	50	1000	2719	97.6	75-125		0		
Sulfate	1255	100	1000	273	98.2	75-125		0		
Surr: Dichloroacetic acid (surr)	528	10	500	0	106	80-120		0		

MSD Sample ID: 0407016-02AMSD Test Code: E300 Units: mg/L Analysis Date: 07/13/04 1:59
Client ID: Run ID: IC201_040712B SeqNo: 506935 Prep Date: DF: 100

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	3686	50	1000	2719	96.7	75-125	3695	0.244	20	
Sulfate	1255	100	1000	273	98.2	75-125	1255	0	20	
Surr: Dichloroacetic acid (surr)	534	10	500	0	107	80-120	528	1.13	20	

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21698 InstrumentID: IC201

DUP Sample ID: 0407016-02ADUP Test Code: E300 Units: mg/L Analysis Date: 07/13/04 1:02
Client ID: Run ID: IC201_040712B SeqNo: 506933 Prep Date: DF: 100

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	2515	50	0	0	0	0-0	2719	7.8	20	
Sulfate	259	100	0	0	0	0-0	273	5.26	20	
Surr: Dichloroacetic acid (surr)	538	10	500	0	108	80-120	571	5.95	20	

DUP Sample ID: 0407076-04BDUP Test Code: E300 Units: mg/L Analysis Date: 07/13/04 11:01
Client ID: Run ID: IC201_040712B SeqNo: 506938 Prep Date: DF: 50

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	844	25	0	0	0	0-0	845.5	0.178	20	
Sulfate	2172	50	0	0	0	0-0	2174	0.115	20	
Surr: Dichloroacetic acid (surr)	279	5.0	250	0	112	80-120	284.5	1.95	20	

DUP Sample ID: 0407076-07BDUP Test Code: E300 Units: mg/L Analysis Date: 07/13/04 14:49
Client ID: Run ID: IC201_040712B SeqNo: 506944 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	3191	0.50	0	0	0	0-0	3183	0.227	20	E
Sulfate	4941	1.0	0	0	0	0-0	4912	0.6	20	E
Surr: Dichloroacetic acid (surr)	4.38	0.10	5	0	87.6	80-120	5.6	24.4	20	R

The following samples were analyzed in this batch: 0407074-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

e-Lab
QUALITY • INTEGRITY • SERVICE

☐ e-Lab, Inc.
10450 Stancliff Rd. #210
Houston, Texas 77099
(Tel) 281.530.5656
(Fax) 281.530.5887

Chain of Custody Form

Page ____ of ____

☐ e-Lab, Inc.
3352 128th Avenue
Holland, Michigan 49424
(Tel) 616.399.6070
(Fax) 616.399.6185

e-Lab Project Manager: | e-Lab Work Order #: 0406041

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Injection Wells	A	VOC (8260)
Work Order		Project Number		B	SVOC (8270)
Company Name	Navajo Refining Company	Bill To Company	Navajo Refining Company	C	Tot Metals WQCC + Cations (6020)
Send Report To	Charlie Plymale	Invoice Attn	Charlie Plymale	D	Anions: Cl, SO4 (300)
Address	P.O. Box 159	Address	P.O. Box 159	E	Alkalinity (310.1)
				F	pH
City/State/Zip	Artesia, New Mexico 88211	City/State/Zip	Artesia, New Mexico 88211	G	TDS
Phone	(505) 748-3311	Phone	(505) 748-3311	H	Conductivity
Fax	(505) 746-5421	Fax	(505) 746-5421	I	Uranium
e-Mail Address		e-Mail Address		J	RCI

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	Inj. Wells	7/7/04	900			11	X	X	X	X	X	X	X	X	X	X	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Charlie Plymale | Shipment Method: FedEx | Required Turnaround Time: (Check Box) ☐ STD 10 WK Days ☐ 5 WK Days ☐ 2 WK Days ☐ 24 hour ☐ Other 10 Day TAT | Results Due Date:

Relinquished by:	Date: 7/7/04	Time: 1615	Received by:	Notes:		
Relinquished by:	Date:	Time:	Received by (Laboratory):	e-lab Cooler ID	Cooler Temp.	QC Package: (Check One Box Below) ☑ Level II Std QC ☐ TRRP Checklist
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory): 7/8/04			☐ Level III Std QC/Raw Data ☐ TRRP Level IV ☐ Level IV SW846/CLP ☐ Other

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to e-Lab, Inc.
2. Unless ... wise agreed in a formal contract, services provided by e-Lab, Inc. are ... limited to the ...

Copyright 2003 by e-Lab, Inc.

e-Lab Analytical, Inc.

Sample Receipt Checklist

Client Name NAVAJO REFINING Date/Time Received: 7/8/2004 8:40:00 AM

Work Order Number 0407074 Received by: FSM

Checklist completed by RICHARD SIMCHER 7-8-04 (Signature / Date) Reviewed by (Initials) 7/9/04 (Date)

Matrix: W Carrier name FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	3.0c	002	
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐

Adjusted? _____ Checked by _____

Login Notes: Trip blank not on COC; logged in without analysis.

Any No and/or NA (not applicable) response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

e-Lab, Inc

Date: *July 19, 2004*

CLIENT: e-Lab, Inc
Project: 0407074
Work Order: *0407128*

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0407128-01	0407074-01E	Water		7/7/2004 09:00	7/9/2004 10:00	☐

e-Lab, Inc

Date: *July 19, 2004*

CLIENT: e-Lab, Inc
Project: 0407074
Work Order: 0407128

Lab ID: 0407128-01A
Client Sample ID: 0407074-01E
Collection Date: 7/7/2004 9:00:00 AM
Matrix: WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
CYANIDE, REACTIVE			**EPA 7.3.3.2**			Analyst: KAE
Cyanide, Reactive	ND	0.0300		mg/Kg	1	7/16/2004
FLASHPOINT, P-M CLOSED-CUP			**ASTM D93**			Analyst: MB
Flashpoint, P-M Closed-cup	>200			°F	1	7/16/2004
SULFIDE, REACTIVE			**EPA 7.3.4.2**			Analyst: KAE
Sulfide, Reactive	ND	40.0		mg/Kg	1	7/16/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time

e-Lab, Inc

CLIENT: e-Lab, Inc
Work Order: 0407128
Project: 0407074

Date: *Jul 19 2004*

QC BATCH REPORT

Batch ID: **R22476** InstrumentID: **WETCHEM**

LCS Sample ID: **WLCSW1-071504** Test Code: **ASTM D93** Units: **°F** Analysis Date **07/16/04 0:00**

Client ID: Run ID: **WETCHEM_040716G** SeqNo: **329758** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Flashpoint, P-M Closed-cup	80	0	81	0	98.8	97.5-102.4		0		

The following samples were analyzed in this batch: 0407128-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: e-Lab, Inc
Work Order: 0407128
Project: 0407074

QC BATCH REPORT

Batch ID: R22479 InstrumentID: WETCHEM

MBLK Sample ID: **WBLKW1-071504** Test Code: **EPA 7.3.3.2** Units: **mg/Kg** Analysis Date **07/16/04 0:00**

Client ID: Run ID: **WETCHEM_040716I** SeqNo: **329826** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	ND	0.030								

LCS Sample ID: **WLCSW1-071504** Test Code: **EPA 7.3.3.2** Units: **mg/Kg** Analysis Date **07/16/04 0:00**

Client ID: Run ID: **WETCHEM_040716I** SeqNo: **329827** Prep Date: DF: **25**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	4.238	0.75	19.71	0	21.5	5-100		0		

The following samples were analyzed in this batch: 0407128-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: e-Lab, Inc
Work Order: 0407128
Project: 0407074

QC BATCH REPORT

Batch ID: R22482 InstrumentID: WETCHEM

MBLK Sample ID: WBLKW1-071604 Test Code: EPA 7.3.4.2 Units: mg/Kg Analysis Date 07/16/04 0:00

Client ID: Run ID: WETCHEM_040716L SeqNo: 329840 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide, Reactive	ND	40								

The following samples were analyzed in this batch: 0407128-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

040725

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Date: 4/14/03, 2003
Work Order: 3781
Due Date: 7/25/2003

Accutest
Houston, TX 77054
Tel: (713)271-4700
Fax: (713)660-0910

Client Information		Project Information		Requested Analysis (See TEST CODE sheet)
Purchase Order		Project Name	Q407075	A: Cyanide, Reactive (SW-846)
Work Order		Project Number		B: Sulfide, Reactive (SW-846)
Company Name	e-Lab Analytical, Inc.	Bill To Company	e-Lab Analytical, Inc.	C: Flashpoint (SW-846)
Send Report To	Jeffery Dickson	Invoice To	Accounts Payable	D:
Address	7300 Hudson Bend Blvd., Suite 200	Address	7300 Hudson Bend Blvd., Suite 200	E:
				F:
City/State/Zip	Houston, Texas 77059-4511	City/State/Zip	Houston, Texas 77059-4511	G:
Phone	(281) 530-5656	Phone	(281) 530-5656	H:
Fax	(281) 530-5851	Fax	(281) 530-5887	I:
e-Mail Address				

Sample ID	Matrix	Collection Date	Bottle	A	B	C	D	E	F	G	H	I
MW-2 [Wells]	Water	7/16/03 9:00	40 VOA/DAT	X	X	X						

Comments:

Relinquished by:	Date/Time:	Received by:	Date/Time:	Cooler #:	Special Conditions:
	7/16/03		7/16/03		

6

e-Lab, Inc

Sample Receipt Checklist

Client Name ELAB-HOU

Date/Time Received: 7/9/2004 10:00:00 AM

Work Order Number 0407128

Received by: TL

Checklist completed by [signature] 7/9/04 (Signature / Date)

Reviewed by [initials] 7/9/04 (Initials / Date)

Matrix:

Carrier name FedEx

Shipping container/cooler in good condition?	Yes ✓	No	Not Present
Custody seals intact on shipping container/cooler?	Yes ✓	No	Not Present
Custody seals intact on sample bottles?	Yes	No	Not Present ✓
Chain of custody present?	Yes ✓	No	
Chain of custody signed when relinquished and received?	Yes ✓	No	
Chain of custody agrees with sample labels?	Yes ✓	No	
Samples in proper container/bottle?	Yes ✓	No	
Sample containers intact?	Yes ✓	No	
Sufficient sample volume for indicated test?	Yes ✓	No	
All samples received within holding time?	Yes ✓	No	
Container/Temp Blank temperature in compliance?	Yes ✓	No	
Temperature(s)/Thermometer(s):	1.6 C		
Water - VOA vials have zero headspace?	Yes	No	No VOA vials submitted ✓
Water - pH acceptable upon receipt?	Yes ✓	No	N/A

Adjusted? Checked b

Login Notes:

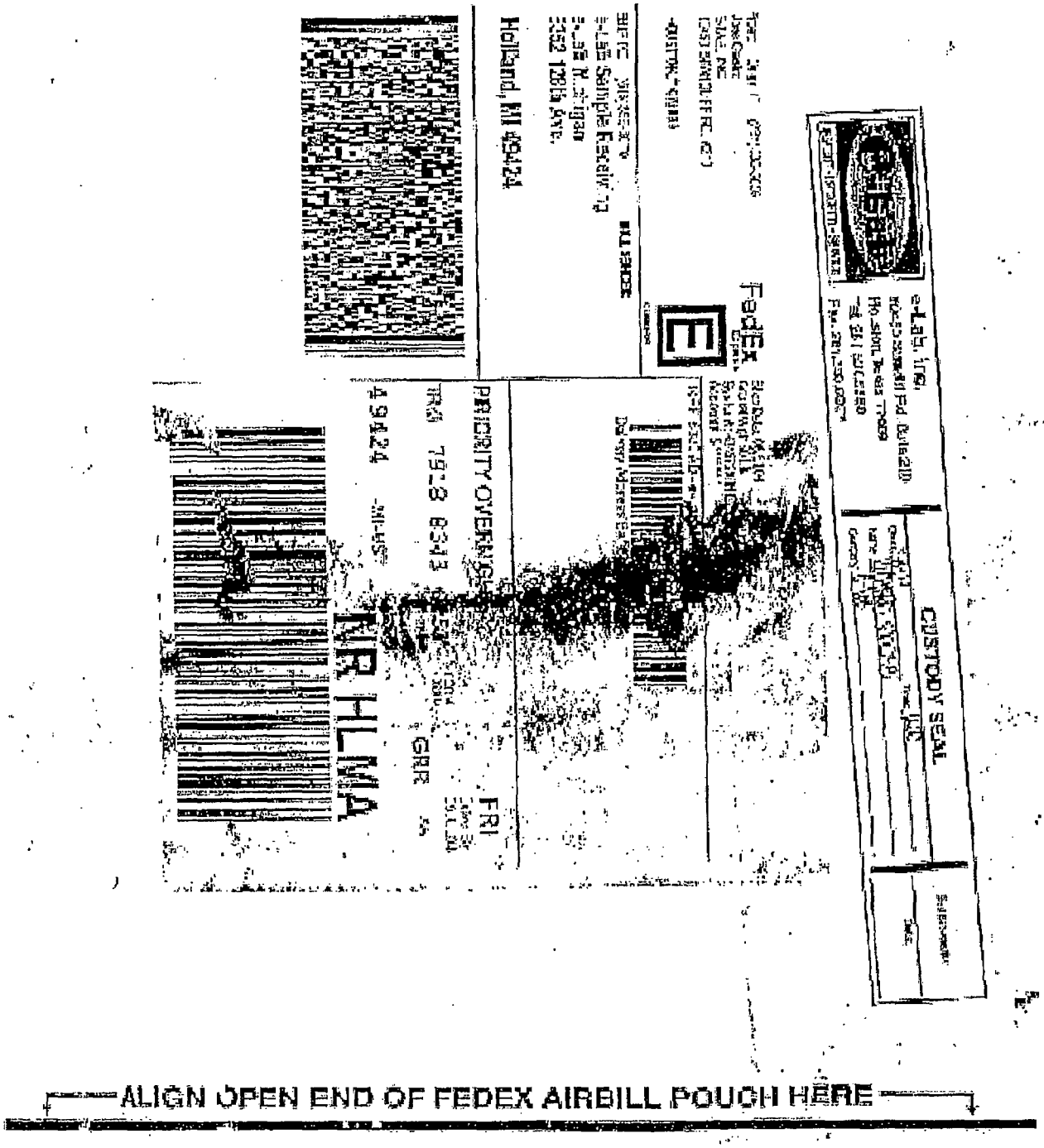
Any No and/or NA (not applicable) response must be detailed in the comments section below.

Client contacted | Date contacted: | Person contacted

Contacted by: | Regarding:

Comments:

Corrective Action



ALIGN OPEN END OF FEDEX AIRBILL POUCH HERE

e-Lab Analytical, Inc.

10450 Stancliff Rd, Suite 210 Houston, Texas 77099-4338 281-530-5656 Fax 281-530-5887

December 23, 2004

Jeff Byrd
Navajo Refining Company
P.O. Box 159
Artesia, New Mexico 88211

Tel: (505) 746-5468
Fax: (505) 746-5421

Re: Injection Wells

Work Order : **0412005**

Dear Jeff Byrd,

e-Lab Analytical, Inc. received 1 sample on 12/1/2004 9:05:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by e-Lab Analytical, Inc. and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by e-Lab Analytical, Inc. The total number of pages in this report is 40.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Jeffrey L Croston

Electronically approved by: Jeffrey L Croston

Jeffrey L Croston

e-Lab Analytical, Inc.

Date: *December 23, 2004*

CLIENT: Navajo Refining Company
Project: Injection Wells
Work Order: 0412005

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0412005-01	Inj Wells	Water		11/30/2004 07:30	12/1/2004 09:05	☐

e-Lab Analytical, Inc. **Date:** *December 23, 2004*

CLIENT: Navajo Refining Company
Project: Injection Wells
Work Order: 0412005

Case Narrative

Batch 11292 Metals MS/MSD was an unrelated sample.

Batch 11279 Semivolatiles MS/MSD were unrelated sample.

Batch R25184 Volatiles MS/MSD was an unrelated sample.

e-Lab Analytical, Inc.

Date: *December 23, 2004*

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells
Lab ID: 0412005-01

Client Sample ID: Inj Wells
Collection Date: 11/30/2004 7:30:00 AM
Matrix: WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
MERCURY, TOTAL		**SW7470**			Prep Date: **12/7/2004**	Analyst: **JCJ**
Mercury	ND	0.000200		mg/L	1	12/8/2004 4:29:34 PM
ICP METALS, TOTAL		**SW6020**			Prep Date: **12/3/2004**	Analyst: **SA**
Aluminum	0.0414	0.0100		mg/L	1	12/10/2004 9:00:00 PM
Arsenic	0.193	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Barium	0.0187	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Beryllium	ND	0.00200		mg/L	1	12/10/2004 9:00:00 PM
Boron	0.211	0.200		mg/L	10	12/9/2004 9:13:00 PM
Cadmium	ND	0.00100		mg/L	1	12/10/2004 9:00:00 PM
Calcium	172	25.0		mg/L	50	12/9/2004 5:23:00 PM
Chromium	ND	0.00200		mg/L	1	12/10/2004 9:00:00 PM
Cobalt	0.00208	0.00200		mg/L	1	12/10/2004 9:00:00 PM
Copper	0.00888	0.00200		mg/L	1	12/10/2004 9:00:00 PM
Iron	0.304	0.200		mg/L	1	12/10/2004 9:00:00 PM
Lead	ND	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Magnesium	22.7	0.200		mg/L	1	12/10/2004 9:00:00 PM
Manganese	0.0658	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Molybdenum	0.00632	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Nickel	0.0286	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Potassium	26.6	0.200		mg/L	1	12/10/2004 9:00:00 PM
Selenium	0.300	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Silver	ND	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Sodium	1,880	10.0		mg/L	50	12/9/2004 5:23:00 PM
Vanadium	0.0117	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Zinc	0.0541	0.00500		mg/L	1	12/10/2004 9:00:00 PM
SEMIVOLATILE ORGANICS BY GC/MS		**SW8270**			Prep Date: **12/1/2004**	Analyst: **HV**
1,2,4-Trichlorobenzene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
2,4,5-Trichlorophenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
2,4,6-Trichlorophenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
2-Methylnaphthalene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
2-Methylphenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
2-Nitroaniline	ND	11		µg/L	1	12/3/2004 10:18:00 PM
2-Nitrophenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
3&4-Methylphenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
3-Nitroaniline	ND	11		µg/L	1	12/3/2004 10:18:00 PM
4-Nitroaniline	ND	11		µg/L	1	12/3/2004 10:18:00 PM
4-Nitrophenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Acenaphthene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Acenaphthylene	ND	11		µg/L	1	12/3/2004 10:18:00 PM

Qualifiers:

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P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time

e-Lab Analytical, Inc.

Date: *December 23, 2004*

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells
Lab ID: 0412005-01

Client Sample ID: Inj Wells
Collection Date: 11/30/2004 7:30:00 AM
Matrix: WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
Aniline	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Anthracene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Benz(a)anthracene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Benzidine	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Hexachloroethane	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Indeno(1,2,3-cd)pyrene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Isophorone	ND	11		µg/L	1	12/3/2004 10:18:00 PM
N-Nitrosodi-n-propylamine	ND	11		µg/L	1	12/3/2004 10:18:00 PM
N-Nitrosodimethylamine	ND	11		µg/L	1	12/3/2004 10:18:00 PM
N-Nitrosodiphenylamine	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Naphthalene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Nitrobenzene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Pentachlorophenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Phenanthrene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Phenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Pyrene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Surr: 2,4,6-Tribromophenol	108	39-153		%REC	1	12/3/2004 10:18:00 PM
Surr: 2-Fluorobiphenyl	89.2	40-147		%REC	1	12/3/2004 10:18:00 PM
Surr: 2-Fluorophenol	46.8	21-110		%REC	1	12/3/2004 10:18:00 PM
Surr: 4-Terphenyl-d14	93.6	39-141		%REC	1	12/3/2004 10:18:00 PM
Surr: Nitrobenzene-d5	88.3	37-140		%REC	1	12/3/2004 10:18:00 PM
Surr: Phenol-d6	24.9	11-100		%REC	1	12/3/2004 10:18:00 PM
VOLATILES BY GC/MS		**SW8260**				Analyst: **PC**
1,1,1-Trichloroethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
1,1,2-Trichloroethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
1,1-Dichloroethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
1,1-Dichloroethene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
1,2-Dichloroethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
2-Butanone	ND	10		µg/L	1	12/10/2004 7:44:00 PM
2-Chloroethyl vinyl ether	ND	10		µg/L	1	12/10/2004 7:44:00 PM
2-Hexanone	ND	10		µg/L	1	12/10/2004 7:44:00 PM
4-Methyl-2-pentanone	ND	10		µg/L	1	12/10/2004 7:44:00 PM
Acetone	39	10		µg/L	1	12/10/2004 7:44:00 PM
Benzene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Bromodichloromethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Bromoform	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Bromomethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Carbon disulfide	ND	10		µg/L	1	12/10/2004 7:44:00 PM
Carbon tetrachloride	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
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B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time

e-Lab Analytical, Inc.

Date: *December 23, 2004*

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells
Lab ID: 0412005-01

Client Sample ID: Inj Wells
Collection Date: 11/30/2004 7:30:00 AM
Matrix: WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
Chlorobenzene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Chloroethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Chloroform	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Chloromethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
cis-1,3-Dichloropropene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Dibromochloromethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Ethylbenzene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
m,p-Xylene	ND	10		µg/L	1	12/10/2004 7:44:00 PM
Methylene chloride	ND	10		µg/L	1	12/10/2004 7:44:00 PM
Styrene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Tetrachloroethene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Toluene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
trans-1,3-Dichloropropene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Trichloroethene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Vinyl acetate	ND	10		µg/L	1	12/10/2004 7:44:00 PM
Vinyl chloride	ND	2.0		µg/L	1	12/10/2004 7:44:00 PM
Xylenes, Total	ND	15		µg/L	1	12/10/2004 7:44:00 PM
Surr: 1,2-Dichloroethane-d4	105	71-126		%REC	1	12/10/2004 7:44:00 PM
Surr: 4-Bromofluorobenzene	80.8	74-125		%REC	1	12/10/2004 7:44:00 PM
Surr: Dibromofluoromethane	96.4	73-126		%REC	1	12/10/2004 7:44:00 PM
Surr: Toluene-d8	80.4	75-125		%REC	1	12/10/2004 7:44:00 PM
FLASHPOINT		**SW1010**				Analyst: **MAG**
Ignitability	>196	50		°F	1	12/6/2004
CYANIDE, REACTIVE		**SW-846**				Analyst: **MAG**
Reactive Cyanide	ND	0.0300		mg/Kg	1	12/2/2004
SULFIDE, REACTIVE		**SW-846**				Analyst: **MAG**
Reactive Sulfide	ND	40.0		mg/Kg	1	12/2/2004
ANIONS BY ION CHROMATOGRAPHY		**E300**				Analyst: **MG**
Chloride	1,200	50.0		mg/L	100	12/8/2004 11:32:00 PM
Sulfate	2,450	100		mg/L	100	12/8/2004 11:32:00 PM
Surr: Dichloroacetic acid (surr)	102	80-120		%REC	100	12/8/2004 11:32:00 PM
ALKALINITY		**E310.1**				Analyst: **IGF**
Alkalinity, Bicarbonate (As CaCO3)	132	5.00		mg/L	1	12/6/2004
Alkalinity, Carbonate (As CaCO3)	ND	5.00		mg/L	1	12/6/2004
Alkalinity, Hydroxide (As CaCO3)	ND	5.00		mg/L	1	12/6/2004
Alkalinity, Total (As CaCO3)	132	5.00		mg/L	1	12/6/2004
CONDUCTIVITY		**E120.1**				Analyst: **IGF**
Specific Conductance	6,350	1.00		µmhos/cm	1	12/3/2004

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e-Lab Analytical, Inc.

Date: *December 23, 2004*

CLIENT:	Navajo Refining Company	**Client Sample ID:**	Inj Wells
Work Order:	0412005	**Collection Date:**	11/30/2004 7:30:00 AM
Project:	Injection Wells		
Lab ID:	0412005-01	**Matrix:**	WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
PH		E150.1				Analyst: IGF
pH	7.19	0.100		pH units	1	12/1/2004
TOTAL DISSOLVED SOLIDS		E160.1				Analyst: MG
Total Dissolved Solids (Residue, Filterable)	4,940	10.0		mg/L	1	12/3/2004

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	P - Dual Column results percent difference > 40%
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	H - Analyzed outside of Hold Time

e-Lab Analytical, Inc.

CLIENT: Navajo Refining Company

Work Order: 0412005

Project: Injection Wells

Date: *Dec 23 2004*

QC BATCH REPORT

Batch ID: **11292** InstrumentID: **ICP4500**

MBLK Sample ID: **MBLKW1-120304** Test Code: **SW6020** Units: **mg/L** Analysis Date: **12/08/04 15:12**

Client ID: Run ID: **ICP4500_041208A** SeqNo: **585425** Prep Date: **12/3/2004** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	ND	0.010								
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Copper	ND	0.0050								
Iron	ND	0.20								
Lead	0.0006782	0.0050								J
Magnesium	ND	0.20								
Manganese	ND	0.0050								
Molybdenum	ND	0.0050								
Nickel	ND	0.0050								
Potassium	ND	0.20								
Selenium	ND	0.0050								
Silver	ND	0.0050								
Sodium	0.07729	0.20								J
Vanadium	ND	0.0050								
Zinc	0.0021	0.0050								J

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

O - Referenced analyte value is > 4 times amount spiked

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

P - Dual Column results percent difference > 40%

B - Analyte detected in assoc. Method Blank

U - Analyzed for but not detected

E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: **11292** InstrumentID: **ICP4500**

LCS Sample ID: **MLCSW1-120304** Test Code: **SW6020** Units: **mg/L** Analysis Date: **12/08/04 15:17**

Client ID: Run ID: **ICP4500_041208A** SeqNo: **585426** Prep Date: **12/3/2004** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.04516	0.010	0.05	0	90.3	79-126	0			
Arsenic	0.04774	0.0050	0.05	0	95.5	80-121	0			
Barium	0.04532	0.0050	0.05	0	90.6	79.6-119	0			
Beryllium	0.04939	0.0020	0.05	0	98.8	78.9-120	0			
Boron	0.5121	0.020	0.5	0	102	80-120	0			
Cadmium	0.05014	0.0020	0.05	0	100	79.1-119	0			
Calcium	4.515	0.50	5	0	90.3	80-121	0			
Chromium	0.04476	0.0050	0.05	0	89.5	79.3-121	0			
Cobalt	0.04611	0.0050	0.05	0	92.2	82-121	0			
Copper	0.04562	0.0050	0.05	0	91.2	81-120	0			
Iron	4.832	0.20	5	0	96.6	80-120	0			
Lead	0.04448	0.0050	0.05	0	89	80-118	0			
Magnesium	4.737	0.20	5	0	94.7	80-120	0			
Manganese	0.0458	0.0050	0.05	0	91.6	82-119	0			
Molybdenum	0.04286	0.0050	0.05	0	85.7	81-115	0			
Nickel	0.0465	0.0050	0.05	0	93	82-120	0			
Potassium	4.477	0.20	5	0	89.5	80-120	0			
Selenium	0.04793	0.0050	0.05	0	95.9	79.2-118	0			
Silver	0.04639	0.0050	0.05	0	92.8	80-117	0			
Sodium	4.588	0.20	5	0	91.8	80.6-119	0			
Vanadium	0.04421	0.0050	0.05	0	88.4	82.1-119	0			
Zinc	0.04855	0.0050	0.05	0	97.1	79-118	0			

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S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: **11292** InstrumentID: **ICP4500**

MS Sample ID: **0411323-01CMS** Test Code: **SW6020** Units: **mg/L** Analysis Date: **12/13/04 17:14**

Client ID: Run ID: **ICP7500_041213A** SeqNo: **587685** Prep Date: **12/3/2004** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1069	0.010	0.05	0.5579	-902	79-126	0			SO
Arsenic	0.05512	0.0050	0.05	0.006109	98	80-121	0			
Barium	0.09539	0.0050	0.05	0.05106	88.7	79.8-119	0			
Beryllium	0.04669	0.0020	0.05	0	93.4	78.9-120	0			
Boron	0.7308	0.020	0.5	0.2504	96.1	80-120	0			
Cadmium	0.04737	0.0020	0.05	0	94.7	79.1-119	0			
Calcium	264.3	0.50	5	266.5	-44	80-121	0			SEO
Chromium	0.04732	0.0050	0.05	0.0007623	93.1	79.3-121	0			
Cobalt	0.04668	0.0050	0.05	0.001722	89.9	82-121	0			
Copper	0.04436	0.0050	0.05	0.0009763	86.8	80-120	0			
Iron	6.504	0.20	5	2.249	85.1	80-120	0			
Lead	0.04604	0.0050	0.05	0.000464	91.2	80-118	0			
Magnesium	114.1	0.20	5	106.8	146	80-120	0			SEO
Manganese	0.1654	0.0050	0.05	0.1179	95	82-119	0			
Molybdenum	0.05048	0.0050	0.05	0.00484	91.3	81-115	0			
Nickel	0.05074	0.0050	0.05	0.006594	88.3	82-120	0			
Potassium	5.203	0.20	5	0.5493	93.1	80-120	0			
Selenium	0.04587	0.0050	0.05	0	91.7	79.2-118	0			
Silver	0.03777	0.0050	0.05	0	75.5	80-117	0			S
Sodium	40.61	0.20	5	34.32	126	80.6-119	0			SO
Vanadium	0.04854	0.0050	0.05	0.001477	94.1	82.1-119	0			
Zinc	0.07754	0.0050	0.05	0.02374	108	79-118	0			

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O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11292 InstrumentID: ICP4500

MSD Sample ID: 0411323-01CMSD Test Code: SW6020 Units: mg/L Analysis Date: 12/13/04 17:25
Client ID: Run ID: ICP7500_041213A SeqNo: 587686 Prep Date: 12/3/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.09847	0.010	0.05	0.5579	-919	79-126	0.1069	8.21	15	SO
Arsenic	0.05478	0.0050	0.05	0.006109	97.3	80-121	0.05512	0.619	15	
Barium	0.09357	0.0050	0.05	0.05106	85	79.8-119	0.09539	1.93	15	
Beryllium	0.04578	0.0020	0.05	0	91.6	78.9-120	0.04669	1.97	15	
Boron	0.7187	0.020	0.5	0.2504	93.7	80-120	0.7308	1.67	15	
Cadmium	0.04671	0.0020	0.05	0	93.4	79.1-119	0.04737	1.4	15	
Calcium	264.8	0.50	5	266.5	-34	80-121	264.3	0.189	15	SEO
Chromium	0.04649	0.0050	0.05	0.0007623	91.5	79.3-121	0.04732	1.77	15	
Cobalt	0.04571	0.0050	0.05	0.001722	88	82-121	0.04668	2.1	15	
Copper	0.04363	0.0050	0.05	0.0009763	85.3	81-120	0.04436	1.66	15	
Iron	6.331	0.20	5	2.249	81.6	80-120	6.504	2.7	15	
Lead	0.04463	0.0050	0.05	0.000464	88.3	80-118	0.04604	3.11	15	
Magnesium	111.1	0.20	5	106.8	86	80-120	114.1	2.66	15	EO
Manganese	0.1615	0.0050	0.05	0.1179	87.2	82-119	0.1654	2.39	15	
Molybdenum	0.0504	0.0050	0.05	0.00484	91.1	81-115	0.05048	0.159	15	
Nickel	0.04918	0.0050	0.05	0.006594	85.2	82-120	0.05074	3.12	15	
Potassium	5.187	0.20	5	0.5493	92.8	80-120	5.203	0.308	15	
Selenium	0.04899	0.0050	0.05	0	98	79.2-118	0.04587	6.58	15	
Silver	0.03712	0.0050	0.05	0	74.2	80-117	0.03777	1.74	15	S
Sodium	39.2	0.20	5	34.32	97.6	80.6-119	40.61	3.53	15	O
Vanadium	0.0472	0.0050	0.05	0.001477	91.4	82.1-119	0.04854	2.8	15	
Zinc	0.04375	0.0050	0.05	0.02374	40	79-118	0.07754	55.7	15	SR

DUP Sample ID: 0411323-01CDUP Test Code: SW6020 Units: mg/L Analysis Date: 12/08/04 15:26
Client ID: Run ID: ICP4500_041208A SeqNo: 585428 Prep Date: 12/3/2004 DF: 50

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	242.3	25	0	0	0	0-0	237.6	1.96	25	

DUP Sample ID: 0411323-01CDUP Test Code: SW6020 Units: mg/L Analysis Date: 12/09/04 17:33
Client ID: Run ID: ICP4500_041209A SeqNo: 586207 Prep Date: 12/3/2004 DF: 10

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Magnesium	104	2.0	0	0	0	0-0	94.02	10.1	25	

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E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: **11292** InstrumentID: **ICP4500**

DUP Sample ID: **0411323-01CDUP** Test Code: **SW6020** Units: **mg/L** Analysis Date: **12/13/04 17:08**

Client ID: Run ID: **ICP7500_041213A** SeqNo: **687684** Prep Date: **12/3/2004** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.5114	0.010	0	0	0	0-0	0.5579	8.7	25	
Arsenic	0.007011	0.0050	0	0	0	0-0	0.006109	13.8	25	
Barium	0.04884	0.0050	0	0	0	0-0	0.05106	4.44	25	
Beryllium	ND	0.0020	0	0	0	0-0	0.00004484	0	25	
Boron	0.2336	0.020	0	0	0	0-0	0.2504	6.94	25	
Cadmium	ND	0.0020	0	0	0	0-0	0.00002551	0	25	
Chromium	0.00112	0.0050	0	0	0	0-0	0.0007623	0	25	J
Cobalt	0.001584	0.0050	0	0	0	0-0	0.001722	0	25	J
Copper	0.0007835	0.0050	0	0	0	0-0	0.0009763	0	25	J
Iron	2.272	0.20	0	0	0	0-0	2.249	1.02	25	
Lead	0.0005578	0.0050	0	0	0	0-0	0.000464	0	25	J
Manganese	0.118	0.0050	0	0	0	0-0	0.1179	0.0848	25	
Molybdenum	0.004888	0.0050	0	0	0	0-0	0.00484	0	25	J
Nickel	0.006244	0.0050	0	0	0	0-0	0.006594	5.45	25	
Potassium	0.1045	0.20	0	0	0	0-0	0.5493	0	25	J
Selenium	ND	0.0050	0	0	0	0-0	0.00126	0	25	
Silver	ND	0.0050	0	0	0	0-0	0.00001912	0	25	
Sodium	34.43	0.20	0	0	0	0-0	34.32	0.32	25	
Vanadium	0.001493	0.0050	0	0	0	0-0	0.001477	0	25	J
Zinc	0.02671	0.0050	0	0	0	0-0	0.02374	11.8	25	

The following samples were analyzed in this batch: 0412005-01B

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11333 InstrumentID: Mercury

MBLK Sample ID: GBLKW2-120704 Test Code: SW7470 Units: mg/L Analysis Date: 12/08/04 15:16
Client ID: Run ID: MERCURY_041208B SeqNo: 585330 Prep Date: 12/7/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020								

LCS Sample ID: GLCSW2-120704 Test Code: SW7470 Units: mg/L Analysis Date: 12/08/04 15:18
Client ID: Run ID: MERCURY_041208B SeqNo: 585331 Prep Date: 12/7/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00516	0.00020	0.005	0	103	83-115	0			

LCSD Sample ID: GLCSDW2-120704 Test Code: SW7470 Units: mg/L Analysis Date: 12/08/04 15:19
Client ID: Run ID: MERCURY_041208B SeqNo: 585332 Prep Date: 12/7/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00525	0.00020	0.005	0	105	83-115	0.00516	1.73	20	

MS Sample ID: 0411323-05CMS Test Code: SW7470 Units: mg/L Analysis Date: 12/08/04 15:24
Client ID: Run ID: MERCURY_041208B SeqNo: 585335 Prep Date: 12/7/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00521	0.00020	0.005	-0.00001	104	83-115	0			

MSD Sample ID: 0411323-05CMSD Test Code: SW7470 Units: mg/L Analysis Date: 12/08/04 15:25
Client ID: Run ID: MERCURY_041208B SeqNo: 585336 Prep Date: 12/7/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00537	0.00020	0.005	-0.00001	108	83-115	0.00521	3.02	20	

DUP Sample ID: 0411323-05CDUP Test Code: SW7470 Units: mg/L Analysis Date: 12/08/04 15:22
Client ID: Run ID: MERCURY_041208B SeqNo: 585334 Prep Date: 12/7/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020	0	0	0	0-0	-0.00001	0	20	

The following samples were analyzed in this batch: 0412005-01B

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11279 InstrumentID: SV-3

MBLK Sample ID: SBLKW1-041201 Test Code: SW8270 Units: µg/L Analysis Date: 12/06/04 19:16

Client ID: Run ID: SV-3_041206A SeqNo: 584523 Prep Date: 12/1/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
2-Nitroaniline	ND	10								
2-Nitrophenol	ND	10								
3&4-Methylphenol	ND	10								
3-Nitroaniline	ND	10								
4-Nitroaniline	ND	10								
4-Nitrophenol	ND	10								
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Benz(a)anthracene	ND	10								
Benzidine	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	10								
Isophorone	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodimethylamine	ND	10								
N-Nitrosodiphenylamine	ND	10								
Naphthalene	ND	10								
Nitrobenzene	ND	10								
Pentachlorophenol	ND	10								
Phenanthrene	ND	10								
Phenol	ND	10								
Pyrene	ND	10								
1,4-Dichlorobenzene-d4	40	0								
Acenaphthene-d10	40	0								
Chrysene-d12	40	0								
Naphthalene-d8	40	0								
Perylene-d12	40	0								
Phenanthrene-d10	40	0								
Surr: 2,4,6-Tribromophenol	111.4	10	100	0	111	39-153	0			
Surr: 2-Fluorobiphenyl	94.94	10	100	0	94.9	40-147	0			
Surr: 2-Fluorophenol	41.49	10	100	0	41.5	21-110	0			
Surr: 4-Terphenyl-d14	92.33	10	100	0	92.3	39-141	0			
Surr: Nitrobenzene-d5	92.12	10	100	0	92.1	37-140	0			
Surr: Phenol-d6	24.52	10	100	0	24.5	11-100	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11279 InstrumentID: SV-3

LCS Sample ID: SLCSW1-041201 Test Code: SW8270 Units: µg/L Analysis Date: 12/06/04 19:42
Client ID: Run ID: SV-3_041206A SeqNo: 584524 Prep Date: 12/1/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	46.41	10	50	0	92.8	50-115	0			
2,4,5-Trichlorophenol	85.9	10	100	0	85.9	68-128	0			
2,4,6-Trichlorophenol	80.73	10	100	0	80.7	66-125	0			
2-Methylnaphthalene	42.71	10	50	0	85.4	47-122	0			
2-Methylphenol	62.35	10	100	0	62.4	51-115	0			
2-Nitroaniline	40.81	10	50	0	81.6	64-128	0			
2-Nitrophenol	85.56	10	100	0	85.6	60-119	0			
3&4-Methylphenol	83.39	10	150	0	55.6	44-115	0			
3-Nitroaniline	31.82	10	50	0	63.6	61-118	0			
4-Nitroaniline	35.23	10	50	0	70.5	61-123	0			
4-Nitrophenol	38.6	10	100	0	38.6	17-100	0			
Acenaphthene	47.59	10	50	0	95.2	68-115	0			
Acenaphthylene	45.62	10	50	0	91.2	67-116	0			
Aniline	28.31	10	50	0	56.6	40-130	0			
Anthracene	51.46	10	50	0	103	70-129	0			
Benz(a)anthracene	45.47	10	50	0	90.9	55-131	0			
Benzidine	7.922	10	50	0	15.8	10-115	0			J
Hexachloroethane	44.02	10	50	0	88	46-115	0			
Indeno(1,2,3-cd)pyrene	45.47	10	50	0	90.9	42-123	0			
Isophorone	43.19	10	50	0	86.4	63-117	0			
N-Nitrosodi-n-propylamine	41.82	10	50	0	83.6	67-115	0			
N-Nitrosodimethylamine	18.78	10	50	0	37.6	28-115	0			
N-Nitrosodiphenylamine	52.16	10	50	0	104	72-144	0			
Naphthalene	47.05	10	50	0	94.1	52-115	0			
Nitrobenzene	42.92	10	50	0	85.8	65-115	0			
Pentachlorophenol	88.33	10	100	0	88.3	65-123	0			
Phenanthrene	49.68	10	50	0	99.4	69-119	0			
Phenol	28.84	10	100	0	28.8	16-115	0			
Pyrene	47.04	10	50	0	94.1	51-130	0			
Surr: 2,4,6-Tribromophenol	104.5	10	100	0	105	39-153	0			
Surr: 2-Fluorobiphenyl	88	10	100	0	88	40-147	0			
Surr: 2-Fluorophenol	42.87	10	100	0	42.9	21-110	0			
Surr: 4-Terphenyl-d14	92.9	10	100	0	92.9	39-141	0			
Surr: Nitrobenzene-d5	84.16	10	100	0	84.2	37-140	0			
Surr: Phenol-d6	26.45	10	100	0	26.5	11-100	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11279 InstrumentID: SV-3

MS Sample ID: 0411323-01DMS Test Code: SW8270 Units: µg/L Analysis Date: 12/06/04 20:34
Client ID: Run ID: SV-3_041206A SeqNo: 584526 Prep Date: 12/1/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	43.38	10	50	0	86.8	50-115	0			
2,4,5-Trichlorophenol	90.42	10	100	0	90.4	68-128	0			
2,4,6-Trichlorophenol	85.7	10	100	0	85.7	66-125	0			
2-Methylnaphthalene	43.28	10	50	0	86.6	47-122	0			
2-Methylphenol	64.36	10	100	0	64.4	51-115	0			
2-Nitroaniline	43.16	10	50	0	86.3	64-128	0			
2-Nitrophenol	86.59	10	100	0	86.6	60-119	0			
3&4-Methylphenol	86.42	10	150	0	57.6	44-115	0			
3-Nitroaniline	33.78	10	50	0	67.6	61-118	0			
4-Nitroaniline	38.79	10	50	0	77.6	61-123	0			
4-Nitrophenol	36.47	10	100	0	36.5	17-100	0			
Acenaphthene	48.47	10	50	0	96.9	68-115	0			
Acenaphthylene	47.05	10	50	0	94.1	67-116	0			
Aniline	32.99	10	50	0	66	40-130	0			
Anthracene	51.79	10	50	0	104	70-129	0			
Benz(a)anthracene	49.25	10	50	0	98.5	55-131	0			
Benzidine	6.74	10	50	0	13.5	10-115	0			J
Hexachloroethane	36.94	10	50	0	73.9	46-115	0			
Indeno(1,2,3-cd)pyrene	49.15	10	50	0	98.3	42-123	0			
Isophorone	45.12	10	50	0	90.2	63-117	0			
N-Nitrosodi-n-propylamine	43.97	10	50	0	87.9	67-115	0			
N-Nitrosodimethylamine	17.91	10	50	0	35.8	28-115	0			
N-Nitrosodiphenylamine	53.36	10	50	0	107	72-144	0			
Naphthalene	45.94	10	50	0	91.9	52-115	0			
Nitrobenzene	44.54	10	50	0	89.1	65-115	0			
Pentachlorophenol	94.58	10	100	0	94.6	65-123	0			
Phenanthrene	50.51	10	50	0	101	69-119	0			
Phenol	29.37	10	100	0	29.4	16-115	0			
Pyrene	48.25	10	50	0	96.5	51-130	0			
Surr: 2,4,6-Tribromophenol	101.5	10	100	0	102	39-153	0			
Surr: 2-Fluorobiphenyl	84.74	10	100	0	84.7	40-147	0			
Surr: 2-Fluorophenol	39.74	10	100	0	39.7	21-110	0			
Surr: 4-Terphenyl-d14	90.52	10	100	0	90.5	39-141	0			
Surr: Nitrobenzene-d5	82.8	10	100	0	82.8	37-140	0			
Surr: Phenol-d6	25.63	10	100	0	25.6	11-100	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11279 InstrumentID: SV-3

MS Sample ID: 0411323-05DMS Test Code: SW8270 Units: µg/L Analysis Date: 12/06/04 21:52

Client ID: Run ID: SV-3_041206A SeqNo: 584529 Prep Date: 12/1/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	44.27	10	50	0	88.5	50-115	0			
2,4,5-Trichlorophenol	93.28	10	100	0	93.3	68-128	0			
2,4,6-Trichlorophenol	83.02	10	100	0	83	66-125	0			
2-Methylnaphthalene	45.01	10	50	0	90	47-122	0			
2-Methylphenol	64.66	10	100	0	64.7	51-115	0			
2-Nitroaniline	45.32	10	50	0	90.6	64-128	0			
2-Nitrophenol	89.99	10	100	0	90	60-119	0			
3&4-Methylphenol	85.58	10	150	0	57.1	44-115	0			
3-Nitroaniline	36.65	10	50	0	73.3	61-118	0			
4-Nitroaniline	39.1	10	50	0	78.2	61-123	0			
4-Nitrophenol	40.12	10	100	0	40.1	17-100	0			
Acenaphthene	48.32	10	50	0	96.6	68-115	0			
Acenaphthylene	47.27	10	50	0	94.5	67-116	0			
Aniline	30.49	10	50	0	61	40-130	0			
Anthracene	52.19	10	50	0	104	70-129	0			
Benz(a)anthracene	49.77	10	50	0	99.5	55-131	0			
Benzidine	ND	10	50	0	0	10-115	0			S
Hexachloroethane	35.92	10	50	0	71.8	46-115	0			
Indeno(1,2,3-cd)pyrene	50.64	10	50	0	101	42-123	0			
Isophorone	47.44	10	50	0	94.9	63-117	0			
N-Nitrosodi-n-propylamine	43.49	10	50	0	87	67-115	0			
N-Nitrosodimethylamine	19.55	10	50	0	39.1	28-115	0			
N-Nitrosodiphenylamine	53.06	10	50	0	106	72-144	0			
Naphthalene	46.32	10	50	0	92.6	52-115	0			
Nitrobenzene	44.87	10	50	0	89.7	65-115	0			
Pentachlorophenol	95.19	10	100	0	95.2	65-123	0			
Phenanthrene	50.74	10	50	0	101	69-119	0			
Phenol	30.24	10	100	0	30.2	16-115	0			
Pyrene	48.75	10	50	0	97.5	51-130	0			
Surr: 2,4,6-Tribromophenol	109.7	10	100	0	110	39-153	0			
Surr: 2-Fluorobiphenyl	86.29	10	100	0	86.3	40-147	0			
Surr: 2-Fluorophenol	44.57	10	100	0	44.6	21-110	0			
Surr: 4-Terphenyl-d14	92.93	10	100	0	92.9	39-141	0			
Surr: Nitrobenzene-d5	87.65	10	100	0	87.7	37-140	0			
Surr: Phenol-d6	28.07	10	100	0	28.1	11-100	0			

ND - Not Detected at the Reporting Limit
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O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11279 InstrumentID: SV-3

MSD Sample ID: 0411323-01DMS Test Code: SW8270 Units: µg/L Analysis Date: 12/06/04 21:00

Client ID: Run ID: SV-3_041206A SeqNo: 584527 Prep Date: 12/1/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	43.32	10	50	0	86.6	50-115	43.38	0.129	30	
2,4,5-Trichlorophenol	94.48	10	100	0	94.5	68-128	90.42	4.39	30	
2,4,6-Trichlorophenol	86.55	10	100	0	86.6	66-125	85.7	0.994	30	
2-Methylnaphthalene	44.24	10	50	0	88.5	47-122	43.28	2.19	30	
2-Methylphenol	68.14	10	100	0	68.1	51-115	64.36	5.71	30	
2-Nitroaniline	45.64	10	50	0	91.3	64-128	43.16	5.59	30	
2-Nitrophenol	90.48	10	100	0	90.5	60-119	86.59	4.4	30	
3&4-Methylphenol	91.48	10	150	0	61	44-115	86.42	5.69	30	
3-Nitroaniline	34.37	10	50	0	68.7	61-118	33.78	1.73	30	
4-Nitroaniline	41.5	10	50	0	83	61-123	38.79	6.75	30	
4-Nitrophenol	39.15	10	100	0	39.2	17-100	36.47	7.1	30	
Acenaphthene	50.19	10	50	0	100	68-115	48.47	3.49	30	
Acenaphthylene	48.71	10	50	0	97.4	67-116	47.05	3.46	30	
Aniline	32.02	10	50	0	64	40-130	32.99	3.01	30	
Anthracene	53.42	10	50	0	107	70-129	51.79	3.1	30	
Benz(a)anthracene	48.44	10	50	0	96.9	55-131	49.25	1.68	30	
Benzidine	1.612	10	50	0	3.22	10-115	6.74	0	30	JS
Hexachloroethane	37.56	10	50	0	75.1	46-115	36.94	1.67	30	
Indeno(1,2,3-cd)pyrene	48.03	10	50	0	96.1	42-123	49.15	2.29	30	
Isophorone	46.72	10	50	0	93.4	63-117	45.12	3.49	30	
N-Nitrosodi-n-propylamine	46.57	10	50	0	93.1	67-115	43.97	5.74	30	
N-Nitrosodimethylamine	18.67	10	50	0	37.3	28-115	17.91	4.15	30	
N-Nitrosodiphenylamine	55.51	10	50	0	111	72-144	53.36	3.96	30	
Naphthalene	45.62	10	50	0	91.2	52-115	45.94	0.71	30	
Nitrobenzene	45.19	10	50	0	90.4	65-115	44.54	1.44	30	
Pentachlorophenol	98.42	10	100	0	98.4	65-123	94.58	3.98	30	
Phenanthrene	51.17	10	50	0	102	69-119	50.51	1.3	30	
Phenol	31.17	10	100	0	31.2	16-115	29.37	5.95	30	
Pyrene	50.05	10	50	0	100	51-130	48.25	3.67	30	
Surr: 2,4,6-Tribromophenol	107.9	10	100	0	108	39-153	101.5	6.09	30	
Surr: 2-Fluorobiphenyl	89.32	10	100	0	89.3	40-147	84.74	5.26	30	
Surr: 2-Fluorophenol	43.8	10	100	0	43.8	21-110	39.74	9.73	30	
Surr: 4-Terphenyl-d14	95.13	10	100	0	95.1	39-141	90.52	4.97	30	
Surr: Nitrobenzene-d5	85.54	10	100	0	85.5	37-140	82.8	3.26	30	
Surr: Phenol-d6	29.34	10	100	0	29.3	11-100	25.63	13.5	30	

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11279 InstrumentID: SV-3

MSD Sample ID: 0411323-05DMSD Test Code: SW8270 Units: µg/L Analysis Date: 12/06/04 22:18
Client ID: Run ID: SV-3_041206A SeqNo: 584530 Prep Date: 12/1/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	44.57	10	50	0	89.1	50-115	44.27	0.69	30	
2,4,5-Trichlorophenol	84.29	10	100	0	84.3	68-128	93.28	10.1	30	
2,4,6-Trichlorophenol	81.09	10	100	0	81.1	66-125	83.02	2.35	30	
2-Methylnaphthalene	42.69	10	50	0	85.4	47-122	45.01	5.28	30	
2-Methylphenol	62.41	10	100	0	62.4	51-115	64.66	3.54	30	
2-Nitroaniline	40.69	10	50	0	81.4	64-128	45.32	10.8	30	
2-Nitrophenol	84.59	10	100	0	84.6	60-119	89.99	6.18	30	
3&4-Methylphenol	84.1	10	150	0	56.1	44-115	85.58	1.74	30	
3-Nitroaniline	33.02	10	50	0	66	61-118	36.65	10.4	30	
4-Nitroaniline	36.04	10	50	0	72.1	61-123	39.1	8.15	30	
4-Nitrophenol	36.03	10	100	0	36	17-100	40.12	10.8	30	
Acenaphthene	47.19	10	50	0	94.4	68-115	48.32	2.36	30	
Acenaphthylene	45.79	10	50	0	91.6	67-116	47.27	3.19	30	
Aniline	29.07	10	50	0	58.1	40-130	30.49	4.79	30	
Anthracene	51.25	10	50	0	102	70-129	52.19	1.82	30	
Benz(a)anthracene	45	10	50	0	90	55-131	49.77	10.1	30	
Benzidine	4.102	10	50	0	8.2	10-115	0	0	30	JS
Hexachloroethane	38.51	10	50	0	77	46-116	35.92	6.94	30	
Indeno(1,2,3-cd)pyrene	47.66	10	50	0	95.3	42-123	50.64	6.06	30	
Isophorone	43.85	10	50	0	87.7	63-117	47.44	7.86	30	
N-Nitrosodi-n-propylamine	42.41	10	50	0	84.8	67-115	43.49	2.52	30	
N-Nitrosodimethylamine	18.23	10	50	0	36.5	28-115	19.55	6.99	30	
N-Nitrosodiphenylamine	51.31	10	50	0	103	72-144	53.06	3.35	30	
Naphthalene	45.52	10	50	0	91	52-115	46.32	1.73	30	
Nitrobenzene	42.69	10	50	0	85.4	65-115	44.87	4.98	30	
Pentachlorophenol	88.25	10	100	0	88.3	65-123	95.19	7.56	30	
Phenanthrene	49.54	10	50	0	99.1	69-119	50.74	2.39	30	
Phenol	28.67	10	100	0	28.7	16-115	30.24	5.35	30	
Pyrene	45.83	10	50	0	91.7	51-130	48.75	6.17	30	
Surr: 2,4,6-Tribromophenol	103.5	10	100	0	104	39-153	109.7	5.77	30	
Surr: 2-Fluorobiphenyl	89.41	10	100	0	89.4	40-147	86.29	3.55	30	
Surr: 2-Fluorophenol	40.87	10	100	0	40.9	21-110	44.57	8.65	30	
Surr: 4-Terphenyl-d14	88.85	10	100	0	88.8	39-141	92.93	4.48	30	
Surr: Nitrobenzene-d5	84.44	10	100	0	84.4	37-140	87.65	3.74	30	
Surr: Phenol-d6	26.57	10	100	0	26.6	11-100	28.07	5.5	30	

The following samples were analyzed in this batch: 0412005-01D

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25184 InstrumentID: VOA2

MBLK Sample ID: VBLKW-1210 Test Code: SW8260 Units: µg/L Analysis Date: 12/10/04 14:40
Client ID: Run ID: VOA2_041210A SeqNo: 586932 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	ND	5.0								
1,1,2,2-Tetrachloroethane	ND	5.0								
1,1,2-Trichloroethane	ND	5.0								
1,1-Dichloroethane	ND	5.0								
1,1-Dichloroethene	ND	5.0								
1,2-Dichloroethane	ND	5.0								
2-Butanone	ND	10								
2-Chloroethyl vinyl ether	ND	10								
2-Hexanone	ND	10								
4-Methyl-2-pentanone	ND	10								
Acetone	ND	10								
Benzene	ND	5.0								
Bromodichloromethane	ND	5.0								
Bromoform	ND	5.0								
Bromomethane	ND	5.0								
Carbon disulfide	ND	10								
Carbon tetrachloride	ND	5.0								
Chlorobenzene	ND	5.0								
Chloroethane	ND	5.0								
Chloroform	ND	5.0								
Chloromethane	ND	5.0								
cis-1,3-Dichloropropene	ND	5.0								
Dibromochloromethane	ND	5.0								
Ethylbenzene	ND	5.0								
m,p-Xylene	ND	10								
Methylene chloride	ND	10								
Styrene	ND	5.0								
Tetrachloroethene	ND	5.0								
Toluene	ND	5.0								
trans-1,3-Dichloropropene	ND	5.0								
Trichloroethene	ND	5.0								
Vinyl acetate	ND	10								
Vinyl chloride	ND	2.0								
Xylenes, Total	ND	15								
Surr: 1,2-Dichloroethane-d4	50.58	5.0	50	0	101	71-126		0		
Surr: 4-Bromofluorobenzene	38.87	5.0	50	0	77.7	74-125		0		
Surr: Dibromofluoromethane	46.88	5.0	50	0	93.8	73-126		0		
Surr: Toluene-d8	43.86	5.0	50	0	87.7	75-125		0		

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

EXHIBIT 3

SUBSURFACE

TABLE VII
Wells that have been Recompleted in Upper Zones since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
3	30 015 00646	A	36	17S	27E	990 FNL & 330 FEL	Delhi No 007	Aspen Oil Inc	Change of Owner: Pronghorn Management Corp to Aspen Oil Company Inc. Recomp Well:
73	30 015 01659	N	32	17S	28E	660 FNL & 1980 FWL	Empire ABO Unit No. 026A	BP America Production Company	Recomp Well: New Perf in ABO 5651'-6118'
74	30 015 21539	N	32	17S	28E	150 FSL & 1400 FWL	Empire ABO Unit No. 261	BP America Production Company	Recomp Well: New Perf in ABO 5690'-5954'
75	30 015 22009	O	32	17S	28E	330 FSL & 2481 FWL	Empire ABO Unit No. 272	BP America Production Company	Recomp Well: New Perf in ABO 5714'-6120'
76	30 015 02606	C	05	18S	28E	330 FNL & 1941 FWL	Empire ABO Unit No. 026E	BP America Production Company	Recomp Well: New Perf in ABO 5662'-5907'
78	30 015 02607	D	05	18S	28E	660 FNL & 660 FWL	Empire ABO Unit No. 025C	BP America Production Company	Recomp Well: New Perf in ABO 5760"
88	30 015 02615	A	06	18S	28E	660 FNL & 660 FEL	Empire ABO Unit No. 24B	BP America Production Company	Recomp Well: PBTD 6205' CIBP 6091', New Perf in ABO 5794'-5924'
90	30 015 21542	B	06	18S	28E	1260 FNL & 1580 FEL	Empire ABO Unit No. 231	BP America Production Company	Recomp Well: PBTD 6222' New Perf in ABO 5850'-6018'
94	30 015 23116	E	06	18S	28E	2050 FNL & 100 FWL	Empire ABO Unit No. 213	BP America Production Company	Recomp Well: New Perf in ABO 5606'-5796'
96	30 015 22637	E	06	18S	28E	2450 FNL & 400 FWL	Empire ABO Unit No. 212	BP America Production Company	Recomp Well: PBTD 6203' New Perf in ABO 5588'-6080'
106	30 015 02614	G	06	18S	28E	1980 FNL & 1980 FEL	Empire ABO Unit No. 23B	BP America Production Company	Recomp Well: PBTD 6240', New Perf in ABO 5842'-6142'
752	30 015 00703	L	01	18S	27E	1980 FSL & 660 FWL	Empire ABO Unit No. 017A	BP America Production Company	Recomp Well: PBD 6101', CIBP 5823', New Vert Perf in Abo 5472'-5736'
765	30 015 00724	A	02	18S	27E	990 FNL & 330 FEL	Empire Abo Unit No. 16B	BP America Production Company	Recomp Well: New Perf in ABO 5444'-5786'
766	30 015 00737	B	02	18S	27E	905 FNL & 1610 FEL	South Red Lake II Unit #38	Fairway Resources Operating LLC	Change of Owner: McQuadrangle LC to Fairway Resources Operating LLC Recomp Well: Plugback 75 sks cmt 1430'-1530' & complete in Grayburg
786	30 015 00716	J	02	18S	27E	1980 FSL & 1980 FEL	Empire Abo Unit No. 15	BP America Production Company	Recomp Well: New Perf in ABO 5348'-6000'
841	30 015 22834	C	11	18S	27E	225 FNL & 2280 FWL	Empire Abo Unit No. 141B	BP America Production Company	Recomp Well: New Perf in ABO 5961'-6030'
843	30 015 22833	D	11	18S	27E	450 FNL & 1175 FWL	Empire Abo Unit No. 133B	BP America Production Company	Recomp Well: New Perf in ABO 5966'-6064'
912	30 015 31036	H	36	17S	27E	231 FNL & 990 FEL	Gates State No 3	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service; Recomplete
928	30 015 32310	1	01	18S	27E	990 FNL & 990 FEL	AAO Federal No 004	Marbob Energy Corp.	Recomp Well: New Perf San Andres 2134'-2849'
929	30 015 32309	2	01	18S	27E	330 FNL & 1690 FEL	AAO Federal No 003	Marbob Energy Corp.	Recomp Well: New Perf San Andres 2092'-2807'
930	30 015 32308	3	01	18S	27E	430 FNL & 2310 FWL	AAO Federal No 002	Marbob Energy Corp.	Recomp Well: New Perf San Andres 1967'-3115'; Old Perf Glorieta 3373'-3699'
931	30 015 32307	4	01	18S	27E	330 FNL & 990 FWL	AAO Federal No 001	Marbob Energy Corp.	Recomp Well: CIBP 3250', New Perf in San Andres 2356'-2900'; 2974'-3071'
10	30 015 00669	H	36	17S	27E	2310 FNL & 330 FEL	Homan #1	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service Recomp Well: Drill out cmt plugs, tagg at 1805', run 4-1/2" liner to 1390' to surf and cmt 316 sks, prod 1450' to 1800'
159	30 015 00698	O	01	18S	27E	660 FSL & 1980 FEL	Empire Abo Unit No. 191	BP America Production Company	Reclamation of plugged well: installed liner and waiting for reclamation inspection.
133	30 015 00710	C	01	18S	27E	660 FNL & 1980 FWL	AAO Federal No. 013	Marbob Energy Corp.	Change of Owner: from BP America Production Company to Marbob Energy Corp; Recomp: Perf the Yeso 1 from 4581'-4944' and acdz w/ 2000 gal NE Fe 15% HCL; Perf the Yeso 2 from 3990'-4395' and acdz w/ 2500 gal NE Fe 15% HCl; Perf the Yeso 3 from 3377'-3678' and acdz w/ 2500 gal NE Fe 15% HCl; Well producing as single from 3377'-4395'.
152	30 015 22096	K	01	18S	27E	2370 FSL & 1510 FWL	Empire Abo Unit No. 183	BP America Production Company	Recomp Well: New perf at 5641'-6053'. Acdz with 15% HCL.
929	30 015 32309	2	01	18S	27E	330 FNL & 1690 FEL	AAO Federal No 003	Marbob Energy Corp.	Recomp Well: Pump 1000 gal NE Fe 15% HCl acid.
807	30 015 22608	N	02	18S	27E	100 FSL & 1950 FWL	Empire Abo Unit No. 142	BP America Production Company	Recomplete: New perfs in the Abo: 5927'-5930', 5938'-5956', 6123', 6130'-6140'. Return to production.

TABLE VII
Wells that have been Recompleted in Upper Zones since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

65	30	015	01657	F	32	17S	28E	2280 FNL & 1980 FWL	AA State No. 001	Marbob Energy Corp.	Change of Owner: BP America Production Company to Marbob Energy Corp.; Recomplete: Proposal to plug back and perforate, acidize, test, and possibly frac the Yeso 1 (4288'-4525'), Yeso 2 (3880'-4173'), and Yeso 3 (3523'-3715').
954	30	015	35050	D	32	17S	28E	330 FNL & 500 FWL	Enron State No 012	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP; Recompletion: Open San Andres and comingle with Yeso by perfing San Andres at 2294',2312',2409',2503' and acidized with 3360 gal NEFE acid. Then fraced perfs w/ 95,000 lbs 16/30 and 35,000 lbs 12/20 brady sand in 25 lb X-linked gel.
104	30	015	22913	G	06	18S	28E	1750 FNL & 1600 FEL	Empire Abo Unit No. 235	BP America Production Company	Recomplete: Set CIBP to shut off water. Set at 6176'

TABLE VIII
Newly Drilled Wells in the Area of Review since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
944	30 015 26575	N	01	18S	27E	790 FSL & 2250 FWL	Chalk Bluff Fed Com 1/ WDW-3	Navajo Refining Co. Pipeline Division	Well Completed in the Wolfcamp 7660'-8620' Injecting
945	30 015 32959	E	01	18S	27E	1650 FNL & 875 FWL	AAO Federal No 005	Marbob Energy Corp.	NEW ~4000'
946	30 015 33473	G	01	18S	27E	1750 FNL & 1650 FEL	AAO Federal No 007	Marbob Energy Corp.	NEW ~4000'
947	30 015 33784	H	01	18S	27E	1650 FNL & 330 FEL	AAO Federal No 008	Marbob Energy Corp.	NEW ~4000'
948	30 015 34071	F	01	18S	27E	2169 FNL & 1963 FWL	AAO Federal No 006	Marbob Energy Corp.	NEW ~4000'
949	30 015 34387	L	01	18S	27E	1980 FSL & 630 FWL	AAO Federal No 009	Marbob Energy Corp.	NEW ~4000'
950	30 015 34555	M	01	18S	27E	890 FSL & 660 FWL	AAO Federal No 011	Marbob Energy Corp.	NEW ~4000'
951	30 015 34576	K	01	18S	27E	2060 FSL & 2160 FWL	AAO Federal No 010	Marbob Energy Corp.	NEW ~4000'
952	30 015 34998	N	01	18S	27E	890 FSL & 1650 FWL	AAO Federal No 012	Marbob Energy Corp.	NEW ~4000'
955	30 015 36939	A	14	18S	27E	660 FNL & 990 FEL	Violet BIV State Com 001	Yates Petroleum Corp	NEW: Permit to Drill by 2/20/09
956	30 015 33994	A	36	17S	27E	915 FNL & 420 FEL	Red Lake 36 State No 2	Edge Petroleum Operating Company Inc	NEW ~3650'
957	30 015 36116	G	36	17S	27E	2305 FNL & 1650 FEL	South Red Lake II Unit No 57	Fairway Resources Operating LLC	NEW ~2081' Well completed in the Queen, Grayburg, San Andres
958	30 015 32946	J	02	18S	27E	2210 FSL & 1650 FEL	SCBP State No 1	Marbob Energy Corp.	NEW ~3880' Perf: 1975'-2664', 3342'-3638'
959	30 015 35814	H	02	18S	27E	2063 FNL & 441 FEL	State H No 2	Mack Energy Corporation	NEW: ~7545' PBTD: 5265' Perf: 6134.5'-6434' w/CIBP 6020' Perf: 5391'-5957.5' w/ CIBP 5300' Perf: 4118.5'-4197'
960	30 015 36343	G	31	17S	28E	1650 FNL & 2310 FEL	Malco State No 002	George A Chase JR DBA and C Service	NEW: 633' Open Hole Completion. Change of Owner: Aspen Oil Inc. to George A Chase JR DBA G and C Service
961	30 015 36978	D	31	17S	28E	990 FNL & 330 FWL	Enron State No. 015	Lime Rock Resources A, LP	NEW: 3700' in the Glorietta-Yeso.
962	30 015 36554	L	32	17S	28E	1770 FSL & 550 FWL	NW State No. 029	Lime Rock Resources A, LP	NEW: 3450'. Well completed in the San Andres from 2817'-3098', 69 perforations.
963	30 015 36989	K	32	17S	28E	1630 FSL & 1710 FWL	NW State No. 030	Lime Rock Resources A, LP	NEW: 3405'. No completion yet.
964	30 015 37057	N	32	17S	28E	330 FSL & 1750 FWL	NW State No. 031	Lime Rock Resources A, LP	NEW: 3500'. No completion yet.
965	30 015 37058	M	32	17S	28E	330 FSL & 330 FWL	NW State No. 032	Lime Rock Resources A, LP	NEW: 3425'. No completion yet.
	30 015 36281	J	01	18S	27E	2193 FSL & 1520 FEL	Sun Devils Federal No. 001	Mack Energy Corporation	Permit to Drill - 6000' TVD
966	30 015 37428	G	31	17S	28E	1980 FNL & 1980 FWL	Malco State No. 3	G and C Service	NEW: TD at 650'. Completed in Yates Seven Rivers with Open Hole
967	30 015 38240	G	36	17S	27E	1425 FNL & 1520 FEL	Kiowa State No. 3	Cog Operating LLC	NEW: Currently drilling to 4850' in the Glorietta-Yeso; To be perforated in Yeso Formation; Proposed TD 4850'
968	30 015 39029	G	36	17S	27E	2210 FNL & 2310 FEL	Conklin State No. 1-Y	G and C Service	NEW: Drilled to 540' TD, producing oil
969	30 015 39321	M	36	17S	27E	990 FSL & 890 FWL	Big Boy State No. 1	Cog Operating LLC	NEW: Permit to Drill
970	30 015 39322	M	36	17S	27E	840 FSL & 425 FWL	Big Boy State No. 3	Cog Operating LLC	NEW: Permit to Drill
971	30 015 39323	O	36	17S	27E	870 FSL & 1560 FEL	Big Boy State No. 5	Cog Operating LLC	NEW: Permit to Drill
972	30 015 39324	O	36	17S	27E	480 FSL & 2210 FEL	Big Boy State No. 6	Cog Operating LLC	NEW: Permit to Drill
973	30 015 39325	O	36	17S	27E	990 FSL & 2210 FEL	Big Boy State No. 7	Cog Operating LLC	NEW: Permit to Drill
974	30 015 39326	O	36	17S	27E	275 FSL & 1560 FEL	Big Boy State No. 8	Cog Operating LLC	NEW: Permit to Drill
975	30 015 39401	P	36	17S	27E	1110 FSL & 630 FEL	Empire Abo Unit No. 417	Apache Corp	NEW: Permit to Drill
976	30 015 39009	G	02	18S	27E	1650 FNL & 2430 FEL	Empire Abo Unit No. 415	Apache Corp	NEW: Permit to Drill
977	30 015 39066	L	02	18S	27E	2551 FSL & 1170 FWL	Empire Abo Unit No. 416	Apache Corp	NEW: Permit to Drill
978	30 015 38234	P	30	17S	28E	430 FSL & 800 FEL	Anthony No. 2	Lime Rock Resources	NEW: Drilled to 4823' TD, PBTD: 4762'. Perforations in Upper Yeso: 3644'-3932', Middle Yeso: 3962'-4254', and Lower Yeso: 4355'-4719'
979	30 015 39299	M	30	17S	28E	990 FSL & 990 FWL	Maple State No. 5	Cog Operating LLC	NEW: Permit to Drill
980	30 015 39300	M	30	17S	28E	330 FSL & 330 FWL	Maple State No. 6	Cog Operating LLC	NEW: Permit to Drill
981	30 015 38512	D	30	17S	28E	990 FNL & 940 FWL	Enron State No. 16	Lime Rock Resources	NEW: Well is drilled to total depth of 3658'. Will be completed later this year.
982	30 015 39004	P	31	17S	28E	150 FSL & 1300 FEL	Empire Abo Unit No. 401	Apache Corp	NEW: Permit to Drill
983	30 015 39011	O	31	17S	28E	1190 FSL & 1320 FEL	Empire Abo Unit No. 419	Apache Corp	NEW: Permit to Drill
984	30 015 39020	O	31	17S	28E	140 FSL & 2560 FEL	Empire Abo Unit No. 408	Apache Corp	NEW: Permit to Drill
985	30 015 38513	J	32	17S	28E	2310 FSL & 2032 FEL	Jeffer 32 State No. 3	Lime Rock Resources	NEW: Drilled to 5093' TD, PBTD: 5070'. Perforations in Upper Yeso: 3441'-4727', 3768'-4076', Middle Yeso: 4130'-4476', and Lower Yeso: 4540'-5007'

TABLE VIII

Newly Drilled Wells in the Area of Review since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

986	30	015	39006	J	32	17S	28E	2400 FSL & 2450 FEL	Empire Abo Unit No. 407	Apache Corp	NEW: Permit to Drill
987	30	015	39007	M	32	17S	28E	70 FSL & 100 FWL	Empire Abo Unit No. 409	Apache Corp	NEW: Permit to Drill
988	30	015	39064	O	32	17S	28E	1175 FSL & 1310 FEL	Empire Abo Unit No. 403	Apache Corp	NEW: Permit to Drill
989	30	015	39008	D	06	18S	28E	160 FNL & 1300 FWL	Empire Abo Unit No. 410	Apache Corp	NEW: Permit to Drill
990	30	015	39021	D	06	18S	28E	40 FNL & 145 FWL	Empire Abo Unit No. 411	Apache Corp	NEW: Permit to Drill
995	30	015	33473	G	01	18S	27E	1750 FNL & 1650 FEL	AAO Federal No. 7	Apache Corp	NEW to AOR, change of operator from Marbob Energy Corp to Apache Corp
996	30	015	33784	H	01	18S	27E	1650 FNL & 330 FEL	AAO Federal No. 8	Apache Corp	NEW to AOR, change of operator from Marbob Energy Corp to Apache Corp
997	30	015	34071	F	01	18S	27E	2169 FNL & 1963 FWL	AAO Federal No. 6	Apache Corp	NEW to AOR, change of operator from Marbob Energy Corp to Apache Corp
998	30	015	34555	M	01	18S	27E	890 FSL & 660 FWL	AAO Federal No. 11	Apache Corp	NEW to AOR, change of operator from Marbob Energy Corp to Apache Corp
999	30	015	34576	K	01	18S	27E	2060 FSL & 2160 FWL	AAO Federal No. 10	Apache Corp	NEW to AOR, change of operator from Marbob Energy Corp to Apache Corp

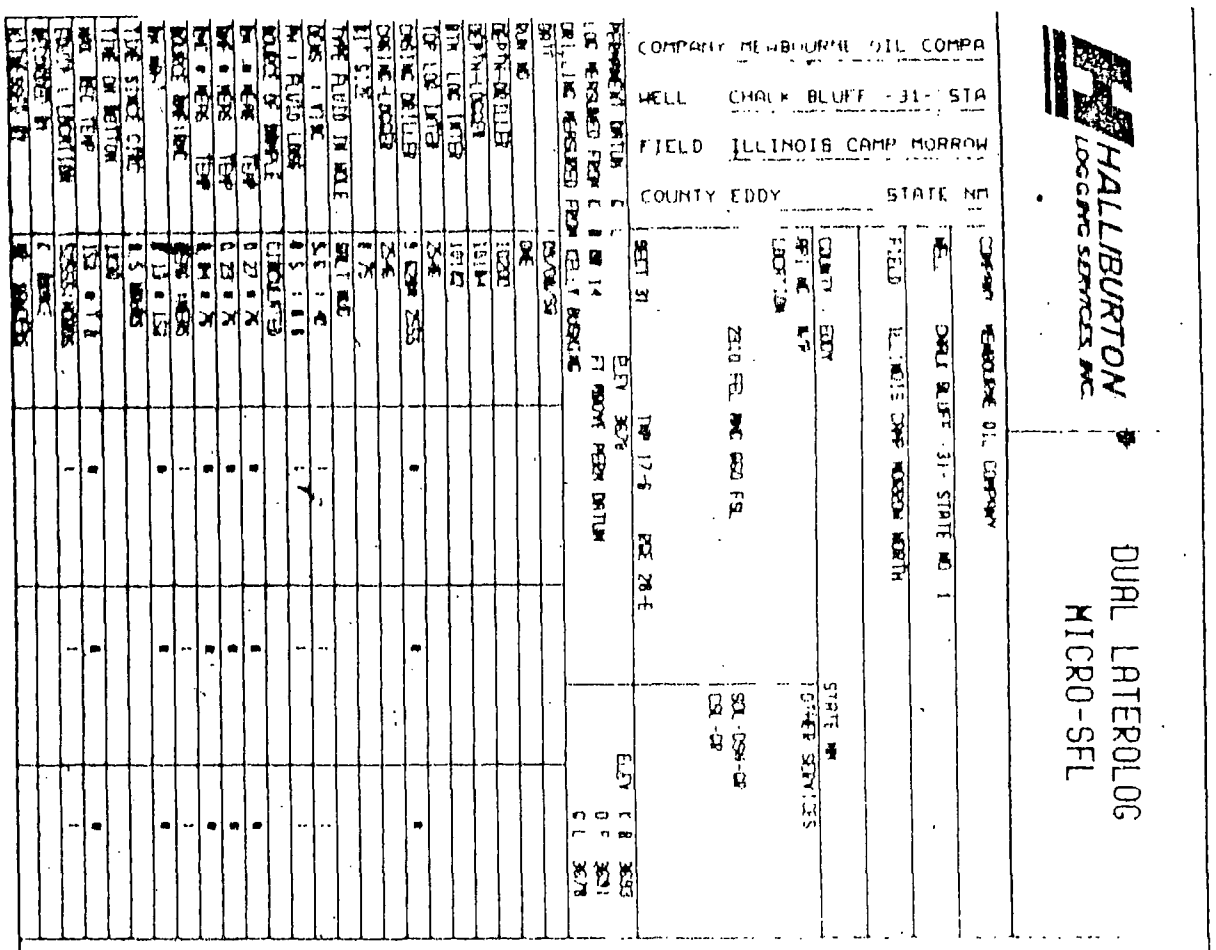
API# 406384

31-17S-28E

HALLIBURTON LOGGING SERVICES INC.

DUAL LATEROLOG
MICRO-SFL

COMPANY MEWBOURNE OIL COMPA
WELL CHALK BLUFF -31- STA
FIELD ILLINOIS CAMP MORROW
COUNTY EDDY STATE NE



FOLD HERE

SERVICE TICKET NO.: 414605 API SERIAL NO.: N/A PGM VERSION: 2.31

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLES

DATE/SAMPLE NO.	/ / /	/ / /
DEPTH-DRILLER		
TYPE FLUID IN HOLE		
DENS. / VISC.	/	/
PH / FLUID LOSS	/	/
SOURCE OF SAMPLE		
RM @ MEAS TEMP	@	@
RMF @ MEAS TEMP	@	@
RMC @ MEAS TEMP	@	@
SOURCE: RMF/RMC	CALC./CALC.	/
RM @ BHT	0.13 @ 153	@
RMF @ BHT	0.11 @ 153	@
RMC @ BHT	0.18 @ 153	@

RESISTIVITY SCALE CHANGES

TYPE LOG	DEPTH	SCALE UP HOLE	SCALE DOWN HOLE

RESISTIVITY EQUIPMENT DATA

RUN NO	TOOL TYPE & NO	PAD TYPE	TOOL POS.	OTHER
ONE	DLLT 113308		CENT	
	MSFL 113910	SOLID	CENT	

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
RUN NO.	ONE	RUN NO.		RUN NO.	ONE	RUN NO.	ONE
SERIAL NO.	108998	SERIAL NO.		SERIAL NO.	1094	SERIAL NO.	1998
MODEL NO.	432	MODEL NO.		MODEL NO.	463	MODEL NO.	418
DIAMETER	3.625	NO OF CENT.		DIAMETER	4.5	DIAMETER	1 6/8
DETECTOR MODEL NO.	102	SPACING		LOG TYPE	G G	LOG TYPE	D H
TYPE	SCINT.			SOURCE TYPE	CS 137	SOURCE TYPE	AMRC 241
LENGTH	4"	L9A (Y/N)		SERIAL NO	SDL-115	SERIAL NO	0/0 811
DISTANCE TO SOURCE	N/A	FWDA (Y,N)		STRENGTH	1.5 CI	STRENGTH	17 CI

LOGGING DATA

GENERAL				GAMMA	ACOUSTIC			DENSITY			NEUTRON		
RUN	DEPTH		SPEED	SCALE	SCALE			SCALE			SCALE		
NO	FROM	TO	FT/MIN	L R	L	R	MATRIX	L	R	MATRIX	L	R	MATRIX
ONE	10182	2546	REC.	0 100				30	-10	2.71	30	-10	LIME

REMARKS:
ANNULAR VOLUME CALCULATED USING 5.5 INCH CASING

THANKS FOR CALLING HALLIBURTON ENERGY SERVICES

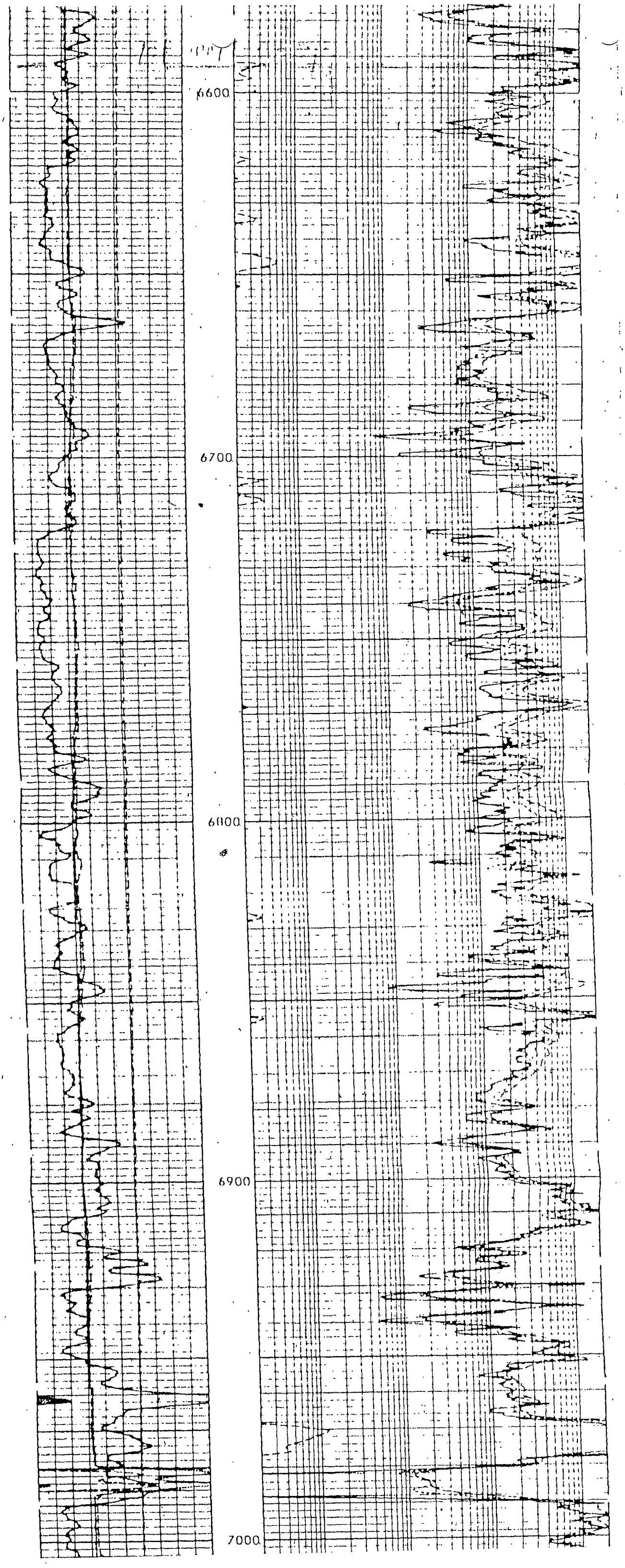
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SDL CALIPER		
6	INCHES	16
GAMMA		
0	API	100
TENSION		
10000	POUNDS	0
MSFL CALIPER		

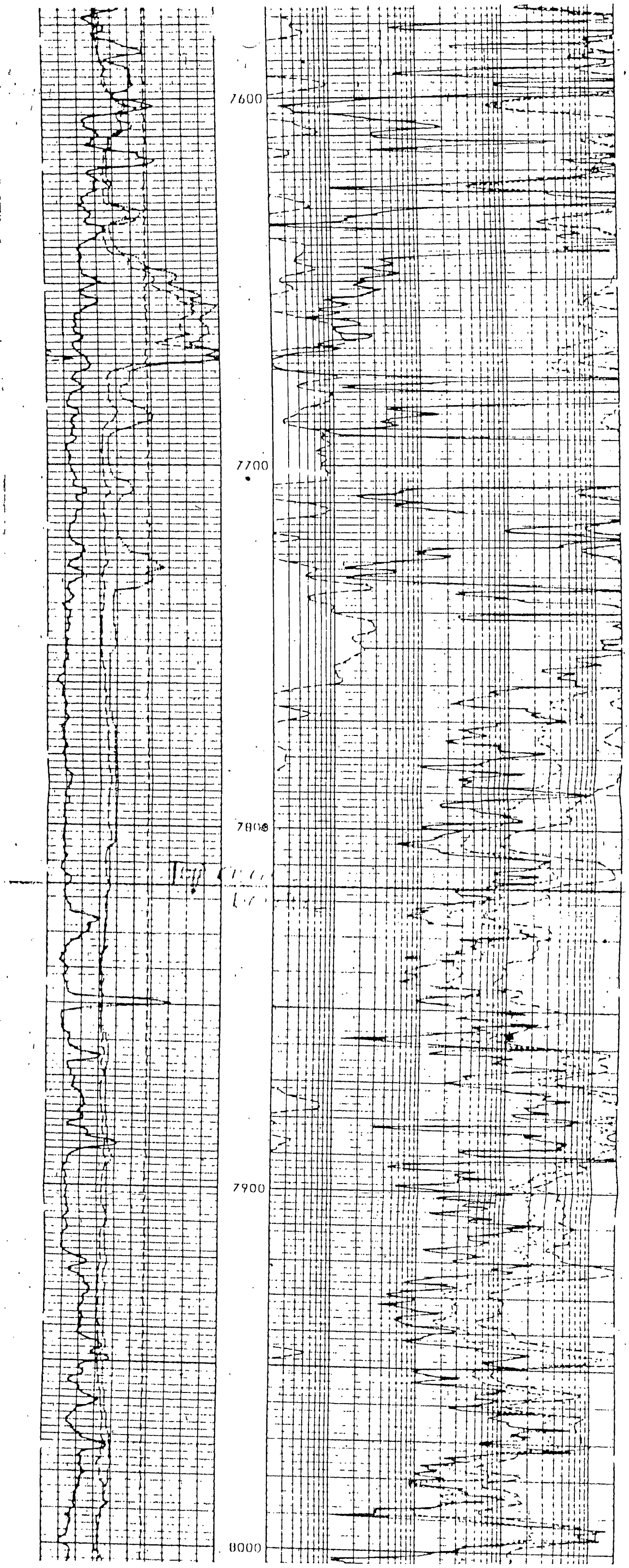
DEEP LL		
.2	OHM-M	2000
SHALLOW LL		
.2	OHM-M	2000

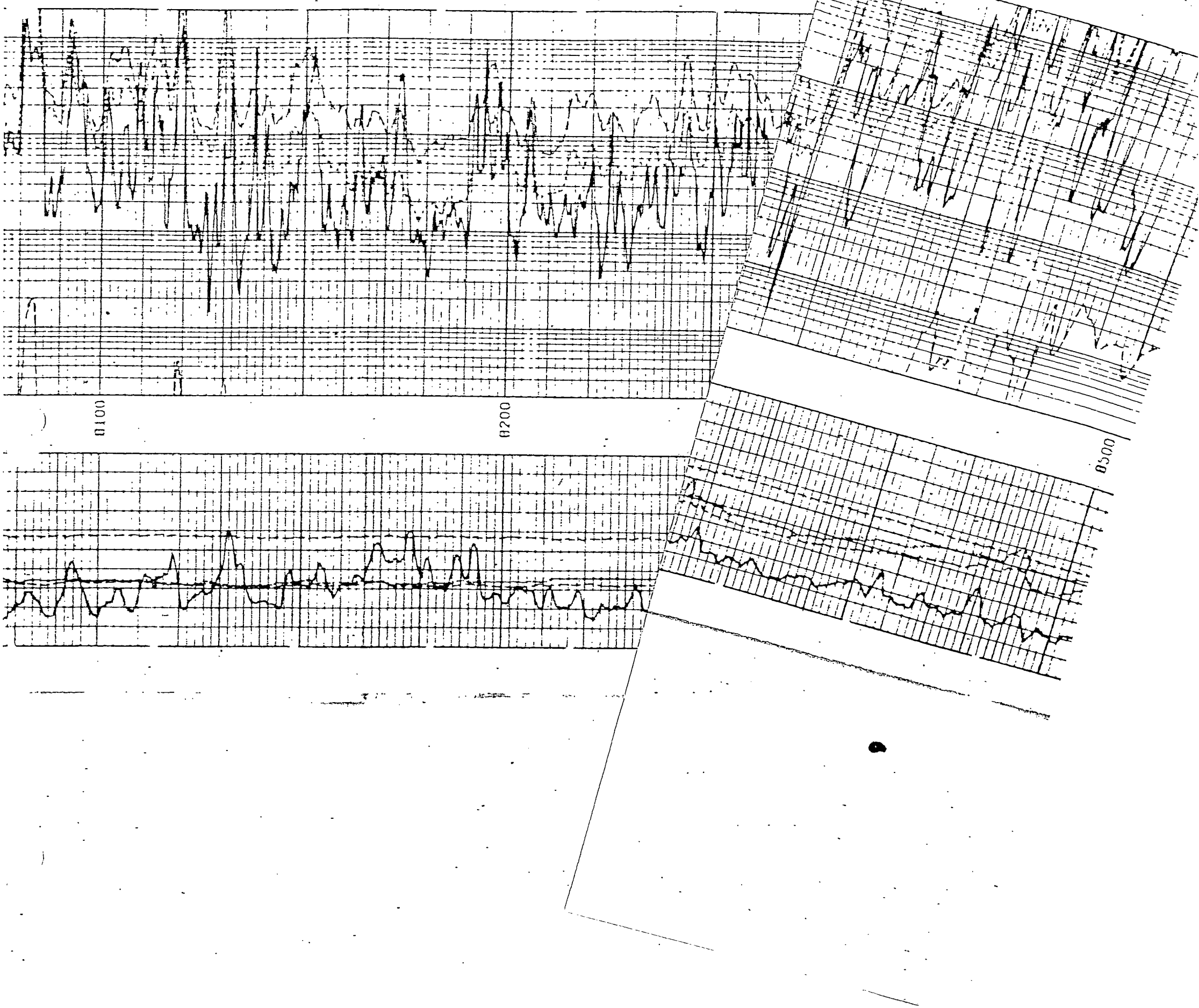
APPENDIX J

EXHIBIT 3


6600
6700
6800
6900
7000


7100
7200
7300
7400
7500


7600
7700
7800
7900
8000


0100
0200
0300

Schlumberger DUAL INDUCTION ... LOG

8161

COMPANY AMOCO PRODUCTION COMPANY

WELL DIAMOND FEDERAL GAS COM #1

FIELD SCOGGINS DRAW MORROW

COUNTY EDDY STATE NEW MEXICO

COUNTY EDDY
FIELD or LOCATION SCOGGINS DRAW
WELL DIAMOND FEDERAL GAS COM #1
COMPANY AMOCO PROD. CO.

Location: 1980' FNL & 660' FWL

Sec. 12 Twp. 18-S Rge. 27-E

Other Services: CNL-FDC

Permanent Datum G.L. ; Elev.: 3610
Log Measured From R.K.B. 13 Ft. Above Perm. Datum
Drilling Measured From R.K.B.

Elev.: K.B. 3623
D.F. 3622
G.L. 3610

Date	8-27-73			
Run No.	ONE			
Depth—Driller	10373			
Depth—Logger	10370			
Btm. Log Interval	10366			
Top Log Interval	1997			
Casing—Driller	8 5/8@ 1995	@	@	@
Casing—Logger	1997			
Bit Size	7 7/8			
Type Fluid in Hole	FRESH MUD			
Fluid Level	FULL			
Dens. / Visc.	9 / 39			
pH / Fluid Loss	11 / 8 ml	ml	ml	ml
Source of Sample	FLOWLINE			
R_m @ Meas. Temp.	1.6 @ 90 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	.70 @ 75 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	3.2 @ 90 °F	@ °F	@ °F	@ °F
Source: R_{mf} / R_{mc}	M / C			
R_m @ BHT	1.06 @ 152°F	@ °F	@ °F	@ °F
Time Since Circ.	14 HOURS			
Max. Rec. Temp.	152 °F	°F	°F	°F
Equip. / Location	7646 / HOBBS			
Recorded By	CREEK			
Witnessed By	KLAAR			

Reproduced By
Electrical Log Services
Midland, Texas 79701

24

REFERENCE W 8664W

21 COMPLETION RECORD

SPUD DATE

COMP DATE

DST RECORD

API NO 30-015-20894

CASING RECORD

PERFORATING RECORD

ACID FRAC SHOT

IP

GOR GR

TP CP

REMARKS:

REPRODUCTION FOR RESALE PROHIBITED

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date / Sample No.				
Depth - Driller				
Type Fluid in Hole				
Dens. / Visc.				
pH / Fluid Loss		ml		ml
Source of Sample				
R_m @ Meas. Temp.		@ °F	@ °F	
R_{mf} @ Meas. Temp.		@ °F	@ °F	
R_{mc} @ Meas. Temp.		@ °F	@ °F	
Source: R_{mf} / R_{mc}				
R_m @ BHT		@ °F	@ °F	
R_{mf} @ BHT		@ °F	@ °F	
R_{mc} @ BHT		@ °F	@ °F	

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	ONE
Panel No.	C-133
Cart. No.	5
Sonde No.	6-24
Hom. Panel No.	
G.R. Cart. No.	
G.R. Panel No.	
TTR No.	
Cent. Device	YES
Stand off - Inches	1.5
Time Const - Sec.	
Speed - F.P.M.	60/80

REMARKS

Service Order No. - 90316
API Serial No. -

☐ Surface determined sonde errors used.
☐ Sonde error corrected for Inch
borehole signed at R_m =
☒ Induction sere set in hole at depth of 9450 feet.

CALIBRATION DATA

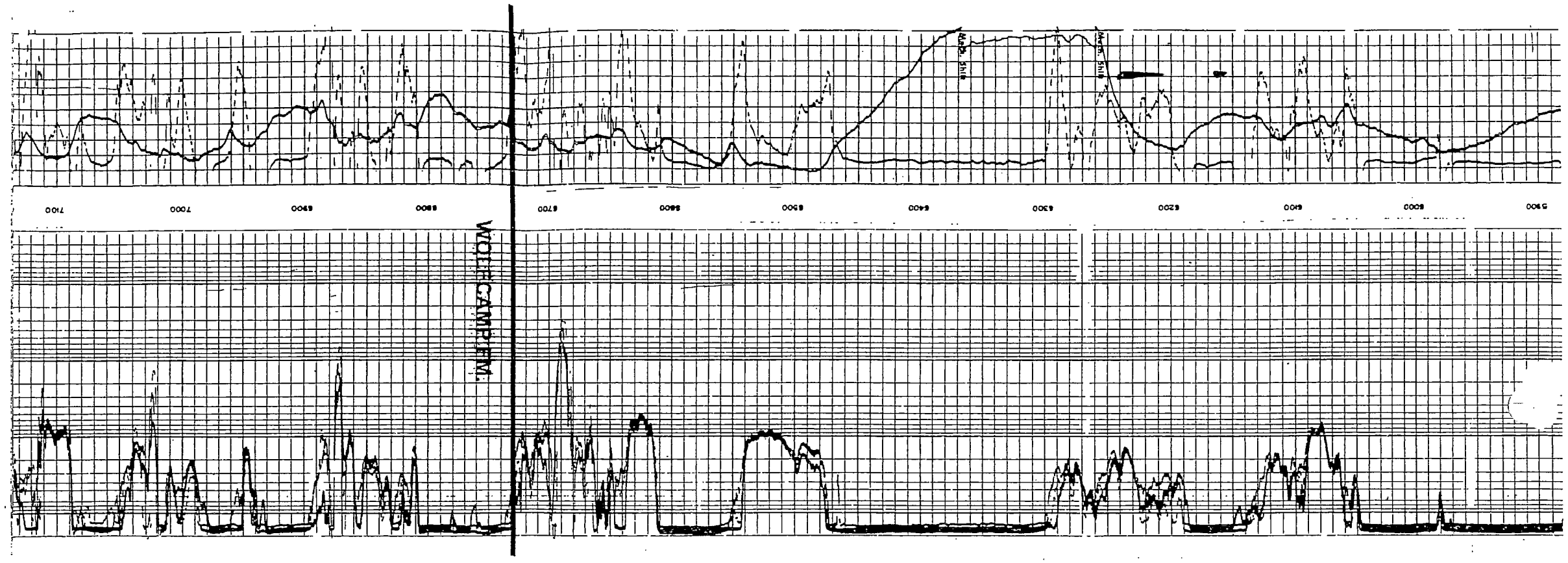
CALIBRATION:	BACKGND. CPS.	SOURCE CPS.	GALV. INCR. DIVISION	SENS. TAP (FOR CAL.)	SENS. TAP (RECORD)	TIME CONST.	
GAMMA RAY:							

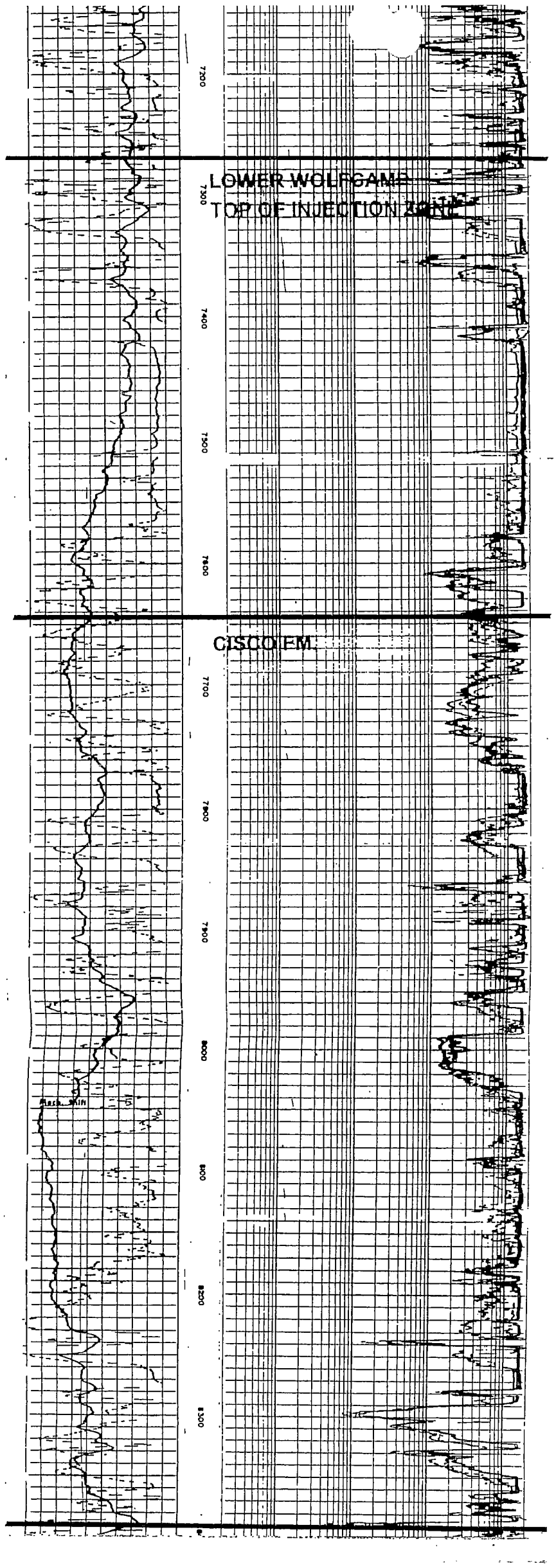
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

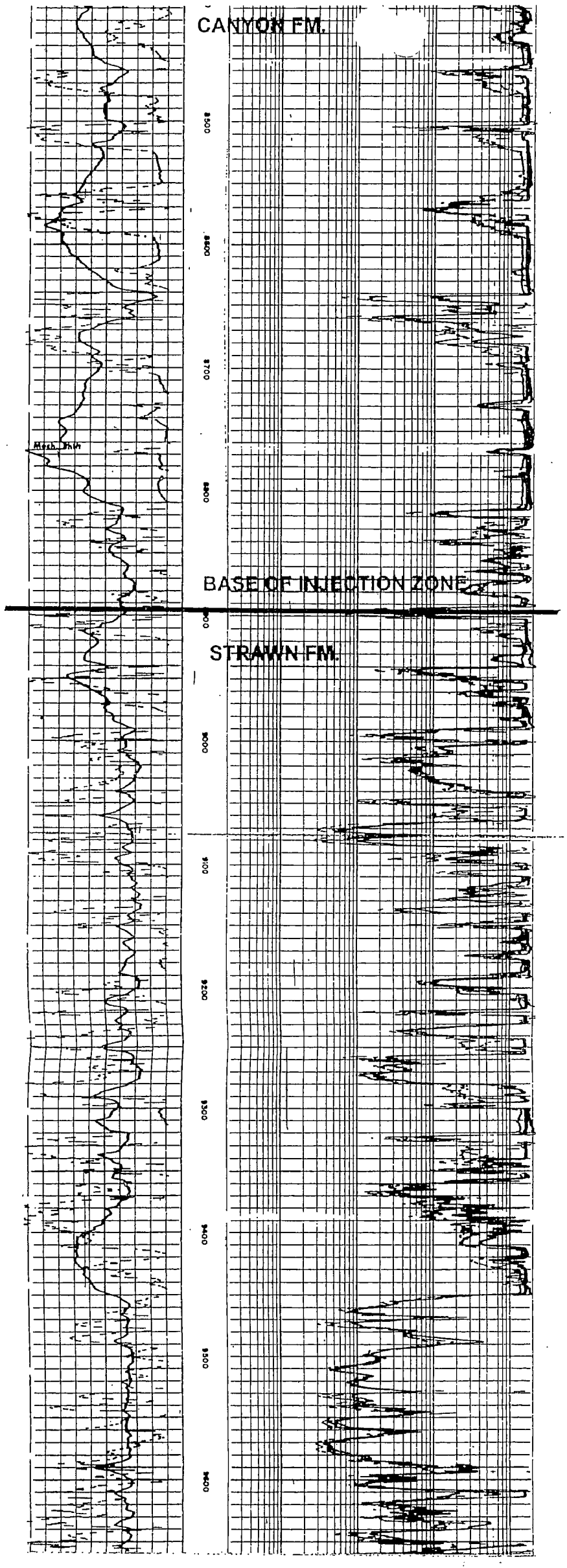
SPONTANEOUS POTENTIAL (MILLIVOLTS)	DEPTHS	RESISTIVITY (OHMS. M²/M)
10 (−|+) R_{XO}/R_T		DEEP INDUCTION LOG 0.2 1.0 10 100 1000 2000
		MEDIUM INDUCTION LOG 0.2 1.0 10 100 1000 2000
		LATEROLOG — 8 0.2 1.0 10 100 1000 2000
		CALIBRATION AFTER SURVEY

EXHIBIT 3

APPENDIX J


WOLFCAMP FM
7100
7000
6900
6800
6700
6600
6500
6400
6300
6200
6100
6000
5900


LOWER WOLFCAMP
TOP OF INJECTION ZONE
CISCO FM.


CANYON FM.
BASE OF INJECTION ZONE
STRAWN FM.

AQ
861

Schlumberger

COMPENSATED NEUTRON-FORMATION DENSITY

COUNTY EDDY
FIELD SCOGGINS DRAW
LOCATION DIAMOND FEDERAL
WELL DIAMOND FEDERAL GAS COMM #1
COMPANY AMOCO PROD. CO.

COMPANY AMOCO PRODUCTION COMPANY

WELL DIAMOND FEDERAL GAS COMM #1

FIELD SCOGGINS DRAW MORROW

COUNTY EDDY STATE NEW MEXICO

Location: 1980' FNL & 660' FWL

Sec. 12 Twp. 18-S Rge. 27-E

Other Services: DIL

Permanent Datum: G.L. Elev.: 3610
Log Measured from R.K.B. 13 Ft. Above Perm. Datum
Drilling Measured from R.K.B.

Elev.: K.B. 3623
D.F. 3622
G.L. 3610

Date	8-27-73			
Run No.	ONE			
Depth - Driller	10372			
Depth - Logger	10370			
Btm. Log Interval	10369			
Top Log Interval	0			
Casing - Driller	8 5/8 @ 1995	@	@	@
Casing - Logger	1997			
Bit Size	7 7/8			
Type Fluid in Hole	FRESH MUD			
Fluid Level	FULL			
Dens. / Visc.	9 / 39			
pH / Fluid Loss	11 / 8 ml	ml	ml	ml
Source of Sample	FLOWLINE			
Rm @ Meas. Temp.	1.8 @ 90 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp	.70 @ 75 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp	3.2 @ 90 °F	@ °F	@ °F	@ °F
Source: Rmf / Rmc	M / C			
Rm @ BHT	1.07 @ 152 °F	@ °F	@ °F	@ °F
Time Since Circ.	5 HOURS			
Max. Rec. Temp.	152 °F	°F	°F	°F
Equip. / Location	7646 / HOBBS			
Recorded By	CREEK			
Witnessed By	KLAAR			

Reproduced By
Electrical Log Services
Midland, Texas 79701

REFERENCE W 86645

24 COMPLETION RECORD

SPUD DATE

COMP DATE

DST RECORD

API NO. 30-015-20894

CASING RECORD

PERFORATING RECORD

ACID FRAC SHOT

T P

GOR GR

T P C P

REMARKS

REPRODUCTION FOR RESALE PROHIBITED

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Type / Sample No.				
Depth - Driller				
Type Fluid				
Source of Sample				
Rm @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rm @ BHT	@ °F			
Dens. / Visc.				
pH / Fluid Loss		ml		ml
% Water by Vol.				
% Oil by Vol.				
% Solids by Vol.				
Salinity Eq. Sp. Gr.				

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	ONE
Inst. Pnl.	D-396
Inst. Cart	A-117
Inst. Skid	D-1032
Inst. Sde	C-203
Inst. Source	134
Inst. Calib.	C-2472
Aux. Pnl.	A-130
Aux. Cart	A-92
Aux. Source	C-234
Aux. Calib	A-67
R Cart	J-251
FR	
Gam Pnl.	C-247

LOGGING DATA

CNP

Matrix	Auto Hole Size Corr.	Hole Size Setting (if not auto)	Porosity Scale	From	To
LIME	☒ Yes ☐ No		30 -10	TD	CSG
	☐ Yes ☐ No				
	☐ Yes ☐ No				
	☐ Yes ☐ No				

FDC

Liquid Density	Grain Density	Hole Fluid	Porosity Scale	From	To
1.0	2.71	LIQUID	30 -10	TD	CSG

HOLE SIZE/CASING DATA

Type	From	To	Csg. Size	Csg. Wt.	From	To
PE	10378	1995	5 1/2		1995	SURF

REMARKS

Service Order No. - 90316
API Serial No. -

CALIBRATION DATA

Run No.	Gamma Ray API Scale	Gamma Ray Background CPS	Gamma Ray Total CPS	CNL—Before Log—ACPS Long Spacing	CNL—Before Log—ACPS Short Spacing	CNL—After Log—ACPS Long Spacing	CNL—After Log—ACPS Short Spacing
1	165	100	550	440	940	440	960
2							
3							
4							

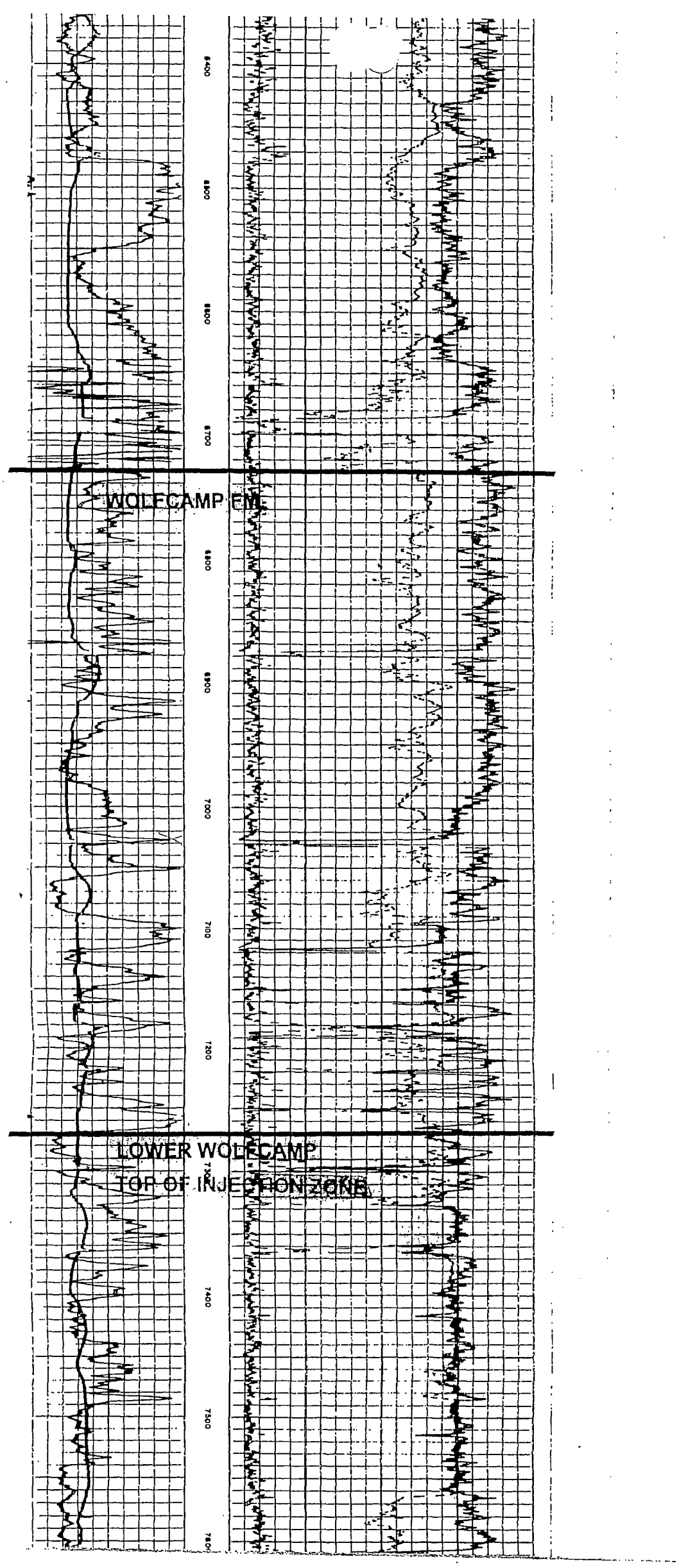
Run No.	FDC — Before Log — ACPS P_1	FDC — Before Log — ACPS P_2	FDC — After Log — ACPS P_1	FDC — After Log — ACPS P_2
1	466	764	472	752
2				
3				
4				

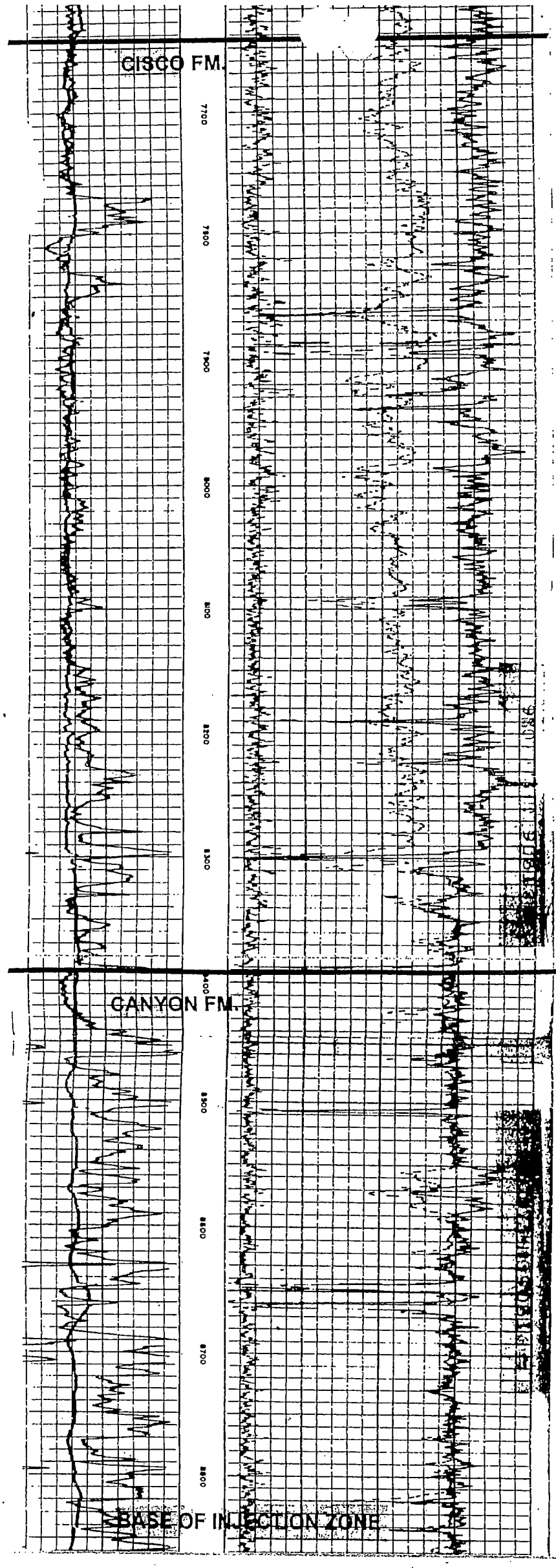
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CALIPER HOLE DIAM. IN INCHES	DEPTHS	CNL POROSITY—%
6 16	0 1:25	30 20 10 0 -10

EXHIBIT 3

APPENDIX J


WOLFCAMP EM
LOWER WOLFCAMP
TOP OF INJECTION ZONE
8400
8500
8600
8700
7000
7100
7200
7300
7400
7500
7600


CISCO FM.
7700
7600
7900
8000
8100
8200
8300
8400
CANYON FM.
8500
8700
8800
BASE OF INJECTION ZONE

157

EDDY SEC 1-18S-27E

Petroleum Information

DENVER, COLORADO 80201

REFERENCE Y 4949N

API NO. 30 015 26575

REPRODUCTION FOR RESALE IN WHOLE OR PART PROHIBITED

HALLIBURTON Logging Services

COMPANY MEWBOURNE OIL CO.

WELL CHALK BLUFF FEDERAL NO. 1

FIELD NORTH ILLINOIS CAMP-MORROW

COUNTY EDDY STATE NM

API NO. NA OTHER SERVICES DLL-MSFL

LOCATION 2250 FNL & 760 FSL DLL

PERMANENT DATUM G.L. ELEV. 3605 ELEV.: K.B. 3625

LOG MEASURED FROM K.B. 16 FT. ABOVE PERM. DATUM D.F. 3624

DRILLING MEASURED FROM K.B. G.L. 3609

DATE	11/22/95	11/28/95
RUN NO.	ONE	TWO
DEPTH-DRILLER	9450	10120
DEPTH-LOGGER	9449	10124
BTM. LOG INTER.	9417	10121
TOP LOG INTER.	SURFACE	8500
CASING-DRILLER	8 5/8@1600	7 @ 9450
CASING-LOGGER	1595	9446
BIT SIZE	7 7/8	6 1/8
TYPE FLUID IN HOLE	WATER	SALT MUD
DENS. / VISC.	NA / NA	9.3 / 33
PH / FLUID LOSS	NA / NA	10.5 / 17.0
SOURCE OF SAMPLE	MUD PIT	CIRCULATED PIT
RM @ MEAS. TEMP.	1.4 @43	.21 @55
RMF @ MEAS. TEMP.	NA @NA	.18 @49
RMC @ MEAS. TEMP.	NA @NA	NA @NA
SOURCE RMF / RMC	NA / NA	NA / NA
RM @ BHT	.541 @122	.093 @143
TIME CIRC.	6 HOURS	6 HOURS
TIME ON BOTTOM	12:44 HRS	5:11 HRS
UNIT NUMBER	122	148
WITNESSED BY	D. BRUTE	D. BRUTE

TIGHT HOLE

Fold Here

Service Ticket No.: 63052 API Serial No.: NA PGM Version: 2.51

Change in Mud Type or Additional Samples

Date/Sample No.	/ / :	/ / :
Depth-Driller		
Type Fluid in Hole		
Dens. : Visc.	:	:
pH. : Fluid Loss	:	:
Source of Sample		
Rm @ Meas. Temp.	@	@
Rmf @ Meas. Temp.	@	@
Rmc @ Meas. Temp.	@	@
Source: Rmf:Rmc	:	:
Rm @ BHT	.541 @122	@
Rmf @ BHT	NA @NA	@
Rmc @ BHT	NA @NA	NA @NA

RESISTIVITY SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole
NA			

RESISTIVITY EQUIPMENT DATA

Run No	Tool Type & No	Pad Type	Tool Pos.	Other
ONE	DILT-109430	NA	NA	
	SGPT-108928	NA	CENT	
TWO	DLL-113309	NA	CENT	NA

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.		Run No.	ONE	Run No.	ONE
Serial No.	108615	Serial No.		Serial No.	112611	Serial No.	108763
Model No.	432	Model No.		Model No.	455	Model No.	434
Diameter	3.625	No.of Cent.		Diameter	4.5"	Diameter	3 5/8
Detector Model No.	1027	Spacing		Log Type	G-G	Log Type	N-N
Type	SCINT			Source Type	CS-137	Source Type	AM-241
Length	4"	LSA		Serial No.	30	Serial No.	DSN-27
Distance To Source	18"	FWDA		Strength	1.5 CI	Strength	18.5 CI

LOGGING DATA

GENERAL Run No.	Depth From	Depth To	Speed Ft/Min	GAMMA Scale L	GAMMA Scale R	ACOUSTIC Scale L	ACOUSTIC Scale R	ACOUSTIC Matrix	DENSITY Scale L	DENSITY Scale R	DENSITY Matrix	NEUTRON Scale L	NEUTRON Scale R	NEUTRON Matrix
ONE	9417	SURF	REC	0	100				30	-10	2.71	30	-10	LIME
TWO	10124	8500	REC	0	100				30	-10	2.71	30	-10	LIME

Remarks:

2" = 100'

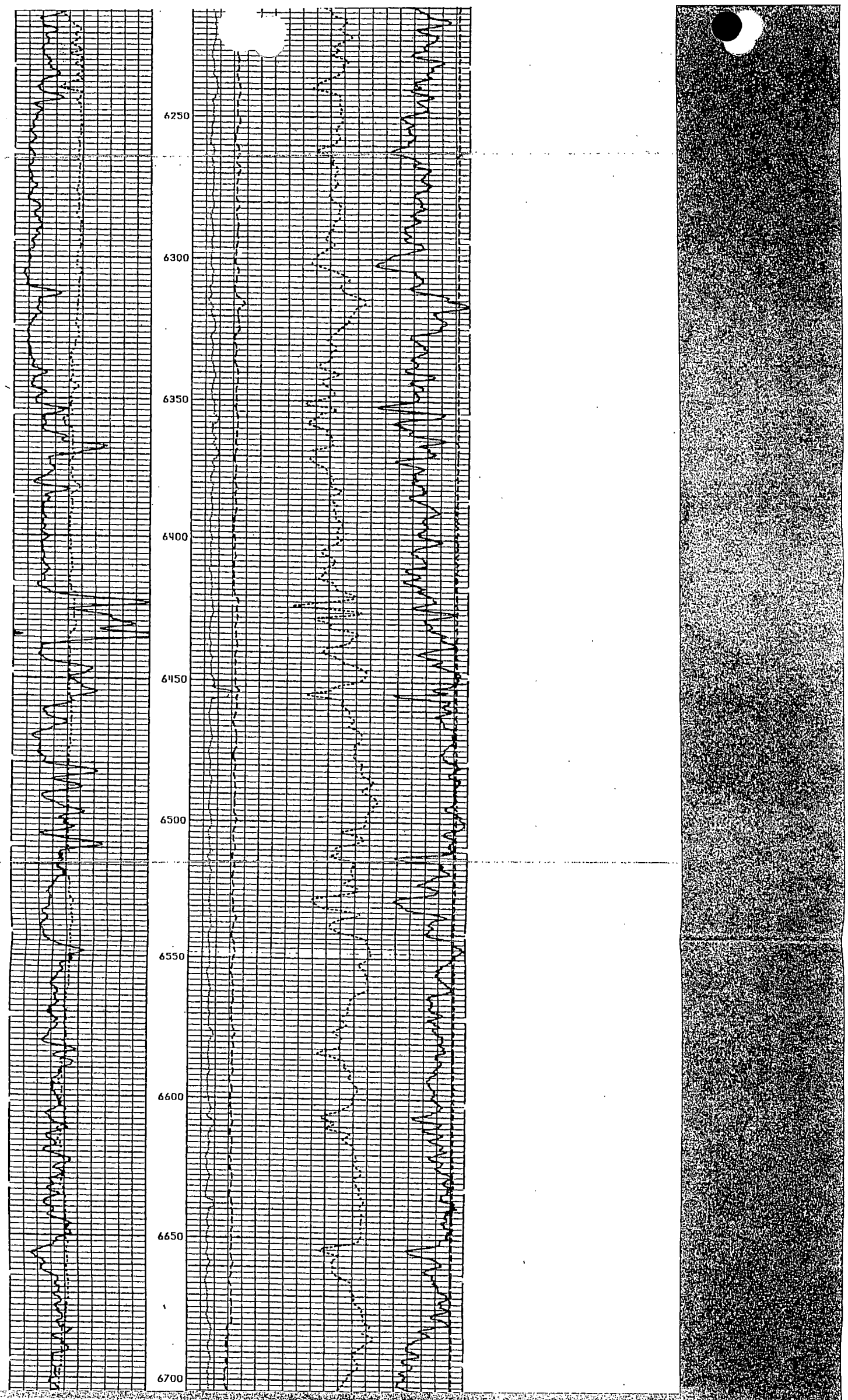
P.E.			PE CORR		
0	QUALITY	-2	-1	B/E	9
	G SHORT			DEN CORR	TENSION
-4.5		8.5	-0.2	GM/CC	0.8 10000 POUNDS 0
	G LONG			DENSITY	
4.5		-8.5			
	GAMMA				
0	API	100	2	GM/CC	1
	CALIPER			NEU POROS	
6	INCHES	16	30		-10

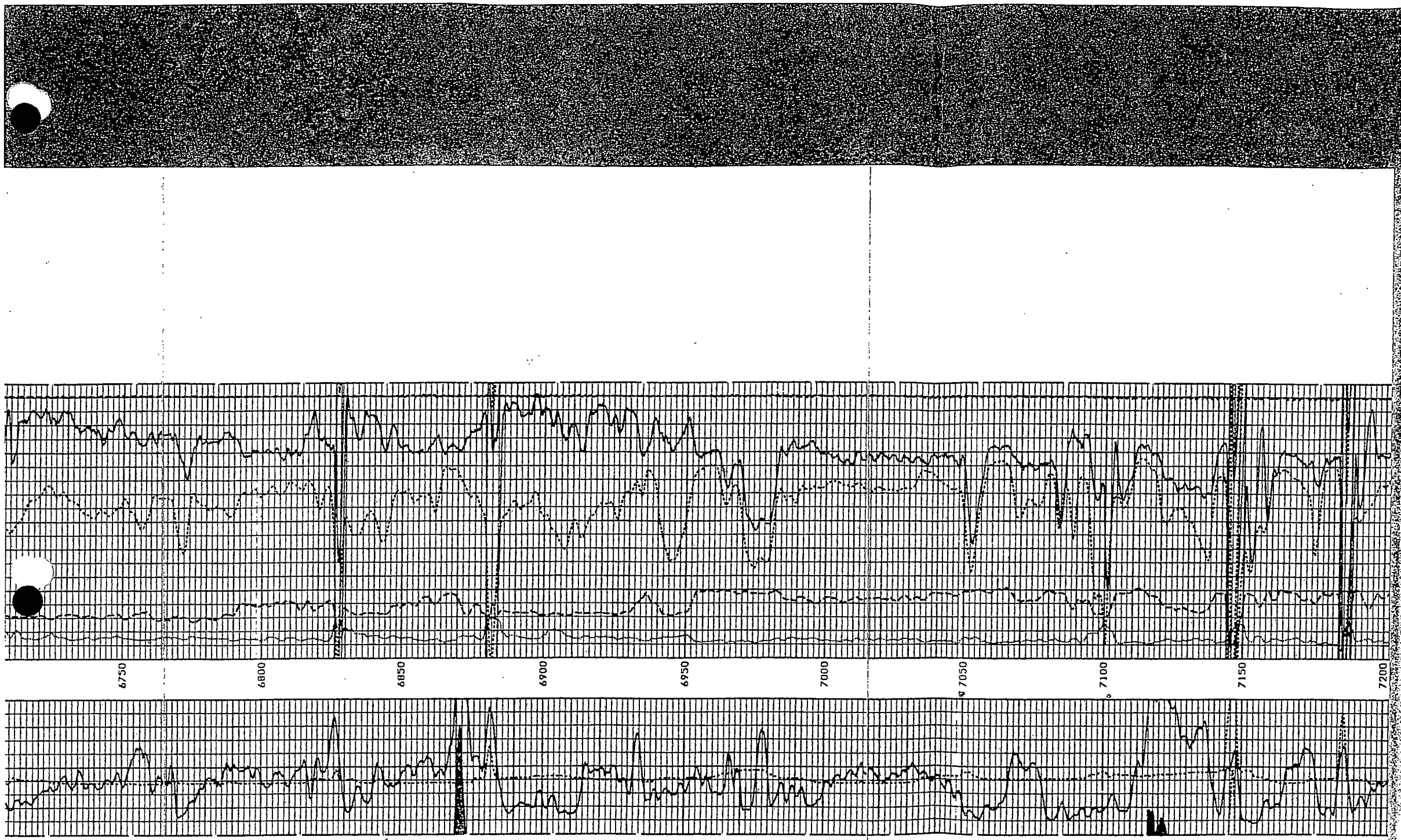
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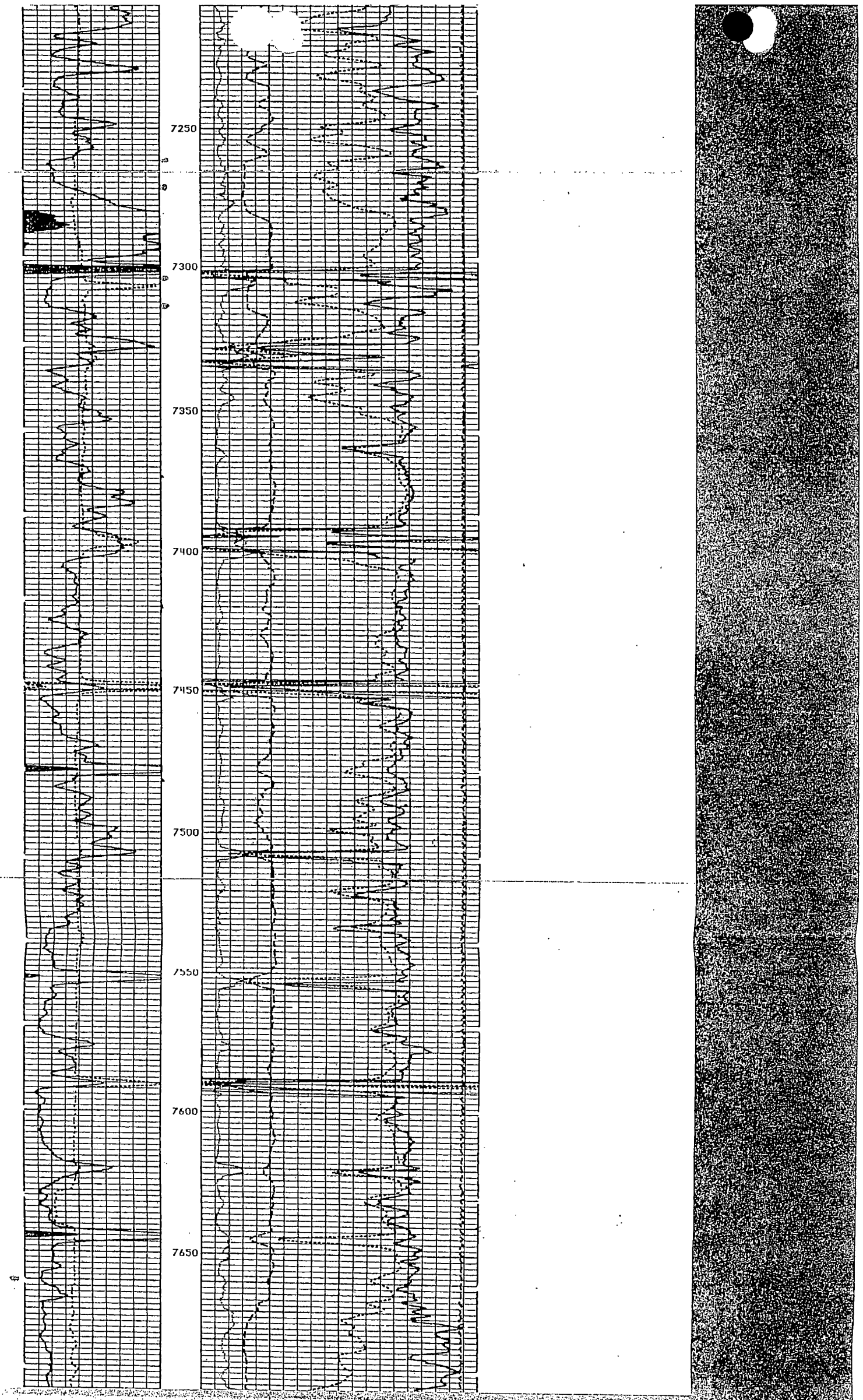
← MINUTE MARKER

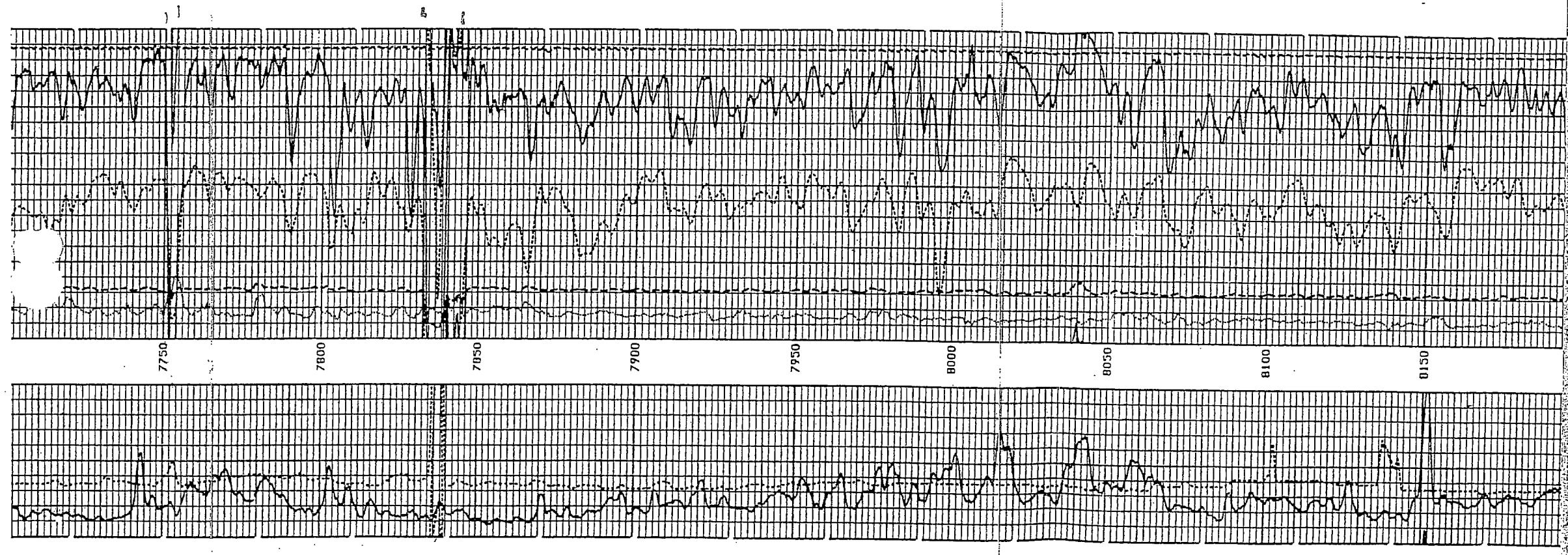
EXHIBIT 3

APPENDIX J


6250
6300
6350
6400
6450
6500
6550
6600
6650
6700


6750
6800
6850
6900
6950
7000
7050
7100
7150
7200


7250
7300
7350
7400
7450
7500
7550
7600
7650


7750
7800
7850
7900
7950
8000
8050
8100
8150

157

EDDY SEC 1-18S-27E

Petroleum Information

DENVER, COLORADO 80201

REFERENCE Y 49491

25 API NO. 30 015 26575

REPRODUCTION FOR RESALE IN WHOLE OR PART PROHIBITED

HALLIBURTON LOGGING SERVICES

DUAL INDUCTION LATEROLOG

COMPANY MEWBOURNE OIL CO.
WELL CHALK BLUFF FEDERAL NO.1
FIELD NORTH ILLINOIS CAMP-MORROW
COUNTY EDDY STATE NM
API NO. NA OTHER SERVICES SDL-DSN
LOCATION 2250 FNL & 760 FEL
SEC 1 TWP 18S RGE 27E
PERMANENT DATUM G.L. ELEV. 2605 ELEV.: K.B. 2
LOG MEASURED FROM K.B. 15 FT. ABOVE PERM. DATUM D.F. NA
DRILLING MEASURED FROM K.B. G.L. NA

DATE	1/22/91	
RUN NO.	ONE	
DEPTH-DRILLER	9450	
DEPTH-LOGGER	9449	
BTM. LOG INTER.	9446	
TOP LOG INTER.	2595	
CASING-DRILLER	9 625@2600	
CASING-LOGGER	2595	
BIT SIZE	6 7/8	
TYPE FLUID IN HOLE	WATER	NO RETURNS
DENS. / VISC.	NA / NA	
PH / FLUID LOSS	NA / NA	
SOURCE OF SAMPLE	MUDPIT	
RM @ MEAS. TEMP.	1.4 @ 63	
RMF @ MEAS. TEMP.	NA @ NA	
RMC @ MEAS. TEMP.	NA @ NA	
SOURCE RMF / RMC	NA / NA	
RM @ BHT	.541 @122	
TIME SINCE CIRC.	5 HRS	
TIME ON BOTTOM	12:44 HRS	
MAX. REC. TEMP.	122 @ R	
EQUIP. / LOCATION	5414 / HOBBS	
RECORDED BY	RIEGERJED	
WITNESSED BY	D. OVERTON	

TIGHT HOLE

Fold Here

Service Ticket No.: 63852 API Serial No.: NA PGM Version: 2.58 E

Change in Mud Type or Additional Samples

Date/Sample No.	/ / !	/ / !
Depth-Driller		
Type Fluid in Hole		
Dens. ! Visc.	!	!
pH. ! Fluid Loss	!	!
Source of Sample		
Rm @ Meas.Temp.	@	@
Rmf @ Meas.Temp.	@	@
Rmc @ Meas.Temp.	@	@
Source: Rmf!Rmc	!	!
Rm @ BHT	.541 @122	@
Rmf @ BHT	NA @NA	@
Rmc @ BHT	NA @NA	@

RESISTIVITY SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole
NA			

RESISTIVITY EQUIPMENT DATA

Run No	Tool Type & No	Pad Type	Tool Pos.	Other
ONE	DILT-189430	NA	NA	
	SGRT-188920	NA	CENT	

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.	NA	Run No.	ONE	Run No.	ONE
Serial No.	180615	Serial No.		Serial No.	112611	Serial No.	184763
Model No.	432	Model No.		Model No.	465	Model No.	4M
Diameter	3.625	No.of Cent.		Diameter	4.5"	Diameter	3 5/8
Detector Model No.	102T	Spacing		Log Type	C-C	Log Type	M-M
Type	SCINT			Source Type	CS-137	Source Type	AM-241
Length	4"	LSA		Serial No.	39	Serial No.	DSN-27
Distance To Source	18'	FMDA		Strength	1.5 C.	Strength	18.5 Ci

LOGGING DATA

Run No.	GENERAL Depth From	Depth To	Speed Ft/Min	GAMMA Scale L	GAMMA Scale R	ACOUSTIC Scale L	ACOUSTIC Scale R	ACOUSTIC Matrix	DENSITY Scale L	DENSITY Scale R	DENSITY Matrix	NEUTRON Scale L	NEUTRON Scale R	NEUTRON Matrix
ONE	9446	2595	REC	0	100				30	-10	2.71	30	-10	LIME

Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 7" CASING
DUAL INDUCTION RUN IN COMBO WITH SDL-DSN.
DRILLING RIG HAD NO RETURNS BEFORE COMING OUT OF THE HOLE.

CREW: SIEGFRIED, HOUSTON, MORRIS, D'SOUZA

Halliburton Logging Services, Inc. does not guarantee the accuracy of any recommendation or any interpretation of the basic information or other data or any product, conclusion or opinion furnished by its employees or agents which may be given to the customer or used in the log or otherwise. The use of such data, interpretations, conclusions or recommendations during well drilling, completion or production operations shall be at customer's sole risk and customer agrees that the person making the same is not, in any case, an agent of Halliburton Logging Services, Inc.

2" = 100'

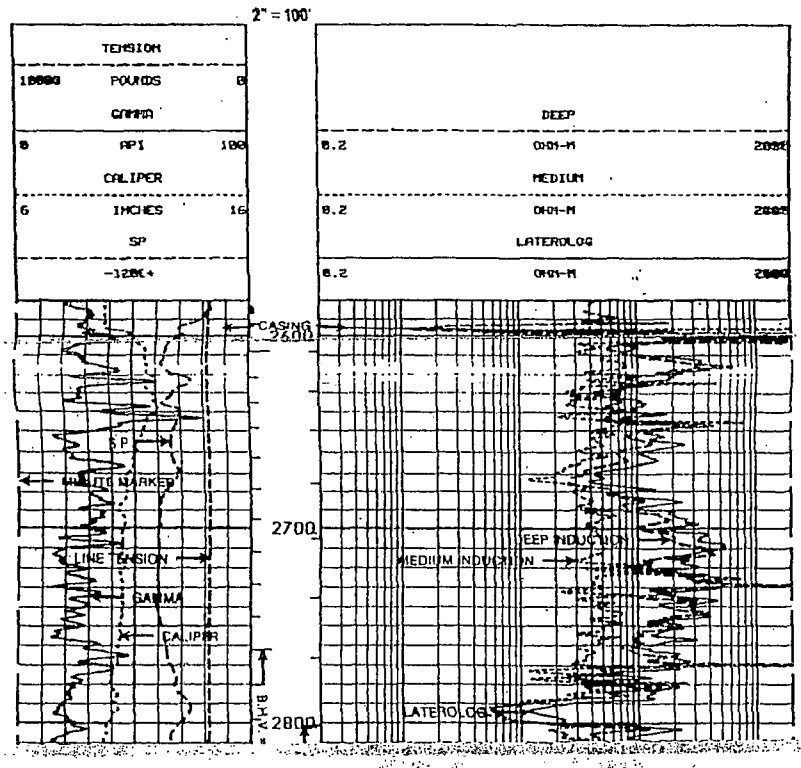
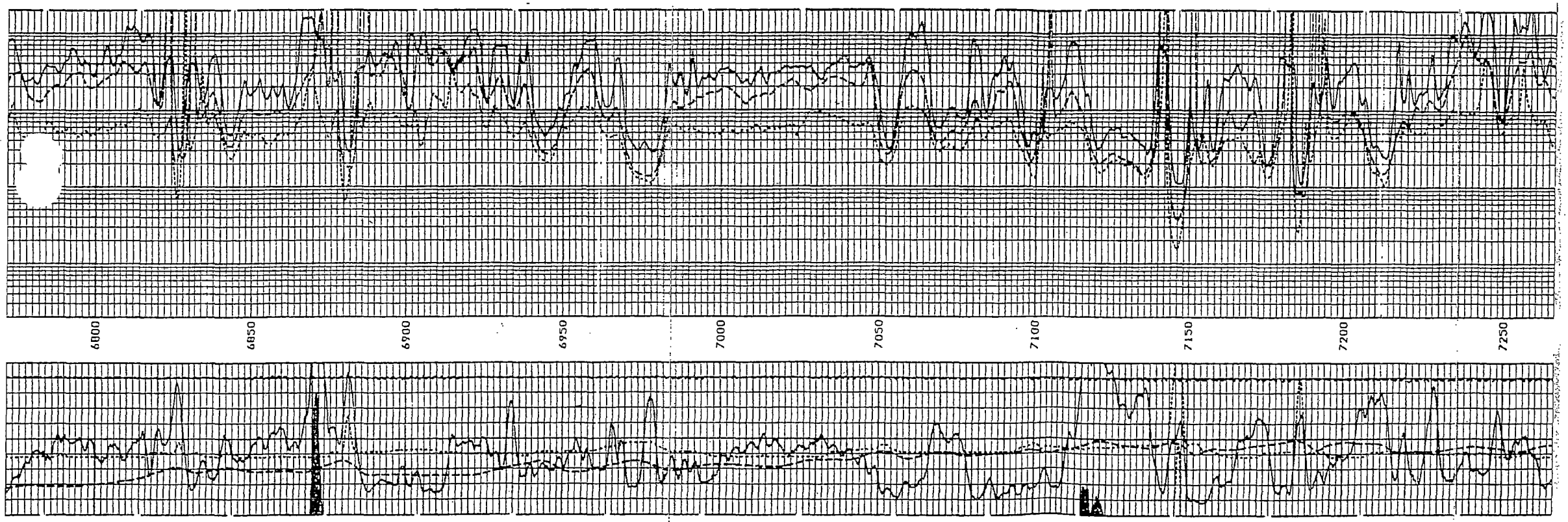
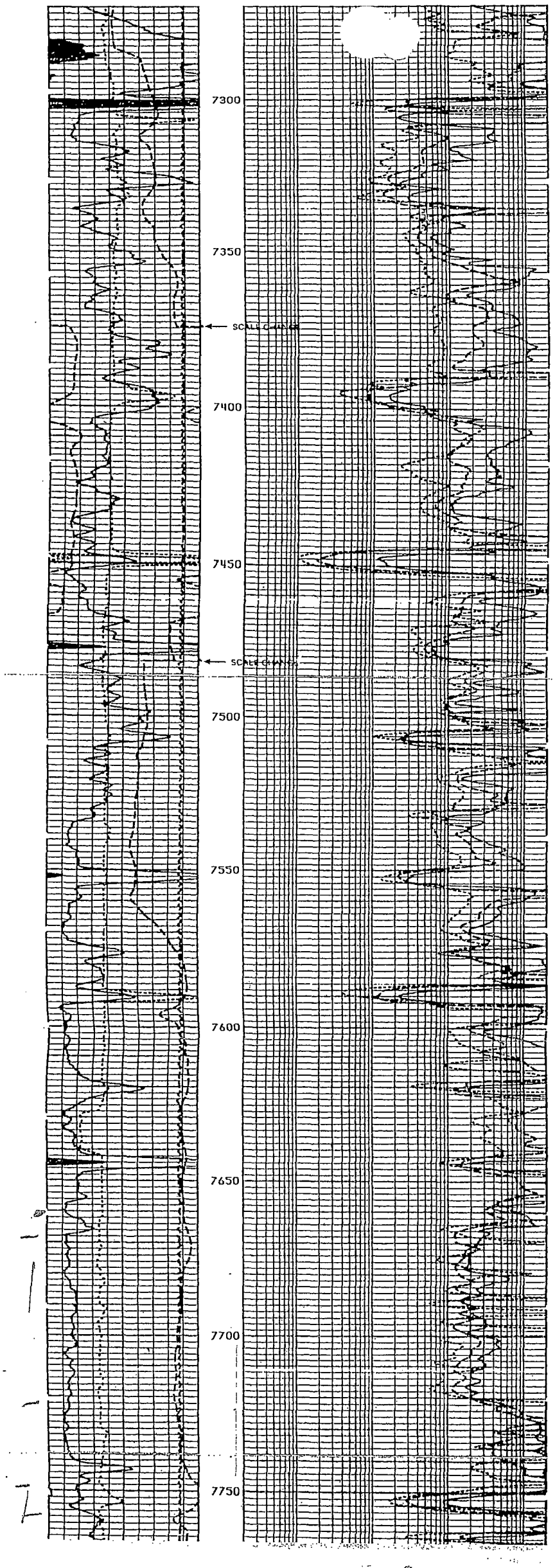
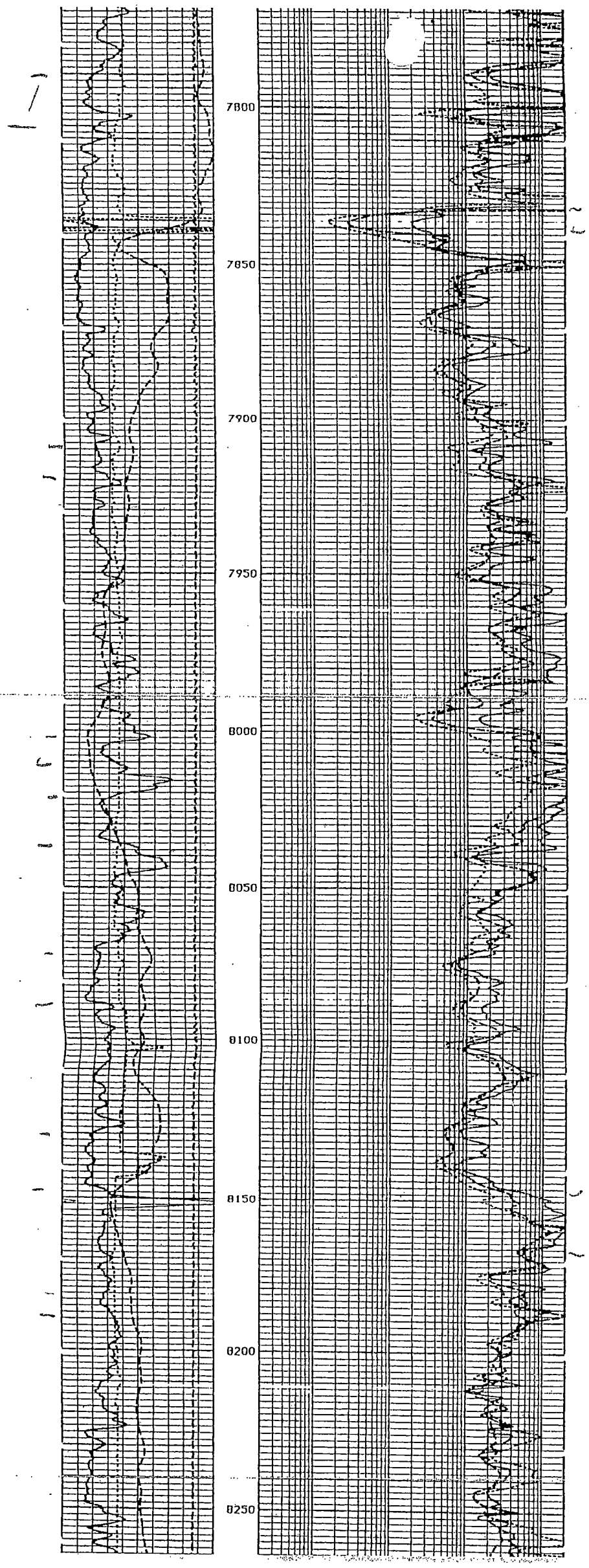


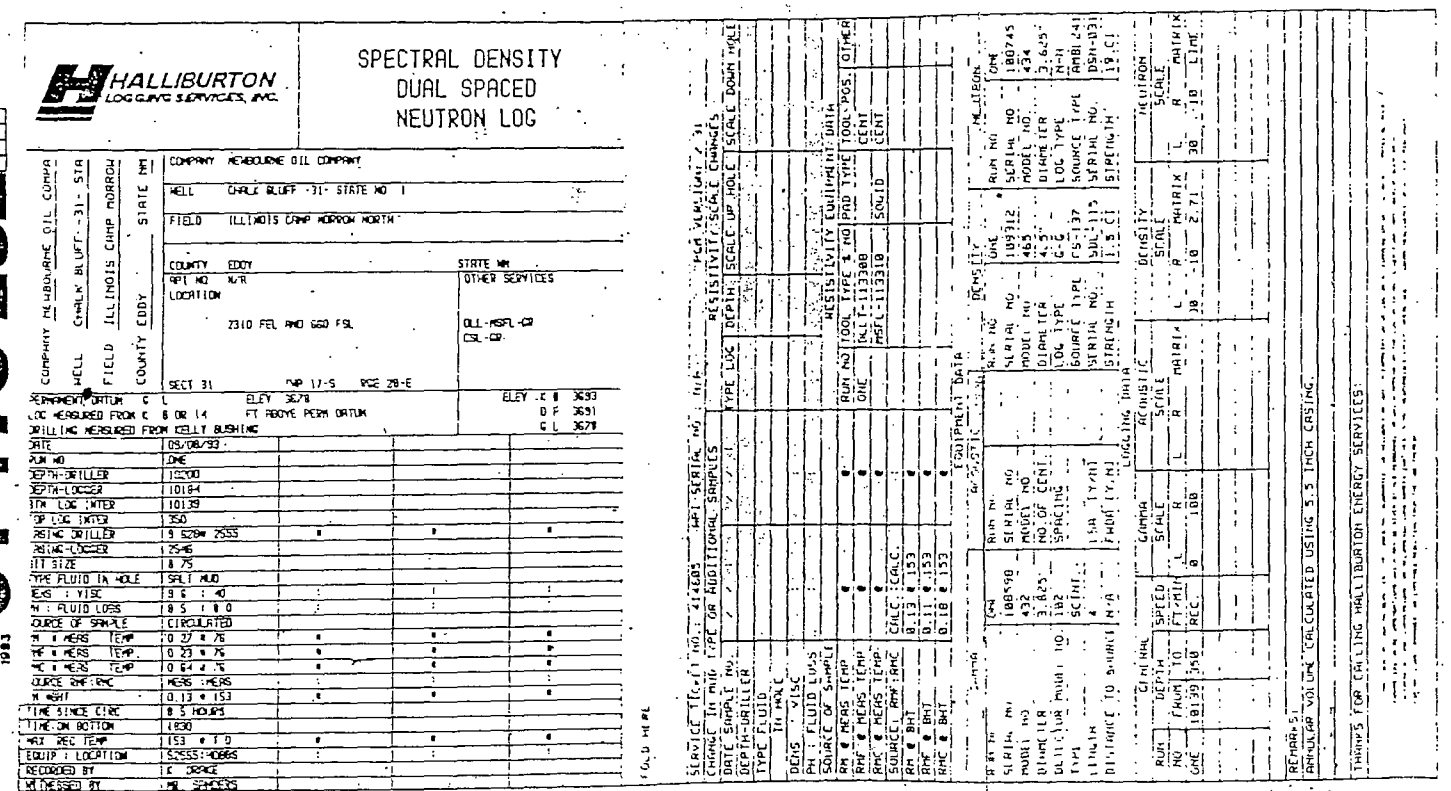
EXHIBIT 3

APPENDIX J


6800
6850
6900
6950
7000
7050
7100
7150
7200
7250


7300
7350
7400
7450
7500
7550
7600
7650
7700
7750


7800
7850
7900
7950
8000
8050
8100
8150
8200
8250

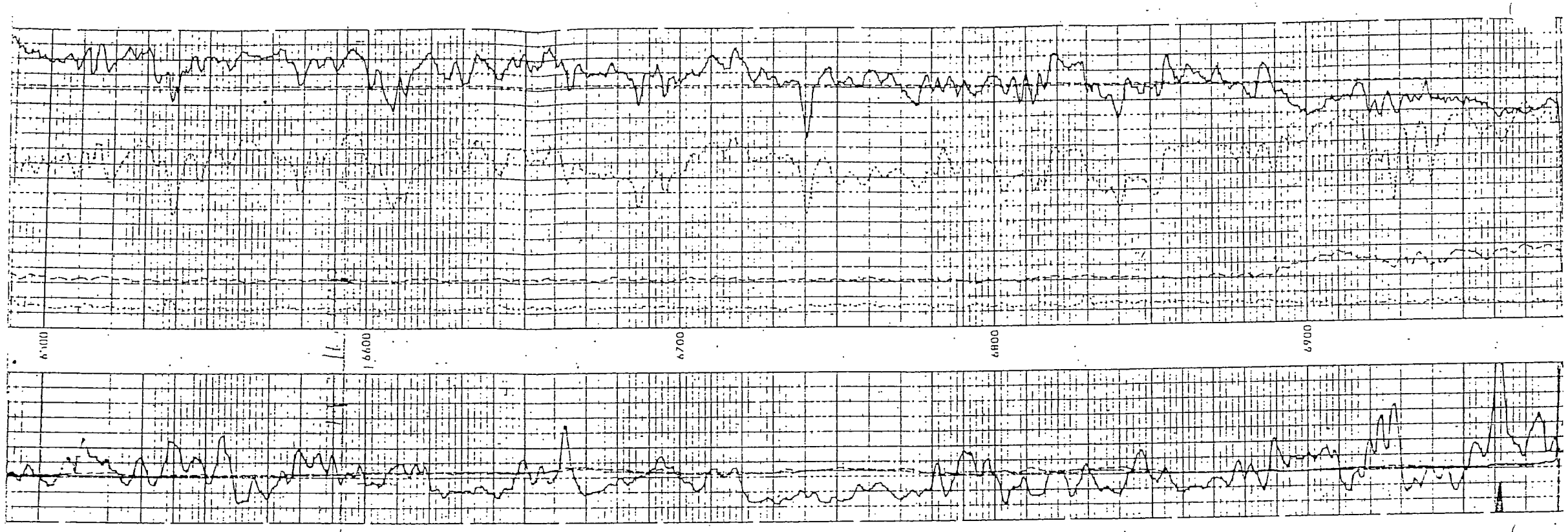


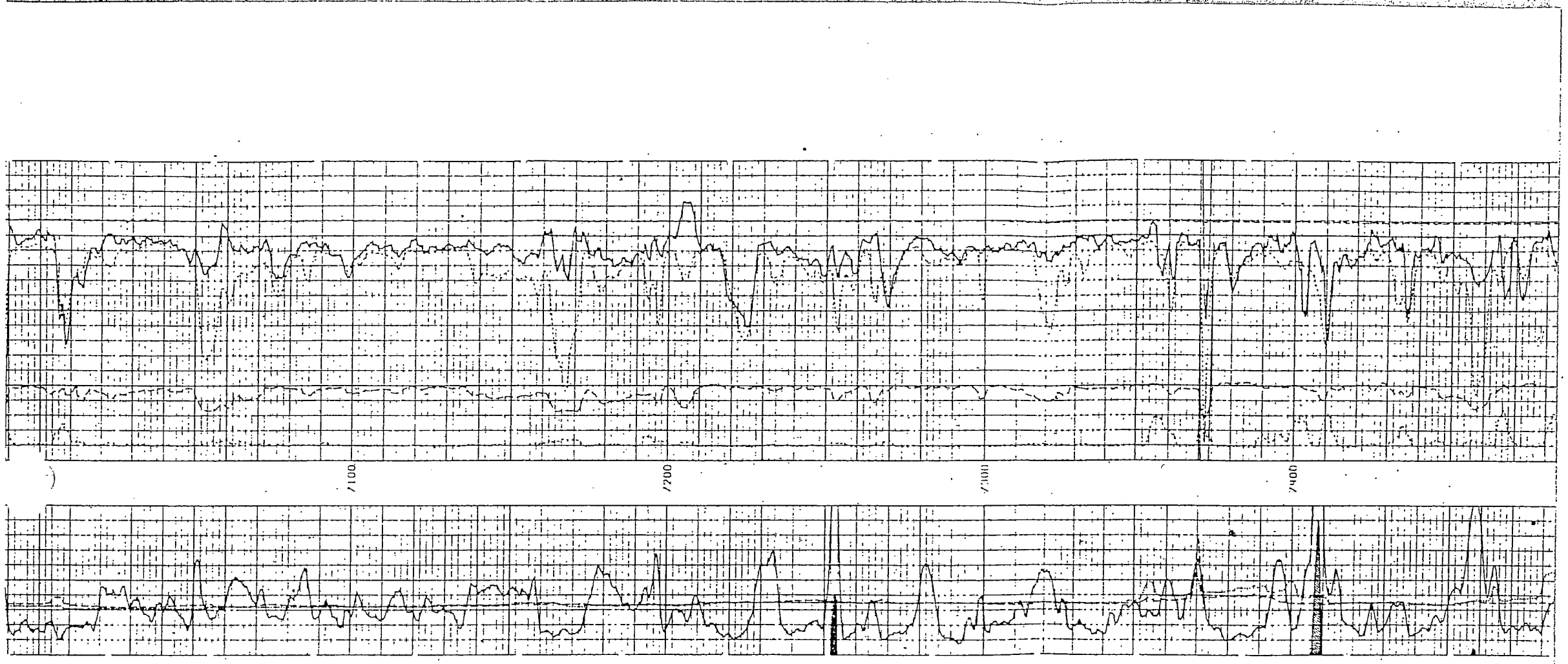
DNX-406385

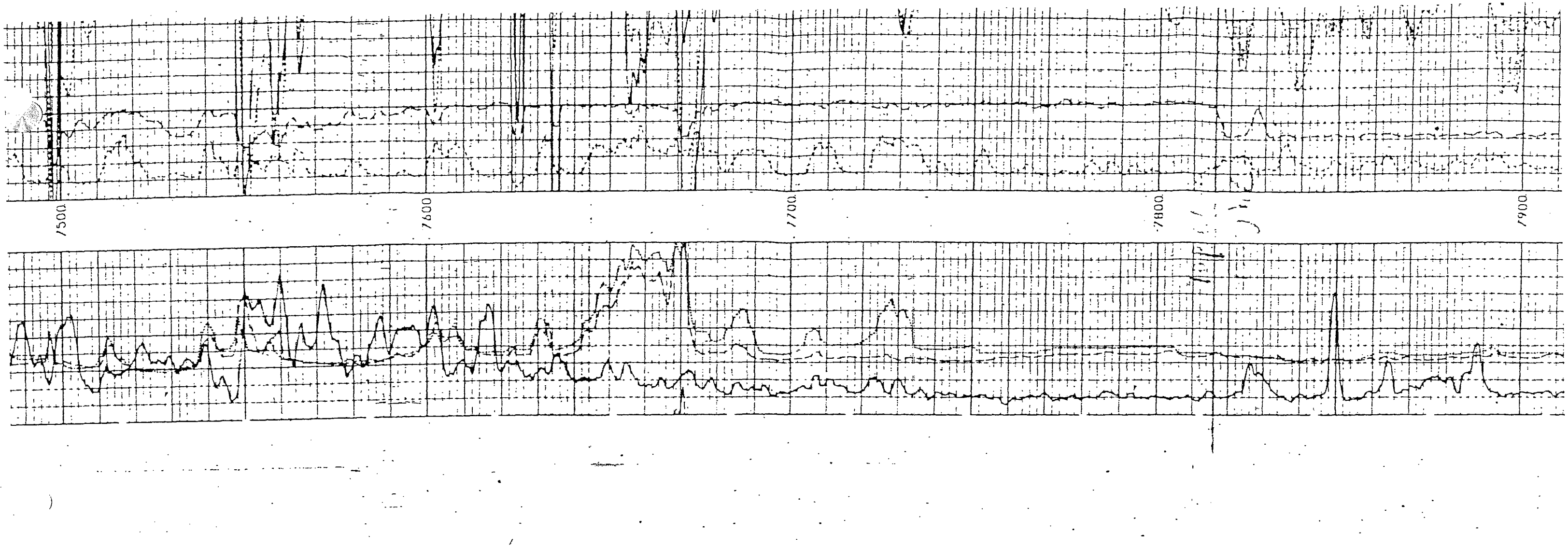
Revised 3-1-17S-28E

(c) 1993

EXHIBIT 3


0700
0800
0900

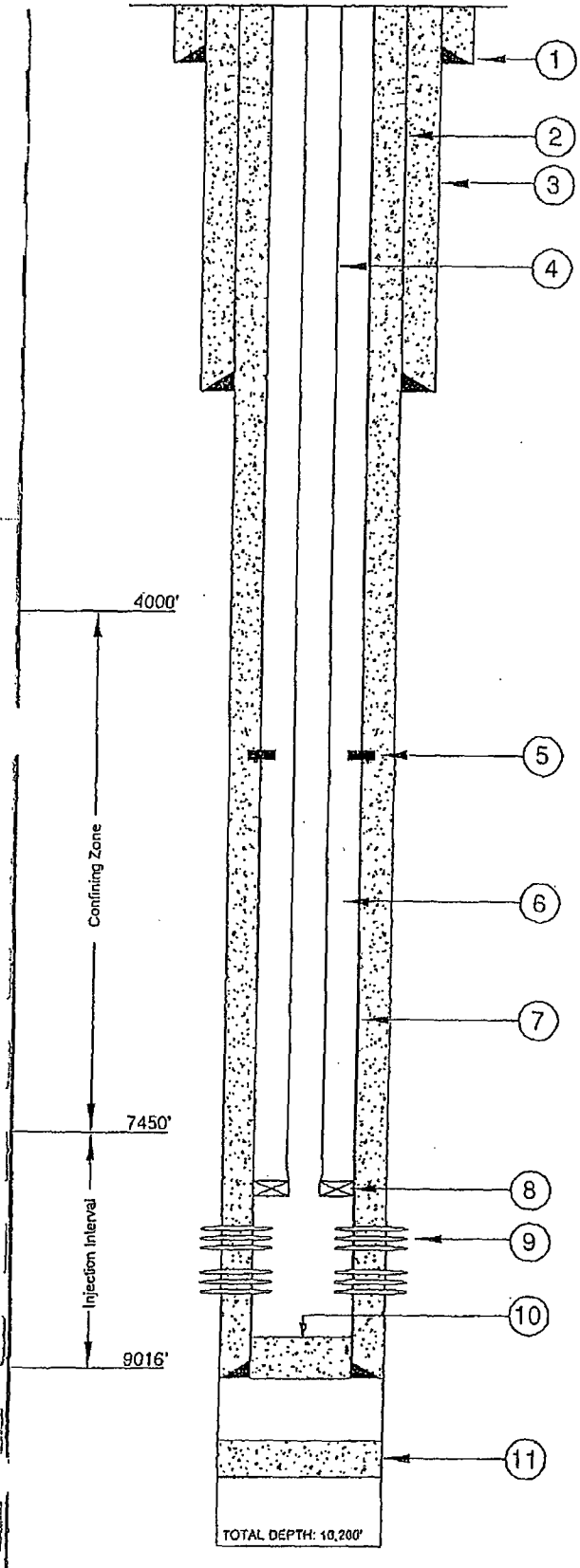

7100
7200
7300
7400


7500
7600
7700
7800
7900


0000
0100
0200
0300
0400

EXHIBIT 4





BELOW GROUND DETAILS

All depths are referenced to the Kelly bushing elevation of 12.5' above ground level. Ground level elevation is 3,678' above mean sea level.

1. Surface Casing: 13 ⅜", 48 lb/ft, J-55, ST&C set at 390' in a 17 ½" hole. Cemented with 150 sx Class C with 3 % calcium chloride, 375 sx Class C Litewate w/3% calcium chloride and ½ lb/sx flocele. Circulated 86 sx to surface.

2. Intermediate Casing: 9 ⅝", 36 lb/ft, J-55, ST&C set at 2,555' in a 12 ¼ " hole. Cemented w/800 sx of Class C Lite w/ ½ lb/sx flocele and 2 lb/sx Gilsonite and 12 % salt. Followed by 200 sx of Class C w/2 % calcium chloride. Circulated 133 sx to surface.

3. Base of the USDW at 493'.

4. Injection Tubing: 4 ½", 11.6 lb/ft, N-80, SMLS, R3, LT&C set at 7,879'.

5. DV Tool: at 5,498'.

6. Annulus Fluid: 8.7 lb/gal brine water mixed w/UniChem Techni-Hib 370 corrosion inhibitor.

7. Protection Casing: 7", 29 lb/ft, N-80, LT&C: 9094' to 7031'. 7", 29 lb/ft, P-110, LT&C: 7031' to 5845'. 7", 26 lb/ft, P-110, LT&C; 5845' to surface. Casing cemented in two stages as follows:

   First Stage - 600 sx modified Class H w/0.4 % CFR-3, 5 lb/sx Gilsonite, 0.5 % Halad-344, and 1 lb/sx salt mixed at 13.0 ppg. Opened DV tool at 5498' and circulated 142 sx to surface.

   Second Stage - Lead Slurry: 220 sx Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail Slurry: 550 sx modified Class H w/0.4 % CFR-3, 5 lb/sx, Gilsonite, 0.5 % Halad-344, 0.1% HR-7, and 1 lb/sx mixed at 13.0 ppg. Circulated 75 sx to surface. Top out w/20 sx permium plus 3% calcium chloride.

8. Packer: 7" x 3.5" EVI Oil Tools (Arrow), Model X-1 retrievable packer set at 7879'. Minimum I.D. is 3.0". Wireline re-entry guide on bottom. To release: turn ¼ turn to the right and pick up.

9. Perforations (2 SPF):

   Upper Zone - 7924-7942', 7974-8030', 8050-8056', 8066-8080', 8118-8127', 8132-8140', 8160-8164', 8170-8188'.

   Lower Zone - 8220-8254', 8260-8270', 8280-8302', 8360-8366', 8370-8378', 8400-8410', 8419-8423', 8430-8446', 8460-8464', 8470-8476'.

10. PBTD: 9004'.

11. Cement Plug: 45 sx Class H from 9624' to 9734'.

SUBSURFACE

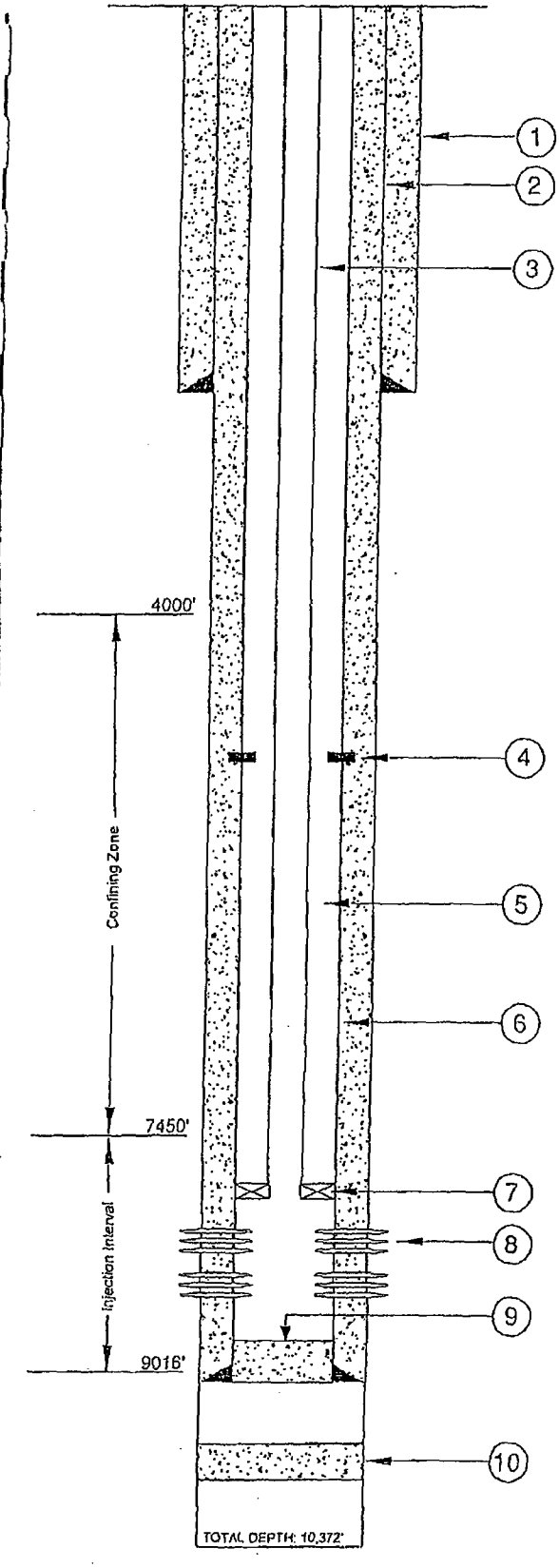
HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO

BELOW GROUND DETAILS
WASTE DISPOSAL WELL NO. 1

DATE: 07/13/01	CHECKED BY:	JOB NO: 7DD5256
DRAWN BY: WDL	APPROVED BY:	DWG. NO:

FIGURE 1



BELOW GROUND DETAILS

All depths are referenced to the Kelly bushing elevation of 13' above ground level. Ground level elevation is 3610' above mean sea level.

1. Base of the USDW at 473'.
2. Surface Casing: 8 5/8", 32 lb/ft, set at 1995' in an 11" hole. Cemented to surface with 800 sacks of cement.
3. Injection Tubing: 3 ½", 9.2 lb/ft, J-55, smls, NUE 10 rd, set at 7528'.
4. DV Tool: at 5,785'.
5. Annulus Fluid: 8.7 lb/gal brine water mixed w/UniChem Techni-Hib 370 corrosion inhibitor.
6. Protection Casing: 5 ½", 17 lb/ft, L-80, LT&C; 8869' to the surface and set in a 7 7/8" hole. Casing cemented in two stages as follows:

   First Stage - 575 sacks of modified Class "H" with 0.4 % CFR-3, 5 lb/sk Gilsonite, 0.5 % Halad-344, and 3 lb/sk salt. Mixed at 13.0 ppg. Opened DV tool at 5785 and circulated 20 sacks to surface.

   Second Stage - Lead Slurry: 300 sacks of Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail slurry: 695 sacks modified Class "H" with 0.4% CFR-3, 5 lb/sk Gilsonite, 0.5 % Halad-344 and 3 lb/sk salt mixed at 13.0 ppg. Circulated 150 sacks to surface. Topped out with 10 yards of Redi-mix.
7. Packer: 5 ½" x 2 7/8" Weatherford Completion Tools (Arrow) Model X-1 retrievable packer set at 7528'. Minimum ID is 2.4375". Wireline re-entry guide is on bottom. To release: turn ¼ turn to the right and pick up.
8. Perforations (2 SPF):

   Zone 1: 7570-7620', 7676-7736'

   Zone 2: 7826-7834', 7858-7880', 7886-7904', 7916-7936', 7944-7964', 7990-8042', 8096-8116', 8191-8201', 8304-8319',8395-8399'.
9. PBTD: 8770'
10. Cement Plug: 45 sacks from 9675' to 9775'.

SUBSURFACE

HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO

BELOW GROUND DETAILS
WASTE DISPOSAL WELL NO. 2

DATE: 07/13/01	CHECKED BY:	JOB NO: 7005256
DRAWN BY: WDL	APPROVED BY:	DWG. NO:

FIGURE 1

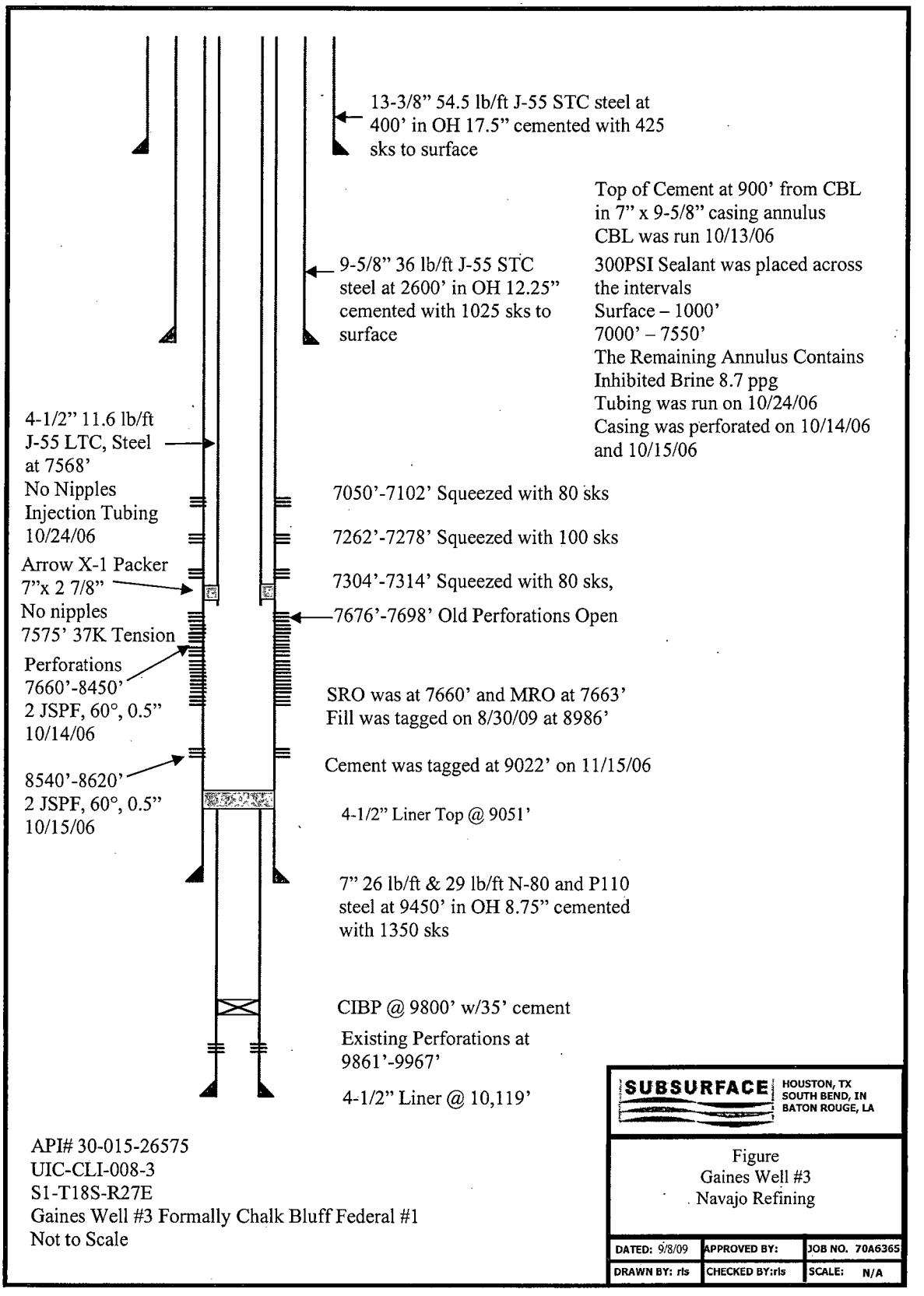

13-3/8" 54.5 lb/ft J-55 STC steel at 400' in OH 17.5" cemented with 425 sks to surface
Top of Cement at 900' from CBL in 7" x 9-5/8" casing annulus
CBL was run 10/13/06
9-5/8" 36 lb/ft J-55 STC steel at 2600' in OH 12.25" cemented with 1025 sks to surface
300PSI Sealant was placed across the intervals
Surface – 1000'
7000' – 7550'
The Remaining Annulus Contains Inhibited Brine 8.7 ppg
Tubing was run on 10/24/06
Casing was perforated on 10/14/06 and 10/15/06
4-1/2" 11.6 lb/ft J-55 LTC, Steel at 7568'
No Nipples
Injection Tubing 10/24/06
7050'-7102' Squeezed with 80 sks
7262'-7278' Squeezed with 100 sks
Arrow X-1 Packer 7"x 2 7/8"
7304'-7314' Squeezed with 80 sks,
No nipples
7575' 37K Tension
7676'-7698' Old Perforations Open
Perforations 7660'-8450' 2 JSPF, 60°, 0.5" 10/14/06
SRO was at 7660' and MRO at 7663'
Fill was tagged on 8/30/09 at 8986'
Cement was tagged at 9022' on 11/15/06
8540'-8620' 2 JSPF, 60°, 0.5" 10/15/06
4-1/2" Liner Top @ 9051'
7" 26 lb/ft & 29 lb/ft N-80 and P110 steel at 9450' in OH 8.75" cemented with 1350 sks
CIBP @ 9800' w/35' cement
Existing Perforations at 9861'-9967'
4-1/2" Liner @ 10,119'
API# 30-015-26575
UIC-CLI-008-3
S1-T18S-R27E
Gaines Well #3 Formally Chalk Bluff Federal #1
Not to Scale
SUBSURFACE
HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA
Figure
Gaines Well #3
Navajo Refining
DATED: 9/8/09
APPROVED BY:
JOB NO. 70A6365
DRAWN BY: rls
CHECKED BY:rls
SCALE: N/A

FIGURE 1

EXHIBIT 5



SUBSURFACE

HOUSTON, TX • BATON ROUGE, LA • SOUTH BEND, IN

Production Optimization Systems | Report File: Navajo Chukka-2 2010.pan

PanSystem Version 3.5 | Analysis Date: 11/03/2010

Well Test Analysis Report

Company	Navajo Refining (Holly Corporation)
Location	Artesia, NM
Well	Chukka Well No. 2
Test Date	9/27/2010 to 10/2/2010
Test Type	Buildup / Falloff Test
Gauge Type/Serial Number	Spartek Systems / 76182
Gauge Depth	7570 feet
Injection Interval	7570 feet to 8399 feet
Completion Type	Perforated at 2 SPF on 120° phasing
Top of Fill	8775 feet
Time Since Last Stabilization	9/26/2010 at 8:03 am
Analyst	RLS
Subsurface Project No.	70A6516

Remarks:

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Reservoir Description

Fluid type : Water
Well orientation : Vertical
Number of wells : 1
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	0.000000 psia
Temperature	0.000000 deg F

Well Parameters Data

	Well 1
Well radius	0.3281 ft
Distance from observation to active well	0.000000 ft
Wellbore storage coefficient	0.165091 bbl/psi
Storage Amplitude	0.000000 psi
Storage Time Constant	0.000000 hr
Second Wellbore Storage	0.000000 bbl/psi
Time Change for Second Storage	0.000000 hr
Well offset - x direction	0.0000 ft
Well offset - y direction	0.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	0.000000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.590 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

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Layer 1 Correlations
Not Used

Layer Boundaries Data
Layer 1 Boundary Type : Infinitely acting

	Layer 1
L1	0.000000 ft
L2	0.000000 ft
L3	0.000000 ft
L4	0.000000 ft
Drainage area	0.000000 acres
Dietz shape factor	0.000000

Layer 1 Model Data
Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	819.765533 md
Skin factor (Well 1)	86.420585

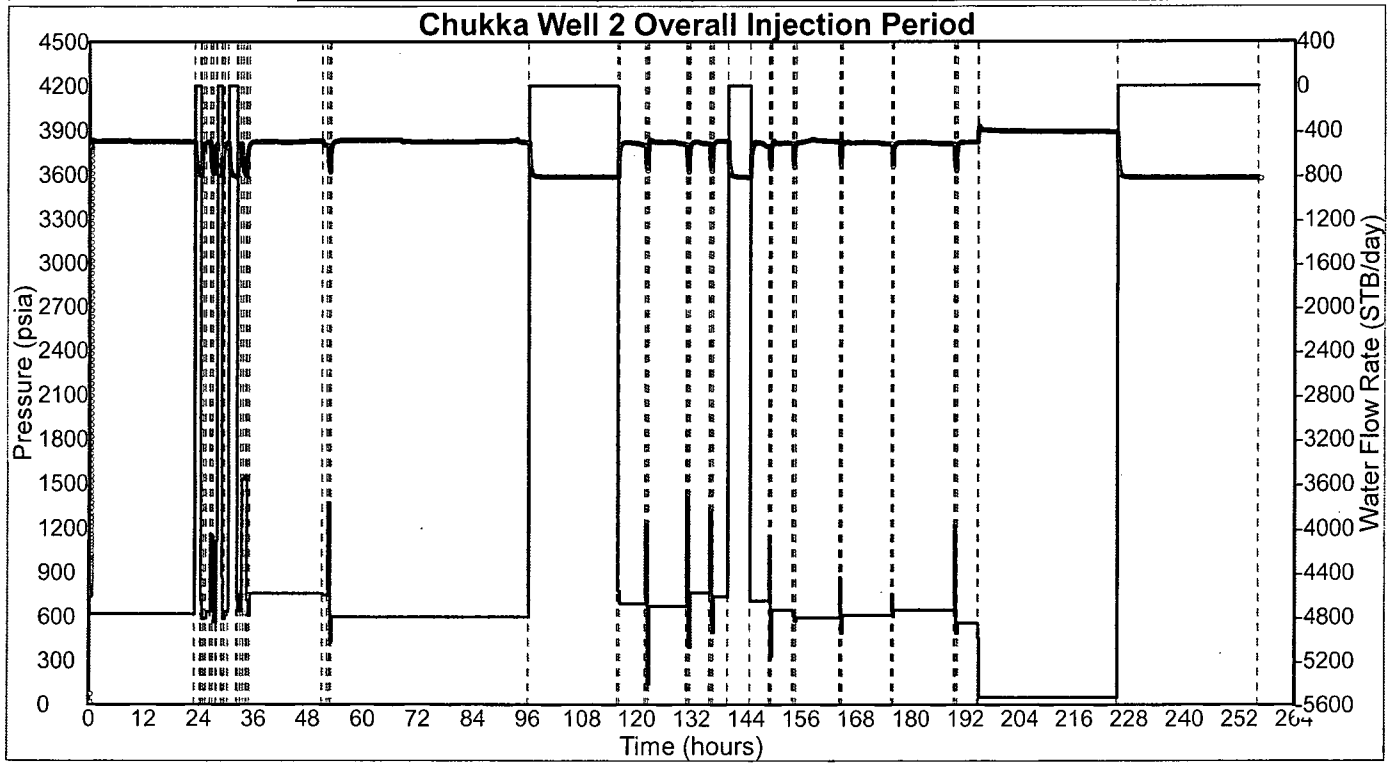
Rate Change Data

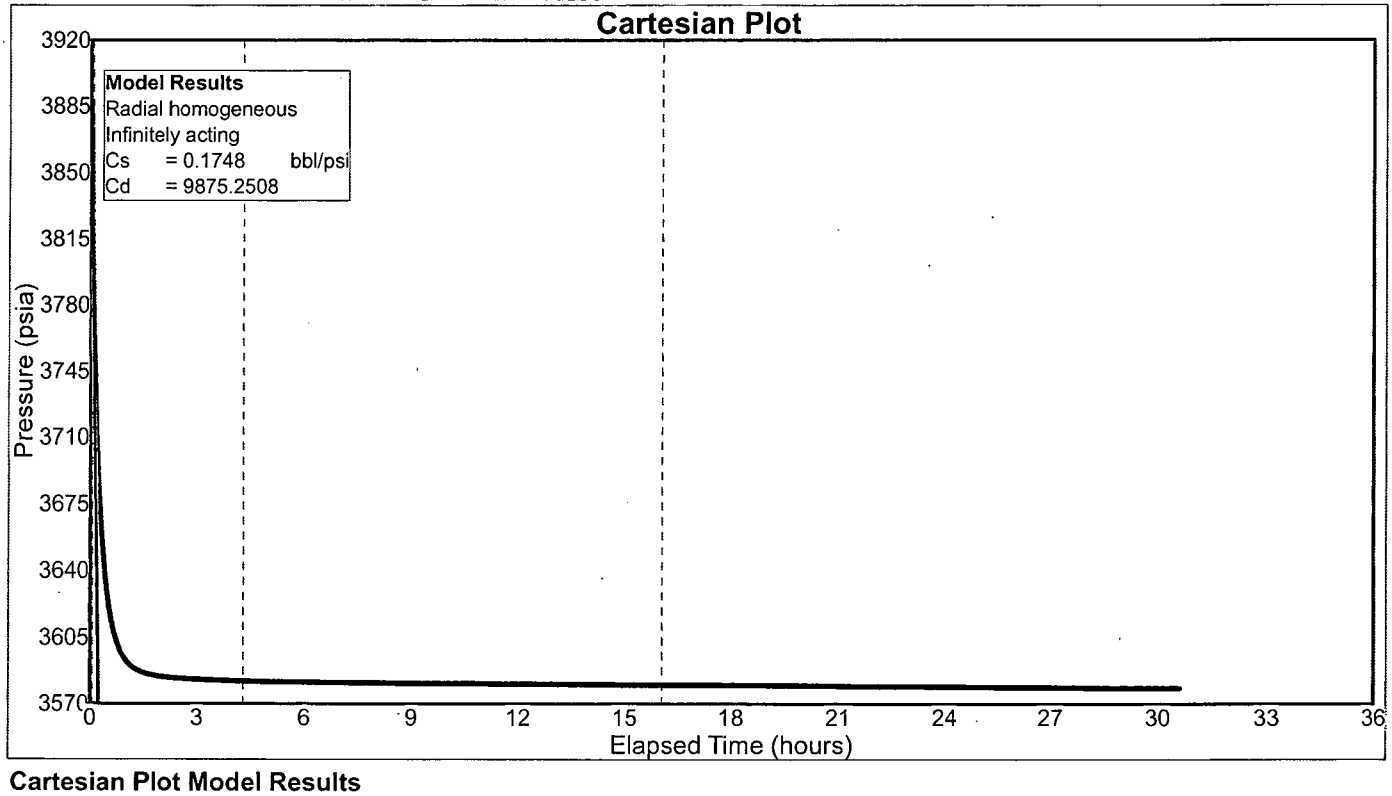
Time Hours	Pressure psia	Rate STB/day
0.000000	3833.476563	-4871.559201
22.970710	3831.992188	-4778.058483
24.246201	3594.394531	0.000000
24.493927	3743.125000	-4646.123708
25.015291	3805.429688	-4820.724923
25.487001	3819.179688	-4814.652537
26.338441	3823.615770	-4756.099574
26.568248	3663.033854	-4053.304818
26.970536	3606.384413	-4069.764434
27.638318	3803.437500	-4853.830169
27.835189	3803.111979	-4116.067297
28.787478	3596.601563	0.000000
29.004138	3724.218750	-4438.998944
29.492399	3801.562500	-4820.724923
30.257061	3818.600260	-4754.483452
32.196910	3570.787760	0.000000
32.496448	3753.867188	-4591.773558
33.149199	3813.437500	-4748.918492
33.678249	3612.089844	-3559.195009
34.207299	3591.438802	-3535.635027
34.561977	3775.000000	-4652.313650
35.028786	3808.007813	-4788.344923
51.127182	3828.203125	-4586.994614
52.273767	3799.583333	-4605.305001
52.728528	3617.154948	-3769.179656
53.065196	3799.218750	-5032.468196
96.112292	3819.540405	-4803.208696
115.714673	3581.354167	0.000000
116.076831	3773.489583	-4565.768407
121.761133	3796.093750	-4682.080000
122.154782	3620.911458	-3974.992332
122.532686	3841.302083	-5408.425253

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
130.752092	3807.395833	-4707.712921
131.208726	3615.260417	-3724.231763
131.598737	3795.208333	-5075.855633
135.853792	3801.744792	-4583.763218
136.278934	3626.562500	-3859.921643
136.641092	3801.744792	-4944.449187
139.900511	3801.000000	-4618.582529
144.764163	3572.762051	0.000000
148.944717	3790.625000	-4656.048179
149.214800	3646.875000	-4073.744778
149.541742	3812.500000	-5159.058022
154.052238	3808.593750	-4742.680000
154.360583	3659.375000	-4746.863123
154.867295	3815.234375	-4840.936435
164.300092	3823.645833	-4813.104923
164.552646	3665.625000	-4443.194397
164.908018	3821.875000	-4950.027966
175.630419	3809.375000	-4786.818089
175.856322	3656.250000	-4595.321201
176.101868	3790.625000	-4799.183140
189.389981	3806.250000	-4739.656009
189.788532	3622.916667	-3974.317347
190.175005	3799.583333	-4950.509508
194.534909	3822.916667	-4855.210548
194.742789	3910.703125	-4989.309519
225.350268	3887.736977	-5530.270000
255.962283	3578.465271	0.000000

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Chukka Well 2 Overall Injection Period
Pressure (psia)
Water Flow Rate (STB/day)
Time (hours)
4500
4200
3900
3600
3300
3000
2700
2400
2100
1800
1500
1200
900
600
300
0
400
0
-400
-800
-1200
-1600
-2000
-2400
-2800
-3200
-3600
-4000
-4400
-4800
-5200
-5600
0 12 24 36 48 60 72 84 96 108 120 132 144 156 168 180 192 204 216 228 240 252 264

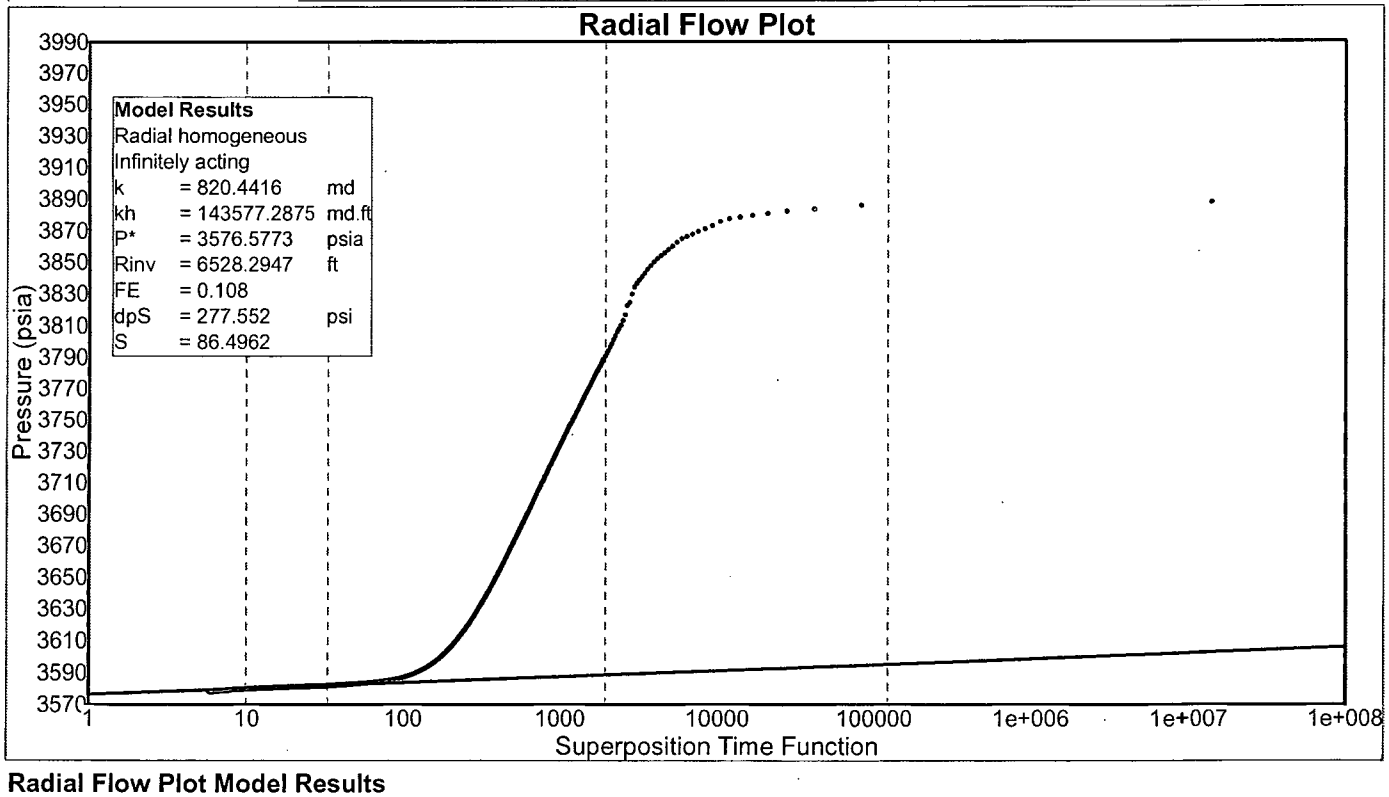


Cartesian Plot Model Results
Radial homogeneous - Infinitely acting

Fair Wellbore Storage

	Value
Wellbore storage coefficient	0.1748 bbl/psi
Dimensionless wellbore storage	9875.250844

Cartesian Plot Line Details
Line type : Wellbore storage
Slope : -1318.24
Intercept : 3892.6
Coefficient of Determination : 0.975954
Number of Intersections = 0



Radial Flow Plot Model Results
Radial homogeneous - Infinitely acting

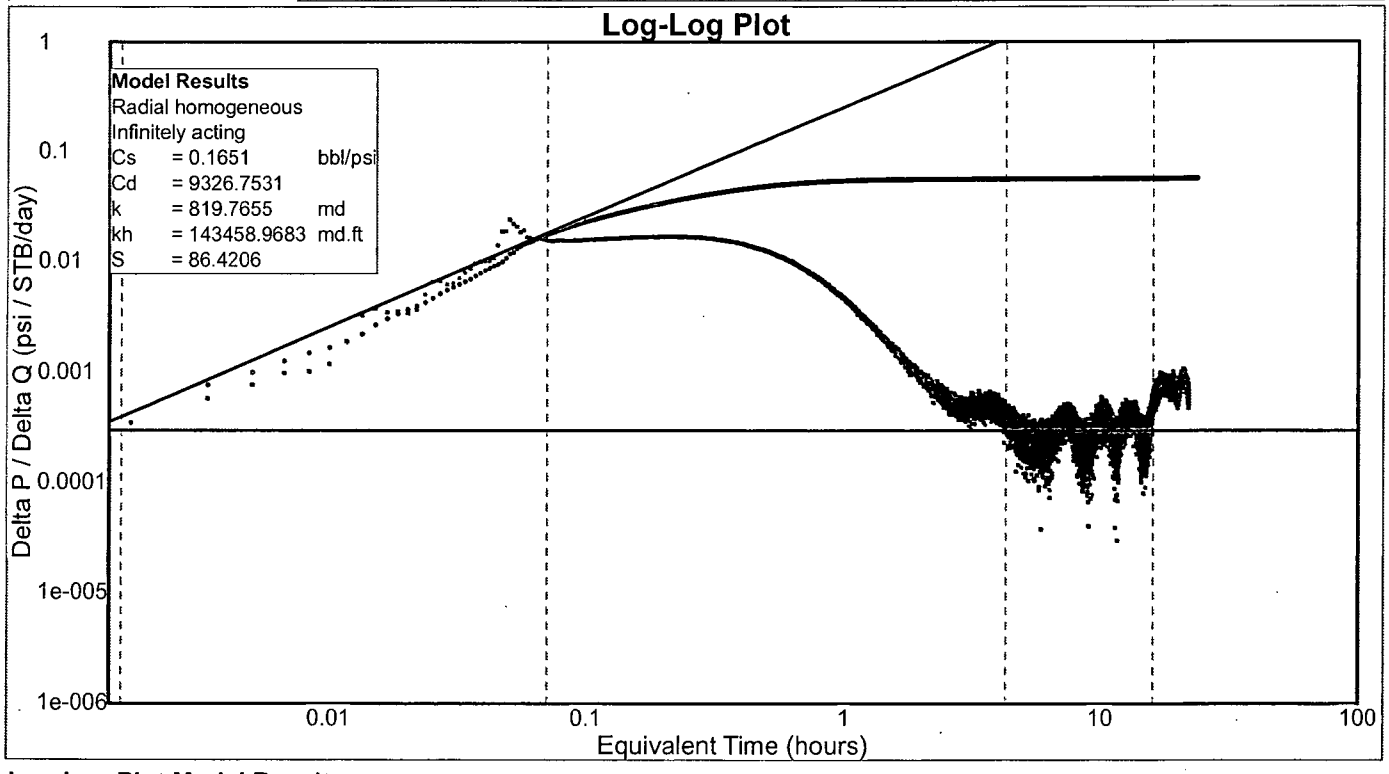
Fair Wellbore Storage

	Value
Permeability	820.441643 md
Permeability-thickness	1.4358e5 md.ft
Extrapolated pressure	3576.577282 psia
Radius of investigation	6528.294692 ft
Flow efficiency	0.108008
dP skin (constant rate)	277.551972 psi
Skin factor	86.496198

Radial Flow Plot Line Details
Line type : Radial flow
Slope : 3.69431
Intercept : 3576.58
Coefficient of Determination : 0.990257

	Radial flow
Extrapolated pressure	3576.577282 psia
Pressure at dt = 1 hour	3584.486694 psia

Number of Intersections = 0



Log-Log Plot Model Results
Radial homogeneous - Infinitely acting

Fair Wellbore Storage

	Value
Wellbore storage coefficient	0.165091 bbl/psi
Dimensionless wellbore storage	9326.753065
Permeability	819.765533 md
Permeability-thickness	1.4346e5 md.ft
Skin factor	86.420585

Log-Log Plot Line Details
Line type : Wellbore storage
Slope : 1
Intercept : 0.252386
Coefficient of Determination : Not Used
Line type : Radial flow
Slope : 0
Intercept : 0.000290355
Coefficient of Determination : Not Used
Number of Intersections = 0

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Production Optimization Systems	Report File:	2011 chukka wdw-2.pan
PanSystem Version 3.5.1	Analysis Date:	11/16/2011
Well Test Analysis Report		APPENDIX M

Company	Navajo Refining (Holly Corporation)
Location	Artesia, NM
Well	Chukka Well No. 2
Test Date	10/17/2011 to 10/22/2011
Test Type	Buildup/Falloff Test
Gauge Type/ Serial Number	Spartek Systems/76182
Gauge Depth	7570 feet
Injection Interval	7570 feet to 8399 feet
Completion Type	Perforated at 2 SPF on 120 deg Phasing
Top Of Fill	8335 feet
Analyst	TJJ
Subsurface Project No.	70A6645

Remarks:

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Reservoir Description

Fluid type : Water
Well orientation : Vertical
Number of wells : 1
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	0.000000 psia
Temperature	0.000000 deg F

Well Parameters Data

	Well 1
Well radius	0.3281 ft
Distance from observation to active well	0.000000 ft
Wellbore storage coefficient	0.0000 bbl/psi
Storage Amplitude	0.000000 psi
Storage Time Constant	0.000000 hr
Second Wellbore Storage	0.000000 bbl/psi
Time Change for Second Storage	0.000000 hr
Well offset - x direction	0.0000 ft
Well offset - y direction	0.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	0.000000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.590 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

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Layer 1 Correlations
Not Used

Layer Boundaries Data
Layer 1 Boundary Type : Infinitely acting

	Layer 1
L1	0.000000 ft
L2	0.000000 ft
L3	0.000000 ft
L4	0.000000 ft
Drainage area	0.000000 acres
Dietz shape factor	0.000000

Layer 1 Model Data
Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	0.0000 md
Skin factor (Well 1)	0.0000

Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-8793.188944	0.000000	-4820.724923
-8769.188944	0.000000	-4820.724923
-8745.188944	0.000000	-4820.724923
-8721.188944	0.000000	-4820.724923
-8697.188944	0.000000	-4713.016009
-8673.188944	0.000000	-4713.016009
-8649.188944	0.000000	-4820.724923
-8625.188944	0.000000	-4820.724923
-8601.188944	0.000000	-4924.720459
-8577.188944	0.000000	-4820.724923
-8553.188944	0.000000	-4718.401402
-8529.188944	0.000000	-4924.720459
-8505.188944	0.000000	-3427.924282
-8481.188944	0.000000	-3212.504883
-8457.188944	0.000000	-4713.016009
-8433.188944	0.000000	-4713.016009
-8409.188944	0.000000	-4605.305001
-8385.188944	0.000000	-4713.016009
-8361.188944	0.000000	-4713.016009
-8337.188944	0.000000	-4713.016009
-8313.188944	0.000000	-4610.690395
-8289.188944	0.000000	-4605.305001
-8265.188944	0.000000	-4713.016009
-8241.188944	0.000000	-4713.016009
-8217.188944	0.000000	-4713.016009
-8193.188944	0.000000	-4713.016009
-8169.188944	0.000000	-3427.924282
-8145.188944	0.000000	-3212.504883
-8121.188944	0.000000	-3212.504883
-8097.188944	0.000000	-4713.016009
-8073.188944	0.000000	-4713.016009
-8049.188944	0.000000	-4713.016009

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-8025.188944	0.000000	-4713.016009
-8001.188944	0.000000	-4713.016009
-7977.188944	0.000000	-4713.016009
-7953.188944	0.000000	-4713.016009
-7929.188944	0.000000	-4713.016009
-7905.188944	0.000000	-4713.016009
-7881.188944	0.000000	-4605.305001
-7857.188944	0.000000	-4713.016009
-7833.188944	0.000000	-4605.305001
-7809.188944	0.000000	-4605.305001
-7785.188944	0.000000	-4713.016009
-7761.188944	0.000000	-4605.305001
-7737.188944	0.000000	-4605.305001
-7713.188944	0.000000	-4605.305001
-7689.188944	0.000000	-4605.305001
-7665.188944	0.000000	-4605.305001
-7641.188944	0.000000	-4497.596087
-7617.188944	0.000000	-3320.215367
-7593.188944	0.000000	-4605.305001
-7569.188944	0.000000	-4713.016009
-7545.188944	0.000000	-4605.305001
-7521.188944	0.000000	-4497.596087
-7497.188944	0.000000	-4605.305001
-7473.188944	0.000000	-4605.305001
-7449.188944	0.000000	-4497.596087
-7425.188944	0.000000	-4820.724923
-7401.188944	0.000000	-4713.016009
-7377.188944	0.000000	-4605.305001
-7353.188944	0.000000	-4178.180629
-7329.188944	0.000000	-4605.305001
-7305.188944	0.000000	-4605.305001
-7281.188944	0.000000	-4713.016009

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-7257.188944	0.000000	-3639.630824
-7233.188944	0.000000	-3639.630824
-7209.188944	0.000000	-3540.834699
-7185.188944	0.000000	-4713.016009
-7161.188944	0.000000	-4820.724923
-7137.188944	0.000000	-4820.724923
-7113.188944	0.000000	-4820.724923
-7089.188944	0.000000	-4605.305001
-7065.188944	0.000000	-4820.724923
-7041.188944	0.000000	-4820.724923
-7017.188944	0.000000	-4820.724923
-6993.188944	0.000000	-4820.724923
-6969.188944	0.000000	-4820.724923
-6945.188944	0.000000	-4713.016009
-6921.188944	0.000000	-4820.724923
-6897.188944	0.000000	-4820.724923
-6873.188944	0.000000	-4713.016009
-6849.188944	0.000000	-4713.016009
-6825.188944	0.000000	-4820.724923
-6801.188944	0.000000	-4820.724923
-6777.188944	0.000000	-4820.724923
-6753.188944	0.000000	-4820.724923
-6729.188944	0.000000	-4820.724923
-6705.188944	0.000000	-4820.724923
-6681.188944	0.000000	-4713.016009
-6657.188944	0.000000	-4820.724923
-6633.188944	0.000000	-4713.016009
-6609.188944	0.000000	-4713.016009
-6585.188944	0.000000	-4713.016009
-6561.188944	0.000000	-4605.305001
-6537.188944	0.000000	-4820.724923
-6513.188944	0.000000	-4924.720459
-6489.188944	0.000000	-4713.016009
-6465.188944	0.000000	-4713.016009
-6441.188944	0.000000	-4718.401402
-6417.188944	0.000000	-4713.016009
-6393.188944	0.000000	-4713.016009
-6369.188944	0.000000	-4713.016009
-6345.188944	0.000000	-4610.690395
-6321.188944	0.000000	-3535.635027
-6297.188944	0.000000	-4820.724923
-6273.188944	0.000000	-4723.601074
-6249.188944	0.000000	-4820.724923
-6225.188944	0.000000	-4820.724923
-6201.188944	0.000000	-4713.016009
-6177.188944	0.000000	-2.1843e4
-6153.188944	0.000000	0.000000
-6129.188944	0.000000	-2.1843e4
-6105.188944	0.000000	-4713.016009

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-6081.188944	0.000000	-3535.635027
-6057.188944	0.000000	-3427.924282
-6033.188944	0.000000	-4820.724923
-6009.188944	0.000000	-3427.924282
-5985.188944	0.000000	-4497.596087
-5961.188944	0.000000	-3530.249372
-5937.188944	0.000000	-3427.924282
-5913.188944	0.000000	-4713.016009
-5889.188944	0.000000	-5463.270264
-5865.188944	0.000000	-5463.270264
-5841.188944	0.000000	-5567.266323
-5817.188944	0.000000	-5782.685721
-5793.188944	0.000000	-5468.469936
-5769.188944	0.000000	-5674.976807
-5745.188944	0.000000	-5463.270264
-5721.188944	0.000000	-5355.561349
-5697.188944	0.000000	-5355.561349
-5673.188944	0.000000	-3427.924282
-5649.188944	0.000000	-5355.561349
-5625.188944	0.000000	-3427.924282
-5601.188944	0.000000	-5890.396729
-5577.188944	0.000000	-3427.924282
-5553.188944	0.000000	-5998.105643
-5529.188944	0.000000	-6105.816127
-5505.188944	0.000000	-5998.105643
-5481.188944	0.000000	-5890.396729
-5457.188944	0.000000	-6317.521101
-5433.188944	0.000000	-4924.720459
-5409.188944	0.000000	-3427.924282
-5385.188944	0.000000	-3427.924282
-5361.188944	0.000000	-3427.924282
-5337.188944	0.000000	-5140.140381
-5313.188944	0.000000	-5140.140381
-5289.188944	0.000000	-5032.431466
-5265.188944	0.000000	-4605.305001
-5241.188944	0.000000	-3427.924282
-5217.188944	0.000000	-4605.305001
-5193.188944	0.000000	-4924.720459
-5169.188944	0.000000	-5032.431466
-5145.188944	0.000000	-5463.270264
-5121.188944	0.000000	-5355.561349
-5097.188944	0.000000	-5567.266323
-5073.188944	0.000000	-4820.724923
-5049.188944	0.000000	-3639.630824
-5025.188944	0.000000	-5140.140381
-5001.188944	0.000000	-5782.685721
-4977.188944	0.000000	-5140.140381
-4953.188944	0.000000	-3427.924282
-4929.188944	0.000000	-5355.561349

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-4905.188944	0.000000	-5247.850865
-4881.188944	0.000000	-5463.270264
-4857.188944	0.000000	-3427.924282
-4833.188944	0.000000	-5567.266323
-4809.188944	0.000000	-5247.850865
-4785.188944	0.000000	-5463.270264
-4761.188944	0.000000	-5567.266323
-4737.188944	0.000000	-5463.270264
-4713.188944	0.000000	-3433.309937
-4689.188944	0.000000	-5355.561349
-4665.188944	0.000000	-4605.305001
-4641.188944	0.000000	-3427.924282
-4617.188944	0.000000	-5757.143032
-4593.188944	0.000000	-5485.714286
-4569.188944	0.000000	-6171.428571
-4545.188944	0.000000	-5622.857143
-4521.188944	0.000000	-6000.000000
-4497.188944	0.000000	-5828.571429
-4473.188944	0.000000	-5931.428571
-4449.188944	0.000000	-5728.571254
-4425.188944	0.000000	-5554.285714
-4401.188944	0.000000	-4391.428397
-4377.188944	0.000000	-5691.428571
-4353.188944	0.000000	-5625.714111
-4329.188944	0.000000	-3497.142857
-4305.188944	0.000000	-3462.857143
-4281.188944	0.000000	-3462.857143
-4257.188944	0.000000	-5585.714460
-4233.188944	0.000000	-5417.142857
-4209.188944	0.000000	-6034.285714
-4185.188944	0.000000	-4971.428571
-4161.188944	0.000000	-5894.285889
-4137.188944	0.000000	-6000.000000
-4113.188944	0.000000	-5968.571254
-4089.188944	0.000000	-5931.428571
-4065.188944	0.000000	-6034.285714
-4041.188944	0.000000	-3394.285714
-4017.188944	0.000000	-6000.000000
-3993.188944	0.000000	-6000.000000
-3969.188944	0.000000	-5931.428571
-3945.188944	0.000000	-3462.857143
-3921.188944	0.000000	-6137.142857
-3897.188944	0.000000	-5965.714286
-3873.188944	0.000000	-6065.714460
-3849.188944	0.000000	-6034.285714
-3825.188944	0.000000	-5657.142857
-3801.188944	0.000000	-5931.428571
-3777.188944	0.000000	-6034.285714
-3753.188944	0.000000	-5622.857143

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-3729.188944	0.000000	-5862.857143
-3705.188944	0.000000	-6034.285714
-3681.188944	0.000000	-5931.428571
-3657.188944	0.000000	-6000.000000
-3633.188944	0.000000	-5928.571603
-3609.188944	0.000000	-5894.285889
-3585.188944	0.000000	-5862.857143
-3561.188944	0.000000	-5865.714111
-3537.188944	0.000000	-5897.142857
-3513.188944	0.000000	-5897.142857
-3489.188944	0.000000	-5897.142857
-3465.188944	0.000000	-5862.857143
-3441.188944	0.000000	-6015.714111
-3417.188944	0.000000	-6000.000000
-3393.188944	0.000000	-5897.142857
-3369.188944	0.000000	-5897.142857
-3345.188944	0.000000	-5862.857143
-3321.188944	0.000000	-5865.714111
-3297.188944	0.000000	-5865.714111
-3273.188944	0.000000	-5828.571429
-3249.188944	0.000000	-6139.999826
-3225.188944	0.000000	-6102.857143
-3201.188944	0.000000	-6277.142683
-3177.188944	0.000000	-6271.428746
-3153.188944	0.000000	-5965.714286
-3129.188944	0.000000	-6240.000000
-3105.188944	0.000000	-6000.000000
-3081.188944	0.000000	-5654.285889
-3057.188944	0.000000	-5962.857317
-3033.188944	0.000000	-5760.000000
-3009.188944	0.000000	-6034.285714
-2985.188944	0.000000	-6031.428746
-2961.188944	0.000000	-5965.714286
-2937.188944	0.000000	-5916.586042
-2913.188944	0.000000	-6037.142683
-2889.188944	0.000000	-5965.714286
-2865.188944	0.000000	-6000.000000
-2841.188944	0.000000	-5965.714286
-2817.188944	0.000000	-6000.000000
-2793.188944	0.000000	-6024.375000
-2769.188944	0.000000	-6000.000000
-2745.188944	0.000000	-6000.000000
-2721.188944	0.000000	-6031.428746
-2697.188944	0.000000	-6034.285714
-2673.188944	0.000000	-3497.142857
-2649.188944	0.000000	-5965.714286
-2625.188944	0.000000	-3497.142857
-2601.188944	0.000000	-3497.142857
-2577.188944	0.000000	-5965.714286

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-2553.188944	0.000000	-3497.142857
-2529.188944	0.000000	-5965.714286
-2505.188944	0.000000	-5962.857317
-2481.188944	0.000000	-3462.857143
-2457.188944	0.000000	-5451.428571
-2433.188944	0.000000	-5965.714286
-2409.188944	0.000000	-5931.428571
-2385.188944	0.000000	-5897.142857
-2361.188944	0.000000	-5865.714111
-2337.188944	0.000000	-5865.714111
-2313.188944	0.000000	-5828.571429
-2289.188944	0.000000	-5722.857317
-2265.188944	0.000000	-3462.857143
-2241.188944	0.000000	-5928.571603
-2217.188944	0.000000	-5688.571603
-2193.188944	0.000000	-5897.142857
-2169.188944	0.000000	-3497.142857
-2145.188944	0.000000	-5928.571603
-2121.188944	0.000000	-5934.285540
-2097.188944	0.000000	-5934.285540
-2073.188944	0.000000	-5862.857143
-2049.188944	0.000000	-5865.714111
-2025.188944	0.000000	-5862.857143
-2001.188944	0.000000	-5862.857143
-1977.188944	0.000000	-5765.714460
-1953.188944	0.000000	-5860.000174
-1929.188944	0.000000	-5688.571603
-1905.188944	0.000000	-3431.428659
-1881.188944	0.000000	-5794.285714
-1857.188944	0.000000	-5860.000174
-1833.188944	0.000000	-3497.142857
-1809.188944	0.000000	-5897.142857
-1785.188944	0.000000	-5828.571429
-1761.188944	0.000000	-5862.857143
-1737.188944	0.000000	-5894.285889
-1713.188944	0.000000	-5648.571429
-1689.188944	0.000000	-5797.142683
-1665.188944	0.000000	-5794.285714
-1641.188944	0.000000	-5794.285714
-1617.188944	0.000000	-5794.285714
-1593.188944	0.000000	-5757.143032
-1569.188944	0.000000	-5760.000000
-1545.188944	0.000000	-5762.856968
-1521.188944	0.000000	-3462.857143
-1497.188944	0.000000	-5757.143032
-1473.188944	0.000000	-5725.714286
-1449.188944	0.000000	-5860.000174
-1425.188944	0.000000	-5862.857143
-1401.188944	0.000000	-5862.857143

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-1377.188944	0.000000	-5862.857143
-1353.188944	0.000000	-5862.857143
-1329.188944	0.000000	-5860.000174
-1305.188944	0.000000	-3497.142857
-1281.188944	0.000000	-5760.000000
-1257.188944	0.000000	-5897.142857
-1233.188944	0.000000	-5828.571429
-1209.188944	0.000000	-5794.285714
-1185.188944	0.000000	-5831.428397
-1161.188944	0.000000	-5894.285889
-1137.188944	0.000000	-5862.857143
-1113.188944	0.000000	-5797.142683
-1089.188944	0.000000	-5794.285714
-1065.188944	0.000000	-5797.142683
-1041.188944	0.000000	-5760.000000
-1017.188944	0.000000	-5694.285540
-993.188944	0.000000	-5725.714286
-969.188944	0.000000	-5860.000174
-945.188944	0.000000	-5828.571429
-921.188944	0.000000	-5894.285889
-897.188944	0.000000	-5825.714460
-873.188944	0.000000	-5637.143032
-849.188944	0.000000	-5828.571429
-825.188944	0.000000	-5797.142683
-801.188944	0.000000	-5794.285714
-777.188944	0.000000	-5760.000000
-753.188944	0.000000	-5725.714286
-729.188944	0.000000	-3394.285714
-705.188944	0.000000	-3394.285714
-681.188944	0.000000	-6137.142857
-657.188944	0.000000	-6139.999826
-633.188944	0.000000	-5928.571603
-609.188944	0.000000	-5862.857143
-585.188944	0.000000	-5828.571429
-561.188944	0.000000	-5825.714460
-537.188944	0.000000	-5725.714286
-513.188944	0.000000	-5794.285714
-489.188944	0.000000	-5794.285714
-465.188944	0.000000	-5828.571429
-441.188944	0.000000	-3397.142944
-417.188944	0.000000	-5794.285714
-393.188944	0.000000	-5794.285714
-369.188944	0.000000	-5797.142683
-345.188944	0.000000	-5825.714460
-321.188944	0.000000	-4182.857143
-297.188944	0.000000	-5794.285714
-273.188944	0.000000	-4182.857143
-249.188944	0.000000	-5725.714286
-225.188944	0.000000	-4045.714286

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-201.188944	0.000000	-5317.142683
-177.188944	0.000000	-5760.000000
-153.188944	0.000000	-5691.428571
-129.188944	0.000000	-5825.714460
-105.188944	0.000000	-5794.285714
-81.188944	0.000000	-5794.285714
-57.188944	0.000000	-5794.285714
-33.188944	0.000000	-5828.571429
-9.188944	0.000000	-5798.857143
-8.688944	0.000000	-5796.571429
-8.188944	0.000000	-5795.428571
-7.688944	0.000000	-5795.428571
-7.188944	0.000000	-5589.424601
-6.688944	0.000000	-4824.194444
-6.188944	0.000000	-4775.523810
-5.688944	0.000000	-4724.099209
-5.188944	0.000000	-5048.206347
-4.688944	0.000000	-5711.218254
-4.188944	0.000000	-5765.051590
-3.688944	0.000000	-5775.515871
-3.188944	0.000000	-5785.623016
-2.688944	0.000000	-5790.857143
-2.188944	0.000000	-5789.714286
-1.688944	0.000000	-5790.861114
-1.188944	0.000000	-5829.523812
-0.688944	0.000000	-6277.714292
-0.188944	0.000000	-6210.468252
0.311056	0.000000	-6221.051587
0.811056	0.000000	-6193.329362
1.311056	0.000000	-6208.480158
1.811056	0.000000	-6144.190476
2.311056	0.000000	-6150.194447
2.811056	0.000000	-6155.428574
3.311056	0.000000	-6169.138889
3.811056	0.000000	-6174.194450
4.311056	0.000000	-6175.519842
4.811056	0.000000	-6174.857143
5.311056	0.000000	-6164.571429
5.811056	0.000000	-6168.000000
6.311056	0.000000	-6165.234124
6.811056	0.000000	-6169.142854
7.311056	0.000000	-6142.857140
7.811056	0.000000	-6137.146825
8.311056	0.000000	-6154.567458
8.811056	0.000000	-6130.289682
9.311056	0.000000	-5789.242066
9.811056	0.000000	-5062.551585
10.311056	0.000000	-4181.730158
10.811056	0.000000	-4912.666667

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
11.311056	0.000000	-5693.527780
11.811056	0.000000	-5724.567461
12.311056	0.000000	-5725.714286
12.811056	0.000000	-5728.000000
13.311056	0.000000	-5728.000000
13.811056	0.000000	-5728.000000
14.311056	0.000000	-5728.000000
14.811056	0.000000	-5726.194447
15.311056	0.000000	-5728.658728
15.811056	0.000000	-5721.146825
16.311056	0.000000	-5720.000000
16.811056	0.000000	-5721.146828
17.311056	0.000000	-5719.996032
17.811056	0.000000	-5720.003971
18.311056	0.000000	-5719.996032
18.811056	0.000000	-5717.714286
19.311056	0.000000	-5704.662696
19.811056	0.000000	-5706.289682
20.311056	0.000000	-5704.000000
20.811056	0.000000	-5705.138886
21.311056	0.000000	-5701.718254
21.811056	0.000000	-5703.337304
22.311056	0.000000	-5701.714289
22.811056	0.000000	-5701.714289
23.311056	0.000000	-6042.757937
23.811056	0.000000	-5360.865077
24.311056	0.000000	-5221.226188
24.811056	0.000000	-5166.571426
25.311056	0.000000	-5419.242063
25.811056	0.000000	-5565.043648
26.311056	0.000000	-5639.999997
26.811056	0.000000	-5634.765873
27.311056	0.000000	-5361.615077
27.811056	0.000000	-5337.619045
28.311056	0.000000	-5643.813492
28.811056	0.000000	-6040.761905
29.311056	0.000000	-6161.623019
29.811056	0.000000	-6151.515871
30.311056	0.000000	-6146.285711
30.811056	0.000000	-6153.142854
31.311056	0.000000	-6133.238092
31.811056	0.000000	-5667.619045
32.311056	0.000000	-5196.384920
32.811056	0.000000	-5705.619048
33.311056	0.000000	-5729.142857
33.811056	0.000000	-5729.142857
34.311056	0.000000	-5724.571429
34.811056	0.000000	-5724.571429
35.311056	0.000000	-5723.428571

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
35.811056	0.000000	-5724.571429
36.311056	0.000000	-5720.000000
36.811056	0.000000	-5715.432542
37.311056	0.000000	-5714.281746
37.811056	0.000000	-5707.432542
38.311056	0.000000	-5705.801585
38.811056	0.000000	-5705.142854
39.311056	0.000000	-5705.623016
39.811056	0.000000	-5706.952381
40.311056	0.000000	-5700.567458
40.811056	0.000000	-5702.198415
41.311056	0.000000	-5700.567461
41.811056	0.000000	-5697.809524
42.311056	0.000000	-5698.285714
42.811056	0.000000	-5698.285714
43.311056	0.000000	-5351.523810
43.811056	0.000000	-5679.333333
44.311056	0.000000	-5690.285714
44.811056	0.000000	-5694.857143
45.311056	0.000000	-5696.476190
45.811056	0.000000	-5699.432542
46.311056	0.000000	-5697.805556
46.811056	0.000000	-5692.571429
47.311056	0.000000	-5694.861114
47.811056	0.000000	-5694.853175
48.311056	0.000000	-5719.337304
48.811056	0.000000	-5725.226193
49.311056	0.000000	-5755.246032
49.811056	0.000000	-5796.575399
50.311056	0.000000	-5746.281746
50.811056	0.000000	-5755.428571
51.311056	0.000000	-5070.952381
51.811056	0.000000	-3861.694443
52.311056	0.000000	-3948.781746
52.811056	0.000000	-5173.809524
53.311056	0.000000	-6424.666667
53.811056	0.000000	-6410.285714
54.311056	0.000000	-6401.809524
54.811056	0.000000	-6403.904762
55.311056	0.000000	-6384.666667
55.811056	0.000000	-6371.428571
56.311056	0.000000	-6374.857143
56.811056	0.000000	-6351.527780
57.311056	0.000000	-6338.281746
57.811056	0.000000	-6336.000000
58.311056	0.000000	-6331.428571
58.811056	0.000000	-6330.289685
59.311056	0.000000	-6335.515871
59.811056	0.000000	-6346.765873

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
60.311056	0.000000	-6341.714286
60.811056	0.000000	-6344.480161
61.311056	0.000000	-6344.000003
61.811056	0.000000	-6363.428574
62.311056	0.000000	-6369.801585
62.811056	0.000000	-6368.480158
63.311056	0.000000	-6374.857143
63.811056	0.000000	-6376.000000
64.311056	0.000000	-6378.285714
64.811056	0.000000	-6385.142857
65.311056	0.000000	-6378.285714
65.811056	0.000000	-6382.194447
66.311056	0.000000	-6372.757937
66.811056	0.000000	-6324.095238
67.311056	0.000000	-6307.428571
67.811056	0.000000	-6333.047619
68.311056	0.000000	-6334.857143
68.811056	0.000000	-6342.376981
69.311056	0.000000	-6317.718254
69.811056	0.000000	-6328.476190
70.311056	0.000000	-6348.571429
70.811056	0.000000	-6353.619048
71.311056	0.000000	-6378.281743
71.811056	0.000000	-6388.095235
72.311056	0.000000	-6359.337301
72.811056	0.000000	-6381.714286
73.311056	0.000000	-6369.805553
73.811056	0.000000	-6370.769844
74.311056	0.000000	-6367.996032
74.811056	0.000000	-6374.857143
75.311056	0.000000	-6406.190476
75.811056	0.000000	-6409.805553
76.311056	0.000000	-6368.670635
76.811056	0.000000	-6328.666667
77.311056	0.000000	-6308.571429
77.811056	0.000000	-6371.714286
78.311056	0.000000	-6416.480161
78.811056	0.000000	-6424.662699
79.311056	0.000000	-6400.666667
79.811056	0.000000	-6381.714286
80.311056	0.000000	-6373.714286
80.811056	0.000000	-6366.857143
81.311056	0.000000	-6344.666667
81.811056	0.000000	-6326.857143
82.311056	0.000000	-6339.424601
82.811056	0.000000	-6349.718254
83.311056	0.000000	-6366.190476
83.811056	0.000000	-6379.428571
83.949132	3784.981762	-6377.142857
117.984861	3701.527825	0.000000

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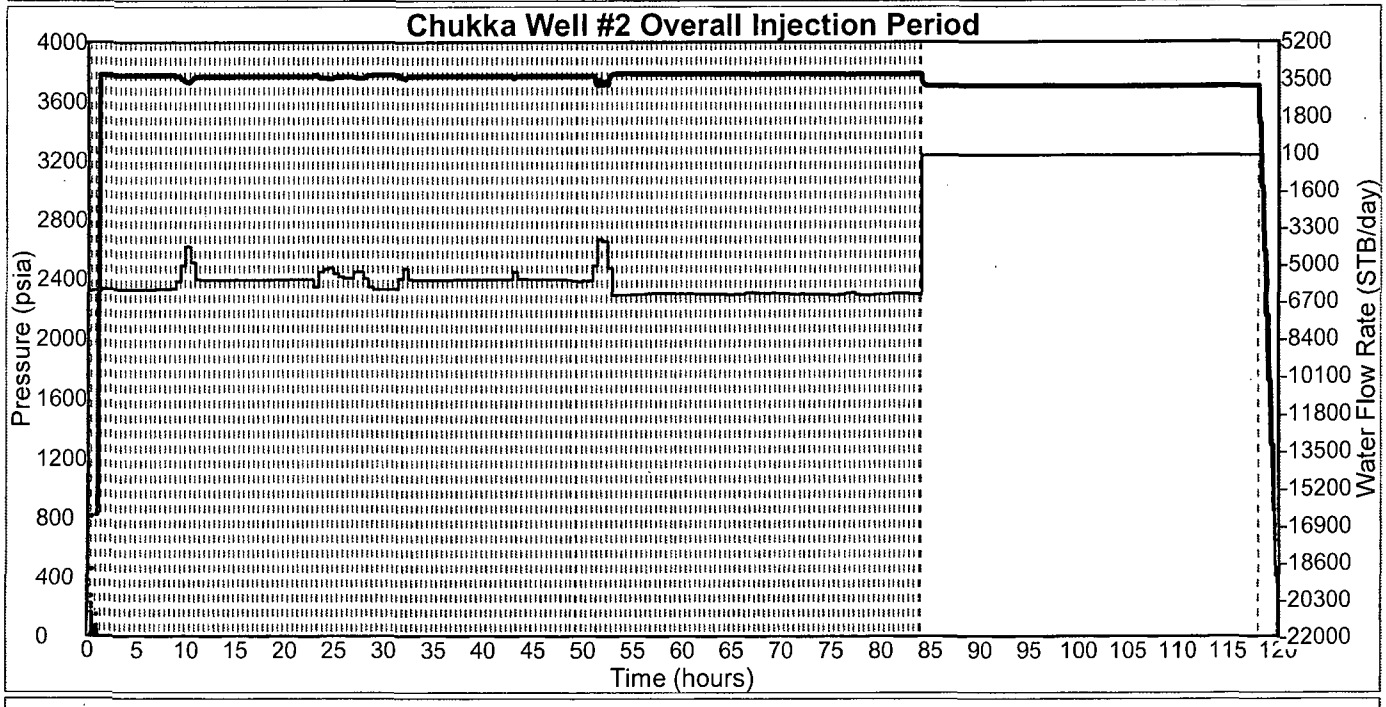
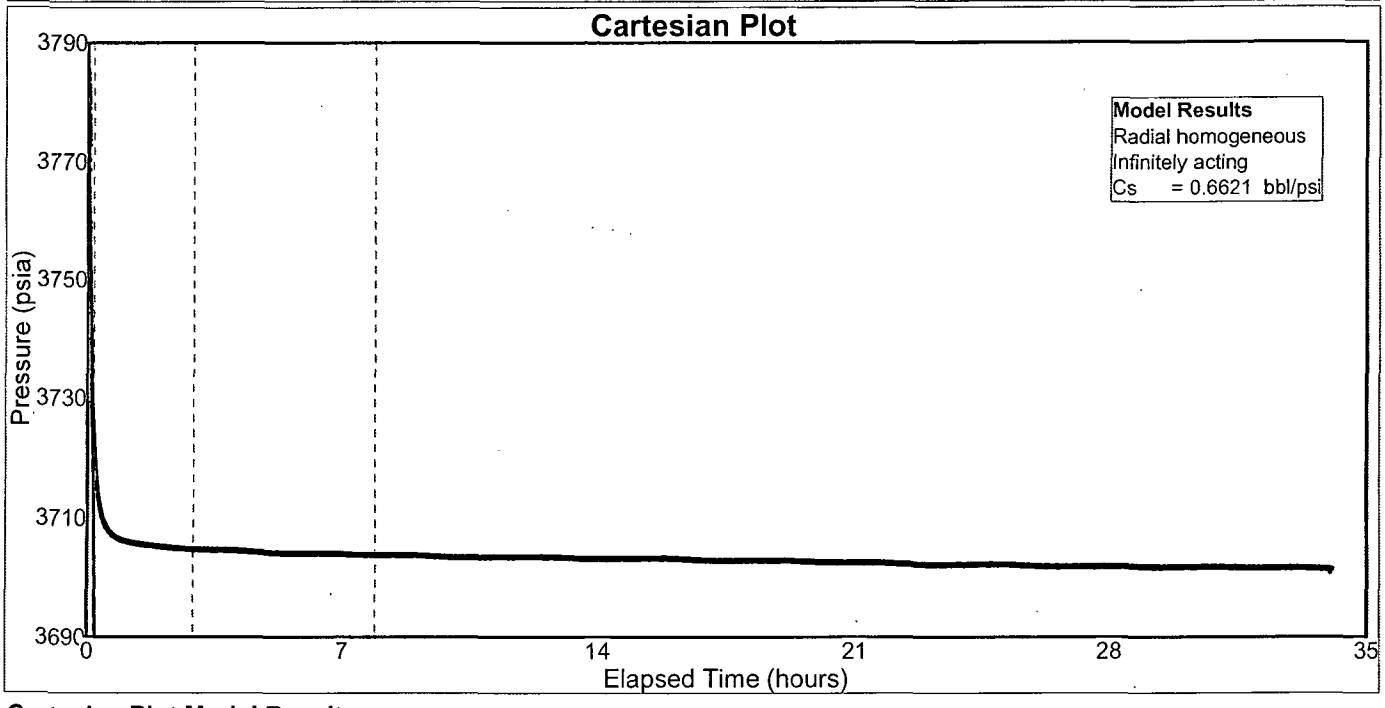

Chukka Well #2 Overall Injection Period
Pressure (psia)
Water Flow Rate (STB/day)
Time (hours)
4000
3600
3200
2800
2400
2000
1600
1200
800
400
0
5200
3500
1800
100
-1600
-3300
-5000
-6700
-8400
-10100
-11800
-13500
-15200
-16900
-18600
-20300
-22000
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120

FIGURE 11



Cartesian Plot Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Wellbore storage coefficient	0.662106 bbl/psi

Cartesian Plot Line Details
Line type : Wellbore storage
Slope : -401.317
Intercept : 3779.38
Coefficient of Determination : 0.892479
Number of Intersections = 0

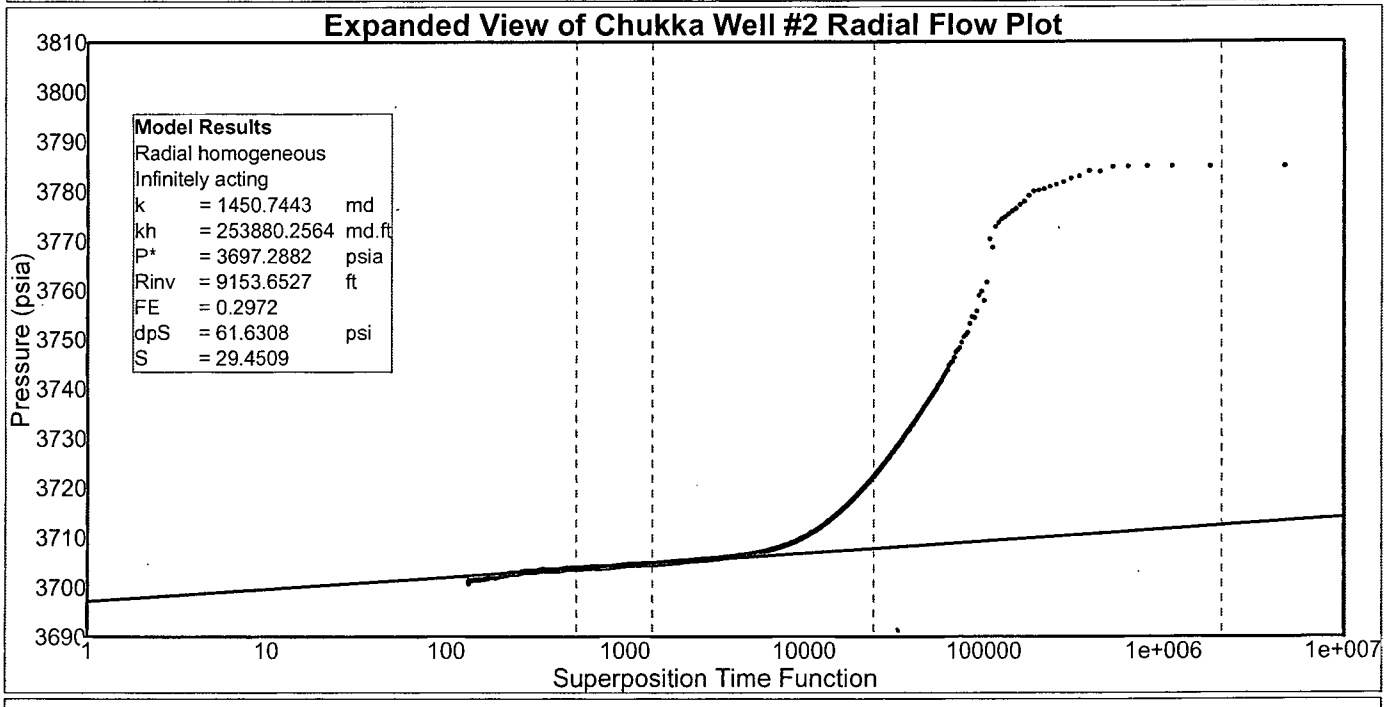


FIGURE 16

Expanded View of Chukka Well #2 Radial Flow Plot Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Permeability	1450.744322 md
Permeability-thickness	2.5388e5 md.ft
Extrapolated pressure	3697.288216 psia
Radius of investigation	9153.652743 ft
Flow efficiency	0.297202
dP skin (constant rate)	61.630829 psi
Skin factor	29.450909

Expanded View of Chukka Well #2 Radial Flow Plot Line Details
Line type : Radial flow
Slope : 2.40918
Intercept : 3697.29
Coefficient of Determination : 0.937454

	Radial flow
Extrapolated pressure	3697.288216 psia
Pressure at dt = 1 hour	3705.990668 psia

Number of Intersections = 0

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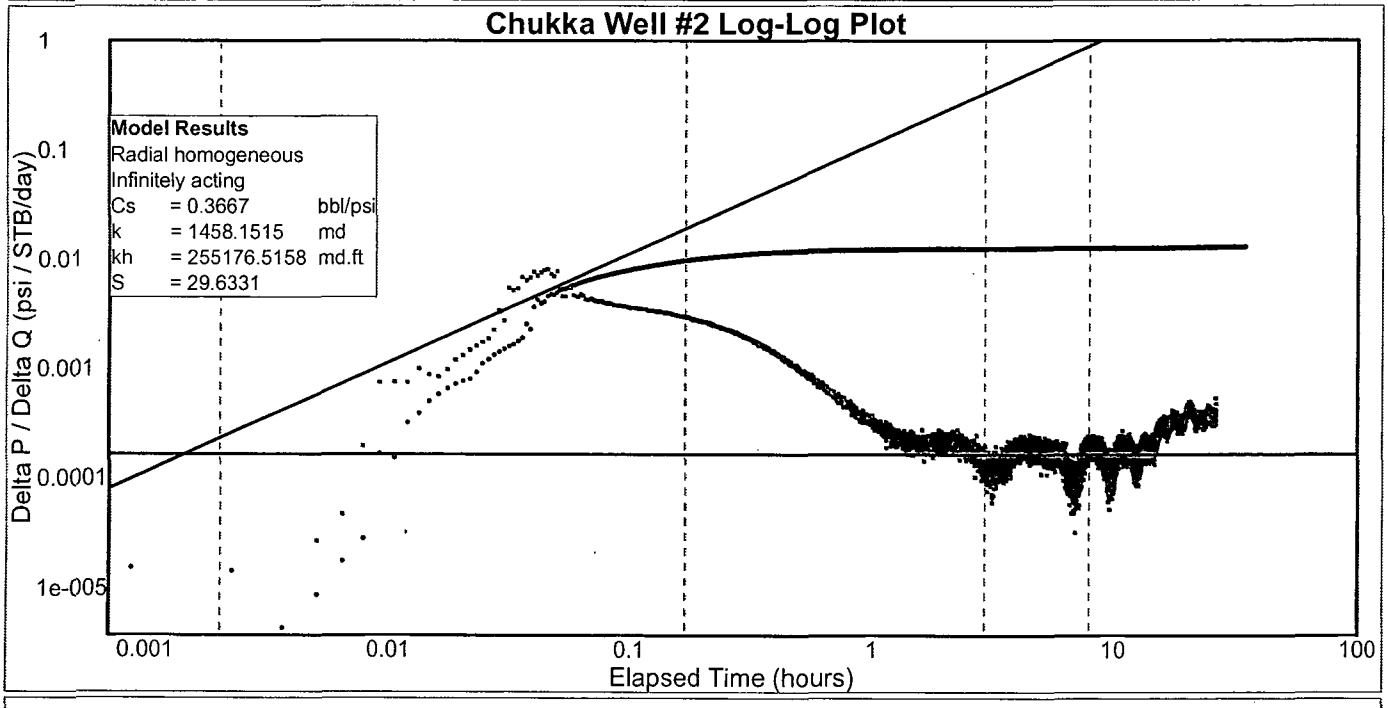


FIGURE 14

Chukka Well #2 Log-Log Plot Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Wellbore storage coefficient	0.366653 bbl/psi
Permeability	1458.151519 md
Permeability-thickness	2.5518e5 md.ft
Skin factor	29.633117

Chukka Well #2 Log-Log Plot Line Details
Line type : Radial flow
Slope : 0
Intercept : 0.000163236
Coefficient of Determination : Not Used
Line type : Wellbore storage
Slope : 1
Intercept : 0.11364
Coefficient of Determination : Not Used
Number of Intersections = 0

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SUBSURFACE

HOUSTON, TX • BATON ROUGE, LA • SOUTH BEND, IN

Production Optimization Systems | Report File: 2010 Gaines Well-3.pan

PanSystem Version 3.5 | Analysis Date: 12/02/2010

Well Test Analysis Report

Company	Navajo Refining Company
Location	Artesia, New Mexico
Well	Gaines Well No. 3
Date	November 8 - 13, 2010
Gauge Type / Serial Number	Spartek / Top No. 76585 & Bottom No. 76648
Guage Depth	7660 feet
Injection Interval	7660 feet to 8620 feet
Completion Type	Perforated
Top of Fill	8986 feet
Analyst	RLS
Subsurface Project No.	70A6516

Remarks:

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Reservoir Description

Fluid type : Water
Well orientation : Vertical
Number of wells : 1
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	3622.164936 psia
Temperature	0.000000 deg F

Well Parameters Data

	Well 1
Well radius	0.3246 ft
Distance from observation to active well	0.000000 ft
Wellbore storage coefficient	0.040651 bbl/psi
Storage Amplitude	0.000000 psi
Storage Time Constant	0.000000 hr
Second Wellbore Storage	0.000000 bbl/psi
Time Change for Second Storage	0.000000 hr
Well offset - x direction	0.0000 ft
Well offset - y direction	0.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	3622.870000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.570 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

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Layer 1 Correlations
Not Used

Layer Boundaries Data
Layer 1 Boundary Type : Infinitely acting

	Layer 1
L1	0.000000 ft
L2	0.000000 ft
L3	0.000000 ft
L4	0.000000 ft
Drainage area	0.000000 acres
Dietz shape factor	0.000000

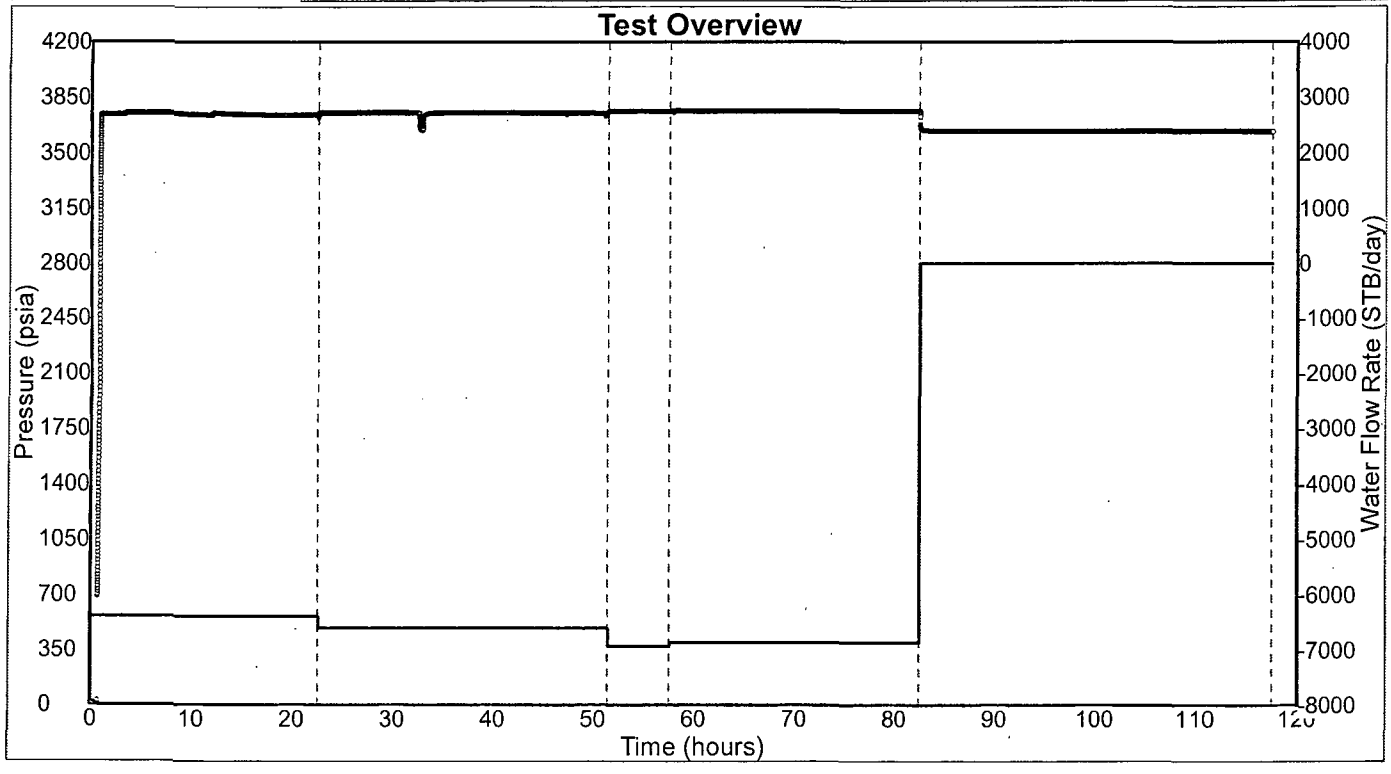
Layer 1 Model Data
Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	567.835809 md
Skin factor (Well 1)	14.63743

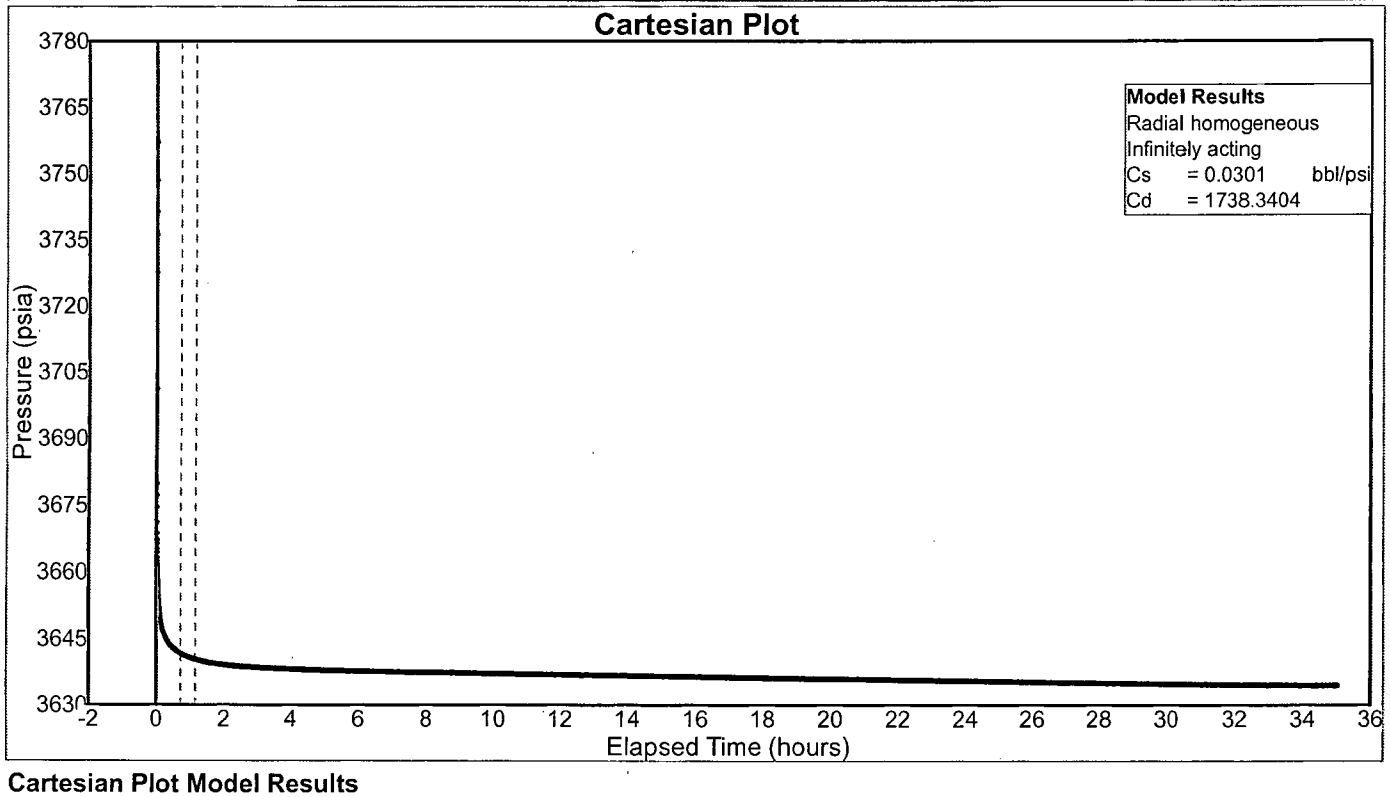
Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-896.530000	0.000000	-6556.478291
-800.530000	0.000000	-6601.295752
-752.530000	0.000000	-6527.197437
-680.530000	0.000000	-6455.564906
-560.530000	0.000000	-6495.140172
-488.530000	0.000000	-6447.882191
-416.530000	0.000000	-6579.061020
-392.530000	0.000000	-6494.151021
-368.530000	0.000000	-6407.507286
-344.530000	0.000000	-6502.572720
-320.530000	0.000000	-6550.762753
-296.530000	0.000000	-6537.209766
-272.530000	0.000000	-7090.581141
-224.530000	0.000000	-6405.124987
-176.530000	0.000000	-6511.595238
-152.530000	0.000000	-6457.245522
-80.530000	0.000000	-6400.552384
-56.530000	0.000000	-6553.585991
-32.530000	0.000000	-6481.716753
-8.530000	0.000000	-6357.386028
22.640735	3754.422743	-6388.006784
51.435332	3761.219618	-6599.617354
57.610353	3764.865451	-6928.849572
82.475272	3765.713641	-6857.001709
117.500343	3634.618056	0.000000

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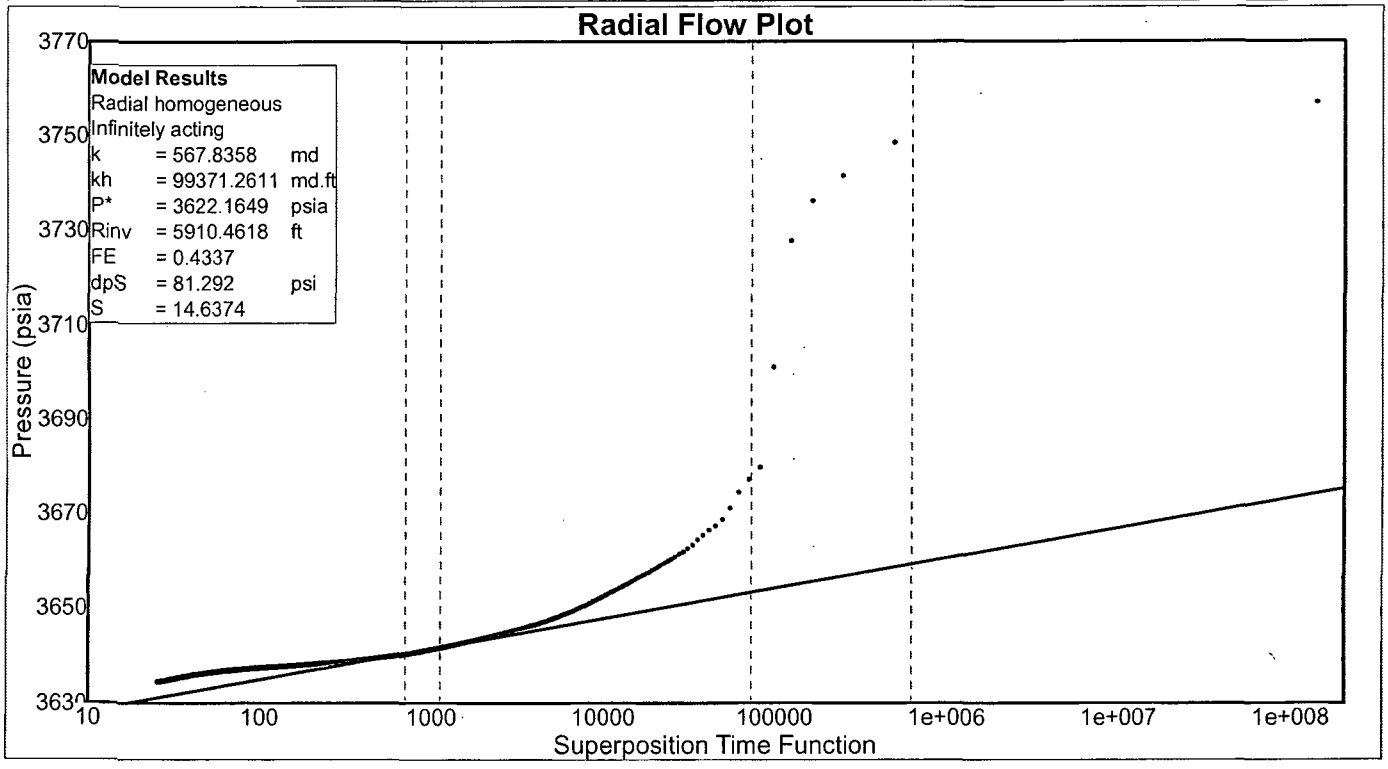


Cartesian Plot Model Results
Radial homogeneous - Infinitely acting

Fair Wellbore Storage

	Value
Wellbore storage coefficient	0.030117 bbl/psi
Dimensionless wellbore storage	1738.340434

Cartesian Plot Line Details
Line type : Wellbore storage
Slope : -9486.62
Intercept : 3780.53
Coefficient of Determination : 0.923237
Number of Intersections = 0



Radial Flow Plot Model Results
Radial homogeneous - Infinitely acting

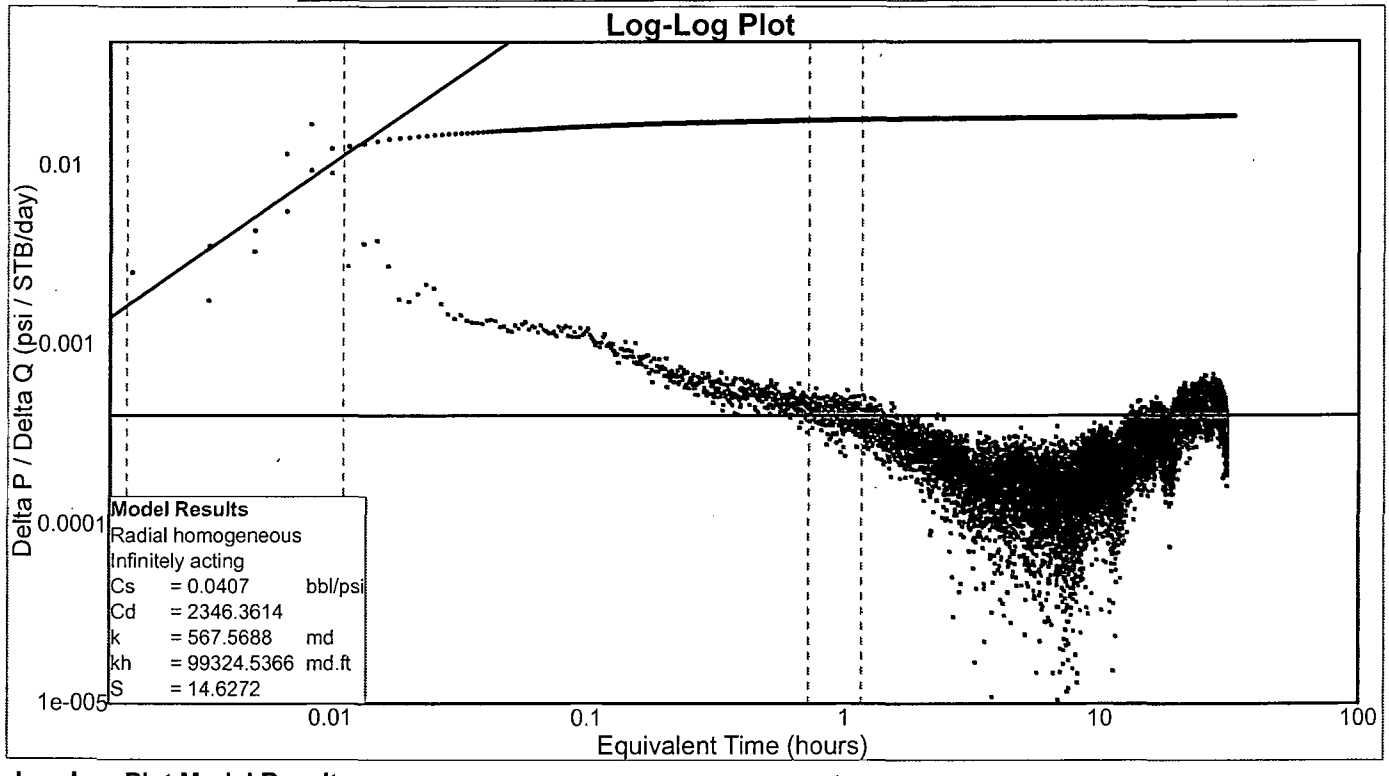
Fair Wellbore Storage

	Value
Permeability	567.835778 md
Permeability-thickness	9.9371e4 md.ft
Extrapolated pressure	3622.164936 psia
Radius of investigation	5910.461759 ft
Flow efficiency	0.433697
dP skin (constant rate)	81.291998 psi
Skin factor	14.637429

Radial Flow Plot Line Details
Line type : Radial flow
Slope : 6.39394
Intercept : 3622.16
Coefficient of Determination : Not Used

	Radial flow
Extrapolated pressure	3622.164936 psia
Pressure at dt = 1 hour	3640.793976 psia

Number of Intersections = 0



Log-Log Plot Model Results

Radial homogeneous - Infinitely acting

Fair Wellbore Storage

	Value
Wellbore storage coefficient	0.040651 bbl/psi
Dimensionless wellbore storage	2346.361416
Permeability	567.56878 md
Permeability-thickness	9.9325e4 md.ft
Skin factor	14.627163

Log-Log Plot Line Details

Line type : Radial flow
Slope : 0
Intercept : 0.000405157
Coefficient of Determination : Not Used

Line type : Wellbore storage
Slope : 1
Intercept : 1.02498
Coefficient of Determination : Not Used

Number of Intersections = 0

SUBSURFACE

HOUSTON, TX • BATON ROUGE, LA • SOUTH BEND, IN

Subsurface Technology, Inc Report File: 2011 Gaines Well-3 rev.pan

PanSystem Version 3.5

Well Test Analysis Report

Company	Navajo Refining Company
Location	Artesia, New Mexico
Well	Gaines Well No. 3
Date	January 21 - 28, 2012
Gauge Type / Serial Number	Spartek / Top No. 77120 & Bottom No. 76404
Guage Depth	7660 feet
Injection Interval	7660 feet to 8620 feet
Completion Type	Perforated
Top of Fill	8986 feet
Analyst	RLS
Subsurface Project No.	70A6645

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Reservoir Description

Fluid type : Water
Well orientation : Vertical
Number of wells : 1
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	3622.164936 psia
Temperature	0.000000 deg F

Well Parameters Data

	Well 1
Well radius	0.3246 ft
Distance from observation to active well	0.000000 ft
Wellbore storage coefficient	0.11809 bbl/psi
Storage Amplitude	0.000000 psi
Storage Time Constant	0.000000 hr
Second Wellbore Storage	0.000000 bbl/psi
Time Change for Second Storage	0.000000 hr
Well offset - x direction	0.0000 ft
Well offset - y direction	0.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	3622.870000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.570 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

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Layer 1 Correlations
Not Used

Layer 1 Model Data
Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	596.528914 md
Skin factor (Well 1)	27.240663

Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-11208.000000	0.000000	-6398.265381
-11184.000000	0.000000	-6398.265381
-11160.000000	0.000000	-6398.265381
-11136.000000	0.000000	-6547.910679
-11112.000000	0.000000	-6398.265381
-11088.000000	0.000000	-6398.265381
-11064.000000	0.000000	-6540.428467
-11040.000000	0.000000	-6398.265381
-11016.000000	0.000000	-6098.977400
-10992.000000	0.000000	-6398.265381
-10968.000000	0.000000	-6547.910679
-10944.000000	0.000000	-6398.265381
-10920.000000	0.000000	-7433.133022
-10896.000000	0.000000	-7141.325160
-10872.000000	0.000000	-6398.265381
-10848.000000	0.000000	-6398.265381
-10824.000000	0.000000	-6256.104911
-10800.000000	0.000000	-6248.622698
-10776.000000	0.000000	-6248.622698
-10752.000000	0.000000	-6547.910679
-10728.000000	0.000000	-6398.265381
-10704.000000	0.000000	-6398.265381
-10680.000000	0.000000	-6398.265381
-10656.000000	0.000000	-6547.910679
-10632.000000	0.000000	-6248.622698
-10608.000000	0.000000	-6540.428467
-10584.000000	0.000000	-6842.037179
-10560.000000	0.000000	0.000000
-10536.000000	0.000000	0.000000
-10512.000000	0.000000	-6540.428467
-10488.000000	0.000000	-6248.622698
-10464.000000	0.000000	-6241.140485
-10440.000000	0.000000	-6398.265381
-10416.000000	0.000000	-6398.265381
-10392.000000	0.000000	-6398.265381
-10368.000000	0.000000	-6547.910679
-10344.000000	0.000000	-6398.265381
-10320.000000	0.000000	-6405.747593
-10296.000000	0.000000	-6248.622698
-10272.000000	0.000000	-6098.977400
-10248.000000	0.000000	-6248.622698

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-10224.000000	0.000000	-6098.977400
-10200.000000	0.000000	-6098.977400
-10176.000000	0.000000	-6248.622698
-10152.000000	0.000000	-6098.977400
-10128.000000	0.000000	-6248.622698
-10104.000000	0.000000	-5949.334717
-10080.000000	0.000000	-6106.459612
-10056.000000	0.000000	-6098.977400
-10032.000000	0.000000	0.000000
-10008.000000	0.000000	-6547.910679
-9984.000000	0.000000	-6398.265381
-9960.000000	0.000000	-6547.910679
-9936.000000	0.000000	-6398.265381
-9912.000000	0.000000	-6540.428467
-9888.000000	0.000000	-6547.910679
-9864.000000	0.000000	-6248.622698
-9840.000000	0.000000	-6248.622698
-9816.000000	0.000000	-6098.977400
-9792.000000	0.000000	-6398.265381
-9768.000000	0.000000	-6398.265381
-9744.000000	0.000000	-6248.622698
-9720.000000	0.000000	-5804.850900
-9696.000000	0.000000	-5949.334717
-9672.000000	0.000000	0.000000
-9648.000000	0.000000	0.000000
-9624.000000	0.000000	0.000000
-9600.000000	0.000000	-6690.071150
-9576.000000	0.000000	-6398.265381
-9552.000000	0.000000	-6547.910679
-9528.000000	0.000000	-6405.747593
-9504.000000	0.000000	-6547.910679
-9480.000000	0.000000	-6547.910679
-9456.000000	0.000000	-6405.747593
-9432.000000	0.000000	-6540.428467
-9408.000000	0.000000	-6697.553362
-9384.000000	0.000000	-6547.910679
-9360.000000	0.000000	-6547.910679
-9336.000000	0.000000	-6248.622698
-9312.000000	0.000000	-6248.622698
-9288.000000	0.000000	-6398.265381
-9264.000000	0.000000	-6547.910679

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-9240.000000	0.000000	-6547.910679
-9216.000000	0.000000	-6547.910679
-9192.000000	0.000000	-6697.553362
-9168.000000	0.000000	-6248.622698
-9144.000000	0.000000	-6697.553362
-9120.000000	0.000000	-6697.553362
-9096.000000	0.000000	-6690.071150
-9072.000000	0.000000	-6547.910679
-9048.000000	0.000000	-6398.265381
-9024.000000	0.000000	-6547.910679
-9000.000000	0.000000	-6547.910679
-8976.000000	0.000000	-6540.428467
-8952.000000	0.000000	-6398.265381
-8928.000000	0.000000	-6547.910679
-8904.000000	0.000000	-6547.910679
-8880.000000	0.000000	-6547.910679
-8856.000000	0.000000	-6398.265381
-8832.000000	0.000000	-6547.910679
-8808.000000	0.000000	-6398.265381
-8784.000000	0.000000	-6547.910679
-8760.000000	0.000000	-6398.265381
-8736.000000	0.000000	0.000000
-8712.000000	0.000000	-5949.334717
-8688.000000	0.000000	-6547.910679
-8664.000000	0.000000	-6398.265381
-8640.000000	0.000000	-6697.553362
-8616.000000	0.000000	-6547.910679
-8592.000000	0.000000	0.000000
-8568.000000	0.000000	-3.0346e4
-8544.000000	0.000000	-575.822689
-8520.000000	0.000000	-6091.495187
-8496.000000	0.000000	0.000000
-8472.000000	0.000000	0.000000
-8448.000000	0.000000	-6697.553362
-8424.000000	0.000000	-6909.119176
-8400.000000	0.000000	-4919.370117
-8376.000000	0.000000	0.000000
-8352.000000	0.000000	-4019.441267
-8328.000000	0.000000	-3420.865566
-8304.000000	0.000000	-4455.730852
-8280.000000	0.000000	-4612.858364
-8256.000000	0.000000	-5206.272845
-8232.000000	0.000000	-5505.560826
-8208.000000	0.000000	-5655.205601
-8184.000000	0.000000	-5056.630162
-8160.000000	0.000000	-5942.110421
-8136.000000	0.000000	-5206.272845
-8112.000000	0.000000	-5505.560826
-8088.000000	0.000000	0.000000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-8064.000000	0.000000	-5655.205601
-8040.000000	0.000000	0.000000
-8016.000000	0.000000	-6842.037179
-7992.000000	0.000000	0.000000
-7968.000000	0.000000	-6697.553362
-7944.000000	0.000000	-6547.910679
-7920.000000	0.000000	-6398.265381
-7896.000000	0.000000	-6697.553362
-7872.000000	0.000000	-7290.970459
-7848.000000	0.000000	-4463.213065
-7824.000000	0.000000	0.000000
-7800.000000	0.000000	-5949.334717
-7776.000000	0.000000	0.000000
-7752.000000	0.000000	-149.336406
-7728.000000	0.000000	-4612.858364
-7704.000000	0.000000	-4762.501046
-7680.000000	0.000000	-3570.508248
-7656.000000	0.000000	0.000000
-7632.000000	0.000000	-4463.213065
-7608.000000	0.000000	-4762.501046
-7584.000000	0.000000	-4313.570382
-7560.000000	0.000000	-5949.334717
-7536.000000	0.000000	-5520.525251
-7512.000000	0.000000	-6547.910679
-7488.000000	0.000000	-4612.858364
-7464.000000	0.000000	0.000000
-7440.000000	0.000000	-5206.272845
-7416.000000	0.000000	-6697.553362
-7392.000000	0.000000	-5505.560826
-7368.000000	0.000000	0.000000
-7344.000000	0.000000	-6398.265381
-7320.000000	0.000000	-5804.850900
-7296.000000	0.000000	-6098.977400
-7272.000000	0.000000	0.000000
-7248.000000	0.000000	-6398.265381
-7224.000000	0.000000	-5855.419922
-7200.000000	0.000000	-5804.850900
-7176.000000	0.000000	-6398.265381
-7152.000000	0.000000	-6098.977400
-7128.000000	0.000000	0.000000
-7104.000000	0.000000	-5949.334717
-7080.000000	0.000000	-4612.858364
-7056.000000	0.000000	0.000000
-7032.000000	0.000000	-1490.971854
-7008.000000	0.000000	-4422.857143
-6984.000000	0.000000	-5385.714111
-6960.000000	0.000000	-4902.857143
-6936.000000	0.000000	-5179.999826
-6912.000000	0.000000	-5074.285714

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-6888.000000	0.000000	-5131.428746
-6864.000000	0.000000	-4797.143032
-6840.000000	0.000000	-4694.285889
-6816.000000	0.000000	-2602.857056
-6792.000000	0.000000	-4800.000000
-6768.000000	0.000000	-4800.000000
-6744.000000	0.000000	0.000000
-6720.000000	0.000000	-7502.856968
-6696.000000	0.000000	0.000000
-6672.000000	0.000000	-4662.857143
-6648.000000	0.000000	-4425.714111
-6624.000000	0.000000	-5074.285714
-6600.000000	0.000000	-3500.000087
-6576.000000	0.000000	-4974.285540
-6552.000000	0.000000	-5177.142857
-6528.000000	0.000000	-5214.285540
-6504.000000	0.000000	-5080.000174
-6480.000000	0.000000	-5314.285714
-6456.000000	0.000000	0.000000
-6432.000000	0.000000	-5177.142857
-6408.000000	0.000000	-5177.142857
-6384.000000	0.000000	-5348.571429
-6360.000000	0.000000	0.000000
-6336.000000	0.000000	-5108.571429
-6312.000000	0.000000	-4971.428571
-6288.000000	0.000000	-5214.285540
-6264.000000	0.000000	-5108.571429
-6240.000000	0.000000	-4800.000000
-6216.000000	0.000000	-5102.856968
-6192.000000	0.000000	-5214.285540
-6168.000000	0.000000	-4865.714460
-6144.000000	0.000000	-5382.857143
-6120.000000	0.000000	-5145.714111
-6096.000000	0.000000	-5042.856968
-6072.000000	0.000000	-5239.999826
-6048.000000	0.000000	-5217.143032
-6024.000000	0.000000	-5280.000000
-6000.000000	0.000000	-5214.285540
-5976.000000	0.000000	-5179.999826
-5952.000000	0.000000	-5211.428571
-5928.000000	0.000000	-5208.571603
-5904.000000	0.000000	-5179.999826
-5880.000000	0.000000	-5248.571254
-5856.000000	0.000000	-5140.000174
-5832.000000	0.000000	-4968.571603
-5808.000000	0.000000	-5080.000174
-5784.000000	0.000000	-5114.285889
-5760.000000	0.000000	-5074.285714
-5736.000000	0.000000	-5111.428397

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-5712.000000	0.000000	-5071.428746
-5688.000000	0.000000	-5211.428571
-5664.000000	0.000000	-5591.428397
-5640.000000	0.000000	-5588.571429
-5616.000000	0.000000	-5588.571429
-5592.000000	0.000000	-5591.428397
-5568.000000	0.000000	-5237.142857
-5544.000000	0.000000	-5754.285540
-5520.000000	0.000000	-5242.857317
-5496.000000	0.000000	-4731.428571
-5472.000000	0.000000	-5242.857317
-5448.000000	0.000000	-5011.428746
-5424.000000	0.000000	-5242.857317
-5400.000000	0.000000	-5108.571429
-5376.000000	0.000000	-5242.857317
-5352.000000	0.000000	-5042.856968
-5328.000000	0.000000	-5071.428746
-5304.000000	0.000000	-5142.857143
-5280.000000	0.000000	-5145.714111
-5256.000000	0.000000	-5140.000174
-5232.000000	0.000000	-5174.285889
-5208.000000	0.000000	-5143.661237
-5184.000000	0.000000	-5137.054269
-5160.000000	0.000000	-5142.857143
-5136.000000	0.000000	-5174.285889
-5112.000000	0.000000	-5074.285714
-5088.000000	0.000000	0.000000
-5064.000000	0.000000	-5042.856968
-5040.000000	0.000000	0.000000
-5016.000000	0.000000	-5345.714460
-4992.000000	0.000000	-5102.856968
-4968.000000	0.000000	0.000000
-4944.000000	0.000000	-5108.571429
-4920.000000	0.000000	-5074.285714
-4896.000000	0.000000	0.000000
-4872.000000	0.000000	-4114.285714
-4848.000000	0.000000	-5105.714460
-4824.000000	0.000000	-5074.285714
-4800.000000	0.000000	-5040.000000
-4776.000000	0.000000	-5042.856968
-4752.000000	0.000000	-5008.571254
-4728.000000	0.000000	-5077.142683
-4704.000000	0.000000	-5080.000174
-4680.000000	0.000000	0.000000
-4656.000000	0.000000	-4974.285540
-4632.000000	0.000000	-4688.571429
-4608.000000	0.000000	-4834.285714
-4584.000000	0.000000	0.000000
-4560.000000	0.000000	-5005.714286

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-4536.000000	0.000000	-4834.285714
-4512.000000	0.000000	-4771.428746
-4488.000000	0.000000	-4971.428571
-4464.000000	0.000000	-5008.571254
-4440.000000	0.000000	-4902.857143
-4416.000000	0.000000	-4797.143032
-4392.000000	0.000000	-4937.142857
-4368.000000	0.000000	-5002.857317
-4344.000000	0.000000	-4597.142683
-4320.000000	0.000000	0.000000
-4296.000000	0.000000	-4900.000174
-4272.000000	0.000000	-4934.285889
-4248.000000	0.000000	0.000000
-4224.000000	0.000000	-4937.142857
-4200.000000	0.000000	-4902.857143
-4176.000000	0.000000	-5002.857317
-4152.000000	0.000000	-5011.428746
-4128.000000	0.000000	-4468.571254
-4104.000000	0.000000	-4997.142857
-4080.000000	0.000000	-4968.571603
-4056.000000	0.000000	-4999.999826
-4032.000000	0.000000	-5002.857317
-4008.000000	0.000000	-4974.285540
-3984.000000	0.000000	-4965.714111
-3960.000000	0.000000	-4874.285889
-3936.000000	0.000000	0.000000
-3912.000000	0.000000	-4865.714460
-3888.000000	0.000000	-4934.285889
-3864.000000	0.000000	-4905.714111
-3840.000000	0.000000	-4902.857143
-3816.000000	0.000000	-5002.857317
-3792.000000	0.000000	-4942.857317
-3768.000000	0.000000	-4939.999826
-3744.000000	0.000000	-4934.285889
-3720.000000	0.000000	0.000000
-3696.000000	0.000000	-4765.714286
-3672.000000	0.000000	-4931.428397
-3648.000000	0.000000	-4937.142857
-3624.000000	0.000000	-4868.571429
-3600.000000	0.000000	-4905.714111
-3576.000000	0.000000	-5002.857317
-3552.000000	0.000000	-4937.142857
-3528.000000	0.000000	-4937.142857
-3504.000000	0.000000	-4931.428397
-3480.000000	0.000000	-4871.428397
-3456.000000	0.000000	-5037.143032
-3432.000000	0.000000	-4837.142683
-3408.000000	0.000000	-4939.999826
-3384.000000	0.000000	-4931.428397

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-3360.000000	0.000000	-4937.142857
-3336.000000	0.000000	-4837.142683
-3312.000000	0.000000	-4974.285540
-3288.000000	0.000000	-5037.143032
-3264.000000	0.000000	-4942.857317
-3240.000000	0.000000	-4937.142857
-3216.000000	0.000000	-4868.571429
-3192.000000	0.000000	-4971.428571
-3168.000000	0.000000	-4937.142857
-3144.000000	0.000000	0.000000
-3120.000000	0.000000	-5419.999826
-3096.000000	0.000000	-5239.999826
-3072.000000	0.000000	-5208.571603
-3048.000000	0.000000	-4668.571603
-3024.000000	0.000000	-4871.428397
-3000.000000	0.000000	-4900.000174
-2976.000000	0.000000	-4934.285889
-2952.000000	0.000000	-4697.142857
-2928.000000	0.000000	-4868.571429
-2904.000000	0.000000	-4771.428746
-2880.000000	0.000000	-4928.571429
-2856.000000	0.000000	0.000000
-2832.000000	0.000000	-4871.428397
-2808.000000	0.000000	-4731.428571
-2784.000000	0.000000	-4834.285714
-2760.000000	0.000000	-4831.428746
-2736.000000	0.000000	-1948.571385
-2712.000000	0.000000	-4771.428746
-2688.000000	0.000000	-2022.857143
-2664.000000	0.000000	-4902.857143
-2640.000000	0.000000	-1242.857143
-2616.000000	0.000000	-4182.857143
-2592.000000	0.000000	-4802.856968
-2568.000000	0.000000	-4837.142683
-2544.000000	0.000000	-4634.285889
-2520.000000	0.000000	-4668.571603
-2496.000000	0.000000	-4731.428571
-2472.000000	0.000000	-4699.999826
-2448.000000	0.000000	-4597.142683
-2424.000000	0.000000	-4625.714460
-2400.000000	0.000000	-4797.143032
-2376.000000	0.000000	-4597.142683
-2352.000000	0.000000	0.000000
-2328.000000	0.000000	0.000000
-2304.000000	0.000000	-36.357143
-2280.000000	0.000000	-4483.702381
-2256.000000	0.000000	-4683.331018
-2232.000000	0.000000	-4498.543981
-2208.000000	0.000000	-4739.353257

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-2184.000000	0.000000	-4498.311508
-2160.000000	0.000000	-4739.888558
-2136.000000	0.000000	-4293.713624
-2112.000000	0.000000	-4625.099950
-2088.000000	0.000000	-4324.223628
-2064.000000	0.000000	-4827.789104
-2040.000000	0.000000	-4792.579034
-2016.000000	0.000000	-4881.841105
-1992.000000	0.000000	-4815.456267
-1968.000000	0.000000	-7234.171048
-1944.000000	0.000000	-6065.735284
-1920.000000	0.000000	-4486.401207
-1896.000000	0.000000	-4603.563244
-1872.000000	0.000000	-4207.539683
-1848.000000	0.000000	-3875.855076
-1824.000000	0.000000	-2134.996280
-1800.000000	0.000000	0.000000
-1776.000000	0.000000	0.000000
-1752.000000	0.000000	-3960.563740
-1728.000000	0.000000	-4768.571254
-1704.000000	0.000000	-5025.714111
-1680.000000	0.000000	-4831.428746
-1656.000000	0.000000	-5974.285714
-1632.000000	0.000000	-5991.428571
-1608.000000	0.000000	-8548.571254
-1584.000000	0.000000	-2231.428659
-1560.000000	0.000000	-5217.143032
-1536.000000	0.000000	-2905.714286
-1512.000000	0.000000	-5002.857317
-1488.000000	0.000000	-1.6786e4
-1464.000000	0.000000	-1314.285671
-1440.000000	0.000000	-4494.285540
-1416.000000	0.000000	-3597.142770
-1392.000000	0.000000	-4488.571603
-1368.000000	0.000000	-2294.285627
-1344.000000	0.000000	-5065.714286
-1320.000000	0.000000	-3974.285627
-1296.000000	0.000000	-4457.142857
-1272.000000	0.000000	-4971.428571
-1248.000000	0.000000	-4077.142770
-1224.000000	0.000000	-4428.571603
-1200.000000	0.000000	-4425.714111
-1176.000000	0.000000	0.000000
-1152.000000	0.000000	-4557.143032
-1128.000000	0.000000	-19.999999
-1104.000000	0.000000	-4971.428571
-1080.000000	0.000000	-4734.285540
-1056.000000	0.000000	-5008.571254
-1032.000000	0.000000	-4560.000000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-1008.000000	0.000000	-3331.428484
-984.000000	0.000000	-5111.428397
-960.000000	0.000000	-5008.571254
-936.000000	0.000000	-4865.714460
-912.000000	0.000000	-5242.857317
-888.000000	0.000000	-5182.857317
-864.000000	0.000000	-4179.999913
-840.000000	0.000000	-5042.856968
-816.000000	0.000000	-3791.428659
-792.000000	0.000000	-3871.428484
-768.000000	0.000000	-3057.142770
-744.000000	0.000000	-4768.571254
-720.000000	0.000000	-4348.571516
-696.000000	0.000000	0.000000
-672.000000	0.000000	-5202.857143
-648.000000	0.000000	-3871.428484
-624.000000	0.000000	-2097.142901
-600.000000	0.000000	-3608.571429
-576.000000	0.000000	-2514.285801
-552.000000	0.000000	-5034.285540
-528.000000	0.000000	-4865.714460
-504.000000	0.000000	-4968.571603
-480.000000	0.000000	-5040.000000
-456.000000	0.000000	-3088.571516
-432.000000	0.000000	-4217.142857
-408.000000	0.000000	-4699.999826
-384.000000	0.000000	-437.142857
-360.000000	0.000000	0.000000
-336.000000	0.000000	-3502.857056
-312.000000	0.000000	-4362.857143
-288.000000	0.000000	-3085.714286
-264.000000	0.000000	-4417.142683
-240.000000	0.000000	-3231.428571
-216.000000	0.000000	-3660.000000
-192.000000	0.000000	-4634.285889
-168.000000	0.000000	-4491.428571
-144.000000	0.000000	-5322.857143
-120.000000	0.000000	-4588.571254
-96.000000	0.000000	-1414.285714
-76.289593	3841.764422	-3960.000000
-55.927602	3842.748942	-4611.428571
-30.569832	3852.797833	-7262.856968
0.000000	3853.883527	-1808.571429
37.273743	3800.553372	0.000000

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SUBSURFACE

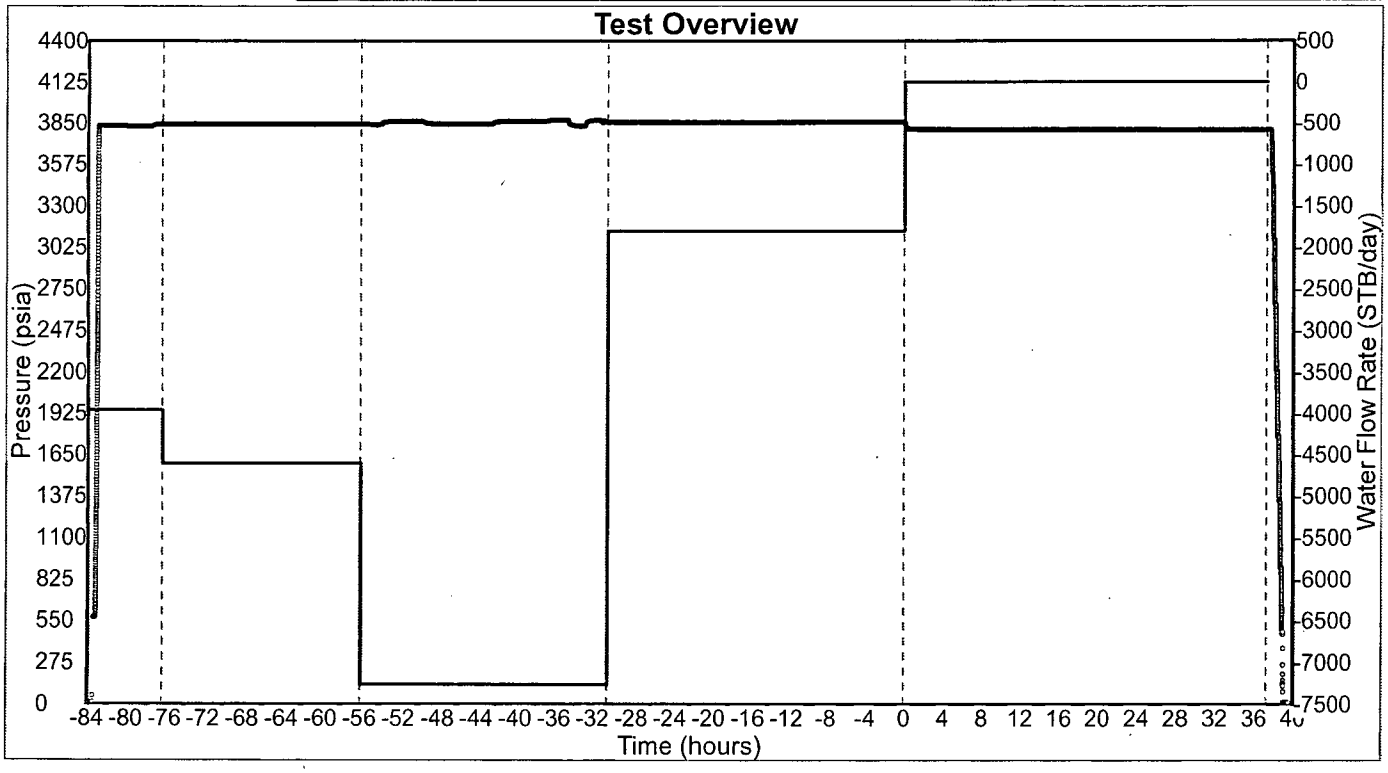
HOUSTON, TX • BATON ROUGE, LA • SOUTH BEND, IN

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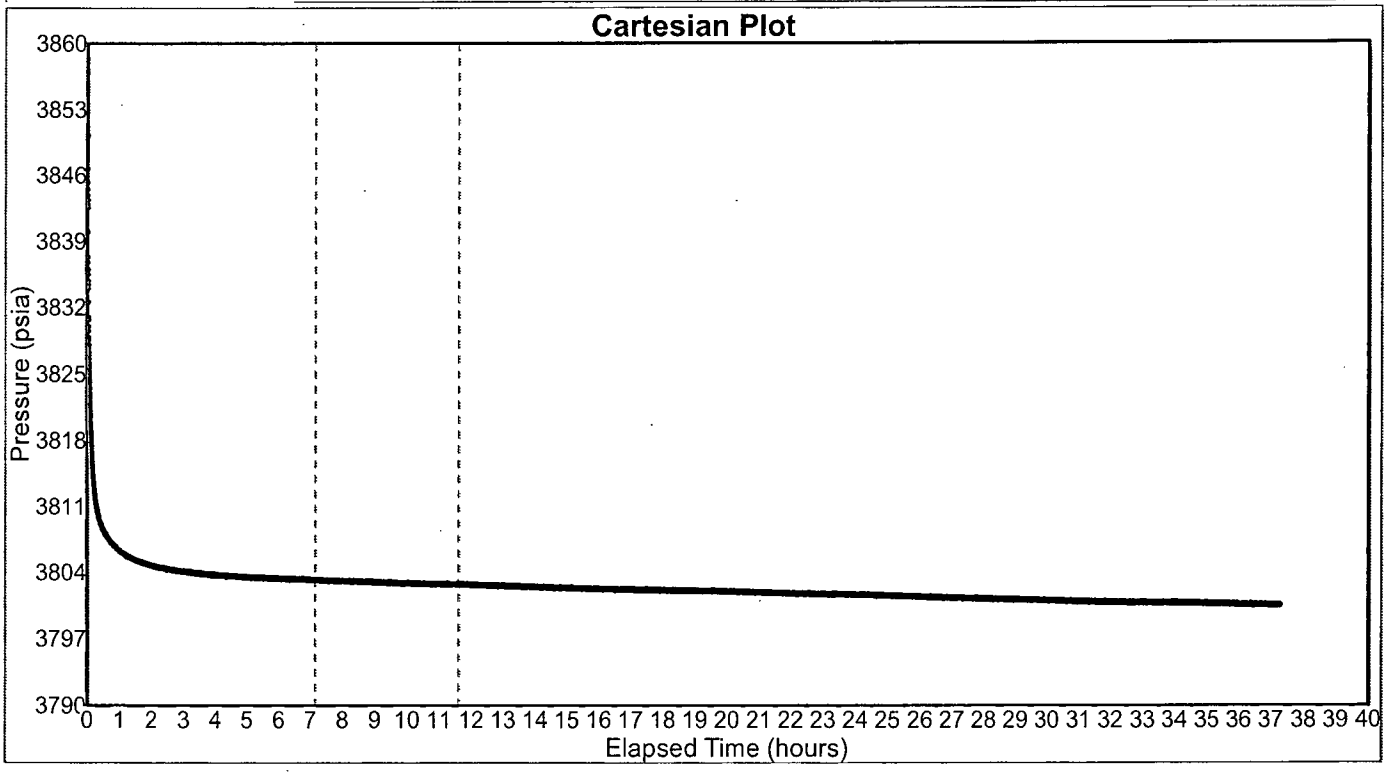
PanSystem Version 3.5

Well Test Analysis Report

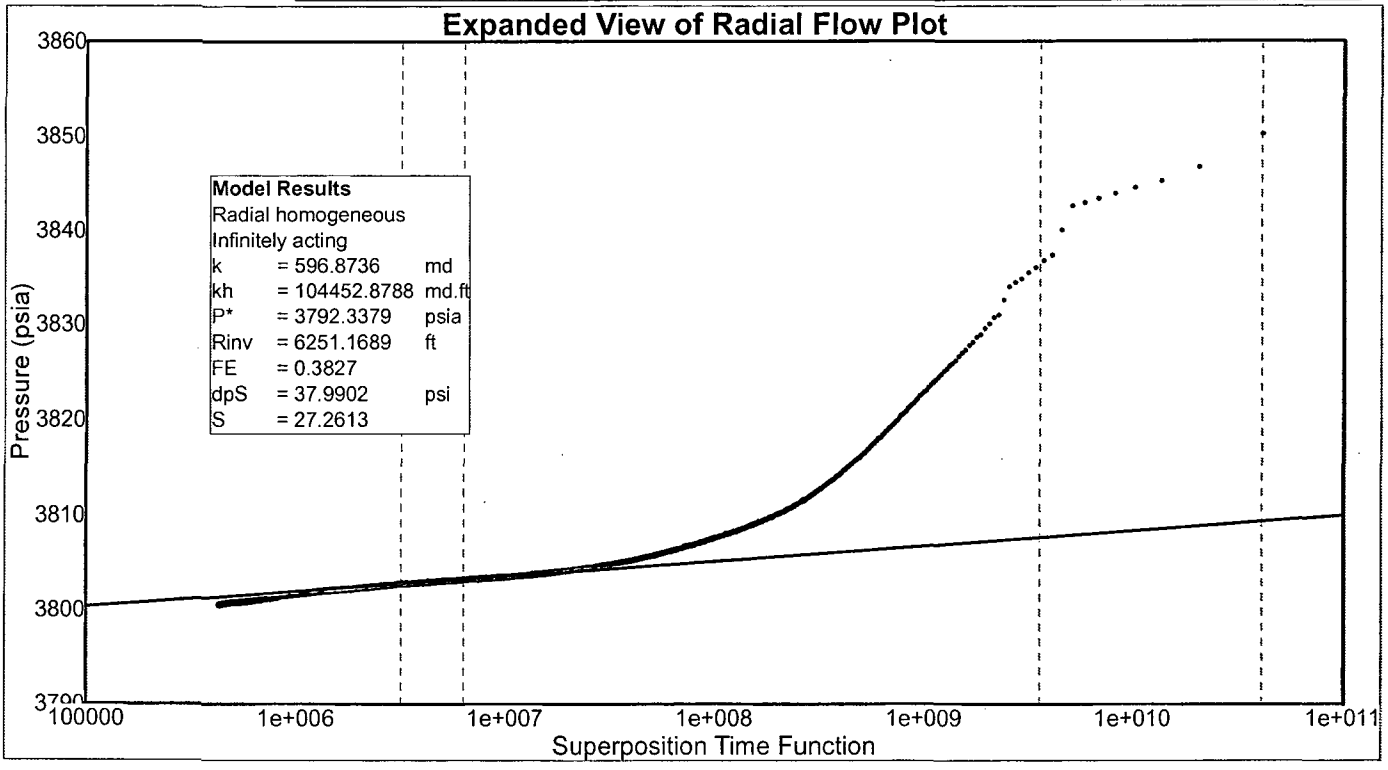
Report File: 2011 Gaines Well-3 rev.pan



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Expanded View of Radial Flow Plot Model Results
Radial homogeneous - Infinitely acting

Fair Wellbore Storage

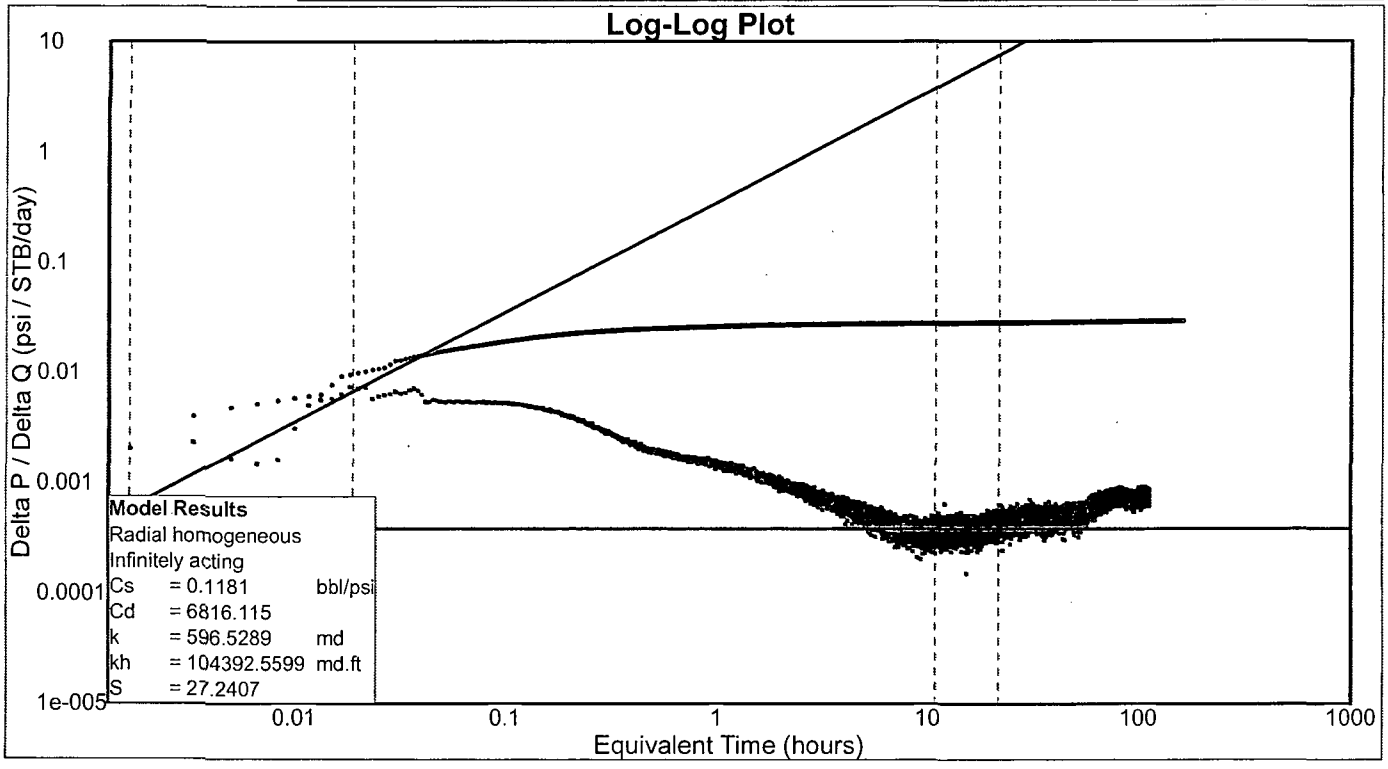
	Value
Permeability	596.873593 md
Permeability-thickness	1.0445e5 md.ft
Extrapolated pressure	3792.337923 psia
Radius of investigation	6251.168856 ft
Flow efficiency	0.382731
dP skin (constant rate)	37.990201 psi
Skin factor	27.261314

Expanded View of Radial Flow Plot Line Details
Line type : Radial flow
Slope : 1.60439
Intercept : 3792.34
Coefficient of Determination : 0.899916

	Radial flow
Extrapolated pressure	3792.337923 psia
Pressure at dt = 1 hour	3804.910506 psia

Number of Intersections = 0

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Log-Log Plot Model Results

Radial homogeneous - Infinitely acting

Fair Wellbore Storage

	Value
Wellbore storage coefficient	0.11809 bbl/psi
Dimensionless wellbore storage	6816.114987
Permeability	596.528914 md
Permeability-thickness	1.0439e5 md.ft
Skin factor	27.240663

Log-Log Plot Line Details

Line type : Wellbore storage
Slope : 1
Intercept : 0.352838
Coefficient of Determination : Not Used

Line type : Radial flow
Slope : 0
Intercept : 0.000385487
Coefficient of Determination : Not Used

Number of Intersections = 0

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Subsurface Technology, Inc	Report File:	Navajo Mewbourne Well No. 1 201
PanSystem Version 3.5		
Well Test Analysis Report		

Company	Navajo Refining Company
Location	Artesia, New Mexico
Well	Mewbourne Well No. 1
Date	December 16 - 21, 2010
Test	Falloff
Gauge Depth	7924 feet
Injection Interval	7924 feet - 8476 feet
Completion Type	Perforated
Top of Fill	9001feet
Last Stabilization	January 2009
Analyst	RLS
Subsurface Project No.	70A6516

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Reservoir Description

Fluid type : Water
Well orientation : Vertical
Number of wells : 3
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	3716.931804 psia
Temperature	0.000000 deg F

Well Parameters Data

	WDW-1	WDW-2	WDW-3
Well radius	0.3646 ft	0.3281 ft	0.3281 ft
Distance from observation to active well	0.000000 ft	1.0970e4 ft	7907.000000 ft
Wellbore storage coefficient	0.0900 bbl/psi	1.0000e-3 bbl/psi	1.0000e-3 bbl/psi
Storage Amplitude	0.000000 psi	0.000000 psi	0.000000 psi
Storage Time Constant	0.000000 hr	0.000000 hr	0.000000 hr
Second Wellbore Storage	0.170000 bbl/psi	2.7000e-3 bbl/psi	1.7500e-4 bbl/psi
Time Change for Second Storage	0.050000 hr	0.017500 hr	7.5000e-3 hr
Well offset - x direction	0.0000 ft	-7590.0000 ft	-6000.0000 ft
Well offset - y direction	0.0000 ft	-7920.0000 ft	-5150.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	0.000000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.570 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

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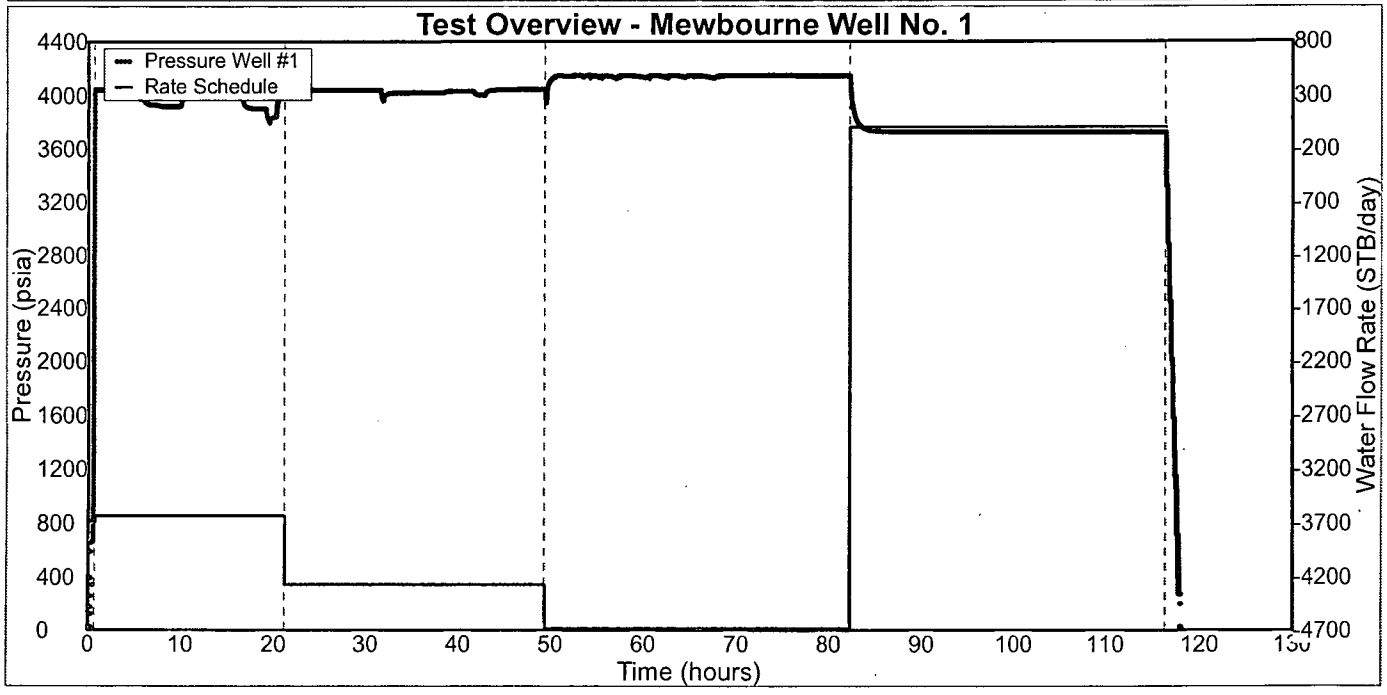
Layer 1 Correlations

Not Used

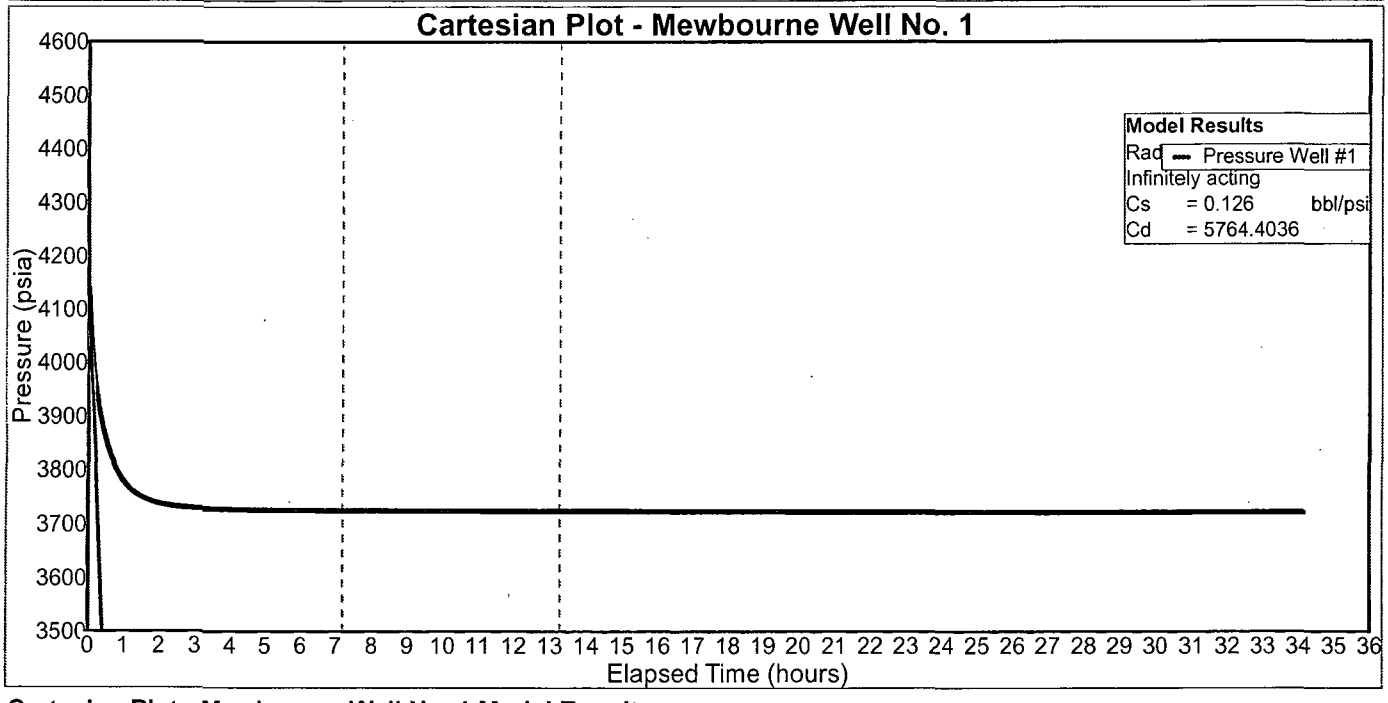
Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-792.000000	0.000000	-4228.888582
-768.000000	0.000000	-4391.549806
-744.000000	0.000000	-4384.479672
-720.000000	0.000000	-4384.376378
-696.000000	0.000000	-4374.848597
-672.000000	0.000000	-4176.157065
-648.000000	0.000000	-4325.868803
-624.000000	0.000000	-4308.064641
-600.000000	0.000000	-4302.856847
-576.000000	0.000000	-4268.163357
-552.000000	0.000000	-4211.405051
-528.000000	0.000000	-4314.799121
-504.000000	0.000000	-4274.892719
-480.000000	0.000000	-3790.877466
-456.000000	0.000000	-4078.245257
-432.000000	0.000000	-4080.230053
-408.000000	0.000000	-4067.616136
-384.000000	0.000000	-4044.605134
-360.000000	0.000000	-4027.491560
-336.000000	0.000000	-3777.450665
-312.000000	0.000000	-3466.263264
-288.000000	0.000000	-4606.468701
-264.000000	0.000000	-4060.063248
-240.000000	0.000000	-4051.826741
-216.000000	0.000000	-4064.050333
-192.000000	0.000000	-4064.043834
-168.000000	0.000000	-4082.369662
-144.000000	0.000000	-4090.841307
-120.000000	4031.250000	-4091.821452
-96.000000	4031.250000	-4087.686695
-72.000000	4031.250000	-4091.460208
-47.449664	4031.250000	-4113.064348
-23.489933	4040.625000	-4063.756218
0.696213	4045.107422	-3687.836512
21.181005	4039.775391	-3633.179677
49.300562	4046.689453	-4268.197524
82.243625	4145.268121	-4683.825820
116.393616	3722.481995	0.000000

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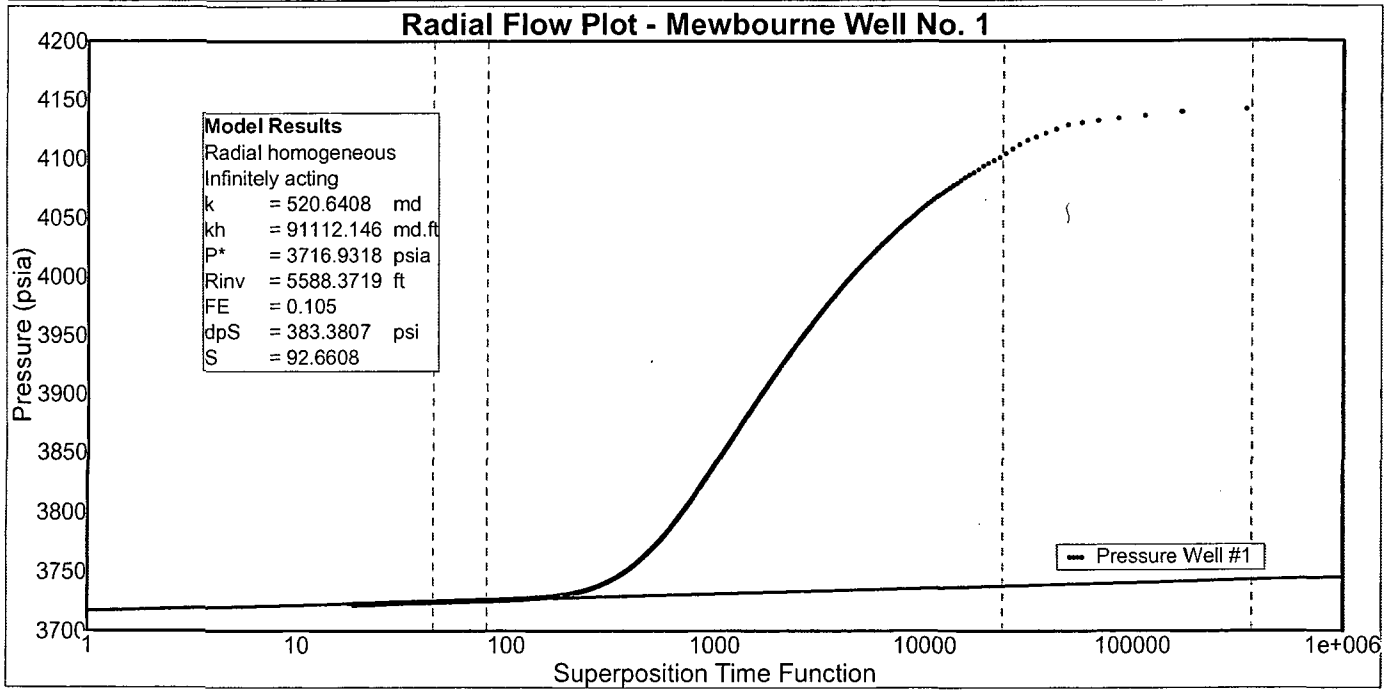
Cartesian Plot - Mewbourne Well No. 1 Model Results
Radial homogeneous - Infinitely acting

Time Stepped Wellbore Storage

	Value
Wellbore storage coefficient	0.125999 bbl/psi
Dimensionless wellbore storage	5764.403591

Cartesian Plot - Mewbourne Well No. 1 Line Details
Line type : Wellbore storage
Slope : -1548.89
Intercept : 4144.84
Coefficient of Determination : 0.990512
Number of Intersections = 0

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Radial Flow Plot - Mewbourne Well No. 1 Model Results
Radial homogeneous - Infinitely acting

Time Stepped Wellbore Storage

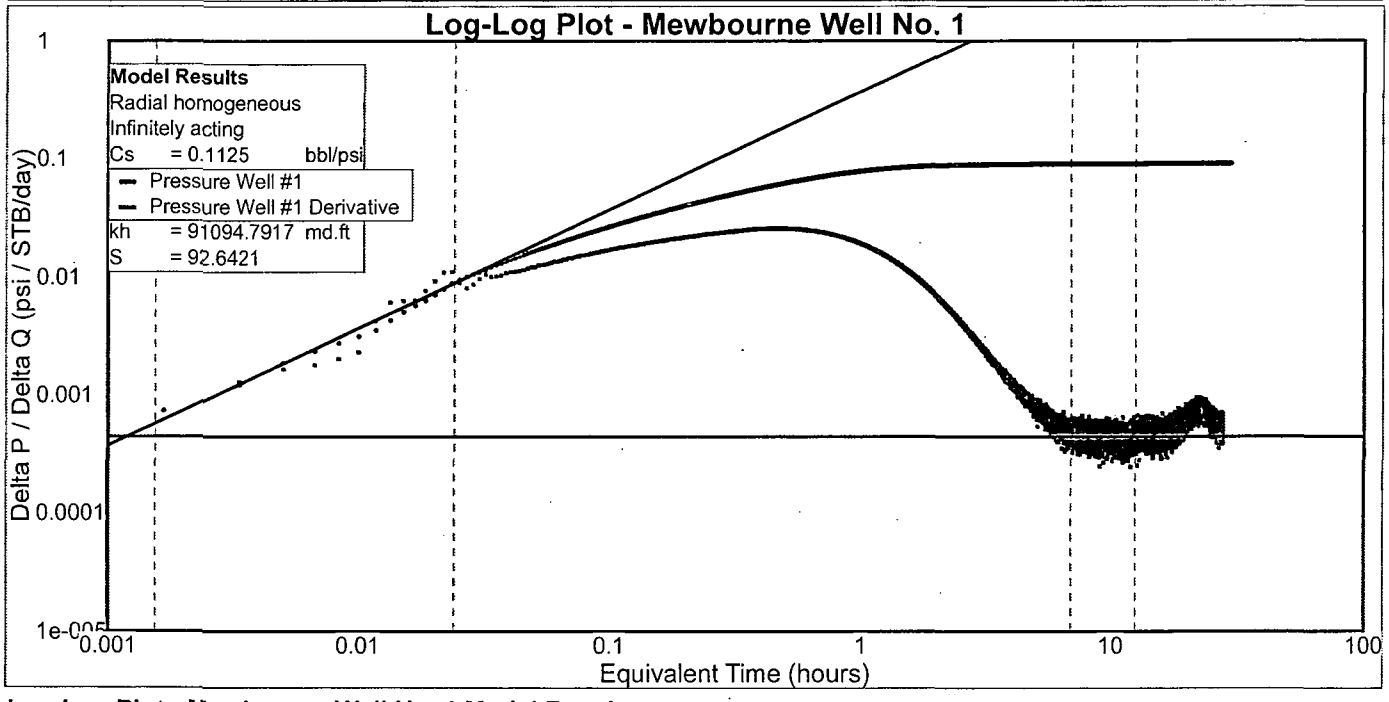
	Value
Permeability	520.640835 md
Permeability-thickness	9.1112e4 md.ft
Extrapolated pressure	3716.931804 psia
Radius of investigation	5588.371933 ft
Flow efficiency	0.104954
dP skin (constant rate)	383.380738 psi
Skin factor	92.660849

Radial Flow Plot - Mewbourne Well No. 1 Line Details
Line type : Radial flow
Slope : 4.76343
Intercept : 3716.93
Coefficient of Determination : 0.991562

	Radial flow
Extrapolated pressure	3716.931804 psia
Pressure at dt = 1 hour	3730.046611 psia

Number of Intersections = 0

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Log-Log Plot - Mewbourne Well No. 1 Model Results
Radial homogeneous - Infinitely acting

Time Stepped Wellbore Storage

	Value
Wellbore storage coefficient	0.11247 bbl/psi
Dimensionless wellbore storage	5145.441094
Permeability	520.541667 md
Permeability-thickness	9.1095e4 md.ft
Skin factor	92.642114

Log-Log Plot - Mewbourne Well No. 1 Line Details
Line type : Wellbore storage
Slope : 1
Intercept : 0.37047
Coefficient of Determination : Not Used
Line type : Radial flow
Slope : 0
Intercept : 0.00044176
Coefficient of Determination : Not Used
Number of Intersections = 0

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SUBSURFACE

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Subsurface Technology, Inc | Report File: | Well No. 1 2011.pan

PanSystem Version 3.5

Well Test Analysis Report

Company	Navajo Refining Company
Location	Artesia, New Mexico
Well	Mewbourne Well No. 1
Date	November 10 - 13, 2011
Test	Falloff
Gauge Depth	7924 feet
Injection Interval	7924 feet - 8476 feet
Completion Type	Perforated
Top of Fill	9001feet
Last Stabilization	December 21, 2010
Analyst	RLS
Subsurface Project No.	70A6645

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Reservoir Description

Fluid type : Water
Well orientation : Vertical
Number of wells : 3
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	3716.931804 psia
Temperature	0.000000 deg F

Well Parameters Data

	WDW-1	WDW-2	WDW-3
Well radius	0.3646 ft	0.3281 ft	0.3281 ft
Distance from observation to active well	0.000000 ft	1.0970e4 ft	7907.000000 ft
Wellbore storage coefficient	0.0900 bbl/psi	1.0000e-3 bbl/psi	1.0000e-3 bbl/psi
Storage Amplitude	0.000000 psi	0.000000 psi	0.000000 psi
Storage Time Constant	0.000000 hr	0.000000 hr	0.000000 hr
Second Wellbore Storage	0.170000 bbl/psi	2.7000e-3 bbl/psi	1.7500e-4 bbl/psi
Time Change for Second Storage	0.050000 hr	0.017500 hr	7.5000e-3 hr
Well offset - x direction	0.0000 ft	-7590.0000 ft	-6000.0000 ft
Well offset - y direction	0.0000 ft	-7920.0000 ft	-5150.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	0.000000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.570 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

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Layer 1 Correlations
Not Used

Layer 1 Model Data
Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	520.6408 md
Skin factor (Well 1)	92.6608
Skin factor (Well 2)	0.0000
Skin factor (Well 3)	0.0000

Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-9403.500000	0.000000	-4389.885603
-9379.500000	0.000000	-4389.885603
-9355.500000	0.000000	-4389.885603
-9331.500000	0.000000	-4389.885603
-9307.500000	0.000000	-4389.885603
-9283.500000	0.000000	-4389.885603
-9259.500000	0.000000	-4282.176688
-9235.500000	0.000000	-4389.885603
-9211.500000	0.000000	-4389.885603
-9187.500000	0.000000	-4282.176688
-9163.500000	0.000000	-4282.176688
-9139.500000	0.000000	-4389.885603
-9115.500000	0.000000	-4924.720459
-9091.500000	0.000000	-4820.724923
-9067.500000	0.000000	-4389.885603
-9043.500000	0.000000	-4740.420096
-9019.500000	0.000000	-4282.176688
-8995.500000	0.000000	-4389.885603
-8971.500000	0.000000	-4287.562081
-8947.500000	0.000000	-4384.500209
-8923.500000	0.000000	-4389.885603
-8899.500000	0.000000	-4389.885603
-8875.500000	0.000000	-4282.176688
-8851.500000	0.000000	-4389.885603
-8827.500000	0.000000	-4287.562081
-8803.500000	0.000000	-4276.977016
-8779.500000	0.000000	-2462.250105
-8755.500000	0.000000	-2569.959019
-8731.500000	0.000000	-2569.959019
-8707.500000	0.000000	-4178.180629
-8683.500000	0.000000	-4389.885603
-8659.500000	0.000000	-4389.885603
-8635.500000	0.000000	-4389.885603
-8611.500000	0.000000	-4282.176688
-8587.500000	0.000000	-4389.885603
-8563.500000	0.000000	-4282.176688
-8539.500000	0.000000	-4384.500209
-8515.500000	0.000000	-4389.885603
-8491.500000	0.000000	-4389.885603

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-8467.500000	0.000000	-4178.180629
-8443.500000	0.000000	-4282.176688
-8419.500000	0.000000	-4282.176688
-8395.500000	0.000000	-4178.180629
-8371.500000	0.000000	-4070.470145
-8347.500000	0.000000	-4070.470145
-8323.500000	0.000000	-4070.470145
-8299.500000	0.000000	-4070.470145
-8275.500000	0.000000	-3962.759399
-8251.500000	0.000000	-4070.470145
-8227.500000	0.000000	-2462.250105
-8203.500000	0.000000	-4070.470145
-8179.500000	0.000000	-3535.635027
-8155.500000	0.000000	-4070.470145
-8131.500000	0.000000	-4070.470145
-8107.500000	0.000000	-4070.470145
-8083.500000	0.000000	-4070.470145
-8059.500000	0.000000	-4070.470145
-8035.500000	0.000000	-4178.180629
-8011.500000	0.000000	-4070.470145
-7987.500000	0.000000	-4070.470145
-7963.500000	0.000000	-4178.180629
-7939.500000	0.000000	-3914.411970
-7915.500000	0.000000	-3639.630824
-7891.500000	0.000000	-3747.339739
-7867.500000	0.000000	-4930.105852
-7843.500000	0.000000	-2358.254307
-7819.500000	0.000000	-2462.250105
-7795.500000	0.000000	-4172.795236
-7771.500000	0.000000	-4070.470145
-7747.500000	0.000000	-3962.759399
-7723.500000	0.000000	-3957.374006
-7699.500000	0.000000	-4070.470145
-7675.500000	0.000000	-4070.470145
-7651.500000	0.000000	-4070.470145
-7627.500000	0.000000	-3855.050485
-7603.500000	0.000000	-4063.999721
-7579.500000	0.000000	-4015.157384
-7555.500000	0.000000	-3962.759399

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-7531.500000	0.000000	0.000000
-7507.500000	0.000000	-4070.470145
-7483.500000	0.000000	-4070.470145
-7459.500000	0.000000	-4070.470145
-7435.500000	0.000000	-4070.470145
-7411.500000	0.000000	-4282.176688
-7387.500000	0.000000	-4178.180629
-7363.500000	0.000000	-4070.470145
-7339.500000	0.000000	-4070.470145
-7315.500000	0.000000	-4065.084490
-7291.500000	0.000000	-3855.050485
-7267.500000	0.000000	-3639.630824
-7243.500000	0.000000	-3962.759399
-7219.500000	0.000000	-3962.759399
-7195.500000	0.000000	-3962.759399
-7171.500000	0.000000	-3986.257324
-7147.500000	0.000000	-3962.759399
-7123.500000	0.000000	-3941.403285
-7099.500000	0.000000	-3962.759399
-7075.500000	0.000000	-3962.759399
-7051.500000	0.000000	-3855.050485
-7027.500000	0.000000	-3855.050485
-7003.500000	0.000000	-3855.050485
-6979.500000	0.000000	-3855.050485
-6955.500000	0.000000	-3855.050485
-6931.500000	0.000000	-2358.254307
-6907.500000	0.000000	-3962.759399
-6883.500000	0.000000	-3855.050485
-6859.500000	0.000000	-3855.050485
-6835.500000	0.000000	-3855.050485
-6811.500000	0.000000	-3747.339739
-6787.500000	0.000000	-2.1843e4
-6763.500000	0.000000	-1.8095e4
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-6571.500000	0.000000	-2548.602905
-6547.500000	0.000000	-4820.724923
-6523.500000	0.000000	-3855.050485
-6499.500000	0.000000	-4924.720459
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-6427.500000	0.000000	-4605.305001
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-6379.500000	0.000000	-5140.140381

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
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-6307.500000	0.000000	-5247.850865
-6283.500000	0.000000	-2569.959019
-6259.500000	0.000000	-5032.431466
-6235.500000	0.000000	-3339.307774
-6211.500000	0.000000	-5782.685721
-6187.500000	0.000000	-2569.959019
-6163.500000	0.000000	-5674.976807
-6139.500000	0.000000	-5567.266323
-6115.500000	0.000000	-5782.685721
-6091.500000	0.000000	-5782.685721
-6067.500000	0.000000	-4282.176688
-6043.500000	0.000000	-4820.724923
-6019.500000	0.000000	-4497.596087
-5995.500000	0.000000	-7387.192906
-5971.500000	0.000000	-4820.724923
-5947.500000	0.000000	-7062.392055
-5923.500000	0.000000	-7283.196847
-5899.500000	0.000000	-7186.071429
-5875.500000	0.000000	-8029.738770
-5851.500000	0.000000	-3634.431152
-5827.500000	0.000000	-7494.901821
-5803.500000	0.000000	-7602.612305
-5779.500000	0.000000	-7602.612305
-5755.500000	0.000000	-6960.066964
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-5707.500000	0.000000	-5032.431466
-5683.500000	0.000000	-7387.192906
-5659.500000	0.000000	-3962.759399
-5635.500000	0.000000	-7175.486363
-5611.500000	0.000000	-7175.486363
-5587.500000	0.000000	-7283.196847
-5563.500000	0.000000	-7272.426060
-5539.500000	0.000000	-7288.396519
-5515.500000	0.000000	-7277.811454
-5491.500000	0.000000	-7175.486363
-5467.500000	0.000000	-7175.486363
-5443.500000	0.000000	-7175.486363
-5419.500000	0.000000	-7387.192906
-5395.500000	0.000000	-7494.901821
-5371.500000	0.000000	-7818.032227
-5347.500000	0.000000	-7602.612305
-5323.500000	0.000000	-7387.192906
-5299.500000	0.000000	-7576.386370
-5275.500000	0.000000	-7175.486363
-5251.500000	0.000000	-5816.444092
-5227.500000	0.000000	-6857.142857
-5203.500000	0.000000	-7437.143032

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
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-5107.500000	0.000000	-7542.857143
-5083.500000	0.000000	-7474.285714
-5059.500000	0.000000	-7571.428397
-5035.500000	0.000000	-4628.571429
-5011.500000	0.000000	-6857.142857
-4987.500000	0.000000	-7614.285540
-4963.500000	0.000000	-7437.143032
-4939.500000	0.000000	-3808.571516
-4915.500000	0.000000	-3702.857143
-4891.500000	0.000000	-2742.857143
-4867.500000	0.000000	-4800.000000
-4843.500000	0.000000	-4631.428397
-4819.500000	0.000000	-5248.571254
-4795.500000	0.000000	-3942.857143
-4771.500000	0.000000	-5071.428746
-4747.500000	0.000000	-5245.714286
-4723.500000	0.000000	-5277.143032
-4699.500000	0.000000	-4974.285540
-4675.500000	0.000000	-5142.857143
-4651.500000	0.000000	-2640.000000
-4627.500000	0.000000	-5142.857143
-4603.500000	0.000000	-5174.285889
-4579.500000	0.000000	-5108.571429
-4555.500000	0.000000	-2708.571429
-4531.500000	0.000000	-5108.571429
-4507.500000	0.000000	-5002.857317
-4483.500000	0.000000	-5040.000000
-4459.500000	0.000000	-5179.999826
-4435.500000	0.000000	-4800.000000
-4411.500000	0.000000	-5248.571254
-4387.500000	0.000000	-5108.571429
-4363.500000	0.000000	-4974.285540
-4339.500000	0.000000	-5040.000000
-4315.500000	0.000000	-5182.857317
-4291.500000	0.000000	-5142.857143
-4267.500000	0.000000	-5037.143032
-4243.500000	0.000000	-5037.143032
-4219.500000	0.000000	-5008.571254
-4195.500000	0.000000	-5037.143032
-4171.500000	0.000000	-5005.714286
-4147.500000	0.000000	-5037.143032
-4123.500000	0.000000	-5008.571254
-4099.500000	0.000000	-5040.000000
-4075.500000	0.000000	-5037.143032
-4051.500000	0.000000	-5037.143032
-4027.500000	0.000000	-5105.714460

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
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-3979.500000	0.000000	-4937.142857
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-3931.500000	0.000000	-4937.142857
-3907.500000	0.000000	-4971.428571
-3883.500000	0.000000	-4974.285540
-3859.500000	0.000000	-5620.000174
-3835.500000	0.000000	-5451.428571
-3811.500000	0.000000	-5382.857143
-3787.500000	0.000000	-5385.714111
-3763.500000	0.000000	-5174.285889
-3739.500000	0.000000	-5625.714111
-3715.500000	0.000000	-5145.714111
-3691.500000	0.000000	-4697.142857
-3667.500000	0.000000	-5074.285714
-3643.500000	0.000000	-5968.571254
-3619.500000	0.000000	-5140.000174
-3595.500000	0.000000	-5177.142857
-3571.500000	0.000000	-5108.571429
-3547.500000	0.000000	-5208.571603
-3523.500000	0.000000	-5211.428571
-3499.500000	0.000000	-5245.714286
-3475.500000	0.000000	-5177.142857
-3451.500000	0.000000	-5111.428397
-3427.500000	0.000000	-5145.714111
-3403.500000	0.000000	-5128.392857
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-3355.500000	0.000000	-5142.857143
-3331.500000	0.000000	-5142.857143
-3307.500000	0.000000	-5074.285714
-3283.500000	0.000000	-2811.428571
-3259.500000	0.000000	-5174.285889
-3235.500000	0.000000	-2811.428571
-3211.500000	0.000000	-5451.428571
-3187.500000	0.000000	-5074.285714
-3163.500000	0.000000	-2777.142857
-3139.500000	0.000000	-5108.571429
-3115.500000	0.000000	-5140.000174
-3091.500000	0.000000	-2777.142857
-3067.500000	0.000000	-4488.571603
-3043.500000	0.000000	-5108.571429
-3019.500000	0.000000	-5074.285714
-2995.500000	0.000000	-5040.000000
-2971.500000	0.000000	-5040.000000
-2947.500000	0.000000	-5002.857317
-2923.500000	0.000000	-5002.857317
-2899.500000	0.000000	-4971.428571
-2875.500000	0.000000	-2742.857143
-2851.500000	0.000000	-5005.714286

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-2827.500000	0.000000	-6211.428746
-2803.500000	0.000000	-5005.714286
-2779.500000	0.000000	-2742.857143
-2755.500000	0.000000	-4968.571603
-2731.500000	0.000000	-5008.571254
-2707.500000	0.000000	-5074.285714
-2683.500000	0.000000	-4971.428571
-2659.500000	0.000000	-4968.571603
-2635.500000	0.000000	-5002.857317
-2611.500000	0.000000	-5008.571254
-2587.500000	0.000000	-4974.285540
-2563.500000	0.000000	-4974.285540
-2539.500000	0.000000	-6042.857143
-2515.500000	0.000000	-2742.857143
-2491.500000	0.000000	-5005.714286
-2467.500000	0.000000	-4971.428571
-2443.500000	0.000000	-2742.857143
-2419.500000	0.000000	-4902.857143
-2395.500000	0.000000	-4902.857143
-2371.500000	0.000000	-4937.142857
-2347.500000	0.000000	-4831.428746
-2323.500000	0.000000	-5854.285714
-2299.500000	0.000000	-4902.857143
-2275.500000	0.000000	-4900.000174
-2251.500000	0.000000	-4902.857143
-2227.500000	0.000000	-4902.857143
-2203.500000	0.000000	-4902.857143
-2179.500000	0.000000	-4902.857143
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-2107.500000	0.000000	-4902.857143
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-1939.500000	0.000000	-4834.285714
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-1867.500000	0.000000	-4731.428571
-1843.500000	0.000000	-4868.571429
-1819.500000	0.000000	-4900.000174
-1795.500000	0.000000	-4868.571429
-1771.500000	0.000000	-4765.714286
-1747.500000	0.000000	-4900.000174
-1723.500000	0.000000	-4868.571429
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Rate Change Data (cont)

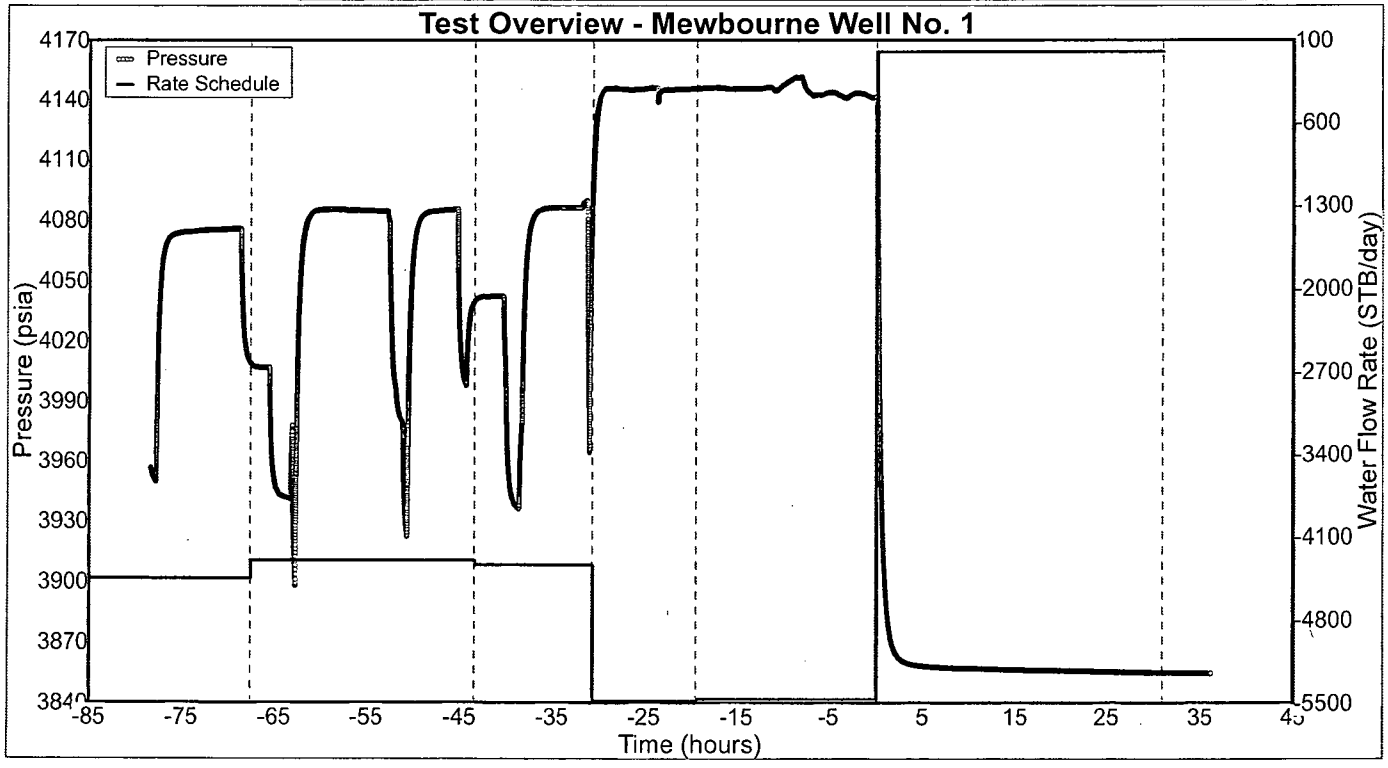
Time Hours	Pressure psia	Rate STB/day
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-1579.500000	0.000000	-4797.143032
-1555.500000	0.000000	-4800.000000
-1531.500000	0.000000	-4800.000000
-1507.500000	0.000000	-4731.428571
-1483.500000	0.000000	-4697.142857
-1459.500000	0.000000	-4665.714111
-1435.500000	0.000000	-4800.000000
-1411.500000	0.000000	-4831.428746
-1387.500000	0.000000	-4800.000000
-1363.500000	0.000000	-4837.142683
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-1099.500000	0.000000	-4765.714286
-1075.500000	0.000000	-4831.428746
-1051.500000	0.000000	-2708.571429
-1027.500000	0.000000	-4797.143032
-1003.500000	0.000000	-4765.714286
-979.500000	0.000000	-4800.000000
-955.500000	0.000000	-4800.000000
-931.500000	0.000000	-3085.714286
-907.500000	0.000000	-4802.856968
-883.500000	0.000000	-2705.714199
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-811.500000	0.000000	-4080.000000
-787.500000	0.000000	-4594.285714
-763.500000	0.000000	-4562.856968
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-691.500000	0.000000	-4731.428571
-667.500000	0.000000	-4734.285540
-643.500000	0.000000	-4734.285540
-619.500000	0.000000	-4765.714286
-595.500000	0.000000	-4728.571603
-571.500000	0.000000	-4731.428571
-547.500000	0.000000	-2708.571429
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-499.500000	0.000000	-2759.132937

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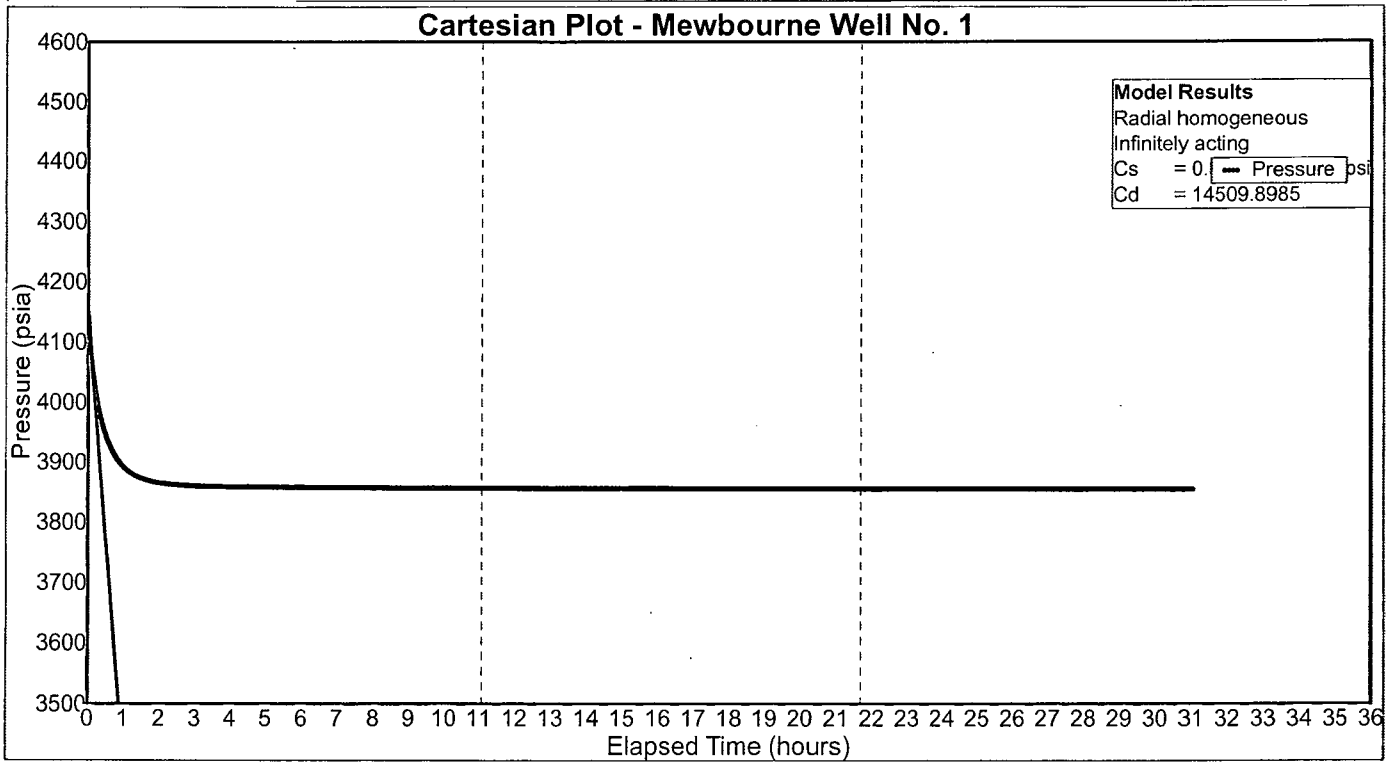
Rate Change Data (cont)

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-379.500000	0.000000	-4644.039600
-355.500000	0.000000	-4802.922702
-331.500000	0.000000	-4665.658565
-307.500000	0.000000	-4822.174851
-283.500000	0.000000	-4665.500000
-259.500000	0.000000	-4990.081184
-235.500000	0.000000	-4942.172619
-211.500000	0.000000	-4932.035714
-187.500000	0.000000	-4751.518023
-163.500000	0.000000	-4741.628886
-139.500000	0.000000	-4898.200397
-115.500000	0.000000	-4668.714368
-91.500000	0.000000	-4817.236028
-67.556421	4075.930664	-4453.633019
-43.473193	4085.119173	-4301.085152
-30.635319	4111.204427	-4338.133714
-19.379886	4145.851563	-5485.292571
-0.000011	4141.747120	-5470.539429
31.033530	3855.374219	0.000000

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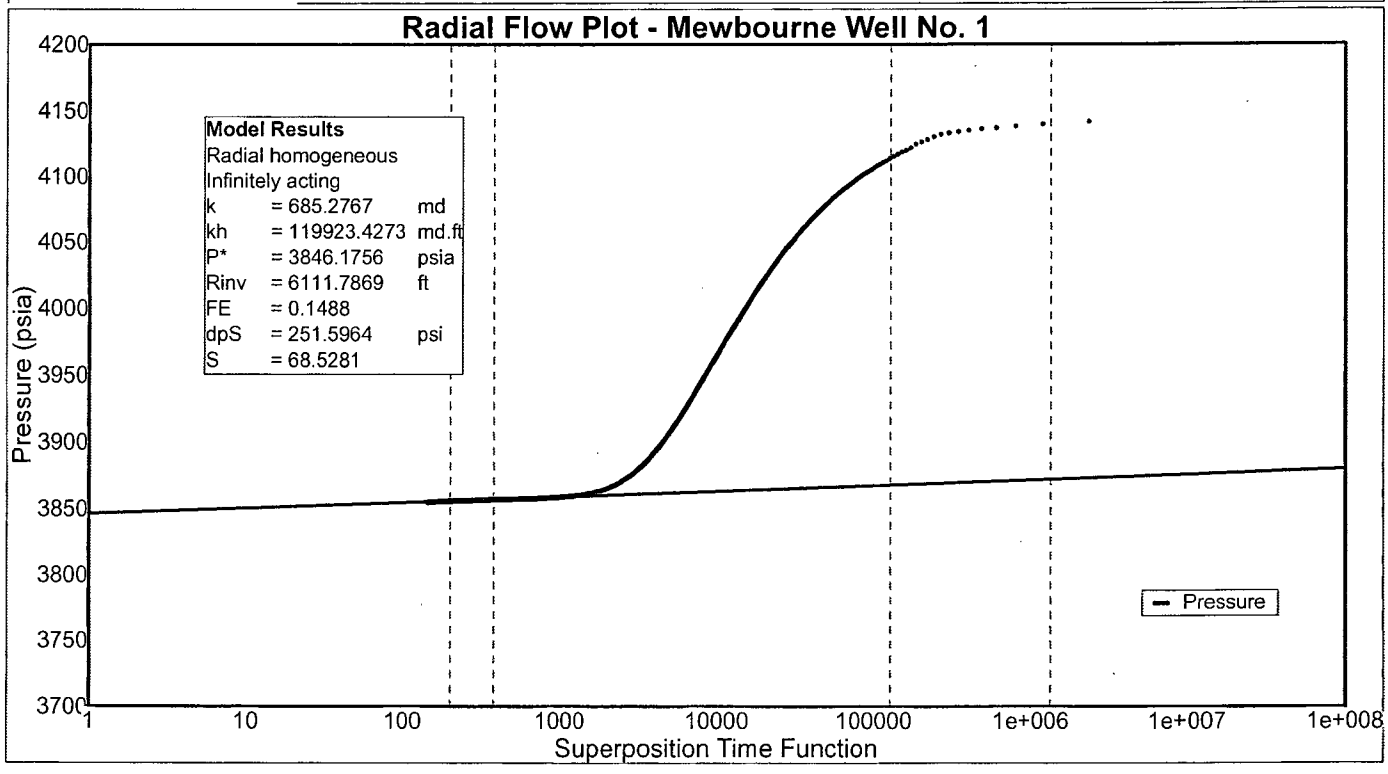
Cartesian Plot - Mewbourne Well No. 1 Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Wellbore storage coefficient	0.317159 bbl/psi
Dimensionless wellbore storage	1.4510e4

Cartesian Plot - Mewbourne Well No. 1 Line Details
Line type : Wellbore storage
Slope : -718.69
Intercept : 4142.2
Coefficient of Determination : 0.987644
Number of Intersections = 0

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Radial Flow Plot - Mewbourne Well No. 1 Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

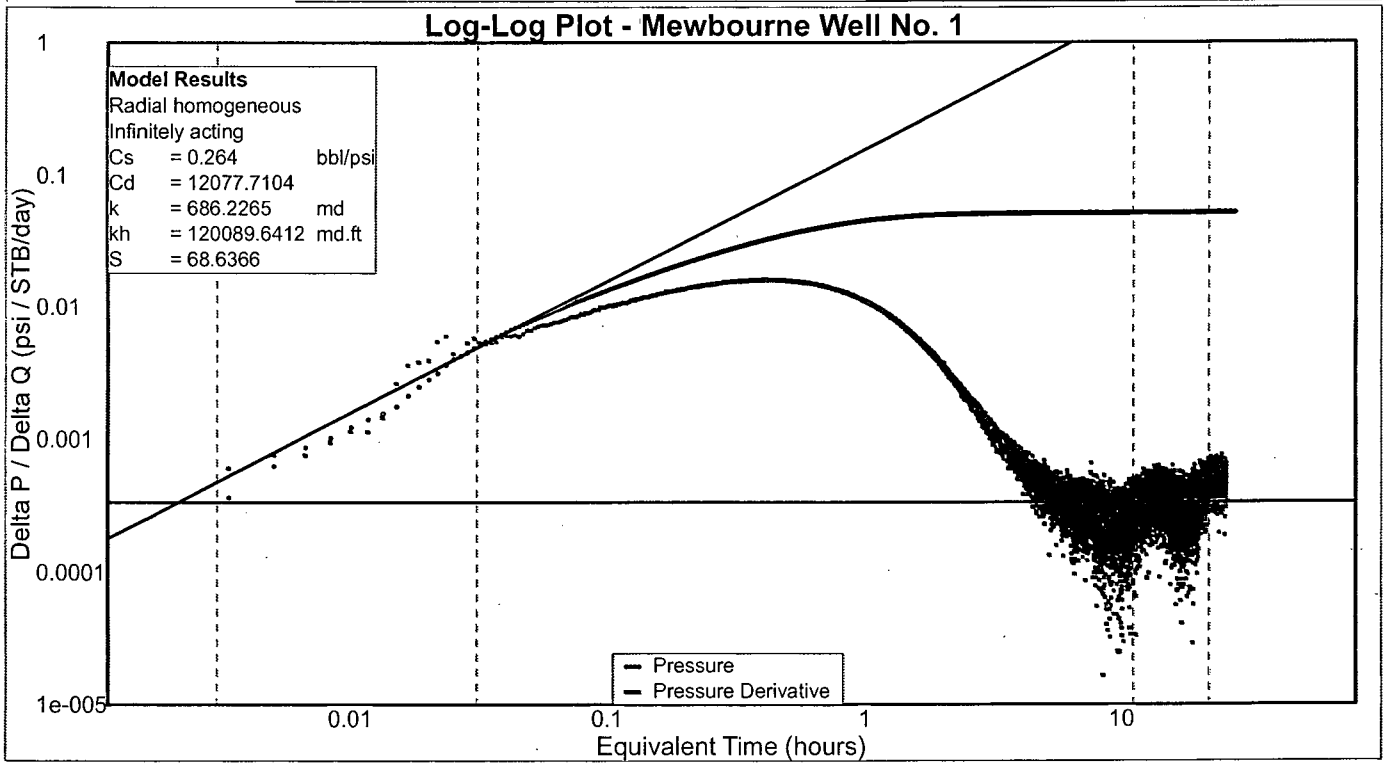
	Value
Permeability	685.276727 md
Permeability-thickness	1.1992e5 md.ft
Extrapolated pressure	3846.175567 psia
Radius of investigation	6111.786899 ft
Flow efficiency	0.148780
dP skin (constant rate)	251.596437 psi
Skin factor	68.528119

Radial Flow Plot - Mewbourne Well No. 1 Line Details
Line type : Radial flow
Slope : 4.22689
Intercept : 3846.18
Coefficient of Determination : Not Used

	Radial flow
Extrapolated pressure	3846.175567 psia
Pressure at dt = 1 hour	3861.389169 psia

Number of Intersections = 0

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Log-Log Plot - Mewbourne Well No. 1 Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Wellbore storage coefficient	0.263996 bbl/psi
Dimensionless wellbore storage	1.2078e4
Permeability	686.226521 md
Permeability-thickness	1.2009e5 md.ft
Skin factor	68.636593

Log-Log Plot - Mewbourne Well No. 1 Line Details
Line type : Radial flow
Slope : 0
Intercept : 0.0003351
Coefficient of Determination : Not Used
Line type : Wellbore storage
Slope : 1
Intercept : 0.157831
Coefficient of Determination : Not Used
Number of Intersections = 0

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EXHIBIT 6



EXHIBIT 6: CHANGES MADE TO 2011 TEST PLAN

Changes to 2012 Revised Test Plan:

Table of Contents

Removed: "Why does a Temperature Survey need to be Performed....3"
Added:

EXHIBIT 1: 2011 Annual Bottom Hole Pressure Survey
EXHIBIT 3: 2011 Annual Report
EXHIBIT 5: Historical Data 2010 and 2011 Falloff Test Results
Well No. 1 (Mewbourne)
Well No. 2 (Chukka)
Well No. 3 (Gaines)

EXHIBIT 6: Changes to 2011 Test Plan

Removed from 2011 Revised Test Plan:

Why does a temperature survey need to be performed?

From New Mexico Oil Conservation Division (OCD) UIC Manual

20.6.2.5204 MECHANICAL INTEGRITY FOR CLASS I NON-HAZARDOUS WASTE INJECTION WELLS AND CLASS III WELLS:

A. A Class I non-hazardous waste injection well or Class III well has mechanical integrity if there is no detectable leak in the casing, tubing or packer which the secretary considers to be significant at maximum operating temperature and pressure; and no detectable conduit for fluid movement out of the injection zone through the well bore or vertical channels adjacent to the well bore which the secretary considers to be significant.

B. Prior to well injection and at least once every five years or more frequently as the secretary may require for good cause during the life of the well, the discharger must demonstrate that a Class I non-hazardous waste injection well or Class III well has mechanical integrity. The demonstration shall be made through use of the following tests:

20.6.2 NMAC 42

(1) For evaluation of leaks,

(a) Monitoring of annulus pressure (after an initial pressure test with liquid or gas before operation commences), or

(b) Pressure test with liquid or gas;

(2) For determination of conduits for fluid movement,

(a) The results of a temperature or noise log, or

(b) Where the nature of the casing used for Class III wells precludes use of these logs, cementing records and an appropriate monitoring program as the secretary may require which will demonstrate the presence of adequate cement to prevent such movement;

Temperature surveys are performed every 5 years.

SECTION II – Regulatory Citation

Added:

"This can be seen in the historical data acquired from the 2010 and 2011 falloff test data (Exhibit V)"

SECTION III - Developing a Test Plan

Revised from the 2011 Test Plan:

"Well No. 2 Chukka Total Waste Fluid Generated: 46,629 bbls" This was revised from 49,629 bbls.

Removed from the 2011 Test Plan:

5. "With the well still shut in, run a temperature survey from top of fluid level to the fill. "

From 2011 Test Plan:

The following schedule is proposed after approval of test plan:

Testing of Well No. 1 (Mewbourne) on the second week of November 2011.

Testing of Well No. 2 (Chukka) on the third week of October 2011;

Testing of Well No. 3 (Gaines) on the second week of December 2011;

From 2012 Test Plan:

The following schedule is proposed after approval of test plan:

Testing of Well No. 1 (Mewbourne) on the second week of September 2012.

Testing of Well No. 2 (Chukka) on the first week of October 2012;

Testing of Well No. 3 (Gaines) on the third week of October 2012;

An annulus pressure test will be performed on WDW-1, WDW-2, and WDW-3 prior to falloff testing during the second week of September 2012.

Revised From 2011 Test Plan:

Mewbourne Well No. 1: "Total Waste Fluid Gain for the Test Period 35,486 bbls" This was revised from 35,489 bbls.

Revised From 2011 Test Plan:

Chukka Well No. 2: "Total Waste Fluid 46,629 bbls" This was revised from 49,629 bbls

Removed From 2011 Test Plan:

Chukka Well No. 2:

"Following the pressure falloff, a temperature survey will be performed from the surface to the top of the fill. An additional pressure test will be performed. A pump track will pump brine water in the annulus to 600 psi and the annulus pressure will be recorded using a chart recorder for 30 minutes."

Removed from 2011 Test Plan:

Gaines Well No. 3: "Following the pressure falloff, a temperature survey will be performed from the surface to the top of the fill."

Revised from 2011 Test Plan:

SECTION IV - Scheduling of Test and Report

"It is currently estimated that the Test Plan will be submitted to OCD for approval the end of August 2012. Subsequently, after approval, the field work will be performed in September, and October. The report will be submitted 30 days thereafter for each individual well."

SECTION VI – Background Information

D: Size, type, and depth of casings:

Added to the 2012 Test Plan:

Well No. 3:

Surface Casing: 13 5/8" set at 400', 54.5 lb/ft, J-55, LT&C

Intermediate Casing: 9 5/8" set at 2,600',36 lb/ft, J-55, ST&C

Protection Casing: 7" set at 9450', 26 lb/ft N-80 & 29 lb/ft P-110

F: Top and bottom perforation/completion depths including the size of perforation holes and date perforated:

Added to the 2012 Test Plan:

Well No. 2: Zone 2 – 7858'-7880'

Removed from 2011 Test Plan:

"To show that the wells are hydraulically connected it is proposed that each well be isolated and interference test be completed on each well set. This is to be accomplished by shutting in all the wells for a 24 hour period, placing bottom hole pressure gauges in each well. At the end of the 24 hour shut-in period initiate injection into the closest offset well at the maximum rate for a period of four hours and shut-in the well for four hours. The offset injection well should have the cycle repeated a minimum of three times.

The proposed procedure would have bottom hole pressure gauges in all three wells after the 24 hour shut-in period, injection would commence on the number three well for a period of four hours and then be shut-in for four hours, inject for another four hours and shut-in for another four hours, inject for four more hours and shut-in for four more hours. Repeat this injection

process on the number two well and then repeat this injection process on the number one well. Pull all gauges and analyze the pressure data.

If the analysis shows good communication between the wells it will be proposed that falloff testing be completed on one well per year with an interference test being completed at the end of the falloff testing. The interference test at the end of the falloff testing will show that the wells continue to stay in communication and that the falloff data represents the reservoir parameters as they exist throughout the reservoir from well to well. This would eliminate the need to test each well individually to obtain the reservoir data allowing the required annual reservoir data to be collected at one well rather than at three."

SUBSURFACE

DEVELOPMENT AND IMPLEMENTATION OF PRESSURE FALL-OFF TEST PLAN FOR NAVAJO REFINING WASTE DISPOSAL WELLS 1 (WDW-1 MEWBOURNE), WELL 2 (WDW-2 CHUKKA), AND WELL 3 (WDW-3 GAINES)

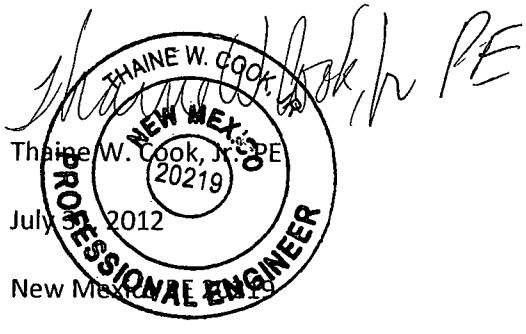
NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO
PROJECT NO. 70D6835

TEST PLAN SUBMITTED:
AUGUST 2012

SUBSURFACE TECHNOLOGY, INC.
6925 PORTWEST DR., STE. 110
HOUSTON, TEXAS 77024
pfh@subsurfacegroup.com

To whom it may concern:

I Thane Walter Cook, Jr PE certify that the engineering materials contained herein have been prepared by personnel under my supervision. I have met the requirements of NMSA 1978 61-23-3 (definition of responsible charge) with respect to these materials. I have personally reviewed the content and made any calculations and changes needed.



Thane W. Cook, Jr. PE

July 3, 2012

New Mexico PE 20219

New Mexico Oil Conservation Division
UIC Class I Well Fall-Off Test Guidance with Temperature Survey
(December 3, 2007)

REVISED 2012 TESTING PROCEDURE
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New Mexico Oil Conservation Division
UIC Class I Well Fall-Off Test Guidance

Why does a fall-off test need to be performed?

From New Mexico Oil Conservation Division (OCD) Guidance Document.

Fall-off testing is a pressure transient test conducted on injection well formations to assess individual well conditions. The test provides the state regulatory agency with the necessary information to assess the validity of requested or existing injection well permit conditions and satisfy the permitting objective of protecting underground sources of drinking water (USDW). The test may also provide information about reservoir and completion characteristics such as transmissibility, skin factor, bottom-hole injection pressure, reservoir static pressure, and geologic boundaries.

In addition to the state UIC regulatory requirements, Federal UIC regulations in 40 CFR Part 146 have monitoring requirements applying to both Class I hazardous and nonhazardous injection wells that include annual fall-off testing. Specifically, Part 146 regulations state "the Director shall require monitoring of the pressure build up in the injection zone annually, including at a minimum, a shutdown of the well for a time sufficient to conduct a valid observation of the pressure fall-off curve" (§146.13 (Non-hazardous)/§ 146.68 (Hazardous). In the case of Class II wells, the regulations may not directly require that a fall-off test be conducted, but under 40 CFR 146.8(f), EPA or the state agency delegated UIC Class II program primacy can require additional testing such as a fall-off test on individual injection wells to ensure protection of USDW's.

Essentials of Fall-Off (PFO) Testing.

From New Mexico Oil Conservation Division (OCD) Guidance Document.

A fall-off test is a pressure transient test involving shutting in an injection well and measuring the wellbore pressure decline versus time after radial flow conditions are achieved and well established in the preceding injection period. It is analyzed using the same pressure transient techniques for oil and gas well pressure build up and drawdown tests. The fall-off period is a replay of the preceding injection period, but is typically less noisy since no injection occurs while the well's pressure change is measured, similar to the pressure build up period in a production well.

Fall-off test data analysis can provide valuable information about both the condition of the wellbore itself and the nature of the reservoir the well injects into. For example, the skin factor parameter obtained from a fall-off test analysis can indicate whether completion damage exists and provide justification for a well stimulation or remedial treatment. The signature of the derivative may also provide insight into the well's completion, for example a negative half slope indicating spherical flow may be caused from wellbore fill or the well's completion. A properly designed fall-off may also provide

information about natural fractures or geologic boundaries in the reservoir. The test analysis provides a determination of reservoir transmissibility which can be utilized to predict the relationship between reservoir pressure and injection rate, critical to designing appropriate UIC permit conditions. Recommended published technical references on fall-off testing methodology include Society of Petroleum Engineers (SPE) Monographs Volumes 1 and 5 as well as SPE Textbook Series Volumes 1 and 9.

For more detailed information about the basis, recommended calculations, and procedures for fall-off tests, the reader is referred to the US EPA internet URLs provided below:

USEPA Fall-Off Test Course
http://www.epa.gov/safewater/dwa/electronic/presentations/uic/2003nutsbolts-notebook.pdf

EPA Region 6 Fall-off Guidelines
http://www.epa.gov/region6/water/swp/uic/guideline.pdf

OCD UIC FALL-OFF TEST GUIDANCE

SECTION I – Purpose

The purpose of a fall-off test is to identify injection interval or wellbore problems and injection interval characteristics. The permittee is responsible for developing a testing procedure which will generate adequate data for a meaningful analysis.

SECTION II - Regulatory Citation

Pursuant to all applicable parts of the Water Quality Control Commission (WQCC) Regulations 20.6.2 NMAC and more specifically 20.6.2.3104 - 20.6.2.3999 discharge permit, and 20.6.2.5000-.5299 Underground Injection Control, the Oil Conservation Division (OCD), the OCD UIC Permit requires monitoring of the pressure build up in the injection zone at least annually, including at a minimum, shut down of the well for a time sufficient to conduct a valid observation of the pressure fall-off. This test is known as the formation pressure fall-off test.

In accordance with the above statement "OCD UIC Permit requires monitoring of the pressure build up in the injection zone at least annually, including at a minimum, shut down of the well for a **time sufficient to conduct a valid observation of the pressure fall-off**.", historical data shows that a 30 hour shut down time is sufficient to conduct a valid observation of the pressure falloff. This can be seen in the historical data acquired from the 2010 and 2011 falloff test data (Exhibit V). Any data obtained after 30 hours was inconclusive in determining the reservoir parameters and the flow regime beyond 30 hours could not be identified.

SECTION III - Developing a Test Plan

A plan for conducting the test shall be submitted to OCD for review and approval prior to conducting the test. Plan approval shall be obtained from OCD prior to commencing the test. The plan shall include a proposed schedule. The test plan must address all items listed in the Sections V through IX of this document.

The Test Plan addresses these requirements and includes the requirements of Section V through IX below.

Proposed Procedure Considerations

The following is a proposed test procedure for Well No. 1 (Mewbourne), Well No. 2 (Chukka), and Well No. 3 (Gaines). The volumes and rates were determined from historical data collected during the previous fall-off testing. The rates, wellhead pressures, and bottom-hole pressure will be recorded throughout the procedure. An analysis will be completed using Pan System © pressure transient analysis software. An estimate of the tank volumes associated with the injection/fall-off periods are included at the end of the procedure. The reports for each well will be constructed according to Section IX in this test plan. All other considerations have been addressed in the following Sections, IV through IX.

Procedure

The general procedure for testing each individual well is to inject into the test well for a period of 30 hours, with the two offset wells shut-in. Following the 30 hour injection period, the test well will be shut-in and the pressure fall-off monitored for 30 hours. The two offset Navajo wells will remain shut-in during the fall-off portion of the testing.

1. Navajo Refining is to maintain a constant injection rate into the disposal well for a minimum of 30 hours prior to testing. The approximate anticipated rates for each well are:

Well No. 1 (Mewbourne)	maximum of 260 gpm (8,914 bpd)
Volume injected 30 hours	11,143 bbls;
Well No. 2 (Chukka)	maximum of 175 gpm (6000 bpd)
Volume injected 30 hours	7,500 bbls;
Well No. 3 (Gaines)	maximum of 300 gpm (10,286 bpd)
Volume injected 30 hours	12,857 bbls.

The injection period used for the determination of the total volume of fluid needed for the injection portion of the testing was 30 hours. The volume is determined from the time it takes to reach radial flow in the reservoir fluid as a function of radius of investigation.

These rates are based on historical information gathered after an acid stimulation and after the completion of the wells. The rates are estimates based on averages. The initial well system consisted of two wells and a third well was added in 2007.

The waste fluid will be used during the testing. Samples of the waste fluid should be gathered periodically for viscosity and density determination. Injection rates, pressure, and time will be recorded and submitted to Subsurface for fall-off analysis. The viscosity and density data should be included. If necessary, the flow rate will be controlled at the wing valve. The general procedure is to open the wing valve wide open and let the pump pressure control the flow rate. This will maximize the flow to the well at a steady rate with only one (1) well open in the three (3) well system.

Adequate waste storage has been accounted for using the storage tank located at the refinery. The tank holds 65,000 bbls. The working volume of the tank is 85% of the total capacity. Tank bottom is calculated at 18 % of the total capacity of the tank. The initial volume for the tank prior to starting the testing was calculated as follows:

Well No. 1 (Mewbourne)

Total Waste Fluid Gain for the Test Period	35,486 bbls
Total Waste Fluid Loss to Well No. 1 for the Test Period	11,143 bbls
Total Waste Fluid Generated	46,629 bbls
Initial Tank Fill Tank 1 (65,000 bbls)	12,000 bbls
Final Tank Fill Tank 1 (65,000 bbls)	33,857 bbls

Well No. 2 (Chukka)

Total Waste Fluid Gain for the Test Period	39,129 bbls
Total Waste Fluid Loss to Well No. 2 for the Test Period	7,500 bbls
Total Waste Fluid Generated	46,629 bbls
Initial Tank Volume Tank 1 (65,000 bbls)	12,000 bbls
Final Tank Volume Tank 1 (65,000 bbls)	17,500 bbls

Well No. 3 (Gaines)

Total Waste Fluid Gain for the Test Period	33,771 bbls
Total Waste Fluid Loss to Well No. 3 for the Test Period	12,857 bbls
Total Waste Fluid Generated	46,628 bbls
Initial Tank Fill Tank 1 (65,000 bbls)	12,000 bbls
Final Tank Fill Tank 1 (65,000 bbls)	32,143 bbls

Confirmation of the injection rate and volumes will be provided by the continuous monitoring system at the plant. The plant has the ability to continuously monitor flow rates, wellhead pressures, annulus pressures, filter pod differential pressures, line pressures, and tank levels. Pressures and temperatures will be confirmed via

data memory logging gauges. The recording time on the gauges will be set at minimum of 10-second intervals. The surface pressure gauge data can be downloaded to ascertain the status of the fall-off testing at any time during the fall-off segment of the procedure. The surface pressure memory gauge will be attached to a tee just above the crown valve.

1A. Install a 5000 psi digital quartz memory pressure gauge on the wellhead. Drop tandem 8000 psi sapphire memory gauges into the wellbore and tag fill. Pull the memory gauges up to the top of the perforations. Correlate depths from the wellhead at ground level to kelly bushing height as the reference depth. The top of the perforations for each well are as follows:

Well No. 1 (Mewbourne):	7924 feet RKB;
Well No. 2 (Chukka):	7570 feet RKB;
Well No. 3 (Gaines):	7660 feet RKB.

Monitor injection pressure for one hour after placement of wellhead pressure gauge to ensure stabilization. Be sure to synchronize the time on the wellhead gauge and bottom-hole gauge and calibrate to the monitoring computer time. Discontinue injection into the test well and block well in near the wellhead by closing the wing valve and the motorized gate valve. The well should be blocked in as carefully and quickly as possible so as to avoid creating a water hammer effect in the wellbore.

Each wellhead consists of a crown valve, wing valve, and master valve. The crown valves on Well No. 1 and Well No. 2 are two-inch ball valves and the crown valve on Well No. 3 is a four-inch gate valve. The wells will be shut-in via the four-inch wing valves and the motorized gate valves.

1B. Monitor the pressure fall-off for minimum of 30 hours. The testing fall-off segment was extended to include a full 30 hour fall-off period for conservative reasons. The 30 hour injection falloff period was determined based on data collected during the 2010 and 2011 falloff testing. The 2010 and 2011 falloff data clearly show that radial flow has been reached by the end of the 30-hour period and any data collected after the 30-hour period was not able to be analyzed and contained no intrinsic value (Exhibit 5).

1C. At the end of the fall-off period, discontinue the pressure fall-off test. Tag the bottom of the fill and pull out of the wellbore, slowly with the downhole surface read out and memory gauges making gradient stops every 1000 feet to surface.

2. After completing the survey, return the well to Navajo.

The following schedule is proposed after approval of test plan:

Testing of Well No. 1 (Mewbourne) on the second week of September 2012.
Testing of Well No. 2 (Chukka) on the first week of October 2012;
Testing of Well No. 3 (Gaines) on the third week of October 2012;
An annulus pressure test will be performed on WDW-1, WDW-2, and WDW-3 prior to falloff testing during the second week of September 2012.

Testing Rates

The estimated maximum rates into each test well are as follows:

Well No. 1 (Mewbourne)	260 gpm (8,914 bpd)
Well No. 2 (Chukka)	175 gpm (6,000 bpd)
Well No. 3 (Gaines)	300 gpm (10,286 bpd)

This assumes the maximum pressure is 785 psig at the wellhead and can be maintained for 30 hours, and the total generated waste fluid flow rate from the plant processes is 510 gpm. Using the two holding tanks at the plant, the proposed schedules are based on starting tank volumes as described below.

It is assumed the working capacities of the tanks are 85% of their total capacities. Tank 1 has a total capacity of 65,000 bbls and a working capacity of 55,250 bbls. It is also assumed that minimum volume for Tank 1 is 11,700 bbls or 18% of its capacity. All calculations were based on the 85% operating capacity of each tank using minimum volume levels.

Well No. 1 (Mewbourne)

The general procedure for testing Well No. 1 would be to inject into Well No. 1 for a period of 30 hours with Well No. 2 and Well No. 3 shut-in. Following the 30-hour injection period Well No. 1 will be shut-in for 30 hours with Well No. 2 and Well No. 3 shut-in. In the first 30 hours, only Well No. 1 will be operating at its full rate. After the injection period is completed, all three wells will be shut-in for 30 hours. The excess volume generated by the plant will be stored in the holding tank at the plant.

Estimated Well Test Rates

HOURS	24	6	24	10
Total Fluid	**510**	**510**	510	510
Well 1 Mewbourne Test Rates (gpm)	**260**	**260**	0	0
Well 2 Chukka Test Rates (gpm)	0	0	0	0
Well 3 Gaines Test Rates (gpm)	0	0	0	0

Total Waste Fluid Gain for the Test Period	35,486 bbls
Total Waste Fluid Loss to Well No. 1 for the Test Period	11,143 bbls
Total Waste Fluid Generated	46,629 bbls

Well No. 2 (Chukka)

The general procedure for testing Well No. 2 would be to inject into Well No. 2 for a period of 30 hours, with Well No. 1 and Well No. 3 shut-in. Following the 30-hour injection period, Well No. 2 will be shut-in for 30 hours, with Well No. 1 and Well No. 3 shut-in. For the first 30 hours, only Well No. 2 will be operating at its full rate. For the next 30 hours, all three (3) wells will be shut-in. The excess volume generated by the plant will be stored in the holding tank at the plant.

HOURS	24	6	24	10
Total Fluid	510	510	510	510
Well 1 Mewbourne Test Rates (gpm)	0	0	0	0
Well 2 Chukka Test Rates (gpm)	**175**	**175**	0	0
Well 3 Gaines Test Rates (gpm)	0	0	0	0

Total Waste Fluid Gain for the Test Period	39,129 bbls
Total Waste Fluid Loss to Well No. 2 for the Test Period	7,500 bbls
Total Waste Fluid	46,629 bbls

Well No. 3 (Gaines)

The general procedure for testing Well No. 3 would be to inject into Well No. 3 for a period of 30 hours with Well No. 1 and Well No. 2 shut-in. Following the 30-hour injection period, Well No. 3 will be shut-in for 30 hours, with Well No. 1 and Well No. 2 shut-in. For the first 30 hours, only Well No. 3 will be operating at its full rate. For the next 30 hours all three (3) wells will be shut-in. The excess volume generated by the plant will be stored in the holding tank at the plant.

HOURS	24	6	24	10
Total Fluid	510	510	510	510
Well 1 Mewbourne Test Rates (gpm)	0	0	0	0
Well 2 Chukka Test Rates (gpm)	0	0	0	0
Well 3 Gaines Test Rates (gpm)	**300**	**300**	0	0

Total Waste Fluid Gain for the Test Period	33,771 bbls
Total Waste Fluid Loss to Well No. 3 for the Test Period	12,857 bbls
Total Waste Fluid	46,628 bbls

SECTION IV - Scheduling of Test and Report

The schedule for the test must be mutually agreed upon between OCD and the permittee so that OCD has the opportunity to witness the test. The operator should submit a summary report to OCD within 30 days of test completion.

It is currently estimated that the Test Plan will be submitted to OCD for approval the end of August 2012. Subsequently, after approval, the field work will be performed in September and October. The report will be submitted 30 days thereafter for each individual well.

SECTION V - General Test Operational Considerations

A successful fall-off test involves consideration of numerous factors of which most are under the control of the permittee. These include but are not limited to the following:

1. Confirmation of a constant injection rate can be maintained in the test well during the injectivity portion of the test.

   The injection rate of the injectate fluid will be maintained by throttling the flow with the wellhead wing valves and nearby injectate flow line valves or other control system.

2. The injection rate is sufficient to produce a measurable pressure build-up that will result in valid test data.

   These injection rates or equivalent conditions will be maintained to insure a 100 psi pressure differential. Historically, the reservoir has produced greater than 100 psi on previous testing after the maximum injection rate has been achieved.

3. Consideration for using the normal waste liquid during the injectivity portion of the test, unless the waste will be corrosive to the down-hole pressure gauge.

   The normal injectate will be maintained throughout the test period.

4. Calculating the total volume of injection fluid needed for the injectivity portion of the test.

   a. Arrange for additional fluids and storage of such fluid.

      It is not anticipated any additional fluids, other than the liquid waste injectate, will be needed.

   b. Reduce the injection rate to reduce the total fluid requirement.

      Every effort will be made to maintain the injection rate required for a successful pressure fall-off test as well as the disposal rate required to maintain refinery operation. (see procedure)

5. Sustaining a constant injection rate after installing the pressure gauges to allow stabilization of the gauges prior to initiating the fall-off test. A three day period is recommended, but adjustments may be made because rates have previously been stabilized or historical test results indicate a lesser time is adequate.

A constant injection rate will be maintained throughout the required three day build up period. Historically, for the 2010 and 2011 falloff testing, 30 hours is sufficient time to adequately perform a falloff analysis of the reservoir. In Exhibit 5 the 2010 and 2011 falloff tests show that the data obtained after the 30 hour period was inconclusive in determining reservoir parameters and was not able to analyze. The data after 30 hours had added no intrinsic value to the reservoir determination.

6. Ensuring adequate waste storage is available for the duration of the fall-off test.

   The need for additional storage is not anticipated at the well site. The refinery facility storage tank will be used. One tank holds 65,000 bbls.

7. Shutting in offset wells completed in the same formation as the test well prior to the test. If impractical, then maintaining stable measured injection rates into the offset injection wells prior to and during the fall-off test.

   We plan to inject into one well at a constant rate for the 30-hour build up period. After the 30-hour period, all three (3) wells will be shut-in for the 30-hour pressure fall-off period. However, if this method is not feasible, it will be necessary to maintain constant injection rates into the offset injection wells during each of the PFO Tests on WDW-1, 2 & 3. This will allow us to maintain constant injection rates into WDW-1 & 2 when WDW-3 is shut-in, constant injection rates into WDW-2 & 3 when WDW-1 is shut-in and constant injection rates into WDW-1 & 3 when WDW-2 is shut-in.

8. Installing a crown valve on the well prior to starting the injectivity portion of the test so the well does not have to be shut-in to install the pressure gauges. Running both memory gauges in the hole through a lubricator installed into the crown valve for safety.

   All three wells have crown valves.

9. Locating the shut-in valve, ceasing flow to the well at or near the wellhead to minimize the wellbore storage in the well. Shut-in must be accomplished as instantaneously as possible to prevent erratic pressure behavior during the shut-in caused by the rate fluctuations.

   All three wells have wing valves or nearby injectate flow line valves that will be used to shut-in each well for the required PFO Test period. If necessary, other controllers will be implemented from the control room.

10. Evaluating the condition of the well, including wellbore fill, junk in the hole or wellbore damage, which may increase the length of shut-in time needed for the well to obtain a valid fall-off test and therefore also necessitate a longer injectivity period.

    All three wells were recently treated with a Coiled Tubing/HCl acid stimulation utilizing a sonic pulse tool in 2012. There was no wellbore fill across the perforated interval.

11. Using a surface readout down-hole pressure gauge and tandem down-hole memory electronic pressure gauges, one of which is surface readout capable, with a pressure resolution level of 0.0002% of the gauge's full pressure range. Gauge pressure range should exceed the maximum pressure expected during the testing with the larger the percentage of the gauge pressure range utilized, the better.

    The previously approved memory gauges used on these wells were sapphire gauges with an accuracy of 0.025% full scale (FS) or 0.01% of the reading and will have a resolution of 0.0003%. The pressure range of the gauges is from 0-10,000 psi. This gauge is a typical bottom-hole memory gauge with the best accuracy available in the area.

12. Maintaining a test operations log throughout the fall-off test and submitting the log as part of the test report. The log should list all key test events, dates, and times. For example, the time the gauges were activated, run in the well and placed on bottom as well their setting depths. Synchronization of times and events is especially important in tests involving multiple wells.

    A field supervisor will be present throughout the testing period and all operating system control room monitors will be active and creating the aforementioned log.

13. If available, monitoring test progress with appropriate plots at the well site to insure valid test data is obtained and problematic tests can be identified and aborted.

    Where applicable, this requirement will be implemented. A surface pressure logging gauge will be installed on the wellhead.

14. Configuring the test gauges to obtain pressure data more frequently in the early portion of the test when the rate of pressure decline is greater, if the memory capacity of the gauge is limited. Memory capacity of the gauge should allow for a 10-day total recording time interval, unless a shorter test time is sufficient based on prior testing or appropriate test design calculations. Larger time

increments may be used to obtain data later in the test when the rate of pressure decline is less. The recording frequency of the gauges and overall length of test should be set based on results of previous tests or test design calculations.

Based on previous testing, a 10-second to 15-second interval will be adequate.

15. Using the injection facility pump if capable of maintaining a constant injection rate at the desired pre-fall-off test rate. If an alternate pump is needed, design the pump to operate as smoothly as possible at the desired constant rate. If feasible, design the test for a constant injection rate to cause a minimum of 100 psi differential pressure between the final injection and shut-in pressures.

    The injection facility pump will be used to maintain the appropriate injection rate and differential pressure requirement.

SECTION VI. Background Information

Acquisition of the following information is recommended for the planning, design, and analysis of the fall-off test.

1. Current wellbore schematic (Exhibit 4)

    a. Size and type of injection tubing (include type of internal coating, if applicable)

    - Well No. 1: 4 ½", 11.6 lb/ft, N-80, SMLS, R3, LT&C, set at 7,879'
    - Well No. 2: 3 ½", 9.2 lb/ft, J-55, SMLS, NUE 10 rd, set at 7,528'
    - Well No. 3: 4 ½", 11.6 lb/ft, J-55, LT&C, set at 7568'

    b. Packer depth

    - Well No. 1: 7,879', July 1998
    - Well No. 2: 7,528', May 1999
    - Well No. 3: 7,575', October 2006

    c. Tubing length including the depth of any seating or profile nipples, and the last date tubing was run. When tubing was originally installed.

    - Well No. 1: 7879'
    - Well No. 2: 7528'
    - Well No. 3: 7575'

d. Size, type, and depth of casings

- Well No. 1: Surface Casing-13 3/8", 48 lb/ft, J-55, ST&C, set at 390'
  Intermediate Casing-9 5/8", 36 lb/ft, J-55, ST&C, set at 2,555'
  Protection Casing-7", 29 lb/ft, N-80, LT&C: 9094' to 7031'; 7", 29 lb/ft, P-110, LT&C: 7031' to 5845'; 7", 26 lb/ft, P-110, LT&C: 5845' to surface
- Well No. 2: Surface Casing-8 5/8", 32 lb/ft, set at 1,995'
  Protection Casing-5 ½", 17 lb/ft, L-80, LT&C: 8869' to surface
- Well No. 3: Surface Casing-13 3/8" set at 400', 54.5 lb/ft,J-55, LT&C
  Intermediate Casing-9 5/8" set at 2,600',36 lb/ft, J-55, ST&C
  Protection Casing-7" set at 9450', 26lb/ft N-80 & 29 lb/ft P-110

e. Cement tops with method of determining the top of cement

- Well No. 1: On July 12, 1998, 9 5/8" protection casing was set from 2548' to the surface. It was confirmed that a continuous column of cement with good bonding characteristics behind the 9 5/8" protection casing from 2548' to 400'. The hydraulic coupling was lost above 400' and the tool would not respond.

  Exhibit 3.3.1-2 shows the intermediate casing is 9 5/8", 36 lb/ft, J-55, that was set in a 12 ¼" open hole at 2,555' and cemented to the surface with 800 sacks of Class C Lite containing ½ lb/sack floccule, 2 lb/sack Gilsonite and 12% salt, followed by 200 sacks of Class C containing 2% Calcium Chloride. With 133 sacks of lead cement circulated to the surface, the volume of cement placed behind pipe approximated the estimated annular hole volume, which was based on an average hole diameter of 14"

  On July 13, 1998 a cement bond log was run from 2548' to 580'. The log indicated an apparent cement compressive strength of 4,300 psi and bond index calculations ranged from 25% to 100% and averaged 72%.

- Well No. 2: On May 9, 1999, a bond log was performed within the 9 5/8" protection casing from 1910' to the surface. It was confirmed that a continuous column of cement with good bonding characteristics behind the 9 5/8" protection casing from 1910' to 116'. The hydraulic coupling was lost above 400' and the tool would not respond.

Exhibit 2.2-2 shows the 8 5/8" surface casing was originally set in an 11" open hole to a depth of 1955' (KB) and cemented to surface using 700 sacks of Class 'H' cement with 2% gel and 100 sacks of Class 'H' neat. A total of 200 sacks of cement were recorded circulated to surface. The calculated volume between an 11" and 8 5/8" casing is (0.2407 ft^3 per ft X 1955') 471 ft^3. The volume of cement pumped is (1.18 ft^3 per sack X 800 sacks) 944 ft^3 for an excess of 473 ft^3 or 400 sacks circulated to surface. The calculated volume of cement and apparent volume of actual cement pumped indicated excess cement was circulated to surface. (Re-entry and Completion report for Well No. 2)

- Well No. 3: On October 13, 2006, a CBL/VDL revealed cement had not been circulated to the surface behind the 7" protective casing, as was indicated in the state records. The top of cement (TOC) behind the 7" protective casing was located at 900' and the cement bond quality was poor down to 1200'. There were indications on the log that a micro-annulus may be present from 2662' to 2160', from 4876' to 5372', and from 6750' to 7600'. The CBL indicated there was good bonding between the 7" casing and the cement to isolate the injection interval. (Re-entry and Completion report for Well No. 3)

f. Top and bottom perforation/completion depths including the size of perforation holes and date perforated

- Well No. 1: Upper Zone – 7924'-7942', 7974'-8030', 8050'-8056', 8066'-8080', 8118'-8127', 8132'-8140', 8160'-8164', 8170'-8188'.
- Lower Zone – 8220'-8254', 8260'-8270', 8280'-8302', 8360'-8366', 8370'-8378', 8400'-8410', 8419'-8423', 8430'-8446', 8460'-8464', 8470'-8476'.
- Well No. 2: Zone 1 – 7570'-7620', 7676'-7736'
- Zone 2 – 7826'-7834', 7858'-7880', 7886'-7904', 7916'-7936', 7944'-7964', 7990'-8042', 8096'-8116', 8191'-8201', 8304'-8319', 8395'-8399'.

- Well No. 3: Original Open Perforations – 7676'-7698'
  New Upper Perforations – 7660'-8450'
  New Lower Perforations – 8540'-8620'

- Average hole sizes are approximately ½-inch in diameter.

g. Total depth, plug back depth, and the most recent depth to wellbore fill and date measured

- Well No. 1: TD-10,200', PBTD-9004',
- Well No. 2: TD-10,372', PBTD-8770'
- Well No. 3: TD-10,119', PBTD-9022'

h. Location of the pressure measuring tool during the test

- Well No. 1: 7924'
- Well No. 2: 7570'
- Well No. 3: 7660'

2. Copy of an electric log encompassing the completed interval

   Exhibit 3 (Appendix J - 2008 Annual Report)

3. Copy of relevant portions of any porosity log used to estimate formation porosity

   Exhibit 3 (Figure: 2.0-2 – 2008 Annual Report)

4. PVT Data

   a. Estimation of formation fluid and reservoir rock compressibility

      3.6×10^{-6} ^{1}/psi

   b. Formation fluid viscosity with reference temperature

      0.72 cp at 112° F

   c. Formation fluid specific gravity/density with reference temperature

      8.6 ppg at 112° F

      This data may or may not be available since it will not exist for older wells when the regulations did not require it. When necessary, it will be estimated.

5. Injection fluids

   a. Description of fluids injected
   b. Injection fluid specific gravity/density with reference temperature
   c. Injection fluid compressibility
   d. Injection fluid viscosity with reference temperature

- Petroleum Refinery Waste Analytical Data for all three wells (See Exhibit 4)

6. Daily rate history data for a minimum of one month preceding the fall-off test

   The daily rate history will be provided with fall-off test report.

7. Cumulative injection into the formation from test well and offset wells

   The total injection volumes for each well will be included in final reports.

8. Pressure gauges

   a. Description of the down-hole surface pressure readout or memory gauge

      The memory gauges that will be used for each well are sapphire gauges with an accuracy of 0.025% full scale (FS) or 0.01% of the reading and will have a resolution of 0.0003% (FS). The pressure range of the gauges will be from 0-10,000 psi. These are typical bottom-hole memory gauges with the best accuracy available in the area. The gauges will be lowered to the top of the injection interval at 7924 feet in Mewbourne Well No. 1, 7820 feet in Chukka Well No. 2, and 7660 feet in Gaines Well No. 3. The recording period will be set to record pressures at a minimum of every 10 seconds.

   b. List the full range, accuracy and resolution of the gauges

      - +/-0.025% F.S. + 0.01% of reading
      - Will also provide a data specification sheet of gauges that were used to run the fall-off with each well report.

   c. A calibration certificate showing date the gauges were last calibrated

      Current calibration certificates for the gauges used in each well will be provided with final reports.

9. One mile Area of Review (AOR)

   a. Identification of wells located within the one mile AOR

      Exhibit 3 (Table VII)

   b. Ascertaining the status of wells within the one mile AOR

      Exhibit 3 (Table VIII)

c. Providing details on any offset producers and injectors completed in the same injection interval

Area of Review (AOR) lists all wells. The only wells that will affect the PFO Test are Navajo's current injection wells. These wells will be referred to as offset wells. These wells and the controlled rates are referenced in the general procedure. An update to the AOR will be included in each well report.

10. Geology

a. Description of the geologic environment of the injection interval

The proposed injection zones are porous carbonates of the lower portion of the Wolfcamp Formation and the Cisco and Canyon Formations. The Lower Wolfcamp is the shallowest porous unit in the proposed injection interval. The Wolfcamp Formation consists of light brown to tan, fine to medium-grained, fossiliferous limestone with variegated shale interbeds.

The Cisco Formation of the Northwest Shelf is described as consisting of uniform, light-colored, chalky, fossiliferous limestone interbedded with variegated shales. Cisco, at the edge of the Permian basin, is also described as consisting of biothermal (mound) reefs composed of thick, porous, coarse-grained dolomites. Locally, the Cisco consists of porous dolomite that is 745' thick in the Chukka Well No. 2, 650' thick in Mewbourne Well No. 1, and 720' thick in Gaines Well No. 3.

The Canyon Formation consists of white to tan to light brown fine grained, chalky, fossiliferous limestone with gray and red shale interbeds.

In summary, permeability values in the injection zone from producing fields in the region range up to 200 md. However, based on test data for the Mewbourne Well No. 1, Chukka Well No. 2, and Gaines Well No. 3, permeability values as high as 2733 md or higher occur in intervals in the injection zone. All three share the same injection interval.

b. Discussion on the presence of pinchouts, channels, and faults, if applicable.

N/A

c. Providing a portion of a relevant structure map, if necessary.

N/A

SECTION VII. Conducting the Fall-off Test

The following are recommended procedures for conducting the fall-off test. Alternative procedures that will produce valid test results and satisfy the requirements of OCD and the regulations will be considered by the OCD.

We anticipate additional analysis may be performed to confirm these results. If same zone injection is confirmed, it may be beneficial to annually run PFO tests on one well instead of all three for different (probably longer) periods of time.

1. Install a digital surface recorder, connected to a rate meter and a digital surface transducer, capable of adequately measuring surface injection rates and wellhead injection pressures during the test.

   Digital pressure recorders (Sapphire or other similar gauges) will be located just above the perforated interval and on the wellhead. Injection rates will be monitored with the normal operation instrumentation. Historically the wellhead pressures will fall to zero psig at some point during the falloff segment of the testing depending upon the weight of the waste fluid at the time of the testing. The plant has the ability to record rates and wellhead pressure through flow meters and pressure indicating gauges at each well site. The instrumentation is connected to the plant by RTU and wireless transmitters.

2. Confirm the constant pre-fall-off test injection rate is maintained prior to the fall-off.

   The rate will be maintained through plant monitoring and flow equipment for each well.

3. Confirm pressure gauges have stabilized prior to shutting in the well for the fall-off test.

   For each well, the gauges will remain on bottom for one hour to stabilize. This should be sufficient for pressure gauge stabilization.

4. Following installation of the bottom-hole pressure gauges and surface recorders, regulate injection to the stabilized designated pre-fall-off test injection rate that will result in a sufficiently sized pressure increase (above shut-in pressure) on the wellhead. If the injection rate was stabilized prior to running the down-hole gauges and the gauge installation did not disrupt the injection rate, monitoring the gauge for a minimum of one hour may be sufficient for verifying that the bottom-hole pressure is stabilized prior to initiating the fall-off test.

   As indicated in 2 & 3 of the above section, every effort will be made to comply with this requirement.

5. The injection rate shall be high enough and continuous for a period of time sufficient to produce a pressure build up that will result in valid test data. The injection rate shall result in a pressure build up such that a semi-log straight line can be determined from the Horner plot or other appropriate semi-log plot. The injection rate shall be the maximum injection rate that can be feasibly maintained constantly, in order to maximize pressure changes in the formation and provide valid test results, but not exceeding the daily injection pressure and volume limit of the UIC Permit.

   We anticipate a pressure build up of 100 psi or greater will be maintained during critical portions of the pressure fall off testing for each well.

6. Confirm the liquid injection density is held relatively constant during the injectivity portion of the test by periodically measuring one or more of the following:

   a. Density
   b. Chloride concentration
   c. Total dissolved solids concentration
   d. Conductivity
   e. pH

   Samples of the injectate for each well will be taken and where possible, analyzed before shut-in.

7. The surface readout down-hole pressure gauge must be located at or near the top of the injection interval, unless previous testing indicates a more appropriate location.

   The down-hole digital pressure gauges will be located at the top of the perforations at the following depths.

   - Well No. 1: 7924'
   - Well No. 2: 7570'
   - Well No. 3: 7660'

8. If the stabilization injection period is interrupted for any reason and for any length of time, the stabilization injection period must be restarted, unless superposition analysis can be applied and valid test results obtained.

   If the testing is interrupted as stated above the test will be shut down and restarted from the beginning for any one of the well test on wells 1 through 3.

9. The well must be shut-in at the wellhead or as near as feasible to the wellhead to minimize wellbore storage and after flow.

The PFO test well(s) will be shut-in utilizing the wing valve on the wellhead or the nearby injectate flow line valve.

10. The well shut-in must be accomplished as instantaneously as possible to prevent erratic pressure behavior during the test.

    Every effort will be made to shut-in the PFO test well instantaneously.

11. Following shut-in at the well, shut-in relevant tubing valves to ensure complete shut-in of the well. Bottom-hole shut-in is preferred to surface shut-in, but not required. Shut-in the well with no disturbances for at least seven days or other approved time period as determined from previous tests results or the test design.

    Previous testing on each one of the wells has indicated only 30-hour shut-in period is necessary. Historically during the 2009 and 2010 falloff test the data obtained after the 30-hour period could not be analyzed. Exhibit 5 contains the 2010 and 2011 falloff data and analysis and clearly shows that radial flow was achieved before the end of the 30-hour period. The data obtained after the 30-hour period is highly scattered and banded indicating that the limit of the gauge resolution had been reached making the data unusable for analysis. The log-log plots for 2010 and 2011 clearly show that radial flow has been achieved before the end of a 30-hour shut-in period.

12. Upon completion of the test, tag fill depth with gauges, pull out bottom-hole gauges making stops every 1000 feet for 5-minutes to obtain gradient data, rig down, and resume normal injection into the well as needed.

    The absence of fill across the perforations will be confirmed before starting the PFO testing and if necessary reconfirmed prior to the gradient stop portion of the PFO tests for each well.

13. The fall-off portion of the test must be conducted for a length of time sufficient to reach radial flow, i.e., the pressure is no longer influenced by wellbore storage or skin effects and enough data points lie within the infinite acting period that the semi-log straight line is well developed. A log-log with derivative plot should be prepared during the fall-off to verify radial flow is occurring.

    This requirement has been considered during PFO Test Plan development and implemented into the general procedure for each well.

SECTION VIII - Evaluation of the Test Results

A licensed professional who is knowledgeable in the methods of pressure transient test analysis, must evaluate and summarize the test results. The following information and evaluations shall be provided in the test report:

1. A log-log plot with a derivative diagnostic plot shall be used to identify flow regimes.

2. The wellbore storage portion and infinite acting portion of the test shall be identified on the plot. Type curves shall be used to verify results.

3. A Horner plot or other appropriate semi-log plot must be used to calculate the kh/u product and to determine P*. The wellbore storage and infinite acting portions of the test should be identified on the plot. An expanded semi-log plot containing the entire infinite acting portion must be reproduced to permit a closer inspection of the semi-log slope and any data fluctuations. The slope used to calculate the transmissibility (kh/u) and to determine P* must be drawn on both semi-log plots.

4. The "h" value (injection interval thickness) used in the analysis must be agreed upon between OCD and the permittee. For formations with characteristics such as fracture- controlled karst reservoirs with porosity and permeability influenced by basement structural patterns and sub aerial exposure, the entire thickness of the injection interval should be considered. A reliable literature value can be used if site specific data is not available.

5. The viscosity used in analyzing the test shall be that of the liquid through which the pressure transient was propagating during the infinite acting portion of the test. The information used to determine the viscosity shall be provided. Distance estimates to the waste front may also be needed.

6. Any test that was not shut-in long enough to develop an infinite acting period, or cannot be properly analyzed for transmissibility (kh/u) from the semi-log plot, should be rerun using a procedure that will result in valid test results, unless other arrangements have been made with OCD.

7. All equations and assumptions used in the analysis shall be provided with the appropriate parameters substituted into the equations.

8. A plot of the temperature data shall be provided for review. Any temperature anomalies shall be noted to determine if they correspond to pressure anomalies since the temperature compensation mechanism of the pressure gauge may be influenced by temperature fluctuations.

9. Explain any anomalous pressure data responses. Investigate any potential physical causes for the anomaly in addition to potential reservoir response characteristics.

   Navajo will comply with these requirements in the test results for each well.

SECTION IX - Report Components

Include the following information in the report to the OCD in Santa Fe - Attention environmental Bureau of the Division (see address under OCD contacts listed in the Contacts Section). The information in the report includes general information, an overview of the test, analysis of the test data, summary of the results and a comparison of the results with previous test results and UIC permit parameters. Submit the report to OCD within 30 days of test completion.

1. Facility information
   a. Name: Navajo Refining Company (Subsidiary of Holly Corporation)
   b. Location: Highway 82 East, Artesia, New Mexico 88211
   c. Operator's OGRD number: 94081

   The above Data will be included in the report for each well.

2. Well information:

   a. OCD UIC Permit number authorizing injection

      - Well No. 1: UIC-CLI-008-1
      - Well No. 2: UIC-CLI-008-2
      - Well No. 3: UIC-CLI-008-3

   b. Well classification

      - Well No. 1: Class I Non Hazardous
      - Well No. 2: Class I Non Hazardous
      - Well No. 3: Class I Non Hazardous

   c. Well name and number

      - WDW-1 (Mewbourne)
      - WDW-2 (Chukka)
      - WDW-3 (Gaines

d. API number

- Well No. 1: 30-015-27592
- Well No. 2: 30-015-20894
- Well No. 3: 30-015-26575

e. Legal location

- Well No. 1: 660 FSL, 2310-FEL, Sect 31 T17S R28E
- Well No. 2: 1980 FNL, 660-FWL, Sect 12 T18S R27E
- Well No. 3: 790 FSL, 2250-FWL, Sect 1 T18S R27E

3. Current wellbore schematic as described in Section VI

   Current wellbore schematics will be attached and presented as figures for each well report. A copy of the well schematic for each well can be found in Exhibit 4.

4. Copy of an electric log encompassing the completed interval

   A copy of an electric log encompassing the completed interval will be attached and presented as exhibits for each well report.

5. Copy of relevant portions of any porosity log used to estimate formation porosity

   A copy of porosity logs used to estimate formation porosity will be attached and presented as exhibits for each well report.

6. PVT data of the formation and injection fluid as described in Section VI

   a. Estimation of formation fluid and reservoir rock compressibility
      3.6×10^{-6} 1/psi
   b. Formation fluid viscosity with reference temperature
      0.72 cp at 112° F
   c. Formation fluid specific gravity/density with reference temperature
      8.6 ppg at 112° F

7. Daily rate history data for a minimum of one month preceding the fall-off test

   The daily rate history will be provided with fall-off test report for each well.

8. Cumulative injection into the formation from test well and offset wells

   Current cumulative volumes will be provided in the test report for each well.

9. Pressure gauges

   a. Describe the type of down-hole surface pressure readout gauge used including manufacturer and type

      The memory gauges that will be used are sapphire gauges that will have an accuracy of 0.025% full scale (FS) or 0.01% of the reading and will have a resolution of 0.0003% (FS). The pressure range of the gauges will be from 0-10,000 psi. These are typical bottom hole memory gauges with the best accuracy available in the area. The gauges will be lowered to the top of the injection interval at 7924 feet in Mewbourne Well No. 1, 7820 feet in Chukka Well No. 2, and 7660 feet in Gaines Well No. 3. The recoding period will be set to record pressures at a minimum of every 10 seconds for each well.

   b. List the full range, accuracy and resolution of the gauge

      - +/-0.025% F.S. + 0.01% of reading
      - Will also provide a data specification sheet of gauges that were used to run the fall-off with report for each well.

   c. Provide the manufacturer's recommended frequency of calibration and a calibration certificate showing date the gauge was last calibrated.

      Current calibration certificates will be provided with final report for each well.

10. One mile Area of Review (AOR)

   a. Identify wells located within the one mile AOR

      Exhibit 3 (Table VII)

   b. Ascertain the status of wells within the one-mile AOR

      Exhibit 3 (Table VIII)

   c. Provide details on any offset producers and injectors completed in the same injection interval

      Area of Review (AOR) lists all wells. The only wells that will affect the PFO Test are Navajo's well(s). These wells and the controlled rates are referenced in the procedure for each well.

11. Geology

a. Describe geologic environment of the injection interval.

The proposed injection zones are porous carbonates of the lower portion of the Wolfcamp Formation and the Cisco and Canyon Formations. The Lower Wolfcamp is the shallowest porous unit in the proposed injection interval. The Wolfcamp Formation consists of light brown to tan, fine to medium-grained, fossiliferous limestone with variegated shale interbeds.

The Cisco Formation of the Northwest Shelf is described as consisting of uniform, light-colored, chalky, fossiliferous limestone interbedded with variegated shales. Cisco, at the edge of the Permian basin, is also described as consisting of biothermal (mound) reefs composed of thick, porous, coarse-grained dolomites. Locally, the Cisco consists of porous dolomite that is 745 feet thick in the Chukka Well No. 2, 650 feet thick in Mewbourne Well No. 1, and 720 feet thick in Gaines Well No. 3.

The Canyon Formation consists of white to tan to light brown, fine grained, chalky, fossiliferous limestone with gray and red shale interbeds.

In summary, permeability values in the injection zone from producing fields in the region range up to 200 md. However, based on test data for the Mewbourne Well No. 1, Chukka Well No. 2, and Gaines Well No. 3, permeability values as high as 2733 md or higher occur in intervals in the injection zone. Each well report will include a short description of the injection interval as described above.

b. Discuss the presence of geologic features, i.e., pinchouts, channels, and faults, if applicable.

N/A

c. Provide a portion of a relevant structure map, if necessary.

N/A

12. Offset wells

(Area of Review lists all wells within the AOR. The AOR was updated in 2011 and the only wells that will affect the PFO Test are the Navajo injection wells. These wells and controlled rates will be referenced in the procedure and accounted for in the analysis if necessary.)

a. Identify the distance between the test well and any offset wells completed in the same injection interval
b. Report the status of the offset wells during both the injection and shut-in portions of the test
c. Describe the impact, if any, the offset wells had on the test

13. Chronological listing of the daily testing activities (operations log)

A chronology of field activities will be included in each well report with a minimum of the following items:

a. Date of the test
b. Time of the injection period
c. Type of injection fluid
d. Final injection pressure and temperature prior to shutting in the well
e. Total shut-in time
f. Final static pressure and temperature at the end of the fall-off portion of the test

14. Describe the location of the shut-in valve used to cease flow to the well for the shut-in portion of the test.

Each well will be shut-in with a 4-inch gate valve: one at the wellhead and one at the filter pods. The valves will be locked out and tagged out.

15. Provide each of the following; including the equations used to calculate each, the equations with the appropriate parameters substituted in them, description of parameters used in calculations with references as to how the values were derived:

a. Radius of test investigation

$$r_{waste} = \left[\frac{0.13368\ V}{\pi\ h\ \varphi}\right]^{1/2}$$

b. Time to beginning of the infinite acting portion of the test

$$t_{waste} = 948\frac{\varphi\ \mu_{waste}\ c_t\ r^2_{waste}}{k}$$

c. Slope or slopes determined from the semi-log plot

Determined from Pan Systems V3.5 © Horner or Superposition Plot

d. The value for transmissibility (kh/u)

$$\frac{k\,h}{\mu} = 162.6\,\frac{q_{last}\,B}{m}$$

e. Permeability (k)

$$k = \frac{k\,h}{h}$$

f. Skin factor (s)

$$s = 1.151\left[\frac{p_{wf} - p_{1hr}}{m} - \log\left[\frac{k}{\phi\,\mu\,c_t\,r_w^2}\right] + 3.23\right]$$

g. Pressure drop due to skin (ΔPskin)

ΔPskin = 0.869ms

h. Flow efficiency ((Pwf-ΔPskin-Pstatic)/ (Pwf-Pstatic))

i. Flow capacity (kh) or mobility thickness

$$k\,h = \left(\frac{k\,h}{\mu}\right)\mu_{res}$$

j. $P_{1\ hour}$ (extrapolated pressure at one hour)

Determined from Pan Systems© V3.5, which is the extrapolated straight line at one hour on the Horner Plot.

16. Explain any pressure or temperature anomaly

Any pressure and temperature anomalies will be explained in the report for each well.

17. Describe the test results

a. Discuss if the test reached radial flow or if it was dominated by wellbore storage or another type of flow regime.

Will be determined from Log-Log Plot

b. Describe the reservoir results as homogeneous or heterogeneous explaining how this was determined.

Note: Initial assumption will be homogeneous reservoir in semi-steady state flow. An explanation will be included in the well reports.

18. Provide the following graphs:

The following graphs will be provided by the Pan System V3.5 © and will include the identifiable flow regemes on each plot, which will be included in each well report.

a. Cartesian plot of pressure and temperature versus time
b. Cartesian plot of injection rate versus time
c. Log-log and derivative plots with the flow regions identified

i. Identify the wellbore storage period
ii. Identify the radial flow period in.
iii. Identify any other relevant flow regimes
iv. Semi-log plot and expanded semi-log plot (typically Horner plots)
v. Identify the flow regions on each
vi. Draw the semi-log straight line
vii. Identify the P* (false extrapolated pressure)
viii. Calculate $P_{1\ hour}$ (extrapolated pressure at one hour)

d. Plot of the digital surface rates and pressures from the surface pressure gauge

Subsurface will attach a data logging surface gauge to the wellhead to generate data and plot. Navajo will provide the rates from there flow meters. This will be included in the well report for each well. As a note, historically the wellhead pressure at some point in time during the pressure falloff will go to zero and then on a vacuum.

e. Plot of digital pressures and times from the bottom hole gauges

Data will be provided from down-hole gauges for plot. The plots for each well will be generated by the Pan Systems© V3.5 software.

f. Complete injection rate history plot (injection rate and wellhead pressure vs. calendar time)

Injection rate history will be provided in Pan System © Report for each well.

g. Current Hall plot with explanation for any changes to the slope of this plot

Explanation will be provided in report for each well.

19. Comparison of permeability (k), transmissibility (kh/u), skin (s), false extrapolated pressure (P*), and depth to fill with the same values determined from fall-off tests previously conducted in the well.

A table will be provided comparing the results from previous testing with the report for each well.

20. A statement that the raw test data generated by the test will be kept on file by the permittee for a period of not less than 3 years and will be made available to OCD upon request during this time period. The raw test data need not be submitted to OCD unless requested.

Navajo will comply with this and a table of acquired pressure, rate, and analytical data will be included with the report for each well.

SECTION X – Contacts

OCD Contacts:

Mr. Carl Chavez
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, NM 87505
Phone: 505-476-3490
E-mail: carlj.chavez@state.nm.us

Mr. William Jones
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, NM 87505
Phone: 505-476-3448
E-mail: william.jones@state.nm.us

USEPA Contacts:

Mr. Ken Johnson
USEPA Region 6 (6WQ-SG)
1445 Ross Avenue
Dallas, TX 75202-2733
Phone: 214-665-8473
E-mail: Johnson. ken-e@epa.gov

Ms. Susan Lopez McKenzie
USEPA Region 6 (6WQ-SG)
1445 Ross Avenue
Dallas, TX 75202-2733
Phone: 214-665-7198
E-mail: lopez.susan@epa.gov

SECTION XI – Additional Information

As a result of the falloff testing done in 2008 and 2009 it appears that all three of the wells may be in communication to some degree. Pressure communication between the wells indicates that the reservoir is continuous with similar properties at each wellbore. Exhibit 1 contains a chart and tables with historical pressures for all 3 wells. On the chart, the trend appears to show that the addition of the Gaines well in 2007 to the injection interval resulted in an increase in pressure in the Mewbourne and Chukka wells. This would also indicate pressure communication between the wells.

EXHIBIT 1



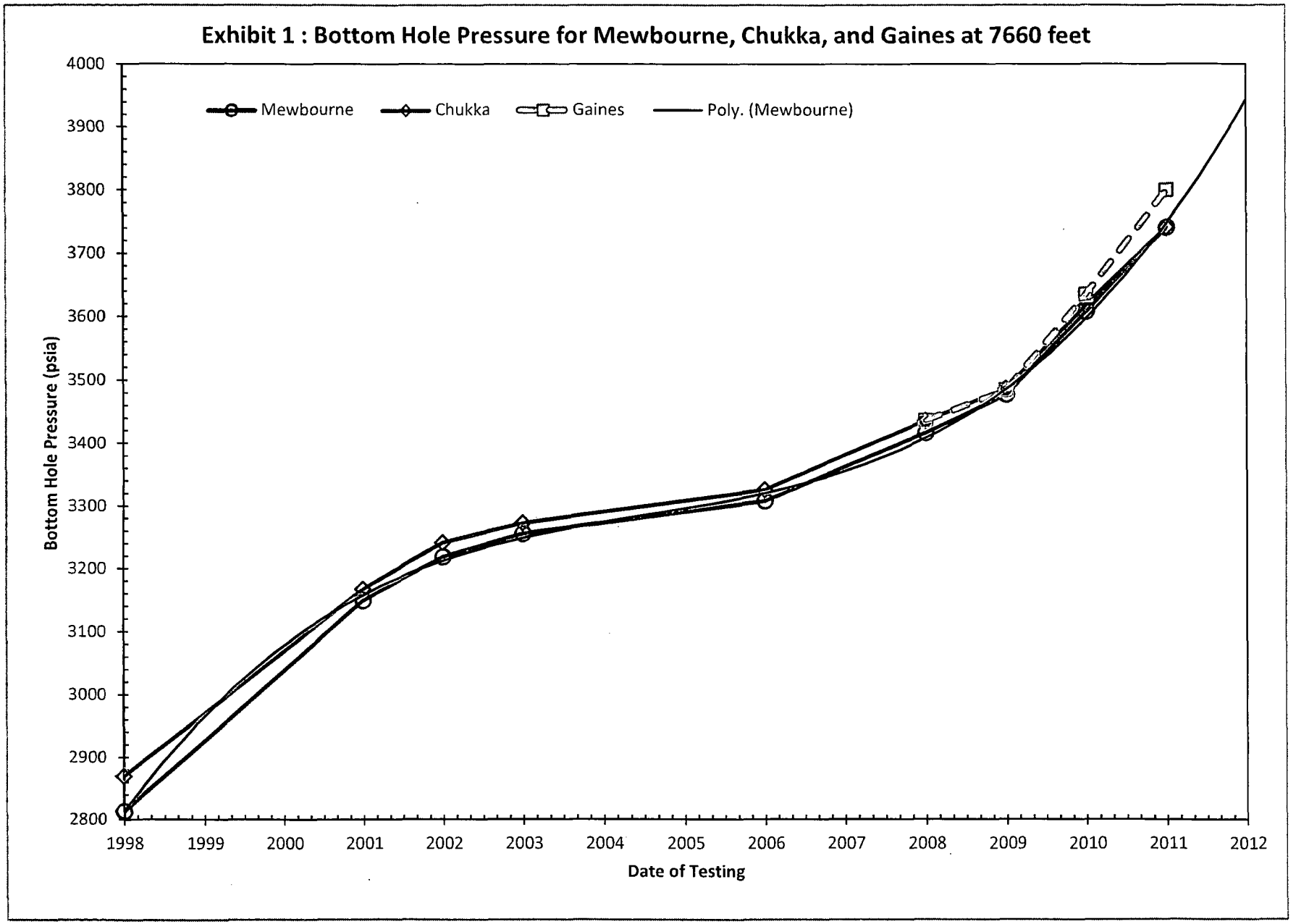

Exhibit 1 : Bottom Hole Pressure for Mewbourne, Chukka, and Gaines at 7660 feet
Mewbourne
Chukka
Gaines
Poly. (Mewbourne)
Bottom Hole Pressure (psia)
4000
3900
3800
3700
3600
3500
3400
3300
3200
3100
3000
2900
2800
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Date of Testing

EXHIBIT 2



CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: **R25184** InstrumentID: **VOA2**

LCS Sample ID: **VLCSW-1210** Test Code: **SW8260** Units: **µg/L** Analysis Date: **12/10/04 13:50**
Client ID: Run ID: **VOA2_041210A** SeqNo: **586931** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	53.94	5.0	50	0	108	75.2-120	0			
1,1,2,2-Tetrachloroethane	53.63	5.0	50	0	107	72.4-121	0			
1,1,2-Trichloroethane	52.21	5.0	50	0	104	80-120	0			
1,1-Dichloroethane	51.53	5.0	50	0	103	76.9-120	0			
1,1-Dichloroethene	54.08	5.0	50	0	108	72.6-123	0			
1,2-Dichloroethane	51.67	5.0	50	0	103	80-120	0			
2-Butanone	119.9	10	100	0	120	69-131	0			
2-Chloroethyl vinyl ether	113.4	10	100	0	113	60-135	0			
2-Hexanone	121.4	10	100	0	121	55.6-126	0			
4-Methyl-2-pentanone	118.2	10	100	0	118	67.4-121	0			
Acetone	109.7	10	100	0	110	64.4-140	0			
Benzene	51.72	5.0	50	0	103	80-120	0			
Bromodichloromethane	51.04	5.0	50	0	102	80-120	0			
Bromoform	55.31	5.0	50	0	111	77.9-121	0			
Bromomethane	53.52	5.0	50	0	107	63.3-137	0			
Carbon disulfide	101.4	10	100	0	101	74.1-123	0			
Carbon tetrachloride	51.52	5.0	50	0	103	74.7-120	0			
Chlorobenzene	48.09	5.0	50	0	96.2	80-120	0			
Chloroethane	50.53	5.0	50	0	101	74.7-126	0			
Chloroform	50.64	5.0	50	0	101	80-120	0			
Chloromethane	49.38	5.0	50	0	98.8	64.5-132	0			
cis-1,3-Dichloropropene	50.36	5.0	50	0	101	80-120	0			
Dibromochloromethane	53.13	5.0	50	0	106	80-120	0			
Ethylbenzene	53.38	5.0	50	0	107	80-120	0			
m,p-Xylene	103.8	10	100	0	104	80-120	0			
Methylene chloride	48.39	10	50	0	96.8	76.2-120	0			
Styrene	53.58	5.0	50	0	107	80-120	0			
Tetrachloroethene	53.39	5.0	50	0	107	68.5-130	0			
Toluene	52.27	5.0	50	0	105	80-120	0			
trans-1,3-Dichloropropene	54.85	5.0	50	0	110	80-120	0			
Trichloroethene	54.11	5.0	50	0	108	78.9-120	0			
Vinyl acetate	115.6	10	100	0	116	62.4-133	0			
Vinyl chloride	52.09	2.0	50	0	104	72.7-128	0			
Xylenes, Total	152.9	15	150	0	102	80-120	0			
Surr: 1,2-Dichloroethane-d4	45.28	5.0	50	0	90.6	71-126	0			
Surr: 4-Bromofluorobenzene	45.14	5.0	50	0	90.3	74-125	0			
Surr: Dibromofluoromethane	43.25	5.0	50	0	86.5	73-126	0			
Surr: Toluene-d8	46.04	5.0	50	0	92.1	75-125	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25184 InstrumentID: VOA2

MS Sample ID: 0412122-01AMS Test Code: SW8260 Units: µg/L Analysis Date: 12/10/04 15:31

Client ID: Run ID: VOA2_041210A SeqNo: 586934 Prep Date: DF: 100

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	4798	500	5000	0	96	75.2-120	0			
1,1,2,2-Tetrachloroethane	3949	500	5000	0	79	72.4-121	0			
1,1,2-Trichloroethane	4942	500	5000	0	98.8	80-120	0			
1,1-Dichloroethane	4844	500	5000	0	96.9	76.9-120	0			
1,1-Dichloroethene	4755	500	5000	0	95.1	72.6-123	0			
1,2-Dichloroethane	4962	500	5000	0	99.2	80-120	0			
2-Butanone	11580	1,000	10000	0	116	69-131	0			
2-Chloroethyl vinyl ether	8304	1,000	10000	0	83	60-135	0			
2-Hexanone	11630	1,000	10000	0	116	55.6-126	0			
4-Methyl-2-pentanone	11200	1,000	10000	0	112	67.4-121	0			
Acetone	10640	1,000	10000	0	106	64.4-140	0			
Benzene	4919	500	5000	0	98.4	80-120	0			
Bromodichloromethane	4991	500	5000	0	99.8	80-120	0			
Bromoform	5184	500	5000	0	104	77.9-121	0			
Bromomethane	4562	500	5000	0	91.2	63.3-137	0			
Carbon disulfide	9132	1,000	10000	0	91.3	74.1-123	0			
Carbon tetrachloride	4713	500	5000	0	94.3	74.7-120	0			
Chlorobenzene	4596	500	5000	0	91.9	80-120	0			
Chloroethane	4625	500	5000	0	92.5	74.7-126	0			
Chloroform	8788	500	5000	4602	83.7	80-120	0			
Chloromethane	4632	500	5000	0	92.6	64.5-132	0			
cis-1,3-Dichloropropene	4838	500	5000	0	96.8	80-120	0			
Dibromochloromethane	4989	500	5000	0	99.8	80-120	0			
Ethylbenzene	5104	500	5000	0	102	80-120	0			
m,p-Xylene	9965	1,000	10000	0	99.6	80-120	0			
Methylene chloride	4625	1,000	5000	0	92.5	76.2-120	0			
Styrene	5121	500	5000	0	102	80-120	0			
Tetrachloroethene	5010	500	5000	0	100	68.5-130	0			
Toluene	4924	500	5000	0	98.5	80-120	0			
trans-1,3-Dichloropropene	5349	500	5000	0	107	80-120	0			
Trichloroethene	5895	500	5000	0	118	78.9-120	0			
Vinyl acetate	1690	1,000	10000	0	16.9	62.4-133	0			S
Vinyl chloride	4609	200	5000	0	92.2	72.7-128	0			
Xylenes, Total	14660	1,500	15000	0	97.7	80-120	0			
Surr: 1,2-Dichloroethane-d4	4231	500	5000	0	84.6	71-126	0			
Surr: 4-Bromofluorobenzene	4306	500	5000	0	86.1	74-125	0			
Surr: Dibromofluoromethane	4042	500	5000	0	80.8	73-126	0			
Surr: Toluene-d8	4389	500	5000	0	87.8	75-125	0			

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ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

03-Sep-08

Aaron Strange
Navajo Refining Company
PO Box 159
Artesia, NM 88211

Tel: (575) 746-5468
Fax: (505) 746-5421

Re: Injection Well Quarterly

Work Order : 0808447

Dear Aaron,

ALS Laboratory Group received 2 samples on 8/20/2008 08:55 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Laboratory Group and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Laboratory Group. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 36.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Jaylynn F Thibault

Electronically approved by: Glenda H. Ramos

Jaylynn F Thibault

Certificate No: T104704231-08-TX

ALS Laboratory Group

Date: 03-Sep-08

Client: Navajo Refining Company
Project: Injection Well Quarterly
Work Order: 0808447

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0808447-01	Injection Well	Water		8/19/2008 11:30	8/20/2008 08:55	☐

ALS Laboratory Group *Date: 03-Sep-08*

Client:	Navajo Refining Company
Project:	Injection Well Quarterly
Work Order:	0808447

Case Narrative

pH sample (Injection Well) holding time had expired prior to request for analysis.

Batch 31577 Metals (sample 0808511-02MS/MSD) unrelated sample.

Batch R67271 Volatiles (sample 0808627-06MS/MSD) unrelated sample.

ALS Laboratory Group

Date: *03-Sep-08*

Client: Navajo Refining Company
Project: Injection Well Quarterly
Work Order: 0808447
Sample ID: Injection Well
Lab ID: 0808447-01
Collection Date: 8/19/2008 11:30 AM
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ICP METALS, TOTAL - SW6020A			SW6020		Prep Date: 8/25/2008	Analyst: ALR
Aluminum	0.447		0.0100	mg/L	1	8/25/2008 09:21 PM
Arsenic	0.116		0.00500	mg/L	1	9/2/2008 03:31 PM
Barium	0.0187		0.00500	mg/L	1	8/25/2008 09:21 PM
Beryllium	ND		0.00200	mg/L	1	8/25/2008 09:21 PM
Boron	0.163		0.0200	mg/L	1	8/25/2008 09:21 PM
Cadmium	ND		0.00200	mg/L	1	8/25/2008 09:21 PM
Calcium	68.7		0.500	mg/L	1	8/25/2008 09:21 PM
Chromium	ND		0.00500	mg/L	1	9/2/2008 03:31 PM
Cobalt	ND		0.00500	mg/L	1	9/2/2008 03:31 PM
Copper	ND		0.00500	mg/L	1	8/25/2008 09:21 PM
Iron	0.240		0.200	mg/L	1	8/25/2008 09:21 PM
Lead	ND		0.00500	mg/L	1	8/25/2008 09:21 PM
Magnesium	27.1		0.200	mg/L	1	8/25/2008 09:21 PM
Manganese	0.0478		0.00500	mg/L	1	9/2/2008 03:31 PM
Molybdenum	0.0577		0.00500	mg/L	1	8/25/2008 09:21 PM
Nickel	0.00528		0.00500	mg/L	1	8/25/2008 09:21 PM
Potassium	13.0		0.200	mg/L	1	8/25/2008 09:21 PM
Selenium	0.339		0.00500	mg/L	1	9/2/2008 03:31 PM
Silver	ND		0.00500	mg/L	1	8/25/2008 09:21 PM
Sodium	985		20.0	mg/L	100	8/26/2008 04:20 PM
Vanadium	ND		0.00500	mg/L	1	9/2/2008 03:31 PM
Zinc	0.0369		0.00500	mg/L	1	8/25/2008 09:21 PM
SEMIVOLATILE ORGANICS BY GC/MS			SW8270		Prep Date: 8/22/2008	Analyst: ACN
1,2,4-Trichlorobenzene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
2,4,5-Trichlorophenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
2,4,6-Trichlorophenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
2-Methylnaphthalene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
2-Methylphenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
2-Nitroaniline	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
2-Nitrophenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
3&4-Methylphenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
3-Nitroaniline	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
4-Nitroaniline	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
4-Nitrophenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Acenaphthene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Acenaphthylene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Aniline	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Anthracene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM

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ALS Laboratory Group

Date: *03-Sep-08*

Client: Navajo Refining Company
Project: Injection Well Quarterly
Sample ID: Injection Well
Collection Date: 8/19/2008 11:30 AM

Work Order: 0808447
Lab ID: 0808447-01
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Benz(a)anthracene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Benzidine	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Hexachloroethane	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Indeno(1,2,3-cd)pyrene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Isophorone	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
N-Nitrosodi-n-propylamine	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
N-Nitrosodimethylamine	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
N-Nitrosodiphenylamine	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Naphthalene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Nitrobenzene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Pentachlorophenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Phenanthrene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Phenol	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Pyrene	ND		0.0050	mg/L	1	8/26/2008 09:58 PM
Surr: 2,4,6-Tribromophenol	*80.5*		*42-124*	*%REC*	1	8/26/2008 09:58 PM
Surr: 2-Fluorobiphenyl	*56.9*		*48-120*	*%REC*	1	8/26/2008 09:58 PM
Surr: 2-Fluorophenol	*43.8*		*20-120*	*%REC*	1	8/26/2008 09:58 PM
Surr: 4-Terphenyl-d14	*75.2*		*51-135*	*%REC*	1	8/26/2008 09:58 PM
Surr: Nitrobenzene-d5	*50.8*		*41-120*	*%REC*	1	8/26/2008 09:58 PM
Surr: Phenol-d6	*50.8*		*20-120*	*%REC*	1	8/26/2008 09:58 PM
VOLATILES BY GC/MS			**SW8260**			Analyst: PC
1,1,1-Trichloroethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
1,1,2,2-Tetrachloroethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
1,1,2-Trichloroethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
1,1-Dichloroethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
1,1-Dichloroethene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
1,2-Dichloroethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
2-Butanone	ND		0.10	mg/L	10	8/28/2008 03:56 PM
2-Chloroethyl vinyl ether	ND		0.10	mg/L	10	8/28/2008 03:56 PM
2-Hexanone	ND		0.10	mg/L	10	8/28/2008 03:56 PM
4-Methyl-2-pentanone	ND		0.10	mg/L	10	8/28/2008 03:56 PM
Acetone	ND		0.10	mg/L	10	8/28/2008 03:56 PM
Benzene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Bromodichloromethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Bromoform	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Bromomethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Carbon disulfide	ND		0.10	mg/L	10	8/28/2008 03:56 PM
Carbon tetrachloride	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Chlorobenzene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Chloroethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM

Qualifiers:

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E - Value above quantitation range
H - Analyzed outside of Hold Time
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ALS Laboratory Group

Date: *03-Sep-08*

Client: Navajo Refining Company
Project: Injection Well Quarterly
Work Order: 0808447
Sample ID: Injection Well
Lab ID: 0808447-01
Collection Date: 8/19/2008 11:30 AM
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Chloroform	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Chloromethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
cis-1,3-Dichloropropene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Dibromochloromethane	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Ethylbenzene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
m,p-Xylene	ND		0.10	mg/L	10	8/28/2008 03:56 PM
Methylene chloride	ND		0.10	mg/L	10	8/28/2008 03:56 PM
Styrene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Tetrachloroethene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Toluene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
trans-1,3-Dichloropropene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Trichloroethene	ND		0.050	mg/L	10	8/28/2008 03:56 PM
Vinyl acetate	ND		0.10	mg/L	10	8/28/2008 03:56 PM
Vinyl chloride	ND		0.020	mg/L	10	8/28/2008 03:56 PM
Xylenes, Total	ND		0.15	mg/L	10	8/28/2008 03:56 PM
Surr: 1,2-Dichloroethane-d4	*106*		*70-125*	*%REC*	10	8/28/2008 03:56 PM
Surr: 4-Bromofluorobenzene	*93.3*		*72-125*	*%REC*	10	8/28/2008 03:56 PM
Surr: Dibromofluoromethane	*105*		*71-125*	*%REC*	10	8/28/2008 03:56 PM
Surr: Toluene-d8	*102*		*75-125*	*%REC*	10	8/28/2008 03:56 PM
CYANIDE, REACTIVE			**SW-846**			Analyst: **HN**
Reactive Cyanide	ND		40.0	mg/Kg	1	8/22/2008
SULFIDE, REACTIVE			**SW-846**			Analyst: **HN**
Reactive Sulfide	ND		40.0	mg/Kg	1	8/22/2008
ANIONS BY ION CHROMATOGRAPHY			**E300**			Analyst: **PV**
Chloride	**492**		**10.0**	**mg/L**	20	8/20/2008 06:07 PM
Sulfate	**1,490**		**50.0**	**mg/L**	100	8/20/2008 06:30 PM
Surr: Selenate (surr)	*98.5*		*85-115*	*%REC*	100	8/20/2008 06:30 PM
Surr: Selenate (surr)	*100*		*85-115*	*%REC*	20	8/20/2008 06:07 PM
ALKALINITY			**SM2320B**			Analyst: **MAM**
Alkalinity, Bicarbonate (As CaCO3)	**179**		**5.00**	**mg/L**	1	8/21/2008 05:30 PM
Alkalinity, Carbonate (As CaCO3)	ND		5.00	mg/L	1	8/21/2008 05:30 PM
Alkalinity, Hydroxide (As CaCO3)	ND		5.00	mg/L	1	8/21/2008 05:30 PM
Alkalinity, Total (As CaCO3)	**179**		**5.00**	**mg/L**	1	8/21/2008 05:30 PM
CONDUCTIVITY			**E120.1**			Analyst: **MAM**
Specific Conductance	**4,710**		**1.00**	**µmhos/cm**	1	8/22/2008 04:00 PM
PH			**SW9040**			Analyst: **RPM**
pH	**7.29**	H	**0.100**	**pH units**	1	8/20/2008 04:00 PM

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ALS Laboratory Group

Date: *03-Sep-08*

Client:	Navajo Refining Company		
Project:	Injection Well Quarterly	**Work Order:**	0808447
Sample ID:	Injection Well	**Lab ID:**	0808447-01
Collection Date:	8/19/2008 11:30 AM	**Matrix:**	WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TOTAL DISSOLVED SOLIDS			E160.1			Analyst: KKP
Total Dissolved Solids (Residue, Filterable)	3,620		10.0	mg/L	1	8/20/2008 04:00 PM

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ALS Laboratory Group

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

Date: *03-Sep-08*

QC BATCH REPORT

Batch ID: **31577** Instrument ID **ICPMS02** Method: **SW6020**

MBLK Sample ID: **MBLKW1-082508-31577** Units: **mg/L** Analysis Date: **8/25/2008 09:08 PM**

Client ID: Run ID: **ICPMS02_080825A** SeqNo: **1476311** Prep Date: **8/25/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.009435	0.010								J
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.050								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Copper	ND	0.0050								
Iron	ND	0.20								
Lead	ND	0.0050								
Magnesium	ND	0.20								
Molybdenum	ND	0.0050								
Nickel	ND	0.0050								
Potassium	ND	0.20								
Silver	ND	0.0050								
Sodium	ND	0.20								
Zinc	0.00199	0.0050								J

MBLK Sample ID: **MBLKW1-082508-31577** Units: **mg/L** Analysis Date: **8/26/2008 06:06 PM**

Client ID: Run ID: **ICPMS02_080826A** SeqNo: **1477419** Prep Date: **8/25/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	ND	0.0050								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Manganese	ND	0.0050								
Selenium	ND	0.0050								
Vanadium	ND	0.0050								

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U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: 31577 Instrument ID ICPMS02 Method: SW6020

LCS Sample ID: MLCSW1-082508-31577 Units: mg/L Analysis Date: 8/25/2008 09:14 PM
Client ID: Run ID: ICPMS02_080825A SeqNo: 1476312 Prep Date: 8/25/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.05241	0.010	0.05	0	105	80-120	0			
Barium	0.04958	0.0050	0.05	0	99.2	80-120	0			
Beryllium	0.04832	0.0020	0.05	0	96.6	80-120	0			
Boron	0.9602	0.050	1	0	96	80-120	0			
Cadmium	0.05195	0.0020	0.05	0	104	80-120	0			
Calcium	4.85	0.50	5	0	97	80-120	0			
Copper	0.04442	0.0050	0.05	0	88.8	80-120	0			
Iron	4.997	0.20	5	0	99.9	80-120	0			
Lead	0.04998	0.0050	0.05	0	100	80-120	0			
Magnesium	4.729	0.20	5	0	94.6	80-120	0			
Molybdenum	0.05009	0.0050	0.05	0	100	80-120	0			
Nickel	0.04845	0.0050	0.05	0	96.9	80-120	0			
Potassium	4.876	0.20	5	0	97.5	80-120	0			
Silver	0.04927	0.0050	0.05	0	98.5	80-120	0			
Sodium	4.708	0.20	5	0	94.2	80-120	0			
Zinc	0.05174	0.0050	0.05	0	103	80-120	0			

LCS Sample ID: MLCSW1-082508-31577 Units: mg/L Analysis Date: 8/26/2008 06:12 PM
Client ID: Run ID: ICPMS02_080826A SeqNo: 1477420 Prep Date: 8/25/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.05269	0.0050	0.05	0	105	80-120	0			
Chromium	0.05122	0.0050	0.05	0	102	80-120	0			
Cobalt	0.05196	0.0050	0.05	0	104	80-120	0			
Manganese	0.0518	0.0050	0.05	0	104	80-120	0			
Selenium	0.05144	0.0050	0.05	0	103	80-120	0			
Vanadium	0.05104	0.0050	0.05	0	102	80-120	0			

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E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: **31577** Instrument ID **ICPMS02** Method: **SW6020**

MS Sample ID: **0808511-02BMS** Units: **mg/L** Analysis Date: **8/27/2008 02:01 PM**

Client ID: Run ID: **ICPMS02_080827A** SeqNo: **1477992** Prep Date: **8/25/2008** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.05404	0.020	0.05	0.007596	92.9	80-120	0			
Arsenic	0.05388	0.010	0.05	0.002166	103	80-120	0			
Barium	0.09094	0.010	0.05	0.03702	108	80-120	0			
Beryllium	0.04818	0.0040	0.05	0.0002298	95.9	80-120	0			
Boron	2.136	0.10	1	1.157	97.9	80-120	0			
Cadmium	0.05082	0.0040	0.05	0.0002848	101	80-120	0			
Calcium	287.2	1.0	5	278.8	168	80-120	0			SO
Chromium	0.05212	0.010	0.05	0.0006506	103	80-120	0			
Cobalt	0.05068	0.010	0.05	0.0002952	101	80-120	0			
Copper	0.05728	0.010	0.05	0.00864	97.3	80-120	0			
Iron	5.116	0.40	5	0.2318	97.7	80-120	0			
Lead	0.0531	0.010	0.05	0.001542	103	80-120	0			
Magnesium	133.9	0.40	5	126.4	152	80-120	0			SO
Manganese	0.05614	0.010	0.05	0.00613	100	80-120	0			
Molybdenum	0.06142	0.010	0.05	0.009076	105	80-120	0			
Nickel	0.0536	0.010	0.05	0.00507	97.1	80-120	0			
Potassium	12.93	0.40	5	8.01	98.4	80-120	0			
Selenium	0.0552	0.010	0.05	0.002548	105	80-120	0			
Silver	0.04754	0.010	0.05	-0.0003784	95.8	80-120	0			
Sodium	171.2	0.40	5	164.6	131	80-120	0			SO
Vanadium	0.05928	0.010	0.05	0.007996	103	80-120	0			
Zinc	0.1101	0.010	0.05	0.06128	97.7	80-120	0			

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: **31577** Instrument ID **ICPMS02** Method: **SW6020**

MSD Sample ID: **0808511-02BMSD** Units: **mg/L** Analysis Date: **8/27/2008 02:27 PM**
Client ID: Run ID: **ICPMS02_080827A** SeqNo: **1478014** Prep Date: **8/25/2008** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.05314	0.020	0.05	0.007596	91.1	80-120	0.05404	1.68	15	
Arsenic	0.05368	0.010	0.05	0.002166	103	80-120	0.05388	0.372	15	
Barium	0.08932	0.010	0.05	0.03702	105	80-120	0.09094	1.8	15	
Beryllium	0.04804	0.0040	0.05	0.0002298	95.6	80-120	0.04818	0.291	15	
Boron	2.114	0.10	1	1.157	95.7	80-120	2.136	1.04	15	
Cadmium	0.0507	0.0040	0.05	0.0002848	101	80-120	0.05082	0.236	15	
Calcium	284.4	1.0	5	278.8	112	80-120	287.2	0.98	15	O
Chromium	0.04898	0.010	0.05	0.0006506	96.7	80-120	0.05212	6.21	15	
Cobalt	0.04924	0.010	0.05	0.0002952	97.9	80-120	0.05068	2.88	15	
Copper	0.05714	0.010	0.05	0.00864	97	80-120	0.05728	0.245	15	
Iron	5.212	0.40	5	0.2318	99.6	80-120	5.116	1.86	15	
Lead	0.05296	0.010	0.05	0.001542	103	80-120	0.0531	0.264	15	
Magnesium	132.6	0.40	5	126.4	125	80-120	133.9	1.01	15	SO
Manganese	0.05514	0.010	0.05	0.00613	98	80-120	0.05614	1.8	15	
Molybdenum	0.06142	0.010	0.05	0.009076	105	80-120	0.06142	0	15	
Nickel	0.05416	0.010	0.05	0.00507	98.2	80-120	0.0536	1.04	15	
Potassium	13.05	0.40	5	8.01	101	80-120	12.93	0.924	15	
Selenium	0.04946	0.010	0.05	0.002548	93.8	80-120	0.0552	11	15	
Silver	0.04836	0.010	0.05	-0.0003784	97.5	80-120	0.04754	1.71	15	
Sodium	171.5	0.40	5	164.6	138	80-120	171.2	0.21	15	SO
Vanadium	0.05814	0.010	0.05	0.007996	100	80-120	0.05928	1.94	15	
Zinc	0.1117	0.010	0.05	0.06128	101	80-120	0.1101	1.44	15	

DUP Sample ID: **0808511-02BDUP** Units: **mg/L** Analysis Date: **8/26/2008 03:38 PM**
Client ID: Run ID: **ICP7500_080826A** SeqNo: **1477167** Prep Date: **8/25/2008** DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	312.2	25	0	0	0	0-0	289	7.7	25	
Magnesium	140.6	10	0	0	0	0-0	136.3	3.11	25	
Sodium	181	10	0	0	0	0-0	175.8	2.94	25	

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: 31577 Instrument ID ICPMS02 Method: SW6020

DUP Sample ID: 0808511-02BDUP Units: mg/L Analysis Date: 8/27/2008 01:48 PM
Client ID: Run ID: ICPMS02_080827A SeqNo: 1477928 Prep Date: 8/25/2008 DF: 2

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.006054	0.020	0	0	0	0-0	0.007596	0	25	J
Arsenic	ND	0.010	0	0	0	0-0	0.002166	0	25	
Barium	0.03874	0.010	0	0	0	0-0	0.03702	4.54	25	
Beryllium	ND	0.0040	0	0	0	0-0	0.0002298	0	25	
Boron	1.2	0.10	0	0	0	0-0	1.157	3.68	25	
Cadmium	ND	0.0040	0	0	0	0-0	0.0002848	0	25	
Chromium	ND	0.010	0	0	0	0-0	0.0006506	0	25	
Cobalt	ND	0.010	0	0	0	0-0	0.0002952	0	25	
Copper	0.008378	0.010	0	0	0	0-0	0.00864	0	25	J
Iron	0.241	0.40	0	0	0	0-0	0.2318	0	25	J
Lead	ND	0.010	0	0	0	0-0	0.001542	0	25	
Manganese	0.00617	0.010	0	0	0	0-0	0.00613	0	25	J
Molybdenum	0.009256	0.010	0	0	0	0-0	0.009076	0	25	J
Nickel	0.005284	0.010	0	0	0	0-0	0.00507	0	25	J
Potassium	8.234	0.40	0	0	0	0-0	8.01	2.76	25	
Selenium	ND	0.010	0	0	0	0-0	0.002548	0	25	
Silver	ND	0.010	0	0	0	0-0	-0.0003784	0	25	
Vanadium	0.008804	0.010	0	0	0	0-0	0.007996	0	25	J
Zinc	0.06038	0.010	0	0	0	0-0	0.06128	1.48	25	

The following samples were analyzed in this batch: 0808447-01B

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: 31556 Instrument ID SV-5 Method: SW8270

MBLK Sample ID: SBLKW3-080822-31556 Units: µg/L Analysis Date: 8/26/2008 03:21 PM

Client ID: Run ID: SV-5_080826B SeqNo: 1477746 Prep Date: 8/22/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	ND	5.0								
2,4,5-Trichlorophenol	ND	5.0								
2,4,6-Trichlorophenol	ND	5.0								
2-Methylnaphthalene	ND	5.0								
2-Methylphenol	ND	5.0								
2-Nitroaniline	ND	5.0								
2-Nitrophenol	ND	5.0								
3&4-Methylphenol	ND	5.0								
3-Nitroaniline	ND	5.0								
4-Nitroaniline	ND	5.0								
4-Nitrophenol	ND	5.0								
Acenaphthene	ND	5.0								
Acenaphthylene	ND	5.0								
Aniline	ND	5.0								
Anthracene	ND	5.0								
Benz(a)anthracene	ND	5.0								
Benzidine	ND	5.0								
Hexachloroethane	ND	5.0								
Indeno(1,2,3-cd)pyrene	ND	5.0								
Isophorone	ND	5.0								
N-Nitrosodi-n-propylamine	ND	5.0								
N-Nitrosodimethylamine	ND	5.0								
N-Nitrosodiphenylamine	ND	5.0								
Naphthalene	ND	5.0								
Nitrobenzene	ND	5.0								
Pentachlorophenol	ND	5.0								
Phenanthrene	ND	5.0								
Phenol	ND	5.0								
Pyrene	ND	5.0								
Surr: 2,4,6-Tribromophenol	*67.43*	5.0	*100*	0	*67.4*	*42-124*	0			
Surr: 2-Fluorobiphenyl	*72.06*	5.0	*100*	0	*72.1*	*48-120*	0			
Surr: 2-Fluorophenol	*60.11*	5.0	*100*	0	*60.1*	*20-120*	0			
Surr: 4-Terphenyl-d14	*81.01*	5.0	*100*	0	*81*	*51-135*	0			
Surr: Nitrobenzene-d5	*73.36*	5.0	*100*	0	*73.4*	*41-120*	0			
Surr: Phenol-d6	*64.98*	5.0	*100*	0	*65*	*20-120*	0			

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: **31556** Instrument ID **SV-5** Method: **SW8270**

LCS Sample ID: **SLCSW3-080822-31556** Units: µg/L Analysis Date: **8/26/2008 03:49 PM**
Client ID: Run ID: **SV-5_080826B** SeqNo: **1477747** Prep Date: **8/22/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	34.72	5.0	50	0	69.4	50-120	0			
2,4,5-Trichlorophenol	77.01	5.0	100	0	77	50-120	0			
2,4,6-Trichlorophenol	75.15	5.0	100	0	75.1	50-120	0			
2-Methylnaphthalene	35.59	5.0	50	0	71.2	55-120	0			
2-Methylphenol	76.58	5.0	100	0	76.6	50-120	0			
2-Nitroaniline	38.37	5.0	50	0	76.7	55-120	0			
2-Nitrophenol	74.18	5.0	100	0	74.2	55-120	0			
3&4-Methylphenol	114.7	5.0	150	0	76.5	55-120	0			
3-Nitroaniline	34.11	5.0	50	0	68.2	40-120	0			
4-Nitroaniline	36.62	5.0	50	0	73.2	50-120	0			
4-Nitrophenol	79.01	5.0	100	0	79	45-120	0			
Acenaphthene	36.95	5.0	50	0	73.9	55-120	0			
Acenaphthylene	36.28	5.0	50	0	72.6	55-120	0			
Aniline	29.52	5.0	50	0	59	30-120	0			
Anthracene	38.39	5.0	50	0	76.8	55-120	0			
Benz(a)anthracene	36.89	5.0	50	0	73.8	55-120	0			
Benzidine	22.62	5.0	50	0	45.2	10-120	0			
Hexachloroethane	33.94	5.0	50	0	67.9	55-120	0			
Indeno(1,2,3-cd)pyrene	40.02	5.0	50	0	80	55-120	0			
Isophorone	41	5.0	50	0	82	55-120	0			
N-Nitrosodi-n-propylamine	36.91	5.0	50	0	73.8	50-120	0			
N-Nitrosodimethylamine	34.52	5.0	50	0	69	45-120	0			
N-Nitrosodiphenylamine	36.2	5.0	50	0	72.4	55-120	0			
Naphthalene	35.86	5.0	50	0	71.7	55-120	0			
Nitrobenzene	36.23	5.0	50	0	72.5	55-120	0			
Pentachlorophenol	82.21	5.0	100	0	82.2	55-120	0			
Phenanthrene	35.76	5.0	50	0	71.5	55-120	0			
Phenol	77.28	5.0	100	0	77.3	50-120	0			
Pyrene	38.67	5.0	50	0	77.3	55-120	0			
Surr: 2,4,6-Tribromophenol	*75.53*	5.0	*100*	0	*75.5*	*42-124*	0			
Surr: 2-Fluorobiphenyl	*75.37*	5.0	*100*	0	*75.4*	*48-120*	0			
Surr: 2-Fluorophenol	*69.51*	5.0	*100*	0	*69.5*	*20-120*	0			
Surr: 4-Terphenyl-d14	*79.92*	5.0	*100*	0	*79.9*	*51-135*	0			
Surr: Nitrobenzene-d5	*74.24*	5.0	*100*	0	*74.2*	*41-120*	0			
Surr: Phenol-d6	*73.1*	5.0	*100*	0	*73.1*	*20-120*	0			

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: 31556 Instrument ID SV-5 Method: SW8270

MS Sample ID: 0808511-02CMS Units: µg/L Analysis Date: 8/26/2008 04:46 PM
Client ID: Run ID: SV-5_080826B SeqNo: 1477749 Prep Date: 8/22/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	33.46	5.0	50	0	66.9	50-120	0			
2,4,5-Trichlorophenol	75.07	5.0	100	0	75.1	50-120	0			
2,4,6-Trichlorophenol	73.33	5.0	100	0	73.3	50-120	0			
2-Methylnaphthalene	35.68	5.0	50	0	71.4	55-120	0			
2-Methylphenol	77.57	5.0	100	0	77.6	50-120	0			
2-Nitroaniline	37.45	5.0	50	0	74.9	55-120	0			
2-Nitrophenol	75.45	5.0	100	0	75.4	55-120	0			
3&4-Methylphenol	115.5	5.0	150	0	77	55-120	0			
3-Nitroaniline	30.01	5.0	50	0	60	40-120	0			
4-Nitroaniline	37.96	5.0	50	0	75.9	50-120	0			
4-Nitrophenol	76.56	5.0	100	0	76.6	45-120	0			
Acenaphthene	35.71	5.0	50	0	71.4	55-120	0			
Acenaphthylene	35.78	5.0	50	0	71.6	55-120	0			
Aniline	26.28	5.0	50	0	52.6	30-120	0			
Anthracene	37.89	5.0	50	0	75.8	55-120	0			
Benz(a)anthracene	35.95	5.0	50	0	71.9	55-120	0			
Benzidine	26.85	5.0	50	0	53.7	10-120	0			
Hexachloroethane	33.96	5.0	50	0	67.9	55-120	0			
Indeno(1,2,3-cd)pyrene	38.84	5.0	50	0	77.7	55-120	0			
Isophorone	41.18	5.0	50	0	82.4	55-120	0			
N-Nitrosodi-n-propylamine	37.63	5.0	50	0	75.3	50-120	0			
N-Nitrosodimethylamine	34.99	5.0	50	0	70	45-120	0			
N-Nitrosodiphenylamine	36.46	5.0	50	0	72.9	55-120	0			
Naphthalene	35.13	5.0	50	0	70.3	55-120	0			
Nitrobenzene	35.47	5.0	50	0	70.9	55-120	0			
Pentachlorophenol	80.62	5.0	100	0	80.6	55-120	0			
Phenanthrene	36.14	5.0	50	0	72.3	55-120	0			
Phenol	76.73	5.0	100	0	76.7	50-120	0			
Pyrene	37.91	5.0	50	0	75.8	55-120	0			
Surr: 2,4,6-Tribromophenol	72.83	5.0	100	0	72.8	42-124	0			
Surr: 2-Fluorobiphenyl	68.96	5.0	100	0	69	48-120	0			
Surr: 2-Fluorophenol	66.08	5.0	100	0	66.1	20-120	0			
Surr: 4-Terphenyl-d14	75.78	5.0	100	0	75.8	51-135	0			
Surr: Nitrobenzene-d5	70.47	5.0	100	0	70.5	41-120	0			
Surr: Phenol-d6	70.07	5.0	100	0	70.1	20-120	0			

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: 31556 Instrument ID SV-5 Method: SW8270

MSD Sample ID: 0808511-02CMSD Units: µg/L Analysis Date: 8/26/2008 05:15 PM

Client ID: Run ID: SV-5_080826B SeqNo: 1477750 Prep Date: 8/22/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	34.31	5.0	50	0	68.6	50-120	33.46	2.52	20	
2,4,5-Trichlorophenol	74.68	5.0	100	0	74.7	50-120	75.07	0.523	20	
2,4,6-Trichlorophenol	74.48	5.0	100	0	74.5	50-120	73.33	1.56	20	
2-Methylnaphthalene	35.49	5.0	50	0	71	55-120	35.68	0.532	20	
2-Methylphenol	75.01	5.0	100	0	75	50-120	77.57	3.35	20	
2-Nitroaniline	37.64	5.0	50	0	75.3	55-120	37.45	0.502	20	
2-Nitrophenol	74.39	5.0	100	0	74.4	55-120	75.45	1.41	20	
3&4-Methylphenol	110.4	5.0	150	0	73.6	55-120	115.5	4.5	20	
3-Nitroaniline	29.11	5.0	50	0	58.2	40-120	30.01	3.05	20	
4-Nitroaniline	36.67	5.0	50	0	73.3	50-120	37.96	3.43	20	
4-Nitrophenol	74.08	5.0	100	0	74.1	45-120	76.56	3.28	20	
Acenaphthene	36.41	5.0	50	0	72.8	55-120	35.71	1.94	20	
Acenaphthylene	36.19	5.0	50	0	72.4	55-120	35.78	1.14	20	
Aniline	26.16	5.0	50	0	52.3	30-120	26.28	0.454	20	
Anthracene	38.25	5.0	50	0	76.5	55-120	37.89	0.937	20	
Benz(a)anthracene	36.41	5.0	50	0	72.8	55-120	35.95	1.25	20	
Benzidine	23.27	5.0	50	0	46.5	10-120	26.85	14.3	20	
Hexachloroethane	33.42	5.0	50	0	66.8	55-120	33.96	1.6	20	
Indeno(1,2,3-cd)pyrene	39.46	5.0	50	0	78.9	55-120	38.84	1.6	20	
Isophorone	40.61	5.0	50	0	81.2	55-120	41.18	1.39	20	
N-Nitrosodi-n-propylamine	36.2	5.0	50	0	72.4	50-120	37.63	3.89	20	
N-Nitrosodimethylamine	34.97	5.0	50	0	69.9	45-120	34.99	0.0437	20	
N-Nitrosodiphenylamine	36.26	5.0	50	0	72.5	55-120	36.46	0.562	20	
Naphthalene	35.01	5.0	50	0	70	55-120	35.13	0.338	20	
Nitrobenzene	35.59	5.0	50	0	71.2	55-120	35.47	0.322	20	
Pentachlorophenol	82.71	5.0	100	0	82.7	55-120	80.62	2.57	20	
Phenanthrene	36.31	5.0	50	0	72.6	55-120	36.14	0.474	20	
Phenol	74.67	5.0	100	0	74.7	50-120	76.73	2.71	20	
Pyrene	38.78	5.0	50	0	77.6	55-120	37.91	2.28	20	
Surr: 2,4,6-Tribromophenol	*75.82*	5.0	*100*	0	*75.8*	*42-124*	72.83	*4.02*	*20*	
Surr: 2-Fluorobiphenyl	*76.92*	5.0	*100*	0	*76.9*	*48-120*	68.96	*10.9*	*20*	
Surr: 2-Fluorophenol	*70.84*	5.0	*100*	0	*70.8*	*20-120*	66.08	*6.96*	*20*	
Surr: 4-Terphenyl-d14	*82.48*	5.0	*100*	0	*82.5*	*51-135*	75.78	*8.47*	*20*	
Surr: Nitrobenzene-d5	*74.59*	5.0	*100*	0	*74.6*	*41-120*	70.47	*5.68*	*20*	
Surr: Phenol-d6	*73.62*	5.0	*100*	0	*73.6*	*20-120*	70.07	*4.94*	*20*	

The following samples were analyzed in this batch: 0808447-01D

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R67271 Instrument ID VOA1 Method: SW8260

MBLK Sample ID: VBLKW-082808-R67271 Units: µg/L Analysis Date: 8/28/2008 11:58 AM

Client ID: Run ID: VOA1_080828A SeqNo: 1480001 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	ND	5.0								
1,1,2,2-Tetrachloroethane	ND	5.0								
1,1,2-Trichloroethane	ND	5.0								
1,1-Dichloroethane	ND	5.0								
1,1-Dichloroethene	ND	5.0								
1,2-Dichloroethane	ND	5.0								
2-Butanone	ND	10								
2-Chloroethyl vinyl ether	ND	10								
2-Hexanone	ND	10								
4-Methyl-2-pentanone	ND	10								
Acetone	ND	10								
Benzene	ND	5.0								
Bromodichloromethane	ND	5.0								
Bromoform	ND	5.0								
Bromomethane	ND	5.0								
Carbon disulfide	ND	10								
Carbon tetrachloride	ND	5.0								
Chlorobenzene	ND	5.0								
Chloroethane	ND	5.0								
Chloroform	ND	5.0								
Chloromethane	ND	5.0								
cis-1,3-Dichloropropene	ND	5.0								
Dibromochloromethane	ND	5.0								
Ethylbenzene	ND	5.0								
m,p-Xylene	ND	10								
Methylene chloride	ND	10								
Styrene	ND	5.0								
Tetrachloroethene	ND	5.0								
Toluene	ND	5.0								
trans-1,3-Dichloropropene	ND	5.0								
Trichloroethene	ND	5.0								
Vinyl acetate	ND	10								
Vinyl chloride	ND	2.0								
Xylenes, Total	ND	15								
Surr: 1,2-Dichloroethane-d4	*53.86*	5.0	*50*	0	*108*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*52.67*	5.0	*50*	0	*105*	*72-125*	0			
Surr: Dibromofluoromethane	*53.07*	5.0	*50*	0	*106*	*71-125*	0			
Surr: Toluene-d8	*52.33*	5.0	*50*	0	*105*	*75-125*	0			

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E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R67271 Instrument ID VOA1 Method: SW8260

LCS Sample ID: VLCSW-082808-R67271 Units: µg/L Analysis Date: 8/28/2008 11:06 AM
Client ID: Run ID: VOA1_080828A SeqNo: 1479999 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	48.42	5.0	50	0	96.8	80-120	0			
1,1,2,2-Tetrachloroethane	47.22	5.0	50	0	94.4	72-120	0			
1,1,2-Trichloroethane	48.36	5.0	50	0	96.7	80-120	0			
1,1-Dichloroethane	49.74	5.0	50	0	99.5	76-120	0			
1,1-Dichloroethene	49.09	5.0	50	0	98.2	73-124	0			
1,2-Dichloroethane	48.21	5.0	50	0	96.4	78-120	0			
2-Butanone	95.73	10	100	0	95.7	58-132	0			
2-Chloroethyl vinyl ether	96.27	10	100	0	96.3	74-120	0			
2-Hexanone	93.29	10	100	0	93.3	61-130	0			
4-Methyl-2-pentanone	92.5	10	100	0	92.5	65-127	0			
Acetone	85.83	10	100	0	85.8	59-137	0			
Benzene	46.72	5.0	50	0	93.4	73-121	0			
Bromodichloromethane	46.81	5.0	50	0	93.6	80-120	0			
Bromoform	47.28	5.0	50	0	94.6	79-120	0			
Bromomethane	58.96	5.0	50	0	118	66-137	0			
Carbon disulfide	90.45	10	100	0	90.4	68-141	0			
Carbon tetrachloride	47.05	5.0	50	0	94.1	75-124	0			
Chlorobenzene	48.28	5.0	50	0	96.6	80-120	0			
Chloroethane	49.6	5.0	50	0	99.2	76-121	0			
Chloroform	48.58	5.0	50	0	97.2	80-120	0			
Chloromethane	44.24	5.0	50	0	88.5	67-123	0			
cis-1,3-Dichloropropene	45.99	5.0	50	0	92	80-120	0			
Dibromochloromethane	48.32	5.0	50	0	96.6	80-120	0			
Ethylbenzene	48.09	5.0	50	0	96.2	80-120	0			
m,p-Xylene	97.7	10	100	0	97.7	78-121	0			
Methylene chloride	46.2	10	50	0	92.4	65-133	0			
Styrene	50.75	5.0	50	0	101	80-120	0			
Tetrachloroethene	47.81	5.0	50	0	95.6	79-120	0			
Toluene	47.84	5.0	50	0	95.7	80-120	0			
trans-1,3-Dichloropropene	46.15	5.0	50	0	92.3	80-120	0			
Trichloroethene	46.02	5.0	50	0	92	80-120	0			
Vinyl acetate	91.99	10	100	0	92	67-139	0			
Vinyl chloride	46.39	2.0	50	0	92.8	70-127	0			
Xylenes, Total	147.9	15	150	0	98.6	80-120	0			
Surr: 1,2-Dichloroethane-d4	*54.64*	5.0	*50*	0	*109*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*54.98*	5.0	*50*	0	*110*	*72-125*	0			
Surr: Dibromofluoromethane	*52.57*	5.0	*50*	0	*105*	*71-125*	0			
Surr: Toluene-d8	*53.14*	5.0	*50*	0	*106*	*75-125*	0			

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lient: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R67271 Instrument ID VOA1 Method: SW8260

MS Sample ID: 0808627-06AMS Units: µg/L Analysis Date: 8/28/2008 03:03 PM

Client ID: Run ID: VOA1_080828A SeqNo: 1480008 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	45.92	5.0	50	0	91.8	80-120	0			
1,1,2,2-Tetrachloroethane	49.08	5.0	50	0	98.2	72-120	0			
1,1,2-Trichloroethane	48.76	5.0	50	0	97.5	80-120	0			
1,1-Dichloroethane	48.06	5.0	50	0	96.1	76-120	0			
1,1-Dichloroethene	43.76	5.0	50	0	87.5	73-124	0			
1,2-Dichloroethane	49.42	5.0	50	0	98.8	78-120	0			
2-Butanone	102.5	10	100	0	103	58-132	0			
2-Chloroethyl vinyl ether	ND	10	100	0	0	74-120	0			S
2-Hexanone	107.8	10	100	0	108	61-130	0			
4-Methyl-2-pentanone	105.3	10	100	0	105	65-127	0			
Acetone	100.7	10	100	3.737	97	59-137	0			
Benzene	46.44	5.0	50	0	92.9	73-121	0			
Bromodichloromethane	49.65	5.0	50	0	99.3	80-120	0			
Bromoform	49.32	5.0	50	0	98.6	79-120	0			
Bromomethane	52.71	5.0	50	0	105	66-137	0			
Carbon disulfide	86.56	10	100	0	86.6	68-141	0			
Carbon tetrachloride	45	5.0	50	0	90	75-124	0			
Chlorobenzene	46.09	5.0	50	0	92.2	80-120	0			
Chloroethane	43.6	5.0	50	0	87.2	76-121	0			
Chloroform	47.89	5.0	50	0	95.8	80-120	0			
Chloromethane	38.28	5.0	50	0	76.6	67-123	0			
cis-1,3-Dichloropropene	48.35	5.0	50	0	96.7	80-120	0			
Dibromochloromethane	50.05	5.0	50	0	100	80-120	0			
Ethylbenzene	46.95	5.0	50	0.1866	93.5	80-120	0			
m,p-Xylene	92.79	10	100	1.119	91.7	78-121	0			
Methylene chloride	46.72	10	50	0	93.4	65-133	0			
Styrene	44.75	5.0	50	0	89.5	80-120	0			
Tetrachloroethene	42.94	5.0	50	0	85.9	79-120	0			
Toluene	47.05	5.0	50	1.586	90.9	80-120	0			
trans-1,3-Dichloropropene	47.75	5.0	50	0	95.5	80-120	0			
Trichloroethene	46.39	5.0	50	0	92.8	80-120	0			
Vinyl acetate	102.3	10	100	0	102	67-139	0			
Vinyl chloride	41.12	2.0	50	0	82.2	70-127	0			
Xylenes, Total	138	15	150	1.119	91.3	80-120	0			
Surr: 1,2-Dichloroethane-d4	*54.66*	5.0	*50*	0	*109*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*55.17*	5.0	*50*	0	*110*	*72-125*	0			
Surr: Dibromofluoromethane	*55.4*	5.0	*50*	0	*111*	*71-125*	0			
Surr: Toluene-d8	*53.05*	5.0	*50*	0	*106*	*75-125*	0			

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: **R67271** Instrument ID **VOA1** Method: **SW8260**

MSD Sample ID: **0808627-06AMSD** Units: **µg/L** Analysis Date: **8/28/2008 03:29 PM**

Client ID: Run ID: **VOA1_080828A** SeqNo: **1480009** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	41.94	5.0	50	0	83.9	80-120	45.92	9.07	20	
1,1,2,2-Tetrachloroethane	53.17	5.0	50	0	106	72-120	49.08	8.01	20	
1,1,2-Trichloroethane	50.71	5.0	50	0	101	80-120	48.76	3.92	20	
1,1-Dichloroethane	46.4	5.0	50	0	92.8	76-120	48.06	3.51	20	
1,1-Dichloroethene	41.39	5.0	50	0	82.8	73-124	43.76	5.59	20	
1,2-Dichloroethane	48.13	5.0	50	0	96.3	78-120	49.42	2.64	20	
2-Butanone	112.5	10	100	0	113	58-132	102.5	9.3	20	
2-Chloroethyl vinyl ether	ND	10	100	0	0	74-120	0	0	20	S
2-Hexanone	111.1	10	100	0	111	61-130	107.8	2.99	20	
4-Methyl-2-pentanone	112.2	10	100	0	112	65-127	105.3	6.35	20	
Acetone	108.2	10	100	3.737	104	59-137	100.7	7.13	20	
Benzene	45.28	5.0	50	0	90.6	73-121	46.44	2.53	20	
Bromodichloromethane	46.83	5.0	50	0	93.7	80-120	49.65	5.84	20	
Bromoform	50.69	5.0	50	0	101	79-120	49.32	2.75	20	
Bromomethane	52.06	5.0	50	0	104	66-137	52.71	1.24	20	
Carbon disulfide	85.97	10	100	0	86	68-141	86.56	0.686	20	
Carbon tetrachloride	39.27	5.0	50	0	78.5	75-124	45	13.6	20	
Chlorobenzene	45.26	5.0	50	0	90.5	80-120	46.09	1.8	20	
Chloroethane	44.84	5.0	50	0	89.7	76-121	43.6	2.79	20	
Chloroform	46.93	5.0	50	0	93.9	80-120	47.89	2.04	20	
Chloromethane	36.88	5.0	50	0	73.8	67-123	38.28	3.71	20	
cis-1,3-Dichloropropene	47.49	5.0	50	0	95	80-120	48.35	1.8	20	
Dibromochloromethane	50.22	5.0	50	0	100	80-120	50.05	0.344	20	
Ethylbenzene	46.01	5.0	50	0.1866	91.7	80-120	46.95	2.02	20	
m,p-Xylene	91.92	10	100	1.119	90.8	78-121	92.79	0.938	20	
Methylene chloride	46.42	10	50	0	92.8	65-133	46.72	0.647	20	
Styrene	47.71	5.0	50	0	95.4	80-120	44.75	6.41	20	
Tetrachloroethene	40.18	5.0	50	0	80.4	79-120	42.94	6.65	20	
Toluene	47.34	5.0	50	1.586	91.5	80-120	47.05	0.612	20	
trans-1,3-Dichloropropene	47.04	5.0	50	0	94.1	80-120	47.75	1.5	20	
Trichloroethene	43.51	5.0	50	0	87	80-120	46.39	6.39	20	
Vinyl acetate	101.4	10	100	0	101	67-139	102.3	0.936	20	
Vinyl chloride	38.99	2.0	50	0	78	70-127	41.12	5.32	20	
Xylenes, Total	139.1	15	150	1.119	92	80-120	138	0.743	20	
Surr: 1,2-Dichloroethane-d4	*51.43*	5.0	*50*	0	*103*	*70-125*	54.66	*6.1*	*20*	
Surr: 4-Bromofluorobenzene	*53.63*	5.0	*50*	0	*107*	*72-125*	55.17	*2.83*	*20*	
Surr: Dibromofluoromethane	*53.49*	5.0	*50*	0	*107*	*71-125*	55.4	*3.51*	*20*	
Surr: Toluene-d8	*54.15*	5.0	*50*	0	*108*	*75-125*	53.05	*2.05*	*20*	

The following samples were analyzed in this batch: 0808447-01A

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R66876 Instrument ID WetChem Method: SW9040

LCS Sample ID: WLCSW1-082008-R66876 Units: pH units Analysis Date: 8/20/2008 04:00 PM

Client ID: Run ID: WETCHEM_080820G SeqNo: 1472036 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	6.04	0.10	6	0	101	90-110	0			

DUP Sample ID: 0808447-01CDUP Units: pH units Analysis Date: 8/20/2008 04:00 PM

Client ID: Injection Well Run ID: WETCHEM_080820G SeqNo: 1472039 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	7.32	0.10	0	0	0	0-0	7.29	0.411	20	H

The following samples were analyzed in this batch: 0808447-01C

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Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R66965 Instrument ID WetChem Method: SM2320B

MBLK Sample ID: WBLKW1-082108-R66965 Units: mg/L Analysis Date: 8/21/2008 05:30 PM

Client ID: Run ID: WETCHEM_080821I SeqNo: 1473296 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	ND	5.0								
Alkalinity, Carbonate (As CaCO3)	ND	5.0								
Alkalinity, Hydroxide (As CaCO3)	ND	5.0								
Alkalinity, Total (As CaCO3)	ND	5.0								

LCS Sample ID: WLCSW1-082108-R66965 Units: mg/L Analysis Date: 8/21/2008 05:30 PM

Client ID: Run ID: WETCHEM_080821I SeqNo: 1473297 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	1011	5.0	1000	0	101	80-120	0			
Alkalinity, Total (As CaCO3)	1011	5.0	1000	0	101	80-120	0			

DUP Sample ID: 0808436-02DDUP Units: mg/L Analysis Date: 8/21/2008 05:30 PM

Client ID: Run ID: WETCHEM_080821I SeqNo: 1473318 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	357	5.0	0	0	0	0-0	359	0.559	20	
Alkalinity, Carbonate (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	20	
Alkalinity, Hydroxide (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	20	
Alkalinity, Total (As CaCO3)	357	5.0	0	0	0	0-0	359	0.559	20	

The following samples were analyzed in this batch: 0808447-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R67012 Instrument ID ICS3000 Method: E300

MBLK Sample ID: **WBLKW1-082008-R67012** Units: mg/L Analysis Date: **8/20/2008 11:47 AM**
Client ID: Run ID: **ICS3000_080820A** SeqNo: **1474281** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	0.50								
Sulfate	ND	0.50								
Surr: Selenate (surr)	*5.084*	0.10	*5*	0	*102*	*85-115*	0			

LCS Sample ID: **WLCSW1-082008-R67012** Units: mg/L Analysis Date: **8/20/2008 12:10 PM**
Client ID: Run ID: **ICS3000_080820A** SeqNo: **1474282** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	19.88	0.50	20	0	99.4	90-110	0			
Sulfate	19.89	0.50	20	0	99.5	90-110	0			
Surr: Selenate (surr)	*4.925*	0.10	*5*	0	*98.5*	*85-115*	0			

MS Sample ID: **0808436-03DMS** Units: mg/L Analysis Date: **8/20/2008 01:46 PM**
Client ID: Run ID: **ICS3000_080820A** SeqNo: **1474286** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	79.05	0.50	10	71.12	79.3	80-120	0			SEO
Sulfate	68.28	0.50	10	60.14	81.4	80-120	0			EO
Surr: Selenate (surr)	*4.676*	0.10	*5*	0	*93.5*	*85-115*	0			

DUP Sample ID: **0808436-03DDUP** Units: mg/L Analysis Date: **8/20/2008 01:22 PM**
Client ID: Run ID: **ICS3000_080820A** SeqNo: **1474285** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	69.26	0.50	0	0	0	0-0	71.12	2.65	20	E
Sulfate	59.16	0.50	0	0	0	0-0	60.14	1.64	20	E
Surr: Selenate (surr)	*4.502*	0.10	*5*	0	*90*	*85-115*	4.576	*1.63*	*20*	

The following samples were analyzed in this batch: 0808447-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

lient: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R67013 Instrument ID Balance1 Method: E160.1 (Dissolve)

MBLK Sample ID: BLANK-R67013 Units: mg/L Analysis Date: 8/20/2008 04:00 PM
Client ID: Run ID: BALANCE1_080820E SeqNo: 1474298 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	ND	10								

LCS Sample ID: LCS-R67013 Units: mg/L Analysis Date: 8/20/2008 04:00 PM
Client ID: Run ID: BALANCE1_080820E SeqNo: 1474300 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	1038	10	1000	0	104	85-115	0			

DUP Sample ID: 0808424-02ADUP Units: mg/L Analysis Date: 8/20/2008 04:00 PM
Client ID: Run ID: BALANCE1_080820E SeqNo: 1474292 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	1508	10	0	0	0	0-0	1488	1.34	20	

The following samples were analyzed in this batch: 0808447-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

lient: Navajo Refining Company
Work Order: 0808447
Project: Injection Well Quarterly

QC BATCH REPORT

Batch ID: R67035 Instrument ID WetChem Method: E120.1

MBLK Sample ID: WBLKW1-082208-R67035 Units: µmhos/cm Analysis Date: 8/22/2008 04:00 PM
Client ID: Run ID: WETCHEM_080822C SeqNo: 1474821 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	ND	1.0								

LCS Sample ID: WLCSW1-082208-R67035 Units: µmhos/cm Analysis Date: 8/22/2008 04:00 PM
Client ID: Run ID: WETCHEM_080822C SeqNo: 1474822 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	1420	1.0	1413	0	100	80-120	0			

DUP Sample ID: 0808333-01CDUP Units: µmhos/cm Analysis Date: 8/22/2008 04:00 PM
Client ID: Run ID: WETCHEM_080822C SeqNo: 1474836 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	711	1.0	0	0	0	0-0	716	0.701	20	

DUP Sample ID: 0808447-01CDUP Units: µmhos/cm Analysis Date: 8/22/2008 04:00 PM
Client ID: Injection Well Run ID: WETCHEM_080822C SeqNo: 1474837 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	4690	1.0	0	0	0	0-0	4710	0.426	20	

The following samples were analyzed in this batch: 0808447-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

☐ ALS Laboratory Group
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

Chain of Custody Form

Page 1 of 1

☐ ALS Laboratory Group
3352 128th Ave.
Holland, MI 49424-9263
Tel: +1 616 399 6070
Fax: +1 616 399 6185

ALS Project Manager: | ALS Work Order #: 0808L17

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Injection Well Qrtly	A	VOC (8260) Select
Work Order		Project Number		B	SVOC (8270) Select
Company Name	Navajo Refining Company	Bill-to Company	Navajo Refining Company	C	Total Metals (6020/7000) Select
Send Report To	Aaron Strange	Invoice Attn	Aaron Strange	D	RCI Profile
Address	P.O. Box 159	Address	P.O. Box 159	E	Anions (300) Cl, SO4
				F	Alkalinity
City/State/Zip	Artesia, NM 88211	City/State/Zip	Artesia, NM 88211	G	pH
Phone	(505) 748-3311	Phone	(505) 748-3311	H	Conductivity
Fax	(505) 746-5421	Fax	(505) 746-5421	I	TDS
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	Injection Well	8/19/08	1130	L	Y	9	X	X	X	X	X	X	X	X	X		
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Aaron Strange | Shipment Method: Fed Ex | Required Turnaround Time: (Check Box) ☐ Other ☑ Std 10 WK Days ☐ 5 WK Days ☐ 2 WK Days ☐ 24 Hour | Results Due Date:

Relinquished by:	Date:	Time:	Received by:	Notes:
Aaron Strange	8/19/08	1615		10 Day TAT.
Relinquished by:	Date:	Time:	Received by (Laboratory):	
	8/20/8	8:55		

Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	Cooler ID	Cooler Temp.

QC Packages: (Check One Box Below)
☑ Level II Std QC ☐ TRRP Checklist
☐ Level III Std QC/Raw Data ☐ TRRP Level IV
☐ Level IV SW846/CLP
☐ Other

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Laboratory Group.
2. Unless otherwise agreed in a formal contract, services provided by ALS Laboratory Group are expressly limited to the terms and conditions stated on the reverse.

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ALS Group USA, Corp.

Sample Receipt Checklist

Client Name: NAVAJO REFINING

Date/Time Received: 8/20/2008 08:55

Work Order Number 0808442

Received by: RSZ

Checklist completed by Signature 8.2008 Date

Reviewed by Initials Date 8/20/08

Matrix: water

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	0.6c	002	
Cooler(s)/Kit(s):	0394		
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐

Adjusted? Checked by

Login Notes: Trip blank not on COC--logged in without analysis.

Client contacted: Date contacted: Person contacted

Contacted by: Regarding:

Comments:

Corrective Action

PURCHASE ORDER

The following number must appear on all related correspondence, shipping papers, and invoices:

P.O. NUMBER: 10-2114565

To: ALS Laboratory Group
3352 128th Ave.
Holland, MI 494249263
Ph: (616) 399-6070 Fax: (616) 399-6185

Bill To: ALS Group USA, Corp.
10450 Stancliff Rd, Suite 210
Houston, TX 77099
TEL 281-530-5656 FAX 281-530-5887

Ship To: ALS Laboratory Group
10450 Stancliff Rd, Suite 210

Houston, Texas 77099-4338
TEL (281) 530-5656 FAX (281) 530-5887

Acct #:

P.O. DATE	REQUISITIONER	Ship VIA	Department	TERMS
8/20/2008	rsanchez	UPS		NET 30

Item	Catalog No.	QTY	Unit Price	Total Price
Reactive Cyanide		2	$24.50	$49.00
Reactive Sulfide		2	$24.50	$49.00

Sales Tax:	$0.00
Shipping/Handling:	$0.00
Other:	$0.00
OrderAmount:	$98.00

Comments: 0808447

Authorized by 8/20/08 Date

Subcontractor:
ALS Laboratory Group
3352 128th Ave.
Holland, MI 49424
TEL: (616) 399-6070
FAX: (616) 399-6185
Acct #:

CHAIN-OF-CUSTODY RECORD

Date: 20-Aug-08
COC ID: 6639
Due Date 01-Sep-08

Customer Information		Project Information		Parameter/Method Request for Analysis
Purchase Order		Project Name	0808447	A Cyanide, Reactive (SW-846)
Work Order		Project Number		B Sulfide, Reactive (SW-846)
Company Name	ALS Group USA, Corp.	Bill To Company	ALS Group USA, Corp.	C
Send Report To	Jeffrey L Croston	Inv Attn	Accounts Payable	D
Address	10450 Stanciff Rd, Suite 210	Address	10450 Stanciff Rd, Suite 210	E
				F
City/State/Zip	Houston, Texas 77099-4338	City/State/Zip	Houston, Texas 77099-4338	G
Phone	(281) 530-5656	Phone	(281) 530-5656	H
Fax	(281) 530-5887	Fax	(281) 530-5887	I
eMail Address	jeff.croston@alsenviro.com	eMail CC	glenda.ramos@alsenviro.com	J

Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
0808447-01E (Injection Well)	Water	8/19/2008 11:30	(1) 1LPNEAT	X	X								

Comments:

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
					Std
Relinquished by:	Date/Time	Received by:	Date/Time		
	8/20/08				

ALS Laboratory Group

Date: 22-Aug-08

Client: ALS Laboratory Group
Project: 0808447
Work Order: 0808386

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0808386-01	0808447-01E	Water		8/19/2008 11:30	8/21/2008 14:10	☐

ALS Laboratory Group

Date: *22-Aug-08*

Client:	ALS Laboratory Group		
Project:	0808447	**Work Order:**	0808386
Sample ID:	0808447-01E	**Lab ID:**	0808386-01
Collection Date:	8/19/2008 11:30 AM	**Matrix:**	WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CYANIDE, REACTIVE			**EPA 7.3.3.2**			Analyst: **DB**
Cyanide, Reactive	ND		40.0	mg/Kg	1	8/22/2008
SULFIDE, REACTIVE			**EPA 7.3.4.2**			Analyst: **DB**
Sulfide, Reactive	ND		40.0	mg/Kg	1	8/22/2008

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	P - Dual Column results percent difference > 40%
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	H - Analyzed outside of Hold Time

ALS Laboratory Group

Client: ALS Laboratory Group
Work Order: 0808386
Project: 0808447

Date: *22-Aug-08*

QC BATCH REPORT

Batch ID: **R61249** Instrument ID **WETCHEM** Method: **EPA 7.3.4.2**

MBLK Sample ID: **WBLKS1-082208** Units: **mg/Kg** Analysis Date: **8/22/2008**

Client ID: Run ID: **WETCHEM_080822C** SeqNo: **1018085** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide, Reactive	ND	40								

The following samples were analyzed in this batch: 0808386-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: ALS Laboratory Group
Work Order: 0808386
Project: 0808447

QC BATCH REPORT

Batch ID: **R61250** Instrument ID **WETCHEM** Method: **EPA 7.3.3.2**

MBLK Sample ID: **WBLKS1-082208** Units: **mg/Kg** Analysis Date: **8/22/2008**
Client ID: Run ID: **WETCHEM_080822D** SeqNo: **1018091** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	ND	40								

LCS Sample ID: **WLCSS1-082208** Units: **mg/Kg** Analysis Date: **8/22/2008**
Client ID: Run ID: **WETCHEM_080822D** SeqNo: **1018092** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	278.9	40	250	0	112	75-125	0			

LCSD Sample ID: **WLCSDS1-082208** Units: **mg/Kg** Analysis Date: **8/22/2008**
Client ID: Run ID: **WETCHEM_080822D** SeqNo: **1018100** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	278.9	40	250	0	112	75-125	278.9	0	35	

MS Sample ID: **0808386-01A MS** Units: **mg/Kg** Analysis Date: **8/22/2008**
Client ID: **0808447-01E** Run ID: **WETCHEM_080822D** SeqNo: **1018096** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	249.6	40	250	0	99.8	50-150	0			

MSD Sample ID: **0808386-01A MSD** Units: **mg/Kg** Analysis Date: **8/22/2008**
Client ID: **0808447-01E** Run ID: **WETCHEM_080822D** SeqNo: **1018097** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	249.6	40	250	0	99.8	50-150	249.6	0	35	

The following samples were analyzed in this batch: 0808386-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

0808386

Subcontractor:
ALS Laboratory Group
3352 128th Ave.
Holland, MI 49424
TEL: (616) 399-6070
FAX: (616) 399-6185
Acct #:

CHAIN-OF-CUSTODY RECORD

Date: 20-Aug-08
COC ID: 6639
Due Date 01-Sep-08

Customer Information		Project Information		Parameter/Method Request for Analysis
Purchase Order		Project Name	0808447	A Cyanide, Reactive (SW-846)
Work Order		Project Number		B Sulfide, Reactive (SW-846)
Company Name	ALS Group USA, Corp.	Bill To Company	ALS Group USA, Corp.	C
Send Report To	Jeffrey L Croston	Inv Attn	Accounts Payable	D
Address	10450 Stancliff Rd, Suite 210	Address	10450 Stancliff Rd, Suite 210	E
				F
City/State/Zip	Houston, Texas 77099-4338	City/State/Zip	Houston, Texas 77099-4338	G
Phone	(281) 530-5656	Phone	(281) 530-5656	H
Fax	(281) 530-5887	Fax	(281) 530-5887	I
eMail Address	jeff.croston@alsenviro.com	eMail CC	glenda.ramos@alsenviro.com	J

Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
0808447-01E (Injection Well)	Water	8/19/2008 11:30	(1) 1LPNEAT	X	X								

Comments:

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
Relinquished by:	Date/Time	Received by:	Date/Time		Std
[signature]	8/20/08	[signature]	8/21/8 2:10p	[signature]	

ALS Laboratory Group

Sample Receipt Checklist

Client Name ELAB-HOU

Date/Time Received: 8/21/2008 14:10

Work Order Number 0808386

Received by: ARB

Checklist completed by _____ 8/21/8
Signature Date

Reviewed by _____ 8/22/08
Initials Date

Matrix: Water

Carrier name: UPS

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	3.1 C		
Cooler(s)/Kit(s):			
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐

Adjusted? _____ Checked by _____

Login Notes:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

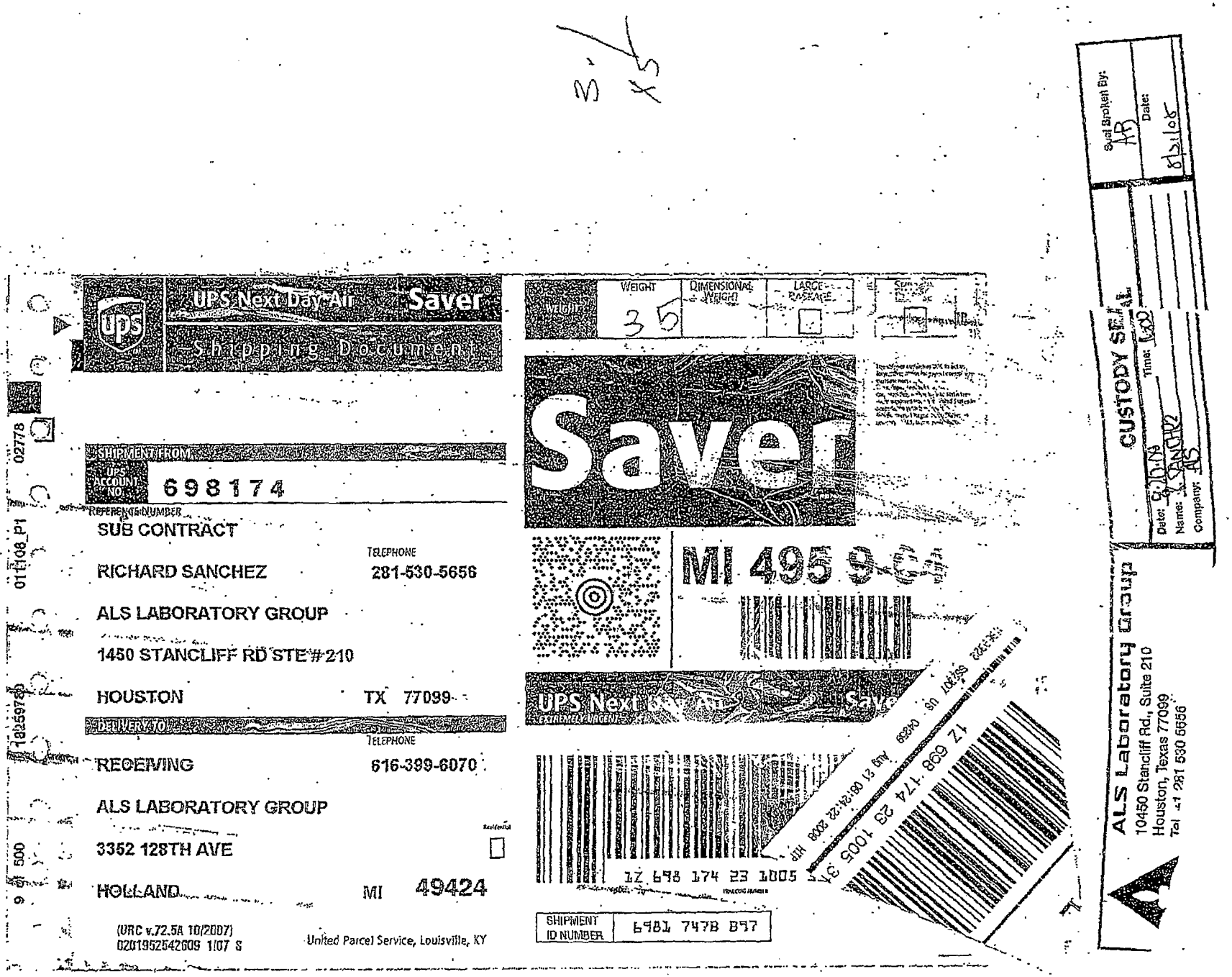
_____

_____

Corrective Action _____

_____

_____


UPS Next Day Air Saver
Shipping Document
WEIGHT
35
DIMENSIONAL WEIGHT
LARGE PACKAGE
Save
SHIPMENT FROM
UPS ACCOUNT NO.
698174
REFERENCE NUMBER
SUB CONTRACT
TELEPHONE
RICHARD SANCHEZ
281-530-5656
ALS LABORATORY GROUP
1450 STANCLIFF RD STE#210
HOUSTON
TX 77099
DELIVER TO
TELEPHONE
RECEIVING
616-399-6070
ALS LABORATORY GROUP
3352 128TH AVE
HOLLAND
MI 49424
MI 495
1Z 698 174 23 1005
SHIPMENT ID NUMBER
6481 747B B97
(ORC v.72.5A 10/2007)
0201952542609 1/07 S
United Parcel Service, Louisville, KY
CUSTODY SEAL
Seal Broken By:
Date:
Time:
Date:
Name:
Company:
ALS Laboratory Group
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel +1 281 530 5656

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25184 InstrumentID: VOA2

MSD Sample ID: 0412122-01AMSD Test Code: SW8260 Units: µg/L Analysis Date: 12/10/04 15:56

Client ID: Run ID: VOA2_041210A SeqNo: 586935 Prep Date: DF: 100

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	4901	500	5000	0	98	75.2-120	4798	2.14	20	
1,1,2,2-Tetrachloroethane	3673	500	5000	0	73.5	72.4-121	3949	7.23	20	
1,1,2-Trichloroethane	5074	500	5000	0	101	80-120	4942	2.63	20	
1,1-Dichloroethane	4943	500	5000	0	98.9	76.9-120	4844	2.02	20	
1,1-Dichloroethene	4860	500	5000	0	97.2	72.6-123	4755	2.18	20	
1,2-Dichloroethane	5155	500	5000	0	103	80-120	4962	3.81	20	
2-Butanone	11480	1,000	10000	0	115	69-131	11580	0.868	20	
2-Chloroethyl vinyl ether	8419	1,000	10000	0	84.2	60-135	8304	1.37	20	
2-Hexanone	11740	1,000	10000	0	117	55.6-126	11630	0.973	20	
4-Methyl-2-pentanone	11100	1,000	10000	0	111	67.4-121	11200	0.93	20	
Acetone	11240	1,000	10000	0	112	64.4-140	10640	5.48	20	
Benzene	5163	500	5000	0	103	80-120	4919	4.82	20	
Bromodichloromethane	5176	500	5000	0	104	80-120	4991	3.63	20	
Bromoform	5440	500	5000	0	109	77.9-121	5184	4.82	20	
Bromomethane	4925	500	5000	0	98.5	63.3-137	4562	7.66	20	
Carbon disulfide	9210	1,000	10000	0	92.1	74.1-123	9132	0.851	20	
Carbon tetrachloride	4749	500	5000	0	95	74.7-120	4713	0.763	20	
Chlorobenzene	4736	500	5000	0	94.7	80-120	4596	3.01	20	
Chloroethane	4762	500	5000	0	95.2	74.7-126	4625	2.92	20	
Chloroform	9470	500	5000	4602	97.4	80-120	8788	7.47	20	
Chloromethane	4892	500	5000	0	97.8	64.5-132	4632	5.45	20	
cis-1,3-Dichloropropene	5058	500	5000	0	101	80-120	4838	4.44	20	
Dibromochloromethane	5191	500	5000	0	104	80-120	4989	3.97	20	
Ethylbenzene	5207	500	5000	0	104	80-120	5104	1.99	20	
m,p-Xylene	10210	1,000	10000	0	102	80-120	9965	2.46	20	
Methylene chloride	4799	1,000	5000	0	96	76.2-120	4625	3.7	20	
Styrene	5332	500	5000	0	107	80-120	5121	4.03	20	
Tetrachloroethene	5155	500	5000	0	103	68.5-130	5010	2.85	20	
Toluene	5106	500	5000	0	102	80-120	4924	3.63	20	
trans-1,3-Dichloropropene	5390	500	5000	0	108	80-120	5349	0.761	20	
Trichloroethene	6591	500	5000	0	132	78.9-120	5895	11.2	20	S
Vinyl acetate	613	1,000	10000	0	6.13	62.4-133	1690	0	20	JS
Vinyl chloride	4832	200	5000	0	96.6	72.7-128	4609	4.73	20	
Xylenes, Total	15030	1,500	15000	0	100	80-120	14660	2.5	20	
Surr: 1,2-Dichloroethane-d4	4254	500	5000	0	85.1	71-126	4231	0.551	20	
Surr: 4-Bromofluorobenzene	4444	500	5000	0	88.9	74-125	4306	3.16	20	
Surr: Dibromofluoromethane	4082	500	5000	0	81.6	73-126	4042	0.978	20	
Surr: Toluene-d8	4509	500	5000	0	90.2	75-125	4389	2.69	20	

The following samples were analyzed in this batch: 0412005-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: **R24953** InstrumentID: **WetChem**

LCS Sample ID: **WLCSW1-120104** Test Code: **E150.1** Units: **pH units** Analysis Date: **12/01/04 0:00**
Client ID: Run ID: **WETCHEM_041201B** SeqNo: **581999** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	6.06	0.10	6	0	101	85-115	0			

DUP Sample ID: **0412005-01CDUP** Test Code: **E150.1** Units: **pH units** Analysis Date: **12/01/04 0:00**
Client ID: **Inj Wells** Run ID: **WETCHEM_041201B** SeqNo: **582003** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	7.17	0.10	0	0	0	0-0	7.19	0.279	20	

The following samples were analyzed in this batch: 0412005-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25032 InstrumentID: WetChem

MBLK Sample ID: WBLKW1-120304 Test Code: E120.1 Units: µmhos/cm Analysis Date: 12/03/04 0:00
Client ID: Run ID: WETCHEM_041203B SeqNo: 583600 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	ND	1.0								

LCS Sample ID: WLCSW1-120304 Test Code: E120.1 Units: µmhos/cm Analysis Date: 12/03/04 0:00
Client ID: Run ID: WETCHEM_041203B SeqNo: 583601 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	142	1.0	141.2	0	101	80-120	0			

DUP Sample ID: 0412005-01CDUP Test Code: E120.1 Units: µmhos/cm Analysis Date: 12/03/04 0:00
Client ID: Inj Wells Run ID: WETCHEM_041203B SeqNo: 583639 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	6390	1.0	0	0	0	0-0	6350	0.628	20	

The following samples were analyzed in this batch: 0412005-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25042 InstrumentID: WetChem

MBLK Sample ID: **WBLKW1-120304** Test Code: **E160.1** Units: **mg/L** Analysis Date: **12/03/04 0:00**
Client ID: Run ID: **WETCHEM_041203D** SeqNo: **583929** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	ND	10								

LCS Sample ID: **WLCSW1-120304** Test Code: **E160.1** Units: **mg/L** Analysis Date: **12/03/04 0:00**
Client ID: Run ID: **WETCHEM_041203D** SeqNo: **583930** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	992	10	1000	0	99.2	80-120	0			

DUP Sample ID: **0412038-01EDUP** Test Code: **E160.1** Units: **mg/L** Analysis Date: **12/03/04 0:00**
Client ID: Run ID: **WETCHEM_041203D** SeqNo: **583942** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	21880	10	0	0	0	0-0	21420	2.12	20	

The following samples were analyzed in this batch: 0412005-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25082 InstrumentID: WetChem

MBLK Sample ID: WBLKW1-120604 Test Code: E310.1 Units: mg/L Analysis Date: 12/06/04 0:00
Client ID: Run ID: WETCHEM_041206F SeqNo: 584614 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	ND	5.0								
Alkalinity, Carbonate (As CaCO3)	ND	5.0								
Alkalinity, Hydroxide (As CaCO3)	ND	5.0								
Alkalinity, Total (As CaCO3)	ND	5.0								

LCS Sample ID: WLCSW1-120604 Test Code: E310.1 Units: mg/L Analysis Date: 12/06/04 0:00
Client ID: Run ID: WETCHEM_041206F SeqNo: 584615 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	1000	5.0	0	0.9809	0	0-0	0			
Alkalinity, Carbonate (As CaCO3)	ND	5.0	0	0	0	0-0	0			
Alkalinity, Hydroxide (As CaCO3)	ND	5.0	0	0	0	0-0	0			
Alkalinity, Total (As CaCO3)	1000	5.0	1000	0	100	80-120	0			

LCSD Sample ID: WLCSDW1-12060 Test Code: E310.1 Units: mg/L Analysis Date: 12/06/04 0:00
Client ID: Run ID: WETCHEM_041206F SeqNo: 584638 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	961	5.0	0	0.9809	0	0-0	1000	3.98	0	
Alkalinity, Carbonate (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	0	
Alkalinity, Hydroxide (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	0	
Alkalinity, Total (As CaCO3)	961	5.0	1000	0	96.1	80-120	1000	3.98	20	

DUP Sample ID: 0411319-04CDUP Test Code: E310.1 Units: mg/L Analysis Date: 12/06/04 0:00
Client ID: Run ID: WETCHEM_041206F SeqNo: 584625 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	284	5.0	0	0	0	0-0	275	3.22	20	
Alkalinity, Carbonate (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	20	
Alkalinity, Hydroxide (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	20	
Alkalinity, Total (As CaCO3)	284	5.0	0	0	0	0-0	275	3.22	20	

The following samples were analyzed in this batch: 0412005-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

LIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: **R25133** InstrumentID: **IC201**

MBLK Sample ID: **WBLKW1-120804** Test Code: **E300** Units: **mg/L** Analysis Date: **12/09/04 0:01**
Client ID: Run ID: **IC201_041208A** SeqNo: **585675** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	0.50								
Sulfate	ND	1.0								
Surr: Dichloroacetic acid (surr)	4.97	0.10	5	0	99.4	80-120	0			

LCS Sample ID: **WLCSW1-120804** Test Code: **E300** Units: **mg/L** Analysis Date: **12/09/04 0:29**
Client ID: Run ID: **IC201_041208A** SeqNo: **585676** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	8.79	0.50	10	0	87.9	80-120	0			
Sulfate	9.07	1.0	10	0	90.7	80-120	0			
Surr: Dichloroacetic acid (surr)	5.03	0.10	5	0	101	80-120	0			

LCSD Sample ID: **WLCSDW1-12080** Test Code: **E300** Units: **mg/L** Analysis Date: **12/09/04 0:58**
Client ID: Run ID: **IC201_041208A** SeqNo: **585677** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	8.72	0.50	10	0	87.2	80-120	8.79	0.8	20	
Sulfate	9.25	1.0	10	0	92.5	80-120	9.07	1.97	20	
Surr: Dichloroacetic acid (surr)	5.07	0.10	5	0	101	80-120	5.03	0.792	20	

MS Sample ID: **0412109-01EMS** Test Code: **E300** Units: **mg/L** Analysis Date: **12/08/04 21:38**
Client ID: Run ID: **IC201_041208A** SeqNo: **585655** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	45.15	0.50	10	34.02	111	75-125	0			
Sulfate	25.12	1.0	10	14.39	107	75-125	0			
Surr: Dichloroacetic acid (surr)	5.04	0.10	5	0	101	80-120	0			

MSD Sample ID: **0412109-01EMSD** Test Code: **E300** Units: **mg/L** Analysis Date: **12/08/04 22:07**
Client ID: Run ID: **IC201_041208A** SeqNo: **585696** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	45.28	0.50	10	34.02	113	75-125	45.15	0.288	20	
Sulfate	25.1	1.0	10	14.39	107	75-125	25.12	0.0796	20	
Surr: Dichloroacetic acid (surr)	4.93	0.10	5	0	98.6	80-120	5.04	2.21	20	

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

LIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25133 InstrumentID: IC201

DUP Sample ID: 0412109-01EDUP Test Code: E300 Units: mg/L Analysis Date: 12/08/04 17:50

Client ID: Run ID: IC201_041208A SeqNo: 585641 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	33.91	0.50	0	0	0	0-0	34.02	0.324	20	
Sulfate	14.43	1.0	0	0	0	0-0	14.39	0.278	20	
Surr: Dichloroacetic acid (surr)	5.04	0.10	5	0	101	80-120	5.04	0	20	

The following samples were analyzed in this batch: 0412005-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

e-Lab
QUALITY - INTEGRITY - SERVICE

☐ e-Lab Analytical, Inc.
10450 Stancliff Rd. #210
Houston, Texas 77099
(Tel) 281.530.5656
(Fax) 281.530.5887

Chain of C tody Form

Page ____ of ____

☐ e-Lab Analytical, Inc.
3352 128th Avenue
Holland, Michigan 49424
(Tel) 616.399.6070
(Fax) 616.399.6185

e-Lab Project Manager:

e-Lab Work Order #: 1411005

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Injection Wells	A	VOC 8260
Work Order		Project Number		B	SVOC 8270
Company Name	Navajo Refining Company	Bill To Company	Navajo Refining Company	C	Total Metals 6020
Send Report To	Jeff Byrd	Invoice Attn	Jeff Byrd	D	RCI Profile
Address	PO Box 159	Address	PO Box 159	E	Anions: (Cl, SO4)
				F	Alkalinity
City/State/Zip	Artesia, NM 88211	City/State/Zip	Artesia, NM 88211	G	pH
Phone	(505) 748-3311	Phone	(505) 748-3311	H	Conductivity
Fax	(505) 746-5421	Fax	(505) 746-5421	I	TDS
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	Inj Well	11/30	0730	L	-	10	X	X	X	X	X	X	X	X	X		
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: [signature]

Shipment Method: FedEx

Required Turnaround Time: (Check Box) ☐ STD 10 WK Days ☐ 5 WK Days ☐ 2 WK Days ☐ 24 Hour ☐ Other Std TAT

Results Due Date:

Relinquished by: [signature]	Date: 11/30	Time: 0730	Received by:	Notes:	
Relinquished by:	Date:	Time:	Received by (Laboratory):	e-Lab Cooler ID	Cooler Temp
Logged by (Laboratory):	Date: 12/1/04	Time: 09:05	Checked by (Laboratory): [signature]		

QC Package: (Check One Box Below)
☑ Level II Std QC ☐ TRRP CheckList
☐ Level III Std QC/Raw Data ☐ TRRP Level IV
☐ Level IV SW846/CLP
☐ Other _____

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to e-Lab Analytical, Inc.

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e-Lab Analytical, Inc.

Sample Receipt Checklist

Client Name NAVAJO REFINING | Date/Time Received: 12/1/2004 9:05:00 AM

Work Order Number 0412005 | Received by: FSM

Checklist completed by [signature] 12/1/04 (Signature / Date) | Reviewed by [initials] 12/2/04 (Initials / Date)

Matrix: W | Carrier name FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	3.2c	002	
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐

Adjusted? _____ Checked by [initials]

Login Notes:

Any No and/or NA (not applicable) response must be detailed in the comments section below.

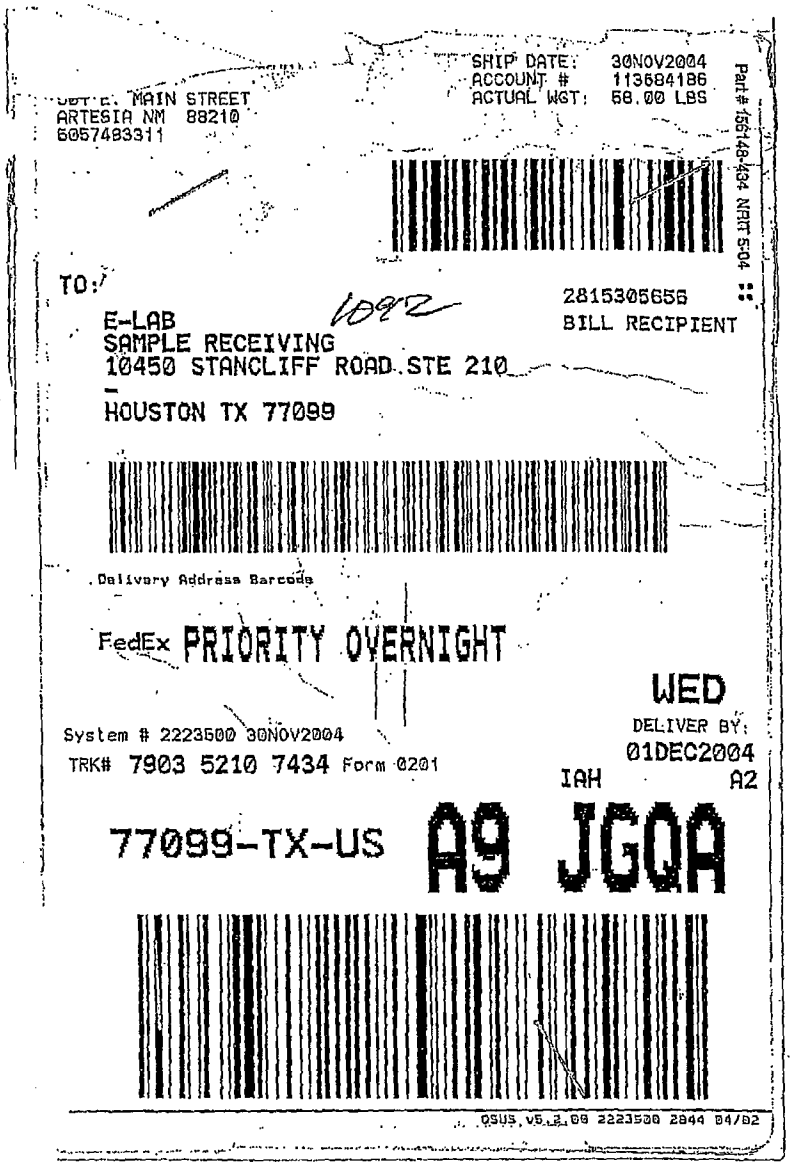
Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

W.O.# 041200E



SHIP DATE: 30NOV2004
ACCOUNT #: 113684186
ACTUAL WGT: 58.00 LBS

Part # 156148-434 NRIT 5/04

[illegible] MAIN STREET
ARTESIA NM 88210
6057483311

TO:

E-LAB
SAMPLE RECEIVING
10450 STANCLIFF ROAD STE 210
HOUSTON TX 77099

1092

2815305656
BILL RECIPIENT

Delivery Address Barcode

FedEx PRIORITY OVERNIGHT

WED
DELIVER BY:
01DEC2004

System # 2223500 30NOV2004
TRK# 7903 5210 7434 Form 0201

IAH A2

77099-TX-US A9 JGQA

QSUS,V5.2.00 2223500 2844 04/02

e-Lab Analytical, Inc

Date: *December 10, 2004*

CLIENT: e-Lab Analytical, Inc
Project: 0412005
Work Order: 0412024

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0412024-01	0412005-01E	Water		11/30/2004 07:30	12/2/2004 10:00	☐

e-Lab Analytical, Inc

Date: *December 10, 2004*

CLIENT: e-Lab Analytical, Inc
Project: 0412005
Work Order: 0412024

Lab ID: 0412024-01A
Client Sample ID: 0412005-01E
Collection Date: 11/30/2004 7:30:00 AM
Matrix: WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
CYANIDE, REACTIVE			**EPA 7.3.3.2**			Analyst: **BAT**
Cyanide, Reactive	ND	0.0300		mg/Kg	1	12/2/2004
FLASHPOINT, P-M CLOSED-CUP			**ASTM D93**			Analyst: **KAE**
Flashpoint, P-M Closed-cup	>196			°F	1	12/6/2004
SULFIDE, REACTIVE			**EPA 7.3.4.2**			Analyst: **BAT**
Sulfide, Reactive	ND	40.0		mg/Kg	1	12/2/2004

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- P - Dual Column results percent difference > 40%
- E - Value above quantitation range
- H - Analyzed outside of Hold Time

-Lab Analytical, Inc

CLIENT: e-Lab Analytical, Inc
Work Order: 0412024
Project: 0412005

Date: *Dec 10 2004*

QC BATCH REPORT

Batch ID: R25689 InstrumentID: WETCHEM

MBLK Sample ID: WBLKW1-041202 Test Code: EPA 7.3.4.2 Units: mg/Kg Analysis Date 12/02/04 0:00

Client ID: Run ID: WETCHEM_041202H SeqNo: 381679 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide, Reactive	ND	40								

The following samples were analyzed in this batch: 0412024-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

LIENT: e-Lab Analytical, Inc
Work Order: 0412024
Project: 0412005

QC BATCH REPORT

Batch ID: R25698 InstrumentID: WETCHEM

MBLK Sample ID: WBLKW1-041202 Test Code: EPA 7.3.3.2 Units: mg/Kg Analysis Date 12/02/04 0:00
Client ID: Run ID: WETCHEM_041202I SeqNo: 381814 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	ND	0.030								

LCS Sample ID: WLCSW1-041202 Test Code: EPA 7.3.3.2 Units: mg/Kg Analysis Date 12/02/04 0:00
Client ID: Run ID: WETCHEM_041202I SeqNo: 381815 Prep Date: DF: 2500

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	449.2	75	922	0	48.7	5-100		0		

The following samples were analyzed in this batch: 0412024-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: e-Lab Analytical, Inc
Work Order: 0412024
Project: 0412005

QC BATCH REPORT

Batch ID: R25752 InstrumentID: WETCHEM

LCS Sample ID: WLCSW1-120304 Test Code: ASTM D93 Units: °F Analysis Date 12/06/04 0:00
Client ID: Run ID: WETCHEM_041206G SeqNo: 382883 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Flashpoint, P-M Closed-cup	83	0	81	0	102	97-103	0	0	0	

The following samples were analyzed in this batch: 0412024-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

04/2024

Subcontractor:
e-Lab Analytical, Inc.
3352 128th Ave.
Holland, MI 49424
TEL: (616) 399-6070
FAX: (616) 399-6185
Acct #:

QUALITY · INTEGRITY · SERVICE

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Date: Dec 01, 2004
COC ID: 2225
Due Date: 12/13/2004

Customer Information		Project Information			Parameter/Method Request for Analysis
Purchase Order	2107246	Project Name	0412005	A	Cyanide, Reactive (SW-846)
Work Order		Project Number		B	Sulfide, Reactive (SW-846)
Company Name	e-Lab Analytical, Inc.	Bill To Company	e-Lab Analytical, Inc.	C	Flashpoint (SW1010)
Send Report To	Jeffrey L. Croston	Inv Attn	Accounts Payable	D	
Address	10450 Stancliff Rd, Suite 210	Address	10450 Stancliff Rd, Suite 210	E	
				F	
City/State/Zip	Houston, Texas 77099-4338	City/State/Zip	Houston, Texas 77099-4338	G	
Phone	(281) 530-5656	Phone	(281) 530-5656	H	
Fax	(281) 530-5887	Fax	(281) 530-5887	I	
eMail Address				J	

Sample ID	Matrix	Collection Date	Bottle	A	B	C	D	E	F	G	H	I	J
0412005-01E (Inj Wells)	Water	11/30/2004 7:30	(1) 1LPNEAT	X	X	X							

Comments:

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
	12/1/04 1105		12-2-04 10:00		Std
Relinquished by:	Date/Time	Received by:	Date/Time		

Signature | Date | Initials | Date

Matrix: Carrier name: UPS

Shipping container/cooler in good condition?	Yes	☑	No ☐	Not Present	☐
Custody seals intact on shipping container/cooler?	Yes	☑	No ☐	Not Present	☐
Custody seals intact on sample bottles?	Yes	☐	No ☐	Not Present	☑
Chain of custody present?	Yes	☑	No ☐		
Chain of custody signed when relinquished and received?	Yes	☑	No ☐		
Chain of custody agrees with sample labels?	Yes	☑	No ☐		
Samples in proper container/bottle?	Yes	☑	No ☐		
Sample containers intact?	Yes	☑	No ☐		
Sufficient sample volume for indicated test?	Yes	☑	No ☐		
All samples received within holding time?	Yes	☑	No ☐		
Container/Temp Blank temperature in compliance?	Yes	☑	No ☐		
Temperature(s)/Thermometer(s):	2.0C				
Water - VOA vials have zero headspace?	Yes	☐	No ☐	No VOA vials submitted	☑
Water - pH acceptable upon receipt?	Yes	☑	No ☐	N/A	☐

Adjusted? _____ Checked by

Login Notes

Any No and/or NA (not applicable) response must be detailed in the comments section below.

Client contacted: _____ Date contacted: _____ Person contacted: _____

Contacted by: _____ Regarding: _____

Comments: _____

_____

_____

Corrective Action: _____

_____

_____

UPS Next Day Air Saver

Shipping Document

SHIPMENT FROM

ACCOUNT NO.

REFERENCE NUMBER

DELIVERY TO

Saver

UPS Next Day Air Saver 1P

1P

1P

United Parcel Service, Louisville, KY

e-Lab, Inc.
10450 Stancliff Rd. Suite 210
Houston, Texas 77099
Tel. 281.530.5656
Fax. 281.530.5887

CUSTODY SEAL

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

17-Dec-08

Aaron Strange
Navajo Refining Company
PO Box 159
Artesia, NM 88211

Tel: (575) 746-5468
Fax: (575) 746-5421

Re: Injection Wells

Work Order : **0812122**

Dear Aaron,

ALS Laboratory Group received **1** sample on 12/4/2008 10:10 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Laboratory Group and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Laboratory Group. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 17.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

JayLynn F Thibault

Electronically approved by: Glenda H. Ramos

JayLynn F Thibault
Project Manager

ACCREDITED IN ACCORDANCE WITH nelac

Certificate No: T104704231-08-TX

ALS Laboratory Group

Date: 17-Dec-08

Client: Navajo Refining Company
Project: Injection Wells
Work Order: 0812122

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0812122-01	Effluent To Inj. Wells	Water		12/3/2008 15:25	12/4/2008 10:10	☐

ALS Laboratory Group

Date: *17-Dec-08*

Client: Navajo Refining Company
Project: Injection Wells
Sample ID: Effluent To Inj. Wells
Collection Date: 12/3/2008 03:25 PM

Work Order: 0812122
Lab ID: 0812122-01
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY			SW7470		Prep Date: 12/15/2008	Analyst: JCJ
Mercury	ND		0.000200	mg/L	1	12/15/2008 06:37 PM
METALS			SW6020		Prep Date: 12/8/2008	Analyst: ALR
Arsenic	0.103		0.00500	mg/L	1	12/9/2008 02:09 AM
Cadmium	ND		0.00200	mg/L	1	12/9/2008 02:09 AM
Chromium	ND		0.00500	mg/L	1	12/9/2008 02:09 AM
Copper	ND		0.00500	mg/L	1	12/9/2008 02:09 AM
Lead	ND		0.00500	mg/L	1	12/9/2008 02:09 AM
Molybdenum	0.0843		0.00500	mg/L	1	12/9/2008 02:09 AM
Nickel	0.00662		0.00500	mg/L	1	12/9/2008 02:09 AM
Selenium	0.653		0.0500	mg/L	10	12/10/2008 04:06 PM
Silver	ND		0.00500	mg/L	1	12/9/2008 02:09 AM
Zinc	0.0624		0.00500	mg/L	1	12/9/2008 02:09 AM
BOD			SM5210 B		Prep Date: 12/5/2008	Analyst: DM
Biochemical Oxygen Demand	48.4		2.00	mg/L	1	12/5/2008 03:00 PM
CYANIDE			M4500CN E&G			Analyst: KKP
Cyanide	0.0580		0.0200	mg/L	1	12/11/2008 03:00 PM
Cyanide, Amenable to Chlorination	ND		0.0200	mg/L	1	12/11/2008 03:00 PM
AMMONIA AS N			SM4500 NH3-B-F			Analyst: KKP
Nitrogen, Ammonia (as N)	24.3		0.625	mg/L	25	12/10/2008 01:00 PM
OIL AND GREASE			E1664			Analyst: MAM
Oil and Grease	6.00		2.00	mg/L	1	12/12/2008 03:00 PM
PHENOLICS			E420.1			Analyst: DM
Phenolics, Total Recoverable	0.665		0.0500	mg/L	1	12/15/2008 03:15 PM
TOTAL KJELDAHL L NITROGEN			M4500 NH3 D			Analyst: RPM
Nitrogen, Total Kjeldahl	28.2		1.00	mg/L	1	12/8/2008 07:00 AM
TOTAL SUSPENDED SOLIDS			M2540D			Analyst: TDW
Suspended Solids (Residue, Non-Filterable)	60.0		2.00	mg/L	1	12/8/2008 09:00 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
a - Not accredited
S - Spike Recovery outside accepted recovery limits
P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time
n - Not offered for accreditation

ALS Laboratory Group

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

Date: *17-Dec-08*

QC BATCH REPORT

Batch ID: **33311** Instrument ID **ICPMS02** Method: **SW6020**

MBLK Sample ID: **MBLKW3-120808-33311** Units: **mg/L** Analysis Date: **12/9/2008 02:22 PM**

Client ID: Run ID: **ICPMS02_081209A** SeqNo: **1555470** Prep Date: **12/8/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	ND	0.0050								
Cadmium	ND	0.0020								
Chromium	ND	0.0050								
Copper	ND	0.0050								
Lead	ND	0.0050								
Molybdenum	ND	0.0050								
Nickel	ND	0.0050								
Selenium	ND	0.0050								
Silver	ND	0.0050								
Zinc	0.002495	0.0050								J

LCS Sample ID: **MLCSW3-120808-33311** Units: **mg/L** Analysis Date: **12/9/2008 02:28 PM**

Client ID: Run ID: **ICPMS02_081209A** SeqNo: **1555471** Prep Date: **12/8/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.05244	0.0050	0.05	0	105	80-120	0			
Cadmium	0.05188	0.0020	0.05	0	104	80-120	0			
Chromium	0.0506	0.0050	0.05	0	101	80-120	0			
Copper	0.04657	0.0050	0.05	0	93.1	80-120	0			
Lead	0.0509	0.0050	0.05	0	102	80-120	0			
Molybdenum	0.05101	0.0050	0.05	0	102	80-120	0			
Nickel	0.05078	0.0050	0.05	0	102	80-120	0			
Selenium	0.05401	0.0050	0.05	0	108	80-120	0			
Silver	0.05068	0.0050	0.05	0	101	80-120	0			
Zinc	0.05208	0.0050	0.05	0	104	80-120	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: 33311 Instrument ID ICPMS02 Method: SW6020

MS Sample ID: 0812117-01CMS Units: mg/L Analysis Date: 12/9/2008 02:54 PM

Client ID: Run ID: ICPMS02_081209A SeqNo: 1555475 Prep Date: 12/8/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.05294	0.0050	0.05	0.001126	104	80-120	0			
Cadmium	0.0503	0.0020	0.05	0.0001897	100	80-120	0			
Chromium	0.05013	0.0050	0.05	0.001399	97.5	80-120	0			
Copper	0.04434	0.0050	0.05	0.0008793	86.9	80-120	0			
Lead	0.05066	0.0050	0.05	0.0005488	100	80-120	0			
Molybdenum	0.05264	0.0050	0.05	0.002014	101	80-120	0			
Nickel	0.04974	0.0050	0.05	0.004183	91.1	80-120	0			
Selenium	0.06171	0.0050	0.05	0.009191	105	80-120	0			
Silver	0.04861	0.0050	0.05	0.00006999	97.1	80-120	0			
Zinc	0.05362	0.0050	0.05	0.007323	92.6	80-120	0			

MSD Sample ID: 0812117-01CMSD Units: mg/L Analysis Date: 12/9/2008 03:00 PM

Client ID: Run ID: ICPMS02_081209A SeqNo: 1555476 Prep Date: 12/8/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.05573	0.0050	0.05	0.001126	109	80-120	0.05294	5.13	15	
Cadmium	0.04992	0.0020	0.05	0.0001897	99.5	80-120	0.0503	0.758	15	
Chromium	0.0525	0.0050	0.05	0.001399	102	80-120	0.05013	4.62	15	
Copper	0.04488	0.0050	0.05	0.0008793	88	80-120	0.04434	1.21	15	
Lead	0.0503	0.0050	0.05	0.0005488	99.5	80-120	0.05066	0.713	15	
Molybdenum	0.05296	0.0050	0.05	0.002014	102	80-120	0.05264	0.606	15	
Nickel	0.04983	0.0050	0.05	0.004183	91.3	80-120	0.04974	0.181	15	
Selenium	0.06479	0.0050	0.05	0.009191	111	80-120	0.06171	4.87	15	
Silver	0.04952	0.0050	0.05	0.00006999	98.9	80-120	0.04861	1.85	15	
Zinc	0.05265	0.0050	0.05	0.007323	90.7	80-120	0.05362	1.83	15	

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: 33311 Instrument ID ICPMS02 Method: SW6020

DUP Sample ID: 0812117-01CDUP Units: mg/L Analysis Date: 12/9/2008 02:41 PM

Client ID: Run ID: ICPMS02_081209A SeqNo: 1555473 Prep Date: 12/8/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.00128	0.0050	0	0	0	0-0	0.001126	0	25	J
Cadmium	ND	0.0020	0	0	0	0-0	0.0001897	0	25	
Chromium	0.001442	0.0050	0	0	0	0-0	0.001399	0	25	J
Copper	0.001068	0.0050	0	0	0	0-0	0.0008793	0	25	J
Lead	ND	0.0050	0	0	0	0-0	0.0005488	0	25	
Molybdenum	0.002052	0.0050	0	0	0	0-0	0.002014	0	25	J
Nickel	0.002117	0.0050	0	0	0	0-0	0.004183	0	25	J
Selenium	0.008773	0.0050	0	0	0	0-0	0.009191	4.65	25	
Silver	ND	0.0050	0	0	0	0-0	0.00006999	0	25	
Zinc	0.007153	0.0050	0	0	0	0-0	0.007323	2.35	25	

The following samples were analyzed in this batch: 0812122-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: 33455 Instrument ID Mercury Method: SW7470

MBLK Sample ID: GBLKW2-121508-33455 Units: mg/L Analysis Date: 12/15/2008 05:31 PM
Client ID: Run ID: MERCURY_081215C SeqNo: 1559517 Prep Date: 12/15/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020								

LCS Sample ID: GLCSW2-121508-33455 Units: mg/L Analysis Date: 12/15/2008 05:33 PM
Client ID: Run ID: MERCURY_081215C SeqNo: 1559518 Prep Date: 12/15/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00495	0.00020	0.005	0	99	85-115	0			

MS Sample ID: 0812097-01BMS Units: mg/L Analysis Date: 12/15/2008 06:12 PM
Client ID: Run ID: MERCURY_081215C SeqNo: 1559840 Prep Date: 12/15/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00517	0.00020	0.005	-0.000028	104	85-115	0			

MSD Sample ID: 0812097-01BMSD Units: mg/L Analysis Date: 12/15/2008 06:14 PM
Client ID: Run ID: MERCURY_081215C SeqNo: 1559843 Prep Date: 12/15/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00525	0.00020	0.005	-0.000028	106	85-115	0.00517	1.54	20	

DUP Sample ID: 0812097-01BDUP Units: mg/L Analysis Date: 12/15/2008 06:10 PM
Client ID: Run ID: MERCURY_081215C SeqNo: 1559837 Prep Date: 12/15/2008 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020	0	0	0	0-0	-0.000028	0	20	

The following samples were analyzed in this batch: 0812122-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: **33290** Instrument ID **WetChem** Method: **SM5210 B**

MBLK Sample ID: **WBLKW1-120508-33290** Units: **mg/L** Analysis Date: **12/5/2008 01:00 PM**
Client ID: Run ID: **WETCHEM_081210E** SeqNo: **1556302** Prep Date: **12/5/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Biochemical Oxygen Demand	ND	2.0								

LCS Sample ID: **WLCSW1-120508-33290** Units: **mg/L** Analysis Date: **12/5/2008 01:00 PM**
Client ID: Run ID: **WETCHEM_081210E** SeqNo: **1556303** Prep Date: **12/5/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Biochemical Oxygen Demand	193.3	2.0	198	0	97.6	85-115	0			

LCSD Sample ID: **WLCSDW1-120508-33290** Units: **mg/L** Analysis Date: **12/5/2008 01:00 PM**
Client ID: Run ID: **WETCHEM_081210E** SeqNo: **1556307** Prep Date: **12/5/2008** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Biochemical Oxygen Demand	192.8	2.0	198	0	97.4	85-115	0			

DUP Sample ID: **0812114-01HDUP** Units: **mg/L** Analysis Date: **12/5/2008 01:00 PM**
Client ID: Run ID: **WETCHEM_081210E** SeqNo: **1556306** Prep Date: **12/5/2008** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Biochemical Oxygen Demand	982.8	20	0	0	0	0-0	985.8	0.305	20	

The following samples were analyzed in this batch: 0812122-01B

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: R70944 Instrument ID WetChem Method: M4500 NH3 D

MBLK	Sample ID: WBLKW1-120808-R70944				Units: mg/L			Analysis Date: 12/8/2008 07:00 AM			
Client ID:		Run ID: WETCHEM_081208C			SeqNo: 1554324		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Nitrogen, Total Kjeldahl	ND	1.0									

LCS	Sample ID: WLCSW1-120808-R70944				Units: mg/L			Analysis Date: 12/8/2008 07:00 AM			
Client ID:		Run ID: WETCHEM_081208C			SeqNo: 1554325		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Nitrogen, Total Kjeldahl	20.2	1.0	20	0	101	80-120	0				

MS	Sample ID: 0812027-02IMS				Units: mg/L			Analysis Date: 12/8/2008 07:00 AM			
Client ID:		Run ID: WETCHEM_081208C			SeqNo: 1554329		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Nitrogen, Total Kjeldahl	20	1.0	20	1.526	92.4	75-125	0				

DUP	Sample ID: 0812027-02IDUP				Units: mg/L			Analysis Date: 12/8/2008 07:00 AM			
Client ID:		Run ID: WETCHEM_081208C			SeqNo: 1554328		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Nitrogen, Total Kjeldahl	1.516	1.0	0	0	0	0-0	1.526	0.657	20		

The following samples were analyzed in this batch: 0812122-01G

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: R70952 Instrument ID Balance1 Method: M2540D

MBLK	Sample ID: BLANK-R70952				Units: mg/L			Analysis Date: 12/8/2008 09:00 PM			
Client ID:		Run ID: BALANCE1_081208A			SeqNo: 1554423		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Suspended Solids (Residue, Non-Fi	ND	2.0									

LCS	Sample ID: LCS-R70952				Units: mg/L			Analysis Date: 12/8/2008 09:00 PM			
Client ID:		Run ID: BALANCE1_081208A			SeqNo: 1554424		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Suspended Solids (Residue, Non-Fi	94	2.0	100	0	94	78-120	0				

DUP	Sample ID: 0812145-01ADUP				Units: mg/L			Analysis Date: 12/8/2008 09:00 PM			
Client ID:		Run ID: BALANCE1_081208A			SeqNo: 1554417		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Suspended Solids (Residue, Non-Fi	70	2.0	0	0	0	0-0	69	1.44	20		

The following samples were analyzed in this batch: 0812122-01D

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: R71045 Instrument ID UV-2450 Method: SM4500 NH3-

MBLK Sample ID: WBLKW1-121008-R71045 Units: mg/L Analysis Date: 12/10/2008 01:00 PM
Client ID: Run ID: UV-2450_081210A SeqNo: 1556194 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (as N)	ND	0.025								

LCS Sample ID: WLCSW1-121008-R71045 Units: mg/L Analysis Date: 12/10/2008 01:00 PM
Client ID: Run ID: UV-2450_081210A SeqNo: 1556195 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (as N)	0.192	0.025	0.2	0	96	80-120	0			

MS Sample ID: 0812086-01BMS Units: mg/L Analysis Date: 12/10/2008 01:00 PM
Client ID: Run ID: UV-2450_081210A SeqNo: 1556201 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (as N)	0.363	0.025	0.2	0.176	93.5	80-120	0			

DUP Sample ID: 0812086-01BDUP Units: mg/L Analysis Date: 12/10/2008 01:00 PM
Client ID: Run ID: UV-2450_081210A SeqNo: 1556200 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (as N)	0.173	0.025	0	0	0	0-0	0.176	1.72	20	

The following samples were analyzed in this batch: 0812122-01G

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: R71097 Instrument ID UV-2450 Method: M4500CN E&

MBLK Sample ID: WBLKW1-121108-R71097 Units: mg/L Analysis Date: 12/11/2008 03:00 PM

Client ID: Run ID: UV-2450_081211A SeqNo: 1557039 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide	ND	0.020								
Cyanide, Amenable to Chlorination	ND	0.020								

LCS Sample ID: WLCSW1-121108-R71097 Units: mg/L Analysis Date: 12/11/2008 03:00 PM

Client ID: Run ID: UV-2450_081211A SeqNo: 1557040 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide	0.193	0.020	0.2	0	96.5	80-120	0			

MS Sample ID: 0812191-01BMS Units: mg/L Analysis Date: 12/11/2008 03:00 PM

Client ID: Run ID: UV-2450_081211A SeqNo: 1557050 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide	0.185	0.020	0.2	0.001	92	80-120	0			

DUP Sample ID: 0812191-01BDUP Units: mg/L Analysis Date: 12/11/2008 03:00 PM

Client ID: Run ID: UV-2450_081211A SeqNo: 1557049 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide	ND	0.020	0	0	0	0-0	0.001	0	20	
Cyanide, Amenable to Chlorination	ND	0.020	0	0	0	0-0	0	0	0	

The following samples were analyzed in this batch: 0812122-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: R71172 Instrument ID WetChem Method: E1664

MBLK Sample ID: WBLKW1-121208-R71172 Units: mg/L Analysis Date: 12/12/2008 03:00 PM

Client ID: Run ID: WETCHEM_081212F SeqNo: 1558390 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	ND	2.0								

LCS Sample ID: WLCSW1-121208-R71172 Units: mg/L Analysis Date: 12/12/2008 03:00 PM

Client ID: Run ID: WETCHEM_081212F SeqNo: 1558391 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	36.3	2.0	40	0	90.8	80-120	0			

DUP Sample ID: 0812073-02BDUP Units: mg/L Analysis Date: 12/12/2008 03:00 PM

Client ID: Run ID: WETCHEM_081212F SeqNo: 1558402 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	2.5	2.0	0	0	0	0-0	3	18.2	20	

The following samples were analyzed in this batch: 0812122-01E

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

Client: Navajo Refining Company
Work Order: 0812122
Project: Injection Wells

QC BATCH REPORT

Batch ID: R71220 Instrument ID UV-2450 Method: E420.1

MBLK Sample ID: WBLKW1-121508-R71220 Units: mg/L Analysis Date: 12/15/2008 03:15 PM
Client ID: Run ID: UV-2450_081215A SeqNo: 1559301 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phenolics, Total Recoverable	ND	0.050								

LCS Sample ID: WLCSW1-121508-R71220 Units: mg/L Analysis Date: 12/15/2008 03:15 PM
Client ID: Run ID: UV-2450_081215A SeqNo: 1559302 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phenolics, Total Recoverable	0.519	0.050	0.5	0	104	80-120	0			

MS Sample ID: 0812219-01BMS Units: mg/L Analysis Date: 12/15/2008 03:15 PM
Client ID: Run ID: UV-2450_081215A SeqNo: 1559316 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phenolics, Total Recoverable	0.53	0.050	0.5	0.021	102	80-120	0			

DUP Sample ID: 0812219-01BDUP Units: mg/L Analysis Date: 12/15/2008 03:15 PM
Client ID: Run ID: UV-2450_081215A SeqNo: 1559315 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phenolics, Total Recoverable	0.028	0.050	0	0	0	0-0	0.021	0	20	J

The following samples were analyzed in this batch: 0812122-01F

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range



☐ e-Lab Analytical, Inc.
10450 Stancliff Rd. #210
Houston, Texas 77099
(Tel) 281.530.5656
(Fax) 281.530.5887

Chain of Custody Form

Page 1 of 1

The Chain of Custody is a Legal Document. All information must be completed accurately.

☐ e-Lab Analytical, Inc.
3352 128th Avenue
Holland, Michigan 49424
(Tel) 616.399.6070
(Fax) 616.399.6185

e-Lab Project Manager:

e-Lab Work Order: 08122

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order:		Project Name:	Injection Wells	A	—
Work Order:		Project Number:		B	
Company Name:	Navajo Refining Co	Bill To Company:		C	
Send Report To:	Aaron Strange	Invoice Attn:		D	
Address:	P.O. Box 159	Address:		E	
				F	
City/State/Zip:	Artesia NM 88210	City/State/Zip:		G	
Phone:	575-748-3311	Phone:		H	
Fax:	575-746-5421	Fax:		I	
e-Mail Address:		e-Mail Address:		J	

No.	Sample Description	Date	Time	Matrix	Pres.	Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	Effluent To Inj. Wells	12/3/08	1525	L	Y	7	X										
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Aaron Strange

Shipment Method: Fed Ex

Required Turnaround Time: (Check Box) ☐ STD 10 Wk Days ☐ 5 Wk Days ☐ 2 Wk Days ☐ 24 Hour ☐ Other

Results Due Date:

Relinquished by:	Date:	Time:	Received by:	Notes:
Aaron Strange	12/3/08	1615		
Relinquished by:	Date:	Time:	Received by (Laboratory): 12/4/08 1010	

Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	e-Lab Analytical Cooler ID:	Trip Blank Number:

QC Package: (Check One Box Below)
☐ Level II Std QC ☐ TRRP Checklist
☐ Level III Std QC/Raw Data ☐ TRRP Level IV
☐ Level IV SW846/CLP
☐ Other

Preservative Key: 1-HCl; 2-HNO$_3$; 3-H$_2$SO$_4$; 4-NaOH; 5-Na$_2$S$_2$O$_3$; 6-NaHSO$_4$; 7-Other; 8-4°C; 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to e-Lab Analytical, Inc.
2. Unless otherwise agreed in a formal contract, services provided by e-Lab Analytical, Inc. are expressly limited to the terms and conditions stated on the reverse.

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ALS Laboratory Group

Sample Receipt Checklist

Client Name: NAVAJO REFINING

Date/Time Received: 12/4/2008 10:10

Work Order Number 0812122

Received by: RNG

Checklist completed by Signature 12/5/08 Date

Reviewed by Initials Date 12/7/08

Matrix: Water

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ✓	No	Not Present
Custody seals intact on shipping container/cooler?	Yes ✓	No	Not Present
Custody seals intact on sample bottles?	Yes	No	Not Present ✓
Chain of custody present?	Yes ✓	No	
Chain of custody signed when relinquished and received?	Yes ✓	No	
Chain of custody agrees with sample labels?	Yes ✓	No	
Samples in proper container/bottle?	Yes ✓	No	
Sample containers intact?	Yes ✓	No	
Sufficient sample volume for indicated test?	Yes ✓	No	
All samples received within holding time?	Yes ✓	No	
Container/Temp Blank temperature in compliance?	Yes ✓	No	
Temperature(s)/Thermometer(s):	3.3c	002	
Cooler(s)/Kit(s):			
Water - VOA vials have zero headspace?	Yes	No	No VOA vials submitted ✓
Water - pH acceptable upon receipt?	Yes ✓	No	N/A

Adjusted? Checked by

Login Notes:

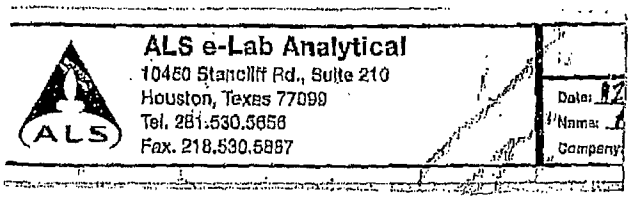
Client contacted: Date contacted: Person contacted

Contacted by: Regarding:

Comments:

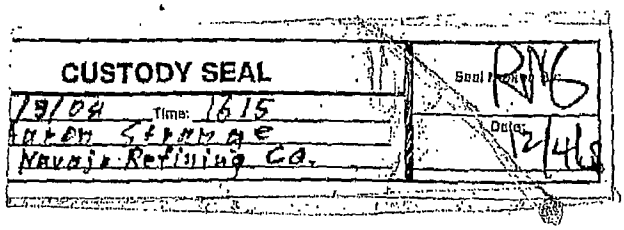
Corrective Action

W10#C812122



ALS e-Lab Analytical
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. 281.530.5656
Fax. 218.530.5887

Date: 12
Name:
Company:



CUSTODY SEAL
Seal Number: RNG
12/08 Time: 1615
Date: 12/4/8
Anton Stamps
Navajo Refining Co.

e-Lab Analytical, Inc.

10450 Stancliff Rd, Suite 210 Houston, Texas 77099-4338 281-530-5656 Fax 281-530-5887

July 23, 2004

Darrell Moore
Navajo Refining Company
P.O. Box 159
Artesia, New Mexico 88211

Tel: (505) 746-5281
Fax: (505) 746-5421

Re: Injection Wells

Work Order : **0407074**

Dear Darrell Moore,

e-Lab Analytical, Inc. received 2 samples on 7/8/2004 8:40:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by e-Lab Analytical, Inc. and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by e-Lab Analytical, Inc. The total number of pages in this report is 38.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Jeffrey L Croston

Electronically approved by: Patrina A. Dathorne

Jeffrey L Croston

e-Lab Analytical, Inc.

Date: *July 23, 2004*

CLIENT: Navajo Refining Company
Project: Injection Wells
Work Order: 0407074

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0407074-01	Inj Wells	Water		7/7/2004 09:00	7/8/2004 08:40	☐
0407074-02	Trip Blank	Water		7/7/2004	7/8/2004 08:40	☐

e-Lab Analytical, Inc. **Date:** *July 23, 2004*

CLIENT:	Navajo Refining Company
Project:	Injection Wells
Work Order:	0407074

Case Narrative

Semivolatile (sample Inj. Wells) Surrogates were outside of control limits due to a matrix interference. Sample was re-extracted and re-analyzed and surrogates recoveries were confirmed.

Batch 9539 Metals MS/MSD was an unrelated sample.

e-Lab Analytical, Inc.

Date: *July 23, 2004*

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells
Lab ID: 0407074-01

Client Sample ID: Inj Wells
Collection Date: 7/7/2004 9:00:00 AM
Matrix: WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
MERCURY, TOTAL		**SW7470**			Prep Date: **7/17/2004**	Analyst: **JCJ**
Mercury	ND	0.000200		mg/L	1	7/17/2004 6:08:25 PM
ICP METALS, TOTAL		**SW6020**			Prep Date: **7/9/2004**	Analyst: **ALR**
Aluminum	0.556	0.100		mg/L	10	7/9/2004 10:24:00 PM
Arsenic	0.171	0.0500		mg/L	10	7/9/2004 10:24:00 PM
Barium	0.0354	0.0100		mg/L	2	7/23/2004 2:11:00 PM
Beryllium	ND	0.00400		mg/L	2	7/23/2004 12:23:00 AM
Boron	0.240	0.200		mg/L	10	7/9/2004 10:24:00 PM
Cadmium	ND	0.00200		mg/L	2	7/23/2004 2:11:00 PM
Calcium	216	25.0		mg/L	50	7/9/2004 9:39:00 PM
Chromium	0.00818	0.00400		mg/L	2	7/23/2004 12:23:00 AM
Cobalt	ND	0.00400		mg/L	2	7/23/2004 12:23:00 AM
Copper	0.00655	0.00400		mg/L	2	7/23/2004 12:23:00 AM
Iron	4.42	0.400		mg/L	2	7/23/2004 12:23:00 AM
Lead	ND	0.0100		mg/L	2	7/23/2004 2:11:00 PM
Magnesium	34.1	2.00		mg/L	10	7/9/2004 10:24:00 PM
Manganese	0.116	0.0100		mg/L	2	7/23/2004 12:23:00 AM
Molybdenum	ND	0.0100		mg/L	2	7/23/2004 12:23:00 AM
Nickel	0.0195	0.0100		mg/L	2	7/23/2004 12:23:00 AM
Potassium	24.9	0.400		mg/L	2	7/23/2004 12:23:00 AM
Selenium	0.432	0.0500		mg/L	10	7/9/2004 10:24:00 PM
Silver	ND	0.0100		mg/L	2	7/23/2004 2:11:00 PM
Sodium	1,580	10.0		mg/L	50	7/9/2004 9:39:00 PM
Vanadium	ND	0.0100		mg/L	2	7/23/2004 12:23:00 AM
Zinc	0.0677	0.0100		mg/L	2	7/23/2004 12:23:00 AM
SEMIVOLATILE ORGANICS BY GC/MS		**SW8270**			Prep Date: **7/12/2004**	Analyst: **HV**
1,2,4-Trichlorobenzene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
2,4,5-Trichlorophenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
2,4,6-Trichlorophenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
2-Methylnaphthalene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
2-Methylphenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
2-Nitroaniline	ND	12		µg/L	1	7/15/2004 1:53:00 AM
2-Nitrophenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
3-Nitroaniline	ND	12		µg/L	1	7/15/2004 1:53:00 AM
4-Methylphenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
4-Nitroaniline	ND	12		µg/L	1	7/15/2004 1:53:00 AM
4-Nitrophenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Acenaphthene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Acenaphthylene	ND	12		µg/L	1	7/15/2004 1:53:00 AM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time

e-Lab Analytical, Inc.

Date: *July 23, 2004*

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells
Lab ID: 0407074-01

Client Sample ID: Inj Wells
Collection Date: 7/7/2004 9:00:00 AM
Matrix: WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
Aniline	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Anthracene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Benz(a)anthracene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Benzidine	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Hexachloroethane	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Indeno(1,2,3-cd)pyrene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Isophorone	ND	12		µg/L	1	7/15/2004 1:53:00 AM
N-Nitrosodi-n-propylamine	ND	12		µg/L	1	7/15/2004 1:53:00 AM
N-Nitrosodimethylamine	ND	12		µg/L	1	7/15/2004 1:53:00 AM
N-Nitrosodiphenylamine	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Naphthalene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Nitrobenzene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Pentachlorophenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Phenanthrene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Phenol	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Pyrene	ND	12		µg/L	1	7/15/2004 1:53:00 AM
Surr: 2,4,6-Tribromophenol	28.6	39-153	S	%REC	1	7/15/2004 1:53:00 AM
Surr: 2-Fluorobiphenyl	45.7	40-147		%REC	1	7/15/2004 1:53:00 AM
Surr: 2-Fluorophenol	12.1	21-110	S	%REC	1	7/15/2004 1:53:00 AM
Surr: 4-Terphenyl-d14	40.9	39-141		%REC	1	7/15/2004 1:53:00 AM
Surr: Nitrobenzene-d5	40.8	37-140		%REC	1	7/15/2004 1:53:00 AM
Surr: Phenol-d6	7.92	11-100	S	%REC	1	7/15/2004 1:53:00 AM
VOLATILES BY GC/MS		**SW8260**				Analyst: PC
1,1,1-Trichloroethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
1,1,2-Trichloroethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
1,1-Dichloroethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
1,1-Dichloroethene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
1,2-Dichloroethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
2-Butanone	16	10		µg/L	1	7/19/2004 2:58:00 PM
2-Chloroethyl vinyl ether	ND	10		µg/L	1	7/19/2004 2:58:00 PM
2-Hexanone	ND	10		µg/L	1	7/19/2004 2:58:00 PM
4-Methyl-2-pentanone	ND	10		µg/L	1	7/19/2004 2:58:00 PM
Acetone	87	10		µg/L	1	7/19/2004 2:58:00 PM
Benzene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Bromodichloromethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Bromoform	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Bromomethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Carbon disulfide	ND	10		µg/L	1	7/19/2004 2:58:00 PM
Carbon tetrachloride	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time

e-Lab Analytical, Inc.

Date: *July 23, 2004*

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells
Lab ID: 0407074-01

Client Sample ID: Inj Wells
Collection Date: 7/7/2004 9:00:00 AM
Matrix: WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
Chlorobenzene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Chloroethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Chloroform	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Chloromethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
cis-1,3-Dichloropropene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Dibromochloromethane	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Ethylbenzene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
m,p-Xylene	ND	10		µg/L	1	7/19/2004 2:58:00 PM
Methylene chloride	ND	10		µg/L	1	7/19/2004 2:58:00 PM
Styrene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Tetrachloroethene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Toluene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
trans-1,3-Dichloropropene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Trichloroethene	ND	5.0		µg/L	1	7/19/2004 2:58:00 PM
Vinyl acetate	ND	10		µg/L	1	7/19/2004 2:58:00 PM
Vinyl chloride	ND	2.0		µg/L	1	7/19/2004 2:58:00 PM
Xylenes, Total	ND	15		µg/L	1	7/19/2004 2:58:00 PM
Surr: 1,2-Dichloroethane-d4	85.9	71-126		%REC	1	7/19/2004 2:58:00 PM
Surr: 4-Bromofluorobenzene	93.8	74-125		%REC	1	7/19/2004 2:58:00 PM
Surr: Dibromofluoromethane	89.3	73-126		%REC	1	7/19/2004 2:58:00 PM
Surr: Toluene-d8	89.9	75-125		%REC	1	7/19/2004 2:58:00 PM
FLASHPOINT		**SW1010**				Analyst: **MAG**
Ignitability	>200	50		°F	1	7/16/2004
CYANIDE, REACTIVE		**SW-846**				Analyst: **MAG**
Reactive Cyanide	ND	0.0300		mg/L	1	7/16/2004
SULFIDE, REACTIVE		**SW-846**				Analyst: **MAG**
Reactive Sulfide	ND	40.0		mg/L	1	7/16/2004
ANIONS BY ION CHROMATOGRAPHY		**E300**				Analyst: **MG**
Chloride	992	50.0		mg/L	100	7/13/2004 3:25:00 AM
Sulfate	2,270	100		mg/L	100	7/13/2004 3:25:00 AM
Surr: Dichloroacetic acid (surr)	107	80-120		%REC	100	7/13/2004 3:25:00 AM
ALKALINITY		**E310.1**				Analyst: **HDO**
Alkalinity, Bicarbonate (As CaCO3)	157	5.00		mg/L	1	7/12/2004
Alkalinity, Carbonate (As CaCO3)	ND	5.00		mg/L	1	7/12/2004
Alkalinity, Hydroxide (As CaCO3)	ND	5.00		mg/L	1	7/12/2004
Alkalinity, Total (As CaCO3)	157	5.00		mg/L	1	7/12/2004
CONDUCTIVITY		**E120.1**				Analyst: **HDO**
Specific Conductance	7,200	1.00		µmhos/cm	1	7/12/2004

Qualifiers:

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- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- P - Dual Column results percent difference > 40%
- E - Value above quantitation range
- H - Analyzed outside of Hold Time

e-Lab Analytical, Inc.

Date: *July 23, 2004*

CLIENT:	Navajo Refining Company	**Client Sample ID:**	Inj Wells
Work Order:	0407074	**Collection Date:**	7/7/2004 9:00:00 AM
Project:	Injection Wells		
Lab ID:	0407074-01	**Matrix:**	WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
PH			**E150.1**			Analyst: **LMD**
pH	6.92	0.100		pH units	1	7/8/2004
TOTAL DISSOLVED SOLIDS			**E160.1**			Analyst: **LMD**
Total Dissolved Solids (Residue, Filterable)	4,960	10.0		mg/L	1	7/8/2004

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	P - Dual Column results percent difference > 40%
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	H - Analyzed outside of Hold Time

Batch ID: 9539 InstrumentID: ICP4500

MBLK Sample ID: MBLKW3-070904 Test Code: SW6020 Units: mg/L Analysis Date: 07/09/04 21:25

Client ID: Run ID: ICP4500_040709A SeqNo: 505844 Prep Date: 7/9/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.003459	0.010								J
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Copper	ND	0.0050								
Iron	ND	0.20								
Lead	ND	0.0050								
Magnesium	ND	0.20								
Manganese	ND	0.0050								
Molybdenum	ND	0.0050								
Nickel	ND	0.0050								
Potassium	ND	0.20								
Selenium	ND	0.0050								
Silver	ND	0.0050								
Sodium	ND	0.20								
Vanadium	ND	0.0050								
Zinc	ND	0.0050								

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9539 InstrumentID: ICP4500

LCS Sample ID: MLCSW3-070904 Test Code: SW6020 Units: mg/L Analysis Date: 07/09/04 21:29
Client ID: Run ID: ICP4500_040709A SeqNo: 505845 Prep Date: 7/9/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.04844	0.010	0.05	0	96.9	79-126	0			
Arsenic	0.04766	0.0050	0.05	0	95.3	80-121	0			
Barium	0.04274	0.0050	0.05	0	85.5	79.8-119	0			
Beryllium	0.04529	0.0020	0.05	0	90.6	78.9-120	0			
Boron	0.4936	0.020	0.5	0	98.7	80-120	0			
Cadmium	0.04849	0.0020	0.05	0	97	79.1-119	0			
Calcium	4.804	0.50	5	0	96.1	80-121	0			
Chromium	0.04798	0.0050	0.05	0	96	79.3-121	0			
Cobalt	0.04761	0.0050	0.05	0	95.2	82-121	0			
Copper	0.04535	0.0050	0.05	0	90.7	83-121	0			
Iron	4.902	0.20	5	0	98	80-120	0			
Lead	0.04454	0.0050	0.05	0	89.1	80-118	0			
Magnesium	5.139	0.20	5	0	103	80-120	0			
Manganese	0.04778	0.0050	0.05	0	95.6	82-119	0			
Molybdenum	0.04486	0.0050	0.05	0	89.7	84.6-115	0			
Nickel	0.04723	0.0050	0.05	0	94.5	85-120	0			
Potassium	4.953	0.20	5	0	99.1	80-120	0			
Selenium	0.0466	0.0050	0.05	0	93.2	79.2-118	0			
Silver	0.04787	0.0050	0.05	0	95.7	83-117	0			
Sodium	5.081	0.20	5	0	102	82.4-120	0			
Vanadium	0.04735	0.0050	0.05	0	94.7	82.1-119	0			
Zinc	0.04587	0.0050	0.05	0	91.7	83-118	0			

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B - Analyte detected in assoc. Method Blank
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CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9539 InstrumentID: ICP4500

MS Sample ID: 0407028-83CMS Test Code: SW6020 Units: mg/L Analysis Date: 07/10/04 0:14

Client ID: Run ID: ICP4500_040709A SeqNo: 505874 Prep Date: 7/9/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.05038	0.010	0.05	0.002733	95.3	79-126	0			
Arsenic	0.04968	0.0050	0.05	0.003932	91.5	80-121	0			
Barium	0.07232	0.0050	0.05	0.02595	92.7	79.8-119	0			
Beryllium	0.0509	0.0020	0.05	0.0005094	101	78.9-120	0			
Boron	0.623	0.020	0.5	0.09092	106	80-120	0			
Cadmium	0.04574	0.0020	0.05	0.0003332	90.8	79.1-119	0			
Calcium	90.82	0.50	5	84.69	123	80-121	0			SEO
Chromium	0.04515	0.0050	0.05	0	90.3	79.3-121	0			
Cobalt	0.04827	0.0050	0.05	0.004039	88.5	82-121	0			
Copper	0.04228	0.0050	0.05	0.0009502	82.7	83-121	0			S
Iron	5.002	0.20	5	0.2496	95	80-120	0			
Lead	0.04748	0.0050	0.05	0	95	80-118	0			
Magnesium	28.5	0.20	5	23.83	93.4	80-120	0			O
Manganese	0.1942	0.0050	0.05	0.1499	88.6	82-119	0			
Molybdenum	0.04699	0.0050	0.05	0	94	84.6-115	0			
Nickel	0.05298	0.0050	0.05	0.01094	84.1	85-120	0			S
Potassium	7.353	0.20	5	2.353	100	80-120	0			
Selenium	0.046	0.0050	0.05	0.003609	84.8	79.2-118	0			
Silver	0.04262	0.0050	0.05	0	85.2	83-117	0			
Sodium	164.1	0.20	5	161.8	46	82.4-120	0			SEO
Vanadium	0.0482	0.0050	0.05	0.0006576	95.1	82.1-119	0			
Zinc	0.04617	0.0050	0.05	0.004682	83	83-118	0			S

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
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S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9539 InstrumentID: ICP4500

MSD Sample ID: 0407028-83CMSD Test Code: SW6020 Units: mg/L Analysis Date: 07/10/04 0:19
Client ID: Run ID: ICP4500_040709A SeqNo: 505875 Prep Date: 7/9/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.05215	0.010	0.05	0.002733	98.8	79-126	0.05038	3.45	15	
Arsenic	0.04869	0.0050	0.05	0.003932	89.5	80-121	0.04968	2.01	15	
Barium	0.07266	0.0050	0.05	0.02595	93.4	79.8-119	0.07232	0.469	15	
Beryllium	0.05198	0.0020	0.05	0.0005094	103	78.9-120	0.0509	2.1	15	
Boron	0.6325	0.020	0.5	0.09092	108	80-120	0.623	1.51	15	
Cadmium	0.04625	0.0020	0.05	0.0003332	91.8	79.1-119	0.04574	1.11	15	
Calcium	93.55	0.50	5	84.69	177	80-121	90.82	2.96	15	SEO
Chromium	0.04685	0.0050	0.05	0	93.7	79.3-121	0.04515	3.7	15	
Cobalt	0.04998	0.0050	0.05	0.004039	91.9	82-121	0.04827	3.48	15	
Copper	0.04371	0.0050	0.05	0.0009502	85.5	83-121	0.04228	3.33	15	
Iron	5.13	0.20	5	0.2496	97.6	80-120	5.002	2.53	15	
Lead	0.0471	0.0050	0.05	0	94.2	80-118	0.04748	0.804	15	
Magnesium	30.14	0.20	5	23.83	126	80-120	28.5	5.59	15	SO
Manganese	0.2008	0.0050	0.05	0.1499	102	82-119	0.1942	3.34	15	
Molybdenum	0.04735	0.0050	0.05	0	94.7	84.6-115	0.04699	0.763	15	
Nickel	0.05422	0.0050	0.05	0.01094	86.6	85-120	0.05298	2.31	15	
Potassium	7.483	0.20	5	2.353	103	80-120	7.353	1.75	15	
Selenium	0.04327	0.0050	0.05	0.003609	79.3	79.2-118	0.046	6.12	15	
Silver	0.04351	0.0050	0.05	0	87	83-117	0.04262	2.07	15	
Sodium	173.9	0.20	5	161.8	242	82.4-120	164.1	5.8	15	SEO
Vanadium	0.04997	0.0050	0.05	0.0006576	98.6	82.1-119	0.0482	3.61	15	
Zinc	0.04806	0.0050	0.05	0.004682	86.8	83-118	0.04617	4.01	15	

ND - Not Detected at the Reporting Limit
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R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9539 InstrumentID: ICP4500

DUP Sample ID: 0407028-83CDUP Test Code: SW6020 Units: mg/L Analysis Date: 07/10/04 0:09
Client ID: Run ID: ICP4500_040709A SeqNo: 505873 Prep Date: 7/9/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.002615	0.010	0	0	0	0-0	0.002733	0	25	J
Arsenic	0.003323	0.0050	0	0	0	0-0	0.003932	0	25	J
Barium	0.026	0.0050	0	0	0	0-0	0.02595	0.192	25	
Beryllium	0.000439	0.0020	0	0	0	0-0	0.0005094	0	25	J
Boron	0.08249	0.020	0	0	0	0-0	0.09092	9.72	25	
Cadmium	0.0002675	0.0020	0	0	0	0-0	0.0003332	0	25	J
Chromium	ND	0.0050	0	0	0	0-0	0.0003544	0	25	
Cobalt	0.003999	0.0050	0	0	0	0-0	0.004039	0	25	J
Copper	0.001006	0.0050	0	0	0	0-0	0.0009502	0	25	J
Iron	0.2425	0.20	0	0	0	0-0	0.2496	2.89	25	
Lead	ND	0.0050	0	0	0	0-0	0.0001737	0	25	
Magnesium	22.32	0.20	0	0	0	0-0	23.83	6.54	25	
Manganese	0.1501	0.0050	0	0	0	0-0	0.1499	0.133	25	
Molybdenum	ND	0.0050	0	0	0	0-0	0.0005272	0	25	
Nickel	0.01059	0.0050	0	0	0	0-0	0.01094	3.25	25	
Potassium	2.237	0.20	0	0	0	0-0	2.353	5.05	25	
Selenium	ND	0.0050	0	0	0	0-0	0.003609	0	25	
Silver	ND	0.0050	0	0	0	0-0	0.0001129	0	25	
Vanadium	0.0005641	0.0050	0	0	0	0-0	0.0006576	0	25	J
Zinc	0.00462	0.0050	0	0	0	0-0	0.004682	0	25	J

DUP Sample ID: 0407028-83CDUP Test Code: SW6020 Units: mg/L Analysis Date: 07/12/04 20:25
Client ID: Run ID: ICP4500_040712A SeqNo: 506283 Prep Date: 7/9/2004 DF: 10

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	85.98	5.0	0	0	0	0-0	85.98	0	25	
Sodium	175.6	2.0	0	0	0	0-0	175.6	0	25	

The following samples were analyzed in this batch: 0407074-01B

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9641 InstrumentID: Mercury

MBLK Sample ID: GBLKW1-071704 Test Code: SW7470 Units: mg/L Analysis Date: 07/17/04 17:39
Client ID: Run ID: MERCURY_040717C SeqNo: 509754 Prep Date: 7/17/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020	0	0	0	0-0	0			

LCS Sample ID: GLCSW1-071704 Test Code: SW7470 Units: mg/L Analysis Date: 07/17/04 17:41
Client ID: Run ID: MERCURY_040717C SeqNo: 509755 Prep Date: 7/17/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00503	0.00020	0.005	0	101	83-115	0			

LCSD Sample ID: GLCSDW1-071704 Test Code: SW7470 Units: mg/L Analysis Date: 07/17/04 17:43
Client ID: Run ID: MERCURY_040717C SeqNo: 509756 Prep Date: 7/17/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00506	0.00020	0.005	0	101	83-115	0.00503	0.595	20	

MS Sample ID: 0407082-18CMS Test Code: SW7470 Units: mg/L Analysis Date: 07/17/04 17:50
Client ID: Run ID: MERCURY_040717C SeqNo: 509759 Prep Date: 7/17/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00482	0.00020	0.005	-0.000006	96.5	83-115	0			

MSD Sample ID: 0407082-18CMSD Test Code: SW7470 Units: mg/L Analysis Date: 07/17/04 17:51
Client ID: Run ID: MERCURY_040717C SeqNo: 509760 Prep Date: 7/17/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00484	0.00020	0.005	-0.000006	96.9	83-115	0.00482	0.414	20	

DUP Sample ID: 0407082-18CDUP Test Code: SW7470 Units: mg/L Analysis Date: 07/17/04 17:48
Client ID: Run ID: MERCURY_040717C SeqNo: 509758 Prep Date: 7/17/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020	0	0	0	0-0	-0.000006	0	20	

The following samples were analyzed in this batch: 0407074-01B

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9560 InstrumentID: SV-2

MBLK Sample ID: SBLKW1-040712 Test Code: SW8270 Units: µg/L Analysis Date: 07/13/04 15:58
Client ID: Run ID: SV-2_040713A SeqNo: 507356 Prep Date: 7/12/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
2-Nitroaniline	ND	10								
2-Nitrophenol	ND	10								
3-Nitroaniline	ND	10								
4-Methylphenol	ND	10								
4-Nitroaniline	ND	10								
4-Nitrophenol	ND	10								
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Benz(a)anthracene	ND	10								
Benzidine	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	10								
Isophorone	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodimethylamine	ND	10								
N-Nitrosodiphenylamine	ND	10								
Naphthalene	ND	10								
Nitrobenzene	ND	10								
Pentachlorophenol	ND	10								
Phenanthrene	ND	10								
Phenol	ND	10								
Pyrene	ND	10								
1,4-Dichlorobenzene-d4	40	0								
Acenaphthene-d10	40	0								
Chrysene-d12	40	0								
Naphthalene-d8	40	0								
Perylene-d12	40	0								
Phenanthrene-d10	40	0								
Surr: 2,4,6-Tribromophenol	82.25	10	100	0	82.2	39-153	0			
Surr: 2-Fluorobiphenyl	78.39	10	100	0	78.4	40-147	0			
Surr: 2-Fluorophenol	33.79	10	100	0	33.8	21-110	0			
Surr: 4-Terphenyl-d14	84.32	10	100	0	84.3	39-141	0			
Surr: Nitrobenzene-d5	70.65	10	100	0	70.7	37-140	0			
Surr: Phenol-d6	18.81	10	100	0	18.8	11-100	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9560 InstrumentID: SV-2

LCS Sample ID: SLCSW1-040712 Test Code: SW8270 Units: µg/L Analysis Date: 07/13/04 16:29
Client ID: Run ID: SV-2_040713A SeqNo: 507357 Prep Date: 7/12/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	31.26	10	50	0	62.5	50-115	0			
2,4,5-Trichlorophenol	86.7	10	100	0	86.7	68-128	0			
2,4,6-Trichlorophenol	85.39	10	100	0	85.4	66-125	0			
2-Methylnaphthalene	34.79	10	50	0	69.6	47-122	0			
2-Methylphenol	61.44	10	100	0	61.4	51-115	0			
2-Nitroaniline	46.51	10	50	0	93	64-128	0			
2-Nitrophenol	76.92	10	100	0	76.9	60-119	0			
3-Nitroaniline	44.47	10	50	0	88.9	61-118	0			
4-Methylphenol	81.14	10	150	0	54.1	44-115	0			
4-Nitroaniline	44.56	10	50	0	89.1	61-123	0			
4-Nitrophenol	29.12	10	100	0	29.1	17-100	0			
Acenaphthene	40.9	10	50	0	81.8	68-115	0			
Acenaphthylene	40.88	10	50	0	81.8	67-116	0			
Aniline	32.02	10	50	0	64	40-130	0			
Anthracene	43.56	10	50	0	87.1	70-129	0			
Benz(a)anthracene	42.22	10	50	0	84.4	55-131	0			
Benzidine	30.17	10	50	0	60.3	10-115	0			
Hexachloroethane	30.87	10	50	0	61.7	46-115	0			
Indeno(1,2,3-cd)pyrene	48.4	10	50	0	96.8	42-123	0			
Isophorone	39.55	10	50	0	79.1	63-117	0			
N-Nitrosodi-n-propylamine	42.61	10	50	0	85.2	67-115	0			
N-Nitrosodimethylamine	21.15	10	50	0	42.3	28-115	0			
N-Nitrosodiphenylamine	46.31	10	50	0	92.6	72-144	0			
Naphthalene	33.4	10	50	0	66.8	52-115	0			
Nitrobenzene	38.35	10	50	0	76.7	65-115	0			
Pentachlorophenol	70.64	10	100	0	70.6	65-123	0			
Phenanthrene	41.84	10	50	0	83.7	69-119	0			
Phenol	23.79	10	100	0	23.8	16-115	0			
Pyrene	40.12	10	50	0	80.2	61-130	0			
Surr: 2,4,6-Tribromophenol	87.89	10	100	0	87.9	39-153	0			
Surr: 2-Fluorobiphenyl	82.26	10	100	0	82.3	40-147	0			
Surr: 2-Fluorophenol	40.23	10	100	0	40.2	21-110	0			
Surr: 4-Terphenyl-d14	86.41	10	100	0	86.4	39-141	0			
Surr: Nitrobenzene-d5	75.5	10	100	0	75.5	37-140	0			
Surr: Phenol-d6	23.26	10	100	0	23.3	11-100	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9560 InstrumentID: SV-2

LCSD Sample ID: SLCSDW1-040712 Test Code: SW8270 Units: µg/L Analysis Date: 07/13/04 16:59
Client ID: Run ID: SV-2_040713A SeqNo: 507358 Prep Date: 7/12/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	31.58	10	50	0	63.2	50-115	31.26	1.01	30	
2,4,5-Trichlorophenol	87.3	10	100	0	87.3	68-128	86.7	0.685	30	
2,4,6-Trichlorophenol	86.39	10	100	0	86.4	66-125	85.39	1.16	30	
2-Methylnaphthalene	33.56	10	50	0	67.1	47-122	34.79	3.61	30	
2-Methylphenol	60.16	10	100	0	60.2	51-115	61.44	2.11	30	
2-Nitroaniline	47.23	10	50	0	94.5	64-128	46.51	1.53	30	
2-Nitrophenol	75.92	10	100	0	75.9	60-119	76.92	1.32	30	
3-Nitroaniline	40.62	10	50	0	81.2	61-118	44.47	9.05	30	
4-Methylphenol	81.3	10	150	0	54.2	44-115	81.14	0.188	30	
4-Nitroaniline	42.15	10	50	0	84.3	61-123	44.56	5.54	30	
4-Nitrophenol	30.34	10	100	0	30.3	17-100	29.12	4.08	30	
Acenaphthene	39.88	10	50	0	79.8	68-115	40.9	2.52	30	
Acenaphthylene	39.7	10	50	0	79.4	67-116	40.88	2.93	30	
Aniline	31.01	10	50	0	62	40-130	32.02	3.2	30	
Anthracene	42.13	10	50	0	84.3	70-129	43.56	3.34	30	
Benz(a)anthracene	41.72	10	50	0	83.4	55-131	42.22	1.2	30	
Benzidine	28.39	10	50	0	56.8	10-115	30.17	6.06	30	
Hexachloroethane	29.4	10	50	0	58.8	46-115	30.87	4.89	30	
Indeno(1,2,3-cd)pyrene	44.19	10	50	0	88.4	42-123	48.4	9.1	30	
Isophorone	38.71	10	50	0	77.4	63-117	39.55	2.15	30	
N-Nitrosodi-n-propylamine	41.17	10	50	0	82.3	67-115	42.61	3.43	30	
N-Nitrosodimethylamine	22.1	10	50	0	44.2	28-115	21.15	4.41	30	
N-Nitrosodiphenylamine	44.6	10	50	0	89.2	72-144	46.31	3.77	30	
Naphthalene	32.74	10	50	0	65.5	52-115	33.4	1.99	30	
Nitrobenzene	38.2	10	50	0	76.4	65-115	38.35	0.387	30	
Pentachlorophenol	72.91	10	100	0	72.9	65-123	70.64	3.15	30	
Phenanthrene	40.12	10	50	0	80.2	69-119	41.84	4.2	30	
Phenol	24.22	10	100	0	24.2	16-115	23.79	1.79	30	
Pyrene	40.25	10	50	0	80.5	51-130	40.12	0.331	30	
Surr: 2,4,6-Tribromophenol	86.61	10	100	0	86.6	39-153	87.89	1.46	30	
Surr: 2-Fluorobiphenyl	81.97	10	100	0	82	40-147	82.26	0.35	30	
Surr: 2-Fluorophenol	39.11	10	100	0	39.1	21-110	40.23	2.82	30	
Surr: 4-Terphenyl-d14	85.17	10	100	0	85.2	39-141	86.41	1.45	30	
Surr: Nitrobenzene-d5	75.33	10	100	0	75.3	37-140	75.5	0.231	30	
Surr: Phenol-d6	23.6	10	100	0	23.6	11-100	23.26	1.46	30	

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
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R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9560 InstrumentID: SV-2

MS Sample ID: 0407082-18DMS Test Code: SW8270 Units: µg/L Analysis Date: 07/13/04 18:00
Client ID: Run ID: SV-2_040713A SeqNo: 507360 Prep Date: 7/12/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	38.77	11	53.19	0	72.9	50-115	0			
2,4,5-Trichlorophenol	91.48	11	106.4	0	86	68-128	0			
2,4,6-Trichlorophenol	92.28	11	106.4	0	86.7	66-125	0			
2-Methylnaphthalene	39.59	11	53.19	0	74.4	47-122	0			
2-Methylphenol	68.77	11	106.4	0	64.6	51-115	0			
2-Nitroaniline	49.37	11	53.19	0	92.8	64-128	0			
2-Nitrophenol	82.66	11	106.4	0	77.7	60-119	0			
3-Nitroaniline	39.84	11	53.19	0	74.9	61-118	0			
4-Methylphenol	95.14	11	159.6	0	59.6	44-115	0			
4-Nitroaniline	41.31	11	53.19	0	77.7	61-123	0			
4-Nitrophenol	36.34	11	106.4	0	34.2	17-100	0			
Acenaphthene	46.9	11	53.19	0	88.2	68-115	0			
Acenaphthylene	42.53	11	53.19	0	80	67-116	0			
Aniline	31.51	11	53.19	0	59.2	40-130	0			
Anthracene	45.14	11	53.19	0	84.9	70-129	0			
Benz(a)anthracene	44.52	11	53.19	0	83.7	55-131	0			
enzidine	24.16	11	53.19	0	45.4	10-115	0			
Hexachloroethane	42.45	11	53.19	0	79.8	46-115	0			
Indeno(1,2,3-cd)pyrene	49.91	11	53.19	0	93.8	42-123	0			
Isophorone	41.24	11	53.19	0	77.5	63-117	0			
N-Nitrosodi-n-propylamine	46.57	11	53.19	0	87.5	67-115	0			
N-Nitrosodimethylamine	26.9	11	53.19	0	50.6	28-115	0			
N-Nitrosodiphenylamine	47.19	11	53.19	0	88.7	72-144	0			
Naphthalene	37.95	11	53.19	0	71.4	52-115	0			
Nitrobenzene	42.36	11	53.19	0	79.6	65-115	0			
Pentachlorophenol	71.64	11	106.4	0	67.3	65-123	0			
Phenanthrene	43.67	11	53.19	0	82.1	69-119	0			
Phenol	29.8	11	106.4	0	28	16-115	0			
Pyrene	41.73	11	53.19	0	78.4	51-130	0			
Surr: 2,4,6-Tribromophenol	88.29	11	106.4	0	83	39-153	0			
Surr: 2-Fluorobiphenyl	88.06	11	106.4	0	82.8	40-147	0			
Surr: 2-Fluorophenol	46.77	11	106.4	0	44	21-110	0			
Surr: 4-Terphenyl-d14	88.44	11	106.4	0	83.1	39-141	0			
Surr: Nitrobenzene-d5	81.74	11	106.4	0	76.8	37-140	0			
Surr: Phenol-d6	27.76	11	106.4	0	26.1	11-100	0			

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R - RPD outside accepted recovery limits
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CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: 9560 InstrumentID: SV-2

MSD Sample ID: 0407082-18DMSD Test Code: SW8270 Units: µg/L Analysis Date: 07/13/04 18:30
Client ID: Run ID: SV-2_040713A SeqNo: 507361 Prep Date: 7/12/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	38.35	11	53.19	0	72.1	50-115	38.77	1.09	30	
2,4,5-Trichlorophenol	95.8	11	106.4	0	90.1	68-128	91.48	4.61	30	
2,4,6-Trichlorophenol	92.06	11	106.4	0	86.5	66-125	92.28	0.244	30	
2-Methylnaphthalene	39.08	11	53.19	0	73.5	47-122	39.59	1.29	30	
2-Methylphenol	70.25	11	106.4	0	66	51-115	68.77	2.12	30	
2-Nitroaniline	48.77	11	53.19	0	91.7	64-128	49.37	1.21	30	
2-Nitrophenol	83.64	11	106.4	0	78.6	60-119	82.66	1.17	30	
3-Nitroaniline	37.37	11	53.19	0	70.3	61-118	39.84	6.4	30	
4-Methylphenol	94.8	11	159.6	0	59.4	44-115	95.14	0.358	30	
4-Nitroaniline	38.45	11	53.19	0	72.3	61-123	41.31	7.17	30	
4-Nitrophenol	36.01	11	106.4	0	33.8	17-100	36.34	0.923	30	
Acenaphthene	47.64	11	53.19	0	89.6	68-115	46.9	1.56	30	
Acenaphthylene	42.64	11	53.19	0	80.2	67-116	42.53	0.255	30	
Aniline	31.17	11	53.19	0	58.6	40-130	31.51	1.09	30	
Anthracene	45.61	11	53.19	0	85.7	70-129	45.14	1.04	30	
Benz(a)anthracene	45.17	11	53.19	0	84.9	55-131	44.52	1.46	30	
Benzidine	18.51	11	53.19	0	34.8	10-115	24.16	26.5	30	
Hexachloroethane	40.74	11	53.19	0	76.6	46-115	42.45	4.12	30	
Indeno(1,2,3-cd)pyrene	50.25	11	53.19	0	94.5	42-123	49.91	0.68	30	
Isophorone	42.87	11	53.19	0	80.6	63-117	41.24	3.88	30	
N-Nitrosodi-n-propylamine	46.44	11	53.19	0	87.3	67-115	46.57	0.281	30	
N-Nitrosodimethylamine	25.12	11	53.19	0	47.2	28-115	26.9	6.83	30	
N-Nitrosodiphenylamine	47.79	11	53.19	0	89.8	72-144	47.19	1.25	30	
Naphthalene	38.24	11	53.19	0	71.9	52-115	37.95	0.757	30	
Nitrobenzene	42.83	11	53.19	0	80.5	65-115	42.36	1.09	30	
Pentachlorophenol	81.78	11	106.4	0	76.9	65-123	71.64	13.2	30	
Phenanthrene	44.03	11	53.19	0	82.8	69-119	43.67	0.831	30	
Phenol	29.65	11	106.4	0	27.9	16-115	29.8	0.497	30	
Pyrene	42.44	11	53.19	0	79.8	51-130	41.73	1.71	30	
Surr: 2,4,6-Tribromophenol	93.87	11	106.4	0	88.2	39-153	88.29	6.12	30	
Surr: 2-Fluorobiphenyl	87.34	11	106.4	0	82.1	40-147	88.06	0.818	30	
Surr: 2-Fluorophenol	46.17	11	106.4	0	43.4	21-110	46.77	1.28	30	
Surr: 4-Terphenyl-d14	90.02	11	106.4	0	84.6	39-141	88.44	1.78	30	
Surr: Nitrobenzene-d5	80.82	11	106.4	0	76	37-140	81.74	1.14	30	
Surr: Phenol-d6	27.76	11	106.4	0	26.1	11-100	27.76	0.011	30	

The following samples were analyzed in this batch: 0407074-01D

ND - Not Detected at the Reporting Limit
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U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21831 InstrumentID: VOA2

MBLK Sample ID: VBLKW-0719 Test Code: SW8260 Units: µg/L Analysis Date: 07/19/04 11:33
Client ID: Run ID: VOA2_040719A SeqNo: 510670 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	ND	5.0								
1,1,2,2-Tetrachloroethane	ND	5.0								
1,1,2-Trichloroethane	ND	5.0								
1,1-Dichloroethane	ND	5.0								
1,1-Dichloroethene	ND	5.0								
1,2-Dichloroethane	ND	5.0								
2-Butanone	ND	10								
2-Chloroethyl vinyl ether	ND	10								
2-Hexanone	ND	10								
4-Methyl-2-pentanone	ND	10								
Acetone	ND	10								
Benzene	ND	5.0								
Bromodichloromethane	ND	5.0								
Bromoform	ND	5.0								
Bromomethane	ND	5.0								
Carbon disulfide	ND	10								
Carbon tetrachloride	ND	5.0								
Chlorobenzene	ND	5.0								
Chloroethane	ND	5.0								
Chloroform	ND	5.0								
Chloromethane	ND	5.0								
cis-1,3-Dichloropropene	ND	5.0								
Dibromochloromethane	ND	5.0								
Ethylbenzene	ND	5.0								
m,p-Xylene	ND	10								
Methylene chloride	ND	10								
Styrene	ND	5.0								
Tetrachloroethene	ND	5.0								
Toluene	ND	5.0								
trans-1,3-Dichloropropene	ND	5.0								
Trichloroethene	ND	5.0								
Vinyl acetate	ND	10								
Vinyl chloride	ND	2.0								
Xylenes, Total	ND	15								
Surr: 1,2-Dichloroethane-d4	42.27	5.0	50	0	84.5	71-126		0		
Surr: 4-Bromofluorobenzene	43.71	5.0	50	0	87.4	74-125		0		
Surr: Dibromofluoromethane	43.99	5.0	50	0	88	73-126		0		
Surr: Toluene-d8	44.34	5.0	50	0	88.7	75-125		0		

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R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21831 InstrumentID: VOA2

LCS Sample ID: VLCSW-0719 Test Code: SW8260 Units: µg/L Analysis Date: 07/19/04 10:42
Client ID: Run ID: VOA2_040719A SeqNo: 510669 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	49.5	5.0	50	0	99	75.2-120	0			
1,1,2,2-Tetrachloroethane	47.64	5.0	50	0	95.3	72.4-121	0			
1,1,2-Trichloroethane	49.05	5.0	50	0	98.1	80-120	0			
1,1-Dichloroethane	40.8	5.0	50	0	81.6	76.9-120	0			
1,1-Dichloroethene	42.24	5.0	50	0	84.5	72.6-123	0			
1,2-Dichloroethane	50.08	5.0	50	0	100	80-120	0			
2-Butanone	98.22	10	100	0	98.2	69-131	0			
2-Chloroethyl vinyl ether	99.78	10	100	0	99.8	60-135	0			
2-Hexanone	109.7	10	100	0	110	55.6-126	0			
4-Methyl-2-pentanone	105.7	10	100	0	106	67.4-121	0			
Acetone	110	10	100	0	110	64.4-140	0			
Benzene	47.36	5.0	50	0	94.7	80-120	0			
Bromodichloromethane	49.67	5.0	50	0	99.3	80-120	0			
Bromoform	52.48	5.0	50	0	105	77.9-121	0			
Bromomethane	46.73	5.0	50	0	93.5	63.3-137	0			
Carbon disulfide	81.78	10	100	0	81.8	74.1-123	0			
Carbon tetrachloride	50.26	5.0	50	0	101	74.7-120	0			
Chlorobenzene	48.77	5.0	50	0	97.5	80-120	0			
Chloroethane	46	5.0	50	0	92	74.7-126	0			
Chloroform	46.23	5.0	50	0	92.5	80-120	0			
Chloromethane	43.9	5.0	50	0	87.8	64.5-132	0			
cis-1,3-Dichloropropene	51.24	5.0	50	0	102	80-120	0			
Dibromochloromethane	50.88	5.0	50	0	102	80-120	0			
Ethylbenzene	49.39	5.0	50	0	98.8	80-120	0			
m,p-Xylene	98.82	10	100	0	98.8	80-120	0			
Methylene chloride	41.13	10	50	0	82.3	76.2-120	0			
Styrene	50.69	5.0	50	0	101	80-120	0			
Tetrachloroethene	51.64	5.0	50	0	103	68.5-130	0			
Toluene	48.46	5.0	50	0	96.9	80-120	0			
trans-1,3-Dichloropropene	52.38	5.0	50	0	105	80-120	0			
Trichloroethene	50.2	5.0	50	0	100	78.9-120	0			
Vinyl acetate	106.1	10	100	0	106	62.4-133	0			
Vinyl chloride	46.69	2.0	50	0	93.4	72.7-128	0			
Xylenes, Total	148.4	15	150	0	98.9	80-120	0			
Surr: 1,2-Dichloroethane-d4	40.65	5.0	50	0	81.3	71-126	0			
Surr: 4-Bromofluorobenzene	46.15	5.0	50	0	92.3	74-125	0			
Surr: Dibromofluoromethane	41.66	5.0	50	0	83.3	73-126	0			
Surr: Toluene-d8	45.05	5.0	50	0	90.1	75-125	0			

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S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21831 InstrumentID: VOA2

MS Sample ID: 0407154-01AMS Test Code: SW8260 Units: µg/L Analysis Date: 07/19/04 14:05
Client ID: Run ID: VOA2_040719A SeqNo: 510672 Prep Date: DF: 250

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	12140	1,200	12500	0	97.1	75.2-120	0			
1,1,2,2-Tetrachloroethane	11150	1,200	12500	0	89.2	72.4-121	0			
1,1,2-Trichloroethane	12470	1,200	12500	0	99.8	80-120	0			
1,1-Dichloroethane	11610	1,200	12500	0	92.9	76.9-120	0			
1,1-Dichloroethene	9668	1,200	12500	0	77.3	72.6-123	0			
1,2-Dichloroethane	12100	1,200	12500	0	96.8	80-120	0			
2-Butanone	24170	2,500	25000	0	96.7	69-131	0			
2-Chloroethyl vinyl ether	23350	2,500	25000	0	93.4	60-135	0			
2-Hexanone	28460	2,500	25000	0	114	55.6-126	0			
4-Methyl-2-pentanone	26920	2,500	25000	0	108	67.4-121	0			
Acetone	28630	2,500	25000	0	115	64.4-140	0			
Benzene	12840	1,200	12500	1617	89.8	80-120	0			
Bromodichloromethane	12110	1,200	12500	0	96.9	80-120	0			
Bromoform	12900	1,200	12500	0	103	77.9-121	0			
Bromomethane	10540	1,200	12500	0	84.3	63.3-137	0			
Carbon disulfide	21710	2,500	25000	0	86.8	74.1-123	0			
Carbon tetrachloride	15530	1,200	12500	3701	94.7	74.7-120	0			
Chlorobenzene	17760	1,200	12500	6761	88	80-120	0			
Chloroethane	11150	1,200	12500	0	89.2	74.7-126	0			
Chloroform	27960	1,200	12500	16690	90.2	80-120	0			
Chloromethane	11340	1,200	12500	0	90.7	64.5-132	0			
cis-1,3-Dichloropropene	12280	1,200	12500	0	98.3	80-120	0			
Dibromochloromethane	12560	1,200	12500	0	101	80-120	0			
Ethylbenzene	12120	1,200	12500	0	97	80-120	0			
m,p-Xylene	24660	2,500	25000	0	98.7	80-120	0			
Methylene chloride	11050	2,500	12500	251	86.4	76.2-120	0			
Styrene	12310	1,200	12500	0	98.5	80-120	0			
Tetrachloroethene	12830	1,200	12500	307.5	100	68.5-130	0			
Toluene	11740	1,200	12500	0	93.9	80-120	0			
trans-1,3-Dichloropropene	12720	1,200	12500	0	102	80-120	0			
Trichloroethene	13050	1,200	12500	382.7	101	78.9-120	0			
Vinyl acetate	16340	2,500	25000	0	65.4	62.4-133	0			
Vinyl chloride	11910	500	12500	0	95.2	72.7-128	0			
Xylenes, Total	36910	3,800	37500	0	98.4	80-120	0			
Surr: 1,2-Dichloroethane-d4	10910	1,200	12500	0	87.3	71-126	0			
Surr: 4-Bromofluorobenzene	12050	1,200	12500	0	96.4	74-125	0			
Surr: Dibromofluoromethane	10810	1,200	12500	0	86.5	73-126	0			
Surr: Toluene-d8	11660	1,200	12500	0	93.3	75-125	0			

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R - RPD outside accepted recovery limits
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U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21831 InstrumentID: VOA2

MSD Sample ID: 0407154-01AMSD Test Code: SW8260 Units: µg/L Analysis Date: 07/19/04 14:33
Client ID: Run ID: VOA2_040719A SeqNo: 510673 Prep Date: DF: 250

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	12300	1,200	12500	0	98.4	75.2-120	12140	1.31	20	
1,1,2,2-Tetrachloroethane	11100	1,200	12500	0	88.8	72.4-121	11150	0.381	20	
1,1,2-Trichloroethane	12660	1,200	12500	0	101	80-120	12470	1.46	20	
1,1-Dichloroethane	10890	1,200	12500	0	87.2	76.9-120	11610	6.37	20	
1,1-Dichloroethene	10340	1,200	12500	0	82.7	72.6-123	9668	6.67	20	
1,2-Dichloroethane	12510	1,200	12500	0	100	80-120	12100	3.41	20	
2-Butanone	25510	2,500	25000	0	102	69-131	24170	5.39	20	
2-Chloroethyl vinyl ether	23900	2,500	25000	0	95.6	60-135	23350	2.29	20	
2-Hexanone	29060	2,500	25000	0	116	55.6-126	28460	2.07	20	
4-Methyl-2-pentanone	27690	2,500	25000	0	111	67.4-121	26920	2.82	20	
Acetone	28630	2,500	25000	0	115	64.4-140	28630	0.0181	20	
Benzene	13310	1,200	12500	1617	93.5	80-120	12840	3.55	20	
Bromodichloromethane	12400	1,200	12500	0	99.2	80-120	12110	2.29	20	
Bromoform	13180	1,200	12500	0	105	77.9-121	12900	2.16	20	
Bromomethane	11380	1,200	12500	0	91	63.3-137	10540	7.65	20	
Carbon disulfide	22610	2,500	25000	0	90.4	74.1-123	21710	4.08	20	
Carbon tetrachloride	16060	1,200	12500	3701	98.9	74.7-120	15530	3.35	20	
Chlorobenzene	18250	1,200	12500	6761	91.9	80-120	17760	2.71	20	
Chloroethane	11550	1,200	12500	0	92.4	74.7-126	11150	3.48	20	
Chloroform	27240	1,200	12500	16690	84.4	80-120	27960	2.59	20	
Chloromethane	11380	1,200	12500	0	91.1	64.5-132	11340	0.38	20	
cis-1,3-Dichloropropene	12670	1,200	12500	0	101	80-120	12280	3.12	20	
Dibromochloromethane	12910	1,200	12500	0	103	80-120	12560	2.71	20	
Ethylbenzene	12480	1,200	12500	0	99.8	80-120	12120	2.91	20	
m,p-Xylene	25180	2,500	25000	0	101	80-120	24660	2.07	20	
Methylene chloride	10390	2,500	12500	251	81.1	76.2-120	11050	6.19	20	
Styrene	12620	1,200	12500	0	101	80-120	12310	2.5	20	
Tetrachloroethene	13110	1,200	12500	307.5	102	68.5-130	12830	2.1	20	
Toluene	12160	1,200	12500	0	97.3	80-120	11740	3.54	20	
trans-1,3-Dichloropropene	12790	1,200	12500	0	102	80-120	12720	0.554	20	
Trichloroethene	13550	1,200	12500	382.7	105	78.9-120	13050	3.73	20	
Vinyl acetate	16770	2,500	25000	0	67.1	62.4-133	16340	2.6	20	
Vinyl chloride	11890	500	12500	0	95.1	72.7-128	11910	0.11	20	
Xylenes, Total	37950	3,800	37500	0	101	80-120	36910	2.78	20	
Surr: 1,2-Dichloroethane-d4	10830	1,200	12500	0	86.7	71-126	10910	0.714	20	
Surr: 4-Bromofluorobenzene	12050	1,200	12500	0	96.4	74-125	12050	0.0324	20	
Surr: Dibromofluoromethane	11040	1,200	12500	0	88.3	73-126	10810	2.07	20	
Surr: Toluene-d8	11800	1,200	12500	0	94.4	75-125	11660	1.17	20	

The following samples were analyzed in this batch: 0407074-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
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CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21602 InstrumentID: WetChem

LCS Sample ID: WLCSW1-070804 Test Code: E150.1 Units: pH units Analysis Date: 07/08/04 0:00
Client ID: Run ID: WETCHEM_040708A SeqNo: 504779 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	6.04	0.10	6	0	101	85-115	0			

DUP Sample ID: 0407074-01CDUP Test Code: E150.1 Units: pH units Analysis Date: 07/08/04 0:00
Client ID: Inj Wells Run ID: WETCHEM_040708A SeqNo: 504783 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	6.91	0.10	0	0	0	0-0	6.92	0.145	20	

The following samples were analyzed in this batch: 0407074-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21620 InstrumentID: WetChem

MBLK Sample ID: WBLKW1-070804 Test Code: E160.1 Units: mg/L Analysis Date: 07/08/04 0:00
Client ID: Run ID: WETCHEM_040708F SeqNo: 505164 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	ND	10								

LCS Sample ID: WLCSW1-070804 Test Code: E160.1 Units: mg/L Analysis Date: 07/08/04 0:00
Client ID: Run ID: WETCHEM_040708F SeqNo: 505165 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	1058	10	1000	0	106	80-120	0			

DUP Sample ID: 0407068-01EDUP Test Code: E160.1 Units: mg/L Analysis Date: 07/08/04 0:00
Client ID: Run ID: WETCHEM_040708F SeqNo: 505171 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Fil	25900	10	0	0	0	0-0	25620	1.07	20	

The following samples were analyzed in this batch: 0407074-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21657 InstrumentID: WetChem

MBLK Sample ID: WBLKW-071204 Test Code: E310.1 Units: mg/L Analysis Date: 07/12/04 0:00
Client ID: Run ID: WETCHEM_040712B SeqNo: 506101 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	ND	5.0								
Alkalinity, Carbonate (As CaCO3)	ND	5.0								
Alkalinity, Hydroxide (As CaCO3)	ND	5.0								
Alkalinity, Total (As CaCO3)	ND	5.0								

LCS Sample ID: WLCSW1-071204 Test Code: E310.1 Units: mg/L Analysis Date: 07/12/04 0:00
Client ID: Run ID: WETCHEM_040712B SeqNo: 506102 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	980.7	5.0	0	0.9806	0	0-0	0			
Alkalinity, Carbonate (As CaCO3)	ND	5.0	0	0	0	0-0	0			
Alkalinity, Hydroxide (As CaCO3)	ND	5.0	0	0	0	0-0	0			
Alkalinity, Total (As CaCO3)	980.7	5.0	1000	0	98.1	80-120	0			

DUP Sample ID: 0407076-01BDUP Test Code: E310.1 Units: mg/L Analysis Date: 07/12/04 0:00
Client ID: Run ID: WETCHEM_040712B SeqNo: 506130 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (As CaCO3)	421.7	5.0	0	0	0	0-0	421.7	0	20	
Alkalinity, Carbonate (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	20	
Alkalinity, Hydroxide (As CaCO3)	ND	5.0	0	0	0	0-0	0	0	20	
Alkalinity, Total (As CaCO3)	421.7	5.0	0	0	0	0-0	421.7	0	20	

The following samples were analyzed in this batch: 0407074-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
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CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: **R21661** InstrumentID: **WetChem**

MBLK Sample ID: **WBLKW1-071204** Test Code: **E120.1** Units: **µmhos/cm** Analysis Date: **07/12/04 0:00**
Client ID: Run ID: **WETCHEM_040712D** SeqNo: **506172** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	ND	1.0								

LCS Sample ID: **WLCSW1-071204** Test Code: **E120.1** Units: **µmhos/cm** Analysis Date: **07/12/04 0:00**
Client ID: Run ID: **WETCHEM_040712D** SeqNo: **506173** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	1440	1.0	1409	0	102	80-120	0			

DUP Sample ID: **0407074-01CDUP** Test Code: **E120.1** Units: **µmhos/cm** Analysis Date: **07/12/04 0:00**
Client ID: **Inj Wells** Run ID: **WETCHEM_040712D** SeqNo: **506175** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Specific Conductance	7190	1.0	0	0	0	0-0	7200	0.139	20	

The following samples were analyzed in this batch: 0407074-01C

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J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
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E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21698 InstrumentID: IC201

MBLK Sample ID: WBLKW1-071204 Test Code: E300 Units: mg/L Analysis Date: 07/12/04 23:08
Client ID: Run ID: IC201_040712B SeqNo: 506929 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	0.50								
Sulfate	ND	1.0								
Surr: Dichloroacetic acid (surr)	5.26	0.10	5	0	105	80-120		0		

LCS Sample ID: WLCSW1-071204 Test Code: E300 Units: mg/L Analysis Date: 07/12/04 23:37
Client ID: Run ID: IC201_040712B SeqNo: 506930 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.89	0.50	10	0	98.9	80-120		0		
Sulfate	10.41	1.0	10	0	104	80-120		0		
Surr: Dichloroacetic acid (surr)	5.58	0.10	5	0	112	80-120		0		

LCSD Sample ID: WLCSW1DUP-071 Test Code: E300 Units: mg/L Analysis Date: 07/13/04 0:05
Client ID: Run ID: IC201_040712B SeqNo: 506931 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.9	0.50	10	0	99	80-120		0		
Sulfate	10.43	1.0	10	0	104	80-120		0		
Surr: Dichloroacetic acid (surr)	5.6	0.10	5	0	112	80-120		0		

MS Sample ID: 0407016-02AMS Test Code: E300 Units: mg/L Analysis Date: 07/13/04 1:31
Client ID: Run ID: IC201_040712B SeqNo: 506934 Prep Date: DF: 100

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	3695	50	1000	2719	97.6	75-125		0		
Sulfate	1255	100	1000	273	98.2	75-125		0		
Surr: Dichloroacetic acid (surr)	528	10	500	0	106	80-120		0		

MSD Sample ID: 0407016-02AMSD Test Code: E300 Units: mg/L Analysis Date: 07/13/04 1:59
Client ID: Run ID: IC201_040712B SeqNo: 506935 Prep Date: DF: 100

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	3686	50	1000	2719	96.7	75-125	3695	0.244	20	
Sulfate	1255	100	1000	273	98.2	75-125	1255	0	20	
Surr: Dichloroacetic acid (surr)	534	10	500	0	107	80-120	528	1.13	20	

ND - Not Detected at the Reporting Limit
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B - Analyte detected in assoc. Method Blank
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E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0407074
Project: Injection Wells

QC BATCH REPORT

Batch ID: R21698 InstrumentID: IC201

DUP Sample ID: 0407016-02ADUP Test Code: E300 Units: mg/L Analysis Date: 07/13/04 1:02
Client ID: Run ID: IC201_040712B SeqNo: 506933 Prep Date: DF: 100

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	2515	50	0	0	0	0-0	2719	7.8	20	
Sulfate	259	100	0	0	0	0-0	273	5.26	20	
Surr: Dichloroacetic acid (surr)	538	10	500	0	108	80-120	571	5.95	20	

DUP Sample ID: 0407076-04BDUP Test Code: E300 Units: mg/L Analysis Date: 07/13/04 11:01
Client ID: Run ID: IC201_040712B SeqNo: 506938 Prep Date: DF: 50

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	844	25	0	0	0	0-0	845.5	0.178	20	
Sulfate	2172	50	0	0	0	0-0	2174	0.115	20	
Surr: Dichloroacetic acid (surr)	279	5.0	250	0	112	80-120	284.5	1.95	20	

DUP Sample ID: 0407076-07BDUP Test Code: E300 Units: mg/L Analysis Date: 07/13/04 14:49
Client ID: Run ID: IC201_040712B SeqNo: 506944 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	3191	0.50	0	0	0	0-0	3183	0.227	20	E
Sulfate	4941	1.0	0	0	0	0-0	4912	0.6	20	E
Surr: Dichloroacetic acid (surr)	4.38	0.10	5	0	87.6	80-120	5.6	24.4	20	R

The following samples were analyzed in this batch: 0407074-01C

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

e-Lab, Inc.
10450 Stancliff Rd. #210
Houston, Texas 77099
(Tel) 281.530.5656
(Fax) 281.530.5887

Chain of Custody Form

Page ____ of ____

e-Lab, Inc.
3352 128th Avenue
Holland, Michigan 49424
(Tel) 616.399.6070
(Fax) 616.399.6185

e-Lab Project Manager:

e-Lab Work Order #: 04010

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	Injection Wells	A	VOC (8260)
Work Order		Project Number		B	SVOC (8270)
Company Name	Navajo Refining Company	Bill To Company	Navajo Refining Company	C	Tot Metals WQCC + Cations (6020)
Send Report To	Charlie Plymale	Invoice Attn	Charlie Plymale	D	Anions: Cl, SO4 (300)
Address	P.O. Box 159	Address	P.O. Box 159	E	Alkalinity (310.1)
				F	pH
City/State/Zip	Artesia, New Mexico 88211	City/State/Zip	Artesia, New Mexico 88211	G	TDS
Phone	(505) 748-3311	Phone	(505) 748-3311	H	Conductivity
Fax	(505) 746-5421	Fax	(505) 746-5421	I	Uranium
e-Mail Address		e-Mail Address		J	RCI

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	Inj. Wells	7/7/04	900			11	X	X	X	X	X	X	X	X	X	X	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Charlie Plymale

Shipment Method: Fed Ex

Required Turnaround Time: (Check Box) ☐ STD 10 WK Days ☐ 5 WK Days ☐ 2 WK Days ☐ 24 hour ☐ Other 10 Day TAT

Results Due Date:

Relinquished by:	Date: 7/7/04	Time: 1615	Received by:	Notes:	
Relinquished by:	Date:	Time:	Received by (Laboratory):	e-lab Cooler ID:	Cooler Temp.:
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):		

QC Package: (Check One Box Below)
- ☑ Level II Std QC
- ☐ Level III Std QC/Raw Data
- ☐ Level IV SW846/CLP
- ☐ Other

☐ TRRP Checklist
☐ TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to e-Lab, Inc.

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e-Lab Analytical, Inc.

Sample Receipt Checklist

Client Name NAVAJO REFINING — Date/Time Received: 7/8/2004 8:40:00 AM

Work Order Number 0407074 — Received by: FSM

Checklist completed by RICHARD SANCHEZ 7-8-04 (Signature / Date) — Reviewed by (Initials) 7/9/04 (Date)

Matrix: W — Carrier name FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	3.0c	002	
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐

Adjusted? _____ Checked by _____

Login Notes: Trip blank not on COC; logged in without analysis.

Any No and/or NA (not applicable) response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

e-Lab, Inc

Date: *July 19, 2004*

CLIENT: e-Lab, Inc
Project: 0407074
Work Order: 0407128

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0407128-01	0407074-01E	Water		7/7/2004 09:00	7/9/2004 10:00	☐

e-Lab, Inc

Date: *July 19, 2004*

CLIENT: e-Lab, Inc
Project: 0407074
Work Order: 0407128

Lab ID: 0407128-01A
Client Sample ID: 0407074-01E
Collection Date: 7/7/2004 9:00:00 AM
Matrix: WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
CYANIDE, REACTIVE		**EPA 7.3.3.2**				Analyst: **KAE**
Cyanide, Reactive	ND	0.0300		mg/Kg	1	7/16/2004
FLASHPOINT, P-M CLOSED-CUP		**ASTM D93**				Analyst: **MB**
Flashpoint, P-M Closed-cup	>200			°F	1	7/16/2004
SULFIDE, REACTIVE		**EPA 7.3.4.2**				Analyst: **KAE**
Sulfide, Reactive	ND	40.0		mg/Kg	1	7/16/2004

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	P - Dual Column results percent difference > 40%
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	H - Analyzed outside of Hold Time

e-Lab, Inc

CLIENT: e-Lab, Inc
Work Order: 0407128
Project: 0407074

Date: *Jul 19 2004*

QC BATCH REPORT

Batch ID: **R22476** InstrumentID: **WETCHEM**

LCS Sample ID: **WLCSW1-071504** Test Code: **ASTM D93** Units: **°F** Analysis Date **07/16/04 0:00**

Client ID: Run ID: **WETCHEM_040716G** SeqNo: **329758** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Flashpoint, P-M Closed-cup	80	0	81	0	98.8	97.5-102.4		0		

The following samples were analyzed in this batch: 0407128-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: e-Lab, Inc
Work Order: 0407128
Project: 0407074

QC BATCH REPORT

Batch ID: R22479 InstrumentID: WETCHEM

MBLK Sample ID: **WBLKW1-071504** Test Code: **EPA 7.3.3.2** Units: **mg/Kg** Analysis Date **07/16/04 0:00**
Client ID: Run ID: **WETCHEM_040716I** SeqNo: **329826** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	ND	0.030								

LCS Sample ID: **WLCSW1-071504** Test Code: **EPA 7.3.3.2** Units: **mg/Kg** Analysis Date **07/16/04 0:00**
Client ID: Run ID: **WETCHEM_040716I** SeqNo: **329827** Prep Date: DF: **25**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Reactive	4.238	0.75	19.71	0	21.5	5-100	0			

The following samples were analyzed in this batch: 0407128-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: e-Lab, Inc
Work Order: 0407128
Project: 0407074

QC BATCH REPORT

Batch ID: R22482 InstrumentID: WETCHEM

MBLK Sample ID: **WBLKW1-071604** Test Code: **EPA 7.3.4.2** Units: **mg/Kg** Analysis Date **07/16/04 0:00**

Client ID: Run ID: **WETCHEM_040716L** SeqNo: **329840** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfide, Reactive	ND	40								

The following samples were analyzed in this batch: 0407128-01A

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

040728

e-Lab

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Date: Jul 03, 2014
Work Order: 37[illegible]
Due Date: 7/10/2014

Customer Information		Project Information		Parameter/Method Request for Analysis
Purchase Order		Project Name	[illegible]	A: Cyan Blu, PASSIVE-GW-3-5
Work Order		Project Number		B: Cyan Blu, Passive [EVAB38]
Company Name	e-Lab Analytical, Inc.	Bill To Company	e-Lab Analytical, Inc.	C: Flashpoint@W[illegible]
Send Report To	Jeffery L Dacus	Invoice To	Accounts Payable	D:
Address	[illegible]	Address	1400 Smith St, Ste 830	E:
				F:
City/State/Zip	Houston, Texas 77058-4311	City/State/Zip	Houston, Texas 77002-6335	G:
Phone	(281) 589-0520	Phone	(713) 758-4052	H:
Fax	(281) 589-0525	Fax	(713) 758-4172	I:
eMail Address				J:

Sample ID	Matrix	Collection Date	Bottle	A	B	C	D	E	F	G	H
[illegible]	Water	7/2/2014 9:00	40 VOA DAT	X	X	X					

Comments:

Relinquished by:	Date/Time:	Received by:	Date/Time:	Cooler ID	Temp °C

e-Lab, Inc

Sample Receipt Checklist

Client Name ELAB-HOU

Date/Time Received: 7/9/2004 10:00:00 AM

Work Order Number 0407128

Received by: TL

Checklist completed by [signature] 7/9/04 (Signature, Date)

Reviewed by [signature] 7/9/04 (Initials, Date)

Matrix:

Carrier name FedEx

Shipping container/cooler in good condition?	Yes ✓	No	Not Present
Custody seals intact on shipping container/cooler?	Yes ✓	No	Not Present
Custody seals intact on sample bottles?	Yes	No	Not Present ✓
Chain of custody present?	Yes ✓	No	
Chain of custody signed when relinquished and received?	Yes ✓	No	
Chain of custody agrees with sample labels?	Yes ✓	No	
Samples in proper container/bottle?	Yes ✓	No	
Sample containers intact?	Yes ✓	No	
Sufficient sample volume for indicated test?	Yes ✓	No	
All samples received within holding time?	Yes ✓	No	
Container/Temp Blank temperature in compliance?	Yes ✓	No	
Temperature(s)/Thermometer(s):	1.8 C		
Water - VOA vials have zero headspace?	Yes	No	No VOA vials submitted ✓
Water - pH acceptable upon receipt?	Yes ✓	No	N/A

Adjusted? Checked b

Login Notes:

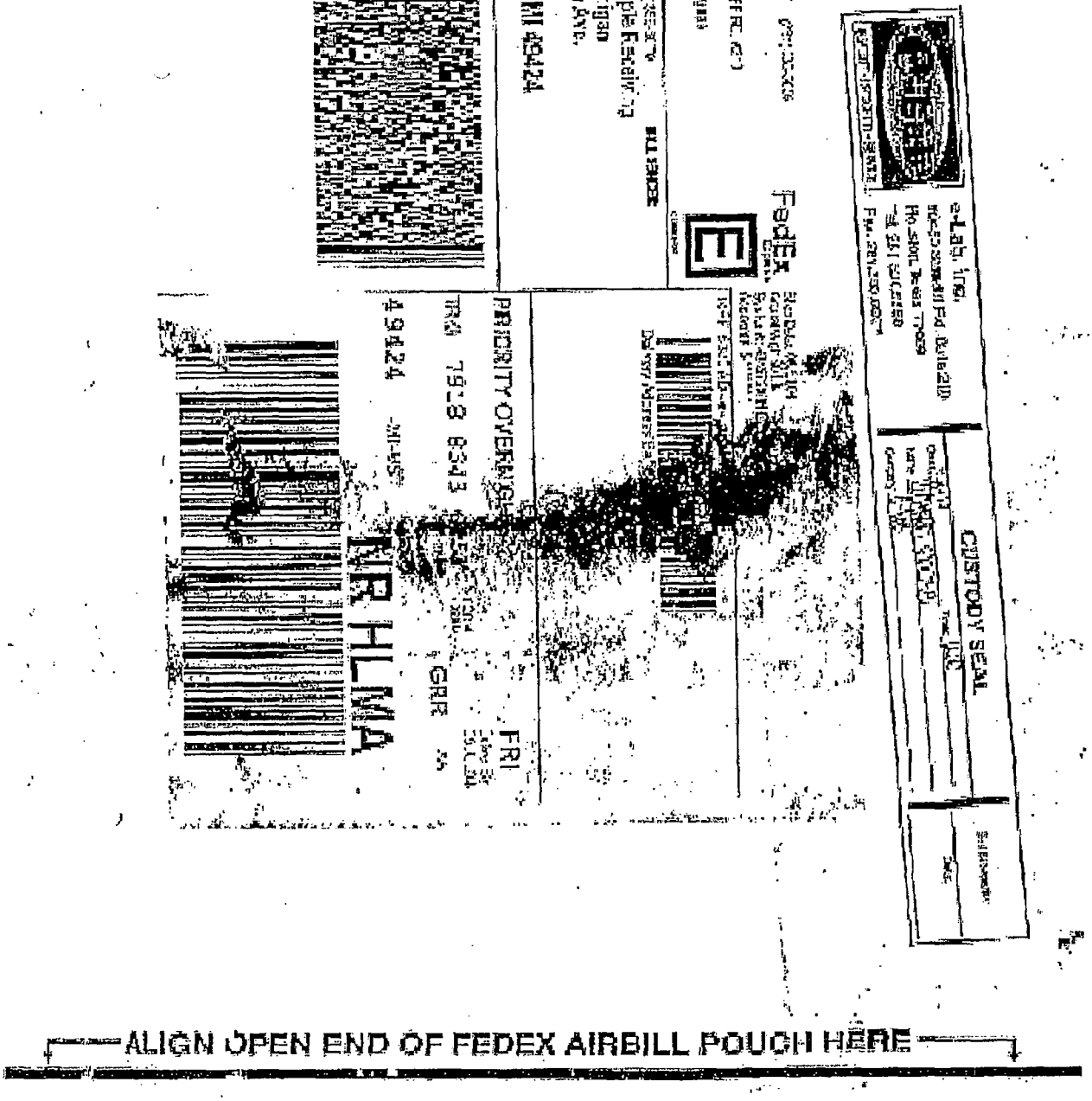
Any No and/or NA (not applicable) response must be detailed in the comments section below.

Client contacted Date contacted: Person contacted

Contacted by: Regarding:

Comments:

Corrective Action



ALIGN OPEN END OF FEDEX AIRBILL POUCH HERE

e-Lab Analytical, Inc.

10450 Stancliff Rd, Suite 210 Houston, Texas 77099-4338 281-530-5656 Fax 281-530-5887

December 23, 2004

Jeff Byrd
Navajo Refining Company
P.O. Box 159
Artesia, New Mexico 88211

Tel: (505) 746-5468
Fax: (505) 746-5421

Re: Injection Wells

Work Order : **0412005**

Dear Jeff Byrd,

e-Lab Analytical, Inc. received 1 sample on 12/1/2004 9:05:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by e-Lab Analytical, Inc. and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by e-Lab Analytical, Inc. The total number of pages in this report is 40.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Jeffrey L Croston

Electronically approved by: Jeffrey L Croston

Jeffrey L Croston

e-Lab Analytical, Inc.

Date: *December 23, 2004*

CLIENT: Navajo Refining Company
Project: Injection Wells
Work Order: 0412005

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
0412005-01	Inj Wells	Water		11/30/2004 07:30	12/1/2004 09:05	☐

e-Lab Analytical, Inc. **Date:** *December 23, 2004*

CLIENT: Navajo Refining Company
Project: Injection Wells
Work Order: 0412005

Case Narrative

Batch 11292 Metals MS/MSD was an unrelated sample.

Batch 11279 Semivolatiles MS/MSD were unrelated sample.

Batch R25184 Volatiles MS/MSD was an unrelated sample.

e-Lab Analytical, Inc.

Date: *December 23, 2004*

CLIENT:	Navajo Refining Company	**Client Sample ID:**	Inj Wells
Work Order:	0412005	**Collection Date:**	11/30/2004 7:30:00 AM
Project:	Injection Wells		
Lab ID:	0412005-01	**Matrix:**	WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
MERCURY, TOTAL		**SW7470**			Prep Date: **12/7/2004**	Analyst: **JCJ**
Mercury	ND	0.000200		mg/L	1	12/8/2004 4:29:34 PM
ICP METALS, TOTAL		**SW6020**			Prep Date: **12/3/2004**	Analyst: **SA**
Aluminum	0.0414	0.0100		mg/L	1	12/10/2004 9:00:00 PM
Arsenic	0.193	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Barium	0.0187	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Beryllium	ND	0.00200		mg/L	1	12/10/2004 9:00:00 PM
Boron	0.211	0.200		mg/L	10	12/9/2004 9:13:00 PM
Cadmium	ND	0.00100		mg/L	1	12/10/2004 9:00:00 PM
Calcium	172	25.0		mg/L	50	12/9/2004 5:23:00 PM
Chromium	ND	0.00200		mg/L	1	12/10/2004 9:00:00 PM
Cobalt	0.00208	0.00200		mg/L	1	12/10/2004 9:00:00 PM
Copper	0.00888	0.00200		mg/L	1	12/10/2004 9:00:00 PM
Iron	0.304	0.200		mg/L	1	12/10/2004 9:00:00 PM
Lead	ND	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Magnesium	22.7	0.200		mg/L	1	12/10/2004 9:00:00 PM
Manganese	0.0658	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Molybdenum	0.00632	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Nickel	0.0286	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Potassium	26.6	0.200		mg/L	1	12/10/2004 9:00:00 PM
Selenium	0.300	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Silver	ND	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Sodium	1,880	10.0		mg/L	50	12/9/2004 5:23:00 PM
Vanadium	0.0117	0.00500		mg/L	1	12/10/2004 9:00:00 PM
Zinc	0.0541	0.00500		mg/L	1	12/10/2004 9:00:00 PM
SEMIVOLATILE ORGANICS BY GC/MS		**SW8270**			Prep Date: **12/1/2004**	Analyst: **HV**
1,2,4-Trichlorobenzene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
2,4,5-Trichlorophenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
2,4,6-Trichlorophenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
2-Methylnaphthalene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
2-Methylphenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
2-Nitroaniline	ND	11		µg/L	1	12/3/2004 10:18:00 PM
2-Nitrophenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
3&4-Methylphenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
3-Nitroaniline	ND	11		µg/L	1	12/3/2004 10:18:00 PM
4-Nitroaniline	ND	11		µg/L	1	12/3/2004 10:18:00 PM
4-Nitrophenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Acenaphthene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Acenaphthylene	ND	11		µg/L	1	12/3/2004 10:18:00 PM

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	P - Dual Column results percent difference > 40%
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	H - Analyzed outside of Hold Time

e-Lab Analytical, Inc.

Date: *December 23, 2004*

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells
Lab ID: 0412005-01

Client Sample ID: Inj Wells
Collection Date: 11/30/2004 7:30:00 AM
Matrix: WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
Aniline	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Anthracene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Benz(a)anthracene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Benzidine	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Hexachloroethane	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Indeno(1,2,3-cd)pyrene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Isophorone	ND	11		µg/L	1	12/3/2004 10:18:00 PM
N-Nitrosodi-n-propylamine	ND	11		µg/L	1	12/3/2004 10:18:00 PM
N-Nitrosodimethylamine	ND	11		µg/L	1	12/3/2004 10:18:00 PM
N-Nitrosodiphenylamine	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Naphthalene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Nitrobenzene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Pentachlorophenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Phenanthrene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Phenol	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Pyrene	ND	11		µg/L	1	12/3/2004 10:18:00 PM
Surr: 2,4,6-Tribromophenol	108	39-153		%REC	1	12/3/2004 10:18:00 PM
Surr: 2-Fluorobiphenyl	89.2	40-147		%REC	1	12/3/2004 10:18:00 PM
Surr: 2-Fluorophenol	46.8	21-110		%REC	1	12/3/2004 10:18:00 PM
Surr: 4-Terphenyl-d14	93.6	39-141		%REC	1	12/3/2004 10:18:00 PM
Surr: Nitrobenzene-d5	88.3	37-140		%REC	1	12/3/2004 10:18:00 PM
Surr: Phenol-d6	24.9	11-100		%REC	1	12/3/2004 10:18:00 PM
VOLATILES BY GC/MS		**SW8260**				Analyst: **PC**
1,1,1-Trichloroethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
1,1,2,2-Tetrachloroethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
1,1,2-Trichloroethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
1,1-Dichloroethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
1,1-Dichloroethene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
1,2-Dichloroethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
2-Butanone	ND	10		µg/L	1	12/10/2004 7:44:00 PM
2-Chloroethyl vinyl ether	ND	10		µg/L	1	12/10/2004 7:44:00 PM
2-Hexanone	ND	10		µg/L	1	12/10/2004 7:44:00 PM
4-Methyl-2-pentanone	ND	10		µg/L	1	12/10/2004 7:44:00 PM
Acetone	39	10		µg/L	1	12/10/2004 7:44:00 PM
Benzene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Bromodichloromethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Bromoform	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Bromomethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Carbon disulfide	ND	10		µg/L	1	12/10/2004 7:44:00 PM
Carbon tetrachloride	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time

e-Lab Analytical, Inc.

Date: *December 23, 2004*

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells
Lab ID: 0412005-01

Client Sample ID: Inj Wells
Collection Date: 11/30/2004 7:30:00 AM
Matrix: WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
Chlorobenzene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Chloroethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Chloroform	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Chloromethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
cis-1,3-Dichloropropene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Dibromochloromethane	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Ethylbenzene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
m,p-Xylene	ND	10		µg/L	1	12/10/2004 7:44:00 PM
Methylene chloride	ND	10		µg/L	1	12/10/2004 7:44:00 PM
Styrene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Tetrachloroethene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Toluene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
trans-1,3-Dichloropropene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Trichloroethene	ND	5.0		µg/L	1	12/10/2004 7:44:00 PM
Vinyl acetate	ND	10		µg/L	1	12/10/2004 7:44:00 PM
Vinyl chloride	ND	2.0		µg/L	1	12/10/2004 7:44:00 PM
Xylenes, Total	ND	15		µg/L	1	12/10/2004 7:44:00 PM
Surr: 1,2-Dichloroethane-d4	105	71-126		%REC	1	12/10/2004 7:44:00 PM
Surr: 4-Bromofluorobenzene	80.8	74-125		%REC	1	12/10/2004 7:44:00 PM
Surr: Dibromofluoromethane	96.4	73-126		%REC	1	12/10/2004 7:44:00 PM
Surr: Toluene-d8	80.4	75-125		%REC	1	12/10/2004 7:44:00 PM
FLASHPOINT		**SW1010**				Analyst: MAG
Ignitability	>196	50		°F	1	12/6/2004
CYANIDE, REACTIVE		**SW-846**				Analyst: MAG
Reactive Cyanide	ND	0.0300		mg/Kg	1	12/2/2004
SULFIDE, REACTIVE		**SW-846**				Analyst: MAG
Reactive Sulfide	ND	40.0		mg/Kg	1	12/2/2004
ANIONS BY ION CHROMATOGRAPHY		**E300**				Analyst: MG
Chloride	1,200	50.0		mg/L	100	12/8/2004 11:32:00 PM
Sulfate	2,450	100		mg/L	100	12/8/2004 11:32:00 PM
Surr: Dichloroacetic acid (surr)	102	80-120		%REC	100	12/8/2004 11:32:00 PM
ALKALINITY		**E310.1**				Analyst: IGF
Alkalinity, Bicarbonate (As CaCO3)	132	5.00		mg/L	1	12/6/2004
Alkalinity, Carbonate (As CaCO3)	ND	5.00		mg/L	1	12/6/2004
Alkalinity, Hydroxide (As CaCO3)	ND	5.00		mg/L	1	12/6/2004
Alkalinity, Total (As CaCO3)	132	5.00		mg/L	1	12/6/2004
CONDUCTIVITY		**E120.1**				Analyst: IGF
Specific Conductance	6,350	1.00		µmhos/cm	1	12/3/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
P - Dual Column results percent difference > 40%
E - Value above quantitation range
H - Analyzed outside of Hold Time

e-Lab Analytical, Inc.

Date: *December 23, 2004*

CLIENT:	Navajo Refining Company	**Client Sample ID:**	Inj Wells
Work Order:	0412005	**Collection Date:**	11/30/2004 7:30:00 AM
Project:	Injection Wells		
Lab ID:	0412005-01	**Matrix:**	WATER

Analyses	Result	Report Limit	Qual	Units	Dilution Factor	Date Analyzed
PH		**E150.1**				Analyst: **IGF**
pH	7.19	0.100		pH units	1	12/1/2004
TOTAL DISSOLVED SOLIDS		**E160.1**				Analyst: **MG**
Total Dissolved Solids (Residue, Filterable)	4,940	10.0		mg/L	1	12/3/2004

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	P - Dual Column results percent difference > 40%
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	H - Analyzed outside of Hold Time

e-Lab Analytical, Inc.

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

Date: *Dec 23 2004*

QC BATCH REPORT

Batch ID: **11292** InstrumentID: **ICP4500**

MBLK Sample ID: **MBLKW1-120304** Test Code: **SW6020** Units: **mg/L** Analysis Date: **12/08/04 15:12**

Client ID: Run ID: **ICP4500_041208A** SeqNo: **585425** Prep Date: **12/3/2004** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	ND	0.010								
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Copper	ND	0.0050								
Iron	ND	0.20								
Lead	0.0006782	0.0050								J
Magnesium	ND	0.20								
Manganese	ND	0.0050								
Molybdenum	ND	0.0050								
Nickel	ND	0.0050								
Potassium	ND	0.20								
Selenium	ND	0.0050								
Silver	ND	0.0050								
Sodium	0.07729	0.20								J
Vanadium	ND	0.0050								
Zinc	0.0021	0.0050								J

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J - Analyte detected below quantitation limits
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S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: **11292** InstrumentID: **ICP4500**

LCS Sample ID: **MLCSW1-120304** Test Code: **SW6020** Units: **mg/L** Analysis Date: **12/08/04 15:17**

Client ID: Run ID: **ICP4500_041208A** SeqNo: **585426** Prep Date: **12/3/2004** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.04516	0.010	0.05	0	90.3	79-126	0			
Arsenic	0.04774	0.0050	0.05	0	95.5	80-121	0			
Barium	0.04532	0.0050	0.05	0	90.6	79.8-119	0			
Beryllium	0.04939	0.0020	0.05	0	98.8	78.9-120	0			
Boron	0.5121	0.020	0.5	0	102	80-120	0			
Cadmium	0.05014	0.0020	0.05	0	100	79.1-119	0			
Calcium	4.515	0.50	5	0	90.3	80-121	0			
Chromium	0.04476	0.0050	0.05	0	89.5	79.3-121	0			
Cobalt	0.04611	0.0050	0.05	0	92.2	82-121	0			
Copper	0.04562	0.0050	0.05	0	91.2	81-120	0			
Iron	4.832	0.20	5	0	96.6	80-120	0			
Lead	0.04448	0.0050	0.05	0	89	80-118	0			
Magnesium	4.737	0.20	5	0	94.7	80-120	0			
Manganese	0.0458	0.0050	0.05	0	91.6	82-119	0			
Molybdenum	0.04286	0.0050	0.05	0	85.7	81-115	0			
Nickel	0.0465	0.0050	0.05	0	93	82-120	0			
Potassium	4.477	0.20	5	0	89.5	80-120	0			
Selenium	0.04793	0.0050	0.05	0	95.9	79.2-118	0			
Silver	0.04639	0.0050	0.05	0	92.8	80-117	0			
Sodium	4.588	0.20	5	0	91.8	80.6-119	0			
Vanadium	0.04421	0.0050	0.05	0	88.4	82.1-119	0			
Zinc	0.04855	0.0050	0.05	0	97.1	79-118	0			

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P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11292 InstrumentID: ICP4500

MS Sample ID: 0411323-01CMS Test Code: SW6020 Units: mg/L Analysis Date: 12/13/04 17:14

Client ID: Run ID: ICP7500_041213A SeqNo: 587685 Prep Date: 12/3/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1069	0.010	0.05	0.5579	-902	79-126	0			SO
Arsenic	0.05512	0.0050	0.05	0.006109	98	80-121	0			
Barium	0.09539	0.0050	0.05	0.05106	88.7	79.8-119	0			
Beryllium	0.04669	0.0020	0.05	0	93.4	78.9-120	0			
Boron	0.7308	0.020	0.5	0.2504	96.1	80-120	0			
Cadmium	0.04737	0.0020	0.05	0	94.7	79.1-119	0			
Calcium	264.3	0.50	5	266.5	-44	80-121	0			SEO
Chromium	0.04732	0.0050	0.05	0.0007623	93.1	79.3-121	0			
Cobalt	0.04668	0.0050	0.05	0.001722	89.9	82-121	0			
Copper	0.04436	0.0050	0.05	0.0009763	86.8	80-120	0			
Iron	6.504	0.20	5	2.249	85.1	80-120	0			
Lead	0.04604	0.0050	0.05	0.000464	91.2	80-118	0			
Magnesium	114.1	0.20	5	106.8	146	80-120	0			SEO
Manganese	0.1654	0.0050	0.05	0.1179	95	82-119	0			
Molybdenum	0.05048	0.0050	0.05	0.00484	91.3	81-115	0			
Nickel	0.05074	0.0050	0.05	0.006594	88.3	82-120	0			
Potassium	5.203	0.20	5	0.5493	93.1	80-120	0			
Selenium	0.04587	0.0050	0.05	0	91.7	79.2-118	0			
Silver	0.03777	0.0050	0.05	0	75.5	80-117	0			S
Sodium	40.61	0.20	5	34.32	126	80.6-119	0			SO
Vanadium	0.04854	0.0050	0.05	0.001477	94.1	82.1-119	0			
Zinc	0.07754	0.0050	0.05	0.02374	108	79-118	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
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R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11292 InstrumentID: ICP4500

MSD Sample ID: 0411323-01CMSD Test Code: SW6020 Units: mg/L Analysis Date: 12/13/04 17:25
Client ID: Run ID: ICP7500_041213A SeqNo: 587686 Prep Date: 12/3/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.09847	0.010	0.05	0.5579	-919	79-126	0.1069	8.21	15	SO
Arsenic	0.05478	0.0050	0.05	0.006109	97.3	80-121	0.05512	0.619	15	
Barium	0.09357	0.0050	0.05	0.05106	85	79.8-119	0.09539	1.93	15	
Beryllium	0.04578	0.0020	0.05	0	91.6	78.9-120	0.04669	1.97	15	
Boron	0.7187	0.020	0.5	0.2504	93.7	80-120	0.7308	1.67	15	
Cadmium	0.04671	0.0020	0.05	0	93.4	79.1-119	0.04737	1.4	15	
Calcium	264.8	0.50	5	266.5	-34	80-121	264.3	0.189	15	SEO
Chromium	0.04649	0.0050	0.05	0.0007623	91.5	79.3-121	0.04732	1.77	15	
Cobalt	0.04571	0.0050	0.05	0.001722	88	82-121	0.04668	2.1	15	
Copper	0.04363	0.0050	0.05	0.0009763	85.3	81-120	0.04436	1.66	15	
Iron	6.331	0.20	5	2.249	81.6	80-120	6.504	2.7	15	
Lead	0.04463	0.0050	0.05	0.000464	88.3	80-118	0.04604	3.11	15	
Magnesium	111.1	0.20	5	106.8	86	80-120	114.1	2.66	15	EO
Manganese	0.1615	0.0050	0.05	0.1179	87.2	82-119	0.1654	2.39	15	
Molybdenum	0.0504	0.0050	0.05	0.00484	91.1	81-115	0.05048	0.159	15	
Nickel	0.04918	0.0050	0.05	0.006594	85.2	82-120	0.05074	3.12	15	
Potassium	5.187	0.20	5	0.5493	92.8	80-120	5.203	0.308	15	
Selenium	0.04899	0.0050	0.05	0	98	79.2-118	0.04587	6.58	15	
Silver	0.03712	0.0050	0.05	0	74.2	80-117	0.03777	1.74	15	S
Sodium	39.2	0.20	5	34.32	97.6	80.6-119	40.61	3.53	15	O
Vanadium	0.0472	0.0050	0.05	0.001477	91.4	82.1-119	0.04854	2.8	15	
Zinc	0.04375	0.0050	0.05	0.02374	40	79-118	0.07754	55.7	15	SR

DUP Sample ID: 0411323-01CDUP Test Code: SW6020 Units: mg/L Analysis Date: 12/08/04 15:26
Client ID: Run ID: ICP4500_041208A SeqNo: 585428 Prep Date: 12/3/2004 DF: 50

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	242.3	25	0	0	0	0-0	237.6	1.96	25	

DUP Sample ID: 0411323-01CDUP Test Code: SW6020 Units: mg/L Analysis Date: 12/09/04 17:33
Client ID: Run ID: ICP4500_041209A SeqNo: 586207 Prep Date: 12/3/2004 DF: 10

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Magnesium	104	2.0	0	0	0	0-0	94.02	10.1	25	

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B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11292 InstrumentID: ICP4500

DUP Sample ID: 0411323-01CDUP Test Code: SW6020 Units: mg/L Analysis Date: 12/13/04 17:08

Client ID: Run ID: ICP7500_041213A SeqNo: 587684 Prep Date: 12/3/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.5114	0.010	0	0	0	0-0	0.5579	8.7	25	
Arsenic	0.007011	0.0050	0	0	0	0-0	0.006109	13.8	25	
Barium	0.04884	0.0050	0	0	0	0-0	0.05106	4.44	25	
Beryllium	ND	0.0020	0	0	0	0-0	0.00004484	0	25	
Boron	0.2336	0.020	0	0	0	0-0	0.2504	6.94	25	
Cadmium	ND	0.0020	0	0	0	0-0	0.00002551	0	25	
Chromium	0.00112	0.0050	0	0	0	0-0	0.0007623	0	25	J
Cobalt	0.001584	0.0050	0	0	0	0-0	0.001722	0	25	J
Copper	0.0007835	0.0050	0	0	0	0-0	0.0009763	0	25	J
Iron	2.272	0.20	0	0	0	0-0	2.249	1.02	25	
Lead	0.0005578	0.0050	0	0	0	0-0	0.000464	0	25	J
Manganese	0.118	0.0050	0	0	0	0-0	0.1179	0.0848	25	
Molybdenum	0.004888	0.0050	0	0	0	0-0	0.00484	0	25	J
Nickel	0.006244	0.0050	0	0	0	0-0	0.006594	5.45	25	
Potassium	0.1045	0.20	0	0	0	0-0	0.5493	0	25	J
Selenium	ND	0.0050	0	0	0	0-0	0.00126	0	25	
Silver	ND	0.0050	0	0	0	0-0	0.00001912	0	25	
Sodium	34.43	0.20	0	0	0	0-0	34.32	0.32	25	
Vanadium	0.001493	0.0050	0	0	0	0-0	0.001477	0	25	J
Zinc	0.02671	0.0050	0	0	0	0-0	0.02374	11.8	25	

The following samples were analyzed in this batch: 0412005-01B

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: **11333** InstrumentID: **Mercury**

MBLK Sample ID: **GBLKW2-120704** Test Code: **SW7470** Units: **mg/L** Analysis Date: **12/08/04 15:16**
Client ID: Run ID: **MERCURY_041208B** SeqNo: **585330** Prep Date: **12/7/2004** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020								

LCS Sample ID: **GLCSW2-120704** Test Code: **SW7470** Units: **mg/L** Analysis Date: **12/08/04 15:18**
Client ID: Run ID: **MERCURY_041208B** SeqNo: **585331** Prep Date: **12/7/2004** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00516	0.00020	0.005	0	103	83-115		0		

LCSD Sample ID: **GLCSDW2-120704** Test Code: **SW7470** Units: **mg/L** Analysis Date: **12/08/04 15:19**
Client ID: Run ID: **MERCURY_041208B** SeqNo: **585332** Prep Date: **12/7/2004** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00525	0.00020	0.005	0	105	83-115	0.00516	1.73	20	

MS Sample ID: **0411323-05CMS** Test Code: **SW7470** Units: **mg/L** Analysis Date: **12/08/04 15:24**
Client ID: Run ID: **MERCURY_041208B** SeqNo: **585335** Prep Date: **12/7/2004** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00521	0.00020	0.005	-0.00001	104	83-115		0		

MSD Sample ID: **0411323-05CMSD** Test Code: **SW7470** Units: **mg/L** Analysis Date: **12/08/04 15:25**
Client ID: Run ID: **MERCURY_041208B** SeqNo: **585336** Prep Date: **12/7/2004** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00537	0.00020	0.005	-0.00001	108	83-115	0.00521	3.02	20	

DUP Sample ID: **0411323-05CDUP** Test Code: **SW7470** Units: **mg/L** Analysis Date: **12/08/04 15:22**
Client ID: Run ID: **MERCURY_041208B** SeqNo: **585334** Prep Date: **12/7/2004** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020	0	0	0	0-0	-0.00001	0	20	

The following samples were analyzed in this batch: 0412005-01B

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11279 InstrumentID: SV-3

MBLK Sample ID: SBLKW1-041201 Test Code: SW8270 Units: µg/L Analysis Date: 12/06/04 19:16

Client ID: Run ID: SV-3_041206A SeqNo: 584523 Prep Date: 12/1/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
2-Nitroaniline	ND	10								
2-Nitrophenol	ND	10								
3&4-Methylphenol	ND	10								
3-Nitroaniline	ND	10								
4-Nitroaniline	ND	10								
4-Nitrophenol	ND	10								
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Benz(a)anthracene	ND	10								
Benzidine	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	10								
Isophorone	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodimethylamine	ND	10								
N-Nitrosodiphenylamine	ND	10								
Naphthalene	ND	10								
Nitrobenzene	ND	10								
Pentachlorophenol	ND	10								
Phenanthrene	ND	10								
Phenol	ND	10								
Pyrene	ND	10								
1,4-Dichlorobenzene-d4	40	0								
Acenaphthene-d10	40	0								
Chrysene-d12	40	0								
Naphthalene-d8	40	0								
Perylene-d12	40	0								
Phenanthrene-d10	40	0								
Surr: 2,4,6-Tribromophenol	111.4	10	100	0	111	39-153	0			
Surr: 2-Fluorobiphenyl	94.94	10	100	0	94.9	40-147	0			
Surr: 2-Fluorophenol	41.49	10	100	0	41.5	21-110	0			
Surr: 4-Terphenyl-d14	92.33	10	100	0	92.3	39-141	0			
Surr: Nitrobenzene-d5	92.12	10	100	0	92.1	37-140	0			
Surr: Phenol-d6	24.52	10	100	0	24.5	11-100	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11279 InstrumentID: SV-3

LCS Sample ID: SLCSW1-041201 Test Code: SW8270 Units: µg/L Analysis Date: 12/06/04 19:42

Client ID: Run ID: SV-3_041206A SeqNo: 584524 Prep Date: 12/1/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	46.41	10	50	0	92.8	50-115	0			
2,4,5-Trichlorophenol	85.9	10	100	0	85.9	68-128	0			
2,4,6-Trichlorophenol	80.73	10	100	0	80.7	66-125	0			
2-Methylnaphthalene	42.71	10	50	0	85.4	47-122	0			
2-Methylphenol	62.35	10	100	0	62.4	51-115	0			
2-Nitroaniline	40.81	10	50	0	81.6	64-128	0			
2-Nitrophenol	85.56	10	100	0	85.6	60-119	0			
3&4-Methylphenol	83.39	10	150	0	55.6	44-115	0			
3-Nitroaniline	31.82	10	50	0	63.6	61-118	0			
4-Nitroaniline	35.23	10	50	0	70.5	61-123	0			
4-Nitrophenol	38.6	10	100	0	38.6	17-100	0			
Acenaphthene	47.59	10	50	0	95.2	68-115	0			
Acenaphthylene	45.62	10	50	0	91.2	67-116	0			
Aniline	28.31	10	50	0	56.6	40-130	0			
Anthracene	51.46	10	50	0	103	70-129	0			
Benz(a)anthracene	45.47	10	50	0	90.9	55-131	0			
Benzidine	7.922	10	50	0	15.8	10-115	0			J
Hexachloroethane	44.02	10	50	0	88	46-115	0			
Indeno(1,2,3-cd)pyrene	45.47	10	50	0	90.9	42-123	0			
Isophorone	43.19	10	50	0	86.4	63-117	0			
N-Nitrosodi-n-propylamine	41.82	10	50	0	83.6	67-115	0			
N-Nitrosodimethylamine	18.78	10	50	0	37.6	28-115	0			
N-Nitrosodiphenylamine	52.16	10	50	0	104	72-144	0			
Naphthalene	47.05	10	50	0	94.1	52-115	0			
Nitrobenzene	42.92	10	50	0	85.8	65-115	0			
Pentachlorophenol	88.33	10	100	0	88.3	65-123	0			
Phenanthrene	49.68	10	50	0	99.4	69-119	0			
Phenol	28.84	10	100	0	28.8	16-115	0			
Pyrene	47.04	10	50	0	94.1	51-130	0			
Surr: 2,4,6-Tribromophenol	104.5	10	100	0	105	39-153	0			
Surr: 2-Fluorobiphenyl	88	10	100	0	88	40-147	0			
Surr: 2-Fluorophenol	42.87	10	100	0	42.9	21-110	0			
Surr: 4-Terphenyl-d14	92.9	10	100	0	92.9	39-141	0			
Surr: Nitrobenzene-d5	84.16	10	100	0	84.2	37-140	0			
Surr: Phenol-d6	26.45	10	100	0	26.5	11-100	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11279 InstrumentID: SV-3

MS Sample ID: 0411323-01DMS Test Code: SW8270 Units: µg/L Analysis Date: 12/06/04 20:34
Client ID: Run ID: SV-3_041206A SeqNo: 584526 Prep Date: 12/1/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	43.38	10	50	0	86.8	50-115	0			
2,4,5-Trichlorophenol	90.42	10	100	0	90.4	68-128	0			
2,4,6-Trichlorophenol	85.7	10	100	0	85.7	66-125	0			
2-Methylnaphthalene	43.28	10	50	0	86.6	47-122	0			
2-Methylphenol	64.36	10	100	0	64.4	51-115	0			
2-Nitroaniline	43.16	10	50	0	86.3	64-128	0			
2-Nitrophenol	86.59	10	100	0	86.6	60-119	0			
3&4-Methylphenol	86.42	10	150	0	57.6	44-115	0			
3-Nitroaniline	33.78	10	50	0	67.6	61-118	0			
4-Nitroaniline	38.79	10	50	0	77.6	61-123	0			
4-Nitrophenol	36.47	10	100	0	36.5	17-100	0			
Acenaphthene	48.47	10	50	0	96.9	68-115	0			
Acenaphthylene	47.05	10	50	0	94.1	67-116	0			
Aniline	32.99	10	50	0	66	40-130	0			
Anthracene	51.79	10	50	0	104	70-129	0			
Benz(a)anthracene	49.25	10	50	0	98.5	55-131	0			
Benzidine	6.74	10	50	0	13.5	10-115	0			J
Hexachloroethane	36.94	10	50	0	73.9	46-115	0			
Indeno(1,2,3-cd)pyrene	49.15	10	50	0	98.3	42-123	0			
Isophorone	45.12	10	50	0	90.2	63-117	0			
N-Nitrosodi-n-propylamine	43.97	10	50	0	87.9	67-115	0			
N-Nitrosodimethylamine	17.91	10	50	0	35.8	28-115	0			
N-Nitrosodiphenylamine	53.36	10	50	0	107	72-144	0			
Naphthalene	45.94	10	50	0	91.9	52-115	0			
Nitrobenzene	44.54	10	50	0	89.1	65-115	0			
Pentachlorophenol	94.58	10	100	0	94.6	65-123	0			
Phenanthrene	50.51	10	50	0	101	69-119	0			
Phenol	29.37	10	100	0	29.4	16-115	0			
Pyrene	48.25	10	50	0	96.5	51-130	0			
Surr: 2,4,6-Tribromophenol	101.5	10	100	0	102	39-153	0			
Surr: 2-Fluorobiphenyl	84.74	10	100	0	84.7	40-147	0			
Surr: 2-Fluorophenol	39.74	10	100	0	39.7	21-110	0			
Surr: 4-Terphenyl-d14	90.52	10	100	0	90.5	39-141	0			
Surr: Nitrobenzene-d5	82.8	10	100	0	82.8	37-140	0			
Surr: Phenol-d6	25.63	10	100	0	25.6	11-100	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11279 InstrumentID: SV-3

MS Sample ID: 0411323-05DMS Test Code: SW8270 Units: µg/L Analysis Date: 12/06/04 21:52

Client ID: Run ID: SV-3_041206A SeqNo: 584529 Prep Date: 12/1/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	44.27	10	50	0	88.5	50-115	0			
2,4,5-Trichlorophenol	93.28	10	100	0	93.3	68-128	0			
2,4,6-Trichlorophenol	83.02	10	100	0	83	66-125	0			
2-Methylnaphthalene	45.01	10	50	0	90	47-122	0			
2-Methylphenol	64.66	10	100	0	64.7	51-115	0			
2-Nitroaniline	45.32	10	50	0	90.6	64-128	0			
2-Nitrophenol	89.99	10	100	0	90	60-119	0			
3&4-Methylphenol	85.58	10	150	0	57.1	44-115	0			
3-Nitroaniline	36.65	10	50	0	73.3	61-118	0			
4-Nitroaniline	39.1	10	50	0	78.2	61-123	0			
4-Nitrophenol	40.12	10	100	0	40.1	17-100	0			
Acenaphthene	48.32	10	50	0	96.6	68-115	0			
Acenaphthylene	47.27	10	50	0	94.5	67-116	0			
Aniline	30.49	10	50	0	61	40-130	0			
Anthracene	52.19	10	50	0	104	70-129	0			
Benz(a)anthracene	49.77	10	50	0	99.5	55-131	0			
Benzidine	ND	10	50	0	0	10-115	0			S
Hexachloroethane	35.92	10	50	0	71.8	46-115	0			
Indeno(1,2,3-cd)pyrene	50.64	10	50	0	101	42-123	0			
Isophorone	47.44	10	50	0	94.9	63-117	0			
N-Nitrosodi-n-propylamine	43.49	10	50	0	87	67-115	0			
N-Nitrosodimethylamine	19.55	10	50	0	39.1	28-115	0			
N-Nitrosodiphenylamine	53.06	10	50	0	106	72-144	0			
Naphthalene	46.32	10	50	0	92.6	52-115	0			
Nitrobenzene	44.87	10	50	0	89.7	65-115	0			
Pentachlorophenol	95.19	10	100	0	95.2	65-123	0			
Phenanthrene	50.74	10	50	0	101	69-119	0			
Phenol	30.24	10	100	0	30.2	16-115	0			
Pyrene	48.75	10	50	0	97.5	51-130	0			
Surr: 2,4,6-Tribromophenol	109.7	10	100	0	110	39-153	0			
Surr: 2-Fluorobiphenyl	86.29	10	100	0	86.3	40-147	0			
Surr: 2-Fluorophenol	44.57	10	100	0	44.6	21-110	0			
Surr: 4-Terphenyl-d14	92.93	10	100	0	92.9	39-141	0			
Surr: Nitrobenzene-d5	87.65	10	100	0	87.7	37-140	0			
Surr: Phenol-d6	28.07	10	100	0	28.1	11-100	0			

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11279 InstrumentID: SV-3

MSD Sample ID: 0411323-01DMS Test Code: SW8270 Units: µg/L Analysis Date: 12/06/04 21:00

Client ID: Run ID: SV-3_041206A SeqNo: 584527 Prep Date: 12/1/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	43.32	10	50	0	86.6	50-115	43.38	0.129	30	
2,4,5-Trichlorophenol	94.48	10	100	0	94.5	68-128	90.42	4.39	30	
2,4,6-Trichlorophenol	86.55	10	100	0	86.6	66-125	85.7	0.994	30	
2-Methylnaphthalene	44.24	10	50	0	88.5	47-122	43.28	2.19	30	
2-Methylphenol	68.14	10	100	0	68.1	51-115	64.36	5.71	30	
2-Nitroaniline	45.64	10	50	0	91.3	64-128	43.16	5.59	30	
2-Nitrophenol	90.48	10	100	0	90.5	60-119	86.59	4.4	30	
3&4-Methylphenol	91.48	10	150	0	61	44-115	86.42	5.69	30	
3-Nitroaniline	34.37	10	50	0	68.7	61-118	33.78	1.73	30	
4-Nitroaniline	41.5	10	50	0	83	61-123	38.79	6.75	30	
4-Nitrophenol	39.15	10	100	0	39.2	17-100	36.47	7.1	30	
Acenaphthene	50.19	10	50	0	100	68-115	48.47	3.49	30	
Acenaphthylene	48.71	10	50	0	97.4	67-116	47.05	3.46	30	
Aniline	32.02	10	50	0	64	40-130	32.99	3.01	30	
Anthracene	53.42	10	50	0	107	70-129	51.79	3.1	30	
Benz(a)anthracene	48.44	10	50	0	96.9	55-131	49.25	1.68	30	
Benzidine	1.612	10	50	0	3.22	10-115	6.74	0	30	JS
Hexachloroethane	37.56	10	50	0	75.1	46-115	36.94	1.67	30	
Indeno(1,2,3-cd)pyrene	48.03	10	50	0	96.1	42-123	49.15	2.29	30	
Isophorone	46.72	10	50	0	93.4	63-117	45.12	3.49	30	
N-Nitrosodi-n-propylamine	46.57	10	50	0	93.1	67-115	43.97	5.74	30	
N-Nitrosodimethylamine	18.67	10	50	0	37.3	28-115	17.91	4.15	30	
N-Nitrosodiphenylamine	55.51	10	50	0	111	72-144	53.36	3.96	30	
Naphthalene	45.62	10	50	0	91.2	52-115	45.94	0.71	30	
Nitrobenzene	45.19	10	50	0	90.4	65-115	44.54	1.44	30	
Pentachlorophenol	98.42	10	100	0	98.4	65-123	94.58	3.98	30	
Phenanthrene	51.17	10	50	0	102	69-119	50.51	1.3	30	
Phenol	31.17	10	100	0	31.2	16-115	29.37	5.95	30	
Pyrene	50.05	10	50	0	100	51-130	48.25	3.67	30	
Surr: 2,4,6-Tribromophenol	107.9	10	100	0	108	39-153	101.5	6.09	30	
Surr: 2-Fluorobiphenyl	89.32	10	100	0	89.3	40-147	84.74	5.26	30	
Surr: 2-Fluorophenol	43.8	10	100	0	43.8	21-110	39.74	9.73	30	
Surr: 4-Terphenyl-d14	95.13	10	100	0	95.1	39-141	90.52	4.97	30	
Surr: Nitrobenzene-d5	85.54	10	100	0	85.5	37-140	82.8	3.26	30	
Surr: Phenol-d6	29.34	10	100	0	29.3	11-100	25.63	13.5	30	

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
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P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: 11279 InstrumentID: SV-3

MSD Sample ID: 0411323-05DMSD Test Code: SW8270 Units: µg/L Analysis Date: 12/06/04 22:18
Client ID: Run ID: SV-3_041206A SeqNo: 584530 Prep Date: 12/1/2004 DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trichlorobenzene	44.57	10	50	0	89.1	50-115	44.27	0.69	30	
2,4,5-Trichlorophenol	84.29	10	100	0	84.3	68-128	93.28	10.1	30	
2,4,6-Trichlorophenol	81.09	10	100	0	81.1	66-125	83.02	2.35	30	
2-Methylnaphthalene	42.69	10	50	0	85.4	47-122	45.01	5.28	30	
2-Methylphenol	62.41	10	100	0	62.4	51-115	64.66	3.54	30	
2-Nitroaniline	40.69	10	50	0	81.4	64-128	45.32	10.8	30	
2-Nitrophenol	84.59	10	100	0	84.6	60-119	89.99	6.18	30	
3&4-Methylphenol	84.1	10	150	0	56.1	44-115	85.58	1.74	30	
3-Nitroaniline	33.02	10	50	0	66	61-118	36.65	10.4	30	
4-Nitroaniline	36.04	10	50	0	72.1	61-123	39.1	8.15	30	
4-Nitrophenol	36.03	10	100	0	36	17-100	40.12	10.8	30	
Acenaphthene	47.19	10	50	0	94.4	68-115	48.32	2.38	30	
Acenaphthylene	45.79	10	50	0	91.6	67-116	47.27	3.19	30	
Aniline	29.07	10	50	0	58.1	40-130	30.49	4.79	30	
Anthracene	51.25	10	50	0	102	70-129	52.19	1.82	30	
Benz(a)anthracene	45	10	50	0	90	55-131	49.77	10.1	30	
Benzidine	4.102	10	50	0	8.2	10-115	0	0	30	JS
Hexachloroethane	38.51	10	50	0	77	46-115	35.92	6.94	30	
Indeno(1,2,3-cd)pyrene	47.66	10	50	0	95.3	42-123	50.64	6.06	30	
Isophorone	43.85	10	50	0	87.7	63-117	47.44	7.86	30	
N-Nitrosodi-n-propylamine	42.41	10	50	0	84.8	67-115	43.49	2.52	30	
N-Nitrosodimethylamine	18.23	10	50	0	36.5	28-115	19.55	6.99	30	
N-Nitrosodiphenylamine	51.31	10	50	0	103	72-144	53.06	3.35	30	
Naphthalene	45.52	10	50	0	91	52-115	46.32	1.73	30	
Nitrobenzene	42.69	10	50	0	85.4	65-115	44.87	4.98	30	
Pentachlorophenol	88.25	10	100	0	88.3	65-123	95.19	7.56	30	
Phenanthrene	49.54	10	50	0	99.1	69-119	50.74	2.39	30	
Phenol	28.67	10	100	0	28.7	16-115	30.24	5.35	30	
Pyrene	45.83	10	50	0	91.7	51-130	48.75	6.17	30	
Surr: 2,4,6-Tribromophenol	103.5	10	100	0	104	39-153	109.7	5.77	30	
Surr: 2-Fluorobiphenyl	89.41	10	100	0	89.4	40-147	86.29	3.55	30	
Surr: 2-Fluorophenol	40.87	10	100	0	40.9	21-110	44.57	8.65	30	
Surr: 4-Terphenyl-d14	88.85	10	100	0	88.8	39-141	92.93	4.48	30	
Surr: Nitrobenzene-d5	84.44	10	100	0	84.4	37-140	87.65	3.74	30	
Surr: Phenol-d6	26.57	10	100	0	26.6	11-100	28.07	5.5	30	

The following samples were analyzed in this batch: 0412005-01D

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

CLIENT: Navajo Refining Company
Work Order: 0412005
Project: Injection Wells

QC BATCH REPORT

Batch ID: R25184 InstrumentID: VOA2

MBLK Sample ID: VBLKW-1210 Test Code: SW8260 Units: µg/L Analysis Date: 12/10/04 14:40

Client ID: Run ID: VOA2_041210A SeqNo: 586932 Prep Date: DF: 1

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	ND	5.0								
1,1,2,2-Tetrachloroethane	ND	5.0								
1,1,2-Trichloroethane	ND	5.0								
1,1-Dichloroethane	ND	5.0								
1,1-Dichloroethene	ND	5.0								
1,2-Dichloroethane	ND	5.0								
2-Butanone	ND	10								
2-Chloroethyl vinyl ether	ND	10								
2-Hexanone	ND	10								
4-Methyl-2-pentanone	ND	10								
Acetone	ND	10								
Benzene	ND	5.0								
Bromodichloromethane	ND	5.0								
Bromoform	ND	5.0								
Bromomethane	ND	5.0								
Carbon disulfide	ND	10								
Carbon tetrachloride	ND	5.0								
Chlorobenzene	ND	5.0								
Chloroethane	ND	5.0								
Chloroform	ND	5.0								
Chloromethane	ND	5.0								
cis-1,3-Dichloropropene	ND	5.0								
Dibromochloromethane	ND	5.0								
Ethylbenzene	ND	5.0								
m,p-Xylene	ND	10								
Methylene chloride	ND	10								
Styrene	ND	5.0								
Tetrachloroethene	ND	5.0								
Toluene	ND	5.0								
trans-1,3-Dichloropropene	ND	5.0								
Trichloroethene	ND	5.0								
Vinyl acetate	ND	10								
Vinyl chloride	ND	2.0								
Xylenes, Total	ND	15								
Surr: 1,2-Dichloroethane-d4	50.58	5.0	50	0	101	71-126		0		
Surr: 4-Bromofluorobenzene	38.87	5.0	50	0	77.7	74-125		0		
Surr: Dibromofluoromethane	46.88	5.0	50	0	93.8	73-126		0		
Surr: Toluene-d8	43.86	5.0	50	0	87.7	75-125		0		

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
O - Referenced analyte value is > 4 times amount spiked
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
P - Dual Column results percent difference > 40%
B - Analyte detected in assoc. Method Blank
U - Analyzed for but not detected
E - Value above quantitation range

EXHIBIT 3

SUBSURFACE

TABLE VII
Wells that have been Recompleted in Upper Zones since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
3	30 015 00646	A	36	17S	27E	990 FNL & 330 FEL	Delhi No 007	Aspen Oil Inc	Change of Owner: Pronghorn Management Corp to Aspen Oil Company Inc. Recomp Well:
73	30 015 01659	N	32	17S	28E	660 FNL & 1980 FWL	Empire ABO Unit No. 026A	BP America Production Company	Recomp Well: New Perf in ABO 5651'-6118'
74	30 015 21539	N	32	17S	28E	150 FSL & 1400 FWL	Empire ABO Unit No. 261	BP America Production Company	Recomp Well: New Perf in ABO 5690'-5954'
75	30 015 22009	O	32	17S	28E	330 FSL & 2481 FWL	Empire ABO Unit No. 272	BP America Production Company	Recomp Well: New Perf in ABO 5714'-6120'
76	30 015 02606	C	05	18S	28E	330 FNL & 1941 FWL	Empire ABO Unit No. 026E	BP America Production Company	Recomp Well: New Perf in ABO 5662'-5907'
78	30 015 02607	D	05	18S	28E	660 FNL & 660 FWL	Empire ABO Unit No. 025C	BP America Production Company	Recomp Well: New Perf in ABO 5760"
88	30 015 02615	A	06	18S	28E	660 FNL & 660 FEL	Empire ABO Unit No. 24B	BP America Production Company	Recomp Well: PBTD 6205' CIBP 6091', New Perf in ABO 5794'-5924'
90	30 015 21542	B	06	18S	28E	1260 FNL & 1580 FEL	Empire ABO Unit No. 231	BP America Production Company	Recomp Well: PBTD 6222' New Perf in ABO 5850'-6018'
94	30 015 23116	E	06	18S	28E	2050 FNL & 100 FWL	Empire ABO Unit No. 213	BP America Production Company	Recomp Well: New Perf in ABO 5606'-5796'
96	30 015 22637	E	06	18S	28E	2450 FNL & 400 FWL	Empire ABO Unit No. 212	BP America Production Company	Recomp Well: PBTD 6203' New Perf in ABO 5588'-6080'
106	30 015 02614	G	06	18S	28E	1980 FNL & 1980 FEL	Empire ABO Unit No. 23B	BP America Production Company	Recomp Well: PBTD 6240', New Perf in ABO 5842'-6142'
752	30 015 00703	L	01	18S	27E	1980 FSL & 660 FWL	Empire ABO Unit No. 017A	BP America Production Company	Recomp Well: PBD 6101', CIBP 5823', New Vert Perf in Abo 5472'-5736'
765	30 015 00724	A	02	18S	27E	990 FNL & 330 FEL	Empire Abo Unit No. 16B	BP America Production Company	Recomp Well: New Perf in ABO 5444'-5786'
766	30 015 00737	B	02	18S	27E	905 FNL & 1610 FEL	South Red Lake II Unit #38	Fairway Resources Operating LLC	Change of Owner: McQuadrangle LC to Fairway Resources Operating LLC Recomp Well: Plugback 75 sks cmt 1430'-1530' & complete in Grayburg
786	30 015 00716	J	02	18S	27E	1980 FSL & 1980 FEL	Empire Abo Unit No. 15	BP America Production Company	Recomp Well: New Perf in ABO 5348'-6000'
841	30 015 22834	C	11	18S	27E	225 FNL & 2280 FWL	Empire Abo Unit No. 141B	BP America Production Company	Recomp Well: New Perf in ABO 5961'-6030'
843	30 015 22833	D	11	18S	27E	450 FNL & 1175 FWL	Empire Abo Unit No. 133B	BP America Production Company	Recomp Well: New Perf in ABO 5966'-6064'
912	30 015 31036	H	36	17S	27E	231 FNL & 990 FEL	Gates State No 3	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service; Recomplete
928	30 015 32310	1	01	18S	27E	990 FNL & 990 FEL	AAO Federal No 004	Marbob Energy Corp.	Recomp Well: New Perf San Andres 2134'-2849'
929	30 015 32309	2	01	18S	27E	330 FNL & 1690 FEL	AAO Federal No 003	Marbob Energy Corp.	Recomp Well: New Perf San Andres 2092'-2807'
930	30 015 32308	3	01	18S	27E	430 FNL & 2310 FWL	AAO Federal No 002	Marbob Energy Corp.	Recomp Well: New Perf San Andres 1967'-3115'; Old Perf Glorieta 3373'-3699'
931	30 015 32307	4	01	18S	27E	330 FNL & 990 FWL	AAO Federal No 001	Marbob Energy Corp.	Recomp Well: CIBP 3250', New Perf in San Andres 2356'-2900'; 2974'-3071'
10	30 015 00669	H	36	17S	27E	2310 FNL & 330 FEL	Homan #1	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service Recomp Well: Drill out cmt plugs, tagg at 1805', run 4-1/2" liner to 1390' to surf and cmt 316 sks, prod 1450' to 1800'
159	30 015 00698	O	01	18S	27E	660 FSL & 1980 FEL	Empire Abo Unit No. 191	BP America Production Company	Reclamation of plugged well: installed liner and waiting for reclamation inspection.
133	30 015 00710	C	01	18S	27E	660 FNL & 1980 FWL	AAO Federal No. 013	Marbob Energy Corp.	Change of Owner: from BP America Production Company to Marbob Energy Corp; Recomp: Perf the Yeso 1 from 4581'-4944' and acdz w/ 2000 gal NE Fe 15% HCL; Perf the Yeso 2 from 3990'-4395' and acdz w/ 2500 gal NE Fe 15% HCl; Perf the Yeso 3 from 3377'-3678' and acdz w/ 2500 gal NE Fe 15% HCl; Well producing as single from 3377'-4395'.
152	30 015 22096	K	01	18S	27E	2370 FSL & 1510 FWL	Empire Abo Unit No. 183	BP America Production Company	Recomp Well: New perf at 5641'-6053'. Acdz with 15% HCL.
929	30 015 32309	2	01	18S	27E	330 FNL & 1690 FEL	AAO Federal No 003	Marbob Energy Corp.	Recomp Well: Pump 1000 gal NE Fe 15% HCl acid.
807	30 015 22608	N	02	18S	27E	100 FSL & 1950 FWL	Empire Abo Unit No. 142	BP America Production Company	Recomplete: New perfs in the Abo: 5927'-5930', 5938'-5956', 6123', 6130'-6140'. Return to production.

TABLE VII
Wells that have been Recompleted in Upper Zones since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

65	30	015	01657	F	32	17S	28E	2280 FNL & 1980 FWL	AA State No. 001	Marbob Energy Corp.	Change of Owner: BP America Production Company to Marbob Energy Corp.; Recomplete: Proposal to plug back and perforate, acidize, test, and possibly frac the Yeso 1 (4288'-4525'), Yeso 2 (3880'-4173'), and Yeso 3 (3523'-3715').
954	30	015	35050	D	32	17S	28E	330 FNL & 500 FWL	Enron State No 012	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP; Recompletion: Open San Andres and comingle with Yeso by perfing San Andres at 2294',2312',2409',2503' and acidized with 3360 gal NEFE acid. Then fraced perfs w/ 95,000 lbs 16/30 and 35,000 lbs 12/20 brady sand in 25 lb X-linked gel.
104	30	015	22913	G	06	18S	28E	1750 FNL & 1600 FEL	Empire Abo Unit No. 235	BP America Production Company	Recomplete: Set CIBP to shut off water. Set at 6176'

TABLE VIII
Newly Drilled Wells in the Area of Review since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
944	30 015 26575	N	01	18S	27E	790 FSL & 2250 FWL	Chalk Bluff Fed Com 1/ WDW-3	Navajo Refining Co. Pipeline Division	Well Completed in the Wolfcamp 7660'-8620' Injecting
945	30 015 32959	E	01	18S	27E	1650 FNL & 875 FWL	AAO Federal No 005	Marbob Energy Corp.	NEW ~4000'
946	30 015 33473	G	01	18S	27E	1750 FNL & 1650 FEL	AAO Federal No 007	Marbob Energy Corp.	NEW ~4000'
947	30 015 33784	H	01	18S	27E	1650 FNL & 330 FEL	AAO Federal No 008	Marbob Energy Corp.	NEW ~4000'
948	30 015 34071	F	01	18S	27E	2169 FNL & 1963 FWL	AAO Federal No 006	Marbob Energy Corp.	NEW ~4000'
949	30 015 34387	L	01	18S	27E	1980 FSL & 630 FWL	AAO Federal No 009	Marbob Energy Corp.	NEW ~4000'
950	30 015 34555	M	01	18S	27E	890 FSL & 660 FWL	AAO Federal No 011	Marbob Energy Corp.	NEW ~4000'
951	30 015 34576	K	01	18S	27E	2060 FSL & 2160 FWL	AAO Federal No 010	Marbob Energy Corp.	NEW ~4000'
952	30 015 34998	N	01	18S	27E	890 FSL & 1650 FWL	AAO Federal No 012	Marbob Energy Corp.	NEW ~4000'
955	30 015 36939	A	14	18S	27E	660 FNL & 990 FEL	Violet BIV State Com 001	Yates Petroleum Corp	NEW: Permit to Drill by 2/20/09
956	30 015 33994	A	36	17S	27E	915 FNL & 420 FEL	Red Lake 36 State No 2	Edge Petroleum Operating Company Inc	NEW ~3650'
957	30 015 36116	G	36	17S	27E	2305 FNL & 1650 FEL	South Red Lake II Unit No 57	Fairway Resources Operating LLC	NEW ~2081' Well completed in the Queen, Grayburg, San Andres
958	30 015 32946	J	02	18S	27E	2210 FSL & 1650 FEL	SCBP State No 1	Marbob Energy Corp.	NEW ~3880' Perf: 1975'-2664', 3342'-3638'
959	30 015 35814	H	02	18S	27E	2063 FNL & 441 FEL	State H No 2	Mack Energy Corporation	NEW: ~7545' PBTD: 5265' Perf: 6134.5'-6434' w/CIBP 6020' Perf: 5391'-5957.5' w/ CIBP 5300' Perf: 4118.5'-4197'
960	30 015 36343	G	31	17S	28E	1650 FNL & 2310 FEL	Malco State No 002	George A Chase JR DBA and C Service	NEW: 633' Open Hole Completion. Change of Owner: Aspen Oil Inc. to George A Chase JR DBA G and C Service
961	30 015 36978	D	31	17S	28E	990 FNL & 330 FWL	Enron State No. 015	Lime Rock Resources A, LP	NEW: 3700' in the Glorietta-Yeso.
962	30 015 36554	L	32	17S	28E	1770 FSL & 550 FWL	NW State No. 029	Lime Rock Resources A, LP	NEW: 3450'. Well completed in the San Andres from 2817'-3098', 69 perforations.
963	30 015 36989	K	32	17S	28E	1630 FSL & 1710 FWL	NW State No. 030	Lime Rock Resources A, LP	NEW: 3405'. No completion yet.
964	30 015 37057	N	32	17S	28E	330 FSL & 1750 FWL	NW State No. 031	Lime Rock Resources A, LP	NEW: 3500'. No completion yet.
965	30 015 37058	M	32	17S	28E	330 FSL & 330 FWL	NW State No. 032	Lime Rock Resources A, LP	NEW: 3425'. No completion yet.
	30 015 36281	J	01	18S	27E	2193 FSL & 1520 FEL	Sun Devils Federal No. 001	Mack Energy Corporation	Permit to Drill - 6000' TVD
966	30 015 37428	G	31	17S	28E	1980 FNL & 1980 FWL	Malco State No. 3	G and C Service	NEW: TD at 650'. Completed in Yates Seven Rivers with Open Hole
967	30 015 38240	G	36	17S	27E	1425 FNL & 1520 FEL	Kiowa State No. 3	Cog Operating LLC	NEW: Currently drilling to 4850' in the Glorietta-Yeso; To be perforated in Yeso Formation; Proposed TD 4850'
968	30 015 39029	G	36	17S	27E	2210 FNL & 2310 FEL	Conklin State No. 1-Y	G and C Service	NEW: Drilled to 540' TD, producing oil
969	30 015 39321	M	36	17S	27E	990 FSL & 890 FWL	Big Boy State No. 1	Cog Operating LLC	NEW: Permit to Drill
970	30 015 39322	M	36	17S	27E	840 FSL & 425 FWL	Big Boy State No. 3	Cog Operating LLC	NEW: Permit to Drill
971	30 015 39323	O	36	17S	27E	870 FSL & 1560 FEL	Big Boy State No. 5	Cog Operating LLC	NEW: Permit to Drill
972	30 015 39324	O	36	17S	27E	480 FSL & 2210 FEL	Big Boy State No. 6	Cog Operating LLC	NEW: Permit to Drill
973	30 015 39325	O	36	17S	27E	990 FSL & 2210 FEL	Big Boy State No. 7	Cog Operating LLC	NEW: Permit to Drill
974	30 015 39326	O	36	17S	27E	275 FSL & 1560 FEL	Big Boy State No. 8	Cog Operating LLC	NEW: Permit to Drill
975	30 015 39401	P	36	17S	27E	1110 FSL & 630 FEL	Empire Abo Unit No. 417	Apache Corp	NEW: Permit to Drill
976	30 015 39009	G	02	18S	27E	1650 FNL & 2430 FEL	Empire Abo Unit No. 415	Apache Corp	NEW: Permit to Drill
977	30 015 39066	L	02	18S	27E	2551 FSL & 1170 FWL	Empire Abo Unit No. 416	Apache Corp	NEW: Permit to Drill
978	30 015 38234	P	30	17S	28E	430 FSL & 800 FEL	Anthony No. 2	Lime Rock Resources	NEW: Drilled to 4823' TD, PBTD: 4762'. Perforations in Upper Yeso: 3644'-3932', Middle Yeso: 3962'-4254', and Lower Yeso: 4355'-4719'
979	30 015 39299	M	30	17S	28E	990 FSL & 990 FWL	Maple State No. 5	Cog Operating LLC	NEW: Permit to Drill
980	30 015 39300	M	30	17S	28E	330 FSL & 330 FWL	Maple State No. 6	Cog Operating LLC	NEW: Permit to Drill
981	30 015 38512	D	30	17S	28E	990 FNL & 940 FWL	Enron State No. 16	Lime Rock Resources	NEW: Well is drilled to total depth of 3658'. Will be completed later this year.
982	30 015 39004	P	31	17S	28E	150 FSL & 1300 FEL	Empire Abo Unit No. 401	Apache Corp	NEW: Permit to Drill
983	30 015 39011	O	31	17S	28E	1190 FSL & 1320 FEL	Empire Abo Unit No. 419	Apache Corp	NEW: Permit to Drill
984	30 015 39020	O	31	17S	28E	140 FSL & 2560 FEL	Empire Abo Unit No. 408	Apache Corp	NEW: Permit to Drill
985	30 015 38513	J	32	17S	28E	2310 FSL & 2032 FEL	Jeffer 32 State No. 3	Lime Rock Resources	NEW: Drilled to 5093' TD, PBTD: 5070'. Perforations in Upper Yeso: 3441'-4727', 3768'-4076', Middle Yeso: 4130'-4476', and Lower Yeso: 4540'-5007'

TABLE VIII

Newly Drilled Wells in the Area of Review since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

986	30	015	39006	J	32	17S	28E	2400 FSL & 2450 FEL	Empire Abo Unit No. 407	Apache Corp	NEW: Permit to Drill
987	30	015	39007	M	32	17S	28E	70 FSL & 100 FWL	Empire Abo Unit No. 409	Apache Corp	NEW: Permit to Drill
988	30	015	39064	O	32	17S	28E	1175 FSL & 1310 FEL	Empire Abo Unit No. 403	Apache Corp	NEW: Permit to Drill
989	30	015	39008	D	06	18S	28E	160 FNL & 1300 FWL	Empire Abo Unit No. 410	Apache Corp	NEW: Permit to Drill
990	30	015	39021	D	06	18S	28E	40 FNL & 145 FWL	Empire Abo Unit No. 411	Apache Corp	NEW: Permit to Drill
995	30	015	33473	G	01	18S	27E	1750 FNL & 1650 FEL	AAO Federal No. 7	Apache Corp	NEW to AOR, change of operator from Marbob Energy Corp to Apache Corp
996	30	015	33784	H	01	18S	27E	1650 FNL & 330 FEL	AAO Federal No. 8	Apache Corp	NEW to AOR, change of operator from Marbob Energy Corp to Apache Corp
997	30	015	34071	F	01	18S	27E	2169 FNL & 1963 FWL	AAO Federal No. 6	Apache Corp	NEW to AOR, change of operator from Marbob Energy Corp to Apache Corp
998	30	015	34555	M	01	18S	27E	890 FSL & 660 FWL	AAO Federal No. 11	Apache Corp	NEW to AOR, change of operator from Marbob Energy Corp to Apache Corp
999	30	015	34576	K	01	18S	27E	2060 FSL & 2160 FWL	AAO Federal No. 10	Apache Corp	NEW to AOR, change of operator from Marbob Energy Corp to Apache Corp

NM-406384

31-17S-28E

HALLIBURTON LOGGING SERVICES, INC.

DUAL LATEROLOG
MICRO-SFL

COMPANY MEWBOURNE OIL COMPA
WELL CHALK BLUFF -31- STA
FIELD ILLINOIS CAMP MORROW
COUNTY EDDY STATE NE

COMPANY MEWBOURNE OIL COMPANY
WELL CHALK BLUFF -31- STATE NO. 1
FIELD ILLINOIS CAMP MORROW NORTH
COUNTY EDDY STATE NM
API NO. N/A SERVICES
LOCATION
2310 FSL & 660 FEL
SEC 31 TWP 17-S RGE 28-E
ELEV. K.B. 3654
D.F. 3653
G.L. 3639
SDL-DSN-GR
DIL-GR

FOLD HERE

SERVICE TICKET NO.: 414605 API SERIAL NO.: N/A PGM VERSION: 2.31

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLES		
DATE | SAMPLE NO.	/ / |	/ / |
DEPTH-DRILLER		
TYPE FLUID IN HOLE		
DENS. | VISO	|	|
PH | FLUID LOSS	|	|
SOURCE OF SAMPLE		
RM @ MEAS TEMP	@	@
RMF @ MEAS TEMP	@	@
RMC @ MEAS TEMP	@	@
SOURCE: RMF | RMC	CALC. | CALC.	|
RM @ BHT	0.13 @ 153	@
RMF @ BHT	0.11 @ 153	@
RMC @ BHT	0.18 @ 153	@

RESISTIVITY SCALE CHANGES			
TYPE LOG	DEPTH	SCALE UP HOLE	SCALE DOWN HOLE

RESISTIVITY EQUIPMENT DATA				
RUN NO	TOOL TYPE & NO	PAD TYPE	TOOL POS.	OTHER
ONE	DLLT 113308		CENT	
	MSFL 113310	SOLID	CENT	

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
RUN NO.	ONE	RUN NO.		RUN NO.	ONE	RUN NO.	ONE
SERIAL NO.	108598	SERIAL NO.		SERIAL NO.	1094	SERIAL NO.	1504
MODEL NO.	432	MODEL NO.		MODEL NO.	465	MODEL NO.	4.64
DIAMETER	3.625	NO OF CENT.		DIAMETER	4.5	DIAMETER	1 6.5
DETECTOR MODEL NO.	102	SPACING		LOG TYPE	G G	LOG TYPE	R R
TYPE	SCINT.			SOURCE TYPE	CS 137	SOURCE TYPE	AMRC 241
LENGTH	4"	L9A (Y/N)		SERIAL NO.	SDL-115	SERIAL NO.	0201 811
DISTANCE TO SOURCE	N/A	FWDA (Y,N)		STRENGTH	1.5 CI	STRENGTH	17 CI

LOGGING DATA

GENERAL				GAMMA	ACOUSTIC			DENSITY			NEUTRON		
RUN	DEPTH		SPEED	SCALE	SCALE			SCALE			SCALE		
NO	FROM	TO	FT/MIN	L R	L	R	MATRIX	L	R	MATRIX	L	R	MATRIX
ONE	10182	2546	REC.	0 100				30	-10	2.71	30	-10	LIME

REMARKS:
ANNULAR VOLUME CALCULATED USING 5.5 INCH CASING

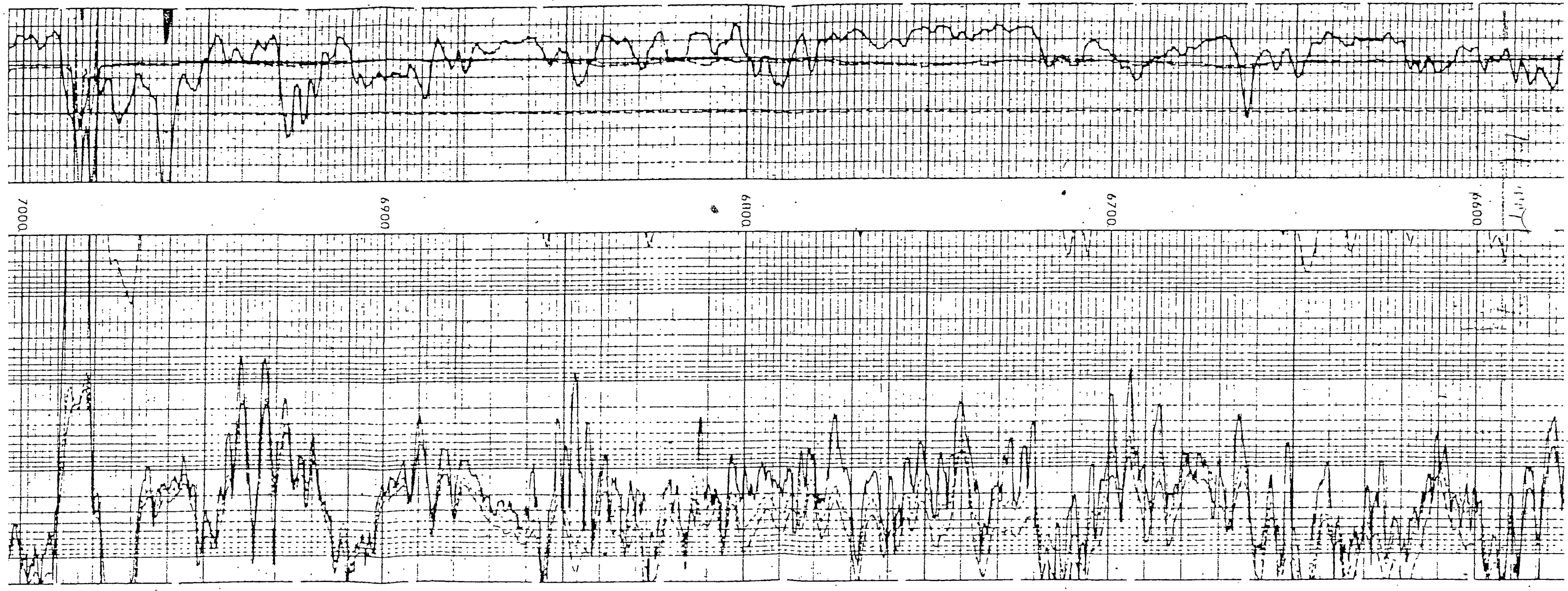
THANKS FOR CALLING HALLIBURTON ENERGY SERVICES

[illegible] THE USE THEREOF.

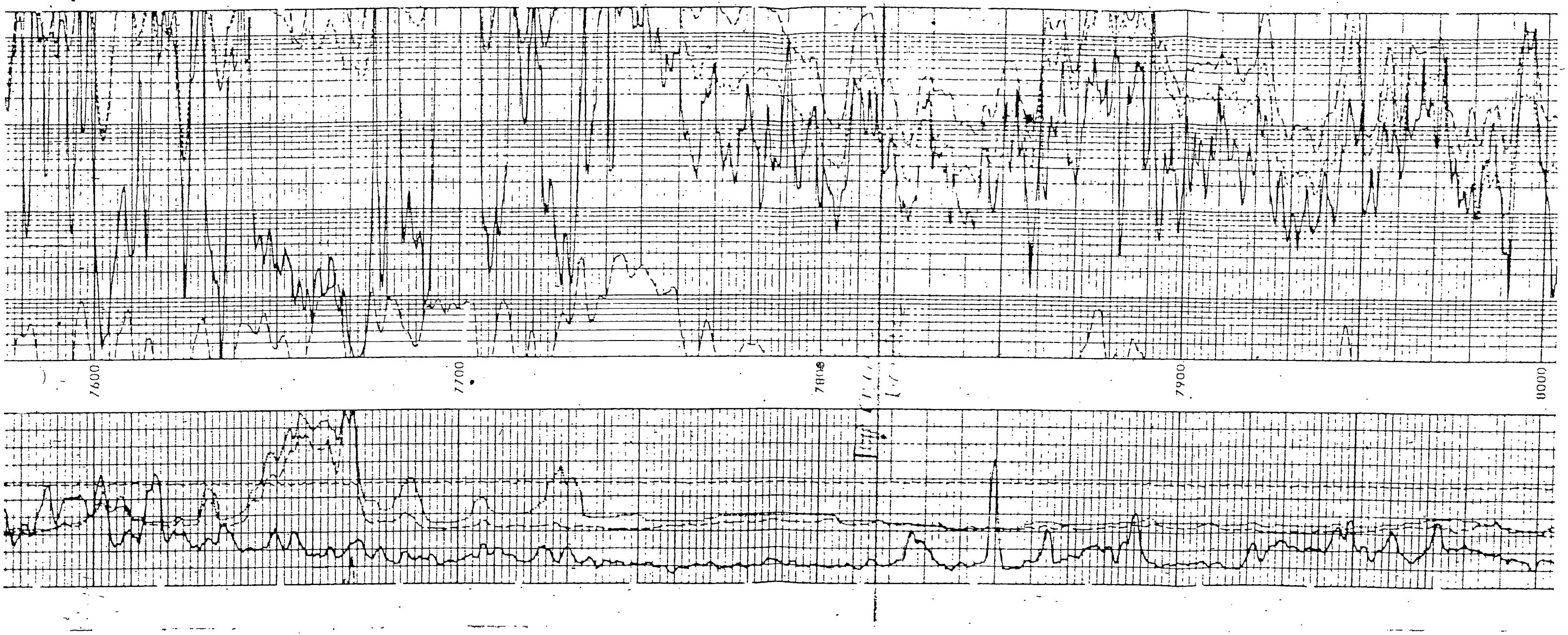
APPENDIX J

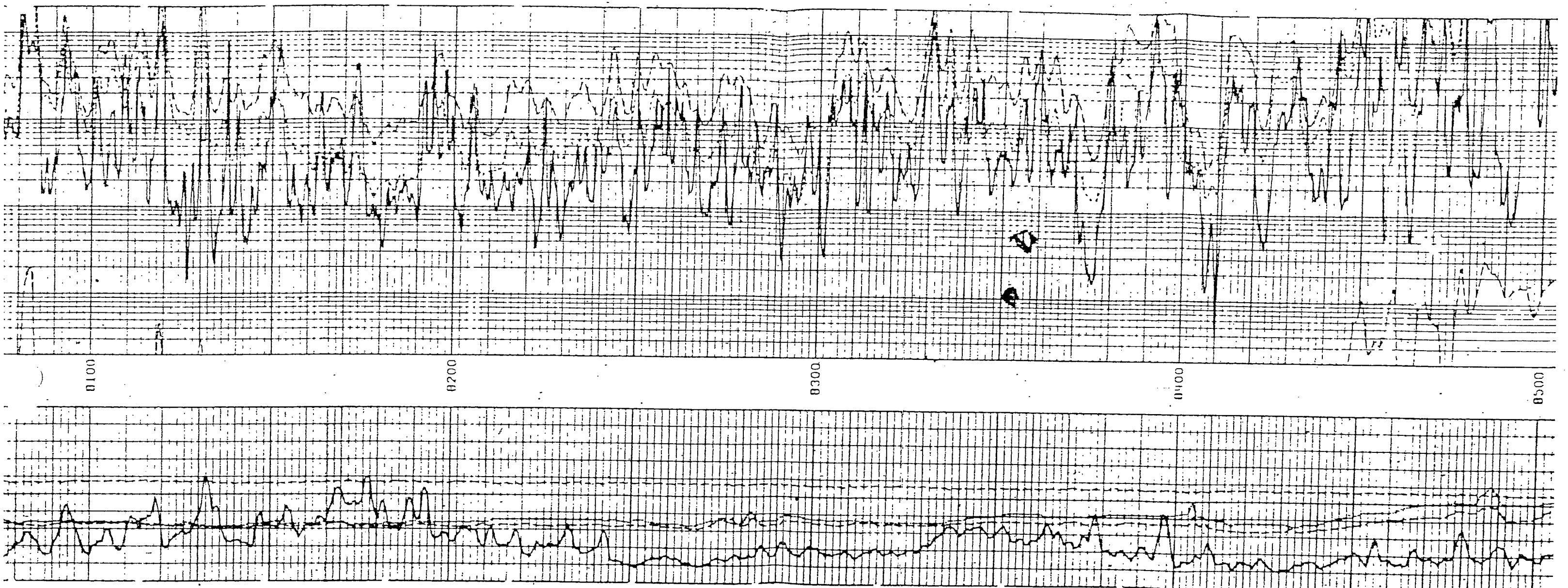
EXHIBIT 3

SDL CALIPER			DEEP LL		
6	INCHES	16	.2	OHM-M	2000
	GAMMA			SHALLOW LL	
0	API	100	.2	OHM-M	2000
	TENSION				
10000	POUNDS	0			
	MSFL CALIPER				


7000
6900
6800
6700
6600


7100
7200
7300
7400
7500


7600
7700
7800
7900
8000


0100
0200
0300
0400
0500

Schlumberger DUAL INDUCTION ... LOG

8611

COMPANY AMOCO PRODUCTION COMPANY

WELL DIAMOND FEDERAL GAS COM #1

FIELD SCOGGINS DRAW MORROW

COUNTY EDDY STATE: NEW MEXICO

COUNTY EDDY
FIELD or LOCATION SCOGGINS DRAW
WELL DIAMOND FEDERAL GAS COM #1
COMPANY AMOCO PROD. CO.

Location: 1980' FNL & 660' FWL

Sec. 12 Twp. 18-S Rge. 27-E

Other Services: CNL-FDC

Permanent Datum: G.L. Elev.: 3610
Log Measured From: R.K.B. 13 Ft. Above Perm. Datum
Drilling Measured From: R.K.B.

Elev.: K.B. 3623
D.F. 3622
G.L. 3610

Date	8-27-73			
Run No.	ONE			
Depth—Driller	10373			
Depth—Logger	10370			
Btm. Log Interval	10366			
Top Log Interval	1997			
Casing—Driller	8 5/8@ 1995	@	@	@
Casing—Logger	1997			
Bit Size	7 7/8			
Type Fluid in Hole	FRESH MUD			
Fluid Level	FULL			
Dens. / Visc.	9 / 39			
pH / Fluid Loss	11 / 8 ml	ml	ml	ml
Source of Sample	FLOWLINE			
R_m @ Meas. Temp.	1.6 @ 90 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	.70 @ 75 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	3.2 @ 90 °F	@ °F	@ °F	@ °F
Source: Rmf / Rmc	M / C			
R_m @ BHT	1.06 @ 152°F	@ °F	@ °F	@ °F
Time Since Circ.	14 HOURS			
Max. Rec. Temp.	152 °F	°F	°F	°F
Equip. / Location	7646 / HOBBS			
Recorded By	CREEK			
Witnessed By	KLAAR			

Reproduced By
Electrical Log Services
MIDLAND, TEXAS 79701

24

REFERENCE W 8664W

21 COMPLETION RECORD

SPUD DATE

COMP DATE

DST RECORD

API NO 30-015-20894

CASING RECORD

PERFORATING RECORD

ACID FRAC SHOT

I P

GOR GR

T P C P

REMARKS:

REPRODUCTION FOR RESALE PROHIBITED

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date / Sample No.				
Depth - Driller				
Type Fluid in Hole				
Dens. / Visc.				
pH / Fluid Loss		ml		ml
Source of Sample				
R_m @ Meas. Temp.		@ °F	@	°F
R_{mf} @ Meas. Temp.		@ °F	@	°F
R_{mc} @ Meas. Temp.		@ °F	@	°F
Source: Rmf / Rmc				
R_m @ BHT		@ °F	@	°F
R_{mf} @ BHT		@ °F	@	°F
R_{mc} @ BHT		@ °F	@	°F

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	ONE
Panel No.	C-133
Cart. No.	D-
Sonde No.	G-241
Mem. Panel No.	
G.R. Cart. No.	
G.R. Panel No.	
TTR No.	
Cent. Device	YES
Stand off - Inches	1.5
Time Const - Sec.	
Speed - F.P.M.	60/80

REMARKS

Service Order No. - 90316

API Serial No. -

☐ Surface determined sonde errors used.

☐ Sonde error corrected for borehole signed at R_m =

☒ Induction were set in hole at depth of 9450 feet.

CALIBRATION DATA

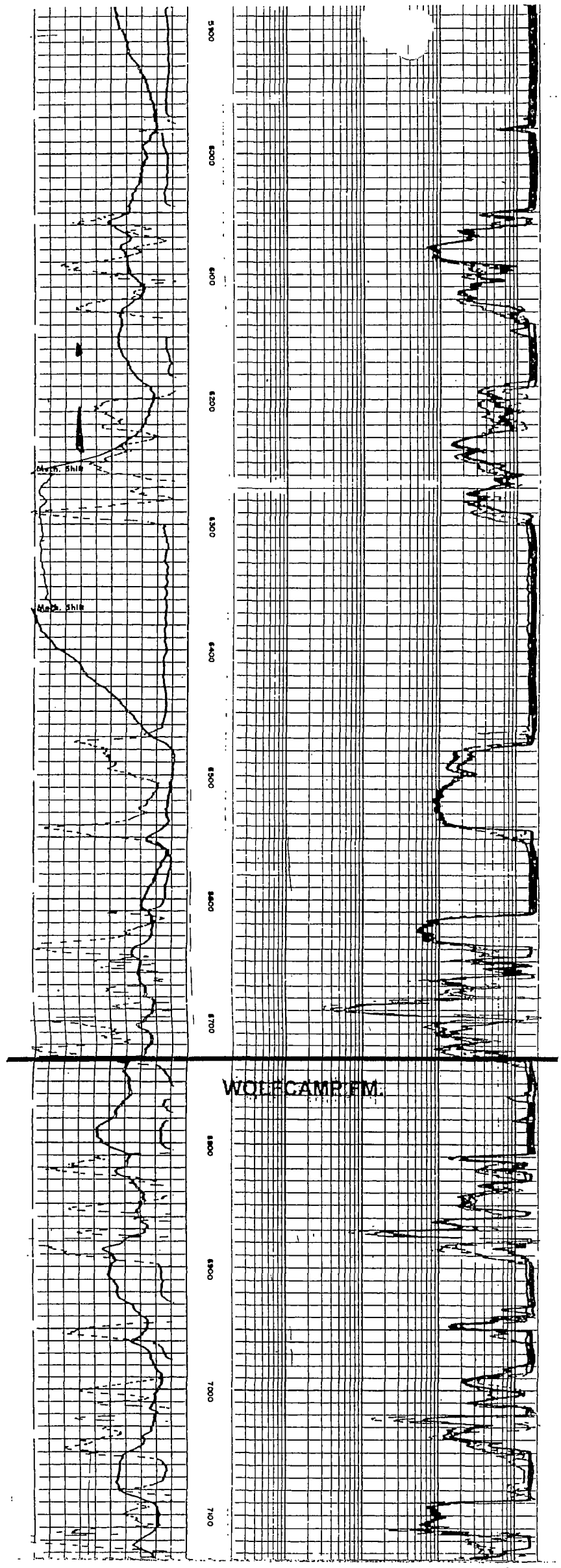
CALIBRATION:	BACKGND.	SOURCE	GALV. INCR.	SENS. TAP	SENS. TAP	TIME
	CPS.	CPS.	DIVISION	(FOR CAL.)	(RECORD)	CONST.
GAMMA RAY:						

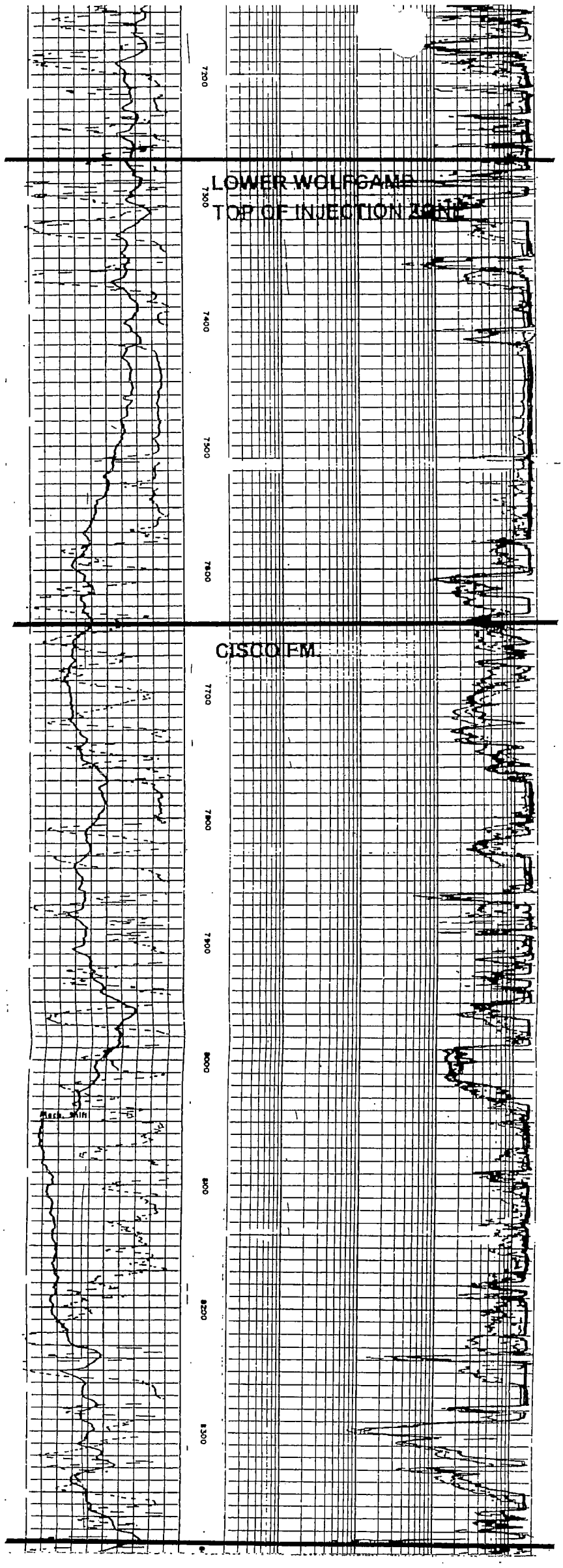
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

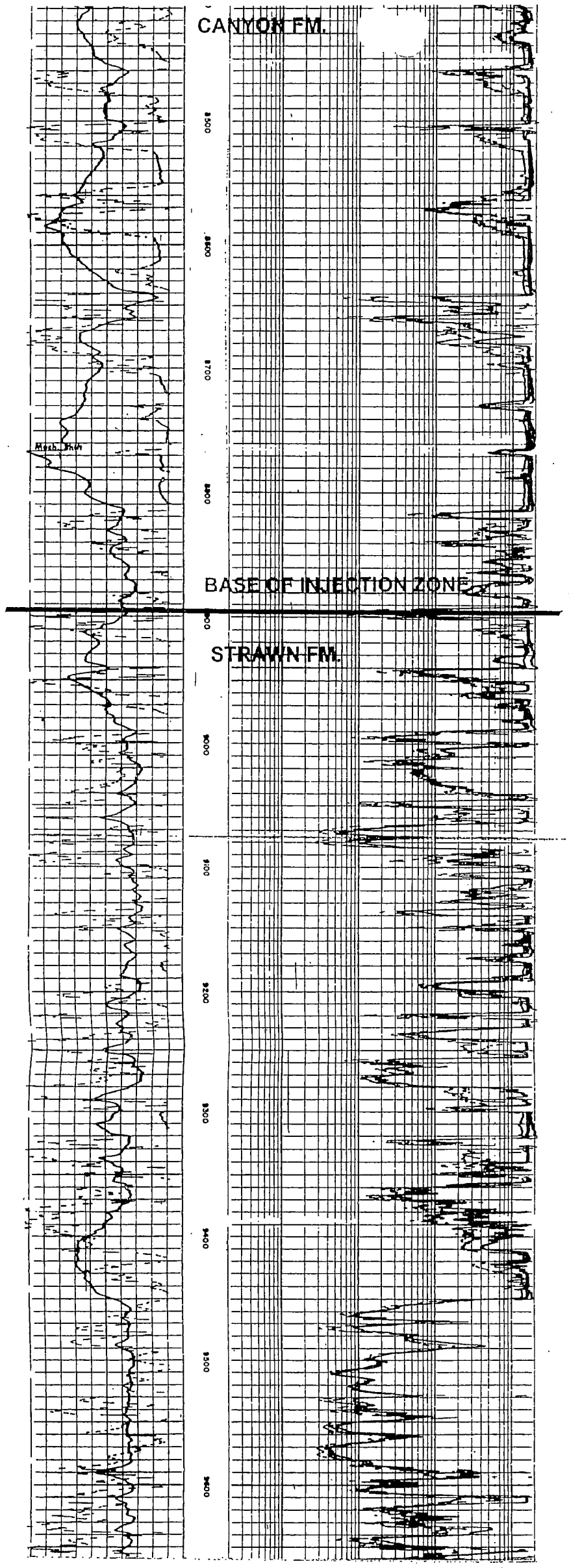
SPONTANEOUS POTENTIAL MILLIVOLTS	DEPTHS	RESISTIVITY OHMS. M²/M
10		DEEP INDUCTION LOG 0.2 1.0 10 100 1000 2000
R_{XO}/R_T		MEDIUM INDUCTION LOG 0.2 1.0 10 100 1000 2000
		LATEROLOG — 8 0.2 1.0 10 100 1000 2000
		CALIBRATION TYPE SURVEY

EXHIBIT 3

APPENDIX J


5900
6000
6100
6200
6300
6400
6500
6600
6700
6800
6900
7000
7100
Mesa. Shale
Mesa. Shale
WOLFCAMP FM.


LOWER WOLFCAMP
TOP OF INJECTION ZONE
CISCO FM.


CANYON FM.
BASE OF INJECTION ZONE
STRAWN FM.

AQ
8601

Schlumberger

COMPENSATED NEUTRON-FORMATION DENSITY

COUNTY EDDY
FIELD OR LOCATION SCOGGINS DRAW
WELL DIAMOND FEDERAL GAS COMM #1
COMPANY AMOCO PRODUCTION CO.

COMPANY AMOCO PRODUCTION COMPANY

WELL DIAMOND FEDERAL GAS COMM #1

FIELD SCOGGINS DRAW MORROW

COUNTY EDDY STATE NEW MEXICO

Location: 1980' FNL & 660' FWL
Sec. 12 Twp. 18-S Rge. 27-E

Other Services: DIL

Permanent Datum: G.L. Elev.: 3610
Log Measured From: R.K.B. 13 Ft. Above Perm. Datum
Drilling Measured From: R.K.B.

Elev.: K.B. 3623
D.F. 3622
G.L. 3610

Date	8-27-73			
Run No.	ONE			
Depth - Driller	10372			
Depth - Logger	10370			
Btm. Log Interval	10369			
Top Log Interval	0			
Casing - Driller	8 5/8@1995	@	@	@
Casing - Logger	1997			
Bit Size	7 7/8			
Type Fluid in Hole	FRESH MUD			
Fluid Level	FULL			
Dens. / Visc.	9 / 39	/	/	/
pH / Fluid Loss	11 / 8 ml	/ ml	/ ml	/ ml
Source of Sample	FLOWLINE			
Rm @ Meas. Temp.	1.8 @ 90 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp	.70 @ 75 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp	3.2 @ 90 °F	@ °F	@ °F	@ °F
Source: Rmf / Rmc	M / C	/	/	/
Rm @ BHT	1.07 @ 152 °F	@ °F	@ °F	@ °F
Time Since Circ.	5 HOURS			
Max. Rec. Temp.	152 °F	°F	°F	°F
Equip. / Location	7646 / HOBBS	/	/	/
Recorded By	CREEK			
Witnessed By	KLAAR			

Reproduced By
Electrical Log Services
MIDLAND, TEXAS 79701

REFERENCE W 86645

24 COMPLETION RECORD

SPUD DATE

COMP DATE

DST RECORD

API NO. 30-015-20894

CASING RECORD

PERFORATING RECORD

ACID FRAC SHOT

T P

GOR GR

T P C P

REMARKS.

REPRODUCTION FOR RESALE PROHIBITED

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

	Sample No.		
Depth - Driller			
Type Fluid			
Source of Sample			
Rm @ Meas. Temp.	@ °F	@ °F	
Rmf @ Meas. Temp.	@ °F	@ °F	
Rmc @ Meas. Temp.	@ °F	@ °F	
Rm @ BHT	@ °F		
Dens. / Visc.			
pH / Fluid Loss	ml		ml
% Water by Vol.			
% Oil by Vol.			
% Solids by Vol.			
Chlorides Av. Spr. Gr.			

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	ONE
Trans. Pnl.	D-396
Trans. Cart	A-117
Trans. Skid	D-1032
Trans. Sde	C-203
Trans. Source	134
Trans. Calib.	A-2472
Aquis. Pnl.	A-130
Aquis. Cart	A-9
Aquis. Source	C-234
Aquis. Calib	A-67
DR Cart	J-257
DR	
Program Pnl.	P-247

LOGGING DATA

CNP

Matrix	Auto Hole Size Corr.	Hole Size Setting (if not auto)	Porosity Scale	From	To
LIME	Yes No		30 - 10	TD	CSG
	Yes No				
	Yes No				
	Yes No				
	Yes No				

FDC

Liquid Density	Grain Density	Hole Fluid	Porosity Scale	From	To
1.0	2.71	LIQUID	30 - 10	TD	CSG

HOLE SIZE/CASING DATA

Run	From	To	Csg. Size	Csg. Wt.	From	To
ONE	10378	TD	5 1/2		1995	SURF

REMARKS

Service Order No. - 90316
API Serial No. -

CALIBRATION DATA

Run No.	Gamma Ray API Scale	Gamma Ray Background CPS	Gamma Ray Total CPS	CNL—Before Log—ACPS Long Spacing	CNL—Before Log—ACPS Short Spacing	CNL—After Log—ACPS Long Spacing	CNL—After Log—ACPS Short Spacing
1	165	100	550	440	940	440	960
2							
3							
4							

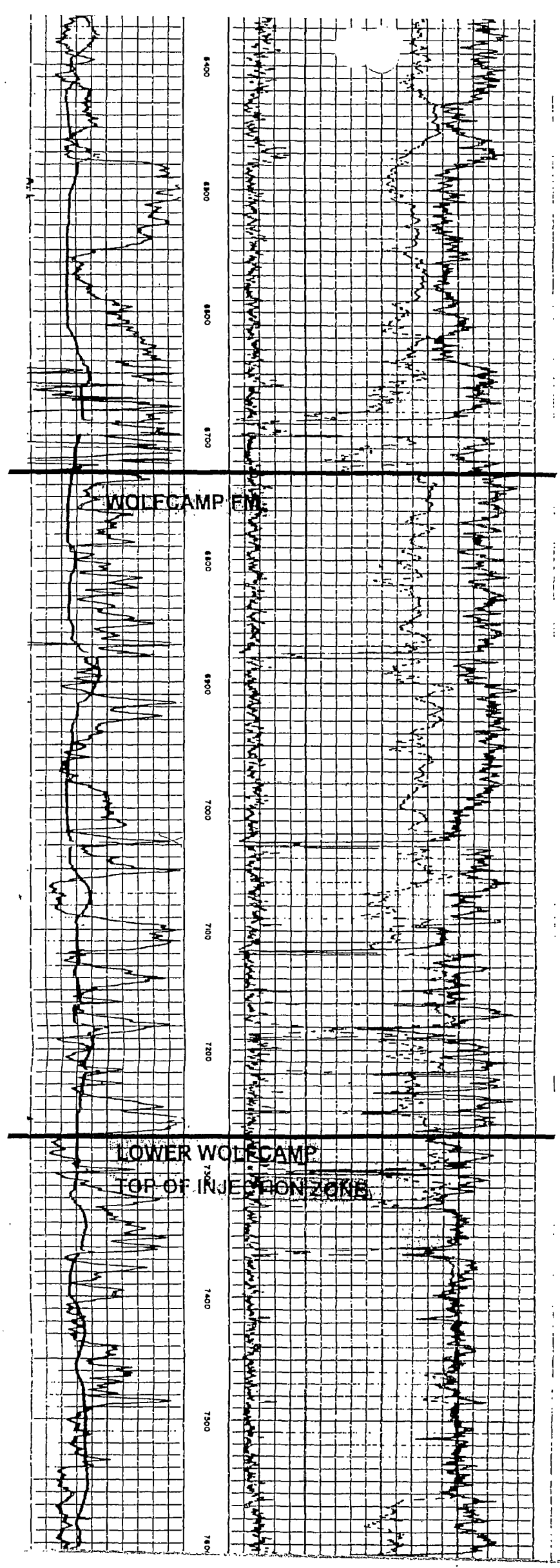
Run No.	FDC—Before Log—ACPS P_1	FDC—Before Log—ACPS P_2	FDC—After Log—ACPS P_1	FDC—After Log—ACPS P_2
1	466	744	472	752
2				
3				
4				

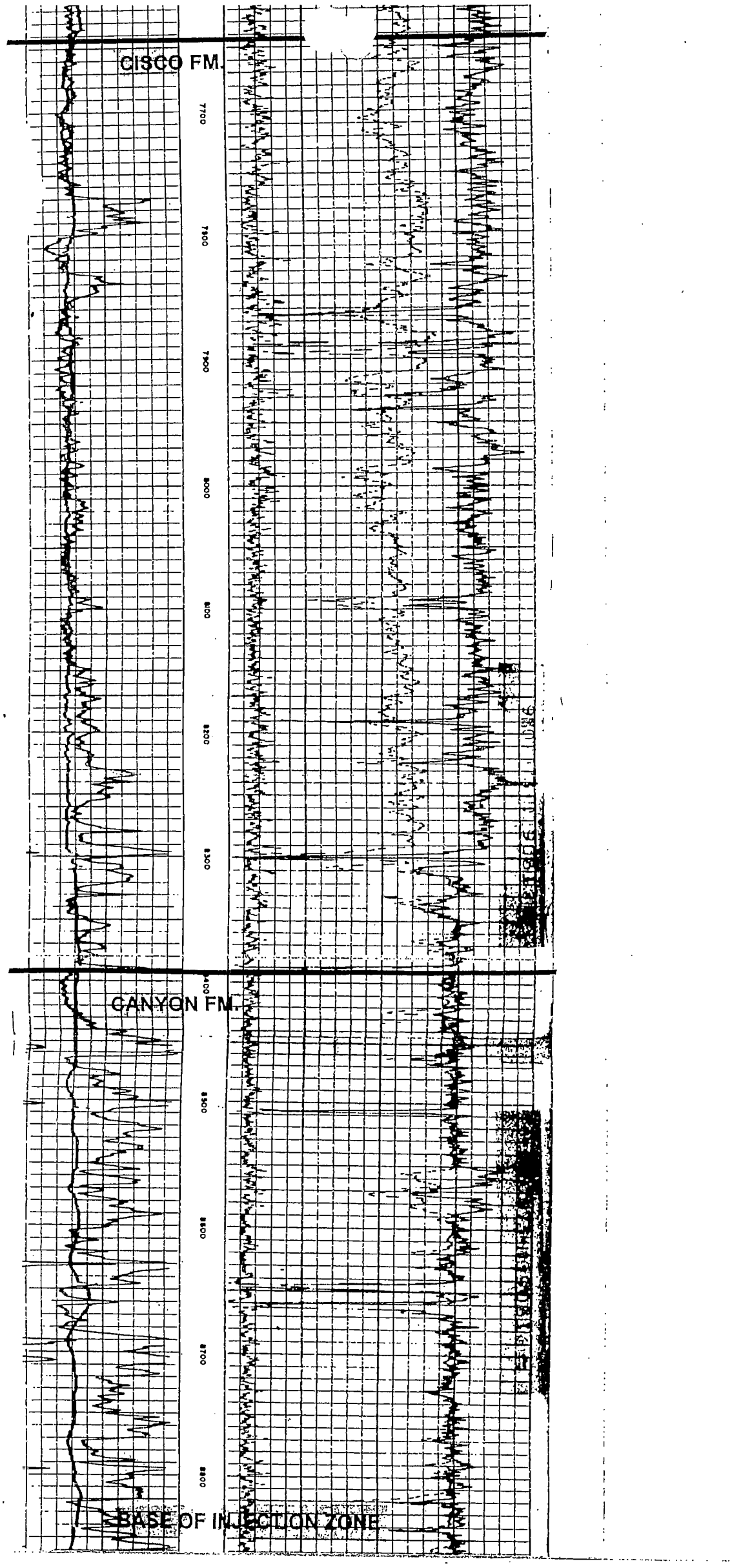
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CALIPER HOLE DIAM. IN INCHES	DEPTHS	CNL POROSITY—%
6 ... 16		30 20 10 0 -10
		0 ... 1:25

EXHIBIT 3

APPENDIX J


WOLFCAMP EM
LOWER WOLFCAMP
TOP OF INJECTION ZONE


CISCO FM.
7700
7800
7900
8000
8100
8200
8300
8400
CANYON FM.
8500
8600
8700
8800
BASE OF INJECTION ZONE

157

EDDY SEC 1-18S-27E

Petroleum Information

DENVER, COLORADO 80201

REFERENCE Y 4949N

38 API NO. 30 015 26575

REPRODUCTION FOR RESALE IN WHOLE OR PART PROHIBITED

HALLIBURTON LOGGING SERVICES INC.

SPECTRAL DENSITY DUAL SPACED NEUTRON LOG

COMPANY HENBOURNE OIL CO.

WELL CHALK BLUFF FEDERAL NO. 1

FIELD NORTH ILLINOIS CAMP-MORROW

COUNTY EDDY STATE NM

API NO. NM OTHER SERVICES

LOCATION 2520 FNL & 790 FEL DLL-MSFL DIL

SEC 1 TWP 18S RGE 27E

PERMANENT DATUM G.L. ELEV. 3503 ELEV.: K.B. 3525 D.F. 3524 G.L. 3503

LOG MEASURED FROM K.B. 16 FT. ABOVE PERM. DATUM

DRILLING MEASURED FROM K.B.

DATE	1/22/91		
RUN NO.	ONE	TWO	
DEPTH-DRILLER	9450	10120	
DEPTH-LOGGER	9448	10124	
BTM. LOG INTER.	9417	10121	
TOP LOG INTER.	SURFACE	8500	
CASING-DRILLER	8 @ 2500	7 @ 9450	
CASING-LOGGER	2515	9445	
BIT SIZE	7 7/8	6	
TYPE FLUID IN HOLE	WATER	SALT MUD	
DENS. / VISC.	NA / NA	9.5 / 32	
PH. / FLUID LOSS	NA / NA	10.5 / 10	
SOURCE OF SAMPLE	MUD PIT	CIRCULATED PILL	
RM @ MEAS. TEMP.	1.4 @ 62	.21 @ 155	
RMF @ MEAS. TEMP.	NA @ NA	.18 @ 149	
RMC @ MEAS. TEMP.	NA @ NA	NA @ NA	
SOURCE: RMF / RMC	NA / NA	NA / NA	
RM @ BHT	.541 @ 122	.083 @ 141	
TIME SINCE CIRC.	6 HOURS	6 HOURS	
TIME ON LOCATION	1/22 @ 1400	1/23 @ 0400	
REC. TEMP.	1/22 @ 1400	1/23 @ 0400	
EQUIP. / LOCATION	3416/ARTESIA	3416/ARTESIA	
RECORDED BY	D. ROUTE	D. ROUTE	
WITNESSED BY	D. DYKMAN		

TIGHT HOLE

Fold Here

Service Ticket No.: 63052 API Serial No.: NA PGM Version: 2.51

Change in Mud Type or Additional Samples

Date/Sample No.	/ / :	/ / :	
Depth-Driller			
Type Fluid in Hole			
Dens. : Visc.	:	:	
pH. : Fluid Loss	:	:	
Source of Sample			
Rm @ Meas. Temp.	@	@	
Rmf @ Meas. Temp.	@	@	
Rmc @ Meas. Temp.	@	@	
Source: Rmf:Rmc	:	:	
Rm @ BHT	.541 @122	@	
Rmf @ BHT	NA @NA	@	
Rmc @ BHT	NA @NA	NA @NA	

RESISTIVITY SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole
NA			

RESISTIVITY EQUIPMENT DATA

Run No	Tool Type & No	Pad Type	Tool Pos.	Other
ONE	DILT-109430	NA	NA	
	SGPT-108928	NA	CENT	
TWO	DLL-113309	NA	CENT	NA

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.		Run No.	ONE	Run No.	ONE
Serial No.	108615	Serial No.		Serial No.	112611	Serial No.	108763
Model No.	432	Model No.		Model No.	455	Model No.	434
Diameter	3.625	No.of Cent.		Diameter	4.5"	Diameter	3 5/8
Detector Model No.	102T	Spacing		Log Type	G-G	Log Type	N-N
Type	SCINT			Source Type	CS-137	Source Type	AM-241
Length	4"	LSA		Serial No.	30	Serial No.	DSN-27
Distance To Source	18"	FWDA		Strength	1.5 CI	Strength	18.5 CI

LOGGING DATA

Run	Depth		Speed	GAMMA		ACOUSTIC			DENSITY			NEUTRON		
				Scale		Scale			Scale			Scale		
No.	From	To	Ft/Min	L	R	L	R	Matrix	L	R	Matrix	L	R	Matrix
ONE	9417	SURF	REC	0	100				30	-10	2.71	30	-10	LIME
TWO	10124	8500	REC	0	100				30	-10	2.71	30	-10	LIME

Remarks:

2" = 100'

P.E.			
0 QUALITY -2		PE CORR	
Q SHORT		-1 B/E 9	
-4.5 8.5		DEN CORR	TENSION
Q LONG		-0.2 GM/CC 0.8	10000 POUNDS 0
4.5 -0.5		DENSITY	
GAMMA		2 GM/CC 1	
0 API 100		NEU POROS	
CALIPER		30 LIME -10	
6 INCHES 16			

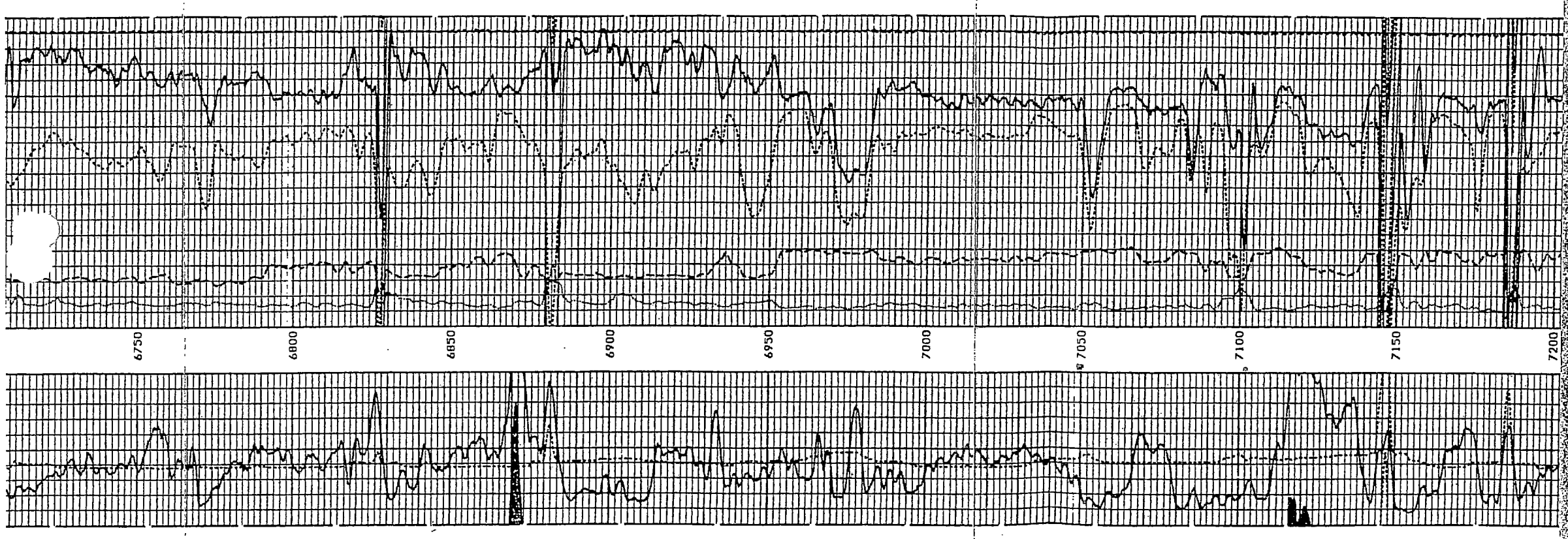
157

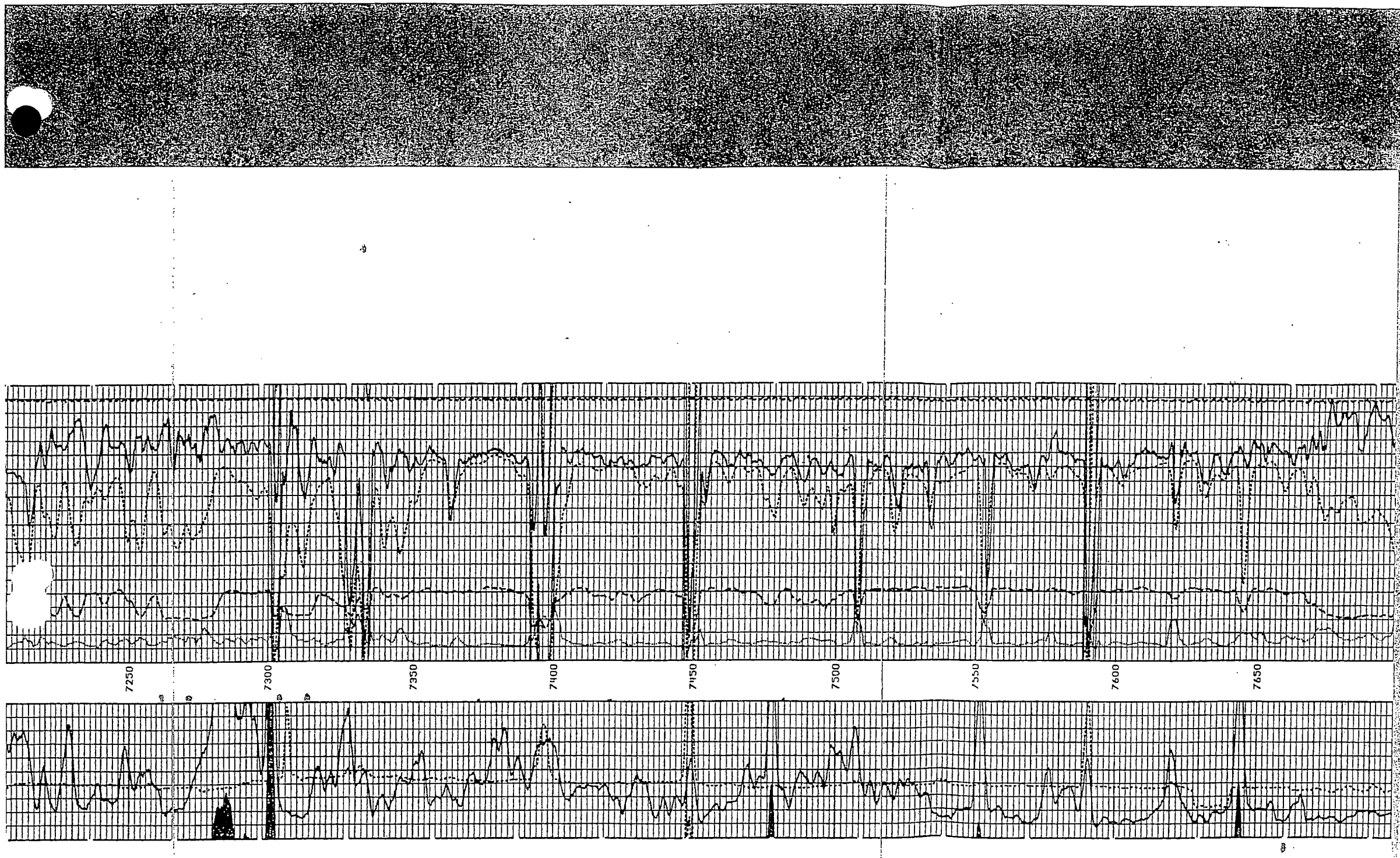
← MINUTE MARKER

EXHIBIT 3

APPENDIX J


6250
6300
6350
6400
6450
6500
6550
6600
6650
6700


6750
6800
6850
6900
6950
7000
7050
7100
7150
7200


7250
7300
7350
7400
7450
7500
7550
7600
7650


7750
7800
7850
7900
7950
8000
8050
8100
8150

157

EDDY SEC 1-18S-27E

Petroleum Information

DENVER, COLORADO 80201

REFERENCE Y 49491

25 API NO. 30 015 26575

REPRODUCTION FOR RESALE IN WHOLE OR PART PROHIBITED

HALLIBURTON LOGGING SERVICES, INC.

DUAL INDUCTION LATEROLOG

COMPANY _____
WELL _____
FIELD _____
COUNTY _____ ST _

COMPANY KENNOURNE OIL CO.
WELL CHALK BLUFF FEDERAL NO.1
FIELD NORTH ILLINOIS CAMP-MORROW
COUNTY EDDY STATE NM
API NO. NA OTHER SERVICES
LOCATION 2250 FNL & 760 FEL SEC 1 TWP 18S RGE 27E
ELEV. K.B. 3609 D.F. NA G.L. 3585
25
PERMANENT DATUM G.L. ELEV. 3609
LOG MEASURED FROM K.B. 15 FT. ABOVE PERM. DATUM
DRILLING MEASURED FROM K.B.
DATE 11/23/78
RUN NO. ONE
DEPTH-DRILLER 9450
DEPTH-LOGGER 9449
BTM. LOG INTER. 9445
TOP LOG INTER. 2595
CASING-DRILLER @ 2595 @ 2500
CASING-LOGGER 2595
BIT SIZE 6.75
TYPE FLUID IN HOLE WATER
DENS. : VISC. NA : NA NO RETURNS
PH : FLUID LOSS NA : NA
SOURCE OF SAMPLE MUDPIT
RM @ MEAS. TEMP. 1.4 @ 63
RMF @ MEAS. TEMP. NA @ NA
RMC @ MEAS. TEMP. NA @ NA
SOURCE: RMF : RMC NA : NA
RM @ BHT .541 @ 122
RMF @ BHT NA @ NA
RMC @ BHT NA @ NA
TIME SINCE CIRC. 5 HRS
TIME ON BOTTOM 17:44 HRS
MAX. REC. TEMP. 122 @ 9 H
EQUIP. : LOCATION 3414 : MORRO
RECORDED BY SIEGFRIED
WITNESSED BY D. OVERTON

TIGHT HOLE

Fold Here

Service Ticket No.: 63852 API Serial No.: NA PGM Version: 2.58 E

Change in Mud Type or Additional Samples

Date/Sample No.	/ / :	/ / :
Depth-Driller		
Type Fluid in Hole		
Dens. : Visc.	:	:
pH. : Fluid Loss	:	:
Source of Sample		
Rm @ Meas.Temp.	@	@
Rmf @ Meas.Temp.	@	@
Rmc @ Meas.Temp.	@	@
Source: Rmf:Rmc	:	:
Rm @ BHT	.541 @122	@
Rmf @ BHT	NA @NA	@
Rmc @ BHT	NA @NA	@

RESISTIVITY SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole
NA			

RESISTIVITY EQUIPMENT DATA

Run No	Tool Type & No	Pad Type	Tool Pos.	Other
ONE	DILT-189430	NA	NA	
	SGRT-188920	NA	CENT	

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.	NA	Run No.	ONE	Run No.	ONE
Serial No.	100615	Serial No.		Serial No.	112611	Serial No.	104763
Model No.	432	Model No.		Model No.	465	Model No.	494
Diameter	3.625	No.of Cent.		Diameter	4.5"	Diameter	3 3/8
Detector Model No.	1927	Spacing		Log Type	C-C	Log Type	M-M
Type	SCINT			Source Type	CS-137	Source Type	AM-241
Length	4"	LSA		Serial No.	38	Serial No.	DSN-27
Distance To Source	18"	FWDA		Strength	1.5 C.	Strength	18.5 Ci

LOGGING DATA

GENERAL				GAMMA		ACOUSTIC			DENSITY			NEUTRON		
Run	Depth		Speed	Scale		Scale			Scale			Scale		
No.	From	To	Ft/Min	L	R	L	R	Matrix	L	R	Matrix	L	R	Matrix
ONE	9446	2595	REC	0	100				30	-10	2.71	30	-10	LIME

Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 7" CASING
DUAL INDUCTION RUN IN COMBO WITH SDL-DSN.
DRILLING RIG HAD NO RETURNS BEFORE COMING OUT OF THE HOLE.

CREW:SIEGFRIED,HOUSTON,NORRIS,D'SOUZA

Halliburton Logging Services, Inc. does not guarantee the accuracy of any interpretation of log data, and is not responsible for conclusions or interpretations which may be drawn by its customers or others from any report on any log or any other form. Any use of such data, interpretations, conclusions or recommendations beyond the actual cost of our recommended report shall be upon customer's express written agreement. For any loss, damages or expenses resulting from the use thereof.

2" = 100'

TENSION		
10000	POUNDS	0
GAMMA		
0	API	100
CALIPER		
6	INCHES	16
SP		
-120		+120

DEEP		
0.2	OHM-M	2000
MEDIUM		
0.2	OHM-M	2000
LATEROLOG		
0.2	OHM-M	2000

CASING 2600

2700

2800

SP

TIE MARKER

LINE TENSION

GAMMA

CALIPER

B.H.V.=

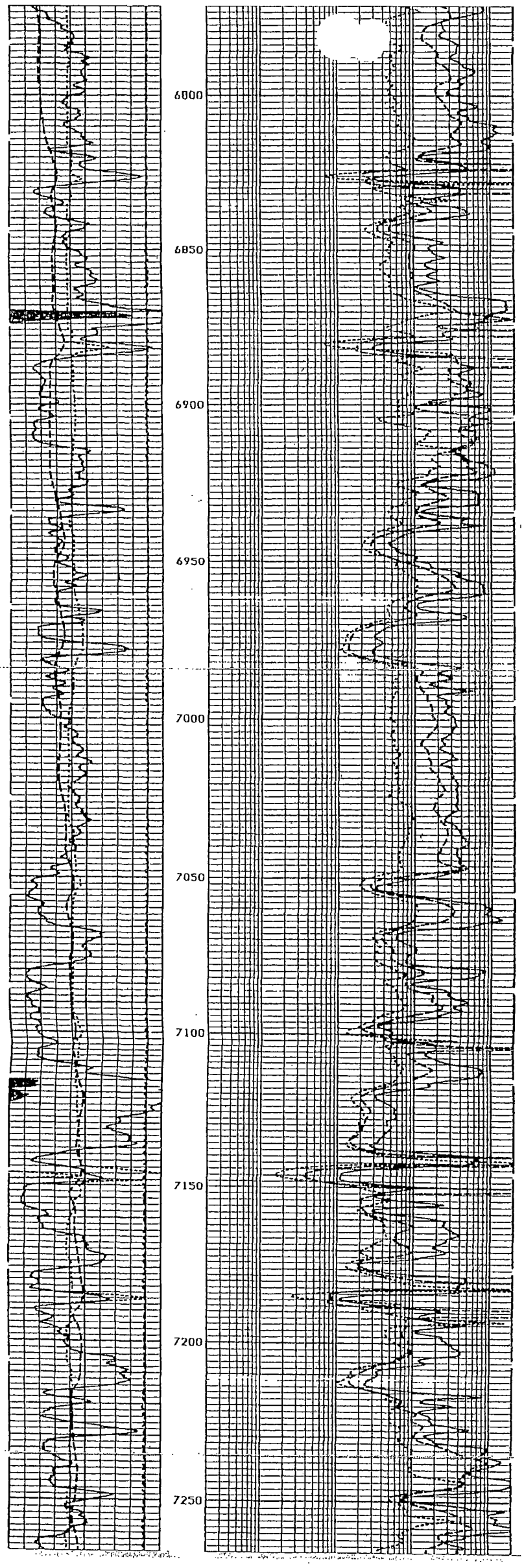
DEEP INDUCTION

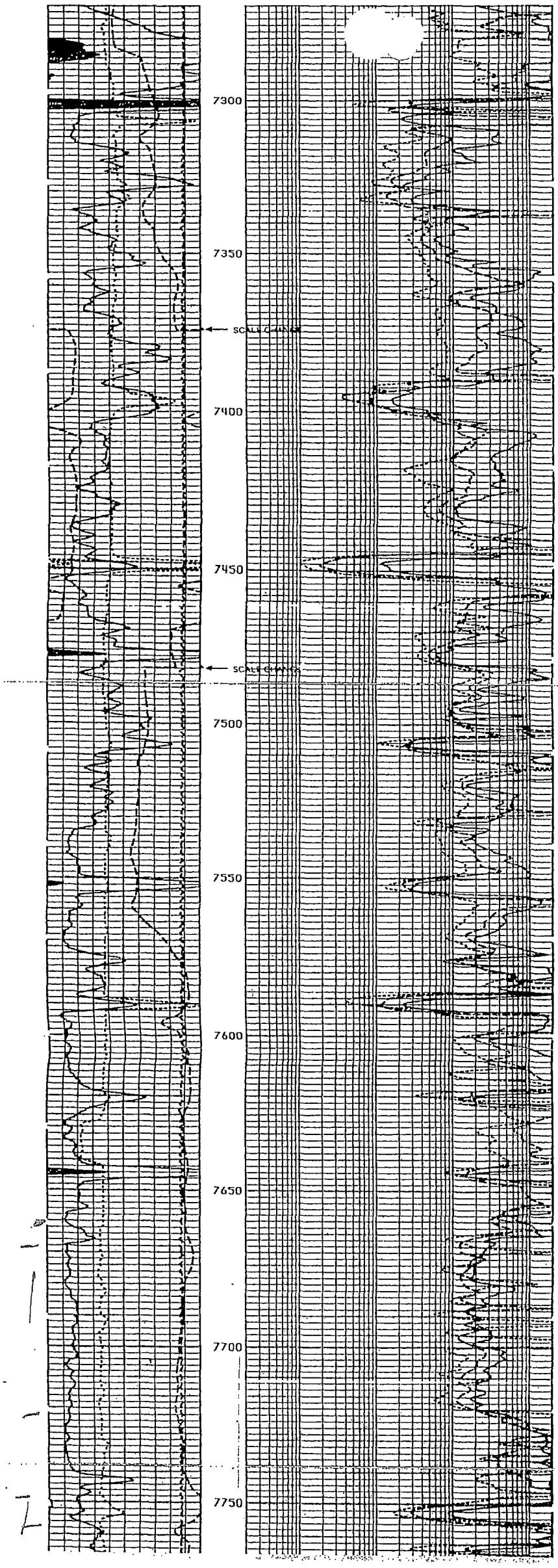
MEDIUM INDUCTION

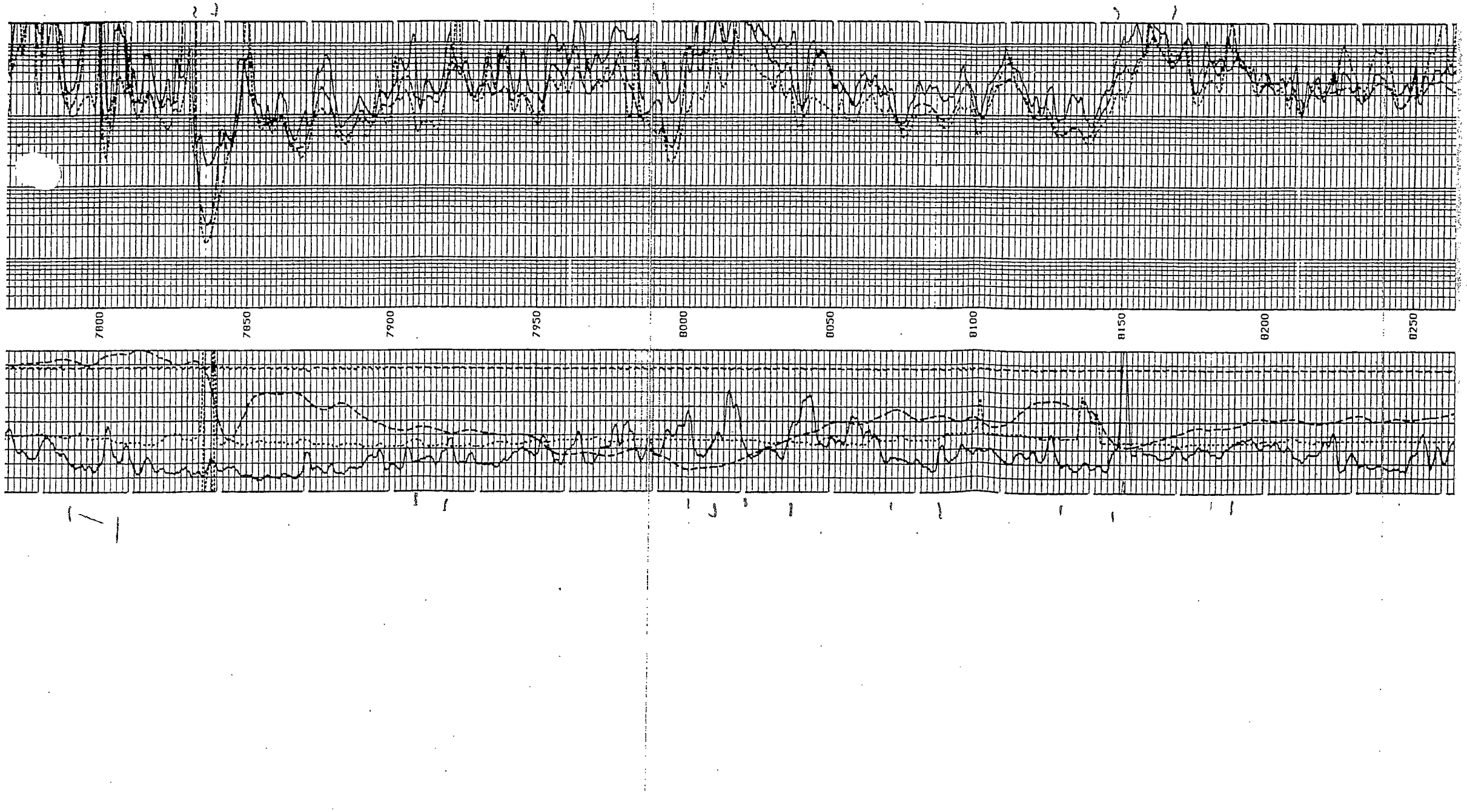
LATEROLOG

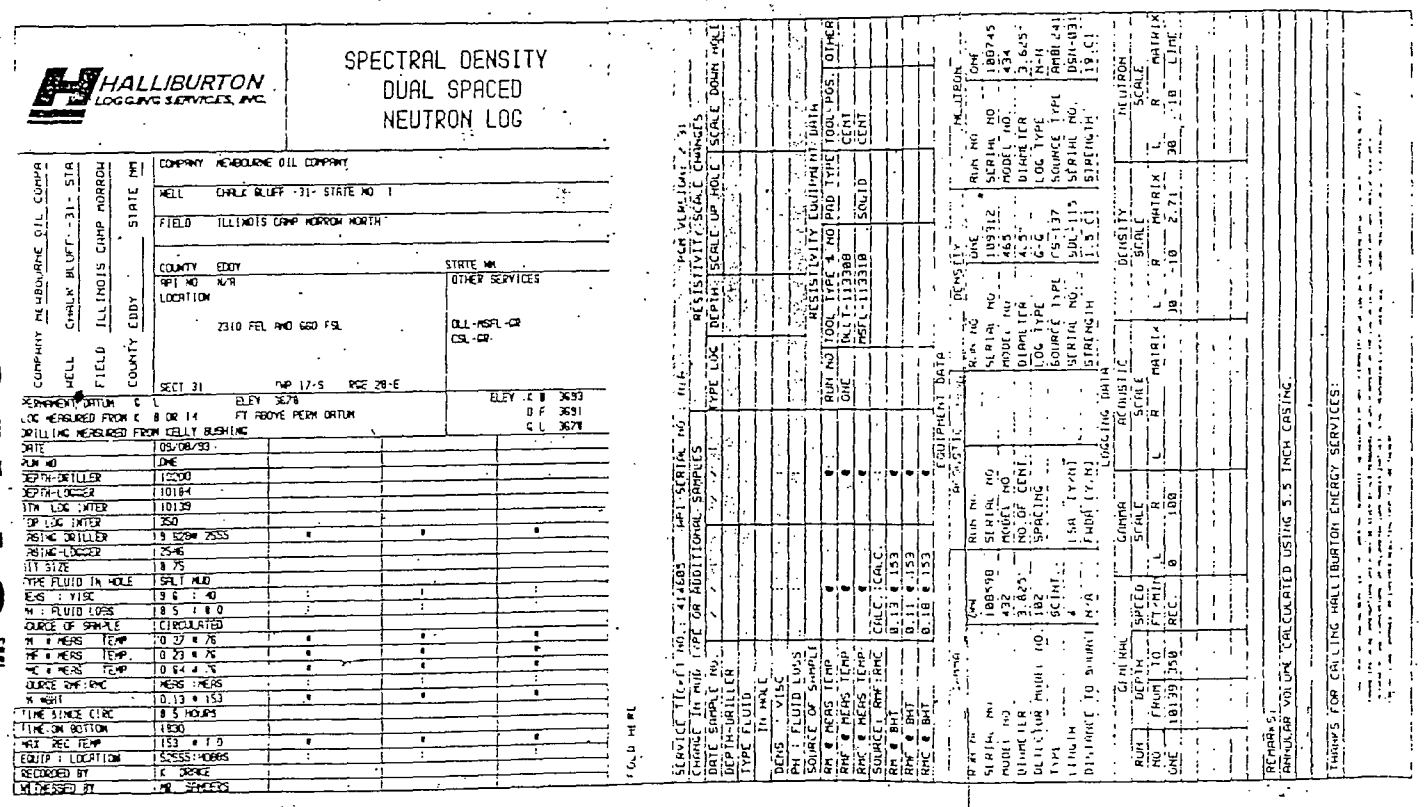
EXHIBIT 3

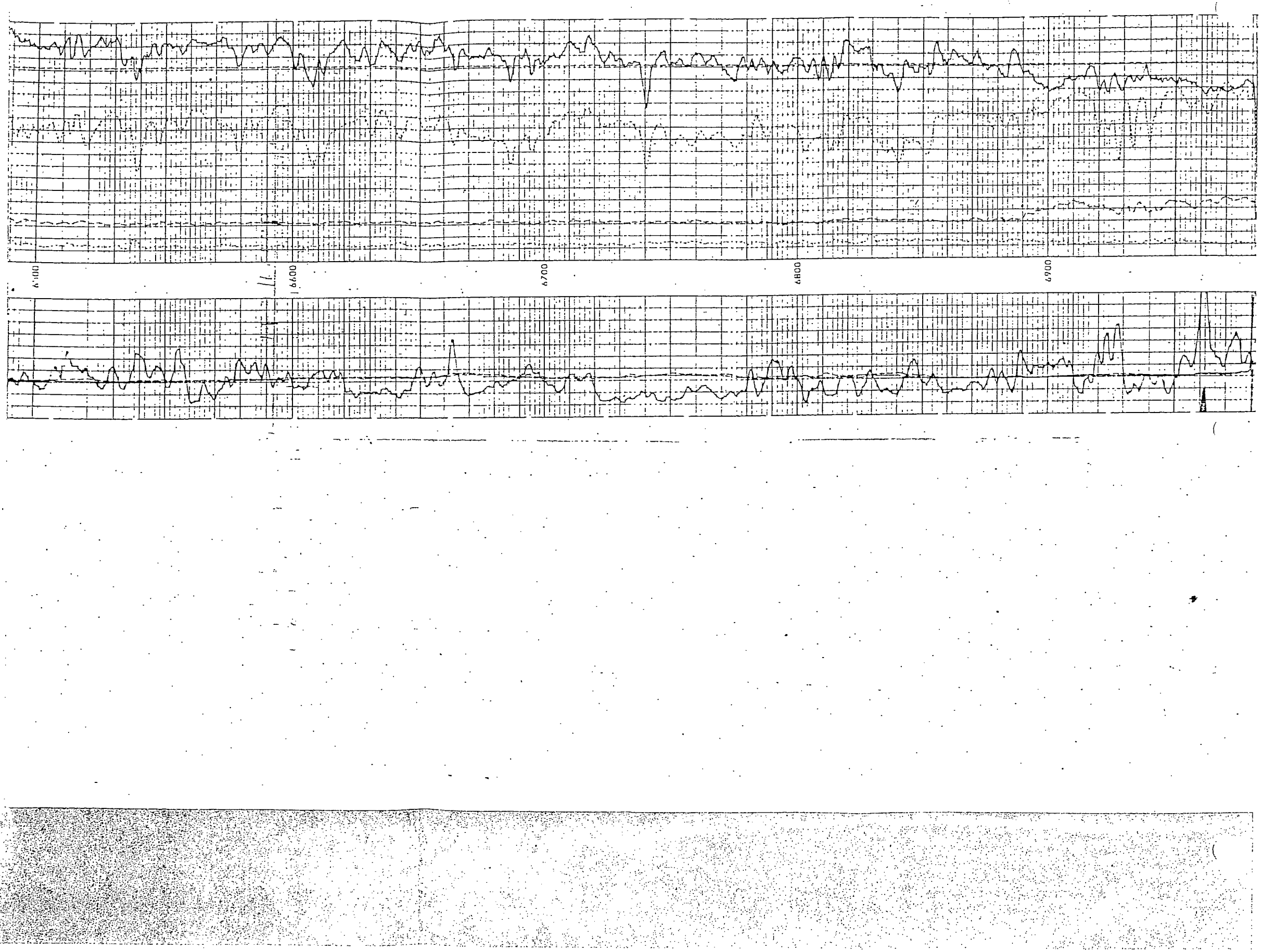
APPENDIX J

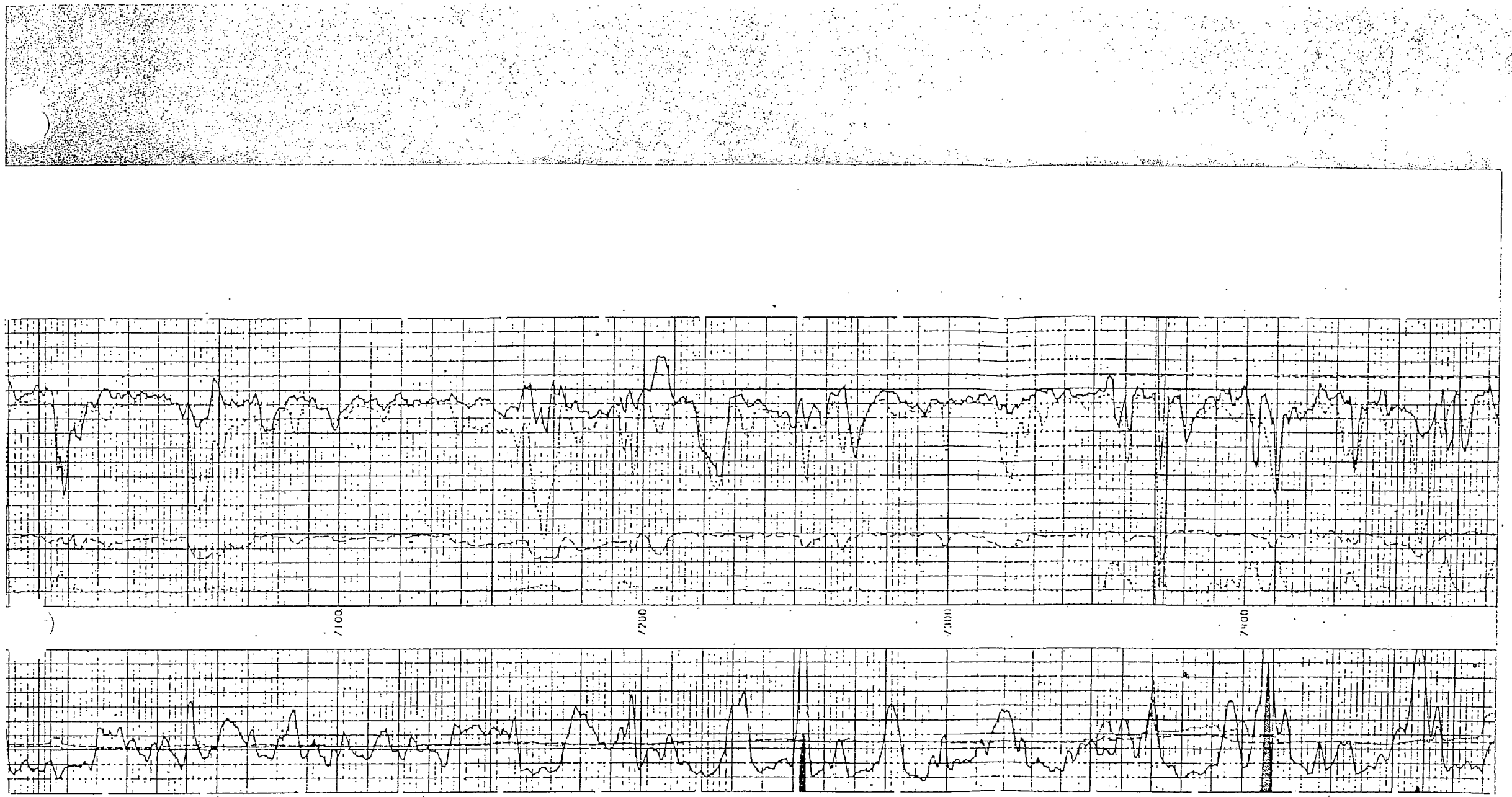

6800
6850
6900
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7150
7200
7250

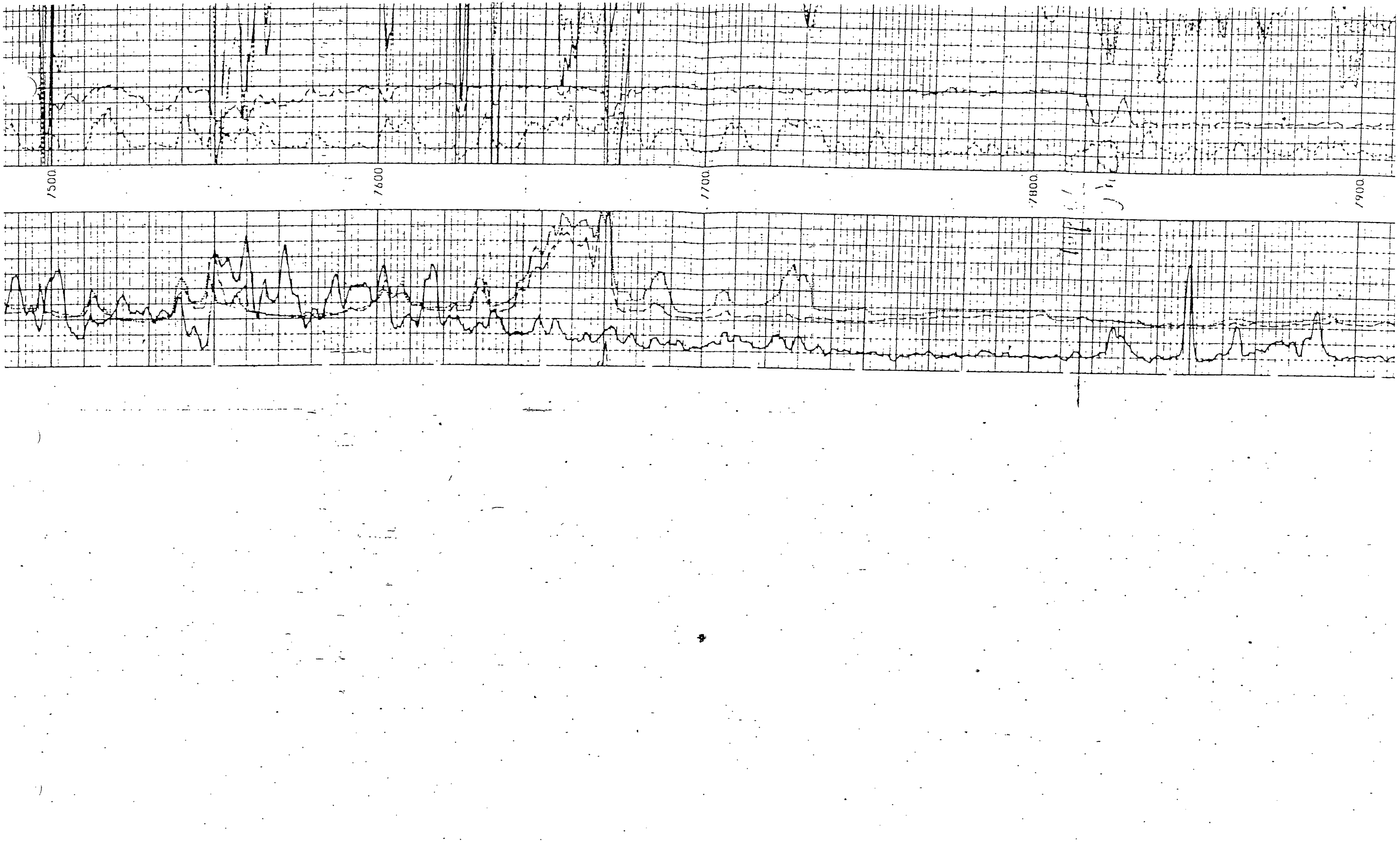

7300
7350
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7750


7800
7850
7900
7950
8000
8050
8100
8150
8200
8250


HALLIBURTON
LOGGING SERVICES, INC.
SPECTRAL DENSITY
DUAL SPACED
NEUTRON LOG
COMPANY MEWBOURNE OIL COMPANY
WELL CHALK BLUFF -31- STATE NO 1
FIELD ILLINOIS CAMP MORROW NORTH
COUNTY EDDY
STATE NM
API NO N/R
LOCATION
2310 FEL AND 660 FSL
SECT 31
TWP 17-S
RGE 28-E
PERMANENT DATUM G L
ELEV 3678
LOG MEASURED FROM K B 14 FT ABOVE PERM DATUM
DRILLING MEASURED FROM KELLY BUSHING
ELEV K B 3692
D F 3691
G L 3678
DATE 05/08/93
RUN NO ONE
DEPTH-DRILLER 10200
DEPTH-LOGGER 10184
BTM LOG INTER 10139
TOP LOG INTER 350
CASING-DRILLER 13 3/8@ 355
CASING-LOGGER 355
BIT SIZE 17 5
TYPE FLUID IN HOLE SALT MUD
DENS : VISC 10 0 : 40
PH : FLUID LOSS 10 5 : 8 0
SOURCE OF SAMPLE CIRCULATED
RM @ MEAS TEMP 0 27 @ 75
RMF @ MEAS TEMP 0 23 @ 75
RMC @ MEAS TEMP 0 64 @ 75
SOURCE RMF RMC MEAS MEAS
R MUD CAKE 0 13 @ 153
TIME SINCE CIRC 8 5 HOURS
TIME ON BOTTOM 1830
MAX REC TEMP 153 @ TD
EQUIP LOCATION 5SSS1 MIDLAND
RECORDED BY TC SPIKES
WITNESSED BY MR SPIKES
OTHER SERVICES
DLL-MSFL-GR
CSL-GR
RUN NO ONE
TYPE LOG CSL
DEPTH-DRILLER 10200
SCHLUMBERGER DEPTH 10184
BOTTOM LOGGED INTERVAL 10139
TOP LOGGED INTERVAL 350
TYPE FLUID IN HOLE SALT MUD
DENS VISC 10 0 40
PH FLUID LOSS 10 5 8 0
SOURCE OF SAMPLE CIRCULATED
RM @ MEAS TEMP 0 27 @ 75
RMF @ MEAS TEMP 0 23 @ 75
RMC @ MEAS TEMP 0 64 @ 75
RM @ BHT 0 13 @ 153
RMF @ BHT 0 11 @ 153
RMC @ BHT 0 18 @ 153
SOURCE RMF RMC CALC CALC
RUN NO ONE
TOOL TYPE & NO PAD TYPE TOOL PRES OTHER
NLT-1123380 CENT
MSFL-1123318 CENT SOLID
DENSITY
RUN NO ONE
SERIAL NO 180745
MODEL NO 434
DIAMETER 3 625"
LOG TYPE TI-TI
SOURCE TYPE AMBI 241
SERIAL NO. DSH-401
STRENGTH 19 CI
NEUTRON
SCALE
L R MATRIX
30 -10 2 71 LIME
RUN NO ONE
SERIAL NO 180590
MODEL NO 432
DIAMETER 3 625"
LOG TYPE TI-TI
SOURCE TYPE AMBI 241
SERIAL NO. DSH-401
STRENGTH 19 CI
GAMMA RAY
SCALE
L R
0 100
SERVICE TICKET NO 414685
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLES
DATE SAMPLE NO
DEPTH-DRILLER
TYPE FLUID
IN HOLE
RUN NO ONE
SERIAL NO 180590
MODEL NO 432
DIAMETER 3 625"
DETECTOR TO SOURCE 10"
SPACING 1 5"
SOURCE SCINT
STRENGTH 4
LOGGING DATA
ACOUSTIC
SCALE
L R
0 100
SPACING 3'
TYPE LOG CSL
SERIAL NO 180745
MODEL NO 434
NO OF CENT 2
SPACING 10'
ISA (TYP) 1
FWD (T-R) 3
RUN NO ONE
SERIAL NO 180745
MODEL NO 434
DIAMETER 3 625"
LOG TYPE TI-TI
SOURCE TYPE AMBI 241
SERIAL NO. DSH-401
STRENGTH 19 CI
CALIPER
SCALE
L R
6 16
RUN NO ONE
SERIAL NO 180745
MODEL NO 434
DIAMETER 3 625"
LOG TYPE TI-TI
SOURCE TYPE AMBI 241
SERIAL NO. DSH-401
STRENGTH 19 CI
RUN NO ONE
DEPTH-DRILLER 10200
DEPTH-LOGGER 10184
BOTTOM LOGGED INTERVAL 10139
TOP LOGGED INTERVAL 350
TYPE FLUID IN HOLE SALT MUD
DENS VISC 10 0 40
PH FLUID LOSS 10 5 8 0
SOURCE OF SAMPLE CIRCULATED
RM @ MEAS TEMP 0 27 @ 75
RMF @ MEAS TEMP 0 23 @ 75
RMC @ MEAS TEMP 0 64 @ 75
RM @ BHT 0 13 @ 153
RMF @ BHT 0 11 @ 153
RMC @ BHT 0 18 @ 153
SOURCE RMF RMC CALC CALC
RUN NO ONE
TOOL TYPE & NO PAD TYPE TOOL PRES OTHER
NLT-1123380 CENT
MSFL-1123318 CENT SOLID
RUN NO ONE
SERIAL NO 180590
MODEL NO 432
DIAMETER 3 625"
LOG TYPE TI-TI
SOURCE TYPE AMBI 241
SERIAL NO. DSH-401
STRENGTH 19 CI
RUN NO ONE
SERIAL NO 180590
MODEL NO 432
DIAMETER 3 625"
DETECTOR TO SOURCE 10"
SPACING 1 5"
SOURCE SCINT
STRENGTH 4
RUN NO ONE
SERIAL NO 180745
MODEL NO 434
NO OF CENT 2
SPACING 10'
ISA (TYP) 1
FWD (T-R) 3
RUN NO ONE
DEPTH-DRILLER 10200
SCHLUMBERGER DEPTH 10184
BOTTOM LOGGED INTERVAL 10139
TOP LOGGED INTERVAL 350
RUN NO ONE
SERIAL NO 180745
MODEL NO 434
DIAMETER 3 625"
LOG TYPE TI-TI
SOURCE TYPE AMBI 241
SERIAL NO. DSH-401
STRENGTH 19 CI
RUN NO ONE
DEPTH-DRILLER 10200
SCHLUMBERGER DEPTH 10184
BOTTOM LOGGED INTERVAL 10139
TOP LOGGED INTERVAL 350
RUN NO ONE
SERIAL NO 180590
MODEL NO 432
DIAMETER 3 625"
LOG TYPE TI-TI
SOURCE TYPE AMBI 241
SERIAL NO. DSH-401
STRENGTH 19 CI
RUN NO ONE
SERIAL NO 180590
MODEL NO 432
NO OF CENT 2
SPACING 10'
ISA (TYP) 1
FWD (T-R) 3
RUN NO ONE
SERIAL NO 180745
MODEL NO 434
DIAMETER 3 625"
LOG TYPE TI-TI
SOURCE TYPE AMBI 241
SERIAL NO. DSH-401
STRENGTH 19 CI
RUN NO ONE
SERIAL NO 180745
MODEL NO 434
DIAMETER 3 625"
DETECTOR TO SOURCE 10"
SPACING 1 5"
SOURCE SCINT
STRENGTH 4
RUN NO ONE
SERIAL NO 180590
MODEL NO 432
DIAMETER 3 625"
LOG TYPE TI-TI
SOURCE TYPE AMBI 241
SERIAL NO. DSH-401
STRENGTH 19 CI
RUN NO ONE
SERIAL NO 180590
MODEL NO 432
NO OF CENT 2
SPACING 10'
ISA (TYP) 1
FWD (T-R) 3
RUN NO ONE
SERIAL NO 180745
MODEL NO 434
DIAMETER 3 625"
LOG TYPE TI-TI
SOURCE TYPE AMBI 241
SERIAL NO. DSH-401
STRENGTH 19 CI
RUN NO ONE
DEPTH-DRILLER 10200
SCHLUMBERGER DEPTH 10184
BOTTOM LOGGED INTERVAL 10139
TOP LOGGED INTERVAL 350
RUN NO ONE
SERIAL NO 180745
MODEL NO 434


0010
0060
0070
0080
0090




1500
1600
1700
1800
1900

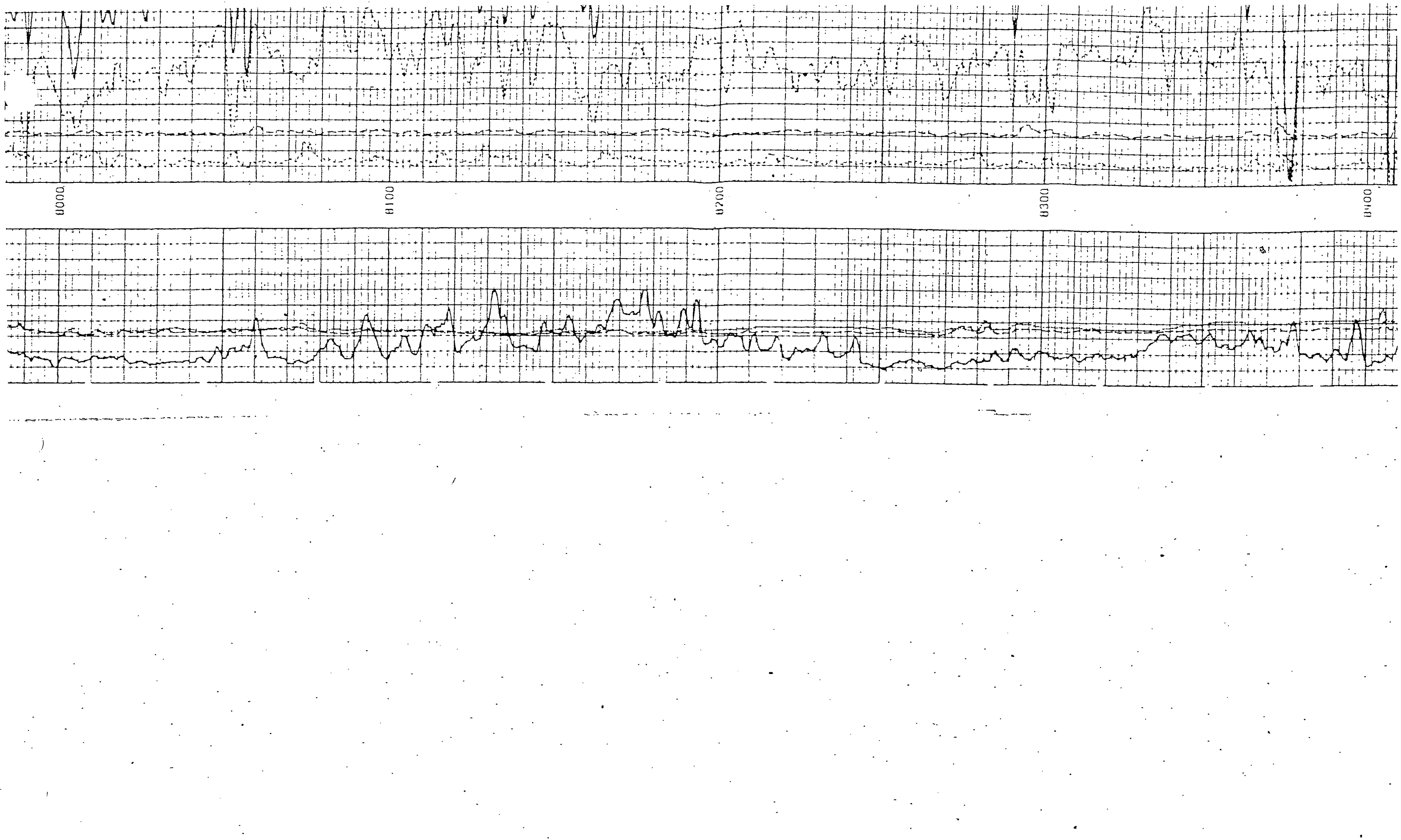
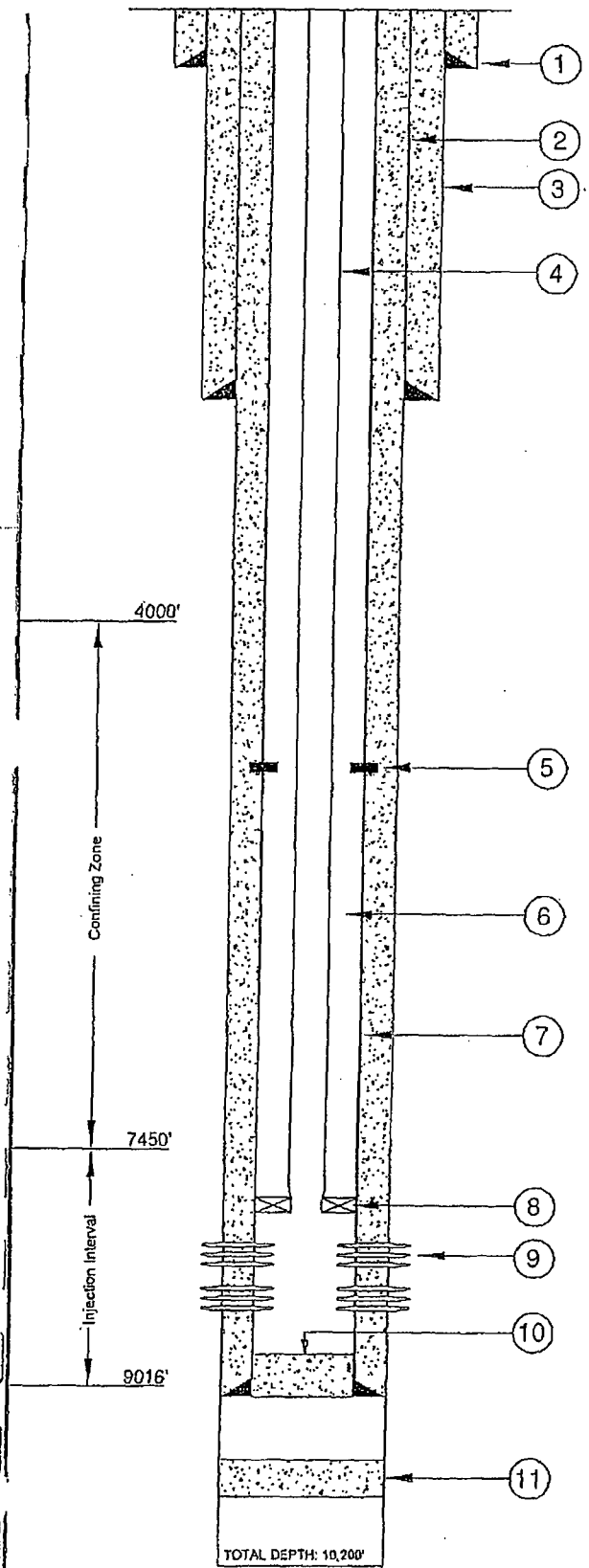

0000
0100
0200
0300
0400

EXHIBIT 4





BELOW GROUND DETAILS

All depths are referenced to the Kelly bushing elevation of 12.5' above ground level. Ground level elevation is 3,678' above mean sea level.

1. Surface Casing: 13 ⅜", 48 lb/ft, J-55, ST&C set at 390' in a 17 ½" hole. Cemented with 150 sx Class C with 3 % calcium chloride, 375 sx Class C Litewate w/3% calcium chloride and ½ lb/sx flocele. Circulated 86 sx to surface.

2. Intermediate Casing: 9 ⅝", 36 lb/ft, J-55, ST&C set at 2,555' in a 12 ¼" hole. Cemented w/800 sx of Class C Lite w/ ½ lb/sx flocele and 2 lb/sx Gilsonite and 12 % salt. Followed by 200 sx of Class C w/2 % calcium chloride. Circulated 133 sx to surface.

3. Base of the USDW at 493'.

4. Injection Tubing: 4 ½", 11.6 lb/ft, N-80, SMLS, R3, LT&C set at 7,879'.

5. DV Tool: at 5,498'.

6. Annulus Fluid: 8.7 lb/gal brine water mixed w/UniChem Techni-Hib 370 corrosion inhibitor.

7. Protection Casing: 7", 29 lb/ft, N-80, LT&C: 9094' to 7031'. 7", 29 lb/ft, P-110, LT&C: 7031' to 5845'. 7", 26 lb/ft, P-110, LT&C; 5845' to surface. Casing cemented in two stages as follows:

   First Stage - 600 sx modified Class H w/0.4 % CFR-3, 5 lb/sx Gilsonite, 0.5% Halad-344, and 1 lb/sx salt mixed at 13.0 ppg. Opened DV tool at 5498' and circulated 142 sx to surface.

   Second Stage - Lead Slurry: 220 sx Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail Slurry: 550 sx modified Class H w/0.4 % CFR-3, 5 lb/sx, Gilsonite, 0.5 % Halad-344, 0.1% HR-7, and 1 lb/sx mixed at 13.0 ppg. Circulated 75 sx to surface. Top out w/20 sx permium plus 3% calcium chloride.

8. Packer: 7" x 3.5" EVI Oil Tools (Arrow), Model X-1 retrievable packer set at 7879'. Minimum I.D. is 3.0". Wireline re-entry guide on bottom. To release: turn ¼ turn to the right and pick up.

9. Perforations (2 SPF):

   Upper Zone - 7924-7942', 7974-8030', 8050-8056', 8066-8080', 8118-8127', 8132-8140', 8160-8164', 8170-8188'.

   Lower Zone - 8220-8254', 8260-8270', 8280-8302', 8360-8366', 8370-8378', 8400-8410', 8419-8423', 8430-8446', 8460-8464', 8470-8476'.

10. PBTD: 9004'.

11. Cement Plug: 45 sx Class H from 9624' to 9734'.

SUBSURFACE

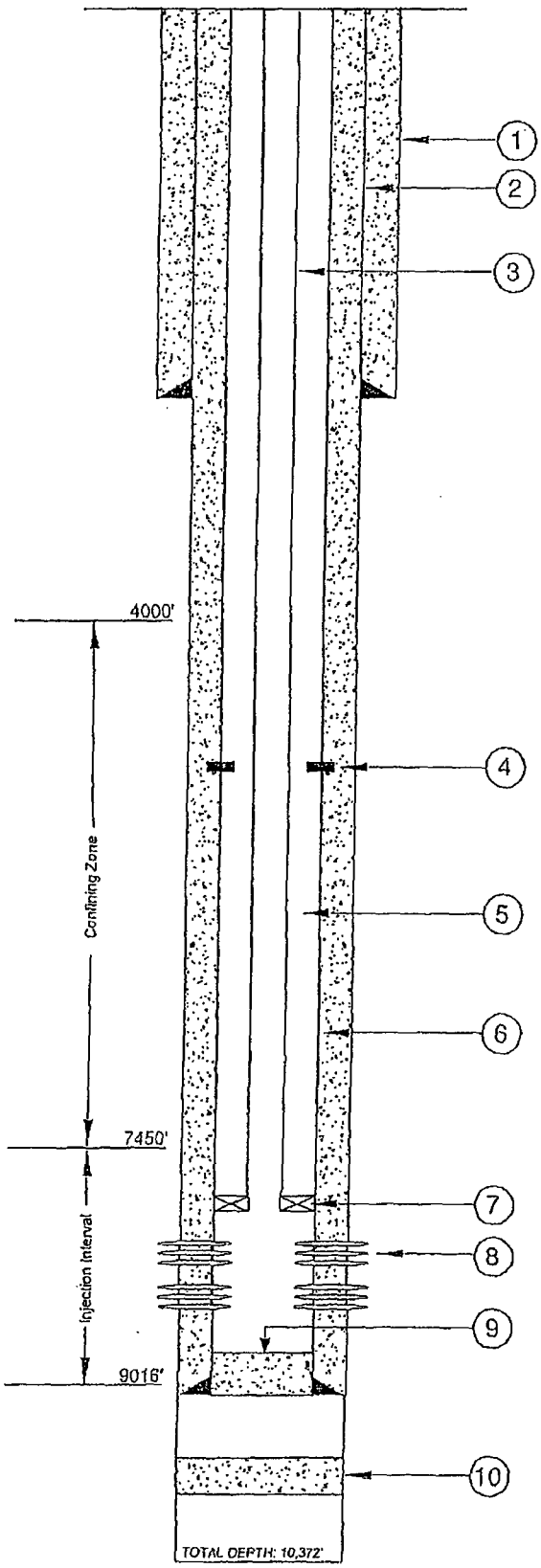
HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO

BELOW GROUND DETAILS
WASTE DISPOSAL WELL NO. 1

DATE: 07/13/01	CHECKED BY:	JOB NO: 7005256
DRAWN BY: WOL	APPROVED BY:	DWG. NO:

FIGURE 1



BELOW GROUND DETAILS

All depths are referenced to the Kelly bushing elevation of 13' above ground level. Ground level elevation is 3610' above mean sea level.

1. Base of the USDW at 473'.
2. Surface Casing: 8 5/8", 32 lb/ft, set at 1995' in an 11" hole. Cemented to surface with 800 sacks of cement.
3. Injection Tubing: 3 ½", 9.2 lb/ft, J-55, smls, NUE 10 rd. set at 7528'.
4. DV Tool: at 5,785'.
5. Annulus Fluid: 8.7 lb/gal brine water mixed w/UniChem Techni-Hib 370 corrosion inhibitor.
6. Protection Casing: 5 ½", 17 lb/ft, L-80, LT&C; 8869' to the surface and set in a 7 7/8" hole. Casing cemented in two stages as follows:

   First Stage - 575 sacks of modified Class "H" with 0.4 % CFR-3, 5 lb/sk Gilsonite, 0.5 % Halad-344, and 3 lb/sk salt. Mixed at 13.0 ppg. Opened DV tool at 5785 and circulated 20 sacks to surface.

   Second Stage - Lead Slurry: 300 sacks of Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail slurry: 695 sacks modified Class "H" with 0.4% CFR-3, 5 lb/sk Gilsonite, 0.5 % Halad-344 and 3 lb/sk salt mixed at 13.0 ppg. Circulated 150 sacks to surface. Topped out with 10 yards of Redi-mix.
7. Packer: 5 ½" x 2 7/8" Weatherford Completion Tools (Arrow) Model X-1 retrievable packer set at 7528'. Minimum ID is 2.4375". Wireline re-entry guide is on bottom. To release: turn ¼ turn to the right and pick up.
8. Perforations (2 SPF):

   Zone 1: 7570-7620', 7676-7736'

   Zone 2: 7826-7834', 7858-7880', 7886-7904', 7916-7936', 7944-7964', 7990-8042', 8096-8116', 8191-8201', 8304-8319',8395-8399'.
9. PBTD: 8770'
10. Cement Plug: 45 sacks from 9675' to 9775'.

SUBSURFACE

HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO

BELOW GROUND DETAILS
WASTE DISPOSAL WELL NO. 2

DATE: 07/13/01	CHECKED BY:	JOB NO: 7005256
DRAWN BY: WOL	APPROVED BY:	DWG. NO:

FIGURE 1

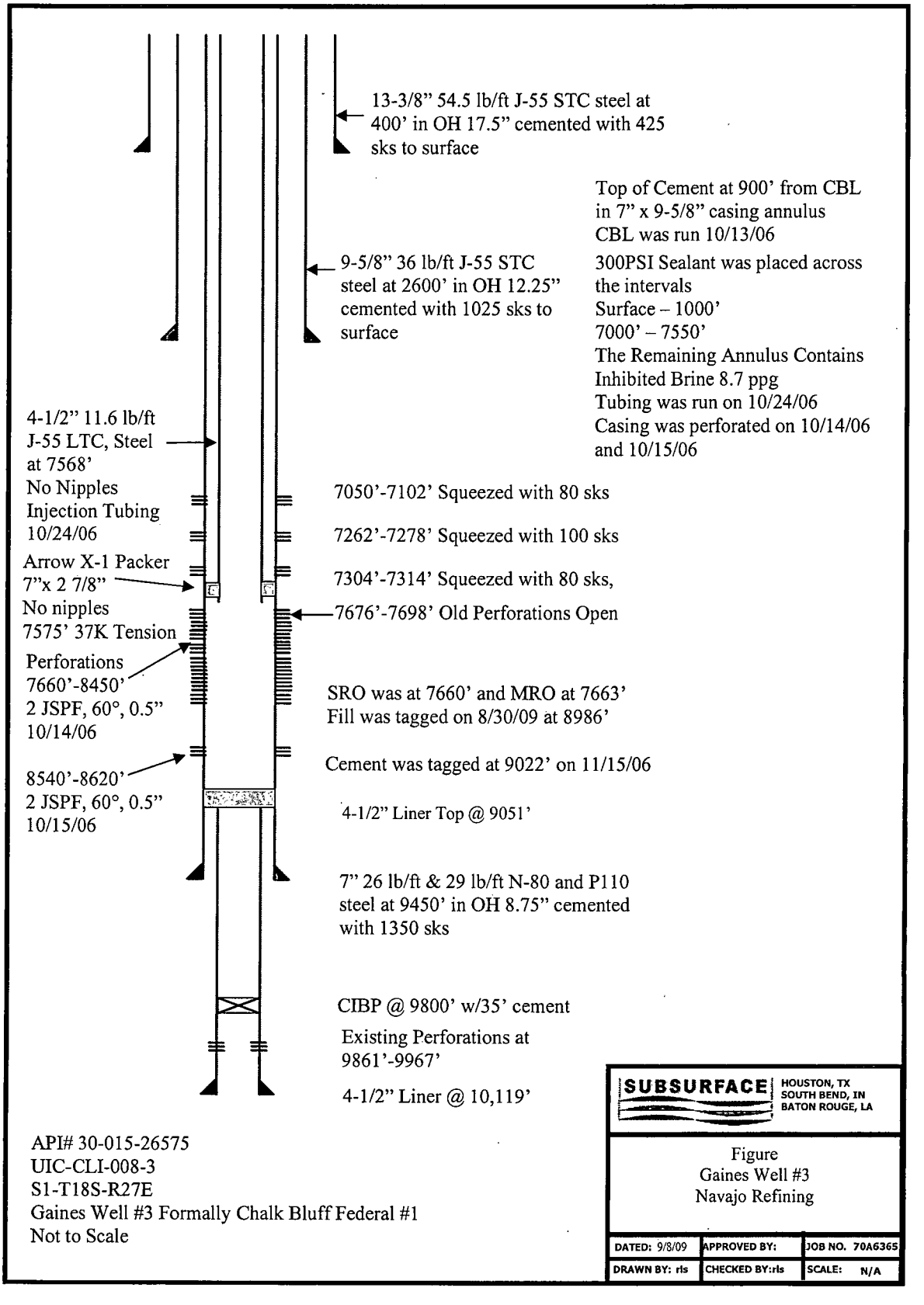

13-3/8" 54.5 lb/ft J-55 STC steel at 400' in OH 17.5" cemented with 425 sks to surface
Top of Cement at 900' from CBL in 7" x 9-5/8" casing annulus CBL was run 10/13/06
9-5/8" 36 lb/ft J-55 STC steel at 2600' in OH 12.25" cemented with 1025 sks to surface
300PSI Sealant was placed across the intervals
Surface – 1000'
7000' – 7550'
The Remaining Annulus Contains Inhibited Brine 8.7 ppg
Tubing was run on 10/24/06
Casing was perforated on 10/14/06 and 10/15/06
4-1/2" 11.6 lb/ft J-55 LTC, Steel at 7568'
No Nipples
Injection Tubing 10/24/06
7050'-7102' Squeezed with 80 sks
7262'-7278' Squeezed with 100 sks
Arrow X-1 Packer 7"x 2 7/8"
7304'-7314' Squeezed with 80 sks,
No nipples
7575' 37K Tension
7676'-7698' Old Perforations Open
Perforations 7660'-8450' 2 JSPF, 60°, 0.5" 10/14/06
SRO was at 7660' and MRO at 7663'
Fill was tagged on 8/30/09 at 8986'
Cement was tagged at 9022' on 11/15/06
8540'-8620' 2 JSPF, 60°, 0.5" 10/15/06
4-1/2" Liner Top @ 9051'
7" 26 lb/ft & 29 lb/ft N-80 and P110 steel at 9450' in OH 8.75" cemented with 1350 sks
CIBP @ 9800' w/35' cement
Existing Perforations at 9861'-9967'
4-1/2" Liner @ 10,119'
API# 30-015-26575
UIC-CLI-008-3
S1-T18S-R27E
Gaines Well #3 Formally Chalk Bluff Federal #1
Not to Scale
SUBSURFACE
HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA
Figure
Gaines Well #3
Navajo Refining
DATED: 9/8/09
APPROVED BY:
JOB NO. 70A6365
DRAWN BY: rls
CHECKED BY:rls
SCALE: N/A

FIGURE 1

EXHIBIT 5

SUBSURFACE

SUBSURFACE

HOUSTON, TX • BATON ROUGE, LA • SOUTH BEND, IN

Production Optimization Systems | Report File: Navajo Chukka-2 2010.pan

PanSystem Version 3.5 | Analysis Date: 11/03/2010

Well Test Analysis Report

Company	Navajo Refining (Holly Corporation)
Location	Artesia, NM
Well	Chukka Well No. 2
Test Date	9/27/2010 to 10/2/2010
Test Type	Buildup / Falloff Test
Gauge Type/Serial Number	Spartek Systems / 76182
Gauge Depth	7570 feet
Injection Interval	7570 feet to 8399 feet
Completion Type	Perforated at 2 SPF on 120° phasing
Top of Fill	8775 feet
Time Since Last Stabilization	9/26/2010 at 8:03 am
Analyst	RLS
Subsurface Project No.	70A6516

Remarks:

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Reservoir Description
Fluid type : Water
Well orientation : Vertical
Number of wells : 1
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	0.000000 psia
Temperature	0.000000 deg F

Well Parameters Data

	Well 1
Well radius	0.3281 ft
Distance from observation to active well	0.000000 ft
Wellbore storage coefficient	0.165091 bbl/psi
Storage Amplitude	0.000000 psi
Storage Time Constant	0.000000 hr
Second Wellbore Storage	0.000000 bbl/psi
Time Change for Second Storage	0.000000 hr
Well offset - x direction	0.0000 ft
Well offset - y direction	0.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	0.000000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.590 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

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Layer 1 Correlations
Not Used

Layer Boundaries Data
Layer 1 Boundary Type : Infinitely acting

	Layer 1
L1	0.000000 ft
L2	0.000000 ft
L3	0.000000 ft
L4	0.000000 ft
Drainage area	0.000000 acres
Dietz shape factor	0.000000

Layer 1 Model Data
Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	819.765533 md
Skin factor (Well 1)	86.420585

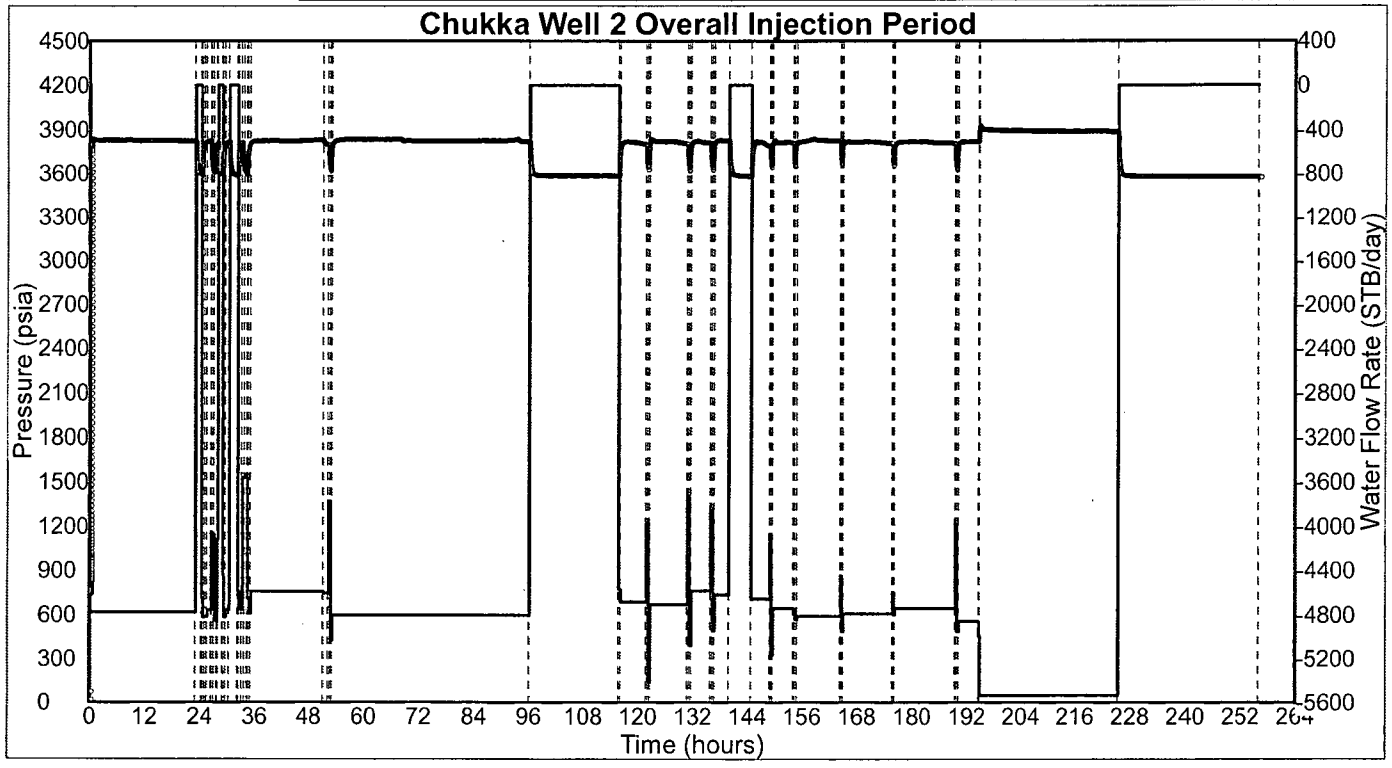
Rate Change Data

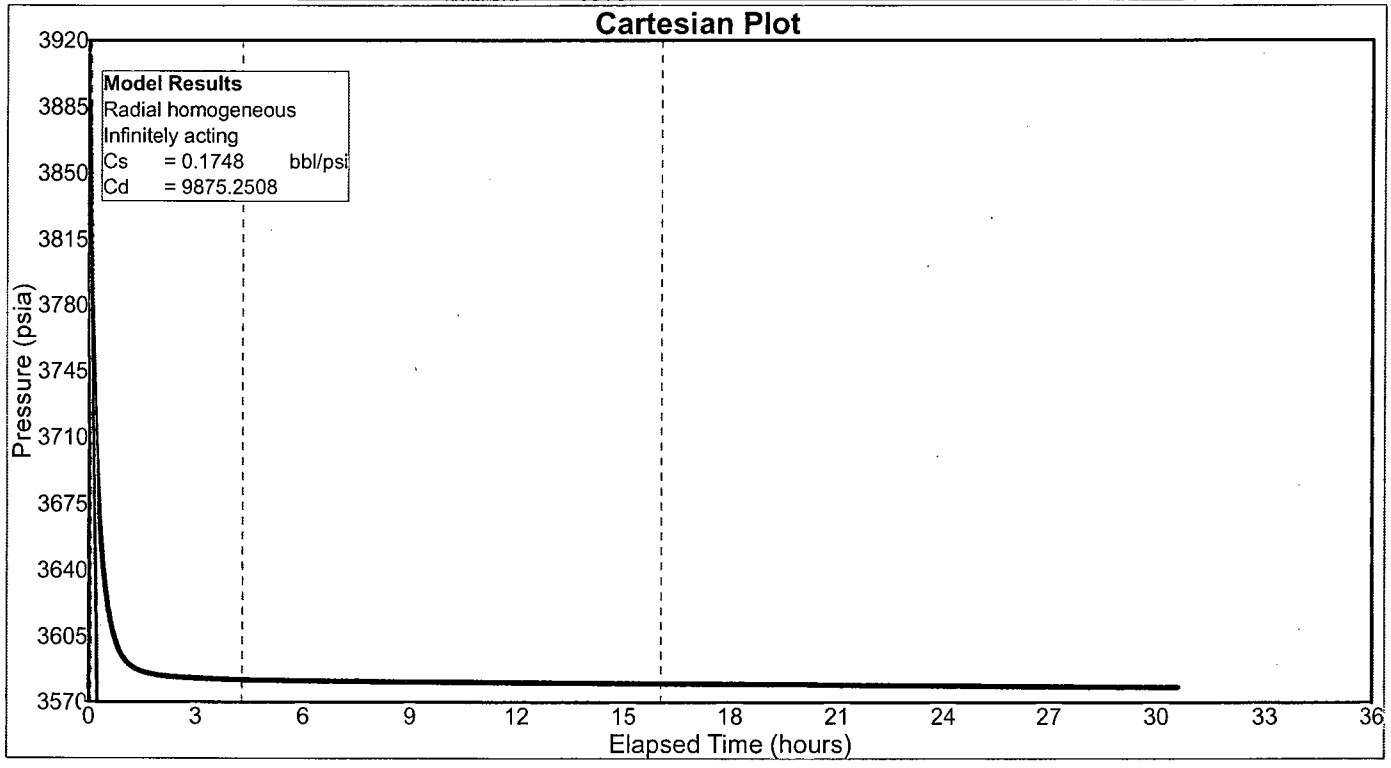
Time Hours	Pressure psia	Rate STB/day
0.000000	3833.476563	-4871.559201
22.970710	3831.992188	-4778.058483
24.246201	3594.394531	0.000000
24.493927	3743.125000	-4646.123708
25.015291	3805.429688	-4820.724923
25.487001	3819.179688	-4814.652537
26.338441	3823.615770	-4756.099574
26.568248	3663.033854	-4053.304818
26.970536	3606.384413	-4069.764434
27.638318	3803.437500	-4853.830169
27.835189	3803.111979	-4116.067297
28.787478	3596.601563	0.000000
29.004138	3724.218750	-4438.998944
29.492399	3801.562500	-4820.724923
30.257061	3818.600260	-4754.483452
32.196910	3570.787760	0.000000
32.496448	3753.867188	-4591.773558
33.149199	3813.437500	-4748.918492
33.678249	3612.089844	-3559.195009
34.207299	3591.438802	-3535.635027
34.561977	3775.000000	-4652.313650
35.028786	3808.007813	-4788.344923
51.127182	3828.203125	-4586.994614
52.273767	3799.583333	-4605.305001
52.728528	3617.154948	-3769.179656
53.065196	3799.218750	-5032.468196
96.112292	3819.540405	-4803.208696
115.714673	3581.354167	0.000000
116.076831	3773.489583	-4565.768407
121.761133	3796.093750	-4682.080000
122.154782	3620.911458	-3974.992332
122.532686	3841.302083	-5408.425253

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
130.752092	3807.395833	-4707.712921
131.208726	3615.260417	-3724.231763
131.598737	3795.208333	-5075.855633
135.853792	3801.744792	-4583.763218
136.278934	3626.562500	-3859.921643
136.641092	3801.744792	-4944.449187
139.900511	3801.000000	-4618.582529
144.764163	3572.762051	0.000000
148.944717	3790.625000	-4656.048179
149.214800	3646.875000	-4073.744778
149.541742	3812.500000	-5159.058022
154.052238	3808.593750	-4742.680000
154.360583	3659.375000	-4746.863123
154.867295	3815.234375	-4840.936435
164.300092	3823.645833	-4813.104923
164.552646	3665.625000	-4443.194397
164.908018	3821.875000	-4950.027966
175.630419	3809.375000	-4786.818089
175.856322	3656.250000	-4595.321201
176.101868	3790.625000	-4799.183140
189.389981	3806.250000	-4739.656009
189.788532	3622.916667	-3974.317347
190.175005	3799.583333	-4950.509508
194.534909	3822.916667	-4855.210548
194.742789	3910.703125	-4989.309519
225.350268	3887.736977	-5530.270000
255.962283	3578.465271	0.000000

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Chukka Well 2 Overall Injection Period
Pressure (psia)
Water Flow Rate (STB/day)
Time (hours)
4500
4200
3900
3600
3300
3000
2700
2400
2100
1800
1500
1200
900
600
300
0
400
0
-400
-800
-1200
-1600
-2000
-2400
-2800
-3200
-3600
-4000
-4400
-4800
-5200
-5600
0 12 24 36 48 60 72 84 96 108 120 132 144 156 168 180 192 204 216 228 240 252

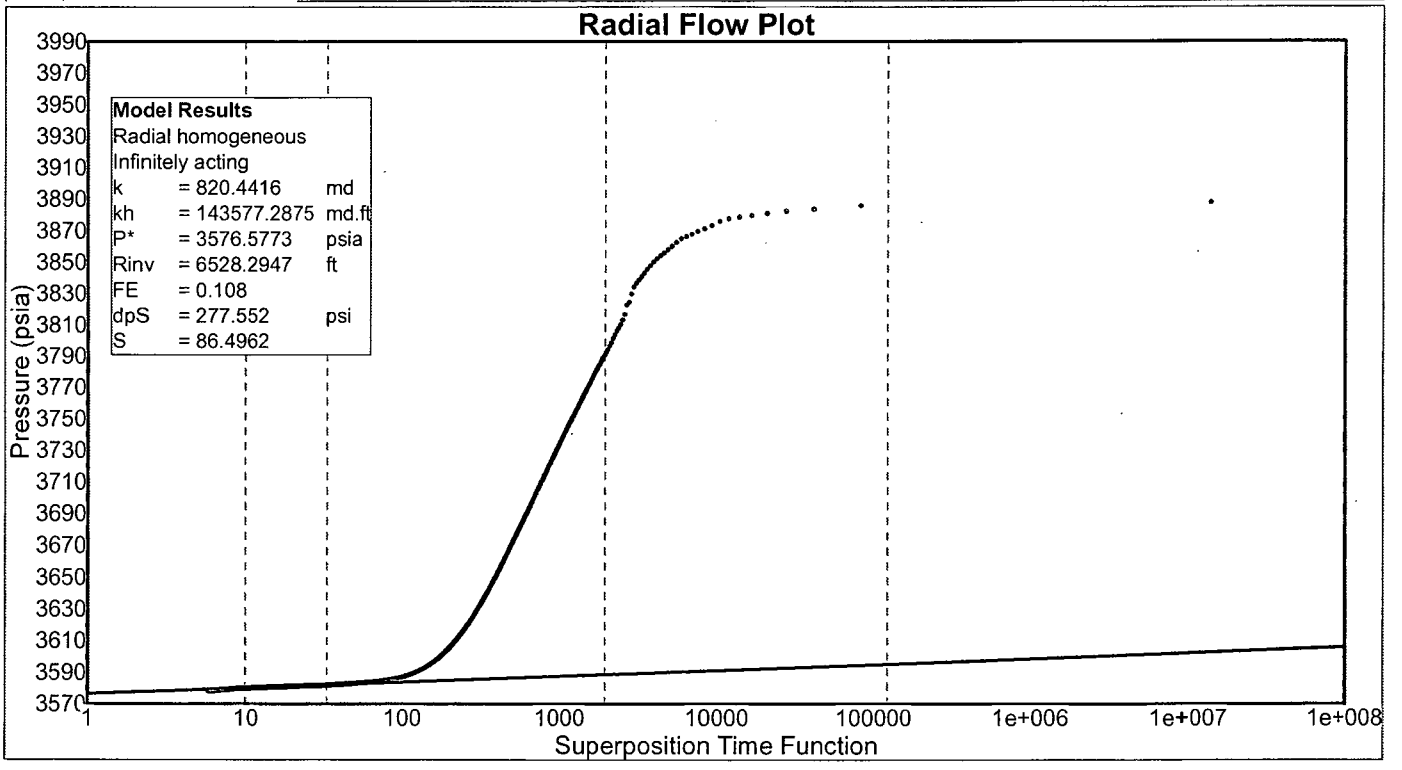


Cartesian Plot Model Results
Radial homogeneous - Infinitely acting

Fair Wellbore Storage

	Value
Wellbore storage coefficient	0.1748 bbl/psi
Dimensionless wellbore storage	9875.250844

Cartesian Plot Line Details
Line type : Wellbore storage
Slope : -1318.24
Intercept : 3892.6
Coefficient of Determination : 0.975954
Number of Intersections = 0



Radial Flow Plot Model Results
Radial homogeneous - Infinitely acting

Fair Wellbore Storage

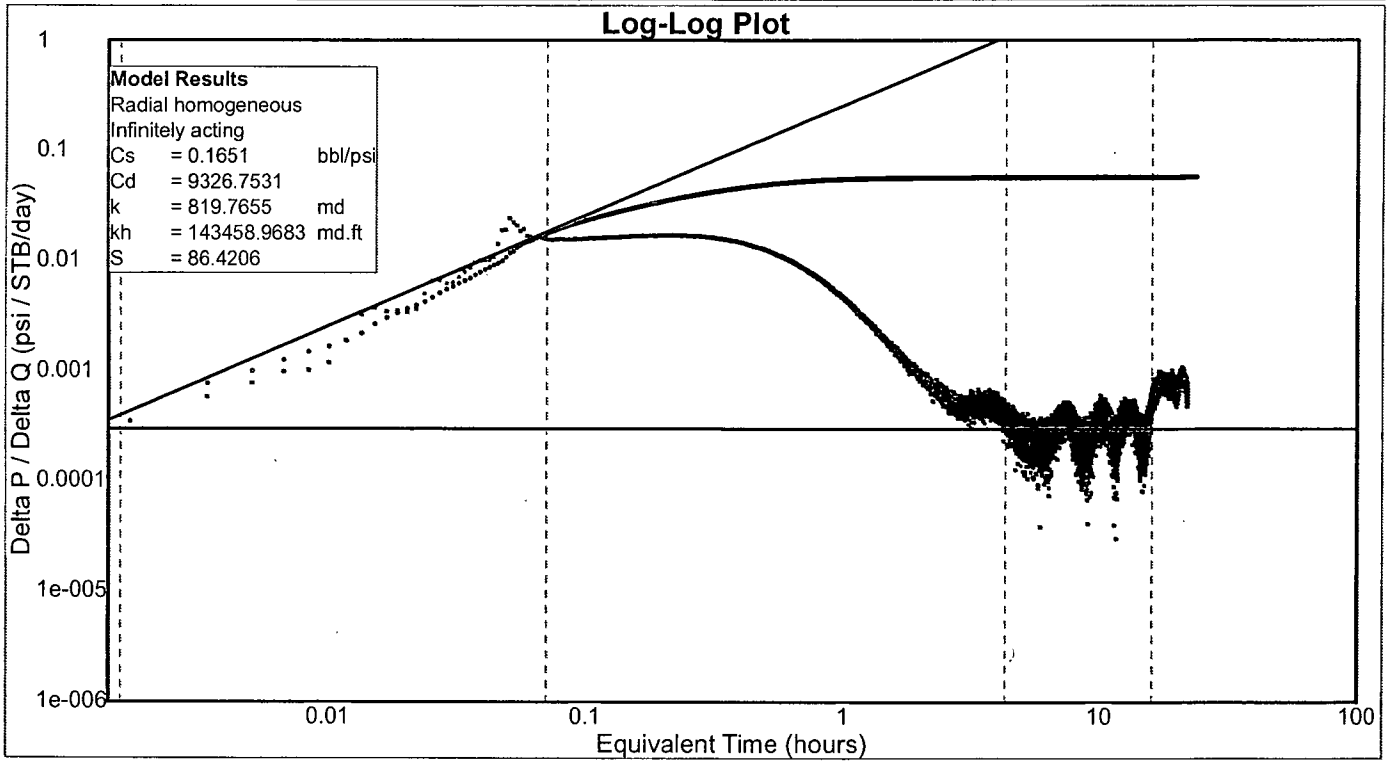
	Value
Permeability	820.441643 md
Permeability-thickness	1.4358e5 md.ft
Extrapolated pressure	3576.577282 psia
Radius of investigation	6528.294692 ft
Flow efficiency	0.108008
dP skin (constant rate)	277.551972 psi
Skin factor	86.496198

Radial Flow Plot Line Details
Line type : Radial flow
Slope : 3.69431
Intercept : 3576.58
Coefficient of Determination : 0.990257

	Radial flow
Extrapolated pressure	3576.577282 psia
Pressure at dt = 1 hour	3584.486694 psia

Number of Intersections = 0

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Log-Log Plot Model Results
Radial homogeneous - Infinitely acting

Fair Wellbore Storage

	Value
Wellbore storage coefficient	0.165091 bbl/psi
Dimensionless wellbore storage	9326.753065
Permeability	819.765533 md
Permeability-thickness	1.4346e5 md.ft
Skin factor	86.420585

Log-Log Plot Line Details
Line type : Wellbore storage
Slope : 1
Intercept : 0.252386
Coefficient of Determination : Not Used
Line type : Radial flow
Slope : 0
Intercept : 0.000290355
Coefficient of Determination : Not Used
Number of Intersections = 0

Production Optimization Systems	Report File:	2011 chukka wdw-2.pan
PanSystem Version 3.5.1	Analysis Date:	11/16/2011
Well Test Analysis Report		APPENDIX M

Company	Navajo Refining (Holly Corporation)
Location	Artesia, NM
Well	Chukka Well No. 2
Test Date	10/17/2011 to 10/22/2011
Test Type	Buildup/Falloff Test
Gauge Type/ Serial Number	Spartek Systems/76182
Gauge Depth	7570 feet
Injection Interval	7570 feet to 8399 feet
Completion Type	Perforated at 2 SPF on 120 deg Phasing
Top Of Fill	8335 feet
Analyst	TJJ
Subsurface Project No.	70A6645

Remarks:

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Reservoir Description

Fluid type : Water
Well orientation : Vertical
Number of wells : 1
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	0.000000 psia
Temperature	0.000000 deg F

Well Parameters Data

	Well 1
Well radius	0.3281 ft
Distance from observation to active well	0.000000 ft
Wellbore storage coefficient	0.0000 bbl/psi
Storage Amplitude	0.000000 psi
Storage Time Constant	0.000000 hr
Second Wellbore Storage	0.000000 bbl/psi
Time Change for Second Storage	0.000000 hr
Well offset - x direction	0.0000 ft
Well offset - y direction	0.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	0.000000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.590 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

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Layer 1 Correlations
Not Used

Layer Boundaries Data
Layer 1 Boundary Type : Infinitely acting

	Layer 1
L1	0.000000 ft
L2	0.000000 ft
L3	0.000000 ft
L4	0.000000 ft
Drainage area	0.000000 acres
Dietz shape factor	0.000000

Layer 1 Model Data
Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	0.0000 md
Skin factor (Well 1)	0.0000

Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-8793.188944	0.000000	-4820.724923
-8769.188944	0.000000	-4820.724923
-8745.188944	0.000000	-4820.724923
-8721.188944	0.000000	-4820.724923
-8697.188944	0.000000	-4713.016009
-8673.188944	0.000000	-4713.016009
-8649.188944	0.000000	-4820.724923
-8625.188944	0.000000	-4820.724923
-8601.188944	0.000000	-4924.720459
-8577.188944	0.000000	-4820.724923
-8553.188944	0.000000	-4718.401402
-8529.188944	0.000000	-4924.720459
-8505.188944	0.000000	-3427.924282
-8481.188944	0.000000	-3212.504883
-8457.188944	0.000000	-4713.016009
-8433.188944	0.000000	-4713.016009
-8409.188944	0.000000	-4605.305001
-8385.188944	0.000000	-4713.016009
-8361.188944	0.000000	-4713.016009
-8337.188944	0.000000	-4713.016009
-8313.188944	0.000000	-4610.690395
-8289.188944	0.000000	-4605.305001
-8265.188944	0.000000	-4713.016009
-8241.188944	0.000000	-4713.016009
-8217.188944	0.000000	-4713.016009
-8193.188944	0.000000	-4713.016009
-8169.188944	0.000000	-3427.924282
-8145.188944	0.000000	-3212.504883
-8121.188944	0.000000	-3212.504883
-8097.188944	0.000000	-4713.016009
-8073.188944	0.000000	-4713.016009
-8049.188944	0.000000	-4713.016009

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-8025.188944	0.000000	-4713.016009
-8001.188944	0.000000	-4713.016009
-7977.188944	0.000000	-4713.016009
-7953.188944	0.000000	-4713.016009
-7929.188944	0.000000	-4713.016009
-7905.188944	0.000000	-4713.016009
-7881.188944	0.000000	-4605.305001
-7857.188944	0.000000	-4713.016009
-7833.188944	0.000000	-4605.305001
-7809.188944	0.000000	-4605.305001
-7785.188944	0.000000	-4713.016009
-7761.188944	0.000000	-4605.305001
-7737.188944	0.000000	-4605.305001
-7713.188944	0.000000	-4605.305001
-7689.188944	0.000000	-4605.305001
-7665.188944	0.000000	-4605.305001
-7641.188944	0.000000	-4497.596087
-7617.188944	0.000000	-3320.215367
-7593.188944	0.000000	-4605.305001
-7569.188944	0.000000	-4713.016009
-7545.188944	0.000000	-4605.305001
-7521.188944	0.000000	-4497.596087
-7497.188944	0.000000	-4605.305001
-7473.188944	0.000000	-4605.305001
-7449.188944	0.000000	-4497.596087
-7425.188944	0.000000	-4820.724923
-7401.188944	0.000000	-4713.016009
-7377.188944	0.000000	-4605.305001
-7353.188944	0.000000	-4178.180629
-7329.188944	0.000000	-4605.305001
-7305.188944	0.000000	-4605.305001
-7281.188944	0.000000	-4713.016009

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-7257.188944	0.000000	-3639.630824
-7233.188944	0.000000	-3639.630824
-7209.188944	0.000000	-3540.834699
-7185.188944	0.000000	-4713.016009
-7161.188944	0.000000	-4820.724923
-7137.188944	0.000000	-4820.724923
-7113.188944	0.000000	-4820.724923
-7089.188944	0.000000	-4605.305001
-7065.188944	0.000000	-4820.724923
-7041.188944	0.000000	-4820.724923
-7017.188944	0.000000	-4820.724923
-6993.188944	0.000000	-4820.724923
-6969.188944	0.000000	-4820.724923
-6945.188944	0.000000	-4713.016009
-6921.188944	0.000000	-4820.724923
-6897.188944	0.000000	-4820.724923
-6873.188944	0.000000	-4713.016009
-6849.188944	0.000000	-4713.016009
-6825.188944	0.000000	-4820.724923
-6801.188944	0.000000	-4820.724923
-6777.188944	0.000000	-4820.724923
-6753.188944	0.000000	-4820.724923
-6729.188944	0.000000	-4820.724923
-6705.188944	0.000000	-4820.724923
-6681.188944	0.000000	-4713.016009
-6657.188944	0.000000	-4820.724923
-6633.188944	0.000000	-4713.016009
-6609.188944	0.000000	-4713.016009
-6585.188944	0.000000	-4713.016009
-6561.188944	0.000000	-4605.305001
-6537.188944	0.000000	-4820.724923
-6513.188944	0.000000	-4924.720459
-6489.188944	0.000000	-4713.016009
-6465.188944	0.000000	-4713.016009
-6441.188944	0.000000	-4718.401402
-6417.188944	0.000000	-4713.016009
-6393.188944	0.000000	-4713.016009
-6369.188944	0.000000	-4713.016009
-6345.188944	0.000000	-4610.690395
-6321.188944	0.000000	-3535.635027
-6297.188944	0.000000	-4820.724923
-6273.188944	0.000000	-4723.601074
-6249.188944	0.000000	-4820.724923
-6225.188944	0.000000	-4820.724923
-6201.188944	0.000000	-4713.016009
-6177.188944	0.000000	-2.1843e4
-6153.188944	0.000000	0.000000
-6129.188944	0.000000	-2.1843e4
-6105.188944	0.000000	-4713.016009

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-6081.188944	0.000000	-3535.635027
-6057.188944	0.000000	-3427.924282
-6033.188944	0.000000	-4820.724923
-6009.188944	0.000000	-3427.924282
-5985.188944	0.000000	-4497.596087
-5961.188944	0.000000	-3530.249372
-5937.188944	0.000000	-3427.924282
-5913.188944	0.000000	-4713.016009
-5889.188944	0.000000	-5463.270264
-5865.188944	0.000000	-5463.270264
-5841.188944	0.000000	-5567.266323
-5817.188944	0.000000	-5782.685721
-5793.188944	0.000000	-5468.469936
-5769.188944	0.000000	-5674.976807
-5745.188944	0.000000	-5463.270264
-5721.188944	0.000000	-5355.561349
-5697.188944	0.000000	-5355.561349
-5673.188944	0.000000	-3427.924282
-5649.188944	0.000000	-5355.561349
-5625.188944	0.000000	-3427.924282
-5601.188944	0.000000	-5890.396729
-5577.188944	0.000000	-3427.924282
-5553.188944	0.000000	-5998.105643
-5529.188944	0.000000	-6105.816127
-5505.188944	0.000000	-5998.105643
-5481.188944	0.000000	-5890.396729
-5457.188944	0.000000	-6317.521101
-5433.188944	0.000000	-4924.720459
-5409.188944	0.000000	-3427.924282
-5385.188944	0.000000	-3427.924282
-5361.188944	0.000000	-3427.924282
-5337.188944	0.000000	-5140.140381
-5313.188944	0.000000	-5140.140381
-5289.188944	0.000000	-5032.431466
-5265.188944	0.000000	-4605.305001
-5241.188944	0.000000	-3427.924282
-5217.188944	0.000000	-4605.305001
-5193.188944	0.000000	-4924.720459
-5169.188944	0.000000	-5032.431466
-5145.188944	0.000000	-5463.270264
-5121.188944	0.000000	-5355.561349
-5097.188944	0.000000	-5567.266323
-5073.188944	0.000000	-4820.724923
-5049.188944	0.000000	-3639.630824
-5025.188944	0.000000	-5140.140381
-5001.188944	0.000000	-5782.685721
-4977.188944	0.000000	-5140.140381
-4953.188944	0.000000	-3427.924282
-4929.188944	0.000000	-5355.561349

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-4905.188944	0.000000	-5247.850865
-4881.188944	0.000000	-5463.270264
-4857.188944	0.000000	-3427.924282
-4833.188944	0.000000	-5567.266323
-4809.188944	0.000000	-5247.850865
-4785.188944	0.000000	-5463.270264
-4761.188944	0.000000	-5567.266323
-4737.188944	0.000000	-5463.270264
-4713.188944	0.000000	-3433.309937
-4689.188944	0.000000	-5355.561349
-4665.188944	0.000000	-4605.305001
-4641.188944	0.000000	-3427.924282
-4617.188944	0.000000	-5757.143032
-4593.188944	0.000000	-5485.714286
-4569.188944	0.000000	-6171.428571
-4545.188944	0.000000	-5622.857143
-4521.188944	0.000000	-6000.000000
-4497.188944	0.000000	-5828.571429
-4473.188944	0.000000	-5931.428571
-4449.188944	0.000000	-5728.571254
-4425.188944	0.000000	-5554.285714
-4401.188944	0.000000	-4391.428397
-4377.188944	0.000000	-5691.428571
-4353.188944	0.000000	-5625.714111
-4329.188944	0.000000	-3497.142857
-4305.188944	0.000000	-3462.857143
-4281.188944	0.000000	-3462.857143
-4257.188944	0.000000	-5585.714460
-4233.188944	0.000000	-5417.142857
-4209.188944	0.000000	-6034.285714
-4185.188944	0.000000	-4971.428571
-4161.188944	0.000000	-5894.285889
-4137.188944	0.000000	-6000.000000
-4113.188944	0.000000	-5968.571254
-4089.188944	0.000000	-5931.428571
-4065.188944	0.000000	-6034.285714
-4041.188944	0.000000	-3394.285714
-4017.188944	0.000000	-6000.000000
-3993.188944	0.000000	-6000.000000
-3969.188944	0.000000	-5931.428571
-3945.188944	0.000000	-3462.857143
-3921.188944	0.000000	-6137.142857
-3897.188944	0.000000	-5965.714286
-3873.188944	0.000000	-6065.714460
-3849.188944	0.000000	-6034.285714
-3825.188944	0.000000	-5657.142857
-3801.188944	0.000000	-5931.428571
-3777.188944	0.000000	-6034.285714
-3753.188944	0.000000	-5622.857143

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-3729.188944	0.000000	-5862.857143
-3705.188944	0.000000	-6034.285714
-3681.188944	0.000000	-5931.428571
-3657.188944	0.000000	-6000.000000
-3633.188944	0.000000	-5928.571603
-3609.188944	0.000000	-5894.285889
-3585.188944	0.000000	-5862.857143
-3561.188944	0.000000	-5865.714111
-3537.188944	0.000000	-5897.142857
-3513.188944	0.000000	-5897.142857
-3489.188944	0.000000	-5897.142857
-3465.188944	0.000000	-5862.857143
-3441.188944	0.000000	-6015.714111
-3417.188944	0.000000	-6000.000000
-3393.188944	0.000000	-5897.142857
-3369.188944	0.000000	-5897.142857
-3345.188944	0.000000	-5862.857143
-3321.188944	0.000000	-5865.714111
-3297.188944	0.000000	-5865.714111
-3273.188944	0.000000	-5828.571429
-3249.188944	0.000000	-6139.999826
-3225.188944	0.000000	-6102.857143
-3201.188944	0.000000	-6277.142683
-3177.188944	0.000000	-6271.428746
-3153.188944	0.000000	-5965.714286
-3129.188944	0.000000	-6240.000000
-3105.188944	0.000000	-6000.000000
-3081.188944	0.000000	-5654.285889
-3057.188944	0.000000	-5962.857317
-3033.188944	0.000000	-5760.000000
-3009.188944	0.000000	-6034.285714
-2985.188944	0.000000	-6031.428746
-2961.188944	0.000000	-5965.714286
-2937.188944	0.000000	-5916.586042
-2913.188944	0.000000	-6037.142683
-2889.188944	0.000000	-5965.714286
-2865.188944	0.000000	-6000.000000
-2841.188944	0.000000	-5965.714286
-2817.188944	0.000000	-6000.000000
-2793.188944	0.000000	-6024.375000
-2769.188944	0.000000	-6000.000000
-2745.188944	0.000000	-6000.000000
-2721.188944	0.000000	-6031.428746
-2697.188944	0.000000	-6034.285714
-2673.188944	0.000000	-3497.142857
-2649.188944	0.000000	-5965.714286
-2625.188944	0.000000	-3497.142857
-2601.188944	0.000000	-3497.142857
-2577.188944	0.000000	-5965.714286

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-2553.188944	0.000000	-3497.142857
-2529.188944	0.000000	-5965.714286
-2505.188944	0.000000	-5962.857317
-2481.188944	0.000000	-3462.857143
-2457.188944	0.000000	-5451.428571
-2433.188944	0.000000	-5965.714286
-2409.188944	0.000000	-5931.428571
-2385.188944	0.000000	-5897.142857
-2361.188944	0.000000	-5865.714111
-2337.188944	0.000000	-5865.714111
-2313.188944	0.000000	-5828.571429
-2289.188944	0.000000	-5722.857317
-2265.188944	0.000000	-3462.857143
-2241.188944	0.000000	-5928.571603
-2217.188944	0.000000	-5688.571603
-2193.188944	0.000000	-5897.142857
-2169.188944	0.000000	-3497.142857
-2145.188944	0.000000	-5928.571603
-2121.188944	0.000000	-5934.285540
-2097.188944	0.000000	-5934.285540
-2073.188944	0.000000	-5862.857143
-2049.188944	0.000000	-5865.714111
-2025.188944	0.000000	-5862.857143
-2001.188944	0.000000	-5862.857143
-1977.188944	0.000000	-5765.714460
-1953.188944	0.000000	-5860.000174
-1929.188944	0.000000	-5688.571603
-1905.188944	0.000000	-3431.428659
-1881.188944	0.000000	-5794.285714
-1857.188944	0.000000	-5860.000174
-1833.188944	0.000000	-3497.142857
-1809.188944	0.000000	-5897.142857
-1785.188944	0.000000	-5828.571429
-1761.188944	0.000000	-5862.857143
-1737.188944	0.000000	-5894.285889
-1713.188944	0.000000	-5648.571429
-1689.188944	0.000000	-5797.142683
-1665.188944	0.000000	-5794.285714
-1641.188944	0.000000	-5794.285714
-1617.188944	0.000000	-5794.285714
-1593.188944	0.000000	-5757.143032
-1569.188944	0.000000	-5760.000000
-1545.188944	0.000000	-5762.856968
-1521.188944	0.000000	-3462.857143
-1497.188944	0.000000	-5757.143032
-1473.188944	0.000000	-5725.714286
-1449.188944	0.000000	-5860.000174
-1425.188944	0.000000	-5862.857143
-1401.188944	0.000000	-5862.857143

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-1377.188944	0.000000	-5862.857143
-1353.188944	0.000000	-5862.857143
-1329.188944	0.000000	-5860.000174
-1305.188944	0.000000	-3497.142857
-1281.188944	0.000000	-5760.000000
-1257.188944	0.000000	-5897.142857
-1233.188944	0.000000	-5828.571429
-1209.188944	0.000000	-5794.285714
-1185.188944	0.000000	-5831.428397
-1161.188944	0.000000	-5894.285889
-1137.188944	0.000000	-5862.857143
-1113.188944	0.000000	-5797.142683
-1089.188944	0.000000	-5794.285714
-1065.188944	0.000000	-5797.142683
-1041.188944	0.000000	-5760.000000
-1017.188944	0.000000	-5694.285540
-993.188944	0.000000	-5725.714286
-969.188944	0.000000	-5860.000174
-945.188944	0.000000	-5828.571429
-921.188944	0.000000	-5894.285889
-897.188944	0.000000	-5825.714460
-873.188944	0.000000	-5637.143032
-849.188944	0.000000	-5828.571429
-825.188944	0.000000	-5797.142683
-801.188944	0.000000	-5794.285714
-777.188944	0.000000	-5760.000000
-753.188944	0.000000	-5725.714286
-729.188944	0.000000	-3394.285714
-705.188944	0.000000	-3394.285714
-681.188944	0.000000	-6137.142857
-657.188944	0.000000	-6139.999826
-633.188944	0.000000	-5928.571603
-609.188944	0.000000	-5862.857143
-585.188944	0.000000	-5828.571429
-561.188944	0.000000	-5825.714460
-537.188944	0.000000	-5725.714286
-513.188944	0.000000	-5794.285714
-489.188944	0.000000	-5794.285714
-465.188944	0.000000	-5828.571429
-441.188944	0.000000	-3397.142944
-417.188944	0.000000	-5794.285714
-393.188944	0.000000	-5794.285714
-369.188944	0.000000	-5797.142683
-345.188944	0.000000	-5825.714460
-321.188944	0.000000	-4182.857143
-297.188944	0.000000	-5794.285714
-273.188944	0.000000	-4182.857143
-249.188944	0.000000	-5725.714286
-225.188944	0.000000	-4045.714286

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-201.188944	0.000000	-5317.142683
-177.188944	0.000000	-5760.000000
-153.188944	0.000000	-5691.428571
-129.188944	0.000000	-5825.714460
-105.188944	0.000000	-5794.285714
-81.188944	0.000000	-5794.285714
-57.188944	0.000000	-5794.285714
-33.188944	0.000000	-5828.571429
-9.188944	0.000000	-5798.857143
-8.688944	0.000000	-5796.571429
-8.188944	0.000000	-5795.428571
-7.688944	0.000000	-5795.428571
-7.188944	0.000000	-5589.424601
-6.688944	0.000000	-4824.194444
-6.188944	0.000000	-4775.523810
-5.688944	0.000000	-4724.099209
-5.188944	0.000000	-5048.206347
-4.688944	0.000000	-5711.218254
-4.188944	0.000000	-5765.051590
-3.688944	0.000000	-5775.515871
-3.188944	0.000000	-5785.623016
-2.688944	0.000000	-5790.857143
-2.188944	0.000000	-5789.714286
-1.688944	0.000000	-5790.861114
-1.188944	0.000000	-5829.523812
-0.688944	0.000000	-6277.714292
-0.188944	0.000000	-6210.468252
0.311056	0.000000	-6221.051587
0.811056	0.000000	-6193.329362
1.311056	0.000000	-6208.480158
1.811056	0.000000	-6144.190476
2.311056	0.000000	-6150.194447
2.811056	0.000000	-6155.428574
3.311056	0.000000	-6169.138889
3.811056	0.000000	-6174.194450
4.311056	0.000000	-6175.519842
4.811056	0.000000	-6174.857143
5.311056	0.000000	-6164.571429
5.811056	0.000000	-6168.000000
6.311056	0.000000	-6165.234124
6.811056	0.000000	-6169.142854
7.311056	0.000000	-6142.857140
7.811056	0.000000	-6137.146825
8.311056	0.000000	-6154.567458
8.811056	0.000000	-6130.289682
9.311056	0.000000	-5789.242066
9.811056	0.000000	-5062.551585
10.311056	0.000000	-4181.730158
10.811056	0.000000	-4912.666667

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
11.311056	0.000000	-5693.527780
11.811056	0.000000	-5724.567461
12.311056	0.000000	-5725.714286
12.811056	0.000000	-5728.000000
13.311056	0.000000	-5728.000000
13.811056	0.000000	-5728.000000
14.311056	0.000000	-5728.000000
14.811056	0.000000	-5726.194447
15.311056	0.000000	-5728.658728
15.811056	0.000000	-5721.146825
16.311056	0.000000	-5720.000000
16.811056	0.000000	-5721.146828
17.311056	0.000000	-5719.996032
17.811056	0.000000	-5720.003971
18.311056	0.000000	-5719.996032
18.811056	0.000000	-5717.714286
19.311056	0.000000	-5704.662696
19.811056	0.000000	-5706.289682
20.311056	0.000000	-5704.000000
20.811056	0.000000	-5705.138886
21.311056	0.000000	-5701.718254
21.811056	0.000000	-5703.337304
22.311056	0.000000	-5701.714289
22.811056	0.000000	-5701.714289
23.311056	0.000000	-6042.757937
23.811056	0.000000	-5360.865077
24.311056	0.000000	-5221.226188
24.811056	0.000000	-5166.571426
25.311056	0.000000	-5419.242063
25.811056	0.000000	-5565.043648
26.311056	0.000000	-5639.999997
26.811056	0.000000	-5634.765873
27.311056	0.000000	-5361.615077
27.811056	0.000000	-5337.619045
28.311056	0.000000	-5643.813492
28.811056	0.000000	-6040.761905
29.311056	0.000000	-6161.623019
29.811056	0.000000	-6151.515871
30.311056	0.000000	-6146.285711
30.811056	0.000000	-6153.142854
31.311056	0.000000	-6133.238092
31.811056	0.000000	-5667.619045
32.311056	0.000000	-5196.384920
32.811056	0.000000	-5705.619048
33.311056	0.000000	-5729.142857
33.811056	0.000000	-5729.142857
34.311056	0.000000	-5724.571429
34.811056	0.000000	-5724.571429
35.311056	0.000000	-5723.428571

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
35.811056	0.000000	-5724.571429
36.311056	0.000000	-5720.000000
36.811056	0.000000	-5715.432542
37.311056	0.000000	-5714.281746
37.811056	0.000000	-5707.432542
38.311056	0.000000	-5705.801585
38.811056	0.000000	-5705.142854
39.311056	0.000000	-5705.623016
39.811056	0.000000	-5706.952381
40.311056	0.000000	-5700.567458
40.811056	0.000000	-5702.198415
41.311056	0.000000	-5700.567461
41.811056	0.000000	-5697.809524
42.311056	0.000000	-5698.285714
42.811056	0.000000	-5698.285714
43.311056	0.000000	-5351.523810
43.811056	0.000000	-5679.333333
44.311056	0.000000	-5690.285714
44.811056	0.000000	-5694.857143
45.311056	0.000000	-5696.476190
45.811056	0.000000	-5699.432542
46.311056	0.000000	-5697.805556
46.811056	0.000000	-5692.571429
47.311056	0.000000	-5694.861114
47.811056	0.000000	-5694.853175
48.311056	0.000000	-5719.337304
48.811056	0.000000	-5725.226193
49.311056	0.000000	-5755.246032
49.811056	0.000000	-5796.575399
50.311056	0.000000	-5746.281746
50.811056	0.000000	-5755.428571
51.311056	0.000000	-5070.952381
51.811056	0.000000	-3861.694443
52.311056	0.000000	-3948.781746
52.811056	0.000000	-5173.809524
53.311056	0.000000	-6424.666667
53.811056	0.000000	-6410.285714
54.311056	0.000000	-6401.809524
54.811056	0.000000	-6403.904762
55.311056	0.000000	-6384.666667
55.811056	0.000000	-6371.428571
56.311056	0.000000	-6374.857143
56.811056	0.000000	-6351.527780
57.311056	0.000000	-6338.281746
57.811056	0.000000	-6336.000000
58.311056	0.000000	-6331.428571
58.811056	0.000000	-6330.289685
59.311056	0.000000	-6335.515871
59.811056	0.000000	-6346.765873

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
60.311056	0.000000	-6341.714286
60.811056	0.000000	-6344.480161
61.311056	0.000000	-6344.000003
61.811056	0.000000	-6363.428574
62.311056	0.000000	-6369.801585
62.811056	0.000000	-6368.480158
63.311056	0.000000	-6374.857143
63.811056	0.000000	-6376.000000
64.311056	0.000000	-6378.285714
64.811056	0.000000	-6385.142857
65.311056	0.000000	-6378.285714
65.811056	0.000000	-6382.194447
66.311056	0.000000	-6372.757937
66.811056	0.000000	-6324.095238
67.311056	0.000000	-6307.428571
67.811056	0.000000	-6333.047619
68.311056	0.000000	-6334.857143
68.811056	0.000000	-6342.376981
69.311056	0.000000	-6317.718254
69.811056	0.000000	-6328.476190
70.311056	0.000000	-6348.571429
70.811056	0.000000	-6353.619048
71.311056	0.000000	-6378.281743
71.811056	0.000000	-6388.095235
72.311056	0.000000	-6359.337301
72.811056	0.000000	-6381.714286
73.311056	0.000000	-6369.805553
73.811056	0.000000	-6370.769844
74.311056	0.000000	-6367.996032
74.811056	0.000000	-6374.857143
75.311056	0.000000	-6406.190476
75.811056	0.000000	-6409.805553
76.311056	0.000000	-6368.670635
76.811056	0.000000	-6328.666667
77.311056	0.000000	-6308.571429
77.811056	0.000000	-6371.714286
78.311056	0.000000	-6416.480161
78.811056	0.000000	-6424.662699
79.311056	0.000000	-6400.666667
79.811056	0.000000	-6381.714286
80.311056	0.000000	-6373.714286
80.811056	0.000000	-6366.857143
81.311056	0.000000	-6344.666667
81.811056	0.000000	-6326.857143
82.311056	0.000000	-6339.424601
82.811056	0.000000	-6349.718254
83.311056	0.000000	-6366.190476
83.811056	0.000000	-6379.428571
83.949132	3784.981762	-6377.142857
117.984861	3701.527825	0.000000

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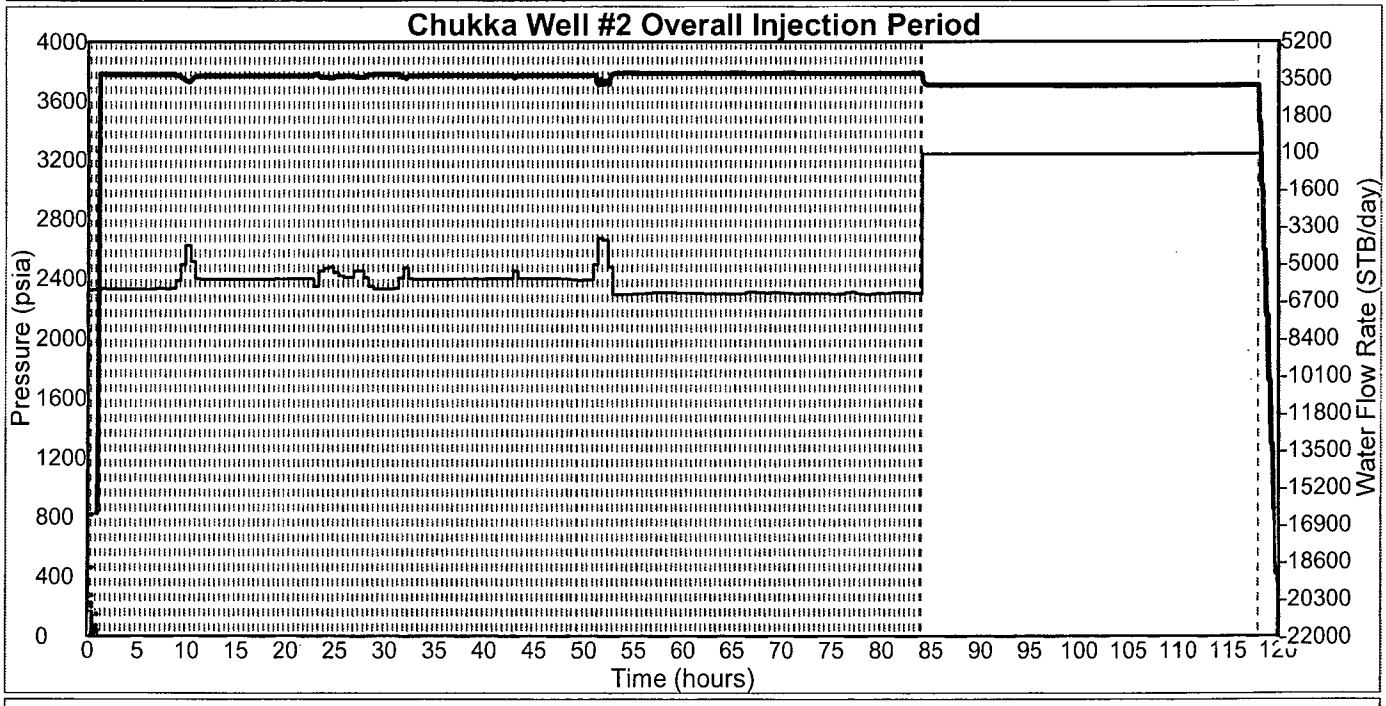
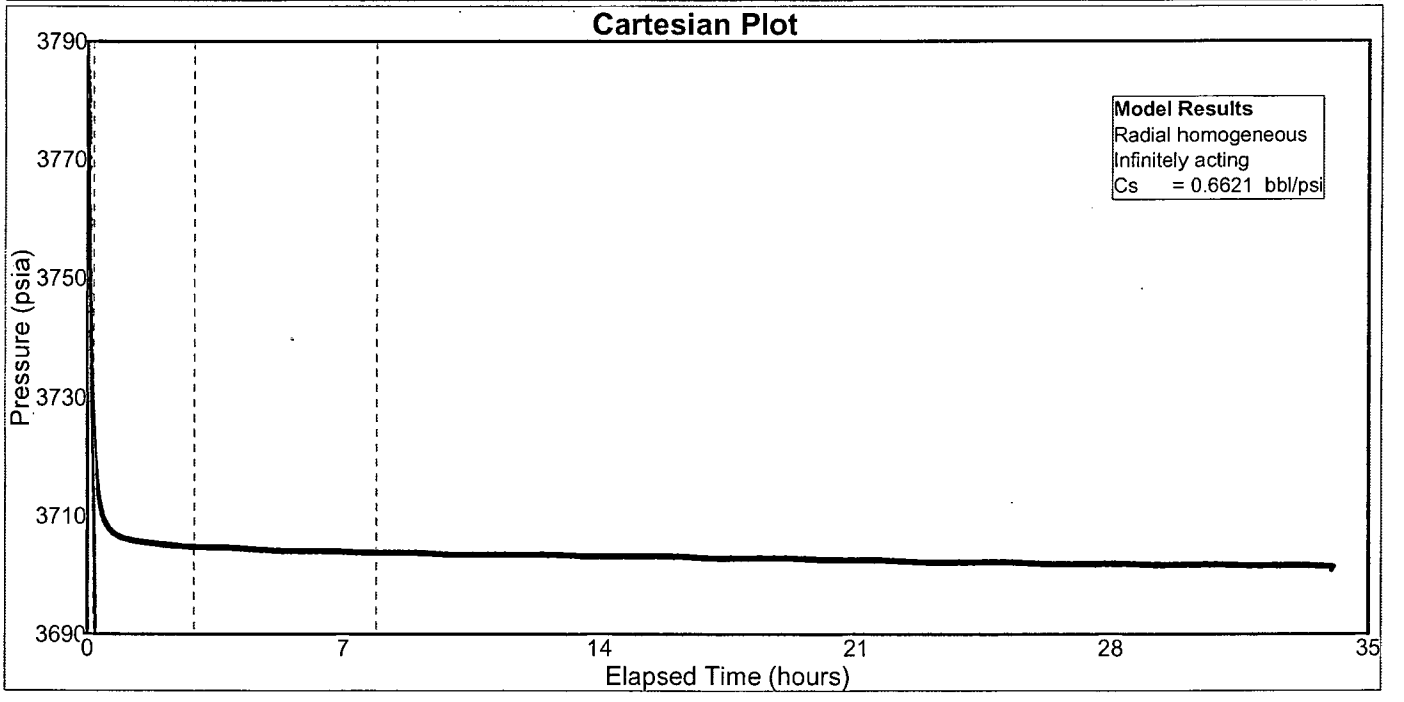

Chukka Well #2 Overall Injection Period
Pressure (psia)
Water Flow Rate (STB/day)
Time (hours)
4000
3600
3200
2800
2400
2000
1600
1200
800
400
0
5200
3500
1800
100
-1600
-3300
-5000
-6700
-8400
-10100
-11800
-13500
-15200
-16900
-18600
-20300
-22000
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115

FIGURE 11



Cartesian Plot Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Wellbore storage coefficient	0.662106 bbl/psi

Cartesian Plot Line Details
Line type : Wellbore storage
Slope : -401.317
Intercept : 3779.38
Coefficient of Determination : 0.892479
Number of Intersections = 0

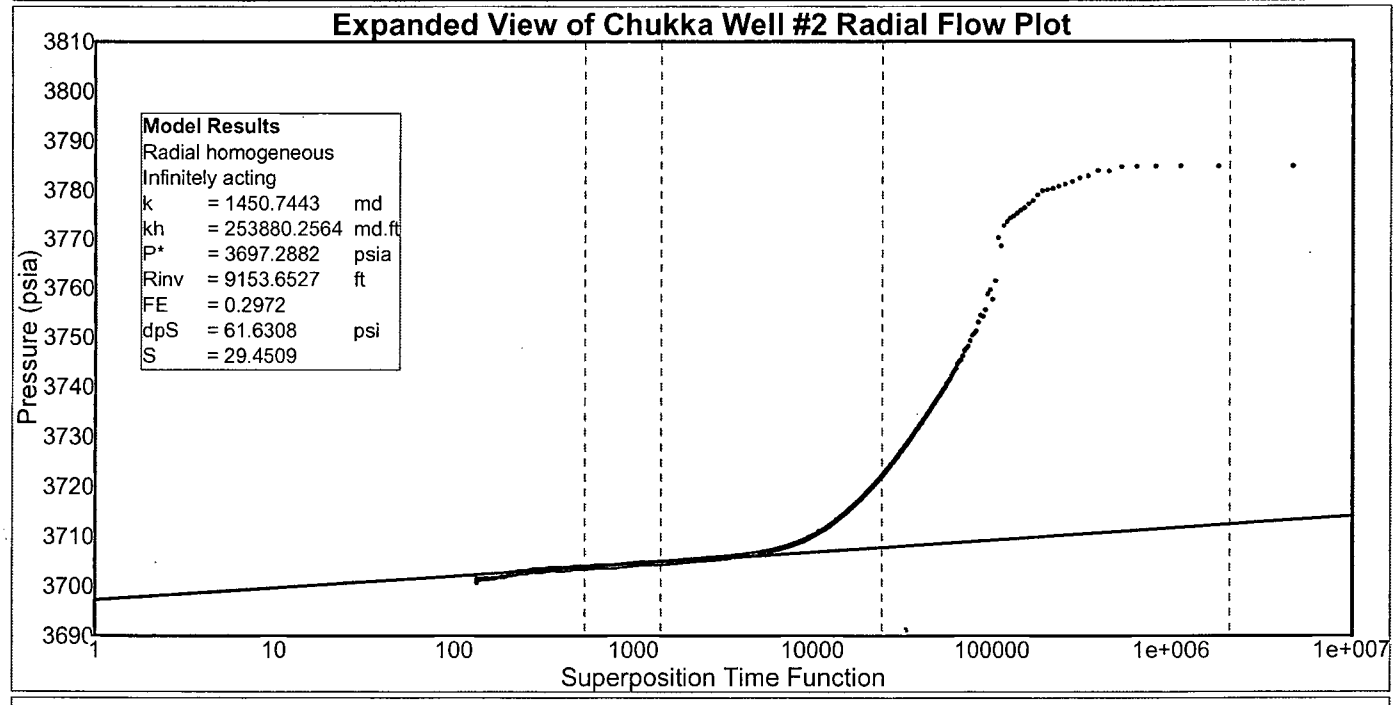


FIGURE 16

Expanded View of Chukka Well #2 Radial Flow Plot Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Permeability	1450.744322 md
Permeability-thickness	2.5388e5 md.ft
Extrapolated pressure	3697.288216 psia
Radius of investigation	9153.652743 ft
Flow efficiency	0.297202
dP skin (constant rate)	61.630829 psi
Skin factor	29.450909

Expanded View of Chukka Well #2 Radial Flow Plot Line Details
Line type : Radial flow
Slope : 2.40918
Intercept : 3697.29
Coefficient of Determination : 0.937454

	Radial flow
Extrapolated pressure	3697.288216 psia
Pressure at dt = 1 hour	3705.990668 psia

Number of Intersections = 0

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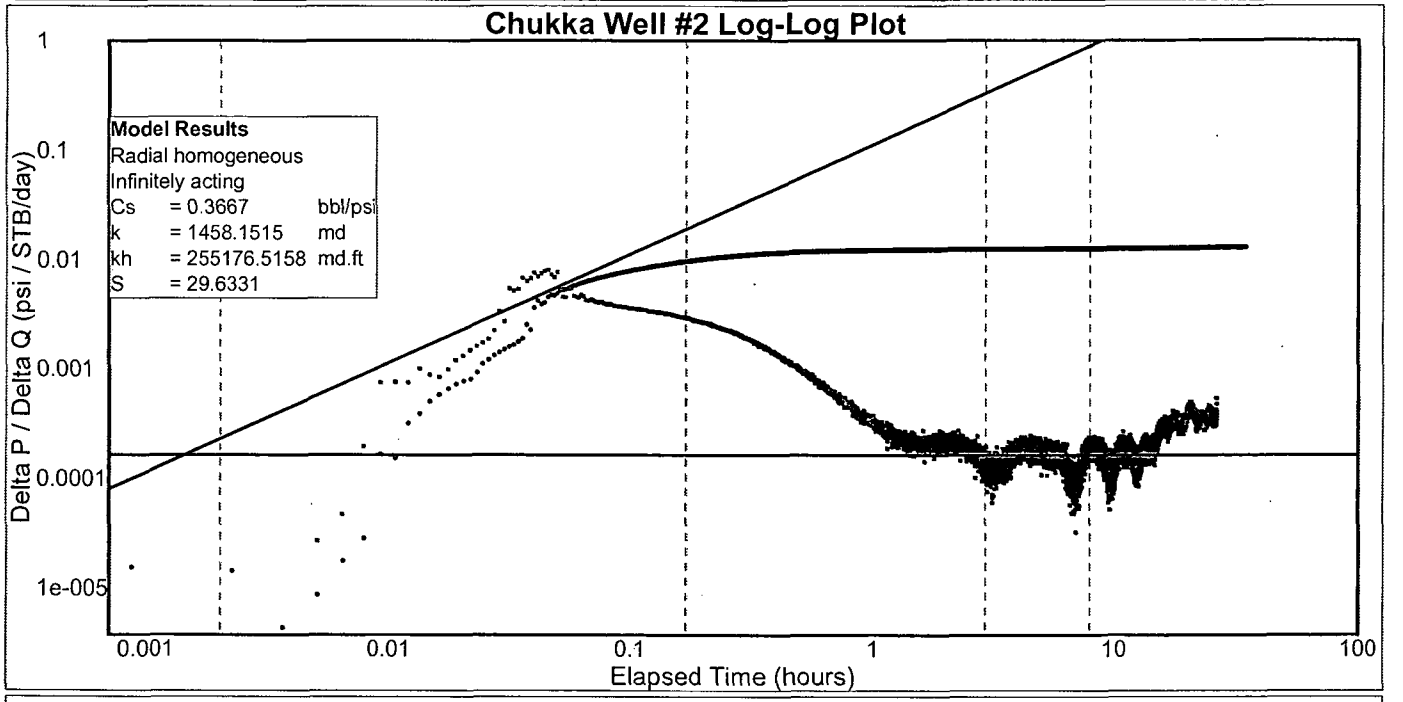


FIGURE 14

Chukka Well #2 Log-Log Plot Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Wellbore storage coefficient	0.366653 bbl/psi
Permeability	1458.151519 md
Permeability-thickness	2.5518e5 md.ft
Skin factor	29.633117

Chukka Well #2 Log-Log Plot Line Details
Line type : Radial flow
Slope : 0
Intercept : 0.000163236
Coefficient of Determination : Not Used
Line type : Wellbore storage
Slope : 1
Intercept : 0.11364
Coefficient of Determination : Not Used
Number of Intersections = 0

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SUBSURFACE

HOUSTON, TX • BATON ROUGE, LA • SOUTH BEND, IN

Production Optimization Systems | Report File: 2010 Gaines Well-3.pan

PanSystem Version 3.5 | Analysis Date: 12/02/2010

Well Test Analysis Report

Company	Navajo Refining Company
Location	Artesia, New Mexico
Well	Gaines Well No. 3
Date	November 8 - 13, 2010
Gauge Type / Serial Number	Spartek / Top No. 76585 & Bottom No. 76648
Guage Depth	7660 feet
Injection Interval	7660 feet to 8620 feet
Completion Type	Perforated
Top of Fill	8986 feet
Analyst	RLS
Subsurface Project No.	70A6516

Remarks:

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Reservoir Description
Fluid type : Water
Well orientation : Vertical
Number of wells : 1
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	3622.164936 psia
Temperature	0.000000 deg F

Well Parameters Data

	Well 1
Well radius	0.3246 ft
Distance from observation to active well	0.000000 ft
Wellbore storage coefficient	0.040651 bbl/psi
Storage Amplitude	0.000000 psi
Storage Time Constant	0.000000 hr
Second Wellbore Storage	0.000000 bbl/psi
Time Change for Second Storage	0.000000 hr
Well offset - x direction	0.0000 ft
Well offset - y direction	0.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	3622.870000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.570 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

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Layer 1 Correlations
Not Used

Layer Boundaries Data
Layer 1 Boundary Type : Infinitely acting

	Layer 1
L1	0.000000 ft
L2	0.000000 ft
L3	0.000000 ft
L4	0.000000 ft
Drainage area	0.000000 acres
Dietz shape factor	0.000000

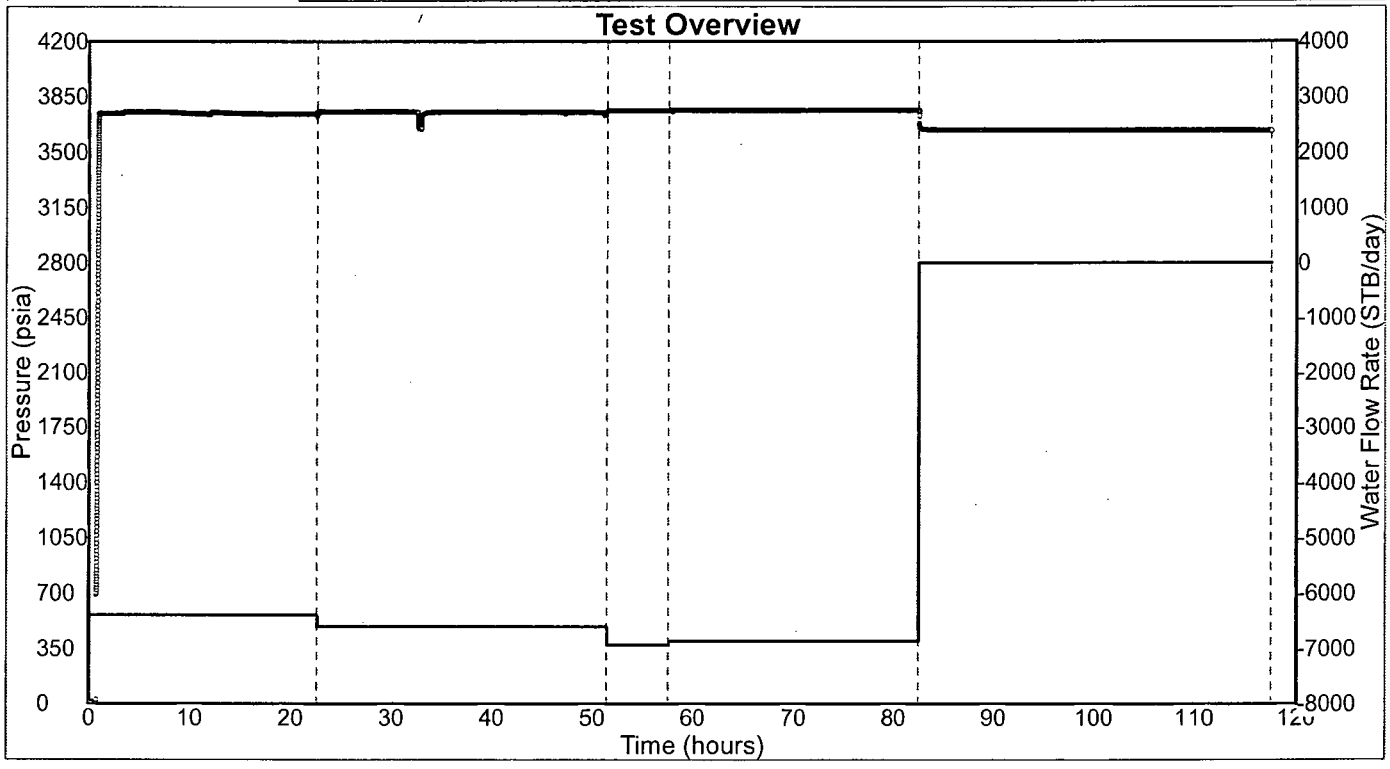
Layer 1 Model Data
Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	567.835809 md
Skin factor (Well 1)	14.63743

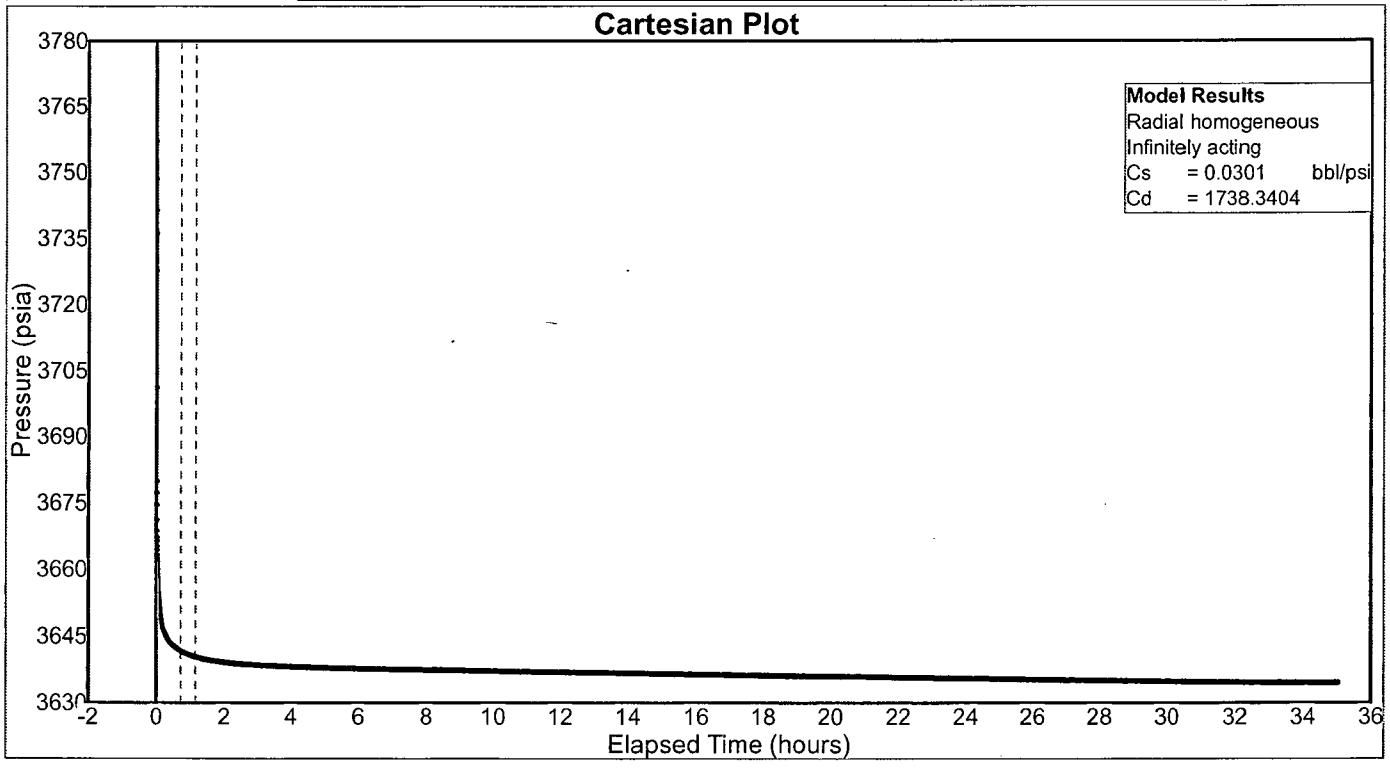
Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-896.530000	0.000000	-6556.478291
-800.530000	0.000000	-6601.295752
-752.530000	0.000000	-6527.197437
-680.530000	0.000000	-6455.564906
-560.530000	0.000000	-6495.140172
-488.530000	0.000000	-6447.882191
-416.530000	0.000000	-6579.061020
-392.530000	0.000000	-6494.151021
-368.530000	0.000000	-6407.507286
-344.530000	0.000000	-6502.572720
-320.530000	0.000000	-6550.762753
-296.530000	0.000000	-6537.209766
-272.530000	0.000000	-7090.581141
-224.530000	0.000000	-6405.124987
-176.530000	0.000000	-6511.595238
-152.530000	0.000000	-6457.245522
-80.530000	0.000000	-6400.552384
-56.530000	0.000000	-6553.585991
-32.530000	0.000000	-6481.716753
-8.530000	0.000000	-6357.386028
22.640735	3754.422743	-6388.006784
51.435332	3761.219618	-6599.617354
57.610353	3764.865451	-6928.849572
82.475272	3765.713641	-6857.001709
117.500343	3634.618056	0.000000

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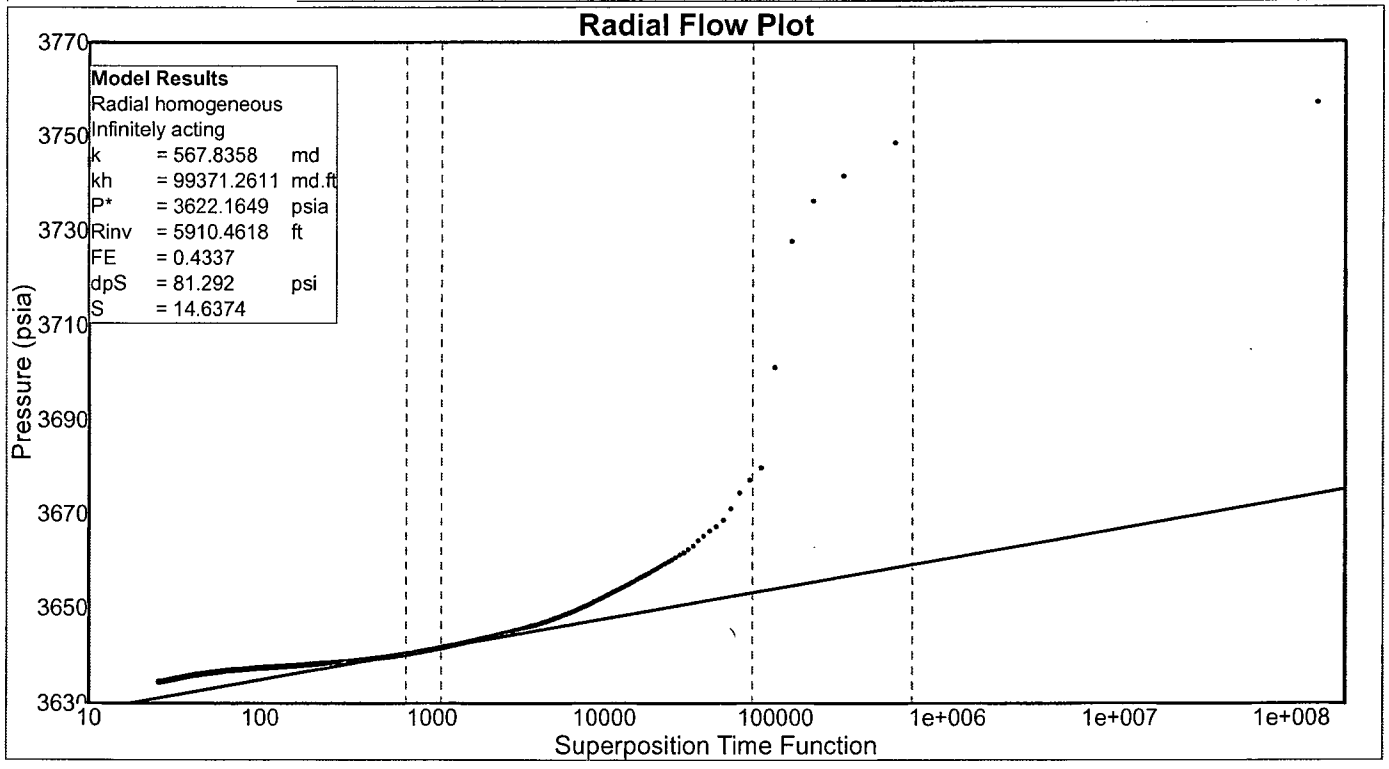
Cartesian Plot Model Results
Radial homogeneous - Infinitely acting

Fair Wellbore Storage

	Value
Wellbore storage coefficient	0.030117 bbl/psi
Dimensionless wellbore storage	1738.340434

Cartesian Plot Line Details
Line type : Wellbore storage
Slope : -9486.62
Intercept : 3780.53
Coefficient of Determination : 0.923237
Number of Intersections = 0

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Radial Flow Plot Model Results
Radial homogeneous - Infinitely acting

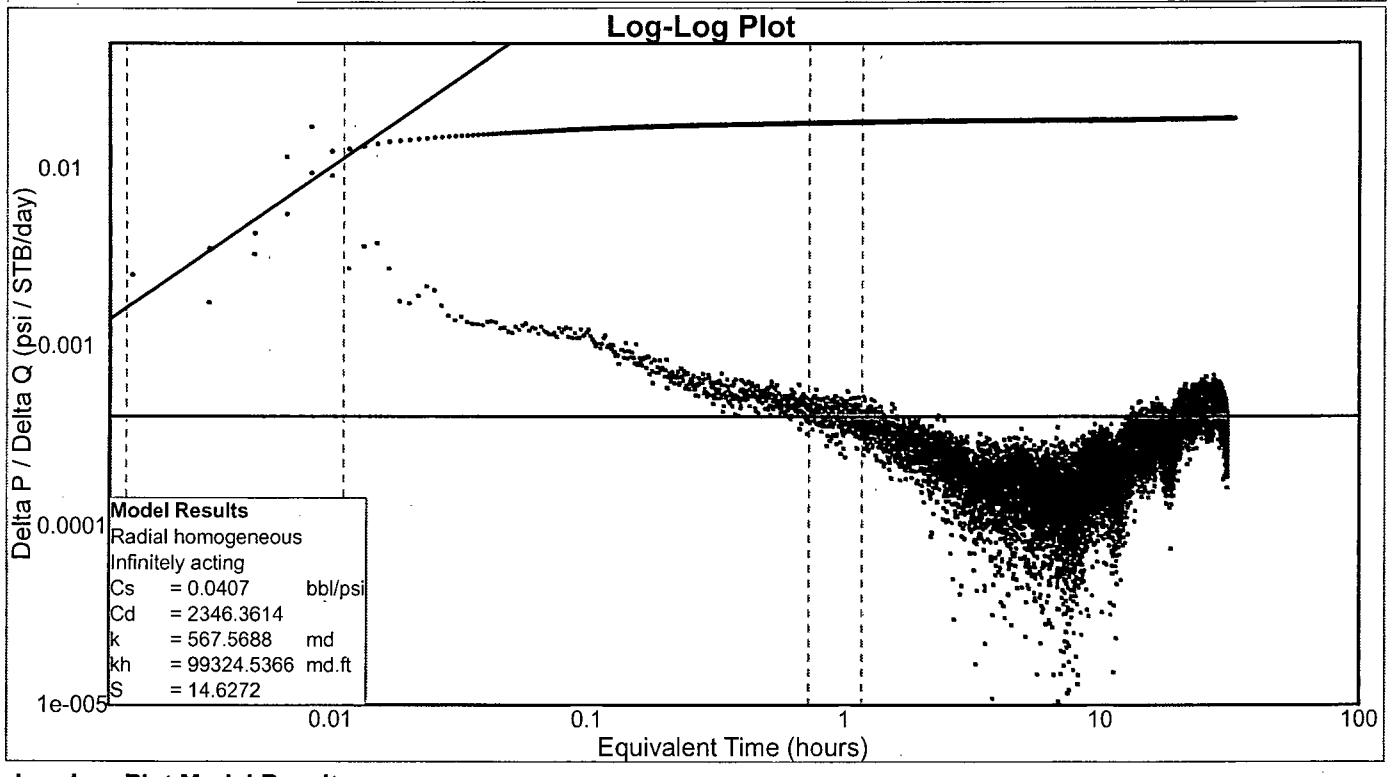
Fair Wellbore Storage

	Value
Permeability	567.835778 md
Permeability-thickness	9.9371e4 md.ft
Extrapolated pressure	3622.164936 psia
Radius of investigation	5910.461759 ft
Flow efficiency	0.433697
dP skin (constant rate)	81.291998 psi
Skin factor	14.637429

Radial Flow Plot Line Details
Line type : Radial flow
Slope : 6.39394
Intercept : 3622.16
Coefficient of Determination : Not Used

	Radial flow
Extrapolated pressure	3622.164936 psia
Pressure at dt = 1 hour	3640.793976 psia

Number of Intersections = 0



Log-Log Plot Model Results
Radial homogeneous - Infinitely acting

Fair Wellbore Storage

	Value
Wellbore storage coefficient	0.040651 bbl/psi
Dimensionless wellbore storage	2346.361416
Permeability	567.56878 md
Permeability-thickness	9.9325e4 md.ft
Skin factor	14.627163

Log-Log Plot Line Details
Line type : Radial flow
Slope : 0
Intercept : 0.000405157
Coefficient of Determination : Not Used
Line type : Wellbore storage
Slope : 1
Intercept : 1.02498
Coefficient of Determination : Not Used
Number of Intersections = 0

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SUBSURFACE

HOUSTON, TX • BATON ROUGE, LA • SOUTH BEND, IN

Subsurface Technology, Inc Report File: 2011 Gaines Well-3 rev.pan

PanSystem Version 3.5

Well Test Analysis Report

Company	Navajo Refining Company
Location	Artesia, New Mexico
Well	Gaines Well No. 3
Date	January 21 - 28, 2012
Gauge Type / Serial Number	Spartek / Top No. 77120 & Bottom No. 76404
Guage Depth	7660 feet
Injection Interval	7660 feet to 8620 feet
Completion Type	Perforated
Top of Fill	8986 feet
Analyst	RLS
Subsurface Project No.	70A6645

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Reservoir Description

Fluid type : Water
Well orientation : Vertical
Number of wells : 1
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	3622.164936 psia
Temperature	0.000000 deg F

Well Parameters Data

	Well 1
Well radius	0.3246 ft
Distance from observation to active well	0.000000 ft
Wellbore storage coefficient	0.11809 bbl/psi
Storage Amplitude	0.000000 psi
Storage Time Constant	0.000000 hr
Second Wellbore Storage	0.000000 bbl/psi
Time Change for Second Storage	0.000000 hr
Well offset - x direction	0.0000 ft
Well offset - y direction	0.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	3622.870000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.570 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

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Layer 1 Correlations
Not Used

Layer 1 Model Data
Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	596.528914 md
Skin factor (Well 1)	27.240663

Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-11208.000000	0.000000	-6398.265381
-11184.000000	0.000000	-6398.265381
-11160.000000	0.000000	-6398.265381
-11136.000000	0.000000	-6547.910679
-11112.000000	0.000000	-6398.265381
-11088.000000	0.000000	-6398.265381
-11064.000000	0.000000	-6540.428467
-11040.000000	0.000000	-6398.265381
-11016.000000	0.000000	-6098.977400
-10992.000000	0.000000	-6398.265381
-10968.000000	0.000000	-6547.910679
-10944.000000	0.000000	-6398.265381
-10920.000000	0.000000	-7433.133022
-10896.000000	0.000000	-7141.325160
-10872.000000	0.000000	-6398.265381
-10848.000000	0.000000	-6398.265381
-10824.000000	0.000000	-6256.104911
-10800.000000	0.000000	-6248.622698
-10776.000000	0.000000	-6248.622698
-10752.000000	0.000000	-6547.910679
-10728.000000	0.000000	-6398.265381
-10704.000000	0.000000	-6398.265381
-10680.000000	0.000000	-6398.265381
-10656.000000	0.000000	-6547.910679
-10632.000000	0.000000	-6248.622698
-10608.000000	0.000000	-6540.428467
-10584.000000	0.000000	-6842.037179
-10560.000000	0.000000	0.000000
-10536.000000	0.000000	0.000000
-10512.000000	0.000000	-6540.428467
-10488.000000	0.000000	-6248.622698
-10464.000000	0.000000	-6241.140485
-10440.000000	0.000000	-6398.265381
-10416.000000	0.000000	-6398.265381
-10392.000000	0.000000	-6398.265381
-10368.000000	0.000000	-6547.910679
-10344.000000	0.000000	-6398.265381
-10320.000000	0.000000	-6405.747593
-10296.000000	0.000000	-6248.622698
-10272.000000	0.000000	-6098.977400
-10248.000000	0.000000	-6248.622698

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-10224.000000	0.000000	-6098.977400
-10200.000000	0.000000	-6098.977400
-10176.000000	0.000000	-6248.622698
-10152.000000	0.000000	-6098.977400
-10128.000000	0.000000	-6248.622698
-10104.000000	0.000000	-5949.334717
-10080.000000	0.000000	-6106.459612
-10056.000000	0.000000	-6098.977400
-10032.000000	0.000000	0.000000
-10008.000000	0.000000	-6547.910679
-9984.000000	0.000000	-6398.265381
-9960.000000	0.000000	-6547.910679
-9936.000000	0.000000	-6398.265381
-9912.000000	0.000000	-6540.428467
-9888.000000	0.000000	-6547.910679
-9864.000000	0.000000	-6248.622698
-9840.000000	0.000000	-6248.622698
-9816.000000	0.000000	-6098.977400
-9792.000000	0.000000	-6398.265381
-9768.000000	0.000000	-6398.265381
-9744.000000	0.000000	-6248.622698
-9720.000000	0.000000	-5804.850900
-9696.000000	0.000000	-5949.334717
-9672.000000	0.000000	0.000000
-9648.000000	0.000000	0.000000
-9624.000000	0.000000	0.000000
-9600.000000	0.000000	-6690.071150
-9576.000000	0.000000	-6398.265381
-9552.000000	0.000000	-6547.910679
-9528.000000	0.000000	-6405.747593
-9504.000000	0.000000	-6547.910679
-9480.000000	0.000000	-6547.910679
-9456.000000	0.000000	-6405.747593
-9432.000000	0.000000	-6540.428467
-9408.000000	0.000000	-6697.553362
-9384.000000	0.000000	-6547.910679
-9360.000000	0.000000	-6547.910679
-9336.000000	0.000000	-6248.622698
-9312.000000	0.000000	-6248.622698
-9288.000000	0.000000	-6398.265381
-9264.000000	0.000000	-6547.910679

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-9240.000000	0.000000	-6547.910679
-9216.000000	0.000000	-6547.910679
-9192.000000	0.000000	-6697.553362
-9168.000000	0.000000	-6248.622698
-9144.000000	0.000000	-6697.553362
-9120.000000	0.000000	-6697.553362
-9096.000000	0.000000	-6690.071150
-9072.000000	0.000000	-6547.910679
-9048.000000	0.000000	-6398.265381
-9024.000000	0.000000	-6547.910679
-9000.000000	0.000000	-6547.910679
-8976.000000	0.000000	-6540.428467
-8952.000000	0.000000	-6398.265381
-8928.000000	0.000000	-6547.910679
-8904.000000	0.000000	-6547.910679
-8880.000000	0.000000	-6547.910679
-8856.000000	0.000000	-6398.265381
-8832.000000	0.000000	-6547.910679
-8808.000000	0.000000	-6398.265381
-8784.000000	0.000000	-6547.910679
-8760.000000	0.000000	-6398.265381
-8736.000000	0.000000	0.000000
-8712.000000	0.000000	-5949.334717
-8688.000000	0.000000	-6547.910679
-8664.000000	0.000000	-6398.265381
-8640.000000	0.000000	-6697.553362
-8616.000000	0.000000	-6547.910679
-8592.000000	0.000000	0.000000
-8568.000000	0.000000	-3.0346e4
-8544.000000	0.000000	-575.822689
-8520.000000	0.000000	-6091.495187
-8496.000000	0.000000	0.000000
-8472.000000	0.000000	0.000000
-8448.000000	0.000000	-6697.553362
-8424.000000	0.000000	-6909.119176
-8400.000000	0.000000	-4919.370117
-8376.000000	0.000000	0.000000
-8352.000000	0.000000	-4019.441267
-8328.000000	0.000000	-3420.865566
-8304.000000	0.000000	-4455.730852
-8280.000000	0.000000	-4612.858364
-8256.000000	0.000000	-5206.272845
-8232.000000	0.000000	-5505.560826
-8208.000000	0.000000	-5655.205601
-8184.000000	0.000000	-5056.630162
-8160.000000	0.000000	-5942.110421
-8136.000000	0.000000	-5206.272845
-8112.000000	0.000000	-5505.560826
-8088.000000	0.000000	0.000000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-8064.000000	0.000000	-5655.205601
-8040.000000	0.000000	0.000000
-8016.000000	0.000000	-6842.037179
-7992.000000	0.000000	0.000000
-7968.000000	0.000000	-6697.553362
-7944.000000	0.000000	-6547.910679
-7920.000000	0.000000	-6398.265381
-7896.000000	0.000000	-6697.553362
-7872.000000	0.000000	-7290.970459
-7848.000000	0.000000	-4463.213065
-7824.000000	0.000000	0.000000
-7800.000000	0.000000	-5949.334717
-7776.000000	0.000000	0.000000
-7752.000000	0.000000	-149.336406
-7728.000000	0.000000	-4612.858364
-7704.000000	0.000000	-4762.501046
-7680.000000	0.000000	-3570.508248
-7656.000000	0.000000	0.000000
-7632.000000	0.000000	-4463.213065
-7608.000000	0.000000	-4762.501046
-7584.000000	0.000000	-4313.570382
-7560.000000	0.000000	-5949.334717
-7536.000000	0.000000	-5520.525251
-7512.000000	0.000000	-6547.910679
-7488.000000	0.000000	-4612.858364
-7464.000000	0.000000	0.000000
-7440.000000	0.000000	-5206.272845
-7416.000000	0.000000	-6697.553362
-7392.000000	0.000000	-5505.560826
-7368.000000	0.000000	0.000000
-7344.000000	0.000000	-6398.265381
-7320.000000	0.000000	-5804.850900
-7296.000000	0.000000	-6098.977400
-7272.000000	0.000000	0.000000
-7248.000000	0.000000	-6398.265381
-7224.000000	0.000000	-5855.419922
-7200.000000	0.000000	-5804.850900
-7176.000000	0.000000	-6398.265381
-7152.000000	0.000000	-6098.977400
-7128.000000	0.000000	0.000000
-7104.000000	0.000000	-5949.334717
-7080.000000	0.000000	-4612.858364
-7056.000000	0.000000	0.000000
-7032.000000	0.000000	-1490.971854
-7008.000000	0.000000	-4422.857143
-6984.000000	0.000000	-5385.714111
-6960.000000	0.000000	-4902.857143
-6936.000000	0.000000	-5179.999826
-6912.000000	0.000000	-5074.285714

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-6888.000000	0.000000	-5131.428746
-6864.000000	0.000000	-4797.143032
-6840.000000	0.000000	-4694.285889
-6816.000000	0.000000	-2602.857056
-6792.000000	0.000000	-4800.000000
-6768.000000	0.000000	-4800.000000
-6744.000000	0.000000	0.000000
-6720.000000	0.000000	-7502.856968
-6696.000000	0.000000	0.000000
-6672.000000	0.000000	-4662.857143
-6648.000000	0.000000	-4425.714111
-6624.000000	0.000000	-5074.285714
-6600.000000	0.000000	-3500.000087
-6576.000000	0.000000	-4974.285540
-6552.000000	0.000000	-5177.142857
-6528.000000	0.000000	-5214.285540
-6504.000000	0.000000	-5080.000174
-6480.000000	0.000000	-5314.285714
-6456.000000	0.000000	0.000000
-6432.000000	0.000000	-5177.142857
-6408.000000	0.000000	-5177.142857
-6384.000000	0.000000	-5348.571429
-6360.000000	0.000000	0.000000
-6336.000000	0.000000	-5108.571429
-6312.000000	0.000000	-4971.428571
-6288.000000	0.000000	-5214.285540
-6264.000000	0.000000	-5108.571429
-6240.000000	0.000000	-4800.000000
-6216.000000	0.000000	-5102.856968
-6192.000000	0.000000	-5214.285540
-6168.000000	0.000000	-4865.714460
-6144.000000	0.000000	-5382.857143
-6120.000000	0.000000	-5145.714111
-6096.000000	0.000000	-5042.856968
-6072.000000	0.000000	-5239.999826
-6048.000000	0.000000	-5217.143032
-6024.000000	0.000000	-5280.000000
-6000.000000	0.000000	-5214.285540
-5976.000000	0.000000	-5179.999826
-5952.000000	0.000000	-5211.428571
-5928.000000	0.000000	-5208.571603
-5904.000000	0.000000	-5179.999826
-5880.000000	0.000000	-5248.571254
-5856.000000	0.000000	-5140.000174
-5832.000000	0.000000	-4968.571603
-5808.000000	0.000000	-5080.000174
-5784.000000	0.000000	-5114.285889
-5760.000000	0.000000	-5074.285714
-5736.000000	0.000000	-5111.428397

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-5712.000000	0.000000	-5071.428746
-5688.000000	0.000000	-5211.428571
-5664.000000	0.000000	-5591.428397
-5640.000000	0.000000	-5588.571429
-5616.000000	0.000000	-5588.571429
-5592.000000	0.000000	-5591.428397
-5568.000000	0.000000	-5237.142857
-5544.000000	0.000000	-5754.285540
-5520.000000	0.000000	-5242.857317
-5496.000000	0.000000	-4731.428571
-5472.000000	0.000000	-5242.857317
-5448.000000	0.000000	-5011.428746
-5424.000000	0.000000	-5242.857317
-5400.000000	0.000000	-5108.571429
-5376.000000	0.000000	-5242.857317
-5352.000000	0.000000	-5042.856968
-5328.000000	0.000000	-5071.428746
-5304.000000	0.000000	-5142.857143
-5280.000000	0.000000	-5145.714111
-5256.000000	0.000000	-5140.000174
-5232.000000	0.000000	-5174.285889
-5208.000000	0.000000	-5143.661237
-5184.000000	0.000000	-5137.054269
-5160.000000	0.000000	-5142.857143
-5136.000000	0.000000	-5174.285889
-5112.000000	0.000000	-5074.285714
-5088.000000	0.000000	0.000000
-5064.000000	0.000000	-5042.856968
-5040.000000	0.000000	0.000000
-5016.000000	0.000000	-5345.714460
-4992.000000	0.000000	-5102.856968
-4968.000000	0.000000	0.000000
-4944.000000	0.000000	-5108.571429
-4920.000000	0.000000	-5074.285714
-4896.000000	0.000000	0.000000
-4872.000000	0.000000	-4114.285714
-4848.000000	0.000000	-5105.714460
-4824.000000	0.000000	-5074.285714
-4800.000000	0.000000	-5040.000000
-4776.000000	0.000000	-5042.856968
-4752.000000	0.000000	-5008.571254
-4728.000000	0.000000	-5077.142683
-4704.000000	0.000000	-5080.000174
-4680.000000	0.000000	0.000000
-4656.000000	0.000000	-4974.285540
-4632.000000	0.000000	-4688.571429
-4608.000000	0.000000	-4834.285714
-4584.000000	0.000000	0.000000
-4560.000000	0.000000	-5005.714286

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-4536.000000	0.000000	-4834.285714
-4512.000000	0.000000	-4771.428746
-4488.000000	0.000000	-4971.428571
-4464.000000	0.000000	-5008.571254
-4440.000000	0.000000	-4902.857143
-4416.000000	0.000000	-4797.143032
-4392.000000	0.000000	-4937.142857
-4368.000000	0.000000	-5002.857317
-4344.000000	0.000000	-4597.142683
-4320.000000	0.000000	0.000000
-4296.000000	0.000000	-4900.000174
-4272.000000	0.000000	-4934.285889
-4248.000000	0.000000	0.000000
-4224.000000	0.000000	-4937.142857
-4200.000000	0.000000	-4902.857143
-4176.000000	0.000000	-5002.857317
-4152.000000	0.000000	-5011.428746
-4128.000000	0.000000	-4468.571254
-4104.000000	0.000000	-4997.142857
-4080.000000	0.000000	-4968.571603
-4056.000000	0.000000	-4999.999826
-4032.000000	0.000000	-5002.857317
-4008.000000	0.000000	-4974.285540
-3984.000000	0.000000	-4965.714111
-3960.000000	0.000000	-4874.285889
-3936.000000	0.000000	0.000000
-3912.000000	0.000000	-4865.714460
-3888.000000	0.000000	-4934.285889
-3864.000000	0.000000	-4905.714111
-3840.000000	0.000000	-4902.857143
-3816.000000	0.000000	-5002.857317
-3792.000000	0.000000	-4942.857317
-3768.000000	0.000000	-4939.999826
-3744.000000	0.000000	-4934.285889
-3720.000000	0.000000	0.000000
-3696.000000	0.000000	-4765.714286
-3672.000000	0.000000	-4931.428397
-3648.000000	0.000000	-4937.142857
-3624.000000	0.000000	-4868.571429
-3600.000000	0.000000	-4905.714111
-3576.000000	0.000000	-5002.857317
-3552.000000	0.000000	-4937.142857
-3528.000000	0.000000	-4937.142857
-3504.000000	0.000000	-4931.428397
-3480.000000	0.000000	-4871.428397
-3456.000000	0.000000	-5037.143032
-3432.000000	0.000000	-4837.142683
-3408.000000	0.000000	-4939.999826
-3384.000000	0.000000	-4931.428397

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-3360.000000	0.000000	-4937.142857
-3336.000000	0.000000	-4837.142683
-3312.000000	0.000000	-4974.285540
-3288.000000	0.000000	-5037.143032
-3264.000000	0.000000	-4942.857317
-3240.000000	0.000000	-4937.142857
-3216.000000	0.000000	-4868.571429
-3192.000000	0.000000	-4971.428571
-3168.000000	0.000000	-4937.142857
-3144.000000	0.000000	0.000000
-3120.000000	0.000000	-5419.999826
-3096.000000	0.000000	-5239.999826
-3072.000000	0.000000	-5208.571603
-3048.000000	0.000000	-4668.571603
-3024.000000	0.000000	-4871.428397
-3000.000000	0.000000	-4900.000174
-2976.000000	0.000000	-4934.285889
-2952.000000	0.000000	-4697.142857
-2928.000000	0.000000	-4868.571429
-2904.000000	0.000000	-4771.428746
-2880.000000	0.000000	-4928.571429
-2856.000000	0.000000	0.000000
-2832.000000	0.000000	-4871.428397
-2808.000000	0.000000	-4731.428571
-2784.000000	0.000000	-4834.285714
-2760.000000	0.000000	-4831.428746
-2736.000000	0.000000	-1948.571385
-2712.000000	0.000000	-4771.428746
-2688.000000	0.000000	-2022.857143
-2664.000000	0.000000	-4902.857143
-2640.000000	0.000000	-1242.857143
-2616.000000	0.000000	-4182.857143
-2592.000000	0.000000	-4802.856968
-2568.000000	0.000000	-4837.142683
-2544.000000	0.000000	-4634.285889
-2520.000000	0.000000	-4668.571603
-2496.000000	0.000000	-4731.428571
-2472.000000	0.000000	-4699.999826
-2448.000000	0.000000	-4597.142683
-2424.000000	0.000000	-4625.714460
-2400.000000	0.000000	-4797.143032
-2376.000000	0.000000	-4597.142683
-2352.000000	0.000000	0.000000
-2328.000000	0.000000	0.000000
-2304.000000	0.000000	-36.357143
-2280.000000	0.000000	-4483.702381
-2256.000000	0.000000	-4683.331018
-2232.000000	0.000000	-4498.543981
-2208.000000	0.000000	-4739.353257

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-2184.000000	0.000000	-4498.311508
-2160.000000	0.000000	-4739.888558
-2136.000000	0.000000	-4293.713624
-2112.000000	0.000000	-4625.099950
-2088.000000	0.000000	-4324.223628
-2064.000000	0.000000	-4827.789104
-2040.000000	0.000000	-4792.579034
-2016.000000	0.000000	-4881.841105
-1992.000000	0.000000	-4815.456267
-1968.000000	0.000000	-7234.171048
-1944.000000	0.000000	-6065.735284
-1920.000000	0.000000	-4486.401207
-1896.000000	0.000000	-4603.563244
-1872.000000	0.000000	-4207.539683
-1848.000000	0.000000	-3875.855076
-1824.000000	0.000000	-2134.996280
-1800.000000	0.000000	0.000000
-1776.000000	0.000000	0.000000
-1752.000000	0.000000	-3960.563740
-1728.000000	0.000000	-4768.571254
-1704.000000	0.000000	-5025.714111
-1680.000000	0.000000	-4831.428746
-1656.000000	0.000000	-5974.285714
-1632.000000	0.000000	-5991.428571
-1608.000000	0.000000	-8548.571254
-1584.000000	0.000000	-2231.428659
-1560.000000	0.000000	-5217.143032
-1536.000000	0.000000	-2905.714286
-1512.000000	0.000000	-5002.857317
-1488.000000	0.000000	-1.6786e4
-1464.000000	0.000000	-1314.285671
-1440.000000	0.000000	-4494.285540
-1416.000000	0.000000	-3597.142770
-1392.000000	0.000000	-4488.571603
-1368.000000	0.000000	-2294.285627
-1344.000000	0.000000	-5065.714286
-1320.000000	0.000000	-3974.285627
-1296.000000	0.000000	-4457.142857
-1272.000000	0.000000	-4971.428571
-1248.000000	0.000000	-4077.142770
-1224.000000	0.000000	-4428.571603
-1200.000000	0.000000	-4425.714111
-1176.000000	0.000000	0.000000
-1152.000000	0.000000	-4557.143032
-1128.000000	0.000000	-19.999999
-1104.000000	0.000000	-4971.428571
-1080.000000	0.000000	-4734.285540
-1056.000000	0.000000	-5008.571254
-1032.000000	0.000000	-4560.000000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-1008.000000	0.000000	-3331.428484
-984.000000	0.000000	-5111.428397
-960.000000	0.000000	-5008.571254
-936.000000	0.000000	-4865.714460
-912.000000	0.000000	-5242.857317
-888.000000	0.000000	-5182.857317
-864.000000	0.000000	-4179.999913
-840.000000	0.000000	-5042.856968
-816.000000	0.000000	-3791.428659
-792.000000	0.000000	-3871.428484
-768.000000	0.000000	-3057.142770
-744.000000	0.000000	-4768.571254
-720.000000	0.000000	-4348.571516
-696.000000	0.000000	0.000000
-672.000000	0.000000	-5202.857143
-648.000000	0.000000	-3871.428484
-624.000000	0.000000	-2097.142901
-600.000000	0.000000	-3608.571429
-576.000000	0.000000	-2514.285801
-552.000000	0.000000	-5034.285540
-528.000000	0.000000	-4865.714460
-504.000000	0.000000	-4968.571603
-480.000000	0.000000	-5040.000000
-456.000000	0.000000	-3088.571516
-432.000000	0.000000	-4217.142857
-408.000000	0.000000	-4699.999826
-384.000000	0.000000	-437.142857
-360.000000	0.000000	0.000000
-336.000000	0.000000	-3502.857056
-312.000000	0.000000	-4362.857143
-288.000000	0.000000	-3085.714286
-264.000000	0.000000	-4417.142683
-240.000000	0.000000	-3231.428571
-216.000000	0.000000	-3660.000000
-192.000000	0.000000	-4634.285889
-168.000000	0.000000	-4491.428571
-144.000000	0.000000	-5322.857143
-120.000000	0.000000	-4588.571254
-96.000000	0.000000	-1414.285714
-76.289593	3841.764422	-3960.000000
-55.927602	3842.748942	-4611.428571
-30.569832	3852.797833	-7262.856968
0.000000	3853.883527	-1808.571429
37.273743	3800.553372	0.000000

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SUBSURFACE

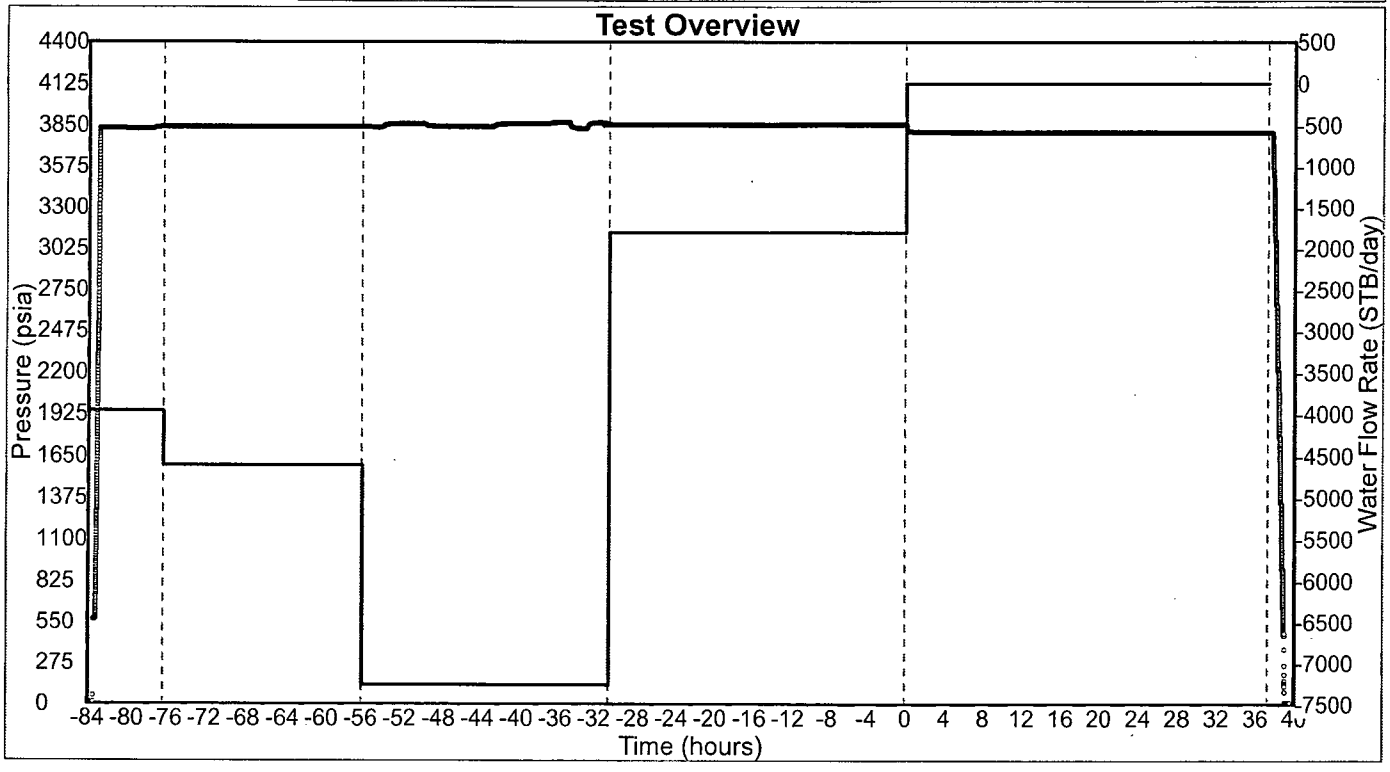
HOUSTON, TX • BATON ROUGE, LA • SOUTH BEND, IN

Subsurface Technology, Inc

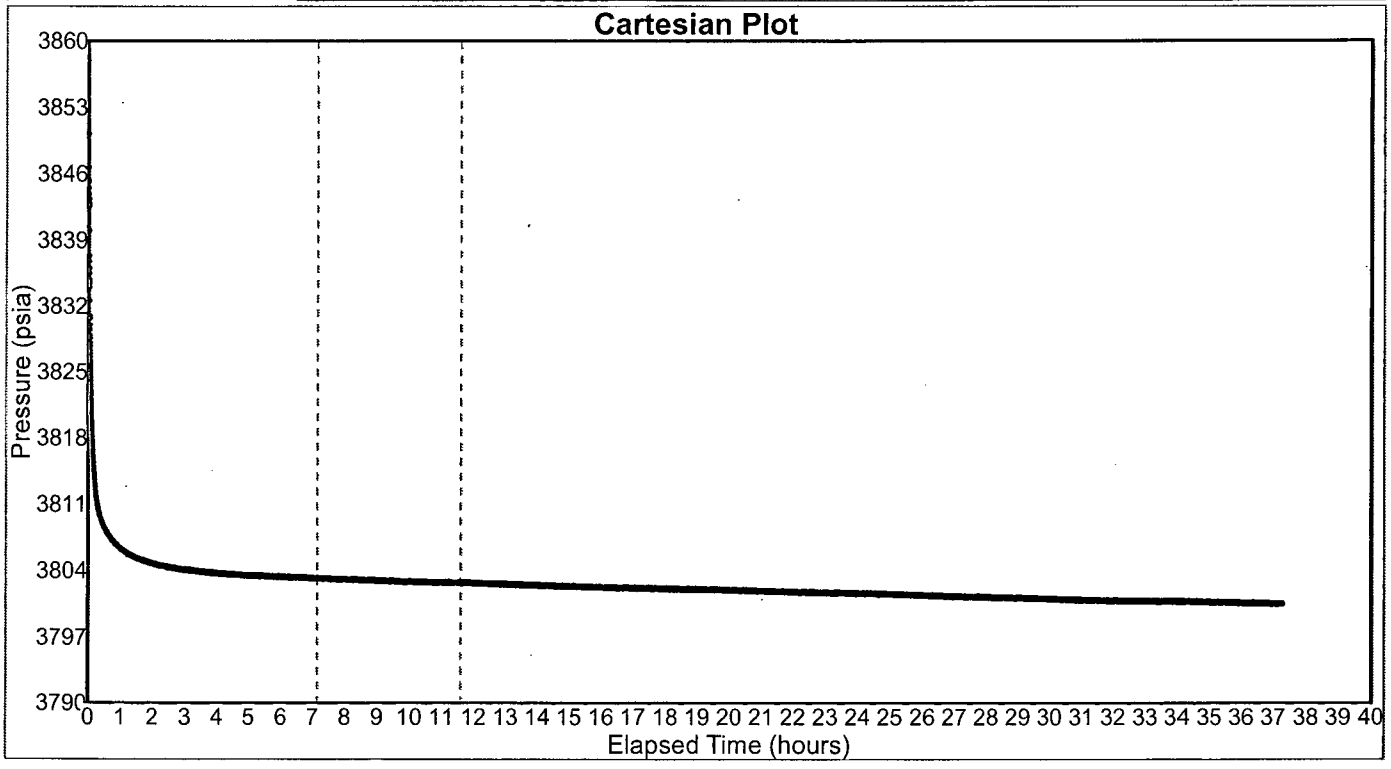
PanSystem Version 3.5

Well Test Analysis Report

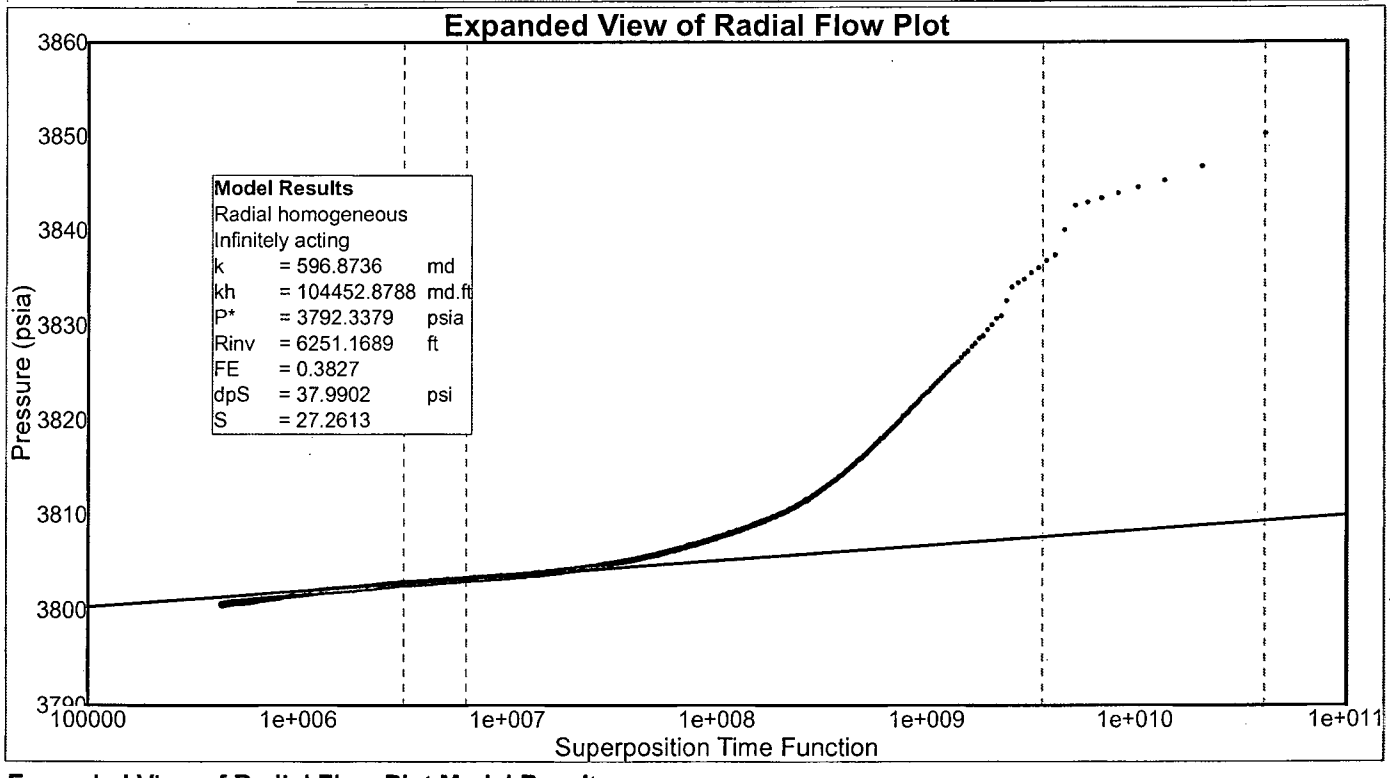
Report File: 2011 Gaines Well-3 rev.pan



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Expanded View of Radial Flow Plot Model Results
Radial homogeneous - Infinitely acting

Fair Wellbore Storage

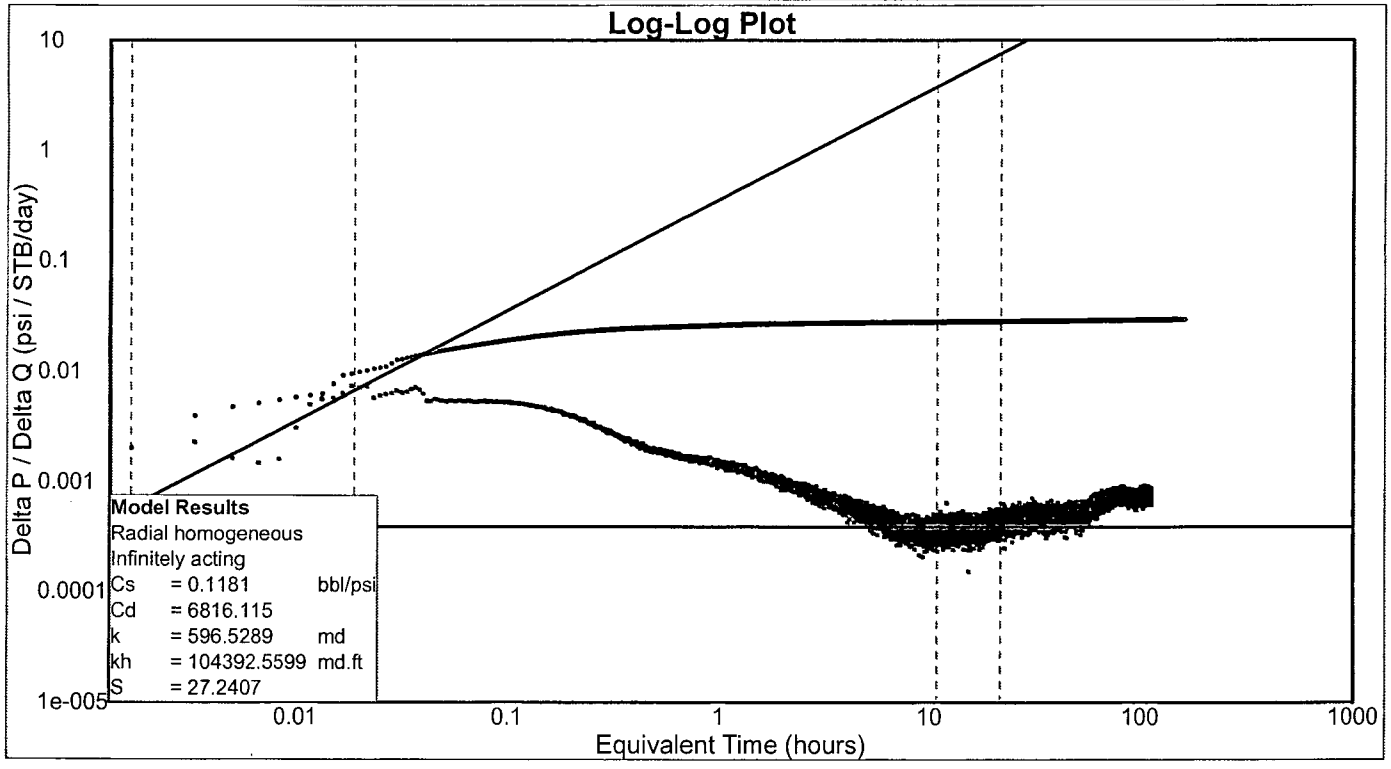
	Value
Permeability	596.873593 md
Permeability-thickness	1.0445e5 md.ft
Extrapolated pressure	3792.337923 psia
Radius of investigation	6251.168856 ft
Flow efficiency	0.382731
dP skin (constant rate)	37.990201 psi
Skin factor	27.261314

Expanded View of Radial Flow Plot Line Details
Line type : Radial flow
Slope : 1.60439
Intercept : 3792.34
Coefficient of Determination : 0.899916

	Radial flow
Extrapolated pressure	3792.337923 psia
Pressure at dt = 1 hour	3804.910506 psia

Number of Intersections = 0

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Log-Log Plot Model Results

Radial homogeneous - Infinitely acting

Fair Wellbore Storage

	Value
Wellbore storage coefficient	0.11809 bbl/psi
Dimensionless wellbore storage	6816.114987
Permeability	596.528914 md
Permeability-thickness	1.0439e5 md.ft
Skin factor	27.240663

Log-Log Plot Line Details

Line type : Wellbore storage
Slope : 1
Intercept : 0.352838
Coefficient of Determination : Not Used

Line type : Radial flow
Slope : 0
Intercept : 0.000385487
Coefficient of Determination : Not Used

Number of Intersections = 0

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Subsurface Technology, Inc	Report File:	Navajo Mewbourne Well No. 1 201
PanSystem Version 3.5		
Well Test Analysis Report		

Company	Navajo Refining Company
Location	Artesia, New Mexico
Well	Mewbourne Well No. 1
Date	December 16 - 21, 2010
Test	Falloff
Gauge Depth	7924 feet
Injection Interval	7924 feet - 8476 feet
Completion Type	Perforated
Top of Fill	9001feet
Last Stabilization	January 2009
Analyst	RLS
Subsurface Project No.	70A6516

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Reservoir Description

Fluid type : Water
Well orientation : Vertical
Number of wells : 3
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	3716.931804 psia
Temperature	0.000000 deg F

Well Parameters Data

	WDW-1	WDW-2	WDW-3
Well radius	0.3646 ft	0.3281 ft	0.3281 ft
Distance from observation to active well	0.000000 ft	1.0970e4 ft	7907.000000 ft
Wellbore storage coefficient	0.0900 bbl/psi	1.0000e-3 bbl/psi	1.0000e-3 bbl/psi
Storage Amplitude	0.000000 psi	0.000000 psi	0.000000 psi
Storage Time Constant	0.000000 hr	0.000000 hr	0.000000 hr
Second Wellbore Storage	0.170000 bbl/psi	2.7000e-3 bbl/psi	1.7500e-4 bbl/psi
Time Change for Second Storage	0.050000 hr	0.017500 hr	7.5000e-3 hr
Well offset - x direction	0.0000 ft	-7590.0000 ft	-6000.0000 ft
Well offset - y direction	0.0000 ft	-7920.0000 ft	-5150.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	0.000000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.570 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

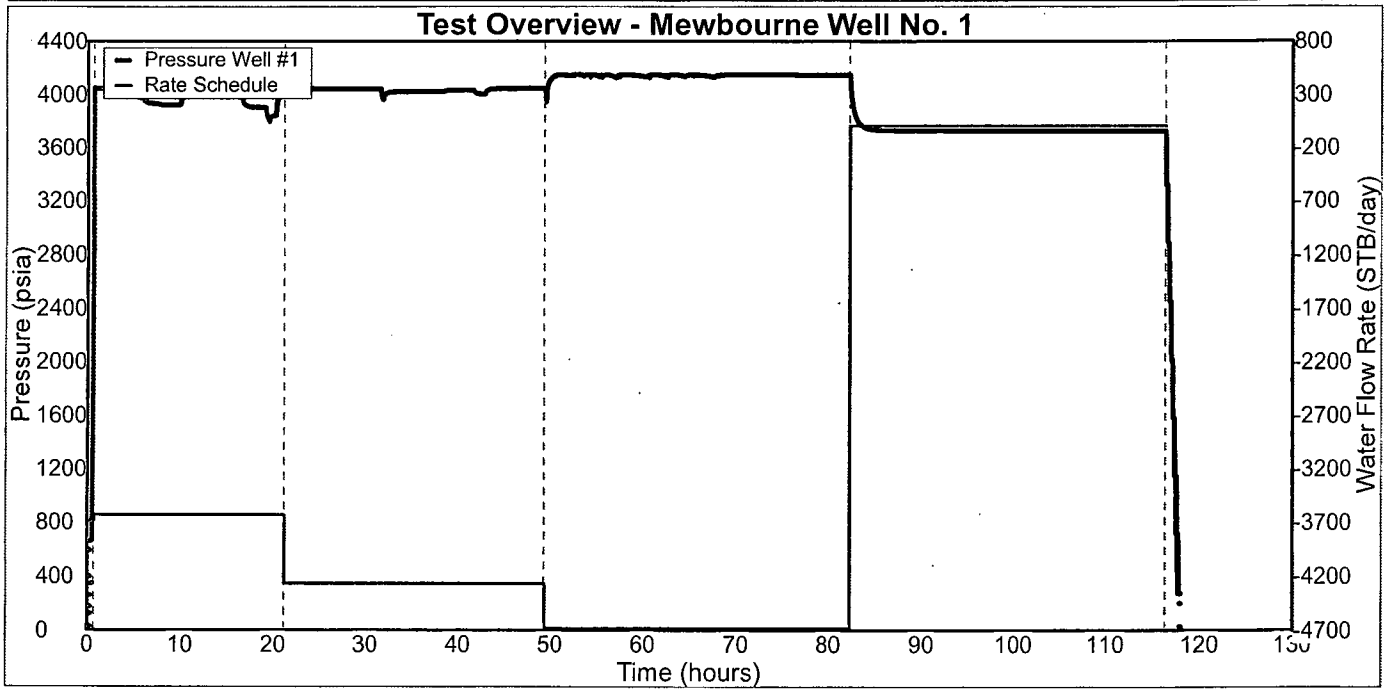
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Layer 1 Correlations
Not Used

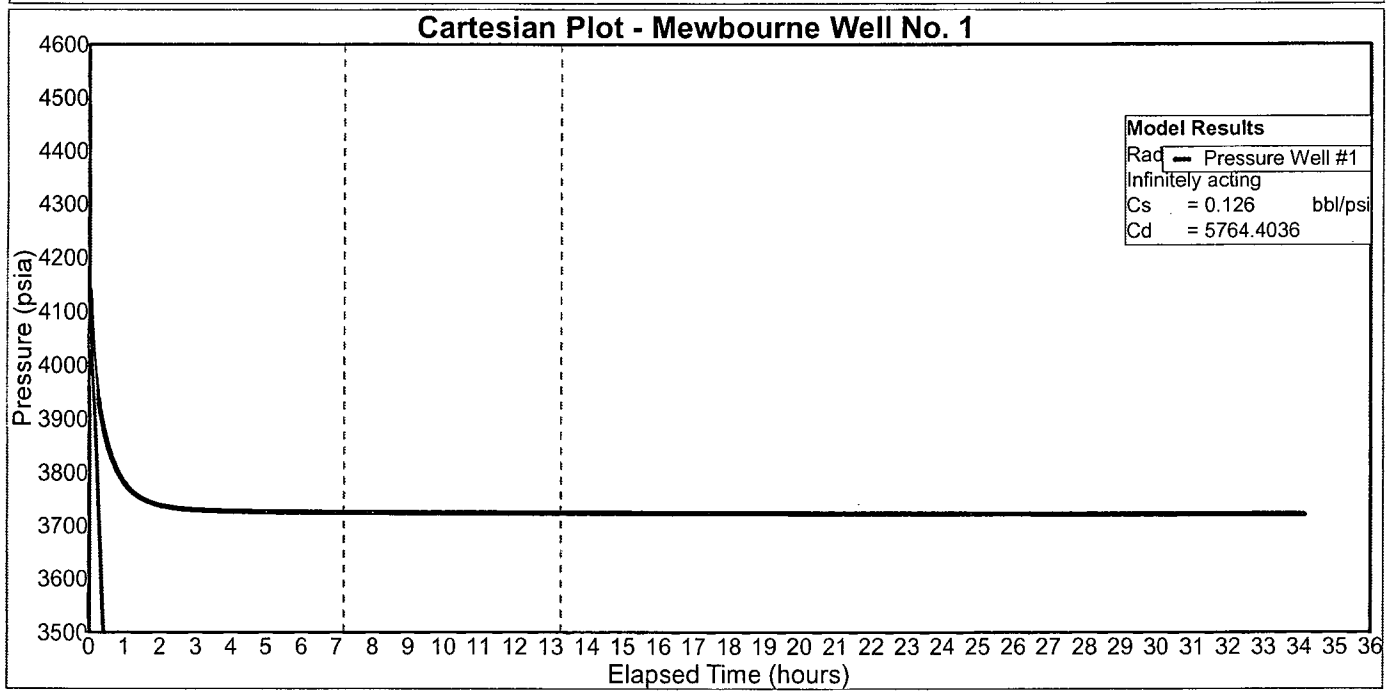
Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-792.000000	0.000000	-4228.888582
-768.000000	0.000000	-4391.549806
-744.000000	0.000000	-4384.479672
-720.000000	0.000000	-4384.376378
-696.000000	0.000000	-4374.848597
-672.000000	0.000000	-4176.157065
-648.000000	0.000000	-4325.868803
-624.000000	0.000000	-4308.064641
-600.000000	0.000000	-4302.856847
-576.000000	0.000000	-4268.163357
-552.000000	0.000000	-4211.405051
-528.000000	0.000000	-4314.799121
-504.000000	0.000000	-4274.892719
-480.000000	0.000000	-3790.877466
-456.000000	0.000000	-4078.245257
-432.000000	0.000000	-4080.230053
-408.000000	0.000000	-4067.616136
-384.000000	0.000000	-4044.605134
-360.000000	0.000000	-4027.491560
-336.000000	0.000000	-3777.450665
-312.000000	0.000000	-3466.263264
-288.000000	0.000000	-4606.468701
-264.000000	0.000000	-4060.063248
-240.000000	0.000000	-4051.826741
-216.000000	0.000000	-4064.050333
-192.000000	0.000000	-4064.043834
-168.000000	0.000000	-4082.369662
-144.000000	0.000000	-4090.841307
-120.000000	4031.250000	-4091.821452
-96.000000	4031.250000	-4087.686695
-72.000000	4031.250000	-4091.460208
-47.449664	4031.250000	-4113.064348
-23.489933	4040.625000	-4063.756218
0.696213	4045.107422	-3687.836512
21.181005	4039.775391	-3633.179677
49.300562	4046.689453	-4268.197524
82.243625	4145.268121	-4683.825820
116.393616	3722.481995	0.000000

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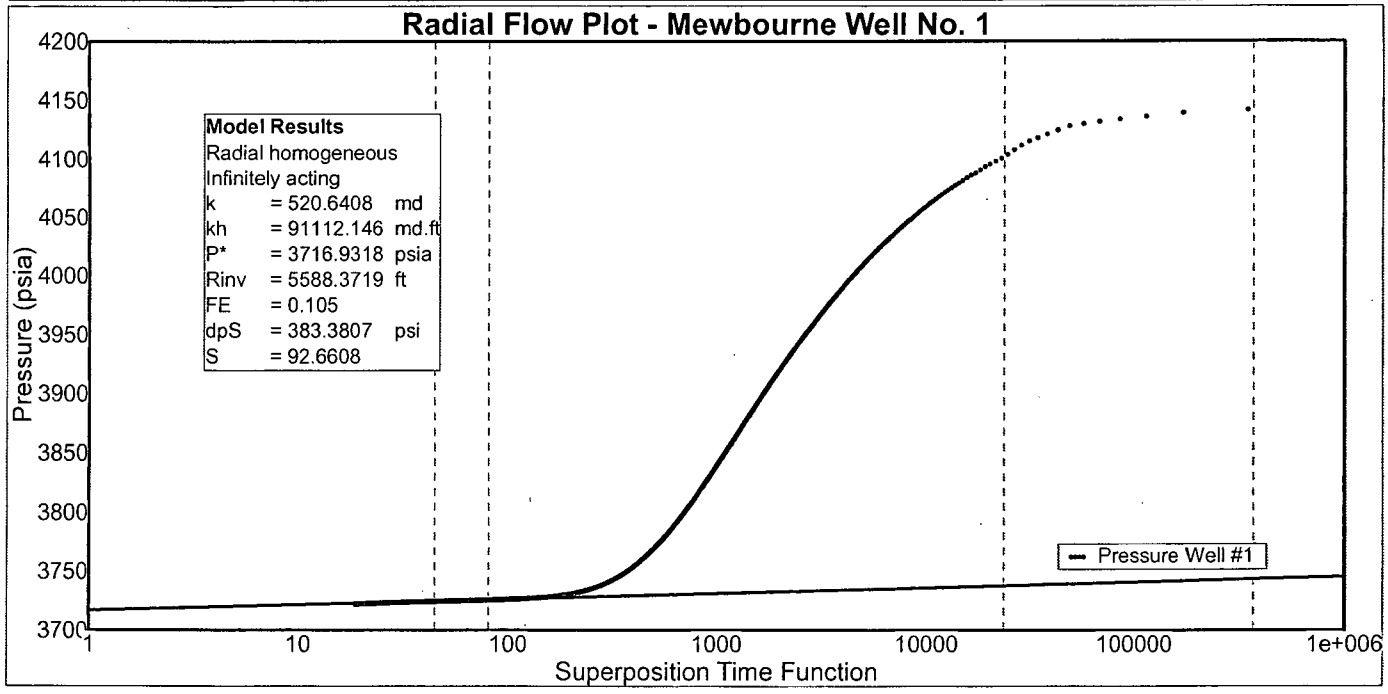
Cartesian Plot - Mewbourne Well No. 1 Model Results
Radial homogeneous - Infinitely acting

Time Stepped Wellbore Storage

	Value
Wellbore storage coefficient	0.125999 bbl/psi
Dimensionless wellbore storage	5764.403591

Cartesian Plot - Mewbourne Well No. 1 Line Details
Line type : Wellbore storage
Slope : -1548.89
Intercept : 4144.84
Coefficient of Determination : 0.990512
Number of Intersections = 0

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Radial Flow Plot - Mewbourne Well No. 1 Model Results
Radial homogeneous - Infinitely acting

Time Stepped Wellbore Storage

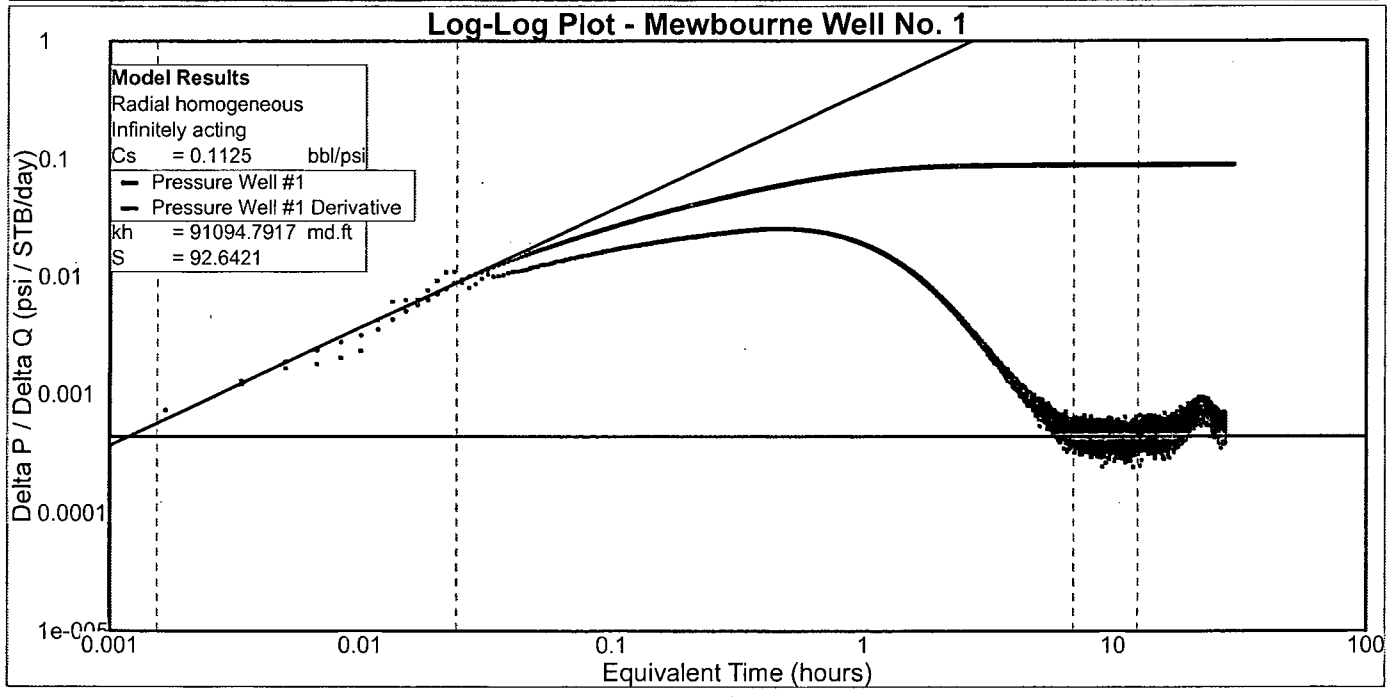
	Value
Permeability	520.640835 md
Permeability-thickness	9.1112e4 md.ft
Extrapolated pressure	3716.931804 psia
Radius of investigation	5588.371933 ft
Flow efficiency	0.104954
dP skin (constant rate)	383.380738 psi
Skin factor	92.660849

Radial Flow Plot - Mewbourne Well No. 1 Line Details
Line type : Radial flow
Slope : 4.76343
Intercept : 3716.93
Coefficient of Determination : 0.991562

	Radial flow
Extrapolated pressure	3716.931804 psia
Pressure at dt = 1 hour	3730.046611 psia

Number of Intersections = 0

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Log-Log Plot - Mewbourne Well No. 1 Model Results
Radial homogeneous - Infinitely acting

Time Stepped Wellbore Storage

	Value
Wellbore storage coefficient	0.11247 bbl/psi
Dimensionless wellbore storage	5145.441094
Permeability	520.541667 md
Permeability-thickness	9.1095e4 md.ft
Skin factor	92.642114

Log-Log Plot - Mewbourne Well No. 1 Line Details
Line type : Wellbore storage
Slope : 1
Intercept : 0.37047
Coefficient of Determination : Not Used
Line type : Radial flow
Slope : 0
Intercept : 0.00044176
Coefficient of Determination : Not Used
Number of Intersections = 0

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Subsurface Technology, Inc | Report File: | Well No. 1 2011.pan

PanSystem Version 3.5

Well Test Analysis Report

Company	Navajo Refining Company
Location	Artesia, New Mexico
Well	Mewbourne Well No. 1
Date	November 10 - 13, 2011
Test	Falloff
Gauge Depth	7924 feet
Injection Interval	7924 feet - 8476 feet
Completion Type	Perforated
Top of Fill	9001feet
Last Stabilization	December 21, 2010
Analyst	RLS
Subsurface Project No.	70A6645

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Reservoir Description

Fluid type : Water
Well orientation : Vertical
Number of wells : 3
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	3716.931804 psia
Temperature	0.000000 deg F

Well Parameters Data

	WDW-1	WDW-2	WDW-3
Well radius	0.3646 ft	0.3281 ft	0.3281 ft
Distance from observation to active well	0.000000 ft	1.0970e4 ft	7907.000000 ft
Wellbore storage coefficient	0.0900 bbl/psi	1.0000e-3 bbl/psi	1.0000e-3 bbl/psi
Storage Amplitude	0.000000 psi	0.000000 psi	0.000000 psi
Storage Time Constant	0.000000 hr	0.000000 hr	0.000000 hr
Second Wellbore Storage	0.170000 bbl/psi	2.7000e-3 bbl/psi	1.7500e-4 bbl/psi
Time Change for Second Storage	0.050000 hr	0.017500 hr	7.5000e-3 hr
Well offset - x direction	0.0000 ft	-7590.0000 ft	-6000.0000 ft
Well offset - y direction	0.0000 ft	-7920.0000 ft	-5150.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	0.000000 psia
Check Temperature	0.000000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.570 cp
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

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Layer 1 Correlations
Not Used

Layer 1 Model Data
Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	520.6408 md
Skin factor (Well 1)	92.6608
Skin factor (Well 2)	0.0000
Skin factor (Well 3)	0.0000

Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-9403.500000	0.000000	-4389.885603
-9379.500000	0.000000	-4389.885603
-9355.500000	0.000000	-4389.885603
-9331.500000	0.000000	-4389.885603
-9307.500000	0.000000	-4389.885603
-9283.500000	0.000000	-4389.885603
-9259.500000	0.000000	-4282.176688
-9235.500000	0.000000	-4389.885603
-9211.500000	0.000000	-4389.885603
-9187.500000	0.000000	-4282.176688
-9163.500000	0.000000	-4282.176688
-9139.500000	0.000000	-4389.885603
-9115.500000	0.000000	-4924.720459
-9091.500000	0.000000	-4820.724923
-9067.500000	0.000000	-4389.885603
-9043.500000	0.000000	-4740.420096
-9019.500000	0.000000	-4282.176688
-8995.500000	0.000000	-4389.885603
-8971.500000	0.000000	-4287.562081
-8947.500000	0.000000	-4384.500209
-8923.500000	0.000000	-4389.885603
-8899.500000	0.000000	-4389.885603
-8875.500000	0.000000	-4282.176688
-8851.500000	0.000000	-4389.885603
-8827.500000	0.000000	-4287.562081
-8803.500000	0.000000	-4276.977016
-8779.500000	0.000000	-2462.250105
-8755.500000	0.000000	-2569.959019
-8731.500000	0.000000	-2569.959019
-8707.500000	0.000000	-4178.180629
-8683.500000	0.000000	-4389.885603
-8659.500000	0.000000	-4389.885603
-8635.500000	0.000000	-4389.885603
-8611.500000	0.000000	-4282.176688
-8587.500000	0.000000	-4389.885603
-8563.500000	0.000000	-4282.176688
-8539.500000	0.000000	-4384.500209
-8515.500000	0.000000	-4389.885603
-8491.500000	0.000000	-4389.885603

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-8467.500000	0.000000	-4178.180629
-8443.500000	0.000000	-4282.176688
-8419.500000	0.000000	-4282.176688
-8395.500000	0.000000	-4178.180629
-8371.500000	0.000000	-4070.470145
-8347.500000	0.000000	-4070.470145
-8323.500000	0.000000	-4070.470145
-8299.500000	0.000000	-4070.470145
-8275.500000	0.000000	-3962.759399
-8251.500000	0.000000	-4070.470145
-8227.500000	0.000000	-2462.250105
-8203.500000	0.000000	-4070.470145
-8179.500000	0.000000	-3535.635027
-8155.500000	0.000000	-4070.470145
-8131.500000	0.000000	-4070.470145
-8107.500000	0.000000	-4070.470145
-8083.500000	0.000000	-4070.470145
-8059.500000	0.000000	-4070.470145
-8035.500000	0.000000	-4178.180629
-8011.500000	0.000000	-4070.470145
-7987.500000	0.000000	-4070.470145
-7963.500000	0.000000	-4178.180629
-7939.500000	0.000000	-3914.411970
-7915.500000	0.000000	-3639.630824
-7891.500000	0.000000	-3747.339739
-7867.500000	0.000000	-4930.105852
-7843.500000	0.000000	-2358.254307
-7819.500000	0.000000	-2462.250105
-7795.500000	0.000000	-4172.795236
-7771.500000	0.000000	-4070.470145
-7747.500000	0.000000	-3962.759399
-7723.500000	0.000000	-3957.374006
-7699.500000	0.000000	-4070.470145
-7675.500000	0.000000	-4070.470145
-7651.500000	0.000000	-4070.470145
-7627.500000	0.000000	-3855.050485
-7603.500000	0.000000	-4063.999721
-7579.500000	0.000000	-4015.157384
-7555.500000	0.000000	-3962.759399

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-7531.500000	0.000000	0.000000
-7507.500000	0.000000	-4070.470145
-7483.500000	0.000000	-4070.470145
-7459.500000	0.000000	-4070.470145
-7435.500000	0.000000	-4070.470145
-7411.500000	0.000000	-4282.176688
-7387.500000	0.000000	-4178.180629
-7363.500000	0.000000	-4070.470145
-7339.500000	0.000000	-4070.470145
-7315.500000	0.000000	-4065.084490
-7291.500000	0.000000	-3855.050485
-7267.500000	0.000000	-3639.630824
-7243.500000	0.000000	-3962.759399
-7219.500000	0.000000	-3962.759399
-7195.500000	0.000000	-3962.759399
-7171.500000	0.000000	-3986.257324
-7147.500000	0.000000	-3962.759399
-7123.500000	0.000000	-3941.403285
-7099.500000	0.000000	-3962.759399
-7075.500000	0.000000	-3962.759399
-7051.500000	0.000000	-3855.050485
-7027.500000	0.000000	-3855.050485
-7003.500000	0.000000	-3855.050485
-6979.500000	0.000000	-3855.050485
-6955.500000	0.000000	-3855.050485
-6931.500000	0.000000	-2358.254307
-6907.500000	0.000000	-3962.759399
-6883.500000	0.000000	-3855.050485
-6859.500000	0.000000	-3855.050485
-6835.500000	0.000000	-3855.050485
-6811.500000	0.000000	-3747.339739
-6787.500000	0.000000	-2.1843e4
-6763.500000	0.000000	-1.8095e4
-6739.500000	0.000000	-1.0600e4
-6715.500000	0.000000	-4680.888846
-6691.500000	0.000000	-2569.959019
-6667.500000	0.000000	-2462.250105
-6643.500000	0.000000	-2061.865670
-6619.500000	0.000000	-3747.339739
-6595.500000	0.000000	-5998.105643
-6571.500000	0.000000	-2548.602905
-6547.500000	0.000000	-4820.724923
-6523.500000	0.000000	-3855.050485
-6499.500000	0.000000	-4924.720459
-6475.500000	0.000000	-4713.016009
-6451.500000	0.000000	-5140.140381
-6427.500000	0.000000	-4605.305001
-6403.500000	0.000000	-4924.720459
-6379.500000	0.000000	-5140.140381

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
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-6283.500000	0.000000	-2569.959019
-6259.500000	0.000000	-5032.431466
-6235.500000	0.000000	-3339.307774
-6211.500000	0.000000	-5782.685721
-6187.500000	0.000000	-2569.959019
-6163.500000	0.000000	-5674.976807
-6139.500000	0.000000	-5567.266323
-6115.500000	0.000000	-5782.685721
-6091.500000	0.000000	-5782.685721
-6067.500000	0.000000	-4282.176688
-6043.500000	0.000000	-4820.724923
-6019.500000	0.000000	-4497.596087
-5995.500000	0.000000	-7387.192906
-5971.500000	0.000000	-4820.724923
-5947.500000	0.000000	-7062.392055
-5923.500000	0.000000	-7283.196847
-5899.500000	0.000000	-7186.071429
-5875.500000	0.000000	-8029.738770
-5851.500000	0.000000	-3634.431152
-5827.500000	0.000000	-7494.901821
-5803.500000	0.000000	-7602.612305
-5779.500000	0.000000	-7602.612305
-5755.500000	0.000000	-6960.066964
-5731.500000	0.000000	-4070.470145
-5707.500000	0.000000	-5032.431466
-5683.500000	0.000000	-7387.192906
-5659.500000	0.000000	-3962.759399
-5635.500000	0.000000	-7175.486363
-5611.500000	0.000000	-7175.486363
-5587.500000	0.000000	-7283.196847
-5563.500000	0.000000	-7272.426060
-5539.500000	0.000000	-7288.396519
-5515.500000	0.000000	-7277.811454
-5491.500000	0.000000	-7175.486363
-5467.500000	0.000000	-7175.486363
-5443.500000	0.000000	-7175.486363
-5419.500000	0.000000	-7387.192906
-5395.500000	0.000000	-7494.901821
-5371.500000	0.000000	-7818.032227
-5347.500000	0.000000	-7602.612305
-5323.500000	0.000000	-7387.192906
-5299.500000	0.000000	-7576.386370
-5275.500000	0.000000	-7175.486363
-5251.500000	0.000000	-5816.444092
-5227.500000	0.000000	-6857.142857
-5203.500000	0.000000	-7437.143032

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-5179.500000	0.000000	-7474.285714
-5155.500000	0.000000	-7714.285714
-5131.500000	0.000000	-7608.571603
-5107.500000	0.000000	-7542.857143
-5083.500000	0.000000	-7474.285714
-5059.500000	0.000000	-7571.428397
-5035.500000	0.000000	-4628.571429
-5011.500000	0.000000	-6857.142857
-4987.500000	0.000000	-7614.285540
-4963.500000	0.000000	-7437.143032
-4939.500000	0.000000	-3808.571516
-4915.500000	0.000000	-3702.857143
-4891.500000	0.000000	-2742.857143
-4867.500000	0.000000	-4800.000000
-4843.500000	0.000000	-4631.428397
-4819.500000	0.000000	-5248.571254
-4795.500000	0.000000	-3942.857143
-4771.500000	0.000000	-5071.428746
-4747.500000	0.000000	-5245.714286
-4723.500000	0.000000	-5277.143032
-4699.500000	0.000000	-4974.285540
-4675.500000	0.000000	-5142.857143
-4651.500000	0.000000	-2640.000000
-4627.500000	0.000000	-5142.857143
-4603.500000	0.000000	-5174.285889
-4579.500000	0.000000	-5108.571429
-4555.500000	0.000000	-2708.571429
-4531.500000	0.000000	-5108.571429
-4507.500000	0.000000	-5002.857317
-4483.500000	0.000000	-5040.000000
-4459.500000	0.000000	-5179.999826
-4435.500000	0.000000	-4800.000000
-4411.500000	0.000000	-5248.571254
-4387.500000	0.000000	-5108.571429
-4363.500000	0.000000	-4974.285540
-4339.500000	0.000000	-5040.000000
-4315.500000	0.000000	-5182.857317
-4291.500000	0.000000	-5142.857143
-4267.500000	0.000000	-5037.143032
-4243.500000	0.000000	-5037.143032
-4219.500000	0.000000	-5008.571254
-4195.500000	0.000000	-5037.143032
-4171.500000	0.000000	-5005.714286
-4147.500000	0.000000	-5037.143032
-4123.500000	0.000000	-5008.571254
-4099.500000	0.000000	-5040.000000
-4075.500000	0.000000	-5037.143032
-4051.500000	0.000000	-5037.143032
-4027.500000	0.000000	-5105.714460

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
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-3931.500000	0.000000	-4937.142857
-3907.500000	0.000000	-4971.428571
-3883.500000	0.000000	-4974.285540
-3859.500000	0.000000	-5620.000174
-3835.500000	0.000000	-5451.428571
-3811.500000	0.000000	-5382.857143
-3787.500000	0.000000	-5385.714111
-3763.500000	0.000000	-5174.285889
-3739.500000	0.000000	-5625.714111
-3715.500000	0.000000	-5145.714111
-3691.500000	0.000000	-4697.142857
-3667.500000	0.000000	-5074.285714
-3643.500000	0.000000	-5968.571254
-3619.500000	0.000000	-5140.000174
-3595.500000	0.000000	-5177.142857
-3571.500000	0.000000	-5108.571429
-3547.500000	0.000000	-5208.571603
-3523.500000	0.000000	-5211.428571
-3499.500000	0.000000	-5245.714286
-3475.500000	0.000000	-5177.142857
-3451.500000	0.000000	-5111.428397
-3427.500000	0.000000	-5145.714111
-3403.500000	0.000000	-5128.392857
-3379.500000	0.000000	-5139.955706
-3355.500000	0.000000	-5142.857143
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-3307.500000	0.000000	-5074.285714
-3283.500000	0.000000	-2811.428571
-3259.500000	0.000000	-5174.285889
-3235.500000	0.000000	-2811.428571
-3211.500000	0.000000	-5451.428571
-3187.500000	0.000000	-5074.285714
-3163.500000	0.000000	-2777.142857
-3139.500000	0.000000	-5108.571429
-3115.500000	0.000000	-5140.000174
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-3067.500000	0.000000	-4488.571603
-3043.500000	0.000000	-5108.571429
-3019.500000	0.000000	-5074.285714
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-2971.500000	0.000000	-5040.000000
-2947.500000	0.000000	-5002.857317
-2923.500000	0.000000	-5002.857317
-2899.500000	0.000000	-4971.428571
-2875.500000	0.000000	-2742.857143
-2851.500000	0.000000	-5005.714286

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Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-2827.500000	0.000000	-6211.428746
-2803.500000	0.000000	-5005.714286
-2779.500000	0.000000	-2742.857143
-2755.500000	0.000000	-4968.571603
-2731.500000	0.000000	-5008.571254
-2707.500000	0.000000	-5074.285714
-2683.500000	0.000000	-4971.428571
-2659.500000	0.000000	-4968.571603
-2635.500000	0.000000	-5002.857317
-2611.500000	0.000000	-5008.571254
-2587.500000	0.000000	-4974.285540
-2563.500000	0.000000	-4974.285540
-2539.500000	0.000000	-6042.857143
-2515.500000	0.000000	-2742.857143
-2491.500000	0.000000	-5005.714286
-2467.500000	0.000000	-4971.428571
-2443.500000	0.000000	-2742.857143
-2419.500000	0.000000	-4902.857143
-2395.500000	0.000000	-4902.857143
-2371.500000	0.000000	-4937.142857
-2347.500000	0.000000	-4831.428746
-2323.500000	0.000000	-5854.285714
-2299.500000	0.000000	-4902.857143
-2275.500000	0.000000	-4900.000174
-2251.500000	0.000000	-4902.857143
-2227.500000	0.000000	-4902.857143
-2203.500000	0.000000	-4902.857143
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-1891.500000	0.000000	-5282.856968
-1867.500000	0.000000	-4731.428571
-1843.500000	0.000000	-4868.571429
-1819.500000	0.000000	-4900.000174
-1795.500000	0.000000	-4868.571429
-1771.500000	0.000000	-4765.714286
-1747.500000	0.000000	-4900.000174
-1723.500000	0.000000	-4868.571429
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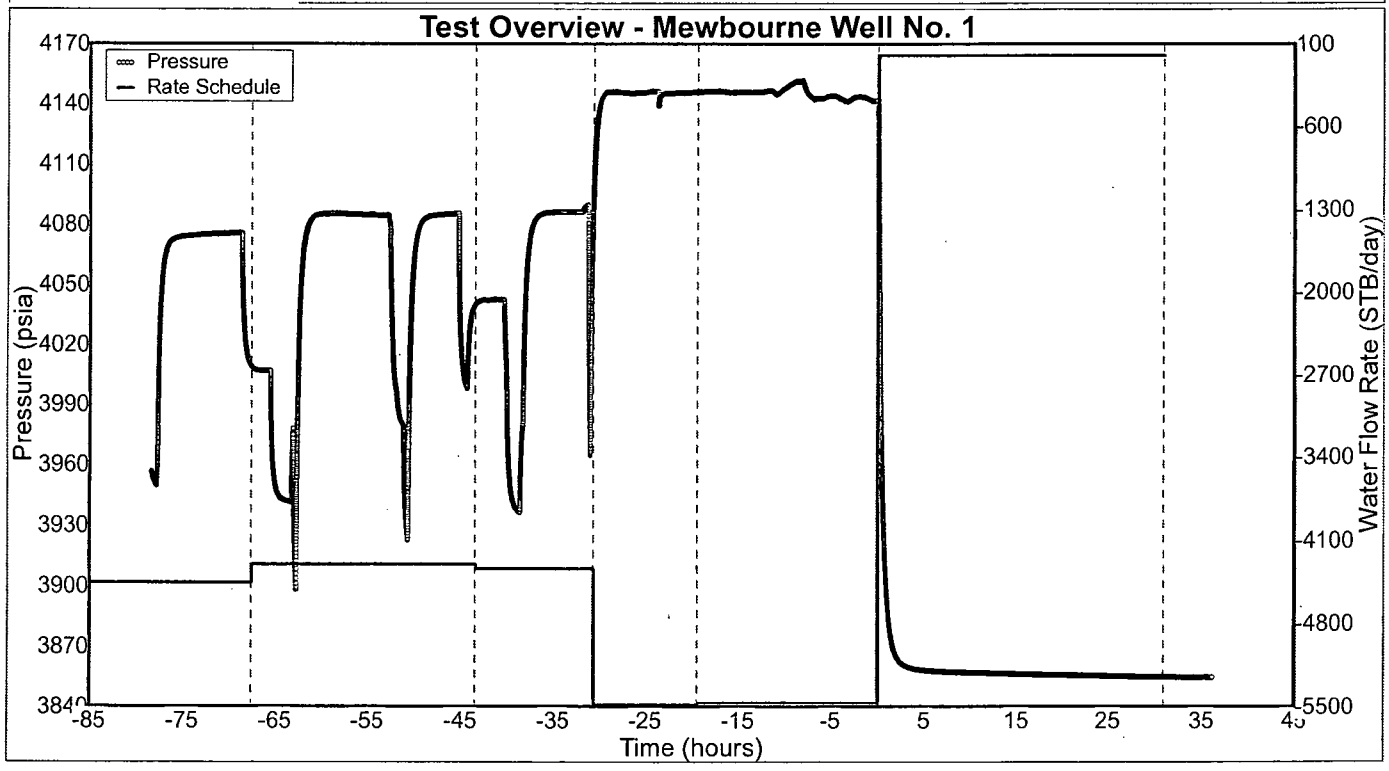
Time Hours	Pressure psia	Rate STB/day
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-1579.500000	0.000000	-4797.143032
-1555.500000	0.000000	-4800.000000
-1531.500000	0.000000	-4800.000000
-1507.500000	0.000000	-4731.428571
-1483.500000	0.000000	-4697.142857
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-1435.500000	0.000000	-4800.000000
-1411.500000	0.000000	-4831.428746
-1387.500000	0.000000	-4800.000000
-1363.500000	0.000000	-4837.142683
-1339.500000	0.000000	-2742.857143
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-1075.500000	0.000000	-4831.428746
-1051.500000	0.000000	-2708.571429
-1027.500000	0.000000	-4797.143032
-1003.500000	0.000000	-4765.714286
-979.500000	0.000000	-4800.000000
-955.500000	0.000000	-4800.000000
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-907.500000	0.000000	-4802.856968
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-859.500000	0.000000	-4731.428571
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-787.500000	0.000000	-4594.285714
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-643.500000	0.000000	-4734.285540
-619.500000	0.000000	-4765.714286
-595.500000	0.000000	-4728.571603
-571.500000	0.000000	-4731.428571
-547.500000	0.000000	-2708.571429
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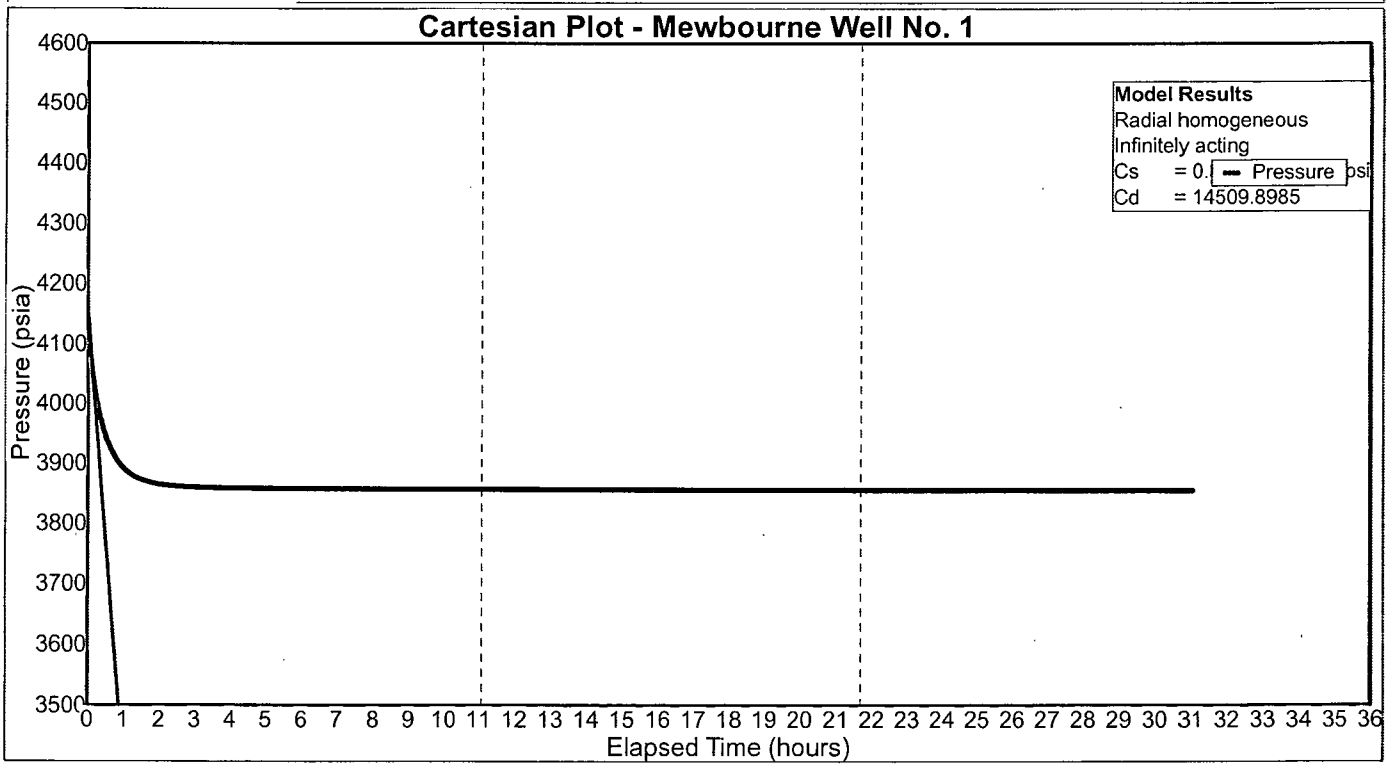
Rate Change Data (cont)

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-307.500000	0.000000	-4822.174851
-283.500000	0.000000	-4665.500000
-259.500000	0.000000	-4990.081184
-235.500000	0.000000	-4942.172619
-211.500000	0.000000	-4932.035714
-187.500000	0.000000	-4751.518023
-163.500000	0.000000	-4741.628886
-139.500000	0.000000	-4898.200397
-115.500000	0.000000	-4668.714368
-91.500000	0.000000	-4817.236028
-67.556421	4075.930664	-4453.633019
-43.473193	4085.119173	-4301.085152
-30.635319	4111.204427	-4338.133714
-19.379886	4145.851563	-5485.292571
-0.000011	4141.747120	-5470.539429
31.033530	3855.374219	0.000000

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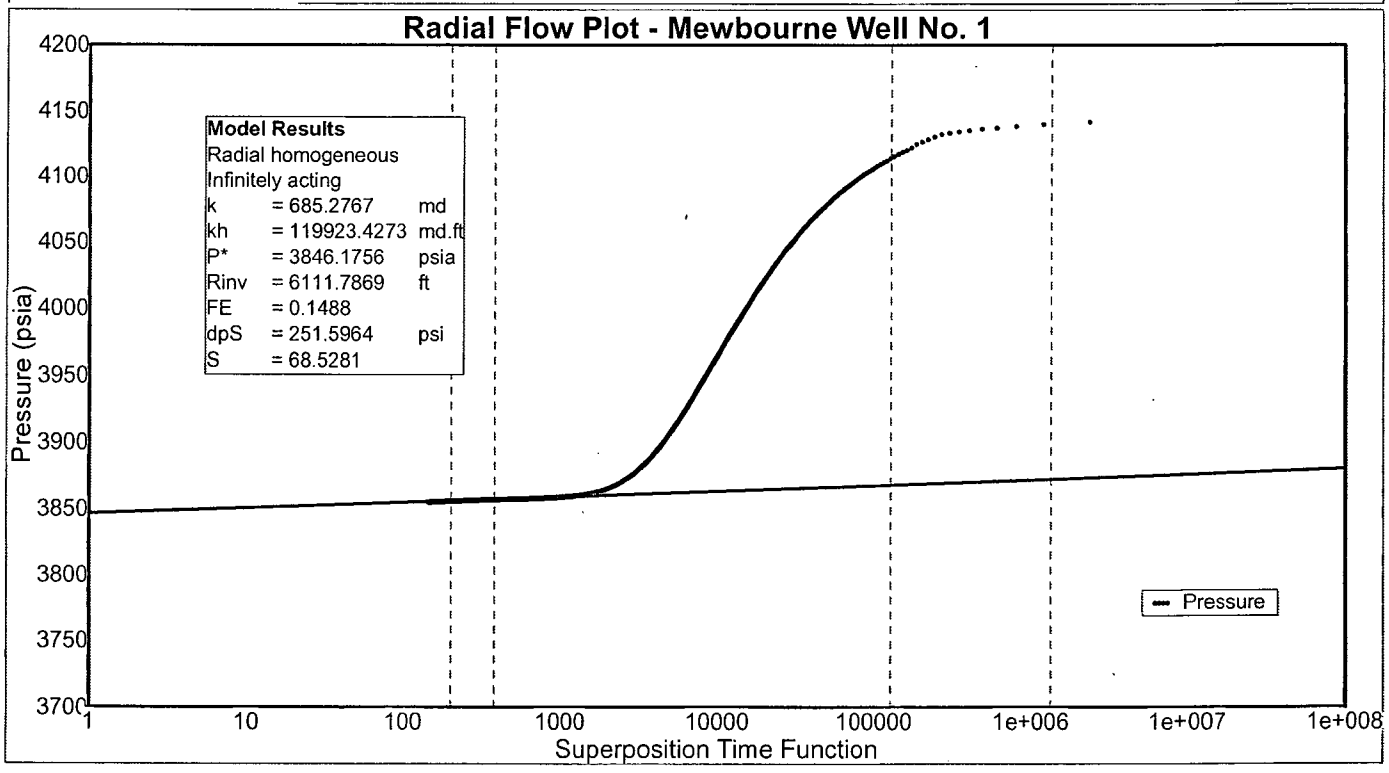
Cartesian Plot - Mewbourne Well No. 1 Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Wellbore storage coefficient	0.317159 bbl/psi
Dimensionless wellbore storage	1.4510e4

Cartesian Plot - Mewbourne Well No. 1 Line Details
Line type : Wellbore storage
Slope : -718.69
Intercept : 4142.2
Coefficient of Determination : 0.987644
Number of Intersections = 0

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Radial Flow Plot - Mewbourne Well No. 1 Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

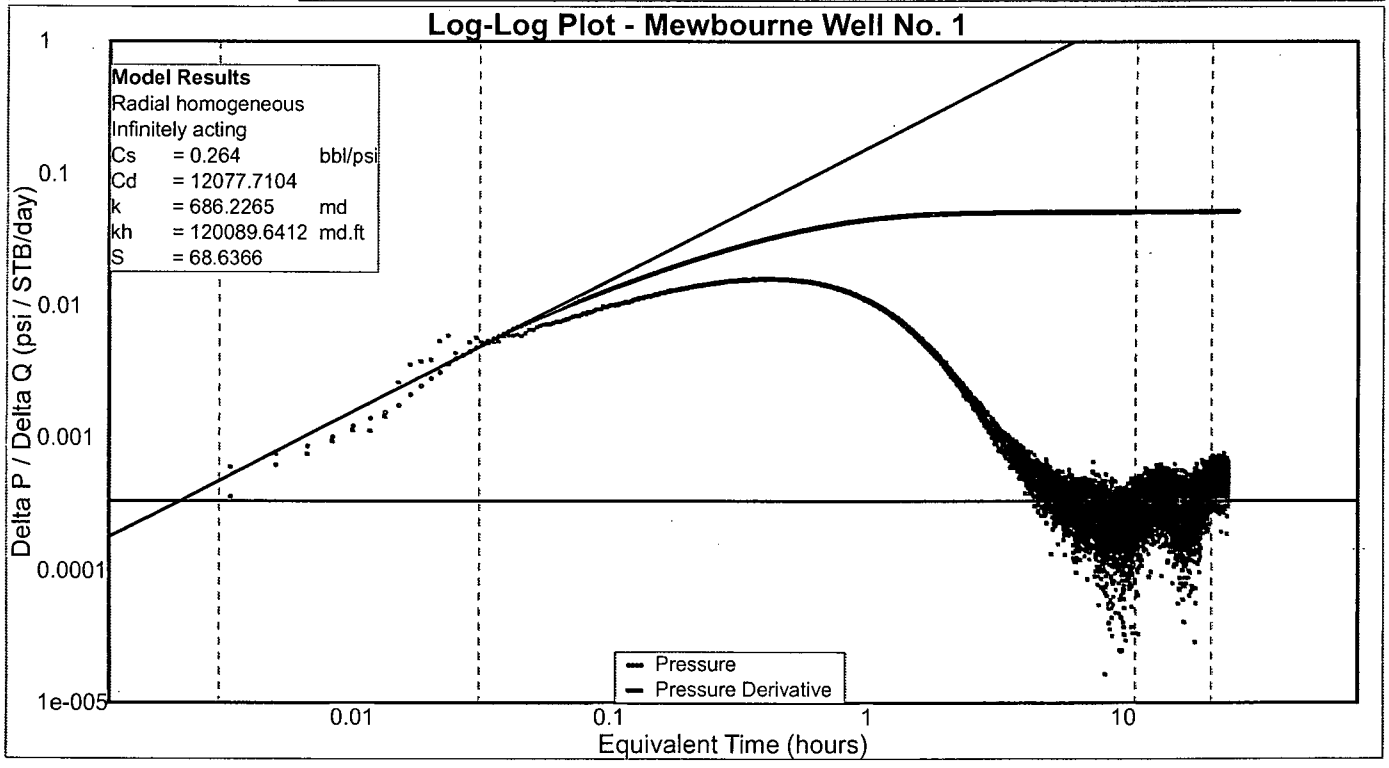
	Value
Permeability	685.276727 md
Permeability-thickness	1.1992e5 md.ft
Extrapolated pressure	3846.175567 psia
Radius of investigation	6111.786899 ft
Flow efficiency	0.148780
dP skin (constant rate)	251.596437 psi
Skin factor	68.528119

Radial Flow Plot - Mewbourne Well No. 1 Line Details
Line type : Radial flow
Slope : 4.22689
Intercept : 3846.18
Coefficient of Determination : Not Used

	Radial flow
Extrapolated pressure	3846.175567 psia
Pressure at dt = 1 hour	3861.389169 psia

Number of Intersections = 0

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Log-Log Plot - Mewbourne Well No. 1 Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Wellbore storage coefficient	0.263996 bbl/psi
Dimensionless wellbore storage	1.2078e4
Permeability	686.226521 md
Permeability-thickness	1.2009e5 md.ft
Skin factor	68.636593

Log-Log Plot - Mewbourne Well No. 1 Line Details
Line type : Radial flow
Slope : 0
Intercept : 0.0003351
Coefficient of Determination : Not Used
Line type : Wellbore storage
Slope : 1
Intercept : 0.157831
Coefficient of Determination : Not Used
Number of Intersections = 0

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EXHIBIT 6



EXHIBIT 6: CHANGES MADE TO 2011 TEST PLAN

Changes to 2012 Revised Test Plan:

Table of Contents

Removed: "Why does a Temperature Survey need to be Performed....3"
Added:

EXHIBIT 1: 2011 Annual Bottom Hole Pressure Survey
EXHIBIT 3: 2011 Annual Report
EXHIBIT 5: Historical Data 2010 and 2011 Falloff Test Results
Well No. 1 (Mewbourne)
Well No. 2 (Chukka)
Well No. 3 (Gaines)

EXHIBIT 6: Changes to 2011 Test Plan

Removed from 2011 Revised Test Plan:

Why does a temperature survey need to be performed?

From New Mexico Oil Conservation Division (OCD) UIC Manual

20.6.2.5204 MECHANICAL INTEGRITY FOR CLASS I NON-HAZARDOUS WASTE INJECTION WELLS AND CLASS III WELLS:

A. A Class I non-hazardous waste injection well or Class III well has mechanical integrity if there is no detectable leak in the casing, tubing or packer which the secretary considers to be significant at maximum operating temperature and pressure; and no detectable conduit for fluid movement out of the injection zone through the well bore or vertical channels adjacent to the well bore which the secretary considers to be significant.

B. Prior to well injection and at least once every five years or more frequently as the secretary may require for good cause during the life of the well, the discharger must demonstrate that a Class I non-hazardous waste injection well or Class III well has mechanical integrity. The demonstration shall be made through use of the following tests:

20.6.2 NMAC 42

(1) For evaluation of leaks,

(a) Monitoring of annulus pressure (after an initial pressure test with liquid or gas before operation commences), or

(b) Pressure test with liquid or gas;

(2) For determination of conduits for fluid movement,

(a) The results of a temperature or noise log, or

(b) Where the nature of the casing used for Class III wells precludes use of these logs, cementing records and an appropriate monitoring program as the secretary may require which will demonstrate the presence of adequate cement to prevent such movement;

Temperature surveys are performed every 5 years.

SECTION II – Regulatory Citation

Added:

"This can be seen in the historical data acquired from the 2010 and 2011 falloff test data (Exhibit V)"

SECTION III - Developing a Test Plan

Revised from the 2011 Test Plan:

"Well No. 2 Chukka Total Waste Fluid Generated: 46,629 bbls" This was revised from 49,629 bbls.

Removed from the 2011 Test Plan:

5. "With the well still shut in, run a temperature survey from top of fluid level to the fill. "

From 2011 Test Plan:

The following schedule is proposed after approval of test plan:

Testing of Well No. 1 (Mewbourne) on the second week of November 2011.

Testing of Well No. 2 (Chukka) on the third week of October 2011;

Testing of Well No. 3 (Gaines) on the second week of December 2011;

From 2012 Test Plan:

The following schedule is proposed after approval of test plan:

Testing of Well No. 1 (Mewbourne) on the second week of September 2012.

Testing of Well No. 2 (Chukka) on the first week of October 2012;

Testing of Well No. 3 (Gaines) on the third week of October 2012;

An annulus pressure test will be performed on WDW-1, WDW-2, and WDW-3 prior to falloff testing during the second week of September 2012.

Revised From 2011 Test Plan:

Mewbourne Well No. 1: "Total Waste Fluid Gain for the Test Period 35,486 bbls" This was revised from 35,489 bbls.

Revised From 2011 Test Plan:

Chukka Well No. 2: "Total Waste Fluid 46,629 bbls" This was revised from 49,629 bbls

Removed From 2011 Test Plan:

Chukka Well No. 2:

"Following the pressure falloff, a temperature survey will be performed from the surface to the top of the fill. An additional pressure test will be performed. A pump track will pump brine water in the annulus to 600 psi and the annulus pressure will be recorded using a chart recorder for 30 minutes."

Removed from 2011 Test Plan:

Gaines Well No. 3: "Following the pressure falloff, a temperature survey will be performed from the surface to the top of the fill."

Revised from 2011 Test Plan:

SECTION IV - Scheduling of Test and Report

"It is currently estimated that the Test Plan will be submitted to OCD for approval the end of August 2012. Subsequently, after approval, the field work will be performed in September, and October. The report will be submitted 30 days thereafter for each individual well."

SECTION VI – Background Information

D: Size, type, and depth of casings:

Added to the 2012 Test Plan:

Well No. 3:

Surface Casing: 13 5/8" set at 400', 54.5 lb/ft, J-55, LT&C

Intermediate Casing: 9 5/8" set at 2,600',36 lb/ft, J-55, ST&C

Protection Casing: 7" set at 9450', 26 lb/ft N-80 & 29 lb/ft P-110

F: Top and bottom perforation/completion depths including the size of perforation holes and date perforated:

Added to the 2012 Test Plan:

Well No. 2: Zone 2 – 7858'-7880'

Removed from 2011 Test Plan:

"To show that the wells are hydraulically connected it is proposed that each well be isolated and interference test be completed on each well set. This is to be accomplished by shutting in all the wells for a 24 hour period, placing bottom hole pressure gauges in each well. At the end of the 24 hour shut-in period initiate injection into the closest offset well at the maximum rate for a period of four hours and shut-in the well for four hours. The offset injection well should have the cycle repeated a minimum of three times.

The proposed procedure would have bottom hole pressure gauges in all three wells after the 24 hour shut-in period, injection would commence on the number three well for a period of four hours and then be shut-in for four hours, inject for another four hours and shut-in for another four hours, inject for four more hours and shut-in for four more hours. Repeat this injection

process on the number two well and then repeat this injection process on the number one well. Pull all gauges and analyze the pressure data.

If the analysis shows good communication between the wells it will be proposed that falloff testing be completed on one well per year with an interference test being completed at the end of the falloff testing. The interference test at the end of the falloff testing will show that the wells continue to stay in communication and that the falloff data represents the reservoir parameters as they exist throughout the reservoir from well to well. This would eliminate the need to test each well individually to obtain the reservoir data allowing the required annual reservoir data to be collected at one well rather than at three."

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Wednesday, October 19, 2011 4:06 PM
To: 'Moore, Darrell'
Cc: Sanchez, Daniel J., EMNRD; VonGonten, Glenn, EMNRD; Dade, Randy, EMNRD
Subject: Navajo Refining Company UIC Class I (NH) Injection Wells WDWs 1, 2 & 3 (UICI-008) Fall Off Test Plan (August 2011)

Darrell:

The New Mexico Oil Conservation Division (OCD) is in receipt of your above subject test plan. OCD has already approved the Fall-Off Test (FOT) Plan with conditions on July 28, 2009. The OCD notes that it is also in the process of reviewing C-103s Sundry Notices for the upcoming FOTs.

OCD observes some changes in this FOT Plan submittal that are not acceptable to the OCD. For example, Exhibit 1 is not an acceptable exhibit to the OCD for reasons specified in the 2010 FOT report review and later during the May 2011 meeting in Santa Fe. However, the operator continues to submit exhibits with certain assumptions that have not been accepted or approved by the OCD, i.e., that the injection wells are show interconnection with the injection zone during past FOTs. Perhaps the operator can conduct the 2011 FOT with the information and exhibits needed to prove the interconnection of injection wells with the injection zone? The Certified PE should provide the exhibits in the 2011 FOT Report with the analysis and conclusions supporting any claims for the OCD to review and consider before approving. This is apparently a FOT frequency per well issue that the operator is attempting to prove.

The OCD provides the following comments, observations, and/or recommendations on the above subject plan below.

Comments:

- The OCD approved the original Fall-Off Test (FOT) Plan based on OCD Guidance dated December 3, 2007. There should not be any significant changes to this FOT Plan because it is flexible where needed to allow operators to implement it on each injection well.
- OCD likes to be notified to witness the installation of bottom hole gauges and to be present at least one hour before injection shut-off and commencement of FOT monitoring.
- OCD is concerned about the Section VI No. 1(e) WDW-3 Cement Bond Log quality being poor from 900 ft. to 1200 ft- especially at the depths: 2662 – 2160; 4876 – 5372; and 6750 – 7600 ft. micro annulus scenario.

Observations:

- Section V No. 2: The objective of the FOT is NOT to achieve or limit a 100 psig pressure differential before vs. after FOT injection vs. shut-off, but it is a minimum pressure differential that OCD stipulates in its guidance for a successful FOT and injection zone that may still continue to be utilized for disposal, i.e., not too pressured up and subject to continued fracturing under daily allowed maximum surface injection pressure operational limits.
- Section V No. 7 and Exhibit 1: OCD observes a bottom hole pressure chart for WDWs 1, 2 and 3 at 7660 feet that the operator presented in the 2010 FOT and again during a May 2011 meeting in Santa Fe, New Mexico to show the interconnection between injection wells and the injection formation. The OCD had commented that there was no explanation or conclusion provided from the Certified PE who conducted and completed the 2010 FOT report that supports the operator's claim that all injection wells are interconnected based on Exhibit 1.

  Furthermore, the OCD requested a statement or information supporting the operator's claim by the Certified PE, but never received one. At the meeting, the OCD explained that based on Exhibit 1, there was no support for the claim. In order to make the interconnection determination, during each FOT at each well and off-set injection wells (WDWs not being FOT'd) before and throughout the FOT would need bottom hole pressures monitored in tandem at each well location to establish the interconnectivity of the injection wells with the receiving injection formation under a uniform time scale. This would be a chart that could be plotted that would show during the test the interconnectivity of the wells for each FOT. The OCD doubts that the operator can make the case for interconnectivity between injection wells and injection formation because of the significant distance between the injection wells and fact that sedimentation in formation varies laterally and uniformity in sedimentation, saturated porosity and permeability due to variation in sedimentation would by chance make the injection formation aerially extensive and uniform over a 3 to 5 mile radius from each injection well. Also, even if by chance there was

uniformity over the mileage specified, the distance between injection wells and corresponding pressure would likely not be observed.
- Exhibit 6: OCD observes in Section B a proposed MIT once every 5 years. OCD's UIC Program requires annual MITs and/or after down hole work is performed on a well.

Recommendations:

- Operator is running survey logs to the bottom of fill or below USDW (fresh water) zones, which excludes an evaluation of casing in the fresh water zone. Please run logs up to surface.
- Be sure to also record and provide injection flow rate and pressure leading up to shut-off and monitoring throughout the FOT monitoring period. OCD needs to confirm that a pseudo steady-state condition was achieved before shut-off. This data is also needed for software modeling of the FOT.
- Please provide electronic data from the FOTs at each well in order for the OCD to run its software model to confirm the results in the report.
- Section V No. 13: Surface pressure monitoring and Horner Plot during injection should be used to confirm radial flow condition is achieved instead of waiting a set period if operator wishes to reduce the injection period.

Disclaimer: *Please be advised that OCD has already approved with conditions Navajo Refining Company's Fall-Off Test (FOT) Plan on July 28, 2009, and is not providing approval of this FOT Plan; however, comments, observations and recommendations herein should help Navajo Refining Company understand the OCD's concerns based on the submittal.*

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
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"Why not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward with the Rest of the Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at:
http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Friday, July 01, 2011 8:48 AM
To: 'Lackey, Johnny'; 'Moore, Darrell'
Cc: Sanchez, Daniel J., EMNRD; Dade, Randy, EMNRD
Subject: FW: UICI-8 MIT Explanation Due
Attachments: UICI-8 MIT Explanation Due

Johnny and Darrell:

Good morning. The OCD has not received a response to its request for a signed PE opinion on the anomalous differential annulus pressures occurring in WDWs 1, 2 and 3. At the /31 meeting in Santa Fe OCD requested this information by COB on 6/10. Was this sent? If not, when can Navajo Refining Company have its down hole PE Expert provide an opinion for OCD review?

Also, OCD requested a response to the annual Fall-Off Test (FOT) performed in 2010 related to your request for a reduced FOT schedule for the aforementioned WDWs. The response was expected by 6/30 or early July 2011 (5/31 Mtg. in Santa Fe). When can OCD expect to receive this?

Please contact me if you have questions. Thank you.

File: OCD Online WDWs "Annual Report" and "FOT" Thumbnails

Carl J. Chavez, CHMM
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Oil Conservation Division, Environmental Bureau
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"Why not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward with the Rest of the Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at:
http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

Chavez, Carl J, EMNRD

Subject: UICI-8 MIT Explanation Due
Location: Office

Start: Fri 6/10/2011 4:00 PM
End: Fri 6/10/2011 4:30 PM

Recurrence: (none)

Organizer: Chavez, Carl J, EMNRD

OCD requested PE explanation for variation in annulus pressure in WDWs 1, 2 & 3 due by today that would explain why OCD should not consider wells failing MIT.

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, June 14, 2011 10:53 AM
To: 'Patterson, Bob'; 'Dan Gibson'; 'Moore, Darrell'; 'Lackey, Johnny'; 'Schmaltz, Randy'
Cc: Dade, Randy, EMNRD; Perrin, Charlie, EMNRD; VonGonten, Glenn, EMNRD
Subject: New Mexico UIC Class I (non-hazardous) Well MIT & Annual Fall-Off Test Scheduling with Completion by September 30, 2011

Gentlemen:

Re:

Key Energy Services: UICI-005
Navajo Refining Company: UICI-008; UICI-008-0 & UICI-008-1
Western Refining Southwest, Inc.: UICI-009

Good morning. It is that time of year again to remind operators that their annual MITs and Fall-Off Tests (FOT) for this season must be completed by 9/30/2011. The list of operator names w/ associated UIC Class I (non-hazardous) Wells are provided above.

Operators are aware of the MIT (30 min @ 300 psig or more w/ Bradenhead) requirement(s) that are typically run concurrently (usually before the FOT) with the FOT and more frequent where required.

The FOTs span several days with a couple of important notes to operators from past testing, please install your bottom hole gauge(s) with recorder(s) at least 48-hours in advance of the pump shut-off during the steady-state injection period. Also, you are accountable for your OCD approved FOT Test Plan and the requirements in the UIC Test Guidance at http://www.emnrd.state.nm.us/ocd/documents/UICGuidance.pdf.

You may access your well information on OCD Online either by API# and/or Permit Number at http://ocdimage.emnrd.state.nm.us/imaging/AEOrderCriteria.aspx and http://www.emnrd.state.nm.us/OCD/OCDPermitting/Data/Wells.aspx. For information on New Mexico's UIC Program and training information, please go to: http://www.emnrd.state.nm.us/ocd/Publications.htm.

Please contact me at (505) 476-3490 on or before June 30, 2011 to schedule your preferred MIT and FOT date and time. I will work to finalize the witness schedule with each of you. Thank you in advance for your cooperation.

File: Class I (non-hazardous) Well Files UICI- 5, 8, 8-0, 8-1 & 9

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http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, August 24, 2010 9:08 AM
To: Dade, Randy, EMNRD
Cc: 'Moore, Darrell'; Lackey, Johnny; Rusty Smith
Subject: FW: Navajo Refining Company (UICI-8; UICI-8-1 & UICI-8-0) Annual Fall-Off Test (FOT) Electronic Test Data Request Work Plan & OCD Clarifications

FYI, in case OCD Artesia is available to witness important aspects of a fall-off test. I am copying Navajo Refining Company (NRC) so they are aware of OCD aspects and/or concerns associated with their FOT and recent work plan submittal for the upcoming FOTs. I think we will have to wait and see how this year's annual FOT results go on these wells to make a final determination of whether it will be approvable for next year and beyond.

The annual FOT for WDWs 1, 2 and 3 will begin one well per month in September 2010 and end in November 2010. Some important aspects of the tests to observe or witness are bottom hole gauge installation at least 48 hours in advance of well shut-in; the period prior to injection shut-in and FOT monitoring for confirmation that a steady-state injection rate condition was achieved (NRC should be monitoring T,P&Q during the 48 hrs. leading up to FOT monitoring); instant or quick shut-off of flow into the well was achieved; and to observe bottom-hole pressure differential after shut-off. If steady-state injection is not achieved coupled with instant shut-off, the test results may be compromised. In addition, there should be some noticeable fall-off in pressure in the injection zone and OCD has required at least 3 days of monitoring to see the pressure fall off. NRC maintains that they need about 24 hours to show the pressure drop off, and this may be acceptable, but we will have to see the test results. There is concern that they may not be creating the pressure buildup necessary to create a pressure differential that will adequately characterize the characteristics of the injection zone, and NRC has formulated some flow rates per well that should create the pressure buildup needed to be consistent and/or comparible with past FOTs.

There are a couple of concerns identified in the FOT work plan (work plan) that I am copying Navajo Refining Company (NRC) so they are aware. The concerns are:

1) A steady-state injection condition must be achieved in advance of system shut-off and FOT monitoring. The shut-off should also be instantaneous or quick. Bottom hole temperature, pressure and flow rates should be recorded for 48 hours before shut-in of injection to the well.
2) On page 9 of the work plan, the goal is **NOT** to achieve a pressure differential of 100 psi before and after injection shut-in, but OCD uses this rule of thumb for an over pressured injection zone condition if the pressure differential approaches just 100 psi. Therefore, NRC's flow rates in the work plan must create sufficient pressure buildup in the injection zone to allow FOT monitoring to record true injection zone characteristics. In past FOT monitoring, there has been a significant pressure differential realized indicating the injection zone has good porosity, transmissibility, etc.
3) NRC must ensure that it submits C-103s for all work performed on each of its disposal wells, i.e., Page 11 No. 10 in the work plan indicates that NRC performed acid stimulation on WDWs 1, 2, and 3. It must also submit C-103s for each well it performs work to for final OCD approvals of their FOTs.
4) Page 12 No. 15 of the work plan seems to indicate that NRC's goal is to achieve a pressure differential at FOT monitoring of about 100 psi. Again, per No. 2 above, this is not the goal. We should see a significant pressure drop over the FOT monitoring period, and if it is not consistent with past FOT monitoring results, then NRC's request for a shorter FOT monitoring period may fail in providing true injection zone characteristics.

Please contact me if you have questions. Thanks.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Chavez, Carl J, EMNRD
Sent: Tuesday, August 10, 2010 8:21 AM
To: 'Moore, Darrell'
Cc: Lackey, Johnny; 'Ken Davis'; Rusty Smith; Jones, William V., EMNRD
Subject: RE: Annual Fall-Off Test Electronic Test Data Request

Darrell:

Approved. Let's get the tests wrapped up in November 2010 and let OCD know when you want to run the pulse tests for the proposed one well fall-off test to be performed annually consideration for approval. Also, you will need to submit a C-103 and reference your approved fall-off test plan.

One important note is that OCD wants the bottom hole gauges installed a minimum of 48 hours in advance of fall-off test monitoring. We want pressure and flow rate data to verify that a steady-state injection condition was reached and also for the software evaluation. I think I shared this with you recently on things OCD noticed last year on the fall-off test.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM
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Oil Conservation Division, Environmental Bureau
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Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Moore, Darrell [mailto:Darrell.Moore@hollycorp.com]
Sent: Tuesday, August 10, 2010 8:09 AM
To: Chavez, Carl J, EMNRD
Cc: Lackey, Johnny; 'Ken Davis'; Rusty Smith
Subject: RE: Annual Fall-Off Test Electronic Test Data Request

Carl

We are scheduling the fall off tests in September, October and November...much like last year. One well each month. The procedure we Fed-Exed you last week is our preferred plan of action. We are waiting for OCD's approval of that plan to finalize the timing of the tests. The electronic data on CD will be no problem.

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Tuesday, August 10, 2010 6:20 AM
To: Moore, Darrell
Cc: Lackey, Johnny
Subject: Annual Fall-Off Test Electronic Test Data Request

Darrell:

Good morning. Similar to last year's fall-off test and electronic data submittal, OCD needs the CD with the electronic data for our software evaluation from this year's test.

Please contact me if you have questions. Thanks.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
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Office: (505) 476-3490

Fax: (505) 476-3462
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(Pollution Prevention Guidance is under "Publications")

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Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, July 13, 2010 11:22 AM
To: 'Moore, Darrell'
Subject: UICI-Class I WDW-1 and WDW-2 MITs w/ Bradenheads to be completed by 9/30/2010 + Annual Fall-Off Test Scheduling

Darrell:

Good morning. FYI, OCD records indicate that MITs are needed for WDW-1 and WDW-~~3~~ 2 by 9/30/2010.

Also, I have not heard when Navajo Refining Company is scheduling the Annual Fall-Off Test, which also needs to be completed by 9/30/2010. I presume the above wells could be MIT'd before at the time of and before the FOT.

Please advise or clarify.

Thank you.

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(Pollution Prevention Guidance is under "Publications")

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Friday, April 23, 2010 7:25 AM
To: 'Patterson, Bob'; 'Dan Gibson'; 'Moore, Darrell'; 'Lackey, Johnny'; 'Schmaltz, Randy'
Cc: Dade, Randy, EMNRD; Perrin, Charlie, EMNRD
Subject: New Mexico UIC Class I (non-hazardous) Well MIT & Annual Fall-Off Test Scheduling with Completion by September 30, 2010

Gentlemen:

Re:

Key Energy Services: UICI-005
Navajo Refining Company: UICI-008; UICI-008-0 & UICI-008-1
Western Refining Southwest: BW-028

Good morning. It is that time of year again to remind operators that their annual MITs and Fall-Off Tests (FOT) for this season must be completed by 9/30/2010. The list of operator names w/ associated UIC Class I (non-hazardous) Wells are provided above.

Operators are aware of the MIT (30 min @ 300 psig or more w/ Bradenhead) requirement(s) and more frequent where required.

The FOTs span several days with a couple of important notes to operators from past testing, please install your bottom hole gauge(s) with recorder(s) at least 48-hours in advance of the pump shut-off during the steady-state injection period. Also, you are accountable for your OCD approved FOT Test Plan and the requirements in the UIC Test Guidance at http://www.emnrd.state.nm.us/ocd/documents/UICGuidance.pdf.

You may access your well information on OCD Online either by API# and/or Permit Number at http://ocdimage.emnrd.state.nm.us/imaging/AEOrderCriteria.aspx and http://www.emnrd.state.nm.us/OCD/OCDPermitting/Data/Wells.aspx. For information on New Mexico's UIC Program and training information, please go to: http://www.emnrd.state.nm.us/ocd/Publications.htm.

Please contact me at (505) 476-3490 on or before May 7, 2010 to schedule your preferred MIT and FOT date and time. I will work to finalize the witness schedule with each of you. Thank you in advance for your cooperation.

Copy: Class I (non-hazardous) Well Files UICI- 5, 8, 8-0, 8-1 & 9

Carl J. Chavez, CHMM
UIC Quality Assurance and Quality Control Officer
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
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REFINING COMPANY, LLC

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(575) 746-5451 ENV/PURCH/MKTG
(575) 746-5421 ENGINEERING

October 27, 2009

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division
Environmental Bureau
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

RE: 2009 Annual Bottom-Hole Pressure Fall Off Test for WDW-3
Navajo Refining Co., LLC

Dear Carl,

Enclosed, please find the fall off test report for our WDW-3 (Gaines Well No. 3). If there are any questions concerning this submission, please call me at 575-746-5281.

Sincerely,

NAVAJO REFINING COMPANY, LLC

Darrell Moore
Environmental Manager for Water and Waste

Encl:

File: Injection Wells Technical Analytical Data 4A2F

SUBSURFACE

2009 ANNUAL BOTTOM-HOLE PRESSURE SURVEY AND PRESSURE FALLOFF TEST FOR GAINES WELL NO. 3

NAVAJO REFINING COMPANY
Artesia, New Mexico

Subsurface Project No. 70A6365

September 2009

Prepared By:

SUBSURFACE CONSTRUCTION CORP.
6925 Portwest Dr., Suite 110
Houston, Texas 77024

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FIGURE 18: Gaines Well No. 3 Static Pressure Gradient Survey

APPENDICES

APPENDIX A: Dual Induction Log Sections from 7,660 feet to 8,620 feet

APPENDIX B: Neutron Density Log Sections from 7,660 feet to 8,620 feet

APPENDIX C: Compressibility of Fluid

APPENDIX D: Compressibility of Pore Volume

APPENDIX E: Gaines Well No. 3 2006 Temperature Log Sections from 7,660 Feet to 8,620 Feet

APPENDIX F: Water Viscosities at Various Salinities and Temperatures

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CERTIFICATION STATEMENT

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attached documents, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

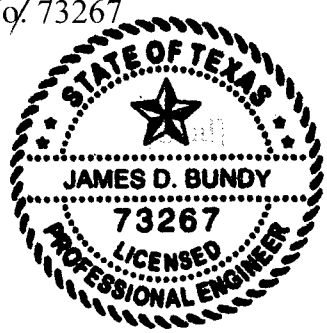
I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Client: Navajo Refining Company
Well Name: Gaines Well No. 3
Test Date(s): August 24 – August 30, 2009

Name: James D. Bundy, P.E.
Title: Director of Engineering

Phone Number: 713-880-4640

Signature _____ Date Signed 10/11/09
Texas Registration No. 73267



This P.E. Seal is specifically limited to the designs presented on this drawing or report that were performed under the direct supervision of the Engineer signing hereof, and does not incorporate or relate to any work or designs performed by others. Engineer makes no representations and has no liability hereof as to any work or designs or specifications performed by others.

SUBSURFACE

EXECUTIVE SUMMARY

Subsurface Construction Corp (Subsurface) was contracted by Navajo Refining Company (Navajo) to perform a pressure falloff test and bottom-hole pressure survey on Navajo's Gaines Well No. 3. The test was performed according to New Mexico Oil Conservation Division (OCD) falloff test guidelines (*New Mexico Oil Conservation Division UIC Class I Well Fall-Off Test Guidance, December 3, 2007*).

The test provides the state regulatory agency with the necessary information to access the validity of requested or existing injection well permit conditions and satisfy the permitting objective of protecting the underground sources of drinking water (USDW). Specifically, 40 CFR Part 146 states "the Director shall require monitoring of the pressure buildup in the injection zone annually, including at a minimum, a shutdown of the well for a time sufficient to conduct a valid observation of the pressure fall-off curve" (40 CFR § 146.13 for Non-hazardous Class I Wells)

The falloff testing was conducted according to the test plan submitted and approved by the OCD. The test plan stated that all offset wells that inject into the injection interval would be shut-in for the duration of the test period. The testing consisted of a 72-hour injection period and a 72-hour falloff period. Bottom-hole gauges were also placed in the offset wells Mewbourne Well No. 1 and Chukka Federal Well No. 2. These wells are owned by Navajo and are also used to inject plant waste into the same intervals that the Gaines Well No. 3 injects into.

As prescribed by the guidelines, the report discusses supporting and background information in Sections 1 through 9. The one mile area of review (updated since the 2008 falloff testing) is discussed in Section 10 and geology in Section 11. Information on the offset wells is discussed in Section 12, daily testing activities in Section 13, and point of shut-in, in Section 14. The pressure falloff testing and analysis results are discussed in Sections 15. The OCD required record keeping statement is discussed in Section 16.

1. FACILITY INFORMATION

a. Name: Navajo Refining Company (subsidiary of the Holly Corporation)
b. Facility Location: Highway 82 East, Artesia, New Mexico 88211
c. Operator's OGRD Number: Section 1, Township 18 South, Range 27 East

2. WELL INFORMATION

a. OCD UIC Permit Number: UIC-CLI-008-3
b. Well Classification: Class I Non-hazardous
c. Well Name and Number: Gaines Well No. 3
d. API Number: 30-015-26575
e. Well Legal Location: 760 FSL, 2250 FWL

3. CURRENT WELLBORE SCHEMATIC

The Gaines Well No. 3 wellbore schematic is presented in Figure 1. The schematic has all data as requested by the guidelines and includes the following:

a. Tubing: 4-1/2-inch, 11.6 pound per foot, steel construction, API grade J-55, with long thread connections (LTC).
b. Packer: Arrow X-1, 7-inch by 2-7/8-inch set in tension (37,000 pounds) at 7,575 feet.
c. Tubing Length: 7,568 feet with a 0.54-foot, 4-1/2-inch by 2-7/8-inch crossover in the top of the packer. There are no profile nipples in the tubing or the packer as this was not a requirement of the permit.
d. Size, Type, and Depth of Casing: There are four casing strings in the well and one below the injection interval. The information for these casing strings was obtained from OCD records on file with the state and geophysical logs. The casing strings are:

    i. 13-3/8-inch, 54.5 pound per foot, steel construction, API grade J-55, with short thread connections (STC), set at a depth of 400 feet. The casing was cemented to the surface with 425 sacks of cement. The casing was set in open hole with a diameter of 17.5 inches. This information was obtained from OCD records.

ii. 9-5/8-inch, 36 pound per foot, steel construction, API grade J-55, STC, set at a depth of 2,600 feet. The casing was cemented to the surface with 1,025 sacks of cement. The casing was set in open hole with a diameter of 12.25 inches. This information was obtained from OCD records.

iii. 7-inch, 26 pound per foot and 29 pound per foot, steel construction, API grade N-80 and P-110, STC, set at a depth of 9,450 feet. The casing was cemented with 1,350 sacks of cement to 900 feet from surface. The casing was set in open hole with a diameter of 8.75 inches. The top cement and weight of the pipe was verified with a CBL and caliper log run on October 13, 2006. The remainder of the information was obtained from OCD records.

iv. Below the cement plug at 9,022 feet is the top of a 4-1/2-inch liner. The liner is a string of 4-1/2-inch casing installed to a depth of 10,119 feet. There is a cast iron bridge plug set in the liner at 9,800 feet, which is above the original perforations, between 9,861 feet and 9,967 feet. The current injection interval is above the plug at 9,022 feet. The cement plug also isolates the lower section of the original wellbore. This information was obtained from OCD records.

e. The top of cement was determined from a CBL run in the 7-inch casing string on October 13, 2006. The top of cement in the 7-inch casing was found at 900 feet below the surface. The top of cement in the 9-5/8-inch and 13-3/8-inch casing strings was verified through OCD records and volume calculations.

f. The 7-inch casing was perforated on October 14 and October 15, 2006. The casing was perforated with a 0.5-inch diameter hole at 2 shots per foot on a 60° phasing. The perforations are located between 7,660 feet and 8,450 feet and from 8,540 feet to 8,620 feet.

g. The total depth of the well is 10,119 feet with the plug back depth at 9,022 feet. On August 30, 2009 fill was tagged at 8,986 feet.

h. The bottom-hole pressure gauges consisted of one surface readout (SRO) pressure gauge and memory readout (MRO) backup pressure gauge. The SRO was placed

at 7,660 feet (top of the perforations) and the MRO was placed three feet lower at 7,663 feet.

4. ELECTRIC LOG ENCOMPASSING THE COMPLETED INTERVAL

The dual induction log is presented in Appendix A and encompasses the completed interval between 7,660 feet and 8,620 feet. The dual induction log was submitted to the OCD with the original permit after the well was drilled by the Mewbourne Oil Company. The log was resubmitted to the OCD when the well was re-permitted as a Class I injection well.

5. RELEVANT PORTIONS OF POROSITY LOG USED TO ESTIMATE FORMATION POROSITY

The neutron density log is presented in Appendix B and encompasses the completed interval between 7,660 feet and 8,620 feet. The neutron density log was submitted to the OCD with the original permit after the well was drilled by Mewbourne Oil Company. The log was resubmitted to the OCD when the well was re-permitted as a Class I injection well. The porosity of the formation, 10%, and the reservoir thickness, 175 feet, were determined from this log. These values were used in the analysis of the pressure falloff data (Section 15). Additional information concerning the geology of the injection reservoir is discussed in Section 11.

6. PVT DATA OF THE FORMATION AND INJECTION FLUID

The Gaines Well No. 3 was recompleted in October 2006, prior to the issuance of the current well testing guidelines (December 3, 2007). At the time, no directives were in place to test formation fluids or derive formation characteristics from cores. However, reservoir fluid samples were obtained and the density and total dissolved solids (TDS) were measured at 1.03 g/l and 26,500 mg/l, respectively. The analytical results of the analysis of the formation fluid are summarized in Table I.

The viscosity of the formation fluid, formation water compressibility, and total system compressibility were estimated in reference to bottom-hole temperature using industry accepted correlations. These correlations are found in the Society of

Petroleum Engineer's "Advances in Well Test Analysis, Monograph Volume 5" and "Pressure Buildup and Flow Tests in Wells, Monograph Volume 1".

a. Estimation of formation fluid and reservoir rock compressibility:

The fluid compressibility of the formation brine was estimated for a sodium chloride solution (26,500 mg/l) at the bottom-hole temperature of 127°F using Appendix C (Figure D.16 SPE Monograph 5). This value was 2.9 x 10^{-6} psi^{-1}. The formation pore volume compressibility was estimated using Appendix D (Figure G.5 SPE Monograph 1). This value was 5.5 x 10^{-6} psi^{-1}. The total system compressibility is the sum of the fluid compressibility and the pore volume compressibility, 8.4 x 10^{-6} psi^{-1}. The temperature used with the correlations was recorded during the temperature survey conducted in the Gaines Well No. 3 on October 13, 2006, and included in this report as Appendix E.

b. Formation fluid viscosity with reference temperature:

The formation fluid had a TDS concentration of 26,500 mg/l. This equates to an approximate equivalent percentage of NaCl of 4.5%. The average viscosity of the formation fluid was estimated using Appendix F (Figure D.35 SPE Monograph 5). This value was 0.57 centipoise (cp) at 127°F.

c. Formation fluid specific gravity/density with reference temperature:

The average formation fluid density was measured at 1.03 g/l at 70°F (Table I).

d. Injection fluid specific gravity, viscosity and compressibility with reference temperature:

The specific gravity of the refinery waste water was measured during the injection portion of the reservoir testing. The specific gravity was 1.03 (8.54 pounds per gallon). This equates to an approximate equivalent percentage of NaCl of 4%. Using the same methodology described above, the viscosity of the injected fluid was 0.54 cp at 127°F. The compressibility of the injected plant waste was 2.9 x 10^{-6} psi^{-1} at 127°F.

7. DAILY RATE HISTORY DATA (MINIMUM OF ONE MONTH PRECEDING THE FALLOFF TEST)

The rate history used in the analysis of the pressure falloff data began on July 20, 2009 (38.6 days prior to the falloff test). The daily rate history is summarized in Appendix G.

8. CUMULATIVE INJECTION INTO THE FORMATION FROM TEST WELL AND OFFSET WELLS

The total volume of fluid injected into all three well as of August 27, 2009, was 2,118,815,412 gallons. The volume of fluid injected into the Mewbourne Well No. 1 was 1,253,126,272 gallons. The volume of fluid injected into the Chukka Well No. 2 was 656,880,532 gallons. The volume of fluid injected into the Gaines Well No. 3 was 152,291,162 gallons. The area of review (AOR) indicates that there are no other wells injecting into the intervals in which the Navajo wells inject. The volumes injected were obtained from plant records.

9. PRESSURE GAUGES

Two (2) downhole pressure gauges and one surface pressure gauge were used for the Gaines Well No. 3 buildup and falloff testing. The downhole pressure gauges were set at 7,660 feet (SRO) and 7,663 feet (MRO). Bottom-hole pressure gauges were also placed in each of the offset wells (Mewbourne Well No. 1 and Chukka Well No. 2). The pressure gauges were set at 7,840 feet in the Mewbourne Well No. 1 and at 7,570 feet in the Chukka Well No. 2.

a. Describe the type of down hole surface pressure readout gauge used including manufacture and type:

   In the Gaines Well No. 3, an SRO pressure gauge and a MRO pressure gauge were used to record the pressure and temperature data during the injection/falloff testing. Both gauges were sapphire crystal gauges. The manufacturer of the SRO pressure gauge (Serial No. CSC-2609) is Cardinal Surveys. The manufacturer of the MRO pressure gauge (Serial No. 80780) is Spartek Systems. The surface

pressure gauge was a quartz crystal gauge (Serial No. 10213) manufactured by Spartek Systems.

In the Mewbourne Well No. 1, two MRO pressure gauges were used to monitor the bottom-hole pressure and temperature during the testing of the Gaines Well No. 3. Both gauges were sapphire crystal gauges with Serial Nos. 77128 and 76222. Both gauges were manufactured by Spartek Systems.

In the Chukka Well No. 2, two MRO pressure gauges were used to monitor the bottom-hole pressure and temperature during the testing of the Gaines Well No. 3. Both gauges were sapphire crystal gauges with Serial Nos. 76108 and 76298. Both gauges were manufactured by Spartek Systems.

b. List the full range, accuracy and resolution of the gauge:

In Gaines Well No. 3, the SRO pressure gauge, Serial No. CSC-2609, has a full range of 0 psi to 10,000 psi, an accuracy of 0.000012% of full scale, and a reported infinite resolution. The MRO pressure gauge, Serial No. 80780, has a full range of 0 psi to 6000 psi, an accuracy of 0.022% of full scale, and a resolution of 0.0003% of full scale. The surface pressure gauge has a full range of 0 psi to 6000 psi, an accuracy of 0.03% of full scale, and a resolution of 0.0003% of full scale.

In Mewbourne Well No. 1, the MRO pressure gauge, Serial No. 77128, has a full range of 0 psi to 10,000 psi, an accuracy of 0.022% of full scale, and a resolution of 0.0003% of full scale. The MRO pressure gauge, Serial No. 76222, has a full range of 0 psi to 10,000 psi, and accuracy of 0.022% of full scale, and a resolution of 0.0003% of full scale.

In Chukka Well No. 2, the MRO pressure gauge, Serial No. 76108, has a full range of 0 psi to 10,000 psi, an accuracy of 0.022% of full scale, and a resolution of 0.0003% of full scale. The MRO pressure gauge, Serial No. 76298, has a full range of 0 psi to 10,000 psi, an accuracy of 0.022% of full scale, and a resolution of 0.0003% of full scale.

c. Provide the manufacture's recommended frequency of calibration and a calibration certificate showing date the gauge was last calibrated:

The certificate of calibration for each of the pressure gauges used during the testing are included as Appendix H. The manufacturers recommended calibration frequency is one year.

10. ONE MILE AREA OF REVIEW (AOR)

Federal Abstract Company was contracted by Subsurface and instructed to undertake a review of well changes made within a one-mile Area of Review (AOR) of the Mewbourne Well No. 1, Chukka Well No. 2, and Gaines Well No. 3. In 2008, an update of the original AOR, submitted with the Discharge Application Permit 2003, was completed within the one-mile AOR for all three wells. The current update includes all existing wells within the one-mile AOR and any changes that have occurred to these wells since the 2008 update.

No new fresh water wells were reported within the search area since the submittal of the Discharge Application Permit 2003. The discharge application lists the water wells located in the Area of Review.

a. Identify wells located within the one mile AOR:

Table II contains a listing of all wells within the one-mile AOR of Mewbourne Well No. 1, Chukka Well No. 2, and Gaines Well No. 3. Figure 6 is a Midland Map Company base map of the area containing the one mile AOR.

b. Ascertain the status of wells within the one mile AOR:

Table II contains a listing of all wells within the one-mile AOR with their current status. Tables III through XIII contain a list of all wells within the one-mile AOR that have had modification to the current permit or have had new drilling and/or completions permits issued since the 2003 discharge application submittal.

Thirty one (31) wells were found in which the owner had changed. Fourteen (14) new plugged and abandoned oil and gas wells were found. One (1) well was placed in temporarily abandoned status. Twelve (12) wells were found that were returned to production status. Thirty-one (31) wells were found that had been recompleted in an upper interval. There were twenty-one (21) new drills, of which only one penetrated the Wolfcamp interval and was recompleted in upper Abo Formation by isolating the Wolfcamp Formation with cast iron bridge plugs (ID No. 959). All plugged and abandoned wells were successfully plugged and isolated from the Mewbourne Well No. 1, Chukka Well No. 2, and Gaines Well No. 3 injection intervals according to current OCD records.

c. Provide details on any offset producers and injectors completed in the same interval:

Navajo has two injection wells in the same interval. Mewbourne Well No. 1 is listed at ID No. 59 in Table II and no changes have occurred to this well. Chukka Well No. 2 is listed at ID No. 120 in Table II and no changes have occurred to this well. The wellbore schematics for the Mewbourne Well No. 1 and Chukka Well No. 2 are presented as Figure 3 and Figure 4, respectively.

11. GEOLOGY

The injection zones are porous carbonates of the lower portion of the Wolfcamp Formation, the Cisco Formation, and the Canyon Formation. These formations occur in the Mewbourne Well No. 1, the Chukka Well No. 2, and the Gaines Well No. 3 at the depths shown in the table below.

Injection Zone Formation	Mewbourne Well No. 1 (KB = 3,693 ft)		Chukka Well No. 2 (KB = 3,623 ft)		Gaines Well No. 3 (KB = 3,625 ft)	
	MD below KB (ft)	SS Depth (ft)	MD below KB (ft)	SS Depth (ft)	MD below KB (ft)	SS Depth (ft)
Lower Wolfcamp	7,450	-3,757	7,270	-3,647	7,303	-3,678
Cisco	7,816	-4,123	7,645	-4,022	7,650	-4,025
Canyon	8,475	-4,782	8,390	-4,767	8,390	-4,765
Base of Injection Zone (base of Canyon)	9,016	-5,323	8,894	-5,271	8,894	-5,269

a. Description of the geological environment of the injection interval:

The lower portion of the Wolfcamp Formation (Lower Wolfcamp) is the shallowest porous unit in the proposed injection interval. The Wolfcamp Formation (Permian-Wolf campaign age) consists of light brown to tan, fine to medium-grained, fossiliferous limestones with variegated shale interbeds (Meyer, 1966, page 69). The top of the Wolfcamp Formation was correlated for this study to be below the base of the massive, dense dolomites of the overlying Abo Formation. The base of the Wolfcamp coincides with the top of the Cisco Formation. The thickness of log porosity greater than 5% in the entire Wolfcamp Formation ranges from 0 feet to 295 feet in a band three miles wide that trends northeast-southwest across the study area.

The Cisco Formation (Pennsylvanian-Virgilian age) of the Northwest Shelf is described by Meyer (1966, page 59) as consisting of uniform, light colored, chalky, fossiliferous limestones interbedded with variegated shales. Meyer (1966, page 59) also describes the Cisco at the edge of the Permian basin as consisting of biothermal (mound) reefs composed of thick, porous, coarse-grained dolomites. Locally, the Cisco consists of porous dolomite that is 745 feet thick in Chukka Well No. 2, 659 feet thick in Mewbourne Well No. 1, and 720 feet in Gaines Well No. 3. The total thickness of intervals with log porosity greater than 5% is approximately 310 feet in Mewbourne Well No. 1, 580 feet in Chukka Well No. 2, and 572 feet in Gaines

Well No. 3. The total thickness with log porosity greater than 10% is approximately 100 feet in Mewbourne Well No. 1, 32 feet in Chukka Well No. 2, and 65 feet in Gaines Well No. 3. The thickness of the porous intervals in the Cisco ranges from 0 feet in the northwestern part of the study area to nearly 700 feet in a band three miles wide that trends northeast-southwest.

The Canyon Formation (Pennsylvanian-Missourian age) consists of white to tan to light brown fine grained, chalky, fossiliferous limestone with gray and red shale interbeds (Meyer, 1966, page 53). Locally, the Canyon occurs between the base of the Cisco dolomites and the top of the Strawn Formation (Pennsylvanian-Desmoinesian age). The total thickness of intervals with log porosity greater than 5% is 34 feet in Mewbourne Well No. 1, 30 feet in Chukka Well No. 2, and 10 feet in Gaines Well No. 3. No intervals appear to have log porosity greater than 10% in any of the three injection wells.

b. Discuss the presence of geological features, i.e., pinchouts, channels, and faults, if applicable:

From the geological study completed and submitted in the Discharge Plan Application and Application for Authorization to Inject, the reservoir appears to be continuous, with the possibility of anisotropic conditions extending to the west-southwest. The injection intervals that were studied are well confined by the Abo and Yeso low porosity carbonate beds, Tubbs shale, and Salado salt. The Cisco and Wolfcamp formations follow the Vacuum arch and have a southeasterly dip. No faults existed in the study area although, the study also shows that faulting occurs via the K-M fault located 6 miles northwest of Artesia and trends northeast-southwest. The distance to this fault line occurs no closer than 16 miles. No faults are known to exist in the confining zone within the AOR.

c. Provide a portion of relevant structure map, if necessary:

The structure map for Strawn is presented as Appendix I. The structure map for the Wolfcamp presented as Appendix J. The structure map for the Cisco presented as Appendix K.

12. OFFSET WELLS

There are only two offset wells identified in the AOR that inject into the same interval: the Mewbourne Well No. 1 and the Chukka Well No. 2. Both wells were shut-in during the buildup and falloff portions of the testing.

a. Identify the distance between the test well and any offset well completed in the same injection interval:

The Mewbourne Well No. 1 is approximately 7,900 feet from Gaines Well No. 3, the test well. The Chukka Well No. 2 is approximately 3,130 feet from the Gaines Well No. 3.

b. Report the status of the offset wells during both the injection and shut-in portions of the test:

Both the Mewbourne Well No. 1 and Chukka Well No. 2 were shut-in during the buildup and falloff portions of the testing. Bottom-hole pressure gauges were lowered into each well approximately six hours before shutting in the Gaines Well No. 3. The bottom-hole pressure and temperature data are graphically depicted in Figure 5 for the Mewbourne Well No. 1 and Figure 2 for the Chukka Well No. 2.

c. Describe the impact, if any, the offset wells had on the testing:

The offset wells were shut in prior to beginning the 72-hour injection period and remained shut-in during the falloff portion of the testing.

13. CHRONOLOGICAL LISTING OF THE DAILY TESTING ACTIVITIES (OPERATIONS LOG)

Appendix L contains the formal Chronology of Field Activities. This chronology was developed from the field activity reports.

a. Date of the testing:

The buildup portion of the testing started on August 24, 2009, at 12:00 p.m., and continued until August 27, 2009, at 1:29 p.m., when the Gaines Well No. 3 was shut-in. The falloff test ended on August 30, 2009, at 2:00 p.m. On August 30, 2009, at 2:07 p.m., the total depth of the well was tagged at 8,986 feet and five-minute gradient stops were made while pulling out of the wellbore with the pressure gauges. At 4:00 p.m., on August 30, 2009, the well was turned over to Navajo plant operations personnel.

b. Time of the injection period:

The buildup portion of the testing began on August 24, 2009, when the injection rate was set at an average injection rate of 305.16 gallons per minute (gpm). The injection rate was held constant for 73.5 hours. The injection period used in the pressure falloff analysis was 38.6 days.

c. Type of injection fluid:

The injected fluid was non-hazardous waste water from the plant. The density of the injection fluid was periodically measured and averaged 8.54 pounds per gallon during the 73.5-hour injection period (OCD Guideline Section VII.6).

d. Final injection pressure and temperature prior to shutting in the well:

The final flowing pressure (P_{wf}) and temperature (T_{wf}) were 3,641.52 psia and 107.1°F, respectively.

e. Total shut-in time:

The Gaines Well No. 3 was shut-in for a total of 73 hours.

f. Final static pressure and temperature at the end of the fall-off portion of the test:

The final static pressure at 7,663 feet was 3,484.12 psia. The final temperature was 114.8 °F.

14. DESCRIBE THE LOCATION OF THE SHUT-IN VALVE USED TO CEASE FLOW TO THE WELL FOR THE SHUT-IN PORTION OF THE TEST

On the pipeline to the Gaines Well No. 3, there are two, 4-inch motor controlled valves installed on the incoming pipeline before the pod filters. Two 4-inch valves are installed between the pod filters and the wellhead. There is one, 6-inch valve installed in the main line between the pod filters and the wellhead. A 4-1/16-inch wing valve is installed on the wellhead. All valves were closed during the falloff portion of the testing. A diagram of the wellhead is shown in Figure 7 and a diagram of the valve locations are shown in Figure 8.

15. PRESSURE FALLOFF ANALYSIS

The following discussion of the analysis of the pressure data recorded during the falloff testing of the Gaines Well No. 3 satisfies Sections 15 through 19 of the OCD's falloff test guidelines. Where appropriate, the specific guideline addressed is annotated. Specific parameters used in the equations and discussed previously in this report are also annotated. The plots included with this report are summarized in Table IX. The inclusion of these plots in this report satisfies OCD Guideline Section IX.18.

The pressure data obtained during the falloff test were analyzed using the commercially available pressure transient analysis software program PanSystem©. Appendix M contains the output from this software program. Figure 9 shows the pressure data recorded by the bottom-hole gauge from the time the tool was in place through the 73-hour shut-in period. Figure 10 shows the pressure and temperature data recorded by the bottom-hole gauge from the time the tool was in place through the 73-hour shut-in period. Figure 11 is a Cartesian plot of the injection rates versus time for the injection period (38.6 days) used in the pressure falloff analysis. The superposition time function was used to account for all rate changes during the 38.6-day injection period. Figure 12 is a plot of the surface pressures and injection rates versus time for the stabilized

injection period (73 hours) of the testing. Figure 13 is a plot of the historical injection rates and surface pressures versus calendar time since injection began in 2008.

Figure 14 is a log-log diagnostic plot of the falloff data, showing change in pressure and pressure derivative versus elapsed shut in time. The wellbore storage, radial flow and change in reservoir characteristics flow regimes are indicated on the log-log plot and the superposition Horner plot (OCD Guideline Section IX.18.c and IX.18.d)

Wellbore storage begins at the beginning of the falloff test and continues to an elapsed shut in time of 0.103 hours. Radial flow begins at an elapsed shut in time of 0.103 hours and continues until 0.682 hours (OCD Guideline Section IX.15.b).

The reservoir permeability was determined from the radial flow region of the superposition Horner plot, Figure 15. The radial flow regime begins at a Horner time of 4,259 and continues until a Horner time of 638, at which time the pressure data departs the semi-log straight-line. Figure 16 shows an expanded view of the radial flow regime. The slope of the radial flow period, as calculated by the analysis software, was 7.203515 psi/cycle (OCD Guideline Section IX.15.c). The measured injection rate prior to shut in was 10,322.74 bbl/day (301.08 gpm).

An estimate of mobility-thickness (transmissibility, OCD Guideline Section IX.15.d), kh/μ, for the reservoir was determined to be 233,008 md-ft/cp from the following equation:

$$\frac{k\ h}{\mu} = 162.6\frac{q\ B}{m}$$

where,

kh/μ	=	formation mobility-thickness, millidarcy-feet/centipoise
q	=	rate prior to shut in, bpd
B	=	formation volume factor, reservoir volume/surface volume
m	=	slope of radial flow period, psi/cycle

$$\frac{kh}{\mu} = 162.6 \frac{(10,322.74)(1.0)}{7.203515}$$

$$= 233,008 \text{ md-ft/cp}$$

The permeability-thickness (flow capacity, OCD Guideline Section IX.15.i), kh, was determined to be 125,824 md-ft by multiplying the mobility-thickness, kh/μ, by the viscosity of the waste fluid (see Section 6), μ_{waste}, of 0.54 centipoise:

$$kh = \left(\frac{kh}{\mu} \right) \mu_{waste}$$

$$= 233,008 \text{ x } 0.54$$

$$= 125,824 \text{ md-ft}$$

The reservoir permeability (OCD Guideline Section IX.15.e) using the total thickness (see Section 5 and Section 11) of 175 feet was 718.99 md:

$$k = \frac{(k\ h)}{h}$$

$$= \frac{125,824}{175}$$

$$= 718.99 \text{ md}$$

To determine whether the proper viscosity was used in arriving at this permeability, the travel time for a pressure transient to pass beyond the waste front needs to be calculated (OCD Guideline Section VIII.5). The distance to the waste front is determined from the following equation:

$$r_{waste} = \left(\frac{0.13368\ V}{\pi\ h\ \phi} \right)^{1/2}$$

where,

r_{waste}	=	radius to waste front, feet
V	=	total volume injected into the injection interval, gallons
h	=	formation thickness, feet
ϕ	=	formation porosity, fraction
0.13368	=	constant

A cumulative volume of approximately 152,291,162 gallons of waste has been injected into Gaines Well No. 3 (see Section 8). The formation has a porosity of 0.10 (see Section 5 and Section 11).

The distance to the waste front was determined to be 609 feet:

$$r_{waste} = \left(\frac{(0.13368)(152,291,162)}{(\pi)(175)(0.10)} \right)^{1/2}$$

$$= 609 \text{ feet}$$

The time necessary for a pressure transient to traverse this distance is calculated from the following equation:

$$t_{waste} = 948 \frac{\phi \mu_{waste} c_t r^2_{waste}}{k}$$

where,

t_{waste}	=	time for pressure transient to reach waste front, hours
ϕ	=	formation porosity, fraction
μ_{waste}	=	viscosity of the waste at reservoir conditions, centipoise
r_{waste}	=	radius to waste front, feet
c_t	=	total compressibility of the formation and fluid, psi
k	=	formation permeability, millidarcies
948	=	constant

The pore volume compressibility is 8.4×10^{-6} psi^{-1} (see Section 6). The time necessary for a pressure transient to traverse the distance from the wellbore to the leading edge of the waste front would be 0.22 hours:

$$t_{waste} = 948 \frac{(0.10)(0.54)(8.4 \times 10^{-6})(609)^2}{718.99}$$

$$= 0.22 \text{ hours}$$

Since the time required to pass through the waste is greater than the 0.103 hours required to reach the beginning of the radial flow period, the assumption that the pressure transient was traveling through waste fluid during the period of the semi-log straight line was correct.

The near wellbore skin damage (OCD Guideline Section IX.15.f) was determined from the following equation:

$$s = 1.151\left[\frac{p_{wf} - p_{1hr}}{m_1} - \log\left(\frac{k}{\phi \mu c_t r_w^2}\right) + 3.23\right]$$

where,

s	=	formation skin damage, dimensionless
1.151	=	constant
p_{wf}	=	flowing pressure immediately prior to shut in, psi
p_{1hr}	=	pressure determined from extrapolating the first radial flow semi-log line to a Δt of one hour, psi
m_1	=	slope of the first radial flow semi-log line, psi/cycle
k	=	permeability of the formation, md
ϕ	=	porosity of the injection interval, fraction
μ	=	viscosity of the fluid the pressure transient is traveling through, cp
c_t	=	total compressibility of the formation plus fluid, psi^{-1}
r_w	=	radius of the wellbore, feet
3.23	=	constant

The final measured flowing pressure was 3,641.57 psia. The pressure determined by extrapolating the radial flow semi-log line to a Δt of one hour, p_{1hr}, was 3,494.71 psia (calculated from the analysis software). The wellbore radius, r_w, is 0.3646 feet (completion records). Using these values in addition to the previously discussed parameters results in a skin of 15.59:

$$s = 1.151\left[\frac{3,641.57-3,494.71}{7.203515} - \log\left(\frac{718.99}{(0.10)(0.54)(8.4\times10^{-6})(0.3646)^2}\right) + 3.23\right]$$

$$= 15.59$$

The change in pressure, Δp_{skin}, in the wellbore associated with the skin factor (OCD Guideline Section IX.15.g) was calculated using the following equation:

$$\Delta p_{skin} = 0.869(m)(s)$$

where,

0.869= constant
m = slope from superposition plot of the well test, psi/cycle
s = skin factor calculated from the well test

The change in pressure, Δp_{skin}, using the previously calculated and defined values was determined to be 97.59 psi:

$$\Delta p_{skin} = 0.869(m)(s)$$

$$= 0.869(7.203515)(15.59)$$

$$= 97.59 \text{ psi}$$

The flow efficiency (E, OCD Guideline Section IX.15.h) was determined from the following equation:

$$E = \frac{p_{wf} - \Delta p_{skin} - p_{static}}{p_{wf} - p_{static}}$$

where:

E	=	flow efficiency, fraction
p_{wf}	=	flowing pressure prior to shutting in the well for the fall-off test,
p_{static}	=	final pressure from the pressure falloff test
Δp_{skin}	=	pressure change due to skin damage

Using the previously determined parameters, the flow efficiency was calculated to be 0.38:

$$E = \frac{3,641.57 - 3,484.12 - 97.59}{3,641.57 - 3,484.12}$$

$$= 0.38$$

The radius of investigation (OCD Guideline Section IX.15.a) was calculated using the analysis software and was determined to be 9,866 feet at an elapsed shut in time of 73 hours.

$$R_{inv} = 0.029\sqrt{\frac{k\,\Delta t_s}{\theta\,\mu\,C_t}}$$

where,

k	=	formation permeability, millidarcies
Δt_s	=	elapsed shut-in time, hours
θ	=	formation porosity, fraction
μ	=	viscosity of the fluid the pressure transient is traveling through, cp
C_t	=	total compressibility of the formation plus fluid, psi^{-1}
0.029	=	constant

$$Rinv = 0.029\sqrt{\frac{718.99(73.02)}{0.10(0.54)(8.4 \times 10^{6})}}$$

$$Rinv = 9866 \text{ ft}$$

As indicated on Figure 14, the pressure data departs the radial flow region at an elapsed time from shut in of 0.682 hours. Another change in slope is seen at an elapsed time from shut in of 7.23 hours. No pressure or temperature anomalies were noted that would cause this type of pressure response observed on the derivative log-log plot (OCD Section VIII.9). A review of the geology of the injection zones (Section 11) indicates that all three of the formations in which the Gaines Well No. 3 injects into have varying thicknesses and porosities within the mapped area. Changes in formation thickness, porosity, and fluid viscosity (pressure transient passing through the waste front into formation brine) can cause the slope changes seen on the derivative log-log plot. Because these changes occurred during the duration of the pressure falloff test, the reservoir analysis results are considered heterogeneous as opposed to homogeneous (OCD Guideline Section IX.17.b).

The Hall plot (OCD Guideline Section IX.18.h) is presented as Figure 17. No slope changes are seen in the plotted data.

A comparison of the current analysis results with previous analysis results as well as with the reservoir parameters submitted with the permit application is presented in Table X (OCD Guideline Section IX.19).

On August 30, 2009, a static pressure gradient survey was conducted while pulling the pressure gauges out of the well. Static gradient stops were conducted at 8,986 feet, 8,000 feet, 7,660 feet, 7,000 feet, 6,000 feet, 5,000 feet, 4,000 feet, 3,000 feet, 2,000 feet, 1,000 feet, and at the surface. The bottom-hole pressure and temperature, after 73 hours of shut-in at 7,660 feet, were 3,484.12 psia and 114.82°F, respectively. The gradient survey is summarized in Table XI. The data are depicted graphically in Figure 18.

16. NEW MEXICO OIL CONSERVATION DIVISION THREE YEAR RECORDING KEEPING STATEMENT

Navajo will keep the raw test data, generated during the testing, on file for a minimum of three years. The raw test data will be made available to OCD upon request.

TABLES

TABLE I

FORMATION WATER ANALYSIS SUMMARY

Chemical	Mewbourne Well No. 1	Chukka Well No. 2	Gaines Well No. 3	Average
Date	July 31, 1998	June 14, 1999	Nov 8, 2006	
Fluoride (mg/l)	2.6	9.7	Not Detected	6.15
Chloride (mg/L)	19,000	15,000	10,447	14,816
NO3-N (mg/L)	<10	<10	--	<10
SO4 (mg/L)	2,200	2,000	1,908	2,036
CaCO3 (mg/L)	1,000	1,210	--	1,105
Specific Gravity (g/L)	1.034	1.0249	--	1.0295
TDS (mg/L)	33,000	20,000	--	26,500
Specific Conductance (uMHOs/cm)	52,000	43,000	--	47,500
Potassium (mg/L)	213	235	85.5	178
Magnesium (mg/L)	143	128	155	142
Calcium (mg/L)	390	609	393	464
Sodium (mg/L)	12,770	8,074	6,080	8,975
pH (s.u.)	8.1	7.2	--	7.65

The data in the above table was referenced from "Discharge Plan Application and Application for Authorization to Inject per Oil Conservation Division Form C-108, into Class I Wells WDW-1 and Proposed WDW-2 and WDW-3" and the "Discharge Permit Approval Conditions", "Reentry and Completion Report Waste Disposal Well No. 2", and "Reentry and Completion Report Waste Disposal Well No. 3".

TABLE II

Wells Within the One-Mile Area of Review of the Mewbourne Well #1, Chukka Well #2, and Gaines Well #3

DATE Comp/Plug	ID NO	API	OPERATOR	SEC	TWN	RNG	OCD UL	TVD DEPTH	STATUS	WELL NAME	PLUG DATE	NS FTG	EW FTG	WELL TYPE
		30-015-36281	MACK ENERGY CORPORATION		18S	27E	J	6000	PERMIT TO DRILL	SUN DEVILS FEDERAL NO. 001		2193 S	1520 W	O
8/30/1941	1	30-015-00693	GEORGE A CHASE & C SERVICE	36	17S	27E	A	528	T/A	DELHI #001		330N	330E	O
6/24/1948	2	30-015-00694	DELHI OIL CORP.	36	17S	27E	A	1993	P&A	STATE #013	6/24/1948	990N	990E	O
4/21/1950	3	30-015-00646	GEORGE A CHASE & C SERVICE	36	17S	27E	A	540	T/A	DELHI #007		990N	330E	O
12/6/1947	4	30-015-00668	FAIRWAY RESOURCES OPERATING INC	36	17S	27E	G	1736	SHUT IN	SOUTH RED LAKE GRAYBURG UNIT #010		1650 N	2310E	O
3/6/1949	5	30-015-00690	GEORGE A CHASE & C SERVICE	36	17S	27E	G	532	ACTIVE	CONKLIN #002		1830 N	2205E	O
3/23/1949	6	30-015-00667	FAIRWAY RESOURCES OPERATING INC	36	17S	27E	G	1733	ACTIVE	SOUTH RED LAKE GRAYBURG UNIT #011		2310 N	2310E	I
1/10/1942	7	30-015-00666	GEORGE A CHASE & C SERVICE	36	17S	27E	G	533	P&A	CONKLIN #001	9/10/2007	2310 N	2310E	O
8/4/1950	8	30-015-00689	GEORGE A CHASE JR & C SERVICE	36	17S	27E	H	557	ACTIVE	GATES STATE #001		1650 N	330E	O
10/21/2003	9	30-015-00647	ASPEN OIL INC	36	17S	27E	H	551	ACTIVE	#002	10/21/2003	N	990E	O
5/6/2008	10	30-015-00669	GEORGE A CHASE JR & C SERVICE	36	17S	27E	H	1804	P&A	HOMAN #001	5/6/2008	2310 N	330E	O
10/28/1941	11	30-015-00688	KERSEY & CO	36	17S	27E	I	590	P&A	RAMAPO #001	10/28/1941	S	330E	O

1/3/1950	12	30-015-00670	KERSEY & CO	36	17S	27E	I	1857	P&A	RAMAPO #003	1/3/1950	N	330E	O
5/7/1948	13	30-015-00687	KERSEY & CO	36	17S	27E	I	1900	P&A	RAMAPO #002	5/7/1948	S	990E	G
7/10/1989	14	30-015-00685	ARCO OIL & GAS	36	17S	27E	I	5980	P&A	EMPIRE ABO UNIT G #020	7/10/1989	1650 S	330E	O
2/13/1942	15	30-015-00671	ROJO GRANDE COMPANY LLC	36	17S	27E	J	591	ZONE ABAN	RAMAPO #003	1/24/2000	2310 S	2310E	O
2/27/1948	16	30-015-01221	MCQUADRANGLE, LC	36	17S	27E	J	1790	ZONE ABAN	LAKE GRAYBURG	8/13/2002	2300 S	2300E	O
4/22/1961	17		MARTIN YATES III	36	17S	27E	J	5865		STATE #3				
2/26/1961	18	30-015-05934	BP AMERICA PRODUCTION COMPANY	36	17S	27E	J	5970	ACTIVE	EMPIRE ABO UNIT #019A		1650 S	1650E	O
2/3/1949	19	30-015-01220	MCQUADRANGLE, LC	36	17S	27E	K	1747	ZONE ABAN	LAKE GRAYBURG	7/17/2002	2310 S	2330 W	O
5/15/1947	20	30-015-00674	ROJO GRANDE COMPANY LLC	36	17S	27E	K	514	ACTIVE	RAMAPO #002		2310 S	2310 W	O
1/20/1948	21	30-015-01219	MCQUADRANGLE, LC	36	17S	27E	K	1710	ACTIVE	LAKE GRAYBURG		2310 S	1650 W	I
12/11/1981	22	30-015-23913	MCQUADRANGLE, LC	36	17S	27E	K	1785	ACTIVE	SOUTH RED LAKE		1650 S	1650 W	O
4/19/1961	23		MARTIN YATES III	36	17S	27E	K	5865	ACTIVE	STATE ABO #3				O
1/24/2000	24	30-015-00673	ROJO GRANDE COMPANY LLC	36	17S	27E	K	510	ZONE ABAN	RAMAPO #001	1/24/2000	1650 S	2310 W	O
1/24/2000	25	30-015-00682	ROJO GRANDE COMPANY LLC	36	17S	27E	N	541	ZONE ABAN	RAMAPO #004	1/24/2000	990S	1650 W	O
4/16/1948	26	30-015-00683	FAIRWAY RESOURCES OPERATING INC	36	17S	27E	N	1812	ACTIVE	LAKE GRAYBURG UNIT #028		965S	1650 W	I
3/11/2009	27	30-015-01218	BP AMERICA PRODUCTION COMPANY	36	17S	27E	N	5925	P&A	EMPIRE ABO UNIT #018	3/11/2009	330S	2310 W	O
5/13/1947	28	30-015-00684	BURNHAM OIL COMPANY	36	17S	27E	O	1500	P&A	STATE B-6961 NO. 1-A	5/13/1947	990S	2310E	O
9/8/1959	29	30-015-01251	BP AMERICA PRODUCTION COMPANY	36	17S	27E	O	6200	P&A	EMPIRE ABO UNIT #019	4/27/2009	660S	1980E	O
	30			36	17S	27E	I		OF 14					

4/13/2009	31	30-015-00677	BP AMERICA PRODUCTION COMPANY	36	17S	27E	P	6013	P&A	EMPIRE ABO UNIT #020	4/10/2009	330S	990E	O
3/7/1953	32	30-015-01616	C F M OIL CO	30	17S	28E	P	615	ACTIVE	#001		330S	990E	O
7/15/1952	33	30-015-01638	BEDINGFIELD, MALCO, RESLER	31	17S	28E	A	2004	P&A	STATE NO. 1	7/15/1952	330N	990E	O
11/15/1975	34	30-015-21594	FINNEY OIL COMPANY	31	17S	28E	B	652	ACTIVE	POWCO STATE #001		330N	1650E	O
12/23/1952	35	30-015-01636	BEDINGFIELD, J E	31	17S	28E	C	637	P&A	DELHI-STATE NO. 1	12/23/1952	330N	2310E	O
7/15/1986	36	30-015-25621	FINNEY OIL COMPANY	31	17S	28E	B	747	ACTIVE	POWCO STATE #002		980N	1620E	O
6/23/1942	37	30-015-01633	GEORGE A CHASE JR DBA G AND C SERVICE	31	17S	28E	D	531	ACTIVE	ASTON & FAIR A #001		330N	330W	O
1/5/1946	38	30-015-01634	ASTON & FAIR	31	17S	28E	D	525	NO COMPL	STATE 31 NO. 1X		350N	345W	O
2/16/1950	39	30-015-01645	MCLAUGHLIN, C T	31	17S	28E	F	2307	P&A	BEDINGFIELD STATE 1 NO. 1	2/16/1950	990N	990W	O
5/29/1948	40	30-015-02666	DORAL ENERGY CORP.	31	17S	28E	E	1816	ACTIVE	SAIKIN STATE #001		2310 N	330W	O
7/7/1984	41	30-015-24887	DORAL ENERGY CORP.	31	17S	28E	E	1950	ACTIVE	SAIKIN STATE #002		2310 N	990W	O
6/7/1960	42	30-015-01643	BP AMERICA PRODUCTION COMPANY	31	17S	28E	F	5971	P&A	EMPIRE ABO UNIT #022	7/10/2009	2310 N	2260 W	O
5/8/1948	43	30-015-01635	GEORGE A CHASE JR DBA G AND C SERVICE	31	17S	28E	F	1926	ACTIVE	ASTON & FAIR #001Y		2310 N	2310 W	O
10/12/1953	44	30-015-01637	GEORGE A CHASE JR DBA G AND C SERVICE	31	17S	28E	G	1852	ACTIVE	MALCO STATE #001		2310 N	2310E	O
8/10/1960	45	30-015-01652	KERSEY & CO	31	17S	28E	G	6025	ACTIVE	BOLING #001		2288 N	1625E	O
9/23/1965	46	30-015-10537	LIME ROCK RESOURCES A, L.P.	31	17S	28E	H	6180	ACTIVE	NORTHWEST ARTESIA UNIT #004		2277 N	330E	O

6/17/1966	47	30-015-10833	LIME ROCK RESOURCES A, LP	31	17S	28E	I	1945	ACTIVE	NORTHWEST ARTESIA UNIT #010		1980 S	660E	O
4/29/1960	48	30-015-01644	BP AMERICA PRODUCTION COMPANY	31	17S	28E	I	6106	P&A	EMPIRE ABO UNIT #024A	6/12/2009	1650 S	330E	O
12/23/1962	49	30-015-01642	DORAL ENERGY CORP.	31	17S	28E	J	1937	ACTIVE	STATE FW #001		1650 S	2310E	O
9/17/2003	50	30-015-01650	BP AMERICA PRODUCTION	31	17S	28E	J	6094	P&A	EMPIRE ABO UNIT #023A	9/17/2003	1650 S	1958E	O
4/10/1960	51	30-015-01651	BP AMERICA PRODUCTION COMPANY	31	17S	28E	K	6046	Proposal to P&A	EMPIRE ABO UNIT #022B		1650 S	2387 W	O
7/16/1955	52	30-015-01640	DORAL ENERGY CORP.	31	17S	28E	L	1996	ACTIVE	RAMPO #002		2310 S	330W	O
8/24/2002	53	30-015-01648	BP AMERICA PRODUCTION COMPANY	31	17S	28E	L	5971	ZONE ABAN	EMPIRE ABO UNIT #021A	8/24/2002	1651 S	1089E	O
5/1/1948	54	30-015-01639	DORAL ENERGY CORP.	31	17S	28E	M	1975	ACTIVE	RAMPO #001		990S	330W	O
1/31/1960	55	30-015-01647	BP AMERICA PRODUCTION COMPANY	31	17S	28E	M	6006	P&A	EMPIRE ABO UNIT #021	7/23/2005	660S	660W	O
1/22/1960	56	30-015-01646	BP AMERICA PRODUCTION COMPANY	31	17S	28E	N	6050	ACTIVE	EMPIRE ABO UNIT #022A		660S	2082 W	O
3/1/1963	57	30-015-10118	DORAL ENERGY CORP.	31	17S	28E	N	1938	ACTIVE	STATE FV #001		766S	2188 W	O
1/18/1942	58	30-015-01653	OTIS A ROBERTS	31	17S	28E	O	742	P&A	NO. 1	1/18/1942	990S	1650E	O
8/4/1998	59	30-015-27592	CO. PIPELINE DIVISION	31	17S	28E		10200	ACTIVE	WDW #001		660S	2310E	I
2/24/1960	60	30-015-01649	BP AMERICA PRODUCTION COMPANY	31	17S	28E	O	6094	P&A	EMPIRE ABO UNIT #023	8/14/2009	660S	1939E	O
5/8/1967	61	30-015-20042	LIME ROCK RESOURCHES A,	31	17S	28E	P	2012	ACTIVE	NORTHWEST ARTESIA UNIT		990S	660E	O

3/12/1960	62	30-015-01641	BP AMERICA PRODUCTION COMPANY	31	17S	28E	P	6122	ACTIVE	EMPIRE ABO UNIT #024		660S	660E	O
5/12/1953	63	30-015-01654	BEDINGFIELD, J E	32	17S	28E	D	651	P&A	ASTON-STATE NO. 1	5/12/1953	330N	330W	O
9/13/1960	64	30-015-01671	BP AMERICA PRODUCTION COMPANY	32	17S	28E	E	6013	P&A	EMPIRE ABO UNIT #025B	8/14/2008	2280 N	978W	O
8/24/1960	65	30-015-01657	MARBOB ENERGY CORP	32	17S	28E	F	6171	ACTIVE	AA STATE NO. 1		2280 N	1980 W	O
11/6/2006	66	30-015-10818	SDX RESOURCES INC	32	17S	28E	K	2003	P&A	ARTESIA UNIT #008	11/6/2006	2310 S	2105 W	O
3/27/1960	67	30-015-01661	BP AMERICA PRODUCTION COMPANY	32	17S	28E	K	6083	ACTIVE	EMPIRE ABO UNIT #026B		1650 S	2310 W	O
5/15/1966	68	30-015-10795	LIME ROCK RESOURCES A, LP	32	17S	28E	L	1930	P&A	ARTESIA UNIT #009	5/28/2008	2310 S	660W	O
4/13/1960	69	30-015-01662	BP AMERICA PRODUCTION COMPANY	32	17S	28E	L	6075	ACTIVE	EMPIRE ABO UNIT #025A		1650 S	990W	O
5/9/1967	70	30-015-20043	LIME ROCK RESOURCES A, LP	32	17S	28E	M	1998	T/A	NORTHWEST ARTESIA UNIT		990S	760W	O
3/5/1960	71	30-015-01660	BP AMERICA PRODUCTION COMPANY	32	17S	28E	M	6132	P&A	EMPIRE ABO UNIT #025	1/14/2009	660S	660W	O
9/15/2006	72	30-015-10834	SDX RESOURCES INC	32	17S	28E	N	1954	P&A	ARTESIA UNIT #013	9/15/2006	990S	2030 W	O
2/14/1960	73	30-015-01659	BP AMERICA PRODUCTION COMPANY	32	17S	28E	N	6172	ACTIVE	EMPIRE ABO UNIT #026A		660S	1980 W	O
7/25/1975	74	30-015-21539	BP AMERICA PRODUCTION COMPANY	32	17S	28E	N	6220	ACTIVE	EMPIRE ABO UNIT #261		150S	1400 W	O
7/18/1977	75	30-015-22009	BP AMERICA PRODUCTION COMPANY	32	17S	28E	O	6370	ACTIVE	EMPIRE ABO UNIT #272		330S	2481E	O
7/18/1960	76	30-015-02606	BP AMERICA PRODUCTION COMPANY	5	18S	28E	C	6254	ACTIVE	EMPIRE ABO UNIT #026E		330N	1941 W	O

1/4/1979	77	30-015-22697	BP AMERICA PRODUCTION COMPANY	5	18S	28E	C	6350	P&A	EMPIRE ABO UNIT #261A	6/16/2009	1080 N	1914 W	O
3/27/1960	78	30-015-02607	BP AMERICA PRODUCTION COMPANY	5	18S	28E	D	6273	ACTIVE	EMPIRE ABO UNIT #025C		660N	660W	O
1/12/1979	79	30-015-22750	BP AMERICA PRODUCTION COMPANY	5	18S	28E	D	6250	SHUT IN	EMPIRE ABO UNIT #251		660N	150W	O
1/13/2006	80	30-015-02608	CONOCOPHILLIPS COMPANY	5	18S	28E	E	6265	P&A	STATE E AI #001	1/13/2006	1660 N	330W	O
8/10/1983	81	30-015-24485	CONOCOPHILLIPS COMPANY	5	18S	28E	E	10450	ACTIVE	ILLINOIS CAMP A COM #001		1980 N	990W	G
12/30/1959	82	30-015-02602	BP AMERICA PRODUCTION COMPANY	5	18S	28E	F	6265	ACTIVE	EMPIRE ABO UNIT #026D		1650 N	1650 W	O
8/12/1983	83	30-015-25522	I & W INC	5	18S	28E	L	8500	ACTIVE	WALTER SOLT STATE #001		2240 S	400W	S
3/27/2001	84	30-015-10244	MACK ENERGY CORP	5	18S	28E	L	6365	ZONE ABAN	STATE AG #001	3/27/2001	2310 S	330W	O
3/14/1967	87	30-015-20019	LIME ROCK RESOURCES A, LP	6	18S	28E	A	3280	ACTIVE	ARTESIA UNIT #016		330N	330E	O
2/29/1960	88	30-015-02615	BP AMERICA PRODUCTION COMPANY	6	18S	28E	A	6241	ACTIVE	EMPIRE ABO UNIT #024B		660N	660E	O
12/21/1959	89	30-015-02625	BP AMERICA PRODUCTION COMPANY	6	18S	28E	B	6194	T/A	EMPIRE ABO UNIT #023C		470N	2170E	O
11/1/1975	90	30-015-21542	BP AMERICA PRODUCTION COMPANY	6	18S	28E	B	6250	ACTIVE	EMPIRE ABO UNIT #231		1260 N	1580E	O
12/29/1959	91	30-015-02621	BP AMERICA PRODUCTION COMPANY	6	18S	28E	C	6033	ACTIVE	EMPIRE ABO UNIT #022E		660N	1980 W	O
10/22/1975	92	30-015-21626	BP AMERICA PRODUCTION COMPANY	6	18S	28E	G	6380	SHUT IN	EMPIRE ABO UNIT #231A		1361 N	2531E	O

12/30/1959	93	30-015-02613	BP AMERICA PRODUCTION COMPANY	6	18S	28E	D	6119	ACTIVE	EMPIRE ABO UNIT #021B		990N	660W	O
6/2/1980	94	30-015-23116	BP AMERICA PRODUCTION COMPANY	6	18S	28E	E	6225	ACTIVE	EMPIRE ABO UNIT #213		2050 N	100W	O
10/30/1959	95	30-015-02619	BP AMERICA PRODUCTION COMPANY	6	18S	28E	E	6202	ACTIVE	EMPIRE ABO UNIT #021C		1990 N	660W	O
12/28/1978	96	30-015-22637	BP AMERICA PRODUCTION COMPANY	6	18S	28E	E	6267	ACTIVE	EMPIRE ABO UNIT #212		2450 N	400W	O
2/11/1975	97	30-015-21395	BP AMERICA PRODUCTION COMPANY	6	18S	28E	E	6200	ACTIVE	EMPIRE ABO UNIT #211		2630 N	1300 W	O
3/13/1977	98	30-015-22012	BP AMERICA PRODUCTION COMPANY	6	18S	28E	F	6303	ACTIVE	EMPIRE ABO UNIT #222		1350 N	1572 W	O
2/21/1942	99	30-015-02626	SARKIN, DAVID C & OLIVER, HENRY F	6	18S	28E	F	705	P&A	STATE NO. 1	2/21/1942	1650 N	1650 W	O
8/8/1963	100	30-015-10107	DORAL ENERGY CORP	6	18S	28E	F	1985	ACTIVE	STATE FX #001		1874 N	1874 W	O
11/26/1959	101	30-015-02620	BP AMERICA PRODUCTION COMPANY	6	18S	28E	F	6206	ACTIVE	EMPIRE ABO UNIT #022D		1990 N	2082 W	O
5/19/1978	102	30-015-22527	BP AMERICA PRODUCTION COMPANY	6	18S	28E	F	6250	ACTIVE	EMPIRE ABO UNIT #223		2630 N	1930 W	O
4/23/1976	103	30-015-21746	BP AMERICA PRODUCTION COMPANY	6	18S	28E	F	6305	ACTIVE	EMPIRE ABO UNIT #221		2610 N	2713 W	O
7/8/1979	104	30-015-22913	BP AMERICA PRODUCTION COMPANY	6	18S	28E	G	6300	ACTIVE	EMPIRE ABO UNIT #235		1750 N	1600E	O
8/27/1978	105	30-015-22593	BP AMERICA PRODUCTION COMPANY	6	18S	28E	G	6260	P&A	EMPIRE ABO UNIT #234	12/3/2008	1900 N	2441E	O

1/26/1960	106	30-015-02614	BP AMERICA PRODUCTION COMPANY	6	18S	28E	G	6242	ACTIVE	EMPIRE ABO UNIT #023B		1980 N	1980E	O
4/13/1976	107	30-015-21737	BP AMERICA PRODUCTION COMPANY	6	18S	28E	G	6345	P&A	EMPIRE ABO UNIT #232	5/7/2009	2253 N	1576E	O
	108			6	18S	28E	H		OF 107					
6/5/1978	109	30-015-22490	BP AMERICA PRODUCTION COMPANY	6	18S	28E	G	6300	P&A	EMPIRE ABO UNIT #233	4/3/2009	2550 N	2050E	O
3/24/1960	110	30-015-02616	BP AMERICA PRODUCTION COMPANY	6	18S	28E	H	6253	ACTIVE	EMPIRE ABO UNIT #024C		1650 N	990E	O
4/12/1981	111	30-015-23547	BP AMERICA PRODUCTION COMPANY	6	18S	28E	H	6386	P&A	EMPIRE ABO UNIT #241	9/19/2008	1950 N	660E	O
12/12/2002	112	30-015-02617	BP AMERICA PRODUCTION COMPANY	6	18S	28E	I	6350	P&A	EMPIRE ABO UNIT #024K	12/12/2002	2310 S	990E	O
2/5/1979	113	30-015-22528	BP AMERICA PRODUCTION COMPANY	6	18S	28E	J	6350	P&A	EMPIRE ABO UNIT #232A	4/7/2009	2300 S	1570E	O
8/15/1949	114	30-015-02611	COCKBURN	6	18S	28E	J	2095	P&A	STATE NO. 1	8/15/1949	S	2310E	O
5/23/1979	115	30-015-02628	BP AMERICA PRODUCTION COMPANY	6	18S	28E	J	6310	ACTIVE	EMPIRE ABO UNIT #023D		2260 S	2270E	O
8/13/1978	116	30-015-22491	BP AMERICA PRODUCTION COMPANY	6	18S	28E	J	6350	P&A	EMPIRE ABO UNIT #231B	9/2/2009	1700 S	2350E	O
3/21/1955	117	30-015-02618	MILLER BROS OIL CO	6	18S	28E	J	2396	P&A	CAPITOL STATE NO. 1	3/21/1955	1647 S	2076E	G
2/22/1960	118	30-015-02623	BP AMERICA PRODUCTION COMPANY	6	18S	28E	K	6210	ACTIVE	EMPIRE ABO UNIT #022F		2248 S	2075 W	O
	119			6	18S	28E	K		MISPLOT					
	120		NAVAJO REFINING COMPANY	6	18S	28E	L			(ORIGINAL LOCATION)				

1/23/1960	121	30-015-02622	BP AMERICA PRODUCTION COMPANY	6	18S	28E	L	6194	ACTIVE	EMPIRE ABO UNIT #021D		2219 S	660W	O
7/17/1980	122	30-015-23548	BP AMERICA PRODUCTION COMPANY	6	18S	28E	L	6312	ACTIVE	EMPIRE ABO UNIT #211A		1950 S	1000 W	O
10/21/1960	123	30-015-02627	RUTH OIL CO, LLC	6	18S	28E	M	6225	ACTIVE	#002		949S	990W	O
4/16/1992	124	30-015-26943	MEWBOURNE OIL CO	6	18S	28E	M	10200	ACTIVE	CHALK BLUFF 6 STATE #001		990S	730W	G
8/5/1960	125	30-015-02610	BP AMERICA PRODUCTION COMPANY	6	18S	28E	N	6243	ACTIVE	EMPIRE ABO UNIT #022C		955S	1750 W	O
5/1/1961	126	30-015-02624	PAN AMERICAN PETROLEUM CO	6	18S	28E	O	6412	P&A	STATE CD NO. 1	5/1/1961	968S	2270E	O
12/30/1985	127	30-015-25503	DICKSON PETROLEUM CO	6	18S	28E	P	1750	P&A	KIMBERLY STATE NO. 1	12/30/1985	660S	330E	O
5/13/1952	128	30-015-02612	D & H OIL CO	6	18S	28E	P	2246	P&A	STATE NO. 1	5/13/1952	330S	330E	O
11/5/1959	129	30-015-01215	BP AMERICA PRODUCTION COMPANY	1	18S	27E	A	6118	ACTIVE	EMPIRE ABO UNIT #020D		667N	666E	O
7/7/1959	130	30-015-00708	BP AMERICA PRODUCTION COMPANY	1	18S	27E	B	6078	ACTIVE	EMPIRE ABO UNIT #019B		660N	1980E	O
5/10/1948	131		MALCO REFINERIES	1	18S	27E	C	1840	P&A	HILL #4	5/10/1948			
	132			1	18S	27E	C		MISPLOT					
7/21/2004	133	30-015-00710	MARBOB ENERGY CORP	1	18S	27E	C	6173	ACTIVE	AAO FEDERAL No. 013		660N	1980 W	O
8/24/1991	134	30-015-26741	MEWBOURNE OIL CO	1	18S	27E	F	10140	ACTIVE	FEDERAL COM #002		1650 N	1350 W	G
5/31/1959	135	30-015-00706	BP AMERICA PRODUCTION COMPANY	1	18S	27E	F	6087	ACTIVE	EMPIRE ABO UNIT #018A		2310 N	1980 W	O
8/2/1959	136	30-015-00709	BP AMERICA PRODUCTION COMPANY	1	18S	27E	G	6205	ACTIVE	EMPIRE ABO UNIT #019C		1980 N	1980E	O
	137			1	18S	27E	G		MISPLOT					

9/7/1975	138	30-015-21552	BP AMERICA PRODUCTION COMPANY	1	18S	27E	G	6259	ACTIVE	EMPIRE ABO UNIT #191		2500 N	2500E	O
10/13/1959	139	30-015-00711	BP AMERICA PRODUCTION COMPANY	1	18S	27E	H	6218	ACTIVE	EMPIRE ABO UNIT #020C		1980 N	660E	O
5/13/1976	140	30-015-21783	BP AMERICA PRODUCTION COMPANY	1	18S	27E	H	6296	ACTIVE	EMPIRE ABO UNIT #202		2490 N	1299E	O
10/10/1978	141	30-015-22656	BP AMERICA PRODUCTION COMPANY	1	18S	27E	H	6225	ACTIVE	EMPIRE ABO UNIT #203		2400 N	700E	O
7/1/1927	142		MANHATTAN OIL	1	18S	27E	H	2900	P&A	CRONIN #1	7/1/2027			
7/19/1975	143	30-015-21553	BP AMERICA PRODUCTION COMPANY	1	18S	27E	H	6225	ACTIVE	EMPIRE ABO UNIT #201		2501 N	20E	O
1/16/1993	144	30-015-27163	MEWBOURNE OIL CO	1	18S	27E	I	10150	ACTIVE	FEDERAL COM #003		1980 S	990E	G
1/5/2003	145	30-015-00697	BP AMERICA PRODUCTION COMPANY	1	18S	27E	I	6185	P&A	EMPIRE ABO UNIT #020K	1/5/2003	1980 S	660E	O
10/26/1978	146	30-015-22657	BP AMERICA PRODUCTION COMPANY	1	18S	27E	J	6225	ACTIVE	EMPIRE ABO UNIT #193		2490 S	2200E	O
8/20/1959	147	30-015-00696	BP AMERICA PRODUCTION COMPANY	1	18S	27E	J	6180	ACTIVE	EMPIRE ABO UNIT #019Q		1980 S	1980E	O
6/25/1978	148	30-015-22560	BP AMERICA PRODUCTION COMPANY	1	18S	27E	J	6250	ACTIVE	EMPIRE ABO UNIT #192		220S	1390E	O
9/23/1976	149	30-015-21873	BP AMERICA PRODUCTION COMPANY	1	18S	27E	J	6350	ACTIVE	EMPIRE ABO UNIT #191A		1526 S	1470E	O
11/14/1978	150	30-015-22658	BP AMERICA PRODUCTION COMPANY	1	18S	27E	J	6325	ACTIVE	EMPIRE ABO UNIT #194		1500 S	2130E	O

7/25/1978	151	30-015-22559	BP AMERICA PRODUCTION COMPANY	1	18S	27E	K	6200	SHUT IN	EMPIRE ABO UNIT #184		2290 S	2445 W	O
7/24/1977	152	30-015-22096	BP AMERICA PRODUCTION COMPANY	1	18S	27E	K	6210	ACTIVE	EMPIRE ABO UNIT #183		2370 S	1510 W	O
4/17/2003	153	30-015-21554	BP AMERICA PRODUCTION COMPANY	1	18S	27E	K	6203	P&A	EMPIRE ABO UNIT #181	4/17/2003	1367 S	1440 W	O
5/22/1959	154	30-015-00707	BP AMERICA PRODUCTION COMPANY	1	18S	27E	K	6163	ACTIVE	EMPIRE ABO UNIT #018B		1980 S	1980 W	O
6/1/1976	155	30-015-21792	BP AMERICA PRODUCTION COMPANY	1	18S	27E	K	6369	ACTIVE	EMPIRE ABO UNIT #182		1533 S	2370 W	O
9/27/2003	156	30-015-00713	BP AMERICA PRODUCTION COMPANY	1	18S	27E	N	6174	P&A	EMPIRE ABO UNIT #018D	9/27/2003	995S	1644 W	O
3/7/1991	157	30-015-26575	NAVAJO REFINING COMPANY	1	18S	27E	N	10120	ACTIVE	WDW-3		790S	2250 W	I
4/9/1971	158	30-015-20394	HUMBLE OIL & REFINING CO	1	18S	27E	O	6300	P&A	EMPIRE ABO FEDERAL NO. 5	4/9/1971	953S	2197E	O
11/8/1959	159	30-015-00698	BP AMERICA PRODUCTION COMPANY	1	18S	27E	O	6365	ACTIVE	EMPIRE ABO UNIT #191		660S	1980E	S
12/2/1961	160	30-015-00699	BP AMERICA PRODUCTION COMPANY	1	18S	27E	P	6250	ACTIVE	EMPIRE ABO UNIT #020B		940S	330E	O
9/13/1990	161	30-015-26404	DEVON ENERGY PRODUCTION COMPANY LP	12	18S	27E	A	10141	ACTIVE	FEDERAL T #001		660N	990E	I
9/11/1985	162	30-015-25099	HARLOW ENTERPRISES LLC	12	18S	27E	H	1652	ACTIVE	COMSTOCK FEDERAL #006		1809 N	990E	O
2/23/1987	165	30-015-25997	EASTLAND OIL CO	7	18S	28E	C	1690	ACTIVE	LAUREL STATE #001		940N	1757 W	O
11/10/1988	166	30-015-25675	EASTLAND OIL CO	7	18S	28E	E	1690	ACTIVE	LAUREL STATE #002		940N	1757 W	O
6/10/1985	167	30-015-25236	MOREXCO INC	7	18S	28E	F	10400	ACTIVE	STATE BY #001		N	W	O

	168	30-015-22636	DYAD PE	7	18S	28E	J		ABAN LOCATION	PRE-ONGUARD WELL #213		1950 N	1300 W	O
	169	30-015-22635	DYAD PE	8	18S	28E	J		ABAN LOCATION	PRE-ONGUARD WELL #212		1900 N	100W	O
	170	30-015-24372	DYAD PE	8	18S	28E	J		ABAN LOCATION	PRE-ONGUARD WELL #001		1980 S	990E	O
	171	30-015-27636	PHILLIPS PETROLEUM	7	18S	28E	H		ABAN LOCATION	CHALK BLUFF 6 STATE #002		2310 N	810E	O
3/30/1993	353	30-015-27286	MEWBOURNE OIL CO	36	17S	27E	M	10060	ACTIVE	CHALK BLUFF 36 STATE #001		660S	990W	O
10/11/1983	354	30-015-24612	MANAGEMENT CORP	36	17S	27E	M	1451	P&A	STATE M #001	4/21/2009	790S	990W	O
	355	30-015-00676	BP AMERICA PRODUCTION COMPANY	36	17S	27E	M	5797	ACTIVE	EMPIRE ABO UNIT #017		330N	990W	O
	356	30-015-10184	ASPEN OIL INC	36	17S	27E	M	1343	ACTIVE	STATE #006		330S	920W	O
	358	30-015-21623	GEORGE A CHASE JR & C SERVICE	36	17S	27E	M	1366	ACTIVE	STATE #007		360S	455W	O
10/15/1942	359	30-015-00662	ACREY, B L & F D	36	17S	27E	M	592	P&A	STATE NO. 2	10/15/1942	330S	330W	O
3/30/1960	595	30-015-02605	BP AMERICA PRODUCTION UNIT	5	18S	28E	B	6261	P&A	EMPIRE ABO UNIT NO. 27 E	6/12/2009	930N	2271E	O
	748	30-015-00701	FAIRWAY RESOURCES OPERATING LLC	1	18S	27E	D	1835	ACTIVE	LAKE GRAYBURG UNIT 37 WIW		330N	330W	O
	748	30-015-00715	MCQUADRANGLE, LC	1	18S	27E	D	1835	ACTIVE	LAKE GRAYBURG		330N	330W	I
1/24/1987	749	30-015-00712	ARCO OIL & GAS	1	18S	27E	D	5900	P&A	EMPIRE ABO UNIT I NO. 17	1/24/1987	647N	667W	O
5/10/1939	750		JONES	1	18S	27E	E	481	P&A	BRAINARD	5/10/1939	N	330W	O
3/26/1959	751	30-015-00704	ARCO OIL & GAS	1	18S	27E	E	5960	P&A	EMPIRE ABO UNIT J NO. 17	3/26/1959	1980 N	660W	O
5/22/1995	752	30-015-00703	BP AMERICA PRODUCTION COMPANY	1	18S	27E	L	6091	P&A	EMPIRE ABO UNIT #017A	3/27/2009	1980 S	660W	O

5/22/1979	753	30-015-22815	BP AMERICA PRODUCTION COMPANY	1	18S	27E	M	6300	ACTIVE	EMPIRE ABO UNIT #171		670S	330W	O
	754			1	18S	27E	M		MISPLOT OF 756					
12/20/1943	755	30-015-00714	VALLEY REFINING CO	1	18S	27E	N	2404	P&A	HILL #1	12/20/1943			
6/25/1959	756	30-015-00705	BP AMERICA PRODUCTION COMPANY	1	18S	27E	M	6150	P&A	EMPIRE ABO UNIT #017B	7/21/2004	990S	660W	O
1/31/1942	757		BRAINARD & GUY	2	18S	27E	A	530	NO COMPL	STATE 2	1/31/1942	330N	610E	
11/6/1947	758	30-015-00721	FAIRWAY RESOURCES OPERATING LLC	2	18S	27E	A	1705	SHUT IN	LAKE GRAYBURG UNIT #036		330N	990E	O
	765	30-015-00724	BP AMERICA PRODUCTION COMPANY	2	18S	27E	A	5920	ACTIVE	EMPIRE ABO UNIT #016B		990N	330E	O
5/23/1948	766	30-015-00737	FAIRWAY RESOURCES OPERATING LLC	2	18S	27E	B	1722	ACTIVE	LAKE GRAYBURG UNIT #038		905N	1601E	O
3/7/2008	772	30-015-00745	MACK ENERGY CORPORATION	2	18S	27E	H	6140	P&A	STATE H #001	3/7/2008	1980 N	660E	O
2/8/1991	773	30-015-00742	S&J OPERATING COMPANY	2	18S	27E	H	1742	P&A	LAKE GRAYBURG	2/8/1991	1650 N	990E	O
7/10/2002	774	30-015-00740	MCQUADRANGLE, LC	2	18S	27E	G	1707	P&A	SOUTH RED LAKE	7/10/2002	1650 N	2197E	I
1/1/1957	778		RUTTER & WILBANKS	2	18S	27E	G			HUDSON #2		2310 N	1650E	O
6/6/1959	779	30-015-00741	BP AMERICA PRODUCTION COMPANY	2	18S	27E	G	5880	ACTIVE	EMPIRE ABO UNIT #015B		2310 N	1980E	O
1/1/1947	781		CO	2	18S	27E	J	4164	P&A	STATE B-2	1/1/1947	S	2310E	O
2/6/1995	785	30-015-00717	BP AMERICA PRODUCTION COMPANY	2	18S	27E	I	6114	ACTIVE	EMPIRE ABO UNIT #016		1980 S	660E	O

3/23/1959	786	30-015-00716	BP AMERICA PRODUCTION COMPANY	2	18S	27E	J	6100	ACTIVE	EMPIRE ABO UNIT #015		1980 S	1830E	O
5/13/1979	789	30-015-22896	BP AMERICA PRODUCTION COMPANY	2	18S	27E	K	6108	ACTIVE	EMPIRE ABO UNIT #143A		1820 S	2550 W	O
9/13/1979	791	30-015-22914	BP AMERICA PRODUCTION COMPANY	2	18S	27E	I	6225	ACTIVE	EMPIRE ABO UNIT #161		1310 S	590E	O
	792			2	18S	27E	O		OF 814					
12/20/1978	793	30-015-22609	BP AMERICA PRODUCTION COMPANY	2	18S	27E	N	6093	ACTIVE	EMPIRE ABO UNIT #143		1200 S	1900 W	O
	795			2	18S	27E	P		OF 765					
11/4/1975	796	30-015-21544	BP AMERICA PRODUCTION COMPANY	2	18S	27E	O	6285	T/A	EMPIRE ABO UNIT #151		1110 S	1322E	O
5/1/1979	797	30-015-22885	BP AMERICA PRODUCTION COMPANY	2	18S	27E	O	6202	T/A	EMPIRE ABO UNIT #155		1040 S	2025E	O
1/20/1959	799	30-015-00722	BP AMERICA PRODUCTION COMPANY	2	18S	27E	P	6115	P&A	EMPIRE ABO UNIT #016A	2/24/2009	660S	660E	O
4/12/1979	800	30-015-22808	BP AMERICA PRODUCTION COMPANY	2	18S	27E	O	6225	P&A	EMPIRE ABO UNIT #156	2/5/2009	600S	1330E	O
11/19/1958	801	30-015-00731	BP AMERICA PRODUCTION COMPANY	2	18S	27E	O	6220	P&A	EMPIRE ABO UNIT #015A	2/11/2009	660S	1980E	O
12/4/1978	802	30-015-22669	BP AMERICA PRODUCTION COMPANY	2	18S	27E	O	6200	P&A	EMPIRE ABO UNIT #154	1/27/2009	800S	2500E	O
4/20/1977	805	30-015-22013	BP AMERICA PRODUCTION COMPANY	2	18S	27E	O	6303	P&A	EMPIRE ABO UNIT #153	10/30/2008	90S	1456E	O
6/17/1976	806	30-015-21825	BP AMERICA PRODUCTION COMPANY	2	18S	27E	O	6335	T/A	EMPIRE ABO UNIT #152		320S	2602E	O

1/12/1979	807	30-015-22608	BP AMERICA PRODUCTION COMPANY	2	18S	27E	N	6200	ACTIVE	EMPIRE ABO UNIT #142		100S	1950 W	O
7/1/1976	808	30-015-21807	BP AMERICA PRODUCTION COMPANY	2	18S	27E	M	6200	ACTIVE	EMPIRE ABO UNIT #132		275S	1243 W	O
10/21/1958	812	30-015-00730	BP AMERICA PRODUCTION COMPANY	2	18S	27E	N	6112	ACTIVE	EMPIRE ABO UNIT #014		660S	1980 W	O
10/21/1959	813	30-015-00720	BP AMERICA PRODUCTION COMPANY	2	18S	27E	A	5881	P&A	RIVERWOLF UNIT #004	12/12/2008	990N	1650E	O
5/17/1977	814	30-015-22051	BP AMERICA PRODUCTION COMPANY	2	18S	27E	K	6203	ACTIVE	EMPIRE ABO UNIT #141A		1370 S	2445 W	O
10/25/2004	836	30-015-00869	BP AMERICA PRODUCTION COMPANY	11	18S	27E	A	6211	P&A	EMPIRE ABO UNIT #016C	10/25/2004	330N	653E	O
8/16/2006	837	30-015-22568	BP AMERICA PRODUCTION COMPANY	11	18S	27E	B	6310	P&A	EMPIRE ABO UNIT #151B	8/16/2006	400N	1450E	O
5/6/1979	838	30-015-22838	BP AMERICA PRODUCTION COMPANY	11	18S	27E	B	6252	P&A	EMPIRE ABO UNIT #153B	1/4/2009	200N	1925E	O
7/16/2004	839	30-015-00868	BP AMERICA PRODUCTION COMPANY	11	18S	27E	B	6260	P&A	EMPIRE ABO UNIT #015C	7/16/2004	660N	1980E	O
8/23/1978	840	30-015-22569	BP AMERICA PRODUCTION COMPANY	11	18S	27E	B	6300	P&A	EMPIRE ABO UNIT #152B	9/24/2008	560N	2588E	O
5/21/1979	841	30-015-22834	BP AMERICA PRODUCTION COMPANY	11	18S	27E	C	6225	ACTIVE	EMPIRE ABO UNIT #141B		225N	2280 W	O
9/5/1957	842	30-015-00864	ARCO OIL & GAS	11	18S	27E	C	6315	P&A	EMPIRE ABO UNIT M NO. 14	9/5/1957	660N	1980 W	O
5/23/1979	843	30-015-22833	BP AMERICA PRODUCTION COMPANY	11	18S	27E	D	6225	ACTIVE	EMPIRE ABO UNIT #133B		450N	1175 W	O

4/26/1958	844	30-015-00867	ARCO OIL & GAS	11	18S	27E	D	6114	P&A	EMPIRE ABO UNIT M NO. 13	4/26/1958	660N	660W	O
7/10/1978	846	30-015-22556	ARCO OIL & GAS	11	18S	27E	D	6325	P&A	EMPIRE ABO UNIT M NO. 131	7/10/1978	1100 N	1200 W	O
10/16/1971	848	30-015-20510	AMOCO PRODUCTION CO	11	18S	27E	F	10168	P&A	MALCO S NO. 1	10/16/1971	1650 N	1653 W	O
2/3/1961	849	30-015-00865	ARCO OIL & GAS	11	18S	27E	F	6208	P&A	EMPIRE ABO UNIT N NO. 14	2/3/1961	1650 N	1980 W	O
3/27/1958	850	30-015-00866	ARCO OIL & GAS	11	18S	27E	E	6120	P&A	EMPIRE ABO UNIT N NO. 131	3/27/1958	1980 N	660W	O
9/1/1956	851	30-015-00870	AMOCO PRODUCTION CO	11	18S	27E	J	7270	P&A	SMITH-MCPHERSON NO. 1	9/1/1956	1980 S	1980E	O
	852	30-015-01201	OSCAR HOWARD	11	18S	27E	N	1828	P&A	AN ETZ #3	4/15/2027			
	853	30-015-01202	OSCAR HOWARD	11	18S	27E	O	1827	P&A	AN ETZ #2	2/4/2027			
10/14/1949	854	30.015-00863	B.R. POLK, JR.	11	18S	27E	N	1794	P&A	VICKERS #1	10/14/1949			
5/18/1984	855	30-015-24857	CHESAPEAKE OPERATING INC	11	18S	27E	M	11915	ACTIVE	FEDERAL DH GAS COM #001		700S	990W	G
8/7/1973	856	30-015-20535	ROBERT G COX	12	18S	27E	D	6248	P&A	FEDERAL EA 2	8/7/1973	330N	455W	O
4/12/1994	857	30-015-00871	RHONDA OPERATING CO	12	18S	27E	D	6253	P&A	FEDERAL EA #001	4/12/1994	330N	330W	O
3/16/1980	858	30-015-23115	RHONDA OPERATING CO	12	18S	27E	D	6295	D&A	FEDERAL EA NO. 3	3/16/1980	330N	380W	O
4/25/1987	859	30-015-25738	HARLOW ENTERPRISES LLC	12	18S	27E	G	1586	ACTIVE	COMSTOCK FEDERAL #009		2310 N	2310E	O
4/23/1985	860	30-015-25270	BILL MILLER	12	18S	27E	F	1600	ACTIVE	CHUKKA FEDERAL #001		2310 N	2310 W	O
7/18/1973	861	30-015-20894	NAVAJO REFINING COMPANY	12	18S	27E	E	10372	ACTIVE	WDW #002		1980 N	660W	I
6/29/1948	862	30-015-00874	HARLOW ENTERPRISES LLC	12	18S	27E	J	3664	ACTIVE	COMSTOCK FEDERAL #007		2310 S	2355E	O
	863	30-015-00872	MCKEE-JONES	12	18S	27E	L	594	D&A	MAGRUDER NO. 1	2/18/1943	310S	990W	O

3/16/1985	864	30-015-25201	HARLOW ENTERPRISES LLC	12	18S	27E	K	1600	ACTIVE	COMSTOCK FEDERAL #002		1650 S	1770 W	O
	865	30-015-25649	*FRED POOL* DRILLING CO	12	18S	27E	L	2000	D&A	*COMSTOCK* FEDERAL NO. 8	10/10/1986	*1650* S	990W	O
5/19/1986	866	30-015-25545	HARLOW ENTERPRISES LLC	12	18S	27E	M	1530	ACTIVE	COMSTOCK FEDERAL #003		990S	990W	O
2/27/1945	867	30.015-00873	R.E. McKEE ET AL	12	18S	27E	M	2510	P&A	MAGRUDER #2	2/27/1945			
1/23/2003	868	30-015-26017	EASTLAND OIL CO	12	18S	27E	N	2040	P&A	COMSTOCK FEDERAL #010	1/23/2003	990S	1650 W	O
12/10/1984	869	30-015-25100	HARLOW ENTERPRISES LLC	12	18S	27E	N	2400	ACTIVE	COMSTOCK FEDERAL #001		330S	1650 W	O
4/19/1985	870	30-015-25202	HARLOW ENTERPRISES LLC	12	18S	27E	O	1625	ACTIVE	COMSTOCK FEDERAL #005		330S	2310E	O
	871	30-015-06171	PILCHER OIL & GAS	12	18S	27E	I	2200	P&A	MICHAEL CRONIN NO. 3	5/20/2026	1069 S	251E	O
2/15/1932	872		PILCHER OIL & GAS	12	18S	27E	P	2002	P&A	MICHAEL CRONIN #1	2/15/1932			
7/30/1952	873	30-015-00875	CITIES SERVICE OIL CO	12	18S	27E	P	2000	P&A	MAGRUDER NO. B-4	7/30/1952	330S	330E	O
2/8/1954	874	30-015-00876	ROBERT E MCKEE	12	18S	27E	P	1994	P&A	MAGRUDER NO. 5	2/8/1954	100S	500E	O
	875	30-015-06170	PILCHER OIL & GAS	12	18S	27E	P	2004	P&A	MICHAEL CRONIN NO. 2	2/22/2026	200S	200E	O
	876	30-015-01200	HASSENFUSH-DONNELLY	13	18S	27E	A	2030	P&A	STATE NO. 1	1/1/2026	0	0	O
	877	30-015-06137	EASTLAND OIL CO	13	18S	27E	A	2696	D&A	STATE NO. 2	1/1/2026	250N	990E	O
9/28/1985	878	30-015-25394	BILL MILLER	13	18S	27E	C	1613	ACTIVE	ARTESIA STATE #002		330N	2310 W	O
4/13/1985	879	30-015-25241	BILL MILLER	13	18S	27E	C	1575	ACTIVE	ARTESIA STATE #001		330N	1650 W	O
1/29/1945	880	30-015-00884	DALE RESLER	13	18S	27E	C	2047	P&A	STATE NO. 3	1/29/1945	990N	1650 W	O
8/27/1985	881	30-015-25370	CBS OPERATING CORP	13	18S	27E	D	1608	ACTIVE	ARTESIA STATE UNIT #002A		480N	940W	O

12/11/1944	882	30-015-00883	CBS OPERATING CORP	13	18S	27E	D	1950	ACTIVE	STATE UNIT #001		990N	990W	O
1/26/1945	883	30-015-00880	DALE RESLER - JONES	13	18S	27E	E	2353	P&A	STATE NO. 1	1/26/1945	1650 N	990W	O
6/18/1984	*884*	*30-015-24881*	*DAVID G HAMMOND*	*13*	*18S*	*27E*	*F*	*3020*	*ACTIVE*	*ANADARKO 13 FEDERAL #001*		*1880 N*	*1830 W*	*O*
11/28/1954	885	30-015-00888	RALPH NIX & JERRY CURTIS	13	18S	27E	F	2000	P&A	PAGE NO. 1	11/28/1954	1980 N	1650 W	O
3/14/1945	886	30-015-00879	DALE RESLER	13	18S	27E	F	2000	D&A	NO. 1	3/14/1945	N	W	O
12/30/1984	888	30-015-25078	DICKSON PETROLEUM, INC	13	18S	27E	G	2150	D&A	ANADARKO 13 FEDERAL NO. 1	12/30/1984	1724 N	2279E	O
6/30/1944	895	30-015-00891	ANADARKO PETROLEUM CORP	14	18S	27E	A	2060	P&A	STATE UNIT TRACT 4 NO. 1	6/30/1944	990N	330E	O
1/2/1900	896	30-015-00893	RESLER	14	18S	27E	G	2375	D&A	STATE NO. 1	1/2/1900	1650 N	1650E	O
2/8/1945	897	30-015-00895	CBS OPERATING CORP	14	18S	27E	H	1888	ACTIVE	ARTESIA STATE UNIT #001B		1650 N	330E	O
6/18/1948	901	30-015-00695	WILLIAM & EDWARD HUDSON	1	18S	27E	L	1763	D&A	HILL NO. 1	6/18/1948	1650 S	330W	O
	910	30-015-00744	COMPTON-SMITH	2	18S	27E	J	1080	P&A	STATE 1		S	1640E	O
	911	30-015-31123	LIME ROCK RESOURCES A, LP	36	17S	27E	H	10050	ACTIVE	NO BLUFF 36 STATE COM #002		1980 N	760E	G
	912	30-015-31036	GEORGE A CHASE JR & C SERVICE	36	17S	27E	H	614	ACTIVE	GATES STATE #003		2310 N	990E	O
12/21/2001	916	30-015-31592	ROJO GRANDE COMPANY LLC	36	17S	27E	N	612	P&A	RAMAPO #007	12/21/2001	330S	2310E	O
	917	30-015-30784	LIME ROCK RESOURCES A, LP	31	17S	28E	A	3300	ACTIVE	NW STATE #012		330N	480E	O
	918	30-015-30893	LIME ROCK RESOURCES A, LP	31	17S	28E	A	2808	ACTIVE	NW STATE #028		973N	959E	O
4/3/2003	919	30-015-32162	LIME ROCK RESOURCES A, LP	31	17S	28E	D	3460	ACTIVE	ENRON STATE #004		460N	990W	O
	920	30-015-30783	LIME ROCK RESOURCES A, LP	31	17S	28E	H	3205	ACTIVE	NW STATE #011		1650 N	330E	O

	921	30-015-30849	LIME ROCK RESOURCES A, LP	31	17S	28E	I	3195	ACTIVE	NW STATE #009		2310 S	270E	O
	922	30-015-30760	LIME ROCK RESOURCES A, LP	31	17S	28E	P	3210	ACTIVE	NW STATE #010		735S	330E	O
	923	30-015-31920	LIME ROCK RESOURCES A, LP	32	17S	28E	D	4030	ACTIVE	ENRON STATE #002		990N	990W	O
	924	30-015-30781	LIME ROCK RESOURCES A, LP	32	17S	28E	K	3190	ACTIVE	NW STATE #005		1900 S	2146 W	I
	925	30-015-30777	LIME ROCK RESOURCES A, LP	32	17S	28E	L	3204	ACTIVE	NW STATE #006		2310 S	990W	O
	926	30-015-30685	LIME ROCK RESOURCES A, LP	32	17S	28E	M	3220	ACTIVE	NW STATE #007		990S	990W	O
	927	30-015-30815	LIME ROCK RESOURCES A, LP	32	17S	28E	N	3310	ACTIVE	NW STATE #008		1090 S	2126 W	I
5/4/2004	928	30-015-32310	MARBOB ENERGY CORP	1	18S	27E	A	4000	ACTIVE	AAO FEDERAL #004		990N	990E	O
4/10/2003	929	30-015-32309	MARBOB ENERGY CORP	1	18S	27E	B	4125	ACTIVE	AAO FEDERAL #003		330N	1690E	O
9/19/2002	930	30-015-32308	MARBOB ENERGY CORP	1	18S	27E	C	4150	ACTIVE	AAO FEDERAL #002		430N	2310 W	O
12/10/2002	931	30-015-32307	MARBOB ENERGY CORP	1	18S	27E	D	3851	ACTIVE	AAO FEDERAL #001		330N	990W	O
6/28/1980	932	30-015-22816	ARCO OIL & GAS	1	18S	27E	O	6350	ABAN LOCATION	EMPIRE ABO UNIT L #192	6/23/1980	1120 S	1440E	O
	933	30-015-20388	ARCO OIL & GAS	1	18S	27E	N	6300	SAME AS 158	EMPIRE ABO #5	12/31/9999	990S	2297E	O
	934	30-015-27719	MEWBOURNE OIL CO	12	18S	27E			ABAN LOCATION	CHALK BLUFF 12 FED #001		1650 S	990E	G
	935	30-015-27437	YATES PETROLEUM CORPORATION	14	18S	27E	B	0	ABAN LOCATION	BEAUREGARD ANP STATE COM #001		660N	1980E	G
3/11/2008	936	30-015-31086	MARBOB ENERGY CORP	5	18S	28E	E	4503	P&A	LP STATE #001	3/11/2008	1650 N	990W	O
	937	30-015-31109	MARBOB ENERGY CORP	5	18S	28E	E	0	PROPOSED	LP STATE #002		2301 N	230W	O
	938	30-015-30785	LIME ROCK RESOURCES A, LP	6	18S	28E	A	3225	ACTIVE	NW STATE #015		430N	330E	O

5/23/1979	939	30-015-00264	BARNEY COCKBURN	6	18S	28E	J	2095	SAME AS 114	CAPITAL STATE NO. 1		2310 S	2310E	O
7/15/2000	940	30-015-31087	MARBOB ENERGY CORP	6	18S	28E	M	4466	P&A	LP STATE #003	3/17/2008	990S	330W	O
	941	30-015-31088	MARBOB ENERGY CORP	6	18S	28E	M	0	PROPOSED	LP STATE #004		330S	990W	O
	942	30-015-06250	BP AMERICA PRODUCTION COMPANY	6	18S	28E	O	0	SAME AS 89			470S	2170E	O
1/31/2001	943	30-015-31319	EASTLAND OIL CO	7	18S	28E	E	1630	ACTIVE	LAUREL STATE #003		2310 N	330W	O
	944	30-015-26575	NAVAJO REFINING COMPANY	6	18S	28E	D		ACTIVE	(ORIGINAL LOC.)		778N	995W	I
10/12/2004	945	30-015-32959	MARBOB ENERGY CORP	1	18S	27E	E	3900	ACTIVE	AAO FEDERAL #005		1650 N	875W	O
4/4/2005	946	30-015-33473	MARBOB ENERGY CORP	1	18S	27E	G	4100	ACTIVE	AAO FEDERAL #007		1750 N	1650S	O
2/25/2005	947	30-015-33784	MARBOB ENERGY CORP	1	18S	27E	H	4310	ACTIVE	AAO FEDERAL #008		1650 N	330W	O
8/5/2005	948	30-015-34071	MARBOB ENERGY CORP	1	18S	27E	F	4000	ACTIVE	AAO FEDERAL #006		2169 N	1963 W	O
1/17/2006	949	30-015-34387	MARBOB ENERGY CORP	1	18S	27E	L	3950	ACTIVE	AAO FEDERAL #009		1980 S	630W	O
3/9/2006	950	30-015-34555	MARBOB ENERGY CORP	1	18S	27E	M	4100	ACTIVE	AAO FEDERAL #011		890S	660W	O
10/26/2006	951	30-015-34576	MARBOB ENERGY CORP	1	18S	27E	K	4000	ACTIVE	AAO FEDERAL #010		2060 S	2160 W	O
9/21/2006	952	30-015-34998	MARBOB ENERGY CORP	1	18S	27E	N	4075	ACTIVE	AAO FEDERAL #012		890S	1650 W	O
12/17/2006	953	30-015-34028	BP AMERICA PRODUCTION	6	18S	28E	G	10433	P&A	SLIDER 6 STATE NO. 001	12/17/2006	2285 N	1366E	O
12/21/2006	954	30-015-35050	LIME ROCK RESOURCES A, LP	32	17S	28E	D	3810	ACTIVE	ENRON STATE NO 012		330N	500W	O
2/20/2009	955	30-015-36939	YATES PETROLEUM CORP	14	18S	27E	A	10500	EXT PERMIT TO DRILL	VIOLET BIV STATE COM #1		660N	990E	O

4/20/2005	956	30-015-33994	EDGE PETROLEUM OPERATING COMPANY, INC	36	17S	27E	A	3650	ACTIVE	RED LAKE 36 A STATE #2		915N	420E	O
6/6/2008	957	30-015-36116	FAIRWAY RESOURCES OPERATING LLC	36	17S	27E	G	2100	ACTIVE	SOUTH RED LAKE UNIT II #57		2305 N	1650E	O
4/26/2005	958	30-015-32946	MARBOB ENERGY CORPORATION	2	18S	27E	J	3880	ACTIVE	SCBP STATE #1		2210 S	1650E	O
1/11/2008	959	30-015-35814	MACK ENERGY CORPORATION	2	18S	27E	H	7545	ACTIVE	STATE H NO 2		2063 N	441E	O
7/9/2008	960	30-015-36343	GEORGE A CHASE JR DBA G AND C SERVICE	31	17S	28E	G	633	ACTIVE	MALCO STATE NO. 002		1650 N	2310E	O
7/3/2009	961	30-015-36978	LIME ROCK RESOURCES A, LP	31	17S	28E	D	3700	ACTIVE	ENRON STATE NO. 015		990N	330W	O
1/30/2009	962	30-015-36554	LIME ROCK RESOURCES A, LP	32	17S	28E	L	3450	ACTIVE	NW STATE NO. 029		1770 S	550W	O
7/14/2009	963	30-015-36989	LIME ROCK RESOURCES A, LP	32	17S	28E	K	3405	NO COMPL	NW STATE NO. 030		1630 S	1710 W	O
7/28/2009	964	30-015-37057	LIME ROCK RESOURCES A, LP	32	17S	28E	N	3500	NO COMPL	NW STATE NO. 031		330S	1750 W	O
8/23/2009	965	30-015-37058	LIME ROCK RESOURCES A, LP	32	17S	28E	M	3425	NO COMPL	NW STATE NO. 032		330S	330W	O

TABLE III

Well Changes in the Combined One Mile Area of Review Since the Revised 2003 Permit for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
1	30 015 00693	A	36	17S	27E	330 FNL & 330 FEL	Delhi No 001	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service
3	30 015 00646	A	36	17S	27E	990 FNL & 330 FEL	Delhi No 007	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service
4	30 015 00668	G	36	17S	27E	1650 FNL & 2310 FEL	South Red Lake II Unit #10	Fairway Resources Operating LLC	Recomp Well: Change of Owner: McQuadrangle LC to Fairway Resources Operating LLC
5	30 015 00690	G	36	17S	27E	1830 FNL & 2205 FEL	Conklin No. 2	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service
6	30 015 00667	G	36	17S	27E	2310 FNL & 2310 FEL	South Red Lake II Unit #11	Fairway Resources Operating LLC	Change of Owner: McQuadrangle LC to Fairway Resources Operating LLC
7	30 015 00666	G	36	17S	27E	2310 FNL & 2310 FEL	Conklin State #1	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service
8	30 015 00689	H	36	17S	27E	1650 FNL & 330 FEL	Gates State #1	George A Chase JR DBA and C Service	P&A Well: Fill hole to surf with concrete Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service
9	30 015 00647	H	36	17S	27E	1650 FNL & 990 FEL	Gates State #2	Aspen Oil Inc	P&A Well: 7" Casing pulled from 120' The hole was filled from 380' to surf with 29 cuyd of concrete
10	30 015 00669	H	36	17S	27E	2310 FNL & 330 FEL	Homan #1	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service
26	30 015 00683	N	36	17S	27E	965 FSL & 1650 FWL	South Red Lake II Unit #28	Fairway Resources Operating LLC	Recomp Well: Drill out cmt plugs, tag at 1805', run 4-1/2" liner to 1390' to surf and cmt 316 sks, prod 1450' to 1800' Change of Owner: McQuadrangle LC to Fairway Resources Operating LLC
27	30 015 01218	N	36	17S	27E	330 FSL & 2310 FWL	Empire Abo Unit No. 18	BP America Production Company	T&A Well: Tested Casing to 500 psi w/CIBP 5846'+35' cmt, bad casing 5552'-5560'
29	30 015 01251	O	36	17S	27E	660 FSL & 1980 FEL	Empire ABO Unit No. 19	BP America Production Company	P&A Well: Set CIBP 5600' with 25 sks cmt on top (TOC at 5360'), spot 9.5 ppg mud from 5360' to 3359', spot 50 sk cmt plug from 3359' to 2849', spot 9.5 mud from 2849' to 1172', circulated cmt from 1172' to surface..
31	30 015 00677	P	36	17S	27E	330 FSL & 990 FEL	Empire Abo Unit No. 20	BP America Production Company	P&A Well: CIBP 5457', Spot 25 sk cmt plug 5474' to 5100', spot 9 ppg mud from 5100' to 3350', perf at 3350' inj 100 sk cmt and spot plug at 2980', perf at 1150' and circulate to surface 400 sks cmt
34	30 015 21594	B	31	17S	28E	330 FNL & 1650 FEL	Powco State No 001	Finney Oil Company	Change of Owner Rodney B. Webb dba-Webb Oil Co to Darrel Finney dba Finney Oil Company
36	30 015 25621	B	31	17S	28E	980 FNL & 1620 FEL	Powco State No 002	Finney Oil Company	Change of Owner Rodney B. Webb dba-Webb Oil Co to Darrel Finney dba Finney Oil Company
37	30 015 01633	D	31	17S	28E	330 FNL & 330 FWL	Aston & Fair A No 001	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Inc to George A Chase JR DBA G and C Service
40	30 015 02666	E	31	17S	28E	2310 FNL & 330 FWL	Hudson Saikin State No. 001	Doral Energy Corp.	Change of Owner: Hanson Energy to Doral Energy Corp.
41	30 015 24887	E	31	17S	28E	2310 FNL & 990 FWL	Hudson Saikin State No. 002	Doral Energy Corp.	Change of Owner: Hanson Energy to Doral Energy Corp.
42	30 015 01643	F	31	17S	28E	2310 FNL & 2260 FWL	Empire Abo Unit No. 022	BP America Production Company	P&A Well: CIBP 5615' + 25 sks Class C cmt; bottom plug set from 5365'-5615'; 145 sks Class C cmt from 0-1320'; Top plug set at 297'
43	30 015 01635	F	31	17S	28E	2310 FNL & 2310 FWL	Aston & Fair No 001Y	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Inc to George A Chase JR DBA G and C Service
44	30 015 01637	G	31	17S	28E	2310 FNL & 2310 FEL	Malco State No 001	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Inc to George A Chase JR DBA G and C Service
46	30 015 10537	H	31	17S	28E	2277 FNL & 330 FEL	Northwest Artesia Unit No. 004	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
47	30 015 10833	I	31	17S	28E	1980 FSL & 660 FEL	Northwest Artesia Unit No. 010	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
48	30 015 01644	I	31	17S	28E	1650 FSL & 330 FEL	Empire Abo Unit No. 024A	BP America Production Company	P&A Well: CIBP 5750' + 25 sks Class C cmt ; 25 sks Class C cmt from 3370' to 1187';135 sks Class C cmt from 1187'-surface.
49	30 015 01642	J	31	17S	28E	1650 FSL & 2310 FEL	State FW No. 001	Doral Energy Corp.	Change of Owner: Hanson Energy to Doral Energy Corp.
50	30 015 01650	J	31	17S	28E	1650 FSL & 1958 FWL	Empire ABO Unit No. 023A	BP America Production Company	P&A Well: CIBP 5563'+8 sks cmt+ mud 9.5 ppg, 25 sks cmt plug 2997'-3230', 25 sks cmt plug 1060' to 1290', 25 sks cir cmt 370' to surf
51	30 015 01651	K	31	17S	28E	1650 FSL & 2387 FWL	Empire Abo Unit No. 022B	BP America Production Company	Proposal to P&A as of 9/18/2009

TABLE III

Well Changes in the Combined One Mile Area of Review Since the Revised 2003 Permit for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
52	30 015 01640	L	31	17S	28E	2310 FSL & 330 FWL	Rampo No. 002	Doral Energy Corp.	Change of Owner: Hanson Energy to Doral Energy Corp.
54	30 015 01639	M	31	17S	28E	990 FSL & 330 FWL	Rampo No. 001	Doral Energy Corp.	Change of Owner: Hanson Energy to Doral Energy Corp.
55	30 015 01647	M	31	17S	28E	660 FSL & 660 FWL	Empire ABO Unit No. 021	BP America Production Company	P&A Well: CIBP 5726'+35 sks cmt+ mud 9.5 ppg, 25 sks cmt plug 3608'-3708', 25 sks cmt plug 946' to 1046', 25 sks cmt plug 400' to 500', 10 sks cmt plug+sqz 60' to surf
56	30 015 01646	N	31	17S	28E	660 FSL & 2082 FEL	Empire ABO Unit No. 22A	BP America Production Company	Put back into Prod.
57	30 015 10118	N	31	17S	28E	766 FSL & 2188 FWL	State FV No. 001	Doral Energy Corp.	Change of Owner: Hanson Energy to Doral Energy Corp.
60	30 015 01649	O	31	17S	28E	660 FSL & 1939 FEL	Empire Abo Unit No. 023	BP America Production Company	P&A Well: CIBP at 5740' + + 25 sks Class C cmt; Spot 250 ft balanced cmt plug from 3600'-3350' with 25 sks Class C cmt; spot 250 ft cmt plug from 2250'-2000' using 25 sks Class C cmt; 1250'-surface with 125 sks Class C cmt.
61	30 015 20042	P	31	17S	28E	990 FSL & 660 FEL	Northwest Artesia Unit No. 11	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
64	30 015 01671	E	32	17S	28E	2280 FNL & 978 FWL	Empire Abo Unit No. 025B	BP America Production Company	P&A Well: CIBP 5510' with 25 sks Class C cmt; 1120'-159' pumped 25 sks Class C cmt; 17 sks Class C from 159'-surface
65	30 015 01657	F	32	17S	28E	2280 FNL & 1980 FWL	AA State No. 001	Marbob Energy Corp.	Change of Owner: BP America Production Company to Marbob Energy Corp.; Recomplete: Proposal to plug back and perforate, acidize, test, and possibly frac the Yeso 1 (4288'-4525'), Yeso 2 (3880'-4173'), and Yeso 3 (3523'-3715').
66	30 015 10818	K	32	17S	28E	2310 FSL & 2105 FWL	Northwest Artesia Unit No. 008	SDX Resources Inc.	P&A Well: CIBP 1800'+25 sks cmt+ mud 9 ppg, 35 sks cmt plug+sqz 1240'-1080', 70 sks cmt plug+sqz 512' to 200', 15 sks cmt plug+sqz 60' to surf
68	30 015 10795	L	32	17S	28E	2310 FSL & 660 FWL	Northwest Artesia Unit No. 009	Lime Rock Resources A, LP	Change of Owner: from SDX Resources Inc. to Lime Rock Resources A, LP. P&A Well: Set 100 ft plug at 1821'-1721' and spot 25 sks cmt at 1821'; Tag plug at 1451' and spot 25 sks cmt and circ to surface.
70	30 015 20043	M	32	17S	28E	990 FSL & 760 FWL	Northwest Artesia Unit No. 012	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
71	30 015 01660	M	32	17S	28E	660 FSL & 660 FWL	Empire Abo Unit No. 025	BP America Production Company	P&A Well: CIBP set at 5700' and pump 25 sks cmt plug on CIBP; pump 60 sks cement plug at 1250';
72	30 015 10834	N	32	17S	28E	990 FSL & 2030 FWL	Northwest Artesia Unit No. 013	SDX Resources Inc.	P&A Well: CIBP 1856'+25 sks cmt+ mud 9 ppg, 35 sks cmt plug+sqz 1300'-998', 40 sks cmt plug+sqz 543' to 160', 10 sks cmt plug+sqz 60' to surf
73	30 015 01659	N	32	17S	28E	660 FNL & 1980 FWL	Empire ABO Unit No. 026A	BP America Production Company	Recomp Well: New Perf in ABO 5651'-6118'
74	30 015 21539	N	32	17S	28E	150 FSL & 1400 FWL	Empire ABO Unit No. 261	BP America Production Company	Recomp Well: New Perf in ABO 5690'-5954'
75	30 015 22009	O	32	17S	28E	330 FSL & 2481 FWL	Empire ABO Unit No. 272	BP America Production Company	Recomp Well: New Perf in ABO 5714'-6120'
76	30 015 02606	C	05	18S	28E	330 FNL & 1941 FWL	Empire ABO Unit No. 026E	BP America Production Company	Recomp Well: New Perf in ABO 5662'-5907'
77	30 015 22697	C	05	18S	18E	1080 FNL & 1914 FWL	Empire Abo Unit No. 261A	BP America Production Company	P&A Well: CIBP set at 5949' and spotted 25 sks Class C cmt onto CIBP, spotted 90 sks Class C cmt from 2712'-3705', spotted 155 sks Class C cmt from 0'-1385'
78	30 015 02607	D	05	18S	28E	660 FNL & 660 FWL	Empire ABO Unit No. 025C	BP America Production Company	Recomp Well: New Perf in ABO 5760"
80	30 015 02608	E	05	18S	28E	1660 FNL & 330 FWL	State E Al No. 001	Conoco Phillips Company	P&A Well: CIBP 6000'+20 sks cmt+ mud, 25 sks cmt plug 3642'-3542', 45 sks cmt plug+sqz 3380'-3249', 45 sks cmt plug+sqz 1199'-1065', 25 sks cmt plug+sqz 900', 175 sks cmt cir 500' to surf, 85 sks cmt sqz 100' to surf
81	30 015 24485	E	05	18S	28E	1980 FNL & 990 FWL	Illinois Camp A Com No. 001	Conoco Phillips Company	
83	30 015 25522	L	05	18S	28E	2240 FSL & 400 FWL	Walter Solt State No. 001	I & W Inc	
87	30 015 20019	A	06	18S	28E	330 FNL & 330 FEL	Northwest Artesia Unit No. 016	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
88	30 015 02615	A	06	18S	28E	660 FNL & 660 FEL	Empire ABO Unit No. 24B	BP America Production Company	Recomp Well: PBTD 6205' CIBP 6091', New Perf in ABO 5794'-5924'
90	30 015 21542	B	06	18S	28E	1260 FNL & 1580 FEL	Empire ABO Unit No. 231	BP America Production Company	Recomp Well: PBTD 6222' New Perf in ABO 5850'-6018'
94	30 015 23116	E	06	18S	28E	2050 FNL & 100 FWL	Empire ABO Unit No. 213	BP America Production Company	Recomp Well: New Perf in ABO 5606'-5796'
96	30 015 22637	E	06	18S	28E	2450 FNL & 400 FWL	Empire ABO Unit No. 212	BP America Production Company	Recomp Well: PBTD 6203' New Perf in ABO 5588'-6080'
100	30 015 10107	F	06	18S	28E	1874 FNL & 1874 FWL	State FX No. 001	Doral Energy Corp.	Change of Owner: Hanson Energy to Doral Energy Inc
104	30 015 22913	G	06	18S	28E	1750 FNL & 1600 FEL	Empire Abo Unit No. 235	BP America Production Company	Recomplete: Set CIBP to shut off water. Set at 6176'
105	30 015 22593	G	06	18S	28E	1900 FNL & 2441 FEL	Empire Abo Unit No. 234	BP America Production Company	P&A Well: CIBP set at 3910' and spot 25 sks cmt, spot 25 sks cmt at 1310'

TABLE III

Well Changes in the Combined One Mile Area of Review Since the Revised 2003 Permit for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
106	30 015 02614	G	06	18S	28E	1980 FNL & 1980 FEL	Empire ABO Unit No. 23B	BP America Production Company	Recomp Well: PBTD 6240', New Perf in ABO 5842'-6142'
107	30 015 21737	G	06	18S	28E	2253 FNL & 1576 FEL	Empire Abo Unit No. 232	BP America Production Company	P&A Well: CIBP set at 5900', spot 25 sks cmt from 5900'-5650', spot 25 sks cmt plug from 5157'-4916', spot 25 sks cmt from 3735'-3494', 150 sks cmt from 1374' to surface.
109	30 015 22490	G	06	18S	28E	2550 FNL & 2050 FEL	Empire ABO Unit No. 233	BP America Production Company	P&A Well: CIBP set at 6060' and spot 25 sks cmt 6,060'-5813', 25 sks balanced cmt plug 3614'-3372', pump 85 sks surface cmt plug
111	30 015 23547	H	06	18S	28E	1950 FNL & 660 FEL	Empire Abo Unit No. 241	BP America Production Company	P&A Well: CIBP set at 6100' and spot 25 sks cmt from 6100'-5950', spot 25 sks cmt from 4064' to 3668', pump 70 sks cmt from 850' to surface.
112	30 015 02617	I	06	18S	28E	2310 FSL & 990 FEL	Empire ABO Unit No. 24K	BP America Production Company	P&A Well: CIBP 6220'+25 sks cmt, 25sks cmt plug+sqz 3642'-3395', 160sks cmt plug+sqz 771'-220', cir 35sks cmt fom 60' to surf
113	30 015 22528	J	06	18S	28E	2300 FSL & 1570 FEL	Empire ABO Unit No. 232A	BP America Production Company	P&A Well: CIBP set at 6174' and spotted 25 sks Class C, spotted 25 sks class C cmt at 3640'-3455', 130 sks Class C from 1260' to surface
115	30 015 02628	J	06	18S	28E	2260 FSL & 2270 FEL	Empire ABO Unit No. 23D	BP America Production Company	P&A Well: CIBP set at 6060' with 25 sks Class C cmt, 3494'-779' : 75 sks Class C cmt
116	30 015 22491	J	06	18S	28E	1700 FSL & 2350 FEL	Empire ABO Unit No. 231B	BP America Production Company	P&A Well: CIBP set at 6150' and pump 35 sks Class C cmt, pump 70 sks cmt from 5800'-4105', pump 140 sks Class C cmt from 1350' to surface.
122	30 015 23548	L	06	18S	28E	1950 FSL & 1000 FWL	Empire ABO Unit No. 211A	BP America Production Company	Resumed Production
123	30 015 02627	M	06	18S	28E	949 FSL & 990 FWL	State M-AI No. 002	Ruth Oil Co, LLC	Change of Owner: Penrock Oil Corp to Ruth Oil Co, LLC
133	30 015 00710	C	01	18S	27E	660 FNL & 1980 FWL	AAO Federal No. 013	Marbob Energy Corp.	Change of Owner: from BP America Production Company to Marbob Energy Corp; Recomp: Perf the Yeso 1 from 4581'-4944' and acdz w/ 2000 gal NE Fe 15% HCL; Perf the Yeso 2 from 3990'-4395' and acdz w/ 2500 gal NE Fe 15% HCl; Perf the Yeso 3 from 3377'-3678' and acdz w/ 2500 gal NE Fe 15% HCl; Well producing as single from 3377'-4395'.
145	30 015 00697	I	01	18S	27E	1980 FSL & 660 FWL	Empire ABO Unit No. 020K	BP America Production Company	P&A Well: CIBP 5840'+25 sks cmt, 35sks cmt plug+sqz 3039'-2737', 50sks cmt plug+sqz 2300'-1425', cir 95sks cmt to surf
152	30 015 22096	K	01	18S	27E	2370 FSL & 1510 FWL	Empire Abo Unit No. 183	BP America Production Company	Recomp Well: New perf at 5641'-6053'. Acdz with 15% HCL.
153	30 015 21554	K	01	18S	27E	1367 FSL & 1440 FWL	Empire ABO Unit No. 181	BP America Production Company	P&A Well: CIBP 5940'+25 sks cmt+9.5 ppg mud, 25sks cmt plug 3000'-2900', 25sks cmt plug 1050'-950', 10sks cir cmt plug 60'-surf
154	30 015 00707	K	01	18S	27E	1980 FSL & 1980 FWL	Empire Abo Unit No. 018B	BP America Production Company	Return to Prod: 5/19/09
156	30 015 00713	N	01	18S	27E	995 FSL & 1644 FWL	Empire ABO Unit No. 018D	BP America Production Company	P&A Well: CIBP 5934'+25 sks cmt+9.5 ppg mud, 25sks cmt plug 3788'-3688', 25sks cmt plug 1520'-1420', 25sks sqz cmt plug 635'-535', cir cmt 60'-surf
159	30 015 00698	O	01	18S	27E	660 FSL & 1980 FEL	Empire Abo Unit No. 191	BP America Production Company	Reclamation of plugged well: installed liner and waiting for reclamation inspection.
161	30 015 26404	A	12	18S	27E	660 FNL & 990 FEL	Federal T #1	Devon Energy Production Company LP	Conversion to Salt Water Disposal Well. Inject into the Cisco at 7758'-8060'
162	30 015 25099	H	12	18S	27E	1809 FNL & 990 FEL	Comstock Federal No 6	Harlow Enterprises LLC	Change of Owner Eastland Oil Co to Harlow Enterprises LLC
354	30 015 24612	M	36	17S	27E	790 FSL & 990 FWL	State M No. 1	Pronghorn Management Corp	P&A Well: Spot 35 sks cmt from 1216' to 830', spot 30 sks cmt from 350' to surface.
355	30 015 00676	M	36	17S	27E	330 FSL & 990 FWL	Empire Abo Unit No. 17	BP America Production Company	Prod: Return well to production
356	30 015 10184	M	36	17S	27E	330 FSL & 920 FWL	State No 6	Aspen Oil Inc	Change of Owner: Pronghorn Management Corp to Aspen Oil Company Inc.
358	30 015 21623	M	36	17S	27E	360 FSL & 455 FWL	State No 7	Aspen Oil Inc	Change of Owner: Pronghorn Management Corp to Aspen Oil Company Inc.
595	30 015 02605	B	05	18S	28E	330 FNL & 2271 FEL	Empire Abo Unit No. 027E	BP America Production Company	P&A Well: CIBP set at 5700'and pump 25 sks cmt to 3760', Pump 150 sks cmt at 204'.
748	30 015 00715	D	01	18S	27E	330 FNL & 330 FWL	S Red Lake II Unit No. 037	Fairway Resources Operating LLC	Change of Owner McQuadrangle LC to Fairway Resources LLC
752	30 015 00703	L	01	18S	27E	1980 FSL & 660 FWL	Empire ABO Unit No. 017A	BP America Production Company	Recomp Well: PBD 6101', CIBP 5823', New Vert Perf in Abo 5472'-5736'
752	30 015 00703	L	01	18S	27E	1980 FSL & 660 FWL	Empire Abo Unit No. 017A	BP America Production Company	P&A Well: CIBP 5770' + 20 sks cmt, CIBP 5420' + 25 sks cmt from 5420'-5179', 25 sks cmt from 3416'-3175', 170 sks cmt from 1566' to surface.

TABLE III

Well Changes in the Combined One Mile Area of Review Since the Revised 2003 Permit for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
756	30 015 00705	M	01	18S	27E	660 FNL & 1980 FWL	Empire ABO Unit No. 017B	BP America Production Company	P&A Well: CIBP 6000'+25 sks cmt+9.5 ppg mud, 25sks cmt plug 3707'-3807', 25sks cmt plug 1446'-1546', 35sks cir cmt plug surf'-654'
758	30 015 00721	A	02	18S	27E	330 FNL & 990 FEL	Red Lake Unit II No 36	Fairway Resources Operating LLC	Change of Owner: McQuadrangle LC to Fairway Resources Operating LLC
765	30 015 00724	A	02	18S	27E	990 FNL & 330 FEL	Empire Abo Unit No. 16B	BP America Production Company	Recomp Well: New Perf in ABO 5444'-5786'
766	30 015 00737	B	02	18S	27E	905 FNL & 1610 FEL	South Red Lake II Unit #38	Fairway Resources Operating LLC	Change of Owner: McQuadrangle LC to Fairway Resources Operating LLC Recomp Well: Plugback 75 sks cmt 1430'-1530' & complete in Grayburg
772	30 015 00745	H	02	18S	27E	1980 FNL & 660 FEL	State H No 1	Mack Energy Corporation	Change of Owner:H&S Oil LLC to Mack Energy Corporation P&A Well: CIBP 5300'+35 sks cmt+ mud 9.5 ppg, 25 sks cmt plug 2872'-2504', 25 sks cmt plug 1267' to 899', 15 sks cmt plug 164' to surf
786	30 015 00716	J	02	18S	27E	1980 FSL & 1980 FEL	Empire Abo Unit No. 15	BP America Production Company	Recomp Well: New Perf in ABO 5348'-6000'
791	30 015 22914	I	02	18S	27E	1310 FSL & 590 FEL	Empire Abo Unit No. 161	BP America Production Company	Production - Resumed production on 7/1/2009
799	30 015 00722	P	02	18S	27E	660 FSL & 660 FEL	Empire Abo Unit No. 016A	BP America Production Company	P&A Well: CIBP set at 5940'. Spot 280' cmt plug on top of CIBP using 30 sks Class C. Set cmt retainer at 800' and pumped 200 sks cmt to retainer. Spot 35 sks cmt from 320' to surf.
800	30 015 22808	O	02	18S	27E	600 FSL & 1330 FEL	Empire Abo Unit No. 156	BP America Production Company	P&A Well: CIBP set at 5870' and spot 25 sks cmt from 5870'-5623'; spot 25 sks Class C cmt from 4129'-3882'; spot 25 sks Class C cmt from 3450'-3203'; spot 25 sks cmt from 1120' and tag at 920'; spot 25 sks cmt from 250' to surface.
801	30 015 00731	O	02	18S	27E	660 FSL & 1980 FEL	Empire Abo Unit No. 015A	BP America Production Company	P&A Well: CIBP set at 5840'. Spot 30 sks cmt plug from 5840'-5564'. Set CIBP at 5815' and spot 80 sks cmt from 5815'-5045'. Spot 30 sks cmt from 3319'-3031'. Spot 30 sks cmt from 1040'-764'.
802	30 015 22669	O	02	18S	27E	800 FSL & 2500 FEL	Empire Abo Unit No. 154	BP America Production Company	P&A Well: CIBP 5680' + 25 sks Class C cmt, 4115'-336' sqz with 25 sks Class C cmt, 107 sks Class C cmt from 1067' to surface.
805	30 015 22013	O	02	18S	27E	90 FSL & 1456 FEL	Empire Abo Unit No. 153	BP America Production Company	P&A Well: CIBP set at 5975'. Spot 25 sks Class C cmt, 4627'-3455' spot 25 sks Class C cmt, 3235'-1129' spot 35 sks cmt.
807	30 015 22608	N	02	18S	27E	100 FSL & 1950 FWL	Empire Abo Unit No. 142	BP America Production Company	Recomplete: New perfs in the Abo: 5927'-5930', 5938'-5956', 6123', 6130'-6140'. Return to production.
812	30 015 00730	N	02	18S	27E	660 FSL & 1980 FWL	Empire Abo Unit No. 14	BP America Production Company	Production: Returned to production 4/15/09
813	30 015 00720	B	02	18S	27E	990 FNL & 1650 FEL	Riverwolf Unit No. 004	BP America Production Company	P&A Well: CIBP set at 5590'. Spot 250' cement plug on top of CIBP using 25 sks Class C. Cement perfs at 3130' with 50 sks Class C + 2% CaCl2. Spot 300' cement plug from 1100' to 800' using 30 sks Class C + 2% CaCl2. Fill 5 1/2" casing from 250' to surface using 25 sks Class C + 2% CaCl2.
836	30 015 00869	A	11	18S	27E	330 FNL & 653 FEL	Empire Abo Unit No. 16C	BP America Production Company	P&A Well: CIBP 6130'+35 sks cmt+ mud 9.5 ppg, 25 sks cmt plug+sqz 3186'-3586', 140 sks cmt plug+sqz 595' to 1585', 35 sks cmt plug+sqz surf to 435'
837	30 015 22568	B	11	18S	27E	400 FNL & 1450 FEL	Empire Abo Unit No. 151B	BP America Production Company	P&A Well: CIBP 6050'+25 sks cmt+ mud 9.5 ppg, 25 sks cmt plug 4054'-3810', 25 sks cmt plug 3470' to 3243', 25 sks cmt plug 1060' to 810', 50 sks cmt plug+sqz 460' to surf
838	30 015 22838	B	11	18S	27E	200 FNL & 1925 FEL	Empire Abo Unit No. 153B	BP America Production Company	P&A Well: CIBP set at 6074', TOC plug at 5827'; spotted 25 sks Class C cmt at 3864'-4111', spotted 25 sks Class C cmt from 3487'-3240'; spotted 25 sks Class C cmt 1102'-838'.
839	30 015 00868	B	11	18S	27E	660 FNL & 1980 FEL	Empire Abo Unit No. 15C	BP America Production Company	P&A Well: CIBP 6050'+10 sks cmt+ mud 9.5 ppg, 35 sks cmt plug+sqz 5300'-5100', 35 sks cmt plug+sqz 3770' to 3516', 170 sks cmt plug+sqz 1000' to 750', 140 sks cmt plug+sqz 645' to 500', 10 sks cmt plug+sqz 60' to surf
840	30 015 22569	B	11	18S	27E	560 FNL & 2588 FEL	Empire Abo Unit No. 152B	BP America Production Company	P&A Well: CIBP 6005' and spot 25 sks Class C cmt; Spot 25 sks Class C cmt from 3280'-1135'; Spot 35 sks from 340' to surface.
841	30 015 22834	C	11	18S	27E	225 FNL & 2280 FWL	Empire Abo Unit No. 141B	BP America Production Company	Recomp Well: New Perf in ABO 5961'-6030'
843	30 015 22833	D	11	18S	27E	450 FNL & 1175 FWL	Empire Abo Unit No. 133B	BP America Production Company	Recomp Well: New Perf in ABO 5966'-6064'
855	30 015 24857	M	11	18S	27E	700 FSL & 990 FWL	Federal DH Gas Com No 1	Chesapeake Operating Inc	Change of Owner: Ricks Exploration Inc to Concho Exploration Inc. to Chesapeake Operating Inc

TABLE III

Well Changes in the Combined One Mile Area of Review Since the Revised 2003 Permit for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
859	30 015 25738	G	12	18S	27E	2310 FNL & 2310 FEL	Comstock Federal No 9	Harlow Enterprises LLC	Change of Owner Eastland Oil Co to Harlow Enterprises LLC
860	30 015 25270	F	12	18S	27E	2310 FNL & 2310 FWL	Chukka Federal No 1	Bill Miller	Change of Owner Eastland Oil Co to Bill Miller
862	30 015 00874	J	12	18S	27E	2310 FSL & 2355 FEL	Comstock Federal No 7	Harlow Enterprises LLC	Change of Owner Eastland Oil Co to Harlow Enterprises LLC
864	30 015 25201	K	12	18S	27E	1650 FSL & 1770 FWL	Comstock Federal No 2	Harlow Enterprises LLC	Change of Owner Eastland Oil Co to Harlow Enterprises LLC
866	30 015 25545	M	12	18S	27E	990 FSL & 990 FWL	Comstock Federal No 3	Harlow Enterprises LLC	Change of Owner Eastland Oil Co to Harlow Enterprises LLC
868	30 015 26017	N	12	18S	27E	990 FSL & 1650 FWL	Comstock Federal No 10	Eastland Oil Company	P&A Well: CIBP 1434'+25 sks cmt 1150' + mud 9.3 ppg, 40 sks cmt plug 592'-surf
869	30 015 25100	N	12	18S	27E	330 FSL & 1650 FWL	Comstock Federal No 1	Harlow Enterprises LLC	Change of Owner Eastland Oil Co to Harlow Enterprises LLC
870	30 015 25202	O	12	18S	27E	330 FSL & 2310 FEL	Comstock Federal No 5	Harlow Enterprises LLC	Change of Owner Eastland Oil Co to Harlow Enterprises LLC
878	30 015 25394	C	13	18S	27E	330 FNL & 2310 FWL	Artesia State 002	Bill Miller	Change of Owner Eastland Oil Co to Bill Miller
879	30 015 25241	C	13	18S	27E	330 FNL & 1650 FWL	Artesia State 001	Bill Miller	Change of Owner Eastland Oil Co to Bill Miller
882	30 015 00883	D	13	18S	27E	990 FNL & 990 FWL	Artesia State Unit No. 001	CBS Operating Corp	Moved in new pumping unit - returned to production 9/5/2008
897	30 015 00895	H	14	18S	27E	1650 FNL & 330 FEL	Artesia State Unit No. 001B	CBS Operating Corp	Return to Prod: 6/19/2008
911	30 015 31123	H	36	17S	27E	1980 FNL & 760 FEL	No Bluff 36 State Com No 02	Lime Rock Resources A, LP	Change of Owner Southwestern Energy Production Co to Lime Rock Resources A, LP
912	30 015 31036	H	36	17S	27E	231 FNL & 990 FEL	Gates State No 3	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service
917	30 015 30784	A	31	17S	28E	330 FNL & 480 FEL	NW State No. 012	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
918	30 015 30893	A	31	17S	28E	973 FNL & 959 FEL	NW State No. 028	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
919	30 015 32162	D	31	17S	28E	460 FNL & 990 FWL	Enron State No. 004	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
920	30 015 30783	H	31	17S	28E	1650 FNL & 330 FEL	NW State No. 011	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
921	30 015 30849	I	31	17S	28E	2310 FSL & 270 FEL	NW State No. 009	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
922	30 015 30760	P	31	17S	28E	735 FSL & 330 FEL	NW State No. 010	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
923	30 015 31920	D	32	17S	28E	990 FNL & 990 FWL	Enron State No. 002	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
924	30 015 30781	K	32	17S	28E	1900 FSL & 2146 FWL	NW State No. 005	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
925	30 015 30777	L	32	17S	28E	2310 FSL & 990 FWL	NW State No. 006	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
926	30 015 30685	M	32	17S	28E	990 FSL & 990 FWL	NW State No. 007	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
927	30 015 30815	N	32	17S	28E	1090 FSL & 2126 FWL	NW State No. 008	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
928	30 015 32310	1	01	18S	27E	990 FNL & 990 FEL	AAO Federal No. 004	Marbob Energy Corp.	Recomp Well: New Perf San Andres 2134'-2849'
929	30 015 32309	2	01	18S	27E	330 FNL & 1690 FEL	AAO Federal No 003	Marbob Energy Corp.	Recomp Well: Pump 1000 gal NE Fe 15% HCl acid.
930	30 015 32308	3	01	18S	27E	430 FNL & 2310 FWL	AAO Federal No 002	Marbob Energy Corp.	Recomp Well: New Perf San Andres 1967'-3115'; Old Perf Glorieta 3373'-3699'
931	30 015 32307	4	01	18S	27E	330 FNL & 990 FWL	AAO Federal No 001	Marbob Energy Corp.	Recomp Well: CIBP 3250', New Perf in San Andres 2356'-2900'; 2974'-3071'
936	30 015 31086	E	05	18S	28E	1650 FNL & 990 FWL	LP State No. 001	Marbob Energy Corp.	P&A Well: CIBP 3685'+25 sks cmt+ mud 9 ppg, 25 sks cmt plug 2167'-1831', 25 sks cmt plug 619' to 60', 15 sks cmt plug 60' to surf
938	30 015 30785	A	06	18S	28E	430 FNL & 330 FEL	NW State No. 015	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP
940	30 015 31087	M	06	18S	28E	990 FSL & 330 FWL	LP State No. 003	Marbob Energy Corp.	P&A Well: CIBP 3750'+25 sks cmt 3043', CIBP 3200'&1700', CIBP 1460'+25 sks cmt, CIBP 620'+65sks cmt plug to surf
944	30 015 26575	N	01	18S	27E	790 FSL & 2250 FWL	Chalk Bluff Fed Com 1/ WDW-3	Navajo Refining Co. Pipeline Division	Well Completed in the Wolfcamp 7660'-8620' Injecting
945	30 015 32959	E	01	18S	27E	1650 FNL & 875 FWL	AAO Federal No 005	Marbob Energy Corp.	NEW ~4000'
946	30 015 33473	G	01	18S	27E	1750 FNL & 1650 FEL	AAO Federal No 007	Marbob Energy Corp.	NEW ~4000'
947	30 015 33784	H	01	18S	27E	1650 FNL & 330 FEL	AAO Federal No 008	Marbob Energy Corp.	NEW ~4000'

TABLE IV
Wells that have been Plugged and Abandoned since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

77	30	015	22697	C	05	18S	18E	1080 FNL & 1914 FWL	Empire Abo Unit No. 261A	BP America Production Company	P&A Well: CIBP set at 5949' and spotted 25 sks Class C cmt onto CIBP, spotted 90 sks Class C cmt from 2712'-3705', spotted 155 sks Class C cmt from 0'-1385'
105	30	015	22593	G	06	18S	28E	1900 FNL & 2441 FEL	Empire Abo Unit No. 234	BP America Production Company	P&A Well: CIBP set at 3910' and spot 25 sks cmt, spot 25 sks cmt at 1310'
107	30	015	21737	G	06	18S	28E	2253 FNL & 1576 FEL	Empire Abo Unit No. 232	BP America Production Company	P&A Well: CIBP set at 5900', spot 25 sks cmt from 5900'-5650', spot 25 sks cmt plug from 5157'-4916', spot 25 sks cmt from 3735'-3494', 150 sks cmt from 1374' to surface.
109	30	015	22490	G	06	18S	28E	2550 FNL & 2050 FEL	Empire ABO Unit No. 233	BP America Production Company	P&A Well: CIBP set at 6060' and spot 25 sks cmt 6,060'-5813', 25 sks balanced cmt plug 3614'-3372', pump 85 sks surface cmt plug
111	30	015	23547	H	06	18S	28E	1950 FNL & 660 FEL	Empire Abo Unit No. 241	BP America Production Company	P&A Well: CIBP set at 6100' and spot 25 sks cmt from 6100'-5950', spot 25 sks cmt from 4064' to 3668', pump 70 sks cmt from 850' to surface.
113	30	015	22528	J	06	18S	28E	2300 FSL & 1570 FEL	Empire ABO Unit No. 232A	BP America Production Company	P&A Well: CIBP set at 6174' and spotted 25 sks Class C, spotted 25 sks class C cmt at 3640'-3455', 130 sks Class C from 1260' to surface
115	30	015	02628	J	06	18S	28E	2260 FSL & 2270 FEL	Empire ABO Unit No. 23D	BP America Production Company	P&A Well: CIBP set at 6060' with 25 sks Class C cmt, 3494'-779' : 75 sks Class C cmt
116	30	015	22491	J	06	18S	28E	1700 FSL & 2350 FEL	Empire ABO Unit No. 231B	BP America Production Company	P&A Well: CIBP set at 6150' and pump 35 sks Class C cmt, pump 70 sks cmt from 5800'-4105', pump 140 sks Class C cmt from 1350' to surface.
595	30	015	02605	B	05	18S	28E	330 FNL & 2271 FEL	Empire Abo Unit No. 027E	BP America Production Company	P&A Well: CIBP set at 5700'and pump 25 sks cmt to 3760', Pump 150 sks cmt at 204'.
813	30	015	00720	B	02	18S	27E	990 FNL & 1650 FEL	Riverwolf Unit No. 004	BP America Production Company	P&A Well: CIBP set at 5590'. Spot 250' cement plug on top of CIBP using 25 sks Class C. Cement perfs at 3130' with 50 sks Class C + 2% CaCl2. Spot 300' cement plug from 1100' to 800' using 30 sks Class C + 2% CaCl2. Fill 5 1/2" casing from 250' to surface using 25 sks Class C + 2% CaCl2.
837	30	015	22568	B	11	18S	27E	400 FNL & 1450 FEL	Empire Abo Unit No. 151B	BP America Production Company	P&A Well: CIBP 6050'+25 sks cmt+ mud 9.5 ppg, 25 sks cmt plug 4054'-3810', 25 sks cmt plug 3470' to 3243', 25 sks cmt plug 1060' to 810', 50 sks cmt plug+sqz 460' to surf
838	30	015	22838	B	11	18S	27E	200 FNL & 1925 FEL	Empire Abo Unit No. 153B	BP America Production Company	P&A Well: CIBP set at 6074', TOC plug at 5827'; spotted 25 sks Class C cmt at 3864'-4111', spotted 25 sks Class C cmt from 3487'-3240'; spotted 25 sks Class C cmt 1102'-838'.
839	30	015	00868	B	11	18S	27E	660 FNL & 1980 FEL	Empire Abo Unit No. 15C	BP America Production Company	P&A Well: CIBP 6050'+10 sks cmt+ mud 9.5 ppg, 35 sks cmt plug+sqz 5300'-5100', 35 sks cmt plug+sqz 3770' to 3516', 170 sks cmt plug+sqz 1000' to 750', 140 sks cmt plug+sqz 645' to 500', 10 sks cmt plug+sqz 60' to surf
840	30	015	22569	B	11	18S	27E	560 FNL & 2588 FEL	Empire Abo Unit No. 152B	BP America Production Company	P&A Well: CIBP 6005' and spot 25 sks Class C cmt; Spot 25 sks Class C cmt from 3280'-1135'; Spot 35 sks from 340' to surface.

TABLE III

Well Changes in the Combined One Mile Area of Review Since the Revised 2003 Permit for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
948	30 015 34071	F	01	18S	27E	2169 FNL & 1963 FWL	AAO Federal No 006	Marbob Energy Corp.	NEW ~4000'
949	30 015 34387	L	01	18S	27E	1980 FSL & 630 FWL	AAO Federal No 009	Marbob Energy Corp.	NEW ~4000'
950	30 015 34555	M	01	18S	27E	890 FSL & 660 FWL	AAO Federal No 011	Marbob Energy Corp.	NEW ~4000'
951	30 015 34576	K	01	18S	27E	2060 FSL & 2160 FWL	AAO Federal No 010	Marbob Energy Corp.	NEW ~4000'
952	30 015 34998	N	01	18S	27E	890 FSL & 1650 FWL	AAO Federal No 012	Marbob Energy Corp.	NEW ~4000'
953	30 015 34028	G	06	18S	28E	2285 FNL & 1366 FEL	Slider 6 State No. 001	BP America Production Company	P&A Well: CIBP 10050'+25 sks cmt 9899', CIBP 7364'+25 sks cmt, 25 sks cmt plug 7364'-7081', 75 sks cmt plug 6909'-6185', 25 sks cmt plug 5361'-5101', 75 sks cmt plug 3640'-2828', 30 sks cmt plug 2600'-2437', 30 sk cmt plug 1596-1475', 155 sks cmt cir 521' to surf
954	30 015 35050	D	32	17S	28E	330 FNL & 500 FWL	Enron State No 012	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP; Recompletion: Open San Andres and comingle with Yeso by perfing San Andres at 2294',2312',2409',2503' and acidized with 3360 gal NEFE acid. Then fraced perfs w/ 95,000 lbs 16/30 and 35,000 lbs 12/20 brady sand in 25 lb X-linked gel.
955	30 015 36939	A	14	18S	27E	660 FNL & 990 FEL	Violet BIV State Com No. 001	Yates Petroleum Corp	NEW: Permit to Drill by 2/20/09
956	30 015 33994	A	36	17S	27E	915 FNL & 420 FEL	Red Lake 36 State No 2	Edge Petroleum Operating Company Inc	NEW ~3650'
957	30 015 36116	G	36	17S	27E	2305 FNL & 1650 FEL	South Red Lake II Unit No 57	Fairway Resources Operating LLC	NEW ~2081' Well completed in the Queen, Grayburg, San Andres from 1535' to 1805', 32 perforations
958	30 015 32946	J	02	18S	27E	2210 FSL & 1650 FEL	SCBP State No 1	Marbob Energy Corp.	NEW ~3880' Perf: 1975'-2664', 3342'-3638'
959	30 015 35814	H	02	18S	27E	2063 FNL & 441 FEL	State H No 2	Mack Energy Corporation	NEW: ~7545' PBTD: 5265' Perf: 6134.5'-6434' w/CIBP 6020' Perf: 5391'-5957.5' w/ CIBP 5300' Perf: 4118.5'-4197'
960	30 015 36343	G	31	17S	28E	1650 FNL & 2310 FEL	Malco State No 002	George A Chase JR DBA and C Service	NEW: 633' Open Hole Completion. Change of Owner: Aspen Oil Inc. to George A Chase JR DBA G and C Service
961	30 015 36978	D	31	17S	28E	990 FNL & 330 FWL	Enron State No. 015	Lime Rock Resources A, LP	NEW: 3700' in the Glorietta-Yeso.
962	30 015 36554	L	32	17S	28E	1770 FSL & 550 FWL	NW State No. 029	Lime Rock Resources A, LP	NEW: 3450'. Well completed in the San Andres from 2817'-3098', 69 perforations.
963	30 015 36989	K	32	17S	28E	1630 FSL & 1710 FWL	NW State No. 030	Lime Rock Resources A, LP	NEW: 3405'. Well not completed yet.
964	30 015 37057	N	32	17S	28E	330 FSL & 1750 FWL	NW State No. 031	Lime Rock Resources A, LP	NEW: 3500'. Well not completed yet.
965	30 015 37058	M	32	17S	28E	330 FSL & 330 FWL	NW State No. 032	Lime Rock Resources A, LP	NEW: 3425'. Well not completed yet.
	30 015 36281	J	01	18S	27E	2193 FSL & 1520 FEL	Sun Devils Federal No. 001	Mack Energy Corporation	Permit to Drill - 6000' TVD

TABLE IV
Wells that have been Plugged and Abandoned since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

77	30	015	22697	C	05	18S	18E	1080 FNL & 1914 FWL	Empire Abo Unit No. 261A	BP America Production Company	P&A Well: CIBP set at 5949' and spotted 25 sks Class C cmt onto CIBP, spotted 90 sks Class C cmt from 2712'-3705', spotted 155 sks Class C cmt from 0'-1385'
105	30	015	22593	G	06	18S	28E	1900 FNL & 2441 FEL	Empire Abo Unit No. 234	BP America Production Company	P&A Well: CIBP set at 3910' and spot 25 sks cmt, spot 25 sks cmt at 1310'
107	30	015	21737	G	06	18S	28E	2253 FNL & 1576 FEL	Empire Abo Unit No. 232	BP America Production Company	P&A Well: CIBP set at 5900', spot 25 sks cmt from 5900'-5650', spot 25 sks cmt plug from 5157'-4916', spot 25 sks cmt from 3735'-3494', 150 sks cmt from 1374' to surface.
109	30	015	22490	G	06	18S	28E	2550 FNL & 2050 FEL	Empire ABO Unit No. 233	BP America Production Company	P&A Well: CIBP set at 6060' and spot 25 sks cmt 6,060'-5813', 25 sks balanced cmt plug 3614'-3372', pump 85 sks surface cmt plug
111	30	015	23547	H	06	18S	28E	1950 FNL & 660 FEL	Empire Abo Unit No. 241	BP America Production Company	P&A Well: CIBP set at 6100' and spot 25 sks cmt from 6100'-5950', spot 25 sks cmt from 4064' to 3668', pump 70 sks cmt from 850' to surface.
113	30	015	22528	J	06	18S	28E	2300 FSL & 1570 FEL	Empire ABO Unit No. 232A	BP America Production Company	P&A Well: CIBP set at 6174' and spotted 25 sks Class C, spotted 25 sks class C cmt at 3640'-3455', 130 sks Class C from 1260' to surface
115	30	015	02628	J	06	18S	28E	2260 FSL & 2270 FEL	Empire ABO Unit No. 23D	BP America Production Company	P&A Well: CIBP set at 6060' with 25 sks Class C cmt, 3494'-779' : 75 sks Class C cmt
116	30	015	22491	J	06	18S	28E	1700 FSL & 2350 FEL	Empire ABO Unit No. 231B	BP America Production Company	P&A Well: CIBP set at 6150' and pump 35 sks Class C cmt, pump 70 sks cmt from 5800'-4105', pump 140 sks Class C cmt from 1350' to surface.
595	30	015	02605	B	05	18S	28E	330 FNL & 2271 FEL	Empire Abo Unit No. 027E	BP America Production Company	P&A Well: CIBP set at 5700'and pump 25 sks cmt to 3760', Pump 150 sks cmt at 204'.
813	30	015	00720	B	02	18S	27E	990 FNL & 1650 FEL	Riverwolf Unit No. 004	BP America Production Company	P&A Well: CIBP set at 5590'. Spot 250' cement plug on top of CIBP using 25 sks Class C. Cement perfs at 3130' with 50 sks Class C + 2% CaCl2. Spot 300' cement plug from 1100' to 800' using 30 sks Class C + 2% CaCl2. Fill 5 1/2" casing from 250' to surface using 25 sks Class C + 2% CaCl2.
837	30	015	22568	B	11	18S	27E	400 FNL & 1450 FEL	Empire Abo Unit No. 151B	BP America Production Company	P&A Well: CIBP 6050'+25 sks cmt+ mud 9.5 ppg, 25 sks cmt plug 4054'-3810', 25 sks cmt plug 3470' to 3243', 25 sks cmt plug 1060' to 810', 50 sks cmt plug+sqz 460' to surf
838	30	015	22838	B	11	18S	27E	200 FNL & 1925 FEL	Empire Abo Unit No. 153B	BP America Production Company	P&A Well: CIBP set at 6074', TOC plug at 5827'; spotted 25 sks Class C cmt at 3864'-4111', spotted 25 sks Class C cmt from 3487'-3240'; spotted 25 sks Class C cmt 1102'-838'.
839	30	015	00868	B	11	18S	27E	660 FNL & 1980 FEL	Empire Abo Unit No. 15C	BP America Production Company	P&A Well: CIBP 6050'+10 sks cmt+ mud 9.5 ppg, 35 sks cmt plug+sqz 5300'-5100', 35 sks cmt plug+sqz 3770' to 3516', 170 sks cmt plug+sqz 1000' to 750', 140 sks cmt plug+sqz 645' to 500', 10 sks cmt plug+sqz 60' to surf
840	30	015	22569	B	11	18S	27E	560 FNL & 2588 FEL	Empire Abo Unit No. 152B	BP America Production Company	P&A Well: CIBP 6005' and spot 25 sks Class C cmt; Spot 25 sks Class C cmt from 3280'-1135'; Spot 35 sks from 340' to surface.

TABLE V
Wells that have been Temporally Abandoned since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
27	30 015 01218	N	36	17S	27E	330 FSL & 2310 FWL	Empire Abo Unit No. 18	BP America Production Company	T&A Well: Tested Casing to 500 psi w/CIBP 5846'+35' cmt, bad casing 5552'-5560'

TABLE VI

Wells that have been put back into Production Since the Revised 2003 Permit

Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
8	30 015 00689	H	36	17S	27E	1650 FNL & 330 FEL	Gates State #1	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service
10	30 015 00669	H	36	17S	27E	2310 FNL & 330 FEL	Homan #1	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service Recomp Well: Drill out cmt plugs, tagg at 1805', run 4-1/2" liner to 1390' to surf and cmt 316 sks, prod 1450' to 1800'
56	30 015 01646	N	31	17S	28E	660 FSL & 2082 FEL	Empire ABO Unit No. 22A	BP America Production Company	Put back into Prod.
122	30 015 23548	L	06	18S	28E	1950 FSL & 1000 FWL	Empire ABO Unit No. 211A	BP America Production Company	Resumed Production
154	30 015 00707	K	01	18S	27E	1980 FSL & 1980 FWL	Empire Abo Unit No. 018B	BP America Production Company	Return to Prod: 5/19/09
161	30 015 26404	A	12	18S	27E	660 FNL & 990 FEL	Federal T #1	Devon Energy Production Company LP	Conversion to Salt Water Disposal Well. Inject into the Cisco at 7758'-8060'
355	30 015 00676	M	36	17S	27E	330 FSL & 990 FWL	Empire Abo Unit No. 17	BP America Production Company	Prod: Return well to production
791	30 015 22914	I	02	18S	27E	1310 FSL & 590 FEL	Empire Abo Unit No. 161	BP America Production Company	Production - Resumed production on 7/1/2009
807	30 015 22608	N	02	18S	27E	100 FSL & 1950 FWL	Empire Abo Unit No. 142	BP America Production Company	Recomplete: New perfs in the Abo: 5927'-5930', 5938'-5956', 6123', 6130'-6140'. Return to production.
812	30 015 00730	N	02	18S	27E	660 FSL & 1980 FWL	Empire Abo Unit No. 14	BP America Production Company	Ptoduction: Returned to production 4/15/09
882	30 015 00883	D	13	18S	27E	990 FNL & 990 FWL	Artesia State Unit No. 001	CBS Operating Corp	Moved in new pumping unit - returned to production 9/5/2008
897	30 015 00895	H	14	18S	27E	1650 FNL & 330 FEL	Artesia State Unit No. 001B	CBS Operating Corp	Return to Prod: 6/19/2008

TABLE VII
Wells that have been Recompleted in Upper Zones since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
3	30 015 00646	A	36	17S	27E	990 FNL & 330 FEL	Delhi No 007	Aspen Oil Inc	Change of Owner: Pronghorn Management Corp to Aspen Oil Company Inc. Recomp Well:
73	30 015 01659	N	32	17S	28E	660 FNL & 1980 FWL	Empire ABO Unit No. 026A	BP America Production Company	Recomp Well: New Perf in ABO 5651'-6118'
74	30 015 21539	N	32	17S	28E	150 FSL & 1400 FWL	Empire ABO Unit No. 261	BP America Production Company	Recomp Well: New Perf in ABO 5690'-5954'
75	30 015 22009	O	32	17S	28E	330 FSL & 2481 FWL	Empire ABO Unit No. 272	BP America Production Company	Recomp Well: New Perf in ABO 5714'-6120'
76	30 015 02606	C	05	18S	28E	330 FNL & 1941 FWL	Empire ABO Unit No. 026E	BP America Production Company	Recomp Well: New Perf in ABO 5662'-5907'
78	30 015 02607	D	05	18S	28E	660 FNL & 660 FWL	Empire ABO Unit No. 025C	BP America Production Company	Recomp Well: New Perf in ABO 5760"
88	30 015 02615	A	06	18S	28E	660 FNL & 660 FEL	Empire ABO Unit No. 24B	BP America Production Company	Recomp Well: PBTD 6205' CIBP 6091', New Perf in ABO 5794'-5924'
90	30 015 21542	B	06	18S	28E	1260 FNL & 1580 FEL	Empire ABO Unit No. 231	BP America Production Company	Recomp Well: PBTD 6222' New Perf in ABO 5850'-6018'
94	30 015 23116	E	06	18S	28E	2050 FNL & 100 FWL	Empire ABO Unit No. 213	BP America Production Company	Recomp Well: New Perf in ABO 5606'-5796'
96	30 015 22637	E	06	18S	28E	2450 FNL & 400 FWL	Empire ABO Unit No. 212	BP America Production Company	Recomp Well: PBTD 6203' New Perf in ABO 5588'-6080'
106	30 015 02614	G	06	18S	28E	1980 FNL & 1980 FEL	Empire ABO Unit No. 23B	BP America Production Company	Recomp Well: PBTD 6240', New Perf in ABO 5842'-6142'
752	30 015 00703	L	01	18S	27E	1980 FSL & 660 FWL	Empire ABO Unit No. 017A	BP America Production Company	Recomp Well: PBD 6101', CIBP 5823', New Vert Perf in Abo 5472'-5736'
765	30 015 00724	A	02	18S	27E	990 FNL & 330 FEL	Empire Abo Unit No. 16B	BP America Production Company	Recomp Well: New Perf in ABO 5444'-5786'
766	30 015 00737	B	02	18S	27E	905 FNL & 1610 FEL	South Red Lake II Unit #38	Fairway Resources Operating LLC	Change of Owner: McQuadrangle LC to Fairway Resources Operating LLC Recomp Well: Plugback 75 sks cmt 1430'-1530' & complete in Grayburg
786	30 015 00716	J	02	18S	27E	1980 FSL & 1980 FEL	Empire Abo Unit No. 15	BP America Production Company	Recomp Well: New Perf in ABO 5348'-6000'
841	30 015 22834	C	11	18S	27E	225 FNL & 2280 FWL	Empire Abo Unit No. 141B	BP America Production Company	Recomp Well: New Perf in ABO 5961'-6030'
843	30 015 22833	D	11	18S	27E	450 FNL & 1175 FWL	Empire Abo Unit No. 133B	BP America Production Company	Recomp Well: New Perf in ABO 5966'-6064'
912	30 015 31036	H	36	17S	27E	231 FNL & 990 FEL	Gates State No 3	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service; Recomplete
928	30 015 32310	1	01	18S	27E	990 FNL & 990 FEL	AAO Federal No 004	Marbob Energy Corp.	Recomp Well: New Perf San Andres 2134'-2849'
929	30 015 32309	2	01	18S	27E	330 FNL & 1690 FEL	AAO Federal No 003	Marbob Energy Corp.	Recomp Well: New Perf San Andres 2092'-2807'
930	30 015 32308	3	01	18S	27E	430 FNL & 2310 FWL	AAO Federal No 002	Marbob Energy Corp.	Recomp Well: New Perf San Andres 1967'-3115'; Old Perf Glorieta 3373'-3699'
931	30 015 32307	4	01	18S	27E	330 FNL & 990 FWL	AAO Federal No 001	Marbob Energy Corp.	Recomp Well: CIBP 3250', New Perf in San Andres 2356'-2900'; 2974'-3071'
10	30 015 00669	H	36	17S	27E	2310 FNL & 330 FEL	Homan #1	George A Chase JR DBA and C Service	Change of Owner: Aspen Oil Company Inc. to George A Chase JR DBA and C Service Recomp Well: Drill out cmt plugs, tagg at 1805', run 4-1/2" liner to 1390' to surf and cmt 316 sks, prod 1450' to 1800'
159	30 015 00698	O	01	18S	27E	660 FSL & 1980 FEL	Empire Abo Unit No. 191	BP America Production Company	Reclamation of plugged well: installed liner and waiting for reclamation inspection.
133	30 015 00710	C	01	18S	27E	660 FNL & 1980 FWL	AAO Federal No. 013	Marbob Energy Corp.	Change of Owner: from BP America Production Company to Marbob Energy Corp; Recomp: Perf the Yeso 1 from 4581'-4944' and acdz w/ 2000 gal NE Fe 15% HCL; Perf the Yeso 2 from 3990'-4395' and acdz w/ 2500 gal NE Fe 15% HCl; Perf the Yeso 3 from 3377'-3678' and acdz w/ 2500 gal NE Fe 15% HCl; Well producing as single from 3377'-4395'.
152	30 015 22096	K	01	18S	27E	2370 FSL & 1510 FWL	Empire Abo Unit No. 183	BP America Production Company	Recomp Well: New perf at 5641'-6053'. Acdz with 15% HCL.
929	30 015 32309	2	01	18S	27E	330 FNL & 1690 FEL	AAO Federal No 003	Marbob Energy Corp.	Recomp Well: Pump 1000 gal NE Fe 15% HCl acid.
807	30 015 22608	N	02	18S	27E	100 FSL & 1950 FWL	Empire Abo Unit No. 142	BP America Production Company	Recomplete: New perfs in the Abo: 5927'-5930', 5938'-5956', 6123', 6130'-6140'. Return to production.

TABLE VII
Wells that have been Recompleted in Upper Zones since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

65	30	015	01657	F	32	17S	28E	2280 FNL & 1980 FWL	AA State No. 001	Marbob Energy Corp.	Change of Owner: BP America Production Company to Marbob Energy Corp.; Recomplete: Proposal to plug back and perforate, acidize, test, and possibly frac the Yeso 1 (4288'-4525'), Yeso 2 (3880'-4173'), and Yeso 3 (3523'-3715').
954	30	015	35050	D	32	17S	28E	330 FNL & 500 FWL	Enron State No 012	Lime Rock Resources A, LP	Change of Owner: SDX Resources Inc. to Lime Rock Resources A, LP; Recompletion: Open San Andres and comingle with Yeso by perfing San Andres at 2294',2312',2409',2503' and acidized with 3360 gal NEFE acid. Then fraced perfs w/ 95,000 lbs 16/30 and 35,000 lbs 12/20 brady sand in 25 lb X-linked gel.
104	30	015	22913	G	06	18S	28E	1750 FNL & 1600 FEL	Empire Abo Unit No. 235	BP America Production Company	Recomplete: Set CIBP to shut off water. Set at 6176'

TABLE VIII
Newly Drilled Wells in the Area of Review since the Revised 2003 Permit
Well Changes in the Combined One Mile Area of Review for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
944	30 015 26575	N	01	18S	27E	790 FSL & 2250 FWL	Chalk Bluff Fed Com 1/ WDW-3	Navajo Refining Co. Pipeline Division	Well Completed in the Wolfcamp 7660'-8620' Injecting
945	30 015 32959	E	01	18S	27E	1650 FNL & 875 FWL	AAO Federal No 005	Marbob Energy Corp.	NEW ~4000'
946	30 015 33473	G	01	18S	27E	1750 FNL & 1650 FEL	AAO Federal No 007	Marbob Energy Corp.	NEW ~4000'
947	30 015 33784	H	01	18S	27E	1650 FNL & 330 FEL	AAO Federal No 008	Marbob Energy Corp.	NEW ~4000'
948	30 015 34071	F	01	18S	27E	2169 FNL & 1963 FWL	AAO Federal No 006	Marbob Energy Corp.	NEW ~4000'
949	30 015 34387	L	01	18S	27E	1980 FSL & 630 FWL	AAO Federal No 009	Marbob Energy Corp.	NEW ~4000'
950	30 015 34555	M	01	18S	27E	890 FSL & 660 FWL	AAO Federal No 011	Marbob Energy Corp.	NEW ~4000'
951	30 015 34576	K	01	18S	27E	2060 FSL & 2160 FWL	AAO Federal No 010	Marbob Energy Corp.	NEW ~4000'
952	30 015 34998	N	01	18S	27E	890 FSL & 1650 FWL	AAO Federal No 012	Marbob Energy Corp.	NEW ~4000'
955	30 015 36939	A	14	18S	27E	660 FNL & 990 FEL	Violet BIV State Com 001	Yates Petroleum Corp	NEW: Permit to Drill by 2/20/09
956	30 015 33994	A	36	17S	27E	915 FNL & 420 FEL	Red Lake 36 State No 2	Edge Petroleum Operating Company Inc	NEW ~3650'
957	30 015 36116	G	36	17S	27E	2305 FNL & 1650 FEL	South Red Lake II Unit No 57	Fairway Resources Operating LLC	NEW ~2081' Well completed in the Queen, Grayburg, San Andres
958	30 015 32946	J	02	18S	27E	2210 FSL & 1650 FEL	SCBP State No 1	Marbob Energy Corp.	NEW ~3880' Perf: 1975'-2664', 3342'-3638'
959	30 015 35814	H	02	18S	27E	2063 FNL & 441 FEL	State H No 2	Mack Energy Corporation	NEW: ~7545' PBTD: 5265' Perf: 6134.5'-6434' w/CIBP 6020' Perf: 5391'-5957.5' w/ CIBP 5300' Perf: 4118.5'-4197'
960	30 015 36343	G	31	17S	28E	1650 FNL & 2310 FEL	Malco State No 002	George A Chase JR DBA and C Service	NEW: 633' Open Hole Completion. Change of Owner: Aspen Oil Inc. to George A Chase JR DBA G and C Service
961	30 015 36978	D	31	17S	28E	990 FNL & 330 FWL	Enron State No. 015	Lime Rock Resources A, LP	NEW: 3700' in the Glorietta-Yeso.
962	30 015 36554	L	32	17S	28E	1770 FSL & 550 FWL	NW State No. 029	Lime Rock Resources A, LP	NEW: 3450'. Well completed in the San Andres from 2817'-3098', 69 perforations.
963	30 015 36989	K	32	17S	28E	1630 FSL & 1710 FWL	NW State No. 030	Lime Rock Resources A, LP	NEW: 3405'. No completion yet.
964	30 015 37057	N	32	17S	28E	330 FSL & 1750 FWL	NW State No. 031	Lime Rock Resources A, LP	NEW: 3500'. No completion yet.
965	30 015 37058	M	32	17S	28E	330 FSL & 330 FWL	NW State No. 032	Lime Rock Resources A, LP	NEW: 3425'. No completion yet.
	30 015 36281	J	01	18S	27E	2193 FSL & 1520 FEL	Sun Devils Federal No. 001	Mack Energy Corporation	Permit to Drill - 6000' TVD

TABLE IX

FIGURES INCLUDED IN THE REPORT

Figure	Description	OCD Reference
1	Gaines Well #3 Schematic	Section VI.1 and IX.3
2	Plot of Bottom Hole Pressure and Temperature Data Chukka Well #2	n/a
3	Mewbourne Well #1 Schematic	n/a
4	Chukka Well #2 Schematic	n/a
5	Plot of Bottom Hole Pressure and Temperature Data Mewbourne Well #1	n/a
6	Midland Map of One Mile Area of Review	n/a
7	Gaines Well #3 Wellhead Schematic	Section IX.14
8	Diagram of Valve Locations for Shut-in on Gaines Well #3	Section IX.14
9	Gaines Well #3 Test Overview	Section IX.18.f
10	Gaines Well #3 Cartesian Plot of Bottom-Hole Pressure and Temperature vs. Time	Section IX.18.a
11	Gaines Well #3 Cartesian Plot of Injection Rate vs. Time	Section IX.18.b
12	Gaines Well #3 Cartesian Plot of Surface Pressure and Injection Rates vs. Time	Section IX.18.e
13	Historical Surface Pressure and Injection Rates vs. Calendar Time	Section IX.18.g

TABLE IX (cont.)

Figure	Description	OCD Reference
14	Gaines Well #3 Derivative Log-Log Plot	Section IX.18.c
15	Gaines Well #3 Superposition Horner (Semi-Log) Plot	Section IX.18.d
16	Gaines Well #3 Expanded Superposition Horner (Semi-Log) Plot	Section IX.18.d
17	Gaines Well #3 Hall Plot	Section IX.18.h
18	Gaines Well #3 Static Pressure Gradient Survey	n/a

TABLE X

Comparison of Permeability, Transmissibility, Skin, False Extrapolated Pressure, and Fill Depth

Date of Test	Permeability (k)	Transmissibility (kh/μ)	Skin (s)	False Extrapolated Pressure (p*)	Fill Depth
August 27 – 30, 2009	719 md	233,008 md-ft/cp	15.59	3,475.68 psia	8,986 feet
April 1 – 2, 2008	1,322 md	321,411 md-ft/cp	107	3,430.27 psia	n/a
Permit Parameters	250 md	40,094 md-ft-cp	0	n/a	n/a

TABLE XI

Navajo Refining Company
Static Pressure Gradient Survey
Gaines Well #3
August 30, 2009

Depth (ft)	Pressure (psia)	Gradient (psi/ft)	Temperature (°F)
8986	4065.22		140.14
		0.441	
8000	3630.21		114.13
		0.430	
7660	3484.12		114.82
		0.433	
7000	3198.60		112.45
		0.431	
6000	2767.53		106.87
		0.431	
5000	2336.10		101.18
		0.432	
4000	1904.58		96.31
		0.431	
3000	1473.25		92.42
		0.431	
2000	1042.15		87.88
		0.431	
1000	611.48		83.46
		0.435	
0	176.11		83.33

FIGURES

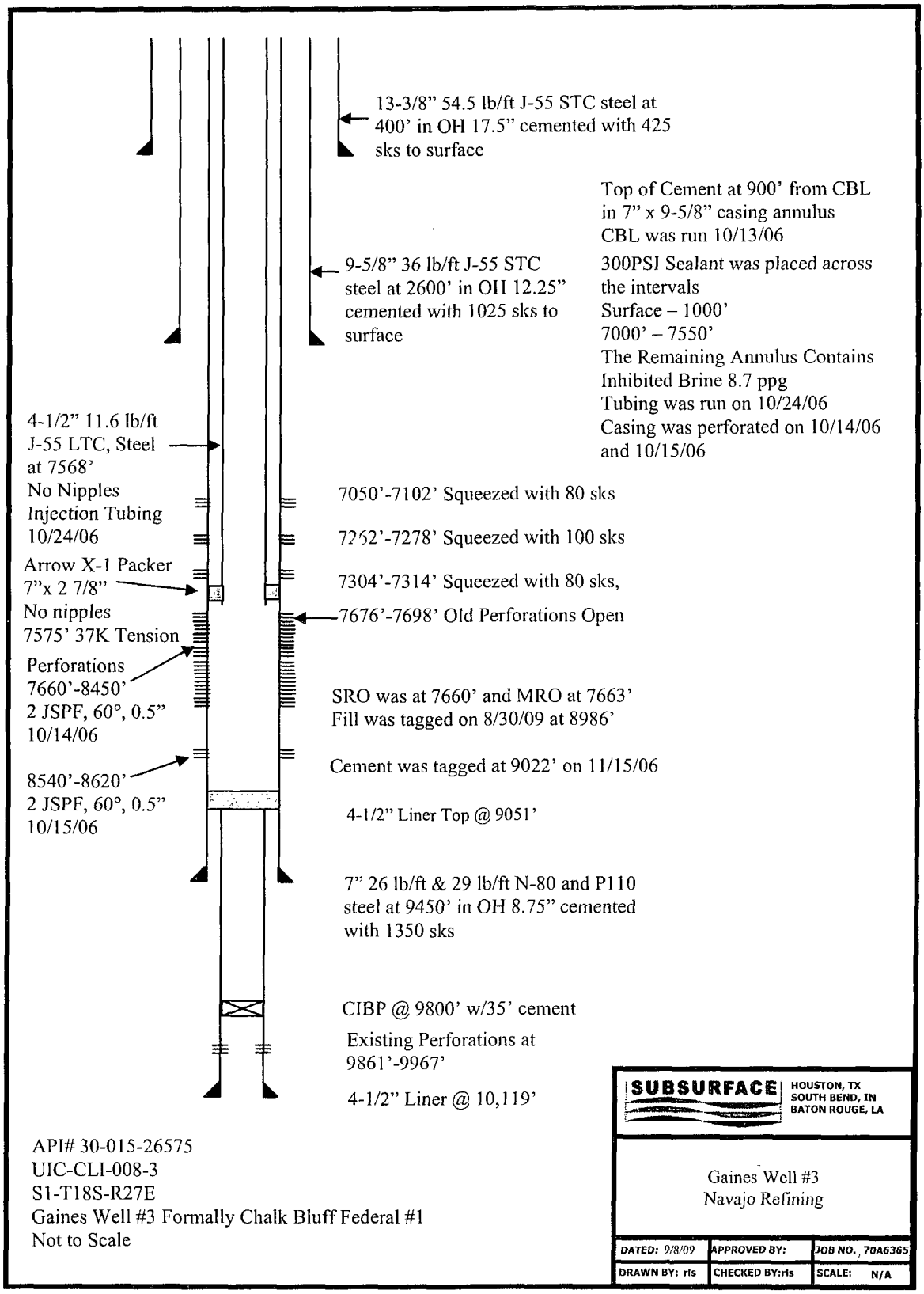

13-3/8" 54.5 lb/ft J-55 STC steel at 400' in OH 17.5" cemented with 425 sks to surface
Top of Cement at 900' from CBL in 7" x 9-5/8" casing annulus CBL was run 10/13/06
9-5/8" 36 lb/ft J-55 STC steel at 2600' in OH 12.25" cemented with 1025 sks to surface
300PSI Sealant was placed across the intervals
Surface – 1000'
7000' – 7550'
The Remaining Annulus Contains Inhibited Brine 8.7 ppg
Tubing was run on 10/24/06
Casing was perforated on 10/14/06 and 10/15/06
4-1/2" 11.6 lb/ft J-55 LTC, Steel at 7568'
No Nipples
Injection Tubing 10/24/06
7050'-7102' Squeezed with 80 sks
7262'-7278' Squeezed with 100 sks
Arrow X-1 Packer 7"x 2 7/8"
No nipples
7575' 37K Tension
7304'-7314' Squeezed with 80 sks,
7676'-7698' Old Perforations Open
Perforations 7660'-8450' 2 JSPF, 60°, 0.5" 10/14/06
SRO was at 7660' and MRO at 7663'
Fill was tagged on 8/30/09 at 8986'
Cement was tagged at 9022' on 11/15/06
8540'-8620' 2 JSPF, 60°, 0.5" 10/15/06
4-1/2" Liner Top @ 9051'
7" 26 lb/ft & 29 lb/ft N-80 and P110 steel at 9450' in OH 8.75" cemented with 1350 sks
CIBP @ 9800' w/35' cement
Existing Perforations at 9861'-9967'
4-1/2" Liner @ 10,119'
API# 30-015-26575
UIC-CLI-008-3
S1-T18S-R27E
Gaines Well #3 Formally Chalk Bluff Federal #1
Not to Scale
SUBSURFACE
HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA
Gaines Well #3
Navajo Refining
DATED: 9/8/09
APPROVED BY:
JOB NO. 70A6365
DRAWN BY: rls
CHECKED BY:rls
SCALE: N/A

FIGURE 1

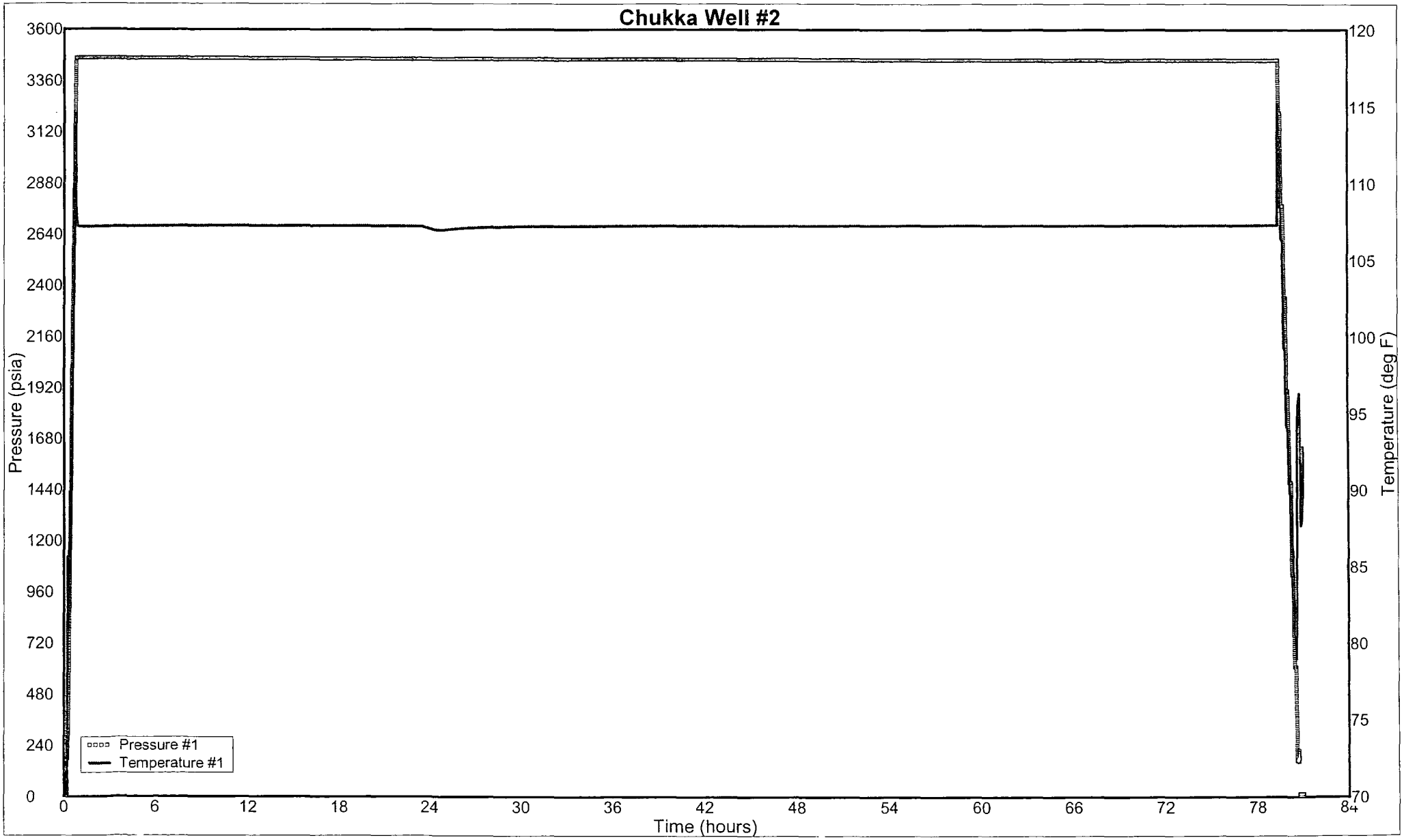
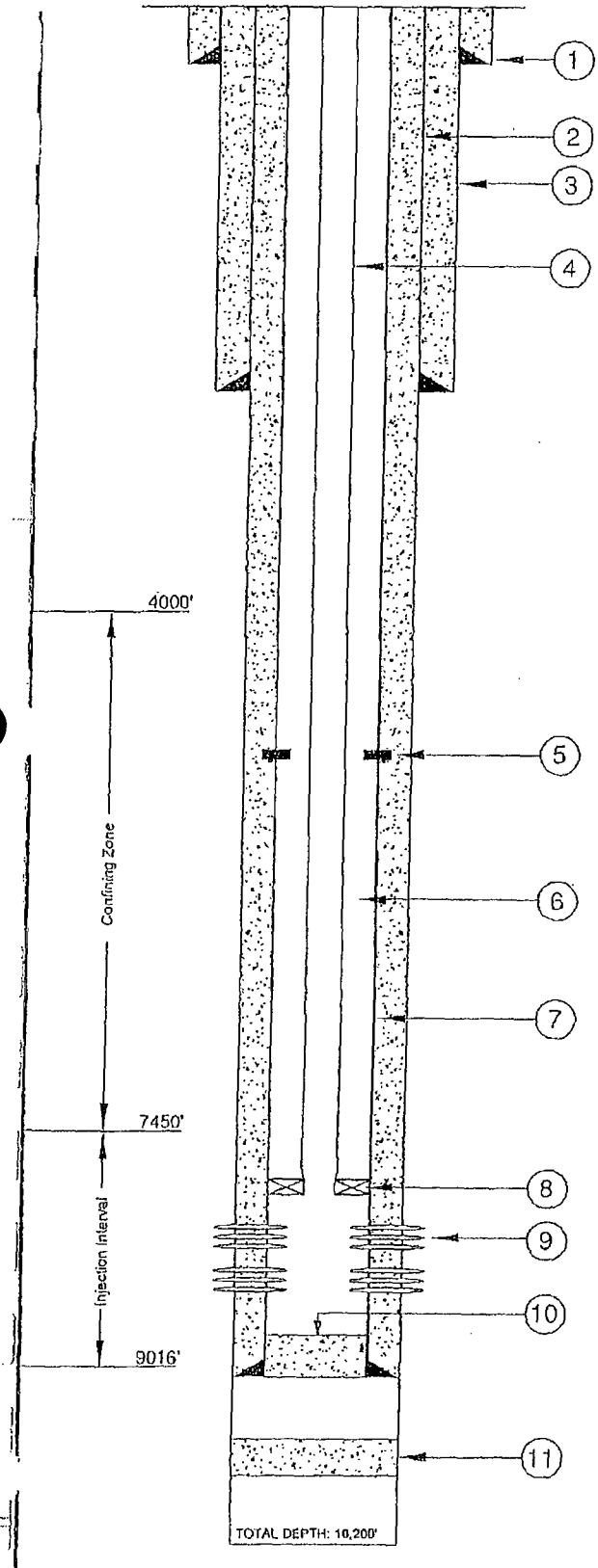

Chukka Well #2
Pressure (psia)
Temperature (deg F)
Time (hours)
Pressure #1
Temperature #1
3600
3360
3120
2880
2640
2400
2160
1920
1680
1440
1200
960
720
480
240
0
120
115
110
105
100
95
90
85
80
75
70
0
6
12
18
24
30
36
42
48
54
60
66
72
78
84

FIGURE 2



BELOW GROUND DETAILS

All depths are referenced to the Kelly bushing elevation of 12.5' above ground level. Ground level elevation is 3,678' above mean sea level.

1. Surface Casing: 13 ⅜", 48 lb/ft, J-55, ST&C set at 390' in a 17 ½" hole. Cemented with 150 sx Class C with 3 % calcium chloride, 375 sx Class C Litewate w/3 % calcium chloride and ½ lb/sx flocele. Circulated 86 sx to surface.

2. Intermediate Casing: 9 ⅝", 36 lb/ft, J-55, ST&C set at 2,555' in a 12 ¼" hole. Cemented w/800 sx of Class C Lite w/ ½ lb/sx flocele and 2 lb/sx Gilsonite and 12 % salt. Followed by 200 sx of Class C w/2 % calcium chloride. Circulated 133 sx to surface.

3. Base of the USDW at 493'.

4. Injection Tubing: 4 ½", 11.6 lb/ft, N-80, SMLS, R3, LT&C set at 7,879'.

5. DV Tool: at 5,498'.

6. Annulus Fluid: 8.7 lb/gal brine water mixed w/UniChem Techni-Hib 370 corrosion inhibitor.

7. Protection Casing: 7", 29 lb/ft, N-80, LT&C: 9094' to 7031'. 7", 29 lb/ft, P-110, LT&C: 7031' to 5845'. 7", 26 lb/ft, P-110, LT&C; 5845' to surface. Casing cemented in two stages as follows:

   First Stage - 600 sx modified Class H w/0.4 % CFR-3, 5 lb/sx Gilsonite, 0.5% Halad-344, and 1 lb/sx salt mixed at 13.0 ppg. Opened DV tool at 5498' and circulated 142 sx to surface.

   Second Stage - Lead Slurry: 220 sx Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail Slurry: 550 sx modified Class H w/0.4 % CFR-3, 5 lb/sx, Gilsonite, 0.5 % Halad-344, 0.1% HR-7, and 1 lb/sx mixed at 13.0 ppg. Circulated 75 sx to surface. Top out w/20 sx permium plus 3% calcium chloride.

8. Packer: 7" x 3.5" EVI Oil Tools (Arrow), Model X-1 retrievable packer set at 7879'. Minimum I.D. is 3.0". Wireline re-entry guide on bottom. To release; turn ¼ turn to the right and pick up.

9. Perforations (2 SPF):

   Upper Zone - 7924-7942', 7974-8030', 8050-8056', 8066-8080', 8118-8127', 8132-8140', 8160-8164', 8170-8188'.

   Lower Zone - 8220-8254', 8260-8270', 8280-8302', 8360-8366', 8370-8378', 8400-8410', 8419-8423', 8430-8446', 8460-8464', 8470-8476'.

10. PBTD: 9004'.

11. Cement Plug: 45 sx Class H from 9624' to 9734'.

SUBSURFACE

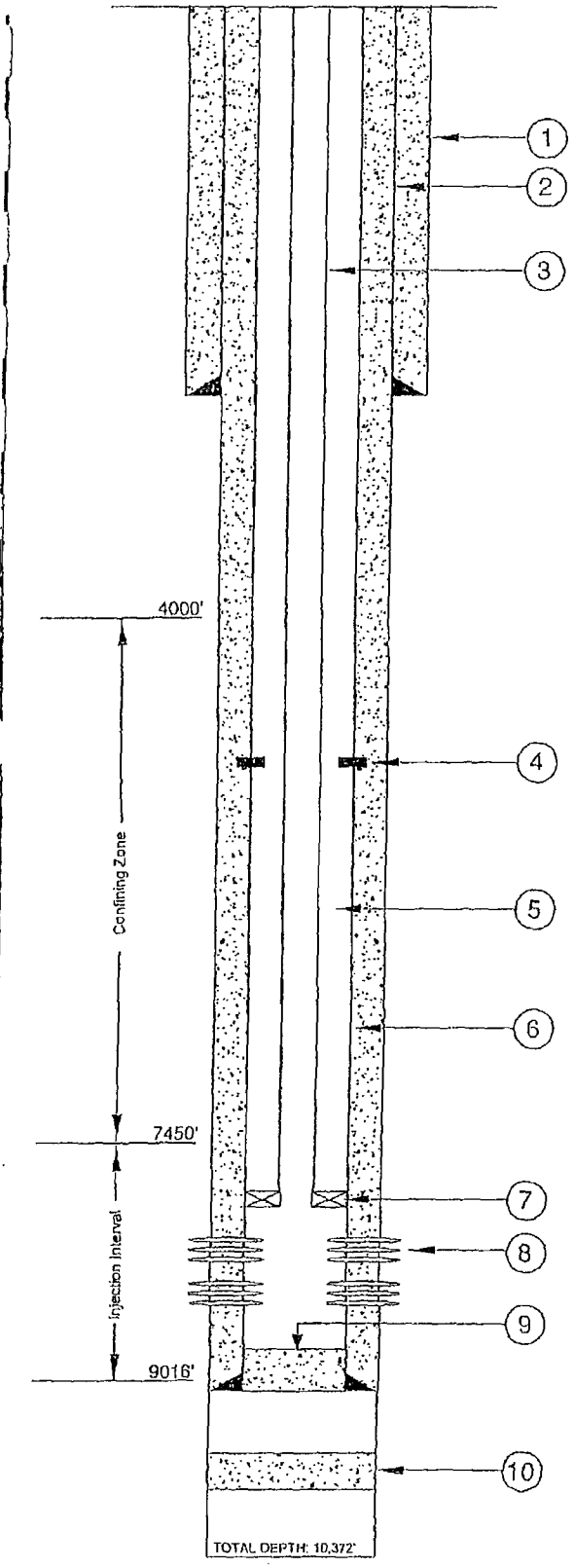
HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO

BELOW GROUND DETAILS
WASTE DISPOSAL WELL NO. 1

DATE: 07/13/01	CHECKED BY:	JOB NO: 7005256
DRAWN BY: WDL	APPROVED BY:	DWG. NO:

FIGURE 3



BELOW GROUND DETAILS

All depths are referenced to the Kelly bushing elevation of 13' above ground level. Ground level elevation is 3610' above mean sea level.

1. Base of the USDW at 473'.
2. Surface Casing: 8 5/8", 32 lb/ft, set at 1995' in an 11" hole. Cemented to surface with 800 sacks of cement.
3. Injection Tubing: 3 ½", 9.2 lb/ft, J-55, smls, NUE 10 rd. set at 7528'.
4. DV Tool: at 5,785'.
5. Annulus Fluid: 8.7 lb/gal brine water mixed w/UniChem Techni-Hib 370 corrosion inhibitor.
6. Protection Casing: 5 ½", 17 lb/ft, L-80, LT&C; 8869' to the surface and set in a 7 7/8" hole. Casing cemented in two stages as follows:

   First Stage - 575 sacks of modified Class "H" with 0.4 % CFR-3, 5 lb/sk Gilsonite, 0.5 % Halad-344, and 3 lb/sk salt. Mixed at 13.0 ppg. Opened DV tool at 5785 and circulated 20 sacks to surface.

   Second Stage - Lead Slurry: 300 sacks of Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail slurry: 695 sacks modified Class "H" with 0.4% CFR-3, 5 lb/sk Gilsonite, 0.5 % Halad-344 and 3 lb/sk salt mixed at 13.0 ppg. Circulated 150 sacks to surface. Topped out with 10 yards of Redi-mix.
7. Packer: 5 ½" x 2 7/8" Weatherford Completion Tools (Arrow) Model X-1 retrievable packer set at 7528'. Minimum ID is 2.4375". Wireline re-entry guide is on bottom. To release: turn ¼ turn to the right and pick up.
8. Perforations (2 SPF):

   Zone 1: 7570-7620', 7676-7736'

   Zone 2: 7826-7834', 7858-7880', 7886-7904', 7916-7936', 7944-7964', 7990-8042', 8096-8116', 8191-8201', 8304-8319',8395-8399'.
9. PBTD: 8770'
10. Cement Plug: 45 sacks from 9675' to 9775'.

FIGURE 4

SUBSURFACE

HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO

BELOW GROUND DETAILS
WASTE DISPOSAL WELL NO. 2

DATE: 07/13/01	CHECKED BY:	JOB NO: 70D5256
DRAWN BY: WOL	APPROVED BY:	DWG. NO:

FIGURE 4

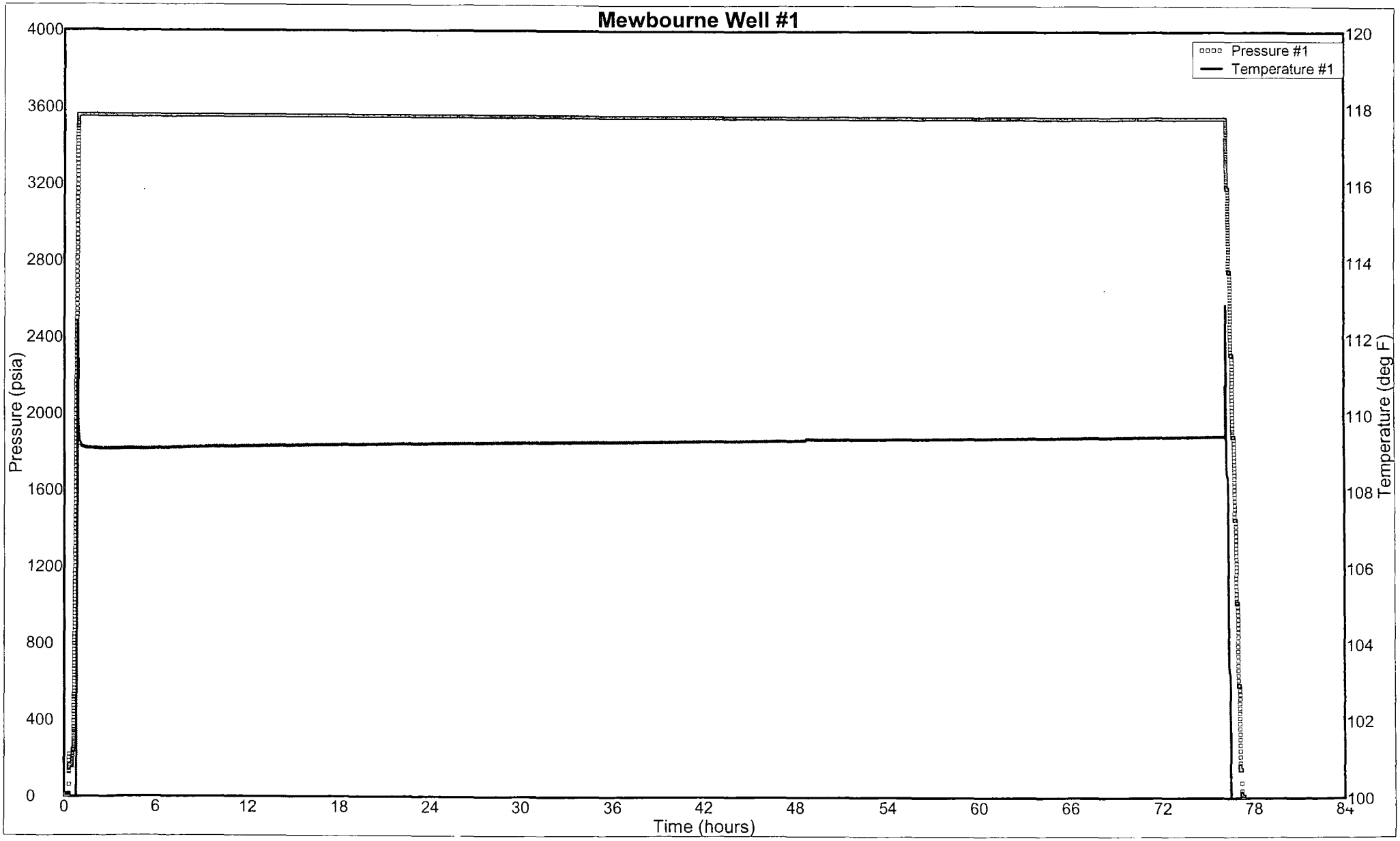
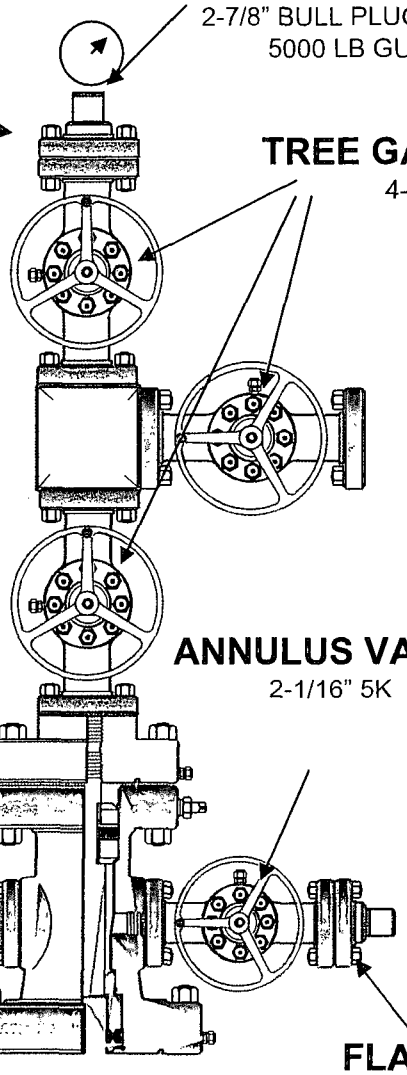

Mewbourne Well #1
Pressure #1
Temperature #1
Pressure (psia)
Temperature (deg F)
Time (hours)
4000
3600
3200
2800
2400
2000
1600
1200
800
400
0
120
118
116
114
112
110
108
106
104
102
100
0
6
12
18
24
30
36
42
48
54
60
66
72
78
84

FIGURE 5

SUBSURFACE TECHNOLOGY

WELL: NAVAJO REFINING WDW #3



TOP CONNECTION
4-1/2" EUE, 2-7/8" 8rd
2-7/8" BULL PLUG 1/2" NPT
5000 LB GUAGE

FLANGE
4-1/16" 3K X 4-1/2" UPTBG 3K

TREE GATE VALVES
4-1/16" 3K

UPPER TREE ASSEMBLY
A5PP,4-1/2",7-1/16" 3K X 4-1/16" 3K

ANNULUS VALVE
2-1/16" 5K

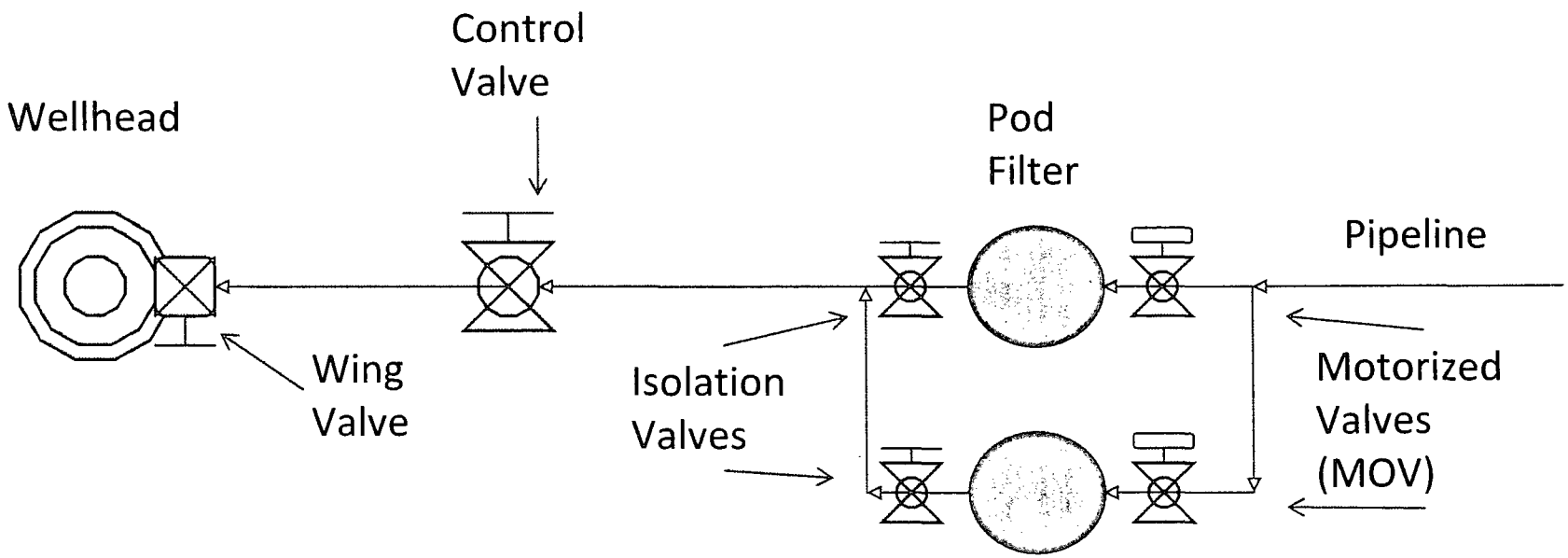
ANNULUS VALVE
2" BALL VALVE 3K

FLANGE
2-1/16" 5K X 2" LP 5K

SUPERIOR WELLHEAD

FIGURE 7

FIGURE
Gaines Well #3
Diagram of Shut-in Valve Control



At Shut-in
- Close MOV
- Close Wing Valve
- Close Isolation Valves
- Close Control Valve
- Drain POD Filters

FIGURE 8

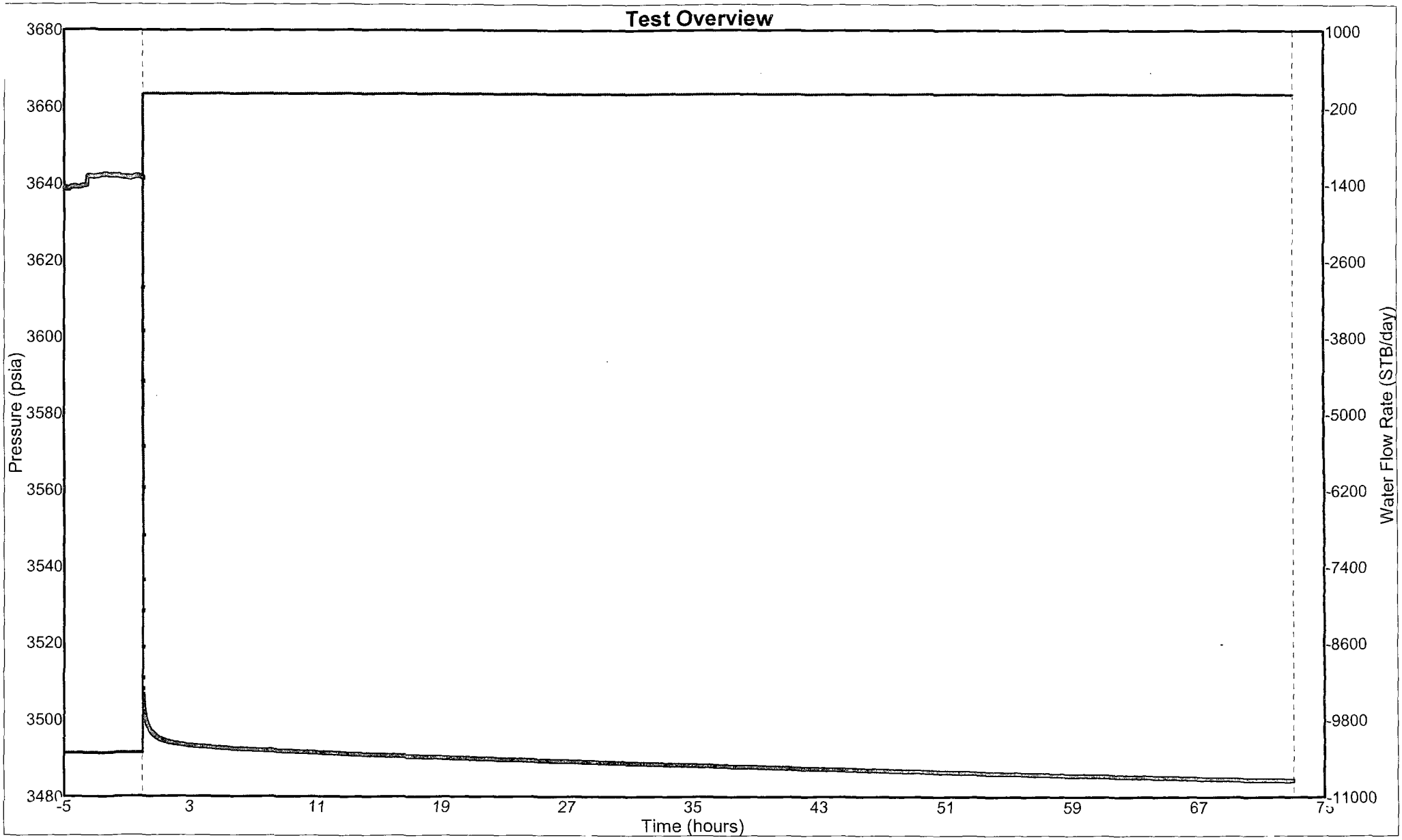

Test Overview
Pressure (psia)
Water Flow Rate (STB/day)
Time (hours)
3680
3660
3640
3620
3600
3580
3560
3540
3520
3500
3480
1000
-200
-1400
-2600
-3800
-5000
-6200
-7400
-8600
-9800
-11000
-5
3
11
19
27
35
43
51
59
67
75

FIGURE 9

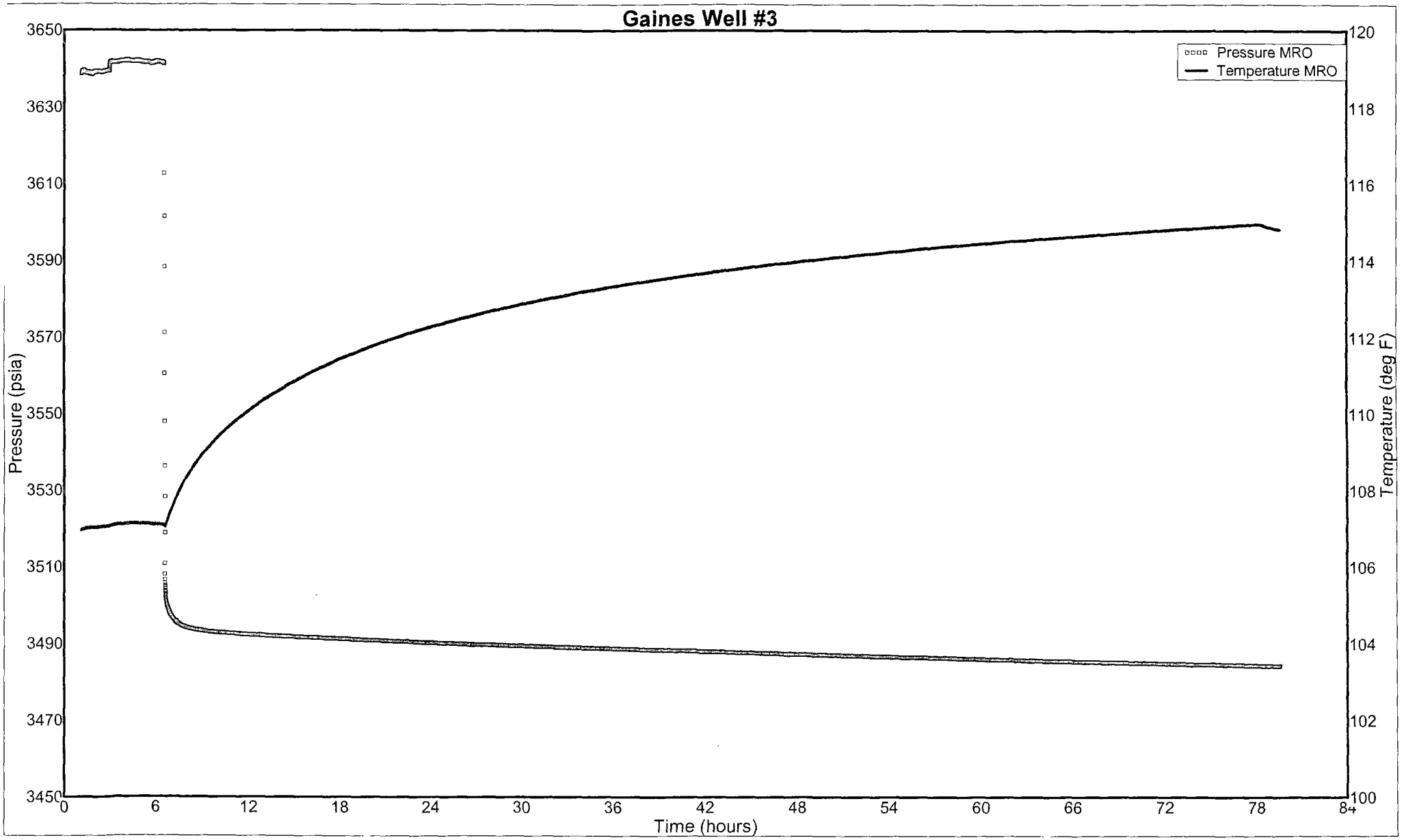

Gaines Well #3
Pressure MRO
Temperature MRO
Pressure (psia)
Temperature (deg F)
Time (hours)
3650
3630
3610
3590
3570
3550
3530
3510
3490
3470
3450
120
118
116
114
112
110
108
106
104
102
100
0
6
12
18
24
30
36
42
48
54
60
66
72
78
84

FIGURE 10

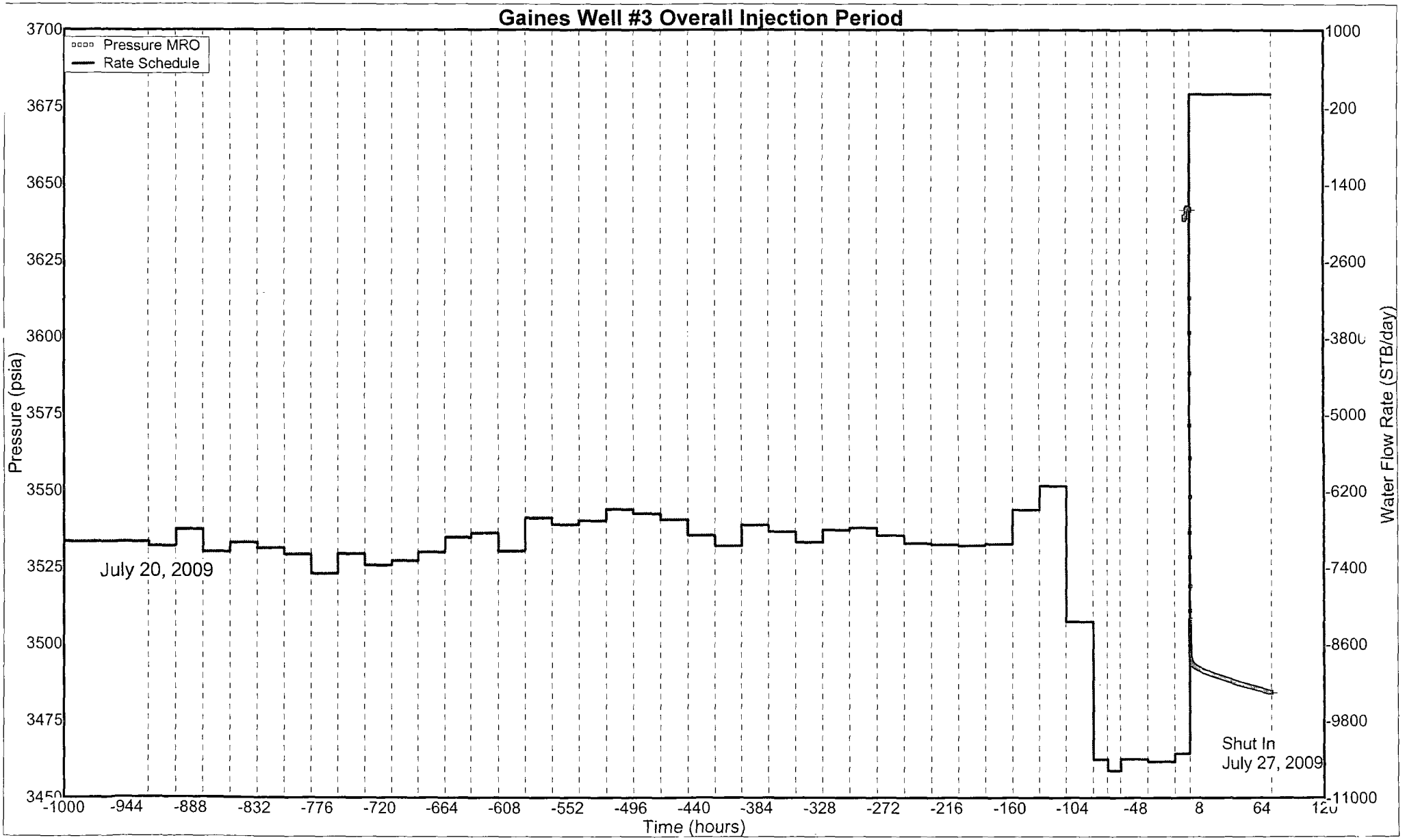

Gaines Well #3 Overall Injection Period
Pressure MRO
Rate Schedule
Pressure (psia)
Water Flow Rate (STB/day)
Time (hours)
July 20, 2009
Shut In
July 27, 2009
3700
3675
3650
3625
3600
3575
3550
3525
3500
3475
3450
1000
-200
-1400
-2600
-3800
-5000
-6200
-7400
-8600
-9800
-11000
-1000
-944
-888
-832
-776
-720
-664
-608
-552
-496
-440
-384
-328
-272
-216
-160
-104
-48
8
64
120

FIGURE 11

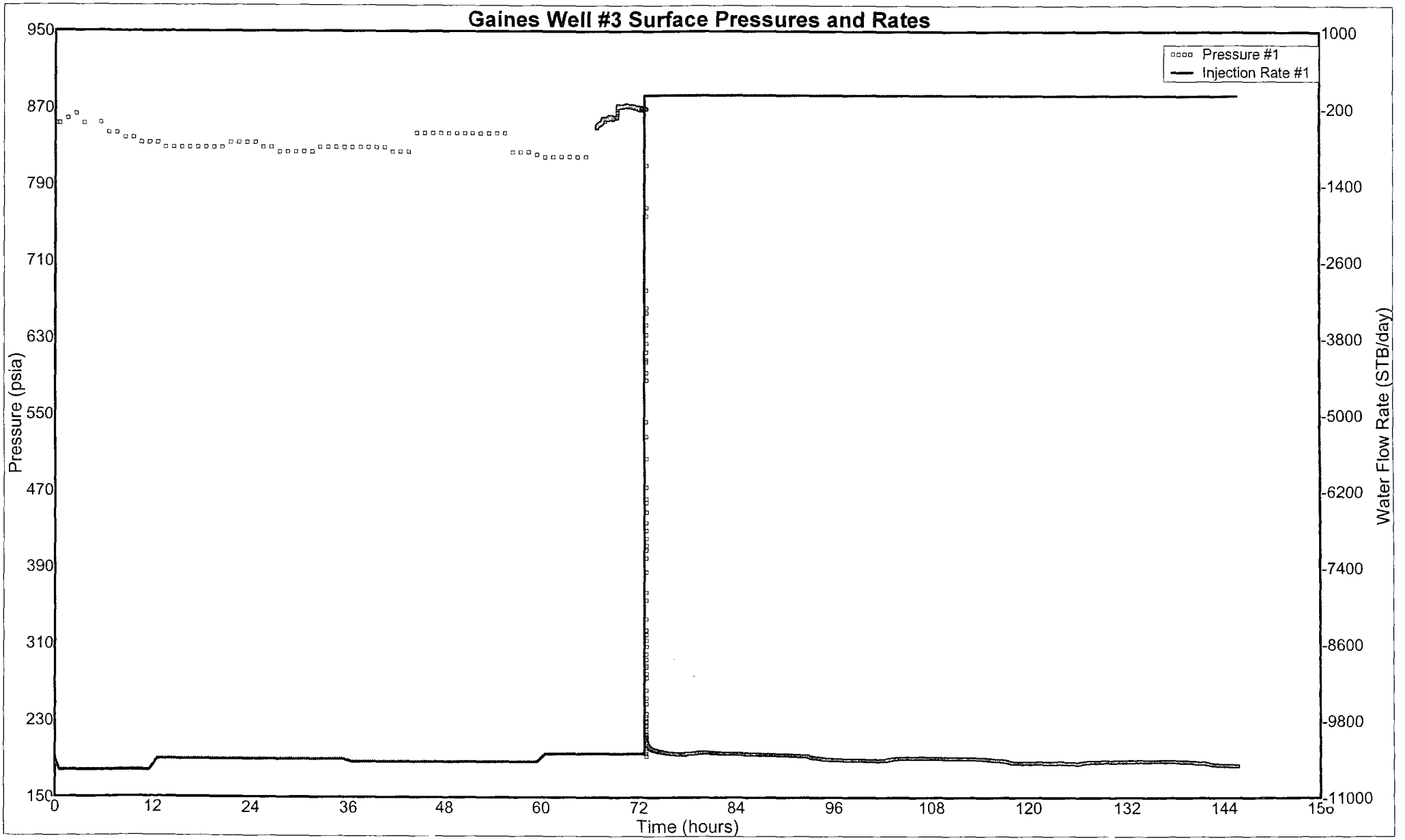

Gaines Well #3 Surface Pressures and Rates
Pressure #1
Injection Rate #1
Pressure (psia)
Water Flow Rate (STB/day)
Time (hours)
950
870
790
710
630
550
470
390
310
230
150
1000
-200
-1400
-2600
-3800
-5000
-6200
-7400
-8600
-9800
-11000
0
12
24
36
48
60
72
84
96
108
120
132
144
156

FIGURE 12

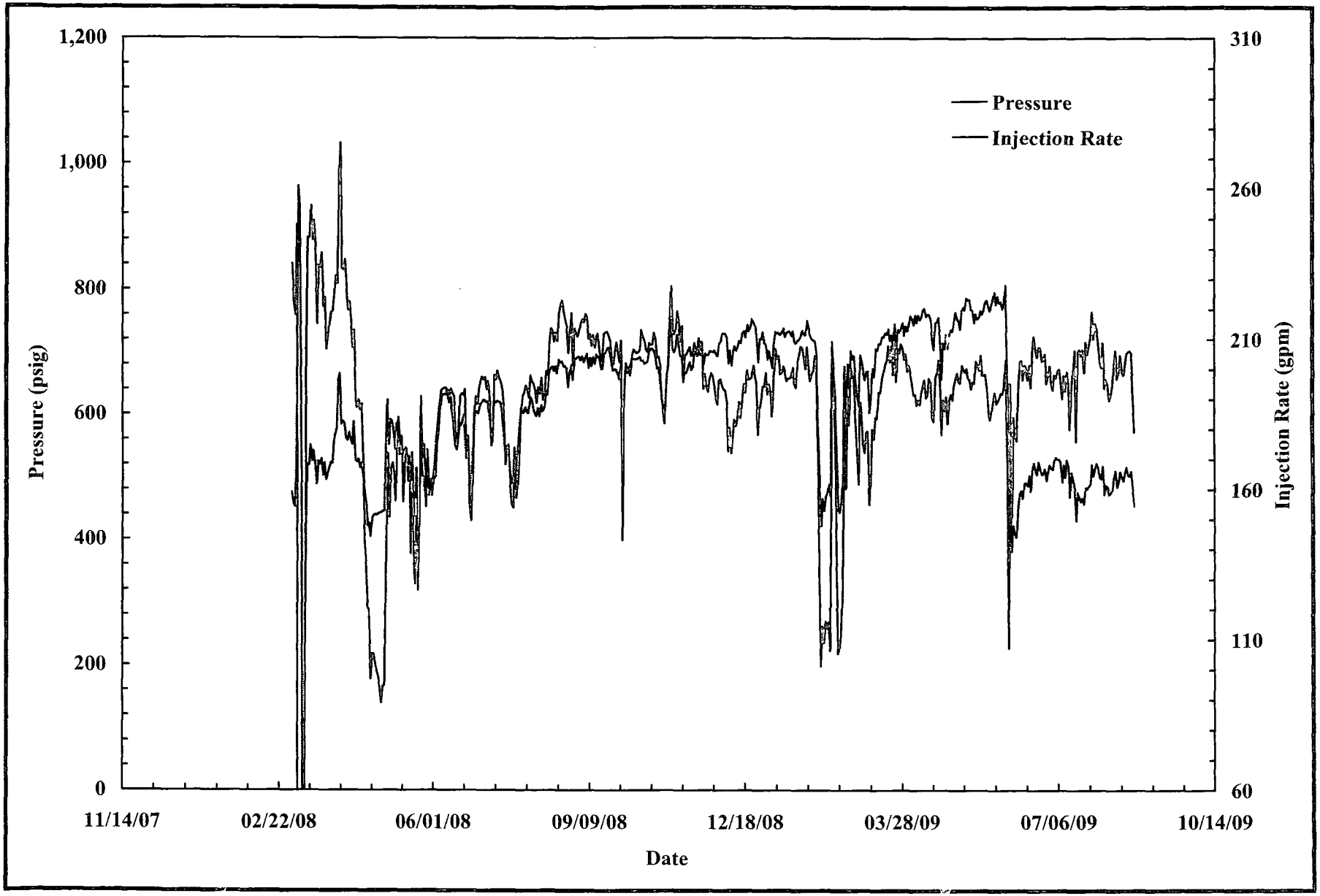

1,200
1,000
800
600
400
200
0
Pressure (psig)
310
260
210
160
110
60
Injection Rate (gpm)
Pressure
Injection Rate
11/14/07
02/22/08
06/01/08
09/09/08
12/18/08
03/28/09
07/06/09
10/14/09
Date

FIGURE 13

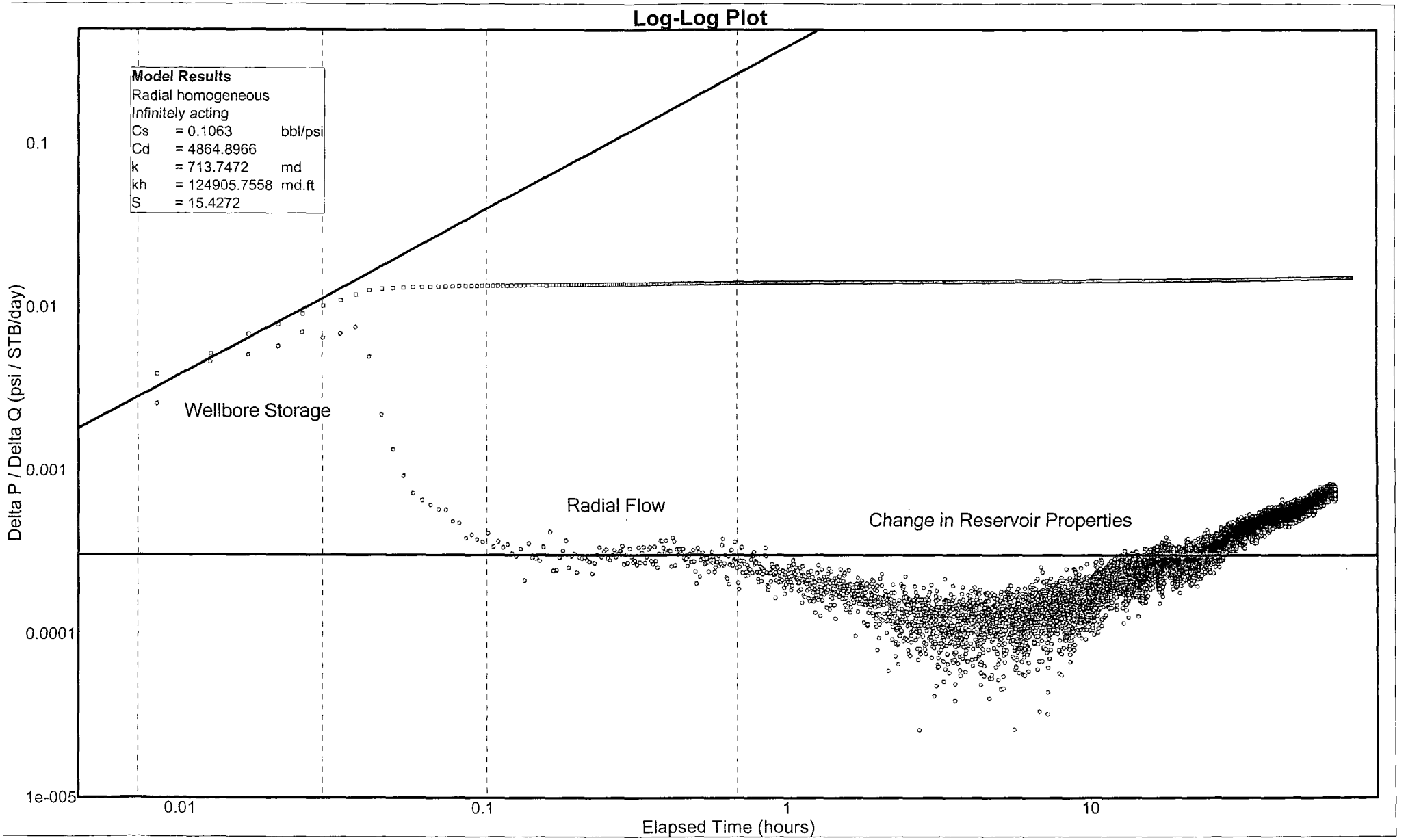

Log-Log Plot
Model Results
Radial homogeneous
Infinitely acting
Cs = 0.1063 bbl/psi
Cd = 4864.8966
k = 713.7472 md
kh = 124905.7558 md.ft
S = 15.4272
Wellbore Storage
Radial Flow
Change in Reservoir Properties
Delta P / Delta Q (psi / STB/day)
0.1
0.01
0.001
0.0001
1e-005
0.01
0.1
1
10
Elapsed Time (hours)

FIGURE 14

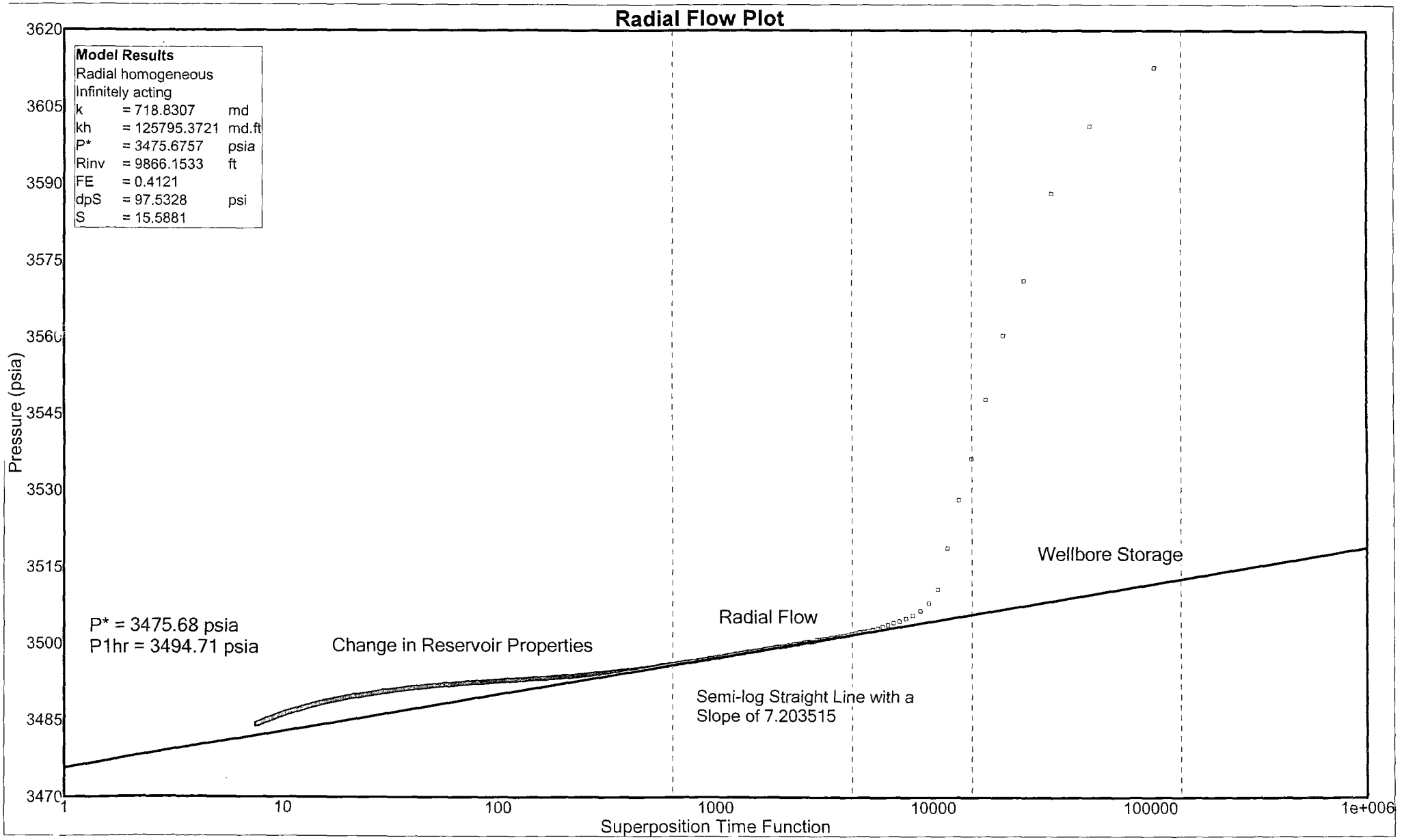

Radial Flow Plot
Model Results
Radial homogeneous
Infinitely acting
k = 718.8307 md
kh = 125795.3721 md.ft
P* = 3475.6757 psia
Rinv = 9866.1533 ft
FE = 0.4121
dpS = 97.5328 psi
S = 15.5881
Pressure (psia)
3620
3605
3590
3575
3560
3545
3530
3515
3500
3485
3470
P* = 3475.68 psia
P1hr = 3494.71 psia
Change in Reservoir Properties
Radial Flow
Wellbore Storage
Semi-log Straight Line with a
Slope of 7.203515
1
10
100
1000
10000
100000
1e+006
Superposition Time Function

FIGURE 15

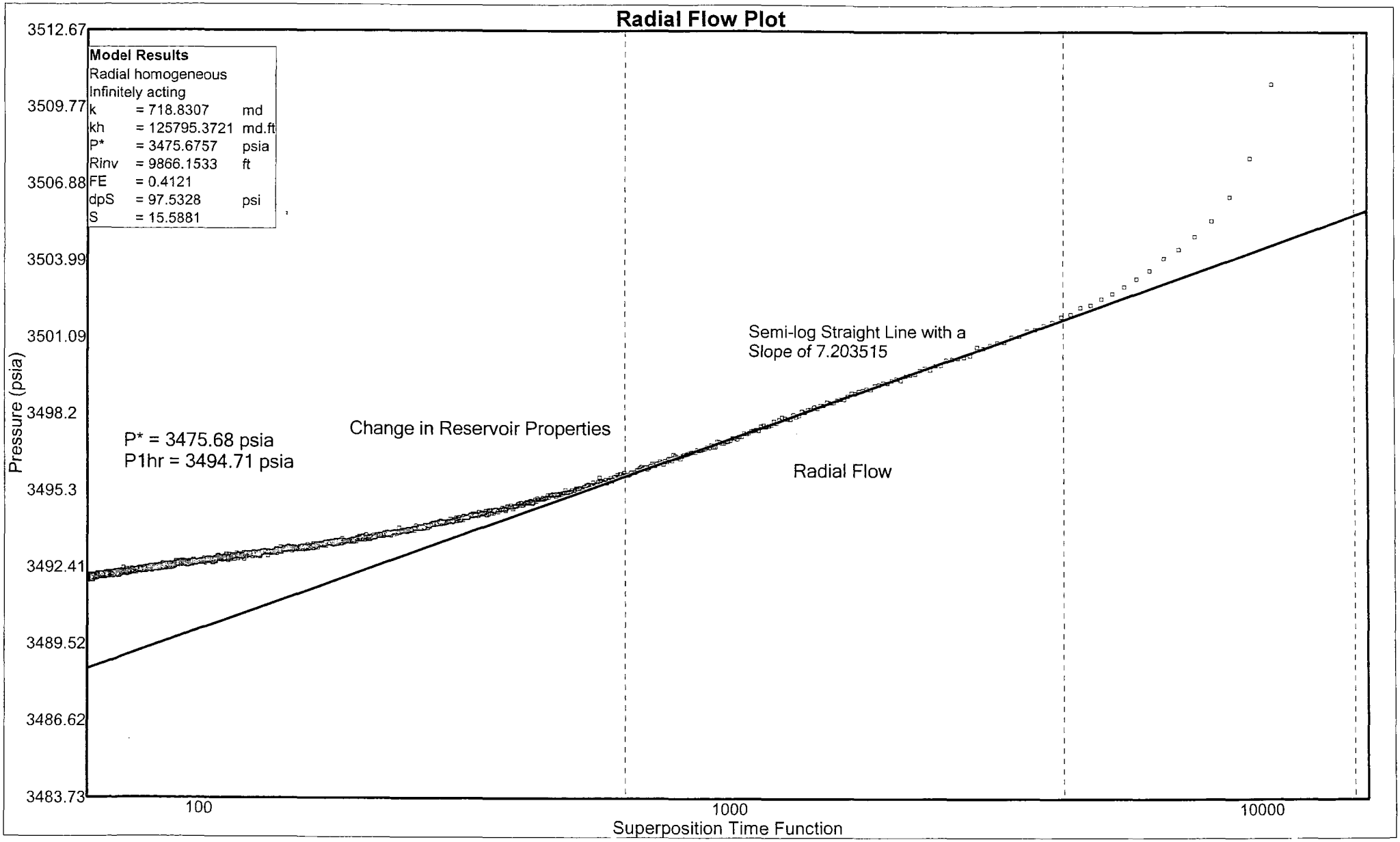

Radial Flow Plot
Model Results
Radial homogeneous
Infinitely acting
k = 718.8307 md
kh = 125795.3721 md.ft
P* = 3475.6757 psia
Rinv = 9866.1533 ft
FE = 0.4121
dpS = 97.5328 psi
S = 15.5881
3512.67
3509.77
3506.88
3503.99
3501.09
3498.2
3495.3
3492.41
3489.52
3486.62
3483.73
Pressure (psia)
Semi-log Straight Line with a
Slope of 7.203515
Change in Reservoir Properties
P* = 3475.68 psia
P1hr = 3494.71 psia
Radial Flow
100
1000
10000
Superposition Time Function

FIGURE 16

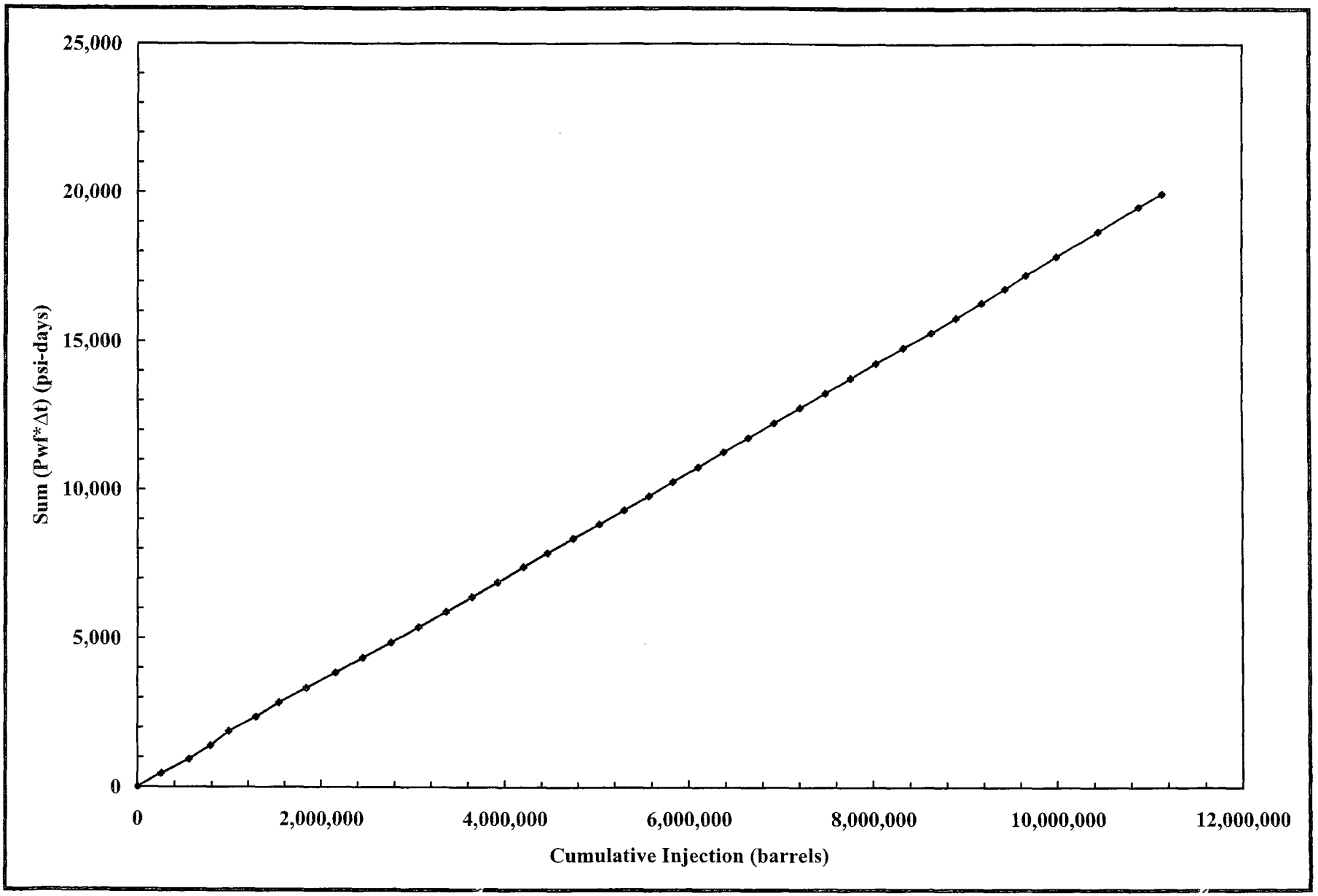

25,000
20,000
15,000
10,000
5,000
0
Sum (Pwf*Δt) (psi-days)
0
2,000,000
4,000,000
6,000,000
8,000,000
10,000,000
12,000,000
Cumulative Injection (barrels)

FIGURE 17

Navajo Refining Company
Static Pressure Gradient Survey
Gaines Well #3
August 30, 2009

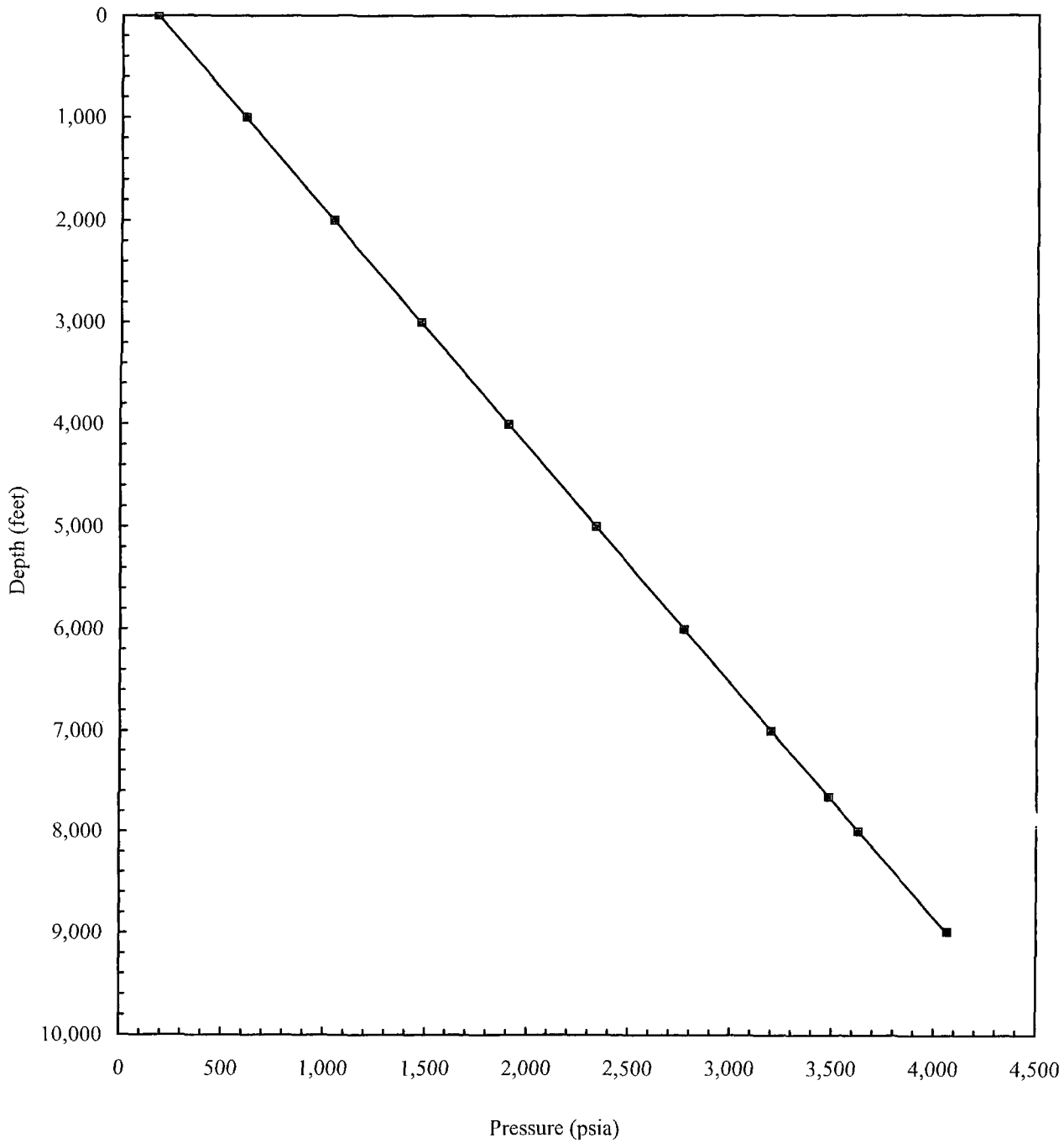


Figure 18

APPENDIX A

DUAL INDUCTION LOG
SECTIONS FROM 7,660 FEET TO 8,620 FEET

SUBSURFACE

APPENDIX B

NEUTRON DENSITY LOG
SECTIONS FROM 7,660 FEET TO 8,620 FEET

SUBSURFACE

APPENDIX C

COMPRESSIBILITY OF FLUID

APPENDIX C

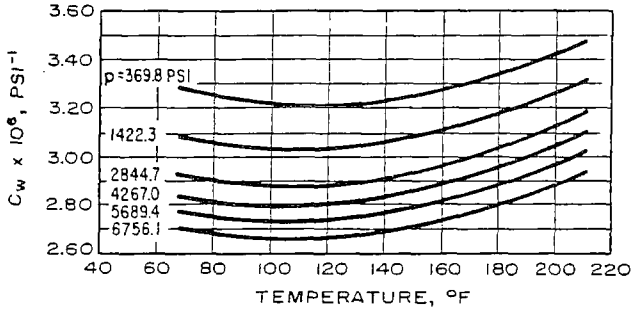


Fig. D.16 Average compressibility of distilled water. After Long and Chierici.[13]

Source: Earlougher, 1977, Advances in Well Test Analysis

COMPRESSIBILITY OF PORE VOLUME AND DISTILLED WATER

APPENDIX D

COMPRESSIBILITY OF PORE VOLUME

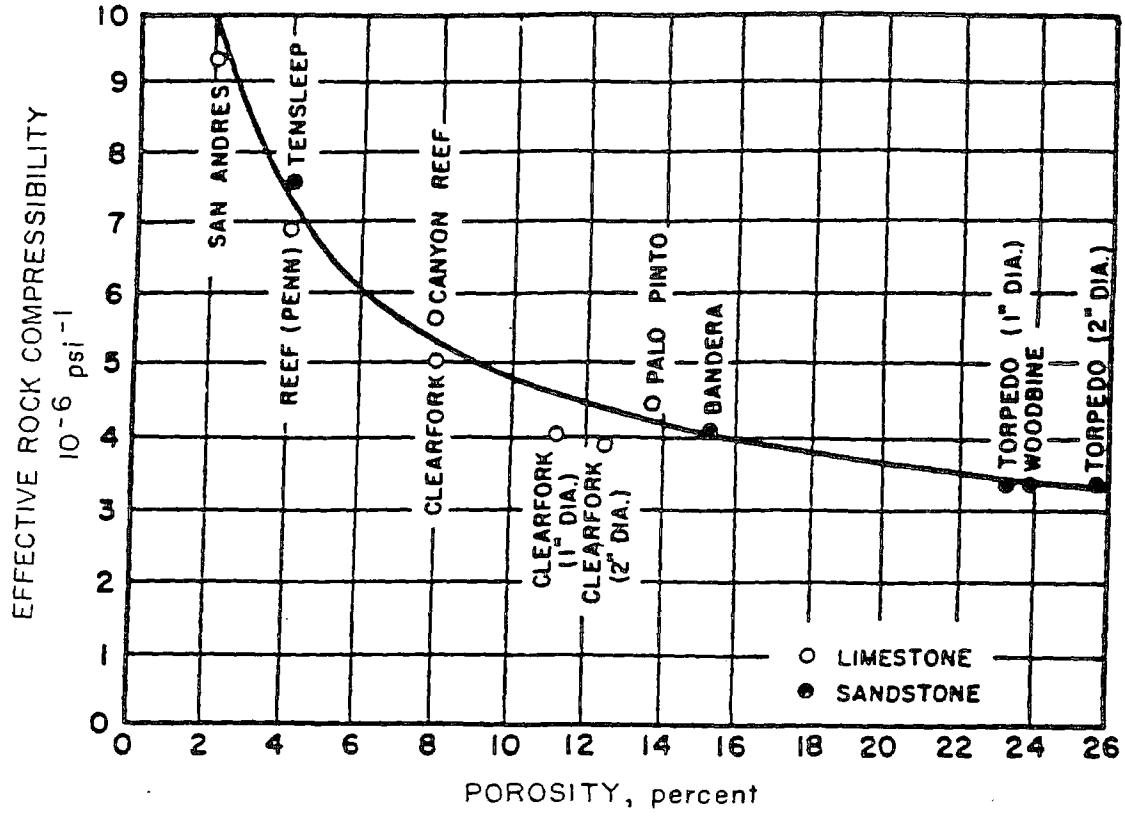


Fig. G.5 Effective formation (rock) compressibility. From Hall, *Trans.*, AIME (1953) **198**, 309.

Source: Matthews and Russell, 1967, Pressure Buildup and Flow Tests in Wells

APPENDIX E

GAINES WELL NO. 3 2006 TEMPERATURE LOG SECTIONS FROM 7,660 FEET TO 8,620 FEET

SUBSURFACE

APPENDIX F

WATER VISCOSITIES AT VARIOUS SALINITIES AND TEMPERATURES

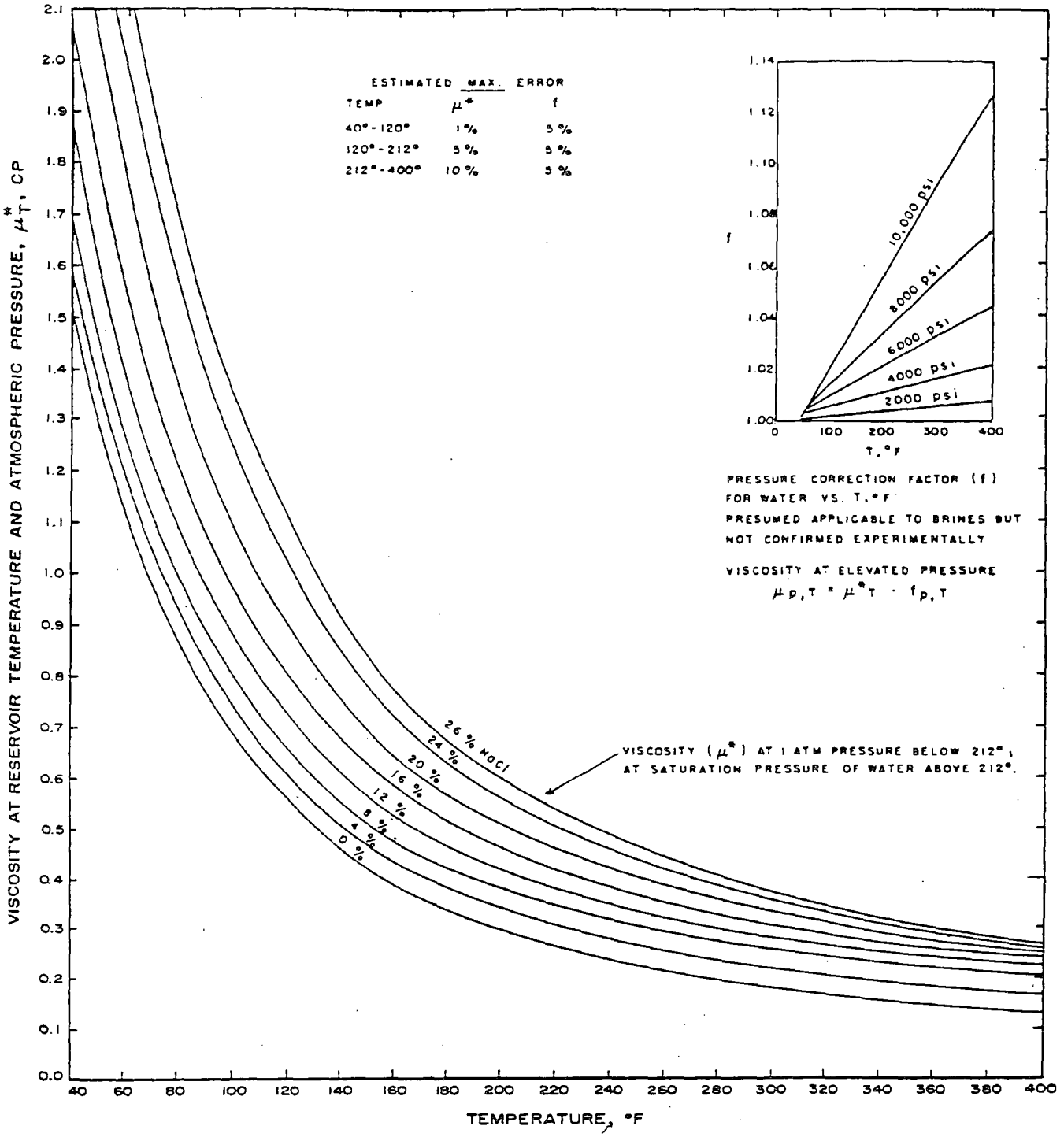


Fig. D.35 Water viscosity at various salinities and temperatures. After Matthews and Russell, data of Chesnut.[18]

FROM: Earlougher, R.C., 1977, "Advances in Well Test Analysis", SPE of AIME, Dallas, Texas

APPENDIX G

DAILY RATE HISTORY DATA

APPENDIX G

NAVAJO REFINING
INJECTION RATES USED IN ANALYSIS

Date	Elasped Time (hours)	Injection Pressure (psig)	Injection Rate (bpd)	Injection Rate (gpm)	Comments
07/20/09 00:00	0.00	460.00	7006.00	204.34	
07/21/09 00:00	24.00	465.94	7073.94	206.32	
07/22/09 00:00	48.00	456.22	6813.49	198.73	
07/23/09 00:00	72.00	482.74	7164.46	208.96	
07/24/09 00:00	96.00	480.78	7021.02	204.78	
07/25/09 00:00	120.00	485.28	7107.95	207.32	
07/26/09 00:00	144.00	488.91	7208.18	210.24	
07/27/09 00:00	168.00	519.99	7508.98	219.01	
07/28/09 00:00	192.00	501.22	7197.63	209.93	
07/29/09 00:00	216.00	513.58	7375.97	215.13	
07/30/09 00:00	240.00	521.28	7304.95	213.06	
07/31/09 00:00	264.00	514.31	7168.64	209.09	
08/01/09 00:00	288.00	499.81	6937.17	202.33	
08/02/09 00:00	312.00	496.73	6870.56	200.39	
08/03/09 00:00	336.00	517.12	7152.81	208.62	
08/04/09 00:00	360.00	471.00	6632.39	193.44	
08/05/09 00:00	384.00	486.38	6736.96	196.49	
08/06/09 00:00	408.00	484.30	6677.31	194.75	
08/07/09 00:00	432.00	471.63	6495.64	189.46	
08/08/09 00:00	456.00	473.89	6562.18	191.40	
08/09/09 00:00	480.00	479.21	6656.03	194.13	
08/10/09 00:00	504.00	498.55	6903.07	201.34	
08/11/09 00:00	528.00	509.63	7067.91	206.15	
08/12/09 00:00	552.00	483.51	6741.21	196.62	
08/13/09 00:00	576.00	493.71	6845.95	199.67	
08/14/09 00:00	600.00	508.15	7010.79	204.48	
08/15/09 00:00	624.00	499.77	6822.86	199.00	
08/16/09 00:00	648.00	493.87	6786.21	197.93	
08/17/09 00:00	672.00	506.22	6905.04	201.40	
08/18/09 00:00	696.00	515.66	7031.59	205.09	
08/19/09 00:00	720.00	502.31	7052.84	205.71	
08/20/09 00:00	744.00	501.16	7064.32	206.04	
08/21/09 00:00	768.00	508.74	7042.00	205.39	
08/22/09 00:00	792.00	478.30	6504.35	189.71	
08/23/09 00:00	816.00	453.51	6133.12	178.88	
08/24/09 00:00	840.00	637.95	8259.03	240.89	
08/24/09 12:30	852.50	853.02	10412.91	303.71	Start stabile injection
08/25/09 00:00	864.00	846.03	10585.37	308.74	
08/26/09 00:00	888.00	828.71	10406.74	303.53	
08/27/09 00:00	912.00	832.28	10445.83	304.67	
08/27/09 13:29	925.48	826.58	10322.74	301.08	Shut well in

APPENDIX H

GAUGE CALIBRATION SHEETS

Tool Manufacture	Cardinal Surveys Company P. O. Box 729 Odessa, TX 79760	Calabrated to Chandler Engineering Dead Weight Tester Serial # 18822	
Gauge #	CSC 2609	Resolution	infinite
		Accuracy	.000012% of Full Scale
Gauge Model #	CSCPSIV2		

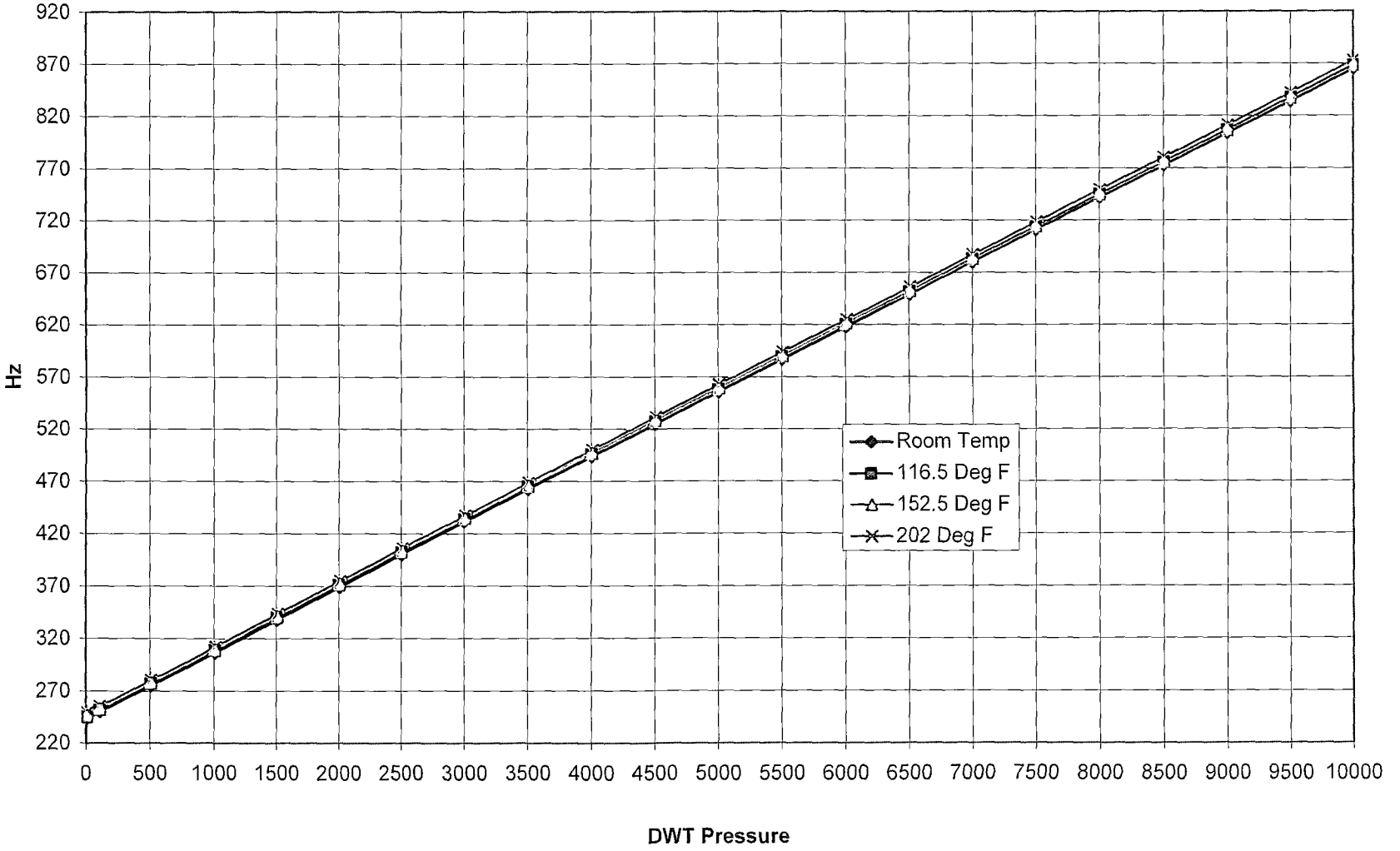
CSC Pressure Tool Calibration
3/4/2009
Original Calabration Date 02-28-2009

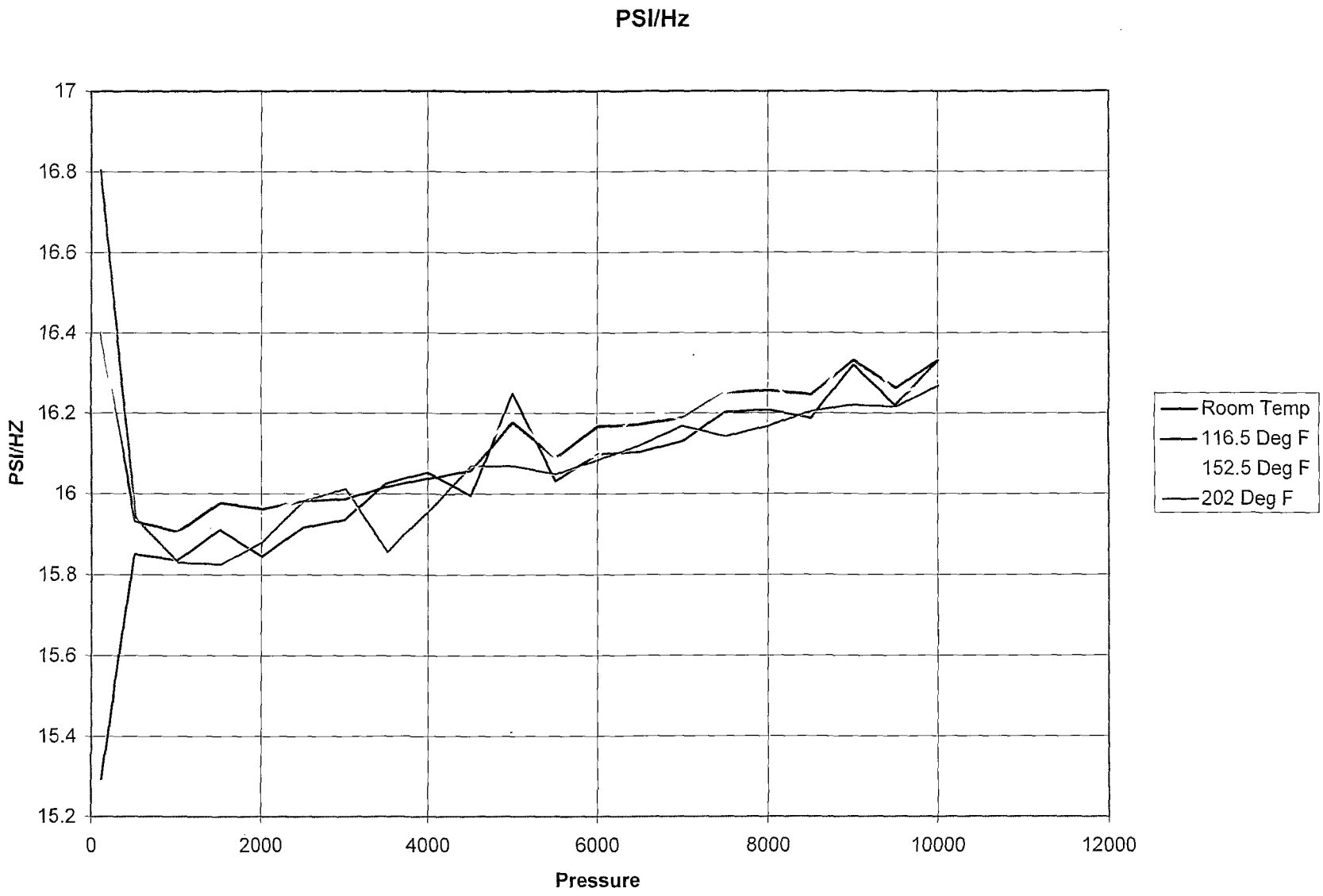
	Up	Down	Up	Down	Up	Down	Up	Down	(Down)					
DWT	Temperature:													
Pressure	room temp		116.5		152.5		202		average	PSI/Hz:				
0	244.65	245.12	245.88	246.23	247.81	248.36	250.25	246.69	247.15					
100	250.746	251.31	252.418	252.64	253.9	254.57	256.2	256.94	253.32	16.4042	15.2952	16.42036	16.80672	
500	275.85		277.65		279.07		281.29		278.47	15.93372	15.85289	15.89193	15.94261	
1000	307.28	308.23	309.22	309.21	310.51	311.3	312.87	313.65	309.97	15.90837	15.83782	15.90331	15.83281	
1500	338.57		340.64		341.88		344.46		341.39	15.97955	15.91343	15.9388	15.82779	
2000	369.89		372.19		373.24		375.94	2.7	372.82	15.96424	15.84786	15.94388	15.8831	
2500	401.17		403.6		404.5		407.22		404.12	15.98465	15.9185	15.99488	15.98465	
3000	432.44	433.15	434.97	434.77	435.7	436.26	438.44	438.96	435.39	15.98977	15.9388	16.02564	16.01537	
3500	463.65		466.16		466.84		469.97		466.66	16.02051	16.03078	16.05652	15.85791	
4000	494.82		497.3		497.83		501.3		497.81	16.04107	16.05652	16.13424	15.95914	
4500	525.95		528.55		528.91		532.41		528.96	16.06168	16	16.08752	16.072	
5000	556.85	557.49	559.31	559.48	559.77	560.48	563.52	563.66	559.86	16.18123	16.25488	16.2022	16.072	
5500	587.92		590.49		590.84		594.67		590.98	16.09269	16.03592	16.09269	16.05136	
6000	618.84		621.54		621.9		625.75		622.01	16.17076	16.10306	16.09788	16.08752	
6500	649.75		652.58		652.74		656.76		652.96	16.17599	16.10825	16.21271	16.12383	
7000	680.63	681.25	683.57	684.54	683.63	684.09	687.68	687.87	683.88	16.19171	16.13424	16.18647	16.17076	
7500	711.39		714.42		714.39		718.65		714.71	16.25488	16.20746	16.25488	16.14466	
8000	742.14		745.26		745.1		749.57		745.52	16.26016	16.21271	16.28134	16.17076	
8500	772.91		776.14		775.96		780.42		776.36	16.24959	16.19171	16.2022	16.20746	
9000	803.52	804.01	806.77	80638	806.47	806.9	811.24	811.43	807.00	16.33453	16.32387	16.38807	16.22323	
9500	834.26		837.59		837.24		842.07		837.79	16.26545	16.22323	16.24959	16.21797	
10000	864.87		868.2		867.94		872.8		868.45	16.33453	16.33453	16.28664	16.27075	
	0.0622	248.29												

APPENDIX H

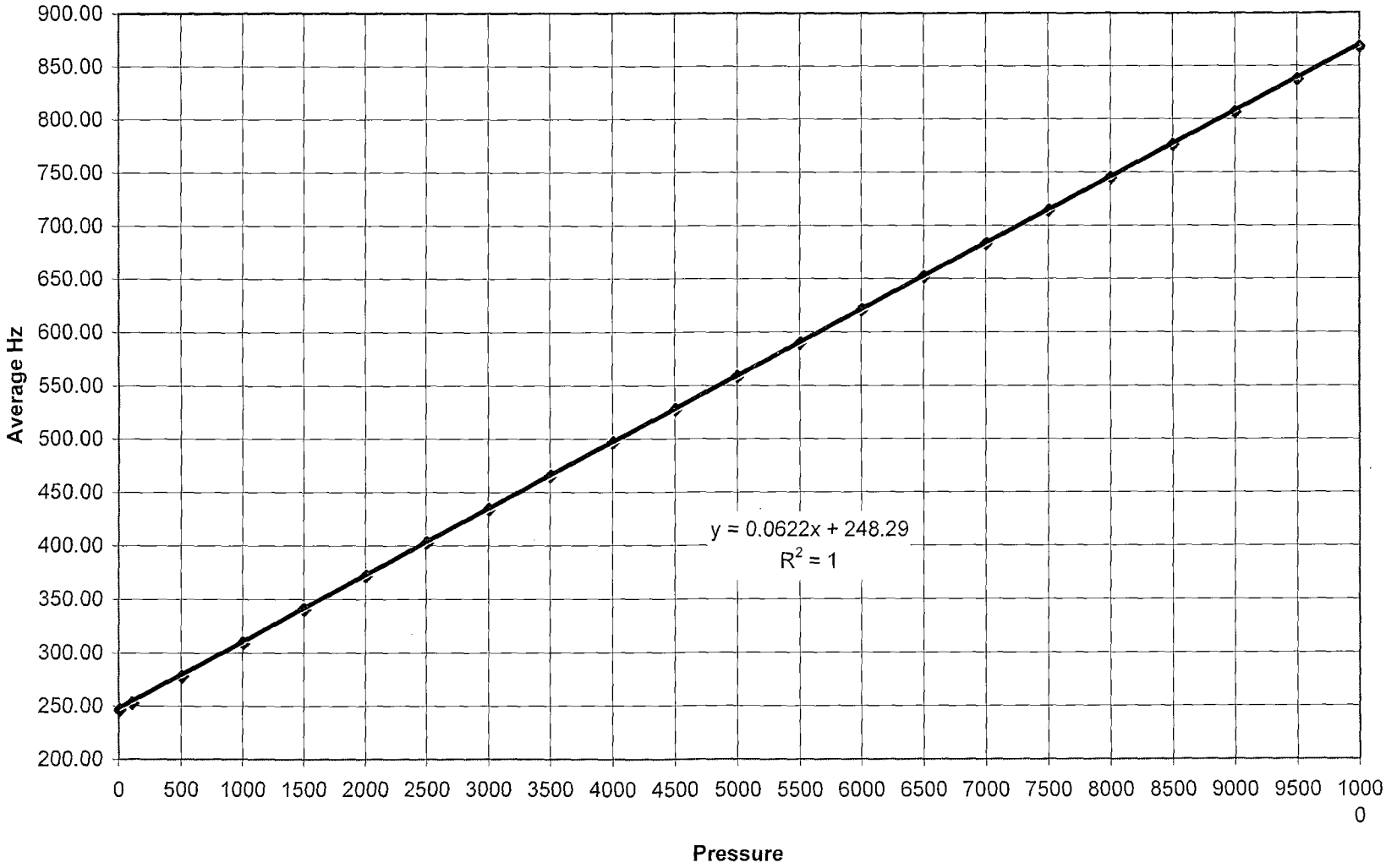
psi	predicted	error	predicted	error	predicted	error	predicted	error
0	-58.5209	-58.5209	-38.74598	-38.74598	-7.717042	-7.717042	31.51125	31.51125
100	39.48553	-60.51447	66.36656	-33.63344	90.19293	-9.807074	127.1704	27.17042
500	443.0868	-56.91318	472.0257	-27.97428	494.8553	-5.144695	530.5466	30.54662
1000	948.3923	-51.60772	979.582	-20.41801	1000.322	0.321543	1038.264	38.26367
1500	1451.447	-48.55305	1484.727	-15.27331	1504.662	4.662379	1546.141	46.14148
2000	1954.984	-45.01608	1991.961	-8.038585	2008.842	8.842444	2052.251	52.2508
2500	2457.878	-42.12219	2496.945	-3.054662	2511.415	11.41479	2555.145	55.14469
3000	2960.611	-39.38907	3001.286	1.286174	3013.023	13.02251	3057.074	57.07395
3500	3462.379	-37.62058	3502.733	2.733119	3513.666	13.66559	3563.987	63.98714
4000	3963.505	-36.49518	4003.376	3.376206	4011.897	11.89711	4067.685	67.68489
4500	4463.987	-36.01286	4505.788	5.787781	4511.576	11.57556	4567.846	67.84566
5000	4960.772	-39.2283	5000.322	0.321543	5007.717	7.717042	5068.006	68.00643
5500	5460.289	-39.71061	5501.608	1.607717	5507.235	7.234727	5568.81	68.81029
6000	5957.395	-42.6045	6000.804	0.803859	6006.592	6.59164	6068.489	68.48875
6500	6454.341	-45.65916	6499.839	-0.160772	6502.412	2.411576	6567.042	67.0418
7000	6950.804	-49.19614	6998.071	-1.92926	6999.035	-0.96463	7064.148	64.14791
7500	7445.338	-54.66238	7494.051	-5.948553	7493.569	-6.430868	7562.058	62.05788
8000	7939.711	-60.28939	7989.871	-10.12862	7987.299	-12.70096	8059.164	59.16399
8500	8434.405	-65.59486	8486.334	-13.66559	8483.441	-16.55949	8555.145	55.14469
9000	8926.527	-73.47267	8978.778	-21.22186	8973.955	-26.04502	9050.643	50.64309
9500	9420.74	-79.26045	9474.277	-25.72347	9468.65	-31.35048	9546.302	46.30225
10000	9912.862	-87.13826	9966.399	-33.60129	9962.219	-37.78135	10040.35	40.3537

DWT Pressure Tool Calibration




PSI/Hz
17
16.8
16.6
16.4
16.2
16
15.8
15.6
15.4
15.2
PSI/HZ
0
2000
4000
6000
8000
10000
12000
Pressure
Room Temp
116.5 Deg F
152.5 Deg F
202 Deg F

DWT Calibration



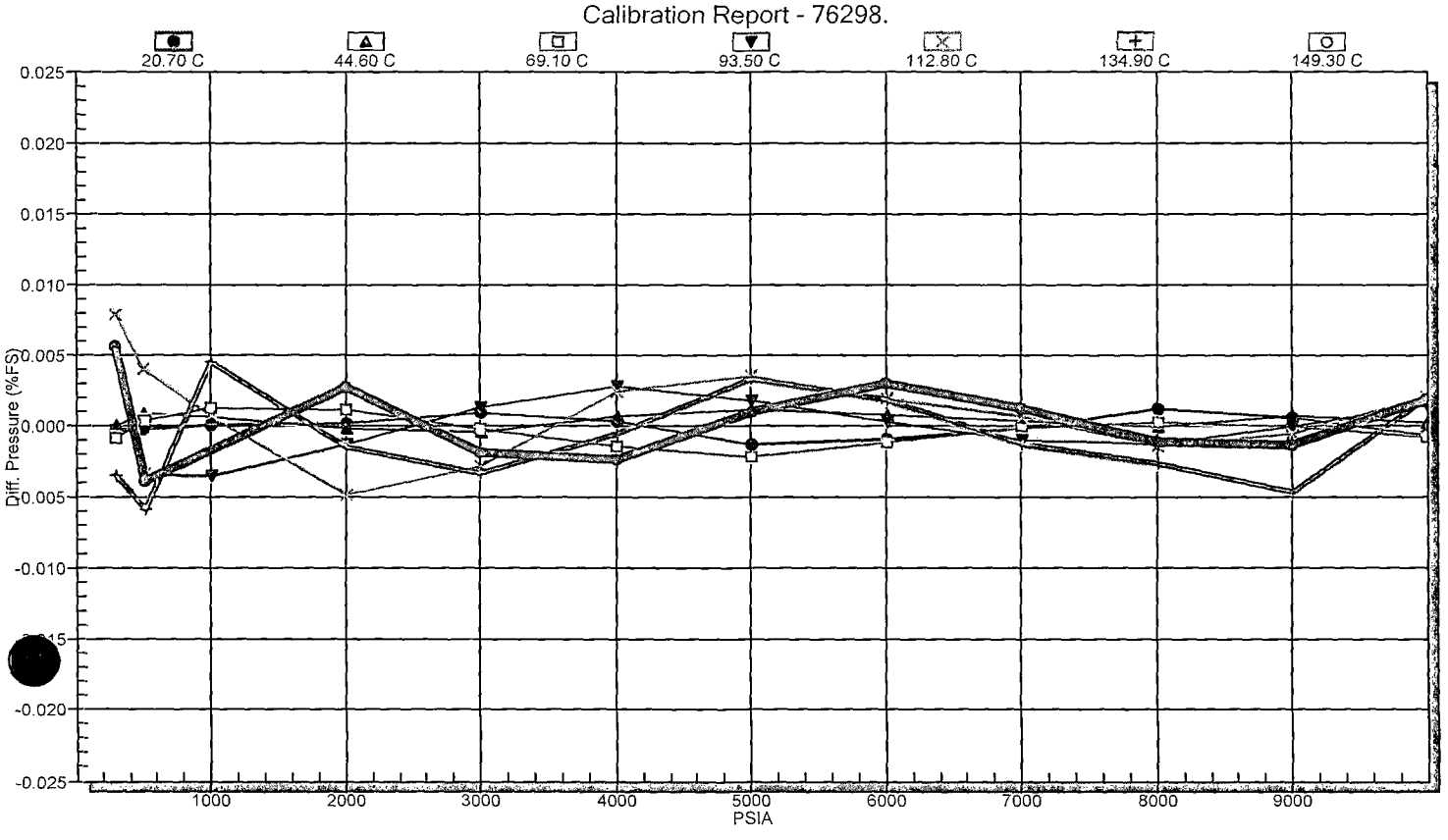
Sapphire, Feb 14/05
Pres, Temp, F(pres), F(temp)
Calibrator02, Channel3
Gauge Model 1052
12.41, 20.00, 678955.750, 194654.656
513.38, 20.00, 697339.438, 194685.484
1013.55, 20.00, 715712.813, 194712.609
2013.87, 20.00, 752537.000, 194740.000
3014.16, 20.00, 789452.688, 194753.250
4014.44, 20.00, 826447.313, 194750.000
5014.69, 20.00, 863505.688, 194732.750
6014.92, 20.00, 900618.688, 194701.250
7015.12, 20.00, 937755.313, 194647.000
8015.31, 20.00, 974910.313, 194578.500
9015.47, 20.00, 1012072.688, 194494.250
10015.60, 20.00, 1049257.625, 194406.250
12.41, 50.00, 679365.063, 184331.813
513.38, 50.00, 696580.063, 184361.000
1013.55, 50.00, 713776.688, 184379.500
2013.87, 50.00, 748232.688, 184409.750
3014.16, 50.00, 782759.313, 184426.000
4014.44, 50.00, 817363.000, 184435.500
5014.69, 50.00, 852020.000, 184423.500
6014.92, 50.00, 886719.313, 184401.500
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513.38, 85.00, 695624.313, 172668.250
1013.55, 85.00, 711615.063, 172687.109
2013.87, 85.00, 743656.313, 172712.000
3014.16, 85.00, 775762.938, 172727.984
4014.44, 85.00, 807912.250, 172738.094
5014.69, 85.00, 840101.000, 172736.000
6014.92, 85.00, 872325.000, 172724.250
7015.31, 85.00, 904580.313, 172701.750
8015.31, 85.00, 936867.000, 172673.000
9015.47, 85.00, 969162.313, 172634.000
10015.60, 85.00, 1001449.688, 172580.000
12.41, 115.00, 679835.313, 163285.938
513.38, 115.00, 694907.313, 163310.906
1013.55, 115.00, 709949.750, 163331.734
2013.87, 115.00, 740097.563, 163359.188
3014.16, 115.00, 770322.000, 163378.813
4014.44, 115.00, 800604.938, 163382.797
5014.69, 115.00, 830934.688, 163387.250
6014.92, 115.00, 861289.688, 163382.000
7015.12, 115.00, 891669.688, 163369.500
8015.31, 115.00, 922056.000, 163346.250
9015.47, 115.00, 952453.688, 163315.656
10015.60, 115.00, 982865.000, 163280.500
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513.38, 150.00, 694233.750, 153348.766
1013.55, 150.00, 708230.000, 153365.016
2013.87, 150.00, 736366.000, 153387.500
3014.16, 150.00, 764630.938, 153405.938
4014.44, 150.00, 792920.000, 153415.750
5014.69, 150.00, 821265.688, 153422.750
6014.92, 150.00, 849660.000, 153425.000
7015.12, 150.00, 878079.688, 153417.250
8015.31, 150.00, 906504.313, 153399.750
9015.47, 150.00, 934939.000, 153379.750

10015.60, 150.00, 963360.000, 153347.250
12.41, 170.00, 680552.313, 148064.250
513.38, 170.00, 693990.688, 148086.250
1013.55, 170.00, 707411.000, 148104.656
2013.87, 170.00, 734457.313, 148131.000
3014.16, 170.00, 761608.000, 148154.500
4014.44, 170.00, 788900.688, 148165.750
5014.69, 170.00, 816235.000, 148178.500
6014.92, 170.00, 843610.313, 148167.250
7015.12, 170.00, 871021.313, 148169.500
8015.31, 170.00, 898451.313, 148161.250
9015.47, 170.00, 925897.000, 148150.000
10015.60, 170.00, 953327.000, 148134.750

Spartek Systems
#1 Thevenaz Ind. Tr.
Sylvan Lake, AB, Ca, T4S 1P5
Phone (403) 887-2443
Fax (403) 887-4050

Pressure Gauge

Certificate of Calibration



GAUGE NUMBER: 76298

2-D POLYNOMIAL LMS CURVEFIT

Source of f:	Pres	Temp	Pressure Equation:
Fit Order:	3	4	Pressure (PSI) = A + xp(B + xp(C + xp(D)))
Prescale:	xp = m * (fp - fp0)	xt = m * (ft - ft0)	
m:	0.01	0.01	Temperature Compenstation:
	fp0 = 689855	ft0 = 153362	A = A0 + xt(A1 + xt(A2 + xt(A3 + xt(A4))))
			B = B0 + xt(B1 + xt(B2 + xt(B3 + xt(B4))))
			C = C0 + xt(C1 + xt(C2 + xt(C3 + xt(C4))))
			D = D0 + xt(D1 + xt(D2 + xt(D3 + xt(D4))))

0	1	2	3	4
Pressure (psi) STANDARD FIT COEFFICIENTS:				
A 302.3084764	0.01589100173	0.001268314839	3.666350036E-06	4.215587197E-09
B 2.648431817	-0.002303493808	-1.56286308E-06	-7.948706535E-09	-7.279169293E-12
C -1.234321968E-05	4.566479392E-08	6.637576119E-10	3.215704265E-12	4.326058595E-15
D 1.112397052E-10	-1.026273609E-11	-1.352632638E-13	-6.515455232E-16	-8.960911284E-19

Temperature (C) STANDARD FIT COEFFICIENTS

A 20.49654689

B -0.3724455849

C -6.338305864E-05

D -3.453394155E-07

1 points eliminated.
Error File: Gauge # 76298

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
302.35	20.70	689855.33	153362.00	-0.04
506.67	20.50	697573.67	153367.50	-0.02
1000.86	20.70	716267.00	153377.50	0.00
2006.64	20.80	754420.67	153398.00	0.01
2993.36	20.70	791983.67	153401.50	0.09
3998.81	20.70	830376.67	153394.75	0.02
5003.59	20.60	868845.00	153371.25	-0.14
6002.89	20.80	907190.67	153328.00	-0.10
6993.08	20.50	945285.33	153283.25	-0.03
7998.92	20.70	984016.00	153210.50	0.11
8995.91	20.70	1022451.00	153128.75	0.06
9997.19	20.70	1061090.33	153037.75	-0.07
302.36	44.60	689735.33	146879.25	-0.02
506.67	44.60	697056.33	146887.25	0.07
1000.86	44.70	714778.33	146898.00	0.05
2006.64	44.70	750942.67	146914.25	-0.03
2993.36	44.70	786541.67	146921.75	-0.05
3998.80	44.60	822927.00	146916.25	0.06
5003.59	44.70	859381.00	146899.25	0.12
6002.88	44.70	895711.67	146870.25	0.08
6993.07	44.70	931778.67	146831.00	0.04
7998.91	44.60	968469.00	146779.50	-0.01
8995.91	44.60	1004879.33	146716.50	0.06
9997.18	44.70	1041469.00	146642.50	0.01
302.36	69.10	689420.67	140232.50	-0.09
506.68	69.10	696377.33	140235.50	0.04
1000.86	69.20	713215.00	140245.00	0.12
2006.64	69.10	747558.67	140260.25	0.12
2993.37	69.10	781345.33	140266.50	-0.02
3998.81	69.10	815868.33	140268.00	-0.14
5003.60	69.20	850448.00	140255.25	-0.23
6002.89	69.20	884912.33	140231.00	-0.13
6993.08	69.10	919126.00	140200.00	-0.02
7998.92	69.20	953926.00	140157.75	0.01
8995.92	69.20	988458.00	140106.50	-0.02
9997.20	69.20	1023165.67	140045.50	-0.09
506.66	93.50	695679.67	133794.75	-0.35
1000.85	93.50	711703.67	133805.75	-0.36
2006.62	93.50	744397.33	133821.75	-0.14
2993.35	93.50	776564.00	133832.75	0.12
3998.79	93.50	809418.67	133833.75	0.28
5003.58	93.50	842322.00	133830.50	0.18
6002.88	93.50	875104.33	133815.75	0.03
6993.06	93.50	907643.67	133793.50	-0.10
7998.91	93.50	940744.67	133762.25	-0.14
8995.90	93.50	973599.33	133724.75	-0.02
9997.18	93.50	1006621.00	133678.25	0.14
302.36	112.80	688839.00	128899.50	0.78
506.67	112.80	695196.33	128906.00	0.40
1000.86	112.80	710610.00	128917.75	0.07
2006.63	112.80	742057.33	128935.25	-0.48
2993.35	112.80	773023.00	128949.50	-0.29
3998.79	112.80	804663.00	128951.25	0.23
5003.58	112.80	836351.33	128955.00	0.34
6002.87	112.80	867905.00	128939.50	0.19
6993.05	112.90	899226.33	128921.25	0.06
7998.89	112.90	931077.33	128893.50	-0.14
8995.88	112.90	962696.33	128863.50	-0.06
9997.15	112.80	994470.00	128823.25	0.19
302.38	134.90	688529.67	123566.75	-0.35
506.69	134.90	694625.00	123571.75	-0.59
1000.87	134.90	709434.67	123582.75	0.45
2006.65	135.00	739568.67	123598.75	-0.15
2993.37	135.00	769236.33	123614.50	-0.33
3998.80	134.90	799561.00	123621.75	-0.06
5003.59	135.00	829942.67	123624.00	0.33
6002.88	135.00	860196.00	123615.50	0.18
6993.06	134.90	890219.33	123603.00	-0.13
7998.90	135.00	920752.33	123579.75	-0.28

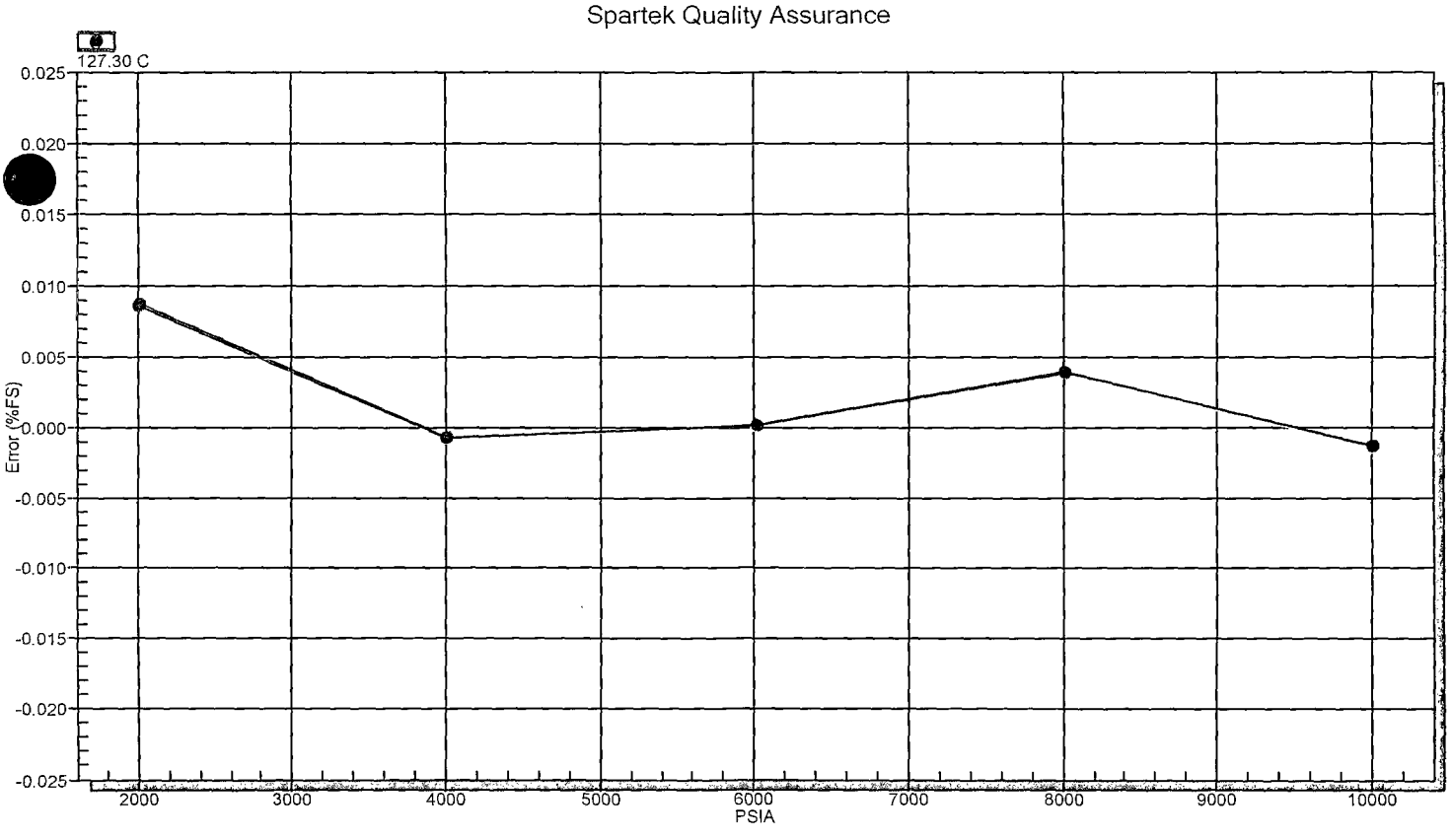
8995.89	135.00	951040.33	123551.00	-0.47
9997.16	135.00	981499.33	123516.50	0.18
002.39	149.30	688380.67	120247.00	0.56
506.70	149.20	694292.00	120250.00	-0.39
2006.66	149.30	738040.00	120274.75	0.27
2993.39	149.30	766903.00	120283.00	-0.19
3998.82	149.40	796406.33	120288.25	-0.24
5003.61	149.30	825972.33	120288.25	0.10
6002.91	149.30	855432.67	120283.50	0.30
6993.09	149.30	884658.67	120271.75	0.13
7998.94	149.40	914385.67	120256.25	-0.11
8995.93	149.30	943878.67	120232.75	-0.14
9997.21	149.30	973525.33	120204.50	0.18

Spartek Systems
#1 Thevenaz Ind. Tr.
Sylvan Lake, AB, Ca, T4S 1P5
Phone (403) 887-2443
Fax (403) 887-4050

Pressure Gauge
Certificate of Conformance

MODEL	1139	REVISION	0
SERIAL NUMBER	76298	DEADWEIGHT USED	Piston Cylinder No. 528
CALIBRATED	JUL22/08	E.U.B. CERT. DATE	May 09 2006
PRESSURE RANGE	9997.21 psi	TEMPERATURE RANGE	149.40 Deg. C

ACCURACY
As shown in the graph below, this Spartek Gauge conformed to within +/- 0.025 %F.S. of the pressure standard used in calibration, which is accurate to within +/- 0.01% of reading. This gives an overall accuracy of +/-(0.025%F.S. + 0.01% of reading)



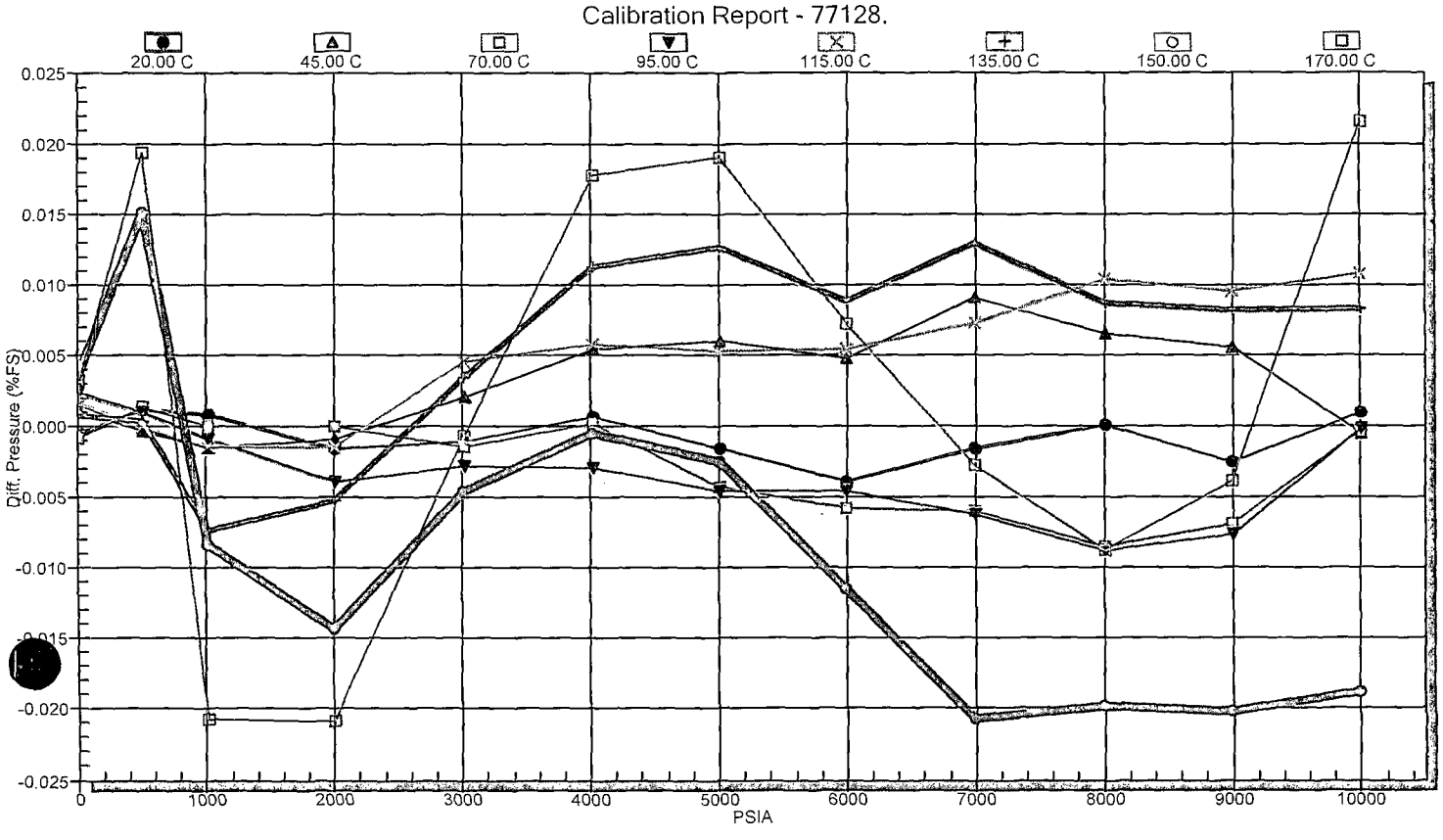
Accepted By: _____

Date: Wednesday, July 30, 2008

Spartek Systems
#1 Thevenaz Ind. Tr.
Sylvan Lake, AB, Ca, T4S 1P5
Phone (403) 887-2443
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Pressure Gauge

Certificate of Calibration



GAUGE NUMBER: 77128

2-D POLYNOMIAL LMS CURVEFIT

Source of f:	Pres	Temp	Pressure Equation:
Fit Order:	3	4	Pressure (PSI) = A + xp(B + xp(C + xp(D)))
Prescale:	xp = m * (fp - fp0)	xt = m * (ft - ft0)	
m:	0.01	0.01	Temperature Compenstation:
	fp0 = 683570	ft0 = 152594	A = A0 + xt(A1 + xt(A2 + xt(A3 + xt(A4))))
			B = B0 + xt(B1 + xt(B2 + xt(B3 + xt(B4))))
			C = C0 + xt(C1 + xt(C2 + xt(C3 + xt(C4))))
			D = D0 + xt(D1 + xt(D2 + xt(D3 + xt(D4))))

0	1	2	3	4
Pressure (psi) STANDARD FIT COEFFICIENTS:				
A 13.93758821	0.1105061696	-2.845595986E-05	-1.321569524E-06	-3.402280268E-09
B 2.615460822	-0.002167088185	6.650856862E-07	3.35067851E-09	1.117276987E-11
C -1.367893707E-05	-7.105198163E-08	-1.45680596E-09	-7.75370668E-12	-1.338191738E-14
D 1.45091692E-10	1.507747296E-11	3.083809878E-13	1.638499627E-15	2.76560472E-18

Temperature (C) STANDARD FIT COEFFICIENTS

A 19.92251188

B -0.3705779895

C -7.804504791E-08

D -2.008246399E-07

0 points eliminated.
Error File: Gauge # 77128

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
507.36	20.00	0.11	-0.14	-0.14
1003.47	20.00	0.08	-0.19	-0.19
1993.04	20.00	-0.16	-0.26	-0.26
3007.88	20.00	-0.11	-0.28	-0.28
4011.71	20.00	0.07	-0.22	-0.22
5001.00	20.00	-0.16	-0.14	-0.14
5986.94	20.00	-0.39	0.01	0.01
6989.72	20.00	-0.16	0.21	0.21
8008.20	20.00	0.00	0.47	0.47
8992.34	20.00	-0.26	0.78	0.78
9995.50	20.00	0.09	1.15	1.15
14.00	45.00	0.10	-0.33	-0.33
507.36	45.00	-0.05	-0.37	-0.37
1003.47	45.00	-0.16	-0.42	-0.42
1993.04	45.00	-0.10	-0.51	-0.51
3007.88	45.00	0.20	-0.51	-0.51
4011.71	45.00	0.53	-0.50	-0.50
5001.00	45.00	0.60	-0.44	-0.44
5986.94	45.00	0.48	-0.34	-0.34
6989.72	45.00	0.91	-0.16	-0.16
8008.20	45.00	0.64	0.04	0.04
8992.34	45.00	0.54	0.28	0.28
9995.50	45.00	-0.06	0.57	0.57
14.00	70.00	-0.08	-0.04	-0.04
507.36	70.00	0.14	-0.09	-0.09
1003.47	70.00	0.00	-0.15	-0.15
1993.04	70.00	0.00	-0.22	-0.22
3007.88	70.00	-0.14	-0.23	-0.23
4011.71	70.00	0.01	-0.23	-0.23
5001.00	70.00	-0.43	-0.19	-0.19
5986.94	70.00	-0.59	-0.10	-0.10
6989.72	70.00	-0.61	0.02	0.02
8008.20	70.00	-0.86	0.16	0.16
8992.34	70.00	-0.70	0.38	0.38
9995.50	70.00	-0.04	0.60	0.60
14.00	95.00	0.23	0.19	0.19
507.36	95.00	0.09	0.14	0.14
1003.47	95.00	-0.10	0.11	0.11
1993.04	95.00	-0.40	0.06	0.06
3007.88	95.00	-0.29	0.02	0.02
4011.71	95.00	-0.30	0.02	0.02
5001.00	95.00	-0.46	0.02	0.02
5986.94	95.00	-0.46	0.08	0.08
6989.72	95.00	-0.62	0.17	0.17
8008.20	95.00	-0.89	0.28	0.28
8992.34	95.00	-0.77	0.45	0.45
9995.50	95.00	-0.03	0.65	0.65
14.00	115.00	0.15	0.21	0.21
507.36	115.00	-0.01	0.16	0.16
1003.47	115.00	-0.15	0.12	0.12
1993.04	115.00	-0.14	0.05	0.05
3007.88	115.00	0.44	0.00	0.00
4011.71	115.00	0.58	-0.01	-0.01
5001.00	115.00	0.52	0.01	0.01
5986.94	115.00	0.53	0.04	0.04
6989.72	115.00	0.73	0.12	0.12
8008.20	115.00	1.03	0.23	0.23
8992.34	115.00	0.95	0.36	0.36
9995.50	115.00	1.07	0.52	0.52
14.00	135.00	0.07	0.00	0.00
507.36	135.00	0.04	-0.05	-0.05
1003.47	135.00	-0.73	-0.09	-0.09
1993.04	135.00	-0.53	-0.13	-0.13
3007.88	135.00	0.33	-0.20	-0.20
4011.71	135.00	1.13	-0.21	-0.21
5001.00	135.00	1.26	-0.21	-0.21
5986.94	135.00	0.87	-0.18	-0.18
6989.72	135.00	1.29	-0.11	-0.11
8008.20	135.00	0.87	-0.03	-0.03

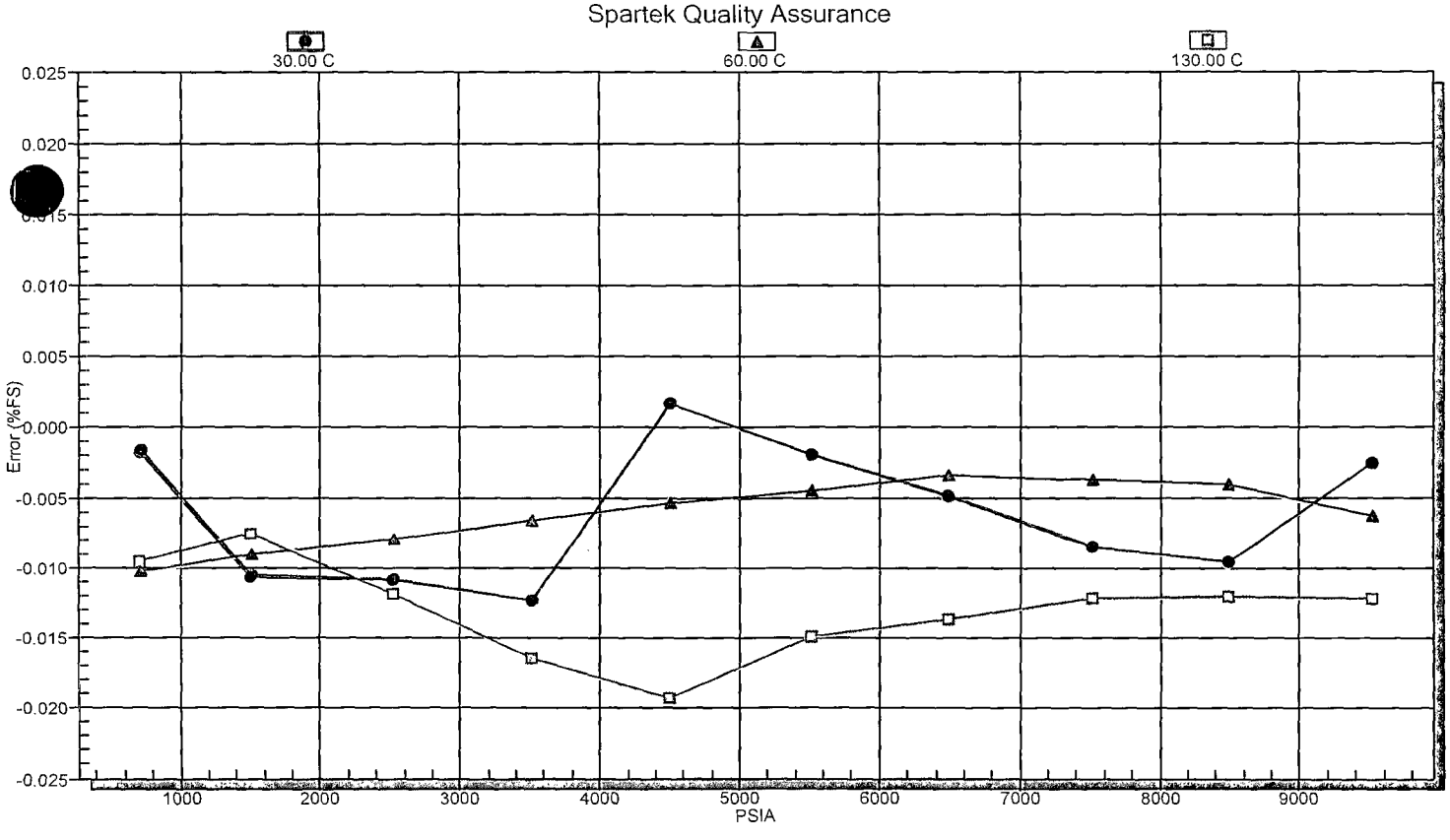
8992.34	135.00	0.81	0.09	0.09
9995.50	135.00	0.83	0.23	0.23
14.00	150.00	0.35	-0.24	-0.24
507.36	150.00	1.51	-0.28	-0.28
1003.47	150.00	-0.83	-0.31	-0.31
1993.04	150.00	-1.43	-0.39	-0.39
3007.88	150.00	-0.46	-0.44	-0.44
4011.71	150.00	-0.05	-0.46	-0.46
5001.00	150.00	-0.25	-0.45	-0.45
5986.94	150.00	-1.15	-0.43	-0.43
6989.72	150.00	-2.07	-0.37	-0.37
8008.20	150.00	-1.99	-0.29	-0.29
8992.34	150.00	-2.02	-0.19	-0.19
9995.50	150.00	-1.88	-0.07	-0.07
14.00	170.00	0.33	0.25	0.25
507.36	170.00	1.93	0.23	0.23
1003.47	170.00	-2.07	0.20	0.20
1993.04	170.00	-2.08	0.15	0.15
3007.88	170.00	-0.08	0.10	0.10
4011.71	170.00	1.77	0.07	0.07
5001.00	170.00	1.89	0.05	0.05
5986.94	170.00	0.71	0.10	0.10
6989.72	170.00	-0.28	0.14	0.14
8008.20	170.00	-0.88	0.21	0.21
8992.34	170.00	-0.39	0.32	0.32
9995.50	170.00	2.14	0.43	0.43

Spartek Systems
#1 Thevenaz Ind. Tr.
Sylvan Lake, AB, Ca, T4S 1P5
Phone (403) 887-2443
Fax (403) 887-4050

Pressure Gauge
Certificate of Conformance

MODEL	1139	REVISION	0
SERIAL NUMBER	77128	DEADWEIGHT USED	Piston Cylinder No. 528
CALIBRATED	MAY08/07	E.U.B. CERT. DATE	May 09 2006
PRESSURE RANGE	9995.50 psi	TEMPERATURE RANGE	170.00 Deg. C

ACCURACY
As shown in the graph below, this Spartek Gauge conformed to within +/- 0.025 %F.S. of the pressure standard used in calibration, which is accurate to within +/- 0.01% of reading. This gives an overall accuracy of +/-(0.025%F.S. + 0.01% of reading)



Accepted By: _____ Date: Thursday, May 10, 2007

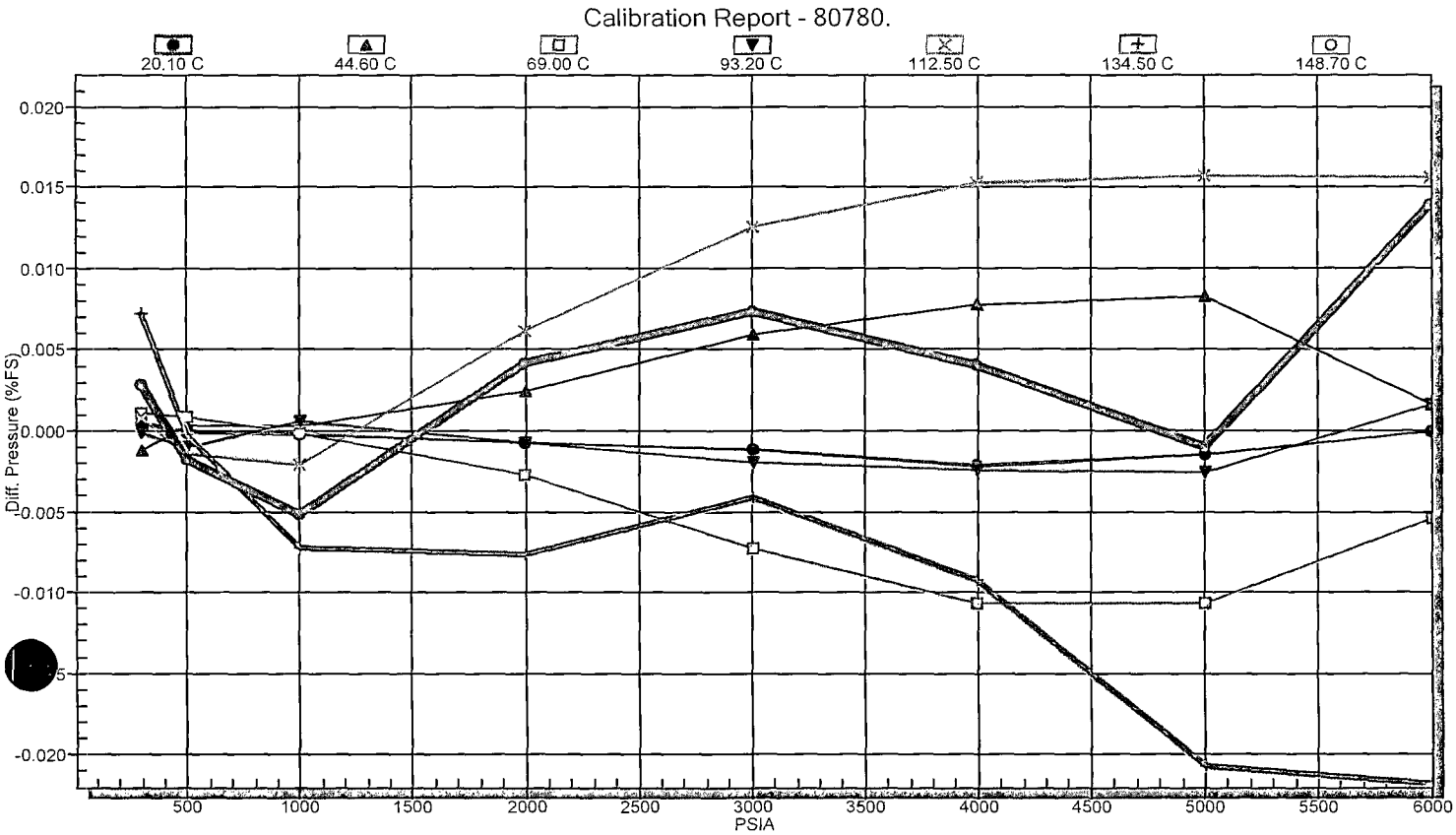
Sapphire, Jul 24/06
Pres, Temp, F(pres), F(temp)
Calibrator02, Channel11
Gauge Model 1139
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513.38, 20.40, 695278.688, 150397.750
1013.55, 20.40, 713884.313, 150412.000
2013.87, 20.40, 751212.688, 150425.500
3014.16, 20.40, 788672.688, 150426.750
4014.44, 20.40, 826260.688, 150419.000
5014.69, 20.40, 863976.000, 150405.500
6014.92, 20.40, 901774.000, 150371.000
7015.12, 20.40, 939638.313, 150316.500
8015.31, 20.40, 977582.688, 150254.000
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12.41, 50.40, 677111.313, 142404.391
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2013.87, 50.40, 746929.000, 142457.000
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5014.69, 50.40, 852451.000, 142452.000
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12.41, 115.30, 677537.688, 125644.133
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7015.12, 115.30, 893400.688, 125691.500
8015.31, 115.30, 924481.688, 125670.500
9015.47, 115.30, 955613.688, 125646.500
10015.60, 115.30, 986781.688, 125616.500
12.41, 135.20, 677719.688, 120891.250
513.38, 135.20, 692417.688, 120918.500
1013.55, 135.20, 707087.000, 120929.500
2013.87, 135.20, 736613.313, 120943.500
3014.16, 135.20, 766229.000, 120950.250
4014.44, 135.20, 795920.000, 120958.250
5014.69, 135.20, 825724.313, 120959.750
6014.92, 135.20, 855570.313, 120959.250
7015.12, 135.20, 885493.000, 120978.250
8015.31, 135.20, 915452.313, 120978.250
9015.47, 135.20, 945544.000, 121015.000

10015.60, 135.20, 975896.688, 121122.250
12.41, 150.10, 678009.313, 117368.000
513.38, 150.10, 692241.688, 117331.000
1013.55, 150.10, 706445.188, 117346.773
2013.87, 150.10, 735033.688, 117361.250
3014.16, 150.10, 763848.688, 117374.000
4014.44, 150.10, 792725.313, 117382.750
5014.69, 150.10, 821675.688, 117389.000
6014.92, 150.10, 850718.688, 117385.500
7015.12, 150.10, 879793.000, 117380.500
8015.31, 150.10, 908923.688, 117375.750
9015.47, 150.10, 938107.000, 117376.000
10015.60, 150.10, 967611.313, 117489.250

Spartek Systems
#1 Thevenaz Ind. Tr.
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Fax (403) 887-4050

Pressure Gauge

Certificate of Calibration



GAUGE NUMBER: 80780

2-D POLYNOMIAL LMS CURVEFIT

Source of f:	Pres	Temp	Pressure Equation:
Fit Order:	3	4	Pressure (PSI) = A + xp(B + xp(C + xp(D)))
Prescale:	xp = m * (fp - fp0)	xt = m * (ft - ft0)	
m:	0.01	0.01	Temperature Compenstation:
	fp0 = 710483	ft0 = 151646	A = A0 + xt(A1 + xt(A2 + xt(A3 + xt(A4))))
			B = B0 + xt(B1 + xt(B2 + xt(B3 + xt(B4))))
			C = C0 + xt(C1 + xt(C2 + xt(C3 + xt(C4))))
			D = D0 + xt(D1 + xt(D2 + xt(D3 + xt(D4))))

0	1	2	3	4
Pressure (psi) STANDARD FIT COEFFICIENTS:				
A 297.0732471	0.006192421051	0.000200013813	-7.218859807E-07	-2.739646676E-09
B 2.587263566	-0.002112347827	-1.401479022E-07	-5.919382137E-10	6.178761131E-12
C 4.664881982E-06	-1.006434756E-07	-1.979221335E-09	-1.144460595E-11	-2.141892068E-14
D 2.512438887E-10	4.258574058E-11	8.408847342E-13	4.674255892E-15	8.238317879E-18

Temperature (C) STANDARD FIT COEFFICIENTS

A 20.23122284

B -0.3560691421

C 4.754616611E-06

D -1.752575816E-07

0 points eliminated.
Error File: Gauge # 80780

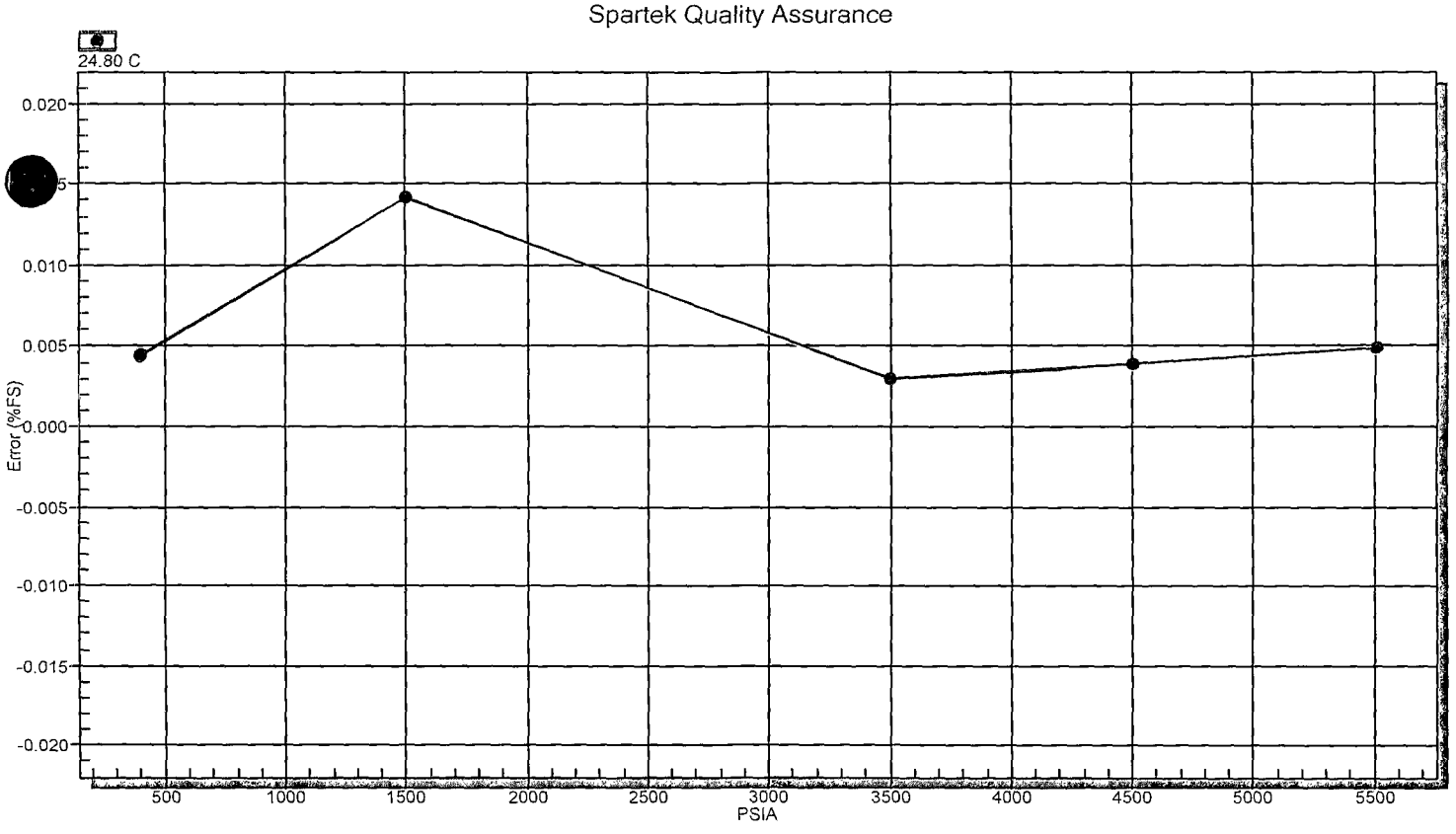
Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
297.07	20.10	710483.67	151646.75	0.02
500.77	20.00	718355.67	151659.25	-0.01
998.15	20.10	737573.33	151677.50	-0.01
1997.27	20.10	776144.00	151699.25	-0.04
3002.10	20.00	814880.67	151710.75	-0.07
3996.91	20.10	853156.33	151706.00	-0.13
5001.68	20.00	891731.67	151689.25	-0.09
6002.84	20.00	930069.00	151660.25	0.00
297.12	44.60	710457.00	144814.50	-0.08
500.83	44.70	717918.00	144818.75	0.02
998.21	44.70	736119.67	144831.25	0.01
1997.33	44.70	772655.33	144849.25	0.15
3002.17	44.70	809354.67	144860.75	0.36
3996.99	44.70	845628.33	144861.75	0.47
5001.76	44.70	882198.00	144853.00	0.50
6002.92	44.70	918550.67	144835.25	0.09
297.14	69.00	710357.67	138050.25	0.07
500.84	69.00	717441.33	138058.00	0.05
998.22	69.00	734734.67	138074.50	-0.01
1997.35	69.00	769453.00	138096.00	-0.16
3002.19	69.00	804324.00	138104.25	-0.44
3997.01	68.90	838802.00	138112.00	-0.65
5001.79	69.00	873558.67	138106.50	-0.65
6002.96	69.00	908118.33	138094.25	-0.33
297.12	93.20	710211.67	131538.25	-0.01
500.82	93.20	716952.00	131541.00	-0.07
998.21	93.20	733415.33	131550.75	0.03
1997.34	93.20	766463.00	131569.50	-0.05
3002.17	93.30	799667.67	131579.50	-0.12
3997.00	93.30	832498.00	131581.75	-0.14
5001.77	93.30	865596.33	131575.50	-0.16
6002.92	93.20	898515.33	131564.75	0.09
297.11	112.50	710117.00	126554.00	0.05
500.81	112.50	716595.33	126559.75	-0.09
998.19	112.40	732423.00	126568.50	-0.13
1997.32	112.40	764230.33	126584.75	0.37
3002.15	112.50	796199.33	126597.25	0.75
3996.97	112.50	827811.67	126601.25	0.91
5001.74	112.40	859696.33	126602.00	0.94
6002.90	112.50	891408.67	126595.00	0.93
297.11	134.50	710087.00	121132.25	0.43
500.81	134.50	716267.67	121135.75	-0.02
998.19	134.50	731389.33	121145.00	-0.44
1997.32	134.50	761821.00	121158.00	-0.46
3002.15	134.50	792456.00	121170.25	-0.25
3996.97	134.60	822762.00	121172.25	-0.56
5001.75	134.50	853337.33	121176.50	-1.24
6002.90	134.50	883760.00	121169.25	-1.31
297.13	148.70	710115.00	117561.75	0.17
500.83	148.80	716104.33	117564.25	-0.11
998.21	148.90	730766.67	117575.50	-0.31
1997.34	148.80	760330.00	117591.75	0.25
3002.17	148.70	790122.67	117605.50	0.44
3996.99	148.80	819628.67	117612.50	0.25
5001.76	148.80	849404.00	117616.75	-0.06
6002.92	148.80	879030.67	117611.25	0.84

Spartek Systems
#1 Thevenaz Ind. Tr.
Sylvan Lake, AB, Ca, T4S 1P5
Phone (403) 887-2443
Fax (403) 887-4050

Pressure Gauge
Certificate of Conformance

MODEL	1139	REVISION	0
SERIAL NUMBER	80780	DEADWEIGHT USED	Piston Cylinder No. 528
CALIBRATED	SEP12/08	E.U.B. CERT. DATE	May 09 2006
PRESSURE RANGE	6002.96 psi	TEMPERATURE RANGE	148.90 Deg. C

ACCURACY
As shown in the graph below, this Spartek Gauge conformed to within +/- 0.022 %F.S. of the pressure standard used in calibration, which is accurate to within +/- 0.01% of reading. This gives an overall accuracy of +/-(0.022%F.S. + 0.01% of reading)

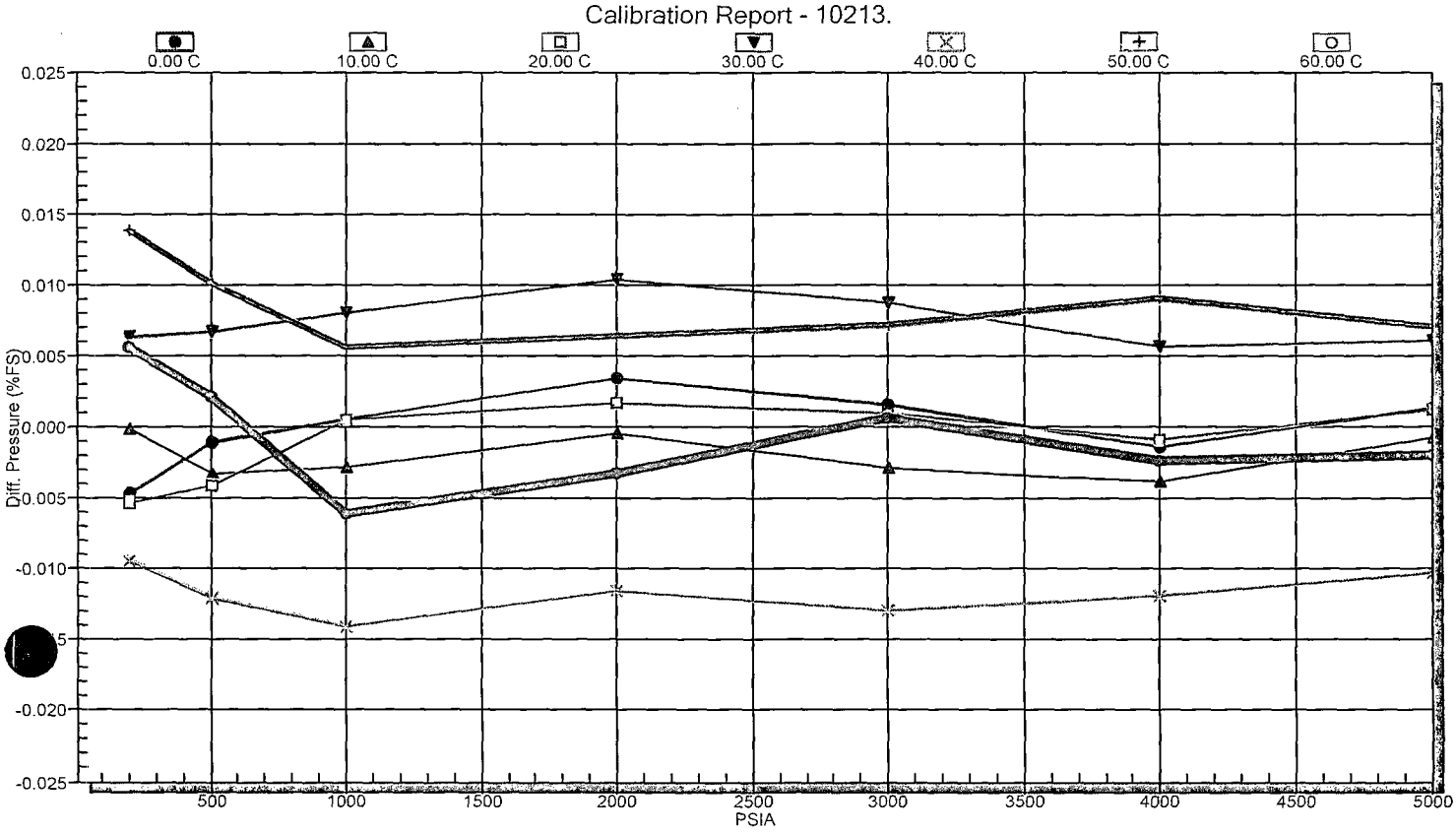


Accepted By: _____

Date: Wednesday, September 17, 2008

Spartek Systems
#1 Thevenaz Ind. Tr.
Sylvan Lake, AB, Ca, T4S 1P5
Phone (403) 887-2443
Fax (403) 887-4050

Pressure Gauge
Certificate of Calibration



GAUGE NUMBER: 10213

2-D POLYNOMIAL LMS CURVEFIT

Source of f:	Pres	Temp	Pressure Equation:
Fit Order:	3	4	Pressure (PSI) = A + xp(B + xp(C + xp(D)))
Prescale:	xp = m * (fp - fp0)	xt = m * (ft - ft0)	
m:	0.01	0.01	Temperature Compenstation:
	fp0 = 690051	ft0 = 85465	A = A0 + xt(A1 + xt(A2 + xt(A3 + xt(A4))))
			B = B0 + xt(B1 + xt(B2 + xt(B3 + xt(B4))))
			C = C0 + xt(C1 + xt(C2 + xt(C3 + xt(C4))))
			D = D0 + xt(D1 + xt(D2 + xt(D3 + xt(D4))))

0	1	2	3	4
Pressure (psi) STANDARD FIT COEFFICIENTS:				
A 0.2457777096	0.2250688508	-0.003895867539	-8.917014821E-05	-5.916007779E-07
B 1.771058665	-0.001738699331	2.377479294E-06	3.959843792E-08	2.170022442E-10
C -1.092096046E-05	-2.073842055E-08	-1.414989301E-09	-2.073822751E-11	-8.630831862E-14
D 1.63996303E-10	3.705293926E-12	2.379231182E-13	3.417996017E-15	1.35579722E-17

Temperature (C) STANDARD FIT COEFFICIENTS

A -0.1591297378

B -0.4327789888

C -3.315535661E-05

D -1.107815362E-06

0 points eliminated.
Error File: Gauge # 10213

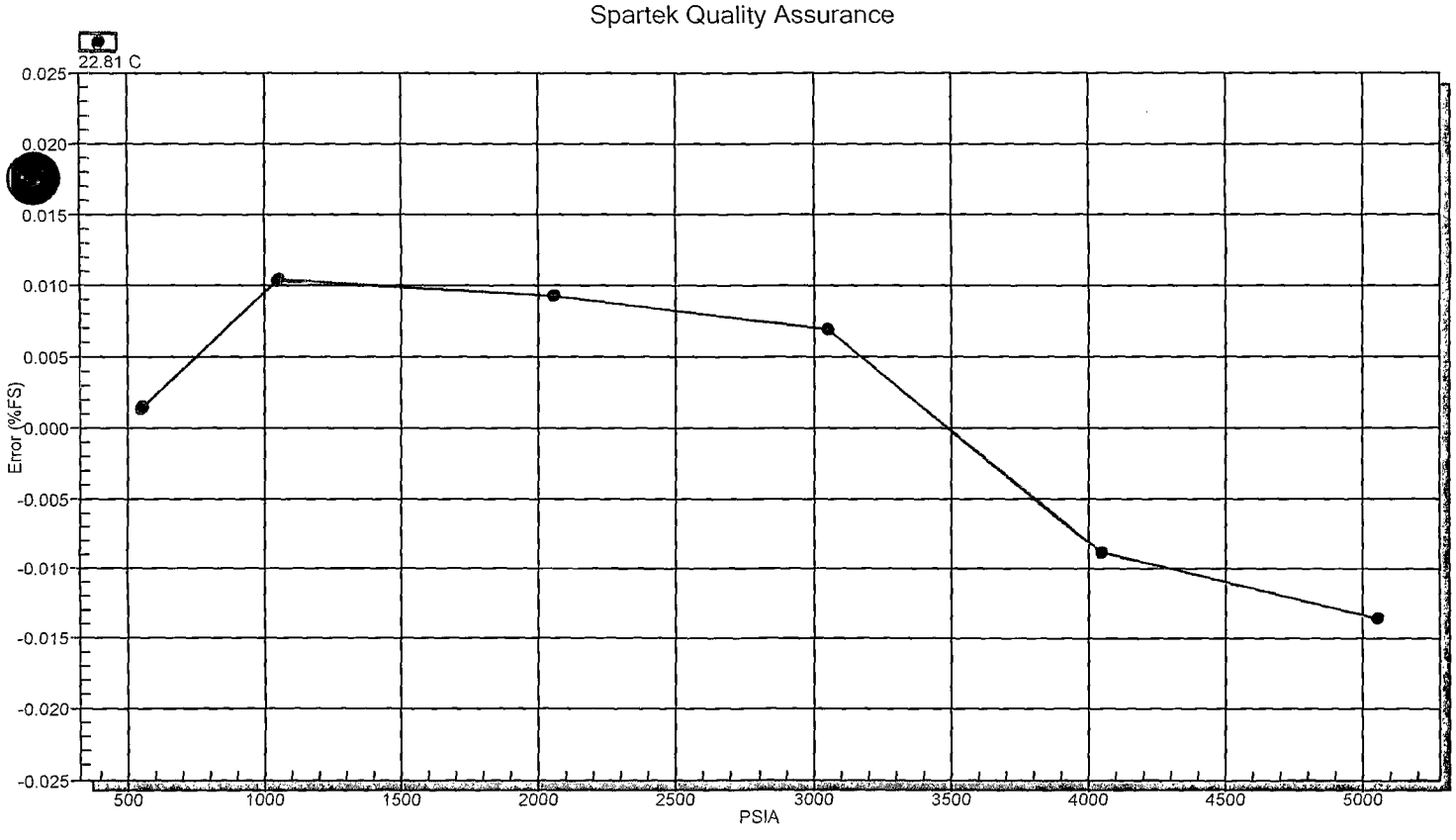
Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
0.00	0.00	0.00	0.00	0.25
200.00	0.00	703751.00	72066.14	-0.23
500.00	0.00	718595.38	72071.45	-0.06
1000.00	0.00	743427.88	72068.73	0.02
2000.00	0.00	793346.13	72056.44	0.17
3000.00	0.00	843532.75	72041.09	0.07
4000.00	0.00	893957.00	72016.91	-0.07
5000.00	0.00	944635.81	71985.98	0.06
0.00	10.00	693512.25	72059.20	0.12
200.00	10.00	702377.00	74165.70	-0.01
500.00	10.00	717581.13	74168.03	-0.17
1000.00	10.00	717581.13	74168.03	-0.14
2000.00	10.00	742983.81	74165.86	-0.02
3000.00	10.00	768467.56	74164.20	-0.14
4000.00	10.00	794022.75	74162.59	-0.19
5000.00	10.00	845330.38	74147.41	-0.04
0.00	20.00	896896.06	74122.61	-0.03
200.00	20.00	948690.81	74087.03	-0.27
500.00	20.00	692203.63	74165.47	-0.21
1000.00	20.00	701677.31	76337.50	0.03
2000.00	20.00	717212.63	76337.94	0.08
3000.00	20.00	743171.75	76338.11	0.05
4000.00	20.00	795331.50	76333.53	-0.05
5000.00	20.00	847758.81	76313.56	0.05
0.00	30.00	900462.63	76288.20	0.54
200.00	30.00	953400.63	76246.16	0.31
500.00	30.00	691338.13	76328.98	0.33
1000.00	30.00	701580.81	78572.20	0.40
2000.00	30.00	717457.00	78570.77	0.52
3000.00	30.00	743985.25	78569.91	0.43
4000.00	30.00	797281.13	78562.27	0.28
5000.00	30.00	850870.50	78545.31	0.30
0.00	40.00	904727.31	78512.73	-0.38
200.00	40.00	958848.56	78470.66	-0.47
500.00	40.00	691026.56	78570.31	-0.60
1000.00	40.00	701502.06	80841.13	-0.71
2000.00	40.00	717728.88	80843.33	-0.58
3000.00	40.00	744851.81	80844.28	-0.65
4000.00	40.00	799327.31	80833.16	-0.60
5000.00	40.00	854114.25	80809.95	-0.52
0.00	50.00	909194.06	80777.70	-0.19
200.00	50.00	964553.25	80734.14	0.69
500.00	50.00	690717.31	80840.80	0.50
1000.00	50.00	701432.38	83149.63	0.28
2000.00	50.00	718017.81	83150.36	0.32
3000.00	50.00	745749.75	83150.31	0.36
4000.00	50.00	801479.75	83137.23	0.45
5000.00	50.00	857527.88	83112.48	0.35
0.00	60.00	913882.38	83073.23	-0.37
200.00	60.00	970527.31	83021.95	0.28
500.00	60.00	690396.13	83144.55	0.11
1000.00	60.00	701324.50	85460.22	-0.31
2000.00	60.00	718313.88	85460.20	-0.16
3000.00	60.00	746695.88	85459.97	0.03
4000.00	60.00	803739.50	85447.59	-0.12
5000.00	60.00	861118.13	85419.63	-0.10

Spartek Systems
#1 Thevenaz Ind. Tr.
Sylvan Lake, AB, Ca, T4S 1P5
Phone (403) 887-2443
Fax (403) 887-4050

Pressure Gauge
Certificate of Conformance

MODEL	0	REVISION	0
SERIAL NUMBER	10213	DEADWEIGHT USED	Piston Cylinder No. 528
CALIBRATED	Dec 24/99	E.U.B. CERT. DATE	May 09 2006
PRESSURE RANGE	5000.00 psi	TEMPERATURE RANGE	60.00 Deg. C

ACCURACY
As shown in the graph below, this Spartek Gauge conformed to within +/- 0.025 %F.S. of the pressure standard used in calibration, which is accurate to within +/- 0.01% of reading. This gives an overall accuracy of +/-(0.025%F.S. + 0.01% of reading)

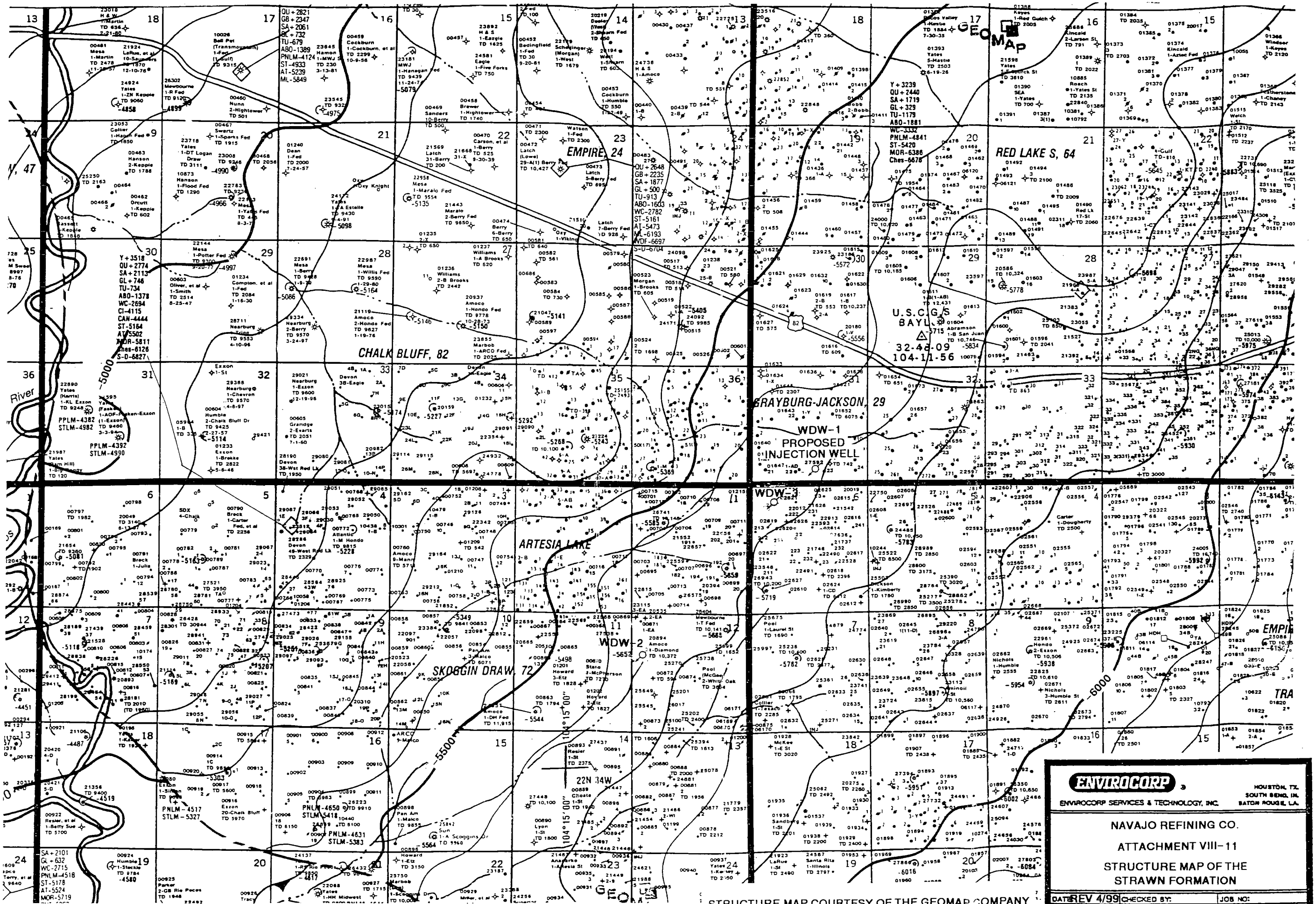


Accepted By: _____

Date: Friday, May 30, 2008

APPENDIX I

STRAWN STUCTURE MAPS



ENVIROCORP
ENVIROCORP SERVICES & TECHNOLOGY, INC.
HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

NAVAJO REFINING CO.

ATTACHMENT VIII-11

STRUCTURE MAP OF THE STRAWN FORMATION

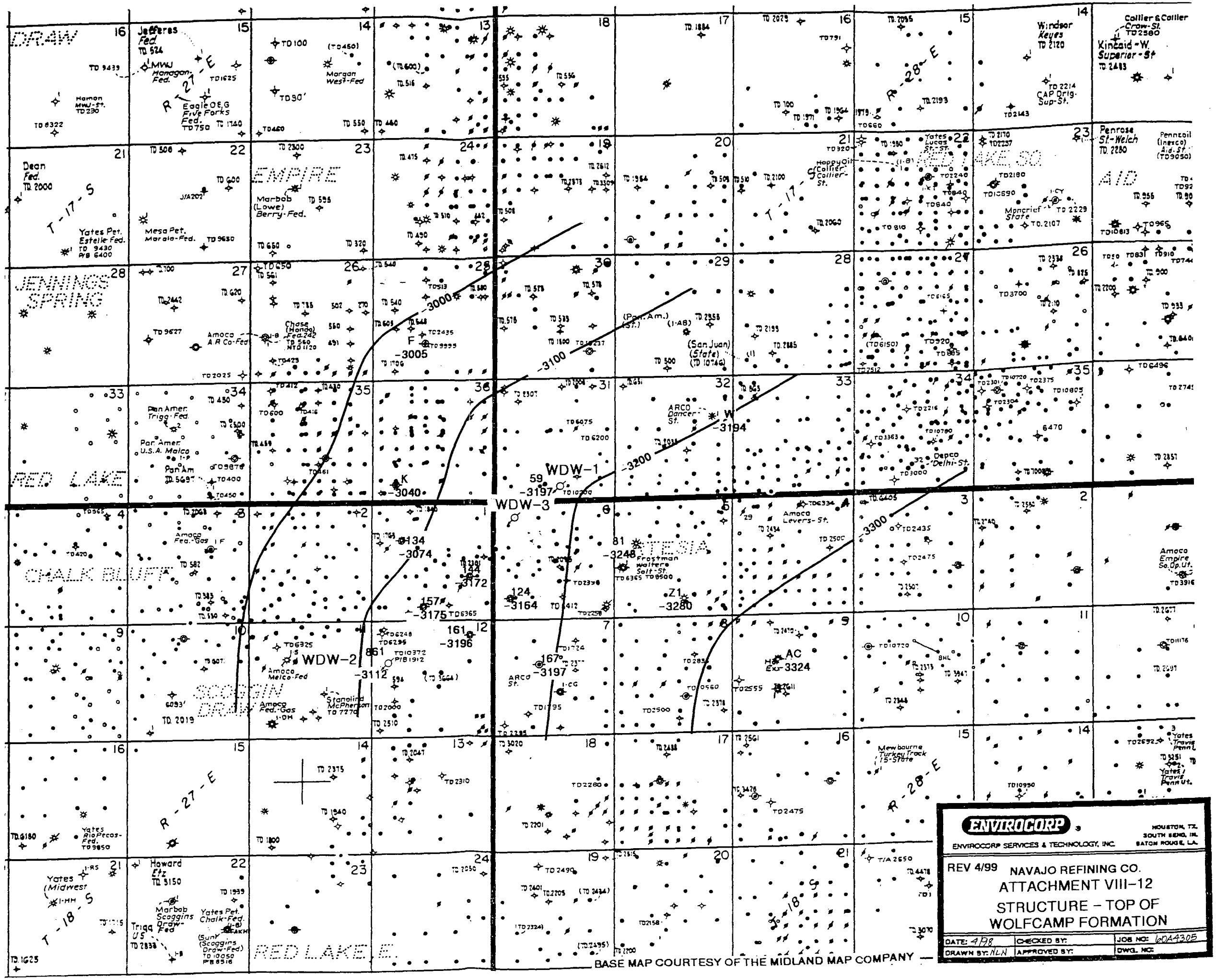
DATE REV 4/99	CHECKED BY:	JOB NO:
DRAWN BY:	APPROVED BY:	DWG. NO:

STRUCTURE MAP COURTESY OF THE GEOMAP COMPANY
Poster July 1997

APPENDIX J

WOLFCAMP STRUCTURE MAPS

APPENDIX J



157 ID NO.
-4025 SUBSEA DEPTH

BASE MAP COURTESY OF THE MIDLAND MAP COMPANY

ENVIROCORP
ENVIROCORP SERVICES & TECHNOLOGY, INC.
HOUSTON, TX. SOUTH BEND, IN. BATON ROUGE, LA.

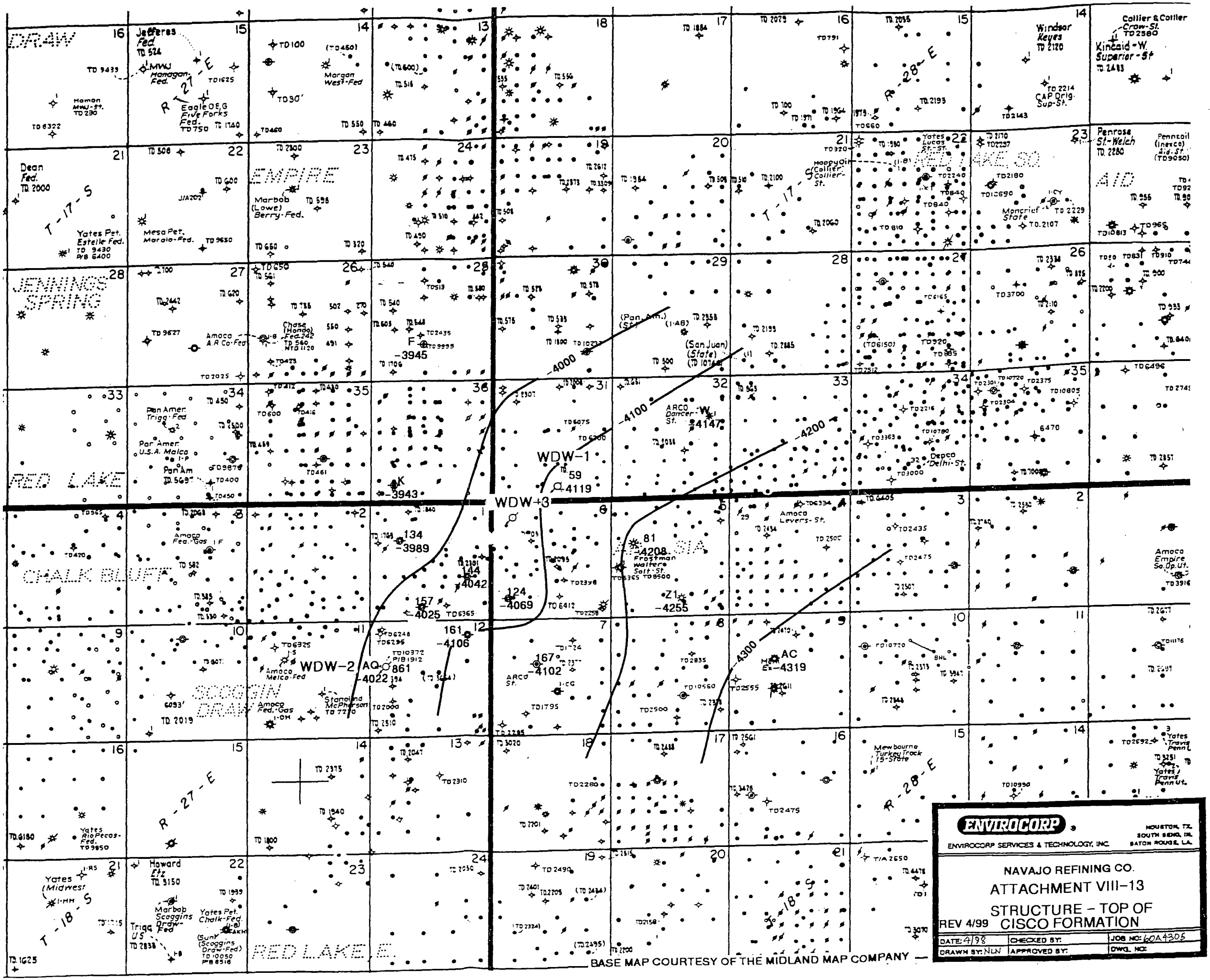
REV 4/99 NAVAJO REFINING CO.
ATTACHMENT VIII-12
STRUCTURE – TOP OF WOLFCAMP FORMATION

DATE: 4/98	CHECKED BY:	JOB NO: 60A4305
DRAWN BY: NLN	APPROVED BY:	DWG. NO:

APPENDIX K

CISCO STRUCTURE MAPS

APPENDIX K


WDW-1
WDW-2
WDW-3
-4000
-4100
-4200
-4300
DRAW
JENNINGS SPRING
RED LAKE
CHALK BLUFF
SCOGGIN DRAW
RED LAKE E.
EMPIRE
ARTESIA
R-27-E
R-28-E
T-17-S
T-18-S
Jeffers Fed. TD 524
MWJ Monagan Fed.
Eagle OE,G Five Forks Fed. TD 750
Morgan West-Fed
Dean Fed. TD 2000
Yates Pet. Estelle Fed. TD 9430 PB 6400
Marbob (Lowe) Berry-Fed.
Mesa Pet. Maralo-Fed. TD 9650
Amoco A R Co-Fed
Chase (Maralo) Fed-242 TD 560
Pan Amer. Trigg-Fed
Par Amer. U.S.A. Malco I-P
Pan Am TD 5698
Amoco Fed.-Gas I F
Marbob Scoggins Draw-Fed
Amoco Fed.-Gas I-DH
Stanolind McPherson TD 7270
Howard Etz TD 9150
Yates (Midwest I-HH
Trigg US
Marbob Scoggins Draw-Fed
Yates Pet. Chalk-Fed. PB 8516
(Sun) (Scoggins Draw-Fed) TD 10050 PB 8516
Yates Rio Pecos-Fed. TD 9850
Collier & Collier -Crow-St. TD 2580
Kincaid-W. Superior-St TD 2483
Windsor Keyes TD 2120
CAP Orig. Sup-St.
Penrose St-Welch TD 2880
Penroil (Inexco) Aid St. (TD 9050)
AID
Yates Lucas St.-St.
Mapco Oil Collier-Collier-St.
Mancrief State TD 2107
Amoco Levers-St.
Amoco Empire So. Op. Ut.
Mewbourne Turkey Track (S-State
Depco Delhi-St.
ARCO Dancer-W St.
(San Juan) (State)
(Pan Am.) (State)
Frostman Walters Solt-St.
Hondo Ex.
Yates Travis Penn L
Yates Travis Penn Ut.
TD 9439
TD 6322
TD 9627
TD 2025
TD 2019
TD 1625
TD 9850
TD 1800
TD 2838
TD 10050
TD 2193
TD 2143
TD 2413
TD 2107
TD 2229
TD 2180
TD 2257
TD 2170
TD 2336
TD 3700
TD 2375
TD 10805
TD 6470
TD 6496
TD 2749
TD 2851
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TD 2500
TD 2558
TD 2885
TD 2835
TD 10560
TD 2555
TD 2511
TD 2448
TD 10720
TD 2515
TD 5967
TD 2495

APPENDIX L

CHRONOLOGY OF FIELD ACTIVITIES

APPENDIX L
CHRONOLOGY OF FIELD ACTIVITIES

August 23, 2009

Travel to Artesia, NM. Contact contractors.

August 24, 2009

Subsurface arrived at the plant at 7:00 a.m., MST, and contacted Darrell Moore. Darrell Moore had me contact Ricky Sworford, with maintenance to shut-in Well No. 1 and Well No. 2. Darrell also had me contact Bryon Ironmonger, Manager over the tanks and pumps to discuss the procedure. Well No. 1 and Well No. 2 were blocked in at 11:30 a.m.; with the following pressures on each well; Well No. 1 - 186 psig and Well No. 2 - 220 psig. At 12:30 p.m., Well No. 3 stabilized at 305 gpm, with 828 psig on the wellhead and 358 psig on the annulus. The well pressures and rates were monitored for the remainder of the day. At 300 pm the rate on Well No. 3 was 313 gpm, with 860 psig on the wellhead and 363 psig on the annulus. Well No. 1 had a wellhead pressure of 160 psig, and annulus pressure of 80 psig, shut-in. Well No. 2 had 180 psig at the wellhead, and 180 psig on the annulus shut-in.

August 25, 2009

Subsurface arrived at the well site at 6:30 a.m. to monitor well pressures and rates. At 7:00 a.m. Well No. 1 had a wellhead pressure of 140 psig and a annulus pressure of 110 psig. Well No. 2 had a wellhead pressure of 170 psig and annulus pressure of 128 psig. Well No. 3 had a rate of 306 gpm at a wellhead pressure of 822 psig with annulus pressure of 297 psig. Filters are being changed in Well No. 3 every 3 to 4 hours. The filters are changed when the differential pressure reaches about 80 psi. At 3:30 p.m. Well No. 1 had a wellhead pressure of 138 psig with a annulus pressure of 100 psig; Well No. 2 had a wellhead pressure of 182 psig with an annulus pressure of 230 psig. Well No.3 at a rate of 305 gpm had a wellhead pressure of 822 psig and an annulus pressure of 282 psig. The wellhead pressures appear to be stabilizing, with Well No. 3 maintaining a stabilized rate indicating reservoir stabilization.

August 26, 2009

Subsurface arrived at the well site at 8:30 a.m. to monitor well pressures and rates. At 8:50 a.m., Well No. 1 had a wellhead pressure of 138 psig and a annulus pressure of 78 psig. Well No. 2 had a wellhead pressure of 178 psig and annulus pressure of 200 psig. Well No. 3 had a rate of 318 gpm at a wellhead pressure of 838 psig, with annulus pressure of 260 psig. Filters are being changed in Well No. 3 every 4 to 5 hours. At 2:30 p.m., Well No. 1 had a wellhead pressure of 136 psig with an annulus pressure of 78 psig. Well No. 2 had a wellhead pressure of 180 psig with an annulus pressure of 190 psig. Well No. 3, at a rate of 312 gpm, had a wellhead pressure of 836 psig and an annulus

pressure of 258 psig. At 6:20 p.m., Well No. 1 had a wellhead pressure of 136 psig with a annulus pressure of 76 psig. Well No. 2 had a wellhead pressure of 180 psig with an annulus pressure of 200 psig. Well No. 3, at a rate of 310 gpm, had a wellhead pressure of 838 psig and an annulus pressure of 260 psig. The wellhead pressures have stabilized, with Well No. 3 maintaining a stabilized rate indicating reservoir stabilization.

August 27, 2009

At 6:30 a.m., Subsurface, Cardinal, and Pro Well testing personnel arrived at the Gaines Well No. 3. A tailgate meeting was held and all gauges were synchronized to the same time. At 8:24 a.m., Pro Well Testing had MROs at 7570 feet in Chukka Well No. 2. At 8:58 a.m., Cardinal had SRO tool at 7660 feet in Gaines Well No. 3. At 10:04 a.m., Pro Well Testing had MROs at 7840 feet in Mewbourne Well No. 1. The BHP in Gaines Well No. 3 was 3732 psia, with the rate at 310 gpm and a WHP of 822 psig. At 1:21 pm the rate in Gaines Well No. 3 was 309 gpm, with a WHP of 830 psig and BHP of 3732 psia. At 1:29 p.m., Gaines Well No. 3 was shut-in. Subsurface continued to monitor the pressures on all three wells. At 3:53 p.m., the BHP on Gaines Well No. 3 had fallen to 3582.4 psia with a WHP of 162 psig. At 3:37 p.m., the WHP on Mewbourne Well No. 1 was 110 psig and at 3:47 p.m., the WHP on Chukka Well No. 2 was 12 psig. The BHP on Gaines Well No. 3 had started to stabilize. The OCD representative elected not to witness the gauges being placed into the wellbore. Darrell Moore, with Navajo, had notified OCD the day before, on 8/26/09.

August 28, 2009

Subsurface and Cardinal personnel arrived at the job site at 7:00 a.m. At 9:20 a.m., LAS file from SRO logging tool was downloaded. It appears that the well had reached radial flow. Waited until 1:20 pm and updated pressure data from SRO. The pressure data appeared to have reached the resolution of the gauge and contained a lot of noise. Called Navajo and informed them that the well appeared to have reached radial flow and to call OCD. Navajo called back at 2:10 p.m., and held a conference call with Subsurface, Navajo, and OCD. The OCD representative would not let Navajo end the testing after radial flow was determined. OCD representative and Navajo agreed to run the falloff portion of the testing on Sunday at 1:30 p.m., at which time we will tag fill in the bottom of the well and make gradient stops every 1000 feet. One more LAS pressure update was completed with the noisy bottom hole pressure data. At 7:11 a.m., the BHP on Gaines Well No. 3 had fallen to 3579.5 psia, with a WHP of 158 psig. At 6:50 am the WHP on Mewbourne Well No. 1 was 122 psig and at 7:00 p.m., the WHP on Chukka Well No. 2 was 11 psig.

August 29, 2009

Subsurface and Cardinal personnel arrived at the job site at 8:00 a.m. At 11:20 a.m., LAS file from SRO logging tool was downloaded. Updated pressure data from SRO and the pressure data appeared to have reached the resolution of the gauge and contained a lot of noise. Checked wellhead and flow line. Wing valve is closed. Filter pods and flow

line are isolated. The filter pods were drained at well shut-in and when checked, flowed a little fluid and air. Injection line valves and wing valve appear to be holding. Subsurface continued to monitor the pressures on all three wells. At 8:06 a.m., the BHP on Gaines Well No. 3 had fallen to 3573.4 psia, with a WHP of 158 psig. At 7:51 a.m., the WHP on Mewbourne Well No. 1 was 108 psig and at 8:01 p.m., the WHP on Chukka Well No. 2 was 11 psig.

August 30, 2009

Subsurface and Cardinal personnel arrived at the job site at 8:00 a.m. Subsurface continued to monitor the pressures on all three wells. At 8:31 a.m., the BHP on Gaines Well No.3 had fallen to 3569.4 psia, with a WHP of 158 psig. At 8:15 a.m., the WHP on Mewbourne Well No. 1 was 108 psig and at 8:26 a.m., the WHP on Chukka Well No. 2 was 12 psig. At 1:20 pm., the LAS file from SRO logging tool was downloaded. Updated pressure data from SRO and the pressure data appeared to have reached the resolution of the gauge and contained a lot of noise. Subsurface personnel checked the time on the pressure data to insure that the data would span a falloff period of 72 hours. At 2:20 pm., Cardinal crew started into the wellbore and tagged fill at 8986 feet. Gradient stops were made for 5-minutes at 8000 feet, 7000 feet, 6000 feet, 5000 feet, 4000 feet, 3000 feet, 2000 feet, 1000 feet, and at the surface. At 3:23 p.m., Cardinal started to rig down E-line unit and at 4:10 p.m., Navajo started injection into Gaines Well No. 3. At 4:30 p.m., Pro Well Testing had removed the slick line and MROs from the wellbores of Mewbourne Well No. 1 and Chukka Well No. 2. By 4:50 p.m., Navajo had resumed injection into all three wells. Subsurface personnel left the well location at 5:30 p.m.

August 31, 2009

Subsurface personnel traveled to Houston.

APPENDIX M

PANSYSTEM© ANALYSIS OUTPUT

SUBSURFACE

HOUSTON, TX • BATON ROUGE, LA • SOUTH BEND, IN

Production Optimization Systems

PanSystem Version 3.5

Report File: Navajo Well No. 3 Gaines 2

Well Test Analysis Report

Company	Navajo Refining Company
Location	Artesia, New Mexico
Well	Gaines Well #3
Date	August 24 - 30, 2009
Test	Injection/Falloff
Gauge Type/Serial Number	Spartek.#80780
Gauge Depth	7,663 feet
Injection Interval	7,660 feet - 8,620 feet
Completion Type	Perforated
Top of Fill	8,986 feet
Analyst	LKM
Subsurface Project No.	70A6365

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Reservoir Description
Fluid type : Water
Well orientation : Vertical
Number of wells : 1
Number of layers : 1

Layer Parameters Data

	Layer 1
Formation thickness	175.0000 ft
Average formation porosity	0.1000
Water saturation	0.0000
Gas saturation	0.0000
Formation compressibility	0.000000 psi-1
Total system compressibility	8.4000e-6 psi-1
Layer pressure	3475.675745 psia
Temperature	114.820000 deg F

Well Parameters Data

	Well 1
Well radius	0.3646 ft
Distance from observation to active well	0.000000 ft
Wellbore storage coefficient	0.043509 bbl/psi
Storage Amplitude	0.000000 psi
Storage Time Constant	0.000000 hr
Second Wellbore Storage	0.035103 bbl/psi
Time Change for Second Storage	0.016000 hr
Well offset - x direction	0.0000 ft
Well offset - y direction	0.0000 ft

Fluid Parameters Data

	Layer 1
Oil gravity	0.000000 API
Gas gravity	0.000000 sp grav
Gas-oil ratio (produced)	0.000000 scf/STB
Water cut	0.000000
Water salinity	0.000000 ppm
Check Pressure	3484.080000 psia
Check Temperature	114.820000 deg F
Gas-oil ratio (solution)	0.000000 scf/STB
Bubble-point pressure	0.000000 psia
Oil density	0.000 lb/ft3
Oil viscosity	0.000 cp
Oil formation volume factor	0.000 RB/STB
Gas density	0.000 lb/ft3
Gas viscosity	0.0 cp
Gas formation volume factor	0.000 ft3/scf
Water density	0.000 lb/ft3
Water viscosity	0.540 cp

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Fluid Parameters Data (cont)

	Layer 1
Water formation volume factor	1.000 RB/STB
Oil compressibility	0.000000 psi-1
Initial Gas compressibility	0.000000 psi-1
Water compressibility	0.000000 psi-1

Layer 1 Correlations
Not Used

Layer 1 Model Data
Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	718.830698 md
Skin factor (Well 1)	15.588053

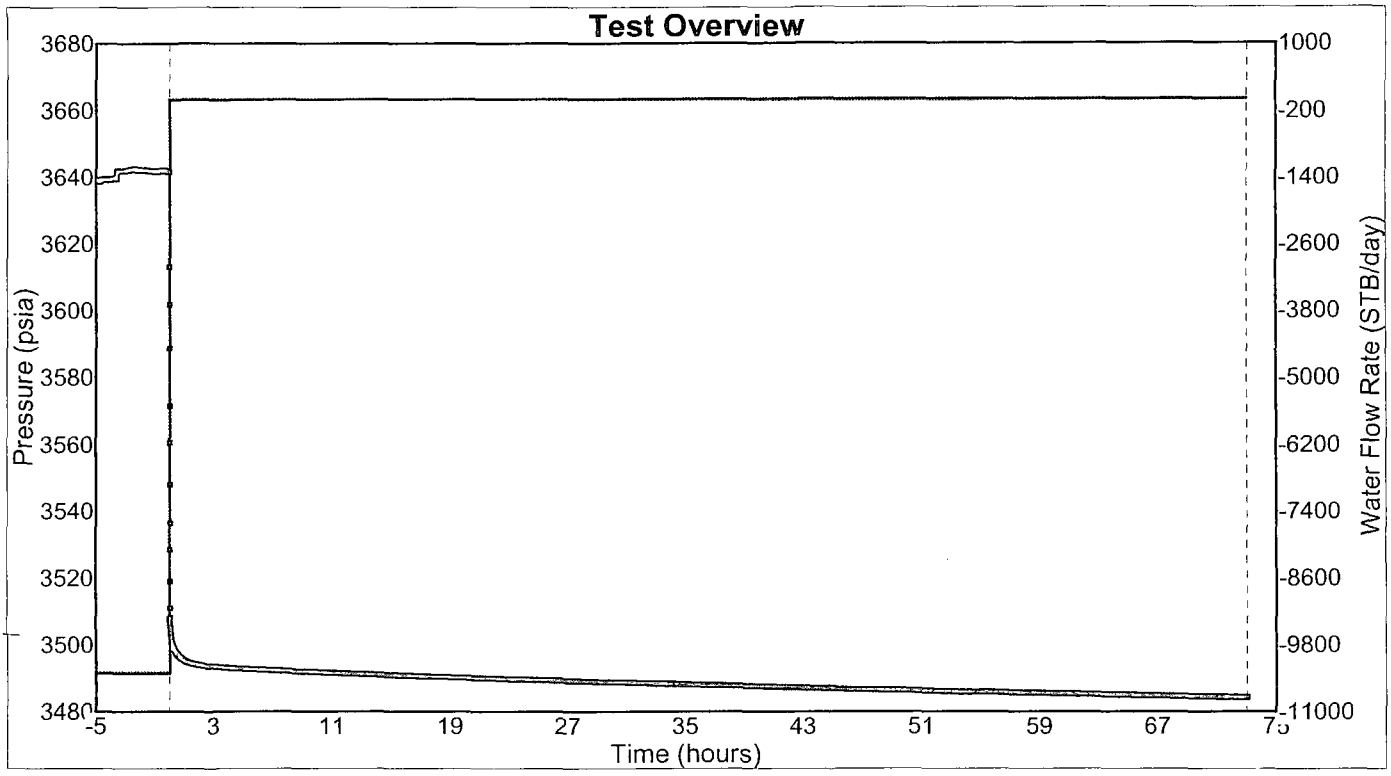
Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-925.483330	0.000000	-7006.000000
-901.483330	0.000000	-7073.940000
-877.483330	0.000000	-6813.490000
-853.483330	0.000000	-7164.460000
-829.483330	0.000000	-7021.020000
-805.483330	0.000000	-7107.950000
-781.483330	0.000000	-7208.180000
-757.483330	0.000000	-7508.980000
-733.483330	0.000000	-7197.630000
-709.483330	0.000000	-7375.970000
-685.483330	0.000000	-7304.950000
-661.483330	0.000000	-7168.640000
-637.483330	0.000000	-6937.170000
-613.483330	0.000000	-6870.560000
-589.483330	0.000000	-7152.810000
-565.483330	0.000000	-6632.390000
-541.483330	0.000000	-6736.960000
-517.483330	0.000000	-6677.310000
-493.483330	0.000000	-6495.640000
-469.483330	0.000000	-6562.180000
-445.483330	0.000000	-6656.030000
-421.483330	0.000000	-6903.070000
-397.483330	0.000000	-7067.910000
-373.483330	0.000000	-6741.210000
-349.483330	0.000000	-6845.950000
-325.483330	0.000000	-7010.790000
-301.483330	0.000000	-6822.860000
-277.483330	0.000000	-6786.210000
-253.483330	0.000000	-6905.040000

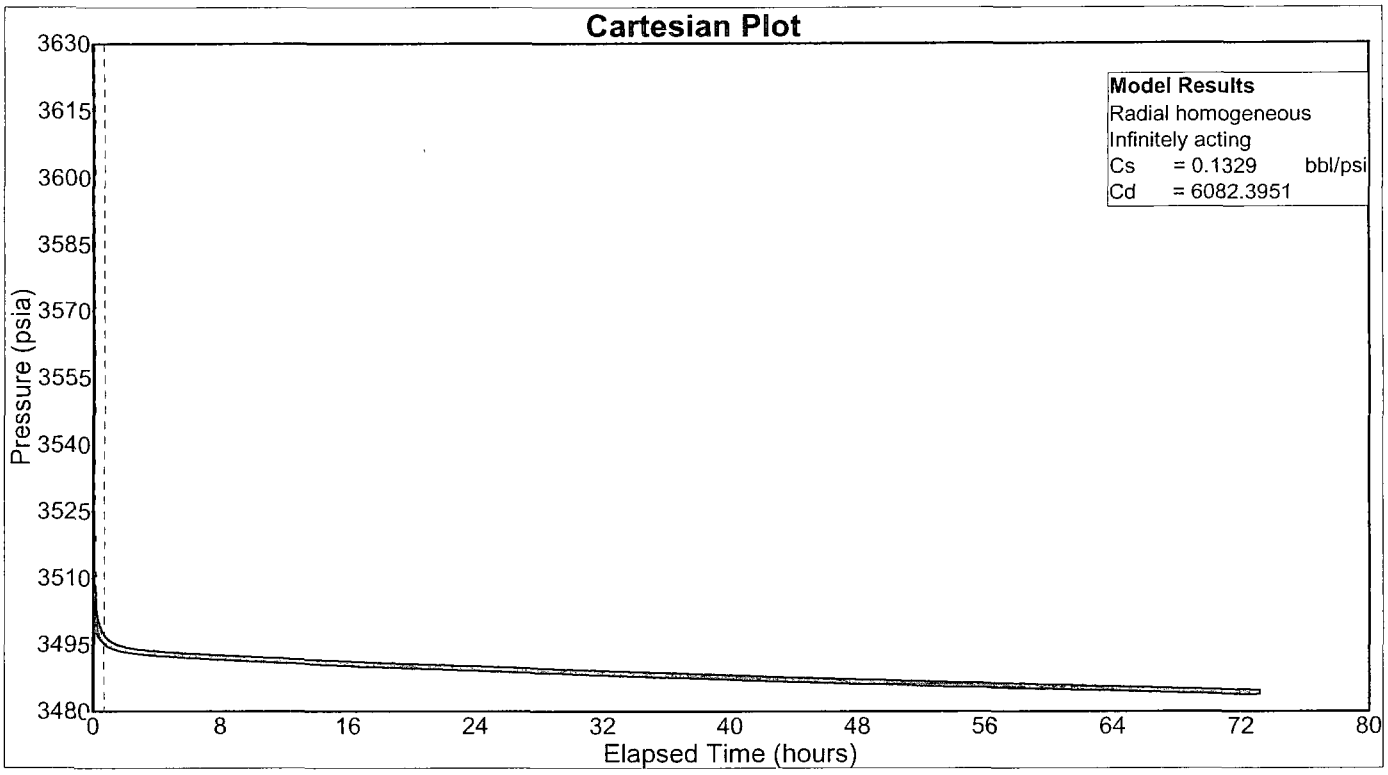
Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-229.483330	0.000000	-7031.590000
-205.483330	0.000000	-7052.840000
-181.483330	0.000000	-7064.320000
-157.483330	0.000000	-7042.000000
-133.483330	0.000000	-6504.350000
-109.483330	0.000000	-6133.120000
-85.483330	0.000000	-8259.030000
-72.983330	0.000000	-1.0413e4
-61.483330	0.000000	-1.0585e4
-37.483330	0.000000	-1.0407e4
-13.483330	0.000000	-1.0446e4
0.000007	3641.573000	-1.0323e4
73.037550	3484.078000	0.000000

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Cartesian Plot Model Results
Radial homogeneous - Infinitely acting

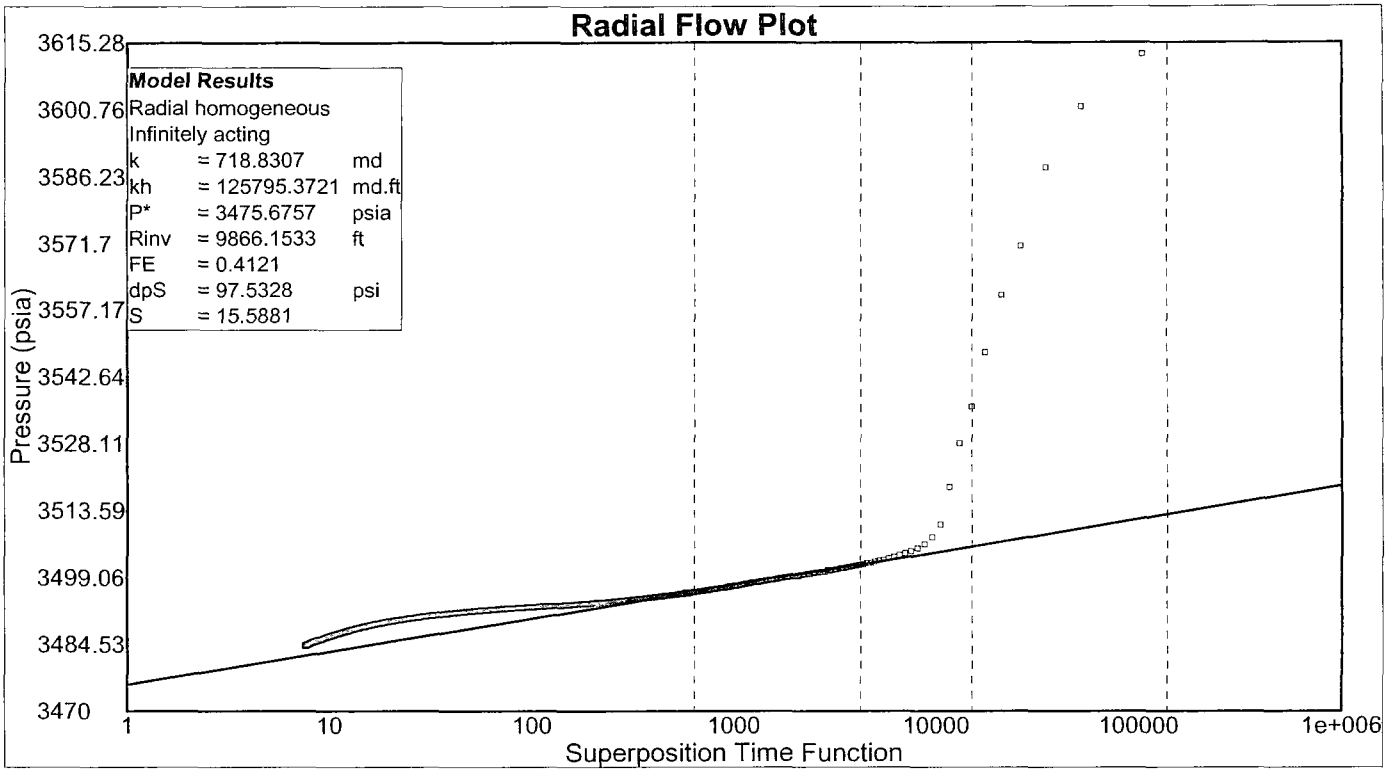
Classic Wellbore Storage

	Value
Wellbore storage coefficient	0.13295 bbl/psi
Dimensionless wellbore storage	6082.395108

Cartesian Plot Line Details
Line type : Wellbore storage
Slope : -3235.16
Intercept : 3627.89
Coefficient of Determination : 0.994898

Number of Intersections = 0

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Radial Flow Plot Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

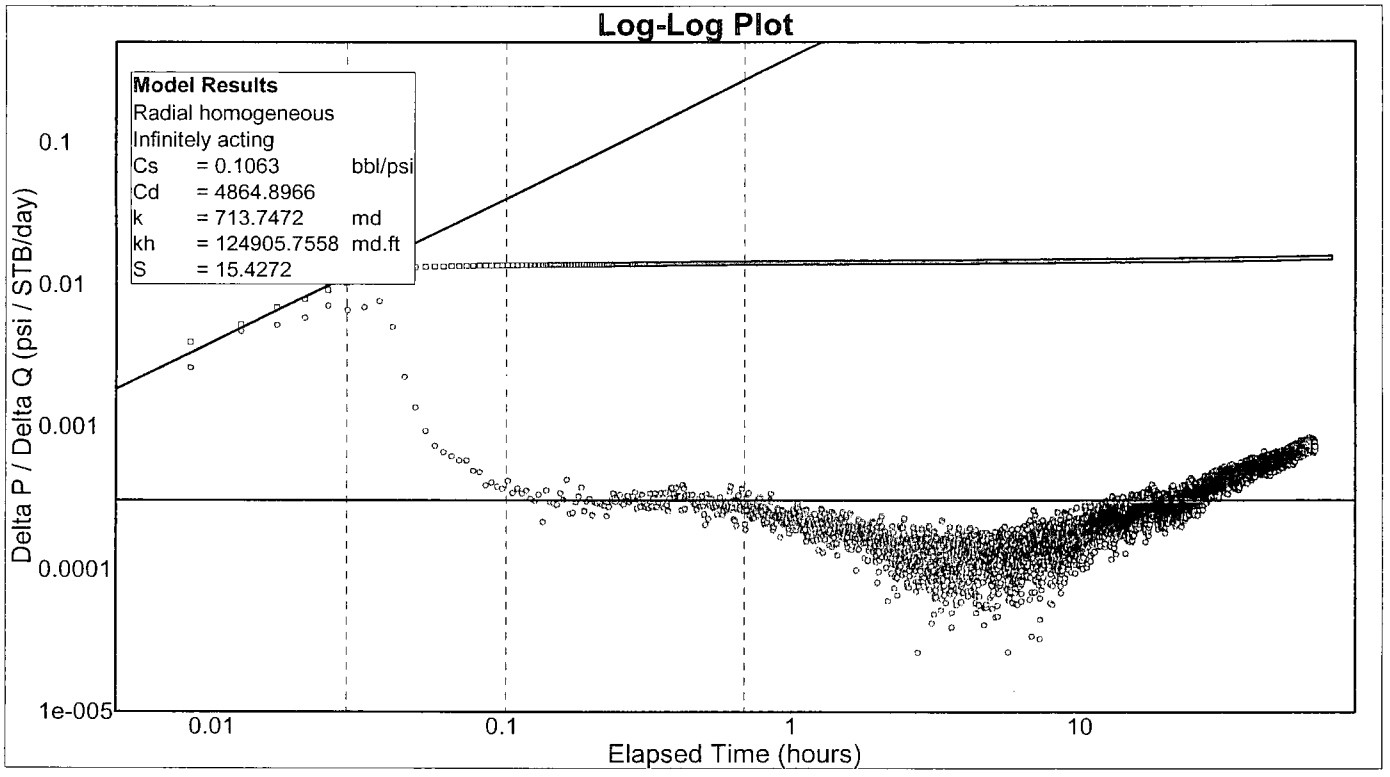
	Value
Permeability	718.830698 md
Permeability-thickness	1.2580e5 md.ft
Extrapolated pressure	3475.675745 psia
Radius of investigation	9866.153307 ft
Flow efficiency	0.412089
dP skin (constant rate)	97.532793 psi
Skin factor	15.588053

Radial Flow Plot Line Details
Line type : Radial flow
Slope : 7.20352
Intercept : 3475.68
Coefficient of Determination : 0.998862

	Radial flow
Extrapolated pressure	3475.675745 psia
Pressure at dt = 1 hour	3494.712188 psia

Number of Intersections = 0

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Log-Log Plot Model Results
Radial homogeneous - Infinitely acting

Classic Wellbore Storage

	Value
Wellbore storage coefficient	0.106338 bbl/psi
Dimensionless wellbore storage	4864.896562
Permeability	713.747176 md
Permeability-thickness	1.2491e5 md.ft
Skin factor	15.427202

Log-Log Plot Line Details
Line type : Wellbore storage
Slope : 1
Intercept : 0.391834
Coefficient of Determination : Not Used

Line type : Radial flow
Slope : 0
Intercept : 0.000305222
Coefficient of Determination : Not Used

Number of Intersections = 0

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Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, July 28, 2009 5:06 PM
To: 'Moore, Darrell'
Cc: 'Ken Davis'; 'Rusty Smith'; 'Lackey, Johnny'; Sanchez, Daniel J., EMNRD
Subject: Fall-Off Test Plan 2009 (UICI-008 WDW-1; UICI-008-1 WDW-2 & UICI-008-0 WDW-3) Resubmittal w/ Schedule for Each Class I Well (August, September & October) Approved by the OCD

Darrell:

The Fall-Off Test Plan is hereby approved. The Fall-Off Test Plan for the three UIC Class I Disposal Wells is available at OCD Online at "UICI-008" under the thumbnail entitled, "EPA Fall-Off Test Plan" at http://ocdimage.emnrd.state.nm.us/imaging/AEOrderFileView.aspx?appNo=pLWP0425236022.

If possible, the OCD recommends that the operator monitor bottom hole pressures in the other UIC Class I Disposal Wells that are not being tested in order to determine if there is a physical connection with the other disposal wells that inject into the same formation.

Please provide the OCD with notification of the Fall-Off Test dates and time that injection will be shut-off for at least 72 hour monitoring for each of your UIC Class I Disposal Wells scheduled for the third week of August, September and October of 2009 in order for the OCD to be present to witness the point at which injection is shut-off for each well.

Please be advised that OCD approval of this Fall-Off Test Plan does not relieve the Navajo Refining Company of responsibility should their operations fail to meet OCD "Fail-Off Test Guidelines." In addition, OCD approval does not relieve the Navajo Refining Company of responsibility for compliance with any other federal, state, or local laws and/or regulations throughout the Fall-Off Test.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Chavez, Carl J, EMNRD
Sent: Thursday, May 21, 2009 2:52 PM
To: 'Moore, Darrell'
Cc: 'Ken Davis'; Rusty Smith; Lackey, Johnny
Subject: RE: Fall-Off Test Plan Submittal

Darrell, et al.:

Your request for an extension from June 1, 2009 to July 20, 2009 is hereby approved.

In response to your questions in the attached letter dated May 19, 2009, the OCD responses are in red text below.

Section II of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states that, "shut down of the well for time sufficient to conduct a valid observation of the pressure fall-off".
What does the OCD consider sufficient when there are different radial flow periods, such as you find in naturally fractured or induced fractured formations?

A minimum of at least 72 hours or until you see a boundary.

What exactly does the OCD need for confirmation? Would rate data submitted with the report be confirmation?

A plot or graph.

Section V item 4 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "Calculating the total volume of injection fluid needed for the injectivity portion of the test".
Does the OCD have any specific equation that they require?

Calculate a daily rate based on the last 14 days of production, i.e., cumulative production/days to obtain an average daily rate of injection. Remember that at least 100 psi differential in pressure from injection to the end of the fall-off test is needed for a good fall-off test.

Section V item 5 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document implies that the OCD request a 3 day injection period and fall-off.
Is this what the OCD wants or can a shorter fall-off period be used?

Minimum day fall-off period needed for test.

Section V item 4 and item 6 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document appear to say the same thing.
Is this what OCD intended or are they different, if so how?

Item 6 deals with the handling of waste at the well during the test. You could divert the waste from the test well to the furthest way class I well owned by Navajo. Item 4 is talking about an adequate volume of injected fluid being available for the 3 day injection period.

Section V item 11 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "Using a surface readout downhole pressure gauge. Utilizing tandem down-hole memory electronic pressure gauges, one of which is surface readout capable, with a pressure resolution level of 0.0002% of the gauge full pressure range".
What type of gauge does the OCD require? There are surface readout gauges (SRO) that record data on a computer at the surface, there are memory read out (MRO) gauges that record data on volatile memory in the tool, and there are surface attached gauges that record wellhead pressure on volatile memory (data logger). There is only one pressure media Quartz that will have a pressure resolution of 0.0002% FS. The next best down-hole gauge pressure medium is Sapphire which has a pressure resolution of 0.0003% FS.

If cost is a factor, you could hang in hole 2 memory gauges without surface readout and sapphire gauges should be good enough.

Section VI item 4 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for PVT data.
The data may or may not be available as this data will not exist for older wells where the OCD has not required it. Can the data be estimated where it does exist?

Yes.

Section VI item 9 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for AOR data.
Is the OCD requesting this data before the testing to be included in the test plan?

No. Include the data in the final report.

Section VII items 2 &3 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for conformation.
How would the does the OCD want conformation in the test plan stated?

Present recorded information in the final report. Chart recorder?

Section IX item 18 sub-item (h) of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for a Hall plot.
What is the Hall plot to be used for? In generally this plot is used for injection wells in water floods for Enhanced Oil Recovery (EOR) and is a cheap qualitative approach to determine near wellbore damage and has very little usefulness in determining pressure build in a reservoir.

A change in slope on the plot shows limits of reservoir or changes in injectivity rates and pressures. By estimating the average injection pressure based on cumulative volume injected with record of injection pressure.

Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Moore, Darrell [mailto:Darrell.Moore@hollycorp.com]
Sent: Tuesday, May 19, 2009 8:03 AM
To: Chavez, Carl J, EMNRD
Cc: 'Ken Davis'; Rusty Smith; Lackey, Johnny
Subject:

Carl

Attached is a letter with an extension request and some questions about the fall off test on our injection wells. Hard copy will follow.

Thanks

Darrell Moore
Environmental Manager for Water and Waste
Navajo Refining Company, LLC
Phone Number 575-746-5281
Cell Number 575-703-5058
Fax Number 575-746-5451

This inbound email has been scanned by the MessageLabs Email Security System.

REFINING COMPANY, LLC

FAX
(575) 746-5283 DIV. ORDERS
(575) 746-5481 TRUCKING
(575) 746-5458 PERSONNEL

501 EAST MAIN STREET • P. O. BOX 159
ARTESIA, NEW MEXICO 88211-0159
TELEPHONE (575) 748-3311

FAX
(575) 746-5419 ACCOUNTING
(575) 746-5451 ENV/PURCH/MKTG
(575) 746-5421 ENGINEERING

May 19, 2009

Carl J. Chavez, CHMM
New Mexico Energy Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

Re: Navajo Refining APT, PFO & MIT Test Plan (UICI-8) and Request for Extension on WDWs 1, 2 & 3

Dear Carl:

Navajo has received your May 1, 2009 e-mail concerning the subject 2009 Pressure Fall-Off (PFO) Test Plan. Generally, based on your comments, it appears that the Oil Conservation Division (OCD) wants a stand alone test plan for each of the Navajo WDW 1, 2 & 3 facilities at Artesia. We agree that most, if not all, of the required information is available but it is scattered between the original permit application files and numerous maintenance and other reports. These files are generally located in the state files with drilling records and other files our contractor, Subsurface Technology Inc. (Subsurface), has developed. Additionally, we will need to evaluate any new activity in the Area of Review. Since it will be virtually impossible to locate, evaluate, copy and assemble this information by June 1, 2009, we are requesting an extension to July 20, 2009. At or before that time, we will deliver the test plan to the OCD for approval. Upon receipt of approval, we will implement the test procedure and schedule the field work. Probably in the July-August time frame.

Subsurface has also reviewed the referenced e-mail and has asked the following questions:

Section II of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states that, "shut down of the well for time sufficient to conduct a valid observation of the pressure fall-off".
What does the OCD consider sufficient when there are different radial flow periods, such as you find in naturally fractured or induced fractured formations?

Section V item 1 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "Confirmation that a constant injection rate can be maintained into the test well during the injectivity portion of the test".

What exactly does the OCD need for confirmation? Would rate data submitted with the report be confirmation?

Section V item 4 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "Calculating the total volume of injection fluid needed for the injectivity portion of the test".
Does the OCD have any specific equation that they require? In order to analyze the transit pressures in late time the maximum amount of volume injected into the well needs to be considered, this would encompass the injected volumes since the last major shut down. The injectivity will need to remain constant at least for the period of time that fall-off portion of the testing is conducted (3 days of injection for 3 days of fall-off). The rate into the well will be limited by the pump and the permitted wellhead pressure. In most cases the plant generally has more volume than they can dispose of down the well(s) due to economics (the well(s) cost a lot of money) and are constantly trying to keep up with production. In most cases they cannot shut down a well for more than 2 days.

Section V item 5 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document implies that the OCD request a 3 day injection period and fall-off.
Is this what the OCD wants or can a shorter fall-off period be used?

Section V item 4 and item 6 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document appear to say the same thing.
Is this what OCD intended or are they different, if so how?

Section V item 11 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "Using a surface readout downhole pressure gauge. Utilizing tandem down-hole memory electronic pressure gauges, one of which is surface readout capable, with a pressure resolution level of 0.0002% of the gauge full pressure range".
What type of gauge does the OCD require? There are surface readout gauges (SRO) that record data on a computer at the surface, there are memory read out (MRO) gauges that record data on volatile memory in the tool, and there are surface attached gauges that record wellhead pressure on volatile memory (data logger). There is only one pressure media Quartz that will have a pressure resolution of 0.0002% FS. The next best down-hole gauge pressure medium is Sapphire which has a pressure resolution of 0.0003% FS.

Section V item 13 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "If available, monitoring test progress with appropriate plots at the well site to insure a valid test data is obtained and problematic test can be identified and aborted".

In order to do this we would have to have all the rate data available before starting the falloff testing to construct a real-time Horner plot or Log-Log plot and analyze the data as we collect it. In most cases the rate data can only be obtained at some point toward the end of the testing.

Section VI item 4 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for PVT data.
The data may or may not be available as this data will not exist for older wells where the OCD has not required it. Can the data be estimated where it does exist?

Section VI item 9 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for AOR data.
Is the OCD requesting this data before the testing to be included in the test plan?

Section VII items 2 &3 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for conformation.
How would the does the OCD want conformation in the test plan stated?

Section IX item 18 sub-item (h) of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for a Hall plot.
What is the Hall plot to be used for? In generally this plot is used for injection wells in water floods for Enhanced Oil Recovery (EOR) and is a cheap qualitative approach to determine near wellbore damage and has very little usefulness in determining pressure build in a reservoir.

For convenience, we have sent Subsurface a copy of this letter. Please send them a copy of your response. If it would be more convenient to call them, you can contact Ken Davis with Subsurface at 713-880-4640. Or you can contact me at 575-748-3311.

Very truly yours,
NAVAJO REFINING COMPANY,LLC

Darrell Moore

Darrell Moore
Environmental Manager for Water and Waste

Cc: Subsurface Technology Inc.

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Thursday, May 21, 2009 2:52 PM
To: 'Moore, Darrell'
Cc: 'Ken Davis'; Rusty Smith; Lackey, Johnny
Subject: RE:

Darrell, et al.:

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A plot or graph.

Section V item 4 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "Calculating the total volume of injection fluid needed for the injectivity portion of the test".
Does the OCD have any specific equation that they require?

Calculate a daily rate based on the last 14 days of production, i.e., cumulative production/days to obtain an average daily rate of injection. Remember that at least 100 psi differential in pressure from injection to the end of the fall-off test is needed for a good fall-off test.

Section V item 5 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document implies that the OCD request a 3 day injection period and fall-off.
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How would the does the OCD want conformation in the test plan stated?

Present recorded information in the final report. Chart recorder?

Section IX item 18 sub-item (h) of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for a Hall plot.
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A change in slope on the plot shows limits of reservoir or changes in injectivity rates and pressures. By estimating the average injection pressure based on cumulative volume injected with record of injection pressure.

Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Moore, Darrell [mailto:Darrell.Moore@hollycorp.com]
Sent: Tuesday, May 19, 2009 8:03 AM
To: Chavez, Carl J, EMNRD
Cc: 'Ken Davis'; Rusty Smith; Lackey, Johnny
Subject:

Carl

Attached is a letter with an extension request and some questions about the fall off test on our injection wells. Hard copy will follow.

Thanks

Darrell Moore
Environmental Manager for Water and Waste
Navajo Refining Company, LLC
Phone Number 575-746-5281
Cell Number 575-703-5058
Fax Number 575-746-5451

This inbound email has been scanned by the MessageLabs Email Security System.

REFINING COMPANY, LLC

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(575) 746-5481 TRUCKING
(575) 746-5458 PERSONNEL

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(575) 746-5451 ENV/PURCH/MKTG
(575) 746-5421 ENGINEERING

May 19, 2009

Carl J. Chavez, CHMM
New Mexico Energy Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

Re: Navajo Refining APT, PFO & MIT Test Plan (UICI-8) and Request for Extension on WDWs 1, 2 & 3

Dear Carl:

Navajo has received your May 1, 2009 e-mail concerning the subject 2009 Pressure Fall-Off (PFO) Test Plan. Generally, based on your comments, it appears that the Oil Conservation Division (OCD) wants a stand alone test plan for each of the Navajo WDW 1, 2 & 3 facilities at Artesia. We agree that most, if not all, of the required information is available but it is scattered between the original permit application files and numerous maintenance and other reports. These files are generally located in the state files with drilling records and other files our contractor, Subsurface Technology Inc. (Subsurface), has developed. Additionally, we will need to evaluate any new activity in the Area of Review. Since it will be virtually impossible to locate, evaluate, copy and assemble this information by June 1, 2009, we are requesting an extension to July 20, 2009. At or before that time, we will deliver the test plan to the OCD for approval. Upon receipt of approval, we will implement the test procedure and schedule the field work. Probably in the July-August time frame.

Subsurface has also reviewed the referenced e-mail and has asked the following questions:

Section II of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states that, "shut down of the well for time sufficient to conduct a valid observation of the pressure fall-off".
What does the OCD consider sufficient when there are different radial flow periods, such as you find in naturally fractured or induced fractured formations?

Section V item 1 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "Confirmation that a constant injection rate can be maintained into the test well during the injectivity portion of the test".

What exactly does the OCD need for confirmation? Would rate data submitted with the report be confirmation?

Section V item 4 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "Calculating the total volume of injection fluid needed for the injectivity portion of the test".
Does the OCD have any specific equation that they require? In order to analyze the transit pressures in late time the maximum amount of volume injected into the well needs to be considered, this would encompass the injected volumes since the last major shut down. The injectivity will need to remain constant at least for the period of time that fall-off portion of the testing is conducted (3 days of injection for 3 days of fall-off). The rate into the well will be limited by the pump and the permitted wellhead pressure. In most cases the plant generally has more volume than they can dispose of down the well(s) due to economics (the well(s) cost a lot of money) and are constantly trying to keep up with production. In most cases they cannot shut down a well for more than 2 days.

Section V item 5 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document implies that the OCD request a 3 day injection period and fall-off.
Is this what the OCD wants or can a shorter fall-off period be used?

Section V item 4 and item 6 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document appear to say the same thing.
Is this what OCD intended or are they different, if so how?

Section V item 11 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "Using a surface readout downhole pressure gauge. Utilizing tandem down-hole memory electronic pressure gauges, one of which is surface readout capable, with a pressure resolution level of 0.0002% of the gauge full pressure range".
What type of gauge does the OCD require? There are surface readout gauges (SRO) that record data on a computer at the surface, there are memory read out (MRO) gauges that record data on volatile memory in the tool, and there are surface attached gauges that record wellhead pressure on volatile memory (data logger). There is only one pressure media Quartz that will have a pressure resolution of 0.0002% FS. The next best down-hole gauge pressure medium is Sapphire which has a pressure resolution of 0.0003% FS.

Section V item 13 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "If available, monitoring test progress with appropriate plots at the well site to insure a valid test data is obtained and problematic test can be identified and aborted".

In order to do this we would have to have all the rate data available before starting the falloff testing to construct a real-time Horner plot or Log-Log plot and analyze the data as we collect it. In most cases the rate data can only be obtained at some point toward the end of the testing.

Section VI item 4 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for PVT data.
The data may or may not be available as this data will not exist for older wells where the OCD has not required it. Can the data be estimated where it does exist?

Section VI item 9 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for AOR data.
Is the OCD requesting this data before the testing to be included in the test plan?

Section VII items 2 &3 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for conformation.
How would the does the OCD want conformation in the test plan stated?

Section IX item 18 sub-item (h) of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for a Hall plot.
What is the Hall plot to be used for? In generally this plot is used for injection wells in water floods for Enhanced Oil Recovery (EOR) and is a cheap qualitative approach to determine near wellbore damage and has very little usefulness in determining pressure build in a reservoir.

For convenience, we have sent Subsurface a copy of this letter. Please send them a copy of your response. If it would be more convenient to call them, you can contact Ken Davis with Subsurface at 713-880-4640. Or you can contact me at 575-748-3311.

Very truly yours,
NAVAJO REFINING COMPANY,LLC

Darrell Moore
Environmental Manager for Water and Waste

Cc: Subsurface Technology Inc.

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Thursday, May 21, 2009 2:52 PM
To: 'Moore, Darrell'
Cc: 'Ken Davis'; Rusty Smith; Lackey, Johnny
Subject: RE:

Darrell, et al.:

Your request for an extension from June 1, 2009 to July 20, 2009 is hereby approved.

In response to your questions in the attached letter dated May 19, 2009, the OCD responses are in red text below.

Section II of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states that, "shut down of the well for time sufficient to conduct a valid observation of the pressure fall-off".
What does the OCD consider sufficient when there are different radial flow periods, such as you find in naturally fractured or induced fractured formations?

A minimum of at least 72 hours or until you see a boundary.

What exactly does the OCD need for confirmation? Would rate data submitted with the report be confirmation?

A plot or graph.

Section V item 4 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "Calculating the total volume of injection fluid needed for the injectivity portion of the test".
Does the OCD have any specific equation that they require?

Calculate a daily rate based on the last 14 days of production, i.e., cumulative production/days to obtain an average daily rate of injection. Remember that at least 100 psi differential in pressure from injection to the end of the fall-off test is needed for a good fall-off test.

Section V item 5 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document implies that the OCD request a 3 day injection period and fall-off.
Is this what the OCD wants or can a shorter fall-off period be used?

Minimum day fall-off period needed for test.

Section V item 4 and item 6 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document appear to say the same thing.
Is this what OCD intended or are they different, if so how?

Item 6 deals with the handling of waste at the well during the test. You could divert the waste from the test well to the furthest way class I well owned by Navajo. Item 4 is talking about an adequate volume of injected fluid being available for the 3 day injection period.

Section V item 11 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document states, "Using a surface readout downhole pressure gauge. Utilizing tandem down-hole memory electronic pressure gauges, one of which is surface readout capable, with a pressure resolution level of 0.0002% of the gauge full pressure range".
What type of gauge does the OCD require? There are surface readout gauges (SRO) that record data on a computer at the surface, there are memory read out (MRO) gauges that record data on volatile memory in the tool, and there are surface attached gauges that record wellhead pressure on volatile memory (data logger). There is only one pressure media Quartz that will have a pressure resolution of 0.0002% FS. The next best down-hole gauge pressure medium is Sapphire which has a pressure resolution of 0.0003% FS.

If cost is a factor, you could hang in hole 2 memory gauges without surface readout and sapphire gauges should be good enough.

Section VI item 4 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for PVT data.
The data may or may not be available as this data will not exist for older wells where the OCD has not required it. Can the data be estimated where it does exist?

Yes.

Section VI item 9 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for AOR data.
Is the OCD requesting this data before the testing to be included in the test plan?

No. Include the data in the final report.

Section VII items 2 &3 of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for conformation.
How would the does the OCD want conformation in the test plan stated?

Present recorded information in the final report. Chart recorder?

Section IX item 18 sub-item (h) of the UIC Well Fall-Off Test Guidance (December 3, 2007) document asks for a Hall plot.
What is the Hall plot to be used for? In generally this plot is used for injection wells in water floods for Enhanced Oil Recovery (EOR) and is a cheap qualitative approach to determine near wellbore damage and has very little usefulness in determining pressure build in a reservoir.

A change in slope on the plot shows limits of reservoir or changes in injectivity rates and pressures. By estimating the average injection pressure based on cumulative volume injected with record of injection pressure.

Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
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Sent: Tuesday, May 19, 2009 8:03 AM
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Darrell Moore
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May 19, 2009

Carl J. Chavez, CHMM
New Mexico Energy Minerals & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

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For convenience, we have sent Subsurface a copy of this letter. Please send them a copy of your response. If it would be more convenient to call them, you can contact Ken Davis with Subsurface at 713-880-4640. Or you can contact me at 575-748-3311.

Very truly yours,
NAVAJO REFINING COMPANY,LLC

Darrell Moore

Darrell Moore
Environmental Manager for Water and Waste

Cc: Subsurface Technology Inc.

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Friday, May 01, 2009 2:23 PM
To: 'Moore, Darrell'; Griswold, Jim, EMNRD
Cc: 'Ken Davis'; 'Rusty Smith'; Jones, William V., EMNRD
Subject: Navajo Refining Company's Fall-Off Test Plan (UICI-8) (WDW-1, WDW-2 & WDW-3)

Darrell:

The Fall-Off Test Plan cannot be approved in its present form as it does not fully address Section III (Developing a Test Plan) and the items listed in Sections: V (General Test Operational Considerations), VI (Background Information), VII (Conducting the Fall-Off Test), VIII (Evaluation of the Test Results), and IX (Report Components) of the OCD UIC Class I Well Fall-Off Guidance (guidance). The OCD notices that the test plan does follow the itemized elements provided in each section of the guidance. The test plan did not have a proposed schedule to be approved by the OCD for fall-off testing.

In general, the test plan proposes one fall-off test from one well and each well alternating every year thereafter, which does not meet the Federal UIC Regulations requirement. Annual falloff testing for a non-hazardous Class I well is a federal requirement under 40 CFR §146.13(d)(1). A Class I UIO permit requires that an annual falloff test be conducted to satisfy this requirement. The test plan fails to include the supporting documentation that is required in each of the sections for an approvable test plan.

OCD review comments:

Section V: Only 4 items appear to have been addressed in the test plan.

Section VI: Zero items appear to have been addressed and Information is supposed to be submitted up front with the test plan, and not as proposed in your test plan submittal. The operator needs to reference applicable items in the "Tables" section of the report if any tables 3 & 4 or figures satisfy each item in the applicable section. Some water quality tables are provided, but neither are referenced in the applicable section nor do they satisfy completely water quality data for the injected fluids in this section.

Section VII

Test plan is not consistent with guidance.

Section VIII

Test plan is not completely consistent with guidance.

Section IX

The test plan was missing this section. Simply cutting and pasting the report components into the test plan to report or referencing all of this section in the test plan to ensure when reports are received they contain the basic elements of the guidance would have sufficed.

The majority of this information is to be submitted within 30 days of completion of the fall-off test. Some of the tables and figures at the back of the test plan may assist the operator with the submittal of the final report components. The operator may copy and paste this section into Section IX of the test plan in order for the OCD to confirm that the operator will submit what is specified in the test plan guidance to the OCD in the final report. The OCD observes that some tables and figures at the back of the report may help the operator to address this section for the final report to the OCD.

The OCD requires that you look over the guidance and submit a test plan that follows the basic guidance for the test plan within 30 days or by June 1, 2009. The OCD realizes that there are some sections that you could simply refer to a well diagram to address each item, but you need to correctly reference the applicable table or figure to enter a value or pertinent information, and you need to ensure that it addresses each test plan item. Statements stating that logs exist somewhere in the file are not acceptable for an approvable test plan. Alternative procedures that will produce valid test

results and satisfy the requirements of OCD and the regulations will be considered by the OCD, but you need to specify that it is an alternative to each guidance item.

You may provide separate test plans for each of the 3 UIC Class I Disposal Wells, or submit one test plan that will address each well individually.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Chavez, Carl J, EMNRD
Sent: Friday, May 01, 2009 8:16 AM
To: 'Moore, Darrell'; Griswold, Jim, EMNRD; Jones, Brad A., EMNRD
Cc: 'Ken Davis'; Rusty Smith; Jones, William V., EMNRD
Subject: RE: Fall off tests on Injection Wells

Darrell:

I'm looking this over this a.m.

You will recall that OCD had some concerns based on last years fall-off test and requested a test plan.

The test plan must meet the minimum criteria specified for a test plan under the UIC Guidance for Fall-Off at http://www.emnrd.state.nm.us/ocd/documents/UICGuidance.pdf. If the report submitted by Navajo Refining Company does not address each of the elements provided in this guidance, it cannot be approved.

In addition, a fall-off test will be required at each UIC Class I Disposal Well this year. Consequently, Navajo Refining Company will need to run three separate fall-off tests at each of its wells. I will get something to you this morning. Thanks.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Moore, Darrell [mailto:Darrell.Moore@hollycorp.com]
Sent: Friday, May 01, 2009 7:39 AM
To: Griswold, Jim, EMNRD; Chavez, Carl J, EMNRD; Jones, Brad A., EMNRD
Cc: 'Ken Davis'; Rusty Smith
Subject: RE: Fall off tests on Injection Wells

Jim

Im just following up on the status of your reviewing our plan to perform fall-off tests on our Injection wells. It has been over a year since we tested these wells.

From: Griswold, Jim, EMNRD [mailto:Jim.Griswold@state.nm.us]
Sent: Wednesday, April 01, 2009 8:44 AM
To: Moore, Darrell
Subject: RE: Fall off tests on Injection Wells

Mr. Moore,

I began looking at the files for WDW-1, -2, and -3 yesterday. Is the 2008 plan you are referring to that submitted by Subsurface Construction Corp. dated October 2008, Project # 70G6142?

Jim Griswold

From: Moore, Darrell [mailto:Darrell.Moore@hollycorp.com]
Sent: Friday, March 27, 2009 7:26 AM
To: Chavez, Carl J, EMNRD; Jones, Brad A., EMNRD
Cc: Griswold, Jim, EMNRD; 'Ken Davis'; Rusty Smith
Subject: RE: Fall off tests on Injection Wells

Is he reviewing it now? What time frame are we looking at?

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Thursday, March 26, 2009 5:55 PM
To: Jones, Brad A., EMNRD; Moore, Darrell
Cc: Griswold, Jim, EMNRD
Subject: RE: Fall off tests on Injection Wells

Darrell:

I recommend that you not schedule the fall-off test until after Jim Griswold can review the test plan and approve it if it is approvable. The test plan was developed after your last Fall-Off test where the OCD had some concerns about the way you conducted it. Thanks.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
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E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Jones, Brad A., EMNRD
Sent: Thursday, March 26, 2009 1:20 PM
To: Chavez, Carl J, EMNRD; Moore, Darrell
Subject: FW: Fall off tests on Injection Wells

Carl,

Could you assist Darrell in this matter, since I'm not up to speed with Navajo's permits? Thanks.

Brad

From: Moore, Darrell [mailto:Darrell.Moore@hollycorp.com]
Sent: Thursday, March 26, 2009 8:22 AM
To: Jones, Brad A., EMNRD
Cc: 'Ken Davis'; Rusty Smith
Subject: Fall off tests on Injection Wells

Brad

As you know, we have three injection wells that OCD requires us to perform pressure fall off (PFO) tests on annually. We sent a PFO plan to Carl last year that detailed the test plan. Do we need to resend another PFO plan this year? Is that one sufficient? We plan on doing the tests basically the same as last years plan. We are working on getting these tests done the second week of April so we need some guidance from you pretty quick. Thanks for your attention.

Darrell Moore
Environmental Manager for Water and Waste
Navajo Refining Company, LLC
Phone Number 575-746-5281
Cell Number 575-703-5058
Fax Number 575-746-5451

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SUBSURFACE

WELL BUILD-UP/FALL-OFF TEST PLAN
MEWBOURNE WELL NO. 1
CHUKKA WELL NO. 2
AND
GAINES WELL NO. 3

HOLLY CORPORATION INC.
NAVAJO REFINING
Artesia, New Mexico

Subsurface Project No. 70G6142

October 2008

Prepared By:

SUBSURFACE CONSTRUCTION CORP.
6925 Portwest Dr., Suite 110
Houston, Texas 77024

WELL BUILD-UP/FALL-OFF TEST PLAN
NAVAJO REFINERY
ARTESIA, NM
MEWBOURNE WELL NO. 1 (UIC-CLI-008-1)
CHUKKA WELL NO. 2 (UIC-CLI-008-2
GAINES WELL NO 3 (UIC-CLI-008-3)

General Test Operational Consideration

The falloff testing will be performed on Gaines Well No. 3 in the first year, then on the Mewbourne Well No. 1 in the second year, completing the process with Chukka Well No. 2 in the third year. This cycle will be repeated every three years.

This sequence will be repeated for each well on a yearly basis. For example, in 2009 the reservoir (Wolfcamp/Cisco/Canyon) will be tested via the Gaines Well No. 3, in 2010 via the Mewbourne Well No. 1, and in 2011 via the Chukka Well No. 2. This represents a fair approximation of the reservoir buildup pressure over time as all three wells inject into the Wolfcamp/Cisco/Canyon formations. The 2008 falloff tests show that the wells communicate, which will allow a fair representation of the reservoir pressure (reference to "2008 Annual Bottom-Hole Pressure Survey and Pressure Falloff Test for Mewbourne Well No.1, Chukka Well No. 2, and Gaines Well No. 3"). Communication between the wells shows that the reservoir is continuous between each well and that results from one well should be sufficient to represent the general reservoir characteristic and pressure buildup over time. See Table 5 for comparisons of reservoir values over time.

The process of performing buildup/falloff test on each individual well under the same conditions would likely yield similar results for each test, adding unneeded, costly redundancy. The request by Navajo Refining to perform one buildup/falloff test a year alternating between the well is justified having shown that the wells are communicating as represented in the data obtained during the 2008 buildup/falloff testing. The mechanical integrity testing will continue to be performed annually on each well as required.

The procedure for the target well will consist of the following. A constant rate will be maintained in the first targeted well for 24 hours prior to shut in with one offset well shut in and the other offset under a constant injection rate. Tandem bottom-hole memory

gauges will be lowered into the targeted well (two memory gauges per well, one primary, and one backup), and allowed to stabilize for one hour. Just before the targeted well is shut in, the two offset wells will be set to maintain a low constant injection rate. The targeted well will be shut in for a minimum of 72 hours, with both of the offset wells maintaining a low constant injection rate. At the end of the falloff test, the bottom-hole pressure gauges will be pulled from the well making gradient stops every 1,000 feet.

The injection build-up period will consist of no less than 72 hours at a constant rate. The pressure falloff sequence will be maintained for at a minimum, the same amount of time. Due to refinery expansion, the refinery does not have the storage capacity to shut in more than two wells for 24 hours and will have to maintain a constant injection into the two offset wells while performing a falloff in the adjacent well.

The memory gauges that will be used are quartz or sapphire gauges that will have a resolution of 0.0002% (FS) or 0.0003% (FS) respectively. The pressure range of the gauges will be from 0 - 10,000 psi minimum. These are typical bottom-hole memory gauges, with the best accuracy available in the area. The gauges will be lowered to the top of the injection interval at 7,924 feet in Mewbourne Well No. 1, 7,820 feet in Chukka Well No. 2, and 7,660 feet in Gaines Well No. 3. The recording period will be set to record pressures at a minimum of every 10 seconds, which should allow for a minimum of a 10-day recording period.

The fluid that will be used for the injection test is the refinery's brine waste water (effluent). A current waste analysis of the fluid will be included in the final report.

A crown valve has been installed on each of the three wells. A wireline lubricator will be installed into the crown valve before running into the wellbore with the memory gauges. The wells will be shut in through two inline gate valves. The first valve is located in the injection line just prior to the wellhead (wing valve), and the other is located behind the filter pods, and is mechanically operated from the control room at the plant (primary and secondary shut-in valves). The instantaneous shut in of the wells will be accomplished by the mechanical operated valve (MOV) behind the filter pods.

Background Information

All background information will be included in the final report encompassing a log of the events (Chronology of Field Activity), an overview of the Geology, a current one mile area of review (AOR) update, falloff analysis including injection data (rate and volume history), gauge calibration certificates, bottom-hole pressure analysis, well schematic, electric logs (if necessary), reservoir fluid description, and injection fluid analysis. The procedure for the buildup/falloff testing will also be included in the final report. An AOR update will be completed prior to the build-up/falloff testing to ascertain any changes, which have occurred in the AOR that might have an effect on the testing. Historically, there has not been any production or injection in the current injection interval within a one mile radius of Mewborune Well No. 1, Chukka Well No. 2, or Gaines Well No. 3.

Navajo Refining has been running buildup/falloff tests on Mewborune Well No. 1, Chukka Well No. 2 since 2000 using sapphire gauges. The tests were performed to comply with EPA directives for UIC non-hazardous Class I injection wells. April 1, 2008 through April 4, 2008 buildup/falloff tests were conducted on Mewborne Well No. 1, Chukka Well No. 2, and Gaines Well No. 3 concurrently, and the injection rates were varied at the end of the testing to ascertain that the wells were hydraulically connected. The 24-hour buildup portion of the testing was done at a constant injection rate in each of the offset wells. The falloff portion of the testing was terminated after 24 hours. The Mewbourne Well No. 1 had a permeability of 2,010 md (height of 175 ft, reservoir viscosity 0.72 cp), for a radius of investigation of 8,455 ft and a skin of 262. The Chukka Well No. 2 had a permeability of 1,091 md (height of 175 ft, reservoir viscosity 0.72 cp), for a radius of investigation of 6,221 ft and a skin of 155. The Gaines Well No. 3 had a permeability of 1,322 md (height of 175 ft, reservoir viscosity 0.72 cp), for a radius of investigation of 7,008 ft and a skin of 107. The pressure data at the end of the testing shows that the wells were hydraulically connected with pressure responses relative to changes in the offset wells injection rate (reference "2008 Annual Bottom-Hole Pressure Survey and Pressure Falloff Test for Mewbourne Well No.1, Chukka Well No. 2, and Gaines Well No. 3" for additional information). A summary of the historical reservoir data is presented in Table 5.

Figures 1 through 3 are the well schematics for Mewborune Well No. 1, Chukka Well No. 2, or Gaines Well No. 3. Table 2 is a summary of the injection intervals for each well. Table 3 is a summary of the injection fluid analysis. Table 4 is a summary of the formation fluids. The majority of the background information can also be found in the permit application that was submitted to the State of New Mexico Oil Conservation Division for each well, and reference data for this request can be found in the "2008 Annual Bottom-Hole Pressure Survey and Pressure Falloff Test for Mewbourne Well No.1, Chukka Well No. 2, and Gaines Well No. 3".

Conduct Annulus Pressure Testing

Utilizing the Navajo annulus monitoring system on each well, an annulus pressure test (APT) will be run at a minimum pressure of 300 psi for a period of no less than 30 minutes. The annulus pressure data will be recorded using a digital surface readout pressure recorder or plant recording equipment (RTU/PLC). Each well will be tested annually apart from the buildup/falloff testing of the reservoir.

Conducting the Falloff Testing

This is the generalized procedure that will be used to perform the buildup/falloff testing at Navajo Refining facility in Artesia, New Mexico:

Day 1

- Inject into one of the offset wells at a low constant rate.
- Shut in the remaining offset well.
- Inject into the target well for the buildup portion of the testing, at a constant rate, for a minimum of 72 hours.

Day 4

- Move in and rig up slick line unit on target well. Make a gauge ring run into the well and tag the bottom of fill. Pull out of the hole with the gauge ring and run tandem memory tools into the well. The memory tools will be set at top of the perforations. Allow the pressure to stabilize for approximately one hour. After

setting the memory tools in place, shut in the target well for a minimum of 72 hours.

- Start injection into each of the offset wells at a minimum constant rate just before shut in of the targeted well and maintain a constant rate for duration of the falloff testing period.

Day 7

- End the 72 hour pressure falloff test, making gradient stops every 1,000 feet while pulling the memory gauges from the wellbore.
- Turn over the targeted well to the refinery operations.
- Turn over the offset wells to the refinery operations.

Evaluation of the Test Results

The falloff analysis will be completed by a qualified engineer using PanSystem®2006 Edinburgh Petroleum Services Ltd. transient pressure analysis program and reviewed for accuracy by a licensed professional engineer (PE). The falloff analysis will include the following:

- A log-log plot with a derivative diagnostic plot used to identify flow regimes;
- A wellbore storage portion and infinite acting portion of the plot;
- A semi-log plot with wellbore storage, p*, and slope;
- An expanded portion of the semi-log plot showing the infinite acting pressure portion (radial flow);
- The geological parameters, height, porosity, compressibility of the rock for the falloff analysis will be based on historical data, loss and local geology developed for the permit application;
- The viscosity of the formation used for the calculations based on historical data;
- A summary of all the equations used for the analysis;
- An explanation of any temperature or pressure anomalies;

The injection records prior to the testing will be included in the analysis. All records from the testing shall be kept on file for no less than 5 years.

Table 1 is a summary of Well Data. Table 2 is a summary of the local geology for injection intervals. Table 3 is a summary of injected waste water. Table 4 is a summary of formation fluids. Table 5 is a summary of pressure fall-off test results.

TABLES

Well Data Table 1

	Mewbourne Well No. 1	Chukka Well No. 2	Gaines Well No. 3
Tubing	4.5", 11.6 lb/ft, N-80, SMLS; R3, LT&C 7879'	3.5", 9.2 lb/ft, J-55, NUE 10RD 7528'	4.5", 11.6 lb/ft, J-55, LT&C, 8RD 7575'
Packer	7"x 3.5", EVI Oil Tools (Arrow), X-1, ID 3", 7879'	5.5"x 2.875" Weatherford (Arrow), X-1, ID 2.4375", 7528'	7"x 2.875" Kenco Tools (Arrow), X-1, ID 2.4375" 7575'
Perforations	Upper: 7924 – 42; 7974 – 8030; 8050 – 56; 8066 – 80; 8118 – 27; 8132 – 40; 8160 – 64; 8170 – 88 Lower: 8220 - 54; 8260 - 70; 8280 - 8302; 8360 - 66; 8370 - 78; 8400 - 10; 8419 - 23; 8430 - 46; 8460 - 64; 8470 - 76	Upper: 7570 – 7620; 7676 – 7736 Lower: 7826 - 34; 7858 - 80; 7886 - 7904; 7916 - 36; 7944 - 64; 7990 - 8042; 8096 - 8116; 8191 - 8201; 8304 - 19; 8395 - 99	Upper: 7660 – 8450 Lower: 8540 - 8620
Protection Casing	7", 29 lb/ft, N-80, LT&C, 9094 - 7031	5.5", 17 lb/ft, L-80, LT&C	7", 29 lb/ft, N-80, LT&C
Cement Top Protection Casing	Surface	Surface	900'
PBTD / TD	9004' / 10,200'	8770' / 10,372'	9022' / 10,119'
Formation	Wolfcamp / Cisco / Canyon	Wolfcamp / Cisco / Canyon	Wolfcamp / Cisco / Canyon
Inj. Interval	7450' – 9016'	7270' – 8894'	7303' – 8894'
OCD UIC Permit Number	UIC-CLI-008-1	UIC-CLI-008-2	UIC-CLI-008-3
API Number	30-015-27592	30-015-20894	30-015-26575

Geology Information Table 2

Injection Zone Formation	Mewbourn Well No. 1 (KB height = 3693 feet)		Chukka Well No. 2 (KB height = 3623 feet)		Gaines Well No. 3 (KB height = 3625 feet)	
	Measured Depth below KB (feet)	Subsea Depth (feet)	Measured Depth below KB (feet)	Subsea Depth (feet)	Measured Depth below KB (feet)	Subsea Depth (feet)
Lower Wolfcamp	7450	-3757	7270	-3647	7303	-3678
Cisco	7816	-4123	7645	-4022	7650	-4025
Canyon	8475	-4782	8390	-4767	8390	-4765
Base of Injection Zone (base of Canyon)	9016	-5323	8894	-5271	8894	-5269

Injected Brine Waste Water Table 3

Chemical Date	Refinery Waste Water Jan 22, 1998	Refinery Waste Water June 14, 1999
Calcium (mg/L)	48	21
Magnesium (mg/L)	98	31
Potassium (mg/L)	51	18
Sodium (mg/L)	1200	424
Chloride (mg/L)	1100	630
Fluoride (mg/L)	3.9	74
Nitrate-N (mg/L)	<0.01	<10
Sulfate (mg/L)	1500	570
Alkalinity (CaCO3) (mg/L)	100	40
pH (s.u.)	6.0 – 9.0	6.0 – 9.0
Specific Gravity (g/L)	1.00 – 1.01	1.00 – 1.01

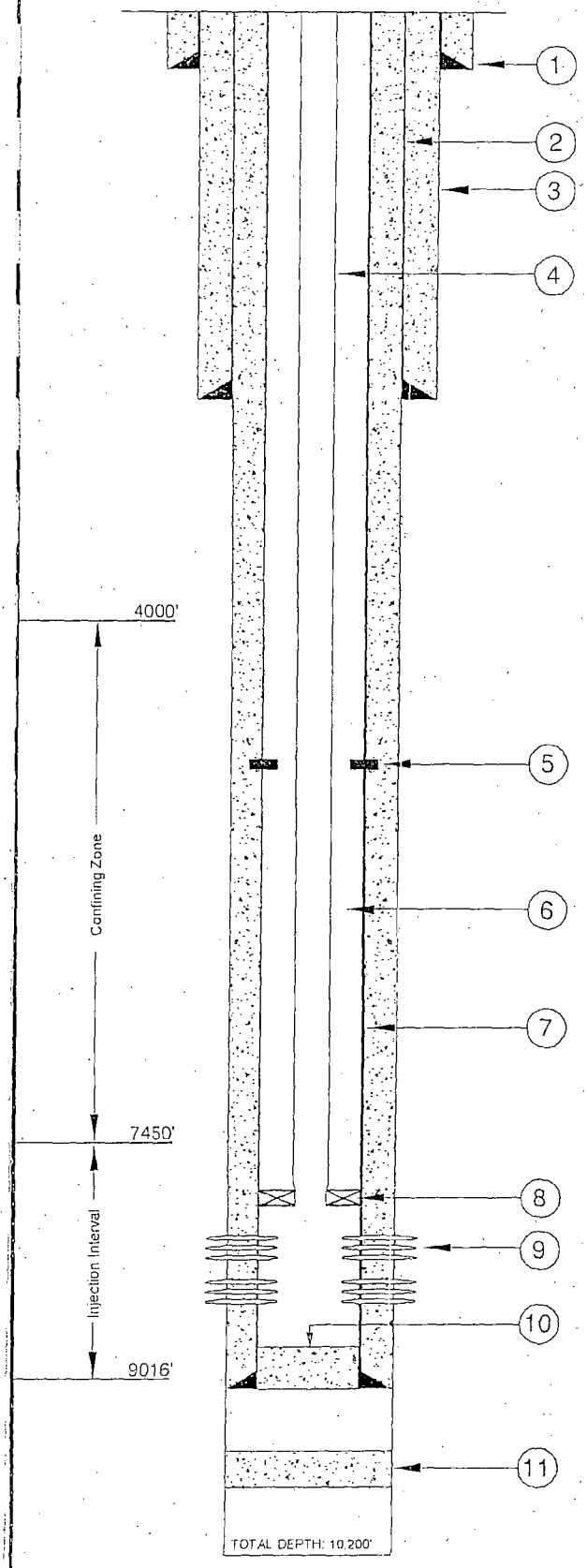
Formation Fluids Table 4

Chemical	Mewbourn Well No. 1	Chukka Well No. 2	Gaines Well No. 3	Average
Date	July 31, 1998	June 14, 1999	Nov 8, 2006	
Fluoride (mg/l)	2.6	9.7	Not Detected	6.15
Chloride (mg/L)	19,000	15,000	10,447	14,815.67
NO3-N (mg/L)	<10	<10	--	<10
SO4 (mg/L)	2,200	2000	1,908	2,036
CaCO3 (mg/L)	1000	1210	--	1105
Specific Gravity (g/L)	1.034	1.0249	--	1.0295
TDS (mg/L)	33,000	20,000	--	26,500
Specific Conductance (uMHOs/cm)	52,000	43,000	--	47,500
Potassium (mg/L)	213	235	85.5	177.83
Magnesium (mg/L)	143	128	155	142
Calcium (mg/L)	390	609	393	464
Sodium (mg/L)	12,770	8,074	6,080	8,974.67
pH (s.u.)	8.1	7.2	--	7.65

Summary of Pressure Fall-off Test Results Table 5

Test No.	Test Date	P_{static} (psia)	kh/μ (md-ft/cp)	V_{well} (10^6 gal)	V_{total} (10^6 gal)
WDW-1 (Static Pressure Ref Depth 7924 ft)					
1	07/31/98	2913.7	537,308	0.0	0.0
2	04/19/00	3073.7	479,925	95.4	108.6
3	12/18/00	3202.9	413,013	196.5	240.3
4	01/14/01	3207.8	405,663	204.7	253.2
5	05/17/01	3243.6	357,754	247.9	303.7
6	08/30/01	3254.8	354,579	276.4	349.5
7	02/14/02	3332.9	398,234	333.1	424.3
8	03/26/03	3370.33	452,416	466.6	631.7
9	08/26/03	3380.97	484,330	506.6	702.5
10	04/05/06	3422.45	751,105	842.4	1208.9
11	04/04/08	3443.53	351,832	1087.0	2714.6
WDW-2 (Static Pressure Ref Depth 7570 ft)					
1	06/05/99	2973.0	1,527,413	0.0	0.0
2	01/13/01	3207.7	713,248	48.7	253.0
3	02/02/01	3213.6	713,575	50.8	262.5
4	05/18/01	3243.6	712,844	56.3	304.4
5	08/29/01	3258.7	572,135	73.4	349.3
6	02/15/02	3311.7	874,047	91.5	424.3
7	03/22/03	3342.48	854,309	165.1	631.7
8	08/27/03	3349.14	837,073	195.9	702.5
9	04/06/06	3395.12	707,786	366.5	1208.9
10	04/03/08	3494.13	265,300	409.4	2714.6
WDW-3 (Static Pressure Ref Depth 7660 ft)					
1	11/05/06	3324.93	1,601,204	0.0	0.0
2	04/02/08	3326.72	321,411	9.3	2714.6

FIGURES



BELOW GROUND DETAILS

All depths are referenced to the Kelly bushing elevation of 12.5' above ground level. Ground level elevation is 3,678' above mean sea level.

1. Surface Casing: 13 ⅜", 48 lb/ft, J-55, ST&C set at 390' in a 17 ½" hole. Cemented with 150 sx Class C with 3 % calcium chloride, 375 sx Class C Litewate w/3% calcium chloride and ½ lb/sx flocele. Circulated 86 sx to surface.

2. Intermediate Casing: 9⅝", 36 lb/ft, J-55, ST&C set at 2,555' in a 12 ¼ " hole. Cemented w/800 sx of Class C Lite w/ ½ lb/sx flocele and 2 lb/sx Gilsonite and 12 % salt. Followed by 200 sx of Class C w/2 % calcium chloride. Circulated 133 sx to surface.

3. Base of the USDW at 493'.

4. Injection Tubing: 4 ½", 11.6 lb/ft, N-80, SMLS, R3, LT&C set at 7,879'.

5. DV Tool: at 5,498'.

6. Annulus Fluid: 8.7 lb/gal brine water mixed w/UniChem Techni-Hib 370 corrosion inhibitor.

7. Protection Casing: 7", 29 lb/ft, N-80, LT&C: 9094' to 7031'. 7", 29 lb/ft, P-110, LT&C: 7031' to 5845'. 7", 26 lb/ft, P-110, LT&C; 5845' to surface. Casing cemented in two stages as follows:

   First Stage - 600 sx modified Class H w/0.4 % CFR-3, 5 lb/sx Gilsonite, 0.5% Halad-344, and 1 lb/sx salt mixed at 13.0 ppg. Opened DV tool at 5498' and circulated 142 sx to surface.

   Second Stage - Lead Slurry: 220 sx Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail Slurry: 550 sx modified Class H w/0.4 % CFR-3, 5 lb/sx, Gilsonite, 0.5 % Halad-344, 0.1 % HR-7, and 1 lb/sx mixed at 13.0 ppg. Circulated 75 sx to surface. Top out w/20 sx permium plus 3 % calcium chloride.

8. Packer: 7" x 3.5" EVI Oil Tools (Arrow), Model X-1 retrievable packer set at 7879'. Minimum I.D. is 3.0". Wireline re-entry guide on bottom. To release: turn ¼ turn to the right and pick up.

9. Perforations (2 SPF):

   Upper Zone - 7924-7942', 7974-8030', 8050-8056', 8066-8080', 8118-8127', 8132-8140', 8160-8164', 8170-8188'.

   Lower Zone - 8220-8254', 8260-8270', 8280-8302', 8360-8366', 8370-8378', 8400-8410', 8419-8423', 8430-8446', 8460-8464', 8470-8476'.

10. PBTD: 9004'.

11. Cement Plug: 45 sx Class H from 9624' to 9734'.

SUBSURFACE

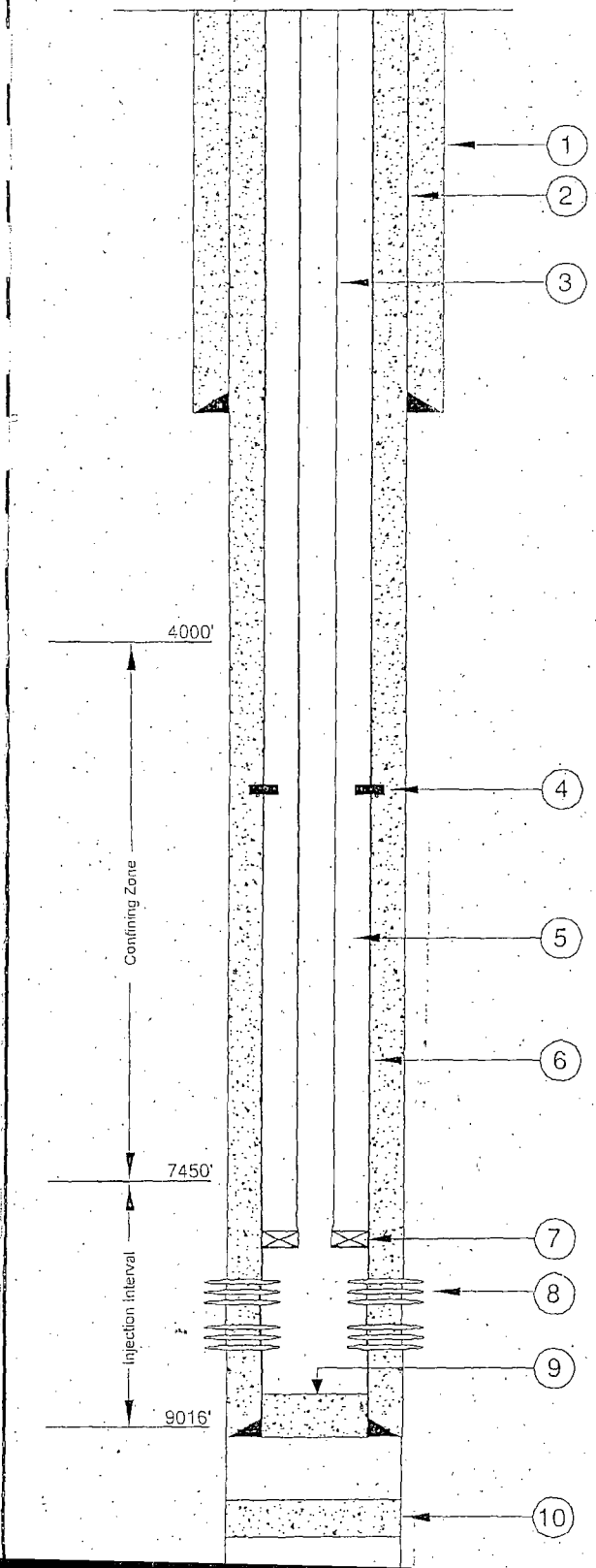
HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

FIGURE 1

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO

BELOW GROUND DETAILS
WASTE DISPOSAL WELL NO. 1

DATE: 07/13/01	CHECKED BY:	JOB NO: 7005256
DRAWN BY: WDL	APPROVED BY:	DWG. NO:



BELOW GROUND DETAILS

All depths are referenced to the Kelly bushing elevation of 13' above ground level. Ground level elevation is 3610' above mean sea level.

1. Base of the USDW at 473'.
2. Surface Casing: 8 5/8", 32 lb/ft, set at 1995' in an 11" hole. Cemented to surface with 800 sacks of cement.
3. Injection Tubing: 3 ½", 9.2 lb/ft, J-55, smls, NUE 10 rd. set at 7528'.
4. DV Tool: at 5,785'.
5. Annulus Fluid: 8.7 lb/gal brine water mixed w/UniChem Techni-Hib 370 corrosion inhibitor.
6. Protection Casing: 5 ½", 17 lb/ft, L-80, LT&C: 8869' to the surface and set in a 7 7/8" hole. Casing cemented in two stages as follows:

   First Stage - 575 sacks of modified Class "H" with 0.4 % CFR-3, 5 lb/sk Gilsonite, 0.5 % Halad-344, and 3 lb/sk salt. Mixed at 13.0 ppg. Opened DV tool at 5785 and circulated 20 sacks to surface.

   Second Stage - Lead Slurry: 300 sacks of Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail slurry: 695 sacks modified Class "H" with 0.4% CFR-3, 5 lb/sk Gilsonite, 0.5 % Halad-344 and 3 lb/sk salt mixed at 13.0 ppg. Circulated 150 sacks to surface. Topped out with 10 yards of Redi-mix.
7. Packer: 5 ½" x 2 7/8" Weatherford Completion Tools (Arrow) Model X-1 retrievable packer set at 7528'. Minimum ID is 2.4375". Wireline re-entry guide is on bottom. To release: turn ¼ turn to the right and pick up.
8. Perforations (2 SPF):

   Zone 1: 7570-7620', 7676-7736'

   Zone 2: 7826-7834', 7858-7880', 7886-7904', 7916-7936', 7944-7964', 7990-8042', 8096-8116', 8191-8201', 8304-8319',8395-8399'.
9. PBTD: 8770'
10. Cement Plug: 45 sacks from 9675' to 9775'.

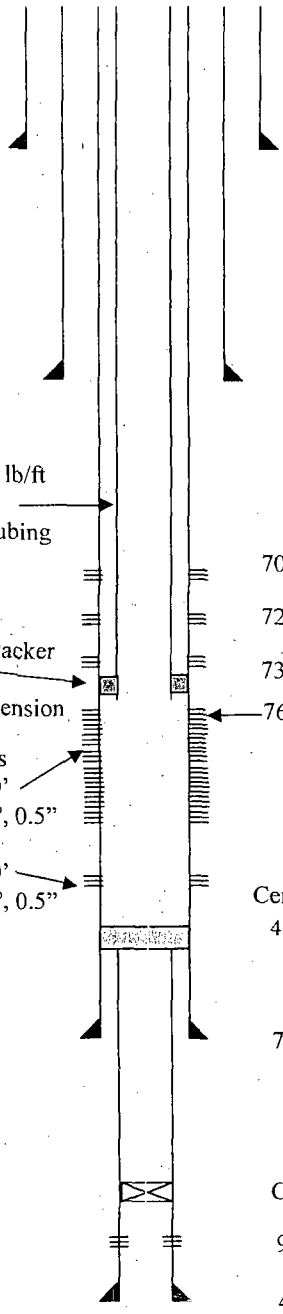
SUBSURFACE

HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

FIGURE 2

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO

BELOW GROUND DETAILS



13-3/8" at 400'

Top of Cement at 900'
7' x 9/58" Casing Annulus

300PSI Sealant was placed across the intervals
Surface – 1000'
7000' – 7550'
The Remaining Annulus Contains Inhibited Brine 8.7 ppg

9-5/8" at 2600'

4-1/2" 11.6 lb/ft
J-55 LTC
Injection Tubing

7050'-7102' Squeezed with 80 sks

7262'-7278' Squeezed with 100 sks

Arrow X-1 Packer
7"x 2 7/8"
7575' 37K Tension

7304'-7314' Squeezed with 80 sks,

7676'-7698' Old Perforations Open

Perforations
7660'-8450'
2 JSPF, 60°, 0.5"

8540'-8620'
2 JSPF, 60°, 0.5"

Cement was tagged at 9022'
4-1/2" Liner Top @ 9051'

7" 26 lb/ft & 29 lb/ft @ 9450'

CIBP @ 9800' w/35' cement

9861-9967

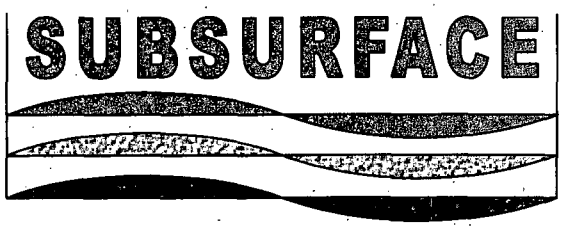
4-1/2" Liner @ 10,119'

API# 30-015-26575
S1-T18S-R27E
Formally Chalk Bluff Feceral #1
Not to Scale

SUBSURFACE
HOUSTON, TX.
SOUTH BEND, IN
BATON ROUGE, LA

Figure 3
Injection Well / WDW-3
Navajo Refining

DATED: 12/14/05	APPROVED BY:	JOB NO. 70F5826
DRAWN BY: JDB	CHECKED BY:	SCALE: N/A



HOUSTON, TX • BATON ROUGE, LA • SOUTH BEND, IN