UIC - I - ___8-0___

EPA FALL-OFF/ SRT MONITORING (WDW-3)

DATE:

2010

Submit 1 Copy To Appropriate District Office
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised August 1, 2011

WELL API NO.
30-015-26575

5. Indicate Type of Lease
STATE ☒ FEE ☐

6. State Oil & Gas Lease No.
NM-0557371

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

7. Lease Name or Unit Agreement Name
Gaines WDW-3

1. Type of Well: Oil Well ☐ Gas Well ☐ Other **Injection Well**

8. Well Number **WDW-3**

2. Name of Operator
Navajo Refining Company

9. OGRID Number

3. Address of Operator
Post Office Box 159, Artesia, New Mexico 88211

10. Pool name or Wildcat: **Navajo Permo-Penn**

4. Well Location
Unit Letter **N** : **790** feet from the **South** line and **2250** feet from the **West** line
Section **01** Township **18S** Range **27E** NMPM County **Eddy**

11. Elevation *(Show whether DR, RKB, RT, GR, etc.)*
3609' GL, ' RKB

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
PERFORM REMEDIAL WORK ☐	PLUG AND ABANDON ☐	REMEDIAL WORK ☐	ALTERING CASING ☐
TEMPORARILY ABANDON ☐	CHANGE PLANS ☐	COMMENCE DRILLING OPNS. ☐	P AND A ☐
PULL OR ALTER CASING ☐	MULTIPLE COMPL ☐	CASING/CEMENT JOB ☐	
DOWNHOLE COMMINGLE ☐			
OTHER: **PERFORM PRESSURE FALLOFF TEST** ☒		OTHER:	☐

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 19.15.7.14 NMAC. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

December 12, 2011 –Install bottomhole gauges into WDW-1, WDW-2, and WDW-3 by 11:45am. Continue injection into all three wells.
December 13, 2011 – Continue injection into all three wells.
December 14, 2011 – At 12:15pm, the offset wells WDW-1 and WDW-2 will be shut-in. A constant injection rate will be established for WDW-3 and continue for a 30 hour injection period. Do not exceed 1000 psig wellhead pressure.
December 15, 2011 – At 7:00pm, WDW-3 will be shut in for a 30-hour falloff period. WDW-1 and WDW-2 will remain shut-in.
December 16, 2011 – All three wells will continue to be shut in while monitoring falloff pressure in all three wells.
December 17, 2011 – At 7:00am, acquire downhole pressure gauges from all three wells. Tag bottom of fill and come out of hole very slowly, making 7-minute gradient stops while coming out of WDW-3 every 1000 feet (7000 ft, 6000 ft, 5000 ft, 4000 ft, 3000 ft, 2000 ft, 1000 ft, surface). Run in hole with a temperature tool and conduct temperature survey from the surface to the top of the fill. Turn the wells back to Navajo personnel.

Spud Date: | Rig Release Date:

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Timothy Jones TITLE Project Engineer DATE 10/3/2011

Type or print name Timothy Jones E-mail address: tjones@subsurfacegroup.com PHONE: 713-880-4640

For State Use Only

APPROVED BY: Carl J. Chavez TITLE Environmental Engineer DATE 10/19/2011

Conditions of Approval (if any):

See E-mail conditions dated 10/19/2011 attached to WDW-1.

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
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/
"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)

SUBSURFACE

RECEIVED OCD

2011 OCT -6 A 12:52

October 3, 2011

Mr. Ed Martin
Oil Conservation Division
District IV
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Subsurface Project No. : 70A6645

Dear Mr. Martin:

On behalf of Navajo Refining Company, please find enclosed three (3) Form C-103 Sundry Notices for the pressure transient testing of Navajo Refining's disposal wells WDW-1, WDW-2, and WDW-3. These forms were also sent to Sherry Bonham at the Artesia OCD Office.

Please call Ken Davis or me at (713) 880-4640 if you have any questions.

Sincerely,

Tim Jones
Project Engineer

TJ/bl

cc: Sherry Bonham
Ken Davis

Subsurface Technology, Inc.
6925 Portwest Drive Suite 110 Houston TX 77024
713/880-4640 Fax 713/880-3248 1-800-535-4105

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, January 25, 2011 3:50 PM
To: 'Moore, Darrell'; Lackey, Johnny
Cc: Dade, Randy, EMNRD
Subject: Annual Fall-Off Tests WDWs 1, 2 & 3 UIC Class I (NH) Disposal Wells

Gentlemen:

The OCD is in receipt of your Fall-Off Tests for the above subject wells.

The OCD will contact you if it has questions or requires more information from the above subject reports.

The OCD expects to receive the annual reports for each well soon.

Also, I do not recall the quarterly Bradenhead Test being performed on WDW-3. Please submit the tests in order to update the well file.

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")

NAVAJO 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

January 20, 2011

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: 2010 ANNUAL FALL-OFF PRESSURE TESTS
NAVAJO REFINING COMPANY

Carl,

Enclosed, please find the results for the Annual Fall Off tests on Navajo Refining Company's three injection wells (Mewbourne WWD-#1), (Chukka WWD-#2), and (Gaines WWD-#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:

SUBSURFACE

2010 ANNUAL BOTTOM-HOLE PRESSURE SURVEY AND PRESSURE FALLOFF TEST FOR GAINES WELL NO. 3

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO
PROJECT NO. 70A6516

REPORT SUBMITTED:
DECEMBER 2010

SUBSURFACE CONSTRUCTION CORP.
6925 PORTWEST DRIVE, SUITE 110
HOUSTON, TEXAS 77024
pfh@subsurfacegroup.com

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

TABLES

TABLE OF CONTENTS (CONTINUED)

FIGURES

TABLE OF CONTENTS (CONTINUED)

APPENDICES

TABLE OF CONTENTS (CONTINUED)

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 in accordance with The 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 to 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 30-hour injection period and a 30-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 as the Gaines Well No. 3.

As prescribed by the guidelines, this report discusses supporting and background information, the one-mile area of review (updated since the 2009 falloff testing), and geology. Information on the offset wells is provided as are, daily testing activities and the point of shutin. The pressure falloff testing and analysis results are discussed in Section 15.

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 Oil and Gas Remittance Identifier (OGRID) Number: 223518

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, Section 1, Township 18 South, Range 27 East

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 that was 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 two memory readout (MRO) backup pressure gauges. The MROs was placed at 7,660 feet (top of the perforations) and two feet lower at 7,658 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 2.9×10^{-6} psi^{-1}. The formation pore volume compressibility was estimated using Appendix D (Figure G.5 SPE Monograph 1). This value was 5.5×10^{-6} psi^{-1}. The total system compressibility is the sum of the fluid compressibility and the pore volume compressibility, 8.4×10^{-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 2.9×10^{-6} psi^{-1} at 127°F.

7. DAILY RATE HISTORY DATA (MINIMUM OF ONE MONTH PRECEDING 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 November 11, 2010, was 2,343,432,495 gallons. The volume of fluid injected into the Mewbourne Well No. 1 was 1,333,745,459 gallons. The volume of fluid injected into the Chukka Well No. 2 was 740,730,228 gallons. The volume of fluid injected into the Gaines Well No. 3 was 268,956,808 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 memory readout (MRO) pressure gauges were used for the Gaines Well No. 3 buildup and falloff testing. The upper gauge was used as a backup gauge. The downhole MRO gauges were set at 7,658 feet and 7,660 feet. Bottom-hole MRO 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 7,924 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, two MRO pressure gauges were used to record the pressure and temperature data during the injection/falloff testing. The MRO pressure gauges (Serial Nos. 76585 and 76648) were used. Both gauges were sapphire crystal gauges and were 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. 76173 and 75871. 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. 76182 and 76169. Both gauges were manufactured by Spartek Systems.

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

In Gaines Well No. 3, the MRO pressure gauges, Serial Nos. 76585 and 76648, have 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.

In Mewbourne Well No. 1, the MRO pressure gauges, Serial Nos. 76173 and 75871, have 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.

In Chukka Well No. 2, the MRO pressure gauges, Serial Nos. 76182 and 76169, have 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 manufacturer'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 is included as Appendix H. The manufacturer's 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 2009, 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 2009 update.

No new fresh water wells were reported within the search area since the submittal of the 2009 report. The discharge application lists the water wells located in the area of review.

a. Identify wells located within the one mile AOR:

Table II also 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.

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 modifications to the current permit, or have had new drilling and/or completion permits issued since the 2009 annual report submittal.

Six (6) wells were found in which the owner had changed. Thirteen (13) new plugged and abandoned oil and gas wells were found. Three (3) wells were placed in temporarily abandoned status. One (1) well was found that was returned to production status. Three (3) wells were found that had been recompleted in an upper interval. There were five (5) new drills, of which none penetrated the Wolfcamp interval. 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 exist in the study area although, the study 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 is presented as Appendix J, and the structure map for the Cisco Formation is 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 48 hours before shutting in the Gaines Well No. 3. The bottom-hole pressure and temperature data are graphically depicted in Figure 2 for the Mewbourne Well No. 1, and Figure 5 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 30-hour injection period and remained shut in during the 30-hour 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 bottom-hole gauges were placed into the wells on November 8, 2010, at 11:00 p.m., and the 48-hour injection monitoring period portion of the testing started, and continued until November 10, 2010, at 12:00 p.m. On November 10, 2010, at 12:00 p.m., the Mewbourne Well No. 1 and Chukka Well No. 2 were shut in and the 30-hour buildup portion for Gaines Well no. 3 was started. The buildup portion of the testing ended on November 11, 2010, at 7:00 p.m., and Gaines Well No. 3 was shut in with both of the offset wells remaining shut in for the duration of the 30-hour falloff portion of the testing. The falloff test ended on November 13, 2010, at 7:30 a.m. On November 13, 2010, at 8:35 a.m., five-minute gradient stops were made while pulling out of the wellbore with the pressure gauges. At 1:00 p.m., on November 13, 2010, the well was turned over to Navajo plant operations personnel.

b. Time of the injection period:

The buildup portion of the testing began on November 10, 2010, when the injection rate was set at an average injection rate of 200.0 gallons per minute (gpm). The injection rate was held constant for 31.0 hours. The injection period used in the pressure falloff analysis was 979 hours.

c. Type of injection fluid:

The injected fluid was non-hazardous waste water from the plant. The density averaged 8.3 pounds per gallon during the 30-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 3,765.71 psia and 97.61°F, respectively.

e. Total shut-in time:

The Gaines Well No. 3 was shut in for a total of 35.02 hours.

f. Final static pressure and temperature at the end of the falloff portion of the test:

The final static pressure at 7660 feet was 3,634.62 psia. The final temperature was 101.52 °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. Figure 10 shows the pressure and temperature data recorded by the bottom-hole gauge from the time the tool was in place until it was pulled. Figure 11 is a Cartesian plot of the injection rates, versus time for the injection period, from the time the bottom-hole pressure gauges were placed into the wellbore. The superposition time function was used to account for all rate changes during and since the last stable shut-in period. Figure 12 is a plot of the surface pressures and injection rates versus time for the stabilized injection period 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, and continues to an elapsed shut-in time of 0.016 hours. Radial flow begins at an elapsed shut-in time of 0.725 hours, and continues until 1.163 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 1,130.68, and continues until a Horner time of 705.74, 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 3.69431 psi/cycle (OCD Guideline Section IX.15.c). The measured injection rate prior to shut in was 6,857 bbl/day (200.0 gpm).

An estimate of mobility-thickness (transmissibility, OCD Guideline Section IX.15.d), kh/μ, for the reservoir was determined to be 174,376 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)

$$\frac{kh}{\mu} = 162.6\ \frac{(6857)(1.0)}{(6.39394}$$

$$= 174,376$$

The permeability-thickness (flow capacity, OCD Guideline Section IX.15.i), kh, was determined to be 99,394 md-ft by multiplying the mobility-thickness, kh/μ, by the viscosity of the formation fluid (see Section 6), μ, of 0.57 centipoise:

$$kh = \left(\frac{kh}{\mu} \right) \mu$$

$$= 174,376 \times 0.57$$

$$= 99,394 \text{ md-ft}$$

The reservoir permeability (OCD Guideline Section IX.15.e) using the total thickness (see Section 5 and Section 11) of 175 feet was 568 md:

$$k = \frac{(kh)}{h}$$

$$= \frac{99,394}{175}$$

$$= 568 \text{ md}$$

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:

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

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 268,956,808 gallons of waste has been injected into Chukka Well No. 2 (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 808 feet:

$$r_{waste} = \left(\frac{(0.13368)\ (268{,}956{,}808)}{(\pi)(175)(0.10)} \right)^{1/2}$$

$$= 808 \text{ feet}$$

The time necessary for a pressure transient to traverse this distance is calculated from the following equation:

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

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 0.495 hours:

$$t_{waste} = 948\ \frac{(0.10)(0.54)\left(8.4x10^{-6}\right)(808)^2}{568}$$

$$= 0.495 \text{ hours}$$

Since the time required to pass through the waste is less than the 0.725 hours required to reach the beginning of the radial flow period, the assumption that the pressure transient was traveling through formation 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:

$$s = 1.151 \left[\frac{p_{wf} - p_{1\,hr}}{m_1} - \log \left(\frac{k}{\varphi\, \mu\, c_t\, r_w^2} \right) + 3.23 \right]$$

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 3,765.71 psia. The pressure determined by extrapolating the radial flow semi-log line to a Δt of one hour, p_{1hr}, was 3640.79 psia (calculated from the analysis software). The wellbore radius, r_w, is 0.3246 feet (completion records). Using these values in addition to the previously discussed parameters results in a skin of :

$$s = 1.151\left[\left[\frac{3765.71 - 3640.79}{6.39394}\right] - \log\left(\frac{568}{(0.10)(0.59)\left(8.4\text{x}10^{-6}\right)(0.3246)^2}\right) + 3.23\right]$$

$= 14.64$

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 81.32 psi:

$$\Delta p_{skin} = 0.869\,(m)\,(s)$$
$$= 0.869\,(6.39394)\,(14.64)$$
$$= 81.32 \text{ psi}$$

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

$$E = \frac{3765.71 - 81.32 - 3634.62}{3765.71 - 3634.62}$$
$$= 0.38$$

The radius of investigation (OCD Guideline Section IX.15.a) was calculated using the analysis software and was determined to be 5,910 feet at an elapsed shut in time of 35.02 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

$$R_{inv} = 0.029 \sqrt{\frac{568\,(35.02)}{0.10(0.57)\left(8.4x10^{-6}\right)}}$$
$$= 5{,}910 \text{ ft}$$

As indicated on Figure 14, the pressure data departs the radial flow region at an elapsed time from shutin of 1.163 hours. Another change in slope is seen at an elapsed time from shutin of 8.691 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 can cause the slope changes seen on the derivative log-log plot.

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 November 13, 2010, a static pressure gradient survey was conducted while pulling the pressure gauges out of the well. Static gradient stops were conducted at 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, at 7,660 feet, was measured at 3,634.59 psia and 101.56 °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	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

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".

TABULATION OF WELLS WITHIN TE ONE-MILE AREA OF REVIEW OF THE MEWBOURNE WELL #1, CHUKKA WELL #2, AND GAINES WELL #3

DATE Comp or Plug	ID NO	API	OPERATOR	WELL NAME	OCD UL	SECT	TOWNSHIP	RANGE	NS FTG	EW FTG	TVD DEPTH	PLUG DATE	STATUS	WELL TYPE
		30-015-36281	MACK ENERGY CORPORATION	SUN DEVILS FEDERAL NO. 001	J	1	18S	27E	2193S	1520W	6000		PERMIT	O
8/30/1941	1	30-015-00693	GEORGE A CHASE & C SERVICE	DELHI #001	A	36	17S	27E	330N	330E	528		T/A	O
6/24/1948	2	30-015-00694	DELHI OIL CORP.	STATE #013	A	36	17S	27E	990N	990E	1993	6/24/1948	P&A	O
4/21/1950	3	30-015-00646	GEORGE A CHASE & C SERVICE	DELHI #007	A	36	17S	27E	990N	330E	540		T/A	O
12/6/1947	4	30-015-00668	LEGACY RESERVES OPERATING, LP	SOUTH RED LAKE GRAYBURG UNIT #010	G	36	17S	27E	1650N	2310E	1736		SHUT IN	O
3/6/1949	5	30-015-00690	GEORGE A CHASE & C SERVICE	CONKLIN #002	G	36	17S	27E	1830N	2205E	532		ACTIVE	O
3/23/1949	6	30-015-00667	FAIRWAY RESOURCES OPERATING INC	SOUTH RED LAKE GRAYBURG UNIT #011	G	36	17S	27E	2310N	2310E	1733		ACTIVE	I
1/10/1942	7	30-015-00666	GEORGE A CHASE & C SERVICE	CONKLIN #001	G	36	17S	27E	2310N	2310E	533	9/10/2007	ACTIVE 1/12/18	O
8/4/1950	8	30-015-00689	GEORGE A CHASE JR & C SERVICE	GATES STATE #001	H	36	17S	27E	1650N	330E	557		ACTIVE	O
10/21/2003	9	30-015-00647	ASPEN OIL INC	GATES STATE #002	H	36	17S	27E	1650N	990E	551	10/21/2003	ACTIVE	O
5/6/2008	10	30-015-00669	GEORGE A CHASE JR & C SERVICE	HOMAN #001	H	36	17S	27E	2310N	330E	1804	5/6/2008	P&A	O
10/28/1941	11	30-015-00688	KERSEY & CO	RAMAPO #001	I	36	17S	27E	2310S	330E	590	10/28/1941	P&A	O
1/3/1950	12	30-015-00670	KERSEY & CO	RAMAPO #003	I	36	17S	27E	2970N	330E	1857	1/3/1950	P&A	O
5/7/1948	13	30-015-00687	KERSEY & CO	RAMAPO #002	I	36	17S	27E	2310S	990E	1900	5/7/1948	P&A	G
7/10/1989	14	30-015-00685	ARCO OIL & GAS	EMPIRE ABO UNIT G #020	I	36	17S	27E	1650S	330E	5980	7/10/1989	P&A	O
2/13/1942	15	30-015-00671	ROJO GRANDE COMPANY LLC	RAMAPO #003	J	36	17S	27E	2310S	2310E	591	1/24/2000	ZONE ABAN	O
2/27/1948	16	30-015-01221	MCQUADRANGLE, LC	SOUTH RED LAKE GRAYBURG UNIT #023	J	36	17S	27E	2300S	2300E	1790	8/13/2002	ZONE ABAN	O
4/22/1961	17		MARTIN YATES III	DOOLEY STATE #3	J	36	17S	27E			5865			
2/26/1961	18	30-015-05934	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #019A	J	36	17S	27E	1650S	1650E	5970		ACTIVE	O
2/3/1949	19	30-015-01220	MCQUADRANGLE, LC	SOUTH RED LAKE GRAYBURG UNIT #022	K	36	17S	27E	2310S	2330W	1747	7/17/2002	ZONE ABAN	O
5/15/1947	20	30-015-00674	ROJO GRANDE COMPANY LLC	RAMAPO #002	K	36	17S	27E	2310S	2310W	514		ACTIVE	O
1/20/1948	21	30-015-01219	MCQUADRANGLE, LC	SOUTH RED LAKE GRAYBURG UNIT #021	K	36	17S	27E	2310S	1650W	1710		ACTIVE	I
12/11/1981	22	30-015-23913	MCQUADRANGLE, LC	SOUTH RED LAKE GRAYBURG UNIT #043	K	36	17S	27E	1650S	1650W	1785		ACTIVE	O
4/19/1961	23		MARTIN YATES III	DOOLEY STATE ABO #3	K	36	17S	27E			5865		ACTIVE	O
1/24/2000	24	30-015-00673	ROJO GRANDE COMPANY LLC	RAMAPO #001	K	36	17S	27E	1650S	2310W	510	1/24/2000	ZONE ABAN	O
1/24/2000	25	30-015-00682	ROJO GRANDE COMPANY LLC	RAMAPO #004	N	36	17S	27E	990S	1650W	541	1/24/2000	ZONE ABAN	O
4/16/1948	26	30-015-00683	FAIRWAY RESOURCES OPERATING INC	SOUTH RED LAKE GRAYBURG UNIT #028	N	36	17S	27E	965S	1650W	1812		ACTIVE	I
3/11/2009	27	30-015-01218	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #018	N	36	17S	27E	330S	2310W	5925	3/11/2009	P&A	O
5/13/1947	28	30-015-00684	BURNHAM OIL COMPANY	STATE B-6961 NO. 1-A	O	36	17S	27E	990S	2310E	1500	5/13/1947	P&A	O
9/8/1959	29	30-015-01251	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #019	O	36	17S	27E	660S	1980E	6200	4/27/2009	P&A	O
	30				I	36	17S	27E					MISPLOT OF 11	
4/13/2009	31	30-015-00677	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #020	P	36	17S	27E	330S	990E	6013	4/10/2009	P&A	O
3/7/1953	32	30-015-01616	C F M OIL CO	BLAKE STATE #001	P	30	17S	28E	330S	990E	615		ACTIVE	O
7/15/1952	33	30-015-01638	BEDINGFIELD, MALCO, RESLER	STATE NO. 1	A	31	17S	28E	330N	990E	2004	7/15/1952	P&A	O
11/15/1975	34	30-015-21594	FINNEY OIL COMPANY	POWCO STATE #001	B	31	17S	28E	330N	1650E	652		ACTIVE	O
12/23/1952	35	30-015-01636	BEDINGFIELD, J E	DELHI-STATE NO. 1	C	31	17S	28E	330N	2310E	637	12/23/1952	P&A	O
7/15/1986	36	30-015-25621	FINNEY OIL COMPANY	POWCO STATE #002	B	31	17S	28E	980N	1620E	747		ACTIVE	O
6/23/1942	37	30-015-01633	GEORGE A CHASE JR DBA G AND C SERVICE	ASTON & FAIR A #001	D	31	17S	28E	330N	330W	531		ACTIVE	O
1/5/1946	38	30-015-01634	ASTON & FAIR	STATE 31 NO. 1X	D	31	17S	28E	350N	345W	525		INC COMPL	O
2/16/1950	39	30-015-01645	MCLAUGHLIN, C T	BEDINGFIELD STATE 1 NO. 1	F	31	17S	28E	990N	990W	2307	2/16/1950	P&A	O
5/29/1948	40	30-015-02666	DORAL ENERGY CORP.	HUDSON SAIKIN STATE #001	E	31	17S	28E	2310N	330W	1816		ACTIVE	O
7/7/1984	41	30-015-24887	DORAL ENERGY CORP.	HUDSON SAIKIN STATE #002	E	31	17S	28E	2310N	990W	1950		ACTIVE	O
6/7/1960	42	30-015-01643	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #022	F	31	17S	28E	2310N	2260W	5971	7/10/2009	P&A	O
5/8/1948	43	30-015-01635	GEORGE A CHASE JR DBA G AND C SERVICE	ASTON & FAIR #001Y	F	31	17S	28E	2310N	2310W	1926		ACTIVE	O
10/12/1953	44	30-015-01637	GEORGE A CHASE JR DBA G AND C SERVICE	MALCO STATE #001	G	31	17S	28E	2310N	2310E	1852		ACTIVE	O
8/10/1960	45	30-015-01652	KERSEY & CO	BOLING #001	G	31	17S	28E	2288N	1625E	6025		ACTIVE	O

TABULATION OF WELLS WITHIN TE ONE-MILE AREA OF REVIEW OF THE MEWBOURNE WELL #1, CHUKKA WELL #2, AND GAINES WELL #3

DATE Comp or Plug	ID NO	API	OPERATOR	WELL NAME	OCD UL	SECT	TOWNSHIP	RANGE	NS FTG	EW FTG	TVD DEPTH	PLUG DATE	STATUS	WELL TYPE
9/23/1965	46	30-015-10537	LIME ROCK RESOURCES A, L.P.	NORTHWEST ARTESIA UNIT #004	H	31	17S	28E	2277N	330E	6180		ACTIVE	O
6/17/1966	47	30-015-10833	LIME ROCK RESOURCES A, LP	NORTHWEST ARTESIA UNIT #010	I	31	17S	28E	1980S	660E	1945		ACTIVE	O
4/29/1960	48	30-015-01644	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #024A	I	31	17S	28E	1650S	330E	6106	6/12/2009	P&A	O
12/23/1962	49	30-015-01642	DORAL ENERGY CORP.	STATE FW #001	J	31	17S	28E	1650S	2310E	1937		ACTIVE	O
9/17/2003	50	30-015-01650	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #023A	J	31	17S	28E	1650S	1958E	6094	9/17/2003	P&A	O
4/10/1960	51	30-015-01651	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #022B	K	31	17S	28E	1650S	2387W	6046	10/22/2009	P&A	O
7/16/1955	52	30-015-01640	DORAL ENERGY CORP.	RAMPO #002	L	31	17S	28E	2310S	330W	1996		ACTIVE	O
8/24/2002	53	30-015-01648	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #021A	L	31	17S	28E	1651S	1089E	5971	8/24/2002	ZONE ABAN	O
5/1/1948	54	30-015-01639	DORAL ENERGY CORP.	RAMPO #001	M	31	17S	28E	990S	330W	1975		ACTIVE	O
1/31/1960	55	30-015-01647	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #021	M	31	17S	28E	660S	660W	6006	7/23/2005	P&A	O
1/22/1960	56	30-015-01646	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #022A	N	31	17S	28E	660S	2082W	6050		P&A	O
3/1/1963	57	30-015-10118	DORAL ENERGY CORP.	STATE FV #001	N	31	17S	28E	766S	2188W	1938		ACTIVE	O
1/18/1942	58	30-015-01653	OTIS A ROBERTS	PARKER-STATE NO. 1	O	31	17S	28E	990S	1650E	742	1/18/1942	P&A	O
8/4/1998	59	30-015-27592	NAVAJO REFINING CO. PIPELINE DIVISION	WDW #001		31	17S	28E	660S	2310E	10200		ACTIVE	I
2/24/1960	60	30-015-01649	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #023	O	31	17S	28E	660S	1939E	6094	8/14/2009	P&A	O
5/8/1967	61	30-015-20042	LIME ROCK RESOURCHES A, LP	NORTHWEST ARTESIA UNIT #011	P	31	17S	28E	990S	660E	2012		ACTIVE	O
3/12/1960	62	30-015-01641	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #024	P	31	17S	28E	660S	660E	6122		ACTIVE	O
5/12/1953	63	30-015-01654	BEDINGFIELD, J E	ASTON-STATE NO. 1	D	32	17S	28E	330N	330W	651	5/12/1953	P&A	O
9/13/1960	64	30-015-01671	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #025B	E	32	17S	28E	2280N	978W	6013	8/14/2008	P&A	O
8/24/1960	65	30-015-01657	MARBOB ENERGY CORP	AA STATE NO. 1	F	32	17S	28E	2280N	1980W	6171		ACTIVE	O
11/6/2006	66	30-015-10818	SDX RESOURCES INC	NORTHWEST ARTESIA UNIT #008	K	32	17S	28E	2310S	2105W	2003	11/6/2006	P&A	O
3/27/1960	67	30-015-01661	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #026B	K	32	17S	28E	1650S	2310W	6083		ACTIVE	O
5/15/1966	68	30-015-10795	LIME ROCK RESOURCES A, LP	NORTHWEST ARTESIA UNIT #009	L	32	17S	28E	2310S	660W	1930	5/28/2008	P&A	O
4/13/1960	69	30-015-01662	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #025A	L	32	17S	28E	1650S	990W	6075		ACTIVE	O
5/9/1967	70	30-015-20043	LIME ROCK RESOURCES A, LP	NORTHWEST ARTESIA UNIT #012	M	32	17S	28E	990S	760W	1998		T/A	O
3/5/1960	71	30-015-01660	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #025	M	32	17S	28E	660S	660W	6132	1/14/2009	P&A	O
9/15/2006	72	30-015-10834	SDX RESOURCES INC	NORTHWEST ARTESIA UNIT #013	N	32	17S	28E	990S	2030W	1954	9/15/2006	P&A	O
2/14/1960	73	30-015-01659	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #026A	N	32	17S	28E	660S	1980W	6172		ACTIVE	O
7/25/1975	74	30-015-21539	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #261	N	32	17S	28E	150S	1400W	6220		ACTIVE	O
7/18/1977	75	30-015-22009	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #272	O	32	17S	28E	330S	2481E	6370		ACTIVE	O
7/18/1960	76	30-015-02606	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #026E	C	5	18S	28E	330N	1941W	6254		ACTIVE	O
1/4/1979	77	30-015-22697	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #261A	C	5	18S	28E	1080N	1914W	6350	6/16/2009	P&A	O
3/27/1960	78	30-015-02607	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #025C	D	5	18S	28E	660N	660W	6273		ACTIVE	O
1/12/1979	79	30-015-22750	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #251	D	5	18S	28E	660N	150W	6250		SHUT IN	O
1/13/2006	80	30-015-02608	CONOCOPHILLIPS COMPANY	STATE E AI #001	E	5	18S	28E	1660N	330W	6265	1/13/2006	P&A	O
8/10/1983	81	30-015-24485	CONOCOPHILLIPS COMPANY	ILLINOIS CAMP A COM #001	E	5	18S	28E	1980N	990W	10450		ACTIVE	G
12/30/1959	82	30-015-02602	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #026D	F	5	18S	28E	1650N	1650W	6265		ACTIVE	O
8/12/1983	83	30-015-25522	I & W INC	WALTER SOLT STATE #001	L	5	18S	28E	2240S	400W	8500		ACTIVE	S
3/27/2001	84	30-015-10244	MACK ENERGY CORP	STATE AG #001	L	5	18S	28E	2310S	330W	6365	3/27/2001	ZONE ABAN	O
3/14/1967	87	30-015-20019	LIME ROCK RESOURCES A, LP	NORTHWEST ARTESIA UNIT #016	A	6	18S	28E	330N	330E	3280		ACTIVE	O
2/29/1960	88	30-015-02615	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #024B	A	6	18S	28E	660N	660E	6241		ACTIVE	O
12/21/1959	89	30-015-02625	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #023C	B	6	18S	28E	470N	2170E	6194		T/A	O
11/1/1975	90	30-015-21542	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #231	B	6	18S	28E	1260N	1580E	6250		ACTIVE	O
12/29/1959	91	30-015-02621	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #022E	C	6	18S	28E	660N	1980W	6033		ACTIVE	O
10/22/1975	92	30-015-21626	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #231A	G	6	18S	28E	1361N	2531E	6380		SHUT IN	O
12/30/1959	93	30-015-02613	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #021B	D	6	18S	28E	990N	660W	6119		ACTIVE	O

TABLE II

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DATE Comp or Plug	ID NO	API	OPERATOR	WELL NAME	OCD UL	SECT	TOWNSHIP	RANGE	NS FTG	EW FTG	TVD DEPTH	PLUG DATE	STATUS	WELL TYPE
6/2/1980	94	30-015-23116	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #213	E	6	18S	28E	2050N	100W	6225		ACTIVE	O
10/30/1959	95	30-015-02619	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #021C	E	6	18S	28E	1990N	660W	6202		ACTIVE	O
12/28/1978	96	30-015-22637	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #212	E	6	18S	28E	2450N	400W	6267		ACTIVE	O
2/11/1975	97	30-015-21395	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #211	E	6	18S	28E	2630N	1300W	6200		ACTIVE	O
3/13/1977	98	30-015-22012	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #222	F	6	18S	28E	1350N	1572W	6303		ACTIVE	O
2/21/1942	99	30-015-02626	SARRIN, DAVID C & OLIVER, HENRY E	STATE NO. 1	F	6	18S	28E	1650N	1650W	705	2/21/1942	P&A	O
8/8/1963	100	30-015-10107	DORAL ENERGY CORP	STATE FX #001	F	6	18S	28E	1874N	1874W	1985		ACTIVE	O
11/26/1959	101	30-015-02620	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #022D	F	6	18S	28E	1990N	2082W	6206		ACTIVE	O
5/19/1978	102	30-015-22527	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #223	F	6	18S	28E	2630N	1930W	6250		ACTIVE	O
4/23/1976	103	30-015-21746	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #221	F	6	18S	28E	2610N	2713W	6305		ACTIVE	O
7/8/1979	104	30-015-22913	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #235	G	6	18S	28E	1750N	1600E	6300		ACTIVE	O
8/27/1978	105	30-015-22593	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #234	G	6	18S	28E	1900N	2441E	6260	12/3/2008	P&A	O
1/26/1960	106	30-015-02614	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #023B	G	6	18S	28E	1980N	1980E	6242		ACTIVE	O
4/13/1976	107	30-015-21737	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #232	G	6	18S	28E	2253N	1576E	6345	5/7/2009	P&A	O
	108				H	6	18S	28E					MISPLOT OF 107	
6/5/1978	109	30-015-22490	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #233	G	6	18S	28E	2550N	2050E	6300	4/3/2009	P&A	O
3/24/1960	110	30-015-02616	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #024C	H	6	18S	28E	1650N	990E	6253		ACTIVE	O
4/12/1981	111	30-015-23547	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #241	H	6	18S	28E	1950N	660E	6386	9/19/2008	P&A	O
12/12/2002	112	30-015-02617	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #024K	I	6	18S	28E	2310S	990E	6350	12/12/2002	P&A	O
2/5/1979	113	30-015-22528	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #232A	J	6	18S	28E	2300S	1570E	6350	4/7/2009	P&A	O
8/15/1949	114	30-015-02611	BARNEY COCKBURN	STATE NO. 1	J	6	18S	28E	2310S	2310E	2095	8/15/1949	P&A	O
5/23/1979	115	30-015-02628	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #023D	J	6	18S	28E	2260S	2270E	6310		ACTIVE	O
8/13/1978	116	30-015-22491	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #231B	J	6	18S	28E	1700S	2350E	6350	9/2/2009	P&A	O
3/21/1955	117	30-015-02618	MILLER BROS OIL CO	CAPITOL STATE NO. 1	J	6	18S	28E	1647S	2076E	2396	3/21/1955	P&A	G
2/22/1960	118	30-015-02623	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #022F	K	6	18S	28E	2248S	2075W	6210		ACTIVE	O
	119				K	6	18S	28E					MISPLOT	
	120		NAVAJO REFINING COMPANY	WDW-2 (ORIGINAL LOCATION)	L	6	18S	28E						
1/23/1960	121	30-015-02622	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #021D	L	6	18S	28E	2219S	660W	6194		ACTIVE	O
7/17/1980	122	30-015-23548	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #211A	L	6	18S	28E	1950S	1000W	6312		ACTIVE	O
10/21/1960	123	30-015-02627	RUTH OIL CO, LLC	STATE M-AI #002	M	6	18S	28E	949S	990W	6225		ACTIVE	O
4/16/1992	124	30-015-26943	MEWBOURNE OIL CO	CHALK BLUFF 6 STATE #001	M	6	18S	28E	990S	730W	10200		ACTIVE	G
8/5/1960	125	30-015-02610	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #022C	N	6	18S	28E	955S	1750W	6243		ACTIVE	O
5/1/1961	126	30-015-02624	PAN AMERICAN PETROLEUM CO	STATE CD NO. 1	O	6	18S	28E	968S	2270E	6412	5/1/1961	P&A	O
12/30/1985	127	30-015-25503	DICKSON PETROLEUM CO	KIMBERLY STATE NO. 1	P	6	18S	28E	660S	330E	1750	12/30/1985	P&A	O
5/13/1952	128	30-015-02612	D & H OIL CO	STATE NO. 1	P	6	18S	28E	330S	330E	2246	5/13/1952	P&A	O
11/5/1959	129	30-015-01215	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #020D	A	1	18S	27E	667N	666E	6118		ACTIVE	O
7/7/1959	130	30-015-00708	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #019B	B	1	18S	27E	660N	1980E	6078		ACTIVE	O
5/10/1948	131		MALCO REFINERIES	HILL #4	C	1	18S	27E			1840	5/10/1948	P&A	
	132				C	1	18S	27E					MISPLOT	
7/21/2004	133	30-015-00710	MARBOB ENERGY CORP	AAO FEDERAL No. 013	C	1	18S	27E	660N	1980W	6173		ACTIVE	O
8/24/1991	134	30-015-26741	MEWBOURNE OIL CO	CHALK BLUFF FEDERAL COM #002	F	1	18S	27E	1650N	1350W	10140		ACTIVE	G
5/31/1959	135	30-015-00706	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #018A	F	1	18S	27E	2310N	1980W	6087		ACTIVE	O
8/2/1959	136	30-015-00709	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #019C	G	1	18S	27E	1980N	1980E	6205		ACTIVE	O
	137				G	1	18S	27E					MISPLOT	
9/7/1975	138	30-015-21552	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #191	G	1	18S	27E	2500N	2500E	6259		ACTIVE	O
10/13/1959	139	30-015-00711	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #020C	H	1	18S	27E	1980N	660E	6218		ACTIVE	O

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5/13/1976	140	30-015-21783	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #202	H	1	18S	27E	2490N	1299E	6296		ACTIVE	O
10/10/1978	141	30-015-22656	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #203	H	1	18S	27E	2400N	700E	6225		ACTIVE	O
7/1/1927	142		MANHATTAN OIL	CRONIN #1	H	1	18S	27E			2900	7/1/2027	P&A	
7/19/1975	143	30-015-21553	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #201	H	1	18S	27E	2501N	20E	6225		ACTIVE	O
1/16/1993	144	30-015-27163	MEWBOURNE OIL CO	CHALK BLUFF FEDERAL COM #003	I	1	18S	27E	1980S	990E	10150		ACTIVE	G
1/5/2003	145	30-015-00697	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #020K	I	1	18S	27E	1980S	660E	6185	1/5/2003	P&A	O
10/26/1978	146	30-015-22657	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #193	J	1	18S	27E	2490S	2200E	6225		ACTIVE	O
8/20/1959	147	30-015-00696	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #019Q	J	1	18S	27E	1980S	1980E	6180		ACTIVE	O
6/25/1978	148	30-015-22560	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #192	J	1	18S	27E	220S	1390E	6250		ACTIVE	O
9/23/1976	149	30-015-21873	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #191A	J	1	18S	27E	1526S	1470E	6350		ACTIVE	O
11/14/1978	150	30-015-22658	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #194	J	1	18S	27E	1500S	2130E	6325		ACTIVE	O
7/25/1978	151	30-015-22559	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #184	K	1	18S	27E	2290S	2445W	6200		SHUT IN	O
7/24/1977	152	30-015-22096	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #183	K	1	18S	27E	2370S	1510W	6210		ACTIVE	O
4/17/2003	153	30-015-21554	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #181	K	1	18S	27E	1367S	1440W	6203	4/17/2003	P&A	O
5/22/1959	154	30-015-00707	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #018B	K	1	18S	27E	1980S	1980W	6163		ACTIVE	O
6/1/1976	155	30-015-21792	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #182	K	1	18S	27E	1533S	2370W	6369		ACTIVE	O
9/27/2003	156	30-015-00713	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #018D	N	1	18S	27E	995S	1644W	6174	9/27/2003	P&A	O
3/7/1991	157	30-015-26575	NAVAJO REFINING COMPANY	WDW-3	N	1	18S	27E	790S	2250W	10120		ACTIVE	I
4/9/1971	158	30-015-20394	HUMBLE OIL & REFINING CO	EMPIRE ABO FEDERAL NO. 5	O	1	18S	27E	953S	2197E	6300	4/9/1971	P&A	O
11/8/1959	159	30-015-00698	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #191	O	1	18S	27E	660S	1980E	6365		ACTIVE	S
12/2/1961	160	30-015-00699	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #020B	P	1	18S	27E	940S	330E	6250		ACTIVE	O
9/13/1990	161	30-015-26404	DEVON ENERGY PRODUCTION COMPANY LP	FEDERAL T #001	A	12	18S	27E	660N	990E	10141		ACTIVE	I
9/11/1985	162	30-015-25099	HARLOW ENTERPRISES LLC	COMSTOCK FEDERAL #006	H	12	18S	27E	1809N	990E	1652		ACTIVE	O
2/23/1987	165	30-015-25997	EASTLAND OIL CO	LAUREL STATE #001	C	7	18S	28E	940N	1757W	1690		ACTIVE	O
11/10/1988	166	30-015-25675	EASTLAND OIL CO	LAUREL STATE #002	E	7	18S	28E	940N	1757W	1690		ACTIVE	O
6/10/1985	167	30-015-25236	MOREXCO INC	STATE BY #001	F	7	18S	28E	1980N	1980W	10400		ACTIVE	O
	168	30-015-22636	DYAD PE	PRE-ONGUARD WELL #213	J	7	18S	28E	1950N	1300W			ABAN LOCATIO	O
	169	30-015-22635	DYAD PE	PRE-ONGUARD WELL #212	J	8	18S	28E	1900N	100W			ABAN LOCATIO	O
	170	30-015-24372	DYAD PE	PRE-ONGUARD WELL #001	J	8	18S	28E	1980S	990E			ABAN LOCATIO	O
	171	30-015-27636	PHILLIPS PETROLEUM	CHALK BLUFF 6 STATE #002	H	7	18S	28E	2310N	810E			ABAN LOCATIO	O
3/30/1993	353	30-015-27286	MEWBOURNE OIL CO	CHALK BLUFF 36 STATE #001	M	36	17S	27E	660S	990W	10060		ACTIVE	O
10/11/1983	354	30-015-24612	PRONGHORN MANAGEMENT CORP	STATE M #001	M	36	17S	27E	790S	990W	1451	4/21/2009	P&A	O
	355	30-015-00676	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #017	M	36	17S	27E	330N	990W	5797		ACTIVE	O
	356	30-015-10184	ASPEN OIL INC	STATE #006	M	36	17S	27E	330S	920W	1343		ACTIVE	O
	358	30-015-21623	GEORGE A CHASE JR & C SERVICE	STATE #007	M	36	17S	27E	360S	455W	1366		ACTIVE	O
10/15/1942	359	30-015-00662	ACREY, B L & F D	STATE NO. 2	M	36	17S	27E	330S	330W	592	10/15/1942	P&A	O
3/30/1960	595	30-015-02605	BP AMERICA PRODUCTION UNIT	EMPIRE ABO UNIT NO. 27 E	B	5	18S	28E	930N	2271E	6261	6/12/2009	P&A	O
	748	30-015-00701	FAIRWAY RESOURCES OPERATING LLC	SOUTH RED LAKE GRAYBURG UNIT 37 WIW	D	1	18S	27E	330N	330W	1835		ACTIVE	O
	748	30-015-00715	MCQUADRANGLE, LC	SOUTH RED LAKE GRAYBURG UNIT #037	D	1	18S	27E	330N	330W	1835		ACTIVE	I
1/24/1987	749	30-015-00712	ARCO OIL & GAS	EMPIRE ABO UNIT I NO. 17	D	1	18S	27E	647N	667W	5900	1/24/1987	P&A	O
5/10/1939	750		JONES	BRAINARD	E	1	18S	27E	1650N	330W	481	5/10/1939	P&A	O
3/26/1959	751	30-015-00704	ARCO OIL & GAS	EMPIRE ABO UNIT J NO. 17	E	1	18S	27E	1980N	660W	5960	3/26/1959	P&A	O
5/22/1995	752	30-015-00703	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #017A	L	1	18S	27E	1980S	660W	6091	3/27/2009	P&A	O
5/22/1979	753	30-015-22815	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #171	M	1	18S	27E	670S	330W	6300		ACTIVE	O
	754				M	1	18S	27E					MISPLOT OF 756	
12/20/1943	755	30-015-00714	VALLEY REFINING CO	HILL #1	N	1	18S	27E			2404	12/20/1943	P&A	

TABLE II

TABULATION OF WELLS WITHIN TE ONE-MILE AREA OF REVIEW OF THE MEWBOURNE WELL #1, CHUKKA WELL #2, AND GAINES WELL #3

DATE Comp or Plug	ID NO	API	OPERATOR	WELL NAME	OCD UL	SECT	TOWNSHIP	RANGE	NS FTG	EW FTG	TVD DEPTH	PLUG DATE	STATUS	WELL TYPE
6/25/1959	756	30-015-00705	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #017B	M	1	18S	27E	990S	660W	6150	7/21/2004	P&A	O
1/31/1942	757		BRAINARD & GUY	STATE 2	A	2	18S	27E	330N	610E	530	1/31/1942	NO COMPL	
11/6/1947	758	30-015-00721	FAIRWAY RESOURCES OPERATING LLC	SOUTH RED LAKE GRAYBURG UNIT #036	A	2	18S	27E	330N	990E	1705		SHUT IN	O
	765	30-015-00724	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #016B	A	2	18S	27E	990N	330E	5920		ACTIVE	O
5/23/1948	766	30-015-00737	FAIRWAY RESOURCES OPERATING LLC	SOUTH RED LAKE GRAYBURG UNIT #038	B	2	18S	27E	905N	1601E	1722		ACTIVE	O
3/7/2008	772	30-015-00745	MACK ENERGY CORPORATION	STATE H #001	H	2	18S	27E	1980N	660E	6140	3/7/2008	P&A	O
2/8/1991	773	30-015-00742	S&J OPERATING COMPANY	SOUTH RED LAKE GRAYBURG UNIT 39 WIW	H	2	18S	27E	1650N	990E	1742	2/8/1991	P&A	O
7/10/2002	774	30-015-00740	MCQUADRANGLE, LC	SOUTH RED LAKE GRAYBURG UNIT #040	G	2	18S	27E	1650N	2197E	1707	7/10/2002	P&A	I
1/1/1957	778		RUTTER & WILBANKS	HUDSON #2	G	2	18S	27E	2310N	1650E				O
6/6/1959	779	30-015-00741	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #015B	G	2	18S	27E	2310N	1980E	5880		ACTIVE	O
1/1/1947	781		MALCO REFINING CO	STATE B-2	J	2	18S	27E	2310S	2310E	4164	1/1/1947	P&A	O
2/6/1995	785	30-015-00717	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #016	I	2	18S	27E	1980S	660E	6114		ACTIVE	O
3/23/1959	786	30-015-00716	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #015	J	2	18S	27E	1980S	1830E	6100		ACTIVE	O
5/13/1979	789	30-015-22896	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #143A	K	2	18S	27E	1820S	2550W	6108		ACTIVE	O
9/13/1979	791	30-015-22914	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #161	I	2	18S	27E	1310S	590E	6225		ACTIVE	O
	792				O	2	18S	27E					MISPLOT OF 814	
12/20/1978	793	30-015-22609	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #143	N	2	18S	27E	1200S	1900W	6093		ACTIVE	O
	795				P	2	18S	27E					MISPLOT OF 766	
11/4/1975	796	30-015-21544	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #151	O	2	18S	27E	1110S	1322E	6285		T/A	O
5/1/1979	797	30-015-22885	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #155	O	2	18S	27E	1040S	2025E	6202		T/A	O
1/20/1959	799	30-015-00722	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #016A	P	2	18S	27E	660S	660E	6115	2/24/2009	P&A	O
4/12/1979	800	30-015-22808	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #156	O	2	18S	27E	600S	1330E	6225	2/5/2009	P&A	O
11/19/1958	801	30-015-00731	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #015A	O	2	18S	27E	660S	1980E	6220	2/11/2009	P&A	O
12/4/1978	802	30-015-22669	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #154	O	2	18S	27E	800S	2500E	6200	1/27/2009	P&A	O
4/20/1977	805	30-015-22013	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #153	O	2	18S	27E	90S	1456E	6303	10/30/2008	P&A	O
6/17/1976	806	30-015-21825	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #152	O	2	18S	27E	320S	2602E	6335		T/A	O
	807	30-015-22608	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #142	N	2	18S	27E	100S	1950W	6200		P&A (NO Info on	O
7/1/1976	808	30-015-21807	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #132	M	2	18S	27E	275S	1243W	6200		ACTIVE	O
10/21/1958	812	30-015-00730	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #014	N	2	18S	27E	660S	1980W	6112		ACTIVE	O
10/21/1959	813	30-015-00720	BP AMERICA PRODUCTION COMPANY	RIVERWOLF UNIT #004	A	2	18S	27E	990N	1650E	5881	12/12/2008	P&A	O
5/17/1977	814	30-015-22051	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #141A	K	2	18S	27E	1370S	2445W	6203		ACTIVE	O
10/25/2004	836	30-015-00869	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #016C	A	11	18S	27E	330N	653E	6211	10/25/2004	P&A	O
8/16/2006	837	30-015-22568	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #151B	B	11	18S	27E	400N	1450E	6310	8/16/2006	P&A	O
5/6/1979	838	30-015-22838	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #153B	B	11	18S	27E	200N	1925E	6252	1/4/2009	P&A	O
7/16/2004	839	30-015-00868	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #015C	B	11	18S	27E	660N	1980E	6260	7/16/2004	P&A	O
8/23/1978	840	30-015-22569	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #152B	B	11	18S	27E	560N	2588E	6300	9/24/2008	P&A	O
5/21/1979	841	30-015-22834	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #141B	C	11	18S	27E	225N	2280W	6225		ACTIVE	O
9/5/1957	842	30-015-00864	ARCO OIL & GAS	EMPIRE ABO UNIT M NO. 14	C	11	18S	27E	660N	1980W	6315	9/5/1957	P&A	O
5/23/1979	843	30-015-22833	BP AMERICA PRODUCTION COMPANY	EMPIRE ABO UNIT #133B	D	11	18S	27E	450N	1175W	6225		ACTIVE	O
4/26/1958	844	30-015-00867	ARCO OIL & GAS	EMPIRE ABO UNIT M NO. 13	D	11	18S	27E	660N	660W	6114	4/26/1958	P&A	O
7/10/1978	846	30-015-22556	ARCO OIL & GAS	EMPIRE ABO UNIT M NO. 131	D	11	18S	27E	1100N	1200W	6325	7/10/1978	P&A	O
10/16/1971	848	30-015-20510	AMOCO PRODUCTION CO	MALCO S NO. 1	F	11	18S	27E	1650N	1653W	10168	10/16/1971	P&A	O
2/3/1961	849	30-015-00865	ARCO OIL & GAS	EMPIRE ABO UNIT N NO. 14	F	11	18S	27E	1650N	1980W	6208	2/3/1961	P&A	O
3/27/1958	850	30-015-00866	ARCO OIL & GAS	EMPIRE ABO UNIT N NO. 131	E	11	18S	27E	1980N	660W	6120	3/27/1958	P&A	O
9/1/1956	851	30-015-00870	AMOCO PRODUCTION CO	SMITH-MCPHERSON NO. 1	J	11	18S	27E	1980S	1980E	7270	9/1/1956	P&A	O
	852	30-015-01201	OSCAR HOWARD	AN ETZ #3	N	11	18S	27E			1828	4/15/2027	P&A	

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DATE Comp or Plug	ID NO	API	OPERATOR	WELL NAME	OCD UL	SECT	TOWNSHIP	RANGE	NS FTG	EW FTG	TVD DEPTH	PLUG DATE	STATUS	WELL TYPE
	853	30-015-01202	OSCAR HOWARD	AN ETZ #2	O	11	18S	27E			1827	2/4/2027	P&A	
10/14/1949	854	30.015-00863	B.R. POLK, JR.	VICKERS #1	N	11	18S	27E			1794	10/14/1949	P&A	
5/18/1984	855	30-015-24857	CHESAPEAKE OPERATING INC	FEDERAL DH GAS COM #001	M	11	18S	27E	700S	990W	11915		ACTIVE	G
8/7/1973	856	30-015-20535	ROBERT G COX	FEDERAL EA 2	D	12	18S	27E	330N	455W	6248	8/7/1973	P&A	O
4/12/1994	857	30-015-00871	RHONDA OPERATING CO	FEDERAL EA #001	D	12	18S	27E	330N	330W	6253	4/12/1994	P&A	O
3/16/1980	858	30-015-23115	RHONDA OPERATING CO	FEDERAL EA NO. 3	D	12	18S	27E	330N	380W	6295	3/16/1980	D&A	O
4/25/1987	859	30-015-25738	HARLOW ENTERPRISES LLC	COMSTOCK FEDERAL #009	G	12	18S	27E	2310N	2310E	1586		ACTIVE	O
4/23/1985	860	30-015-25270	BILL MILLER	CHUKKA FEDERAL #001	F	12	18S	27E	2310N	2310W	1600		ACTIVE	O
7/18/1973	861	30-015-20894	NAVAJO REFINING COMPANY	WDW #002	E	12	18S	27E	1980N	660W	10372		ACTIVE	I
6/29/1948	862	30-015-00874	HARLOW ENTERPRISES LLC	COMSTOCK FEDERAL #007	J	12	18S	27E	2310S	2355E	3664		ACTIVE	O
	863	30-015-00872	MCKEE-JONES	MAGRUDER NO. 1	L	12	18S	27E	310S	990W	594	2/18/1943	D&A	O
3/16/1985	864	30-015-25201	HARLOW ENTERPRISES LLC	COMSTOCK FEDERAL #002	K	12	18S	27E	1650S	1770W	1600		ACTIVE	O
	865	30-015-25649	FRED POOL DRILLING CO	COMSTOCK FEDERAL NO. 8	L	12	18S	27E	1650S	990W	2000	10/10/1986	D&A	O
5/19/1986	866	30-015-25545	HARLOW ENTERPRISES LLC	COMSTOCK FEDERAL #003	M	12	18S	27E	990S	990W	1530		ACTIVE	O
2/27/1945	867	30.015-00873	R.E. McKEE ET AL	MAGRUDER #2	M	12	18S	27E			2510	2/27/1945	P&A	
1/23/2003	868	30-015-26017	EASTLAND OIL CO	COMSTOCK FEDERAL #010	N	12	18S	27E	990S	1650W	2040	1/23/2003	P&A	O
12/10/1984	869	30-015-25100	HARLOW ENTERPRISES LLC	COMSTOCK FEDERAL #001	N	12	18S	27E	330S	1650W	2400		ACTIVE	O
4/19/1985	870	30-015-25202	HARLOW ENTERPRISES LLC	COMSTOCK FEDERAL #005	O	12	18S	27E	330S	2310E	1625		ACTIVE	O
	871	30-015-06171	PILCHER OIL & GAS	MICHAEL CRONIN NO. 3	I	12	18S	27E	1069S	251E	2200	5/20/2026	P&A	O
2/15/1932	872		PILCHER OIL & GAS	MICHAEL CRONIN #1	P	12	18S	27E			2002	2/15/1932	P&A	
7/30/1952	873	30-015-00875	CITIES SERVICE OIL CO	MAGRUDER NO. B-4	P	12	18S	27E	330S	330E	2000	7/30/1952	P&A	O
2/8/1954	874	30-015-00876	ROBERT E MCKEE	MAGRUDER NO. 5	P	12	18S	27E	100S	500E	1994	2/8/1954	P&A	O
	875	30-015-06170	PILCHER OIL & GAS	MICHAEL CRONIN NO. 2	P	12	18S	27E	200S	200E	2004	2/22/2026	P&A	O
	876	30-015-01200	HASSENFUSH-DONNELLY	STATE NO. 1	A	13	18S	27E	0	0	2030	1/1/2026	P&A	O
	877	30-015-06137	EASTLAND OIL CO	STATE NO. 2	A	13	18S	27E	250N	990E	2696	1/1/2026	D&A	O
9/28/1985	878	30-015-25394	BILL MILLER	ARTESIA STATE #002	C	13	18S	27E	330N	2310W	1613		ACTIVE	O
4/13/1985	879	30-015-25241	BILL MILLER	ARTESIA STATE #001	C	13	18S	27E	330N	1650W	1575		ACTIVE	O
1/29/1945	880	30-015-00884	DALE RESLER	STATE NO. 3	C	13	18S	27E	990N	1650W	2047	1/29/1945	P&A	O
8/27/1985	881	30-015-25370	CBS OPERATING CORP	ARTESIA STATE UNIT #002A	D	13	18S	27E	480N	940W	1608		ACTIVE	O
12/11/1944	882	30-015-00883	CBS OPERATING CORP	ARTESIA STATE UNIT #001	D	13	18S	27E	990N	990W	1950		ACTIVE	O
1/26/1945	883	30-015-00880	DALE RESLER - JONES	STATE NO. 1	E	13	18S	27E	1650N	990W	2353	1/26/1945	P&A	O
6/18/1984	884	30-015-24881	DAVID G HAMMOND	ANADARKO 13 FEDERAL #001	F	13	18S	27E	1880N	1830W	3020		ACTIVE	O
11/28/1954	885	30-015-00888	RALPH NIX & JERRY CURTIS	PAGE NO. 1	F	13	18S	27E	1980N	1650W	2000	11/28/1954	P&A	O
3/14/1945	886	30-015-00879	DALE RESLER	JONES-GOVT NO. 1	F	13	18S	27E	2310N	1650W	2000	3/14/1945	D&A	O
12/30/1984	888	30-015-25078	DICKSON PETROLEUM, INC	ANADARKO 13 FEDERAL NO. 1	G	13	18S	27E	1724N	2279E	2150	12/30/1984	D&A	O
6/30/1944	895	30-015-00891	ANADARKO PETROLEUM CORP	ARTESIA STATE UNIT TRACT 4 NO. 1	A	14	18S	27E	990N	330E	2060	6/30/1944	P&A	O
1/2/1900	896	30-015-00893	RESLER	STATE NO. 1	G	14	18S	27E	1650N	1650E	2375	1/2/1900	D&A	O
2/8/1945	897	30-015-00895	CBS OPERATING CORP	ARTESIA STATE UNIT #001B	H	14	18S	27E	1650N	330E	1888		ACTIVE	O
6/18/1948	901	30-015-00695	WILLIAM & EDWARD HUDSON	HILL NO. 1	L	1	18S	27E	1650S	330W	1763	6/18/1948	D&A	O
	910	30-015-00744	COMPTON-SMITH	STATE 1	J	2	18S	27E	2310S	1640E	1080		P&A	O
	911	30-015-31123	LIME ROCK RESOURCES A, LP	NO BLUFF 36 STATE COM #002	H	36	17S	27E	1980N	760E	10050		ACTIVE	G
	912	30-015-31036	GEORGE A CHASE JR & C SERVICE	GATES STATE #003	H	36	17S	27E	2310N	990E	614		ACTIVE	O
12/21/2001	916	30-015-31592	ROJO GRANDE COMPANY LLC	RAMAPO #007	N	36	17S	27E	330S	2310E	612	12/21/2001	P&A	O
	917	30-015-30784	LIME ROCK RESOURCES A, LP	NW STATE #012	A	31	17S	28E	330N	480E	3300		ACTIVE	O
	918	30-015-30893	LIME ROCK RESOURCES A, LP	NW STATE #028	A	31	17S	28E	973N	959E	2808		ACTIVE	O
4/3/2003	919	30-015-32162	LIME ROCK RESOURCES A, LP	ENRON STATE #004	D	31	17S	28E	460N	990W	3460		ACTIVE	O

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DATE Comp or Plug	ID NO	API	OPERATOR	WELL NAME	OCD UL	SECT	TOWNSHIP	RANGE	NS FTG	EW FTG	TVD DEPTH	PLUG DATE	STATUS	WELL TYPE
	920	30-015-30783	LIME ROCK RESOURCES A, LP	NW STATE #011	H	31	17S	28E	1650N	330E	3205		ACTIVE	O
	921	30-015-30849	LIME ROCK RESOURCES A, LP	NW STATE #009	I	31	17S	28E	2310S	270E	3195		ACTIVE	O
	922	30-015-30760	LIME ROCK RESOURCES A, LP	NW STATE #010	P	31	17S	28E	735S	330E	3210		ACTIVE	O
	923	30-015-31920	LIME ROCK RESOURCES A, LP	ENRON STATE #002	D	32	17S	28E	990N	990W	4030		ACTIVE	O
	924	30-015-30781	LIME ROCK RESOURCES A, LP	NW STATE #005	K	32	17S	28E	1900S	2146W	3190		ACTIVE	I
	925	30-015-30777	LIME ROCK RESOURCES A, LP	NW STATE #006	L	32	17S	28E	2310S	990W	3204		ACTIVE	O
	926	30-015-30685	LIME ROCK RESOURCES A, LP	NW STATE #007	M	32	17S	28E	990S	990W	3220		ACTIVE	O
	927	30-015-30815	LIME ROCK RESOURCES A, LP	NW STATE #008	N	32	17S	28E	1090S	2126W	3310		ACTIVE	I
5/4/2004	928	30-015-32310	MARBOB ENERGY CORP	AAO FEDERAL #004	A	1	18S	27E	990N	990E	4000		ACTIVE	O
4/10/2003	929	30-015-32309	MARBOB ENERGY CORP	AAO FEDERAL #003	B	1	18S	27E	330N	1690E	4125		ACTIVE	O
9/19/2002	930	30-015-32308	MARBOB ENERGY CORP	AAO FEDERAL #002	C	1	18S	27E	430N	2310W	4150		ACTIVE	O
12/10/2002	931	30-015-32307	MARBOB ENERGY CORP	AAO FEDERAL #001	D	1	18S	27E	330N	990W	3851		ACTIVE	O
6/28/1980	932	30-015-22816	ARCO OIL & GAS	EMPIRE ABO UNIT L #192	O	1	18S	27E	1120S	1440E	6350	6/23/1980	ABAN LOCATIO	O
	933	30-015-20388	ARCO OIL & GAS	EMPIRE ABO #5	N	1	18S	27E	990S	2297E	6300	12/31/9999	SAME AS 159	O
	934	30-015-27719	MEWBOURNE OIL CO	CHALK BLUFF 12 FED #001		12	18S	27E	1650S	990E			ABAN LOCATIO	G
	935	30-015-27437	YATES PETROLEUM CORPORATION	BEAUREGARD ANP STATE COM #001	B	14	18S	27E	660N	1980E	0		ABAN LOCATIO	G
3/11/2008	936	30-015-31086	MARBOB ENERGY CORP	LP STATE #001	E	5	18S	28E	1650N	990W	4503	3/11/2008	P&A	O
	937	30-015-31109	MARBOB ENERGY CORP	LP STATE #002	E	5	18S	28E	2301N	230W	0		PROPOS ED	O
	938	30-015-30785	LIME ROCK RESOURCES A, LP	NW STATE #015	A	6	18S	28E	430N	330E	3225		ACTIVE	O
5/23/1979	939	30-015-00264	BARNEY COCKBURN	CAPITAL STATE NO. 1	J	6	18S	28E	2310S	2310E	2095		SAME AS 111	O
7/15/2000	940	30-015-31087	MARBOB ENERGY CORP	LP STATE #003	M	6	18S	28E	990S	330W	4466	3/17/2008	P&A	O
	941	30-015-31088	MARBOB ENERGY CORP	LP STATE #004	M	6	18S	28E	330S	990W	0		PROPOS ED	O
	942	30-015-06250	BP AMERICA PRODUCTION COMPANY		O	6	18S	28E	470S	2170E	0		SAME AS 90	O
1/31/2001	943	30-015-31319	EASTLAND OIL CO	LAUREL STATE #003	E	7	18S	28E	2310N	330W	1630		ACTIVE	O
	944	30-015-26575	NAVAJO REFINING COMPANY	WDW-3 (ORIGINAL LOC.)	D	6	18S	28E	778N	995W			ACTIVE	I
10/12/2004	945	30-015-32959	MARBOB ENERGY CORP	AAO FEDERAL #005	E	1	18S	27E	1650N	875W	3900		ACTIVE	O
4/4/2005	946	30-015-33473	MARBOB ENERGY CORP	AAO FEDERAL #007	G	1	18S	27E	1750N	1650S	4100		ACTIVE	O
2/25/2005	947	30-015-33784	MARBOB ENERGY CORP	AAO FEDERAL #008	H	1	18S	27E	1650N	330W	4310		ACTIVE	O
8/5/2005	948	30-015-34071	MARBOB ENERGY CORP	AAO FEDERAL #006	F	1	18S	27E	2169N	1963W	4000		ACTIVE	O
1/17/2006	949	30-015-34387	MARBOB ENERGY CORP	AAO FEDERAL #009	L	1	18S	27E	1980S	630W	3950		ACTIVE	O
3/9/2006	950	30-015-34555	MARBOB ENERGY CORP	AAO FEDERAL #011	M	1	18S	27E	890S	660W	4100		ACTIVE	O
10/26/2006	951	30-015-34576	MARBOB ENERGY CORP	AAO FEDERAL #010	K	1	18S	27E	2060S	2160W	4000		ACTIVE	O
9/21/2006	952	30-015-34998	MARBOB ENERGY CORP	AAO FEDERAL #012	N	1	18S	27E	890S	1650W	4075		ACTIVE	O
12/17/2006	953	30-015-34028	BP AMERICA PRODUCTION COMPANY	SLIDER 6 STATE NO. 001	G	6	18S	28E	2285N	1366E	10433	12/17/2006	P&A	O
12/21/2006	954	30-015-35050	LIME ROCK RESOURCES A, LP	ENRON STATE NO 012	D	32	17S	28E	330N	500W	3810		ACTIVE	O
2/20/2009	955	30-015-36939	YATES PETROLEUM CORP	VIOLET BIV STATE COM #1	A	14	18S	27E	660N	990E	10500		EXT PERMIT	O
4/20/2005	956	30-015-33994	EDGE PETROLEUM OPERATING COMPANY, INC	RED LAKE 36 A STATE #2	A	36	17S	27E	915N	420E	3650		ACTIVE	O
6/6/2008	957	30-015-36116	LEGACY RESERVES OPERATING LP	SOUTH RED LAKE UNIT II #57	G	36	17S	27E	2305N	1650E	2100		ACTIVE	O
4/26/2005	958	30-015-32946	MARBOB ENERGY CORPORATION	SCBP STATE #1	J	2	18S	27E	2210S	1650E	3880		ACTIVE	O
1/11/2008	959	30-015-35814	MACK ENERGY CORPORATION	STATE H NO 2	H	2	18S	27E	2063N	441E	7545		ACTIVE	O
7/9/2008	960	30-015-36343	GEORGE A CHASE JR DBA G AND C SERVICE	MALCO STATE NO. 002	G	31	17S	28E	1650N	2310E	633		ACTIVE	O
7/3/2009	961	30-015-36978	LIME ROCK RESOURCES A, LP	ENRON STATE NO. 015	D	31	17S	28E	990N	330W	3700		ACTIVE	O
1/30/2009	962	30-015-36554	LIME ROCK RESOURCES A, LP	NW STATE NO. 029	L	32	17S	28E	1770S	550W	3450		ACTIVE	O
7/14/2009	963	30-015-36989	LIME ROCK RESOURCES A, LP	NW STATE NO. 030	K	32	17S	28E	1630S	1710W	3405		INCOMPL ETE	O
7/28/2009	964	30-015-37057	LIME ROCK RESOURCES A, LP	NW STATE NO. 031	N	32	17S	28E	330S	1750W	3500		INCOMPL ETE	O
8/23/2009	965	30-015-37058	LIME ROCK RESOURCES A, LP	NW STATE NO. 032	M	32	17S	28E	330S	330W	3425		INCOMPL ETE	O

TABLE II

TABULATION OF WELLS WITHIN TE ONE-MILE AREA OF REVIEW OF THE MEWBOURNE WELL #1, CHUKKA WELL #2, AND GAINES WELL #3

DATE Comp.or Plug	ID NO	API	OPERATOR	WELL NAME	OCD UL	SECT	TOWNSHIP	RANGE	NS FTG	EW FTG	TVD DEPTH	PLUG DATE	STATUS	WELL TYPE
2/10/2010	966	30-015-37428	G&C SERVICE	MALCO STATE NO. 3	G	31	17S	28E	1980N	1980E	650		ACTIVE	O
	967	30-015-38203	COG OPERATING LLC	MAPLE STATE 008	N	30	17S	28E	330S	990W	4750		PERMIT TO DRILL	O

TABLE III

Well Changes in the Combined One Mile Area of Review Since the 2009 Annual Report for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
4	30 015 00668	G	36	17S	27E	1650 FNL & 2310 FEL	South Red Lake II Unit #10	Legacy Reserves Operating, LP	Change of Owner: McQuadrangle LC to Fairway Resources Operating LLC to Legacy Reserves Operating, LP
27	30 015 01218	N	36	17S	27E	330 FSL & 2310 FWL	Empire Abo Unit No. 18	BP America Production Company	P&A Well: No P&A Info; 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
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'
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.
51	30 015 01651	K	31	17S	28E	1650 FSL & 2387 FWL	Empire Abo Unit No. 022B	BP America Production Company	P&A Well: Proposal to P&A as of 9/18/2009; Extended P&A Deadline for 30 days Spot 25 sks cmt at 5310'; Cir 9.5 ppg Mud 35-40 vis; Spot cmt 3485'-3125' 25 sks; TOC at 1500'; Perf 1345' and Cir Cmt to Surface 365 sks.
56	30 015 01646	N	31	17S	28E	660 FSL & 2082 FEL	Empire ABO Unit No. 22A	BP America Production Company	P&A Well: No Info Submitted Pit Closing Documents Only after P&A
65	30 015 01657	F	32	17S	28E	2280 FNL & 1980 FWL	AA State No. 001	Marbob Energy Corp.	Recomp: BP America Production Company to Marbob Energy Corp 2009.; 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').
70	30 015 20043	M	32	17S	28E	990 FSL & 760 FWL	Northwest Artesia Unit No. 012	Lime Rock Resources A, LP	T&A Well: Well request for 1yr for T&A extension, Change of Owner in 2008 SDX Resources Inc. to Lime Rock Resources A, LP
81	30 015 24485	E	05	18S	28E	1980 FNL & 990 FWL	Illinois Camp A Com No. 001	Conoco Phillips Company	
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'.
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 to Legacy Reserves Operating LP
797	30 015 22885	O	02	18S	27E	1040 FSL & 2025 FEL	Empire Abo Unit "L"	BP America Production Company	T&A Well: Extend to 9/18/2011 TD 6202' Perf 6065' - 6074'
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'.
806	30 015 21825	O	02	18S	27E	2602 FEL & 320 FSL	Empire Abo Unit "L"	BP America Production Company	T&A Well: 2 year T&A extension to 9/15/2011
807	30 015 22608	N	02	18S	27E	100 FSL & 1950 FWL	Empire Abo Unit No. 142	BP America Production Company	P&A Well: No Info on File with New perfs in the Abo: 5927'-5930', 5938'-5956', 6123', 6130'-6140'.
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 5/5/10
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.
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
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

TABLE III

Well Changes in the Combined One Mile Area of Review Since the 2009 Annual Report for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes
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
957	30 015 36116	G	36	17S	27E	2305 FNL & 1650 FEL	South Red Lake II Unit No 57	Legacy Reserves Operating, LP	Change of Owner: Fairway Resources Operating, LLC to Legacy Reserves Operating, LP; TD 2081' Well completed in the Queen, Grayburg, San Andres from 1535' to 1805', 32 perforations
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; Perforated at 3285'-3524' with 74 holes; TD 3683'
962	30 015 36554	L	32	17S	28E	1770 FSL & 550 FWL	NW State No. 029	Lime Rock Resources A, LP	Recomp: 3450'. Well completed in the San Andres from 2453'-2719', 54 perforations and 2788'-3102', 63 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: TD at 3489'. Completed in the San Andres 2546'-2934', 72 perforations.

TABLE IV
Wells that have been Plugged and Abandoned since the 2009 Annual Report
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	P&A Well: No P&A Info; 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
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'
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.
51	30 015 01651	K	31	17S	28E	1650 FSL & 2387 FWL	Empire Abo Unit No. 022B	BP America Production Company	P&A Well: Proposal to P&A as of 9/18/2009; Extended P&A Deadline for 30 days Spot 25 sks cmt at 5310'; Cir 9.5 ppg Mud 35-40 vis; Spot cmt 3485'-3125' 25 sks; TOC at 1500'; Perf 1345' and Cir Cmt to Surface 365 sks.
56	30 015 01646	N	31	17S	28E	660 FSL & 2082 FEL	Empire ABO Unit No. 22A	BP America Production Company	P&A Well: No Info Submitted Pit Closing Documents Only after P&A
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'.
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'.
807	30 015 22608	N	02	18S	27E	100 FSL & 1950 FWL	Empire Abo Unit No. 142	BP America Production Company	P&A Well: No Info on File with New perfs in the Abo: 5927'-5930', 5938'-5956', 6123', 6130'-6140'.
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.

TABLE V
Wells that have been Temporally Abandoned since the 2009 Annual Report
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
70	30 015 20043	M	32	17S	28E	990 FSL & 760 FWL	Northwest Artesia Unit No. 012	Lime Rock Resources A, LP	T&A Well: Well request for 1yr for T&A extension, Change of Owner in 2008 SDX Resources Inc. to Lime Rock Resources A, LP
797	30 015 22885	O	02	18S	27E	1040 FSL & 2025 FEL	Empire Abo Unit "L"	BP America Production Company	T&A Well: Extend to 9/18/2011 TD 6202' Perf 6065' - 6074'
806	30 015 21825	O	02	18S	27E	2602 FEL & 320 FSL	Empire Abo Unit "L"	BP America Production Company	T&A Well: 2 year T&A extension to 9/15/2011

TABLE VI
Wells that have been put back into Production Since the 2009 Annual Report
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
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 5/5/10

TABLE VII
Wells that have been Recompleted in Upper Zones since the 2009 Annual Report
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
65	30 015 01657	F	32	17S	28E	2280 FNL & 1980 FWL	AA State No. 001	Marbob Energy Corp.	Recomp: BP America Production Company to Marbob Energy Corp 2009.; 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').
957	30 015 36116	G	36	17S	27E	2305 FNL & 1650 FEL	South Red Lake II Unit No 57	Legacy Reserves Operating, LP	Change of Owner: Fairway Resources Operating, LLC to Legacy Reserves Operating, LP; TD 2081' Well completed in the Queen, Grayburg, San Andres from 1535' to 1805', 32 perforations
962	30 015 36554	L	32	17S	28E	1770 FSL & 550 FWL	NW State No. 029	Lime Rock Resources A, LP	Recomp: 3450'. Well completed in the San Andres from 2453'-2719', 54 perforations and 2788'-3102', 63 perforations.

TABLE VIII

Newly Drilled Wells in the Area of Review since the 2009 Annual Report
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
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; Perforated at 3285'-3524' with 74 holes; TD 3683'
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: TD at 3489'. Completed in the San Andres 2546'-2934', 72 perforations.
965	30 015 37058	M	32	17S	28E	330 FSL & 330 FWL	NW State No. 032	Lime Rock Resources A, LP	NEW: TD at 3408'. Completed in the San Andres 2572'-2741', 72 perforations.
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
	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/u)	Skin (s)	False Extrapolated Pressure (p*)	Fill Depth
November 10 - 13, 2010	568 md	174,376 md-ft/cp	14.64	3622.16 psia	8,986 feet
August 27 – 30, 2009	719 md	233,008 md-ft/cp	54.07	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	N/A	N/A	N/A

TABLE XI

NAVAJO REFINING COMPANY
STATIC PRESSURE GRADIENT SURVEY – GAINES WELL #3
NOVEMBER 13, 2010

Depth (ft)	Pressure (psia)	Pressure Gradient (psi/ft)	Temperature (°F)
7660	3634.59		101.56
		0.4362	
7000	3346.70		109.34
		0.4348	
6000	2911.90		104.30
		0.4339	
5000	2477.96		99.54
		0.4346	
4000	2043.37		95.08
		0.4338	
3000	1609.55		91.35
		0.4344	
2000	1175.19		87.23
		0.4340	
1000	741.17		83.22
		0.4406	
0	300.57		52.21

FIGURES

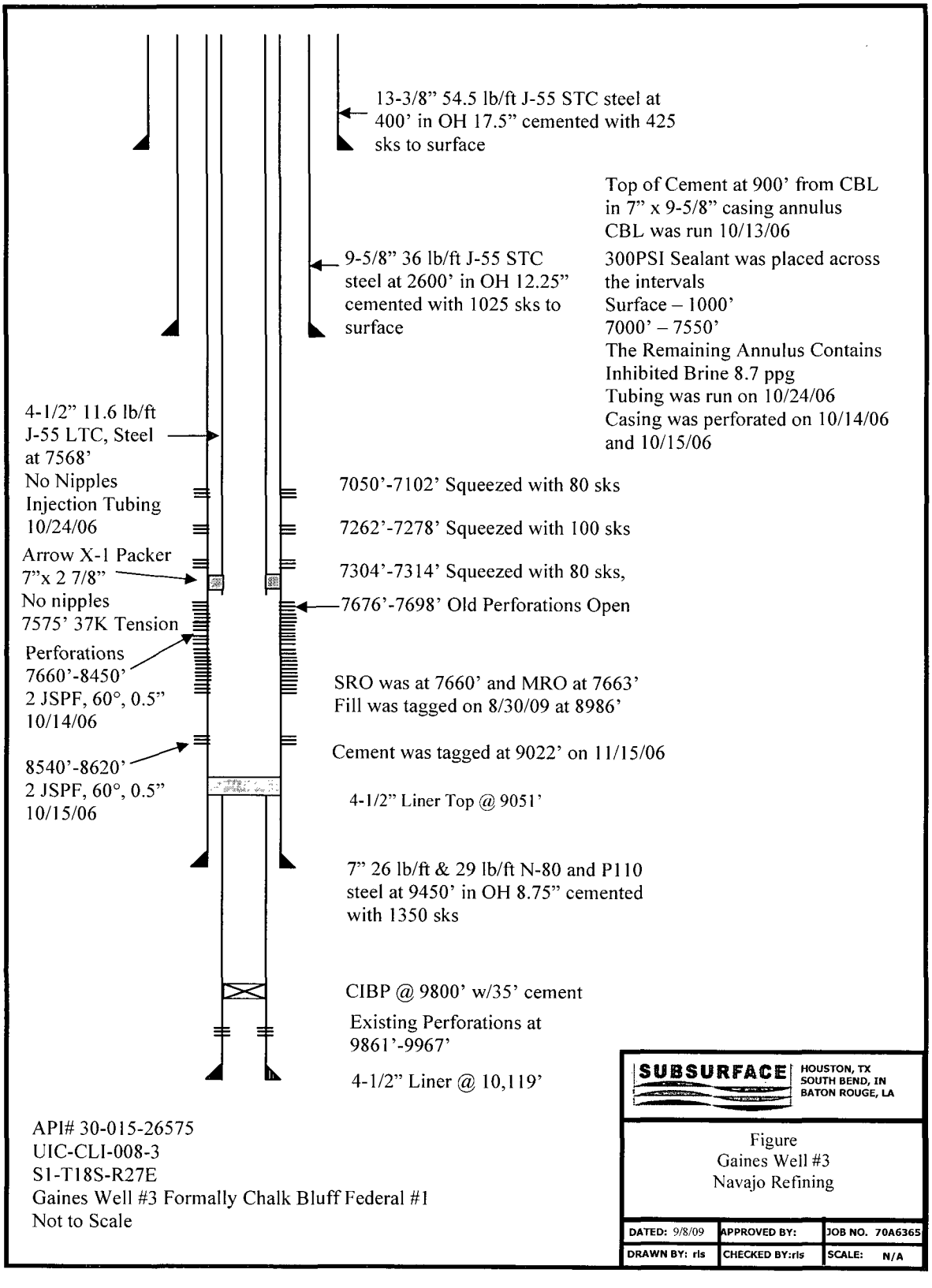

13-3/8" 54.5 lb/ft J-55 STC steel at 400' in OH 17.5" cemented with 425 sks to surface
Top of Cement at 900' from CBL in 7" x 9-5/8" casing annulus CBL was run 10/13/06
9-5/8" 36 lb/ft J-55 STC steel at 2600' in OH 12.25" cemented with 1025 sks to surface
300PSI Sealant was placed across the intervals
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"
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

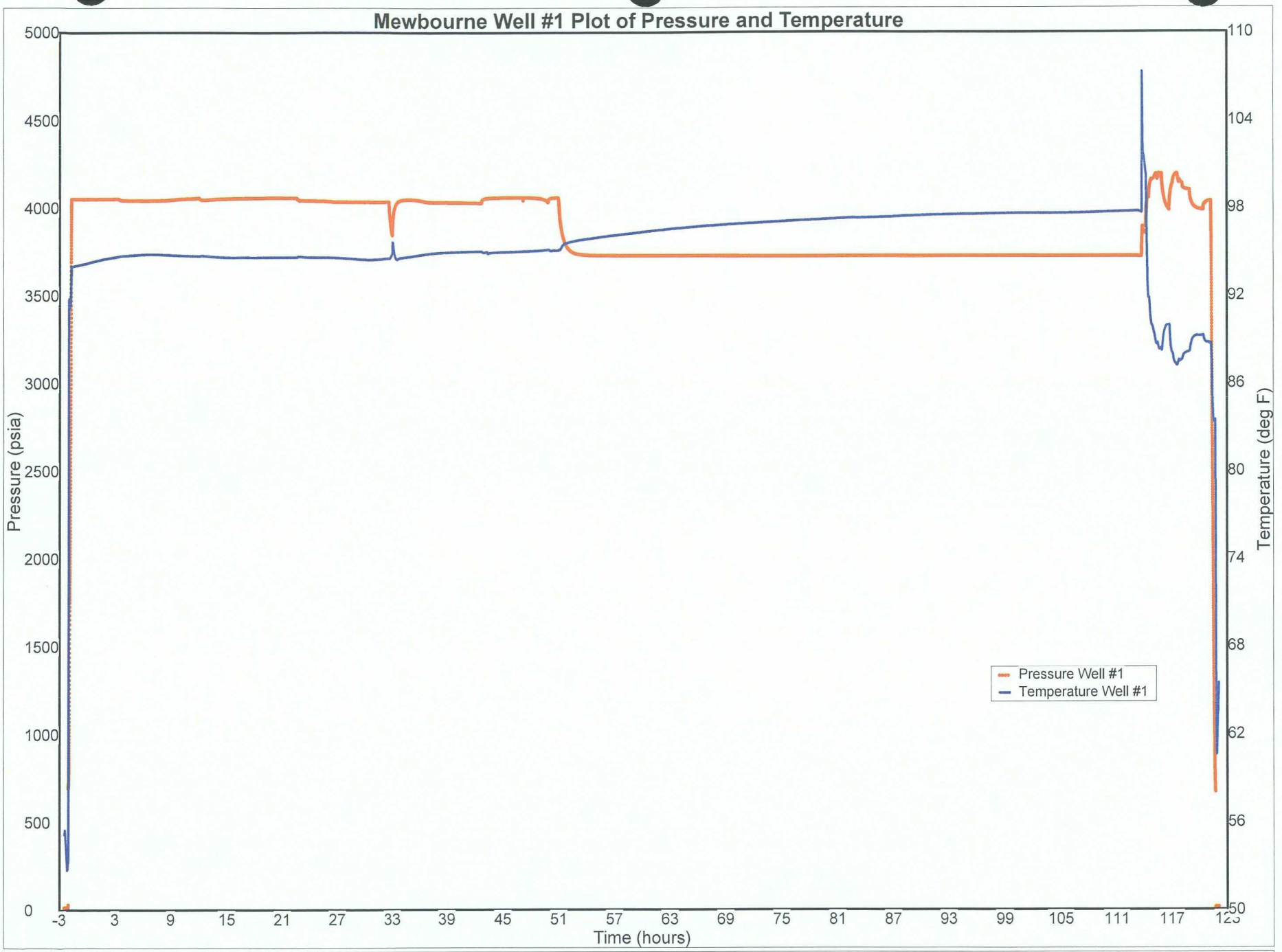
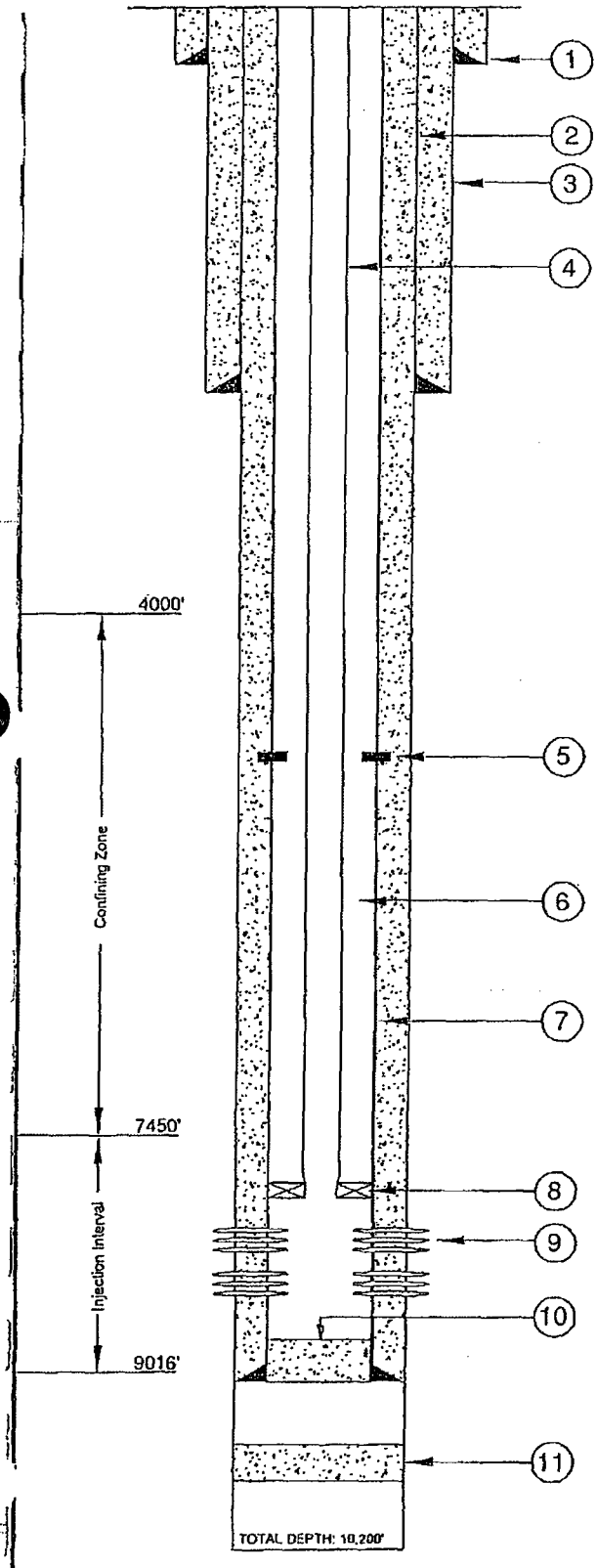

Mewbourne Well #1 Plot of Pressure and Temperature
Pressure (psia)
Temperature (deg F)
Time (hours)
Pressure Well #1
Temperature Well #1
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
110
104
98
92
86
80
74
68
62
56
50
-3
3
9
15
21
27
33
39
45
51
57
63
69
75
81
87
93
99
105
111
117

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

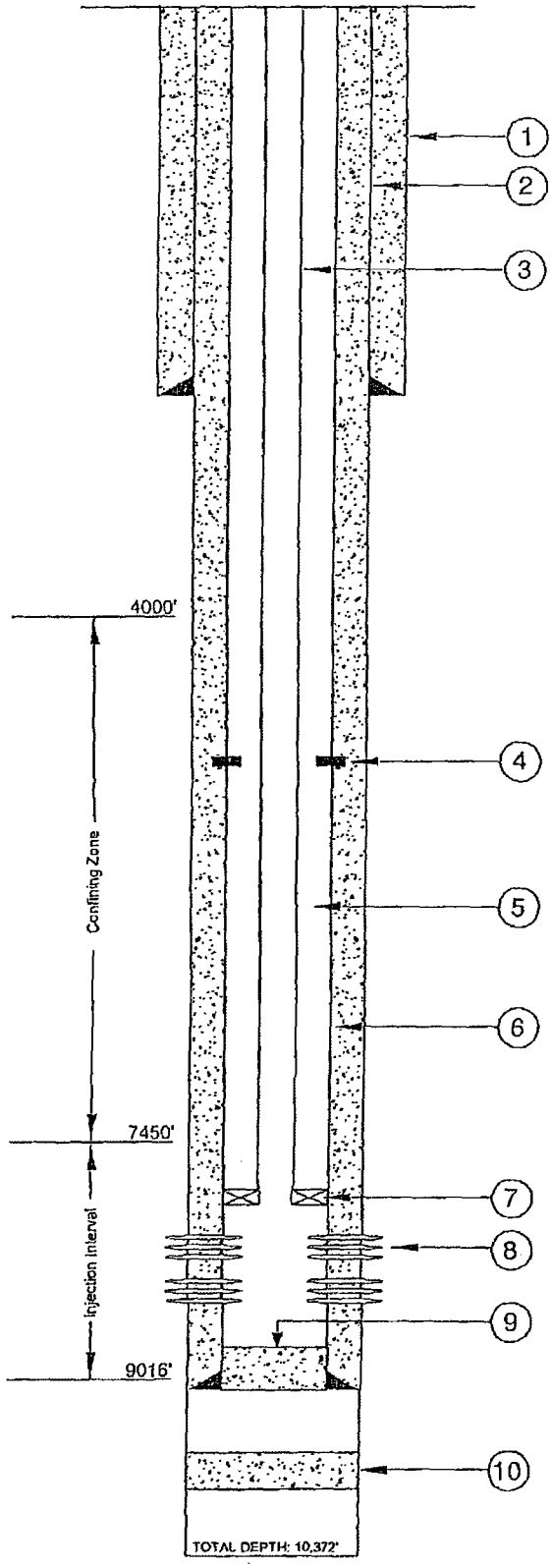
HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

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 Technl-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: 70D5256
DRAWN BY: WDL	APPROVED BY:	DWG. NO:

FIGURE 4

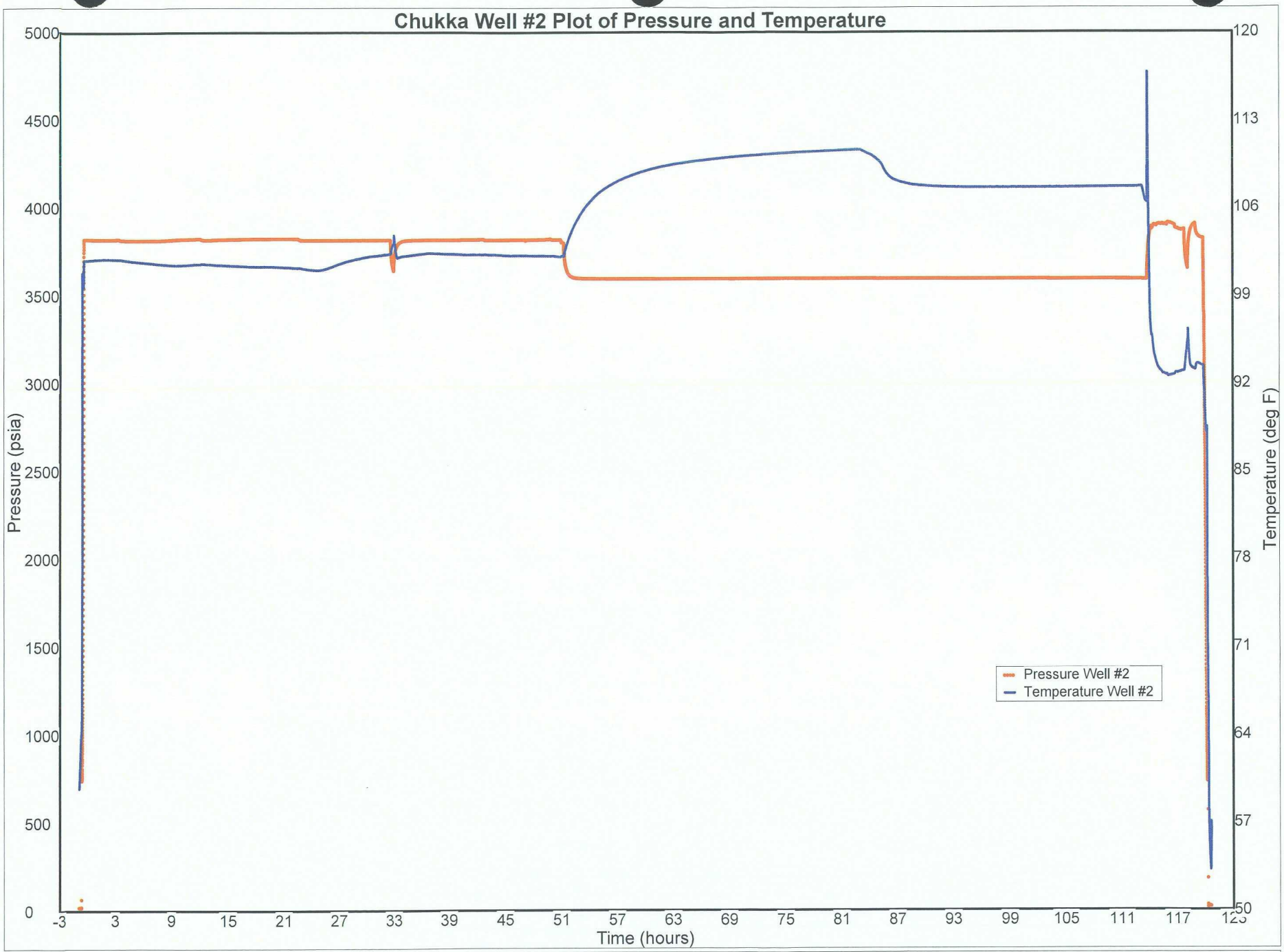
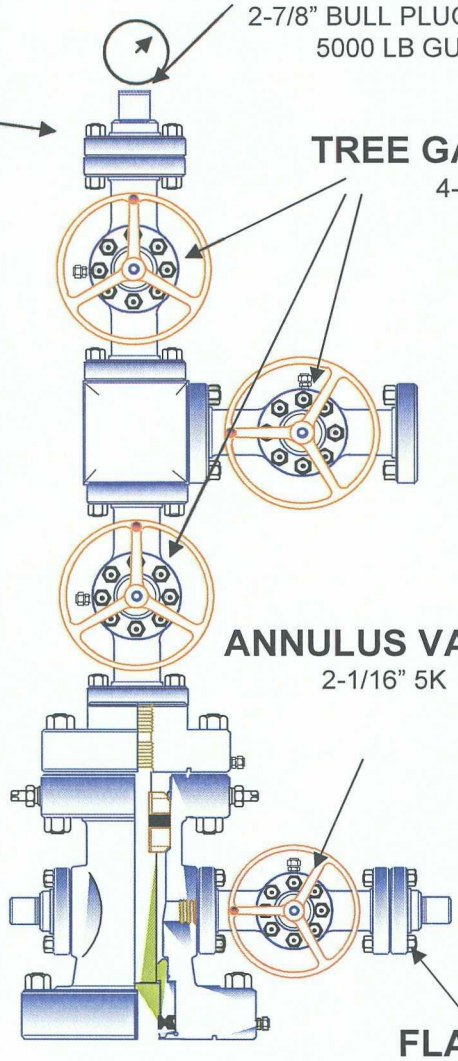

Chukka Well #2 Plot of Pressure and Temperature
Pressure (psia)
Temperature (deg F)
Time (hours)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
120
113
106
99
92
85
78
71
64
57
50
-3
3
9
15
21
27
33
39
45
51
57
63
69
75
81
87
93
99
105
111
117
Pressure Well #2
Temperature Well #2

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

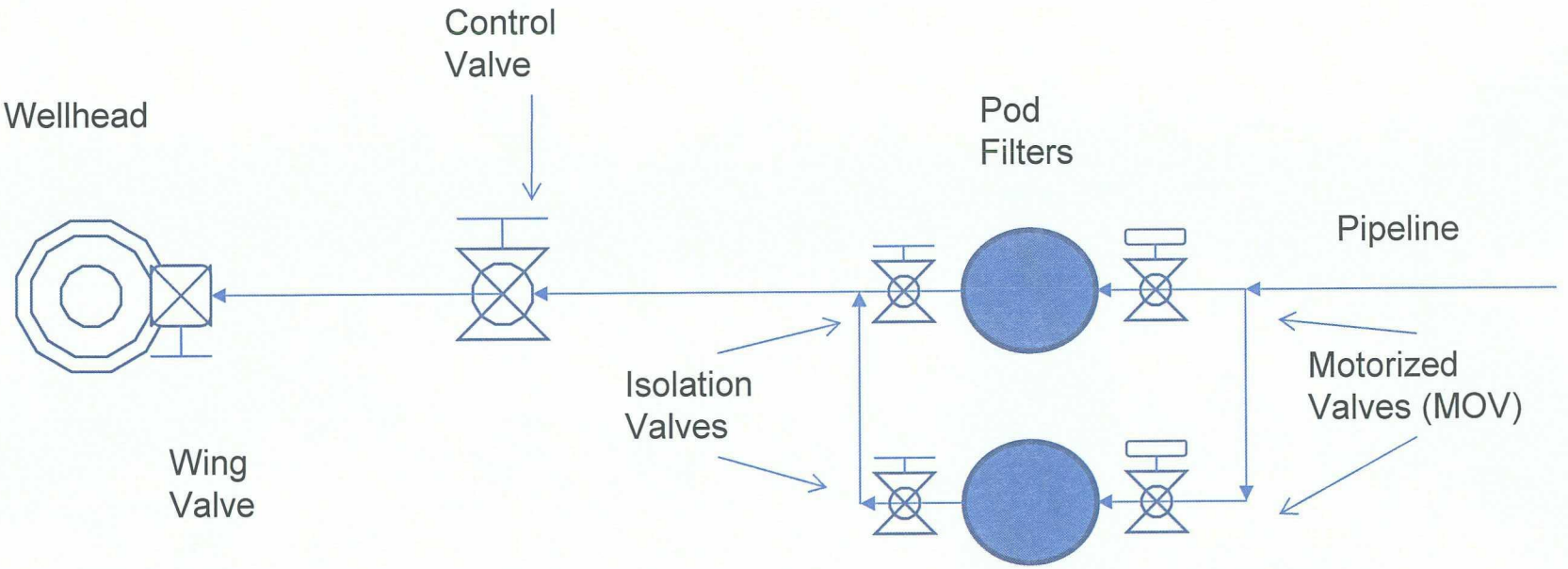
ANNULUS VALVE
2" BALL VALVE 3K

FLANGE
2-1/16" 5K X 2" LP 5K

SUPERIOR WELLHEAD

FIGURE 7

FIGURE 8
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

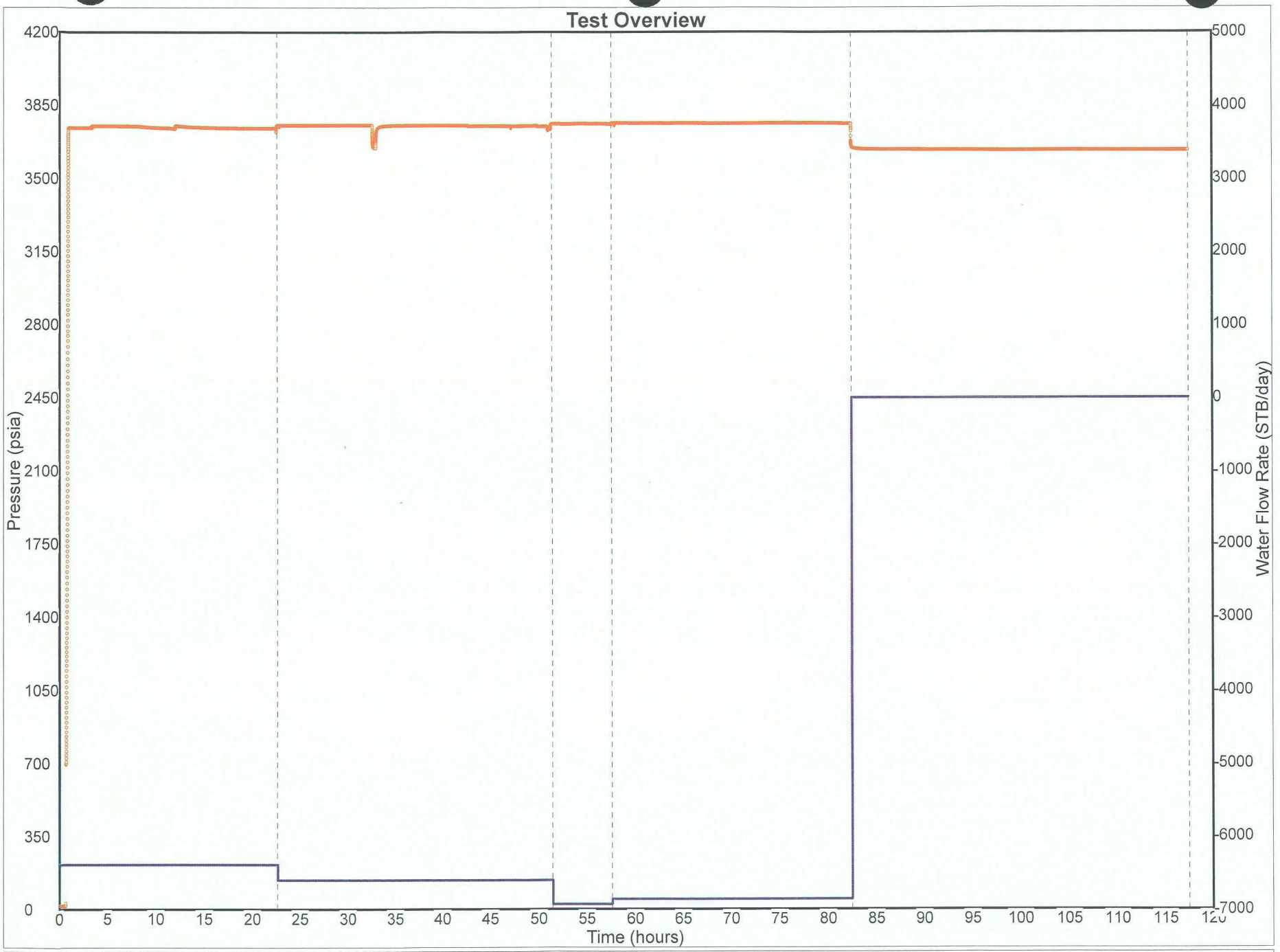

Test Overview
Pressure (psia)
Water Flow Rate (STB/day)
Time (hours)
4200
3850
3500
3150
2800
2450
2100
1750
1400
1050
700
350
0
5000
4000
3000
2000
1000
0
-1000
-2000
-3000
-4000
-5000
-6000
-7000
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120

FIGURE 9

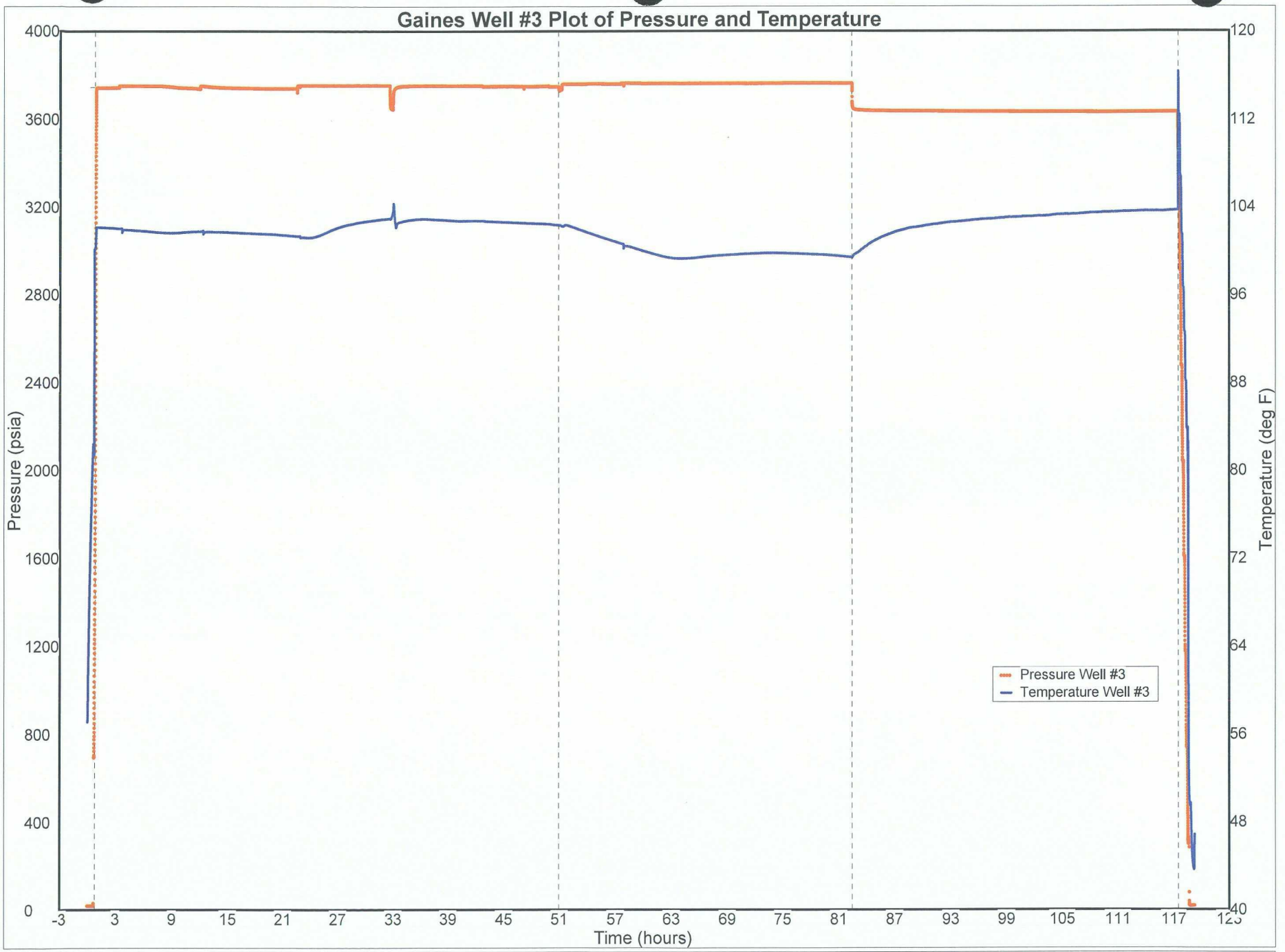

Gaines Well #3 Plot of Pressure and Temperature
Pressure (psia)
Temperature (deg F)
Time (hours)
Pressure Well #3
Temperature Well #3
4000
3600
3200
2800
2400
2000
1600
1200
800
400
0
120
112
104
96
88
80
72
64
56
48
40
-3
3
9
15
21
27
33
39
45
51
57
63
69
75
81
87
93
99
105
111
117

FIGURE 10

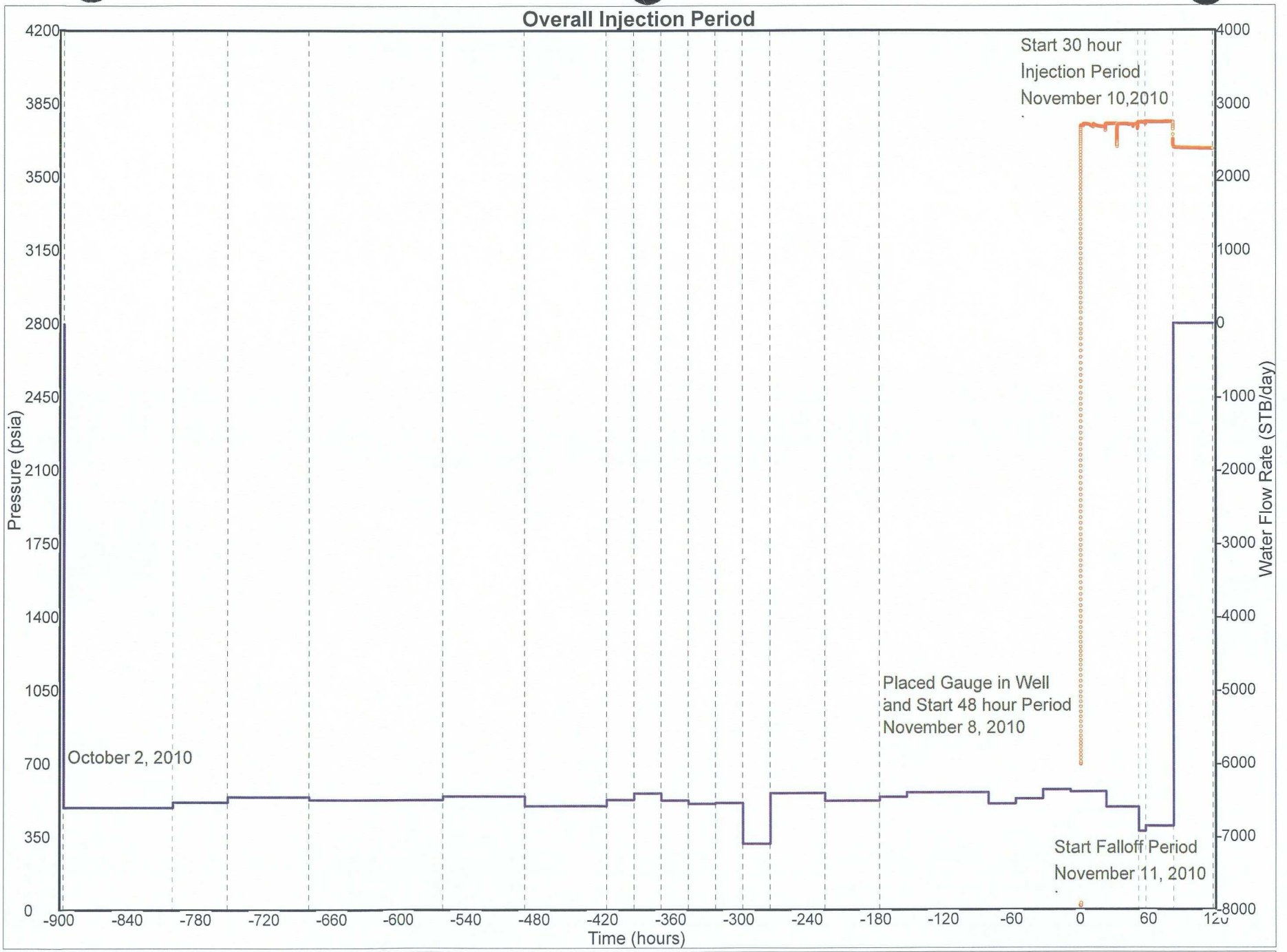

Overall Injection Period
Start 30 hour
Injection Period
November 10,2010
Placed Gauge in Well
and Start 48 hour Period
November 8, 2010
October 2, 2010
Start Falloff Period
November 11, 2010
Pressure (psia)
Water Flow Rate (STB/day)
Time (hours)
4200
3850
3500
3150
2800
2450
2100
1750
1400
1050
700
350
0
4000
3000
2000
1000
0
-1000
-2000
-3000
-4000
-5000
-6000
-7000
-8000
-900
-840
-780
-720
-660
-600
-540
-480
-420
-360
-300
-240
-180
-120
-60
0
60
120

FIGURE 11

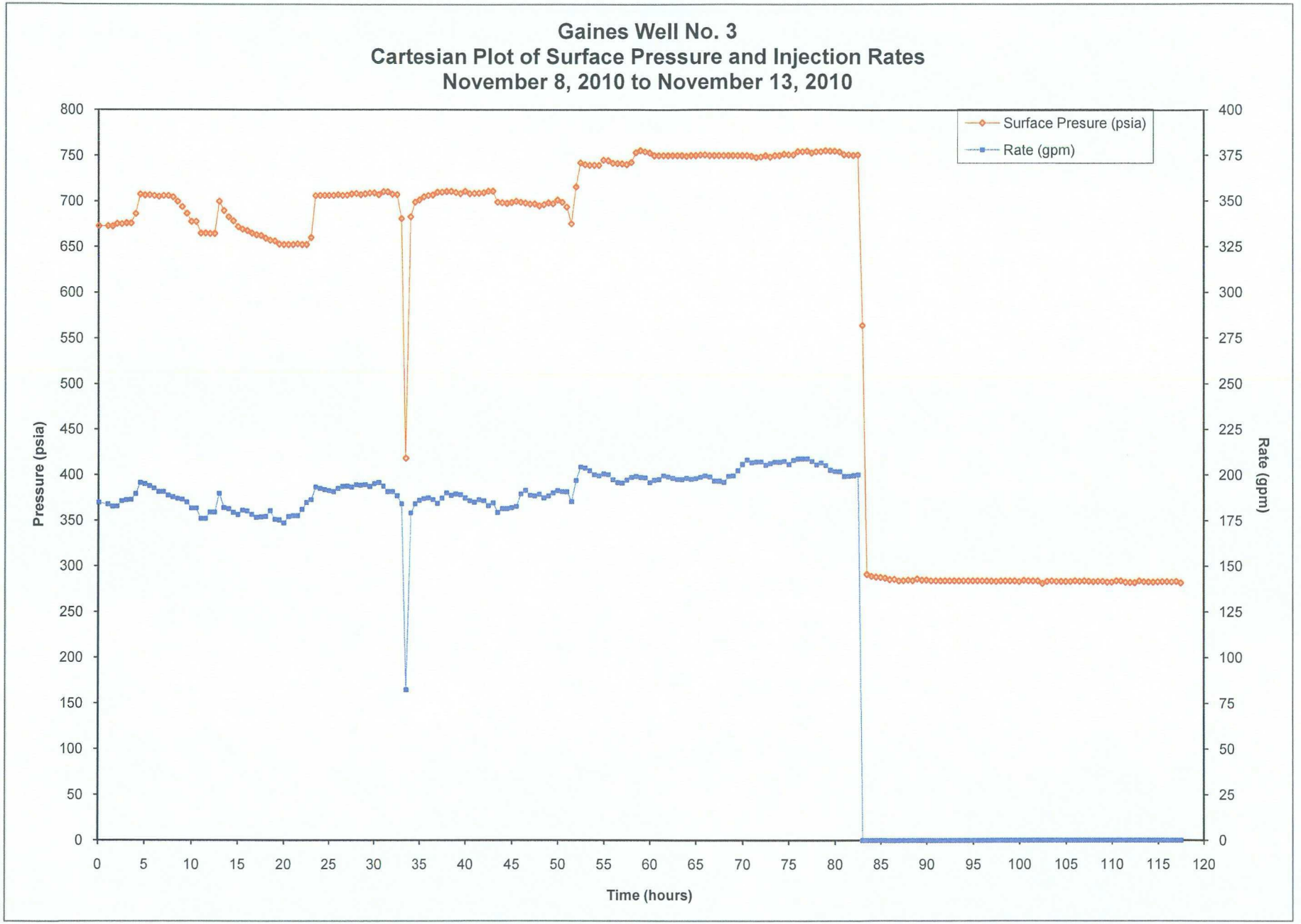

Gaines Well No. 3
Cartesian Plot of Surface Pressure and Injection Rates
November 8, 2010 to November 13, 2010
Surface Presure (psia)
Rate (gpm)
Pressure (psia)
Rate (gpm)
Time (hours)
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
400
375
350
325
300
275
250
225
200
175
150
125
100
75
50
25
0
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 12

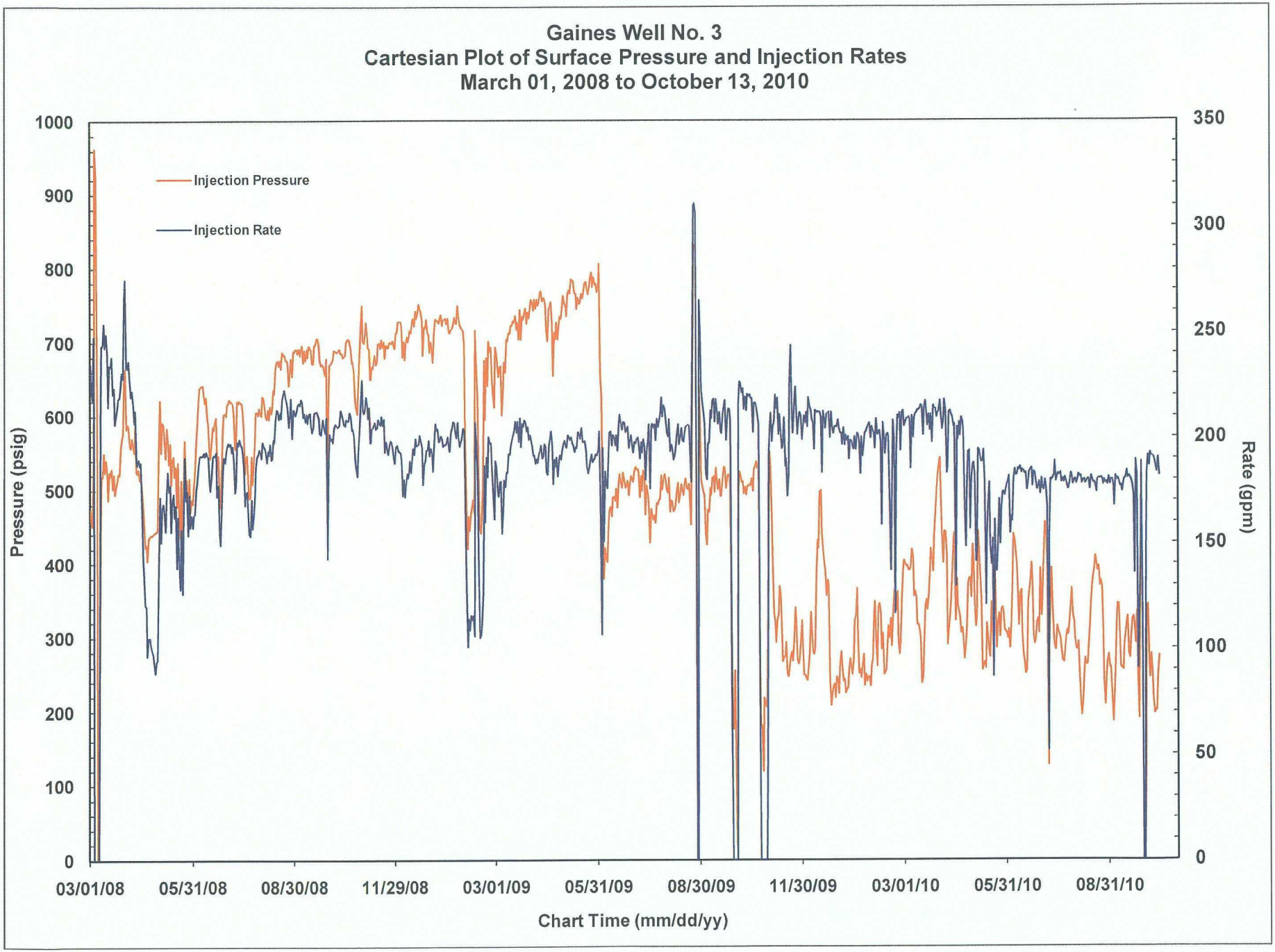

Gaines Well No. 3
Cartesian Plot of Surface Pressure and Injection Rates
March 01, 2008 to October 13, 2010
Injection Pressure
Injection Rate
Pressure (psig)
Rate (gpm)
1000
900
800
700
600
500
400
300
200
100
0
350
300
250
200
150
100
50
0
03/01/08
05/31/08
08/30/08
11/29/08
03/01/09
05/31/09
08/30/09
11/30/09
03/01/10
05/31/10
08/31/10
Chart Time (mm/dd/yy)

FIGURE 13

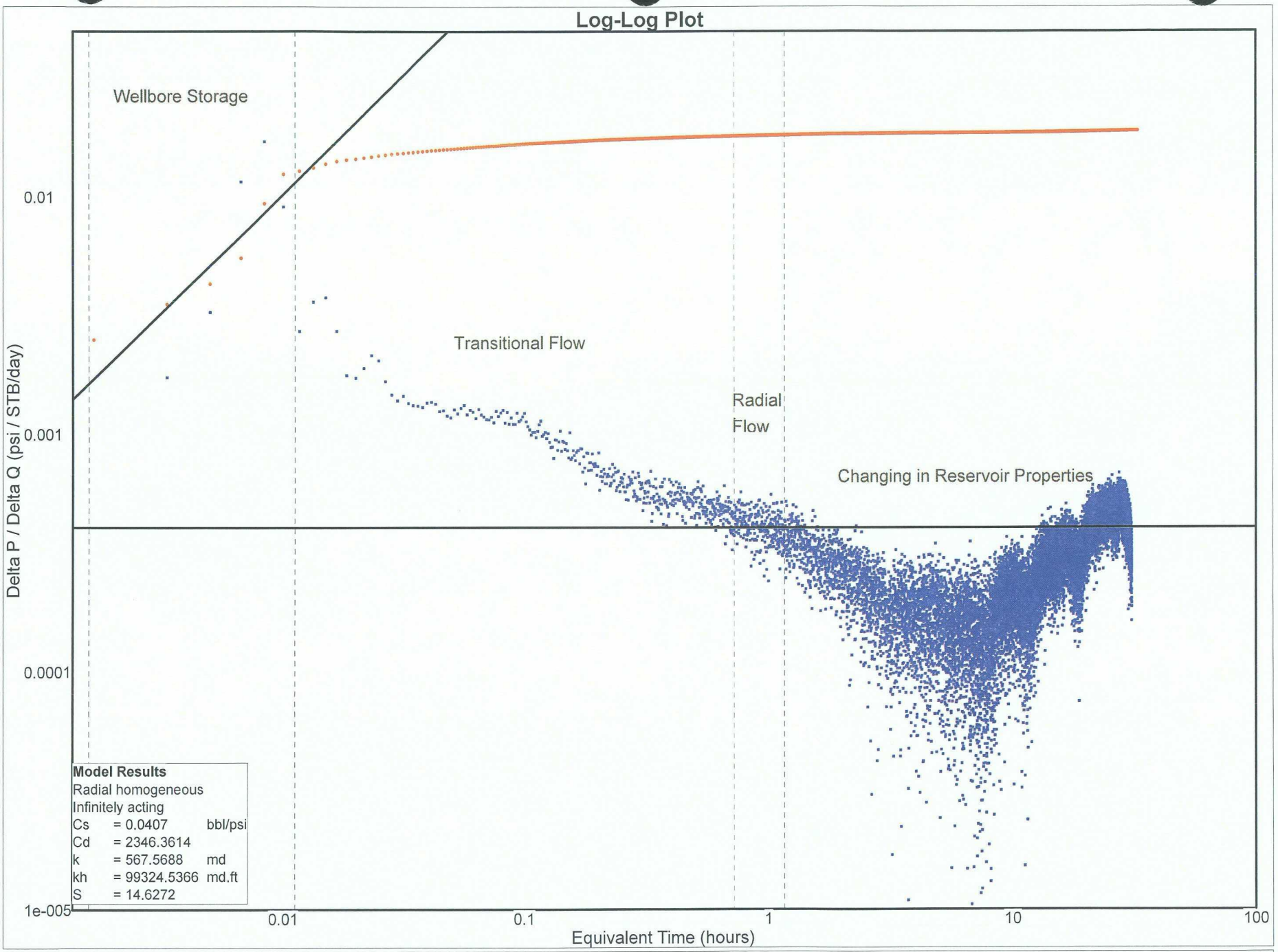

Log-Log Plot
Wellbore Storage
Transitional Flow
Radial
Flow
Changing in Reservoir Properties
Delta P / Delta Q (psi / STB/day)
0.01
0.001
0.0001
1e-005
0.01
0.1
1
10
100
Equivalent Time (hours)
Model Results
Radial homogeneous
Infinitely acting
Cs = 0.0407 bbl/psi
Cd = 2346.3614
k = 567.5688 md
kh = 99324.5366 md.ft
S = 14.6272

FIGURE 14

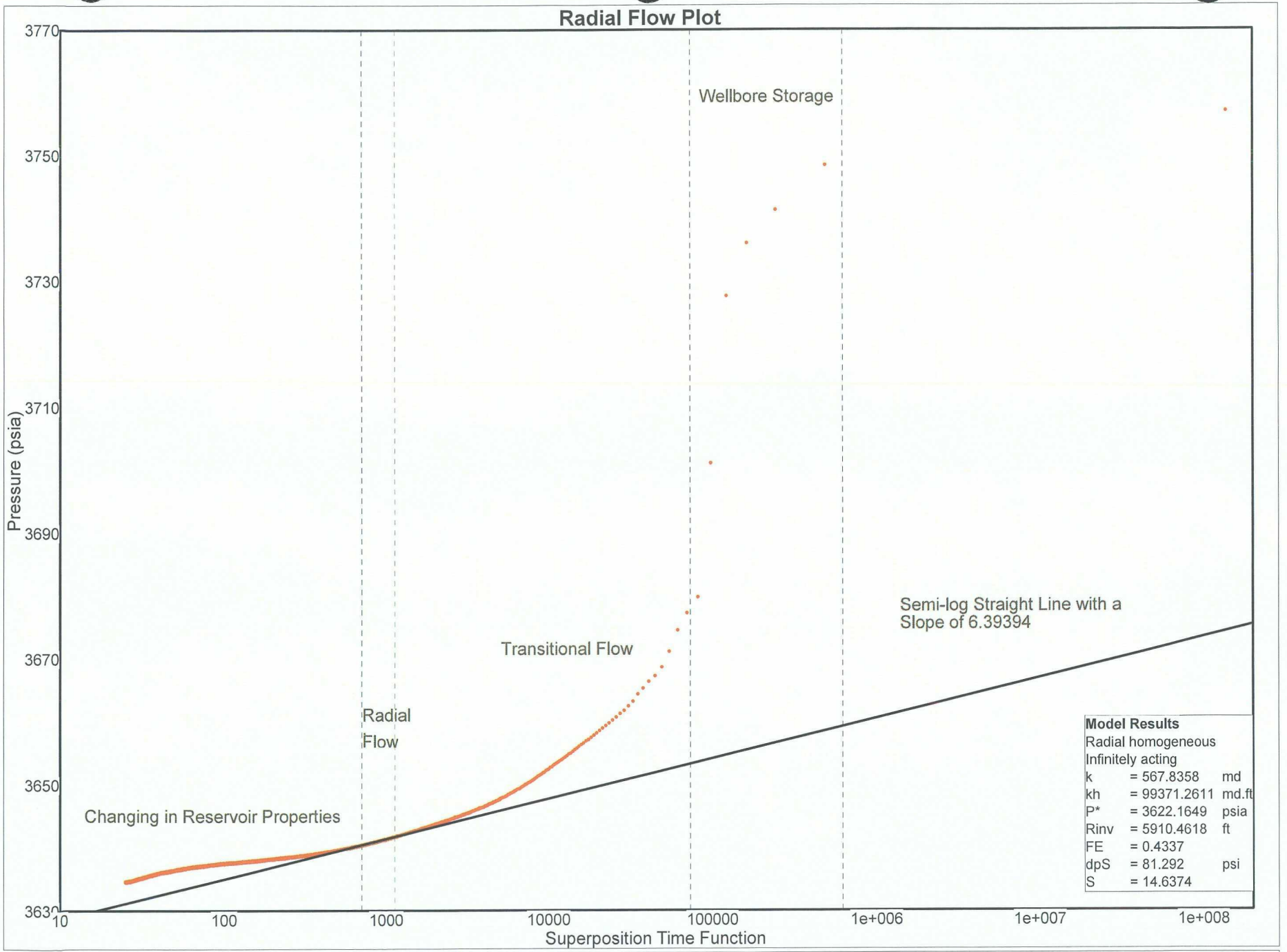

Radial Flow Plot
Wellbore Storage
Semi-log Straight Line with a
Slope of 6.39394
Transitional Flow
Radial
Flow
Changing in Reservoir Properties
Pressure (psia)
Superposition Time Function
3770
3750
3730
3710
3690
3670
3650
3630
10
100
1000
10000
100000
1e+006
1e+007
1e+008
Model Results
Radial homogeneous
Infinitely acting
k = 567.8358 md
kh = 99371.2611 md.ft
P* = 3622.1649 psia
Rinv = 5910.4618 ft
FE = 0.4337
dpS = 81.292 psi
S = 14.6374

FIGURE 15

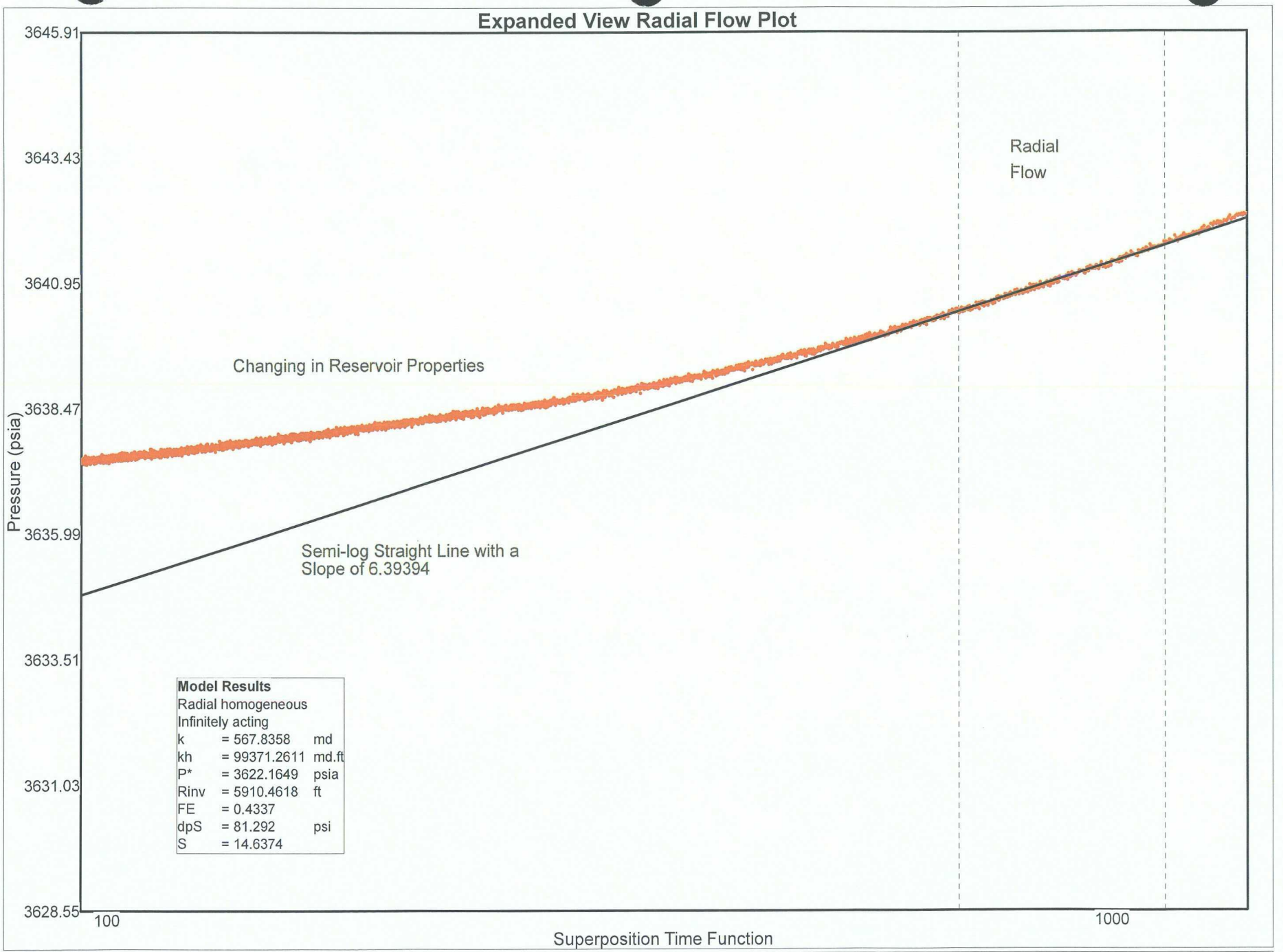

Expanded View Radial Flow Plot
3645.91
3643.43
3640.95
3638.47
3635.99
3633.51
3631.03
3628.55
Pressure (psia)
Radial
Flow
Changing in Reservoir Properties
Semi-log Straight Line with a
Slope of 6.39394
Model Results
Radial homogeneous
Infinitely acting
k = 567.8358 md
kh = 99371.2611 md.ft
P* = 3622.1649 psia
Rinv = 5910.4618 ft
FE = 0.4337
dpS = 81.292 psi
S = 14.6374
100
1000
Superposition Time Function

FIGURE 16

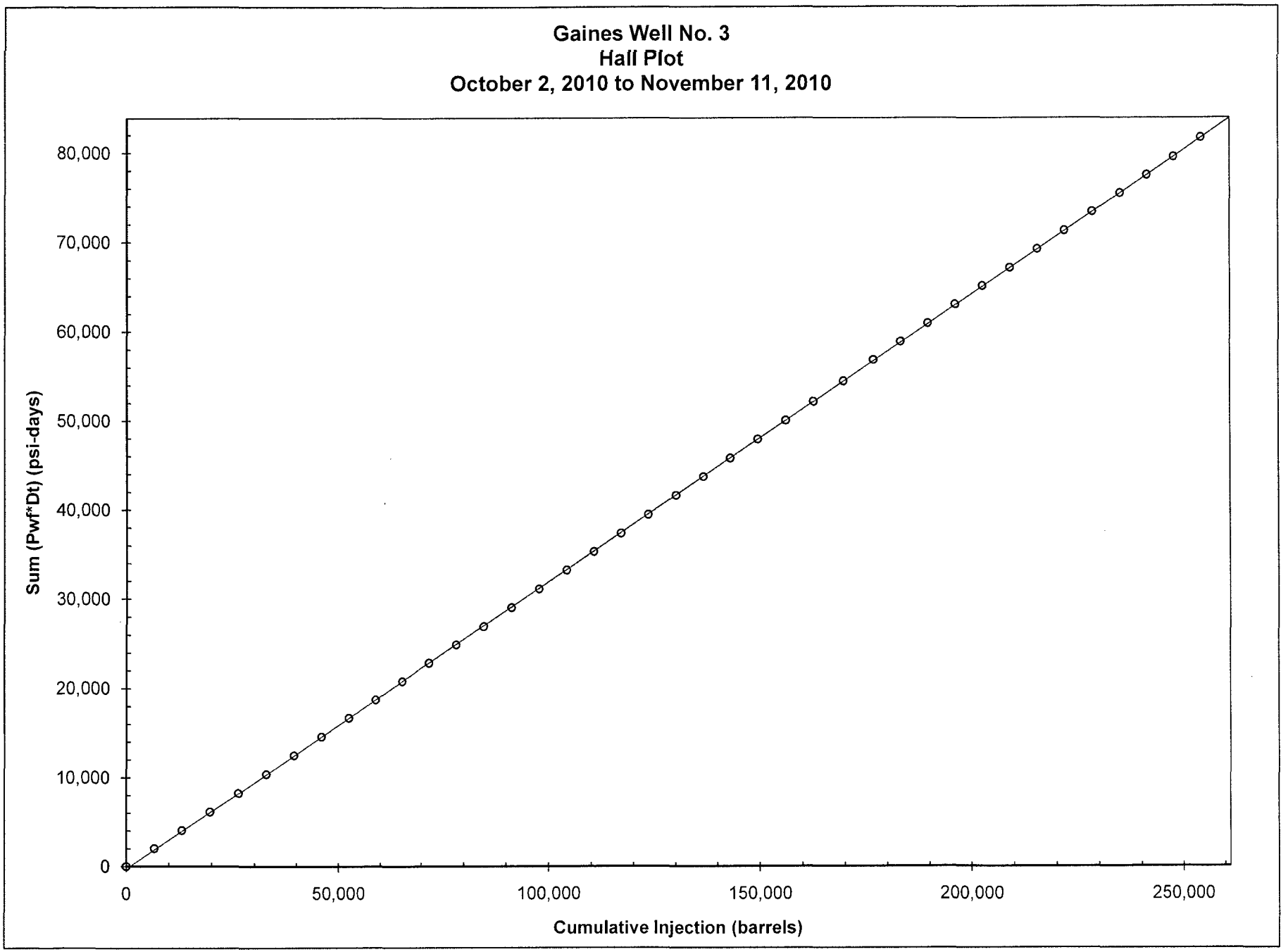

Gaines Well No. 3
Hall Plot
October 2, 2010 to November 11, 2010
Sum (Pwf*Dt) (psi-days)
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
0
50,000
100,000
150,000
200,000
250,000
Cumulative Injection (barrels)

FIGURE 17

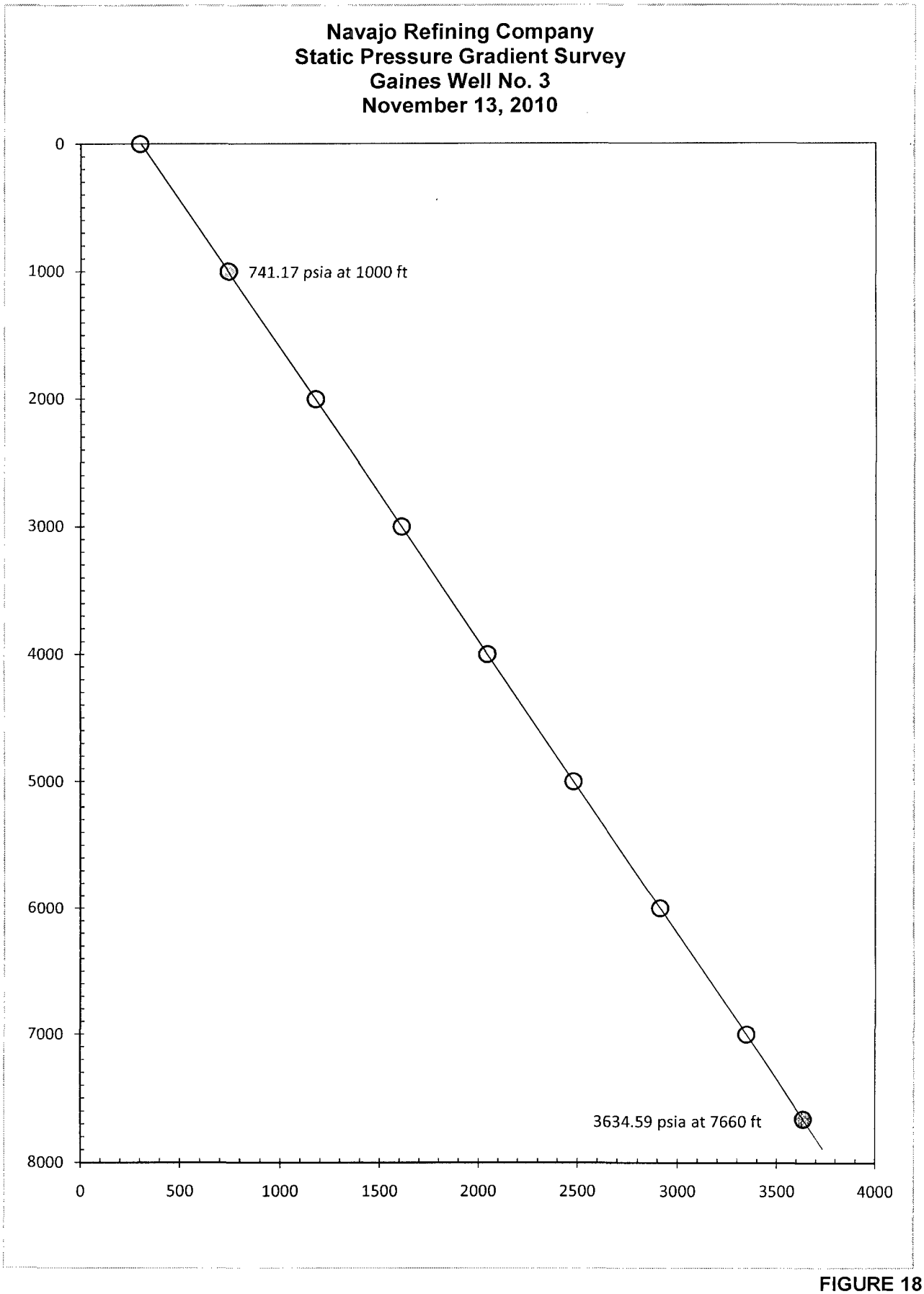

Navajo Refining Company
Static Pressure Gradient Survey
Gaines Well No. 3
November 13, 2010
0
1000
2000
3000
4000
5000
6000
7000
8000
741.17 psia at 1000 ft
3634.59 psia at 7660 ft
0
500
1000
1500
2000
2500
3000
3500
4000

FIGURE 18

APPENDICES

APPENDIX C

COMPRESSIBILITY OF FLUID

APPENDIX C

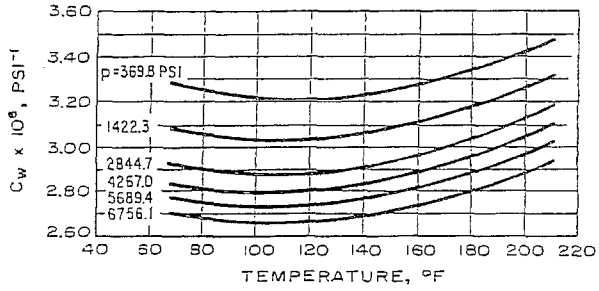


Fig. D.16 Average compressibility of distilled water. After Long and Chierici.[13]

Source: Earlougher, 1977, Advances in Well Test Analysis

COMPRESSIBILITY OF PORE VOLUME AND DISTILLED WATER

APPENDIX D

COMPRESSIBILITY OF PORE VOLUME

APPENDIX D

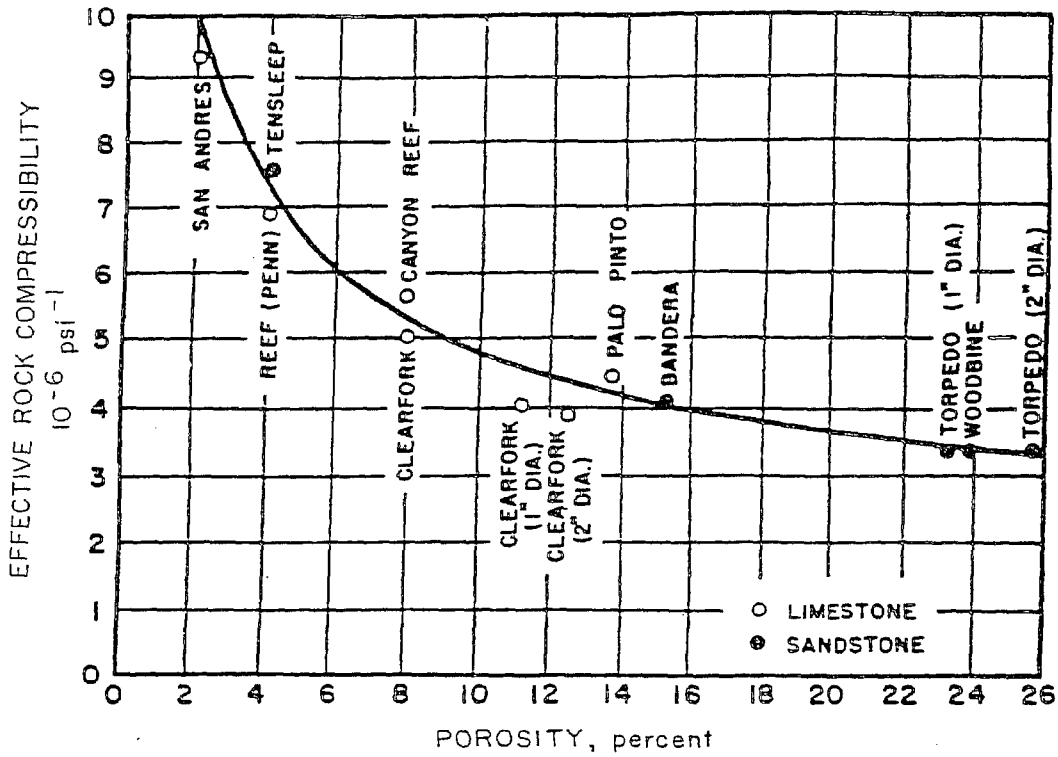


Fig. G.5 Effective formation (rock) compressibility. From Hall, *Trans.*, AIME (1953) 198, 309.

Source: Matthews and Russell, 1967, Pressure Buildup and Flow Tests in Wells

APPENDIX F

WATER VISCOSITIES AT VARIOUS SALINITIES AND TEMPERATURES

SUBSURFACE

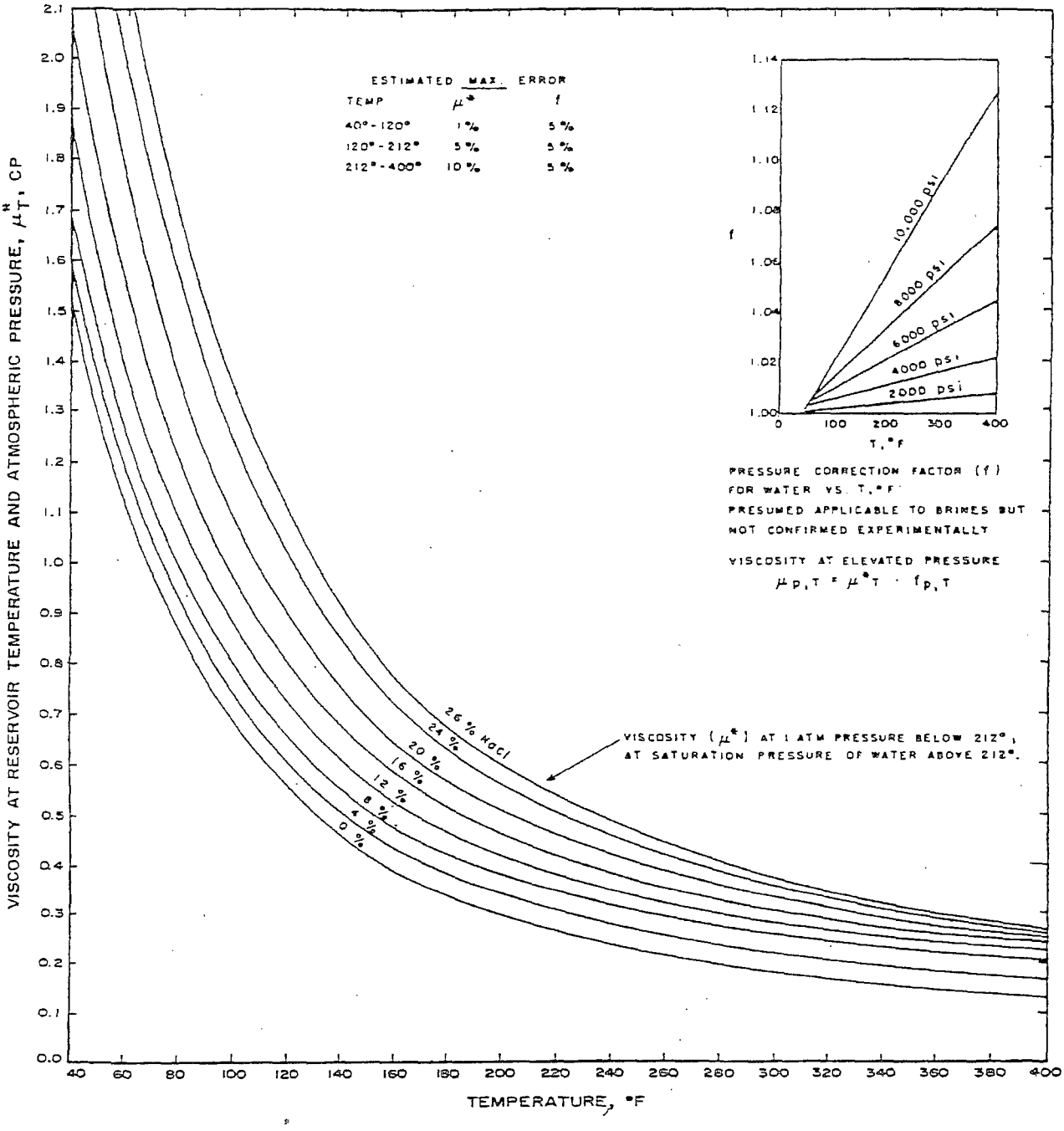


Fig. D.35 Water viscosity at various salinities and temperatures. After Matthews and Russell, data of Chesnut.[18]

FROM: Earlougher, R.C., 1977, "Advances in Well Test Analysis", SPE of AIME, Dallas, Texas

APPENDIX G

DAILY RATE HISTORY DATA

SUBSURFACE

APPENDIX G

NAVAJO REFINING
INJECTION RATES USED IN ANALYSIS

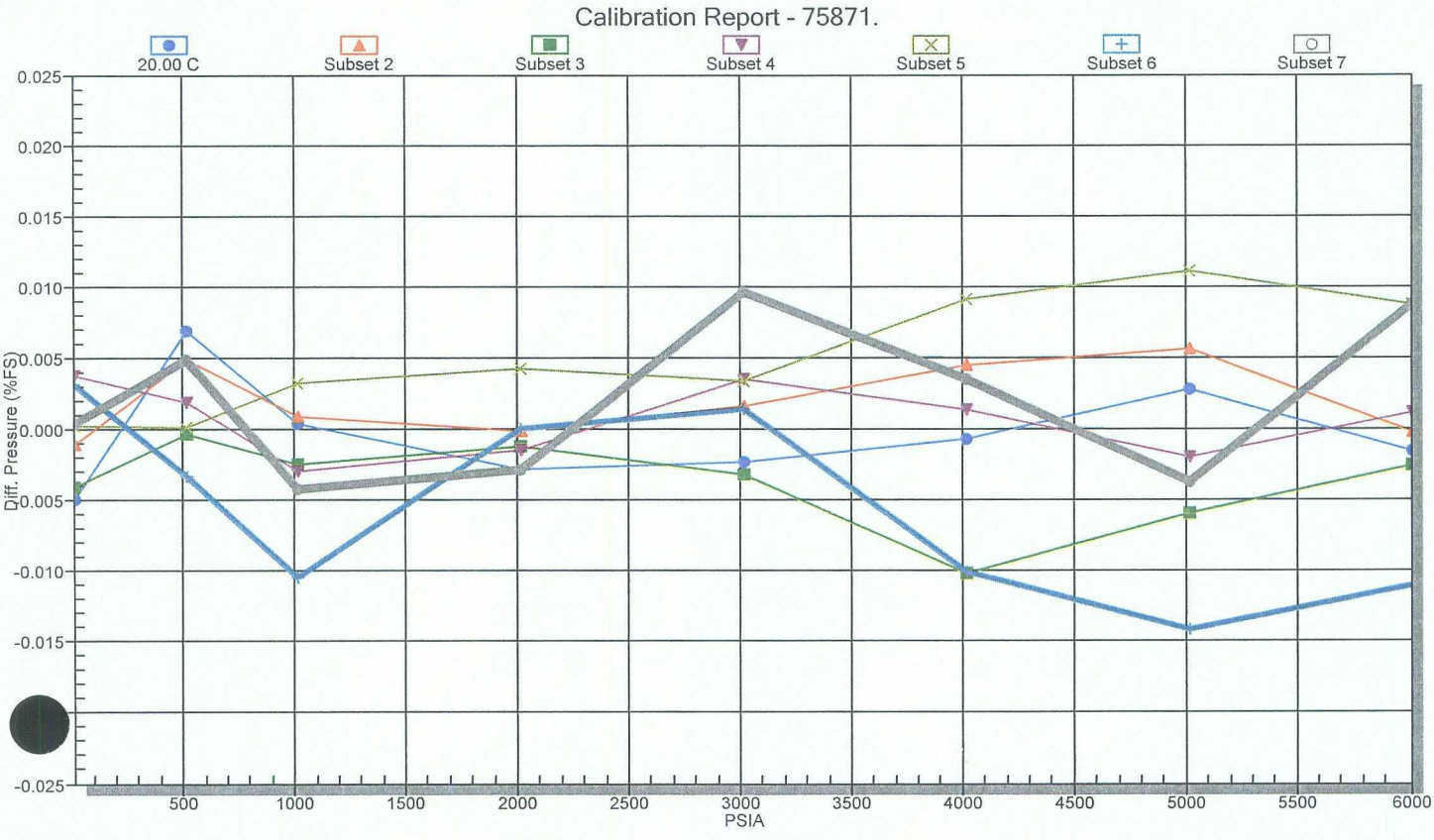
Date	Elasped Time (hours)	Average Surface Injection Pressure (psig)	Average Injection Rate (bpd)	Average Injection Rate (gpm)	Comments
10/3/2010	-896.53	697.99	6556.48	191.2306	Start of Stable Injection Since Last Falloff Testing
10/7/2010	-800.53	703.08	6601.30	192.5378	
10/9/2010	-752.53	697.64	6527.20	190.3766	
10/12/2010	-680.53	679.01	6455.56	188.2873	
10/17/2010	-560.53	701.31	6495.14	189.4416	
10/20/2010	-488.53	697.66	6447.88	188.0632	
10/23/2010	-416.53	709.87	6579.06	191.8893	
10/24/2010	-392.53	702.11	6494.15	189.4127	
10/25/2010	-368.53	692.12	6407.51	186.8856	
10/26/2010	-344.53	707.05	6502.57	189.6584	
10/27/2010	-320.53	706.83	6550.76	191.0639	
10/28/2010	-296.53	706.53	6537.21	190.6686	
10/29/2010	-272.53	790.72	7090.58	206.8086	
10/30/2010	-224.53	684.11	6405.12	186.8161	
11/1/2010	-176.53	698.40	6511.60	189.9215	
11/2/2010	-152.53	697.97	6457.25	188.3363	
11/5/2010	-80.53	688.60	6400.55	186.6828	
11/6/2010	-56.53	700.47	6553.59	191.1463	
11/7/2010	-32.53	688.56	6481.72	189.0501	
11/08/2010	-8.53	683.14	6357.39	185.4238	Place Gauges into All Three Wells
11/9/2010	22.64	682.83	6388.01	186.3169	
11/10/2010	51.44	720.95	6599.62	192.4888	Shut In Offset Wells and Start Well #3 Constant Rate Injection Period
11/10/2010	57.61	751.23	6928.85	202.0914	
11/11/2010	82.47	751.34	6857.00	199.9959	Shutin Well #3 for Falloff Testing Leaving Offset Wells Shutin
11/13/2010	117.50	300.52	0	0	Pull Gauges From Wells

APPENDIX H

GAUGE CALIBRATION SHEETS

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: 75871

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 = 681662	ft0 = 152045	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 12.10286968	0.1470412742	0.0002468938414	-7.497062382E-07	-3.70888077E-09
B 1.667309854	-0.00140454224	-2.843588797E-07	-1.401645552E-09	2.298300841E-12
C -4.224954529E-06	-2.851033337E-08	-6.041581441E-10	-3.146294955E-12	-5.756520944E-15
D -1.483149629E-11	7.399789391E-12	1.626124344E-13	8.394193027E-16	1.426114424E-18

Temperature (C) STANDARD FIT COEFFICIENTS

A 19.84409497

B -0.3680945049

C -1.917152205E-05

D -2.247456296E-07

0 points eliminated.
Error File: Gauge # 75871

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
513.28	20.00	0.41	-0.27	-0.27
1013.55	20.00	0.02	-0.33	-0.33
2013.87	20.00	-0.17	-0.33	-0.33
3014.16	20.00	-0.14	-0.20	-0.20
4014.44	20.00	-0.05	0.07	0.07
5014.69	20.00	0.16	0.48	0.48
6014.92	20.00	-0.10	1.03	1.03
12.41	50.00	-0.07	-0.20	-0.20
513.28	50.00	0.29	-0.30	-0.30
1013.55	50.00	0.06	-0.35	-0.35
2013.87	50.00	-0.01	-0.37	-0.37
3014.16	50.00	0.10	-0.28	-0.28
4014.44	50.00	0.27	-0.10	-0.10
5014.69	50.00	0.34	0.21	0.21
6014.92	50.00	-0.01	0.64	0.64
12.41	75.00	-0.25	-0.03	-0.03
513.28	75.00	-0.02	-0.12	-0.12
1013.55	75.00	-0.15	-0.17	-0.17
2013.87	75.00	-0.07	-0.21	-0.21
3014.16	75.00	-0.19	-0.17	-0.17
4014.44	75.00	-0.62	-0.01	-0.01
5014.69	75.00	-0.36	0.24	0.24
6014.92	75.00	-0.16	0.59	0.59
12.41	95.10	0.23	0.11	0.11
513.28	95.10	0.11	0.04	0.04
1013.55	95.10	-0.18	-0.03	-0.03
2013.87	95.10	-0.09	-0.07	-0.07
3014.16	95.10	0.21	-0.03	-0.03
4014.44	95.10	0.08	0.10	0.10
5014.69	95.10	-0.12	0.30	0.30
6014.92	95.10	0.07	0.56	0.56
12.41	115.10	0.01	0.05	0.05
513.28	115.10	0.00	-0.06	-0.06
1013.55	115.10	0.20	-0.12	-0.12
2013.87	115.10	0.26	-0.17	-0.17
3014.16	115.10	0.21	-0.14	-0.14
4014.44	115.10	0.55	-0.04	-0.04
5014.69	115.10	0.66	0.07	0.07
6014.92	115.10	0.52	0.28	0.28
12.41	134.90	0.18	-0.01	-0.01
513.28	134.90	-0.20	-0.07	-0.07
1013.55	134.90	-0.63	-0.13	-0.13
2013.87	134.90	0.00	-0.20	-0.20
3014.16	134.90	0.08	-0.25	-0.25
4014.44	134.90	-0.61	-0.28	-0.28
5014.69	134.90	-0.85	-0.19	-0.19
6014.92	134.90	-0.66	-0.14	-0.14
12.41	149.80	0.03	0.31	0.31
513.28	149.80	0.29	0.26	0.26
1013.55	149.80	-0.26	0.18	0.18
2013.87	149.80	-0.17	0.08	0.08
3014.16	149.80	0.58	0.02	0.02
4014.44	149.80	0.21	-0.01	-0.01
5014.69	149.80	-0.23	-0.02	-0.02
6014.92	149.80	0.52	-0.10	-0.10

Spartek Systems
#1 Thevenaz Ind. Tr.
Sylvan Lake, AB, Ca, T4S 1P5
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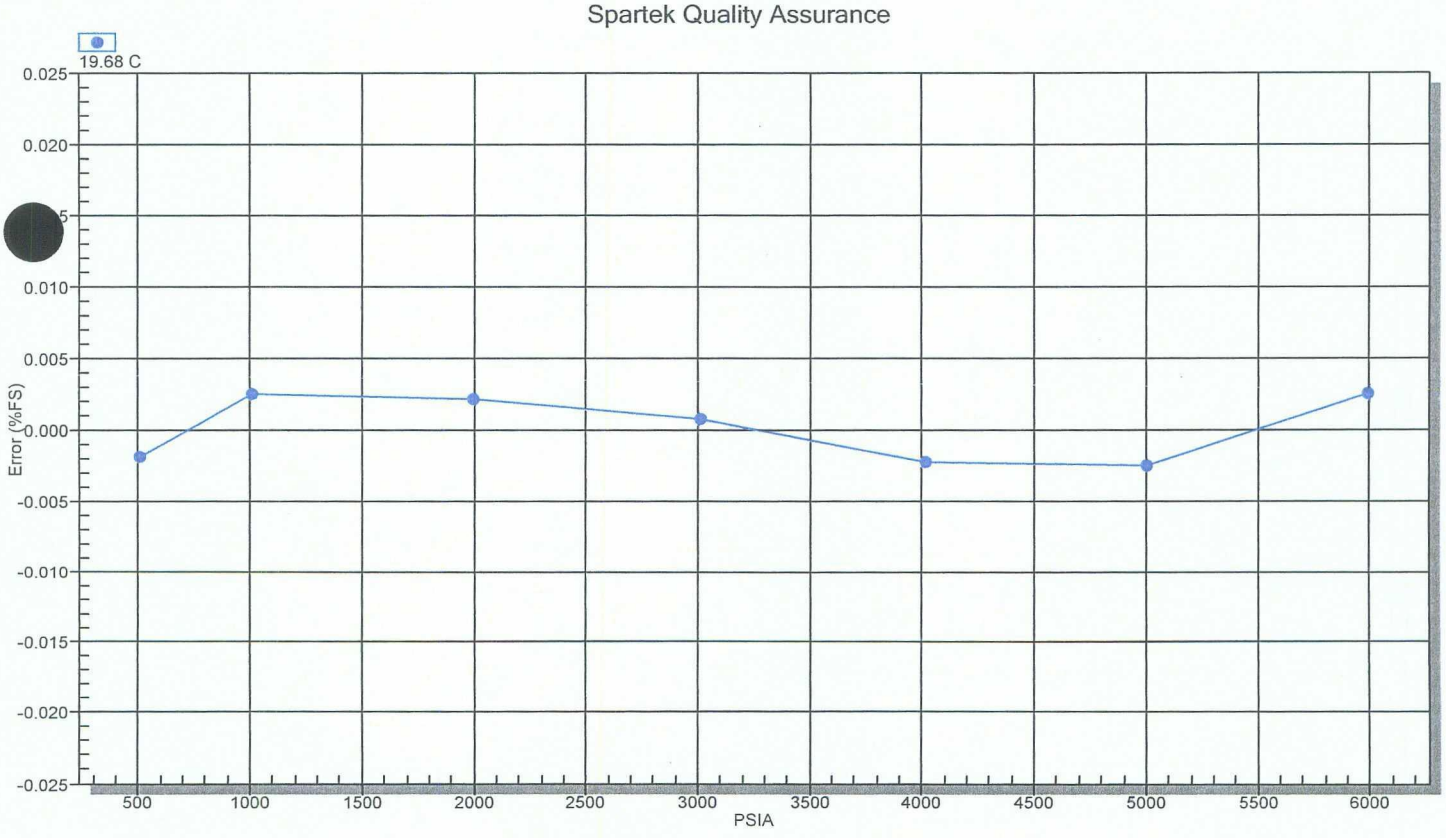
Fax (403) 887-4050

Pressure Gauge
Certificate of Conformance

MODEL	1139	REVISION	0
SERIAL NUMBER	75871	DEADWEIGHT USED	Piston Cylinder No. 528
CALIBRATED	JUN13/06	E.U.B. CERT. DATE	May 09 2006
PRESSURE RANGE	6014.92 psi	TEMPERATURE RANGE	149.80 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, April 09, 2008

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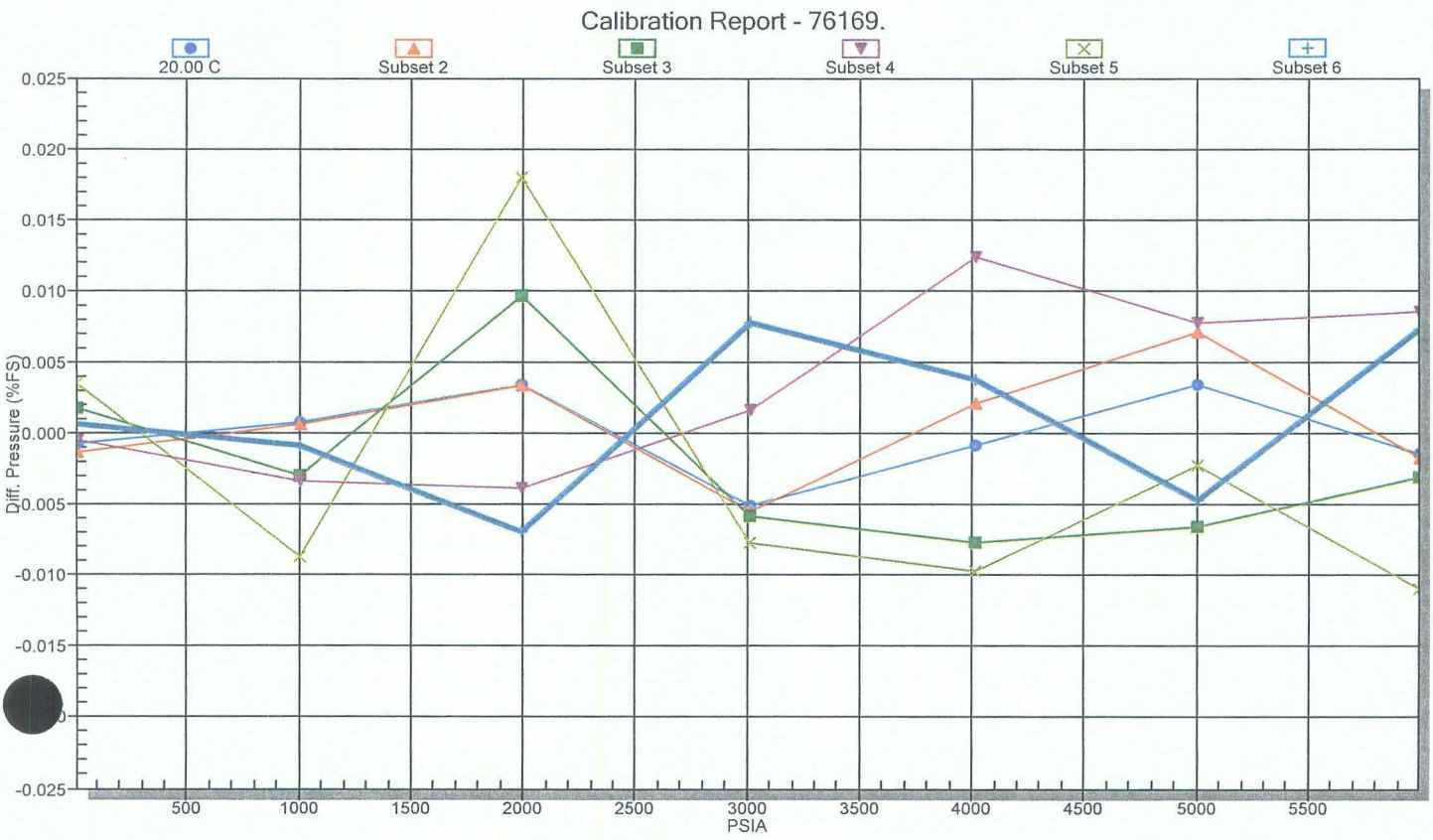
Pressure Gauge
Certificate of Calibration



GAUGE NUMBER: 76169

2-D POLYNOMIAL LMS CURVEFIT

Source of f:	Pres	Temp
Fit Order:	3	4
Prescale:	xp = m * (fp - fp0)	xt = m * (ft - ft0)
m:	0.01	0.01
	fp0 = 681645	ft0 = 151106

Pressure Equation:

Pressure (PSI) = A + xp(B + xp(C + xp(D)))

Temperature Compenstation:

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	13.44324838	0.1882850161	0.00101019162	2.870013815E-06	3.120425604E-09
B	2.01472189	-0.001786427729	-3.408955408E-06	-1.762779483E-08	-2.326711214E-11
C	-4.883058348E-06	1.031978613E-07	1.962575439E-09	1.037101793E-11	1.587160732E-14
D	2.999047813E-10	-2.003609874E-11	-3.805828823E-13	-2.12811198E-15	-3.419813586E-18

Temperature (C) STANDARD FIT COEFFICIENTS

A 19.9770683
B -0.357215731
C 4.219414208E-06
D -2.235439456E-07

0 points eliminated.
Error File: Gauge # 76169

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
1003.75	20.00	0.05	-0.14	-0.14
1993.33	20.00	0.20	-0.19	-0.19
3008.16	20.00	-0.31	-0.16	-0.16
4012.02	20.00	-0.05	0.00	0.00
5001.33	20.00	0.20	0.20	0.20
5987.27	20.00	-0.09	0.47	0.47
13.50	50.00	-0.08	-0.08	-0.08
1003.75	50.00	0.04	-0.16	-0.16
1993.33	50.00	0.20	-0.22	-0.22
3008.16	50.00	-0.33	-0.20	-0.20
4012.02	50.00	0.13	-0.11	-0.11
5001.33	50.00	0.42	0.02	0.02
5987.27	50.00	-0.10	0.28	0.28
13.50	85.00	0.11	0.07	0.07
1003.75	85.00	-0.18	0.01	0.01
1993.33	85.00	0.57	-0.04	-0.04
3008.16	85.00	-0.35	-0.03	-0.03
4012.02	85.00	-0.46	0.02	0.02
5001.33	85.00	-0.39	0.12	0.12
5987.27	85.00	-0.19	0.30	0.30
13.50	110.00	-0.03	0.13	0.13
1003.75	110.00	-0.20	0.01	0.01
1993.33	110.00	-0.23	-0.06	-0.06
3008.16	110.00	0.10	-0.06	-0.06
4012.02	110.00	0.74	-0.01	-0.01
5001.33	110.00	0.46	0.09	0.09
5987.27	110.00	0.51	0.23	0.23
13.50	135.00	0.21	-0.10	-0.10
1003.75	135.00	-0.52	-0.17	-0.17
1993.33	135.00	1.07	-0.21	-0.21
3008.16	135.00	-0.47	-0.23	-0.23
4012.02	135.00	-0.58	-0.21	-0.21
5001.33	135.00	-0.14	-0.13	-0.13
5987.27	135.00	-0.65	-0.01	-0.01
13.50	150.00	0.04	0.17	0.17
1003.75	150.00	-0.05	0.07	0.07
1993.33	150.00	-0.42	0.01	0.01
3008.16	150.00	0.47	0.01	0.01
4012.02	150.00	0.23	0.03	0.03
5001.33	150.00	-0.28	0.08	0.08
5987.27	150.00	0.44	0.19	0.19

Spartek Systems
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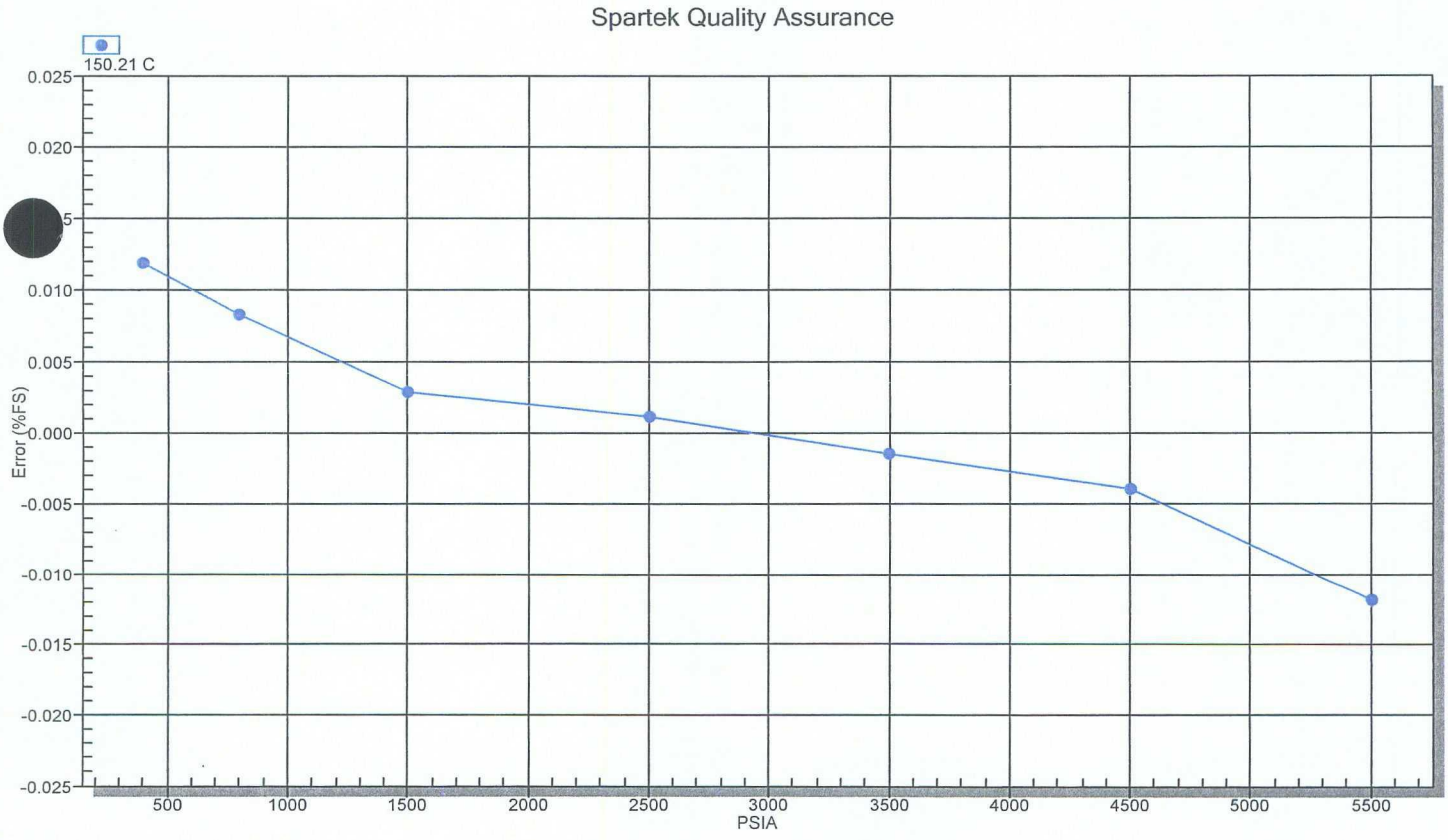
Pressure Gauge
Certificate of Conformance

MODEL	1139	REVISION	0
SERIAL NUMBER	76169	DEADWEIGHT USED	Piston Cylinder No. 528
CALIBRATED	DEC15/06	E.U.B. CERT. DATE	May 09 2006
PRESSURE RANGE	5987.27 psi	TEMPERATURE RANGE	150.00 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: Wednesday, April 09, 2008

Source of f:	Pres	Temp
Fit Order:	3	4
Prescale:	xp = m * (fp - fp0)	xt = m * (ft - ft0)
m:	0.01	0.01
	fp0 = 693181	ft0 = 155171

Pressure Equation:

Pressure (PSI) = A + xp(B + xp(C + xp(D)))

Temperature Compenstation:

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 296.8243979	-0.009034878215	0.001358751677	5.020502212E-06	6.509090838E-09
B 1.637207894	-0.001254275254	-9.246861864E-08	-2.503492126E-09	-2.678433945E-12
C -3.629488314E-06	-5.782243012E-08	-7.453253941E-10	-2.691177945E-12	-3.159127954E-15
D 1.648318667E-10	1.138808285E-11	1.882101656E-13	8.002614476E-16	1.059857244E-18
Temperature (C) STANDARD FIT COEFFICIENTS				
A 20.10372196				
B -0.3563077466				
C -4.920886728E-05				
D -2.839383097E-07				

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Pressure Gauge

Certificate of Calibration

0 points eliminated.
Error File: Gauge # 76173

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
296.90	20.20	693181.67	155171.50	-0.07
500.63	20.30	705629.67	155170.25	-0.05
747.13	20.20	720704.33	155191.50	-0.04
998.06	20.40	736060.33	155189.50	0.03
1997.30	20.20	797311.00	155210.00	0.07
3002.25	20.30	858976.33	155161.00	-0.02
3997.19	20.30	920089.33	155099.00	0.01
5002.07	20.30	981732.00	154980.25	-0.01
6003.35	20.40	1043097.67	154845.25	0.01
296.85	44.60	692878.67	148289.75	0.33
500.57	44.70	704692.67	148304.25	0.19
747.08	44.70	718998.33	148311.25	0.11
998.00	44.70	733560.00	148307.75	-0.04
1997.25	44.80	791636.33	148313.75	-0.25
3002.20	44.70	850113.00	148281.50	-0.09
3997.15	44.70	908011.67	148218.00	0.02
5002.04	44.70	966471.33	148133.50	0.08
6003.32	44.70	1024618.33	148012.00	-0.05
296.92	69.10	692267.00	141375.00	-0.40
500.66	69.10	703505.67	141381.25	-0.31
747.18	69.10	717108.33	141385.00	-0.27
998.11	69.10	730965.33	141388.00	-0.18
1997.36	69.20	786235.00	141392.75	0.56
3002.33	69.20	841838.67	141379.50	0.32
3997.28	69.10	896877.33	141335.00	-0.17
5002.18	69.20	952435.00	141260.75	-0.22
6003.47	69.10	1007736.33	141173.75	0.16
296.99	93.40	691780.00	134731.50	0.23
500.72	93.40	702467.33	134737.00	0.18
747.24	93.40	715409.00	134744.00	0.12
998.17	93.40	728588.67	134749.75	0.00
1997.42	93.40	781166.33	134761.25	-0.30
3002.38	93.40	834146.00	134745.00	-0.26
3997.33	93.40	886664.33	134713.75	0.37
5002.23	93.50	939627.33	134659.00	0.04
6003.51	93.40	992316.00	134581.50	-0.18
297.01	112.70	691429.00	129608.50	0.11
500.73	112.70	701713.33	129617.00	0.18
747.25	112.70	714164.33	129622.50	0.20
998.17	112.80	726847.67	129629.25	0.21
1997.42	112.70	777426.67	129640.50	-0.03
3002.37	112.70	828395.00	129633.75	-0.28
3997.32	112.70	878919.33	129611.75	-0.36
5002.21	112.70	929982.67	129568.00	0.25
6003.49	112.70	980766.00	129501.25	0.09
297.04	134.70	691041.00	124063.25	-0.38
500.77	134.80	700893.33	124056.50	-0.30
747.29	134.80	712825.00	124063.75	-0.21
998.22	134.80	724979.33	124070.25	-0.13
1997.47	134.80	773458.33	124081.00	0.19
3002.43	134.80	822309.33	124079.25	0.33
3997.38	134.80	870713.67	124059.00	0.12
5002.28	134.80	919633.00	124027.75	-0.06
6003.56	134.70	968360.00	123978.50	-0.10
297.09	149.00	690806.33	120603.00	0.32
500.82	149.10	700388.00	120608.00	0.14
747.34	149.10	711994.00	120620.75	-0.03
998.27	149.10	723819.33	120624.25	-0.12
1997.53	149.20	771000.33	120622.75	-0.02
3002.49	149.20	818537.33	120612.25	-0.01
3997.45	149.20	865657.00	120593.75	-0.04
5002.35	149.20	913253.00	120557.25	-0.12
5996.37	149.30	960315.67	120505.75	0.10

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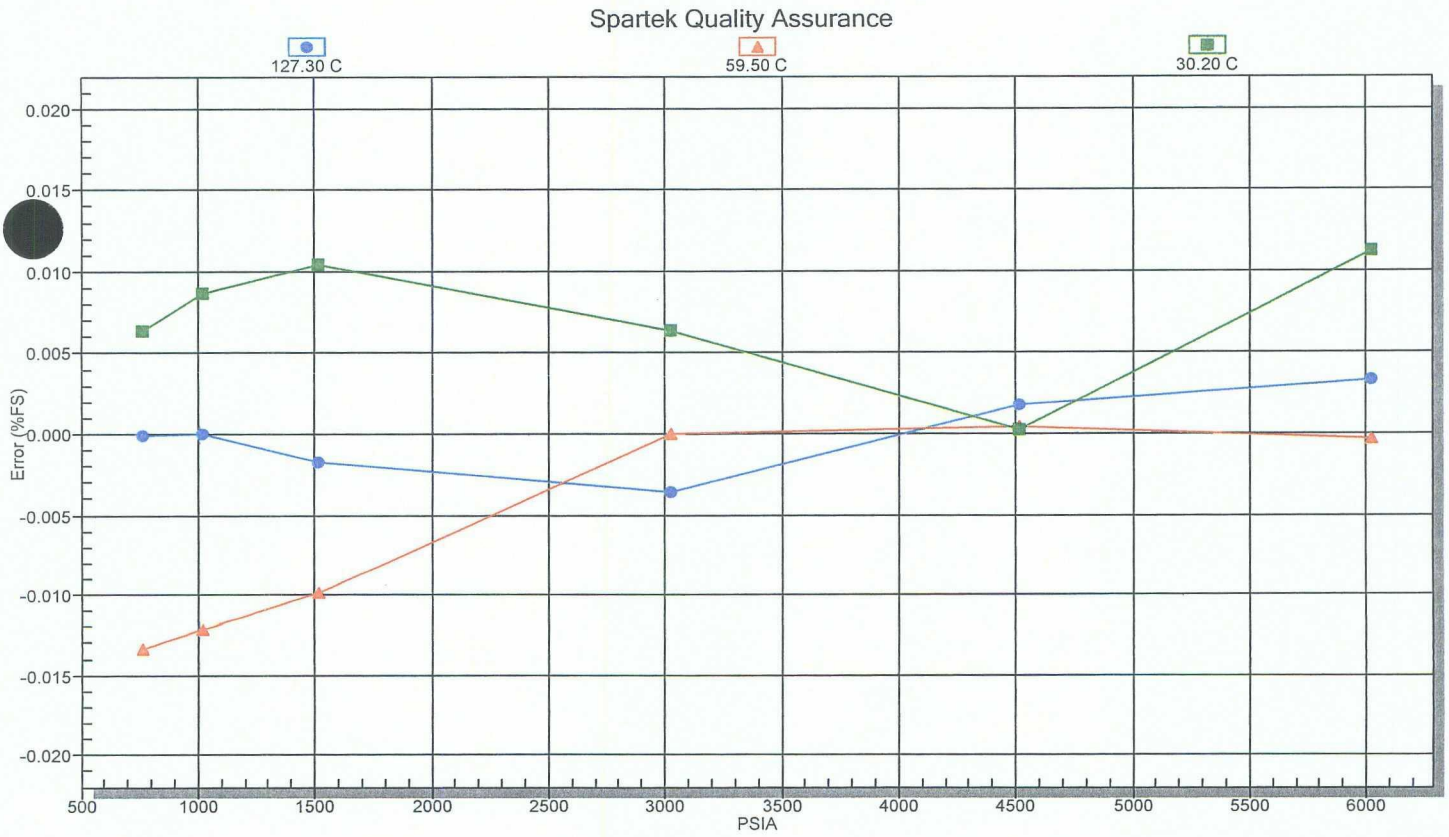
Pressure Gauge
Certificate of Conformance

MODEL	1139	REVISION	0
SERIAL NUMBER	76173	DEADWEIGHT USED	Piston Cylinder No. 528
CALIBRATED	DEC09/08	E.U.B. CERT. DATE	May 09 2006
PRESSURE RANGE	6003.56 psi	TEMPERATURE RANGE	149.30 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, December 17, 2008

Spartek Systems
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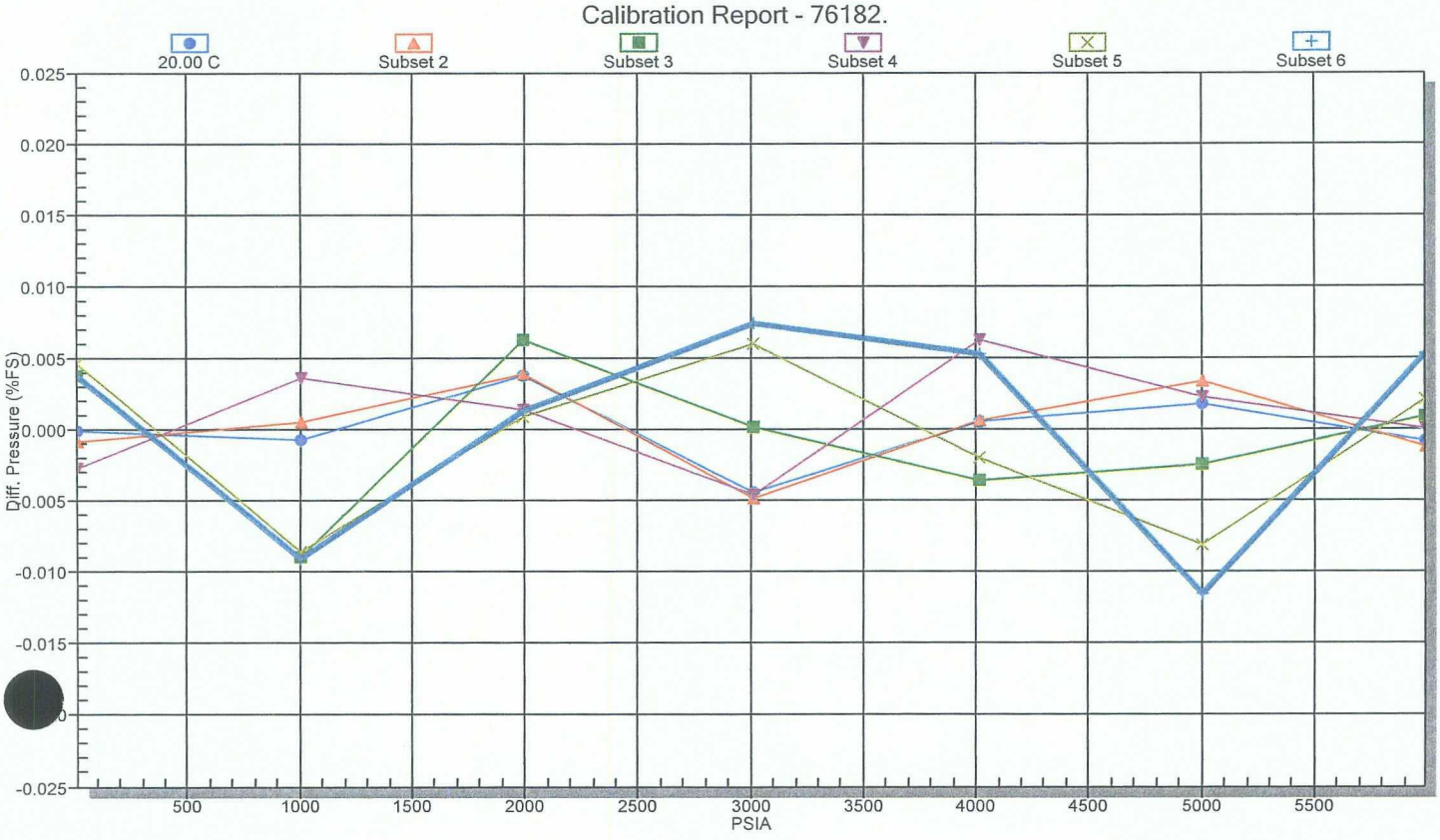
Pressure Gauge
Certificate of Calibration



GAUGE NUMBER: 76182

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 = 688862	ft0 = 152426	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 13.47852494	0.2189303292	0.0005428346087	-5.845752466E-07	-4.705748664E-09
B 1.99173863	-0.00165322469	-7.67652636E-07	-2.220527404E-09	4.851584078E-12
C -4.524144325E-06	1.026879913E-08	-4.319609922E-12	-1.009417117E-12	-4.518369862E-15
D 1.235198867E-10	5.134001041E-13	6.499233546E-14	4.86295983E-16	1.270013257E-18

Temperature (C) STANDARD FIT COEFFICIENTS

A 19.94484003

B -0.3611188605

C -4.342615759E-05

D -3.152177425E-07

0 points eliminated.
Error File: Gauge # 76182

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
1003.75	20.00	-0.05	-0.17	-0.17
1993.33	20.00	0.22	-0.22	-0.22
3008.16	20.00	-0.27	-0.18	-0.18
4012.02	20.00	0.03	0.00	0.00
5001.33	20.00	0.11	0.22	0.22
5987.27	20.00	-0.05	0.51	0.51
13.50	50.00	-0.05	-0.05	-0.05
1003.75	50.00	0.03	-0.13	-0.13
1993.33	50.00	0.23	-0.20	-0.20
3008.16	50.00	-0.29	-0.18	-0.18
4012.02	50.00	0.04	-0.09	-0.09
5001.33	50.00	0.20	0.05	0.05
5987.27	50.00	-0.08	0.31	0.31
13.50	85.00	0.22	0.08	0.08
1003.75	85.00	-0.54	0.00	0.00
1993.33	85.00	0.38	-0.08	-0.08
3008.16	85.00	0.01	-0.08	-0.08
4012.02	85.00	-0.21	0.00	0.00
5001.33	85.00	-0.15	0.11	0.11
5987.27	85.00	0.05	0.29	0.29
13.50	110.00	-0.16	0.06	0.06
1003.75	110.00	0.22	-0.03	-0.03
1993.33	110.00	0.08	-0.09	-0.09
3008.16	110.00	-0.27	-0.09	-0.09
4012.02	110.00	0.37	-0.04	-0.04
5001.33	110.00	0.13	0.04	0.04
5987.27	110.00	0.00	0.19	0.19
13.50	135.00	0.27	0.00	0.00
1003.75	135.00	-0.51	-0.06	-0.06
1993.33	135.00	0.06	-0.13	-0.13
3008.16	135.00	0.36	-0.16	-0.16
4012.02	135.00	-0.12	-0.12	-0.12
5001.33	135.00	-0.49	-0.05	-0.05
5987.27	135.00	0.13	0.07	0.07
13.50	150.00	0.22	0.14	0.14
1003.75	150.00	-0.55	0.06	0.06
1993.33	150.00	0.07	-0.03	-0.03
3008.16	150.00	0.44	-0.05	-0.05
4012.02	150.00	0.31	-0.03	-0.03
5001.33	150.00	-0.69	0.03	0.03
5987.27	150.00	0.31	0.14	0.14

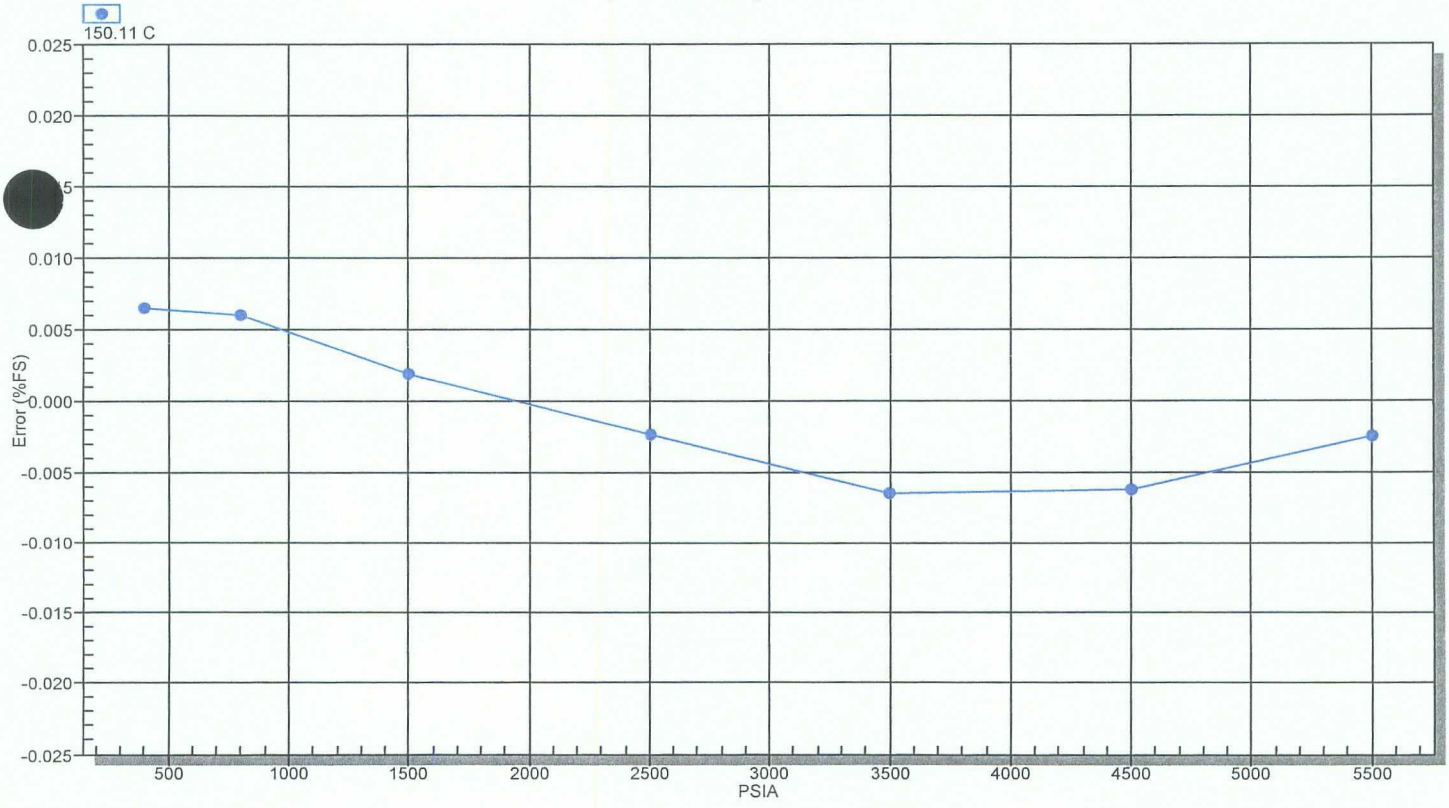
Spartek Systems
#1 Thevenaz Ind. Tr.
Sylvan Lake, AB, Ca, T4S 1P5
Phone (403) 887-2443
Fax (403) 887-4050

Pressure Gauge
Certificate of Conformance

MODEL	1139	REVISION	0
SERIAL NUMBER	76182	DEADWEIGHT USED	Piston Cylinder No. 528
CALIBRATED	DEC15/06	E.U.B. CERT. DATE	May 09 2006
PRESSURE RANGE	5987.27 psi	TEMPERATURE RANGE	150.00 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)

Spartek Quality Assurance

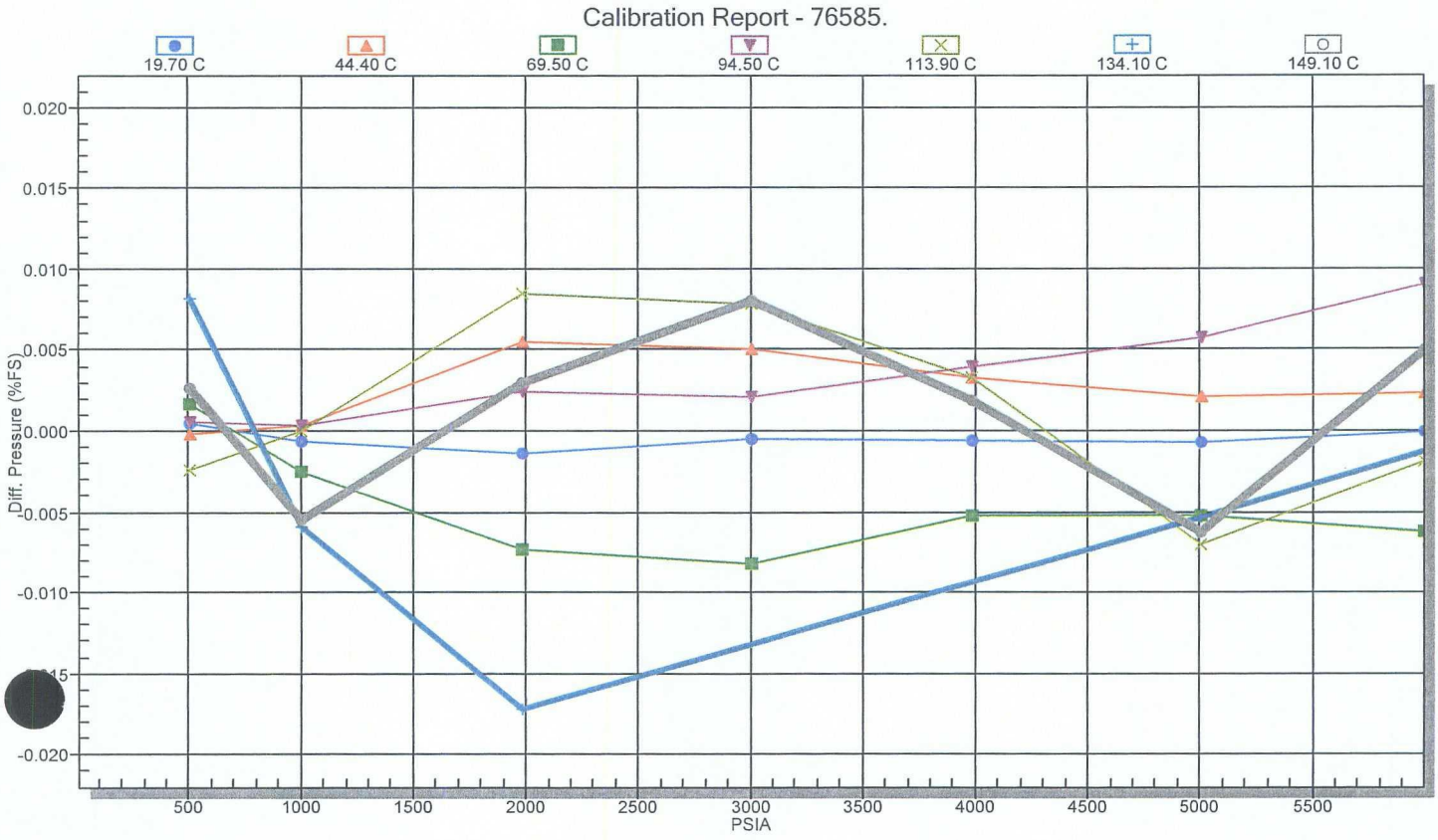


Accepted By: _____

Date: Wednesday, April 09, 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: 76585

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 = 716247	ft0 = 154394	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 506.56816	-0.3021983464	-0.0002011536835	-3.342493636E-06	-7.392728168E-09
B 2.539145276	-0.002248915424	-3.160630871E-06	-1.532756376E-08	-1.520790322E-11
C 4.170599769E-06	1.507087904E-07	2.501358088E-09	1.101189316E-11	1.099585241E-14
D 2.934358933E-11	-4.523237952E-11	-7.325144003E-13	-3.298214675E-15	-3.419194911E-18

Temperature (C) STANDARD FIT COEFFICIENTS

A 19.80967765

B -0.3540814361

C 4.758682836E-05

D -5.814773214E-08

2 points eliminated.
Error File: Gauge # 76585

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
506.55	19.70	716247.31	154394.25	0.03
999.76	19.70	735667.00	154408.25	-0.04
1986.22	19.70	774482.69	154428.75	-0.09
3001.67	19.70	814392.31	154436.75	-0.03
3988.09	19.70	853094.69	154430.25	-0.04
5003.51	19.70	892855.31	154409.25	-0.05
5989.88	19.70	931392.31	154376.50	-0.01
506.55	44.40	715472.31	147516.50	-0.02
999.76	44.40	733853.69	147530.75	0.02
1986.22	44.40	770615.69	147555.25	0.33
3001.67	44.40	808413.00	147567.25	0.30
3988.09	44.40	845077.69	147566.25	0.20
5003.51	44.40	882752.31	147552.75	0.12
5989.88	44.40	919267.31	147527.25	0.14
506.55	69.50	714697.00	140632.00	0.10
999.76	69.50	732155.69	140646.00	-0.15
1986.22	69.50	767052.69	140670.00	-0.44
3001.67	69.50	802935.00	140680.00	-0.49
3988.09	69.50	837750.00	140682.50	-0.32
5003.51	69.50	873529.00	140678.25	-0.32
5989.88	69.50	908215.00	140659.25	-0.38
506.55	94.50	713924.31	133949.25	0.03
999.76	94.50	730523.00	133956.50	0.02
1986.22	94.50	763713.00	133971.50	0.14
3001.67	94.50	797844.31	133981.50	0.13
3988.09	94.50	830966.00	133987.00	0.23
5003.51	94.50	865003.31	133981.00	0.34
5989.88	94.50	898005.00	133967.75	0.54
506.55	113.90	713393.00	128865.25	-0.15
999.76	113.90	729326.31	128878.00	0.00
1986.22	113.90	761235.00	128898.00	0.51
3001.67	113.90	794082.00	128910.75	0.47
3988.09	113.90	825969.00	128916.75	0.19
5003.51	113.90	858737.00	128917.00	-0.42
5989.88	113.90	890514.31	128906.00	-0.11
506.55	134.10	713042.00	123983.25	0.49
999.76	134.10	728289.69	123994.00	-0.35
1986.22	134.10	758915.31	124011.75	-1.03
5003.51	134.10	852963.31	124028.00	-0.32
5989.88	134.10	883616.31	124024.50	-0.08
506.55	149.10	712889.00	120032.00	0.16
999.76	149.10	727621.00	120047.00	-0.33
1986.22	149.10	757288.00	120066.00	0.18
3001.67	149.10	787971.69	120075.00	0.48
3988.09	149.10	817833.31	120083.50	0.11
5003.51	149.10	848556.69	120081.25	-0.38
5989.88	149.10	878358.69	120081.50	0.29

Spartek Systems
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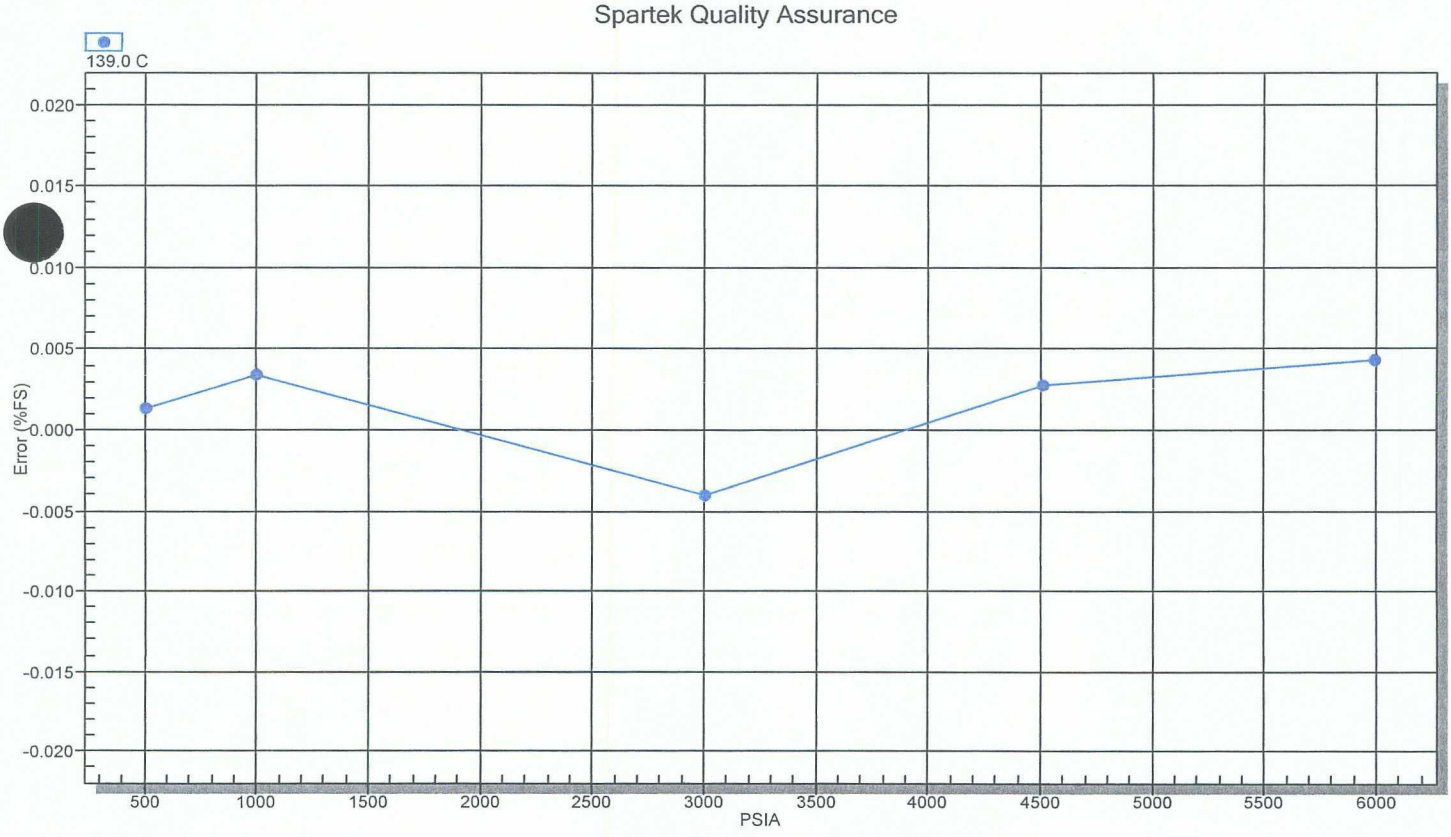
Phone (403) 887-2443
Fax (403) 887-4050

Pressure Gauge
Certificate of Conformance

MODEL	1139	REVISION	0
SERIAL NUMBER	76585	DEADWEIGHT USED	Piston Cylinder No. 528
CALIBRATED	APR23/09	E.U.B. CERT. DATE	May 09 2007
PRESSURE RANGE	5989.88 psi	TEMPERATURE RANGE	149.10 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: Tuesday, April 28, 2009

Sapphire,Apr 24/06
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1002.15, 20.00, 744991.31, 153130.25
1990.65, 20.00, 804243.69, 153128.75
3006.81, 20.00, 865357.69, 153117.25
3993.52, 20.00, 924665.00, 153033.00
5011.56, 20.00, 985922.31, 152918.25
5998.12, 20.00, 1045264.69, 152778.00
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506.26, 50.00, 713978.69, 144891.75
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3993.52, 85.00, 894709.00, 135386.50
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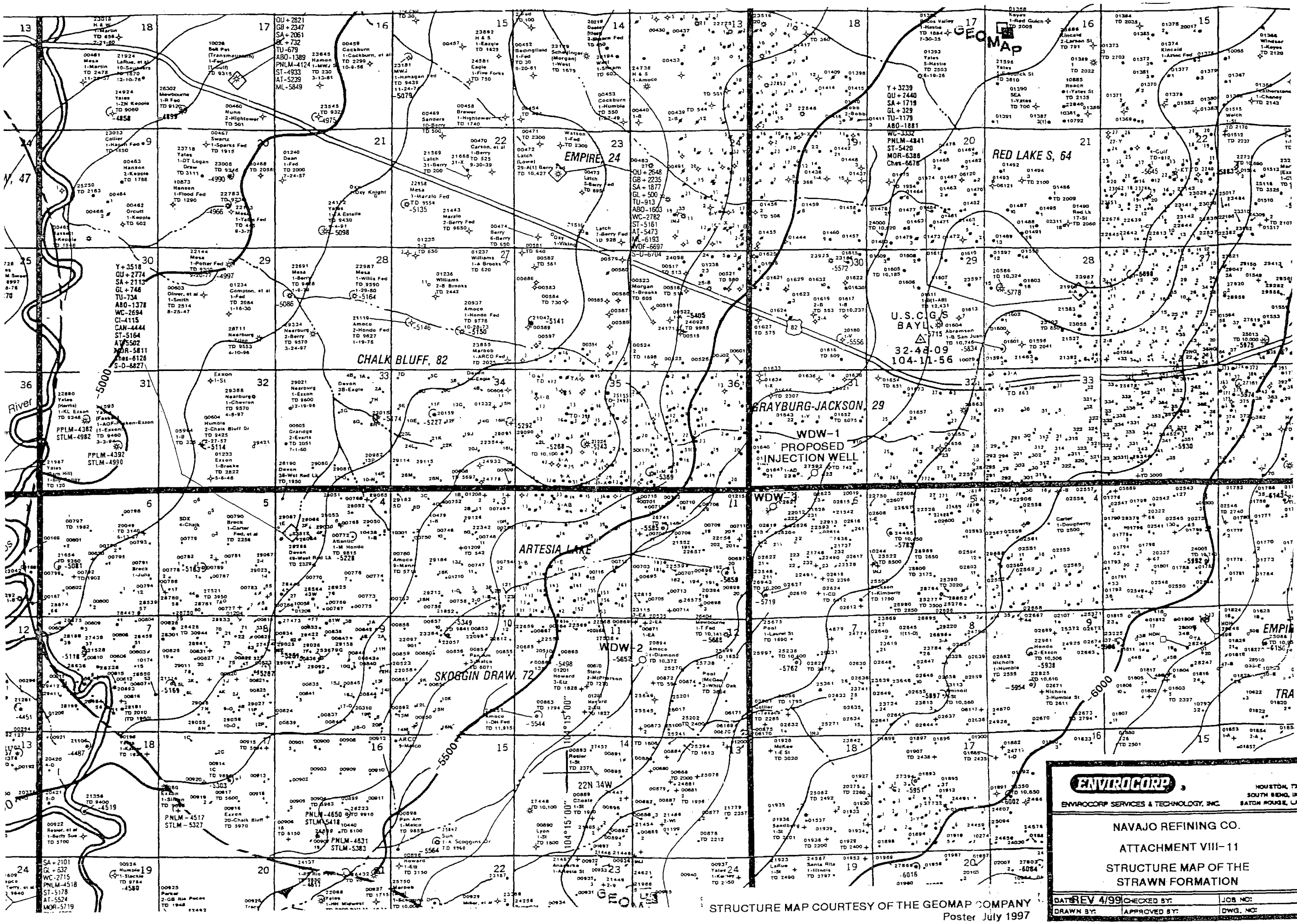
APPENDIX I

STRAWN STRUCTURE MAPS



STRUCTURE MAP COURTESY OF THE GEOMAP COMPANY
Poster July 1997

ENVIROCORP
ENVIROCORP SERVICES & TECHNOLOGY, INC.
HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

NAVAJO REFINING CO.

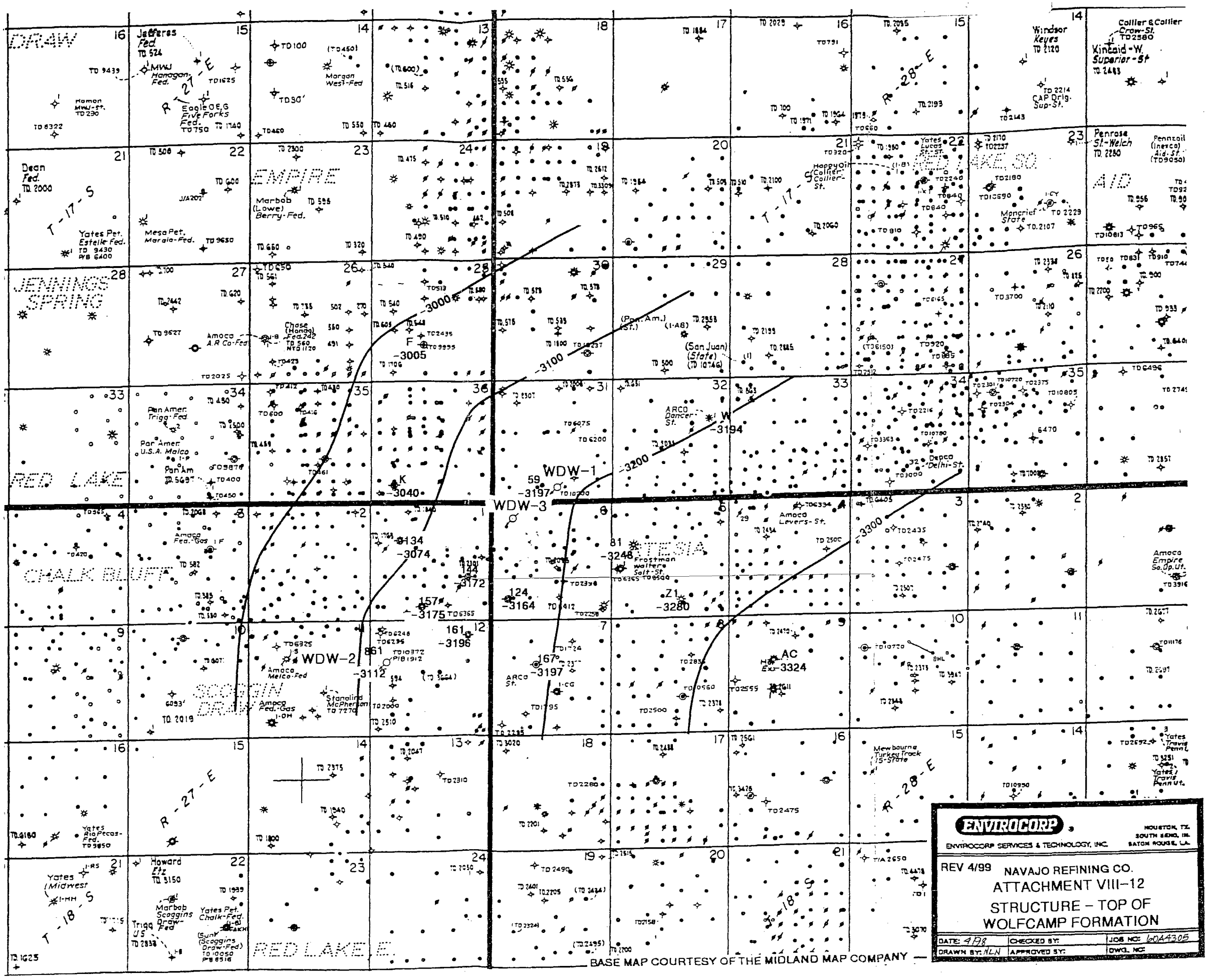
ATTACHMENT VIII-11

STRUCTURE MAP OF THE STRAWN FORMATION

DATE REV 4/99	CHECKED BY:	JOB NO:
DRAWN BY:	APPROVED BY:	DWG. NO:

APPENDIX J

WOLFCAMP STRUCTURE MAPS



157 ID NO.
-4025 SUBSEA DEPTH

ENVIROCORP
ENVIROCORP SERVICES & TECHNOLOGY, INC.
HOUSTON, TX. SOUTH BEND, IN. BATON ROUGE, LA.

REV 4/99 NAVAJO REFINING CO.

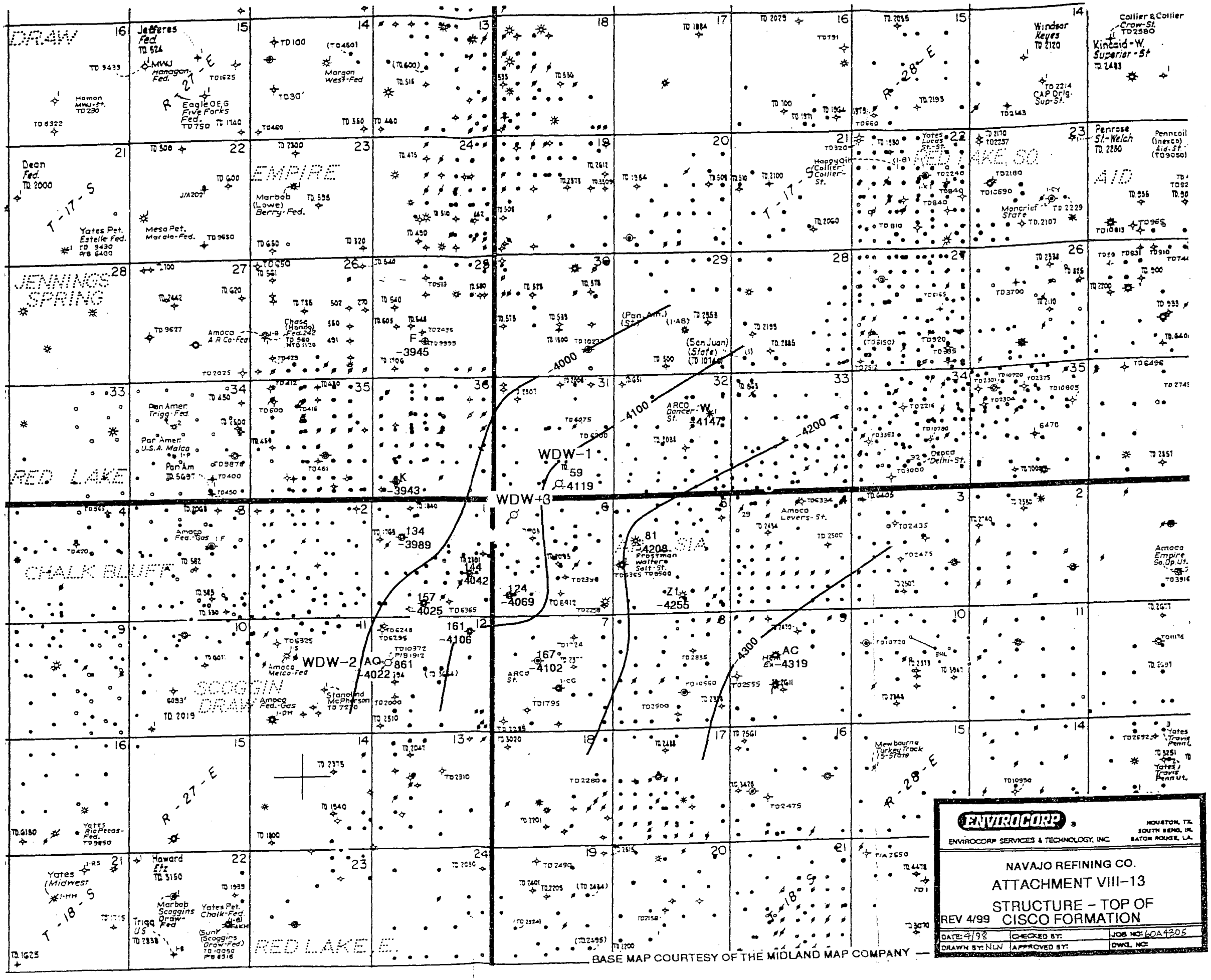
ATTACHMENT VIII-12

STRUCTURE – TOP OF WOLFCAMP FORMATION

DATE: 4/98	CHECKED BY:	JOB NO: 6044305
DRAWN BY: MLN	APPROVED BY:	DWG. NO:

APPENDIX K

CISCO STRUCTURE MAPS



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.

NAVAJO REFINING CO.

ATTACHMENT VIII-13

STRUCTURE – TOP OF CISCO FORMATION

REV 4/99

DATE: 4/98	CHECKED BY:	JOB NO: 60A4205
DRAWN BY: NLN	APPROVED BY:	DWG. NO:

APPENDIX L

CHRONOLOGY OF FIELD ACTIVITIES

SUBSURFACE

APPENDIX L

CHRONOLOGY OF FIELD ACTIVITIES

Sunday November 7, 2010

Russell Smith:

Travel to Artesia, NM, and contacted contractors. Note all times are in Mountain Standard Time (MST).

Monday November 8, 2010

Russell Smith:

Subsurface arrived at the Navajo Plant at 8:00 am CST. Memory read out (MRO) gauges were placed into each well as follows;

WDW-1 ----- 2 MROs spotted on depth at 7924 feet 09:09 am CST, wire was 092 carbon steel
WDW-2 ----- 2 MROs spotted on depth at 7570 feet 10:27 pm CST, wire was 092 stainless steel
WDW-3 ----- 2 MROs spotted on depth at 7660 feet 11:47 pm CST, wire was 092 carbon steel

On Well No. 1 there was a treatment procedure in place to remove iron sulfide and scale from the well. Below is a listing of the anticipated date and times for each stage of the testing process;

Operation	Day	Date	Time	Hours
Gauges in All Well by Continue Normal Operations	Monday	11/08/2010	12:00 PM	0
Shut-in Wells No. 1 and No. 3 and Start Injection Period in Well No.2	Wednesday	11/10/2010	12:00 PM	48
Shut In Well No. 2 start Falloff Period	Thursday	11/11/2010	07:00 PM	31
Pull Gauges from all Wells and Return Wells to Normal Operations	Saturday	11/13/2010	07:00 AM	36

After 2:00 PM on Saturday 11/13/2010 the plant can restart injection into the wells.

Friday November 12, 2010

Russell Smith:

Travel to Artesia, NM, and contacted contractors. Note all times are in Mountain Standard Time (MST).

Saturday November 13, 2010

Russell Smith:

Subsurface arrived at the well location at 7:15 am CST (6:15 MST) at 8:00 am CST received a call from the wireline crew that they could not find the well and had to go escort them to the well site. At 8:30 am wireline crew started out of the wellbore with memory read out (MRO) pressure gauges making five minute gradient stops every 1,000 feet (7660', 7000', 6000', 5000', 4000', 3000', 2000', 1000', surface). At 9:45 am wireline crew was out of the WDW-3 wellbore and moved over to the WDW-2 well. At 10:30 am wireline crew started out of WDW-2 wellbore with MRO gauges. At 11:40 wireline crew moved over to WDW-1 and started out of the wellbore with MRO gauges. At 1:00 pm wireline crew had pulled all gauges and left the well site.

Sunday November 14, 2010

Russell Smith:

Subsurface personnel traveled from Artesia, NM to Houston, TX.

APPENDIX M

PANSYSTEM© ANALYSIS OUTPUT

SUBSURFACE

APPENDIX M

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:

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

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
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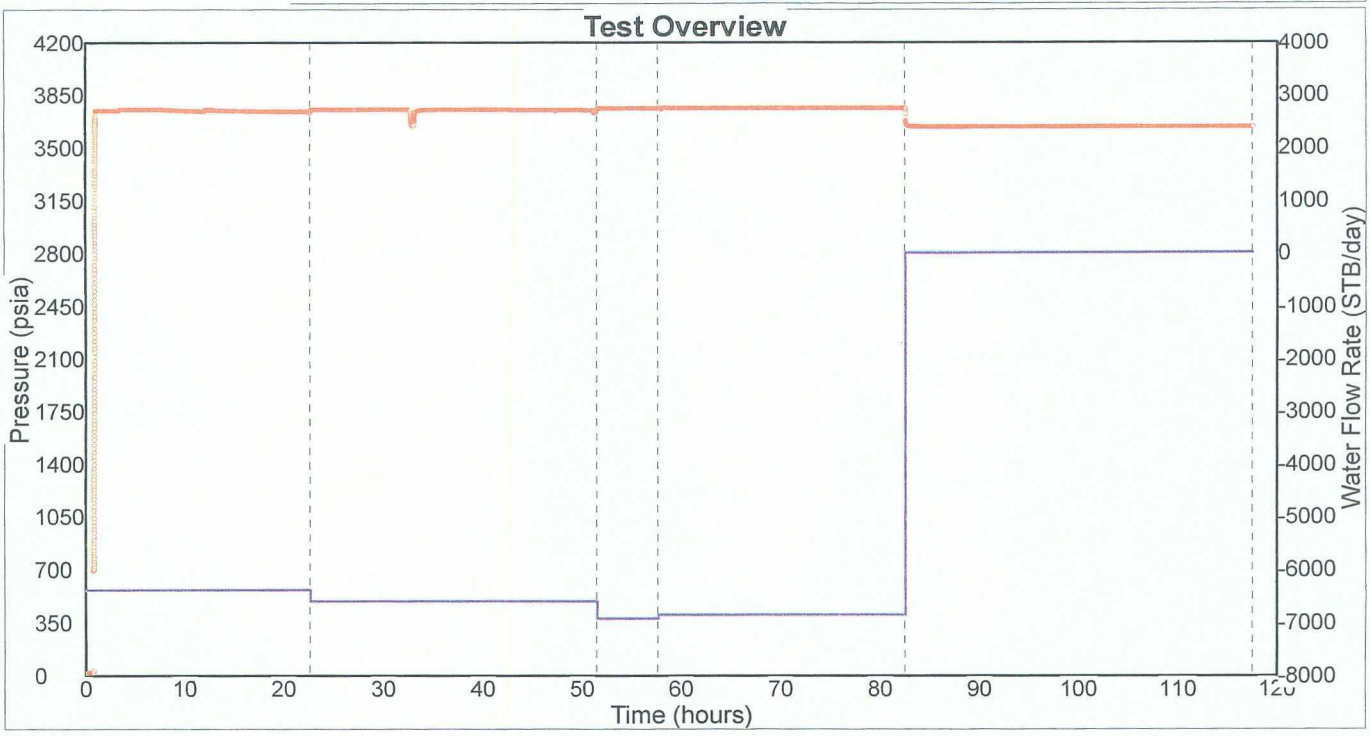
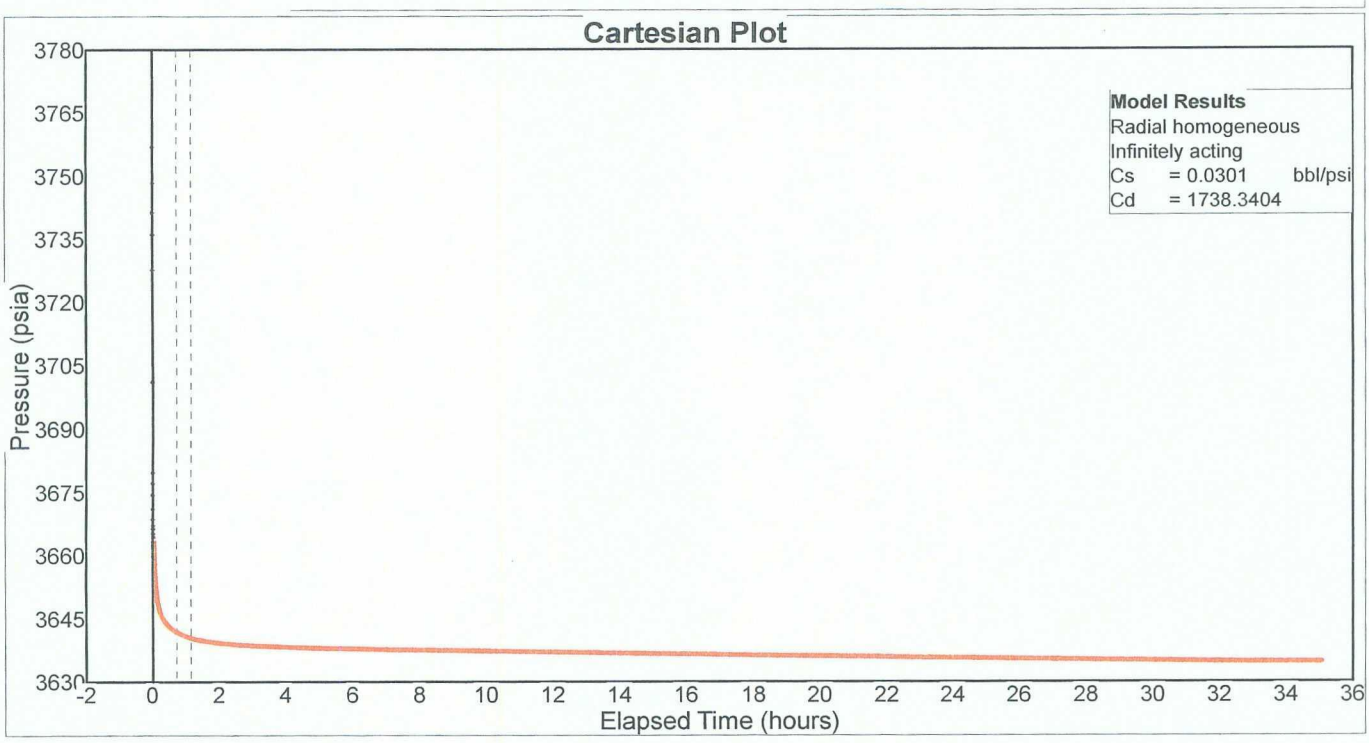


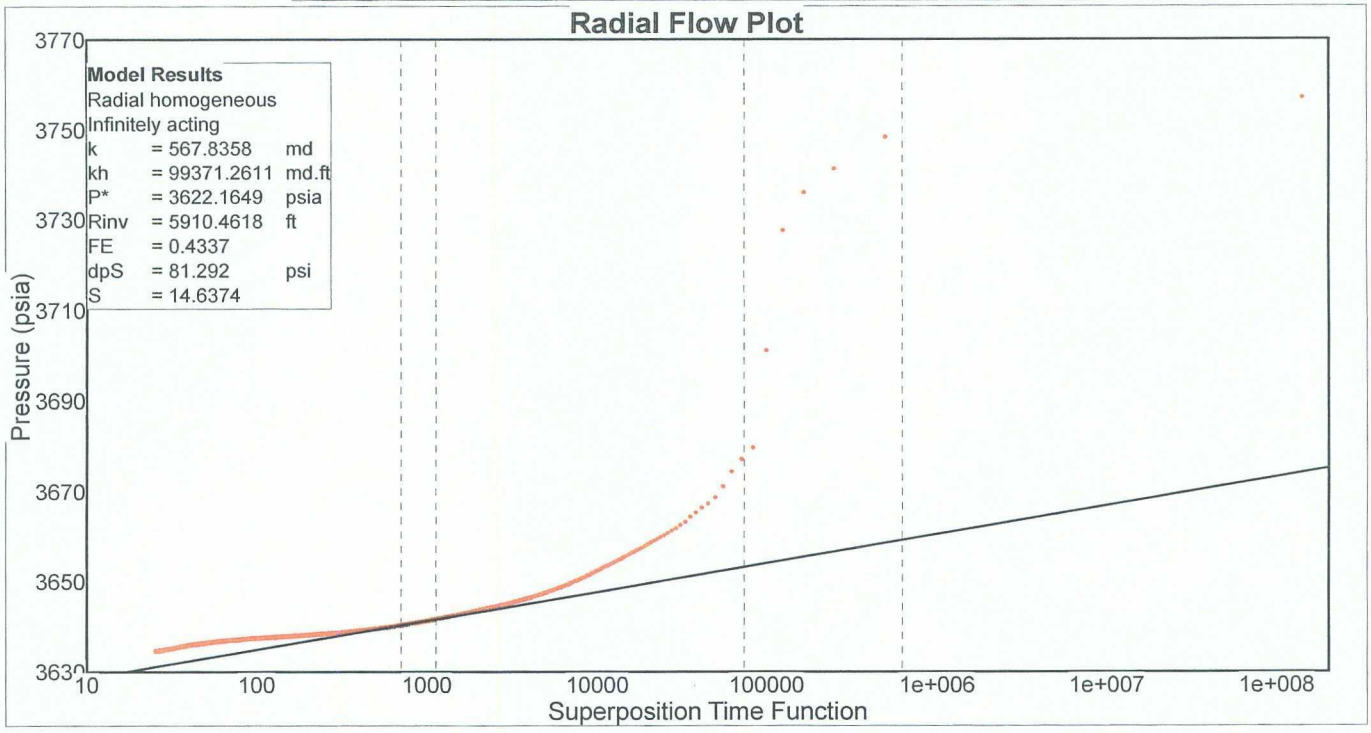


Cartesian Plot Model Results
Radial homogeneous - Infinitely acting

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

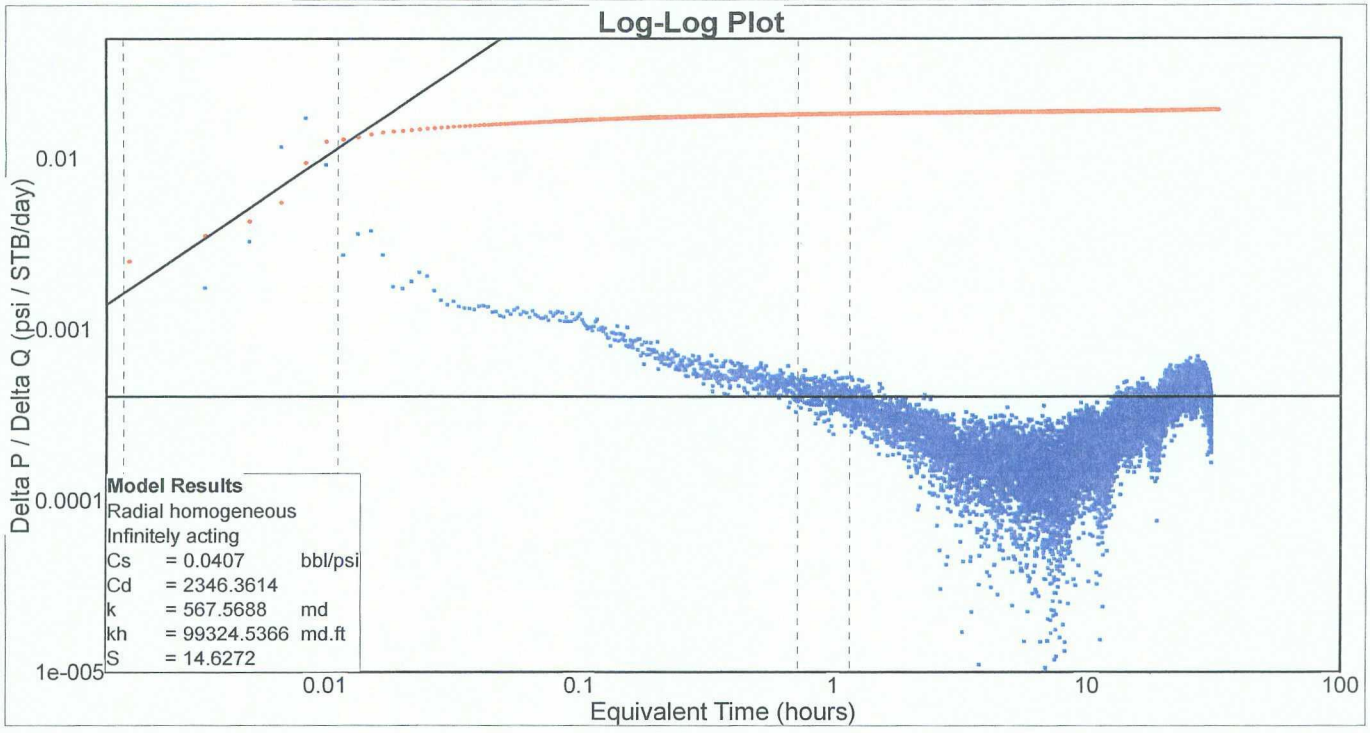
Fair Wellbore Storage

	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