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EPA FALL-OFF TEST (WDW-3)

2014

2014 PRESSURE FALLOFF TEST AND BOTTOM-HOLE PRESSURE SURVEY ON GAINES WELL NO. 3

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO
PROJECT NO. 185818-7039

SUBMITTED:
SEPTEMBER 2014

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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 27-hour injection period and a 40-hour falloff period. Bottom-hole gauges were also placed in the offset wells: Mewbourne Well No. 1 and Chukka Well No. 2. These wells are owned by Navajo and are also used to inject plant waste into the same injection interval as Gaines Well No. 3.

As prescribed by the guidelines, this report discusses supporting and background information for Gaines Well No. 3, the one-mile area of review (updated since the falloff testing performed on August 22 – 28, 2014), and geology. In addition, information on the offset wells is provided. Daily testing activities and the point of shut-in is also provided. 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 OGRD Number: Section 1, Township 18 South, Range 27 East

2. WELL INFORMATION

a. OCD UIC Permit Number: WDW-3 UICI-8-0
b. Well Classification: Class I Non-Hazardous
c. Well Name and Number: Gaines Well No. 3
d. API Number: 30-015-26575
e. Well Legal Location: 760 FSL, 2250 FWL

3. CURRENT WELLBORE SCHEMATIC

The Gaines Well No. 3 wellbore schematic is presented in Figure 1. The schematic contains data, as requested by the guidelines and includes the following:

a. Tubing: 4-1/2-inch, 11.6 pound per foot, steel construction, API grade J-55, with long thread connections (LTC).
b. Packer: Arrow X-1, 7-inch by 2-7/8-inch set in tension (37,000 pounds) at 7,575 feet.
c. Tubing Length: 7,568 feet with a 0.54-foot, 4-1/2-inch by 2-7/8-inch crossover in the top of the packer. There are no profile nipples in the tubing or the packer as this was not a requirement of the permit.
d. Size, Type, and Depth of Casing: There are four casing strings in the well and one below the injection interval. The information for these casing strings was obtained from OCD records on file with the state and geophysical logs. The casing strings are:

    i. 13-3/8-inch, 54.5 pound per foot, steel construction, API grade J-55, with short thread connections (STC), set at a depth of 400 feet. The casing was cemented to the surface with 425 sacks of cement. The casing was set in

open hole with a diameter of 17.5 inches. This information was obtained from OCD records.

ii. 9-5/8-inch, 36 pound per foot, steel construction, API grade J-55, STC, set at a depth of 2,600 feet. The casing was cemented to the surface with 1,025 sacks of cement. The casing was set in open hole with a diameter of 12.25 inches. This information was obtained from OCD records.

iii. 7-inch, 26 pound per foot and 29 pound per foot, steel construction, API grade N-80 and P-110, STC, set at a depth of 9,450 feet. The casing was cemented with 1,350 sacks of cement to 900 feet from surface. The casing was set in open hole with a diameter of 8.75 inches. The top cement and weight of the pipe was verified with a CBL and caliper log run on October 13, 2006. The remainder of the information was obtained from OCD records.

iv. Below the cement plug at 9,022 feet is the top of a 4-1/2-inch liner. The liner is a string of 4-1/2-inch casing installed to a depth of 10,119 feet. There is a cast iron bridge plug set in the liner at 9,800 feet, which is above the original perforations, between 9,861 feet and 9,967 feet. The current injection interval is above the plug at 9,022 feet. The cement plug also isolates the lower section of the original wellbore. This information was obtained from OCD records.

e. The top of cement was determined from a CBL run in the 7-inch casing string on October 13, 2006. The top of cement in the 7-inch casing was found at 900 feet below the surface. The top of cement in the 9-5/8-inch and 13-3/8-inch casing strings was verified through OCD records and volume calculations.

f. The 7-inch casing was perforated on October 14 and October 15, 2006. The casing was perforated with a 0.5-inch diameter hole at 2 shots per foot on a 60° phasing. The perforations are located between 7,660 feet and 8,450 feet and from 8,540 feet to 8,620 feet.

g. The total depth of the well is 10,119 feet with the plug back depth at 9,022 feet. On August 28, 2014, fill was tagged at 8,946 feet.

h. The bottom-hole pressure gauges consisted of two memory readout (MRO) backup pressure gauges. The MROs were placed at 7,660 feet (top of the perforations) and 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 1.0040 (8.36 pounds per gallon). Using the same methodology described above, the viscosity of the injected fluid was 0.50 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 August 28, 2014, was 3,150,350,847 gallons. The volume of fluid injected into the Mewbourne Well No. 1 was 1,604,073,815 gallons. The volume of fluid injected into the Chukka Well No. 2 was 1,028,807,249 gallons. The volume of fluid injected into the Gaines Well No. 3 was 517,469,783 gallons. The area of review (AOR) indicates that there are two 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 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. Both gauges were sapphire crystal gauges. The MRO pressure gauges (Serial Nos. 76404 and 76171) 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. 76120 and 76111. 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. 75871 and 76173. 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 gauge, Serial No. 76404 has a full range of 0 psi to 10,000 psi, an accuracy of 0.024% of full scale, and a resolution of 0.01% of full scale. Serial No. 76171, has a full range of 0 psi to 6,000 psi, an accuracy of 0.024% of full scale and a resolution of 0.01% of full scale.

In Mewbourne Well No. 1, the MRO pressure gauges, Serial Nos. 76120 and 76111, have a full range of 0 psi to 10,000 psi, an accuracy of 0.024% of full scale, and a resolution of 0.01% of full scale

In Chukka Well No. 2, the MRO pressure gauges, Serial Nos. 75871 and 76173 have a full range of 0 psi to 6,000 psi, an accuracy of 0.024% of full scale, and a resolution of 0.01% of full scale.

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

The certificate of calibration for each of the pressure gauges used during the testing are included as Appendix H. The manufacturers recommended calibration frequency is one year.

10. ONE MILE AREA OF REVIEW (AOR)

Federal Abstract Company was contracted by Subsurface and instructed to undertake a review of well changes made within a one-mile Area of Review (AOR) of the Mewbourne Well No. 1, Chukka Well No. 2, and Gaines Well No. 3. In 2012, 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 2012 report.

No new fresh water wells were reported within the search area since the submittal of the 2012 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.

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

   Table II contains a listing of all wells within the one-mile AOR, with their current status. Tables III through VII 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 2012 annual report submittal.

   Thirteen (13) wells were found in which the owner had changed. Fourteen (14) new plugged and abandoned oil and gas well was found. Sixteen (16) wells were placed in temporarily abandoned status. No wells were found that were returned to production status. Eight (8) wells were found that had been recompleted.

There were sixty-eight (68) new drills and permits to drill, 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., pinch outs, channels, and faults, if applicable:

From the geological study completed and submitted in the Discharge Plan Application and Application for Authorization to Inject, the reservoir appears to be continuous, with the possibility of anisotropic conditions extending to the west-southwest. The injection intervals that were studied are well confined by the Abo and Yeso low porosity carbonate beds, Tubbs shale, and Salado salt. The Cisco and Wolfcamp formations follow the Vacuum arch and have a southeasterly dip. No faults existed in the study area, but the study also shows that faulting occurs via the K-M fault located 6 miles northwest of Artesia and trends northeast-southwest. The distance to this fault line occurs no closer than 16 miles. No faults are known to exist in the confining zone within the AOR.

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

The structure map for Strawn is presented as Appendix I. The structure map for the Wolfcamp presented as Appendix J and the structure map for the Cisco Formation is presented as Appendix K.

12. OFFSET WELLS

There are only four offset wells identified in the AOR that inject into the same interval: the Federal No. 1, the Chalk Bluff Federal com No. 3, the Mewbourne Well No. 1 and the Chukka Well No. 2. The Gaines and Chukka 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 31-hour injection period and remained shut-in during the 36 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 bottomhole gauges were placed into the wells on August 22, 2014, and the 48 hour injection monitoring period portion of the testing started on August 23, 2014, at 12:00 p.m. and continued until August 25, 2014, at 12:00 p.m. On August 25, 2014, at 12:00 p.m. the Mewbourne Well No. 1 and Chukka Well No. 2 were shut-in and the 27 hour buildup portion for Gaines Well No. 3 was started. The buildup portion of the testing ended at 08:00 p.m. on August 26, 2014, and Gaines Well No. 3 was shut-in with both of the offset wells remaining shut-in for the duration of the 40 hour falloff portion of the testing. The falloff

test ended on August 28, 2014 at 11:00 a.m. On August 28, 2014 at 09:00 a.m., seven-minute gradient stops were made while pulling out of the wellbore with the pressure gauges. At 12:00 p.m., on August 28, 2014, all wells were turned over to Navajo plant operations personnel.

b. Time of the injection period:

The buildup portion of the testing began on August 22, 2014, when the injection rate was set at an average injection rate of 115 gallons per minute (gpm). The injection rate was held constant for 10 hours. The injection period used in the pressure falloff analysis was 15,226 hours, which includes the total volume since the last falloff test.

c. Type of injection fluid:

The injected fluid was non-hazardous waste water from the plant. The density averaged 8.36 pounds per gallon during the 27-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 4,410.04 psia and 103.66°F, respectively.

e. Total shut-in time:

The Gaines Well No. 3 was shut-in for a total of 40.25 hours.

f. Final static pressure and temperature at the end of the fall-off portion of the test:

The final static pressure at 7660 feet was 4,358.66 psia. The final temperature was 108.72 °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 booster pump. 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 VIII. 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 (634 days) since the August 28, 2014 falloff testing. The superposition time function was used to account for all rate changes during the time 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 (27 hours) of the testing. Figure 13 is a plot of the historical injection rates and surface pressures versus calendar time since injection began in 2008.

Figure 14 is a log-log diagnostic plot of the falloff data, showing change in pressure and pressure derivative versus elapsed shut in time. The wellbore storage, radial flow and change in reservoir characteristics flow regimes are indicated on the log-log plot and the superposition Horner plot (OCD Guideline Section IX.18.c and IX.18.d)

Wellbore storage begins at 0.003 hours and continues to an elapsed shut in time of 0.008 hours. Radial flow begins at an elapsed shut in time of 4.67 hours and continues until 13.55 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 logarithmic Horner time of 4664.98 and continues until a Horner time of 1598.42, 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 2.86087 psi/cycle (OCD Guideline Section IX.15.c). The measured injection rate prior to shut in was 3,942.86 bbl/day (115 gpm).

An estimate of mobility-thickness (transmissibility, OCD Guideline Section IX.15.d), kh/μ, for the reservoir was determined to be 325,751 md-ft/cp from the following equation:

$$\frac{kh}{\mu} = 162.6 \frac{qB}{m}$$

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

$$\frac{kh}{\mu} = 162.6 \frac{(3{,}942.86)(1.0)}{(2.86087)}$$

$$= 224{,}096$$

The permeability-thickness (flow capacity, OCD Guideline Section IX.15.i), kh, was determined to be 127,735 md-ft by multiplying the mobility-thickness, kh/μ, by the viscosity of the formation fluid (see Section 6), μ,of 0.57 centipoise:

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

$$= 224{,}096 \text{ x } 0.57$$

$$= 127{,}735 \text{ md} - \text{ft}$$

The reservoir permeability (OCD Guideline Section IX.15.e) using the total thickness (see Section 5 and Section 11) of 175 feet was 730 md:

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

$$= \frac{127{,}735}{175}$$

$$= 730 \text{ md}$$

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 517,469,783 gallons of waste has been injected into Gaines Well No. 3 (see Section 8). The formation has a porosity of 0.10 (see Section 5 and Section 11).

The distance to the waste front was determined to be 1,122 feet:

$$r_{waste} = \left(\frac{(0.13368)(517{,}469{,}783)}{(\pi)(175)(0.10)} \right)^{1/2}$$

$$= 1{,}122 \ \textit{feet}$$

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

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

where,

t_{waste}	=	time for pressure transient to reach waste front, hours
ϕ	=	formation porosity, fraction
μ_{waste}	=	viscosity of the waste at reservoir conditions, centipoise
r_{waste}	=	radius to waste front, feet

c_t = total compressibility of the formation and fluid, psi
k = formation permeability, millidarcies
948 = constant

The pore volume compressibility is 8.4 x 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 0.78 hours:

$$t_{waste} = 948\frac{(0.10)(0.57)(8.4x10^{-6})(1{,}122)^2}{730}$$

$$= 0.78$$

Since the time required to pass through the waste is less than the 4.67 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:

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

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 4,410.04 psia. The pressure determined by extrapolating the radial flow semi-log line to a Δt of one hour, p_{1hr}, was 4,364.05 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:

$$s = 1.151\left[\left[\frac{4{,}410.04 - 4{,}364.05}{2.86087}\right] - \log\left(\frac{730}{(0.10)(0.57)\left(8.4x10^{-6}\right)(0.3246)^2}\right) + 3.23\right]$$

$$= 10.53$$

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 26.18 psi:

$$\Delta p_{skin} = 0.869(m)(s)$$

$$= 0.869\ (2.86087)\ (10.53)$$

$$= 26.18\ psi$$

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 0.49:

$$E = \frac{4{,}410.04 - 26.18 - 4{,}358.66}{4{,}410.04 - 4{,}358.66}$$

$$= 0.49$$

The radius of investigation (OCD Guideline Section IX.15.a) was calculated using the analysis software and was determined to be 7,184 feet at an elapsed shut in time of 40.25 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

$$0.029\sqrt{\frac{730(40.25)}{0.10(0.57)(8.4x10^{-6})}}$$

$R_{inv} = 7{,}184\ ft$

As indicated on Figure 14, the pressure data departs the radial flow region at an elapsed time from shut in of 13.55 hours. Another change in slope is seen at an elapsed time from shut in of 22.84 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. The pressure and rate data used in the Hall plot analysis was obtained from (July 28, 2014 to August 26, 2014). Data after August 26, 2014 had unrealistic values at several data points, this appeared to be a wireless communication interference glitch in the gathering system.

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 IX (OCD Guideline Section IX.19).

On August 28, 2014, 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 after the well had been shut-in for 2 days and was 4,358.66 psia and

108.72°F, respectively. The gradient survey is summarized in Table X. 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.

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".

TABLE II
Tabulation of Wells Within One Mile Area of Review

ID NO	API	Unit No.	Sect	TOWNSHIP	RNG	NS FTG	EW FTG	WELL NAME	OPERATOR	WELL TYPE	PLUG DATE	STATUS	DATE - Comp or Plug
1	30-015-00693	A	36	17S	27E	330N	330E	DELHI #001	GEORGE A CHASE & C SERVICE	O		T/A	8/30/1941
2	30-015-00694	A	36	17S	27E	990N	990E	STATE #013	DELHI OIL CORP.	O	6/24/1948	P&A	6/24/1948
3	30-015-00646	A	36	17S	27E	990N	330E	DELHI #007	GEORGE A CHASE & C SERVICE	O		T/A	4/21/1950
4	30-015-00668	G	36	17S	27E	1650N	2310E	SOUTH RED LAKE GRAYBURG UNIT #010	LEGACY RESERVES OPERATING, LP	O		SHUT IN	12/6/1947
5	30-015-00690	G	36	17S	27E	1830N	2205E	CONKLIN #002	GEORGE A CHASE & C SERVICE	O		ACTIVE	3/6/1949
6	30-015-00667	G	36	17S	27E	2310N	2310E	SOUTH RED LAKE GRAYBURG UNIT #011	FAIRWAY RESOURCES OPERATING INC	I		ACTIVE	3/23/1949
7	30-015-00666	G	36	17S	27E	2310N	2310E	CONKLIN #001	GEORGE A CHASE & C SERVICE	O	N/A	P&A	1/10/1942
8	30-015-00689	H	36	17S	27E	1650N	330E	GATES STATE #001	GEORGE A CHASE JR & C SERVICE	O		ACTIVE	8/4/1950
9	30-015-00647	H	36	17S	27E	1650N	990E	GATES STATE #002	ASPEN OIL INC	O	10/21/2003	ACTIVE	10/21/2003
10	30-015-00669	H	36	17S	27E	2310N	330E	HOMAN #001	GEORGE A CHASE JR & C SERVICE	O	5/6/2008	P&A	5/6/2008
11	30-015-00688	I	36	17S	27E	2310S	330E	RAMAPO #001	KERSEY & CO	O	10/28/1941	P&A	10/28/1941
12	30-015-00670	I	36	17S	27E	2970N	330E	RAMAPO #003	KERSEY & CO	O	1/3/1950	P&A	1/3/1950
13	30-015-00687	I	36	17S	27E	2310S	990E	RAMAPO #002	KERSEY & CO	G	5/7/1948	P&A	5/7/1948
14	30-015-00685	I	36	17S	27E	1650S	330E	EMPIRE ABO UNIT G #020	ARCO OIL & GAS	O	7/10/1989	P&A	7/10/1989
15	30-015-00671	J	36	17S	27E	2310S	2310E	RAMAPO #003	ROJO GRANDE COMPANY LLC	O	1/24/2000	ZONE ABAN	2/13/1942
16	30-015-01221	J	36	17S	27E	2300S	2300E	SOUTH RED LAKE GRAYBURG UNIT #023	LEGACY RESOURCES OPERATING LP	O	8/13/2002	ZONE ABAN	2/27/1948
17		J	36	17S	27E			DOOLEY STATE #3	MARTIN YATES III				4/22/1961
18	30-015-05934	J	36	17S	27E	1650S	1650E	EMPIRE ABO UNIT #019A	BP AMERICA PRODUCTION COMPANY	O		ACTIVE	2/26/1961
19	30-015-01220	K	36	17S	27E	2310S	2330W	SOUTH RED LAKE GRAYBURG UNIT #022	MCQUADRANGLE, LC	O	7/17/2002	ZONE ABAN	2/3/1949
20	30-015-00674	K	36	17S	27E	2310S	2310W	RAMAPO #002	ROJO GRANDE COMPANY LLC	O		ACTIVE	5/15/1947
21	30-015-01219	K	36	17S	27E	2310S	1650W	SOUTH RED LAKE GRAYBURG UNIT #021	MCQUADRANGLE, LC	I		ACTIVE	1/20/1948
22	30-015-23913	K	36	17S	27E	1650S	1650W	SOUTH RED LAKE GRAYBURG UNIT #043	MCQUADRANGLE, LC	O		ACTIVE	12/11/1981
23		K	36	17S	27E			DOOLEY STATE ABO #3	MARTIN YATES III	O		ACTIVE	4/19/1961
24	30-015-00673	K	36	17S	27E	1650S	2310W	RAMAPO #001	ROJO GRANDE COMPANY LLC	O	1/24/2000	ZONE ABAN	1/24/2000
25	30-015-00682	N	36	17S	27E	990S	1650W	RAMAPO #004	ROJO GRANDE COMPANY LLC	O	1/24/2000	ZONE ABAN	1/24/2000
26	30-015-00683	N	36	17S	27E	965S	1650W	SOUTH RED LAKE GRAYBURG UNIT #028	FAIRWAY RESOURCES OPERATING INC	I		ACTIVE	4/16/1948
27	30-015-01218	N	36	17S	27E	330S	2310W	EMPIRE ABO UNIT #018	BP AMERICA PRODUCTION COMPANY	O	3/11/2009	P&A	3/11/2009
28	30-015-00684	O	36	17S	27E	990S	2310E	STATE B-6961 NO. 1-A	BURNHAM OIL COMPANY	O	5/13/1947	P&A	5/13/1947
29	30-015-01251	O	36	17S	27E	660S	1980E	EMPIRE ABO UNIT #019	BP AMERICA PRODUCTION COMPANY	O	4/27/2009	P&A	9/8/1959
30		I	36	17S	27E							MISPLOT OF 14	
31	30-015-00677	P	36	17S	27E	330S	990E	EMPIRE ABO UNIT #020	BP AMERICA PRODUCTION COMPANY	O	4/10/2009	P&A	4/13/2009
32	30-015-01616	P	30	17S	28E	330S	990E	BLAKE STATE #001	APACHE CORPORATION	O		ACTIVE	3/7/1953
33	30-015-01638	A	31	17S	28E	330N	990E	STATE NO. 1	BEDINGFIELD, MALCO, RESLER	O	7/15/1952	P&A	7/15/1952
34	30-015-21594	B	31	17S	28E	330N	1650E	POWCO STATE #001	FINNEY OIL COMPANY	O		ACTIVE	11/15/1975
35	30-015-01636	C	31	17S	28E	330N	2310E	DELHI-STATE NO. 1	BEDINGFIELD, J E	O	12/23/1952	P&A	12/23/1952
36	30-015-25621	B	31	17S	28E	980N	1620E	POWCO STATE #002	FINNEY OIL COMPANY	O		ACTIVE	7/15/1986
37	30-015-01633	1	31	17S	28E	330N	330W	ASTON & FAIR A #001	GEORGE A CHASE JR DBA G AND C SERVICE	O		ACTIVE	6/23/1942
38	30-015-01634	D	31	17S	28E	350N	345W	STATE 31 NO. 1X	ASTON & FAIR	O		NO COMPL	1/5/1946
39	30-015-01645	F	31	17S	28E	990N	990W	BEDINGFIELD STATE 1 NO. 1	MCLAUGHLIN, C T	O	2/16/1950	P&A	2/16/1950
40	30-015-02666	2	31	17S	28E	2310N	330W	HUDSON SAIKIN STATE #001	APACHE CORPORATION	O		ACTIVE	5/29/1948
41	30-015-24887	2	31	17S	28E	2310N	990W	HUDSON SAIKIN STATE #002	APACHE CORPORATION	O		ACTIVE	7/7/1984
42	30-015-01643	F	31	17S	28E	2310N	2260W	EMPIRE ABO UNIT #022	BP AMERICA PRODUCTION COMPANY	O	7/10/2009	P&A	6/7/1960
43	30-015-01635	F	31	17S	28E	2310N	2310W	ASTON & FAIR #001Y	GEORGE A CHASE JR DBA G AND C SERVICE	O		ACTIVE	5/8/1948
44	30-015-01637	G	31	17S	28E	2310N	2310E	MALCO STATE #001	GEORGE A CHASE JR DBA G AND C SERVICE	O		ACTIVE	10/12/1953
45	30-015-01652	G	31	17S	28E	2288N	1625E	BOLING #001	KERSEY & CO	O		ACTIVE	8/10/1960
46	30-015-10537	H	31	17S	28E	2277N	330E	NORTHWEST ARTESIA UNIT #004	LIME ROCK RESOURCES A, L.P.	O		ACTIVE	9/23/1965
47	30-015-10833	I	31	17S	28E	1980S	660E	NORTHWEST ARTESIA UNIT #010	LIME ROCK RESOURCES A, LP	O		ACTIVE	6/17/1966
48	30-015-01644	I	31	17S	28E	1650S	330E	EMPIRE ABO UNIT #024A	BP AMERICA PRODUCTION COMPANY	O	6/12/2009	P&A	4/29/1960
49	30-015-01642	J	31	17S	28E	1650S	2310E	STATE FW #001	APACHE CORPORATION	O		ACTIVE	12/23/1962
50	30-015-01650	J	31	17S	28E	1650S	1958E	EMPIRE ABO UNIT #023A	BP AMERICA PRODUCTION COMPANY	O	9/17/2003	P&A	9/17/2003
51	30-015-01651	K	31	17S	28E	1650S	2387W	EMPIRE ABO UNIT #022B	BP AMERICA PRODUCTION COMPANY	O	10/22/2009	P&A	4/10/1960
52	30-015-01640	3	31	17S	28E	2310S	330W	RAMPO #002	APACHE CORPORATION	O		ACTIVE	7/16/1955
53	30-015-01648	3	31	17S	28E	1651S	1089E	EMPIRE ABO UNIT #021A	BP AMERICA PRODUCTION COMPANY	O	8/24/2002	ZONE ABAN	8/24/2002
54	30-015-01639	4	31	17S	28E	990S	330W	RAMPO #001	APACHE CORPORATION	O		ACTIVE	5/1/1948

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ID NO	API	Unit No.	Sect	TOWNSHIP	RNG	NS FTG	EW FTG	WELL NAME	OPERATOR	WELL TYPE	PLUG DATE	STATUS	DATE - Comp or Plug
55	30-015-01647	4	31	17S	28E	660S	660W	EMPIRE ABO UNIT #021	BP AMERICA PRODUCTION COMPANY	O	7/23/2005	P&A	1/31/1960
56	30-015-01646	N	31	17S	28E	660S	2082W	EMPIRE ABO UNIT #022A	BP AMERICA PRODUCTION COMPANY	O		P&A	1/22/1960
57	30-015-10118	N	31	17S	28E	766S	2188W	STATE FV #001	APACHE CORPORATION	O		ACTIVE	3/1/1963
58	30-015-01653	O	31	17S	28E	990S	1650E	PARKER-STATE NO. 1	OTIS A ROBERTS	O	1/18/1942	P&A	1/18/1942
59	30-015-27592	O	31	17S	28E	660S	2310E	WDW #001	NAVAJO REFINING CO. PIPELINE DIVISION	I		ACTIVE	8/4/1998
60	30-015-01649	O	31	17S	28E	660S	1939E	EMPIRE ABO UNIT #023	BP AMERICA PRODUCTION COMPANY	O	8/14/2009	P&A	2/24/1960
61	30-015-20042	P	31	17S	28E	990S	660E	NORTHWEST ARTESIA UNIT #011	LIME ROCK RESOURCHES A, LP	O		ACTIVE	5/8/1967
62	30-015-01641	P	31	17S	28E	660S	660E	EMPIRE ABO UNIT #024	APACHE CORPORATION	O		ACTIVE	3/12/1960
63	30-015-01654	D	32	17S	28E	330N	330W	ASTON-STATE NO. 1	BEDINGFIELD, J E	O	5/12/1953	P&A	5/12/1953
64	30-015-01671	E	32	17S	28E	2280N	978W	EMPIRE ABO UNIT #025B	BP AMERICA PRODUCTION COMPANY	O	8/14/2008	P&A	9/13/1960
65	30-015-01657	F	32	17S	28E	2280N	1980W	AA STATE NO. 1	APACHE CORPORATION	O		ACTIVE	8/24/1960
66	30-015-10818	K	32	17S	28E	2310S	2105W	NORTHWEST ARTESIA UNIT #008	SDX RESOURCES INC	O	11/6/2006	P&A	11/6/2006
67	30-015-01661	K	32	17S	28E	1650S	2310W	EMPIRE ABO UNIT #026B	APACHE CORPORATION	O		T/A	3/27/1960
68	30-015-10795	L	32	17S	28E	2310S	660W	NORTHWEST ARTESIA UNIT #009	LIME ROCK RESOURCES A, LP	O	5/28/2008	P&A	5/15/1966
69	30-015-01662	L	32	17S	28E	1650S	990W	EMPIRE ABO UNIT #025A	APACHE CORPORATION	O		P/A	4/13/1960
70	30-015-20043	M	32	17S	28E	990S	760W	NORTHWEST ARTESIA UNIT #012	APACHE CORPORATION	O		T/A	5/9/1967
71	30-015-01660	M	32	17S	28E	660S	660W	EMPIRE ABO UNIT #025	BP AMERICA PRODUCTION COMPANY	O	1/14/2009	P&A	3/5/1960
72	30-015-10834	N	32	17S	28E	990S	2030W	NORTHWEST ARTESIA UNIT #013	SDX RESOURCES INC	O	9/15/2006	P&A	9/15/2006
73	30-015-01659	N	32	17S	28E	660S	1980W	EMPIRE ABO UNIT #026A	APACHE CORPORATION	O		T/A	2/14/1960
74	30-015-21539	N	32	17S	28E	150S	1400W	EMPIRE ABO UNIT #261	APACHE CORPORATION	O		ACTIVE	7/25/1975
75	30-015-22009	O	32	17S	28E	330S	2481E	EMPIRE ABO UNIT #272	APACHE CORPORATION	O		T/A	7/18/1977
76	30-015-02606	3	5	18S	28E	330N	1941W	EMPIRE ABO UNIT #026E	APACHE CORPORATION	O		ACTIVE	7/18/1960
77	30-015-22697	3	5	18S	28E	1080N	1914W	EMPIRE ABO UNIT #261A	BP AMERICA PRODUCTION COMPANY	O	6/16/2009	P&A	1/4/1979
78	30-015-02607	4	5	18S	28E	660N	660W	EMPIRE ABO UNIT #025C	APACHE CORPORATION	O		P/A	3/27/1960
79	30-015-22750	4	5	18S	28E	660N	150W	EMPIRE ABO UNIT #251	APACHE CORPORATION	O		P/A	1/12/1979
80	30-015-02608	E	5	18S	28E	1660N	330W	STATE E AI #001	CONOCOPHILLIPS COMPANY	O	1/13/2006	P&A	1/13/2006
81	30-015-24485	E	5	18S	28E	1980N	990W	ILLINOIS CAMP A COM #001	CONOCOPHILLIPS COMPANY	G		ACTIVE	8/10/1983
82	30-015-02602	F	5	18S	28E	1650N	1650W	EMPIRE ABO UNIT #026D	APACHE CORPORATION	O		ACTIVE	12/30/1959
83	30-015-25522	L	5	18S	28E	2240S	400W	WALTER SOLT STATE #001	APACHE CORPORATION	S		ACTIVE	8/12/1983
84	30-015-10244	L	5	18S	28E	2310S	330W	STATE AG #001	MACK ENERGY CORP	O	3/27/2001	ZONE ABAN	3/27/2001
87	30-015-20019	1	6	18S	28E	330N	330E	NORTHWEST ARTESIA UNIT #016	LIME ROCK RESOURCES A, LP	O		ACTIVE	3/14/1967
88	30-015-02615	1	6	18S	28E	660N	660E	EMPIRE ABO UNIT #024B	APACHE CORPORATION	O		ACTIVE	2/29/1960
89	30-015-02625	2	6	18S	28E	470N	2170E	EMPIRE ABO UNIT #023C	APACHE CORPORATION	I		ACTIVE	12/21/1959
90	30-015-21542	2	6	18S	28E	1260N	1580E	EMPIRE ABO UNIT #231	APACHE CORPORATION	O		P/A	11/1/1975
91	30-015-02621	3	6	18S	28E	660N	1980W	EMPIRE ABO UNIT #022E	APACHE CORPORATION	O		ACTIVE	12/29/1959
92	30-015-21626	G	6	18S	28E	1361N	2531E	EMPIRE ABO UNIT #231A	APACHE CORPORATION	O		P/A	10/22/1975
93	30-015-02613	4	6	18S	28E	990N	660W	EMPIRE ABO UNIT #021B	APACHE CORPORATION	O		ACTIVE	12/30/1959
94	30-015-23116	5	6	18S	28E	2050N	100W	EMPIRE ABO UNIT #213	APACHE CORPORATION	O		ACTIVE	6/2/1980
95	30-015-02619	5	6	18S	28E	1990N	660W	EMPIRE ABO UNIT #021C	APACHE CORPORATION	O		ACTIVE	10/30/1959
96	30-015-22637	5	6	18S	28E	2450N	400W	EMPIRE ABO UNIT #212	APACHE CORPORATION	O		ACTIVE	12/28/1978
97	30-015-21395	5	6	18S	28E	2630N	1300W	EMPIRE ABO UNIT #211	APACHE CORPORATION	O		ACTIVE	2/11/1975
98	30-015-22012	F	6	18S	28E	1350N	1572W	EMPIRE ABO UNIT #222	APACHE CORPORATION	O		ACTIVE	3/13/1977
99	30-015-02626	F	6	18S	28E	1650N	1650W	STATE NO. 1	SARKIN, DAVID C & OLIVER, HENRY F	O	2/21/1942	P&A	2/21/1942
100	30-015-10107	F	6	18S	28E	1874N	1874W	STATE FX #001	DORAL ENERGY CORP	O		ACTIVE	8/8/1963
101	30-015-02620	F	6	18S	28E	1990N	2082W	EMPIRE ABO UNIT #022D	APACHE CORPORATION	O		ACTIVE	11/26/1959
102	30-015-22527	F	6	18S	28E	2630N	1930W	EMPIRE ABO UNIT #223	APACHE CORPORATION	O		ACTIVE	5/19/1978
103	30-015-21746	F	6	18S	28E	2610N	2713W	EMPIRE ABO UNIT #221	APACHE CORPORATION	O		ACTIVE	4/23/1976
104	30-015-22913	G	6	18S	28E	1750N	1600E	EMPIRE ABO UNIT #235	APACHE CORPORATION	O		T/A	7/8/1979
105	30-015-22593	G	6	18S	28E	1900N	2441E	EMPIRE ABO UNIT #234	BP AMERICA PRODUCTION COMPANY	O	12/3/2008	P&A	8/27/1978
106	30-015-02614	G	6	18S	28E	1980N	1980E	EMPIRE ABO UNIT #023B	APACHE CORPORATION	O		ACTIVE	1/26/1960
107	30-015-21737	G	6	18S	28E	2253N	1576E	EMPIRE ABO UNIT #232	BP AMERICA PRODUCTION COMPANY	O	5/7/2009	P&A	4/13/1976
108		H	6	18S	28E							MISPLOT OF 107	
109	30-015-22490	G	6	18S	28E	2550N	2050E	EMPIRE ABO UNIT #233	BP AMERICA PRODUCTION COMPANY	O	4/3/2009	P&A	6/5/1978
110	30-015-02616	H	6	18S	28E	1650N	990E	EMPIRE ABO UNIT #024C	APACHE CORPORATION	O		P/A	3/24/1960

TABLE II
Tabulation of Wells Within One Mile Area of Review

ID NO	API	Unit No.	Sect	TOWNSHIP	RNG	NS FTG	EW FTG	WELL NAME	OPERATOR	WELL TYPE	PLUG DATE	STATUS	DATE - Comp or Plug
111	30-015-23547	H	6	18S	28E	1950N	660E	EMPIRE ABO UNIT #241	BP AMERICA PRODUCTION COMPANY	O	9/19/2008	P&A	4/12/1981
112	30-015-02617	I	6	18S	28E	2310S	990E	EMPIRE ABO UNIT #024K	BP AMERICA PRODUCTION COMPANY	O	12/12/2002	P&A	12/12/2002
113	30-015-22528	J	6	18S	28E	2300S	1570E	EMPIRE ABO UNIT #232A	BP AMERICA PRODUCTION COMPANY	O	4/7/2009	P&A	2/5/1979
114	30-015-02611	J	6	18S	28E	2310S	2310E	STATE NO. 1	BARNEY COCKBURN	O	8/15/1949	P&A	8/15/1949
115	30-015-02628	J	6	18S	28E	2260S	2270E	EMPIRE ABO UNIT #023D	BP AMERICA PRODUCTION COMPANY	O		ACTIVE	5/23/1979
116	30-015-22491	J	6	18S	28E	1700S	2350E	EMPIRE ABO UNIT #231B	BP AMERICA PRODUCTION COMPANY	O	9/2/2009	P&A	8/13/1978
117	30-015-02618	J	6	18S	28E	1647S	2076E	CAPITOL STATE NO. 1	MILLER BROS OIL CO	G	3/21/1955	P&A	3/21/1955
118	30-015-02623	K	6	18S	28E	2248S	2075W	EMPIRE ABO UNIT #022F	APACHE CORPORATION	O		ACTIVE	2/22/1960
119		K	6	18S	28E							MISPLOT	
120		L	6	18S	28E			WDW-2 (ORIGINAL LOCATION)	NAVAJO REFINING COMPANY				
121	30-015-02622	6	6	18S	28E	2219S	660W	EMPIRE ABO UNIT #021D	APACHE CORPORATION	O		ACTIVE	1/23/1960
122	30-015-23548	6	6	18S	28E	1950S	1000W	EMPIRE ABO UNIT #211A	APACHE CORPORATION	O		ACTIVE	7/17/1980
123	30-015-02627	7	6	18S	28E	949S	990W	STATE M-AI #002	RUTH OIL CO, LLC	O		ACTIVE	10/21/1960
124	30-015-26943	7	6	18S	28E	990S	730W	CHALK BLUFF 6 STATE #001	MEWBOURNE OIL CO	G		ACTIVE	4/16/1992
125	30-015-02610	N	6	18S	28E	955S	1750W	EMPIRE ABO UNIT #022C	APACHE CORPORATION	O		ACTIVE	8/5/1960
126	30-015-02624	O	6	18S	28E	968S	2270E	STATE CD NO. 1	PAN AMERICAN PETROLEUM CO	O	5/1/1961	P&A	5/1/1961
127	30-015-25503	P	6	18S	28E	660S	330E	KIMBERLY STATE NO. 1	DICKSON PETROLEUM CO	O	12/30/1985	P&A	12/30/1985
128	30-015-02612	P	6	18S	28E	330S	330E	STATE NO. 1	D & H OIL CO	O	5/13/1952	P&A	5/13/1952
129	30-015-01215	1	1	18S	27E	667N	666E	EMPIRE ABO UNIT #020D	APACHE CORPORATION	O		ACTIVE	11/5/1959
130	30-015-00708	2	1	18S	27E	660N	1980E	EMPIRE ABO UNIT #019B	APACHE CORPORATION	O		P/A	7/7/1959
131		C	1	18S	27E			HILL #4	MALCO REFINERIES		5/10/1948	P&A	5/10/1948
132		C	1	18S	27E							MISPLOT	
133	30-015-00710	3	1	18S	27E	660N	1980W	AAO FEDERAL No. 013	ALAMO PERMIAN RESOURCES, LLC	O		ACTIVE	7/21/2004
134	30-015-26741	F	1	18S	27E	1650N	1350W	CHALK BLUFF FEDERAL COM #002	MEWBOURNE OIL CO	G		ACTIVE	8/24/1991
135	30-015-00706	F	1	18S	27E	2310N	1980W	EMPIRE ABO UNIT #018A	ALAMO PERMIAN RESOURCES, LLC	O		ACTIVE	5/31/1959
136	30-015-00709	G	1	18S	27E	1980N	1980E	EMPIRE ABO UNIT #019C	ALAMO PERMIAN RESOURCES, LLC	O		ACTIVE	8/2/1959
137		G	1	18S	27E							MISPLOT	
138	30-015-21552	G	1	18S	27E	2500N	2500E	EMPIRE ABO UNIT #191	CFM OIL, LLC	O		P/A	9/7/1975
139	30-015-00711	H	1	18S	27E	1980N	660E	EMPIRE ABO UNIT #020C	BP AMERICA PRODUCTION COMPANY	O		P/A	10/13/1959
140	30-015-21783	H	1	18S	27E	2490N	1299E	EMPIRE ABO UNIT #202	ALAMO PERMIAN RESOURCES, LLC	O		ACTIVE	5/13/1976
141	30-015-22656	H	1	18S	27E	2400N	700E	EMPIRE ABO UNIT #203	APACHE CORPORATION	O		ACTIVE	10/10/1978
142		H	1	18S	27E			CRONIN #1	MANHATTAN OIL		7/1/2027	P&A	7/1/1927
143	30-015-21553	H	1	18S	27E	2501N	20E	EMPIRE ABO UNIT #201	ALAMO PERMIAN RESOURCES, LLC	O		ACTIVE	7/19/1975
144	30-015-27163	I	1	18S	27E	1980S	990E	CHALK BLUFF FEDERAL COM #003	MEWBOURNE OIL CO	I		ACTIVE	1/16/1993
145	30-015-00697	I	1	18S	27E	1980S	660E	EMPIRE ABO UNIT #020K	BP AMERICA PRODUCTION COMPANY	O	1/5/2003	P&A	1/5/2003
146	30-015-22657	J	1	18S	27E	2490S	2200E	EMPIRE ABO UNIT #193	ALAMO PERMIAN RESOURCES, LLC	O		ACTIVE	10/26/1978
147	30-015-00696	J	1	18S	27E	1980S	1980E	EMPIRE ABO UNIT #019Q	APACHE CORPORATION	O		P&A	8/20/1959
148	30-015-22560	J	1	18S	27E	220S	1390E	EMPIRE ABO UNIT #192	BP AMERICA PRODUCTION COMPANY	O		T/A	6/25/1978
149	30-015-21873	J	1	18S	27E	1526S	1470E	EMPIRE ABO UNIT #191A	ALAMO PERMIAN RESOURCES, LLC	O		ACTIVE	9/23/1976
150	30-015-22658	J	1	18S	27E	1500S	2130E	EMPIRE ABO UNIT #194	APACHE CORPORATION	O		T/A	11/14/1978
151	30-015-22559	K	1	18S	27E	2290S	2445W	EMPIRE ABO UNIT #184	APACHE CORPORATION	O		P/A	7/25/1978
152	30-015-22096	K	1	18S	27E	2370S	1510W	EMPIRE ABO UNIT #183	APACHE CORPORATION	O		ACTIVE	7/24/1977
153	30-015-21554	K	1	18S	27E	1367S	1440W	EMPIRE ABO UNIT #181	BP AMERICA PRODUCTION COMPANY	O	4/17/2003	P&A	4/17/2003
154	30-015-00707	K	1	18S	27E	1980S	1980W	EMPIRE ABO UNIT #018B	APACHE CORPORATION	O		ACTIVE	5/22/1959
155	30-015-21792	K	1	18S	27E	1533S	2370W	EMPIRE ABO UNIT #182	LIME ROCK RESOURCES A, L.P.	O		ACTIVE	6/1/1976
156	30-015-00713	N	1	18S	27E	995S	1644W	EMPIRE ABO UNIT #018D	BP AMERICA PRODUCTION COMPANY	O	9/27/2003	P&A	9/27/2003
157	30-015-26575	N	1	18S	27E	790S	2250W	WDW-3	NAVAJO REFINING COMPANY	I		ACTIVE	3/7/1991
158	30-015-20394	O	1	18S	27E	953S	2197E	EMPIRE ABO FEDERAL NO. 5	HUMBLE OIL & REFINING CO	O	4/9/1971	P&A	4/9/1971
159	30-015-00698	O	1	18S	27E	660S	1980E	EMPIRE ABO UNIT #191	BP AMERICA PRODUCTION COMPANY	S		ACTIVE	11/8/1959
160	30-015-00699	P	1	18S	27E	940S	330E	EMPIRE ABO UNIT #020B	APACHE CORPORATION	O		ACTIVE	12/2/1961
161	30-015-26404	A	12	18S	27E	660N	990E	FEDERAL T #001	APACHE CORPORATION	I		ACTIVE	9/13/1990
162	30-015-25099	H	12	18S	27E	1809N	990E	COMSTOCK FEDERAL #006	HARLOW ENTERPRISES LLC	O		ACTIVE	9/11/1985
165	30-015-25997	C	7	18S	28E	940N	1757W	LAUREL STATE #001	EASTLAND OIL CO	O		ACTIVE	2/23/1987
166	30-015-25675	2	7	18S	28E	940N	1757W	LAUREL STATE #002	EASTLAND OIL CO	O		ACTIVE	11/10/1988

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ID NO	API	Unit No.	Sect	TOWNSHIP	RNG	NS FTG	EW FTG	WELL NAME	OPERATOR	WELL TYPE	PLUG DATE	STATUS	DATE - Comp or Plug
167	30-015-25236	F	7	18S	28E	1980N	1980W	STATE BY #001	MOREXCO INC	O		ACTIVE	6/10/1985
168	30-015-22636	J	7	18S	28E	1950N	1300W	PRE-ONGUARD WELL #213	DYAD PE	O		ABAN LOCATION	
169	30-015-22635	J	8	18S	28E	1900N	100W	PRE-ONGUARD WELL #212	DYAD PE	O		ABAN LOCATION	
170	30-015-24372	J	8	18S	28E	1980S	990E	PRE-ONGUARD WELL #001	DYAD PE	O		ABAN LOCATION	
171	30-015-27636	H	7	18S	28E	2310N	810E	CHALK BLUFF 6 STATE #002	PHILLIPS PETROLEUM	O		ABAN LOCATION	
353	30-015-27286	M	36	17S	27E	660S	990W	CHALK BLUFF 36 STATE #001	MEWBOURNE OIL CO	O		ACTIVE	3/30/1993
354	30-015-24612	M	36	17S	27E	790S	990W	STATE M #001	PRONGHORN MANAGEMENT CORP	O	4/21/2009	P&A	10/11/1983
355	30-015-00676	M	36	17S	27E	330N	990W	EMPIRE ABO UNIT #017	LIME ROCK RESOURCES A, L.P.	O		ACTIVE	
356	30-015-10184	M	36	17S	27E	330S	920W	STATE #006	ASPEN OIL INC	O		ACTIVE	
358	30-015-21623	M	36	17S	27E	360S	455W	STATE #007	GEORGE A CHASE JR & C SERVICE	O		ACTIVE	
359	30-015-00662	M	36	17S	27E	330S	330W	STATE NO. 2	ACREY, B L & F D	O	10/15/1942	P&A	10/15/1942
595	30-015-02605	B	5	18S	28E	930N	2271E	EMPIRE ABO UNIT NO. 27 E	BP AMERICA PRODUCTION UNIT	O	6/12/2009	P&A	3/30/1960
748	30-015-00701	D	1	18S	27E	330N	330W	SOUTH RED LAKE GRAYBURG UNIT 37 WIW	FAIRWAY RESOURCES OPERATING LLC	O		ACTIVE	
748	30-015-00715	4	1	18S	27E	330N	330W	SOUTH RED LAKE GRAYBURG UNIT #037	LEGACY RESERVES OPERATING LP	I		ACTIVE	
749	30-015-00712	D	1	18S	27E	647N	667W	EMPIRE ABO UNIT I NO. 17	ARCO OIL & GAS	O	1/24/1987	P&A	1/24/1987
750		E	1	18S	27E	1650N	330W	BRAINARD	JONES	O	5/10/1939	P&A	5/10/1939
751	30-015-00704	E	1	18S	27E	1980N	660W	EMPIRE ABO UNIT J NO. 17	ARCO OIL & GAS	O	3/26/1959	P&A	3/26/1959
752	30-015-00703	L	1	18S	27E	1980S	660W	EMPIRE ABO UNIT #017A	BP AMERICA PRODUCTION COMPANY	O	3/27/2009	P&A	5/22/1995
753	30-015-22815	M	1	18S	27E	670S	330W	EMPIRE ABO UNIT #171	LIME ROCK RESOURCES A, L.P.	O		ACTIVE	5/22/1979
754		M	1	18S	27E							MISPLOT OF 756	
755	30-015-00714	N	1	18S	27E			HILL #1	VALLEY REFINING CO		12/20/1943	P&A	12/20/1943
756	30-015-00705	M	1	18S	27E	990S	660W	EMPIRE ABO UNIT #017B	BP AMERICA PRODUCTION COMPANY	O	7/21/2004	P&A	6/25/1959
757		A	2	18S	27E	330N	610E	STATE 2	BRAINARD & GUY		1/31/1942	NO COMPL	1/31/1942
758	30-015-00721	1	2	18S	27E	330N	990E	SOUTH RED LAKE GRAYBURG UNIT #036	FAIRWAY RESOURCES OPERATING LLC	O		PROD	11/6/1947
765	30-015-00724	1	2	18S	27E	990N	330E	EMPIRE ABO UNIT #016B	LIME ROCK RESOURCES A, L.P.	O		ACTIVE	
766	30-015-00737	B	2	18S	27E	905N	1601E	SOUTH RED LAKE GRAYBURG UNIT #038	FAIRWAY RESOURCES OPERATING LLC	O		ACTIVE	5/23/1948
772	30-015-00745	H	2	18S	27E	1980N	660E	STATE H #001	MACK ENERGY CORPORATION	O	3/7/2008	P&A	3/7/2008
773	30-015-00742	H	2	18S	27E	1650N	990E	SOUTH RED LAKE GRAYBURG UNIT 39 WIW	S&J OPERATING COMPANY	O	2/8/1991	P&A	2/8/1991
774	30-015-00740	G	2	18S	27E	1650N	2197E	SOUTH RED LAKE GRAYBURG UNIT #040	MCQUADRANGLE, LC	I	7/10/2002	P&A	7/10/2002
778		G	2	18S	27E	2310N	1650E	HUDSON #2	RUTTER & WILBANKS	O			1/1/1957
779	30-015-00741	G	2	18S	27E	2310N	1980E	EMPIRE ABO UNIT #015B	APACHE CORPORATION	O		ACTIVE	6/6/1959
781		J	2	18S	27E	2310S	2310E	STATE B-2	MALCO REFINING CO	O	1/1/1947	P&A	1/1/1947
785	30-015-00717	I	2	18S	27E	1980S	660E	EMPIRE ABO UNIT #016	BP AMERICA PRODUCTION COMPANY	O		P/A	2/6/1995
786	30-015-00716	J	2	18S	27E	1980S	1830E	EMPIRE ABO UNIT #015	APACHE CORPORATION	O		ACTIVE	3/23/1959
789	30-015-22896	K	2	18S	27E	1820S	2550W	EMPIRE ABO UNIT #143A	WALTER SOLT, LLC	O		ACTIVE	5/13/1979
791	30-015-22914	I	2	18S	27E	1310S	590E	EMPIRE ABO UNIT #161	COG OPERATING, LLC	O		T/A	9/13/1979
792		O	2	18S	27E							MISPLOT OF 814	
793	30-015-22609	N	2	18S	27E	1200S	1900W	EMPIRE ABO UNIT #143	APACHE CORPORATION	O		ACTIVE	12/20/1978
795		P	2	18S	27E							MISPLOT OF 765	
796	30-015-21544	O	2	18S	27E	1110S	1322E	EMPIRE ABO UNIT #151	APACHE CORPORATION	O		P/A	11/4/1975
797	30-015-22885	O	2	18S	27E	1040S	2025E	EMPIRE ABO UNIT #155	APACHE CORPORATION	O		T/A	5/1/1979
799	30-015-00722	P	2	18S	27E	660S	660E	EMPIRE ABO UNIT #016A	APACHE CORPORATION	O	2/24/2009	P&A	1/20/1959
800	30-015-22808	O	2	18S	27E	600S	1330E	EMPIRE ABO UNIT #156	BP AMERICA PRODUCTION COMPANY	O	2/5/2009	P&A	4/12/1979
801	30-015-00731	O	2	18S	27E	660S	1980E	EMPIRE ABO UNIT #015A	BP AMERICA PRODUCTION COMPANY	O	2/11/2009	P&A	11/19/1958
802	30-015-22669	O	2	18S	27E	800S	2500E	EMPIRE ABO UNIT #154	BP AMERICA PRODUCTION COMPANY	O	1/27/2009	P&A	12/4/1978
805	30-015-22013	O	2	18S	27E	90S	1456E	EMPIRE ABO UNIT #153	BP AMERICA PRODUCTION COMPANY	O	10/30/2008	P&A	4/20/1977
806	30-015-21825	O	2	18S	27E	320S	2602E	EMPIRE ABO UNIT #152	APACHE CORPORATION	O		T/A P&A	6/17/1976
807	30-015-22608	N	2	18S	27E	100S	1950W	EMPIRE ABO UNIT #142	BP AMERICA PRODUCTION COMPANY	O		(No Info on dates)	
808	30-015-21807	M	2	18S	27E	275S	1243W	EMPIRE ABO UNIT #132	BP AMERICA PRODUCTION COMPANY	O		ACTIVE	7/1/1976
812	30-015-00730	N	2	18S	27E	660S	1980W	EMPIRE ABO UNIT #014	APACHE CORPORATION	O		ACTIVE	10/21/1958
813	30-015-00720	A	2	18S	27E	990N	1650E	RIVERWOLF UNIT #004	BP AMERICA PRODUCTION COMPANY	O	12/12/2008	P&A	10/21/1959
814	30-015-22051	K	2	18S	27E	1370S	2445W	EMPIRE ABO UNIT #141A	APACHE CORPORATION	O		ACTIVE	5/17/1977
836	30-015-00869	A	11	18S	27E	330N	653E	EMPIRE ABO UNIT #016C	BP AMERICA PRODUCTION COMPANY	O	10/25/2004	P&A	10/25/2004

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837	30-015-22568	B	11	18S	27E	400N	1450E	EMPIRE ABO UNIT #151B	BP AMERICA PRODUCTION COMPANY	O	8/16/2006	P&A	8/16/2006
838	30-015-22838	B	11	18S	27E	200N	1925E	EMPIRE ABO UNIT #153B	BP AMERICA PRODUCTION COMPANY	O	1/4/2009	P&A	5/6/1979
839	30-015-00868	B	11	18S	27E	660N	1980E	EMPIRE ABO UNIT #015C	BP AMERICA PRODUCTION COMPANY	O	7/16/2004	P&A	7/16/2004
840	30-015-22569	B	11	18S	27E	560N	2588E	EMPIRE ABO UNIT #152B	BP AMERICA PRODUCTION COMPANY	O	9/24/2008	P&A	8/23/1978
841	30-015-22834	C	11	18S	27E	225N	2280W	EMPIRE ABO UNIT #141B	APACHE CORPORATION	O		ACTIVE	5/21/1979
842	30-015-00864	C	11	18S	27E	660N	1980W	EMPIRE ABO UNIT M NO. 14	ARCO OIL & GAS	O	9/5/1957	P&A	9/5/1957
843	30-015-22833	D	11	18S	27E	450N	1175W	EMPIRE ABO UNIT #133B	APACHE CORPORATION	O		ACTIVE	5/23/1979
844	30-015-00867	D	11	18S	27E	660N	660W	EMPIRE ABO UNIT M NO. 13	ARCO OIL & GAS	O	4/26/1958	P&A	4/26/1958
846	30-015-22556	D	11	18S	27E	1100N	1200W	EMPIRE ABO UNIT M NO. 131	ARCO OIL & GAS	O	7/10/1978	P&A	7/10/1978
848	30-015-20510	F	11	18S	27E	1650N	1653W	MALCO S NO. 1	AMOCO PRODUCTION CO	O	10/16/1971	P&A	10/16/1971
849	30-015-00865	F	11	18S	27E	1650N	1980W	EMPIRE ABO UNIT N NO. 14	ARCO OIL & GAS	O	2/3/1961	P&A	2/3/1961
850	30-015-00866	E	11	18S	27E	1980N	660W	EMPIRE ABO UNIT N NO. 131	ARCO OIL & GAS	O	3/27/1958	P&A	3/27/1958
851	30-015-00870	J	11	18S	27E	1980S	1980E	SMITH-MCPHERSON NO. 1	AMOCO PRODUCTION CO	O	9/1/1956	P&A	9/1/1956
852	30-015-01201	N	11	18S	27E			AN ETZ #3	OSCAR HOWARD		4/15/2027	P&A	
853	30-015-01202	O	11	18S	27E			AN ETZ #2	OSCAR HOWARD		2/4/2027	P&A	
854	30.015-00863	N	11	18S	27E			VICKERS #1	B.R. POLK, JR.		10/14/1949	P&A	10/14/1949
855	30-015-24857	M	11	18S	27E	700S	990W	FEDERAL DH GAS COM #001	CHEVERON USA INC.	G		ACTIVE	5/18/1984
856	30-015-20535	D	12	18S	27E	330N	455W	FEDERAL EA 2	ROBERT G COX	O	8/7/1973	P&A	8/7/1973
857	30-015-00871	D	12	18S	27E	330N	330W	FEDERAL EA #001	RHONDA OPERATING CO	O	4/12/1994	P&A	4/12/1994
858	30-015-23115	D	12	18S	27E	330N	380W	FEDERAL EA NO. 3	RHONDA OPERATING CO	O	3/16/1980	D&A	3/16/1980
859	30-015-25738	G	12	18S	27E	2310N	2310E	COMSTOCK FEDERAL #009	HARLOW ENTERPRISES LLC	O		ACTIVE	4/25/1987
860	30-015-25270	F	12	18S	27E	2310N	2310W	CHUKKA FEDERAL #001	PHOENIX ENERGY	O		ACTIVE	4/23/1985
861	30-015-20894	E	12	18S	27E	1980N	660W	WDW #002	NAVAJO REFINING COMPANY	I		ACTIVE	7/18/1973
862	30-015-00874	J	12	18S	27E	2310S	2355E	COMSTOCK FEDERAL #007	HARLOW ENTERPRISES LLC	O		ACTIVE	6/29/1948
863	30-015-00872	L	12	18S	27E	310S	990W	MAGRUDER NO. 1	MCKEE-JONES	O	2/18/1943	D&A	
864	30-015-25201	K	12	18S	27E	1650S	1770W	COMSTOCK FEDERAL #002	HARLOW ENTERPRISES LLC	O		ACTIVE	3/16/1985
865	30-015-25649	L	12	18S	27E	1650S	990W	COMSTOCK FEDERAL NO. 8	FRED POOL DRILLING CO	O	10/10/1986	D&A	
866	30-015-25545	M	12	18S	27E	990S	990W	COMSTOCK FEDERAL #003	HARLOW ENTERPRISES LLC	O		ACTIVE	5/19/1986
867	30.015-00873	M	12	18S	27E			MAGRUDER #2	R.E. McKEE ET AL		2/27/1945	P&A	2/27/1945
868	30-015-26017	N	12	18S	27E	990S	1650W	COMSTOCK FEDERAL #010	EASTLAND OIL CO	O	1/23/2003	P&A	1/23/2003
869	30-015-25100	N	12	18S	27E	330S	1650W	COMSTOCK FEDERAL #001	HARLOW ENTERPRISES LLC	O		ACTIVE	12/10/1984
870	30-015-25202	O	12	18S	27E	330S	2310E	COMSTOCK FEDERAL #005	HARLOW ENTERPRISES LLC	O		ACTIVE	4/19/1985
871	30-015-06171	I	12	18S	27E	1069S	251E	MICHAEL CRONIN NO. 3	PILCHER OIL & GAS	O	5/20/2026	P&A	
872		P	12	18S	27E			MICHAEL CRONIN #1	PILCHER OIL & GAS		2/15/1932	P&A	2/15/1932
873	30-015-00875	P	12	18S	27E	330S	330E	MAGRUDER NO. B-4	CITIES SERVICE OIL CO	O	7/30/1952	P&A	7/30/1952
874	30-015-00876	P	12	18S	27E	100S	500E	MAGRUDER NO. 5	ROBERT E MCKEE	O	2/8/1954	P&A	2/8/1954
875	30-015-06170	P	12	18S	27E	200S	200E	MICHAEL CRONIN NO. 2	PILCHER OIL & GAS	O	2/22/2026	P&A	
876	30-015-01200	A	13	18S	27E	0	0	STATE NO. 1	HASSENFUSH-DONNELLY	O	1/1/2026	P&A	
877	30-015-06137	A	13	18S	27E	250N	990E	STATE NO. 2	EASTLAND OIL CO	O	1/1/2026	D&A	
878	30-015-25394	C	13	18S	27E	330N	2310W	ARTESIA STATE #002	BILL MILLER	O		ACTIVE	9/28/1985
879	30-015-25241	C	13	18S	27E	330N	1650W	ARTESIA STATE #001	BILL MILLER	O		ACTIVE	4/13/1985
880	30-015-00884	C	13	18S	27E	990N	1650W	STATE NO. 3	DALE RESLER	O	1/29/1945	P&A	1/29/1945
881	30-015-25370	D	13	18S	27E	480N	940W	ARTESIA STATE UNIT #002A	APACHE CORPORATION	O		ACTIVE	8/27/1985
882	30-015-00883	D	13	18S	27E	990N	990W	ARTESIA STATE UNIT #001	APACHE CORPORATION	O		ACTIVE	12/11/1944
883	30-015-00880	E	13	18S	27E	1650N	990W	STATE NO. 1	DALE RESLER - JONES	O	1/26/1945	P&A	1/26/1945
884	30-015-24881	F	13	18S	27E	1880N	1830W	ANADARKO 13 FEDERAL #001	DAVID G HAMMOND	O	7/17/2011	P&A	6/18/1984
885	30-015-00888	F	13	18S	27E	1980N	1650W	PAGE NO. 1	RALPH NIX & JERRY CURTIS	O	11/28/1954	P&A	11/28/1954
886	30-015-00879	F	13	18S	27E	2310N	1650W	JONES-GOVT NO. 1	DALE RESLER	O	3/14/1945	D&A	3/14/1945
888	30-015-25078	G	13	18S	27E	1724N	2279E	ANADARKO 13 FEDERAL NO. 1	DICKSON PETROLEUM, INC	O	12/30/1984	D&A	12/30/1984
895	30-015-00891	A	14	18S	27E	990N	330E	ARTESIA STATE UNIT TRACT 4 NO. 1	ANADARKO PETROLEUM CORP	O	6/30/1944	P&A	6/30/1944
896	30-015-00893	G	14	18S	27E	1650N	1650E	STATE NO. 1	RESLER	O	1/1/1900	D&A	1/1/1900
897	30-015-00895	H	14	18S	27E	1650N	330E	ARTESIA STATE UNIT #001B	APACHE CORPORATION	O		ACTIVE	2/8/1945
901	30-015-00695	L	1	18S	27E	1650S	330W	HILL NO. 1	WILLIAM & EDWARD HUDSON	O	6/18/1948	D&A	6/18/1948
910	30-015-00744	J	2	18S	27E	2310S	1640E	STATE 1	COMPTON-SMITH	O		P&A	

TABLE II
Tabulation of Wells Within One Mile Area of Review

ID NO	API	Unit No.	Sect	TOWNS HIP	RNG	NS FTG	EW FTG	WELL NAME	OPERATOR	WELL TYPE	PLUG DATE	STATUS	DATE - Comp or Plug
911	30-015-31123	H	36	17S	27E	1980N	760E	NO BLUFF 36 STATE COM #002	LIME ROCK RESOURCES A, LP	G		ACTIVE	
912	30-015-31036	H	36	17S	27E	2310N	990E	GATES STATE #003	GEORGE A CHASE JR & C SERVICE	O		ACTIVE	
916	30-015-31592	N	36	17S	27E	330S	2310E	RAMAPO #007	ROJO GRANDE COMPANY LLC	O	12/21/2001	P&A	12/21/2001
917	30-015-30784	A	31	17S	28E	330N	480E	NW STATE #012	LIME ROCK RESOURCES A, LP	O		ACTIVE	
918	30-015-30893	A	31	17S	28E	973N	959E	NW STATE #028	LIME ROCK RESOURCES A, LP	O		ACTIVE	
919	30-015-32162	1	31	17S	28E	460N	990W	ENRON STATE #004	LIME ROCK RESOURCES A, LP	O		ACTIVE	4/3/2003
920	30-015-30783	H	31	17S	28E	1650N	330E	NW STATE #011	LIME ROCK RESOURCES A, LP	O		ACTIVE	
921	30-015-30849	I	31	17S	28E	2310S	270E	NW STATE #009	LIME ROCK RESOURCES A, LP	O		ACTIVE	
922	30-015-30760	P	31	17S	28E	735S	330E	NW STATE #010	LIME ROCK RESOURCES A, LP	O		ACTIVE	
923	30-015-31920	D	32	17S	28E	990N	990W	ENRON STATE #002	APACHE CORPORATION	O		ACTIVE	
924	30-015-30781	K	32	17S	28E	1900S	2146W	NW STATE #005	LIME ROCK RESOURCES A, LP	I		ACTIVE	
925	30-015-30777	L	32	17S	28E	2310S	990W	NW STATE #006	APACHE CORPORATION	O		ACTIVE	
926	30-015-30685	M	32	17S	28E	990S	990W	NW STATE #007	APACHE CORPORATION	O		ACTIVE	
927	30-015-30815	N	32	17S	28E	1090S	2126W	NW STATE #008	LIME ROCK RESOURCES A, LP	I		ACTIVE	
928	30-015-32310	1	1	18S	27E	990N	990E	AAO FEDERAL #004	APACHE CORPORATION	O		ACTIVE	5/4/2004
929	30-015-32309	2	1	18S	27E	330N	1690E	AAO FEDERAL #003	APACHE CORPORATION	O		ACTIVE	4/10/2003
930	30-015-32308	3	1	18S	27E	430N	2310W	AAO FEDERAL #002	APACHE CORPORATION	O		ACTIVE	9/19/2002
931	30-015-32307	4	1	18S	27E	330N	990W	AAO FEDERAL #001	APACHE CORPORATION	O		ACTIVE	12/10/2002
932	30-015-22816	O	1	18S	27E	1120S	1440E	EMPIRE ABO UNIT L #192	ARCO OIL & GAS	O	6/23/1980	ABAN LOCATION	6/28/1980
933	30-015-20388	N	1	18S	27E	990S	2297E	EMPIRE ABO #5	ARCO OIL & GAS	O	12/31/9999	SAME AS 158	
934	30-015-27719	I	12	18S	27E	1650S	990E	CHALK BLUFF 12 FED #001	MEWBOURNE OIL CO	G		ABAN LOCATION	
935	30-015-27437	B	14	18S	27E	660N	1980E	BEAUREGARD ANP STATE COM #001	YATES PETROLEUM CORPORATION	G		ABAN LOCATION	
936	30-015-31086	E	5	18S	28E	1650N	990W	LP STATE #001	MARBOB ENERGY CORP	O	3/11/2008	P&A	3/11/2008
937	30-015-31109	E	5	18S	28E	2301N	230W	LP STATE #002	APACHE CORPORATION	O		PROPOSED	
938	30-015-30785	1	6	18S	28E	430N	330E	NW STATE #015	APACHE CORPORATION	O		ACTIVE	
939	30-015-00264	J	6	18S	28E	2310S	2310E	CAPITAL STATE NO. 1	BARNEY COCKBURN	O		SAME AS 114	5/23/1979
940	30-015-31087	7	6	18S	28E	990S	330W	LP STATE #003	MARBOB ENERGY CORP	O	3/17/2008	P&A	7/15/2000
941	30-015-31088	7	6	18S	28E	330S	990W	LP STATE #004	MARBOB ENERGY CORP	O		PROPOSED	
942	30-015-06250	O	6	18S	28E	470S	2170E		BP AMERICA PRODUCTION COMPANY	O		SAME AS 89	
943	30-015-31319	3	7	18S	28E	2310N	330W	LAUREL STATE #003	EASTLAND OIL CO	O		ACTIVE	1/31/2001
944	30-015-26575	D	6	18S	28E	778N	995W	WDW-3 (ORIGINAL LOC.)	NAVAJO REFINING COMPANY	I		ACTIVE	
945	30-015-32959	E	1	18S	27E	1650N	875W	AAO FEDERAL #005	APACHE CORPORATION	O		ACTIVE	10/12/2004
946	30-015-33473	G	1	18S	27E	1750N	1650S	AAO FEDERAL #007	MARBOB ENERGY CORP	O		ACTIVE	4/4/2005
947	30-015-33784	H	1	18S	27E	1650N	330W	AAO FEDERAL #008	MARBOB ENERGY CORP	O		ACTIVE	2/25/2005
948	30-015-34071	F	1	18S	27E	2169N	1963W	AAO FEDERAL #006	MARBOB ENERGY CORP	O		ACTIVE	8/5/2005
949	30-015-34387	L	1	18S	27E	1980S	630W	AAO FEDERAL #009	MARBOB ENERGY CORP	O		ACTIVE	1/17/2006
950	30-015-34555	M	1	18S	27E	890S	660W	AAO FEDERAL #011	MARBOB ENERGY CORP	O		ACTIVE	3/9/2006
951	30-015-34576	K	1	18S	27E	2060S	2160W	AAO FEDERAL #010	MARBOB ENERGY CORP	O		ACTIVE	10/26/2006
952	30-015-34998	N	1	18S	27E	890S	1650W	AAO FEDERAL #012	MARBOB ENERGY CORP	O		ACTIVE	9/21/2006
953	30-015-34028	G	6	18S	28E	2285N	1366E	SLIDER 6 STATE NO. 001	BP AMERICA PRODUCTION COMPANY	O	12/17/2006	P&A	12/17/2006
954	30-015-35050	D	32	17S	28E	330N	500W	ENRON STATE NO 012	LIME ROCK RESOURCES A, LP	O		ACTIVE	12/21/2006
955	30-015-40187	A	14	18S	27E	660N	990E	VIOLET BIV STATE COM #1	YATES PETROLEUM CORP	O		EXT PERMIT TO DRILL	2/20/2009
956	30-015-33994	A	36	17S	27E	915N	420E	RED LAKE 36 A STATE #2	EDGE PETROLEUM OPERATING COMPANY, INC	O		ACTIVE	4/20/2005
957	30-015-36116	G	36	17S	27E	2305N	1650E	SOUTH RED LAKE UNIT II #57	LEGACY RESERVES OPERATING LP	O		ACTIVE	6/6/2008
958	30-015-32946	J	2	18S	27E	2210S	1650E	SCBP STATE #1	APACHE CORPORATION	O		ACTIVE	4/26/2005
959	30-015-35814	H	2	18S	27E	2063N	441E	STATE H NO 2	MACK ENERGY CORPORATION	O		ACTIVE	1/11/2008
960	30-015-36343	G	31	17S	28E	1650N	2310E	MALCO STATE NO. 002	GEORGE A CHASE JR DBA G AND C SERVICE	O		ACTIVE	7/9/2008
961	30-015-36978	D	31	17S	28E	990N	330W	ENRON STATE NO. 015	LIME ROCK RESOURCES A, LP	O		ACTIVE	7/3/2009
962	30-015-36554	L	32	17S	28E	1770S	550W	NW STATE NO. 029	LIME ROCK RESOURCES A, LP	O		ACTIVE	1/30/2009
963	30-015-36989	K	32	17S	28E	1630S	1710W	NW STATE NO. 030	LIME ROCK RESOURCES A, LP	O		NO COMPL	7/14/2009
964	30-015-37057	N	32	17S	28E	330S	1750W	NW STATE NO. 031	LIME ROCK RESOURCES A, LP	O		NO COMPL	7/28/2009
965	30-015-37058	M	32	17S	28E	330S	330W	NW STATE NO. 032	LIME ROCK RESOURCES A, LP	O		NO COMPL	8/23/2009
966	30-015-37428	G	31	17S	28E	1980N	1980E	MALCO STATE NO. 3	G&C SERVICE	O		ACTIVE	2/10/2010
967	30-015-38240	G	36	17S	27E	1425N	1520E	KIOWA STATE NO. 3	COG OPERATING, LLC	O		ACTIVE	

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ID NO	API	Unit No.	Sect	TOWNSHIP	RNG	NS FTG	EW FTG	WELL NAME	OPERATOR	WELL TYPE	PLUG DATE	STATUS	DATE - Comp or Plug
968	30-015-39029	G	36	17S	27E	2210N	2310E	CONKLIN STATE NO. 1-Y	G AND C SERVICE	O		ACTIVE	
969	30-015-39321	M	36	17S	27E	990S	890W	BIG BOY STATE NO. 1	COG OPERATING, LLC	O		PERMIT TO DRILL	
970	30-015-39322	M	36	17S	27E	840S	425W	BIG BOY STATE NO. 3	COG OPERATING, LLC	O		ACTIVE	
971	30-015-39323	O	36	17S	27E	870S	1560E	BIG BOY STATE NO. 5	COG OPERATING, LLC	O		ACTIVE	
972	30-015-39324	O	36	17S	27E	480S	2210E	BIG BOY STATE NO. 6	COG OPERATING, LLC	O		PERMIT TO DRILL	
973	30-015-39325	O	36	17S	27E	990S	2210E	BIG BOY STATE NO. 7	COG OPERATING, LLC	O		PERMIT TO DRILL	
974	30-015-39326	O	36	17S	27E	275S	1560E	BIG BOY STATE NO. 8	COG OPERATING, LLC	O		ACTIVE	
975	30-015-39401	P	36	17S	27E	1110S	630E	EMPIRE ABO UNIT NO. 417	APACHE CORPORATION	O		ACTIVE	
976	30-015-39009	G	2	18S	27E	1650N	2430E	EMPIRE ABO UNIT NO. 415	APACHE CORPORATION	O		PERMIT TO DRILL	
977	30-015-39066	L	2	18S	27E	2551S	1170W	EMPIRE ABO UNIT NO. 416	APACHE CORPORATION	O		PERMIT TO DRILL	
978	30-015-38234	P	30	17S	28E	430S	800E	ANTHONY NO. 2	LIME ROCK RESOURCES	O		ACTIVE	
979	30-015-39299	M	30	17S	28E	990S	990W	MAPLE STATE NO. 5	COG OPERATING, LLC	O		PERMIT TO DRILL	
980	30-015-39300	M	30	17S	28E	330S	330W	MAPLE STATE NO. 6	COG OPERATING, LLC	O		PERMIT TO DRILL	
981	30-015-38512	D	30	17S	28E	990N	940W	ENRON STATE NO. 16	LIME ROCK RESOURCES	O		ACTIVE	
982	30-015-39004	P	31	17S	28E	150S	1300E	EMPIRE ABO UNIT NO. 401	APACHE CORPORATION	O		PERMIT TO DRILL	
983	30-015-39011	O	31	17S	28E	1190S	1320E	EMPIRE ABO UNIT NO. 419	APACHE CORPORATION	O		PERMIT TO DRILL	
984	30-015-39020	O	31	17S	28E	140S	2560E	EMPIRE ABO UNIT NO. 408	APACHE CORPORATION	O		PERMIT TO DRILL	
985	30-015-38513	J	32	17S	28E	2310S	2032E	JEFFER 32 STATE NO. 3	LIME ROCK RESOURCES	O		ACTIVE	
986	30-015-39006	J	32	17S	28E	2400S	2450E	EMPIRE ABO UNIT NO. 407	APACHE CORPORATION	O		T/A	
987	30-015-39007	M	32	17S	28E	70S	100W	EMPIRE ABO UNIT NO. 409	APACHE CORPORATION	O		PERMIT TO DRILL	
988	30-015-39064	O	32	17S	28E	1175S	1310E	EMPIRE ABO UNIT NO. 403	APACHE CORPORATION	O		T/A	
989	30-015-39008	D	6	18S	28E	160N	1300W	EMPIRE ABO UNIT NO. 410	APACHE CORPORATION	O		PERMIT TO DRILL	
990	30-015-39021	D	6	18S	28E	40N	145W	EMPIRE ABO UNIT NO. 411	APACHE CORPORATION	O		PERMIT TO DRILL	
992	30-015-00715	D	1	18S	27E	330N	330W	SOUTH RED LAKE II UNIT NO. 37	LEGACY RESERVES OPERATING LP	O			
993	30-015-32307	4	1	18S	27E	330N	990W	AAO FEDERAL NO. 1	APACHE CORPORATION	O		PERMIT TO DRILL	
994	30-015-32959	E	1	18S	27E	1650N	875W	AAO FEDERAL NO. 5	APACHE CORPORATION	O		PERMIT TO DRILL	
995	30-015-33473	G	1	18S	27E	1750N	1650E	AAO FEDERAL NO. 7	APACHE CORPORATION	O		PERMIT TO DRILL	
996	30-015-33784	H	1	18S	27E	1650N	330E	AAO FEDERAL NO. 8	APACHE CORPORATION	O		PERMIT TO DRILL	
997	30-015-34071	F	1	18S	27E	2169N	1963W	AAO FEDERAL NO. 6	APACHE CORPORATION	O		PERMIT TO DRILL	
998	30-015-34555	M	1	18S	27E	890S	660W	AAO FEDERAL NO. 11	APACHE CORPORATION	O		PERMIT TO DRILL	
999	30-015-34576	K	1	18S	27E	2060S	2160W	AAO FEDERAL NO. 10	APACHE CORPORATION	O		PERMIT TO DRILL	
1000	30-015-00735	K	2	18S	27E	1980S	1830W	EMPIRE ABO UNIT NO. 14B	APACHE CORPORATION	O		PERMIT TO DRILL	
1001	30-015-22777	M	2	18S	27E	10S	640W	EMPIRE ABO UNIT NO. 134	APACHE CORPORATION	O		PERMIT TO DRILL	
1002	30-015-22824	M	2	18S	27E	800S	950W	EMPIRE ABO UNIT NO. 133	APACHE CORPORATION	O		PERMIT TO DRILL	
1003	30-015-22952	K	2	18S	27E	1310S	1400W	EMPIRE ABO UNIT NO. 142A	APACHE CORPORATION	O		PERMIT TO DRILL	
1004	30-015-39956	G	36	17S	27E	2176N	1858E	KIOWA STATE NO. 8	COG OPERATING, LLC	O		ACTIVE	4/30/2012
1005	30-015-40428	M	36	17S	27E	200S	485W	BIG BOY STATE NO. 2	COG OPERATING, LLC	O		ACTIVE	
1006	30-015-40429	M	36	17S	27E	492S	806W	BIG BOY STATE NO. 4	COG OPERATING, LLC	O		PERMIT TO DRILL	
1007	30-015-39898	A	1	18S	27E	1258E	1005E	EMPIRE ABO UNIT NO. 412	APACHE CORPORATION	O		PERMIT TO DRILL	
1008	30-015-39899	3	1	18S	27E	1305N	2535W	EMPIRE ABO UNIT NO. 413	APACHE CORPORATION	O		PERMIT TO DRILL	
1009	30-015-39900	4	1	18S	27E	1120N	1205W	EMPIRE ABO UNIT NO. 414	APACHE CORPORATION	O		PERMIT TO DRILL	
1011	30-015-36564	O	30	17S	28E	330S	2210E	STALEY STATE NO. 9	LRE OPERATING, LLC	O		ACTIVE	5/5/2009
1012	30-015-37673	N	30	17S	28E	330S	1650W	STALEY STATE NO. 12	LRE OPERATING, LLC	O		ACTIVE	7/7/2010
1013	30-015-38203	P	30	17S	28E	330S	990W	MAPLE STATE NO. 8	COG OPERATING LLC	O		PERMIT TO DRILL	
1014	30-015-40026	N	30	17S	28E	330S	2410W	STALEY STATE No. 17	LRE OPERATING, LLC	O		ACTIVE	4/4/2012
1015	30-015-39011	O	31	17S	28E	1190S	1320E	EMPIRE ABO UNIT NO. 419	APACHE CORPORATION	O		T/A	11/7/2011
1016	30-015-39020	O	31	17S	28E	140S	2560E	EMPIRE ABO UNIT NO. 408	APACHE CORPORATION	O		T/A	11/9/2011
1017	30-015-40257	D	31	17S	28E	184N	257W	BIG GIRL 31 STATE NO. 1	COG OPERATING, LLC	O		PERMIT TO DRILL	
1018	30-015-40258	D	31	17S	28E	195N	990W	BIG GIRL 31 STATE NO. 2	COG OPERATING, LLC	O		PERMIT TO DRILL	
1019	30-015-40259	G	31	17S	28E	2160N	2310E	BIG GIRL 31 STATE NO. 5	COG OPERATING, LLC	O		PERMIT TO DRILL	
1020	30-015-40260	D	31	17S	28E	1155N	990W	BIG GIRL 31 STATE NO. 7	COG OPERATING, LLC	O		PERMIT TO DRILL	
1021	30-015-40409	L	31	17S	28E	1920S	330W	BIG GIRL 31 STATE NO. 9H	COG OPERATING, LLC	O		PERMIT TO DRILL	
1022	30-015-40410	M	31	17S	28E	615S	10W	BIG GIRL 31 STATE NO. 11H	COG OPERATING, LLC	O		PERMIT TO DRILL	
1023	30-015-39927	K	32	17S	28E	1750S	1765W	AA STATE NO. 2	APACHE CORPORATION	O		ACTIVE	

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ID NO	API	Unit No.	Sect	TOWNS HIP	RNG	NS FTG	EW FTG	WELL NAME	OPERATOR	WELL TYPE	PLUG DATE	STATUS	DATE - Comp or Plug
1024	30-015-40339	D	32	17S	28E	990N	330W	ENRON STATE No. 18	LRE OPERATING, LLC	O		ACTIVE	
1025	30-015-00643	O	35	17S	27E	990S	2310E	South Red Lake Grayburg Unit #026	Legacy Reserves Operating LP	O		ACTIVE	
1026	30-015-37783	O	35	17S	27E	990S	2225E	Russell C 003	Tarco Energy, L.C.	I		ACTIVE	
1027	30-015-00644	N	35	17S	27E	330S	2310W	South Red Lake Grayburg Unit #031	Legacy Reserves Operating LP	O		ACTIVE	
1028	30-015-20104	P	35	17S	27E	990S	990E	South Red Lake Grayburg Unit #041	Legacy Reserves Operating LP	O		ACTIVE	
1029	30-015-34626	M	36	17S	27E	935N	2260E	Jeffers 36 State #4t	LRE Operating LLC	O		ACTIVE	
1030	30-015-41289	O	25	17S	27E	985S	2310E	Enron Federal #18	LRE Operating LLC	O		ACTIVE	
1031	30-015-41890	N	29	17S	28E	330S	2200E	Williams A Federal No 12	LRE Operating LLC	O		ACTIVE	
1032	30-015-40807	N	35	17S	27E	330N	2310W	Logan B "35" N Federal #18	Lime Rock Resources A, L.P.	O		ACTIVE	
1033	30-015-40808	P	35	17S	27E	970S	990E	Logan 35 P Federal #19	LRE Operating LLC	O		ACTIVE	
1034	30-015-41435	O	35	17S	27E	720S	1770E	Logan 35 O Federal 10	Lime Rock Resources A, L.P.	O		ACTIVE	
1035	30-015-42003	E	2	18S	27E	2515N	800W	Sb State 004	Apache Corporation	O		ACTIVE	
1036	30-015-42002	E	2	18S	27E	1900N	990W	Sb State 002	Apache Corporation	O		ACTIVE	
1037	30-015-36979	C	32	17S	28E	990N	2035W	Enron State #14	LRE Operating LLC	O		ACTIVE	
1038	30-015-41833	C	32	17S	28E	990 N	1700W	Enron State 19	LRE Operating LLC	O		ACTIVE	
1039	30-015-39996	C	32	17S	28E	230 N	2420W	Enron State 17	LRE Operating LLC	O		ACTIVE	
1040	30-015-41511	N	32	17S	28E	330 S	2365W	Ab State 647 016	Apache Corporation	O		ACTIVE	
1041	30-015-41498	M	32	17S	28E	330S	1090W	Ab State 647 014	Apache Corporation	O		ACTIVE	
1042	30-015-41493	N	32	17S	28E	1080S	2535W	Ab State 647 009	Apache Corporation	O		ACTIVE	
1043	30-015-41491	L	32	17S	28E	1650S	950W	Ab State 647 007	Apache Corporation	O		ACTIVE	
1044	30-015-41492	K	32	17S	28E	1375S	2320W	Ab State 647 008	Apache Corporation	O		ACTIVE	
1045	30-015-40783	C	2	18S	27E	990N	1500W	Logan 2c State No. 4	Lime Rock Resources A, L.P.	O		ACTIVE	
1046	30-015-38420	G	36	17S	27E	1460N	1539E	Kiowa State	COG Operating LLC	O		ACTIVE	
1047	30-015-39626	G	36	17S	27E	2152N	2103E	Kiowa State # 04	COG Operating LLC	O		ACTIVE	
1048	30-015-41500	K	32	17S	28E	2355S	2600W	Ab State 647 002	Apache Corporation	O		ACTIVE	
1049	30-015-41501	K	32	17S	28E	2370S	1650W	Ab State 647 003	Apache Corporation	O		ACTIVE	
1050	30-015-41505	L	32	17S	28E	2250S	1185W	Ab State 647 004	Apache Corporation	O		ACTIVE	
1051	30-015-41502	L	32	17S	28E	2310S	330W	Ab State 647 005	Apache Corporation	O		ACTIVE	
1052	30-015-41504	N	32	17S	28E	330S	1650W	Ab State 647 015	Apache Corporation	O		ACTIVE	
1053	30-015-41497	M	32	17S	28E	220 S	350W	Ab State 647 013	Apache Corporation	O		ACTIVE	
1054	30-015-41503	L	32	17S	28E	1730S	430W	Ab State 647 006	Apache Corporation	O		ACTIVE	
1055	30-015-41495	M	32	17S	28E	920S	960W	Ab State 647 011	Apache Corporation	O		ACTIVE	
1056	30-015-41494	N	32	17S	28E	1140S	1650W	Ab State 647 010	Apache Corporation	O		ACTIVE	
1057	30-015-41496	M	32	17S	28E	910S	930W	Ab State 647 012	Apache Corporation	O		ACTIVE	
1058	30-015-40679	B	2	18S	27E	968N	2300E	Blake State No. 4	Lime Rock Resources A, L.P.	O		ACTIVE	
1059	30-015-40621	C	2	18S	27E	968N	1650W	Brad State No. 4	Tarco Energy, L.C.	O		ACTIVE	
1060	30-015-31530	C	32	17S	28E	530N	1650W	Enron State #1	Lime Rock Resources A, L.P.	O		ACTIVE	
1061	30-015-00681	M	36	17S	27E	990S	330W	South Red Lake Grayburg Unit #027	Legacy Reserves Operating LP	O		P/A	
1062	30-015-33111	I	2	18S	27E	530N	2310W	Logan 2c State #3	Devon Energy	O		ACTIVE	
1063	30-015-22526	B	5	18S	28E	1300N	2345E	Empire Abo Unit "I" 272a	Apache Corporation	O		T/A	
1064	30-015-32070	I	2	18S	27E	660S	990W	Bb State Com #1	Apache Corporation	O		T/A	
1065	30-015-32899	I	2	18S	27E	2310S	2310W	Bm State #1	Apache Corporation	O		T/A	
1066	30-015-32900	I	2	18S	27E	1650N	2305W	Tdf State #2	Apache Corporation	O		T/A	
1067	30-015-36978	D	31	17S	28E	990N	330W	Enron State #15	LRE Operating LLC	O		ACTIVE	
1068	30-015-36513	N	29	17S	28E	1090S	1550W	Williams A Federal No. 8	LRE Operating LLC	O		ACTIVE	
1069	30-015-33232	M	29	17S	28E	690S	530W	Williams A Federal 5	LRE Operating LLC	O		ACTIVE	
1070	30-015-40480	M	29	17S	28E	600S	645W	Williams A Federal No. 10	Tarco Energy, L.C.	O		ACTIVE	
1071	30-015-40677	B	2	18S	27E	380N	1650E	Blake State No. 1	Tarco Energy, L.C.	O		Permit to Drill	
1072	30-015-40678	B	2	18S	27E	330N	2300E	Blake State No. 2	Tarco Energy, L.C.	O		Permit to Drill	
1073	30-015-41766	F	5	18S	28E	1910N	1505W	Libby State 001	Apache Corporation	O		Permit to Drill	
1074	30-015-41767	F	5	18S	28E	1570N	2245W	Libby State 002	Apache Corporation	O		Permit to Drill	
1075	30-015-41768	F	5	18S	28E	1570N	2245W	Libby State 002	Apache Corporation	O		Permit to Drill	
1076	30-015-41770	B	31	17S	28E	330N	2270E	T Rex State 001	Apache Corporation	O		Permit to Drill	
1077	30-015-41771	B	31	17S	28E	575N	1650E	T Rex State 002	Apache Corporation	O		Permit to Drill	

TABLE II
Tabulation of Wells Within One Mile Area of Review

ID NO	API	Unit No.	Sect	TOWNSHIP	RNG	NS FTG	EW FTG	WELL NAME	OPERATOR	WELL TYPE	PLUG DATE	STATUS	DATE - Comp or Plug
1078	30-015-41772	B	31	17S	28E	875N	2430E	T Rex State 003	Apache Corporation	O		Permit to Drill	
1079	30-015-41774	B	31	17S	28E	890N	1750E	T Rex State 004	Apache Corporation	O		Permit to Drill	
1080	30-015-41892	M	29	17S	28E	330S	975W	Williams A Federal 15	LRE Operating LLC	O		Permit to Drill	
1081	30-015-41959	K	2	18S	27E	2310S	1750W	Bm State 002	Apache Corporation	O		Permit to Drill	
1082	30-015-42024	1	1	18S	27E	126N	141E	Aao Federal #14	Apache Corporation	O		Permit to Drill	
1083	30-015-42025	1	1	18S	27E	1130N	2408E	Aao Federal #15	Apache Corporation	O		Permit to Drill	
1084	30-015-42026	1	1	18S	27E	1305N	2455W	Aao Federal #16	Apache Corporation	O		Permit to Drill	
1085	30-015-42029	1	1	18S	27E	1650N	865E	Aao Federal #17	Apache Corporation	O		Permit to Drill	
1086	30-015-42035	1	1	18S	27E	2310N	1650E	Aao Federal #18	Apache Corporation	O		Permit to Drill	
1087	30-015-42036	1	1	18S	27E	2188N	909W	Aao Federal #20	Apache Corporation	O		Permit to Drill	
1088	30-015-42051	1	1	18S	27E	2310N	2310W	Aao Federal #19	Apache Corporation	O		Permit to Drill	
1089	30-015-42116	M	29	17S	28E	990S	2160W	Williams A Federal 16	LRE Operating LLC	O		Permit to Drill	
1090	30-015-42121	C	2	18S	27E	658N	1984W	Brade State No. 5	Tarco Energy, L.C.	O		Permit to Drill	
1091	30-015-42156	D	32	17S	28E	385N	900W	Enron State 21	LRE Operating LLC	O		Permit to Drill	
1092	30-015-42334	1	1	18S	27E	1005N	1630W	Aao Federal #21	Apache Corporation	O		Permit to Drill	
1093	30-015-42335	1	1	18S	27E	790N	330W	Aao Federal #22	Apache Corporation	O		Permit to Drill	
1094	30-015-42336	1	1	18S	27E	226N	330E	Aao Federal #23	Apache Corporation	O		Permit to Drill	
1095	30-015-42337	1	1	18S	27E	984S	243E	Aao Federal #24	Apache Corporation	O		Permit to Drill	
1096	30-015-42338	1	1	18S	27E	2270S	1650W	Aao Federal #26	Apache Corporation	O		Permit to Drill	
1097	30-015-42339	1	1	18S	27E	360S	990W	Aao Federal #29	Apache Corporation	O		Permit to Drill	
1098	30-015-42358	1	1	18S	27E	183S	2497W	Aao Federal #28	Apache Corporation	O		Permit to Drill	
1099	30-015-42359	1	1	18S	27E	1960S	2063W	Aao Federal #27	Apache Corporation	O		Permit to Drill	
1100	30-015-42360	1	1	18S	27E	1261S	281W	Aao Federal #30	Apache Corporation	O		Permit to Drill	
1101	30-015-42361	1	1	18S	27E	2000S	1022W	Aao Federal #25	Apache Corporation	O		Permit to Drill	
1102	30-015-42372	D	31	17S	28E	330N	430W	Enron State #20	LRE Operating LLC	O		Permit to Drill	
1103	30-015-36281	1		18S	27E	2193S	1520W	SUN DEVILS FEDERAL NO. 001	MACK ENERGY CORPORATION	O		PERMIT TO DRILL 4/11/12	

TABLE III

Well Changes in the Combined One Mile Area of Review Since the 2012 Annual Report for Navajo's WDW-1, WDW-2, and WDW-3

ID	API No.	Unit	Sect	Town	Range	Footages	Well Name	Operator	Changes	Change of Owner	P&A	T&A	Prod	Recomp	New	Total
1025	30 015 00643	O	35	17S	27E	990 FSL & 2310 FEL	South Red Lake Grayburg Unit #026	Legacy Reserves Operating LP	Changed owner from Fairway Resources Operating, LLC to Legacy Reserves Operating LP	1						
1027	30 015 00644	N	35	17S	27E	330 FSL & 2310 FWL	South Red Lake Grayburg Unit #031	Legacy Reserves Operating LP	Changed owner from Fairway Resources Operating, LLC to Legacy Reserves Operating LP	1						
7	30 015 00666	G	36	17S	27E	2310 FNL & 2310 FEL	Conklin #001	Aspen Oil Inc	Plugged - Spotted cement 35' to Surface.		1					
1061	30 015 00681	M	36	17S	27E	990 FSL & 330 FWL	South Red Lake Grayburg Unit #027	Legacy Reserves Operating LP	Plugged - Spotted cement 1200' to 1165' and 60' to Surface.		1					
147	30 015 00696	J	1	18S	27E	1980 FSL & 1980 FEL	Empire Abo Unit #019q	Apache Corporation	Plugged - Set CIBP at 5850'. Spotted 10 sacks of cement at 5850'. Spotted 25 sacks of cement at 4430'		1					
130	30 015 00708	B	1	18S	27E	660 FNL & 1980 FEL	Empire Abo Unit #019b	Apache Corporation	Plugged - Set CIBP at 5650'. Spotted 25 sacks of cement at 5650'. Spotted 25 sacks at 3415'. Perforated at 1895'. Squeezed 50 sacks of cement at 1895'. Perforate at 1535' and squeezed 150 sacks of cement. Perforated at 250'. Squeezed 80 sacks of cement.		1					
139	30 015 00711	H	1	18S	27E	1980 FNL & 660 FEL	Empire Abo Unit #020c	BP America Production Company	Plugged - Set CIBP at 5600'. Spotted 25 sacks of cement at 5600'. Spotted 50 sacks at 3420'. Perforated at 2000'. Squeezed 50 sacks of cement at 2000'. Perforate at 1550' and squeezed 60 sacks of cement. Perforated at 250'. Squeezed 100 sacks of cement.		1					
785	30 015 00717	I	2	18S	27E	1980 FSL & 660 FEL	Empire Abo Unit #016	BP America Production Company	Set CIBP above perfs and filled with packed fluid.			1				
862	30 015 00874	J	12	18S	27E	2310 FSL & 2355 FEL	Comstock Federal #007	Harlow Enterprises LLC	Changed owner to Harlow Enterprises LLC	1						
18	30 015 01222	O	35	17S	27E	330 FSL & 2310 FEL	South Red Lake Grayburg Unit #030	Legacy Reserves Operating LP	Changed owner from Fairway Resources Operating, LLC to Legacy Reserves Operating LP	1						
73	30 015 01659	N	32	17S	28E	660 FSL & 1980 FWL	Empire Abo Unit #026a	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
67	30 015 01661	K	32	17S	28E	1650 FSL & 2310 FWL	Empire Abo Unit "G" 026b	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
69	30 015 01662	L	32	17S	28E	1650 FSL & 990 FWL	Empire Abo Unit #025a	Apache Corporation	Plugged - Set CIBP at 5800'. Spotted 25 sacks of cement at 4000'. Spotted 45 sacks at 2300'. Spotted 25 sacks at 1230'. Perforate at 778' and squeeze 90 sacks at 778'.		1					
78	30 015 02607	D	5	18S	28E	660 FNL & 660 FWL	Empire Abo Unit #025c	Apache Corporation	Plugged - Set CIBP at 5775'. Spotted 25 sacks of cement at 5775'. Spotted 25 sacks at 3310'. Spotted 25 sacks at 2045'. Perforate at 1250' and squeeze 50 sacks at 1250'. Perforate at 250' and squeeze 800 sacks at 250'.		1					
110	30 015 02616	H	6	18S	28E	1650 FNL & 990 FEL	Empire Abo Unit #024c	Apache Corporation	Plugged - Set CIBP at 6220'. Spotted 55 sacks of cement at 6220'. Spotted 25 sacks at 3550'. Spotted 50 sacks at 2125'. Perforate at 1300' and squeeze 50 sacks at 1300'. Spotted 80 sacks at 800'.		1					
89	30 015 02625	B	6	18S	28E	470 FNL & 2170 FEL	Empire Abo Unit #023c	Apache Corporation	Changed from producing/flaring gas to gas injection well	1						
1028	30 015 20104	P	35	17S	27E	990 FSL & 990 FEL	South Red Lake Grayburg Unit #041	Legacy Reserves Operating LP	Changed owner from Fairway Resources Operating, LLC to Legacy Reserves Operating LP	1						
90	30 015 21542	B	6	18S	28E	1260 FNL & 1580 FEL	Empire Abo Unit #231	Apache Corporation	Plugged - Set CIBP at 5800'. Spotted 25 sacks of cement at 5800'. Spotted 25 sacks at 4292'. Spotted 25 sacks at 2050'. Perforate at 1210' and squeeze 130 sacks at 1210'.		1					
796	30 015 21544	O	2	18S	27E	1110 FSL & 1322 FEL	Empire Abo Unit #151	Apache Corporation	Plugged - Set CIBP at 5600'. Spotted 25 sacks of cement at 5600'. Spotted 25 sacks at 4292'. Spotted 25 sacks at 2050'. Perforate at 1210' and squeeze 130 sacks at 1210'.		1					
138	30 015 21552	G	1	18S	27E	2500 FNL & 2500 FEL	Empire Abo Unit #191	Apache Corporation	Plugged - Set CIBP at 6000'. Spotted 25 sacks of cement at 6000'. Spotted 80 sacks at 4311'. Spotted 25 sacks of cement at 1700'. Spotted 50 sacks of cement at 1051. Spotted 25 sacks of cement at 200'		1					
92	30 015 21626	G	6	18S	28E	1361 FNL & 2531 FEL	Empire Abo Unit #231a	Apache Corporation	Plugged - Set CIBP at 5600'. Spotted 25 sacks at 4454'. Spotted 25 sacks at 3310'. Spotted 25 sacks at 2045'. Perforate at 1210' and squeeze 40 sacks at 1210'. Spotted 50 sacks at 160'.		1					
75	30 015 22009	O	32	17S	28E	330 FSL & 2481 FEL	Empire Abo Unit #272	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
1063	30 015 22526	B	5	18S	28E	1300 FNL & 2345 FEL	Empire Abo Unit "I" 272a	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
151	30 015 22559	K	1	18S	27E	2290 FSL & 2445 FWL	Empire Abo Unit #184	Apache Corporation	Plugged - Set CIBP at 5725'. Spotted 25 sacks of cement at 5725'. Spotted 65 sacks at 4570'. Spotted 25 sacks of cement at 3470'. Spotted 100 sacks of cement at 1950. Spotted 25 sacks of cement at 250'		1					
148	30 015 22560	J	1	18S	27E	220 FSL & 1390 FEL	Empire Abo Unit #192	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
150	30 015 22658	J	1	18S	27E	1500 FSL & 2130 FEL	Empire Abo Unit #194	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
79	30 015 22750	D	5	18S	28E	660 FNL & 150 FWL	Empire Abo Unit #251	Apache Corporation	Plugged - Set CIBP at 5600'. Spotted 25 sacks of cement at 5600'. Spotted 40 sacks at 3310'. Spotted 25 sacks at 2045'. Perforate at 800' and squeeze 70 sacks at 800'. Spotted 25 sacks at 250'.		1					
104	30 015 22913	G	6	18S	28E	1750 FNL & 1600 FEL	Empire Abo Unit #235	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
791	30 015 22914	I	2	18S	27E	1310 FSL & 590 FEL	Empire Abo Unit #161	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
855	30 015 24857	M	11	18S	27E	700 FSL & 990 FWL	Federal Dh Gas Com #001	Chevron Usa Inc.	Changed owner from Chesapeake Operating, Inc. to Chevron USA Inc.	1						
162	30 015 25099	H	12	18S	27E	1809 FNL & 990 FEL	Comstock Federal #006	Harlow Enterprises LLC	Changed owner to Harlow Enterprises LLC	1						
869	30 015 25100	N	12	18S	27E	330 FSL & 1650 FWL	Comstock Federal #001	Harlow Enterprises LLC	Changed owner to Harlow Enterprises LLC	1						
864	30 015 25201	K	12	18S	27E	1650 FSL & 1770 FWL	Comstock Federal #002	Harlow Enterprises LLC	Changed owner to Harlow Enterprises LLC	1						
870	30 015 25202	O	12	18S	27E	330 FSL & 2310 FEL	Comstock Federal #005	Harlow Enterprises LLC	Changed owner to Harlow Enterprises LLC	1						
860	30 015 25270	F	12	18S	27E	2310 FNL & 2310 FWL	Chukka Federal #001	Phoenix Energy	Changed owner from Eastland Oil Co. to Phoenix Energy	1						
866	30 015 25545	M	12	18S	27E	990 FSL & 990 FWL	Comstock Federal #003	Harlow Enterprises LLC	Changed owner to Harlow Enterprises LLC	1						
859	30 015 25738	G	12	18S	27E	2310 FNL & 2310 FEL	Comstock Federal #009	Harlow Enterprises LLC	Changed owner to Harlow Enterprises LLC	1						

144	30	015	27163	I	1 18S	27E	1980 FSL & 990 FEL	Chalk Bluff Federal Com #003	Mewbourne Oil Co	Changed from producing to Salt Water Disposal Well	1			
1060	30	015	31530	C	32 17S	28E	530 FNL & 1650 FWL	Enron State #1	Lime Rock Resources A, L.P.	Perforations in Glorieta-Yeso: 3226' - 3795'; 3806' - 3864'			1	
1064	30	015	32070	I	2 18S	27E	660 FSL & 990 FWL	Bb State Com #1	Apache Corporation	Set CIBP above perfs and filled with packed fluid.		1		
1065	30	015	32899	I	2 18S	27E	2310 FSL & 2310 FWL	Bm State #1	Apache Corporation	Set CIBP above perfs and filled with packed fluid.		1		
1066	30	015	32900	I	2 18S	27E	1650 FNL & 2305 FWL	Tdf State #2	Apache Corporation	Set CIBP above perfs and filled with packed fluid.		1		
1062	30	015	33111	I	2 18S	27E	530 FNL & 2310 FWL	Logan 2c State #3	Devon Energy	REMOVED BRIDGE PLUG AT 2600'			1	
1069	30	015	33232	M	29 17S	28E	690 FSL & 530 FWL	Williams A Federal 5	LRE Operating LLC	Set CIBP at 3250'. Perforations in San Andres: 1786' - 2035'; 2100' - 2301; 2326' - 2621'; 2650' - 2941'; 2970' - 3201'			1	
1029	30	015	34626	M	36 17S	27E	935 FNL & 2260 FEL	Jeffers 36 State #4t	LRE Operating LLC	Drilled to 4000' TD, PBTD: 3488'. Perforations in the Glorieta/Upper Yeso: 3152' - 3481'			1	
1068	30	015	36513	N	29 17S	28E	1090 FSL & 1550 FWL	Williams A Federal No. 8	LRE Operating LLC	Set CIBP at 3150'. Perforations in San Andres: 2000' - 2200'; 2300' - 2601; 2700' - 3031'			1	
961	30	015	36978	D	31 17S	28E	990 FNL & 330 FWL	Enron State #15	LRE Operating LLC	Set CIBP at 3100'. Perforations in San Andres: 2018' - 2339'; 2376' - 2651; 2684' - 2951'			1	
1037	30	015	36979	C	32 17S	28E	990 FNL & 2035 FWL	Enron State #14	LRE Operating LLC	NEW: Drilled to 4205' TD, PBTD: 3250'. Perforations in San Andres; 5578' - 2568'; 2635' - 2870'; 2920' - 3165'				1
1026	30	015	37783	O	35 17S	27E	990 FSL & 2225 FEL	Russell C 003	Tarco Energy, L.C.	Changed from producting to injection well	1			
1046	30	015	38420	G	36 17S	27E	1460 FNL & 1539 FEL	Kiowa State	COG Operating LLC	NEW: Drilled to 4873' TD, PBTD: 4805'. Perforations in Upper Blinebry: 3770' - 4020'; Middle Blinebry: 4080' - 4330'; Lower Blinebry: 4390' - 4640'				1
981	30	015	38512	D	31 17S	28E	990 FNL & 940 FWL	Enron State #16	LRE Operating LLC	Perforations in San Andres: 2120' - 2370'; 2400' - 2710'; 2752' - 3034'			1	
986	30	015	39006	J	32 17S	28E	2400 FSL & 2450 FEL	Empire Abo Unit 407	Apache Corporation	Set CIBP above perfs and filled with packed fluid.		1		
984	30	015	39020	O	31 17S	28E	140 FSL & 2560 FEL	Empire Abo Unit 408	Apache Corporation	Set CIBP above perfs and filled with packed fluid.		1		
988	30	015	39064	O	32 17S	28E	1175 FSL & 1310 FEL	Empire Abo Unit 403	Apache Corporation	Set CIBP above perfs and filled with packed fluid.		1		
970	30	015	39322	M	36 17S	27E	840 FSL & 425 FWL	Big Boy State #3	COG Operating LLC	NEW: Drilled to 5015 TD, PBTD: 4958'. Perforations in Lower Yeso: 4360' - 4610'; Middle Yeso: 4050' - 4300'; Glorieta/Upper Yeso: 3740' - 3990'				1
971	30	015	39323	O	36 17S	27E	870 FSL & 1560 FEL	Big Boy State #5	COG Operating LLC	NEW: Drilled to 5016' TD, PBTD: 4958'. Perforations in Lower Yeso: 4375' - 4600'; Middle Yeso: 4090' - 4315' and 3805' - 4030'; Glorieta/Upper Yeso: 3410' - 3660';				1
974	30	015	39326	O	36 17S	27E	275 FSL & 1560 FEL	Big Boy State #8	COG Operating LLC	NEW: Drilled to 5510' TD, PBTD: 4955'. Perforations in Lower Yeso: 4700' - 4450'; Middle Yeso: 4050' - 4275' and 3800' - 4000'; Glorieta/Upper Yeso: 3500' - 3750';				1
975	30	015	39401	M	36 17S	27E	1110 FSL & 630 FEL	Empire Abo Unit #417	Apache Corporation	Set CIBP above perfs and filled with packed fluid.		1		
974	30	015	39626	G	36 17S	27E	2152 FNL & 2103 FEL	Kiowa State # 04	COG Operating LLC	NEW: Drilled to 4934' TD, PBTD: 4863'. Perforations in Lower Yeso: 4350' - 4600'; Middle Yeso: 4040' - 4290' and 3755' - 3980'; Glorieta/Upper Yeso: 3250' - 3500';				1
1023	30	015	39927	K	32 17S	28E	1750 FSL & 1765 FWL	Ab State 647	LRE Operating LLC	NEW: Drilled to 5016' TD, PBTD: 5000'. Perforations in Blinebry; 4069' - 4855'; Perforations in Glorieta/Paddock; 3448' - 3991'				1
1039	30	015	39996	C	32 17S	28E	230 FNL & 2420 FWL	Enron State 17	LRE Operating LLC	NEW: Drilled to 4215' TD, PBTD: 4193'. Perforations in San Andres; 1896' - 2234'; 2268' - 2574'; 2650' - 2970'; 3000' - 3310'				1
1024	30	015	40339	D	32 17S	28E	990 FNL & 330 FWL	Enron State 18	COG Operating LLC	NEW: Drilled to 4250' TD, PBTD: 4196'. Perforations in Yeso; 3460' - 3752'; 3800' - 4140'				1
1005	30	015	40428	M	36 17S	28E	200 FSL & 485 FWL	Big Boy State #2	LRE Operating LLC	NEW: Drilled to 4934' TD, PBTD: 4863'. Perforations in Lower Yeso: 4400' - 4650'; Middle Yeso: 4100' - 4350' and 3818' - 4043'; Glorieta/Upper Yeso: 3300' - 3550';				1
1070	30	015	40480	M	29 17S	28E	600 FSL & 645 FWL	Williams A Federal No. 10	Tarco Energy, L.C.	Sidetracked well. Perforations in San Andres: 1880' - 2193'; 2324' - 2692'; 2896' - 3251'; 3,403' - 3586'			1	
1059	30	015	40621	C	2 18S	27E	968 FNL & 1650 FWL	Brad State No. 4	Tarco Energy, L.C.	NEW: Drilled to 550' TD, PBTD: 529'. Perforations in Seven Rivers: 415' - 419'; 424' - 426'; 433' - 439'; 446' - 458'				1
1071	30	015	40677	B	2 18S	27E	380 FNL & 1650 FEL	Blake State No. 1	Tarco Energy, L.C.	NEW: Permit to Drill				1
1072	30	015	40678	B	2 18S	27E	330 FNL & 2300 FEL	Blake State No. 2	Tarco Energy, L.C.	NEW: Permit to Drill				1
1058	30	015	40679	B	2 18S	27E	968 FNL & 2300 FEL	Blake State No. 4	Lime Rock Resources A, L.P.	NEW: Drilled to 530' TD, PBTD: 523'. Perforations in Seven Rivers: 417' - 421'; 429' - 434'; 438' - 440'; 450' - 456'; 461' - 463'				1
1045	30	015	40783	C	2 18S	27E	990 FNL & 1500 FWL	Logan 2c State No. 4	Lime Rock Resources A, L.P.	NEW: Drilled to 4776' TD, PBTD: 4729'. Perforations in Lower Yeso: 4293' - 4620'; Middle Yeso: 3900' - 4226''; Upper Yeso: 3498' - 3844';				1
1032	30	015	40807	N	35 17S	27E	330 FNL & 2310 FWL	Logan B "35" N Federal #18	Lime Rock Resources A, L.P.	NEW: Drilled to 4000' TD, PBTD: 3960'. Perforations in Lower Yeso: 3604' - 3916'; Middle Yeso: 3326' - 3546'; Glorieta/Upper Yeso: 3032' - 3265'				1
1033	30	015	40808	P	35 17S	27E	970 FSL & 990 FEL	Logan 35 P Federal #19	LRE Operating LLC	NEW: Drilled to 4000' TD, PBTD: 3960'. Perforations in Lower Yeso: 3609' - 3890'; Middle Yeso: 3362' - 3561'; Glorieta/Upper Yeso: 3128' - 3304'				1
1030	30	015	41289	O	25 17S	27E	985 FSL & 2310 FEL	Enron Federal #18	LRE Operating LLC	NEW: Drilled to 3157' TD, PBTD: 3157'. Perforations in Lower San Andreas: 2590' - 2826'; Upper San Andreas: 2015' - 2088'				1
1034	30	015	41435	O	35 17S	27E	720 FSL & 1770 FEL	Logan 35 O Federal 10	Lime Rock Resources A, L.P.	NEW: Drilled to 4000' TD, PBTD: 3960'. Perforations in Lower Yeso: 3609' - 3890'; Middle Yeso: 3362' - 3561'; Glorieta/Upper Yeso: 3128' - 3304'				1
1043	30	015	41491	L	32 17S	28E	1650 FSL & 950 FWL	Ab State 647 007	Apache Corporation	NEW: Drilled to 4300' TD, PBTD: 4257'. Perforations in Yeso; 3406' - 4100'				1
1044	30	015	41492	K	32 17S	28E	1375 FSL & 2320 FWL	Ab State 647 008	Apache Corporation	NEW: Drilled to 4326' TD, PBTD: 4288'. Perforations in Yeso; 3443' - 4098'				1
1042	30	015	41493	N	32 17S	28E	1080 FSL & 2535 FWL	Ab State 647 009	Apache Corporation	NEW: Drilled to 4300' TD, PBTD: 4257'. Perforations in Blinebry; 4161' - 4930'; Perforations in Glorieta/Paddock; 3414' - 4058'				1
1056	30	015	41494	N	32 17S	28E	1140 FSL & 1650 FWL	Ab State 647 010	Apache Corporation	NEW: Drilled to 5076' TD, PBTD: 5056'. Perforations in Glorieta/Paddock; 3415' - 3955'				1
1055	30	015	41495	M	32 17S	28E	920 FSL & 960 FWL	Ab State 647 011	Apache Corporation	NEW: Drilled to 5070' TD, PBTD: 5060'. Perforations in Blinebry; 4198' - 4905'; Perforations in Glorieta/Paddock; 3393' - 4118'				1

1057	30	015	41496	M		32	17S	28E	910 FSL & 930 FWL	Ab State 647 012	Apache Corporation	NEW: Drilled to 5080' TD, PBTD: 5070'. Perforations in Blinebry; 4180' - 4890'; Perforations in Glorieta/Paddock; 3373' - 4091'	1
1053	30	015	41497	M		32	17S	28E	220 FSL & 350 FWL	Ab State 647 013	Apache Corporation	NEW: Drilled to 5065' TD, PBTD: 4025'. Perforations in Blinebry; 4033' - 4886'; Perforations in Glorieta/Paddock; 3417' - 3930'	1
1041	30	015	41498	M		32	17S	28E	330 FSL & 1090 FWL	Ab State 647 014	Apache Corporation	NEW: Drilled to 4300' TD, PBTD: 4251'. Perforations in Glorieta/Paddock; 3466' - 4010'	1
1048	30	015	41500	K		32	17S	28E	2355 FSL & 2600 FWL	Ab State 647 002	Apache Corporation	NEW: Drilled to 5013' TD, PBTD: 5005'. Perforations in Blinebry; 4212' - 4858'; Perforations in Glorieta/Paddock; 3427' - 4104'	1
1049	30	015	41501	K		32	17S	28E	2370 FSL & 1650 FWL	Ab State 647 003	Apache Corporation	NEW: Drilled to 5027' TD, PBTD: 4835'. Perforations in Glorieta/Paddock; 3504' - 3885'	1
1051	30	015	41502	L		32	17S	28E	2310 FSL & 330 FWL	Ab State 647 005	Apache Corporation	NEW: Drilled to 5060' TD, PBTD: 5045'. Perforations in Blinebry; 4161' - 4938'; Perforations in Glorieta/Paddock; 3427' - 4104'	1
1054	30	015	41503	L		32	17S	28E	1730 FSL & 430 FWL	Ab State 647 006	Apache Corporation	NEW: Drilled to 5065' TD, PBTD: 5050'. Perforations in Blinebry; 4208' - 4919'; Perforations in Glorieta/Paddock; 3380' - 4120'	1
1052	30	015	41504	N		32	17S	28E	330 FSL & 1650 FWL	Ab State 647 015	Apache Corporation	NEW: Drilled to 5063' TD, PBTD: 5050'. Perforations in Blinebry; 4142' - 4900'; Perforations in Glorieta/Paddock; 3394' - 3943'	1
1050	30	015	41505	L		32	17S	28E	2250 FSL & 1185 FWL	Ab State 647 004	Apache Corporation	NEW: Drilled to 5046' TD, PBTD: 4050'. Perforations in Blinebry; 4066' - 4850'; Perforations in Glorieta/Paddock; 3338' - 3990'	1
1040	30	015	41511	N		32	17S	28E	330 FSL & 2365 FWL	Ab State 647 016	Apache Corporation	NEW: Drilled to 4297' TD, PBTD: 4250'. Perforations in Glorieta; 3445' - 4091'	1
1073	30	015	41766	F		5	18S	28E	1910 FNL & 1505 FWL	Libby State 001	Apache Corporation	NEW: Permit to Drill	1
1074	30	015	41767	F		5	18S	28E	1570 FNL & 2245 FWL	Libby State 002	Apache Corporation	NEW: Permit to Drill	1
1075	30	015	41768	F		5	18S	28E	1570 FNL & 2245 FWL	Libby State 002	Apache Corporation	NEW: Permit to Drill	1
1076	30	015	41770	B		31	17S	28E	330 FNL & 2270 FEL	T Rex State 001	Apache Corporation	NEW: Permit to Drill	1
1077	30	015	41771	B		31	17S	28E	575 FNL & 1650 FEL	T Rex State 002	Apache Corporation	NEW: Permit to Drill	1
1078	30	015	41772	B		31	17S	28E	875 FNL & 2430 FEL	T Rex State 003	Apache Corporation	NEW: Permit to Drill	1
1079	30	015	41774	B		31	17S	28E	890 FNL & 1750 FEL	T Rex State 004	Apache Corporation	NEW: Permit to Drill	1
1038	30	015	41833	C		32	17S	28E	990 FNL & 1700 FWL	Enron State 19	LRE Operating LLC	NEW: Drilled to 4206' TD, PBTD: 4167'. Perforations in Glorieta; 3495' - 3762'; 3810' - 4099'	1
1031	30	015	41890	N		29	17S	28E	330 FSL & 2200 FNL	Williams A Federal No 12	LRE Operating LLC	NEW: Drilled to 3700' TD, PBTD: 3694'. Perforations in Yeso: 3536' - 3618'	1
1080	30	015	41892	M		29	17S	28E	330 FSL & 975 FWL	Williams A Federal 15	LRE Operating LLC	NEW: Permit to Drill	1
1081	30	015	41959	K		2	18S	27E	2310 FSL & 1750 FWL	Bm State 002	Apache Corporation	NEW: Permit to Drill	1
1036	30	015	42002	E		2	18S	27E	1900 FNL & 990 FWL	Sb State 002	Apache Corporation	NEW: Drilled to 4115' TD, PBTD: 4077'. Perforations in Yeso: 3076' - 3906'	1
1035	30	015	42003	E		2	18S	27E	2515 FNL & 800 FWL	Sb State 004	Apache Corporation	NEW: Drilled to 4114' TD, Perforations in Yeso: 3173' - 3929'	1
1082	30	015	42024		1	1	18S	27E	126 FNL & 141 FEL	Aao Federal #14	Apache Corporation	NEW: Permit to Drill	1
1083	30	015	42025		1	1	18S	27E	1130 FNL & 2408 FEL	Aao Federal #15	Apache Corporation	NEW: Permit to Drill	1
1084	30	015	42026		1	1	18S	27E	1305 FNL & 2455 FWL	Aao Federal #16	Apache Corporation	NEW: Permit to Drill	1
1085	30	015	42029		1	1	18S	27E	1650 FNL & 865 FEL	Aao Federal #17	Apache Corporation	NEW: Permit to Drill	1
1086	30	015	42035		1	1	18S	27E	2310 FNL & 1650 FEL	Aao Federal #18	Apache Corporation	NEW: Permit to Drill	1
1087	30	015	42036		1	1	18S	27E	2188 FNL & 909 FWL	Aao Federal #20	Apache Corporation	NEW: Permit to Drill	1
1088	30	015	42051		1	1	18S	27E	2310 FNL & 2310 FWL	Aao Federal #19	Apache Corporation	NEW: Permit to Drill	1
1089	30	015	42116	M		29	17S	28E	990 FSL & 2160 FWL	Williams A Federal 16	LRE Operating LLC	NEW: Permit to Drill	1
1090	30	015	42121	C		2	18S	27E	658 FNL & 1984 FWL	Brade State No. 5	Tarco Energy, L.C.	NEW: Permit to Drill	1
1091	30	015	42156	D		32	17S	28E	385 FNL & 900 FWL	Enron State 21	LRE Operating LLC	NEW: Permit to Drill	1
1092	30	015	42334		1	1	18S	27E	1005 FNL & 1630 FWL	Aao Federal #21	Apache Corporation	NEW: Permit to Drill	1
1093	30	015	42335		1	1	18S	27E	790 FNL & 330 FWL	Aao Federal #22	Apache Corporation	NEW: Permit to Drill	1
1094	30	015	42336		1	1	18S	27E	2265 FNL & 330 FEL	Aao Federal #23	Apache Corporation	NEW: Permit to Drill	1
1095	30	015	42337		1	1	18S	27E	984 FNL & 243 FEL	Aao Federal #24	Apache Corporation	NEW: Permit to Drill	1
1096	30	015	42338		1	1	18S	27E	2270 FSL & 1650 FWL	Aao Federal #26	Apache Corporation	NEW: Permit to Drill	1
1097	30	015	42339		1	1	18S	27E	360 FSL & 990 FWL	Aao Federal #29	Apache Corporation	NEW: Permit to Drill	1
1098	30	015	42358		1	1	18S	27E	183 FSL & 2497 FWL	Aao Federal #28	Apache Corporation	NEW: Permit to Drill	1
1099	30	015	42359		1	1	18S	27E	1960 FSL & 2063 FWL	Aao Federal #27	Apache Corporation	NEW: Permit to Drill	1
1100	30	015	42360		1	1	18S	27E	1261 FSL & 281 FWL	Aao Federal #30	Apache Corporation	NEW: Permit to Drill	1
1101	30	015	42361		1	1	18S	27E	2000 FSL & 1022 FWL	Aao Federal #25	Apache Corporation	NEW: Permit to Drill	1
1102	30	015	42372	D		31	17S	28E	330 FNL & 430 FWL	Enron State #20	LRE Operating LLC	NEW: Permit to Drill	1

TABLE IV

Wells that have been Plugged and Abandoned since the 2012 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	Change of Owner	P&A	T&A	Prod	Recomp	New	Total
7	30 015 00666	G	36	17S	27E	2310 FNL & 2310 FEL	Conklin #001	Aspen Oil Inc	Plugged - Spotted cement 35' to Surface.		1					
1061	30 015 00681	M	36	17S	27E	990 FSL & 330 FWL	South Red Lake Grayburg Unit #02	Legacy Reserves Operating LP	Plugged - Spotted cement 1200' to 1165' and 60' to Surface.		1					
147	30 015 00696	J	1	18S	27E	1980 FSL & 1980 FEL	Empire Abo Unit #019q	Apache Corporation	Plugged - Set CIBP at 5850'. Spotted 10 sacks of cement at 5850'. Spotted 25 sacks of cement at 4430'		1					
130	30 015 00708	B	1	18S	27E	660 FNL & 1980 FEL	Empire Abo Unit #019b	Apache Corporation	Plugged - Set CIBP at 5650'. Spotted 25 sacks of cement at 5650'. Spotted 25 sacks at 3415'. Perforated at 1895'. Squeezed 50 sacks of cement at 1895'. Perforate at 1535' and squeezed 150 sacks of cement. Perforated at 250'. Squeezed 80 sacks of cement.		1					
139	30 015 00711	H	1	18S	27E	1980 FNL & 660 FEL	Empire Abo Unit #020c	BP America Production Company	Plugged - Set CIBP at 5600'. Spotted 25 sacks of cement at 5600'. Spotted 50 sacks at 3420'. Perforated at 2000'. Squeezed 50 sacks of cement at 2000'. Perforate at 1550' and squeezed 60 sacks of cement. Perforated at 250'. Squeezed 100 sacks of cement.		1					
69	30 015 01662	L	32	17S	28E	1650 FSL & 990 FWL	Empire Abo Unit #025a	Apache Corporation	Plugged - Set CIBP at 5800'. Spotted 25 sacks of cement at 4000'. Spotted 45 sacks at 2300'. Spotted 25 sacks at 1230'. Perforate at 778' and squeeze 90 sacks at 778'.		1					
78	30 015 02607	D	5	18S	28E	660 FNL & 660 FWL	Empire Abo Unit #025c	Apache Corporation	Plugged - Set CIBP at 5775'. Spotted 25 sacks of cement at 5775'. Spotted 25 sacks at 3310'. Spotted 25 sacks at 2045'. Perforate at 1250' and squeeze 50 sacks at 1250'. Perforate at 250' and squeeze 800 sacks at 250'.		1					
110	30 015 02616	H	6	18S	28E	1650 FNL & 990 FEL	Empire Abo Unit #024c	Apache Corporation	Plugged - Set CIBP at 6220'. Spotted 55 sacks of cement at 6220'. Spotted 25 sacks at 3550'. Spotted 50 sacks at 2125'. Perforate at 1300' and squeeze 50 sacks at 1300'. Spotted 80 sacks at 800'.		1					
90	30 015 21542	B	6	18S	28E	1260 FNL & 1580 FEL	Empire Abo Unit #231	Apache Corporation	Plugged - Set CIBP at 5800'. Spotted 25 sacks of cement at 5800'. Spotted 25 sacks at 4292'. Spotted 25 sacks at 2050'. Perforate at 1210' and squeeze 130 sacks at 1210'.		1					
796	30 015 21544	O	2	18S	27E	1110 FSL & 1322 FEL	Empire Abo Unit #151	Apache Corporation	Plugged - Set CIBP at 5600'. Spotted 25 sacks of cement at 5600'. Spotted 25 sacks at 4292'. Spotted 25 sacks at 2050'. Perforate at 1210' and squeeze 130 sacks at 1210'.		1					
138	30 015 21552	G	1	18S	27E	2500 FNL & 2500 FEL	Empire Abo Unit #191	Apache Corporation	Plugged - Set CIBP at 6000'. Spotted 25 sacks of cement at 6000'. Spotted 80 sacks at 4311'. Spotted 25 sacks of cement at 1700'. Spotted 50 sacks of cement at 1051. Spotted 25 sacks of cement at 200'		1					
92	30 015 21626	G	6	18S	28E	1361 FNL & 2531 FEL	Empire Abo Unit #231a	Apache Corporation	Plugged - Set CIBP at 5600'. Spotted 25 sacks of cement at 5600'. Spotted 25 sacks at 4454'. Spotted 25 sacks at 3310'. Spotted 25 sacks at 2045'. Perforate at 1210' and squeeze 40 sacks at 1210'. Spotted 50 sacks at 160'.		1					
151	30 015 22559	K	1	18S	27E	2290 FSL & 2445 FWL	Empire Abo Unit #184	Apache Corporation	Plugged - Set CIBP at 5725'. Spotted 25 sacks of cement at 5725'. Spotted 65 sacks at 4570'. Spotted 25 sacks of cement at 3470'. Spotted 100 sacks of cement at 1950. Spotted 25 sacks of cement at 250'		1					
79	30 015 22750	D	5	18S	28E	660 FNL & 150 FWL	Empire Abo Unit #251	Apache Corporation	Plugged - Set CIBP at 5600'. Spotted 25 sacks of cement at 5600'. Spotted 40 sacks at 3310'. Spotted 25 sacks at 2045'. Perforate at 800' and squeeze 70 sacks at 800'. Spotted 25 sacks at 250'.		1					

TABLE V

Wells that have been Temporally Abandoned since the 2012 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	Change of Owner	P&A	T&A	Prod	Recomp	New	Total
785	30 015 00717	I	2	18S	27E	1980 FSL & 660 FEL	Empire Abo Unit #016	BP America Production Company	Set CIBP above perfs and filled with packed fluid.			1				
73	30 015 01659	N	32	17S	28E	660 FSL & 1980 FWL	Empire Abo Unit #026a	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
67	30 015 01661	K	32	17S	28E	1650 FSL & 2310 FWL	Empire Abo Unit "G" 026b	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
75	30 015 22009	O	32	17S	28E	330 FSL & 2481 FEL	Empire Abo Unit #272	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
1063	30 015 22526	B	5	18S	28E	1300 FNL & 2345 FEL	Empire Abo Unit "I" 272a	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
148	30 015 22560	J	1	18S	27E	220 FSL & 1390 FEL	Empire Abo Unit #192	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
150	30 015 22658	J	1	18S	27E	1500 FSL & 2130 FEL	Empire Abo Unit #194	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
104	30 015 22913	G	6	18S	28E	1750 FNL & 1600 FEL	Empire Abo Unit #235	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
791	30 015 22914	I	2	18S	27E	1310 FSL & 590 FEL	Empire Abo Unit #161	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
1064	30 015 32070	I	2	18S	27E	660 FSL & 990 FWL	Bb State Com #1	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
1065	30 015 32899	I	2	18S	27E	2310 FSL & 2310 FWL	Bm State #1	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
1066	30 015 32900	I	2	18S	27E	1650 FNL & 2305 FWL	Tdf State #2	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
986	30 015 39006	J	32	17S	28E	2400 FSL & 2450 FEL	Empire Abo Unit 407	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
984	30 015 39020	O	31	17S	28E	140 FSL & 2560 FEL	Empire Abo Unit 408	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
988	30 015 39064	O	32	17S	28E	1175 FSL & 1310 FEL	Empire Abo Unit 403	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				
975	30 015 39401	M	36	17S	27E	1110 FSL & 630 FEL	Empire Abo Unit #417	Apache Corporation	Set CIBP above perfs and filled with packed fluid.			1				

TABLE VI

Wells that have been Recompleted in Upper Zones since the 2012 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	Change of Owner	P&A	T&A	Prod	Recomp	New	Total
1060	30 015 31530	C	32	17S	28E	530 FNL & 1650 FWL	Enron State #1	Lime Rock Resources A, L.P.	Perforations in Glorieta-Yeso: 3226' - 3795'; 3806' - 3864'					1		
1062	30 015 33111	I	2	18S	27E	530 FNL & 2310 FWL	Logan 2c State #3	Devon Energy	REMOVED BRIDGE PLUG AT 2600'					1		
1069	30 015 33232	M	29	17S	28E	690 FSL & 530 FWL	Williams A Federal 5	LRE Operating LLC	Set CIBP at 3250'. Perforations in San Andres: 1786' - 2035'; 2100' - 2301'; 2326' - 2621'; 2650' - 2941'; 2970' - 3201'					1		
1029	30 015 34626	M	36	17S	27E	935 FNL & 2260 FEL	Jeffers 36 State #4t	LRE Operating LLC	Drilled to 4000' TD, PBTD: 3488'. Perforations in the Glorieta/Upper Yeso: 3152' - 3481'					1		
1068	30 015 36513	N	29	17S	28E	1090 FSL & 1550 FWL	Williams A Federal No. 8	LRE Operating LLC	Set CIBP at 3150'. Perforations in San Andres: 2000' - 2200'; 2300' - 2601'; 2700' - 3031'					1		
961	30 015 36978	D	31	17S	28E	990 FNL & 330 FWL	Enron State #15	LRE Operating LLC	Set CIBP at 3100'. Perforations in San Andres: 2018' - 2339'; 2376' - 2651'; 2684' - 2951'					1		
981	30 015 38512	D	31	17S	28E	990 FNL & 940 FWL	Enron State #16	LRE Operating LLC	Perforations in San Andres: 2120' - 2370'; 2400' - 2710'; 2752' - 3034'					1		
1070	30 015 40480	M	29	17S	28E	600 FSL & 645 FWL	Williams A Federal No. 10	Tarco Energy, L.C.	Sidetracked well. Perforations in San Andres: 1880' - 2193'; 2324' - 2692'; 2896' - 3251'; 3,403' - 3586'					1		

TABLE VII
Newly Drilled Wells in the Area of Review since the 2012 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	Change of Owner	P&A	T&A	Prod	Recomp	New	Total
1037	30 015 36979	C	32	17S	28E	990 FNL & 2035 FWL	Enron State #14	LRE Operating LLC	NEW: Drilled to 4205' TD, PBTD: 3250'. Perforations in San Andres; 5578' - 2568'; 2635' - 2870'; 2920' - 3165'						1	
1046	30 015 38420	G	36	17S	27E	1460 FNL & 1539 FEL	Kiowa State	COG Operating LLC	NEW: Drilled to 4873' TD, PBTD: 4805'. Perforations in Upper Blinebry: 3770' - 4020'; Middle Blinebry: 4080' - 4330'; Lower Blinebry: 4390' - 4640'						1	
970	30 015 39322	M	36	17S	27E	840 FSL & 425 FWL	Big Boy State #3	COG Operating LLC	NEW: Drilled to 5015 TD, PBTD: 4958'. Perforations in Lower Yeso: 4360' - 4610'; Middle Yeso: 4050' - 4300'; Glorieta/Upper Yeso: 3740' - 3990'						1	
971	30 015 39323	O	36	17S	27E	870 FSL & 1560 FEL	Big Boy State #5	COG Operating LLC	NEW: Drilled to 5015 TD, PBTD: 4958'. Perforations in Lower Yeso: 4375' - 4600'; Middle Yeso: 4090' - 4315' and 3805' - 4030'; Glorieta/Upper Yeso: 3410' - 3660';						1	
974	30 015 39326	O	36	17S	27E	275 FSL & 1560 FEL	Big Boy State #8	COG Operating LLC	NEW: Drilled to 5510' TD, PBTD: 4955'. Perforations in Lower Yeso: 4700' - 4450'; Middle Yeso: 4050' - 4275' and 3800' - 4000'; Glorieta/Upper Yeso: 3500' - 3750';						1	
974	30 015 39626	G	36	17S	27E	2152 FNL & 2103 FEL	Kiowa State # 04	COG Operating LLC	NEW: Drilled to 4934' TD, PBTD: 4863'. Perforations in Lower Yeso: 4350' - 4600'; Middle Yeso: 4040' - 4290' and 3755' - 3980'; Glorieta/Upper Yeso: 3250' - 3500';						1	
1023	30 015 39927	K	32	17S	28E	1750 FSL & 1765 FWL	Ab State 647	LRE Operating LLC	NEW: Drilled to 5016' TD, PBTD: 5000'. Perforations in Blinebry; 4069' - 4855'; Perforations in Glorieta/Paddock; 3448' - 3991'						1	
1039	30 015 39996	C	32	17S	28E	230 FNL & 2420 FWL	Enron State 17	LRE Operating LLC	NEW: Drilled to 4215' TD, PBTD: 4193'. Perforations in San Andres; 1896' - 2234'; 2268' - 2574'; 2650' - 2970'; 3000' - 3310'						1	
1024	30 015 40339	D	32	17S	28E	990 FNL & 330 FWL	Enron State 18	COG Operating LLC	NEW: Drilled to 4250' TD, PBTD: 4196'. Perforations in Yeso; 3460' - 3752'; 3800' - 4140'						1	
1005	30 015 40428	M	36	17S	28E	200 FSL & 485 FWL	Big Boy State #2	LRE Operating LLC	NEW: Drilled to 4934' TD, PBTD: 4863'. Perforations in Lower Yeso: 4400' - 4650'; Middle Yeso: 4100' - 4350' and 3818' - 4043'; Glorieta/Upper Yeso: 3300' - 3550';						1	
1059	30 015 40621	C	2	18S	27E	968 FNL & 1650 FWL	Brad State No. 4	Tarco Energy, L.C.	NEW: Drilled to 550' TD, PBTD: 529'. Perforations in Seven Rivers: 415' - 419'; 424' - 426'; 433' - 439'; 446' - 458'						1	
1071	30 015 40677	B	2	18S	27E	380 FNL & 1650 FEL	Blake State No. 1	Tarco Energy, L.C.	NEW: Permit to Drill						1	
1072	30 015 40678	B	2	18S	27E	330 FNL & 2300 FEL	Blake State No. 2	Tarco Energy, L.C.	NEW: Permit to Drill						1	
1058	30 015 40679	B	2	18S	27E	968 FNL & 2300 FEL	Blake State No. 4	Lime Rock Resources A, L.P.	NEW: Drilled to 530' TD, PBTD: 523'. Perforations in Seven Rivers: 417' - 421'; 429' - 434'; 438' - 440'; 450' - 456'; 461' - 463'						1	
1045	30 015 40783	C	2	18S	27E	990 FNL & 1500 FWL	Logan 2c State No. 4	Lime Rock Resources A, L.P.	NEW: Drilled to 4776' TD, PBTD: 4729'. Perforations in Lower Yeso: 4293' - 4620'; Middle Yeso: 3900' - 4226''; Upper Yeso: 3498' - 3844';						1	
1032	30 015 40807	N	35	17S	27E	330 FNL & 2310 FWL	Logan B "35" N Federal #18	Lime Rock Resources A, L.P.	NEW: Drilled to 4000' TD, PBTD: 3960'. Perforations in Lower Yeso: 3604' - 3916'; Middle Yeso: 3326' - 3546'; Glorieta/Upper Yeso: 3032' - 3265'						1	
1033	30 015 40808	P	35	17S	27E	970 FSL & 990 FEL	Logan 35 P Federal #19	LRE Operating LLC	NEW: Drilled to 4000' TD, PBTD: 3960'. Perforations in Lower Yeso: 3609' - 3890'; Middle Yeso: 3362' - 3561'; Glorieta/Upper Yeso: 3128' - 3304'						1	
1030	30 015 41289	O	25	17S	27E	985 FSL & 2310 FEL	Enron Federal #18	LRE Operating LLC	NEW: Drilled to 3157' TD, PBTD: 3157'. Perforations in Lower San Andreas: 2590' - 2826'; Upper San Andreas: 2015' - 2088'						1	
1034	30 015 41435	O	35	17S	27E	720 FSL & 1770 FEL	Logan 35 O Federal 10	Lime Rock Resources A, L.P.	NEW: Drilled to 4000' TD, PBTD: 3960'. Perforations in Lower Yeso: 3609' - 3890'; Middle Yeso: 3362' - 3561'; Glorieta/Upper Yeso: 3128' - 3304'						1	
1043	30 015 41491	L	32	17S	28E	1650 FSL & 950 FWL	Ab State 647 007	Apache Corporation	NEW: Drilled to 4300' TD, PBTD: 4257'. Perforations in Yeso; 3406' - 4100'						1	
1044	30 015 41492	K	32	17S	28E	1375 FSL & 2320 FWL	Ab State 647 008	Apache Corporation	NEW: Drilled to 4326' TD, PBTD: 4288'. Perforations in Yeso; 3443' - 4098'						1	
1042	30 015 41493	N	32	17S	28E	1080 FSL & 2535 FWL	Ab State 647 009	Apache Corporation	NEW: Drilled to 4300' TD, PBTD: 4257'. Perforations in Blinebry; 4161' - 4930'; Perforations in Glorieta/Paddock; 3414' - 4058'						1	
1056	30 015 41494	N	32	17S	28E	1140 FSL & 1650 FWL	Ab State 647 010	Apache Corporation	NEW: Drilled to 5076' TD, PBTD: 5056'. Perforations in Glorieta/Paddock; 3415' - 3955'						1	
1055	30 015 41495	M	32	17S	28E	920 FSL & 960 FWL	Ab State 647 011	Apache Corporation	NEW: Drilled to 5070' TD, PBTD: 5060'. Perforations in Blinebry; 4198' - 4905'; Perforations in Glorieta/Paddock; 3393' - 4118'						1	
1057	30 015 41496	M	32	17S	28E	910 FSL & 930 FWL	Ab State 647 012	Apache Corporation	NEW: Drilled to 5080' TD, PBTD: 5070'. Perforations in Blinebry; 4180' - 4890'; Perforations in Glorieta/Paddock; 3373' - 4091'						1	
1053	30 015 41497	M	32	17S	28E	220 FSL & 350 FWL	Ab State 647 013	Apache Corporation	NEW: Drilled to 5065' TD, PBTD: 4025'. Perforations in Blinebry; 4033' - 4886'; Perforations in Glorieta/Paddock; 3417' - 3930'						1	
1041	30 015 41498	M	32	17S	28E	330 FSL & 1090 FWL	Ab State 647 014	Apache Corporation	NEW: Drilled to 4300' TD, PBTD: 4251'. Perforations in Glorieta/Paddock; 3466' - 4010'						1	
1048	30 015 41500	K	32	17S	28E	2355 FSL & 2600 FWL	Ab State 647 002	Apache Corporation	NEW: Drilled to 5013' TD, PBTD: 5005'. Perforations in Blinebry; 4212' - 4858'; Perforations in Glorieta/Paddock; 3427' - 4104'						1	
1049	30 015 41501	K	32	17S	28E	2370 FSL & 1650 FWL	Ab State 647 003	Apache Corporation	NEW: Drilled to 5027' TD, PBTD: 4835'. Perforations in Glorieta/Paddock; 3504' - 3885'						1	
1051	30 015 41502	L	32	17S	28E	2310 FSL & 330 FWL	Ab State 647 005	Apache Corporation	NEW: Drilled to 5060' TD, PBTD: 5045'. Perforations in Blinebry; 4161' - 4938'; Perforations in Glorieta/Paddock; 3427' - 4104'						1	
1054	30 015 41503	L	32	17S	28E	1730 FSL & 430 FWL	Ab State 647 006	Apache Corporation	NEW: Drilled to 5065' TD, PBTD: 5050'. Perforations in Blinebry; 4208' - 4919'; Perforations in Glorieta/Paddock; 3380' - 4120'						1	
1052	30 015 41504	N	32	17S	28E	330 FSL & 1650 FWL	Ab State 647 015	Apache Corporation	NEW: Drilled to 5063' TD, PBTD: 5050'. Perforations in Blinebry; 4142' - 4900'; Perforations in Glorieta/Paddock; 3394' - 3943'						1	
1050	30 015 41505	L	32	17S	28E	2250 FSL & 1185 FWL	Ab State 647 004	Apache Corporation	NEW: Drilled to 5046' TD, PBTD: 4050'. Perforations in Blinebry; 4066' - 4850'; Perforations in Glorieta/Paddock; 3338' - 3990'						1	
1040	30 015 41511	N	32	17S	28E	330 FSL & 2365 FWL	Ab State 647 016	Apache Corporation	NEW: Drilled to 4297' TD, PBTD: 4250'. Perforations in Glorieta; 3445' - 4091'						1	

1073	30	015	41766	F		5	18S	28E	1910 FNL & 1505 FWL	Libby State 001	Apache Corporation	NEW: Permit to Drill	1
1074	30	015	41767	F		5	18S	28E	1570 FNL & 2245 FWL	Libby State 002	Apache Corporation	NEW: Permit to Drill	1
1075	30	015	41768	F		5	18S	28E	1570 FNL & 2245 FWL	Libby State 002	Apache Corporation	NEW: Permit to Drill	1
1076	30	015	41770	B		31	17S	28E	330 FNL & 2270 FEL	T Rex State 001	Apache Corporation	NEW: Permit to Drill	1
1077	30	015	41771	B		31	17S	28E	575 FNL & 1650 FEL	T Rex State 002	Apache Corporation	NEW: Permit to Drill	1
1078	30	015	41772	B		31	17S	28E	875 FNL & 2430 FEL	T Rex State 003	Apache Corporation	NEW: Permit to Drill	1
1079	30	015	41774	B		31	17S	28E	890 FNL & 1750 FEL	T Rex State 004	Apache Corporation	NEW: Permit to Drill	1
1038	30	015	41833	C		32	17S	28E	990 FNL & 1700 FWL	Enron State 19	LRE Operating LLC	NEW: Drilled to 4206' TD, PBTD: 4167'. Perforations in Glorieta; 3495' - 3762'; 3810' - 4099'	1
1031	30	015	41890	N		29	17S	28E	330 FSL & 2200 FNL	Williams A Federal No 12	LRE Operating LLC	NEW: Drilled to 3700' TD, PBTD: 3694'. Perforations in Yeso: 3536' - 3618'	1
1080	30	015	41892	M		29	17S	28E	330 FSL & 975 FWL	Williams A Federal 15	LRE Operating LLC	NEW: Permit to Drill	1
1081	30	015	41959	K		2	18S	27E	2310 FSL & 1750 FWL	Bm State 002	Apache Corporation	NEW: Permit to Drill	1
1036	30	015	42002	E		2	18S	27E	1900 FNL & 990 FWL	Sb State 002	Apache Corporation	NEW: Drilled to 4115' TD, PBTD: 4077'. Perforations in Yeso: 3076' - 3906'	1
1035	30	015	42003	E		2	18S	27E	2515 FNL & 800 FWL	Sb State 004	Apache Corporation	NEW: Drilled to 4114' TD, Perforations in Yeso: 3173' - 3929'	1
1082	30	015	42024		1	1	18S	27E	126 FNL & 141 FEL	Aao Federal #14	Apache Corporation	NEW: Permit to Drill	1
1083	30	015	42025		1	1	18S	27E	1130 FNL & 2408 FEL	Aao Federal #15	Apache Corporation	NEW: Permit to Drill	1
1084	30	015	42026		1	1	18S	27E	1305 FNL & 2455 FWL	Aao Federal #16	Apache Corporation	NEW: Permit to Drill	1
1085	30	015	42029		1	1	18S	27E	1650 FNL & 865 FEL	Aao Federal #17	Apache Corporation	NEW: Permit to Drill	1
1086	30	015	42035		1	1	18S	27E	2310 FNL & 1650 FEL	Aao Federal #18	Apache Corporation	NEW: Permit to Drill	1
1087	30	015	42036		1	1	18S	27E	2188 FNL & 909 FWL	Aao Federal #20	Apache Corporation	NEW: Permit to Drill	1
1088	30	015	42051		1	1	18S	27E	2310 FNL & 2310 FWL	Aao Federal #19	Apache Corporation	NEW: Permit to Drill	1
1089	30	015	42116	M		29	17S	28E	990 FSL & 2160 FWL	Williams A Federal 16	LRE Operating LLC	NEW: Permit to Drill	1
1090	30	015	42121	C		2	18S	27E	658 FNL & 1984 FWL	Brade State No. 5	Tarco Energy, L.C.	NEW: Permit to Drill	1
1091	30	015	42156	D		32	17S	28E	385 FNL & 900 FWL	Enron State 21	LRE Operating LLC	NEW: Permit to Drill	1
1092	30	015	42334		1	1	18S	27E	1005 FNL & 1630 FWL	Aao Federal #21	Apache Corporation	NEW: Permit to Drill	1
1093	30	015	42335		1	1	18S	27E	790 FNL & 330 FWL	Aao Federal #22	Apache Corporation	NEW: Permit to Drill	1
1094	30	015	42336		1	1	18S	27E	2265 FNL & 330 FEL	Aao Federal #23	Apache Corporation	NEW: Permit to Drill	1
1095	30	015	42337		1	1	18S	27E	984 FNL & 243 FEL	Aao Federal #24	Apache Corporation	NEW: Permit to Drill	1
1096	30	015	42338		1	1	18S	27E	2270 FSL & 1650 FWL	Aao Federal #26	Apache Corporation	NEW: Permit to Drill	1
1097	30	015	42339		1	1	18S	27E	360 FSL & 990 FWL	Aao Federal #29	Apache Corporation	NEW: Permit to Drill	1
1098	30	015	42358		1	1	18S	27E	183 FSL & 2497 FWL	Aao Federal #28	Apache Corporation	NEW: Permit to Drill	1
1099	30	015	42359		1	1	18S	27E	1960 FSL & 2063 FWL	Aao Federal #27	Apache Corporation	NEW: Permit to Drill	1
1100	30	015	42360		1	1	18S	27E	1261 FSL & 281 FWL	Aao Federal #30	Apache Corporation	NEW: Permit to Drill	1
1101	30	015	42361		1	1	18S	27E	2000 FSL & 1022 FWL	Aao Federal #25	Apache Corporation	NEW: Permit to Drill	1
1102	30	015	42372	D		31	17S	28E	330 FNL & 430 FWL	Enron State #20	LRE Operating LLC	NEW: Permit to Drill	1

TABLE VIII

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 VIII (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 IX

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
August 22 – 28, 2014	730 md	224,096 md-ft/cp	10.53	4,351.64 psia	8,946 feet
November 20 - 25, 2012	1,248 md	383,087 md-ft/cp	8.34	3,941.88 psia	8,972 feet
January 22 - 27, 2012	597 md	183,293 md-ft/cp	27.26	3,792.34 psia	8,986 feet
November 10 - 13, 2010	568 md	174,376 md-ft/cp	14.64	3,622.16 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 X

SUMMARY OF STATIC PRESSURE GRADIENT DATA
Gaines Well No. 3
August 28, 2014

Surface Readout Gauge			
Depth feet	Pressure psia	Pressure Gradient psi/ft	Temperature ºF
7660	4358.66		108.72
		0.435	
7000	4071.42		111.00
		0.438	
6000	3633.40		106.33
		0.433	
5000	3200.66		101.57
		0.438	
4000	2763.00		97.28
		0.433	
3000	2329.86		94.02
		0.435	
2000	1894.56		90.01
		0.434	
1000	1460.27		86.21
		0.444	
0	1016.36		85.46

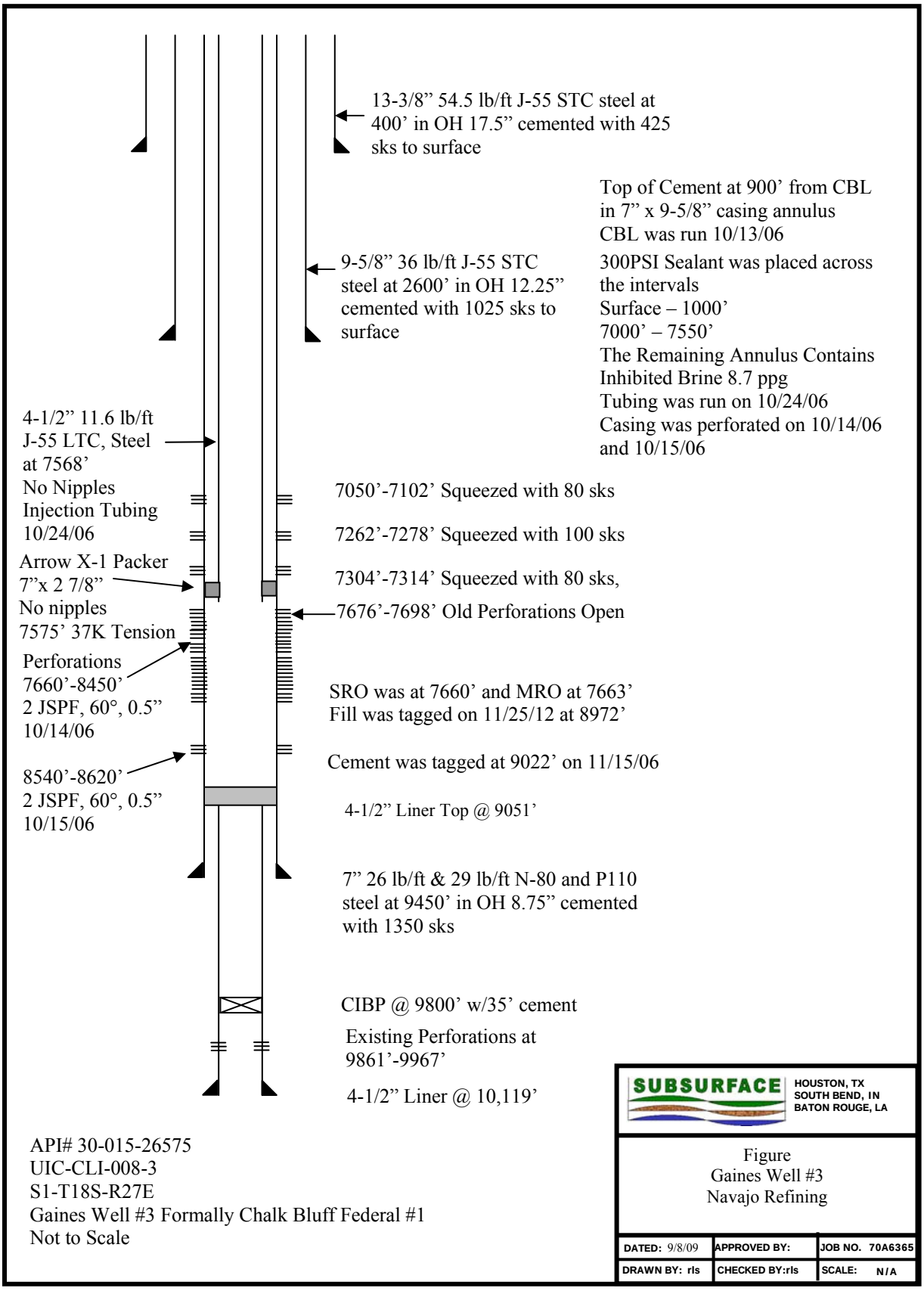

13-3/8" 54.5 lb/ft J-55 STC steel at 400' in OH 17.5" cemented with 425 sks to surface
Top of Cement at 900' from CBL in 7" x 9-5/8" casing annulus CBL was run 10/13/06
9-5/8" 36 lb/ft J-55 STC steel at 2600' in OH 12.25" cemented with 1025 sks to surface
300PSI Sealant was placed across the intervals
Surface – 1000'
7000' – 7550'
The Remaining Annulus Contains Inhibited Brine 8.7 ppg
Tubing was run on 10/24/06
Casing was perforated on 10/14/06 and 10/15/06
4-1/2" 11.6 lb/ft J-55 LTC, Steel at 7568'
No Nipples
Injection Tubing 10/24/06
7050'-7102' Squeezed with 80 sks
7262'-7278' Squeezed with 100 sks
Arrow X-1 Packer 7"x 2 7/8"
No nipples
7575' 37K Tension
7304'-7314' Squeezed with 80 sks,
7676'-7698' Old Perforations Open
Perforations 7660'-8450' 2 JSPF, 60°, 0.5" 10/14/06
SRO was at 7660' and MRO at 7663'
Fill was tagged on 11/25/12 at 8972'
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

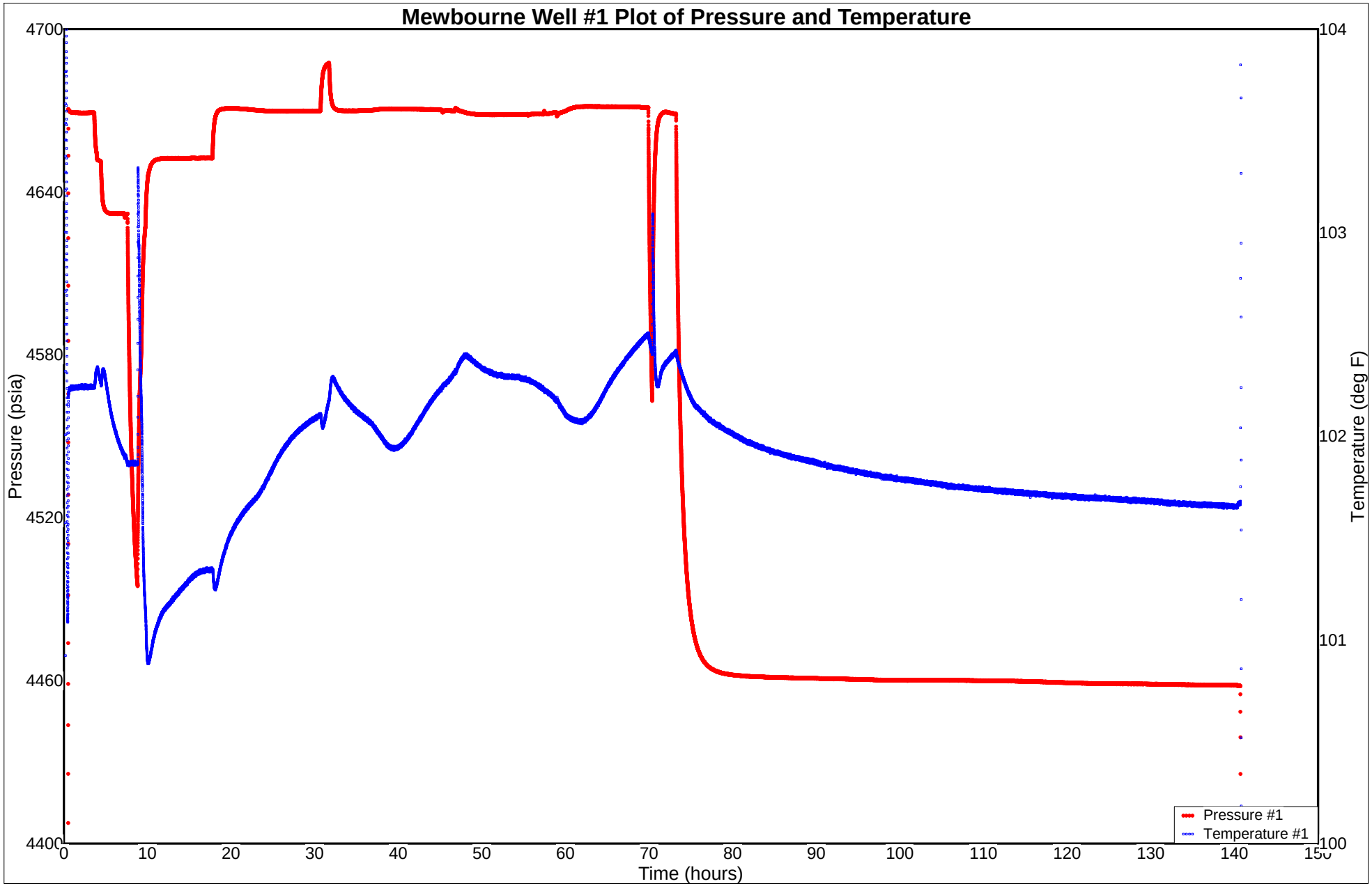
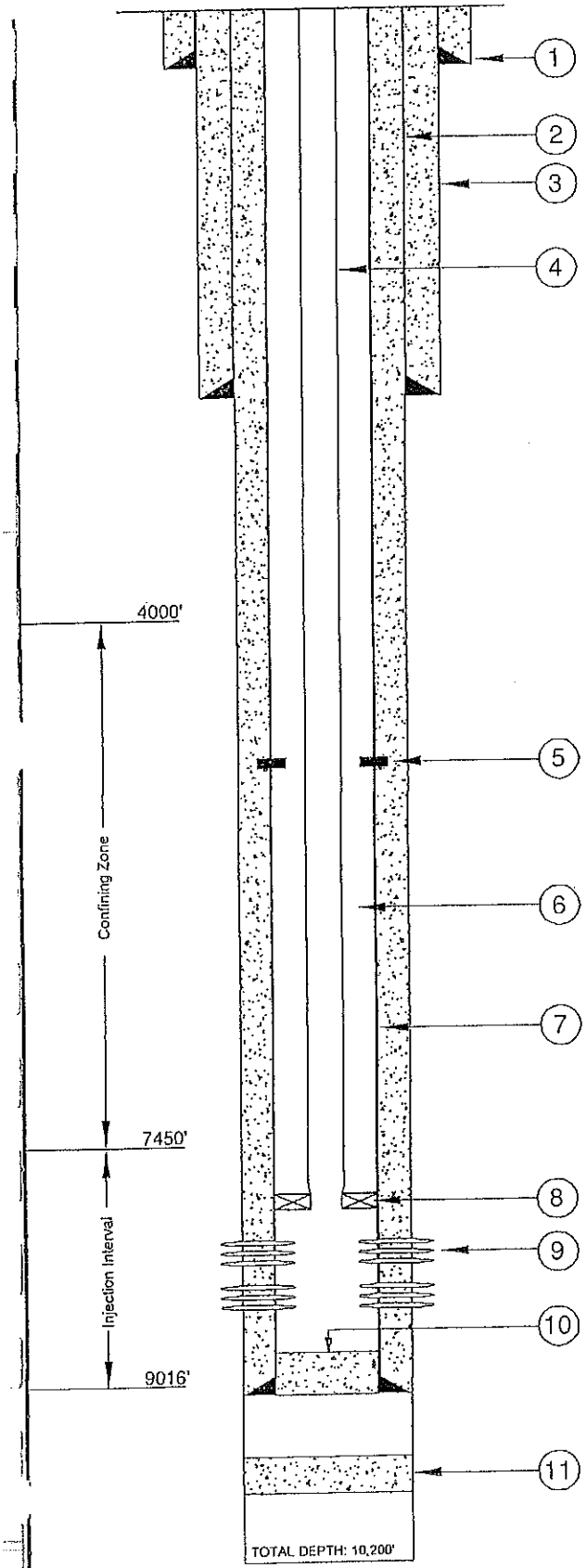

Mewbourne Well #1 Plot of Pressure and Temperature
Pressure (psia)
Temperature (deg F)
Time (hours)
4700
4640
4580
4520
4460
4400
104
103
102
101
100
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
Pressure #1
Temperature #1

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

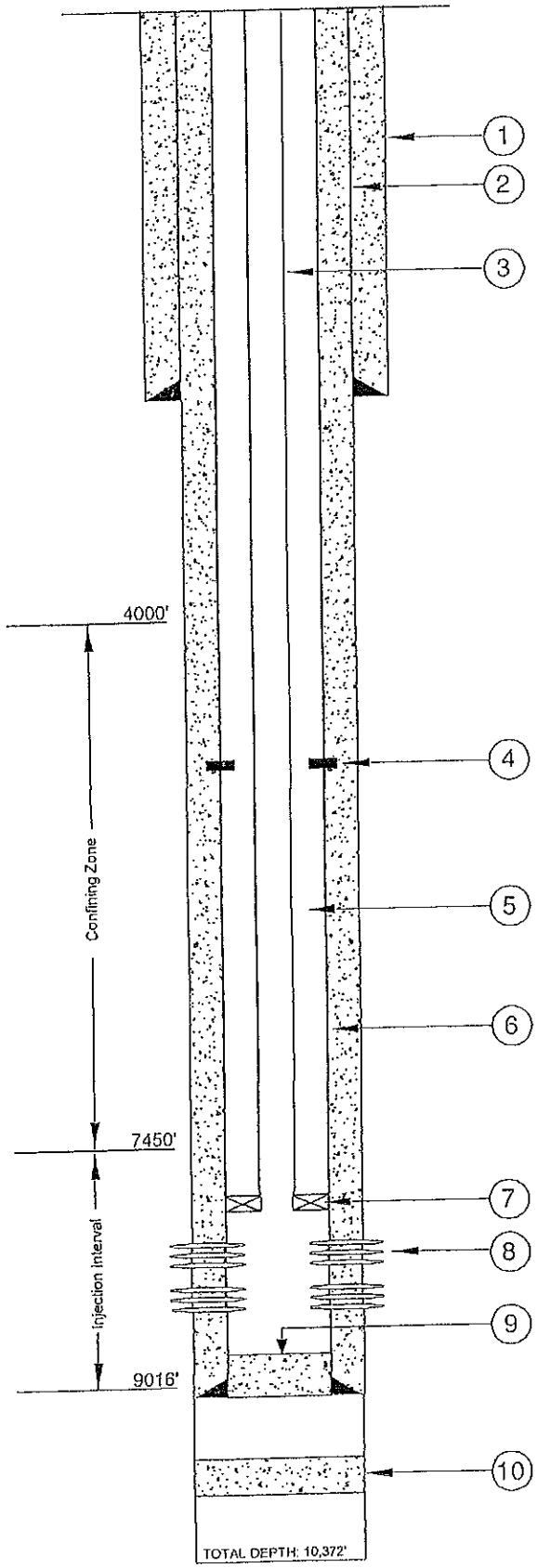
HOUSTON, TX.
SOUTH BEND, IN.
BATON ROUGE, LA.

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO

BELOW GROUND DETAILS
WASTE DISPOSAL WELL NO. 1

DATE: 07/13/01	CHECKED BY:	JOB NO: 70D5256
DRAWN BY: WDL	APPROVED BY:	DWG. NO:

FIGURE 3



BELOW GROUND DETAILS

All depths are referenced to the Kelly bushing elevation of 13' above ground level. Ground level elevation is 3610' above mean sea level.

1. Base of the USDW at 473'.
2. Surface Casing: 8 5/8", 32 lb/ft, set at 1995' in an 11" hole. Cemented to surface with 800 sacks of cement.
3. Injection Tubing: 3 ½", 9.2 lb/ft, J-55, smls, NUE 10 rd, set at 7528'.
4. DV Tool: at 5,785'.
5. Annulus Fluid: 8.7 lb/gal brine water mixed w/UniChem Techni-Hib 370 corrosion inhibitor.
6. Protection Casing: 5 ½", 17 lb/ft, L-80, LT&C: 8869' to the surface and set in a 7 7/8" hole. Casing cemented in two stages as follows:

   First Stage - 575 sacks of modified Class "H" with 0.4 % CFR-3, 5 lb/sk Gilsonite, 0.5 % Halad-344, and 3 lb/sk salt. Mixed at 13.0 ppg. Opened DV tool at 5785 and circulated 20 sacks to surface.

   Second Stage - Lead Slurry: 300 sacks of Interfill "C" (35:65:6) mixed at 11.7 ppg. Tail slurry: 695 sacks modified Class "H" with 0.4% CFR-3, 5 lb/sk Gilsonite, 0.5 % Halad-344 and 3 lb/sk salt mixed at 13.0 ppg. Circulated 150 sacks to surface. Topped out with 10 yards of Redi-mix.
7. Packer: 5 ½" x 2 7/8" Weatherford Completion Tools (Arrow) Model X-1 retrievable packer set at 7528'. Minimum ID is 2.4375". Wireline re-entry guide is on bottom. To release: turn ¼ turn to the right and pick up.
8. Perforations (2 SPF):

   Zone 1: 7570-7620', 7676-7736'

   Zone 2: 7826-7834', 7858-7880', 7886-7904', 7916-7936', 7944-7964', 7990-8042', 8096-8116', 8191-8201', 8304-8319',8395-8399'.
9. PBTD: 8770'
10. Cement Plug: 45 sacks from 9675' to 9775'.

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

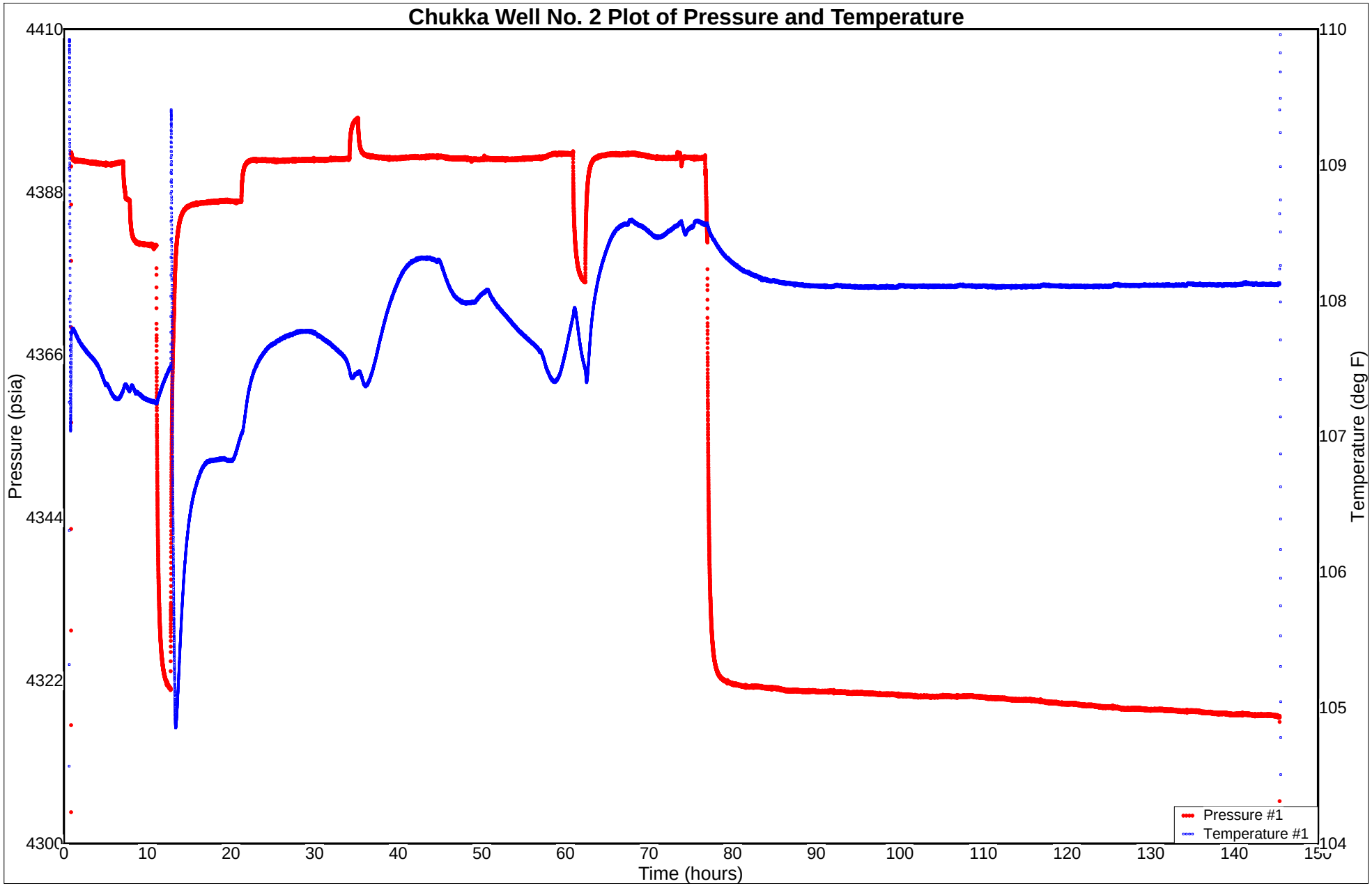
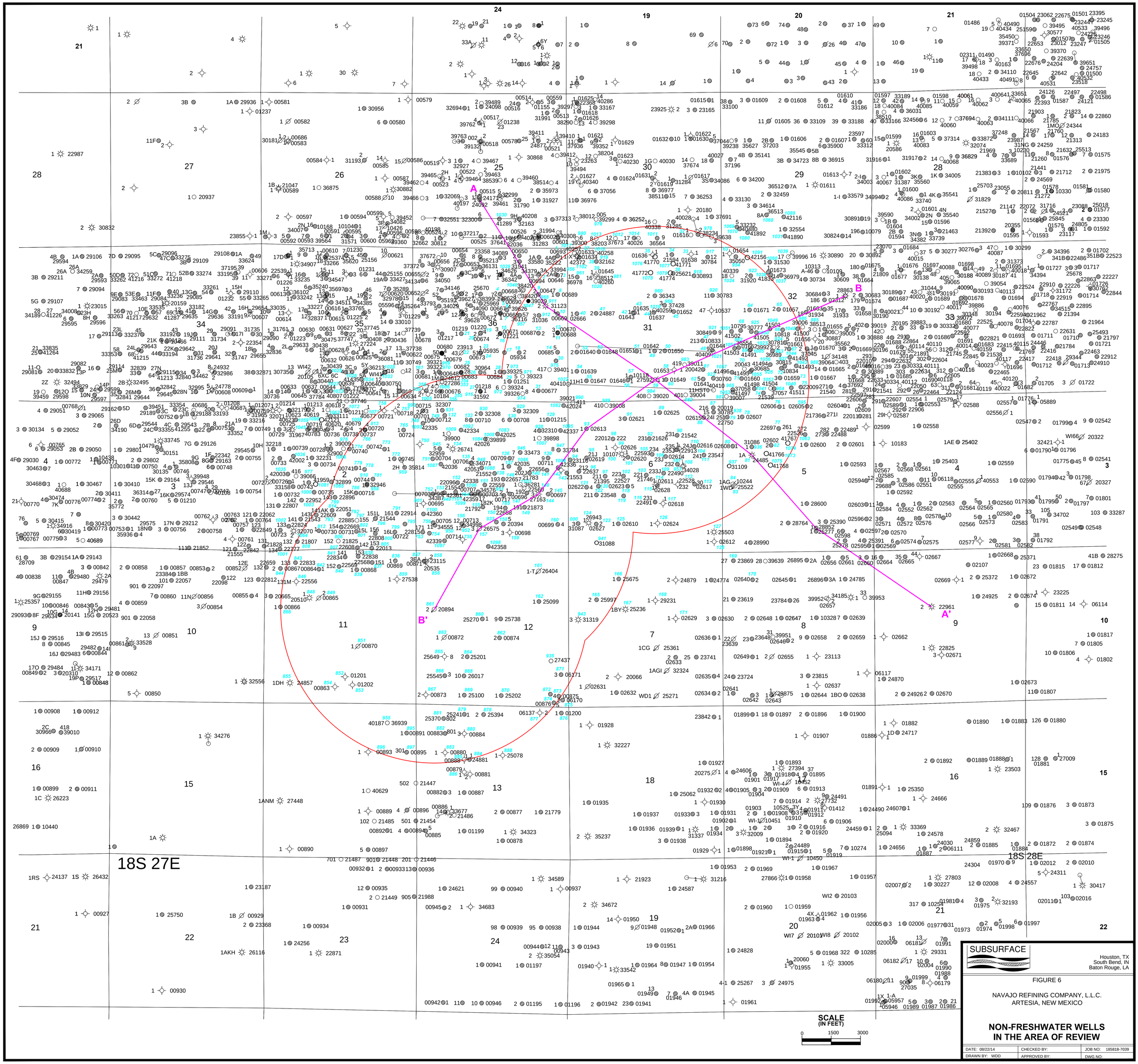

Chukka Well No. 2 Plot of Pressure and Temperature
Pressure (psia)
Temperature (deg F)
Time (hours)
4410
4388
4366
4344
4322
4300
110
109
108
107
106
105
104
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
Pressure #1
Temperature #1

FIGURE 5



SUBSURFACE

Houston, TX
South Bend, IN
Baton Rouge, LA

FIGURE 6

NAVAJO REFINING COMPANY, L.L.C.
ARTESIA, NEW MEXICO

NON-FRESHWATER WELLS IN THE AREA OF REVIEW

DATE: 08/22/14	CHECKED BY:	JOB NO: 185818-7039	
DRAWN BY: WDD	APPROVED BY:	DWG NO:	

SUBSURFACE TECHNOLOGY

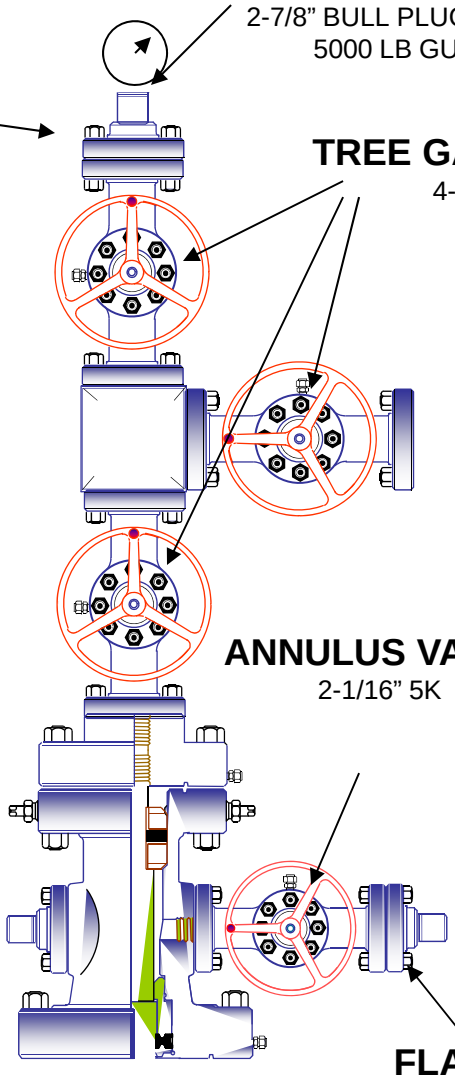
WELL: NAVAJO REFINING WDW #3

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

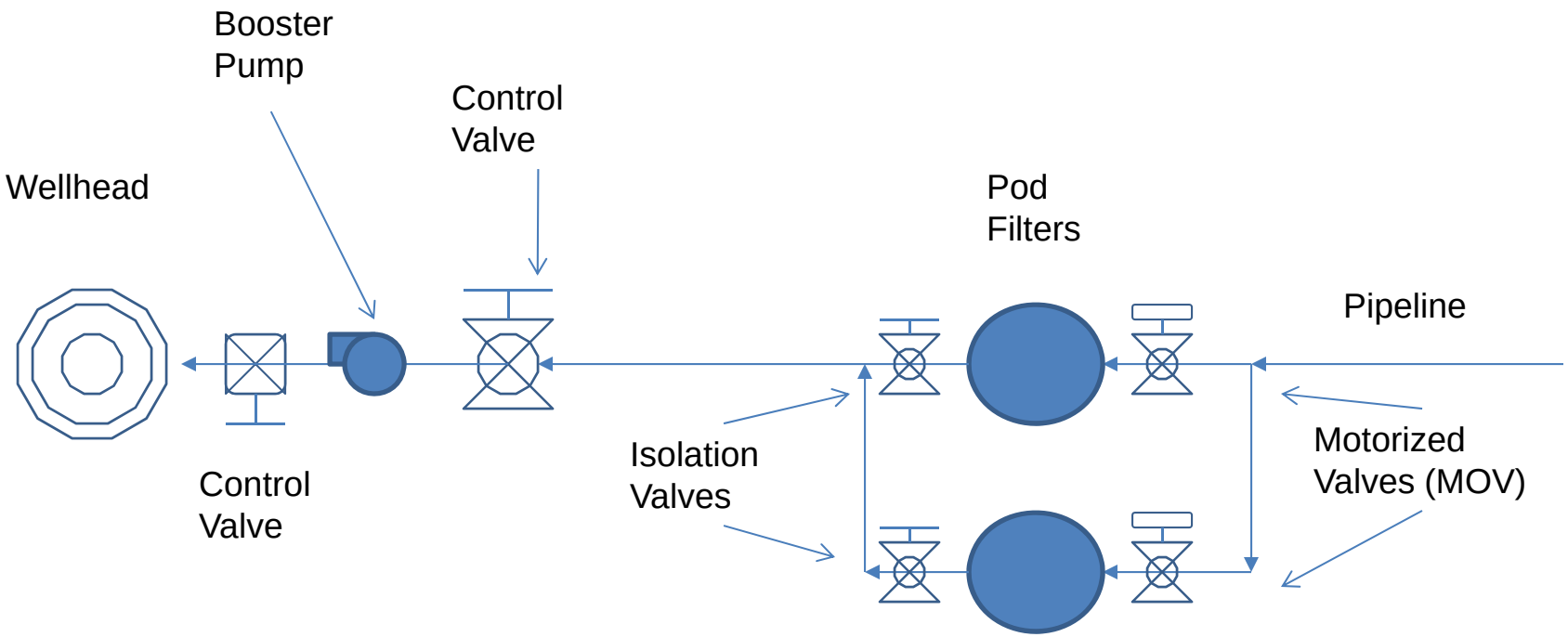
ANNULUS VALVE
2” BALL VALVE 3K

FLANGE
2-1/16” 5K X 2” LP 5K

SUPERIOR WELLHEAD

FIGURE 7

FIGURE 8
Gaines Well No. 3
Diagram of Shut-in Valve Control



At Shut-in
- Close MOV
- Close Control Valve
- Close Isolation Valves
- Close Control Valve
- Drain POD Filters

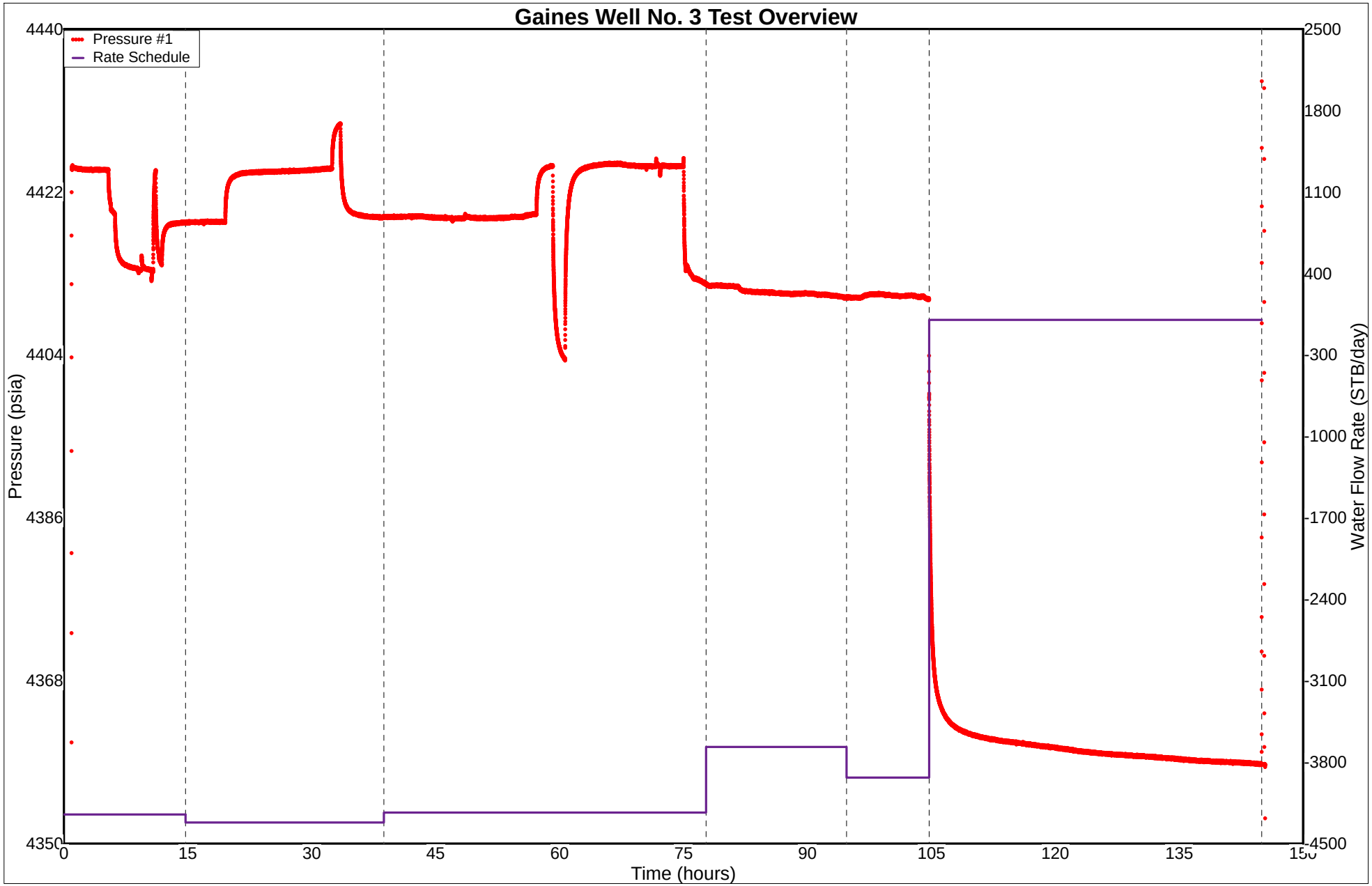

Gaines Well No. 3 Test Overview
Pressure #1
Rate Schedule
Pressure (psia)
Water Flow Rate (STB/day)
Time (hours)
4440
4422
4404
4386
4368
4350
2500
1800
1100
400
-300
-1000
-1700
-2400
-3100
-3800
-4500
0
15
30
45
60
75
90
105
120
135
150

FIGURE 9

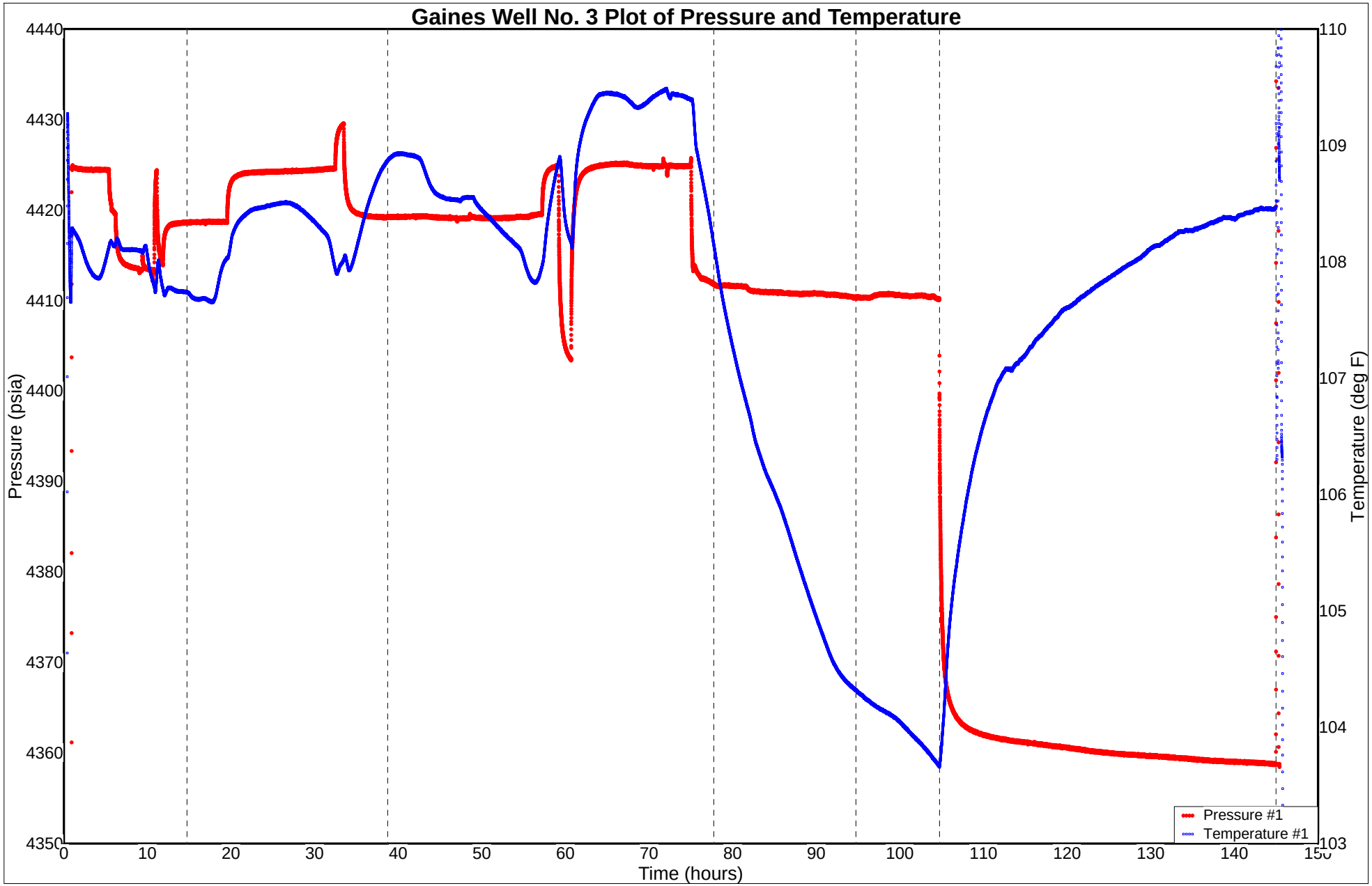

Gaines Well No. 3 Plot of Pressure and Temperature
Pressure (psia)
Temperature (deg F)
Time (hours)
4440
4430
4420
4410
4400
4390
4380
4370
4360
4350
110
109
108
107
106
105
104
103
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
Pressure #1
Temperature #1

FIGURE 10

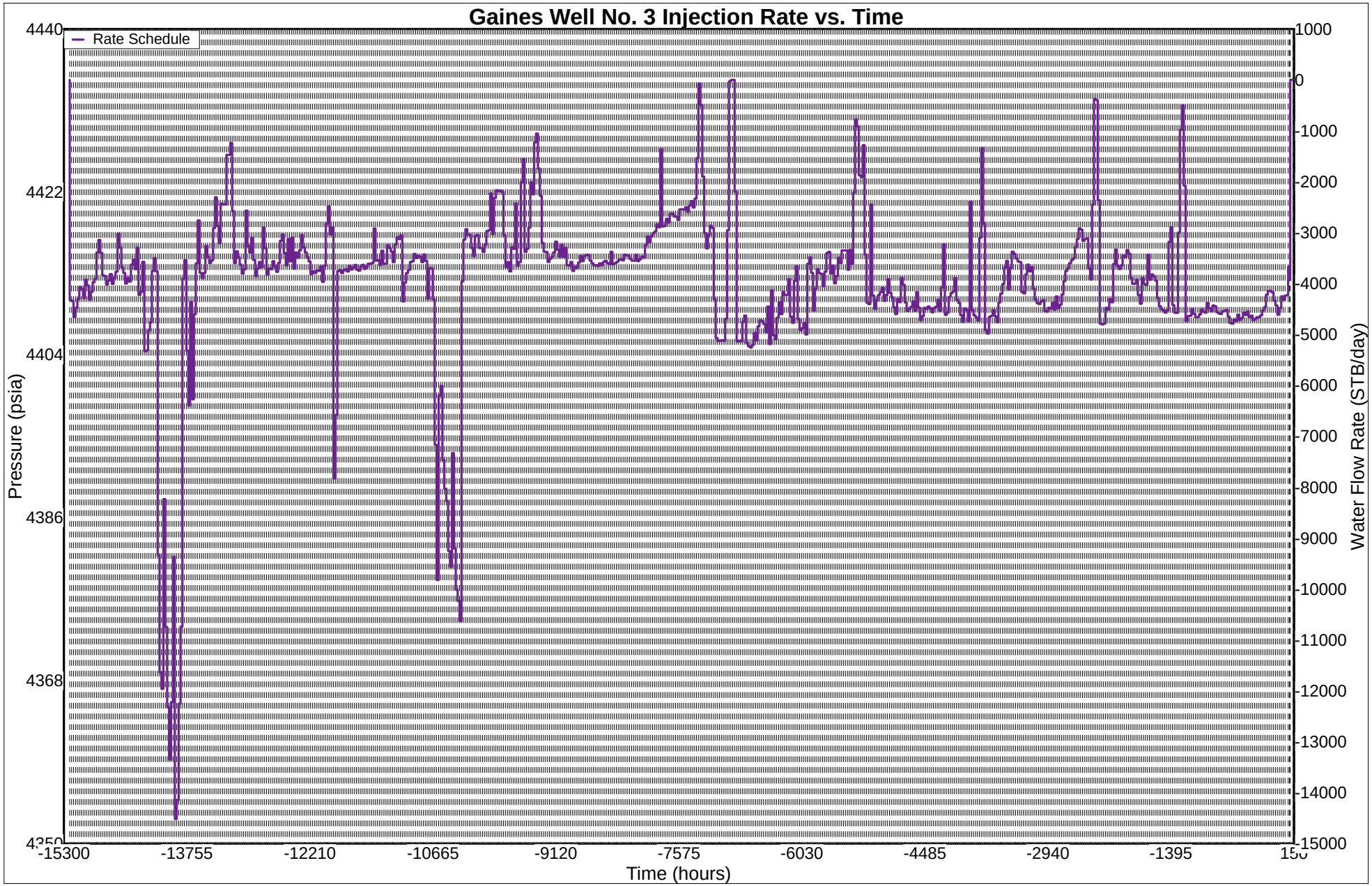

Gaines Well No. 3 Injection Rate vs. Time
Rate Schedule
Pressure (psia)
Water Flow Rate (STB/day)
Time (hours)
4440
4422
4404
4386
4368
4350
1000
0
-1000
-2000
-3000
-4000
-5000
-6000
-7000
-8000
-9000
-10000
-11000
-12000
-13000
-14000
-15000
-15300
-13755
-12210
-10665
-9120
-7575
-6030
-4485
-2940
-1395
150

FIGURE 11

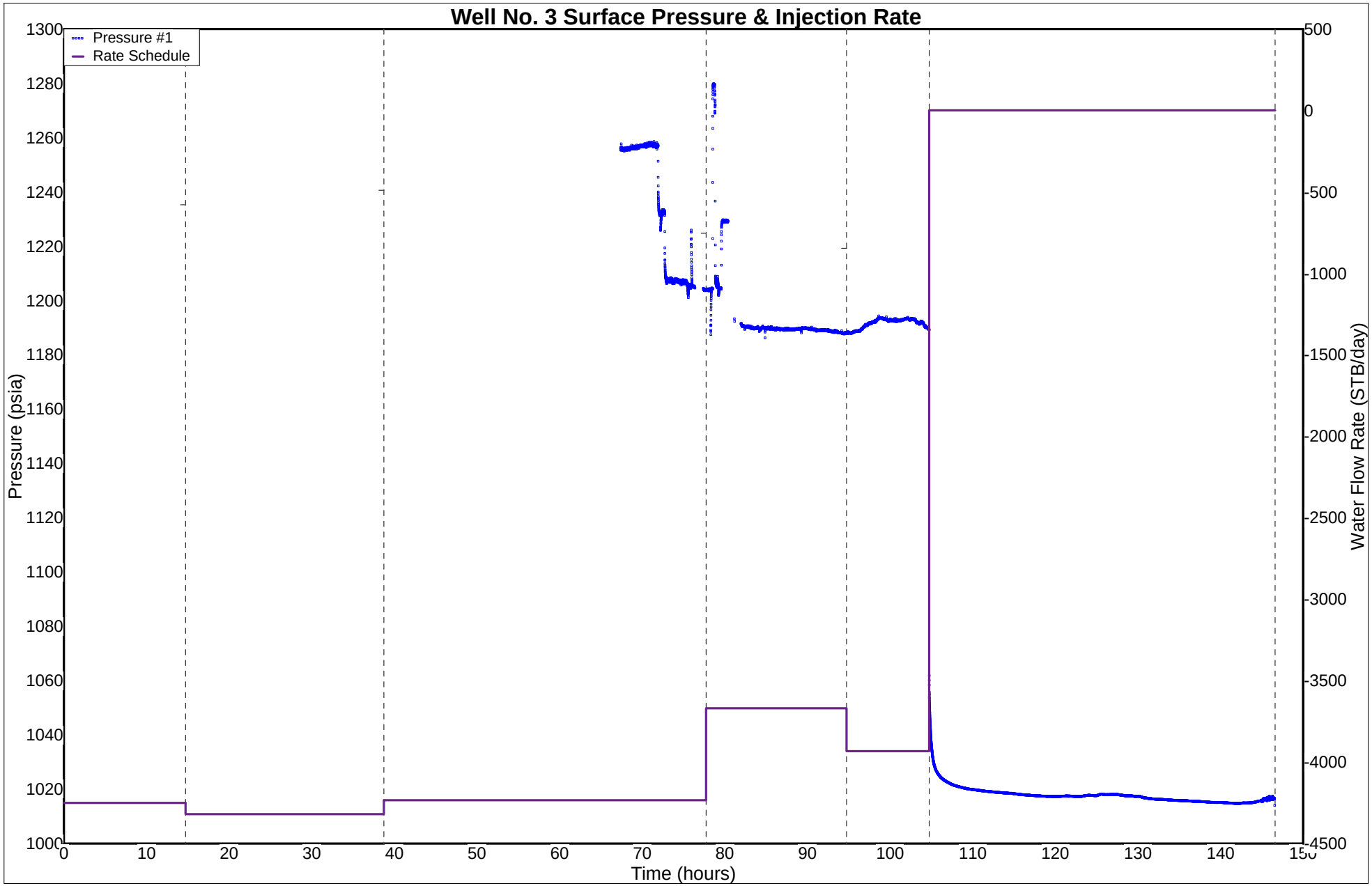

Well No. 3 Surface Pressure & Injection Rate
Pressure #1
Rate Schedule
Pressure (psia)
Water Flow Rate (STB/day)
Time (hours)
1300
1280
1260
1240
1220
1200
1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
500
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
-4000
-4500
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150

FIGURE 12

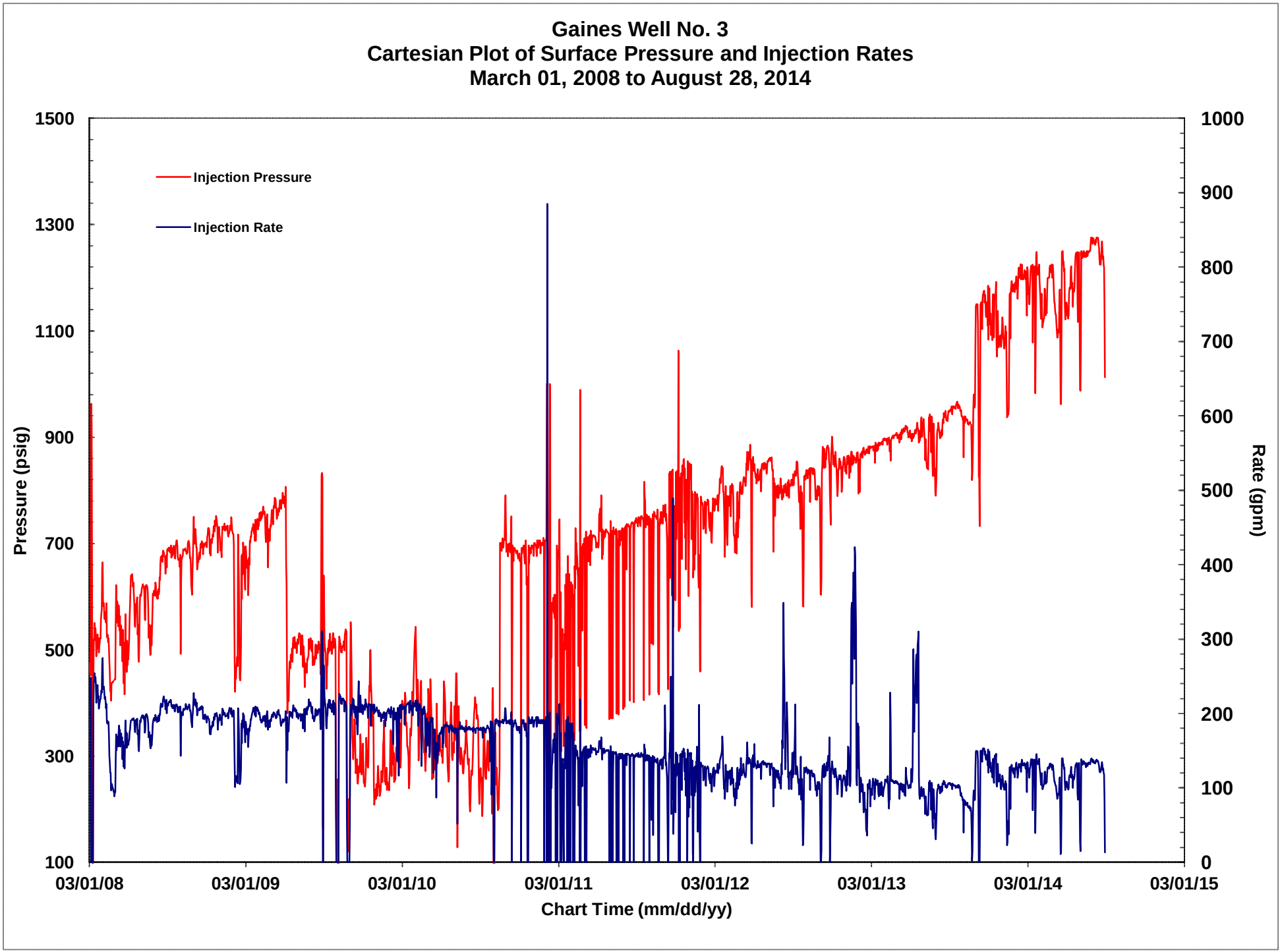

Gaines Well No. 3
Cartesian Plot of Surface Pressure and Injection Rates
March 01, 2008 to August 28, 2014
Injection Pressure
Injection Rate
Pressure (psig)
Rate (gpm)
1500
1300
1100
900
700
500
300
100
1000
900
800
700
600
500
400
300
200
100
0
03/01/08
03/01/09
03/01/10
03/01/11
03/01/12
03/01/13
03/01/14
03/01/15
Chart Time (mm/dd/yy)

FIGURE 13

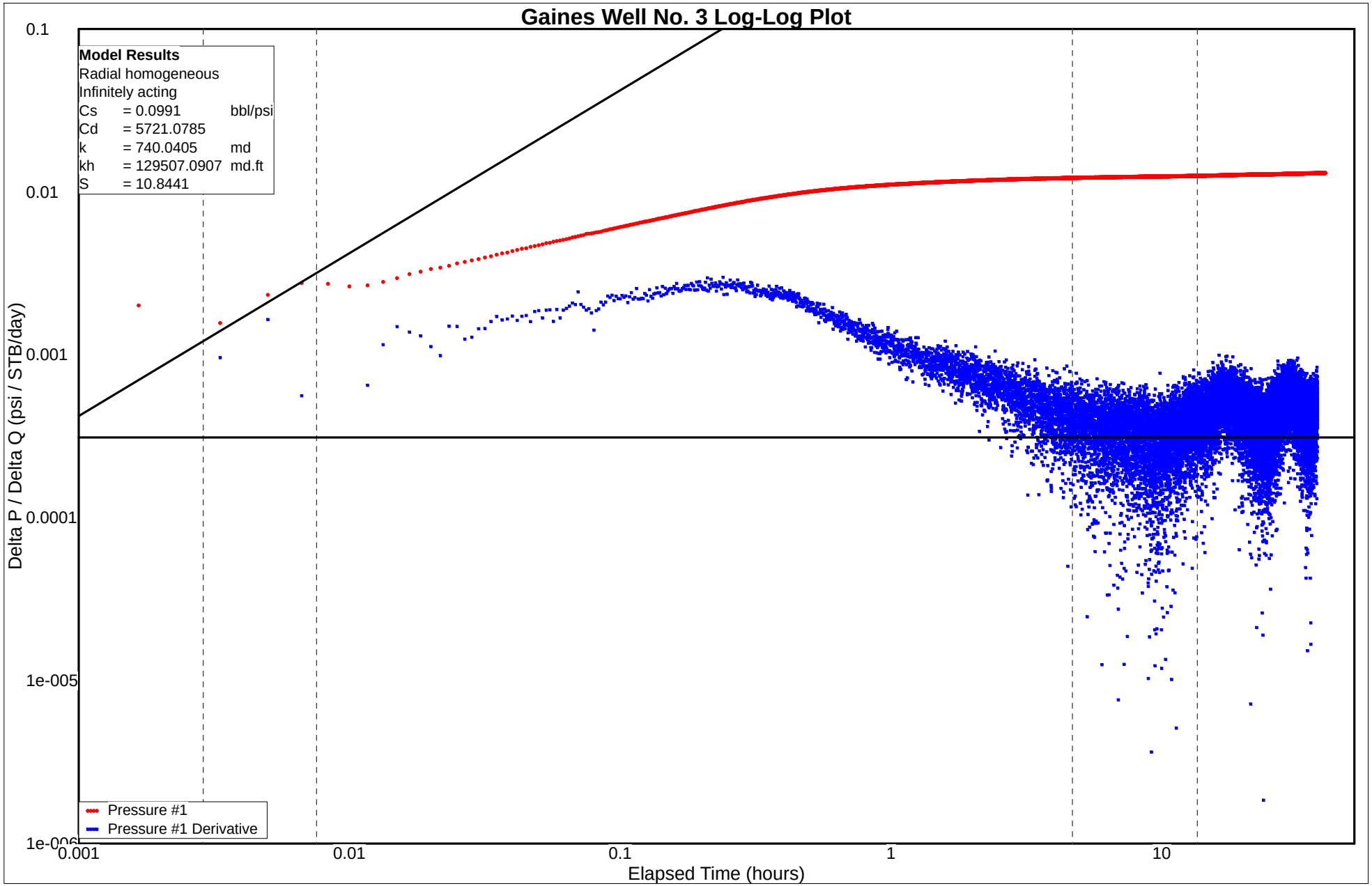

Gaines Well No. 3 Log-Log Plot
Model Results
Radial homogeneous
Infinitely acting
Cs = 0.0991 bbl/psi
Cd = 5721.0785
k = 740.0405 md
kh = 129507.0907 md.ft
S = 10.8441
Pressure #1
Pressure #1 Derivative
Delta P / Delta Q (psi / STB/day)
Elapsed Time (hours)
0.1
0.01
0.001
0.0001
1e-005
1e-006
0.001
0.01
0.1
1
10

FIGURE 14

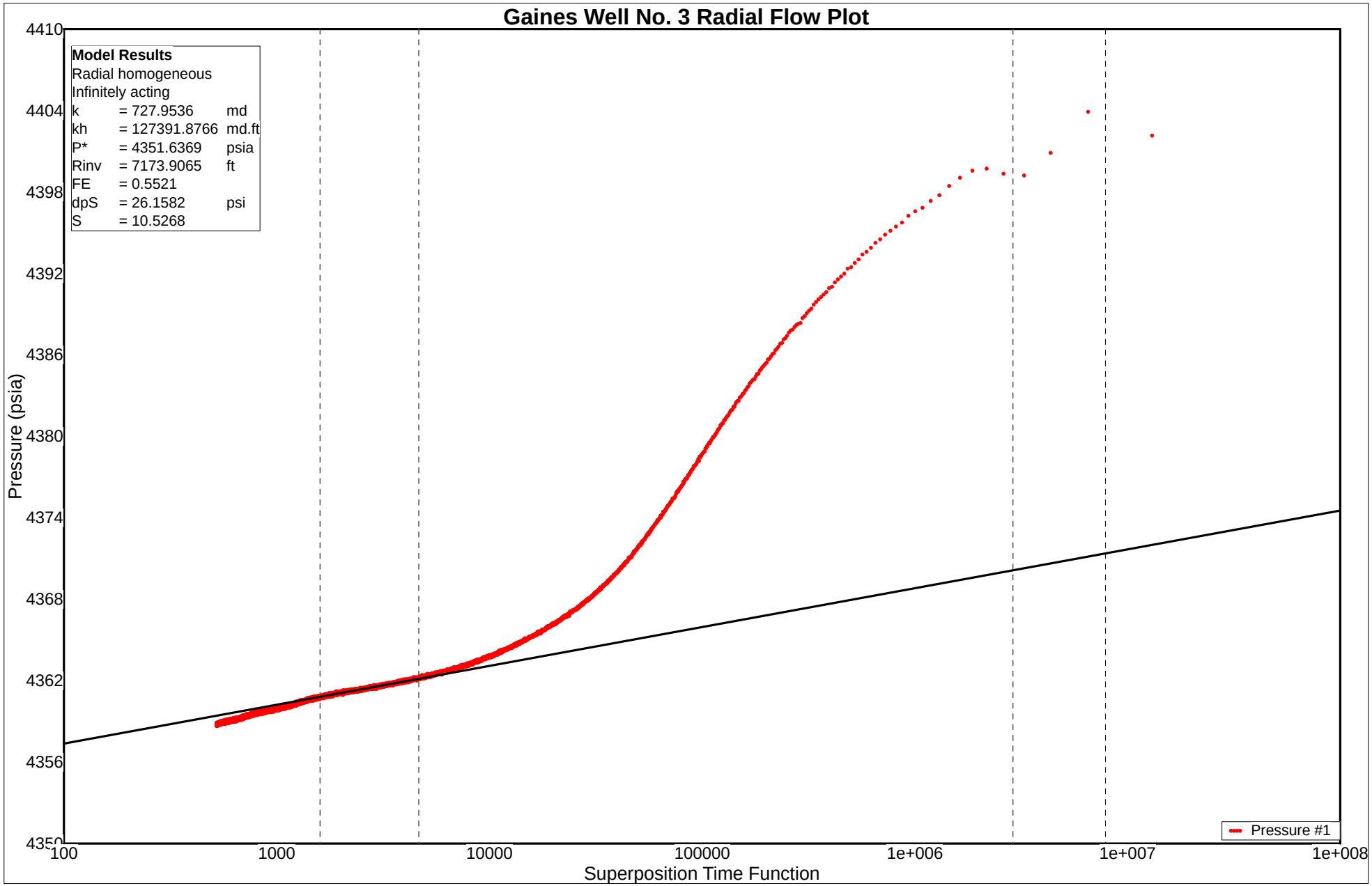

Gaines Well No. 3 Radial Flow Plot
Model Results
Radial homogeneous
Infinitely acting
k = 727.9536 md
kh = 127391.8766 md.ft
P* = 4351.6369 psia
Rinv = 7173.9065 ft
FE = 0.5521
dpS = 26.1582 psi
S = 10.5268
Pressure (psia)
4410
4404
4398
4392
4386
4380
4374
4368
4362
4356
4350
100
1000
10000
100000
1e+006
1e+007
1e+008
Superposition Time Function
Pressure #1

FIGURE 15


Gaines Well No. 3 Radial Flow Plot (Expanded View)
Model Results
Radial homogeneous
Infinitely acting
k = 727.9536 md
kh = 127391.8766 md.ft
P* = 4351.6369 psia
Rinv = 7173.9065 ft
FE = 0.5521
dpS = 26.1582 psi
S = 10.5268
Pressure (psia)
4365
4364
4363
4362
4361
4360
4359
100
1000
10000
Superposition Time Function
Pressure #1

FIGURE 16

Navajo Refining Company
Gaines Well No. 3
July 28, 2014 to August 26, 2014
Hall Plot

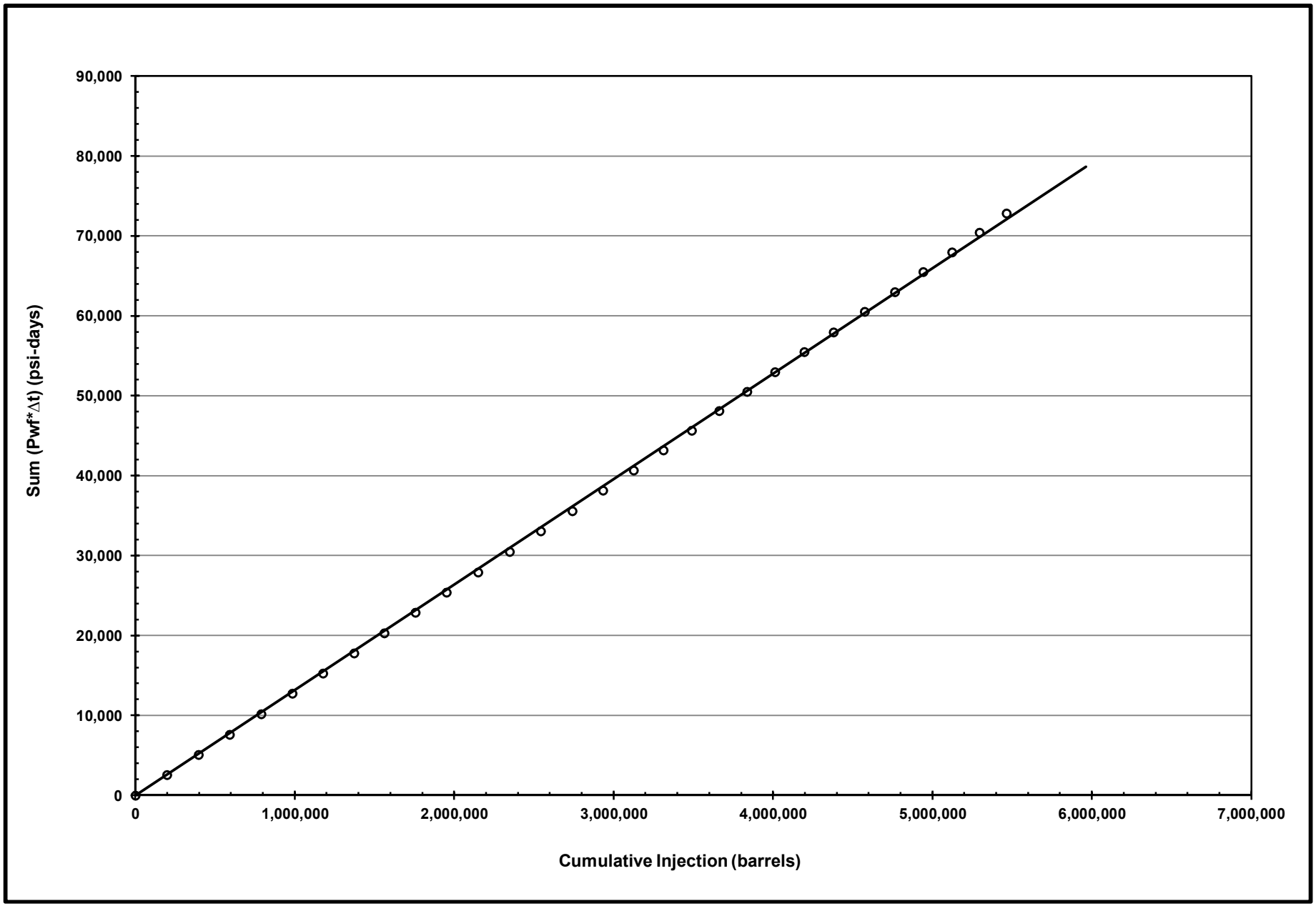


FIGURE 17

Navajo Refining Company
Static Pressure Gradient Survey
Gaines Well No. 3
August 28, 2014

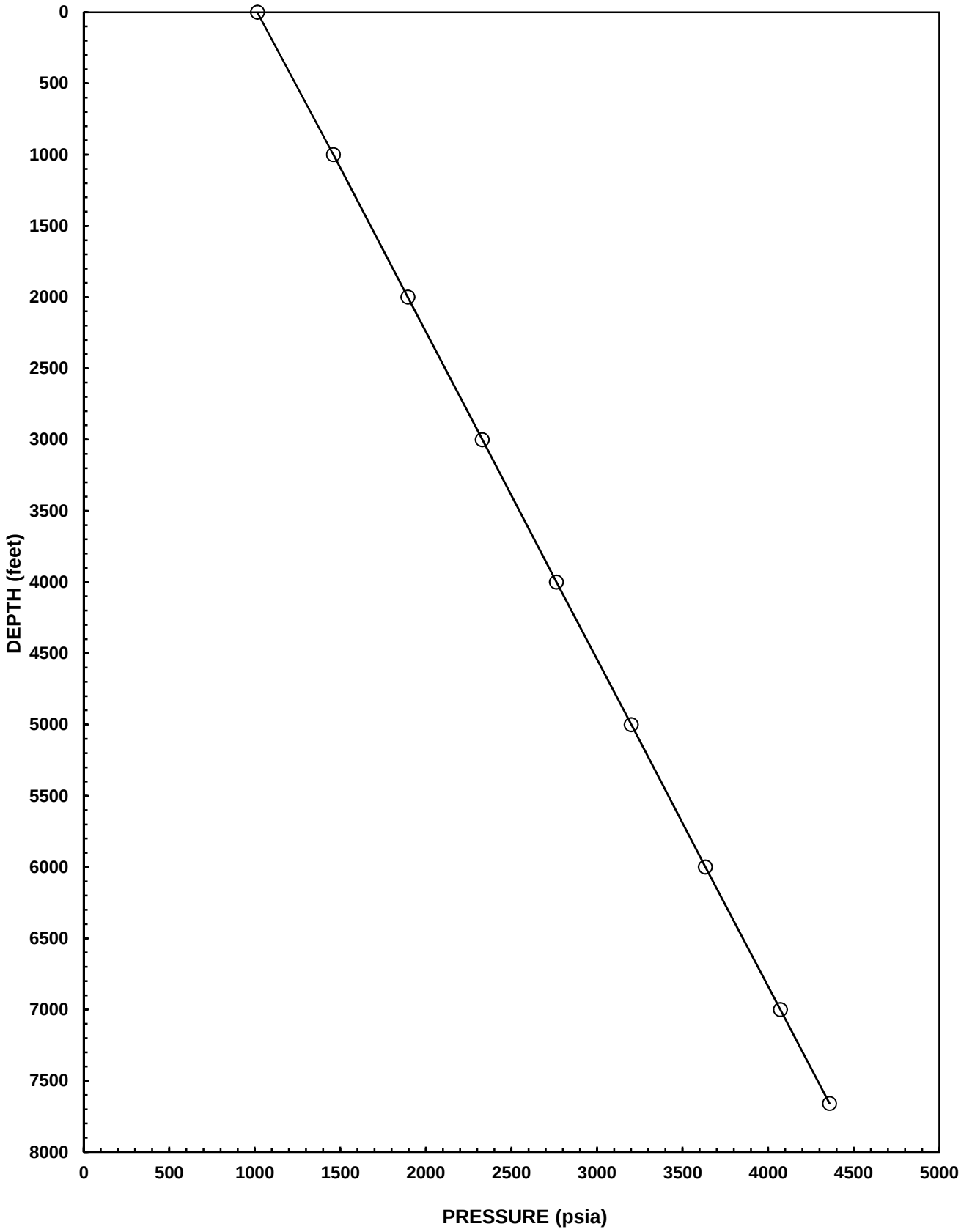


FIGURE 18

APPENDIX C

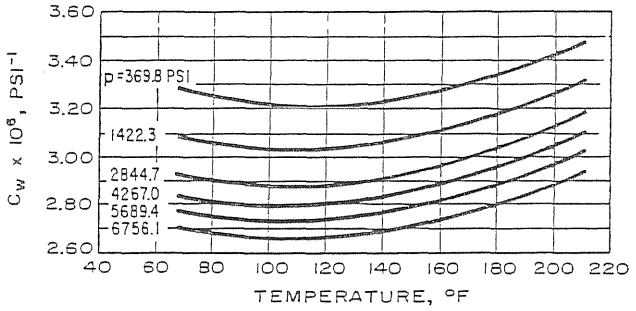


Fig. D.16 Average compressibility of distilled water. After Long and Chierici.[13]

Source: Earlougher, 1977, Advances in Well Test Analysis

COMPRESSIBILITY OF PORE VOLUME AND DISTILLED WATER

APPENDIX D

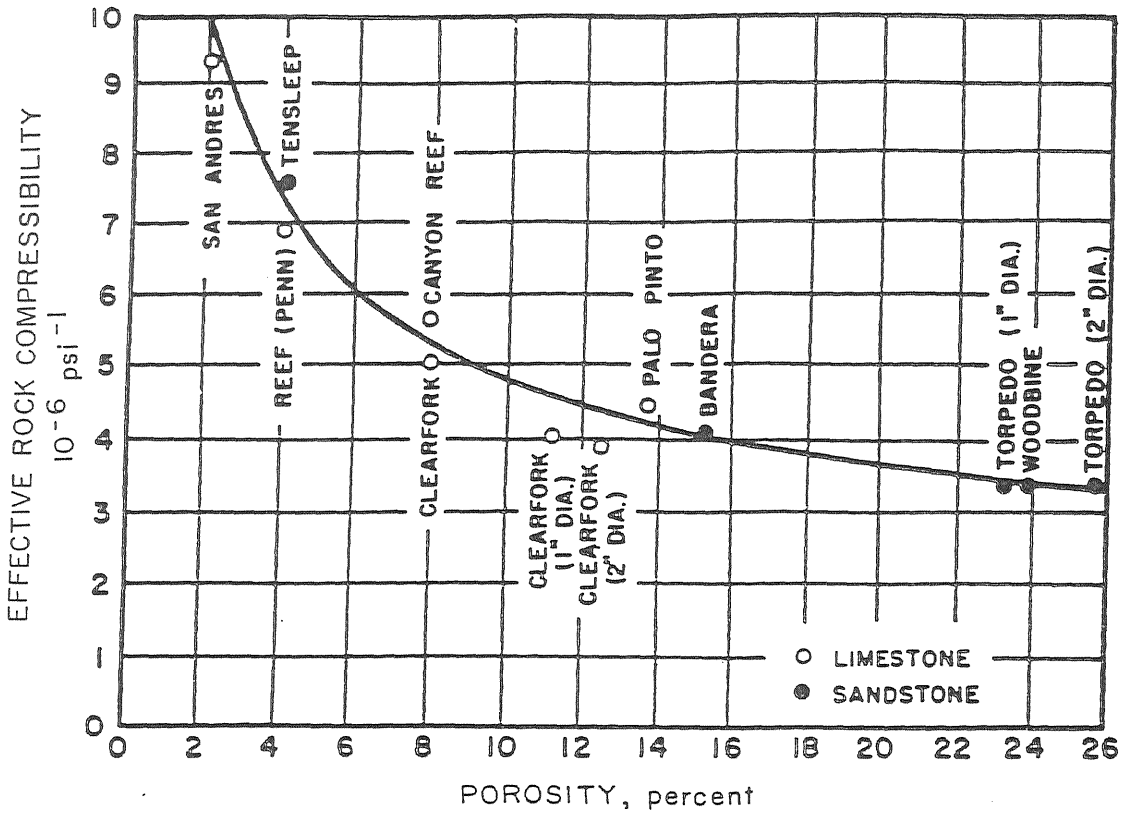


Fig. G.5 Effective formation (rock) compressibility. From Hall, *Trans.*, AIME (1953) 198, 309.

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

APPENDIX F

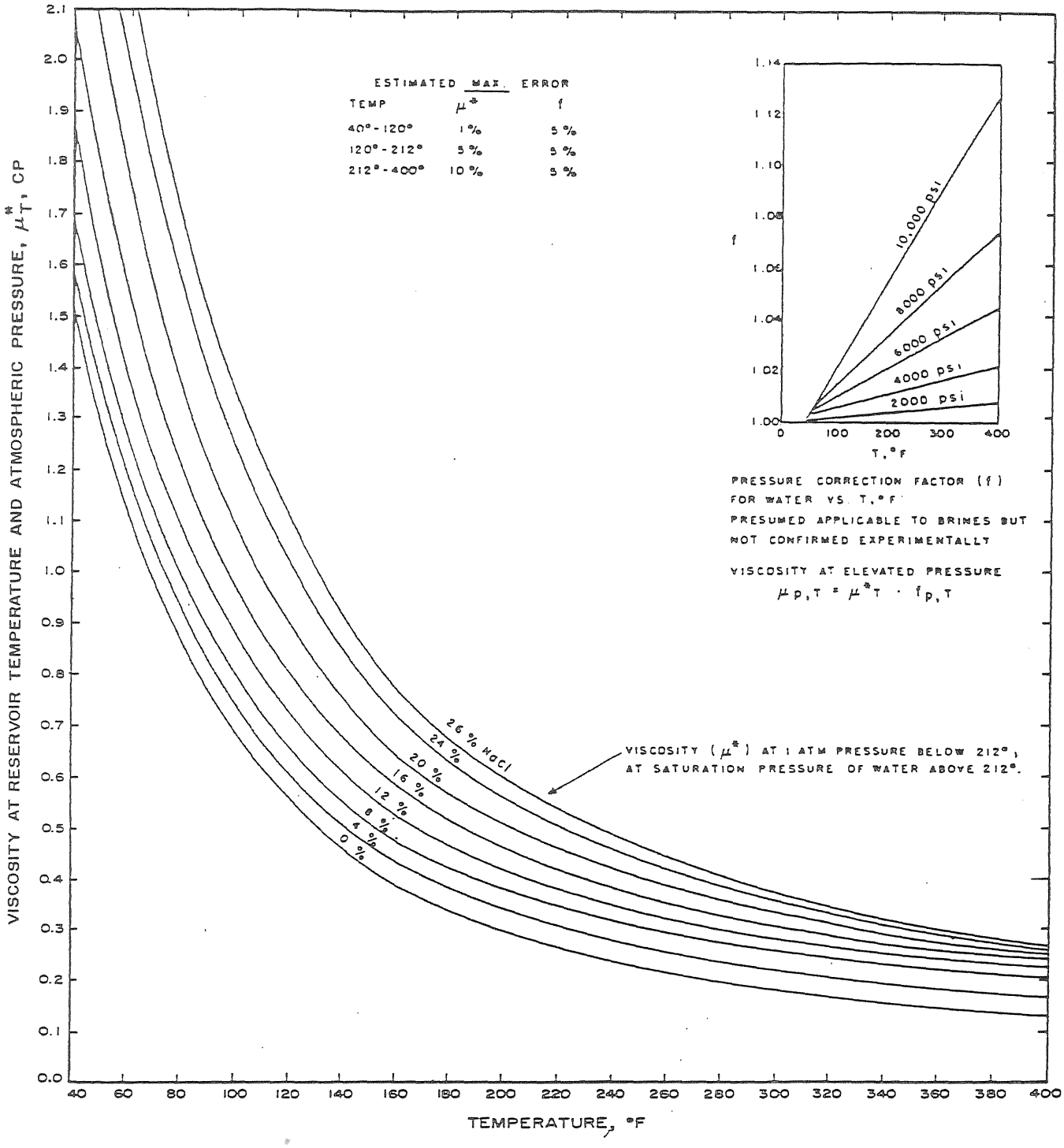


Fig. D.35 Water viscosity at various salinities and temperatures. After Matthews and Russell, data of Chesnut.[18]

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

APPENDIX G: Daily Rate History Data

Date	Time	Hours	Press.	Rate
mm/dd/yy	hh:mm:ss	Δt	psig	bpd
11/25/2012	23:00:00	-15226.27	0735.4	-2319.089
11/26/2012	23:00:00	-15202.27	0869.3	-4322.387
11/27/2012	23:00:00	-15178.27	0876.3	-4347.540
11/28/2012	23:00:00	-15154.27	0901.2	-4660.700
11/29/2012	23:00:00	-15130.27	0885.6	-4480.698
11/30/2012	23:00:00	-15106.27	0873.9	-4302.006
12/01/2012	23:00:00	-15082.27	0848.7	-4068.764
12/02/2012	23:00:00	-15058.27	0850.3	-4111.550
12/03/2012	23:00:00	-15034.27	0865.0	-4287.425
12/04/2012	23:00:00	-15010.27	0844.4	-3921.607
12/05/2012	23:00:00	-14986.27	0845.5	-4040.927
12/06/2012	23:00:00	-14962.27	0872.2	-4317.375
12/07/2012	23:00:00	-14938.27	0857.9	-4163.296
12/08/2012	23:00:00	-14914.27	0845.5	-3974.958
12/09/2012	23:00:00	-14890.27	0837.4	-3907.046
12/10/2012	23:00:00	-14866.27	0807.6	-3390.400
12/11/2012	23:00:00	-14842.27	0788.9	-3145.254
12/12/2012	23:00:00	-14818.27	0804.9	-3398.792
12/13/2012	23:00:00	-14794.27	0839.4	-3838.600
12/14/2012	23:00:00	-14770.27	0839.3	-3856.307
12/15/2012	23:00:00	-14746.27	0856.9	-4020.119
12/16/2012	23:00:00	-14722.27	0859.9	-3941.849
12/17/2012	23:00:00	-14698.27	0848.7	-3815.442
12/18/2012	23:00:00	-14674.27	0854.4	-4006.611
12/19/2012	23:00:00	-14650.27	0840.9	-3894.716
12/20/2012	23:00:00	-14626.27	0844.2	-3766.435
12/21/2012	23:00:00	-14602.27	0797.3	-3023.278
12/22/2012	23:00:00	-14578.27	0810.6	-3295.982
12/23/2012	23:00:00	-14554.27	0837.6	-3684.829
12/24/2012	23:00:00	-14530.27	0845.3	-3789.940
12/25/2012	23:00:00	-14506.27	0862.9	-4001.963
12/26/2012	23:00:00	-14482.27	0860.5	-3891.569
12/27/2012	23:00:00	-14458.27	0860.2	-3960.627
12/28/2012	23:00:00	-14434.27	0835.8	-3628.792
12/29/2012	23:00:00	-14410.27	0835.8	-3532.720
12/30/2012	23:00:00	-14386.27	0846.7	-3718.264
12/31/2012	23:00:00	-14362.27	0830.9	-3295.146
01/01/2013	23:00:00	-14338.27	0853.5	-4223.505
01/02/2013	23:00:00	-14314.27	0864.4	-4165.806
01/03/2013	23:00:00	-14290.27	0849.0	-3573.217
01/04/2013	23:00:00	-14266.27	0863.4	-5329.905
01/05/2013	23:00:00	-14242.27	0864.8	-5313.520
01/06/2013	23:00:00	-14218.27	0863.4	-4921.842
01/07/2013	23:00:00	-14194.27	0823.5	-4761.736
01/08/2013	23:00:00	-14170.27	0860.4	-3750.722
01/09/2013	23:00:00	-14146.27	0833.8	-3501.042
01/10/2013	23:00:00	-14122.27	0834.1	-3762.184
01/11/2013	23:00:00	-14098.27	0869.2	-9337.097
01/12/2013	23:00:00	-14074.27	0873.1	-11640.238
01/13/2013	23:00:00	-14050.27	0872.4	-11963.333
01/14/2013	23:00:00	-14026.27	0847.6	-8234.808
01/15/2013	23:00:00	-14002.27	0859.2	-10748.288
01/16/2013	23:00:00	-13978.27	0865.2	-12319.190
01/17/2013	23:00:00	-13954.27	0850.9	-13352.881
01/18/2013	23:00:00	-13930.27	0863.3	-12223.625
01/19/2013	23:00:00	-13906.27	0858.2	-9367.587
01/20/2013	23:00:00	-13882.27	0859.4	-14518.478
01/21/2013	23:00:00	-13858.27	0860.6	-14146.071
01/22/2013	23:00:00	-13834.27	0860.2	-12253.048
01/23/2013	23:00:00	-13810.27	0852.1	-10741.091
01/24/2013	23:00:00	-13786.27	0855.8	-3902.887
01/25/2013	23:00:00	-13762.27	0870.6	-3541.865
01/26/2013	23:00:00	-13738.27	0870.7	-5321.857
01/27/2013	23:00:00	-13714.27	0871.2	-6395.249
01/28/2013	23:00:00	-13690.27	0853.2	-4359.775
01/29/2013	23:00:00	-13666.27	0793.8	-6273.026
01/30/2013	23:00:00	-13642.27	0854.2	-4602.832
01/31/2013	23:00:00	-13618.27	0857.8	-3603.933
02/01/2013	23:00:00	-13594.27	0796.6	-2760.228
02/02/2013	23:00:00	-13570.27	0866.3	-3790.720
02/03/2013	23:00:00	-13546.27	0868.6	-3890.851
02/04/2013	23:00:00	-13522.27	0863.8	-3793.241
02/05/2013	23:00:00	-13498.27	0870.3	-3262.433
02/06/2013	23:00:00	-13474.27	0872.3	-3472.457
02/07/2013	23:00:00	-13450.27	0861.3	-3600.264
02/08/2013	23:00:00	-13426.27	0873.5	-3545.285
02/09/2013	23:00:00	-13402.27	0879.3	-2913.725
02/10/2013	23:00:00	-13378.27	0880.1	-2307.522
02/11/2013	23:00:00	-13354.27	0872.8	-2871.127
02/12/2013	23:00:00	-13330.27	0868.8	-3209.110
02/13/2013	23:00:00	-13306.27	0866.8	-2430.805
02/14/2013	23:00:00	-13282.27	0869.4	-2447.513
02/15/2013	23:00:00	-13258.27	0872.2	-2445.952
02/16/2013	23:00:00	-13234.27	0875.5	-1471.497
02/17/2013	23:00:00	-13210.27	0877.2	-1472.194
02/18/2013	23:00:00	-13186.27	0869.8	-1236.595
02/19/2013	23:00:00	-13162.27	0872.6	-2577.881
02/20/2013	23:00:00	-13138.27	0874.0	-3600.905
02/21/2013	23:00:00	-13114.27	0879.5	-3368.052
02/22/2013	23:00:00	-13090.27	0882.5	-3488.352
02/23/2013	23:00:00	-13066.27	0868.9	-3630.868
02/24/2013	23:00:00	-13042.27	0879.9	-3805.522
02/25/2013	23:00:00	-13018.27	0882.3	-3721.148
02/26/2013	23:00:00	-12994.27	0881.3	-2570.262
02/27/2013	23:00:00	-12970.27	0879.1	-3266.003
02/28/2013	23:00:00	-12946.27	0881.8	-3390.832
03/01/2013	23:00:00	-12922.27	0882.7	-3099.839
03/02/2013	23:00:00	-12898.27	0882.5	-3536.303
03/03/2013	23:00:00	-12874.27	0882.4	-3857.791
03/04/2013	23:00:00	-12850.27	0874.4	-3704.311
03/05/2013	23:00:00	-12826.27	0876.3	-3576.681
03/06/2013	23:00:00	-12802.27	0883.8	-3679.474
03/07/2013	23:00:00	-12778.27	0875.7	-2899.454
03/08/2013	23:00:00	-12754.27	0851.9	-3307.813
03/09/2013	23:00:00	-12730.27	0889.8	-3827.065
03/11/2013	00:00:00	-12705.27	0882.1	-3704.776
03/12/2013	00:00:00	-12681.27	0884.6	-3718.930
03/13/2013	00:00:00	-12657.27	0873.8	-3561.562
03/14/2013	00:00:00	-12633.27	0874.2	-3660.323
03/15/2013	00:00:00	-12609.27	0886.2	-3771.562
03/16/2013	00:00:00	-12585.27	0876.0	-3594.982
03/17/2013	00:00:00	-12561.27	0888.4	-3160.896
03/18/2013	00:00:00	-12537.27	0889.6	-3038.160
03/19/2013	00:00:00	-12513.27	0887.4	-3400.229
03/20/2013	00:00:00	-12489.27	0884.1	-3647.125
03/21/2013	00:00:00	-12465.27	0889.4	-3123.986
03/22/2013	00:00:00	-12441.27	0887.6	-3566.056
03/23/2013	00:00:00	-12417.27	0887.5	-3099.108
03/24/2013	00:00:00	-12393.27	0886.3	-3708.113
03/25/2013	00:00:00	-12369.27	0891.7	-3390.929
03/26/2013	00:00:00	-12345.27	0891.6	-3489.374
03/27/2013	00:00:00	-12321.27	0886.0	-3346.339

APPENDIX G: Daily Rate History Data

Date	Time	Hours	Press.	Rate
mm/dd/yy	hh:mm:ss	Δt	psig	bpd
03/28/2013	00:00:00	-12297.27	0894.6	-3045.356
03/29/2013	00:00:00	-12273.27	0896.8	-3292.061
03/30/2013	00:00:00	-12249.27	0897.2	-3390.452
03/31/2013	00:00:00	-12225.27	0897.7	-3484.385
04/01/2013	00:00:00	-12201.27	0893.8	-3567.635
04/02/2013	00:00:00	-12177.27	0896.1	-3818.696
04/03/2013	00:00:00	-12153.27	0896.6	-3759.381
04/04/2013	00:00:00	-12129.27	0897.1	-3796.190
04/05/2013	00:00:00	-12105.27	0892.7	-3743.057
04/06/2013	00:00:00	-12081.27	0895.3	-3753.607
04/07/2013	00:00:00	-12057.27	0885.9	-3665.276
04/08/2013	00:00:00	-12033.27	0897.5	-3968.071
04/09/2013	00:00:00	-12009.27	0894.7	-3651.104
04/10/2013	00:00:00	-11985.27	0898.5	-2823.836
04/11/2013	00:00:00	-11961.27	0899.2	-2483.085
04/12/2013	00:00:00	-11937.27	0887.4	-3036.864
04/13/2013	00:00:00	-11913.27	0873.3	-2898.032
04/14/2013	00:00:00	-11889.27	0893.4	-7828.889
04/15/2013	00:00:00	-11865.27	0855.8	-6582.954
04/16/2013	00:00:00	-11841.27	0895.7	-3758.177
04/17/2013	00:00:00	-11817.27	0896.5	-3735.790
04/18/2013	00:00:00	-11793.27	0899.0	-3794.982
04/19/2013	00:00:00	-11769.27	0900.8	-3741.460
04/20/2013	00:00:00	-11745.27	0901.9	-3719.149
04/21/2013	00:00:00	-11721.27	0903.3	-3765.008
04/22/2013	00:00:00	-11697.27	0898.0	-3654.520
04/23/2013	00:00:00	-11673.27	0901.8	-3725.048
04/24/2013	00:00:00	-11649.27	0903.2	-3687.200
04/25/2013	00:00:00	-11625.27	0903.6	-3634.866
04/26/2013	00:00:00	-11601.27	0903.3	-3729.288
04/27/2013	00:00:00	-11577.27	0905.6	-3750.200
04/28/2013	00:00:00	-11553.27	0906.6	-3660.623
04/29/2013	00:00:00	-11529.27	0907.6	-3632.677
04/30/2013	00:00:00	-11505.27	0905.1	-3712.776
05/01/2013	00:00:00	-11481.27	0898.9	-3672.899
05/02/2013	00:00:00	-11457.27	0898.1	-3609.976
05/03/2013	00:00:00	-11433.27	0902.7	-3618.089
05/04/2013	00:00:00	-11409.27	0904.9	-3593.847
05/05/2013	00:00:00	-11385.27	0889.5	-2919.867
05/06/2013	00:00:00	-11361.27	0897.0	-3552.768
05/07/2013	00:00:00	-11337.27	0899.6	-3540.133
05/08/2013	00:00:00	-11313.27	0908.5	-3638.714
05/09/2013	00:00:00	-11289.27	0896.5	-3355.006
05/10/2013	00:00:00	-11265.27	0911.8	-3616.833
05/11/2013	00:00:00	-11241.27	0914.4	-3609.024
05/12/2013	00:00:00	-11217.27	0906.6	-3245.893
05/13/2013	00:00:00	-11193.27	0911.1	-3303.100
05/14/2013	00:00:00	-11169.27	0909.5	-3373.914
05/15/2013	00:00:00	-11145.27	0916.7	-3580.292
05/16/2013	00:00:00	-11121.27	0911.8	-3232.879
05/17/2013	00:00:00	-11097.27	0910.8	-3091.680
05/18/2013	00:00:00	-11073.27	0914.6	-3126.873
05/19/2013	00:00:00	-11049.27	0919.5	-3051.126
05/20/2013	00:00:00	-11025.27	0921.8	-4352.914
05/21/2013	00:00:00	-11001.27	0917.3	-3982.025
05/22/2013	00:00:00	-10977.27	0915.1	-3796.252
05/23/2013	00:00:00	-10953.27	0919.4	-3732.852
05/24/2013	00:00:00	-10929.27	0908.7	-3578.262
05/25/2013	00:00:00	-10905.27	0909.9	-3561.648
05/26/2013	00:00:00	-10881.27	0899.0	-3417.637
05/27/2013	00:00:00	-10857.27	0905.0	-3499.143
05/28/2013	00:00:00	-10833.27	0900.6	-3456.294
05/29/2013	00:00:00	-10809.27	0901.9	-3480.395
05/30/2013	00:00:00	-10785.27	0912.4	-3579.688
05/31/2013	00:00:00	-10761.27	0898.7	-3428.577
06/01/2013	00:00:00	-10737.27	0905.7	-3554.212
06/02/2013	00:00:00	-10713.27	0903.3	-4300.004
06/03/2013	00:00:00	-10689.27	0892.4	-3699.217
06/04/2013	00:00:00	-10665.27	0906.2	-3700.428
06/05/2013	00:00:00	-10641.27	0906.5	-4314.221
06/06/2013	00:00:00	-10617.27	0897.9	-7167.666
06/07/2013	00:00:00	-10593.27	0904.5	-9823.379
06/08/2013	00:00:00	-10569.27	0900.6	-6196.114
06/09/2013	00:00:00	-10545.27	0905.7	-6013.780
06/10/2013	00:00:00	-10521.27	0909.6	-7469.385
06/11/2013	00:00:00	-10497.27	0913.2	-8030.734
06/12/2013	00:00:00	-10473.27	0906.3	-8274.283
06/13/2013	00:00:00	-10449.27	0907.8	-9255.265
06/14/2013	00:00:00	-10425.27	0912.9	-9568.496
06/15/2013	00:00:00	-10401.27	0918.5	-7333.242
06/16/2013	00:00:00	-10377.27	0927.3	-9201.334
06/17/2013	00:00:00	-10353.27	0917.3	-10014.187
06/18/2013	00:00:00	-10329.27	0915.1	-10238.616
06/19/2013	00:00:00	-10305.27	0904.7	-10631.479
06/20/2013	00:00:00	-10281.27	0889.6	-3957.964
06/21/2013	00:00:00	-10257.27	0911.8	-3136.460
06/22/2013	00:00:00	-10233.27	0893.5	-2932.258
06/23/2013	00:00:00	-10209.27	0900.1	-3043.980
06/24/2013	00:00:00	-10185.27	0899.5	-3042.179
06/25/2013	00:00:00	-10161.27	0928.4	-3302.887
06/26/2013	00:00:00	-10137.27	0937.7	-3463.018
06/27/2013	00:00:00	-10113.27	0900.9	-3063.016
06/28/2013	00:00:00	-10089.27	0902.7	-3047.326
06/29/2013	00:00:00	-10065.27	0926.8	-3303.414
06/30/2013	00:00:00	-10041.27	0923.3	-3305.143
07/01/2013	00:00:00	-10017.27	0933.9	-3380.450
07/02/2013	00:00:00	-09993.27	0921.1	-3239.397
07/03/2013	00:00:00	-09969.27	0903.1	-2969.851
07/04/2013	00:00:00	-09945.27	0896.2	-2955.220
07/05/2013	00:00:00	-09921.27	0856.8	-2230.454
07/06/2013	00:00:00	-09897.27	0896.5	-3030.906
07/07/2013	00:00:00	-09873.27	0851.6	-2317.961
07/08/2013	00:00:00	-09849.27	0842.5	-2168.042
07/09/2013	00:00:00	-09825.27	0845.8	-2187.671
07/10/2013	00:00:00	-09801.27	0839.9	-2173.504
07/11/2013	00:00:00	-09777.27	0839.3	-2204.948
07/12/2013	00:00:00	-09753.27	0896.4	-3052.811
07/13/2013	00:00:00	-09729.27	0937.3	-3678.304
07/14/2013	00:00:00	-09705.27	0929.6	-3578.998
07/15/2013	00:00:00	-09681.27	0943.1	-3761.821
07/16/2013	00:00:00	-09657.27	0911.5	-3285.192
07/17/2013	00:00:00	-09633.27	0917.0	-3318.423
07/18/2013	00:00:00	-09609.27	0871.9	-2426.356
07/19/2013	00:00:00	-09585.27	0938.8	-3655.411
07/20/2013	00:00:00	-09561.27	0938.1	-3578.494
07/21/2013	00:00:00	-09537.27	0855.9	-2010.796
07/22/2013	00:00:00	-09513.27	0827.0	-1556.067
07/23/2013	00:00:00	-09489.27	0918.2	-3378.594
07/24/2013	00:00:00	-09465.27	0925.7	-3318.240
07/25/2013	00:00:00	-09441.27	0886.5	-2904.848
07/26/2013	00:00:00	-09417.27	0827.3	-2010.746
07/27/2013	00:00:00	-09393.27	0841.3	-2248.313

APPENDIX G: Daily Rate History Data

Date	Time	Hours	Press.	Rate
mm/dd/yy	hh:mm:ss	Δt	psig	bpd
07/28/2013	00:00:00	-09369.27	0794.6	-1224.974
07/29/2013	00:00:00	-09345.27	0789.9	-1053.847
07/30/2013	00:00:00	-09321.27	0809.8	-1743.048
07/31/2013	00:00:00	-09297.27	0841.0	-2277.901
08/01/2013	00:00:00	-09273.27	0906.5	-3204.619
08/02/2013	00:00:00	-09249.27	0913.3	-3374.623
08/03/2013	00:00:00	-09225.27	0915.4	-3382.566
08/04/2013	00:00:00	-09201.27	0926.7	-3575.887
08/05/2013	00:00:00	-09177.27	0918.0	-3515.597
08/06/2013	00:00:00	-09153.27	0912.5	-3476.621
08/07/2013	00:00:00	-09129.27	0907.1	-3388.663
08/08/2013	00:00:00	-09105.27	0897.8	-3177.520
08/09/2013	00:00:00	-09081.27	0904.0	-3335.623
08/10/2013	00:00:00	-09057.27	0908.9	-3478.101
08/11/2013	00:00:00	-09033.27	0900.8	-3240.228
08/12/2013	00:00:00	-09009.27	0913.3	-3478.558
08/13/2013	00:00:00	-08985.27	0904.0	-3299.954
08/14/2013	00:00:00	-08961.27	0928.2	-3640.881
08/15/2013	00:00:00	-08937.27	0933.3	-3651.512
08/16/2013	00:00:00	-08913.27	0926.6	-3575.393
08/17/2013	00:00:00	-08889.27	0945.7	-3753.272
08/18/2013	00:00:00	-08865.27	0941.0	-3670.379
08/19/2013	00:00:00	-08841.27	0937.3	-3693.575
08/20/2013	00:00:00	-08817.27	0945.5	-3587.948
08/21/2013	00:00:00	-08793.27	0948.9	-3460.959
08/22/2013	00:00:00	-08769.27	0941.3	-3561.363
08/23/2013	00:00:00	-08745.27	0933.4	-3457.064
08/24/2013	00:00:00	-08721.27	0931.2	-3436.423
08/25/2013	00:00:00	-08697.27	0932.1	-3441.825
08/26/2013	00:00:00	-08673.27	0930.0	-3548.897
08/27/2013	00:00:00	-08649.27	0940.4	-3601.466
08/28/2013	00:00:00	-08625.27	0949.5	-3644.631
08/29/2013	00:00:00	-08601.27	0948.5	-3638.874
08/30/2013	00:00:00	-08577.27	0948.3	-3658.192
08/31/2013	00:00:00	-08553.27	0947.7	-3604.565
09/01/2013	00:00:00	-08529.27	0951.5	-3641.573
09/02/2013	00:00:00	-08505.27	0948.9	-3575.322
09/03/2013	00:00:00	-08481.27	0951.0	-3551.458
09/04/2013	00:00:00	-08457.27	0954.8	-3598.091
09/05/2013	00:00:00	-08433.27	0958.0	-3624.474
09/06/2013	00:00:00	-08409.27	0942.9	-3377.978
09/07/2013	00:00:00	-08385.27	0957.0	-3622.206
09/08/2013	00:00:00	-08361.27	0958.0	-3599.996
09/09/2013	00:00:00	-08337.27	0957.7	-3577.297
09/10/2013	00:00:00	-08313.27	0955.1	-3536.455
09/11/2013	00:00:00	-08289.27	0956.9	-3519.327
09/12/2013	00:00:00	-08265.27	0955.5	-3545.335
09/13/2013	00:00:00	-08241.27	0953.2	-3433.881
09/14/2013	00:00:00	-08217.27	0960.5	-3448.816
09/15/2013	00:00:00	-08193.27	0962.3	-3448.333
09/16/2013	00:00:00	-08169.27	0965.5	-3516.782
09/17/2013	00:00:00	-08145.27	0966.8	-3551.675
09/18/2013	00:00:00	-08121.27	0959.3	-3552.363
09/19/2013	00:00:00	-08097.27	0954.2	-3436.859
09/20/2013	00:00:00	-08073.27	0961.4	-3561.177
09/21/2013	00:00:00	-08049.27	0957.2	-3526.718
09/22/2013	00:00:00	-08025.27	0957.9	-3468.780
09/23/2013	00:00:00	-08001.27	0956.5	-3487.748
09/24/2013	00:00:00	-07977.27	0950.4	-3246.488
09/25/2013	00:00:00	-07953.27	0948.8	-3074.210
09/26/2013	00:00:00	-07929.27	0950.7	-3190.230
09/27/2013	00:00:00	-07905.27	0939.4	-3067.631
09/28/2013	00:00:00	-07881.27	0939.7	-3011.665
09/29/2013	00:00:00	-07857.27	0938.1	-2977.018
09/30/2013	00:00:00	-07833.27	0932.6	-2838.744
10/01/2013	00:00:00	-07809.27	0933.8	-2894.829
10/02/2013	00:00:00	-07785.27	0862.3	-1360.714
10/03/2013	00:00:00	-07761.27	0936.5	-2880.002
10/04/2013	00:00:00	-07737.27	0938.9	-2865.490
10/05/2013	00:00:00	-07713.27	0927.5	-2729.048
10/06/2013	00:00:00	-07689.27	0939.2	-2804.577
10/07/2013	00:00:00	-07665.27	0933.0	-2632.528
10/08/2013	00:00:00	-07641.27	0935.2	-2623.884
10/09/2013	00:00:00	-07617.27	0934.4	-2683.030
10/10/2013	00:00:00	-07593.27	0930.9	-2686.438
10/11/2013	00:00:00	-07569.27	0932.8	-2752.512
10/12/2013	00:00:00	-07545.27	0924.9	-2544.832
10/13/2013	00:00:00	-07521.27	0923.7	-2541.008
10/14/2013	00:00:00	-07497.27	0923.0	-2551.456
10/15/2013	00:00:00	-07473.27	0926.1	-2504.367
10/16/2013	00:00:00	-07449.27	0928.0	-2594.628
10/17/2013	00:00:00	-07425.27	0928.8	-2466.748
10/18/2013	00:00:00	-07401.27	0925.5	-2382.073
10/19/2013	00:00:00	-07377.27	0924.8	-2507.232
10/20/2013	00:00:00	-07353.27	0924.2	-2331.754
10/21/2013	00:00:00	-07329.27	0883.9	-1537.458
10/22/2013	00:00:00	-07305.27	0819.4	-0074.286
10/23/2013	00:00:00	-07281.27	0835.7	-0495.879
10/24/2013	00:00:00	-07257.27	0884.5	-1899.901
10/25/2013	00:00:00	-07233.27	0951.4	-3009.606
10/26/2013	00:00:00	-07209.27	0980.6	-3310.409
10/27/2013	00:00:00	-07185.27	0959.6	-3046.194
10/28/2013	00:00:00	-07161.27	0955.5	-2865.056
10/29/2013	00:00:00	-07137.27	0961.3	-2908.980
10/30/2013	00:00:00	-07113.27	1078.5	-4310.448
10/31/2013	00:00:00	-07089.27	1145.9	-5071.462
11/01/2013	00:00:00	-07065.27	1150.1	-5133.067
11/02/2013	00:00:00	-07041.27	1150.1	-5121.479
11/03/2013	00:00:00	-07017.27	1150.1	-5115.437
11/03/2013	23:00:00	-06994.27	1150.1	-5126.448
11/04/2013	23:00:00	-06970.27	1112.7	-4695.444
11/05/2013	23:00:00	-06946.27	1005.5	-2957.296
11/06/2013	23:00:00	-06922.27	0825.9	-0028.905
11/07/2013	23:00:00	-06898.27	0823.7	-0000.929
11/08/2013	23:00:00	-06874.27	0733.1	0000.000
11/09/2013	23:00:00	-06850.27	0951.3	-2200.137
11/10/2013	23:00:00	-06826.27	1150.1	-5140.270
11/11/2013	23:00:00	-06802.27	1150.3	-5128.378
11/12/2013	23:00:00	-06778.27	1153.6	-5138.121
11/13/2013	23:00:00	-06754.27	1118.5	-4747.506
11/14/2013	23:00:00	-06730.27	1103.5	-4629.617
11/15/2013	23:00:00	-06706.27	1163.0	-5165.062
11/16/2013	23:00:00	-06682.27	1168.6	-5230.343
11/17/2013	23:00:00	-06658.27	1175.1	-5257.448
11/18/2013	23:00:00	-06634.27	1175.1	-5207.845
11/19/2013	23:00:00	-06610.27	1153.0	-4971.411
11/20/2013	23:00:00	-06586.27	1167.4	-5117.190
11/21/2013	23:00:00	-06562.27	1148.5	-4842.224
11/22/2013	23:00:00	-06538.27	1126.2	-4722.855
11/23/2013	23:00:00	-06514.27	1126.3	-4738.224
11/24/2013	23:00:00	-06490.27	1146.4	-4796.298
11/25/2013	23:00:00	-06466.27	1154.0	-4953.546

APPENDIX G: Daily Rate History Data

Date	Time	Hours	Press.	Rate
mm/dd/yy	hh:mm:ss	Δt	psig	bpd
11/26/2013	23:00:00	-06442.27	1109.4	-4452.471
11/27/2013	23:00:00	-06418.27	1184.6	-5190.576
11/28/2013	23:00:00	-06394.27	1083.1	-4134.989
11/29/2013	23:00:00	-06370.27	1163.2	-5016.204
11/30/2013	23:00:00	-06346.27	1179.9	-5098.173
12/01/2013	23:00:00	-06322.27	1139.4	-4670.234
12/02/2013	23:00:00	-06298.27	1111.9	-4366.186
12/03/2013	23:00:00	-06274.27	1132.4	-4601.041
12/04/2013	23:00:00	-06250.27	1092.4	-4162.153
12/05/2013	23:00:00	-06226.27	1113.1	-4229.714
12/06/2013	23:00:00	-06202.27	1112.1	-4221.214
12/07/2013	23:00:00	-06178.27	1082.5	-3913.725
12/08/2013	23:00:00	-06154.27	1155.6	-4651.564
12/09/2013	23:00:00	-06130.27	1169.1	-4770.883
12/10/2013	23:00:00	-06106.27	1087.3	-3948.506
12/11/2013	23:00:00	-06082.27	1088.8	-3660.232
12/12/2013	23:00:00	-06058.27	1158.1	-4702.407
12/13/2013	23:00:00	-06034.27	1168.7	-4919.290
12/14/2013	23:00:00	-06010.27	1167.9	-4877.185
12/15/2013	23:00:00	-05986.27	1171.4	-4776.827
12/16/2013	23:00:00	-05962.27	1192.2	-5000.996
12/17/2013	23:00:00	-05938.27	1075.9	-3610.907
12/18/2013	23:00:00	-05914.27	1051.5	-3486.086
12/19/2013	23:00:00	-05890.27	1079.2	-3791.028
12/20/2013	23:00:00	-05866.27	1137.1	-4533.161
12/21/2013	23:00:00	-05842.27	1086.0	-4098.863
12/22/2013	23:00:00	-05818.27	1069.2	-3716.563
12/23/2013	23:00:00	-05794.27	1076.7	-3797.935
12/24/2013	23:00:00	-05770.27	1074.8	-3812.915
12/25/2013	23:00:00	-05746.27	1090.0	-4052.758
12/26/2013	23:00:00	-05722.27	1091.7	-3768.806
12/27/2013	23:00:00	-05698.27	1072.9	-3401.695
12/28/2013	23:00:00	-05674.27	1069.8	-3379.103
12/29/2013	23:00:00	-05650.27	1091.1	-3807.105
12/30/2013	23:00:00	-05626.27	1103.0	-3651.534
12/31/2013	23:00:00	-05602.27	1125.2	-3996.903
01/01/2014	23:00:00	-05578.27	1109.4	-3853.464
01/02/2014	23:00:00	-05554.27	1085.4	-3493.677
01/03/2014	23:00:00	-05530.27	1081.7	-3598.230
01/04/2014	23:00:00	-05506.27	1066.5	-3351.766
01/05/2014	23:00:00	-05482.27	1071.8	-3353.454
01/06/2014	23:00:00	-05458.27	1085.8	-3349.010
01/07/2014	23:00:00	-05434.27	1108.5	-3729.732
01/08/2014	23:00:00	-05410.27	1078.2	-3340.665
01/09/2014	23:00:00	-05386.27	1098.4	-3615.610
01/10/2014	23:00:00	-05362.27	1018.3	-2219.405
01/11/2014	23:00:00	-05338.27	0937.7	-0779.722
01/12/2014	23:00:00	-05314.27	0938.5	-0913.414
01/13/2014	23:00:00	-05290.27	0947.2	-1876.439
01/14/2014	23:00:00	-05266.27	0942.1	-1911.495
01/15/2014	23:00:00	-05242.27	0954.2	-1282.212
01/16/2014	23:00:00	-05218.27	1052.4	-3432.187
01/17/2014	23:00:00	-05194.27	1167.7	-4378.222
01/18/2014	23:00:00	-05170.27	1170.6	-4406.570
01/19/2014	23:00:00	-05146.27	1086.1	-2448.390
01/20/2014	23:00:00	-05122.27	1176.2	-4237.413
01/21/2014	23:00:00	-05098.27	1193.4	-4501.131
01/22/2014	23:00:00	-05074.27	1185.2	-4328.855
01/23/2014	23:00:00	-05050.27	1173.7	-4226.272
01/24/2014	23:00:00	-05026.27	1186.9	-4168.790
01/25/2014	23:00:00	-05002.27	1175.3	-4084.572
01/26/2014	23:00:00	-04978.27	1187.6	-4341.061
01/27/2014	23:00:00	-04954.27	1183.6	-4226.644
01/28/2014	23:00:00	-04930.27	1173.2	-3914.262
01/29/2014	23:00:00	-04906.27	1190.7	-4183.089
01/30/2014	23:00:00	-04882.27	1185.3	-4274.277
01/31/2014	23:00:00	-04858.27	1191.1	-4469.959
02/01/2014	23:00:00	-04834.27	1202.8	-4600.833
02/02/2014	23:00:00	-04810.27	1179.0	-4302.220
02/03/2014	23:00:00	-04786.27	1186.5	-4367.611
02/04/2014	23:00:00	-04762.27	1160.2	-3890.199
02/05/2014	23:00:00	-04738.27	1184.6	-4028.171
02/06/2014	23:00:00	-04714.27	1211.4	-4373.558
02/07/2014	23:00:00	-04690.27	1218.7	-4540.036
02/08/2014	23:00:00	-04666.27	1209.8	-4494.599
02/09/2014	23:00:00	-04642.27	1200.0	-4457.877
02/10/2014	23:00:00	-04618.27	1203.5	-4352.117
02/11/2014	23:00:00	-04594.27	1225.1	-4536.210
02/12/2014	23:00:00	-04570.27	1196.5	-4168.891
02/13/2014	23:00:00	-04546.27	1204.6	-4475.393
02/14/2014	23:00:00	-04522.27	1225.0	-4720.772
02/15/2014	23:00:00	-04498.27	1211.8	-4640.837
02/16/2014	23:00:00	-04474.27	1197.1	-4477.994
02/17/2014	23:00:00	-04450.27	1198.5	-4499.466
02/18/2014	23:00:00	-04426.27	1197.4	-4452.584
02/19/2014	23:00:00	-04402.27	1202.3	-4490.877
02/20/2014	23:00:00	-04378.27	1207.7	-4566.639
02/21/2014	23:00:00	-04354.27	1214.2	-4481.004
02/22/2014	23:00:00	-04330.27	1209.5	-4458.569
02/23/2014	23:00:00	-04306.27	1197.2	-4322.625
02/24/2014	23:00:00	-04282.27	1210.8	-4536.980
02/25/2014	23:00:00	-04258.27	1171.7	-4075.227
02/26/2014	23:00:00	-04234.27	1128.4	-3230.520
02/27/2014	23:00:00	-04210.27	1219.5	-4615.133
02/28/2014	23:00:00	-04186.27	1213.9	-4571.875
03/01/2014	23:00:00	-04162.27	1178.6	-4263.042
03/02/2014	23:00:00	-04138.27	1168.3	-4189.333
03/03/2014	23:00:00	-04114.27	1175.0	-4156.180
03/04/2014	23:00:00	-04090.27	1149.8	-3890.536
03/05/2014	23:00:00	-04066.27	1179.8	-4320.092
03/06/2014	23:00:00	-04042.27	1195.8	-4378.621
03/07/2014	23:00:00	-04018.27	1214.8	-4618.873
03/08/2014	23:00:00	-03994.27	1222.0	-4752.306
03/10/2014	00:00:00	-03969.27	1211.4	-4490.865
03/11/2014	00:00:00	-03945.27	1212.0	-4524.194
03/12/2014	00:00:00	-03921.27	1224.8	-4741.472
03/13/2014	00:00:00	-03897.27	1077.5	-2395.362
03/14/2014	00:00:00	-03873.27	1211.9	-4519.540
03/15/2014	00:00:00	-03849.27	1215.2	-4625.560
03/16/2014	00:00:00	-03825.27	1219.7	-4666.945
03/17/2014	00:00:00	-03801.27	1221.6	-4730.349
03/18/2014	00:00:00	-03777.27	1114.4	-3100.527
03/19/2014	00:00:00	-03753.27	0982.7	-1341.730
03/20/2014	00:00:00	-03729.27	1089.6	-2824.703
03/21/2014	00:00:00	-03705.27	1242.6	-4919.678
03/22/2014	00:00:00	-03681.27	1248.8	-4982.831
03/23/2014	00:00:00	-03657.27	1217.7	-4656.012
03/24/2014	00:00:00	-03633.27	1215.6	-4634.125
03/25/2014	00:00:00	-03609.27	1205.3	-4522.762
03/26/2014	00:00:00	-03585.27	1219.3	-4644.026
03/27/2014	00:00:00	-03561.27	1225.0	-4759.909
03/28/2014	00:00:00	-03537.27	1194.5	-4372.946

APPENDIX G: Daily Rate History Data

Date	Time	Hours	Press.	Rate
mm/dd/yy	hh:mm:ss	Δt	psig	bpd
03/29/2014	00:00:00	-03513.27	1177.8	-4200.623
03/30/2014	00:00:00	-03489.27	1159.9	-4014.468
03/31/2014	00:00:00	-03465.27	1128.2	-3682.849
04/01/2014	00:00:00	-03441.27	1122.6	-3555.599
04/02/2014	00:00:00	-03417.27	1169.6	-4115.425
04/03/2014	00:00:00	-03393.27	1131.6	-3697.756
04/04/2014	00:00:00	-03369.27	1106.7	-3375.321
04/05/2014	00:00:00	-03345.27	1113.5	-3418.274
04/06/2014	00:00:00	-03321.27	1117.0	-3509.500
04/07/2014	00:00:00	-03297.27	1123.3	-3565.562
04/08/2014	00:00:00	-03273.27	1123.6	-3582.093
04/09/2014	00:00:00	-03249.27	1179.7	-4167.102
04/10/2014	00:00:00	-03225.27	1177.4	-4192.583
04/11/2014	00:00:00	-03201.27	1144.4	-3826.361
04/12/2014	00:00:00	-03177.27	1129.8	-3628.845
04/13/2014	00:00:00	-03153.27	1143.3	-3762.183
04/14/2014	00:00:00	-03129.27	1133.7	-3678.046
04/15/2014	00:00:00	-03105.27	1171.7	-4099.024
04/16/2014	00:00:00	-03081.27	1197.9	-4316.427
04/17/2014	00:00:00	-03057.27	1200.0	-4383.760
04/18/2014	00:00:00	-03033.27	1200.2	-4403.617
04/19/2014	00:00:00	-03009.27	1200.0	-4352.274
04/20/2014	00:00:00	-02985.27	1200.0	-4324.375
04/21/2014	00:00:00	-02961.27	1218.8	-4542.998
04/22/2014	00:00:00	-02937.27	1223.2	-4553.257
04/23/2014	00:00:00	-02913.27	1215.4	-4476.299
04/24/2014	00:00:00	-02889.27	1219.5	-4493.581
04/25/2014	00:00:00	-02865.27	1209.8	-4375.084
04/26/2014	00:00:00	-02841.27	1224.6	-4514.940
04/27/2014	00:00:00	-02817.27	1199.9	-4255.621
04/28/2014	00:00:00	-02793.27	1225.0	-4484.137
04/29/2014	00:00:00	-02769.27	1216.2	-4414.441
04/30/2014	00:00:00	-02745.27	1198.4	-4218.439
05/01/2014	00:00:00	-02721.27	1173.4	-3955.033
05/02/2014	00:00:00	-02697.27	1154.0	-3754.171
05/03/2014	00:00:00	-02673.27	1151.3	-3700.690
05/04/2014	00:00:00	-02649.27	1137.6	-3602.014
05/05/2014	00:00:00	-02625.27	1132.0	-3538.123
05/06/2014	00:00:00	-02601.27	1129.4	-3504.663
05/07/2014	00:00:00	-02577.27	1113.0	-3284.907
05/08/2014	00:00:00	-02553.27	1100.1	-3124.315
05/09/2014	00:00:00	-02529.27	1087.5	-2916.716
05/10/2014	00:00:00	-02505.27	1087.1	-2943.214
05/11/2014	00:00:00	-02481.27	1102.2	-3164.384
05/12/2014	00:00:00	-02457.27	1098.0	-3127.083
05/13/2014	00:00:00	-02433.27	1096.7	-3111.595
05/14/2014	00:00:00	-02409.27	1157.4	-3706.155
05/15/2014	00:00:00	-02385.27	1177.7	-3920.722
05/16/2014	00:00:00	-02361.27	1088.9	-2451.748
05/17/2014	00:00:00	-02337.27	0963.7	-0374.024
05/18/2014	00:00:00	-02313.27	0961.7	-0398.024
05/19/2014	00:00:00	-02289.27	1083.0	-2363.927
05/20/2014	00:00:00	-02265.27	1249.4	-4789.484
05/21/2014	00:00:00	-02241.27	1250.1	-4803.569
05/22/2014	00:00:00	-02217.27	1250.0	-4783.797
05/23/2014	00:00:00	-02193.27	1226.4	-4477.244
05/24/2014	00:00:00	-02169.27	1229.9	-4515.994
05/25/2014	00:00:00	-02145.27	1212.1	-4304.825
05/26/2014	00:00:00	-02121.27	1216.5	-4367.968
05/27/2014	00:00:00	-02097.27	1145.8	-3617.673
05/28/2014	00:00:00	-02073.27	1121.4	-3332.222
05/29/2014	00:00:00	-02049.27	1148.9	-3658.998
05/30/2014	00:00:00	-02025.27	1152.9	-3713.821
05/31/2014	00:00:00	-02001.27	1147.7	-3645.276
06/01/2014	00:00:00	-01977.27	1128.6	-3451.817
06/02/2014	00:00:00	-01953.27	1129.0	-3480.619
06/03/2014	00:00:00	-01929.27	1123.2	-3342.478
06/04/2014	00:00:00	-01905.27	1129.8	-3413.427
06/05/2014	00:00:00	-01881.27	1170.5	-3894.959
06/06/2014	00:00:00	-01857.27	1180.3	-4005.935
06/07/2014	00:00:00	-01833.27	1181.9	-4002.698
06/08/2014	00:00:00	-01809.27	1178.8	-3924.022
06/09/2014	00:00:00	-01785.27	1214.0	-4225.943
06/10/2014	00:00:00	-01761.27	1221.3	-4397.111
06/11/2014	00:00:00	-01737.27	1181.0	-3889.157
06/12/2014	00:00:00	-01713.27	1189.0	-4011.440
06/13/2014	00:00:00	-01689.27	1190.7	-4029.917
06/14/2014	00:00:00	-01665.27	1145.3	-3433.631
06/15/2014	00:00:00	-01641.27	1178.8	-3926.988
06/16/2014	00:00:00	-01617.27	1174.0	-3821.512
06/17/2014	00:00:00	-01593.27	1173.9	-3858.476
06/18/2014	00:00:00	-01569.27	1183.0	-3944.321
06/19/2014	00:00:00	-01545.27	1217.0	-4285.960
06/20/2014	00:00:00	-01521.27	1237.5	-4445.857
06/21/2014	00:00:00	-01497.27	1244.9	-4507.226
06/22/2014	00:00:00	-01473.27	1247.1	-4530.607
06/23/2014	00:00:00	-01449.27	1247.5	-4571.581
06/24/2014	00:00:00	-01425.27	1248.7	-4525.377
06/25/2014	00:00:00	-01401.27	1157.6	-3182.169
06/26/2014	00:00:00	-01377.27	1116.3	-2893.010
06/27/2014	00:00:00	-01353.27	1231.7	-4422.919
06/28/2014	00:00:00	-01329.27	1247.8	-4571.444
06/29/2014	00:00:00	-01305.27	1247.3	-4575.941
06/30/2014	00:00:00	-01281.27	1123.3	-2999.754
07/01/2014	00:00:00	-01257.27	0989.7	-0981.825
07/02/2014	00:00:00	-01233.27	0987.0	-0503.536
07/03/2014	00:00:00	-01209.27	1073.9	-2081.423
07/04/2014	00:00:00	-01185.27	1250.0	-4741.547
07/05/2014	00:00:00	-01161.27	1241.3	-4640.286
07/06/2014	00:00:00	-01137.27	1242.4	-4633.726
07/07/2014	00:00:00	-01113.27	1237.3	-4504.851
07/08/2014	00:00:00	-01089.27	1243.9	-4597.262
07/09/2014	00:00:00	-01065.27	1250.0	-4664.262
07/10/2014	00:00:00	-01041.27	1250.0	-4658.119
07/11/2014	00:00:00	-01017.27	1244.9	-4602.355
07/12/2014	00:00:00	-00993.27	1239.1	-4507.801
07/13/2014	00:00:00	-00969.27	1246.6	-4556.086
07/14/2014	00:00:00	-00945.27	1246.6	-4573.083
07/15/2014	00:00:00	-00921.27	1239.1	-4379.333
07/16/2014	00:00:00	-00897.27	1243.2	-4486.776
07/17/2014	00:00:00	-00873.27	1250.0	-4546.187
07/18/2014	00:00:00	-00849.27	1240.2	-4433.248
07/19/2014	00:00:00	-00825.27	1242.4	-4447.004
07/20/2014	00:00:00	-00801.27	1250.1	-4560.437
07/21/2014	00:00:00	-00777.27	1247.0	-4588.486
07/22/2014	00:00:00	-00753.27	1249.5	-4598.518
07/23/2014	00:00:00	-00729.27	1250.0	-4542.973
07/24/2014	00:00:00	-00705.27	1250.0	-4534.097
07/25/2014	00:00:00	-00681.27	1250.0	-4520.135
07/26/2014	00:00:00	-00657.27	1262.8	-4651.877
07/27/2014	00:00:00	-00633.27	1275.0	-4776.329
07/28/2014	00:00:00	-00609.27	1275.0	-4788.107

APPENDIX G: Daily Rate History Data

Date	Time	Hours	Press.	Rate
mm/dd/yy	hh:mm:ss	Δt	psig	bpd
07/29/2014	00:00:00	-00585.27	1270.1	-4709.466
07/30/2014	00:00:00	-00561.27	1275.0	-4738.909
07/31/2014	00:00:00	-00537.27	1263.5	-4609.891
08/01/2014	00:00:00	-00513.27	1274.0	-4713.609
08/02/2014	00:00:00	-00489.27	1274.0	-4677.617
08/03/2014	00:00:00	-00465.27	1265.9	-4571.624
08/04/2014	00:00:00	-00441.27	1267.1	-4619.145
08/05/2014	00:00:00	-00417.27	1261.7	-4550.127
08/06/2014	00:00:00	-00393.27	1271.2	-4664.851
08/07/2014	00:00:00	-00369.27	1266.8	-4632.139
08/08/2014	00:00:00	-00345.27	1275.1	-4723.972
08/09/2014	00:00:00	-00321.27	1275.1	-4696.575
08/10/2014	00:00:00	-00297.27	1275.0	-4659.075
08/11/2014	00:00:00	-00273.27	1275.0	-4666.403
08/12/2014	00:00:00	-00249.27	1273.1	-4625.647
08/13/2014	00:00:00	-00225.27	1263.2	-4530.744
08/14/2014	00:00:00	-00201.27	1256.2	-4465.657
08/15/2014	00:00:00	-00177.27	1235.4	-4218.399
08/16/2014	00:00:00	-00153.27	1224.5	-4145.095
08/17/2014	00:00:00	-00129.27	1224.4	-4148.333
08/18/2014	00:00:00	-00105.27	1225.0	-4173.313
08/19/2014	00:00:00	-00081.27	1243.0	-4335.802
08/20/2014	00:00:00	-00057.27	1251.1	-4431.433
08/21/2014	00:00:00	-00033.27	1268.4	-4614.863
08/22/2014	00:00:00	-00009.27	1253.3	-4481.744
08/23/2014	00:00:00	00014.73	1235.2	-4250.559
08/24/2014	00:00:00	00038.73	1240.6	-4319.447
08/25/2014	15:00:00	00077.73	1224.7	-4234.046
08/26/2014	08:00:00	00094.73	1219.3	-3670.143
08/26/2014	18:00:00	00104.73	4410.0	-3933.186
08/29/2014	09:00:00	00144.98	4358.8	0000.000

Date	Time	Hours	Press.	Rate
mm/dd/yy	hh:mm:ss	Δt	psig	bpd

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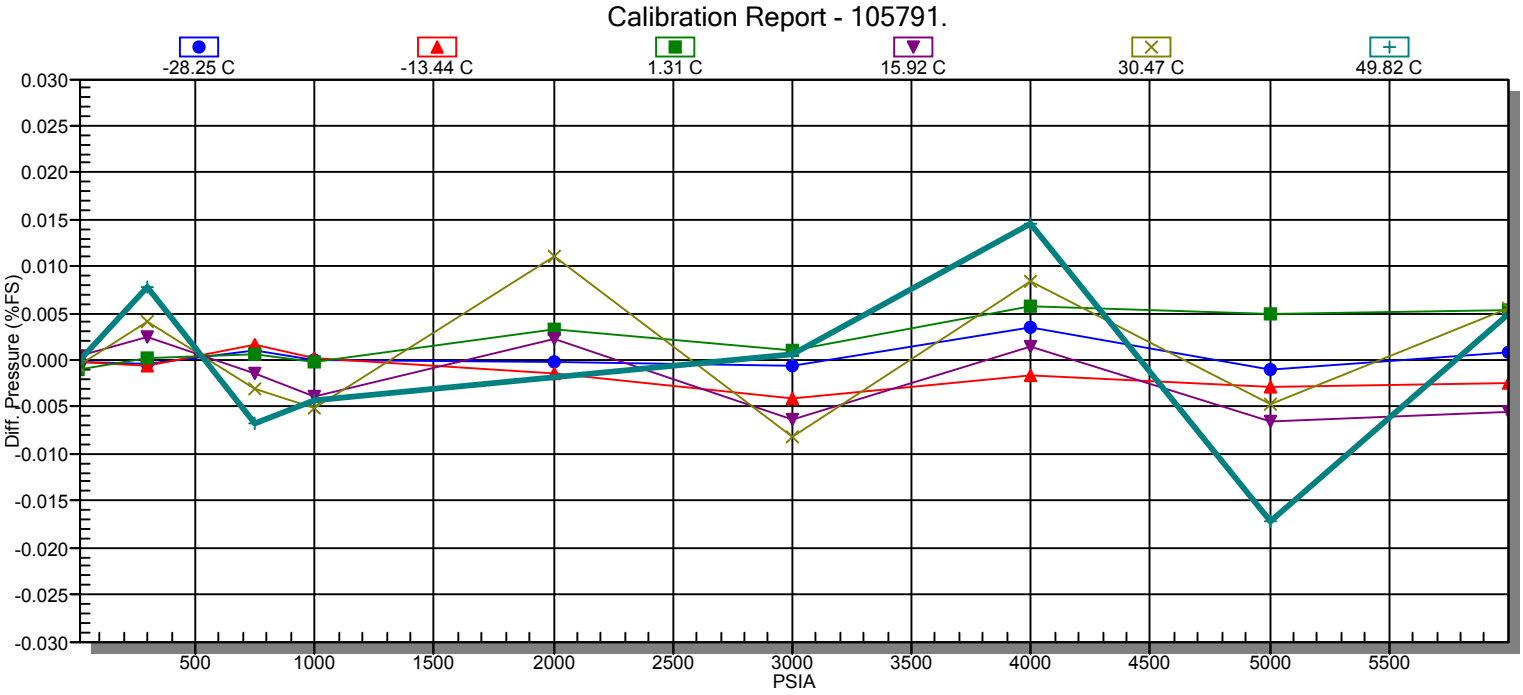
Pressure Gauge Certificate of Calibration



GAUGE NUMBER: 105791

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 = 678074	ft0 = 129521	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 13.01608356	0.2891667924	0.001295996866	5.951371965E-06	1.086111652E-08
B 1.352916959	-0.001797924778	-4.832011761E-06	-2.055203581E-08	-2.552253142E-11
C -1.612555807E-06	2.570590749E-08	1.269837568E-10	-7.506678123E-13	-8.337328246E-15
D -4.519174436E-10	-9.823658273E-12	-6.532926325E-14	-4.896044356E-17	1.091483229E-18

Temperature (C) STANDARD FIT COEFFICIENTS

A -28.77846847

B -0.4934266748

C -0.0008227136643

D -1.830985127E-06

1 points eliminated.
Error File: Gauge # 105791

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
13.03	-28.25	678074.33	129521.75	-0.01
296.52	-28.25	699034.00	129543.25	-0.03
746.58	-28.27	732356.33	129553.75	0.06
1000.65	-28.23	751176.67	129555.50	0.00
2002.94	-28.22	825547.00	129534.50	-0.01
2996.96	-28.24	899355.67	129440.50	-0.03
3999.59	-28.23	973835.00	129298.75	0.20
5001.68	-28.24	1048033.67	129080.75	-0.06
5996.73	-28.22	1121594.33	128830.00	0.05
13.02	-13.44	678636.33	126412.00	-0.01
296.52	-13.42	698824.00	126425.00	-0.04
746.58	-13.42	730921.67	126435.00	0.10
1000.65	-13.39	749050.33	126442.00	0.01
2002.96	-13.47	820694.33	126434.50	-0.08
2996.98	-13.42	891787.67	126349.75	-0.25
3999.61	-13.46	963539.33	126228.50	-0.10
5001.71	-13.42	1035059.00	126035.50	-0.18
5996.77	-13.44	1105935.00	125812.50	-0.15
13.01	1.31	679101.67	122873.50	-0.06
296.51	1.34	698578.33	122896.00	0.01
746.57	1.35	729529.00	122902.25	0.04
1000.64	1.36	747016.00	122909.75	-0.02
2002.95	1.32	816124.67	122897.75	0.20
2996.97	1.35	884699.33	122825.50	0.06
3999.61	1.33	953922.00	122721.75	0.34
5001.71	1.37	1022944.00	122554.00	0.29
5996.77	1.36	1091345.33	122356.25	0.32
13.01	15.92	679499.00	119133.50	0.03
296.50	15.89	698320.00	119150.00	0.14
746.56	15.90	728207.33	119159.00	-0.08
1000.63	15.89	745097.00	119167.25	-0.23
2002.94	15.89	811873.33	119152.25	0.14
2996.96	15.92	878124.33	119099.00	-0.39
3999.59	15.92	945043.33	119012.50	0.09
5001.68	15.91	1011742.00	118864.75	-0.40
5996.75	15.90	1077899.67	118693.75	-0.34
13.00	30.47	679843.33	115258.25	-0.03
296.49	30.43	698043.67	115280.50	0.24
746.56	30.47	726923.00	115292.75	-0.19
1000.63	30.48	743249.33	115290.75	-0.31
2002.93	30.39	807890.33	115312.00	0.66
2996.95	30.41	871951.00	115269.50	-0.49
3999.58	30.33	936742.67	115196.50	0.50
5001.69	30.45	1001243.00	115053.00	-0.29
5996.74	30.33	1065380.33	114929.50	0.33
12.98	49.82	680241.67	110059.00	-0.01
296.48	49.82	697633.67	110075.00	0.47
746.55	49.85	725206.33	110083.25	-0.41
1000.63	49.83	740842.00	110087.25	-0.26
2996.96	49.83	864153.67	110048.00	0.03
3999.60	49.81	926294.67	109992.00	0.87
5001.70	49.86	988118.67	109882.25	-1.03
5996.77	49.78	1049545.00	109760.00	0.30

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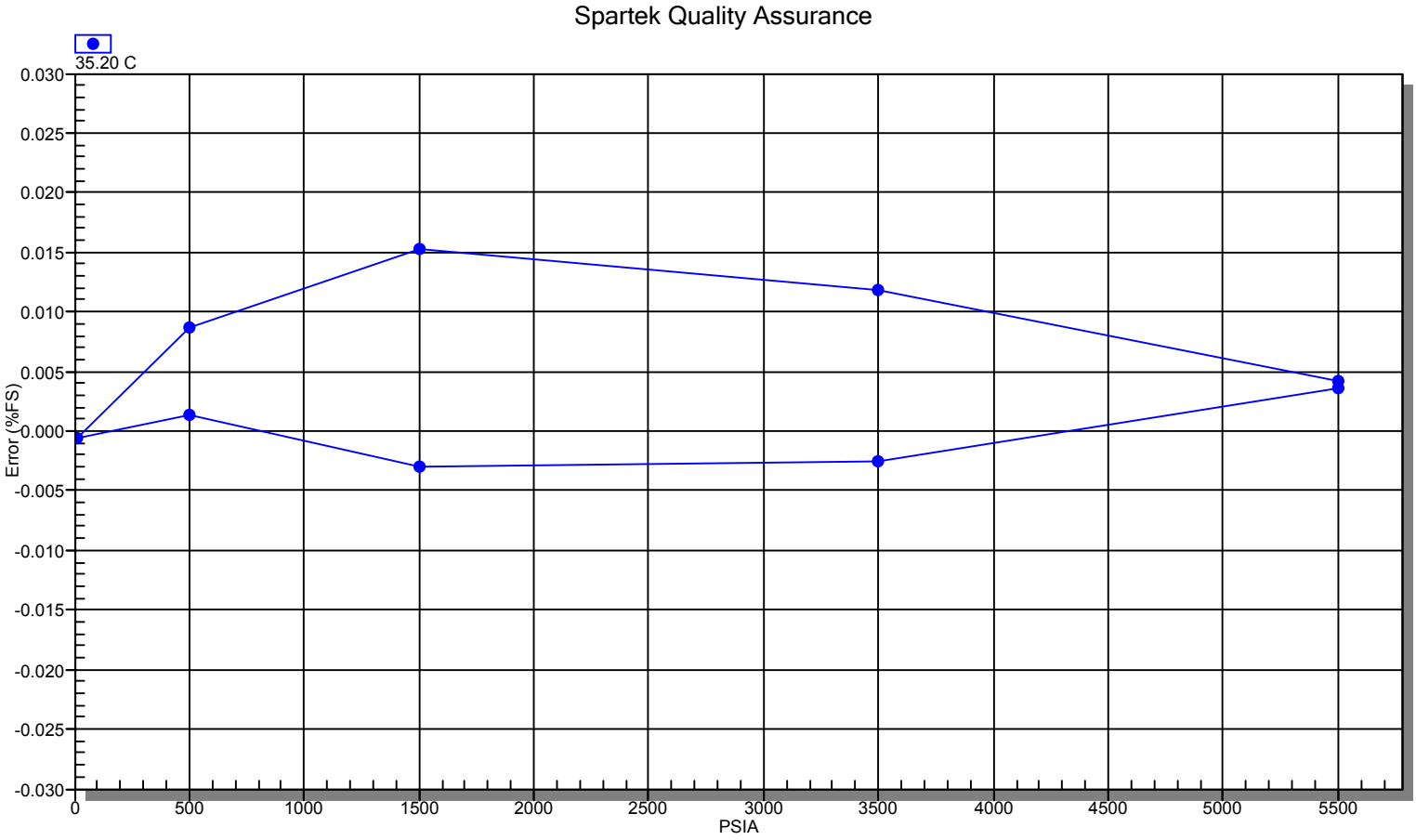
Pressure Gauge Certificate of Conformance

SERIAL NUMBER	105791	CALIBRATION DATE	MAY 27/13
MODEL NUMBER	0 FF0	PRESSURE REFERENCE	NIST Traceable
PRESSURE RANGE	13.03 - 5996.73 psi	TEMP. REFERENCE	NIST Traceable
TEMP. RANGE	-28.25 - 49.82 °C	TRACEABILITY DOC.	CAL-STANDARD-001

ACCURACY
As shown in the graph below, this Spartek Gauge conformed to within +/- 0.030 %F.S. of the pressure standard used in calibration, which is accurate to within +/- 0.01% of reading. This gives an overall accuracy of +/-(0.030%F.S. + 0.01% of reading)



Accepted By: _____ Date: MAY 30/13

Ramp report: Serial # 105791
Gauge range = 5996.770 PSI. Max. DIFF. = 1.799
Ramp check result: PASS, Max Err = 0.015% F.S.

DW Pressure	Gauge Pressure	RPM4 Pressure	Differential	%F.S.	Oven Temp.	Gauge Temp.
5502.56	5502.81	5501.63	0.25	0.0042	35.20	35.87
3497.56	3498.26	3496.89	0.70	0.0117	35.19	35.00
1501.75	1502.67	1501.36	0.91	0.0152	35.22	34.77
499.90	500.42	499.53	0.52	0.0087	35.22	34.78
12.99	12.96	12.48	-0.03	0.0006	35.20	34.85
499.90	499.98	499.56	0.08	0.0014	35.19	34.76
1501.74	1501.56	1501.36	-0.18	0.0030	35.24	34.76
3497.55	3497.39	3496.95	-0.15	0.0025	35.24	35.07
5502.55	5502.76	5501.70	0.21	0.0036	35.23	35.90

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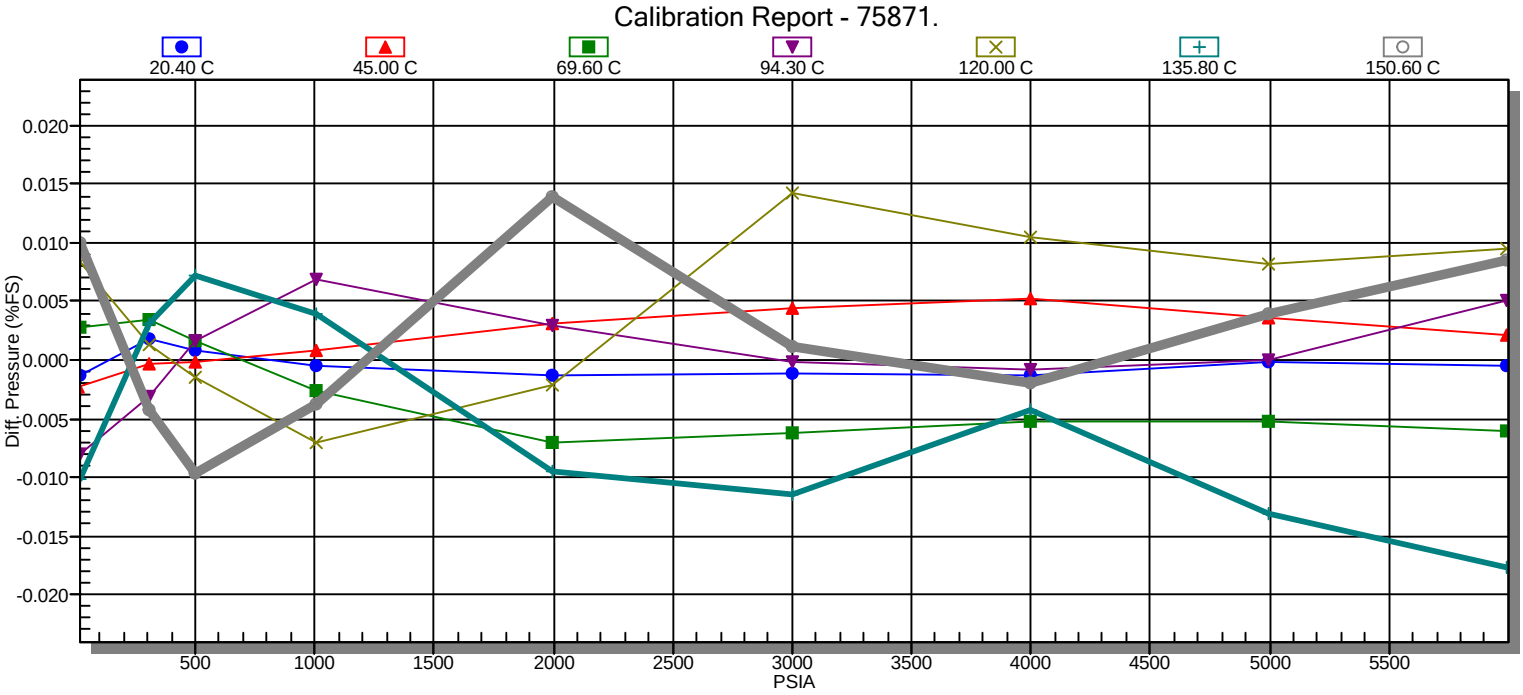
Pressure Gauge Certificate of Calibration



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 = 678735	ft0 = 158408	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 12.97142642	0.11277823	-0.0001505740173	-1.823019195E-06	-3.301484115E-09
B 1.640874332	-0.001297519254	-3.71224205E-07	-1.385623931E-09	1.181939745E-12
C -4.03108653E-06	9.319688525E-09	1.006689622E-11	-5.12304544E-13	-1.763346489E-15
D 1.30010629E-10	-2.139856247E-12	-1.958534961E-15	7.951008165E-17	2.863833649E-19

Temperature (C) STANDARD FIT COEFFICIENTS

A 20.19981389

B -0.343470116

C -2.629672432E-05

D -2.249422711E-07

0 points eliminated.
Error File: Gauge # 75871

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
13.06	20.40	678735.67	158408.25	-0.08
303.58	20.30	696461.00	158422.00	0.11
499.73	20.40	708428.33	158434.00	0.05
1002.67	20.20	739155.33	158454.50	-0.03
1998.86	20.30	800150.00	158459.50	-0.08
3000.93	20.20	861624.33	158426.25	-0.07
3999.15	20.30	922915.67	158357.25	-0.08
4998.32	20.20	984256.67	158250.25	-0.01
5997.31	20.30	1045483.00	158099.75	-0.03
13.05	45.00	679208.00	151257.00	-0.14
303.57	44.90	695994.67	151273.75	-0.02
499.73	44.90	707335.00	151286.25	-0.01
1002.66	44.80	736447.67	151306.50	0.05
1998.85	44.80	794234.00	151319.50	0.19
3000.92	44.80	852472.33	151300.50	0.26
3999.14	44.80	910532.33	151243.50	0.31
4998.32	44.90	968636.00	151156.25	0.21
5997.31	44.90	1026665.33	151037.50	0.12
13.06	69.60	679587.67	144051.25	0.17
303.59	69.60	695525.00	144068.50	0.20
499.74	69.70	706286.00	144076.75	0.09
1002.67	69.60	733908.00	144095.75	-0.16
1998.86	69.60	788734.67	144111.00	-0.42
3000.92	69.60	843999.00	144099.00	-0.37
3999.15	69.60	899095.00	144055.75	-0.31
4998.32	69.60	954243.33	143988.25	-0.31
5997.31	69.70	1009316.33	143888.00	-0.37
13.06	94.30	679761.00	137072.75	-0.48
303.59	94.30	694940.67	137085.00	-0.18
499.73	94.30	705200.33	137093.75	0.09
1002.67	94.40	731510.33	137111.00	0.41
1998.86	94.40	783663.33	137127.50	0.18
3000.92	94.40	836203.67	137118.50	-0.01
3999.14	94.30	888588.67	137086.50	-0.05
4998.32	94.30	941030.67	137034.25	0.00
5997.30	94.40	993420.33	136953.00	0.30
13.06	120.00	679944.00	130197.25	0.50
303.59	120.00	694342.00	130207.75	0.08
499.74	119.90	704076.33	130217.50	-0.08
1002.68	120.10	729063.67	130229.25	-0.42
1998.86	120.10	778693.67	130244.25	-0.13
3000.92	120.10	828736.00	130243.50	0.85
3999.14	120.00	878567.00	130223.00	0.62
4998.31	120.00	928441.67	130180.00	0.49
5997.30	120.00	978274.67	130120.75	0.57
13.07	135.80	679988.67	126175.50	-0.61
303.59	135.80	694006.33	126188.00	0.19
499.74	135.80	703465.33	126195.50	0.43
1002.68	135.80	727711.33	126212.75	0.24
1998.86	135.80	775823.33	126229.00	-0.57
3000.92	135.90	824357.00	126229.50	-0.68
3999.13	135.80	872779.67	126211.50	-0.26
4998.30	135.80	921194.33	126173.25	-0.79
5997.29	135.80	969554.33	126117.75	-1.06
13.09	150.60	680190.00	122440.50	0.60
303.62	150.60	693715.00	122453.25	-0.25
499.77	150.60	702870.00	122461.25	-0.58
1002.69	150.50	726441.33	122479.50	-0.22
1998.86	150.60	773291.00	122498.50	0.83
3000.91	150.60	820468.33	122500.75	0.06
3999.12	150.60	867567.00	122490.25	-0.12
4998.28	150.60	914740.00	122463.25	0.24
5997.25	150.60	961847.33	122425.25	0.51

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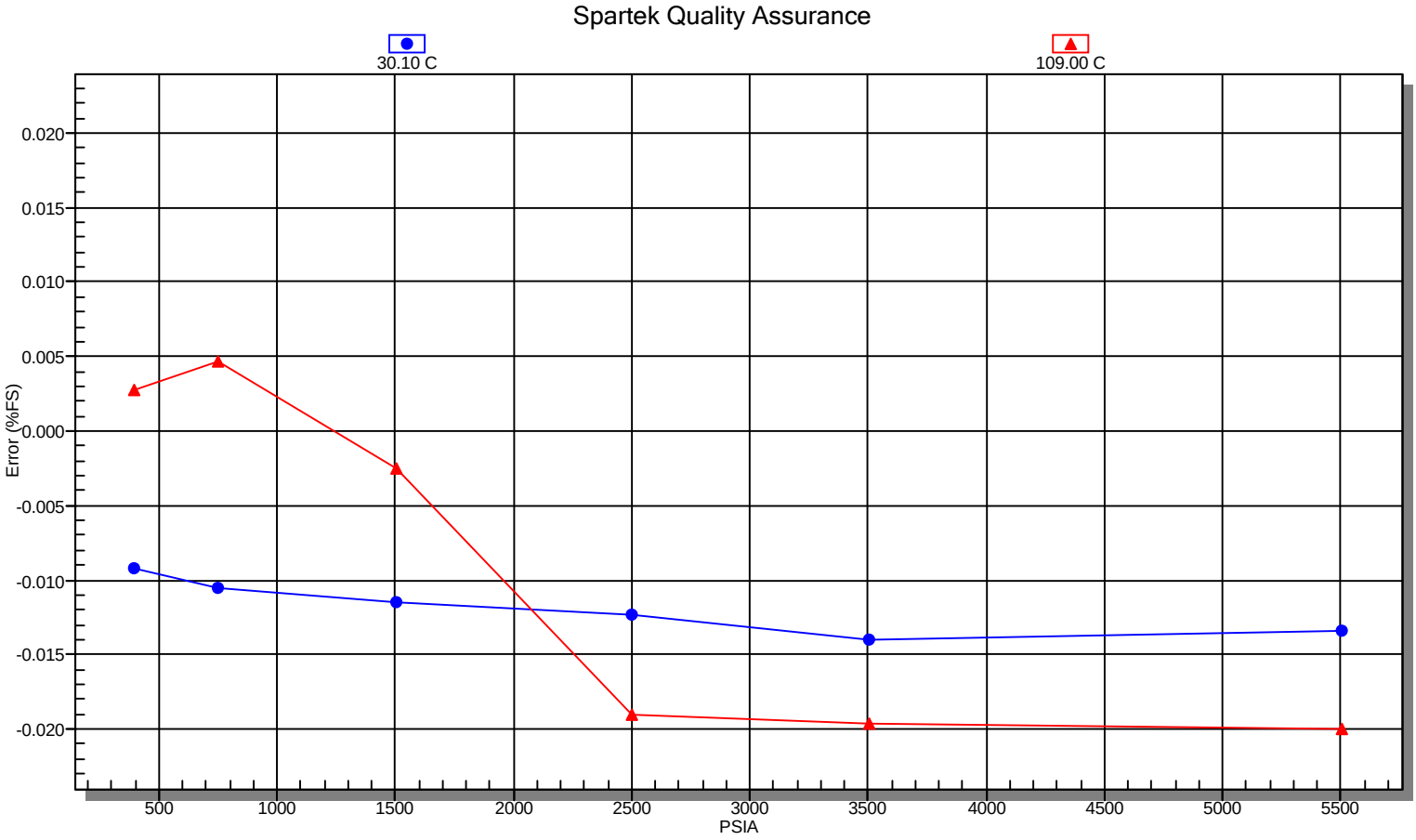
Pressure Gauge Certificate of Conformance

SERIAL NUMBER	75871	CALIBRATION DATE	MAR 25/11
MODEL NUMBER	0 FF0	PRESSURE REFERENCE	NIST Traceable
PRESSURE RANGE	13.06 - 5997.31 psi	TEMP. REFERENCE	NIST Traceable
TEMP. RANGE	20.40 - 150.60 °C	TRACEABILITY DOC.	CAL-STANDARD-001

ACCURACY
As shown in the graph below, this Spartek Gauge conformed to within +/- 0.024 %F.S. of the pressure standard used in calibration, which is accurate to within +/- 0.01% of reading. This gives an overall accuracy of +/-(0.024%F.S. + 0.01% of reading)



Accepted By: _____ Date: MAR 28/11

Ramp report: Serial # 75871
Gauge range = 5997.314 PSI. Max. DIFF. = 1.439
Ramp check result: PASS, Max Err = 0.020% F.S.

DW Pressure	Gauge Pressure	RPM4 Pressure	Differential	%F.S.	Oven Temp.	Gauge Temp.
5501.98	5502.78	5500.70	0.80	0.0134	30.10	30.57
3503.40	3504.24	3502.05	0.84	0.0141	30.20	29.92
2501.32	2502.06	2500.02	0.74	0.0124	30.10	29.77
1503.32	1504.01	1501.96	0.69	0.0115	30.20	29.76
753.27	753.90	751.71	0.63	0.0105	30.20	29.82
397.58	398.13	395.90	0.55	0.0092	30.20	29.89
5501.99	5503.19	5500.72	1.20	0.0200	109.00	109.09
3503.42	3504.60	3502.10	1.18	0.0196	109.20	108.84
2501.33	2502.48	2499.94	1.14	0.0191	109.10	108.85
1503.34	1503.49	1501.87	0.15	0.0026	109.20	108.93
753.29	753.01	751.73	-0.28	0.0046	109.10	109.02
397.59	397.43	395.90	-0.17	0.0028	109.20	109.09

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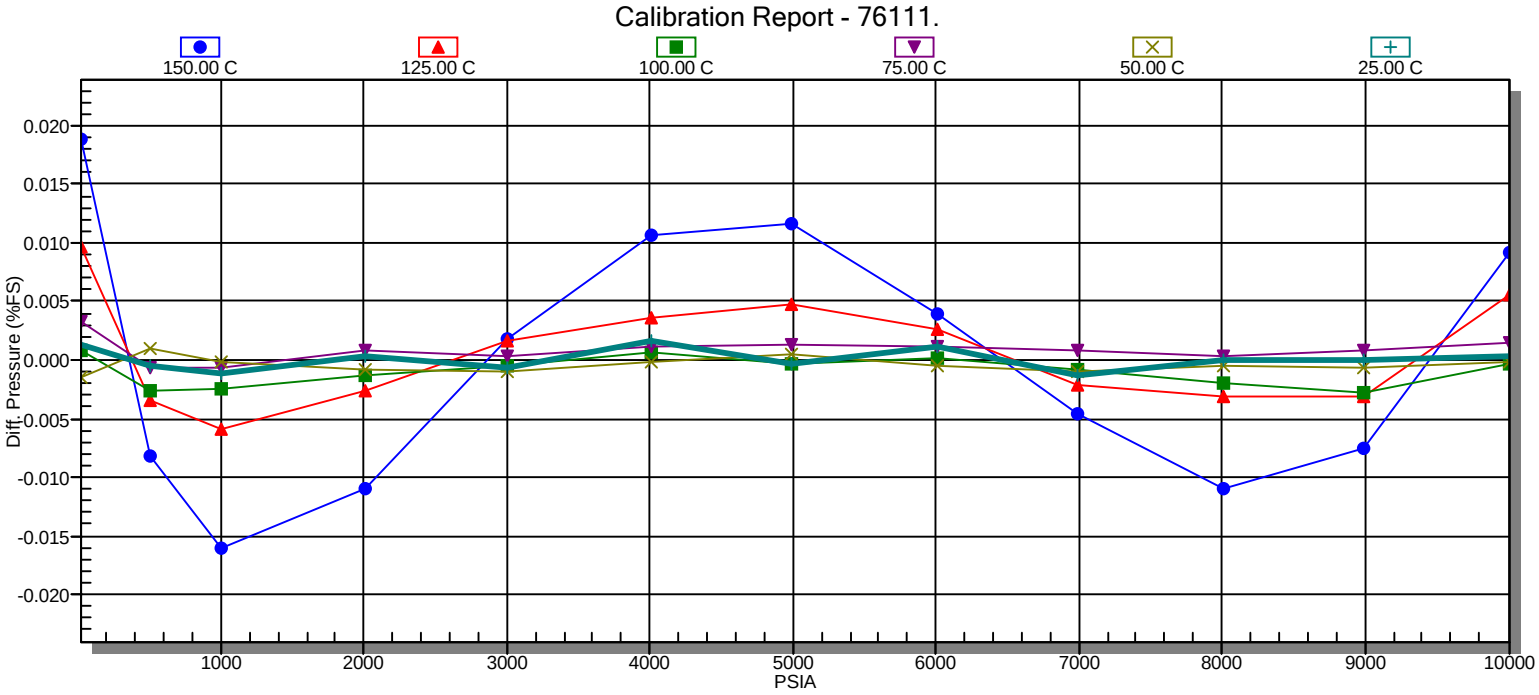
Pressure Gauge Certificate of Calibration



GAUGE NUMBER: 76111

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 = 696814	ft0 = 127521	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 16.56378953	0.3078162022	-0.001315448368	3.045794236E-06	-2.337195411E-09
B 4.000169176	-0.003656486456	5.974905349E-06	-1.280547388E-08	1.023218933E-11
C -2.610719211E-05	4.516112577E-07	-2.81149116E-09	7.624293653E-12	-7.533267602E-15
D 6.430577278E-09	-9.562403819E-11	5.786935565E-13	-1.536814916E-15	1.475842362E-18

Temperature (C) STANDARD FIT COEFFICIENTS

A 150.2092395

B -0.4181411029

C 0.0002449124311

D -3.043562259E-07

0 points eliminated.
Error File: Gauge # 76111

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
14.70	150.00	696814.69	127521.50	1.89
507.03	150.00	709070.00	127698.00	-0.82
999.36	150.00	721392.31	127610.75	-1.61
2012.96	150.00	746857.31	127576.00	-1.09
2997.61	150.00	771666.31	127568.75	0.18
4011.18	150.00	797232.00	127567.25	1.07
4995.80	150.00	822068.69	127565.75	1.16
6009.35	150.00	847619.00	127564.25	0.40
6993.94	150.00	872420.31	127558.25	-0.46
8007.46	150.00	897927.00	127550.50	-1.09
8992.03	150.00	922681.00	127539.75	-0.76
10005.54	150.00	948121.00	127521.00	0.91
14.70	125.00	696402.00	133732.00	0.97
507.03	125.00	709352.31	133790.00	-0.35
999.36	125.00	722336.00	133767.75	-0.60
2012.96	125.00	749108.31	133775.75	-0.26
2997.61	125.00	775129.31	133775.25	0.16
4011.18	125.00	801916.00	133777.75	0.35
4995.80	125.00	827934.31	133778.75	0.47
6009.35	125.00	854695.69	133775.75	0.26
6993.94	125.00	880669.31	133772.50	-0.22
8007.46	125.00	907387.00	133765.25	-0.32
8992.03	125.00	933297.00	133748.75	-0.31
10005.54	125.00	959935.69	133724.75	0.56
14.70	100.00	696110.00	140318.50	0.08
507.03	100.00	709754.31	140329.50	-0.27
999.36	100.00	723407.69	140320.75	-0.25
2012.96	100.00	751523.69	140332.25	-0.13
2997.61	100.00	778837.31	140345.25	-0.04
4011.18	100.00	806945.69	140350.75	0.07
4995.80	100.00	834235.00	140353.50	-0.03
6009.35	100.00	862308.00	140347.75	0.02
6993.94	100.00	889552.00	140338.75	-0.09
8007.46	100.00	917566.00	140324.75	-0.20
8992.03	100.00	944748.69	140308.50	-0.28
10005.54	100.00	972683.00	140279.25	-0.03
14.70	75.00	695913.69	147201.75	0.33
507.03	75.00	710260.31	147246.50	-0.06
999.36	75.00	724614.69	147226.50	-0.06
2012.96	75.00	754176.31	147242.00	0.09
2997.61	75.00	782883.69	147252.75	0.03
4011.18	75.00	812427.31	147257.25	0.11
4995.80	75.00	841116.00	147262.25	0.14
6009.35	75.00	870619.00	147255.75	0.12
6993.94	75.00	899249.31	147242.50	0.08
8007.46	75.00	928683.31	147221.50	0.03
8992.03	75.00	957239.00	147195.25	0.08
10005.54	75.00	986582.00	147159.75	0.15
14.70	50.00	695691.31	154278.50	-0.15
507.03	50.00	710815.00	154271.25	0.09
999.36	50.00	725929.00	154285.25	-0.01
2012.96	50.00	757052.31	154309.00	-0.08
2997.61	50.00	787283.69	154323.25	-0.09
4011.18	50.00	818394.00	154329.75	-0.01
4995.80	50.00	848596.69	154329.00	0.04
6009.35	50.00	879654.00	154319.00	-0.04
6993.94	50.00	909783.69	154297.00	-0.10
8007.46	50.00	940766.00	154271.00	-0.05
8992.03	50.00	970804.69	154234.00	-0.06
10005.54	50.00	1001669.69	154188.25	-0.01
14.70	25.00	695432.00	161354.25	0.13
507.03	25.00	711383.00	161348.00	-0.05
999.36	25.00	727337.31	161362.00	-0.12
2012.96	25.00	760193.31	161383.50	0.03
2997.61	25.00	792100.31	161402.00	-0.07
4011.18	25.00	824935.00	161403.00	0.16
4995.80	25.00	856799.69	161399.00	-0.03
6009.35	25.00	889576.00	161382.00	0.12
6993.94	25.00	921367.00	161358.00	-0.12

8007.46	25.00	954046.31	161318.75	0.00
8992.03	25.00	985734.31	161272.75	0.00
10005.54	25.00	1018277.00	161211.50	0.03

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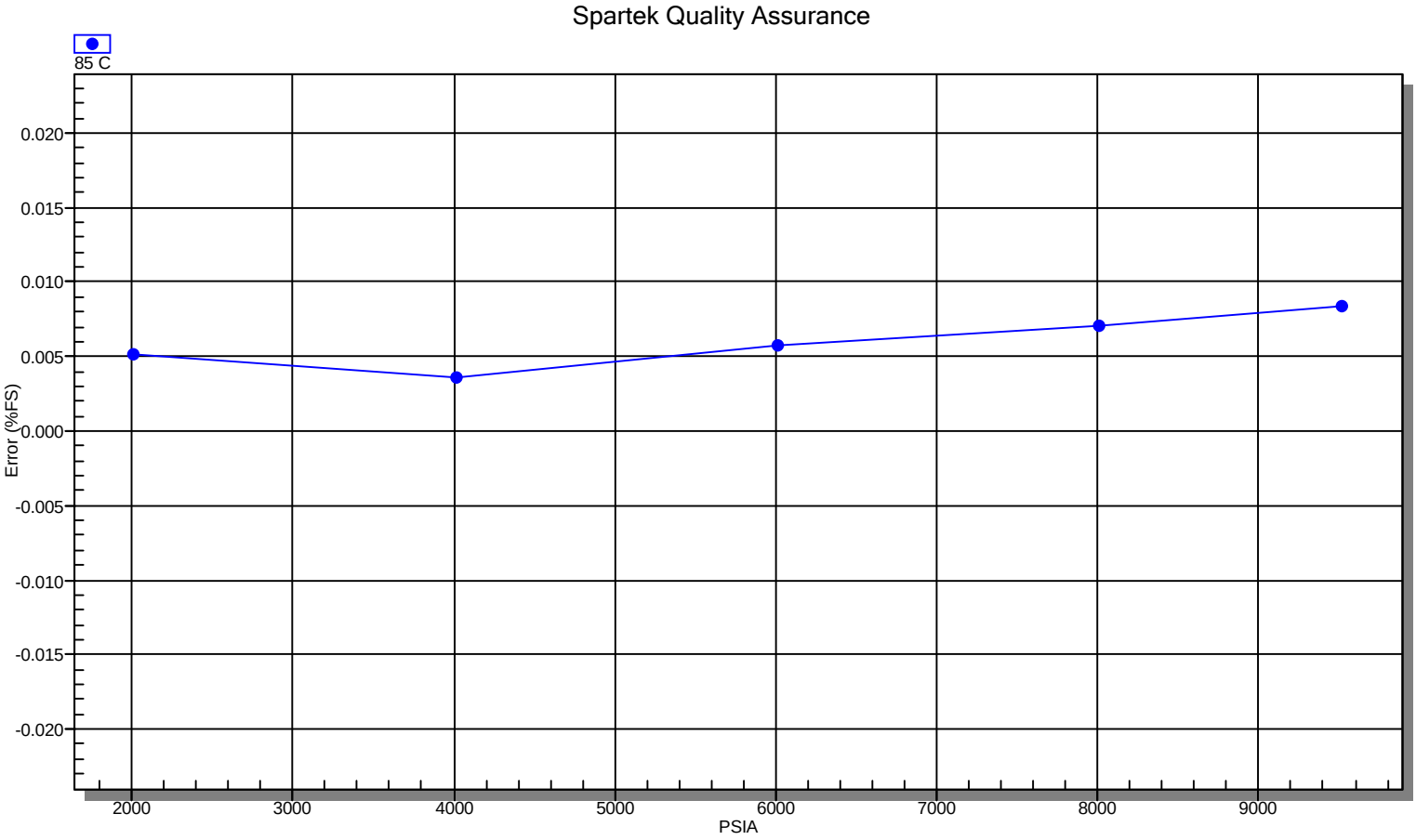
Pressure Gauge Certificate of Conformance

SERIAL NUMBER	76111	CALIBRATION DATE	SEP 28/12
MODEL NUMBER	1139 FF4	PRESSURE REFERENCE	NIST Traceable
PRESSURE RANGE	14.70 - 10005.54 psi	TEMP. REFERENCE	NIST Traceable
TEMP. RANGE	25.00 - 150.00 °C	TRACEABILITY DOC.	CAL-STANDARD-001

ACCURACY
As shown in the graph below, this Spartek Gauge conformed to within +/- 0.024 %F.S. of the pressure standard used in calibration, which is accurate to within +/- 0.01% of reading. This gives an overall accuracy of +/-(0.024%F.S. + 0.01% of reading)



Accepted By: Jeff Banas

Date: SEP 28/12

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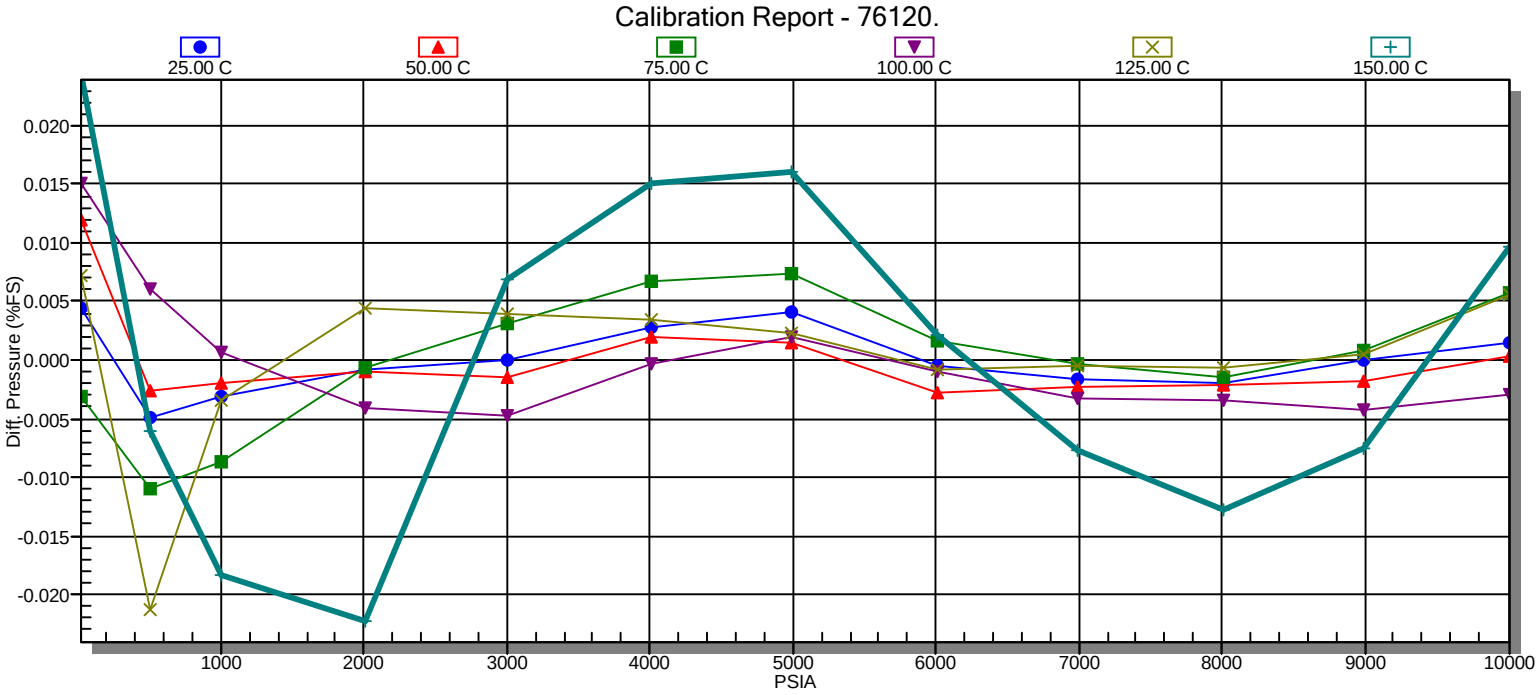
Pressure Gauge Certificate of Calibration



GAUGE NUMBER: 76120

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 = 698062	ft0 = 160161	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 15.12066161	0.05680845349	-0.001202092256	-8.260842789E-06	-1.629649754E-08
B 2.878228813	-0.002159850742	3.099077218E-06	1.84861407E-08	3.943411177E-11
C -2.480722029E-06	-1.242197149E-07	-2.476296517E-09	-1.443813661E-11	-2.665605869E-14
D 2.385658455E-10	2.117928766E-11	4.678089014E-13	2.755013103E-15	5.086206799E-18

Temperature (C) STANDARD FIT COEFFICIENTS

A 24.84245863

B -0.3687428731

C -9.35887363E-05

D -3.595630119E-07

0 points eliminated.
Error File: Gauge # 76120

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
14.70	25.00	698062.69	160161.75	0.44
507.16	25.00	715140.31	160138.25	-0.49
999.50	25.00	732259.31	160151.75	-0.32
2013.15	25.00	767522.31	160172.25	-0.09
2997.81	25.00	801791.69	160182.50	-0.01
4011.14	25.00	837072.69	160179.75	0.29
4995.74	25.00	871340.69	160164.00	0.41
6009.64	25.00	906590.00	160136.25	-0.04
6994.23	25.00	940805.00	160099.50	-0.16
8007.77	25.00	975981.69	160047.25	-0.19
8992.35	25.00	1010106.31	159984.50	0.00
10005.86	25.00	1045168.31	159909.00	0.15
14.70	50.00	698325.69	153313.50	1.19
507.16	50.00	714498.69	153278.50	-0.27
999.50	50.00	730722.31	153290.75	-0.19
2013.15	50.00	764136.31	153311.25	-0.10
2997.81	50.00	796602.31	153323.25	-0.15
4011.14	50.00	830025.00	153320.75	0.19
4995.74	50.00	862488.00	153315.25	0.15
6009.64	50.00	895882.00	153294.00	-0.27
6994.23	50.00	928302.31	153264.50	-0.23
8007.77	50.00	961647.00	153227.50	-0.20
8992.35	50.00	993986.31	153176.50	-0.17
10005.86	50.00	1027233.00	153116.50	0.03
14.70	75.00	698506.00	146335.25	-0.32
507.16	75.00	713864.31	146314.00	-1.10
999.50	75.00	729258.31	146327.25	-0.88
2013.15	75.00	760985.31	146348.50	-0.06
2997.81	75.00	791812.00	146361.25	0.31
4011.14	75.00	823544.69	146364.50	0.67
4995.74	75.00	854368.31	146360.00	0.75
6009.64	75.00	886072.31	146343.25	0.17
6994.23	75.00	916853.69	146322.50	-0.03
8007.77	75.00	948506.00	146290.50	-0.14
8992.35	75.00	979230.00	146255.50	0.09
10005.86	75.00	1010803.31	146207.50	0.58
14.70	100.00	698684.69	139543.00	1.51
507.16	100.00	713296.00	139532.00	0.60
999.50	100.00	727921.31	139543.25	0.07
2013.15	100.00	758068.00	139561.25	-0.41
2997.81	100.00	787379.31	139571.50	-0.48
4011.14	100.00	817568.31	139577.00	-0.04
4995.74	100.00	846894.00	139574.25	0.20
6009.64	100.00	877068.69	139566.00	-0.10
6994.23	100.00	906350.00	139547.00	-0.33
8007.77	100.00	936478.69	139524.75	-0.35
8992.35	100.00	965709.00	139494.75	-0.42
10005.86	100.00	995760.31	139456.75	-0.30
14.70	125.00	698838.31	133074.75	0.73
507.16	125.00	712692.31	133099.00	-2.12
999.50	125.00	726684.00	133110.00	-0.35
2013.15	125.00	755433.69	133125.25	0.44
2997.81	125.00	783361.69	133134.75	0.40
4011.14	125.00	812110.00	133130.00	0.35
4995.74	125.00	840044.00	133120.75	0.24
6009.64	125.00	868802.00	133110.25	-0.09
6994.23	125.00	896724.00	133094.00	-0.04
8007.77	125.00	925440.31	133071.25	-0.07
8992.35	125.00	953313.31	133046.50	0.05
10005.86	125.00	981969.69	133013.25	0.55
14.70	150.00	699376.00	126948.50	2.44
507.16	150.00	712478.31	126998.00	-0.61
999.50	150.00	725657.31	126999.75	-1.84
2013.15	150.00	752921.31	127004.50	-2.23
2997.81	150.00	779571.31	127004.50	0.70
4011.14	150.00	806998.00	127002.50	1.51
4995.74	150.00	833666.31	126997.00	1.61
6009.64	150.00	861110.00	126991.00	0.22
6994.23	150.00	887767.69	126980.75	-0.77

8007.77	150.00	915199.00	126965.75	-1.28
8992.35	150.00	941830.00	126946.75	-0.75
10005.86	150.00	969206.31	126922.00	0.97

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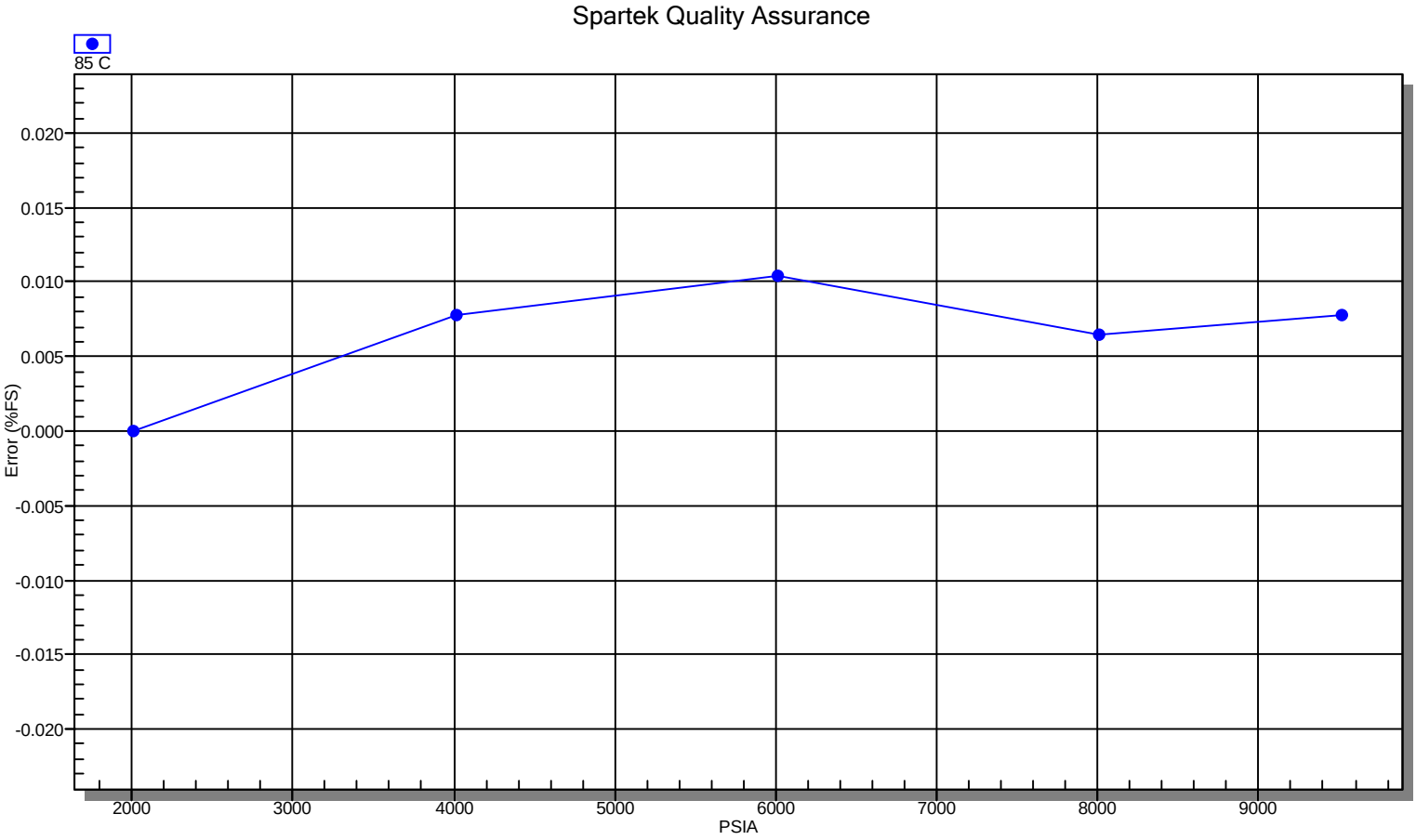
Pressure Gauge Certificate of Conformance

SERIAL NUMBER	76120	CALIBRATION DATE	APR 15/13
MODEL NUMBER	1139 FF4	PRESSURE REFERENCE	NIST Traceable
PRESSURE RANGE	14.70 - 10005.86 psi	TEMP. REFERENCE	NIST Traceable
TEMP. RANGE	25.00 - 150.00 °C	TRACEABILITY DOC.	CAL-STANDARD-001

ACCURACY
As shown in the graph below, this Spartek Gauge conformed to within +/- 0.024 %F.S. of the pressure standard used in calibration, which is accurate to within +/- 0.01% of reading. This gives an overall accuracy of +/-(0.024%F.S. + 0.01% of reading)



Accepted By: Jeff Banas

Date: APR 15/13

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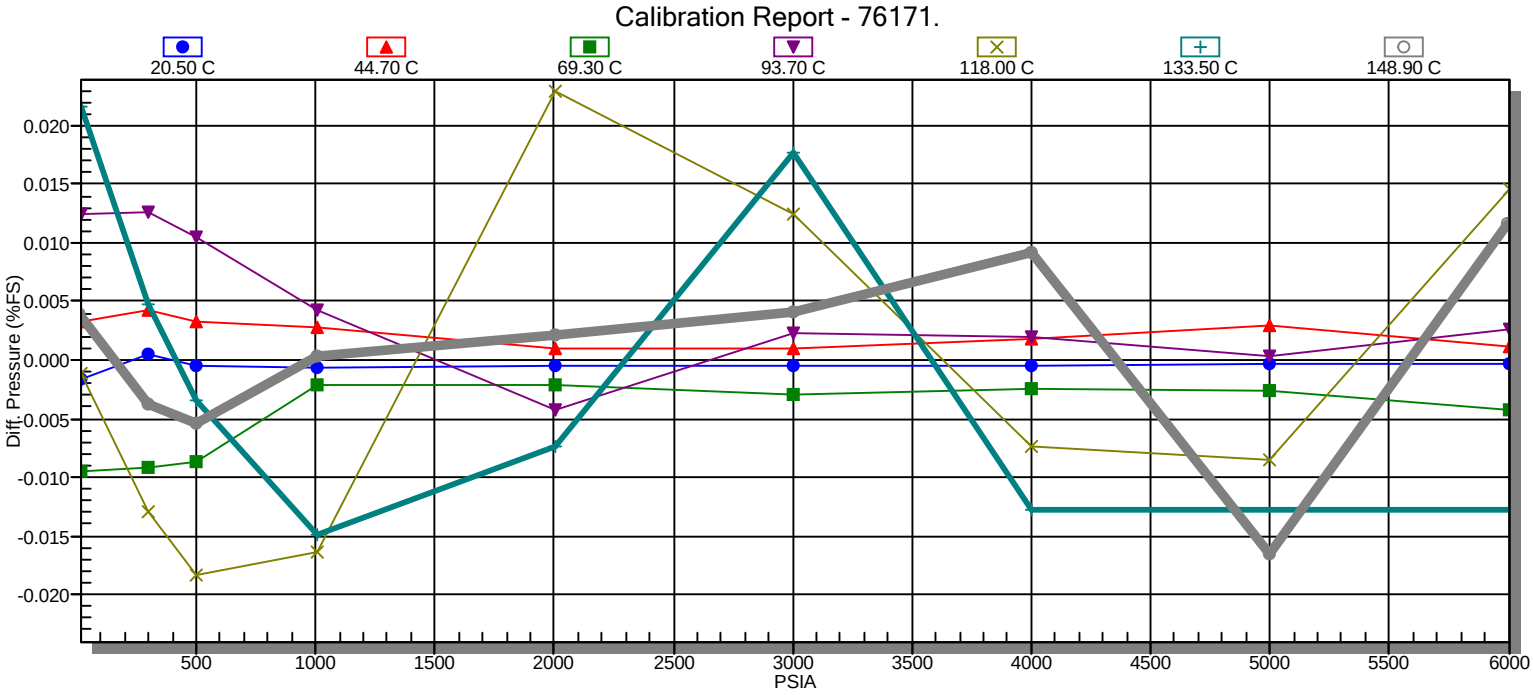
Pressure Gauge Certificate of Calibration



GAUGE NUMBER: 76171

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 = 680467	ft0 = 147715	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 12.95713534	0.07176652475	-0.0008403552752	-8.075479491E-06	-1.986285576E-08
B 2.154114143	-0.001777116361	-1.031398656E-07	2.568332342E-09	2.000963373E-11
C -6.280010174E-06	1.532672175E-08	2.116426596E-10	-1.074931629E-12	-9.914299177E-15
D 1.137635017E-10	-5.275689956E-12	-7.935964758E-14	-5.228817887E-18	1.711892186E-18

Temperature (C) STANDARD FIT COEFFICIENTS

A 20.61027667

B -0.3623574837

C -8.529409921E-06

D -2.511062843E-07

1 points eliminated.
Error File: Gauge # 76171

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
13.06	20.50	680467.00	147715.50	-0.10
296.86	20.50	693654.00	147727.50	0.03
500.40	20.60	703112.33	147738.50	-0.03
1003.35	20.60	726518.33	147758.00	-0.04
2001.27	20.50	773055.67	147771.75	-0.03
3003.39	20.60	819897.67	147764.75	-0.03
4002.65	20.50	866697.00	147742.75	-0.03
4998.57	20.50	913386.67	147693.50	-0.02
6000.93	20.60	960410.33	147625.75	-0.02
13.10	44.70	680768.00	141068.25	0.20
296.90	44.70	693270.33	141080.50	0.26
500.44	44.70	702238.67	141087.00	0.20
1003.39	44.80	724427.33	141101.50	0.17
2001.31	44.80	768537.33	141122.50	0.06
3003.43	44.70	812931.33	141120.75	0.06
4002.70	44.80	857273.67	141100.50	0.11
4998.61	44.70	901516.00	141060.75	0.18
6000.97	44.80	946061.00	141001.25	0.07
13.13	69.30	680937.67	134383.25	-0.57
296.93	69.30	692819.67	134394.75	-0.55
500.47	69.30	701347.33	134402.00	-0.52
1003.42	69.20	722449.00	134418.00	-0.13
2001.35	69.20	764348.33	134434.00	-0.13
3003.46	69.20	806496.00	134435.25	-0.18
4002.73	69.20	848587.33	134421.00	-0.15
4998.64	69.30	890582.00	134391.25	-0.16
6001.00	69.30	932873.67	134344.25	-0.26
13.14	93.70	681100.33	127945.00	0.75
296.94	93.80	692402.67	127954.00	0.76
500.48	93.70	700509.00	127960.75	0.62
1003.43	93.70	720558.33	127975.50	0.26
2001.35	93.70	760419.00	127992.50	-0.25
3003.47	93.70	800560.33	127995.75	0.14
4002.73	93.80	840625.33	127986.00	0.12
4998.64	93.80	880583.33	127962.50	0.02
6001.00	93.70	920816.33	127925.50	0.15
13.11	118.00	681374.00	121840.00	-0.07
296.91	118.00	692059.00	121851.25	-0.77
500.45	118.00	699740.67	121856.00	-1.10
1003.40	118.00	718797.33	121866.75	-0.98
2001.32	118.00	756833.67	121885.00	1.38
3003.43	118.00	795057.00	121890.00	0.74
4002.70	118.10	833236.67	121886.75	-0.44
4998.61	118.00	871355.00	121872.00	-0.51
6000.96	118.20	909727.67	121839.25	0.87
13.09	133.50	681887.33	118155.00	1.30
296.89	133.50	692163.67	118162.00	0.28
500.43	133.50	699561.33	118167.00	-0.20
1003.38	133.50	717922.33	118176.25	-0.90
2001.29	133.50	754648.33	118191.75	-0.44
3003.41	133.50	791796.67	118199.25	1.06
4002.67	133.50	828849.00	118197.75	-0.77
6000.94	133.40	903068.67	118156.25	-0.77
13.04	148.90	682634.67	114532.25	0.23
296.84	148.90	692500.00	114542.25	-0.22
500.37	149.00	699611.67	114551.00	-0.32
1003.32	148.90	717301.33	114561.75	0.02
2001.24	148.80	752726.00	114581.00	0.13
3003.36	148.80	788649.33	114587.00	0.24
4002.61	148.90	824690.00	114587.75	0.55
4998.53	148.90	860606.00	114579.50	-0.99
6000.88	148.90	896784.00	114562.00	0.70

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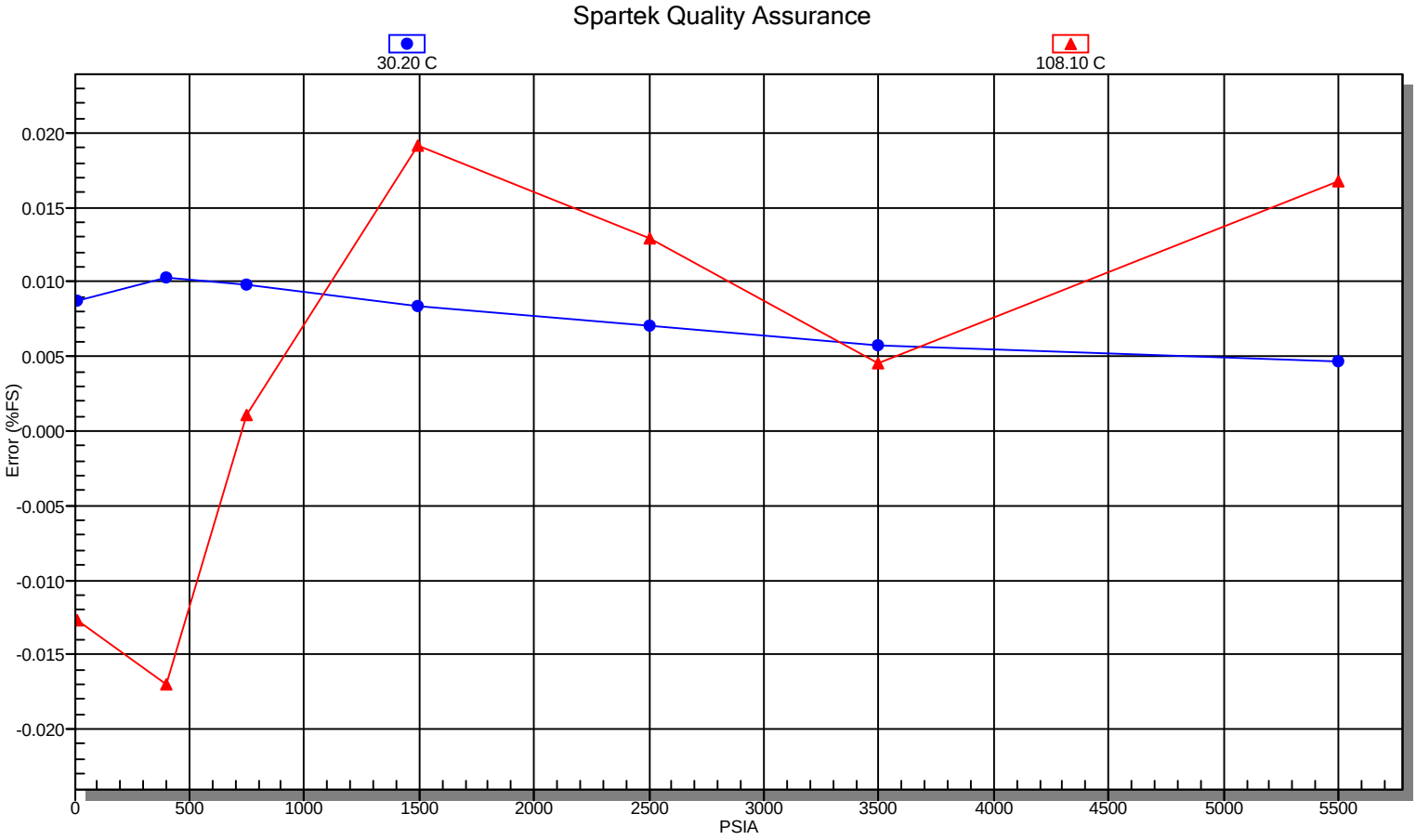
Pressure Gauge Certificate of Conformance

SERIAL NUMBER	76171	CALIBRATION DATE	AUG 23/11
MODEL NUMBER	0 FF0	PRESSURE REFERENCE	NIST Traceable
PRESSURE RANGE	13.06 - 6000.93 psi	TEMP. REFERENCE	NIST Traceable
TEMP. RANGE	20.50 - 148.90 °C	TRACEABILITY DOC.	CAL-STANDARD-001

ACCURACY
As shown in the graph below, this Spartek Gauge conformed to within +/- 0.024 %F.S. of the pressure standard used in calibration, which is accurate to within +/- 0.01% of reading. This gives an overall accuracy of +/-(0.024%F.S. + 0.01% of reading)



Accepted By: _____ Date: AUG 25/11

Ramp report: Serial # 76171
Gauge range = 6001.001 PSI. Max. DIFF. = 1.440
Ramp check result: PASS, Max Err = 0.019% F.S.

DW Pressure	Gauge Pressure	RPM4 Pressure	Differential	%F.S.	Oven Temp.	Gauge Temp.
5500.38	5500.66	5501.26	0.28	0.0046	30.20	30.24
3498.99	3499.33	3499.82	0.35	0.0058	30.10	30.03
2502.86	2503.28	2503.69	0.42	0.0070	30.30	30.01
1497.38	1497.89	1498.19	0.50	0.0084	30.20	30.06
747.03	747.62	747.70	0.59	0.0099	30.10	30.14
398.54	399.16	399.15	0.62	0.0103	30.40	30.18
13.09	13.62	13.51	0.53	0.0088	30.40	30.27
5500.41	5501.41	5501.33	1.00	0.0167	108.10	107.93
3499.02	3499.29	3499.87	0.27	0.0045	108.10	107.91
2502.89	2503.67	2503.71	0.78	0.0129	108.30	108.03
1497.41	1498.56	1498.15	1.15	0.0192	108.20	108.16
747.06	747.13	747.78	0.06	0.0011	108.20	108.25
398.59	397.56	399.23	-1.02	0.0171	108.30	108.34
13.14	12.37	13.52	-0.76	0.0127	108.30	108.41

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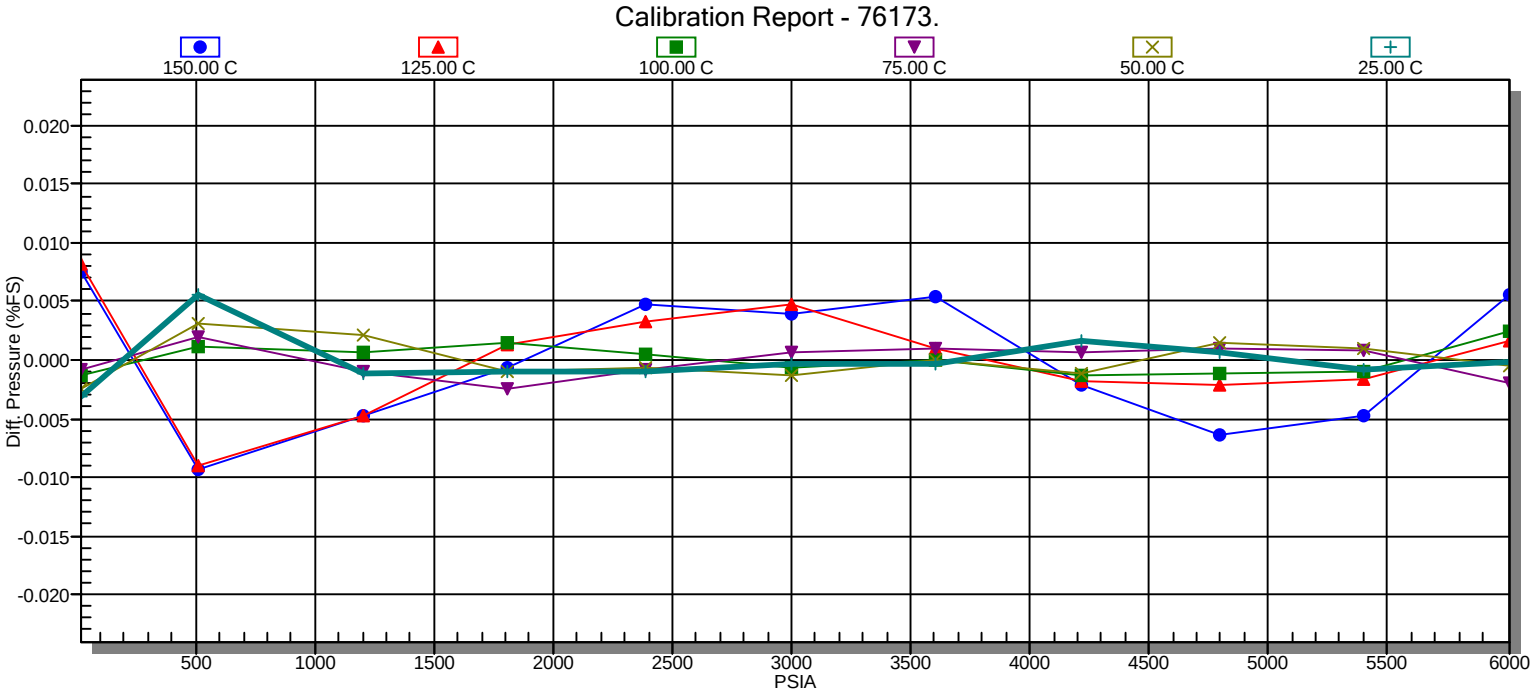
Pressure Gauge Certificate of Calibration



GAUGE NUMBER: 76173

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 = 700229	ft0 = 127024	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 15.14196823	0.289496676	-0.001775714932	5.341638695E-06	-5.666419815E-09
B 2.905735861	-0.002745795093	4.557738229E-06	-9.234916781E-09	6.858524361E-12
C -2.647349886E-05	3.639182637E-07	-1.8805042E-09	4.306707785E-12	-3.674019485E-15
D 6.227769712E-09	-7.620579987E-11	3.518572067E-13	-6.951310252E-16	4.774776321E-19

Temperature (C) STANDARD FIT COEFFICIENTS

A 150.2278801

B -0.4181662077

C 0.0002482875714

D -3.153549048E-07

0 points eliminated.
Error File: Gauge # 76173

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
14.70	150.00	700229.31	127024.75	0.45
506.98	150.00	717173.31	127230.75	-0.56
1202.05	150.00	741245.69	127176.25	-0.28
1810.22	150.00	762325.31	127070.00	-0.04
2389.41	150.00	782467.00	127059.50	0.28
2997.56	150.00	803637.31	127055.00	0.24
3605.68	150.00	824834.31	127053.00	0.32
4213.86	150.00	846022.31	127049.25	-0.12
4793.00	150.00	866198.31	127043.50	-0.38
5401.15	150.00	887377.00	127034.00	-0.29
6009.25	150.00	908541.00	127023.25	0.34
14.70	125.00	699781.69	133256.75	0.49
506.98	125.00	717668.31	133397.25	-0.54
1202.05	125.00	743002.31	133309.25	-0.29
1810.22	125.00	765196.00	133285.50	0.08
2389.41	125.00	786344.69	133282.00	0.19
2997.56	125.00	808563.69	133283.50	0.29
3605.68	125.00	830772.69	133282.25	0.06
4213.86	125.00	852979.00	133276.50	-0.11
4793.00	125.00	874118.69	133269.00	-0.13
5401.15	125.00	896295.00	133255.75	-0.10
6009.25	125.00	918446.31	133239.75	0.09
14.70	100.00	699533.00	139835.75	-0.08
506.98	100.00	718394.31	139831.75	0.07
1202.05	100.00	745028.00	139840.75	0.04
1810.22	100.00	768345.31	139850.25	0.09
2389.41	100.00	790552.00	139857.25	0.03
2997.56	100.00	813866.69	139858.25	-0.04
3605.68	100.00	837179.31	139855.50	0.00
4213.86	100.00	860479.69	139848.50	-0.08
4793.00	100.00	882658.31	139839.25	-0.06
5401.15	100.00	905923.69	139822.00	-0.06
6009.25	100.00	929172.69	139802.25	0.14
14.70	75.00	699386.31	146722.25	-0.05
506.98	75.00	719239.31	146782.00	0.12
1202.05	75.00	747247.31	146753.25	-0.06
1810.22	75.00	771761.00	146756.75	-0.15
2389.41	75.00	795113.00	146758.25	-0.05
2997.56	75.00	819626.00	146754.75	0.04
3605.68	75.00	844131.69	146751.75	0.06
4213.86	75.00	868623.00	146740.50	0.04
4793.00	75.00	891934.69	146727.25	0.06
5401.15	75.00	916391.69	146706.50	0.05
6009.25	75.00	940817.69	146681.00	-0.12
14.70	50.00	699200.31	153818.25	-0.15
506.98	50.00	720120.31	153830.75	0.18
1202.05	50.00	749637.69	153836.00	0.13
1810.22	50.00	775459.69	153840.00	-0.05
2389.41	50.00	800057.69	153841.75	-0.04
2997.56	50.00	825876.31	153837.75	-0.07
3605.68	50.00	851689.69	153830.25	0.00
4213.86	50.00	877487.00	153818.00	-0.07
4793.00	50.00	902036.31	153794.75	0.09
5401.15	50.00	927792.31	153770.25	0.05
6009.25	50.00	953512.31	153737.00	-0.03
14.70	25.00	698976.31	160862.75	-0.19
506.98	25.00	721067.31	160849.50	0.33
1202.05	25.00	752213.31	160867.75	-0.07
1810.22	25.00	779484.00	160877.25	-0.06
2389.41	25.00	805453.31	160880.75	-0.06
2997.56	25.00	832712.69	160874.50	-0.02
3605.68	25.00	859953.69	160860.00	-0.02
4213.86	25.00	887186.00	160839.50	0.10
4793.00	25.00	913091.31	160815.25	0.04
5401.15	25.00	940265.00	160782.00	-0.05
6009.25	25.00	967401.00	160737.75	-0.01

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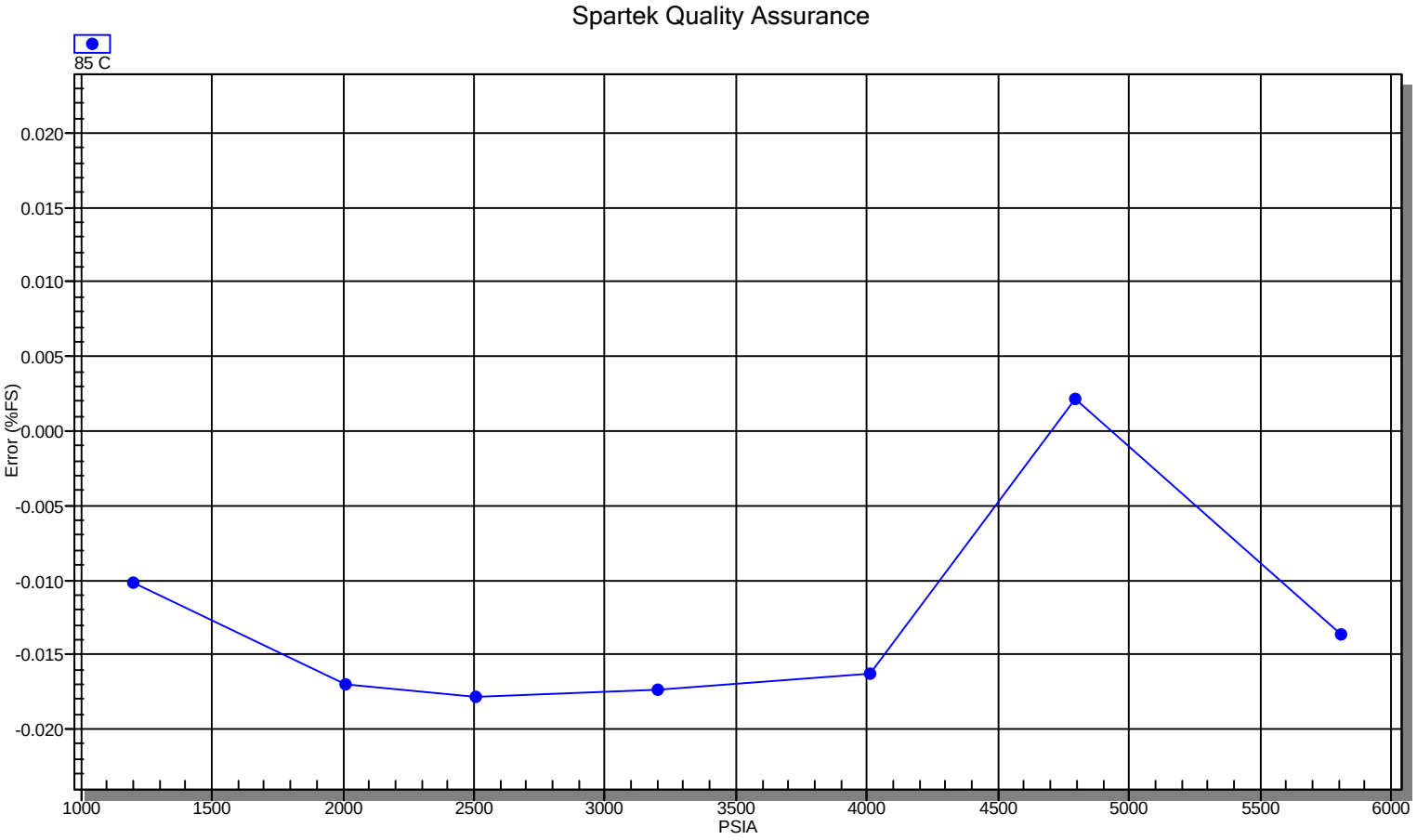
Fax (403) 887-4050
www.sparteksystems.com

Pressure Gauge Certificate of Conformance

SERIAL NUMBER	76173	CALIBRATION DATE	OCT 29/12
MODEL NUMBER	1139 FF4	PRESSURE REFERENCE	NIST Traceable
PRESSURE RANGE	14.70 - 6009.25 psi	TEMP. REFERENCE	NIST Traceable
TEMP. RANGE	25.00 - 150.00 °C	TRACEABILITY DOC.	CAL-STANDARD-001

ACCURACY
As shown in the graph below, this Spartek Gauge conformed to within +/- 0.024 %F.S. of the pressure standard used in calibration, which is accurate to within +/- 0.01% of reading. This gives an overall accuracy of +/-(0.024%F.S. + 0.01% of reading)



Accepted By: Jeff Banas

Date: OCT 29/12

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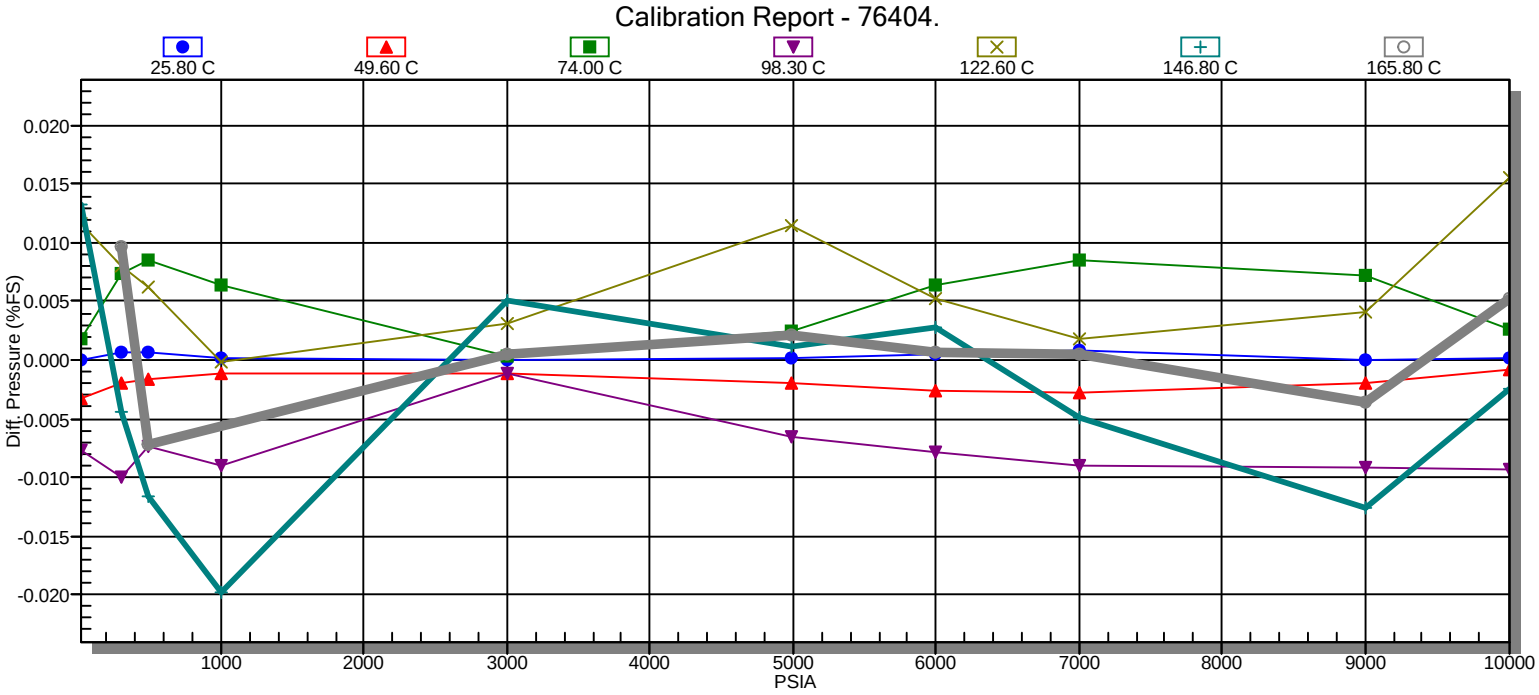
URL www.sparteksystems.com

Pressure Gauge Certificate of Calibration



GAUGE NUMBER: 76404

2-D POLYNOMIAL LMS CURVEFIT

Source of f:	Pres	Temp	Pressure Equation:
Fit Order:	3	5	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 = 679762	ft0 = 147934	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 12.99794347	0.2330350417	0.001448503543	8.059807097E-06	2.546076087E-08
B 3.425793327E-11	2.732094734	-0.002470381242	-2.808599563E-06	-1.357774352E-08
C -9.364561627E-12	7.798827128E-15	-5.296904725E-06	1.130329865E-07	2.416253335E-09
D 1.471188786E-11	3.328730054E-14	2.832889781E-17	1.145768863E-10	-2.228504448E-11

Temperature (C) STANDARD FIT COEFFICIENTS

A 25.84508201

B -0.3744317269

C 1.894632477E-05

D -1.71314099E-07

2 points eliminated.
Error File: Gauge # 76404

Pressure psi	Temperature Deg. C	Count (Pres)	Count (Temp)	DIFF (press) psi
13.02	25.80	679762.67	147934.25	0.00
303.29	25.60	690391.67	147943.75	0.06
492.47	25.70	697321.33	147956.75	0.06
1001.53	25.90	715981.67	147982.75	0.02
3005.18	25.90	789576.33	148010.25	0.00
4994.65	25.80	862809.33	147991.25	0.02
5995.36	25.90	899684.00	147968.00	0.05
6996.43	25.80	936553.00	147921.25	0.08
9002.25	25.80	1010378.00	147797.25	0.00
10004.67	25.90	1047231.00	147721.25	0.02
13.02	49.60	680117.67	141661.00	-0.33
303.29	49.70	690206.67	141675.25	-0.20
492.47	49.60	696783.67	141683.50	-0.16
1001.53	49.60	714492.00	141701.50	-0.12
3005.19	49.50	784326.67	141739.00	-0.11
4994.66	49.60	853811.33	141729.00	-0.20
5995.37	49.50	888789.67	141709.00	-0.26
6996.44	49.60	923776.33	141674.25	-0.28
9002.26	49.60	993832.67	141572.75	-0.20
10004.68	49.60	1028780.33	141499.50	-0.08
13.03	74.00	680338.67	135239.25	0.17
303.29	74.00	689952.67	135250.25	0.73
492.48	74.00	696212.67	135257.25	0.86
1001.53	74.00	713046.00	135275.25	0.64
3005.19	74.00	779388.33	135308.25	0.03
4994.65	74.10	845380.33	135306.25	0.25
5995.37	74.00	878599.00	135288.75	0.64
6996.44	74.00	911827.67	135262.50	0.86
9002.26	74.00	978373.33	135182.50	0.73
10004.67	74.20	1011573.67	135120.00	0.26
13.04	98.30	680447.67	129003.25	-0.77
303.31	98.30	689578.33	129014.00	-0.99
492.49	98.30	695543.67	129019.75	-0.73
1001.55	98.30	711576.00	129037.50	-0.90
3005.20	98.30	774797.33	129066.25	-0.12
4994.67	98.30	837614.67	129069.25	-0.65
5995.38	98.30	869227.00	129056.75	-0.79
6996.45	98.30	900849.67	129035.50	-0.90
9002.27	98.40	964183.67	128969.00	-0.92
10004.69	98.40	995802.33	128923.25	-0.93
13.05	122.60	680623.67	123046.00	1.17
303.32	122.70	689309.33	123054.00	0.80
492.50	122.60	694975.33	123060.50	0.63
1001.56	122.60	710227.67	123076.50	-0.01
3005.21	122.70	770470.33	123108.75	0.31
4994.68	122.60	830430.67	123115.50	1.15
5995.39	122.60	860569.67	123102.75	0.53
6996.47	122.60	890723.33	123084.75	0.17
9002.28	122.70	951127.00	123039.00	0.42
10004.70	122.70	981270.67	122997.75	1.55
13.06	146.80	680801.33	117455.75	1.33
303.34	146.90	689032.33	117466.50	-0.43
492.51	146.80	694413.33	117474.25	-1.17
1001.58	146.70	708942.33	117488.25	-1.99
3005.22	146.70	766486.00	117519.75	0.51
4994.69	146.80	823742.67	117526.75	0.12
5995.40	146.80	852585.67	117520.50	0.27
6996.46	146.80	881413.33	117509.50	-0.49
9002.28	146.90	939126.33	117469.75	-1.27
10004.68	146.80	967923.00	117434.25	-0.25
303.32	165.80	689042.00	113002.50	0.97
492.50	165.90	694186.67	113010.00	-0.72
3005.21	165.90	763520.67	113055.25	0.04
4994.67	165.90	818745.33	113066.25	0.21
5995.38	165.90	846580.33	113067.00	0.07
6996.44	165.90	874446.00	113064.75	0.06
9002.25	165.80	930216.00	113036.50	-0.36
10004.67	165.90	958059.00	113016.00	0.53

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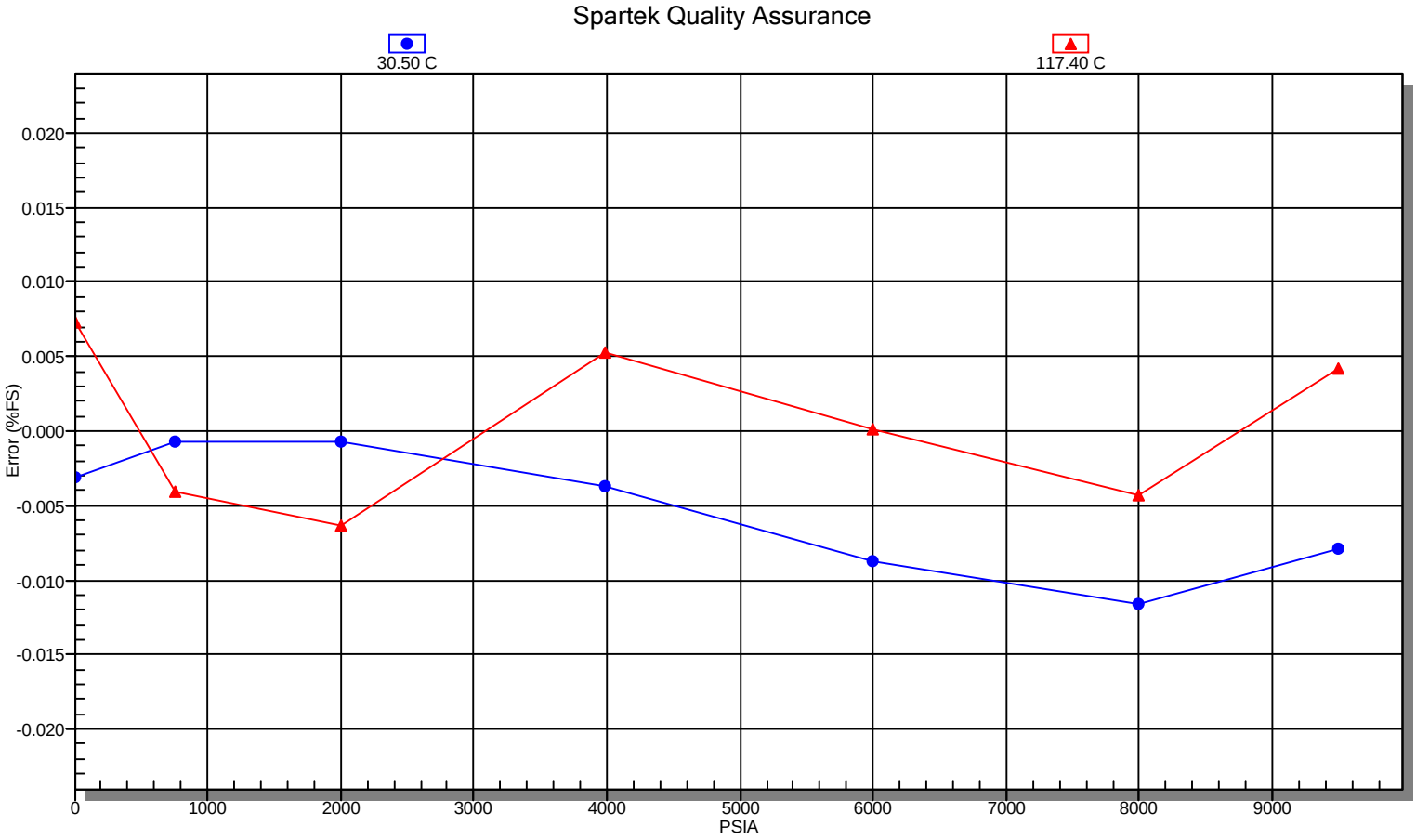
URL www.sparteksystems.com

Pressure Gauge Certificate of Conformance

SERIAL NUMBER	76404	CALIBRATION DATE	JUN 11/11
MODEL NUMBER	0 FF0	PRESSURE REFERENCE	NIST Traceable
PRESSURE RANGE	13.02 - 10004.67 psi	TEMP. REFERENCE	NIST Traceable
TEMP. RANGE	25.80 - 165.80 °C	TRACEABILITY DOC.	CAL-STANDARD-001

ACCURACY
As shown in the graph below, this Spartek Gauge conformed to within +/- 0.024 %F.S. of the pressure standard used in calibration, which is accurate to within +/- 0.01% of reading. This gives an overall accuracy of +/-(0.024%F.S. + 0.01% of reading)

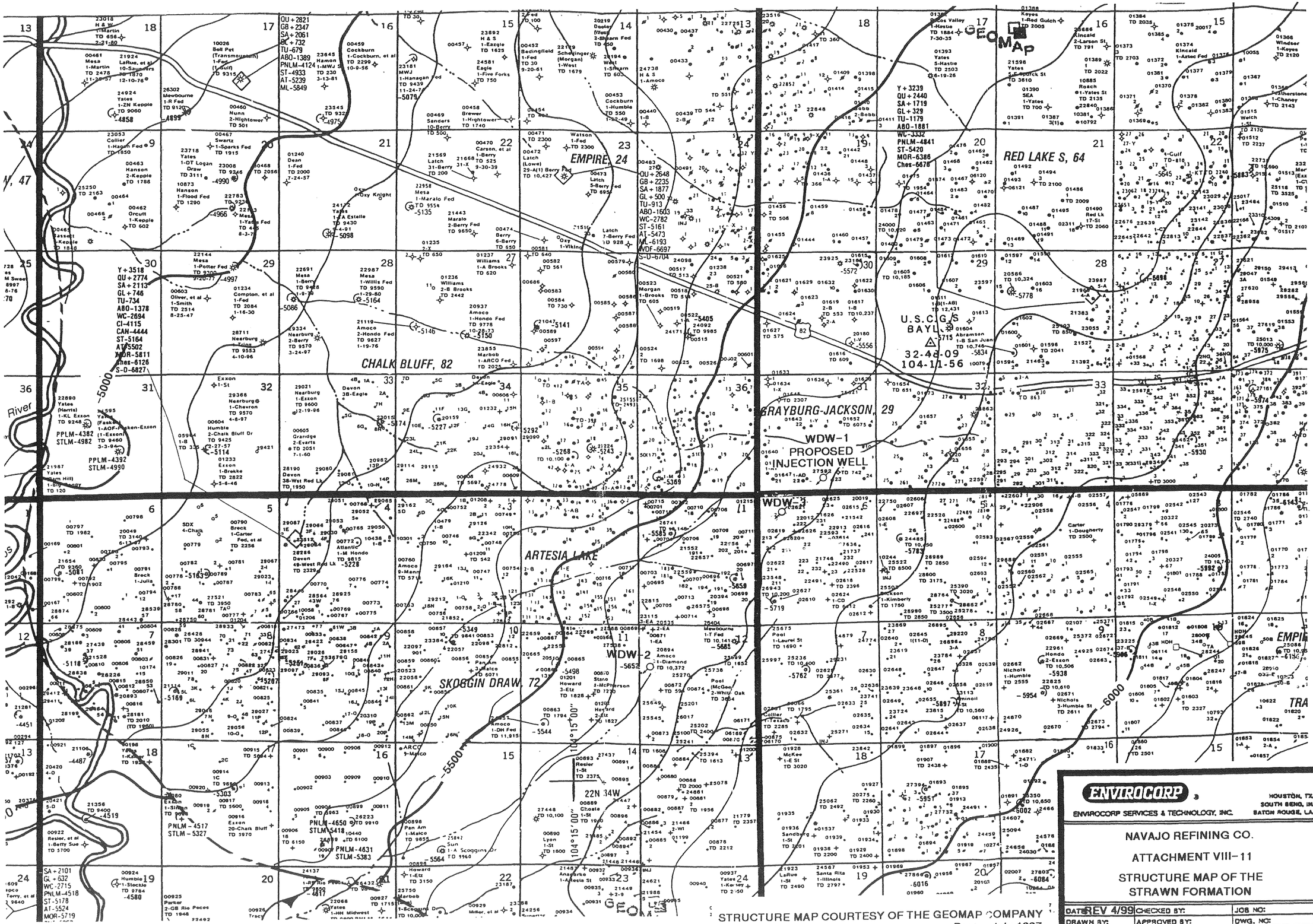


Accepted By: _____

Date: JUN 14/11

Ramp report: Serial # 76404
Gauge range = 10004.700 PSI. Max. DIFF. = 2.401
Ramp check result: PASS, Max Err = 0.012% F.S.

DW Pressure	Gauge Pressure	RPM4 Pressure	Differential	%F.S.	Oven Temp.	Gauge Temp.
9496.60	9495.81	9496.38	-0.79	0.0079	30.50	31.01
8000.40	7999.24	8000.21	-1.16	0.0116	30.60	30.69
5995.36	5994.48	5994.98	-0.88	0.0088	30.40	30.38
3992.86	3992.49	3992.50	-0.37	0.0037	30.30	30.22
2002.91	2002.85	2002.60	-0.07	0.0007	30.60	30.27
753.95	753.88	753.61	-0.07	0.0007	30.60	30.39
13.02	12.70	12.51	-0.32	0.0032	30.60	30.53
9496.60	9497.03	9496.30	0.42	0.0042	117.40	117.41
8000.41	7999.97	8000.16	-0.44	0.0044	117.50	117.35
5995.36	5995.38	5994.97	0.02	0.0002	117.50	117.29
3992.87	3993.39	3992.50	0.52	0.0052	117.60	117.39
2002.92	2002.29	2002.55	-0.63	0.0063	117.60	117.57
753.95	753.54	753.61	-0.41	0.0041	117.60	117.73
13.02	13.75	12.49	0.73	0.0073	117.80	117.87



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:	

157 ID NO.
-4025 SUBSEA DEPTH

BASE MAP COURTESY OF THE MIDLAND MAP COMPANY

ENVIROCORP

ENVIROCORP SERVICES & TECHNOLOGY, INC.

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

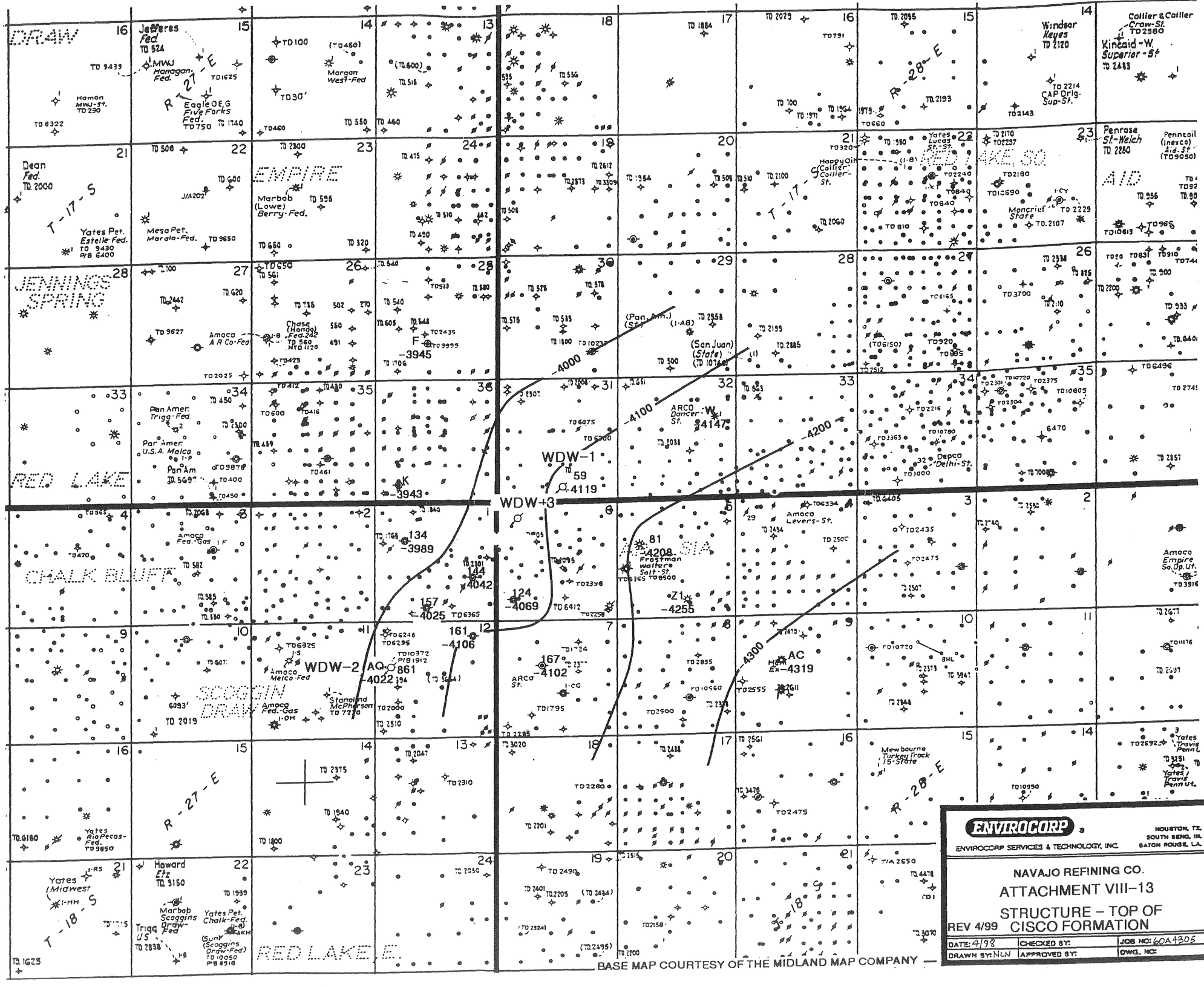
REV 4/99 NAVAJO REFINING CO.

ATTACHMENT VIII-12

STRUCTURE – TOP OF WOLFCAMP FORMATION

DATE: 4/98	CHECKED BY:	JOB NO: 60A4305
DRAWN BY: NLN	APPROVED BY:	DWG. NO:

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: 60A4305
DRAWN BY: NLN	APPROVED BY:	DWG. NO:

APPENDIX L

NAVAJO REFINING COMPANY
CHRONOLOGY OF FIELD ACTIVITIES
WDW-1, WDW-2, AND WDW-3
"MEWBOURNE", CHUKKA", AND "GAINES"

May 9, 2014

Confirmed schedule and picked up rental vehicle.

May 10, 2014

Traveled to Sweetwater, Texas.

May 11, 2014

Traveled to Roswell, New Mexico. Confirmed chart recorder pressure range, calibration and wireline to take Navajo orientation.

May 12, 2014

Traveled to Artesia, New Mexico. Attended Navajo site specific orientation. Picked up chart recorder and traveled to the Mewbourne location. Arrived on location and rigged up chart recorder; annulus pressure: ≈225 psig. Pressure up annulus to 340 psig. Start annulus pressure test at 340 psig. End annulus pressure test at 340 psig. Moved to the Gaines location. Arrived on location and rig up chart recorder; annulus pressure: ≈455 psig; bled to 350 psig. Start annulus pressure test at 350 psig. End annulus pressure test at 360 psig; move to the Chukka location. Arrived on location and rig up chart recorder; annulus pressure: ≈305 psig; pressure up annulus to 355 psig. Start annulus pressure test at 355 psig. End annulus pressure test at 355 psig. Returned to Roswell. Completed paperwork and e-mail same.

APPENDIX L

NAVAJO REFINING COMPANY
CHRONOLOGY OF FIELD ACTIVITIES
WDW-1, WDW-2, AND WDW-3
"MEWBOURNE", CHUKKA", AND "GAINES"

May 13, 2014

Traveled to the Chukka location. Arrived at the location and rig up wireline. Injection pressure: ≈1200 psi. Run into the well with tandem memory gauges. Position the gauges at 7570 feet below ground level. Moved to the Gaines location and rig up. Injection pressure: ≈1280 psi. Ran into the well with tandem memory gauges. Position the gauges at 7660 feet below ground level. Moved to the Mewbourne location and rig up. Injection pressure: ≈1020 psi. Ran into the well with tandem memory gauges. Position the gauges at 7924 feet below ground level. Traveled to San Angelo, Texas.

May 14, 2014

Traveled to Houston, Texas.

June 26, 2014

Traveled to Roswell, New Mexico from Houston, Texas.

June 27, 2014

Traveled from Roswell, New Mexico to Navajo Refinery and obtained work permit. Traveled to Chukka WDW-2 location, met with Pro-Well Testing and rig up. Set Gauges at 7570 feet. Traveled to Gaines WDW-3 Location, and rigged up. Set gauges at 7660 feet. Traveled to Mewbourne WDW-1 Location, and rigged up. Set gauges at 7924 feet. Subsurface personnel confirmed with Byron Ironmonger and left location and traveled to Midland, Texas. Subsurface personnel traveled from Midland, Texas to Houston, Texas. Subsurface personnel arrived in Houston and drove to house.

APPENDIX L

NAVAJO REFINING COMPANY
CHRONOLOGY OF FIELD ACTIVITIES
WDW-1, WDW-2, AND WDW-3
"MEWBOURNE", CHUKKA", AND "GAINES"

July 1, 2014

Traveled to Roswell, New Mexico from Houston, Texas.

July 2, 2014

Traveled from Roswell, New Mexico to Navajo Refinery and obtained work permit. Traveled to Mewbourne WDW-1 location, met with Pro-Well Testing and rig up. Waited on Lightening. Trip out of the well with the bottomhole pressure tool. Moved to Gaines WDW-3 location. Tripped out of the well with the bottomhole pressure tool. Move to Chukka WDW-2 location. Remove BHP tool from WDW-2. Make 5-minute static gradient stops at 7000 feet, 6000 feet, 5000 feet, 4000 feet, 3000 feet, 2000 feet, 1000 feet, and at the surface. Tag Total Depth at 8773 feet. ProWell Testing rigged down and moved off location. Subsurface personnel confirmed with Byron Ironmonger and left location and traveled to Midland, Texas. Subsurface personnel arrived in Houston and drove to house.

Company	Navajo Refining Company
Location	Artesia, New Mexico
Well	Gaines Well No. 3
Date	August 25 - 28, 2014
Gauge Type / Serial Number	Spartek / 76404
Guage Depth	7660 feet
Injection Interval	7660 feet to 8620 feet
Completion Type	Perforated
Top of Fill	8946 feet
Analyst	TLJ
Subsurface Project No.	185818-7039

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	4351.636919 psia
Temperature	0.000000 deg F

Well Parameters Data

	Gaines Well No. 3
Well radius	0.3246 ft
Distance from observation to active well	0.000000 ft
Wellbore storage coefficient	0.099119 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 1 Model Data

Layer 1 Model Type : Radial homogeneous

	Layer 1
Permeability	727.95358 md
Skin factor (Well 1)	10.526754

Rate Change Data

Time Hours	Pressure psia	Rate STB/day
-15226.267500	735.393634	-2319.090000
-15202.267500	869.306539	-4322.390000
-15178.267500	876.293403	-4347.540000
-15154.267500	901.156049	-4660.700000
-15130.267500	885.616539	-4480.700000
-15106.267500	873.921009	-4302.010000
-15082.267500	848.678588	-4068.760000
-15058.267500	850.259607	-4111.550000
-15034.267500	864.993752	-4287.420000
-15010.267500	844.398435	-3921.610000
-14986.267500	845.534493	-4040.930000
-14962.267500	872.177486	-4317.370000
-14938.267500	857.940567	-4163.300000
-14914.267500	845.529051	-3974.960000
-14890.267500	837.396528	-3907.050000
-14866.267500	807.551796	-3390.400000
-14842.267500	788.880498	-3145.250000
-14818.267500	804.931537	-3398.790000
-14794.267500	839.400405	-3838.600000
-14770.267500	839.322627	-3856.310000
-14746.267500	856.889757	-4020.120000
-14722.267500	859.941262	-3941.850000
-14698.267500	848.670833	-3815.440000
-14674.267500	854.371528	-4006.610000
-14650.267500	840.884722	-3894.720000
-14626.267500	844.210243	-3766.430000
-14602.267500	797.317477	-3023.280000
-14578.267500	810.557349	-3295.980000
-14554.267500	837.616840	-3684.830000
-14530.267500	845.321528	-3789.940000
-14506.267500	862.915046	-4001.960000
-14482.267500	860.494734	-3891.570000
-14458.267500	860.243924	-3960.630000
-14434.267500	835.846470	-3628.790000
-14410.267500	835.841609	-3532.720000
-14386.267500	846.694213	-3718.260000
-14362.267500	830.887558	-3295.150000
-14338.267500	853.467303	-4223.510000
-14314.267500	864.395602	-4165.810000
-14290.267500	848.950579	-3573.220000
-14266.267500	863.419358	-5329.900000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-14242.267500	864.826678	-5313.520000
-14218.267500	863.432755	-4921.840000
-14194.267500	823.519444	-4761.740000
-14170.267500	860.439815	-3750.720000
-14146.267500	833.761401	-3501.040000
-14122.267500	834.095949	-3762.180000
-14098.267500	869.204167	-9337.100000
-14074.267500	873.087211	-1.1640e4
-14050.267500	872.415394	-1.1963e4
-14026.267500	847.589641	-8234.810000
-14002.267500	859.207118	-1.0748e4
-13978.267500	865.223264	-1.2319e4
-13954.267500	850.888600	-1.3353e4
-13930.267500	863.276389	-1.2224e4
-13906.267500	858.168981	-9367.590000
-13882.267500	859.388021	-1.4518e4
-13858.267500	860.603472	-1.4146e4
-13834.267500	860.242593	-1.2253e4
-13810.267500	852.086687	-1.0741e4
-13786.267500	855.817016	-3902.890000
-13762.267500	870.610706	-3541.860000
-13738.267500	870.737384	-5321.860000
-13714.267500	871.167882	-6395.250000
-13690.267500	853.245486	-4359.780000
-13666.267500	793.752604	-6273.030000
-13642.267500	854.231655	-4602.830000
-13618.267500	857.811922	-3603.930000
-13594.267500	796.614294	-2760.230000
-13570.267500	866.301389	-3790.720000
-13546.267500	868.581134	-3890.850000
-13522.267500	863.845141	-3793.240000
-13498.267500	870.309430	-3262.430000
-13474.267500	872.271701	-3472.460000
-13450.267500	861.325116	-3600.260000
-13426.267500	873.487732	-3545.280000
-13402.267500	879.290857	-2913.730000
-13378.267500	880.083044	-2307.520000
-13354.267500	872.823322	-2871.130000
-13330.267500	868.794329	-3209.110000
-13306.267500	866.766264	-2430.810000
-13282.267500	869.360417	-2447.510000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-13258.267500	872.195599	-2445.950000
-13234.267500	875.455440	-1471.500000
-13210.267500	877.217245	-1472.190000
-13186.267500	869.778125	-1236.600000
-13162.267500	872.578762	-2577.880000
-13138.267500	874.010532	-3600.900000
-13114.267500	879.503819	-3368.050000
-13090.267500	882.544155	-3488.350000
-13066.267500	868.866493	-3630.870000
-13042.267500	879.865451	-3805.520000
-13018.267500	882.287413	-3721.150000
-12994.267500	881.341664	-2570.260000
-12970.267500	879.113602	-3266.000000
-12946.267500	881.774711	-3390.830000
-12922.267500	882.678067	-3099.840000
-12898.267500	882.534433	-3536.300000
-12874.267500	882.383623	-3857.790000
-12850.267500	874.396643	-3704.310000
-12826.267500	876.300289	-3576.680000
-12802.267500	883.837444	-3679.470000
-12778.267500	875.734604	-2899.450000
-12754.267500	851.871875	-3307.810000
-12730.267500	889.815683	-3827.070000
-12705.267500	882.130264	-3704.780000
-12681.267500	884.624482	-3718.930000
-12657.267500	873.759838	-3561.560000
-12633.267500	874.171007	-3660.320000
-12609.267500	886.230151	-3771.560000
-12585.267500	876.022225	-3594.980000
-12561.267500	888.425576	-3160.900000
-12537.267500	889.582349	-3038.160000
-12513.267500	887.404861	-3400.230000
-12489.267500	884.055150	-3647.130000
-12465.267500	889.356481	-3123.990000
-12441.267500	887.577836	-3566.060000
-12417.267500	887.456655	-3099.110000
-12393.267500	886.297861	-3708.110000
-12369.267500	891.682579	-3390.930000
-12345.267500	891.599595	-3489.370000
-12321.267500	885.990799	-3346.340000
-12297.267500	894.628704	-3045.360000
-12273.267500	896.829167	-3292.060000
-12249.267500	897.223614	-3390.450000
-12225.267500	897.720831	-3484.390000
-12201.267500	893.820949	-3567.640000
-12177.267500	896.084028	-3818.700000
-12153.267500	896.593345	-3759.380000
-12129.267500	897.123898	-3796.190000
-12105.267500	892.713718	-3743.060000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-12081.267500	895.291667	-3753.610000
-12057.267500	885.851968	-3665.280000
-12033.267500	897.514873	-3968.070000
-12009.267500	894.712905	-3651.100000
-11985.267500	898.499190	-2823.840000
-11961.267500	899.178877	-2483.080000
-11937.267500	887.350000	-3036.860000
-11913.267500	873.259433	-2898.030000
-11889.267500	893.449537	-7828.890000
-11865.267500	855.817130	-6582.950000
-11841.267500	895.705095	-3758.180000
-11817.267500	896.479511	-3735.790000
-11793.267500	899.013773	-3794.980000
-11769.267500	900.844039	-3741.460000
-11745.267500	901.923495	-3719.150000
-11721.267500	903.279167	-3765.010000
-11697.267500	897.991088	-3654.520000
-11673.267500	901.833625	-3725.050000
-11649.267500	903.216549	-3687.200000
-11625.267500	903.642477	-3634.870000
-11601.267500	903.304340	-3729.290000
-11577.267500	905.610706	-3750.200000
-11553.267500	906.571528	-3660.620000
-11529.267500	907.646817	-3632.680000
-11505.267500	905.057465	-3712.780000
-11481.267500	898.922049	-3672.900000
-11457.267500	898.100984	-3609.980000
-11433.267500	902.674595	-3618.090000
-11409.267500	904.853299	-3593.850000
-11385.267500	889.464062	-2919.870000
-11361.267500	897.021931	-3552.770000
-11337.267500	899.632410	-3540.130000
-11313.267500	908.489063	-3638.710000
-11289.267500	896.494444	-3355.010000
-11265.267500	911.775174	-3616.830000
-11241.267500	914.405150	-3609.020000
-11217.267500	906.569855	-3245.890000
-11193.267500	911.066377	-3303.100000
-11169.267500	909.499363	-3373.910000
-11145.267500	916.739873	-3580.290000
-11121.267500	911.821933	-3232.880000
-11097.267500	910.778524	-3091.680000
-11073.267500	914.595718	-3126.870000
-11049.267500	919.450174	-3051.130000
-11025.267500	921.837095	-4352.910000
-11001.267500	917.332060	-3982.020000
-10977.267500	915.073493	-3796.250000
-10953.267500	919.371461	-3732.850000
-10929.267500	908.680150	-3578.260000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-10905.267500	909.947269	-3561.650000
-10881.267500	898.960711	-3417.640000
-10857.267500	905.037905	-3499.140000
-10833.267500	900.649421	-3456.290000
-10809.267500	901.857523	-3480.400000
-10785.267500	912.435243	-3579.690000
-10761.267500	898.674016	-3428.580000
-10737.267500	905.680642	-3554.210000
-10713.267500	903.346757	-4300.000000
-10689.267500	892.356015	-3699.220000
-10665.267500	906.236574	-3700.430000
-10641.267500	906.501505	-4314.220000
-10617.267500	897.918889	-7167.670000
-10593.267500	904.462217	-9823.380000
-10569.267500	900.608397	-6196.110000
-10545.267500	905.740278	-6013.780000
-10521.267500	909.615278	-7469.390000
-10497.267500	913.217419	-8030.730000
-10473.267500	906.297340	-8274.280000
-10449.267500	907.822567	-9255.270000
-10425.267500	912.875498	-9568.500000
-10401.267500	918.533333	-7333.240000
-10377.267500	927.340914	-9201.330000
-10353.267500	917.257251	-1.0014e4
-10329.267500	915.083333	-1.0239e4
-10305.267500	904.666317	-1.0631e4
-10281.267500	889.631889	-3957.960000
-10257.267500	911.775926	-3136.460000
-10233.267500	893.478935	-2932.260000
-10209.267500	900.068113	-3043.980000
-10185.267500	899.454167	-3042.180000
-10161.267500	928.366956	-3302.890000
-10137.267500	937.732755	-3463.020000
-10113.267500	900.863021	-3063.020000
-10089.267500	902.685477	-3047.330000
-10065.267500	926.781537	-3303.410000
-10041.267500	923.275174	-3305.140000
-10017.267500	933.885069	-3380.450000
-9993.267500	921.148611	-3239.400000
-9969.267500	903.119560	-2969.850000
-9945.267500	896.197914	-2955.220000
-9921.267500	856.813657	-2230.450000
-9897.267500	896.483594	-3030.910000
-9873.267500	851.620983	-2317.960000
-9849.267500	842.533042	-2168.040000
-9825.267500	845.811456	-2187.670000
-9801.267500	839.850639	-2173.500000
-9777.267500	839.308565	-2204.950000
-9753.267500	896.417535	-3052.810000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-9729.267500	937.302257	-3678.300000
-9705.267500	929.649248	-3579.000000
-9681.267500	943.147781	-3761.820000
-9657.267500	911.489007	-3285.190000
-9633.267500	916.990729	-3318.420000
-9609.267500	871.914178	-2426.360000
-9585.267500	938.845139	-3655.410000
-9561.267500	938.112616	-3578.490000
-9537.267500	855.880440	-2010.800000
-9513.267500	827.044676	-1556.070000
-9489.267500	918.215104	-3378.590000
-9465.267500	925.717014	-3318.240000
-9441.267500	886.490509	-2904.850000
-9417.267500	827.301968	-2010.750000
-9393.267500	841.311111	-2248.310000
-9369.267500	794.613599	-1224.970000
-9345.267500	789.883854	-1053.850000
-9321.267500	809.833912	-1743.050000
-9297.267500	841.013889	-2277.900000
-9273.267500	906.530669	-3204.620000
-9249.267500	913.321472	-3374.620000
-9225.267500	915.447509	-3382.570000
-9201.267500	926.723903	-3575.890000
-9177.267500	917.963021	-3515.600000
-9153.267500	912.485532	-3476.620000
-9129.267500	907.063944	-3388.660000
-9105.267500	897.821357	-3177.520000
-9081.267500	903.959896	-3335.620000
-9057.267500	908.901331	-3478.100000
-9033.267500	900.781482	-3240.230000
-9009.267500	913.281134	-3478.560000
-8985.267500	903.975347	-3299.950000
-8961.267500	928.225058	-3640.880000
-8937.267500	933.259144	-3651.510000
-8913.267500	926.556192	-3575.390000
-8889.267500	945.706482	-3753.270000
-8865.267500	940.956713	-3670.380000
-8841.267500	937.348032	-3693.570000
-8817.267500	945.541787	-3587.950000
-8793.267500	948.900093	-3460.960000
-8769.267500	941.251910	-3561.360000
-8745.267500	933.431015	-3457.060000
-8721.267500	931.249417	-3436.420000
-8697.267500	932.101970	-3441.830000
-8673.267500	929.971759	-3548.900000
-8649.267500	940.381424	-3601.470000
-8625.267500	949.482813	-3644.630000
-8601.267500	948.478067	-3638.870000
-8577.267500	948.325231	-3658.190000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-8553.267500	947.707986	-3604.570000
-8529.267500	951.509838	-3641.570000
-8505.267500	948.932349	-3575.320000
-8481.267500	950.986227	-3551.460000
-8457.267500	954.756192	-3598.090000
-8433.267500	957.991204	-3624.470000
-8409.267500	942.878238	-3377.980000
-8385.267500	957.037387	-3622.210000
-8361.267500	958.007581	-3600.000000
-8337.267500	957.696007	-3577.300000
-8313.267500	955.068866	-3536.460000
-8289.267500	956.900289	-3519.330000
-8265.267500	955.478880	-3545.340000
-8241.267500	953.182752	-3433.880000
-8217.267500	960.485764	-3448.820000
-8193.267500	962.267940	-3448.330000
-8169.267500	965.472512	-3516.780000
-8145.267500	966.838657	-3551.680000
-8121.267500	959.311632	-3552.360000
-8097.267500	954.200521	-3436.860000
-8073.267500	961.361111	-3561.180000
-8049.267500	957.245486	-3526.720000
-8025.267500	957.876852	-3468.780000
-8001.267500	956.519502	-3487.750000
-7977.267500	950.444097	-3246.490000
-7953.267500	948.799711	-3074.210000
-7929.267500	950.702139	-3190.230000
-7905.267500	939.408625	-3067.630000
-7881.267500	939.720197	-3011.660000
-7857.267500	938.104456	-2977.020000
-7833.267500	932.567245	-2838.740000
-7809.267500	933.770255	-2894.830000
-7785.267500	862.283333	-1360.710000
-7761.267500	936.528999	-2880.000000
-7737.267500	938.896178	-2865.490000
-7713.267500	927.460593	-2729.050000
-7689.267500	939.214815	-2804.580000
-7665.267500	932.962558	-2632.530000
-7641.267500	935.153588	-2623.880000
-7617.267500	934.429861	-2683.030000
-7593.267500	930.914931	-2686.440000
-7569.267500	932.805326	-2752.510000
-7545.267500	924.931942	-2544.830000
-7521.267500	923.737095	-2541.010000
-7497.267500	922.953588	-2551.460000
-7473.267500	926.112382	-2504.370000
-7449.267500	928.021821	-2594.630000
-7425.267500	928.822280	-2466.750000
-7401.267500	925.454572	-2382.070000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-7377.267500	924.786111	-2507.230000
-7353.267500	924.199711	-2331.750000
-7329.267500	883.942419	-1537.460000
-7305.267500	819.416088	-74.290000
-7281.267500	835.687268	-495.880000
-7257.267500	884.503067	-1899.900000
-7233.267500	951.378530	-3009.610000
-7209.267500	980.604167	-3310.410000
-7185.267500	959.555208	-3046.190000
-7161.267500	955.502488	-2865.060000
-7137.267500	961.308466	-2908.980000
-7113.267500	1078.532002	-4310.450000
-7089.267500	1145.907639	-5071.460000
-7065.267500	1150.084247	-5133.070000
-7041.267500	1150.108808	-5121.480000
-7017.267500	1150.082639	-5115.440000
-6994.267500	1150.088194	-5126.450000
-6970.267500	1112.727083	-4695.440000
-6946.267500	1005.495370	-2957.300000
-6922.267500	825.868576	-28.900000
-6898.267500	823.736921	-0.930000
-6874.267500	733.080266	0.000000
-6850.267500	951.274074	-2200.140000
-6826.267500	1150.141956	-5140.270000
-6802.267500	1150.280266	-5128.380000
-6778.267500	1153.610706	-5138.120000
-6754.267500	1118.469387	-4747.510000
-6730.267500	1103.528530	-4629.620000
-6706.267500	1162.989468	-5165.060000
-6682.267500	1168.564699	-5230.340000
-6658.267500	1175.073611	-5257.450000
-6634.267500	1175.087068	-5207.840000
-6610.267500	1153.028238	-4971.410000
-6586.267500	1167.359954	-5117.190000
-6562.267500	1148.490220	-4842.220000
-6538.267500	1126.189988	-4722.850000
-6514.267500	1126.280440	-4738.220000
-6490.267500	1146.351563	-4796.300000
-6466.267500	1154.007639	-4953.550000
-6442.267500	1109.403762	-4452.470000
-6418.267500	1184.581887	-5190.580000
-6394.267500	1083.102141	-4134.990000
-6370.267500	1163.215278	-5016.200000
-6346.267500	1179.857352	-5098.170000
-6322.267500	1139.378991	-4670.230000
-6298.267500	1111.906019	-4366.190000
-6274.267500	1132.371123	-4601.040000
-6250.267500	1092.406424	-4162.150000
-6226.267500	1113.067998	-4229.710000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-6202.267500	1112.149306	-4221.210000
-6178.267500	1082.529803	-3913.730000
-6154.267500	1155.644329	-4651.560000
-6130.267500	1169.124421	-4770.880000
-6106.267500	1087.293692	-3948.510000
-6082.267500	1088.811574	-3660.230000
-6058.267500	1158.134317	-4702.410000
-6034.267500	1168.671933	-4919.290000
-6010.267500	1167.885959	-4877.180000
-5986.267500	1171.430707	-4776.830000
-5962.267500	1192.201389	-5001.000000
-5938.267500	1075.921898	-3610.910000
-5914.267500	1051.479525	-3486.090000
-5890.267500	1079.220081	-3791.030000
-5866.267500	1137.082870	-4533.160000
-5842.267500	1085.981713	-4098.860000
-5818.267500	1069.191667	-3716.560000
-5794.267500	1076.725116	-3797.930000
-5770.267500	1074.776389	-3812.910000
-5746.267500	1090.000694	-4052.760000
-5722.267500	1091.704977	-3768.810000
-5698.267500	1072.859433	-3401.690000
-5674.267500	1069.814236	-3379.100000
-5650.267500	1091.118461	-3807.110000
-5626.267500	1103.042417	-3651.530000
-5602.267500	1125.165630	-3996.900000
-5578.267500	1109.385530	-3853.460000
-5554.267500	1085.375764	-3493.680000
-5530.267500	1081.720081	-3598.230000
-5506.267500	1066.515046	-3351.770000
-5482.267500	1071.750694	-3353.450000
-5458.267500	1085.820486	-3349.010000
-5434.267500	1108.459375	-3729.730000
-5410.267500	1078.213833	-3340.660000
-5386.267500	1098.350397	-3615.610000
-5362.267500	1018.255266	-2219.400000
-5338.267500	937.730037	-779.720000
-5314.267500	938.482463	-913.410000
-5290.267500	947.175963	-1876.440000
-5266.267500	942.093448	-1911.500000
-5242.267500	954.199201	-1282.210000
-5218.267500	1052.428484	-3432.190000
-5194.267500	1167.702083	-4378.220000
-5170.267500	1170.577778	-4406.570000
-5146.267500	1086.103958	-2448.390000
-5122.267500	1176.153703	-4237.410000
-5098.267500	1193.389988	-4501.130000
-5074.267500	1185.228472	-4328.860000
-5050.267500	1173.680671	-4226.270000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-5026.267500	1186.887384	-4168.790000
-5002.267500	1175.295139	-4084.570000
-4978.267500	1187.588194	-4341.060000
-4954.267500	1183.582639	-4226.640000
-4930.267500	1173.175347	-3914.260000
-4906.267500	1190.740278	-4183.090000
-4882.267500	1185.268785	-4274.280000
-4858.267500	1191.088889	-4469.960000
-4834.267500	1202.790278	-4600.830000
-4810.267500	1178.960706	-4302.220000
-4786.267500	1186.515955	-4367.610000
-4762.267500	1160.188211	-3890.200000
-4738.267500	1184.603299	-4028.170000
-4714.267500	1211.409201	-4373.560000
-4690.267500	1218.712500	-4540.040000
-4666.267500	1209.818056	-4494.600000
-4642.267500	1200.006655	-4457.880000
-4618.267500	1203.491262	-4352.120000
-4594.267500	1225.059722	-4536.210000
-4570.267500	1196.525000	-4168.890000
-4546.267500	1204.600365	-4475.390000
-4522.267500	1225.003472	-4720.770000
-4498.267500	1211.774306	-4640.840000
-4474.267500	1197.089005	-4477.990000
-4450.267500	1198.487095	-4499.470000
-4426.267500	1197.392650	-4452.580000
-4402.267500	1202.252778	-4490.880000
-4378.267500	1207.740509	-4566.640000
-4354.267500	1214.207350	-4481.000000
-4330.267500	1209.503530	-4458.570000
-4306.267500	1197.206250	-4322.620000
-4282.267500	1210.809141	-4536.980000
-4258.267500	1171.742861	-4075.230000
-4234.267500	1128.401166	-3230.520000
-4210.267500	1219.485704	-4615.130000
-4186.267500	1213.928588	-4571.870000
-4162.267500	1178.586111	-4263.040000
-4138.267500	1168.340972	-4189.330000
-4114.267500	1175.004861	-4156.180000
-4090.267500	1149.804977	-3890.540000
-4066.267500	1179.815046	-4320.090000
-4042.267500	1195.776794	-4378.620000
-4018.267500	1214.755150	-4618.870000
-3994.267500	1222.009090	-4752.310000
-3969.267500	1211.364521	-4490.870000
-3945.267500	1212.039560	-4524.190000
-3921.267500	1224.771528	-4741.470000
-3897.267500	1077.533333	-2395.360000
-3873.267500	1211.949306	-4519.540000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-3849.267500	1215.173611	-4625.560000
-3825.267500	1219.737500	-4666.940000
-3801.267500	1221.637500	-4730.350000
-3777.267500	1114.357407	-3100.530000
-3753.267500	982.684722	-1341.730000
-3729.267500	1089.619616	-2824.700000
-3705.267500	1242.563252	-4919.680000
-3681.267500	1248.753414	-4982.830000
-3657.267500	1217.704572	-4656.010000
-3633.267500	1215.613831	-4634.120000
-3609.267500	1205.336458	-4522.760000
-3585.267500	1219.331453	-4644.030000
-3561.267500	1225.001389	-4759.910000
-3537.267500	1194.459664	-4372.950000
-3513.267500	1177.759954	-4200.620000
-3489.267500	1159.869095	-4014.470000
-3465.267500	1128.170894	-3682.850000
-3441.267500	1122.611632	-3555.600000
-3417.267500	1169.566088	-4115.420000
-3393.267500	1131.572917	-3697.760000
-3369.267500	1106.735012	-3375.320000
-3345.267500	1113.470891	-3418.270000
-3321.267500	1116.999479	-3509.500000
-3297.267500	1123.254745	-3565.560000
-3273.267500	1123.625399	-3582.090000
-3249.267500	1179.720602	-4167.100000
-3225.267500	1177.376389	-4192.580000
-3201.267500	1144.353993	-3826.360000
-3177.267500	1129.750984	-3628.850000
-3153.267500	1143.345891	-3762.180000
-3129.267500	1133.663137	-3678.050000
-3105.267500	1171.699016	-4099.020000
-3081.267500	1197.878646	-4316.430000
-3057.267500	1200.036111	-4383.760000
-3033.267500	1200.151389	-4403.620000
-3009.267500	1200.000000	-4352.270000
-2985.267500	1200.002083	-4324.370000
-2961.267500	1218.782234	-4543.000000
-2937.267500	1223.199306	-4553.260000
-2913.267500	1215.366939	-4476.300000
-2889.267500	1219.529167	-4493.580000
-2865.267500	1209.843750	-4375.080000
-2841.267500	1224.572338	-4514.940000
-2817.267500	1199.869734	-4255.620000
-2793.267500	1225.000000	-4484.140000
-2769.267500	1216.193056	-4414.440000
-2745.267500	1198.384444	-4218.440000
-2721.267500	1173.408044	-3955.030000
-2697.267500	1154.014039	-3754.170000

Rate Change Data (cont)

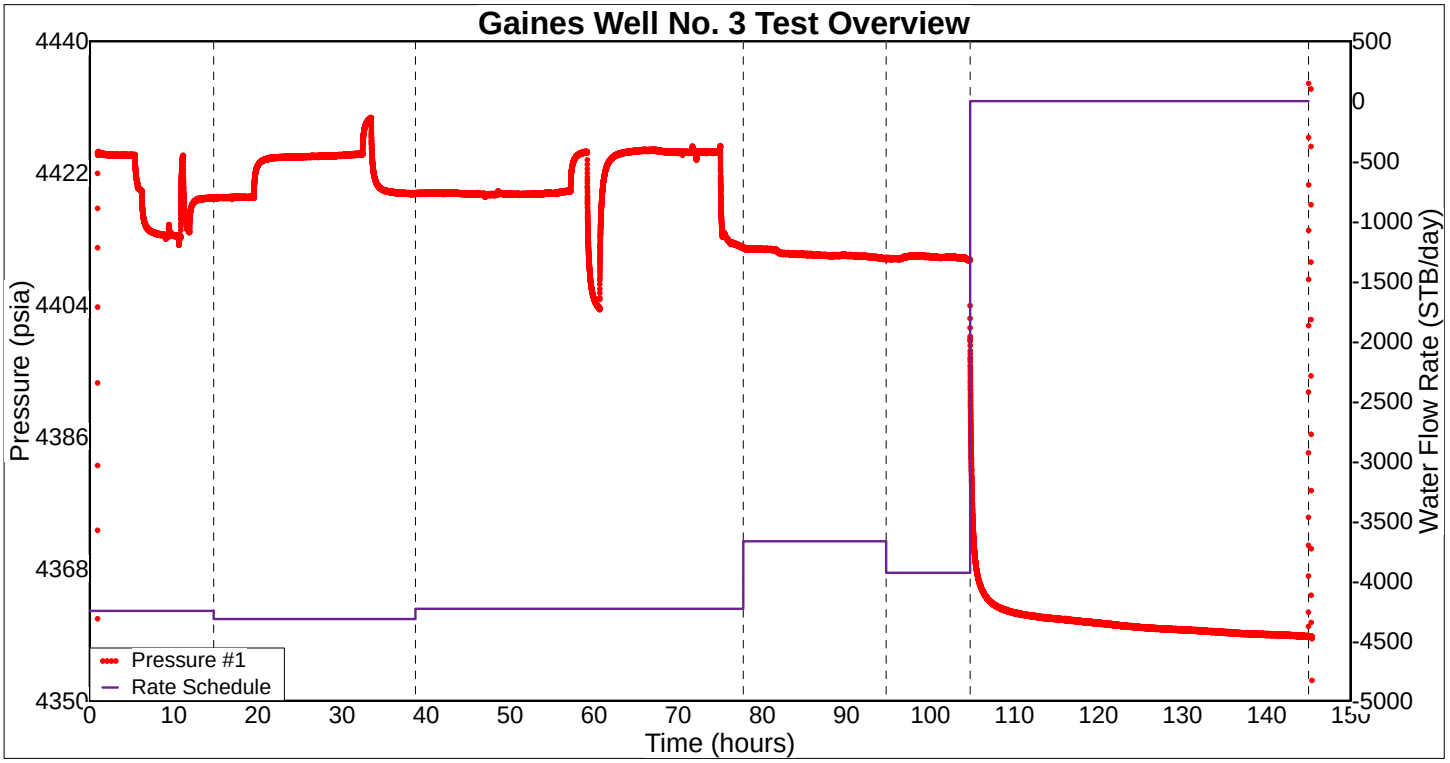
Time Hours	Pressure psia	Rate STB/day
-2673.267500	1151.307581	-3700.690000
-2649.267500	1137.605266	-3602.010000
-2625.267500	1132.020313	-3538.120000
-2601.267500	1129.387037	-3504.660000
-2577.267500	1113.048611	-3284.910000
-2553.267500	1100.073611	-3124.310000
-2529.267500	1087.486111	-2916.720000
-2505.267500	1087.069155	-2943.210000
-2481.267500	1102.241863	-3164.380000
-2457.267500	1097.961806	-3127.080000
-2433.267500	1096.693113	-3111.600000
-2409.267500	1157.422445	-3706.150000
-2385.267500	1177.697799	-3920.720000
-2361.267500	1088.940104	-2451.750000
-2337.267500	963.744965	-374.020000
-2313.267500	961.658044	-398.020000
-2289.267500	1083.023495	-2363.930000
-2265.267500	1249.418461	-4789.480000
-2241.267500	1250.079861	-4803.570000
-2217.267500	1250.022917	-4783.800000
-2193.267500	1226.356655	-4477.240000
-2169.267500	1229.890567	-4515.990000
-2145.267500	1212.119560	-4304.830000
-2121.267500	1216.476389	-4367.970000
-2097.267500	1145.762326	-3617.670000
-2073.267500	1121.449595	-3332.220000
-2049.267500	1148.942766	-3659.000000
-2025.267500	1152.889757	-3713.820000
-2001.267500	1147.719444	-3645.280000
-1977.267500	1128.604282	-3451.820000
-1953.267500	1128.967824	-3480.620000
-1929.267500	1123.219850	-3342.480000
-1905.267500	1129.820445	-3413.430000
-1881.267500	1170.525793	-3894.960000
-1857.267500	1180.317766	-4005.930000
-1833.267500	1181.901678	-4002.700000
-1809.267500	1178.821817	-3924.020000
-1785.267500	1214.007234	-4225.940000
-1761.267500	1221.316782	-4397.110000
-1737.267500	1181.012569	-3889.160000
-1713.267500	1189.030671	-4011.440000
-1689.267500	1190.714468	-4029.920000
-1665.267500	1145.254572	-3433.630000
-1641.267500	1178.788600	-3926.990000
-1617.267500	1173.975579	-3821.510000
-1593.267500	1173.944155	-3858.480000
-1569.267500	1182.986400	-3944.320000
-1545.267500	1216.964873	-4285.960000
-1521.267500	1237.497512	-4445.860000

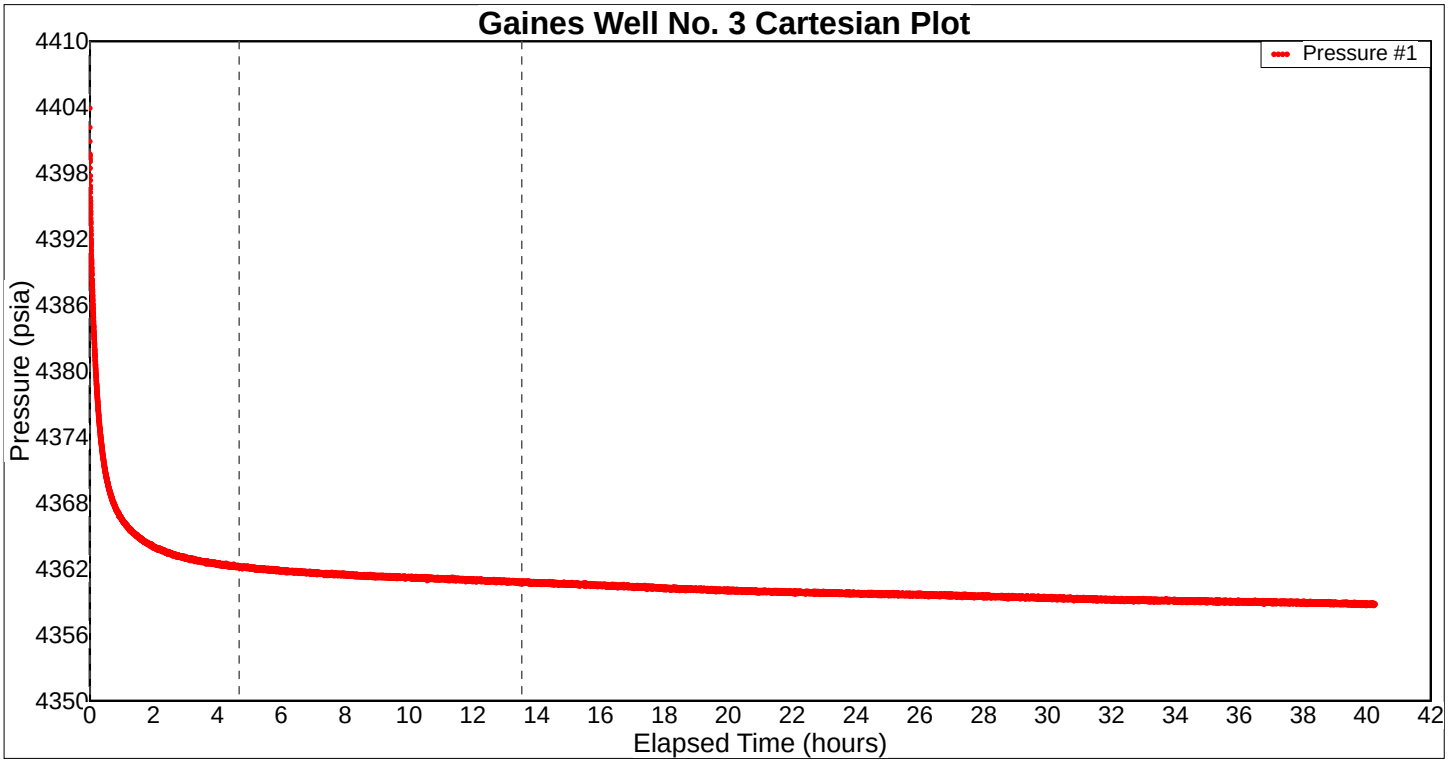
Rate Change Data (cont)

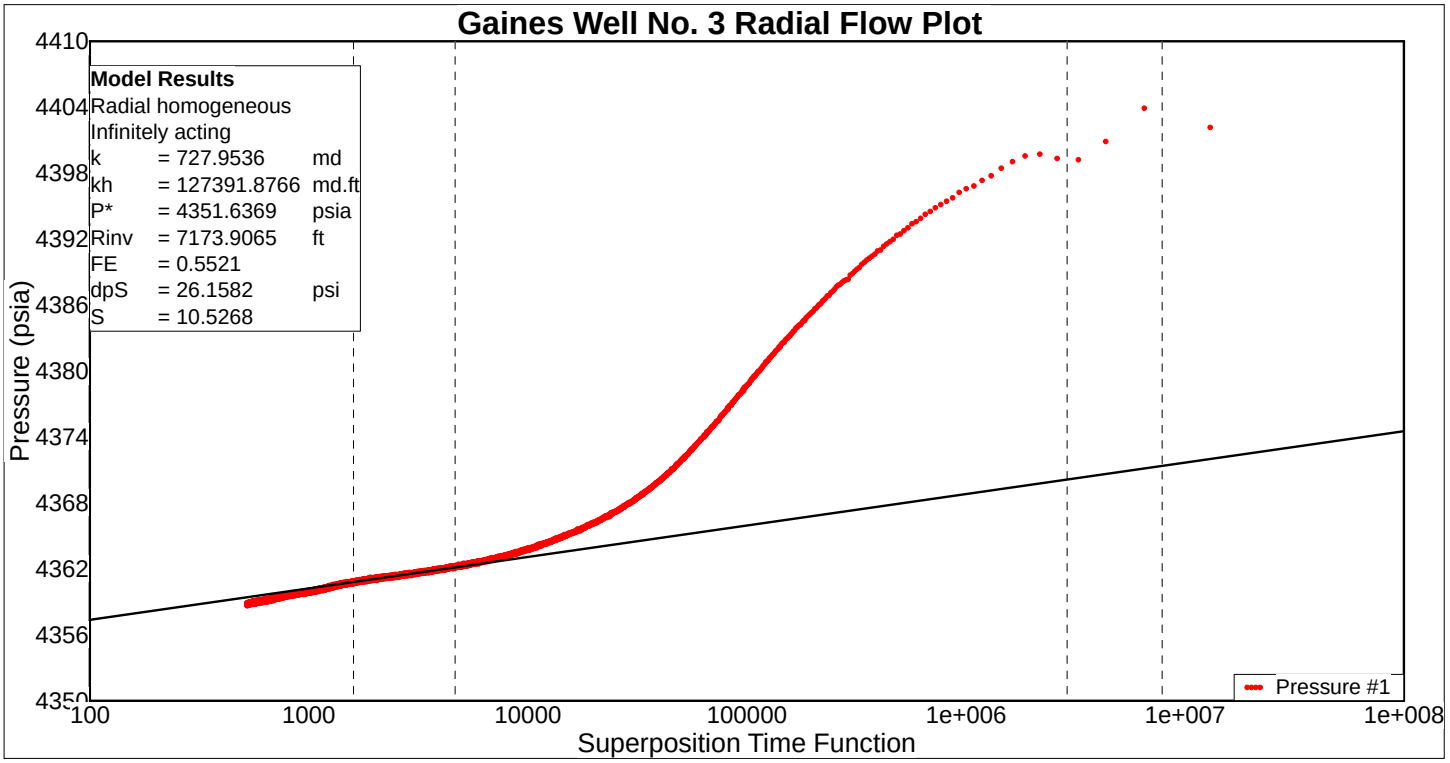
Time Hours	Pressure psia	Rate STB/day
-1497.267500	1244.893750	-4507.230000
-1473.267500	1247.109028	-4530.610000
-1449.267500	1247.540972	-4571.580000
-1425.267500	1248.720359	-4525.380000
-1401.267500	1157.636902	-3182.170000
-1377.267500	1116.333673	-2893.010000
-1353.267500	1231.739583	-4422.920000
-1329.267500	1247.837500	-4571.440000
-1305.267500	1247.300347	-4575.940000
-1281.267500	1123.259028	-2999.750000
-1257.267500	989.745370	-981.830000
-1233.267500	987.041088	-503.540000
-1209.267500	1073.932292	-2081.420000
-1185.267500	1250.045139	-4741.550000
-1161.267500	1241.293056	-4640.290000
-1137.267500	1242.366958	-4633.730000
-1113.267500	1237.307347	-4504.850000
-1089.267500	1243.902778	-4597.260000
-1065.267500	1250.026386	-4664.260000
-1041.267500	1250.012502	-4658.120000
-1017.267500	1244.918750	-4602.360000
-993.267500	1239.051389	-4507.800000
-969.267500	1246.622222	-4556.090000
-945.267500	1246.592361	-4573.080000
-921.267500	1239.092361	-4379.330000
-897.267500	1243.176042	-4486.780000
-873.267500	1250.034722	-4546.190000
-849.267500	1240.200002	-4433.250000
-825.267500	1242.412498	-4447.000000
-801.267500	1250.070139	-4560.440000
-777.267500	1246.984722	-4588.490000
-753.267500	1249.534722	-4598.520000
-729.267500	1250.002083	-4542.970000
-705.267500	1250.001389	-4534.100000
-681.267500	1250.002083	-4520.130000
-657.267500	1262.780845	-4651.880000
-633.267500	1275.007639	-4776.330000
-609.267500	1275.015625	-4788.110000
-585.267500	1270.063889	-4709.470000
-561.267500	1275.019444	-4738.910000
-537.267500	1263.540683	-4609.890000
-513.267500	1274.009028	-4713.610000
-489.267500	1274.004167	-4677.620000
-465.267500	1265.863831	-4571.620000
-441.267500	1267.138889	-4619.140000
-417.267500	1261.673495	-4550.130000
-393.267500	1271.194560	-4664.850000
-369.267500	1266.754167	-4632.140000
-345.267500	1275.092361	-4723.970000

Rate Change Data (cont)

Time Hours	Pressure psia	Rate STB/day
-321.267500	1275.061111	-4696.580000
-297.267500	1275.036806	-4659.080000
-273.267500	1275.039583	-4666.400000
-249.267500	1273.130556	-4625.650000
-225.267500	1263.175000	-4530.740000
-201.267500	1256.186458	-4465.660000
-177.267500	1235.356366	-4218.400000
-153.267500	1224.526736	-4145.100000
-129.267500	1224.415972	-4148.330000
-105.267500	1225.010417	-4173.310000
-81.267500	1243.025984	-4335.800000
-57.267500	1251.120718	-4431.430000
-33.267500	1268.354977	-4614.860000
-9.267500	1253.343750	-4481.740000
14.732500	1235.232350	-4250.560000
38.732500	1240.593056	-4319.450000
77.732500	1224.730150	-4234.050000
94.732500	1219.250637	-3670.140000
104.732500	4410.036800	-3933.190000
144.982500	4358.771700	0.000000







Gaines Well No. 3 Radial Flow Plot Model Results
Radial homogeneous - Infinitely acting

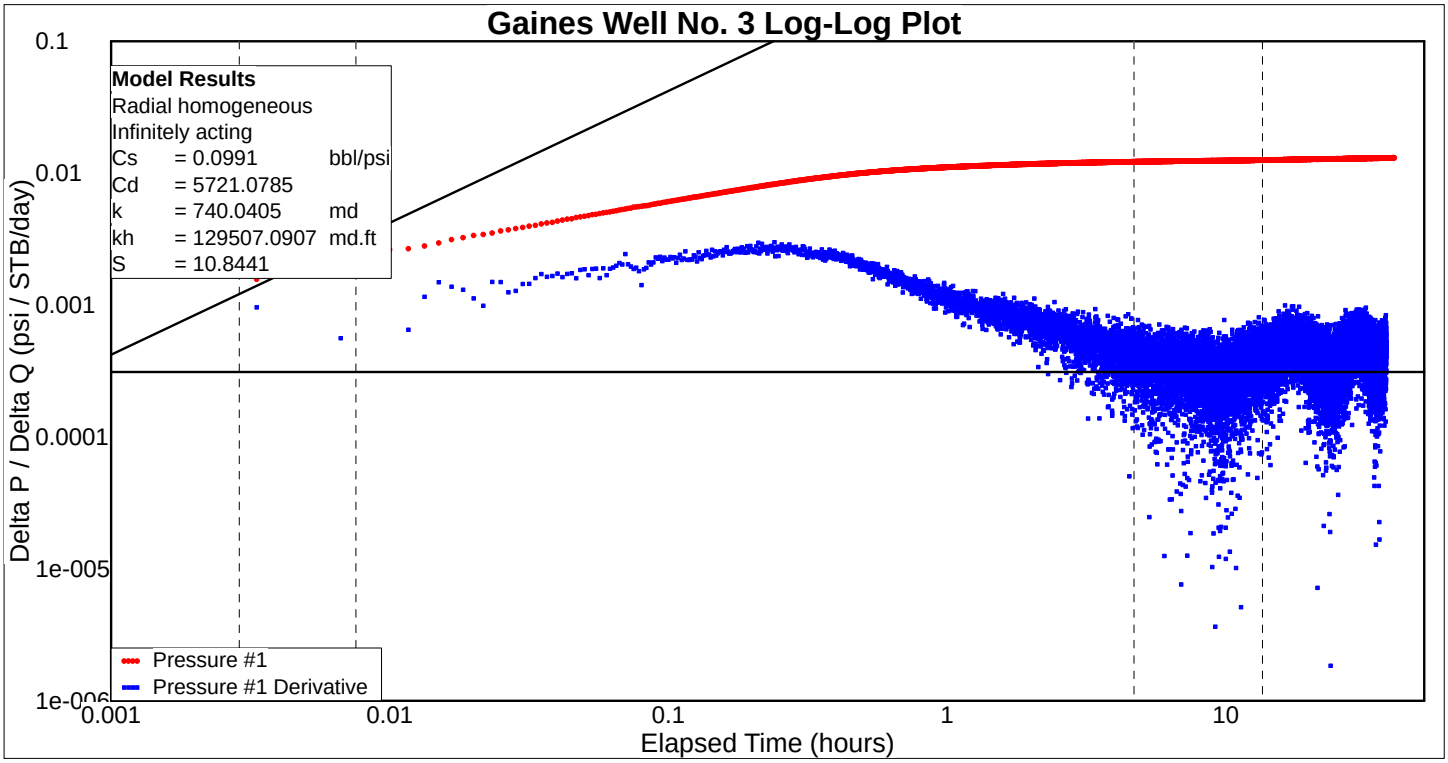
Fair Wellbore Storage

	Value
Permeability	727.95358 md
Permeability-thickness	1.2739e5 md.ft
Extrapolated pressure	4351.636919 psia
Radius of investigation	7173.906509 ft
Flow efficiency	0.552085
dP skin (constant rate)	26.158161 psi
Skin factor	10.526754

Gaines Well No. 3 Radial Flow Plot Line Details
Line type : Radial flow
Slope : 2.86087
Intercept : 4351.64
Coefficient of Determination : 0.982037

	Radial flow
Extrapolated pressure	4351.636919 psia
Pressure at dt = 1 hour	4364.048010 psia

Number of Intersections = 0



Gaines Well No. 3 Log-Log Plot Model Results
Radial homogeneous - Infinitely acting

Fair Wellbore Storage

	Value
Wellbore storage coefficient	0.099119 bbl/psi
Dimensionless wellbore storage	5721.078520
Permeability	740.040518 md
Permeability-thickness	1.2951e5 md.ft
Skin factor	10.844102

Gaines Well No. 3 Log-Log Plot Line Details
Line type : Wellbore storage
Slope : 1
Intercept : 0.420372
Coefficient of Determination : Not Used

Line type : Radial flow
Slope : 0
Intercept : 0.000310732
Coefficient of Determination : Not Used

Number of Intersections = 0