

Final Well Report

Linam AGI #2

Lea County, NM



Volume 1 of 1
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TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY	1
2.0 ORGANIZATION OF THE END OF WELL REPORT	2
3.0 PLANT DESCRIPTION AND HISTORY	3
4.0 PURPOSE AND RATIONALE FOR LINAM AGI #2	4
5.0 SYNOPSIS OF WELL DESIGN, DRILLING, AND LOGGING, AND COMPLETION.....	6
5.1 WELL DESIGN	6
5.2 WELL DRILLING.....	7
5.3 WELL LOGGING	7
5.4 WELL CASING INSTALLATIONS AND CEMENTING	7
5.4.1 Surface Casing	7
5.4.2 Upper Intermediate Casing	8
5.4.3 Lower Intermediate Casing	8
5.4.4 Production Casing.....	9
5.4.5 Packer and Tubing	10
6.0 REGIONAL AND LOCAL GEOLOGY AND HYDROGEOLOGY	11
6.1 GENERAL PHYSIOGRAPHIC SETTING	11
6.2 BEDROCK GEOLOGY	11
6.3 GROUNDWATER HYDROLOGY IN THE VICINITY OF THE INJECTION WELL	11
6.4 ANALYSES OF LITHOLOGIC AND RESERVOIR CHARACTERISTICS OF THE LOWER BONE SPRINGS FORMATION	12
6.5 OIL, GAS, AND AGI WELLS IN THE LINAM AGI #2 AREA OF REVIEW AND VICINITY	13
7.0 SELECTION OF PERFORATION ZONES.....	15
8.0 RESERVOIR CHARACTERISTICS	16
8.1 FORMATION FLUID CHEMISTRY	16
8.2 RESERVOIR TESTING.....	16
9.0 MONITORING AND MAINTENANCE.....	17

LIST OF FIGURES

Figure 4-1:	Location of DCP Midstream Linam AGI #2
Figure 5-1:	Linam AGI #2 As-built Well Schematic
Figure 6-1:	Regional Setting of Linam Plant and General Stratigraphy of the Northwest Side of the Central Basin Platform
Figure 6-2:	Identified Water Wells within One mile of Linam AGI #2
Figure 6-3:	Lower Bone Springs Target Area
Figure 6-4:	Oil, Gas, and AGI Wells within One Mile Radius of Linam AGI #2
Figure 7-1:	Comparison of Well Log Porosity Linam AGI #1 and AGI #2
Figure 7-2:	Proposed Perforation Intervals Based on Porosity and FMI
Figure 7-3:	Optimal Injection Zone in Linam AGI #2
Figure 7-4:	Additional Recommended Perforations for Linam AGI #2
Figure 8-1:	Summary of Step Rate Test, Linam AGI #2, January 15, 2015
Figure 8-2:	DCP AGI #2 Step Rate 01/15/15

LIST OF TABLES

Table 6-1:	Identified Water Wells within One Mile of Linam AGI #2
Table 6-2:	Summary of Wells Penetrating Lower Bone Springs within One
Table 6-3:	Casing and Cement Details for Wells within One Mile of Linam AGI #2 that Penetrate the Lower Bone Springs Injection Reservoir Mile of Linam AGI #2
Table 7-1:	Perforation Intervals and Thickness
Table 8-1:	Step Rate Test Data

LIST OF APPENDICES

Appendix A:	NMOCD Permits and Orders
Appendix B:	Casing Tallies
Appendix C:	Water Well Records
Appendix D:	Daily Drilling and Completion Reports from Geolex and PB Energy
Appendix E:	Well Bore and Design Specifications
Appendix F:	Open Hole Geophysical Well Logs
Appendix G:	Mud Log
Appendix H:	PB Energy Completion Program
Appendix I:	Cement Program
Appendix J:	Cement Bond Logs
Appendix K:	Perforation Shot Records
Appendix L:	Reservoir Tests
Appendix M:	H2S Contingency Plan

1.0 EXECUTIVE SUMMARY

The DCP Linam AGI #2 is located approximately 1.42 miles north of the Linam Gas Plant approximately eight miles west of Hobbs, NM. Linam AGI #2 was drilled as a redundant acid gas injection (AGI) well so that natural gas processing operations can continue during times that Linam AGI #1 may be placed out of service and/or under repair. In addition, the second well provides operational flexibility to operate both wells at once splitting flow rate and reducing surface pressures. The existing Linam AGI Facility, which will house the new well, is located on Section 30, T18S, R37E near Hobbs in Lea County, New Mexico. The Linam AGI #2 was drilled vertically at 2,120 feet from the south line and 2,120 feet from the west line of Section 30. The new well is expected to operate exactly as the Linam AGI #1 does pursuant to NMOCC Order R-12546 and its amendments.

The installation of the Linam AGI #2 was approved by the NMOCC in Order R-12546-K issued February 14, 2013, and modified administratively in January 2015 to extend allowable deadline to begin injection by August 15, 2015.

The Linam AGI #2 was spudded on October 7, 2014 and the production casing was installed and cemented on December 12, 2014. There are four casing strings completed at the following depths:

- 20-inch surface casing at 1,572 feet
- 13 3/8-inch upper intermediate casing at 3,219 feet
- 9 5/8-inch lower intermediate casing at 8,630 feet
- 7-inch production casing at 9,204 feet

The borehole cuttings and drilling fluid were monitored continuously from the bottom of the surface casing to total depth (TD) for H₂S and the air on and around the drill rig was monitored continuously at the start of drilling at the surface. No confirmable H₂S (>5 parts per million) was detected from the surface to the top of injection zone. Very low concentrations of H₂S (less than 1.5 parts per million) were detected while drilling through the injection zone interval confirming that the Linam AGI #2 is located near the outer limit of the current Linam AGI #1 injection radius.

The Linam AGI #2 production casing was perforated 8,765 to 9,006 feet (which correlates with the Linam AGI #1 injection interval) on January 10 and 11, 2015. The perforations were stimulated with 15% HCl acid and the ensuing step rate test indicated that the injection interval is significantly more than adequate to accept treated acid gas (TAG) volume and maximum allowable operating pressure (MAOP) as approved by NMOCC Order R-12546 and its amendments.

The injection tubing was installed, the well head completed, and a mechanical integrity test (MIT) on the annulus between the injection tubing and the 7-inch production casing was successfully completed on February 1, 2015. The final C-103 for the Linam AGI#2 demonstrating that the well has been successfully completed and tested pursuant to all the requirements of the NMOCC Order R-12546-K was submitted on February 13, 2015. NMOCD approval of the final C-103 was received on February 16, 2015. The H₂S contingency plan was approved on February 3, 2015 and the well will be put into service when the surface facility installation is complete.

2.0 ORGANIZATION OF THE END OF WELL REPORT

This is a final end of well report describing the permitting, design, installation, completion, testing, site remediation, and current status of the DCP Midstream Linam AGI #2 acid gas injection well. The end of well report summarizes all the data that indicates that all conditions of NMOCC Order R-12546K have been satisfied such that injection into the Linam AGI #2 can commence as soon as surface facilities are complete. This report is presented in the following categories:

- A history of the Linam AGI #2 project, including: a description of the DCP Linam AGI #2 natural gas processing plant and the need for the AGI project; a summary of the project permitting history; a basic project design and anticipated disposal volumes (Sections 3.0 and 4.0),
- A narrative discussing the rationale and technical aspects of the Linam AGI #2 design, the drilling operations, and completion (Section 5.0),
- An evaluation of regional and local geology within one mile of the Linam AGI #2 (Section 6),
- A description of the rationale used to develop the perforation, the selection of the perforation zones (Section 7),
- An evaluation of the reservoir testing (Section 8.0);
- A synopsis of operations, maintenance, and training recommended for the Linam AGI #2 (Sections 9).

In addition to figures and tables detailed above, this report includes the following supporting information:

Appendix A:	NMOCD Permits and Orders
Appendix B:	Casing Tallies
Appendix C:	Water Well Records
Appendix D:	Daily Drilling and Completion Reports from Geolex and PB Energy (description of drilling activities and specifications)
Appendix E:	Well Bore and Design Specifications
Appendix F:	Open-Hole Geophysical Well Logs
Appendix G:	Mud Logs
Appendix H:	PB Energy Completion Program
Appendix I:	Cement Programs
Appendix J:	Cement Bond Logs
Appendix K:	Perforation Shot Records
Appendix L:	Reservoir Tests
Appendix M:	H ₂ S Contingency Plan Approved for AGI Facility

3.0 PLANT DESCRIPTION AND HISTORY

The DCP Linam Gas Plant (the Plant) is located eight miles west of Hobbs, NM. The plant collects and processes approximately 156 MMSCFD of field gas from fields in the adjacent Permian Basin. The field gas is treated to remove 4.85 MMSCFD (3 % total) of acid gases, of which H₂S comprises 0.89 MMSCFD (18% acid gases) and CO₂ accounts for 4.85 MMSCFD (82% acid gases).

After physical separation to remove the associated hydrocarbon condensate and produced water, the field gas is sent to an amine sweetener to remove the H₂S and CO₂. After a final dehydration process, the gas is sent to a cryogenic plant to remove useful liquefied gases such as butane and propane. The final natural gas stream is then delivered to pipelines for sale. As originally designed and operated, the H₂S and CO₂ TAG stream was piped to a sulfur recovery unit (SRU) to reduce the H₂S to elemental sulfur, using the Claus process. The first stage of the Claus process involves oxidizing the H₂S to SO₂ using atmospheric oxygen for combustion. Due to the high percentage of CO₂ in the Treated Acid Gas (TAG) stream (82%), a significant amount of otherwise-marketable natural gas must be burned with the TAG to maintain combustion.

In effect, the SRU acted as a bottleneck in the plant's operational capacity. Additional problems included the net costs of disposal of the waste sulfur (approximately 40 tons per day), carbon emissions to the atmosphere (approximately 300 tons per day of CO₂), operational costs, and problems with environmental compliance of SO₂ limits. As the SRU at the Linam Plant neared the end of its useful life, the economics and environmental benefits of an AGI greatly outweighed the costs of replacing the SRU with a similar unit.

In 2009, DCP completed the Linam AGI #1 well to dispose of all plant generated TAG. The ability to dispose of acid gas is essential to Plant operations. Without the ability to dispose of acid gas by injection, the plant would have to be shut down and producers would have to be shut in. Given the dependence of the Linam Gas Plant on the compression facility and on the ability to inject acid gas, it was decided that a second acid gas injection well (Linam AGI #2) would also be permitted and completed to provide redundancy and assurance that the plant could continue operations should Linam AGI #1 experience a failure or need to be taken out of service for any other reason.

Additional information concerning the rationale for the expanded TAG injection facility is discussed in Section 4.0.

4.0 PURPOSE AND RATIONALE FOR LINAM AGI #2

Since the complete shutdown of the SRU pursuant to a settlement with the New Mexico Environment Department (NMED) the Linam Gas Plant is dependent on the compression facility and the ability to inject acid gas for its operation. Without the ability to dispose of acid gas by injection, the plant would have to be shut down and producers would have to be shut in.

In 2012, Geolex[®], Inc. (Geolex), on behalf of DCP Midstream LP, submitted a C-108 Application for Authorization to Inject for a second acid gas injection (AGI) well, to be located adjacent to the AGI #1 facility (Figure 4-1). The purpose of the Linam AGI #2 was to provide a redundant AGI well to allow for fall back reliability in event of required well maintenance or workover, in addition to operational flexibility to operate both wells at once. The C-108 Application for Authorization to Inject for Linam AGI #1 was approved under Order No. R-12546. Linam AGI #1 was completed in 2007 and has been operating in compliance with Division rules and Order No. R-12546, as amended, for almost seven years.

In 2011, Linam AGI #1 experienced a tubing leak failure which required cessation of acid gas injection while a workover was completed resulting in a prolonged plant shut down. DCP in conjunction with the New Mexico Oil Conservation Division (NMOCD), that a redundant or backup well, which is capable of serving as a conduit to inject into the currently approved zone is necessary to prevent unscheduled shutdowns of the plant which would have the consequence of negatively affecting many producers and the State of New Mexico.

Linam AGI #2 is located in the same section as AGI #1: Section 30, T18S, R37E, 1750 FWL and 1600 FSL. AGI #2 will be put into immediate use for acid gas injection in the event that AGI #1 needs to be taken out of operation for any reason, including casing or tubing failure, or other necessary workover or repair, keeping the plant operational while the Linam AGI #1 is temporarily out of service. During the last workover, an unsuccessful attempt was made to stack another packer above the existing packer to isolate the compromised casing. This repair will be made as soon as practicable after Linam AGI #2 is placed into operation.

DCP drilled the Linam AGI #2 to a total depth of approximately 9,234 feet and targeted the same injection zone in the Lower Bone Springs formation, the same NMOCD-approved injection interval as approved for the Linam AGI #1. Like the Linam AGI #1, the proposed Linam AGI #2 is located on the northern end of the Central Platform which is a buried structural high in the Permian Basin. In this area, the Permian Bone Springs consists of carbonate debris fans that flowed down slope from the northern edge of the Central Platform. Seismic data show that these debris fans are very thin under the Linam Plant, but thicken abruptly north of the Platform edge to the immediate north. Accordingly, the existing AGI #1 and the proposed AGI #2 are located approximately one mile north of the plant, where a far more favorable reservoir has been identified for injection.

The close proximity of AGI #2 to AGI #1, (approximately 432 feet) ensures that the proposed injection zone for Linam AGI#2 will be nearly identical to that of Linam AGI #1 (Figure 4-1). The injection reservoir selected and successfully implemented for AGI #1 and proposed AGI #2 is between approximately 8,710 and 9,137 feet below ground surface. Data analysis of the reservoir characteristics of this unit from the completion and analysis of AGI #1 confirms that this zone is an excellent closed-system reservoir that should easily accommodate the future needs of DCP for disposal of acid gas and sequestration of CO₂ from the plant.

DCP needs to safely inject up to 7.0 million standard cubic feet (MMSCF) per day of treated acid gas (TAG) for 30 years. Geologic studies conducted for the selection of this location and the performance of Linam AGI #1 demonstrate that the proposed injection zone is readily capable of accepting and containing the proposed acid gas and CO₂ injection volumes well within NMOCD's maximum allowable

injection pressures. Details on the geologic analysis and activities, along with data on the installation and operation of the existing Linam AGI # 2, can be found in the sections that follow.

5.0 SYNOPSIS OF WELL DESIGN, DRILLING, AND LOGGING, AND COMPLETION

Geolex was contracted by DCP to design, permit, and inspect drilling, testing and completion services at the Linam AGI #2; and to train DCP personnel in the operation of the Linam AGI #2 at the Compression and AGI facility. Every effort was made to safely execute the planned project operations from the drilling, to completion, and carried forward to the operation of the well.

A pre-spud meeting was held October 8, 2014. Detailed safety meetings were conducted prior to the beginning of each shift. During major service company operations such as logging, running casing, cementing, perforating, etc., mandatory safety meetings were held to discuss safe procedures and answer any questions personnel had prior to each specific job.

H₂S monitors were placed near the wellhead, inside the wellhead cellar, on the drilling deck, and in the vicinity of solids control to monitor for any possible releases of H₂S according to the driller's NMOCD-approved Rule 11 H₂S Contingency Plan. In addition, all personnel on the site had personal H₂S monitors. H₂S scavengers were added to the drilling fluids to reduce the amount of H₂S available to off-gas from the drilling mud. The mud logging gas chromatograph was set up to detect and report H₂S concentrations identified in the drilling fluids, to document these concentrations encountered in the strata, and to provide additional information for crew safety purposes.

Geolex submitted well installation documentation to the NMOCD using NMOCD Form C-103 for spud notice and to document each casing string and completion details (Appendix A). Daily Drilling and Completion Reports are included in Appendix D.

5.1 WELL DESIGN

Due to the corrosive environment in which the Linam AGI #2 is required to operate, special consideration was given to the metals used in its construction. The DCP Gas Plant providing TAG will generate approximately 7.0 MMSCF per day of acid gases that is compressed to supercritical pressures (up to 2,599 psig) prior to injection. The stream of H₂S (18.4%) and CO₂ (81.6%) is corrosive to wellheads, valves, packers, casing and tubing. Corrosion resistant alloys, or CRA's (chromium and nickel based), were thoroughly evaluated and included in the well design of all potentially impacted components in accordance with standards published by the National Association of Corrosion Engineers (NACE) guidelines.

While the injected fluid will be dehydrated, the line that conveys the TAG to the well from the compression facilities is a stainless steel line; which provides added corrosion protection. The final design for the compression facilities and associated piping and layout of H₂S alarms and other safety equipment was incorporated into a H₂S contingency plan pursuant to the requirements 19.15.11 NMAC which was approved by the NMOCD (Appendix M). The design for the Linam AGI #2 well is shown on Figure 5-1.

Linam AGI #2 is a vertical well, located on property leased by DCP Midstream from the N.M. State Land Office (NMSLO). This location allows DCP access to the primary injection zone (Lower Bone Springs). The well was drilled vertically to a final total depth of 9,200 feet. A 30-inch diameter conductor casing was installed from the surface to 120 feet below ground surface (bgs) prior to the spud date. After the cement properly cured, the Linam AGI #2 was spudded, drilled, and four casing strings installed as follows (Figure 5-1).

Linam AGI #2 has four strings of telescoping casing, all cemented to the surface (Figure 5-1). Design and materials considerations include: quadruple casing through freshwater resources (Dockum and

Rustler Groups) triple cased through the Permian Salt Units (Salado and Castile Formations) and the productive units in the Artesia Group (Yates and Queen Formations); and double casing through the lost circulation zones (Grayburg Formation) to 8600 feet; and placement of SSSV and the packer. This allows for the characterization of the zone of injection, and a TD ensuring identification of the reservoirs.

An SSSV is installed on the production tubing to assure that fluid cannot flow back out of the well during an injection equipment failure event. In addition, the annular space between the production tubing and the well bore is filled with corrosion-inhibited diesel fuel as a further safety measure which is consistent with injection well designs previously approved by NMOCD for acid gas injection.

5.2 WELL DRILLING

Precision Drilling Rig #107 drilled Linam AGI #2. Rig #107 was equipped with a 5,000 psig blowout preventer and choke manifold to account for unforeseen pressures. Drilling began on October 7, 2013. The drilling was completed at TD of 9,234 feet on December 10, 2014. The borehole for the conductor casing was drilled to a depth of 120 feet and a 30-inch diameter conductor casing was installed prior to Rig #107's arrival. Precision Rig #107 drilled the surface casing with a 17 ½ inch bit to a depth of 1,585 feet and then the surface casing pilot hole was logged, and then opened to 26 inches with a 26 inch hole opener to the same depth. The borehole for the upper intermediate casing was drilled with a 17 ½-inch bit to a depth of 3,220 feet. The borehole for the lower intermediate casing was drilled with a 12 ¼-inch bit to a depth of 8,604 feet. The borehole for the production casing was drilled with an 8 ½-inch bit to a depth of 9,234 feet.

5.3 WELL LOGGING

Logging of the Linam AGI #2 consisted of mud logging and geophysical logging. Mud logging was performed by McNeese Logging starting at 600 feet prior to reaching the surface casing depth at 1,572 feet. Mud logging was continued until reaching TD. Mud logs are included in Appendix G.

Open hole geophysical logging was conducted by Schlumberger prior to installing all four casing strings (Appendix F). Schlumberger performed open-hole logging of the upper intermediate open borehole from 1,572 feet to 3,220 feet; and the lower intermediate was e-logged from 3,220 feet to 8,604 feet. Schlumberger logged the production casing from 8,604 feet to 9,234 feet.

5.4 WELL CASING INSTALLATIONS AND CEMENTING

The casing tally for each casing string is included in Appendix B. A schematic of the Linam AGI #2 well design is in Figure 5-1 and Appendix E. Schlumberger designed each cementing job and performed cementing activities for each casing string and provided recommendations for the cementing job. The recommended WOC time was 48 hours for the surface casing and intermediate casing, and 72 hours for the production casing.

5.4.1 Surface Casing

The Linam AGI #2 surface casing 17 ½-inch pilot borehole was completed on Saturday, October 11, 2014 in the Magenta dolomite at 1,585 feet. Linam AGI #2 surface casing was installed on Wednesday, October 22, 2014 and was seated in the Magenta dolomite at 1,570 feet. This portion of the Magenta dolomite (formation top is approximately 1,540 feet) is below an approximately 10-foot thick shale interval well above the underlying the Salado Formation (salt) and is a competent dolomite that provides a

solid and stable casing seat. The casing was run after performing a caliper log of the well. No H₂S was encountered during drilling or completing the surface casing section. The caliper log for the 26-inch borehole was relatively straight and uniform with minor washouts above 1,150 feet, several moderate washouts above 200 feet, and centered around 480 feet and 840 feet. Below 1,150 feet the borehole is very straight and clean. The caliper log from the surface to 1,554 feet is in Appendix F. The Linam AGI #2 surface casing is constructed with 37 joints of 20-inch, 106.5#, J55, BTC to 1,572 feet.

The surface casing for the Linam AGI #2 was cemented with one stage of 969.7 bbls of class C cement with a lead yield of 1.73 and tail yield of 1.33. 235 bbls (745sks) were returned to the surface and the cement returns were witnessed onsite by NMOCD. Cement did not fall back and remained cemented to surface. WOC time is 48 hours before entering hole with drill stem and tools. No CBL was run on the surface casing due to the large casing size. No cement remediation was required by NMOCD. The cement report from Schlumberger is in Appendix I. A schematic of the Linam AGI #2 well design and the as built casing tally is included in Appendix E and Appendix B, respectively.

A pressure test on the 20-inch surface casing for DCP Linam AGI #2 with pipe and borehole near TD was completed on Saturday, October 25, 2014. Mud was circulated within the 20-inch surface casing in preparation for the pressure test. A contractor (Consider naming the contractor here) was brought on site to chart the results of the test and the test was successful.

5.4.2 Upper Intermediate Casing

The Linam AGI #2 upper intermediate casing was run on Saturday and early Sunday morning, November 1-2, 2014, and was seated in the Seven Rivers Formation at 3,220 feet. The Top of the Seven Rivers Formation was determined to be 3,148 feet based on open hole geophysical logs and the mudlog and the casing was set 72 feet below the top of the Seven Rivers Formation. The upper intermediate casing was run after performing a caliper log of the well. No H₂S was encountered during drilling or completing the upper intermediate casing section down to 3220 feet. Mud logs and geophysical logs are contained in Appendix F & G.

The caliper log for the upper intermediate (17 ½-inch) borehole indicated minor and moderate washouts throughout the salt below the surface casing starting at approximately 1,650 feet extending to 2,990 feet. Below 2,990 feet, the borehole is clean with few washouts. The caliper log from the surface to 3,220 feet is in Appendix F with the geophysical logs. The Linam AGI #2 upper intermediate casing is constructed with 78 joints of 13 3/8-inch, 68#, J55 casing from the surface to 3,220 feet.

The upper intermediate casing for the Linam AGI #2 was cemented with one stage of 457.15 bbls of class C lead cement with a lead yield of 1.93 and 238.64 bbls of class C tail cement with a yield of 1.33 for a total of 695.79 bbls of class C cement. Approximately 50 bbls of cement were returned to the surface. The cement returns were not witnessed by the NMOCD. Cement did not fall back and upper intermediate casing remained cemented to surface. The upper intermediate cement report is in Appendix I. WOC time was 24 hours after which the Blow Out Prevention Equipment (BOPE) was installed, tested and passed while isolated from the upper intermediate casing. A cement bond log was run on November 5, 2014 (Appendix J). The results of the CBL indicated the cement bond was adequate, approved by NMOCD, and no cement remediation was required. The upper intermediate casing was tested @ 800 psi for 30 minutes and passed. All results were submitted to NMOCD on a C-103 and approved.

5.4.3 Lower Intermediate Casing

The BOPE was installed on November 3, 2014 and tested on November 4, 2014. The Linam AGI #2 lower intermediate borehole reached TD at midnight on November 29, 2014 at a depth of 8,630 feet. The caliper log for the lower intermediate (12 ¼-inch) borehole indicated minor washouts from 3,220 to 4,130

feet, 5,000 to 6,500 feet, 6,850 to 7,100 feet, and 7,250 to 7,880 feet. The caliper log indicated a clean hole from 7,880 to 8,630 feet. The caliper log from 3,220 to 8,604 feet is in Appendix F. The lower intermediate borehole first log run was completed at 19:30 on November 30, 2014. The top of the Abo Formation was determined to be 7,377 feet based on open-hole geophysical logs and the mud log. Mud logs and geophysical logs are in Appendix G and F. No H₂S was encountered during drilling or completing the upper intermediate casing section down to 8,630 feet. However, at a depth from 8,440 to 8,450 feet the mud loggers detected an apparent 0.6 ppm of H₂S with the bloodhound detector. The reading could not be confirmed because the accuracy of their instrumentation is much higher than the detected concentrations (+/- 5 ppm). No additional readings were observed as the drilling continued to 8,630 feet.

The Linam AGI #2 lower intermediate casing was run starting at 07:00 December 2, 2014, after completing the logging of the open borehole. Casing was set at 8,604 feet near the base of the Abo Formation. The Linam AGI #2 lower intermediate casing is constructed with 191 joints of 9 5/8-inch, 47#, HCL 80 casing from the surface to 8,604 feet. A schematic of the Linam AGI #2 well design and the as built casing tally is in Appendix E and N.

The lower intermediate casing for the Linam AGI #2 was cemented in three stages. DV Tools were located at depths of 8098.50 feet and 5720.20 feet, and a packer was located at a depth of 5731.20 feet (See casing tally sheet Appendix B). The first stage (bottom 8,630 feet - top 8,100 feet) utilized 225 sacks of 15.6 ppg Evercrete™ cement with a yield of 1.18 cuft/sack (47 bbls). WOC time for the first stage was 30 hours. The second stage (bottom 8,098.5 feet - top 3,000 feet) utilized 620 sacks of 12 ppg TXI with a yield of 1.67 cuft/sack (184.5 bbls) for lead and 146 sacks, 13.2 ppg TXI with a yield of 1.62 cuft/sack (42.1 bbls) for tail cement. The third stage was pumped immediately after pumping the second stage (bottom 3,000 feet - top surface). It utilized 705 sacks, 12 ppg TXI with a yield of 1.68 cuft/sack (211 bbls) for lead #1 and 660 sacks, 12 ppg TXI with a yield of 1.67 cuft/sack (196.3 bbls) for Lead #2 cement. WOC time for the second and third stages was 24 hours. Seventy (70) bbls of cement were returned on the second stage and 79 bbls were returned on the third stage. The cement returns were not witnessed by the NMOCD but were photographed and included in the C-103. Cement did not fall back and the lower intermediate casing remained cemented to surface. The cement report is in Appendix I.

After WOC of 24 hours on the second and third stage, the DV Tools were drilled out and a circumferential cement bond log (CBL) was run on December 6, 2014 (Appendix J). There were some dry micro annulus primarily against the Queen Formation (about 3,830- 4,150 feet) which in this hole was logged very tight and probably resulted in some starving of fluid and less than complete cement expansion in this zone. This condition was also observed within the upper intermediate casing. In addition, the CBL for the basal portion of the hole indicated that there were intervals showing high liquids versus solids (Appendix J). It is believed that this is due to the processing of the Schlumberger USIT data. The program assigns "liquid" to all reflections of less than 2.6; where liquid is actually 2.0. This makes the basal portion of the log where this effect (primarily from 8,550 to 8,410 feet) was observed appear to have less than adequate strength; however, this is in part also due to the properties of the EverCrete™ acid resistant cement.

The 9 5/8-inch casing was successfully pressure tested and charted to 800 psi for 30 minutes and it held well. That combined with the tight dolomite the casing it is set in, demonstrates that there is a good bond throughout the overall hole. There were good cement returns to the surface on both the second and third stages. All results were submitted to NMOCD on C-103 forms and approved by NMOCD.

5.4.4 Production Casing

The Linam AGI #2 production borehole was drilled to TD (9,234 feet) at 06:16 on December 9, 2014. The caliper log for the production (8 1/2-inch) borehole indicates a clean hole with no significant washouts

from 8,630 feet to TD. A ledge is present between the bottom of the 9 5/8-inch lower intermediate casing and the total depth of the 12 1/4-borehole (8,600 to 8,630 feet). The caliper log from 8,594 to 9,234 feet is in Appendix F. The production borehole log runs (three) were completed at 06:36 on December 10, 2014.

The top of the Lower Leonard Formation was determined to be 8,811 feet and the Wolfcamp Formation was determined to be 9,041 feet based on open-hole geophysical logs and the mud log (Appendices F & G). Several small isolated H₂S detections were encountered during drilling of the production borehole from 8,696 to 9,028 feet (within the approved injection zone), as the drill bit cut through the injection zone in the Linam AGI #2 well. None of the H₂S concentrations exceeded 1.3 ppm, which is below the Bloodhound detector limit (+/- 5.0 ppm). Monitoring continued until the 7-inch production casing was set on Friday, December 12, 2014. H₂S concentrations are shown on the mudlog (Appendix G).

The Linam AGI #2 production casing was run starting at 18:30 December 11, 2014, after completing the logging of the open borehole and laying down the drill string. Casing was set at 9,204 feet in the Wolfcamp Formation (100% Dolomite – Low Porosity). The Linam AGI #2 production casing is constructed with 184 joints of 7.0", 26#, HCL 80 casing from the surface to 8,414 feet and 24 joints of 7.0 inch, 26#, 28 Cr (nickel-plated, corrosion-resistant) casing from 8,414 to 9,155 feet.

The production casing for the Linam AGI #2 was cemented in two stages. A Differential Valve (DV) Tool is located at a depth of 8,092 feet (see casing tally sheet). The first stage (bottom 9,234 feet - top 8,092 feet) utilized 207 sacks of 16.0 ppg EverCrete™ cement with a yield of 1.12 cuft/sack (approx. 41 bbls). WOC time for the first stage was more than 24 hours while circulating through DV tool to surface to clean out second stage annulus space. The second stage (bottom 8,092 feet - top surface) utilized 870 sacks of 13.2 ppg TXI with a yield of 1.34 cuft/sack (207.4 bbls) for tail. WOC time for the second stage was 24 hours. Thirty bbls of cement were returned on the second stage. The cement returns were not witnessed by the NMOCD but were photographed and submitted with the approved C-103. Cement did not fall back and the production casing remained cemented to surface. The cement report is in Appendix I. After completing the second stage cement Precision Rig #107 was released. All results were reported to, and approved by, NMOCD on C-103 forms.

5.4.5 Packer and Tubing

A work-over rig and workover string was used to complete the work on Linam AGI #2. Linam AGI #2 was treated with 35 barrels of 15% HCL which caused the well to go on-vacuum. The casing packer placed in Linam AGI #2 is built from Incaloy CRA components and was placed at 8,690 feet within the CRA 7" diameter casing. A SSSV was installed and tested with a passing result at a depth of 300 feet. The workstring was removed and new 3 1/2 inch diameter 93#/ft, SM2550, VAM TOP injection tubing was installed at a depth of 8,550 feet to 8,683 and tested with a passing result on January 26, 2015 (Appendix B). Above this special corrosion resistant tubing is the 3.1/2 inch diameter 93#/ft, L80 TS-HP tubing to the surface.

The well tree is comprised of the equipment shown in Appendix H – PB Energy Completion Program. Completion fluids consisting of 55 gal of Bactron (biocide) and 50 bbls of 10# brine, followed by a mixture of 200 gal of methanol and 1 gal of Cortron RU160 (oxygen scavenger), and then 13,000 gal of #2 dye diesel mixed with 275 gal of R2525 (corrosion inhibitor) were pumped in the annulus (backside). Once the diesel was at the surface pumping was stopped. The casing was landed in the tubing hanger and into the tubing head, the annular space was sealed off. The two Inconel control lines were placed through the tubing head and dressed out on the termination blocks. The final P/T connections were made and the Christmas tree was installed. The plug was pulled at the bottom of the tailpipe and the well is ready for acid gas injection.

6.0 REGIONAL AND LOCAL GEOLOGY AND HYDROGEOLOGY

6.1 GENERAL PHYSIOGRAPHIC SETTING

The well location is within the High Plains (Llano Estacado) physiographic province, approximately five miles north of a remnant of the Mescalero Ridge Escarpment (Nicholson & Clebsch, 1961). This area is characterized by flat topography capped by a hard caliche surface, which is covered by a thin layer of eolian sediment. Several scattered playa lakes are also prominent in the area, most of which are partially filled with sand and silt. The primary drainage direction is to the southeast via dry wash beds formed by ephemeral flow, but there are no permanent surface bodies within several miles of the well. Vegetation consists primarily of mesquite trees and short native grasses.

6.2 BEDROCK GEOLOGY

Linam AGI #2 is located on the north end of the Central Basin Platform, a buried structural high in the Permian Basin (Figure 6-1). The persistent relief of this platform throughout the deposition of Permian sediments in the larger basin greatly influenced the stratigraphy and local structure of the surrounding formations. Originally overlain by Ordovician and Mississippian deposits, the platform was draped by younger Pennsylvanian and Permian rocks, and was faulted along generally northwest-southeast and northeast-southwest normal faults. These faults continued to grow during lower Permian (Wolfcamp and Leonardian) time, before being buried by the younger Permian Guadaloupian and Ochoan series.

The Bone Springs Group (Leonardian) was deposited in this area along relatively steep slopes of the northern end of the Central Platform, and consists of relatively porous and permeable clastic carbonates, commonly in the form of debris fans from the adjacent shallow-water Abo Reef (Figure 6-1). The Abo Reef closely parallels the trend of the Central Platform, forming a narrow “fairway” west of the Linam Gas Plant. In contrast, the Bone Springs facies found west and north of the platform (in the Delaware Basin and the San Simon Channel) are not productive. This is due in part to the fact that the Bone Springs Formation is below the oil-water contact. All of the oil production within one mile of the Linam AGI #2 is from the Guadaloupian series rocks on the Central Basin Platform (San Andres/Grayburg, Glorieta, and Paddock zones), much higher stratigraphically, and east of the Abo Reef.

6.3 GROUNDWATER HYDROLOGY IN THE VICINITY OF THE INJECTION WELL

Groundwater in the area of the well site is found in shallow, unconfined aquifers hosted by the Quaternary alluvial and eolian surficial deposits, and the Tertiary Ogallala Formation. Groundwater may also occur in local, confined sandstone beds in the deeper “red beds” of the Triassic Dockum Group.

A review of the New Mexico State Engineer’s database identified 18 water wells within one mile of the Linam AGI #2 (Appendix C). Data on these water wells are summarized in Table 6-1 below, and located in Figure 6-2 and Appendix C. All of these wells are completed in very shallow units, at total depths ranging from 60 to 270 feet below ground surface in either the alluvium and/or the Ogallala Aquifer. Due to their distal locations and shallow completions, there are no potential impacts from the Linam AGI #2 well.

Table 6-1: Identified Water Wells within One Mile of Linam AGI #2

Owner	Type	UTME	UTMN	Distance (miles)	Depth Well	Depth Water
XCEL ENERGY	MON	659878	3621567	0.2525	60	50
JAMES L EVANS	IRR	659586	3621580	0.3575	185	70
MARKWEST PINNACLE LP	CPS	659398	3621041	0.38375	270	120
OLIN LYNCH	DOM	660108	3620475	0.44625	150	57
XCEL ENERGY	MON	659118	3621119	0.54938	68	50
NOBLE DRILLING COMPANY	P&A	659606	3620371	0.56125	120	65
MARCUM DRILLING COMPANY	PRO	659196	3620767	0.5625	103	45
SOUTHWESTERN PUBLIC SERVICE CO	EXP	659078	3621289	0.5775	80	60
XCEL ENERGY - MADDOX STATION	SAN	659067	3620842	0.6175	200	63
XCEL ENERGY	MON	659035	3621493	0.63125	60	50
SOUTHWESTERN PUBLIC SERVICE	IND	658994	3620960	0.64125	206	84
JIMMIE B. COOPER	IRR	661101	3621097	0.6925	166	35
AMERADA PETROLEUM CORPORATION	PRO	660016	3619973	0.755	108	35
CONTINENTAL OIL COMPANY	PRO	658779	3621565	0.7975	125	60
C/O A. H. VIESCAS EL PASO NATURAL GAS COMPANY	IND	659309	3620060	0.82125	181	70
XCEL ENERGY	MON	658677	3620972	0.83438	62	50
OSCAR BOURG DRLG. CO.	PRO	660229	3619765	0.89688	140	70
XCEL ENERGY	MON	658752	3622142	0.9825	60	50

6.4 ANALYSES OF LITHOLOGIC AND RESERVOIR CHARACTERISTICS OF THE LOWER BONE SPRINGS FORMATION

Figure 6-3 indicates the location of lower Permian faults and includes isopach contours on the Bone Springs. The net thickness falls to zero beneath the Linam Gas Plant, but thickens to over 100 feet in Section 30, approximately one mile north of the plant. Note that there are two north-dropping normal faults between the plant and the target area. Seismic data indicate that these faults were active during the deposition of the Bone Springs and enhanced the accumulation of the detrital material that formed the reservoir. There is no indication that these faults penetrate the formation overlying the Bone Springs.

A total of 19 sidewall cores were collected from the Bone Springs in Linam AGI #1. Analyses of these cores (see Final End of Well Report, DCP Midstream LLC, Linam AGI #1, September 30, 2011) show porosity ranging from 0.4 to 15.8 percent, and permeability from 0.013 to 165 milliDarcies. The lithology was primarily dolomite, locally grading into dolomitic limestone. Fossil fragments were abundant, and the major porosity was vuggy in nature, developed by diagenetic dissolution of secondary calcite.

6.5 OIL, GAS, AND AGI WELLS IN THE LINAM AGI #2 AREA OF REVIEW AND VICINITY

There are 22 recorded oil/gas wells within one mile of Linam AGI #2. Three are active oil wells and one is an active AGI well (Linam AGI #1). Eighteen are listed as plugged and abandoned. These wells are shown in Figure 6-4.

A review of the available NMOCD data regarding the wells within one mile of the Linam AGI #2 well shows that of the 22 total wells, only 3 intersect and/or penetrate the proposed injection zone in the Lower Bone Springs. Of the total 22 wells, 19 (86%) are less than 8,500 feet deep. These wells are or were targeted into the San Andres/Grayburg, Glorieta and Paddock zones. The total depths of all these wells are at least 200 feet above the Lower Bone Springs injection reservoir, which lies from 8,710 to 9,137 feet in this area.

Table 6-2 below and Figure 6-4 depict the three wells that penetrate the Lower Bone Springs in the one-mile area of review. Information on the wells in the one-mile area of review includes their total depth, production or injection interval, and current status. A review of the available data on these wells indicates that Goodwin #3 and Conoco-State #1 were dry holes and were plugged and abandoned. The third well that penetrates the Lower Bone Springs is Linam AGI #1 and it has been cased and cemented throughout, above and below the Lower Bone Springs perforated interval, effectively sealing that formation and preventing any migration of injected fluids to deeper or shallower units (Appendix E).

Table 6-2: Summary of Wells Penetrating Lower Bone Springs within One Mile of Linam AGI #2

API #	OPERATOR	SPUD DATE	PLUG DATE	TOTAL DEPTH	WELL NAME	WELL TYPE	STATUS	Producing/ Target/ Production /Injection Zone	Miles From AGI #2
3002503976	CONTINENTAL OIL	2-Jan-00	2-Jan-00	8,582	GOODWIN 003	Oil	Plugged	Goodwin Drinkard	0.855
3002521832	PENNZENERGY EXPLORATION AND PRODUCTION LLC	2-Jan-00	2-Jan-00	11,675	CONOCO-State #1	Oil	Plugged	Goodwin Drinkard	0.703
3002538576	DCP Midstream, LP	21-Oct-07	N/A	9,213	Linam AGI #1	AGI	Active	Lower Bone Springs	0.047 (432 feet)

The details of the completion and/or plugging design and construction of the three wells that penetrate the Lower Bone Springs are summarized below in Table 6-3.

Table 6-3: Casing and Cement Details for Wells within One Mile of Linam AGI #2 that Penetrate the Lower Bone Springs Injection Reservoir			
API #	302503967	3002521832	3002538576
Well Name	Goodwin-003	CONOCO-State #1	Linam-AGI#1
Status	P&A	P&A	Active AGI
Total Depth (feet)	8,582	11,675	9,213
Conductor Casing Depth (feet)	332	362	530
Intermediate Casing Depth (feet)	2,925	3,130	4,212
Long String Casing Depth (feet)	8,025 (Dry Well - Long String Casing Recovered Prior to Plugging)	NA Dry Well	9,213
Conductor Casing TOC Depth (feet)	Surface (From NMOCD Well Log)	Surface (From NMOCD Well Log)	Surface (see Linam AGI #1 EOW Rpt. Section 3.4)
Intermediate Casing TOC Depth (feet)	28 (From NMOCD Well Log)	1,000 (From NMOCD Well Log)	Surface (see Linam AGI #1 EOW Rpt. Section 3.4)
Long String Casing TOC Depth (feet)	NA Long String Casing Recovered	NA	Surface (see Linam AGI #1 EOW Rpt. Section 3.4)
Producing/Target/ Zone	Goodwin Drinkard	Goodwin Drinkard	Lower Bone Springs
Top Lower Bone Springs Injection Reservoir (Depth)	Unknown	Unknown	8,710

7.0 SELECTION OF PERFORATION ZONES

Geolex evaluated the Linam AGI #2 geophysical logs to determine which zones are adequate for perforation and injection. The geophysical logs from Linam AGI #2 were also compared to Linam AGI #1 logs (Figure 7-1). Linam AGI #2 has more of a porosity budget that can be seen on the density/neutron log and the FMI log than Linam AGI #1, particularly in the upper half of the lower Leonard, and the very base of the overlying Abo Formation.

Based on the results of the log evaluation, Geolex proposed perforation intervals for Linam AGI #2 (Figure 7-2). There is a slight depth lag between the FMI log and the other downhole logs. Picks were expanded across some of the FMI porosity. Porosity zones close to the intermediate casing seat were not considered. The zone from 8,840 feet to 8,885 feet is clearly the best injection zone in Linam AGI #2 based on the porosity and good resistivity permeability (Figure 7-3). Additional recommended perforations are shown on Figure 7-4.

The DCP Linam AGI #2 7-inch production casing was perforated in Linam AGI #2 using Schlumberger on January 10 and 11, 2015 (Appendix K). The perforations were six (6) shots per foot (spf) at 60 degree phasing in the following intervals:

Table 7-1: Perforation Intervals and Thickness	
Perforation Interval (ft)	Interval Thickness (ft)
8,765 to 8,769	4
8,795 to 8,801	7
8,817 to 8,832	15
8,840 to 8,885	45
8,925 to 8,945	20
8,956 to 8,978	22
8,995 to 9,006	11
TOTAL	124

The perforations were then stimulated with 35 barrels of 15% HCl that was injected at approximately two (2) barrels per minute. HCl acid was injected into the perforations to stimulate the injection zone and remove as much “skin” as possible prior to our injection, step rate and falloff tests. Initially the injection zone appeared tight, but good action with the acid caused the well to be on a vacuum after pumping the acid into the formation. The DTS slickline string in the hole captured the exothermic reaction data from the acid job (Appendix L). The DTS warmback data clearly shows acid reacting with the formation between 8,864 feet to 8,928 feet, but according to Schlumberger, this zone did not receive the majority of the acid treatment. The zone from 8,768 feet to 8,860 feet shows moderate acid reaction and appears to have taken most of the acid. There is a cold zone from 8,969 feet to 9,005 feet that accepted cold fluid (brine) but shows no reaction exothermically. The acid most likely did not reach the deepest injection zone.

Following the acid wash an OCD-witnessed step rate test (SRT) was performed (and submitted to NMOCD in a separate C-103 and summarized in section 9.0 of this report). The results of the test were submitted to, and approved by, NMOCD on C-103 forms.

8.0 RESERVOIR CHARACTERISTICS

8.1 FORMATION FLUID CHEMISTRY

No formation fluid sample was collected from Linam AGI #2. Drilling Linam AGI #2 consisted of drilling into an active acid gas injection reservoir which was considered too hazardous, due to the presence of high concentrations of H₂S, to collect a sample. However, in January 2008, samples of the Bone Springs formation fluid were collected from AGI #1 and analyzed. The formation fluid is sodium chloride-rich brine with total dissolved solids of 73,412 milligrams per liter. A complete copy of the analyses is included in the Final End of Well Report, DCP Midstream LLC, Linam AGI #1, September 30, 2011. The formation fluid has been further impacted by the injection of acid gas via the Linam AGI #1 since the 2008 sample was recovered. We know that H₂S was encountered, as expected, in the AGI #2 location resulting from nearly seven years of injection into the AGI #1.

8.2 RESERVOIR TESTING

Reservoir testing on the Linam AGI #2 included injection-falloff and step-rate tests in the Bone Springs PB Energy conducted a step rate test (SRT) on Linam AGI #2 beginning at 13:26 on January 15, 2015 (Figure 8-1). Bill Sonnamaker, the NMOCD Hobbs District Staff Manager, arrived an hour before the test was started to witness the test, and he remained on location until the 3rd step and assuring he was satisfied with the testing procedure.

The test design pumping rates were 1.0, 2.0, 3.0, 3.5, 4.0, 4.5 and 5.0 barrels/minute. The step rate test was stopped at 17:33 on January 15, 2015. In all, a total of 787 bbls were pumped during the step rate test. The following table shows the rate, volume maximum step pressure and duration for each step.

Step #	Rate (bbls/min)	Volume (bbls)	Max Step Pressure (psi)	Duration (min)
1	1.2	60	92	52
2	2.0	124	827	31
3	3.0	92	2044	31
4	3.5	108	3014	31
5	4.0	122	3400	30
6	4.5	117	3905	30
7	5.0	164	4319	30

A maximum surface pressure was recorded at 4,319 psig at an injection rate of five barrels per minute, and the well head pressure fell to zero within two minutes after injection ceased. The calculated formation fracture pressure is 3,318 (Figure 8-2). This pressure is well above the well's Maximum Allowed Operating Pressure (MAOP) of 2,644 psig approved in NMOCD Order R-12546-K. The step rate test verifies that Linam AGI #2 can be safely operated at the approved MAOP (Appendix L).

After the step rate test was completed, the five day pressure fall off period began. The results of the pressure fall off period indicate the geothermal profile is consistent over the reservoir interval (Appendix L). The degree of cooling of the formation at different rates indicates the injectivity of the formation. The warm-back profiles indicate the upper perforated intervals were successfully stimulated by the acid job. Most of the fluid is being taken by the formation at the interval between 8,795 feet to 8,885 feet which substantiates the results of the acid stimulation. The zone between 8,885 feet and 8,995 feet is taking very little fluid and below 8,995 feet, the formation did not take any fluid indicating the acid may have not adequately reached this depth (Appendix L).

9.0 MONITORING AND MAINTENANCE

The Linam AGI #2 Operation and Maintenance plan will be included in the End Of Well Report when provided by PB Energy.

FIGURES

- **Figure 4-1: Location of DCP Midstream Linam AGI #2**
- **Figure 5-1: Linam AGI #2 Asbuilt Well Schematic**
- **Figure 6-1: Regional Setting of Linam Plant and General Stratigraphy of the Northwest Side of the Central Basin Platform**
- **Figure 6-2: Identified Water Wells within One mile of Linam AGI #2**
- **Figure 6-3: Lower Bone Springs Target Area**
- **Figure 6-4: Oil, Gas, And AGI Wells within One Mile Radius of Linam AGI #2**
- **Figure 7-1: Comparison of Well Log Porosity Linam AGI #1 and AGI #2**
- **Figure 7-2: Proposed Perforation Intervals Based on Porosity and FMI**
- **Figure 7-3: Optimal Injection Zone in Linam AGI #2**
- **Figure 7-4: Additional Recommended Perforations for Linam AGI #2**
- **Figure 8-1: Summary of Step Rate Test, Linam AGI #2, January 15, 2015**
- **Figure 8-2: DCP AGI #2 Step Rate 01/15/15**

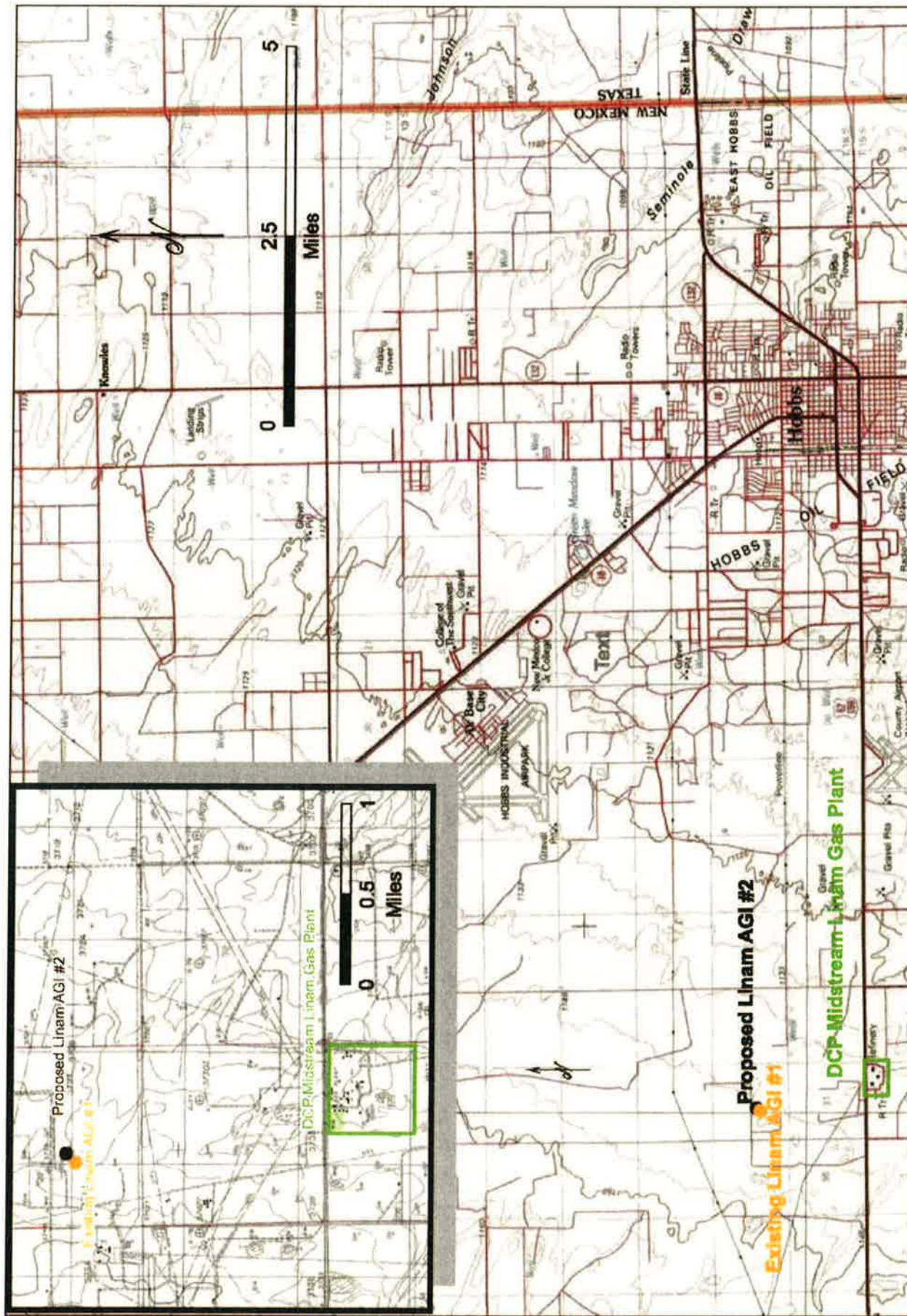
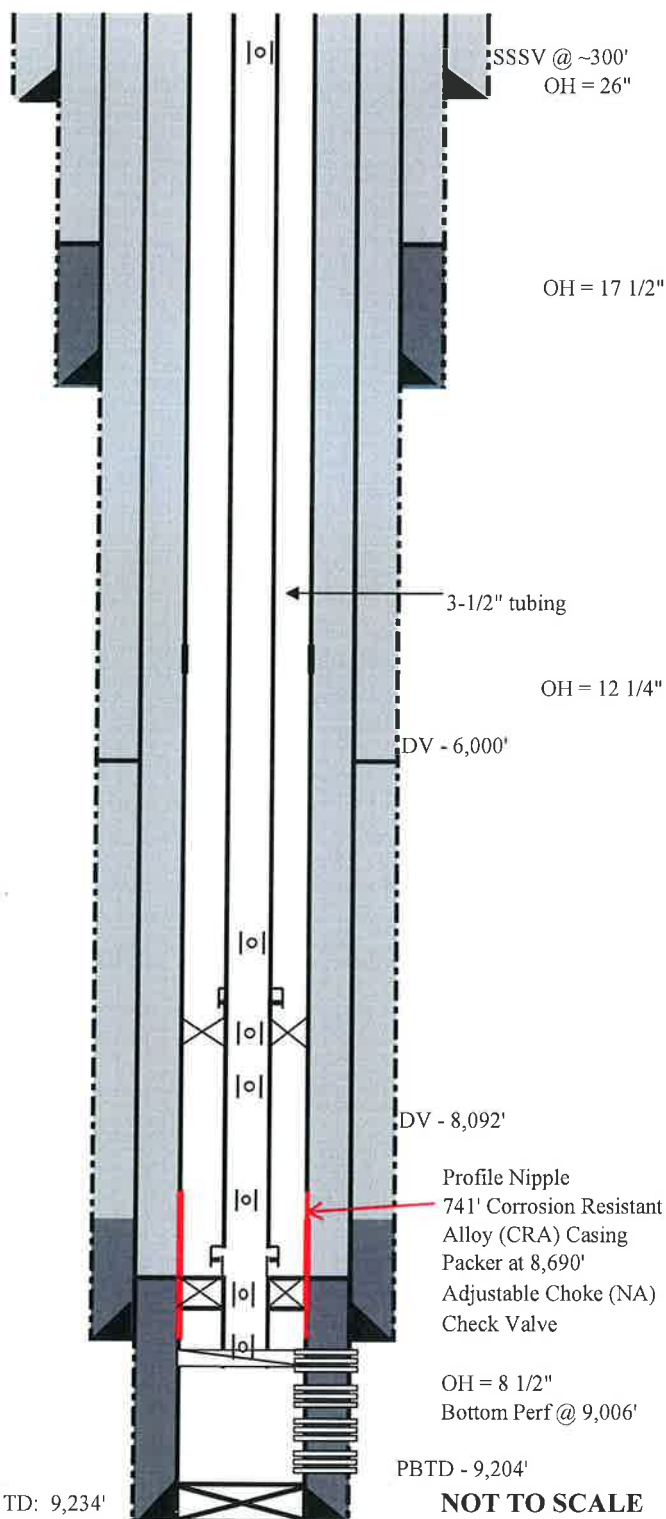


Figure 4.1: Location of DCP Midstream Linam AGI #2

FIGURE 5-1 LINAM AGI #2 ASBUILT WELL SCHEMATIC

Location: 2120 FSL & 2120' FWL
STR S30-T18S-R37E
County, St.: LEA COUNTY, NEW MEXICO



CONDUCTOR CASING

30" Conductor at 120'

SURFACE CASING

20", 106.5#, J55, BTC from surface to 1572'
Cement to surface

UPPER INTERMEDIATE CASING:

13 3/8", 68 #/ft, J55, STC at 3,219'
Cement to surface

LOWER INTERMEDIATE CASING:

9 5/8", 47 #/ft, HCL-80, LTC at 8,604'
Cement to surface

PRODUCTION CASING:

7", 26 #/ft, HCL-80, LTC to 8,414'
7", 26 #/ft, 28Cr, VAM TOP from 8,414' to 9,155'
7", 26 #/ft, HCL-80, LTC to 9,155' to 9,204'
Cement to surface

TUBING:

Subsurface Safety Valve at 300'
3 1/2", 9.3#/ft, L80 from surface to 8,550'
3 1/2", 9.3#/ft, SM2550 from 8,550 to 8,683'
Premium thread utilizing metal to metal sealing in collars

ANNULAR FLUID:

Diesel Fuel w/ biocide from top of packer to surface

BOTTOM HOLE PRESSURE/TEMPERATURE

Monitoring equipment set immediately above packer

PACKER:

Permanent injection packer with Incoloy components set in Corrosion Resistant Alloy (CRA) csg at 8,690'

PERFORATIONS:

Primary Targets:

8,765'-8,769"	8,925'-8,945'
8,795'-8,801'	8,956'-8,978'
8,817'-8,832'	8,995'-9,006'
8,840'-8,885'	

Profile Nipple
741' Corrosion Resistant Alloy (CRA) Casing
Packer at 8,690'
Adjustable Choke (NA)
Check Valve

OH = 8 1/2"
Bottom Perf @ 9,006'

PBTD - 9,204'

NOT TO SCALE

TD: 9,234'

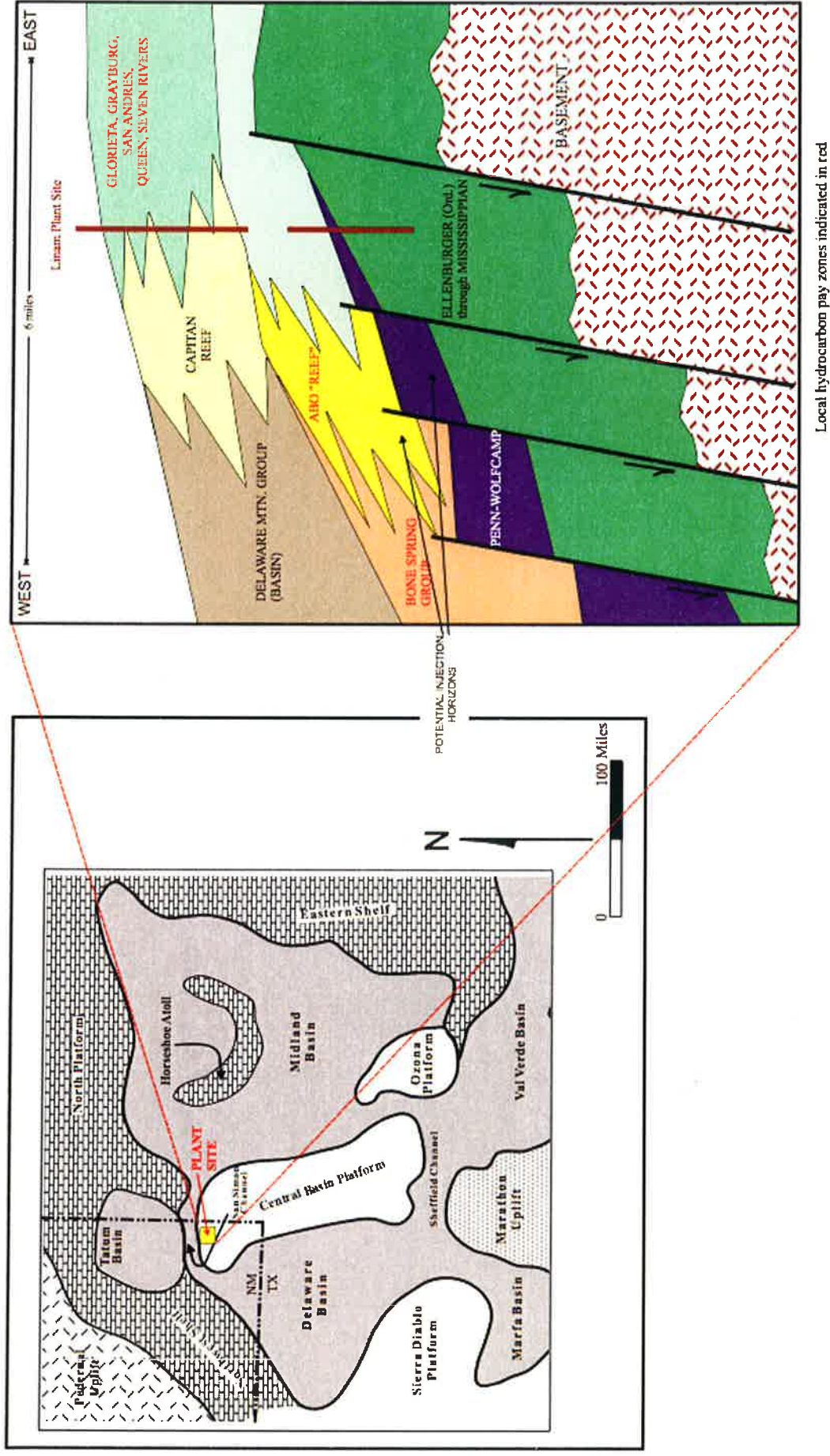


Figure 6-1 : Regional Setting of Linam Plant and General Stratigraphy of the Northwest Side of the Central Basin Platform

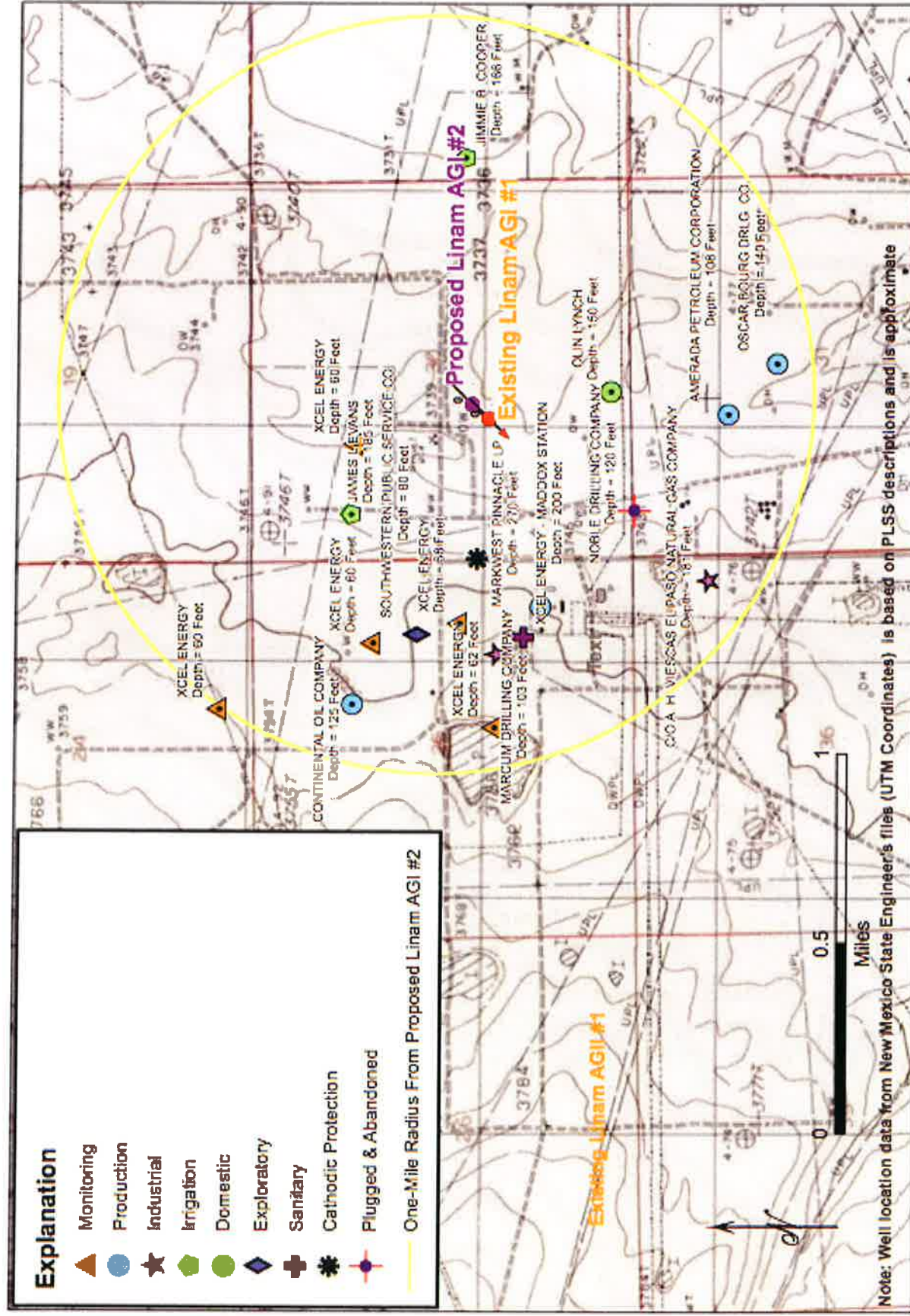


Figure 6-2
Identified Water Wells within One Mile of Linam AGI #2

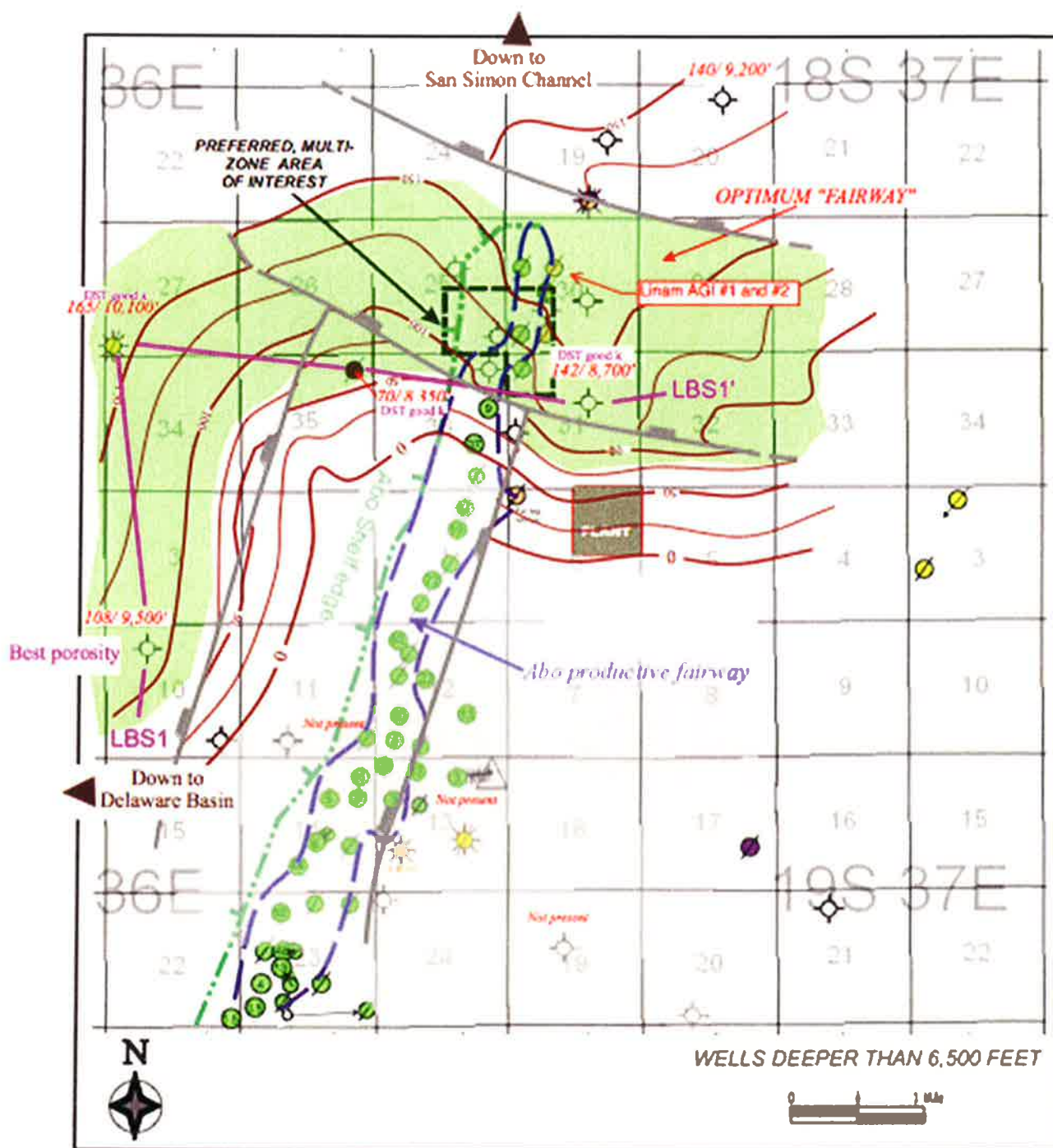


Figure 6-3
Lower Bone Springs Target Area

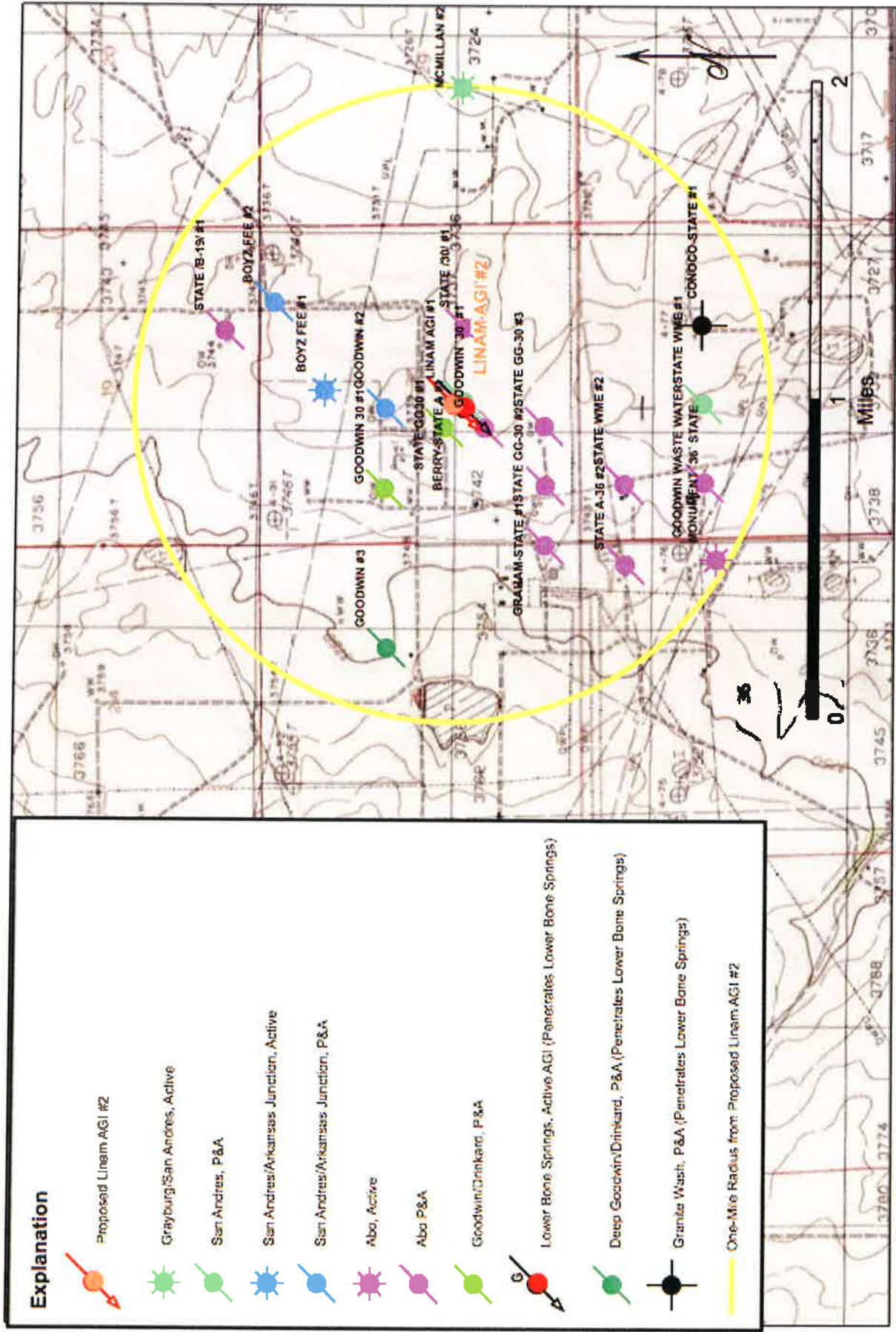
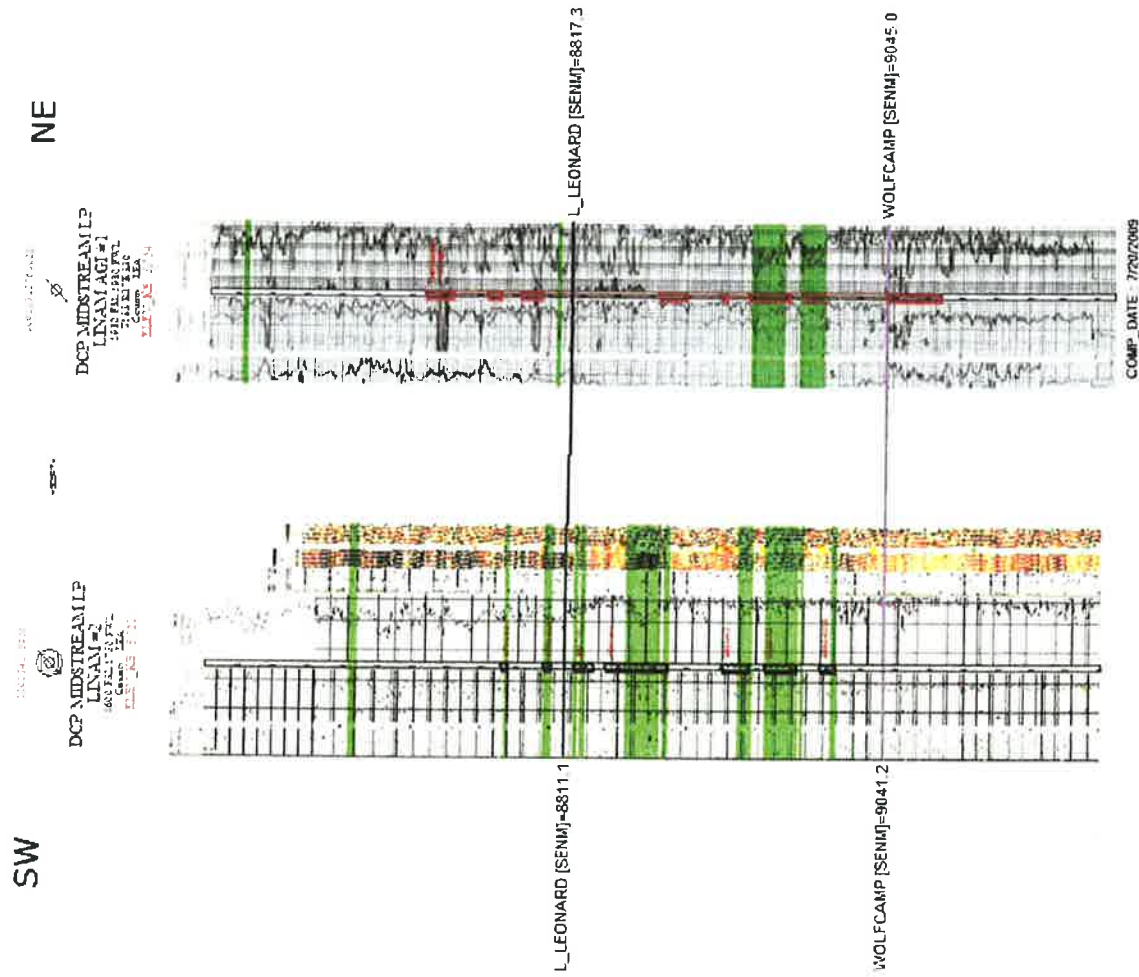


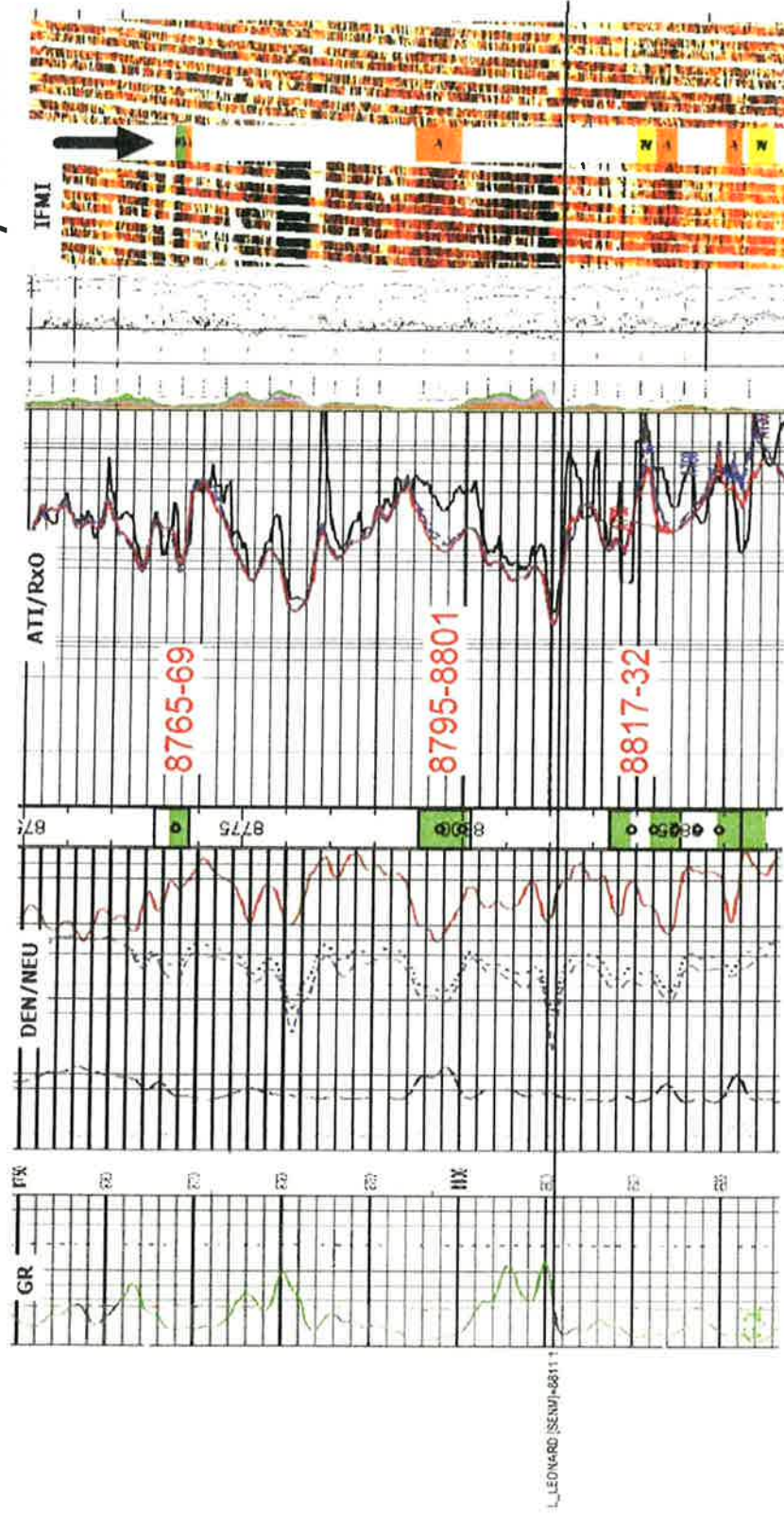
Figure 6-4
Oil, Gas, and AGI Wells Within One Mile Radius of Linam AGI #2

Figure 7-1 Comparison of Well Log Porosity Linam AGI #1 & 2



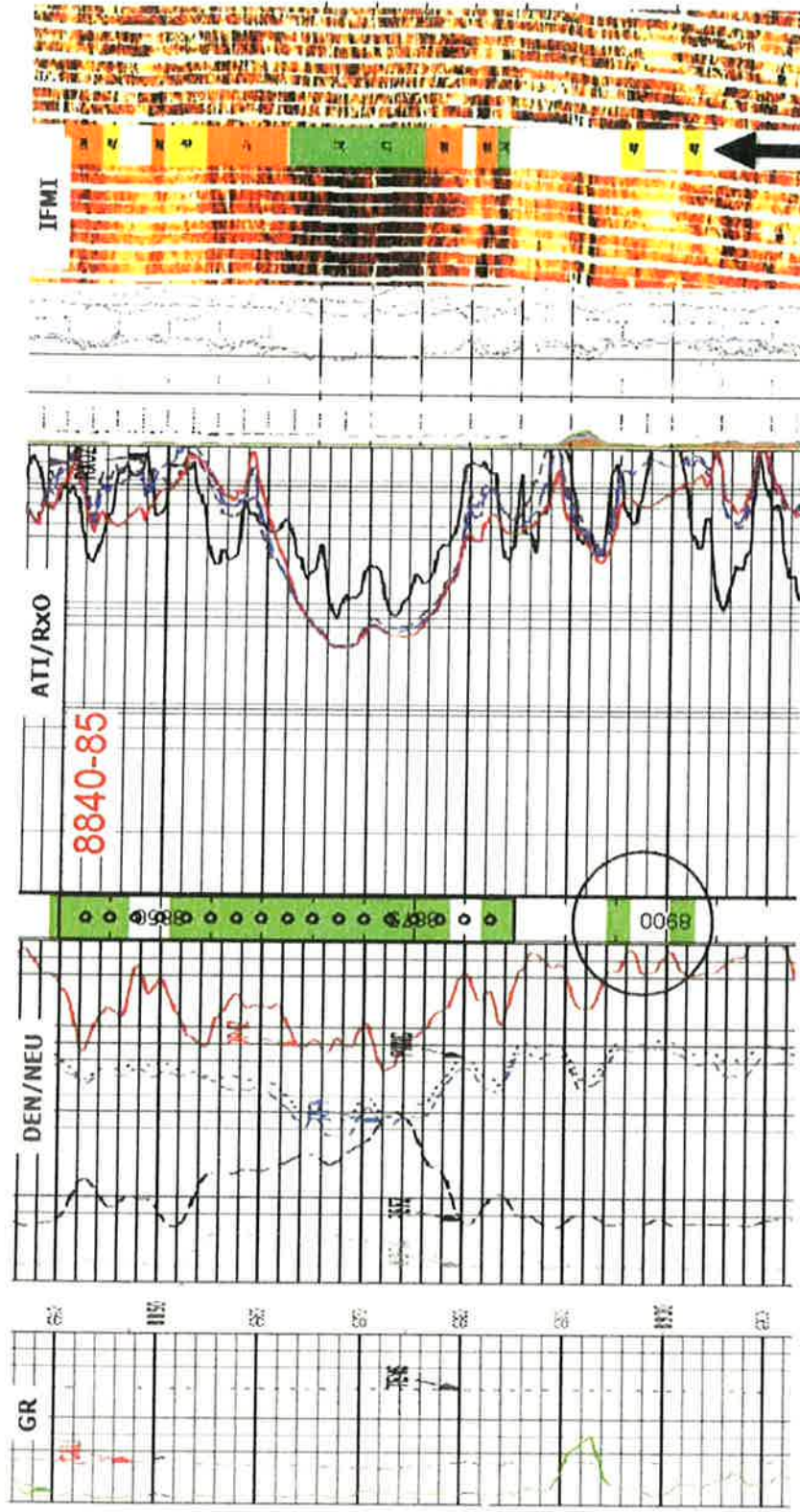
COMPARISON OF WELL LOG POROSITY (GREEN SHADING) OF THE LINAM AGI #2 WITH THE LINAM AGI #1. THE LINAM AGI #2 HAS MORE OF A POROSITY BUDGET THAT CAN BE SEEN ON THE DENSITY NEUTRON AND FMI LOGS THAN THE LINAM AGI #1, PARTICULARLY IN THE UPPER HALF OF THE LOWER LEONARD, AND AT THE VERY BASE OF THE OVERLYING ABO. PROPOSED PERFORATIONS FOR THE LINAM AGI #2 ARE SHOWN IN BLACK ON THE DEPTH TRACK, AND THE INJECTION PERFS IN THE LINAM AGI #1 ARE SHOWN IN RED.

Figure 7-2 Proposed Perforation Intervals Based on Porosity & FMI



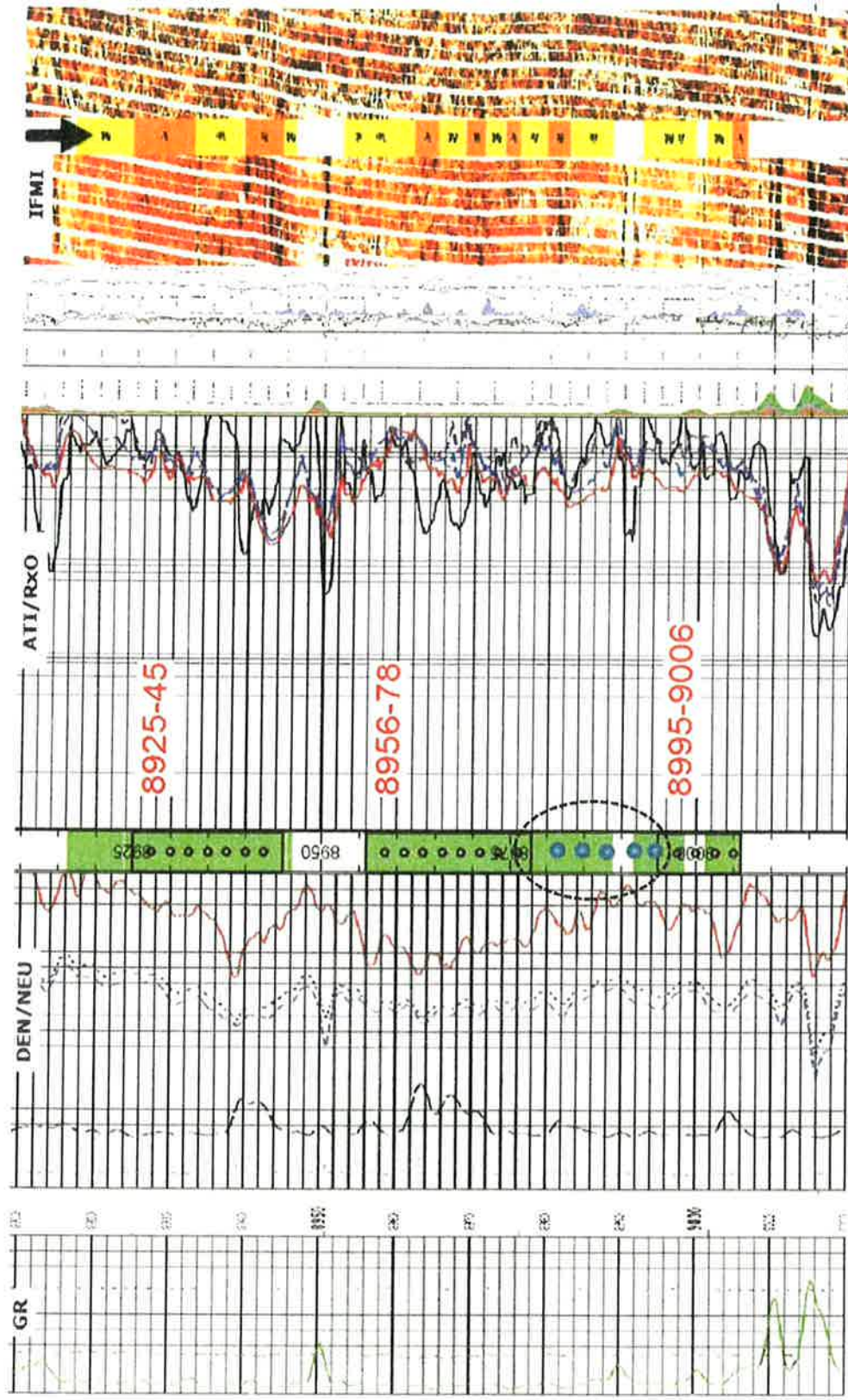
THERE IS A SLIGHT DEPTH LAG BETWEEN THE FMI LOG AND THE OTHER DOWNHOLE LOGS. ON THESE PRESENTATIONS, POROSITY FROM THE DENSITY NEUTRON + IFMI LOGS IS SHADED GREEN IN THE DEPTH TRACK. THE FMI ANALYST'S POROSITY FLAGS ARE SHOWN IN THE IFMI TRACK (ARROW), AND DON'T ALWAYS CORRESPOND TO MEASURED POROSITY ON THE DENSITY NEUTRON LOG THAT MEETS OUR 6% POROSITY CUTOFF. WE HAVE EXPANDED SOME OF OUR PICKS ACROSS SOME OF THE FLAGGED FMI POROSITY, ALTHOUGH NOT ALL OF THE ANALYST'S PICKS IF THE RESISTIVITY LOG INDICATES TIGHT ROCK. THE ZONE 8765-69 WAS ADDED AS A PERF INTERVAL, BUT THE ONLY OTHER INTERVAL HIGHER THAN THAT WAS THE ZONE THAT IS CLOSE TO THE INTERMEDIATE CASING SEAT, AND WE DO NOT INCLUDE IT AS A PROSPECTIVE INJECTION INTERVAL FOR THAT REASON.

Figure 7-3 Optimal Injection Zone in Linam AGI #2



THIS IS CLEARLY THE BEST ZONE WE HAVE IN THIS WELL, BASED ON GROSS POROSITY AND GOOD RESISTIVITY PERMEABILITY, WHICH ALSO SHOWS UP ON THE IFMI LOG. PLEASE NOTE THAT TWO THINNER POROSITY STREAKS BELOW THE MAIN ZONE (BLACK OUTLINE) ARE EXCLUDED, BECAUSE THEY LOOK TIGHT ON THE RESISTIVITY LOG (POORLY-CONNECTED BEDDING FRACTURES).

Figure 7-4 Additional Recommended Perforations in Linam AGI #2



IN THIS INTERVAL, WE EXCLUDE A NUMBER OF INTERVALS FLAGGED ON THE IFMI LOG, BUT IF IT WAS MORE EFFICIENT TO SHOOT CONTINUOUSLY FROM 8956-9006, THEN IT WOULDN'T HURT ANYTHING TO DO SO AND MAY PROVIDE SOME ADDITIONAL RESERVOIR. ON BALANCE WE WOULD RECOMMEND PERFORATING THE ENTIRE ZONE (SHOWN IN BLUE PERFORATION SYMBOLS).

Figure 8-1: Summary of Step Rate Test, Linam AGI #2, January 15, 2015

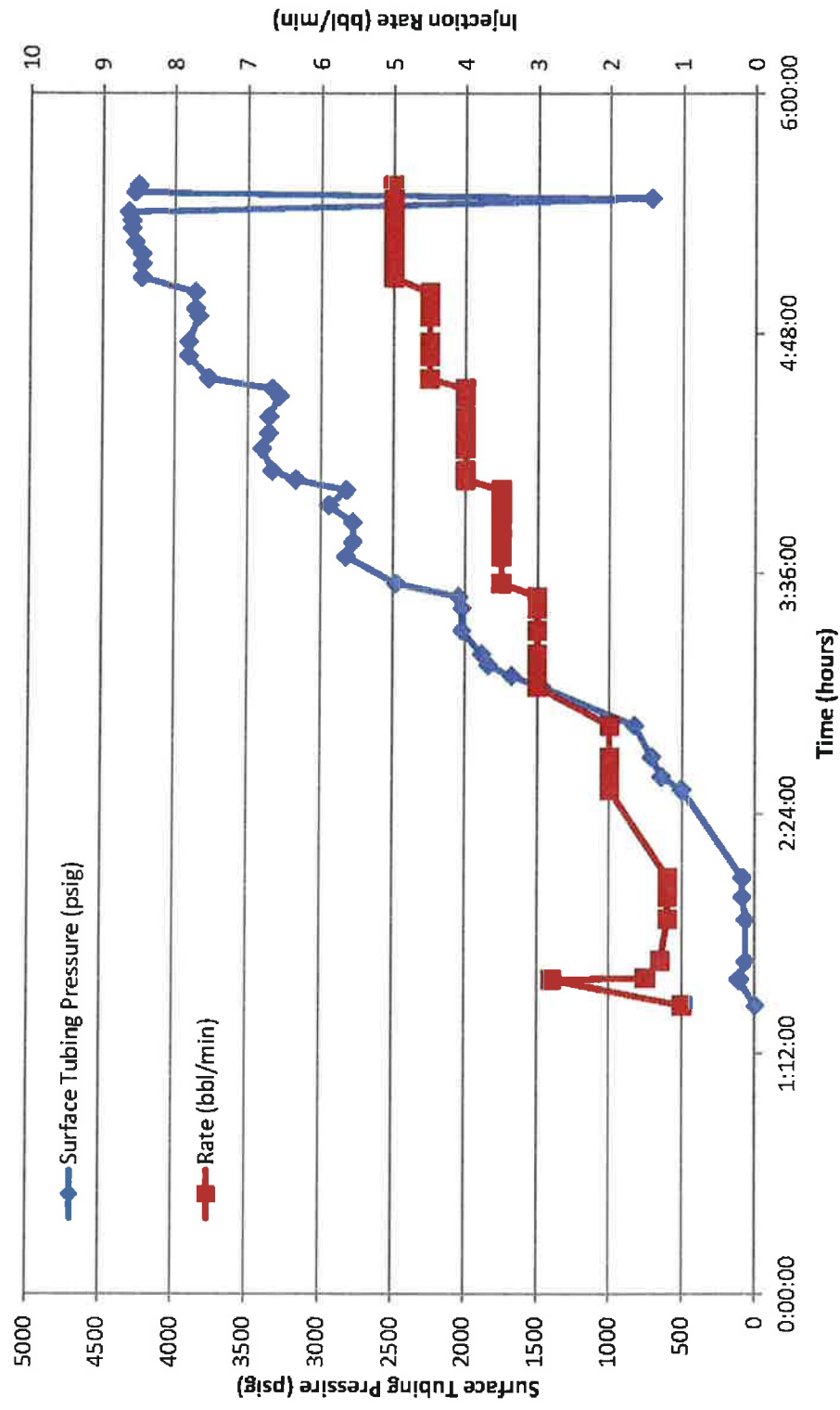


Figure 8-2: DCP AGI #2
STEP RATE 01/15/15

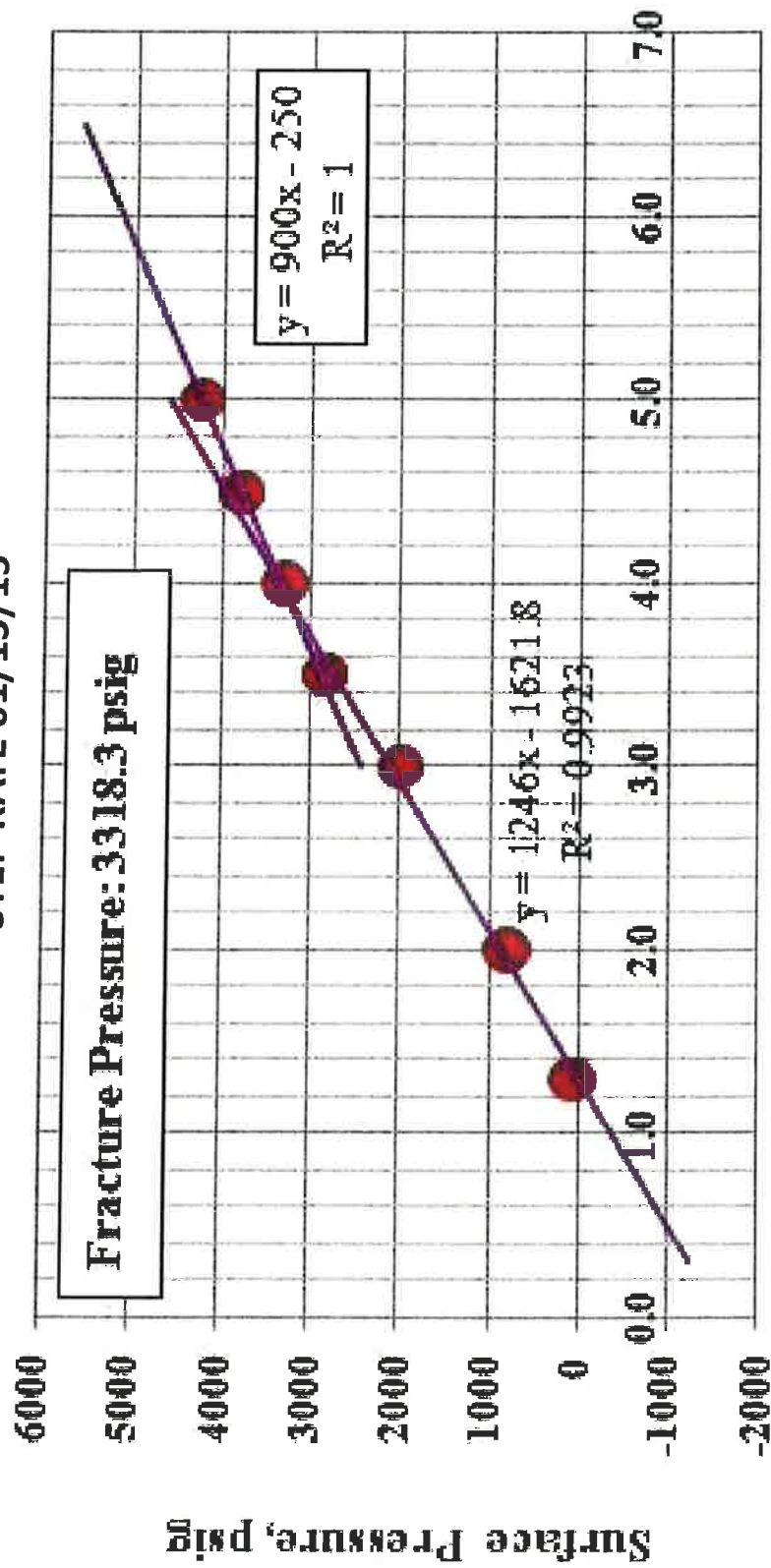


Figure 2 : Fracture Pressure Curve

APPENDICES

- Appendix A: NMOCD Permits and Orders**
- Appendix B: Casing Tallies**
- Appendix C: Water Well Records**
- Appendix D: Daily Drilling and Completion Reports from Geolex and PB Energy**
- Appendix E: Well Bore and Design Specifications**
- Appendix F: Open Hole Geophysical Well Logs**
- Appendix G: Mud Log**
- Appendix H: PB Energy Completion Program**
- Appendix I: Cement Program**
- Appendix J: Cement Bond Logs**
- Appendix K: Perforation Shot Records**
- Appendix L: Reservoir Tests**
- Appendix M: H₂S Contingency Plan**

APPENDIX A

NMOCD APPLICATIONS, PERMITS AND REQUIRED FILINGS

No.	Form/Permit	Submitted	Approved	Notes
1	NMOCD Case 13589 Order No. R-12546-K	10/31/12	2/14/13	DCP Application and Authorization to Amend Order R-12546 for Authorization Second AGI Well (Hearing 12/20/12)
2	C-103 Sundry Notices and Reports on Wells	9/26/14	9/26/14	Casing Design Modification
3	C-103 Sundry Notices and Reports on Wells	10/24/14	10/24/14	Surface Casing Completion
4	C-103 Sundry Notices and Reports on Wells	10/25/14	10/27/14	Surface Casing Pilot Hole Completion
5	C-103 Sundry Notices and Reports on Wells	10/27/14	10/27/14	Surface Casing Pressure Test Completion
6	C-103 Sundry Notices and Reports on Wells	11/3/14	11/6/14	Upper Intermediate Casing Completion
7	C-103 Sundry Notices and Reports on Wells	12/8/14	12/8/14	BOPE Installation and Test Diagrams
8	C-103 Sundry Notices and Reports on Wells	12/15/14	12/15/14	Production Borehole TD Completion
9	C-103 Sundry Notices and Reports on Wells	1/27/15	1/27/15	Witnessed Step Rate Test
10	C-103 Sundry Notices and Reports on Wells	2/13/15	2/13/15	Final Well Completion Report