

INJECTION WELL DATA SHEET

OPERATOR: **DCP Midstream LP**

WELL NAME & NUMBER: **Linam AGI #2 (proposed) see attached well schematic for well design and specifications**

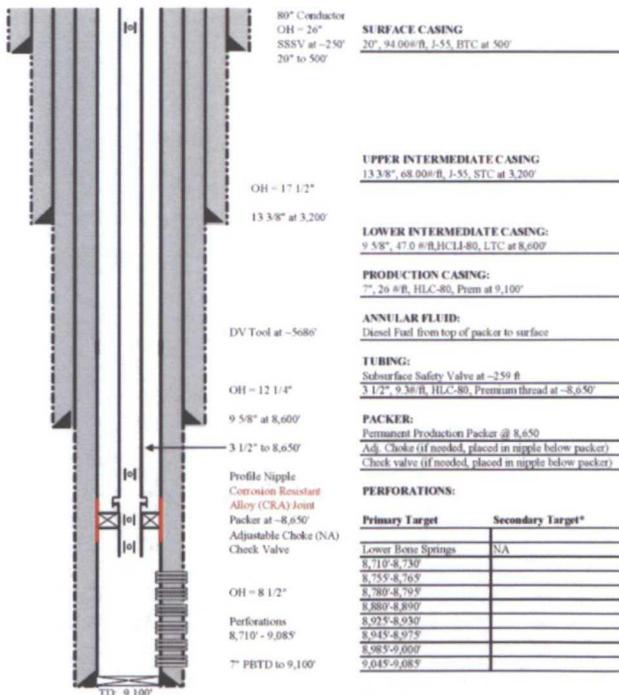
WELL LOCATION: **2120 FWL, 2120 FSL** FOOTAGE LOCATION UNIT LETTER SECTION TOWNSHIP RANGE  
**30 T18S R37E**

**WELLBORE SCHEMATIC**

**GEOLEX**  
INCORPORATED

**DCP Midstream LP**

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



**SURFACE CASING**  
 20" 84.000#B, J-55, BTC at 500'

**UPPER INTERMEDIATE CASING**  
 13 3/8" 68.000#B, J-55, STC at 3,200'

**LOWER INTERMEDIATE CASING:**  
 9 5/8" 47.0 #B, HCLL-80, LTC at 8,600'

**PRODUCTION CASING:**  
 7" 26 #B, HLC-80, Prem at 9,100'

**ANNULAR FLUID:**  
 Diesel Fuel from top of packer to surface

**TUBING:**  
 Subsurface Safety Valve at -259 ft  
 3 1/2" 9.30#B, HLC-80, Premium thread at -8,650'

**PACKER:**  
 Permanent Production Packer @ 8,650'  
 Adj. Choke (if needed, placed in nipple below packer)  
 Check valve (if needed, placed in nipple below packer)

**PERFORATIONS:**

Primary Target	Secondary Target*
Lower Bore Springs	NA
8,710'-8,730'	
8,755'-8,765'	
8,780'-8,795'	
8,880'-8,890'	
8,925'-8,930'	
8,945'-8,975'	
8,985'-9,000'	
9,045'-9,085'	

Linam AGI #2 Proposed Well Design

**INJECTION WELL DATA SHEET**

Tubing Size: 3 ½ inches 9.3 ppf, EUE Lining Material: Plastic Coated

Type of Packer: Retrievable Production Packer (Schlumberger QL, Baker DB or Similar

Packer Setting Depth: 8,650 feet

Other Type of Tubing/Casing Seal (if applicable): N/A

Additional Data

1. Is this a new well drilled for injection? X Yes        No **Note: Well has not yet been drilled.**

If no, for what purpose was the well originally drilled? N/A

2. Name of the Injection Formation: Lower Bone Springs (Wolfcamp)

3. Name of Field or Pool (if applicable): N/A

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e. sacks of cement or plug(s) used. N/A

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area: Ellenberger (9000), Upper Bone Springs – Abo (6200), Yeso (4200)

San Andres – Glorieta (2230), Grayburg – Queen (1450)

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## 1.0 EXECUTIVE SUMMARY

On behalf of DCP Midstream LP (DCP), Geolex<sup>®</sup>, Inc. (Geolex) has prepared and is hereby submitting a complete C-108 application for approval to drill, complete and operate a redundant or backup acid gas injection and CO<sub>2</sub> sequestration well (Linam AGI #2) as part of the existing Linam AGI #1 Facility. 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 (Figure 1). The proposed Linam AGI #2 will be drilled vertically at 2,120 feet from the south line and 2,120 feet from the west line of Section 30 at an approximate distance of 250 feet northeast of Linam AGI #1. Linam AGI #2 is intended to provide redundancy in the case that AGI #1 encounters problems that require it to be temporarily shut down for repairs or upgrades. The new well adds no additional capacity and is expected to operate exactly as the Linam AGI #1 does pursuant to NMOCC Order R-12546 and its amendments.

Operation of the Linam Gas Plant is dependent on the existing Linam AGI #1 well and the associated compression facility for its operation since the complete shutdown of the plant's sulphur reduction unit (SRU) following the settlement with NMED. Without the ability to dispose of acid gas using the existing well, the plant would have to be shut down and producers would have to be shut in. The existing well experienced a tubing leak failure which required a workover resulting in a prolonged plant shut down. For these reasons, DCP has determined, in conjunction with 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 that would negatively affect many producers and the State of New Mexico.

The proposed Linam AGI #2 would be used in the event of the casing or tubing failure of the existing Linam AGI #1 and would be immediately available to continue injection of acid gas and keep the plant running while the Linam AGI #1 is repaired or worked over. During the last workover, an unsuccessful attempt was made to stack another packer above the existing packer to isolate the compromised casing. This repair should be made as soon as practicable to prevent a failure of this casing and it will require the well to be out of service for about 10 days. The ideal situation for assuring the continued operation of the plant is to have an alternate well approved for injection so DCP can continue injection and operations of the Linam Gas Plant when the Linam AGI #1 is being worked over or repaired.

On September 12, 2005, Geolex, on behalf of Duke Energy Field Services (now DCP Midstream LP), submitted a C-108 Application for Authorization to Inject for an acid gas injection (AGI) well, to be located near the DCP's Linam Gas Plant near Hobbs, New Mexico (Figure 1). The purpose of the AGI was to replace the existing SRU used to reduce elemental sulfur from the treated acid gasses (TAG) from the sweetener units. The SRU was aging, inefficient, and caused chronic emission problems. The C-108 Application for Authorization to Inject for Linam AGI #1 was approved under Order No. R-12546. AGI #1 was completed in 2009 and has been operating in compliance with Division rules and Order No. R-12546, as amended, for more than three-and-a-half years.

DCP proposes to drill the Linam AGI #2 to a total depth of approximately 9,100 feet and will target the Lower Bone Springs formation for injection. This is the same NMOCC-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, 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 250 feet away, ensures that the proposed injection zone for Linam AGI#2 will be nearly identical to that of Linam AGI #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. Analysis of the reservoir characteristics of this unit, based on data 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 CO<sub>2</sub> 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 CO<sub>2</sub> injection volumes well within NMOCC'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 #1, can be found in the following documents, which are incorporated here by reference:

- C-108 Application for Authority to Inject, Linam Plant Area Lea County, NM, September 12, 2005;
- Oil Conservation Commission Hearing On Duke Energy Field Services' C-108 Application, February 9, 2006;
- Final End of Well Report, DCP Midstream LP, Linam AGI #1, September 30, 2011;
- NMOCC Order R-12546 and its amendments.

While all of the information required to evaluate and approve an AGI well at this location was already gathered, evaluated and presented to NMOCC for the Linam AGI #1, in preparing this C-108 for the Linam AGI #2 redundant well, Geolex conducted a detailed examination of all of the elements required to be evaluated in order to prepare and obtain approval for this application for injection. The elements of this evaluation include:

- Identification and characterization of all wells completed in hydrocarbon-producing zones and that surround and are present on the plant site;
- The depths of perforated pay intervals in those wells relative to the depth of the target injection zone (Lower Bone Springs);
- The past and current uses of the proposed injection zone;
- Total feet of net porosity in the Lower Bone Springs;
- The stratigraphic and structural setting of the targeted injection zone relative to any nearby active or plugged wells, and other wells penetrating the intervals;
- The identification of all surface owners within a one mile radius of the proposed injection well and sample notification letter;
- The identification of all wells, operators, and mineral leases within a one mile radius of the proposed injection well and a sample notification letter;
- Identification and characterization of all plugged wells within a one mile radius of the proposed injection well;
- The details of the proposed injection operation, including detailed well design and average and maximum daily rates of injection and injection pressures;
- Sources of injection fluid and compatibility with the formation fluid of the injection zone;
- Location and identification of any fresh water bearing zones in the area; the depth and quality of available groundwater in the vicinity of the proposed well, including a determination that there

are no structures which could possibly act as a conduit between the disposal zone and any known sources of drinking water.

Based upon our history with the injection zone through the Linam AGI #1 operation and supplemented by this detailed evaluation, DCP has determined that the proposed injection well is a safe and environmentally-sound project for the disposal of acid gas. Furthermore, the project provides additional environmental benefit by permanently sequestering a significant volume of CO<sub>2</sub>, which would otherwise continue to be released to the atmosphere avoiding the flaring of H<sub>2</sub>S, which currently takes place at the Plant. In addition, the redundant well will provide a more reliable AGI system as the plant can use one well while the other well is serviced as needed. At the expected ratio of 18.4% H<sub>2</sub>S and 81.6% CO<sub>2</sub>, injecting 7.0 MMSCFD will sequester approximately 61 tons of H<sub>2</sub>S and 350 tons of CO<sub>2</sub> per day.

Our research and data from the preliminary analysis, completion and implementation of the AGI system through the Linam AGI #1 has identified and confirmed a primary AGI target interval in the Lower Bone Springs from a depth of 8,710 to 9,137 feet below ground surface. This reservoir is effectively sealed laterally and above and below by the much less permeable adjacent facies.

At the anticipated reservoir conditions (124°F and 3,337 psig), every million standard cubic feet of TAG will occupy 2,886 barrels (16,204 cubic feet) in the reservoir.

Although 22 wells exist within one mile of proposed Linam AGI #2, only 3 penetrate into the Lower Bone Springs. One of those wells is the active Linam AGI #1 and the other two wells have been plugged. NMOCD files show that all three wells that penetrate the injection reservoir have been completed and/or plugged in a manner that effectively isolates the Lower Bone Springs interval.

There are also three active oil wells within the one-mile radius of proposed Linam AGI #2. All three are completed well above the NMOCC-approved Lower Bone Springs AGI reservoir.

In addition to providing a safe and adequate reservoir for H<sub>2</sub>S and CO<sub>2</sub>, the geologic environment is ideal to demonstrate the required capture and sequestration of CO<sub>2</sub> to obtain future credits or offsets.

All surface owners and operators within a one-mile radius of the proposed injection well will be notified at least 20 days prior to the NMOCD hearing pursuant to the requirements of NMOCC.

There is no permanent body of surface water within several miles of the plant. A search of the New Mexico State Engineer's files shows that there are 18 water wells within the one-mile radius of the proposed AGI #2. All of these 18 water wells are completed to depths ranging from 60 to 270 feet below ground surface and will not be impacted by Linam AGI #1 or #2 operations. This will be assured by isolating all fresh water bearing zones with surface casing cemented to the surface, as was done for the Linam AGI #1. The proposed injection zone is a closed system, and there are no open faults, fractures, or other structures that could potentially serve as a pathway between the proposed injection zone and any sources of fresh water.