

**STATE OF NEW MEXICO  
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
OIL CONSERVATION DIVISION**

**APPLICATION OF SPUR ENERGY  
PARTNERS LLC FOR APPROVAL OF A  
PRESSURE MAINTENANCE PROJECT,  
EDDY COUNTY, NEW MEXICO.**

**CASE NO. 24042**

**NOTICE OF SUPPLEMENTAL EXHIBITS**

Spur Energy Partners LLC (“Spur”) (OGRID No. 328947), the applicant in the above-referenced case, submits this notice of filing of supplemental exhibits Spur Exhibits F and G.

At the hearing in this matter the Division Technical Examiners asked Spur to submit its calculations supporting its proposed maximum surface injection pressure and evidence that the Grayburg Deep Unit #001 (API No. 30-015-04187), a well within the area of review, has been properly plugged to prevent migration of injected gas out of the target zone. Submitted herewith is Spur Exhibit F, which is the requested calculation supporting the surface injection pressure, and Spur Exhibit G, which is a written statement from Thomas E. Tomastik confirming that the Grayburg Deep Unit #001 well is properly plugged and will not serve as a conduit for gas to escape the injection zone.

Spur respectfully requests that the attached supplemental exhibits be accepted for filing and made part of the record of this case.

Respectfully submitted,

HOLLAND & HART LLP

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**ATTORNEYS FOR SPUR ENERGY PARTNERS LLC**



**SPUR ENERGY PARTNERS LLC – MAXIMUM ALLOWABLE SURFACE INJECTION PRESSURE (MASIP) CALCULATIONS FOR BKU #566.**

- 1. **BKU #566:** Top perforation = 4,240’
  - a. Gas Density = 0.9148
  - b.  $PG = 0.2 + 0.433(1.04 - 0.9148) = 0.25421$
  - c.  $IP_{Max} = 0.25421 \times 4,240' = \text{MASIP of } 1,077 \text{ psi}$

Below is an example of the calculation applied to the BKU #566 to determine the MASIP calculation:

IPmax = PG (Dtop) where: IPmax= maximum surface injection pressure (psi)
PG = pressure gradient of injection fluid (psi/ft)
Dtop = depth at top of perforated interval of injection zone (ft)
and PG = 0.2 + 0.433 (1.04 – SGtag) where:
SGtag = average specific gravity of treated acid gas in the tubing (SGtag at top = 0.79 and SGtag at bottom hole = 0.82; see Table 1)
For the maximum requested injection volume case, it is assumed that:
SGtag = 0.805 (Average of 0.79 and 0.82)
Dtop = 16,000 ft
Therefore:
$PG = 0.2 + 0.433 (1.04 - 0.805) = 0.3018 \text{ psi/ft}$
$IP_{max} = PG (Dtop) = 0.3018 * 16,000 = 4,829 \text{ psi}$



## **EVALUATION AND ASSESSMENT OF THE PLUGGING AND ABANDONMENT OF THE GRAYBURG DEEP UNIT #001 (API NO. 30-015-04187)**

### **Introduction**

ALL Consulting (ALL) has performed further evaluation and assessment of the plugging and abandonment of the Grayburg Deep Unit #001 well (API No. 30-015-04187) as requested regarding the gas pressure maintenance injection well application of the Burch Keely Unit (BKU) #566 (API No. 30-015-39870) and gas injection into the existing Yeso Group for Spur Energy Partners. This assessment was undertaken to ensure that the plugging and abandonment of the Grayburg Deep Unit #001 well would not allow for the migration of the injected natural gas from the BKU #566 into other producing formations or into underground sources of drinking water (USDWs).

### **Grayburg Deep Unit #001 Well History**

The Grayburg Deep Unit #001 well was drilled and completed by the Great Western Drilling Company in September of 1954. The well was perforated from 11,039 to 11,057 feet in the Morrow Pennsylvanian and was designated in the Anderson-Pennsylvanian Gas Pool. The well construction was as follows:

- 13-3/8" surface casing was set at 316 feet and cemented to the surface.
- 9-5/8" intermediate casing was set at 2,740 feet and cemented with 1,500 sacks and calculated top of the cement was at the surface.
- 5-1/2" production casing was set at 11,190 feet and cemented with 1,025 sacks and the calculated top of cement was at 6,401 feet.

In July of 1957 the General American Oil Company of Texas became the unit operator and in December of 1983 Phillips Petroleum Company became the new operator of this well. In January of 2003 the operator changed to ConcoPhillips Company. In June of 2012, ConcoPhillips move forward with plugging off the Morrow producing zone and placed the well in temporary status after plugging. All plugging operations were witnessed by the Bureau of Land Management (BLM) personnel. In December of 2012, ConcoPhillips applied to BLM and the New Mexico Oil Conservation Division (OCD) to plugback the well and recomplete the well in the Blinbry Formation of the Yeso Group from 5,081 to 5,461 feet. BLM approved the proposal with attached conditions.

**Plugging and Abandonment of the Grayburg Deep Unit #001**

In July of 2013, ConcoPhillips commenced with the plugging back of the well for recompletion in the Blinbry Formation. After plugging back and then perforating the 5-1/2” production casing to squeeze cement behind the production casing at 5,802 to 5,800 feet, ConcoPhillips was unable to establish circulation and decided to plug and abandoned the well. From July 22<sup>nd</sup> to August 1, 2013, ConcoPhillips completed the plugging and abandonment of the Grayburg Deep Unit #001 well per BLM instructions. At a depth of 4,175 feet the 5-1/2” production casing was perforated and attempted to squeeze cement behind the production casing. ConcoPhillips was unable to squeeze cement and per BLM instructions spotted a 25-sack cement plug from 4,225 to 3,789 feet inside the production casing. After the cement plug was set the top of the cement was tagged at 3,797 feet. The plugging with cement continued per BLM requirements and approval. The plugging record was approved by BLM on October 30, 2013, and then received by OCD and approved for record on November 6, 2013. Reclamation of the location was completed on October 19, 2016, and ConcoPhillips proposed to monitor the location.

**Assessment and Evaluation of the Plugging Operation of the Grayburg Deep Unit #001**

ALL has reviewed all the available documents and has assessed the plugging of the Grayburg Deep Unit #001 and the potential for gas migration from the proposed pressure maintenance gas injection well BKU #566. Since ConcoPhillips attempted to plugback and produce this well from the Yeso Group initially, the plugback record after perforating from 5,802 to 5,800 feet shows that the 5-1/2” production casing could not be squeeze cemented. This would indicate there is likely formation caving or dehydrated mud behind the production casing since circulation could not be well established after perforating at 5,800 to 5,802 feet. Then again at 4,175 feet, when squeeze cement plugging was attempted behind the production casing to isolate the top of the Yeso Group, squeeze cementing could not be accomplished due to formation caving or dehydrated mud. During the plugging operations, since cement could not be squeezed behind the production casing to isolate the top of the Yeso Group, BLM approved a solid 428 -foot cement plug from 4,225 to 3,797 feet inside the 5-1/2” production casing which was tagged to confirm the top of the cement. Based on this assessment of the likely caving of the formation behind the production casing and the 428-foot solid cement plug set inside the production casing, ALL believes there is sufficient zonal isolation at the top of the Yeso Group which would prevent gas migration from the BKU #566 gas injection well into the abandoned wellbore of the Grayburg Deep Unit #001 well and gas migration upwards out of the Yeso Group. Additionally, the 9-5/8” intermediate casing was cemented in place to the surface and then the 5-1/2” production casing was squeeze cemented across the 9-5/8” intermediate casing shoe which would further prevent any potential gas migration into shallower oil and gas producing zones or into USDWs.

*Thomas E. Tomastik*

12/13/2023

Thomas E. Tomastik, Chief Geologist – ALL Consulting

Date

Certified Petroleum Geologist #6354

