

State of New Mexico
Energy, Minerals and Natural Resources Department

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David R. Catanach, Division Director
Oil Conservation Division



Date: August 18, 2016

To: New Mexico Oil Conservation Commission

From: William V. Jones, Engineering Bureau, Oil Conservation Division
Phillip Goetze, Engineering Bureau, Oil Conservation Division

RE: STATEMENT REGARDING DIVISION'S REVIEW OF C-108 APPLICATION

Case No. 15528: Application of DCP Midstream, LP for Authorization to Inject Acid Gas into the Zia AGI #2D Well, Section 19, Township 19 South, Range 32 East, NMPM, Lea County, New Mexico.

Mr. Jones and Mr. Goetze of the Engineering Bureau (the "Division") conducted a review of the C-108 application submitted for the above referenced well in Case No. 15528. The application was dated July 12, 2016, and was prepared by Geolex, Inc. on behalf of their client, DCP Midstream LP (the "applicant"). The review applied the same standards used for prior applications submitted for approval of injection authority for acid gas injection (AGI) wells. As a result, the Division compiled a list of questions or concerns regarding the application for discussion with the applicant's consultant prior to the Commission hearing. On August 16, 2016, Mr. Goetze participated in a conference call with Mr. Alberto Gutierrez and Mr. James Hunter, both of Geolex, to address the review items or requests.

The reviewed subjects and comments included the following:

- **True Vertical Depths of the Deeper Pennsylvanian Wells Reported in Table A1**

Division requested that Geolex re-examine the true vertical depths (TVDs) provided in Table A1 for the deep wells (active and plugged) and that are within a one-mile radius of the AGI well. Division had concerns that the TVDs, as provided in the Division's online summary information, may not be TVDs but measured depths. Geolex responded with a summary list for those wells along with confirmation of the accuracy of the data provided in the application (see attachment).

- **Hydrocarbon Potential of Proposed Injection Interval**

Though this well will require an Application to Permit to Drill (APD) approved by the Bureau of Land Management (BLM), the Division reiterated the need for an assessment of the hydrocarbon potential. Geolex responded that they would be required by the BLM to conduct a hydrocarbon assessment as a condition of the federal APD and that this information would be included in the completion report for the well to be submitted to both the BLM and the Division.

NMOCC Case. No. 15528
OCD Exhibit 1

- **Notification of Devonian Mineral Interest Owners**

The summary of "affected persons" notification was very extensive and Division inquired whether the subconsultant that had been thorough in their review for depth severance of Devonian mineral interests. Geolex stated that their subcontractor was aware of possible depth severance and had found no indication any situations of depth severance for the Devonian/Silurian interval in this project.

- **Abandonment of the AOR Penetrating Well**

Division reviewed the information on the single well that penetrated the proposed injection interval. The Lusk Deep Unit Well No. 2 (API 30-025-00900) is located 0.88 miles northeast of the proposed AGI well location. This well was drilled into the Devonian for testing but was plugged backed to a shallower Morrow zone. Geolex noted that the well, based on the well file records, was plugged back with a 1471-foot cement plug and that the well was located where migration of the injectate would not be likely (up-dip from the proposed AGI well).

- **Location of the AGI Well to the Devonian Fault**

Three matters involving the well and the adjacent fault were discussed: the impact of the fault on injection distribution in the proposed interval, the potential for a future induced-seismic event due to the faults presence, and any potential for vertical migration of injectate due to the fault. Geolex stated that their study of the proprietary seismic information available from Devon Energy, their mapping of the regional geology, and the operation information provided by COG Operating LLC for their Magnum Pronto 32 State SWD Well No. 1 (API 30-025-41354; SWD-1399-A).

Geolex findings showed that the Devonian fault did not penetrate the overlying Woodford Shale which would be the primary confining layer for retention of injectate within the permitted interval. This would not permit upward vertical migration of injectate while the Ordovician section (approximately 200 feet of Montoya formation remaining and 400 feet of Simpson formation with an additional Ellenburger interval) provided a lower confining zone to isolate injectate from the pre-Cambrian surface, a potential source for induced seismicity.

Geolex stated their modeling of the injectate plume dispersion over time and the position of the AGI well relative to the fault (on the down-thrown side of the fault) indicated that the horizontal migration plume would result in an elongated shape towards the south following down-dip structure of the Devonian-Silurian section. However, Geolex could not provide any specific detail of the impact of the fault to the fracture configurations in the injection interval or secondary porosity/permeability related to the fault.

To address these items, Geolex stated that the application included a program for open-hole logging (page 8 of the application) for reservoir testing prior to commencing injection (page 10 of the application). These programs include a 10-day fall-off test (FOT) and formation micro-imaging (FMI) of the injection interval that would be beneficial in better assessing the fracturing and reservoir characteristics.



Division found the construction proposed for the AGI well addressed specific issues unique to the location such as a dedicated string of casing to isolate the Capitan Reef from other formations and the inclusion of corrosion-resistant casing for the interval of the well penetrating the former acid-gas disposal interval in the Delaware Mountain Group.

In general, the review found that requests and conditions stipulated by Division for prior AGI well cases involving DCP Midstream LP and Geolex, Inc. were included in this application. Division has two additional conditions to recommend for inclusion in an order:

1. That the top of cement for the seven-inch production casing be circulated to surface.
2. Division requests that the final reservoir evaluation confirm that the open-hole portion of AGI well does not intersect the fault plane of the identified fault in the Devonian section.

Division recommends the approval of the application and would endorse the use of Orders No. R-13443-B and No. R-13443-C as a template for consideration in composing any final order in this case.

Respectfully submitted,


William V. Jones, PE
Phillip R. Goetze, PG

Submitted into record for the consideration of the Commission on August 18, 2016.

Attachment: Copy of e-mail communication (with revised table) from Mr. James Hunter, Geolex, Inc. dated August 16, 2016

cc: Mr. James Hunter, Geolex, Inc.

Goetze, Phillip, EMNRD

From: James C. Hunter (GeoLex) <JCH@GeoLex.com>
Sent: Tuesday, August 16, 2016 3:06 PM
To: Jones, William V, EMNRD; Goetze, Phillip, EMNRD; 'Adam Rankin'
Cc: 'Alberto A. Gutierrez'
Subject: Verifications of depths of wells deeper than 10,000 feet within one mile of proposed Zia AGI #2D
Attachments: ZiaAGI#2D_Revised_OneMileDeepWells.xlsx

Gentlemen,

Per our telephone conversation this afternoon we have reviewed the original logs for all of the wells deeper than 10,000 feet located within one mile of the proposed DCP Midstream Zia AGI #2D.

The results of our review are summarized in the attached revised Table A1. The total depth of two wells required minor corrections.

The Delphi Federal 001 was listed in the NMOCD database as having a total depth of 11,286 feet, but the original log showed a total depth of 11,400 feet.

The SL Deep Federal 004H was listed in the NMOCD database as having a total depth of 10,858 feet, but this was the measured depth; the true total depth was 9,179 feet.

Neither correction reflects any additional risks to the integrity of the proposed injection zone.

Please contact me or Alberto if you have any questions regarding this matter.

Thanks you very much,

James C. Hunter, RG
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Table A1 (Revised 8/16/2016) to Confirm TD of Wells Deeper than 10,000' Within One Mile of Proposed Zia AGI #2D												
API	OPERATOR	PLUG DATE	RANGE	SECTION	SPUD DATE	TOWNSHIP	TVD DEPTH	WELL NAME	WELL TYPE	COMPL STATUS	Distance from AGI #2 (mi)	Note
3002520247	EL PASO NATURAL GAS	10/25/1971	32E	19	12/10/1963	19.05	11432	LUSK DEEP UNIT 006	O	Plugged	0.24	
3002535291	COG OPERATING LLC		32E	19	4/24/2001	19.05	12718	LUSK DEEP UNIT A 021	G	Active	0.26	
3002534573	COG OPERATING LLC		32E	19	12/17/1999	19.05	12540	LUSK DEEP UNIT A 014	G	Active	0.34	
3002520876	TOM R CONE		32E	19	11/6/1964	19.05	11223	GULF FEDERAL 003	O	Active	0.35	
3001510382	PHILLIPS PETROLEUM CO	10/17/1994	31E	24	4/26/1964	19.05	11540	LUSK DEEP UNIT 008	O	Plugged	0.40	
3002520122	COG OPERATING LLC		32E	19	4/16/1963	19.05	12554	LUSK DEEP UNIT A 005	G	Active	0.42	
3002520025	CHISOS, LTD		32E	30	2/2/1963	19.05	11400	DELHI FEDERAL 001	O	Active	0.51	Database listed TD 11,286
3001510393	FINA OIL & CHEMICAL	1/1/1900	31E	24	1/1/1900	19.05	11515	JONES G FED COM 001	O	Plugged	0.61	
3002536257	COG OPERATING LLC		32E	30	4/29/2003	19.05	12640	SL DEEP FEDERAL 002	G	Active	0.71	
3002539538	COG OPERATING LLC		32E	30	12/14/2009	19.05	9179	SL DEEP FEDERAL 004H	O	Active	0.80	Database listed MD 10,858
3002535053	COG OPERATING LLC	8/23/2014	32E	18	6/15/2000	19.05	12780	LUSK DEEP UNIT A 016	S	Plugged	0.80	
3002520104	OXY USA INC		32E	30		19.05	12475	ELLIOTT HALL A 001	O	Active	0.83	
3001510277	DOWDCO INC	1/27/2006	31E	24		19.05	11530	JONES C FEDERAL 001	O	Plugged	0.83	
3001510189	FINA OIL & CHEMICAL	1/10/1994	31E	25		19.05	12775	JONES FEDERAL 002	O	Plugged	0.84	
3002500905	COG OPERATING LLC		32E	19	5/21/1975	19.05	12453	LUSK DEEP UNIT A 001	G	Active	0.85	
3002500900	EL PASO NATURAL GAS	9/4/1971	32E	18	10/16/1960	19.05	13974	LUSK DEEP UNIT 002	O	Plugged	0.88	
3001510279	DOWDCO INC	2/26/2006	31E	25		19.05	11550	JONES B FEDERAL 002	O	Plugged	0.96	
3001510357	PHILLIPS PETROLEUM CO	8/19/1994	31E	13	2/16/1965	19.05	11600	SIMON A 001	O	Plugged	0.97	
3002500913	EL PASO NATURAL GAS	1/1/1900	32E	20	1/1/1900	19.05	12621	LUSK DEEP UNIT 003	O	Plugged	0.98	
3001531357	DEVON ENERGY PRODUCTION COMPANY, LP	4/7/2014	31E	24	10/4/2000	19.05	12750	RADAR 24 FEDERAL 001	O	Plugged	0.98	
3002520874	SHACKELFORD OIL CO		32E	20	2/11/1964	19.05	11467	LUSK WEST DELAWARE UNIT 012	W	Active	0.99	
3002520035	OXY USA INC	3/15/2012	32E	30		19.05	11325	ELLIOTT HALL B 002	O	Plugged	0.99	
3002535095	COG OPERATING LLC		32E	20	9/15/2000	19.05	12750	LUSK DEEP UNIT A 017	G	Active	0.99	
3001531730	COG OPERATING LLC		31E	13	8/26/2001	19.05	12725	MARGARET 13 FEDERAL COM 001	O	Active	1.00	

Note: This Table Included In Appendix A of the C-108 application dated 7/12/2016 represents the verification of the total depths of all wells reported deeper than 10,000 feet. This confirms the material presented in the application and corrects the TD of two wells shown in bold above. This review was done at the request of Mr. Philip Goetze and Mr. Wilt Jones of NMOCD via telephone conversation on 8/16/2016.