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RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 08-0326042

Tracking No. 50397

APPLICATION OF HALCÓN OPERATING CO., INC (344412) PURSUANT TO STATEWIDE RULES 46 AND 36 FOR A PERMIT TO INJECT FLUID CONTAINING HYDROGEN SULFIDE INTO A RESERVOIR PRODUCTIVE OF OIL OR GAS FOR THE HUTCHINGS-SEALY LEASE, WELL NO. 2, WINK, S. (MONTOYA-ELLENBURGER) FIELD, WINKLER COUNTY, TEXAS

HEARD BY: Austin Gaskamp – Technical Examiner
Jennifer Cook – Administrative Law Judge

HEARING DATE: July 16, 2020

CONFERENCE DATE: October 20, 2020

APPEARANCES:

Olga Kobzar
James Clark, P.E.
Bill Walker
Ted Lilly
Jacob Mezey
Dr. Liaqat Ali
Russell Bentley
Nathan Whitman

REPRESENTING:

Halcón Operating Co., Inc

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Halcón Operating Co., Inc. (Halcón) requests authority, pursuant to Statewide Rules 36 and 46, to inject hydrogen sulfide ("H₂S") and carbon dioxide ("CO₂") into a substantially-depleted reservoir productive of oil or gas for its Hutchings-Sealy Lease, Well No. 2 ("Hutchings-Sealy No. 2 Well"), where Halcón owns the minerals in fee.¹ The subject well is an existing well located in Winkler County, approximately 6.5 miles south of Wink,

¹ Official Notice Ex. 1 (Declaration of Richard Little in O&G Docket No. 08-0320873, for the Hutchings-Sealy No. 4 well, of which Examiners took official notice in this hearing per Halcón's request).

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Texas. It is located approximately 0.18 miles from Halcón's Hutchings-Sealy Lease, Well No. 4, for which Halcón had previously obtained Rule 36 and 46 permits in O&G Docket No. 08-0320873.²

Halcón has filed Form H-1/H-1A, *Application to Inject Fluid into a Reservoir Productive of Oil or Gas* pursuant to Statewide Rule 46.³ In the application, Halcón has requested authority to inject up to 5,000 MCFD of fluids containing hydrogen sulfide, methane, and carbon dioxide into its Hutchings-Sealy No. 2, with an estimated average daily injection volume of 3,000 MCFD.⁴ The Railroad Commission of Texas ("Commission") staff reviewed the application and determined it to be administratively complete. The Statewide Rule 46 application is unopposed and may be administratively processed pursuant to Statewide Rule 46(c)(6) pending approval of this Statewide Rule 36 application.

Statewide Rule 36(c)(10)(A) states that "injection of fluids containing hydrogen sulfide shall not be allowed under the conditions specified in this provision unless first approved by the Commission after public hearing:

"(i) where injection fluid is a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100 ppm radius of exposure is in excess of 50 feet and includes any part of a public area except a public road; or, if the 500 ppm radius of exposure is in excess of 50 feet and includes any part of a public road; or if the 100 ppm radius of exposure is 3,000 feet or greater;

(ii) where the hydrogen sulfide content of the gas or gaseous mixture to be injected has been increased by a processing plant operation."

Halcón seeks to inject acid gas containing H₂S and CO₂. The modeled exposure in the event of a catastrophic release from the well for the 500 ppm radius of exposure ("ROE") is estimated to be 4,900 feet, and the 100 ppm ROE to be 12,000 feet.⁵ Thus, a public hearing was required pursuant to Statewide Rule 36(c)(10)(A). A hearing on the application was held on July 16, 2020.

Prior to the hearing, the Commission's State Hydrogen Sulfide Coordinator had reviewed and approved the Form H-9 (Certificate of Compliance Statewide Rule 36) and proposed H₂S Contingency Plan and has determined that the proposed application complies with the applicable provisions of Statewide Rule 36.⁶

Halcón requested that, following approval of this Statewide Rule 36 application, the Statewide Rule 46 application be remanded to the Underground Injection Control (UIC) Section for administrative processing of the application. The Technical Examiner and Administrative Law Judge (collectively, "Examiners") recommend that the Statewide Rule

² Hearing Ex. 12.

³ Hearing Ex. 2.

⁴ *Id.*

⁵ Hearing Ex. 15 at p. 073.

⁶ Hearing Ex. 16; Hearing Ex. 15 at p. 63.

36 authorization be granted and the Rule 46 application be administratively processed pursuant to Statewide Rule 46(c)(6) as the application is unopposed.

DISCUSSION OF THE EVIDENCE

Halcón plans to convert an existing wellbore for the Hutchings-Sealy No. 2 well to conduct its Rule 36 acid gas injection ("AGI") operations on its Hutchings-Sealy Lease approximately 6.5 miles south of Wink, Texas. The proposed injection interval is fully cased across the proposed injection interval and cemented to the surface.⁷

Notice of the application pursuant to Statewide Rule 46 was provided to the operators within the half mile radius of the wellbore and to the Winkler County Clerk.⁸ Halcón is the surface owner of the subject tract. The Notice of Application was published, pursuant to Statewide Rule 46 and 36, in the *Winkler County News*, a newspaper of general circulation in Winkler County with the description of the proposed injection, on April 4, 2019.⁹ Pursuant to Statewide Rule 36, Halcón also identified all receptor points under Statewide Rule 36 and provided notice to all operators or entities located within the 100 ppm or 500 ppm radius of exposure of the Hutchings-Sealy No. 4 well, who were also included on the notice of hearing for this application.¹⁰ Halcón's application pursuant to Statewide Rule 46 and Statewide Rule 36 is unopposed.

Halcón has approximately 55,000 acres under lease in the Delaware Basin area, and the area near the proposed Hutchings-Sealy AGI well is the most prolific area of development for the company.¹¹ Additional disposal capacity is needed for Halcón to be able to fully develop its acreage position in the area.¹² Halcón intends to use the already-permitted Hutchings-Sealy No. 4 AGI well and the Hutchings-Sealy No. 2 AGI well as alternative mediums for injection, with each well acting as the relief well for the other if the original injector is no longer in operation, as opposed to independently-operating wells. Accordingly, because the proposed Hutchings-Sealy No. 2 well is not intended to inject at the same time as the already-permitted Hutchings-Sealy No. 4 well,¹³ at the Examiners' inquiry, Halcón agreed to a permit condition that limits the total volumes injected into the Hutchings-Sealy No.2 well and Hutchings-Sealy No.4 well not to exceed 12 BCF of acid gas total.¹⁴

The Hutchings-Sealy No. 2 AGI well will dispose of gas which primarily contains CO₂ and H₂S. Halcón selected this existing wellbore to be converted into an acid gas injection well because the area is not densely populated and does not have a large number of roads or traffic.¹⁵ Halcón will inject into a substantially depleted Ellenburger formation at

⁷ Hearing Ex. 3.

⁸ Hearing Exs. 6-7.

⁹ Hearing Exs. 8.

¹⁰ Hearing Ex. 15.

¹¹ Hearing Ex. 12; Official Notice Ex. 1 (Declaration of Richard Little).

¹² *Id.*

¹³ Hearing Tr. 82:3-21, 86:7-88:22, 115:23-116:23 (Testimony of Nathaniel Whitman); Hearing Tr. 97:20-98:14 (Testimony of Dr. Liaqat Ali); Hearing Tr. 12:25-13:15 (Testimony of Bill Walker).

¹⁴ Hearing Tr. 116:25-118:4.

¹⁵ Official Notice Ex. 1, Declaration of Richard Little; Hearing Tr. 20:13-21:7 (Testimony of Bill Walker).

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approximately 18,287 feet, below the Wolfcamp formation that is being actively developed in the area, making the location of the existing wellbore well-suitable to Halcón's injection needs.¹⁶ Work performed by Halcón's experts showed that the fluids will be contained within the formation, further motivating Halcón to prepare and file its AGI application for the Hutchings-Sealy No. 2.¹⁷ There are no producing Ellenburger wells in the immediate area except for Halcón's own Hutchings Sealy No. 4 well, for which Halcón had already obtained an AGI permit.¹⁸

At the hearing, Halcón's experts offered exhibits and testimony to demonstrate that the existing wellbore for the Hutchings-Sealy No. 2 well is suitable to acid gas injection and can be operated safely using equipment and materials suitable for injection of H₂S and CO₂ gas.¹⁹ The entire facility will be fenced and locked to restrict access to the Hutchings-Sealy No. 2 well.²⁰

A reservoir simulation was performed for the proposed injection into the Hutchings-Sealy No. 2 Well, using the same methodology and underlying data and assumptions that Halcón used for the previously-permitted Hutchings-Sealy No. 4 Well, to predict the maximum probable extent of underground waste plume migration.²¹ Halcón also performed additional plume study modeling to include injection into the already-permitted Hutchings-Sealy No. 4 well, along with additional modeling based on Halcón's interpretation of its 3D seismic data.²² Halcón's experts' modeling utilized the Computer Modeling Group (CMG)'s suite of software: GEM (3-D compositional simulator), WinProp (Equation of State (EOS) for PVT), and Builder (Static and Dynamic Model).²³ The static geological model was provided to the experts by Halcón based on its internal data and literature studies, and built using the Petrel software.²⁴ The EOS modeling was performed in WinProp using gas composition provided by Halcón and PVT utilized publicly available information available Commission documents.²⁵ A dynamic simulation model was built using Builder and simulations were run in GEM.²⁶ The fluid being disposed of, for purposes of the model, was projected to be approximately 63 mole% hydrogen sulfide, 35 mole% carbon dioxide, and 1 mole% other gases.²⁷ Those simulations were run over the course of 30 and 50 years. In all scenarios run for both wells in the two hearings (i.e., injection solely into the already-permitted Hutchings-Sealy No. 4 Well vs. injection into both the No. 4 Well and the Hutchings-Sealy No. 2 Well subject to this application), the plume migration trended towards northeast of the injection well and just outside of the half mile radius of Hutchings-Sealy No. 4.²⁸ The maximum possible extent of the acid gas plumes in all of the modeled

¹⁶ Hearing Ex. 2; Official Notice Ex. 1 (Declaration of James M. Clark, P.E.).

¹⁷ *Id.*

¹⁸ Hearing Ex. 12.

¹⁹ Hearing Exs. 3, 15; Official Notice Ex. 1 (Declaration of James M. Clark, P.E.).

²⁰ Hearing. Ex. 15 at p. 045.

²¹ Hearing Ex. 17; Official Notice Ex. 1 (Declaration of Dr. Liaqat Ali).

²² Hearing Ex. 17; Official Notice Ex. 1 (Declaration of Dr. Liaqat Ali).

²³ Hearing Ex. 17; Official Notice Ex. 1 (Declaration of Dr. Liaqat Ali).

²⁴ *Id.*

²⁵ *Id.*

²⁶ *Id.*

²⁷ *Id.*

²⁸ Hearing Exs. 12, 17; Official Notice Ex. 1 (Declarations of Dr. Liaqat Ali and Nathaniel Whitman).

scenarios is not estimated to reach either the faulting to the west or any producing Ellenburger wells, even at the maximum requested daily injection rates, for the 12 BCF volume Halcon has accepted as the maximum volume permitted to be injected into Hutchings-Sealy No. 2 Well.

The maximum escape rate of gas containing H₂S is estimated to be 235.1 MMCFD, which uses the worst-case conditions of complete wellhead failure and direct gas discharge from the open casing.²⁹ Halcón employed experts from Flatrock Engineering, Ted Lilly and Jacob Mezey, to perform gas dispersion modeling based on the results of the maximum escape rate, using a dispersion model called CANARY to determine the radius of exposure of H₂S. The CANARY model has been previously accepted by the Commission for radius of exposure ("ROE") calculations.³⁰ Flatrock has further obtained express approval for the use of the CANARY model for this application from the Commission's State Coordinator for Hydrogen Sulfide Operations.³¹ The calculated ROE for 500-ppm H₂S maximum catastrophic release at the proposed injection well is 4,900 feet from the wellbore. For 100 ppm, the calculated ROE is 12,000 feet from the wellbore.

Form H-9 (Certificate of Compliance Statewide Rule 36) and a contingency plan have been prepared for the proposed disposal operations based on the calculated ROE values.³² Halcón also prepared a public assessment within the 500-ppm and the 100-ppm ROE for the Hutchings-Sealy No. 2 well.³³ All residences, businesses, or other potentially affected public areas within the 100 ppm ROE or 500 ppm ROE for the well have been identified and the owners and/or residents notified of Halcón's proposed AGI well through the combined efforts of Flatrock and Halcón representatives.³⁴ Halcón also worked with the Commission's State Hydrogen Sulfide Coordinator Sam Birdwell to obtain approval of the CANARY model, and with the Commission's District Hydrogen Sulfide Coordinator Tom Fouts for the approval of the H-9 for the Hutchings-Sealy No. 2.³⁵ Mr. Fouts has also reviewed Halcón's proposed contingency plan³⁶ that Halcón's put in place for both Hutchings-Sealy AGI wells and found it suitable under Statewide Rule 36.

FINDINGS OF FACT

1. Halcón Operating Company, Inc. (Halcón) requests authority pursuant to Statewide Rule 36 to inject fluids containing primarily hydrogen sulfide (H₂S) and carbon dioxide (CO₂) into the proposed Hutchings-Sealy Lease, Well No. 2.
2. Halcón has filed Form H-1/H-1A, Application to Inject Fluid into a Reservoir Productive of Oil or Gas pursuant to Statewide Rule 46.

²⁹ Hearing Ex. 15 at p. 070.

³⁰ Hearing Ex. 12; see O&G Docket Nos. 01-0300843, 01-0271975 and 01-0249550.

³¹ Hearing Ex. 15 at p. 067.

³² Hearing Ex. 15.

³³ Hearing Ex. 15; Hearing Tr. 17:3-15, 24:5-27:19 (Testimony of Bill Walker); Hearing Tr. 121:16-124:5 (Testimony of Ted Lilly); see also Official Notice Ex. 2 (Exs. A-C).

³⁴ *Id.*

³⁵ Hearing Ex. 16; Hearing Ex. 15 at p. 063.

³⁶ Official Notice Ex. 1 (Declaration of James M. Clark, P.E.).

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3. The Statewide Rule 46 application is unopposed and may be administratively processed pursuant to Statewide Rule 46(c)(6).
4. Statewide Rule 36 requires a public hearing to be held for the injection of fluids containing hydrogen sulfide where:
 - a. injection fluid is a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100-ppm radius of exposure is in excess of 50 feet and includes any part of a public area except a public road; or, if the 500 ppm radius of exposure is in excess of 50 feet and includes any part of a public road; or if the 100-ppm radius of exposure is 3,000 feet or greater; or
 - b. the hydrogen sulfide content of the gas or gaseous mixture to be injected has been increased by a processing plant operation.
5. Halcón intends to convert an existing wellbore on its Hutchings-Sealy lease approximately 6.5 miles south of Wink, Texas, where Halcón owns the surface and also owns minerals in fee.³⁷
6. Halcón will dispose waste gas which contains CO₂ and H₂S into the substantially depleted Ellenberger formation that is not producing in this area.³⁸
 - a. A public hearing is required pursuant to Statewide Rule 36(c)(10)(A) because the 500-ppm radius of exposure ("ROE") is estimated to be 4,900 feet, and the 100-ppm ROE to be 12,000 feet.³⁹
 - b. A hearing on the application was held on July 16, 2020.
 - c. The application is unopposed.
7. The maximum escape rate of fluids containing H₂S is estimated to be 235.1 MMCFD,⁴⁰ which assumes worst case conditions of complete wellhead failure and direct gas discharge from the open casing.
8. Halcón employed experts to perform gas dispersion modeling based on the results of the 235.1 MMCFD maximum escape rate.
 - a. Halcón used a dispersion model called CANARY to determine the radius of exposure of H₂S.

³⁷ Hearing Tr. 12:25-13:15 (Testimony of Bill Walker); Official Notice Ex. 1 (Declaration of Richard Little).

³⁸ Official Notice Ex. 1 (Declaration of Richard Little, Declaration of James M. Clark, P.E.).

³⁹ Hearing Ex. 15 at p. 070.

⁴⁰ Hearing Ex. 15 at p. 067.

- b. This model has been previously accepted by the Railroad Commission for ROE calculations, including Oil and Gas Docket Nos. 08-0320873, 01-0300843, 01-0271975 and 01-0249550, and has been approved by the Commission's State Coordinator for Hydrogen Sulfide Operations for use in this application.⁴¹
- c. The calculated ROE for 500-ppm H₂S, modeled based on the maximum catastrophic release at the proposed injection well, is 4,900 feet from the wellbore. For 100-ppm, the calculated ROE is 12,000 feet from the wellbore.
9. Notice of the application pursuant to Statewide Rule 46 and Statewide Rule 36 was provided to the operators within the ½ mile radius of the wellbore and to the Winkler County Clerk. Halcón is the surface owner of the subject tract.⁴² Notice and information regarding the application, pursuant to Rule 36, was also provided to all receptor points in the 100 ppm and 500 ppm area of exposure.⁴³
10. The Notice of Application was published in the *Winkler County News*, a newspaper of general circulation in Winkler County with the full description of the proposed injection, on April 4, 2019.
11. The Commission's District Coordinator for Hydrogen Sulfide Operations has reviewed and approved the Form H-9 (Certificate of Compliance Statewide Rule 36) and the contingency plan and determined that the proposed application complies with the applicable provisions of Statewide Rule 36 regarding materials and operation.⁴⁴
12. Halcon agreed to a special permit condition that limits the total volume of acid gas to be injected into the Hutchings-Sealy No. 2 Well to 12 BCF.
13. Halcón agreed on the record, that, pursuant to the provisions of Texas Government Code § 2001.144(a)(4)(A), the Final Order in this case shall be effective on the date a Master Order relating to the Final Order is signed.⁴⁵

CONCLUSIONS OF LAW

1. Resolution of the subject application is a matter committed to the jurisdiction of the Railroad Commission of Texas. Tex. Nat. Res. Code § 81.051.
2. All notice requirements have been satisfied. 16 Tex. Admin. Code § 1.41 and 1.42.
3. Halcón has complied with the requirements of Statewide Rule 36(c)(10)(A)(ii).

⁴¹ Hearing Ex. 17; Official Notice Ex. 1 (Declaration of James M. Clark, P.E.).

⁴² Hearing Tr. 15:25-16:4 (Testimony of Bill Walker); Hearing Tr. 44:2-12, 71:6-16 (Testimony of James Clark, P.E.); Hearing Exs. 7, 8, 11; Official Notice Ex. 2 (Exs. A-C).

⁴³ Hearing Ex. 15.

⁴⁴ Hearing Ex. 15 at p. 036; Hearing Ex. 16; Official Notice Ex. 1 (Declaration of James M. Clark, P.E.).

⁴⁵ Hearing Tr. 160:20-161:20.

4. The Statewide Rule 46 application is unopposed and can be administratively processed pursuant to Statewide Rule 46(c)(6).
5. Pursuant to § 2001.144(a)(4)(A) of the Texas Government Code, and the agreement of the applicant on the record, the Final Order in this case can be final and effective when a Master Order relating to the Final Order is signed.

EXAMINERS' RECOMMENDATION

Based on the above findings of fact and conclusions of law, the Examiners recommend that the Commission grant Statewide Rule 36 authorization for the Hutchings-Sealy No. 2, in Winkler County, Texas and Halcón Operating Company's application for a permit pursuant to Statewide Rule 46 for the above-referenced well be remanded for administrative processing in accordance with this report and recommendation.

Respectfully submitted,

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Austin Gaskamp
Technical Examiner

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