



# RAILROAD COMMISSION OF TEXAS

## HEARINGS DIVISION

OIL AND GAS DOCKET NO. 08-0320873

Tracking No. 50396

---

APPLICATION OF HALCÓN OPERATING CO., INC. (344412) PURSUANT TO STATEWIDE RULE 36 AND 46 FOR A PERMIT TO INJECT OIL AND GAS WASTE CONTAINING HYDROGEN SULFIDE INTO A RESERVOIR PRODUCTIVE OF OIL OR GAS FOR THE HUTCHINGS-SEALY (101722) LEASE, WELL NO. 4, WINK S. (MONTOYA-ELLENBURGER) FIELD, WINKLER COUNTY, TEXAS

---

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

**HEARING DATE:** August 13, 2019

**POST-HEARING CONFERENCE DATES:** October 14, 2019 and December 19, 2019

**CONFERENCE DATE:** February 11, 2020

**APPEARANCES:**

Olga Kobzar  
James Clark, P.E.  
Richard Little  
Bill Walker  
Liaqat Ali  
Russell Bentley  
Ted Lilly  
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 ("H<sub>2</sub>S") and carbon dioxide ("CO<sub>2</sub>") into a reservoir productive of oil or gas for its Hutchings-Sealy Lease, Well No. 4 ("Hutchings-Sealy No. 4 Well"), where Halcón owns the minerals in fee.<sup>1</sup>

---

<sup>1</sup> Declaration of Richard Little.

The Hutchings-Sealy No. 4 Well is an existing well located in Winkler County, approximately 6.5 miles south of Wink, Texas.

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.<sup>2</sup> In the application, Halcón has requested authority to inject up to 5,000 thousand cubic feet per day ("MCFD") of fluids containing H<sub>2</sub>S, methane, and CO<sub>2</sub> into its Hutchings-Sealy No. 4 Well, with an estimated average daily injection volume of 3,000 MCFD.<sup>3</sup> 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."<sup>4</sup>

Halcón seeks to inject acid gas containing H<sub>2</sub>S and CO<sub>2</sub>. 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 5,800 feet, and the 100-ppm ROE to be 14,000 feet.<sup>5</sup> Thus, a public hearing was required pursuant to Statewide Rule 36(c)(10)(A). A hearing on the application was held on August 13, 2019, with two post-hearing conferences held on October 14, 2019 and December 19, 2019.

Prior to the hearing, the Commission's State H<sub>2</sub>S Coordinator had reviewed and approved the Form H-9 (Certificate of Compliance Statewide Rule 36) and proposed H<sub>2</sub>S Contingency Plan and has determined that the proposed application complies with the applicable provisions of Statewide Rule 36.<sup>6</sup>

Halcón requested that, following approval of this Statewide Rule 36 application, the Statewide Rule 46 application be remanded to the Injection-Storage Permits Unit for

---

<sup>2</sup> Hearing Ex. 2.

<sup>3</sup> *Id.*

<sup>4</sup> See 16 Tex. Admin Code §3.36(c)(10)(A)

<sup>5</sup> Hearing Ex. 16 at p. 5.

<sup>6</sup> Hearing Ex. 16 at p. C-2; Declaration of James M. Clark, P.E.

administrative processing of the application. The Technical Examiner and Administrative Law Judge (collectively, "Examiners") recommend Statewide Rule 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, the Hutchings-Sealy No. 4 Well to conduct its acid gas injection ("AGI") operations on its Hutchings-Sealy Lease approximately 6.5 miles south of Wink, Texas.

Notice of the application pursuant to Statewide Rule 46 and Statewide Rule 36 was provided to the surface owner, operators within the ½ mile radius of the wellbore, and to the Winkler County Clerk.<sup>7</sup> 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 on February 14, 2019, and republished, with additional description of the proposed injection, on April 4, 2019.<sup>8</sup> 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.<sup>9</sup> The 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 No. 4 Well is the most prolific area of development for the company.<sup>10</sup> Additional disposal capacity is needed for Halcón to be able to fully develop its acreage position in the area.<sup>11</sup> The Hutchings-Sealy No. 4 Well will dispose of gas which primarily contains CO<sub>2</sub> and H<sub>2</sub>S. 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.<sup>12</sup> Halcón will inject into a substantially depleted Ellenburger formation at approximately 18,300 feet, far 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.<sup>13</sup> Because the injection will utilize an existing wellbore, Halcón's proposed injection interval includes both the Ellenburger and the 100-foot thick Connell Sand. However, because the Connell Sand is not porous, only the Ellenburger will have sufficient permeability to accept the injection fluids.<sup>14</sup> Reservoir studies and modelling 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. 4 Well.<sup>15</sup> There are no producing Ellenburger wells

---

<sup>7</sup> Hearing Exs. 7-8.

<sup>8</sup> Hearing Exs. 9, 11.

<sup>9</sup> August 16, 2019 supplemental notice Exs. A-C.

<sup>10</sup> See Declaration of Richard Little.

<sup>11</sup> *Id.*

<sup>12</sup> Declaration of Richard Little; Declaration of James M. Clark, P.E.

<sup>13</sup> Declaration of James M. Clark, P.E.

<sup>14</sup> 12/19/19 Tr. 14:10-15:10; Hearing Ex. 14.

<sup>15</sup> *Id.*

in the immediate area except for Halcón's own Hutchings-Sealy lease, well No. 2 ("Hutchings-Sealy No. 2 Well"), which Halcón is also seeking an injection permit to convert to an AGI well.<sup>16</sup>

At the hearing and during post-hearing conferences, Halcón's experts offered exhibits and testimony to demonstrate that the existing wellbore for the Hutchings-Sealy No. 4 Well is suitable to acid gas injection and can be operated safely using equipment and materials suitable for injection of H<sub>2</sub>S and CO<sub>2</sub> gas.<sup>17</sup> The entire facility will be fenced and locked to restrict access to the Hutchings-Sealy No. 4 Well.<sup>18</sup>

A reservoir simulation was performed for the proposed injection into the Hutchings-Sealy No. 4 Well to predict the maximum probable extent of underground waste plume migration.<sup>19</sup> A study of all wellbores within the projected plume radius shows the only well that penetrated the proposed disposal interval is the Hutchings-Sealy No. 2 Well, operated by Halcón and planned to be converted to an AGI well. At the Examiners' request, Halcón performed additional plume study modeling to include injection into the nearby proposed Hutchings-Sealy No. 2 Well, along with additional modeling based on Halcón's interpretation of its 3D seismic data.<sup>20</sup> Halcón experts utilized the Computer Modeling Group's ("CMG") suite of software to conduct their plume modeling study: GEM (3-D compositional simulator), WinProp [Equation of State ("EOS") for pressure, volume and temperature ("PVT")], Builder (Static and Dynamic Model).<sup>21</sup> The static geological model was provided to the experts by Halcón and built using the Petrel software.<sup>22</sup> The EOS modeling was performed in WinProp using gas composition provided by Halcón and PVT utilized publicly available information and available Commission documents.<sup>23</sup> A dynamic simulation model was built using Builder and simulations were run in GEM.<sup>24</sup> The fluid being disposed of, for purposes of the model, was projected to be approximately 53 mole% H<sub>2</sub>S, 46 mole% CO<sub>2</sub>, and 1 mole% other gases.<sup>25</sup> Those simulations were run over the course of thirty and fifty years. In each scenario (i.e., injection solely into the Hutchings-Sealy No. 4 Well vs. injection into both the Hutchings-Sealy No. 4 Well, subject to this application, and the proposed Hutchings-Sealy No. 2 Well), the plume migration trended towards northeast of the injection well and just outside of the ½ mile radius of Hutchings-Sealy No. 4 Well. The maximum possible extent of the acid gas plumes in all the modeled 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.

The maximum escape rate of gas containing H<sub>2</sub>S is estimated to be 421.7 million

---

<sup>16</sup> *Id.*

<sup>17</sup> Hearing Exs. 3, 16; Late-filed Ex. 20; November 15, 2019 Halcón Response to October 14, 2019 post-hearing questions; 12/19/19 Conf. Tr. 9:18-14:5.

<sup>18</sup> Hearing. Ex. 16 at p. 41.

<sup>19</sup> Hearing Ex. 18; Declaration of Liaqat Ali; Hearing Tr. 7:1-10:3.

<sup>20</sup> Late-Filed Ex. 18-A; November 15, 2019 Ex. F; Declaration of Liaqat Ali.

<sup>21</sup> Declaration of Liaqat Ali.

<sup>22</sup> *Id.*

<sup>23</sup> *Id.*

<sup>24</sup> *Id.*

<sup>25</sup> *Id.*

cubic feet per day ("MMCFD"), which uses the worst-case conditions of complete wellhead failure and direct gas discharge from the open casing. Halcón employed Flatrock Engineering 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 H<sub>2</sub>S. The CANARY model has been previously accepted by the Commission for radius of exposure ("ROE") calculations.<sup>26</sup> 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.<sup>27</sup> The calculated ROE for 500 ppm H<sub>2</sub>S maximum catastrophic release at the proposed injection well, is 5,800 feet from the wellbore. For 100 ppm, the calculated ROE is 14,000 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. Halcón also prepared a public assessment within the 500-ppm and the 100-ppm ROE for the Hutchings-Sealy No. 4 Well.<sup>28</sup> 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.<sup>29</sup> Halcón worked with the Commission's State Hydrogen Sulfide Coordinator Sam Birdwell to obtain administrative approval of the H-9 for the Hutchings-Sealy No. 4 Well, following a thorough review and discussions about Halcón's modeling of the maximum escape rate of the gas using the CANARY model.<sup>30</sup> "Mr. Birdwell has also reviewed and is comfortable with Halcon's contingency plan,"<sup>31</sup> and its suitability 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 (H<sub>2</sub>S) and carbon dioxide (CO<sub>2</sub>) into the proposed Hutchings-Sealy Lease, Well No. 4.
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. The Statewide Rule 46 application is unopposed and may be administratively approved 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

---

<sup>26</sup> See Oil and Gas Docket Nos. 01-0300843, 01-0271975 and 01-0249550

<sup>27</sup> Hearing Ex. 17; Declaration of James M. Clark, P.E.

<sup>28</sup> Hearing Ex. 16; August 16, 2019 supplemental notice Exs. A-C.

<sup>29</sup> *Id.*

<sup>30</sup> *Id.*; Hearing Ex. 16 at C-2.

<sup>31</sup> Declaration of James M. Clark, P.E

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 has approximately 55,000 acres under lease in the Delaware Basin area, and the area near the proposed Hutchings-Sealy No. 4 Well is the most prolific area of development for the company. Halcón intends to convert an existing wellbore on its Hutchings-Sealy lease approximately 6.5 miles south of Wink, Texas, where Halcón owns the minerals in fee.<sup>32</sup>
  6. Halcón will dispose waste gas which contains CO<sub>2</sub> and H<sub>2</sub>S into the substantially depleted Ellenberger formation that is not productive of oil or gas in this area.<sup>33</sup>
  7. Halcón's proposed injection interval includes both the Ellenberger and the 100-foot thick Connell Sand.
  8. There are no producing Ellenberger wells in the immediate area except for Halcón's own Hutchings Sealy No. 2 Well, which Halcón is also seeking to convert to an AGI well.
  9. Reservoir studies and modelling shows that the fluids will be contained within the formation.
  10. The existing wellbore for the Hutchings-Sealy No. 4 Well is suitable to acid gas injection and can be operated safely using equipment and materials suitable for injection of H<sub>2</sub>S and CO<sub>2</sub> gas.
  11. The entire facility will be fenced and locked to restrict access to the Hutchings-Sealy No. 4 Well.
  12. 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 5,800 feet, and the 100-ppm ROE to be 14,000 feet for a catastrophic release on the Hutchings-Sealy No. 4 Well.<sup>34</sup>
  13. On June 12, 2019, the Hearings Division of the Commission sent a Notice of Hearing ("Notice") to Applicant and all offsetting operators in the field setting a hearing date of August 13, 2019. Consequently, the parties received more than 10 days' notice.

---

<sup>32</sup> Declaration of Richard Little.

<sup>33</sup> Declaration of Richard Little; Declaration of James M. Clark, P.E.

<sup>34</sup> Hearing Ex. 16 at p. 5.

The Notice contains (1) a statement of the time, place, and nature of the hearing; (2) a statement of the legal authority and jurisdiction under which the hearing is to be held; (3) a reference to the particular sections of the statutes and rules involved; and (4) a short and plain statement of the matters asserted. The hearing was held on August 13, 2019, as noticed. Applicant appeared and participated at the hearing. No one appeared in protest. Notice of the application pursuant to Statewide Rule 46 and Statewide Rule 36 was provided to surface owner, operators within ½ mile, and to the Winkler County Clerk.<sup>35</sup> Notice and information regarding the application, pursuant to Rule 36, was also provided to all operators or entities located within the 100-ppm and 500-ppm area of exposure.<sup>36</sup> Two post-hearing conferences were held on October 14, 2019 and December 19, 2019, by request of the Examiners.

14. The Notice of Application pursuant to Statewide Rules 36 and 46 was published in the *Winkler County News*, a newspaper of general circulation in Winkler County on February 14, 2019, and republished, with an additional description of the proposed injection, on April 4, 2019.
15. The maximum escape rate of fluids containing H<sub>2</sub>S is estimated to be 421.7 MMCFD,<sup>37</sup> which assumes worst case conditions of complete wellhead failure and direct gas discharge from the open casing.
16. Halcón employed experts to perform gas dispersion modeling based on the results of the 421.7 MMCFD maximum escape rate.
  - a. Halcón used a dispersion model called CANARY to determine the radius of exposure of H<sub>2</sub>S.
  - b. This model has been previously accepted by the Railroad Commission for ROE calculations, including in Oil and Gas Docket Nos. 01-0300843, 01-0271975 and 01-0249550, and has been approved by the Commission's State Coordinator for H<sub>2</sub>S Operations for use in this application.<sup>38</sup>
  - c. The calculated ROE for 500 ppm H<sub>2</sub>S, modeled based on the maximum catastrophic release at the proposed injection well, is 5,800 feet from the wellbore. For 100 ppm, the calculated ROE is 14,000 feet from the wellbore.
17. The Commission's State Coordinator for Hydrogen Sulfide Operations has reviewed and approved the Form H-9 (Certificate of Compliance Statewide Rule 36) and H<sub>2</sub>S Contingency Plan and has determined that the proposed application complies with

---

<sup>35</sup> Hearing Exs. 7, 8, 11; August 16, 2019 supplemental notice Exs. A-C.

<sup>36</sup> August 16, 2019 supplemental notice Exs. A-C.

<sup>37</sup> Hearing Ex. 16 at D-1, p.3.

<sup>38</sup> Hearing Ex. 17; Declaration of James M. Clark, P.E.

the applicable provisions of Statewide Rule 36 regarding materials and operation.<sup>39</sup>

18. Halcón agreed, on the record, pursuant to the provisions of Texas Government Code § 2001.144(a)(4)(A), that the Final Order can be effective on the date a Master Order relating to this Final Order is signed.<sup>40</sup>

### **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 § 1.42 and 1.45.
3. Halcón has complied with the requirements of Statewide Rule 36(c)(10)(A)(ii).
4. 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 can be 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. 4, 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 approval.

Respectfully submitted,



Austin Gaskamp  
Technical Examiner



Jennifer Cook  
Administrative Law Judge

<sup>39</sup> Hearing Ex. 16 at C-2; Declaration of James M. Clark, P.E.

<sup>40</sup> 12/19/19 Conf. Tr. 24:16-22.