

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

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**IN THE MATTER OF THE HEARING CALLED  
BY THE OIL CONSERVATION COMMISSION FOR  
THE PURPOSE OF CONSIDERING:**

**APPLICATION OF AGAVE ENERGY COMPANY  
FOR AUTHORITY TO INJECT, LEA  
COUNTY, NEW MEXICO**

**Case No. 14720**

**AGAVE ENERGY COMPANY'S  
PRE-HEARING STATEMENT**

Pursuant to 19.15.4.13(B)(1) NMAC, applicant Agave Energy Company ("Agave") submits its Pre-Hearing Statement.

**APPEARANCES**

Agave's business address is 105 S. Fourth Street, Artesia, New Mexico 88210. It is represented by the undersigned counsel.

Kaiser-Francis Oil Company ("Kaiser-Francis") appeared with counsel at the Commission hearing held on December 8 and 9, 2011 and opposed Agave's application requesting authorization to inject treated acid gas ("TAG") from its Red Hills Gas Processing Plant into the Red Hills AGI #1 disposal well. Kaiser-Francis is represented by James Bruce.

The Oil Conservation Division ("the Division") entered an appearance on July 20, 2012. The Division is represented by Gabrielle A. Gerholt.

**STATEMENT OF THE CASE**

On January 23, 2012, the Commission issued Order No. R-13507 granting Agave's application and authorizing Agave to drill and operate the Red Hill AGI #1 well, which will be located in Section 13, Township 24 South, Range 33 East, NMPM, in Lea County. Order No. R-

13507 imposes certain conditions, including requirements that Agave reenter and replug four plugged and abandoned wells located within a one-mile radius of the Red Hills AGI #1 well. On May 14, 2012, Agave filed a motion requesting the Commission to amend Order No. R-13507 by eliminating the requirement that Agave reenter and replug the Smith Federal #001 (API 30-025-27491) well. On June 28, 2012, the Commission issued Order No. R-13507-A granting Agave's motion and amending Order No. R-13507 by removing the Smith Federal #1 well from the list of wells that the Commission required Agave to reenter and replug.

On August 13, 2012, Agave filed its Amended Second Motion to Amend Order No. R-13507. The motion is based on new reservoir and production data and Agave's new modeling of the radius of the TAG injection plume after thirty years. In the motion, Agave requests that the Commission amend Order No. R-13507 by: (1) eliminating the requirement that Agave place a balanced plug in the Government L Com #002 well across the injection zone; (2) eliminating the requirement that Agave reenter and replug the Government L Com #001 well; and (3) reducing either the life span of Agave's injection authority or the total volume of TAG to be injected. At the hearing, Agave will withdraw its request for a reduction of either the life span of its injection authority or the total volume of TAG to be injected.

#### **PROPOSED EVIDENCE**

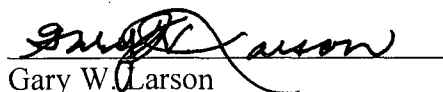
| <u>WITNESSES</u>                 | <u>EST. TIME</u> | <u>EXHIBITS</u> |
|----------------------------------|------------------|-----------------|
| Ivan Villa<br>(Engineer)         | 10 min.          | 1               |
| Alberto Gutierrez<br>(Geologist) | 30 min.          | 1               |

In accordance with 19.15.4.13(B)(2) NMAC, copies of the exhibits that Agave Energy will offer into evidence at the hearing are attached.

### PROCEDURAL MATTERS

There are no procedural matters to be resolved prior to the hearing.

HINKLE, HENSLEY, SHANOR &  
MARTIN, LLP



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*Counsel for Agave Energy Company*

### CERTIFICATE OF SERVICE

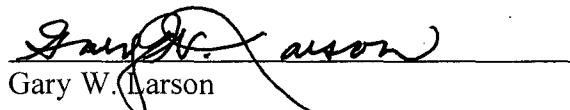
I hereby certify that on this 18<sup>th</sup> day of October, 2012, I served a true and correct copy of the foregoing *Agave Energy Company's Pre-Hearing Statement* via email to:

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Gary W. Larson

**STATE OF NEW MEXICO  
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
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**IN THE MATTER OF THE HEARING CALLED  
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**APPLICATION OF AGAVE ENERGY COMPANY  
FOR AUTHORITY TO INJECT, LEA  
COUNTY, NEW MEXICO**

**Reopened  
Case No. 14720**

**STIPULATION**

Agave Energy Company ("Agave") and the Oil Conservation Division ("the Division")  
hereby agree and stipulate as follows:

**I. STIPULATED FACTS**

1. Agave is the owner and operator of the Red Hills Gas Processing Plant, which is situated on real property owned by Agave and is located in Section 13, Township 24 South, Range 33 East, NMPM, in Lea County.

2. On July 20, 2011, Agave filed an application for authority to inject treated acid gas ("TAG") containing carbon dioxide (CO<sub>2</sub>) and hydrogen sulfide (H<sub>2</sub>S) from the Red Hills Gas Processing Plant into the Red Hills AGI #1 well, which will be located 1,600 feet from the South line and 150 feet from the East line of Section 13, Township 24 South, Range 33 East.

3. On January 23, 2012, the Oil Conservation Commission ("Commission") issued its Order No. R-13507, which authorizes Agave to drill and operate the Red Hills AGI #1 disposal well and to inject TAG into the well.

4. In Order No. R-13570, the Commission found that Agave's actual average daily injection rate over a thirty-year period will be 7.8 MMSCFD, and that the total amount of TAG to be injected over that time period will be 210 MMCF.

OCC Case No. 14720

**AGAVE ENERGY  
Exhibit # 1**

5. The Commission further found that, based on Agave's modeling of the size of the injection plume after thirty years of injecting TAG at an average rate of 7.8 MMSCFD, the radius of the plume will be 0.39 miles.

6. Order No. R-13507 imposes certain conditions on Agave's operation of the Red Hills AGI #1 well, including requirements that, before commencing the injection of TAG, Agave must: (1) reenter the plugged and abandoned Sims #001 (API 30-025-26958), Smith Federal #001 (API 30-025-27491), and Government L Com #001 (API 30-025-25604) wells, perforate and squeeze cement across the injection zone in each well, and replug the wells in accordance with current Division requirements; and (2) reenter the plugged and abandoned Government L Com #002 (API 30-025-26369) well, place a balanced cement plug across the injection zone, and replug the well in accordance with current Division requirements.

7. Order No. R-13507 provides that Agave's injection authority shall terminate thirty (30) years after the date of entry of the order.

8. On June 28, 2012, the Commission entered its Order No. R-13507-A, which amends Order No. R-13507 by eliminating the requirement that Agave reenter and replug the Smith Federal #001 well.

9. Agave has successfully completed the reentry and replugging work on the Sims #001 well that is required by Order No. R-13507.

10. Agave filed a subsequent C-103 identifying the work performed on the Sims #001 well.

11. The Division's District 1 Office has approved Agave's subsequent C-103.

12. In the course of performing the remedial work on the Sims #001 well, Agave conducted an injection test in the Commission-approved injection reservoir in the Cherry Canyon formation.

13. The injection test data reveal that the injection reservoir is under-pressured. At an injection rate of 144% of the maximum rate of injection for the Red Hills AGI #1 well, the reservoir took the injected fluid on vacuum.

14. The injection test data demonstrate that Agave's estimates of the reservoir capacity are overly conservative, and that the reservoir capacity is greater than Agave anticipated when it filed its application.

15. The injection test results further demonstrate that Agave's modeling of the radius of the injection plume prior to filing its application also is overly conservative, and significantly over-predicts the radius of the injection plume.

16. In July of 2012, Agave analyzed the composition and volume of the inlet gas to be delivered to the Red Hills Gas Processing Plant for processing based on production data from wells that will deliver gas to the plant.

17. Agave's analysis of the production data reveals that the composition of the TAG to be injected will be 99.8% CO<sub>2</sub> and 0.2% H<sub>2</sub>S, rather than ratio of 95% CO<sub>2</sub> and 5% H<sub>2</sub>S that Agave originally anticipated and that is indicated in Order No. R-13507.

18. Agave's analysis of the production data further reveals that the average injection rate of TAG over thirty years will be 6.74 MMCFD, or 14% less than the average injection rate of 7.78 MMCFD that is indicated in Order No. R-13507.

19. Based on the reservoir and production data that it analyzed after the Commission issued Order No. R-13507, Agave has conducted new modeling of the injection plume after thirty years of injecting TAG at an average rate of 6.74 MMCFD.

20. Based on Agave's new modeling, the radius of the injection plume will be 0.30 miles after thirty years.

21. The Government L Com #001 well is located 0.72 miles from the surface location of the Red Hills AGI #1 well. It is essentially the same distance from the Red Hills AGI #1 well as the Smith Federal #001 well, which the Commission addressed in Order No. R-13507-A.

22. The Government Com #002 well is located 0.40 miles from the surface location of the Red Hills AGI #1 well. The heavy mud in the wellbore across the injection zone, the existing plugs above and below the injection zone, and the under-pressured injection reservoir are adequate to prevent the well from becoming a conduit for injected TAG.

23. On June 21, 2012, Agave commenced the reentry of the Government L Com #002 well as required by Order No. R-13507.

24. Agave drilled for 17 days to reach the original 10 ¾" casing at 2,731 feet, and in doing so was forced to conduct multiple drilling operations to cut through and remove metal debris in the wellbore.

25. Agave then spent five more days attempting to reenter the 10 ¾" casing before concluding that the casing top was either damaged or loose and not centered and, therefore, could not be entered.

26. Throughout the process of its attempt to reenter the Government L Com #002 well, Agave consulted with Division representatives regarding the reentry work.

27. After Agave determined that it could not enter the 10 ¾" casing at 2,731 feet, Agave and the Division agreed that it was not possible for Agave to reach the requisite depth to place a balanced plug in the Government L Com #002 well across the injection zone and further agreed that, as a consequence, Agave should terminate its reentry efforts.

28. Agave then submitted an alternative plugging plan for the Government L Com #002 well, which the Division has accepted of record and agrees should be approved.

29. Agave has postponed the alternative plugging program for the Government L Com #002 well pending the Commission's ruling on Agave's Amended Second Motion to Amend Order No. R-13507.

30. On July 16, 2012, Agave filed its Second Motion to Amend Order No. R-14720, which requested the Commission to amend the order by eliminating the requirement that Agave place a balanced cement plug in the Government L Com #2 well across the injection zone.

31. Following the submission of Agave's alternative plugging plan for the Government L Com #002 well and the filing of its Second Motion to Amend Order No. R-13507, Agave and the Division entered into discussions regarding the issue of whether the current plugging configuration of the Government L Com #002 well would sufficiently protect against the migration of injected TAG into the wellbore.

32. Those discussions culminated in a verbal agreement between the parties that Agave would reduce the radius of the injection plume by requesting the Commission to reduce either the life span of Agave's injection authority or the total volume of TAG to be injected.

33. On August 8, 2012, Agave withdrew its Second Motion to Amend Order No. R-13507.



34. On August 13, 2012, Agave filed its Amended Second Motion to Amend Order No. R-13507, which requests the Commission to amend Order No. R-13507 by (i) eliminating the requirement that Agave place a balanced plug in the Government L Com #002 well across the injection zone; (ii) eliminating the requirement that Agave reenter and replug the Government L Com #001 well; and (iii) reducing either the life span of Agave's injection authority or the total volume of TAG to be injected.

35. On August 14, 2012, the Commission issued its Order No. R-13507-B, which grants Agave's withdrawal of its Second Motion to Amend Order No. R-13507.

36. After it filed the Amended Second Motion to Amend Order No. R-13507, Agave conducted the new modeling of the radius of the injection plume after thirty years based on: (1) the injection test performed during the reentry of the Sims #001 well; and (2) the production data revealing reductions in the H<sub>2</sub>S concentration and the average daily volume of the TAG to be injected into the Red Hills AGI #1 well.

37. Because the maximum radius of the injection plume will be 0.30 miles after thirty years of injection, Agave determined that it is not necessary for the Commission to reduce either the life span of Agave's injection authority or the total volume of TAG to be injected.

38. Agave and the Division agree that, based on the newly-modeled radius of the injection plume, the Government L Com #001 and #002 wells are a safe distance from the surface location of the Red Hill AGI #1 well and, therefore, there is not a threat of TAG migrating into the wellbores.

39. Agave has not reentered the Government L Com #001 well.

## **II. STIPULATION REGARDING RELIEF REQUESTED BY AGAVE IN ITS AMENDED SECOND MOTION TO AMEND ORDER NO. R-13507.**

Agave and the Division further stipulate that:

40. The radius of the TAG plume after thirty years of injection will be 0.30 miles.

41. The Government L Com #001 well does not present a threat of becoming a conduit for the TAG to be injected in the Red Hills AGI #1 well.

42. The Government L Com #002 well does not present a threat of becoming a conduit for the TAG to be injected into the Red Hills AGI #1 well.

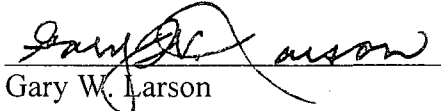
43. It is not necessary for the Commission to reduce the life span of Agave's injection authority or further reduce the total amount of TAG to be injected by Agave beyond the revised average injection rate of 6.74 MMCFD, which is 14% less than the average injection rate in Order No. R-13507.

44. The Commission should enter an order eliminating the requirements in Order No. R-13570 that Agave: (1) reenter the Government L Com #001 well, perforate and squeeze cement across the injection zone, and replug the well in accordance with current Division requirements; and (2) place a balanced cement plug in the Government L Com #002 well across the injection zone.

45. This stipulation should be made a part of the administrative record in Case No. 14720 and its terms should be incorporated in a Commission Order granting Agave's Amended Second Motion to Amend Order No. R-13507.

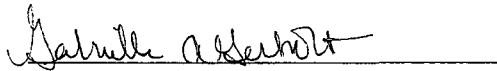
**SUBMITTED BY:**

HINKLE, HENSLEY, SHANOR &  
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A handwritten signature in cursive script, appearing to read "Gary W. Larson", is written over a horizontal line.

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*Counsel for Agave Energy Company*

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*Counsel for the Oil Conservation Division*

# Agave Energy Company

## Request to Discontinue Remediation Attempt for Government "L" Com #2 and Remove Requirement to Remediate the Government "L" Com #1 and #2 Due to Technical Infeasibility, New Production Data and Results of New Reservoir Analyses

Hearing before the New Mexico Oil Conservation Commission

October 25, 2012

Santa Fe, NM

OCC Case No. 14720  
AGAVE ENERGY  
Exhibit # 2

**GEOLEX**  
INCORPORATED



# Agave's Witnesses

- Ivan Villa – Engineering Manager
- Alberto A. Gutierrez, RG – Geolex, Inc



# Presentation Outline

- New data on the projected TAG composition and volume based on enhanced production information
- Summary of request to modify Order R-13507 based on additional data collected on injection zone pressure and Sw and experience during well remediation
- Summary of remedial attempts for Govt #2
- Summary of successful remediation of Sims #1
- Summary of remedial status of Govt #1
- Revised estimate of plume geometry, chemistry and maximum extent based on TAG volumes and reservoir conditions
- Coordination with OCD District 1 and Santa Fe staff and joint development of revised well remediation program protective of correlative rights and fresh water resources – OCD Stipulation
- Summary of Agave's request for relief from OCC



# Updated Calculation of TAG Composition

**TAG composition is now anticipated to be in excess of 99.8% CO<sub>2</sub> and less than 0.2% H<sub>2</sub>S (original composition projected at 95% and 5%, respectively)**

| Process Streams  |             | TAG 1/13  | TAG 7/13 | TAG 120 MM |
|------------------|-------------|-----------|----------|------------|
| Composition      | Status:     | Solved    | Solved   | Solved     |
| Phase: Total     | From Block: | DVDR-3    | DVDR-2   | DVDR-4     |
|                  | To Block:   | --        | --       | --         |
| Mole Fraction    |             | %         | %        | %          |
| CO <sub>2</sub>  |             | 99.9244   | 99.8384  | 99.8373    |
| N <sub>2</sub>   |             | 0         | 0        | 0          |
| H <sub>2</sub> S |             | 0.0756338 | 0.161640 | 0.162717   |
| C <sub>1</sub>   |             | 0         | 0        | 0          |
| C <sub>2</sub>   |             | 0         | 0        | 0          |
| C <sub>3</sub>   |             | 0         | 0        | 0          |
| iC <sub>4</sub>  |             | 0         | 0        | 0          |
| nC <sub>4</sub>  |             | 0         | 0        | 0          |
| iC <sub>5</sub>  |             | 0         | 0        | 0          |
| nC <sub>5</sub>  |             | 0         | 0        | 0          |
| C <sub>6</sub>   |             | 0         | 0        | 0          |
| H <sub>2</sub> O |             | 0         | 0        | 0          |
| MDEA             |             | 0         | 0        | 0          |
| DEA              |             | 0         | 0        | 0          |
| Methyl Mercaptan |             | 0         | 0        | 0          |
| Ethyl Mercaptan  |             | 0         | 0        | 0          |
| Propyl Mercaptan |             | 0         | 0        | 0          |
| Butyl Mercaptan  |             | 0         | 0        | 0          |

Based on engineering assessment of new wells and gas coming online conducted in June 2012

# Updated Calculation of TAG Injection Rate and Composition

**New projected average TAG injection rate over 30 years is 14% less than originally anticipated (6.74 MMCFD vs. 7.78 MMCFD)**

| YEAR | Inlet<br>Volume<br>(mmcf/d) | TAG Volume<br>(mmcf/d) | CO <sub>2</sub> mole % | H <sub>2</sub> S mole % | Operating<br>Days | Annual TAG<br>Volume (mmcf) |
|------|-----------------------------|------------------------|------------------------|-------------------------|-------------------|-----------------------------|
| 2013 | 34                          | 1.93                   | 99.92                  | 0.0756                  | 330               | 637                         |
| 2014 | 34                          | 1.93                   | 99.92                  | 0.0756                  | 330               | 637                         |
| 2015 | 46                          | 2.63                   | 99.92                  | 0.0756                  | 350               | 921                         |
| 2016 | 60                          | 3.69                   | 99.8384                | 0.1616                  | 350               | 1292                        |
| 2017 | 60                          | 3.69                   | 99.8384                | 0.1616                  | 350               | 1292                        |
| 2018 | 90                          | 5.55                   | 99.8384                | 0.1616                  | 350               | 1943                        |
| 2019 | 90                          | 5.55                   | 99.8384                | 0.1616                  | 350               | 1943                        |
| 2020 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 330               | 2455                        |
| 2021 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2022 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2023 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2024 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2025 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2026 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2027 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2028 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2029 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2030 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2031 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2032 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2033 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2034 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2035 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2036 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2037 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2038 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2039 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2040 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2041 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2042 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2043 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |
| 2044 | 120                         | 7.44                   | 99.8373                | 0.1627                  | 350               | 2604                        |

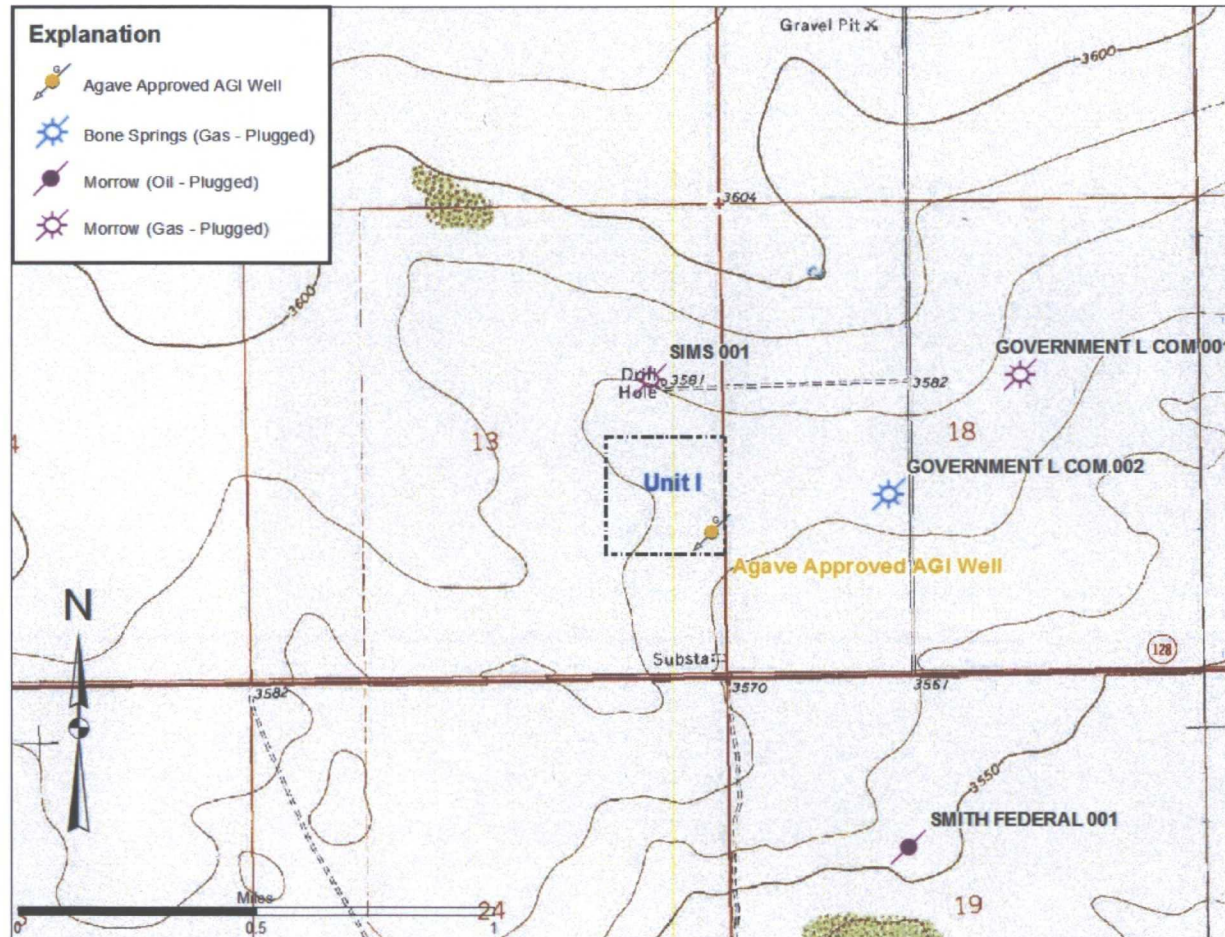




# Key Elements of Agave's Request

- TAG composition is now anticipated to be in excess of 99.8% CO<sub>2</sub> and less than 0.2% H<sub>2</sub>S (original composition projected at 95% and 5%, respectively)
- New projected average TAG injection rate over 30 years is 14% less than originally anticipated (6.74 MMCFD vs. 7.78 MMCFD)
- Extensive attempts to remediate Govt #2 demonstrate technical infeasibility of remedial effort for this well
- Similar conditions exist in Govt #1 making attempt to remediate technically infeasible
- Injection test on the Cherry Canyon completed during remedial operations proves that reservoir is underpressured taking 3.5 bpm of fluid at 400 psi and 3.0 bpm of fluid on vacuum (approximate average injection rate)
- Additional data on Sw indicates original values were overestimated as confirmed by log analysis of newer logs and injection testing of reservoir (.43 vs. .54) which results in substantial increase in reservoir capacity, significantly reducing predicted plume extent
- The underpressured condition of the reservoir makes the predicted radius of 30 year injection plume very conservative and virtually guarantees that fluid will not leave the reservoir even if it encountered a potential conduit
- Distance from edge of revised plume extent calculations indicate that the Govt #2 and Govt #1 are well protected from TAG in the reservoir given the underpressured condition of the Cherry Canyon.

# Location of Government L Com #2 and Government L Com #1



# Summary of Govt. #2 Remedial Operations

- Approved original plan: Drill out surface plugs, reenter cut off 10 ¾" casing, enter open hole below 5500' and set balanced cement plug across the Cherry Canyon zone (from 6150' – 6450') and replace prior up hole plugs per requirements of Order R-13507
- Attempts to implement approved plan:
  - Very difficult drilling in upper well due to metal debris and "junk" and tight/collapsed bore to 1740'
  - Tagged previously cut 10 ¾" casing at 2371'
  - Could not successfully re-enter the 10 ¾" casing after 3 days of attempts; found large washout in borehole; impression block could not identify casing top; bit deviated away from casing to 2563'
- Current Status: Spotted 320 sx above casing stub, tagged at 2310'. Well now secured with night cap.
- Proposed final plugging: Nipple up BOP, replace previous cement plugs per current OCD requirements, remove BOP, weld top plate and reclaim surface
- OCD District 1 staff concurs with proposed final plugging plan

# History of Remediation Operation to Attempt to Set Balanced Plug Across Cherry Canyon Zone

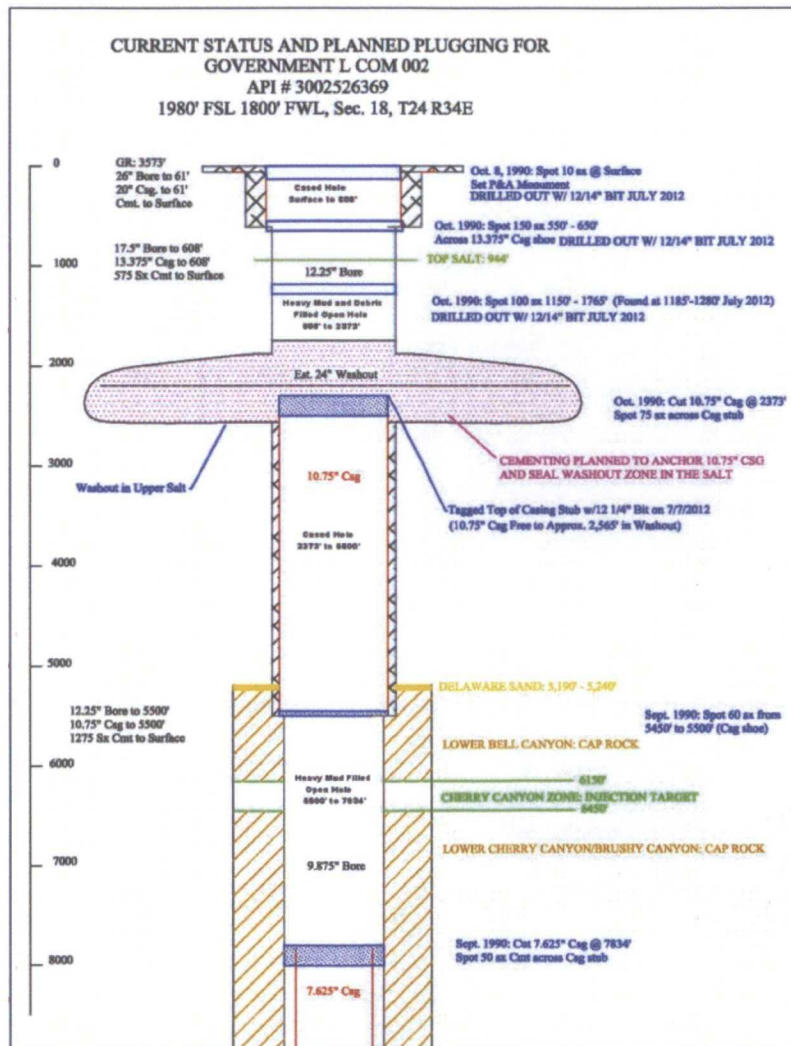
- Moved in and rigged up on June 21, 2012.
- Drilled 17 days w/12 1/4" bit to reach cut-off original 10 3/4" casing at ~2,371'. Multiple milling operations required to cut and remove junk metal in well.
- Rigged up with 9 1/4" bit and spent 5 additional days attempting to reenter 10 3/4" casing.
- Finally we believed we had entered casing and ran to 2,563' where we encountered resistance. We then milled a core and determined our 9 1/4" bore was outside and along side of the original 10 3/4" casing.
- Pulled out and ran impression block in attempt to identify cutoff top of 10 3/4" casing.
- Confirmed casing top was not centered and could not be re-entered.
- After consultation with District 1 set 350sx to fill washout area and plug cutoff top of casing and open hole to 2310'.
- Well is currently protected by periodically monitored night cap and is showing no sign of pressure or gas.

# Observations of Current Well Conditions

1. Analysis indicates that a large “washout” exists in the original borehole adjacent to the top of the cut-off 10  $\frac{3}{4}$ ” casing, and extends an unknown depth below the casing top
2. The top of the casing was not centered and was physically unstable (free to move laterally) within the washout zone
3. The top of the casing is either collapsed or damaged to an unknown extent
4. The instability and damaged top of the casing makes re-entry impossible
5. OCD District 1 and Santa Fe technical staff concur with this assessment and plugging.



# Current Well Status and Proposed Final Remediation



1. Remedial strategy and program developed in constant communication and consultation with OCD technical and legal staff with real time participation in decisions
2. Circulate well with heavy mud
3. Set cement plug to at least 50' above the casing stub
4. Replace former cement plugs above the casing stub according to current OCD requirements including squeezes (in/out)
5. Remove temporary well head and weld top plate
6. Reclaim site





# Summary of Successful Remediation of Sims #1

- Remediation began on July 17, 2012 and work conducted 6 to 7 days per week until completion on 8/14/2012.
- Significant difficulty encountered in drilling through trapped gas pockets between upper plugs, milling wood and metal debris in well.
- Finally after nearly 3 weeks we reached the target depth and circulated all trapped gas out of well and set CIBP under Cherry Canyon injection zone and RSST packer above to perform injection testing on zone and establish rate for proper cement squeeze in consultation with and approval by OCD District 1.
- Provided excellent opportunity to test reservoir– injection rates established:
  - **3bpm at 0 psig/on vacuum (145% of Agave's currently projected average TAG injection rate of 2.07bpm)**
  - **3.5bpm at 400psig surface**
  - Experience on other AGI wells near Hobbs under similar initial porosity/perm regime showed no reservoir pressure increase even after years of injection under similar conditions
- Plugs set at depths shown on final approved C-103 will protect all zones above and below injection zone, although natural underpressured reservoir will effectively prevent migration out of zone.

# Final OCD-Approved C-103 for Remediation of Sims #1

Submit 1 Copy To Appropriate District Office  
 District I - (575) 393-6161  
 1625 N. French Dr., Hobbs, NM 88240  
 District II - (575) 746-1263  
 811 S. First St., Artesia, NM 88210  
 District III - (505) 334-6178  
 1000 Rio Brazos Rd., Aztec, NM 87410  
 District IV - (505) 476-3460  
 1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico  
 Energy, Minerals and Natural Resources

Form C-103  
 Revised August 1, 2011

**RECEIVED**  
 OBSERVATION DIVISION  
 1220 South St. Francis Dr.  
 Santa Fe, NM 87505  
 AUG 16 2012

WELL API NO. 3002526958  
 5. Indicate Type of Lease STATE ☐ FEE ☒  
 6. State Oil & Gas Lease No. SCR-389  
 7. Lease Name or Unit Agreement Name Sims  
 8. Well Number #1  
 9. OGRID Number 147831  
 10. Pool name or Wildcat Big Sinks Wolfcamp

SUNDRY NOTICES AND REPORTS ON WELLS  
 (DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)  
 1. Type of Well: Oil Well ☐ Gas Well ☒ Other  
 2. Name of Operator: Agave Energy Company  
 3. Address of Operator 104 S. Fourth St., Artesia NM 88210 (575-748-4528)  
 4. Well Location  
 Unit Letter K- 1980 feet from the N line and 800 feet from the E line  
 Section 13 Township 24S Range 33E NMPM Lea County  
 11. Elevation (Show whether DR, RKB, RT, GR, etc.)

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

|  |  |   |  |
|--|--|---|--|
| <b>NOTICE OF INTENTION TO:</b><br>PERFORM REMEDIAL WORK <input type="checkbox"/> PLUG AND ABANDON <input type="checkbox"/><br>TEMPORARILY ABANDON <input type="checkbox"/> CHANGE PLANS <input type="checkbox"/><br>PULL OR ALTER CASING <input type="checkbox"/> MULTIPLE COMPL <input type="checkbox"/><br>DOWNHOLE COMMINGLE <input type="checkbox"/> |  | <b>SUBSEQUENT REPORT OF:</b><br>REMEDIAL WORK <input type="checkbox"/> ALTERING CASING <input type="checkbox"/><br>COMMENCE DRILLING OPNS <input type="checkbox"/> P AND A <input type="checkbox"/><br>CASING/CEMENT JOB <input type="checkbox"/> |  |
| OTHER: <input type="checkbox"/>  |  | OTHER: <input checked="" type="checkbox"/> Replug to cement off Cherry Canyon per NMOCC R-13507   |  |

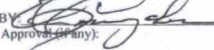
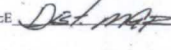
13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 19.15.7.14 NMAC. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion

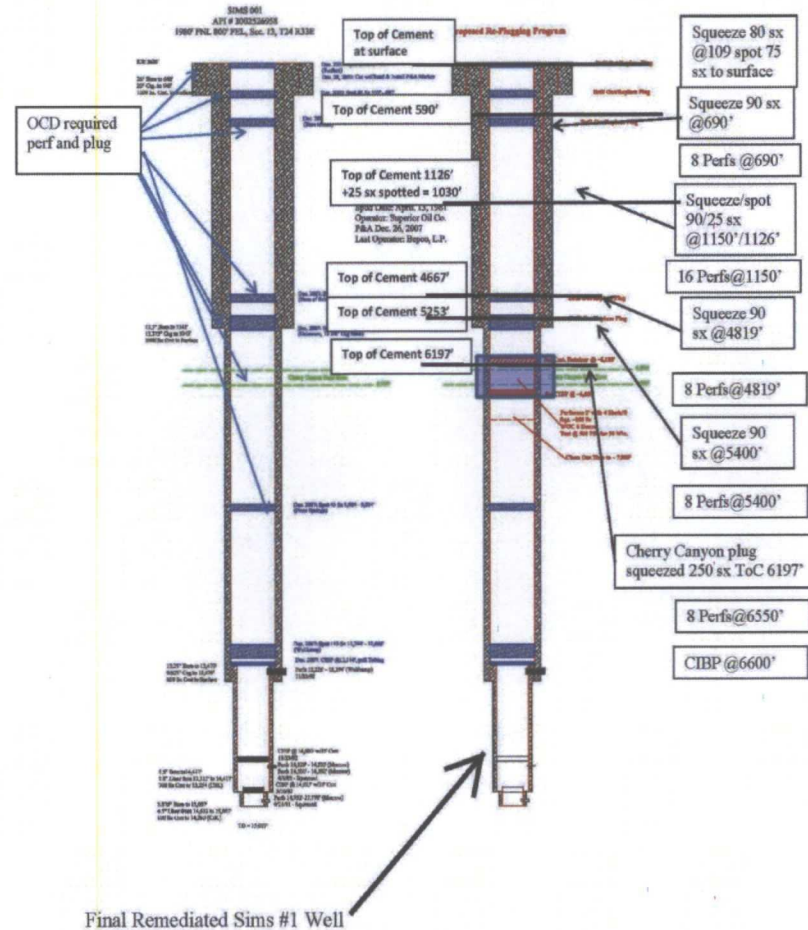
The remediation of the Sims #1 well pursuant to NMOCC order was completed on August 15, 2011 and all equipment has been demobilized. The plugging was done pursuant to NMOCC requirements and all aspects of the effort were reported to Mark Whitaker and E.L. Gonzales of the OCD District I office who approved the specifics of the plugging as shown in the attached plugging diagram. When establishing a rate prior to squeezing the Cherry Canyon, it is clear that the reservoir is an excellent reservoir as it was taking 3bb/min on vacuum. This indicates that the predicted injection plume for the Red Hills AGI #1 in this reservoir will be smaller than anticipated and the reservoir conditions act to prevent migration of injected acid gas out of the intended and permitted injection zone by any nearby wellbores including the Govt#2, Govt#1 and Smith Federal #1 in addition to the Sims#1. Please see attached wellbore sketch for plugging details of all plugs set and amounts of cement squeezed for each plug.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE  TITLE Consultant to Agave Energy Company DATE August 16, 2012

Type or print name Alberto A. Gutierrez, RG E-mail address: aag@geolex.com PHONE: 505-842-8000  
 For State Use Only

APPROVED BY  TITLE  DATE 8-16-2012  
 Conditions of Approval (if any): AUG 16 2012



Final Remediated Sims #1 Well



# Summary of Govt. #1 Remedial Operations Status

- Remedial efforts were originally planned to begin after completion of Sims #1 remedial work –surface agreement negotiated, surface preparation completed and plugging plan approved by OCD and BLM
- Approved original plan: Drill out surface plugs in surface casing and open hole, reenter cut off 10 ¾" casing at 5,540', perforate and squeeze Cherry Canyon between approximately 6550' and 6050' and replace former plugs as consistent with BLM and OCD requirements
- Based on experience with similar cut off 10 ¾" casing in Govt #2 and the fact that this casing is cut off at even deeper depth in Govt. #1, reentry to depth of Cherry Canyon in the Govt #1 is not possible
- Based on new data obtained during plugging process and successful remediation and replugging of Sims #1, all other producing formations and fresh water aquifers will be protected by the distance from the proposed AGI, underpressured reservoir conditions in Cherry Canyon, existing condition of the Govt #1 well, reduction in H<sub>2</sub>S concentration in TAG and proposed modifications in maximum injection rate (plume will extend only .3 miles after 30 yrs.)
- Agave is requesting that the requirement to reenter and remediate this well be removed due to technical infeasibility, the distance from the AGI well (.72 miles – similar to Smith Federal #1), reservoir conditions, revised average and maximum injection volume and revised TAG composition (99.8% CO<sub>2</sub>, 0.2% H<sub>2</sub>S).



# Revised Understanding of Reservoir Conditions Based on New Data and Testing of Cherry Canyon

Table 1: Pressure and Volume Calculations for TAG Red Hills

| PROPOSED INJECTION STREAM CHARACTERISTICS |          |              |                 |             |                   |                 |         |                 |        |
|---|----------|--------------|-----------------|-------------|-------------------|-----------------|---------|-----------------|--------|
| TAG                                       | H2S      | CO2          | H2S             | CO2         | TAG               |                 |         |                 |        |
| Gas Vol                                   | conc     | conc         | inject rate     | inject rate | inject rate       |                 |         |                 |        |
| MMSCFD                                    | mol %    | mol %        | lb/day          | lb/day      | lb/day            |                 |         |                 |        |
| 6740                                      | 0.700    | 99.800       | 1280            | 824512      | 825792            |                 |         |                 |        |
| CONDITIONS AT WELL HEAD                   |          |              |                 |             |                   |                 |         |                 |        |
| Well Head Conditions                      |          |              |                 |             |                   |                 |         |                 |        |
| Temp                                      | Pressure | Gas Vol      | Comp            | Inject Rate | Density           | SG <sup>2</sup> | density | volume          | volume |
| F   | psi      | MMSCFD       | CO2/H2S         | lb/day      | kg/m <sup>3</sup> |                 | lb/gal  | ft <sup>3</sup> | bbl    |
| 100.000                                   | 1400.000 | 6740         | 100.0           | 825792      | 611.85            | 0.61            | 5.11    | 21609           | 3849   |
| CONDITIONS AT BOTTOM OF WELL              |          |              |                 |             |                   |                 |         |                 |        |
| Injection Zone Conditions                 |          |              |                 |             |                   |                 |         |                 |        |
| Temp                                      | Pressure | Depth top    | Depth bottom    | Thickness   | Density           | SG <sup>2</sup> | density | volume          | volume |
| F   | psi      | ft           | ft              | ft          | kg/m <sup>3</sup> |                 | lb/gal  | ft <sup>3</sup> | bbl    |
| 100.000                                   | 2600.000 | 5200.000     | 6530            | 1330        | 839.00            | 0.84            | 7.01    | 15759           | 2807   |
| CONDITIONS IN RESERVOIR AT EQUILIBRIUM    |          |              |                 |             |                   |                 |         |                 |        |
| Injection Reservoir Conditions            |          |              |                 |             |                   |                 |         |                 |        |
| Temp                                      | Pressure | Ave Porosity | Sw <sup>2</sup> | Porosity    | Density           | SG <sup>2</sup> | density | volume          | volume |
| F   | psi      | %            |                 | ft          | kg/m <sup>3</sup> |                 | lb/gal  | ft <sup>3</sup> | bbl    |
| 112.000                                   | 2600.000 | 18.900       | 0               | 21          | 789.34            | 0.79            | 6.59    | 16750           | 2989   |

## CONSTANTS

|                     |         |        |
|---------------------|---------|--------|
|                     | SCF/mol |        |
| Molar volume at STD | 0.792   |        |
|                     | g/mol   | lb/mol |
| Molar weight of H2S | 34.081  | 0.075  |
| Molar weight of CO2 | 44.010  | 0.097  |
| Molar weight of H2O | 18.015  | 0.040  |

Density calculated using AQUIBrium software

Specific gravity calculated assuming a constant density for water

RP is extrapolated using successful Drill Stem Tests at nearby wells; Appendix A

Thickness is the average total thickness of coarse sand units in the reservoir zone

Reservoir temp. is extrapolated temps measured at nearby wells; Appendix A

Porosity is estimated using geophysical logs from nearby wells

CALCULATION OF IRREDUCIBLE WATER (using Archie Equation with values for "average" sands)

|     |       |      |       |
|-----|-------|------|-------|
| a = | 1.450 | Rw = | 0.020 |
| n = | 1.540 | Rt = | 0.000 |

## CALCULATION OF MAXIMUM INJECTION PRESSURE LIMITATION

|                                   |        |
|-----------------------------------|--------|
| SGTAG                             | 0.7    |
| PG = 0.2 + 0.433 (1.04-SGTAG)     | 0.3    |
| IPmax = PG * Depth = 0.336 * 6200 | 2064.5 |

Where: SGTAG is specific gravity of TAG; PG is calculated pressure gradient; and IPmax is calculated maximum injection pressure.

## CALCULATION OF 30-YEAR AREA OF INJECTION

|  |             |                           |
|--|-------------|---------------------------|
| Cubic Feet/day = (5.6146 ft <sup>3</sup> /bbl) | 16750.1     | ft <sup>3</sup> /day      |
| Cubic Feet/30 years                            | 183538914.5 | ft <sup>3</sup> /30 years |
| Area = V/Net Porosity (ft)                     | 8626633.9   | ft <sup>2</sup> /30 years |
| Area = V/Net Porosity (ft)                     | 43560.1980  | acres/30 years            |
| Radius =                                       | 1657.1      | ft                        |
| Radius =                                       | 0.3         | miles                     |

|                                      |        |
|--------------------------------------|--------|
| F = a/φ <sup>n</sup> aven =          | 18.863 |
| SWR = (F * Rw / Rt) <sup>1/2</sup> = | 20.434 |



(150' FEL, 1600' FSL, Section 13, T24S, R33E)



# Technical Basis for Agave Energy Company's Request For Modification of Remediation Requirements for Government "L" Com #2 and #1

- **Cherry Canyon Injection Test Results:** While conducting remedial operations in the Sims #1 well we had the opportunity to test the approved injection zone in the Cherry Canyon formation. The reservoir was shown to take fluid at a rate of 3 bpm at 0 psi (on vacuum). This rate is comparable to Agave's maximum planned injection rate of about 6.74MMCFD and demonstrates that the predicted radius of injection is overly conservative and that fluid injected into this zone will not leave the reservoir regardless of encountering another well bore even if one did exist within the plume.
- **Revised TAG volume and composition:** Agave completed a study in June 2012 of gas feed to the plant based on new wells coming on line which results in a lower average injection rate and TAG with 99.8% CO<sub>2</sub> (vs. 95% originally projected) and only 0.2% H<sub>2</sub>S (96% less than the 5% originally projection), but still too high to flare or vent per air regulations.
- **Well plugging and cementing:** Given the reservoir characteristics and the revised TAG volumes and composition, current plugging configuration is adequate to protect the Cherry Canyon zone and will prevent any potential for the 99.8% CO<sub>2</sub> / 0.2% H<sub>2</sub>S acid gases to leave the injection zone.
- **Distance:** The Government "L" Com #2 well is located 0.40 miles east of the approved location for the Agave Red Hills AGI #1. The Government "L" Com #1 well is located 0.72 miles east of the approved location for Red Hills AGI #1 (approximately same distance as Smith Federal #1).
- **Area Impacted by Injection:** The wells lie outside the area calculated to be impacted even after 30 years of injection at revised anticipated rates (0.30 mile radius from the proposed AGI).
- **Technical Infeasibility:** Despite very lengthy and costly attempts to execute the OCC's requirement to place a balanced plug across the Cherry Canyon in the Govt. #2, it is simply impossible to reach that depth in the well due to the condition of the cutoff casing. Similar conditions exist in the Govt #1.
- **OCD Concurrence:** OCD District 1 and Santa Fe technical experts and OCD Counsel collaborated in developing the proposed revision of the remediation requirements for these two wells. The OCD has indicated their support of Agave's motion in a written stipulation. (Exhibit No. 1).



# Key Factors Supporting Agave's Request

- Agave's proposed amendment of Order No. R13507 has been discussed in detail and prepared in conjunction with NMOCD District 1 and Santa Fe technical staff who support the program based on their independent review (see OCD Stipulation – Exhibit No. 1).
- The physical conditions of these two wells make it impossible to implement the original remediation program required by Order No. 13507.
- The underpressured Cherry Canyon injection zone will restrict the movement of the plume to within the reservoir and will act to reduce overall plume size and enhance mineralization of acid gas.
- All of these factors combined yield a 25% calculated reduction in radius of affected area with a significant number of conservative assumptions—the plume should never reach the Government L Com #2 and definitely will not reach the Government L Com #1, which is about the same distance away as the Smith Federal #1 and which OCC previously agreed was not likely to see TAG even after 30 years of injection at a higher rate than currently anticipated and proposed (Order No. 13507-A).

# Key Factors Supporting Agave's Request

- The Cherry Canyon zone (6,150' to 6,450') is already protected by the heavy mud present in the borehole of the Government L Com #2 which is significantly less transmissive than the formation itself. The combination of heavy mud from plug at 7834' to plug at 5500' combined with cement around 10¾" casing and cement added around washout around and above the existing casing plug will further prevent any potential fluids from migrating up bore, and lower productive formations are protected by an existing cement plug at 7,834'.
- Government L Com #2 is located 0.4 miles cross-gradient from the proposed AGI well. This location is well outside the calculated maximum 30-year injection radius of 0.3 miles
- Government L Com #1 is located 0.72 miles cross-gradient and further east from the proposed AGI well. This location is about the same distance as the Smith Federal #1 outside the calculated maximum 30-year injection radius of 0.3 miles
- As described in the above three bullets, and as Agave's witnesses testified in the initial hearing resulting in Order R-13507, we are confident that the wells as currently plugged will not be impacted by the migration of acid gas or corrosive fluids out of the injection zone.
- Agave has made a good-faith effort to implement the replugging requirements in Order No. R-13507, as amended by Order No. R-13507-A, expending over \$1,000,000, and has determined that it is not possible to reenter the cutoff casing, at any cost, to reach the Cherry Canyon in the Govt L Com #1 and #2
- Geolex and Agave are confident that the proposed modified remedial program fully protects correlative rights, fresh water, human health and the environment.