

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

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

**THE APPLICATION OF CHESAPEAKE EXPLORATION, LLC DOING
BUSINESS THROUGH ITS AGENT, CHESAPEAKE OPERATING INC., FOR
STATUTORY UNITIZATION OF THE CHAMBERS STRAWN UNIT AREA,
LEA COUNTY, NEW MEXICO**

CASE NO. 14477

**THE APPLICATION OF CHESAPEAKE EXPLORATION, LLC, DOING
BUSINESS THROUGH ITS AGENT, CHESAPEAKE OPERATING, INC., FOR
APPROVAL OF A WATERFLOOD PROJECT AND QUALIFICATION OF THE
PROJECT AREA OF THE CHAMBERS STRAWN UNIT FOR THE
RECOVERED OIL TAX RATE PURSUANT TO THE ENHANCED OIL
RECOVERY ACT, LEA COUNTY, NEW MEXICO**

**CASE NO. 14478
ORDER NO. R-13303**

ORDER OF THE DIVISION

BY THE DIVISION:

These cases came on for hearing at 8:15 a.m. on May 27, 2010 at Santa Fe, New Mexico before Examiner William V. Jones.

NOW, on this 9th day of September, 2010, the Division Director, having considered the testimony, the record and the recommendations of the Examiner,

FINDS THAT:

1. Due public notice has been given, and the Division has jurisdiction of this case and its subject matter.
2. In Case No. 14477, Chesapeake Exploration, LLC doing business as Chesapeake Operating, Inc. ("Chesapeake") seeks statutory unitization, pursuant to the Statutory Unitization Act, NMSA 1978 Sections 70-7-1 through 70-7-21, as amended ("the Statutory Unitization Act"), of 480 acres, more or less, of fee lands located in Lea County, New Mexico, more particularly described as follows,

TOWNSHIP 16 SOUTH, RANGE 36 EAST, NMPM

Section 7: NE/4, NE/4 SE/4
Section 8: NW/4 NW/4, S/2 NW/4, SW/4

The proposed Chambers Strawn Unit statutory unit is for the purpose of instituting secondary recovery operations which include a waterflood project within the Northeast Shoe Bar-Strawn Pool, and approval of the Unit Agreement and the Unit Operating Agreement, which were submitted as Applicant's Exhibits No. 2 and 5 in this case.

3. In Case No. 14478, Chesapeake seeks approval to institute secondary recovery operations including a waterflood project for the injection of water into the Strawn formation, Northeast Shoe Bar-Strawn Pool, initially through the following two injection wells:

Chambers 7 Well No. 1	API No. 30-025-33623	1700FNL, 900FEL, H-7-16S-36E
Runnels 8 Well No. 1	API No. 30-025-34264	780FSL, 1510FWL, N- 8-16S-36E

Chesapeake further seeks provisions allowing for the administrative approval of additional injection wells and seeks to qualify the proposed project as an "Enhanced Oil Recovery Project" pursuant to the "Enhanced Oil Recovery Act" (NMSA 1978 Sections 7-29A-1 through 7-29A-5, as amended).

4. Cases No. 14477 and 14478 were consolidated at the hearing for the purpose of testimony. Because the cases involve the same property and subject matter, a single order is being issued in both cases.

5. No party entered an appearance in these cases or otherwise indicated opposition to the implementation of enhanced recovery operations or the unitization of the Unit Area.

6. The proposed vertical extent ("Unitized Formation") of the unit is that stratigraphic interval occurring from the base of the Strawn Carbonate formation to 100 feet above the top of the Strawn Carbonate formation. This Strawn Carbonate interval is located at the following depths shown on logs in the following Chesapeake Operating, Inc. wells, all located in Township 16 South, Range 36 East, N.M.P.M., Lea County, New Mexico:

a. Runnels "8" Well No. 1 (API No. 30-025-34264) located 780 feet from the South line and 1510 feet from the West line of Section 8, between 11442 feet and 11738 feet (-7490 feet to -7786 feet subsea),

b. Alston "8" Well No. 1 (API No. 30-025-33876) located 2281 feet from the South line and 531 feet from the West line of Section 8, between 11422 feet and 11706 feet (-7463 feet to -7747 feet subsea), and

c. Chambers "7" Well No. 1 (API No. 30-025-33623) located 1700 feet from the North line and 900 feet from the East line of Section 7, between 11376 feet and 11660 feet (-7459 feet to -7743 feet subsea).

7. Chesapeake presented the testimony of landman Terry Frohnapfel as follows:

- (a) In late March, 2010 the proposed unit was proposed by Chesapeake to the working interest owners in the unit area. On April 15, 2010, Chesapeake conducted a working interest meeting to review the proposed unitization plan and the unit agreement with the other working interest owners in the unit area and on April 19, 2010 provided the Unit Agreement and Unit Operating Agreement to all working interest owners and all royalty owners in the Unit Area. Since that time, and in accordance with the provisions of the Unit Agreement, Chesapeake has had numerous conversations with the owners in the Unit Area concerning this proposed unit.
- (b) The proposed Unit contains seven separate tracts owned by numerous parties. All owners within this proposed Unit have valid addresses and notices were sent to all owners for purposes of forming this statutory unit. Tracts comprising the 480 acres committed to the Unit are in private ownership and comprise 100% of the unit area. Approximately 75.6% of the working interest was committed to the unit at the time of hearing; and when the ratifications are received from owners who have expressed an interest in participating but had not returned their ratification forms, approximately 93% of the working interest will be committed to the Unit. Owners of 100% of the non-cost bearing interests were committed to the Unit at the time of the hearing.

8. Chesapeake presented the testimony of petroleum geologist Chima Nzewunwah interpreted as follows:

- (a) The primary stratigraphic interval of interest in the proposed Chambers Strawn Unit is the Strawn carbonate. The porous algal mound within the Strawn contains hydrocarbons and the best candidate for waterflooding is the clean limestone in the upper part of the Strawn.
- (b) Core data is available on one well and 3-D seismic and well control were both used to determine the extent of this reservoir.
- (c) The Structure Map shows an east/southeast downward dip on the top of the Strawn carbonate and logs show generally increasing water to the south and southeast. When the Type Log and the Structure Map are compared, it is clear that the portion of the reservoir that is proposed to be unitized is reasonably defined by development.

- (d) The hydrocarbon pore volume map (greater than 5% porosity and less than 45 API units gamma ray) shows that the pore volume does change within this reservoir but, based on water saturation information and hydrocarbon pore volume data, the target porosity is present over the proposed unit area and the entire unitized area should contribute additional secondary reserves.
- (e) The unit area shows good continuity, the entire proposed unit area should contribute enhanced recovery reserves, and it is well suited for secondary recovery operations.

9. Chesapeake presented the testimony of petroleum engineer Everett Bradley interpreted as follows:

- (a) The Strawn oil is approximately 43 degree API gravity and has no H₂S contaminant. The initial reservoir pressure was estimated at 4,200 psi and current pressure is estimated at 800 psi. The permeability is very good within this Strawn algal mound even at over 11,000 feet deep. There is no indication of a secondary gas cap on this reservoir.
- (b) The reservoir has been produced to date under primary recovery operations and 90% of ultimate primary has already been recovered. The estimated remaining primary gross production from the Unit Area amounts to approximately 68,000 barrels of oil.
- (c) The secondary recovery operation will be initiated with two injection wells and only one production well and will be implemented in one phase.
- (d) The estimated additional capital costs of implementing the proposed secondary plan are 1.25 million dollars.
- (e) The estimated future gross production from the Unitized Formation of the Unit Area if the proposed secondary recovery operation is implemented is approximately 572,000 barrels of oil and 580,000 Mcf of natural gas.
- (f) Unitized management of this pool is necessary to effectively implement and carry on the proposed secondary recovery operations.
- (g) The tract participation formula in the Unit Agreement was presented at the working interest owners meeting and is based on tract percentages of the unit for the following parameters: latest average production rate, remaining primary reserves, ultimate primary recovery volume, volume of original oil in place, and number of usable wellbores. This formula allocates unitized substances to the owners of each tract on a fair, reasonable and equitable basis.

- (h) Each of the two proposed injection wells is expected to take 1800 barrels of produced water per day. Makeup produced water will be transported from 6 or 7 miles to the east and no fresh makeup water will be used.
- (i) Injection pressures are expected to initially be low and the proposed maximum injection pressure for each injection well is based on 0.2 psig per foot of depth to the top of the injection interval. If a higher pressure is needed, Chesapeake will justify the pressure increase with a step rate test.
- (j) The two active wells which penetrate the Strawn formation within the ½ mile areas of review have adequate cement to isolate the injection interval and to protect fresh water, and no remedial work is required on these wells.
- (k) There are no plugged and abandoned wells in the two areas of review that penetrated into the Strawn formation.
- (l) The fresh ground water in this area consists of the Ogallala formation that produces from intervals 51 to 160 feet in depth. There is no evidence of non-sealing geologic faults or inadequately cemented wellbores between the proposed waterflood interval and protectable waters. The proposed injection operation will not pose a threat to any freshwater supplies.
- (m) Waterflooding of this Unit Area is expected to be profitable and is necessary to extend the producing life of this reservoir and prevent waste of hydrocarbons.

10. Ronald Miles, mineral owner in Section 17 to the southeast was present at the hearing and asked about the extent of this reservoir within Section 17. Chesapeake's engineer stated that the acreage within the northeastern portion of Section 17 is likely not part of the Strawn reservoir being targeted by Chesapeake for this Unit and this waterflood.

11. Division records indicate that a well located within Unit Letter P of Section 7, the Chambers Well No. 2, API No. 30-025-36317, is producing a low volume of oil and high volume of water from the Strawn formation. This well is offsetting the proposed Unit but Chesapeake's testimony and post-hearing correspondence indicate this well is not connected to the proposed waterflood or the algal mound portion of the Strawn formation.

12. Chesapeake has made a good faith effort to secure voluntary unitization of the Unitized Formation within the Unit Area.

13. The proposed Unit Agreement and Unit Operating Agreement contain satisfactory provisions with respect to all of the matters required by NMSA 1978 Section 70-7-7, as amended.

14. The tract participation formula contained in the proposed Unit Agreement allocates the produced and saved, unitized hydrocarbons to the separately owned tracts in the Unit Area on a fair, reasonable and equitable basis.

15. The estimated additional costs of the proposed operations will not exceed the estimated value of the additional oil and gas recovered plus a reasonable profit.

16. As of the hearing date, owners of more than 75% of the working interest and owners of 100% of the non-cost bearing interest have voluntarily committed to the unit, as the unit was defined at that time. The definition of the Unitized Interval changed after the date of this hearing – raising the base of the Unitized interval from “100 feet below the base of the Strawn” to “the base of the Strawn”. Despite having the required concurrence for the previously worded Unit Agreement, Chesapeake should seek approval from owners of this unit for the currently worded Unit Agreement.

17. The provisions of the proposed Unit Agreement and Unit Operating Agreement are fair and reasonable. The statutory unitization of the Unitized Formation within the Unit Area in accordance with the plan embodied in the Unit Agreement and the Unit Operating Agreement will prevent waste and protect correlative rights.

18. Statutory unitization and adoption of applicant’s proposed unitized method of operation will benefit the working interest and royalty interest owners within the proposed Unit Area, and will prevent waste and protect correlative rights of all parties.

19. The unitized management, operation and further development of the Northeast Shoe Bar-Strawn Pool in the proposed Unit Area is reasonably necessary in order to effectively carry on the proposed secondary recovery project, which will substantially increase the ultimate recovery of oil and gas from this pool, and delays in implementing this project are detrimental to ultimate recovery from this reservoir.

20. The applicant proposes to institute a secondary recovery (waterflood) project within the Chambers Strawn Unit Area.

21. The evidence presented demonstrates that (i) the application for approval of the proposed secondary recovery project has not been prematurely filed either for economic or technical reasons; and (ii) the area affected by the proposed project has been so depleted by primary operations that it is prudent to apply secondary recovery techniques to maximize the ultimate recovery of crude oil from the Northeast Shoe Bar-Strawn Pool.

22. The proposed waterflood is feasible and will result with reasonable probability in the recovery of substantially more oil and gas from the unitized portion of the pool than would otherwise be recovered.

23. The proposed Chambers Strawn Unit Waterflood Project should be approved and should be governed by 19.15.26.1 through 19.15.26.15 NMAC.

24. The evidence establishes that the proposed secondary recovery project meets all the criteria for certification by the Division as a qualified "Enhanced Oil Recovery Project" pursuant to the "Enhanced Oil Recovery Act" (NMSA 1978 Sections 7-29A-1 through 7-29A-5).

25. The certified "project area" should initially comprise the area approved for statutory unitization as described above in this order.

26. The area within the waterflood project and/or the producing wells within such area eligible for the recovered oil tax rate may be contracted and reduced dependent upon the evidence presented by the applicant in its demonstration of the occurrence of a positive production response.

IT IS THEREFORE ORDERED THAT:

1. The application of Chesapeake Operating Inc. for the statutory unitization of 480 acres, more or less, in Lea County, New Mexico, to be known as the Chambers Strawn Unit, is hereby approved pursuant to the Statutory Unitization Act, Sections 70-7-1 through 70-7-21, NMSA 1978, subject to the following provisions.

2. The Chambers Strawn Unit shall comprise the following described 480 acres, more or less, of fee lands located in Lea County, New Mexico:

TOWNSHIP 16 SOUTH, RANGE 36 EAST, NMPM

Section 7: NE/4, NE/4 SE/4

Section 8: NW/4, S/2 NW/4, SW/4

3. The Unitized Formation shall comprise that stratigraphic interval underlying the Unit Area from the base of the Strawn Carbonate formation to a point 100 feet above the top of the Strawn Carbonate formation. This Strawn Carbonate interval is located at the following depths shown on logs in the following Chesapeake Operating, Inc. wells, all located in Township 16 South, Range 36 East, N.M.P.M., Lea County, New Mexico:

a. Runnels "8" Well No. 1 (API No. 30-025-34264) located 780 feet from the South line and 1510 feet from the West line of Section 8, between 11442 feet and 11738 feet (-7490 feet to -7786 feet subsea),

b. Alston "8" Well No. 1 (API No. 30-025-33876) located 2281 feet from the South line and 531 feet from the West line of Section 8, between 11422 feet and 11706 feet (-7463 feet to -7747 feet subsea), and

c. Chambers "7" Well No. 1 (API No. 30-025-33623) located 1700 feet from the North line and 900 feet from the East line of Section 7, between 11376 feet and 11660 feet (-7459 feet to -7743 feet subsea).

4. The Unit Agreement, with the unitized interval as defined above, and the Unit Operating Agreement shall be effective upon entry of an order certifying that these instruments have been ratified as required. These agreements shall be incorporated by reference into this order.

5. This order shall not become effective until the Unit Agreement as amended to revise the definition of the "Unitized Formation" has been ratified by (i) those persons who will be required initially to pay at least 75 percent of the costs of unit operations, and (ii) the owners of at least 75 percent of the production or proceeds thereof that will be credited to interests which are free of costs, and the Division has made a finding in a supplemental order that the Unit Agreement, as changed, has been so approved. If approval is not obtained within six months from the date of this order, this order shall be of no further effect unless the Division shall extend the time for ratification.

6. The applicant shall notify the Division Director in writing of any removal of the applicant as unit operator or substitution as unit operator of any other working interest owner within the Unit Area. In the event a person other than Chesapeake assumes operation of the unit established hereby, such person shall comply with all the terms and provision of this order.

7. The unit established hereby shall terminate upon the plugging and abandonment of the last well in the Unit Area completed in the Unitized Formation.

8. Chesapeake is hereby authorized to institute enhanced recovery operations within the Unit Area by the injection of produced water, limited to only the Strawn formation, within Unitized Formation of the Northeast Shoe Bar-Strawn Pool through the two wells shown below. Said wells are located in Sections 7 and 8 of Township 16 South, Range 36 East, NMPM, Lea County, New Mexico.

Injection Well and API	Location	Allowable Gross Injection Interval, Feet
Chambers 7 Well No. 1 (API No. 30-025-33623)	1700FNL, 900FEL, H-7-16S-36E	11376 to 11660
Runnels 8 Well No. 1 (API No. 30-025-34264)	780FSL, 1510FWL, N- 8-16S-36E	11442 to 11738

9. No fresh water shall be used as make-up water or otherwise injected.

10. Chesapeake shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface from injection, production, or plugged and abandoned wells.

11. Injection into each of the wells shall be accomplished through lined injection tubing installed in an injection packer. Said packer must be located within 100 feet of the actual uppermost injection perforation or injection interval. The casing-tubing annulus shall be filled with an inert, corrosion resistant fluid, and a gauge or approved leak-detection device shall be attached to the annulus in order to determine leakage in the casing, tubing, or packer.

12. The injection wells or pressurization system shall be equipped with a pressure control device or acceptable substitute that is capable of limiting the surface injection pressure on each well. The maximum allowable surface pressure on any injection well within this waterflood project shall be limited to **no more than 2275 psi**.

13. The Division Director may administratively authorize a pressure limitation in excess of the above upon a showing by the operator that such higher pressure will not result in the fracturing of the injection formation or confining strata in any well.

14. The Division Director may administratively authorize additional injection wells within the Unit Area as provided in 19.15.26.8G(5) NMAC.

15. Prior to commencing injection operations, the casing in each well shall be pressure tested throughout the interval from the surface down to the casing/tubing packer setting depth to assure the integrity of such casing.

16. The unit operator shall give advance notice to the supervisor of the Division's Hobbs District Office of the date and time (i) injection equipment will be installed, and (ii) the mechanical integrity pressure test will be conducted on the proposed injection wells, so that these operations may be witnessed.

17. The unit operator shall immediately notify the supervisor of the Division's Hobbs District Office of any failure of the tubing, casing or packer in any of the injection wells or the leakage of water, oil or gas from or around any producing or plugged and abandoned well within the project area, and shall promptly take all steps necessary to correct such failure or leakage.

18. The unit operator shall conduct injection operations in accordance with 19.15.26.1 through 19.15.26.15 NMAC and shall submit monthly progress reports in accordance with 19.15.26.13 NMAC and 19.15.7.24 NMAC.

19. The injection authority granted herein for each well shown on Exhibit "A" shall terminate one year after the date of this order if the unit operator has not commenced injection operations into the well; provided, however, the Division, upon written request, may grant an extension for good cause.

20. The waterflood project authorized by this order shall be known as the Chambers Strawn Unit Waterflood Project.

21. The Chambers Strawn Unit Waterflood Project is hereby certified as an "Enhanced Oil Recovery Project" pursuant to the "Enhanced Oil Recovery Act" (NMSA 1978 Sections 7-29A-1 through 7-29A-5). The project area shall comprise the entire Chambers Strawn Unit, described in Ordering Paragraph No. 2; provided the area and/or the producing wells eligible for the enhanced oil recovery (EOR) tax rate may be contracted and reduced based upon the evidence presented by the unit operator in its demonstration of a positive production response.

22. At such time as a positive production response occurs, and within five years from the date of this order, the unit operator must apply to the Division for certification of a positive production response. This application shall identify the area benefiting from enhanced oil recovery operations and the specific wells eligible for the EOR tax rate. The Division may review the application administratively or set it for hearing. Based upon the evidence presented, the Division will certify to the New Mexico Taxation and Revenue Department those wells that are eligible for the EOR tax rate.

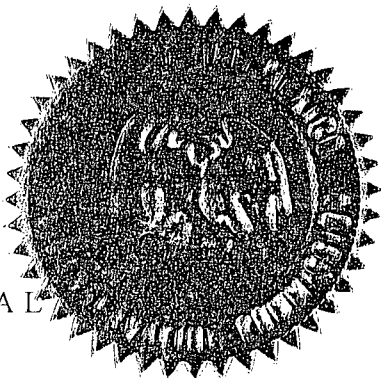
23. The injection authority granted under this order is not transferable except upon Division approval. The Division may require the operator to demonstrate mechanical integrity of any injection well that will be transferred prior to approving transfer of authority to inject.

24. The Division may revoke the injection authority for any well after notice and hearing if the operator is in violation of 19.15.5.9 NMAC.


25. Compliance with this order does not relieve the operator of the obligation to comply with other applicable federal, state or local laws or rules, or to exercise due care for the protection of fresh water, public health and safety and the environment.

26. Jurisdiction is retained by the Division for the entry of such further orders as may be necessary for the prevention of waste and/or protection of correlative rights or upon failure of the operator to conduct operations (i) to protect fresh or protectable waters or (ii) consistent with the requirements in this order, whereupon the Division may, after notice and hearing, or without notice and hearing in case of emergency, terminate the injection authority granted herein.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.



STATE OF NEW MEXICO
OIL CONSERVATION DIVISION


MARK E. FESMIRE, P.E.
Acting Director

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