

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:

CASE NO. 14362

APPLICATION OF CHESAPEAKE OPERATING, INC. FOR STATUTORY
UNITIZATION OF THE CARTER-SHIPPI STRAWN UNIT AREA, LEA
COUNTY, NEW MEXICO.

CASE NO. 14363

APPLICATION OF CHESAPEAKE OPERATING, INC. FOR APPROVAL
OF A WATERFLOOD PROJECT AND QUALIFICATION OF THE PROJECT
AREA OF THE CARTER-SHIPPI STRAWN UNIT FOR THE RECOVERED OIL
TAX RATE PURSUANT TO THE ENHANCED OIL RECOVERY ACT, LEA
COUNTY, NEW MEXICO.

ORDER NO. R-13196

ORDER OF THE DIVISION

BY THE DIVISION:

These cases came on for hearing at 8:15 a.m. on September 17, 2009, at Santa Fe, New Mexico before Examiner Richard Ezeanyim.

NOW, on this 7th day of December, 2009, 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 these cases and their subject matter.

(2) Cases No. 14362 and 14363 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 for both cases.

(3) In Case No. 14362, Chesapeake Operating, Inc. (**OGRID No. 147179**) ("Applicant" or "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 360 acres, more or less, of fee lands for the purpose of instituting secondary recovery operations in the Strawn formation, Northeast Lovington-Upper Pennsylvanian Pool (40760), to be called the **Carter-Shipp Strawn Unit**, and approval of the Unit Agreement and the Unit Operating Agreement, which were submitted as Applicant’s Exhibits No. 2 and 5 in these cases.

(4) In Case No. 14363, Chesapeake Operating Inc. seeks approval of a waterflood project for the injection of water into the Strawn formation within the Carter-Shipp Strawn Unit area through conversion to injection of the following two (2) existing wells.

SECTION 27, TOWNSHIP 16 SOUTH, RANGE 37 EAST, NMPM

<u>Old Name</u>	<u>New Name</u>	<u>API No.</u>	<u>Perforations</u>
Shipp ZI # 2	Carter-Shipp Strawn Unit Well No. 1	30-025-28994	11,460’-11,564’

SECTION 28, TOWNSHIP 16 SOUTH, RANGE 37 EAST, NMPM

Carter # 2	Carter-Shipp Strawn Unit Well No. 4	30-025-29248	11,370’-11,426’
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Chesapeake also 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).

(5) The proposed Unit Area consists solely of fee lands within the Northeast Lovington-Upper Pennsylvanian Pool specifically described as follows:

TOWNSHIP 16 SOUTH, RANGE 37 EAST, NMPM

Section 21:	SE/4 SE/4
Section 27:	NW/4
Section 28:	NE/4

(6) The vertical extent of the proposed Unitized Formation is that stratigraphic interval within the Strawn formation underlying the Unit Area, the vertical limits of which extend from the top of the lower Strawn formation 11,298 feet to the top of the Lower Strawn “B” formation 11,522 feet (-7494 feet to -7718 feet subsea) as measured by the Compensated Density/Compensated Neutron Log run in 1985 on the Amerind Oil Company, Carter Well No. 2 (API No. 30-025-29248), located 1330 feet from the North line and 1980 feet from the East line of Section 28, Township 16 South, Range 37 East, NMPM, Lea County, New Mexico.

(7) The East Lovington-Pennsylvanian Pool was discovered by the Tide Water Associated Oil Company H. T. Montieth “A” Well No. 1 (API No. 30-025-05336) located 660 feet from the South and West lines, in Unit M of Section 20, Township 16 South, Range 37 East, NMPM which was completed on August 12, 1952 from the Strawn

member of the Pennsylvanian formation. The Oil Conservation Commission, by Order No R-3816 issued in Case No. 4172, on September 1, 1969, contracted the East Lovington-Pennsylvanian Pool and established the Northeast Lovington-Pennsylvanian Pool as a new oil pool. The vertical limits of this pool were subsequently contracted to include only the Cisco, Canyon and Strawn formations and the pool was re-designated as the Northeast Lovington-Upper Pennsylvanian Pool.

(8) All owners of interests within the proposed unit were notified of these applications and of this hearing. No party appeared at the hearing to oppose these applications.

(9) Chesapeake appeared at the hearing through legal counsel and presented the following land testimony:

- (a) The proposed unit is comprised of 4 tracts that encompass 360 acres of fee lands. Chesapeake is the operator and majority working interest owner in all tracts. Using the proposed Tract Participation formula, Chesapeake controls 84.8 percent of the working interest in this unit.
- (b) On May 8, 2009, Chesapeake proposed the unit to all working interest owners in the Unit Area and called a working interest owner meeting. On July 15, 2009, the unit agreement and ratification forms were provided to 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.
- (c) There are 45 working interest owners and 7 of these (representing 89.28 percent of the proposed Tract Participation) have agreed to join in this proposed Unit. No response was received from 38 of the working interest owners who own very small interests in the unit area. There are 124 owners of mineral interests or overriding royalty interests in the unit area and 66 of these (representing 91.62 percent of the total unit mineral interest or overriding royalty interest) have agreed to join in this proposed Unit. Therefore the plan for unit operations has been approved in writing by those persons who, under the Division's order, will be required initially to pay at least seventy-five percent of the costs of unit operations, and also by the owners of at least seventy-five percent of the production proceeds thereof that will be credited interests which are free of costs as required by NMSA 1978 Section 70-7-8.
- (d) At the date of this hearing, Chesapeake sought to unitize 10.72% of the working interests and 8.38% the cost free interests.

(10) Chesapeake presented the following geological testimony:

- (a) The Strawn produces oil and gas from phylloid algal biotherms within the lower Strawn limestone. These Strawn carbonates were deposited along the northwest flank of the Central Basin Platform axis in a low energy, middle to outer ramp setting. Growth of algal biotherms developed into elongated, steep-sided, loaf shaped buildups in a dip direction separated by tight limestone mudstones.
 - (b) The single algal mound that Chesapeake proposes to unitize is in the far southeast corner of the Northeast Lovington-Upper Pennsylvanian Pool. The structural cross-section shows good continuity between the five wells drilled in the area and little or no stratification in the central core of the mound. However, stratification does occur in the northeast area as seen in the Shipp Wells Nos. 1 and 2.
 - (c) The Structure Map on the top of the Strawn formation shows very shallow dip of approximately one degree to the north-northeast and structure therefore does not play a role in trapping hydrocarbons; rather it is the development of algal biotherms that provides the basis for the reservoir.
 - (d) The Unit Area has been defined by development. The Isopach Map shows that the entire unitized interval should contribute reserves to the Unit, and that the unit boundary encompasses the entire unitized mound.
 - (e) The geologic studies performed over the Unit Area show that the Strawn formation has good continuity across the Unit Area, the formation is well suited for secondary recovery operations, and all tracts within the Unit Area should contribute to secondary oil and gas production.
- (11) Chesapeake presented the following engineering testimony:
- (a) Five wells were drilled in 1984 and 1985 in the 360-acre unit area. The secondary recovery operation will be initiated with two injection wells and two producing wells and be implemented rapidly in a single phase project.
 - (b) Chesapeake seeks Division approval to inject into two (2) wells as the project is implemented. Chesapeake requests that provisions be made for the operator of the Carter-Shipp Strawn Unit to apply administratively for additional or different injection wells as needed without further hearing. Each of the two proposed injection wells will inject an average of 1800 barrels of produced water per day. No fresh makeup water will be used.
 - (c) The source of the injection water will be produced water from Chesapeake-operated wells in the Wolfcamp formation supplemented, if needed, with water from Chesapeake-operated Strawn wells in the area. Compatibility studies have been conducted and the waters are compatible.

- (d) The wells are initially expected to take water on vacuum but if pressure is needed it will not exceed a maximum of 2274 pounds per square inch gauge (psig) in the Carter Well No. 2 or 2292 psig in the Shipp ZI Well No. 2 or 0.2 psig per foot of depth to the depth of the uppermost perforation in each injection well. If a higher injection pressure is required, it will first be justified with a Division-witnessed step rate test.
- (e) The fresh water interval in this area consists of the Ogallala formation that produces from intervals above 150 feet in depth. Active and plugged and abandoned wells within the half-mile area of review (AOR) of each proposed initial injection well have adequate cement to isolate the injection interval and to protect fresh water, and no remedial work is required on these wells to enable Chesapeake to safely operate the project. The proposed injection operation will not pose a threat to any freshwater supplies.
- (f) For allocation of ownership among the four tracts, Chesapeake proposes to use a tract participation formula which considers three factors:
- Primary Recovery 40 percent
 - Original-Oil-In-Place 50 percent
 - Wellbores Available For Re-Entry 10 percent
- (g) Chesapeake owns the majority of the interests in this unit under any proposed formula. The largest components (90%) are based on the value of the primary and the secondary oil to be produced. Chesapeake believes this will allocate production to the separately owned tracts in the proposed unit on a fair, reasonable and equitable basis.
- (h) Chesapeake is proposing a 200% nonparticipation penalty, to apply to parties who do not elect to participate in subsequent operations.
- (i) Unitized management of this pool is necessary to effectively implement and carry on the proposed secondary recovery operations.
- (j) The proposed secondary recovery operation is feasible, and the proposed Unit Area can be efficiently and effectively operated under the proposed unit plan of development.
- (k) The ultimate primary production from the mound is approximately 1.463 million barrels of oil and a total of 1.792 MMcf of gas. Incremental recovery through secondary operations are forecast to be 355,000 stock tank barrels (STB) of oil and 378,000 Mcf of natural gas or about 418 thousand barrel of oil equivalent (MBOE), on a BTU basis of 6 Mcf to one barrel of oil. The estimated total value of revenue will be approximately \$31.4 million.

- (1) The estimated total costs of operation of the unit pursuant to the proposed secondary recovery project are \$2.8 million in additional capital costs, and the total project cost including operating costs is approximately \$9 million.

The Division concludes as follows:

(12) The provisions of the proposed Unit Agreement and Unit Operating Agreement, are fair, reasonable and equitable, contain satisfactory provisions with respect to all of the matters required by NMSA 1978 Section 70-7-7, as amended, and should be incorporated by reference into this order.

(13) 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.

(14) This order creating a unit comprising the unit area and providing for the unitization and unitized operation of the unit area upon the terms and conditions approved herein is necessary to protect and safeguard the respective rights and obligations of the working interest owners and the royalty interest owners in the unit area.

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

(16) Chesapeake Operating, Inc. (**OGRID No. 147179**), as the operating arm of Chesapeake, and the majority working interest owner in the unit, should be designated as the operator of the unit.

(17) As of the hearing date, owners of more than 89.28% of the working interest and owners of approximately 91.62% of the non-cost bearing interest had voluntarily committed to the unit.

(18) The owners of over 75% of the working interest and more than 75% of the non-cost bearing interest in the Unit Area have agreed on formation of this unit and committed their respective interests, therefore no additional ratification of the Unit Agreement shall be required (NMSA 1978, §70-7-8 (1975)).

(19) Unitized management, operation and further development of the unit area is necessary to effectively carry on secondary recovery operations and to substantially increase the ultimate recovery of oil and gas from the unit area. Unitization and implementation of water-flood operations in the unit area 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.

(20) The **Carter-Shipp Strawn Unit** should be approved for statutory unitization.

(21) The applicant proposes to institute a waterflood project within the Carter-Shipp Strawn Unit Area. The project area should comprise the entire area approved for statutory unitization as described in this order. The Strawn reservoir has been depleted and it is prudent to apply waterflood operations to extend the life of the reservoir and to maximize the ultimate recovery of crude oil from this reservoir.

(22) The proposed unitized method of secondary recovery operations within the Unit Area 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) An examination of all wellbores within half-mile of the proposed two injection wells indicates that all Area of Review ("AOR") wells are properly cased and cemented to prevent vertical migration of injected fluids. The proposed injection operation will not pose a threat to protectable underground sources of drinking water.

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

(25) The proposed waterflood project will prevent waste, protect correlative rights, and should be called the **Carter-Shipp Strawn Unit Waterflood Project**.

(26) The proposed waterflood project should be approved.

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

(28) The certified project area should initially comprise the area approved for statutory unitization.

(29) The project 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 360 acres, more or less, in Lea County, New Mexico, to be known as the Carter-Shipp Strawn Unit, is hereby approved pursuant to the Statutory Unitization Act, Sections 70-7-1 through 70-7-21, NMSA 1978.

(2) The Carter-Shipp Strawn Unit shall comprise the following described 360 acres, more or less, of fee lands located in Lea County, New Mexico:

TOWNSHIP 16 SOUTH, RANGE 37 EAST, NMPM

Section 21:	SE/4 SE/4
Section 27:	NW/4
Section 28:	NE/4

(3) The Unitized Formation shall comprise that interval underlying the Unit Area which is commonly known as the Strawn formation. The proposed vertical extent of the Unitized Formation is that stratigraphic interval within the Strawn formation underlying the Unit Area, the vertical limits of which extend from the top of the lower Strawn formation 11,298 feet to the top of the Lower Strawn "B" formation 11,522 feet (-7494 feet to -7718 feet subsea) as measured by the Compensated Density/Compensated Neutron Log run on the Amerind Oil Company, Carter #2 well (**API No. 30-025-29248**), located 1330 feet from the North line and 1980 feet from the East line of Section 28, Township 16 South, Range 37 East, NMPM, Lea County, New Mexico.

(4) Since the persons owning the required statutory minimum percentage of the working interest and the non-cost bearing interest in the Unit Area have approved or ratified the Unit Agreement, no additional ratification of the Unit Agreement shall be required (NMSA 1978, §70-7-8 (1975)).

(5) The terms and conditions as established in the UNIT AGREEMENT and the UNIT OPERATING AGREEMENT, **EXHIBITS 2 and 5**, respectively, are hereby incorporated into this Order by reference.

(6) Chesapeake Operating, Inc. (**OGRID 14179**), as the operating arm of Chesapeake Exploration, LLC, is hereby designated the operator of the Carter-Shipp Strawn Unit.

(7) All proceeds from production from the Unit that are not disbursed for any reason shall be placed in escrow in Lea County, New Mexico, to be paid to the true owner thereof upon demand and proof of ownership. The operator shall notify the Division Records Clerk in Santa Fe of the name and address of the escrow agent within two (2) years from the date of issuance of this order.

(8) The operator shall notify the Division in writing of its removal or the substitution of any other working interest owner within the Unit Area as operator.

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

IT IS FURTHER ORDERED THAT:

(10) Chesapeake is hereby authorized to institute enhanced recovery operations within the Unit Area initially by the injection of produced water into the Unitized Formation of the Northeast Lovington–Upper Pennsylvanian Pool through the following two (2) wells located in Sections 27 and 28 of Township 16 South, Range 37 East, NMPM, Lea County, New Mexico.

SECTION 27, TOWNSHIP 16 SOUTH, RANGE 37 EAST

<u>Old Name</u>	<u>New Name</u>	<u>API No.</u>	<u>Perforations</u>
Shipp ZI # 2	Carter-Shipp Strawn Unit Well No. 1	30-025-28994	11,460'-11,564'

SECTION 28 TOWNSHIP 16 SOUTH, RANGE 37 EAST

Carter # 2	Carter-Shipp Strawn Unit Well No. 4	30-025-29248	11,370'-11,426'
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(11) No fresh water shall be used as make-up water or otherwise injected.

(12) 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.

(13) Injection into each of the wells shown above shall be accomplished through 2 3/8 inch plastic lined or fiberglass lined tubing installed in a packer located within 100 feet of the uppermost injection perforations or casing shoe. The casing-tubing annulus shall be filled with an inert 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.

(14) The injection wells or pressurization system shall be equipped with a pressure control device or acceptable substitute that will limit the surface injection pressure to no more than **2,292** pounds per square inch.

(15) 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.

(16) The Division Director may administratively authorize additional injection wells within the Unit Area as provided in Division Rule 19.15.26.8.A NMAC.

(17) Prior to commencing injection operations, the casing in each well shall be pressure tested throughout the interval from the surface down to the proposed packer

setting depth to assure the integrity of such casing. Mechanical integrity tests (MITs) shall be conducted once every five years thereafter.

(18) 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.

(19) 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.

(20) The unit operator shall conduct injection operations in accordance with Division Rules No. 19.15.26.1 through 19.15.26.15 NMAC, and shall submit monthly progress reports in accordance with Division Rules No. 19.15.26.11.B, and 19.15.7.8.D.

(21) The injection authority granted herein for the injection wells shall terminate one year after the date of this order if the unit operator has not commenced injection operations into at least one of the wells; provided, however, the Division, upon written request, may grant an extension for good cause. The injection authority shall also terminate *ipso facto*, one year after injection operations into the wells have ceased.

(22) The waterflood project authorized by this order shall be known as the Carter-Shipp Strawn Unit Waterflood Project.

(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 each injection well that will be transferred prior to approving transfer of authority to inject.

(24) The Division may revoke this injection permit at any time after notice and hearing if the operator is in violation of Rule 19.15.5.9 NMAC.

(25) The Carter-Shipp Strawn Unit Waterflood Project is hereby **certified** to the New Mexico Taxation and Revenue Department 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 Carter-Shipp 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.

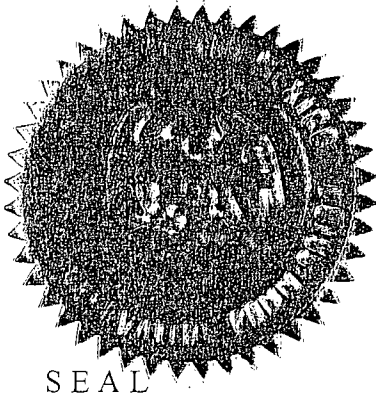
(26) At such time as a positive production response occurs, and within five years from the date the project was certified to the New Mexico Taxation and Revenue

Department, the unit operator shall 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.

(27) This order does not relieve the operator of responsibility should it's operations cause any damage or threat of damage to protectable fresh water, human health or the environment, nor does it relieve the operator of responsibility for complying with applicable Division rules or other federal, state or local laws or regulations.

(28) Jurisdiction is hereby retained for the entry of such further orders as the Division may deem necessary.

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



**STATE OF NEW MEXICO
OIL CONSERVATION DIVISION**

A handwritten signature in black ink, appearing to read "Mark E. Fesmire", written over a horizontal line.

**MARK E. FESMIRE, P. E.
DIRECTOR**