

**STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
SUPERVISOR OF WELLS**

THE PETITION OF CORE ENERGY, LLC FOR AN ORDER)
FROM THE SUPERVISOR OF WELLS APPROVING A)
PRESSURE MAINTENANCE OPERATION FOR RECOVERY)
OF OIL, GAS, AND RELATED HYDROCARBONS, AND) CAUSE NO. 03-2018
ABROGATING EXISTING SPACING AND PRORATION)
ORDERS AND RULES IN BAGLEY AND CHESTER)
TOWNSHIPS, OTSEGO COUNTY, MICHIGAN.)

OPINION AND ORDER

This case involves the Petition of Core Energy, LLC (Petitioner), requesting (i) approval of a unitized operation of the Chester 19 Field (proposed Unit Area), pursuant to Part 617, Unitization, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); (ii) approval of an enhanced oil recovery operation pursuant to Section 61506(i), Part 615, Supervisor of Wells, of the NREPA and R 324.612 of the rules promulgated pursuant to Part 615; and (iii) approval to operate the proposed Unit Area as an exception to the applicable spacing provisions of Part 615 of the NREPA, its administrative rules, and any applicable spacing orders. The proposed Unit Area consists of approximately 126 acres, and is described as the SE 1/4 of NE fractional 1/4 and NE 1/4 of SE fractional 1/4, Section 24, T30N, R3W, Bagley Township; and SW 1/4 of NW fractional 1/4, and NW 1/4 of SW fractional 1/4, Section 19, T30N, R2W, Chester Township, Otsego County, Michigan.

JURISDICTION

The development of oil and gas in this state is regulated under Part 615, Supervisor of Wells; and Part 617, Unitization; of the NREPA, MCL 324.61501, *et seq.* and MCL 324.61701, *et seq.* The purpose of Part 615 is to ensure the orderly development and production of the oil and gas resources of this state, with a view to the ultimate recovery of the maximum production of these natural resources. MCL 324.61502. To the end of maximizing recovery, the Supervisor of Wells (Supervisor) regulates secondary recovery methods for oil and gas, including the introduction of

substances into producing formations for purposes of enhancing production. MCL 324.61506(i). A person proposing secondary recovery by injection of a substance into a producing formation must file a petition for a public evidentiary hearing. 1996 MR 9, R 324.612. The evidentiary hearing is governed by the applicable provisions of the Administrative Procedures Act, 1969 PA 306, as amended, MCL 24.201, *et seq.* See 1996 MR 9, R 324.1203. The evidentiary hearing in this matter was held on March 22, 2018.

FINDINGS OF FACT

The Petitioner specifically requests that the Supervisor issue an Order allowing the Petitioner to inject carbon dioxide and other approved substances into the Guelph Dolomite/Ruff Formation, the productive zone, for purposes of enhanced oil recovery; and exempting the proposed Unit Area from the applicable spacing and proration rules and orders.

In support of its case, the Petitioner offered the testimony of the following witnesses: Mr. Robert G. Mannes, President; Mr. Kim Sanders, Land Manager; and Mr. Rick Pardini, Petroleum Engineer. Mr. Pardini was accepted as an expert in his field.

The Administrative Law Judge determined the Notice of Hearing was properly served and published. No answers were received and no one appeared at the hearing in opposition to the Petition. The Michigan Department of Natural Resources submitted a "Non-Evidentiary Statement" dated March 1, 2018, stating they do not oppose the Petition subject to certain conditions. The Supervisor designated the hearing to be an evidentiary hearing pursuant to R 324.1205(1)(b) and directed evidence be presented in the form of oral testimony.

I. Unitization

There is currently one producing well and two temporarily abandoned wells in the proposed Unit Area. All mineral interests in the proposed Unit Area are subject to valid oil and gas leases. Mr. Sanders testified that Petitioner's Plan of Unitization (Exhibit 2) constitutes a plan of unit operations containing all of the required terms and conditions

as set forth in subsections 61705(a)-(j) of Part 617 of the NREPA, and expressly provides for the unitized operation of the proposed Unit Area for purposes of enhanced oil recovery and pressure maintenance operations.

Petitioner mailed the Notice of Hearing and a full copy of the Petition (except the list of interested parties) to all owners. No objections to the Petition or the Plan of Unitization were received from owners within the proposed Unit Area.

I find that Petitioner is qualified to be named Unit Operator and after obtaining sufficient written approvals of the Plan of Unitization, a Supplemental Order may be entered approving unit operations pursuant to Part 617 of the NREPA.

II. Unit Area

Based on available well control and seismic data, Mr. Pardini prepared Exhibit 4, a structure contour map of the reservoir, from which he determined the Chester 19 Field consists of one Guelph Dolomite reef and the reef is entirely contained within the proposed Unit Area.

The acreage in the SW 1/4 of NW fractional 1/4 of Section 19 (Tract 3) of the proposed Unit Area is also contained in the Chester 18 Unit Area, formed by Supervisor's Order No. (A) 11-6-78 (Exhibit 1). Mr. Pardini testified that after reviewing well and production data, it is his opinion that there is no communication between the Chester 18 and 19 Fields. Mr. Sanders testified this acreage was likely included in the Chester 18 Unit because it was part of an existing drilling unit.

Mr. Pardini testified that Petitioner plans to conduct unitized operations within a Unitized Formation described as all the formations lying between the top of the A-1 Carbonate Formation and the base of the Lockport (Gray Niagaran) Formation, or the stratigraphic equivalents encountered in the original vertically drilled discovery well in the Chester 19 Pool, the Pewinski 1-19 well (PN 28586) located in the NW 1/4 of the SW fractional 1/4 of Section 19, T30N, R2W, Chester Township, Otsego County, Michigan.

I find the Unitized Formation as proposed by the Petitioner is reasonable and appropriate and should be approved. I find the boundaries of the proposed Unit Area

are appropriate. Portions of the reservoir underlie each tract within the proposed Unit Area and all productive portions of the reservoir are within the proposed Unit Area.

III. Secondary Recovery

Mr. Pardini testified that six wells have been drilled into the Chester 19 Field, of which one is currently producing, the Pewinski 1-19 (PN 28586). Total primary recovery has been 2,571.6 thousand barrels of oil (MBO) and 4,340 million cubic feet (MMCF) of gas (Exhibit 11). Petitioner believes significantly more oil will be recovered as a result of carbon dioxide injection based on the positive results of carbon dioxide injection in nearby carbon dioxide enhanced oil recovery units. Petitioner proposes to inject carbon dioxide into the field utilizing one or more of the existing wellbores. Mr. Pardini testified that carbon dioxide injection in the Chester 19 Field would result in incremental oil recovery of approximately 798 MBO over depletion of the reservoir by primary production (Exhibit 11). Mr. Pardini's enhanced oil recovery production forecast and estimated economics indicate the project will be profitable, with an estimated profit of \$6,100,000 (Exhibit 12).

Mr. Pardini indicated no natural gas will be produced for sale from the unitized operations. All gas recovered in the production operation will be compressed for reinjection with carbon dioxide. Oil production from the Chester 19 Field will be handled at the planned Bagley 11-14-23 Unit Central Production Facility (CPF), and separate metering will be used to assure proper allocation (Exhibit 13).

Based on Petitioner's analysis, there is evidence of significant amounts of oil remaining in the reservoir. I find the testimony indicates the proposed Unit Area contains an accumulation of hydrocarbons that will not be recovered by further primary production of the wells in the field, but may be recovered by carbon dioxide enhanced oil recovery operations conducted as part of the unitized operation. I find the estimated additional cost of unitized operations will not exceed the value of the additional hydrocarbons recovered and the unitization requested is reasonably necessary to substantially increase ultimate recovery of oil from the proposed Unit Area.

The Plan of Unitization allocates unit production among the various tracts comprising the proposed Chester 19 Unit Area based on the percentage of the total original reservoir volume under each tract (72%) and wellbores open and useable in the Unitized Formation (28%). It was Mr. Pardini's opinion that the tract factors represent each tract's fair, reasonable, and equitable share of future unit production.

I find the allocation of production to the separately owned tracts is fair, reasonable, and equitable as required by Section 61705 of Part 617 of the NREPA. I further find the type of operations contemplated by Petitioner are feasible, will prevent underground waste by recovering oil not otherwise recoverable, will decrease the amount of waste product carbon dioxide vented into the atmosphere, and will protect correlative rights. I find abrogation of the existing Special Order No. 1-73 and Supervisor's Order Nos. 5-2-72, 6-2-72, and (A) 4-2-90 is necessary to implement the Plan of Unitization and proceed with unitized operations, except no well shall be completed in the Unitized Formation at a location closer than 330 feet from the outside boundary of the proposed Unit Area.

CONCLUSIONS OF LAW

Based on the findings of fact, I conclude, as a matter of law:

1. The applicable spacing, well location, and proration requirements for the proposed Unit Area are established by Special Order No. 1-73 and Supervisor's Order Nos. 5-2-72, 6-2-72, and (A) 4-2-90. Exceptions to these orders may be granted by the Supervisor.
2. The Supervisor shall issue an order providing for the unit operation of a Unit Area if he or she finds all of the following:
 - a. That the unitization requested is reasonably necessary to substantially increase the ultimate recovery of oil and gas from the Unit Area.
 - b. That the type of operations contemplated by the plan are feasible, will prevent waste, and will protect correlative rights.

c. That the estimated additional cost of conducting such operations will not exceed the value of the additional oil and gas so recovered. MCL 324.61704(4).

3. Unit operations under the Plan of Unitization shall not commence until the Plan of Unitization has been approved, in writing, by one of the methods specified in MCL 324.61706, and the Supervisor has issued a Supplemental Order finding that sufficient ratifications have been obtained.

4. The Supervisor may regulate the secondary recovery methods of oil and gas, including pulling or creating a vacuum and the introduction of gas, air, water, and other substances into the producing formations. MCL 324.61506(i).

5. A person desiring to inject water, gas, or other fluids into a producing formation or use other technology for the purpose of increasing the ultimate recovery of hydrocarbons from a reservoir shall file a petition for hearing. 1996 MR 9, R 324.612(1).

6. The operator of a secondary recovery project shall keep accurate records of all oil, gas, and brine produced, volumes of fluids injected, and injection pressures. The operator shall file reports of the data and other data as may be required with the Supervisor at regular intervals, as specified. 1996 MR 9, R 324.612(2).

7. The Supervisor has jurisdiction over the subject matter and the persons interested therein.

8. Due notice of the time, place, and purpose of the hearing was given as required by law, and all interested persons were afforded an opportunity to be heard. 1996 MR 9, R 324.1204.

DETERMINATION AND ORDER

Based on the Findings of Fact and Conclusions of Law, the Supervisor determines the proposed unitization and enhanced oil recovery project will prevent waste and maximize the ultimate recovery of hydrocarbons from the proposed Unit Area.

NOW, THEREFORE, IT IS ORDERED:

1. Subject to entry of a Final Order pursuant to MCL 324.61707, establishing that the approvals as required thereby have been acquired, the Chester 19 Unit is hereby created in accordance with, and subject to, the terms, provisions and conditions of this Order and the Plan of Unitization, which is incorporated herein by reference. Unit operations, as described in the Plan of Unitization, shall not commence until entry of a Supplemental Order under MCL 324.61707 finding that the necessary ratifications have been obtained.

2. Core Energy, LLC is appointed Unit Operator.

3. The Chester 19 Unit is described as the SE 1/4 of NE fractional 1/4 and NE 1/4 of SE fractional 1/4, Section 24, T30N, R3W, Bagley Township; and the SW 1/4 of NW fractional 1/4, and NW 1/4 of SW fractional 1/4, Section 19, T30N, R2W, Chester Township, Otsego County, Michigan.

4. The Unitized Formation is described as:

All the formations lying between the top of the A-1 Carbonate Formation and the base of the Lockport (Gray Niagaran) Formation, or the stratigraphic equivalents encountered in the original vertically drilled discovery well in the Chester 19 Pool, the Pewinski 1-19 well (PN 28586) located in the NW/4 of the SW fractional 1/4 of Section 19, T30N, R2W, Chester Township, Otsego County, Michigan.

5. Core Energy, LLC shall notify the Supervisor between 30 and 60 days prior to the commencement of injection operations, and between 30 and 60 days prior to the anticipated date of permanent cessation of injection operations. Petitioner shall comply with the filing requirements of R 324.610, R 324.612, and R 324.806 of the

administrative rules of Part 615 of the NREPA and shall obtain such approvals as are necessary from the Department of Environmental Quality.

6. Each tract within the Chester 19 Unit shall participate in the unit production and other benefits and burdens of unit operations in accordance with the Plan of Unitization.

7. Operation of the Chester 19 Unit shall be conducted exclusive of and as an exception to all applicable spacing orders and rules, except no well may be completed in the Unitized Formation at a location closer than 330 feet from the outside boundaries of the Chester 19 Unit Area. Core Energy, LLC is authorized to produce wells on the Unit Area at rates that result in the maximum efficient recovery of hydrocarbons. All other parts of Special Order No. 1-73 and the administrative rules of Part 615 of the NREPA shall be adhered to.

8. The unitized operations shall initially be accomplished by the injection of carbon dioxide. During recycling, whatever native natural gas is left in the Unitized Formation that becomes intermixed with carbon dioxide may be cycled into and out of the Unitized Formation and through the CPF, with the injection and recovery of the carbon dioxide, and the natural gas being intermixed with the carbon dioxide. After separation at the CPF, the mixture may be used in one or more of Core's active carbon dioxide EOR units. Other substances may only be injected with written approval from the Supervisor.

9. The Plan of Unitization, which constitutes the plan for unit operations, is hereby approved; and unit operations thereunder may be commenced after entry of a Supplemental Order pursuant to MCL 324.61707 as of the effective date determined by the Unit Operator consistent with the Plan of Unitization. Cessation of the unit operations shall be in accordance with the Plan of Unitization and only with the written approval of the Supervisor.

10. The Supervisor retains continuing jurisdiction over the Chester 19 Unit in order that the Supervisor may exercise such administrative control as is consistent with

the powers and duties of the Supervisor, as established by Part 615 and Part 617 of the NREPA.

11. Upon entry of a Supplemental Order pursuant to MCL 324.61707, the Unit Operator is hereby granted the Supervisor's permission to inject carbon dioxide into the Unitized Formation.

12. Unit Operations shall not commence until the Supervisor has held a supplemental hearing and has made a finding in a supplemental order that the Plan of Unitization has been approved in writing consistent with one of the approval methods set forth in MCL 324.61706. If the written approval is not found within a period of six months from the date hereof, this order shall be ineffective and shall be revoked by the Supervisor, unless for good cause shown, the Supervisor extends the time for an additional period not to exceed one year.

Dated: April 27, 2018



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