STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

ORDER OF THE SUPERVISOR OF WELLS

THE PETITION OF CORE ENERGY, LLC FOR AN ORDER FROM THE SUPERVISOR OF WELLS APPROVING A PLAN OF UNITIZATION FOR PRESSURE MAINTENANCE AND ENHANCED AND/OR SECONDARY RECOVERY OF OIL, GAS, AND RELATED HYDROCARBONS, AND ABROGATING EXISTING SPACING AND PRORATION ORDERS AND RULES IN CHESTER TOWNSHIP, OTSEGO COUNTY, MICHIGAN.	)	ORDER NO. 08-2019

OPINION AND ORDER

This case involves the Petition of Core Energy, LLC (Petitioner), requesting (i) approval of a unitized operation of the Chester 2/10A Unit (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 a secondary recovery operation pursuant to Section 61506(i), Part 615, Supervisor of Wells, of the NREPA and R 324.612; and (iii) approval to operate the proposed Unit Area as an exception to the applicable spacing provisions of Part 615 of the NREPA, and its administrative rules, and any applicable spacing and proration orders, specifically Rule 303(2) and Order No. 23-2008. The proposed Unit Area consists of approximately 640 acres, and is described as:

Section 2: W/2 of SW/4
Section 3: SE/4
Section 10: NE/4 and SE/4
Section 11: W/2 of NW/4
Township 30 North, Range 2 West
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 the various methods for recovery of oil and gas, including unit operation of a pool and the introduction of substances into producing formations for purposes of enhancing production. MCL 324.61506(i). A person proposing secondary recovery by injection of water, gas, or other fluid into a producing formation must file a petition for a public evidentiary hearing. 1996 AACS, R 324.612. Part 617 directs the Supervisor to issue an order providing for unitization pursuant to a hearing if certain criteria are met. MCL 324.61704(4). Evidentiary hearings in these matters are governed by the applicable provisions of the Administrative Procedures Act, 1969 PA 306, as amended, MCL 24.201, et seq. See 1996 AACS, R 324.1203. The evidentiary hearing in this matter was set for December 12, 2019.

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.

The Administrative Law Judge determined the Notice of Hearing was properly served and published. Mr. James Cargas, as Trustee on behalf of the Perry J. Cargas Trust and the Helen I. Cargas Trust, submitted, through counsel, a Response in Opposition to Verified Petition dated December 5, 2019, but counsel withdrew the Response on December 11, 2019. No other answers to the Petition were filed; therefore, the Petitioner is the only party in this matter. The Supervisor designated the hearing to be an uncontested evidentiary hearing pursuant to R 324.1205(1)(c) and directed evidence be presented in the form of Verified Statements.

In support of its case, the Petitioner offered the verified statements of Mr. Kim Sanders, Land Manager for the Petitioner; Mr. Rick Pardini, Vice President and Engineering Manager of Core Energy LLC, and Mr. Allen Modroo, Exploration Manager for the Petitioner.

I. Unitization

There are currently three (3) producing wells and one (1) injection well within the proposed Unit Area. The producing wells are Wolf "C" 1 HD1 (PN 29958); the Cargas 3-2 HD2 (PN 60596); and the Butka 1-10A (PN 61375). The injector well is the Wolf 1-A (PN 29430), EPA UIC Permit No. MI-137-2R-0019. Mr. Sanders testified that Petitioner's Plan of Unitization (Exhibit 4) 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 other appropriate terms, and expressly provides for the unitized operation of the proposed Unit Area for purposes of enhanced oil recovery and pressure maintenance operations.

Mr. Sanders testified that the Unit Area consists of three pertinent areas: the 320-acre Chester 2 carbon dioxide enhanced oil recovery project approved by the Supervisor in Order No. 23-2008 (Exhibit 2); the Chester 10A Unit subject to Part 615 Rule 324.303(2) Voluntary Pooling approved by the Supervisor by letter dated June 28, 2019 (Exhibit 3); and, two stand-up 80-acre tracts (W/2 SE/4 of Section 3 and the W/2 NE/4 of Section 10, T30N, R2W) both of which are partially underlain by reservoir.

Mr. Sanders testified that all of the Unit Area is leased except several interests in Plan of Unitization Tract 3 (Exhibit 1, page 2). The current status of leasehold and unleased ownership in Tract 3 is as follows:

Leased Interest: 60 acres/80 acres
Owner: Core Energy, LLC

Unleased: Interest: 20 acres/80 acres
Unleased Owner(s):
James J. Magda, 6.67 acres
Camille P. Saunders, Trustee of Camille P. Saunders Living Trust, dated 9/17/1998, 6.67 acres
Marlene Magda, 6.67 acres

Total Unleased: 20 acres

Mr. Sanders testified that extensive negotiations occurred in efforts to obtain oil and gas leases from the unleased owners. The Petitioner is the operator and working interest owner of all oil and gas leases in the proposed Unit Area in the Unitized Formation.

The Petitioner's efforts to obtain ratifications of the Plan of Unitization succeeds in meeting or exceeding all three of the ratification thresholds set out under MCL 324.61706, subsections (a), (b), and/or (c). Mr. Sanders testimony indicates the ratification percentages are as follows: 95.2% of all unit production, including 78.4% of the cost free (royalty and overriding royalty) interest owners, and 99% of the cost-bearing (working) unit interest.

I find that the Petitioner is qualified to be named Unit Operator and has obtained sufficient approval to support entry of a final order approving the Plan of Unitization and approving unit operations pursuant to Part 617 of the NREPA. I further find that the terms of the Petitioner's Plan of Unitization are fair, reasonable and equitable.

II. Unit Area

The Petitioner previously pooled the Chester 2 and the Chester 10A units as separate and distinct pools under separate order and voluntary pooling. Based upon 3D seismic and recent drilling in the Chester 10A unit, Petitioner has concluded that the Chester 2 unit and 10A unit are not separate reefs and should be managed as a single pool.

Mr. Modroo's verified statement discusses the origin of the development cited above and the subsequent reef pressure communication discovery after preliminary drilling in the 10A unit. Exhibit 9 to Mr. Modroo's verified statement depicts the structural cross sections for the Chester 2 and Chester 10A units, and Exhibit 10 depicts the 3D seismic data.

Based on available well control and the 3D seismic data, Mr. Modroo prepared Exhibit 11, a structure contour map of the reservoir, from which he determined the Chester 2/10A Unit consists of one Guelph Dolomite reef and the reef is entirely contained within the proposed Unit Area.

Mr. Modroo testified that the Petitioner plans to conduct unitized operations within a Unitized Formation described as follows:

> That portion of the Guelph Dolomite Formation encountered in the interval from 5638 feet measured depth to 6155 feet measured depth in the Butka 1-10 well (PN 29298) located in the NE/4 SE/4 of Section 10, T30N-R02W, Chester Township, Otsego County, Michigan.

The Unitized Formation is illustrated on Mr. Modroo's Exhibit 12, a copy of the log of the Butka 1-10 (PN 29298). Mr. Modroo further testified that he did not believe the Chester 2/10A Unit Area is pressure connected to any other adjoining or nearby reefs.

I find the Unitized Formation as proposed by the Petitioner is reasonable and appropriate and should be approved. I find the Petitioner's characterization of the outline and structural contours of the reservoir to be reasonable. Review of the evidence submitted indicates portions of the reservoir underlie each tract within the proposed Unit Area. Therefore, I find the boundaries of the proposed Unit Area as proposed by the Petitioner are appropriate.

III. Secondary Recovery

The 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 Petitioner's nearby carbon dioxide enhanced oil recovery Units. Currently, carbon dioxide is being injected into the Unitized Formation in the Chester 2 Portion of the reef, which has two producers (Wolf 1-C and Cargas 3-2 HD2), and one injector (Wolf 1-A). Additionally, the Chester 10A portion of the reef complex has a single producer in the Unitized Formation, the Butka 10-A. The Petitioner proposes to continue injecting carbon dioxide into the Unitized Formation utilizing the existing injection well, and for the time being, operating the unit with the 3 existing producers. Mr. Pardini testified that carbon dioxide injection in the Chester 2/10A Unit would result in incremental oil recovery of approximately an additional 518 thousand barrels of oil (Exhibit 19).

Mr. Pardini's enhanced oil recovery production forecast and estimated economics indicate the project will be profitable (Exhibit 20).

Mr. Pardini sponsored Exhibits 14, 15, and 16, pertaining to the Butka 1-10 well, on Tract 4. These exhibits consist of a gas analysis, pressure data, and production data. Mr. Pardini testified these exhibits conclusively establish that the Chester 2 320-acre carbon dioxide enhanced oil recovery unit (Tract 2) and the Chester 10A unit (Tract 4) are connected and are a single reef complex.

Production plots and decline analyses for the Chester 2 and Chester 10A units are Exhibits 17 and 18, and a summary of Estimated Volumes in Place and Recoveries is Exhibit 19.

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 2/10A Unit will be handled at the existing Dover 36 Central Production Facility (CPF), and separate metering will be used to assure proper allocation.

Based on the 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 existing production methods 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 and avoid waste.

The Petitioner, for its assignment of tract factors to each of the tracts comprising the proposed Chester 2/10A Unit Area, has chosen it to be based on the percentage of the total remaining reservoir volume, or hydrocarbon pore volume under each tract. Mr. Pardini stated the basis of tract participation was determined using the Petitioner's structure map and its original oil in place calculations. Exhibit 4, the Plan of Unitization, Exhibits A and B (pages 29 and 30) contain the Tract Participation basis and determinations. It was Mr. Pardini's opinion that the tract factors represent each tract's fair, reasonable, and equitable share of future Unit Production.

Mr. Sanders testimony indicated the Petitioner is requesting the Supervisor of Wells to make the Chester 2/10A Unit effective as of the date of first production of the Butka 1-10A well. He indicated the date of first production from the Butka 1-10A well was the date of the first conclusive evidence that the Chester 2 and Chester 10A reefs are in fact one pool. He further indicated all royalty and overriding royalty interest in Chester 10A and Chester 2 units have been suspended as of that first date of production from the Butka 1-10A, which was August 8, 2019. Mr. Sanders testified that those suspended royalty interest and overriding royalty interest payments would be disbursed once the Chester 2/10A Unit is made effective.

I find the type of operations contemplated by the Petitioner are feasible, will prevent underground waste by recovering oil not otherwise recoverable, will prevent surface waste by decreasing the amount of an oilfield waste product (carbon dioxide produced with Antrim gas) vented into the atmosphere, and will protect correlative rights. I find abrogation of Special Order 1-73, the existing Order No. 23-2008 (Exhibit 2) and the Rule 303(2) approval for the Chester 10A unit (Exhibit 3) 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. Therefore, I find that the allocation of production set out in the Plan of Unitization is fair, reasonable, and equitable as required by Section 61705 of Part 617. I further find that an effective date for the creation of the Chester 2/10A Unit should be August 8, 2019. The effective date of August 8, 2019, is reasonable and fair since it was the first date of production from the Butka 1-10A which confirmed that the Chester 2 unit and Chester 10A unit were one pool.

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, Rule 303(2) and Order No. 23-2008.

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. 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. The Supervisor's Order may be declared effective if the Plan of Unitization has been approved in writing by one of the three ways specified in MCL 324.61706.

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 substances 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 AACS, 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 AACS, R 324.612(2).

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

8. Due notice of time, place, and purpose of the hearing was given as required by law, and all interested persons were afforded an opportunity to be heard. 2015 AACS, R 324.1204.

DETERMINATION AND ORDER

Based upon the Findings of Fact and Conclusions of Law, the Supervisor determines the proposed unitization for unit operations will prevent waste and maximize the recovery of hydrocarbons from the Unitized Formation beneath the proposed Unit Area.

NOW, THEREFORE, IT IS ORDERED:

1. The Petition of Core Energy, LLC is granted, and the proposed Unit Area is created in accordance with, and subject to, this Order and the provisions of the Plan of Unitization, which is hereby approved and incorporated by reference. The proposed Unit Area shall be hereafter known as the Chester 2/10A Unit.

2. Core Energy, LLC is appointed the Unit Operator.

3. The Chester 2/10A Unit Area is described as:

   Section 2: W/2 of SW/4
   Section 3: SE/4
   Section 10: NE/4 and SE/4
   Section 11: W/2 of NW/4
   Township 30 North, Range 2 West
   Chester Township, Otsego County, Michigan

4. The Unitized Formation is described as:

   That portion of the Guelph Dolomite Formation encountered in the interval from 5638 feet measured depth to 6155 feet measured depth in the Butka 1-10 well (PN 29298) located in the NE/4 SE/4 of Section 10, T30N-R02W, Chester Township, Otsego County, Michigan.

5. Core Energy, LLC shall notify the Supervisor 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 324.810 of the administrative rules of Part 615 of the NREPA and shall obtain such approvals as are necessary from the Department of Environment, Great Lakes, and Energy.

6. Each tract within the Chester 2/10A 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 2/10A 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 2/10A Unit Area. Core Energy, LLC is authorized to produce wells on the Unit Area at rates that result in the maximum efficient recovery of oil. All other parts of Special Order No. 1-73 and the administrative rules of Part 615 of the NREPA shall be adhered to.

8. 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 enhanced oil recovery units. Other substances may be injected into the Unitized Formation only after obtaining the written approval of the Supervisor.

9. Carbon dioxide is an oilfield waste generated as a result of Antrim gas production and processing, and the use and injection of such carbon dioxide rather than venting it to the atmosphere is encouraged as a reasonable and prudent method of preventing surface waste where practical.

10. The Plan of Unitization, which constitutes the plan for unit operations, is hereby approved in its entirety; and unit operations thereunder may be commenced 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.

11. Order No. 23-2008 is abrogated and the June 28, 2019, Voluntary Pooling Spacing Exception for the Duffield 4-10 (PN 61420) and Butka 1-10A (PN 61375) wells is withdrawn.

12. The Supervisor retains continuing jurisdiction over the Chester 2/10A 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.

13. The effective date of this Order and creation of the Chester 2/10A Unit is retroactive to August 8, 2019, based on first production from the Butka 1-10A well being the first confirmation that the Chester 2 unit and Chester 10A units are one pool.

Dated: 1-28-2020

ADAM W. WYGANT
ASSISTANT SUPERVISOR OF WELLS
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