

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

ORDER OF THE SUPERVISOR OF WELLS

IN THE MATTER OF:

THE PETITION OF CORE ENERGY, LLC FOR AN)
ORDER OF THE SUPERVISOR OF WELLS)
APPROVING A PRESSURE MAINTENANCE AND)
ENHANCED AND/OR SECONDARY RECOVERY) ORDER NO. 03-2020
OPERATION FOR RECOVERY OF OIL, GAS, AND)
RELATED HYDROCARBONS, AND ABROGATING)
EXISTING SPACING AND PRORATION ORDERS)
AND RULES FOR THE DOVER 12 POOL, IN DOVER)
TOWNSHIP, OTSEGO COUNTY, MICHIGAN;)

OPINION AND ORDER

This case involves the Petition of Core Energy, LLC (Petitioner) requesting (i) formation of the 240-acre Dover 12 Unit (Unit Area); (ii) approval of a secondary or enhanced recovery operation in the Unit Area, pursuant to Section 61506(i), Part 615, Supervisor of Wells, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), and R 324.612 of the rules promulgated pursuant to Part 615; and (iii) approval to operate the Unit Area as an exception to the proration allowables of Special Order No. 1-73. The proposed Unit Area consists of approximately 240 acres and is described as:

Section 12: NW ¼ and N ½ of the SW ¼
Township 31 North, Range 2 West
Dover Township, Otsego County, Michigan.

JURISDICTION

The development of oil and gas in this State is regulated under Part 615, Supervisor of Wells, of the NREPA, MCL 324.61501, *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 of 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 water, gas, or other fluid into a producing formation must file a petition for public evidentiary hearing. 1996 AACCS, 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 AACCS, R 324.1203. The evidentiary hearing in this matter was held on June 15, 2020.

FINDINGS OF FACT

The Petitioner specifically requests that the Supervisor issue an Order forming a 240-acre Unit Area; and allow the Petitioner to inject carbon dioxide (CO₂) and other approved substances into the Guelph Dolomite/Ruff Formation, the productive zone, for purposes of enhanced oil recovery (EOR); and exempting the proposed Unit Area from the applicable spacing and proration rules and orders. The Petitioner requests approval of the Supervisor to drill and utilize additional wells in the Unit Area provided as no well is closer than 330 feet from the unit boundary.

In support of its case, the Petitioner offered the testimony of Mr. Rick Pardini, Vice President and Engineering Manager for the Petitioner, Mr. Allen Modroo, Exploration Manager of the Petitioner, and Mr. Kim Sanders, Land Manager for the Petitioner. Mr. Pardini was recognized as an expert in the field of petroleum engineering, and Mr. Modroo was recognized as an expert in the field of geology and geophysics.

The Supervisor determined the Notice of Hearing was properly served and published. No answers to the Petition or appearances were filed; therefore, the Petitioner is the only party to this case. 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 pursuant to R 324.1205(2).

I. Unit Area

Mr. Sanders testified that the Axford, Henry W Jr, Et Ux 1-12 (PN 29780), and the Axford Et Al 2-12 and 2-12 HD1 (both PN 37122) wells were drilled to test the productive zone in the Dover 12 Unit. The Axford Et Al 2-12 and 2-12 HD1 are both now plugged. The Axford, Henry W Jr, Et Ux 1-12 is currently a producing well. All of these wells were drilled in accordance with Special Order No. 1-73.

The 240-acre proposed Unit Area was contractually established pursuant to a Unitization Agreement dated March 8, 1983, which was recorded in the Otsego County records (Exhibit 2). Mr. Sanders testified that all mineral interests in the Unit Area are subject to a valid oil and gas lease; and that oil and gas leases in the unitized formations are owned by the Petitioner, and that all current owners of the oil and gas interests in the Unit Area and unitized formations are subject to the Unitization Agreement. The Unitization Agreement authorizes the Unit Area to be unitized for purposes of development and operations thereof for all oil and gas purposes, including secondary recovery and pressure maintenance operations (Exhibit 2). Mr. Sanders further testified that the Unitization Agreement provides for net acre allocation of proceeds from production.

Mr. Modroo testified, based on his generation and review of a cross section over the Dover 12 pool (Exhibit 3), his review of well control (Exhibit 4) and seismic data (Exhibit 5, page 1), that the limits of the reef are located entirely within the proposed 240-acre Unit Area (Exhibit 5, page 2).

Using the log of the Axford, Henry W Jr, Et Ux 1-12 well (Exhibit 4), Mr. Modroo testified that the Petitioner plans to conduct unitized operations within the unitized formations described as that portion of the Salina Formation, A1 Carbonate (aka Ruff Formation) encountered in the interval from 4902 feet, and the Guelph Formation from 4969 feet, to the base of the Guelph formation at 5188 feet, as measured depths being from the Axford, Henry W Jr, Et Ux 1-12 well, located in the SW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 12, T31N, R2W, Dover Township, Otsego County, Michigan.

Based on the evidence establishing the Dover 12 Pool to be separate and distinct from any other Guelph Dolomite/Ruff Formation pool, the Petitioner requested that it be allowed to drill one or more new development wells into the unitized formations and within the Unit Area with the producing interval of the wellbore located anywhere not less than 330 feet from the outside boundary of the Unit Area.

I find the boundary of the proposed Unit Area and unitized formations as proposed by the Petitioner are appropriate and all productive portions of the reservoir are within the proposed Unit Area and should be approved.

II. Secondary Recovery

Mr. Pardini testified a total of 1,021,688 barrels of oil had been produced from the Dover 12 field on primary production (Exhibit 8, page 1). The Petitioner proposes to conduct a CO₂ injection operation for the purpose of EOR in the unitized formations within the proposed Unit Area, in order to enhance the recovery of oil and so as to manage the Dover 12 Unit as one common reservoir.

Mr. Pardini testified that the Petitioner plans to initially inject CO₂ into the Axford, Henry W Jr, Et Ux 1-12 well until the reservoir pressure is raised to the necessary operating pressure throughout the reservoir. Ideally, the Petitioner would like to maintain the reservoir pressure above the estimated minimum miscibility pressure of 1200 pounds per square inch (psi) as a means for maximizing production and ultimate recovery. The maximum surface injection pressure will not exceed that to be permitted by the Petitioner's United States Environmental Protection Agency (USEPA) permit, once issued.

In order to produce the reservoir, the petitioner may drill a new production well or may re-enter a plugged well within the proposed Unit Area. The Petitioner expects that several CO₂ injection-oil production cycles may be necessary to maximize flood performance, consistent with the normal CO₂ EOR process. The Petitioner further requests that during the production, all producer well(s) located in the proposed Unit Area be allowed to produce at their maximum efficient rate and not be subject to any proration allowables.

It is the Petitioner's opinion that CO₂ EOR operations are a type of secondary recovery necessary for recovery of additional oil reserves from the proposed Unit Area. The Petitioner indicated that the characteristics of the proposed Unit Area and proposed unitized formations are good candidates for CO₂ EOR because there is a significant volume of oil remaining in the carbonate reef complex. Mr. Pardini projects the recovery of an additional 305 thousand barrels of oil from the Dover 12 Pool by the type of operations the Petitioner proposes (Exhibits 7 and 12). It is the Petitioner's opinion that the proposed EOR operation is technically and economically feasible. Mr. Pardini's enhanced oil production forecast and estimated economics (Exhibit 12) indicate that the project costs will be below the value of the additional oil estimated to be recovered.

Mr. Pardini testified that the source of the Petitioner's CO₂ supply is the Chester Gas Processing Plant that removes CO₂ as a waste product from produced Antrim shale gas. The capture, compression, and injection of CO₂ into the proposed Unit Area and reef for EOR purposes in lieu of venting CO₂ into the atmosphere at the gas processing plant will prevent surface waste. The Petitioner requested that it be authorized to inject fluids other than CO₂ into the reservoir, provided it first obtains all required permits and approvals.

After review of all testimony and evidence on the record, I find the type of operations contemplated by the Petitioner are feasible, will prevent underground waste by recovering oil not otherwise recoverable, and will protect correlative rights. I find abrogation of the existing Special Order No. 1-73 spacing, well location, and proration requirements is necessary to proceed with enhanced recovery operations; except no well shall be completed in the unitized formations at a location closer than 330 feet from the outside boundary of the proposed Unit Area. I further find the testimony and evidence show the reservoir is contained within the Petitioner's proposed 240-acre Unit Area and the Petitioner's proposed EOR project will be confined to 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.

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

3. A person desiring to inject water, gas, or other fluid 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 AACRS, R 324.612(1).

4. 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 AACRS, R 324.612(2).

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

6. 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, with respect to the determination made herein. 2015 AACRS, R 324.1204.

DETERMINATION AND ORDER

Based on the Findings of Fact and Conclusions of Law, the Supervisor of Wells determines that the proposed Unit Area and secondary recovery operations will prevent waste and will maximize the recovery of hydrocarbons from the unitized formations within the 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. The proposed Unit Area shall be hereinafter known as the Dover 12 Unit.

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

3. The Dover 12 Unit Area is described as:

Section 12: NW/4 and the N/2 of SW/4

Township 31 North, Range 2 West

Dover Township, Otsego County, Michigan

4. The Unitized Formation is described as:

That portion of the Salina Formation, A1 Carbonate (aka Ruff Formation) encountered in the interval from 4902 feet to the base of the Guelph formation at 5188 feet, as measured depths in the Axford, Henry W Jr, Et Ux 1-12 well, located in the SW/4 of the NW/4 of Section 12, T31N, R2W, Dover Township, Otsego County.

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. The 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 (EGLE).

6. Operation of the Dover 12 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 Dover 12 Unit. Core Energy, LLC is authorized to produce wells within the Dover 12 Unit 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.

7. 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. Other substances may only be injected with written approval from the Supervisor.

8. The Supervisor retains continuing jurisdiction over the Dover 12 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 of the NREPA.

9. This Order is effective immediately.

A handwritten signature in black ink, appearing to read "Adam W. Wygant". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Dated: July 29, 2020

ADAM W. WYGANT
ASSISTANT SUPERVISOR OF WELLS
Oil, Gas, and Minerals Division
P.O. Box 30256
Lansing, MI 48909-7756