

**STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
SUPERVISOR OF WELLS**

IN THE MATTER OF

THE PETITION OF MILLER ENERGY COMPANY II,)
LLC, FOR AN ORDER OF THE SUPERVISOR OF)
WELLS APPROVING AN ENHANCED OIL)
RECOVERY OPERATION, BY INJECTION OF)
WATER, AND SUCH OTHER APPROPRIATE)
SUBSTANCES AS MAY BE APPROVED, INTO) ORDER NO. 09-2022
THE LUCAS FORMATION FOR THE ROSEBUSH)
RICHFIELD POOL, IN PARTS OF VERNON AND)
ISABELLA TOWNSHIPS, ISABELLA COUNTY,)
MICHIGAN; AND ABROGATING EXISTING)
SPACING AND PRORATION ORDERS AND)
RULES FOR SUCH POOL.)

OPINION AND ORDER

This case involves the Petition of Miller Energy Company II, LLC (Miller Energy or Petitioner), requesting (a) approval of a unitization operation pursuant to Part 617, Unitization, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); (b) approval of an enhanced secondary recovery operation pursuant to Section 61506(i), Part 615, Supervisor of Wells, of the NREPA and R 324.612; and (c) 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 1,280 acres, and is described as:

Section 35: E/2 NE/4 and SE/4 SE/4

Section 36: SW/4 NW/4, NE/4 SW/4, W/2 SW/4 and the NW/4 SE/4

T16N-R4W, Vernon Township

and

Section 1: S/2 NW/4, SW/4, W/2 SE/4

Section 2: E/2 NE/4 and E/2 SE/4

Section 11: E/2 NE/4, SW/4 NE/4 and NE/4 SE/4

Section 12: NW/4, W/2 NE/4 and N/2 SW/4

T15N-R4W, Isabella Township, Isabella 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 Parts 615 and 617 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 the 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 a substance 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 November 16, 2022.

FINDINGS OF FACT

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

The Supervisor determined that the Notice of Hearing was properly served and published. No answers were received in a timely matter, however, a written statement, was received from James Fitzpatrick, a surface owner in the proposed Unit. The Supervisor designated the hearing to be an uncontested evidentiary hearing pursuant to R 324.1205(1)(b) and directed evidence be presented in the form of verified statements

pursuant to R 324.1205(2). The Petitioner responded to James Fitzpatrick's concerns by its Response dated November 17, 2022.

In support of its case, the Petitioner offered the testimony by verified statements of the following witnesses: CJ Miller, Land Manager of Miller Energy; Mark Henning, Independent Consulting Petroleum Geologist; Mike Palmer, Exploration Engineer of Miller Energy; and an Affidavit from Adam Biteman, Hydrogeologist of Gosling Czubak Engineering Sciences, Inc. Mark Henning, Mike Palmer, and Adam Biteman were accepted as experts in their respective fields.

I. Unitization

Mr. Miller further testified that all of the oil, gas, and mineral interests in the proposed unitized formation beneath the proposed Unit Area are subject to recorded oil and gas leases owned by Miller Energy. Mr. Miller sponsored Exhibit 2 as the Petitioner's Plan of Unitization. He testified that it 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.

Mr. Miller sponsored Exhibit 3 showing that the Plan of Unitization has been approved and ratified by sufficient owners to meet the requirements of Part 617, specifically that 85% of the Net Revenue Interest in the proposed unit have ratified the Plan of Unitization.

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.

II. Unit Area

Mr. Miller sponsored Exhibit 1 as showing all of the proposed Unit Area, and the existing wells within the unit that are subject to the plan of Unitization. Based on review of the available well logs and well data, Mr. Henning prepared Exhibit 4, a structure contour map of the reservoir, from which he determined the Rosebush Unit consists of two productive zones, which are the Richfield and the Detroit River Sour Zone of the Lucas Formation. Mr. Henning stated that from his review of available data, the proposed unit boundary encompasses the entire productive area of the Lucas Formation reservoir

in the Rosebush Field.

Mr. Henning testified that the Petitioner plans to conduct unitized operations within the unitized formation, specifically described as the zones lying between the top of the Detroit River Sour member and the base of the Richfield member, an interval from 4415 feet to 4783 feet, or the stratigraphic equivalents encountered in the original vertically drilled discovery well in the Rosebush Field, the McGuire, David 1 well (PN 27405) located in the NW/4 SW/4 SW/4 of Section 36, T16N, R4W, Vernon Township, Isabella County, Michigan.

I find the boundary of the proposed Unit Area and unitized formation as proposed by the Petitioner are appropriate and all productive portions of the reservoir are within the proposed Unit Area and should be approved. I further find that the terms of the Petitioner's Unit Agreement are fair, reasonable, and equitable.

III. Secondary Recovery

Mr. Henning testified that 60 wells have been drilled into the Rosebush Field of which 31 are still producing or are capable of producing oil. The total primary recovery has been a total cumulative production of 1.13 million barrels of oil (MMBO) from the Richfield Zone and a cumulative production of 1.23 MMBO from the Detroit River Sour Zone member from the Rosebush Field (Exhibit 8). The Petitioner believes significantly more oil will be recovered as a result of freshwater injection. The Petitioner proposes to inject fresh water and/or other approved substances into the field utilizing one or more of the existing wellbores. Mr. Biteman's affidavit indicated that he prepared and/or directed the preparation of the Petitioner's Report of Hydrogeological Investigation (Exhibit 11). Mr. Biteman testified that the source aquifer for the Rosebush Unit is capable of furnishing 60 gallons per minute of fresh water without it having an adverse impact on nearby surface waters or potable water wells. Mr. Henning testified that freshwater injection into the Rosebush Unit would result in incremental oil recovery of approximately 1.45 MMBO (Exhibit 8). Mr. Henning's enhanced oil recovery production forecast and estimated economics indicate the project will be profitable, with an estimated net profit of \$66.54 Million (Exhibit 14).

Mr. Palmer testified that in the 40-acre buffer area surrounding the Rosebush Unit, that there were 19 wells drilled to the Lucas Formation. He sponsored Exhibit 17 to show

that all Lucas Formation wells in the 40-acre buffer have been plugged back to the Dundee or are plugged and abandoned. Mr. Palmer also asserted in supplemental testimony that for any wells in the unit having multiple-zone completions involving the Dundee, that the non-unitized perforations will be squeezed with cement to ensure that non-unitized and unitized oil is not commingled. Mr. Palmer further testified that in his professional opinion, that the proposed waterflood will economically recover oil which would not otherwise be produced and will prevent waste by reducing the amount of oil which will be left unrecoverable in the ground.

Mr. Miller indicated no natural gas sales are anticipated from the unitized operations, and that all gas recovered in the production will be utilized to operate oilfield equipment. Mr. Palmer testified that the estimated daily usage of field gas by the equipment is approximately 46.69 thousand cubic feet gas per day.

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 further primary production of the wells in the field but may be recovered by fresh water 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 Rosebush Richfield Pool based on the percentage of the total completion thickness within the Lucas Formation. It is Mr. Henning'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 the Petitioner are feasible, will prevent underground waste, and will protect correlative rights. I find abrogation of the existing spacing orders is necessary to implement the Plan of Unitization and proceed with unitized operations, except no producing 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 the General Rule Spacing (Rule 324.301). Exceptions to this rule 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. 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 production formations. MCL 324.61506(i).

4. 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).

5. 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 AACCS, R 324.612(2).

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

7. 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 AACCS, R 324.1204.

DETERMINATION AND ORDER

Based on the Findings of Fact and Conclusions of Law, the Supervisor determines that 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. The Petition of Miller Energy Company II, 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 incorporated by reference. The proposed Unit Area shall be hereafter known as the Rosebush Unit.

2. Miller Energy Company II, LLC is appointed Unit Operator.

3. The Rosebush Unit is described as the E/2 NE/4 and SE/4 SE/4 of Section 35, SW/4 NW/4, NE/4 SW/4, W/2 SW/4 and the NW/4 SE/4 of Section 36 in T16N-R4W, Vernon Township, and the S/2 NW/4, SW/4, W/2 SE/4 of Section 1, E/2 NE/4 and E/2 SE/4 of Section 2, E/2 NE/4, SW/4 NE/4 and NE/4 SE/4 of Section 11, and the NW/4, W/2 NE/4 and N/2 SW/4 of Section 12 in T15N-R4W, Isabella Township, Isabella County, Michigan.

4. The unitized formation is described as the zones within the Lucas Formation lying between the top of the Detroit River Sour member and the base of the Richfield member, an interval from 4415 feet to 4783 feet, or the stratigraphic equivalents encountered in the original vertically drilled discovery well in the Rosebush Field, the McGuire, David 1 well (PN 27405) located in the NW/4 SW/4 SW/4 of Section 36, T16N, R4W, Vernon Township, Isabella County, Michigan.

5. Miller Energy Company II, 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, 806 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 Rosebush 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 Rosebush Unit shall be conducted as an exception to all applicable spacing orders and rules, except no well may be completed in the unitized formations at a location closer than 330 feet from the outside boundaries of the Rosebush Unit. Miller Energy Company II, 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 R 324.301 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 fresh water. During recycling, whatever native natural gas is left in the unitized formations that becomes intermixed with water may be cycled into and out of the unitized formations. Other substances may only be injected with written approval from the Supervisor. The rate of withdrawal from the fresh water well shall not exceed 60 gallons per minute without first receiving 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 as of the effective date, but subject to the Unit Operator determination of an effective date consistent with Article 26 of the Plan of Unitization. Cessation of 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 Rosebush 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. This order is effective immediately.



Dated: March 20, 2023

Adam W. Wygant
ASSISTANT SUPERVISOR OF WELLS
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