

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

ORDER OF THE SUPERVISOR OF WELLS

IN THE MATTER OF:

THE PETITION OF MUSKEGON OPERATING)
COMPANY, LLC FOR AN ORDER OF THE)
SUPERVISOR OF WELLS APPROVING)
SECONDARY RECOVERY OPERATIONS FOR)
RECOVERY OF OIL, GAS, AND RELATED) ORDER NO. 11-2023
HYDROCARBONS, AND ABROGATING)
EXISTING SPACING AND PRORATION ORDERS)
AND RULES, FOR THE FANSLAU-HOLCOMB UNIT,)
IN HAMILTON TOWNSHIP, CLARE COUNTY,)
MICHIGAN;)

OPINION AND ORDER

This case involves the Petition of Muskegon Operating Company, LLC (“Petitioner”) for approval of a secondary or enhanced recovery operation by injection of water into the producing formation of the Fanslau-Holcomb Unit for the purpose of increasing the ultimate recovery of hydrocarbons from the Unit reservoir 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. In addition, the Petitioner seeks approval to operate the proposed Unit Area as an exception to the applicable spacing provisions of Part 615 of NREPA, and its administrative rules. The proposed Unit Area consists of approximately 80 acres, comprised of the North ½ of the Northwest ¼ of Section 22, T19N, R3W, Hamilton Township, Clare 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 scheduled for October 31, 2023.

FINDINGS OF FACT

The Petitioner requests that the Supervisor issue an Order allowing secondary and enhanced recovery of oil, gas, and associated hydrocarbons from the 80-acre Fanslau-Holcomb Unit by injection of water into the producing formation for the purpose of increasing the ultimate recovery of hydrocarbons from the Unit reservoir. The Petitioner intends to produce oil, gas, and associated hydrocarbons in the Unit from the Lucas Formation of the Detroit River Group. More specifically, the Petitioner proposes to conduct secondary recovery operations in the Richfield Member of the Lucas Formation in the Fanslau 1-22 well.

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).

In support of its case, the Petitioner offered the testimony by verified statement of the following witnesses: David Bell, Petroleum Engineer for the Petitioner, and Clifton J. Roberts, Land Manager for the Petitioner.

I. Unit Area

Mr. Bell sponsored Exhibit 3 as accurately depicting the unit area for the proposed Fanslau-Holcomb Unit. Mr. Bell testified that the proposed unit area was formed by voluntary pooling approved under R 324.R303, August 4, 2008 (Exhibit 2). Mr. Roberts sponsored Exhibit 4, showing the names of all persons owning or having an interest in the surface and in the oil and gas in the 80-Acre Fanslau-Holcomb Unit. He stated he reviewed all petitioner's lease records, ownership information, and pay sheets showing ownership of the oil and gas and payment of revenue from leases within the unit dating back to the beginning of production. He further testified he conducted a title search in the register of deeds and cross-checked those results with a review of records at the equalization department.

Mr. Bell testified that there are presently two wells in the unit, the Fanslau, R&P 1-22 (PN 58365), and the Holcomb 1-22 (PN 59345). The petitioner has a third well, west of the proposed Fanslau-Holcomb Unit, the Rhodes 1-21 (PN 59974). Mr. Bell sponsored Exhibit 7c as a Richfield Structure map and testified to the structural relationship and completed productive intervals of the Richfield zone in the Rhodes 1-21, Fanslau, R&P 1-22, and Holcomb 1-22. Mr. Bell testified based on his review of the data that in this area, he believes the majority of the oil production in the Fanslau-Holcomb Unit has originated from the top two dolomite sections within the Richfield (which he referred to as "R1" and "R2" respectively, with the third dolomite section (referred to as "R3") contributing to a lesser extent (Refer to Exhibit 7g). Mr. Bell testified that the porosity development in these intervals is generally well correlated in the Fanslau, R&P 1-22, and Holcomb 1-22. There is poor porosity development in the Rhodes 1-21 however, which likely contributes to its poor production history and subsequently has no value to the Fanslau-Holcomb Unit.

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

II. Secondary Recovery

Mr. Bell testified that Petitioner proposes to inject water into productive intervals within the Lucas formation, and to conduct waterflood operations to increase the ultimate

recovery of hydrocarbons. The Richfield Zone is the primary focus for the contemplated secondary recovery operations. Of the two wells presently located in the Unit, the Fanslau, R&P 1-22 and the Holcomb 1-22, the Petitioner plans to convert the Holcomb 1-22 well to a water injection well, and continue production from the Fanslau, R&P 1-22 well, subject to possible changes as determined by conditions in the field and results.

Mr. Bell testified that primary production within the Unit began in 2008. Both wells are producing from the Richfield zone and have exhibited typical solution gas drive behavior with minimal native water production. Mr. Bell sponsored Exhibit 7a and 7b and testified that approximately 136,000 barrels of oil have been produced from this area as of June, 2023, and that past production constitutes approximately 96% of the primary reserves from the Unit area.

Based on tabular data attached as Exhibit 7g to the Petition, which was derived from log sections attached as Exhibit 7f to the Petition, Mr. Bell testified that percent water saturation was calculated at points within each Richfield pay interval in the Rhodes 1-21, Fanslau, R&P 1-22, and Holcomb 1-22. Mr. Bell testified that the Fanslau, R&P 1-22 is highest on structure within this area, and also displays the lowest calculated water saturation values within the completed Richfield intervals. The Holcomb 1-22 is generally several feet lower on structure than the Fanslau, R&P 1-22 and subsequently has higher calculated water saturation values, particularly in R3. The Rhodes 1-21 is lower still, has higher water saturation generally, has poorer porosity generally, and has especially low average porosity within the R1 to R3 section.

With regard to the proposal to inject groundwater as a part of the secondary recovery operations proposed in this matter, Mr. Bell testified that the water supply well for this project is completed within the glacial drift at a depth of approximately 120 feet below ground level.

The Petitioner also submitted a hydrogeological investigation report that shows data related to the proposed operations with regard to the Fanslau-Holcomb Unit. Mr. Bell testified that the conclusions from the hydrogeological investigation report include the following: Three wells (one supply well and two observation wells) were drilled in a triangular pattern to determine groundwater table elevation and direction of flow. A pump test was performed at a withdrawal rate of 50 gpm. Analysis of test data shows a

maximum drawdown in the supply well of 48 feet, 1.5 feet in one observation well, and 2.1 feet in the other observation well. Plotting the drawdown vs. distance data shows that at a 50 gpm pump rate the induced aquifer drawdown would be negligible at a distance of approximately 200 feet away from the supply well. This should be considered a worst-case scenario as the Petitioner's proposed pump rate would likely be closer to an average of 6 gpm. Mr. Bell testified that based on those results, the study shows that the proposed waterflood operations would have no measurable effect on nearby water wells.

Mr. Bell further testified that the proposed secondary recovery operations are reasonably necessary to substantially increase the ultimate recovery of oil, gas, and associated hydrocarbons from the Unit Area. Mr. Bell testified that approximately 96% of the original primary reserves have been produced, and he would only expect to recover approximately 6,000 additional barrels of oil without secondary recovery operations (Exhibit 7a).

Mr. Bell testified that in the Petitioner's experience, a conservative projection of secondary recovery operations through waterflood methods in the Richfield would be an amount equal to one half of the primary recovery. Based on primary production from the Richfield in the amount of 142,300 barrels, Mr. Bell testified that he conservatively estimates secondary recovery in the amount of 71,150 bbls. Mr. Bell testified that this estimate is based upon substantial experience with waterflood projects in the State of Michigan. The Petitioner currently operates 10 waterflood projects in Michigan, 4 of which involve the Richfield Formation.

Mr. Bell testified that he believes the proposed secondary recovery operations are feasible based on substantial prior experience with waterflood projects, including waterflood projects in the Richfield Zone.

Mr. Bell further testified that he believes the proposed secondary recovery operations will prevent waste. The Fanslau-Holcomb Unit has reached the end of its productive life with respect to its primary operations, having produced approximately 96% of the original primary reserves. Mr. Bell testified that if the Petitioner is not able to conduct the proposed secondary operations, the Petitioner would be forced to plug and abandon these wells, leaving a substantial quantity of oil unproduced.

Mr. Bell further testified that he believes the proposed secondary recovery operations will result in the protection and exercise of correlative rights by the mineral owners within the unit, as they will receive the benefit of additional oil production. Mr. Bell testified with respect to mineral owners outside the unit there is nothing in the proposed plan of operations that prevents any adjacent mineral owner from producing his or her own minerals according to the prevailing rule of capture, and so the correlative rights of the adjacent mineral owners are not affected or infringed.

Mr. Bell estimated the costs per barrel of secondary oil recovery to be \$2.98 per barrel. Based on those cost estimates, Mr. Bell testified that he believes there will be a substantial increase in the estimated net revenue as compared to the revenue if secondary recovery operations were not conducted.

Mr. Bell further testified that the Petitioner is also requesting that the applicable law and rules relative to well spacing be abrogated within the unit area. Mr. Bell testified that he believes it may be reasonable and appropriate to prevent waste and to protect correlative rights to drill an infill well that would be inconsistent with the current spacing rules.

Based on the Petitioner's analysis, I find there is evidence of a significant amount of oil remaining in the reservoir that will not be recovered by further primary production but may be recovered by enhanced recovery operations through the injection of water in the reservoir and that the estimated cost of secondary recovery operations will not exceed the value of the additional hydrocarbons recovered. 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 that the abrogation of existing spacing requirements is necessary to proceed with enhanced recovery 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. I further find that it may be reasonable and appropriate to drill an infill well in the Unitized Formation within the proposed Unit Area and that the drilling of such well would require approval by the Supervisor of Wells, which I find may be reviewed at staff level without a future hearing.

CONCLUSIONS OF LAW

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

1. 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).
2. 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 AACS, R 324.612(1).
3. 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).
4. The Supervisor has jurisdiction over the subject matter and the persons interested therein.
5. 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 AACS, 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 Muskegon Operating Company, 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 Fanslau-Holcomb Unit.
2. Muskegon Operating Company, LLC is appointed the Unit Operator.
3. The Fanslau-Holcomb Unit Area is described as:
Section 22: N/2 NW/4, Township 19 North, Range 3 West, Hamilton Township, Clare County, Michigan

4. The Unitized Formation is described as:

That portion of the Richfield Member of the Lucas Formation, located within the interval between 4041' MD to 5150' MD in the Fanslau 1-22 well, located in the NW/4 of the NW/4 of Section 22, T19N, R3W, Hamilton Township, Clare County.

5. Muskegon Operating Company, 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 Fanslau-Holcomb 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 Fanslau-Holcomb Unit. Muskegon Operating Company, LLC is authorized to drill infill wells and produce wells within the Fanslau-Holcomb Unit at rates that result in the maximum efficient recovery of hydrocarbons. All other parts of 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 freshwater. Other substances may only be injected with written approval from the Supervisor. The rate of withdrawal from the freshwater well shall not exceed 30 gallons per minute without first receiving written approval from the Supervisor.

8. The Supervisor retains continuing jurisdiction over the Fanslau-Holcomb 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 shall be 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: 12/13/2023

Adam W. Wygant
ASSISTANT SUPERVISOR OF WELLS
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