STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY

ORDER OF THE SUPERVISOR OF WELLS

THE PETITION OF BREITBURN OPERATING, L.P., FOR AN ORDER FROM THE SUPERVISOR OF WELLS APPROVING AN OPERATION FOR ENHANCED AND/OR SECONDARY RECOVERY OF OIL, GAS, AND RELATED HYDROCARBONS, AND ABROGATING EXISTING SPACING AND PRORATION ORDERS AND RULES IN BEAVER CREEK TOWNSHIP, CRAWFORD COUNTY.	)	ORDER NO. 09-2012

OPINION AND ORDER

This case involves the Petition of BreitBurn Operating, L.P. (Petitioner) for approval of secondary recovery operations in a portion of the Beaver Creek Richfield Field. The Petitioner is requesting (i) an order approving a secondary or enhanced recovery operation 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 (ii) approval to operate the Beaver Creek Richfield East Unit (Unit) as an exception to Part 615 and its administrative rules. The Unit, as proposed, is wholly included within the W 1/2 of Section 22 and the E 1/2 of the NW 1/4 of Section 27, T25N, R4W, Beaver Creek Township, Crawford 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. 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 a fluid 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 September 12, 2012.

FINDINGS OF FACT

The Petitioner specifically requests that the Supervisor issue an Order allowing the Petitioner to inject produced water into productive intervals in the Richfield Member of the Detroit River Group (the Unitized Zone) for purposes of secondary recovery, and exempt the Beaver Creek Richfield East Unit 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 no well is closer than 330 feet from the unit boundary.

In support of its case, the Petitioner offered the testimony of Mr. Scott L. Hansen, Division Landman for the Petitioner; Mr. Christopher E. Angel, Petroleum Geologist for the Petitioner; and Mr. William J. Jansa, consulting Petroleum Engineer working on contract for the Petitioner. Mr. Angel was recognized as an expert in the field of petroleum geology and Mr. Jansa was recognized as an expert in the field of petroleum engineering. The Petitioner also offered the testimony of Mr. Timothy J. Howard, Environmental, Health and Safety Manager – Northern Division, for the Petitioner.

The Administrative Law Judge determined the Notice of Hearing was properly served and published. Answers to the Petition were filed by Robert M. and Karen M. Richards II; Marian Long and Randy Meyer. Mr. Meyer appeared at the hearing. He did not offer testimony or exhibits but did make a statement at the end of the hearing, expressing concern about the handling of sour oil and gas. The Supervisor designated the hearing to be an evidentiary hearing pursuant to R 324.1205(1)(b) and directed substantive evidence be presented in the form of oral testimony.

I. Unit Area

Mr. Angel and Mr. Jansa testified that eight wells were drilled to test the Unitized Zone in the Unit. Currently, there are six wells producing in the Unit Area (Exhibits 5 and 11). All wells were drilled on 40-acre drilling units.

The Unit Area is subject to a Unitization Agreement dated July 9, 2012 (Exhibit 2). Mr. Hansen testified that all mineral interests in the Unit are subject to valid oil and gas leases; and all oil and gas leases in the Unitized Zone are owned by the Petitioner. The Unitization Agreement authorizes unitized operations by secondary recovery on the Unit, which the Petitioner has designated as the Phase 1 Unit Area. All owners in the Unit Area ratified the Phase 1 Unit Area (Exhibit 3). After Phase 1 secondary recovery activities are successful, the Petitioner proposes that it will petition the Supervisor to extend operations to the East and expand the Unit for purposes of conducting Phase 2 unit operations. The Phase 2 Unit Area will be described as follows: the W 1/2, W 1/2 of NE 1/4 and W 1/2 of SE 1/4 of Section 22; the E 1/2 of NW 1/4 and W 1/2 of NE 1/4 of Section 27, T25N, R4W, Beaver Creek Township, Crawford County, Michigan.

For purposes of this Order, the Supervisor is addressing the Phase 1 Unit Area only. When and if the Petitioner proposes to expand the Unit and conduct Phase 2 operations, the Petitioner shall file a Petition with the Supervisor of Wells.

Mr. Angel and Mr. Jansa testified the Unit is easterly of and adjoining the Beaver Creek Richfield Unit established by Order No. 197-3, as amended in 1974 in Order No. (A) 2-74. (Exhibits 5, 6, 8, and 9). Mr. Jansa testified that the productive intervals in the Beaver Creek Richfield Unit are present beneath the proposed Beaver Creek Richfield East Unit (Exhibits 14 and 15). Mr. Jansa described the Petitioner's prior secondary recovery operations in the adjoining Beaver Creek Richfield Unit. Those operations began in 1963 (Exhibits 13-17). In his opinion, the success of the Beaver Creek Richfield Unit indicates secondary oil recovery by water injection is technically and economically feasible for the proposed Beaver Creek Richfield East Unit.

I find the boundaries of the proposed Phase 1 Unit Area are appropriate and all productive intervals of the Richfield Member of the Detroit River Group are within the Unitized Zone of the Unit.

II. Secondary Recovery

Using his structural cross section (Exhibit 7), Mr. Angel testified that the Unitized Zone is described as follows:

> The stratigraphic equivalent of the Richfield Member of the Detroit River Group encountered in the subsea interval from -2916 (4144 MD) feet to -3165 (4393 MD) feet in the State Beaver Creek D8 Well located in the NE 1/4 of SW 1/4 of Section 22, T25N, R4W, Beaver Creek Township, Crawford County, Michigan.

Mr. Jansa indicated this zone is effectively the same zone as is productive in the Beaver Creek Richfield Unit, to the west.

Mr. Jansa testified that on primary production a total of 573,300 barrels of oil had been produced from the area comprising the Unit (Exhibit 11). To recover additional oil, the Petitioner proposes that water produced with oil production within the adjoining Beaver Creek Richfield Unit, and other substances approved in advance by the Supervisor, will be injected into the D5 and D8 wells for purposes of reintroducing energy to the reservoir and mobilizing the oil. The maximum surface injection pressure will be determined by the Petitioner's United States Environmental Protection Agency (USEPA) permit. Other injector and producer wells will be designated as development proceeds. After secondary recovery within the Phase 1 Unit proves to be successful, the Petitioner plans to request approval of the Phase 2 Unit. If approved, additional producer and/or injector wells will be drilled on the Tracts added for Phase 2 operations.

It is the Petitioner's opinion that secondary recovery is necessary for recovery of additional reserves from the Unit. The Petitioner indicated that the characteristics of the Unit make it favorable for secondary recovery by produced water injection because it is analogous to the successful Beaver Creek Richfield Unit. Mr. Jansa projects the recovery of approximately an additional 200,000 barrels of oil from the Unit by the type of operations the Petitioner proposes (Exhibit 19). The Petitioner requested that it be

authorized to inject fluids other than produced water into the reservoir, provided it first obtains all required permits and approvals.

Mr. Howard testified regarding the handling of sour gas in the Beaver Creek Field. Oil and gas produced from the Detroit River Zone 3 Unit established by Order No. (A) 12-8-01 is classified as sour. Produced water from that Unit is intermixed with Richfield water and injected into the Beaver Creek Richfield Unit as part of secondary recovery operations. The Richfield reservoirs originally produced sweet oil and gas. The oil production is now classified as sour by virtue of injection of produced water being injected into the Beaver Creek Richfield Unit. The Detroit River Zone 3 reservoir is not under consideration in this proceeding. No gas injection wells are proposed to be drilled on the Unit. The Petitioner is proposing waterflood operations of a nature successfully conducted in the Beaver Creek Richfield Unit. By reference to Attachment E of Exhibit 4, Mr. Howard described the Production Schematic. The Petitioner operates a closed system for handling sour oil and gas production.

I find the types 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 the abrogation of the existing unit size, and well location provisions of Part 615 and its administrative rules, is necessary to implement the secondary recovery project, except no well shall be completed in the Unitized Zone at a location closer than 330 feet from the outside boundary of the Unit.

CONCLUSIONS OF LAW

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

1. The applicable spacing for the Beaver Creek Richfield East Unit is 40 acres as established by the Supervisor of Wells. 1996 MR 9, R 324.301(1).

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 MR 9, 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 MR 9, R 324.612(2).

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

6. 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, with respect to the determination made herein. 1996 MR 9, R 324.1204.

DETERMINATION AND ORDER

Based on the Findings of Fact and Conclusions of Law, the Supervisor of Wells determines that the proposed secondary recovery operations will prevent waste.

NOW, THEREFORE, IT IS ORDERED:

1. The Beaver Creek Richfield East Unit is described as:

   W 1/2 of Section 22
   E 1/2 of NW 1/4 of Section 27
   T25N, R4W, Beaver Creek Township, Crawford County, Michigan.

Such lands shall be considered and operated as one development unit consisting of 320 acres. The unit shall be referred to as the Beaver Creek Richfield East Unit. The unitized zone is described as:

> The stratigraphic equivalent of the Richfield Member of the Detroit River Group encountered in the subsea interval from -2916 (4144 MD) feet to -3165 (4393 MD) feet in the State Beaver Creek D8 Well located in the NE 1/4 of SW 1/4 of Section 22, T25N, R4W, Beaver Creek Township, Crawford County, Michigan.

At such time as the Petitioner proposes operations on and beneath the Phase 2 Unit Area, the Petitioner shall file a petition and seek an order authorizing such operations.

2. The Petitioner is authorized to inject produced water into the Unitized Zone and may inject other substances upon receipt of written approval from the Supervisor. BreitBurn Operating, LP shall not allow the bottom hole pressure in any injection well to exceed the maximum pressure allowed under Part 615, and its administrative rules.

3. The Petitioner shall notify the Supervisor prior to the commencement of injection operations and at least 30 days prior to the anticipated date of abandonment of injection operations. Secondary recovery shall be limited to the injection of produced water or other substances as authorized by the Supervisor. The Petitioner shall comply with the filing requirements of the Part 615 administrative rules and shall obtain such approvals as are necessary from the Department of Environmental Quality.

4. Operation of the Beaver Creek Richfield East Unit shall be conducted exclusive of and as an exception to the applicable spacing and well location provisions of Part 615, and its administrative rules, provided no well shall be drilled closer than 330 feet from the unit boundary. The Petitioner is authorized to produce wells during the production phase at rates that result in the maximum efficient recovery of hydrocarbons. All other applicable provisions of the administrative rules of Part 615 shall be adhered to.

5. The Supervisor shall retain jurisdiction in this matter.

6. This Order shall be effective immediately.

Dated: Oct. 26, 2012

HAROLD R. FITCH
ASSISTANT SUPERVISOR OF WELLS
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