

Manitoba Regulation /86

Being

The Oil and Natural Gas Conservation Board

Order No. PM 47

An Order Pertaining to Pressure Maintenance by Gas Flooding

Waskada Mission Canyon 3b A Pool

Made and Passed Pursuant to "The Mines Act", Cap. M160, of the
Continuing Consolidation of the Statutes of Manitoba, and
Amendments Thereto, by The Oil and Natural Gas
Conservation Board of Manitoba

(Filed:)

WHEREAS, subsection (9)(d) of Section 62 of "The Mines Act", being Chapter M160 of the Continuing Consolidation of the Statutes of Manitoba, provides as follows:

"62(9) Without restricting the generality of subsection (8) the board, with the approval of the minister, may make orders

(d) requiring the repressuring, recycling, or pressure maintenance, of any pool or portion thereof where it is economical so to do, and for that purpose where necessary requiring the introduction or injection into any pool or portion thereof of gas, air, water or other substance;"

AND WHEREAS, Omega Hydrocarbons Ltd. is the Unit Operator of the Waskada Unit No. 1;

AND WHEREAS, the Unit Operator has conducted pressure maintenance operations in the Waskada MC3b A Pool ("the pool") as authorized by Oil and Natural Gas Conservation Board Order No. PM 30;

AND WHEREAS, such pressure maintenance operations were discontinued in December 1983;

AND WHEREAS, the Board received an application dated January 7, 1986 from Omega Hydrocarbons Ltd. for approval of a project to inject gas into the pool in the Unit Area;

AND WHEREAS, the Board has received no objections or interventions with respect to the application by Omega Hydrocarbons Ltd.

NOW THEREFORE, the Board orders that:

1. Board Order No. PM 30 (Manitoba Regulation 127/76) is hereby rescinded.
2. The Unit Operator shall conduct pressure maintenance operations by the injection of gas into the pool underlying the Unit Area.
3. The pressure maintenance operation shall be in accordance with, and subject to, the following rules:

PRESSURE MAINTENANCE RULES

1. (1) Gas shall be injected into the pool through the well

Omega Waskada GIW 6-30-1-25 (WPM)

and such other wells in the Unit Area as the Board may approve.

- (2) After the commencement of injection, the Unit Operator shall, subject to any remedial work required to be performed on the wells referred to in subclause (1) of this clause, endeavour to maintain continuous injection.
 - (3) Notwithstanding the provisions of subclause (2), the Board may, upon application by the Unit Operator, or on its own motion, approve or order the suspension of gas injection into any well or wells, provided that the Board is satisfied that pressure maintenance operations in the Unit Area will not be adversely affected.
 - (4) The Board may, upon application by the Unit Operator, or on its own motion, approve or require the conversion of any well or wells from gas injection to water injection if the Board is of the opinion that continued gas injection would be detrimental to pressure maintenance operations, ultimate recovery or the correlative rights of offsetting operators or that there is an insufficient supply of gas for injection.
 - (5) The completion of the well referred to in subclause (1) will be as prescribed by the Director of the Petroleum Branch.
2. (1) Before injection of gas is commenced, the Unit Operator shall submit, to the Board, results of a survey conducted to determine the static reservoir pressure in a minimum of one well in the Unit Area.
 - (2) The Unit Operator shall, not less than six months nor more than 12 months after the commencement of injection, and at yearly intervals thereafter, conduct a survey to determine the static reservoir pressure in a minimum of one well in the Unit Area.

- (3) The Unit Operator shall submit the details of the surveys described in subclauses (1) and (2) of this clause to the Petroleum Branch, including a list of the wells to be surveyed, the measurement technique to be used, and the intended shut-in periods for each well, and approval shall be obtained from the Director of the Petroleum Branch before the program is carried out. Within 30 days of the completion date of the surveys, a report shall be submitted to the Petroleum Branch including:
- (a) the static reservoir pressure data obtained from the survey, corrected to a common datum;
 - (b) an isobaric map of the Pool within the Unit Area based on the data obtained; and
 - (c) a discussion of the survey results and pressure distribution within the Pool.
- (4) The Board may, at any time, require the Unit Operator to carry out such additional reservoir pressure surveys as it deems necessary.
3. (1) Each month, the Unit Operator shall submit to the Petroleum Branch, of a minimum of three production tests conducted on each of the following wells:

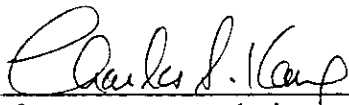
Omega Waskada 3-30-1-25 (WPM)
Omega Waskada 4-30-1-25 (WPM)
Omega Waskada 4-30LAM-1-25 (WPM)

and such other wells as the director may specify.

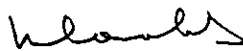
- (2) The results of the production tests referred to in subclause (1) shall include the oil rate, the gas-oil ratio (GOR) and the water-oil ratio (WOR) observed during the test together with the date and duration of the test.
- (3) If any production test required pursuant to subclause (1) indicates a producing GOR in excess of $200 \text{ m}^3/\text{m}^3$, such production test shall be repeated within one week of the first test.
- (4) If the repeated test referred to in subclause (3) confirms a producing GOR in excess of $200 \text{ m}^3/\text{m}^3$, the results shall be immediately reported to the Director of the Petroleum Branch, and the Director may, at his discretion, require the temporary termination of gas injection for a period not exceeding three months and if further testing and investigation indicates gas breakthrough has occurred, the Board may order the permanent termination of gas injection.

- (5) If any production test on a well referred to in subclause (1) indicates a GOR in excess of 500 m³/m³, the production test shall be immediately re-run, and if the GOR is confirmed to exceed 500 m³/m³ gas injection shall be terminated. The Director of the Petroleum Branch shall be notified of the termination of gas injection and production test results shall be submitted to him. No further gas injection shall occur without the written approval of the Board.
- (6) The provisions of subclauses (2) through (5) shall be reviewed for suitability and modified if necessary by the Board after one (1) year from the date of this Order.
4. The maximum wellhead pressure at which gas is injected into the wells referred to in subclause (1) of clause 1 hereof shall not exceed 17 000 kPa or such other maximum pressure as the Board may prescribe. The Board may, from time to time, prescribe a maximum or minimum rate at which gas shall be injected into any well in the Unit Area.
5. (1) The Unit Operator shall, not later than the last day of each month, file with the Petroleum Branch, a report of the quantity, source and pressure of gas injected during the preceding month into the well referred to in clause 1 hereof.
- (2) In addition to the information required in clause 3, the Unit Operator shall, not later than the last day of each month, file with the Petroleum Branch a summary report of production and injection operations during the preceding month. This report shall include:
- (a) a tabulation of total oil, total water and total gas produced;
 - (b) a tabulation of the number of producing wells and injection wells which were active;
 - (c) the results of at least one twenty-four hour production test on each producing well in the Unit including volumes of oil, gas and water produced during the test;
 - (d) a summary of any remedial operations carried out on any well in the Unit Areas.
6. The Unit Operator, shall, within 60 days of the end of each calendar year, file with the Petroleum Branch a report of the pressure maintenance program, setting out graphically such interpretive information necessary to evaluate the efficacy of the gasflood.

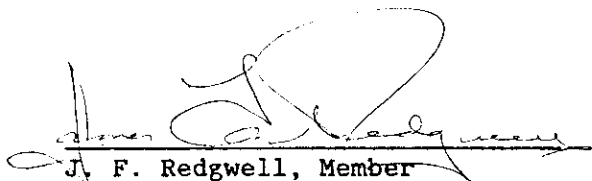
OIL AND NATURAL GAS ORDER NO. PM 47,
MADE AND PASSED THIS *18th* DAY OF
MARCH A.D., 1986, AT THE CITY OF
WINNIPEG, IN THE PROVINCE OF MANITOBA,
BY THE OIL AND NATURAL GAS CONSERVATION BOARD



Charles S. Kang, Chairman
The Oil and Natural Gas
Conservation Board



Wm. McDonald, Deputy Chairman
The Oil and Natural Gas
Conservation Board



J. F. Redgwell, Member
The Oil and Natural Gas
Conservation Board

Approved:



Wilson D. Parasiuk,
Minister of Energy and Mines

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TO

HERE

June/79

THE OIL AND NATURAL GAS CONSERVATION BOARD

ORDER NO. PM 30

An Order pertaining to Pressure Maintenance by Water Flooding

WASKADA UNIT NO. 1

Made and Passed Pursuant to "The Mines Act", Cap. M160, of
the Continuing Consolidation of the Statutes of Manitoba,
and Amendments Thereto, by The Oil and Natural
Gas Conservation Board of Manitoba

WHEREAS, subsection (9)(d) of Section 62 of "The Mines Act", being Chapter M160 of the Continuing Consolidation of the Statutes of Manitoba, provides as follows:

"62(9) Without restricting the generality of subsection (8) the board, with the approval of the minister, may make orders

(d) requiring the repressuring, re-cycling, or pressure maintenance, of any pool or portion thereof where it is economical so to do, and for that purpose where necessary requiring the introduction or injection into any pool or portion thereof of gas, air, water, or other substance;"

AND WHEREAS, the Board, pursuant to Section 62 of "The Mines Act", held a public hearing on March 12, 1976, for the purpose of considering a proposal for pressure maintenance by water flooding within the Unit Area of Waskada Unit No. 1, by Omega Hydrocarbons Ltd., on its own behalf, in the Waskada Field in Manitoba.

AND WHEREAS, upon due consideration of the submissions and testimony at the hearing, the Board has found:

- (a) That the pressure maintenance by water flooding of a certain part of the Waskada Field in Manitoba, comprising the Unit Area of the Waskada Unit No. 1, is reasonably necessary to prevent waste, and to increase substantially the recovery of oil;

- (b) That the value of the estimated additional recovery of oil resulting from such operation will exceed the estimated additional cost incidental to the conduct of such operation; and
- (c) That such operation will result in general advantage to the owners of oil and gas rights within the Unit Area.

AND WHEREAS, Unitization Order No. 22 provides for the appointment of Omega Hydrocarbons Ltd. as Unit Operator.

NOW, THEREFORE, the Board orders:

1. (a) The Unit Operator shall conduct pressure maintenance operations by the injection of water to the Mission Canyon Formation of the Mississippian Age underlying the Unit Area;
- (b) The pressure maintenance operations shall be in accordance with, and subject to, the following rules:

PRESSURE MAINTENANCE RULES

1. (1) Water shall be injected to the Mission Canyon Formation of the Mississippian Age in the well:

Omega Waskada 6-30-1-25 WPM

and, from time to time, in such other wells as the Board may direct, or, upon application of the Unit Operator, may approve;

(2) After the commencement, the Unit Operator shall, subject to any remedial work required to be performed on the well or wells referred to in this clause, endeavour to maintain continuous injection;

(3) Notwithstanding the provisions of subclause (2), the Board may, upon application by the Unit Operator, approve the suspension of water injection, provided the Board is satisfied that the pressure maintenance operation in the Unit Area will not be adversely affected.

2. (1) Before the injection of water is commenced, and from time to time after the commencement of injection, and upon the request of the Board, the Unit Operator shall satisfy the Board as to the source, suitability, and method of treatment of the water to be injected;

(2) Before any change is made in the source of water being injected, the Unit Operator shall satisfy the Board as to the suitability of the water to be injected.

3. The Unit Operator shall immediately report to the Board any indication of channeling or break-through of injected water to producing wells, or any indication of other detrimental effects that may be attributable to the pressure maintenance operations.
4. The maximum surface pressure of injected water in each well referred to in clause 1 hereof shall not exceed 1200 psi. The Board may prescribe from time to time a maximum pressure, or a maximum or a minimum rate, at which water shall be injected to any well in the Unit.
5. At least annually, unless otherwise directed by the Board, the Unit Operator shall carry out a subsurface pressure survey program to determine the reservoir pressure in the producing wells in the Unit. The Unit Operator shall submit the details of such program to the Petroleum Branch including the wells to be surveyed, the measurement technique to be used and the intended shut-in periods for each well, and approval must be obtained from the Branch before the program is carried out. After having the program approved and carried out a report must be submitted to the Branch including:
 - (1) The pressure data obtained from the program;
 - (2) An isobaric map of the reservoir or Unit based on the data obtained;
 - (3) A discussion of the survey results and pressure distribution in the reservoir.
6. The Unit Operator shall inject water to each well referred to in clause 1 hereof in a manner such that, within five years of the effective date of the Order, a suitable balance is achieved and maintained between water injected to, and fluids withdrawn from, the Unitized Strata.
7. The Unit Operator shall, not later than the twenty-fifth day of each month, file with the Petroleum Branch a report of the quantity, source and pressure of water injected during the preceding month to each well referred to in clause 1 hereof.
8. (1) Unless otherwise authorized in writing by the Board, the Unit Operator shall, within six weeks of the expiration of each yearly period commencing on the first day of January, 1977 file with the Board a report of the progress, performance, and efficacy of the pressure maintenance program during the period;

(2) Subject to any direction in writing of the Board to the contrary, a report required by this clause may, at the discretion of the Unit Operator, be in two parts.

The first of which parts shall set out graphically and from the commencement of the operation of the pressure maintenance program:

(a) the daily average rate during each month of oil production of each producing well;

(b) the average water-oil ratio during each month of each producing well;

(c) the monthly cumulative oil and water production from each producing well;

(d) the daily average rate during each month of water injection to each injection well;

(e) the daily average water injection pressure during each month at each injection well;

(f) the monthly cumulative volume of water injected to each injection well;

(g) the average injectivity index during each month, for each water injection well, which index, at the discretion of the Unit Operator, may be determined as

(i) the daily injection rate divided by the average injection well-head pressure, or

(ii) any similar index that the Board, on the application of the Unit Operator, may approve; and

(h) the date and type of any well treatment or workover which shall be indicated on the graph.

The second of which parts shall contain:

(a) calculations of the balance during each month between water injected to, and fluids withdrawn from the Unitized Strata;

(b) such other interpretative information as the Unit Operator considers necessary to evaluate adequately the progress, performance, and efficacy of the pressure maintenance program;

(c) an outline of the method actually in use for the quality control, and treatment of the water, or, where there has been no change in the control or treatment from that outlined in a previous report, a statement to that effect; and

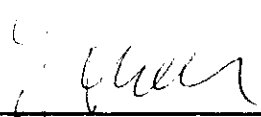
(d) a detailed economic summary of the Unit for the year. This summary shall outline the total revenue from crude oil sales, show a breakdown of the operating costs according to general category, indicate the average production cost per barrel of oil produced during the period and the Unit net revenue before deducting royalties and taxes.

(3) If a report required by this clause is in the form provided for in subclause (2), the Board, at any time, may make the first part of the report available to the public, and, after one year from the end of the period for which the report is made, may make the second part of the report available to the public, and, if the report is not in the form provided for in subclause (2), the Board may make the whole of the report available to the public at any time.

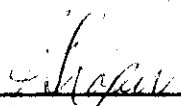
2. This Order shall be effective at the hour of eight o'clock in the forenoon, official time, on the first day of June, A.D., 1976.

Oil and Natural Gas Order No. PM 30,
made and passed this 11th day of
May A.D., 1976, at the City
of Winnipeg, in the Province of
Manitoba, by The Oil and Natural
Gas Conservation Board.


Approved:




Sidney Green,
Minister of Mines, Resources
and Environmental Management.



J. S. Roper,
Deputy Chairman,
The Oil and Natural Gas
Conservation Board.



Jas. T. Cawley, P. Eng.,
Chairman,
The Oil and Natural Gas
Conservation Board.




Dr. I. Haugh,
Member,
The Oil and Natural Gas
Conservation Board.

THE REGULATIONS ACT
C E R T I F I C A T E

I, Jas. T. Canley, P. Eng., Chairman of The Oil and Natural Gas Conservation Board, of Manitoba, hereby certify that the attached Regulation is a true copy of the original Order:—

- (a) entitled The Oil and Natural Gas Conservation Board Order No. PM 30;
- (b) made pursuant to "The Mines Act";
- (c) made by The Oil and Natural Gas Conservation Board, of Manitoba;
- (d) under date of the *11th* day of *May* A.D., 1976;
- (e) which Regulation comes into force on the date of filing with the Registrar of Regulations.


Jas. T. Canley, P. Eng.,
Chairman,
The Oil and Natural Gas
Conservation Board.