



Energy and Mines

Petroleum

555 — 330 Graham Avenue  
Winnipeg, Manitoba, CANADA  
R3C 4E3

(204) 945-6577

August 18, 1986

Chevron Canada Resources Limited  
500 - 5th Avenue S.W.  
CALGARY, Alberta  
T2P 0L7

Attention: Mr. C.G. Folden, P. Eng.  
Supervising Engineer - Reservoir Engineering

Dear Sir:

Re: Board Order No. PM51  
North Virden Scallion Unit No. 1  
Conversion of Chevron Virden 16C-22-11-26 (WPM) to Water Injection

Enclosed is The Oil and Natural Gas Conservation Board Order No. PM51 authorizing pressure maintenance in the subject Unit, including the well Chevron Virden 16C-22-11-26 (WPM).

This Order consolidates and replaces all previous approvals relating to pressure maintenance operations in the subject Unit.

Please notify the Virden District Office of the Petroleum Branch prior to initiating water injection.

Yours sincerely,

A handwritten signature in dark ink, appearing to read "L.R. Dubreuil".

L.R. Dubreuil  
Chief Petroleum Engineer  
Petroleum Branch

LRD:dah

encl  
cc: Virden Office



Date: August 5, 1986

PM NO. 51.

To: Clare Moster

## Action / Route Slip

From: Office of the Deputy Minister  
Manitoba Energy and Mines  
Room 309  
Legislative Building  
Winnipeg, Manitoba  
R3C 0V8

☐ Take Action

☐ Per Your Request

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and Return

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Signature

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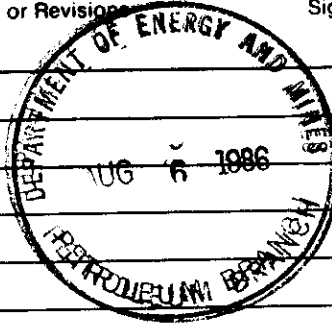
☐ For Your Information

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or Revisions

☐ Draft Reply for  
Signature

☐ Please File

Comments



Date: July 22, 1986

To: Bruce Ball

Bill McDonald

Charles S. Kang

## Action / Route Slip

From: H. Clare Moster

Telephone: \_\_\_\_\_

- |   |   |  |  |  |
|---|---|--|--|--|
| <input type="checkbox"/> Take Action    | <input type="checkbox"/> Per Your Request     | <input type="checkbox"/> Circulate, Initial and Return     | <input checked="" type="checkbox"/> For Approval and Signature | <input type="checkbox"/> Make _____ Copies |
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Comments: Board Order No. PM 51

**Please sign the 6 copies of the attached Order and forward to next party on list.**

**Certificates also attached for execution by C. S. Kang once Order approved by Minister.**

Manitoba Regulation /86

Being

The Oil and Natural Gas Conservation Board

Order No. PM 51

An Order Pertaining to Pressure Maintenance by Water Flooding  
Virden Lodgepole 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, Chevron Canada Resources Limited is the Unit Operator of the North Virden Scallion Unit No. 1 (the "Unit Area").

AND WHEREAS, Manitoba Revised Regulation M160-R8P and Board Order No. PM 37 authorizes pressure maintenance operations in the Unit Area.

AND WHEREAS, the Board received an application dated March 10, 1986 from the Unit Operator for approval to convert the well Chevron Virden 16C-22-11-26 (WPM) to a water injection well.

NOW THEREFORE, the Board orders that:

1. Section 1 and Schedule A of Manitoba Revised Regulation M160-R8P are repealed.

2. Sections 2, 3 and 13 of Board Order PM No. 37 (Manitoba Regulation 104/80) are repealed.
3. The Unit Operator shall conduct pressure maintenance operations by the injection of water into the pool underlying the Unit Area.
4. The pressure maintenance operation shall be in accordance with, and subject to, the following rules:

#### PRESSURE MAINTENANCE RULES

- 1(1) Water shall be injected into the pool through the wells:

Chevron Scallion WIW 2-10-11-26 (WPM)  
Chevron Scallion WIW 10-10-11-26 (WPM)  
Chevron Scallion WIW 12-10-11-26 (WPM)  
Chevron Scallion Prov. WIW 2-11-11-26 (WPM)  
Chevron Scallion Prov. WIW 4-11-11-26 (WPM)  
Chevron Scallion Prov. WIW 6-11-11-26 (WPM)  
Chevron Scallion Prov. WIW 12-11-11-26 (WPM)  
Chevron Scallion WIW 6-13-11-26 (WPM)  
Chevron Scallion WIW 10-13-11-26 (WPM)  
Chevron Scallion WIW 12-13-11-26 (WPM)  
Chevron Scallion WIW 14-13-11-26 (WPM)  
Dome Cdn. Sup. Scallion WIW 8-14-11-26 (WPM)  
Cdn. Res. et al Scallion WIW 10-14-11-26 (WPM)  
Sun G. Braybrook Scallion WIW 12-14-11-26 (WPM)  
Chevron Scallion WIW 2-15-11-26 (WPM)  
Chevron Scallion WIW 10-15-11-26 (WPM)  
Cdn.-Sup. Veldhouse Scallion WIW 7-16-11-26 (WPM)  
Shell Moir South Scallion WIW 10-21-11-26 (WPM)  
Chevron Virden WIW A2-22-11-26 (WPM)  
Chevron Scallion WIW 4-22-11-26 (WPM)  
Sun T. L. Tapp Scallion WIW 10-22-11-26 (WPM)  
Chevron Scallion WIW 12-22-11-26 (WPM)  
Chevron Virden WIW 16C-22-11-26 (WPM)  
Chevron Scallion WIW 12-23-11-26 (WPM)  
Chevron Scallion WIW 14-23-11-26 (WPM)  
Chevron Scallion WIW 16-23-11-26 (WPM)  
Dome Cdn. Sup. Scallion WIW 6-24-11-26 (WPM)  
Chevron Scallion Prov. WIW 12-24-11-26 (WPM)  
Sun P. J. Tapp Scallion WIW 6-26-11-26 (WPM)  
Cdn. Res. et al Scallion WIW 8-26-11-26 (WPM)  
Chevron Scallion WIW 6-27-11-26  
Sun W. C. Tapp Scallion WIW 8-27-11-26 (WPM)  
Chevron Scallion WIW 14-27-11-26

Gulf Union Tapp Scallion WIW 6-28-11-26 (WPM)  
 Cdn.-Sup. Whiteford Scallion WIW 8-28-11-26 (WPM)  
 Gulf Union Tapp Scallion WIW 14-28-11-26 (WPM)  
 Cdn.-Sup. Whiteford Scallion WIW 16-28-11-26 (WPM)  
 Shell Moir North Scallion WIW 6-33-11-26 (WPM)  
 Chevron Scallion WIW 8-33-11-26 (WPM)  
 Shell Moir North Scallion WIW 14-33-11-26 (WPM)  
 Vallat et al Scallion WIW 16-33-11-26 (WPM)  
 Cdn. Res. et al Scallion WIW 6-34-11-26 (WPM)  
 Dome Scallion WIW 4-3-12-26 (WPM)  
 Dome Cdn. Sup. Scallion WIW 2-4-12-26 (WPM)  
 Chevron North Scallion WIW 4-4-12-26 (WPM)  
 Chevron North Scallion WIW 6-4-12-26 (WPM)  
 Chevron North Scallion WIW 10-4-12-26 (WPM)  
 Chevron Virden WIW A12-4-12-26 (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, approve the suspension of water 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 completion of the wells referred to in subclause (1) will be as prescribed by the Director of the Petroleum Branch.
2. The Unit Operator, upon the the request of the Board, shall satisfy the Board as to the source, suitability and method of treatment of the water to be injected.
  - 3(1) At least once every three years commencing in 1981, 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.
  - (2) The Unit Operator shall submit the details of the surveys described in subclause (1) 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.
- (3) The Board may, at any time, require the Unit Operator to carry out such additional reservoir pressure surveys as it deems necessary.
4. The Unit Operator shall immediately report to the Board any indication of channelling 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.
5. The maximum wellhead pressure at which water is injected into the wells referred to in subclause (1) of clause 1 hereof shall not exceed 8 000 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 water shall be injected into any well in the Unit Area.
- 6(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 water injected during the preceding month into each well referred to in clause 1 hereof.
- (2) 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 any production tests conducted 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.
7. 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 waterflood.

OIL AND NATURAL GAS ORDER NO. PM 51,  
MADE AND PASSED THIS                      DAY OF  
                    A.D., 1986, AT THE CITY OF  
WINNIPEG, IN THE PROVINCE OF MANITOBA,  
BY THE OIL AND NATURAL GAS CONSERVATION BOARD

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

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

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B. Ball, Member  
The Oil and Natural Gas  
Conservation Board

Approved:

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Vic Schroeder, Minister  
Department of Energy and Mines



Ordonnance n° MP 51 de la Commission de gestion du pétrole  
et du gaz naturel  
concernant le maintien de la pression par injection d'eau  
dans le gisement Lodgepole A (Virden),  
prise aux termes de la Loi sur les mines, chapitre M160  
de la Codification permanente des lois  
du Manitoba, avec ses modifications

(Déposé le )

Attendu que l'alinéa 62(9)d) de la Loi sur les mines, chapitre M160 de la Codification permanente des lois du Manitoba, prévoit ce qui suit :

"62(9) Sans limiter la portée du paragraphe (8), la Commission peut, par ordonnance sujette à l'approbation du ministre :

- d) exiger la recompression, le recyclage ou le maintien de la pression de tout ou partie de gisement lorsqu'il est économique de ce faire et, à cette fin, exiger l'introduction ou l'injection de gaz, d'air, d'eau ou de toute autre substance dans tout ou partie du gisement;"

Attendu que Chevron Canada Resources Limited est l'exploitant de la zone n° 1 (North Virden Scallion), ci-après "la zone";

Attendu que la Commission a autorisé des opérations de maintien de la pression aux termes du "Manitoba Revised Regulation M160-R8P" et de son "Board Order No. PM 37";

Attendu que la Commission a reçu une demande d'approbation de l'exploitant, datée du 10 mars 1986, relative à la conversion du puits Chevron Virden 16C-22-11-26 (OMP) en puits d'injection d'eau;

La Commission ordonne :

1. L'abrogation de l'article 1 et de l'annexe A du "Manitoba Revised Regulation M160-R8P".
2. L'abrogation des articles 2, 3 et 13 du "Board Order No. PM 37" (règlement du Manitoba 104/80).
3. Le maintien de la pression par l'exploitant au moyen d'injection d'eau dans le gisement situé sous la zone.
4. Le maintien de la pression conformément aux règles ci-après énoncées :

Règles relatives au maintien de la pression

1(1) L'eau doit être injectée dans le gisement par les puits suivants :

Chevron Scallion PIE 2-10-11-26 (OMP)  
Chevron Scallion PIE 10-10-11-26 (OMP)  
Chevron Scallion PIE 12-10-11-26 (OMP)  
Chevron Scallion Prov. PIE 2-11-11-26 (OMP)  
Chevron Scallion Prov. PIE 4-11-11-26 (OMP)  
Chevron Scallion Prov. PIE 6-11-11-26 (OMP)

Chevron Scallion Prov. PIE 12-11-11-26 (OMP)  
 Chevron Scallion PIE 6-13-11-26 (OMP)  
 Chevron Scallion PIE 10-13-11-26 (OMP)  
 Chevron Scallion PIE 12-13-11-26 (OMP)  
 Chevron Scallion PIE 14-13-11-26 (OMP)  
 Dome Cdn. Sup. Scallion PIE 8-14-11-26 (OMP)  
 Cdn. Res. et al Scallion PIE 10-14-11-26 (OMP)  
 Sun G. Braybrook Scallion PIE 12-14-11-26 (OMP)  
 Chevron Scallion PIE 2-15-11-26 (OMP)  
 Chevron Scallion PIE 10-15-11-26 (OMP)  
 Cdn.-Sup. Veldhouse Scallion PIE 7-16-11-26 (OMP)  
 Shell Moir South Scallion PIE 10-21-11-26 (OMP)  
 Chevron Virden PIE A2-22-11-26 (OMP)  
 Chevron Scallion PIE 4-22-11-26 (OMP)  
 Sun T. L. Tapp Scallion PIE 10-22-11-26 (OMP)  
 Chevron Scallion PIE 12-22-11-26 (OMP)  
 Chevron Virden PIE 16C-22-11-26 (OMP)  
 Chevron Scallion PIE 12-23-11-26 (OMP)  
 Chevron Scallion PIE 14-23-11-26 (OMP)  
 Chevron Scallion PIE 16-23-11-26 (OMP)  
 Dome Cdn. Sup. Scallion PIE 6-24-11-26 (OMP)  
 Chevron Scallion Prov. PIE 12-24-11-26 (OMP)  
 Sun. P. J. Tapp Scallion PIE 6-26-11-26 (OMP)  
 Cdn. Res et al Scallion PIE 8-26-11-26 (OMP)  
 Chevron Scallion PIE 6-27-11-26  
 Sun W. C. Tapp Scallion PIE 8-27-11-26 (OMP)  
 Chevron Scallion PIE 14-27-11-26  
 Gulf Union Tapp Scallion PIE 6-28-11-26 (OMP)  
 Cdn.-Sup. Whiteford Scallion PIE 8-28-11-26 (OMP)  
 Gulf Union Tapp Scallion PIE 14-28-11-26 (OMP)  
 Cdn.-Sup. Whiteford Scallion PIE 16-28-11-26 (OMP)  
 Shell Moir North Scallion PIE 6-33-11-26 (OMP)  
 Chevron Scallion PIE 8-33-11-26 (OMP)  
 Shell Moir North Scallion PIE 14-33-11-26 (OMP)  
 Vallat et al Scallion PIE 16-33-11-26 (OMP)  
 Cdn. Res. et al Scallion PIE 6-34-11-26 (OMP)  
 Dome Scallion PIE 4-3-12-26 (OMP)  
 Dome Cdn. Sup. Scallion PIE 2-4-12-26 (OMP)  
 Chevron North Scallion PIE 4-4-12-26 (OMP)  
 Chevron North Scallion PIE 6-4-12-26 (OMP)  
 Chevron North Scallion PIE 10-4-12-26 (OMP)  
 Chevron Virden PIE A12-4-12-26 (OMP)

Elle l'est également par les autres puits situés dans la zone que  
 la Commission approuve.

1(2) L'exploitant doit assurer une injection constante, une fois celle-ci commencée, sauf les travaux de réparation requis à l'égard des puits visés au paragraphe (1).

1(3) Malgré les dispositions du paragraphe (2), la Commission peut, à la requête de l'exploitant, suspendre l'injection d'eau dans un ou plusieurs puits si elle est d'avis que les opérations de maintien de la pression dans la zone n'auront pas à en souffrir.

1(4) Le complètement des travaux relatifs aux puits visés au paragraphe (1) se fera conformément aux instructions du directeur de la Direction du pétrole.

2 L'exploitant doit indiquer à la Commission, à la demande de celle-ci, la provenance, l'adéquation ainsi que la méthode de traitement de l'eau injectée.

3(1) Au moins tous les trois ans à compter de 1981, sous réserve d'une directive contraire de la Commission, l'exploitant doit mettre à effet un programme de relevé de la pression souterraine qui permette de déterminer la pression du réservoir dans les puits de production de la zone.

3(2) L'exploitant transmet les résultats des relevés visés au paragraphe (1) à la Direction du pétrole, accompagnés de la liste des puits à relever, de la technique de mesure envisagée ainsi que des périodes de fermeture prévues à l'égard de chaque puits. Le programme ne peut être entrepris sans l'autorisation du directeur de la Direction du pétrole. Rapport doit être fait à la Direction du pétrole dans les 30 jours de l'achèvement des relevés. Il donne notamment :

- a) les données relatives à la pression statique du réservoir obtenues lors du relevé et ramenées à un même niveau;
- b) une carte isobarique de la partie de gisement située dans la zone, dressée à partir des données recueillies;
- c) une analyse des résultats du relevé et de la répartition de la pression dans le gisement.

3(3) La Commission peut à tout moment exiger de l'exploitant des relevés supplémentaires relatifs à la pression du réservoir, selon ce qu'elle juge à-propos.

4 L'exploitant doit immédiatement signaler à la Commission tout indice d'infiltration d'eau injectée dans les puits de production ou d'effets préjudiciables qui peuvent être attribués aux opérations de maintien de la pression.

5 La pression de tête de puits maximale à laquelle l'eau est injectée dans les puits visés au paragraphe 1(1) est de 8 000 kPa, ou celle prescrite par la Commission. Celle-ci peut fixer les débits maximal et minimal auxquels l'eau doit être injectée dans l'un ou l'autre des puits situés dans la zone.

6(1) L'exploitant doit remettre à la Direction du pétrole, au plus tard le dernier jour de chaque mois, un rapport énonçant la quantité, la provenance et la pression de l'eau injectée dans chacun des puits visés à l'article 1 au cours du mois précédant.

6(2) L'exploitant doit remettre à la Direction du pétrole, au plus tard le dernier jour de chaque mois, un rapport sommaire de la production et de l'injection au cours du mois précédant. Le rapport doit donner :

- a) une table de la production totale de pétrole, d'eau et de gaz;
- b) une table des puits de production et des puits d'injection en activité;
- c) les résultats des évaluations de production menées dans la zone, y compris les volumes de pétrole, de gaz et d'eau produits pendant l'évaluation;
- d) un résumé des opérations correctives menées à l'égard de l'un ou l'autre des puits situés dans la zone.

7 L'exploitant doit remettre à la Direction du pétrole, dans les 60 jours de la fin de chaque année civile, un rapport relatif au programme de maintien de la pression qui indique graphiquement les données nécessaires à l'évaluation de l'efficacité de l'injection d'eau.

Ordonnance n° MP 51 prise par la Commission de gestion du pétrole et du gaz naturel en la ville de Winnipeg, province du Manitoba, ce                   <sup>e</sup> jour d                   1986.

Pour la Commission de gestion du pétrole et du gaz naturel,

le président,

le vice-président,

Charles S. Kang

William McDonald

B. Ball, membre

Approuvée par le ministre de l'Énergie et des Mines,

Vic Schroeder



## Memorandum

Date July 22, 1986

To The Oil and Natural Gas Conservation Board  
 Charles S. Kang - Chairman  
 Wm. McDonald - Deputy Chairman  
 B. Ball - Member

From H. Clare Moster  
 Executive Director  
 Petroleum Branch

Telephone

Subject Virden Lodgepole A Pool

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Pressure Maintenance Operations

Chevron Canada Resources Ltd. have made application for approval to conduct pressure maintenance operations in the subject Pool by conversion of the well Chevron Virden 16C-22-11-26 (WPM) to a water injection well. The proposed conversion is well removed from the Unit boundary therefore advertisement of this application was not necessary.

Recommendation:

It is recommended that the application be approved and that Board Order No. PM 51 (copies attached) be issued. Board Order No. PM 51 provides a consolidation of approvals for pressure maintenance in the North Virden Scallion Unit No. 1.

Discussion:

The proposed Board Order No. PM 51 includes all the normal relevant provisions included in recent pressure maintenance Board Orders. Note that Pressure Maintenance Rule No. 5 limits wellhead pressure to 8 000 kPa to ensure reservoir fracturing does not occur.

Original signed by H. C. Moster

H. Clare Moster

MA/lk

First | Fold



Chevron Canada Resources Limited, as Operator of the North Virden Scallion Unit No. 1, has made application for approval to convert the subject well to water injection.

#### Recommendations:

It is recommended that the application be approved and that Board Order No. PMSI <sup>(attached)</sup> consolidating ~~the~~ pressure maintenance approvals in the subject Unit be issued.

#### Discussion:

Chevron proposes to convert the <sup>existing</sup> well Chevron Virden 16C-22-11-26 (WPM) to water injection. This will result in a 5 spot injection pattern on a 8 hectare (20 acre) well spacing in an area of the Unit which is remote from injection. Implementation of this <sup>pilot</sup> project will provide additional pressure support in the Unit and will provide for an evaluation of the ~~more~~ effectiveness of injection on ~~smaller~~ reduced spacing basis in the Unit. Further implementation

of the pilot will result in minimal disturbance to the surface as ~~all~~ most of the required facilities are existing.

Pressure maintenance operations in the subject Unit are currently governed by Section 1 and Schedule A of Manitoba Revised Regulation M160-RBP and Sections 2 and 3 of Board Order No PM 37 (Manitoba Regulation 104/80). It is proposed to repeal these Regulations and consolidate the approval into ~~a single~~ Board Order No. PM 51.

*All back-up material filed on North Virden Scallion #1  
Order (Original) filed on NUS PM Order Subsurface Pressure Survey*

5, 1980

July 5, 1980

THE MANITOBA GAZETTE

Vol. 109, No. 27

*V.R. # 3*

Manitoba Regulation 104/80

Being

THE OIL AND NATURAL GAS CONSERVATION BOARD

ORDER NO. PM 37

An Order Pertaining to Pressure Maintenance by Water Flooding

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 June 20, 1980)

1. Sections 2, 8 and 9 of Manitoba Revised Regulation M160—RSP are repealed.
2. Subsection 1(1) of Schedule A of the regulation is repealed and the following subsection is substituted therefor:

1(1) Water shall be injected to the Lodgepole Formation of the Mississippian Age in the wells

Chevron Scallion WIW 2-10-11-26  
Chevron Scallion WIW 10-10-11-26  
Chevron Scallion WIW 12-10-11-26  
Chevron Scallion Prov. WIW 2-11-11-26  
Chevron Scallion Prov. WIW 4-11-11-26  
Chevron Scallion Prov. WIW 6-11-11-26  
Chevron Scallion Prov. WIW 12-11-11-26  
Chevron Scallion WIW 6-13-11-26  
Chevron Scallion WIW 10-13-11-26  
Chevron Scallion WIW 12-13-11-26  
Chevron Scallion WIW 14-13-11-26  
Dome Cdn. Sup. Scallion WIW 8-14-11-26  
Cdn. Res. et al Scallion WIW 10-14-11-26  
Sun G. Braybrook Scallion WIW 12-14-11-26  
Chevron Scallion WIW 2-15-11-26  
Chevron Scallion WIW 10-15-11-26  
Cdn. Sup. Veldhouse Scallion WIW 7-16-11-26  
Shell Moir South Scallion WIW 10-21-11-26  
~~Chevron Scallion WIW 2-22-11-26~~ *Chevron Virden WIW A2-22-11-26*  
Chevron Scallion WIW 4-22-11-26  
Sun T.L. Tapp Scallion WIW 10-22-11-26  
Chevron Scallion WIW 12-22-11-26 *Chevron Virden WIW 16c-22-11-26*  
Chevron Scallion WIW 12-23-11-26  
Chevron Scallion WIW 14-23-11-26  
Chevron Scallion WIW 16-23-11-26  
Dome Cdn. Sup. Scallion WIW 6-24-11-26  
Chevron Scallion Prov. WIW 12-24-11-26  
Sun P.J. Tapp Scallion WIW 6-26-11-26  
Cdn. Res. et al Scallion WIW 8-26-11-26  
Chevron Scallion WIW 6-27-11-26  
Sun W.C. Tapp Scallion WIW 8-27-11-26  
Chevron Scallion WIW 14-27-11-26  
Gulf Union Tapp Scallion WIW 6-28-11-26

Cdn. Sup. Whiteford Scallion WIW 8-28-11-26  
 Gulf Union Tapp Scallion WIW 14-28-11-26  
 Cdn. Sup. Whiteford Scallion WIW 16-28-11-26  
 Shell Moir North Scallion WIW 6-33-11-26  
 Chevron Scallion WIW 8-33-11-26  
 Shell Moir North Scallion WIW 14-33-11-26  
 Vallat et al Scallion WIW 16-33-11-26  
 Cdn. Res. et al Scallion WIW 6-34-11-26  
 Dome Scallion WIW 4-3-12-26  
 Dome Cdn. Sup. Scallion WIW 2-4-12-26  
 Chevron North Scallion WIW 4-4-12-26  
 Chevron North Scallion WIW 6-4-12-26  
~~Vallat Scallion WIW 10-4-12-26~~ < Chevron North Scallion WIW 10-4-12-26  
~~Chevron North Scallion WIW 12-4-12-26~~ < Chevron Virden WIW A12-4-12-26

and, from time to time, in such other wells as the board may direct, or, upon application of the unit operator, may approve.

3. Rule 5 of the Pressure Maintenance Rules as set out in Schedule A of the regulation is repealed and the following rule is substituted therefor:
  - 5(1) At least once every three years commencing in 1981, 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.
  - 5(2) The unit operator shall submit the details of the pressure survey program to the Director of the Petroleum Branch including the wells to be surveyed, the measurement techniques to be used and the intended shut-in periods for each well, and shall first obtain approval of the program from the Director before it is carried out.
  - 5(3) After receiving approval of the pressure survey program and after the program is carried out the unit operator shall submit a report thereon to the Director which shall include
    - (a) the pressure data obtained from the program;
    - (b) an isobaric map of the reservoir or unit based on the data obtained; and
    - (c) an analysis of the survey results and pressure distribution in the reservoir.
4. Schedule B of the regulation is repealed.
5. Subsection 1(1) of Schedule C of the regulation is repealed and the following subsection is substituted therefor:
  - 1(1) Water shall be injected to the Virden and Scallion Members of the Lodgepole Formation of the Mississippian Age in the wells

Chevron Virden WIW 9-20-10-25  
 Sun M. Welch Virden WIW 13-20-10-25  
 Chevron Virden WIW 15-20-10-25  
 Chevron Virden WIW 11-21-10-25  
 Chevron Virden WIW 13-21-10-25  
 Chevron East Virden Prov. WIW 5-28-10-25  
 Chevron East Virden Prov. WIW 5-29-10-25  
 Chevron East Virden Prov. WIW 7A-29-10-25  
 Placer Virden WIW 5-30-10-25  
 Placer Virden WIW 7-30-10-25  
 Teck Hepburn Virden WIW 15-23-10-26  
 Chevron Virden WIW 13-24-10-26  
 Chevron Virden WIW 15-24-10-26  
 Chevron Virden WIW 5-25-10-26  
 Chevron Virden CPR WIW 7-25-10-26  
 Chevron Virden WIW 11-25-10-26  
 Chevron Virden WIW 13-25-10-26  
 Chevron Virden CPR WIW 15-25-10-26  
 Chevron Virden WIW 3-26-10-26

and, from time to time, in such other wells as the board may direct, or, upon application of the unit operator, may approve.

1980

6. Rule 5 of the Pressure Maintenance Rules as set out in Schedule C of the regulation is repealed and the following rule is substituted therefor:
- 5(1) At least once every three years commencing in 1981, 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.
- 5(2) The unit operator shall submit the details of the pressure survey program to the Director of the Petroleum Branch including the wells to be surveyed, the measurement techniques to be used and the intended shut-in periods for each well, and shall first obtain approval of the program from the Director before it is carried out.
- 5(3) After receiving approval of the pressure survey program and after the program is carried out the unit operator shall submit a report thereon to the Director which shall include
- (a) the pressure data obtained from the program;
  - (b) an isobaric map of the reservoir or unit based on the data obtained; and
  - (c) an analysis of the survey results and pressure distribution in the reservoir.
7. Subsection 1(1) of Schedule D of the regulation is repealed and the following subsection is substituted therefor:
- 1(1) Water shall be injected to the Virden and Scallion Member of the Lodgepole Formation of the Mississippian Age in the wells
- Continental Virden WIW 12-31-10-25
  - Chevron Virden Prov. WIW 10-36-10-26
  - Chevron Virden WIW 4-5-11-25
  - Chevron Virden WIW 10-5-11-25
  - Chevron Virden Prov. WIW 12-5-11-25
  - Chevron Virden Prov. WIW 14-5-11-25
  - Chevron Virden Prov. WIW 2-6-11-25
  - Chevron Virden Prov. WIW 8-6-11-25
  - Chevron Virden Prov. WIW 10-6-11-25
  - Chevron Virden Prov. WIW 12-6-11-25
  - Chevron Virden Prov. WIW 14-6-11-25
  - Chevron Virden Prov. WIW 16-6-11-25
  - Murphy Virden WIW 2-7-11-25
  - Murphy Virden WIW 4-7-11-25
  - Chevron Virden WIW 4-8-11-25
- and, from time to time, in such other wells as the board may direct, or, upon application of the unit operator, may approve.
8. Rule 5 of the Pressure Maintenance Rules as set out in Schedule D of the regulation is repealed and the following rule is substituted therefor:
- 5(1) At least once every three years commencing in 1981, 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.
- 5(2) The unit operator shall submit the details of the pressure survey program to the Director of the Petroleum Branch including the wells to be surveyed, the measurement techniques to be used and the intended shut-in periods for each well, and shall first obtain approval of the program from the Director before it is carried out.

- 5(3) After receiving approval of the pressure survey program and after the program is carried out the unit operator shall submit a report thereon to the Director which shall include
- (a) the pressure data obtained from the program;
  - (b) an isobaric map of the reservoir or unit based on the data obtained; and
  - (c) an analysis of the survey results and pressure distribution in the reservoir.
9. Subsection 1(1) of Schedule E of the regulation is repealed and the following subsection is substituted therefor:
- 1(1) Water shall be injected to the Virden and Scallion Members of the Lodgepole Formation of the Mississippian Age in the wells
- Chevron South Virden CPR WIW 10-7-10-25
  - Chevron South Virden CPR WIW 12-7-10-25
  - Chevron South Virden CPR WIW 14-7-10-25
  - Chevron East Virden Prov. WIW 2A-18-10-25
  - Sun I. Welch Virden WIW 4-18-10-25
  - Chevron South Virden CPR WIW 6-1-10-26
  - Chevron South Virden CPR WIW 14-1-10-26
  - Chevron South Virden Prov. WIW 8-2-10-26
  - Chevron South Virden WIW 14-2-10-26
  - Mineraloid Virden WIW 16-2-10-26
  - Chevron South Virden WIW 16-3-10-26
  - Gulf Duncan Virden WIW 6-10-10-26
  - Chevron South Virden Prov. WIW 8-10-10-26
  - Chevron South Virden Prov. WIW 6-11-10-26
  - Chevron South Virden Prov. WIW 8-11-10-26
  - Chevron South Virden Prov. WIW 12-11-10-26
  - Chevron South Virden Prov. WIW 14-11-10-26
  - Chevron South Virden Prov. WIW 16-11-10-26
  - Chevron South Virden WIW 6-12-10-26
  - Chevron South Virden WIW 14-12-10-26
  - Placer Virden WIW 6-13-10-26
  - Gulf Union Welch Virden WIW 9-13-10-26
  - Mineraloid Virden WIW 14-13-10-26
  - Rundle Williams Virden WIW 4-14-10-26
  - Rundle Williams Virden WIW 11-14-10-26
  - Murphy Virden WIW 1-23-10-26
  - Esso Virden WIW 3-23-10-26
- and, from time to time, in such other wells as the board may direct, or, upon application of the unit operator, may approve.
10. Rule 5 of the Pressure Maintenance Rules as set out in Schedule E of the regulation is repealed and the following rule is substituted therefor:
- 5(1) At least once every three years commencing in 1981, 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.
- 5(2) The unit operator shall submit the details of the pressure survey program to the Director of the Petroleum Branch including the wells to be surveyed, the measurement techniques to be used and the intended shut-in periods for each well, and shall first obtain approval of the program from the Director before it is carried out.

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and the following subsection

members of the Lodgepole

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15

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16  
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-26  
-26  
-26

5(3) After receiving approval of the pressure survey program and after the program is carried out the unit operator shall submit a report thereon to the Director which shall include

- (a) the pressure data obtained from the program;
- (b) an isobaric map of the reservoir or unit based on the data obtained; and
- (c) an analysis of the survey results and pressure distribution to the reservoir.

11. Subsection 1(1) of Schedule G of the regulation is repealed and the following subsection is substituted therefor:

1(1) Water shall be injected to the Whitewater Members of the Lodgepole Formation of the Mississippian Age in the wells

Chevron Whitewater WIW 13-16-3-21  
Chevron Whitewater WIW 9-17-3-21

and, from time to time, in such other wells as the board may direct, or, upon application of the unit operator, may approve.

12. Schedules A, C, D, E, F and G of the regulation are further amended by striking out the word "Mines" in Rule 7 thereof and substituting therefor the word "Petroleum".

13. Schedule A of the regulation is further amended by striking out the word "Mines" in Rule 8(1) thereof and substituting therefor the word "Petroleum".

14. Schedules H and I of the regulation are repealed.

15. Order Nos. PM 22, 25, 26 and 27 of The Oil and Natural Gas Conservation Board and filed as Manitoba Regulations 206/73, 151/74, 154/74 and 155/74 respectively, are repealed.

Oil and Natural Gas Order No. PM 37  
made and passed this 20th day of  
June A.D., 1980 at the City  
of Winnipeg, in the Province of  
Manitoba, by The Oil and Natural  
Gas Conservation Board.

"Paul E. Jarvis"

Paul E. Jarvis,  
Chairman,  
The Oil and Natural Gas  
Conservation Board.

"Ian Haugh"

Dr. Ian Haugh,  
Deputy Chairman,  
The Oil and Natural Gas  
Conservation Board.

"James F. Redgwell"

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

APPROVED:

"D.W. Craik"

Donald W. Craik,  
Minister of Energy and Mines.



**Chevron Canada Resources Limited**

500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7  
1986-06-25

K.E. Godard  
Chief Engineer

North Virden Scallion Unit No. 1  
Application to Convert Well  
Chevron Scallion 16C-22-11-26 WPM  
to Water Injection Service

The Oil and Natural Gas Conservation Board  
309 Legislative Building  
Winnipeg, Manitoba  
R3C 0V8

Attention: Mr. C. S. Kang

Gentlemen:

In a letter dated 1986-06-03, the Board requested that Chevron provide proof that surface owners affected by the subject application have been notified.

Attached is an Affidavit of Notification indicating that the affected surface owners have been notified about Chevron's proposed plans.

Any questions regarding this matter should be directed to  
Doug Schierman at 234-5150.

Sincerely,

for C. G. FOLDEN, P.Eng.  
Supervising Engineer  
Reservoir Engineering

DNS/lgs  
Attach.



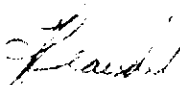
AFFIDAVIT OF NOTIFICATION

I, Kim L. Beaudry, of the City of Calgary, in the Province of Alberta, Land Representative, make oath and say,

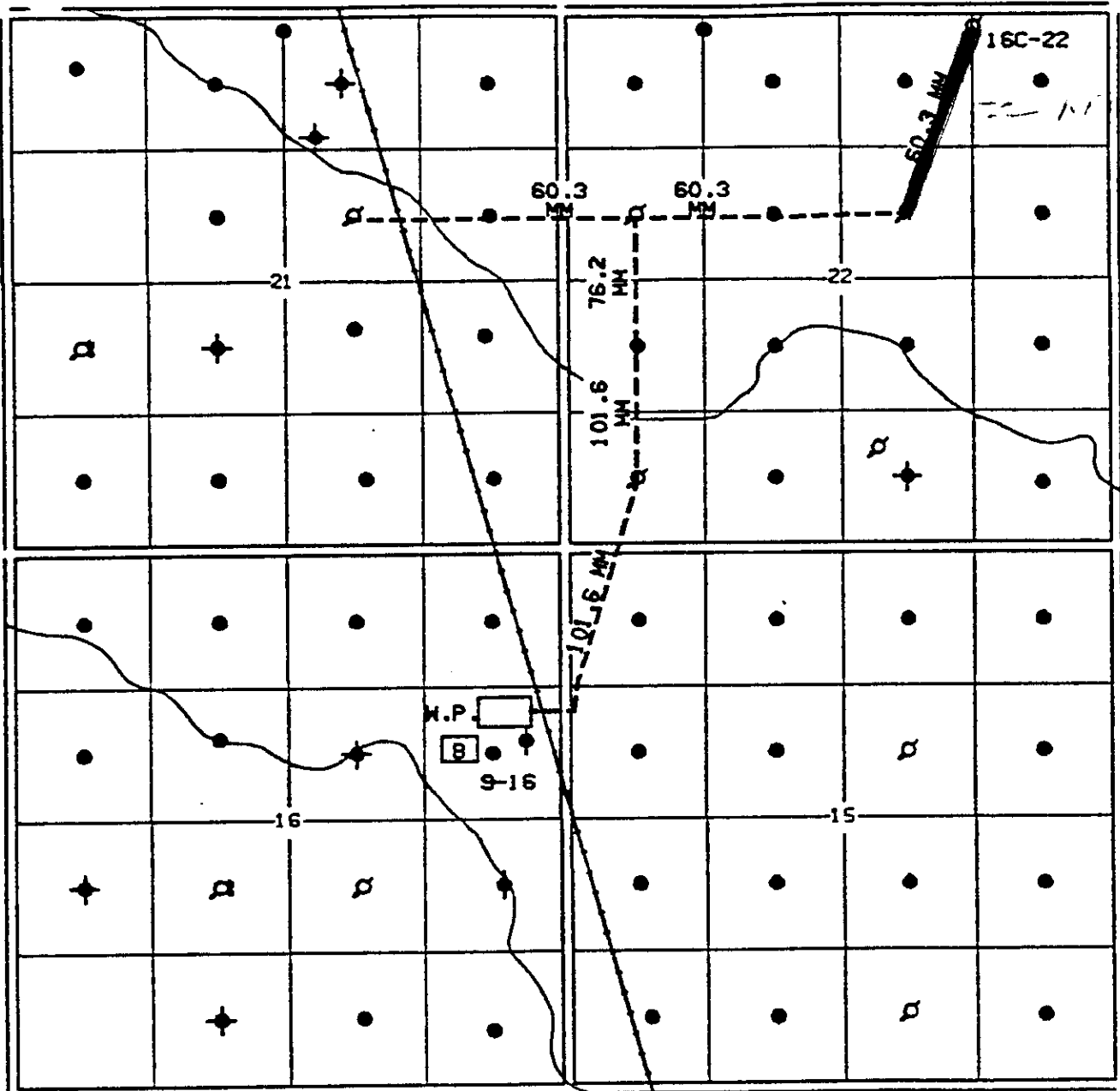
THAT I did on Wednesday, the 11th day of June, A.D. 1986, personally notify Thomas Wesley Tapp and Marjorie Jean Tapp of Box 777, Virden, Manitoba ROM 2C0 of Chevron Canada Resources Limited's intention to install a water injection line in the NE-1/4 22-11-26 WPM as more particularly shown outlined in red on the attached sketch and marked Exhibit "A."

Sworn before me at the City of Calgary  
in the Province of Alberta, this \_\_\_\_\_  
day of June, A.D. 1986.

\_\_\_\_\_  
A Notary Public in and for the  
Province of Alberta

  
\_\_\_\_\_  
Kim L. Beaudry  
Land Representative

RGE 26



PIPELINE  
ROW  
REQUIRED

TWP 11

LEGEND

- EXISTING WATER INJECTION PIPELINES
- PROPOSED WATER INJECTION PIPELINE
- W.P. WATER PLANT
- B BATTERY

FIGURE 1

Chevron Canada Resources Limited

NORTH VIRDEN SCALLION UNIT #1  
SCHEMATIC OF THE WATER INJECTION FACILITIES  
FOR 16C-22-11-26 WPM WELL CONVERSION

DR. CMK	DATE 86-04	N.O.	A-10924
APP'D	SCALE 1:1000	FILE FC-1	

EXHIBIT "A"

SC061008

FC0042

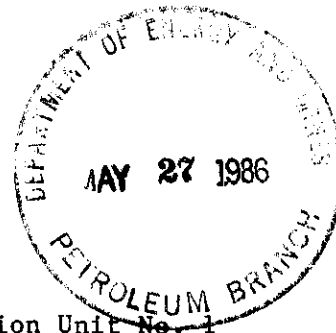


**Chevron Canada Resources Limited**

500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7

K.E. Godard  
Chief Engineer

1986-05-23



North Virden Scallion Unit No. 1  
Application to Convert Well  
Chevron Scallion 16C-22-11-26 WPM  
to Water Injection Service

The Oil and Natural Gas  
Conversation Board  
Room 309, Legislative Building  
Winnipeg, Manitoba  
R3C 0V8

Attention: C. S. Kang, Chairman

Gentlemen:

In a letter dated 1986-04-02, the Board listed several deficiencies in the subject Application.

The answers to these deficiencies are listed below:

1. The affected surface owners in the 16C-22 area are:

Marjorie Jenny Tapp  
and Thomas Wesley Tapp Lsd's 10 and 15-22-11-26 WPM

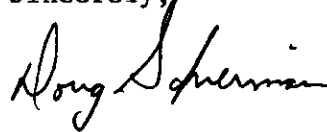
These surface owners will be contacted after Chevron receives Conservation Board approval; as surface easements are required for the injection pipeline right-of-way.

2. All surface facilities are shown on the attached schematics, Figures 1, 2, and 3.
3. The corrosion control methods will be:
  - a) Wellbore:
    - i) the production casing has been cemented from total depth to surface,
    - ii) the casing/tubing annulus will be filled with inhibited fresh water and isolated by a packer,
    - iii) the tubing will be plastic lined.
  - b) Injection pipelines will be cement lined and cathodically protected.
  - c) Corrosion inhibitor will be added to the water at the 9-16-11-22 water plant to protect the other surface facilities.

4. Chevron proposes the following monitoring procedures for the area affected by injection at 16C-22:
  - a) Quarterly production tests on the four adjacent producers before and after injection commences (Chevron will attempt more frequent production tests if operating conditions allow).
  - b) Monthly sonic fluid level surveys to ensure the four producers are pumped off.
  - c) Reservoir pressure survey at the four producers before injection commences and on an annual basis for two years thereafter.
  - d) Water injected will be measured by a positive displacement meter at the wellhead.
5. Field experience indicates that the Scallion area has a fracture pressure of about 8 500 kPa (wellhead pressure with produced water in the well). Current wellhead injection pressures in the Scallion field are about 7 800 kPa. Chevron will maintain the injection pressure below the fracture pressure until a water bank has been established around the 16C-22 well.

Any further questions regarding this matter should be directed to Kevin Matieshin at (204) 748-1334 or Doug Schierman at (403) 234-5150.

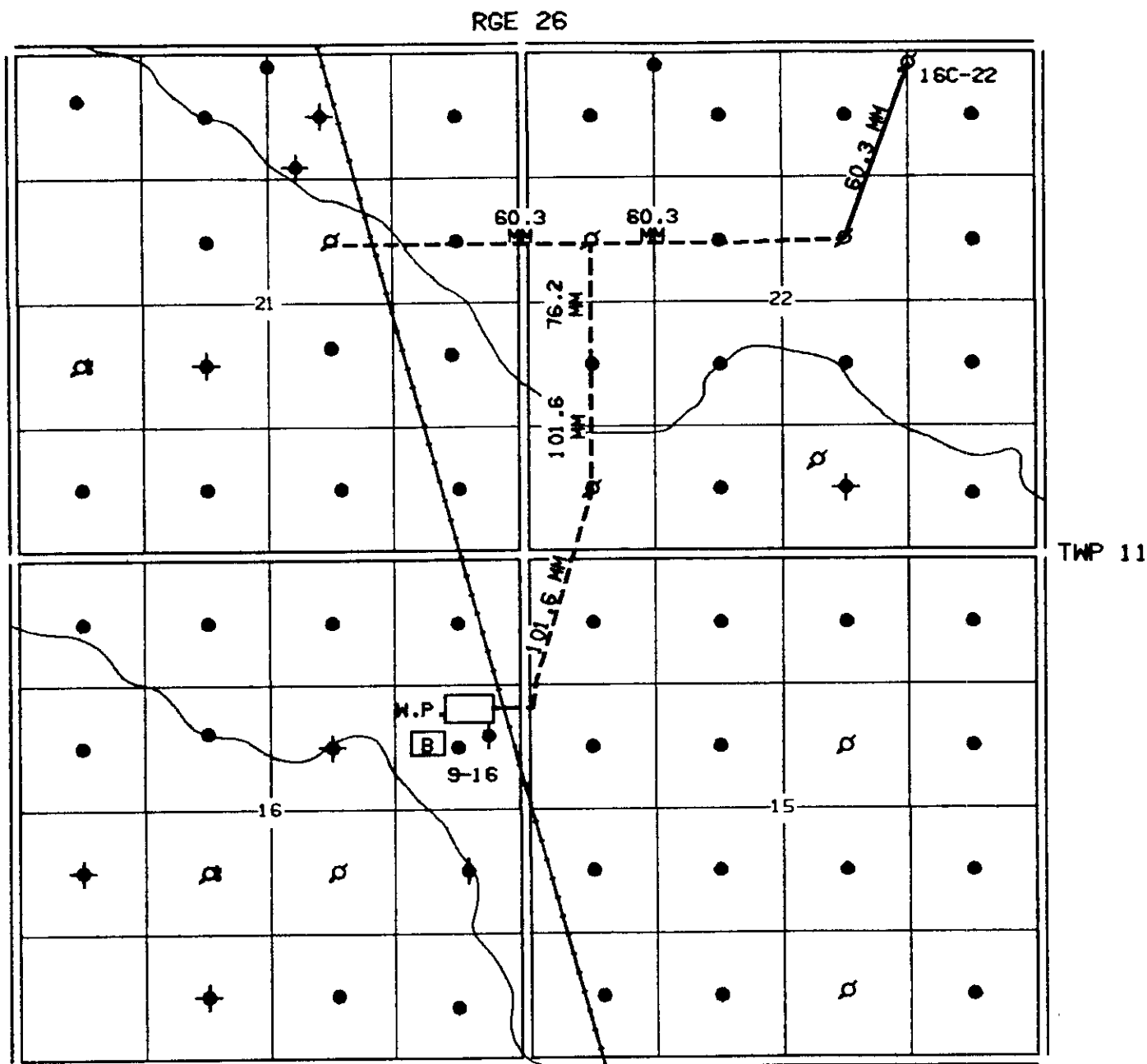
Sincerely,



for

C. G. FOLDEN, P.Eng.  
Supervising Engineer  
Reservoir Engineering

DS/ds  
Encl.

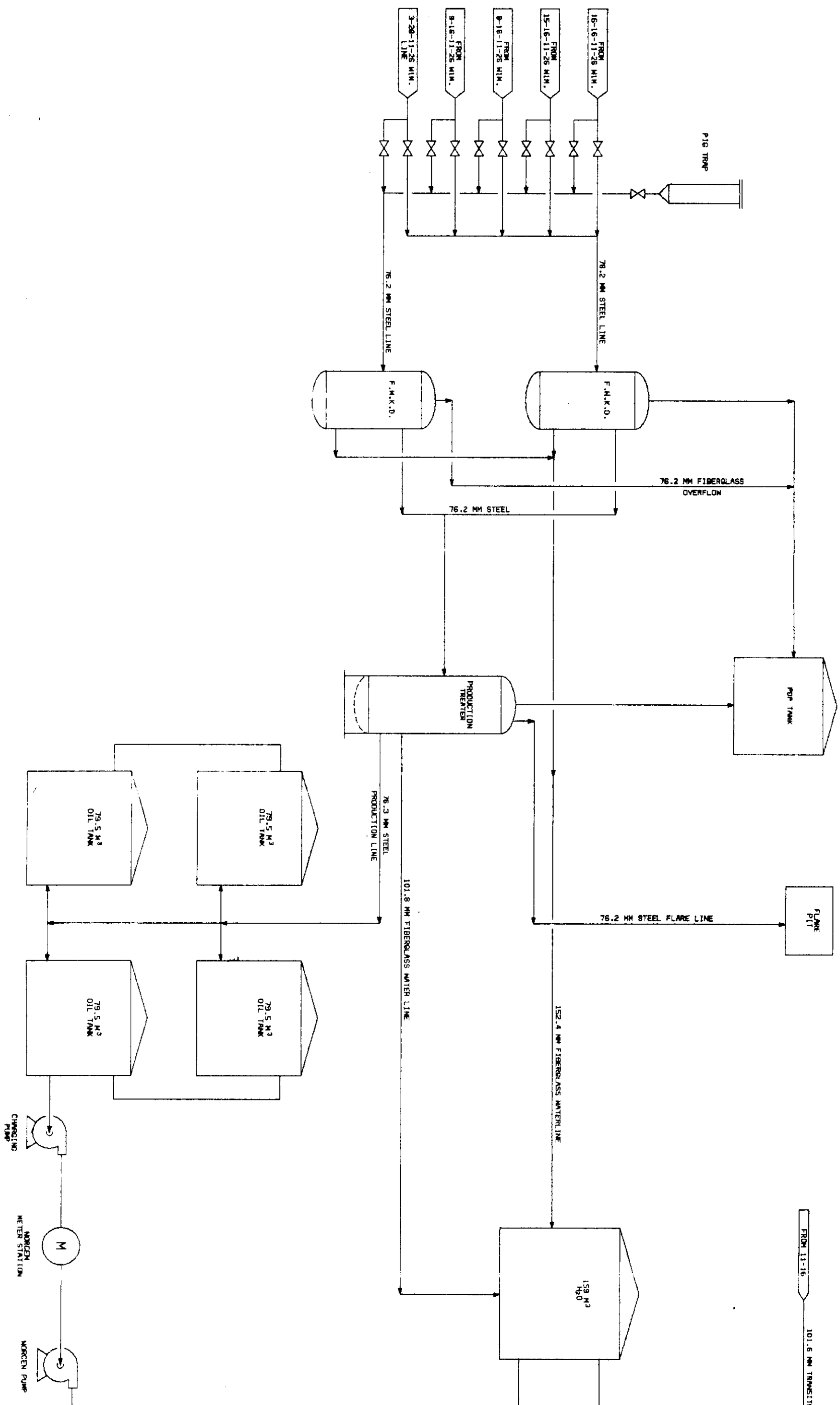


### LEGEND

- EXISTING WATER INJECTION PIPELINES  
 ——— PROPOSED WATER INJECTION PIPELINE  
 W.P. WATER PLANT  
 B BATTERY

FIGURE 1

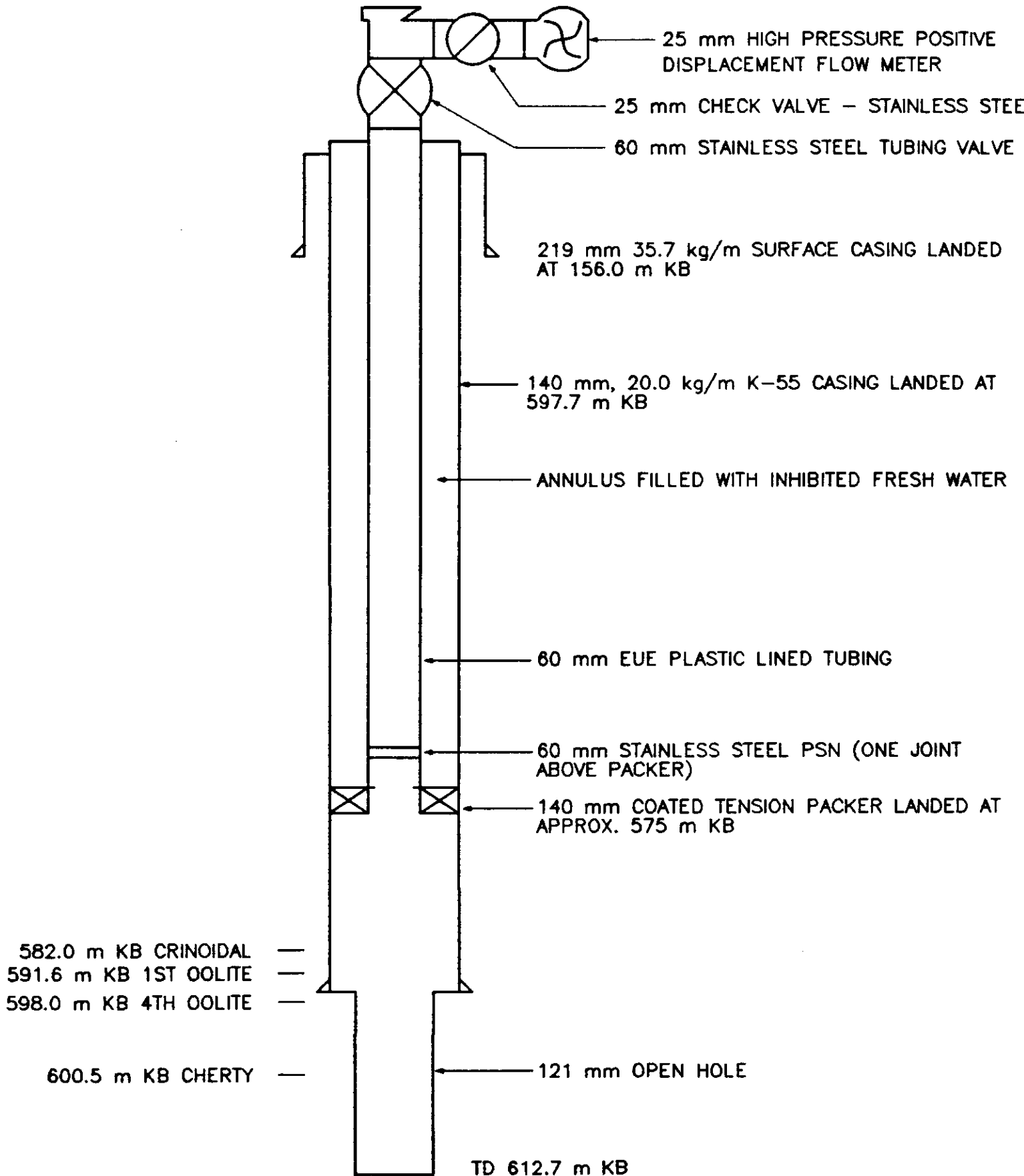
Chevron Canada Resources Limited			
NORTH VIRDEN SCALLION UNIT #1 SCHEMATIC OF THE WATER INJECTION FACILITIES FOR 16C-22-11-26 WPM WELL CONVERSION			
DR. CMK	DATE 86-04	N.O.	A-10924
APP'D	SCALE 1:20 000	FILE FC-1	





# PROPOSED DOWNHOLE COMPLETION SCHEMATIC CHEVRON VIRDEN 16C-22-11-26WPM

KB ELEVATION 456.6 m







**Chevron Canada Resources Limited**

500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7  
1986-06-25

K.I. Godard  
Chief Engineer

North Virden Scallion Unit No. 1  
Application to Convert Well  
Chevron Scallion 16C-22-11-26 WPM  
to Water Injection Service

The Oil and Natural Gas Conservation Board  
309 Legislative Building  
Winnipeg, Manitoba  
R3C 0V8

Attention: Mr. C. S. Kang

Gentlemen:

In a letter dated 1986-06-03, the Board requested that Chevron provide proof that surface owners affected by the subject application have been notified.

Attached is an Affidavit of Notification indicating that the affected surface owners have been notified about Chevron's proposed plans.

Any questions regarding this matter should be directed to  
Doug Schierman at 234-5150.

Sincerely,

for C. G. FOLDEN, P.Eng.  
Supervising Engineer  
Reservoir Engineering

DNS/lgs  
Attach.

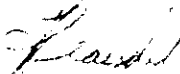
AFFIDAVIT OF NOTIFICATION

I, Kim L. Beaudry, of the City of Calgary, in the Province of Alberta, Land Representative, make oath and say,

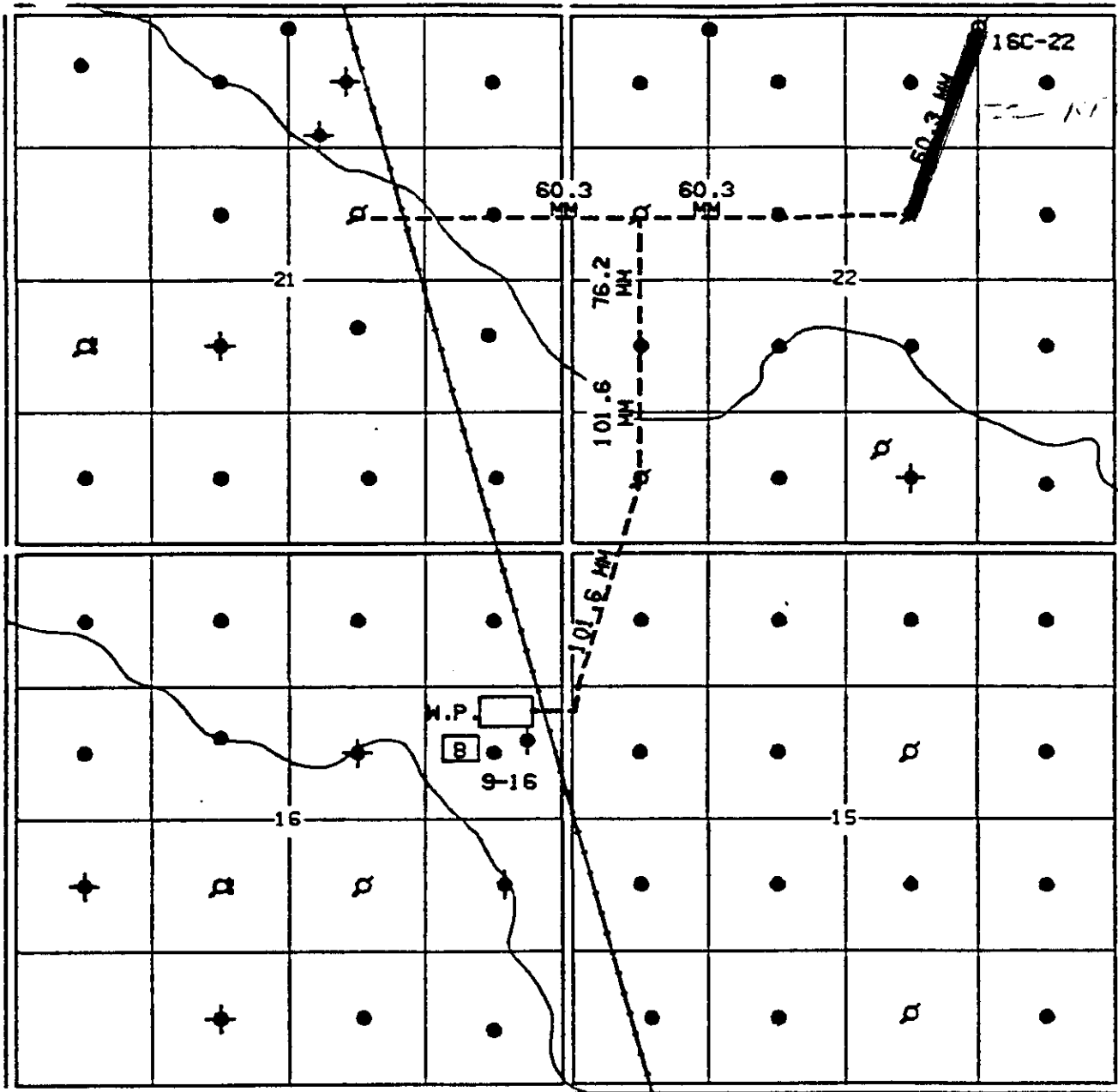
THAT I did on Wednesday, the 11th day of June, A.D. 1986, personally notify Thomas Wesley Tapp and Marjorie Jean Tapp of Box 777, Virden, Manitoba ROM 2C0 of Chevron Canada Resources Limited's intention to install a water injection line in the NE-1/4 22-11-26 WPM as more particularly shown outlined in red on the attached sketch and marked Exhibit "A."

Sworn before me at the City of Calgary  
in the Province of Alberta, this \_\_\_\_\_  
day of June, A.D. 1986.

\_\_\_\_\_  
A Notary Public in and for the  
Province of Alberta

  
\_\_\_\_\_  
Kim L. Beaudry  
Land Representative

RGE 26



PIPELINE  
ROW  
REQUIRED

TWP 11

### LEGEND

- EXISTING WATER INJECTION PIPELINES
- PROPOSED WATER INJECTION PIPELINE
- W.P. WATER PLANT
- B BATTERY

EXHIBIT "A"

FIGURE 1

Chevron Canada Resources Limited			
NORTH VIRDEN SCALLION UNIT #1 SCHEMATIC OF THE WATER INJECTION FACILITIES FOR 16C-22-11-26 NPM WELL CONVERSION			
DR. CHK	DATE 86-04	W.O.	A-10924
APP'D	SCALE 1:25000	FILE FC-1	



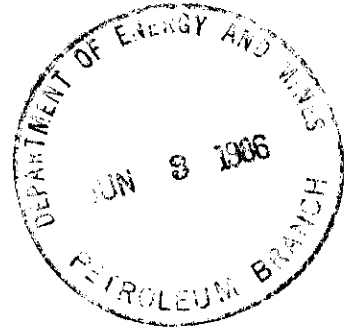
The Oil and Natural Gas  
Conservation Board

Room 309  
Legislative Building  
Winnipeg, Manitoba, CANADA  
R3C 0V8

(204) 945-3130

JUN 3 1986

Chevron Canada Resources Limited  
500 - 5th Avenue S.W.  
Calgary, Alberta  
T2P 0L7



Attention: Mr. C. G. Folden, P. Eng.  
Supervising Engineer - Reservoir Engineering

Dear Sirs:

Re: North Virden Scallion Unit No. 1  
Conversion of Chevron Virden 16C-22-11-26 (WPM)  
to Water Injection

Your letter of May 23, 1986 regarding the subject application is acknowledged.

Clause (d) of Section 126 of The Petroleum Drilling and Production Regulations, 1984 requires submission of proof that the surface owners affected have been notified of the operator's intentions. You are advised that this is a prerequisite for approval of an enhanced recovery project. Upon receipt of proof of the necessary notifications, processing of your application will be concluded.

Yours sincerely,

ORIGINAL SIGNED BY  
CHARLES S. KANG

Charles S. Kang  
Chairman

LRD/HCM/1k

b.c. Wm. McDonald  
B. Ball  
Petroleum Branch



The Oil and Natural Gas  
Conservation Board

Room 309  
Legislative Building  
Winnipeg, Manitoba, CANADA  
R3C 0V8

(204) 945-3130

Chevron Canada Resources Limited  
500 - 5th Avenue S.W.  
Calgary, Alberta  
T2P 0L7

Attention: Mr. Doug Schierman

Dear Sirs:

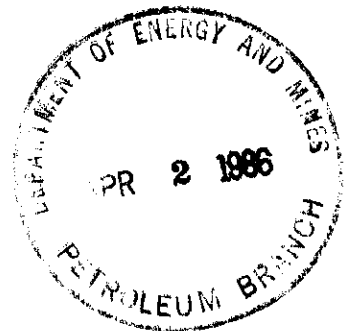
Re: Conversion of Chevron Virden 16C-22-11-26 (WPM)  
to Water Injection - North Virden Scallion Unit No. 1

Your application dated March 3, 1986 for approval to convert the subject well to a water injection well is acknowledged.

Upon review of your application, a number of deficiencies are noted (refer to Section 126 of The Petroleum Drilling and Production Regulations, 1984).

- 1) proof that the surface owner(s) in the project area have been notified of the operator's plans.
- 2) details of the proposed surface facilities should be provided (i.e. - which plant will the proposed injector be tied into; a schematic showing the surface facilities including facilities for metering of the injected water, etc.).
- 3) details of the proposed methods of controlling corrosion in the wellbores, flow lines and surface facilities.

Inasmuch as your proposal is a pilot project to evaluate the effectiveness of injection on smaller spacing, a monitoring system should be put in place to evaluate reservoir response in the area of the proposed injector. Please provide a specific proposal in this regard.



Calculations indicate that the proposed maximum injection pressure of 8 000 kPa may be approaching or exceeding fracture pressure. Your comments on this as well as of the need or desirability of injecting at pressures in excess of the fracture pressure are requested.

Although processing of your application will be commenced, you are requested to submit the information listed above, prior to final disposition of the application.

Yours sincerely,

THE OIL AND NATURAL GAS  
CONSERVATION BOARD

**ORIGINAL SIGNED BY  
CHARLES S. KANG**

Charles S. Kang  
Chairman

MA/LRD/lk

b.c. Wm. McDonald  
J. F. Redgwell  
Petroleum Branch ✓



## Memorandum

Date March 24, 1986

To The Oil and Natural Gas Conservation Board

From H. Clare Moster  
Director, Petroleum Branch

Charles S. Kang - Chairman  
Wm. McDonald - Deputy Chairman  
J. F. Redgwell - Member

Telephone

Subject North Virden Scallion Unit No. 1

### Chevron Virden 16C-22-11-26 (WPM) - Conversion to Water Injection

Chevron Canada Resources Limited, operator of the North Virden Scallion Unit No. 1, has made application for approval to convert the well Chevron Virden 16C-22-11-26 (WPM) to a water injection well.

#### Recommendations:

It is recommended that:

1. A deficiency letter requesting specifics of surface facilities associated with the well, of the proposed reservoir performance monitoring program and requesting comments regarding reservoir fracturing be sent to Chevron. A draft is attached.
2. Pending an appropriate response to the deficiency letter the application be approved.
3. Board Order No. PM 50 (draft attached) be issued to provide a consolidation of approvals for pressure maintenance in the North Virden Scallion Unit No. 1.

#### Discussion:

The Virden Lodgepole A Pool was discovered in December, 1953 with the completion of the well Calstan Scallion Prov. 3-11-11-26 WPM. Extensive development continued in the following 3 to 4 years. By early 1957, the Pool's production rate and pressure were declining rapidly and the need for pressure maintenance became obvious. In August, 1962, the North Virden Scallion Unit 1 became effective and in December of the same year, water injection commenced in a nine-spot waterflood pilot in a portion of the Pool. The reservoir responded favourably and rapidly to water injection and waterflooding was expanded in the Pool (see Figure No. 1).

In 1977, Chevron drilled a number of infill wells in the north-central part of the Unit (see Figure No. 2). These wells were drilled to assist in recovery of oil in a corridor area between two rows of producers. While the drilling of these wells resulted in a temporary increase in production rate, it appears to have had little

positive effect on ultimate recovery (refer Figure A1 of Chevron's application). However, increased withdrawals in the area of the infill wells has resulted in a declining reservoir pressure in this area. Figure No. 3 indicates net change in pressures between the 1981 and 1984 pressure surveys. Note that many of the largest declines are in the general area of the infill wells.

As noted by Chevron and evident from the above comments, ultimate recovery would appear to be somewhat low in this area, due primarily to poorer areal sweep (caused by remoteness from injection). In addition, Chevron has referenced a number of projects that illustrate that ultimate recovery increases as well spacing decreases. The proposed conversion is likely to result in positive response in the surrounding area and may provide a basis for further infill injection.

As noted, the results of the proposed conversion may provide an indication of the need for expanded infill injection program. To properly evaluate this initial project, an improved monitoring program must be incorporated. This should involve more frequent production tests (minimum of quarterly) and annual pressure surveys, both in the general vicinity of the infill injection project.

In addition to the above, Chevron's application is deficient with regards to some of the requirements under Section 126 of the Regulations, primarily pertaining to surface facilities. The attached deficiency letter outlines these requirements.

In that the proposed conversion is well removed from the Unit boundary and pending notification of the surface owner of Chevron's plans, advertisement of this application will not be necessary.

Chevron has proposed a maximum wellhead pressure of 8 000 kPa. This is somewhat higher than the current maximum pressure (about 7 500 kPa) and may be approaching the fracture pressure. The attached letter also requests Chevron's comments in this regard.

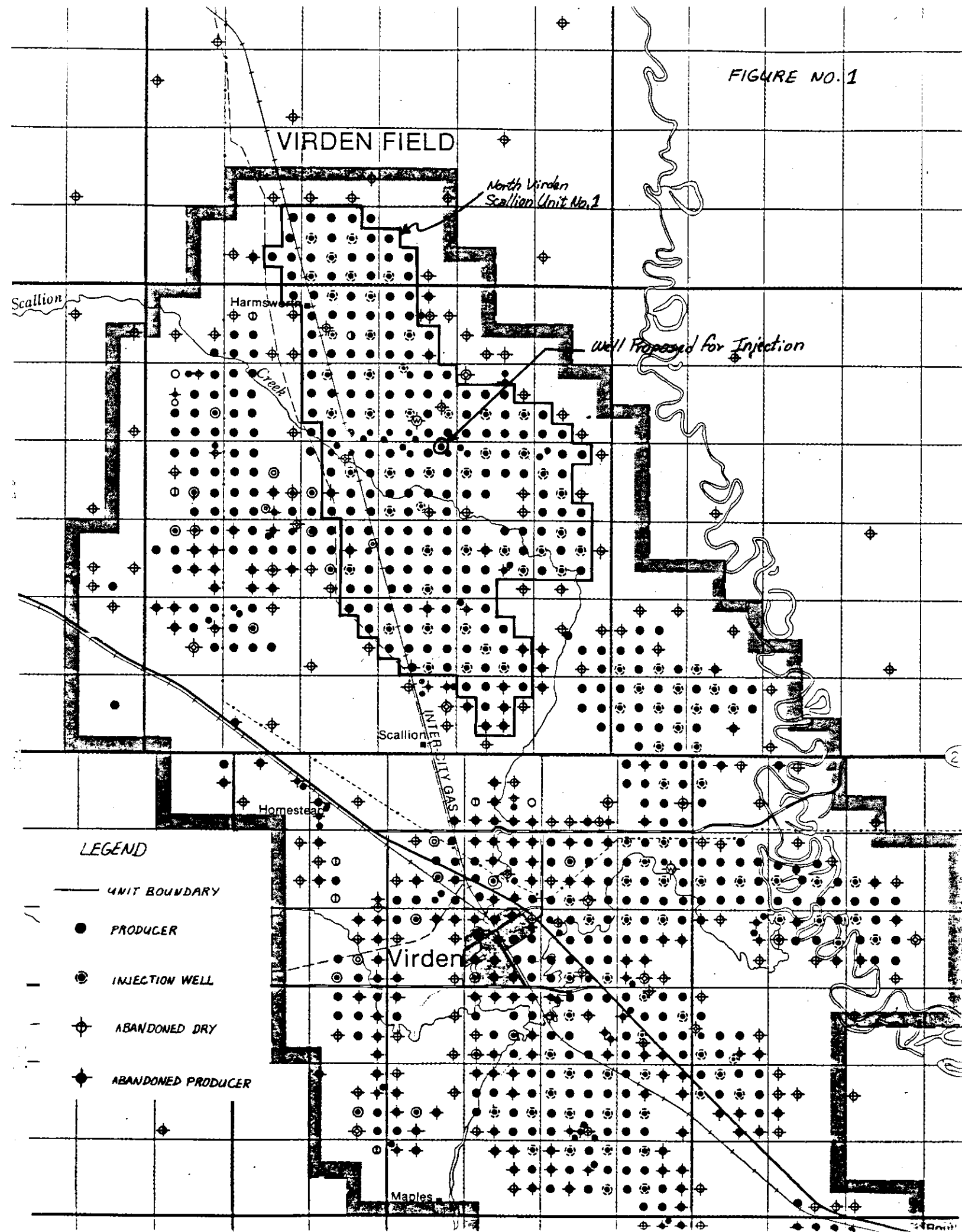
~~original signed by H. C. Moster~~

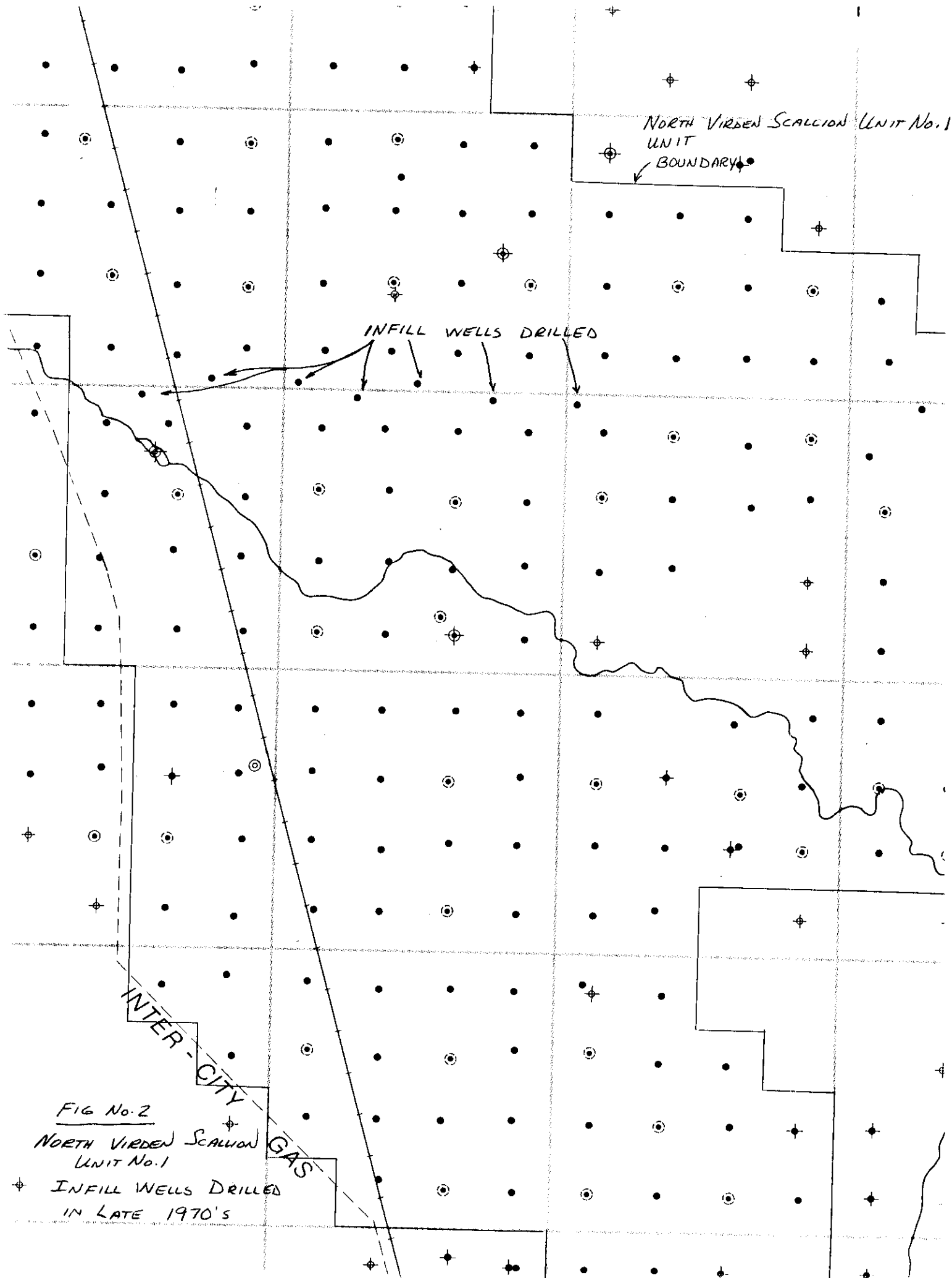
H. Clare Moster

LRD/lk



FIGURE NO. 1





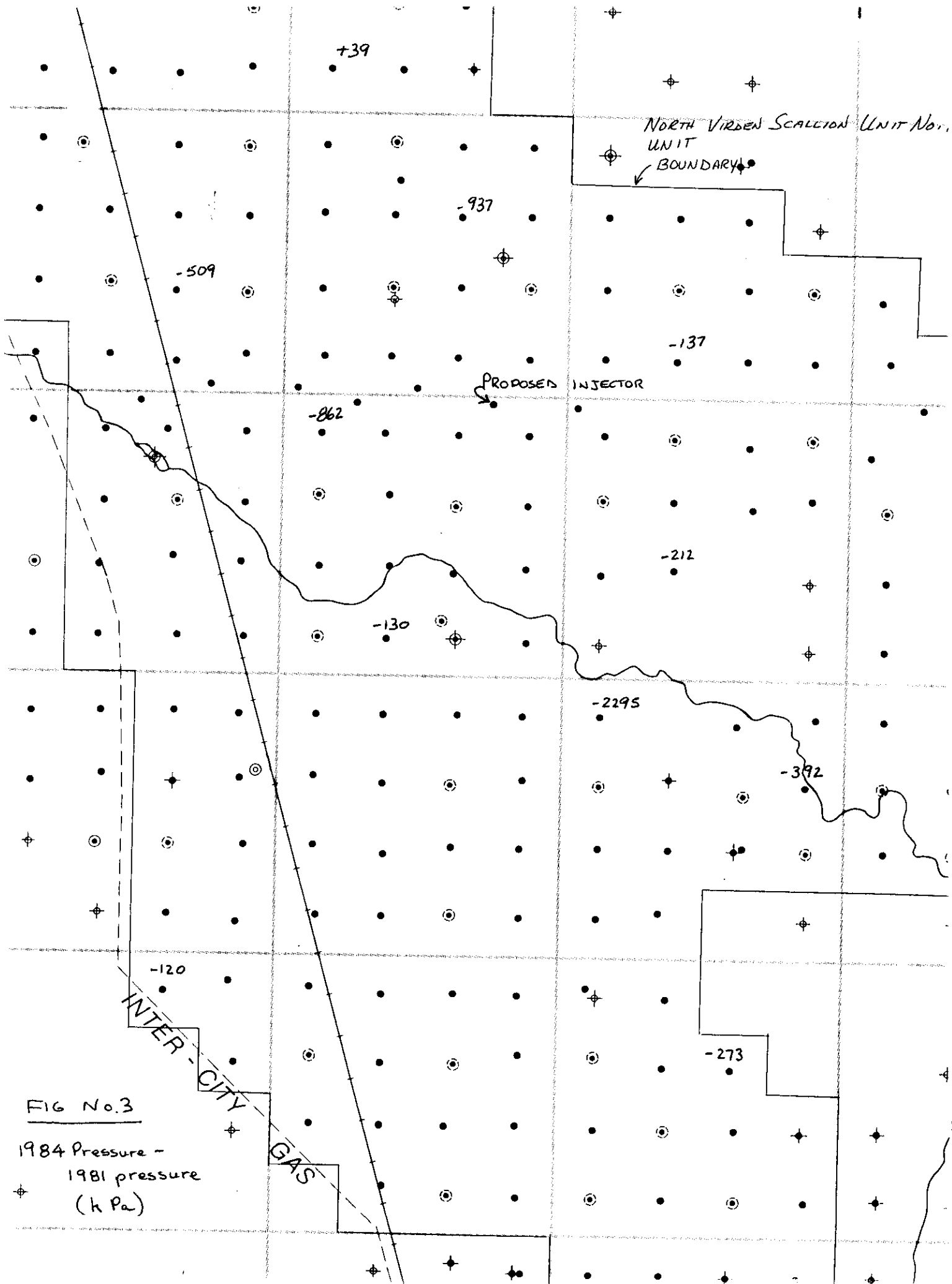


FIG No.3

1984 Pressure -  
1981 pressure  
(k Pa)



**Chevron Canada Resources Limited**  
500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7

K.E. Godard  
Chief Engineer

1986-03-03

Lodgepole "A" Pool  
North Virden Scallion Unit No. 1  
Application for Approval to Convert  
Well Chevron Virden 16C-22-11-26 W1  
to Water Injection Service

The Oil and Natural Gas Conservation Board  
309 Legislative Building  
Winnipeg, Manitoba  
R3C 0V8

Attention: Mr. C. S. Kang, Chairman

Gentlemen:

1. Pursuant to Section 64(1) of the Petroleum Drilling and Production Regulations - 1984, Chevron Canada Resources Limited, as Operator of the North Virden Scallion Unit No. 1 in the Lodgepole "A" Pool requests an Amendment to Regulation No. M16OR8P to permit conversion of Chevron Virden 16C-22-11-26 W1 formerly Chevron Scallion A-16-22-11-26 W1 to water injection service.
2. The proposed injector 16C-22 is identified on the NVSU No. 1 map which is attached as Figure 1. The proposed conversion will form a five-spot pattern with 8 ha well spacing.
3. The reservoir properties at the proposed injector and the expected injection capability are:

Net pay(m)	6.4
Porosity (%)	9.0
Permeability capacity (mdm)	38
Expected injection capability (m <sup>3</sup> /d)	80

4. Maximum wellhead injection pressure will be 8 MPa.
5. The production history of Well 16C-22 is shown on Figure 2. The intended downhole completion is illustrated on Figure 3.
6. Well 16C-22 was drilled on 8 ha well spacing while most of the NVSU No.1 has been developed with 16 ha well spacing. A recent evaluation of the Daly Units 1 and 3 waterflood indicates that 8 ha well spacing increases oil recovery by 4 - 9% of OOIP, over the recovery attained by 16 ha well spacing (see Daly Unit No. 3 Reducing Well Spacing Application dated 1986-02-04). This conclusion is also valid for the Scallion Unit, as both Units produce from the Lodgepole A Pool.
7. A discussion of the performance and characteristics of the subject wells and areas is contained in the attached Appendix A.

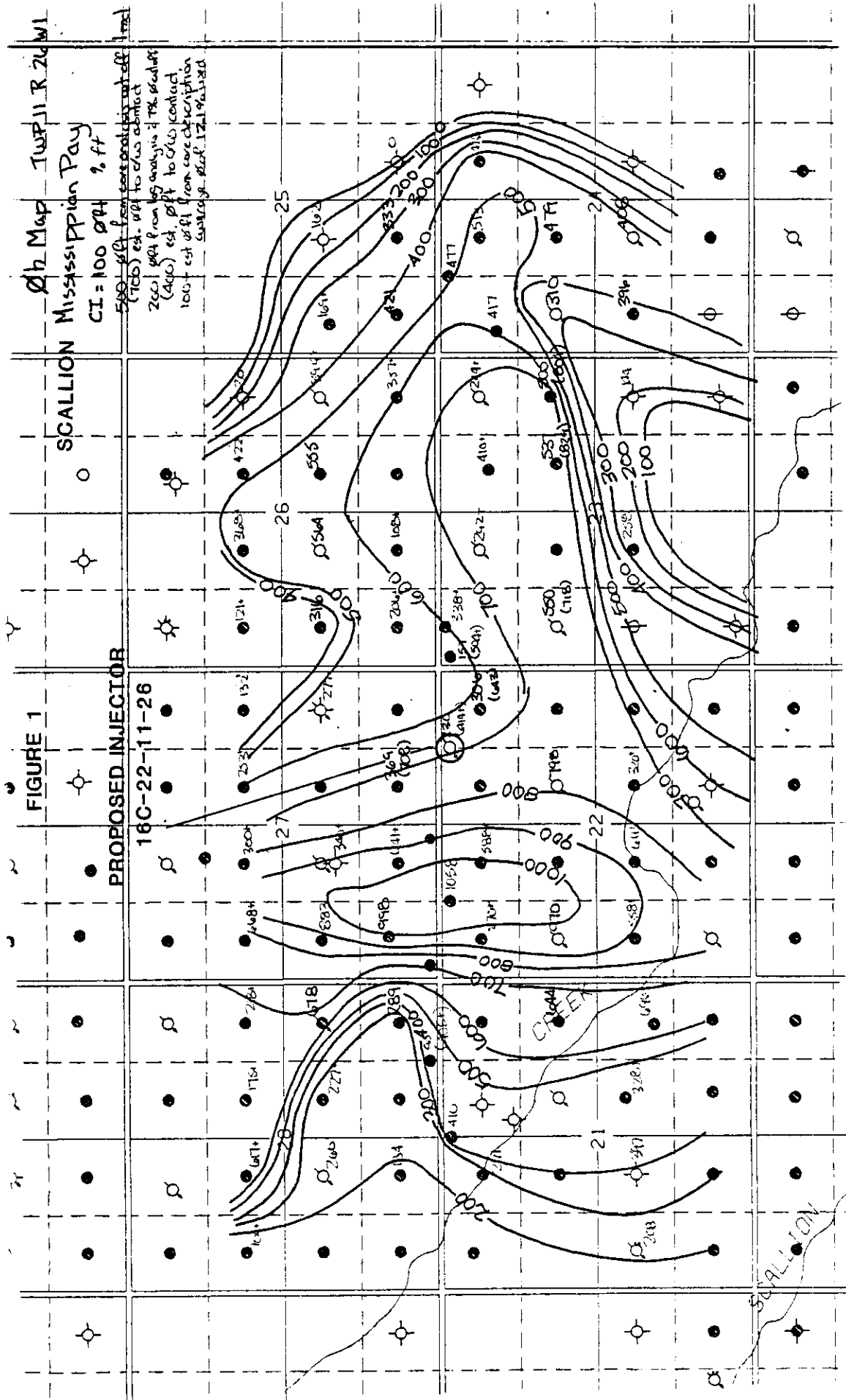
Any questions regarding this application should be directed to Doug Schierman at (403)234-5150 at the letterhead address. Requests for additional copies should be directed to our Information Centre.

Sincerely,



for C. G. FOLDEN, P.Eng.  
Supervising Engineer  
Reservoir Engineering

DS/lgs  
Attach.



Oh Map TWP 11 R 26 W1  
 SCALLION MISSISSIPPIAN PAY  
 CI = 100 gpt % ft  
 500 gpt from core analysis out off 1000  
 (700) est. up to core contact  
 200 gpt from log analysis of 1000  
 (400) est. up to core contact  
 100 gpt from core analysis  
 (100) est. up to core contact

FIGURE 1  
 PROPOSED INJECTOR  
 16C-22-11-26

SCALLION

CREEK

FIGURE 2  
VIRDEN SCALLION  
PRODUCTION PLOT  
A 16-22-011-26W1

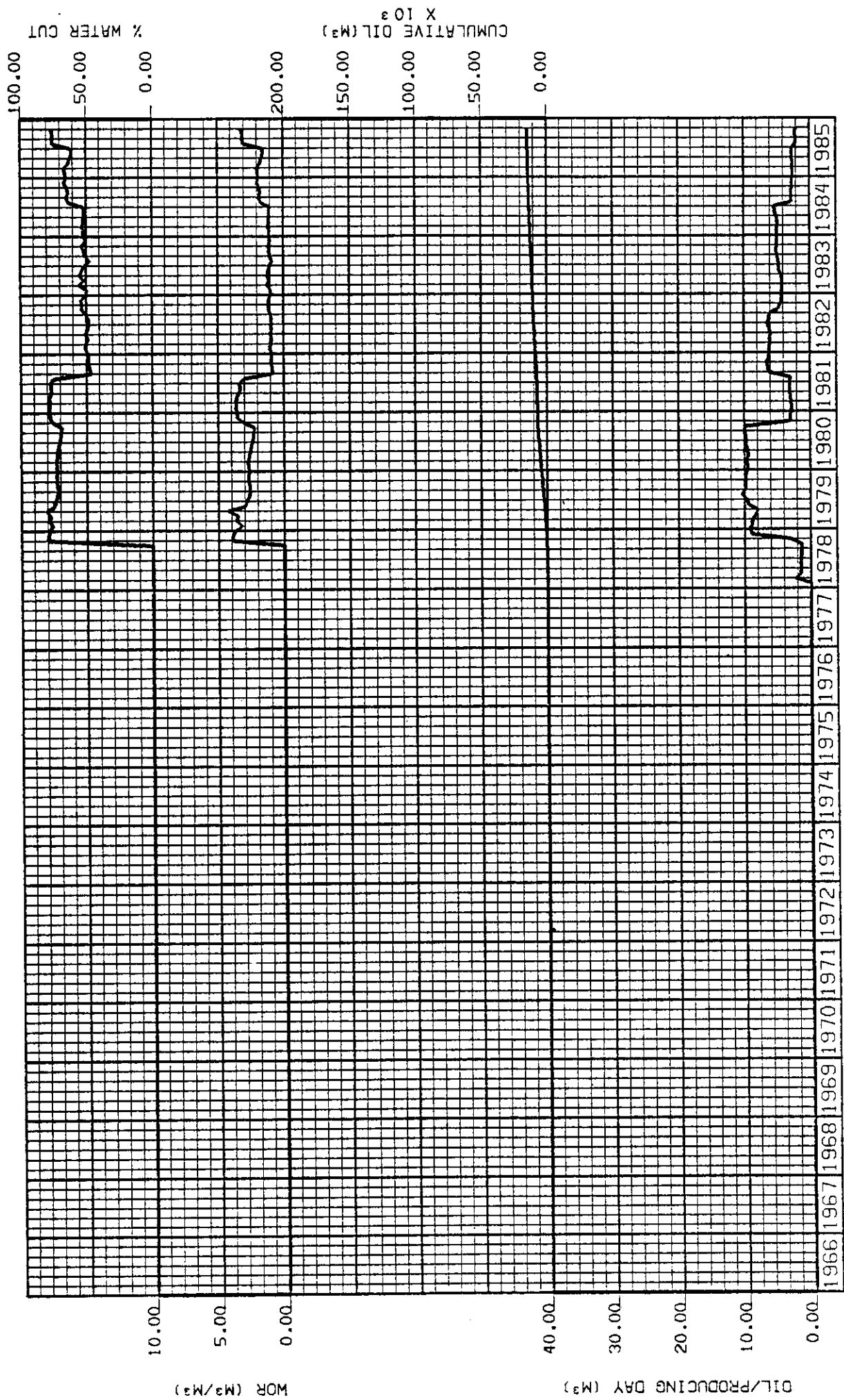
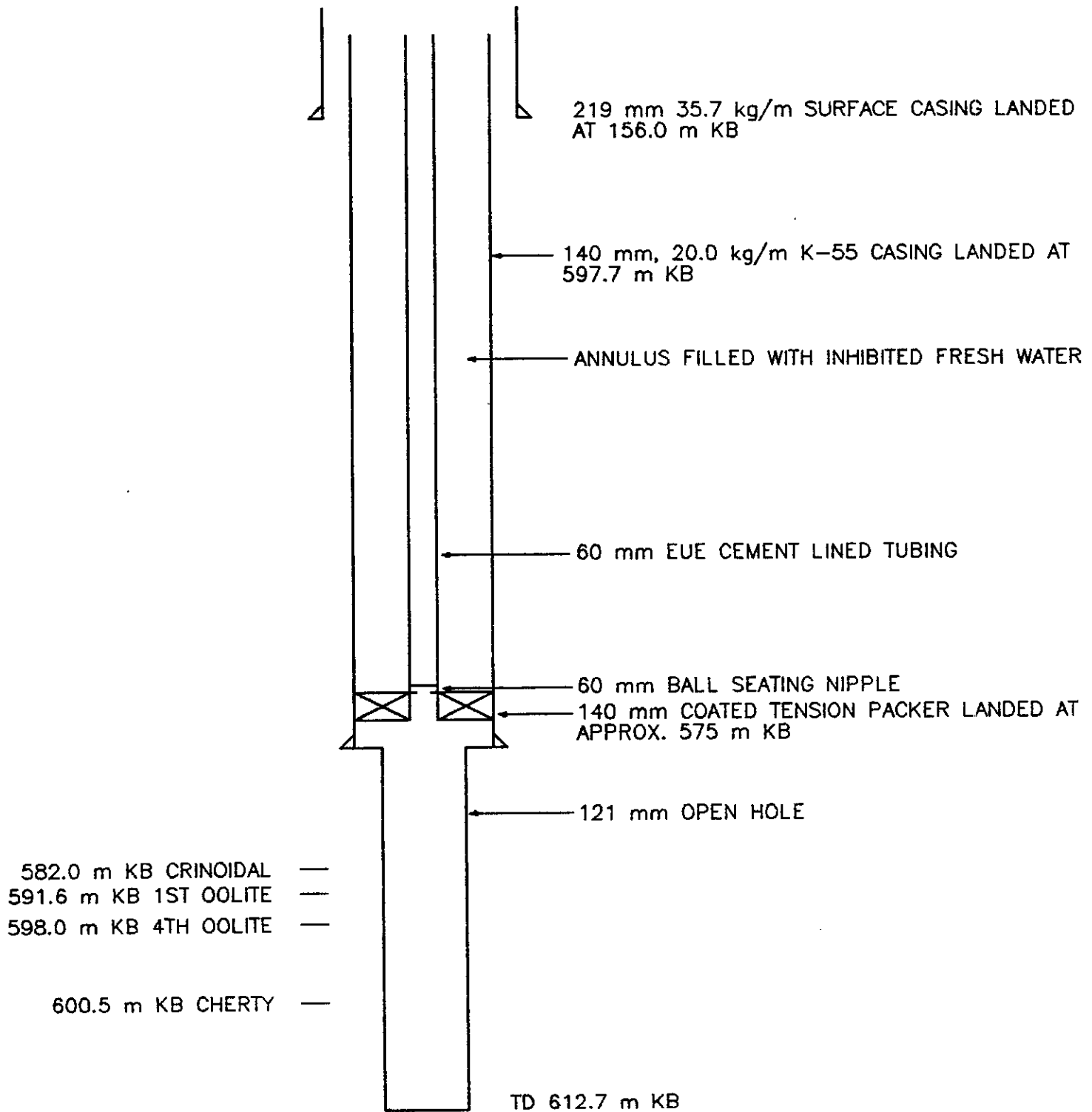


FIGURE 3

1985-12-11

PROPOSED DOWNHOLE COMPLETION SCHEMATIC  
CHEVRON VIRDEN 16C-22-11-26WPM

KB ELEVATION 456.6 m





## APPENDIX

### Performance of the 16C-22-11-26 Area

The proposed conversion candidate Well 16C-22 was drilled in 1978 to recover oil from an unswept corridor in the Scallion Unit. This corridor contains nine wells drilled on 8 ha spacing.

The production history of the 5 spot pattern around 16C-22 is shown on Figure A1. Current recovery from this 5 spot pattern is estimated at 20% of OOIP. Recovery from adjacent 9 spot patterns, centered on Injectors 10-22 and 8-27 is 36 and 30%, respectively. Recovery from the whole Scallion Unit is 26% of OOIP. Projected ultimate recovery is 41%, assuming a terminal WOR of 30 (see Figures A2 and A3). (Figure A2 is based on the Buckley - Leverett recovery formula.)<sup>1</sup> This data indicates that oil recovery from the 16C-22 area is not in line with the recovery from adjacent areas of the Unit. The lower recovery could be due to a lack of water injection and/or poor sweep efficiency. Figure A1 shows that Well 16C-22 provided some flush production but the current production decline is the same as the decline before 16C-22 was drilled.

Also, Figure 2 shows that production at 16C-22 has declined from a maximum of 10 m<sup>3</sup>/d with a 70% water cut to 2 m<sup>3</sup>/d with a 70% water cut. This declining production indicates that Well 16C-22 is not receiving effective pressure support from the adjacent nine-spot injectors.

A review of the Daly Lodgepole "A" Pool Waterflood performance indicates that reducing well spacing from 16 to 8 ha will result in incremental oil recovery of 4 to 9% of OOIP. As the Scallion Unit is also in the Lodgepole "A" Pool, similar results from reduced well spacing would be expected in this area. Results from the 16C-22 conversion will be used to evaluate 8 ha well spacing for all of the NVSU No. 1.

---

1. Ershaghi I., Omoregie O. "A Method For Extrapolation of Cut Versus Recovery Curves" JPT 1978-02, P. 203.

Geologic cross-sections for the area are shown on Figures A4 and A5. These cross-sections show the lateral heterogeneity of the Lodgepole Formation. The wells drilled on 16 ha spacing (15-22, 16-22, 1-27, and 2-27) show the Cherty pay zone to have good vertical and lateral continuity, with only one break in the net pay. Conversely, well data from the 16C-22 Well shows poorer vertical continuity. Consequently, the lateral continuity between wells might not be as good as shown by the 16 ha spacing well data. Better continuity between injectors and producers, as will be achieved by reduced well spacing, will make the waterflood more efficient by improving the sweep efficiency.

In summary the proposed injector is in an area of lower oil recovery in the North Virden Scallion Unit No. 1. Water injection at 16C-22 will improve the oil recovery in this area by increasing the waterflood efficiency.

FIGURE A1  
 15-22, 16-22, A16-22, 1-27, 2-27-11-26 W1  
 VIRDEN SCALLION  
 PRODUCTION PLOT  
 SUMMARY

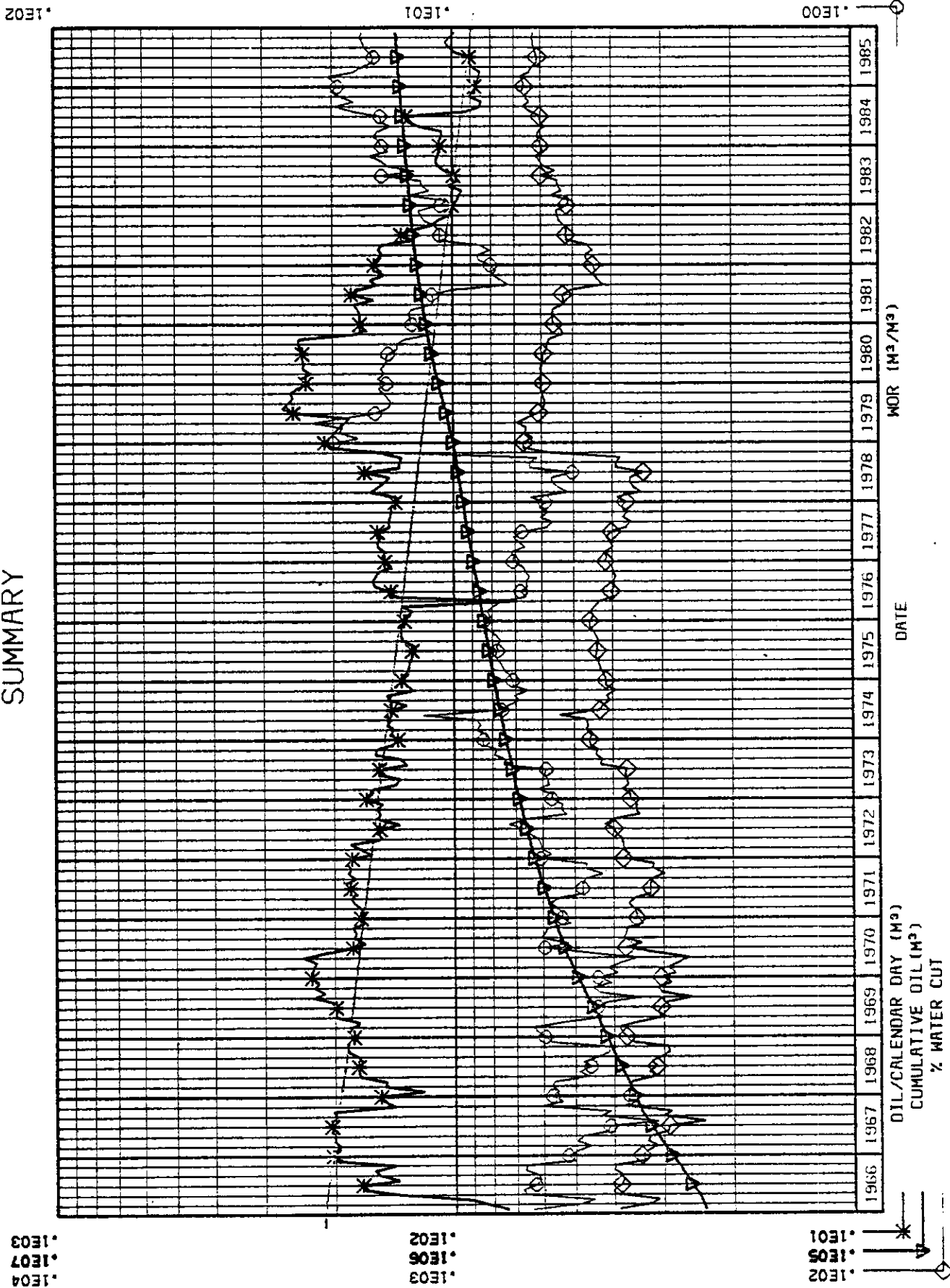


FIGURE A2

# NORTH VIRDEN SCALLION UNIT NO. 1

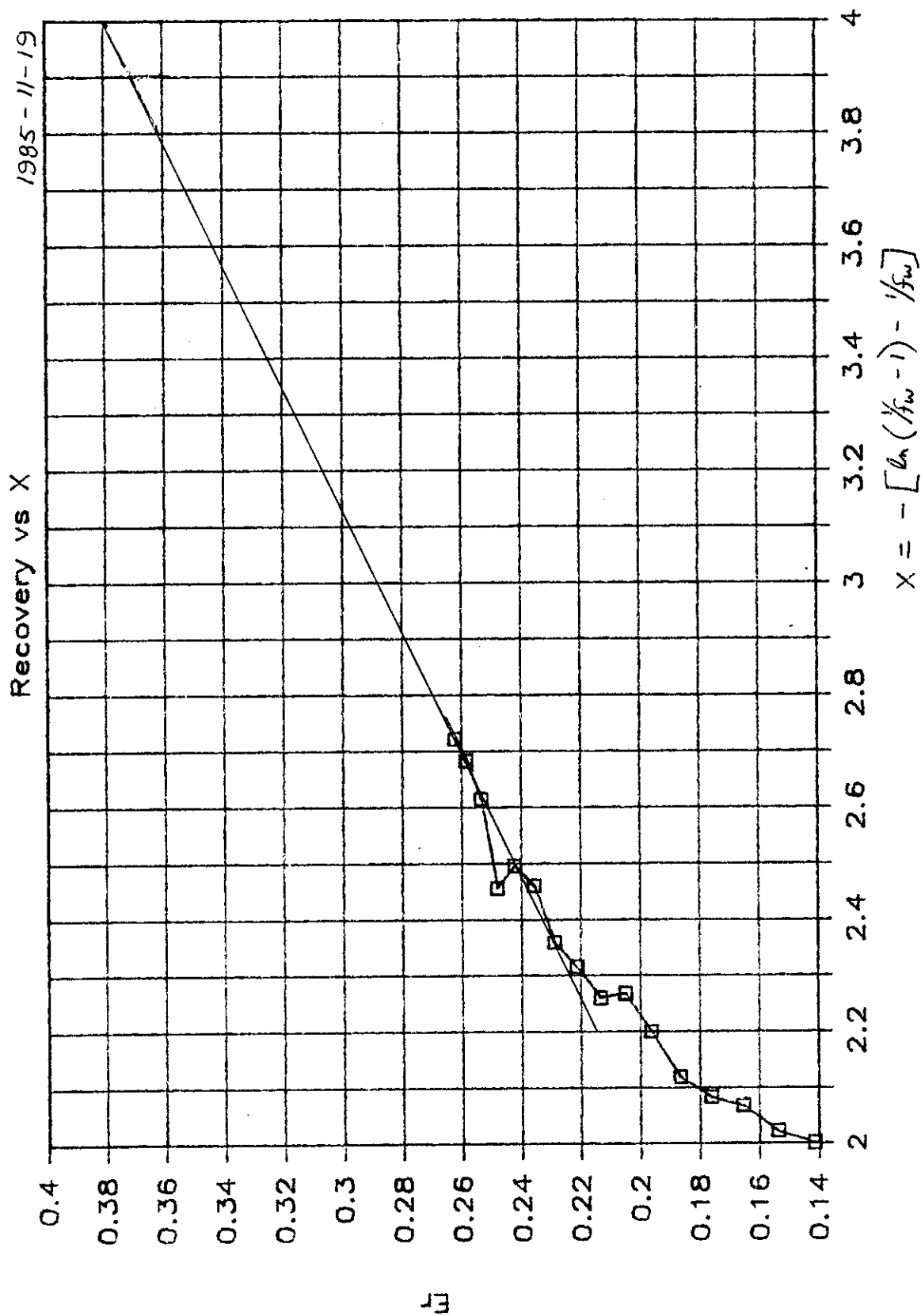
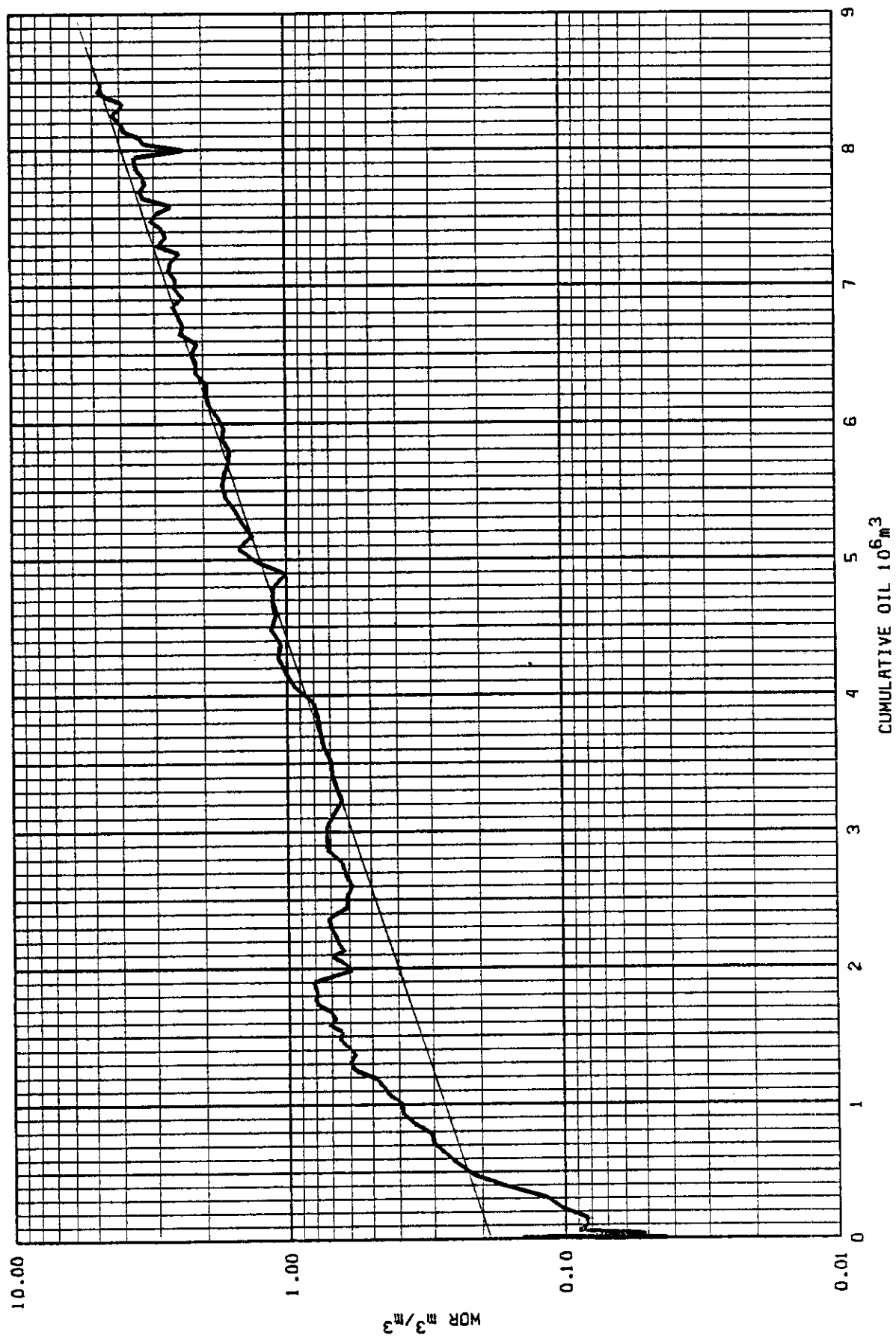


FIGURE A3  
NORTH VIRDEN  
SCALLION UNIT NO. 1





## Action / Route Slip

Date March 11 / 86

To Marc

From: Bob

*last PM 37*

*in favour of new PM50.*

Telephone:

*which accounts PM in N/S U/H/area.*

- |   |   |  |   |  |
|---|---|--|---|--|
| <input checked="" type="checkbox"/> Take Action | <input type="checkbox"/> Per Your Request     | <input type="checkbox"/> Circulate, Initial and Return     | <input type="checkbox"/> For Approval and Signature | <input type="checkbox"/> Make _____ Copies |
| <input type="checkbox"/> May We Discuss         | <input type="checkbox"/> For Your Information | <input type="checkbox"/> Return With Comments or Revisions | <input type="checkbox"/> Draft Reply for Signature  | <input type="checkbox"/> Please File       |

Comments: Please process

- as this is a pilot situation - what monitoring will be put in place to evaluate
- 126(1) - P - has surface owner been notified
- if yes advertisement probably not necessary as it is within the Unit and removed from the Unit boundary.
- Does reservoir pressure data support the need for more injection

(over)

126e) \* surface facilities - what plant tied to  
→ how water measured (need schematic)

(f) → corrosion control

(f) - injection pressure and control

- write def. letter & memo to Bd

Daily Wedge pole A Pool

84-2P

oil case  
104-9-1-11-20

Harmsworth

NORTH VIRDEN SCALLION UNIT No. 1  
UNIT BOUNDARY

INTER-CITY GAS

UNIT

## BOUNDARY

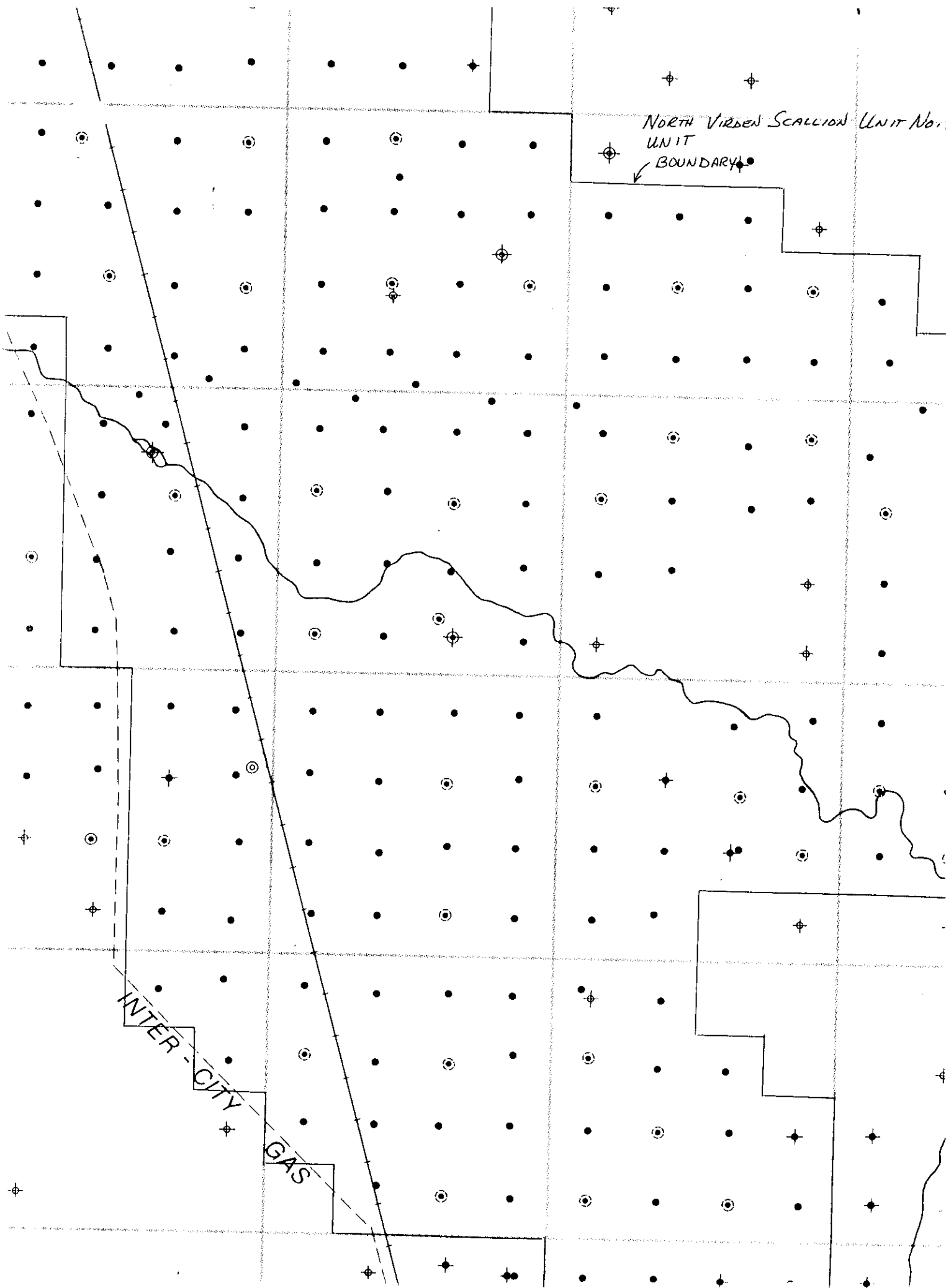
INTER-CITY

**GAS**



NORTH VIRGEN SCALLION UNIT No. 1  
UNIT  
BOUNDARY

INTER-CITY  
GAS



## Fracture Considerations :

Depth = 2000' = 610 meters.

Effective Overburden Pressure Gradient = 0.95 psi/ft (fig. 1.17-Hydrologic Fracturing/H/F)

Hydrostatic head = 0.433 psi/ft.

Allowable WHP (ignoring friction)

$$= 2000(0.95 - 0.433) = 1034 \text{ psi}$$

$$= 7135 \text{ kPa}$$

recommend limit of 7000 kPa, if do not want to fracture.

IMPERIAL:

403 ~~299-3737~~

252059



**Chevron Canada Resources Limited**  
500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7

K.E. Godard  
Chief Engineer

1986-03-03

Lodgepole "A" Pool  
North Virden Scallion Unit No. 1  
Application for Approval to Convert  
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to Water Injection Service

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309 Legislative Building  
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R3C 0V8

Attention: Mr. C. S. Kang, Chairman

Gentlemen:


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2. The proposed injector 16C-22 is identified on the NVSU No. 1 map which is attached as Figure 1. The proposed conversion will form a five-spot pattern with 8 ha well spacing.
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Any questions regarding this application should be directed to Doug Schierman at (403)234-5150 at the letterhead address. Requests for additional copies should be directed to our Information Centre.

Sincerely,

  
for C. G. FOLDEN, P.Eng.  
Supervising Engineer  
Reservoir Engineering

DS/lgs  
Attach.

FIGURE 1

PROPOSED INJECTOR  
16C-22-11-26

SCALLION Mississippi Pay  
CI: 100 0.4 1 ft

Oh Map Twp 11 R 26 W 1

500' est. from top of sandstone outcrop  
(760) est. pit to c/w about 1 mi  
200' est. from top of sandstone outcrop  
(400) est. pit to c/w contact  
100' est. from core description  
average of 17.196388

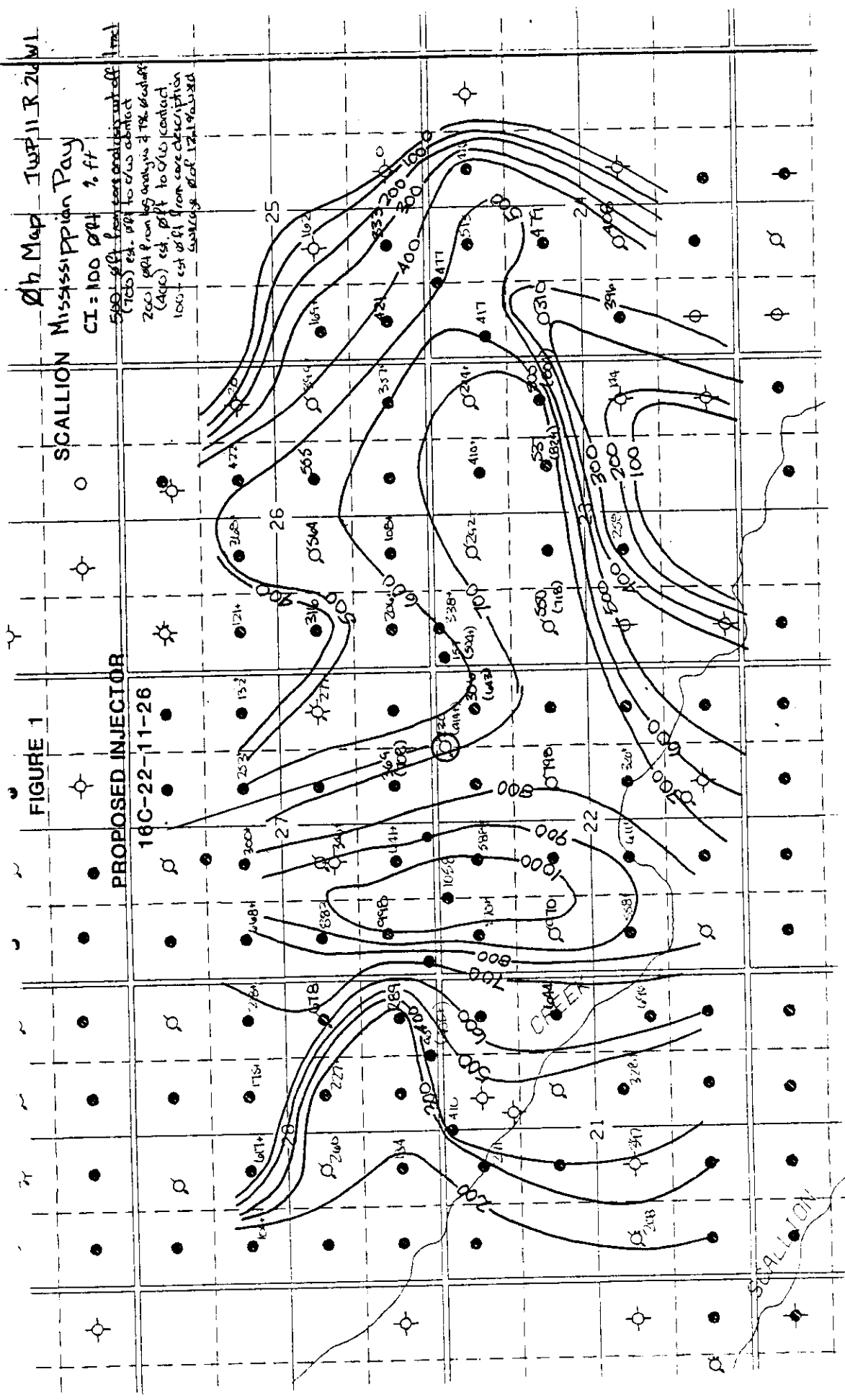


FIGURE 2  
VIRDEN SCALLION  
PRODUCTION PLOT  
A 16-22-011-26W1

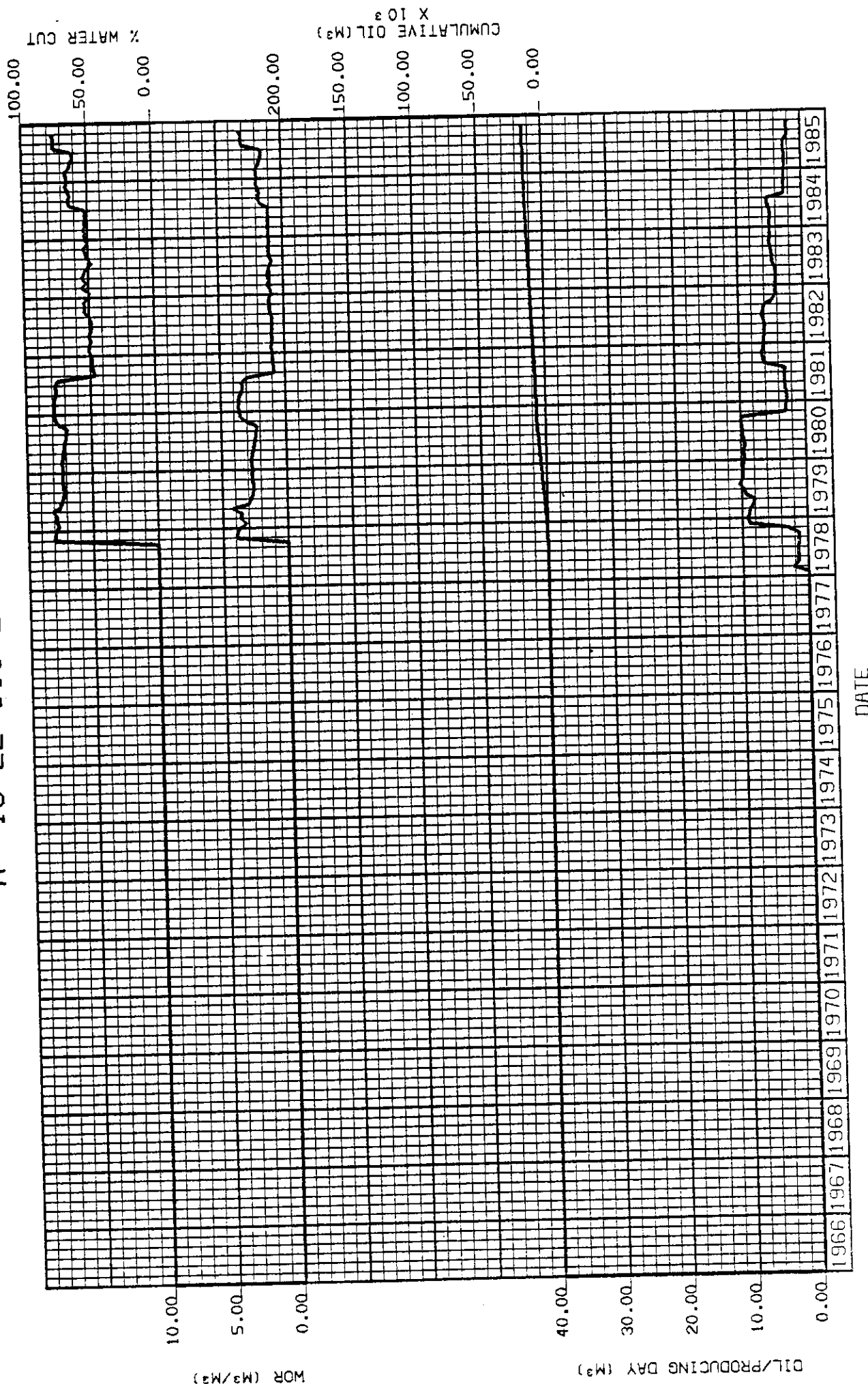
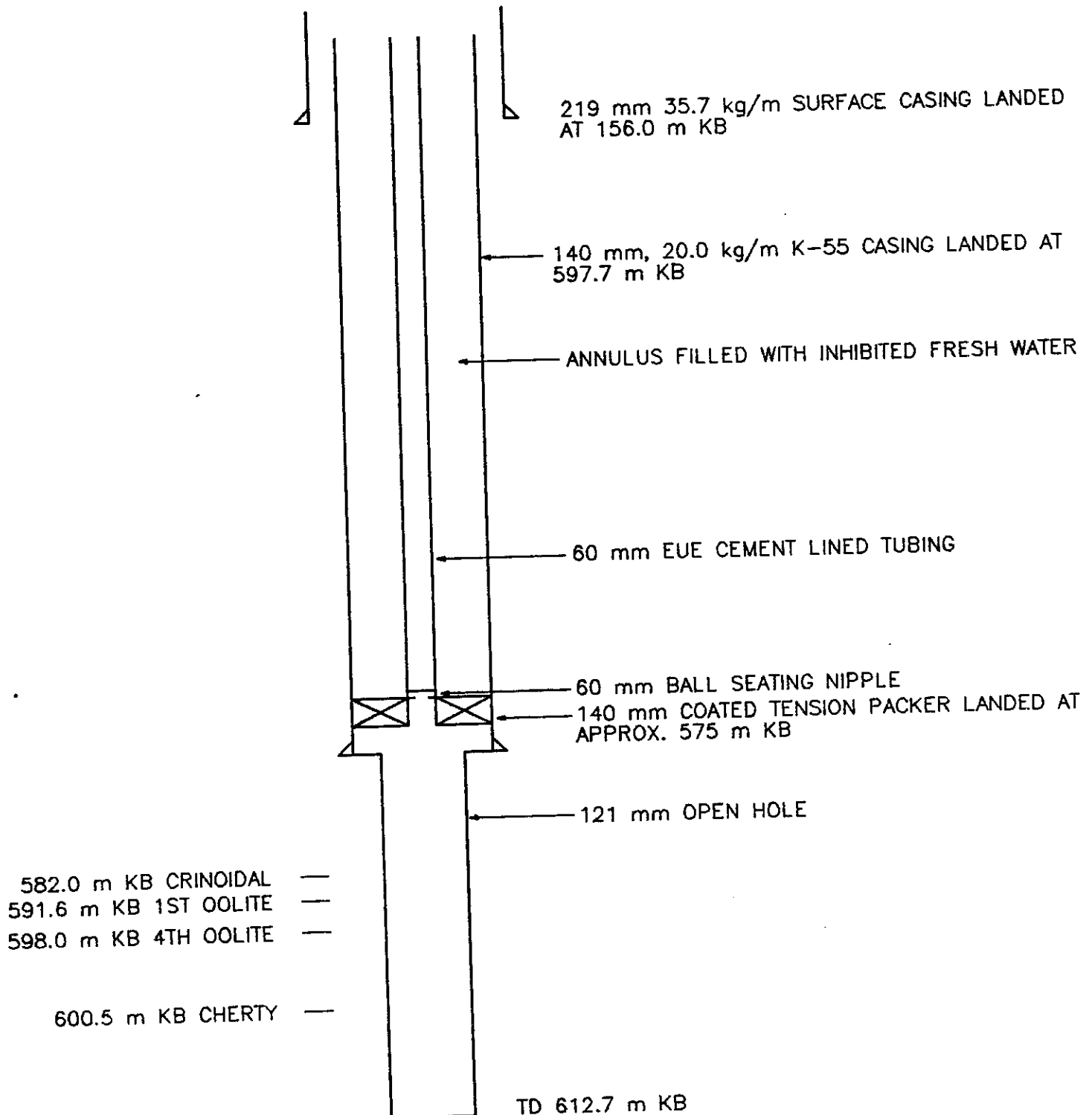


FIGURE 3

1985-12-11

PROPOSED DOWNHOLE COMPLETION SCHEMATIC  
CHEVRON VIRDEN 16C-22-11-26WPM

KB ELEVATION 456.6 m



## APPENDIX

### Performance of the 16C-22-11-26 Area

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---

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In summary the proposed injector is in an area of lower oil recovery in the North Virden Scallion Unit No. 1. Water injection at 16C-22 will improve the oil recovery in this area by increasing the waterflood efficiency.

FIGURE A1  
 15-22, 16-22, A16-22, 1-27, 2-27-11-26 W1  
 VIRDEN SCALLION  
 PRODUCTION PLOT  
 SUMMARY

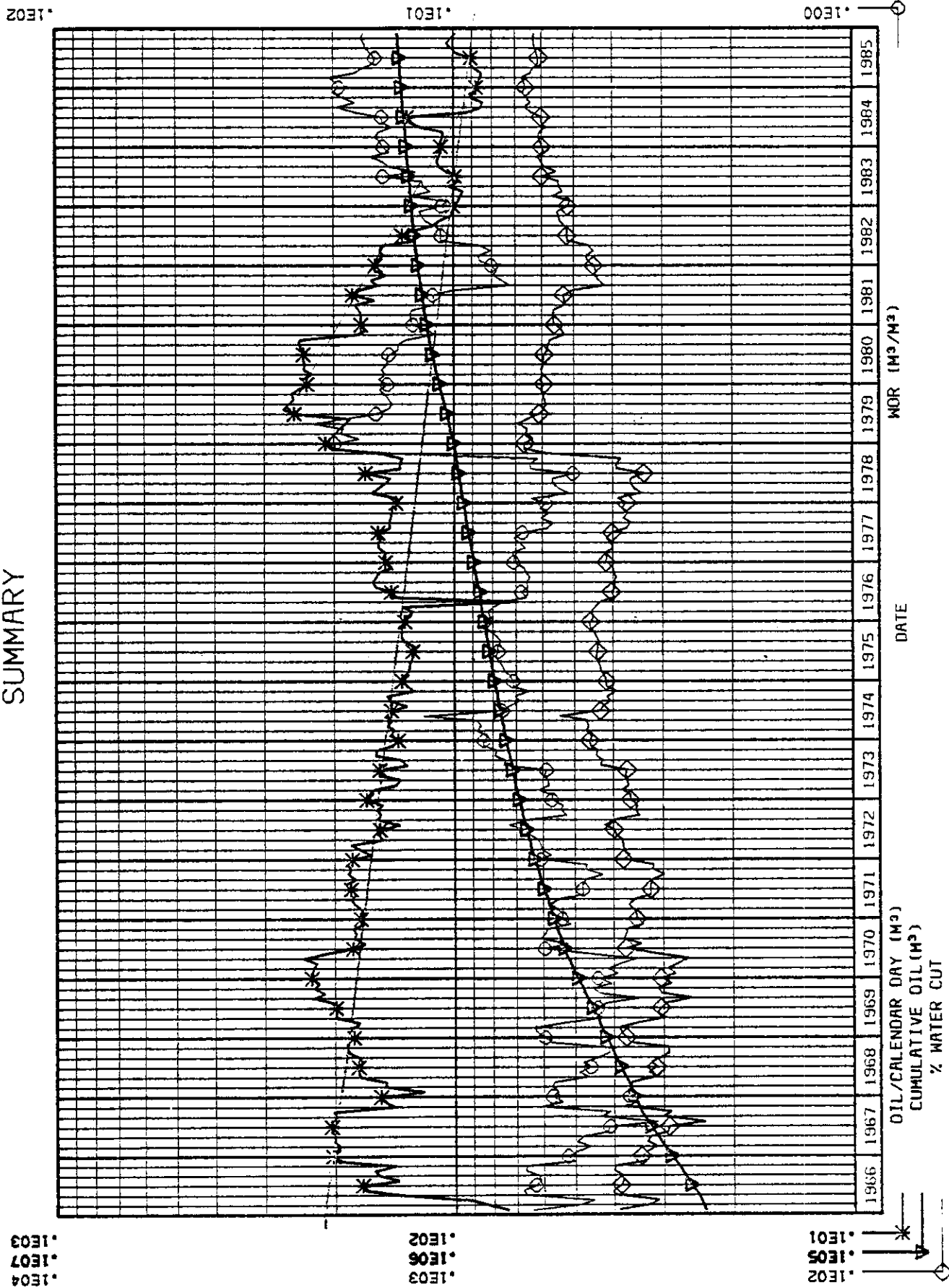


FIGURE A2

# NORTH VIRDEN SCALLION UNIT NO. 1

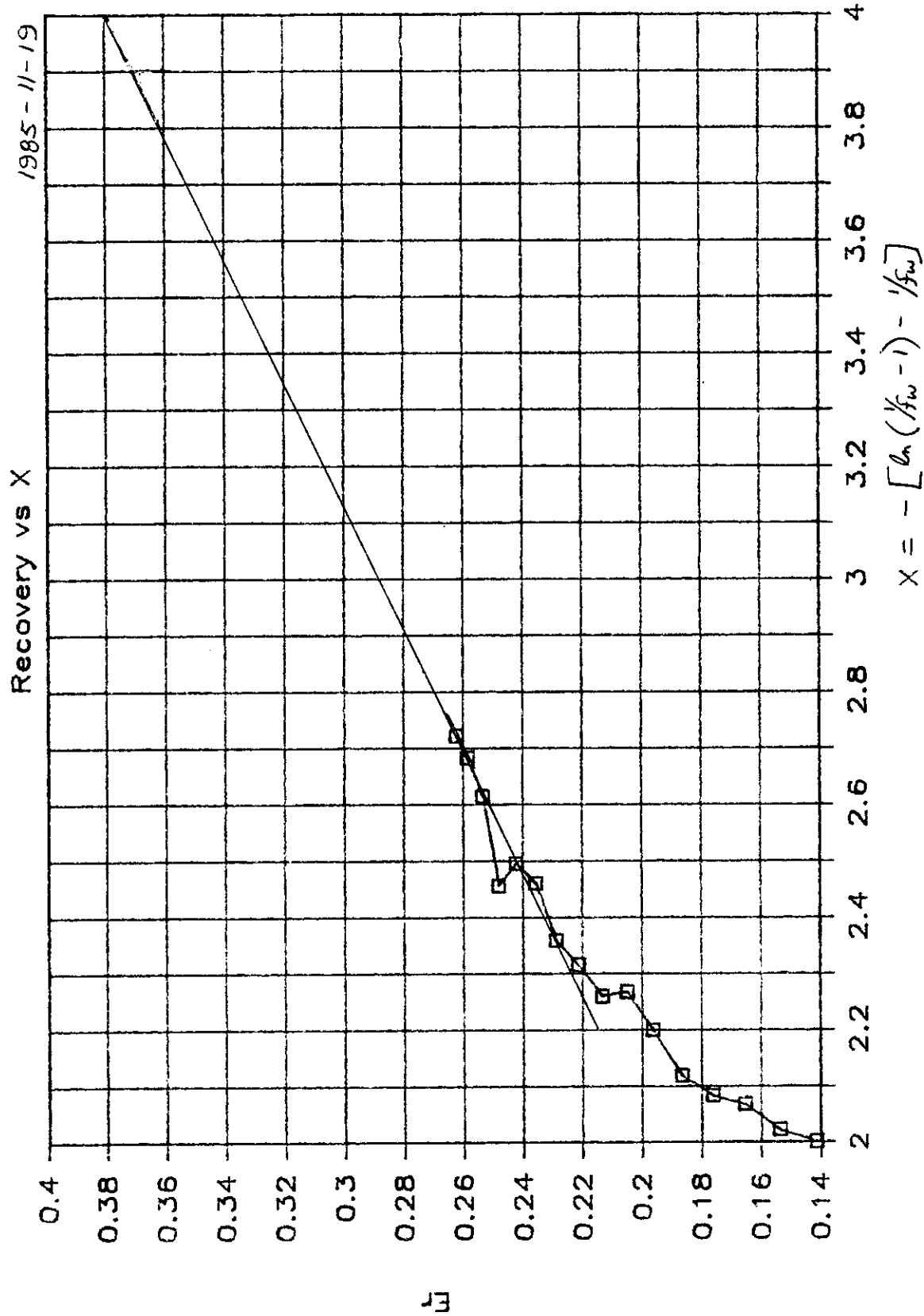
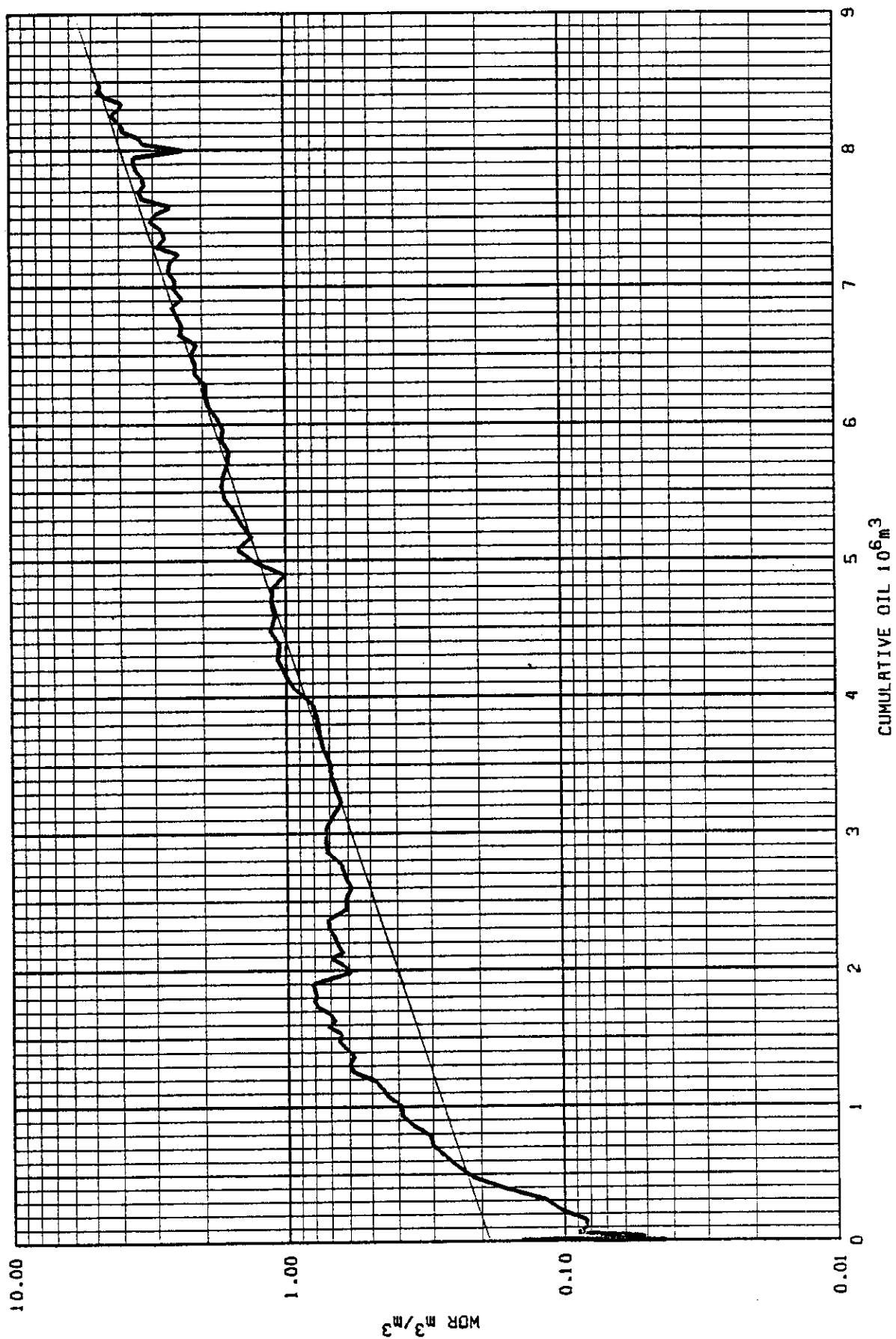


FIGURE A3  
NORTH VIRIDEN  
SCALLION UNIT NO. 1



Manitoba Regulation /86

Being

The Oil and Natural Gas Conservation Board

Order No. PM 51

An Order Pertaining to Pressure Maintenance by Water Flooding  
Virden Lodgepole 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, Chevron Canada Resources Limited is the Unit Operator of the North Virden Scallion Unit No. 1 (the "Unit Area").

AND WHEREAS, Manitoba Revised Regulation M160-R8P and Board Order No. PM 37 authorizes pressure maintenance operations in the Unit Area.

AND WHEREAS, the Board received an application dated March 10, 1986 from the Unit Operator for approval to convert the well Chevron Virden 16C-22-11-26 (WPM) to a water injection well.

NOW THEREFORE, the Board orders that:

1. Section 1 and Schedule A of Manitoba Revised Regulation M160-R8P are repealed.

2. Sections 2, 3 and 13 of Board Order PM No. 37 (Manitoba Regulation 104/80) are repealed.
3. The Unit Operator shall conduct pressure maintenance operations by the injection of water into the pool underlying the Unit Area.
4. The pressure maintenance operation shall be in accordance with, and subject to, the following rules:

PRESSURE MAINTENANCE RULES

- 1(1) Water shall be injected into the pool through the wells:

Chevron Scallion WIW 2-10-11-26 (WPM)  
Chevron Scallion WIW 10-10-11-26 (WPM)  
Chevron Scallion WIW 12-10-11-26 (WPM)  
Chevron Scallion Prov. WIW 2-11-11-26 (WPM)  
Chevron Scallion Prov. WIW 4-11-11-26 (WPM)  
Chevron Scallion Prov. WIW 6-11-11-26 (WPM)  
Chevron Scallion Prov. WIW 12-11-11-26 (WPM)  
Chevron Scallion WIW 6-13-11-26 (WPM)  
Chevron Scallion WIW 10-13-11-26 (WPM)  
Chevron Scallion WIW 12-13-11-26 (WPM)  
Chevron Scallion WIW 14-13-11-26 (WPM)  
Dome Cdn. Sup. Scallion WIW 8-14-11-26 (WPM)  
Cdn. Res. et al Scallion WIW 10-14-11-26 (WPM)  
Sun G. Braybrook Scallion WIW 12-14-11-26 (WPM)  
Chevron Scallion WIW 2-15-11-26 (WPM)  
Chevron Scallion WIW 10-15-11-26 (WPM)  
Cdn.-Sup. Veldhouse Scallion WIW 7-16-11-26 (WPM)  
Shell Moir South Scallion WIW 10-21-11-26 (WPM)  
Chevron Virden WIW A2-22-11-26 (WPM)  
Chevron Scallion WIW 4-22-11-26 (WPM)  
Sun T. L. Tapp Scallion WIW 10-22-11-26 (WPM)  
Chevron Scallion WIW 12-22-11-26 (WPM)  
Chevron Virden WIW 16C-22-11-26 (WPM)  
Chevron Scallion WIW 12-23-11-26 (WPM)  
Chevron Scallion WIW 14-23-11-26 (WPM)  
Chevron Scallion WIW 16-23-11-26 (WPM)  
Dome Cdn. Sup. Scallion WIW 6-24-11-26 (WPM)  
Chevron Scallion Prov. WIW 12-24-11-26 (WPM)  
Sun P. J. Tapp Scallion WIW 6-26-11-26 (WPM)  
Cdn. Res. et al Scallion WIW 8-26-11-26 (WPM)  
Chevron Scallion WIW 6-27-11-26  
Sun W. C. Tapp Scallion WIW 8-27-11-26 (WPM)  
Chevron Scallion WIW 14-27-11-26

Gulf Union Tapp Scallion WIW 6-28-11-26 (WPM)  
 Cdn.-Sup. Whiteford Scallion WIW 8-28-11-26 (WPM)  
 Gulf Union Tapp Scallion WIW 14-28-11-26 (WPM)  
 Cdn.-Sup. Whiteford Scallion WIW 16-28-11-26 (WPM)  
 Shell Moir North Scallion WIW 6-33-11-26 (WPM)  
 Chevron Scallion WIW 8-33-11-26 (WPM)  
 Shell Moir North Scallion WIW 14-33-11-26 (WPM)  
 Vallat et al Scallion WIW 16-33-11-26 (WPM)  
 Cdn. Res. et al Scallion WIW 6-34-11-26 (WPM)  
 Dome Scallion WIW 4-3-12-26 (WPM)  
 Dome Cdn. Sup. Scallion WIW 2-4-12-26 (WPM)  
 Chevron North Scallion WIW 4-4-12-26 (WPM)  
 Chevron North Scallion WIW 6-4-12-26 (WPM)  
 Chevron North Scallion WIW 10-4-12-26 (WPM)  
 Chevron Virden WIW A12-4-12-26 (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, approve the suspension of water 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 completion of the wells referred to in subclause (1) will be as prescribed by the Director of the Petroleum Branch.
2. The Unit Operator, upon the the request of the Board, shall satisfy the Board as to the source, suitability and method of treatment of the water to be injected.
- 3(1) At least once every three years commencing in 1981, 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.
  - (2) The Unit Operator shall submit the details of the surveys described in subclause (1) 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.
- (3) The Board may, at any time, require the Unit Operator to carry out such additional reservoir pressure surveys as it deems necessary.
4. The Unit Operator shall immediately report to the Board any indication of channelling 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.
5. The maximum wellhead pressure at which water is injected into the wells referred to in subclause (1) of clause 1 hereof shall not exceed 8 000 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 water shall be injected into any well in the Unit Area.
- 6(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 water injected during the preceding month into each well referred to in clause 1 hereof.
- (2) 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 any production tests conducted 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.
7. 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 waterflood.



OIL AND NATURAL GAS ORDER NO. PM 51,  
MADE AND PASSED THIS 30th DAY OF  
July 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

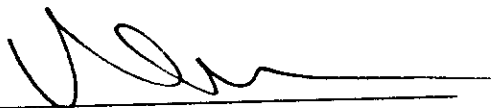


Wm. McDonald, Deputy Chairman  
The Oil and Natural Gas  
Conservation Board



B. Ball, Member  
The Oil and Natural Gas  
Conservation Board

Approved:




Vic Schroeder, Minister  
Department of Energy and Mines

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

I, Paul E. Jarvis, Chairman of The Oil and Natural Gas Conservation Board, of Manitoba, hereby certify that the attached Regulation is the original Order:—

- (a) entitled The Oil and Natural Gas Conservation Board Order No. PM 37;
- (b) made pursuant to "The Mines Act";
- (c) made by The Oil and Natural Gas Conservation Board, of Manitoba;
- (d) under date of the 20th day of June A. D., 1980;
- (e) which Regulation comes into force on the date of filing with the Registrar of Regulations.

  
\_\_\_\_\_  
Paul E. Jarvis,  
Chairman,  
The Oil and Natural Gas  
Conservation Board.

Manitoba Regulation 104/80

Being

THE OIL AND NATURAL GAS CONSERVATION BOARD

ORDER NO. PM 37

An Order Pertaining to Pressure Maintenance by Water Flooding

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:

1. Sections 2, 8 and 9 of Manitoba Revised Regulation M160 - R8P are repealed.
2. Subsection 1(1) of Schedule A of the regulation is repealed and the following subsection is substituted therefor:

1(1) Water shall be injected to the Lodgepole Formation of the Mississippian Age in the wells

Chevron Scallion WIW 2-10-11-26  
Chevron Scallion WIW 10-10-11-26  
Chevron Scallion WIW 12-10-11-26  
Chevron Scallion Prov. WIW 2-11-11-26  
Chevron Scallion Prov. WIW 4-11-11-26  
Chevron Scallion Prov. WIW 6-11-11-26  
Chevron Scallion Prov. WIW 12-11-11-26  
Chevron Scallion WIW 6-13-11-26  
Chevron Scallion WIW 10-13-11-26  
Chevron Scallion WIW 12-13-11-26  
Chevron Scallion WIW 14-13-11-26  
Dome Cdn. Sup. Scallion WIW 8-14-11-26  
Cdn. Res. et al Scallion WIW 10-14-11-26  
Sun G. Braybrook Scallion WIW 12-14-11-26  
Chevron Scallion WIW 2-15-11-26  
Chevron Scallion WIW 10-15-11-26  
Cdn.-Sup. Veldhouse Scallion WIW 7-16-11-26  
Shall Moir South Scallion WIW 10-21-11-26  
Chevron Scallion WIW 2A-22-11-26  
Chevron Scallion WIW 4-22-11-26  
Sun T.L. Tapp Scallion WIW 10-22-11-26  
Chevron Scallion WIW 12-22-11-26  
Chevron Scallion WIW 12-23-11-26  
Chevron Scallion WIW 14-23-11-26  
Chevron Scallion WIW 16-23-11-26  
Dome Cdn. Sup. Scallion WIW 6-24-11-26  
Chevron Scallion Prov. WIW 12-24-11-26  
Sun P.J. Tapp Scallion WIW 6-26-11-26

Cdn. Res. et al Scallion WIW 8-26-11-26  
Chevron Scallion WIW 6-27-11-26  
Sun W. C. Tapp Scallion WIW 8-27-11-26  
Chevron Scallion WIW 14-27-11-26  
Gulf Union Tapp Scallion WIW 6-28-11-26  
Cdn.-Sup. Whiteford Scallion WIW 8-28-11-26  
Gulf Union Tapp Scallion WIW 14-28-11-26  
Cdn.-Sup. Whiteford Scallion WIW 16-28-11-26  
Shell Moir North Scallion WIW 6-33-11-26  
Chevron Scallion WIW 8-33-11-26  
Shell Moir North Scallion WIW 14-33-11-26  
Vallat et al Scallion WIW 16-33-11-26  
Cdn. Res. et al Scallion WIW 6-34-11-26  
Dome Scallion WIW 4-3-12-26  
Dome Cdn. Sup. Scallion WIW 2-4-12-26  
Chevron North Scallion WIW 4-4-12-26  
Chevron North Scallion WIW 6-4-12-26  
Vallat Scallion WIW 10-4-12-26  
Chevron North Scallion WIW 12A-4-12-26

and, from time to time, in such other wells as the board may direct, or, upon application of the unit operator, may approve.

3. Rule 5 of the Pressure Maintenance Rules as set out in Schedule A of the regulation is repealed and the following rule is substituted therefor:

5(1) At least once every three years commencing in 1981, 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.

5(2) The unit operator shall submit the details of the pressure survey program to the Director of the Petroleum Branch including the wells to be surveyed, the measurement techniques to be used and the intended shut-in periods for each well, and shall first obtain approval of the program from the Director before it is carried out.

5(3) After receiving approval of the pressure survey program and after the program is carried out the unit operator shall submit a report thereon to the Director which shall include

(a) the pressure data obtained from the program;

(b) an isobaric map of the reservoir or unit based on the data obtained; and

(c) an analysis of the survey results and pressure distribution in the reservoir.

4. Schedule B of the regulation is repealed.
5. Subsection 1(1) of Schedule C of the regulation is repealed and the following subsection is substituted therefor:

1(1) Water shall be injected to the Virden and Scallion Members of the Lodgepole Formation of the Mississippian Age in the wells

Chevron Virden WIW 9-20-10-25  
Sun M. Welch Virden WIW 13-20-10-25  
Chevron Virden WIW 15-20-10-25  
Chevron Virden WIW 11-21-10-25  
Chevron Virden WIW 13-21-10-25  
Chevron East Virden Prov. WIW 5-28-10-25  
Chevron East Virden Prov. WIW 5-29-10-25  
Chevron East Virden Prov. WIW 7A-29-10-25  
Placer Virden WIW 5-30-10-25  
Placer Virden WIW 7-30-10-25  
Teck Hapburn Virden WIW 15-23-10-26  
Chevron Virden WIW 13-24-10-26  
Chevron Virden WIW 15-24-10-26  
Chevron Virden WIW 5-25-10-26  
Chevron Virden CPR WIW 7-25-10-26  
Chevron Virden WIW 11-25-10-26  
Chevron Virden WIW 13-25-10-26  
Chevron Virden CPR WIW 15-25-10-26  
Chevron Virden WIW 3-26-10-26

and, from time to time, in such other wells as the board may direct, or, upon application of the unit operator, may approve.

6. Rule 5 of the Pressure Maintenance Rules as set out in Schedule C of the regulation is repealed and the following rule is substituted therefor:

5(1) At least once every three years commencing in 1981, 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.

5(2) The unit operator shall submit the details of the pressure survey program to the Director of the Petroleum Branch including the wells to be surveyed, the measurement techniques to be used and the intended shut-in periods for each well, and shall first obtain approval of the program from the Director before it is carried out.

5(3) After receiving approval of the pressure survey program and after the program is carried out the unit operator shall submit a report thereon to the Director which shall include

- (a) the pressure data obtained from the program;
- (b) an isobaric map of the reservoir or unit based on the data obtained; and
- (c) an analysis of the survey results and pressure distribution in the reservoir.

7. Subsection 1(1) of Schedule D of the regulation is repealed and the following subsection is substituted therefor:

1(1) Water shall be injected to the Virden and Scallion Member of the Lodgepole Formation of the Mississippian Age in the wells

Continental Virden WIW 12-31-10-25  
Chevron Virden Prov. WIW 10-36-10-26  
Chevron Virden WIW 4-5-11-25  
Chevron Virden WIW 10-5-11-25  
Chevron Virden Prov. WIW 12-5-11-25  
Chevron Virden Prov. WIW 14-5-11-25  
Chevron Virden Prov. WIW 2-6-11-25  
Chevron Virden Prov. WIW 8-6-11-25  
Chevron Virden Prov. WIW 10-6-11-25  
Chevron Virden Prov. WIW 12-6-11-25  
Chevron Virden Prov. WIW 14-6-11-25  
Chevron Virden Prov. WIW 16-6-11-25  
Murphy Virden WIW 2-7-11-25  
Murphy Virden WIW 4-7-11-25  
Chevron Virden WIW 4-8-11-25

and, from time to time, in such other wells as the board may direct, or, upon application of the unit operator, may approve.

8. Rule 5 of the Pressure Maintenance Rules as set out in Schedule D of the regulation is repealed and the following rule is substituted therefor:

5(1) At least once every three years commencing in 1981, 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.

5(2) The unit operator shall submit the details of the pressure survey program to the Director of the Petroleum Branch including the wells to be surveyed, the measurement techniques to be used and the intended shut-in periods for each well, and shall first obtain approval of the program from the Director before it is carried out.

5(3) After receiving approval of the pressure survey program and after the program is carried out the unit operator shall submit a report thereon to the Director which shall include

- (a) the pressure data obtained from the program;
- (b) an isobaric map of the reservoir or unit based on the data obtained; and
- (c) an analysis of the survey results and pressure distribution in the reservoir.

9. Subsection 1(1) of Schedule E of the regulation is repealed and the following subsection is substituted therefor:

1(1) Water shall be injected to the Virden and Scallion Members of the Lodgepole Formation of the Mississippian Age in the wells

Chevron South Virden CPR WIW 10-7-10-25  
Chevron South Virden CPR WIW 12-7-10-25  
Chevron South Virden CPR WIW 14-7-10-25  
Chevron East Virden Prov. WIW 2A-18-10-25  
Sun I. Welch Virden WIW 4-18-10-25  
Chevron South Virden CPR WIW 6-1-10-26  
Chevron South Virden CPR WIW 14-1-10-26  
Chevron South Virden Prov. WIW 8-2-10-26  
Chevron South Virden WIW 14-2-10-26  
Mineraloid Virden WIW 16-2-10-26  
Chevron South Virden WIW 16-3-10-26  
Gulf Duncan Virden WIW 6-10-10-26  
Chevron South Virden Prov. WIW 8-10-10-26  
Chevron South Virden Prov. WIW 6-11-10-26  
Chevron South Virden Prov. WIW 8-11-10-26  
Chevron South Virden Prov. WIW 12-11-10-26  
Chevron South Virden Prov. WIW 14-11-10-26  
Chevron South Virden Prov. WIW 16-11-10-26  
Chevron South Virden WIW 6-12-10-26  
Chevron South Virden WIW 14-12-10-26  
Placer Virden WIW 6-13-10-26  
Gulf Union Welch Virden WIW 9-13-10-26  
Mineraloid Virden WIW 14-13-10-26  
Rundle Williams Virden WIW 4-14-10-26  
Rundle Williams Virden WIW 11-14-10-26  
Murphy Virden WIW 1-23-10-26  
Esso Virden WIW 3-23-10-26

and, from time to time, in such other wells as the board may direct, or, upon application of the unit operator, may approve.

10. Rule 5 of the Pressure Maintenance Rules as set out in Schedule E of the regulation is repealed and the following rule is substituted therefor:

5(1) At least once every three years commencing in 1981, 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.

5(2) The unit operator shall submit the details of the pressure survey program to the Director of the Petroleum Branch including the wells to be surveyed, the measurement techniques to be used and the intended shut-in periods for each well, and shall first obtain approval of the program from the Director before it is carried out.

5(3) After receiving approval of the pressure survey program and after the program is carried out the unit operator shall submit a report thereon to the Director which shall include

- (a) the pressure data obtained from the program;
- (b) an isobaric map of the reservoir or unit based on the data obtained; and
- (c) an analysis of the survey results and pressure distribution in the reservoir.

11. Subsection 1(1) of Schedule G of the regulation is repealed and the following subsection is substituted therefor:

1(1) Water shall be injected to the Whitewater Members of the Lodgepole Formation of the Mississippian Age in the wells

Chevron Whitewater WIW 13-16-3-21  
Chevron Whitewater WIW 9-17-3-21

and, from time to time, in such other wells as the board may direct, or, upon application of the unit operator, may approve.

12. Schedules A, C, D, E, F and G of the regulation are further amended by striking out the word "Mines" in Rule 7 thereof and substituting therefor the word "Petroleum".
13. Schedule A of the regulation is further amended by striking out the word "Mines" in Rule 8(1) thereof and substituting therefor the word "Petroleum".



14. Schedules H and I of the regulation are repealed.
15. Order Nos. PM 22, 25, 26 and 27 of The Oil and Natural Gas Conservation Board and filed as Manitoba Regulations 206/73, 151/74, 154/74 and 155/74 respectively, are repealed.

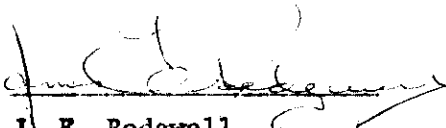
Oil and Natural Gas Order No. PM 37  
made and passed this 20 day of  
JUNE A.D., 1980 at the City  
of Winnipeg, in the Province of  
Manitoba, by The Oil and Natural  
Gas Conservation Board.



Paul E. Jarvis,  
Chairman,  
The Oil and Natural Gas  
Conservation Board.



Dr. Ian Haugh,  
Deputy Chairman,  
The Oil and Natural Gas  
Conservation Board.



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

APPROVED:



Donald W. Craik,  
Minister of Energy and Mines.

MICROFILMED

TO .....

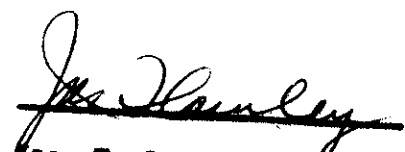
HERE .....

*June/79*

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

I, James T. Cawley, 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 25;
- (b) made pursuant to "The Mines Act";
- (c) made by The Oil and Natural Gas Conservation Board, of Manitoba;
- (d) under date of the 19<sup>th</sup> day of *June* A.D., 1974;
- (e) which Regulation comes into force on the date of filing with the Registrar of Regulations.

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

THE OIL AND NATURAL GAS CONSERVATION BOARD

ORDER NO. PM 25

An Order pertaining to Pressure Maintenance by Water Flooding

NORTH VIRDEN SCALLION UNIT NO. 1

Made and passed pursuant to "The Mines Act", Cap. M160, R.S.M., 1970, and amendments thereto, by The Oil and Natural Gas Conservation Board, of Manitoba.

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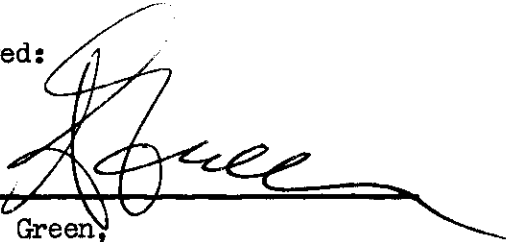
Order No. PM 1, of The Oil and Natural Gas Conservation Board, made and passed on the 18th day of July, 1962, and filed as Manitoba Regulation 58/62, is amended as follows:

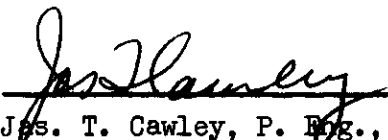
1. Subclause (1) of clause 1 of the Pressure Maintenance Rules of the Order is amended by adding to the list of wells therein set out, the following wells:

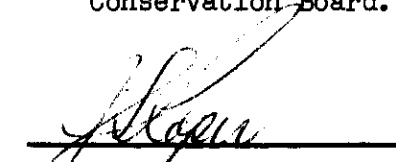
Chevron Scallion Prov. 6-11-11-26  
Chevron North Scallion 6-4-12-26

Oil and Natural Gas Order No. PM 25,  
made and passed this 19<sup>th</sup> day  
of June A.D., 1974, 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.


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

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

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

I, W. Winston Mair, 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 18;
- (b) made pursuant to "The Mines Act";
- (c) made by The Oil and Natural Gas Conservation Board, of Manitoba;
- (d) under date of the 17 day of August, A. D., 1971;
- (e) which Regulation comes into force on the date of filing with the Registrar of Regulations.

  
W. Winston Mair,  
Chairman,  
The Oil and Natural Gas  
Conservation Board.

AUG 18 1971

DIRECTOR OF MINES

THE OIL AND NATURAL GAS CONSERVATION BOARD

ORDER NO. PM 18

An Order pertaining to Pressure Maintenance by Water Flooding

NORTH VIRDEN SCALLION UNIT NO. 1

Made and passed pursuant to "The Mines Act", Cap. M160, R. S. M., 1970, and amendments thereto, by The Oil and Natural Gas Conservation Board, of Manitoba.

Order No. PM 1, of The Oil and Natural Gas Conservation Board, made and passed on the 18th day of July, 1962, and filed as Manitoba Regulation 58/62, is amended as follows:

1. Subclause (1) of clause 1 of the Pressure Maintenance Rules of the Order is amended by adding to the list of wells therein set out, the following wells:

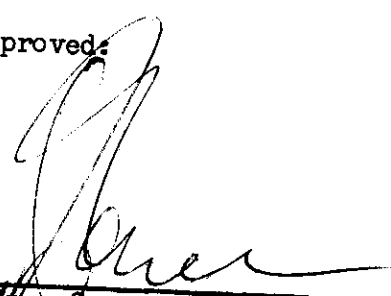
Chevron Scallion Prov. 12-11-11-26


Chevron Scallion 2A-22-11-26

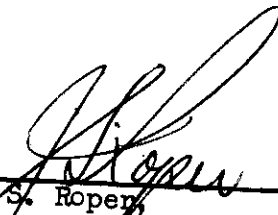
Chevron Scallion 8-33-11-26

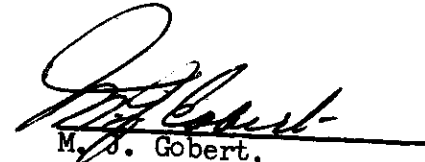
Oil and Natural Gas Order No. PM 18,  
made and passed this 17 day  
of August, A. D., 1971, at  
the City of Winnipeg, in the  
Province of Manitoba, by The Oil  
and Natural Gas Conservation Board.

Approved:

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

  
W. Winston Mair,  
Chairman,  
The Oil and Natural Gas  
Conservation Board.

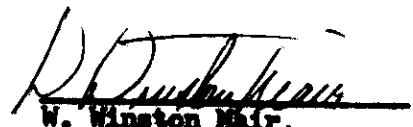
  
J. S. Roper,  
Deputy Chairman,  
The Oil and Natural Gas  
Conservation Board.

  
M. J. Gobert,  
Member,  
The Oil and Natural Gas  
Conservation Board.

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

I, W. Winston Mair, Chairman of The Oil and Natural Gas Conservation Board, of Manitoba, hereby certify that the attached Regulation, marked as Exhibit "A", is a true copy of the original Order:--

- (a) entitled The Oil and Natural Gas Conservation Board Order No. PM 10;
- (b) made pursuant to "The Mines Act";
- (c) made by The Oil and Natural Gas Conservation Board, of Manitoba;
- (d) under date of the 18 day of December A. D., 1969
- (e) which Regulation comes into force on the date of filing with the Registrar of Regulations.

  
W. Winston Mair,  
Chairman,  
The Oil and Natural Gas  
Conservation Board

DEC 5 1966

DIRECTOR

THE OIL AND NATURAL GAS CONSERVATION BOARD

ORDER NO. PM 10

An Order pertaining to Pressure Maintenance by Water Flooding

NORTH VIRDEN SCALLION UNIT NO. 1

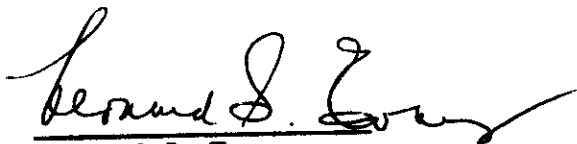
Made and passed pursuant to "The Mines Act", R. S. M., 1954, and amendments thereto, by The Oil and Natural Gas Conservation Board, of Manitoba.


Order No. PM 1 of The Oil and Natural Gas Conservation Board, made and passed on the 18th day of July, 1962, and filed as Manitoba Regulation 58/62, is amended as follows:

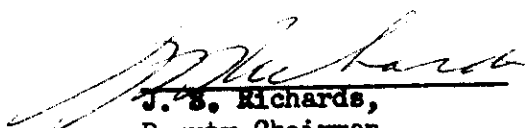
1. Subclause (2) of clause 1 (of the Pressure Maintenance Rules) of the Order is rescinded, and the following subclauses are substituted therefor:
  - (2) After the commencement, the Unit Operator shall, subject to any remedial work required to be performed on the well or wells referred to in this clause, 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.


Oil and Natural Gas Order No. PM 10,  
made and passed this 18 day  
of December A. D., 1967 at  
the City of Winnipeg, in the  
Province of Manitoba, by The Oil  
and Natural Gas Conservation Board.

Approved:

  
Leonard S. Evans,  
Minister of Mines and  
Natural Resources.

  
W. Winston Mair,  
Chairman,  
The Oil and Natural Gas  
Conservation Board.

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

  
M. J. Gobert,  
Member,  
The Oil and Natural Gas  
Conservation Board.



THE OIL AND NATURAL GAS CONSERVATION BOARD

ORDER NO. FM 1

An Order pertaining to Pressure Maintenance by Water Flooding - North Virden Scallion Unit No. 1.

Made and passed pursuant to "The Mines Act", by The Oil and Natural Gas Conservation Board.

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WHEREAS, subsection (8) (d) of Section 59 of "The Mines Act", as enacted by Chapter 45, Statutes of Manitoba, 1955, provides as follows:

"59. (8) Without restricting the generality of subsection (7) 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, the Board, pursuant to Section 59 of "The Mines Act", held a public hearing on April 18, 1962, for the purpose of considering a Proposal for Pressure Maintenance by Water Flooding within the Unit Area of the North Virden Scallion Unit No. 1, by The California Standard Company, on its own behalf and other working interest owners, in the North Virden Scallion 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 North Virden Scallion Field in Manitoba, comprising the Unit Area of the North Virden Scallion Unit No. 1, is reasonably necessary to prevent waste, and to increase substantially the recovery of oil;

2—ORDER NO. FM 1

(b) that the value of the estimated additional recovery of oil and gas 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. 1 provides for the appointment of a Unit Operator.

NOW, THEREFORE, the Board orders:

1. (a) The Unit Operator shall conduct pressure maintenance operations by the injection of water to the Virden and Scallion Members of the Lodgepole 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 Virden and Scallion Members of the Lodgepole Formation of the Mississippian Age in the wells:

Calstan Scallion	2-10-11-26
Calstan Scallion	10-10-11-26
Calstan Scallion	12-10-11-26
Calstan Scallion Prov.	2-11-11-26
Calstan Scallion Prov.	4-11-11-26
Calstan Scallion	2-15-11-26
Calstan Scallion	10-15-11-26
Shell Moir South	
Scallion	10-21-11-26
Calstan Scallion	4-22-11-26
Sun T. L. Tapp Scallion	10-22-11-26
Calstan Scallion	12-22-11-26

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

- (2) The injection in the wells referred to in this clause shall continue after the commencement.
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;

3--ORDER NO. PM 1

- (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 channelling 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. In the interest of equity and good engineering practice, the Board may prescribe from time to time a maximum pressure, or a minimum or a maximum rate, at which water shall be injected in any well in the Unit.
5. At least annually, unless otherwise directed by the Board, the Unit Operator shall determine the reservoir pressure in the producing wells in the Unit to the satisfaction of the Board.
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 Mines Branch a report of the quantity and source of water injected during the preceding month to each well referred to in clause 1 hereof.
8.
  - (1) **Effective** August 1, 1962, and during the initial period of operation of the pressure maintenance program, unless otherwise authorized in writing by the Board, the Unit Operator shall, within six weeks of the expiration of each half of the calendar year, file with the Mines Branch a report of the progress, performance, and efficacy of the pressure maintenance program during the half, the first of which reports shall be for the half ending on December 31, 1962, and the last of which reports shall be for the half ending on June 30, 1965;
  - (2) After the period referred to in subclause (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 July, file with the Board a report of the progress, performance, and efficacy of the pressure maintenance program during the period;
  - (3) 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

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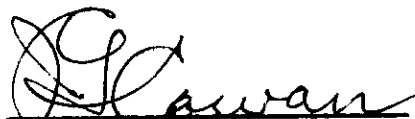
- (a) the daily average rate during each month of oil production of each producing well,
- (b) the average water-oil ratio during each month of each producing well,
- (c) the monthly cumulative oil and water production from each producing well,
- (d) the daily average rate during each month of water 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 work-over which shall be indicated on the graph, and 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, and
  - (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;


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- (4) If a report required by this clause is in the form provided for in subclause (3), 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 (3), 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 seven o'clock in the forenoon, Central Standard Time, on the first day of August, 1962.

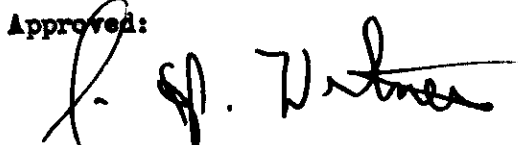
Oil and Natural Gas Order No. PM 1,  
made and passed this 18th day  
of July, A.D. 1962, at the City  
of Winnipeg, in the Province of  
Manitoba, by The Oil and Natural  
Gas Conservation Board.

  
Chairman,  
The Oil and Natural Gas  
Conservation Board

  
Deputy Chairman,  
The Oil and Natural Gas  
Conservation Board

  
Member,  
The Oil and Natural Gas  
Conservation Board

Approved:



Minister of Mines and  
Natural Resources