



MANITOBA

DEPARTMENT OF MINES, RESOURCES
& ENVIRONMENTAL MANAGEMENT
THE OIL AND NATURAL GAS CONSERVATION BOARD
901 NORQUAY BUILDING
401 YORK AVENUE
WINNIPEG 1

Jas. T. Cavley, P. Eng.
~~XXXXXXXXXXXX~~ 946-7438

CHAIRMAN

J. S. ROPER 946-7428

DEPUTY CHAIRMAN

M. J. GOBERT 946-7859

MEMBER

R. R. McDANIEL
CONSULTANT

NOTICE

ROUTLEDGE UNIT NO. 1


CHEVRON STANDARD LIMITED, as Unit Operator of Routledge Unit No. 1
has made application on behalf of the Working Interest Owners of
Routledge Unit No. 1 to convert the well known as

Chevron Routledge Prov. 13-22-9-25

to a water injection well for the purpose of investigating the
feasibility of waterflooding.

If no serious objection to the contrary in writing, is received
by the Board within 14 days of the publication of this Notice,
approval of the application may be granted.

Copies of the proposal are available at the office of the Director
of Mines, 901 Norquay Building, Winnipeg, Manitoba, or at the offices
of Chevron Standard Limited, 400 Fifth Avenue S.W., Calgary, Alberta,
or at their field office in Virden, Manitoba.


J. S. Roper,
Deputy Chairman.

127F

August 30, 1973

*BF. Oct 18 73
OK 12.7.73*

The Oil and Natural Gas Conservation Board
Department of Mines, Resources
and Environmental Management
Room 310, Legislative Building
Winnipeg, Manitoba
R3C 0V8

Dept. Mines, Resources and
Environmental Management
OCT 5 1973
PETROLEUM ENGINEERING
DIVISION

*Phoned L. D. Brown
Oct 5/73. Re-appeal
Board members not
available.*

Attention: Mr. J. T. Cawley, P.Eng.
Chairman

Gentlemen:

Chevron Standard Limited, as Unit Operator of Routledge Unit No. 1, under and pursuant to the Mines Act, being Chapter M160 of the Revised Statutes of Manitoba 1970, and amendments thereto, hereby requests the Board consider for approval an "Application for Implementation of Enhanced Recovery; Routledge Unit No. 1," pursuant to Section 62 of the Mines Act.

The following information is offered in support of this application:

I. General

The feasibility of instituting a waterflood scheme was considered during unitization proceedings of Routledge Unit No. 1. This investigation indicated that waterflooding on a field-wide basis had little chance of success because of the high reservoir pressure and high water cut shown by the majority of producing wells in the field.

Figure 1 shows the number and location of Unit wells cutting over 85% water as of year end 1972. Figure 2 shows the average fluid production rates and associated fluid levels for Unit wells as of December 1972. Figure 3 is a composite of Figures 1 and 2 that represents areas that have relatively high production rates and water cuts and are believed to be influenced by an active water drive. Figure 4 shows the only areas believed capable of responding to waterflooding.

II. Flooding Considerations

In view of the high reservoir pressure and high water cuts, the chances of a successful waterflood in the Routledge Unit appear limited. It is, therefore, proposed that a single well pilot flood be initiated to investigate the feasibility of flooding.

APPROVAL

The Chevron Routledge Prov. 13-22-9-25 well is proposed as the pilot well since it is in the most promising area based on the productivity and water cuts of the surrounding wells. The original oil in place represented by the 8,760 acre-feet of the pilot flood area outlined in Figure 5 is 4,337,000 stock tank barrels of oil. The primary decline curve of the subject area shows remaining reserves of 235,000 STBO. Cumulative production to December 31, 1972 was 1,064,606 STBO. Ultimate recovery, estimated by a decline curve extrapolation, is 1,300,000 STBO, or 30% of the original oil in place. An increase in the recovery factor to 35% would result in the recovery of an additional 105,000 STBO from the 4,242 acre-feet in the water floodable area, as outlined on Figure 5.

Reservoir parameters used are the same as presented in the original Routledge unitization proposal, and are attached as Table 1.

III. Summary


Chevron Standard Limited believes that the proposed pilot flood should be attempted to determine the feasibility of increasing oil recovery from Routledge Unit No. 1. If the pilot flood is successful and expansion of the flood is economic, Chevron proposes to submit at that time additional information as would be required by the Board.

Chevron Standard Limited, as Operator of Routledge Unit No. 1, hereby requests on behalf of the Working Interest Owners of Routledge Unit No. 1, permission to convert Chevron Routledge Prov. 13-22-9-25 WPN to a water injection well and to inject to the well at a pressure sufficiently high so that an injection rate in the order of 200 BWPD to the formation is sustained, but in no case will the pressure exceed 1500 psi.

The injection system will consist of water storage facilities and a reciprocating injection pump. Injection lines will be 2-3/8" cement lined pipe. The well will be converted to injection by pulling the pump, rods and tubing, running a casing scraper followed by the installation of cement lined tubing and packer. Reperforation and acidization may be necessary to assure that all productive zones are open.

If any additional information is required, please contact Mr. A. Hamberg at the above letterhead address. An early consideration of this request would be greatly appreciated.

Respectfully submitted,


L. D. BROWN, Chairman
for Routledge Unit No. 1
Operating Committee

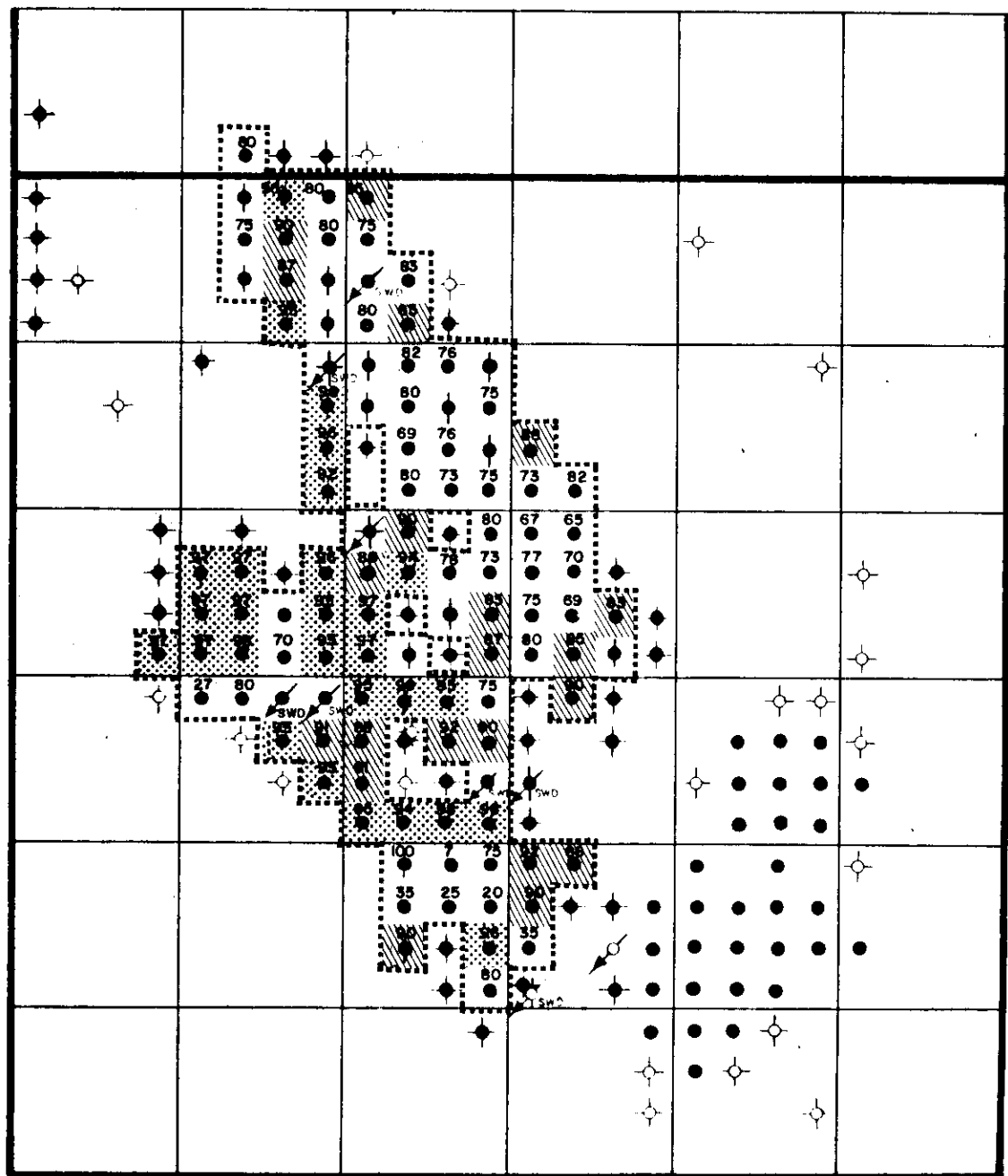
AHamberg/mff
Attach.

cc: Messrs. J. S. Roper & M. J. Gobert

TABLE 1




SUMMARY OF RESERVOIR PARAMETERS
ROUTLEDGE UNIT NO. 1

Est. Average Porosity (%)	12.3
Est. Average Water Saturation (%)	45
Est. Average Initial Oil Saturation (%)	55
Formation Volume Factor (Res. Bbls./S.T.B.)	1.06
Est. Original Oil-in-place (Bbls./Ac.-Ft.)	495

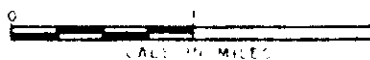


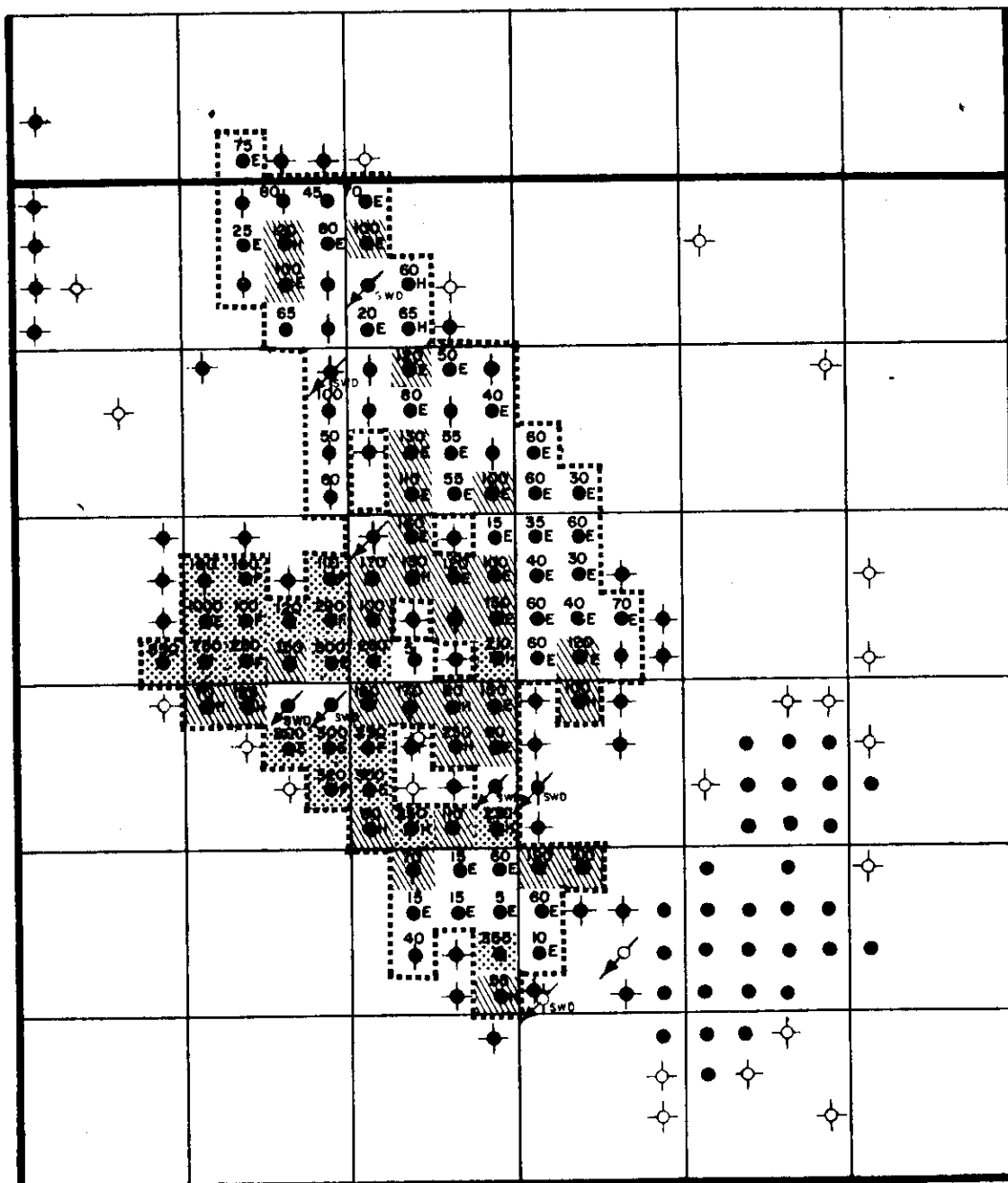
R. 25 W.P.M.

FIGURE 1

- LEGEND**
-  AREA PRODUCING AT OVER 95% W.C.
 -  AREA PRODUCING BETWEEN 85% - 94% W.C.
 -  AREA PRODUCING AT LESS THAN 85% W.C.

ROUTLEDGE UNIT No. 1
SHOWING
WATER CUT %
AS OF DECEMBER 1972





R. 25 W.P.M.

FIGURE 2

LEGEND

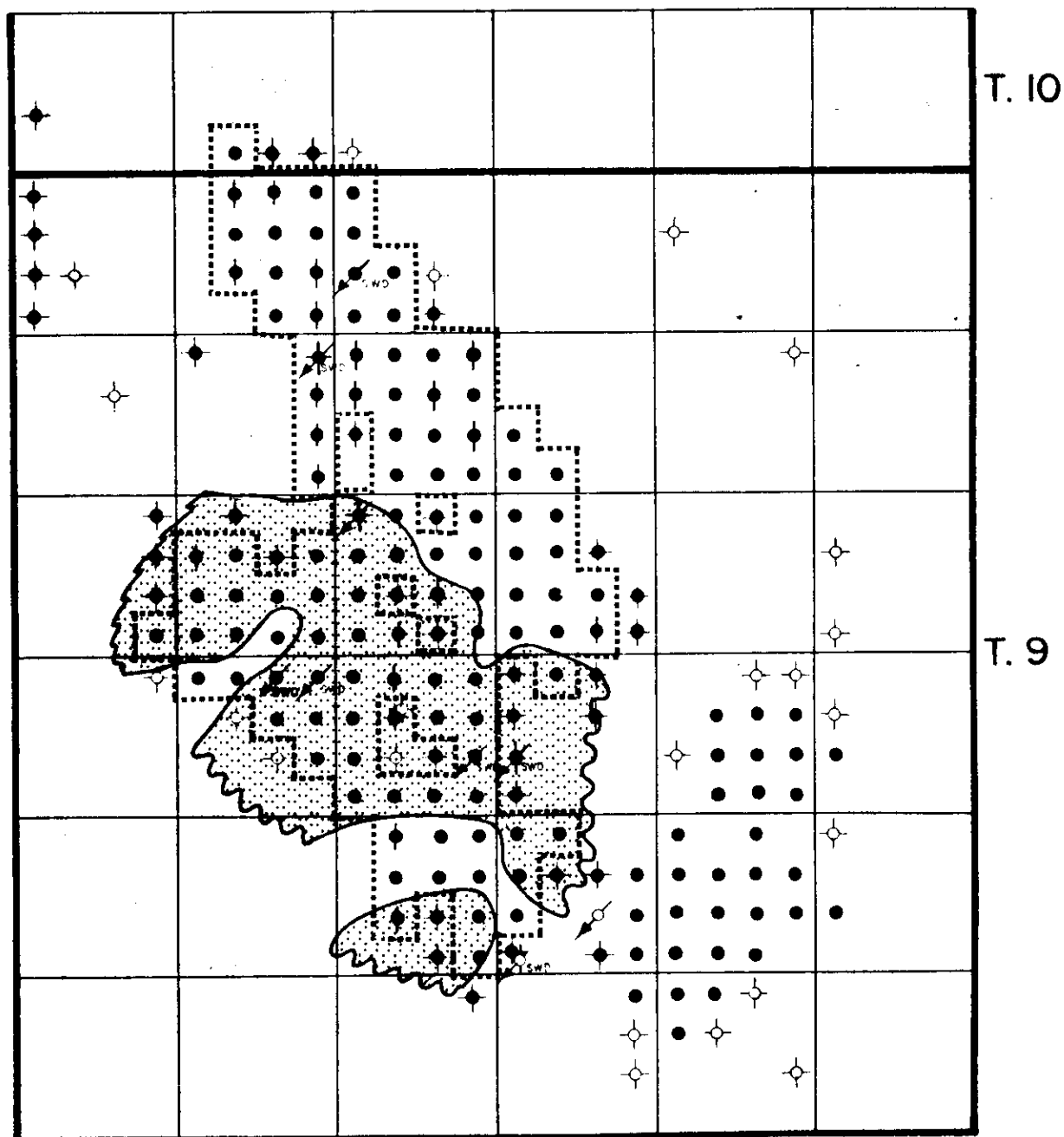
- UNIT BOUNDARY
- S.W.D. WELL
- ◆ SUSPENDED WELL
- ◆ ABANDONED WELL

ROUTLEDGE UNIT No. 1
AVERAGE FLUID RATES & LEVELS
AS OF DECEMBER 1972



- 800 CURRENT FLUID PRODUCTION RATE
- E WELL PUMPED OFF WHILE PRODUCING
- H WELL HALF FULL WHILE PRODUCING
- F WELL FULL WHILE PRODUCING

- WELLS CAPABLE OF PRODUCTION OVER 500 BFPD
- WELLS CAPABLE OF PRODUCTION BETWEEN 100 - 500 BFPD
- WELLS CAPABLE OF PRODUCTION LESS THAN 100 BFPD

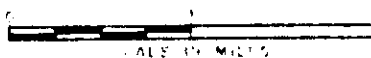


R. 25 W.P.M.

FIGURE 3

- LEGEND**
- UNIT BOUNDARY
 - S. W. D. WELL
 - SUSPENDED WELL
 - ABANDONED WELL

ROUTLEDGE UNIT No. 1
SHOWING
ACTIVE WATER DRIVE AREA



AREA WITH WELLS
CAPABLE OF OVER
100 BFPD AT W.C.
OF OVER 85%

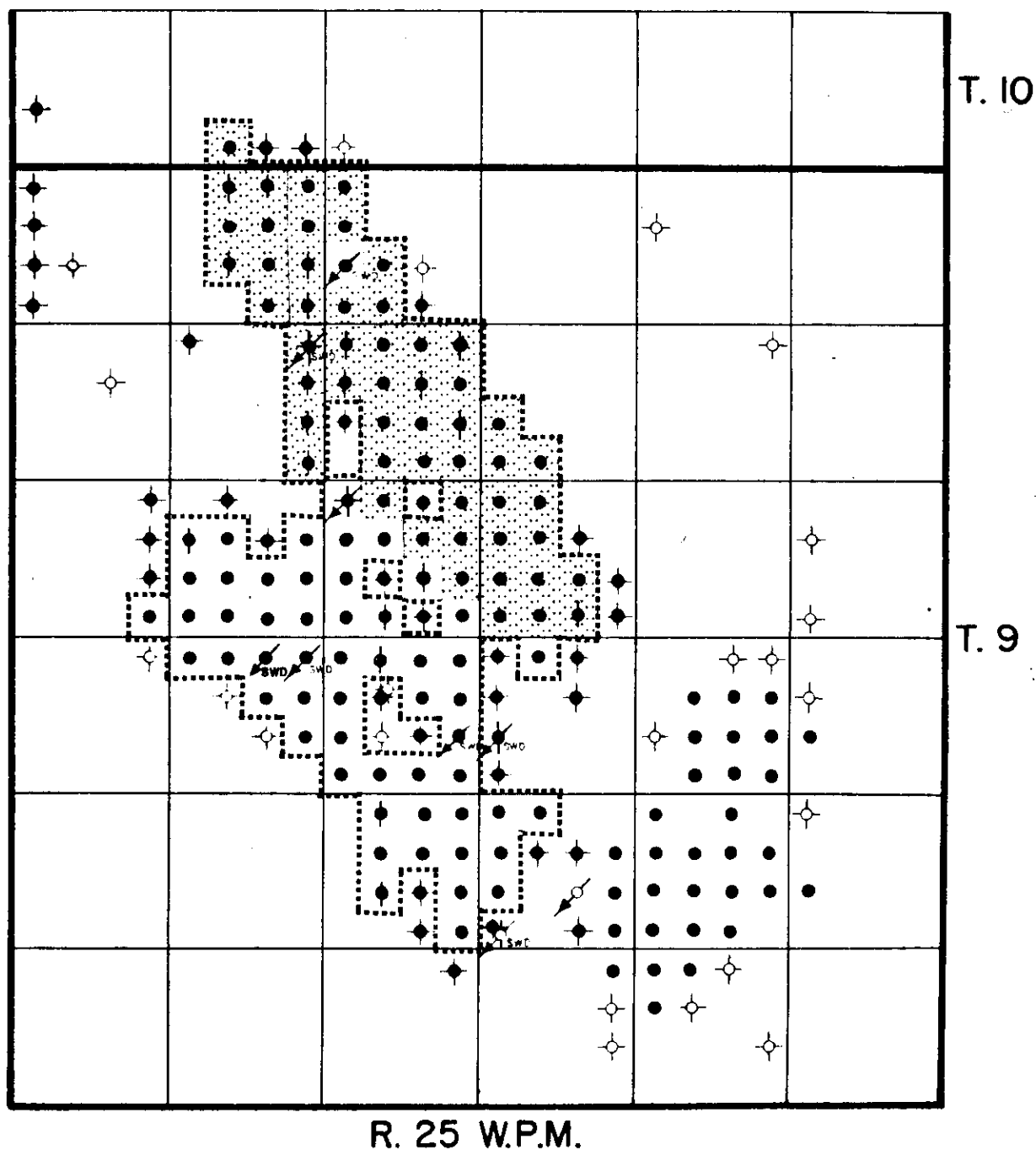


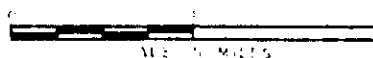
FIGURE 4

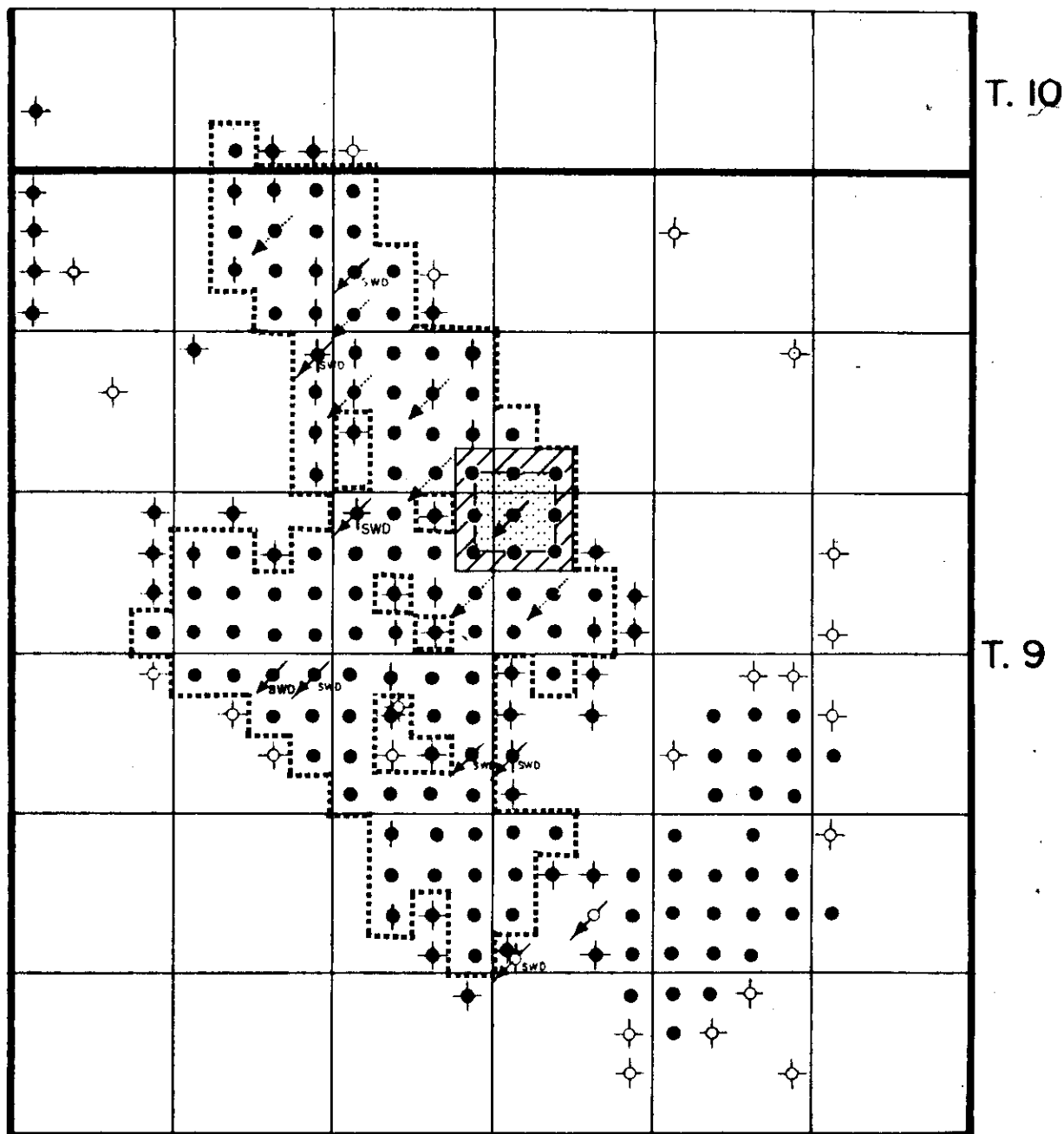
LEGEND

- UNIT BOUNDARY
- S.W.D. WELL
- ◐ SUSPENDED WELL
- ⊕ ABANDONED WELL

ROUTLEDGE UNIT No. 1
POTENTIAL WATERFLOOD AREAS

 POTENTIAL
WATER FLOOD AREA





R. 25 W.P.M.

FIGURE 5

LEGEND

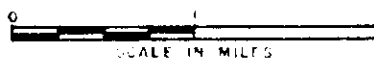
----- UNIT BOUNDARY

● S.W. D. WELL

● SUSPENDED WELL

● ABANDONED WELL

ROUTLEDGE UNIT No.1
PROPOSED PILOT FLOOD
AND
POTENTIAL FLOOD EXPANSION



▨ PILOT FLOOD WELL AREA

▤ WATER FLOODABLE AREA

↘ PROPOSED PILOT FLOOD INJECTOR

↘ POTENTIAL EXPANSION INJECTORS

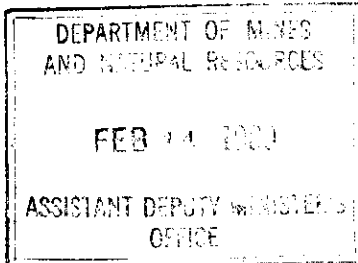
1/27/69 E. J. G. G. G.



CHEVRON STANDARD LIMITED

400 FIFTH AVENUE S.W., CALGARY 1, ALBERTA

February 12, 1969



Designation of Representative
Proposed Routledge-West
Routledge Unit, Operating Committee

TO: ALL WORKING INTEREST OWNERS
PROPOSED ROUTLEDGE - WEST ROUTLEDGE UNIT

Gentlemen:

Please be advised that effective immediately, Chevron Standard Limited's representative on the Operating Committee for the proposed Routledge-West Routledge Unit will be Mr. P. Pisio who will act as Chairman pro-tem of the Operating Committee.

All correspondence pertaining to the proposed Unit should be directed to Mr. Pisio's attention at the above letterhead address.

Yours very truly,

J. G. TROWELL
Division Superintendent
Producing Department
Calgary Division

PP:mg

cc: Oil and Natural Gas Conservation Board
Winnipeg, Manitoba

Unit Book

DEPARTMENT OF MINES AND NATURAL RESOURCES
ROUTE SLIP

TO

FROM

TO

FROM

- | | | |
|--|--|--|
| <input type="checkbox"/> For your approval or revision | <input type="checkbox"/> Reply direct with copy to me | <input type="checkbox"/> Please sign |
| <input checked="" type="checkbox"/> For your information | <input type="checkbox"/> Please supply data for my reply | <input type="checkbox"/> Please return |
| <input type="checkbox"/> Please take action | <input type="checkbox"/> Return with comments and/or recommendations | <input type="checkbox"/> Please see me |
| <input type="checkbox"/> Extracts of minutes for your information and action | <input type="checkbox"/> Investigate and report | <input type="checkbox"/> Please phone |
| <input type="checkbox"/> Please draft reply for signature of | | |

Date

Subject

Message

MNR-A-94

Use reverse side if necessary



CHEVRON STANDARD LIMITED

400 FIFTH AVENUE S.W., CALGARY, ALBERTA

March 22, 1968

Routledge - West Routledge
Proposed Unit

TO: ALL WORKING INTEREST OWNERS
WITHIN PROPOSED UNIT AREA

Gentlemen:

Attached are the minutes of the organization meeting held March 14, 1968.

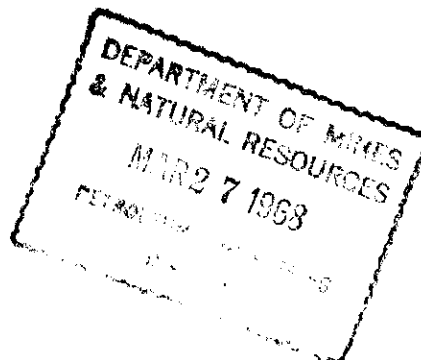
You will note in the minutes that a basis for interim voting interest was approved, however, the question of what percent constitutes a majority was not decided. We propose to resolve this at the next Operating Committee meeting.

An Engineering Committee meeting is planned for April. Until this committee has prepared its initial studies and has recommendations, we do not believe another Operating Committee meeting will be necessary.

Yours very truly,

D. M. FORBES, Chairman pro-tem
Proposed Routledge - West Routledge
Operating Committee

DMF/cb
Attach.





CHEVRON STANDARD LIMITED

400 FIFTH AVENUE S.W., CALGARY, ALBERTA

MINUTES OF MARCH 14, 1968 ORGANIZATION MEETING OF THE ROUTLEDGE - WEST ROUTLEDGE OPERATORS

A meeting of operators in the Routledge and West Routledge fields was held in the Chevron Standard Building on the morning of March 14, 1968. The following were in attendance:

COMPANY

Bralorne Petroleums Limited
Chevron Standard Limited

Mineraloid Limited
Rundle Petroleums Limited
Samedan Oil of Canada, Inc.

REPRESENTATIVE

Mr. D. L. Carruthers
Mr. L. D. Brown
Mr. J. E. Fearn
Mr. D. M. Forbes
Mr. K. A. Harris
Mr. S. A. McCrae
Mr. D. C. Sargeant
Dr. H. Lee Berry
Mr. R. F. Atkinson
Mr. H. B. Elder ✓
Mr. G. McLeod
Mr. H. L. Veeder

In addition to the above operators, invitations to attend had been sent to Jack C. Wallace and Drevzoil, Inc. No reply was received from Mr. Wallace. A letter received from Drevzoil, Inc., dated February 27, 1968, indicated that they would not be represented at this meeting but they were interested and wished to be kept fully informed of unitization discussions and progress.

AGENDA ITEM NO. 1: Review of Battery Consolidation Proposal.

A plan was presented showing the number of operated batteries might be reduced from 23 to 3. Costs to accomplish this were estimated at \$138,000. This consolidation would reduce overall field operating costs by approximately \$70,000 per year. Certain other advantages affecting production rates and operating costs will be gained through the more flexible operation permitted by unitization. In addition, ultimate primary recovery will be increased because the reduced overall costs will lengthen the economic life of many wells.

AGENDA ITEM NO. 2: Desirability and Means of Forming a Unit.

All operators present expressed a desire to unitize the Routledge - West Routledge fields, except Samedan Oil of Canada, Inc. The representative of Samedan stated they did not feel that unitization now would offer many advantages to them, since they are in a stage of active development in what may prove to be a separate pool from the main Routledge - West

Routledge oil accumulation. In either case, their producing facilities are grouped relatively closely and consolidation at the present time would not result in any significant cost reductions or improvement in operations.

Withdrawal of Samedan from the proposed unit does not significantly affect costs and anticipated results of unitization as discussed above, except to reduce the number of batteries to be consolidated from 23 to 22.

The representative of Mineraloid stated that while he felt strongly in favor of unitization, the fact that only a portion of the area may be suitable for secondary recovery operations should be recognized, and that it may be necessary to form two units rather than one.

AGENDA ITEM NO. 3: Organize a Routledge - West Routledge Operators' Committee.

The following committee was organized to serve as an Operating Committee:

Bralorne Petroleums Limited:	Mr. D. L. Carruthers - Representative	Mr. Merrit Chisholm - Alternate
Chevron Standard Limited:	Mr. D. M. Forbes - Representative	Mr. L. D. Brown - Alternate
Mineraloid Limited:	Dr. H. Lee Berry - Representative	Mr. R. F. Atkinson - Alternate
Rundle Petroleums Limited:	Mr. R. F. Atkinson - Representative	Mr. Norm Cummings - Alternate

It was unanimously agreed that the Chevron Standard representative would serve as chairman of the Operating Committee.

AGENDA ITEM NO. 4: Determine an Interim Voting Procedure.

Chevron Standard suggested that well count would serve as a satisfactory interim voting procedure, and that all wells in Routledge - West Routledge fields which had produced oil during 1967 and were within the proposed unit area should be included in the count. This was unanimously agreed to by the Operating Committee.

AGENDA ITEM NO. 5: Form Necessary Committees to Undertake Unitization Studies.

Engineering Committee

Mr. R. F. Atkinson made the following motion:

"BE IT RESOLVED that an Engineering Committee be formed and that any Working Interest Owner may appoint a representative or alternate of his choice to serve on the Engineering Committee,

AND FURTHER BE IT RESOLVED that the representative of Chevron Standard Limited serve as Chairman."

Dr. H. Lee Berry seconded the motion which was carried unanimously.

It was agreed by the Operating Committee that representatives and alternates for the Engineering Committee would be designated at the time the first meeting is called.

It was agreed that the Engineering Committee should give consideration to and then report to the Operating Committee on such matters as:

- (a) how battery consolidation might be accomplished with and without unitization,
- (b) the benefits of unitization to both Royalty and Working Interest Owners,
- (c) whether one or two units might be more desirable,
- (d) a participation formula or formulae for unitization,
- (e) an estimate of battery consolidation costs,
- (f) an estimate of operating costs following battery consolidation, and
- (g) an investment equalization plan.

Legal Committee

Mr. D. M. Forbes made the following motion:

"BE IT RESOLVED that Chevron Standard Limited perform the usual Legal Committee work including preparation of a Unit Plan and related matters, and a Titles Report for and on behalf of the Operating Committee."

The motion was seconded by Mr. R. F. Atkinson and was carried unanimously.

Inventory Committee

Mr. D. M. Forbes made the following motion:

"BE IT RESOLVED that an Inventory Committee be formed and that any Working Interest Owner may appoint a representative or alternate of his choice to serve on the Inventory Committee,

AND FURTHER BE IT RESOLVED that the representative of Chevron Standard Limited serve as Chairman."

The motion was seconded by Mr. R. F. Atkinson and was carried unanimously.

It was agreed by the Operating Committee that representatives and alternates for the Inventory Committee would be designated at the time the committee's work commences.

Accounting Committee

Mr. R. F. Atkinson made the following motion:

"BE IT RESOLVED that an Accounting Committee be formed and that any Working Interest Owner may appoint a representative or alternate of his choice to serve on the Accounting Committee,

AND FURTHER BE IT RESOLVED that the representative of Chevron Standard Limited serve as Chairman."

The motion was seconded by Mr. D. M. Forbes and was carried unanimously.

It was agreed by the Operating Committee that representatives and alternates for the Accounting Committee would be designated at the time the committee's work commences.

AGENDA ITEM NO. 6: Other Business.

The following Schedule of Pre-unitization Rates to be charged for committee work was proposed by Chevron Standard Limited:

<u>1. Committee Members</u>	<u>Rates per Day</u>
Senior Engineer	\$75.00
Senior Geologist	\$75.00
Junior Engineer	\$50.00
Junior Geologist	\$50.00
Technical Assistant	\$35.00
Lawyer	\$75.00
Draftsman	\$50.00
Senior Accountant	\$75.00
Stenographer	\$ 3.50 per hour

These rates to include supplies and general administrative supervision.

2. Printing and reproduction work at cost plus 5%.
3. A daily expense allowance of up to \$25 per day per member when committee members are working outside Calgary, with transportation from Calgary to the Routledge area and return to be at cost.

Dr. H. Lee Berry made the following motion:

"BE IT RESOLVED that the rates to be used for determination of pre-unit costs for committee work and for committee members' travel expenses be and hereby are as proposed by Chevron Standard Limited."

The motion was seconded by Mr. R. F. Atkinson and was carried unanimously.

There being no further business, the meeting adjourned.

D M Forbes

D. M. FORBES, Chairman pro-tem
Proposed Routledge - West Routledge
Operating Committee

DMF/cb

March 22, 1968



CHEVRON STANDARD LIMITED

400 FIFTH AVENUE S.W., CALGARY, ALBERTA

February 15, 1968

Routledge and West Routledge Unitization

TO: ALL OPERATORS
ROUTLEDGE AND WEST
ROUTLEDGE FIELDS

Gentlemen:

Chevron Standard has recently completed a preliminary study of battery consolidation in the Routledge and West Routledge Fields of Manitoba. It appears significant operating cost savings can be achieved by consolidation and that formation of a Routledge - West Routledge Unit is therefore desirable.

No secondary recovery study has been completed by Chevron Standard for these fields, however, based on waterflood success in other fields nearby, we feel at least certain areas may be suitable for flooding. Unitization will also be necessary to ensure maximum future oil recovery by secondary techniques and to ensure maximum economic return to working and royalty interest owners within the floodable areas.

With the above in mind, Chevron Standard is calling a meeting of representatives of the interested operators within the two fields. The proposed agenda is as follows:

1. Review the battery consolidation study prepared by Chevron Standard.
2. Discuss the desirability and means of forming a unit at the earliest possible date in order to realize the benefits of battery consolidation, considering that waterflooding may be undertaken at a future date.
3. Organize a Routledge - West Routledge Unit Operators' Committee and appoint a Chairman.
4. Determine an interim voting procedure (well count is suggested).
5. Form necessary committees to undertake studies of unitization leading to battery consolidation and possible eventual secondary recovery.
6. Other business.

The meeting will be held March 14, 1968 at 9:30 A.M. in the 9th Floor Conference Room of the Chevron Standard Building, 400 Fifth Avenue S.W., Calgary, Alberta. We would appreciate an early written reply expressing an opinion on the purpose and proposed agenda of this meeting.

This letter has been sent to the following operators:

Bralorne Petroleums Ltd.

Drevzoi, Inc.

Mineraloid Ltd.

Rundle Petroleums Ltd.

Jack C. Wallace

Samedan Oil of Canada, Inc.

Yours very truly,



for J. G. TROWELL
Division Superintendent
Producing Department
Calgary Division

DMF/cb