

Province of Manitoba

inter-departmental memo

To

Mr. H. C. Moster,
 Director of Petroleum Branch,
 Mineral Resources Division,
 993 Century Street.

Date December 2nd, 1975.

From J. S. Roper,
 Policy Advisor.

Subject: Waterflood Application - Waskada Field - Omega Hydrocarbons Ltd.

Copy of Omega's application to the Board to initiate a pilot waterflood scheme in the subject field, dated November 19th, 1975, together with Exhibit No. 1, 2, 3 and 4 is acknowledged.

Review of the material suggests that the subjects of unitization and waterflood can be handled at the same time and it is suggested that the Petroleum Branch prepare the material accordingly.

Some of the comments in the exhibits appear to bear on the advisability of unitizing the field and waterflooding the field versus partially doing so.

As per our telephone discussion the D. & S. report suggests a different sequence in initiating the waterflood than is being proposed by Omega. However, this is undoubtedly occasioned by the lack of interest on the part of Copperhead and Whistler. Your attention is drawn to Exhibit No. 4 re Copperhead and reference to possible expansion.

Subject to concurrence by other members of the Board, it is suggested that, if possible, the several matters presently requiring the attention of the Board be included in one agenda for a hearing; further that the hearing be convened in Winnipeg at an early date convenient to the Chairman.

JSR/eh

c.c. - Jas. T. Cawley, P. Eng.,
 - Dr. I. Haugh, ✓
 - Mr. J. Redgwell.

J. S. Roper.

First | Fold

DEPARTMENT OF MINES, RESOURCES AND ENVIRONMENTAL MANAGEMENT

ROUTE SLIP

TO

Dr. I. Haugh

FROM

HB Mester

TO

FROM

☐ For your approval or revision☐ Reply direct with copy to me☐ Please sign☒ For your information☐ Please supply data for my reply☐ Please return☐ Please take action☐ Return with comments and/or recommendations☐ Please see me☐ Extracts of minutes for your information and action☐ Investigate and report☐ Please phone☐ Please draft reply for signature of*WASKADA*

Date

Nov. 21/75

Subject

"UNIT. & WATERFLOOD PLAN"

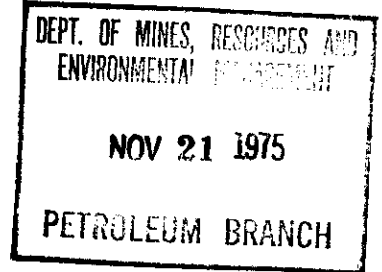
Message

*This Branch shall commence**processing of the Application immediately.*

NOV 21 1975

686B

ASSISTANT DEPUTY MINISTER
T2P 014



TELEPHONES

ACCOUNTING 263-6161
EXECUTIVE 261-7670

574 - 330 FIFTH AVENUE S.W., CALGARY, ALBERTA

November 19, 1975

Oil and Gas Conservation Board
Petroleum Branch
Department of Mines, Resources and Environmental Management
Province of Manitoba
993 Century Street
Box 12
Winnipeg, Manitoba R3H 0W4

Attention: Mr. H. C. Moster, Director

Dear Sir:

Re: Unitization and Waterflood Application

Pursuant to Section 74 Part III of the Mines Act and Revised Regulation, Omega Hydrocarbons Ltd. herein submits on behalf of itself an application to Unitize its segment of the Waskada Oil Field and to initiate a pilot waterflood scheme covering the area (Lsd. 11, 12 and the SW $\frac{1}{4}$ of Section 30, Township 1, Range 25, West of the First Meridian) as more particularly described in the enclosed and accompanying material.

In support of the application we submit twelve (12) copies of each of this letter and the following Exhibits:

Exhibit No. 1

Unit Proposal and Waterflood Plan dated October, 1975;

Exhibit No. 2

Waterflood Report prepared by D. & S. Consultants Ltd.
entitled Waskada Alida Beds Oil Pool Waterflood Potential;

Exhibit No. 3

A set of updated production decline curves which incorporates production information subsequent to the date of preparation of the D. & S. Consultants report;

With regard to the Unit Agreement we have already provided your Department with draft copies of our proposed form of Agreement. It is proposed that once having your direction as to the preferred form of Unit Agreement we would then submit the required number of copies of such Agreement and in further support of the application proof of Royalty Owner approval.

November 19, 1975

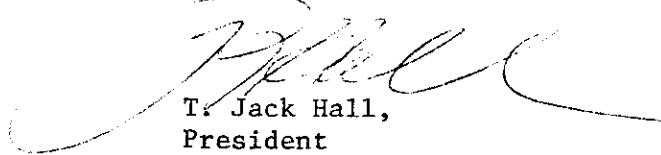
Exhibit No. 4

A draft copy of the letter which is intended to be forwarded to all Royalty Owners.

It would be appreciated if you could advise this office of any additional requirements or deficiencies which would be instrumental in your approval.

Yours very truly,

OMEGA HYDROCARBONS LTD.



T. Jack Hall,
President

TJH*vs



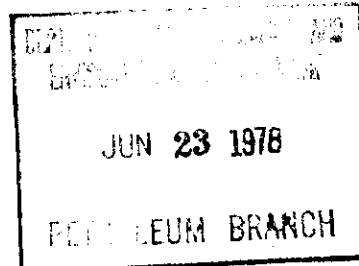
The D & S Group

D & S Petroleum Consultants (1974) Ltd.
D & S Petroleum Field Services Ltd.
D & S Research and Development Ltd.
D & S Production Accounting Services Ltd.

700 Ford Tower, 633 - 6th Avenue S.W., Calgary, Alberta T2P 2Y5
Telephone: (403) 264-9380 Cable Address: Denescons Calgary
Twx No.: 610821-4912

D & S Petroleum Design Ltd.
D & S Geological Services Ltd.
D & S Resource Engineering Ltd.
D & S Materials Engineering Ltd.

June 19, 1978



Omega Hydrocarbons Ltd.
630, 330 - 5th Avenue S.W.
CALGARY, Alberta
T2P 0L4

ATTENTION: Mr. J. Hall

Re: Waskada Alida Beds Oil Pool - Waterflood

Dear Sir:

As requested, we have reviewed the performance of the Waskada Unit No. 1 waterflood. Of concern was the apparent very rapid breakthrough, to all wells, of the injected water.

A brief review of the reservoir description, based on log and core data, coupled with the estimated frontal position of the waterflood, as of September 1, 1977, suggests a hydrocarbon volume behind the front of some 1.033 million reservoir barrels. The net water injection to September 1, 1977 was approximately 257,000 barrels.

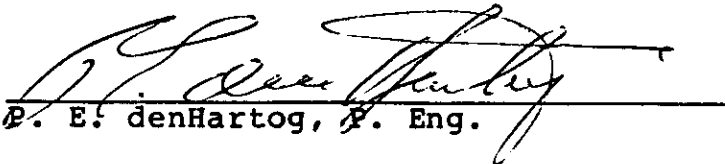
This then would result in a displacement efficiency to breakthrough of approximately 25 percent of the hydrocarbon volume.

A displacement efficiency at breakthrough of this magnitude, considering both the areal sweep and vertical stratification, is considered normal and premature breakthrough has not occurred. Ultimate recovery will depend on the eventual sweep out beyond the well pattern and the eventual vertical sweep.

With this in mind well workovers, in an attempt to reduce water production, are not recommended. However, injection should be maintained at a level not to exceed voidage. Injection rates in excess of voidage will not improve performance. Injection rates at below voidage rates will allow the reservoir pressure to decline and result in a lessening of total well productivity.

Yours very truly,

D&S PETROLEUM CONSULTANTS (1974) LTD.


P. E. denHartog, P. Eng.

:vr

WASKADA UNIT NO. 1
ORDER NO. PM 30

WASKADA UNIT NO. 1

ORDER NO. PM 30

PRESSURE MAINTENANCE PROGRESS REPORT

NUMBER 1

FOR THE PERIOD

APRIL 1, 1976 to

DECEMBER 31, 1977

D&S PETROLEUM CONSULTANTS (1974) LTD.

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I Introduction

The Waskada Alida oil pool was discovered January 1967. The production commenced in January 1967 from the well 11-30-1-25 W1M at a rate of 20 barrels per day. Water injection into the Waskada pool was commenced April 1976 at a rate of in excess of 1,000 barrels per day into well 6-30-1-25 W1M. The Waskada Unit No. 1 was formed in June 1976.

II Discussion

The water injection commenced at a rate of 1,097 barrels per day. During 1976, an average of 969 barrels per day was injected into the unit. January, 1977 the water injection rate was cut back due to rapid water breakthrough in 5-30-1-25 W1M. The average 1977 injection rate was 209 barrels per day.

From June 1976 to December 1976 the oil productivity for the unit increased from 43 barrels per day to 178 barrels per day. From February 1977 to December 1977 the oil productivity declined steadily from 148 barrels per day to 84 barrels per day.

As shown on the Production and Injection Table, the gas production decreased from 511 Mcf per month, a gas-oil ratio of 601 cubic feet per barrel, to a volume of less than 200 Mcf per month and a gas-oil ratio of less than 50 cubic feet per barrel. As there is no P.V.T. data on this reservoir, it was assumed that the producing gas-oil ratio was some 50 cubic feet per barrel. All gas production in excess of this was assumed to be free gas production. An estimated Bg of .004 reservoir barrels per cubic foot was used to determine the gas voidage. An estimated Bo of 1.06 barrel per barrel was used to calculate the reservoir oil voidage.

As requested by the operator no economic analysis was performed on the unit. Any questions concerning the waterflood economics should be directed to the unit operator.

Based on the May, 1977 pressure survey the pressures in all the producing wells had increased between 200 and 450 psi from the survey of October, 1976. The data indicates good response to the waterflood.

III Water Treatment

The water production is from a flowing source well and is not treated. The water is injected into the well 6-30-1-25 WLM by a pump. Corrosion coupons show no indication of corrosion to date.

IV Well Performance

3-30-1-25 WLM

This well was drilled in November, 1967 and placed on production December, 1967. From commencement of the waterflood, the productivity of the well increased from 6 barrels per day in April, 1976 to about 50 barrels per day at year end, 1976. This dropped to about 30 barrels per day in early 1977 and with water breakthrough occurring in July, 1977 the oil production rate has declined steadily to 15 barrels per day by December, 1977.

4-30-1-25 WLM

The well 4-30 was drilled in December, 1967 and placed on production the same month. From the start of the waterflood, the oil production rate increased from about 16 barrels per day to a high of 92 barrels per day, December 1976. Water breakthrough occurred February, 1977 and oil production declined to a rate of 32 barrels per day December, 1977.

5-30-1-25 W1M

The well 5-30 was drilled in March, 1967 and placed on production in May, 1967. After the start of the waterflood the oil production increased from 14 barrels per day in April 1976 to a high of 57 barrels per day in September 1976. Water breakthrough occurred September 1976 with an initial water-oil ratio of 1 barrel per barrel. The water-oil ratio increased steadily to a water-oil ratio of 30 barrels per barrel in January 1977. The oil production rate had declined by this time to 4 barrels per day and the well was shut-in. Two attempts were made to recomplete the well in November, 1977; however, the first set of reperforations at 3050-60, recovered 6 barrels of water, and the second set at 3063-68 recovered 22 barrels of water. The well was suspended and no further oil recovery is anticipated from this well at the present time.

11-30-1-25 W1M

The well 11-30 was drilled in January, 1967 and placed on production the same month. This well had sporadic oil production in mid-1976 but the oil production increased from 3 barrels per day in October, 1976 to about 10 barrels per day from the first half of 1977. Water breakthrough occurred August 1977 at a water-oil ratio of 2.6 barrels per barrel. The water-oil ratio increased to 12 barrels per barrel by December, 1977. By this time the oil production had declined to 6 barrels per day.

12-30-2-25 WLM

The well 12-30 was drilled in November, 1967 and placed on production in December, 1967. The well produced at an average rate of about 6 barrels per day in mid-1976 and was shut-in September, 1976 to January, 1977. It recommenced production February, 1977 at a rate of 20 barrels per day which increased to 35 barrels per day by July, 1977. Water breakthrough occurred in October, 1977 at a water-oil ratio of 0.17 barrels per barrel which increased to 0.35 barrels per barrel by December 19, 1977. The oil production rate was about 30 barrels per day for the latter part of 1977.

6-30-1-25 WLM (Injection Well)

The well 6-30 was drilled in November, 1967 and placed on production in December, 1967. It produced a total of 64,731 barrels of oil before being converted to a water injection well in April, 1976. The injection rate of the well was about 1,000 barrels per day at an injection pressure of 500 psig during 1976. This rate was decreased to about 190 barrels per day at an injection pressure of 11 psig during 1977.

V Summary

After commencement of the waterflood in April, 1976, the oil production rate increased from about 30 barrels per day to a high of about 175 barrels per day in December, 1976. The oil production rate has been declining steadily to the December, 1977 rate of 80 barrels per day. Water breakthrough had occurred in all the producing oil wells by the end of 1977.

The initial injection rate of about 1,000 barrels per day had to be reduced to about 190 barrels per day to minimize the effects of the water breakthrough.

The waterflood is working well with an estimated displacement efficiency to breakthrough of 25 percent. Ultimate recovery will depend on the vertical sweep out beyond the well pattern and the eventual vertical sweep.

TABLE 1
PRESSURE SURVEYS

<u>Well</u>	<u>Date</u>	<u>Shut-in Time</u>	<u>Bottom Hole Pressure</u>
		Hours	Psig
03-30	Oct.16/76	24	124
04-30	Oct.16/76	48	544
05-30	Oct.16/76	24	756
06-30	Oct.16/76	Nil	1044 (est)
11-30	Oct.16/76	Nil	128 (est)
12-30	Oct.19/76	96	153
03-30	May 22/77	72	537
04-30	May 22/77	72	991
05-30	May 22/77	72	1180
12-30	May 22/77	72	332

TABLE 2
UNIT PRODUCTION SUMMARY

<u>Date</u> <u>1976</u>	<u>Oil per</u> <u>Day</u>	<u>Cum.</u> <u>Oil</u>	<u>Cum.</u> <u>Water</u>	<u>Water-Oil</u> <u>Ratio</u>
April	41	330,933	0	0
May	79	332,066	0	0
June	44	333,384	0	0
July	75	335,720	0	0
August	89	338,529	576	0.205
September	110	341,956	2,462	0.546
October	107	345,387	5,070	0.760
November	129	349,468	8,190	0.765
December	175	355,245	11,303	0.539
<u>1977</u>				
January	125	359,096	15,259	1.027
February	149	363,249	15,807	0.132
March	126	367,153	16,505	0.179
April	122	370,805	16,992	0.133
May	115	374,360	18,637	0.463
June	127	378,173	20,030	0.365
July	118	381,829	21,695	0.455
August	118	385,513	23,877	0.592
September	111	388,807	25,840	0.596
October	105	392,092	28,121	0.694
November	95	394,861	30,228	0.761
December	83	397,458	32,172	0.749

TABLE 3
UNIT INJECTION SUMMARY

<u>Date</u> <u>1976</u>	<u>Daily</u> <u>Injection</u>	<u>Cum.</u> <u>Injection</u>	<u>Daily</u> <u>Press</u>	<u>Injection</u> <u>Index</u>
April	97	2,910	500	0.194
May	1097	36,910	500	2.194
June	1180	72,305	500	2.360
July	1061	105,198	500	2.122
August	963	135,054	300	3.210
September	917	162,578	260	3.527
October	531	179,031	310	1.713
November	1127	212,844	200	5.635
December	853	239,271	300	2.843
<u>1977</u>				
January	377	250,970	10	37.700
February	229	257,388	10	22.900
March	229	264,478	10	22.900
April	177	269,800	11	16.091
May	159	274,717	10	15.900
June	187	280,323	12	15.583
July	189	286,180	11	17.182
August	198	292,320	11	18.000
September	191	298,062	11	17.364
October	172	303,383	11	15.636
November	157	308,102	11	14.273
December	237	315,434	11	21.545

TABLE 4

PRODUCTION AND INJECTION TABLE

	ESTIMATED										
	PRODUCTION			SOLUTION		EXCESS		RESERVOIR		INJECTION	
	Oil Stb	Water Bbl	Oil Res. Bbl	Gas Mcf	Gas Mcf	Gas Res. Bbl	Voidage	Water Bbl	Replacement %		
Previous Cum.	329,780	-	349,237	-	-	-	349,237	-	-		
1976											
April	1,153		1,221				1,221	2,910	238		
May	850		900	43	468	1,872	2,772	34,000	1,227		
June	1,295		1,371	65	312	1,248	2,619	35,395	1,351		
July	1,989		2,106	99	274	1,096	3,202	32,893	1,027		
August	2,759	576	2,922	138	282	1,128	4,626	29,856	645		
September	3,304	1,886	3,499	165	389	1,556	6,941	27,524	397		
October	3,290	2,608	3,484	165	834	3,336	9,428	13,589	144		
November	3,861	3,120	4,089	193	85	340	7,549	29,604	392		
December	5,440	3,113	5,761	184			8,874	21,638	244		
TOTAL 1976	23,941	11,303	25,353	1,052	2,644	10,576	47,232	227,409	481		
Cumulative	353,721	11,303	374,590			10,576	396,469	227,409	57		

TABLE 4 (Cont'd)

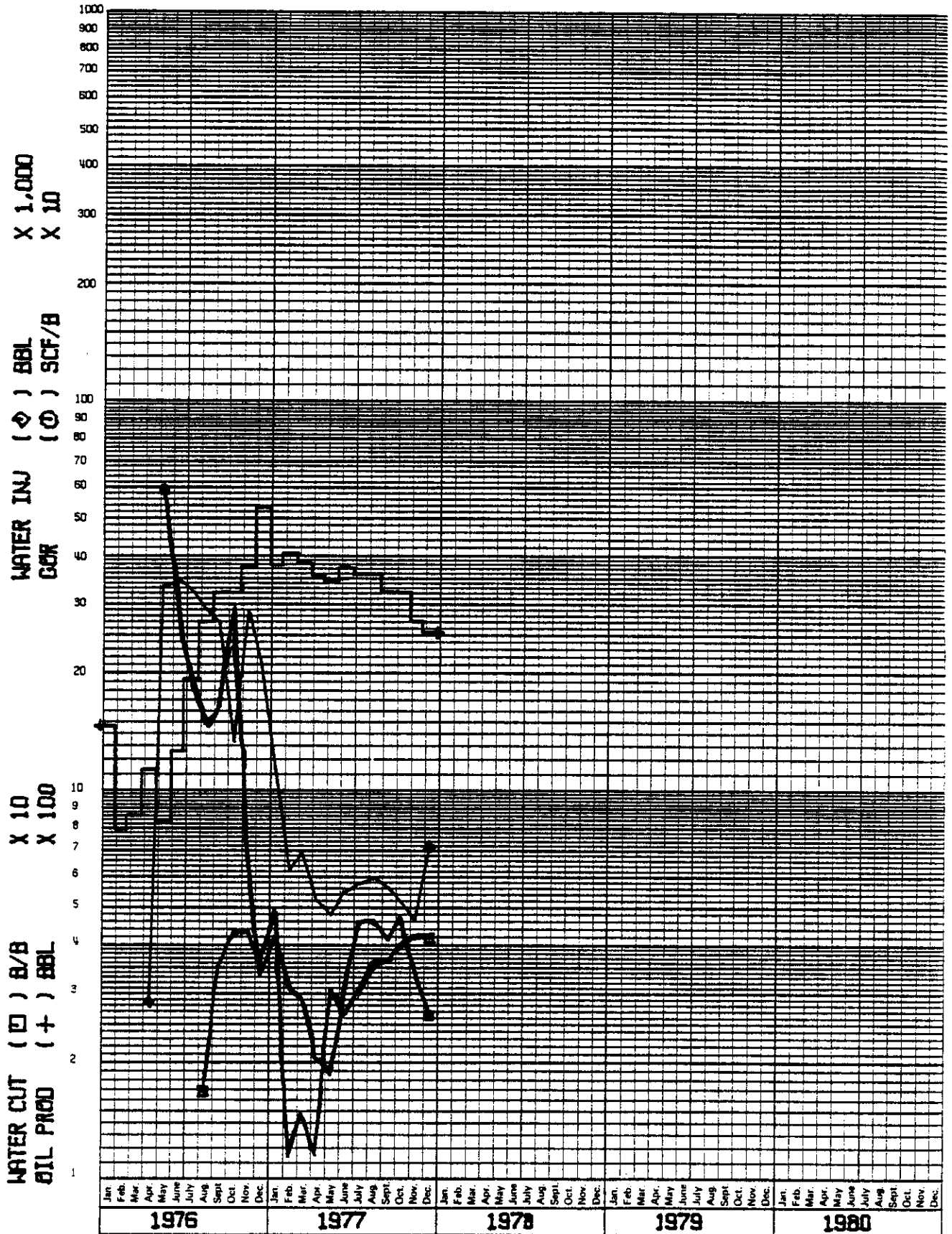
PRODUCTION AND INJECTION TABLE

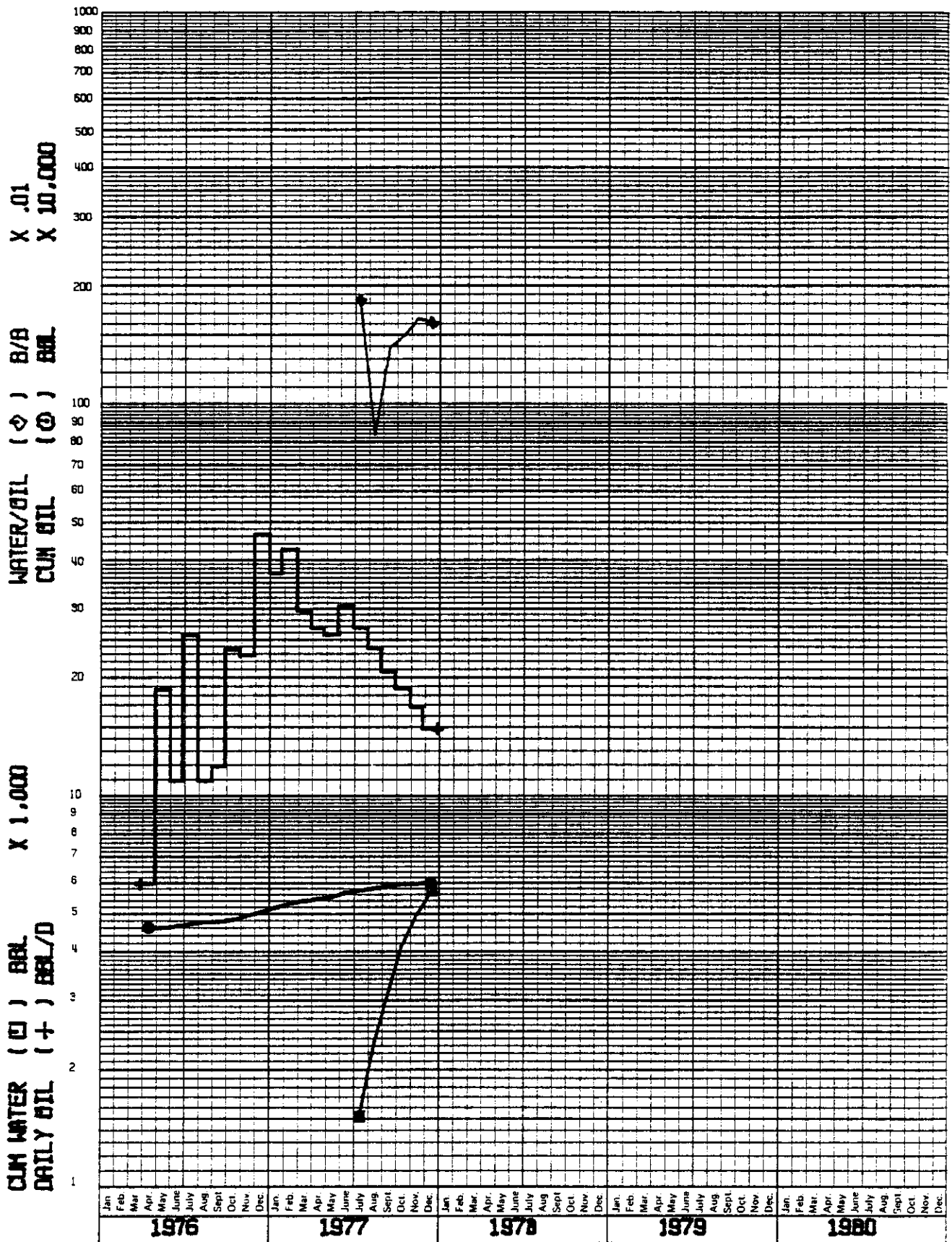
	PRODUCTION			ESTIMATED			RESERVOIR		INJECTION	
	Oil Stb	Water Bbl	Oil Res. Bbl	SOLUTION		EXCESS		Voidage	Water Bbl	Replacement %
				Gas Mcf	Gas Mcf	Gas Res. Bbl				
1977										
January	3,851	3,956	4,078	167			8,034	11,699	146	
February	4,153	548	4,398	134			4,946	6,418	122	
March	3,904	698	4,134	116			4,832	7,090	147	
April	3,652	487	3,867	76			4,354	5,322	122	
May	3,555	1,645	3,765	66			5,410	4,917	91	
June	3,813	1,393	4,038	111			5,431	5,606	103	
July	3,656	1,665	3,872	172			5,537	5,857	106	
August	3,684	2,182	3,901	177			6,083	6,140	101	
September	3,294	1,963	3,488	138			5,451	5,742	105	
October	3,285	2,281	3,479	160			5,760	5,321	92	
November	2,769	2,107	2,932	97			5,039	4,719	94	
December	2,597	1,944	2,750	71			4,694	7,332	156	
TOTAL 1977	42,213	20,869	44,702	1,485			65,571	76,163	116	
Cumulative	395,934	32,172	419,292	2,537	2,644	10,576	462,040	303,572	66	

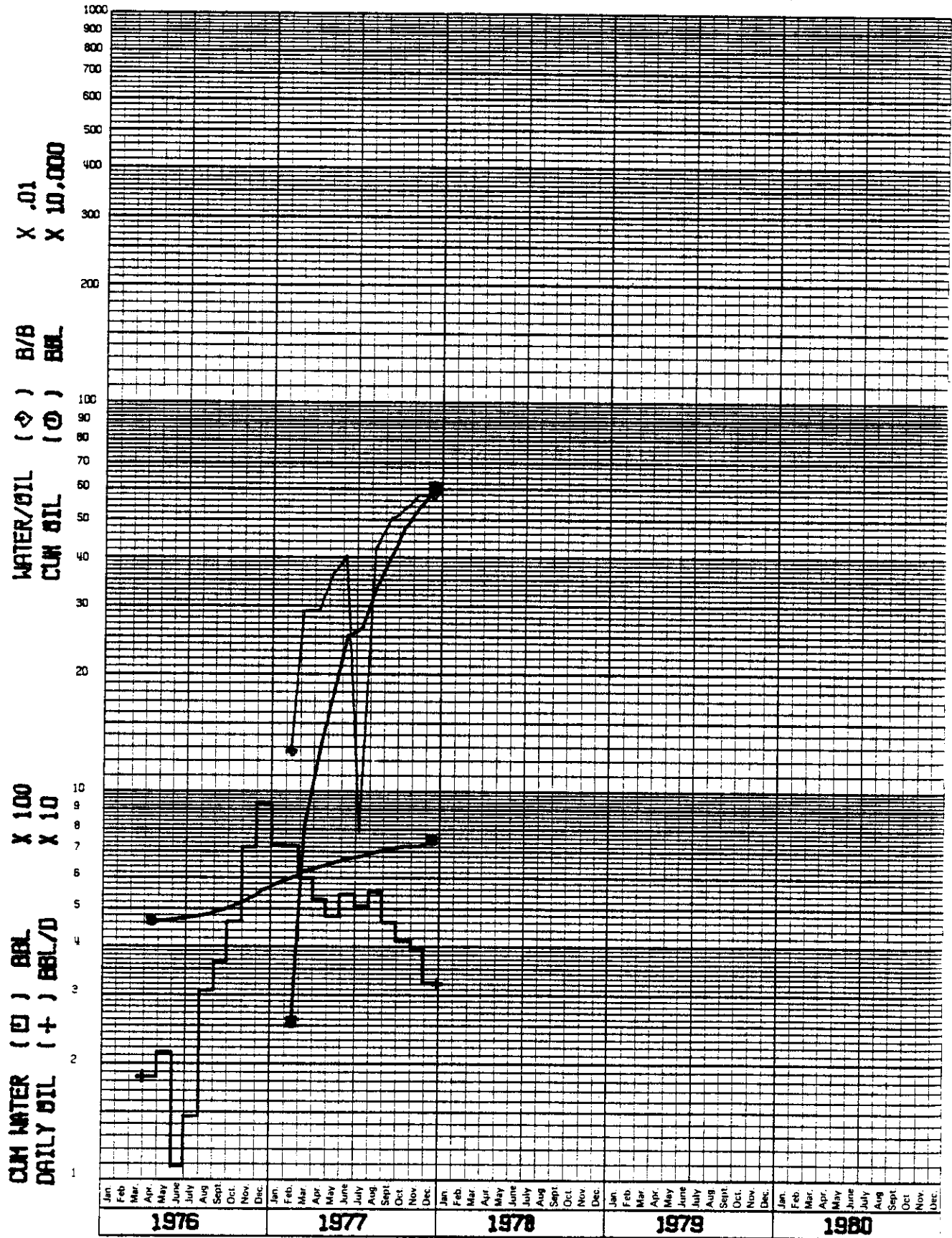
FIGURES

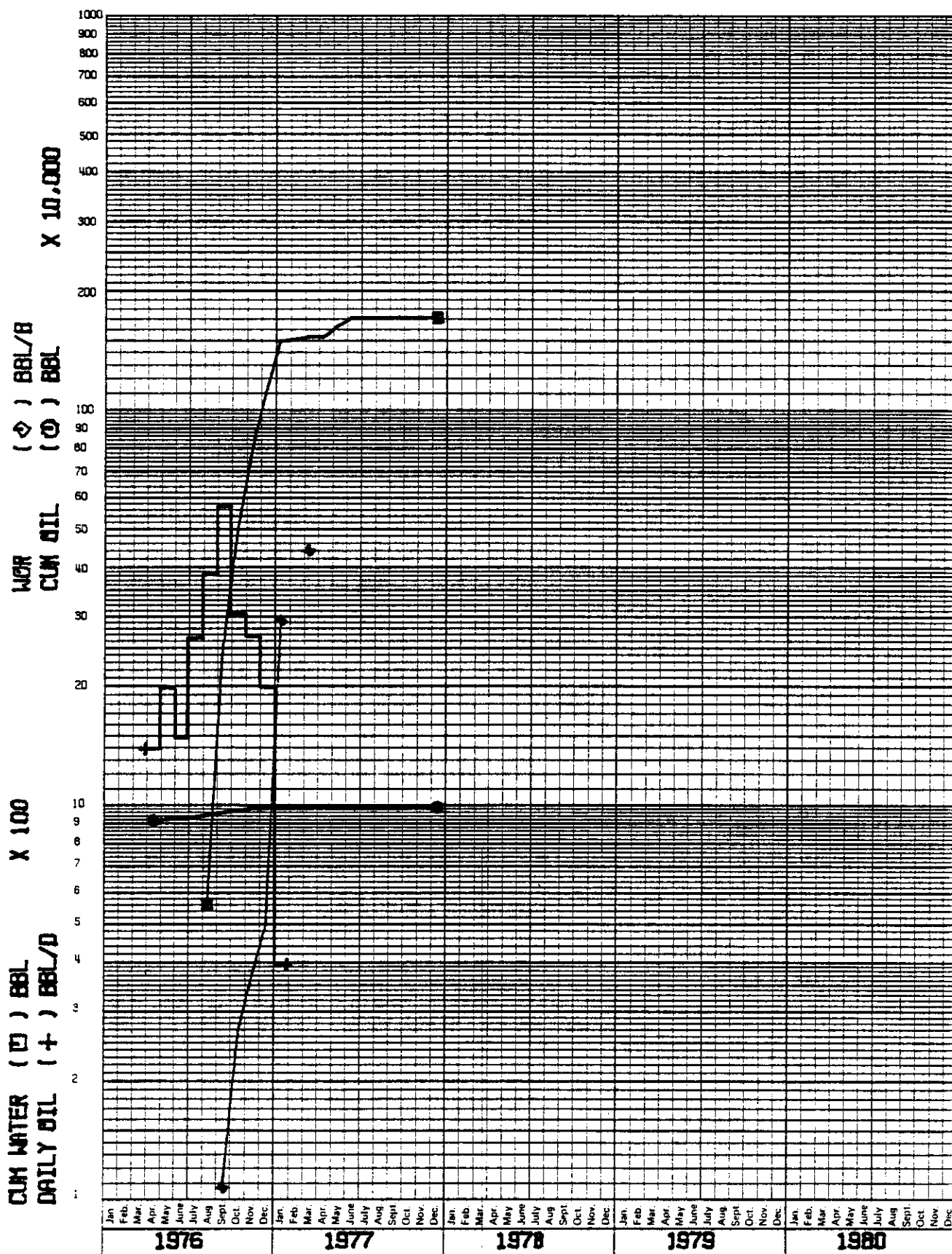
SUMMARY

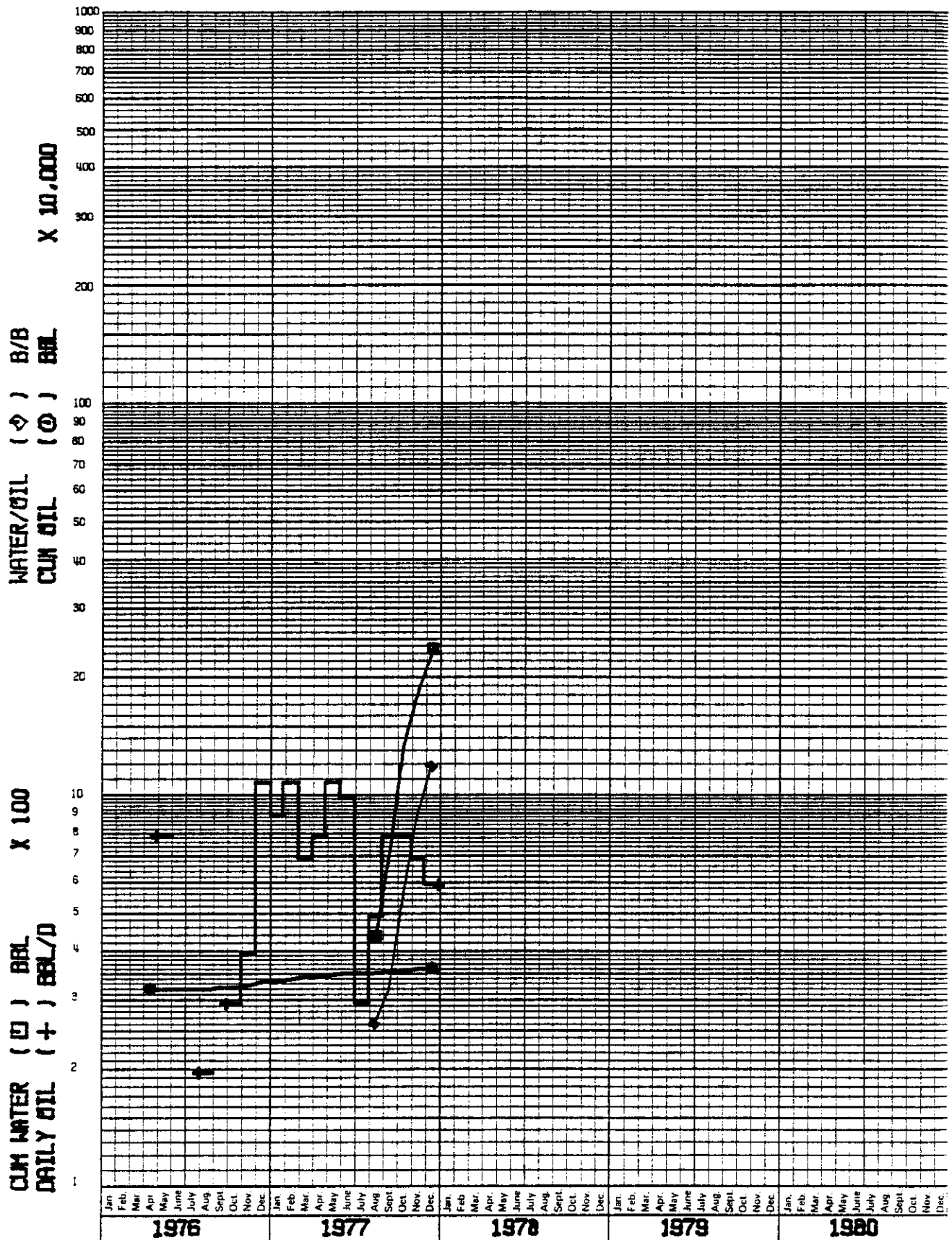
GRAPH 1

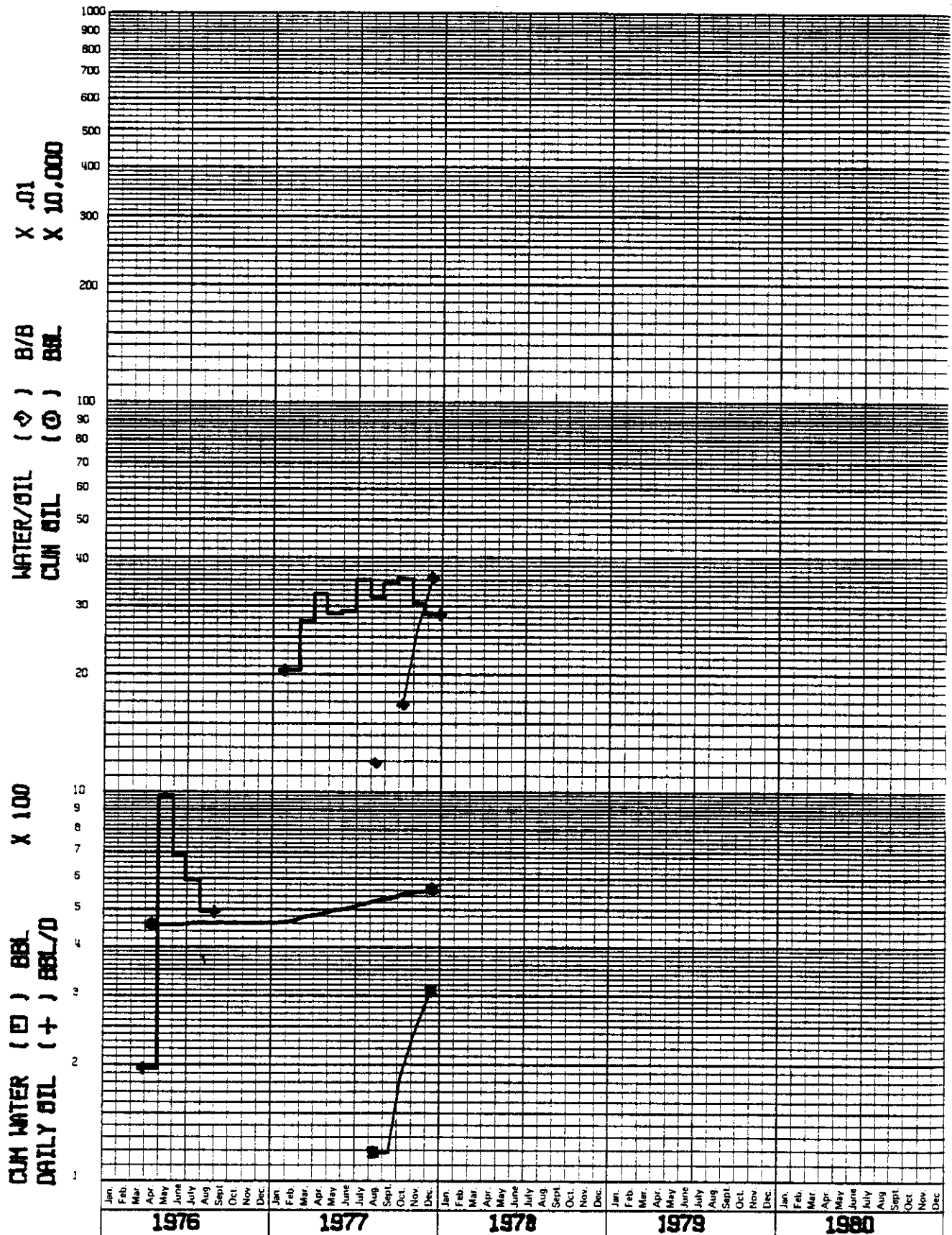












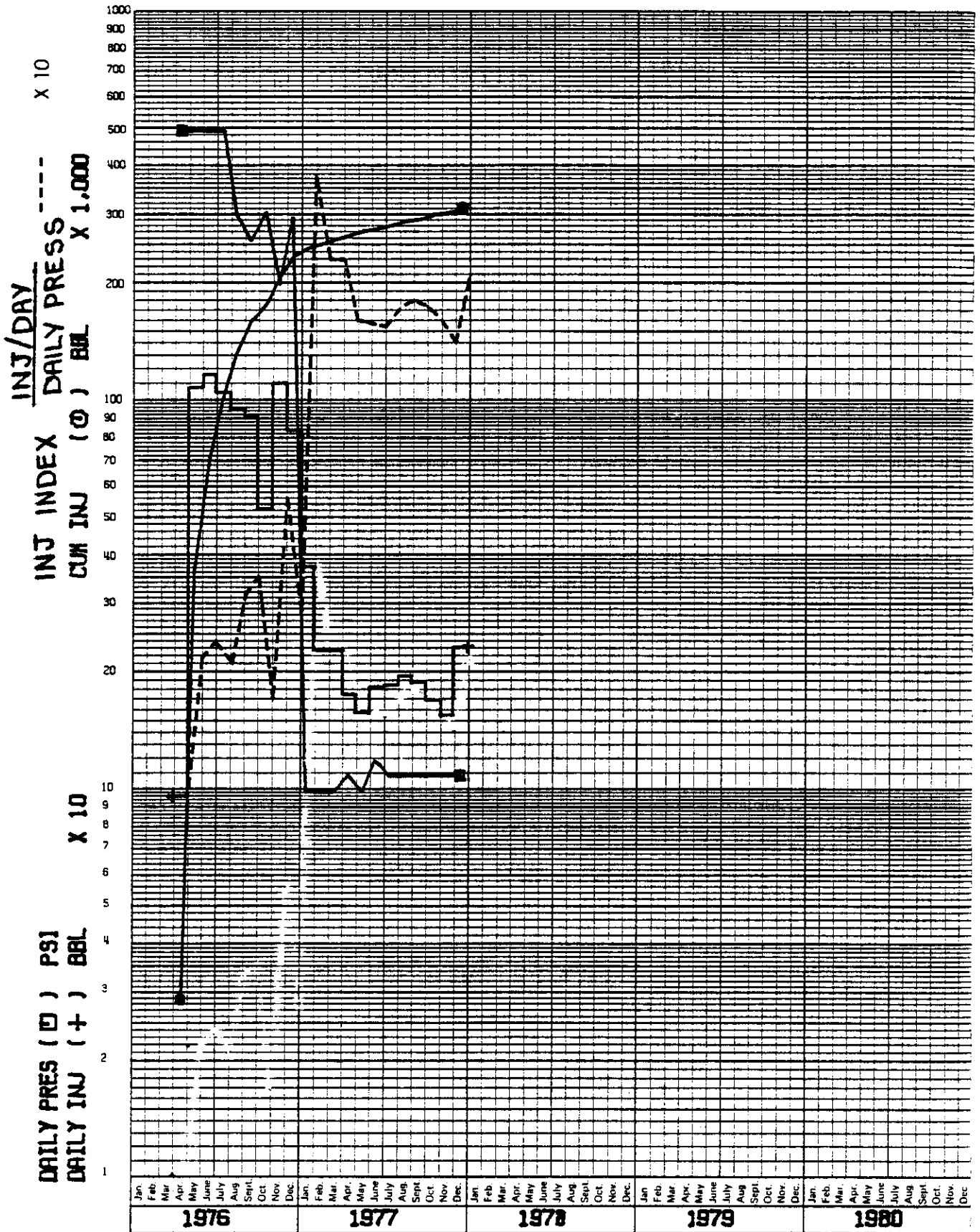


EXHIBIT No. 1

WASKADA UNIT No. 1
(Alida Beds)

Unit Proposal and Waterflood Plan

October 1975

Prepared by Omega Hydrocarbons Ltd.
Calgary, Alberta

Proposed Waskada Unit No. 1

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Figure #2	Schematic Diagram of Existing and Proposed Batter Site
Figure #3	Schematic Diagram of Typical Water Injection Well
Figure #4	Schematic Diagram of Proposed Water Station

Proposed Waskada Unit No. 1

Introduction

A waterflood study of the proposed Waskada Field of Southwest Manitoba was conducted by D. & S. Consultants Ltd., Calgary, Alberta during August, 1974, under the guidance of Omega Hydrocarbons Ltd. This study is attached and referred to as Exhibit 2. Omega submitted copies of the study to Copperhead Oil Company Limited of Virden, Manitoba and Whistler Petroleum Ltd. of Calgary, Alberta with a request that all of the Working Interest Owners subscribe to the study and that a Steering Committee composed of the three companies having lands likely to be included in future negotiations be organized. Subsequent to the request Omega was notified by Copperhead that it was not interested in proceeding with such a scheme. Omega was then faced with the prospect of proceeding without the assistance from either Copperhead or Whistler. Omega herein presents an application to proceed with Unitization and a pilot Waterflood Scheme.

The purpose of the study was to determine the economic feasibility of waterflooding as opposed to continued natural depletion operations and to determine the necessity of unitizing the pool.

The Waskada pool comprises approximately 400 acres and 10 wells located in Sections 19 and 30, Township 1, Range 25, West of the First Meridian, whereas the proposed Unit area comprises 240 acres and six wells all within the Waskada (Alida Beds) Pool. (See Map No. 1)

An analysis of the reservoir study referred to above revealed that unitization followed by waterflood will increase ultimate recovery thereby benefiting the Working Interest Owners and Royalty Interest Owners.

The unitization and waterflood analysis as incorporated into this portion of the study provides details of source water supply, the initial injection well, proposed future injectors and the unit participation formula.

Unit Participation

Participation factors for the individual tracts have been calculated on the basis of a two part formula with the following participation parameters:

Interim Period

- 1) Participation factors for this period are directly proportional to the actual production during the 12 month period from September 1, 1974 to August 31, 1975 as reported to the Department of Mines, Resources and Environmental Management, obtained from each tract and corrected for down time. The interim period will apply for eighteen months following the first day of the month immediately following the date on which water injection is commenced.

Final Period

- 2) Participation for the final period is directly proportional to the share of the unit total gross remaining recoverable crude oil reserve calculated from an estimate of the original recoverable oil less the oil already produced from each tract and will apply from termination of the interim period to pool depletion. Table 3 presents the tract participation factors for each tract showing Working Interest Owners and Royalty Interest Owners. Tables 1 and 2 present the calculation of interim and final participation respectively.

Summary

- 1) Unitization of the proposed area followed by the installation of a pilot waterflood program should be consummated as early as possible to determine the feasibility of arresting oil production decline, promoting more rapid oil recovery and the extent to which it will increase ultimate recovery over that anticipated from continued natural depletion.
- 2) Participation factors based on recent production history in the early stage of the waterflood program and relative remaining recoverable oil for the remaining period provides an equitable means of distributing the unit income to the Working Interest Owners and Royalty Interest holders.
- 3) There is a favorable economic incentive to unitize the area for a pilot waterflood operation. It is believed that if waterflooding is successful income can be three to four times that recovered from continued natural depletion.

General Waterflood Plan

To accomplish the initial injection pattern displayed on Map No. 1 a water injection well will be located at Lsd. 6-30-1-25 by the conversion of an existing producing oil well. Water will be supplied by completing the well (Blairmore Formation) located in Lsd. 11-29-1-25 as a water source well. Depending on the capability of the water source well a water injection pumping station will be constructed at the present battery site at Lsd. 11-30-1-25. Proposed and future water lines and oil lines are shown on Map No. 2.

Water Source Well

The water source well located in Lsd. 11-29-1-25 was taken over

from Manitoba Mineral Resources by Omega Hydrocarbons Ltd. in September, 1975 as a potential water source well prior to abandonment. Casing (4.5", 9.5#) was landed below the Blairmore water producing zone at 2172 feet K.B. In October, 1975 the well was perforated and swabbed into production. Water flowed at rates varying from 20 bbls/hr to 60 bbls/hr indicating a suitable supply of water from the Blairmore Zone. It is intended that the well will be equipped as shown in Figure No. 1.

Battery Facilities

Battery facilities will be consolidated at Lsd. 11-30-1-25 by removing the satellite battery unit located at 6-30 and installing it within the present treater house. A new oil line will be installed from the headers at 6-30 to the headers at 11-30. These provisions will facilitate testing requirements until such time as another treater is required. Finally, it is expected that a free water knockout unit will be installed when required. A schematic battery diagram is enclosed and described in Figure 2 showing present and future facilities.

Water Injection Well

A typical water injection well installation is displayed in the schematic diagram shown as Figure No. 5.

The Omega Waskada well located in Lsd. 6-30-1-25 is presently completed with 4 1/2", 9.5# production casing set at 3122 feet K.B., cemented with 200 sacks of Lite Poz cement and perforated opposite the producing horizon between 3018 and 3030 feet. The well was acidized and placed on production in November 1967 and produced continuously until early 1974 following which it produced marginally since that date. In October 1974 a rework was performed and a casing leak was discovered. A packer was run to seal off the leak but very little production was recovered following the rework. In October, 1975 a cement squeeze was performed and the casing leak sealed off to accommodate completion for water

injection. A new string of plastic coated tubing and a plastic coated Baker AD1 tension packer was run to a depth of approximately 2900 feet. The well is shut in awaiting approval to start injecting water. Injection rates indicated that the well would accept water in the range of 1,000 barrels per day with zero wellhead pressure. Acid will be injected if wellhead pressures increase beyond 100 psig. Wellhead valves will be trimmed to accommodate salt water operation and the annulus will be protected with inhibited fresh water. Inhibiting fluid will be injected into the water stream at the source well, thus protecting the entire water system.

The injection well will be connected to a 3 1/2 inch OD steel line with yellow jacket external coating. This line will extend from the water source well to the water station and to the injection well. A settling tank will be incorporated into the station to insure that any sand in the water source will not enter the injection system. Surface equipment will include a flow meter and corrosion coupon holder at the injection well and water source well. A typical well injection well diagram is described in Figure No. 3.

Water Station

The proposed pump station will consist of a water tank, an electrically driven water pump, a desurger, a pop valve and return water line. The tank will be equipped with a level controller and a source water shut off valve. The schematic diagram of the injection plan is shown in Figure 4.

Produced and source water will be commingled in a high 500 bbl. collection tank, which in turn will supply water to the suction side of the National J30 LC pump equipped with a 20 H.P. triple rated

electric motor. From the pump the high pressure injection water will be conducted through 3 1/2" exterior coated steel flowline. High pressure lines will be installed to the future injectors at a time when the performance of the initial injector appears to justify expansion of the system. The oil flow lines and water lines are shown in Map No. 2. A complete battery layout is reproduced in diagram form and illustrated as Figure 2. The only change anticipated in the battery system will be the location of the satellite at the main battery. A second treater will be installed when required.

Corrosion coupons will be installed at the injection well and the water source well to detect and evaluate the rate of corrosion deterioration. Corrosion will be controlled in all other facilities by injection of chemical inhibiting material.

Table 1

Calculation of Interim Tract Participation Percent

<u>Well Number</u>	<u>Oil Production 12 Month Period</u>	<u>Correction for down time</u>	<u>Total</u>	<u>Interim Participation</u>
3-30	3,155	650	3,805	
4-30	4,282	-	4,282	
5-30	4,488	-	4,488	
6-30	763	150	<u>913</u>	
Sub Total			13,488	83.709
11-30	394	75	469	
12-30	1,906	250	<u>2,156</u>	16.291
Sub Total			<u>2,625</u>	
TOTAL			16,113	

Table 2

Calculation of Final Tract Participation - Percent

Well Number	Calculated Original Oil In Place	Estimate Recoverable Oil at 50% R.F.	Cumulative Production to Aug. 31/75	Estimate of Production (3 months) to Nov. 30/75	Estimate of Cumulative Production to Nov. 30/75	Remaining Recoverable Oil	Final Tract Participation %
3-30	222,000	111,000	44,382	1,050	45,432	65,568	
4-30	468,000	234,000	44,397	1,320	45,717	188,283	
5-30	396,000	198,000	89,976	1,500	91,476	106,524	
6-30	190,000	95,000	64,761	-	64,761	30,239	
Sub Total Tract No. 1	1,276,000	638,000	243,516	3,870	247,386	390,614	82.665
11-30	103,000	51,500	32,555	-	32,555	18,945	
12-30	218,000	109,000	45,597	435	46,032	62,968	
Sub Total Tract No. 2	321,000	160,500	78,152	435	78,587	81,913	17.335
TOTAL	1,597,000	798,500	321,668	4,305	325,973	472,527	100.000

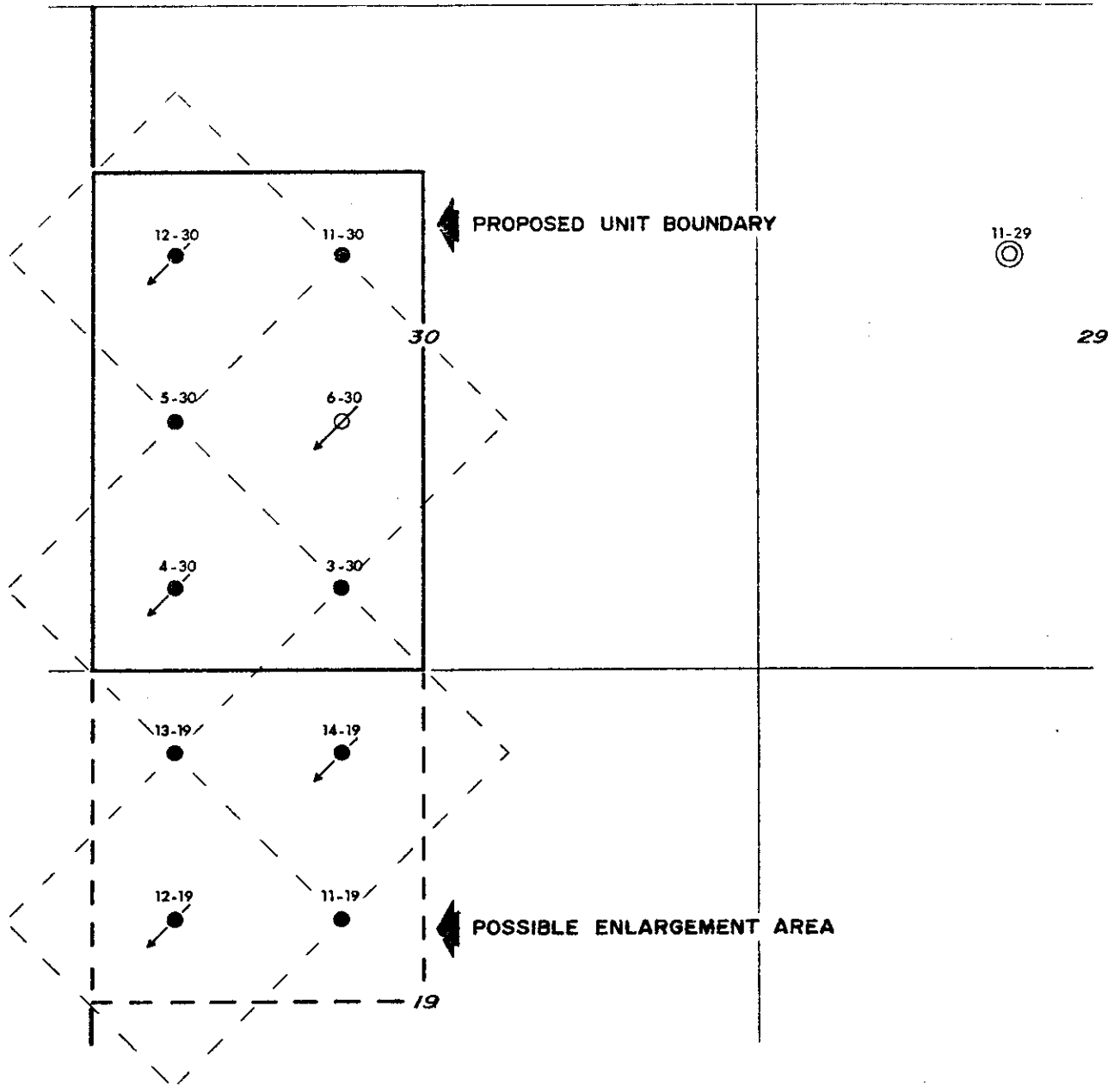
Table 3

Proposed Waskada Unit No. 1

Working Interest and Royalty Interest Ownership

Tract Location	Working Interest Owner	Tract Participation		Royalty Owner
		Interim	Final	
Twp. 1, Rge. 25, W1M				
Tract No. 1	Omega 100%	16.291	17.335	Canada Trust Hunter Masai
Lsd. 11 & 12 Section 30				
Tract No. 2	Omega 100%	83.709	82.665	Crown Hunter Masai PanCanadian
Lds. 3, 4, 5 & 6, Section 30				
Canada Trust	-	The Canada Trust Company		
Crown	-	Her Majesty the Queen in the name of Canada		
Hunter	-	H. D. Hunter & Associates Ltd.		
Masai	-	Masai Minerals Ltd.		
Omega	-	Omega Hydrocarbons Ltd.		
PanCanadian	-	PanCanadian Petroleum Limited		

Twp. 1 Rge. 25 W1M



LEGEND

- PROPOSED INJECTION WELL
- ⊙ WATER SOURCE WELL
- PRODUCING WELLS
- OIL WELLS, FUTURE INJECTION WELLS

**PROPOSED
WASKADA UNIT NO. 1**

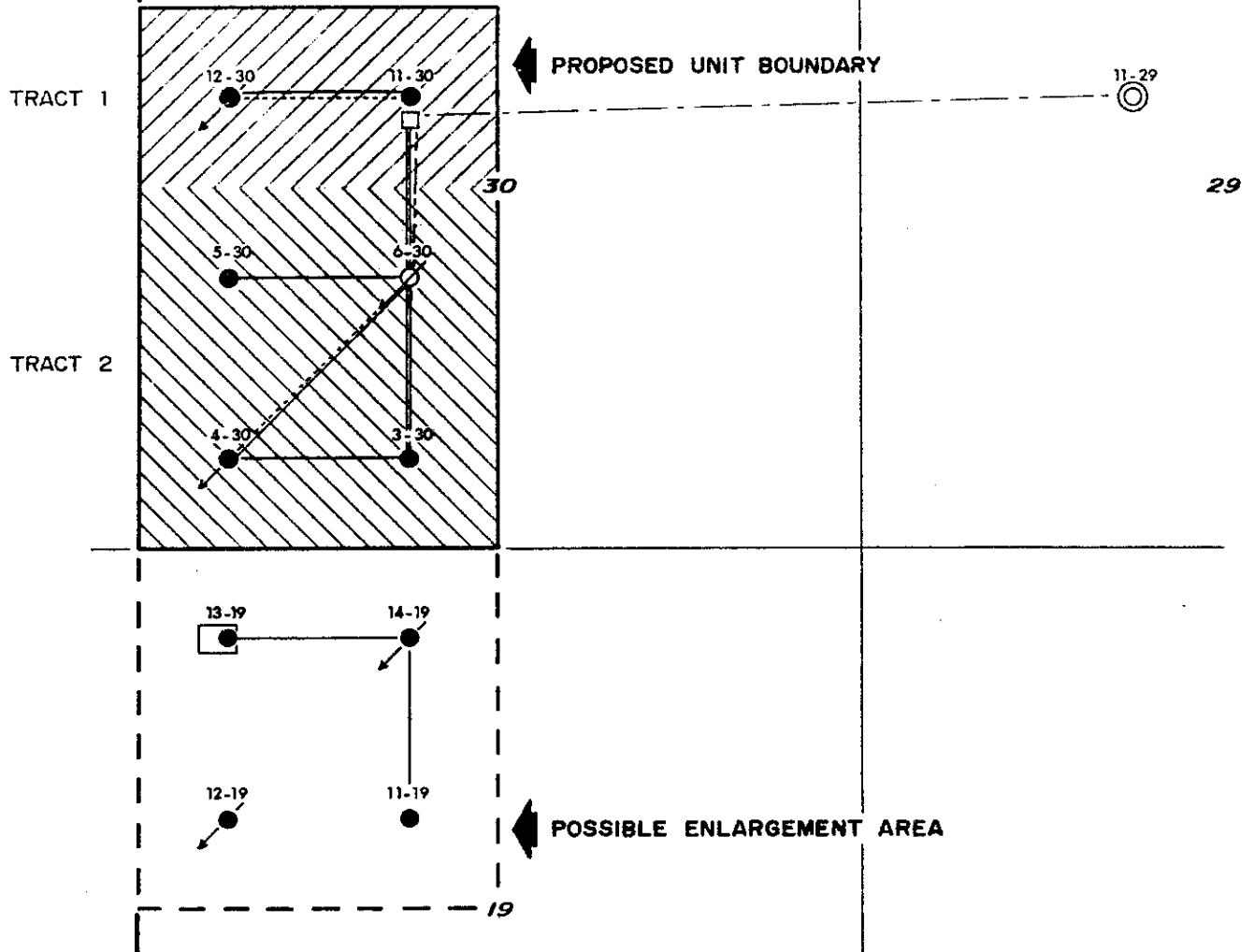
MAP NO. 1

FLOOD PATTERN









SCALE: 4" = 1 MILE

DATE: Nov. 20, 1975

Twp. 1 Rge. 25 W1M



LEGEND

-  PROPOSED INJECTION WELL
-  WATER SOURCE WELL
-  PRODUCING WELLS
-  OIL WELLS, FUTURE INJECTION WELLS
-  PROPOSED WATER LINE
-  PROPOSED INJECTION LINE
-  FUTURE INJECTION LINE
-  GATHERING LINES

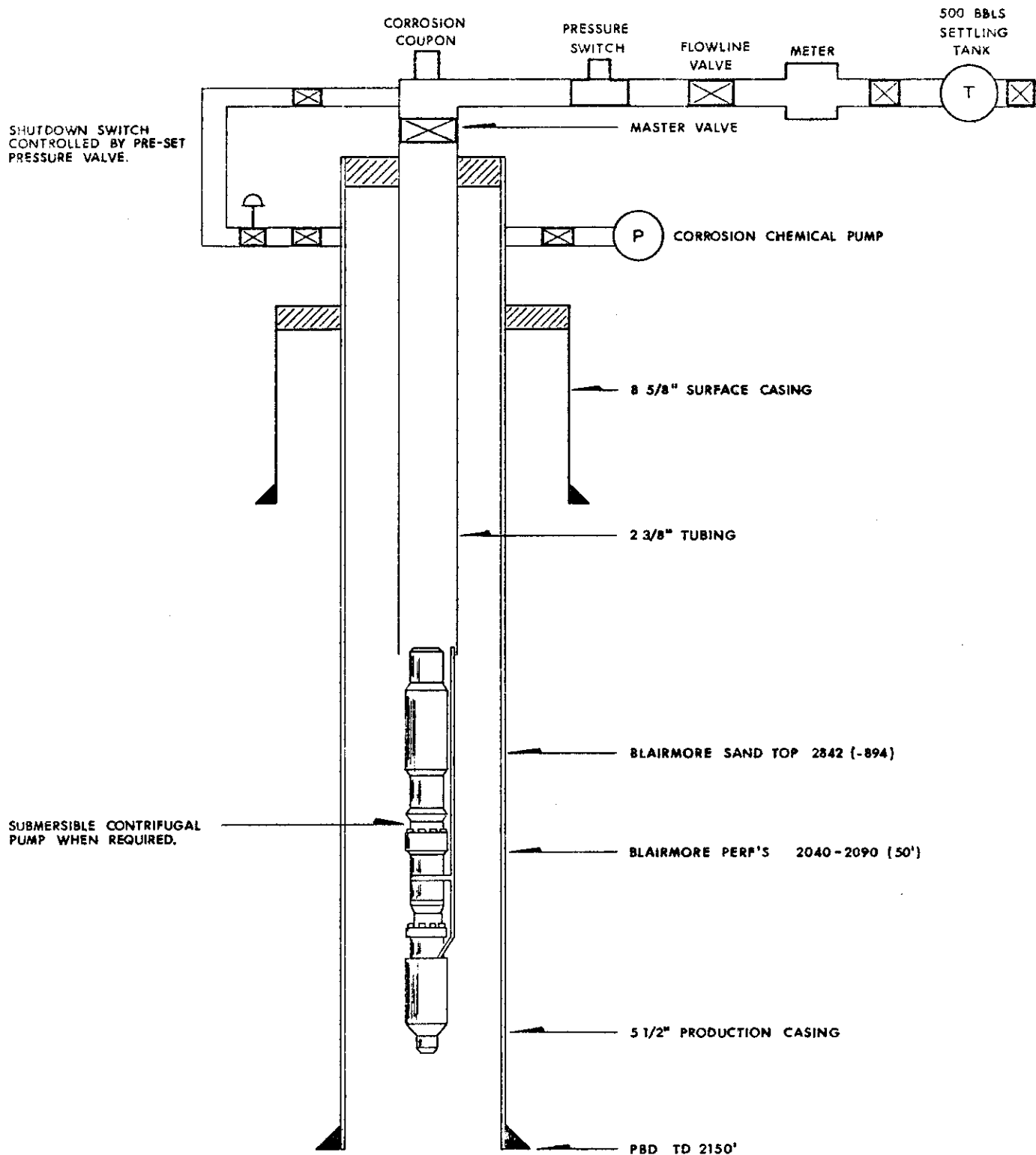
PROPOSED WASKADA UNIT NO. 1

MAP NO. 2

OIL GATHERING LINES AND WATER LINES

SCALE: 4" = 1 MILE

DATE: Nov. 20, 1975

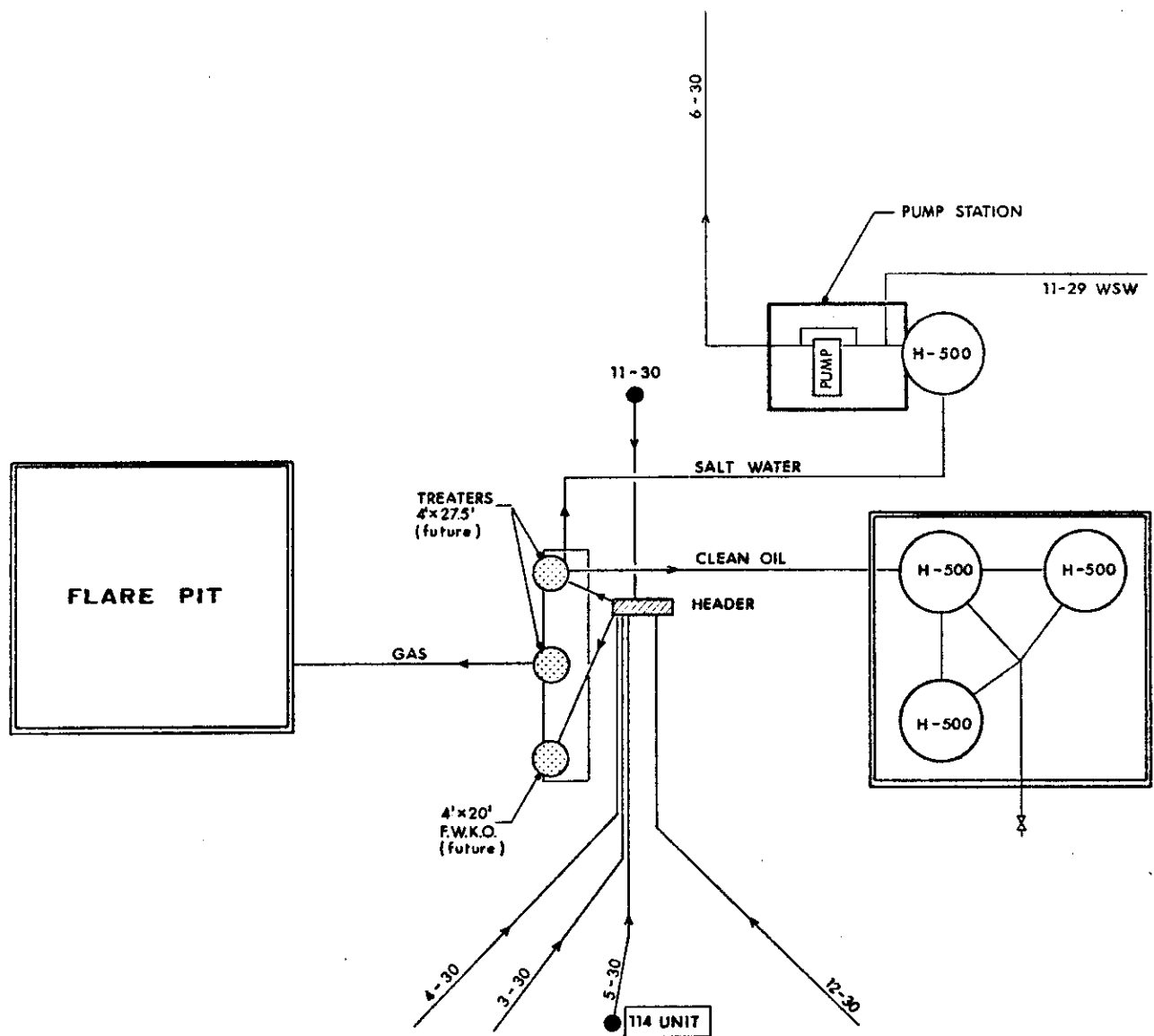


**PROPOSED
WASKADA UNIT NO. 1**

FIGURE NO. 1

**TYPICAL WATER SOURCE WELL
(SCHEMATIC)**

DATE: Nov. 20, 1975

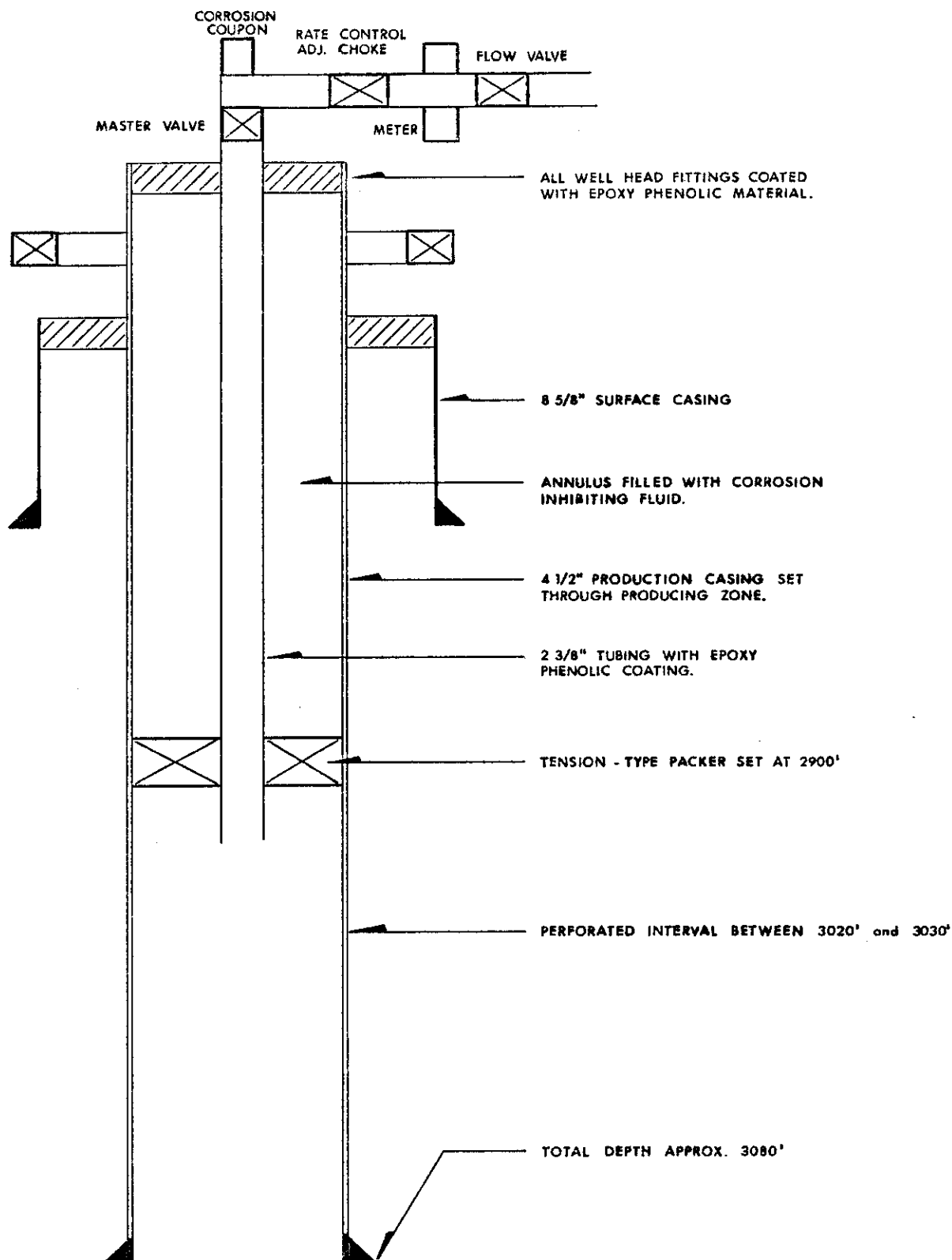


**PROPOSED
WASKADA UNIT NO. 1**

FIGURE NO. 2

**EXSISTING AND PROPOSED
BATTERY SITE
(SCHEMATIC)**

DATE: Nov. 20, 1975

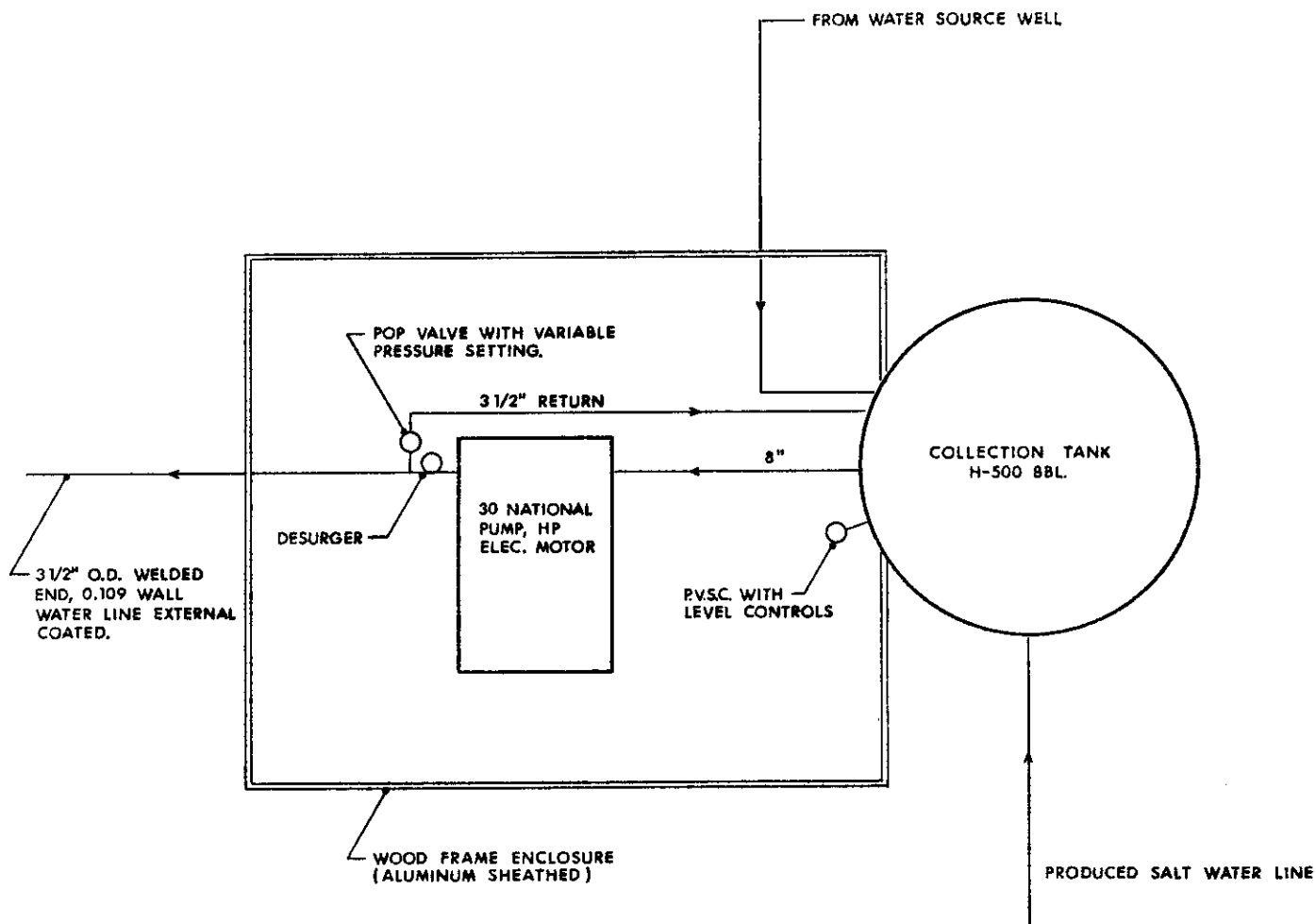


PROPOSED WASKADA UNIT NO. 1

FIGURE NO. 3

TYPICAL WATER INJECTION WELL
(SCHEMATIC)

DATE: Nov. 20, 1975



**PROPOSED
WASKADA UNIT NO. 1**

FIGURE NO. 4

PROPOSED WATER STATION
(SCHEMATIC)

DATE: Nov. 20, 1975