

Sept 11/84

Data provided
to MOGC

WASKADA FIELD

MONTH	<u>OIL Prod (m³)</u>	<u>WATER Prod (m³)</u>	<u>WOR</u>	<u>Wells Prod</u>	
MAY	20,021.0	31 996.8	1.60	252	2.30
JUNE	21 483.7	32 476.0	1.51	279	2.57
JULY	22 708.5	35 816.3	1.58	273	2.68

WASKADA LOWER AMARANTH UNIT No. 1

	<u>OIL (m³)</u>	<u>WATER Prod (m³)</u>	<u>WOR</u>	<u>WATER INT (m³)</u>	<u>Wells Prod</u>	<u>Wells Int.</u>	
MAY	4650.3	2421.0	0.52	17463.9	24	8	6.25
JUNE	4593.3	2119.2	0.46	10 398.4	24	8	6.38
JULY	4351.6	2270.9	0.52	11 441.4	23	8	6.10

WASKADA UNIT No. 2

MAY	1744.0	5587.5	320	15196.0	20	*	7	2.81
JUNE	1719.5	4920.0	286	12 127.0	20	*	7	2.87
JULY	1857.1	5284.6	285	14 279.3	20	*	7	3.00

WASKADA MC 3a A POOL (OMEGA ONLY)

	<u>OIL Prod (m³)</u>	<u>WATER PROD (m³)</u>	<u>WOR</u>	<u>Prod Wells</u>	<u>Rate/Wd</u>
MAY	369.8	785.7	2.12	8	1.49
JUNE	379.9	663.4	1.75	7	1.81
JULY	336.4	624.2	1.86	7	1.55

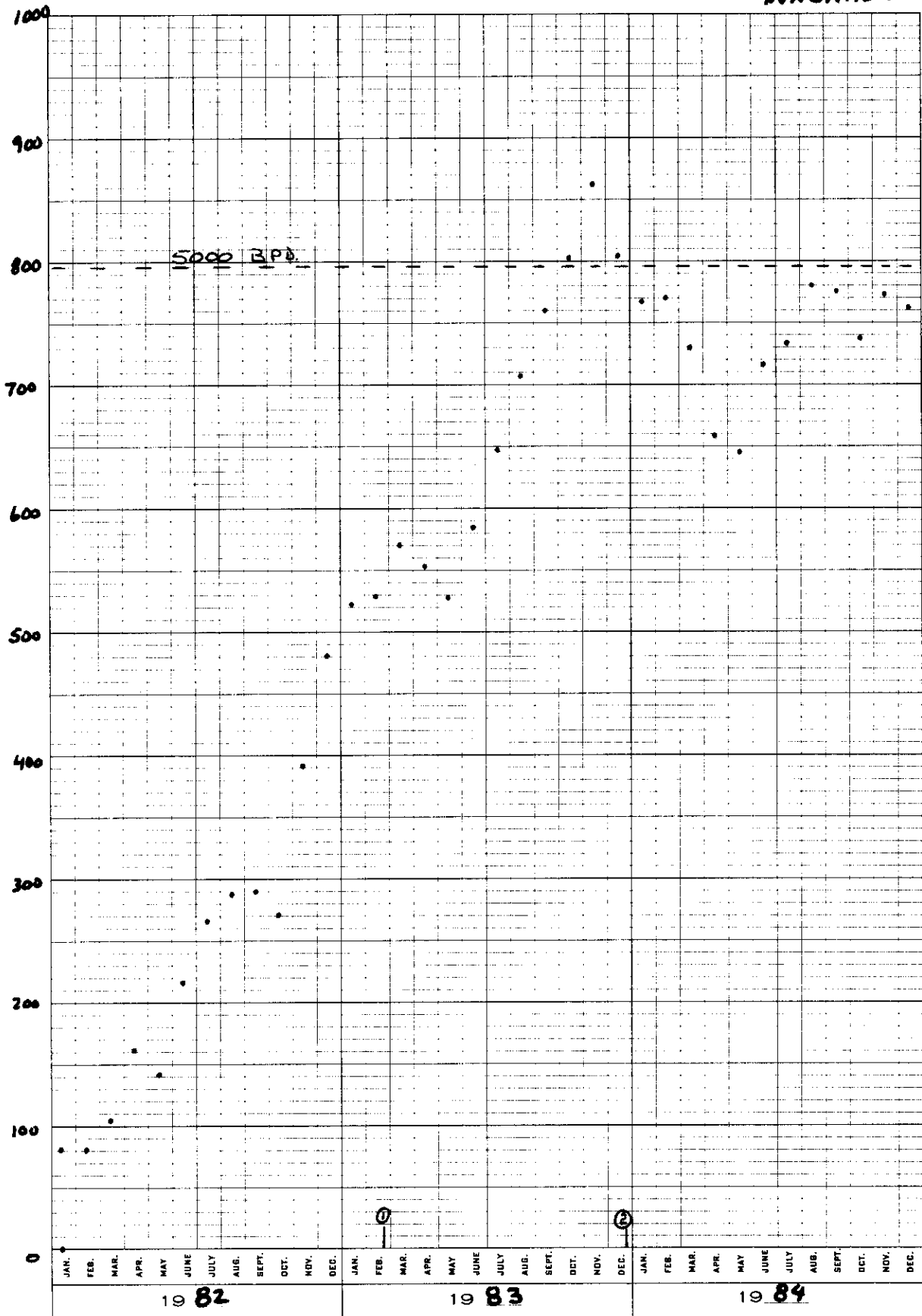
* includes 14-26-1-26 which is producing only water

OIL PRODUCTION WASKADA FIELD.

DIETZGEN CORPORATION
MADE IN U.S.A.

NO. 341-T30 DIETZGEN GRAPH PAPER
3 YEARS BY MONTHS

m³/d



OIL RATE (3000) x 100

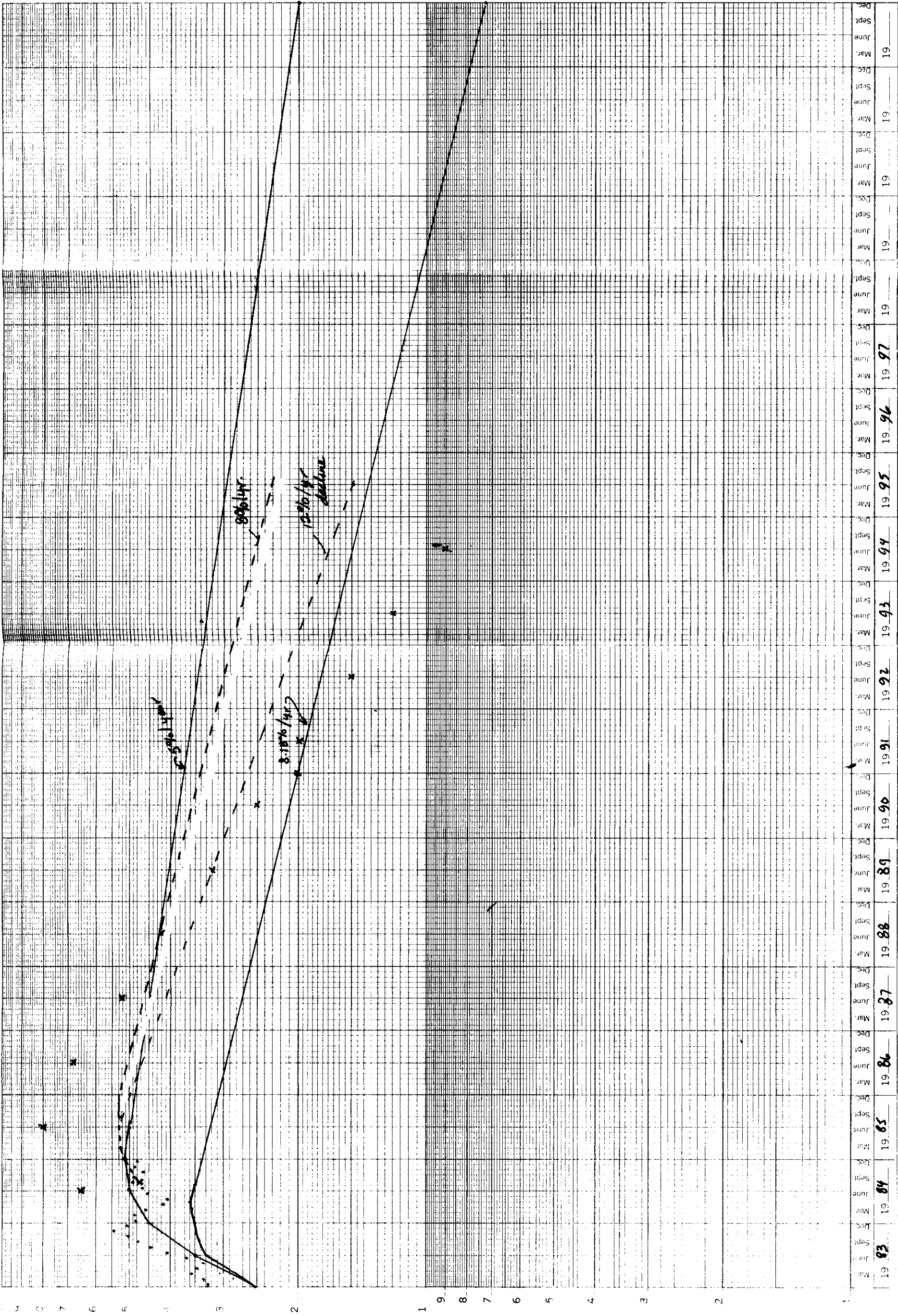
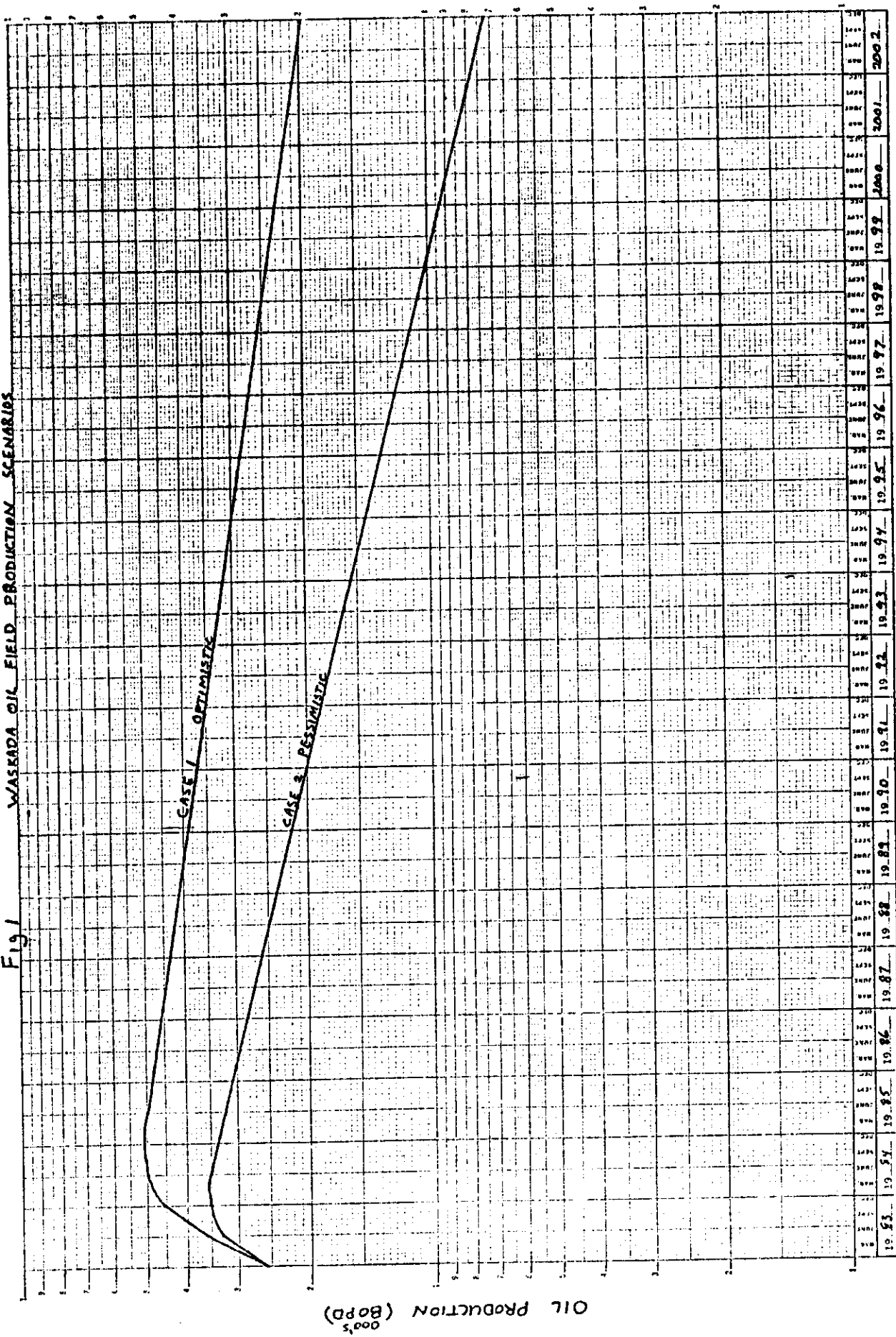


Fig 1

WASKADA OIL FIELD PRODUCTION SCENARIOS



YEAR

OIL PRODUCTION (BOPD)

QUESTIONS RE WASKADA DEVELOPMENT

1. At (current) production and decline rates available to us (up to end of July), it appears the volume projections provided (by our consultant, based on January 1984 data) were too optimistic. Do you have an updated daily production estimate for the field at year-end 1984? How many additional wells (from January 1984) will be on production at that time?
2. Decline rates for Unit 1 Waterflood appear to be in vicinity of 50%/year (Jan.-July/84 data). Is there any unusual set of circumstances causing this?
 - What are they?
 - What is your expected normal decline for this unit?
3. What is your best estimate of drilling activity in the field in 1985? When will the amount of additional wells drilled on a yearly basis become insignificant (i.e. less than 5%) as compared to the total number of wells in production?
4. How much of the field do you see being unitized and under waterflood by the end of 1985?
5. Do you have any preliminary results as to the effectiveness of the gas injection scheme?

OPTIMISTIC CASE

- Assumptions

1) NEW WELLS ON PROD.

Sept 83	12	
OCT-DEC 83	9	wells/mo
JAN-JUN 84	7	wells/mo.
JULY-DEC 84	5	wells/mo
JAN-JUN 85	3	wells/mo
JULY-DEC 85	2	wells/mo
JAN-JUN 86	1	well/mo
JULY 86	1	on

2) New Well Producing rate $7.0 \text{ m}^3/\text{d}/\text{well}$.

3) Primary decline rate $46\%/\text{year}$ ($5\%/\text{mo.}$)

4) Three waterfloods - all successful

Waterflood response curve

Month	Prod Ratio	$\frac{\text{Month } n}{\text{Month } 1}$
-------	------------	---

1		1.0
---	--	-----

2		0.9
---	--	-----

3		0.8
---	--	-----

4		0.9
---	--	-----

5		1.15
---	--	------

6		1.3
---	--	-----

7		1.5
---	--	-----

hold at 1.5 for 6 months

decline at $1\%/\text{month}$.

Current water flood - L. Am Unit No 1 (July 83 $4524 \text{ m}^3/\text{d}$)
peak at $5266 \text{ m}^3/\text{mon.}$

2nd waterflood - commence in Jan 84
initial month $9620 \text{ m}^3/\text{mon}$

3rd water flood

commence July 84

initial month 5000 m³/mon.

Pessimistic Case.

1) New wells on production

Sept 83	12
Oct 83 - Dec 83	8 well/mo.
Jan 84 - June 84	5
July 84 - Dec 84	3
Jan 85 - June 85	1
July 85 & after	0

2) New well rate

Sept - Dec 83	7 m ³ /d
1984	5 m ³ /d
1985	3 m ³ /d.

3) Primary Decline Rate 46%/yr (5%/mo.)

4) Waterflood^(boostflood) Response as per optimistic case except 2%/month decline.

5. Two waterfloods successful
 W.F 1 as in optimistic case
 W.F 2 - initial rate of 8000 m³/mo.

Month →	June 83	July 83	Aug 83	Sept 83	Oct 83	Nov 83
FIRST Water Ad	5053.7 4564.7	4564.2	5266	5266	5266	5266
Primary (old wells)	110635	12667	15538	18265	19745	19684 20612
Second WF	-	-	-	-	-	-
Third WF	-	-	-	-	-	-
New Wells.	1135.1	1844.5	1844.5	1260	976	945
TOTAL	17252.3	19075	22648	24791	25987	25895 26823
		3870	4595	5198	5272	5429

	JULY 84	AUG 84	SEP 84	OCT 84	NOV 84	DEC 84
FIRST WF	4956	4907	4858	4809	4761	4713
PRIMARY	11453	11856	12239	12572	12919	13218
SECOND WF	6016	6230	6133	6010	6744	6969
SECOND WF	14430	14430	14430	14430	14430	14430
THIRD WF	5000	4500	4000	4500	5750	6500
NEW WELLS	542	542	525	542	525	542
	36381 30944 6278 7381	36235 30609 6270 7351	30246	36853 30841 6267 7477	32260	39403 33154 6726 7994
	AUG 85	SEP 85	OCT 85	NOV 85	DEC 85	JAN 86

FIRST WF	4349	4305	4262	4219	4177	4135
PRIMARY	12725 6724	12466 6589	12234 6457	12012 6340	11790 6223	11541 6118
SECOND WF	13314	13181	13049	12919	12789	12661
THIRD WF	7350	7277	7204	7132	7061	6990
NEW WELLS	218 110	217	217 210	210	217	210
	37448 31447 64817699	31567	36966 31189 63287500	30820	36034 30467 7311	35587 30114 7220 6110

WASKADA PRODUCTION
PREDICTION
OPTIMISTIC CASE

Page 1

Dec 83	Jan 84	Feb 84	Mar 84	Apr 84	May 84	June 84
5266	5266	5213	5161	5109	5058	5007
21377 19599	12542 9924	13359 10149	13995 10793	14739 10500	15325 10673	15826 10861
-	9630 4425	8658	7696	8658	11063	12506
-	-	-	-	-	-	-
976	760	686	760	735	760	735
27619 25839	28188 25750	24706	27612 23910	25002	32206 27554	29109
5603 5243	5719 5229	5358	5602 4851		6534 6040	
JAN 85	FEB 85	MAR 85	APR 85	MAY 85	JUN 85	JULY 85
4666	4620	4573	4528	4482	4438	4393
13533 7135	13441 7087	13318 7022	13237 6979	13142 6945	13069 6907	12983 6861
14285	14142	14001	13851	13722	13585	13449
7500	7500	7500	7500	7500	7500	7425
325	305	325	315	325	315	217
40309 33911 6880 8178	40008 33654	39717 33421 8058 6181	33173	39171 32974 16970 7947	32745	38467 32345 78016 562
FEB 86	MAR 86	APR 86	MAY 86	JUN 86	JUL 86	AUG 86
4094	4053	4013	3972	3933	3893	3854
11389 6041	11210 5917	10844 5725	10478 5530	10149 5336	9809 5188	9338 5031
12535	12409	12285	12163	12041	11980	11901
6920	6851	6782	6715	6647	6581	6515
217	108	98	108	105	100	105
29777 6041	29338 34631 7026	28901 5863	28482 33736 6784	28082 5697	27750 32289 6550	27201 5519

	Sept 86	Oct 86	Nov 86	Dec 86	Jan 87	Feb 87	Mar 87	Apr 87	May 87	Jun 87	July 87	Aug 87	Sept 87
FIRST WF	3815	3777	3739	3702	3665	3628	3592						
PRIMARY	8871	8427	8006	7605	7225	6864	6521						
SECOND WF	11682	11566	11450	11335	11222	11110	10999						
THIRD WF	6449 6575	6985	6321	6258	6195	6133	6072						
							27184						
							5515						

INTRODUCTION
PREDICTION
Pessimistic Case.

Month →	June 83	July	Aug	Sep	Oct	Nov	Dec	Jan 84	Feb	Mar	Apr	May	June 84
First WF	5053.7	4564	5266	5266	5266	5266	5266	5266	5161	5057	4956	4857	4760
Primary	11063.5	12667	15538	18265	19745	20406	20897	13415	13442	13422	13449	13451	13477
Second W.F	—	—	—	—	—	—	—	8000	7200	6400	7200	9200	10400
New Wells.	1135.1	1844.5	1844.5	1260	868	840	868	388	362	388	375	388	375
Total	17 252.3				25879 5250		27031 5484	27069 5492		25261 5126		27896 5660	
By	July 84	Aug 84	Sep 84	Oct 84	Nov 84	Dec 84	Jan 85	Feb 85	Mar 85	Apr 85	May 85	June 85	July 85
FIRST WF	4665	4752	4480	4390	4302	4216	4133	4049	3968	3889	3811	3735	3660
Primary	13478	13222	12978	12735	12515	12295	12097	11575	11072	10601	10152	9927	9322
Second WF	12000	12000	12000	12000	12000	12000	11760	11524	11294	11068	10847	10630	10417
New Wells	232	232	225	232	225	232	45	42	46	45	46	45	0
Total	30375 6163	30206 6128		29357 5956		28743 5831	28036 5688		26380 5352		24856 5043		23399 4747
FIRST WF	Aug 85	Sep 85	Oct 85	Nov 85	Dec 85	Jan 86	Mar 86	May 86	July 86	Aug 86			
PRIM	3586	3514	3444	3376	3308	3242	3177	2990	2930	2872	284		
SECOND WF	8855	8412	7991	7592	7212	6851	6509	5530	5301	5037	4985		
	10208	10003	9804	9607	9415	9227	9042	8510	8340	8174	8010		
	22649	21949	21239		19935	19320	18157	17080	16571	16083	15609		
	4595	4449	4309		4044	3919	3684	3465	3362	3263	3167		

WASKADA FIELD PRODUCTION PREDICTION JUNE 1984

OMEGA MODEL
STUDY
6% / year.

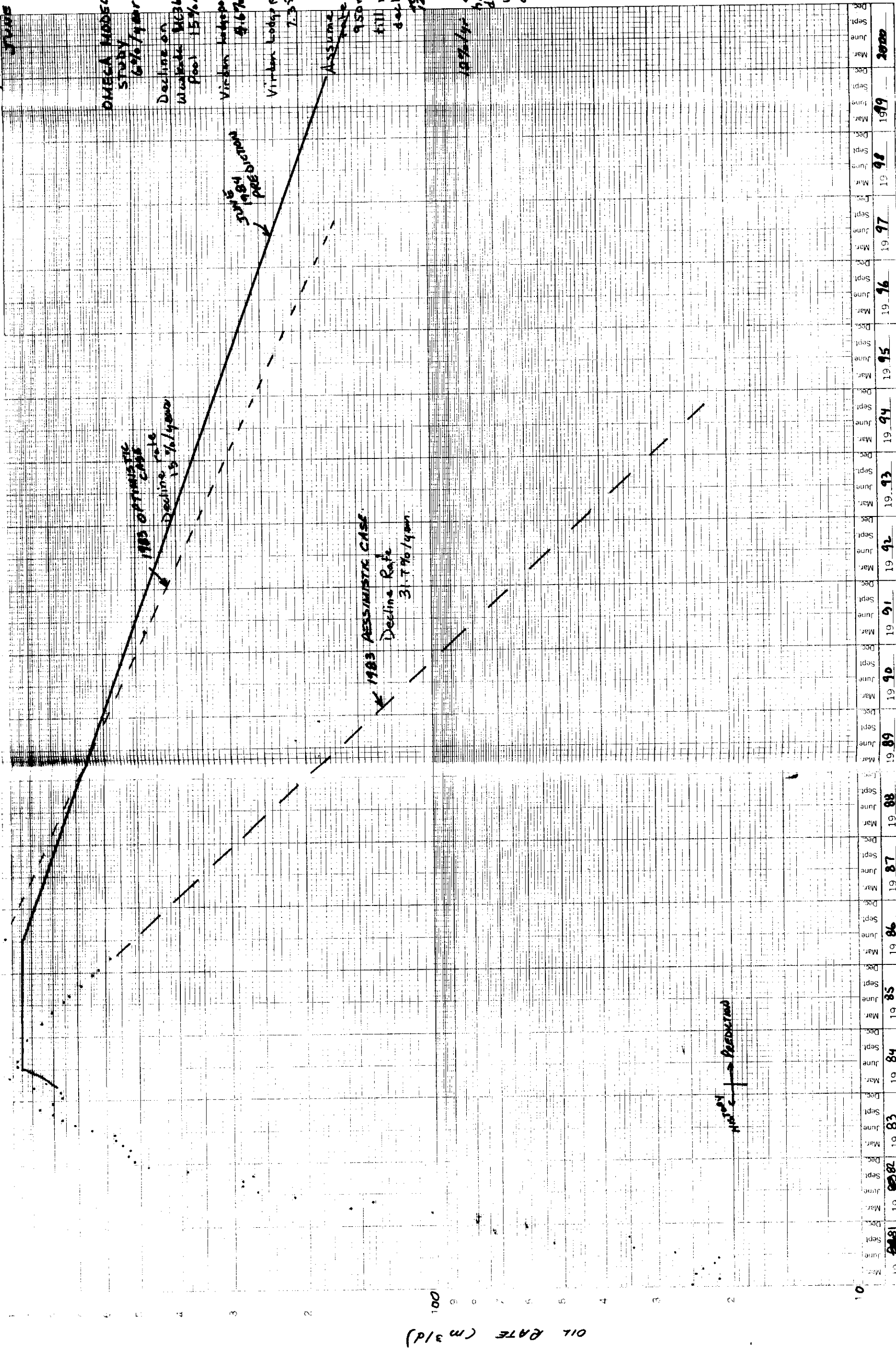
Decline on
Woodstock B Pool
15% / year

Woodstock B Pool
15% / year

Woodstock A
7.35% / year

Assume peak
rate of
950 m³ / d
till mid 1986
decline at
12% / year

Based on
high prim.
decline
w/ F decline
of 6-10%



OIL RATE (m³/d)

New Wells

June 83

~~10-12~~

Well	Rrod	Days	Prod / D.
63 10-12	63.8	4	
5-31	148.8	22	
9-23	241.7	16	
10-23 LAm	120.0	30	
13-23	50.5	11	
1-24 LAm	431.3	16	
12-26 LAm	8.5	1	
15-27 LAm	61.1	6	
16-27 LAm	<u>9.4</u>	<u>2</u>	10.51 m ³ /d

May 83

5-19 1.8 16 0.11

April 83

NIL

March 83

10 4-18	10.7	15	
8-12	45.4	4	
13-31	54.3	6	
13-26	50.3	16	
3-27	56.4	23	
16-28	225.7	14	
8-17	143.0	28	
10-28	32.6	16	5.07 m ³ /d.

Feb 83

14-27	72.7	8	
	37.6	14	5.01 m ³ /d

Jan 83

1-25 LA	354.8	14
15-12	156.6	19
10-23	<u>122.6</u>	26
	634.0	59

10.75

Dec 82

4-30 LA	232.1	21
232.1		
11-31	119.0	13
2-24	95.8	9
3-25 MCZ	2.8	1
14-25-1	36.3	28
15-10	61.5	21
14-7	67.4	10
10-14	156.4	22
2-23	85.7	10
7-23	16.3	2
8-23	174.9	22
1-27	31.8	6
5-27	149.6	14
7-27	198.0	20
9-27	139.4	14
10-27	194.5	15
13-27	22.9	3
14-27	31.3	6
16-27	27.7	13
6-35	142.8	18
14-3	20.9	8
3-14	6.9	6
15-17	80.3	23
2-16	36.1	17
9-33	37.8	29

6.18 m³/d

1) Ave ratio $\frac{\text{Jan/83}}{\text{July 83}}$ non water flood
59 wells = 0.73

* max ratio held at 2.00.

2) Ave ratio $\frac{\text{Jan 83}}{\text{July 83}}$ water flood
15 wells = 1.28

* max ratio held at 2.00

Decline assumptions

Primary 50 % / year

Water flood.	Ratios	(Current month First month)
	1	1.00
	2	90
	3	80
	4	90
	5	1.15
	6	1.30
	7	1.50
	8	stay at 1.50 for 6 months
	9	decline at 10% / year.

Waskada Field Production History

	<u>Oil</u>	m ³ /d	b/d	<u>WOP</u> <u>Wells</u>	wells
1-81	780.7 211.2	25.18 6.81	158 43	1.98 2.33	13 10
2	607.7	21.7	136	3.31	14
3	769.90	24.8	156	3.21	14
4	713.5	23.8	150	3.03	13
5	688.1	22.2	140	2.88	14
6	655.2	21.8	137	1.52	14
7	855.0	27.6	173	2.67	16
8	1070.1	34.5	217	1.79	16
9	1596.0	53.2	335	1.82	18
10	1094.6	35.3	222	2.36	20
11	2195.9 2151.7	73.2 71.7	440 451	1.32	25
12	1906.8	61.5	387	1.43	24
1-82	2506.9	80.9	509	0.95	25
2	2238.6	80.0	503	0.64	32
3	3197.1	103.1	649	0.71	37
4	4828.6	160.9	1012	0.64	41
5	4382.2	141.4	889	0.41	42
6	6511.7	217.1	1365	0.52	50
7	8189.1	264.2	1662	0.24	58
8	8928.7	288.0	1812	0.39	69
9	8669.1	289.0	1817	0.70	77
10	8383.8	270.4	1701	0.57	95
11	11710.7	390.4	2455	0.94	121
12	14922.3	481.4	3028	0.91	149