

Unocal Geothermal Division
Unocal Corporation
3576 Unocal Place, P.O. Box 6854
Santa Rosa, California 95406
Telephone (707) 545-7600

TERRY W. KELLEY

DEC 07 1989

UNOCAL 76

December 5, 1989

Bureau of Land Management
Ukiah District Office
Attn: Richard Estabrook
555 Leslie Street
Ukiah, CA 95482

Dear Mr. Estabrook:

Attached are the test results of our 1989 Glass Mountain activities. We are currently in the process of analyzing the data in order to plan for next year.

If you have any questions, or need any further information, please feel free to call me at (707) 545-7600 ext. 210.

Very truly yours,

David J. Camille
David J. Camille

DJC/smg
/6717R

Attachments

cc: Ben Barker
Dick Dondanville
Terry Kelley
Tim Rossknecht
GM-1-BLM-89-O File

GMF 68-8

GMF 31-7

GMF 87-13

Section 1
Well Chronologies

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Well Chronology GMF 87-13

10-29-89 Completed well to 3010 feet total depth.

10-30-89 Static Temperature/Pressure Survey No. 1.
Began Injection Test No. 1.
Injection Temperature Pressure Survey No. 2
End Injection Test No. 1.
Pressure Fall-off Survey No. 1.

11-03-89 Static Temperature Survey No. 3.

11-04-89 Began Production Test No. 1.
End Production Test No. 1.

11-05-89 Static Temperature/Pressure Survey No. 4
Began Production Test No. 2
End Production Test No. 2

11-06-89 Start Production Test No. 3.
Flowing Pressure Survey No. 6
End Production Test No. 3.
Pressure Build-up No. 1

11-07-89 Static Temperature/Pressure Survey No. 7.

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Well Chronology GMF 68-8

12-01-88 Static Temperature Survey No. 13.
08-12-89 Static Temperature/Pressure Survey No. 14.
08-14-89 Began Injection Test No. 4.
08-20-89 End Injection Test No. 4.
Pressure Falloff Survey.
08-22-89 Injection Temperature/Pressure Survey No. 15.
First Stage Acid Job.
08-24-89 Second stage acid job.
08-29-89 End injection Test No. 5.
Pressure fall-off survey.
09-05-89 Static Temperature/pressure gradient Survey No. 16.
09-06-89 Started Production Test No. 6.
09-15-89 Flowing Temperature/Pressure Gradient Survey No. 17.
09-26-89 Flowing Temperature Survey No. 18.
09-28-89 Flowing Temperature/Pressure Survey No. 19.
10-15-89 Flowing Temperature/Pressure Survey No. 20.
10-16-89 Flowing Temperature/Pressure Survey No. 21.
11-01-89 Flowing Temperature/Pressure Survey No. 22.

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Well Chronology GMF 31-17

12-01-89 Static Temperature Survey No. 8.
03-23-89 Static Temperature/Pressure Survey No. 9.
08-02-89 Static Temperature/Pressure Survey No. 10.
08-14-89 Began Production Test No. 3.
08-18-89 End Production Test No. 3.
Pressure Build-up Survey No. 2.
08-19-89 Began Production Test No. 4.
08-22-89 Flowing Temperature/Pressure Survey No. 11.
08-30-89 End Production Test No. 4.
Pressure Build-up Survey No. 3.
09-06-89 Static Temperature/Pressure Survey No. 12.
09-07-89 Began Injection Test No. 14.
Injection Pressure Survey No. 13.
09-16-89 Injection Temperature/Pressure Survey No. 14.
09-27-89 Injection Temperature/Pressure Survey No. 15.
10-31-89 Injection Temperature/Pressure Survey No. 16.
Pressure Fall-off Survey No. 4.
End Injection Test No. 4.

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PRESSURE AND TEMPERATURE GRADIENT SURVEYS

WELL GMF 68-8

STATIC TEMPERATURE SURVEY NO. 132.1
STATIC TEMPERATURE/PRESSURE SURVEY NO. 14.....2.2
INJECTION TEMPERATURE/PRESSURE SURVEY NO. 15.....2.3
STATIC TEMPERATURE/PRESSURE SURVEY NO. 16.....2.4
FLOWING TEMPERATURE/PRESSURE SURVEY NO. 17.....2.5
FLOWING TEMPERATURE SURVEY NO. 18.....2.6
FLOWING TEMPERATURE/PRESSURE SURVEY NO. 19.....2.7
FLOWING TEMPERATURE/PRESSURE SURVEY NO. 20.....2.8
FLOWING TEMPERATURE/PRESSURE SURVEY NO. 21.....2.9
FLOWING TEMPERATURE/PRESSURE SURVEY NO. 22.....2.10

WELL GMF 31-17

STATIC TEMPERATURE SURVEY NO. 8.....2.11
STATIC TEMPERATURE/PRESSURE SURVEY NO. 9.....2.12
STATIC TEMPERATURE/PRESSURE SURVEY NO. 10.....2.13
FLOWING TEMPERATURE/PRESSURE SURVEY NO. 11.....2.14
STATIC TEMPERATURE/PRESSURE SURVEY NO. 12.....2.15
INJECTION TEMPERATURE/PRESSURE SURVEY NO. 14.....2.16
INJECTION TEMPERATURE/PRESSURE SURVEY NO. 15.....2.17
INJECTION TEMPERATURE/PRESSURE SURVEY NO. 16.....2.18

WELL GMF 87-13

STATIC TEMPERATURE/PRESSURE SURVEY NO. 1.....2.19
INJECTION TEMPERATURE/PRESSURE SURVEY NO. 2.....2.20
STATIC TEMPERATURE SURVEY NO. 3.....2.21
STATIC TEMPERATURE/PRESSURE SURVEY NO. 4.....2.22
STATIC TEMPERATURE/PRESSURE SURVEY NO. 5.....2.23
FLOWING PRESSURE SURVEY NO. 6.....2.24
STATIC TEMPERATURE/PRESSURE SURVEY NO. 7.....2.25

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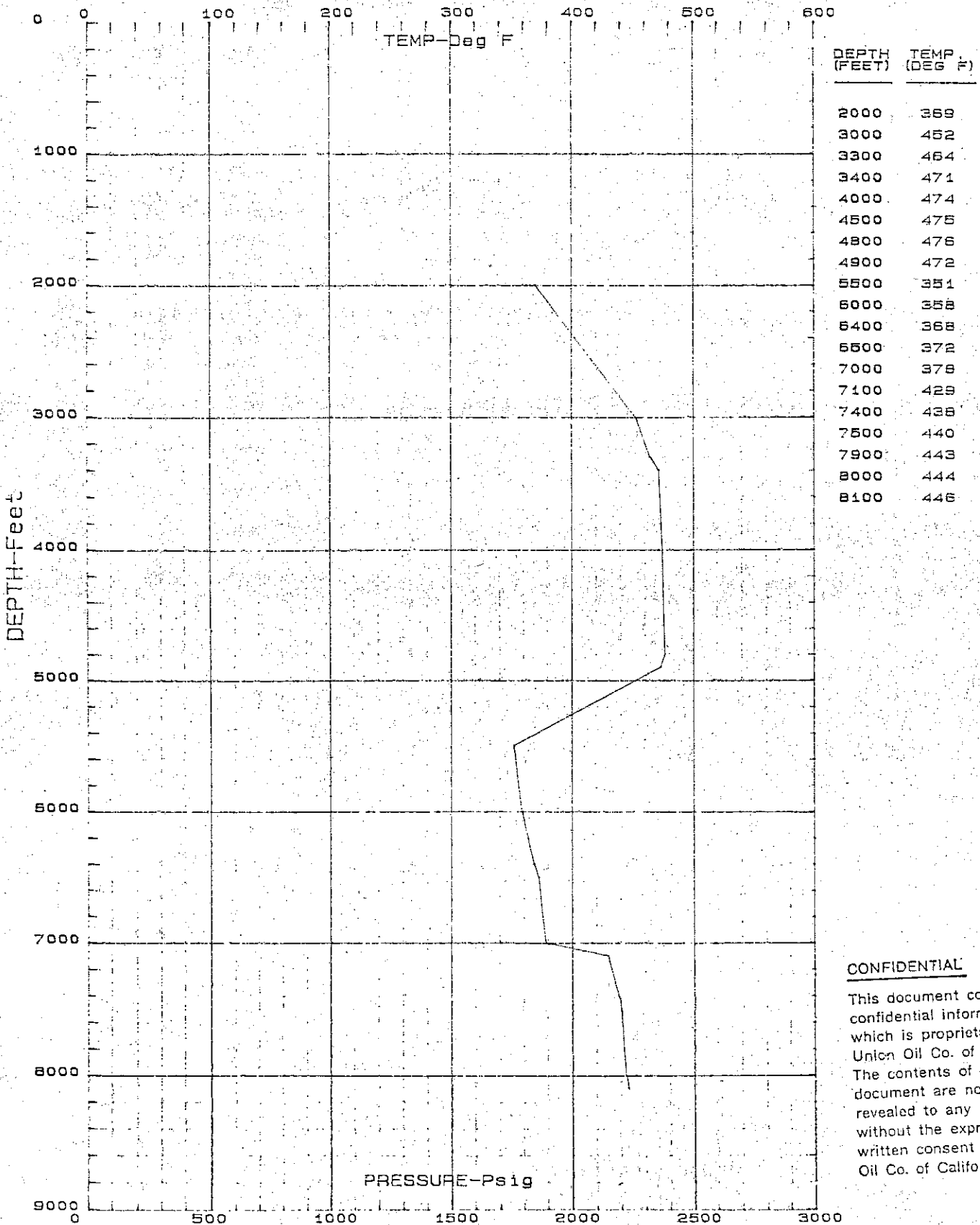
Section 2

Pressure and Temperature Surveys
(Graphs)

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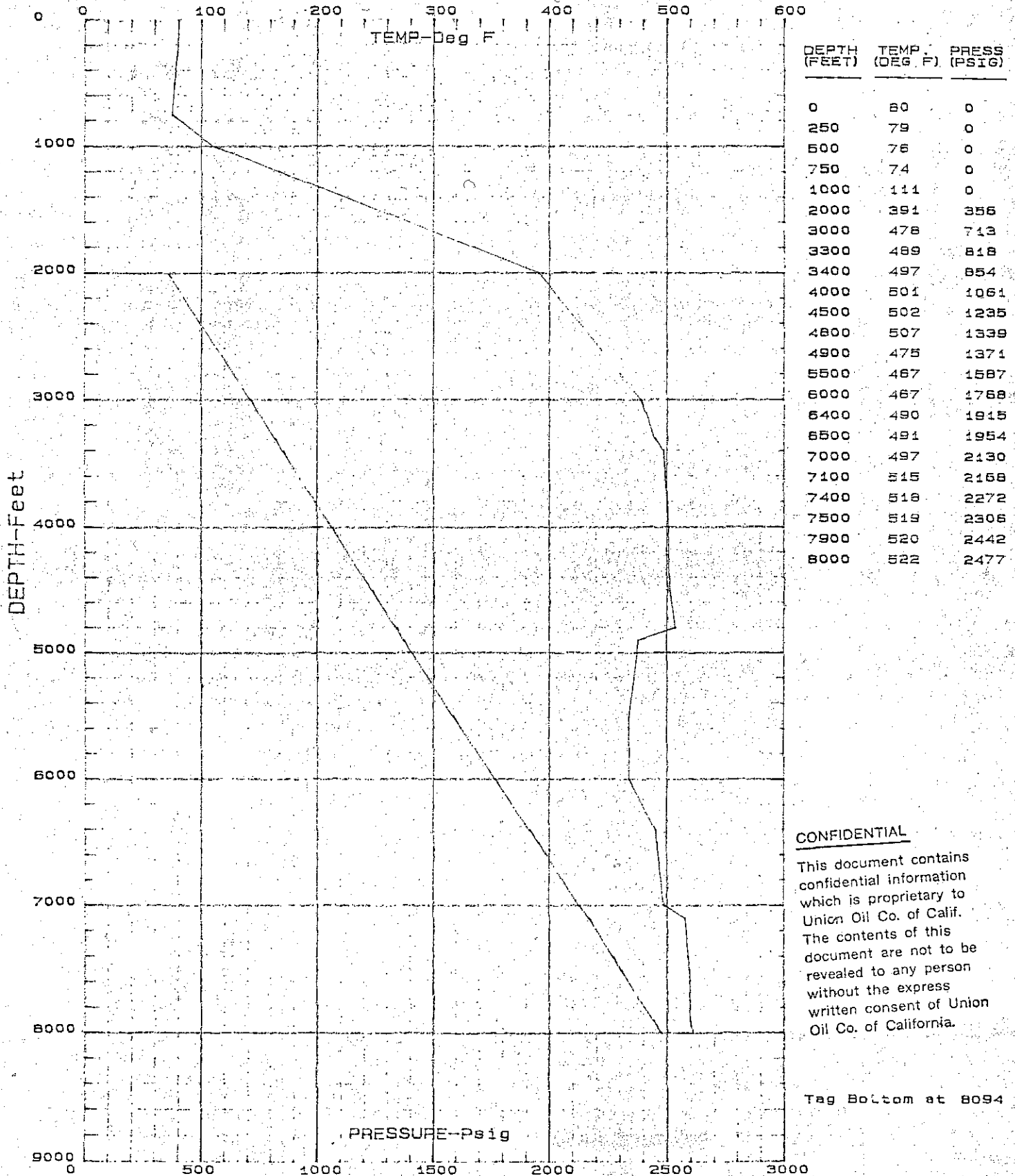
WELL: GM68-8 SURVEY: T Gradient No.13 DATE: 12/2/88
 Total Measured Depth: 8417 Ground Level Elevation: 6991
 COMPLETION: 7 in. liner From 3377 to 8410
 Perfs From 3840 to 8370 9.625 in. From 0 to 3515
 Status: Well Shut In Since 10/18/88 WHP Start: 0
 End : 0



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WELL: GM68-8 SURVEY: T/P Gradient No.14 DATE: 8/12/89
 Total Measured Depth: 8417 Ground Level Elevation: 6991
 COMPLETION: 7 in. liner From 3377 to 8410
 Perfs From 3840 to 8370 9.625 in. From 0 to 3515
 Status: Well Shut In Since 10/18 WHP Start: 0
 End : 0

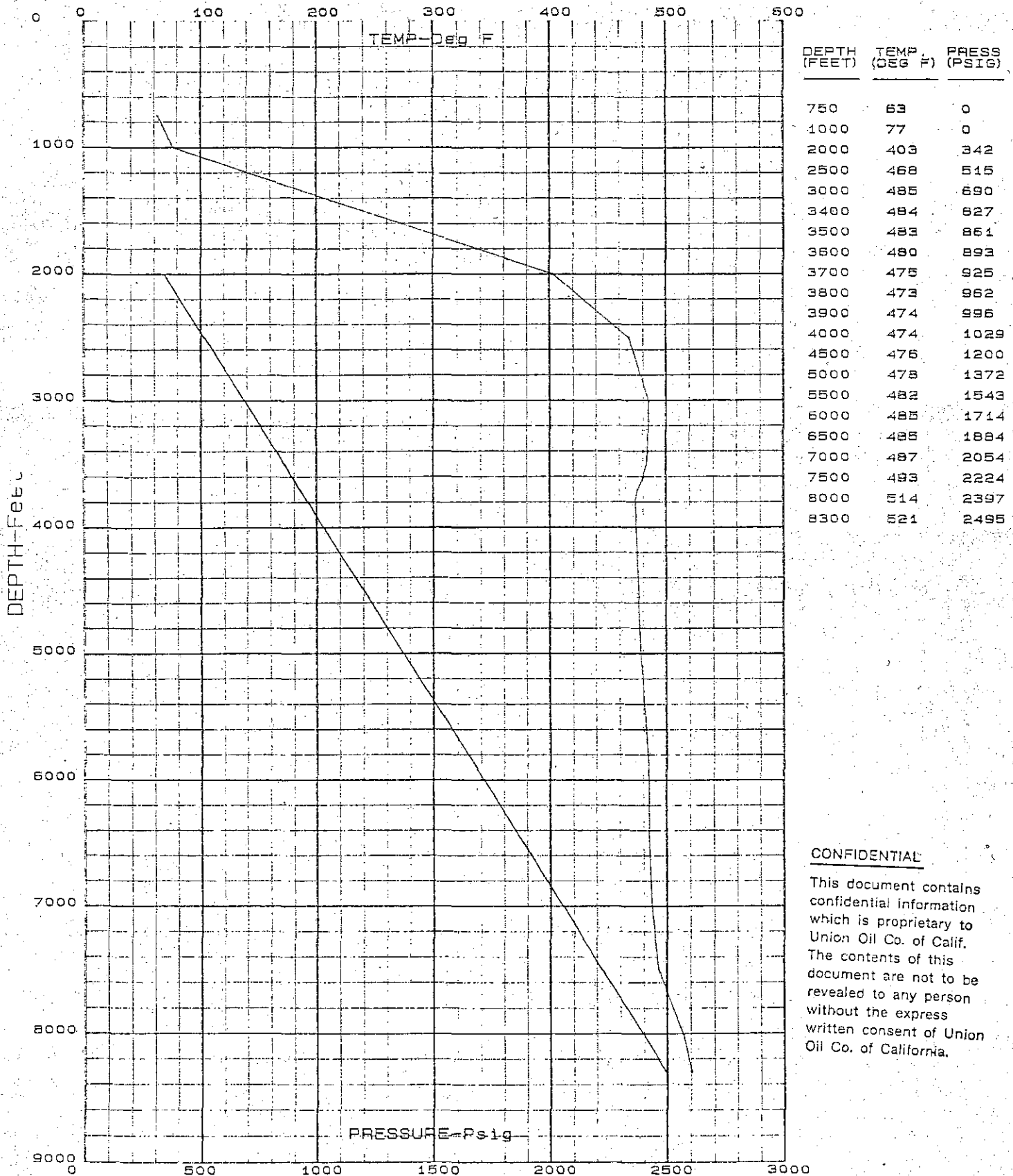


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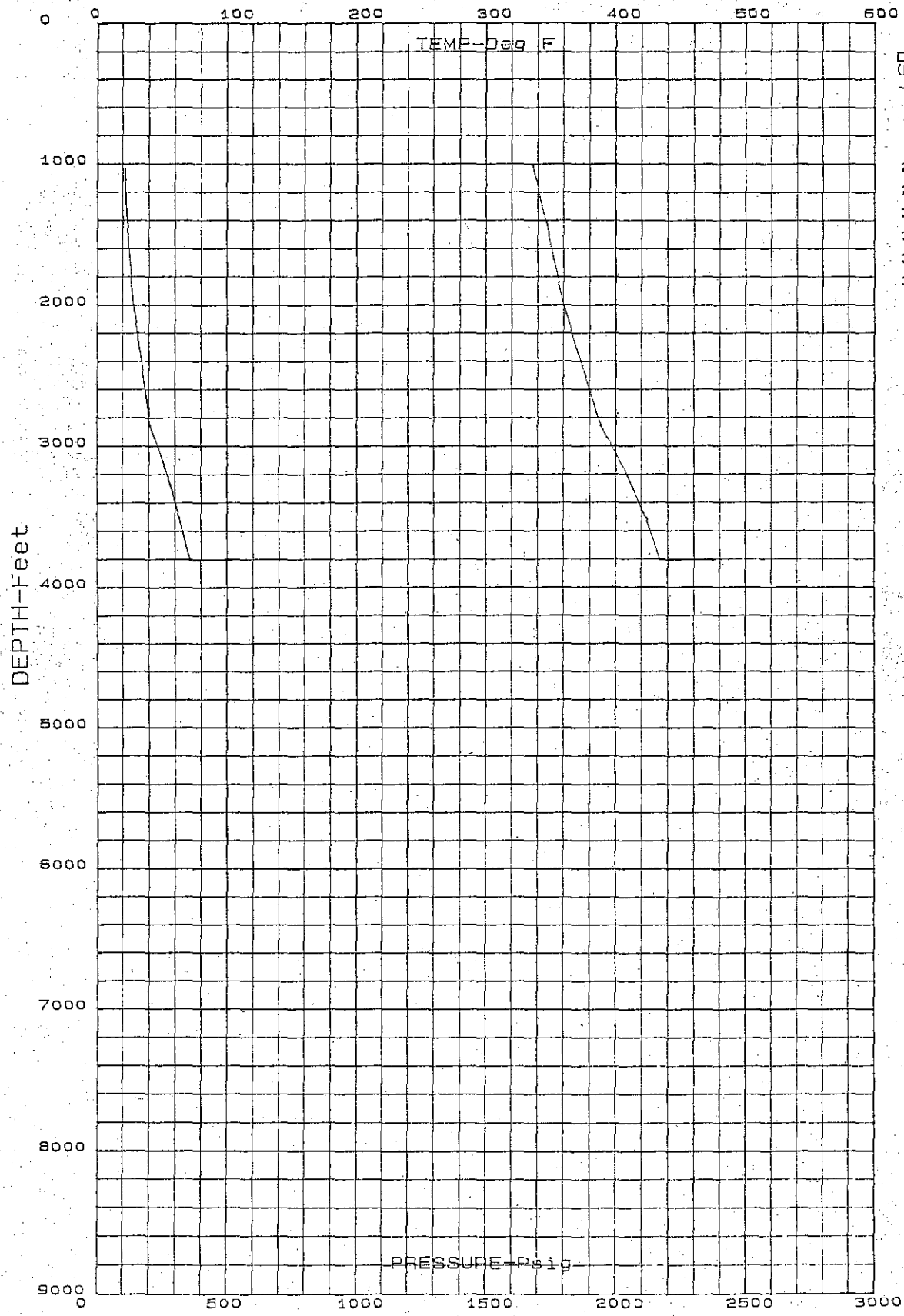
WELL: GM31-17 SURVEY: T/P Gradient No.10 DATE: 8/2/89
 Total Measured Depth: 8787 Ground Level Elevation: 7000
 COMPLETION: 7 in. liner From 2887 to 8777
 Perfs From 3100 to 8737 9.625 in. From 911 to 3054
 13.375 in. From 0 to 1128 WHP Start: 0
 Status: Well Shut In Since 10/31/88 End : 0



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WELL: GM31-17 SURVEY: T/P Gradient No.11 DATE: 8/22/89
 Total Measured Depth: 8787 Ground Level Elevation: 7000
 COMPLETION: 7 in. liner From 2887 to 8777
 Perfs From 3100 to 8737 9.625 in. From 911 to 3054
 13.375 in. From 0 to 1128 WHP Start: 86
 Status: Well Flowing Since 8/19/89 End: 140

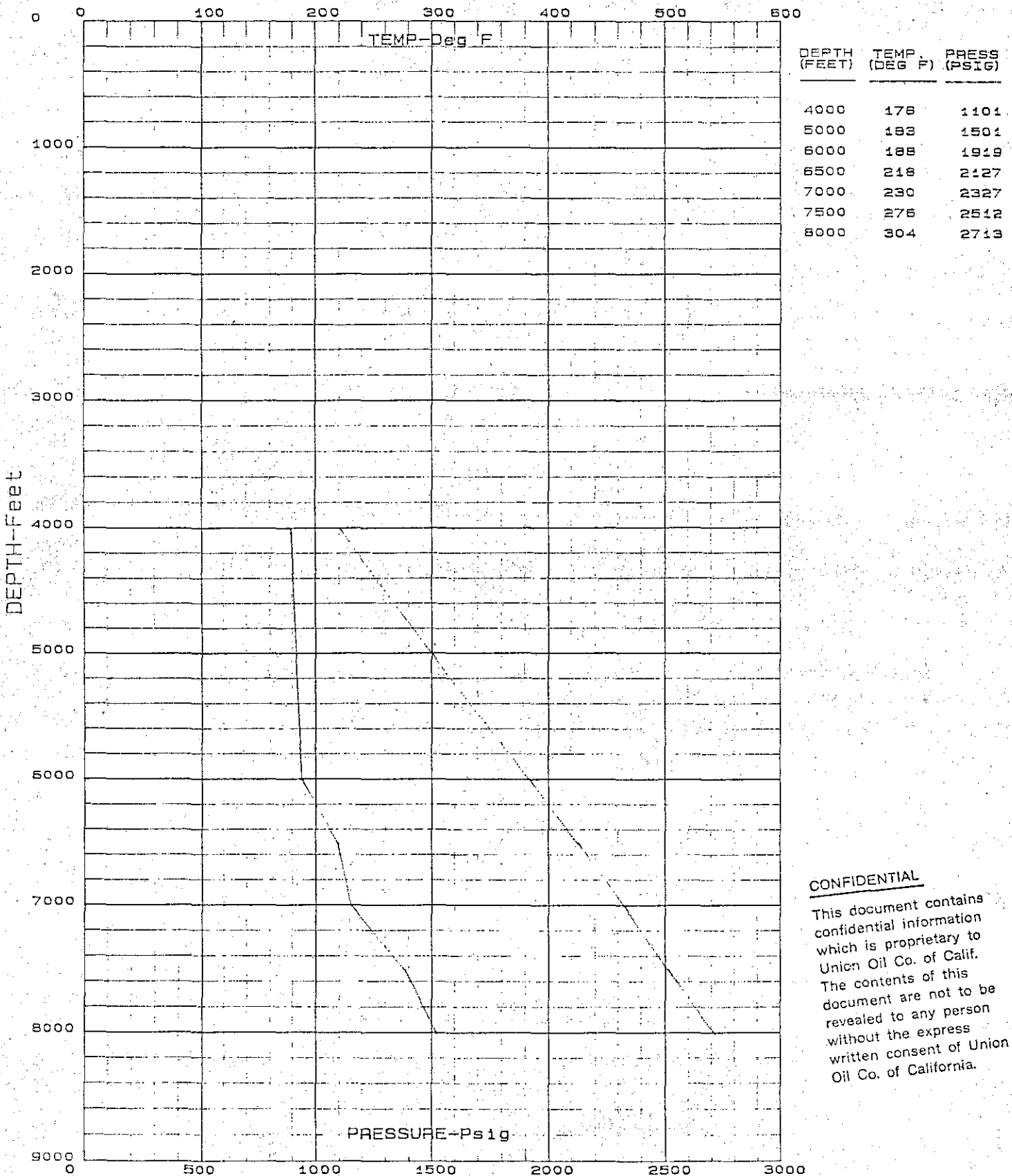


DEPTH (FEET)	TEMP. (DEG F)	PRESS (PSIG)
1000	335	103
1400	348	116
2000	360	140
2850	388	202
3200	409	270
3500	423	314
3800	434	355
3800	474	517

WHP Psig
86
140

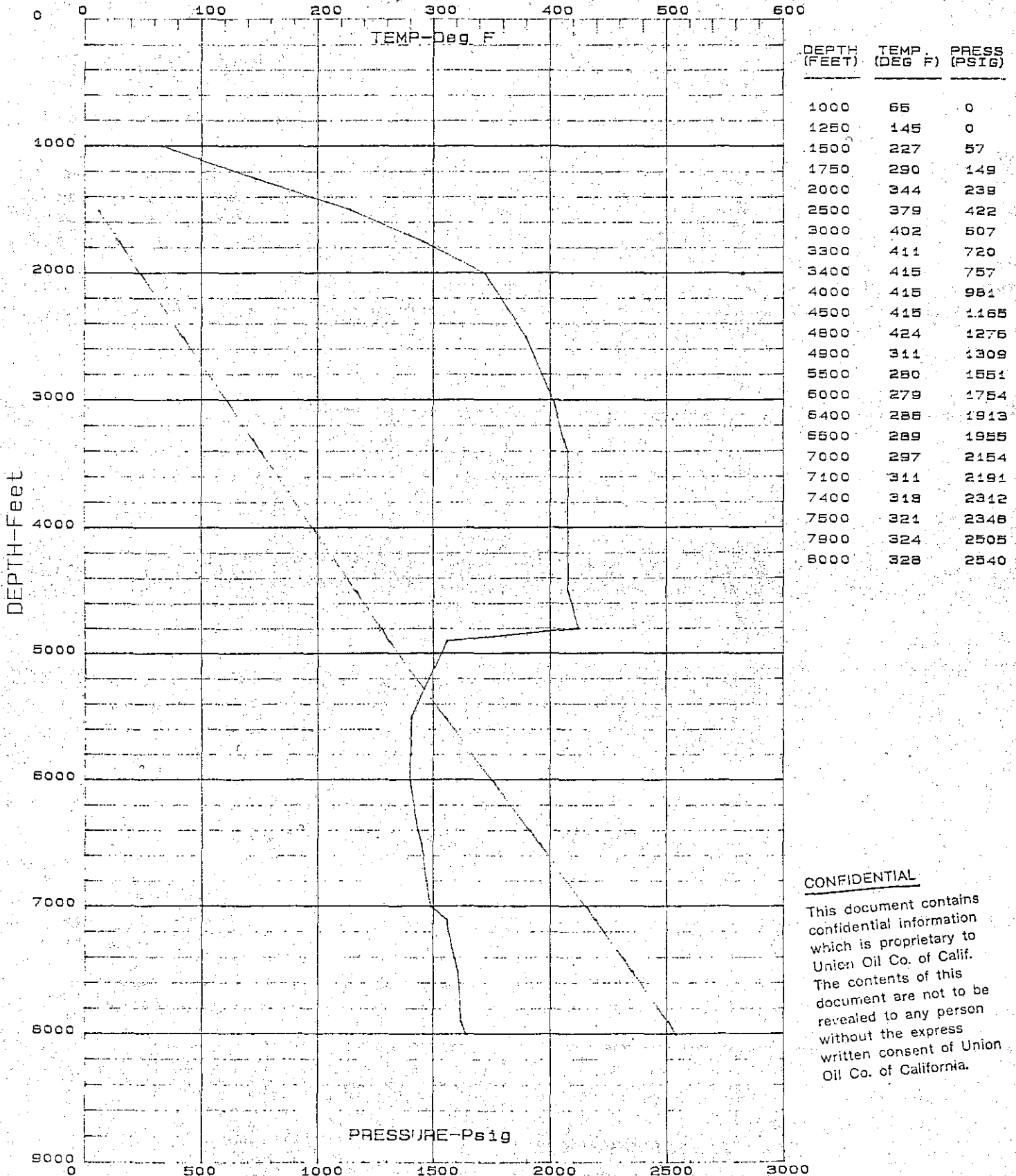
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WELL: GM68-8 SURVEY: T/P Gradient No.15 DATE: 8/22/89
 Total Measured Depth: 8417 Ground Level Elevation: 6991
 COMPLETION: 7 in. liner From 3377 to 8410
 Perfs From 3840 to 8370 9.625 in. From 0 to 3515
 Status: Injection Since 8/15/89 WHP Start: 0
 End : 0



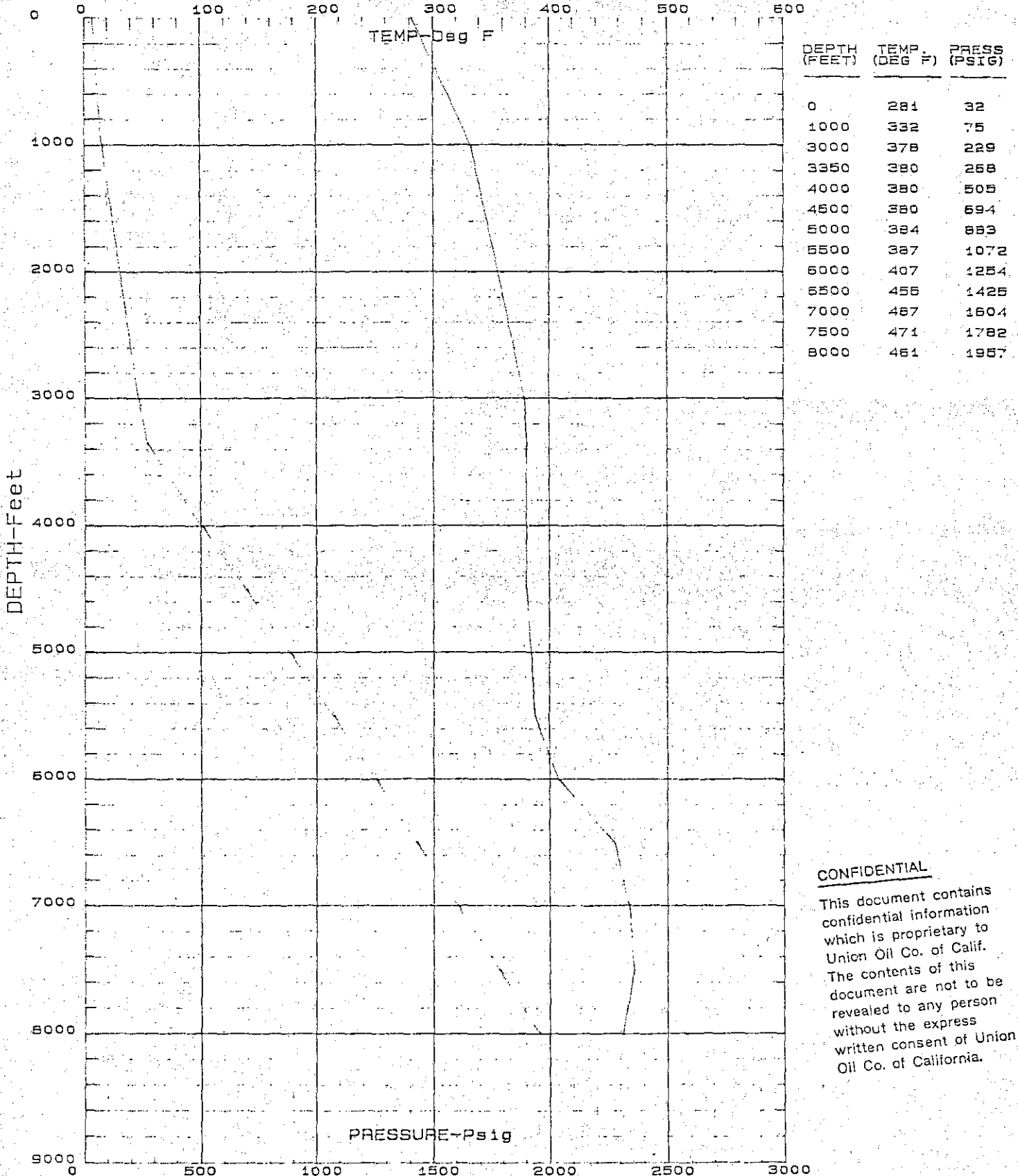
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WELL: GM68-8 SURVEY: T/P Gradient No.16 DATE: 9/5/89
 Total Measured Depth: 8417 Ground Level Elevation: 6991
 COMPLETION: 7 in. liner From 3377 to 8410
 Perfs From 3840 to 8370 9.625 in. From 0 to 3515
 Status: Well Shut In Since 8/29/89 WHP Start: 0
 End : 0



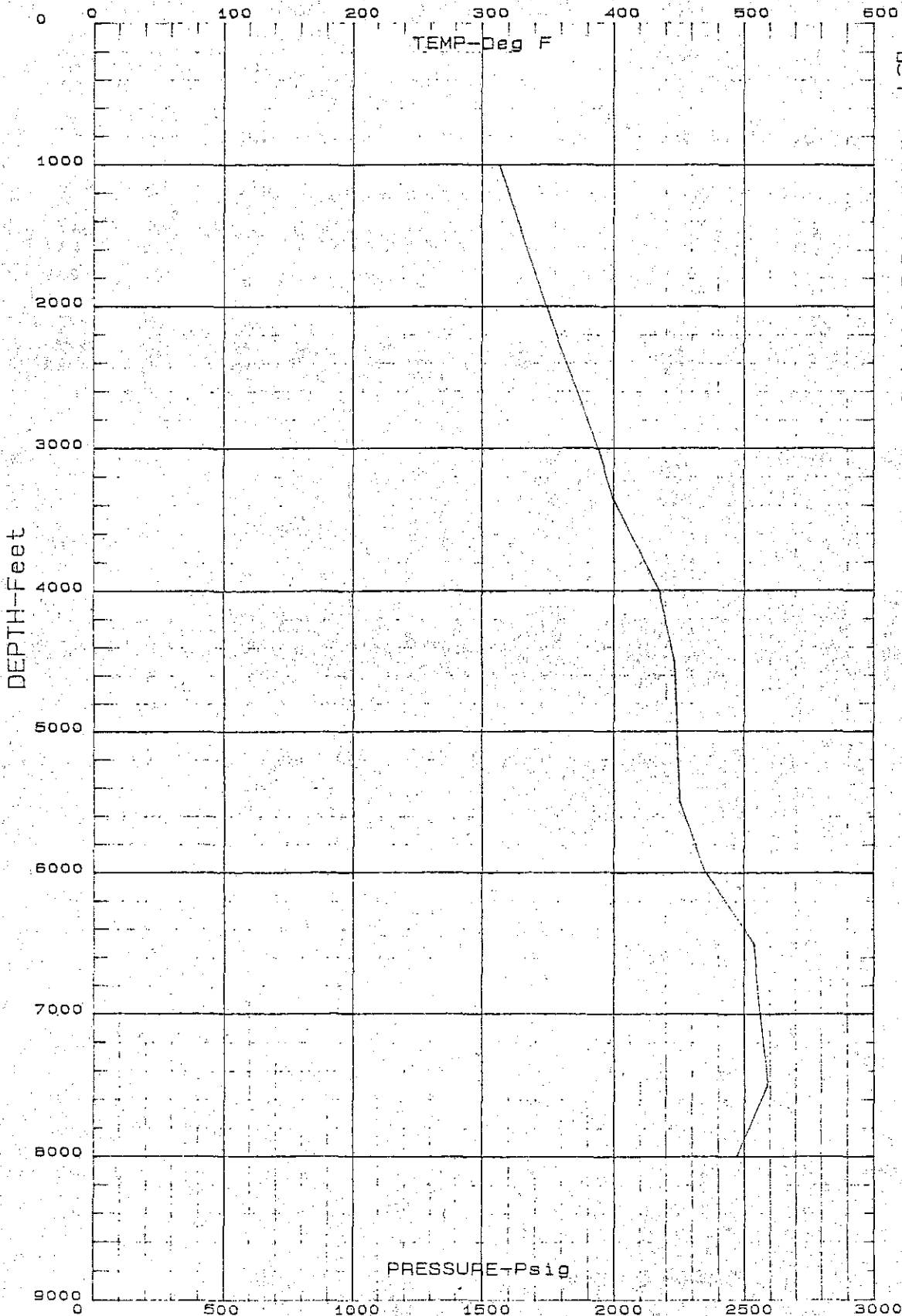
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WELL: GM68-8 SURVEY: T/P Gradient No.17 DATE: 9/15/89
 Total Measured Depth: 8417 Ground Level Elevation: 6991
 COMPLETION: 7 in. liner From 3377 to 8410
 Perfs From 3840 to 8370 9.625 in. From 0 to 3515
 Status: Well Flowing Since 9/13/89 WHP Start: 25
 End : 25



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WELL: GM68-8 SURVEY: T 18 DATE: 9/26/89
 Total Measured Depth: 8417 Ground Level Elevation: 6991
 COMPLETION: 7 in. liner From 3377 to 8410
 Perfs From 3840 to 8370 9.625 in. From 0 to 3515
 Status: Well Flowing Since 9/13/89 WHP Start: 57
 End : 57

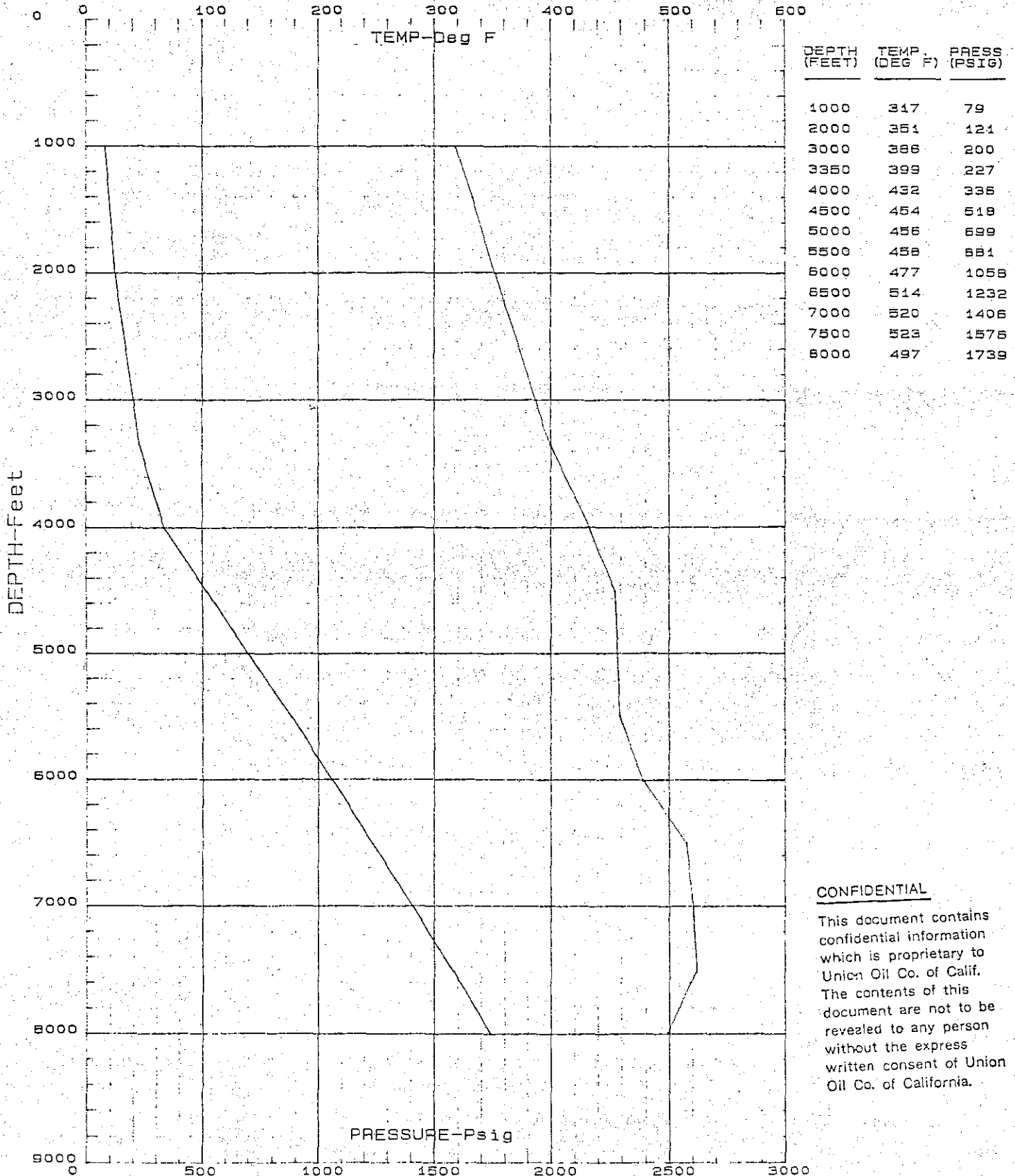


DEPTH (FEET)	TEMP (DEG F)
1000	312
2000	348
3000	387
3350	399
4000	434
4500	446
5000	448
5500	450
6000	470
6500	507
7000	512
7500	518
8000	493

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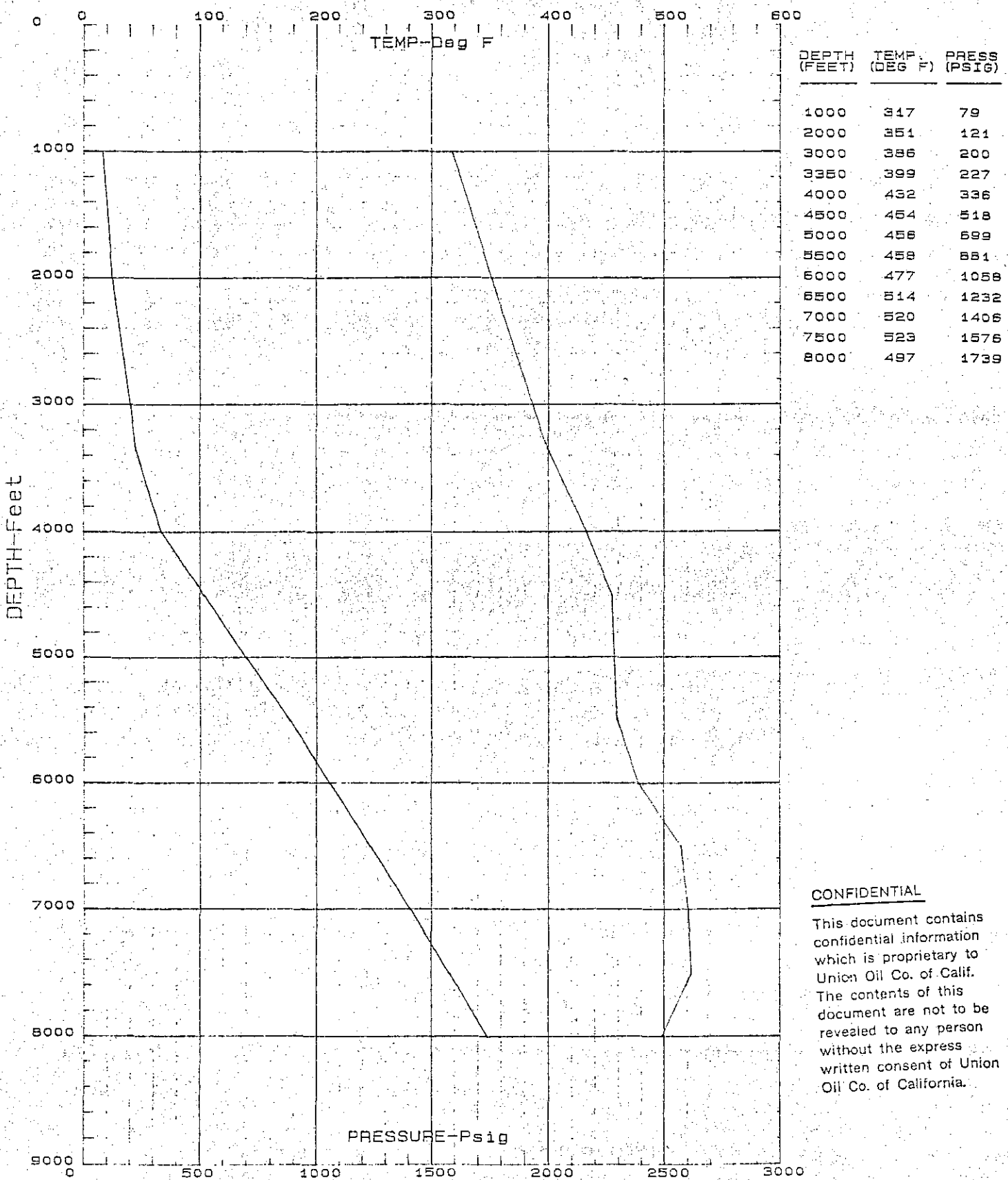
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WELL: GM68-8 SURVEY: T/P 19 DATE: 9/28/1989
 Total Measured Depth: 8417 Ground Level Elevation: 6991
 COMPLETION: 7 in. liner From 3377 to 8410
 Perfs From 3840 to 8370 9.625 in. From 0 to 3515
 Status: Well Flowing Since 9/13/1989 WHP Start: 59
 End : 59



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WELL: GM68-8 SURVEY: T/P 19 DATE: 9/28/1989
 Total Measured Depth: 8417 Ground Level Elevation: 6991
 COMPLETION: 7 in. liner From 3377 to 8410
 Perfs From 3840 to 8370 9.625 in. From 0 to 3515
 Status: Well Flowing Since 9/13/1989 WHP Start: 59
 End : 59



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WELL: GM68-8 SURVEY: T/P

21

DATE: 10/16/89

Total Measured Depth: 8417

Ground Level Elevation: 6991

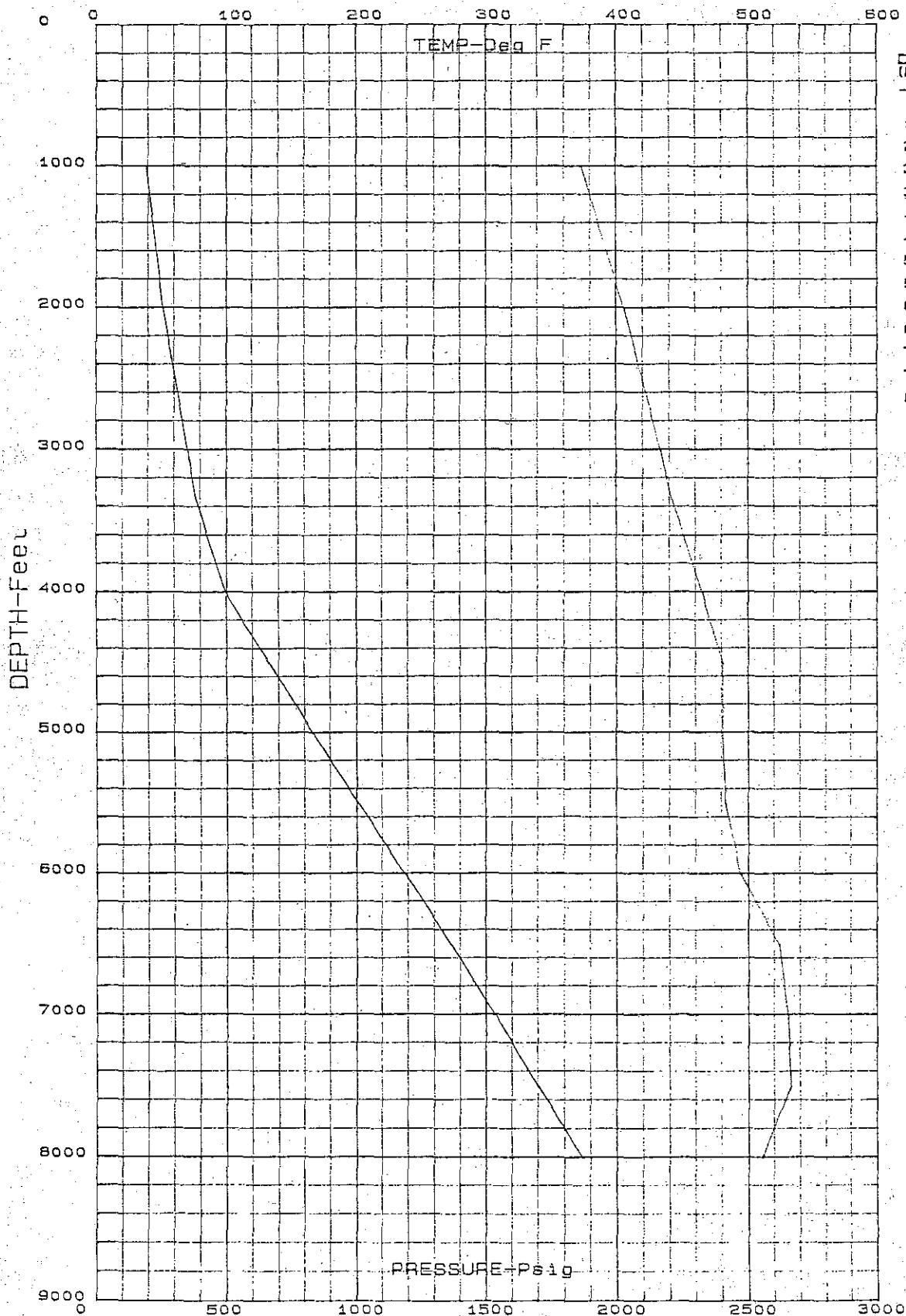
COMPLETION: 7 in. liner From 3377 to 8410

Perfs From 3840 to 8370 9.625 in. From 0 to 3515

Status: Well Flowing Since 9/6/89

WHP Start: 140

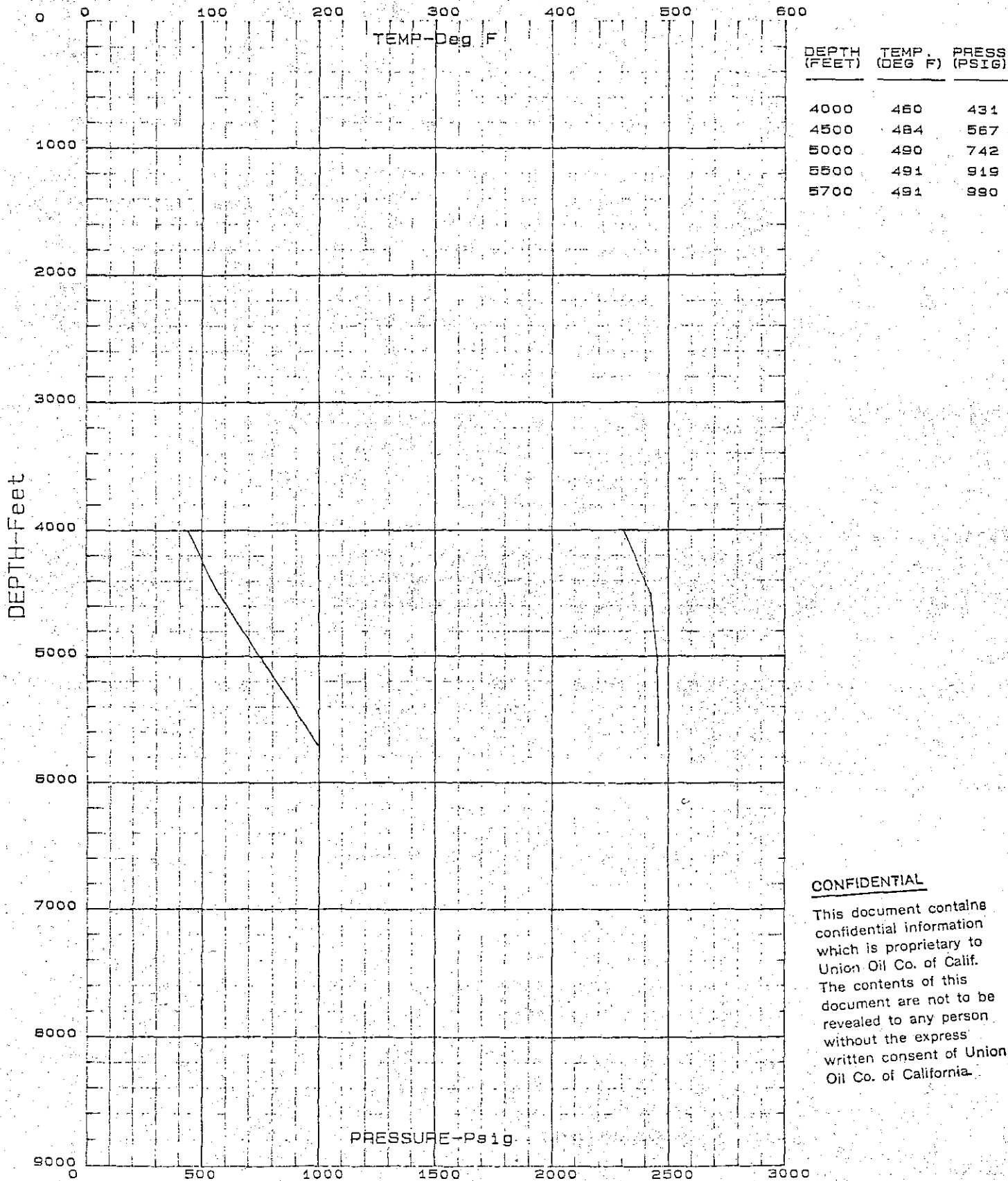
End : 140



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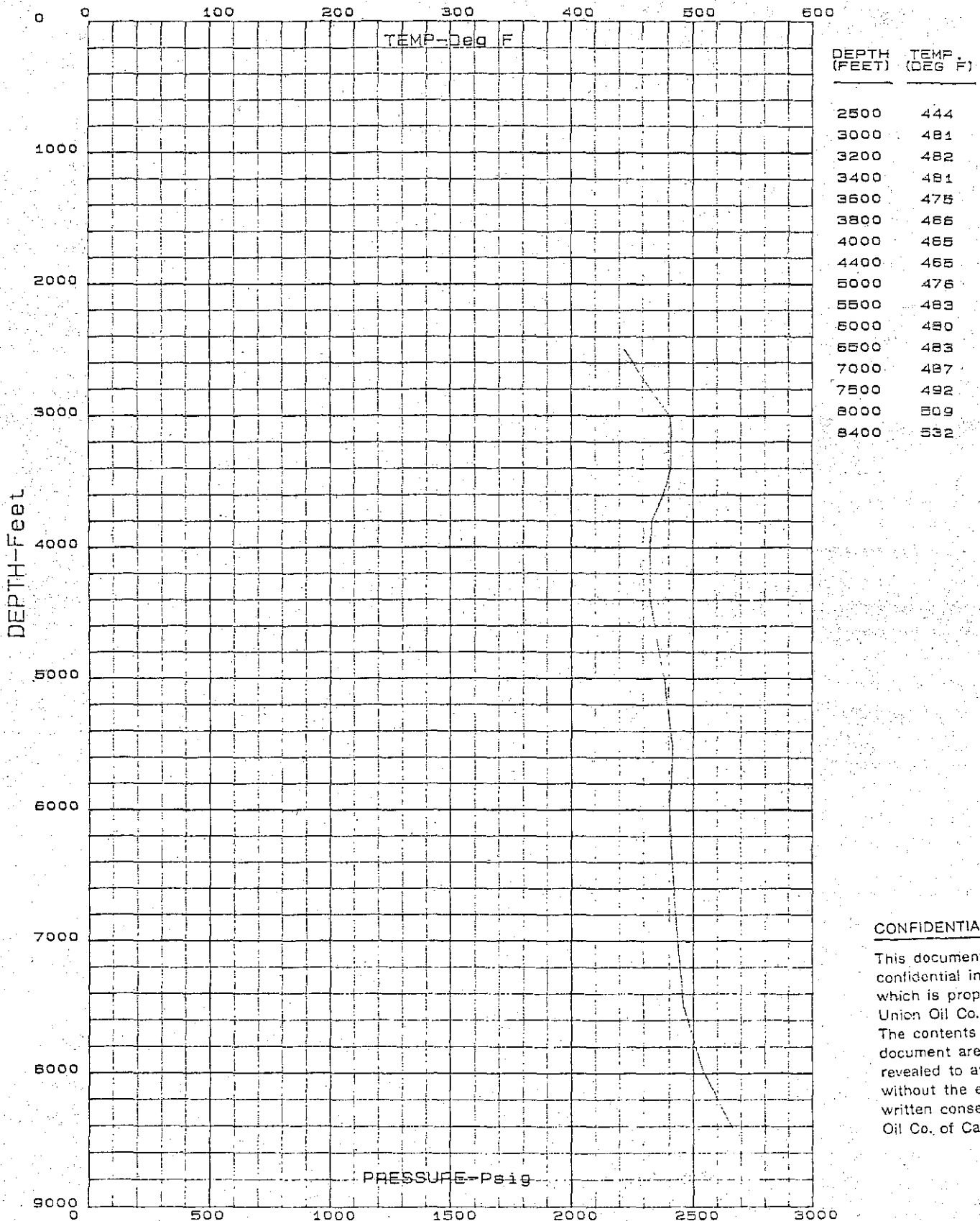
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WELL: GM68-8 SURVEY: T/P Gradient No.22 DATE: 11/1/89
 Total Measured Depth: 8417 Ground Level Elevation: 6991
 COMPLETION: 7 in. liner From 3377 to 8410
 Perfs From 3840 to 8370 9.625 in. From 0 to 3515
 Status: Well Flowing Since 9/6/89 WHP Start: 145
 End : 145



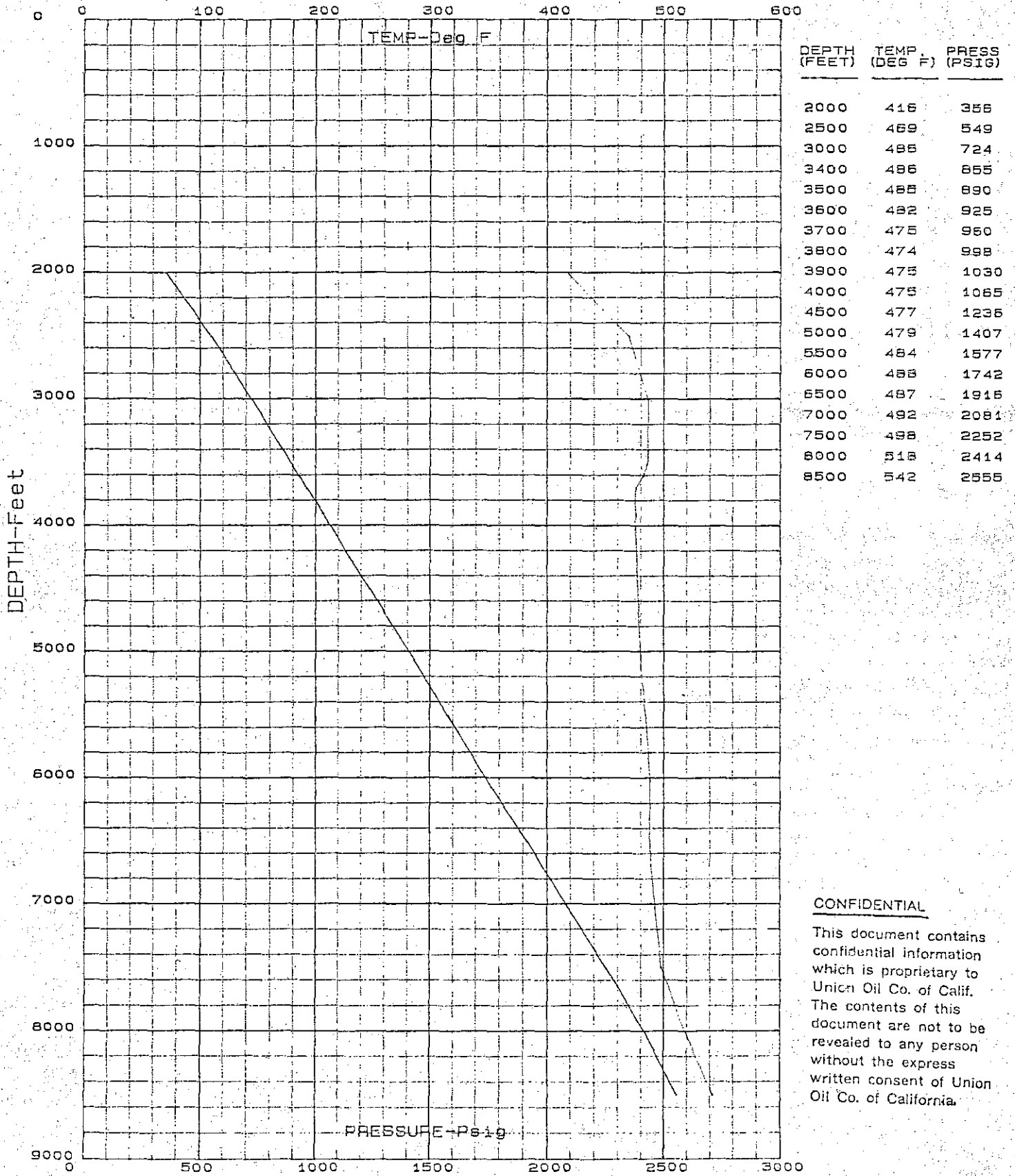
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WELL: GM31-17 SURVEY: T Gradient No.8 DATE: 12/1/88
 Total Measured Depth: 8787 Ground Level Elevation: 7000
 COMPLETION: 7 in. liner From 2887 to 8777
 Perfs From 3100 to 8737 9.625 in. From 911 to 3054
 13.375 in. From 0 to 1128 WHP Start: 0
 Status: Well Shut In Since 10/31/88 End : 0



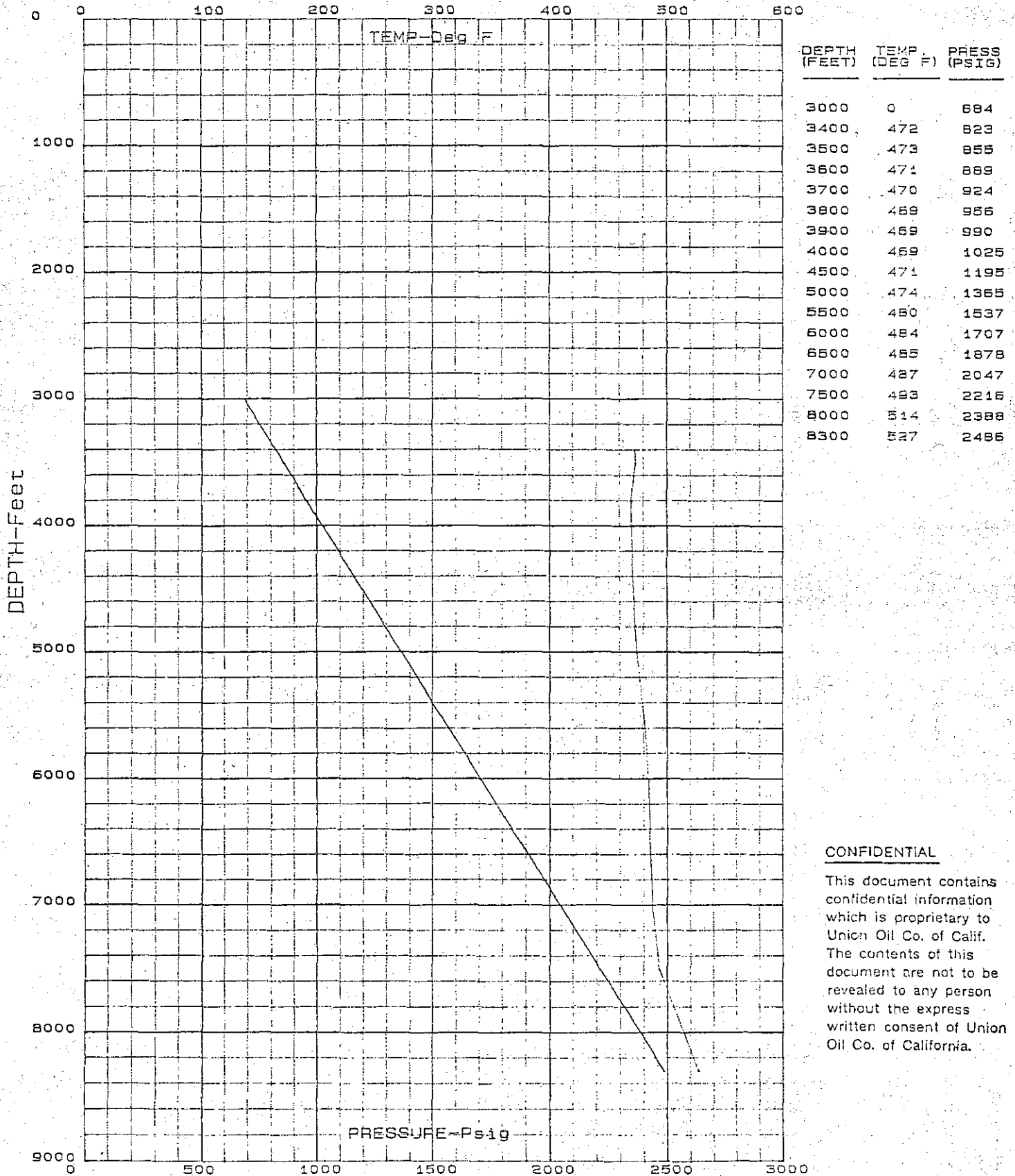
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WELL: GM31-17 SURVEY: T/P Gradient No.9 DATE: 3/23/89
 Total Measured Depth: 8787 Ground Level Elevation: 7000
 COMPLETION: 7 in. liner From 2887 to 8777
 Perfs From 3100 to 8737 9.625 in. From 911 to 3054
 13.375 in. From 0 to 1128 WHP Start: 0
 Status: Well Shut In Since 10/31/89 End : 0



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WELL: GM31-17 SURVEY: T/P Gradient No.12 DATE: 9/6/89
 Total Measured Depth: 8787 Ground Level Elevation: 7000
 COMPLETION: 7 in. liner From 2887 to 8777
 Perfs From 3100 to 8737 9.625 in. From 911 to 3054
 13.375 in. From 0 to 1128 WHP Start: 0
 Status: Well Shut In Since 8/30/89 End : 0



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WELL: GM31-17 SURVEY: T/P

14

DATE: 9/16/1989

Total Measured Depth: 8787

Ground Level Elevation: 7000

COMPLETION: 7 in. liner From 2887 to 8777

Perfs From 3100 to 8737

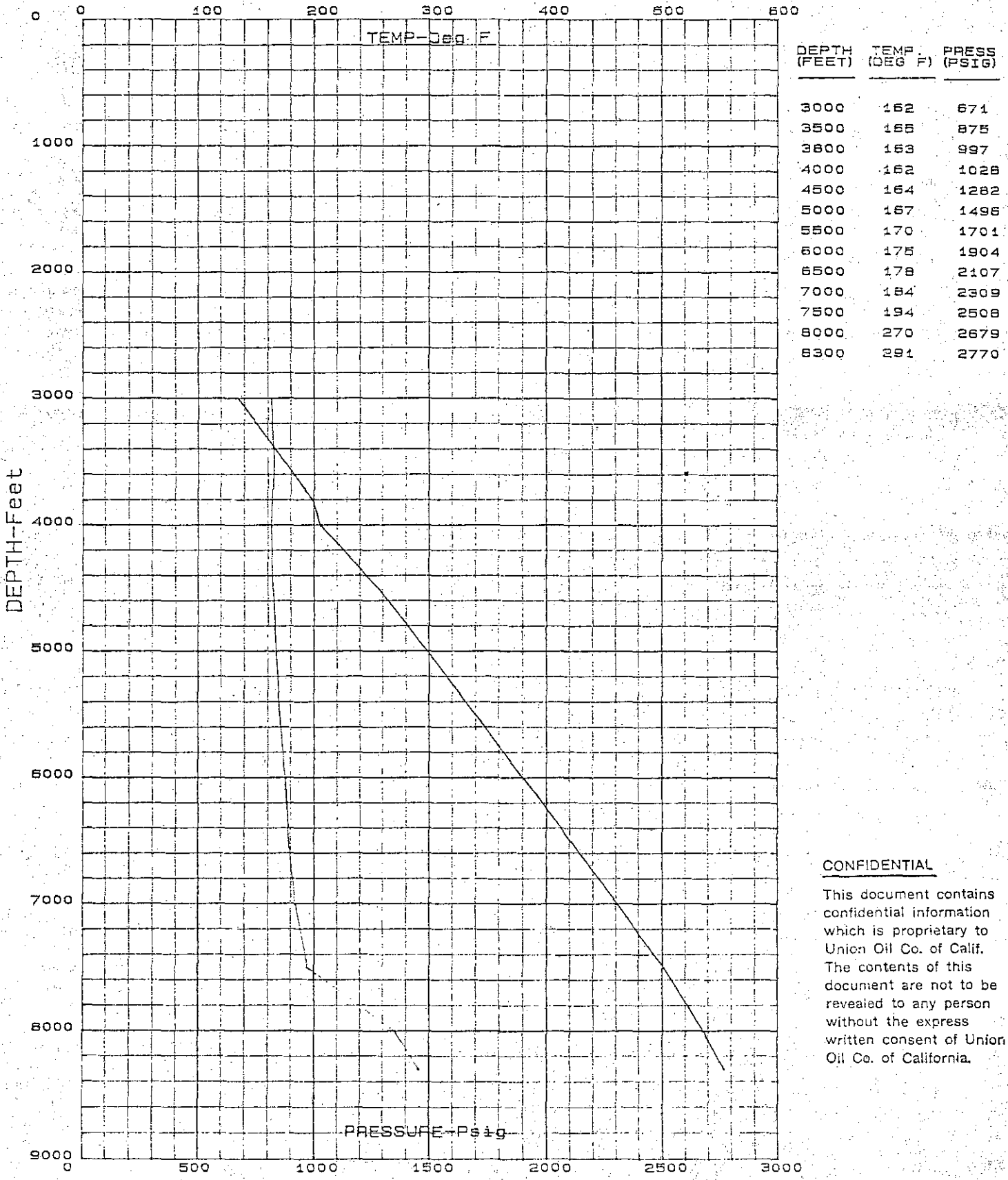
9.625 in. From 911 to 3054

13.375 in. From 0 to 1128

WHP Start: 0

Status: Injection Since 9/7/89

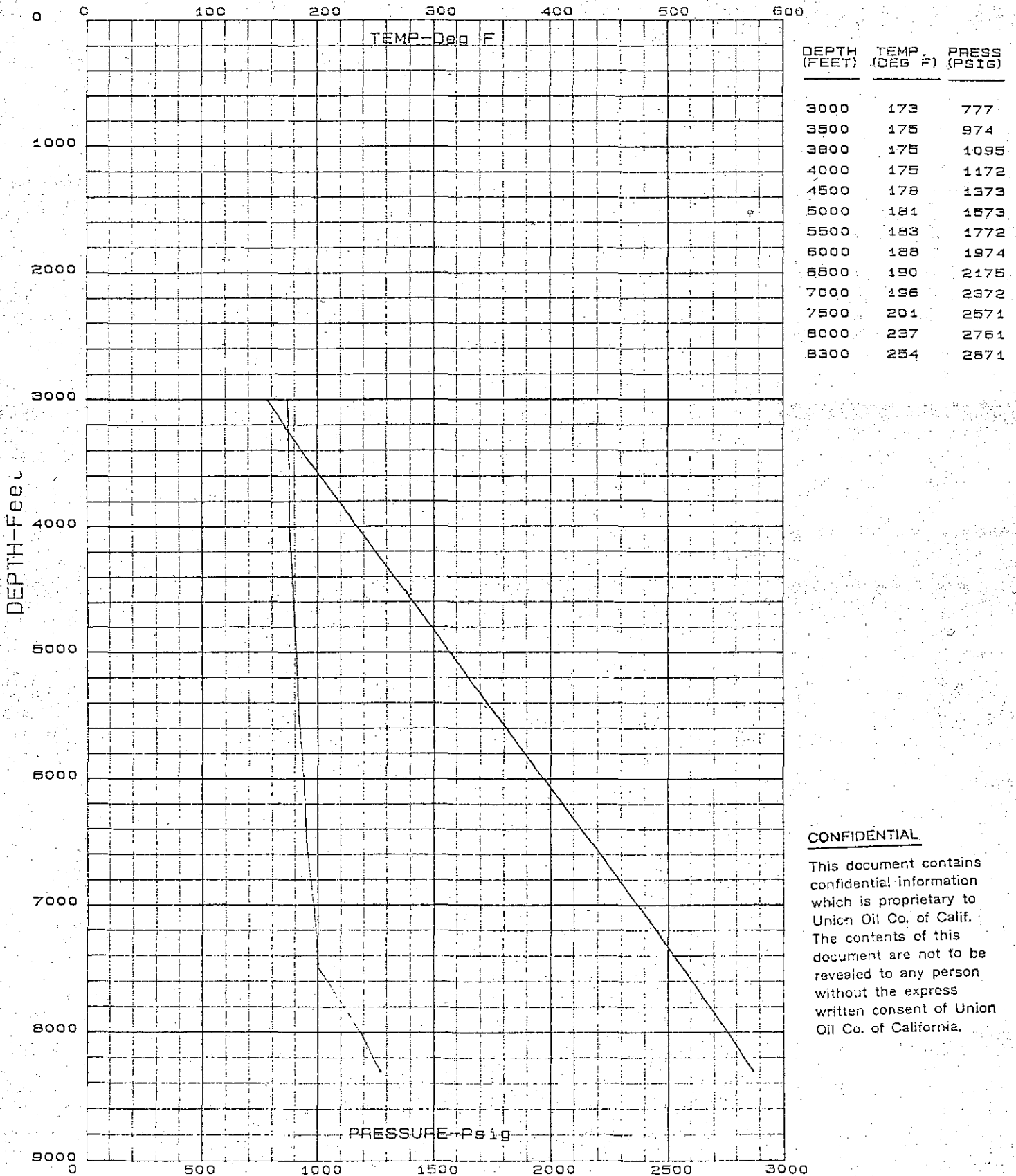
End : 0



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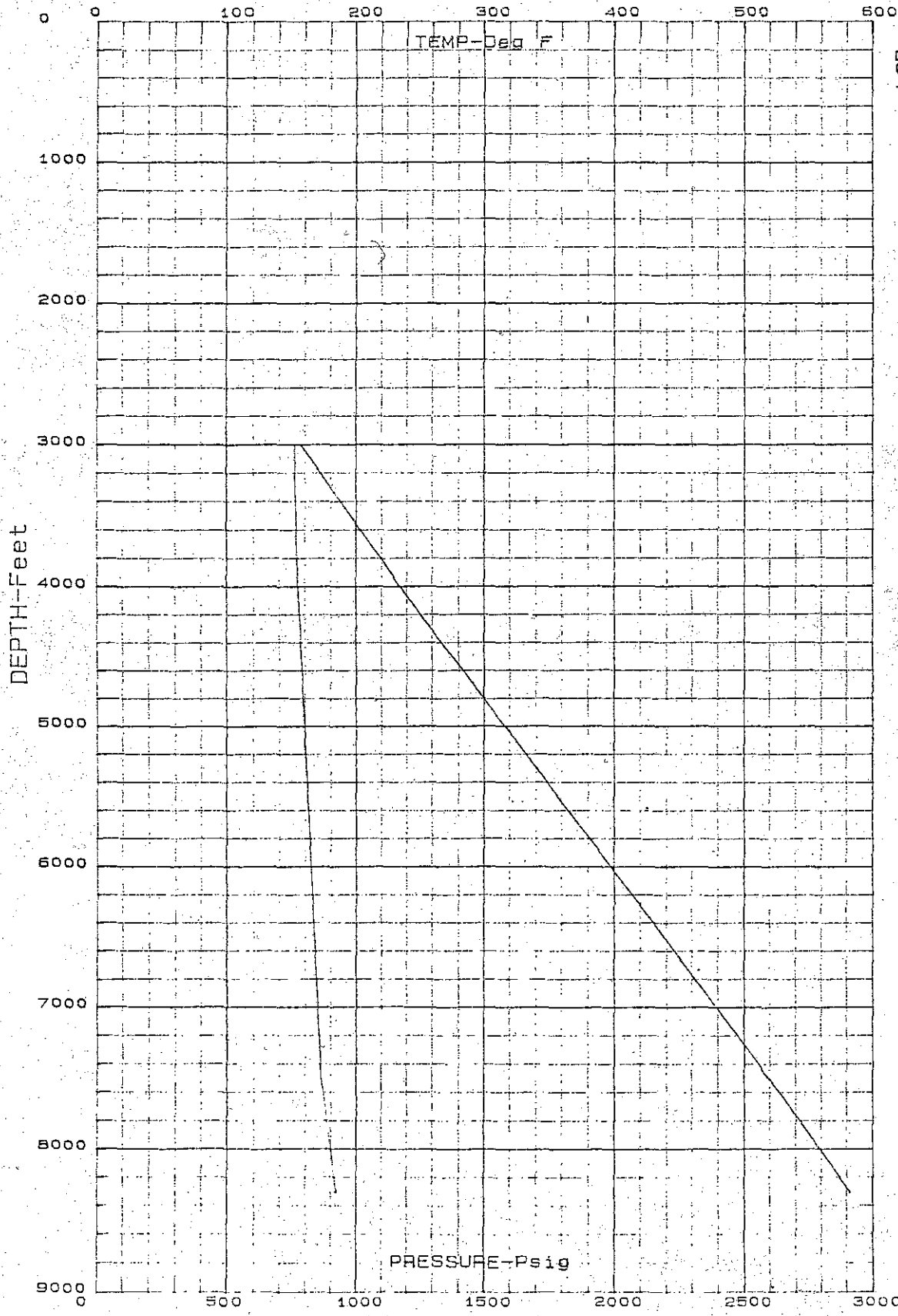
WELL: GM31-17 SURVEY: T/P 15 DATE: 9/27/89
 Total Measured Depth: 8787 Ground Level Elevation: 7000
 COMPLETION: 7 in. liner From 2887 to 8777
 Perfs From 3100 to 8737 9.625 in. From 911 to 3054
 13.375 in. From 0 to 1128 WHP Start: 0
 Status: Injection Since 9/7/89 End: 0



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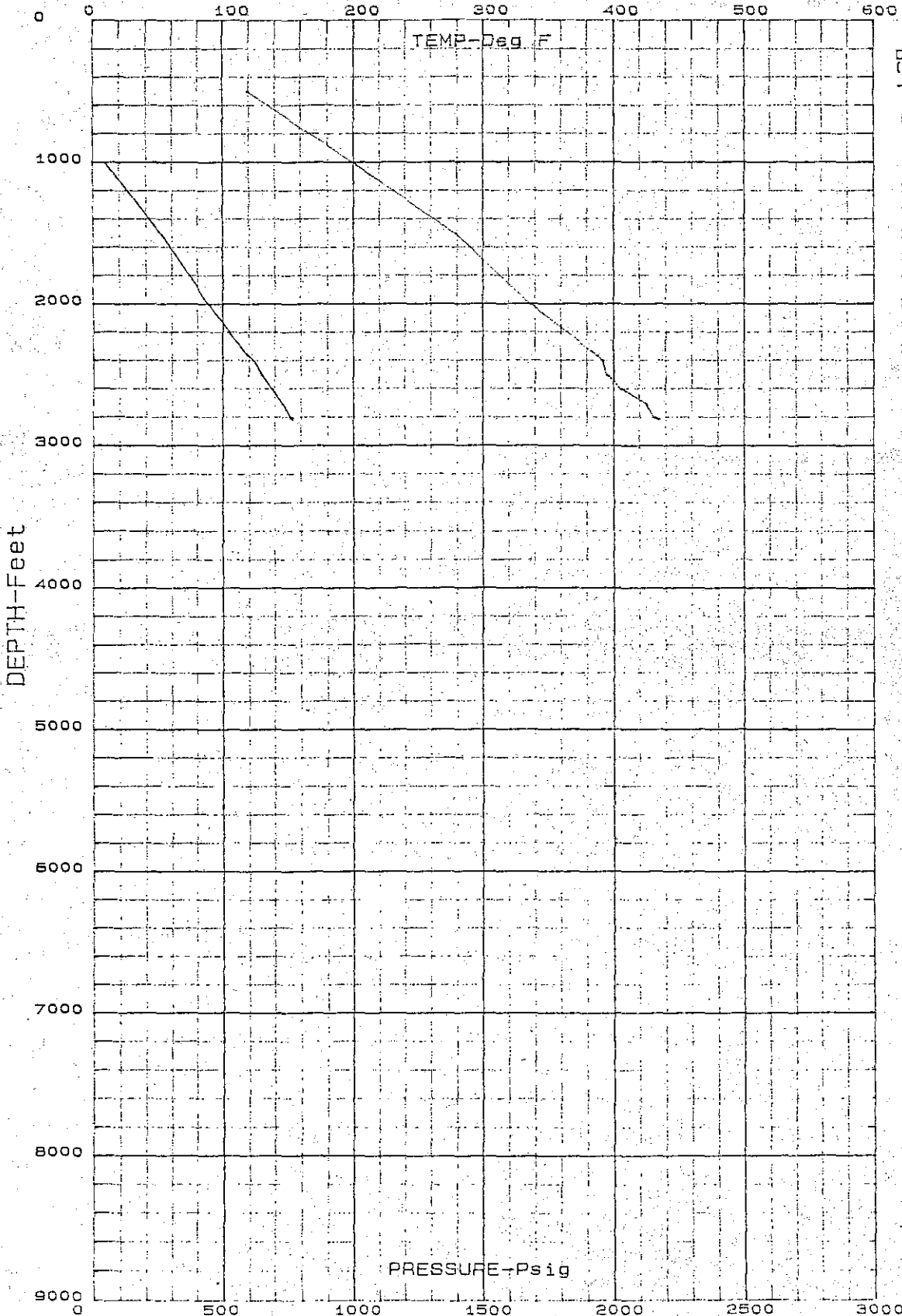
WELL: GM31-17 SURVEY: T/P Gradient No.16 DATE: 10/31/89
 Total Measured Depth: 8787 Ground Level Elevation: 7000
 COMPLETION: 7 in. liner From 2887 to 8777
 Perfs From 3100 to 8737 9.625 in. From 911 to 3054
 13.375 in. From 0 to 1128 WHP Start: 0
 Status: Injection Since 9/7/89 End : 0



DEPTH (FEET)	TEMP. (DEG F)	PRESS (PSIG)
3000	151	782
3800	153	1099
4000	154	1174
5000	159	1584
7500	172	2600
8300	184	2915

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WELL: GM87-13 SURVEY: T/P Gradient No.1 DATE: 10/30/89
 Total Measured Depth: 3013 Ground Level Elevation: 6720
 COMPLETION: 4.5 in. liner From 2158 to 3010
 Perfs From 2158 to 3010 7 in. From 660 to 2356
 9.625 in. From 0 to 870 WHP Start: 0
 Status: Well Shut In Since 10/29/89 End : 0



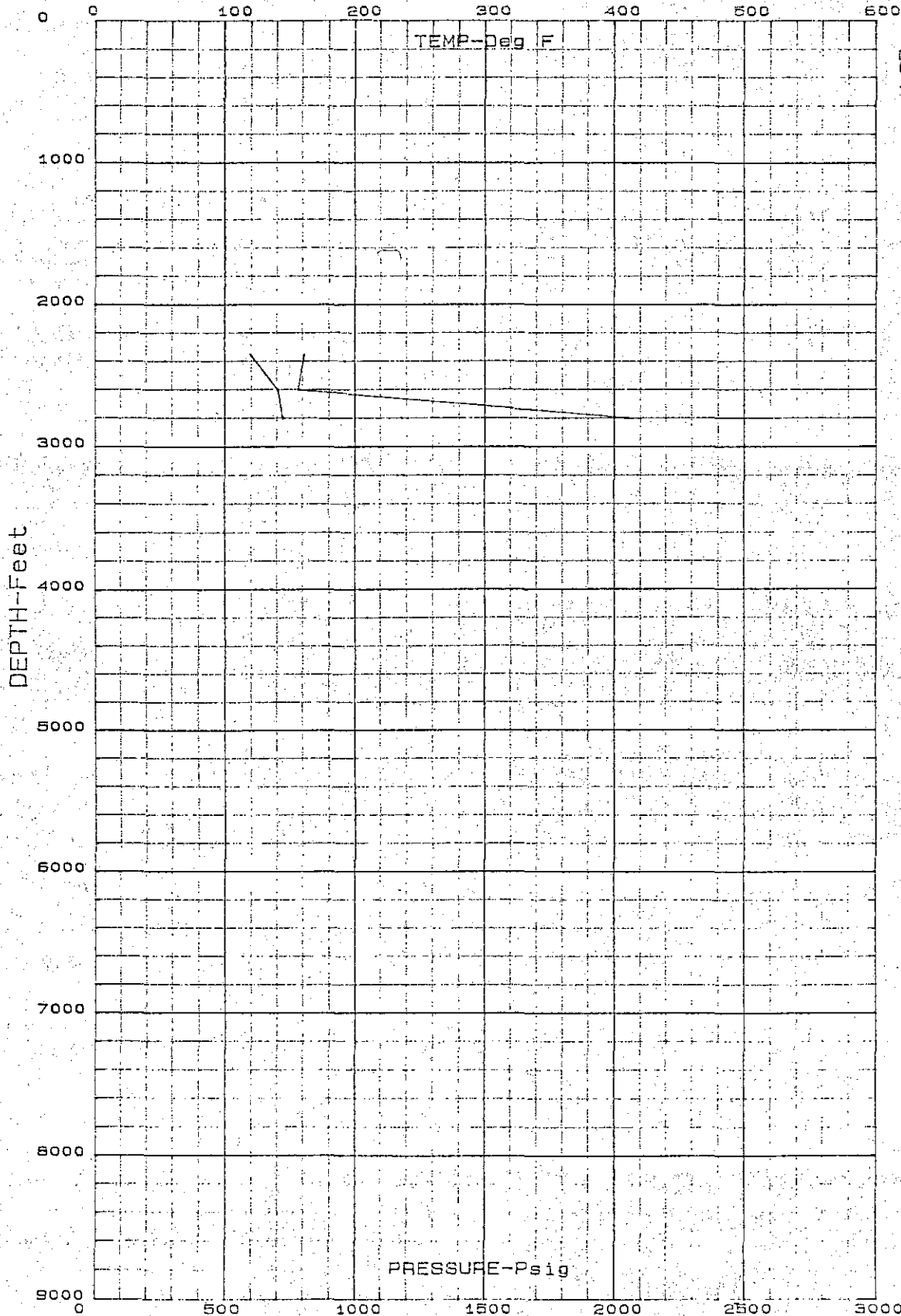
DEPTH (FEET)	TEMP (DEG F)	PRESS (PSIG)
500	118	0
1000	199	47
1500	278	258
2000	336	446
2360	387	594
2400	391	617
2500	394	650
2600	406	689
2700	424	728
2800	430	761
2813	434	771

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Tag Bottom at 2813

WELL: GM87-13 SURVEY: P/T Gradient No.2 DATE: 10/30/89
 Total Measured Depth: 3013 Ground Level Elevation: 6720
 COMPLETION: 4.5 in. liner From 2158 to 3010
 Perfs From 2158 to 3010 7 in. From 660 to 2356
 9.625 in. From 0 to 870 WHP Start: 0
 Status: Injection Since 10/31/89 End : 0

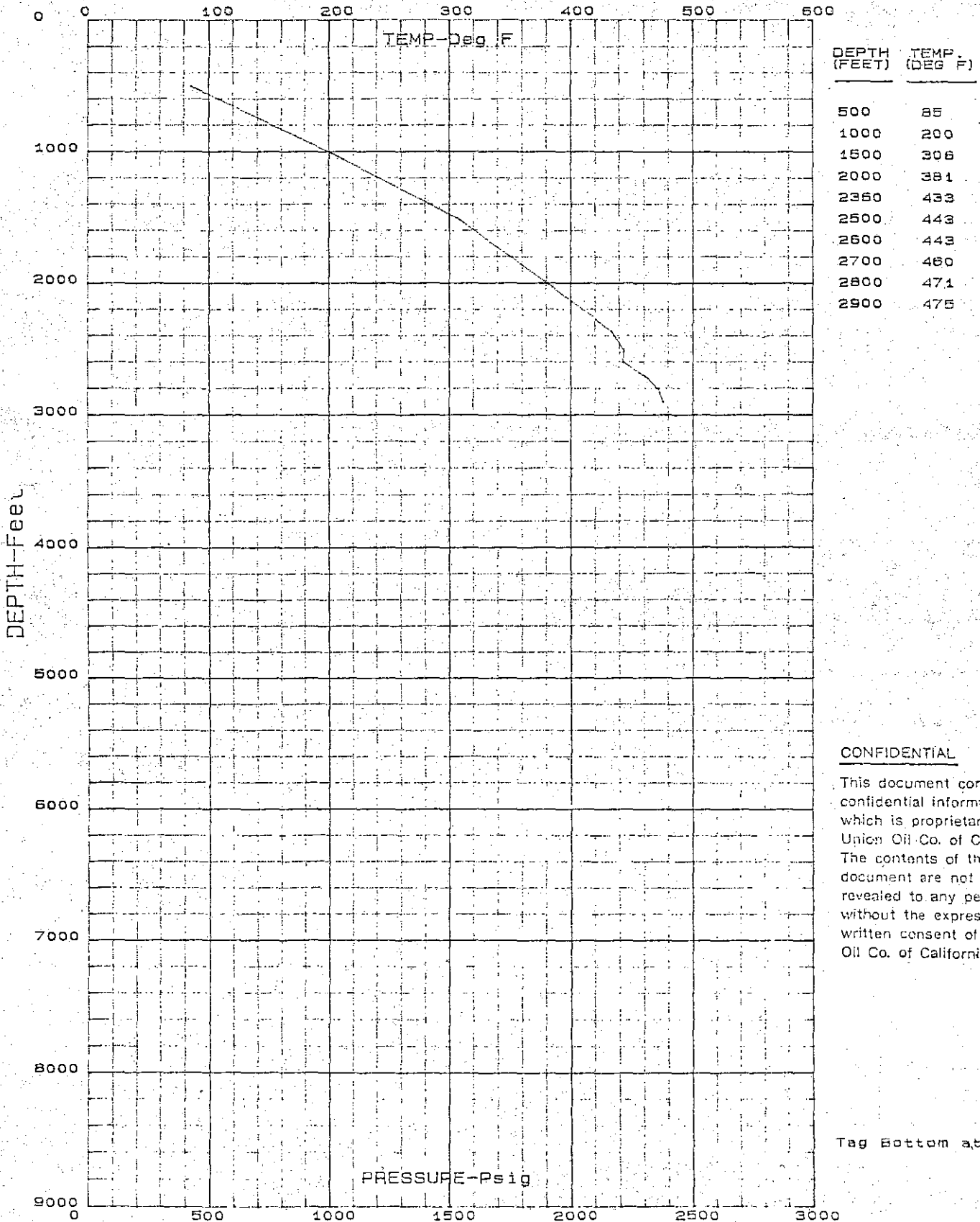


DEPTH (FEET)	PRESS (PSIG)	TEMP. (DEG F)
2350	594	161
2600	705	156
2800	724	413

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WELL: GM87-13 SURVEY: T Gradient No.3 DATE: 11/3/89
 Total Measured Depth: 3013 Ground Level Elevation: 6720
 COMPLETION: 4.5 in. liner From 2158 to 3010
 Perfs From 2158 to 3010 7 in. From 660 to 2356
 9.625 in. From 0 to 870 WHP Start: 0
 Status: Well Shut In Since 10/30/89 End: 0

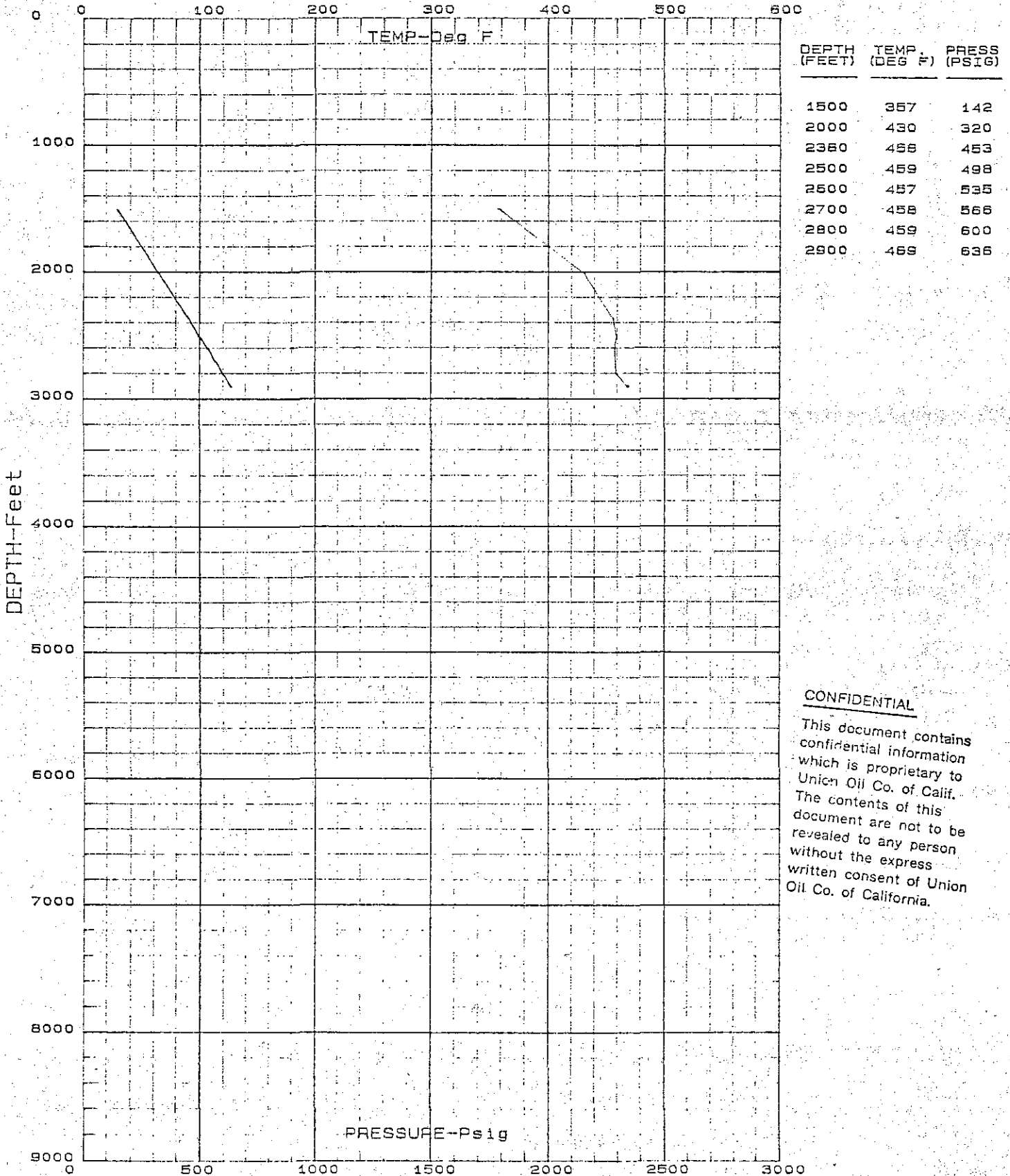


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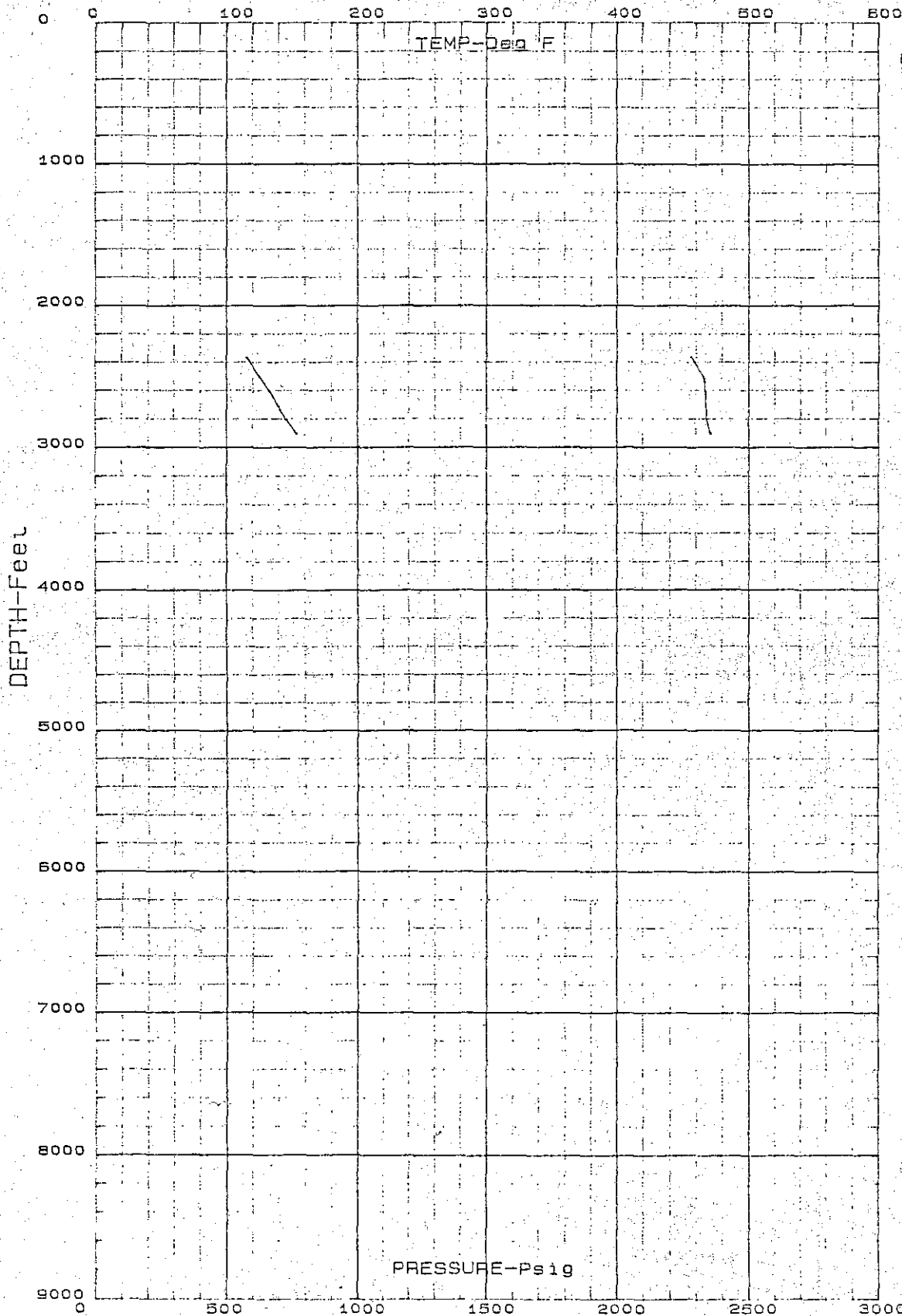
Tag Bottom at 2933

WELL: GM87-13 SURVEY: T/P Gradient No.4 DATE: 11/5/89
 Total Measured Depth: 3013 Ground Level Elevation: 6720
 COMPLETION: 4.5 in. liner From 2158 to 3010
 Perfs From 2158 to 3010 7 in. From 660 to 2356
 9.625 in. From 0 to 870 WHP Start: 0
 Status: Well Shut In Since 11/4/89 End : 0



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WELL: GMB7-13 SURVEY: T/P Gradient No.5 DATE: 11/6/89
 Total Measured Depth: 3013 Ground Level Elevation: 6720
 COMPLETION: 4.5 in. liner From 2158 to 3010
 Perfs From 2158 to 3010 7 in. From 660 to 2356
 9.625 in. From 0 to 870 WHP Start: 0
 Status: Well Shut In Since 11/5/89 End: 0

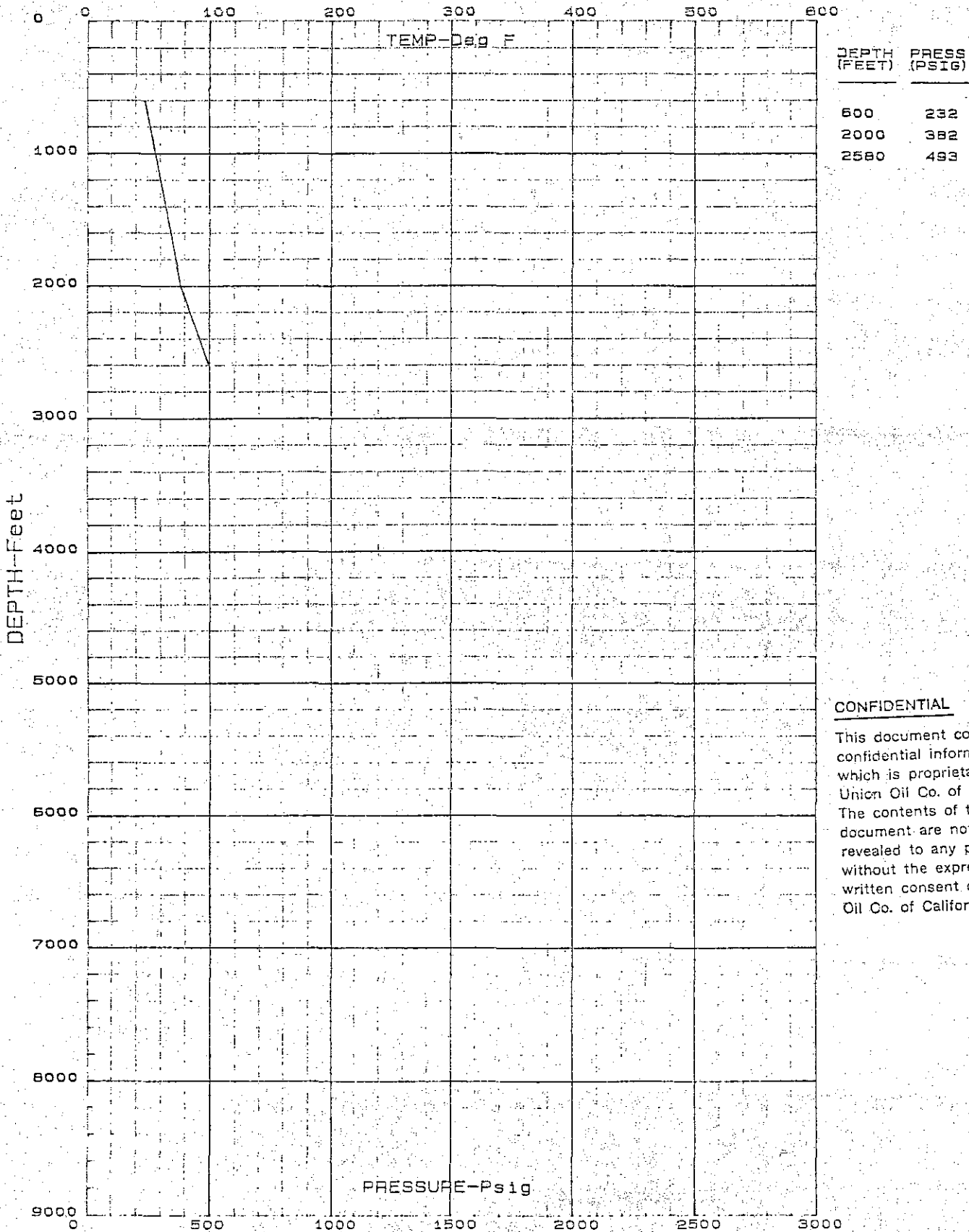


DEPTH (FEET)	TEMP. (DEG F)	PRESS (PSIG)
2360	458	574
2500	456	626
2600	467	662
2700	467	694
2800	468	728
2900	471	768

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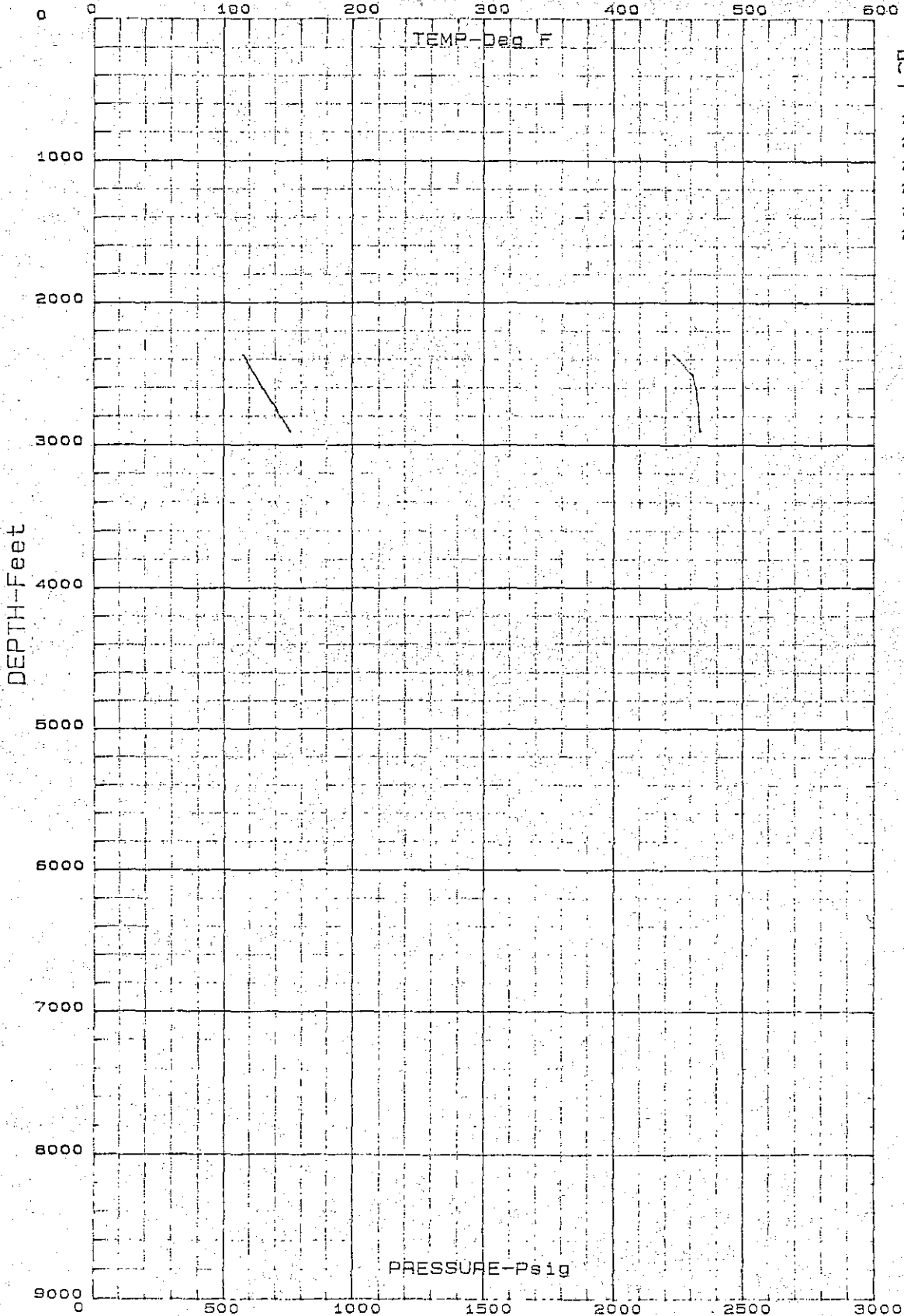
WELL: GM87-13 SURVEY: P Gradient No.6 DATE: 11/6/89
 Total Measured Depth: 3013 Ground Level Elevation: 6720
 COMPLETION: 4.5 in. liner From 2158 to 3010
 Perfs From 2158 to 3010 7 in. From 660 to 2356
 9.625 in. From 0 to 870 WHP Start: 230
 Status: Well Flowing Since 11/6/89 End : 230



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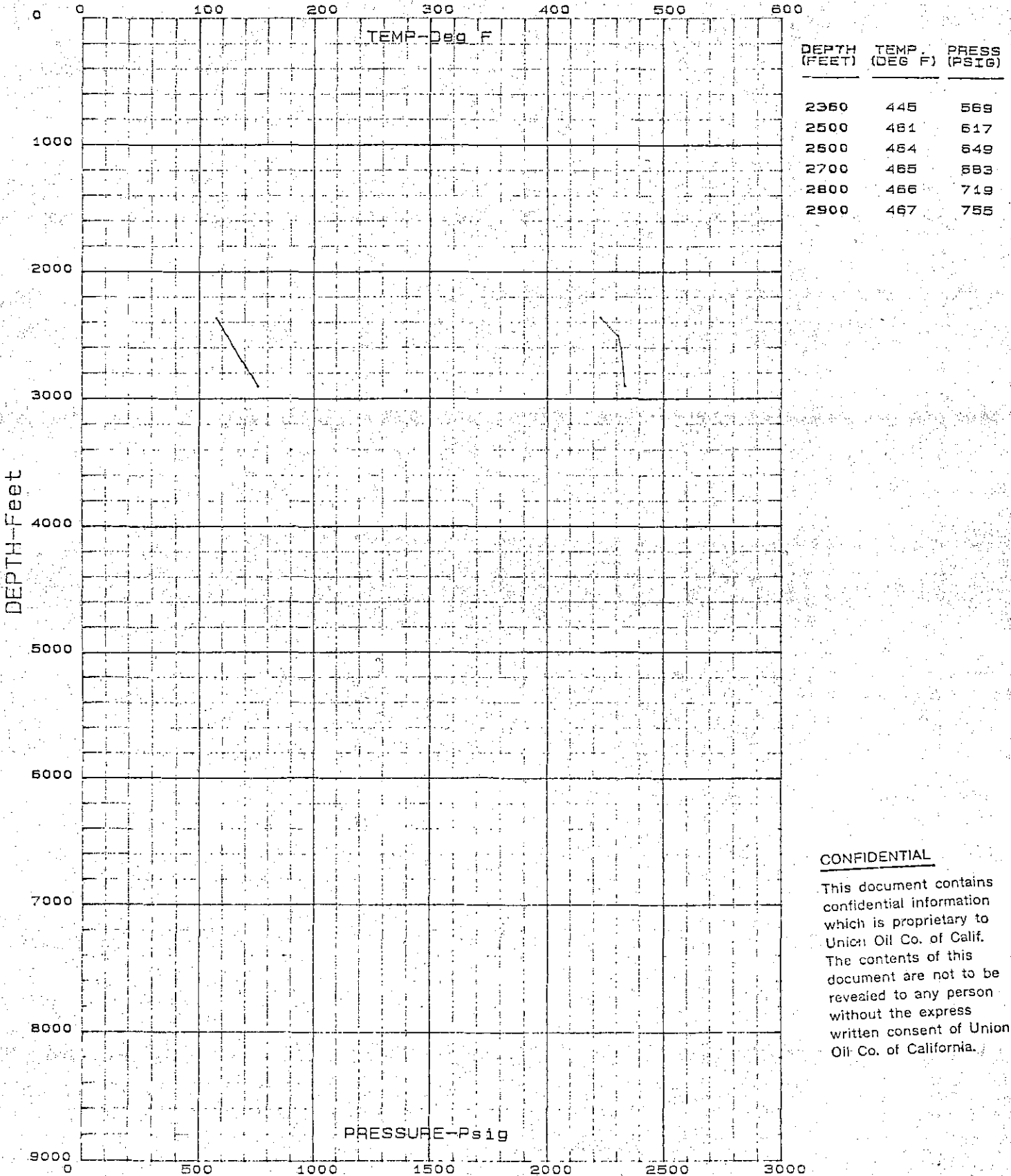
WELL: GMB7-13 SURVEY: T/P Gradient No.7 DATE: 11/7/89
 Total Measured Depth: 3013 Ground Level Elevation: 6720
 COMPLETION: 4.5 in. liner From 2158 to 3010
 Perfs From 2158 to 3010 7 in. From 660 to 2356
 9.625 in. From 0 to 870 WHP Start: 0
 Status: Well Shut In Since 11/6/89 End : 0



DEPTH (FEET)	TEMP. (DEG F)	PRESS (PSIG)
2360	445	569
2500	461	617
2600	484	649
2700	465	683
2800	466	719
2900	467	755

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WELL: GM87-13 SURVEY: T/P Gradient No.7 DATE: 11/7/89
 Total Measured Depth: 3013 Ground Level Elevation: 6720
 COMPLETION: 4.5 in. liner From 2158 to 3010
 Perfs From 2158 to 3010 7 in. From 660 to 2356
 9.625 in. From 0 to 870 WHP Start: 0
 Status: Well Shut In Since 11/6/89 End : 0



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GMF 31-17 temperature gradient survey (T #8) conducted 12/1/88:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>
3000	481
3200	482
3400	481
3600	475
3800	466
4000	465
4400	465
5000	476
5500	483
6000	480
6500	483
7000	487
7500	492
8000	509
8400	532

GMF 31-17 temperature and pressure gradient survey (T/P #9)
conducted 3/23/89:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
2000	416	356
2500	469	549
3000	486	724
3400	486	855
3500	485	890
3600	482	925
3700	475	960
3800	474	998
3900	475	1030
4000	475	1065
4500	477	1236
5000	479	1407
5500	484	1577
6000	488	1742
6500	487	1916
7000	492	2081
7500	498	2252
8000	518	2414
8500	542	2555

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GMF 31-17 temperature and pressure gradient survey (T/P #10)
 conducted 8/2/89:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
750	63	0
1000	77	0
2000	403	342
2500	468	515
3000	485	690
3400	484	827
3500	483	861
3600	480	893
3700	475	925
3800	473	962
3900	474	996
4000	474	1029
4500	476	1200
5000	478	1372
5500	482	1543
6000	485	1714
6500	485	1884
7000	487	2054
7500	493	2224
8000	514	2397
8300	521	2495

GMF 31-17 combination temperature traverse and pressure build-up
 survey (PBU #2) conducted 8/18/89. Well flowing 334,100 lb/hr
 total mass flow at a wellhead pressure of 131 psig prior to shut
 in. Shut in at 1316 hours:

Build-up

<u>Depth</u> <u>Feet</u>	<u>Time</u> <u>Hours</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
3800	1316	459	453 (flowing pressure)
3800	1317	464	465
3800	1318	468	596
3800	1319	469	648
3800	1320	470	703
3800	1321	470	757
3800	1322	471	797
3800	1323		830
3800	1324		852
3800	1325	471	874
3800	1326		894
3800	1327		910
3800	1328		922
3800	1329		928
3800	1330		932

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GMF 31-17: (continued)

<u>Depth</u> <u>Feet</u>	<u>Time</u> <u>Hours</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
3800	1331	472	937
3800	1332		941
3800	1333		945
3800	1334		947
3800	1335		949
3800	1336	474	951
3800	1341	475	957
3800	1346	475	959
3800	1351	476	961
3800	1421		963
3800	1451	475	963
3800	1521	474	963
(conducted traverse)			
3800	1651	471	963

Traverse

3000	465	696
3100	466	729
3200	468	761
3300	466	797
3400	466	828
3500	467	862
3600	468	898
3700	469	930
3800	471	963
3900	475	997
4000	476	1035
4100	477	1069
4200	478	1097

GMF 31-17 temperature and pressure gradient survey (T/P #11) conducted 8/22/89. Well flowing 364,900 lb/hr total mass flow at a wellhead pressure of 86 psig:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
1000	335	103
1400	346	116
2000	360	140
2850	388	202
3200	409	270
3500	423	314
3800	434	355
3800	474	517

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Final point recorded after wellhead pressure had been changed to 140 psig and flowrate had stabilized at 315,200 lb/hr total mass flow.

GMF 31-17 temperature and pressure gradient survey (T/P #12)
 conducted 9/6/89:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
3000	nr	684
3400	472	823
3500	473	855
3600	471	889
3700	470	924
3800	469	956
3900	469	990
4000	469	1025
4500	471	1195
5000	474	1365
5500	480	1537
6000	484	1707
6500	485	1878
7000	487	2047
7500	493	2216
8000	514	2388
8300	527	2486

GMF 31-17 pressure survey (P #13) conducted 9/7/89. Hung tool at
 3800' then started injection at 228,000 lb/hr:

<u>Depth</u> <u>Feet</u>	<u>Time</u> <u>Hours</u>	<u>Pressure</u> <u>Psig</u>
3800	0940	961 (static pressure)
3800	0941	982 injection started
3800	0942	1006
3800	0943	1026
3800	0944	1042
3800	0945	1052
3800	0946	1060
3800	0947	1066
3800	0948	1072
3800	0949	1077
3800	0950	1083
3800	0951	1086
3800	0952	1089
3800	0953	1092
3800	0954	1094
3800	0955	1097
3800	0956	1100
3800	0957	1102
3800	0958	1106
3800	0959	1108
3800	1000	1111
3800	1001	1112
3800	1002	1120
3800	1003	1122

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GMF 31-17: (continued)

<u>Depth</u> <u>Feet</u>	<u>Time</u> <u>Hours</u>	<u>Pressure</u> <u>Psig</u>
3800	1004	1125
3800	1005	1129
3800	1006	1132
3800	1007	1135
3800	1008	1138
3800	1009	1143
3800	1010	1148
3800	1011	1154
3800	1012	1160
3800	1013	1165
3800	1014	1169
3800	1015	1174
3800	1016	1175
3800	1017	1180
3800	1018	1183
3800	1019	1185
3800	1020	1186
3800	1030	1203
3800	1040	1225
3800	1110	1251
3800	1140	1263
3800	1240	1282
3800	1340	1291
3800	1440	1283
3800	1510	1281
3800	1640	1276
3800	1740	1271
3800	1840	1265

GMF 31-17 temperature and pressure gradient survey (T/P #14)
 conducted 9/16/89 while injecting at 138,400 lb/hr:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
3000	162	671
3500	165	875
3800	163	997
4000	162	1028
4500	164	1282
5000	167	1496
5500	170	1701
6000	175	1904
6500	178	2107
7000	184	2309
7500	194	2508
8000	270	2679
8300	291	2770

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GMF 31-17: (continued)

<u>Depth</u> <u>Feet</u>	<u>Time</u> <u>Hours</u>	<u>Pressure</u> <u>Psig</u>
3800	1004	1125
3800	1005	1129
3800	1006	1132
3800	1007	1135
3800	1008	1138
3800	1009	1143
3800	1010	1148
3800	1011	1154
3800	1012	1160
3800	1013	1165
3800	1014	1169
3800	1015	1174
3800	1016	1175
3800	1017	1180
3800	1018	1183
3800	1019	1185
3800	1020	1186
3800	1030	1203
3800	1040	1225
3800	1110	1251
3800	1140	1263
3800	1240	1282
3800	1340	1291
3800	1440	1283
3800	1510	1281
3800	1640	1276
3800	1740	1271
3800	1840	1265

GMF 31-17 temperature and pressure gradient survey (T/P #14)
 conducted 9/16/89 while injecting at 138,400 lb/hr:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
3000	162	671
3500	165	875
3800	163	997
4000	162	1028
4500	164	1282
5000	167	1496
5500	170	1701
6000	175	1904
6500	178	2107
7000	184	2309
7500	194	2508
8000	270	2679
8300	291	2770

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GMF 31-17 temperature and pressure gradient survey (T/P #15)
conducted 9/27/89 while injecting at 224,900 lb/hr:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
3000	173	777
3500	175	974
3800	175	1095
4000	175	1172
4500	178	1373
5000	181	1573
5500	183	1772
6000	188	1974
6500	190	2175
7000	196	2372
7500	201	2571
8000	237	2761
8300	254	2871

GMF 31-17 temperature and pressure gradient survey (T/P #16)
conducted on 10/31/89 while injecting at 229,700 lb/hr:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
3000	151	782
3800	153	1099
4000	154	1174
5000	159	1584
7500	172	2600
8300	184	2915

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Section 4

GM 68-8 Pressure and Temperature Surveys
(Tabulated Data)

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GMF 68-8 temperature gradient survey (T #13) conducted 12/1/88:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>
2000	369
3000	452
3300	464
3400	471
4000	474
4500	475
4800	476
4900	472
5500	351
6000	358
6400	368
6500	372
7000	378
7100	429
7400	438
7500	440
7900	443
8000	444
8100	446

GMF 68-8 temperature and pressure gradient survey (P/T #14)
conducted 8/12/89:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
250	79	0
500	76	0
750	74	0
1000	111	0
2000	391	356
3000	478	713
3300	489	818
3400	497	854
4000	501	1061
4500	502	1235
4800	507	1339
4900	475	1371
5500	467	1587
6000	467	1768
6400	490	1915
6500	491	1954
7000	497	2130
7100	515	2168
7400	518	2272
7500	519	2308
7900	520	2442
8000	522	2477

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GMF 68-8 temperature and pressure gradient survey (T/P #15)
 conducted 8/22/89 while injecting at 303,400 lb/hr:

Depth <u>Feet</u>	Temperature <u>Deg F</u>	Pressure <u>Psig</u>
4000	178	1101
5000	183	1501
6000	188	1919
6500	218	2127
7000	230	2327
7500	276	2512
8000	304	2713

GMF 68-8 temperature and pressure gradient survey (P/T #16)
 conducted 9/5/89:

Depth <u>Feet</u>	Temperature <u>Deg F</u>	Pressure <u>Psig</u>
1000	65	0
1250	145	0
1500	227	57
1750	290	149
2000	344	239
2500	379	422
3000	402	607
3300	411	720
3400	415	757
4000	415	981
4500	415	1165
4800	424	1276
4900	311	1309
5500	280	1551
6000	279	1754
6400	286	1913
6500	289	1955
7000	297	2154
7100	311	2191
7400	318	2312
7500	321	2348
7900	324	2505
8000	328	2540

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GMF 68-8 temperature and pressure gradient survey (P/T #17)
 conducted 9/15/89 while producing at 160,000 lb/hr:

Depth <u>Feet</u>	Temperature <u>Deg F</u>	Pressure <u>Psig</u>
0	281	32
1000	332	75
3000	378	229

GMF 68-8 temperature and pressure gradient survey: (continued)

Depth Feet	Temperature Deg F	Pressure Psig
3350	380	268
4000	380	505
4500	380	694
5000	384	883
5500	387	1072
6000	407	1254
6500	455	1425
7000	467	1604
7500	471	1782
8000	461	1957

GMF 68-8 temperature survey (T #18) conducted 9/26/89 while producing at 285,000 lb/hr:

Depth Feet	Temperature Deg F
1000	312
2000	348
3000	387
3350	399
4000	434
4500	446
5000	448
5500	450
6000	470
6500	507
7000	512
7500	518
8000	493

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GMF 68-8 temperature and pressure gradient survey (P/T #19) conducted 9/26/89 while producing at 292,000 lb/hr:

Depth Feet	Temperature Deg F	Pressure Psig
1000	317	79
2000	351	121
3000	386	200
3350	399	227
4000	432	336
4500	454	518
5000	456	699
5500	458	881
6000	477	1058
6500	514	1232
7000	520	1406
7500	523	1576
8000	497	1739

GMF 68-8 temperature and pressure gradient survey (T/P #20)
 conducted on 10/15/89 at a flowrate of 320,000 lb/hr:

Depth <u>Feet</u>	Temperature <u>Deg F</u>	Pressure <u>Psig</u>
1000	335	98
2000	355	130
3000	384	195
3350	395	218
4000	423	308
4500	439	364
5000	456	434
5500	475	524
6000	502	687
6500	524	848
7000	534	1048
7500	536	1240
8000	514	1400

GMF 68-8 temperature and pressure gradient survey (T/P #21)
 conducted on 10/16/89 at a flowrate of 209,000 lb/hr:

Depth <u>Feet</u>	Temperature <u>Deg F</u>	Pressure <u>Psig</u>
1000	373	191
2000	406	258
3000	433	351
3350	442	385
4000	465	497
4500	481	664
5000	481	834
5500	483	1007
6000	494	1189
6500	524	1365
7000	531	1536
7500	533	1702
8000	510	1868

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GMF 68-8 flowing temperature and pressure gradient survey (T/P
 #22) conducted on 11/1/89 at a flowrate of 229,700 lb/hr:

Depth <u>Feet</u>	Temperature <u>Deg F</u>	Pressure <u>Psig</u>
4000	460	431
4500	484	567
5000	490	742
5500	491	919
5700	491	990

Section 5

GM 87-13 Pressure and Temperature Surveys
(Tabulated Data)

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GMF 87-13 temperature and pressure gradient survey (T/P #1)
conducted 10/30/89:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
500	118	0
1000	199	47
1500	278	258
2000	336	446
2360	387	594
2400	391	617
2500	394	650
2600	406	689
2700	424	728
2800	430	761
2813	434	771

GMF 87-13 temperature and pressure gradient survey (T/P #2)
conducted 10/30/89 while injecting 150,000 lb/hr:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
2350	161	594
2600	156	705
2800	413	775

GMF 87-13 temperature survey (T #3) conducted 11/3/89:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>
500	85
1000	200
1500	306
2000	381
2360	433
2500	443
2600	443
2700	460
2800	471
2900	475

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GMF 87-13 temperature and pressure gradient survey (T/P # 4)
conducted on 11/5/89:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
1500	357	142
2000	430	320
2360	456	453

GMF 87-13 temperature and pressure gradient survey: (continued)

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
2500	459	498
2600	457	535
2700	458	566
2800	459	600
2900	469	636

GMF 87-13 temperature and pressure gradient survey (T/P #5)
conducted on 11/6/89:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
2360	456	574
2500	466	626
2600	467	662
2700	467	694
2800	468	728
2900	471	768

GMF 87-13 pressure survey (P #6) conducted on 11/6/89 while
producing 231,000 lb/hr:

<u>Depth</u> <u>Feet</u>	<u>Pressure</u> <u>Psig</u>
600	232
2000	382
2580	493

GMF 87-13 temperature and pressure gradient survey (T/P #7)
conducted on 11/7/89:

<u>Depth</u> <u>Feet</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
2360	445	569
2500	461	617
2600	464	649
2700	465	683
2800	466	719
2900	467	755

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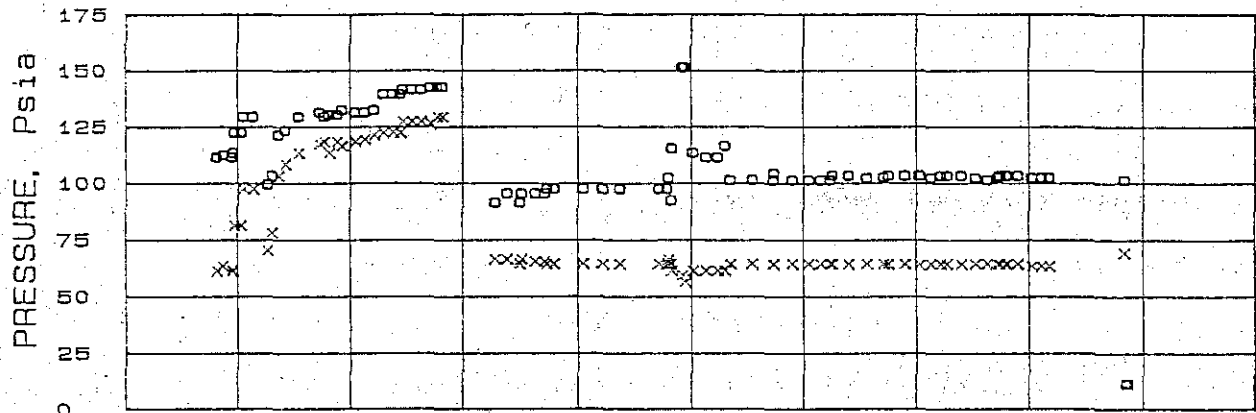
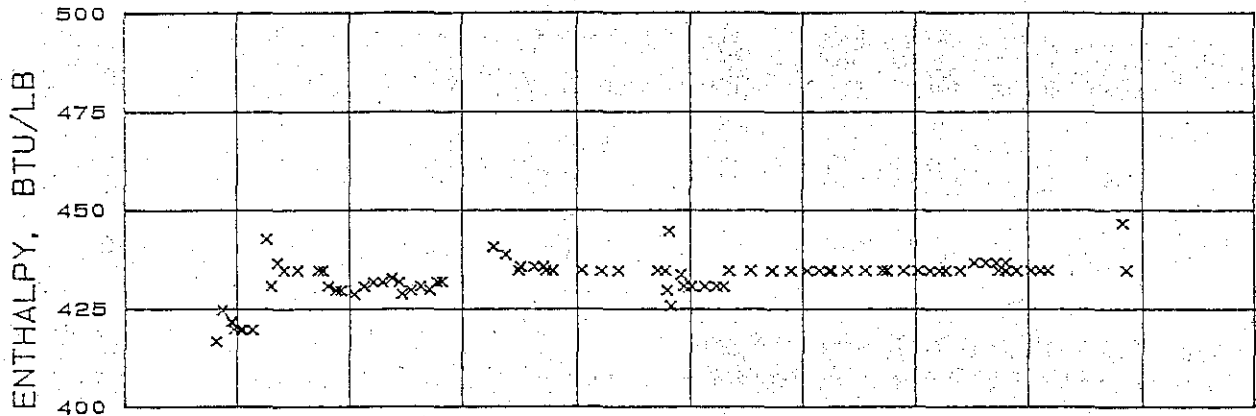
Section 6

GM 31-17 Flowtest Data

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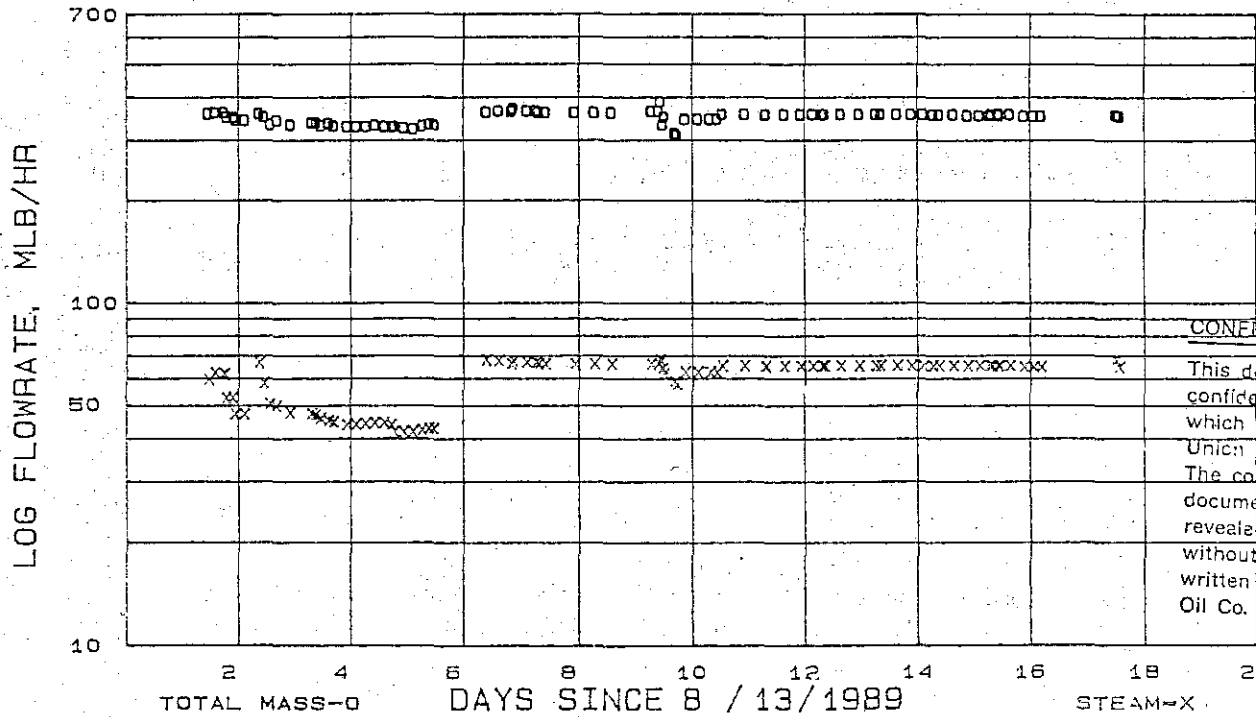
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GLASS MOUNTAIN FEDERAL GMF 31-17 1989 FLOWTEST



WELLHEAD PRESSURE-O

SEPARATOR PRESSURE-X



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Flowtest readings for GMF 31-17:

Date	Time	Whp	Sep	Steam	Water	Enthalpy
	Hour	Psig	Psig	Klb/hr	Klb/hr	Btu/lb
Opened well at 1235, 8/14/89						
8 14 1989	1235	100	50	59.8	299.7	417
8 14 1989	1500	101	52	62.7	299.6	425
8 14 1989	1900	100	50	62.1	299.7	422
8 14 1989	1950	102	50	62.1	299.7	422
8 14 1989	2030	111	70	52.9	298.2	420
8 14 1989	2330	111	70	52.9	298.2	420
8 15 1989	15	118	86	47.4	297.0	420
8 15 1989	430	118	86	47.4	297.0	420
Shut in well at 0431, 8/15/89						
Opened well at 1040, 8/15/89.						
8 15 1989	1040	88	59	67.1	291.8	443
8 15 1989	1230	92	67	58.4	294.3	431
8 15 1989	1500	110	92	50.8	283.3	437
8 15 1989	1800	112	97	50.0	292.3	435
8 15 1989	2400	118	102	47.8	285.8	435
8 16 1989	915	120	106	47.5	291.7	435
8 16 1989	1100	118	107	47.1	291.7	435
8 16 1989	1300	119	102	46.1	285.8	431
8 16 1989	1630	119	107	45.2	291.7	430
8 16 1989	1830	121	105	44.9	285.6	430
8 16 1989	2400	120	107	44.0	285.5	429
8 17 1989	400	120	108	44.2	285.5	431
8 17 1989	800	121	110	44.5	285.3	432
8 17 1989	1200	128	111	44.7	288.4	432
8 17 1989	1600	128	111	44.7	285.3	433
8 17 1989	1900	128	111	44.0	285.3	432
8 17 1989	2015	130	116	42.1	288.1	429
8 17 1989	2400	130	116	42.1	285.0	430
8 18 1989	400	130	116	42.1	281.9	431
8 18 1989	800	131	115	42.6	288.1	430
8 18 1989	1100	131	118	43.1	291.0	432
8 18 1989	1315	131	118	43.1	291.0	432
Shut in well at 1316, 8/18/1989						
Opened well at 1100, 8/19/1989						
8 19 1989	1100	80	55	68.3	295.2	441
8 19 1989	1600	84	55	67.9	298.3	439
8 19 1989	2145	80	53	66.5	298.4	435
8 19 1989	2215	84	55	67.9	304.3	436
8 20 1989	400	84	54	67.2	298.4	436
8 20 1989	800	84	54	67.2	298.4	436
8 20 1989	900	86	53	66.5	295.4	435
8 20 1989	1200	86	53	66.5	295.4	435
8 20 1989	2400	86	53	66.5	295.4	435
8 21 1989	800	86	53	66.5	295.4	435
8 21 1989	1500	86	53	66.5	295.4	435
8 22 1989	800	86	53	66.5	298.4	435
8 22 1989	1130	86	53	66.5	298.4	435
8 22 1989	1200	91	55	68.3	321.7	430

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Flowtest readings for GMF 31-17: (continued)

Date	Time	Whp	Sep	Steam	Water	Enthalpy
	Hour	Psig	Psig	Klb/hr	Klb/hr	Btu/lb
8 22 1989	1300	81	53	64.5	269.6	445
8 22 1989	1355	104	50	62.1	289.4	426
8 22 1989	1800	140	48	59.0	256.2	434
8 22 1989	1915	140	45	57.8	252.8	431
8 22 1989	2245	102	50	62.9	283.0	431
8 23 1989	400	100	50	62.9	283.0	431
8 23 1989	900	100	50	62.9	283.0	431
8 23 1989	1210	105	50	62.9	283.0	431
8 23 1989	1430	90	53	65.7	292.3	435
8 23 1989	2400	90	53	65.7	292.3	435
8 24 1989	900	90	53	65.7	292.3	435
8 26 1989	830	91	53	65.7	292.3	435
8 27 1989	830	92	53	65.7	292.3	435
8 28 1989	830	92	53	65.7	292.3	435
8 29 1989	830	91	52	65.1	289.2	435
8 30 1989	1530	90	52	65.1	289.2	435

Shut in well at 1531, 8/30/1989

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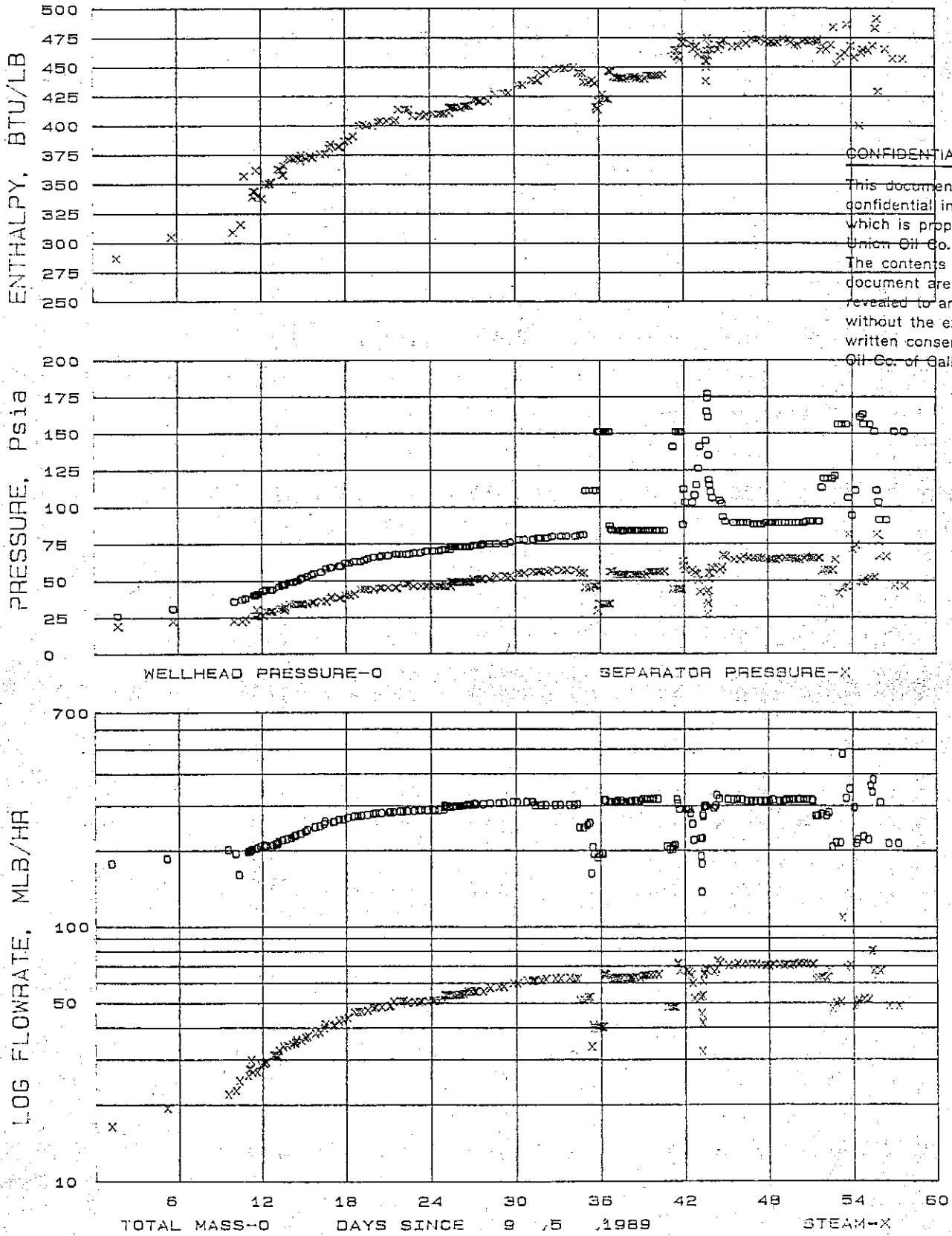
Section 7

GM 68-8 Flowtest Data

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GLASS MOUNTAIN FEDERAL GMF 68-8 1989 FLOWTEST



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Flowtest readings for GMF 68-8. Began airlifting well on 9/6/89:

Date	Time	Whp	Sep	Steam	Brine	Enthalpy
	Hour	Psig	Psig	Klb/hr	Klb/hr	Btu/lb
9 6 1989	900	15	8	16.5	162.2	288
9 10 1989	900	20	11	19.5	167.6	306
9 14 1989	1900	25	11	22.1	181.0	310
9 15 1989	800	26	11	22.8	173.1	317
9 15 1989	1345	27	13	24.9	136.7	358
9 16 1989	400	29	15	26.1	172.8	340
9 16 1989	515	29	15	27.6	172.8	345
9 16 1989	800	29	15	27.6	172.8	345
9 16 1989	930	30	19	30.0	172.5	363
9 16 1989	1200	30	15	26.9	176.7	341
9 16 1989	2000	32	15	26.9	178.7	339
9 17 1989	200	33	18	28.7	180.5	351
9 17 1989	815	33	18	29.1	182.5	351
9 17 1989	845	33	18	29.1	180.5	352
9 17 1989	1200	33	18	29.5	180.5	353
9 17 1989	2400	35	20	31.4	180.4	364
9 18 1989	400	36	20	31.4	182.4	363
9 18 1989	720	36	19	30.8	182.4	359
9 18 1989	830	36	19	31.2	184.4	359
9 18 1989	945	37	21	32.8	186.2	367
9 18 1989	1700	38	23	33.9	188.0	373
9 18 1989	2400	38	23	34.3	189.9	373
9 19 1989	730	39	23	34.7	191.8	374
9 19 1989	1200	40	23	35.1	195.5	373
9 19 1989	1430	41	23	35.1	197.4	371
9 19 1989	1530	41	23	35.9	195.5	376
9 19 1989	2400	42	23	35.9	199.2	373
9 20 1989	730	43	24	36.8	202.7	375
9 20 1989	1100	44	24	37.2	206.2	374
9 20 1989	2400	45	25	38.2	211.3	377
9 21 1989	800	47	25	38.5	213.0	377
9 21 1989	1500	48	27	40.1	216.2	382
9 21 1989	1700	48	28	41.5	221.1	385
9 22 1989	700	49	27	40.9	219.5	383
9 22 1989	900	49	27	41.2	221.1	383
9 22 1989	1700	51	29	42.8	224.2	388
9 22 1989	2400	51	29	43.2	224.2	389
9 23 1989	800	52	30	44.0	227.3	392
9 23 1989	1900	52	33	46.3	228.6	401
9 24 1989	100	53	33	46.5	228.6	402
9 24 1989	700	54	33	46.6	230.2	401
9 24 1989	1700	55	33	47.0	231.7	401
9 25 1989	300	55	34	48.0	233.2	404
9 25 1989	700	56	34	48.3	234.0	405
9 25 1989	1800	56	34	48.5	234.7	405
9 26 1989	700	57	34	48.7	236.3	404
9 26 1989	900	57	34	49.1	236.3	406
9 26 1989	1400	57	37	50.9	234.5	415

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Flowtest readings for GMF 68-8: (continued)

Date	Time Hour	Whp Psig	Sep Psig	Steam Klb/hr	Brine Klb/hr	Enthalpy Btu/lb
9 27 1989	200	57	37	51.2	236.0	415
9 27 1989	700	57	37	51.2	236.0	415
9 27 1989	1400	58	35	50.4	237.7	409
9 28 1989	200	58	35	50.7	237.7	410
9 28 1989	900	59	35	50.7	239.2	409
9 28 1989	1300	59	35	51.1	239.2	411
9 28 1989	2400	59	35	51.1	239.2	411
9 29 1989	800	59	35	51.4	239.2	411
9 29 1989	1200	60	35	51.4	239.2	411
9 29 1989	1800	60	35	51.4	239.2	411
9 30 1989	300	60	35	51.8	240.7	412
9 30 1989	330	62	38	54.0	249.2	416
9 30 1989	400	62	38	54.0	247.8	416
9 30 1989	430	62	38	54.0	246.3	417
9 30 1989	800	62	38	54.0	246.3	417
9 30 1989	1200	62	38	54.0	246.3	417
9 30 1989	1800	62	38	54.0	246.3	417
9 30 1989	2330	62	38	54.0	247.8	416
10 1 1989	400	62	38	54.4	247.8	418
10 1 1989	715	62	38	54.4	247.8	418
10 1 1989	1200	62	38	54.7	247.8	418
10 1 1989	1800	63	40	55.9	249.0	423
10 1 1989	2400	63	40	55.9	249.0	423
10 2 1989	600	63	40	55.9	251.9	421
10 2 1989	635	63	40	55.9	250.5	422
10 2 1989	845	64	40	55.9	250.5	422
10 2 1989	2100	64	40	55.9	250.5	422
10 3 1989	900	64	42	57.5	251.0	428
10 3 1989	2400	64	42	58.2	251.0	429
10 4 1989	800	65	42	58.4	251.0	429
10 4 1989	2400	67	44	60.2	251.6	436
10 5 1989	800	67	44	60.2	251.6	436
10 5 1989	2400	67	45	61.5	251.5	440
10 6 1989	800	68	45	61.5	251.5	440
10 6 1989	1000	68	45	61.5	251.5	440
10 6 1989	1300	68	45	61.8	241.7	446
10 6 1989	2400	68	45	61.8	241.7	446
10 7 1989	800	69	46	62.5	241.7	449
10 7 1989	2400	69	46	62.8	241.7	450
10 8 1989	800	69	46	63.0	241.7	450
10 8 1989	2400	69	46	63.2	241.7	451
10 9 1989	800	70	44	62.3	241.8	446
10 9 1989	1400	70	44	62.6	243.7	446
10 9 1989	1730	100	34	51.5	196.5	438
10 10 1989	30	100	34	51.5	196.5	438
10 10 1989	700	100	35	52.8	201.0	440
10 10 1989	1100	100	35	53.1	205.6	437
10 10 1989	1400	140	18	33.9	129.4	417
10 10 1989	1600	140	23	41.1	166.7	415

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Flowtest readings for GMF 68-8: (continued)

Date	Time	Whp	Sep	Steam	Brine	Enthalpy
	Hour	Psig	Psig	Klb/hr	Klb/hr	Btu/lb
10 10 1989	1830	140	23	39.9	155.2	422
10 10 1989	2400	140	23	39.9	149.1	428
10 11 1989	330	140	23	40.5	155.2	424
10 11 1989	800	140	23	40.5	155.2	424
10 11 1989	910	140	23	40.5	155.2	424
10 11 1989	1030	76	45	65.5	252.8	448
10 11 1989	1200	74	45	65.2	252.8	448
10 11 1989	1400	73	45	64.9	252.8	447
10 11 1989	2000	73	43	63.2	249.3	443
10 11 1989	2400	73	43	62.9	249.3	442
10 12 1989	400	73	43	62.9	249.3	442
10 12 1989	800	72	43	62.9	249.3	442
10 12 1989	1000	73	43	63.2	253.0	441
10 12 1989	1600	73	43	63.2	253.0	441
10 12 1989	2400	73	43	63.2	249.3	443
10 13 1989	500	73	43	63.2	249.3	443
10 13 1989	800	73	43	63.2	249.3	443
10 13 1989	1000	73	43	63.2	253.0	441
10 13 1989	1600	73	43	63.6	253.0	441
10 13 1989	2400	73	43	63.2	253.0	441
10 14 1989	400	73	45	64.6	256.4	444
10 14 1989	800	73	45	64.6	256.4	444
10 14 1989	1200	73	45	64.9	256.4	444
10 14 1989	1800	73	45	64.9	256.4	444
10 14 1989	2400	73	45	64.9	256.4	444
10 15 1989	800	73	45	65.2	256.4	445
10 15 1989	2300	130	33	48.5	160.5	460
10 16 1989	400	140	33	48.5	154.6	466
10 16 1989	900	140	33	48.5	154.6	466
10 16 1989	900	140	33	48.5	160.5	460
10 16 1989	1300	140	33	48.5	163.3	457
10 16 1989	1600	77	52	71.8	248.7	472
10 16 1989	1700	101	49	72.0	235.7	477
10 16 1989	2000	92	46	67.5	226.0	471
10 17 1989	800	92	46	67.2	226.0	471
10 17 1989	1200	97	44	66.4	226.2	466
10 17 1989	1530	104	43	64.8	218.0	468
10 17 1989	1830	115	39	60.0	196.2	469
10 17 1989	2100	130	31	52.4	169.0	462
10 18 1989	800	134	31	53.0	171.7	461
10 18 1989	930	154	25	45.6	145.9	456
10 18 1989	1030	163	16	32.4	105.7	439
10 18 1989	1115	166	23	42.0	136.1	451
10 18 1989	1148	150	32	53.7	171.6	465
10 18 1989	1225	124	40	61.2	218.2	456
10 18 1989	1313	107	44	64.9	209.4	476
10 18 1989	1400	104	44	66.4	234.1	461
10 18 1989	1630	99	48	68.5	233.8	470
10 18 1989	1900	95	47	67.5	233.9	466

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Flowtest readings for GMF 68-8: (continued)

Date	Time Hour	Whp Psig	Sep Psig	Steam Klb/hr	Brine Klb/hr	Enthalpy Btu/lb
10 19 1989	800	93	46	66.5	230.0	466
10 19 1989	1100	91	48	68.5	233.8	470
10 19 1989	1300	82	56	73.7	259.1	473
10 19 1989	1700	79	55	72.1	250.3	474
10 20 1989	800	78	53	70.5	250.4	468
10 20 1989	1800	78	53	70.5	248.6	469
10 20 1989	2400	78	55	71.7	248.5	474
10 21 1989	800	78	54	70.8	248.5	471
10 21 1989	1700	77	54	71.1	244.8	475
10 21 1989	2400	77	54	70.8	244.8	474
10 22 1989	700	77	54	71.1	244.8	475
10 22 1989	1500	78	53	70.5	244.9	472
10 22 1989	2200	78	53	70.2	244.9	471
10 23 1989	200	78	53	70.5	244.9	472
10 23 1989	700	78	53	70.2	244.9	471
10 23 1989	1300	78	54	71.1	248.5	472
10 23 1989	2400	78	54	71.1	244.8	475
10 24 1989	700	78	54	70.8	244.8	474
10 24 1989	1200	78	54	71.1	248.5	472
10 24 1989	1800	78	53	70.5	248.6	469
10 24 1989	2400	78	53	70.9	248.6	470
10 25 1989	800	78	54	71.5	248.5	473
10 25 1989	1200	79	55	72.1	248.5	474
10 25 1989	1800	79	54	71.5	248.5	473
10 25 1989	2400	79	54	71.5	248.5	473
10 26 1989	800	79	54	71.1	248.5	472
10 26 1989	930	79	54	71.5	244.8	475
10 26 1989	1445	102	45	61.8	213.7	465
10 26 1989	1800	108	46	62.8	213.6	469
10 26 1989	2400	108	46	63.2	217.8	466
10 27 1989	800	108	46	63.2	213.6	470
10 27 1989	1200	110	53	67.6	217.4	485
10 27 1989	1800	145	30	47.6	160.6	453
10 27 1989	2400	145	34	50.1	166.1	460
10 28 1989	800	145	35	50.7	166.0	463
10 28 1989	1100	95	70	109.2	374.9	487
10 28 1989	1800	83	60	69.3	255.3	469
10 28 1989	2400	100	63	70.8	282.1	459
10 29 1989	800	150	38	48.6	249.7	401
10 29 1989	1200	152	38	49.5	165.8	463
10 29 1989	1400	145	40	51.4	171.2	466
10 29 1989	2400	145	41	52.3	176.4	465
10 30 1989	800	140	41	51.9	171.1	469
10 30 1989	1200	100	70	80.4	281.6	484
10 30 1989	1500	92	65	80.9	262.0	492
10 30 1989	1630	80	55	67.2	316.0	430
10 31 1989	400	80	55	67.2	244.8	466
10 31 1989	1800	140	35	48.9	166.0	458
11 1 1989	1120	140	35	48.9	166.0	458
Shut-in well at 1121 hrs, 11/1/1989						

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Section 8

GM 87-13 Flowtest Data

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Production History for GMF 87-13:

The well was production flowtested three separate times from November 4-6. During these short flowtests, the well achieved stable flow conditions and downhole production temperatures. The final stabilized total mass flowrate was 231,000 lb/hr at a wellhead pressure of 210 psig. This flowrate was based on the two-phase Murdock equations and an enthalpy of 450 BTU/lb. The input data was as follows:

pipeline ID = 7.63 inches
orifice ID = 5.0 inches
upstream pressure = 202.5 psig
delta pressure = 6.5 psi
downhole production temperature = 467 Degrees F

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Section 9

GM 68-8 Injection Data

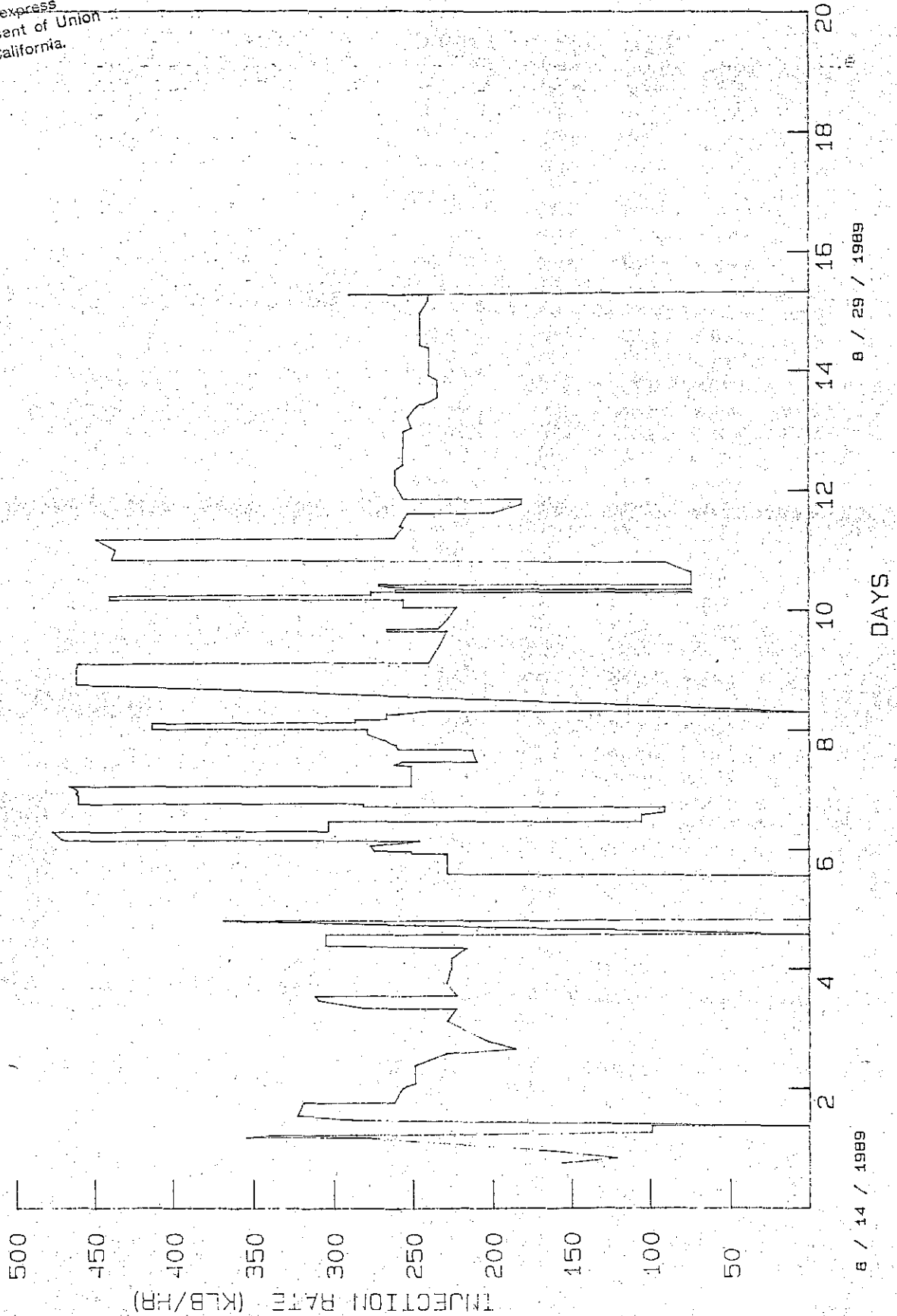
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GLASS MOUNTAIN 68-8 1989 INJECTION



6 / 14 / 1989

8 / 29 / 1989

Injection readings for GMF 68-8:

Date	Time	Wht	Water
	Hour	Deg f	Klb/hr
8 14 1989	1810	100	156.4
8 14 1989	2000	120	120.9
8 14 1989	2310	140	160.7
8 15 1989	420	150	278.0
8 15 1989	445	150	354.4
8 15 1989	510	150	340.5
8 15 1989	535	150	286.5
8 15 1989	630	150	98.3
8 15 1989	900	150	98.3
Shut in injection at			901, 8/15/1989
Started injection at			1140, 8/15/1989
8 15 1989	1140	140	287.7
8 15 1989	1300	150	323.4
8 15 1989	1800	150	319.1
8 15 1989	1845	150	262.3
8 15 1989	2400	155	256.8
8 16 1989	100	155	254.1
8 16 1989	200	155	248.6
8 16 1989	930	155	248.6
8 16 1989	1400	155	228.5
8 16 1989	1600	155	185.3
8 16 1989	1900	155	203.0
8 17 1989	300	155	228.5
8 17 1989	800	155	222.4
8 17 1989	830	155	282.3
8 17 1989	1130	155	310.1
8 17 1989	1300	155	312.3
8 17 1989	1330	155	222.4
8 17 1989	1800	155	228.5
8 17 1989	2400	155	225.4
8 18 1989	400	155	225.4
8 18 1989	830	155	216.1
8 18 1989	915	155	305.6
8 18 1989	1359	155	305.6
8 18 1989	1900	155	368.8
8 18 1989	1907	155	353.6
8 18 1989	1959	155	209.6
Shut in injection at			2000, 8/18/1989
Started injection at			1400, 8/19/1989
8 19 1989	1400	155	228.5
8 19 1989	1800	155	228.5
8 19 1989	2200	155	228.5
8 19 1989	2230	155	251.4
8 19 1989	2307	155	251.4
8 19 1989	2315	155	274.9
8 20 1989	130	155	277.3
8 20 1989	335	155	245.8
8 20 1989	340	155	468.8
8 20 1989	400	155	471.7

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Injection readings for GMF 68-8: (continued)

Date	Time	Wht	Water
	Hour	Deg f	Klb/hr
8 20 1989	700	155	477.5
8 20 1989	710	155	303.4
8 20 1989	800	155	303.4
8 20 1989	1126	157	303.3
Shut in injection at 1127, 8/20/1989			
Started injection at 1728, 8/20/1989			
8 20 1989	1728	158	282.1
8 20 1989	1810	158	282.1
8 20 1989	1820	160	461.1
8 20 1989	2130	160	461.1
8 20 1989	2200	160	462.6
8 20 1989	2250	160	462.6
8 20 1989	2300	160	461.1
8 20 1989	2400	160	462.6
8 21 1989	100	160	465.5
8 21 1989	130	160	467.0
8 21 1989	145	160	251.2
8 21 1989	945	160	251.2
8 21 1989	1000	160	261.8
8 21 1989	1125	160	256.6
8 21 1989	1130	160	209.5
8 21 1989	1610	160	212.7
8 21 1989	1615	160	259.2
8 21 1989	1800	160	261.8
8 21 1989	1930	160	267.0
8 21 1989	2215	160	279.6
8 22 1989	15	160	279.6
8 22 1989	20	160	414.0
8 22 1989	250	160	414.0
8 22 1989	300	160	286.8
8 22 1989	405	160	286.8
8 22 1989	415	160	267.0
8 22 1989	610	160	267.0
8 22 1989	640	160	259.2
8 22 1989	1115	160	240.0
Shut in injection at 1116, 8/22/1989			
Started injection at 1820, 8/22/1989			
8 22 1989	1820	165	462.2
8 23 1989	240	165	462.2
8 23 1989	300	165	239.8
8 23 1989	845	160	234.2
8 23 1989	1535	165	228.1
8 23 1989	1540	165	266.8
8 23 1989	1640	165	266.8
8 23 1989	1645	165	234.0
8 23 1989	2000	165	228.1
8 24 1989	100	165	222.0
8 24 1989	105	165	256.3
8 24 1989	400	165	256.3

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Injection readings for GMF 68-8: (continued)

Date	Time	Wht	Water
	Hour	Deg f	Klb/hr
8 24 1989	405	165	440.9
8 24 1989	555	165	440.9
8 24 1989	600	165	276.9
8 24 1989	700	165	276.9
8 24 1989	705	165	74.0
8 24 1989	710	165	74.0
8 24 1989	715	165	261.6
8 24 1989	810	165	261.6
8 24 1989	815	165	74.0
8 24 1989	818	165	74.0
8 24 1989	820	165	256.3
8 24 1989	900	165	256.3
8 25 1989	900	165	261.6
8 26 1989	900	167	261.5
8 27 1989	900	165	248.2
8 28 1989	900	165	239.8
8 29 1989	809	165	239.8
8 29 1989	810	165	0.0

Shut in injection at 0810, 8/29/1989

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Section 10

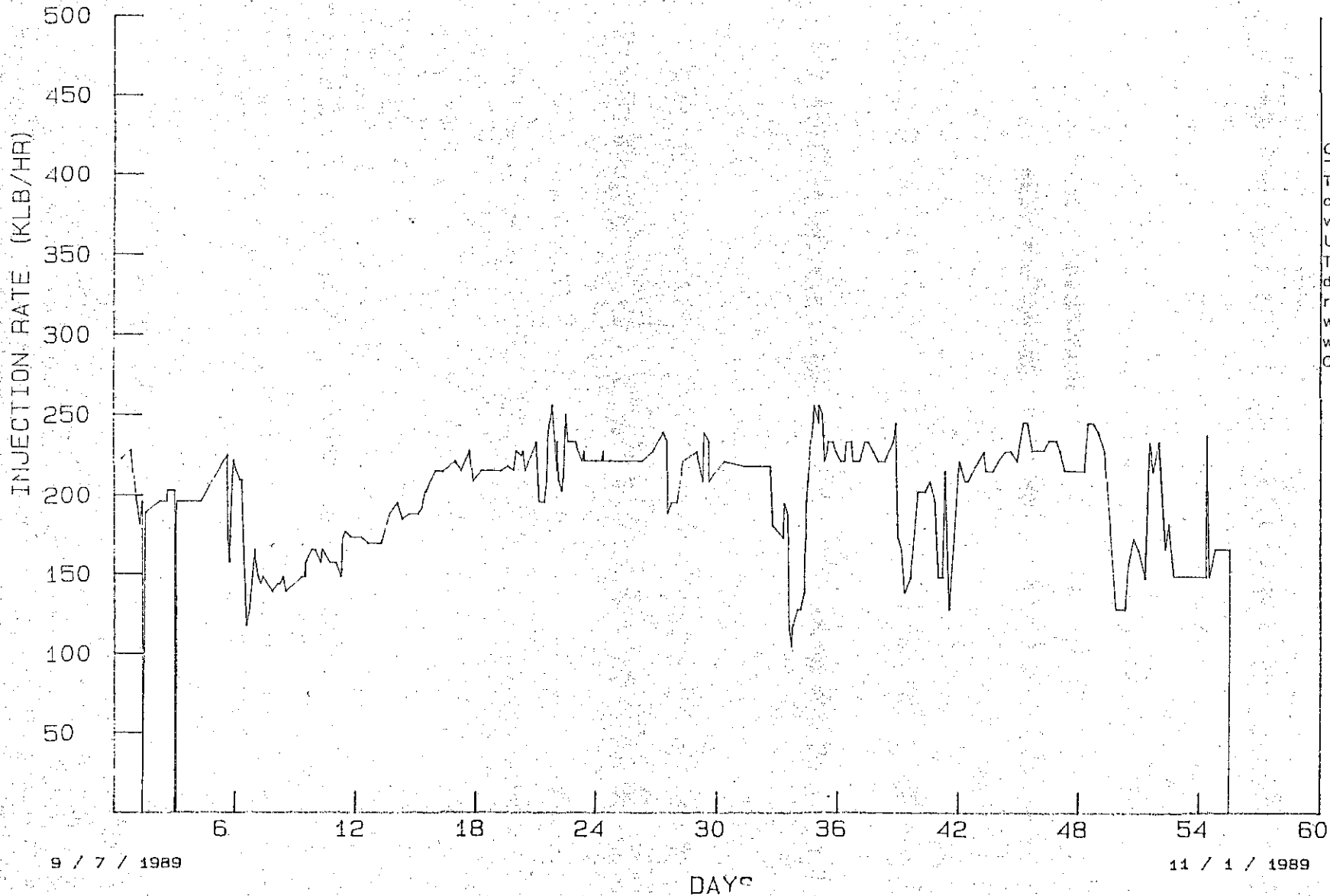
GM 31-17 Injection Data

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GLASS MOUNTAIN 31-17

1989 INJECTION



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Injection readings for GMF 31-17:

Date	Time	Wht	Water
	Hour	Deg f	Klb/hr
9 7 1989	940	125	223.3
9 7 1989	2100	150	228.6
9 8 1989	315	150	196.2
9 8 1989	700	150	181.7
9 8 1989	1015	150	196.2
9 8 1989	1400	150	189.1
9 9 1989	645	150	196.2
9 9 1989	1545	150	196.2
9 9 1989	1600	150	203.1
9 10 1989	45	150	203.1
9 10 1989	120	150	189.1
9 10 1989	220	150	189.1
9 10 1989	300	150	196.2
9 10 1989	715	150	196.2
9 11 1989	800	150	196.2
9 12 1989	800	150	219.4
9 12 1989	1515	155	225.4
9 12 1989	1630	155	173.8
9 12 1989	1830	155	157.2
9 12 1989	1910	155	173.8
9 12 1989	2137	155	209.6
9 12 1989	2250	155	222.4
9 13 1989	135	155	216.1
9 13 1989	615	155	209.6
9 13 1989	850	155	209.6
9 13 1989	1415	155	117.2
9 13 1989	1810	155	128.4
9 13 1989	2145	155	148.2
9 14 1989	50	155	165.7
9 14 1989	155	155	157.2
9 14 1989	400	155	148.2
9 14 1989	700	155	143.5
9 14 1989	1000	155	148.2
9 14 1989	2100	155	138.6
9 15 1989	300	155	143.5
9 15 1989	600	155	143.5
9 15 1989	1015	159	148.1
9 15 1989	1345	159	138.6
9 16 1989	830	159	148.1
9 16 1989	1245	150	148.3
9 16 1989	1300	150	157.3
9 16 1989	2000	159	165.6
9 16 1989	2400	159	165.6
9 17 1989	700	158	157.1
9 17 1989	900	149	165.9
9 17 1989	1745	155	157.2
9 18 1989	100	156	157.2
9 18 1989	715	156	148.2

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Injection readings for GMF 31-17: (continued)

Date	Time	Wht	Water
	Hour	Deg f	Klb/hr
9 18 1989	800	160	152.7
9 18 1989	915	160	173.7
9 18 1989	1200	164	177.5
9 18 1989	1845	165	173.5
9 18 1989	2400	163	173.6
9 19 1989	700	163	173.6
9 19 1989	1500	163	169.6
9 20 1989	700	166	169.5
9 20 1989	1700	170	188.5
9 21 1989	200	170	195.6
9 21 1989	800	170	184.8
9 21 1989	1600	170	188.5
9 22 1989	300	170	188.5
9 22 1989	700	170	192.1
9 22 1989	1100	170	202.5
9 22 1989	1200	170	202.5
9 22 1989	2300	170	215.6
9 23 1989	800	170	215.6
9 23 1989	2400	170	221.8
9 24 1989	700	170	215.6
9 24 1989	1700	170	227.9
9 24 1989	2100	170	209.1
9 25 1989	700	170	215.6
9 26 1989	700	170	215.6
9 26 1989	1500	170	218.7
9 26 1989	2200	170	215.6
9 27 1989	100	172	227.8
9 27 1989	715	172	224.8
9 27 1989	900	170	227.9
9 27 1989	1200	170	215.6
9 28 1989	100	175	233.6
9 28 1989	500	172	195.5
9 28 1989	800	177	195.4
9 28 1989	1100	175	195.4
9 28 1989	1400	175	208.9
9 28 1989	1500	175	239.4
9 28 1989	2000	175	255.9
9 29 1989	200	175	215.4
9 29 1989	215	175	233.6
9 29 1989	430	175	208.9
9 29 1989	800	173	202.4
9 29 1989	930	172	209.1
9 29 1989	1000	174	212.2
9 29 1989	1230	174	250.6
9 29 1989	1530	174	233.7
9 29 1989	1800	174	233.7
9 29 1989	2400	173	233.7
9 30 1989	300	173	227.8
9 30 1989	800	174	221.7

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Injection readings for GMF 31-17: (continued)

Date	Time	Wht	Water
	Hour	Deg f	Klb/hr
9 30 1989	1030	174	227.7
9 30 1989	1100	174	221.7
9 30 1989	1800	174	221.7
9 30 1989	2400	174	221.7
10 1 1989	700	174	221.7
10 1 1989	915	174	227.7
10 1 1989	945	174	221.7
10 1 1989	1630	174	221.7
10 1 1989	1700	174	221.7
10 1 1989	2400	174	221.7
10 2 1989	600	174	221.7
10 2 1989	800	174	221.7
10 3 1989	800	174	221.7
10 3 1989	2000	174	227.7
10 4 1989	800	174	239.4
10 4 1989	1300	174	233.7
10 4 1989	1315	174	188.4
10 4 1989	1800	174	195.5
10 4 1989	2400	174	195.5
10 5 1989	800	174	221.7
10 5 1989	2400	174	227.7
10 6 1989	800	174	209.0
10 6 1989	900	174	239.4
10 6 1989	1500	174	233.7
10 6 1989	1515	174	209.0
10 7 1989	800	174	221.7
10 8 1989	800	174	218.6
10 9 1989	800	174	218.6
10 9 1989	1530	174	218.6
10 9 1989	1830	174	181.0
10 10 1989	700	174	173.3
10 11 1989	700	164	157.0
10 11 1989	800	164	138.4
10 11 1989	830	164	157.0
10 11 1989	1000	173	173.3
10 11 1989	1040	175	195.4
10 11 1989	1230	175	208.9
10 11 1989	1815	175	245.0
10 11 1989	1945	176	255.9
10 12 1989	100	175	245.0
10 12 1989	115	175	255.9
10 12 1989	545	175	250.5
10 12 1989	800	175	221.6
10 12 1989	1100	175	227.7
10 12 1989	1200	175	233.6
10 12 1989	1800	175	233.6
10 12 1989	2100	175	227.7
10 13 1989	300	175	221.6
10 13 1989	800	175	221.6

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Injection readings for GMF 31-17: (continued)

Date	Time	Wht	Water
	Hour	Deg f	Klb/hr
10 13 1989	1000	175	233.6
10 13 1989	1600	175	233.6
10 13 1989	1800	175	221.6
10 14 1989	200	175	221.6
10 14 1989	800	175	233.6
10 14 1989	1200	175	233.6
10 14 1989	1800	175	227.7
10 14 1989	2400	175	221.6
10 15 1989	800	175	221.6
10 15 1989	1800	175	233.6
10 15 1989	2100	175	245.0
10 15 1989	2400	175	173.2
10 16 1989	430	175	165.2
10 16 1989	800	175	138.2
10 16 1989	1500	175	147.7
10 16 1989	2400	175	202.3
10 17 1989	800	175	202.3
10 17 1989	1400	175	208.9
10 17 1989	2000	175	195.4
10 17 1989	2400	175	147.7
10 18 1989	500	175	147.7
10 18 1989	800	175	215.4
10 18 1989	1300	175	127.9
10 18 1989	1800	175	165.2
10 19 1989	100	175	221.6
10 19 1989	800	175	208.9
10 19 1989	1100	175	208.9
10 19 1989	2400	175	221.6
10 20 1989	700	175	227.7
10 20 1989	1000	175	215.4
10 20 1989	1800	175	215.4
10 20 1989	2400	175	221.6
10 21 1989	800	175	227.7
10 21 1989	1500	165	228.1
10 21 1989	2300	165	222.0
10 22 1989	600	165	245.4
10 22 1989	1100	165	245.4
10 22 1989	1700	165	228.1
10 23 1989	700	155	228.5
10 23 1989	1300	155	234.4
10 23 1989	2200	160	234.2
10 24 1989	200	160	228.3
10 24 1989	800	160	215.9
10 24 1989	1200	172	215.5
10 25 1989	800	172	215.5
10 25 1989	1200	172	245.1
10 25 1989	1800	172	245.1
10 25 1989	2400	172	239.5
10 26 1989	800	172	227.8

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Injection readings for GMF 31-17: (continued)

Date	Time	Wht	Water
	Hour	Deg f	Klb/hr
10 26 1989	2100	160	128.3
10 27 1989	400	167	128.1
10 27 1989	800	170	128.0
10 27 1989	1200	177	156.6
10 27 1989	1800	177	173.2
10 27 1989	2400	177	165.1
10 28 1989	800	170	147.9
10 28 1989	1300	177	233.5
10 28 1989	1800	177	215.3
10 28 1989	2400	177	233.5
10 29 1989	800	165	165.5
10 29 1989	1200	142	181.9
10 29 1989	1800	145	148.5
10 29 1989	2400	145	148.5
10 30 1989	800	145	148.5
10 31 1989	800	145	148.5
10 31 1989	900	145	237.7
10 31 1989	1200	145	148.5
10 31 1989	1900	145	166.0
11 1 1989	1200	145	166.0

Shut-in well at 1201 hrs, 11/1/1989

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Section 11

GM 31-17 Pressure Transient Tests

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GMF 31-17 pressure build-up survey (PBU #3) conducted 8/30/89.
 Well flowing 354,300 lb/hr total mass flow at a wellhead pressure
 of 90 psig prior to shut in. Shut in at 1531 hours:

<u>Depth</u> <u>Feet</u>	<u>Time</u> <u>Hours</u>	<u>Temperature</u> <u>Deg F</u>	<u>Pressure</u> <u>Psig</u>
3800	1531		342 (flowing pressure)
3800	1532		356
3800	1533		403
3800	1534	458	466
3800	1535	460	535
3800	1536	461	592
3800	1537	463	645
3800	1538	463	699
3800	1539	463	739
3800	1540	465	774
3800	1541	465	806
3800	1542	465	835
3800	1543		861
3800	1544		879
3800	1545		895
3800	1546		909
3800	1547		918
3800	1548		925
3800	1549		933
3800	1550		938
3800	1551	466	941
3800	1552		944
3800	1553		945
3800	1554		949
3800	1555		950
3800	1556		950
3800	1606	466	956
3800	1616		958
3800	1631		959
3800	1731	461	961
3800	1831	458	961
3800	1931	456	962
3800	2031	453	962

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GMF 31-17 pressure falloff survey conducted on 10/31/89.
 Flowrate prior to shut-in was 229,700 lb/hr. Well was shut-in at
 1201 hours:

<u>Depth</u> <u>Feet</u>	<u>Time</u> <u>Hours</u>	<u>Pressure</u> <u>Psig</u>
3800	1201	1132 (flowing pressure)
3800	1202	1099
3800	1203	1088
3800	1204	1056
3800	1205	1044

GMF 31-17 pressure falloff survey: (continued)

<u>Depth</u> <u>Feet</u>	<u>Time</u> <u>Hours</u>	<u>Pressure</u> <u>Psig</u>
3800	1206	1032
3800	1207	1025
3800	1208	1020
3800	1209	1014
3800	1211	1010
3800	1216	997
3800	1221	988
3800	1231	980
3800	1301	972
3800	1401	966
3800	1501	964
3800	1600	963

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Section 12

GM 68-8 Pressure Transient Tests

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GMF 68-8 pressure fall-off survey (PFO #3) conducted 8/20/89.
 Injection rate of 303,300 lb/hr prior to shut in. Shut in at
 1127 hours:

Depth <u>Feet</u>	Time <u>Hours</u>	Pressure <u>Psig</u>
6500	1127	2131 (flowing pressure)
6500	1128	2085
6500	1129	2057
6500	1130	2047
6500	1131	2037
6500	1132	2031
6500	1133	2029
6500	1134	2023
6500	1135	2021
6500	1136	2019
6500	1137	2017
6500	1147	2009
6500	1157	2005
6500	1227	1999
6500	1257	1995
6500	1327	1993
6500	1427	1991
6500	1527	1991
6500	1627	1989
6500	1727	1989

GMF 68-8 pressure fall-off survey (PFO #4) conducted 8/29/89.
 Injection rate of 239,800 lb/hr prior to shut in. Shut in at
 0810 hours:

Depth <u>Feet</u>	Time <u>Hours</u>	Pressure <u>Psig</u>
6500	0810	2049 (flowing pressure)
6500	0811	2023
6500	0812	2009
6500	0813	2001
6500	0814	1995
6500	0815	1993
6500	0816	1991
6500	0817	1989
6500	0818	1987
6500	0819	1987
6500	0820	1987
6500	0840	1977
6500	0910	1975
6500	1010	1973
6500	1110	1969
6500	1210	1967
6500	1310	1965
6500	1410	1963

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GMF 68-8 pressure build-up survey conducted on 11/1/89. Flowrate prior to shut-in was 229,700 lb/hr. Well was shut-in at 1125 hours:

<u>Depth</u> <u>Feet</u>	<u>Time</u> <u>Hours</u>	<u>Pressure</u> <u>Psig</u>	
5700	1125	990	(flowing pressure)
5700	1126	1017	
5700	1127	1065	
5700	1128	1089	
5700	1129	1128	
5700	1130	1151	
5700	1131	1189	
5700	1132	1212	
5700	1133	1240	
5700	1134	1272	
5700	1135	1299	
5700	1136	1316	
5700	1137	1333	
5700	1138	1353	
5700	1139	1369	
5700	1140	1386	
5700	1141	1399	
5700	1142	1413	
5700	1143	1425	
5700	1144	1439	
5700	1145	1451	
5700	1147	1466	
5700	1149	1483	
5700	1151	1496	
5700	1153	1511	
5700	1155	1520	
5700	1200	1542	
5700	1205	1553	
5700	1210	1562	
5700	1215	1573	
5700	1220	1576	
5700	1225	1577	
5700	1255	1594	
5700	1325	1604	
5700	1425	1610	
5700	1603	1618	

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Section 13

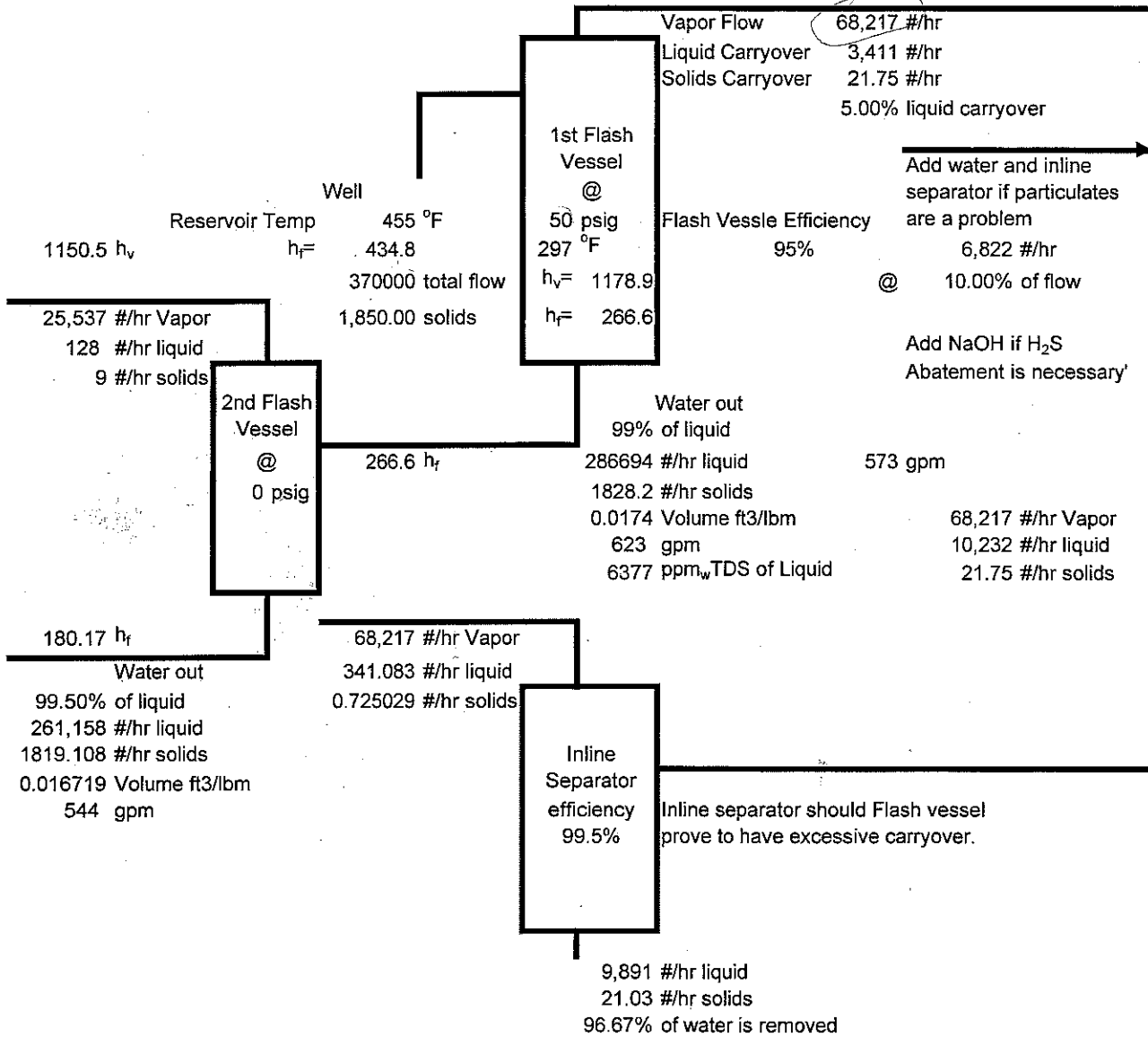
GM 87-13 Pressure Transient Tests

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Wellhead Separator System (Double Separation)

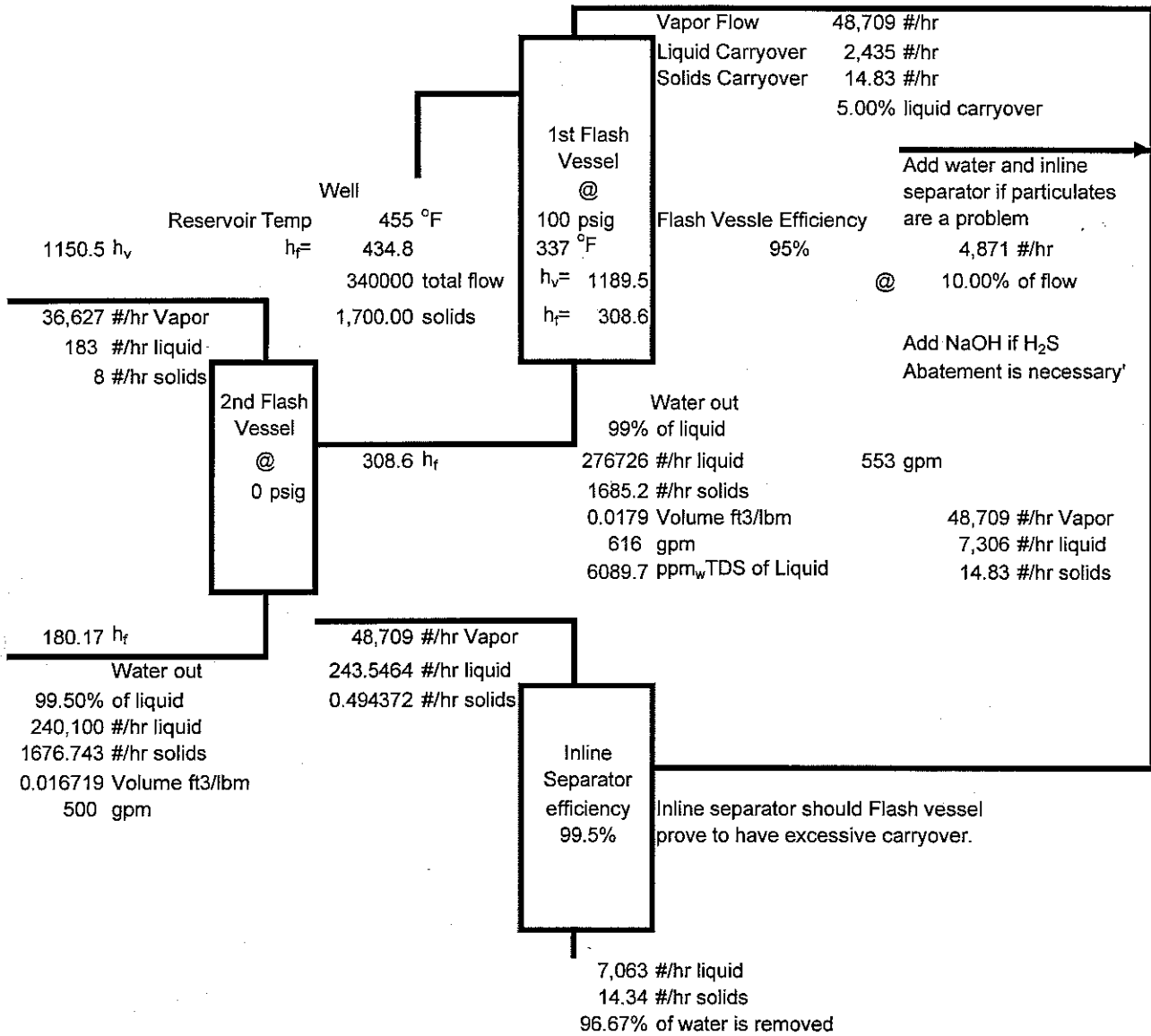
This model is assuming a well with a total flow of 370 Klbs per hour.
 Reservoir Temp 455 °F
 A total vapor flow of 68,217 lbs per hour.
 Total solids loading of 5,000 ppm_wTDS of total
 A total solids load of 1,850 lbs per hour.
 Flash Ratio 18%
 Total Vapor 93,753 Total Water out 544 gpm



T. Conant
 6/3/1997
 Glass Mountain Wellhead Testing

Wellhead Separator System (Double Separation)

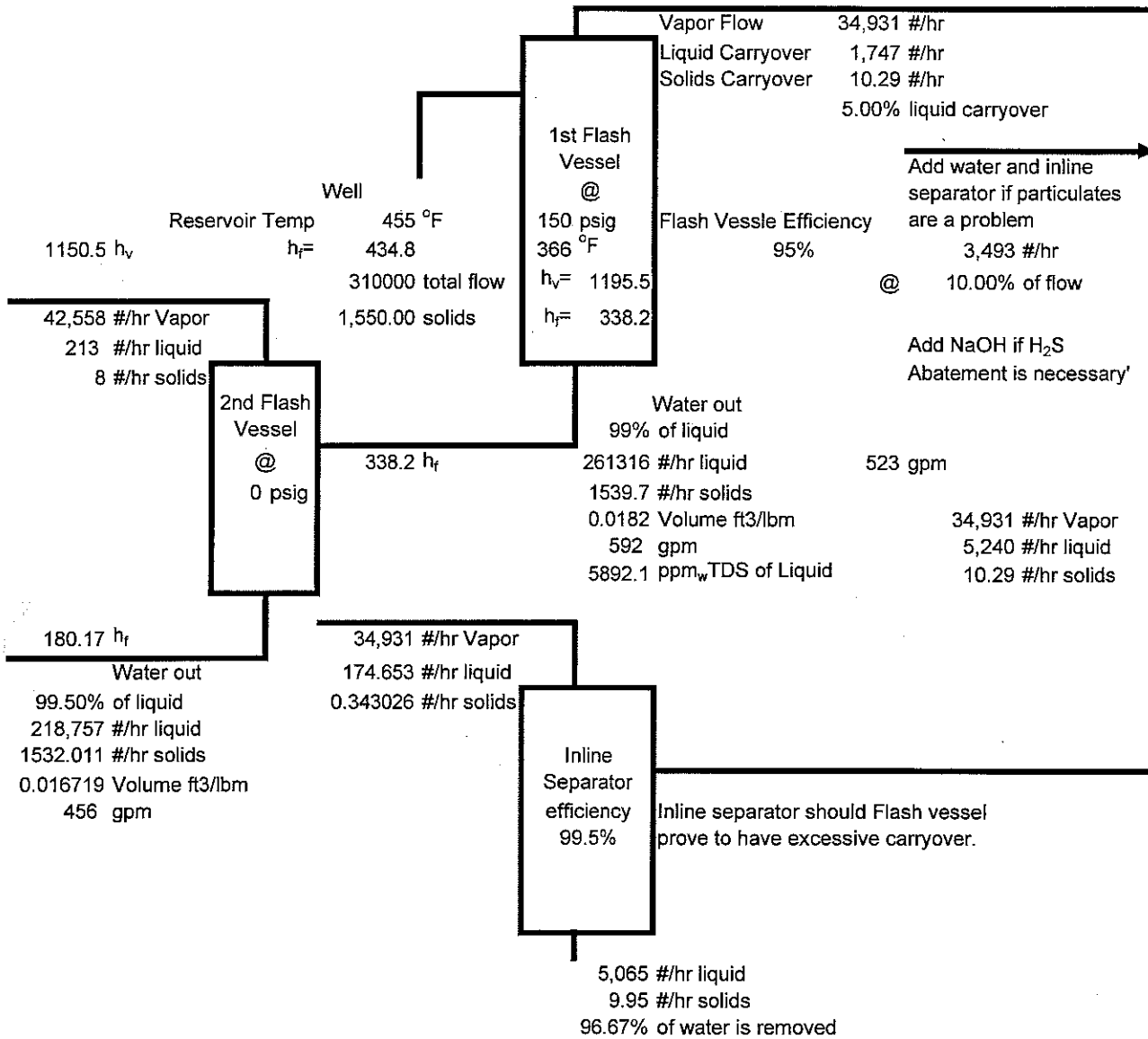
This model is assuming a well with a total flow of 340 Klbs per hour.
 Reservoir Temp 455 °F
 A total vapor flow of 48,709 lbs per hour.
 Total solids loading of 5,000 ppm_wTDS of total
 A total solids load of 1,700 lbs per hour.
 Flash Ratio 14%
 Total Vapor 85,336 Total Water out 500 gpm



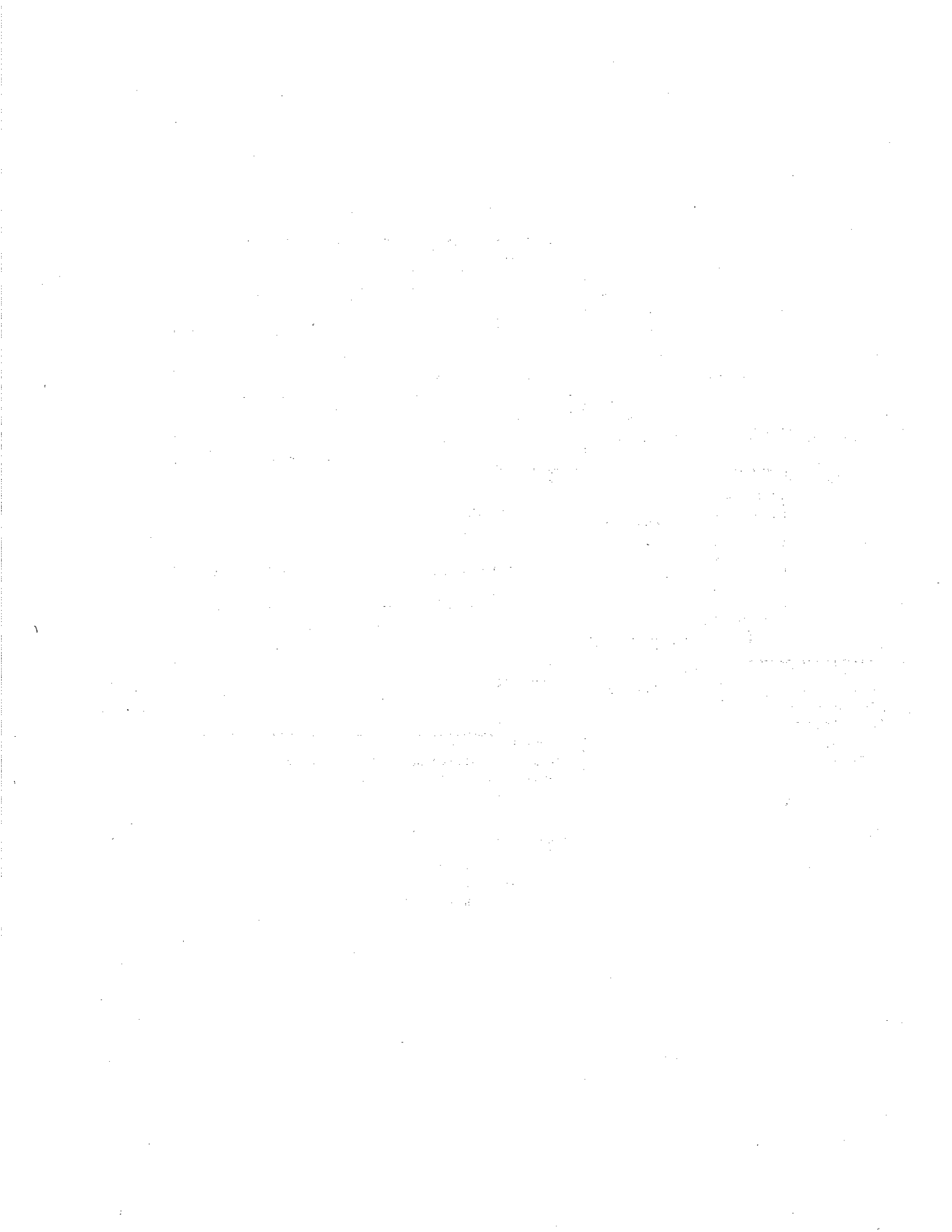
T. Conant
 6/3/1997
 Glass Mountain Wellhead Testing

Wellhead Separator System (Double Separation)

This model is assuming a well with a total flow of 310 Kibs per hour.
 Reservoir Temp 455 °F
 A total vapor flow of 34,931 lbs per hour.
 Total solids loading of 5,000 ppm_wTDS of total
 A total solids load of 1,550 lbs per hour.
 Flash Ratio 11%
 Total Vapor 77,489 Total Water out 456 gpm



T. Conant
 6/3/1997
 Glass Mountain Wellhead Testing



GMF 87-13 pressure fall-off survey (PFO #1) conducted on 10/31/89. Injection rate of 303,000 lb/hr prior to shut-in. Shut in at 1552 hours:

Depth	Time	Pressure
<u>Feet</u>	<u>Hours</u>	<u>Psig</u>
2600	1552	726 (flowing pressure)
2600	1553	712
2600	1554	705
2600	1555	705
2600	1728	699
2600	1827	693

GMF 87-13 pressure build-up survey (PBU #1) conducted on 11/6/89. Production rate of 231,000 lb/hr prior to shut-in. Shut-in at 1915 hours:

Depth	Time	Pressure
<u>Feet</u>	<u>Hours</u>	<u>Psig</u>
2580	1915	493 (flowing pressure)
2580	1916	610
2580	1917	646
2580	1919	650
2580	2015	652
2580	0015	652 (11/7/89)
2580	0451	654

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