



# GEO THERMAL DIVISION

## SUBSURFACE SURVEY

### Field Work Sheet

B-19 S-1 PIT

76

OWNER UNION Geothermal Co. U.Mex FIELD Redondo Canyon  
 CASING 20" AT 248' 13 1/2" AT 1504' ELEV. 9117'  
 LINER DESCRIPTION: 1 9/16" - Surface to 2480'  
7" - 2328' - 5585'

WELL NAME BACA #19  
 DATE: 11-15-79  
 ZERO POINT GL + 12'  
 DEPTH 5585'

TUBING DETAIL:

PURPOSE Gradient Survey

REMARKS:

ELEMENT 0-4050 PSI SN-9222 CLOCK -12 hr 15 TURN

ELEMENT 93"-618°F SERIAL NO. 10222 CLOCK -12 hr 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-0703; T-0700 DISENGAGE STYLUS P-1014; T-1013

WELL HEAD 419 PSIG 0-600 T/C

PICKUP @ 5550 TIME ON BOTTOM 0936-0950 MAX. °F 502 °F

WELL STATUS SHUT IN

SHUT IN: Well Shut in 11-3-79 ON PRODUCTION:

RATE

PRESSURE

TEMPERATURE

TIME	DEPTH	DEFL.	P-T	GRAD.	ROD	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0735	0	.177	433	-	-.005	0735	0	NR	NR	-							
0747	500	.179	437	.008	-.004	0747	500	193	158	-							
0758	1000	.182	444	.014	-.002	0758	1000	545	268	.220							
0810	1500	.184	449	.010	+.001	0810	1500	775	336	.136							
0822	2000	.185	451	.004	0	0822	2000	920	378	.084							
0834	2500	.188	458	.014	+.001	0834	2500	1.149	441	.126							
0846	3000	.263	633	.350	+.002	0846	3000	1.160	444	.006							
0858	3500	.338	808	.350	+.003	0858	3500	1.175	448	.008							
0910	4000	.414	936	.356	+.004	0910	4000	1.201	455	.014							
0922	4500	.487	1157	.342	+.004	0922	4500	1.250	468	.026							
0934	5000	.560	1327	.340	+.005	0934	5000	1.298	481	.026							
0950	5550	.640	1514	.340	+.006	0950	5550	1.386	502	.038							

COMMENTS:

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# GEO THERMAL DIVISION

## SUBSURFACE PRESSURE SURVEY

B-19 S-1 P

OWNER UNION GEOTHERMAL CO of N Mex. FIELD REDONDO  
 CASING 20" AT 248', 13 3/8" AT 1504' ELZY. 9117'  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480'  
7" - 2328' TO 5585'

WELL NAME BAA #19  
 DATE: 11-15-79  
 ZERO POINT GL + 12'  
 DEPTH 5585'

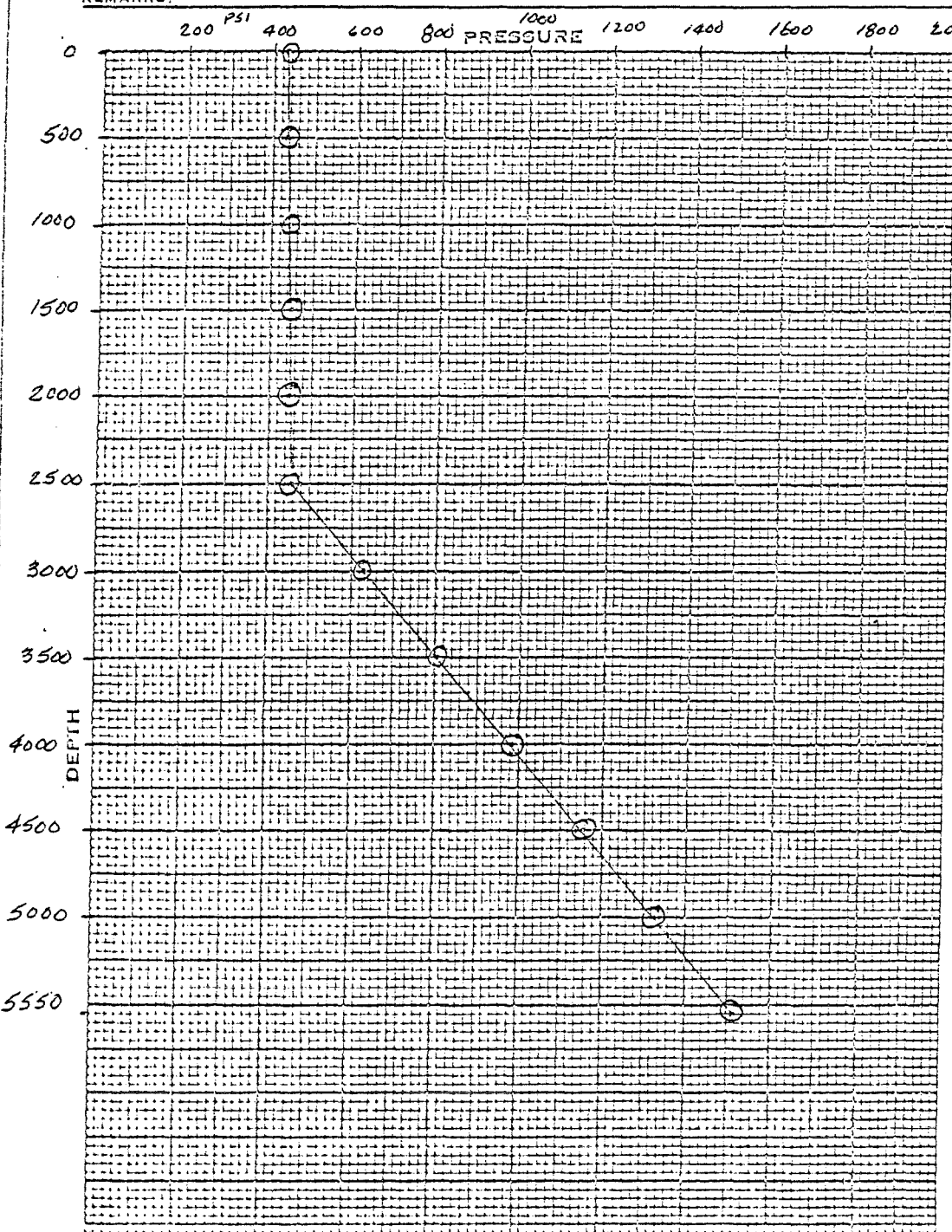
HOLE DESCRIPTION:

INSTRUMENT 0-4650 PSI  
 SERIAL NO. 9222

PURPOSE Gradient Survey

MAX. TEMP 502 °F @ 5550

REMARKS:



PRESSURES	GAUGE	30:0
CASING, PSI	419	433

DEPTH	PRESSURE	GRADIENT
0	433	-
500	437	.008
1000	444	.014
1500	449	.010
2000	451	.009
2500	458	.014
3000	633	.350
3500	808	.350
4000	986	.356
4500	1157	.342
5000	1327	.340
5550	1514	.340

J. BOWEN, T. PARRETT

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# GEOTHERMAL DIVISION

## SUBSURFACE TEMPERATURE SURVEY

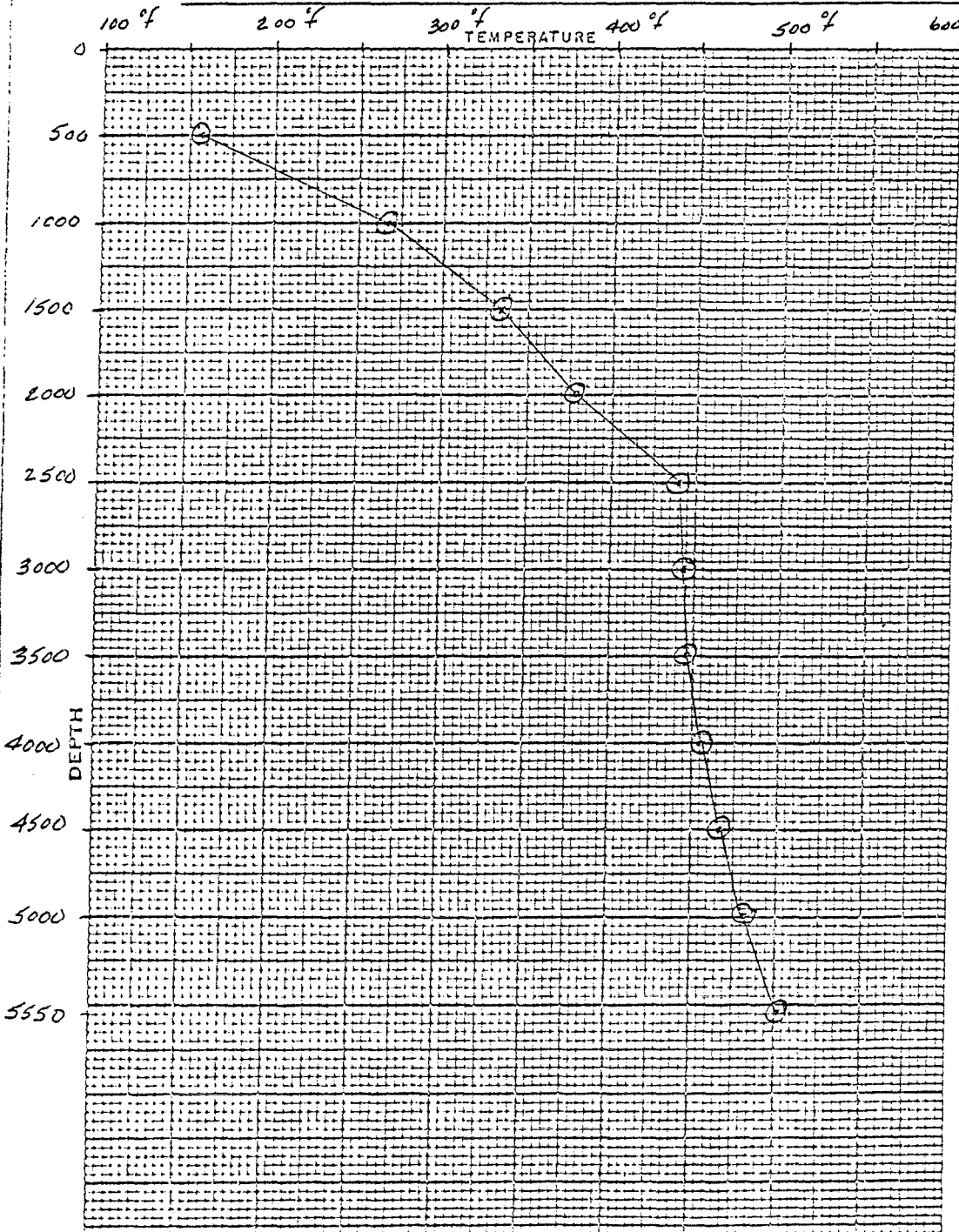
B-19 5-1 T

OWNER UNION Geo. of N. M. FIELD Redondo WELL NAME BACA #19  
 CAGING 20" at 248' 13 3/4" at 1504 ELEV. 9117 DATE: 11/15/79  
 LINER DESCRIPTION: 9 3/4" SURFACE - 2480' ZERO POINT QL + 12'  
7" 2328' - 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_  
 INSTRUMENT 93-618° FAH. \_\_\_\_\_  
 SERIAL NO 10222

PURPOSE GRADIENT SURVEY MAX TEMP. 502 °F @ 5550'

REMARKS: \_\_\_\_\_



STABILIZATION PERIOD \_\_\_\_\_

PRESSURES	GAUGE	BOLTS	
CASING, PSI			
DEPTH	TEMP.	DEPTH	TEMP.
0	NR		
500	158		
1000	268		
1500	336		
2000	378		
2500	441		
3000	444		
3500	448		
4000	455		
4500	468		
5000	481		
5550	502		

J. BOWEN; T. PARRETT

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## GEO THERMAL DIVISION

### SUBSURFACE SURVEY

#### Field Work Sheet

B-19 5-2 P

OWNER Union Geo. of New Mex FIELD Redondo Canyon

WELL NAME BACA # 19

CASING 20" AT 242'; 13 3/4" AT 1504' ELEV. 9117'

DATE: 11/26/79

LINER DESCRIPTION: 9 5/8" SURFACE TO 2480'  
7" 2328' TO 5585'

ZERO POINT AL + 12'  
DEPTH 5585'

TUBING DETAIL:

PURPOSE Flowing Survey

REMARKS:

Element 0-4650 PSI S.N. 9222 Clock 12 HR. 15 TURN

ELEMENT	SERIAL NO.	CLOCK	TURN	STABILIZATION PERIOD
ENGAGE STYLUS	<u>0819 hrs</u>	DISENGAGE STYLUS	<u>1947 hrs</u>	
WELL HEAD	<u>See Attached CHARTS</u>			
PICKUP @ <u>5000'</u>	TIME ON BOTTOM <u>10:33 AM</u> <u>19:15</u> MAX. 'F			
WELL STATUS <u>Flowing</u>				
SHUT IN:	ON PRODUCTION:			
RATE				

ENGAGE STYLUS 0819 hrs DISENGAGE STYLUS 1947 hrs

WELL HEAD See Attached CHARTS

PICKUP @ 5000' TIME ON BOTTOM 10:33 AM 19:15 MAX. 'F

WELL STATUS Flowing

SHUT IN:

ON PRODUCTION:

RATE

### Pressure

TIME	DEPTH	DEFL.	P-F	GRAD.	COR <sup>10</sup>	TIME	DEPTH	DEFL.	P-F	GRAD.	COR <sup>10</sup>	TIME	DEPTH	DEFL.	P-F	GRAD.	COR <sup>10</sup>	
0904	500	.003	9		0	1213	5000	.060	160		-0.002	1813	5000	CLOCK	STOPPED			
0915	1000	.004	11		0	1218	"	.056	150		-0.002	1828	"	"	"	"	"	"
0926	1500	.006	17		0	1223	"	.055	148		-0.002	1843	"	"	"	"	"	"
0937	2000	.007	20		0	1228	"	.056	150		-0.002	1858	"	"	"	"	"	"
0948	2500	.012	34		0	1233	"	.059	157		-0.002	1913	"	"	"	"	"	"
0959	3000	.038	107		-0.003	1238	"	.061	162		-0.002	1915	"	.060	160			-0.002
1010	3500	.121	302		-0.001	1243	"	.064	169		-0.002							
1021	4000	.120	488		0	1258	"	.072	188		-0.002							
1032	4500	.177	666		+0.002	1313	"	.081	209		-0.001							
1038	5000	.350	836		+0.003	1328	"	.090	230		-0.001							
1043	"	.350	836		+0.003	1343	"	.099	251		-0.001							
1048	"	.348	832		+0.003	1358	"	.113	284		0							
1053	"	.347	829		+0.003	1413	"	.137	340		0							
1058	"	.344	822		+0.003	1428	"	.180	440		0							
1103	"	.341	815		+0.003	1443	"	.214	519		+0.001							
1108	"	.335	801		+0.003	1458	"	.247	596		+0.001							
1113	"	.328	785		+0.003	1513	"	.282	678		+0.002							
1118	"	.310	743		+0.002	1528	"	.311	745		+0.002							
1123	"	.286	687		+0.002	1543	"	.337	806		+0.003							
1128	"	.254	612		+0.002	1558	"	.349	834		+0.003							
1133	"	.219	530		+0.001	1613	"	.352	841		+0.003							
1138	"	.189	458		+0.001	1628	"	.353	843		+0.003							
1143	"	.157	396		0	1643	"	.353	843		+0.003							
1148	"	.131	326		0	1658	"	.353	843		+0.003							
1153	"	.115	288		-0.001	1713	"											
1158	"	.094	251		-0.001	1728	"					CLOCK	STOPPED					
1203	"	.080	207		-0.002	1743	"											
1208	"	.067	176		-0.002	1758	"											

COMMENTS:

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## GEOHERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

B-19 5-2 T

OWNER <u>Union Geo. of New Mex. Field Redondo Canyon</u>	WELL NAME <u>BACA #19</u>
CASING <u>20" at 249' ; 13 3/8" at 1504 ELEV. 9117'</u>	DATE: <u>11/26/79</u>
LINER DESCRIPTION: <u>9 5/8" at Surface to 2480'</u> <u>7" 2328' to 5585'</u>	ZERO POINT <u>GL +12'</u>
TUBING DETAIL:	DEPTH <u>5585'</u>

PURPOSE Flowing Survey  
REMARKS:

ELEMENT <u>93° 618°f</u>	SERIAL NO. <u>10222</u>	CLOCK <u>12hr.</u>	<u>15</u> TURN	STABILIZATION PERIOD
ENGAGE STYLUS <u>0820 hrs</u>	DISENGAGE STYLUS <u>1948 hrs</u>			
WELL HEAD <u>See attached CHARTS</u>				
PICKUP @ <u>5000'</u>	TIME ON BOTTOM <u>1033-1915 hrs.</u>		MAX. °F <u>468°f</u>	
WELL STATUS <u>Flowing</u>				
SHUT IN:	ON PRODUCTION:			
RATE				

Temperature

TIME	DEPTH	DEFL.	F-T	GRAD.	ID	TIME	DEPTH	DEFL.	F-T	GRAD.	ID	TIME	DEPTH	DEFL.	F-T	GRAD.	ID
0904	500	.422	231			1213	5000	.885	368			1813	5000	1.249	468		
0915	1000	.453	240			1219	"	.883	367			1828	"	1.216	459		
0926	1500	.480	249			1223	"	.883	367			1843	"	1.101	428		
0937	2000	.513	259			1228	"	.888	369			1858	"	.945	385		
0948	2500	.583	280			1233	"	.898	371			1913	"	.893	367		
0959	3000	.688	311			1238	"	.910	375			1915	"	.893	367		
1010	3500	.853	359			1243	"	.919	377								
1021	4000	.954	387			1258	"	.944	385								
1032	4500	1.031	409			1313	"	.968	391								
1038	5000	1.216	459			1328	"	.994	399								
1043	"	1.219	460			1343	"	1.017	405								
1048	"	1.224	461			1358	"	1.046	413								
1053	"	1.229	463			1413	"	1.070	420								
1058	"	1.233	464			1428	"	1.087	424								
1103	"	1.236	465			1443	"	1.103	428								
1108	"	1.239	465			1458	"	1.113	431								
1113	"	1.242	466			1513	"	1.113	431								
1118	"	1.243	467			1528	"	1.111	431								
1123	"	1.235	464			1543	"	1.105	429								
1128	"	1.209	457			1558	"	1.105	429								
1133	"	1.183	450			1613	"	1.117	432								
1138	"	1.131	436			1628	"	1.134	437								
1143	"	1.099	427			1643	"	1.154	442								
1148	"	1.068	419			1658	"	1.175	448								
1153	"	1.019	406			1713	"	1.199	455								
1158	"	.972	393			1728	"	1.216	459								
1203	"	.926	379			1743	"	1.231	463								
1208	"	.900	372			1758	"	1.241	466								

COMMENTS:

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# GEO THERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

B-19 5-3 P/T

OWNER Union Geo. of. New Mex. Field Redondo Canyon

WELL NAME BACA #19

CASING 20' at 249'; 13 3/4" at 1504 ELEV. 9117'

DATE: 11/27/79

LINER DESCRIPTION: 9 3/8" SURFACE to 2480'  
7" 2228 to 5585'

ZERO POINT FL + 12'

DEPTH 5585'

TUBING DETAIL:

PURPOSE Flowing Survey

REMARKS:

Element 0-4650 PSI SN - 9222 Clock 12HR 15TURN

ELEMENT 93' - 618°F SERIAL NO. 18339 CLOCK 12HR 15TURN STABILIZATION PERIOD

ENGAGE STYLUS P-0608 T-0609 DISENGAGE STYLUS P-0839 T-0835

WELL HEAD See Attached charts

PICKUP @ 5000' TIME ON BOTTOM 0646 - 0716 MAX. 'F 364

WELL STATUS Flowing

SHUT IN:

ON PRODUCTION:

RATE:

Pressure

Temperature

TIME	DEPTH	DEFL.	P-T	GRAD.	COR LB	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
	5000	.058	150		.056		5000	.871	364								
	4000		110		.039		4000	.796	342								
	3000		86		.030		3000	.739	326								
	2000		54		.019		2000	.657	302								

COMMENTS:

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## GEO THERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

B-19 54 P/T

OWNER Union Geo. of. New Mex. FIELD Redondo Canyon

WELL NAME BACA #19

CASING 20" at 248'; 13 3/8" At 1504' ELEV. 9117'

DATE: 11-27-79

LINER DESCRIPTION: 9 5/8" SURFACE to 2480'  
7" 2328 - 5585

ZERO POINT FL + 12'  
DEPTH 5585'

TUBING DETAIL:

PURPOSE Shut in build-up

REMARKS:

ELEMENT 0-4650 PSI SERIAL NO. 9222 CLOCK 12hr. 15 TURN STABILIZATION PERIOD  
 ENGAGE STYLUS 1048 hrs DISENGAGE STYLUS  
 WELL HEAD See Attached CHARTS  
 PICKUP @ 5000' TIME ON BOTTOM MAX. °F  
 WELL STATUS Shut in  
 SHUT IN: 11/27/79 1145 hrs ON PRODUCTION:  
 RATE

Pressure

TIME	DEPTH	DEFL.	P-T	GRAD.	Cor. #	TIME	DEPTH	DEFL.	P-T	GRAD.	Cor. #	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
1135	5000	.068	179		- .002	1804	4000	.314	75.2		+0.02						
1145	"	.070	183		- .002	1815	4500	.393	93.7		+0.03						
1200	"	.091	233		- .001	1830	5000	.474	112.6		+0.05						
1215	"	.136	337		- .001	1845	"	.477	113.3		+0.05						
1230	"	.172	421		0	1900	"	.480	114.0		+0.05						
1245	"	.201	488		0	1915	"	.483	114.7		+0.05						
1300	"	.230	556		+0.01	1930	"	.486	115.4		+0.05						
1315	"	.257	619		+0.02	1945	"	.488	115.9		+0.05						
1330	"	.285	685		+0.02	2000	"	.491	116.6		+0.05						
1345	"	.308	738		+0.02	2015	"	.493	117.1		+0.05						
1400	"	.332	794		+0.03	2030	"	.495	117.5		+0.05						
1415	"	.351	839		+0.03	2045	"	.497	118.0		+0.05						
1430	"	.367	876		+0.03	2100	"	.499	118.5		+0.05						
1445	"	.391	909		+0.03	2115	"	.501	118.9		+0.05						
1500	"	.392	935		+0.04	2130	"	.502	119.2		+0.05						
1515	"	.402	958		+0.04	2145	"	.504	119.6		+0.05						
1530	"	.412	991		+0.04	2200	"	.505	119.9		+0.05						
1545	"	.420	1000		+0.04	2215	"	.507	120.3		+0.05						
1600	"	.427	1016		+0.04	2230	"	.508	120.6		+0.05						
1603	"	.430	1023		+0.04	2237	"	.509	120.8		+0.05						
1635	0	.101	256		- .006												
1647	500	.103	260		- .002												
1658	1000	.106	267		0												
1709	1500	.107	270		0												
1720	2000	.108	272		0												
1731	2500	.109	274		0												
1742	3000	.153	377		0												
1753	3500	.233	563		+0.01												

COMMENTS:

TO T T T

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## GEOHERMAL DIVISION

### SUBSURFACE SURVEY

#### Field Work Sheet

B-19 54 P/H

OWNER Union Geo. of New Mex. Field Redondo Canyon

WELL NAME BACA #19

CASING 20" AT 248'; 13 3/8" AT 1504' ELEV. 9117

DATE: 11/27/79

LINER DESCRIPTION: 9 5/8" SURFACE To 2480'  
7" 2328 - 5585

ZERO POINT G.L. +12'

DEPTH 5585

TUBING DETAIL:

PURPOSE Shut in build-up

REMARKS:

ELEMENT 93-618-F SERIAL NO. 18338 CLOCK 12HR 15 TURN

STABILIZATION PERIOD

ENGAGE STYLUS 1045 hrs DISENGAGE STYLUS

WELL HEAD See attached charts

PICKUP @ 5000' TIME ON BOTTOM MAX. 'F

WELL STATUS Shut in

SHUT IN: 11/27/79 1145 hrs ON PRODUCTION:

RATE

### Temperature

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
1135	5000	.919	377			1804	4000	1.049	413								
1145	"	.926	379			1815	4500	1.037	411								
1200	"	.982	395			1830	5000	1.027	408								
1215	"	.896	371			1845	"	1.029	408								
1230	"	.891	369			1900	"	1.030	409								
1245	"	.909	375			1915	"	1.033	409								
1300	"	.926	379			1930	"	1.036	410								
1315	"	.939	383			1945	"	1.039	411								
1330	"	.950	386			2000	"	1.042	412								
1345	"	.960	389			2015	"	1.045	413								
1400	"	.968	391			2030	"	N.R.	N.R.								
1415	"	.976	394			2045	"	"	"								
1430	"	.985	396			2100	"	"	"								
1445	"	.987	397			2115	"	"	"								
1500	"	.988	397			2130	"	"	"								
1515	"	.989	397			2145	"	"	"								
1530	"	.991	398			2200	"	"	"								
1545	"	.994	399			2215	"	"	"								
1600	"	.997	400			2230	"	"	"								
1603	"	.998	400			2237	"	1.064	418								
1635	0	N.R.	N.R.														
1647	500	.760	332														
1658	1000	1.018	405														
1709	1500	1.035	410														
1720	2000	1.041	412														
1731	2500	1.049	413														
1742	3000	1.087	424														
1753	3500	1.069	419														

CLOCK STOPPED

COMMENTS: Note 443 is the hottest point in well bore when picking up tools. (+ 3100')



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R. O. ENGBRETTSEN

NOV 29 1979

## UNION

### GEOTHERMAL DIVISION

SUBSURFACE SURVEY

Field Work Sheet

B-19 S-5 P/T

OWNER Union Gen. of New Mex. FIELD Redondo Canyon

WELL NAME BACA #19

CASING 20" AT 248'; 1 3/8" AT 1504' ELEV. 9117'

DATE: 11-28-79

LINER DESCRIPTION: 9 3/8" SURFACE to 2480'  
7" 2328 - 5585

ZERO POINT GL + 12'  
DEPTH 5585

TUBING DETAIL:

PURPOSE Shut in build-up

REMARKS:

ELEMENT O-4650 PSI SERIAL NO. 9222 CLOCK 12 hr. 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS 0006 DISENGAGE STYLUS 1126 hrs

WELL HEAD See attached charts

PICKUP @ 5000' TIME ON BOTTOM <sup>070-1033</sup> 0038-0453 MAX. T 436° @ 5000'

WELL STATUS Shut in 448° @ 3000'

SHUT IN: 11-27-79 1145 hrs ON PRODUCTION:

RATE

Pressure

TIME	DEPTH	DEFL.	P-T	GRAD.	Corr	TIME	DEPTH	DEFL.	P-T	GRAD.	Corr	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	
0038	5000	.510	1210		+ .005	0715	5000	.531	1259	1292	+ .006	Time @ 5000' = 1110 hrs. 11/29/79						
0053	"	.515	1222		+ .005	0730	"	.531	1259		+ .006							
0108	"	.515	1222		+ .005	0745	"	.531	1259		+ .006							
0123	"	.516	1224		+ .005	0800	"	.532	1262		+ .006							
0138	"	.517	1227		+ .005	0815	"	.532	1262		+ .006							
0153	"	.518	1229		+ .005	0830	"	.532	1262		+ .006							
0208	"	.518	1229		+ .005	0845	"	.533	1264		+ .006							
0223	"	.519	1231		+ .005	0900	"	.533	1264		+ .006							
0238	"	.520	1234		+ .005	0915	"	.533	1264		+ .006							
0253	"	.520	1234		+ .005	0930	"	.534	1266		+ .006							
0308	"	.521	1236		+ .005	0945	"	.534	1266		+ .006							
0323	"	.521	1236		+ .005	1000	"	.534	1266		+ .006							
0338	"	.522	1238		+ .005	1015	"	.535	1269		+ .006							
0353	"	.523	1241		+ .005	1030	"	.535	1269		+ .006							
0408	"	.524	1243		+ .005	1045	"	.535	1269		+ .006							
0423	"	.524	1243		+ .005	1053	"	.535	1269	1292	+ .006	(Survey #6) Time to 5000' = 1514 hrs. 11/29/79						
0438	"	.525	1245	1129	+ .005		5550			1179								
0453	"	.525	1245		+ .005													
0530	0	.075	195	198	-.006													
0541	500	.077	200	202	-.004													
0552	1000	.078	202	207	-.003													
0603	1500	.080	207	209	-.002													
0614	2000	.080	207	230	-.002													
0625	2500	.151	372	412	0													
0636	3000	.230	556	598	+ .001													
0647	3500	.305	731	766	+ .002													
0658	4000	.282	911	939	+ .003													
0709	4500	.457	1086	1119	+ .004													

COMMENTS:

# 76

# UNION

## GEO THERMAL DIVISION

SUBSURFACE SURVEY

Field Work Sheet

B19-55-P1T

OWNER UNION GEO OF N.M. FIELD REDONDO CANYON WELL NAME BACA #19  
 CASING 20" @ 248', 13 7/8" @ 1504' ELEV. 9117' DATE: 11-28-79  
 LINER DESCRIPTION: 9 7/8" SUPRIE TO 2480' ZERO POINT 66712'  
7 1/2" 2328' - 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE SHOT IN BUILDUP

REMARKS:

ELEMENT 7-959-6185 SERIAL NO. 10222 CLOCK 12HR 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS 0004 hrs DISENGAGE STYLUS 1128 hrs

WELL HEAD SEE ATTACHED CHART

PICKUP @ 5000' TIME ON BOTTOM 0710-1053 MAX. °F 436 @ 5000'

WELL STATUS SHOT IN 4480 @ 3500'

SHUT IN: 11-27-79 1145 hrs ON PRODUCTION:

RATE

### TEMPERATURE

TIME	DEPTH	DEFL.	T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0038	5000	1.057	424			0715	5000	1.126	435	447							
0053	"	1.088	424			0730	"	1.125	434	∩							
108	"	NR	NR			0745	"	1.125	434	∩							
123	"	CLOCK STOPPED					0800	"	1.125	434							
138	"					0815	"	1.126	435								
153	"					0830	"	1.127	435								
204	"					0845	"	1.127	435								
223	"					0900	"	1.128	435								
238	"					0915	"	1.128	435	∩							
253	"					0930	"	1.128	435	∩							
308	"					0945	"	1.129	436								
323	"					1000	"	1.130	436								
338	"					1015	"	1.130	436								
353	"					1030	"	1.131	436								
408	"					1045	"	1.131	436								
423	"					1053	5000	1.131	436	447							
438	"																
453	5000	CLOCK STOPPED						5550			451						
530	0	NR	NR	111													
541	500	1.467	243	201													
552	1000	1.718	320	293													
605	1500	1.883	367	359													
614	2000	1.913	376	371													
625	2500	1.125	434	439													
636	3000	1.174	448	453													
647	3500	1.155	443	443													
658	4000	1.139	438	445													
689	4500	1.134	437	446													

COMMENTS:

6 PM

10

9

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450

400

350

300

250

200

150

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AMERICAN METER DIVISION

REMARKS  
LOCATION  
CHART NO. 11-27-75  
CHART PUT ON 2:00 PM  
11-27-75  
W. H. P. SINGER  
200 How West #1

11-27-75  
W. H. P. SINGER  
200 How West #1

AMERICAN METER  
CHART NO. MP-500  
0-500 RPM

METER

300

200

150

100

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00000001

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200

150

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00000001

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450

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350

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100

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400

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100

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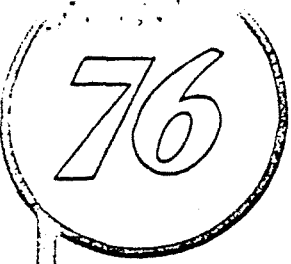
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# GEO THERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

B19-56-PH

OWNER UNION GEO OF N.M. FIELD RECONDO CANYON WELL NAME BACA#19  
 CASING 20" @ 243' 13 3/4" @ 1504' ELEV. 9117' DATE: 11-29-79  
 LINER DESCRIPTION: 9 5/8" - SURFACE TO 2480' ZERO POINT 66412'  
7" - 2328' - 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE SHUT IN GRADIENT

REMARKS:

ELEMENT-P-0-4650 PSIG SIN 9222 CLK 12hr 15 TURN  
ELEMENT-T-930-618° SERIAL NO. 10272 CLOCK 12hr 15 TURN STABILIZATION PERIOD  
ENGAGE STYLUS P-0950 T-0951 DISENGAGE STYLUS P-1615 T-1617  
WELL HEAD 189 PSIG @ 0928 HRS 189 PSIG @ 1530 HRS  
PICKUP @ 5550' TIME ON BOTTOM 1513-1543 MAX. T 4510 @ 5550'  
WELL STATUS SHUT IN 453° @ 3000'  
SHUT IN: 11-3-75 1145 HRS ON PRODUCTION:  
 RATE

PRESSURE

TEMPERATURE

TIME	DEPTH	DEFL.	P-T	GRAD.	TEMP.	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0930	0	.076	199		-1.006	0930	0	NR	NR								
0941	500	.078	202		-1.005	0941	500	.328	201								
0952	1000	.080	207		-1.003	0952	1000	.629	293								
1003	1500	.081	209		-1.002	1003	1500	.853	359								
1014	2000	.090	230		-1.002	1014	2000	.897	371								
1025	2500	.163	412		0	1025	2500	1.141	439								
1036	3000	.243	598		+1.002	1036	3000	1.194	453								
1047	3500	.320	766		+1.003	1047	3500	1.174	448								
1053	4000	.394	939		+1.003	1053	4000	1.164	445								
1109	4500	.471	1119		+1.005	1109	4500	1.166	446								
1110	5000	.545	1292		+1.006	1110	5000	1.168	446								
1140	5000	.545	1292		+1.006	1140	5000	1.170	447								
1210	5000	.545	1292		+1.006	1210	5000	1.170	447								
1240	5000	.545	1292		+1.006	1240	5000	1.170	447								
1310	5000	.545	1292		+1.006	1310	5000	1.170	447								
1340	5000	.545	1292		+1.006	1340	5000	1.172	447								
1410	5000	.545	1292		+1.006	1410	5000	1.172	447								
1440	5000	.545	1292		+1.006	1440	5000	1.172	447								
1510	5000	.545	1292		+1.006	1510	5000	1.172	447								
1513	5550	.625	1479		+1.007	1513	5550	1.180	449								
1523	5550	.623	1479		+1.007	1523	5550	1.186	451								
1543	5550	.625	1479		+1.007	1543	5550	1.186	451								

COMMENTS:

BY: T. J. THOMPSON 105 ZWILF

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# GEO-THERMAL DIVISION

## SUBSURFACE PRESSURE SURVEY

B-19 S-6 D

OWNER United Geothermal Co. of N Mex. Field WELL NAME Rehobeth Canyon

CASING 20" @ 248', 13 3/8" @ 1500' ELEV. 9117

LINER DESCRIPTION: 1 1/2" 2328 - 5585'

DATE: 11-29-79

ZERO POINT GL + 13'

DEPTH 5585'

HOLE DESCRIPTION:

INSTRUMENT 0-4650 PISC

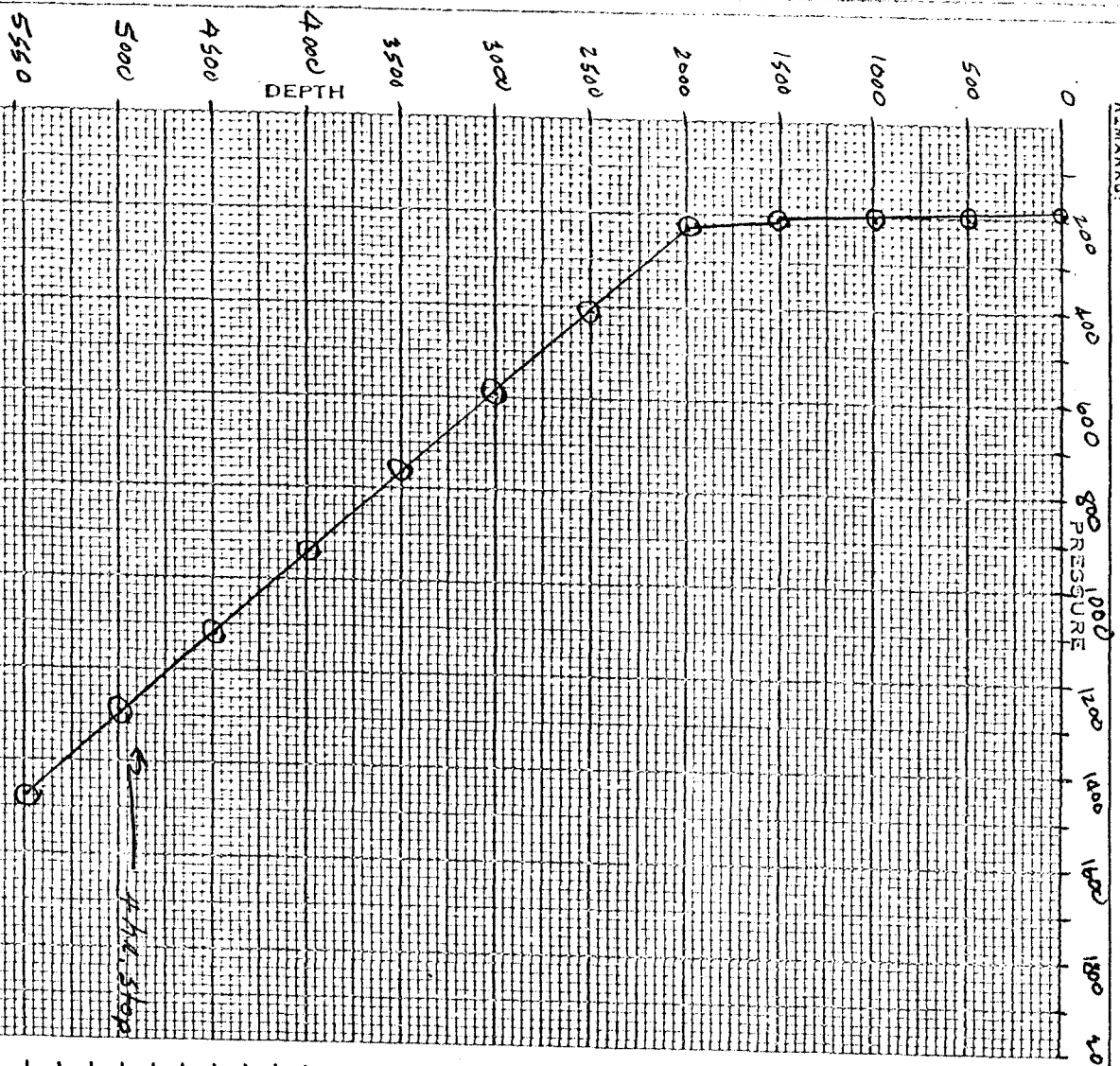
SERIAL NO. 9222

MAX TEMP 453 °F @ 3000'

PURPOSE \_\_\_\_\_

REMARKS: \_\_\_\_\_

STABILIZATION PERIOD \_\_\_\_\_



DEPTH	PRESSURE	GRADIENT
500	202	
1000	207	
1500	209	
2000	230	
2500	412	
3000	558	
3500	766	
4000	939	
4500	1119	
5000	1292	
5550	1479	

N. BROWN

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# GEO THERMAL DIVISION

## SUBSURFACE TEMPERATURE SURVEY

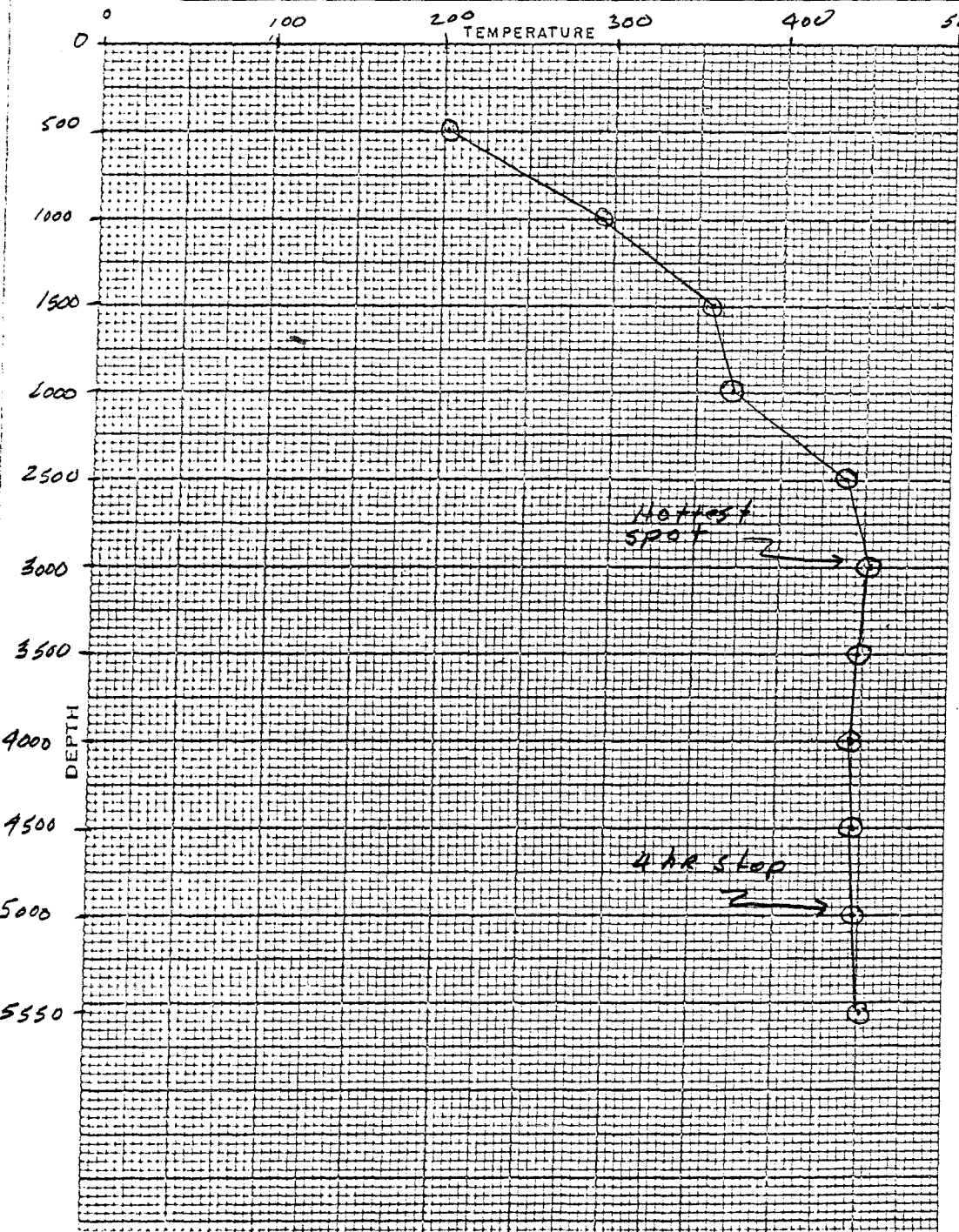
B-195-6 T

OWNER Union Geothermal Co. of N Mex FIELD Redondo Canyon WELL NAME BAC #19  
 CASING 20" @ 248' 13 3/8" @ 1504' ELEV. DATE: 11-29-79  
 LINER DESCRIPTION: 9 5/8" surface to 2480' ZERO POINT GLT-12'  
7" - 2328' to 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_  
 INSTRUMENT 93°-618° FAHR  
 SERIAL NO 10222

PURPOSE \_\_\_\_\_ MAX TEMP. 453° F @ 3000'

REMARKS: \_\_\_\_\_



PRESSURE	GAUGE	SOLE
CASING, PSI	189	198

DEPTH	TEMP.	DEPTH	TEMP.
0	NR		
500	201		
1000	293		
1500	359		
2000	371		
2500	439		
3000	453		
3500	448		
4000	445		
4500	446		
5000	447		
5585	451		

*Joe Simon*

Dick

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UNION

GEO THERMAL DIVISION

SUBSURFACE SURVEY
Field Work Sheet

B19-7-P1T

OWNER UNION GEN OF N.M. FIELD REDONDO CANYON WELL NAME BACA#19
CASING 20" @ 248' ; 13 3/8" 1504' ELEV. 9117' DATE: 11-30-79
LINER DESCRIPTION: 9 5/8" - SURFACE - 2480' ZERO POINT 66712'
7" 2328 - 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE SHUT IN GRADIENT

REMARKS:

ELEMENT - P - 0 - 4650 SSIA SIN 9229 CLOCK 1242 15
ELEMENT - T - 93F - 618 SERIAL NO. 10222 CLOCK 1242 15 TURN STABILIZATION PERIOD
ENGAGE STYLUS P - 0855 hrs T - 0857 hrs DISENGAGE STYLUS P - 1615 T - 1615
WELL HEAD 196 PSIG @ 0930 HRS
PICKUP @ 5550' TIME ON BOTTOM 1507 - 1537 MAX. T 459 OF @ 5550'
WELL STATUS SHUT IN 456 OF @ 3000'
SHUT IN: 11-27-79 1145 hrs. ON PRODUCTION:
RATE

PRESSURE

TEMPERATURE

Table with columns for TIME, DEPTH, DEFL., P-T, GRAD., and /D. It contains two main sections of data: PRESSURE and TEMPERATURE, with rows for various depths and corresponding measurements.

COMMENTS:

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# GEO THERMAL DIVISION

## SUBSURFACE PRESSURE SURVEY

B-19 5-7-9/T

OWNER Union Geo. of New Mex. FIELD Redondo Canyon WELL NAME BACA #19  
 CASING 20" AT 248'; 13 3/8" - 1504' ELEV. 9117' DATE: 11/30/79  
 LINER DESCRIPTION: 9 5/8" SURFACE 2480 ZERO POINT 26' + 13'  
7" 2328' - 5585' DEPTH 5585'

HOLE DESCRIPTION:

INSTRUMENT 0-4650 PSI

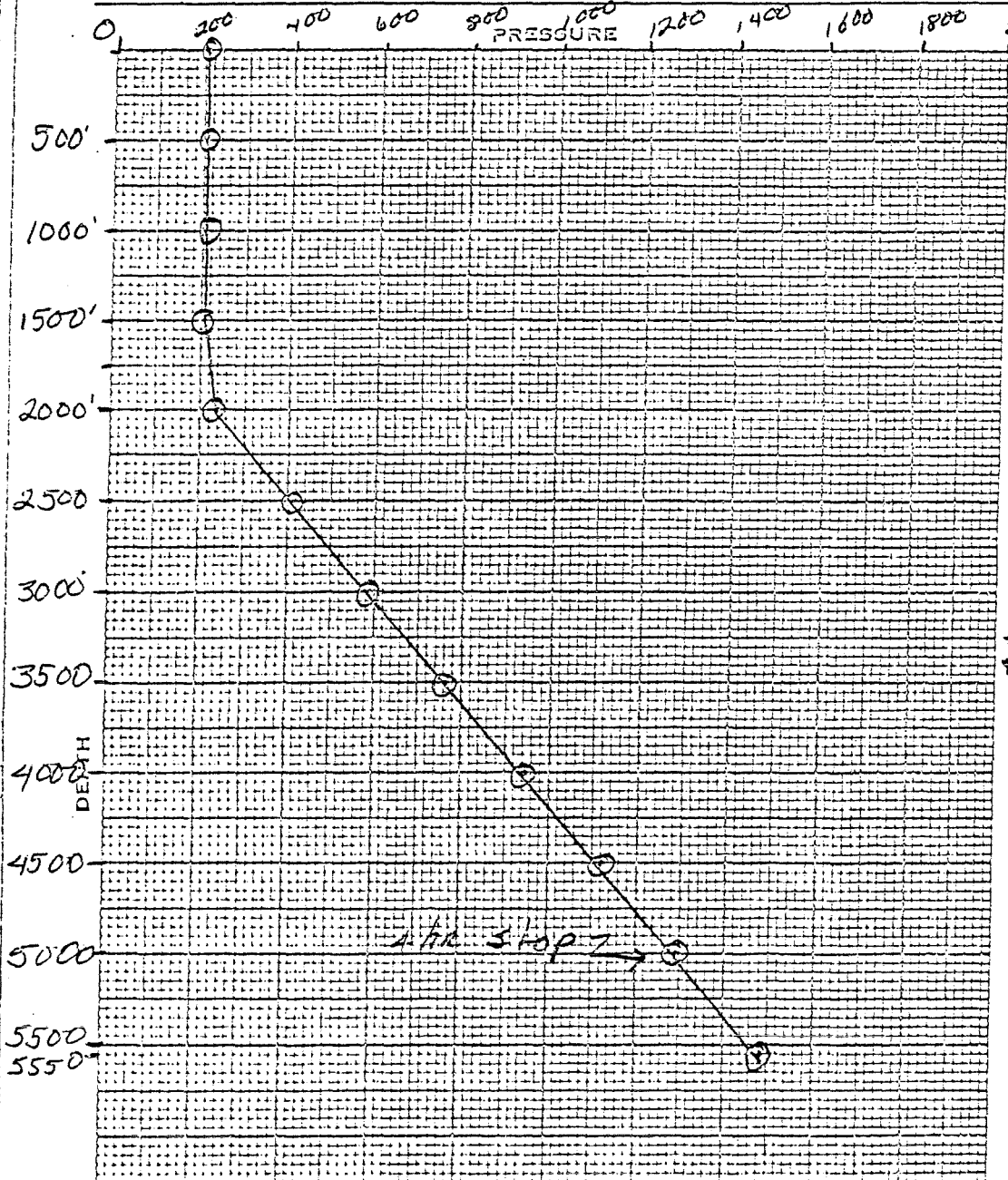
SERIAL NO. 222

PURPOSE SHUT IN GRADIENT

MAX. TEMP °F @ 5550'

REMARKS:

950 3000'



PRESSURES	GAUGE	SEALS
CASING, PSI	196	205

DEPTH	PRESSURE	GRADIENT
0	205	
500	212	
1000	214	
1500	216	
2000	244	
2500	414	
3000	591	
3500	769	
4000	946	
4500	1121	
*5000	1297	
*5550	1484	

\* 5000' & 5550' ARE PLOTTED AT THEIR MAXIMUM POINTS!



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# GEO THERMAL DIVISION

## SUBSURFACE TEMPERATURE SURVEY

B-19 57 P/T

OWNER Union Geo of New Mex FIELD Redondo Canyon WELL NAME BACA #19  
 CASING 20" AT 245' 13 3/8" - 1504' ELEV. 9117' DATE: 11/30/79  
 LINER DESCRIPTION: 9 5/8" SURFACE - 2480' ZERO POINT 26' + 13'  
7" - 2328' - 5585' DEPTH 5585'

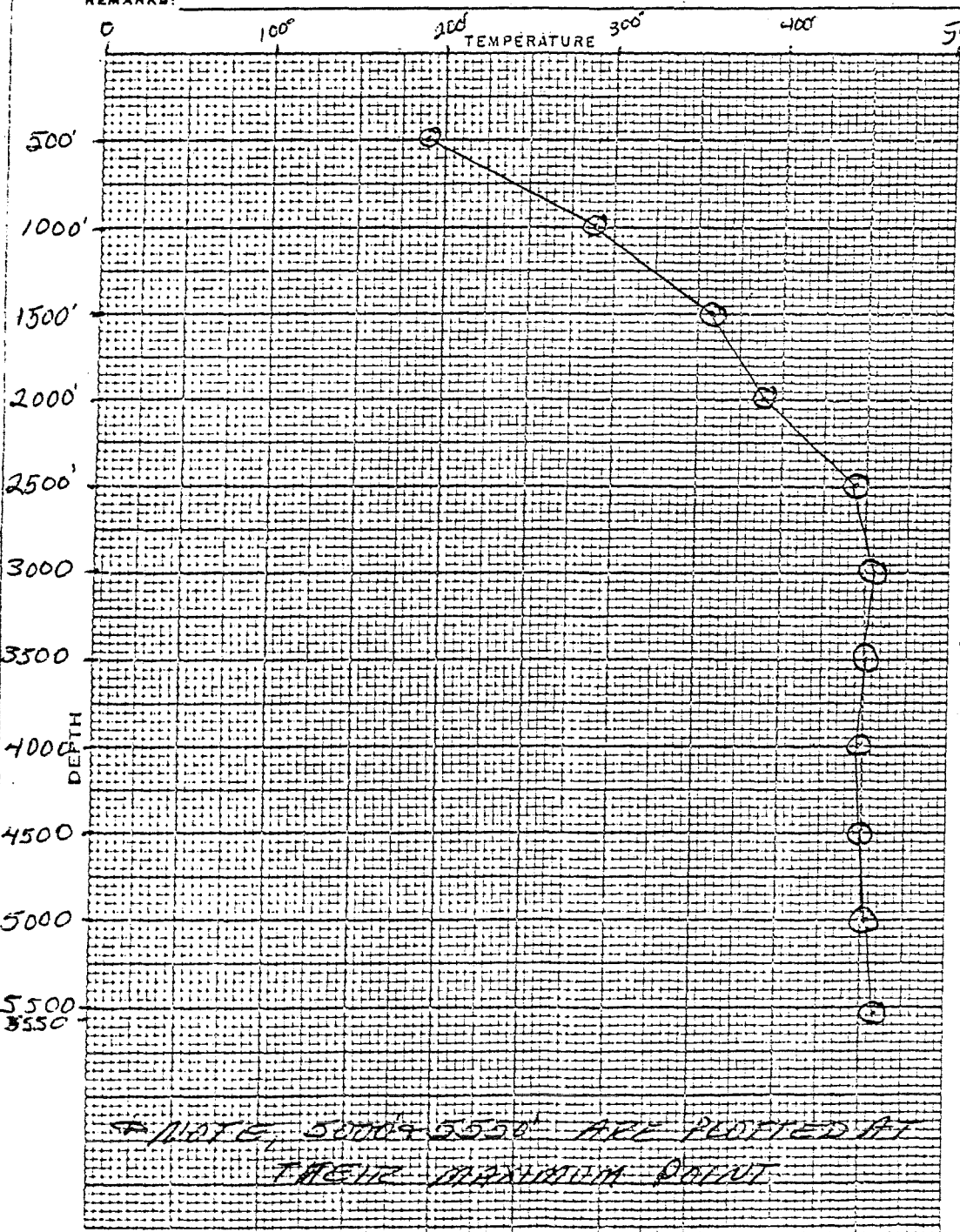
HOLE DESCRIPTION: \_\_\_\_\_

INSTRUMENT 10222 SERIAL NO 93-6180

PURPOSE shut in gradient

MAX TEMP. °F @ 5550'  
 °F @ 3000'

REMARKS: \_\_\_\_\_



PRESSURES	GAUGE	SOLE	
CASING, PSI	196	205	
DEPTH	TEMP.	DEPTH	TEMP.
0	NR		
500	189		
1000	289		
1500	359		
2000	388		
2500	443		
3000	456		
3500	451		
4000	449		
4500	450		
* 5000	453		
* 5500	459		

\* NOTE, 5000 & 5500' ARE PLOTTED AT THEIR MAXIMUM POINT.

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## GEO THERMAL DIVISION

### SUBSURFACE SURVEY

#### Field Work Sheet

B-195-8-PIT

OWNER Union Geothermal Co. NM. FIELD Redondo Canyon

WELL NAME BACA #19

CASING 20" at 248' 13 3/8" at 1504' ELEV. 9117'

DATE: 12-3-75

LINER DESCRIPTION: 4 5/8" at surface to 2480'  
7" 2328' - 5585'

ZERO POINT CL +12'

DEPTH 5585'

TUBING DETAIL:

PURPOSE

REMARKS:

Element 0-4650 PSI SN 9222 Clock 12 hr 15T 14090

ELEMENT 93'-618" f SERIAL NO. 10222 CLOCK 12 hr 15T 140 83 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-0721 T-0726 DISENGAGE STYLUS P- T-

WELL HEAD 244 PSIG @ 0815/25

PICKUP @ 5550 TIME ON BOTTOM 1011-1021 MAX. °F 470 °F

WELL STATUS Shut IN

SHUT IN: 1145 hrs 11-27-77 ON PRODUCTION:

RATE

Pressure

Temperature

TIME	DEPTH	DEFL.	P-T	GRAD.	COL. ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0820	0	.094	249		-006	0820	0	NR	NR								
0831	500	.100	253		-004	0831	500	.272	183								
0842	1000	.101	256		-003	0842	1000	.160	285								
0853	1500	.102	258		-002	0853	1500	.883	307								
0904	2000	.104	263		-001	0904	2000	1.027	408								
0915	2500	.170	416		0	0915	2500	1.167	446								
0926	3000	.247	596		+002	0926	3000	1.215	459								
0937	3500	.321	769		+003	0937	3500	1.201	455								
0948	4000	.398	949		+004	0948	4000	1.198	454								
0959	4500	.473	1124		+005	0959	4500	1.210	458								
1010	5000	.548	1299		+006	1010	5000	1.222	468								
1021	5550	.627	1484		+007	1021	5550	1.257	470								

COMMENTS:

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# GEOTHERMAL DIVISION

## SUBSURFACE PRESSURE SURVEY

B1958T

OWNER: Union Geothermal Co of NM FIELD: Redondo Canyon WELL NAME: BADA #19  
 CASING: 20" AT 248', 1 3/8" AT 1504' ELEV.: 9117' DATE: 12/03/73  
 LINER DESCRIPTION: 9 5/8" Surface to 2480' ZERO POINT: G.L. 412'  
7" 2325' to 5585' DEPTH: 5585'

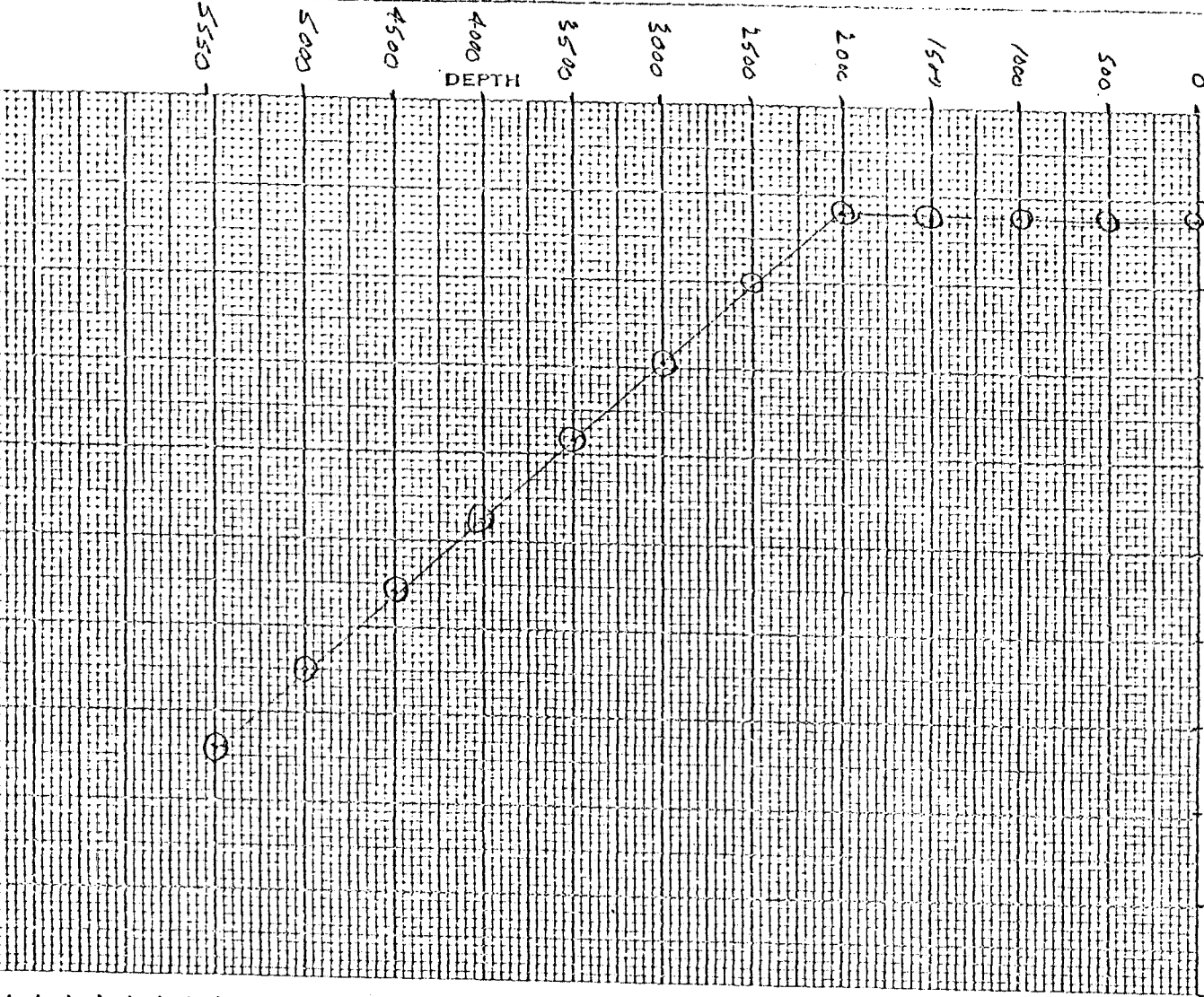
HOLE DESCRIPTION:

INSTRUMENT: 0-4650 PSI  
 SERIAL NO: 9222

MAX. TEMP: 470 °F @ 5550

PURPOSE: \_\_\_\_\_

REMARKS: \_\_\_\_\_



PROQUARED	GAUGE	0000'S
CASING, PSI	244	249

DEPTH	PRESSURE	GRADIENT
0	249	
500	253	
1000	256	
1500	258	
2000	263	
2500	416	
3000	576	
3500	769	
4000	949	
4500	1124	
5000	1299	
5550	1484	

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# GEOHERMAL DIVISION

## SUBSURFACE TEMPERATURE SURVEY

B-19 S-8 P

OWNER UNION GEOTHERMAL CO. OF NM FIELD Reclodido Canyon WELL NAME BACA #19  
 CASING 20" AT 248'; 13 3/8" AT 1504 ELEV. 9117 DATE: 12-3-79  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL + 12'  
7" 2338 TO 5585' DEPTH 5585'

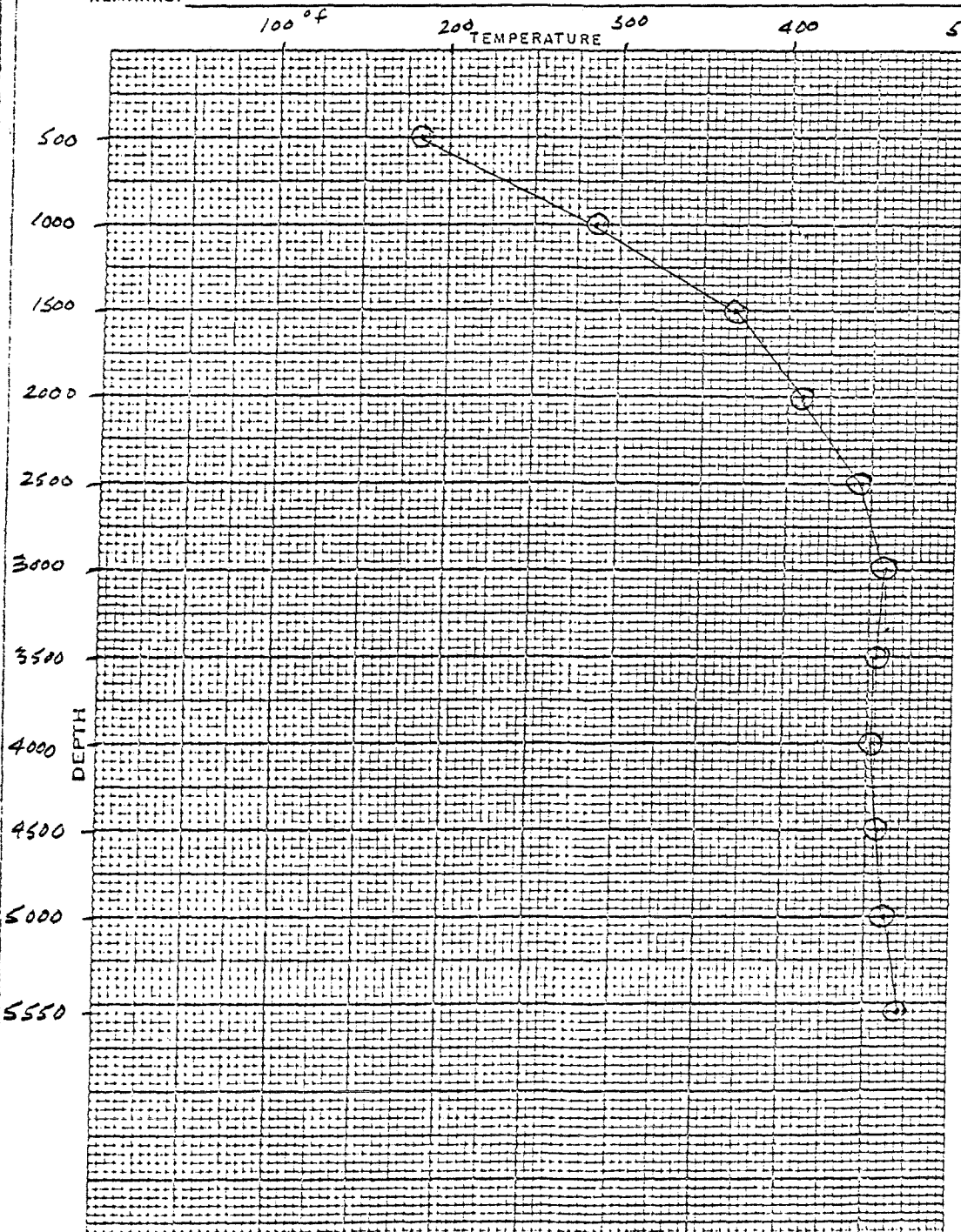
HOLE DESCRIPTION: \_\_\_\_\_

INSTRUMENT 93°-618°f FAH.  
 SERIAL NO 10222

PURPOSE \_\_\_\_\_

MAX TEMP. 470 °F @ 5550'

REMARKS: \_\_\_\_\_



PRESSURES	GAUGE	DOMS
CASING, PSI	244	249

DEPTH	TEMP.	DEPTH	TEMP.
0	NR		
500	183		
1000	285		
1500	367		
2000	408		
2500	446		
3000	459		
3500	455		
4000	454		
4500	458		
5000	461		
5550	470		

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# UNION

## GEOHERMAL DIVISION

### SUBSURFACE SURVEY

### Field Work Sheet

B-195-9 P/T

OWNER UNION Geothermal Co FIELD Redondo Canyon

WELL NAME BACA #19

CASING 20' AT 248'; 13 1/2' AT 1504' ELEV. 9117'

DATE: 8/12/03/79

LINER DESCRIPTION: 9 5/8" SURFACE TO 2480'  
7" 2328' TO 5585'

ZERO POINT CL +12'

DEPTH 5585'

TUBING DETAIL:

PURPOSE:

REMARKS:

ELEMENT 0-4650 PSI SN 9222 CLOCK 12hr 15 TURN

ELEMENT 93°-618°+ SERIAL NO. 10222 CLOCK 12hr 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-1155; T-1156 DISENGAGE STYLUS P-2305; T-2305

WELL HEAD 246 PSIG @ 1226 HRS; VACUUM @ 1410 HRS

PICKUP @ TIME ON BOTTOM MAX. °F

WELL STATUS INJECTING WATER @ ± 50 GPM

SHUT IN: ON PRODUCTION:

RATE

PRESSURE

PRESSURE

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
1259	4500	.476	1131		t.005	1417	4500	.528	1252	t.006							
1300	4500	.476	1131		"	1432	"	.528	1252	"							
1315	4500	.476	1131		"	1447	"	.528	1252	"							
1346	4500	.480	1140		"	2002	"	.527	1250	t.005							
1345	4500	.480	1140		"	2017	"	.526	1248	"							
1400	4500	.480	1140		"	2032	"	.525	1245	"							
1422	2500	.190	963		t.001	2047	"	.524	1243	"							
1433	3000	.271	652		t.002	2102	"	.524	1243	"							
1444	3500	.349	834		t.003	2117	"	.523	1241	t.004							
1455	4000	.422	1005		t.004	2132	"	.523	1241	"							
1506	4500	.503	1194		t.005	2147	"	.524	1243	"							
1517	5000	.580	1374		t.006	2202	"	.525	1245	"							
1528	5550	.662	1565		t.007	2217	"	.525	1245	"							
1532	4500	.512	1215		t.006	2232	"	.526	1248	"							
1547	"	.513	1217		"												
1602	"	.513	1217		"												
1617	"	.513	1217		"												
1632	"	.518	1229		"												
1647	"	.521	1236		t.006												
1702	"	.524	1243		"												
1717	"	.525	1245		"												
1732	"	.526	1248		"												
1747	"	.527	1250		"												
1802	"	.527	1250		"												
1817	"	.527	1250		"												
1832	"	.528	1252		"												
1847	"	.528	1252		"												
1902	"	.528	1252		"												

COMMENTS: Began injecting @ ± 50 gpm @ 1300 hrs  
Well went on Vacuum @ 1410 hrs

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UNION

GEO THERMAL DIVISION

SUBSURFACE SURVEY

Field Work Sheet

B-195-9 PIT

OWNER UNION Geothermal Co FIELD Redondo Canyon

WELL NAME BACA #19

CASING 20" AT 248'; 13 3/8" AT 1504' ELEV. 9117'

DATE: 12/03/79

LINER DESCRIPTION: 9 5/8" AT SURFACE TO 2480'  
7" 2328' TO 5585'

ZERO POINT 6412'  
DEPTH 5585'

TUBING DETAIL:

PURPOSE

REMARKS:

ELEMENT 0-4650 PSI SN 9222 CLOCK 12hr 15 TURN

ELEMENT 93°-618° SERIAL NO. 10222 CLOCK 12hr 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-1155 T-1156 DISENGAGE STYLUS P-2305 T-2305

WELL HEAD 246 PSI @ 1226 hrs; VACUUM @ 1410 hrs

PICKUP @ TIME ON BOTTOM MAX. °F

WELL STATUS Injecting water @ ± 50 gpm

SHUT IN: ON PRODUCTION:

RATE

Temperature

Temperature

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
1259	4500	1.211	458			1917	4500	.682	309								
1300	4500	1.211	458			1932	"	.661	303								
1315	4500	1.212	458			1947	"	.642	297								
1330	4500	1.212	458			2002	"	.625	292								
1345	4500	1.212	458			2017	"	.612	288								
1400	4500	1.212	458			2032	"	.598	284								
1422	2500	1.051	414			2047	"	.587	281								
1433	3000	1.159	444			2102	"	.576	277								
1444	3500	1.199	455			2117	"	.566	274								
1455	4000	1.202	455			2132	"	.555	271								
1506	4500	1.210	458			2147	"	.546	268								
1517	5000	1.222	461			2202	"	.538	266								
1528	5500	1.261	471			2217	"	.529	263								
1532	4500	1.216	459			2232	"	.523	262								
1547	"	1.207	457														
1602	"	1.196	454														
1617	"	1.171	447														
1632	"	1.131	436														
1647	"	1.076	421														
1702	"	1.020	406														
1717	"	.961	389														
1732	"	.910	375														
1747	"	.864	362														
1802	"	.824	350														
1817	"	.787	340														
1832	"	.757	331														
1847	"	.730	323														
1902	"	.706	317														

COMMENTS: BEGAN injecting @ ± 50 gpm @ 1300 hrs.  
Well went ON VACUUM @ 1410 hrs

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# GEO THERMAL DIVISION

## SUBSURFACE SURVEY

### Field Work Sheet

OWNER UNION Geothermal Co NM. FIELD Redonda Canyon  
 CASING 20" AT 248' 13 3/8" AT 1504' ELEV. 9117'  
 LINER DESCRIPTION: 9 5/8" AT SURFACE TO 2480'  
7" - 2328 - 5585'

B-19 S-10 P  
 WELL NAME BACA # 19  
 DATE: 12/04/79  
 ZERO POINT CL + 12'  
 DEPTH 5585'

TUBING DETAIL:

PURPOSE

REMARKS:

ELEMENT 0-4650 PSI SN 9222 CLOCK 12hr 15 TURN

ELEMENT 93°-618° F SERIAL NO. 10222 CLOCK 12hr 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-0126 T-0127 DISENGAGE STYLUS 0126 HR

WELL HEAD VACUUM

PICKUP @ TIME ON BOTTOM 1044 - 1114 MAX. °F

WELL STATUS Injecting

SHUT IN: ON PRODUCTION:

RATE

PRESSURE

PRESSURE

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0218	4500	.521	1236		+001	0904	4500	.533	1264		000						
0249	"	.521	1236		+001	0919	4500	.533	1264		000						
0234	"	.532	1262		+001	0935	2500	.183	447		N/C						
0249	"	.539	1278		+002	0946	3000	.272	654		N/C						
0304	"	.541	1283		+002	0957	3500	.355	848		+003						
0319	"	.542	1285		+002	1008	4000	.443	1054		-002						
0334	"	.541	1285		+001	1019	4500	.532	1262		0						
0349	"	.541	1285		+001	1030	5000	.618	1463		+001						
0404	"	.541	1285		+001	1041	5550	.713	1684		+004						
0419	"	.541	1285		+001	1044	4500	.532	1262		000						
0434	"	.541	1285		+001	1059	"	.532	1262		"						
0449	"	.539	1278		000	1114	"	.532	1262		"						
0504	"	.539	1278		"												
0519	"	.538	1276		"												
0534	"	.538	1276		"												
0549	"	.537	1273		"												
0604	"	.537	1273		"												
0619	"	.537	1273		"												
0634	"	.536	1271		"												
0649	"	.536	1271		"												
0704	"	.535	1269		"												
0719	"	.535	1269		"												
0734	"	.535	1269		"												
0749	"	.534	1266		"												
0804	"	.534	1266		"												
0819	"	.534	1266		"												
0834	"	.533	1264		"												
0849	"	.533	1264		"												

COMMENTS: Increased injection rate from ± 50 gpm to 150 gpm @ 0219 hr

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GEOTHERMAL DIVISION

SUBSURFACE SURVEY

Field Work Sheet

B-19 S-10 - T

OWNER Union Corp. of New Mex. FIELD Redondo Canyon WELL NAME BACA #19  
 CASING 20" at 248' 13 3/8" at 104' ELEV. 9117' DATE: 12/04/79  
 LINER DESCRIPTION: 9 5/8" at surface to 2430' ZERO POINT GL + 12  
7" 2328 - 5585 DEPTH 5585'

TUBING DETAIL:

PURPOSE

REMARKS:

ELL

ELEMENT 93-618' I SERIAL NO. 10222 CLOCK 12R 15 TURN STABILIZATION PERIOD  
 ENGAGE STYLUS 0127 DISENGAGE STYLUS 1105 hrs  
 WELL HEAD VACUUM  
 PICKUP @ TIME ON BOTTOM 1044-1114 MAX. °F  
 WELL STATUS INJECTING  
 SHUT IN: ON PRODUCTION:  
 RATE

TEMP TEMP

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0218	4500	384	219			0904	4500	202	160								
0219	"	384	219			0919	4500	201	160								
0234	"	384	219			0935	2500	N/R	N/R								
0249	"	381	218			0946	3000	N/R	N/R								
0304	"	377	217			0957	3500	1045	109								
0319	"	361	212			1008	4000	1097	126								
0334	"	334	203			1019	4500	182	154								
0349	"	305	194			1030	5000	230	170								
0404	"	279	185			1041	5500	396	223								
0419	"	260	179			1044	4500	198	159								
0434	"	247	175			1059	4500	198	159								
0449	"	237	172			1114	4500	198	159								
0504	"	231	170														
0519	"	227	169														
0534	"	221	167														
0549	"	218	166														
0604	"	217	165														
0619	"	213	164														
0634	"	212	164														
0649	"	209	163														
0704	"	208	162														
0719	"	207	162														
0734	"	206	162														
0749	"	206	162														
0804	"	205	161														
0819	"	204	161														
0834	"	203	161														
0849	"	202	160														

COMMENTS: Increased injection rate from ± 50 gpm to 150 gpm @ 0219h



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# UNION

## GEOTHERMAL DIVISION

SUBSURFACE SURVEY

Field Work Sheet

B-195-11 P/T

OWNER Union Ge. & L. T. M. FIELD Redondo Canyon

WELL NAME BACA #19

CASING 20" AT 248' 13 3/8" AT 1504' ELEV. 911.7

DATE: 12/4/79

LINER DESCRIPTION: 9 3/8" SURFACE to 2480'  
7" 2328' - 5582'

ZERO POINT PL + 12'  
DEPTH 5582'

TUBING DETAIL:

PURPOSE

REMARKS:

Element 0-465051 S/N 9222 CLK 12hr 15 TURN

ELEMENT 93°-618°f SERIAL NO. 10222 CLOCK 12hr 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-1322 T-1320 DISENGAGE STYLUS P-2320 T-2320

WELL HEAD - VACUUM

PICKUP @ 5550' TIME ON BOTTOM 2201 - 2211 MAX. °F 192°F @ 5550'

WELL STATUS (ON INJECTION @ +/- 150 GPM SINCE 0219 hrs 12-4-79)

SHUT IN:       

ON PRODUCTION:       

RATE

PRESSURE

TEMPERATURE

TIME	DEPTH	DEFL.	P-°	GRAD.	CORR.	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
1400	4500	.535	1269		0	1400	4500	.160	147								
1415	4500	.535	1269		0	1415	"	.160	147								
1445	4500	.535	1269		0	1445	"	.160	147								
1515	4500	.535	1269		0	1515	"	.160	147								
1545	4500	.535	1269		0	1545	"	.160	147								
1615	4500	.535	1269		0	1615	"	.160	147								
1645	4500	.535	1269		0	1645	"	.159	147								
1715	4500	.535	1269		0	1715	"	.159	147								
1745	4500	.535	1269		0	1745	"	.158	146								
1815	4500	.535	1269		0	1815	"	.157	146								
1845	4500	.536	1271		0	1845	"	.156	146								
1915	4500	.536	1271		0	1915	"	.155	145								
1945	4500	.536	1271		0	1945	"	.155	145								
2015	4500	.536	1271		0	2015	"	.154	145								
2045	4500	.536	1271		0	2045	4000	.154	145								
2100	2500	.184	449		0	2100	2500	NR	NR								
2111	3000	.273	657		0	2111	3000	NR	NR								
2122	3500	.357	649	853	-0.003	2122	3500	.020	100								
2133	4000	.446	1061		-0.002	2133	4000	.055	112								
2144	4500	.535	1269		-0.001	2144	4500	.115	132								
2200	5000	.621	1470		+0.001	2200	5000	.175	152								
2211	5550	.715	1688		+0.002	2211	5550	.300	192								
2230	4500	.536	1271		0	2230	4500	.154	145								
2300	4500	.536	1271		0	2300	4500	.154	145								

COMMENTS:

LICK

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UNION

GEO THERMAL DIVISION

SUBSURFACE SURVEY

Field Work Sheet

B-19 S 12 PIT

OWNER Union Geo. of N.M. FIELD Redondo Canyon

WELL NAME BACA#19

CASING 20' AT 248' 13 3/8 AT 1504' ELEV. 9117'

DATE: 12/05/79

LINER DESCRIPTION: 9 3/8 SURFACE to 2480'  
7" 2328 to 5585

ZERO POINT GL + 12'

DEPTH 5585

TUBING DETAIL:

PURPOSE

REMARKS: INJECTION SURVEY

Element 0-4650 P514 S/N 9222 Ckck 12hr 15-TURN

ELEMENT 96°-618° SERIAL NO. 10222 CLOCK 12hr 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS 0001 hrs 12-5-79 T-2359 2 1/2 DISENGAGE STYLUS P-1130 - T-1130

WELL HEAD VACUUM

PICKUP @ 5550 TIME ON BOTTOM 1056 to 1106 MAX. F 388° @ 3000'

WELL STATUS Injecting @ ±1500-PPM from 0219 hrs 12/4/79 to 0045 hrs 12/5/79

SHUT IN: Stopped Inj. At 0045 12/5/79 ON PRODUCTION:

RATE

Pressure

Temperature

TIME	DEPTH	DEFL.	P-T	GRAD.	CORR	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
044	4500	.528	1252		-0.01	0044	4500	.104	129								
045	"	.528	1252		-0.01	0045	"	.104	129								
115	"	.493	1171		-0.01	0115	"	.133	138								
145	"	.489	1161		-0.01	0145	"	.161	147								
215	"	.489	1162	low	-0.01	0215	"	.191	157								
245	"	.486	1154		0	0245	"	.235	171								
275	"	.483	1147		0	0275	"	.309	195								
345	"	.483	1147		+0.01	0345	"	.388	221								
415	"	.482	1145		+0.02	0415	"	.455	241								
445	"	.483	1147		+0.03	0445	"	.494	253								
515	"	.483	1147		+0.03	0515	"	.534	265								
545	"	.481	1143		+0.03	0545	"	.570	276								
615	"	.482	1145		+0.04	0615	"	.599	284								
645	"	.482	1145		+0.04	0645	"	.625	292								
715	"	.483	1147		+0.05	0715	"	.651	300								
745	"	.483	1147		+0.05	0745	"	.672	306								
815	"	.483	1147		+0.05	0815	"	.692	312								
845	"	.483	1147		+0.05	0845	"	.709	317								
915	"	.483	1147		+0.05	0915	"	.726	322								
945	"	.483	1147		+0.05	0945	"	.742	327								
1000	2500	.162	398		0	1000	2500	.938	388								
1011	3000	.241	582		+0.01	1011	3000	.955	388								
1022	3500	.321	769		+0.02	1022	3500	.987	368								
1033	4000	.401	956		+0.03	1033	4000	.822	350								
1044	4500	.480	1140		+0.04	1044	4500	.791	341								
1055	5000	.561	1329		+0.06	1055	5000	.765	333								
1106	5500	.648	1533		+0.06	1106	5500	.549	269								

COMMENTS:

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GEO THERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

B19-512-PIT  
SUPP.

OWNER \_\_\_\_\_ FIELD \_\_\_\_\_ WELL NAME \_\_\_\_\_  
 CASING \_\_\_\_\_ ELEV. \_\_\_\_\_ DATE: \_\_\_\_\_  
 LINER DESCRIPTION: \_\_\_\_\_ ZERO POINT \_\_\_\_\_  
 \_\_\_\_\_ DEPTH \_\_\_\_\_  
 TUBING DETAIL: \_\_\_\_\_  
 \_\_\_\_\_

PURPOSE *DETAIL TIMES FROM 0049 HRS - 0249 hrs*  
 REMARKS: *B19-512-PIT SUPPLEMENTAL*

ELEMENT SERIAL NO. CLOCK TURN STABILIZATION PERIOD  
 ENGAGE STYLUS \_\_\_\_\_ DISENGAGE STYLUS \_\_\_\_\_  
 WELL HEAD \_\_\_\_\_  
 PICKUP @ \_\_\_\_\_ TIME ON BOTTOM \_\_\_\_\_ MAX. \*F \_\_\_\_\_  
 WELL STATUS \_\_\_\_\_  
 SHUT IN: \_\_\_\_\_ ON PRODUCTION: \_\_\_\_\_  
 RATE \_\_\_\_\_

*Pressure*

*Temp*

TIME	DEPTH	DEFL.	P-Ø	GRAD.	<i>corr</i>	TIME	DEPTH	DEFL.	<i>° F</i>	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0049	4500	529	1255		-1.001	0049	4500	5106	129								
0059	"	519	1231		-1.001	0059	"	5120	134								
0109	"	500	1187		-1.001	0109	"	5129	137								
0119	"	483	1171		-1.001	0119	"	5138	140								
0129	"	492	1169		-1.001	0129	"	5148	143								
0139	"	481	1166		-1.001	0139	"	5157	146								
0149	"	490	1164		0	0149	"	5165	149								
0159	"	487	1161		0	0159	"	5174	151								
0209	"	489	1161		0	0209	"	5185	155								
0219	"	489	1161		0	0219	"	5195	158								
0229	"	487	1161		0	0229	"	5205	162								
0239	"	488	1159		0	0239	"	5225	168								
0249	4500	487	1157		0	0249	4500	5246	175								

COMMENTS:

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# GEO THERMAL DIVISION

## SUBSURFACE SURVEY

### Field Work Sheet

B-19 S-13 P/T

OWNER UNION GEOTHERMAL Co FIELD REDONDO CANYON WELL NAME BACA #19  
 CASING 20" AT 248', 13 3/8" AT 1504' ELEV. 9117' DATE: 12/05/79  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT CLT 12'  
7" 2328' TO 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE

REMARKS:

ELEMENT - 04650 PSI SN 9222 CLOCK 12 hr 15T

ELEMENT 93°-618°F SERIAL NO. 10 222 CLOCK 12 hr 15T TURN STABILIZATION PERIOD

ENGAGE STYLUS P-1224 ; T-1220 DISENGAGE STYLUS P-1059 ; F1055

WELL HEAD 0

PICKUP @ 5550' TIME ON BOTTOM 2217-2227 MAX. °F 417°F @ 3000'

WELL STATUS - STOPPED INJECTION @ 0045 hr 12/05/79

SHUT IN: OPEN TO ATMOSPHERE ON PRODUCTION:

RATE

### PRESSURE TEMPERATURE

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
1316	4500	.482	1145		+.005	1316	4500	.823	350								
1346	"	"	1145		"	1346	"	.831	352								
1416	"	"	1145		"	1416	"	.841	355								
1446	"	"	1145		"	1446	"	.850	358								
1516	"	"	1145		"	1516	"	.858	360								
1546	"	"	1145		"	1546	"	.865	362								
1616	"	"	1145		"	1616	"	.872	364								
1646	"	"	1145		"	1646	"	.879	366								
1716	"	.481	1143		"	1716	"	.886	368								
1746	"	"	1143		"	1746	"	.892	370								
1816	"	"	1143		"	1816	"	.897	371								
1846	"	"	1143		"	1846	"	.904	373								
1916	"	.480	1140		"	1916	"	.908	374								
1946	"	"	"		"	1946	"	.914	376								
2016	"	"	"		"	2016	"	.919	377								
2046	"	"	"		"	2046	"	.924	379								
2112	2500	.169	414		0	2112	2500	1.053	415								
2132	3000	.246	593		+.001	2132	3000	1.060	417								
2143	3500	.324	776		+.003	2143	3500	1.012	404								
2154	4000	.402	958		+.004	2154	4000	.961	389								
2205	4500	.480	1140		+.005	2205	4500	.945	384								
2216	5000	.558	1322		+.006	2216	5000	.935	381								
2227	5550	.643	1521		+.007	2227	5550	.955	331								

COMMENTS:

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GEOHERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

B-19 S-13 P/T

OWNER/UNION GEOTHERMAL Co FIELD REDONDO CANYON WELL NAME BACA #19  
 CASING 20" AT 248' 13 3/8" AT 1504' ELEV. 9117' DATE: 12/05/79  
 LINER DESCRIPTION: 9 5/8" Surface to 2480' ZERO POINT 6.4 ± 12'  
 7" 2325' TO 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE

REMARKS:

ELEMENT - 04650 PSI SN 9222 CLOCK 12 HR 15T  
 ELEMENT 93°-618°F SERIAL NO. 10 222 CLOCK 12 HR 15T TURN STABILIZATION PERIOD  
 ENGAGE STYLUS P-1224; T-1220 DISENGAGE STYLUS P-1059; F1055  
 WELL HEAD 0  
 PICKUP @ 5550' TIME ON BOTTOM 2217-2227 MAX. °F 417°F @ 3000'  
 WELL STATUS - STOPPED INJECTION @ 0045 HR 12/05/79  
 SHUT IN: OPEN TO ATMOSPHERE ON PRODUCTION:  
 RATE

PRESSURE

TEMPERATURE

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
1316	4500	.482	1145		t.005	1316	4500	.823	350								
1346	"	"	1145		"	1346	"	.831	352								
1416	"	"	1145		"	1416	"	.841	355								
1446	"	"	1145		"	1446	"	.850	358								
1516	"	"	1145		"	1516	"	.858	360								
1546	"	"	1145		"	1546	"	.865	362								
1616	"	"	1145		"	1616	"	.872	364								
1646	"	"	1145		"	1646	"	.879	366								
1716	"	.481	1143		"	1716	"	.886	368								
1746	"	"	1143		"	1746	"	.892	370								
1816	"	"	1143		"	1816	"	.897	371								
1846	"	"	1143		"	1846	"	.904	373								
1916	"	.480	1140		"	1916	"	.908	374								
1946	"	"	"		"	1946	"	.914	376								
2016	"	"	"		"	2016	"	.919	377								
2046	"	"	"		"	2046	"	.924	379								
2112	2500	.169	414		0	2112	2500	1.053	415								
132	3000	.246	593		t.001	2132	3000	1.060	417								
2143	3500	.324	776		t.003	2143	3500	1.012	404								
2154	4000	.402	958		t.004	2154	4000	.961	389								
2205	4500	.480	1140		t.005	2205	4500	.945	384								
2216	5000	.558	1322		t.006	2216	5000	.935	381								
2227	5550	.643	1521		t.007	2227	5550	.955	331								

COMMENTS:

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# UNION

## GEOHERMAL DIVISION

SUBSURFACE SURVEY

Field Work Sheet

B19-S14-P1T

OWNER UNION GEO. OF. N.M. FIELD REDONDO CANYON WELL NAME BACA#19  
 CASING 20" @ 248', 13 3/8" @ 1504' ELEV. 9117' DATE: 12-6-79  
 LINER DESCRIPTION: 9 5/8" FROM SURFACE TO 2480' ZERO POINT 6712'  
7" - 2325' TO 5555' DEPTH 5555'

TUBING DETAIL:

PURPOSE

REMARKS:

ELEMENT T-930F-6150F 5/11 10:22.2 CLOCK 12/12 15

ELEMENT P-0-46505 SERIAL NO. 922.2 CLOCK 12/12 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-0922, T-0922 DISENGAGE STYLUS P-1945, T-1945

WELL HEAD 1 PSI6

PICKUP @ 5550' TIME ON BOTTOM 1907-1917 MAX. 'F 436°F @ 3000'

WELL STATUS SHUT IN

SHUT IN: 0800 HRS 12-6-79 ON PRODUCTION:

RATE WING VALVE WAS OPEN TO ATMOSPHERE

PRESSURE

TEMPERATURE

TIME	DEPTH	DEFL.	P-T	GRAD.	GRAD.	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
1025	4500	.482	1145		7.005	1025	4500	1.012	404								
1055	"	"	"		"	1055	"	1.014	404								
1125	"	"	"		"	1125	"	1.017	405								
1155	"	"	"		"	1155	"	1.020	406								
1225	"	"	"		"	1225	"	1.022	406								
1255	"	"	"		"	1255	"	1.024	407								
1325	"	"	"		"	1325	"	1.026	408								
1355	"	"	"		"	1355	"	1.028	408								
1425	"	"	"		"	1425	"	1.030	409								
1455	"	"	"		"	1455	"	1.032	409								
1525	"	"	"		"	1525	"	1.034	410								
1555	"	"	"		"	1555	"	1.035	410								
1625	"	"	"		"	1625	"	1.037	411								
1655	"	"	"		"	1655	"	1.039	411								
1725	"	"	"		"	1725	"	1.041	412								
1755	4500	.482	1145		7.005	1755	4500	1.043	412								
1811	2500	.176	430		7.001	1811	2500	1.122	434								
1822	3000	.253	610		7.002	1822	3000	1.129	436								
1833	3500	.329	787		7.003	1833	3500	1.058	425								
1844	4000	.426	967		7.004	1844	4000	1.055	415								
1855	4500	.482	1145		7.005	1855	4500	1.051	414								
1906	5000	.559	1325		7.005	1906	5000	1.052	415								
1917	5550	.643	1521		7.008	1917	5550	1.952	357								

COMMENTS:

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GEO THERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

B-19 S-15 P

OWNER Union Geo. of N.M. FIELD Redondo Canyon

WELL NAME Baca #19

CASING 20" at 248'; 13 7/8" at 1504' ELEV. 9117'

DATE: 12/8/79

LINER DESCRIPTION: 9 3/4" Surface to 2480'  
7" 2328' to 5585'

ZERO POINT 62 + 12'  
DEPTH 5585'

TUBING DETAIL:

PURPOSE

REMARKS: Injection survey

Element 0-4650 psig. S/N 9222 clock 12 hr. 15 turn

ELEMENT 93° 618° F SERIAL NO. 10222 CLOCK 12 hr 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-0629 T-0630 DISENGAGE STYLUS P-1326 T-1324

WELL HEAD 13.5 psig; went on Vacuum @ 1001 hrs.

PICKUP @ 5500' TIME ON BOTTOM 0850 - 0900 MAX. F 447 @ 3000'

WELL STATUS Injecting @ 400 gpm 1000 to 1125. Shut in well

SHUT IN: 1125 12/8/79

ON PRODUCTION:

RATE

PRESSURE

PRESSURE

TIME	DEPTH	DEFL.	P-T	GRAD.	COM. #	TIME	DEPTH	DEFL.	P-T	GRAD.	COM. #	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0710	500	.006	17		NC	1210	4500	.517	1227		T.001						
0721	1000	.006	17		NC	1220	"	.514	1220		T.001						
0732	1500	.019	54		NC	1330	"	.512	1215		T.001						
0743	2000	.099	251		T.001	1240	"	.511	1213		T.002						
0754	2500	.179	437		T.001	1250	"	.510	1210		T.002						
0805	3000	.255	614		T.002	1300	"	.509	1208		T.002						
0816	3500	.331	792		T.003												
0827	4000	.408	972		T.004												
0838	4500	.485	1152		T.005												
0949	5000	.560	1327		T.006												
0900	5550	.643	1521		T.008												
0930	4500	.485	1152		T.005												
0945	"	.485	1152		T.005												
1000	"	.485	1152		T.005												
1010	"	.577	1367		T.005												
1020	"	.626	1481		T.007												
1025	"	.639	1512		T.007												
1030	"	.651	1540		T.007												
1035	"	.663	1567		T.008												
1040	"	.672	1588		T.008												
1050	"	.674	1593		T.008												
1100	"	.673	1591		T.005												
1110	"	.680	1607		T.003												
1120	"	.681	1609		T.002												
1130	"	.634	1500		T.001												
1140	"	.559	1325		000												
1150	"	.529	1255		000												
1200	"	.521	1236		T.001												

COMMENTS: Injected from 1000 hrs to 1125 hrs @ 400 gpm; Total injection 766 BBL

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GEOHERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

B-195-15 T

OWNER UNION Geothermal Co. FIELD Redondo Canyon WELL NAME BACA #19  
 CASING 20" @ 248'; 13 3/8" 1504' ELEV. DATE: 12/08/79  
 LINER DESCRIPTION: 9 5/8" surface to 2480' ZERO POINT GL+12'  
7" 2328' to 5585' DEPTH 5585

TUBING DETAIL:

PURPOSE

REMARKS:

ELEMENT 93°-618°f SERIAL NO. 10222 CLOCK 12hr 15 TURN STABILIZATION PERIOD  
 ENGAGE STYLUS T-0630 DISENGAGE STYLUS T 132t  
 WELL HEAD 13.5 @ 0715hr  
 PICKUP @ 4500 TIME ON BOTTOM MAX. °F 447°f @ 3000'  
 WELL STATUS 1000-1120 hrs injecting @ 400 gpm  
 SHUT IN: ON PRODUCTION:  
 RATE

TEMP

TEMP

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0710	500	.124	232			1210	4500	.317	198								
0721	1000	.446	233			1220	"	.384	206								
0732	1500	.610	288			1230	"	.365	213								
0743	2000	.807	345			1240	"	.386	220								
0754	2500	1.154	444			1250	"	.406	226								
0805	3000	1.172	447			1300	"	.422	231								
0816	3500	1.142	439														
0827	4000	1.119	433														
0838	4500	1.124	434														
0849	5000	1.139	438														
0900	5550	1.092	425														
0930	4500	1.125	434														
0945	"	1.124	435														
1000	"	1.126	435														
1010	"	1.126	435														
1020	"	1.126	435														
1025	"	1.126	435														
1030	"	1.139	438														
1035	"	1.148	441														
1040	"	1.102	428														
1050	"	.798	343														
1100	"	.471	246														
1110	"	.312	196														
1120	"	.231	170														
1130	"	.194	158														
1140	"	.203	161														
1150	"	.249	176														
1200	"	.287	188														

COMMENTS:



Dick

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# GEOHERMAL DIVISION

## SUBSURFACE SURVEY

### Field Work Sheet

B-195-16 P

OWNER UNION Geothermal CO FIELD Redondo Canyon WELL NAME BACA #19  
 CASING 20" AT 248' 13 3/8" AT 1504' ELEV. 9117 DATE: 12/09/79  
 LINER DESCRIPTION: 9 5/8" AT SURFACE TO 2480' ZERO POINT GL +12'  
7" 2328' TO TD DEPTH 5585'

TUBING DETAIL:

PURPOSE:

REMARKS:

ELEMENT 0-4650 PSI SERIAL NO. 9222 CLOCK 12hr 15T TURN STABILIZATION PERIOD  
 ENGAGE STYLUS P 0720 hrs DISENGAGE STYLUS P 1445 hrs  
 WELL HEAD 4 PSI at 0800 hrs  
 PICKUP @ TIME ON BOTTOM MAX. °F  
 WELL STATUS BEGAN INJECTING AT 1103 hrs @ 400 gpm  
 SHUT IN: ON PRODUCTION:  
 RATE

PRESSURE

PRESSURE

TIME	DEPTH	DEFL.	P-T	GRAD.	COR'D	TIME	DEPTH	DEFL.	P-T	GRAD.	COR'D	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0801	500	NR	NR		NR	1243	4500	.664	1570		+001						
0812	1000	NR	NR		NR	1253	"	.662	1565		+001						
0823	1500	.016	46		NR	1303	"	.659	1558		+001						
0834	2000	.097	247		+002	1313	"	.657	1555		+001						
0845	2500	.177	433		+001	1323	"	.656	1551		+001						
0856	3000	.254	612		+002	1333	"	.653	1554		+001						
0907	3500	.331	792		+003	1343	"	.650	1537		+001						
0918	4000	.409	974		+004	1353	"	.636	1502		0						
0929	4500	.485	1152		+005	1403	"	.633	1498		0						
0940	5000	.563	1334		+007	1417	5550	.813	1916		+004						
0951	5550	.646	1528		+008												
1058	4500	.485	1152		+005												
1103	"	.485	1152		+005												
1108	"	.556	1318		+006												
1113	"	.596	1411		+007												
1118	"	.622	1472		+008												
1123	"	.634	1500		+008												
1128	"	.645	1526		+008												
1133	"	.657	1554		+008												
1138	"	.659	1558		+008												
1143	"	.661	1563		+008												
1148	"	.664	1570		+008												
1153	"	.664	1570		+006												
1158	"	.666	1574		+004												
1203	"	.668	1579		+002												
1213	"	.669	1581		+002												
1223	"	.669	1581		+001												
1233	"	.667	1577		+001												

COMMENTS: BEGAN INJECTING 400 gpm AT 1103 HRS

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UNION

GEO THERMAL DIVISION

SUBSURFACE SURVEY

Field Work Sheet

B-19 S-16 T

OWNER Union Geothermal-N.M. FIELD Redondo Canyon

WELL NAME BACG # 19

CASING 20" at 248'; 13 3/4" at 1504' ELEV. 9117'

DATE: 12/09/79

LINER DESCRIPTION: 9 5/8" Surface to 2480'  
7" 2328' to 5585'

ZERO POINT GL + 12'  
DEPTH 5585'

TUBING DETAIL:

PURPOSE

REMARKS: Injection Survey

ELEMENT 93°-618° SERIAL NO. 10222 CLOCK 12 hr. 15 TURN

STABILIZATION PERIOD

ENGAGE STYLUS 0725 DISENGAGE STYLUS 1445

WELL HEAD

PICKUP @ TIME ON BOTTOM MAX. °F

WELL STATUS BEGAN INJECTING AT 1103 hrs @ 400 gpm

SHUT IN: ON PRODUCTION:

RATE

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0801	500	.348	208			1243	4500	.125	136								
0812	1000	.364	213			1253	"	.111	131								
0823	1500	.583	280			1303	"	.101	128								
0834	2000	.698	314			1313	"	.091	124								
0845	2500	1.093	426			1323	"	.097	121								
0856	3000	1.106	429			1333	"	.074	119								
0807	3500	1.074	421			1343	"	.068	117								
0918	4000	1.048	414			1353	"	.064	115								
0929	4500	1.046	413			1403	"	.064	115								
0940	5000	1.051	414			1417	5550	.295	191								
0951	5550	.987	397														
1058	4500	1.052	415														
1103	"	1.052	415														
1108	"	1.053	415														
1113	"	1.054	415														
1118	"	1.056	416														
1123	"	1.065	418														
1128	"	1.074	422														
1133	"	1.087	424														
1138	"	1.025	407														
1143	"	.900	372														
1148	"	.722	321														
1153	"	.538	266														
1158	"	.409	227														
1203	"	.322	199														
1213	"	.226	168														
1223	"	.175	152														
1233	"	.146	142														

COMMENTS: BEGAN INJECTING 400 gpm at 1103 hrs

Dick

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# UNION

## GEO THERMAL DIVISION

### SUBSURFACE SURVEY

#### Field Work Sheet

B-19 5-17 P

OWNER Union Geo of N.M. FIELD Redondo Canyon WELL NAME BACA # 19  
 CASING 20" at 248'; 13" at 1504' ELEV. 9117 DATE: 12/09/10/79  
 LINER DESCRIPTION: 9 3/8" AT SURFACE to 2480' ZERO POINT GL + 12'  
7" AT 2328 to 5585 DEPTH 5585

TUBING DETAIL:

PURPOSE

REMARKS:

ELEMENT O-4650 PSI SERIAL NO. 9222 CLOCK 12HR 15 TURN STABILIZATION PERIOD  
 ENGAGE STYLUS P-19/9 hrs DISENGAGE STYLUS P-19/9 hrs. 0655/hrs  
 WELL HEAD VACUUM \_\_\_\_\_  
 PICKUP @ 4500' TIME ON BOTTOM \_\_\_\_\_ MAX. 'F \_\_\_\_\_  
 WELL STATUS ON INJ.  
 SHUT IN: \_\_\_\_\_ ON PRODUCTION: \_\_\_\_\_  
 RATE \_\_\_\_\_

TIME	DEPTH	DEFL.	P-T	GRAD.	COR.	TIME	DEPTH	DEFL.	P-T	GRAD.	COR.	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
2000	4500	.622	1472		NC	0000	4500	.539	1278		-1.001						
2015	"	.622	1472		"	0015	"	.527	1250		-1.001						
2030	"	.621	1470		"	0030	"	.520	1234		-1.001						
2045	"	.621	1470		"	0045	"	.515	1222		-1.001						
2100	"	.621	1470		"	0100	"	.511	1213		-1.001						
2115	"	.622	1472		"	0115	"	.509	1208		-1.001						
2130	"	.622	1472		"	0130	"	.507	1203		-1.001						
2145	"	.622	1472		"	0145	"	.504	1196		-1.001						
2200	"	.619	1465		"	0200	"	.503	1194		0						
2205	"	.639	1572		"	0230	"	.500	1187		0						
2210	"	.652	1542		"	0300	"	.497	1180		0						
2215	"	.665	1572		"	0330	"	.496	1178		+1.001						
2220	"	.674	1593		"	0400	"	.494	1173		+1.001						
2225	"	.681	1609		"	0430	"	.492	1168		+1.001						
2230	"	.685	1617		"	0500	"	.491	1166		+1.001						
2240	"	.683	1614		"	0530	"	.491	1166		+1.002						
2250	"	.690	1607		"	0600	"	.490	1164		+1.002						
2300	"	.674	1593		"	0630	"	.489	1161		+1.002						
2310	"	.678	1602		"												
2315	"	.680	1607		"												
2320	"	.686	1621		"												
2325	"	.680	1607		"												
2330	"	.692	1635		"												
2335	"	.693	1637		"												
2340	"	.615	1456		"												
2345	"	.582	1379		"												
2350	"	.563	1334		-1.001												
2355	"	.549	1301		-1.001												

COMMENTS: Began injecting at 400 GPM 1103 hrs. 12/09/79.  
 Injecting at 400 GPM till 2200 hrs 12/09/79  
 2200 hrs till 2335 hrs. injection rate @ 700 GPM; 2345 open well to atmosphere

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# GEO THERMAL DIVISION

## SUBSURFACE SURVEY Field Work Sheet

B-19-5-17 T

OWNER Union Fed of T.M. FIELD Redondo Canyon WELL NAME BACA #19  
 CASING 20" AT 248' 13 3/8" AT 1504 ELEV. 9117 DATE: 12/09-10/79  
 LINER DESCRIPTION: 0 5/8" AT SURFACE to 2480' ZERO POINT GL +12'  
7" AT 2338 to 5585 DEPTH 5585

TUBING DETAIL:

PURPOSE

REMARKS:

ELEMENT 93° to 618° SERIAL NO. 10222 CLOCK 12 TURN 15 STABILIZATION PERIOD  
 ENGAGE STYLUS T-1920 DISENGAGE STYLUS T-655  
 WELL HEAD VACUUM  
 PICKUP @ 4500 TIME ON BOTTOM MAX. °F  
 WELL STATUS ON INJ  
 SHUT IN: ON PRODUCTION:  
 RATE

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
2000	4400	NR	NR			0000	4500	.024	101								
2015	"	"	"			0015	"	.049	110								
2030	"	"	"			0030	"	.068	117								
2045	"	"	"			0045	"	.083	122								
2100	"	"	"			0100	"	.099	127								
2115	"	"	"			0115	"	.113	132								
2130	"	"	"			0130	"	.132	138								
2145	"	"	"			0145	"	.153	145								
2200	"	"	"			0200	"	.177	152								
2205	"	"	"			0230	"	.200	160								
2210	"	"	"			0300	"	.245	174								
2212	"	"	"			0330	"	.283	187								
2220	"	"	"			0400	"	.319	198								
2225	"	"	"			0430	"	.350	208								
2230	"	"	"			0500	"	.378	217								
2240	"	"	"			0530	"	.403	225								
2250	"	"	"			0600	"	.427	233								
2300	"	"	"			0630	"	.449	239								
2310	"	"	"														
2315	"	"	"														
2320	"	"	"														
2325	"	"	"														
2330	"	"	"														
2335	"	"	"														
2340	"	"	"														
2345	"	"	"														
2350	"	1006	95														
2355	"	1014	98														

COMMENTS: Began injecting at 400 gpm 1103 hrs 12/09/79; Injecting at 400 gpm till 2200 hrs  
2200 hrs till 2335 hrs injection rate @ 700 gpm; 2345 hr open well to atmosphere

DICK

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# GEO THERMAL DIVISION

## SUBSURFACE SURVEY

### Field Work Sheet

B-19 S-18 PIT

OWNER UNION GEOTHERMAL CO FIELD REDONDO CANYON

WELL NAME BACA #19

CASING 20" AT 248' 13 3/4" AT 1504' ELEV. 9117'

DATE: 12/10/79

LINER DESCRIPTION: 9 5/8" AT SURFACE TO 2480'  
7" AT 2328' TO 5585'

ZERO POINT CL+12'  
DEPTH 5585'

TUBING DETAIL:

PURPOSE

REMARKS:

ELEMENT - 0-4650 PSI SN 9222 CLOCK 12 HR 15 TURN

ELEMENT 43'-618' L SERIAL NO. 10222 CLOCK 12 HR 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-0751 T-0749 DISENGAGE STYLUS P-1847 T-1847

WELL HEAD - Well open to Atmosphere 0 = PS19

PICKUP @ 4500' TIME ON BOTTOM MAX. °F

WELL STATUS open to Atmosphere

SHUT IN: ON PRODUCTION:

RATE

### PRESSURE

### TEMPERATURE

TIME	DEPTH	DEFL.	P-T	GRAD.	LOG ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0837	2500	.149	367		- .002	0837	2500	.571	276								
0849	3000	.233	563		- .001	0849	3000	.582	279								
0900	3500	.318	762		+ .001	0900	3500	.567	275								
0911	4000	.402	958		+ .002	0911	4000	.554	271								
0922	4500	.486	1154		+ .004	0922	4500	.550	270								
0933	5000	.567	1343		"	0933	5000	.562	273								
0944	5550	.659	1558		"	0944	5550	.418	230								
1018	4500	.485	1152		"	1018	4500	.567	275								
1048	"	.485	1152		"	1048	"	.579	278								
1118	"	.484	1150		"	1118	"	.591	282								
1148	"	.484	1150		"	1148	"	.602	285								
1218	"	.483	1147		"	1218	"	.613	289								
1248	"	.483	1147		"	1248	"	.625	292								
1318	"	.483	1147		"	1318	"	.635	295								
1348	"	.483	1147		+ .005	1348	"	.645	298								
1418	"	.483	1147		"	1418	"	.655	301								
1448	"	.483	1147		"	1448	"	.664	304								
1518	"	.483	1147		"	1518	"	.674	307								
1548	"	.482	1145		"	1548	"	.683	310								
1618	"	.482	1145		"	1618	"	.691	312								
1648	"	.482	1145		"	1648	"	.699	314								
1718	"	.482	1145		"	1718	"	.707	317								
1748	"	.482	1145		"	1748	"	.715	319								
1818	"	.481	1143		"	1818	"	.723	321								

COMMENTS:

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GEOTHERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

B19-S19-P1T

OWNER UNION GEO. CO. N.M. FIELD REDONDO CANYON WELL NAME BACA #19  
 CASING 20" @ 248' 13 3/8" @ 1454' ELEV. 9117' DATE: 12-11-79  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GLT 12'  
7" - 2328' - 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE GRADIENT

REMARKS:

ELEMENT - P-0-4650 PSIG SIN 9822 12 hr 15  
 ELEMENT - T-93°E-6189 SERIAL NO. 10222 CLOCK 12 hr 15 TURN STABILIZATION PERIOD  
 ENGAGE STYLUS P-0954 T-0955 DISENGAGE STYLUS P-1354 T-1355  
 WELL HEAD 5 PSIG  
 PICKUP @ 5550' TIME ON BOTTOM 1304-1314 MAX. 'F  
 WELL STATUS SHUT IN  
 SHUT IN: 1845 HRS 12/10/79 ON PRODUCTION:  
 RATE

PRESSURE

TEMPERATURE

TIME	DEPTH	DEFL.	P. T	GRAD.	COMP.	TIME	DEPTH	DEFL.	P. T	GRAD.	ID	TIME	DEPTH	DEFL.	P. T	GRAD.	ID
1029	500	.002	6		NC	1029	500	.355	210								
1040	1000	.003	9		NC	1040	1000	.371	215								
1051	1500	.003	9		NC	1051	1500	.374	216								
1102	2000	.079	205		-0.003	1102	2000	.665	304								
1113	2500	.161	395		-0.001	1113	2500	.920	378								
1124	3000	.242	584		+0.001	1124	3000	.910	375								
1135	3500	.322	771		+0.002	1135	3500	.899	372								
1146	4000	.402	958		+0.003	1146	4000	.885	368								
1157	4500	.482	1145		+0.005	1157	4500	.884	367								
1208	5000	.560	1327		+0.006	1208	5000	.898	371								
1219	5100	.580	1374		+0.006	1219	5100	.904	373								
1230	5200	.592	1402		+0.007	1230	5200	.900	372								
1241	5300	.607	1437		+0.007	1241	5300	.856	359								
1252	5400	.622	1472		+0.007	1252	5400	.785	339								
1303	5500	.637	1507		+0.007	1303	5500	.776	336.5								
1314	5550	.645	1536		+0.007	1314	5550	.777	336.8								

COMMENTS:

deck

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# GEOHERMAL DIVISION

## SUBSURFACE SURVEY

### Field Work Sheet

B-19-S-20 P1

OWNER UNION GEOTHERMAL CO. FIELD REDONDO CANYON WELL NAME BACA #19  
 CASING 20" AT 240' 13 3/8" AT 1504' ELEV. 9117' DATE: 12/12/79  
 LINER DESCRIPTION: 9 5/8" AT SURFACE TO 2450' ZERO POINT CL +12'  
 7" AT 2328' TO 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE Gradient

REMARKS:

ELEMENT - 0-4650 PSI SN 9222 CLOCK 12 HR 15 TURN  
 ELEMENT 93°-618°F SERIAL NO. 10222 CLOCK 12 HR 15 TURN STABILIZATION PERIOD  
 ENGAGE STYLUS R0858 T-0900 DISENGAGE STYLUS R-1310 T-1310  
 WELL HEAD 7.5 PSIG 0-200 T/C  
 PICKUP @ 5550 TIME ON BOTTOM MAX. °F  
 WELL STATUS 12/10/79 @ 1845 hrs  
 SHUT IN: ON PRODUCTION:  
 RATE

### PRESSURE

### TEMPERATURE

TIME	DEPTH	DEFL.	P-T	GRAD.	COL ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0951	500	.002	6		NC	0951	500	.382	219								
1003	1000	.002	14		NC	1003	1000	.397	224								
1013	1500	.005	14		NC	1013	1500	.469	245								
1024	2000	.084	216		-002	1024	2000	.747	328								
1035	2500	.164	402		0	1035	2500	1.019	406								
1046	3000	.243	586		t.001	1046	3000	1.009	403								
1057	3500	.322	771		t.003	1057	3500	.996	399								
1108	4000	.401	956		t.004	1108	4000	.980	395								
1119	4500	.479	1138		t.005	1119	4500	.985	396								
1130	5000	.556	1318		t.006	1130	5000	1.000	400								
1141	5100	.573	1357		t.007	1141	5100	1.003	401								
1152	5200	.587	1390		t.007	1152	5200	1.000	400								
1203	5300	.602	1425		t.007	1203	5300	.962	390								
1214	5400	.617	1460		t.007	1214	5400	.906	374								
1225	5500	.632	1495		t.007	1225	5500	.902	373								
1236	5550	.641	1516		t.008	1236	5550	.909	375								

COMMENTS:



# GEOTHERMAL DIVISION SUBSURFACE PRESSURE SURVEY

B-145-20 P

OWNER UNION GEOTHERMAL CO FIELD REDONDO CANYONWELL NAME BALCH #19  
 CASING 20" AT 248' 13 3/8 1504 ELEV. 9117' DATE: 12/12/79  
 LINE DESCRIPTION: 7 3/8 surface to 5885 2480' ZERO POINT GL 412'  
7" 2328 to 5885 DEPTH 5585'

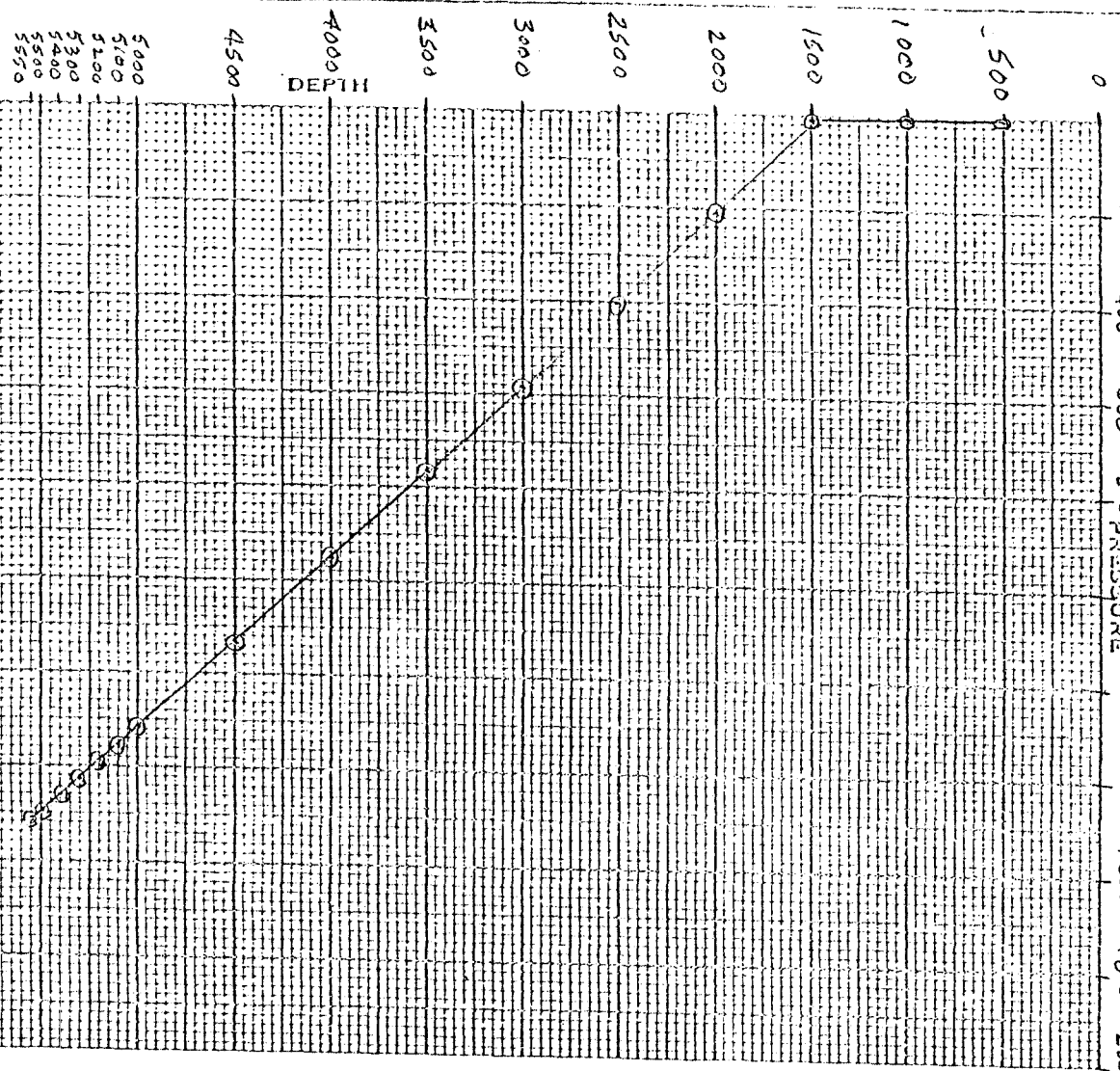
NOTE DESCRIPTION:

INSTRUMENT 0-4650 PS  
 SERIAL NO 9222

MAX TEMP 406 °F @ 2500'

REMARKS:

200 400 600 800 PRESSURE 1000 1200 1400 1600 1800 2000 STABILIZATION PERIOD



PRESSURES	GAUGE	DEPTH	PRESSURE	GRADIENT
	7.5	500	6	
		1000	14	
		1500	21	
		2000	28	
		2500	35	
		3000	42	
		3500	49	
		4000	56	
		4500	63	
		5000	70	
		5100	77	
		5200	84	
		5300	91	
		5400	98	
		5500	105	
		5550	112	



76

# GEO THERMAL DIVISION

## SUBSURFACE TEMPERATURE SURVEY

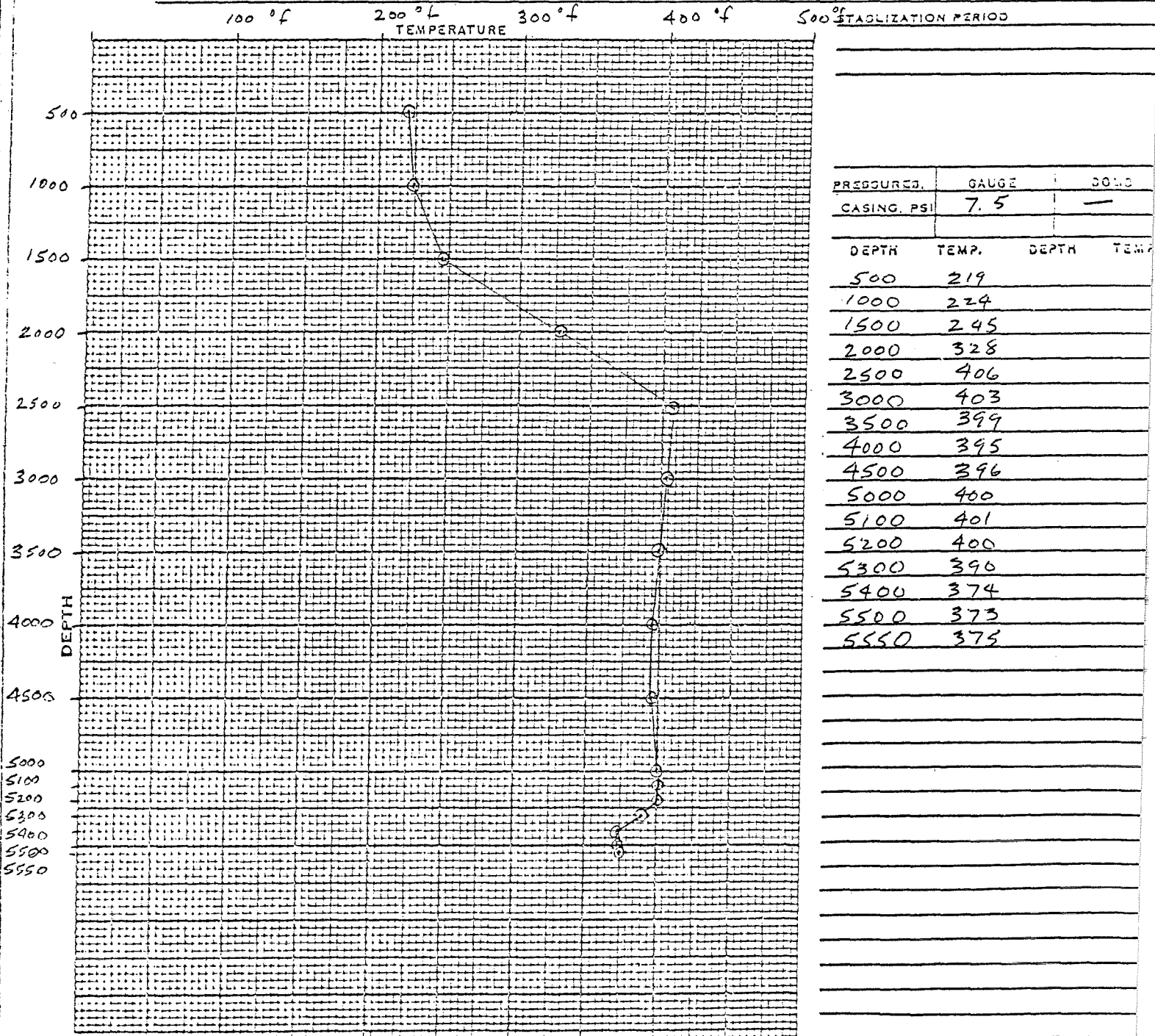
B-19 S-20 T

OWNER UNION GEOTHERMAL CO FIELD REDONDO CANYON WELL NAME BADA #19  
 CASING 20" AT 248'; 13 3/8" AT 1504' ELEV. \_\_\_\_\_ DATE: 12/12/75  
 LINER DESCRIPTION: 9 5/8" AT SURFACE TO 2480' ZERO POINT CL +12'  
7" 2328 TO 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_ INSTRUMENT 93°-618° FAH  
 SERIAL NO 10222

PURPOSE \_\_\_\_\_ MAX TEMP. 406 °F @ 2500'

REMARKS: \_\_\_\_\_



PRESSURES	GAUGE	SOLE
CASING. PSI	7.5	—

DEPTH	TEMP.	DEPTH	TEMP.
500	219		
1000	224		
1500	245		
2000	328		
2500	406		
3000	403		
3500	399		
4000	395		
4500	396		
5000	400		
5100	401		
5200	400		
5300	390		
5400	374		
5500	373		
5550	375		

P.O. ENGINEER  
 DEC 17 1979



# GEOHERMAL DIVISION

## SUBSURFACE SURVEY Field Work Sheet

B-195-21 PIT

OWNER UNION GEOTHERMAL CO FIELD RE DONDO CANYON WELL NAME BACA #19  
 CASING 20" AT 208; 13 3/8" AT 1504 ELEV. 9117' DATE: 12/14/79  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480 ZERO POINT 0.1 + 12  
7" 2328 TO 5585' DEPTH 5585'  
 TUBING DETAIL:

PURPOSE

REMARKS:

ELEMENT 0-4650 PSI SN 9222 CLOCK 12 hr 15 Turn  
 ELEMENT 93° - 618" SERIAL NO. 10222 CLOCK 12 hr 15 TURN STABILIZATION PERIOD  
 ENGAGE STYLUS P-0917; T-0919 DISENGAGE STYLUS P-1305; T-1305  
 WELL HEAD 8.5 PSI @ 0-200 T/C  
 PICKUP @ 5550 TIME ON BOTTOM 1229-1239 MAX. °F 430° @ 2500'  
 WELL STATUS  
 SHUT IN: ON PRODUCTION:  
 RATE

PRESSURE

TEMPERATURE

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0954	500	.004	11	79	NC		500	.396	223	187							
1005	1000	.005	14	79	NC		1000	.410	228	281							
1010	1500	.015	43	79	NC		1500	.582	279	392							
1027	2000	.095	242	211	-0.001		2000	.823	350	381							
1038	2500	.172	421	182	0		2500	1.110	430	442							
1049	3000	.251	605	180	+0.002		3000	1.103	428	403							
1100	3500	.327	783	79	+0.003		3500	1.086	424	439							
1111	4000	.405	965	967	+0.004		4000	1.072	420	436							
1122	4500	.482	1145	105	+0.005		4500	1.085	424	441							
1133	5000	.562	1332	1229	+0.006		5000	1.102	428	447							
1144	5100	.572	1355	1253	+0.006		5100	1.103	428	447							
1155	5200	.587	1390	1277	+0.006		5200	1.101	428	447							
1206	5300	.602	1425	1293	+0.007		5300	1.070	420	441							
1217	5400	.617	1460	1313	+0.007		5400	1.039	411	438							
1228	5500	.633	1498	1333	+0.008		5500	1.038	411	438							
1239	5550	.640	1514	1342	+0.008		5550	1.048	414	440							

COMMENTS:

76

R.O. ENGBRETSSEN

DEC 18 1979

UNION

GEOTHERMAL DIVISION

SUBSURFACE SURVEY

Field Work Sheet

B-19 S-22 P/T

OWNER Union Geothermal Co. FIELD Redondo Canyon WELL NAME Baca #19  
 CASING 20" at 248'; 13 1/8" @ 1504' ELEV. 9117' DATE: 12-17-79  
 LINER DESCRIPTION: 9 5/8" Surface to 2480' ZERO POINT 62 + 12'  
7" 2328' to 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE

REMARKS:

Element 0-4650 psi. S/N 9222 Clock 12 hr. 15 T

ELEMENT 93°-618° ± SERIAL NO. 10222 CLOCK 12 hr. 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-0858 T-0855 DISENGAGE STYLUS P-1251 T-1252

WELL HEAD 39.5 psi. 0-200 1/6

PICKUP @ 5550 TIME ON BOTTOM 1201-1211 MAX. °F 447° @ 5000'

WELL STATUS

SHUT IN:

ON PRODUCTION:

RATE

Pressure

Temperature

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0926	500	.017	49		NC	500	285	187									
0937	1000	.017	49		NC	1000	.589	281									
0948	1500	.071	60		NC	1500	.626	292									
0959	2000	.099	251		- .001	2000	.873	364									
1010	2500	.177	433		+ .001	2500	1.152	442									
1021	3000	.253	610		+ .002	3000	1.156	443									
1032	3500	.330	790		+ .003	3500	1.141	439									
1043	4000	.406	967		+ .004	4000	1.132	436									
1054	4500	.482	1145		+ .005	4500	1.150	441									
1105	5000	.557	1320		+ .006	5000	1.171	441									
1116	5100	.571	1353		+ .006	5100	1.172	447									
1127	5200	.586	1388		+ .006	5200	1.171	447									
1138	5300	.601	1423		+ .007	5300	1.148	441									
1149	5400	.616	1458		+ .007	5400	1.137	438									
1200	5500	.631	1493		+ .007	5500	1.139	438									
1211	5550	.639	1512		+ .007	5550	1.147	440									

COMMENTS:

76

R.G. ENGELHARTSEN  
JAN 2 1980

dick



GEOTHERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

B-19 5-23 P/T

OWNER Union Geo of New Mex FIELD Redondo CANYON WELL NAME BACH #19  
CASING 20" AT 1138" AT 1504' ELEV. 9117' DATE: 12/27/79  
LINER DESCRIPTION: 9 5/8" SURFACE to 2480' ZERO POINT 06 + 12'  
7" 2328 to 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE

REMARKS:

Element 93° to 68° S/N 10222 chik 12hr 15 TURN

ELEMENT 0-4650 DSI SERIAL NO. 9222 CLOCK 12hr 12 TURN STABILIZATION PERIOD

ENGAGE STYLUS P.0856 T.0858 DISENGAGE STYLUS P.1253 T.1254

WELL HEAD 188 PSI 0950 hrs 0-600 TG

PICKUP @ 5550 TIME ON BOTTOM MAX. °F 473° @ 5550'

WELL STATUS

SHUT IN:

ON PRODUCTION:

RATE

Pressure

Temperature

TIME	DEPTH	DEFL.	P-T	GRAD.	COR ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0933	500	.082	212		-0.005	500	0.232	170									
0944	1000	.084	216		-0.003	1000	0.587	281									
0955	1500	.085	219		-0.002	1500	0.863	361									
1006	2000	.111	279		000	2000	1.026	408									
1017	2500	.184	449		7.001	2500	1.172	447									
1028	3000	.260	626		7.002	3000	1.199	455									
1039	3500	.338	804		7.003	3500	1.194	453									
1050	4000	.413	984		7.004	4000	1.198	454									
1101	4500	.486	1154		7.005	4500	1.228	462									
1112	5000	.557	1320		7.006	5000	1.257	470									
1123	5100					5100	1.257	470									
1134	5200					5200	1.259	471									
1145	5300					5300	1.249	468									
1156	5400					5400	1.260	471									
1207	5500					5500	1.266	473									
1218	5550	.642	1519		7.007	5550	1.267	473									

COMMENTS:

716

# GEO THERMAL DIVISION

## SUBSURFACE TEMPERATURE SURVEY

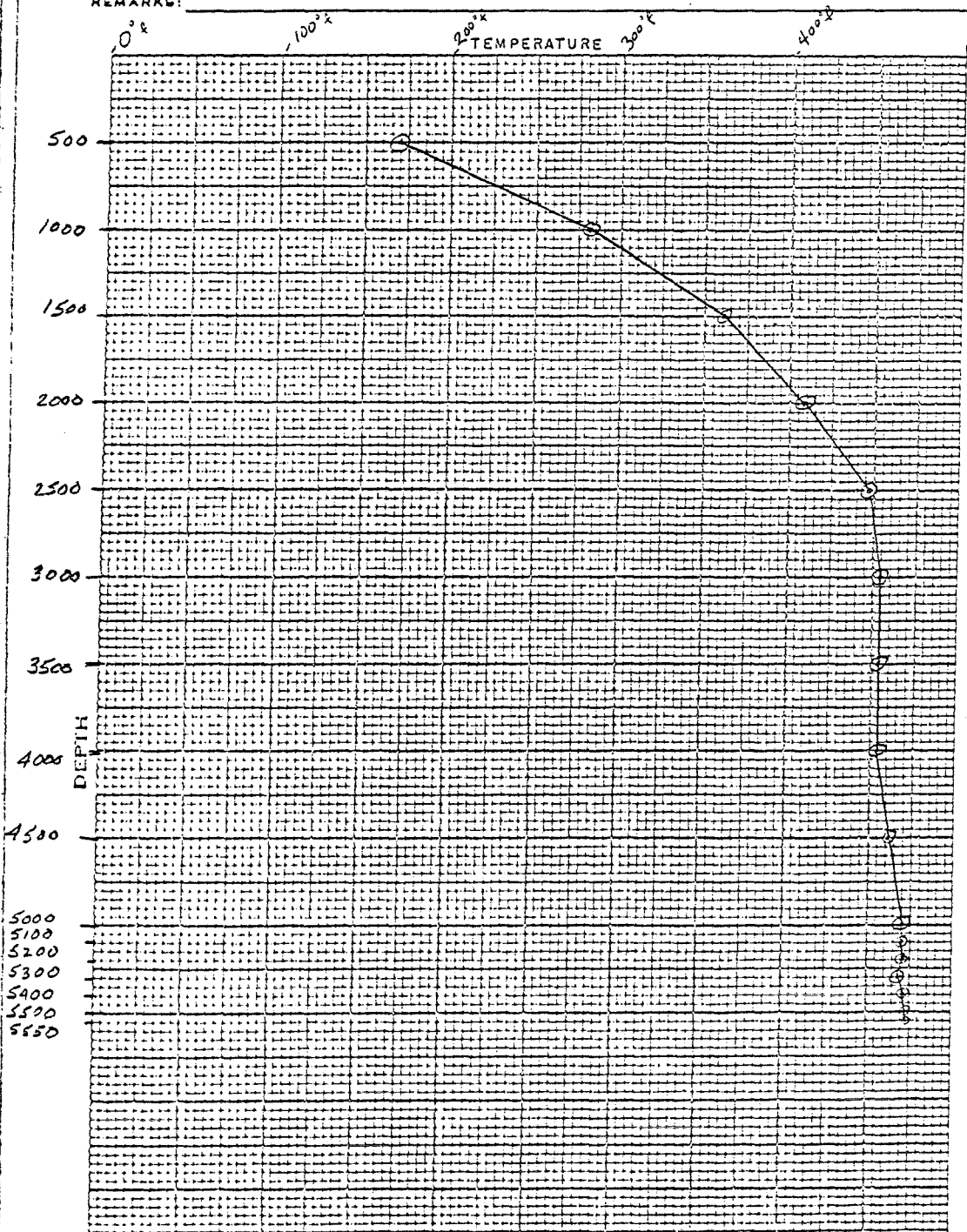
B-19 S-23 P/1

OWNER Union Geothermal Co FIELD Redondo Canyon WELL NAME BACA #19  
 CASING 20" AT 248', 13 3/8" AT 1504' ELZV. 9117' DATE: 12/27/79  
 LINER DESCRIPTION: 9 5/8" AT 248' ZERO POINT GL +12'  
7" 2380' 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_ INSTRUMENT 93°-618°f FAX  
 SERIAL NO 10022

PURPOSE Gradient Survey MAX TEMP. 473°f @ 5550'

REMARKS: \_\_\_\_\_



STAGLIZATION PERIOD \_\_\_\_\_

PRESSURES	GAUGE	DOES
CASING, PSI	188	

DEPTH	TEMP.	DEPTH	TEMP.
500	170		
1000	281		
1500	361		
2000	408		
2500	447		
3000	455		
3500	453		
4000	454		
4500	462		
5000	470		
5100	470		
5200	471		
5300	468		
5400	471		
5500	473		
5550	473		

716

# GEO THERMAL DIVISION

## SUBSURFACE PRESSURE SURVEY

B-19 S-23-P/T

OWNER UNION Geothermal CO FIELD Redondo Canyon WELL NAME BACA #19  
 CASING 20" AT 248', 13 3/8" AT 1509' ELEV. 9117' DATE: CL 412' 12/27/79  
 LINER DESCRIPTION: 9 5/8" AT 2480' ZERO POINT CL 412'  
7" 2328 TO 5585 DEPTH 5585'

HOLE DESCRIPTION:

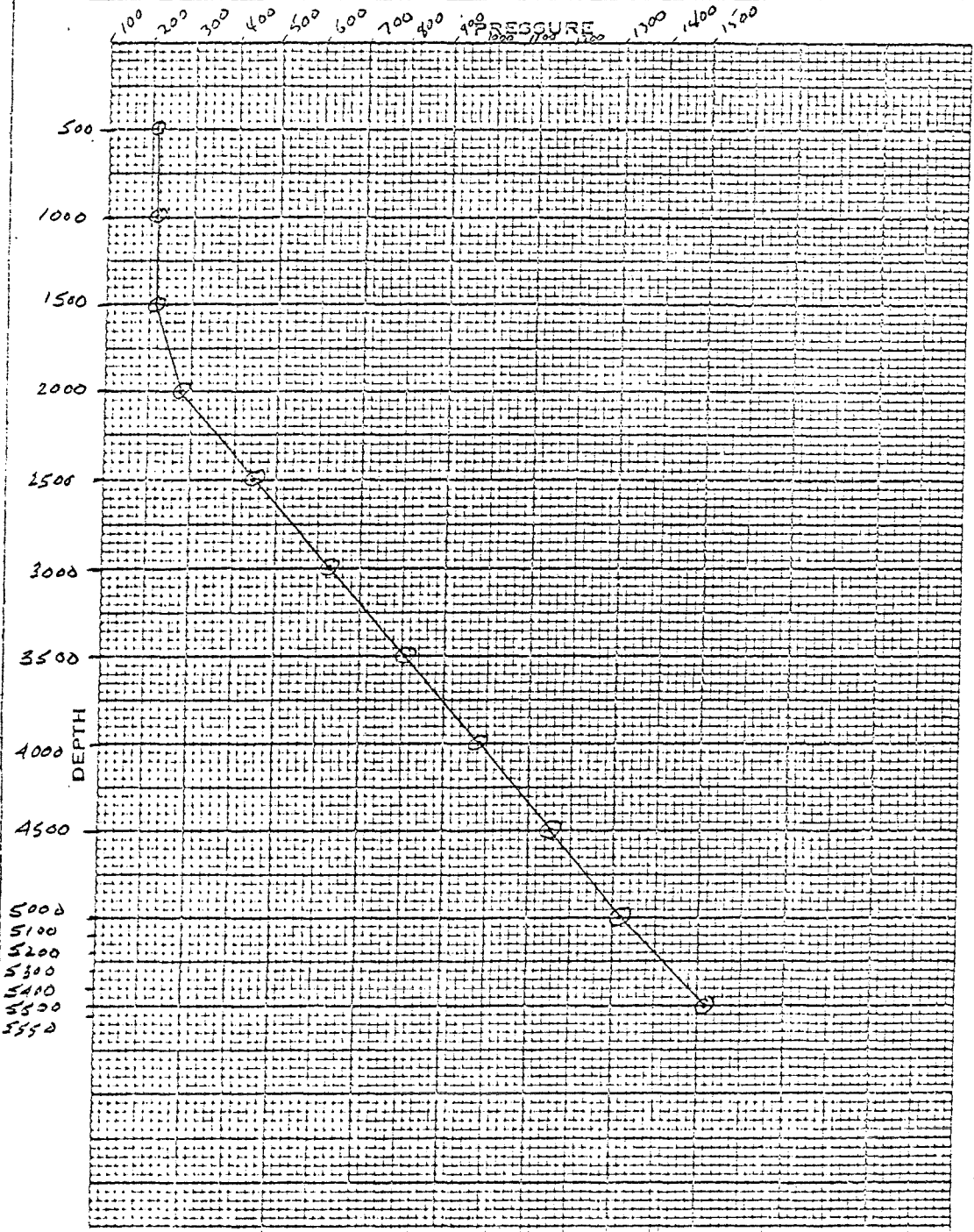
INSTRUMENT 0-4650 PSI  
 SERIAL NO 9222

PURPOSE Gradient

MAX TEMP 473 °F @ 5550'

REMARKS:

STABILIZATION PERIOD



PRESSURES	GAUGE	DEPTH
CASING, PSI	188	

DEPTH	PRESSURE	GRADIENT
500	212	
1000	216	
1500	219	
2000	279	
2500	449	
3000	626	
3500	804	
4000	984	
4500	1154	
5000	1320	
5100		
5200	Clock	
5300	Stopped	
5400		
5500		
5550	1519	

# 76

# UNION

Dick

## GEOHERMAL DIVISION

AS ENGBRETTSEN  
JAN 4 1980

### SUBSURFACE SURVEY

### Field Work Sheet

B19-524 P/T

OWNER Union Geothermal - N.M. FIELD Redondo Canyon

WELL NAME Baca #19

CASING 20" @ 248' 13 3/4" @ 1504' ELEV. 9117

DATE: 1/3/80

LINER DESCRIPTION: 9 3/4" Surface to 2480'  
7" 2328' to 5585'

ZERO POINT GL + 12'  
DEPTH 5585'

**TUBING DETAIL:**

**PURPOSE**

**REMARKS:**

ELEMENT G3°-618° 3/4 N 10222 CI-12hr. 15 T

ELEMENT 0-4650 psi SERIAL NO. 9222 CLOCK 12hr. 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-0342 T-0341 DISENGAGE STYLUS P-1220 T-1221

WELL HEAD 250 psi @ 0905. 0-600 1/2

PICKUP @ 5550 TIME ON BOTTOM MAX. °F 484 @ 5550

**WELL STATUS**

**SHUT IN:**

**ON PRODUCTION:**

**RATE**

Pressure

Temperature

TIME	DEPTH	DEFL.	P-T	GRAD.	R.V. #	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0913	500	.105	265		-005		500	.236	172								
0924	1000	.107	270	.010	-003		1000	.594	283								
0935	1500	.109	274	.008	-001		1500	.849	369								
0946	2000	.111	279	.010	000		2000	1.043	412								
0957	2500	.131	442	.326	+001		2500	1.178	449								
1008	3000	.256	617	.350	+002		3000	1.211	458								
1019	3500	.331	792	.350	+003		3500	1.209	457								
1030	4000	.406	967	.350	+004		4000	1.220	460								
1041	4500	.440	1140	.346	+005		4500	1.253	469								
1052	5000	.554	1313	.346	+006		5000	1.282	477								
1103	5100	.569	1348	.350	+006		5100	1.284	478								
1114	5200	.583	1381	.330	+006		5200	1.287	479								
1125	5300	.597	1414	.330	+006		5300	1.285	478								
1136	5400	.610	1444	.300	+006		5400	1.298	482								
1147	5500	.625	1479	.350	+006		5500	1.305	483								
1158	5550	.633	1498	.380	+006		5550	1.307	484								

COMMENTS:

710

GEO THERMAL DIVISION, INC. ENGBRETTSEN

SUBSURFACE PRESSURE SURVEY JAN 4 1980

OWNER Union Geothermal - N.M. FIELD Redondo Canyon WELL NAME Bacc # 19  
 CASING 20" @ 248', 13 3/4" @ 1504' ELEV. 9117 DATE: 1/3/79  
 LINER DESCRIPTION: 9 3/4" Surface to 2480' ZERO POINT 62 + 12'  
2" 2328' to 5585' DEPTH 5585'

HOLE DESCRIPTION:

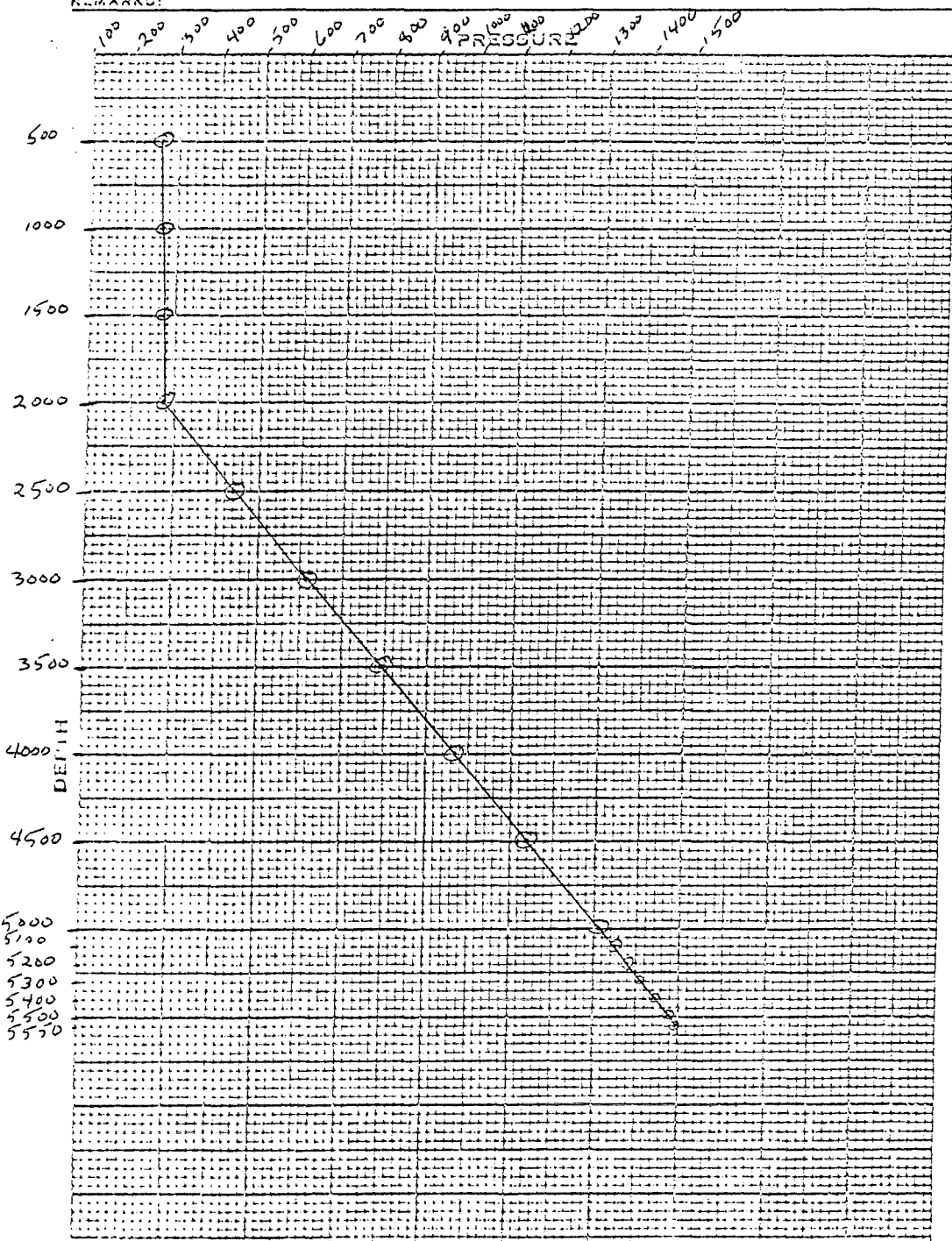
INSTRUMENT 0-4650 PS  
 SERIAL NO 9222

PURPOSE Gradient survey

MAX TEMP 484 °F @ 5550

REMARKS:

STABILIZATION PERIOD



PRESSURED GAUGE  
 CASING, PSI: 250

DEPTH	PRESSURE	GRADIENT
500	265	
1000	270	.010
1500	274	.008
2000	279	.010
2500	442	.320
3000	617	.350
3500	792	.350
4000	967	.350
4500	1140	.346
5000	1313	.340
5100	1348	.350
5200	1381	.330
5300	1414	.330
5400	1444	.300
5500	1479	.350
5550	1498	.380



76

GEOTHERMAL DIVISION  
SUBSURFACE TEMPERATURE SURVEY

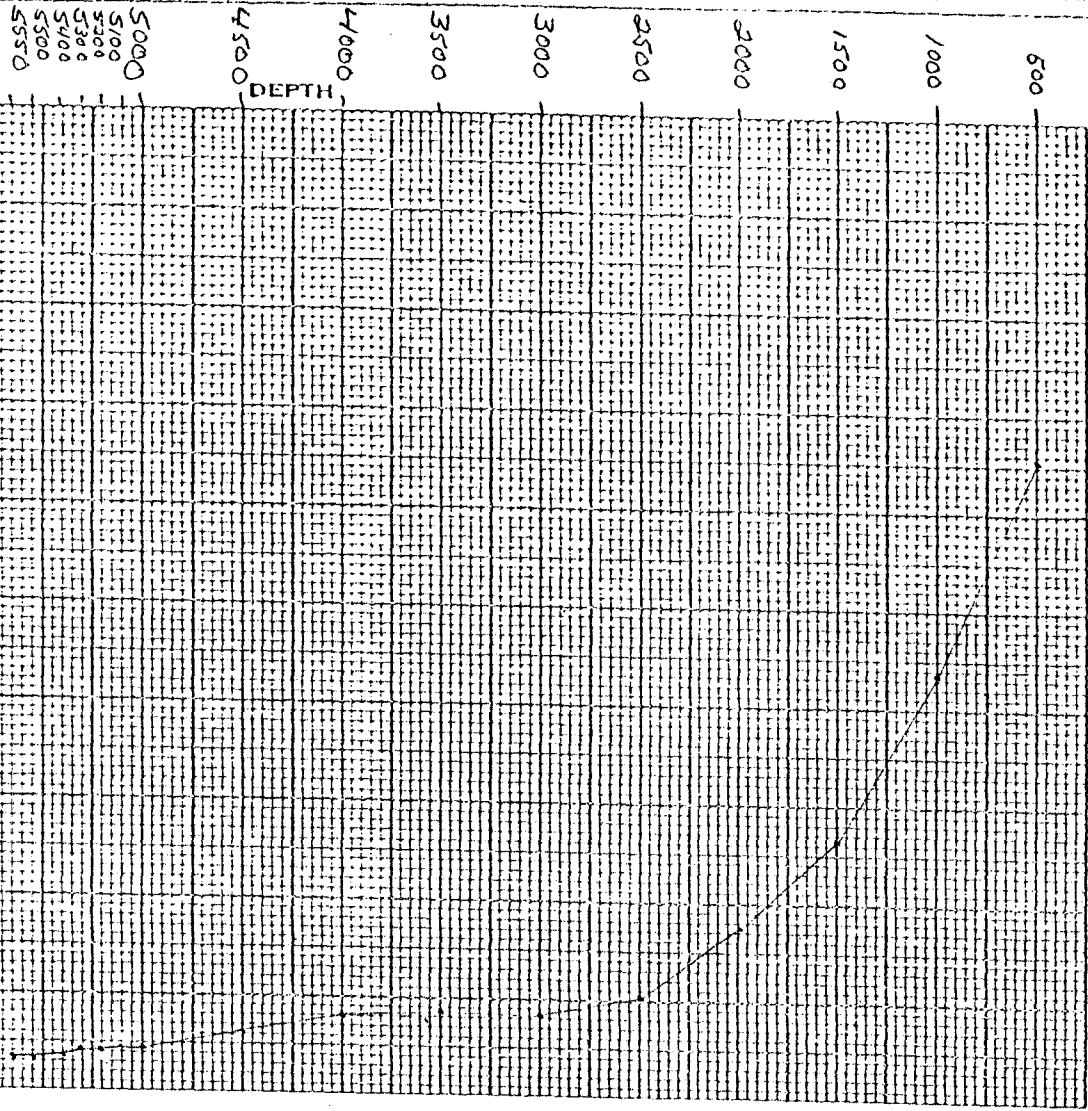
R.O. ENGBRETSSEN  
JAN 4 1980

OWNER UNION GEO - OF NEW MEXICO FIELD REDONDO CANYON WELL NAME BACA #19  
 CASING 20" AT 248' 1.3 3/8" AT 1504' ELEV. 9117' DATE: 1/3/79  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL + 125'  
7" 2328 TO 5585 DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_  
 INSTRUMENT 93° TO 618° FAH  
 SERIAL NO 10022

PURPOSE GRADIENT SURVEY MAX TEMP 484 °F @ 5550'

REMARKS: \_\_\_\_\_  
 STABILIZATION PERIOD \_\_\_\_\_



DEPTH	TEMP.	DEPTH	TEMP.
500	172		
1000	283		
1500	369		
2000	412		
2500	449		
3000	458		
3500	457		
4000	460		
4500	469		
5000	477		
5100	478		
5200	479		
5300	478		
5400	482		
5500	483		
5550	484		

5000  
5100  
5200  
5300  
5400  
5500  
5550

76

R.D. ENGBRETSEN  
JAN 18 1980

UNION

Dick

GEOHERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

B19-525-P/T

OWNER Union Geothermal - N.M. FIELD Redondo Canyon WELL NAME Baca #19  
 CASING 20" @ 248'; 13 3/8" @ 1504 ELEV. 9117' DATE: 1-14-80  
 LINER DESCRIPTION: 9 3/8" Surface to 2480' ZERO POINT 62 + 12'  
 7" - 2328' to 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE Gradient Survey

REMARKS:

ELEMENT 93°-618° S/N - 10222 el - 12hr. 15 Turn  
 ELEMENT 0-4650 psi. SERIAL NO. 9222 CLOCK 12hr. 15 TURN STABILIZATION PERIOD  
 ENGAGE STYLUS P-0840 T-0842 DISENGAGE STYLUS P-1235 T-1236  
 WELL HEAD 325 psi @ .0910 0-1000 T/6  
 PICKUP @ 5550' TIME ON BOTTOM MAX. 'F 490 @ 5550'  
 WELL STATUS  
 SHUT IN: ON PRODUCTION:  
 RATE

Pressure Temperature

TIME	DEPTH	DEFL.	P-T	GRAD.	COM. #	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0913	500	.142	351		-.004	500	.210	163									
0924	1000	.144	356	.010	-.002	1000	.604	286									
0935	1500	.145	358	.004	-.001	1500	.915	376									
0946	2000	.148	365	.014	000	2000	1.131	436									
0957	2500	.152	444	.158	+001	2500	1.179	449									
1008	3000	.257	619	.350	+002	3000	1.216	459									
1019	3500	.332	794	.350	+003	3500	1.218	460									
1030	4000	.408	972	.356	+004	4000	1.237	465									
1041	4500	.479	1138	.332	+005	4500	1.274	475									
1052	5000	.553	1311	.346	+005	5000	1.306	483									
1103	5100	.569	1348	.370	+006	5100	1.309	484									
1114	5200	.582	1379	.310	+006	5200	1.312	485									
1125	5300	.597	1414	.350	+006	5300	1.316	486									
1136	5400	.611	1446	.320	+006	5400	1.327	488									
1147	5500	.625	1479	.330	+006	5500	1.334	490									
1158	5550	.631	1493	.280	+006	5550	1.335	490									

COMMENTS:

76

# GEO THERMAL DIVISION

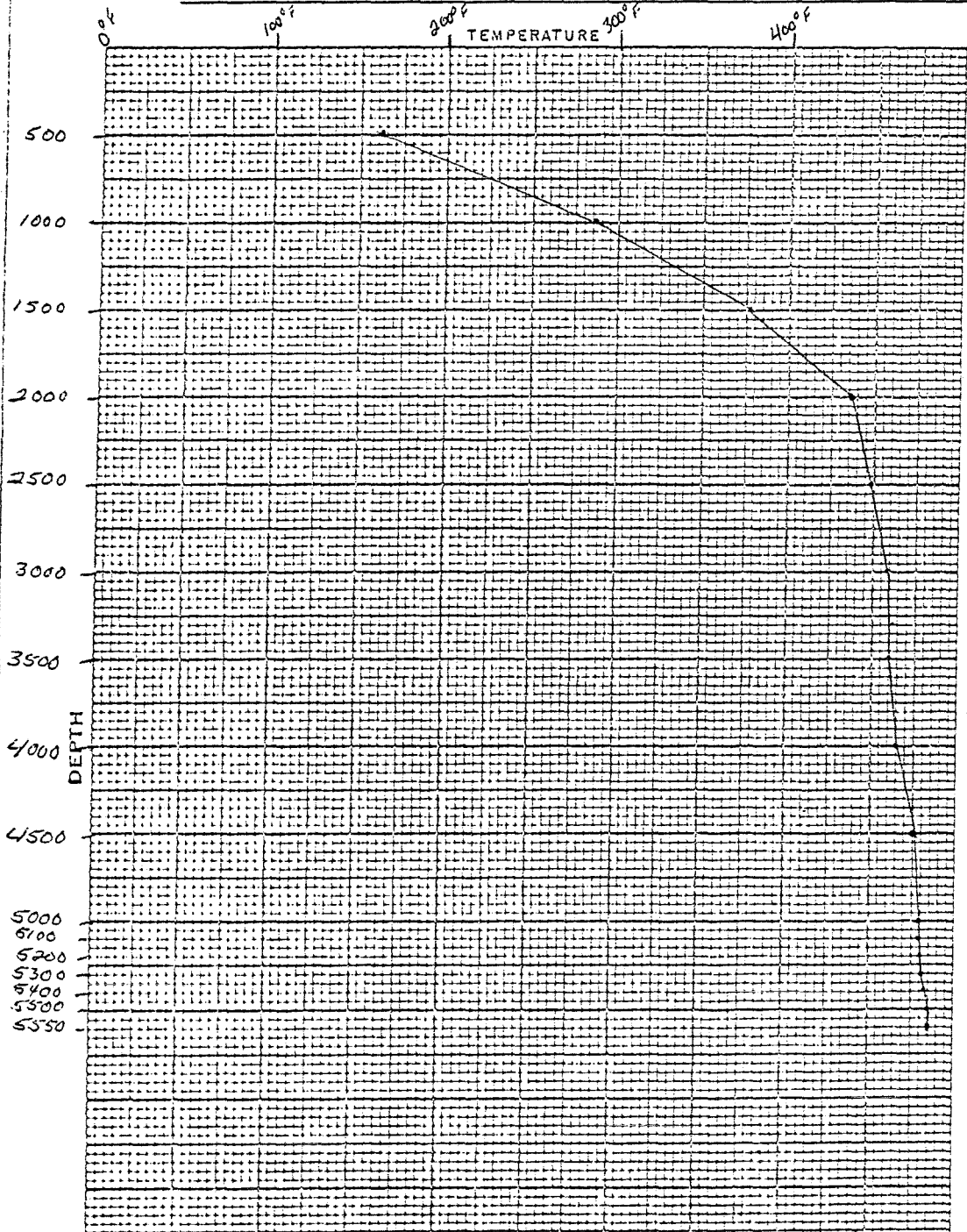
## SUBSURFACE TEMPERATURE SURVEY

R.O. ENGBRETSSEN  
JAN 18 1980

OWNER UNION GEO- OF NEW MEXICO FIELD REDONDO CANYON WELL NAME BACA #19  
 CASING 20" AT 248' ; 13 3/8" AT 1504' ELEV. 9117' DATE: 1/14/79  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL + 12'  
7" 2328 TO 5585 DEPTH. 5585

HOLE DESCRIPTION: \_\_\_\_\_  
 INSTRUMENT 93° TO 618° FAH.  
 SERIAL NO 10222

PURPOSE GRADIENT SURVEY MAX TEMP. 490° °F @ 5550'  
 REMARKS: \_\_\_\_\_



STABILIZATION PERIOD

PRESSURES	GAUGE	COND.
CASING, PSI:	<u>325</u>	

DEPTH	TEMP.	DEPTH	TEMP.
500	163		
1000	286		
1500	376		
2000	436		
2500	449		
3000	459		
3500	460		
4000	465		
4500	475		
5000	483		
5100	484		
5200	485		
5300	486		
5400	488		
5500	490		
5550	490		

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# GEO THERMAL DIVISION

## SUBSURFACE PRESSURE SURVEY

R.O. ENGBRETTSEN  
JAN 18 1980

OWNER UNION GEO. OF NEW MEXICO FIELD REDONDO CANYON WELL NAME BACA #19  
 CASING 20" AT 248' 1 1/2" AT 1504' ELEV. 9117' DATE: 1/14/78  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL + 12'  
7" 2328' TO 5585' DEPTH 5585'

HOLE DESCRIPTION:

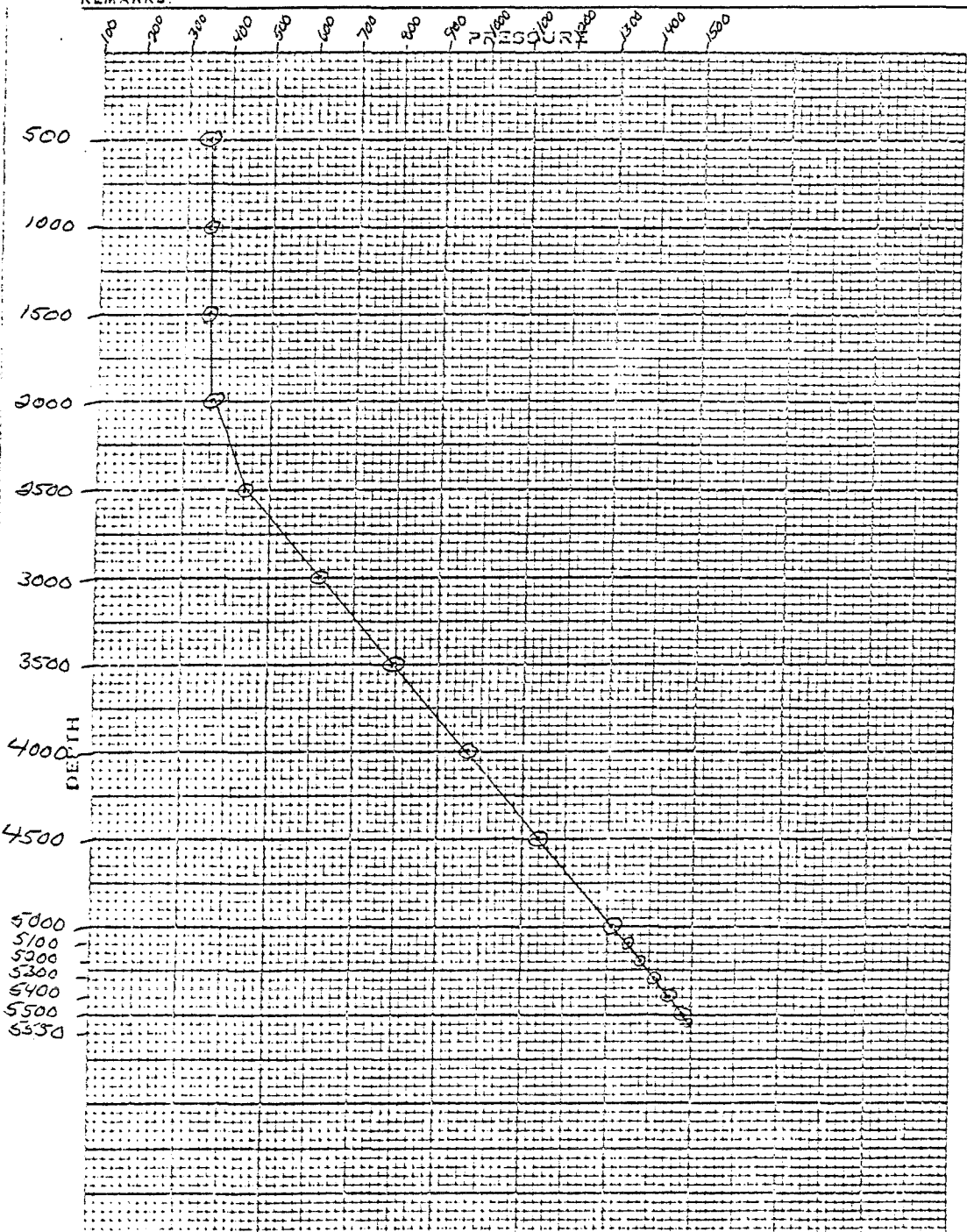
INSTRUMENT 0-4650  
SERIAL NO 9222

PURPOSE GRADIENT SURVEY

MAX TEMP 490 °F @ 5550'

REMARKS:

STABILIZATION PERIOD



PRESSURES GAUGE 33  
CASING PSI 325

DEPTH	PRESSURE	GRADIENT
500	351	
1000	356	.010
1500	358	.004
2000	365	.014
2500	444	.158
3000	619	.350
3500	794	.350
4000	972	.350
4500	1138	.333
5000	1311	.346
5100	1348	.370
5200	1379	.310
5300	1414	.350
5400	1446	.32
5500	1479	.330
5550	1493	.28

76

R.O. ENGBRETSSEN

JAN 25 1980

UNION

GEOHERMAL DIVISION

SUBSURFACE SURVEY

Field Work Sheet

B19-526-T

OWNER Union Geothermal-ALM. FIELD Redondo Canyon WELL NAME Baca #19  
 CASING 20" @ 249' 13 3/4" @ 1504' ELEV. 9117' DATE: 1-23-80  
 LINER DESCRIPTION: 9 3/4" Surface to 2480' ZERO POINT 61+12'  
7" - 2328' to 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE:

REMARKS:

ELEMENT 93°-618° SERIAL NO. 10222 CLOCK 12hr. 15 TURN STABILIZATION PERIOD  
 ENGAGE STYLUS 0716 DISENGAGE STYLUS 1529  
 WELL HEAD 392 PSI.  
 PICKUP @ 5550' TIME ON BOTTOM MAX. °F 495 @ 5550'  
 WELL STATUS  
 SHUT IN: ON PRODUCTION:  
 RATE

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0803	0	NR	-														
0814	500	245	174														
0825	1000	612	288														
0836	1500	924	379														
0847	2000	1074	421														
0858	2500	1210	458														
0909	3000	1235	464														
0920	3500	1236	465														
0931	4000	1257	470														
0942	4500	1294	480														
0953	5000	1325	488														
1004	5100	1328	489														
1015	5200	1331	489														
1026	5300	1337	491														
1037	5400	1349	493														
1048	5500	1355	495														
1049	5550	1357	495														
1119	"	"	"														
1149	"	"	"														
1219	"	"	"														
1249	"	"	"														
1319	"	"	"														
1349	"	"	"														
1419	"	"	"														
1449	"	"	"														

Stylus Assembly  
 on Pressure bomb  
 broke  
 M. 5 min

COMMENTS:

# 76

R.O. ENGBRETTSEN  
 JAN 25 1980



Diek

## GEO THERMAL DIVISION

### SUBSURFACE SURVEY Field Work Sheet

B-195-27 PIT

OWNER UNION GEOTHERMAL CO N.MEX FIELD Redondo Canyon WELL NAME BACA #19  
 CASING 20" AT 248'; 13 3/8" AT 1504' ELEV. 9117' DATE: 1-24-80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT CL +12'  
7" 2380' TO 5555' DEPTH 5585'

TUBING DETAIL:  
 \_\_\_\_\_  
 \_\_\_\_\_

PURPOSE \_\_\_\_\_  
 REMARKS: GLADICHT  
 ELEMENT 0-4650 PSI SN 9222 CLOCK 12 HR 15 TURN  
 ELEMENT 93°-618° SERIAL NO. 10222 CLOCK 12 HR 15 TURN STABILIZATION PERIOD \_\_\_\_\_  
 ENGAGE STYLUS P1095 T1047 DISENGAGE STYLUS P-1900 T-1902  
 WELL HEAD 440 PSIG @ 1105 hgs  
 PICKUP @ 5550 TIME ON BOTTOM 1406-1828 MAX. °F 497° @ 5550'  
 WELL STATUS SHUT IN  
 SHUT IN: \_\_\_\_\_ ON PRODUCTION: \_\_\_\_\_  
 RATE \_\_\_\_\_

PRESSURE

TEMPERATURE

PRESSURE						TEMPERATURE											
TIME	DEPTH	DEFL.	P-T	GRAD.	CCR ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
1115	0	.173	423	-	-0.005	1115	0	NR	-								
1127	500	.179	437	.028	-0.003	1127	500	.247	175								
1138	1000	.182	444	.014	-0.001	1138	1000	.615	289								
1149	1500	.185	451	.014	0	1149	1500	.928	380								
1200	2000	.188	458	.014	+0.001	1200	2000	1.069	419								
1212	2500	.189	460	.004	+0.001	1212	2500	1.217	459								
1223	3000	.259	624	.328	+0.002	1223	3000	1.239	465								
1237	3500	.335	801	.354	+0.003	1237	3500	1.240	466								
1248	4000	.409	974	.346	+0.004	1248	4000	1.259	471								
1259	4500	.483	1147	.346	+0.005	1259	4500	1.297	481								
1310	5000	.555	1315	.336	+0.005	1310	5000	1.332	489								
1321	5100	.571	1353	.380	+0.005	1321	5100	1.335	490								
1332	5200	.586	1388	.350	+0.006	1332	5200	1.339	491								
1343	5300	.600	1421	.360	+0.006	1343	5300	1.344	492								
1354	5400	.613	1451	.300	+0.006	1354	5400	1.356	495								
1405	5500	.627	1484	.330	+0.006	1405	5500	1.364	497								
1406	5550	.634	1500	.320	+0.006	1406	5550	1.365	497								
1506	5550	"	"	"	"	1506	5550	"	"								
1606	5550	"	"	"	"	1606	5550	"	"								
1706	5550	"	"	"	"	1706	5550	"	"								
1806	5550	"	"	"	"	1806	5550	"	"								
1828	5550	"	"	"	"	1828	5550	"	"								

COMMENTS:

76

R.G. ENGBRETTSEN  
JAN 25 1980

GEO THERMAL DIVISION  
SUBSURFACE PRESSURE SURVEY

B-19 S-27 P

OWNER UNION GEOTHERMAL CO of NMex FIELD Redondo Canyon WELL NAME BACH #19  
 CASING 20" AT 248' 13 3/8" AT 1504' ELEV. 9117 DATE: 1-24-80  
 LINER DESCRIPTION: 9 5/8" AT SURFACE TO 2480' ZERO POINT GL + 12'  
7" 2328 TO 5585' DEPTH 5585'

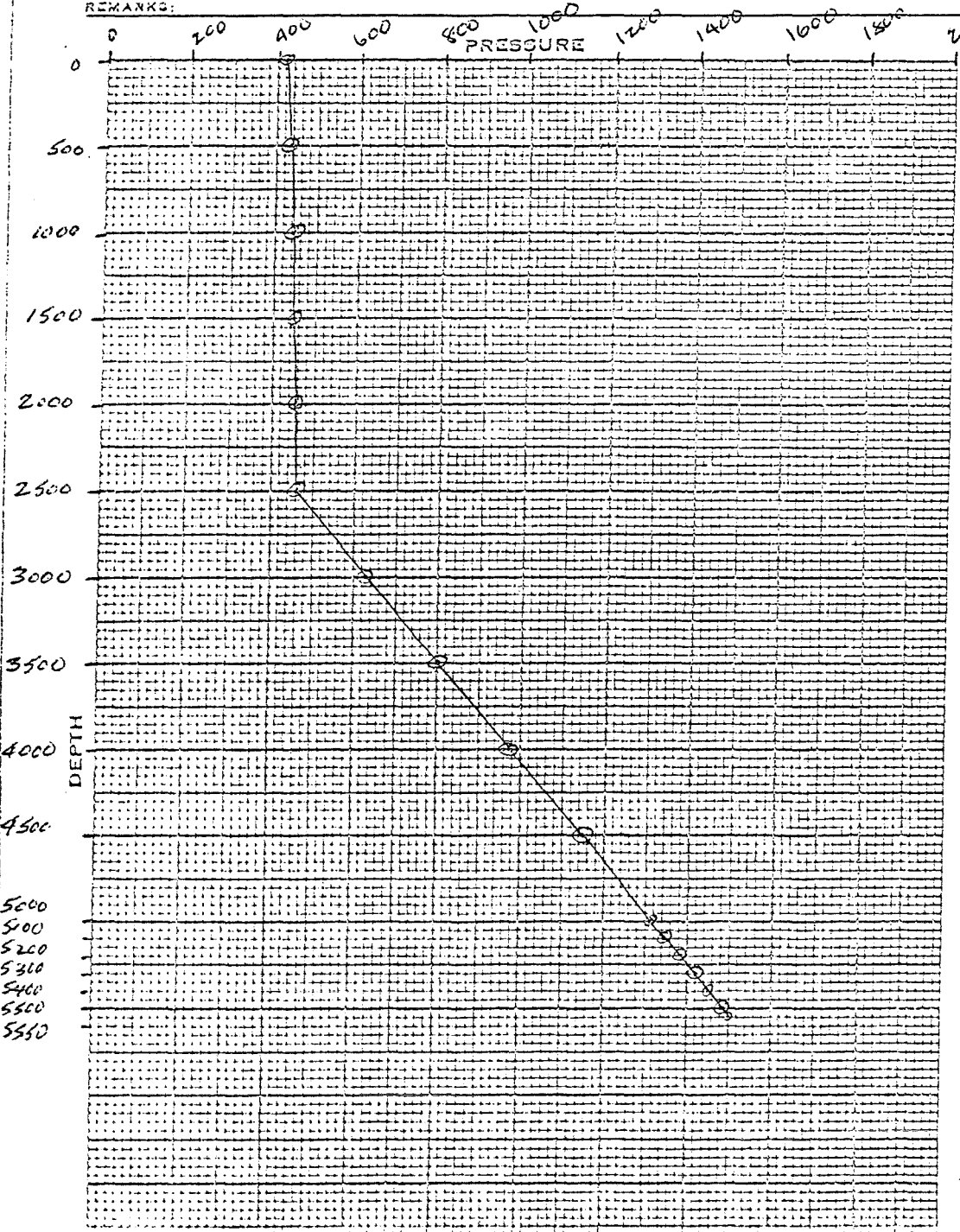
WELL DESCRIPTION:

INSTRUMENT 0-9650 PSI  
SERIAL NO 9222

PURPOSE

MAX. TEMP 497 °F @ 5550

REMARKS:



STABILIZATION PERIOD

PRESSURE	GAUGE	TEMP
CASING, PSI	410	423

DEPTH	PRESSURE	GRADIENT
0	423	-
500	437	.028
1000	444	.014
1500	451	.014
2000	458	.014
2500	460	.004
3000	624	.328
3500	801	.354
4000	974	.346
4500	1147	.346
5000	1315	.336
5100	1353	.380
5200	1388	.350
5300	1421	.360
5400	1451	.300
5500	1484	.330
5585	1500	.320

76

R.O. ENGBRETTSEN  
**GEO THERMAL DIVISION**  
 JAN 25 1980  
**SURFACE TEMPERATURE SURVEY**

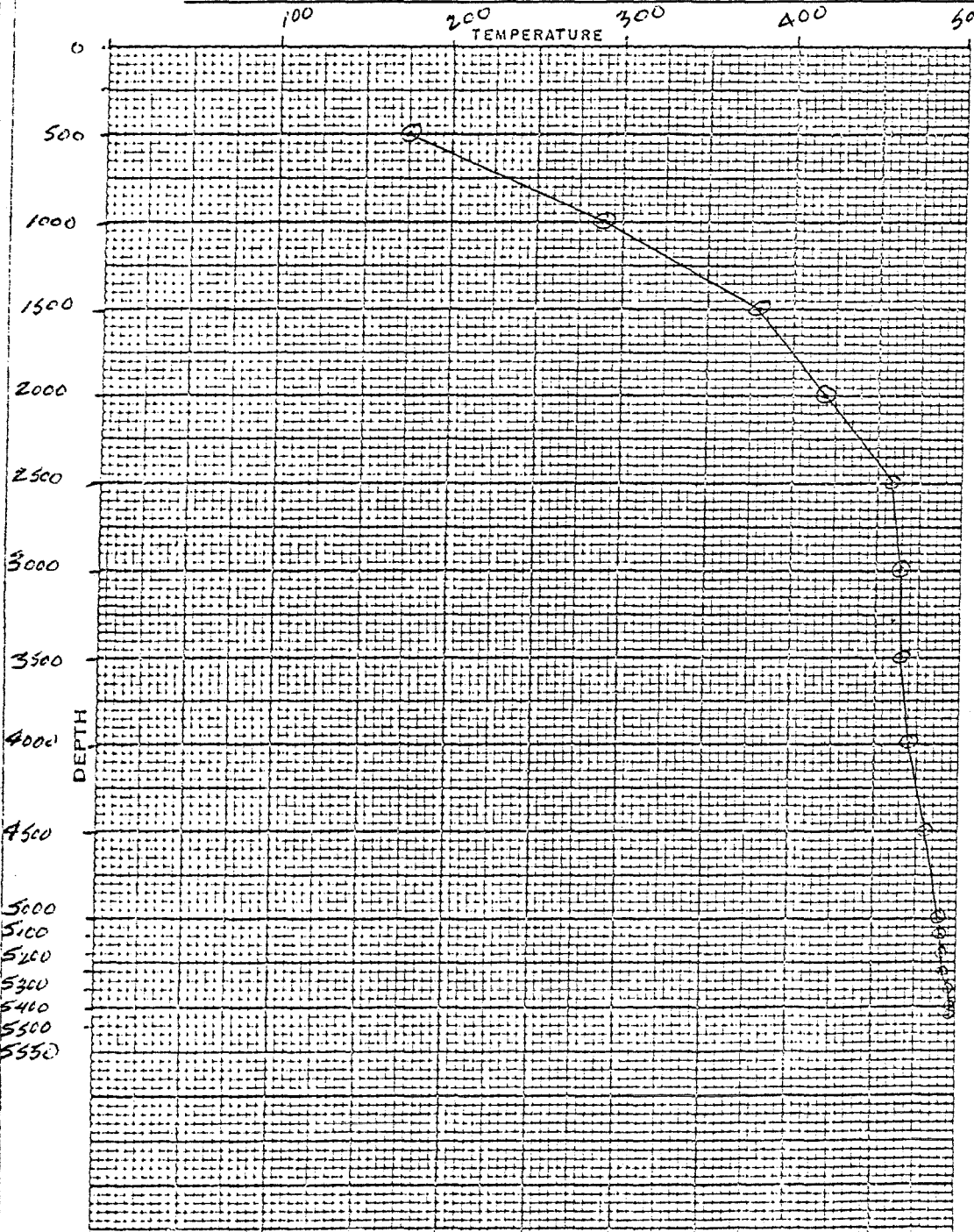
B-19 S-27 T

OWNER UNION GEOTHERMAL CO OF N.MEX FIELD Redondo Canyon WELL NAME BACH #19  
 CASING 20 AT 248'; 13 3/8" AT 1504' ELEV. 9117' DATE: 1-24-80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2450 ZERO POINT C.L. +12'  
7" 2328 TO 5585 DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_ INSTRUMENT 93°-618° FAH  
 SERIAL NO 10222

PURPOSE \_\_\_\_\_ MAX TEMP. 497 °F @ 5550'

REMARKS: \_\_\_\_\_



STABILIZATION PERIOD \_\_\_\_\_

PRESSURES	GAUGE	ROD
CASING, PSI	410	423

DEPTH	TEMP.	DEPTH	TEMP.
0	-		
500	175		
1000	289		
1500	380		
2000	419		
2500	459		
3000	465		
3500	466		
4000	471		
4500	481		
5000	489		
5100	490		
5200	491		
5300	492		
5400	495		
5500	497		
5550	497		



76

R.O. ENGBRETSSEN

UNION

Dick

FEB 19 1980 GEOTHERMAL DIVISION

SUBSURFACE SURVEY B-19 S-28 P/T  
Field Work Sheet

OWNER UNION GEO. OF NEW MEXICO FIELD BERNARDO CANYON WELL NAME BACA #19  
CASING 10" AT 248'; 13 3/8" AT 1504' ELEV. 9117' DATE: 2-13-80  
LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT 66 + 12'  
7' 2339' TO 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE GRADIENT

REMARKS:

ELEMENT 0-4650 PSE SN 9222 CLOCK 12 HR. 15 TURN  
ELEMENT 93°-48°E SERIAL NO. 10222 CLOCK 12 HR. 15 TURN STABILIZATION PERIOD  
ENGAGE STYLUS P-0925 T-0926 DISENGAGE STYLUS P-1250 T-1251  
WELL HEAD 429 PSE AT 1015 HRS.  
PICKUP @ 5550' TIME ON BOTTOM 1205-1215 HRS. MAX. °F 502° AT 5550'  
WELL STATUS SHUT IN  
SHUT IN: 12-10-79 1845 hrs ON PRODUCTION:  
RATE

PRESSURE

TEMPERATURE

PRESSURE						TEMPERATURE											
TIME	DEPTH	DEFL.	P-T	GRAD.	CORRD	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
1014	0	.180	440	—	-0.005	1014	0	NR	RR	—							
1025	500	.186	453	.026	-0.004	1025	500	.244	174	—							
1036	1000	.189	460	.014	-0.001	1036	1000	.616	290	.232							
1047	1500	.191	465	.010	0	1047	1500	.923	379	.178							
1058	2000	.193	470	.010	+0.001	1058	2000	1.019	406	.054							
1109	2500	.194	472	.004	+0.001	1109	2500	1.231	463	.114							
1120	3000	.247	596	.248	+0.002	1120	3000	1.245	467	.008							
1131	3500	.319	764	.336	+0.003	1131	3500	1.252	469	.004							
1142	4000	.400	953	.378	+0.004	1142	4000	1.275	475	.012							
1153	4500	.472	1121	.336	+0.004	1153	4500	1.313	485	.020							
1204	5000	.545	1292	.342	+0.005	1204	5000	1.349	493	.016							
1215	5550	.618	1463	.311	+0.006	1215	5550	1.386	502	.016							

COMMENTS:

R.O. ENGBRETSEN  
 FEB 21 1980

UNION

Dick

GEOHERMAL DIVISION

SUBSURFACE SURVEY B-19 S-29 P/T  
 Field Work Sheet

76

OWNER/UNION GEO. OF NEW MEXICO FIELD REDONDO CANYON WELL NAME BACA #19  
 CASING 10" AT 248' 13 3/8" AT 1504' ELEV. 9117' DATE: 2-21-80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL+12'  
 7" 2338' TO 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE GRADIENT SURVEY

REMARKS:

ELEMENT 0-4650 PSI SN 9222 CLOCK 12 HR. 15-TURN  
 ELEMENT 93°-618° F. SERIAL NO. 10222 CLOCK 12 HR. 15-TURN STABILIZATION PERIOD  
 ENGAGE STYLUS P-0840 T-0835 DISENGAGE STYLUS P-1306 T-1305  
 WELL HEAD 429 PSI AT 0940  
 PICKUP @ 5550' TIME ON BOTTOM 1213-1223 HRS. MAX. F 503° AT 5550'  
 WELL STATUS SHUT IN  
 SHUT IN: 12-10-79 1845 HRS. ON PRODUCTION:  
 RATE 5-30

PRESSURE

TEMPERATURE

2/27

TIME	DEPTH	DEFL.	P-T	GRAD.	CORR ID	TIME	DEPTH	DEFL.	P-T	GRAD.	CORR ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0936	0	.188	449	—	.184	0936	0	NR	—	—	—						
1023	500	.190	456	.014	.187	1023	500	.249	176	—	.176						
1034	1000	.191	463	.014	.190	1034	1000	.628	293	.234	.213						
1045	1500	.191	465	.004	.191	1045	1500	.932	381	.176	.320						
1056	2000	.192	470	.010	.193	1056	2000	1.027	408	.054	.428						
1107	2500	.192	470	0	.193	1107	2500	1.230	463	.110	.414						
1118	3000	.249	605	.270	.251	1118	3000	1.245	467	.008	.469						
1129	3500	.318	769	.328	.321	1129	3500	1.253	469	.004	.471						
1140	4000	.397	956	.374	.401	1140	4000	1.278	476	.014	.473						
1151	4500	.469	1124	.336	.473	1151	4500	1.319	486	.020	.488						
1202	5000	.541	1294	.340	.546	1202	5000	1.354	495	.018	.492						
1213	5550	.619	1479	.336	.625	1213	5550	1.392	503	.016	.491						

COMMENTS: X C to Atkinson 2/22/80

76

# GEO THERMAL DIVISION

## SUBSURFACE PRESSURE SURVEY

R.O. ENGBRETSSEN  
FEB 21 1980

B-19 S-29 P

OWNER Union Geothermal - N.M. FIELD Redondo Canyon WELL NAME Baca #19  
 CASING 20" @ 244' 1 3/4" @ 1504' ELEV. 9117' DATE: 2/21/80  
 LINER DESCRIPTION: 4 3/4" Surface to 2480' ZERO POINT GL + 12'  
7" 2338' to 5585' DEPTH 5585'

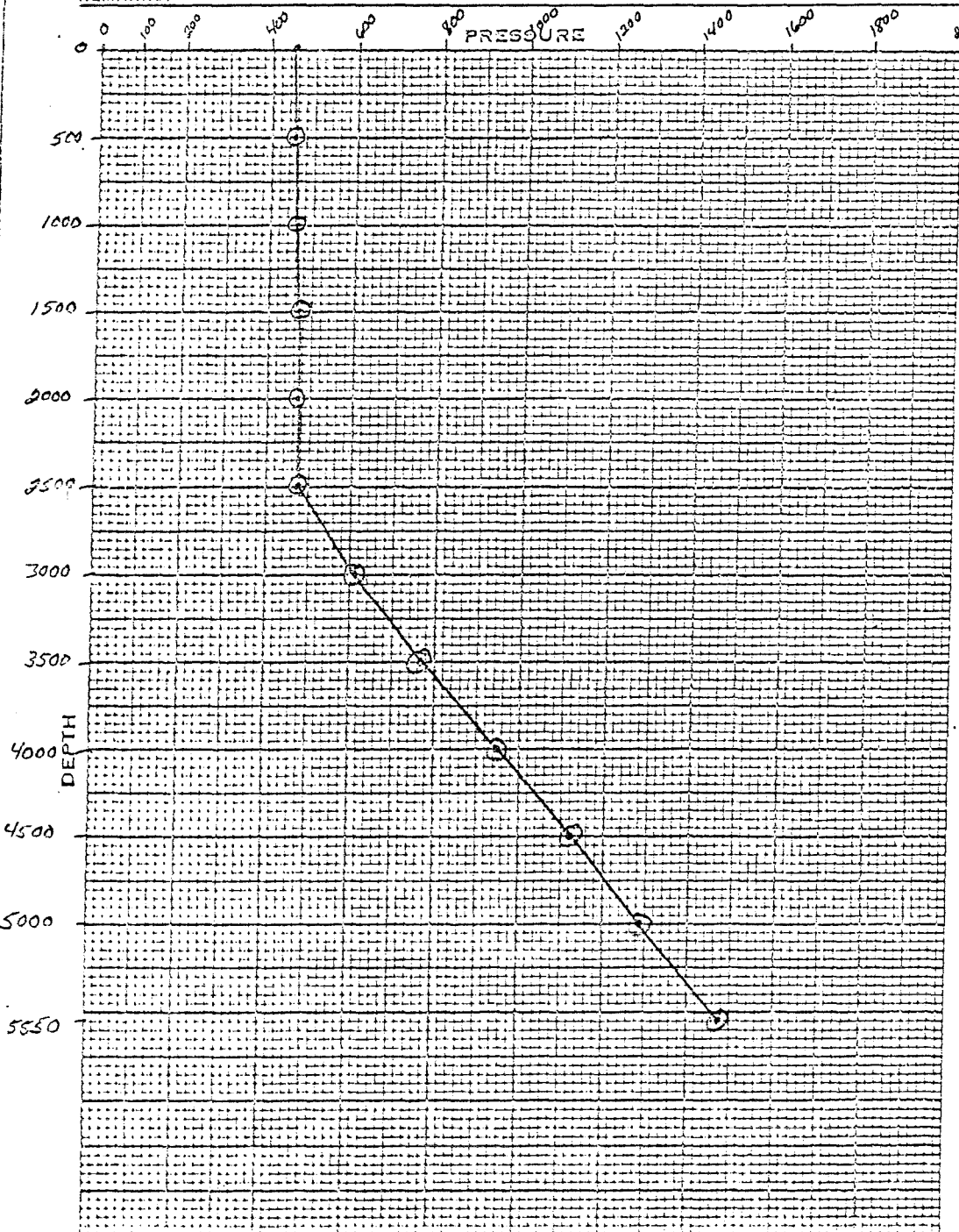
HOLE DESCRIPTION:

INSTRUMENT 0-4650 PS  
 SERIAL NO. 9222

PURPOSE Gradient Survey

MAX TEMP 503 °F @ 5550'

REMARKS:



STABILIZATION PERIOD

PRESSURES	GAUGE	GO'G
CASING, PSI	429	449

DEPTH	PRESSURE	GRADIENT
0	449	-
500	456	.014
1000	463	.014
1500	465	.004
2000	470	.010
2500	470	0
3000	605	.270
3500	769	.328
4000	956	.374
4500	1124	.336
5000	1294	.340
5550	1479	.336

716

R.C. ENGBRETSSEN  
FEB 21 1980

# GEO THERMAL DIVISION

## SUBSURFACE TEMPERATURE SURVEY

879 S-29-T

OWNER Union Geothermal - N.M. FIELD Redonda Canyon WELL NAME Baca #19  
 CASING 20" @ 248'; 13 1/2" @ 1504 ELEV. 9117' DATE: 2/21/80  
 LINER DESCRIPTION: 9 5/8" Surface to 2480' ZERO POINT CL + 12'  
7" 2338 to 5585' DEPTH. 5585'

HOLE DESCRIPTION:

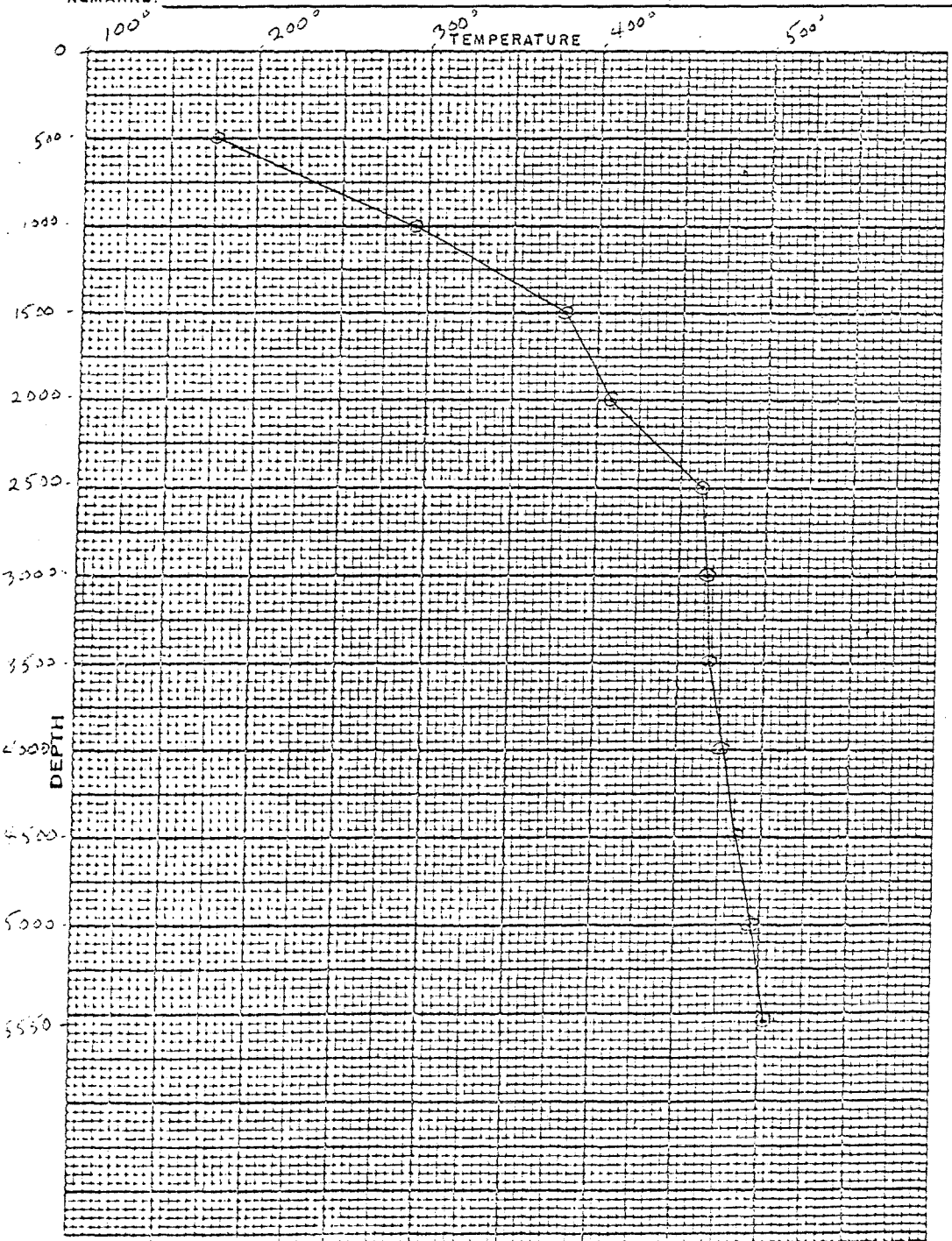
INSTRUMENT 93°-618° FAX:  
 SERIAL NO 10222

PURPOSE Gradient Survey

MAX TEMP. 503 °F @ 5550'

REMARKS:

STABILIZATION PERIOD



PRESSURES	GAUGE	COND
CASING, PSI:	429	449

DEPTH	TEMP.	DEPTH	TEMP.
0	NR		
500	176		
1000	293		
1500	381		
2000	408		
2500	463		
3000	467		
3500	469		
4000	476		
4500	486		
5000	495		
5550	503		

CC L. P.A. 2/29/80

76



R.O. ENGBRETSSEN

FEB 29 1980

# GEO THERMAL DIVISION

## SUBSURFACE SURVEY

B-19 S-30 P/T

### Field Work Sheet

OWNER UNION GEO. OF NEW MEXICO FIELD REDONDO CANYON WELL NAME BACP #19  
 CASING 10" AT 248' ; 13 3/8" AT 1504' ELEV. 9117' DATE: 2-27-80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT 61 + 12'  
7" 2338' TO 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE GRADIENT SURVEY

REMARKS:

ELEMENT-0-4650 P.S.I. SN-9222 CLOCK-12 HR. 15-TURN  
ELEMENT-93°-618° F. SERIAL NO.-10222 CLOCK-12 HR. 15-TURN STABILIZATION PERIOD  
ENGAGE STYLUS P-0855 T-0853 DISENGAGE STYLUS P-1159 T-1158  
WELL HEAD 437 PSI AT 0915 HRS.  
PICKUP @ 5550' TIME ON BOTTOM 1113-1123 HRS. MAX. °F 506° AT 5550'  
WELL STATUS SHUT IN  
SHUT IN: 12-10-79 1845 HRS. ON PRODUCTION:  
 RATE

PRESSURE

TEMPERATURE

TIME	DEPTH	DEFL.	P-T	GRAD.	CORRID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0922	0	.186	453	-	-0.04	0922	0	NA	-	-							
0923	500	.190	463	.020	-0.03	0923	500	.248	175	-							
0944	1000	.194	472	.018	-0.01	0944	1000	.628	293	.236							
0955	1500	.196	477	.010	-0	0955	1500	.930	380	.174							
1006	2000	.198	481	.008	+0.01	1006	2000	1.026	408	.056							
1017	2500	.199	484	.006	+0.01	1017	2500	1.235	464	.112							
1028	3000	.257	619	.270	+0.02	1028	3000	1.252	469	.010							
1039	3500	.331	792	.346	+0.03	1039	3500	1.258	471	.004							
1050	4000	.406	967	.350	+0.04	1050	4000	1.285	478	.014							
1101	4500	.480	1140	.346	+0.05	1101	4500	1.325	488	.020							
1112	5000	.551	1306	.332	+0.05	1112	5000	1.362	496	.016							
1123	5550	.629	1488	.331	+0.05	1123	5550	1.401	506	.018							

COMMENTS:

76

# GEO THERMAL DIVISION

## SUBSURFACE TEMPERATURE SURVEY

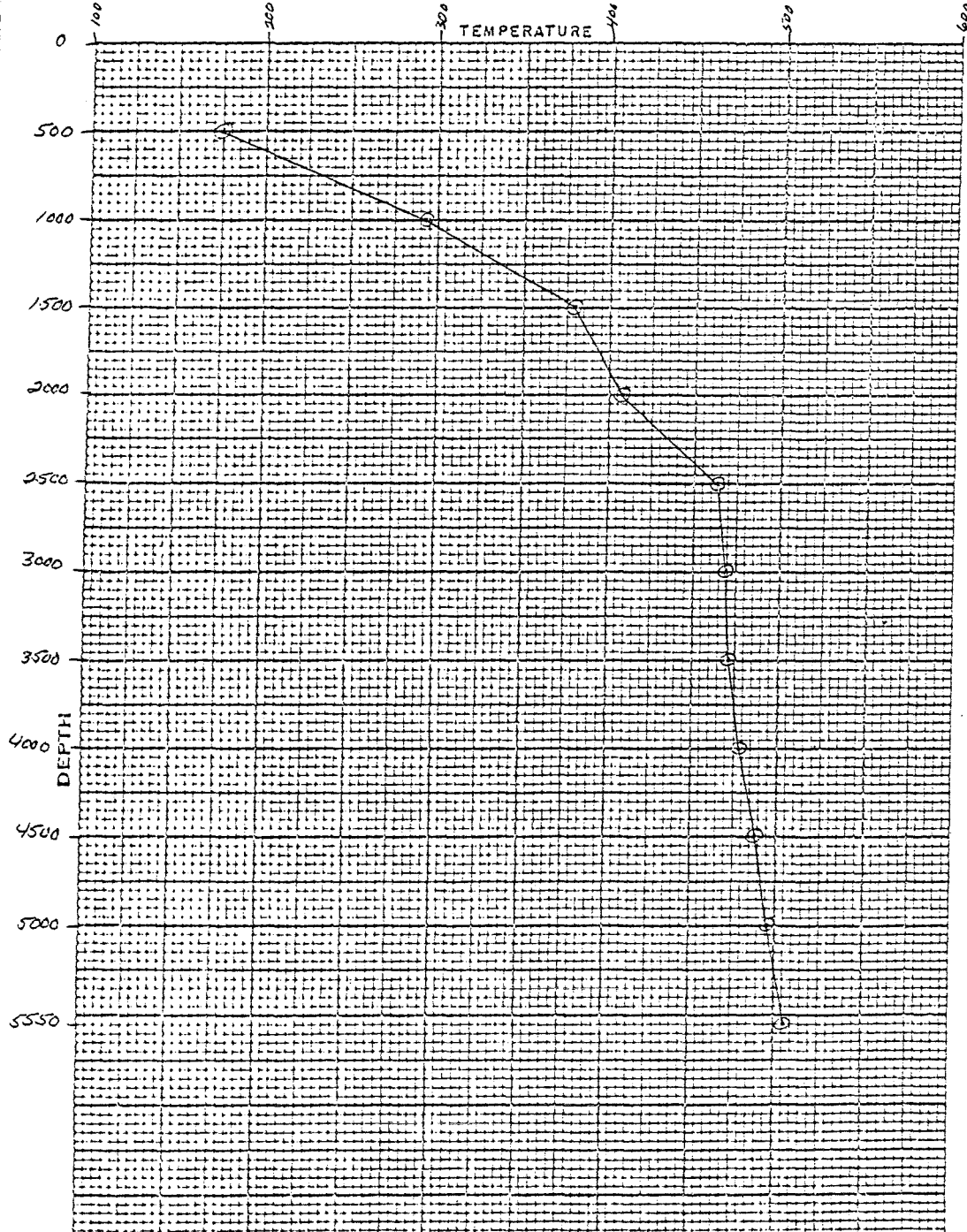
B-19 S-30 T.

OWNER UNION GEO. OF NEW MEXICO FIELD RECONADO CANYON WELL NAME BACA #19  
 CASING 20" AT 248' ; 13 3/8" AT 1504' ELZV. \_\_\_\_\_ DATE: 2-27-80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL + 12'  
7" 2338' TO 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_ INSTRUMENT 93°-618° FAH  
 SERIAL NO 10222

PURPOSE GRADIENT SURVEY MAX TEMP. 506 °F @ 5550'

REMARKS: \_\_\_\_\_



STABILIZATION PERIOD \_\_\_\_\_

PRESSURES.	GAUGE	SONG
CASING, PSI:	432	453

DEPTH	TEMP.	DEPTH	TEMP.
0	NR		
500	175		
1000	293		
1500	340		
2000	406		
2500	464		
3000	464		
3500	471		
4000	478		
4500	488		
5000	496		
5550	506		

76

# GEO THERMAL DIVISION

## SUBSURFACE PRESSURE SURVEY

B-19 S-30 P

OWNER UNION GEO. OF NEW MEXICO FIELD PEROWHO CANYON WELL NAME BACA #19  
 CASING 20" AT 248' ; 13 3/8" AT 1504' ELEV. \_\_\_\_\_ DATE: 2-27-80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL + 12'  
7" 2338' TO 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_

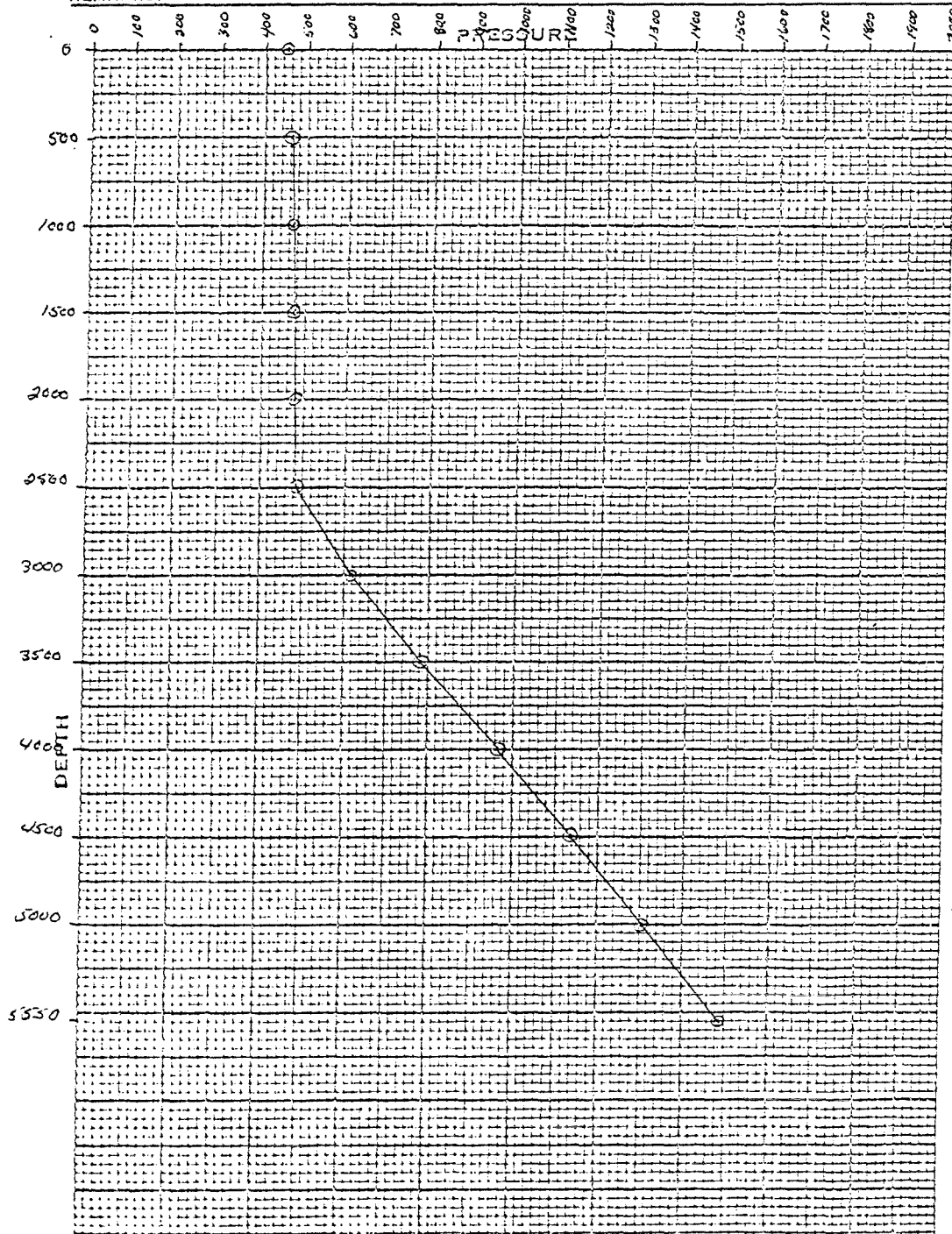
INSTRUMENT 0-4650 PSI  
 SERIAL NO. 9222

PURPOSE GRADIENT SURVEY

MAX. TEMP 506 °F @ 5550'

REMARKS:

STABILIZATION PERIOD



PRESSURE	GAUGE	DEPTH
CASING, PSI	432	453
DEPTH	PRESSURE	GRADIENT
0	453	—
500	463	.020
1000	472	.018
1500	477	.010
2000	481	.005
2500	484	.006
3000	619	.270
3500	792	.346
4000	967	.350
4500	1140	.346
5000	1306	.332
5500	1483	.331

76

UNION

R.O. ENGBRETSSEN

MAR 7 1980

GEO THERMAL DIVISION

SUBSURFACE SURVEY B-19 S-31 P/T  
Field Work Sheet

OWNER UNION GEO. OF NEW MEXICO FIELD REDWOOD CANYON WELL NAME BKA #19  
 CASING 10" AT 248' 13 3/4" AT 1504' ELEV. 9117' DATE: 3-5-80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL +12'  
 7" 2338' TO 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE GRADIENT SURVEY

REMARKS:

ELEMENT-O-4650 PSI SN-9222 CLOCK-12 HR 15-TURN  
 ELEMENT 93°-618° F SERIAL NO. 10222 CLOCK-12 HR 15-TURN STABILIZATION PERIOD  
 ENGAGE STYLUST-0854 P.0855 DISENGAGE STYLUST-1209 P.1208  
 WELL HEAD 429 PSI AT 0930 HRS.  
 PICKUP @ 5550' TIME ON BOTTOM 1129-1139 HRS. MAX. °F 507° AT 5550'  
 WELL STATUS SHUT IN  
 SHUT IN: 12-10-79 1845 HRS. ON PRODUCTION:  
 RATE

PRESSURE						TEMPERATURE											
TIME	DEPTH	DEFL.	P-°	GRAD.	CORR/D	TIME	DEPTH	DEFL.	°-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0938	0	.189	451	—	-.004	0938	0	NR	—	—							
0949	500	.193	463	.024	-.003	0949	500	.250	176	—							
1000	1000	.194	467	.008	-.002	1000	1000	.632	294	.236							
1011	1500	.195	474	.014	0	1011	1500	.932	381	.174							
1022	2000	.198	484	.020	+0.001	1022	2000	1.076	408	.054							
1033	2500	.198	484	0	+0.001	1033	2500	1.236	465	.114							
1044	3000	.256	621	.274	+0.002	1044	3000	1.251	469	.008							
1055	3500	.330	797	.352	+0.003	1055	3500	1.262	472	.006							
1106	4000	.403	970	.346	+0.004	1106	4000	1.288	479	.014							
1117	4500	.476	1143	.346	+0.005	1117	4500	1.328	489	.020							
1128	5000	.548	1311	.336	+0.005	1128	5000	1.365	497	.016							
1139	5550	.625	1491	.327	+0.005	1139	5550	1.406	507	.018							

COMMENTS:

C.C. P. A. King 3/7/80



# GEO THERMAL DIVISION MAR 7 1980

SUBSURFACE PRESSURE SURVEY B-19 S-31 P.

76

OWNER UNION GEO OF NEW MEXICO FIELD RECONDO CANYON WELL NAME Becca #19  
 CASING 20" @ 248'; 13 3/4" @ 1504' ELEV. 9117' DATE: 3/5/80  
 LINER DESCRIPTION: 4 3/8" Surface to 2480' ZERO POINT 66+12'  
7" 2333' to 5545' DEPTH 5585'

HOLE DESCRIPTION:

INSTRUMENT 0-4650 PSI

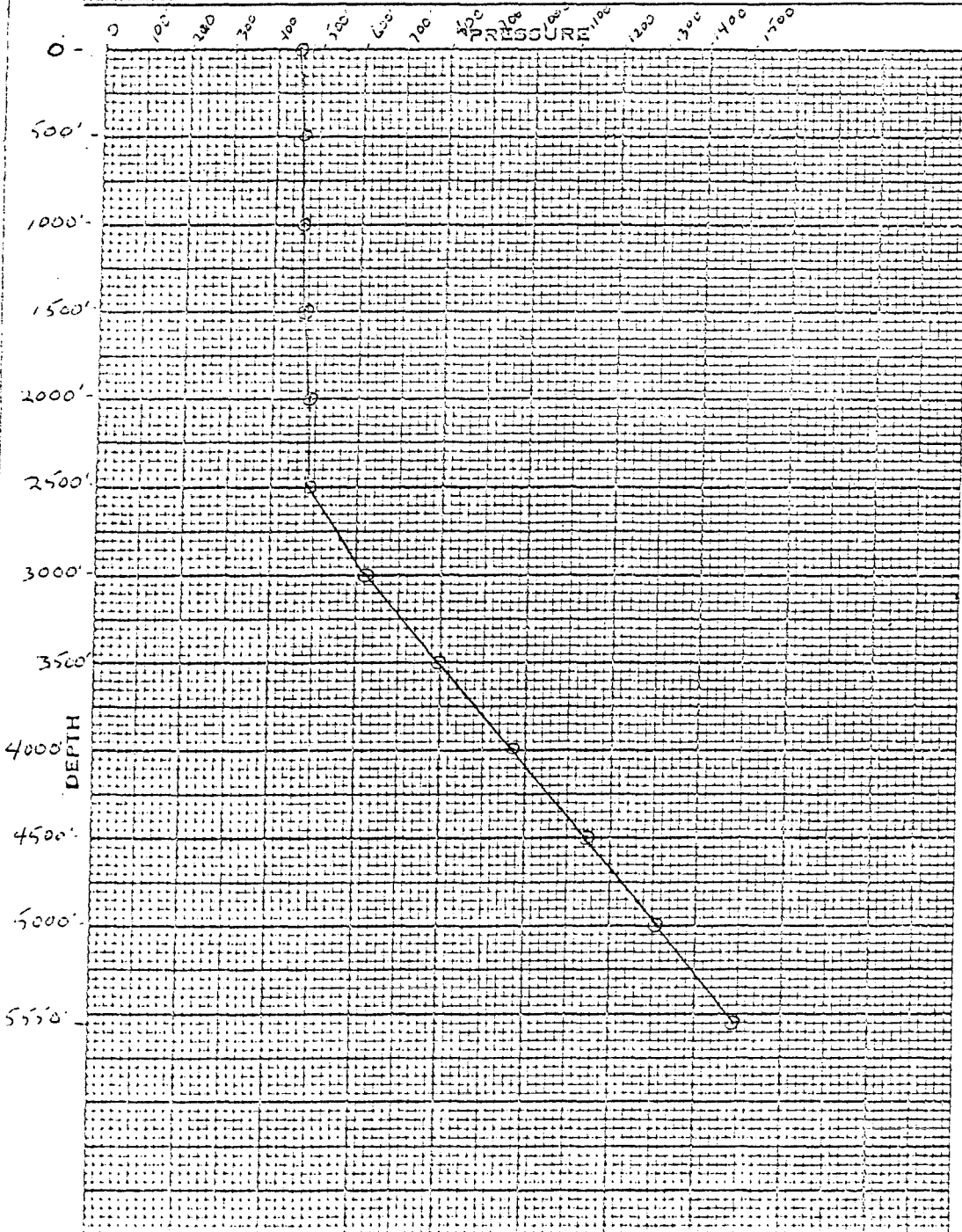
SERIAL NO. 9222

PURPOSE Gradient Survey

MAX. TEMP 507 °F @ 5550'

REMARKS:

STABILIZATION PERIOD



PRESSURE	GAUGE	BO"PS
	429	451

DEPTH	PRESSURE	GRADIENT
0	451	-
500	463	.024
1000	467	.003
1500	474	.014
2000	484	.020
2500	494	0
3000	621	.274
3500	797	.352
4000	970	.346
4500	1143	.346
5000	1311	.336
5550	1491	.327

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## GEOTHERMAL DIVISION MAR 7 1980

### SUBSURFACE TEMPERATURE SURVEY

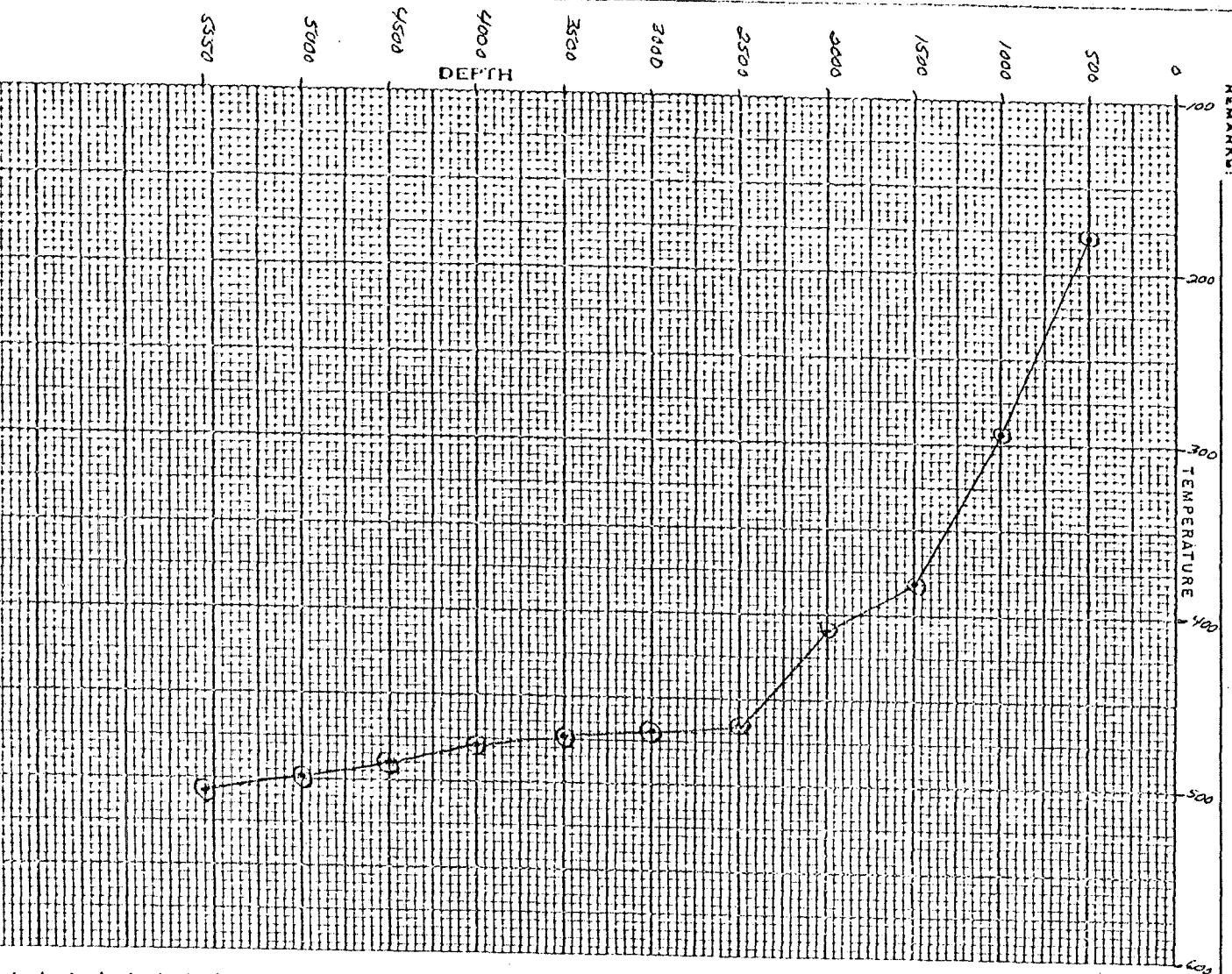
8-19 . 5-31 T.

R.O. ENGERBETSEN

OWNER UNIONISED DE NEW MEXICO FIELD REDWOOD CANYON WELL NAME BPCC #19  
 CASING 50" AT 244' 13 3/8" AT 1504' ELEV. 9117' DATE: 3-5-80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL + 12'  
7" 2338' TO 5585' DEPTH: 5585'

HOLE DESCRIPTION: \_\_\_\_\_  
 INSTRUMENT 93° 615° FAH  
 SERIAL NO 10222  
 MAX TEMP. 50.7 °F @ 5550'

PURPOSE GRADIENT SURVEY  
 REMARKS: \_\_\_\_\_



STABILIZATION PERIOD \_\_\_\_\_

DEPTH	TEMP.	DEPTH	TEMP.
500	176		
1000	894		
1500	381		
2000	408		
2500	465		
3000	469		
3500	472		
4000	479		
4500	489		
5000	497		
5550	507		

DEPTH	TEMP.	DEPTH	TEMP.
500	176		
1000	894		
1500	381		
2000	408		
2500	465		
3000	469		
3500	472		
4000	479		
4500	489		
5000	497		
5550	507		

# 76

# UNION

R.O. ENGBRETSSEN

MAR 20 1980

## GEOHERMAL DIVISION

SUBSURFACE SURVEY

Field Work Sheet

B-19 S-32 P/1

OWNER UNION GEOTHERMAL CO. FIELD REDONDO CANYON WELL NAME BACA #19  
 CASING 20" AT 248' 13 3/8" AT 1504' ELEV. 9117' DATE: 3/13/80  
 LINER DESCRIPTION: 1 9/8" SURFACE TO 2480' ZERO POINT 66 + 12'  
7" 2338' TO 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE GRADIENT SURVEY

REMARKS:

ELEMENT - 0-4700 SN 14191 CLOCK 12 HR 15 TURN

ELEMENT 93'-618' SERIAL NO. 10222 CLOCK 12 HR 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-0854 T-0855 DISENGAGE STYLUS P-1208 T-1209

WELL HEAD 431 P510 @ 0910 HRS

PICKUP @ 5550' TIME ON BOTTOM 1109-1119 MAX. °F 508 °F @ 5550'

WELL STATUS SHUT IN

SHUT IN: 12-10-79 1845 HRS ON PRODUCTION:

RATE

PRESSURE

TEMPERATURE

TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0918	0	.185	465	—	NC	0918	0	NR	NR	—							
0929	500	.190	477	.024	NC	0929	500	.260	174	—							
0940	1000	.193	485	.016	NC	0940	1000	.634	295	.232							
0951	1500	.194	487	.004	NC	0951	1500	.430	381	.172							
1002	2000	.190	492	.010	NC	1002	2000	1.030	409	.056							
1013	2500	.197	495	.006	NC	1013	2500	1.238	465	.112							
1024	3000	.250	621	.252	-.003	1024	3000	1.253	469	.008							
1035	3500	.323	795	.348	-.003	1035	3500	1.263	472	.006							
1046	4000	.376	969	.348	-.002	1046	4000	1.292	480	.016							
1057	4500	.471	1147	.356	-.002	1057	4500	1.332	489	.018							
1108	5000	.541	1313	.332	-.001	1108	5000	1.369	498	.018							
1119	5550	.618	1495	.331	0	1119	5550	1.412	508	.018							

COMMENTS:

# 76

## GEO THERMAL DIVISION SUBSURFACE TEMPERATURE SURVEY

R.O. ENGBREITSEN

MAR 20 1980

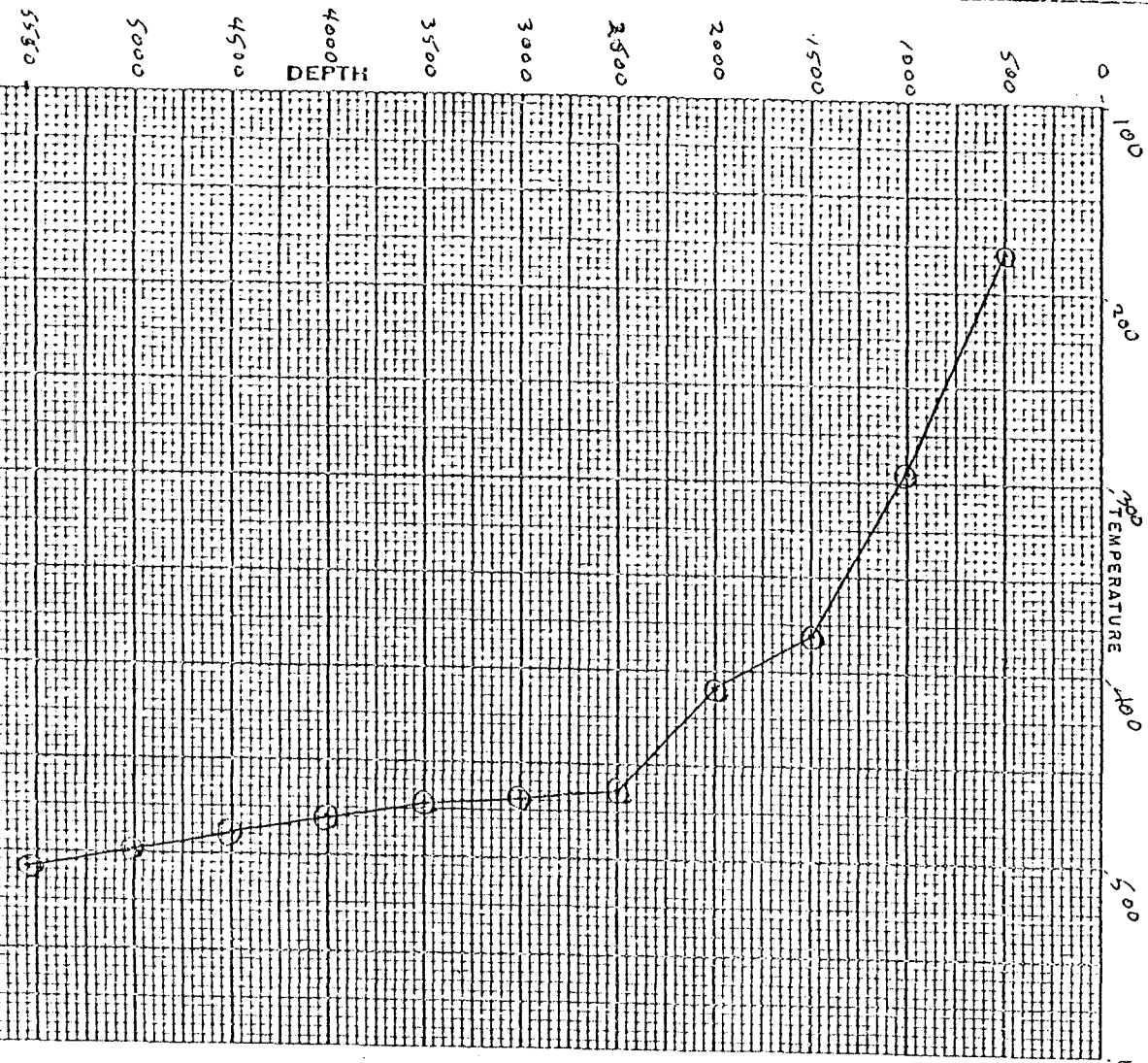
OWNER LINER GEN. OF NEW MEXICO FIELD REDONDO CANY WELL NAME DACA #19  
CASING 20" AT 248' '13 3/8" AT 1504' ELEV. 9112'  
LINEAR DESCRIPTION: 2 3/8" SURFACE TO 2480' DATE: 3-13-80  
7" 2338' TO 5585' ZERO POINT GL + 12'  
DEPTH 5585'

HOLE DESCRIPTION:

INSTRUMENT 93°-618° FAX  
SERIAL NO 102222

PURPOSE GRAVIMETRY SURVEY MAX TEMP 508 °F @ 5550

REMARKS: \_\_\_\_\_ 10° STABILIZATION PERIOD \_\_\_\_\_



DEPTH	TEMP.	DEPTH	TEMP.
0	-		
500	179		
1000	295		
1500	381		
2000	409		
2500	465		
3000	469		
3500	472		
4000	480		
4500	489		
5000	498		
5580	508		

PRESSURE	GAUGE	2000
CASING PSI	431	465

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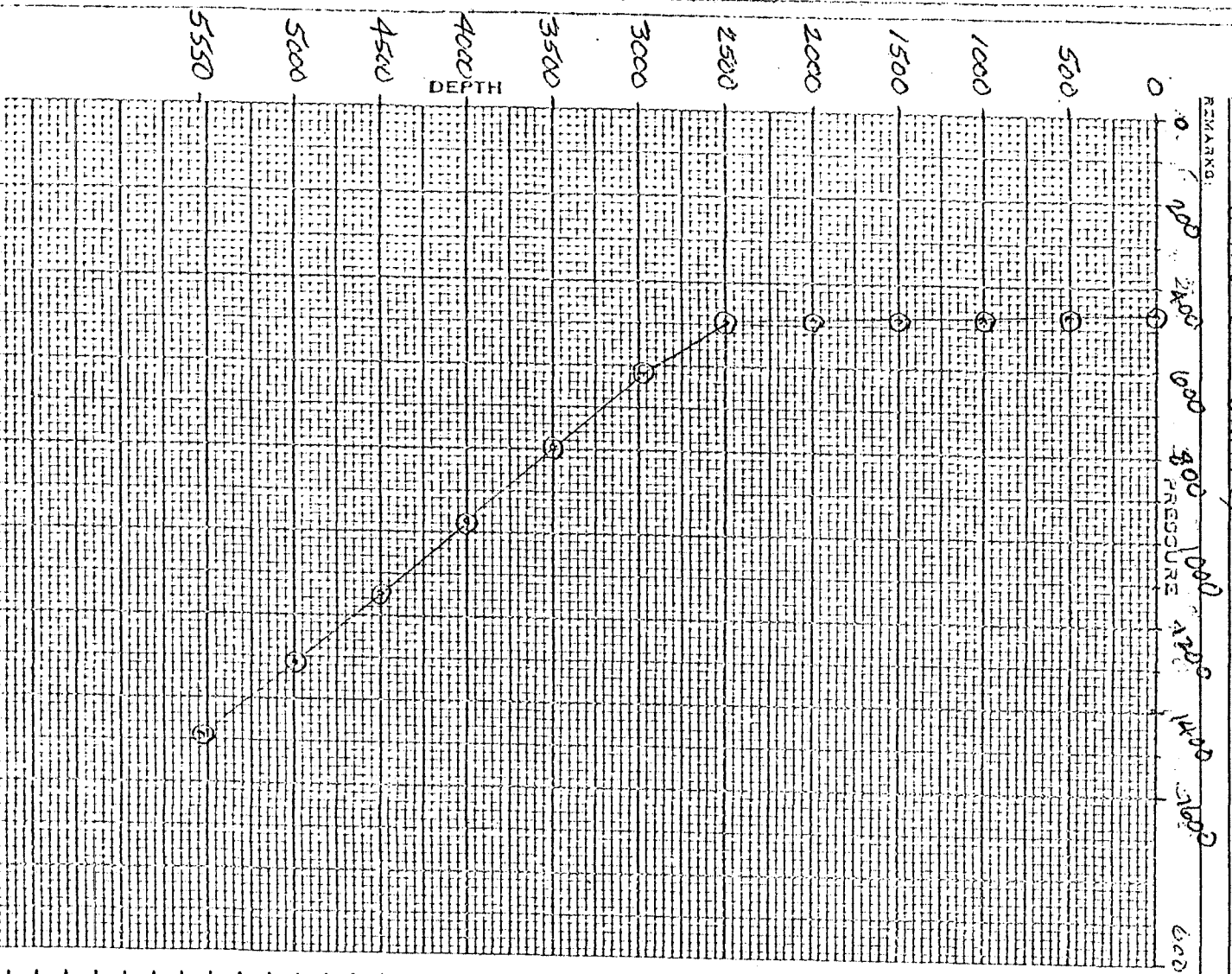
GEOTHERMAL DIVISION  
SUBSURFACE PRESSURE SURVEY

R.D. ENGBERTSEN  
MAR 20 1980

OWNER UNION G.CO. OF NEW MEXICO FIELD REDONDO CAMP WELL NAME RACA #19  
CASING 20" AT 288', 13 3/8" AT 1504' ELEV. 9117' DATE: 3-13-80  
LINEAR DESCRIPTION: 959" SURFACE TO 2480' ZERO POINT GL T1A'  
7" 2338 TO 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_ INSTRUMENT 0-4700 PS

REMARKS: GADGET SURVEY SERIAL NO 14191  
Not Checked MAX TEMP 508 OF @ 5550



DEPTH	PRESSURE	GRADIENT
0	415	-
500	477	.024
1000	485	.016
1500	487	.004
2000	492	.010
2500	495	.006
3000	621	.252
3500	795	.348
4000	969	.348
4510	1147	.356
5000	1313	.332
5550	1495	.331

John Thomson Aldo Kinschick

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UNION

GEO THERMAL DIVISION

BACA-19 S-33 P/T

SUBSURFACE SURVEY

Field Work Sheet

OWNER: UNION GEO. OF NEW MEXICO FIELD REDONDO CANYON WELL NAME: BACA-19  
 CASING: 20" AT 248' } 13 3/8" AT 1504' ELEV. 9117' DATE: 3-26-80  
 LINER DESCRIPTION: 9-5/8" SURFACE TO 2480' ZERO POINT: 66 + 12'  
 7" 2338' TO 5585' DEPTH: 5585'

TUBING DETAIL:

PURPOSE: GRADIENT SURVEY

REMARKS:

ELEMENT: O-4700 RSE SN-14191 CLOCK 12 HR. 15-TURN  
 ELEMENT 93°-618°E SERIAL NO. 10222 CLOCK 12 HR. 15-TURN STABILIZATION PERIOD  
 ENGAGE STYLUS P-0647 T-0646 DISENGAGE STYLUS P-0956 T-0954  
 WELL HEAD 443 P.S.I. AT 0715 HRS.  
 PICKUP @ 5550' TIME ON BOTTOM 0911-0921 MAX. P.S.I. AT 5550'  
 WELL STATUS SHUT IN  
 SHUT IN: 12-10-79 1845 HRS ON PRODUCTION:  
 RATE

PRESSURE

TEMPERATURE

PRESSURE						TEMPERATURE											
TIME	DEPTH	DEFL.	P. T	GRAD.	CORR'D	TIME	DEPTH	DEFL.	P. T	GRAD.	ID	TIME	DEPTH	DEFL.	P. T	GRAD.	ID
0720	0	.184	462	*	NC	0720	0	N.R.	—	—							
0731	500	.190	477	*	NC	0731	500	.251	176	—							
0742	1000	.193	485	*	NC	0742	1000	.438	294	.240							
0753	1500	.195	490	*	NC	0753	1500	.937	383	.174							
0804	2000	.197	495	*	NC	0804	2000	1.036	410	.054							
0815	2500	.196	492	*	-.004	0815	2500	1.240	466	.112							
0826	3000	.253	629	*	-.003	0826	3000	1.255	470	.008							
0837	3500	.325	800	*	-.003	0837	3500	1.266	473	.006							
0848	4000	.398	974	*	-.002	0848	4000	1.296	481	.016							
0859	4500	.469	1142	*	-.002	0859	4500	1.336	490	.018							
0910	5000	.540	1310	*	-.001	0910	5000	1.375	500	.020							
0921	5550	.621	1502	*	0	0921	5550	1.419	510	.018							

COMMENTS:

\* THIS INSTRUMENT DOES NOT PROVIDE FOR CORRECTIONS BELOW 500 P.S.I.G.



# GEOTHERMAL DIVISION

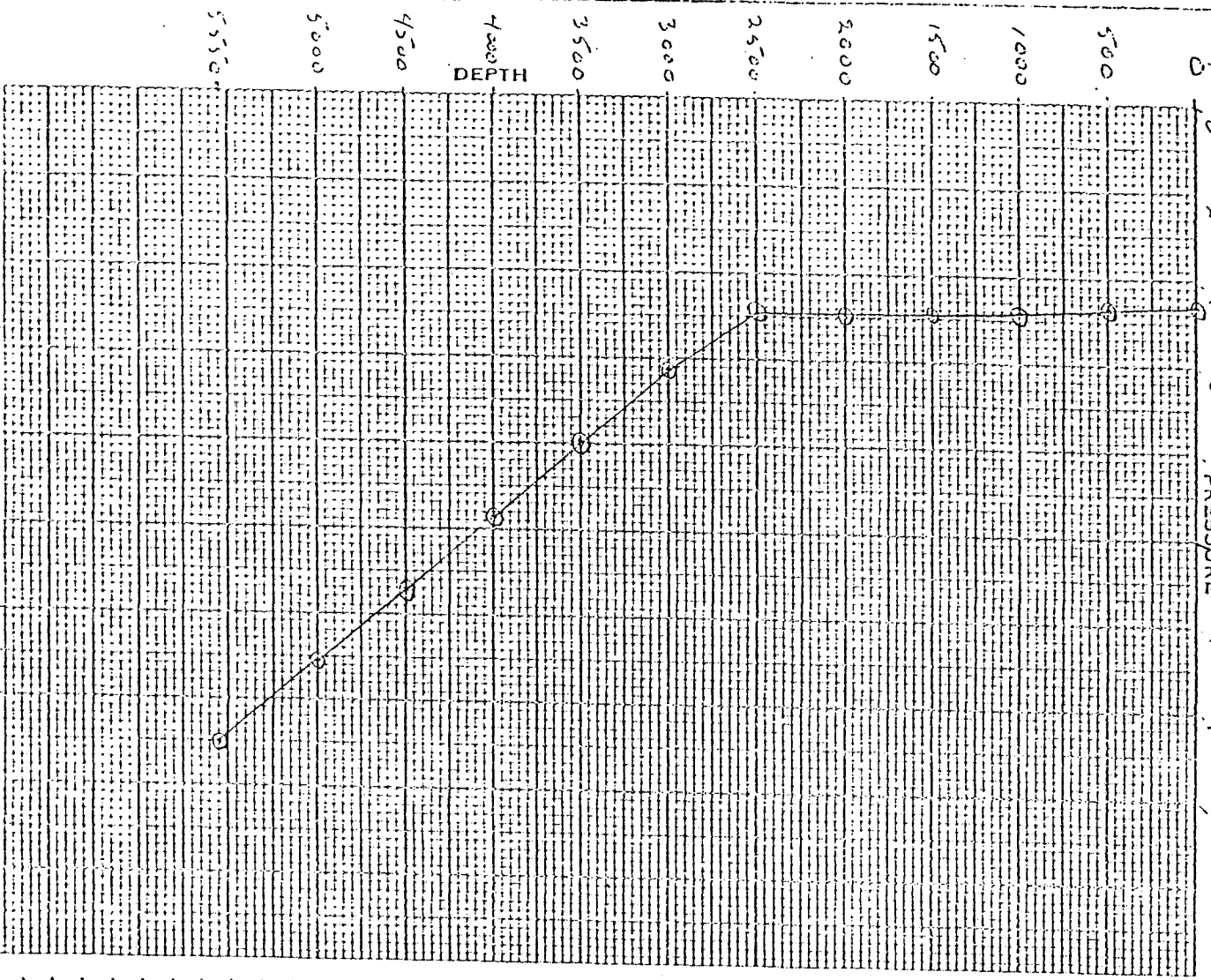
## SUBSURFACE PRESSURE SURVEY

B. 19 S-33 P

OWNER Union Geothermal. W.M. FIELD Redondo WELL NAME Baca #19  
 CASING 20" @ 244' + 1378" @ 1504' ELEV. 9117' DATE: 3/26/80  
 LINER DESCRIPTION: 9 3/4" SURFACE TO 2440' ZERO POINT 1.6712'  
7" 2338' TO 5545' DEPTH 5545'

HOLE DESCRIPTION: \_\_\_\_\_  
 INSTRUMENT 0-700  
 SERIAL NO 14191

PURPOSE Gradient Survey preceding flow test #2 MAX TEMP 510 °F @ 5500  
 REMARKS: This instrument does not provide for corrections below 500 psig.  
 STABILIZATION PERIOD \_\_\_\_\_



PRESSURES	GAUGE	GRADIENT
CASING PSI	443	462
DEPTH	PRESSURE	GRADIENT
0	462	
500	477	
1000	485	
1500	490	
2000	495	
2500	497	
3000	498	
3500	800	
4000	974	
4500	1142	
5000	1310	
5500	1502	

# 76

## GEO THERMAL DIVISION SUBSURFACE TEMPERATURE SURVEY

OWNER UNION GEO. OF NEW MEXICO FIELD BEAVER CANYON WELL NAME BACA #19  
CASING 20" AT 248', 13 1/8" AT 1504' ELEV. 9117' DATE: 3-26-80  
LINER DESCRIPTION: 0.58" SUREAL TO 2480' ZERO POINT 62 + 12'  
7" 2338' TO 5585' DEPTH 5585'

HOLE DESCRIPTION:

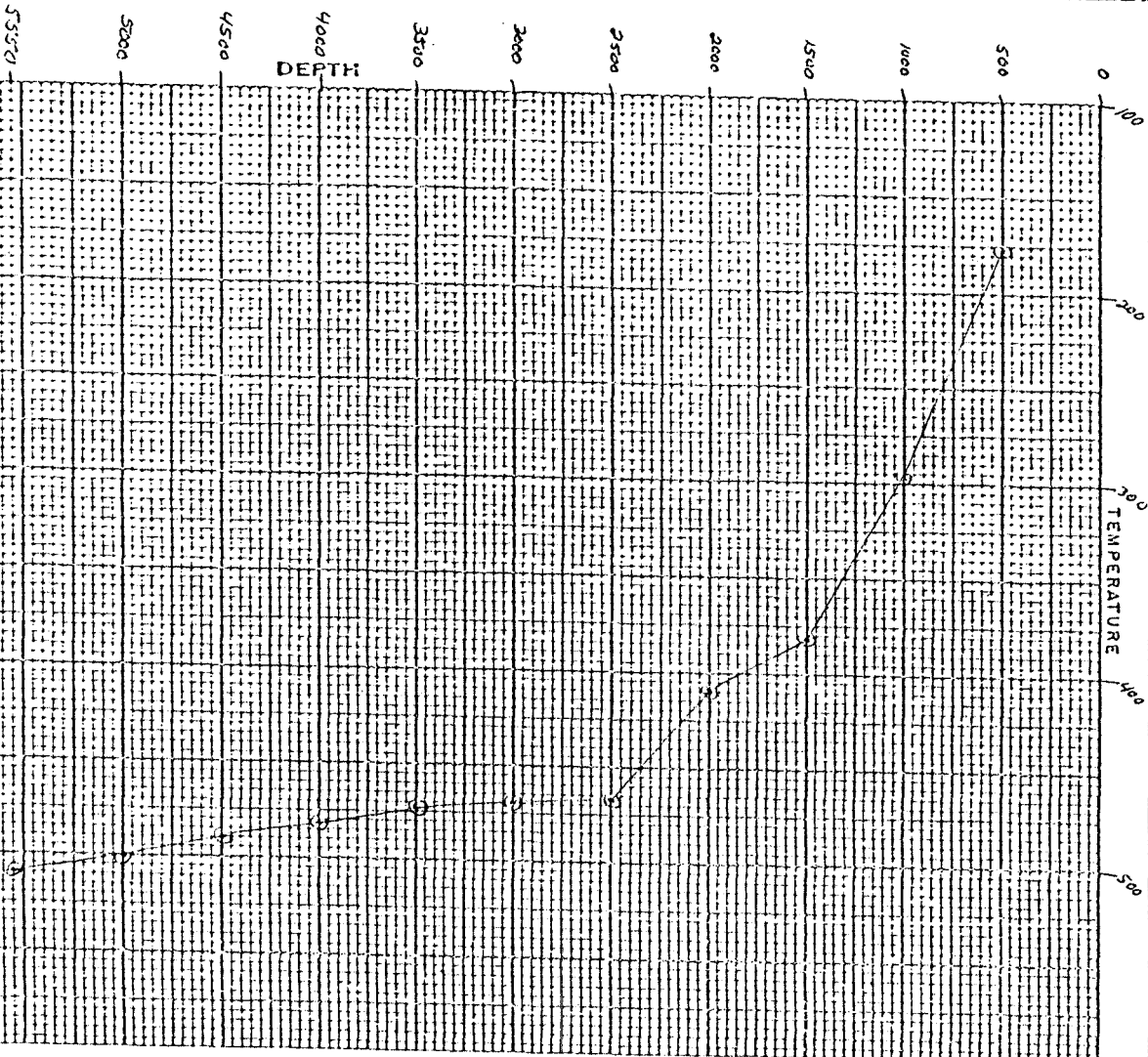
INSTRUMENT 93° - 618' FAT  
SERIAL NO 108282

PURPOSE GRADEBIT SURVEY

MAX TEMP 57.0 °F @ 5550'

REMARKS:

STABILIZATION PERIOD



DEPTH	TEMP.	DEPTH	TEMP.
0	50		
500	51		
1000	52		
1500	53		
2000	54		
2500	55		
3000	56		
3500	57		
4000	57		
4500	57		
5000	57		
5500	57		



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R.O. ENGBRETSEN  
MAY 16 1980



GEO THERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

B-19 S-34 P/T

OWNER UNION GEO. OF NEW MEXICO FIELD REDONDO CANYON WELL NAME BACA #19  
 CASING 20" AT 248' ; 13 3/8" AT 1504' ELEV. 9117' DATE: 5-14-80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT BL +12'  
7" - 2328' TO 5585' DEPTH 5585'

TUBING DETAIL:

PURPOSE PIT BUILDUP

REMARKS:

ELEMENT - 0-4700 PSI SN-14191 CLOCK - 12hr 15 TURN  
 ELEMENT 93°-618°f SERIAL NO. 10222 CLOCK 12hr 15 TURN STABILIZATION PERIOD  
 ENGAGE SYLUS P-0644; T-0646 DISENGAGE SYLUS P-1415; T-1416  
 WELL HEAD SEE ATTACHED WHP CHART  
 PICKUP @ 5000 TIME ON BOTTOM 1252-1302 MAX. 'F 430'F @ 5550'  
 WELL STATUS SHUT IN  
 SHUT IN: 5-14-80 0707 HRS ON PRODUCTION:  
 RATE

PRESSURE TEMPERATURE

TIME	DEPTH	DEFL.	P-T	GRAD.	CORR ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0725	5000	.099	249		NC	0725	5000	.993	396								
0730	"	.141	354		NC	0730	"	.990	398								
0735	"	.184	462		NC	0735	"	.996	399								
0740	"	.217	543		-0.003	0740	"	1.000	400								
0745	"	.247	614		-0.003	0745	"	1.005	402								
0750	"	.271	671		-0.003	0750	"	1.010	403								
0755	"	.291	719		-0.003	0755	"	1.014	404								
0800	"	.305	752		-0.004	0800	"	1.018	405								
0805	"	.321	790		-0.004	0805	"	1.021	406								
0810	"	.338	831		-0.004	0810	"	1.024	407								
0815	"	.352	864		-0.004	0815	"	1.027	408								
0820	"	.363	890		-0.004	0820	"	1.030	409								
0835	"	.388	950		-0.004	0835	"	1.036	410								
0850	"	.403	986		-0.004	0850	"	1.040	411								
0905	"	.415	1014		-0.004	0905	"	1.043	412								
0920	"	.424	1036		-0.004	0920	"	1.046	413								
0935	"	.430	1050		-0.004	0935	"	1.049	414								
0950	"	.436	1064		-0.004	0950	"	1.051	414								
1020	"	.446	1098		-0.003	1020	"	1.055	415								
1050	"	.454	1107		-0.003	1050	"	1.058	416								
1120	"	.460	1121		-0.003	1120	"	1.060	417								
1145	2000	.080	201		NC	1145	2000	.956	388								
1156	2500	.107	269		NC	1156	2500	1.037	410								
1207	3000	.174	437		NC	1207	3000	1.092	425								
1218	3500	.247	614		-0.003	1218	3500	1.068	419								
1229	4000	.325	800		-0.005	1229	4000	1.091	422								
1240	4500	.399	976		-0.004	1240	4500	1.059	416								
1251	5000	.475	1156		-0.003	1251	5000	1.069	419								

GRADIENT PORTION  
OF SURVEY

COMMENTS:



# GEO THERMAL DIVISION

## SUBSURFACE SURVEY

### Field Work Sheet

B-19 5-34 PIT

OWNER UNION GEOTHERMAL CO FIELD REDONDO CANYON

WELL NAME BACA #19

CASING 20" AT 248'; 13 3/8" AT 1504' ELEV.

DATE: 5-14-80

LINER DESCRIPTION: 9 5/8" SURFACE TO 2480'  
7" 2528' TO 5585'

ZERO POINT CL+12'

DEPTH 5585'

TUBING DETAIL:

PURPOSE PIT BUILD UP

REMARKS:

ELLINGHAM D-4700 PSI SN 14191 A LOCK - 12 HR 15 TURN

ELEMENT 93"-618°F SERIAL NO. 10222 CLOCK 12 hr. 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-0644; T-0646 DISENGAGE STYLUS P-1415; T-1416

WELL HEAD SEG ATTACHED WHP CHART

PICKUP @ 5000 TIME ON BOTTOM 1252-1302 MAX. 'F 430°F @ 5550'

WELL STATUS SHUT IN

SHUT IN: 5-14-80 AT 0707 HRS ON PRODUCTION:

RATE

PRESSURE

TEMPERATURE

PRESSURE						TEMPERATURE											
TIME	DEPTH	DEFL.	P-T	GRAD.	COEFF/D	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
1302	5550	.559	1355		7.003	1302	5550	1.110	430	1.1		GRADIENT PORTION					
1320	5000	.484	1172		7.003	1320	5000	1.075	421								
1335	5000	.485	1180		7.003	1335	5000	1.075	421								

COMMENTS:

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# GEO THERMAL DIVISION

## SUBSURFACE PRESSURE SURVEY

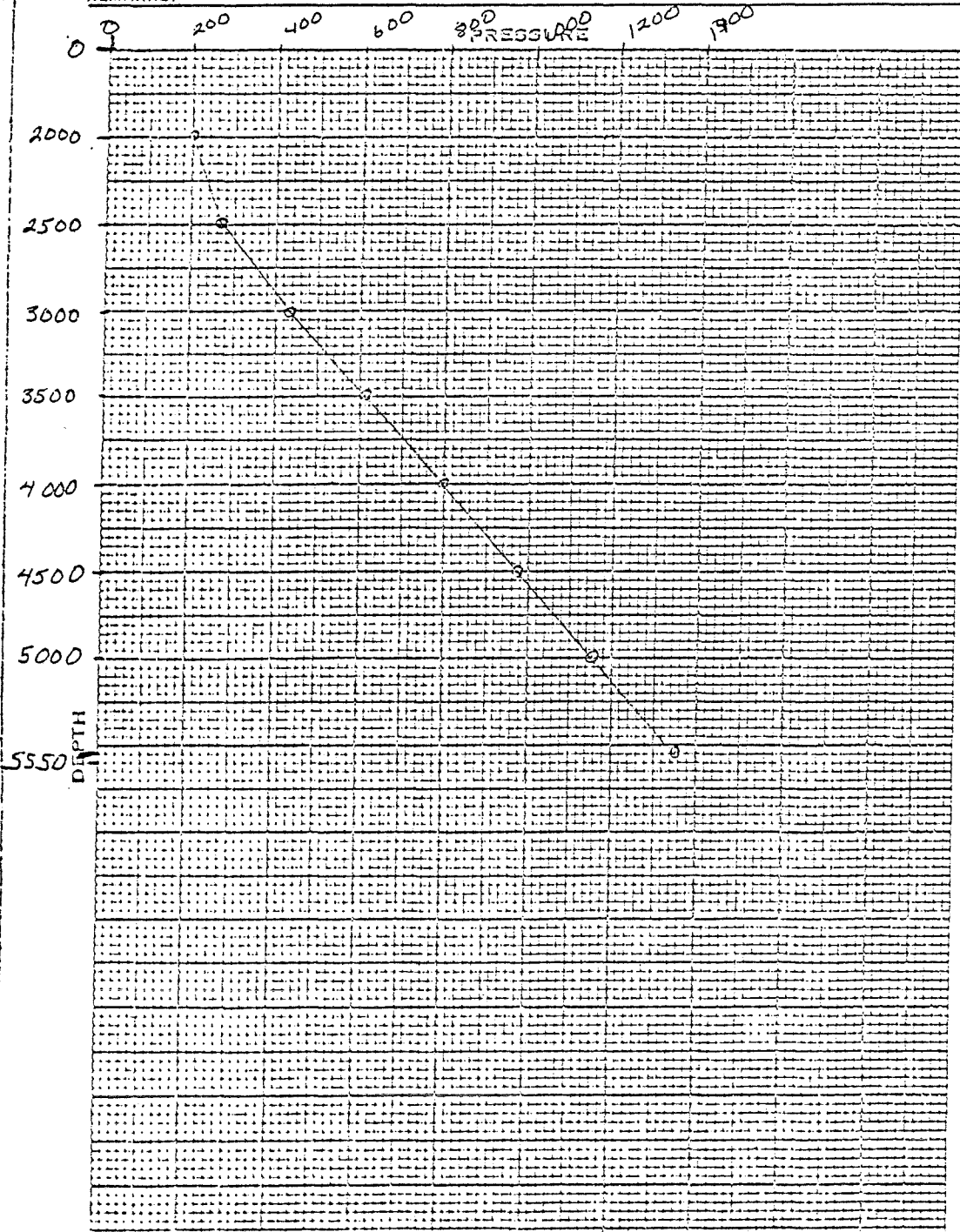
B-195-34 P

OWNER Union Geo. of New Mex FIELD Redondo WELL NAME BACA #19  
 CASING 20" @ 248' / 13 3/8" @ 1204' ELEV. 9117 DATE: 5/14/80  
 LINER DESCRIPTION: 9 5/8" @ SURFACE TO 2480 ZERO POINT GL +12  
7" 2338' to 5585 DEPTH 5585

HOLE DESCRIPTION: \_\_\_\_\_ INSTRUMENT D-4100  
 SERIAL NO. 14191

PURPOSE PIT BUILD UP MAX. TEMP 430 °F @ 5550

REMARKS:



STABILIZATION PERIOD


PRESSURE	GAUGE	BOND
CASING, PSI	—	—

DEPTH	PRESSURE	GRADIENT
2000	201	
2500	269	
3000	437	
3500	614	
4000	800	
4500	976	
5000	1156	
5550	1355	

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# GEOHERMAL DIVISION

## SUBSURFACE TEMPERATURE SURVEY

B-14 S-34 T

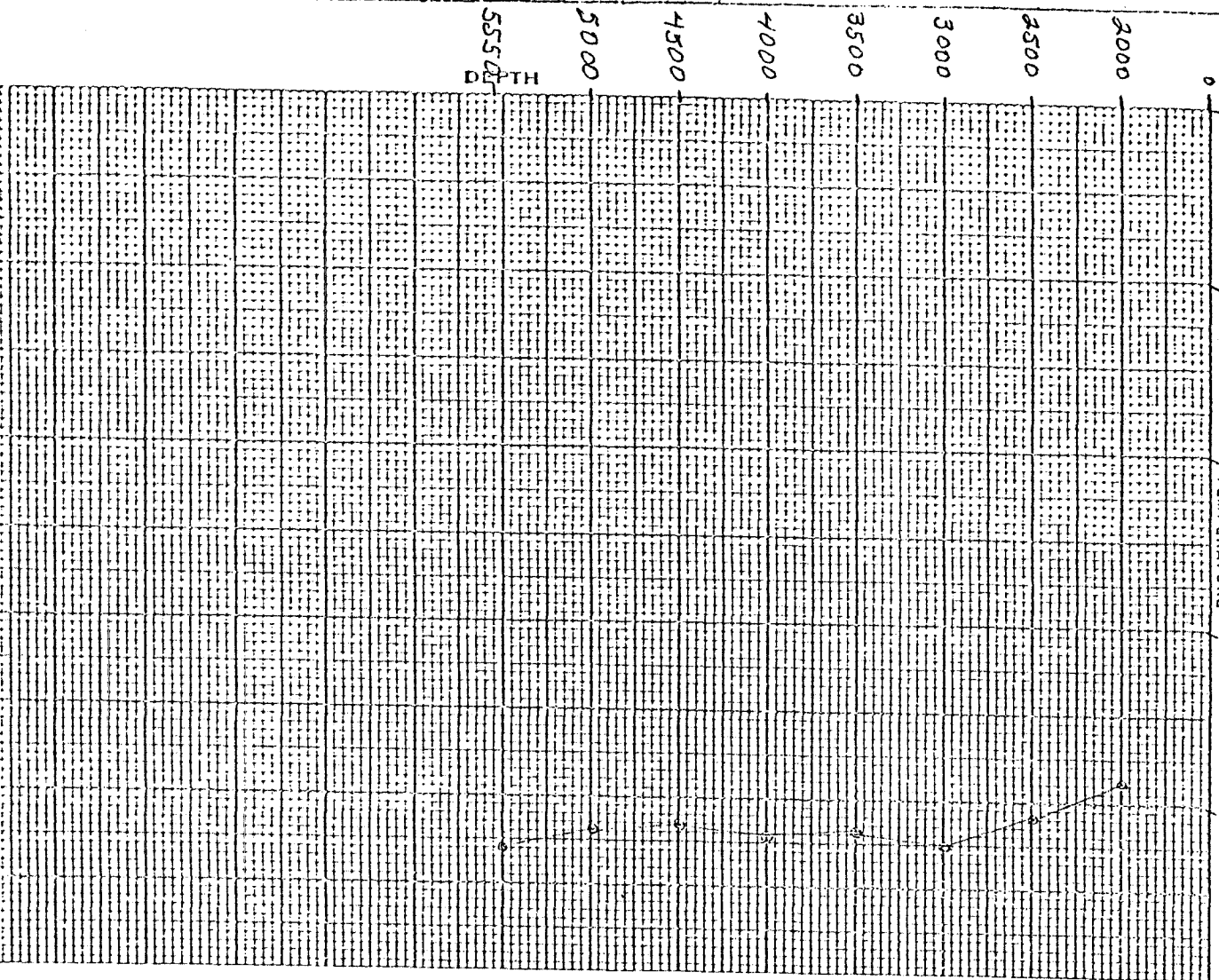
OWNER Union Geo. of New Mex. FIELD Redondo WELL NAME BACH #19  
 CASING 20" AT 248', 1338" AT 1504' ELEV. 9117 DATE: 5/14/80  
 LINER DESCRIPTION: 9 3/8" SURFACE TO 2480' ZERO POINT GL #12  
7" 2338' TO 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_  
 INSTRUMENT 930-6/18° F.S.  
 SERIAL NO 10222

PURPOSE PT Build up MAX TEMP 430 °F @ 5550

REMARKS: \_\_\_\_\_

STABILIZATION PERIOD \_\_\_\_\_



DEPTH	TEMP.	DEPTH	TEM.
2000	382		
2500	410		
3000	425		
3500	419		
4000	422		
4500	416		
5000	419		
5550	430		

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UNION

Drisk

GEO THERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet MAY 16 1980

B-19 S-35 P/T

OWNER UNION GEOTHERMAL CO NM FIELD REDONDO CANYON  
WELL NAME BACA #19  
CASING 20" AT 248', 13 1/2" AT 1504' ELEV. 9117'  
DATE: 62112' 5-15-80  
LINER DESCRIPTION: 9 5/8" SURFACE TO 2480'  
ZERO POINT 62112'  
7" 2325' TO 5585'  
DEPTH 5585'

TUBING DETAIL:

PURPOSE GRADIENT SURVEY

REMARKS:

ELEMENT- 0-4700 PSI SN - 14191 CLOCK 12 HR 15 TURN  
ELEMENT- 95°-6184 SERIAL NO. 10222 CLOCK 12 HR 15 TURN STABILIZATION PERIOD  
ENGAGE STYLUS P-0738' T-0740 DISENGAGE STYLUS P-1251' T-1252  
WELL HEAD 178 PSIC AT 0815 HRS.  
PICKUP @ 5000' TIME ON BOTTOM 1004-1014 MAX. T 450° @ 3000'  
WELL STATUS SHUT IN  
SHUT IN: 5-14-80 0707 HR ON PRODUCTION:  
RATE

PRESSURE TEMPERATURE

TIME	DEPTH	DEFL.	P-T	GRAD.	CORID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0824	500	.076	181	-	NC	0824	500	.436	235								
0835	1000	.073	183	.004	NC	0835	1000	.680	309								
0846	1500	.073	183	0	NC	0846	1500	.835	353								
0857	2000	.078	196	.026	NC	0857	2000	.919	377								
0908	2500	.149	374	.356	NC	0908	2500	1.139	438								
0919	3000	.220	550	.352	.002	0919	3000	1.181	450								
0930	3500	.292	721	.342	-.003	0930	3500	1.163	445								
0941	4000	.366	898	.354	-.003	0941	4000	1.150	441								
0952	4500	.441	1076	.356	-.003	0952	4500	1.142	439								
1003	5000	.516	1254	.356	-.003	1003	5000	1.145	440								
1014	5550	.546	1443	.344	-.002	1014	5550	1.172	447								
1016	5000	.516	1254	-	-.003	1016	5000	1.140	439								
1116	5000	.516	1254	-	-.003	1116	5000	1.145	440								
1216	5000	.516	1254	-	-.003	1216	5000	1.149	441								

COMMENTS:

OV. 1-11-80

716

# GEO THERMAL DIVISION

## SUBSURFACE PRESSURE SURVEY

OWNER Union Geo of New Mex FIELD Redondo WELL NAME BACA # 19  
 CASING 20" AT 248' ; 13 3/8" AT 1504' ELEV. 9117 DATE: 5/15/80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL + 12'  
7' 2328 TO 5585 DEPTH 5585

HOLE DESCRIPTION:

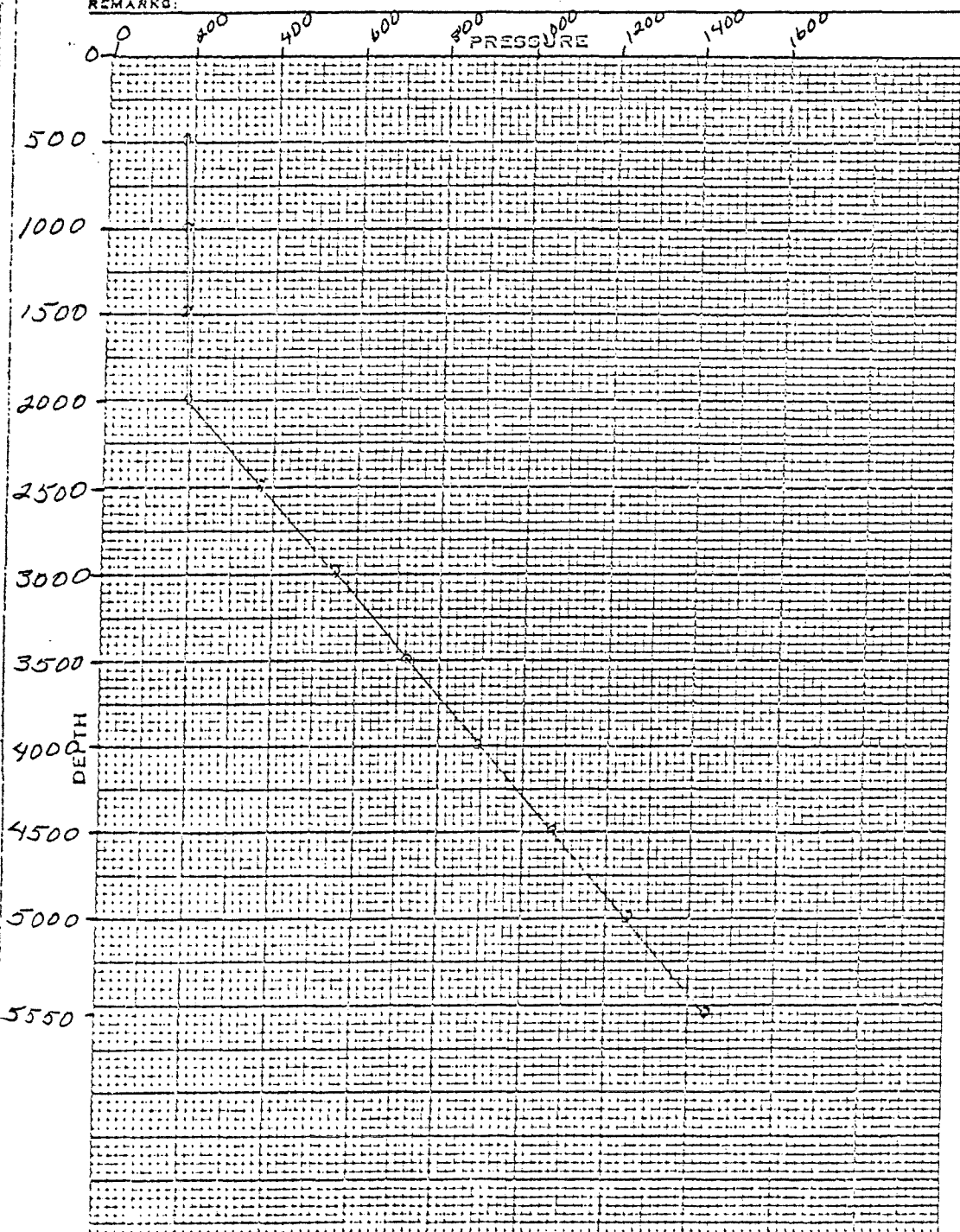
INSTRUMENT 0-4700 P  
 SERIAL NO. 14191

PURPOSE Gradient Survey

MAX. TEMP 450 °F @ 3000

REMARKS:

STABILIZATION PERIOD



PRESSURE	GAUGE	DEPTH

DEPTH	PRESSURE	GRADIENT
500	181	
1000	183	
1500	183	
2000	196	
2500	374	
3000	550	
3500	721	
4000	898	
4500	1076	
5000	1254	
5550	1443	

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# GEOTHERMAL DIVISION

## SUBSURFACE TEMPERATURE SURVEY

OWNER Union Geo. of New Mex FIELD Redondo WELL NAME BACA #19  
 CASING 20" AT 248'; 13 3/8" AT 1504' ELEV. 9117 DATE: 5/15/80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL+12'  
7" 2328 TO 5585' DEPTH 5585

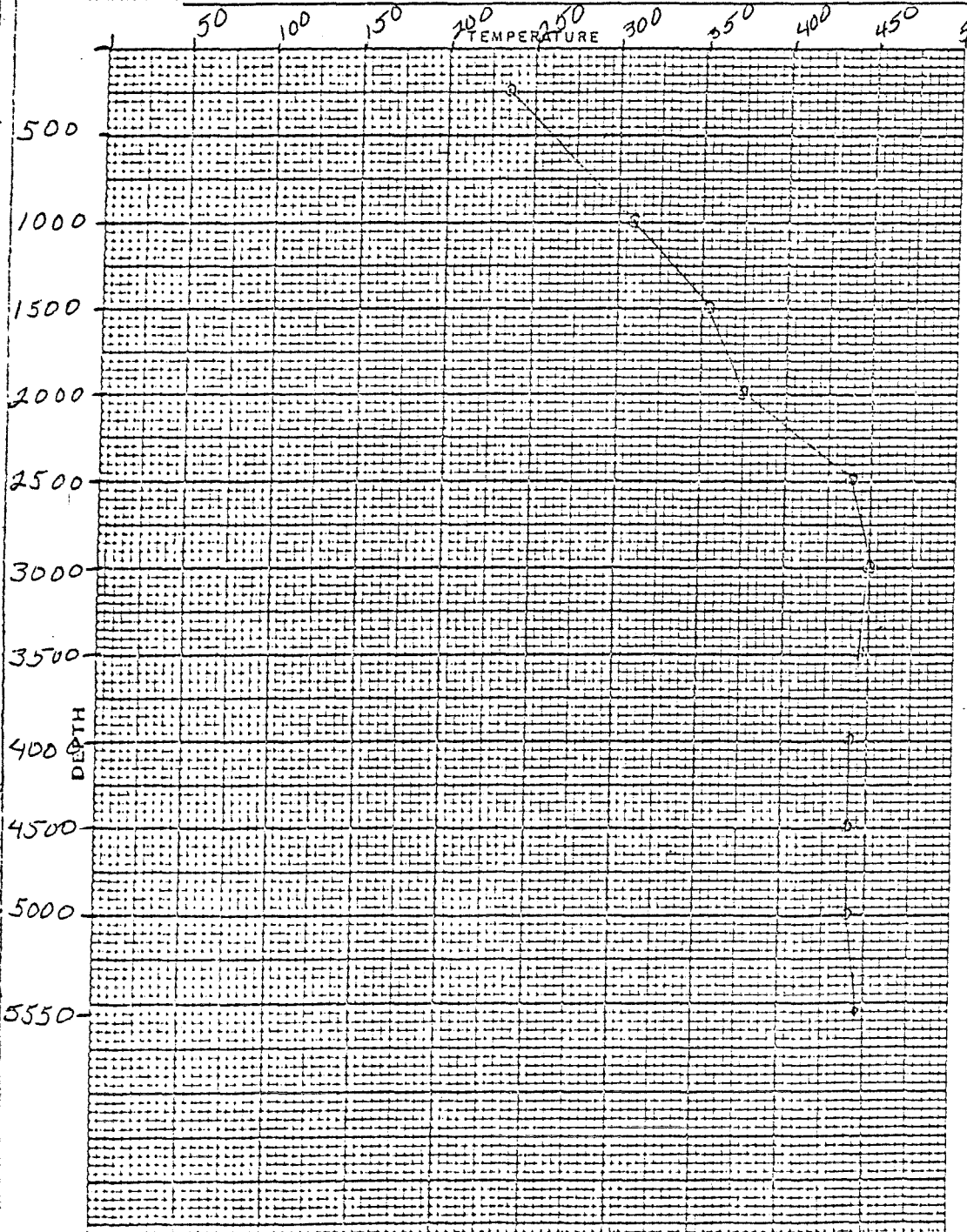
HOLE DESCRIPTION: \_\_\_\_\_

INSTRUMENT 930-618 SERIAL NO 10222

PURPOSE Gradient Survey

MAX TEMP. 450 °F @ 3000

REMARKS: \_\_\_\_\_



STABILIZATION PERIOD \_\_\_\_\_

PRESSURES: \_\_\_\_\_ GAUGE \_\_\_\_\_ COR: \_\_\_\_\_  
 CASING PSI: \_\_\_\_\_

DEPTH	TEMP.	DEPTH	TEMP.
500	235		
1000	309		
1500	353		
2000	377		
2500	438		
3000	450		
3500	445		
4000	441		
4500	439		
5000	440		
5550	447		

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UNION

GEO THERMAL DIVISION

SUBSURFACE SURVEY  
Field Work Sheet

R.O. ENGBRETSSEN

MAY 16 1980  
8-19 5-36 P/7

OWNER Union Geo. of New Mex FIELD Redondo Canyon

WELL NAME BACA #19

CASING 20" AT 248'; 13 3/8" AT 1504 ELEV. 9117

DATE: 5/16/80

LINER DESCRIPTION: 9 3/8" SVA face to 5585  
7" 2328 to 5585

ZERO POINT GL + 12'

DEPTH 5585

TUBING DETAIL:

PURPOSE Gradient Survey

REMARKS:

Element 0-4700 SN 14191 Clock 12hr 15 TURN

ELEMENT 93°-618° SERIAL NO. 10222 CLOCK 12hr 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-0753 T-0751 DISENGAGE STYLUS P-0958 T-0958

WELL HEAD 215 PSI AT 0818

PICKUP @ 5000 TIME ON BOTTOM 0826-0926 MAX. °F

WELL STATUS - shut in

SHUT IN: 5/14/80 0707 hr. ON PRODUCTION:

RATE

Pressure

Temperature

Pressure					Temperature												
TIME	DEPTH	DEFL.	P-T	GRAD.	COR ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
0826	5000	.520	1263		-003	0826	5000	1.174	448								
0856	5000	.520	1263		-003	0856	5000	1.175	448								
0926	5000	.520	1263		-003	0926	5000	1.175	448								

COMMENTS:







R.O. ENGBREITSEN  
MAY 19 1980

# Union Geothermal Co. of New Mexico B-19 S-38 P/T

SURVEY DATE: 5-18-80

TITLE BACA #19 SURVEY #38 BUILDUP GRADIENT

TEMP. EL. S/N : 10222 PRESS. EL. S/N : 14191  
 RANGE : 93°f - 618°f RANGE : 0-4700 PSI  
 CALIBRATED : 10-10-76 CALIBRATED : 1-24-77  
 CLOCK: 12 HRS. : S/N: 14089 CLOCK: 12 HRS. : S/N: 14090

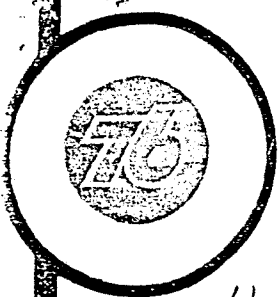
WHP AT START OF SURVEY : 0902 HRS 284 PSIG 0-300 T/C  
 WHP AT END OF SURVEY : 1112 HRS 285 PSIG 0-300 T/C  
 OPENED WELL TO ELEMENT : 0852 HRS HRS.  
 POH : 1122 HRS HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY  
       MOS., 4 DAYS, 1 HRS., 50 MINS.

DATE AND TIME OF LATEST S. I. (ET. NO.       ) 0707 HRS. 5-14 1980

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	500	0902-0912	.364	213	.123	.123	309	
2	1000	0913-0923	.639	296	.124	.124	312	
3	1500	0924-0934	.873	364	.124	.124	312	
4	2000	0935-0945	1.075	421	.124	.124	312	
5	2500	0946-0956	1.174	448	.164	.164	412	
6	3000	0957-1007	1.220	460	.236	.233	581	
7	3500	1008-1018	1.205	456	.309	.306	755	
8	4000	1019-1029	1.196	454	.383	.380	931	
9	4500	1030-1040	1.192	453	.456	.453	1104	
10	5000	1041	1.202	455	.529	.527	1280	
10	5000	1111	1.203	456	.529	.527	1280	
11	5550	1112-1122	1.243	467	.607	.606	1467	

J. Bowen  
J. Thomson



# Union Geothermal Co. of New Mexico

R.O. ENGBRETSSEN  
MAY 19 1980

## SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

B-19 = 38 P

OWNER Union Geothermal - N.M. FIELD Redondo Canyon WELL NAME Bacc # 19  
 CASING 20" @ 248'; 13 3/8" @ 1504 ELEV. 9117 DATE: 5/18/80  
 LINER DESCRIPTION: 9 5/8" Surface to 2480' ZERO POINT CL + 12'  
7" 2338' to 5585' DEPTH 5585'

HOLE DESCRIPTION:

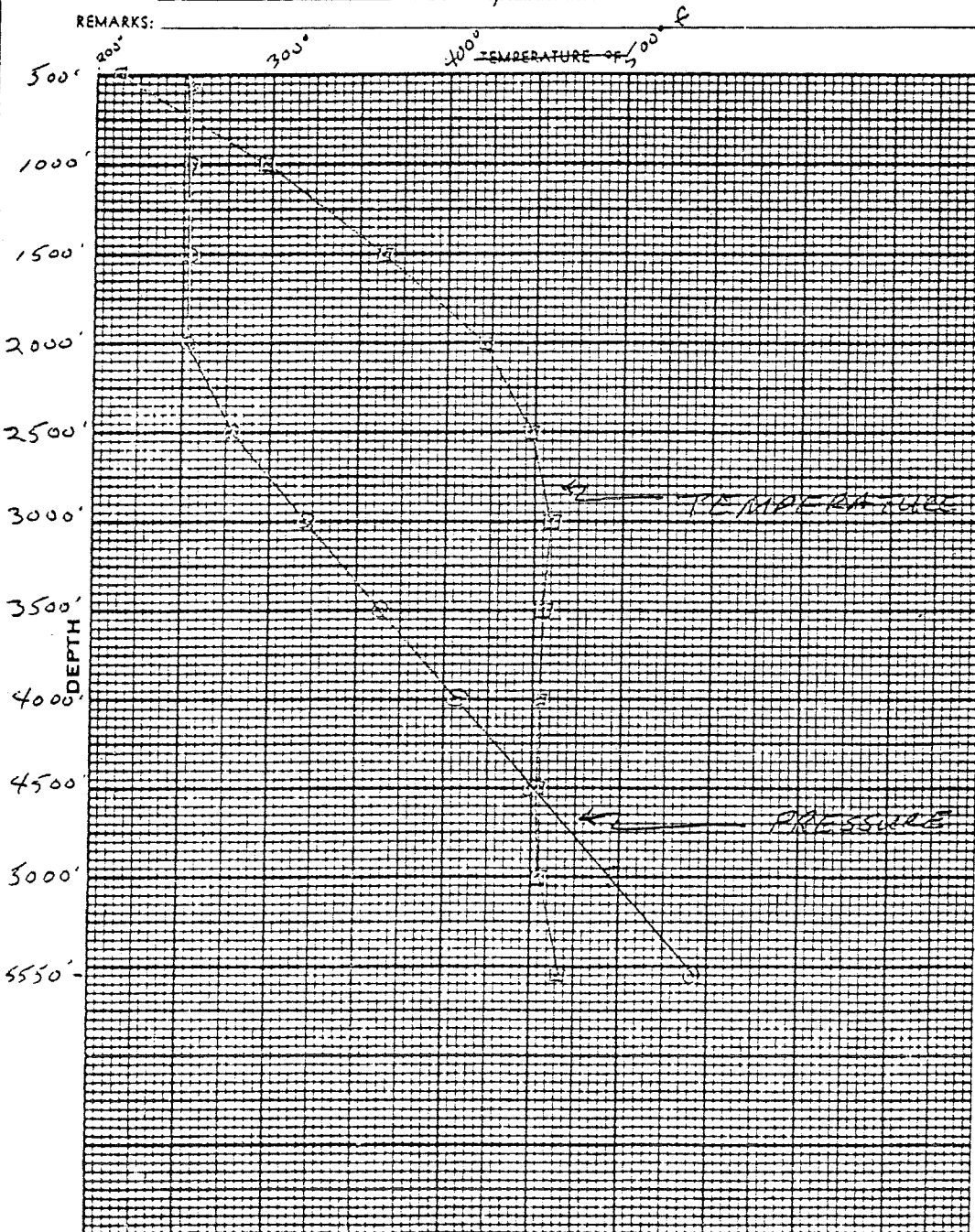
INSTRUMENT 0-4700 FAHR.  
SERIAL NO. 14191

PURPOSE Gradient Survey

MAX. TEMP. 467 °F @ 5550'

REMARKS:

STABILIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI	284	

DEPTH	TEMP.	PRESS.	GRAD.
500	213	309	—
1000	296	312	.006
1500	364	312	—
2000	421	312	—
2500	448	412	.200
3000	460	581	.352
3500	456	755	.348
4000	454	931	.352
4500	453	1104	.346
5000	455	1280	.346
5550	467	1467	.336

□ - Temp  
○ - Press

By: J. Bowen & L. Thomson

MAY 27 1980



**Union Geothermal Co. of New Mexico** B19-539-BUILDUP

SURVEY DATE: May 20, 1980

TITLE BACA #19 SURVEY # 39 BUILDUP

TEMP. EL. S/N : 10222 PRESS. EL. S/N : 14191  
 RANGE : 93° - 618° F. RANGE : 0 - 4700 P.S.I.  
 CALIBRATED : 11-10-76 CALIBRATED : 1-24-77  
 CLOCK: 12 HRS. : S/N: 14089 CLOCK: 12 HRS. : S/N: 14090

WHP AT START OF SURVEY : 338 PSIG  
 WHP AT END OF SURVEY : 340 PSIG  
 OPENED WELL TO ELEMENT : 0914 HRS.  
 POH : 1022 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY  
0 MOS., 6 DAYS, 2 HRS., 7 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO.         ) 0707 HRS. 5/14 1980

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	5000	<del>0927</del> -0937	1.217	459	.531	.529	1284	
1	5000	0952	1.218	460	.531	.529	1284	
1	5000	1007	1.218	460	.531	.529	1284	
1	5000	1022	1.218	460	.531	.529	1284	

J. THOMSON  
 G. DIESEL

R.O. ENGBRETSEN  
MAY 27 1980



Union Geothermal Co. of New Mexico B-19 S-40 7/1

SURVEY DATE: MAY 22, 1980

TITLE BACA #19 SURVEY #40 BUILDUP

TEMP. EL. S/N : 10222 PRESS. EL. S/N : 14191  
 RANGE : 93°-618° F. RANGE : 0-4700 P.S.I.  
 CALIBRATED : 11-10-76 CALIBRATED : 1-24-77  
 CLOCK: 12 HRS. : S/N: 14089 CLOCK: 12 HRS. : S/N: 14090

WHP AT START OF SURVEY : 0906 396-PSIG  
 WHP AT END OF SURVEY : 1016 396 PSIG  
 OPENED WELL TO ELEMENT : 0905 HRS.  
 POH : 1017 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY  
     MOS., 8 DAYS, 1 HRS., 58 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO.     ) 0707 HRS. 5-14- 1980

Station	Depth	Time at Sta.	TEMPERATURE		P R E S S U R E			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	5000	0917-0932	1.230	463	.535	.533	1294	
1	5000	0947	1.230	463	.535	.533	1294	
1	5000	1002	1.230	463	.535	.533	1294	
1	5000	1017	1.230	463	.535	.533	1294	

J. THOMPSON  
G. DIESEL



R.O. ENGBRETSEN  
 JUN 01 1980

# Union Geothermal Co. of New Mexico

## SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

B-19 S-41 P/F

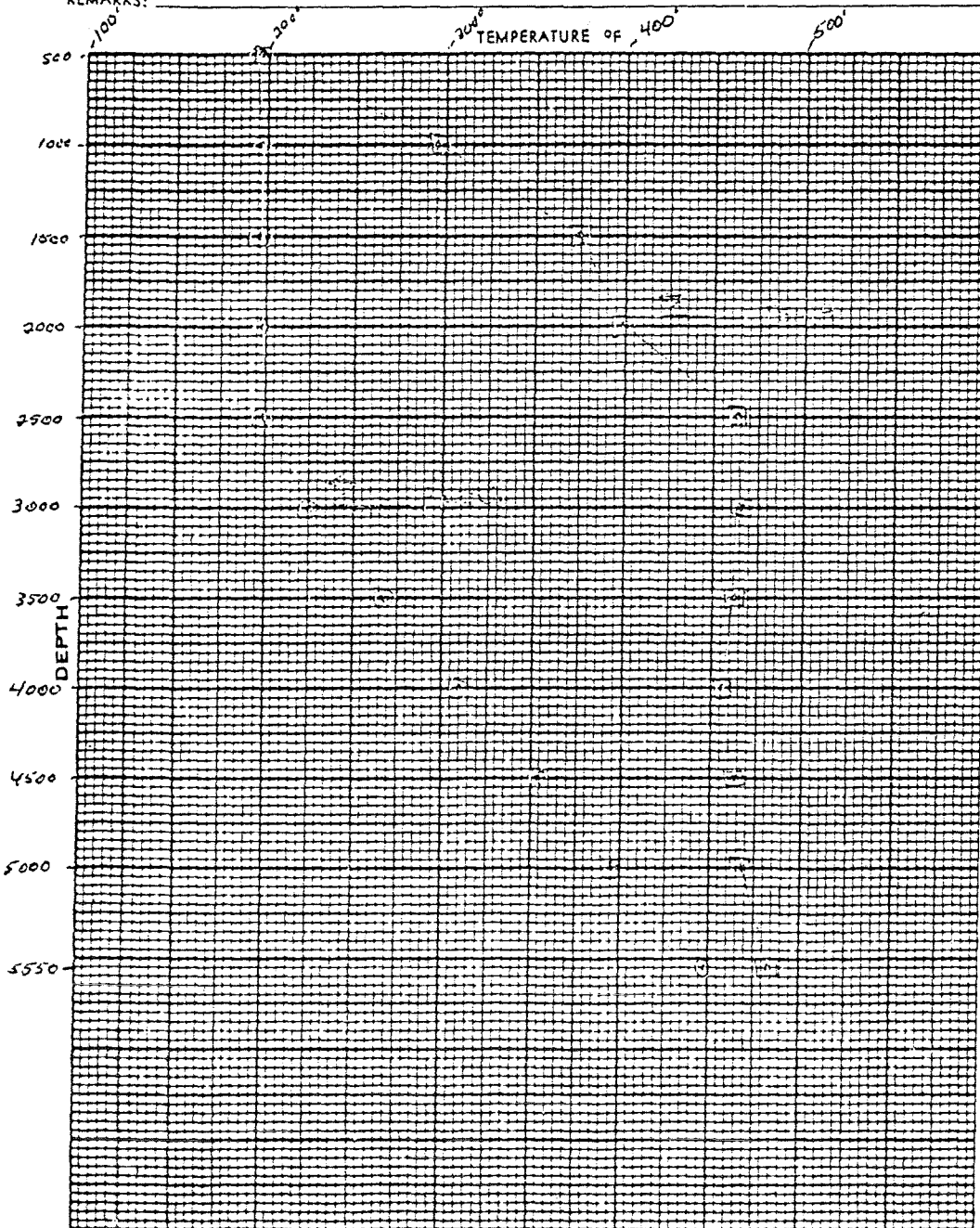
OWNER Union Geothermal Co. of N.M. FIELD Redondo Canyon WELL NAME Baca #19  
 CASING 20" @ 248' ; 13 3/4" @ 1504' ELEV. 9117 DATE: 5/29/80  
 LINER DESCRIPTION: 9 5/4" Surface to 2480' ZERO POINT GL+12  
7" 2338' to 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_  
 \_\_\_\_\_ Instrument - 0-#7007 INSTRUMENT 93°-618° FAHR.  
S/N-14191 SERIAL NO. 10222

PURPOSE Gradient Survey MAX. TEMP. 484 °F @ 5550

REMARKS: \_\_\_\_\_

STABILIZATION PERIOD \_\_\_\_\_



DEPTH	TEMP.	PRESS.	GRAD.
500	196	475	—
1000	295	482	.019
1500	374	482	0
2000	399	487	.010
2500	463	487	0
3000	466	600	.22
3500	463	767	.33
4000	461	940	.34
4500	463	1114	.34
5000	469	1284	.34
5550	484	1495	.38

□ - TEMP.  
 ○ - PRESS.

BY: S. THOMSON, M. MARTINEZ, G. D.

R.O. ENGBRETSSEN  
 JUN 17 1980



Union Geothermal Co. of New Mexico B-19 S-42 P/H

SURVEY DATE: 6-10-80

TITLE BACH #19 SURVEY #42 GRADIENT SURVEY

TEMP. EL. S/N : 10222 PRESS. EL. S/N : 14191  
 RANGE : 93°-618° F. RANGE : 0-4700 P.S.I.  
 CALIBRATED : 11-10-76 CALIBRATED : 1-24-77  
 CLOCK: 12 HRS. : S/N: 14089 CLOCK: 12 HRS. : S/N: 14090

WHP AT START OF SURVEY : 445 PSIG  
 WHP AT END OF SURVEY : 443 PSIG  
 OPENED WELL TO ELEMENT : 0854 HRS.  
 POH : 1057 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY  
       MOS., 27 DAYS,        HRS.,        MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0707 HRS. 5-14-1980

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	500	0857-0907	.295	190	.189	.189	475	
2	1000	0908-0918	.644	298	.192	.192	482	
3	1500	0919-0929	.930	380	.192	.192	482	
4	2000	0930-0940	1.000	400	.194	.194	487	
5	2500	0941-0951	1.237	465	.197	.197	495	
6	3000	0952-1002	1.252	469	.248	.245	610	
7	3500	1003-1013	1.245	467	.321	.318	783	
8	4000	1014-1024	1.243	466	.393	.390	955	
9	4500	1025-1035	1.256	470	.466	.464	1130	
10	5000	1036-1046	1.284	478	.533	.532	1291	
11	5550	1047-1057	1.342	492	.612	.612	1481	

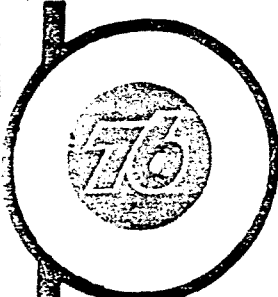
J. THOMPSON, G. WIESEL



R.O. ENGBRETSSEN  
JUN 17 1980

# Union Geothermal Co. of New Mexico B-19 5-42 P/T

## SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

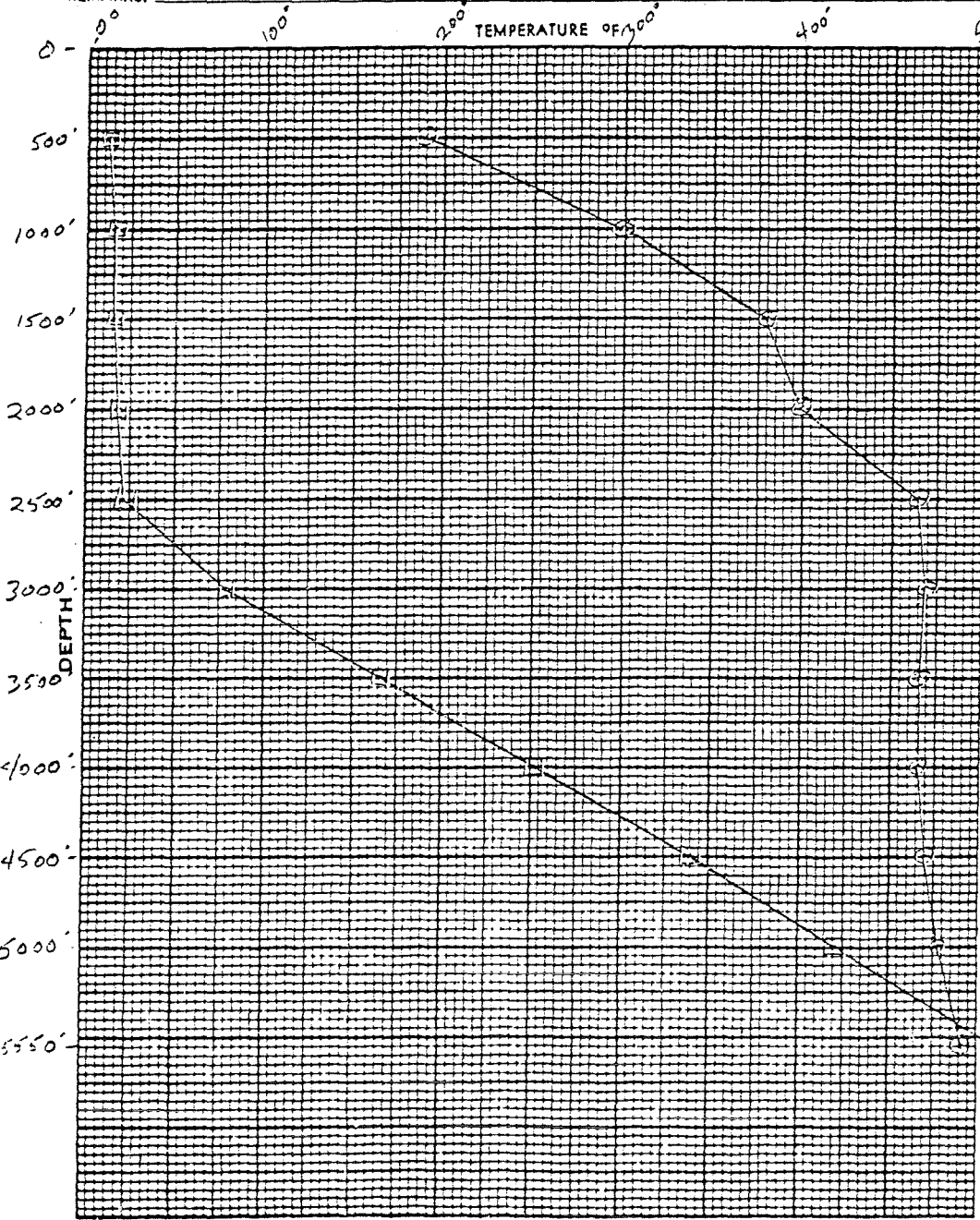


OWNER UNION GEOTHERMAL CO. OF NEW MEXICO FIELD REDONDO CANYON WELL NAME BACA #19  
 CASING 20" AT 248' ; 13 3/8" AT 1504' ELEV. 9117' DATE: 6-10-80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL+12'  
7" 2338' TO 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_  
 INSTRUMENT - 0-4700 PSI INSTRUMENT 93°-618° FAHR.  
SN - 14191 SERIAL NO. 10222

PURPOSE GRADIENT SURVEY MAX. TEMP. 492 °F @ 5550'

REMARKS: \_\_\_\_\_



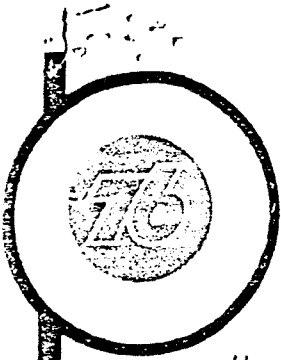
STABILIZATION PERIOD \_\_\_\_\_

PRESSURES	GAUGE	BOMB
CASING, PSI	<u>445</u>	

DEPTH	TEMP.	PRESS.	GRAD.
500	190	475	—
1000	298	482	.019
1500	320	482	0
2000	400	487	.010
2500	465	495	.016
3000	469	610	.235
3500	467	783	.346
4000	466	955	.345
4500	470	1130	.350
5000	478	1291	.323
5550	492	1481	.343

○ - Temp.  
 □ - Press.

BY J. Thomson & Diesel.



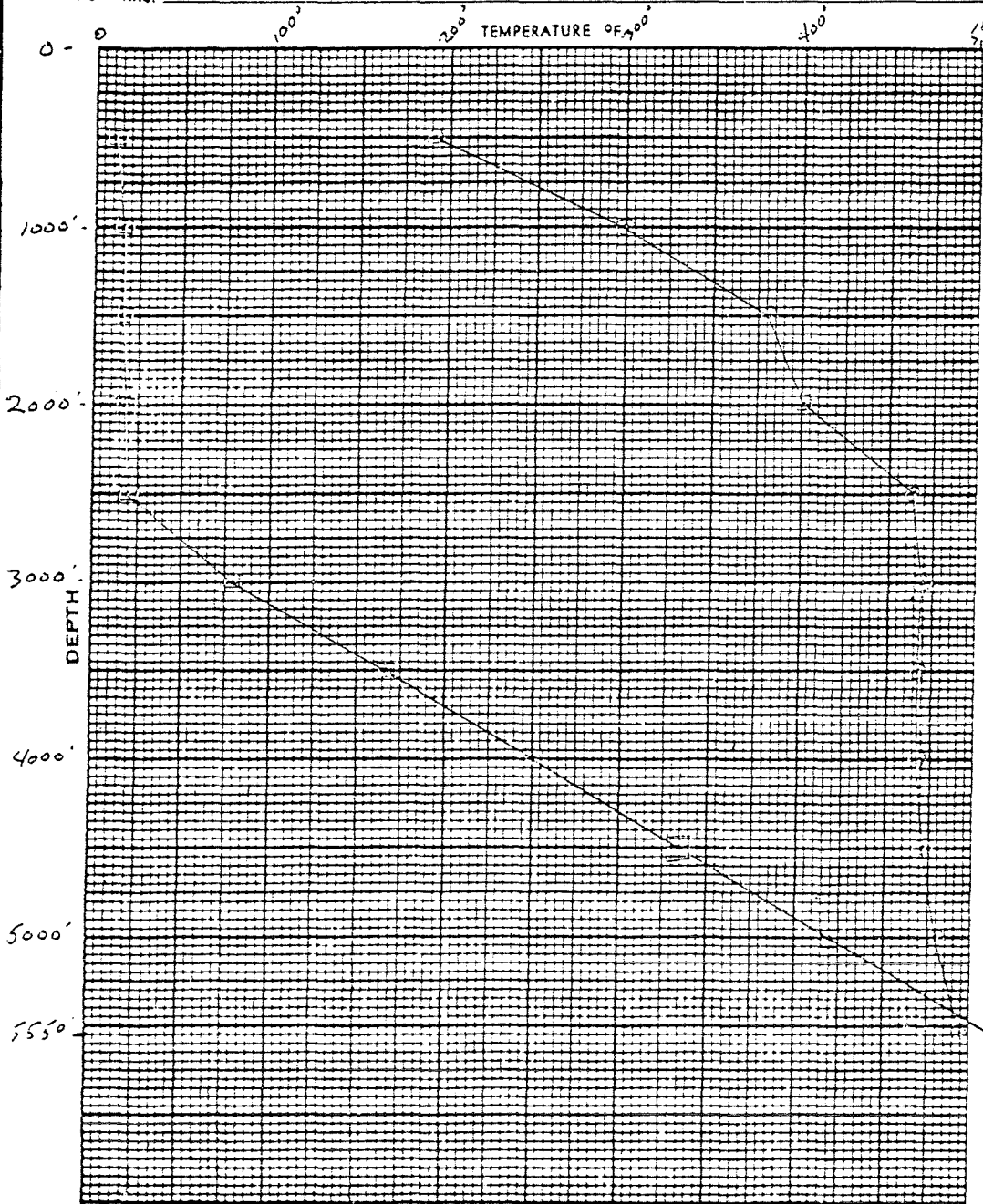
# Union Geothermal Co. of New Mexico B-19 S-43 P/1

## SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER Union Geothermal Co. of N.M. FIELD Redondo Canyon WELL NAME Baca #19  
 CASING 20" @ 248'; 13 3/8" @ 1504' ELEV. \_\_\_\_\_ DATE: 6/17/80  
 LINER DESCRIPTION: 9 5/8" Surface to 2480' ZERO POINT 6L+12'  
7" 2338' to 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_  
 \_\_\_\_\_ 0-4700 psi. INSTRUMENT 93°-618° FAHR.  
 \_\_\_\_\_ 14191 SERIAL NO. 10222

PURPOSE Gradient Survey MAX. TEMP. 495 °F @ 5550  
 REMARKS: \_\_\_\_\_



STABILIZATION PERIOD 10 min.

PRESSURES	GAUGE	BOMB
CASING, PSI	<u>446</u>	

DEPTH	TEMP.	PRESS.	GRAD.
500	192	472	—
1000	299	482	.020
1500	382	482	0
2000	402	487	.010
2500	465	490	.006
3000	469	609	.238
3500	468	783	.348
4000	468	952	.338
4500	472	1118	.332
5000	480	1291	.346
5550	495	1481	.345

○ - Temp.  
 □ - Press.

BY: J. Thomson G. Diesel

JUN 18 1980



Union Geothermal Co. of New Mexico B-19 S-43 P/T

SURVEY DATE: 6-17-80

TITLE BACA #19 SURVEY #43 GRADIENT SURVEY

TEMP. EL. S/N : 10222 PRESS. EL. S/N : 14191  
 RANGE : 93°-618° F. RANGE : 0-4700 P.S.I.  
 CALIBRATED : 11-10-76 CALIBRATED : 1-24-77  
 CLOCK: 12 HRS. : S/N: 14089 CLOCK: 12 HRS. : S/N: 14090

WHP AT START OF SURVEY : 446 PSIG  
 WHP AT END OF SURVEY : 444 PSIG  
 OPENED WELL TO ELEMENT : 0821 HRS.  
 POH : 1024 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY  
       MOS., 34 DAYS,        HRS.,        MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0707 HRS. 5-14-80

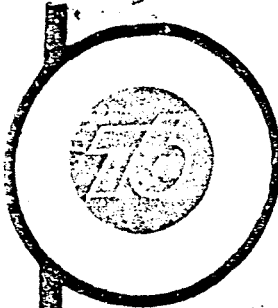
Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	500'	0824-0834	.300	192	.188	.188	472	
2	1000'	0835-0845	.647	299	.192	.192	482	
3	1500'	0846-0856	.935	382	.192	.192	482	
4	2000'	0857-0907	1.005	402	.194	.194	487	
5	2500'	0908-0918	1.237	465	.195	.195	490	
6	3000'	0919-0929	1.253	469	.248	.245	609	
7	3500'	0930-0940	1.247	468	.321	.318	783	
8	4000'	0941-0951	1.247	468	.392	.389	952	
9	4500'	0952-1002	1.263	472	.461	.459	1118	
10	5000'	1003-1013	1.293	480	.533	.532	1291	
11	5550'	1014-1024	1.354	495	.612	.612	1481	

J. THOMSON, G. DIR.

JUN 30 1980

# Union Geothermal Co. of New Mexico B-19 S-44 2/1

## SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

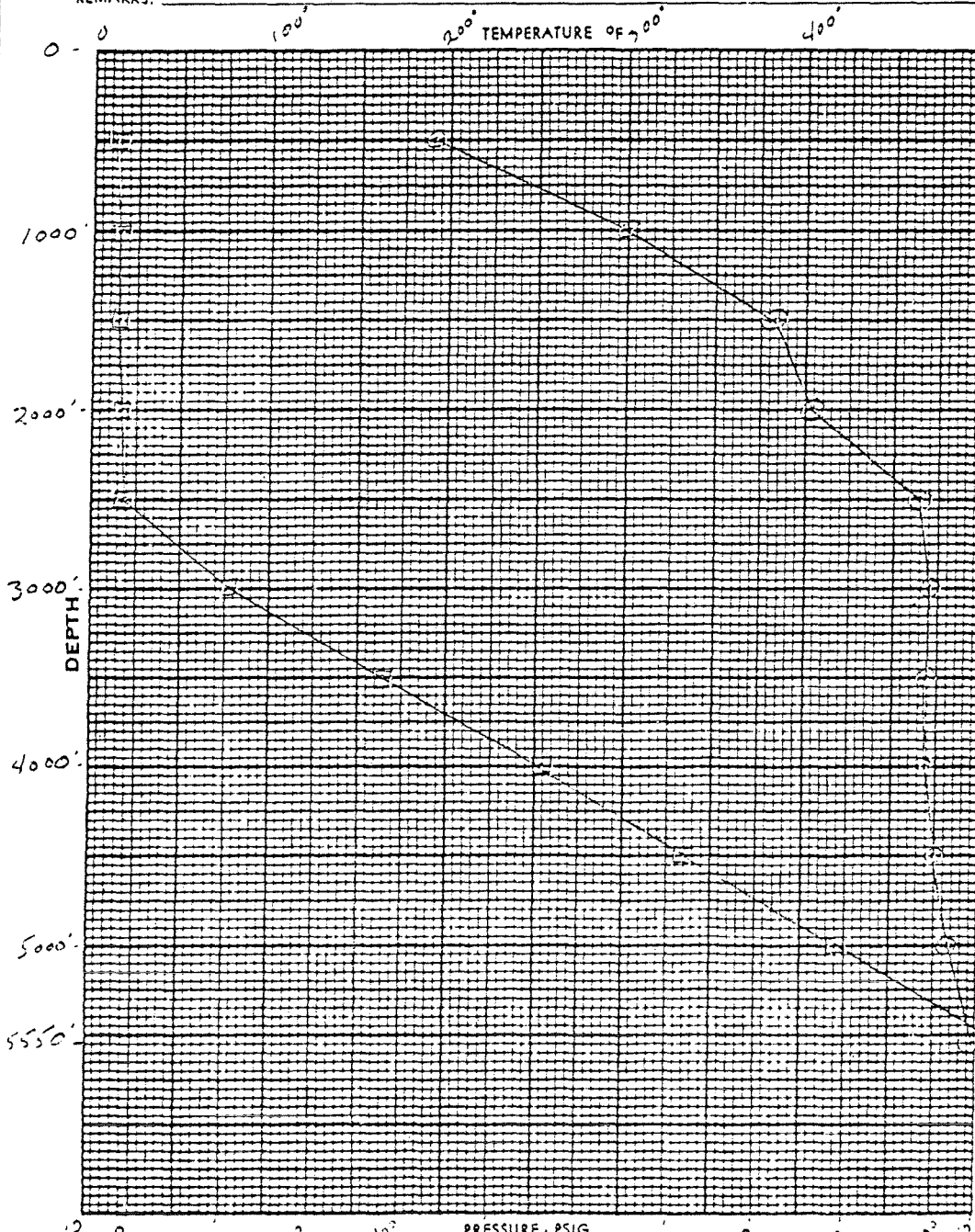


OWNER Union Geothermal Co. of N.M. FIELD Redondo Canyon WELL NAME Baca #19  
 CASING 20" @ 248', 13 3/4" @ 1504' ELEV. 9117' DATE: 6-25-80  
 LINER DESCRIPTION: 9 5/8" Surface to 2480' ZERO POINT GL+12  
7" - 2338 - 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_  
 \_\_\_\_\_ 0 - 4700 psi INSTRUMENT 93° - 618° FAHR.  
 \_\_\_\_\_ 17191 SERIAL NO. 10222

PURPOSE Gradient survey MAX. TEMP. 498 °F @ 5550'

REMARKS: \_\_\_\_\_



STABILIZATION PERIOD 10 min

PRESSURES	GAUGE	BOMB
CASING, PSI	<u>448</u>	-

DEPTH	TEMP.	PRESS.	GRAD.
500	192	475	-
1000	301	482	.017
1500	383	482	0
2000	404	485	.006
2500	465	487	.005
3000	470	605	.236
3500	469	779	.348
4000	469	957	.356
4500	474	1118	.322
5000	483	1291	.346
5550	498	1488	.358

⊙ - Temp.  
 ⊠ - Press.

BY: J. Thomson, M. Martinez

JUN 30 1980



Union Geothermal Co. of New Mexico B-19 S-44 9/4

SURVEY DATE: 6-25-80

TITLE BACA#19 SURVEY#44 GRADIENT SURVEY

TEMP. EL. S/N : 10222 PRESS. EL. S/N : 14191  
 RANGE : 93°-618° F. RANGE : 0-4700 PS.I.  
 CALIBRATED : 11-10-76 CALIBRATED : 1-24-77  
 CLOCK: 12 HRS. : S/N: 14089 CLOCK: 12 HRS. : S/N: 14090.

WHP AT START OF SURVEY : 448 @ 0906 PSIG  
 WHP AT END OF SURVEY : 446 @ 1115 PSIG  
 OPENED WELL TO ELEMENT : 0903 HRS.  
 POH : 1106 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY  
1 MOS., 11 DAYS, 1 HRS., 59 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0707 HRS. 5-14 1980

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	500'	0905-0915	.300	192	.189	.189	475	
2	1000'	0916-0926	.655	301	.192	.192	482	
3	1500'	0927-0937	.940	383	.192	.192	482	
4	2000'	0938-0948	1.012	404	.193	.193	485	
5	2500'	0949-0959	1.239	465	.194	.194	487	
6	3000'	1000-1010	1.256	470	.246	.243	605	
7	3500'	1011-1022	1.252	469	.319	.316	779	
8	4000'	1023-1033	1.253	469	.394	.391	957	
9	4500'	1034-1044	1.272	474	.461	.459	1118	
10	5000'	1045-1055	1.303	483	.533	.532	1291	
11	5550'	1056-1106	1.367	498	.615	.615	1488	

J. Thomson  
 M. Martinez

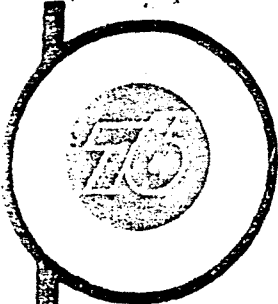


R.O. ENGBRETSSEN

JUL 09 1980

# Union Geothermal Co. of New Mexico B-19 S-45 P/T

## SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

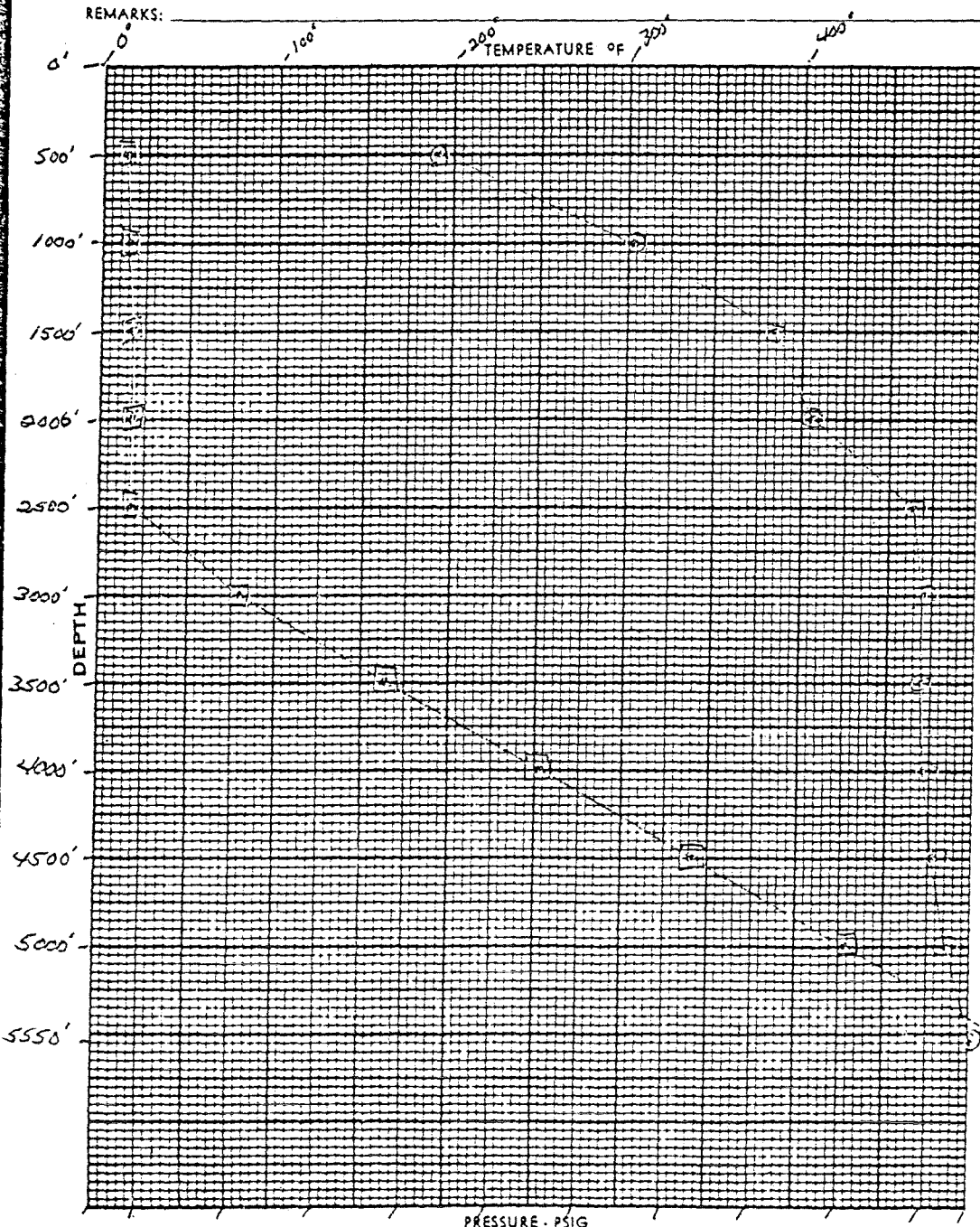


OWNER UNION GEOTHERMAL CO. OF NEW MEXICO FIELD PERCENCO CANYON WELL NAME RACA #19  
 CASING 20" AT 248' ; 13 3/8" AT 1504' ELEV. 9117' DATE: 7-9-80  
 LINER DESCRIPTION: 9 5/8" SURFACE TO 2480' ZERO POINT GL+12'  
7" - 2338' - 5585' DEPTH 5585'

HOLE DESCRIPTION: \_\_\_\_\_  
 \_\_\_\_\_ 0-4700 PSE. INSTRUMENT 93°-618° FAHR  
 \_\_\_\_\_ 14191 SERIAL NO. 10222

PURPOSE GRADIENT SURVEY MAX. TEMP. 501 °F @ 5550'

REMARKS: \_\_\_\_\_ STABILIZATION PERIOD 10 MIN.



PRESSURES	GAUGE	BOMB
CASING. PSI	445	

DEPTH	TEMP.	PRESS.	GRAD
500	193	475	-
1000	302	492	.015
1500	384	495	.06
2000	406	485	0
2500	465	485	0
3000	471	610	.25
3500	470	779	.333
4000	471	955	.35
4500	477	1130	.35
5000	485	1303	.34
5550	501	1483	.32

○ - TEMP.  
 □ - PRESS.

BY: J. THOMPSON, G. DIESEL

R.O. ENGBRETSEN

JUL 28 1980



# Union Geothermal Co. of New Mexico B-19 S-46 P/T

SURVEY DATE: 7-28-80

TITLE BACA #19 SURVEY #46 GRADIENT PRECEDING FT. #4

TEMP. EL. S/N : 10227 PRESS. EL. S/N : 14191  
 RANGE : 93° - 618° F. RANGE : 0-4700 P.S.I.  
 CALIBRATED : 11-10-76 CALIBRATED : 1-24-77  
 CLOCK: 12 HRS. : S/N: 14090 CLOCK: 12 HRS. : S/N: 14089

WHP AT START OF SURVEY : 445 PSIG  
 WHP AT END OF SURVEY : 443 PSIG  
 OPENED WELL TO ELEMENT : 0943 HRS.  
 POH : 1156 HRS.

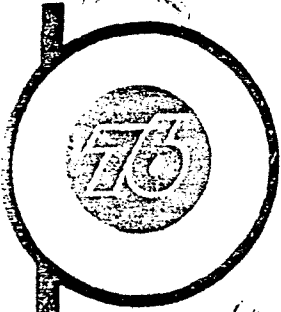
TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY  
2 MOS., 13 DAYS, \_\_\_\_\_ HRS., \_\_\_\_\_ MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0707 HRS. 5-14 1980

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	500	0945-0957	.302	193	.188	.188	472	
2	1000	1011	.658	302	.191	.191	480	
3	1500	1024	.944	384	.191	.191	480	
4	2000	1037	1.027	408	.194	.194	487	
5	2500	1049	1.241	466	.196	.196	492	
6	3000	1101	1.260	471	.251	.248	617	
7	3500	1112	1.259	471	.323	.320	788	
8	4000	1123	1.265	472	.390	.387	948	
9	4500	1134	1.290	479	.463	.461	1123	
10	5000	1145	1.324	488	.536	.535	1298	
11	5550	1156	1.392	503	.614	.614	1486	

J. THOMPSON, G. DEES





R.O. ENGBRETSSEN

# Union Geothermal Co. of New Mexico

JUN 28 1980

B-195-46 P/T

## SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

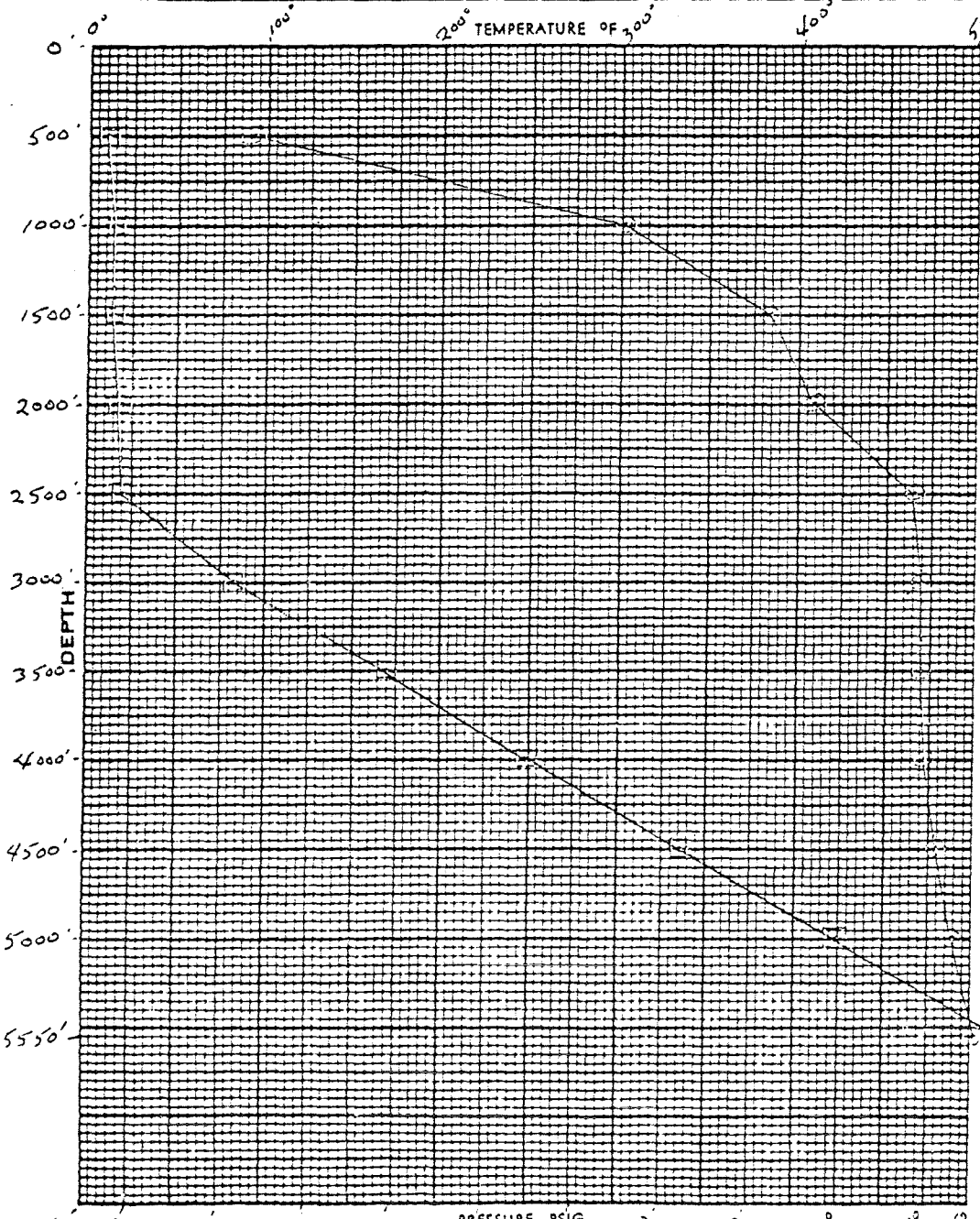
OWNER Union Geothermal Co. - N.M. FIELD Redondo Canyon WELL NAME Baca #14  
 CASING 20" @ 245' 13 3/4" @ 1504' ELEV. 9117' DATE: 7-29-80  
 LINER DESCRIPTION: 9 5/8" Surface to 2480 ZERO POINT 66 ± 12'  
7" 2338' - 5585' DEPTH 5585'

HOLE DESCRIPTION:

0-4700 psi INSTRUMENT 93-618° FAHR.  
 14191 SERIAL NO. 10222

PURPOSE Gradient Survey Proceeding 2<sup>nd</sup> Test #4 MAX. TEMP. 503 °F @ 5550'

REMARKS:



PRESSURES	GAUGE	BOMB
CASING PSI	<u>445</u>	

DEPTH	TEMP.	PRESS.	GRAD.
500	193	472	-
1000	302	480	.016
1500	384	480	0
2000	408	487	.014
2500	466	492	.018
3000	471	617	.25
3500	471	788	.34
4000	472	948	.32
4500	479	1123	.35
5000	488	1298	.35
5550	503	1486	.34

○ - Temp.  
 □ - Press.

BY: L. Thomson, L. Diesel

R.O. ENGBRETSSEN

JAN 27 1982

B19-547 P/T



Union Geothermal Co. of New Mexico

SURVEY DATE: 01-26-82

TITLE BACA No 19 TEMP/PRESS GRADIENT SURVEY TO 5,375 FT.

TEMP. EL. S/N : KTB 23338 PRESS. EL. S/N : KPG 22390
RANGE : 1°F - 680°F RANGE : 3250 PSI
CALIBRATED : 10-16-81 CALIBRATED : 9-1-81
CLOCK: 12 HRS. : S/N: 12890 CLOCK: 12 HRS. : S/N: 14087

WHP AT START OF SURVEY : 39 PSIG
WHP AT END OF SURVEY : 39 PSIG
OPENED WELL TO ELEMENT : 1305 HRS.
POH : 1526 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY
MOS., DAYS, HRS., MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 5 ) 0910 HRS. 02-27-1981
SHUT-IN WATER INJECTION - 10/19/81

Table with columns: Station, Depth, Time at Sta., Temperature (Defl., °F), Pressure (Defl., Corr. Defl., PSIG), and REMARKS. Contains 12 rows of data.

TOOLS CANNOT GET THAT BEYOND 5375'

R. C. ENGBRETSSEN

JAN 27 1982

# Union Geothermal Co. of New Mexico

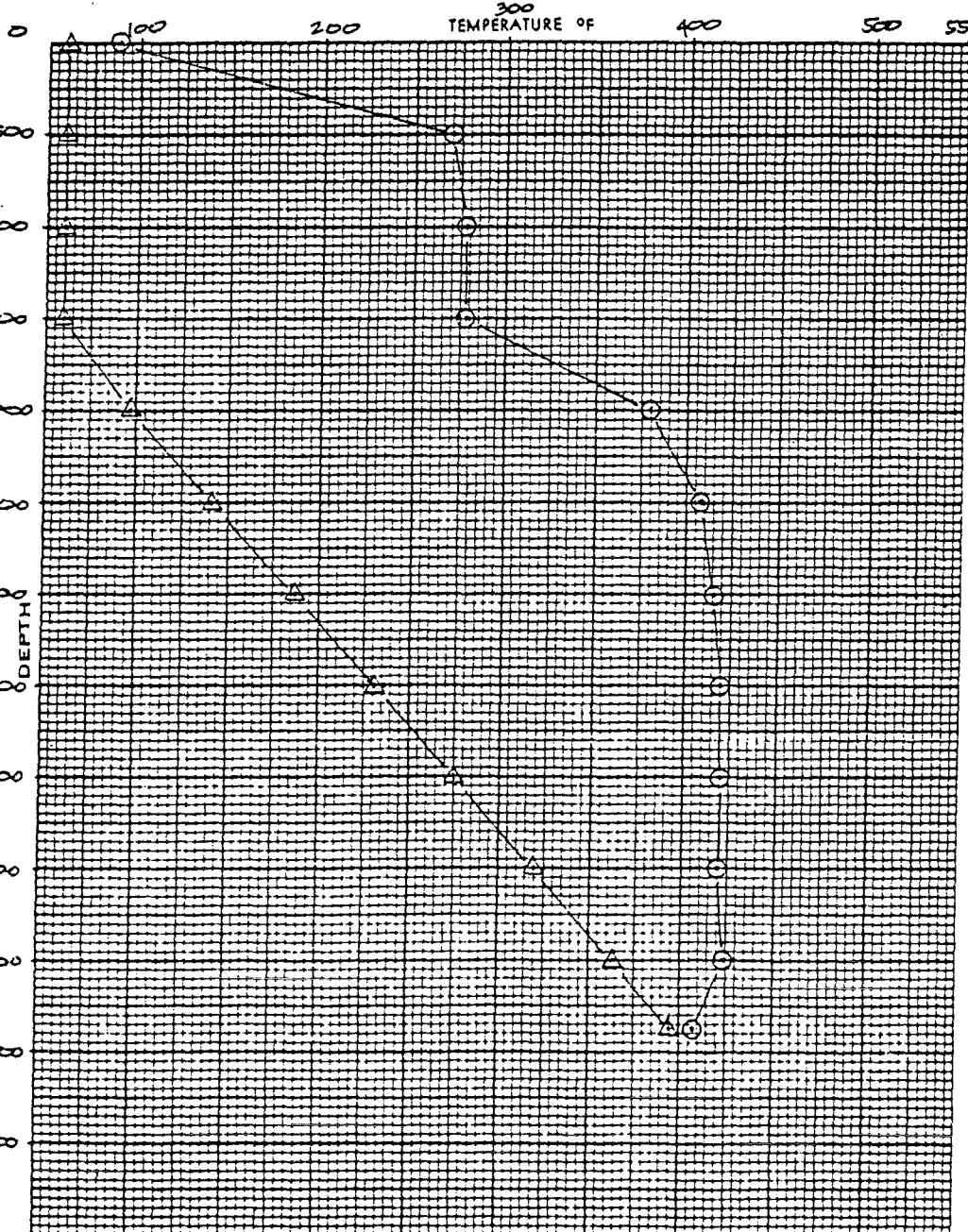
B19-S47 P/T

## SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD BEVONDO CREEK WELL NAME BACA # 19  
 CASING 20" @ 242'; 13 3/8" @ 1504' ELEV. 9117' DATE: 01-26-82  
 LINER DESCRIPTION: 9 5/8" @ SURFACE TO 2480'; 7" @ 2338'-5585' ZERO POINT GL + 5 FT.  
 DEPTH 5550'

HOLE DESCRIPTION: \_\_\_\_\_  
 \_\_\_\_\_ 3250 PSI INSTRUMENT 1-680 FAHR.  
 \_\_\_\_\_ KFC 22390 SERIAL NO. KTB 23388

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5375 FT. MAX. TEMP. 423 °F @ 5000'  
 REMARKS: PRIOR TO SPERRY-SUN INSTALLATION



STABILIZATION PERIOD \_\_\_\_\_

PRESSURES	GAUGE	BOMB
CASING, PSI	39	41

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	77	41	-
500	270	"	-
1000	278	"	-
1500	278	"	-
2000	379	189	0.296
2500	408	366	0.354
3000	416	547	0.362
3500	420	725	0.356
4000	421	900	0.352
4500	419	1079	0.358
5000	423	1252	0.346
5375	407	1380	0.341

○ TEMPERATURE  
 △ PRESSURE

BY: JPA





R.O. ENGBRETSSEN

FEB 22 1980

February 20, 1980

TO: Dick Engebretsen

FM: Paul Atkinson *PGA*  
Rich DiTommaso *RD*RE: BACA-19 TWO-PHASE FLOWTEST NO. 1

### Introduction

Two-Phase Flowtest No. 1 was carried out on Baca-19 during the period November 15 - 27, 1979. During this period, a number of flowing bottomhole and gradient surveys were run in the well. Following shutin, surveying was continued so as to observe pressure and temperature buildup. This memo presents and discusses the data taken for the well prior to the flowtest and during the flowing and subsequent buildup periods. These data are presented in the following order:

1. Pre-flowtest data;
2. flowing wellhead behavior;
3. bottomhole flowing surveys;
4. flowing gradient surveys; and
5. pressure and temperature buildup following well shutin.

### Pre-Flowtest Data

Figure 1 presents a composite picture of the drilling, geology, and electric logs for Baca-19.

Figure 2 presents static temperature profiles for Baca-19 and three other nearby wells (11, 13, and 15). This figure indicates that except below 5000', Baca-19 is uniformly 30 to 50 Fahrenheit degrees cooler than any of its neighbors. The maximum observed temperature in the well was observed at the bottom of the hole as 502°F.

### Flowing Wellhead Behavior

Two-Phase Flowtest No. 1 began November 15, 1979, and lasted for 287-3/4 hours. The flow rate and wellhead pressure steadily declined from about 286,500 lbs/hr total mass at 96 psig, initially, to about 56,800 lbs/hr total mass at 10 psig after 1-1/2 hours flow time. At this point the well began cycling at approximately 4-6 hour intervals from a low rate of 38,200 lbs/hr mass flow at 5 psig wellhead pressure to a high rate of 214,500 lbs/hr mass flow

Dick Engebretsen  
February 20, 1980  
Page 2

at 47 psig wellhead pressure. (Note: All flow calculations have been made assuming 30% quality steam.) This cycling continued for the remainder of the flow test. Occasionally, the well would quit cycling and maintain a sustained flow rate of approximately 120,000 lbs/hr mass flow at 22 psig wellhead pressure for about 12 hours and then revert to its cycling nature.

Near the end of the flow period various wireline surveys were run in the well. The flow behavior and survey activity which occurred during this period are indicated in Figure 3. Survey No. 2 measured the pressure and temperature profiles in the well over a two-hour period just prior to the initiation of the wellhead pressure peaking cycle. This survey then sat at 5,000' for eight hours during a complete cycle of wellhead pressure buildup, falloff, and buildup. A second flowing gradient survey, No. 3, was performed while the well was in the intermediate state of not cycling. A third flowing survey, No. 4, was run to 5000' where it was allowed to stabilize for 30 minutes before shutting in the well.

During the flowtest, liquid samples were taken from the flowline twice daily and analyzed in the field for pH and chlorides. Measured chlorides varied from 4000 - 5000 ppm during the first five days of the test, and from 5000 to 5600 ppm during the second five days. There was no obvious correlation between the cycling activity and chlorides variation. Measured values of pH were always in the range 7.80 - 8.1.

#### Bottomhole Flowing Surveys

Figure 4 presents the results of the bottomhole pressure and temperature survey No. 3 which was carried out over an eight hour period. Two pressure peaking cycles occurred during this period. This figure presents the time variation of pressure and temperature measured at 5000'. The upper graph also shows the time variation of the saturation pressure corresponding to the measured temperature. This dotted line tells us that saturation conditions existed at 5000' during the period 1200 to 1400 hours.

The lower graph in Figure 4 presents the time variation of pressures at the orifice meter over the same time period as the upper graph. One interpretation of the behavior observed on Figure 4 is as follows:

1. at the beginning of the observation period there is a column of liquid in the well;

2. at + 1110 hours this liquid column begins to boil away and unload. The maximum surface flowrate is observed at 1140 hours, but saturation conditions do not develop at 5000' until 1200 hours;
3. from 1200 - 1400 hours, two-phase flowing conditions exist at 5000', but the well is gradually loading up with water;
4. at 1400 hours, single-phase liquid conditions develop at 5000', and the well continues to load up with water until 1600 hours; and
5. from 1600 - 1800 hours, the well flows with a more or less stable liquid level. During this period, the temperature in the liquid column slowly increases until at some level above 5000' the saturation pressure exceeds the flowing pressure. This initiates unloading of the liquid column and the beginning of another cycle.

#### Flowing Gradient Surveys

Two flowing gradient surveys were taken during two-phase flowtest No. 1. Figures 5 and 6 present the observed pressure and temperature profiles respectively for each of these surveys. The data for survey No. 2 were taken just before the well unloaded. The data for survey No. 3 were taken during the period of non-cycling which occurred following survey No. 2. Data for survey No. 1 correspond to the static conditions which existed in the well just prior to flowtest No. 1.

The well had been flowing at an intermediate state for about twelve hours when survey No. 3 was made. The measured pressure at 5000' depth was 150 psig. Four hours later, Survey No. 4 was run to 5000' and allowed to stabilize for thirty minutes. Flowing conditions at depth were still two-phase, but the pressure had increased to 183 psig.

Figure 7 is similar to Figure 5, but also contains the saturation pressures corresponding to the measured temperature at each depth. These data tell us that steam and vapor coexist all the way down the well during survey No. 3 but only down to about 3000' during survey No. 2.

#### Pressure and Temperature Buildup Following Shutin

The well was shutin at 1145 a.m., November 27, 1979. Pressure and temperature tools were in the hole at the moment of shutin and remained there for 10-1/2 hours. Additional surveys were made on succeeding days.

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February 20, 1980  
Page 4

Figure 8 presents the temperature profiles measured in the well following shutin. These data indicate that maximum cooling occurred at the bottom of the well. This suggests that most of the production was occurring from below  $\pm 4500'$ .

Figures 9, 10, and 11 present the pressure buildup observed in the well following shutin. Figure 9 is a cartesian graph of measured pressure versus time.

Examination of data in conjunction with the temperature buildup data indicates that single-phase liquid conditions develop immediately at 5000'.

Figure 10 is a log-log type curve of pressure increase versus shut-in time. This figure exhibits typical wellbore storage behavior. In an approximate sense, we can estimate that the wellbore storage period is over with after about one hour. We would thus expect the semi-log straight line to begin at about thirty hours (1-1/2 log cycles later), or beginning with survey No. 6.

Figure 11 is a Horner graph of the buildup data. Calculations of (kh) and skin factor are presented on the figure: kh = 2360 md-ft, skin = + 9.1.

### Discussion

This memo has presented the substantial amount of data taken during the two-phase flowtest No. 1 on Baca-19.

The well would cycle at four to six hours. Every few days the flowrate would stabilize at  $\pm 130,000$  lb/hr. We gathered downhole wireline data during both cycling and stable flow periods.

A plausible explanation of the cyclic behavior has been presented. This explanation requires fluid entry over a single interval only. It may be that the cycling behavior is caused by a cold fluid entry higher up in the hole, but we have no definite evidence supporting such a situation. We plan to carefully evaluate this data in order to better understand the nature of the cycling behavior.

We made an estimate of fluid lost to the reservoir during drilling as compared to that produced during the flowtest. Fluid lost during drilling was estimated to be  $4 \times 10^6$  lb. No estimate was made of fluid gained during drilling. Approximately  $37 \times 10^6$  lb. water were produced during the flowtest. Thus, we were most likely producing reservoir fluids during most of the period.



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Page 5

The kh and skin factors for the well are within the range normally encountered at Baca. However, they are at the unpromising end of this range (low kh and high skin).

PA:RD:jt  
cc: Mohinder Gulati  
Steve Pye

FIGURE 1

BACA 19 - COMPOSITE OF DRILLING, GEOLOGY, + ELECTRICAL LOGS

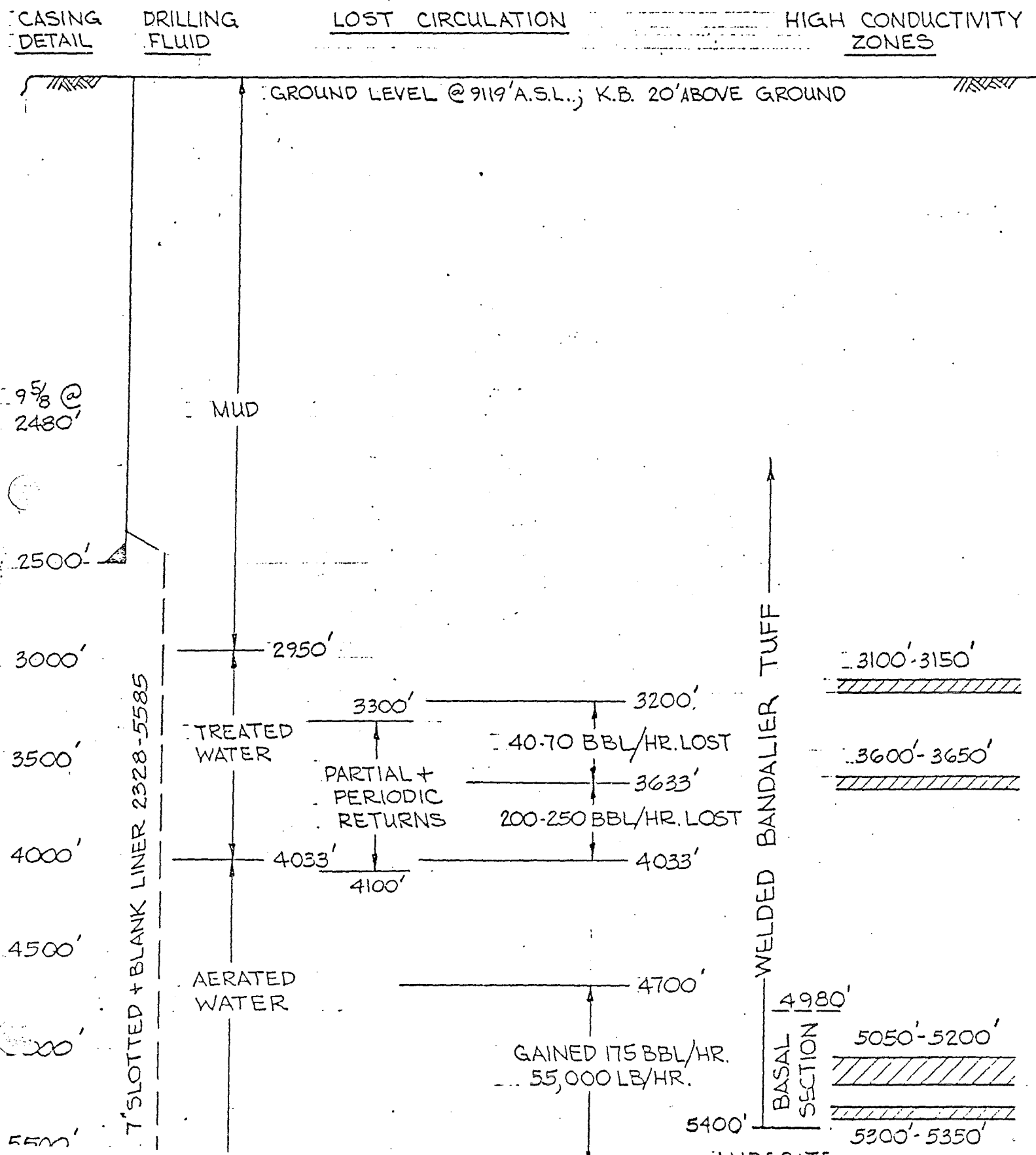


FIGURE 2

COMPARISON OF TEMPERATURE PROFILES FOR BACA WELLS 11, 13, 15, 19  
DATUM IS AT BACA 19 GROUND ELEVATION OF 9117 FT.

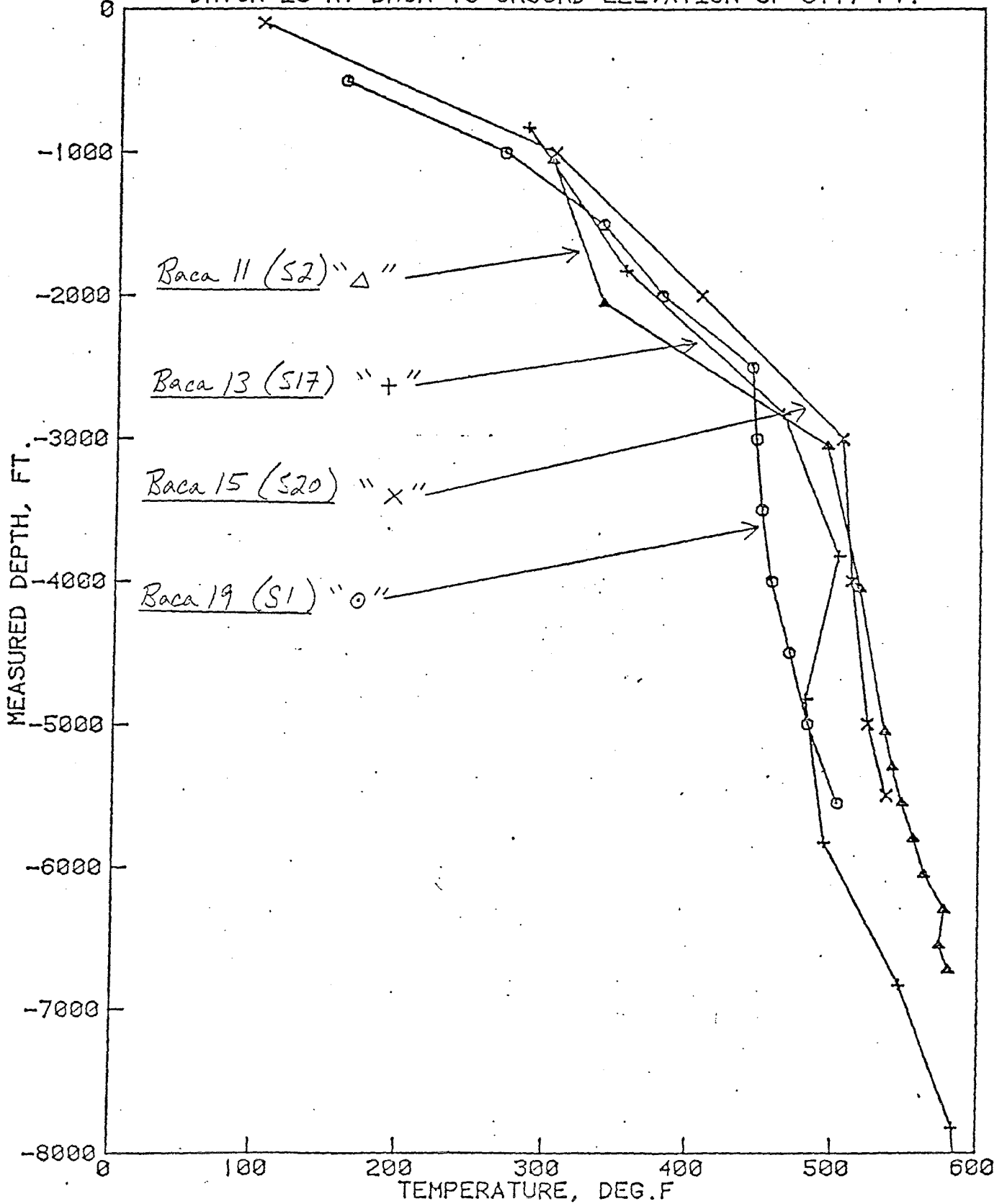


Figure 3. Baca-19 Activity During Flowing Wireline Surveys, Two-Phase Flowtest No. 1

<u>Chronology</u>	<u>Well Flowing?</u>	<u>Well Behavior</u>	<u>Survey No.</u>	<u>Survey Type</u>
-------------------	----------------------	----------------------	-------------------	--------------------

11/26/79 0904  
1038

Valley

Peaking

Valley

Peaking

No. 2

gradient

tools hung at 5000'

1810  
1900

11/27/79

0600  
0830

No cycling  
(well stabilized)

No. 3

gradient

well shutin at 1145

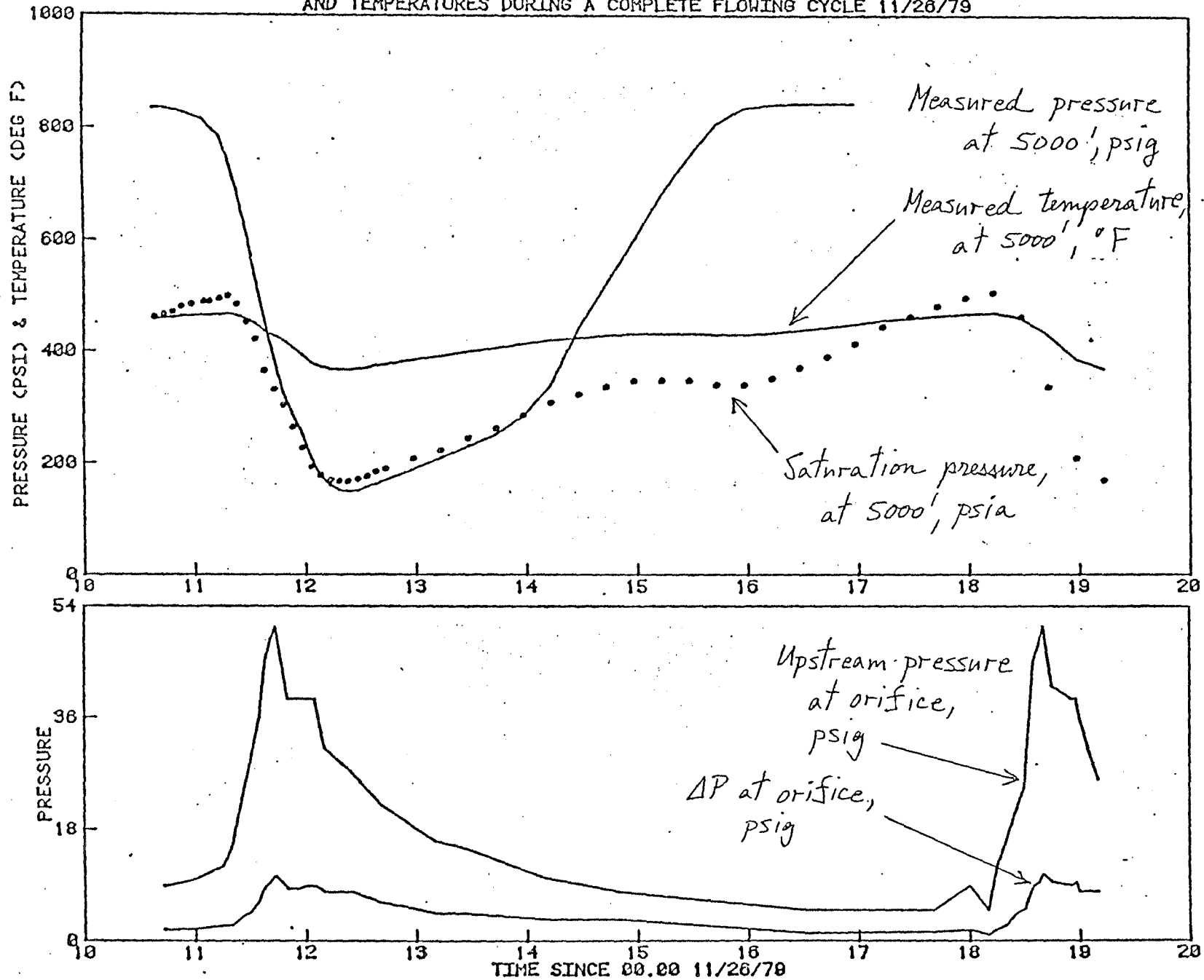
No. 4

tools hung at 5000'

FIGURE 4

BACA 19 SURFACE AND BOTTOMHOLE PRESSURES  
AND TEMPERATURES DURING A COMPLETE FLOWING CYCLE 11/26/79

G. ATKINSON  
NOV 30 1979



PAUL G. ATKINSON  
NOV 30 1979

FIGURE 5  
BACA 19 PRESSURE SURVEYS NOS. 1, 2 & 3

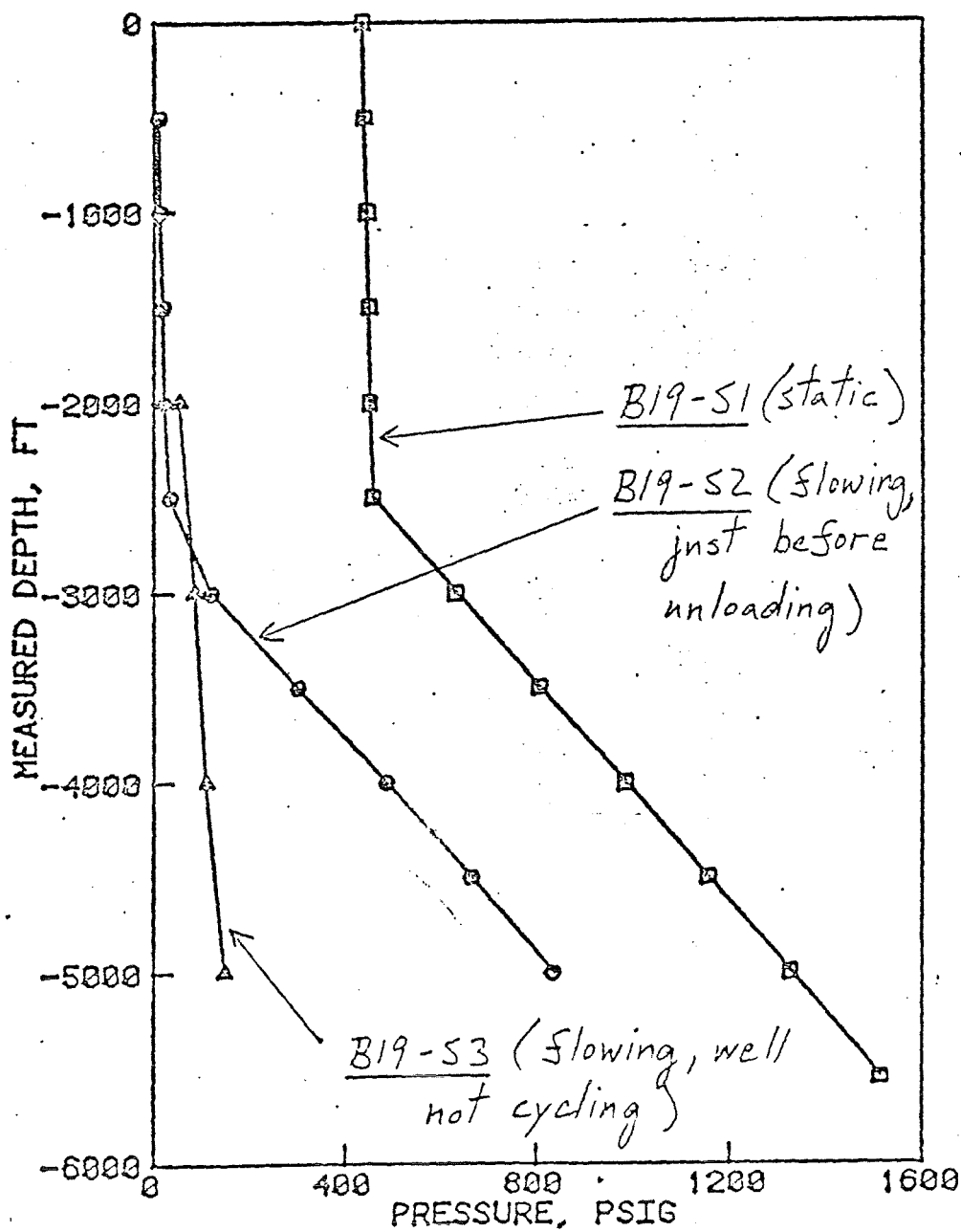


FIGURE 6

BACA 19 TEMPERATURE SURVEYS NOS. 1, 2 & 3

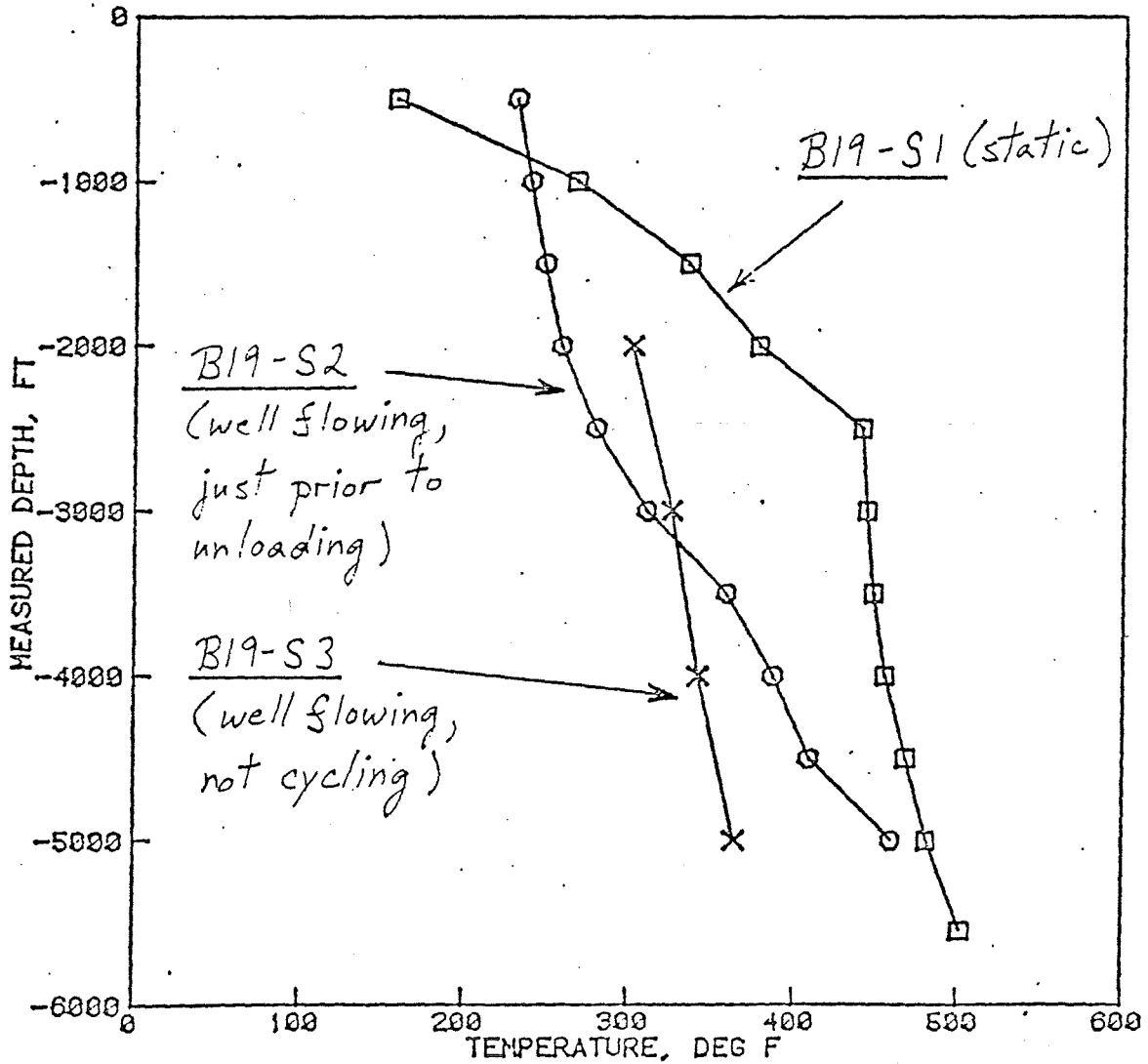


FIGURE 7

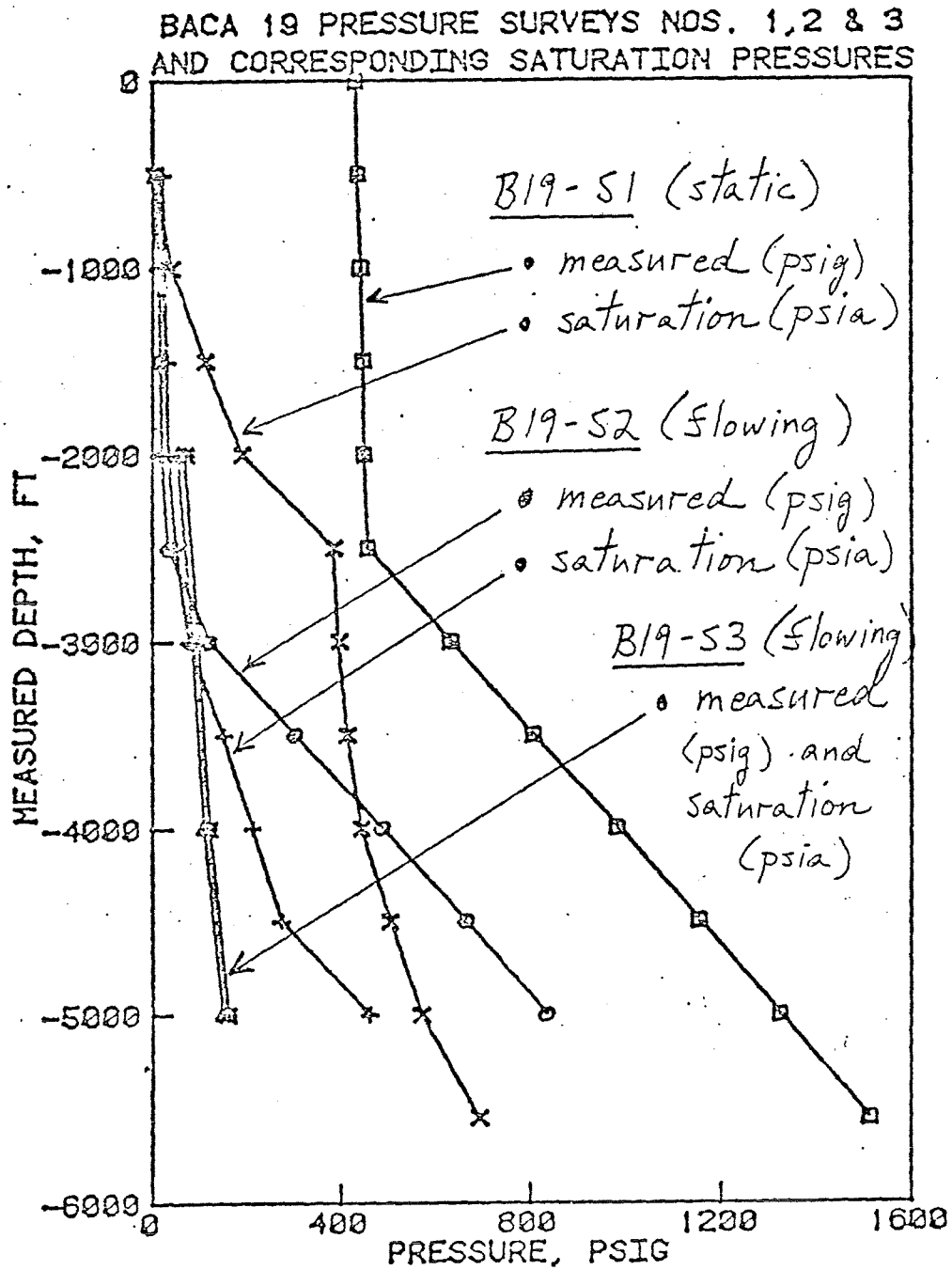




FIGURE 8

BACA 19 TEMPERATURE BUILDUP SURVEYS  
FOLLOWING 288 HR. FLOW PERIOD

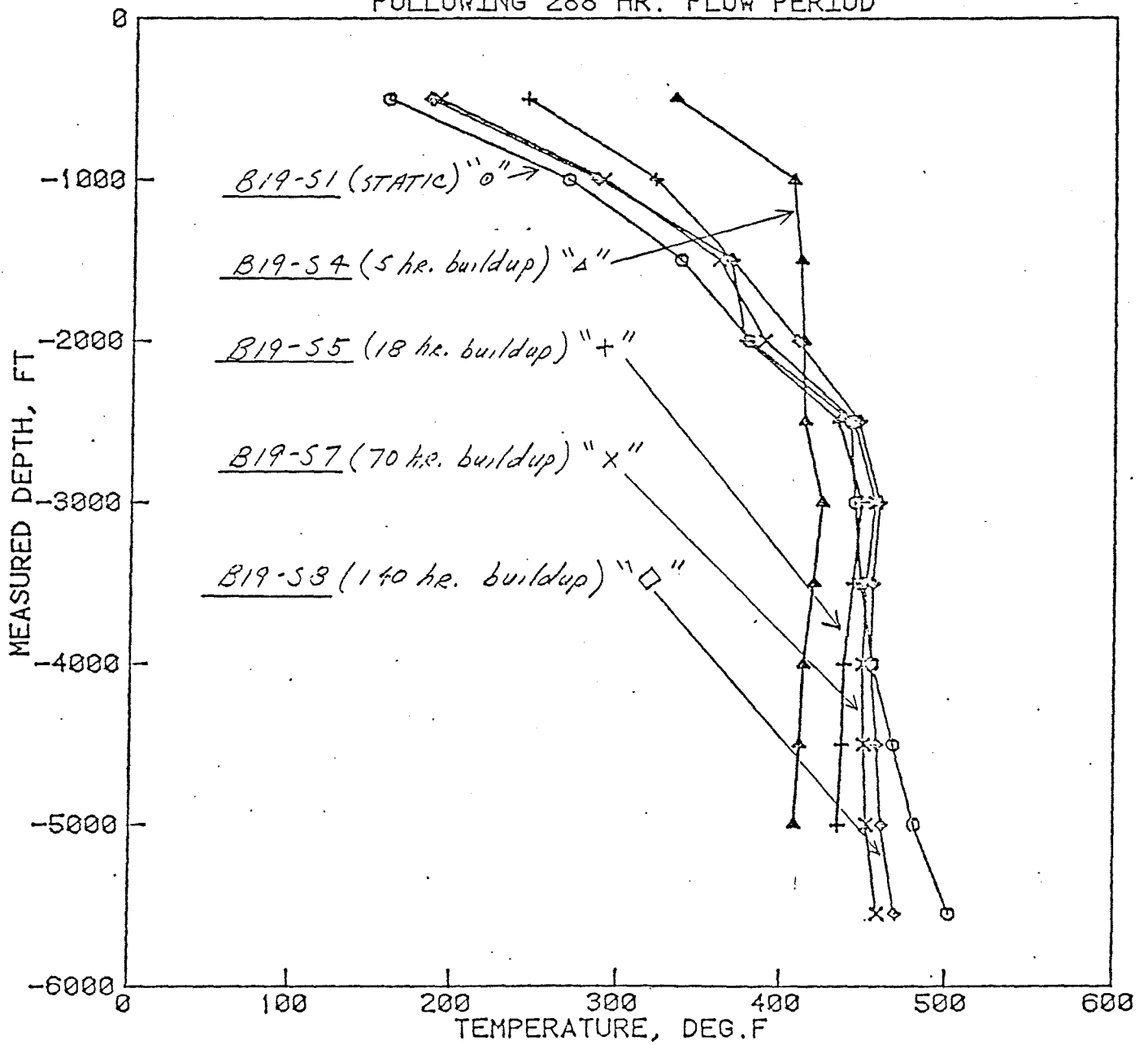


FIGURE 9  
BACA 10 PRESSURE BUILDUP OF 11/27-28/79  
PRESSURES AT 5000 FT M.D.

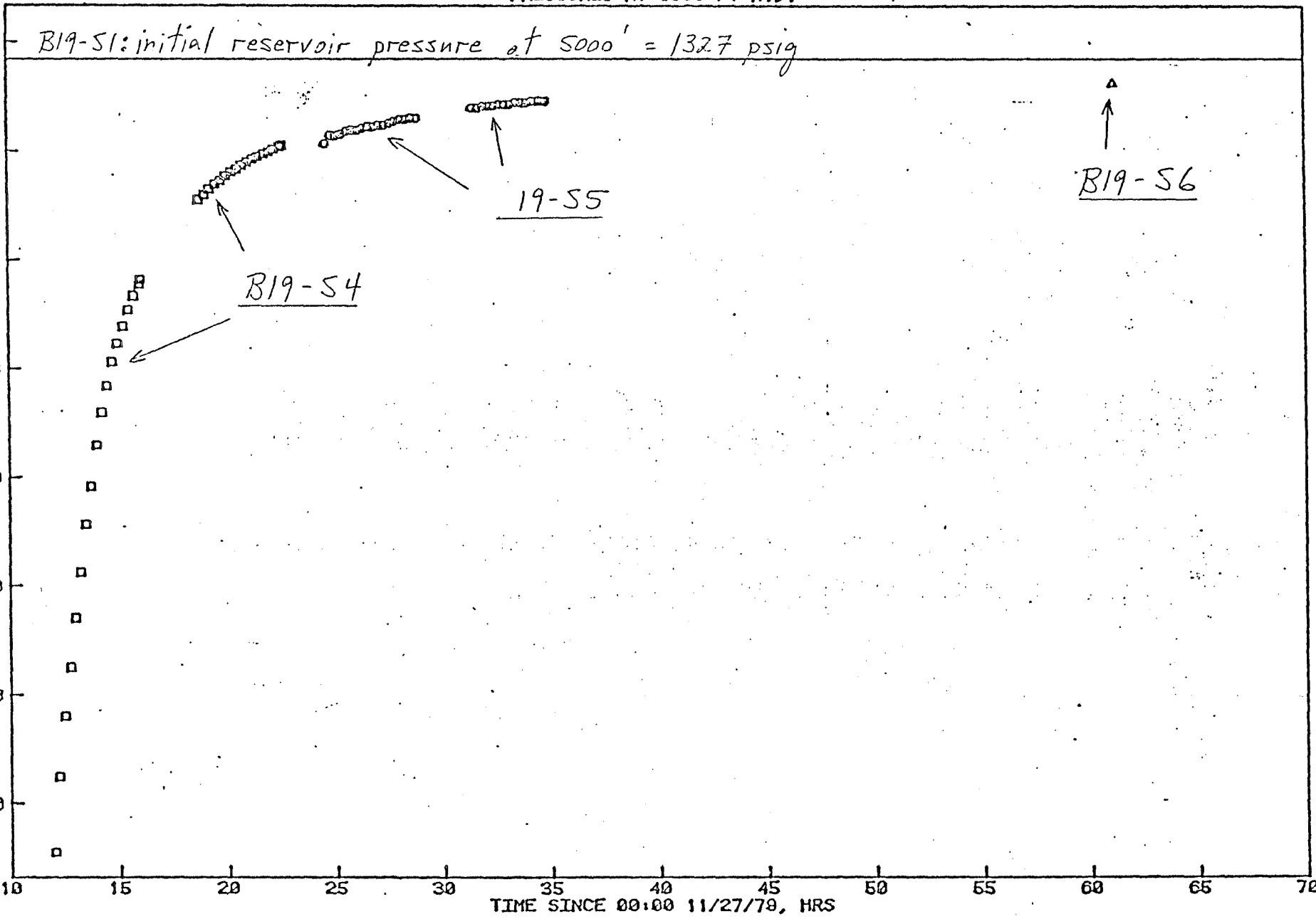
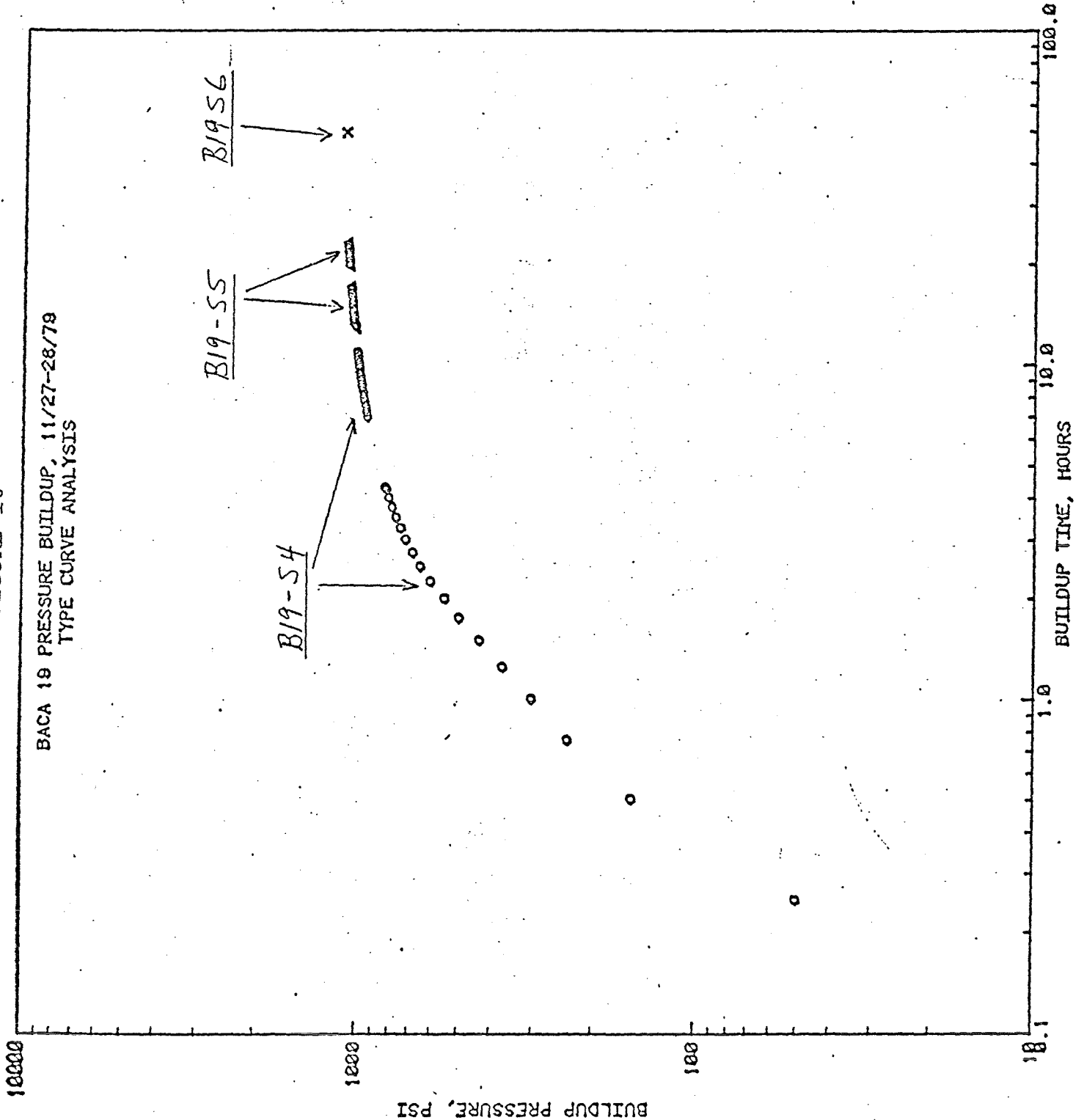


FIGURE 10

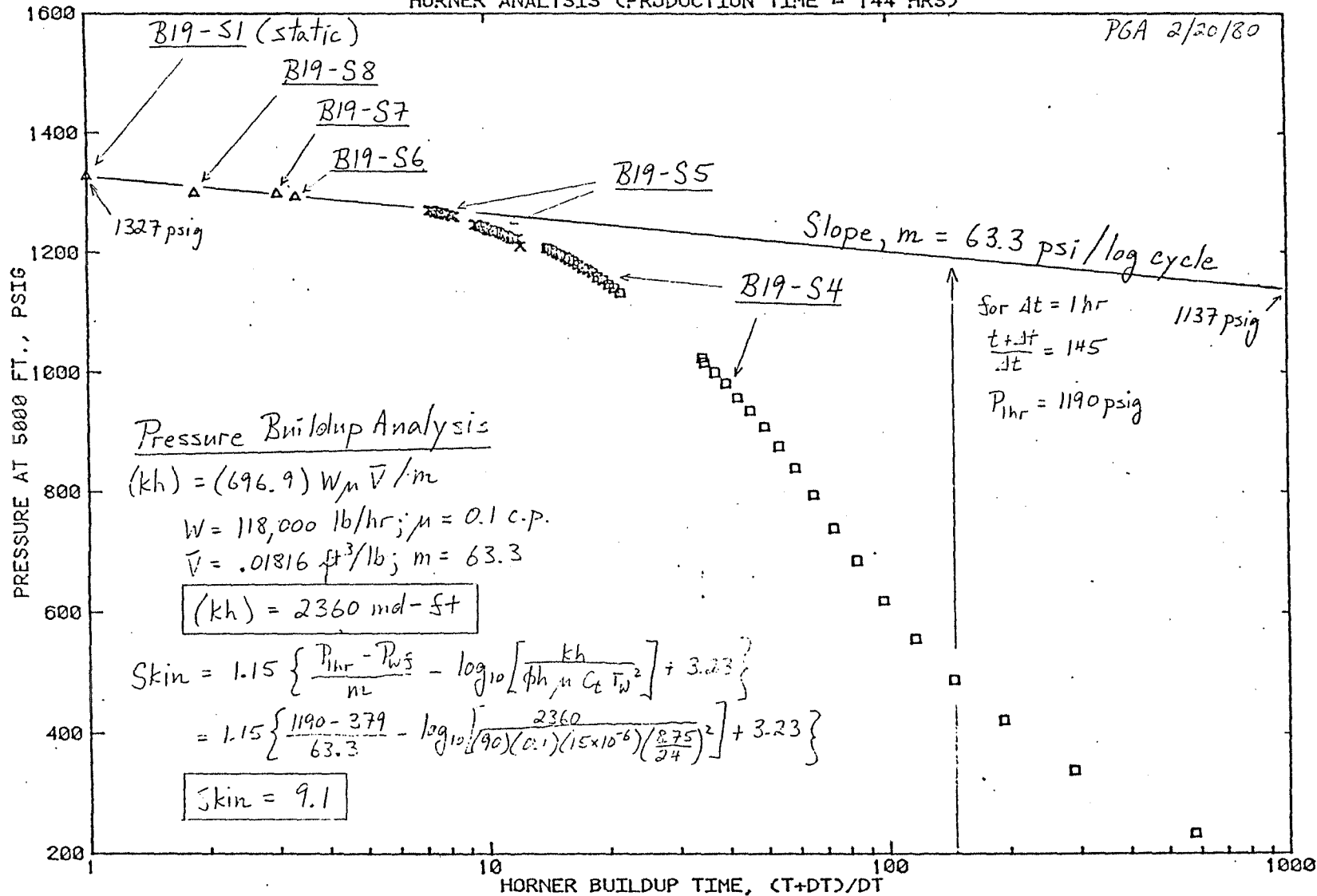
BACA 19 PRESSURE BUILDUP, 11/27-28/79  
TYPE CURVE ANALYSIS



PAUL E. ANDERSON

NOV 30 1979

FIGURE 11. BACA 19 PRESSURE BUILDUP - 11/27-12/03/79  
 HORNER ANALYSIS (PRODUCTION TIME = 144 HRS)





10 LINE  
7" ORIFICE

INS ORIFICE = 3.15  
INS H<sub>2</sub>O OF = 120"  
INT COEFFICIENT = 53

Union Oil Company of California



3ACA 19 2φ TEST

TE	TIME	WHP	WHT	2φ PI	2φ ΔP	2φ TEMP	PPM CHLORIDES	ph	INJ GPM	REMARKS
-26-80	0730	443	—	—	—	—	—	—	—	—
26	1238	443	—	—	—	—	—	—	—	—
26	1309	49	—	38	18	266	8640	6.9	—	well on SAND
-26	1335	32	241	21	9	240	—	—	—	—
-26	1451	46	258	40	10	257	6170	7.8	—	climbing
-26	1503	74	285	50	11.5	282	—	—	260	—
-26	1520	88	296	65	17	295	—	—	—	High cycle
-26	1610	22	226	16	5.5	231	7470	7.0	184	—
-26	1735	48	252	14	8.0	257	6170	6.5	150	—
-26	1940	11	195	7	1.5	210	6870	7.95	150	—
-26	2130	34	238	22	7.5	245	6970	6.3	184	—
-26-80	2330	28	225	16	4.5	235	6100	7.5	130	—
-27-80	0130	17	210	11	3.5	220	—	—	160	—
-27	0203	10	192	7	2	205	6600	8.3	—	—
-27	0340	71	290	50	13	289	5800	7.6	140	—
-27	0545	17	201	10	2.5	200	—	—	130	—
-27	0745	32	224	21	7	223	6700	7.2	135	—
-27-80	0955	26	213	17	4	212	—	—	119	—



10" LINE  
7" ORIFICE  
10" LINE - 6"  
1" ORIFICE = 3.75"  
1" H<sub>2</sub>O OF = 1200  
1" COEFFICIENT = 5.3

Union Oil Company of California

**UNION**

BACA 19 2 Φ TEST

DATE	TIME	RHP	WHT	2 Φ PI	2 Φ ΔP	2 Φ TEMP	PPM CHLORIDES	PH	INJ GPM	REMARKS SWITCH TEST REORDER TO 2
3-28-80	1310	21		15	3.5	238	6800	6.7	106	
3-28-80	1600	15		10	3	226	6500	7.6	106	
3-28-80	1730	23		15	3.5	238	6500	7.6	92	
3-28-80	1930	23		15	5.5	245	6800	7.95	150	
3-28-80	2130	28		12	4.5	235	6800	7.95	92	
3-28-80	2330	28		19	7	252	6700	7.8	—	
3-29-80	0130	18		12	2.5	235	6700	7.8	—	
3-29-80	0312	64		46	11.5	298	6100	6.5	140	HIGH CYCL.
3-29-80	0518	6		4	0.5	212	6800	6.8	150	LOW CYCL.
3-29-80	0738	57		40	11	283	6800	6.8	—	
3-29-80	0950	15	12	2.5	229	6800	6.8	84		



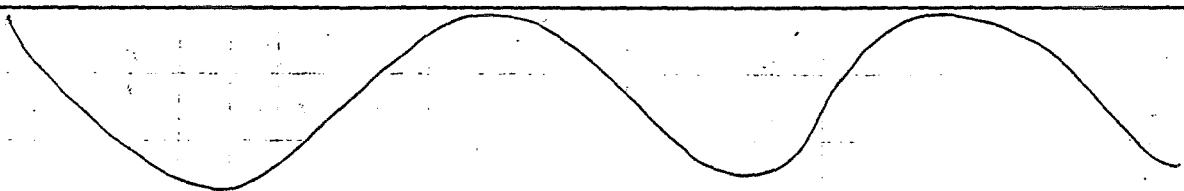
10" LINE  
 7" ORIPICE  
 INJ ORIFICE = 3.75"  
 INJ H<sub>2</sub>O OF = 1200  
 INJ COEFFICIENT = 5.3

Union Oil Company of California

**UNION**

BACA 19 2φ TEST

DATE	TIME	WHP	WHT	2φ PI	2φ ΔP	2φ TEMP	PPM CHLORIDES	PH	INJ GPM	REMARK
1/29/80	1700	37		36	8.5	265	6900	6.4	119	Low Cycle
"	1345	18		7	1	214				
"	1600	52		37	10	275	5900	5.9	106	
"	1750	15		10	2.5	222			75	Partially Plug.
"	1930	22		16	4.5	240	5800	7.35	53	
"	2130	23		15	4.5	240			140	
"	2335	19		13	2.5	235	6500	7.3	92	
1/30/80	0152	23		17	2.5	245	7100	6.9	106	
"	0330	15		11	2	230			75	Low Cycle
"	0630	20		13	4.5	240	7000	7.2	92	High Cycle Sample Take
"	0723	8		6	1	204	10,100	8.3	92	
"	0957	62		47	11.5	297	6000	7.9	75	
"	1225	15		121	3	228			75	
"	1400	44		28	7.5	263				
"	1605	12		10	3	226	2800	6.65	75	
"	1820	34		24	6	255			75	
"	2030	20		12	4	235	7500	6.45	75	
"	2205	20		12	3.5	232				
"	2335	65		44	11.5	288	7000	6.1	75	Low
1/31/80	0137	8		6	1	210	10,500	8.0	75	
"	0336	34		25	7.5	255				
"	0530	22		15	4.5	239	7000	6.8	75	
"	0616	8		6	1	210			75	Low



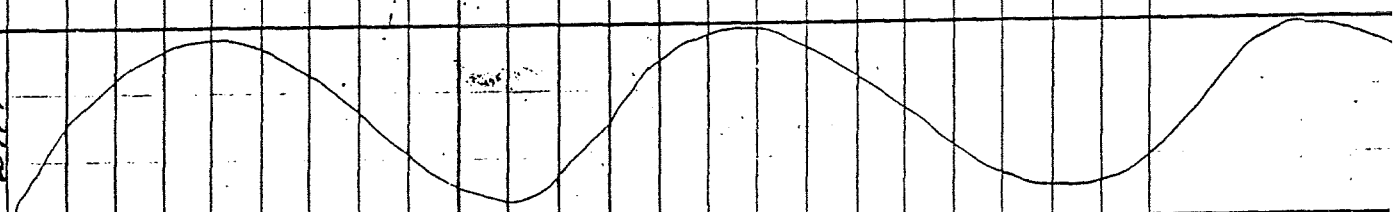
INJ ORIFICE = 53  
 INJ H<sub>2</sub>O OF = 1200  
 INJ COEFFICIENT = 53

7" ORIFICE



BACA 19 2φ TEST

DATE	TIME	WHP	WHT	2φ PI	2φ ΔP	2φ TEMP	PPM CHLORIDES	PH	INJ GPM	REMARKS
3-31-80	1013	20		16	4.5	234	7200	7.8	92	SAMPLE TAKEN
" "	1030	05		15	6	228				TEMP. RECORD
" "	1515	13		10	3.5	229	7200	6.8	75	OUT OF CALIBRATION
" "	1730	26		17	4.5	245			75	
" "	2000	13		10	3	222				
" "	2205	23		14	3.5	240	6400	7.0	56	
1-1-80	0150	14		10	2	218			75	Peak of Cycle
" "	0353	65		43	11.5	284			75	INTERNAL TIME
" "	0604	7		5	1	203	6700	8.1	75	TAKER A 0615



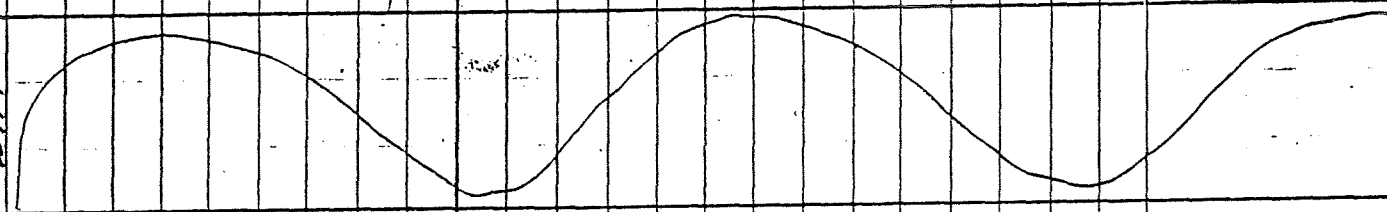
INJ H<sub>2</sub>O OF = 1200  
INJ COEFFICIENT = 5



7" ORIFICE

BACA 19 2φ TEST

DATE	TIME	WHP	WHT	2φ PI	2φ ΔP	2φ TEMP	PPM CHLORIDES	PH	INJ GPM	REMAI SAMPLE TAKEN
-1-80	0914	35		23	7.5	265	6800	6.45	106	
"	1114	12		7	1.5	220			75	
"	1235	23		16	3.5	242				
"	1645	18		10	2.5	232	6400	6.4		
"	1930	25		15	2.5	245				
"	2135	18		10	1.5	228	6200	6.8		
"	2335	48		35	9.5	280				
-2-80	0135	8		6	0.75	209	7800	8.2	150	LOW PARI OF CYCL
"	0330	31		22	5.5	245				
"	0600	15		10	2.5	224	7900	7.2	119	





7" ORIFICE

BACA 19 2φ TEST

DATE	TIME	WHP	WHT	2φ PL	2φ ΔP	2φ TEMP	PPM CHLORIDES	PH	INJ GPM	REMARKS
4-2-80	0930	43	—	28	6	268	—	—	106	
4-2-80	0934	SHUT	THROTTLE	VALUE	ABOUT	40%				
	0942	58		18	5.5	245				
	0950	55		16	5	244	5400	6.4		
	1134	8		4	0.5	203	7300	8.1		
	1225	0		0	0	195				
1-2-80	1630	VAC	SHUT	WELL	1W-					
1-3-80	0824	72	0-300	PSIG	7%.					
1-3-80	1500	22	0-300	7/8						

10" ORIPICE = 3.75"  
 10" H2O OF = 1200  
 10" COEFFICIENT = 5.7



10" LANE  
 7" ORIPICE

19 2 Φ TEST

TIME	WHP	WHT	2 Φ PI	2 Φ ΔP	2 Φ TEMP	PPM CHLORIDES	PH	INJ GPM	REMARKS
0950	105 PSIG								
0935	76.4 WHP	20.11 ON							
1015	71 PSIG	-	45	14	288 °f	7400	8.1		
1110	20	-	14	5	240				
1255	42	-	30	7.5	208	6600	7.6		
1530	41	-	8	2.0	222				
0950	18 PSIG	-	12	3.5	234 °f				
1255	39	-	26	8	262	6900	6.1		Low cycle
1425	7	-	6	1	216	8800	7.8		high cycle
1749	57	-	43	11	286	6000	5.8		
0400	15 PSIG	-	11	2.0	231 °f				
0530	45	-	34	8.0	270				
0600	53	-	39	10.0	279				
1020	59	-	43	10.5	286	6000	6.1		high cycle
1300	13	-	8	1.5	223	6800	7.8		low cycle
1500	56	-	40	10.0	282				

INT H<sub>2</sub>O OF = 1200  
 INT COEFFICIENT = 5

7" ORIFICE

UNION

MAY 19 2φ TEST

TIME	WHP	WHT	2φ PI	2φ ΔP	2φ TEMP	PPM CHLORIDES	pH	INJ GPM	REMARKS
0515	90	-	28	8.0	265 °F				
0810	19	-	12	2.5	235	6800	6.5		
1433	59	-	41	11.0	283	6200	6.1		
1600	22	-	14	3.5	239				
0535	52	-	42	11.0	284 °F				
0635	21	-	14	4.5	240				
0820	14	-	10	2.0	229	6900	7.4		
1305	13	-	8	1.5	222				
1515	57	-	41	10.5	271	5900	6.0		
0800	25	-	13	3.5	238 °F				
0920	11	-	6	1.5	218				
1843	19	-	12	3.5	232				
0930	28	-	29	7.0	265				
1015	23	-	18	5.0	246				
1732	13	-	7	1.5	219	6700	7.7		

R.O. ENGBRETSEN

MAY 18 1980

10" LINE  
7" ORIFICE

INJ ORIFICE = 3.75"  
INJ H<sub>2</sub>O OF = 1204

Union Oil Company of California

INJ COEFFICIENT = 5.7  
**UNION**

BACA 19 2φ TEST

DATE	TIME	WHP	WHT	2φ PI	2φ ΔP	2φ TEMP	PPM CHLORIDES	pH	INJ GPM	REMARK
-14-80	0715	31	-	22	6.5	254 f				
	1020	15	-	8	2.5	223				
	1140	35	-	22	6.0	255				
-15-80	0600	24	-	15	5.5	291				
-16-80	0720	14	-	9	2.0	226				
"	0955	38	-	26	8.5	261	6500	6.5		
"	1314	12	-	7	2	220				
4-18-80	0735	18	-	13	3	233	6200	6.8		
4-17-80	1330	17	-	10	3	232				
4-17-80	1617	27	-	18	6	248				
4-18-80	0827	41	-	27	6.5	264	5800	5.8		
"	1517	37	-	25	6.0	260	6800	5.9		
4-19-20	0855	55	-	37	9.5	278	5900	5.7		
"	16	27	-	17	6.0	246	6900	6.0		
		17	-							
4-20-80	0821	47	-	10	2.5	229				
"	0922	57	-	38	9.5	279	6200	5.8		
"	1545	57	-	37	10	278	6100	5.7		

10" LINE  
7" ORIFICE

INJ ORIFICE = 3.75"  
INJ H<sub>2</sub>O OF = 1200

BACA 19 2 φ TEST

INJ COEFFICIENT = 5.7

Union Oil Company of California

DATE	TIME	WHP	WHT	2 φ PI	2 φ ΔP	2 φ TEMP	PPM CHLORIDES	PH	INJ GPM	REMARK
-14-80	0715	31	-	22	6.5	259.4				
	1020	15	-	8	2.5	223				
	1140	35	-	22	6.0	255				
-15-80	0600	24	-	15	5.5	241				
-16-80	0720	14	-	9	2.0	226				
"	0955	38	-	26	8.5	261	6500	6.5		
"	1314	12	-	7	2	220				
1-18-80	0735	18	-	13	3	233	6200	6.8		
1-17-80	1330	17	-	10	3	232				
1-17-80	1617	27	-	18	6	248				
4-18-80	0827	41	-	27	6.5	264	5800	5.8		
"	1517	37	-	25	6.0	260	6600	5.9		
4-19-80	0855	55	-	37	9.5	278	5900	5.7		
"	16	27	-	17	6.0	246	6900	6.0		
		17	-							
4-20-80	0821	47	-	10	2.5	229				
"	0922	57	-	38	9.5	279	6200	5.8		
"	1545	57	-	37	10	278	6100	5.7		



INJ H<sub>2</sub>O OF = 1200  
 INJ COEFFICIENT = 5



BACH 19 2 φ TEST

DATE	TIME	WHP	WHT	2 φ PL	2 φ ΔP	2 φ TEMP	PPM CHLORIDES	PH	INJ GPM	REMARKS
1-21-80	0830	14	-	8	2	223	6500	6.8		
"	1155	23	-	14	5	240				
"	1430	14	-	8	2	222				
1-22-80	0740	10	-	7	2.0	223				
"	0820	9	-	5	1.5	213	6500	7.0		
1-23-80	0820	20	-	12	4.0	233	6700	6.0		
"	1125	16	-	10	3	224	6200	6.2		
1-24-80	0830	30	-	22	7.0	254				
"	1048	28	-	5	1.5	210	7400	8.0		
"	1550	22	-	13	4.5	237				
1-25-80	0845	36	-	25	6.0	260				
"	1415	15	-	9	3.0	226	6500	7.3		
1-26-80	0845	14	-	7	2.0	222	6000	7.6		
"	1238	23	-	15	5.0	241				
"	1540	14	-	7	2.0	222				
1-27-80	0945	18	-	13	4.0	236	6700	6.3		
"	1815	13	-	8	1.5	223				





INJ H<sub>2</sub>O OF = 1200

INJ COEFFICIENT = 5



7" ORIFICE

BACA 19 2φ TEST

DATE	TIME	WHP	WHT	2φ PI	2φ ΔP	2φ TEMP	PPM CHLORIDES	PH	INJ GPM	REMARKS
5-1-80	0829	15	—	10	2.5	228	6200	6.1		
"	1509	15	—	8	2.5	223				
5-2-80	0830	16	—	11	3	233	6810	5.9		
5-3-80	0840	55	—	37	10	219	6500	5.7		
"	0930	30	—	20	6.5	253				
5-4-80	0915	14	—	7	2.0	219	6400	7.6		
"	1540	11	—	5	1.5	216	6100	6.9		
5-5-80	0800	48	—	38	10.5	280	6710	6.0		
"	1600	27	—	20	6.0	251				

R.O. ENGBRETSEN  
MAY 8 1980

10" LINE  
 7" ORIFICE  
 INJ ORIFICE = 3.75"  
 INJ H2O OF = 1200  
 INJ COEFFICIENT = 53



BACA 19 2 Φ TEST

DATE	TIME	WHP	WHT	2 Φ PI	2 Φ ΔP	2 Φ TEMP	PPM CHLORIDES	PH	INJ GPM	REMARK
-6-80	0935	15	—	10	2.5	230	6000	6.8		
" "	1325	17	—	12	3.5	235				
-7-80	0811	31	—	19	6.5					
-8-80	0830	13	—	8	2	228				
" "	1500	"	—	7	2					
-9-80	0815	23	—	17	5.25					
" "	1600	18	—	12	4	239				
R.O. ENGBREITSEN MAY 13 1980										









UNION GEOTHERMAL CO. OF NEW MEXICO  
PRESSURE INTERFERENCE DATA

WELL NAME : BACA # 19  
 TRANSDUCER : PAROSCIENTIFIC  
 MODEL# : 2900 - A - 002  
 SERIAL# : 7372      900 PSIA

CHAMBER SETTING : 3,500' KB

DATE	TIME #RS	AMBIENT TEMP. °F	TRANSR. RDGS.		WHP PSIC	WHT	INITIALS	REMARKS
			PRESS.	FREQ.				
1-28-82	1400	45	—	—	37			INSTALLED TUBING/CHAMBER
29	1505	44	690.601	27.26021	36			
2-1-82	1510	30	691.130	27.26207	36			
2	1415	25	692.254	27.26601	37			
3	1345	29	692.636	27.26732	37			
4	1405	24	693.173	27.26914	37			
5	1440	42	692.751	27.26768	37			
8	1350	28	692.655	27.26740	39			
9	1502	38	692.463	27.26672	40			
10	1355	32	692.871	27.26816	40			@ 1330 #RS. PURGED TUBING w/ N <sub>2</sub>
11	0840	29	693.159	27.26910	40			
12	1440	52	693.242	27.26941	40			
16	1215	57	692.699	27.26751	42			START B-18 INJECTION @ 1520 #RS
17	1340	64	693.032	27.26863	42			
18	1035	32	693.173	27.26922	42			
19	1215	60	693.025	27.26872	42			
20	1115	67	693.170	27.26916	44			
21	1015	62	693.240	27.26953	44			

# UNION GEOTHERMAL CO. OF NEW MEXICO

## PRESSURE INTERFERENCE DATA

WELL NAME: BACA N<sup>o</sup> 10  
 TRANSDUCER: PAROSCIENTIFIC  
 MODEL#: 2900 - A - 002  
 SERIAL#: 7372      900 PSIA

CHAMBER SETTING: 3,500' eKB

DATE	TIME HRS	AMBIENT TEMP. °F	TRANSR. RDGS.		WHP PSIC	WHT	INITIALS	REMARKS
			PRESS.	FREQ.				
2-22-82	1405	62	693.078	27.26877	44			
23	1405	54	693.371	27.26985	44			
24	1110	58	693.811	27.27138	43			
25	0945	20	693.633	27.27080	44			
26	1030	62	693.937	27.27146	44			
27								NO DATA TAKEN
28	0945	42	693.653	27.27108	44			
3-01-82	1000	56	693.860	27.27156	44			
02	1430	48	693.802	27.27136	47			
03	1350	38	694.523	27.27301	47			
04	1530	35	693.780	27.27130	47			
05	1345	28	694.279	27.27305	47			
06	0940	44	694.624	27.27439	47			
07	1010	56	694.201	27.27273	48			
08	1145	43	693.808	27.27140	47			
09	1245	66	694.270	27.27320	49			
10	1435	56	694.342	27.27319	50			
11	1045	57	694.977	27.27544	50			

# UNION GEOTHERMAL CO. OF NEW MEXICO

## PRESSURE INTERFERENCE DATA

WELL NAME : BACA № 19  
 TRANSDUCER: PAROSCIENTIFIC  
 MODEL #: 2900 - A - 002  
 SERIAL #: 7372      900 FELA

CHAMBER SETTING: 3500 @ KB

DATE	TIME HRS	AMBIENT TEMP. °F	TRANSR. RDGS.		WHP PSIC	WHT	INITIALS	REMARKS
			PRESS.	FREQ.				
3-12-82	1430	48	695.482	27.27727	50			
13	0955	40	695.410	27.27698	51			
14	1010	49	695.500	27.27710	51			
15	1445	36	695.336	27.27666	51			
16	1005	58	695.269	27.27650	52			
17	1220	60	694.799	27.27490	52			
18	1125	50	695.186	27.27619	53			
19	1300	28	695.192	27.27622	52			
20	1110	50	695.361	27.27677	54			
21	1045	55	695.200	27.27640	54			
22	1220	48	695.614	27.27768	71			
23	1005	46	695.660	27.27786	80			
24	1045	42.5	695.275	27.27650	91			
25	1145	52	695.221	27.27629	99			
26	1000	32	694.704	27.27452	104			
27	0955	54	695.080	27.27555	115			
28	0955	68	695.126	27.27577	123			
29	1425	32	695.720	27.27804	139			

# UNION GEOTHERMAL CO. OF NEW MEXICO

## PRESSURE INTERFERENCE DATA

WELL NAME: BACA # 19  
 TRANSDUCER: PAROSCIENTIFIC  
 MODEL #: 2700 - A - 002  
 SERIAL #: 7372      900 PELA

CHAMBER SETTING: 3500 eKB

DATE	TIME HRS	AMBIENT TEMP. °F	TRANSR. RDGS.		WHP PSIC	WHT	INITIALS	REMARKS
			PRESS.	FREQ.				
3-30-82	1325	38	695.878	27.27855	148			
31	0920	62	695.450	27.27717	158			
4-1-82	0954	60	695.149	27.27600	167			
2	1330	45	695.080	27.27578	178			
3	0915	58	695.898	27.27873	187			
4	1147	56	695.900	27.27892	199			
5	1220	54	696.030	27.27914	208			
6	1015	39	695.459	27.27716	225			
7	0945	39	695.516	27.27735	224			
8	1103	58	696.168	27.27973	234			
9	0854	40	696.108	27.27925	244			
10	1025	62	696.263	27.27992	256			
11	—	—	—	—	—			
12	1420	56	696.033	27.27906	218			
13	0718	48	696.409	27.28054	284			SHUT-IN B18 W-INS. @ 0856 HRS.
13	1053	60	696.5	27.2809	286			
14	1045	60	695.858	27.27897	297			
14	1335	62	695.775	27.27803	298			

# UNION GEOTHERMAL CO. OF NEW MEXICO

## PRESSURE INTERFERENCE DATA

WELL NAME : BACA No 19  
 TRANSDUCER: PAROSCIENTIFIC  
 MODEL #: 2900 - A - 002  
 SERIAL #: 7372      900 FELA

CHAMBER SETTING: 3500 @ KB

DATE	TIME HRS	AMBIENT TEMP. °F	TRANSR. RDGS.		WHP PSIC	WHT	INITIALS	REMARKS
			PRESS.	FREQ.				
4-15-82	1310	56	696.545	27.27905	302			
16	1045	64	696.541	27.28081	302			
17	1155	63	696.274	27.28193	302			
18	1047	67	695.884	27.27854	302			
19	1350	62	696.225	27.27993	302			
20	1115	48	696.291	27.28002	302	PURGED	N <sub>2</sub> @	1350 HRS.
20	1310	52	695.333	27.27677	302			
21	1045	58	695.447	27.27913	302			
22	1220	32	696.432	27.28052	302			
23	1050	34	695.413	27.27698	302			
24	1200	55	695.041	27.27878	302			
25	0838	55	695.001	27.27875	305			
26	1305	68	696.060	27.28237	305			
27	1050	66	695.255	27.27644	305			
28	0855	52	695.858	27.27854	305			
29	1420	74	695.881	27.27858	304			
30	1310	70	695.028	27.27550	305			
5-1-82	1130	70	695.381	27.27680	305			

# UNION GEOTHERMAL CO. OF NEW MEXICO

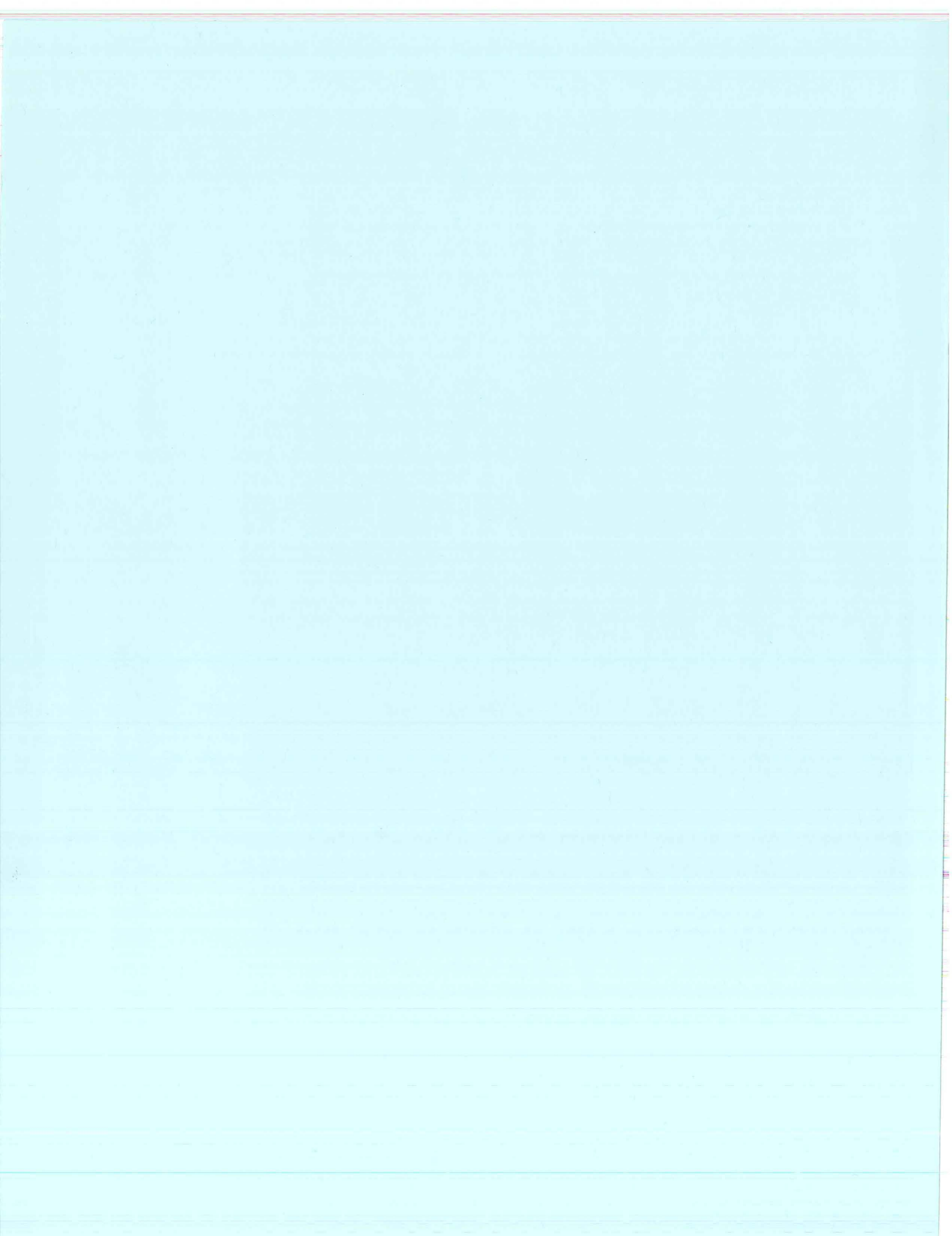
## PRESSURE INTERFERENCE DATA

WELL NAME: BACA #2 19  
 TRANSDUCER: PAROSCIENTIFIC  
 MODEL#: 2000-A-002  
 SERIAL#: 7372      900 PSIA

CHAMBER SETTING: 3500 @KB

DATE	TIME HRS	AMBIENT TEMP. °F	TRANSR. RDGS.		WHP PSIC	WHT	INITIALS	REMARKS
			PRESS.	FREQ.				
5-2-82	0035	57	695.635	27.27870	305			
3	1100	64	696.010	27.27905	304			
4	1005	68	696.383	27.28035	305			
5	1303	61	695.930	27.27848	305			
6	0046	58	695.981	27.27903	305			
7	1305	60	696.567	27.28041	305			
8	0845	56	696.481	27.28030	305			
9	1000	50	696.745	27.28163	307			
10	0950	58	697.240	27.28456	308			
11	1007	50	695.649	27.27931	309			
12	1325	42	696.260	27.28155	310			
13	0951	37	696.733	27.28331	310.5			
14	0841	46	697.467	27.28514	313			
15	0913	58	698.025	27.28784	319			
16	1230	66	697.181	27.28305	325			
17	0958	70	696.980	27.28215	329			
18	0859	70	697.353	27.28390	331			
19	0928	62	696.876	27.28217	336			











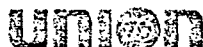
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		7 / 1	of

BACA No. 19 WATER INJECTION

DATE	DAILY TOTAL GALS	CUMULATIVE GALS	REMARKS
7-1-81	164385	164385	Continued injection from Baca-4
2	207167	371552	
3	161434	532986	
4	178400	711386	
5	230034	941420	
6	209064	1150484	
7	220760	1371244	
8	193995	1565239	
9	197367	1762606	
10	238042	2000648	
11	237304	2237952	
12	236356	2474308	
13	227715	2702023	
14	294207	2996230	
15	249949	3246179	
16	260697	3506876	
17	255850	3762726	
18	255429	4018155	
19	252162	4270317	
20	255850	4526167	
21	311733	4837900	Switched to injection from B-13
22	273267	5111167	
23	287376	5398543	
24	311882	5710425	
25	178536	5888961	
26	170007	5998968	
27	109795	6108763	
28	86457	6195220	
29	60149	6255369	
30	433664	6689033	
31	419661	7108694	
	<b>CSTDOE</b>		

R.O. ENGBRETSEN

AUG 1 1981



Prepared by JPR Checked by \_\_\_\_\_ Date    /   /    Sheet 1 of 2

Title BACA No 10 WATER INJECTION W.O. / A.F.E. no. \_\_\_\_\_

DATE	EXACT TIME HRS.	Δ H "W.C.	RATE GPM	DAILY TOTAL GALS.	CUMULATIVE GALS	REMARKS
8-1-81	0000 - 0930	97	296		168,565	WATER
	0930 - 2400	95.71	293.5	423,904	423,904	PRODUCED
8-2-81	0000 - 0835	94.79	292		574,329	FROM
	0835 - 2400	94.95	292.33	420,828	844,732	BACA No 13
8-3-81	0000 - 0858	92.24	288.28		999,824	
	0858 - 2400	93.46	290.02	554,598	1,261,423	INJECTION LINE
8-4-81	0000 - 1327	92.00	287.75		1,493,637	= 4"
	1327 - 2400	89.55	283.89	411,917	1,673,340	ORIFICE = 2.75"
8-5-81	0000 - 0835	90.96	286.11		1,820,688	COEFF = 30
	0835 - 2400	90.24	284.99	410,962	2,084,302	
8-6-81	0000 - 0910	90.91	286.04		2,241,622	
	0910 - 2400	91.84	287.99	413,190	2,497,492	
8-7-81	0000 - 0845	88.92	282.89		2,646,007	
	0845 - 2400	89.13	283.23	407,674	2,905,166	
8-8-81	0000 - 0925	88.13	281.63		3,064,289	
	0925 - 2400	89.27	283.45	407,143	3,312,309	
8-9-81	0000 - 0918	87.49	280.6		3,468,887	
	0918 - 2400	88.24	281.8	405,128	3,717,437	R.O. ENGBRETSSEN
8-10-81	0000 - 0915	88.3	281.9		3,873,908	SEP 01 1981
	0915 - 2400	85.8	277.85	402,370	4,119,806	
8-11-81	0000 - 0900	88.3	281.9		4,272,034	
	0900 - 2400	84.9	276.4	400,991	4,520,797	
8-12-81	0000 - 0854	83.4	274		4,667,084	
	0854 - 2400	84.6	276	396,323	4,917,120	
8-13-81	0000 - 0900	82.25	272		5,064,044	
	0900 - 2400	83	273	392,928	5,310,048	
8-14-81	0000 - 1200	83.4	274		5,507,361	
	1200 - 2400	83.4	274	394,626	5,704,674	
8-15-81	0000 - 0815	82	272		5,839,186	
	0815 - 2400	83.3	274	393,247	6,097,921	
8-16-81	0000 - 0830	81.9	271.6		6,236,464	
	0830 - 2400	86	278	397,384	6,495,304	
8-17-81	0000 - 1015	82.4	272		6,662,808	
	1015 - 2400	83	273	393,034	6,888,339	

CSTD08

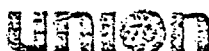


Prepared by JPR Checked by \_\_\_\_\_ Date    /   /    Sheet 2 of 2

Title BACA No 19 WATER INJECTION W.O. / A.F.E. no. \_\_\_\_\_

DATE	EXACT TIME HRS.	Δ H "W.C.	RATE GPM	DAILY TOTAL GALS.	CUMULATIVE GALS	REMARKS
8-18-81	0000 - 0918	82	272		7,040,036	
	0918 - 2400	81	270	389,958	7,278,297	
8-19-81	0000 - 0830	83.6	274		7,418,219	
	0830 - 2400	82.3	272	393,034	7,671,331	
8-20-81	0000 - 0925	81	270		7,824,090	
	0925 - 2400	80.4	269	388,155	8,059,486	
8-21-81	0000 - 0905	80.75	269.6		8,206,410	
	0905 - 2400	80.6	269.4	388,049	8,447,535	
8-22-81	0000 - 1200	81	270		8,641,983	
	1200 - 2400	80.9	269.9	388,791	8,836,326	
8-23-81	0000 - 1200	81	270		9,030,775	
	1200 - 2400	80.9	269.9	388,791	9,225,117	
8-24-81	0000 - 0900	80	269		9,370,131	
	0900 - 2400	80	269	386,882	9,611,999	
8-25-81	0000 - 1110	77.2	264		9,788,626	
	1110 - 2400	81	270	384,866	9,996,865	
8-26-81	0000 - 0930	78	266		10,148,350	
	0930 - 2400	79.9	268	384,866	10,381,731	
8-27-81	0000 - 1000	79.7	267.8		10,542,446	
	1000 - 2400	79.6	267.6	385,503	10,767,234	
8-28-81	0000 - 0915	79.6	267.6		10,915,749	
	0915 - 2400	80.7	269.6	387,094	11,154,327	
8-29-81	0000 - 0934	75	260		11,303,479	
	0934 - 2400	79.4	267	380,729	11,535,056	
8-30-81	0000 - 0923	78.3	265		11,684,526	
	0923 - 2400	80.5	269	385,609	11,970,665	
8-31-81	0000 - 1010	81.6	271		12,086,047	
	1010 - 2400	80	268.8	388,473	12,309,138	

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BACA No 19 WATER INJECTION

W.O. / A.F.E. no.

DATE	EXACT TIME HRS.	Δ H "W.C.	RATE GPM	DAILY TOTAL GALS.	CUMULATIVE GALS	REMARKS
9-1-81	0000 - 0900	79.3	267.2		144,272	WATER PRODUCED
	0900 - 2400	79.7	267.8	385,290	385,290	FROM BACA NO 13
9-2-81	0000 - 0904	78.3	265.4		529,668	
	0904 - 2400	81.4	270.6	386,882	772,172	INJECTION LINE = 4'
9-3-81	0000 - 0932	79.2	267		924,930	ORIFICE BORE = 2.75"
	0932 - 2400	79.6	267.6	385,078	1,157,250	COEFFICIENT = 30
9-4-81	0000 - 0920	78.7	266.2		1,306,296	
	0920 - 2400	79.4	267.3	384,230	1,541,480	
9-5-81	0000 - 0912	96.1	294.0		1,703,786	
	0912 - 2400	83.2	273.6	405,234	1,946,714	
9-6-81	0000 - 1013	78.9	266.5		2,110,080	
	1013 - 2400	79.7	267.8	384,866	2,331,580	
9-7-81	0000 - 0940	79.2	267.0		2,486,460	
	0940 - 2400	81	270	387,094	2,718,674	
9-8-81	0000 - 0842	79.1	266.8		2,857,960	
	0842 - 2400	78.6	266	383,487	3,102,161	
9-9-81	0000 - 0925	78.2	265.3		3,252,055	
	0925 - 2400	78.52	265.9	382,532	3,484,693	
9-10-81	0000 - 1050	76.7	262.75		3,655,486	
	1050 - 2400	14.65	114.81	261,493	3,746,186	
9-11-81	0000 - 0930	101	301.5		3,918,039	
	0930 - 2400	16.95	123.5	279,314	4,025,550	
9-12-81	0000 - 0900	98.3	297.4		4,186,109	
	0900 - 2400	81.8	271.3	404,810	4,430,310	
9-13-81	0000 - 1000	36.3	180.87		4,538,832	
	1000 - 2400	25.73	152.2	236,351	4,666,661	
9-14-81	0000 - 0915	75.5	260.7		4,811,357	
	0915 - 2400	33.3	173.1	297,879	4,964,540	
9-15-81	0000 - 0905	16.4	121.5		5,030,735	
	0905 - 2400	7.11	80.01	137,801	5,102,340	
9-16-81	0000 - 1005	4.6	64.2		5,141,166	
	1005 - 2400	79.8	268.1	262,659	5,364,999	
9-17-81	0000 - 1000	80.14	268.6		5,526,138	

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Title: BACA No 12 WATER INJECTION  
 W.O. / A.F.E. no. \_\_\_\_\_

DATE	EXACT TIME #RS.	A. H "W.C.	RATE GPM	DAILY TOTAL GALS.	CUMULATIVE GALS	REMARKS
9-18-81	0000 - 1038	78.6	266		5,885,120	WATER PRODUCED
	1038 - 2400	46.04	203.6	332,992	6,048,381	FROM BACA No 13
9-19-81	0000 - 1003	66.4	244.5		6,195,835	
	1003 - 2400	57.51	231.43	341,160	6,389,541	INJECTION LINE = 4"
9-20-81	0000 - 1014	34.8	176.9		6,498,169	ORIFICE BORE = 2.75"
	1014 - 2400	54.22	220.9	291,089	6,680,631	COEFFICIENT = 30
9-21-81	0000 - 0850	69.9	250.8		6,813,552	
	0850 - 2400	80.15	262.6	377,334	7,057,965	
9-22-81	0000 - 0944	80.3	268.84		7,214,966	
	0944 - 2400	19.5	132.6	270,509	7,328,474	
9-23-81	0000 - 0855	59.7	231.8		7,452,484	
	0855 - 2400	67.1	245.7	346,358	7,674,832	
9-24-81	0000 - 0918	76.9	263		7,821,650	
	0918 - 2400	60	232.7	352,087	8,026,919	
9-25-81	0000 - 0914	73.8	257.7		8,169,706	
	0914 - 2400	38.4	185.8	307,426	8,334,345	
9-26-81	0000 - 0923	76.1	261.7		8,481,693	
	0923 - 2400	60.9	234.2	352,723	8,687,068	
9-27-81	0000 - 0950	9.1	90.4		8,740,428	
	0950 - 2400	60.97	234.3	252,476	8,939,544	
9-28-81	0000 - 0949	71.96	254.5		9,089,438	
	0949 - 2400	50.96	214.16	332,143	9,271,687	
9-29-81	0000 - 0918	46.84	205.3		9,386,256	
	0918 - 2400	67.96	245.9	331,507	9,603,194	
9-30-81	0000 - 0907	74.6	259		9,744,920	
	0907 - 2400	76.5	262.5	376,168	9,979,362	
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Title BACA No 17 WATER INJECTION	W.O. / A.F.E. no.
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DATE	EXACT TIME #RS.	Δ H "W.C.	RATE GPM	DAILY TOTAL GALS.	CUMULATIVE GALS	REMARKS
10-01-81	0000 - 0905	69.7	250.5		136,528	WATER PRODUCED
	0905 - 2400	77.6	264.3	373,091	373,091	FROM BACA No 13
10-02-81	0000 - 0855	73.0	256.4		510,255	
	0855 - 2400	72.0	254.6	367,575	740,666	INJECTION LINE = 4"
10-03-81	0000 - 1020	96.6	294.8		923,445	ORIFICE BORE = 2.75"
	1020 - 2400	36.7	181.8	331,825	1,072,491	COEFFICIENT = 30
10-04-81	0000 - 1020	86.6	279.2		1,245,617	
	1020 - 2400	80.9	269.9	394,520	1,467,010	
10-05-81	0000 - 0945	96.7	295.0		1,639,606	
	0945 - 2400	93.8	290.6	421,040	1,888,050	
10-06-81	0000 - 0906	113.1	319.0		2,062,237	
	0906 - 2400	50.2	212.6	364,286	2,252,337	
10-07-81	0000 - 0909	58.9	230.3		2,378,787	R.O. ENGBRETSEN
	0909 - 2400	9.5	92.6	208,982	2,461,319	NOV 2 1981
10-08-81	0000 - 0903	39.1	187.5		2,563,157	
	0903 - 2400	41.8	193.9	275,814	2,737,132	
10-09-81	0000 - 0918	9.9	94.3		2,789,749	
	0918 - 2400	27.2	156.4	190,524	2,927,656	
10-10-81	0000 - 0952	53.1	218.6		3,057,076	
	0952 - 2400	40.7	191.4	291,726	3,219,382	
10-11-81	0000 - 0810	53.0	218.4		3,326,419	
	0810 - 2400	2.4	46.2	150,955	3,370,337	
10-12-81	0000 - 0858	59.9	232.3		3,495,301	
	0858 - 2400	11.2	100.6	215,664	3,586,001	
10-13-81	0000 - 0855	61.1	234.6		3,711,496	
	0855 - 2400	1.42	35.15	157,850	3,743,851	
10-14-81	0000 - 0905	4.5	63.5		3,778,434	
GSTDOE	0905 - 2400	50.35	212.9	225,106	3,968,958	
10-15-81	0000 - 0907	74.5	258.9		4,110,578	
	0907 - 2400	74.8	259.4	373,303	4,342,261	
10-16-81	0000 - 0955	74.7	259.2		4,496,504	
	0955 - 2400	70.96	252.7	367,787	4,710,047	
10-17-81	0000 - 1108	43.8	198.5		4,842,650	
	1108 - 2400	60.6	233.6	312,942	5,022,990	

