

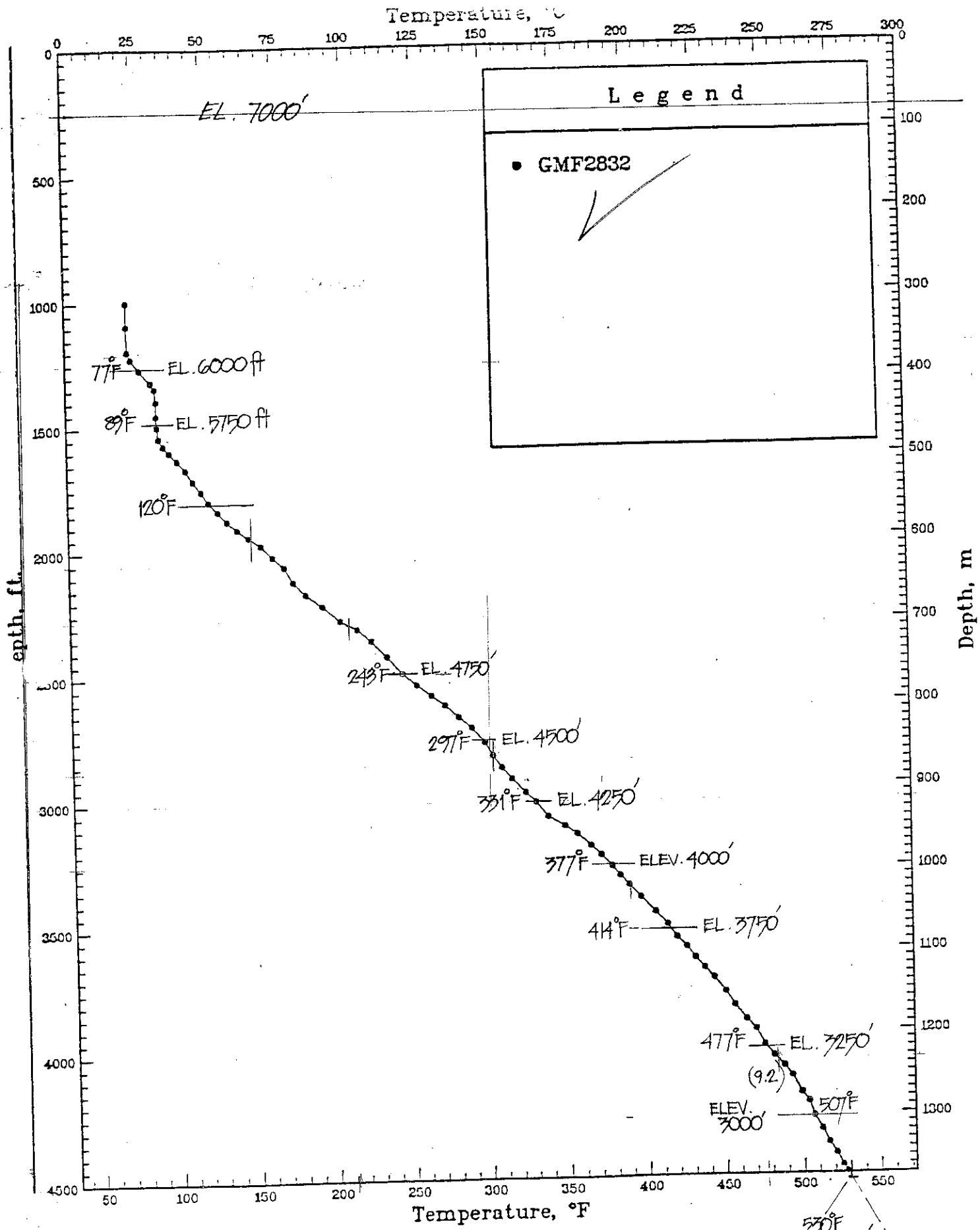
GMF 28-32

Well Name GMF 28-32 Unocal memorandum
 Latitude 4607156.09 Daniel L carrier
 Longitude 622002.66 1989
 TD ft (OH) 3460
 (DP) 4500

depth_ft	Temperature_F	depth_m	Temperature_C
1225	77	373	25
1805	122	550	50
2050	167	625	75
2675	212	815	100
2870	302	875	150
3280	392	1000	200
4000	482	1219	250
4500	520	1372	271

depth (ft)	Temperature (°F)	depth (m)	Temperature (C)
1000	70	305	21
1550	95	472	35
1950	150	594	66
2250	200	686	93
2500	250	762	121
2850	300	869	149
3050	350	930	177
3450	400	1052	204
4300	450	1311	232
4500	520	1372	271

To Convert	Into	Multiply by
feet	meters	0.304799
Fahrenheit (°F)-32	Celsius	0.555556



PRUETT INDUSTRIES INC
 8915 ROSEDALE HWY, BAKERSFIELD, CA. 93308
 (805) 589-2768

SUB-SURFACE TEMPERATURE SURVEY

CO. OCCIDENTAL		RUN 03 FIELD MEDICINE LAKE	WELL 28-32
EFF DEPTH		WELL STAT	STATIC
CASING	-	CASING PRESS	ON BOTTOM 12:55
LINER	-	TUBING PRESS	OFF BOTTOM 1:10
DATE	090584	ELEMENT RANGE	72 - 540
ELEVATION		ZONE	SHUT-IN
MAX TEMP		PICK-UP	4495'
PERF	-	CAL SER NO.	113
TUBING	-		MPP
UNITS	ENGLISH	PURPOSE	TEMPERATURE TRAVERSE

SURVEY DATA

CO. OCCIDENTAL				RUN 03 FIELD MEDICINE LAKE				WELL 28-32			
TIME	DEPTH	P/T	GRAD	TIME	DEPTH	P/T	GRAD	TIME	DEPTH	P/T	GRAD
10:00	1000	72.5	0.000	11:08	2362	225.4	0.000				
10:05	1092	72.4	0.000	11:11	2428	235.5	0.000				
10:10	1194	72.9	0.000	11:15	2496	245.3	0.000				
10:11	1226	74.7	0.000	11:17	2543	254.1	0.000				
10:14	1270	80.3	0.000	11:19	2585	263.6	0.000				
10:16	1319	87.2	0.000	11:22	2625	272.6	0.000				
10:17	1345	89.8	0.000	11:24	2673	281.3	0.000				
10:20	1395	90.6	0.000	11:26	2714	289.4	0.000				
10:23	1453	90.4	0.000	11:29	2772	297.7	0.000				
10:25	1497	90.8	0.000	11:31	2824	302.9	0.000				
10:27	1542	92.0	0.000	11:34	2872	308.5	0.000				
10:29	1573	94.9	0.000	11:36	2917	314.9	0.000				
10:30	1600	98.3	0.000	11:39	2973	323.6	0.000				
10:32	1633	103.4	0.000	11:41	3012	330.8	0.000				
10:34	1670	108.7	0.000	11:44	3070	338.7	0.000				
10:36	1714	113.6	0.000	11:46	3108	349.1	0.000				
10:38	1757	118.8	0.000	11:47	3141	356.6	0.000				
10:40	1799	123.5	0.000	11:49	3188	364.6	0.000				
10:42	1837	129.1	0.000	11:51	3224	371.4	0.000				
10:44	1877	135.0	0.000	11:53	3271	377.9	0.000				
10:46	1912	141.4	0.000	11:55	3308	383.2	0.000				
10:47	1944	148.2	0.000	11:58	3346	388.8	0.000				
10:49	1978	155.6	0.000	12:00	3394	396.5	0.000				
10:51	2024	162.8	0.000	12:03	3455	406.0	0.000				
10:53	2065	170.3	0.000	12:05	3504	413.5	0.000				
10:56	2126	175.9	0.000	12:08	3557	419.2	0.000				
10:59	2174	183.7	0.000	12:10	3596	425.3	0.000				
11:01	2223	194.4	0.000	12:12	3639	430.7	0.000				
11:04	2279	205.7	0.000	12:14	3679	436.7	0.000				
11:06	2316	216.3	0.000	12:16	3719	442.9	0.000				

SURVEY DATA

CO. OCCIDENTAL				RUN 03 FIELD MEDICINE LAKE				WELL 28-32			
TIME	DEPTH	P/T	GRAD	TIME	DEPTH	P/T	GRAD	TIME	DEPTH	P/T	GRAD
12:19	3774	450.5	0.000	12:39	4182	499.1	0.000				
12:22	3829	456.2	0.000	12:41	4218	503.3	0.000				
12:25	3887	463.7	0.000	12:44	4276	506.8	0.000				
12:26	3927	470.0	0.000	12:46	4327	511.7	0.000				
12:29	3990	475.8	0.000	12:49	4379	516.4	0.000				
12:32	4036	481.7	0.000	12:51	4423	521.1	0.000				
12:34	4074	488.1	0.000	12:53	4471	525.2	0.000				
12:36	4115	493.1	0.000	13:06	4495	527.5	0.000				

BY DRIVER / DRIVER

Well Name 28-32 Earth Science Laboratory
 Latitude 4607156.09 University of Utah Research Inst.
 Longitude 622002.66 1988
 TVD ft

depth_ft	mineralogy						
	MM= Predominant M= Major m= Minor <m= <5wt%						
	Quartz	Cristobal.	Tridimite	K-Spar	Plagioclase	Ilmenite	Hematite
440		M	m	MM	<m?		<m
860	m	M	m	MM			
1280		M		M	m		
1500	m	M		M	m		
1950	<m?			<m?	MM		M
2480		M		M			<m?
2950	M			MM			<m
3532	m			<m?	MM	<m	<m
3968	M			m?	M		m
4500	m			m?	M		

depth_ft	mineralogy					
	Magnetitie	Smectite	Illite/ Mica	Chlorite	Koal./ Serpntn.	Calcite
440						
860		<m				
1280		<m				
1500		<m?	<m			
1950		<m				
2480		m				
2950						
3532	<m?	M			<m?	
3968				m		<m
4500			<m	M		<m

depth_ft	mineralogy					
	Glass	Limonite	Pyrite	Clay	Zeolite	Trace amts.
440						
860						
1280						
1500						
1950	m?					cpx, ap
2480						
2950						
3532	m?					cpx,ap
3968						
4500						

APPENDIX 3

OBSERVATIONS AND INTERPRETATIONS FOR GMF 17A-6 AND SELECT BOREHOLES MENTIONED IN THE TEXT.

The observations and interpretations summarized below help to further illustrate the significance of the anomalous geochemical data in select boreholes and well GMF 17A-6. The distribution of the geochemical data is shown in Figure 7 for GMF 28-32, GMF 17A-6 (17-6), GMF 45-37, GMF 44-33 and ML 14-23, Figure 8 for GMF 56-3, and Figure 9 for GMF 87-13.

- (1) GMF 28-32: The trace-element data are characterized by anomalous enrichment from 10' to 650' and 1910' to 3460'. No trace-element data were collected below 3460'. The oxygen-18 data are characterized by anomalous depletion at 440', and values that decrease uniformly from background levels at 3120' to strongly-depleted levels (D population) at 4252'. This is probably the result of a high-conductive temperature gradient over this interval. The coincidence of anomalous mercury and arsenic enrichment, and $\delta^{18}O$ values that decreases from background to low-level depletion in the 1910' to 3460' interval probably indicates of low to moderate hydrothermal activity. The occurrence of anomalous arsenic and $\delta^{18}O$ values in the 10' to 650' interval is probably indicative of the lateral flow of shallow, low to moderate-temperature thermal fluids.
- (2) GMF 17A-6 (17-6): The geochemical data from GM 17A-6 is of particular interest because mafic to silicic intrusive rocks are present from 7720' to 9620' T.D. in the well. The data are characterized by arsenic enrichment in the 4000' to 6500' interval and strong oxygen depletion from 4750' to 9620'. The oxygen-18 values change abruptly from background levels to high-level depletion in the 4310' to 4750' interval.

The geochemical data indicate that at a depth $\geq 4000'$, high-temperature hydrothermal activity has probably occurred in the vicinity of GMF 17A-6. The best evidence for large-scale directed fluid flow occurs in the 4750' to 6500' interval where strong arsenic enrichment and oxygen depletion coincide. The oxygen data suggest that high-temperature fluids have also existed in the 6500' to 9620' interval. However, no arsenic enrichment is measured. This is possibly the result of either extremely high formation temperatures that have caused the arsenic to sublime, or the absence of large-scale directed fluid

possibly the result of boiling. Mercury enrichment in the 258'-590' interval probably resulted from either HgS precipitation during steam condensation or from adsorption of mercury vapor on the surfaces of clay, organic, or organometallic compounds.

- (7) Borehole GMF 87-13: Anomalous enrichment of mercury is found in 43% of the 242' to 908' interval of GMF 87-13 (Figure 9). However, arsenic enrichment and anomalous oxygen-18 depletion are not measured in the borehole. The mercury enrichment in GMF 87-13 has probably resulted from precipitation of HgS by steam condensation, or adsorption of mercury on the surface of clay, organic, and organometallic compounds. The anomalous distribution of mercury throughout the borehole and the magnitude of the enrichment (1000 ppb) probably indicates lateral or vertical partitioning of mercury from a nearby hydrothermal system.

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UCA05.2405

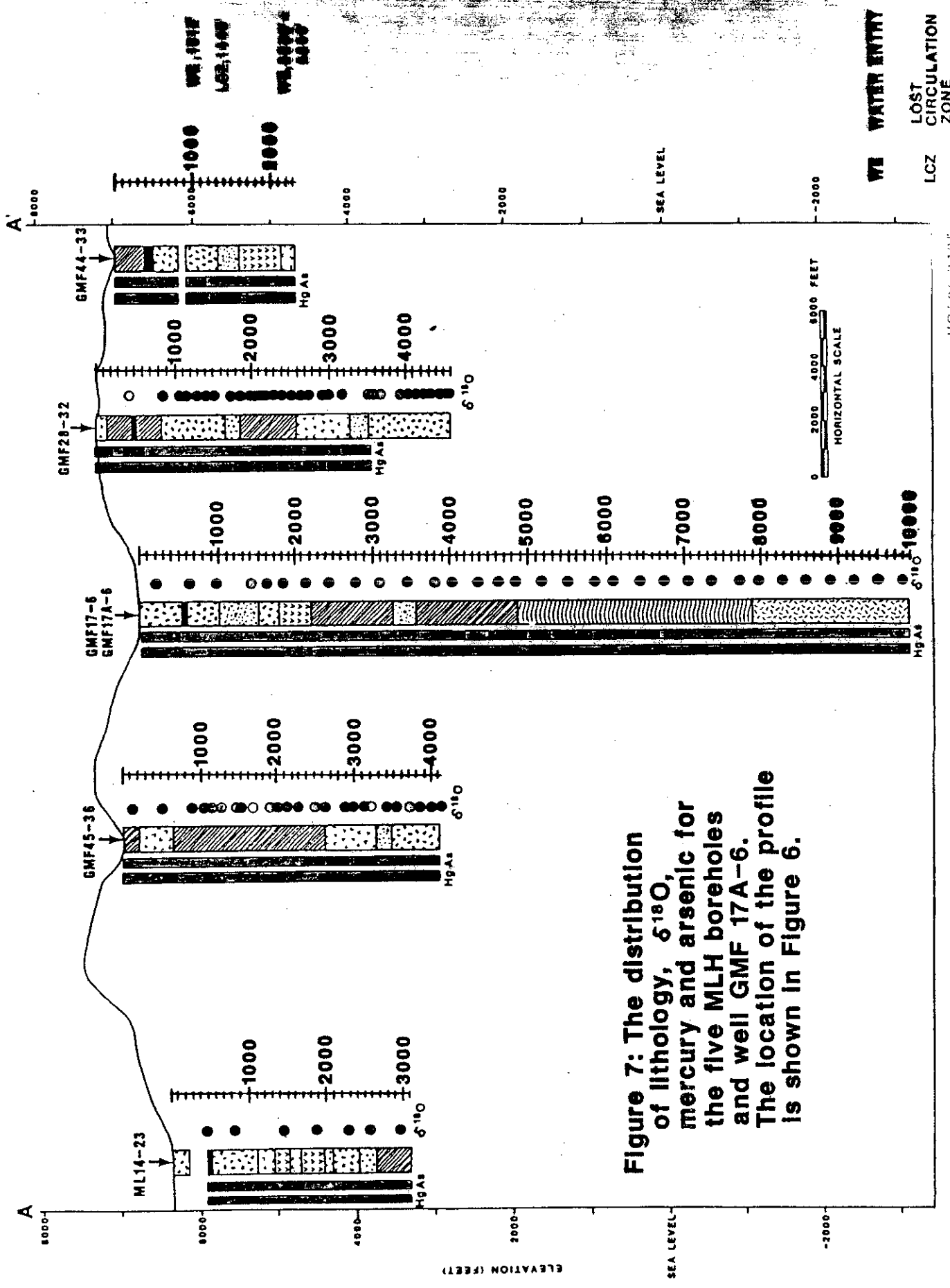


Figure 7: The distribution of lithology, $\delta^{18}O$, mercury and arsenic for the five MLH boreholes and well GMF 17A-6. The location of the profile is shown in Figure 6.