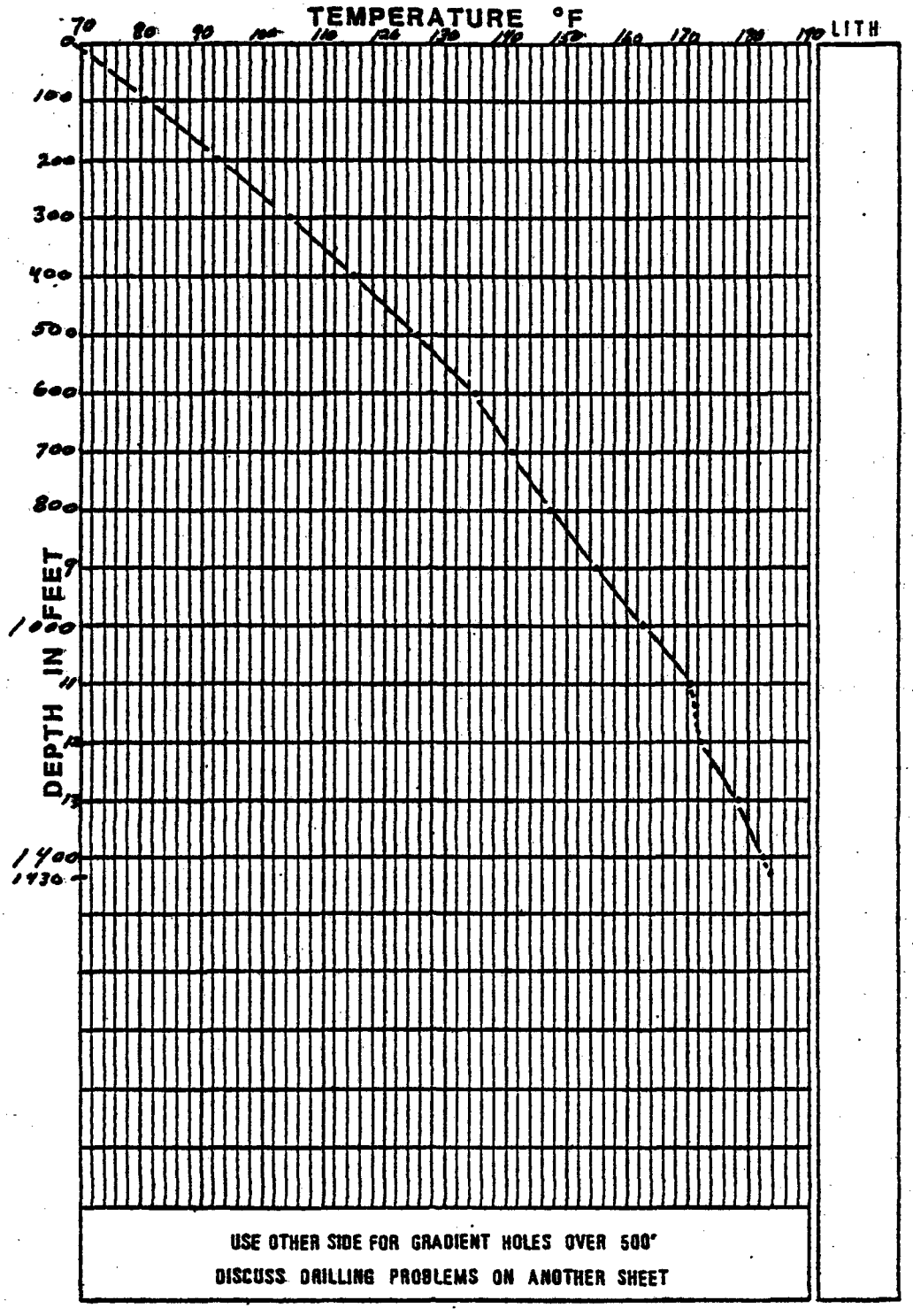
SHALLOW TEMPERATURE GRADIENT HOLE RECORD

GL01053

Southland Royalty Company

DD-9	DIXIE VALLEY NEVADA	
GRADIENT HOLE NO.	PROSPECT	
2600' F.W.L. Sec 14	S 14 T 23N R 35E	CHURCHILL NEVADA
LOCATION	SEC. TOWNSHIP RANGE	COUNTY STATE
3-19-1978	4-6-1978	183.92°F AT 1430 FT. 3.83° F/100
SPUD DATE	COMPLETION DATE	BOTTOM HOLE TEMP. GRADIENT 1130 TO 1430
1,440 FEET	MIKE Jodry	Christiansen Drilling - Ely NEV
TOTAL DEPTH	GEOLOGIST OR PERSON READING TEMP.	COMPANY DRILLING HOLES

K.B. 3419'±



USE OTHER SIDE FOR GRADIENT HOLES OVER 500'

DISCUSS DRILLING PROBLEMS ON ANOTHER SHEET

FOR HOLES 0-500'

TEMP	°C	°F	°F	°F
DATE OF SURVEY				
TIME SINCE COMPLETION				
SEE OTHER SIDE				

LOST CIRCULATION ZONES:

WATER ENTRIES:

by D.S. McMurdie 1/9/79

DD-9

GRADIENT HOLE NO.

5-16-78

DATE OF SURVEY

DEPTH	°C	°F	DEPTH	°C	°F	DEPTH	°C	°F	DEPTH	°C	°F
0	20.2	68.36	60	49.9		20	69.1		80	83.2	
10	18.9		70	50.5		30	69.5		90	83.4	
20	19.2		80	51.0		40	69.9		1400	83.7	182.66
30	20.2		90	51.5		50	70.4		10	83.9	
40	21.4		500	52.0	125.6	60	70.8		20	84.1	
50	22.4		10	52.5		70	71.3		30	84.4	183.9
60	24.2		20	53.0		80	71.7				
70	25.1		30	53.5		90	72.2		T.D.	1430	FEET
80	25.6		40	54.0		1000	72.6	162.68			
90	26.4		50	54.5		10	73.0				
100	26.9	80.4	60	54.8		20	73.4				
10	27.2		70	55.5		30	73.8				
20	27.8		80	56.0		40	74.3				
30	28.6		90	56.5		50	74.7				
40	29.3		600	57.0	134.6	60	75.1				
50	30.0		10	57.6		70	75.5				
60	30.9		20	58.1		80	76.0				
70	31.6		30	58.6		90	76.4				
80	32.6		40	59.0		1100	76.9	170.42			
90	33.1		50	59.4		10	77.3				
200	33.6	92.48	60	59.6		20	77.7				
10	34.4		70	59.7		30	78.0				
20	35.0		80	59.9		40	78.2				
30	35.7		90	60.2		50	78.1				
40	36.3		700	60.5	140.9	60	78.1				
50	37.1		10	60.7		70	—				
60	37.8		20	60.9		80	77.6				
70	38.4		30	61.3		90	77.2				
80	39.0		40	61.6		1200	77.9	172.22			
90	39.7		50	62.0		10	78.8				
300	40.3	104.5	60	62.4		20	79.2				
10	41.0		70	62.8		30	79.5				
20	41.5		80	63.2		40	79.8				
30	42.0		90	63.7		50	80.0				
40	42.7		800	64.1	147.38	60	80.3				
50	43.3		10	64.4		70	80.6				
60	43.9		20	64.8		80	80.8				
70	44.6		30	65.2		90	81.1				
80	45.2		40	65.6		1300	81.3	178.34			
90	45.7		50	66.0		10	81.6				
400	46.3	115.3	60	66.5		20	81.8				
10	46.9		70	67.0		30	82.0				
20	47.5		80	67.4		40	82.2				
30	48.2		90	67.8		50	82.5				
40	48.8		900	68.2	154.76	60	82.7				

SHALLOW TEMPERATURE GRADIENT HOLE RECORD

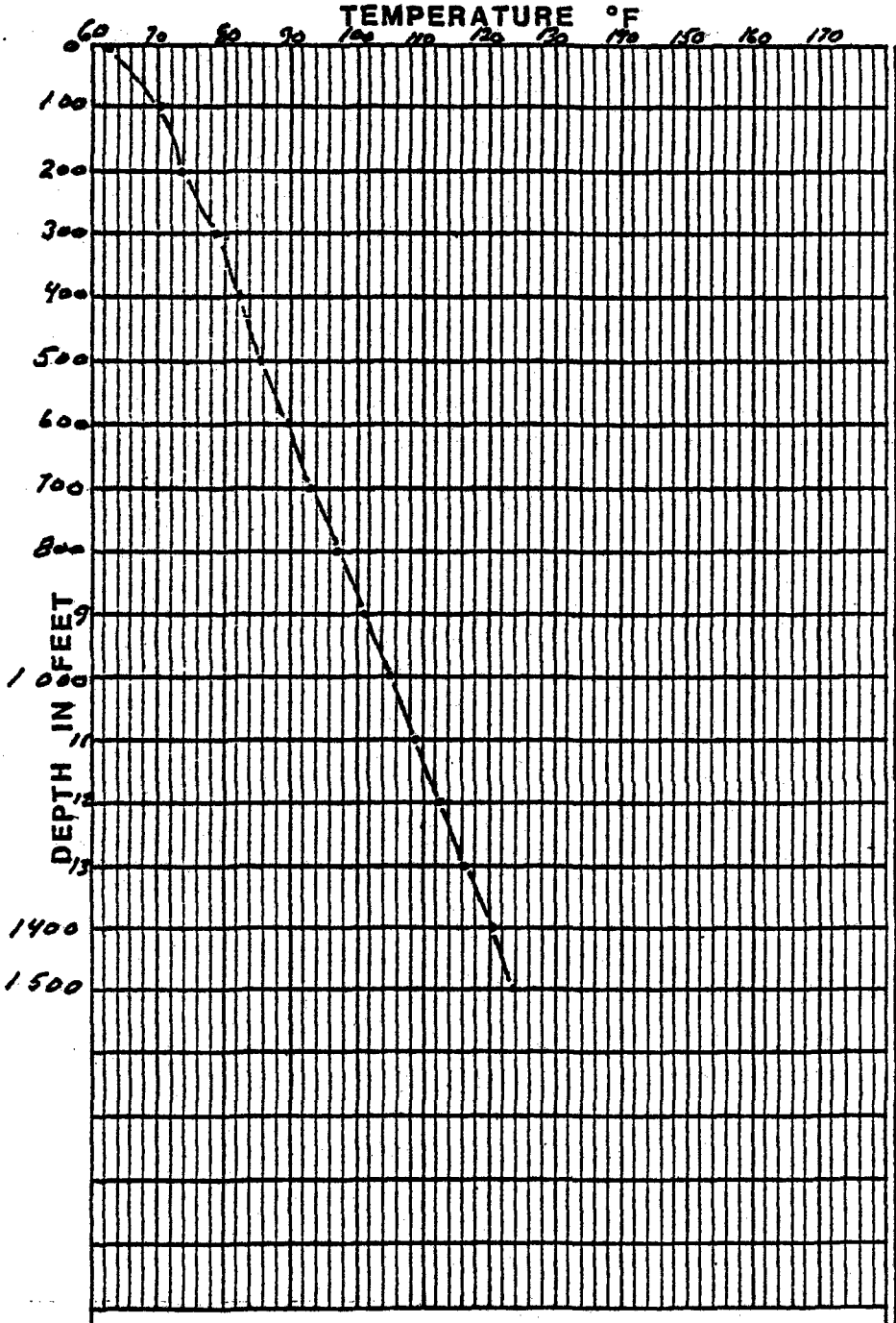
Southland Royalty Company

H-2	DIXIE VALLEY	
GRADIENT HOLE NO.	PROSPECT	

1000' S. & 1500 west of N.W. COR.	S 31	T 24 N.	R 36 E.	CHURCHILL	NEVADA
LOCATION	SEC.	TOWNSHIP	RANGE	COUNTY	STATE

23 MAY 1978	11 June 1978	123.8 AT 1500 FT.	1.74° F/100'
SPUD DATE	COMPLETION DATE	BOTTOM HOLE TEMP.	GRADIENT 100 TO 1500'

1500'	M. Jodry	Chris Hansen Drilling, Ely, Nev.
TOTAL DEPTH	GEOLOGIST OR PERSON READING TEMP.	COMPANY DRILLING HOLES



LITH

USE OTHER SIDE FOR GRADIENT HOLES OVER 500'

DISCUSS DRILLING PROBLEMS ON ANOTHER SHEET

FOR HOLES 0-500'

TEMP	°C	°F	°F	°F
DATE OF SURVEY				
TIME SINCE COMPLETION				
See	other	Side		

LOST CIRCULATION ZONES:

WATER ENTRIES: 90'-120'; 230'-240'.

H-2

GRADIENT HOLE NO.

6-20-78 9 DAYS AFTER Completion.

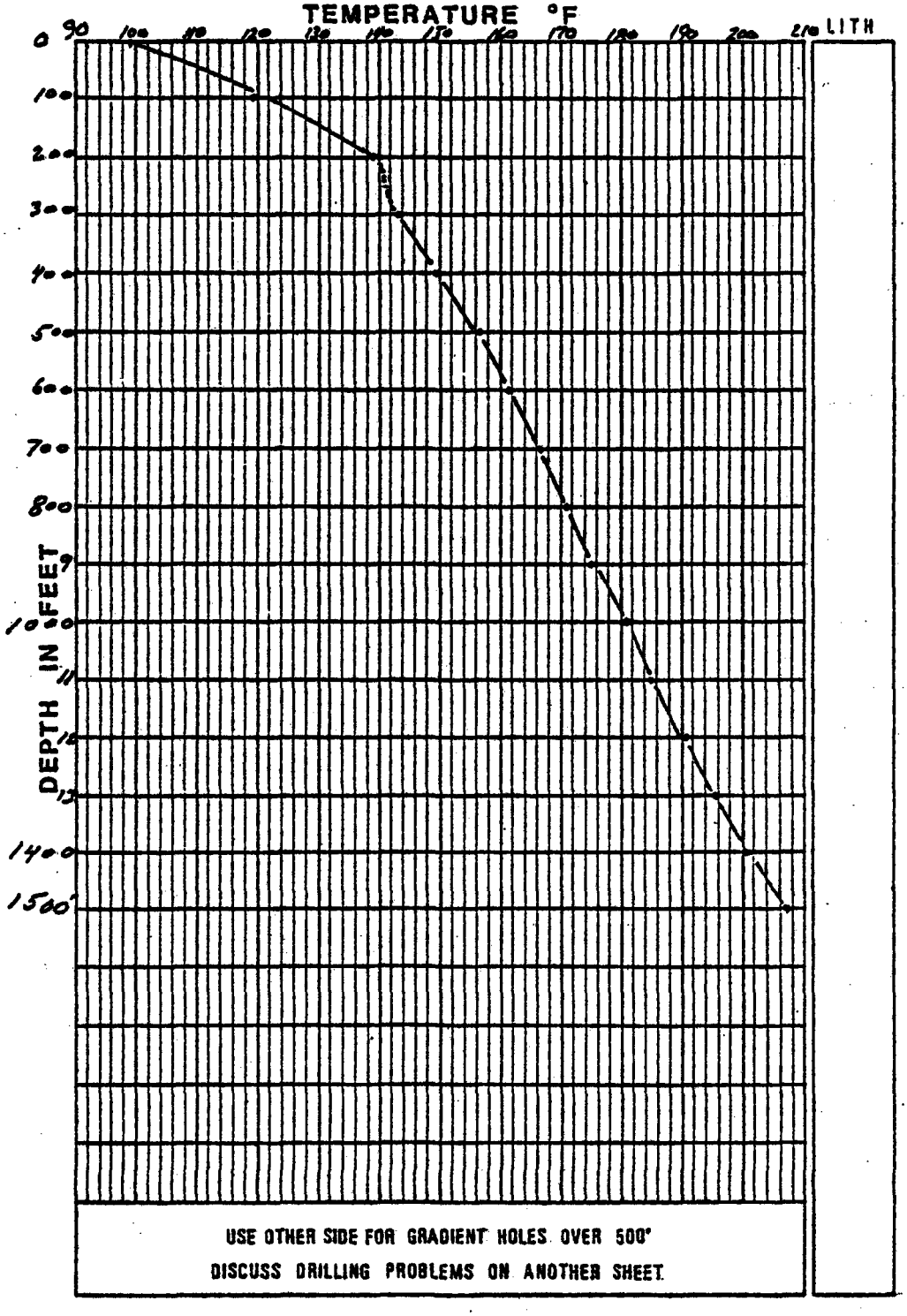
DATE OF SURVEY

DEPTH	°C	°F	DEPTH	°C	°F	DEPTH	°C	°F	DEPTH	°C	°F
0	17.0	62.6	20	38.9							
20	19.0		40	39.3							
40	19.5		60	39.7							
60	20.3		80	40.1							
80	21.0		1000	40.6	105.08						
100	21.2	70.16	20	41.0							
20	21.6		40	41.4							
40	21.9		60	41.8							
60	22.3		80	42.2							
80	22.9		1100	42.7	108.86						
200	23.3	73.9	20	43.1							
20	24.2		40	43.5							
40	24.5		60	43.9							
60	25.0		80	44.3							
80	25.4		1200	44.7	112.46						
300	25.8	78.44	20	45.1							
20	26.2		40	45.5							
40	26.7		60	46.0							
60	27.1		80	46.4							
80	27.5		1300	46.8	116.24						
400	27.9	82.22	20	47.2							
20	28.3		40	47.7							
40	28.7		60	48.1							
60	29.0		80	48.6							
80	29.4		1400	49.0	120.2						
500	29.7	85.46	20	49.4							
20	30.2		40	49.8							
40	30.6		60	50.2							
60	31.0		80	50.7							
80	31.4		1500	51.2	123.8						
600	31.9	89.4									
20	32.3		T.D. 1500'								
40	32.7										
60	33.1										
80	33.6										
700	34.0	93.2									
20	34.4										
40	34.9										
60	35.3										
80	35.7										
800	36.2	97.16									
20	36.6										
40	37.0										
60	37.5										
80	37.9										
900	38.5	101.3									

SHALLOW TEMPERATURE GRADIENT HOLE RECORD

Southland Royalty Company

H-1	DIXIE VALLEY		
GRADIENT HOLE NO.	PROSPECT		
NE,SE	S 16 T 24	R 36	CHURCHILL NEVADA
LOCATION	SEC. TOWNSHIP	RANGE	COUNTY STATE
18 Apr. 1978	14 MAY 1978	207.1°F AT 1500 FT.	6.6° F/100'
SPUD DATE	COMPLETION DATE	BOTTOM HOLE TEMP.	GRADIENT 1200' TO 1500'
1500'	M. Jackey		Christensen Drilling Ely, NEV.
TOTAL DEPTH	GEOLOGIST OR PERSON READING TEMP.		COMPANY DRILLING HOLES



USE OTHER SIDE FOR GRADIENT HOLES OVER 500'

DISCUSS DRILLING PROBLEMS ON ANOTHER SHEET

FOR HOLES 0-500'

TEMP	°C	°F	°F	°F
DATE OF SURVEY				
TIME SINCE COMPLETION				
SEE OTHER SIDE				

LOST CIRCULATION ZONES:

WATER ENTRIES:

H-1 Dixie Valley NV.

GRADIENT HOLE NO.

6-7-78 48 hours AFTER 1ST Temp. Run.

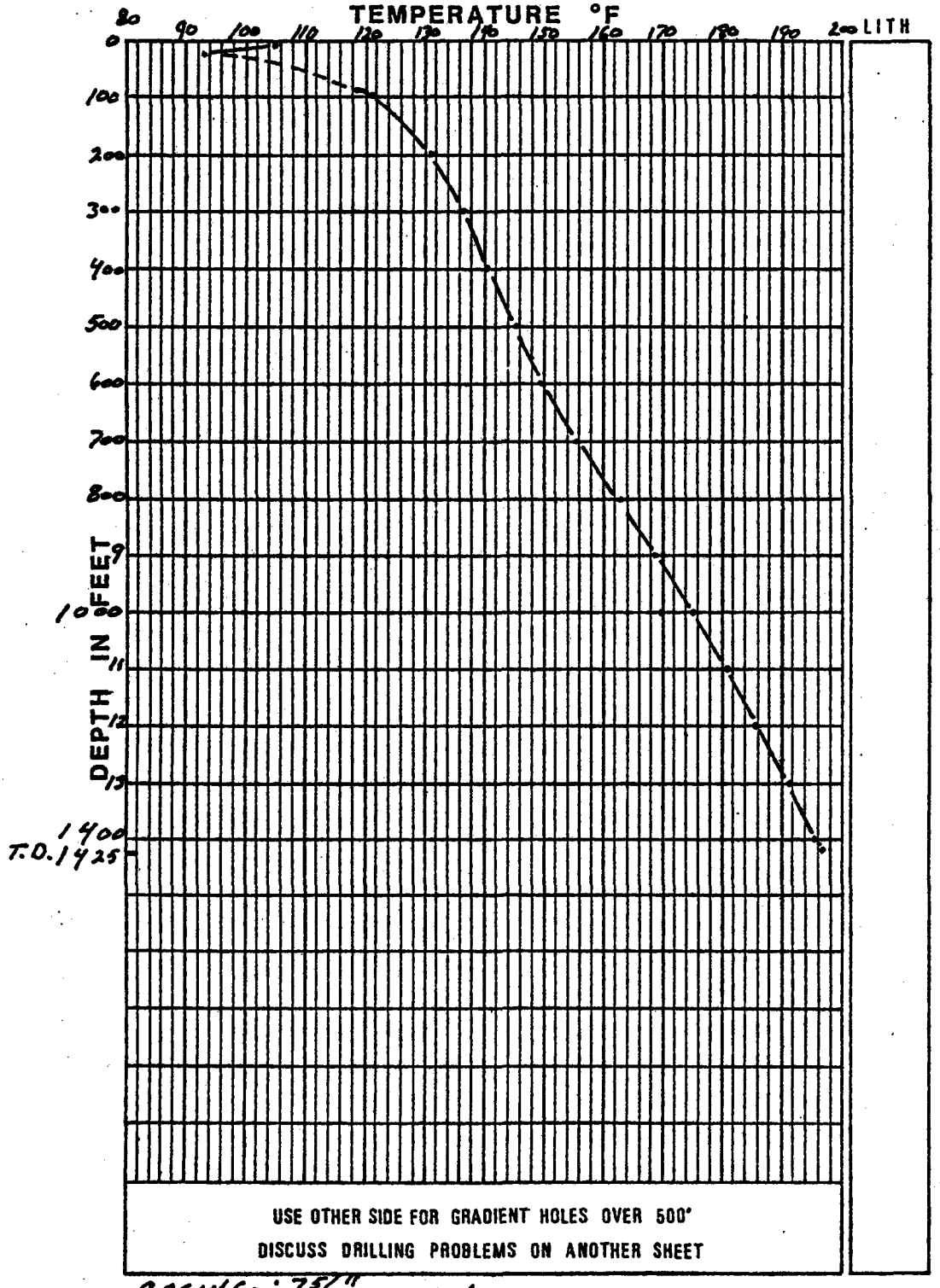
DATE OF SURVEY

EPTH	°C	°F	DEPTH	°C	°F	DEPTH	°C	°F	DEPTH	°C	°F
0	37.3	99.14	60	67.7		20	80.4		80	93.5	
10	22.3		70	68.1		30	80.8		90	93.8	
20	27.7		80	68.5		40	81.1		1400	94.2	201.56
30	32.1		90	68.8		50	81.4		10	94.5	
40	34.7		500	69.2	156.5	60	81.6		20	94.8	
50	37.9		10	69.4		70	81.9		30	95.1	
60	41.8		20	69.8		80	82.1		40	95.4	
70	44.7		30	70.1		90	82.3		50	95.7	
80	46.1		40	70.4		1000	82.5	180.5	60	96.0	
90	47.4		50	70.7		10	82.7		70	96.4	
100	48.7	119.6	60	71.0		20	83.0		80	96.7	
10	50.2		70	71.3		30	83.3		90	97.0	
20	51.8		80	71.6		40	83.6		1500	97.3	207.14
30	53.4		90	71.9		50	83.9				
40	54.8		600	72.2	161.9	60	84.1		T.D. 1500'		
50	56.1		10	72.5		70	84.4				
60	57.1		20	72.8		80	84.6				
70	57.9		30	73.1		90	84.9				
80	58.7		40	73.3		1100	85.1	185.1			
90	59.2		50	73.5		10	85.3				
200	59.6	139.2	60	73.7		20	85.5				
10	59.8		70	73.9		30	85.9				
20	59.9		80	74.1		40	86.3				
30	60.1		90	74.4		50	86.6				
40	60.4		700	74.7	166.46	60	86.9				
50	60.7		10	75.0		70	87.2				
60	61.0		20	75.2		80	87.5				
70	61.3		30	75.4		90	87.8				
80	61.6		40	75.7		1200	88.1	190.5			
90	61.8		50	76.0		10	88.4				
300	62.1	143.7	60	76.2		20	88.6				
10	62.4		70	76.4		30	88.9				
20	62.7		80	76.7		40	89.2				
30	63.0		90	76.9		50	89.5				
40	63.3		800	77.2	170.96	60	89.8				
50	63.6		10	77.5		70	90.1				
60	63.9		20	77.8		80	90.4				
70	64.2		30	78.0		90	90.7				
80	64.5		40	78.2		1300	91.0	195.8			
90	64.8		50	78.5		10	91.4				
400	65.3	149.54	60	78.8		20	91.7				
10	65.8		70	79.0		30	92.0				
20	66.2		80	79.3		40	92.3				
30	66.6		90	79.5		50	92.6				
40	67.0		900	79.8	175.64	60	92.9				
50	67.3		10	80.1		70	93.2				

SHALLOW TEMPERATURE GRADIENT HOLE RECORD

Southland Royalty Company

SRC-2A	DIXIE VALLEY			
GRADIENT HOLE NO.	PROSPECT			
1200'S. & 1600E. NE.cor.	S 14 T 23N	R 35E	CHURCHILL	NEVADA
LOCATION	SEC. TOWNSHIP	RANGE	COUNTY	STATE
31 July 1978	23 SEPT 1978	196.7°F AT 1425' FT.	6.42° F/100'	
SPUD DATE	COMPLETION DATE	BOTTOM HOLE TEMP.	GRADIENT 1000' TO 1400'	
1425'	M. Jodry		Christiansen Drilling Ely Nev.	
TOTAL DEPTH	GEOLOGIST OR PERSON READING TEMP.		COMPANY DRILLING HOLES	



FOR HOLES 0-500'

TEMP	°C	°F	°F	°F
DATE OF SURVEY				
TIME SINCE COMPLETION				
SEE	OTHER			
SIDE				

LOST CIRCULATION ZONES:

715' to 760' + continuing to 960'

WATER ENTRIES: 120-125'

water bearing gravel.

CASING: 7 5/8" 0-122'

Prep. by. D.S. McMurdie

S.R.C. 2-A

GRADIENT HOLE NO.

9-24-78 96 hours after pipe run.

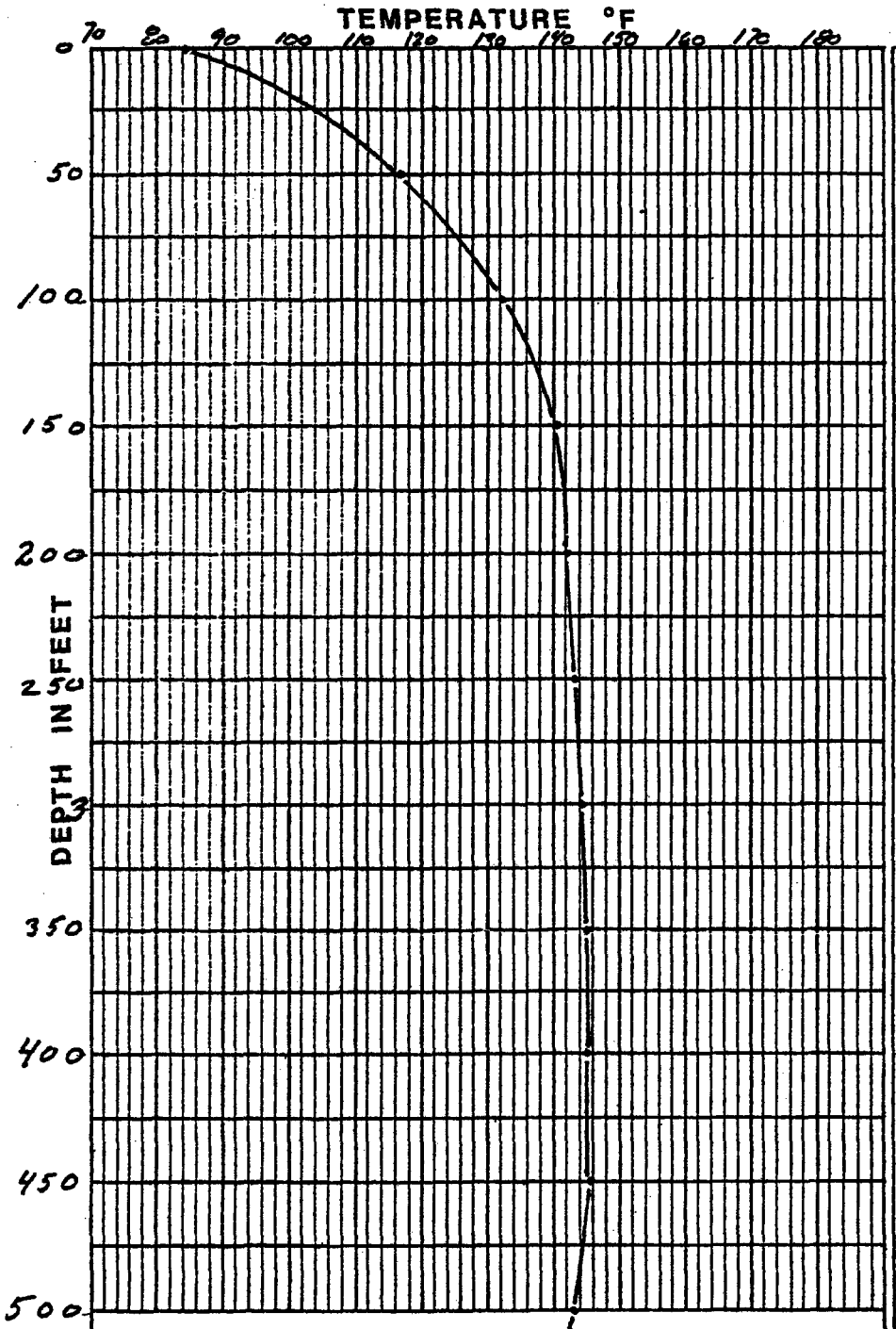
DATE OF SURVEY

DEPTH	°C	°F	DEPTH	°C	°F	DEPTH	°C	°F	DEPTH	°C	°F
0	40.6	105.0	20	76.7							
20	33.9	93.0	40	77.3							
40	41.2		60	78.0							
60	43.0		80	78.5							
80	47.6		1000	79.3	174.7 ~~169.7~~						
100	49.4	120.9	20	79.8							
20	52.2		40	80.5							
40	53.4		60	81.2							
60	54.2		80	82.2							
80	54.8		1100	82.6	180.6						
200	55.1	131	20	83.3							
20	56.1		40	83.9							
40	56.7		60	84.4							
60	57.3		80	85.2							
80	57.8		1200	85.5	185.9						
300	58.0	136.4	20	86.4							
20	58.6		40	87.0							
40	59.0		60	87.6							
60	59.4		80	88.2							
80	59.8		1300	88.7	191.6						
400	60.2	140.3	20	89.2							
20	60.6		40	89.4							
40	61.3		60	90.0							
60	62.0		80	90.4							
80	62.6		1400	90.8	195.4						
500	63.0	145.4	20	91.2							
20	63.1		25	91.5	196.7						
40	63.6										
60	64.2		1425-T.D.								
80	64.7										
600	65.3	149.5									
20	65.9										
40	66.4										
60	67.2										
80	67.8										
700	68.7	155.6									
20	70.0										
40	70.8										
60	71.4										
80	72.1										
800	72.7	162.8									
20	73.3										
40	74.0										
60	74.6										
80	75.3										

SHALLOW TEMPERATURE GRADIENT HOLE RECORD

Southland Royalty Company

SR-2	DIXIE VALLEY	
GRADIENT HOLE NO.	PROSPECT	
Appx 1300' W & 1300' S. NW. cor.	S 14 T 23 N. R 35 E.	CHURCHILL, NEVADA
LOCATION	SEC. TOWNSHIP RANGE	COUNTY STATE
22 June 1978	15 July 1978	143.2 °F. AT 510 FT. ISOTH. 143° F/100'
SPUD DATE	COMPLETION DATE	BOTTOM HOLE TEMP. GRADIENT 200' TO 500'
523'	M. Jadry	Christiansen Drilling, Ely, Nev.
TOTAL DEPTH	GEOLOGIST OR PERSON READING TEMP.	COMPANY DRILLING HOLES



USE OTHER SIDE FOR GRADIENT HOLES OVER 500'

DISCUSS DRILLING PROBLEMS ON ANOTHER SHEET

LITH

FOR HOLES 0-500'

TEMP	°C	°F	°F	°F
DATE OF SURVEY				
TIME SINCE COMPLETION				
See OTHER SIDE				

LOST CIRCULATION ZONES:

WATER ENTRIES: 495 to 500'

Water bearing Sand.

Prep. by D.S. McKenzie

SR-2

GRADIENT HOLE NO.

9/3/78

DATE OF SURVEY

DEPTH	°C	°F	DEPTH	°C	°F	DEPTH	°C	°F	DEPTH	°C	°F
0	29.0	84.2	60	63.2							
10	27.2	80.96	70	63.0							
20	28.6		80	62.6							
30	36.0		90	62.1							
40	45.4		500	61.8	143.24						
50	47.0	116.6	10	61.9	143.2						
60	48.6		20								
70	51.2		523' T.D.								
80	52.6										
90	54.4										
100	55.7	132.2									
10	57.0										
20	58.1										
30	59.0										
40	59.7										
50	60.2	140.36									
60	60.5										
70	61.2										
80	62.0										
90	61.6										
200	61.2	142.16									
10	61.5										
20	61.6										
30	61.7										
40	61.8										
50	61.9	143.4									
60	62.0										
70	62.1										
80	62.2										
90	62.3										
300	62.4	144.32									
10	62.5										
20	62.5										
30	62.6										
40	62.7										
50	62.8	145.0									
60	62.9										
70	63.0										
80	63.0										
90	63.1										
400	63.1	145.5									
10	63.2										
20	63.1										
30	63.2										
40	63.2										

SHALLOW TEMPERATURE GRADIENT HOLE RECORD

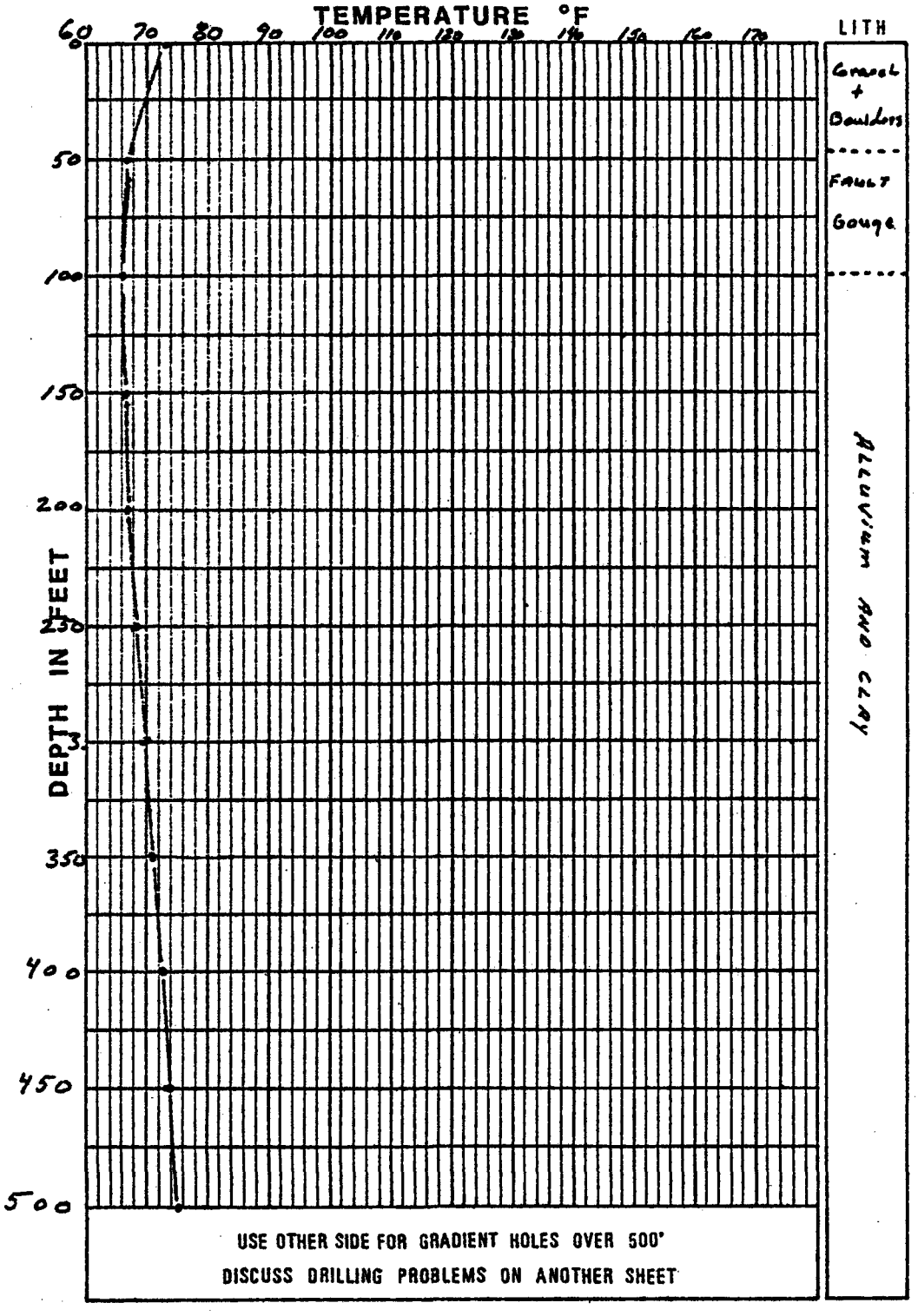
Southland Royalty Company

S-8	DIXIE VALLEY	
GRADIENT HOLE NO.	PROSPECT	

Appox. 200'S on line NW cor.	S 2	T 23N.	R 35E	CHURCHILL	NEVADA
LOCATION	SEC.	TOWNSHIP	RANGE	COUNTY	STATE

14 June 1978	19 June 1978	75.0°	AT 500 FT.	2.6° F/100'
SPUD DATE	COMPLETION DATE	BOTTOM HOLE TEMP.		GRADIENT 200' TO 500'

500	M. Jedry	Christiansen Drilling Ely, Nev
TOTAL DEPTH	GEOLOGIST OR PERSON READING TEMP.	COMPANY DRILLING HOLES



USE OTHER SIDE FOR GRADIENT HOLES OVER 500'

DISCUSS DRILLING PROBLEMS ON ANOTHER SHEET

FOR HOLES 0-500'

TEMP	°C	°F	°F	°F
DATE OF SURVEY	9-3-78	9-3-78		
TIME SINCE COMPLETION	75 days	75 days		
0	22.8	73.0		
20	22.1	71.7		
40	19.4	66.9		
60	18.9	66.0		
80	18.9	66.0		
100	18.9	66.0		
20	19.0	66.2		
40	19.1	66.3		
60	19.3	66.7		
80	19.4	66.9		
200	19.6	67.2		
20	19.8	67.6		
40	20.1	68.1		
60	20.4	68.7		
80	20.7	69.2		
300	21.0	69.8		
20	21.3	70.3		
40	21.6	70.8		
60	21.9	71.4		
80	22.3	72.1		
400	22.6	72.6		
20	22.9	73.2		
40	23.1	73.5		
60	23.3	73.9		
80	23.6	74.4		
500	23.9	75.0		

LOST CIRCULATION ZONES:

48'-50'

WATER ENTRIES: None

Prep. by. D.S. McCurdie

S-8

GRADIENT HOLE NO.

DATE OF SURVEY

DEPTH	°C	°F	DEPTH	°C	°F	DEPTH	°C	°F	DEPTH	°C	°F