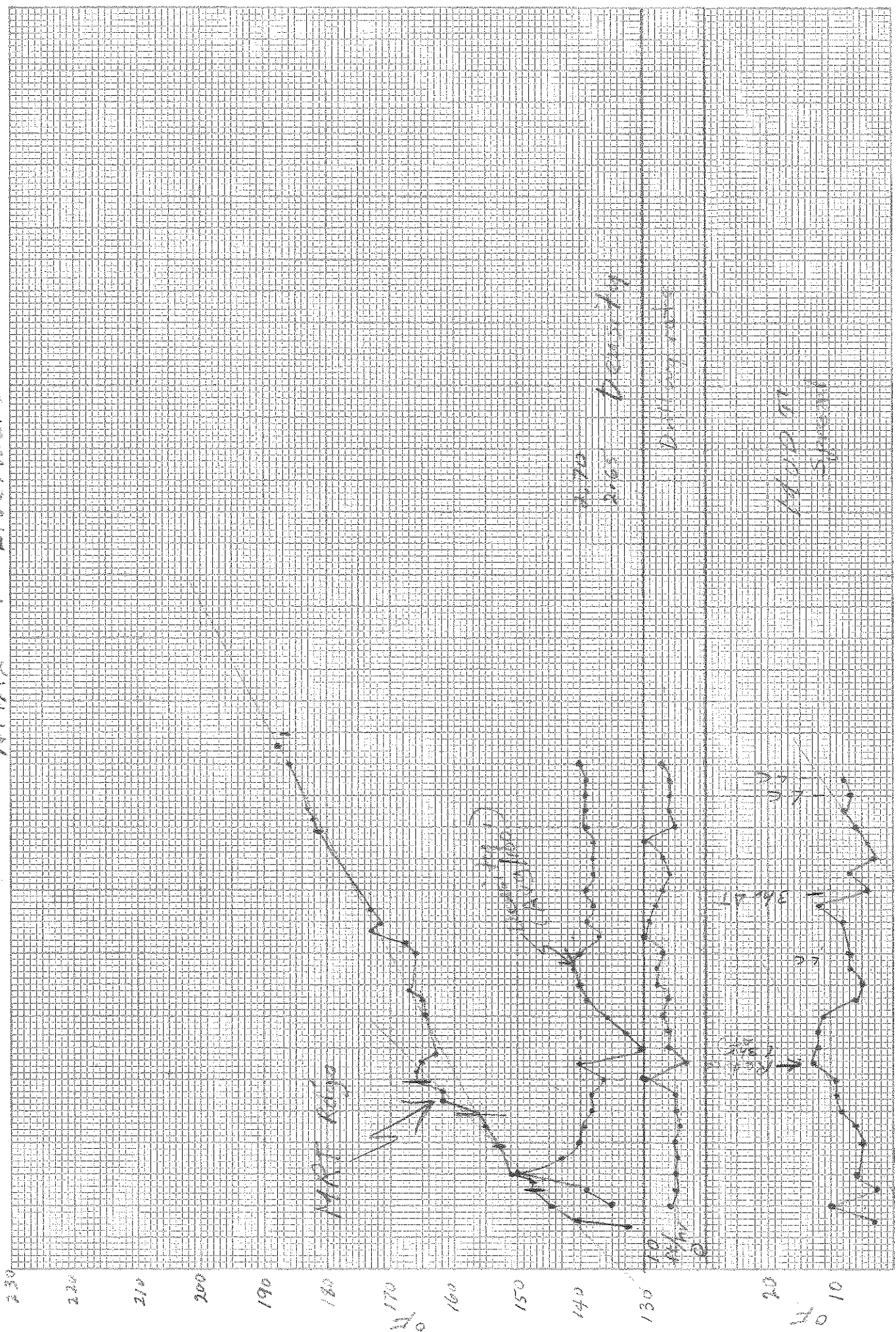


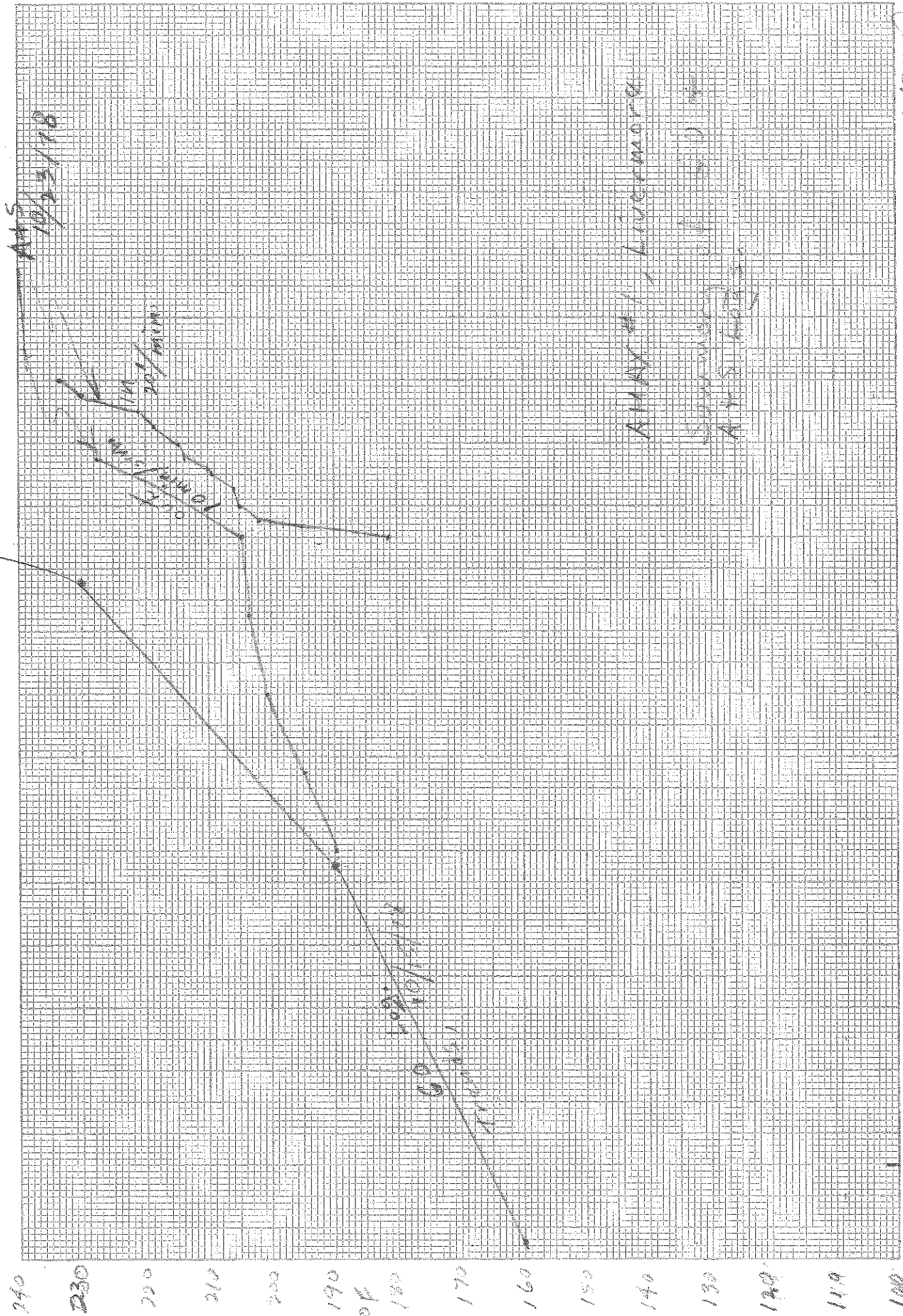
K&E
 10 X 10 TO 1/2 INCH 46 1322
 7 X 10 INCHES
 MADE IN U.S.A.
 KRUPP & ESSER CO.

AMAX #1 Livermore



WMO Plot 118

depth
 5000
 6000
 7000
 8000
 9000



AMS 10/23/18

AMS #1, Livermore

AMS #2

AMS #3

AMS #4

AMS #5

AMS #6

AMS #7

AMS #8

AMS #9

AMS #10

AMS #11

AMS #12

AMS #13

AMS #14

AMS #15

AMS #16

AMS #17

AMS #18

AMS #19

AMS #20

AMS #21

AMS #22

AMS #23

AMS #24

AMS #25

AMS #26

AMS #27

AMS #28

AMS #29

AMS #30

AMS #31

AMS #32

AMS #33

AMS #34

AMS #35

AMS #36

AMS #37

AMS #38

AMS #39

AMS #40

AMS #41

AMS #42

AMS #43

AMS #44

AMS #45

AMS #46

AMS #47

AMS #48

AMS #49

AMS #50

AMS #51

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AMS #74

AMS #75

AMS #76

AMS #77

AMS #78

AMS #79

AMS #80

AMS #81

AMS #82

AMS #83

AMS #84

AMS #85

AMS #86

AMS #87

AMS #88

AMS #89

AMS #90

AMS #91

AMS #92

AMS #93

AMS #94

AMS #95

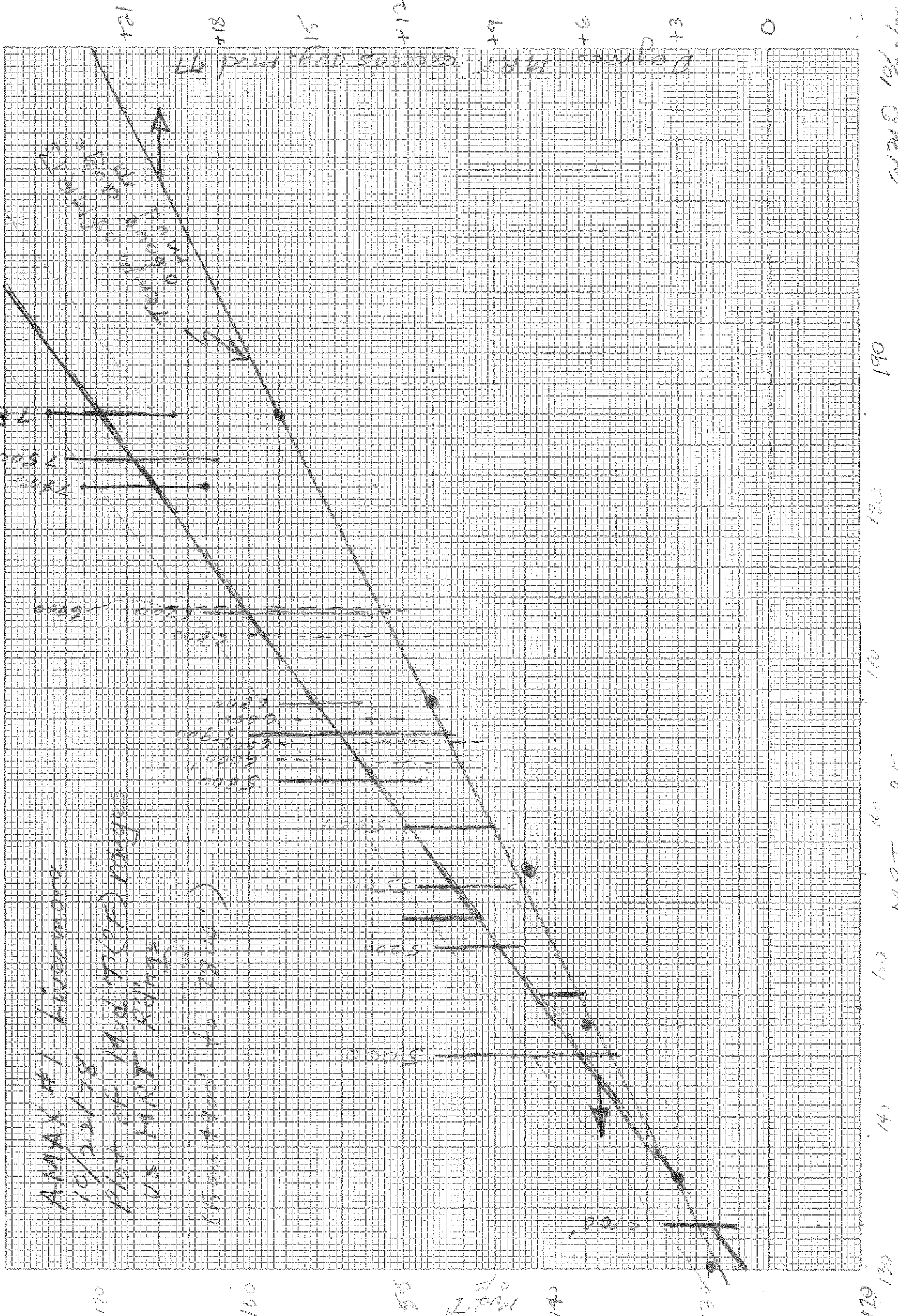
AMS #96

AMS #97

AMS #98

AMS #99

AMS #100



AMAX #1
 10/22/78
 Part of Mid. T(OT) range
 US MRT Range
 Characteristics to 1800

Degrees MRT exceeds 900 min at 17

AMAX #1

MRT OF

170

160

150

140

130

120

110

100

190

180

170

160

150

140

130

0

+3

+6

+9

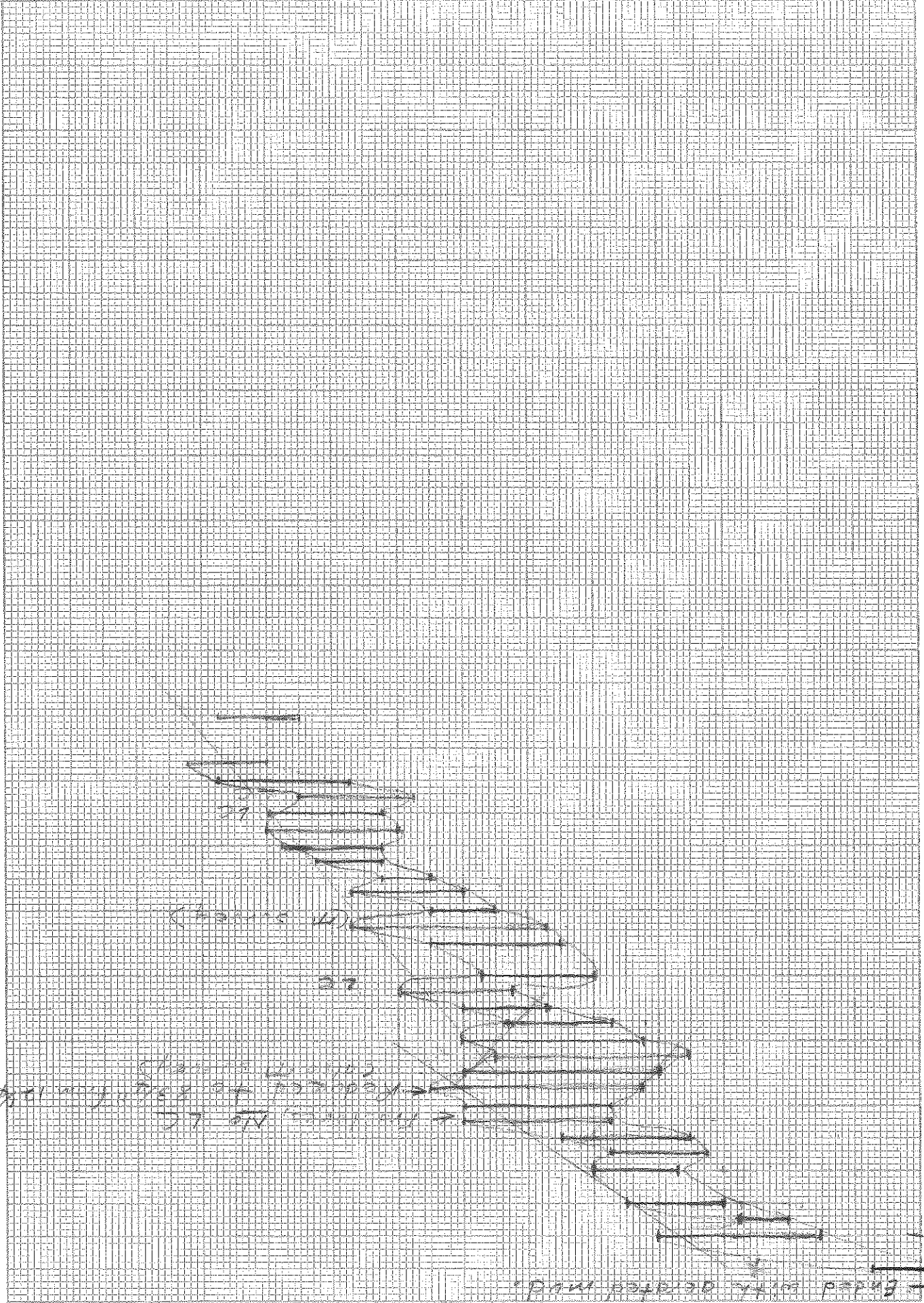
+12

+15

+18

+21

AMAX #1 Livermore, Mud Temp. ranges vs. depth



WMO 10/2/78

9000'

8000'

7000'

Depth, ''

6000'

5000'

180

170

160

MUD T
°F

140

130

AMAX EXPLORATION, INC.
Geothermal Group

TIME-TEMPERATURE OBSERVATION FORM

(For use with the Crosby method)

Date 10/27/78 Field _____
 Well AMAX #1 Livermore Observer W. Raymond
 State CA Analysis WMD
 County NAPA Depth 8195
 Comments: Results of 2-1.5 hr Koster
Bomb mine + 1 HRT (+s) phased
in to Downer by Raymond.

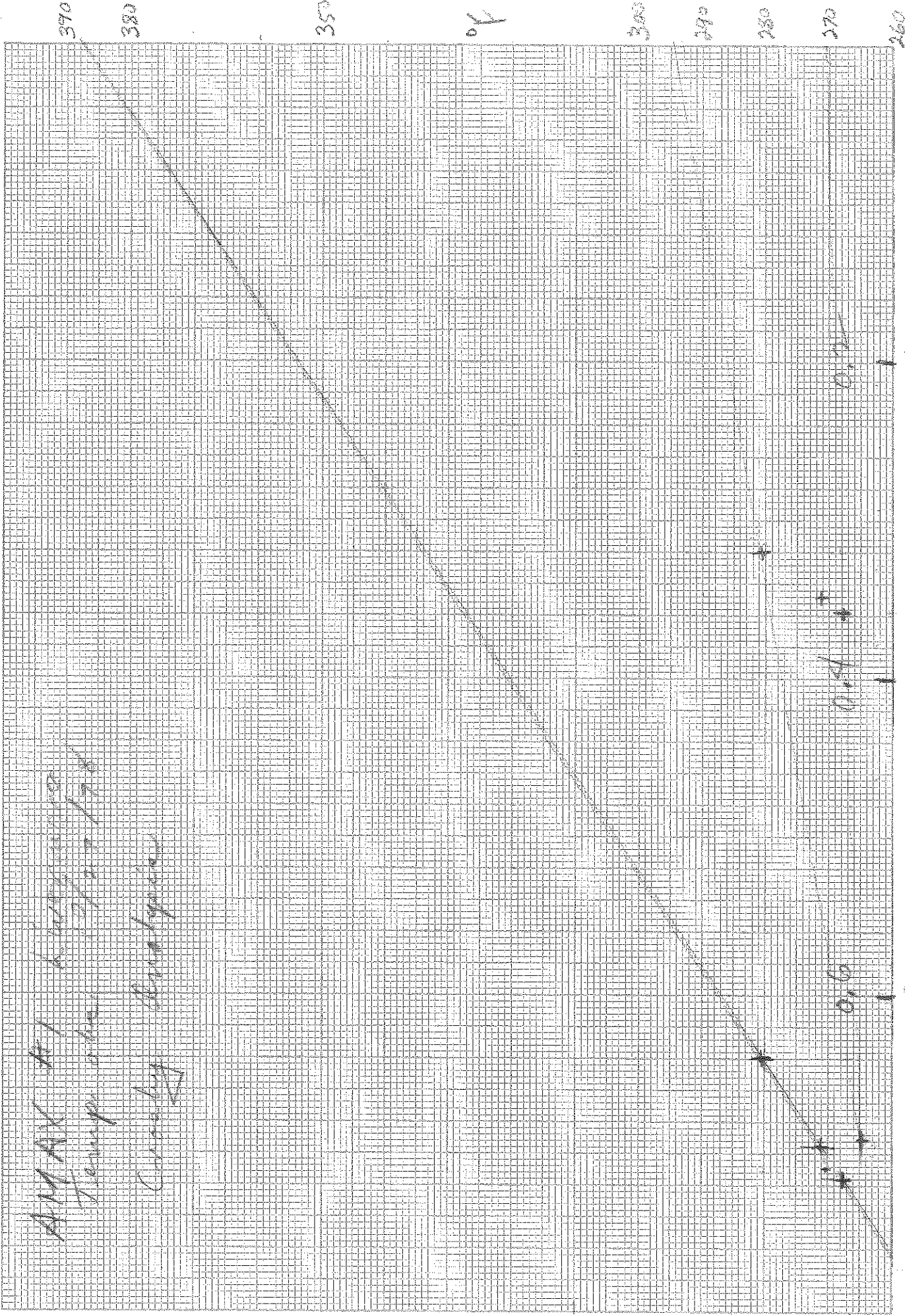
true time	t	event	temp. °C	temp. °F	$\frac{t_n}{t_n-s}$	$\ln \frac{t_n}{t_n-s}$
	t ₀ 0	bit arrival				
	s 10.07	circulation ceases				
	t ₁ 33.58	observation	130.74	267.58	1.428	.358
<u>37/41</u>	t ₂ 34.42	"	132.77	271.33	1.414	.348
	t ₃ 36.75	"	137.92	280.50	1.377	.320
	t ₄ 37.00	"		280.5	1.373	
SAL. Log →	t ₅ 20.2	"		264.9	1.994	.690
	t ₆ 33.83	"		270.34	1.424	.355
→	t ₇ 110.11	"		255		.095

✓
 .3562
 .3464
 .3199
 .317
 .690
 .353

Wob (in 168 out 174)
 By implication

@ 8195 in 168 out 173

AMAX #1
Temp. obs. 3/27/1948
Crosby Analytical



0.2 L₄ $\frac{L_A}{L_H} = 5$

0.3

AMAX EXPLORATION, INC.
Geothermal Group

TIME-TEMPERATURE OBSERVATION FORM

(For use with the Crosby method)

Date 10/27/78 Field _____
Well AMAX #1 Livermore Observer Deymonaz
State CA Analysis WMD
County NAPA Depth 8195

Comments: Results of 2 - 1.5 hr. Kuster runs (t₂, t₃, t₄); the Schlumberger MRT adjusted by their log (t₁), and the AMAX MRT (t₅)

1
MRT

MRT

true time	t	event	temp. °C	temp. °F	$\frac{t_n}{t_n - s}$	$\ln \frac{t_n}{t_n - s}$
	t ₀ 0	bit arrival				
	s 10.07	circulation ceases				
	t ₁ 20.2	observation				
	t ₂ 33.58	"		267.9	1.994	0.690
	t ₃ 33.83	"		267.58	1.428	0.3562
	t ₄ 34.42	"		270.34	1.424	0.353
	t ₅ 37.00	"		271.23	1.414	0.346
	t ₆	"		280.50	1.373	0.317
	t ₇	"				

AMAX #1 WINGMONT
TEMP. OBS. 1/27/78
Crosby Analysis

300
27
0.6
0.4
0.2
0.260

0.6
0.4
0.2
0.260

AMAX EXPLORATION, INC.
Geothermal Group

TIME-TEMPERATURE OBSERVATION FORM

(For use with the Crosby method)

Date 10/23/78 Field NAPA
 Well AMAX #1 Livermore Observer WMD
 State CA Analysis WMD
 County NAPA Depth 7500'
 Comments: A+S survey, deductions from
readings taken going in and out

true time	t	event	temp. °C	temp. °F	$\frac{t_n}{t_n-s}$	$\ln \frac{t_n}{t_n-s}$
	t ₀ 0	bit arrival				
	s 76.33	circulation ceases				
	t ₁ 84.18	observation		213.6	10.724	2.372
	t ₂ 87.83	"		227.8	7.637	2.053
	t ₃	"				
S	74.33	"				
	t ₄ 82.18	"		213.6	10.469	2.348
	t ₅ 85.83	"		227.8	7.463	2.010
	t ₇	"				

AMAX #1 Lückmore
 H+S Springs
 10/23/78
 Ridge station @ 7500'
 ground in area 500'

K&E
 10 X 10 TO 1/2 INCH
 7 X 10 INCHES
 MADE IN U.S.A.
 KEUFFEL & ESSER CO.

320
 300
 250
 240
 230
 220
 210

2 Lu tu
 tu S

AMAX EXPLORATION, INC.
Geothermal Group

TIME-TEMPERATURE OBSERVATION FORM

(For use with the Crosby method)

Date 10/23/78 Field Napa
 Well AMAX #1 Livermore Observer WHD
 State CA Analysis "
 County Napa Depth 7000'
 Comments: R & S survey; deductions from
ridgs taken going in and out

true time	t	event	temp. °C	temp. °F	$\frac{tn}{tn-s}$	$\ln \frac{tn}{tn-s}$
	t ₀ 0	bit arrival				
	s 147.30	circulation ceases				
	t ₁ 151.86	observation		181.4	33.303	3.506
	t ₂ 159.05	"		207.5	13.536	2.605
	t ₃	"				
	t ₄	"				
	t ₅	"				
	t ₆	"				
	t ₇	"				

APR 41
1/25/48
2-11-48
APR 3 1948

300

273

250

240

of

200

190

180

1
2
3
64
64
64

AMAX EXPLORATION, INC.
Geothermal Group

TIME-TEMPERATURE OBSERVATION FORM

(For use with the Crosby method)

Date 10/15/78 Field Mapo
Well AMKX-71 Laramie Observer D. J. D. D.
State CA Analysis WTD
County Mapo Depth 6955'

Comments: Roster bomb failed, employed
60-lut'l, could not log open hole, went
down thru' drill pipe.

true time	t	event	temp. °C	temp. °F	$\frac{tn}{tn-s}$	$Ln \frac{tn}{tn-s}$
1855	t_0 0	bit arrival				
2215	s 3.33	circulation ceases				
0950	t_1 14.91	observation	24.0		1.2875	0.2526
1020	t_2 15.41	"	245.2		1.2756	0.2434
1050	t_3 15.91	"	247.1		1.2647	0.2348
1120	t_4 16.41	"	248.8		1.2545	0.2267
1150	t_5 16.91	"	250.4		1.2452	0.2192
1220	t_6 17.41	"	251.6		1.2365	0.2122
1250	t_7 17.91	"	252.8		1.2283	0.2056

ANN #1 - LIVERMORE

60 - (10/15)
Time - Temp Obs.
10/15/78
Depth = 6955'

310
300
290
280
270
260
250
240

°F

0.2 $\frac{\pm 0.1}{LN \pm n - 5}$ 0.1

WATER & POWER CO.

AMAX EXPLORATION, INC.
Geothermal Group

TIME-TEMPERATURE OBSERVATION FORM

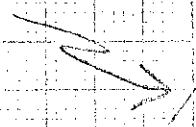
(For use with the Crosby method)

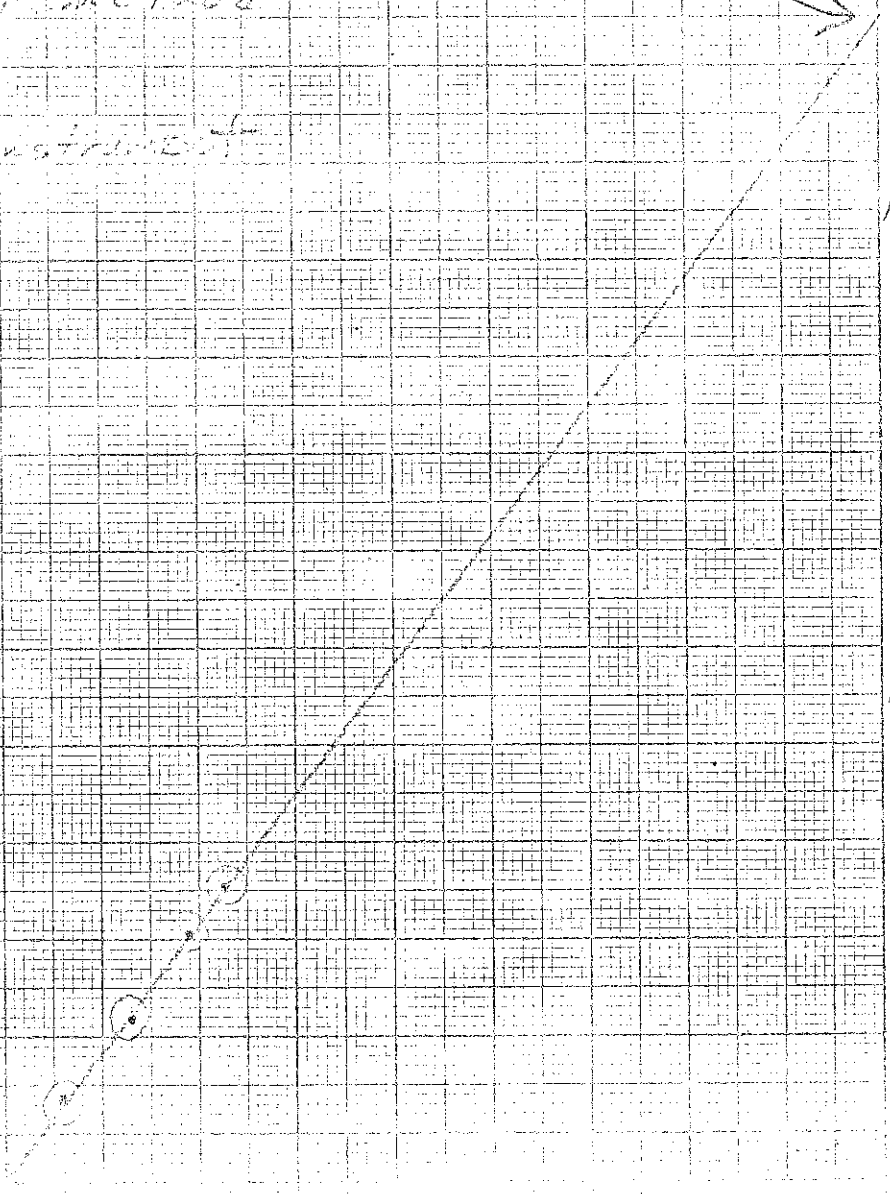
Date 10/6/78 Field Napa
Well AMAX #1 Livermore Observer Deymonaz
State CA Analysis Dolan
County Napa Depth 5874'

Comments: About 4' off bottom; circ. time approximate; Kuster instrument, went down drill pipe; actual observation about 8' below end of drill pipe.

true time	t	event	temp. °C	temp. °F	$\frac{t_n}{t_n - s}$	$\ln \frac{t_n}{t_n - s}$
	t_0 0	bit arrival				
	s 0.5	circulation ceases				
	t_1 5.23	observation	72.73		1.11	0.107
	t_2 5.73	"	79.06		1.095	0.090
	t_3 6.23	"	83.58		1.087	0.084
	t_4 6.73	"	86.70		1.080	0.769
	t_5 7.23	"	90.03		1.074	0.710
	t_6 7.63	"	92.09		1.070	0.677
	t_7	"				

Allat #1 Limestone
 10/6/70
 Expand scale plot
 using Crosby method
 @ 5374
 raster instrument

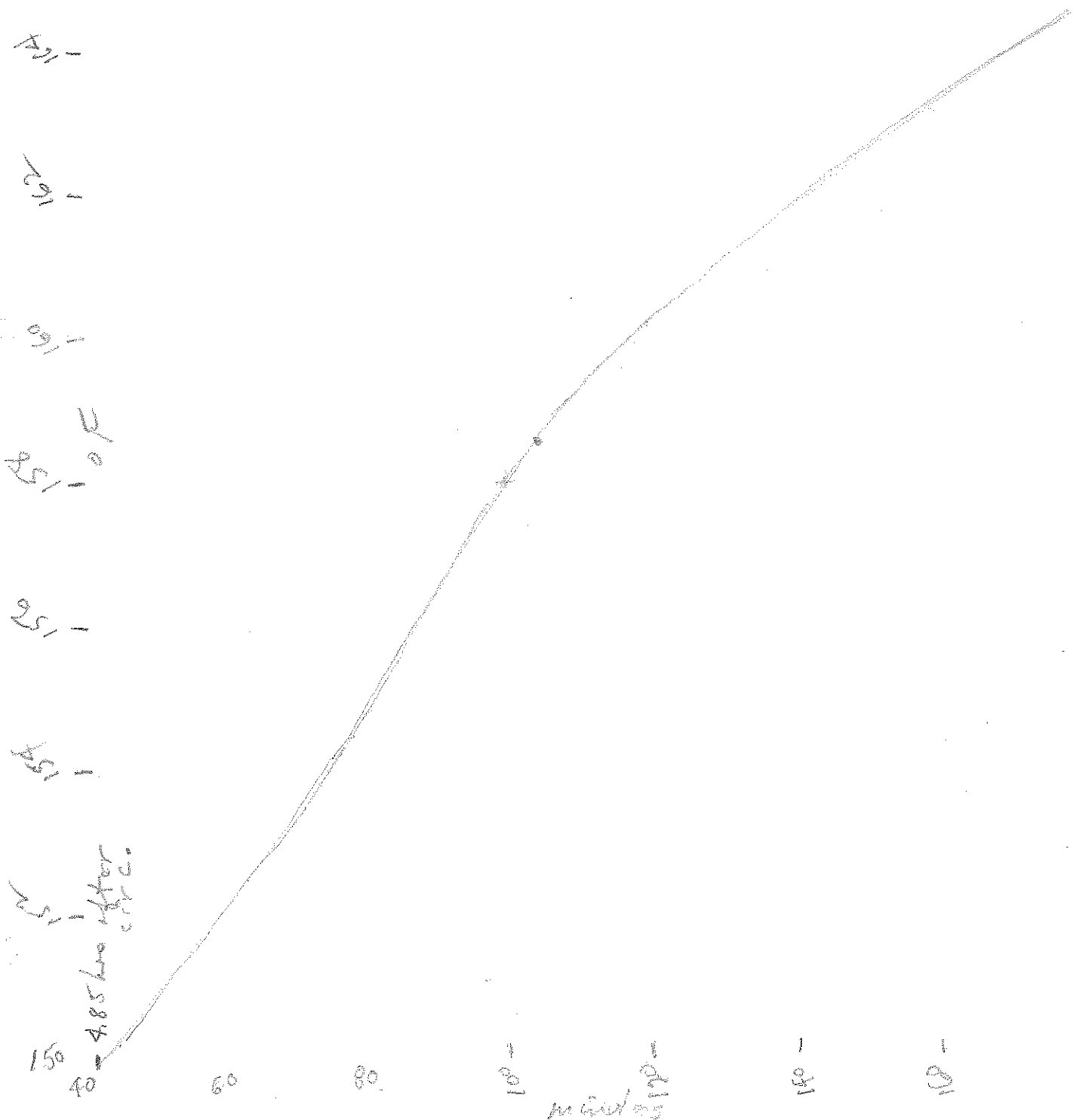
= 280°F




KLEMPER & LINSCH CO.

$$L_u \frac{L_u}{L_u - S}$$

Anax #1 Livermore
 Temp Bomb @ 5000'
 on 10/2/78
 (well depth ~5500')



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

DEPTH 46 0782

TEMP (°F)

100

200

300

400

1000

2000

3000

4000

5000

6000

7000

8000

9000

10000

10000
HOLES

MOISTURE
TENDENCY

APC

AMAX

○ Calculated by AMAX

△ Calculated by APC
wall ctr curves

□ Calculated by APC
wall edge curves

AMAX - LIVERMORE #1 SHOWING ALTERNATE TEMPERATURE
INTERPRETATIONS. RCE 10/31/73

Example: (using 10/27/78 data)

$$t_c = \text{time of circ.} = 10.07 \text{ hrs}$$

$$t_n = \text{time of observation} = 23.51 \text{ hrs after circulation ceased}$$

$$T_m = \text{mud temp.} = 174^\circ \text{F}$$

$$T_n = \text{normalized temp. from chart}$$

(Use t_n or observed, t_c as cooling time)

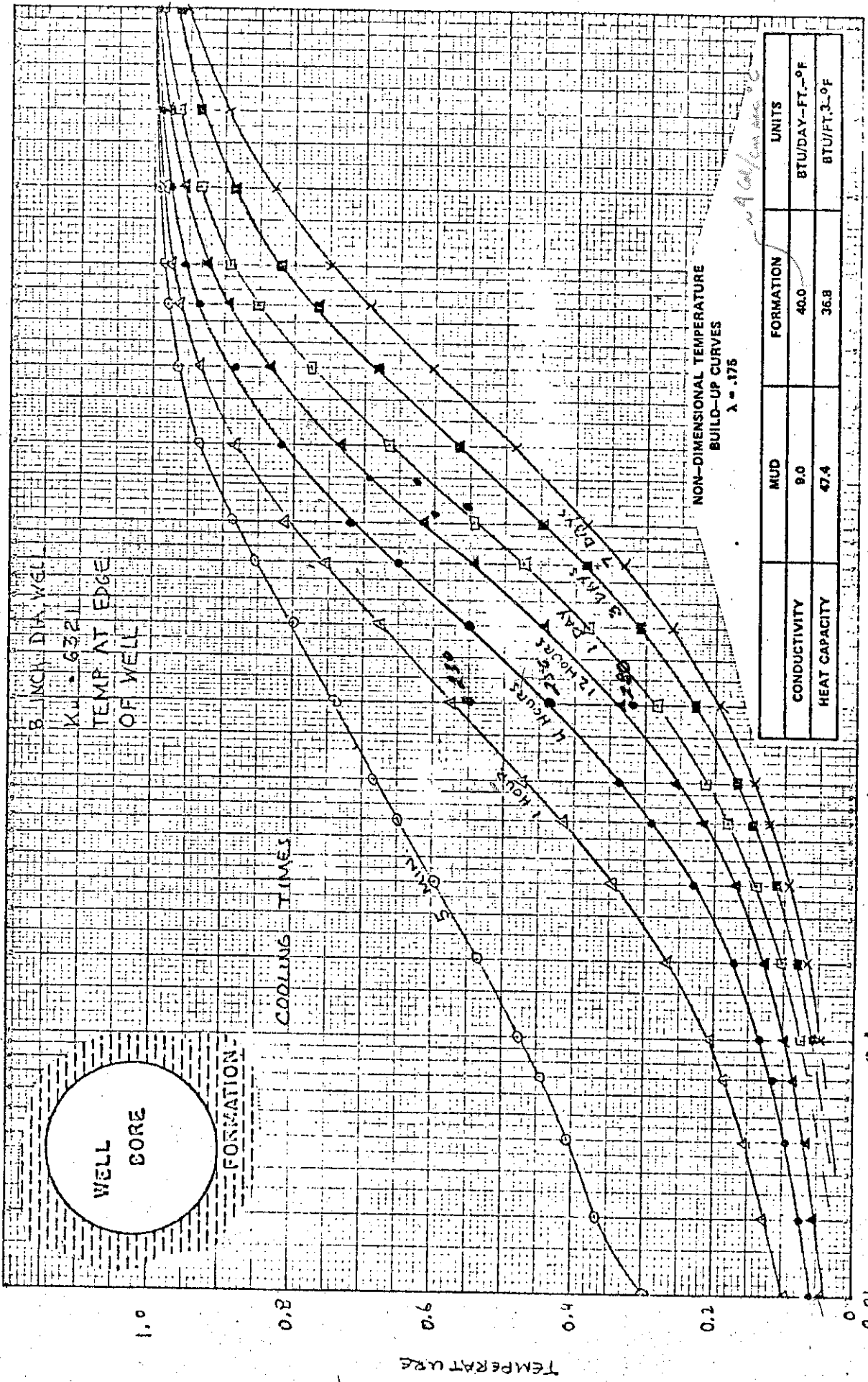
$$= 0.78$$

$$T_n = \text{observed temp. at time } t_n = 267.58^\circ \text{F}$$

$$\therefore T_f = \text{equil. temp.} = \frac{267.58 - 174}{0.71} + 174$$

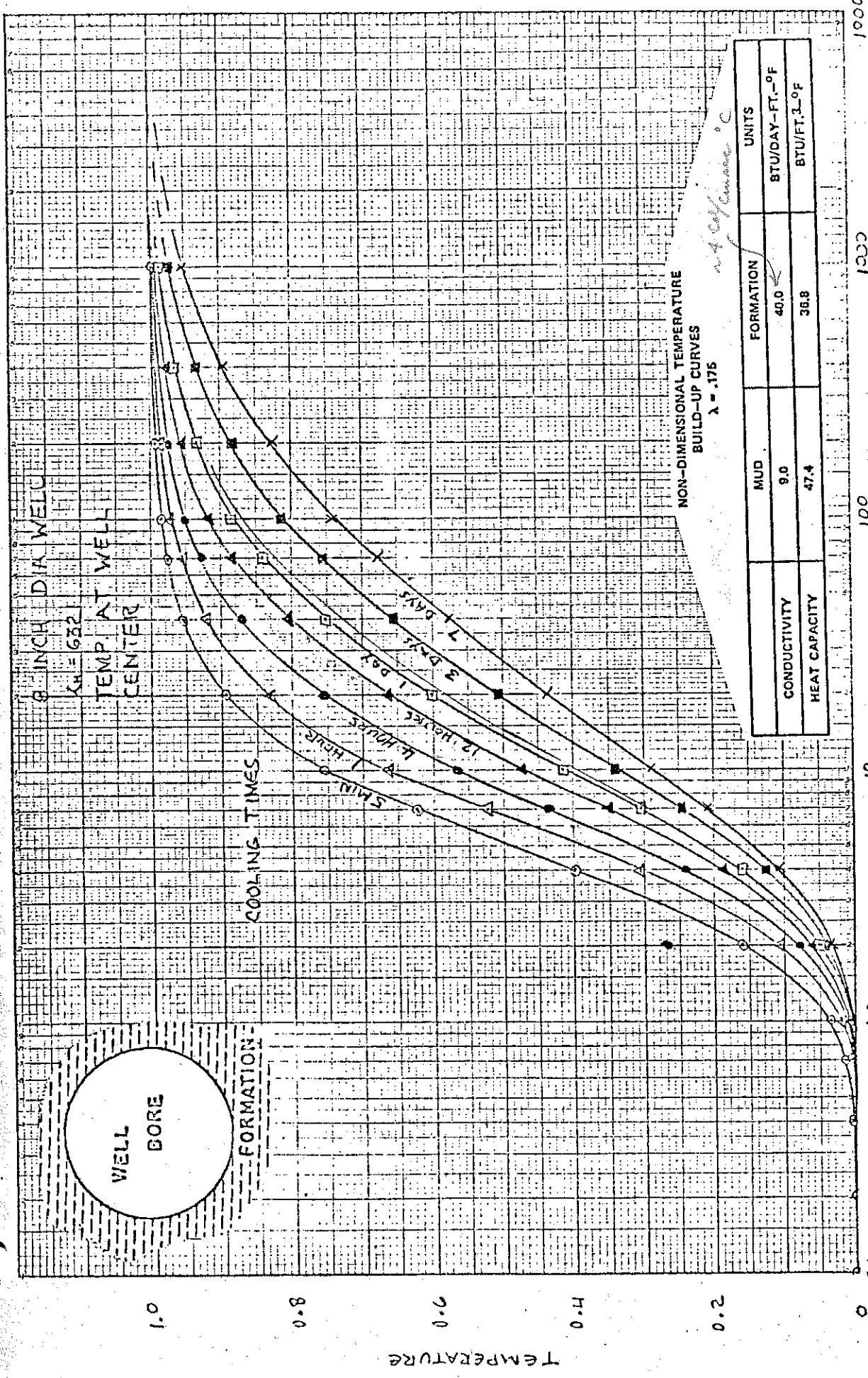
$$= 305$$

$$T_{f_2} = \frac{271.23 - 174}{0.75} + 174 = 303.23$$



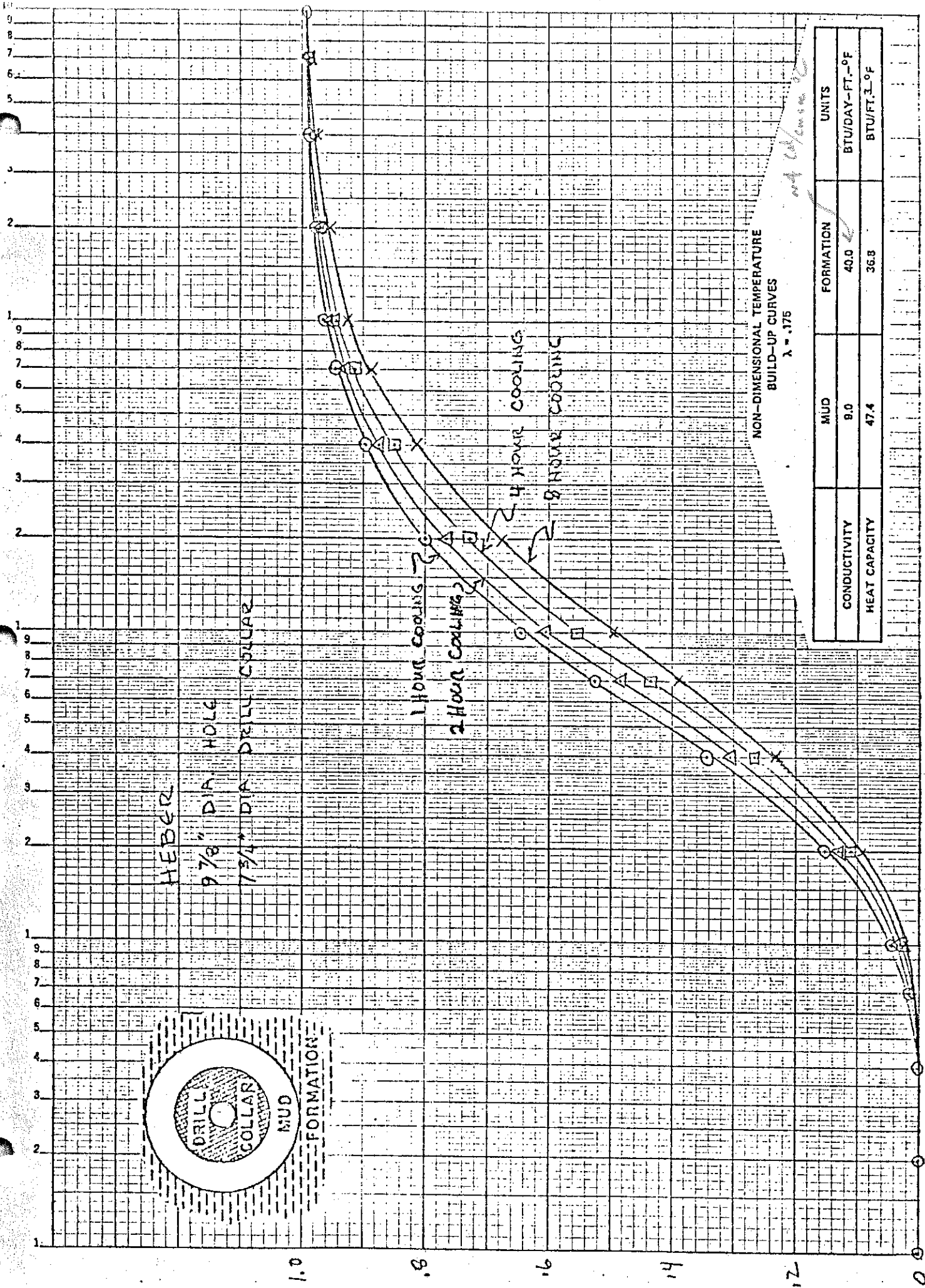
1000
100
10
1.0
0.1

$$T_p = \frac{T_e - T_m}{T_m} + T_m$$



1.0
0.8
0.6
0.4
0.2
0

0.1 1.0 10 100 1000



	MUD	FORMATION	UNITS
CONDUCTIVITY	9.0	40.0	BTU/DAY-FT.-°F
HEAT CAPACITY	47.4	36.3	BTU/FT.³-°F

K&W 10 X 10 TO 1/2 INCH 46 1322
7 X 10 INCHES
MADE IN U.S.A.
KEUFFEL & ESSER, CO.

2.4

0.7

2

1.5

1.5

1.0

0.1

0.2

0.3

0.4

0.5

0.6

0.7

0.8

0.9

1.0

1.1

1.2

1.3

1.4