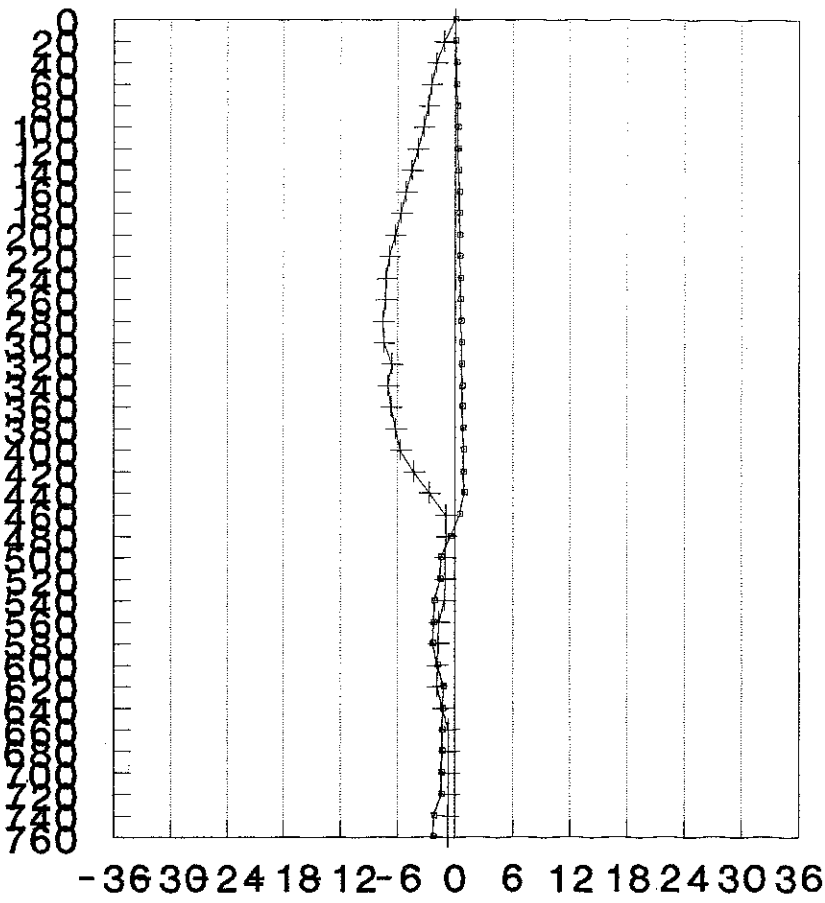
APPENDIX L

WELL LOGS

WELL #112
ALIGNMENT SURVEY

DEPTH IN FEET



SURVEYED 09-JULY-01

LAYNE CHRISTENSEN CO.

11001 ETIWANDA AVE. FONTANA,

OWNER CITY OF SAN BERNARDINO DATE 09-July-01
ADDRESS VIRGINIA St. SAN BERNARDINO PLUMBED BY D. Lawson
WELL DIA. 19.75 WATER LEVEL 171 FT. DATUM 10FT
WELL NUMBER 112 JOB NUMBER 27-5567

DEPTH. FT.	DRIFT READING INCHES				DEPTH FT.	DEVIATION READING INCHES			
	N.	S.	E.	W.		N.	S.	E.	W.
10	.0			.20	10	0			.44
20	.03			.38	* 20	.09			1.14
30	.02			.42	30	.08			1.68
40	.02			.40	* 40	.100			2.00
50	.02			.38	50	.120			2.28
60	.02			.36	* 60	.140			2.52
70	.02			.34	70	.16			2.72
80	.02			.32	* 80	.18			2.88
90	.02			.30	90	.20			3.00
100	.02			.30	* 100	.22			3.30
10	.02			.30	10	.24			3.60
20	.02			.30	* 20	.26			3.90
30	.02			.30	30	.28			4.20
40	.02			.30	* 40	.30			4.50
50	.02			.30	50	.32			4.80
60	.02			.30	* 60	.34			5.10
70	.02			.30	70	.36			5.40
80	.02			.30	* 80	.38			5.70
90	.02			.30	90	.40			6.00
200	.02			.30	* 200	.42			6.3
10	.02			.30	10	.88			6.6
20	.02			.30	* 20	.46			6.9
30	.02			.29	30	.48			6.96
40	.02			.29	* 40	.50			7.25
50	.02			.28	50	.52			7.28

LAYNE CHRISTENSEN CO.

11001 ETIWANDA AVE. FONTANA,

OWNER CITY of SAN BERNARDINO CA DATE 9-July-01 P92

ADDRESS VIRGINIA SAN BERNARDO CA PLUMBED BY D. Lewson

WELL DIA. 19.75 WATER LEVEL 171 FT. DATUM 10 FT

WELL NUMBER #12 JOB NUMBER 27-5567

DEPTH. FT.	DRIFT READING INCHES N.	S.	E.	W.	DEPTH FT.	DEVIATION READING INCHES N.	S.	E.	W.
260	.02			.27	* 260	.54			7.29
70	.02			.26	70	.56			7.28
80	.02			.26	* 80	.58			7.54
90	.02			.25	90	.60			7.50
300	.02			.24	* 300	.62			7.44
10	.02			.22	10	.64			7.04
20	.02			.20	* 20	.66			6.6
30	.02			.20	30	.68			6.8
40	.02			.20	* 40	.70			7.0
50	.02			.19	50	.72			6.84
60	.02			.18	* 60	.74			6.66
70	.02			.17	70	.76			6.46
80	.02			.16	* 80	.78			6.24
90	.02			.15	90	.80			6.0
400	.02			.14	* 400	.82			5.74
10	.02			.12	10	.84			5.04
20	.02			.10	* 20	.86			4.30
30	.02			.08	30	.88			3.52
40	.02			.06	* 40	.90			2.7
50	.01			.04	50	.46			1.84
60	.01			.02	* 60	.47			.94
70		.00		.02	70		.00		.96
80		.01		.02	* 80		.49		.98
90		.07		.02	90		1.00		1.00
500		.03		.02	* 500		1.53		1.02

LAYNE CHRISTENSEN CO.

11001 ETIWANDA AVE. FONTANA,

OWNER CITY OF SAN BERNARDINO DATE 09-July-01 P93

ADDRESS VIRGINIA SAN BERNARDINO Ca PLUMBED BY D. Lawson

WELL DIA. 19.75 WATER LEVEL 171 FT. DATUM 10 FT

WELL NUMBER 112 JOB NUMBER 27-5567

DEPTH. FT.	DRIFT READING INCHES N.	S.	E.	W.	DEPTH FT.	DEVIATION READING INCHES N.	S.	E.	W.
510		.03		.02	510		1.56		1.04
20		.03		.02	* 20		1.59		1.06
30		.04		.02	30		2.16		1.08
40		.04		.02	* 40		2.2		1.10
50		.04		.02	50		2.24		1.12
60		.04		.03	* 60		2.28		1.71
70		.04		.03	70		2.32		1.74
80		.04		.03	* 80		2.36		1.77
90		.03		.03	90		1.80		1.80
600		.03		.03	* 600		1.83		1.83
10		.02		.03	10		1.24		1.86
20		.02		.03	* 20		1.26		1.89
30		.02		.02	30		1.28		1.28
40		.02		.02	* 40		1.30		1.30
50		.02		.01	50		1.32		.66
60		.02		.01	* 60		1.34		.67
70		.02		.01	70		1.36		.68
80		.02		.01	* 80		1.38		.69
90		.02		.01	90		1.40		.70
700		.02		.01	* 700		1.42		.71
10		.02		.01	10		1.44		.72
20		.02		.01	* 20		1.46		.73
30		.02		.01	30		1.48		.74
40		.03		.01	* 40		2.25		.75
50		.03		.01	50		2.28		.76
60		.03		.01	* 760		2.31		.77

TD 769FT

COLOG INC
BOREHOLE GEOPHYSICS
17301 W COLFAX, STE 265, GOLDEN, CO 80401
PHONE (303) 279-0171 FAX 279-7730

WELL: #112
LOGS: NATURAL GAMMA
GUARD RESISTIVITY

PROJECT: CITY OF SAN BERNARDINO
CLIENT: LAYNE CHRISTENSEN
LOCATION: SAN BERNARDINO

DATE: 28 FEBRUARY 2001
COUNTY: SAN BERNARDINO
STATE: CALIFORNIA

BOREHOLE DATA

DRILLING CONTRACTOR: LAYNE CHRISTENSEN
ELEV: NA
DEPTH REF.: GROUND LEVEL

CUSTOMER TD: 935'
COLOG TD: 931'

RUN	BIT RECORD			CASING RECORD		
NO.	Bit Size	From	To	Size/Wgt/Thk.	From	To
1	46"	0'	60'	42"	0	60'
2	17.5"	60'	935'			
3						
4						

DRILL METHOD: REVERSE
HOLE MEDIUM: WATER
VISCOSITY: N/A

DATE DRILLED: 2/28/01
FLUID LEVEL: SURFACE
WEIGHT: N/A

TIME SINCE CIRC: 1 HOUR
MUD TYPE: N/A
Rm: N/A at N/A Deg N/A

GENERAL DATA

LOGGING ENGINEER: JOE ABREAU
CLIENT REP: BRUCE
OTHER SERVICES: GAMMA,16 & 64" NORM. RESISTIVITIES, SP, SPR

INSTRUMENTS: MSI SERIES 3
UNIT/TRUCK: 17

LOGGING DATA

LOG FUNCTION	RUN NO	EQUIPMENT			LOGGING		DETECTOR	SPACING		SOURCE		LOGGED INTERVAL		
		MODEL	PROBE S.N.	UPHOLE S.N.	DIG INT FEET	SPEED FT./MIN.	TYPE	Tx–Rx FEET	Rx–Rx FEET	TYPE	SIZE CURIE	FROM	TO	INT FEET
NAT. GAMMA	1	IPF	1414	1524	0.1	20	NaI					931'	60'	871'
GUARD RES.	1	IPF	1414	1524	0.1	20						931'	~0'	871'

SOURCE S.N.(S): NONE USED
CALIBRATION FACTOR(S):
DIGITAL FILE NAME(S): GUARD.IB1 GUARD.PLP, GUARD.HDP
REMARKS:

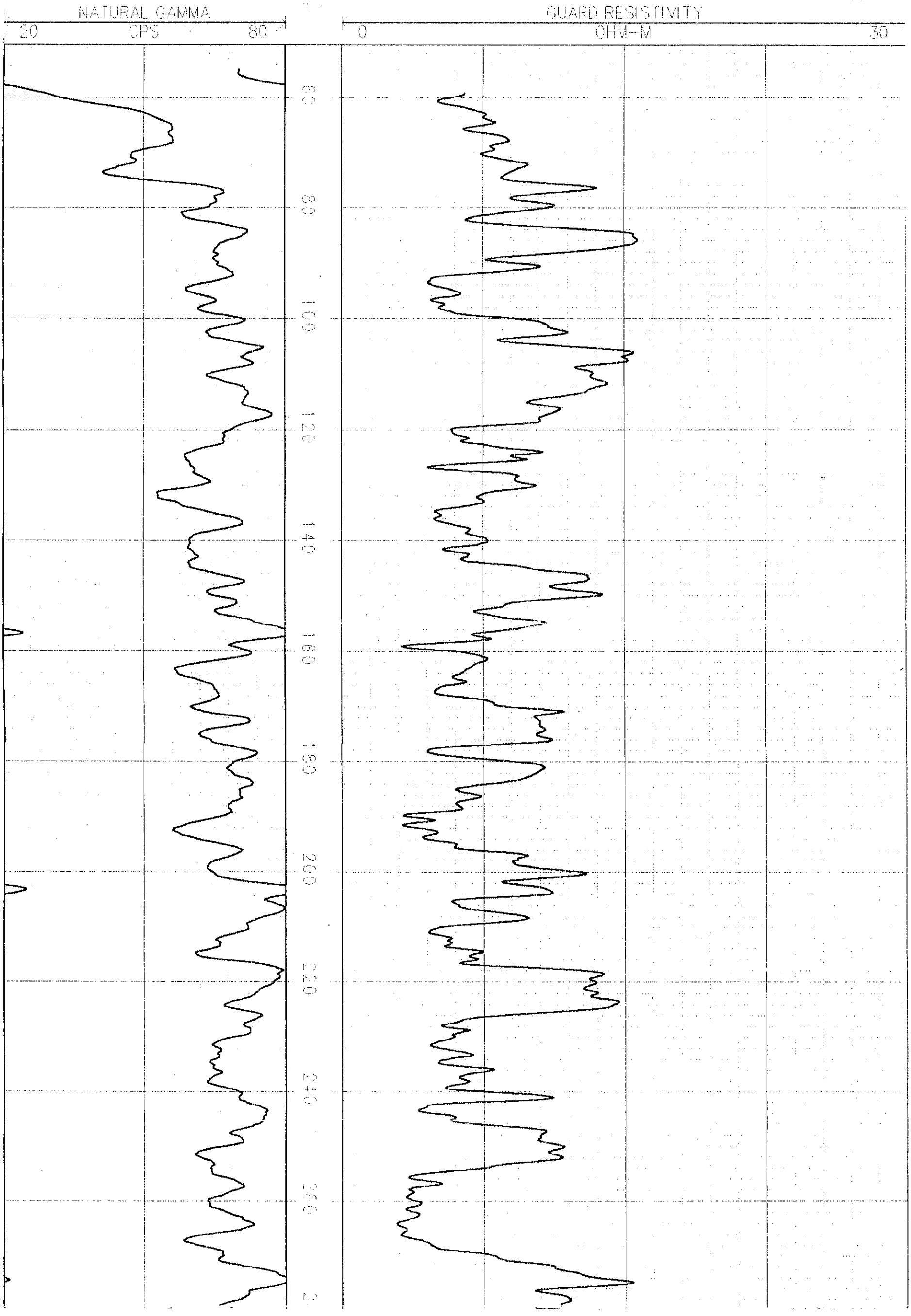
PRE–LOG CALIBRATION CHECK WITHIN 2%
POST–LOG CALIBRATION CHECK WITHIN 2%

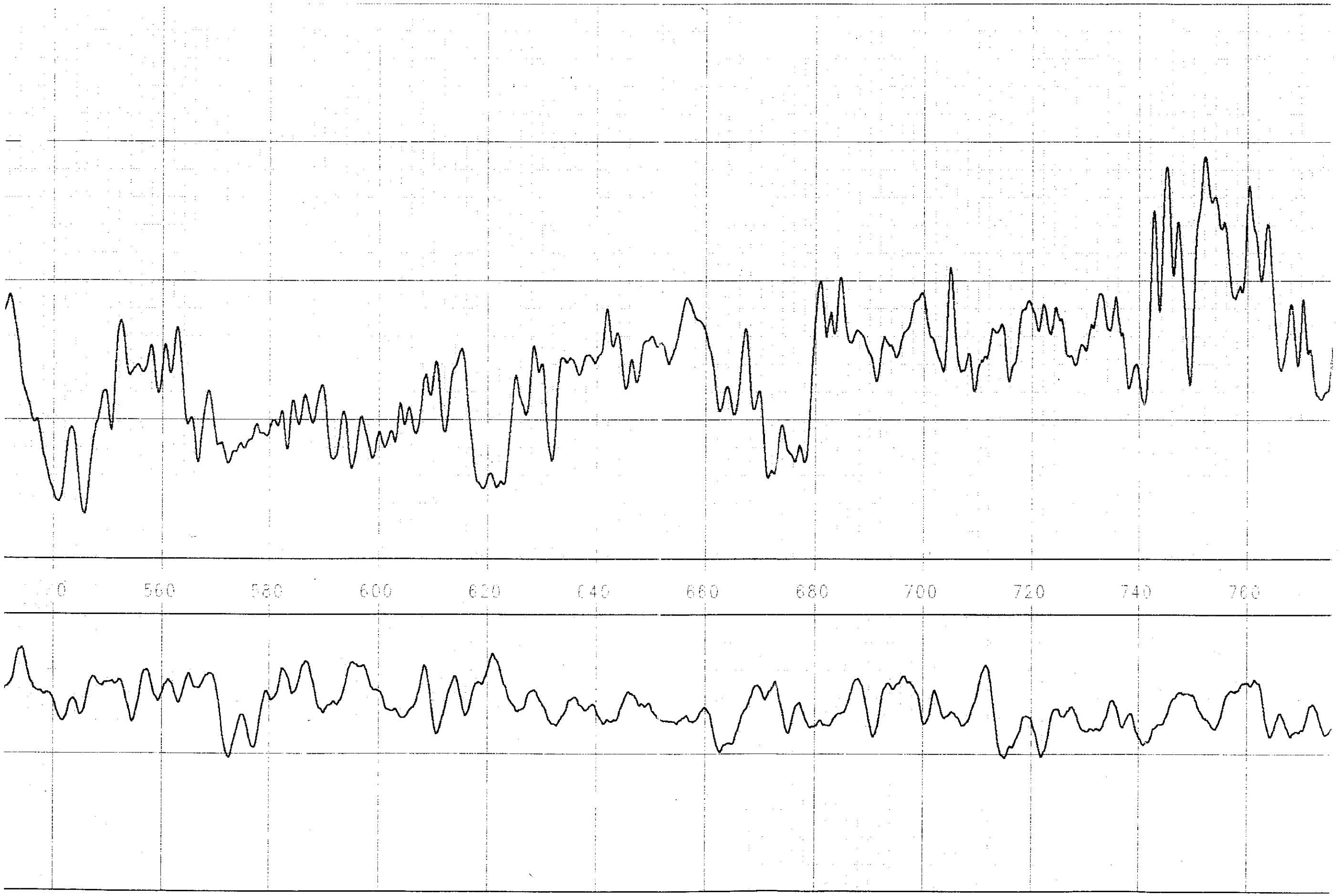
SURFACE CASING STICKUP = 0.0'

N/A – NOT AVAILABLE

CITY OF SAN BERNARDINO, WELL #112, MAIN RUN, 28 FEBRUARY 01

COLOG

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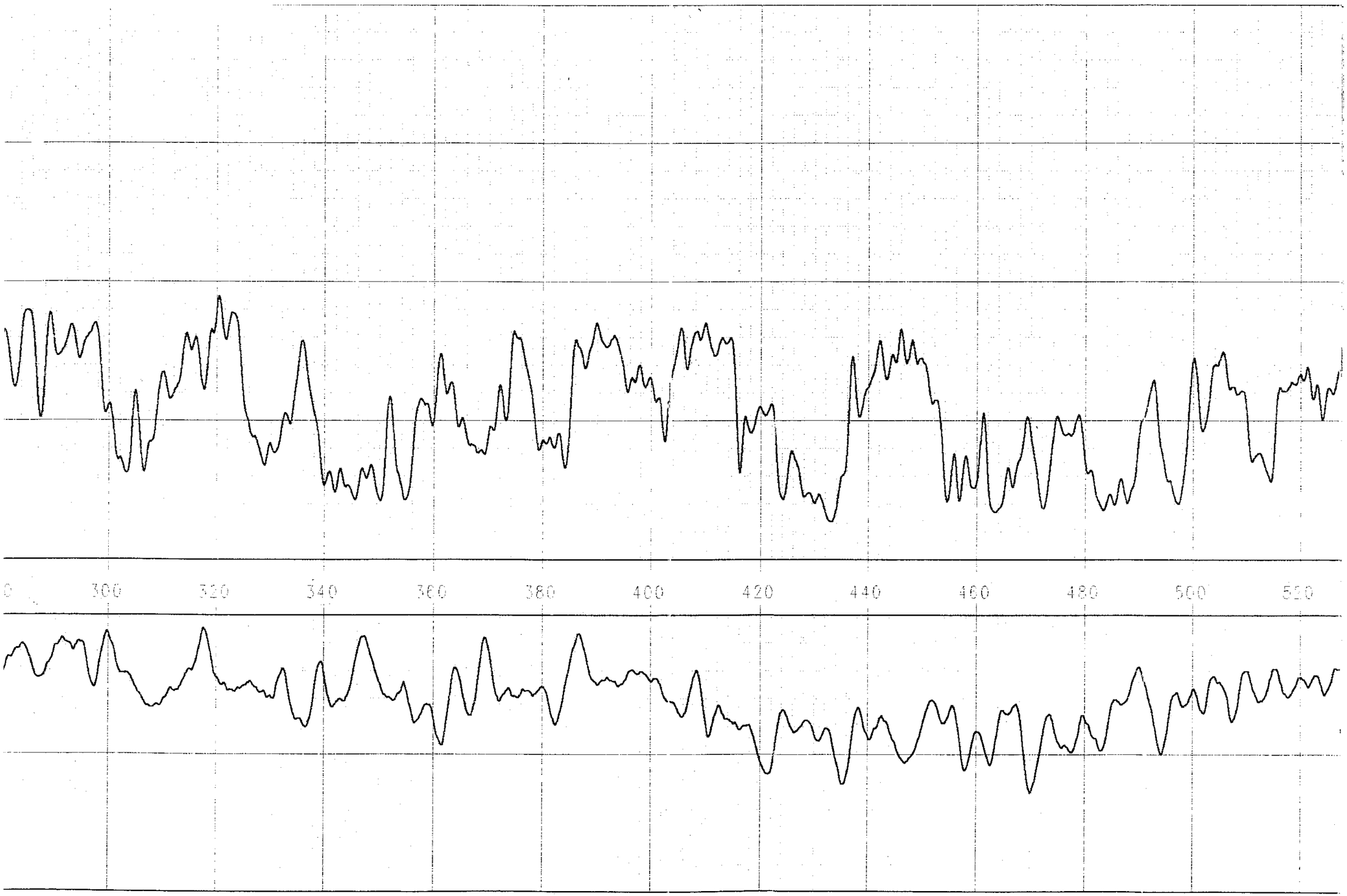
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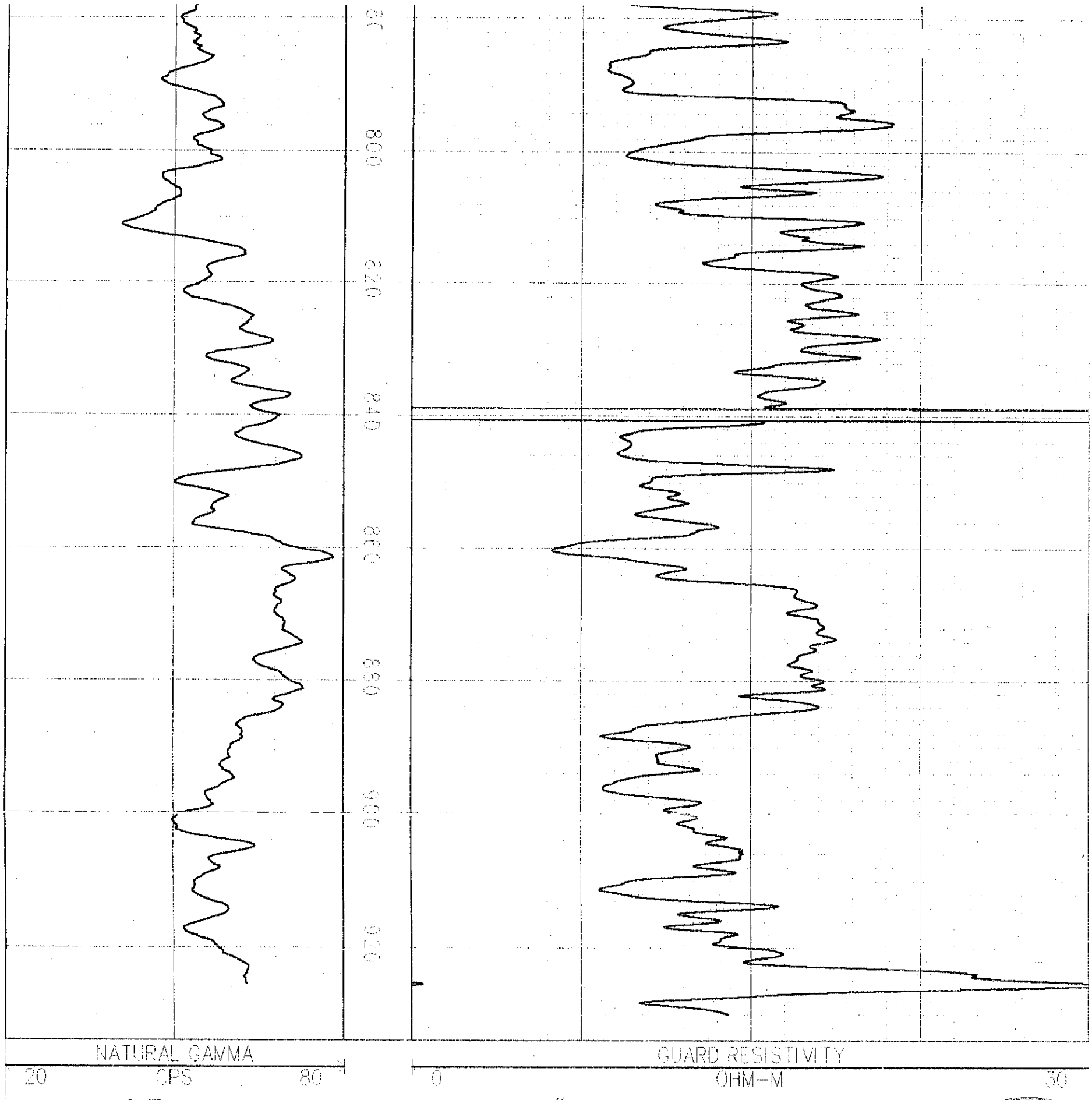


CITY OF SAN BERNARDINO, WELL #112, MAIN RUN, 28 FEBRUARY 01

COLOG

COLOG
INC

BOREHOLE GEOPHYSICS

17301 W. COLFAX, STE 265, GOLDEN, CO 80401
PHONE: (303) 279-0171 FAX: (303) 279-2730

RUN: #112
[illegible]: 16--64" NORMAL RESI
SINGLE POINT RESIST.
SPONTANEOUS POTENTIAL

PROJECT: CITY OF SAN BERNARDINO
CLIENT: LAYNE CHRISTENSEN
LOCATION: SAN BERNARDINO

[illegible]: 28 FEBRUARY 2001
[illegible]: SAN BERNARDINO
[illegible]: CALIFORNIA

BOREHOLE DATA

DRILLING CONTRACTOR: LAYNE CHRISTENSEN
ELEV: NA
DEPTH REF: GROUND LEVEL
[illegible]: 935'
[illegible]: 931'

RUN NO.	Bit Size	From	To	Casing Weight	Casing Record
1	46"	0'	60'		
2	17.5"	60'	935'		
3					
4					

DRILL METHOD: REVERSE
HOLE MEDIUM: WATER
VISCOSITY: N/A

[illegible]: 2/28/01
[illegible]: SURFACE
[illegible]: N/A

TIME [illegible]: 1 HOUR
MUD TYPE: N/A
RM: N/A [illegible]: N/A

LOGGING ENGINEER: JOE ABREAU

LOGGING DATA

LOG FUNCTION	RUN NO.	EQUIPMENT MODEL	PROBE S.N.	UPHOLE S.N.	LOGGING DIG INT FEET	LOGGING SPEED FT./MIN.	DETECTOR TYPE	SPACING T.-R. FEET	SPACING R.-R. FEET	SOURCE TYPE	SOURCE SIZE CURIE	LOGGED INTERVAL FROM	LOGGED INTERVAL TO	LOGGED INTERVAL INT. FEET
16" NORMAL	1	PLP	404	1524	0.1	40						931'	60'	871'
64" NORMAL	1	PLP	404	1524	0.1	40						931'	60'	871'
SINGLE PT.	1	PLP	404	1524	0.1	40						931'	60'	871'
SP	1	PLP	404	1524	0.1	40						931'	60'	871'

SOURCE S.N.(S): NONE USED

CALIBRATION FACTOR(S):

DIGITAL FILE NAME(S): PLP.PAO, PLP.PLP, PLP.HDP

REMARKS:

PRE-LOG CALIBRATION CHECK WITHIN 2%

POST-LOG CALIBRATION CHECK WITHIN 2%

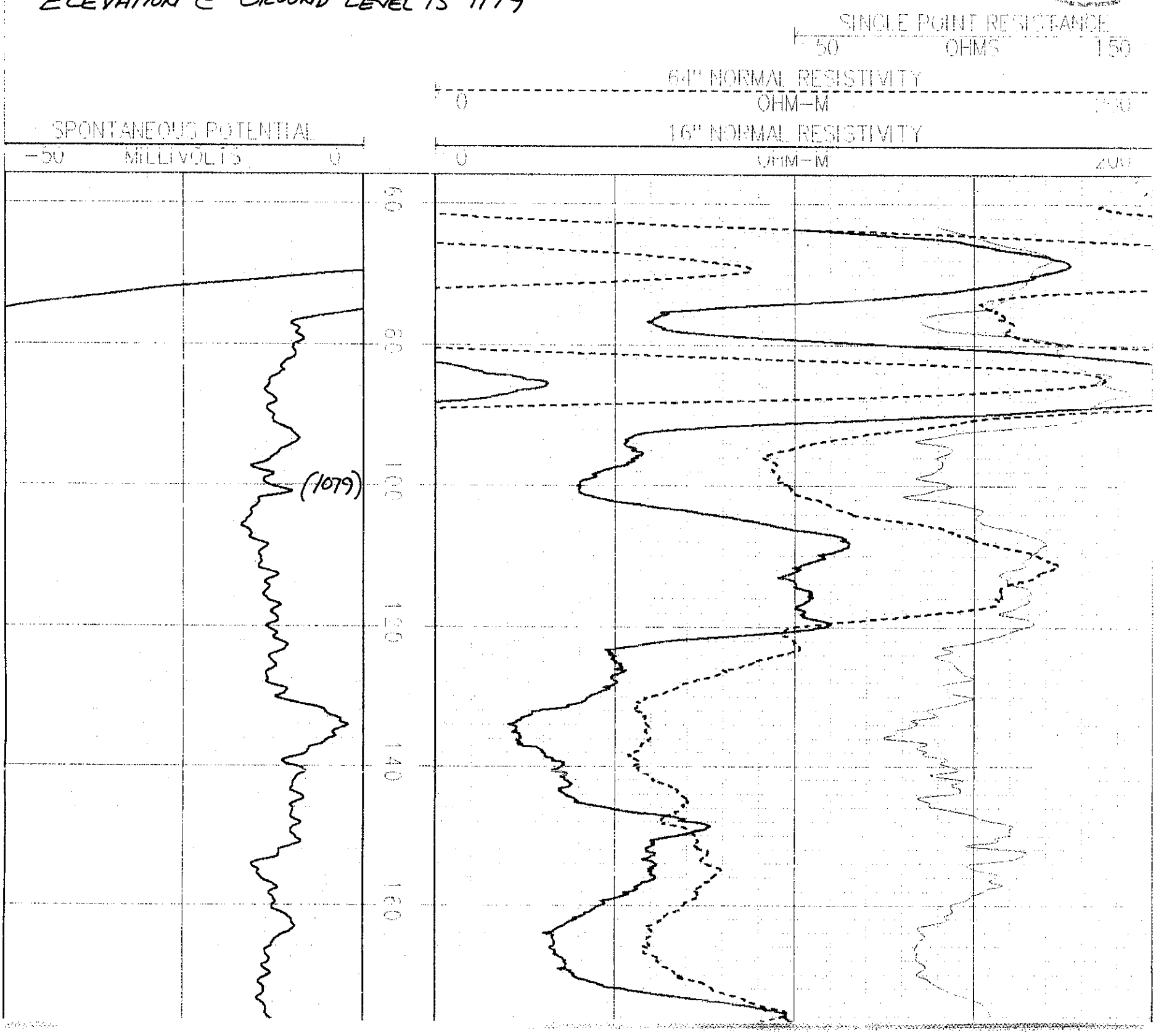
SURFACE CASING STICKUP = 0.0'

N/A – NOT AVAILABLE

CITY OF SAN BERNARDINO, WELL #11?, MAIN LOG, 28 FEBRUARY 01

COLOG

ELEVATION @ GROUND LEVEL IS 1179'



CLAY

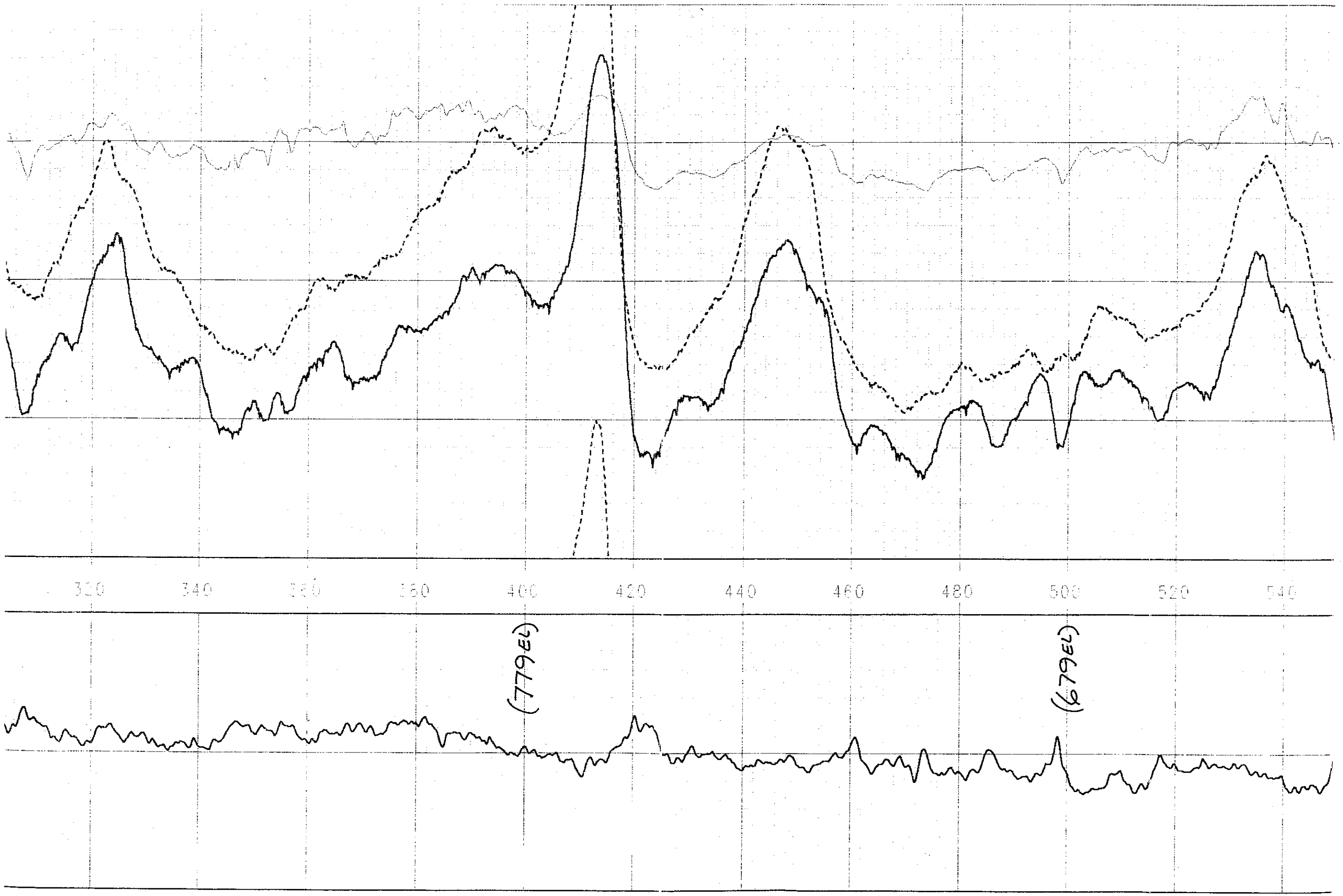
0 200 220 240 260 280 300 320 340 360 380 400 420

(679)

(879ft)

(779ft)

280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500
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540
(779eL)
(679eL)

CLAY

CLAY

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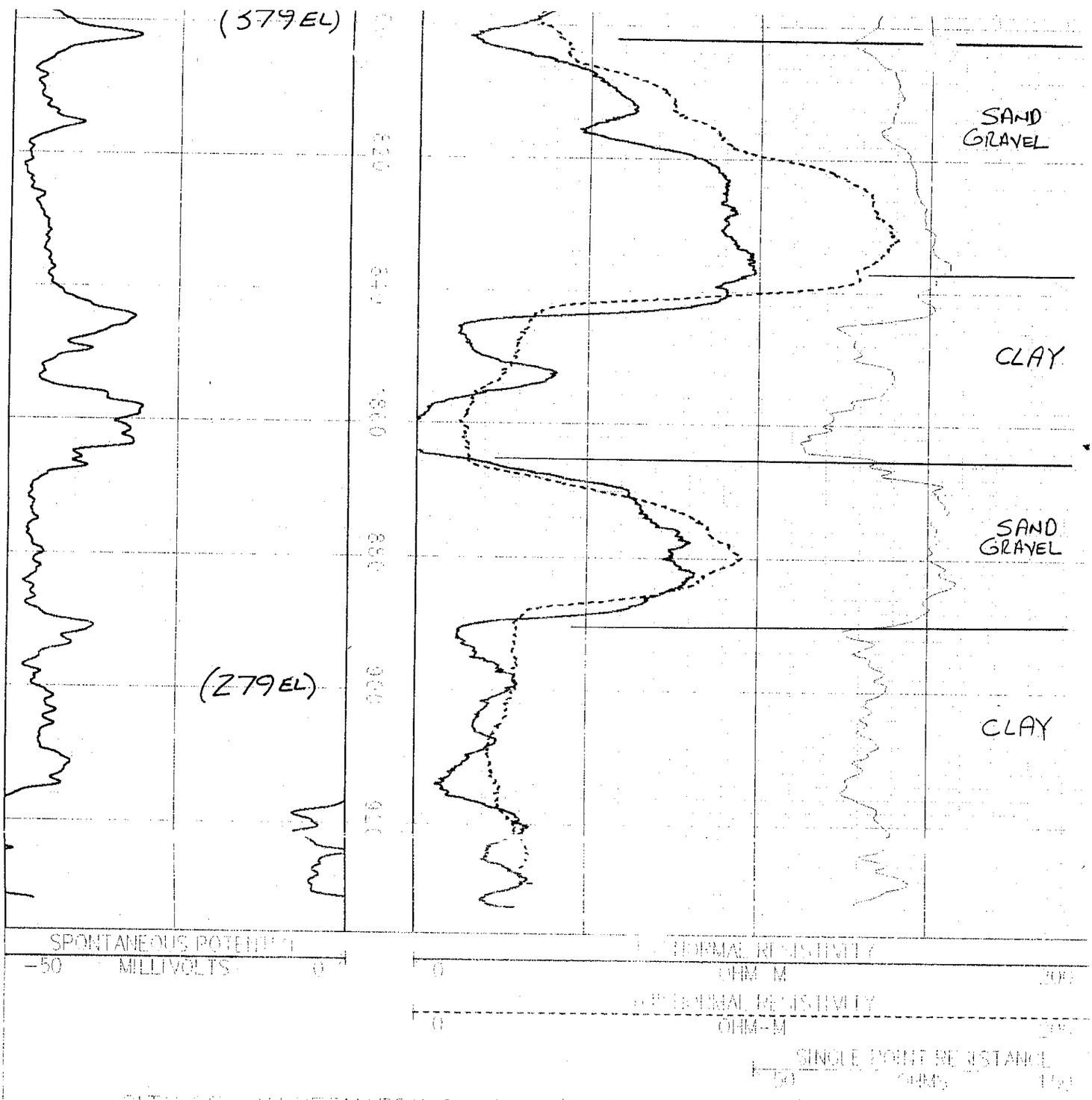
780

(579 EL)

(479 EL)



CITY OF SAN BERNARDINO, WELL #112, MAIN LOG, 28 FEBRUARY 01

COLOC

COLOG INC

BOREHOLE GEOPHYSICS

17301 W COLFAX, STE 265, GOLDEN, CO 80401
PHONE (303) 279-0171 FAX 279-2730

WELL: #112
LOGS: TEMPERATURE
FLUID RES.

PROJECT: CITY OF SAN BERNARDINO
CLIENT: LAYNE CHRISTENSEN
LOCATION: SAN BERNARDINO

DATE: 28 FEBRUARY 2001
COUNTY: SAN BERNARDINO
STATE: CALIFORNIA

BOREHOLE DATA

DRILLING CONTRACTOR: LAYNE CHRISTENSEN
ELEV: NA DEPTH REF: GROUND LEVEL

CUSTOMER TD: 935'
COLOG TD: 931'

RUN NO	BIT RECORD Bit Size	From	To	CASING RECORD Size/Wgt/Thk	From	To
1	45"	0'	60'	42"	0	60'
2	17.5"	60'	935'			
3						
4						

DRILL METHOD: REVERSE
HOLE MEDIUM: WATER
VISCOSITY: N/A

DATE DRILLED: 2/28/01 TIME SINCE CIRC: 1 HOUR
FLUID LEVEL: SURFACE MUD TYPE: N/A
WEIGHT: N/A Pm: N/A at N/A Deg: N/A

PERSONAL DATA

LOGGING ENGINEER: JOE ABREAU
CLIENT REP: BRUCE

INSTRUMENT: MSI SERIES 3
UNIT/TRUCK: 17

OTHER SERVICES: GAMMA, 16 & 64" NORM RESISTIVITIES, SP, SPR

LOG DATA

LOG FUNCTION	RUN NO.	EQUIPMENT MODEL	PROBE S.N.	UPHOLE S.N.	LOGGING DIGITIZ FEET	LOGGING SPEED FT/MIN	CORRELATION TYPE	SPACING T-R FEET	SPACING R-R FEET	SOURCE TYPE	SOURCE SIZE CURIE	LOGGED INTERVAL FROM	LOGGED INTERVAL TO	LOGGED INTERVAL INT FEET
TEMPERATURE	1	MLP	2101	1524	0.1	20						931'	0'	931'
GUARD RES	1	MLP	2101	1524	0.1	20						931'	0'	931'

SOURCE S.N. S/S: NONE USED
CALIBRATION FACTOR(S):

DIGITAL FILE NAME(S): MLP.MBO, MLP.PLP, MLP.HDP

REMARKS:

PRE-LOG CALIBRATION CHECK WITHIN 2%
POST-LOG CALIBRATION CHECK WITHIN 2%

SURFACE CASING STICKUP = 0.0'

N/A – NOT AVAILABLE

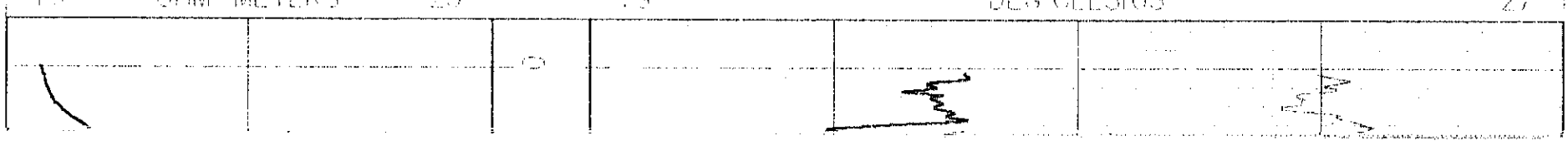
CITY OF SAN BERNARDINO, WELL # 112, MAIN LOG, 28 FEBRUARY 2001

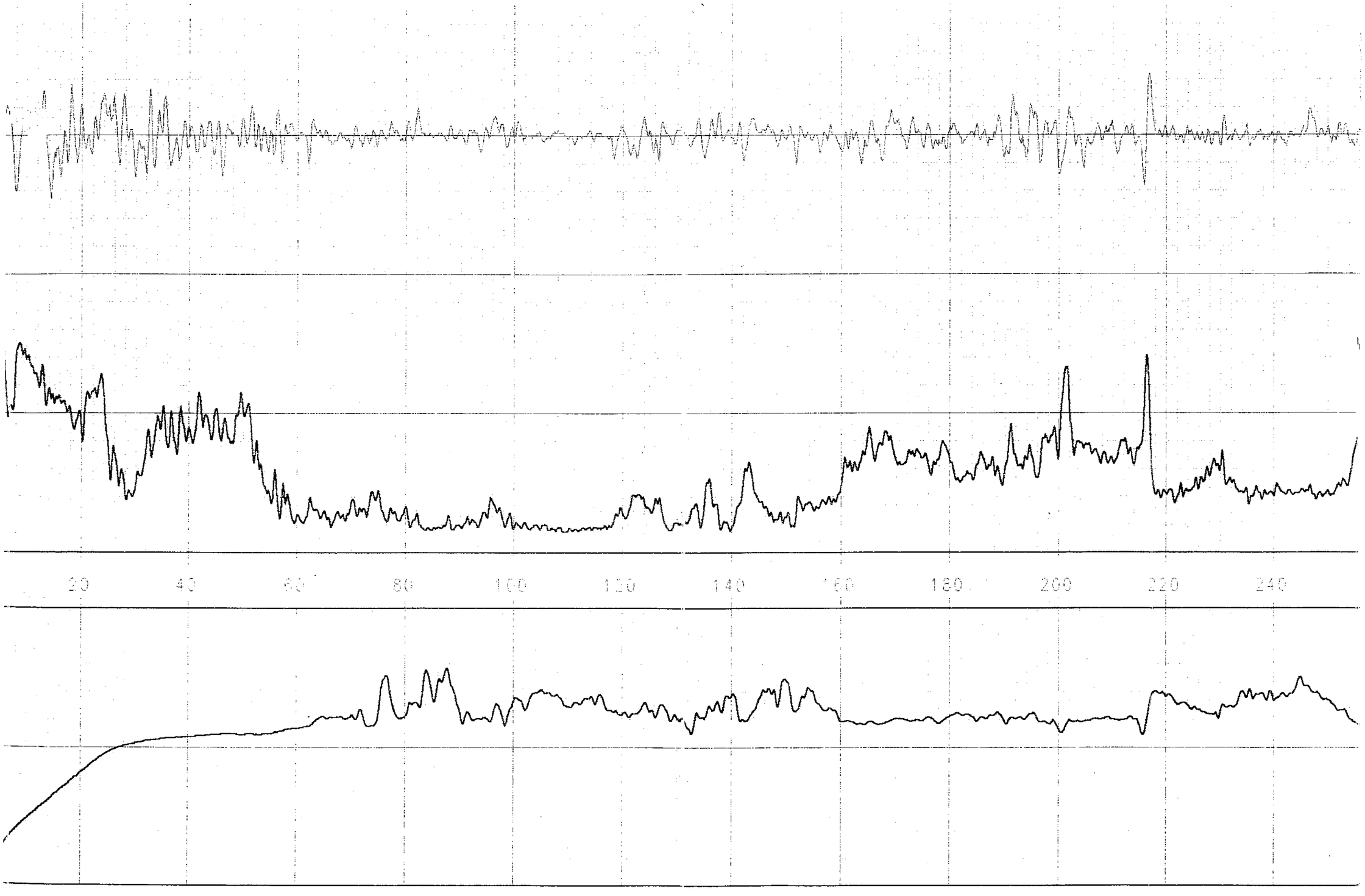
COLOG

DIFFERENTIAL TEMP
-0.5 DEG CELSIUS 0.5

FLUID RESISTIVITY
19 OHM-METERS 23

TEMPERATURE
19 DEG CELSIUS 27

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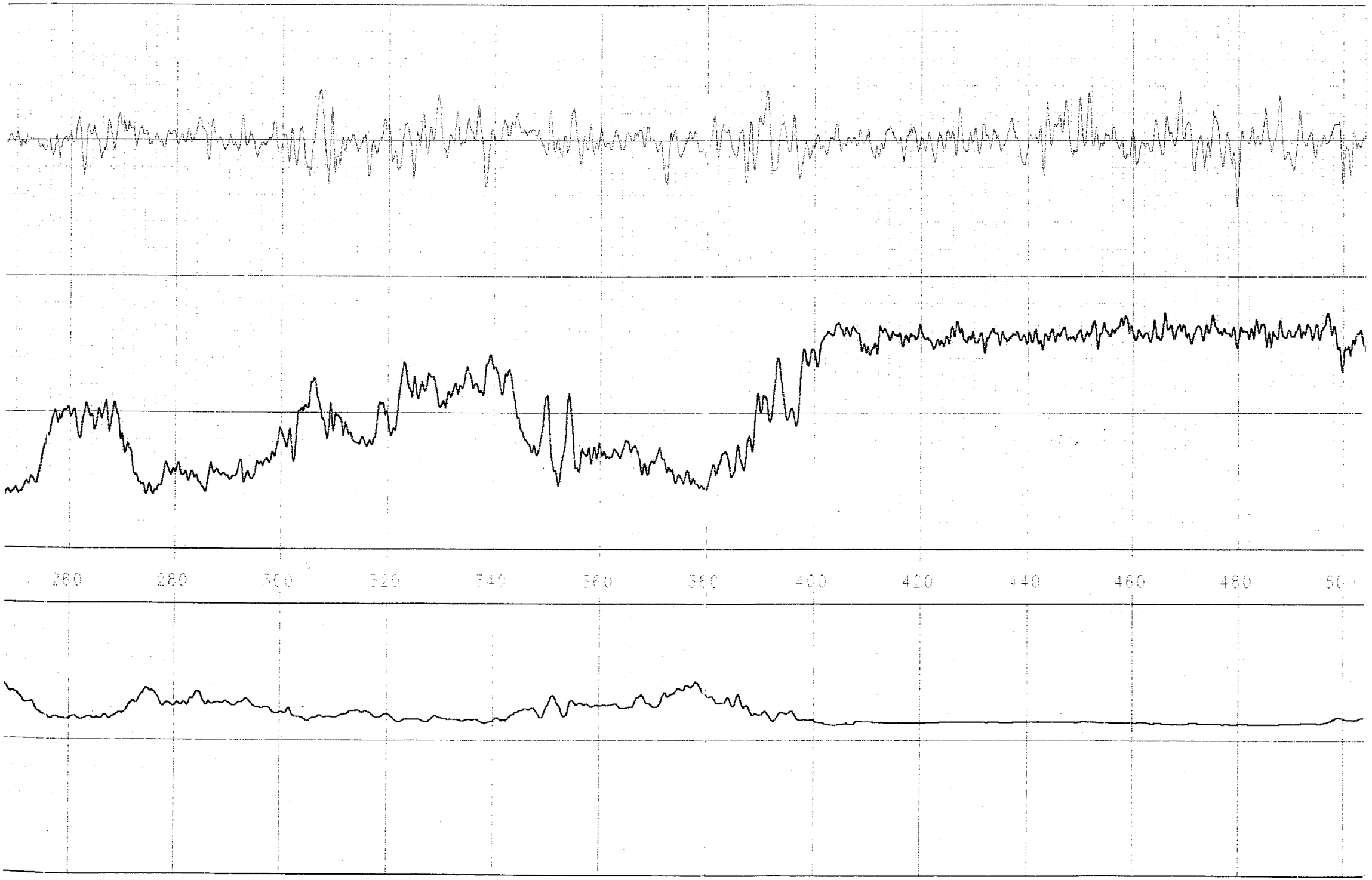
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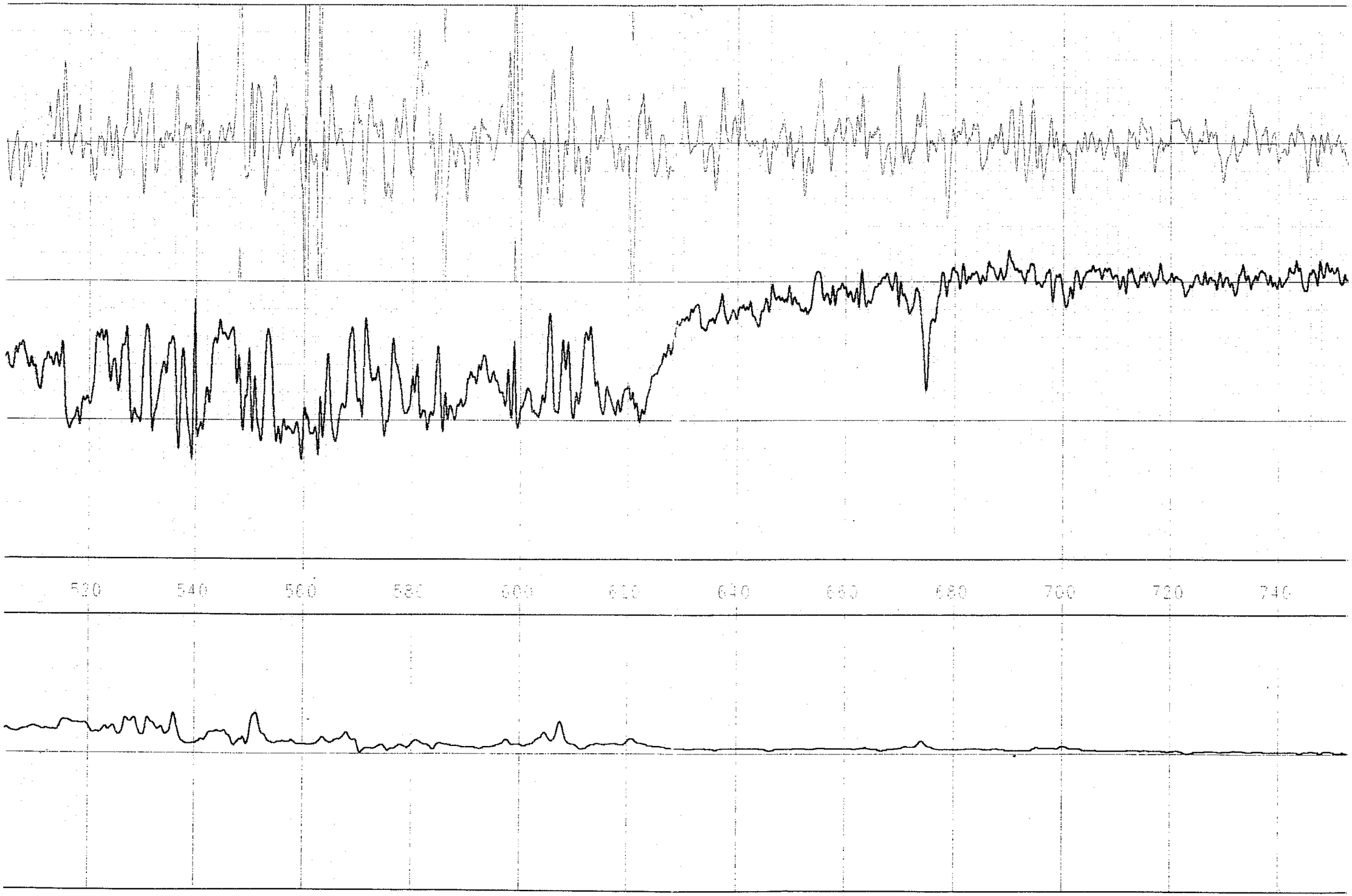
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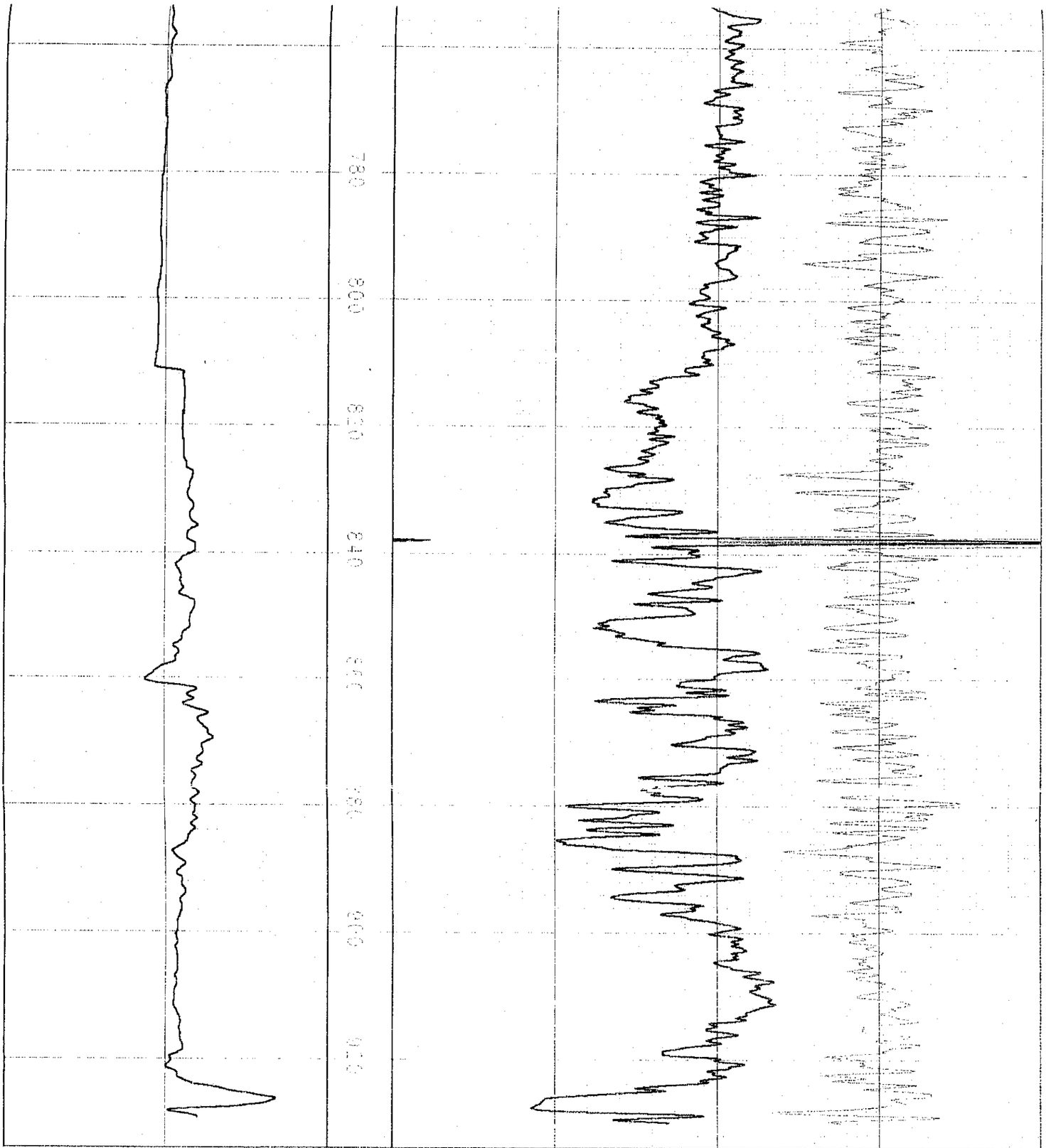


CITY OF SAN BERNARDINO, WELL # 112, MAIN LOG, 28 FEBRUARY 200

COLOG

COLOG INC

BOREHOLE GEOPHYSICS

17301 W. COLFAX, STE 260, GOLDEN, CO 80401
PHONE (303) 279-0171 FAX 279-2730

WELL: #112
LOGS: TEMPERATURE
FLUID RES.

PROJECT: CITY OF SAN BERNARDINO
CLIENT: LAYNE CHRISTENSEN
LOCATION: SAN BERNARDINO

DATE: 28 FEBRUARY 2001
COUNTY: SAN BERNARDINO
STATE: CALIFORNIA

BOREHOLE DATA

DRILLING CONTRACTOR: LAYNE CHRISTENSEN
ELEV: NA
DEPTH REF: GROUND LEVEL

CUSTOMER TD: 935'
COLOG TD: 931'

RUN NO.	BIT RECORD			CASING RECORD		
	Bit Size	From	To	Size/Wgt/Thk.	From	To
1	46"	0'	60'	42"	0	60'
2	17.5"	60'	935'			
3						
4						

DRILL METHOD: REVERSE
HOLE MEDIUM: WATER
VISCOSITY: N/A

DATE DRILLED: 2/28/01
FLUID LEVEL: SURFACE
WEIGHT: N/A

TIME SINCE CIRC: 1 HOUR
MUD TYPE: N/A
Rm: N/A at N/A Deg F: N/A

GENERAL DATA

LOGGING ENGINEER: JOE ABREAU
CLIENT REP: BRUCE

INSTRUMENT: MSI SERIES 3
UNIT/TRUCK: 17

OTHER SERVICES: GAMMA, 16 & 64" NORM, RESISTIVITIES, SP, SPR

LOG DATA

LOG FUNCTION	RUN NO.	EQUIPMENT MODEL	PROBE S.N.	UPHOLE S.N.	LOGGING DIG. INT. FEET	LOGGING SPEED FT/MIN	DETECTOR TYPE	SPACING T-R FEET	SPACING R-R FEET	SOURCE TYPE	SOURCE SIZE CURIE	LOGGED INTERVAL FROM	LOGGED INTERVAL TO	LOGGED INTERVAL INT FEET
TEMPERATURE	1	MLP	2101	1524	0.1	20						931'	0'	931'
GUARD RES	1	"	"	1524	0.1	20						931'	0'	931'

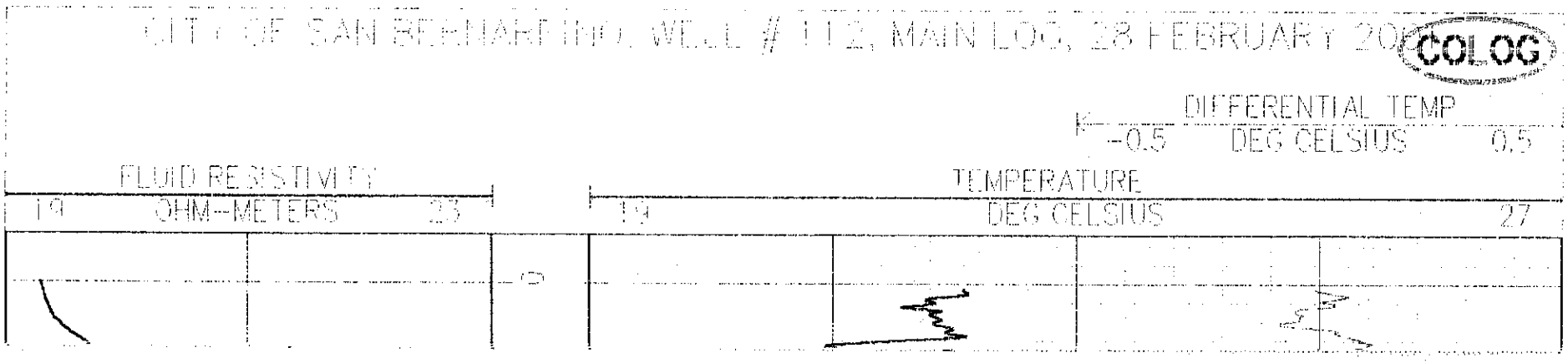
SOURCE S.N.'s: NONE USED
DIGITAL FILE NAME(S): MLP1M30, MLP1LP, MLP1HPP
REMARKS:

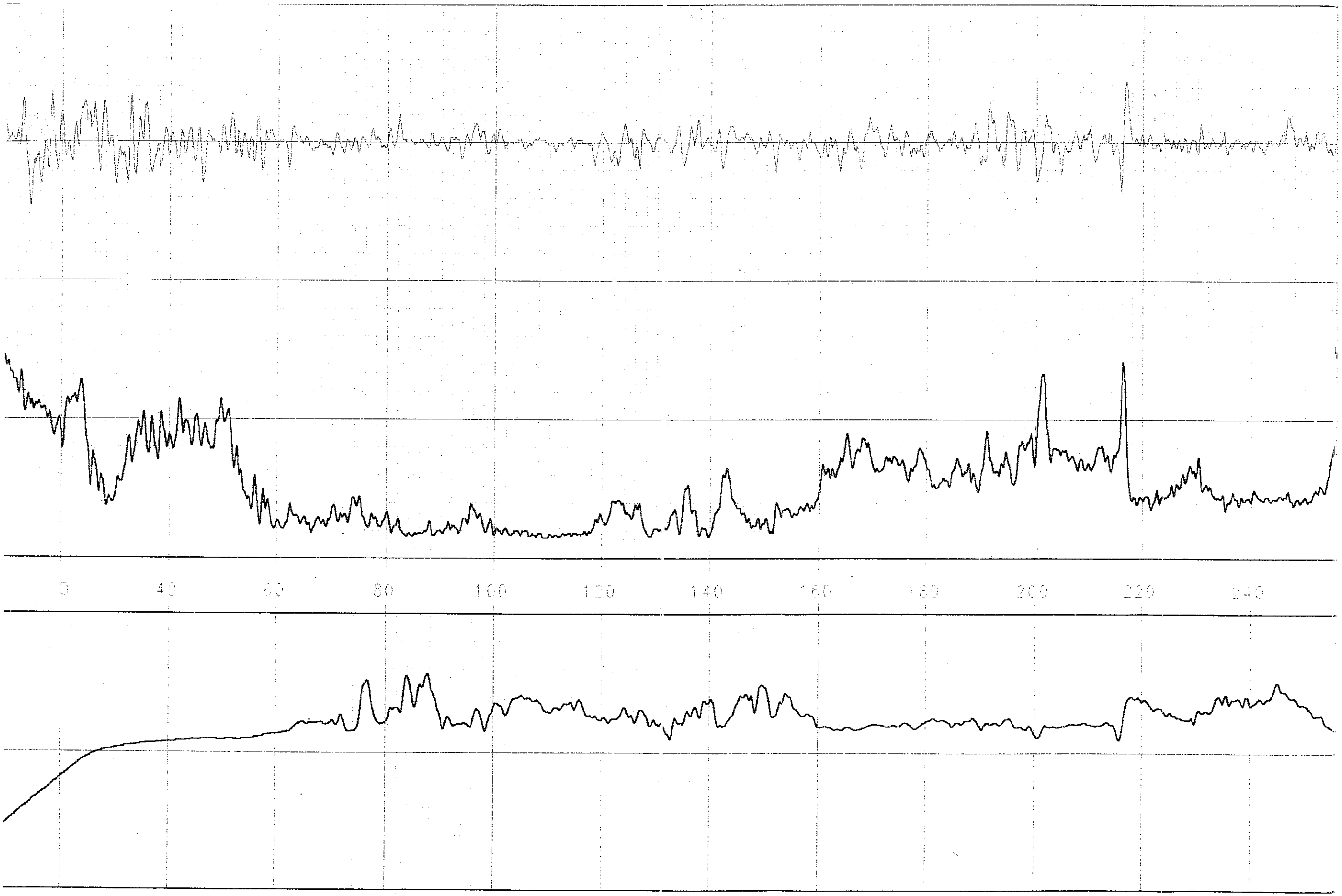
CALIBRATION FACTOR(S):

PRE-LOG CALIBRATION CHECK WITHIN 2%
POST-LOG CALIBRATION CHECK WITHIN 2%

SURFACE CASING STICKUP = 0.0'

N/A = NOT AVAILABLE

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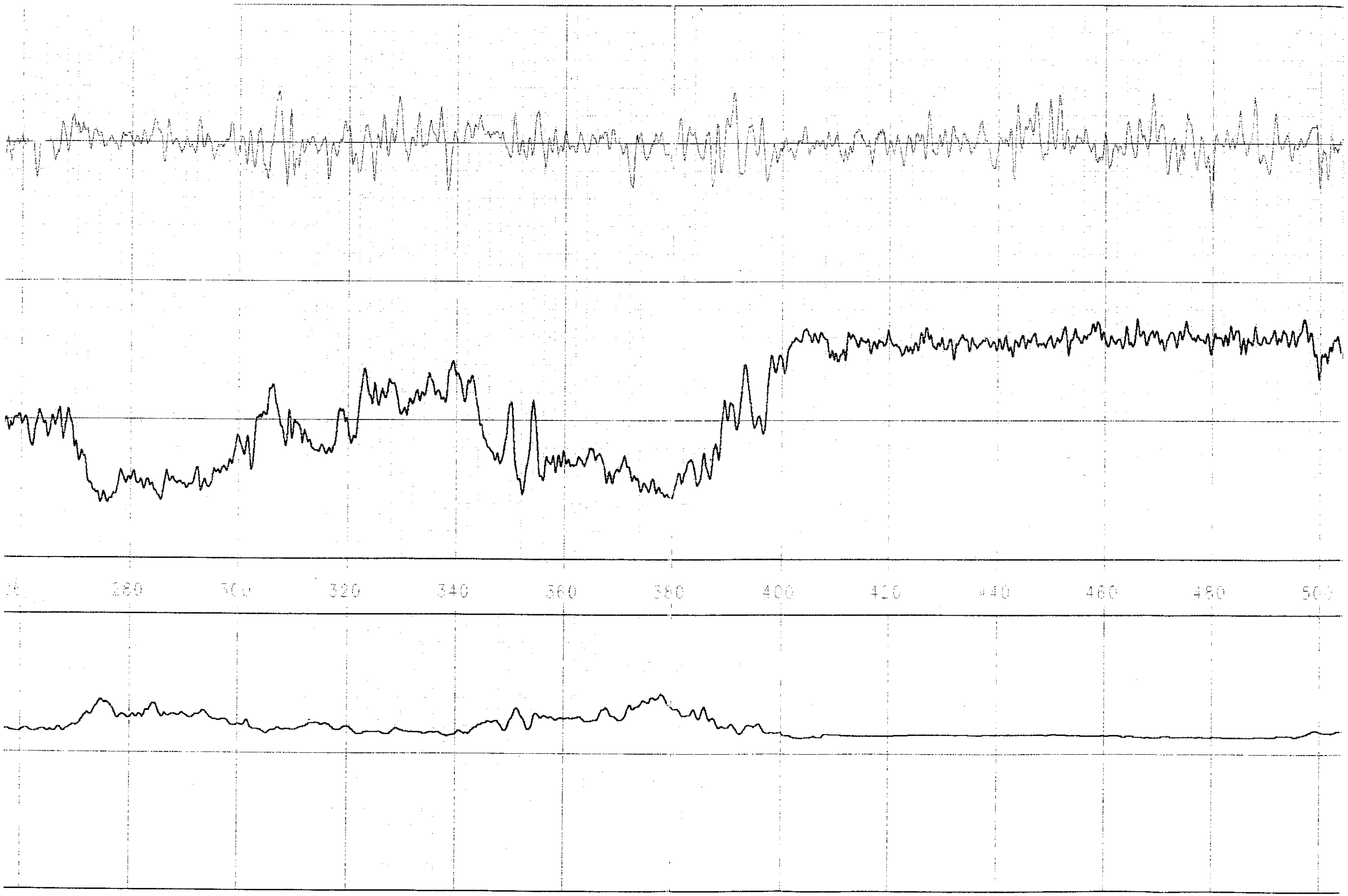
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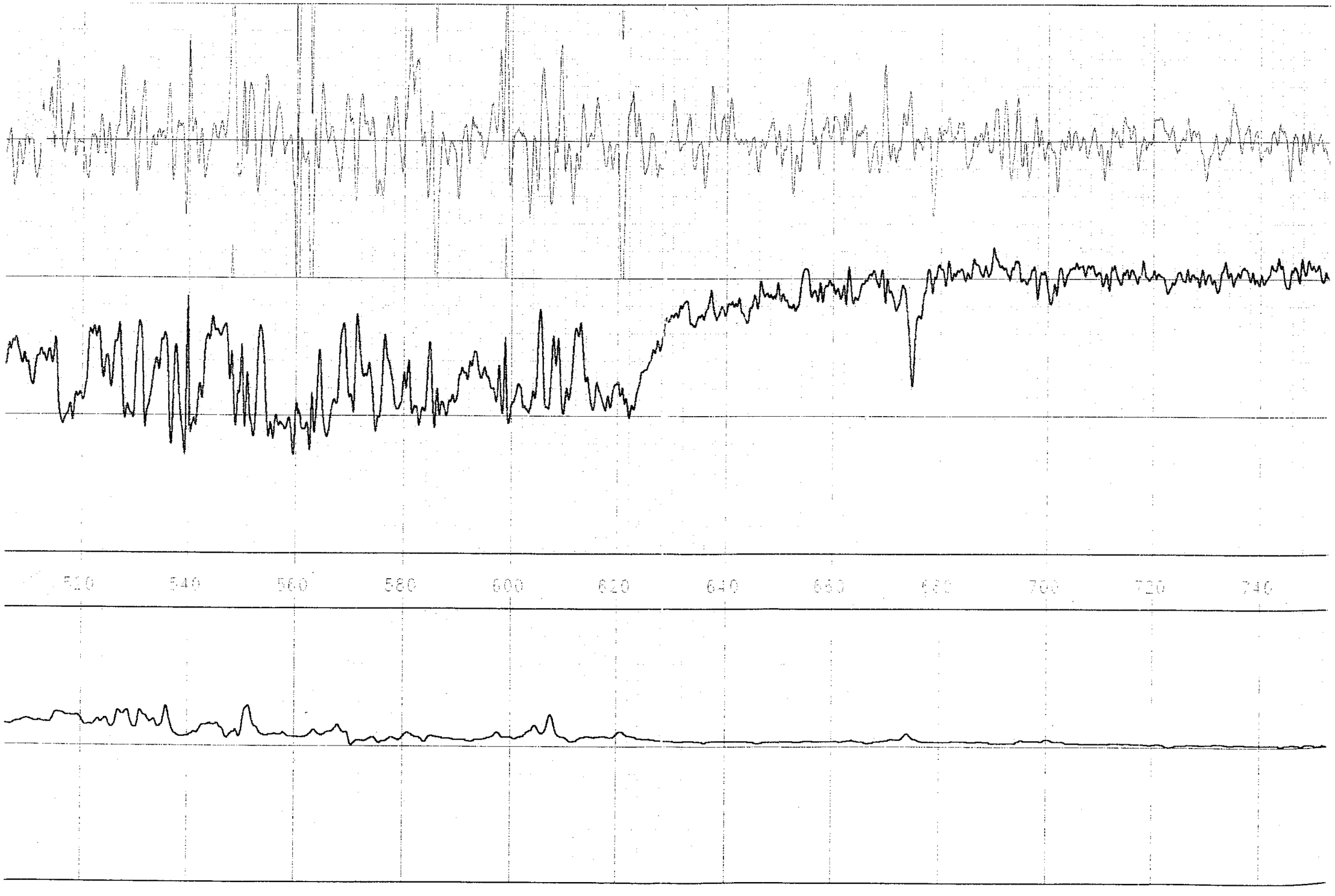
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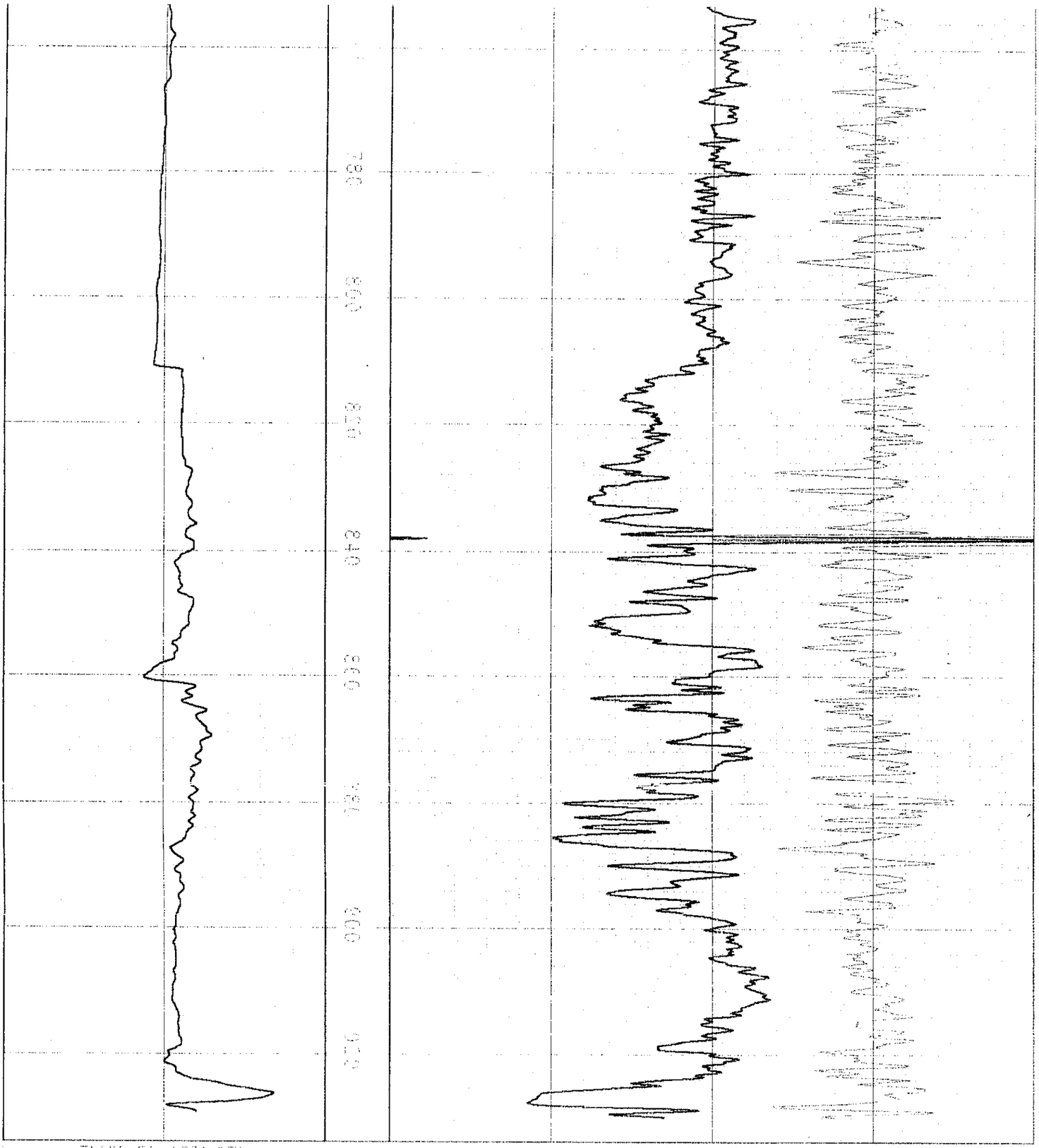

CITY OF SAN BERNARDINO, WELL # 112, MAIN LOG, 28 FEBRUARY 200

COLOG