39p

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: July 25, 1946
Shift: Swing

Hours: 8

Time Breakdown:
Drilling _____
Bailing _____
Casing _____
Fishing 8

Moving _____
Repairs _____
Miscel _____

Depth at start of shift: _____
Depth at end of shift: _____
Feet drilled: _____
Diameter of hole, inches _____ .

Driller: Johnson
Helper: Morse
Sampler: Rocks

Casing set, from _____ feet, to _____ feet.
Feet of casing set _____
Diameter, inches _____

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery

Remarks
Fishing for 8" bit lost in hole.

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/20/46
Shift: Swing

Hours: 9

Time Breakdown:
Drilling _____
Bailing _____
Casing _____
Fishing 9:00

Moving _____
Repairs _____
Miscel 9:00

Depth at start of shift: _____
Depth at end of shift: _____
Feet drilled: _____
Diameter of hole, inches _____ .

Driller: Johnson
Helper: Morse

Casing set, from _____ feet, to _____ feet.
Feet of casing set _____
Diameter, inches _____

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: ~~RGC-1~~

Date: ~~7/19/46~~
Shift: ~~Swing~~

Hours: ~~8-11~~

Time Breakdown:
Drilling _____
Bailing _____
Casing _____
Fishing _____

Moving _____
Repairs _____
Miscel ~~11:00~~ Repairing rig. Knock pin off bit. String up fishing tools. Fishing for bit.

Depth at start of shift: _____
Depth at end of shift: _____
Feet drilled: _____
Diameter of hole, inches _____ .

Driller: Johnson
Helper: Morse
Sampler: Timmerman

Casing set, from _____ feet, to _____ feet.
Feet of casing set _____
Diameter, inches _____

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/19/46
Shift: Day

Hours: 9

Time Breakdown:
Drilling _____
Bailing _____
Casing _____
Fishing _____

Moving _____
Repairs _____
Miscel 9:00 Rigging fishing tools and fishing for bit.

Depth at start of shift: _____
Depth at end of shift: _____
Feet drilled: _____
Diameter of hole, inches _____ .

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from _____ feet, to _____ feet.
Feet of casing set _____
Diameter, inches _____

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/17/46
Shift: Swing

Hours: ~~9~~ 6

Time Breakdown:
Drilling 5:30
Bailing :30
Casing
Fishing

Moving
Repairs
Miscel

Depth at start of shift: 606
Depth at end of shift: 616
Feet drilled: 10
Diameter of hole, inches 8 .

Driller: Johnson
Helper: Morse
Sampler: Timmerman

Casing set, from ____ feet, to ____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	610	Dk-grey	Shale	Trace	4		n	1600
	615	" "	"	"	3			1925

Remarks Shut down for bits at 8:00 PM.

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/17/46
Shift: Day

Hours: 9

Time Breakdown:
Drilling 6:35
Bailing 2:25
Casing
Fishing

Moving
Repairs
Miscel

Depth at start of shift: 590
Depth at end of shift: 606
Feet drilled: 16
Diameter of hole, inches 8 .

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from _____ feet, to _____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	595	Med-grey	Shale	Trace	3			0840
	600	" "	"	"	3			0950
	605	" "	"	"	3			1305

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/16/46
Shift: Swing

Hours: 9

Time Breakdown:
Drilling 7:20
Bailing 1:00
Casing
Fishing

Moving
Repairs
Miscel 0:15 Pumping water for sampler
0:25 Checking depth

Depth at start of shift: 578
Depth at end of shift: 590
Feet drilled: 12
Diameter of hole, inches 8 .

Driller: Johnson
Helper: Morse
Sampler: Timmerman

Casing set, from feet, to feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	580	Dk-grey	Shale	Trace	3			1530
	585	" "	"	"	4			1950
	590	" "	"	"	3			2240

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/16/46
Shift: Day

Hours: 9

Time Breakdown:
Drilling 6:40
Bailing 2:20
Casing
Fishing

Moving
Repairs
Miscel

Depth at start of shift: 560
Depth at end of shift: 578
Feet drilled: 18
Diameter of hole, inches 8 .

Driller: Olineski
Helper: Wilson
Sampler: Fernley

Casing set, from ____ feet, to ____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	565	Med-grey	Shale	Trace	5			0720
	570	" "	"	"	5			0815
	575	" "	"	"	5			1150

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/15/46
Shift: Swing

Hours: 9

Time Breakdown:
Drilling 8:00
Bailing 1:00
Casing
Fishing

Moving
Repairs
Miscel

Depth at start of shift: 547
Depth at end of shift: 560
Feet drilled: 13
Diameter of hole, inches 9 .

Driller: Johnson
Helper: Morse
Sampler: Timmerman

Casing set, from _____ feet, to _____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	550	Dk-grey	Shale	Trace	3			1520
	555	" "	2	"	3			1925
	560	" "	"	"	3			2250

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/15/46
Shift: Day

Hours: 9

Time Breakdown:
Drilling ~~0:50~~ 7:25
Bailing 0:50
Casing _____
Fishing _____

Moving _____
Repairs _____
Miscel 0:45 Change bits.
Ream hole.

Depth at start of shift: 524
Depth at end of shift: 547
Feet drilled: 23
Diameter of hole, inches 8 .

Driller: Glineski
Helper: Wilkon
Sampler: Timmerman (6 hours)

Casing set, from _____ feet, to _____ feet.
Feet of casing set _____
Diameter, inches _____

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	530	Dk-grey	Shale	Trace	3			0730
	535	" "	"	"	3			0955
	540	" "	"	"	3			1125
	545	" "	"	"	3			1300

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/13/46
Shift: Swing

Hours: 9

Time Breakdown:
Drilling 5:00
Bailing 1:00
Casing
Fishing

Moving
Repairs
Miscel 3:00 Changing bits. Put on drilling jars. Refilled stinger. Greased rig.

Depth at start of shift: 511
Depth at end of shift: 525
Feet drilled: 14
Diameter of hole, inches 8 .

Driller: Johnson
Helper: Morse
Sampler: Timmerman

Casing set, from feet, to feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	515	Dk-grey	Shale	Trace	3			1535
	520	" "	"	"	4			1845
	525	" "	"	"	2			2030

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/13/46
Shift: Day

Hours: 9

Time Breakdown:
Drilling 7:40
Bailing 1:20
Casing
Fishing

Moving
Repairs
Miscel

Depth at start of shift: 483
Depth at end of shift: 511
Feet drilled: 28
Diameter of hole, inches 8 .

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from _____ feet, to _____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	485	Dk-grey	Shale	Trace	4			0550
	490	" "	"	"	2			0750
	"	" "	"	"	3			0910
	495	" "	"	"	2			1000
	500	" "	"	"	3			1105
	505	" "	"	"	3			1215
	510	" "	"	"	3			1335

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RCC-1

Date: 7/12/46
Shift: Swing

Hours: 9

Time Breakdown:
Drilling 5:55
Bailing 1:20
Casing
Fishing

Moving
Repairs
Miscel 1:45 Waiting for fresh bit. Changing bits.

Depth at start of shift: 462
Depth at end of shift: 483
Feet drilled: 21
Diameter of hole, inches 8 .

Driller: Johnson
Helper: Morse
Sampler: Timmerman

Casing set, from feet, to feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	465	Dk-grey	Shale	Trace	3			1445
	470	" "	"	"	2			1640
	475	" "	"	"	3			2005
	480	" "	"	"	2			2200
	485	" "	"	"	1			2350

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/12/46
Shift: Day

Hours: 9

Time Breakdown:
Drilling 5:15
Bailing 2:15
Casing
Fishing

Moving
Repairs
Miscel 1:30 Changing tools, bits. Pumping water for sampler.

Depth at start of shift: 442
Depth at end of shift: 462
Feet drilled: 20
Diameter of hole, inches 8 . 2

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from feet, to feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	445	Dk-grey	Shale	Trace	4			0805
	450	" "	"	"	3			0950
	455	" "	"	"	3			1120
	460	" "	"	"	3			1300

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/11/46
Shift: Swing

Hours: 9

Time Breakdown:
Drilling 6:20
Bailing 0:45
Casing
Fishing

Moving
Repairs
Miscel 1:55 Changing bits

Depth at start of shift: 430
Depth at end of shift: 442
Feet drilled: 12
Diameter of hole, inches 10 .

Driller: Johnson
Helper: Morse
Sampler: Timmerman

Casing set, from _____ feet, to _____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	435	Dk-grey			4			1745
	440	" "			2			2200

Remarks Out of gasoline from 2100 to 2200.

Reduced bit size from 10" to 8" at 434 feet.

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/11/46
Shift: Day

Hours: 9

Time Breakdown:
Drilling 6:00
Bailing 3:00
Casing
Fishing

Moving
Repairs
Miscel

Depth at start of shift: 406
Depth at end of shift: 430
Feet drilled: 24
Diameter of hole, inches 10 .

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from ____ feet, to ____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	410	Dk-grey			4			0630
	415	" "			4			0820
	420	" "			4			1000
	425	" "			4			1210
	430	" "			4			1350

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/10/46
Shift: Swing

Hours: 9

Time Breakdown:
Drilling 5:40
Bailing 1:20
Casing
Fishing

Moving
Repairs
Miscel 2:00

Depth at start of shift: 388
Depth at end of shift: 406
Feet drilled: 18
Diameter of hole, inches 10 .

Driller: Johnson
Helper: Morse
Sampler: Timmerman

Casing set, from _____ feet, to _____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	390	Dk-grey			4			1445
	395	" "			3			1750
	400	" "			4			1930
	405	" "			4			2145
	"	" "			2			2250

Remarks Cable stranded 20 feet above tool. Cut cable and refilled stinger. Bailer stuck for 30 minutes.

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/10/46
Shift: Day

Hours: 9

Time Breakdown:
Drilling 3:15
Bailing 3:10
Casing
Fishing

Moving
Repairs 2:05 Broken fan belt. Change oil.
Miscel 0:30 Changing bits.

Depth at start of shift: 374
Depth at end of shift: 388
Feet drilled: 14
Diameter of hole, inches 10 .

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from ____ feet, to ____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	380	Dk-grey			4			0750
	388	" "			4			1245

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/9/46
Shift: Swing

Hours: 9

Time Breakdown:
Drilling 5:00
Bailing 1:20
Casing
Fishing

Moving
Repairs
Miscel 2:45 Reaming hole

Depth at start of shift: 360
Depth at end of shift: 374
Feet drilled: 14
Diameter of hole, inches 10 .

Driller: Johnson
Helper: Morse
Sampler: Timmerman

Casing set, from _____ feet, to _____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	365	Dk-grey			6			1745-1930
	370	" "			2			2055
	374	" "			3			2300

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: _____

Date: 7/9/46
Shift: _____

Hours: 9

Time Breakdown:
Drilling 1:15
Bailing _____
Casing _____
Fishing _____

Moving _____
Repairs _____
Miscel _____

Depth at start of shift: 334
Depth at end of shift: 26
Feet drilled: _____
Diameter of hole, inches 10 .

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from _____ feet, to _____ feet.
Feet of casing set _____
Diameter, inches _____

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	340	Dk-grey			1			0715
	345	" "			1			0900
	350	" "			1			1050
	355	" "			1			1210
	360	" "			1			1350

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/8/46
Shift: Swing

Hours: 9

Time Breakdown:
Drilling 7:00
Bailing 1:00
Casing
Fishing

Moving
Repairs 1:00
Miscel

Depth at start of shift: 315
Depth at end of shift: 334
Feet drilled: 19
Diameter of hole, inches 10 .

Driller: Johnson
Helper: Morse
Sampler: Timmerman

Casing set, from ——— feet, to ——— feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	320	Dk-grey			1			1505
	325	" "			2			1940
	330	" "			3			2115
	334	" "						2250

Remarks Refill stinger (cutting off, and resocketing drilling line)

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/8/46
Shift: Day

Hours: 9

Time Breakdown:
Drilling 8:00
Bailing 0:45
Casing
Fishing

Moving
Repairs
Miscel 0:15 Changing bits.

Depth at start of shift: 300
Depth at end of shift: 315
Feet drilled: 15
Diameter of hole, inches 10 .

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from _____ feet, to _____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	305	Dk-grey	Shale	Trace	2			0840
	310	" "	"	"	1			0955
	315	" "	"	"	1			1250

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/6/46
Shift: Swing

Hours: 9

Time Breakdown:
Drilling 7:50
Bailing 1:10
Casing
Fishing

Moving
Repairs
Miscel

Depth at start of shift: 280
Depth at end of shift: 300
Feet drilled: 20
Diameter of hole, inches 10 .

Driller: Johnson
Helper: Morse

Casing set, from _____ feet, to _____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	Time
	285	Dk-grey	Shale	None	1			1615
	290	" "	"	"	1			1820
	295	" "	"	"	1			2100
	300	" "	"	Trace	1			2250

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/6/46
Shift: Day

Hours: 9

Time Breakdown:
Drilling 6:40
Bailing 2:20
Casing
Fishing

Moving
Repairs
Miscel

Depth at start of shift: 250
Depth at end of shift: 280
Feet drilled: 30
Diameter of hole, inches 10 .

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from _____ feet, to _____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	
	255	Dk-grey	Shale	Trace	1			0625
	260	" "	"	"	1			0740
	265	" "	"	"	1			0910
	270	" "	"	"	1			1015
	275	" "	"	None	1			1155
	280	" "	"	"	1			1310

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/5/46
Shift: Day

Hours: 10

Time Breakdown:
Drilling 8:10
Bailing 1:50
Casing
Fishing

Moving
Repairs
Miscel

Depth at start of shift: 215
Depth at end of shift: 250
Feet drilled: 35
Diameter of hole, inches 10 .

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from _____ feet, to _____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	
	215	Dk-grey	shale	Trace	1			0530
	220	" "	"	"	1			0700
	225	" "	"	"	1			0830
	230	" "	"	"	1			0930
	235	" "	"	None	1			1025
	240	" "	"	"	1			1125
	245	" "	"	Trace	1			1225
	250	" "	"	"	1			1430

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 7/3/46
Shift: Day

Hours: 10

Time Breakdown:
Drilling 8:30
Bailing 1:30
Casing
Fishing

Moving
Repairs
Miscel

Depth at start of shift: 180
Depth at end of shift: 215
Feet drilled: 35
Diameter of hole, inches 10 .

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from _____ feet, to _____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery
	185	Dk-grey	Grey sh.	Trace	1		
	190	" "	" "	"	1		
	195	" "	" "	"	1		
	200	" "	" "	"	1		
	205	" "	" "	"	1		
	210	" "	" "	"	1		
	215	" "	" "	"	1		

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1
Drill: B-1

Date: 7/2/46
Shift: Day

Hours: 10

Time Breakdown:
Drilling 8:10
Bailing 1:50
Casing
Fishing

Moving
Repairs
Miscel

Depth at start of shift: 125
Depth at end of shift: 180
Feet drilled: 55
Diameter of hole, inches 10 .

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from ____ feet, to ____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	
	130	Dk-gray	Grey sh.	Trace	1			0800
	135	" "	" "	"	1			0855
	140	" "	" "	"	1			0930
	145	" "	" "	"	1			1015
	150	" "	" "	"	1			1055
	155	" "	" "	"	1			1145
	160	" "	" "	"	1			1235
	165	" "	" "	"	1			1335
	170	" "	" "	"	1			1430
	175	" "	" "	"	1			1525
Remarks	180	" "	" "	"	1			1605

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: ~~RGC-1~~
Drill No. B-1

Date: ~~7/1/46~~
Shift: ~~Day~~

Hours: ~~10~~

Time Breakdown:
Drilling ~~7:50~~
Bailing ~~1;10~~
Casing _____
Fishing _____

Moving _____
Repairs _____
Miscel ~~1:00~~

Depth at start of shift: ~~80~~
Depth at end of shift: ~~125~~
Feet drilled: ~~45~~
Diameter of hole, inches ~~10~~ .

Driller: Glineski
Helper: Wilson
Sampler: Fernley

Casing set, from _____ feet, to _____ feet.
Feet of casing set _____
Diameter, inches _____

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery	
	~~85~~	~~Dk-grey~~	Grey sh.	Trace				
	~~90~~	" "	" "	"				
	~~95~~	" "	" "	"	1			11:00
	~~100~~	" "	" "	"	1			11:45
	~~105~~	" "	" "	"	1			12:50
	~~110~~	" "	" "	"	1			13445
	~~115~~	" "	" "	"	1			14:50
	~~120~~	" "	" "	"	1			15:50
	125	" "	" "	"	1			16:35
	~~120~~	" "			1			
	~~125~~	" "			1			

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 6/29/46
Shift: Day

Hours: 10

Time Breakdown:
Drilling 8
Bailing
Casing
Fishing

Moving
Repairs
Miscel 2 Dressing bit.

Depth at start of shift: 48
Depth at end of shift: 80
Feet drilled: 32
Diameter of hole, inches 10 .

Driller: Glineski
Helper: Wilson

Casing set, from _____ feet, to _____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery
	50	Black	Dk-grey shale	Trace			
	55	"	"	"			
	60	"	"	"			
	65	"	"	No			
	70	"	"	No			
	75	"	"	Trace			
	80	"	"	"			

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 6/28/46
Shift: Day

Hours: 10

Time Breakdown:
Drilling 8
Bailing
Casing
Fishing

Moving
Repairs
Miscel 2 Dressing bit.

Depth at start of shift: 23
Depth at end of shift: 48
Feet drilled: 25
Diameter of hole, inches 10 .

Driller: Glineski
Helper: Wilson

Casing set, from ____ feet, to ____ feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery
	25	Black	Dk-grey shale	Trace			
	30	"	"	"			
	35	"	"	"			
	40	"	"	No			
	45	"	"	Trace			

Remarks

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1

Date: 6/27/46
Shift: Day

Hours: 8

Time Breakdown:
Drilling 8
Bailing
Casing
Fishing

Moving
Repairs
Miscel

Depth at start of shift: 10
Depth at end of shift: 23
Feet drilled: 13
Diameter of hole, inches 10 .

Driller: Glineski
Helper: Wilson

Casing set, from feet, to feet.
Feet of casing set
Diameter, inches

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery

Remarks Quartzite boulders and clayey overburden to approximately 20 feet. Sludge turned from brown to black in shale at 20 feet. Hole crooked due to tools shearing off of boulders. Backfilled hole with 10 feet of rock and redrilled to straighten.

EE Form -4

EMPIRE ENGINEERING COMPANY
DAILY CHURN DRILL RECORD

Project: Rio Grande Copper Company
Hole No: RGC-1
Drill No: B-1

Date: 6/26/46
Shift: Day

Hours: 8

Time Breakdown:
Drilling 4
Bailing
Casing
Fishing

Moving
Repairs
Miscel 4 Setting up, moving in tools, dressing 10" bit.

Depth at start of shift: 0
Depth at end of shift: 10
Feet drilled: 10
Diameter of hole, inches 10 .

Driller: Glineski
Helpers: Wilson
Morse

Casing set, from 0 feet, to 7 feet.
Feet of casing set 7
Diameter, inches 12

Sample No.	Depth	Sludge color	Kind of rock	Cu present	No. bailers	Wt sludge	% recovery

Remarks Clayey overburden and quartzite boulders.

EE Form -4

Hall
RPC

C O P Y

Box 54
Rio Tinto, Nevada
June 15, 1946

Mr. L. Lore Wartes
Empire Engineering Company
306 Empire State Building
Spokane 8, Washington

WEEKLY REPORT - RIO GRANDE PROJECT
June 9-15, 1946

The bucyrus-Armstrong drill arrived here from Helena on the afternoon of June 9. On the afternnon of the 10th the driller arrived and spent the 11th,12th and 13th moving the rig and tools to the drill site and setting up the drill for operation. The rig was set 100 feet South, eighty degrees East from the site chosen by the Bureau of Mines on Traverse 19, between stations 165 and 166/ Since the 10-inch bit has not arrived for use with this rig, the driller spent the 14th and 15th helping the government driller.

/s/ JOHN J. SPENCER
Field, Engineer

C O P Y

Idaho 1
RGC

Box 54
Rio Tinto, Nevada
June 24, 1946

Mr. L. Lore Wartes
Empire Engineering Company
306 Empire State Building
Spokane 8, Washington

WEEKLY REPORT - RIO GRANDE PROJECT
June 16-22, 1946

Empire Engineering Company Drilling:

On the 17th of June the Bucyrus-Armstrong rig was made completely ready for drilling. However, the first hole has not yet been spudded in because of the lack of tools and labor. It is expected that this hole will be started about the 25th of June.

/s/ JOHN J. SPECNER
Field Engineer

Box 54
Rio Tinto, Nevada
June 29, 1946

Mr. L. Lore Wartes
Empire Engineering Company
306 Empire State Building
Spokane 8, Washington

WEEKLY REPORT - RIO GRANDE PROJECT
June 23-29, 1946

Empire Engineering Company Drilling:

Hole Number One was spudded in on the 26th with the Bucyrus-Armstrong rig. Hole was put down through 20 feet of clayey overburden and quartzite boulders. Some difficulty was experienced with boulders which fell partly into the hole and deflected the bit, as only a 7-foot length of casing was used at the collar of the hole. At 20 feet the hole ran into a dark-grey, medium-hard, iron-stained shale. The hole was carried to a depth of 80 feet at the end of the week, the formation remaining substantially the same. An intermittent trace of copper was noted as far as 50 feet, at which depth the copper disappeared. Samples below 60 feet have not yet been tested.

Some loss of time occurred due to the fact that only one 10-inch bit was available, and drilling had to be stopped every time the bit needed dressing. However, the second 10-inch bit arrived at the end of the week and will be in use the first of July.

/s/ John J. Spencer
Field Engineer

Hole 1
RGC

Box 54
Rio Tinto, Nevada
July 6, 1946

Mr. L. Lore Wartes
Empire Engineering Company
306 Empire State Building
Spokane 8, Washington

WEEKLY REPORT---RIO GRANDE PROJECT
June 30-July 6, 1946

Empire Engineering Company Drilling:

Drilling progressed rapidly and without incident on Hole Number One, increasing the depth from 80 feet to 300 feet at the end of the week, in a total of six shifts. No work was done on the 4th. On the 6th of July the drilling went on two nine-hour shifts daily and will continue at these hours.

Formation remained a hard, dark-grey shale. Water level was struck at 132 feet. It has not yet been necessary to use either casing or cement as the hole is standing up very well. It is planned to reduce the size of the hole at about 400 feet, carry the 8-inch hole to the ore body, case with 6-inch casing, and then keep the casing just behind the bit through the ore.

A trace of copper has been noted in the samples almost continuously since the shale was drilled into at 20 feet.

The Hillman rig has been mounted on skids but not yet strapped to them.

/s/ John J. Spencer
Field Engineer

Hole 1
RGC

Box 54
Rio Tinto, Nevada
July 13, 1946

Mr. L. Lore Wartes
Empire Engineering Company
306 Empire State Building
Spokane 8, Washington

WEEKLY REPORT---RIO GRANDE PROJECT
July 7-13, 1946

Empire Engineering Company Drilling:

Hole Number One was drilled from 300 feet to 525 feet during the week. Size of the hole was reduced from 10 inches to 8 inches at 434 feet. The hole is still standing up well and no casing has been used with the exception of the seven feet of pipe at the collar. The formation is very uniform and continues as a fairly hard, dark-grey shale, with very little quartz and pyrite. A trace of copper has been found in every bailing.

/s/ John J. Spencer
Field Engineer

Box 54,
Rio Tinto, Nevada.

Mr. L. Lore Wartes,
Empire Engineering Company,
306 Empire State Building,
Spokane 8, Washington.

WEEKLY REPORT---RIO GRANDE PROJECT
July 14-19, 1946.

Rio Grande Churn Drill Hole Number One---Bucyrus drill:

July 15, 1946:
Drilled from 524 feet to 560 feet.
Size of hole, 8 inches.
Formation; Dark-grey shale.
Trace of copper in each bailing.

July 16, 1946:
Drilled from 560 feet to 590 feet.
Size of hole, 8 inches.
Formation: Dark-grey shale.
Trace of copper in each bailing.

July 17, 1946:
Drilled from 590 feet to 616 feet.
Size of hole, 8 inches.
Formation: Hard, siliceous shale at 590 feet, changing to black, carbonaceous shale at 600 feet.
Trace of copper in each bailing.

July 18, 1946:
Drill shut down because of worn-out drilling sheave on derrick. Sheave sent to Elko for rebuilding.

July 19, 1946:
Installed repaired sheave. Drilled to approximately 618 feet. Bit broke off at pin. Attempted to fish bit out with horn socket, but top of bit has been driven into side of hole. Plans are to straighten bit in hole with hook and retrieve with finger socket. Drill stem has been badly battered and will need to be remachined.

John J. Spencer
Field Engineer

JUL 22 1946

Box 54,
Rio Tinto, Nevada.
July 27, 1946.

Mr. L. Lore Wartes,
Empire Engineering Company,
306 Empire State Building,
Spokane 8, Washington.

WEEKLY REPORT---RIO GRANDE PROJECT
July 20-26, 1946.

Rio Grande Churn Drill Hole Number One-----Bucyrus drill:

July 20, 1946:
No drilling.
Two shifts were spent in trying to recover the 8-inch bit.

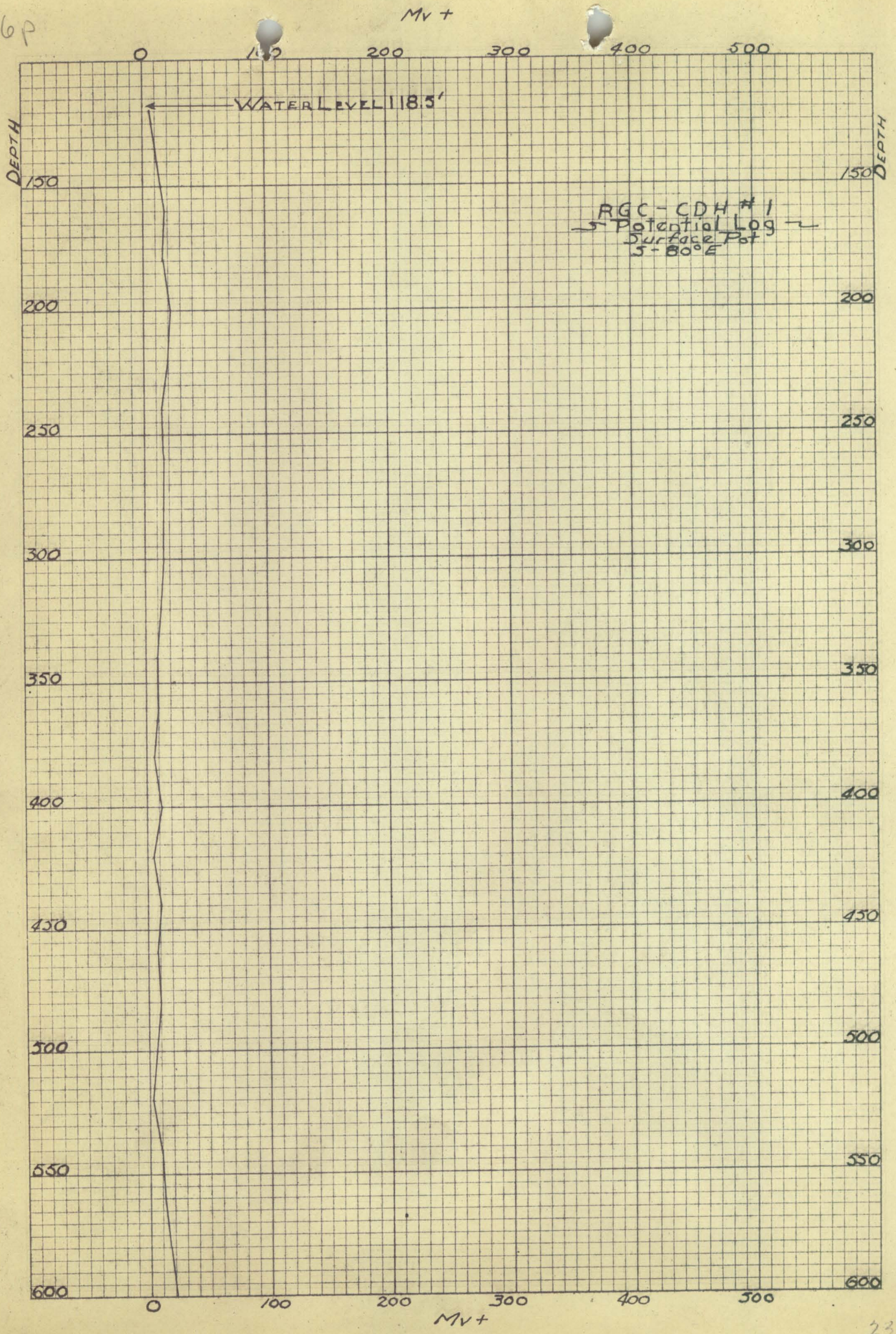
July 22, 23, 24:
No work done on this hole.

July 25, 1946:
Attempted fishing operations for one shift without success.

July 26, 1946:
Abandoned hole and moved to new location.

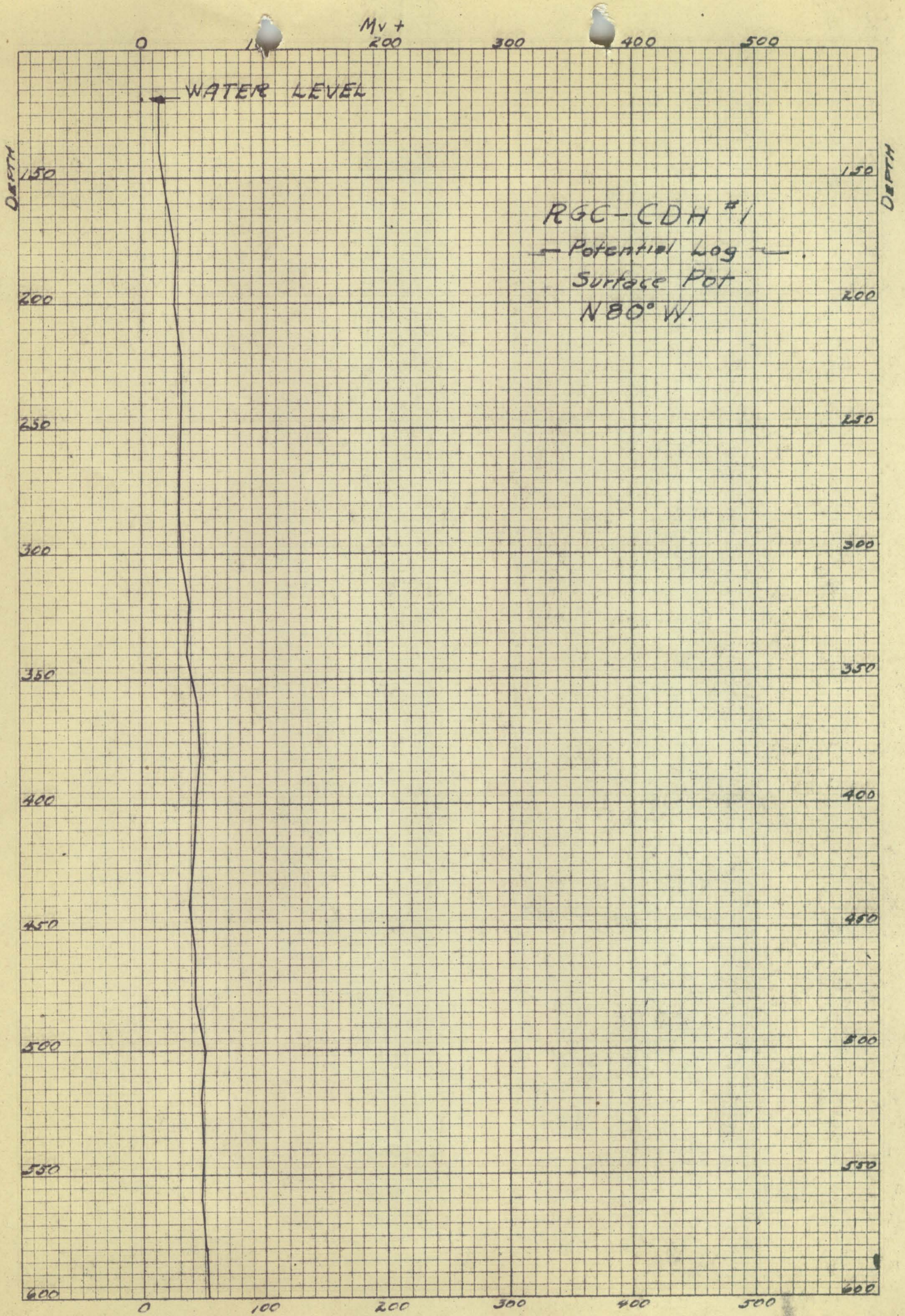
John J. Spencer
Field Engineer

36p

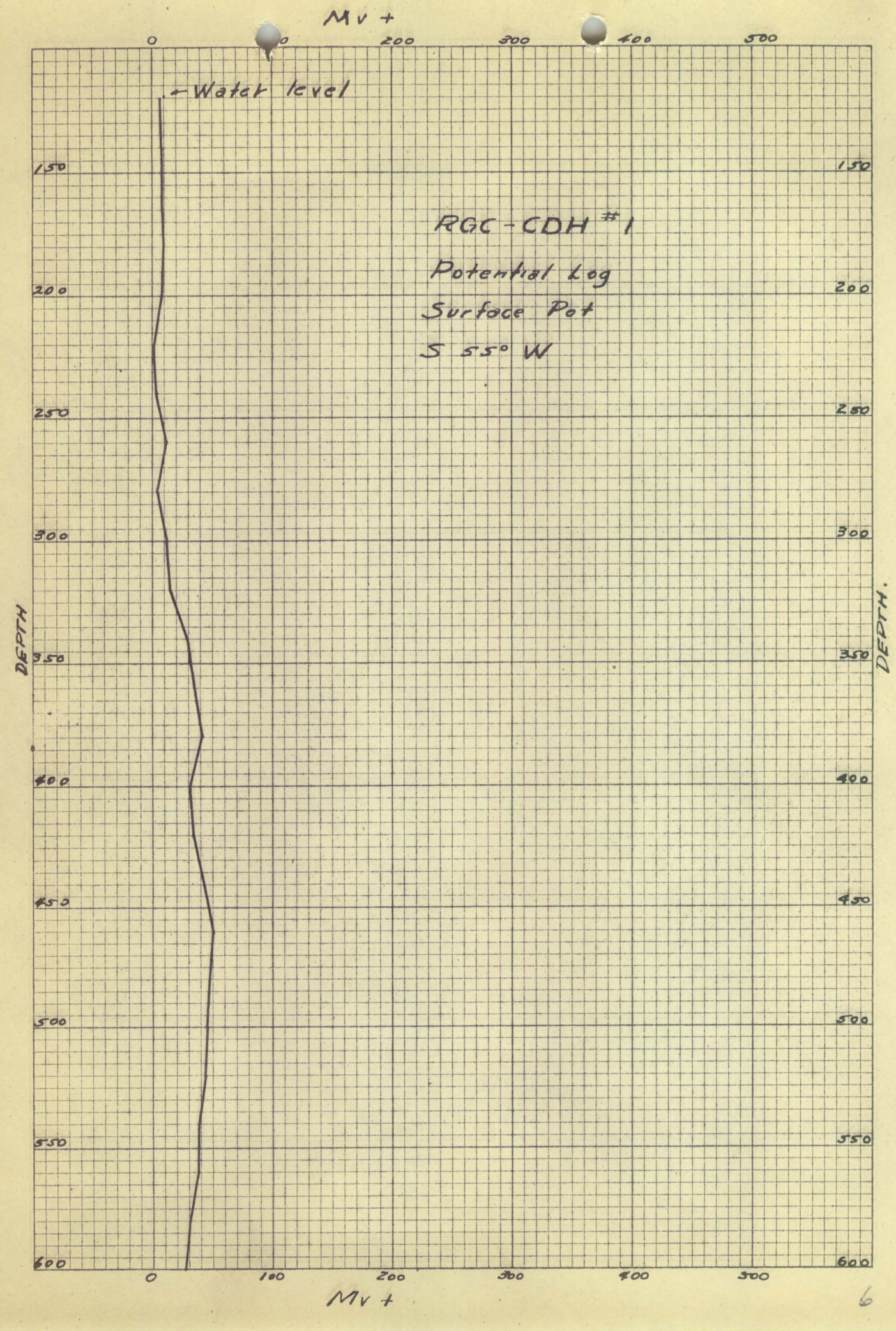


KEUFFEL & ESSER CO., N. Y. NO. 359-S
10 X to the inch.
MADE IN U.S.A.

23



KEUFFEL & ESSER CO. N. Y. NO. 359-8
10 X 1 to the inch.
MADE IN U.S.A.



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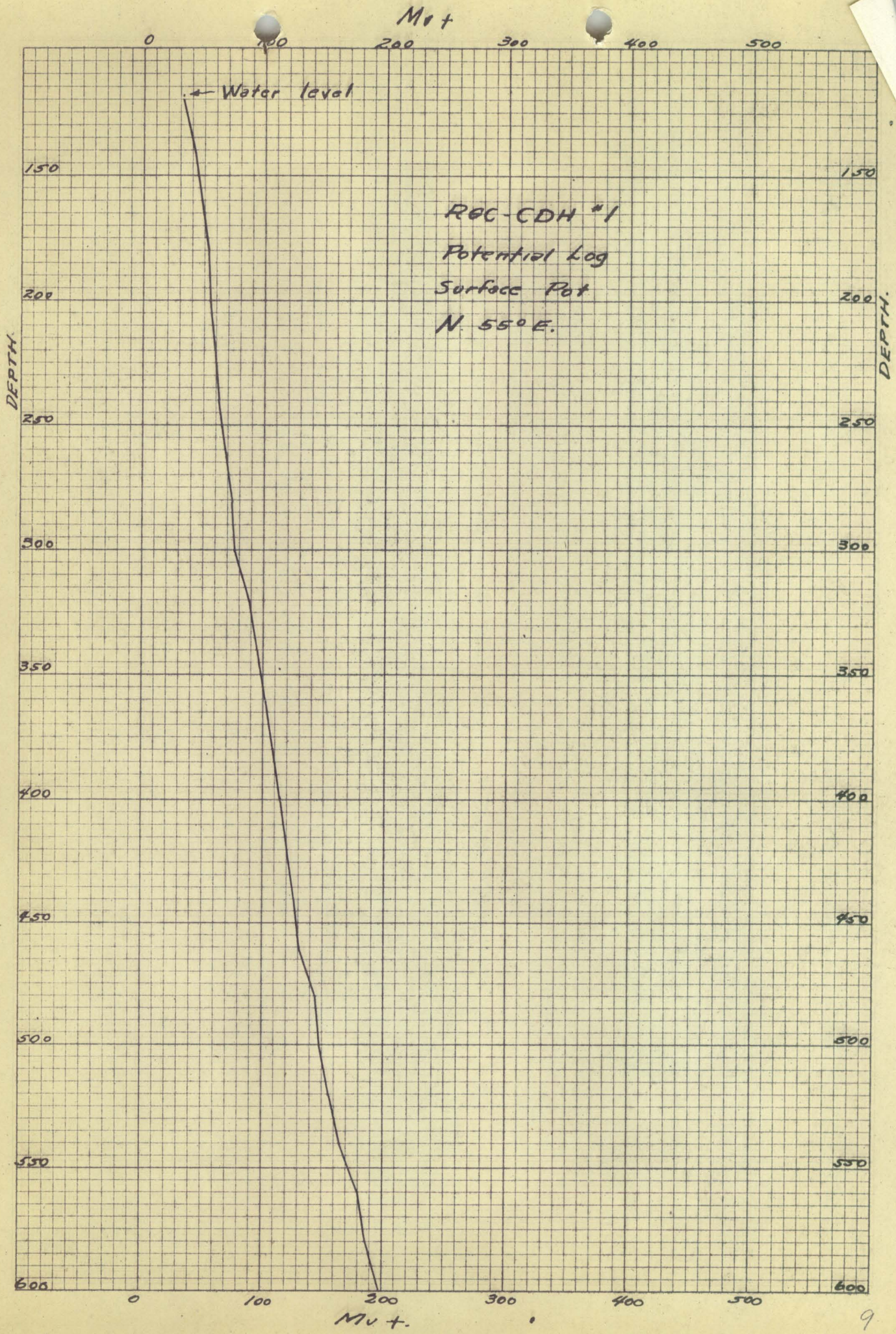
10 X 1 The inch.
MADE IN U.S.A.



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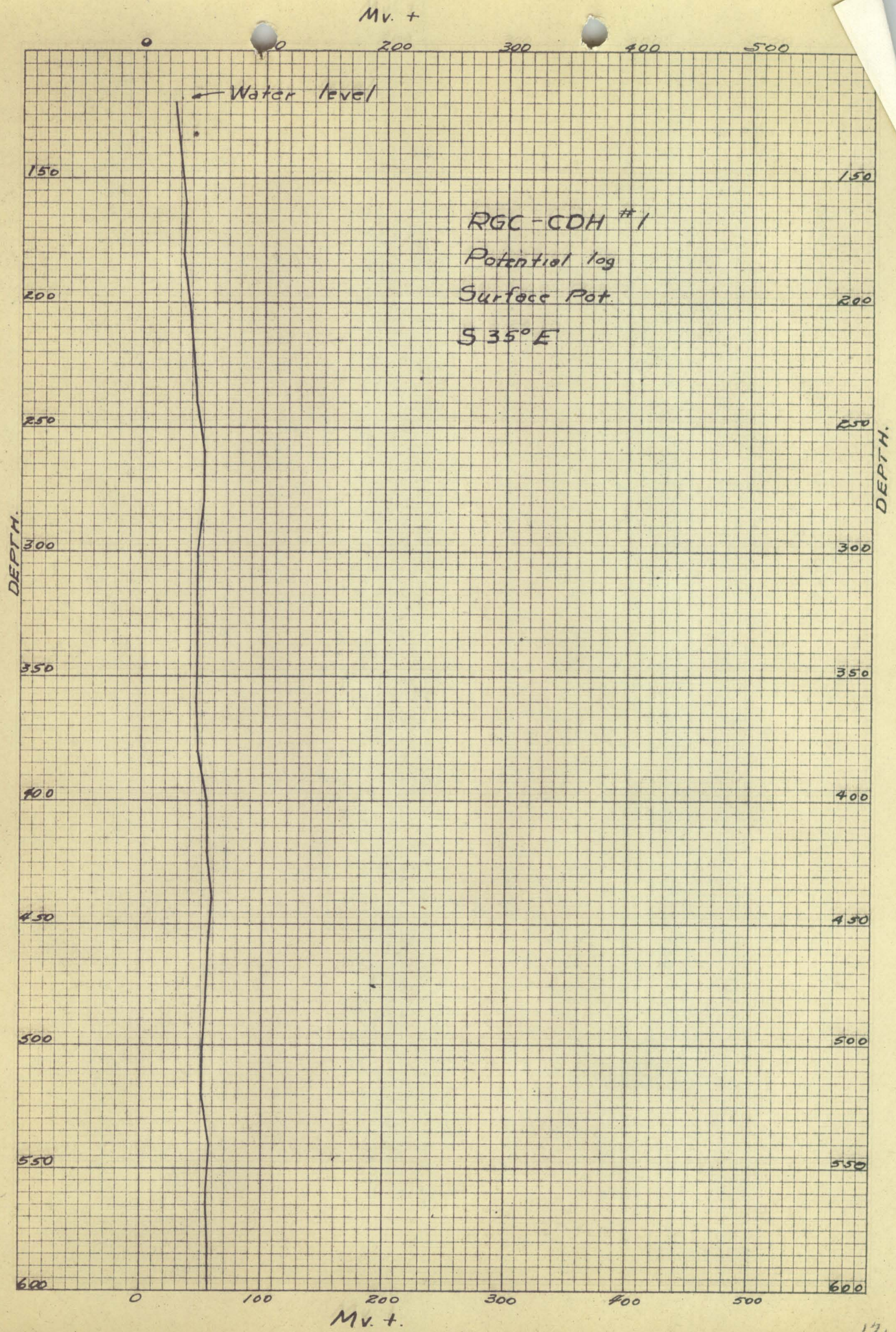
10 X 1 to the inch.
MADE IN U.S.A.



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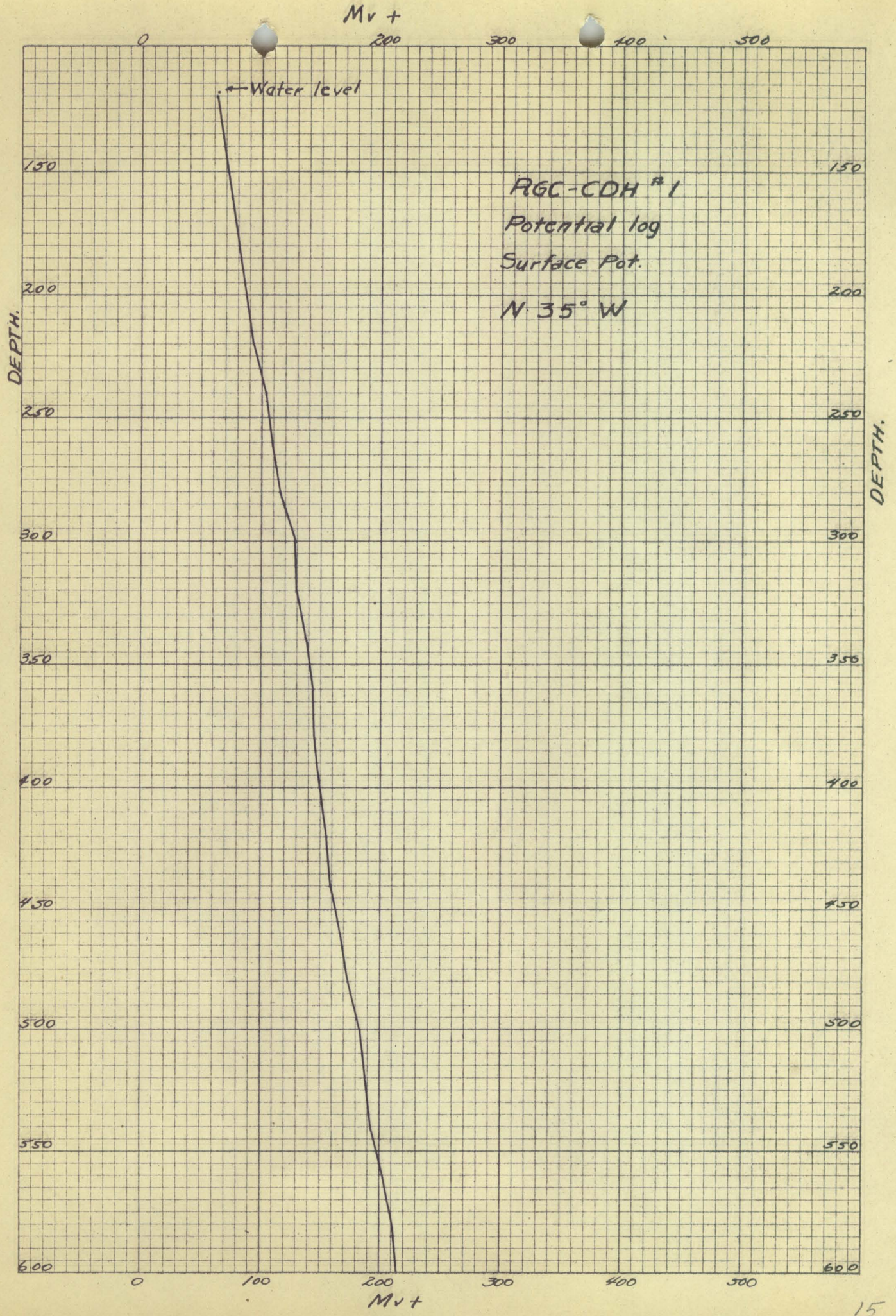
10 X 7 to the inch.
MAD. U.S.A.



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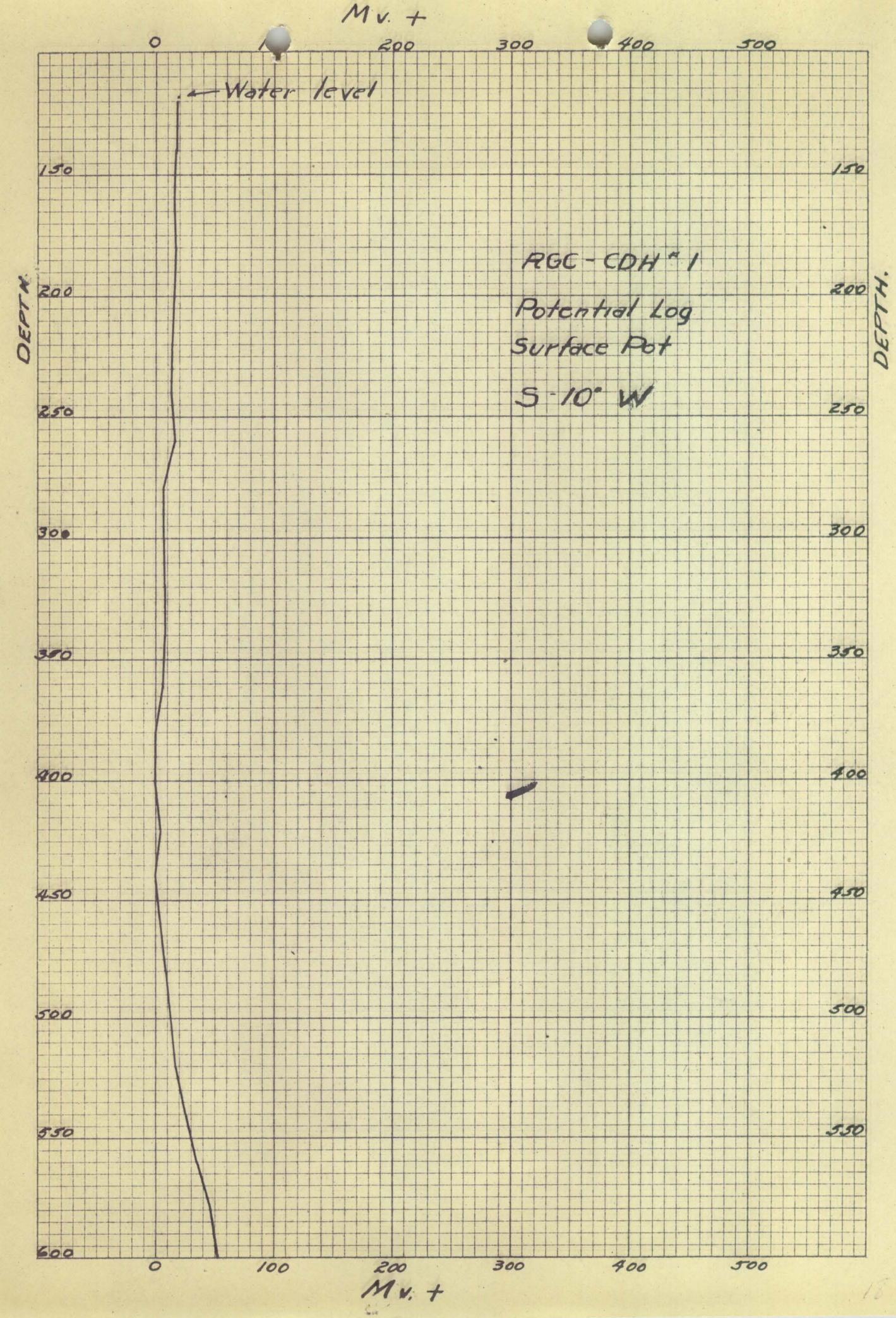
10 X 1 to inch.
W.A.G. U.S.A.



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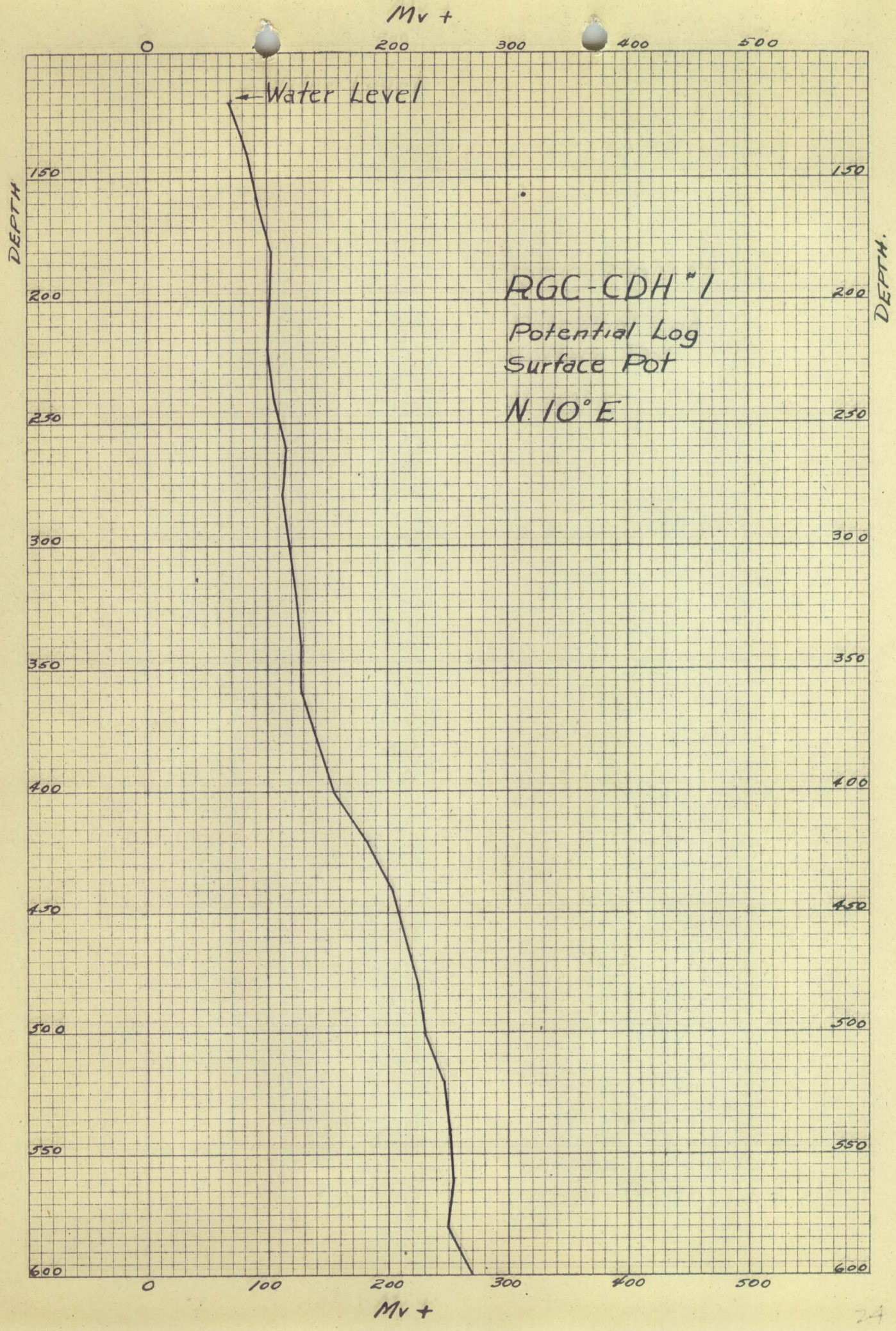
10 X the inch.
MAD .S.A.



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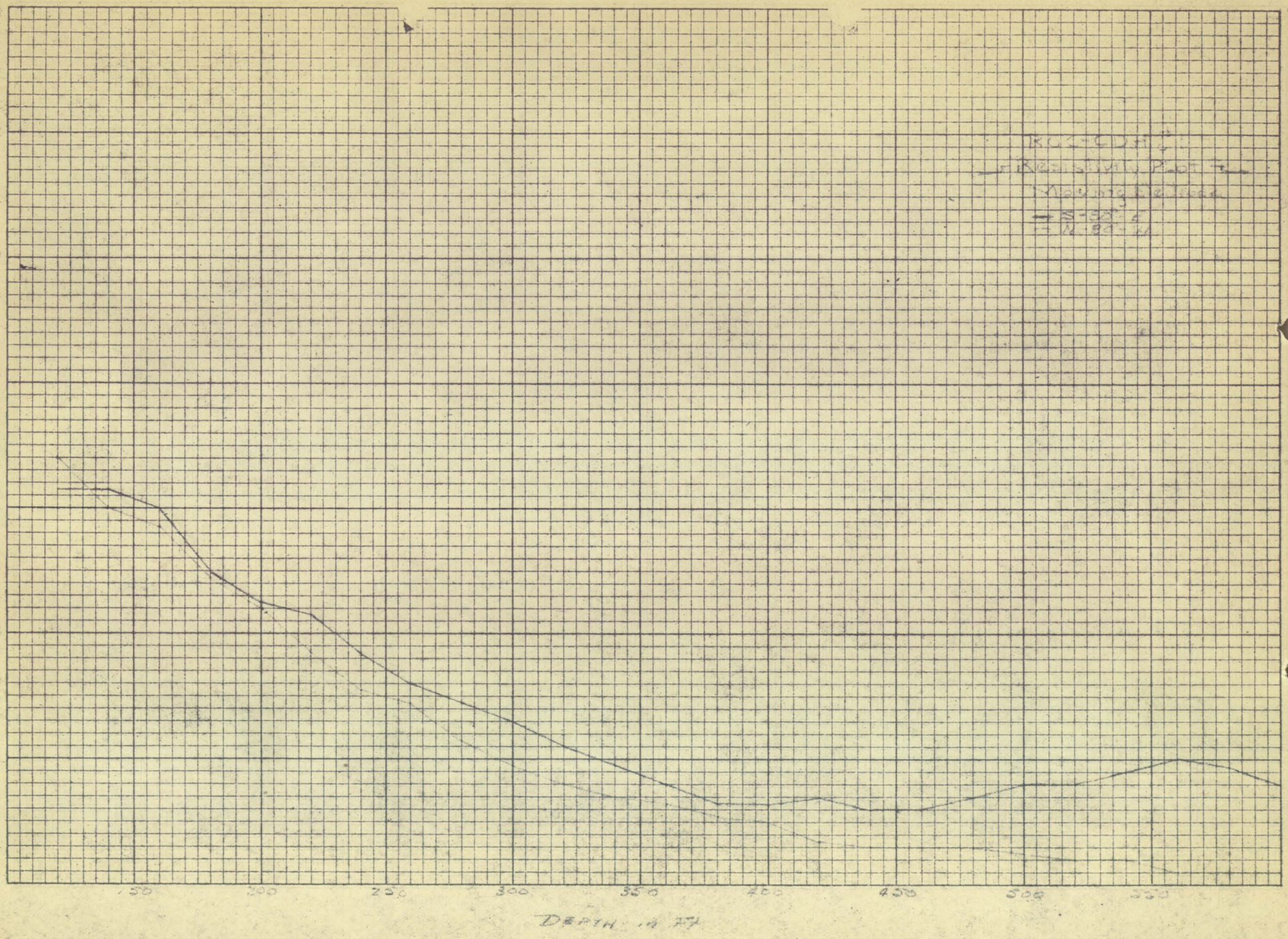
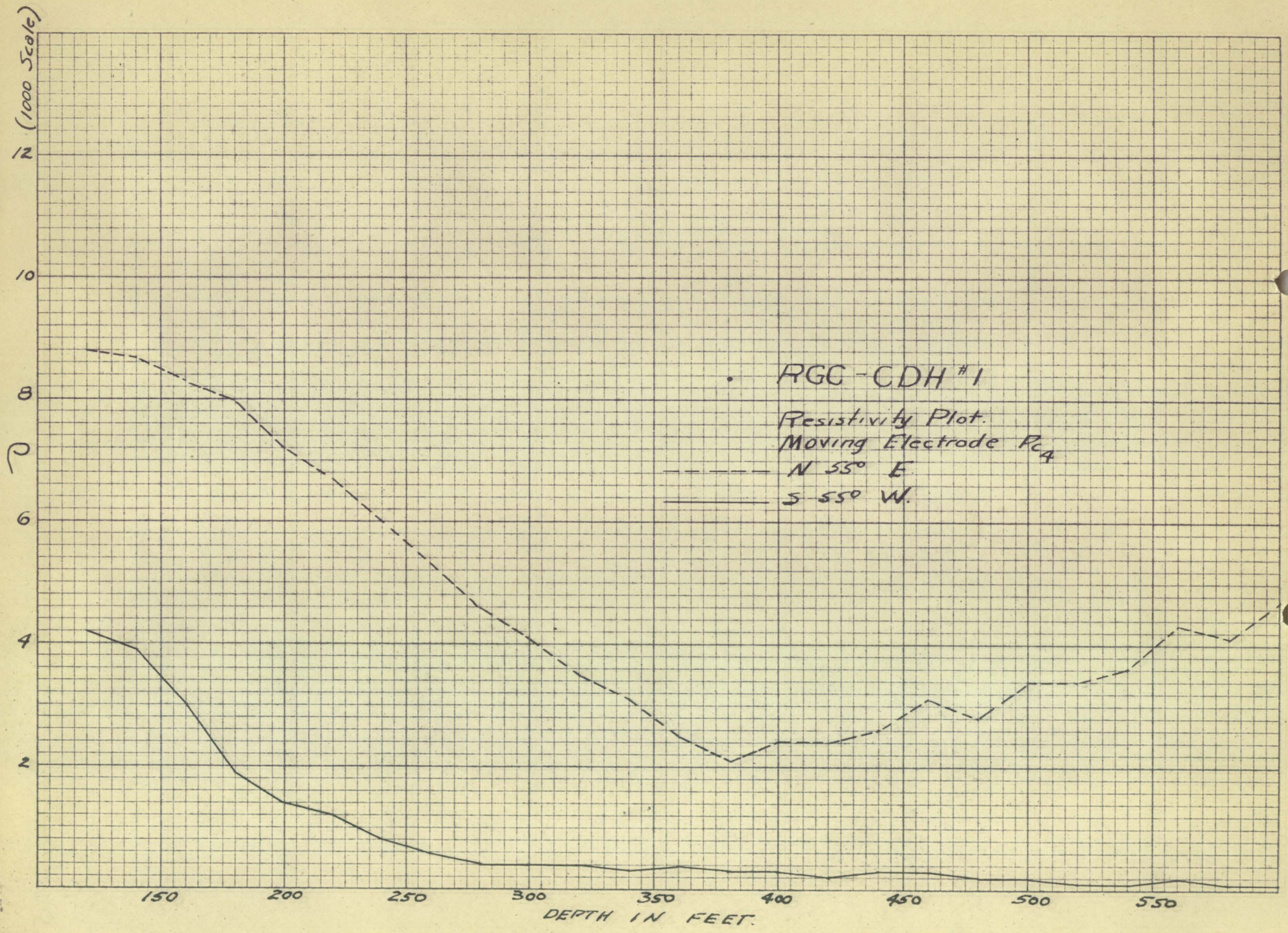
10 X 10 to the inch.
MAD. U.S.A.



KEUFFEL & ESSER CO., N. Y. NO. 359-8
10 X 10 to the inch.
MADE IN U.S.A.

KEUFFEL & ESSER CO., N. Y. NO. 359-B
10 X 7 to inch.
MADE IN U.S.A.



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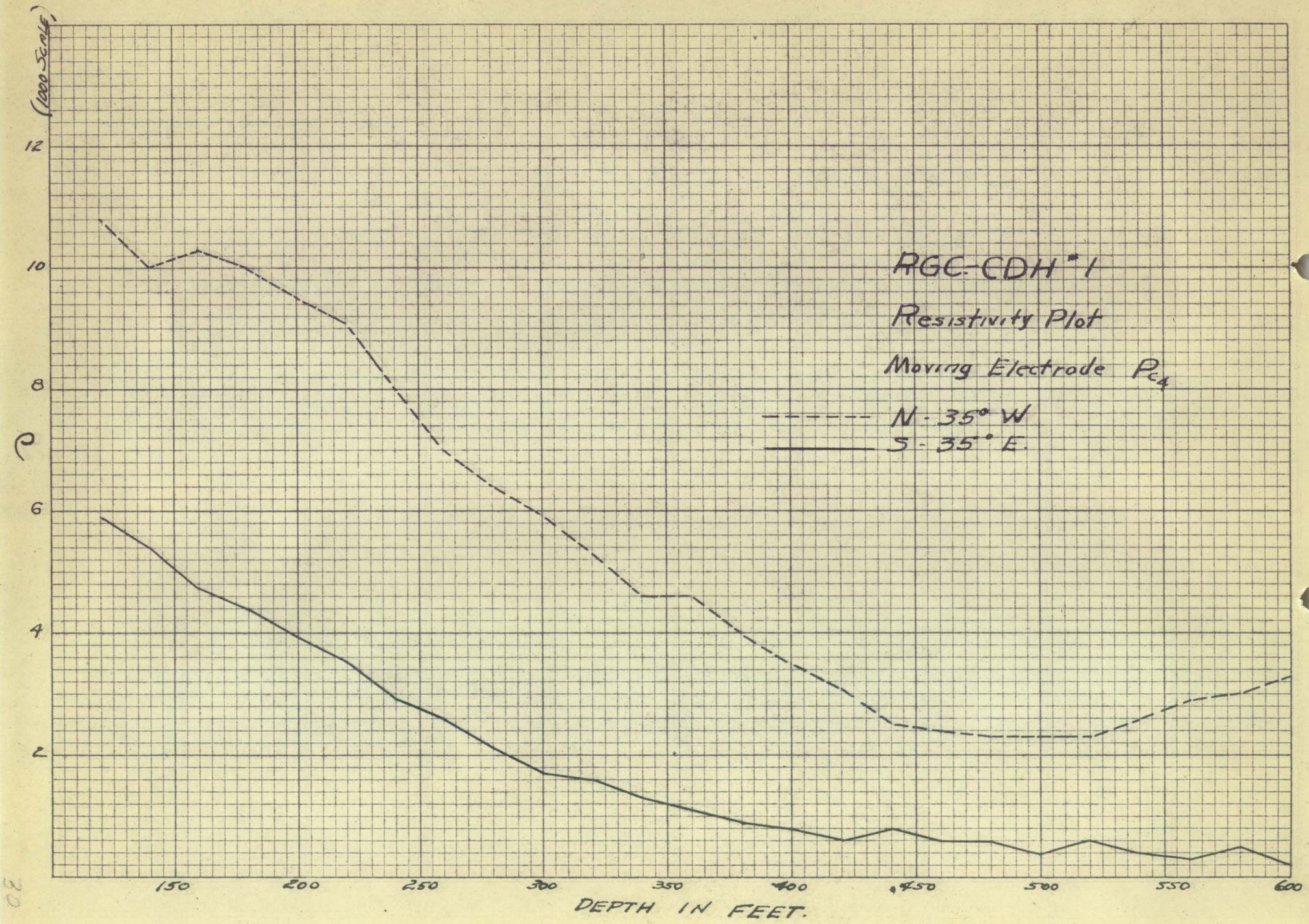
10 X the inch.
MAD .S.A.



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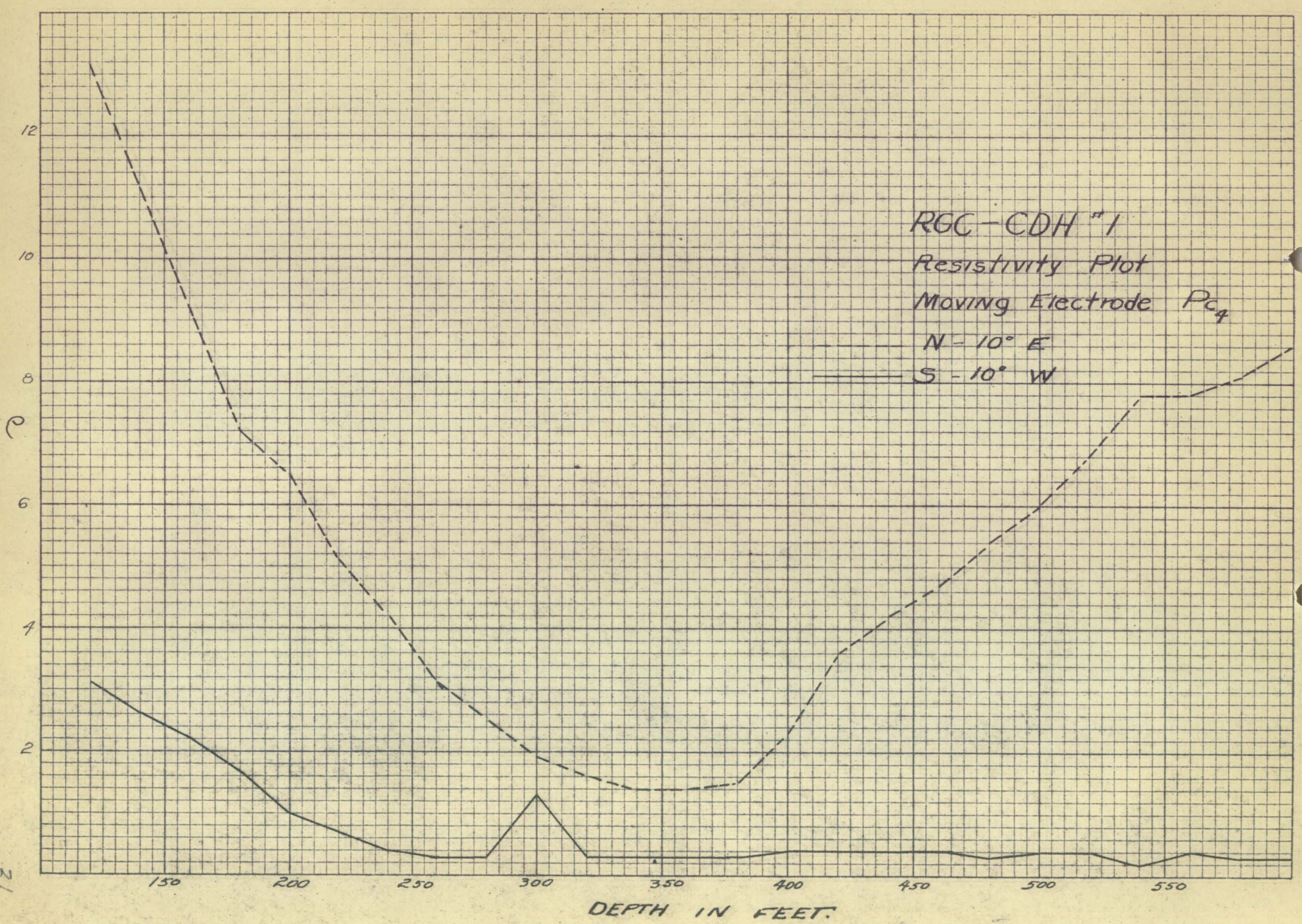
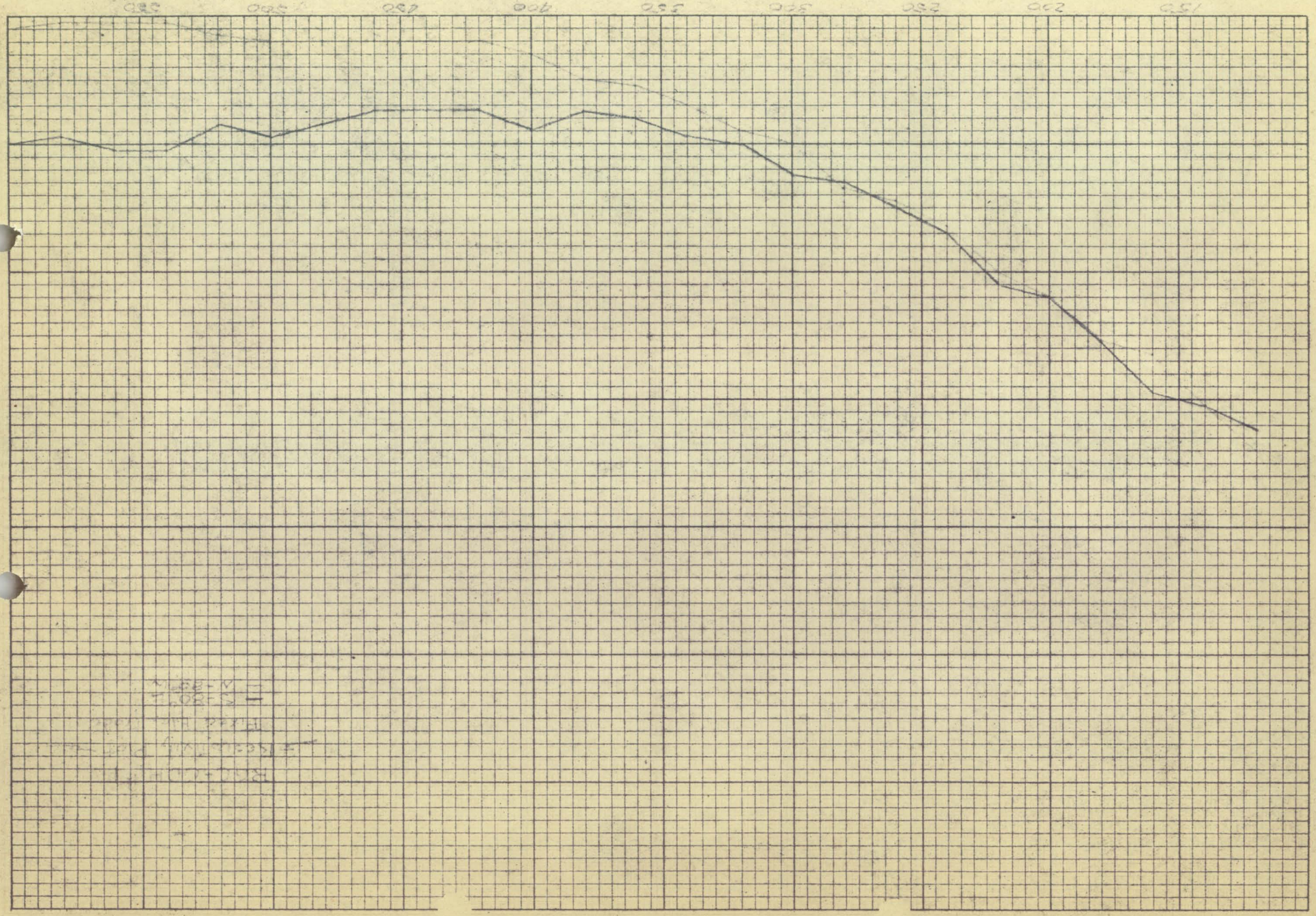
10 X the inch.
MAD. .S.A.

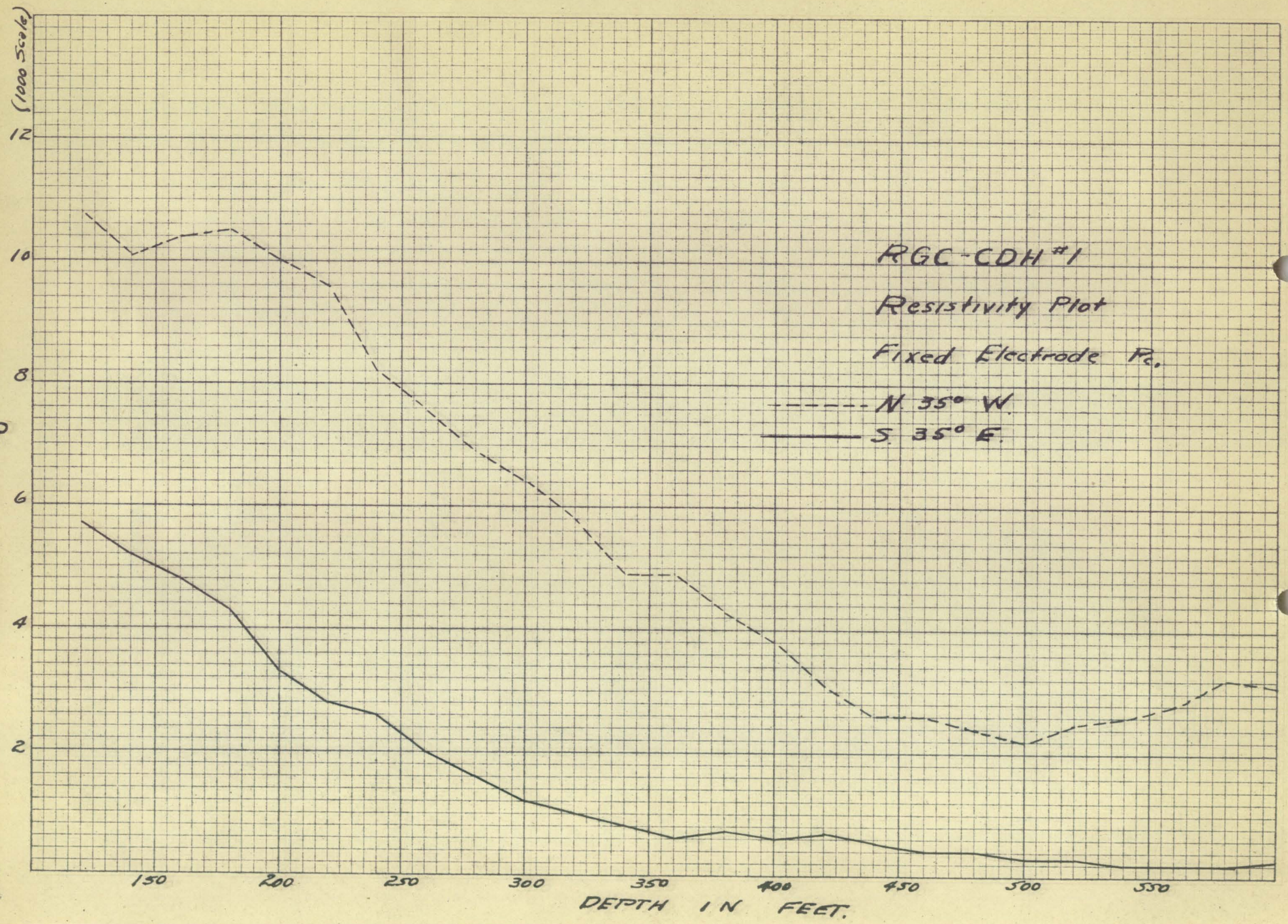


KEUFFEL & ESSER CO., N. Y. NO. 359-5
10 X 10 to the inch.
MADE IN U.S.A.



KEUFFEL & ESSER CO., N. Y. NO. 359-B
10 X the inch.
MAL ..S.A.

KEUFFEL & ESSER CO., N. Y. NO. 359-8
10 X the inch.
MAD .S.A.



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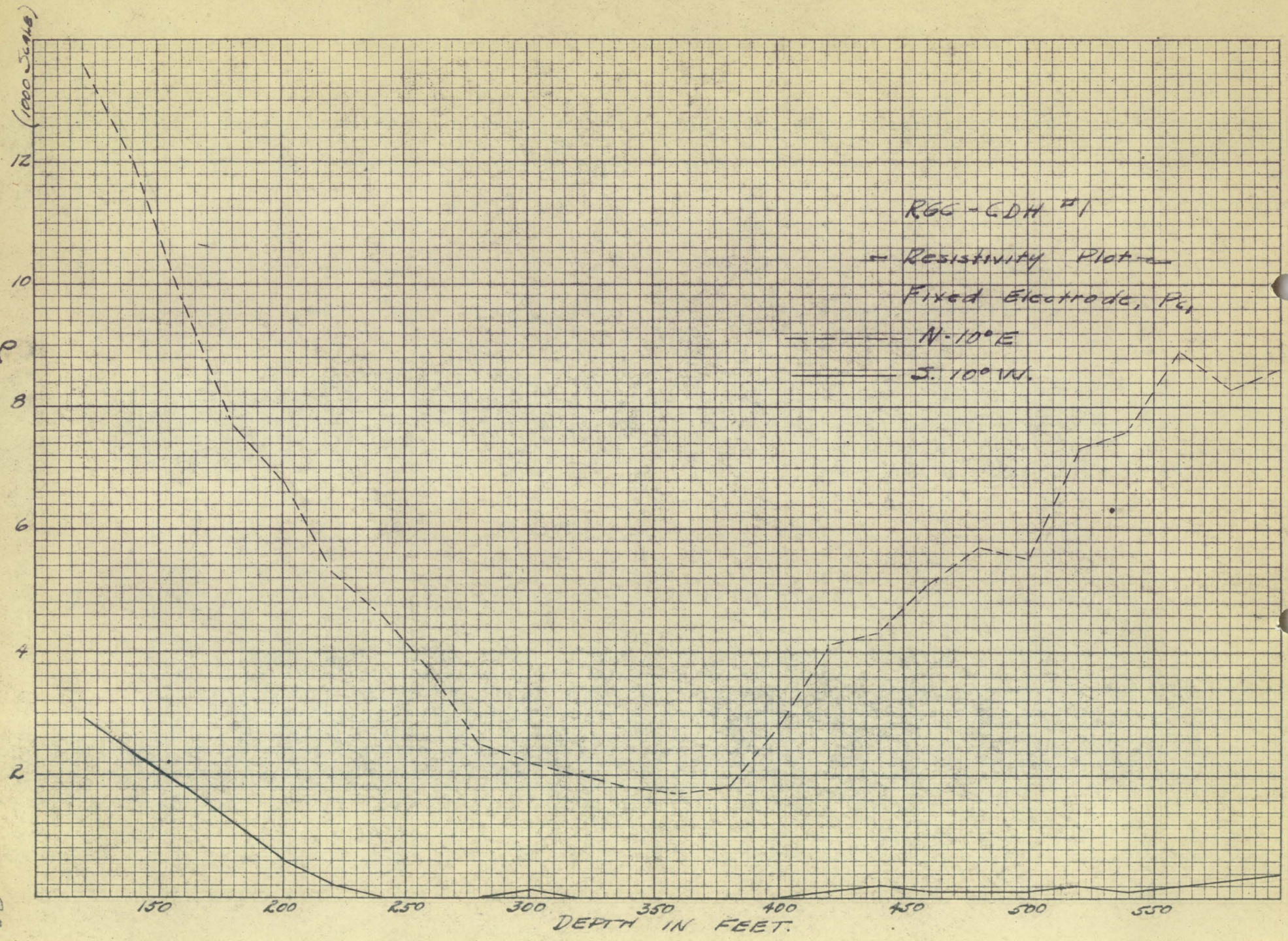
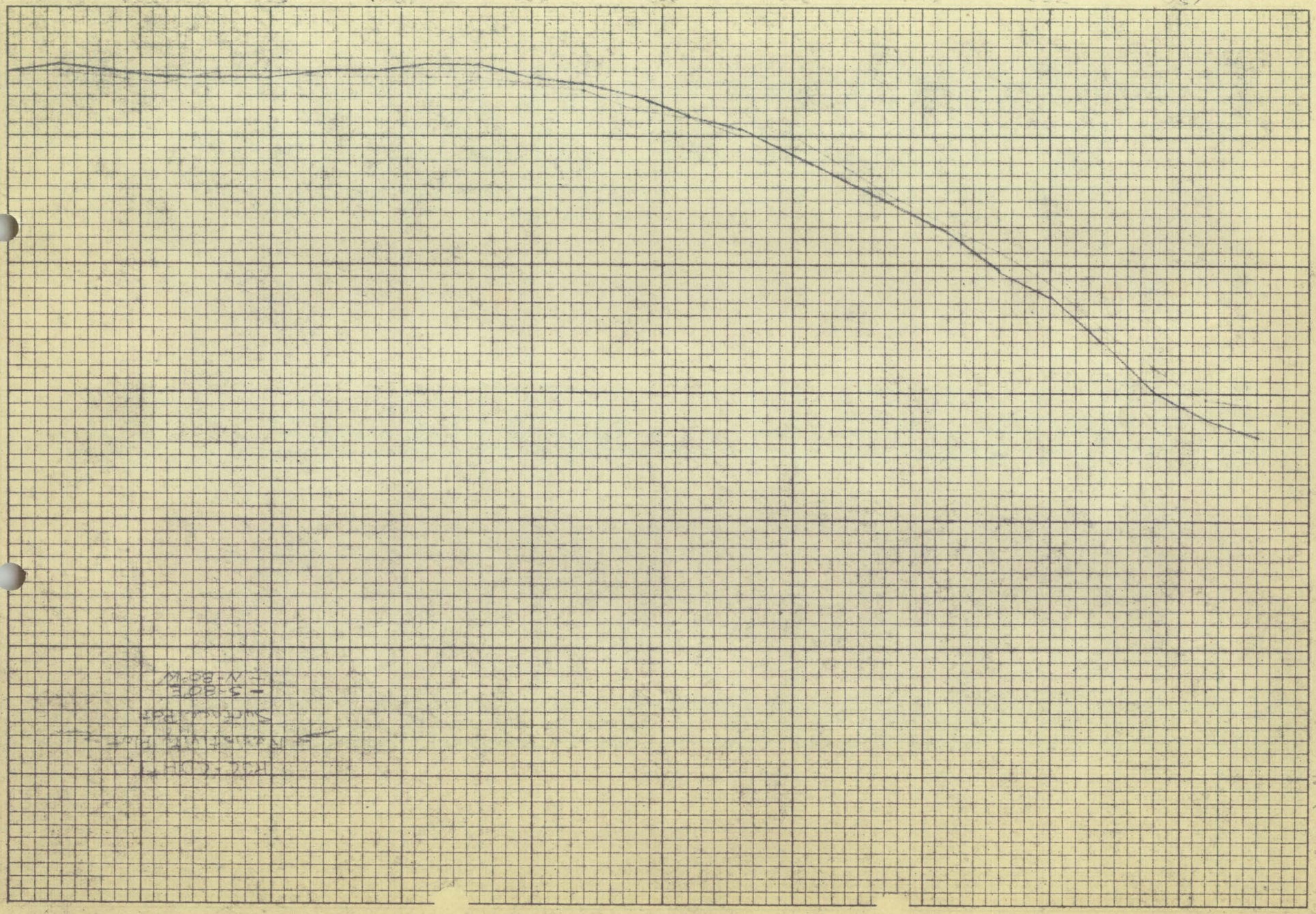
MAD. .S. A.

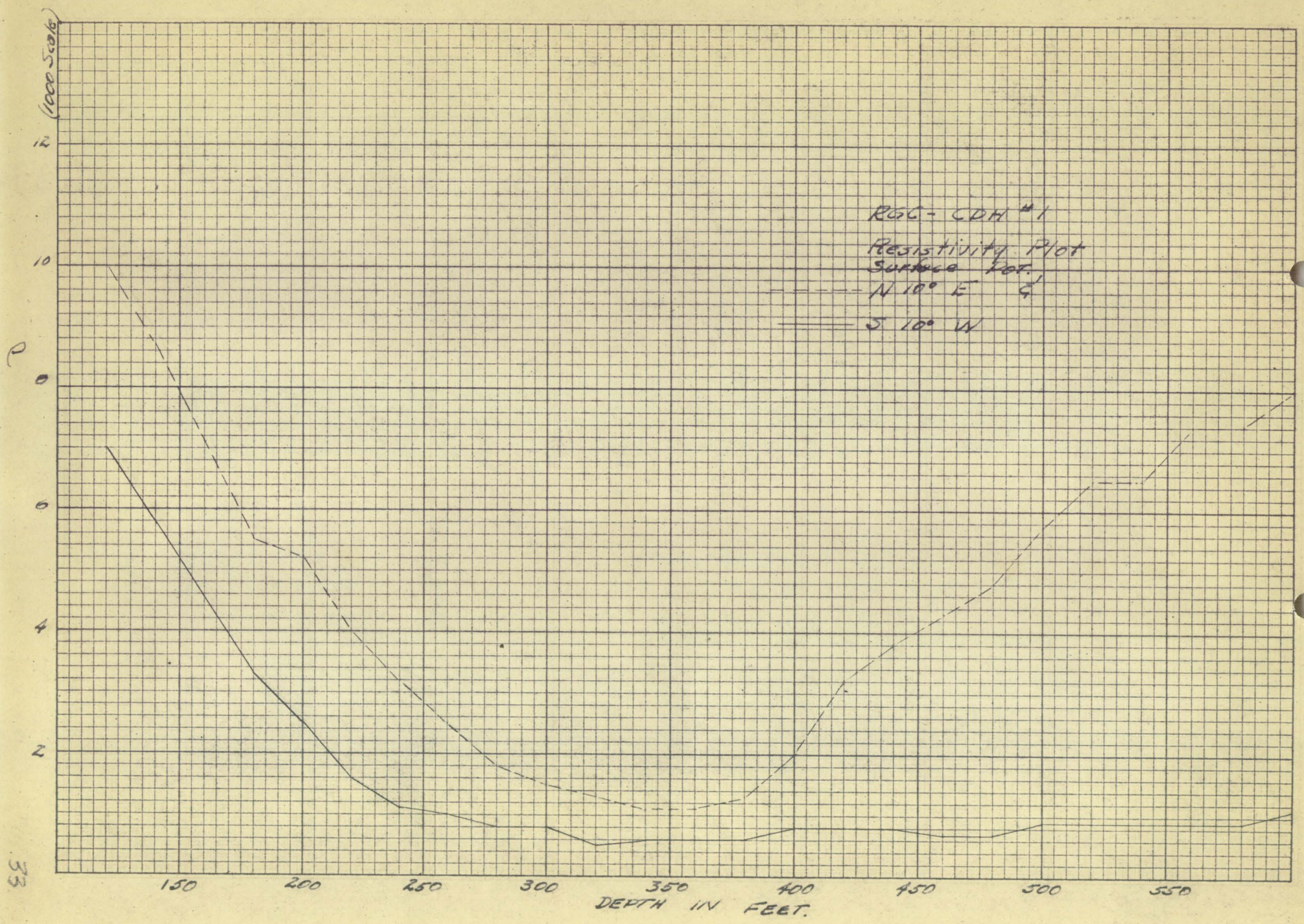


32

KEUFFEL & ESSER CO., N. Y. NO. 359-5
10 X 10 to the inch.
MADE IN U.S.A.



KEUFFEL & ESSER CO., N. Y. NO. 359-8
10 X the inch.
MAD .. S. A.



KEUFFEL & ESSER CO., N. Y. NO. 359-S
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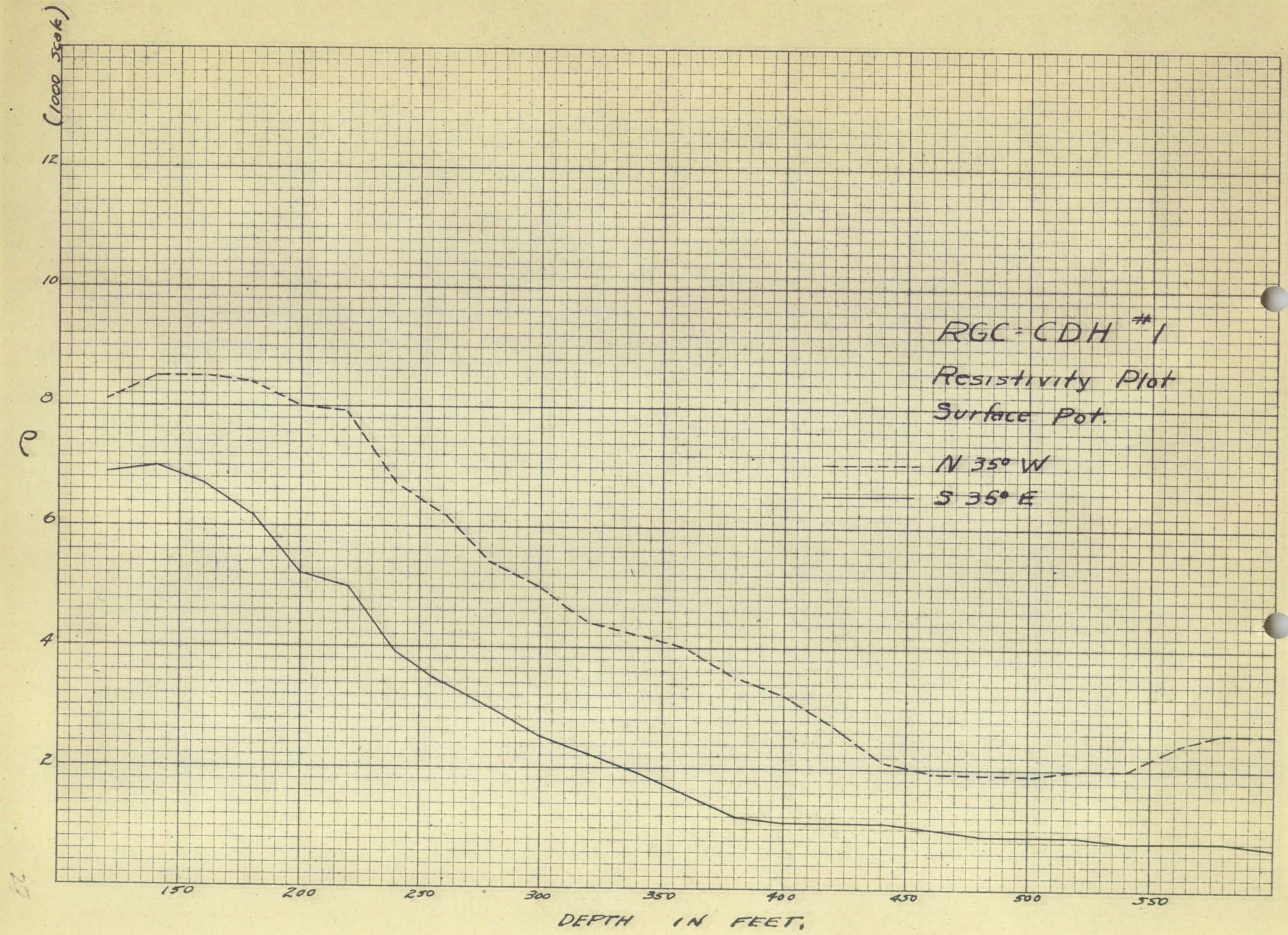
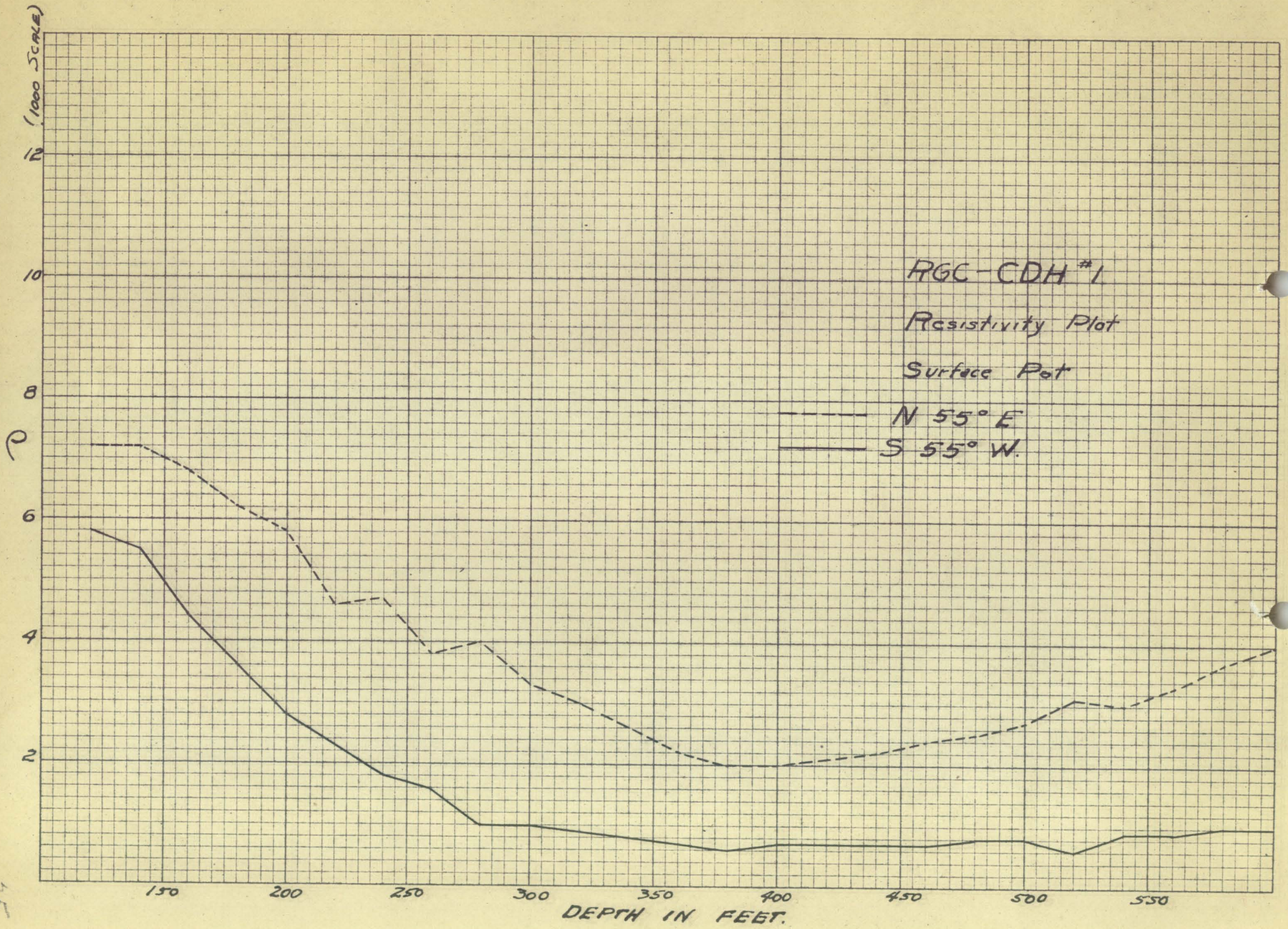
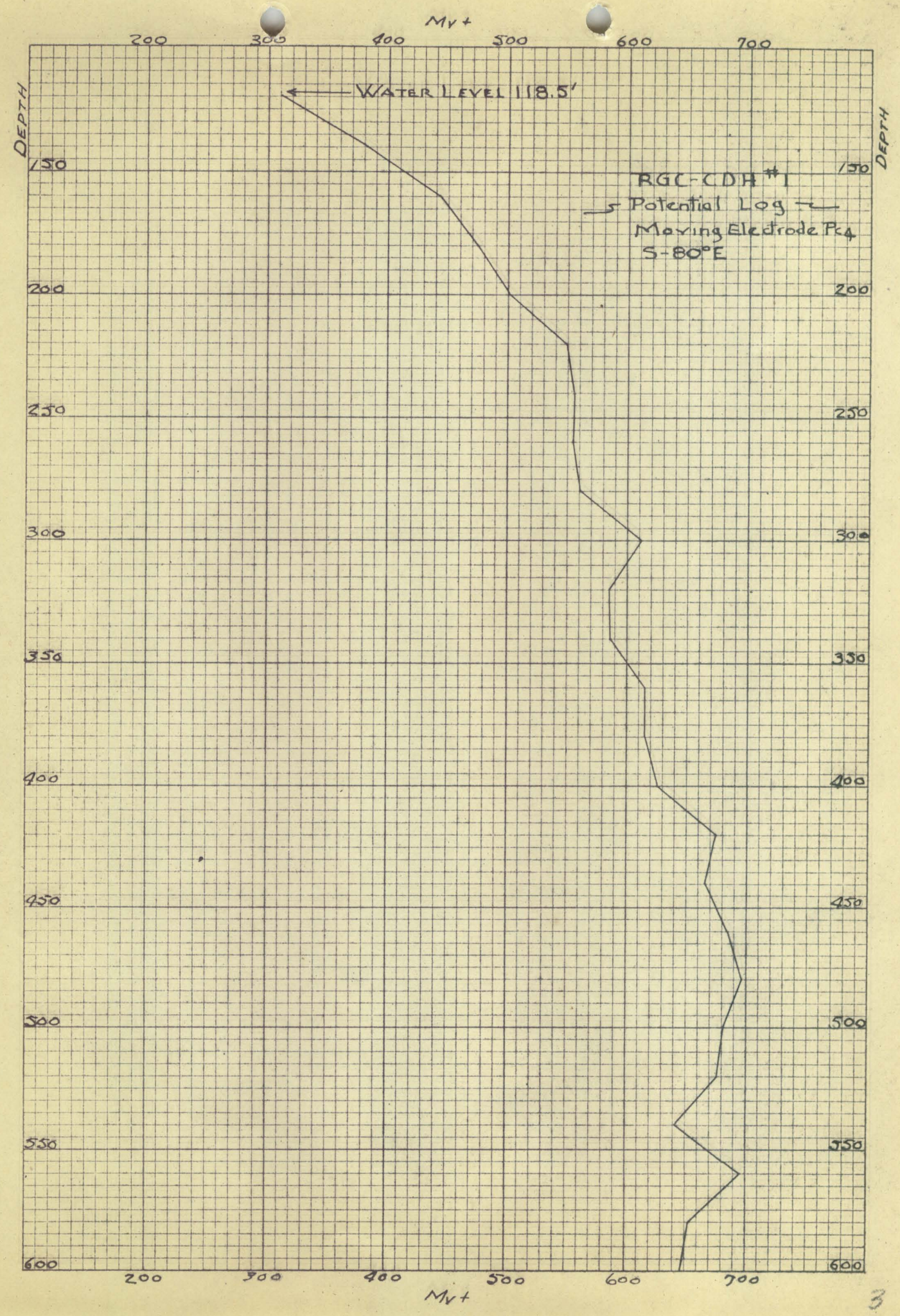
MAD. .S.A.

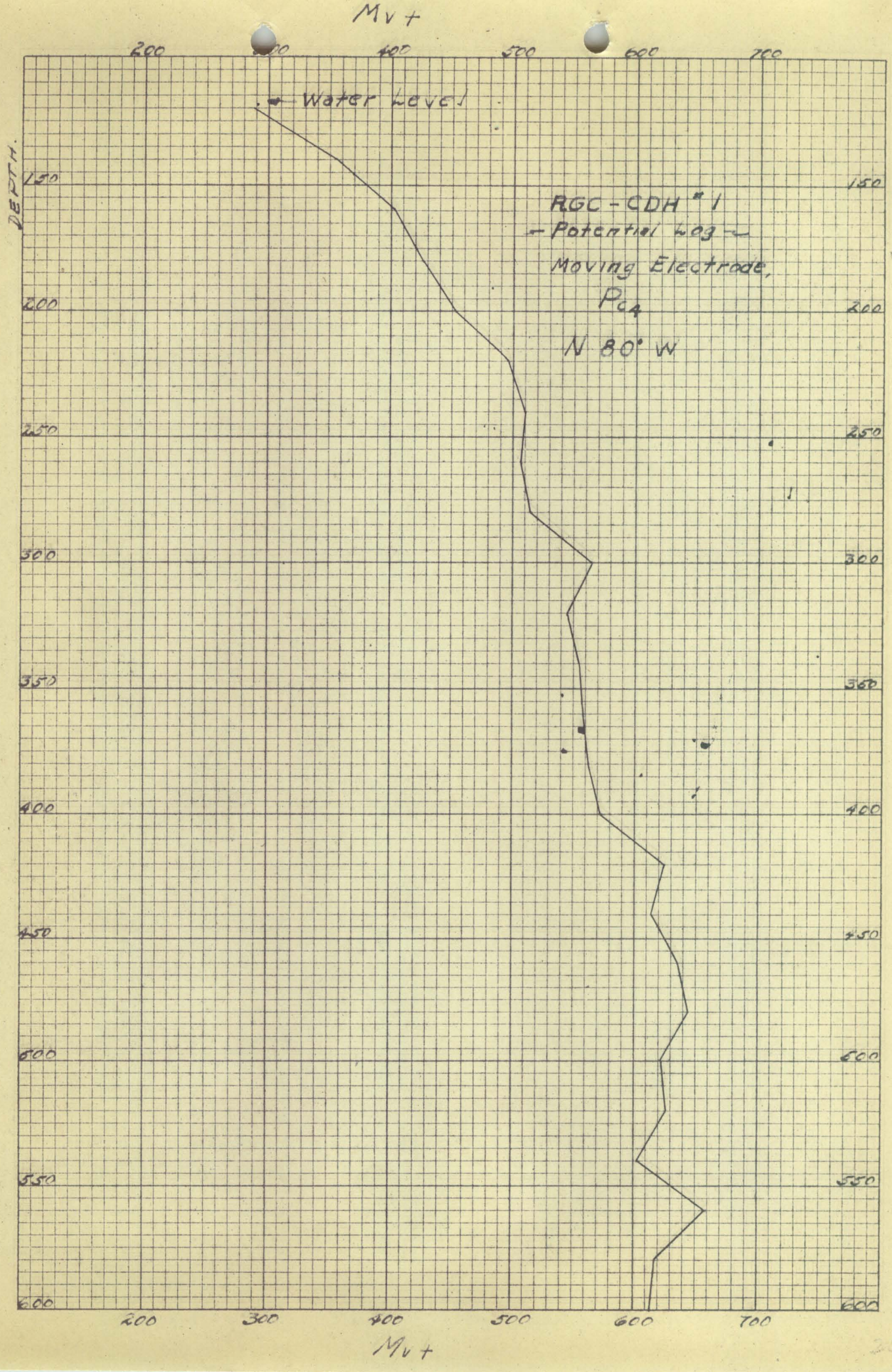


KEUFFEL & ESSER CO., N. Y. NO. 359-5
10 X 7 to inch.
MADE IN U.S.A.

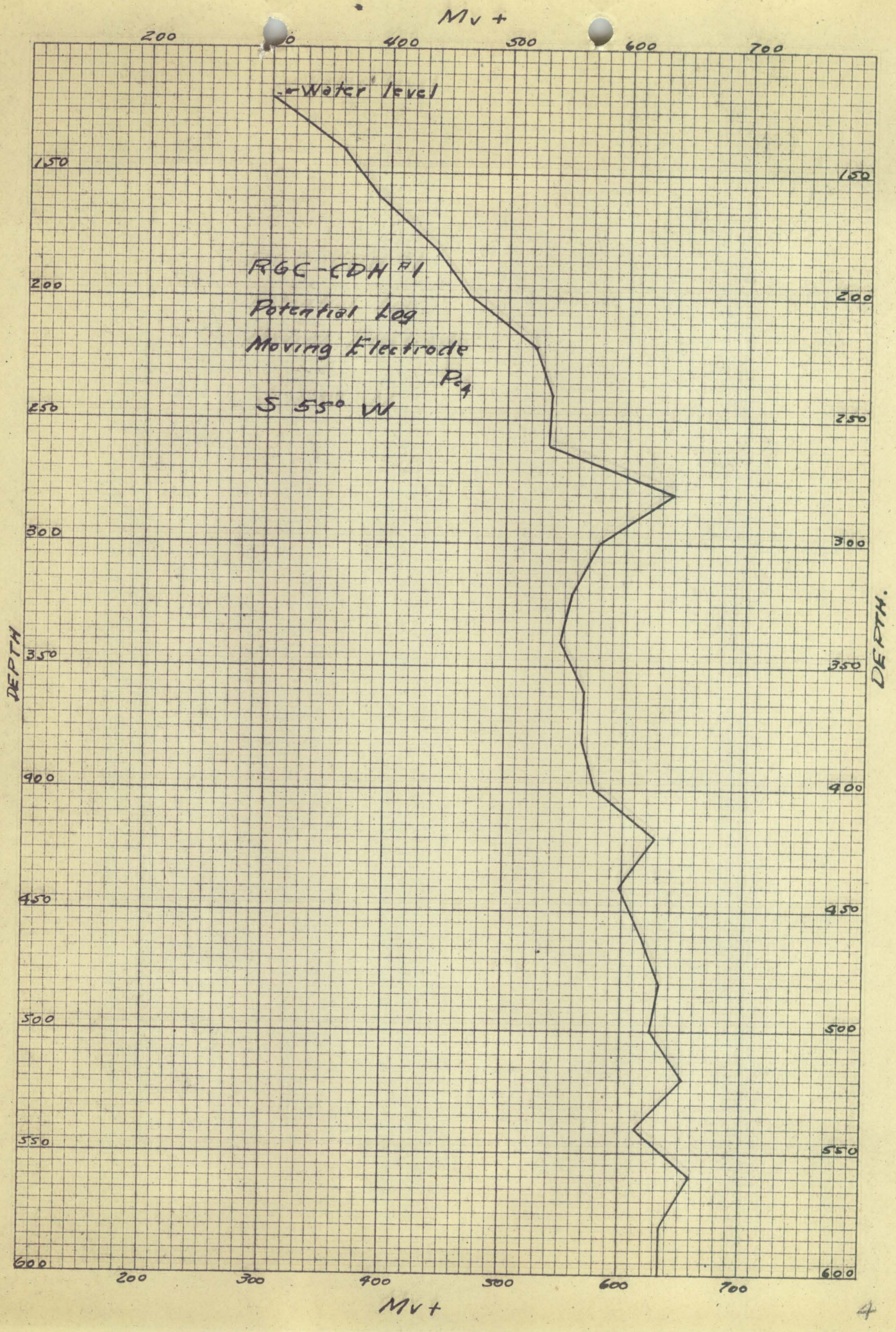




KEUFFEL & ESSER CO., N. Y. NO. 359-8
10 X 1/ the inch.
MAD S. A.



KEUFFEL & ESSER CO., N. Y. NO. 359-B
10 X 10 to inch.
MAD. U.S.A.



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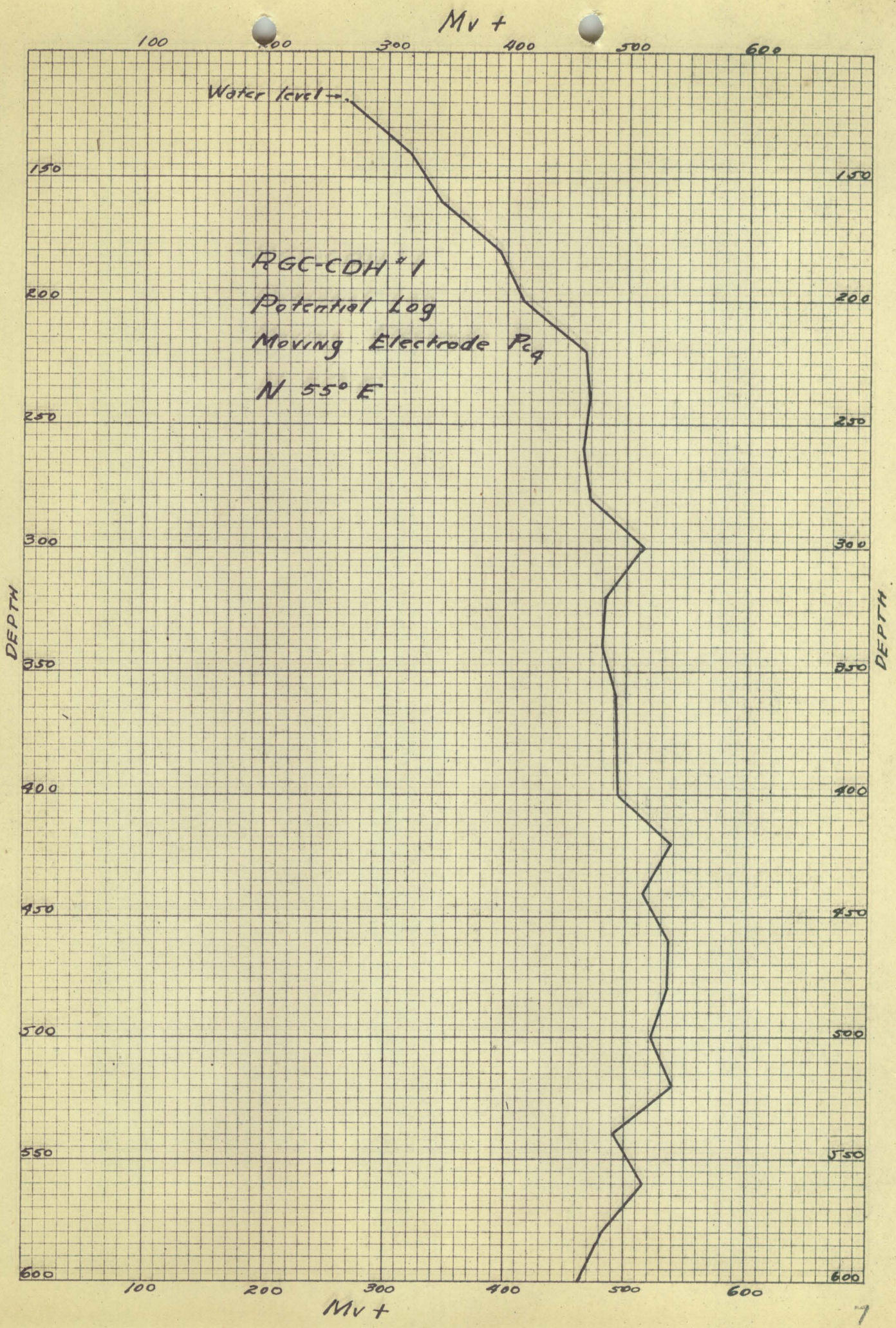
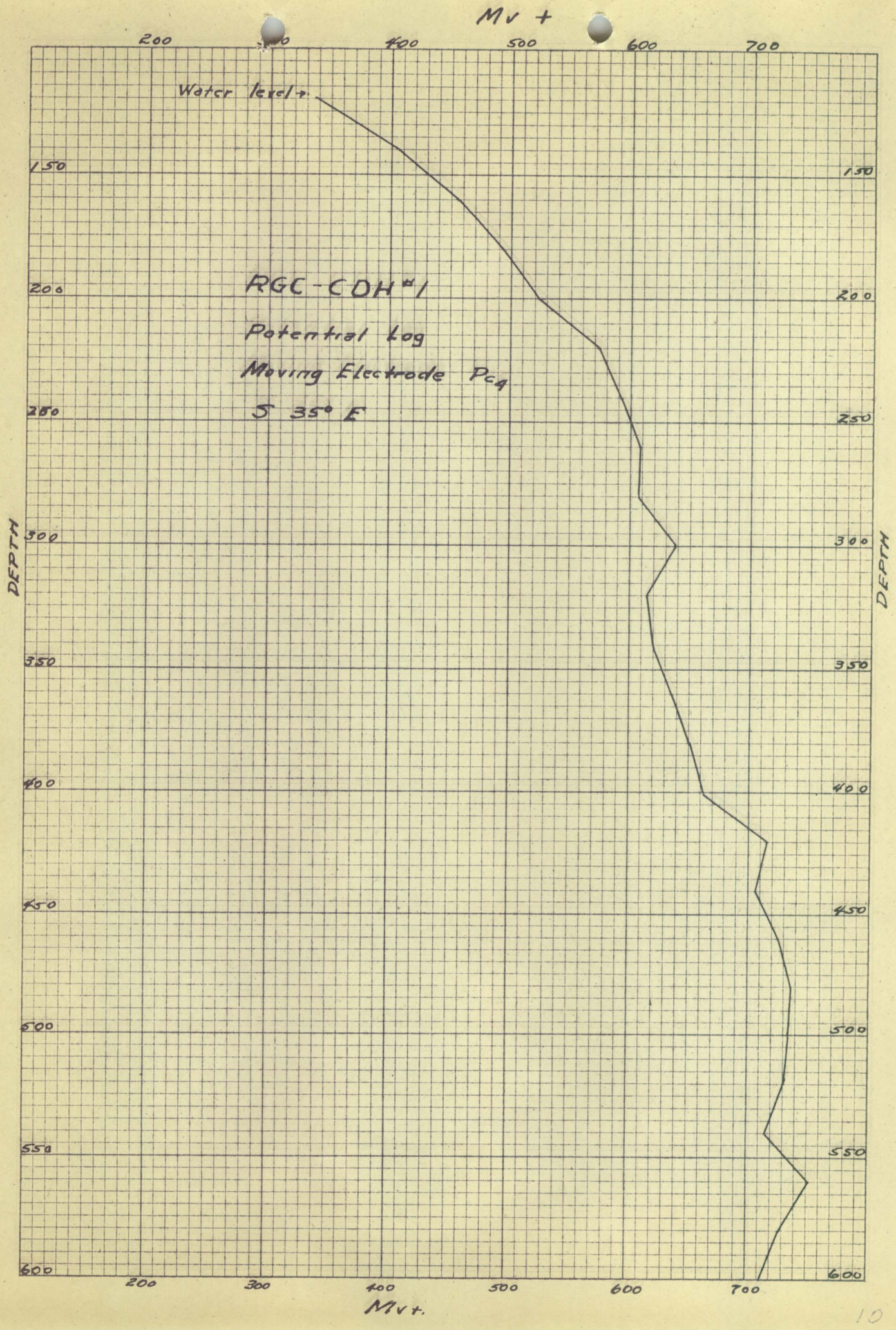
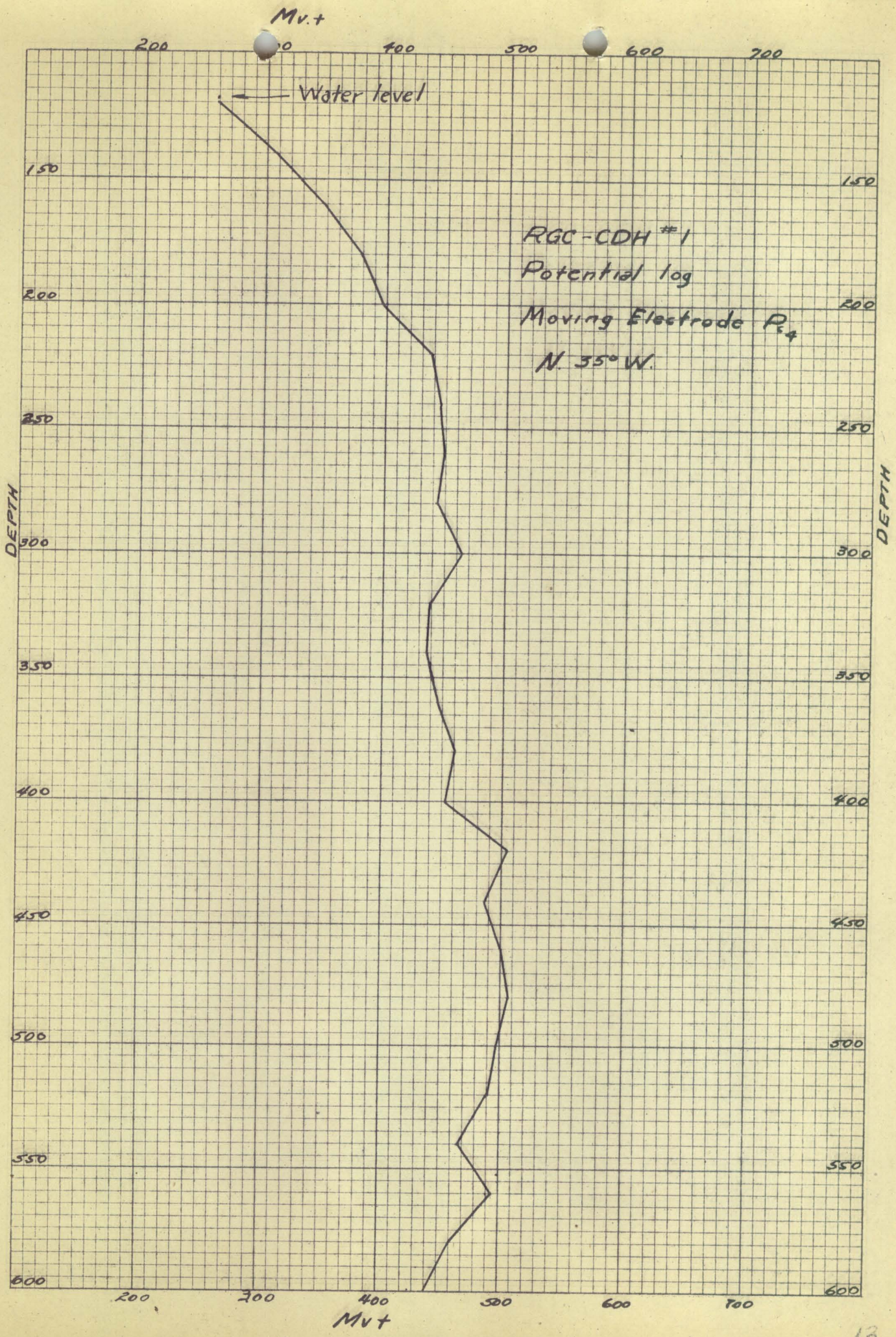
10 X 1 Inch.
MAD. U.S.A.



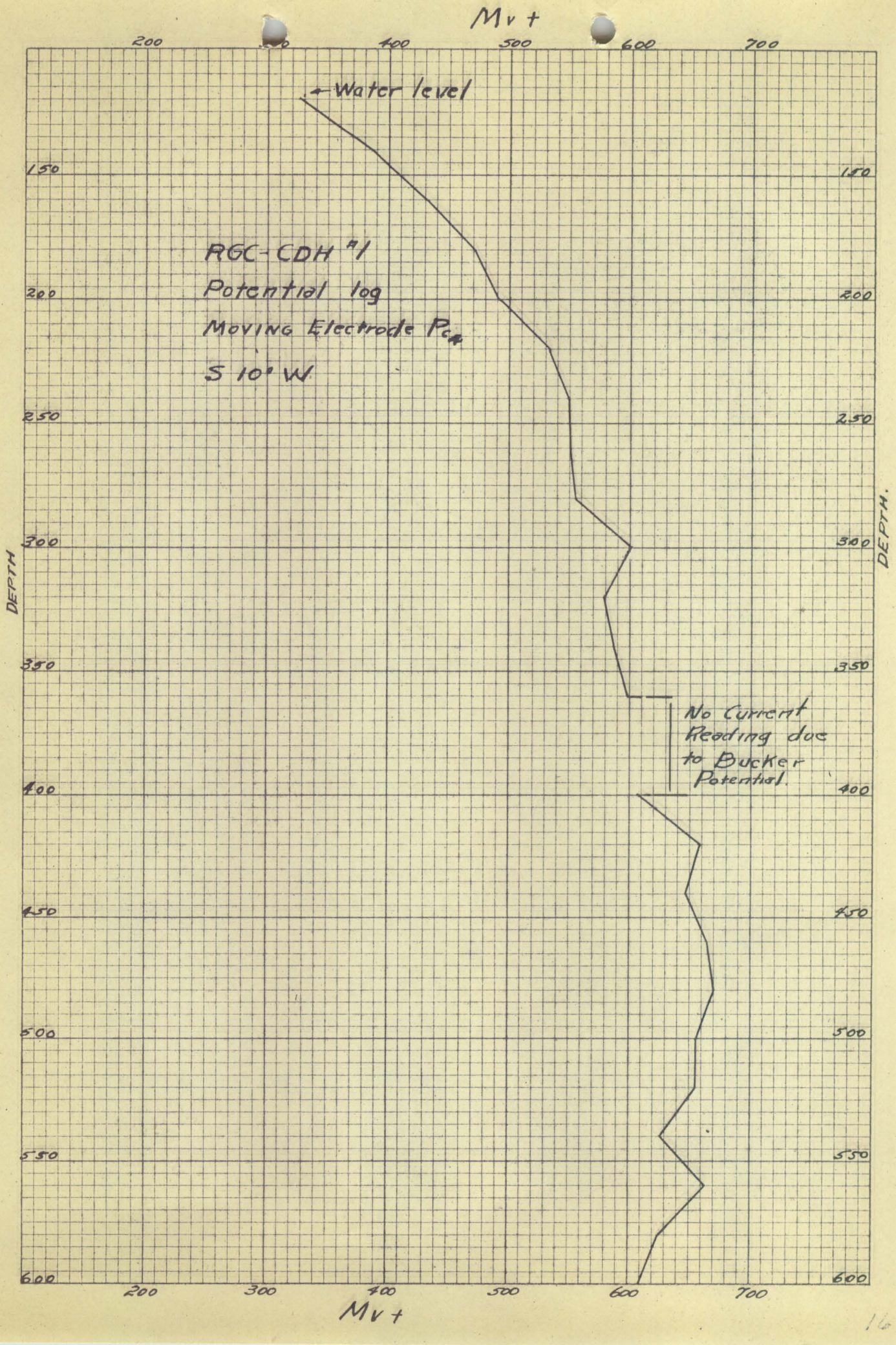
KEUFFEL & ESSER CO., N. Y. NO. 359-8
10 X 7 the inch.
MADE IN U.S.A.



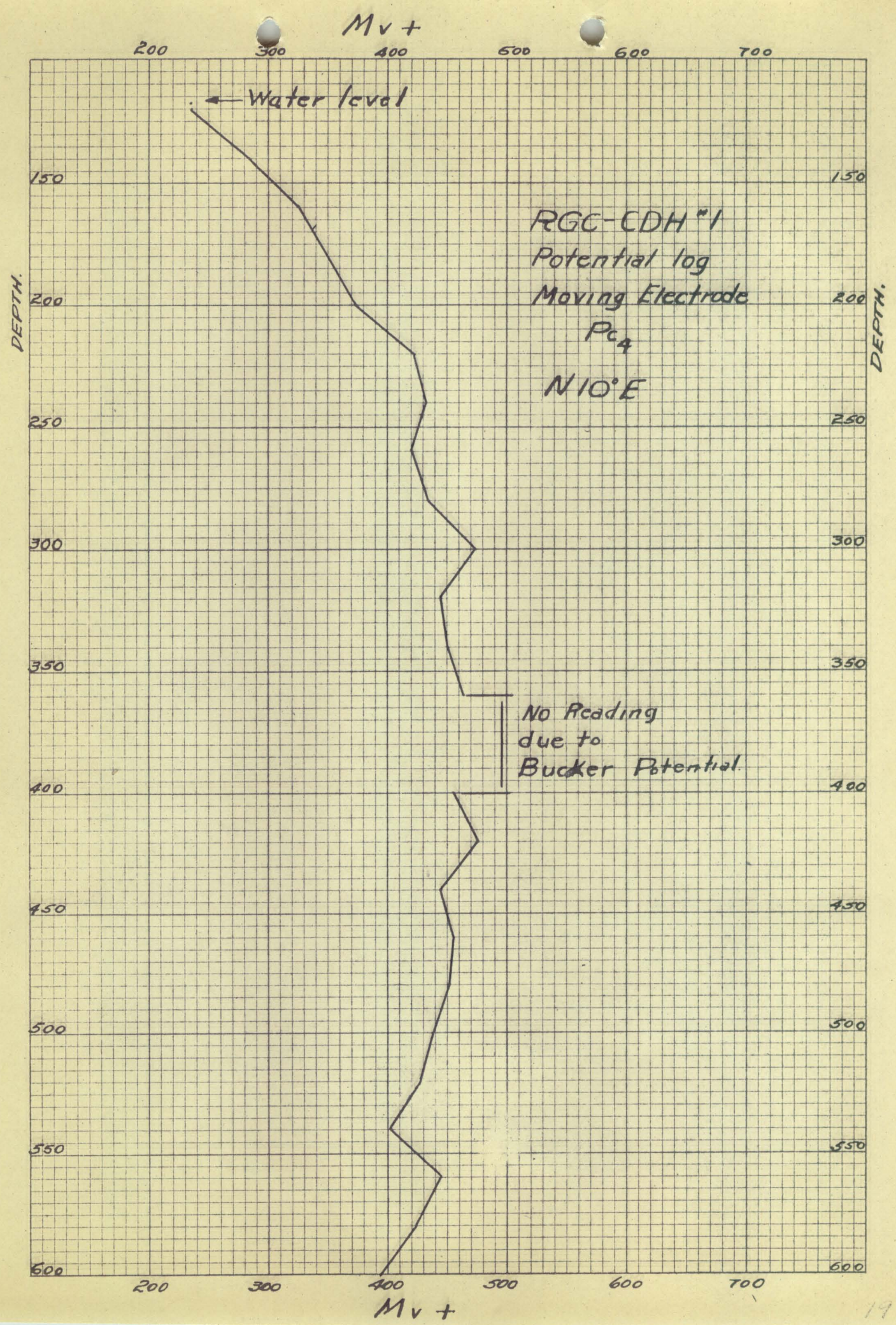
KEUFFEL & ESSER CO., N. Y. NO. 359-S
(10 X 7) 5a inch.
MAD. U.S.A.



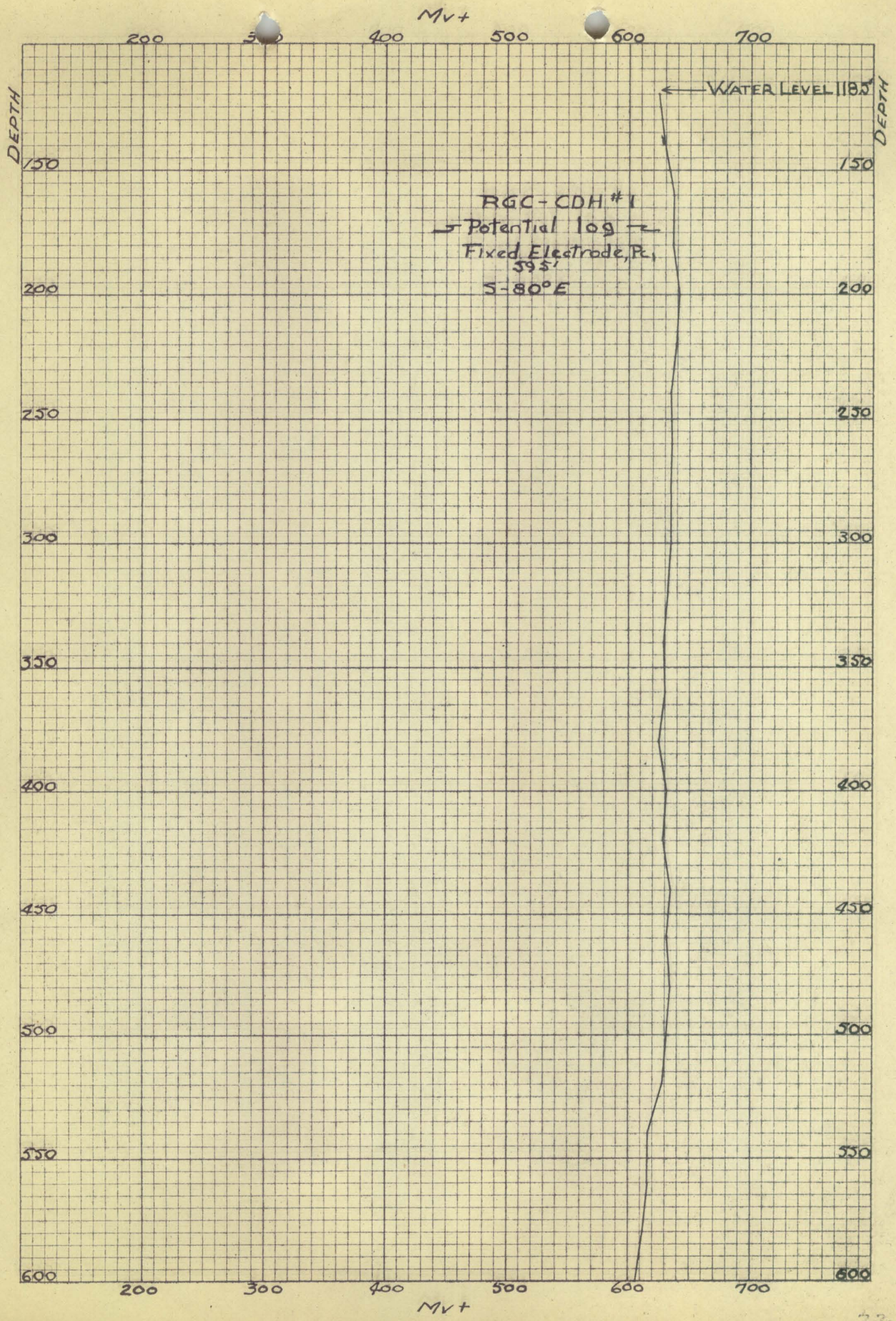
KEUFFEL & ESSER CO., N. Y. NO. 359-8
10 X the inch.
MAD S.A.



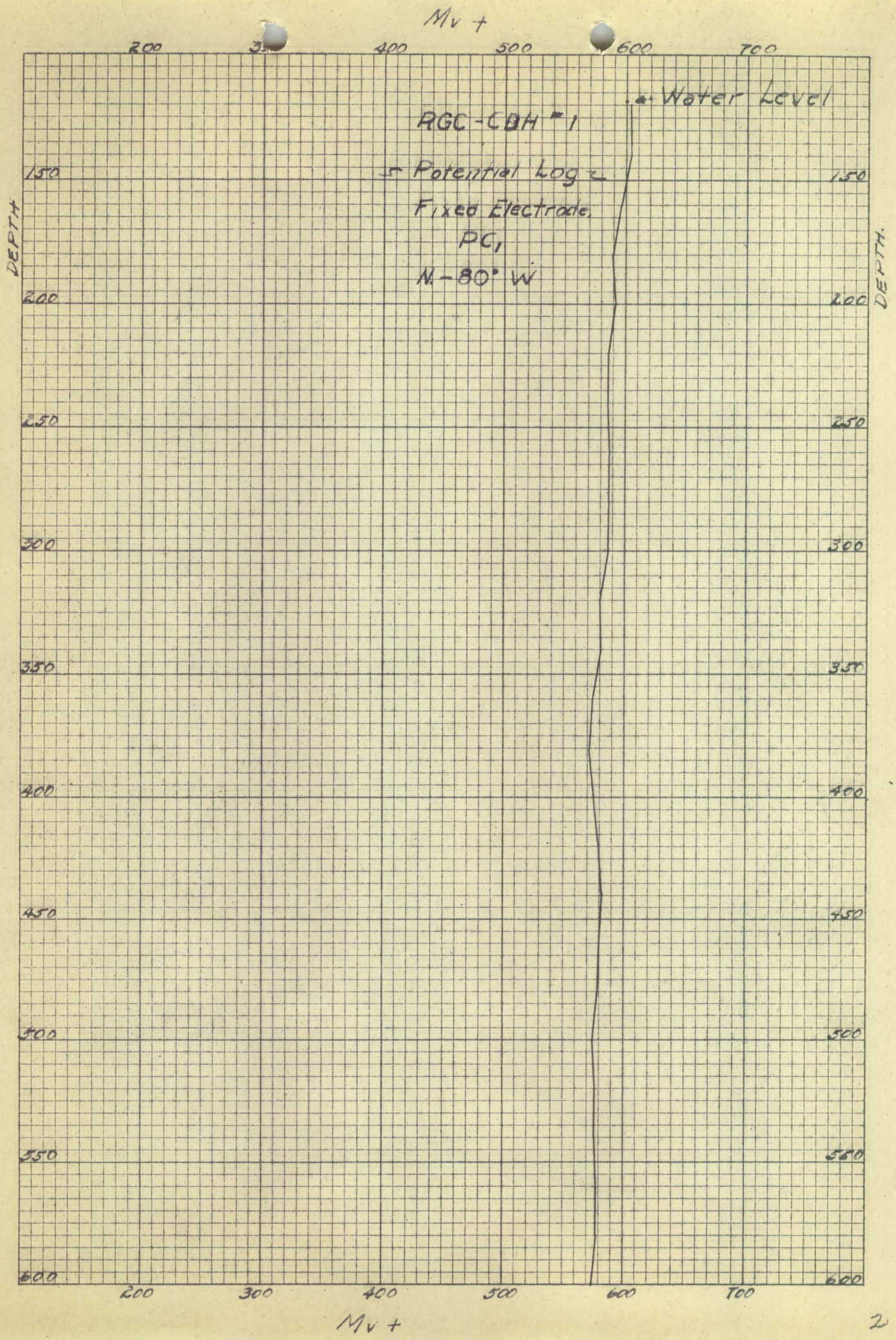
KEUFFEL & ESSER CO., N. Y. NO. 359-S
10 X 10 to the Inch.
MADE IN U.S.A.



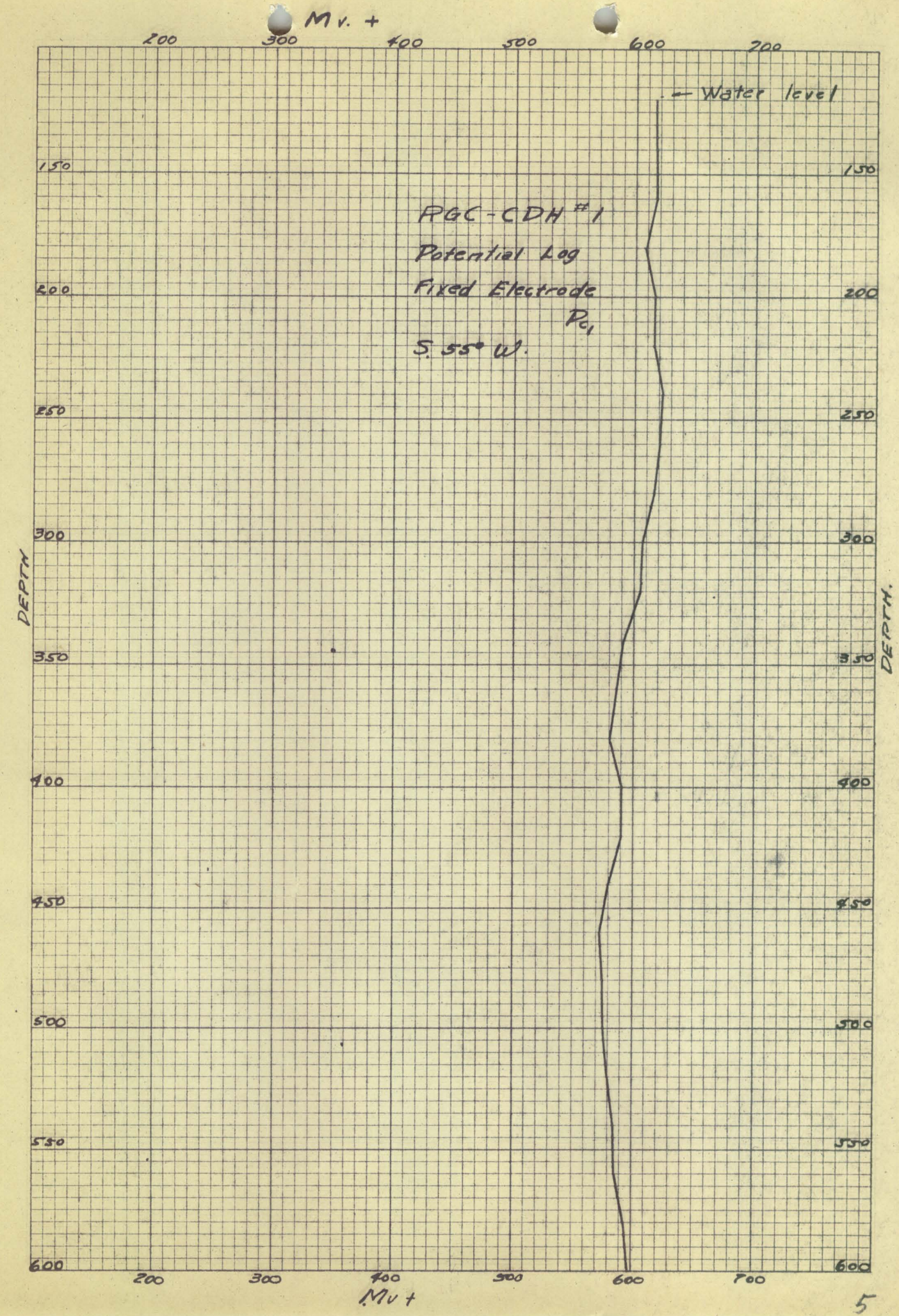
KEUFFEL & ESSER CO., N. Y. NO. 359-8
10 X 7 to inch.
MAD. U.S.A.



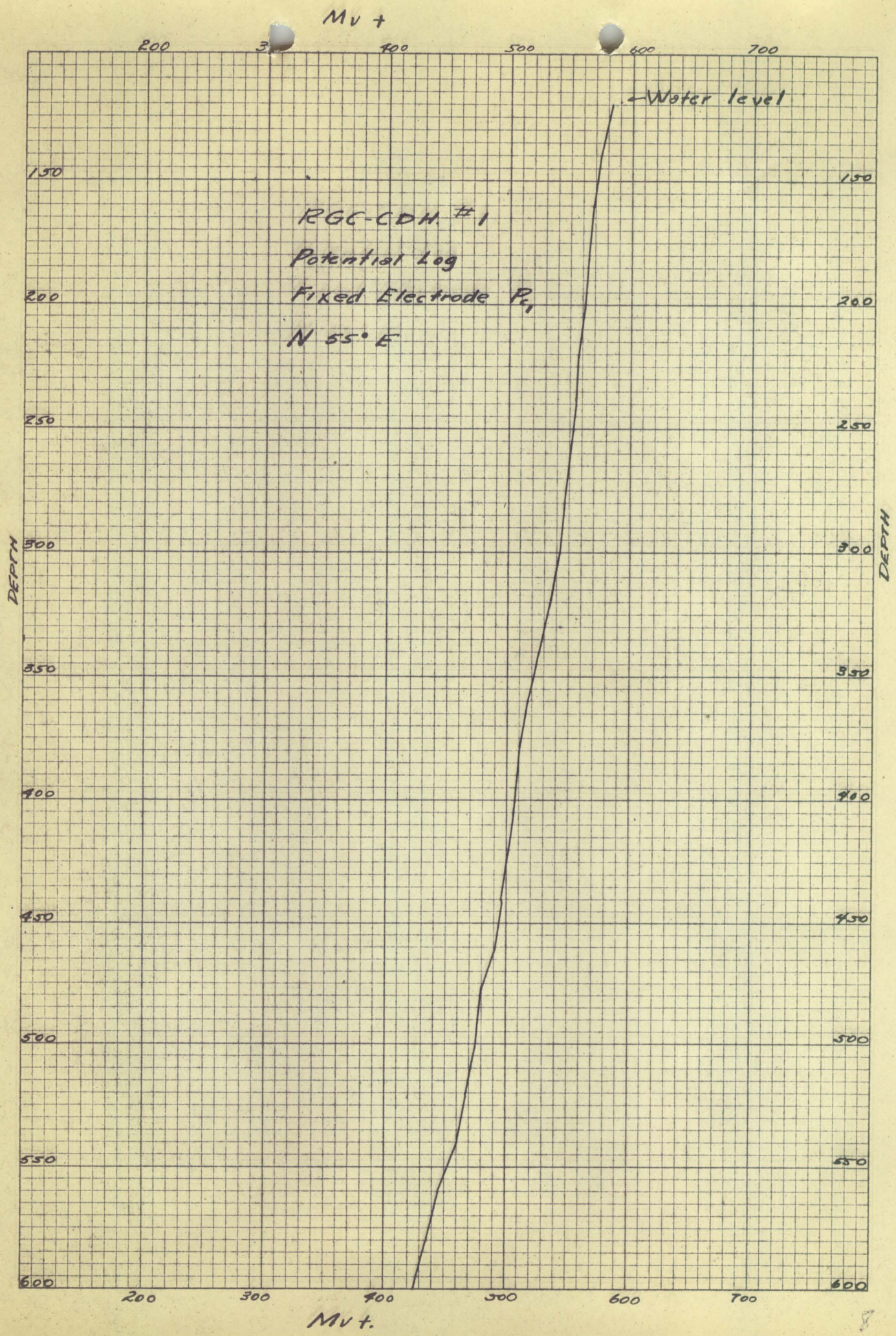
KEUFFEL & ESSER CO., N. Y. NO. 359-8
10 X the inch.
MAD. U.S.A.



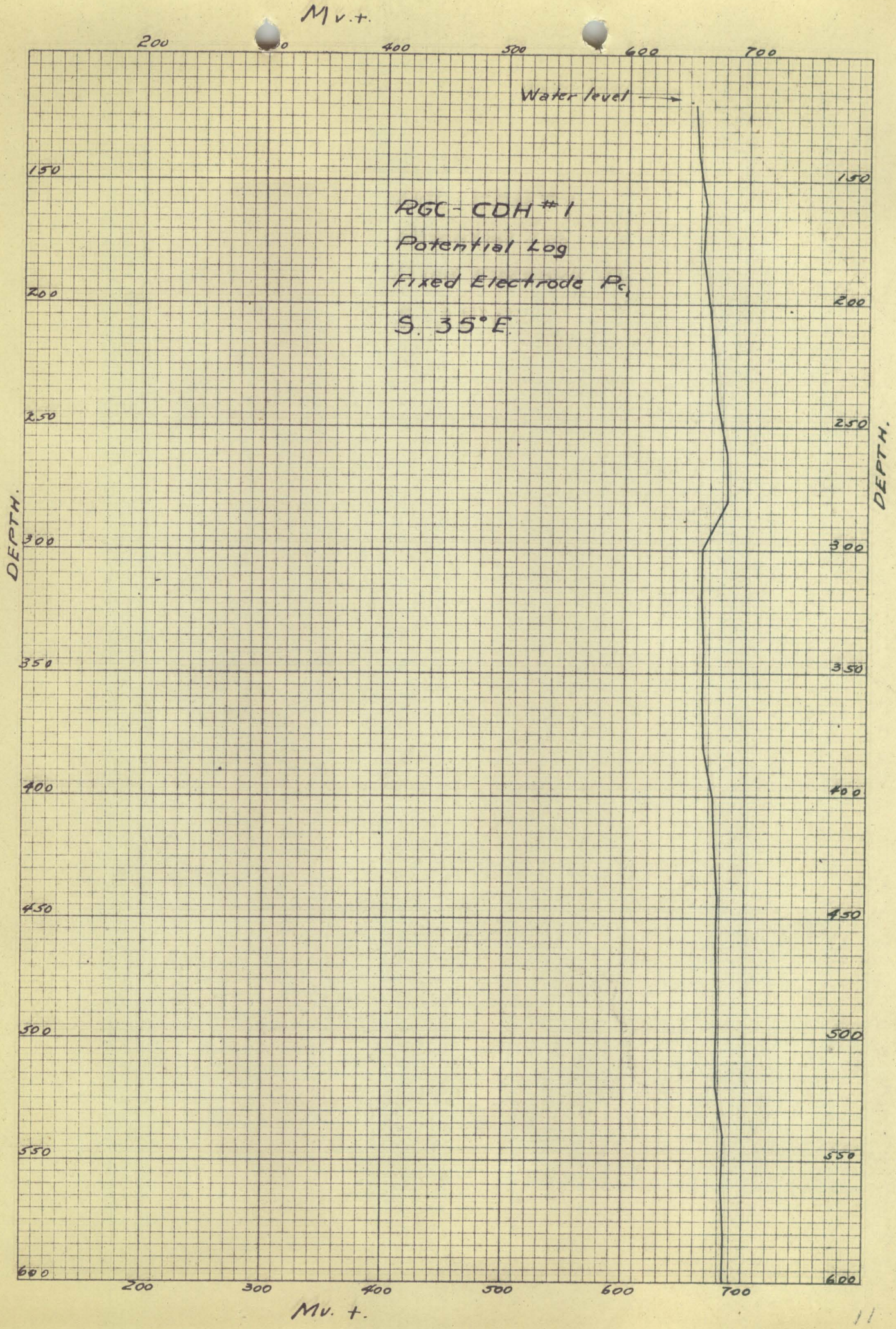
NEUFFEL & ESSER CO., N. Y. NO. 359-B
10 X 1/10 the inch.
MADE IN U.S.A.



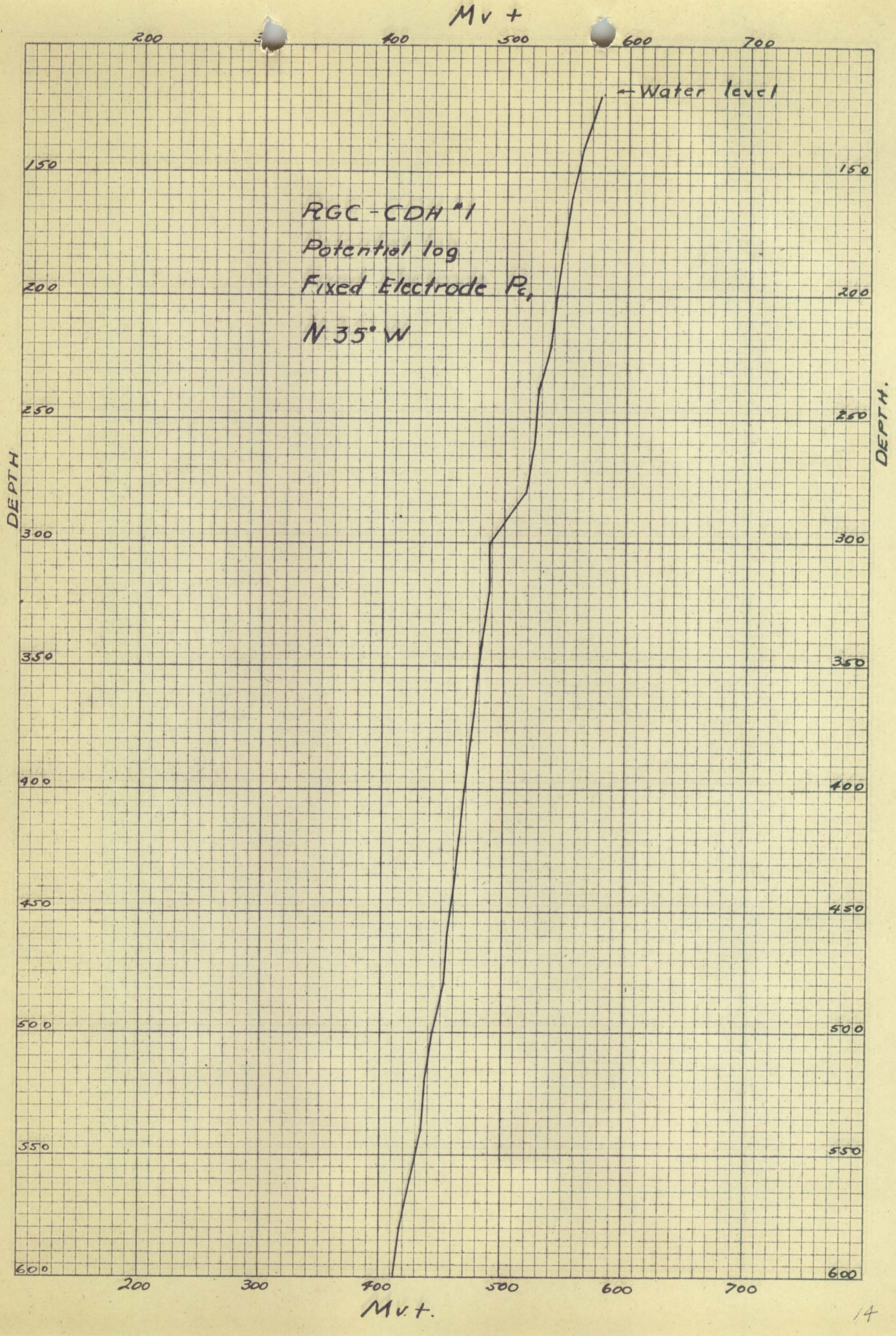
KEUFFEL & ESSER CO., N. Y. NO. 359-B
10 X 1 to inch.
MADE IN U.S.A.



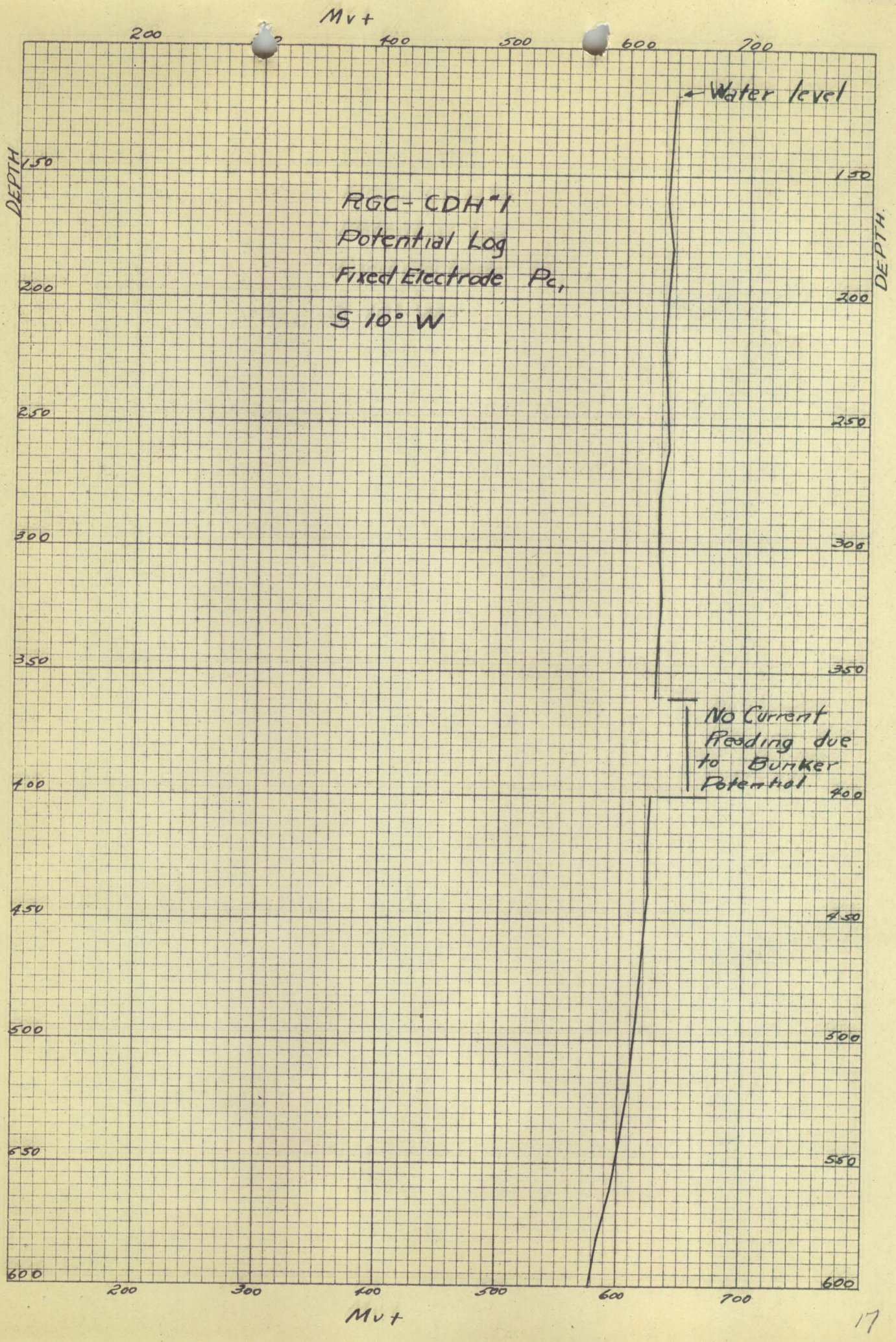
KEUFFEL & ESSER CO., N. Y. NO. 359-S
10 X 7 to inch.
MAD. U.S.A.



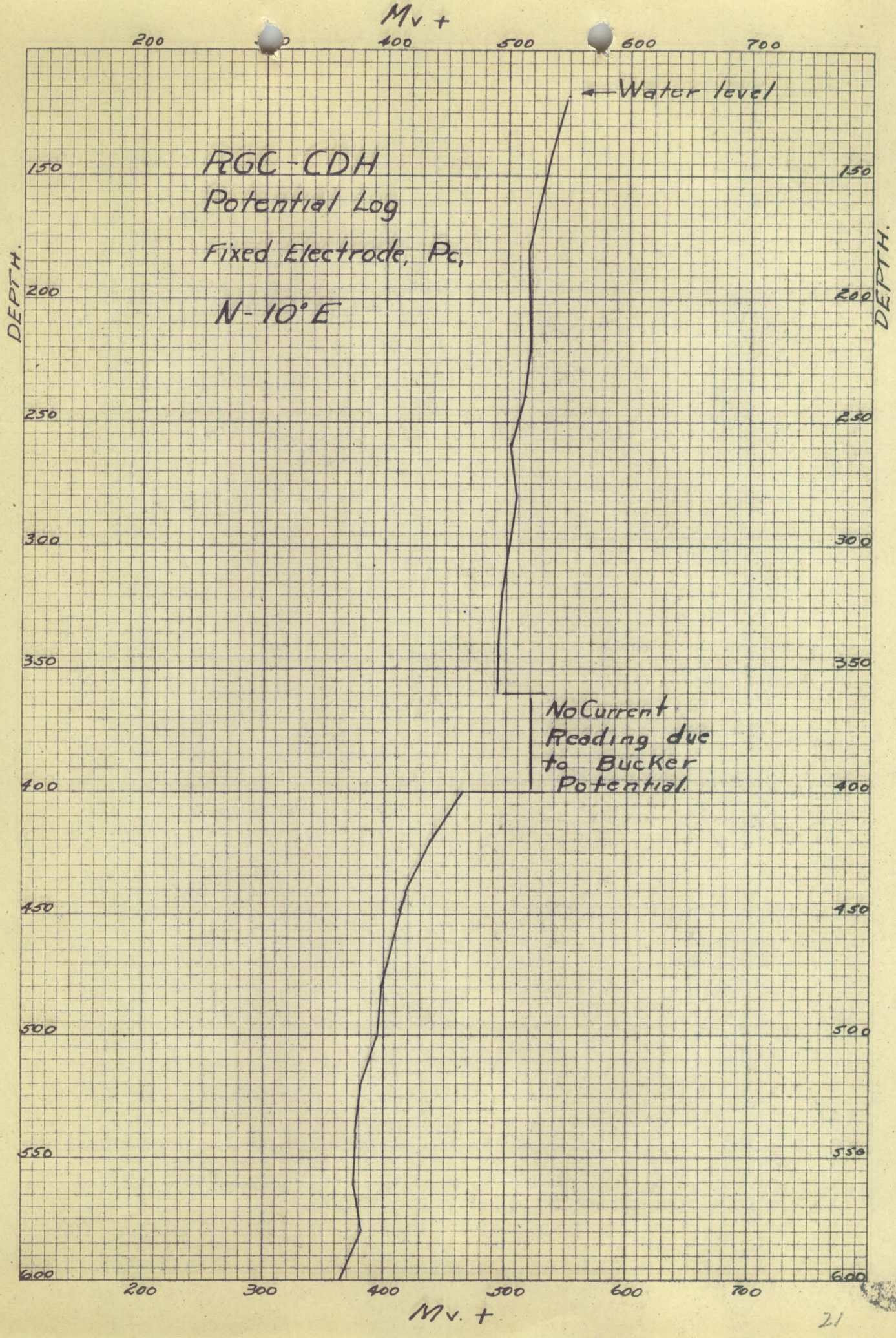
KEUFFEL & ESSER CO., N. Y. NO. 359-8
10 X 1 The Inch.
MAD. U.S.A.



KEUFFEL & ESSER CO., N. Y. NO. 359-8
10 X 10 to the inch.
MADE IN U.S.A.



KEUFFEL & ESSER CO., N. Y. NO. 359-8
10 X 10 to Inch.
MAD U.S.A.



KEUFFEL & ESSER CO., N. Y. NO. 359-5
10 X 10 to Inch.
MAD. U.S.A.

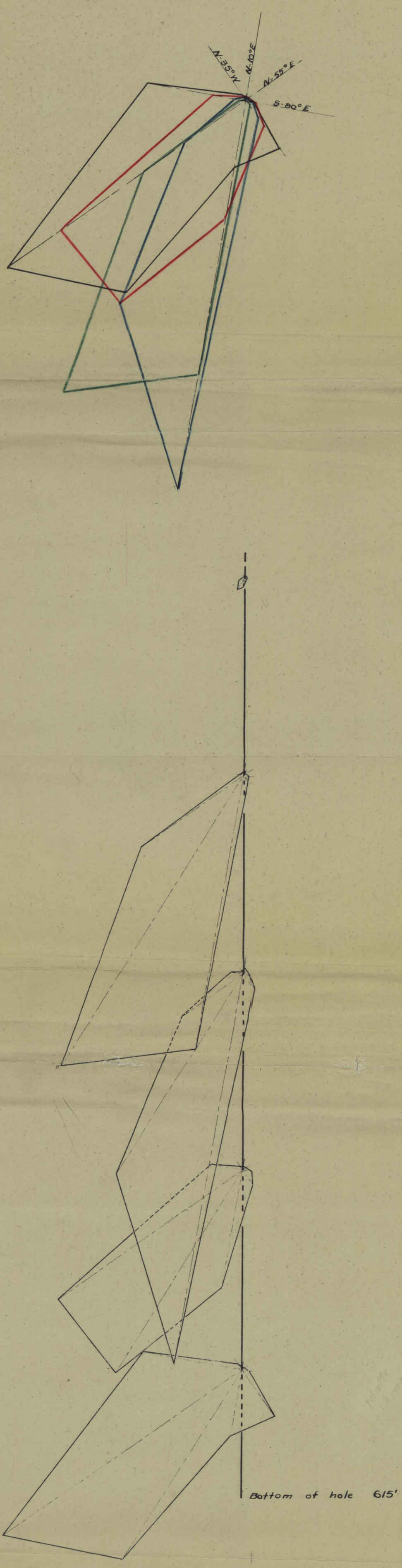
E.E form B

EMPIRE ENGINEERING COMPANY
CHURN · DRILL LOG

Property: Rio Grande Copper Company **Date Started:** June 26, 1946
Hole No.: RGC-1 **Date Finished:** July 25, 1946
Drilled By: Empire Engineering Company Sampled By: Spencer, Peterson, McDonnell.
Coordinates: N. 13113 E. 17218 Elevation at collar: 5796 ft., at bottom: 5181 ft.

DEPTH	Sample NO.	% Sludge Recovery	Accepted Assays CU-%	AU-OZ/T	AG-OZ/T	Summary of Ores Cut	GEOLOGIC COLUMN	Casing Record	REMARKS
5							ALLUVIUM.		
10									
15									
20			TRACE						HOLE CROOKED. BACKFILLED
25			"				GREY, IRON-STAINED SHALE.		10 FEET AND REDRILLED.
30			"						
35			"				GREY, TALCY SHALE.		
40			"				GREY, IRON-STAINED SHALE.		
45			"						
50			"						
55			"						
60			"						
65									
70									
75			TRACE						
80			"						
85			"						
90			"						
95			"						
100			"						
105			"						
110			"						
115			"						
120			"						
125			"				DARK-GREY SILICEOUS SHALE. QUARTZ. PYRITE.		
130			"						
135			"						
140			"						
145			"						
150			"						
155			"						
160			"						
165			"						
170			"						
175			"						
180			"						
185			"						
190			"				HARD, LIMY, GREY SHALE. PYRITE.		
195			"						
200			"						
205			"						
210			"						
215			"				HARD GREY SHALE. PYRITE. QUARTZ.		
220			"						
225			"				HARD GREY. SHALE. PYRITE.		
230			"						
235							DARK-GREY SILICEOUS SHALE. QUARTZ. PYRITE.		
240									
245			TRACE						
250			"						
255			"						
260			"						
265			"				HARD GREY SHALE.		
270			"						
275									
280									
285									
290									
295									
300									
305			TRACE						
310			"				HARD GREY SHALE. QUARTZ. PYRITE.		
315			"						
320			"						
325			"						
330			"						
335			"						
340			"						
345			"						
350			"				HARD, DARK-GREY SHALE. PYRITE.		
355			"						
360			"						
365			"						
370			"						
375			"						
380			"						
385			"						
390			"						
395			"						
400			"						
405			"						
410			"						
415			"						
420			"						
425			"						
430			"						
435			"						REDUCED HOLE FROM 10"
440			"						TO 8" AT 434 FEET.
445			"				SOFT, LIGHT-GREY SHALE. PYRITE.		
450			"						
455			"				HARD, DARK-GREY SHALE. PYRITE. QUARTZ.		
460			"						
465			"						
470			"						
475			"						
480			"						
485			"						
490			"						
495			"				HARD, DARK-GREY SHALE.		
500			"						
505			"						
510			"						
515			"						
520			"						
525			"						
530			"						
535			"						
540			"						
545			"						
550			"						
555			"						
560			"				SOFT GREY SHALE.		
565			"						
570			"						
575			"				HARD GREY SHALE.		
580			"						
585			"						
590			"						GOUGE.
595			"				DARK-GREY SILICEOUS SHALE. PYRITE.		GOUGE.
600			"						
605			"				BLACK SHALE. QUARTZ. PYRITE.		
610			"						
615			"						PIN GAME OFF. DROPPED
									8" BIT IN HOLE. FISHED
									BUT FAILED TO RECOVER.

COMPOSITE HORIZONTAL GRAFT
&
EXTENDED GRAFT of GEOPHYSICAL LOGGING



RGC-CDH #1

EMPIRE ENGINEERING CO.
EMPIRE STATE BLDG. -:- SPOKANE, WASH.

POLAR PLOT of Pc1 595'
FIXED ELECTRODE

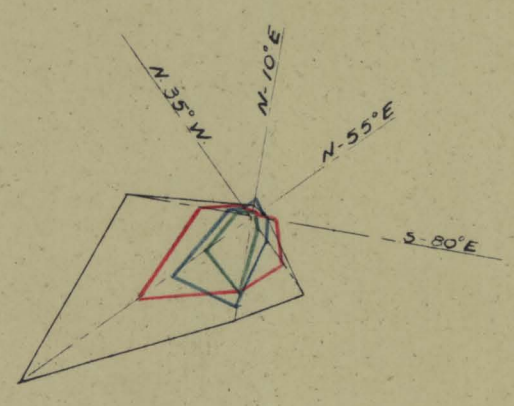
220-300
320-400
420-500
520-600

Bearings

DRAFTING
DRG NO.
DESIGN
FILE NO.
APPROV
DATE
SCALE 1" = 600

3260 C0006

COMPOSITE HORIZONTAL GRAFT
&
EXTENDED GRAFT of GEOPHYSICAL LOGGING



Make Tracing

RGH – CDH #1

EMPIRE ENGINEERING CO.
EMPIRE STATE BLDG. SPOKANE, WASH

POLAR PLOT of Pc4
MOVING ELECTRODE

220–300
320–400
420–500
520–600

Bearings

DRAFTING
DESIGN
APPROV.
DRG. NO.
FILE NO.
SCALE 1" = 600

32600006