GL01642

COMPLETION REPORT

GEOTHERMAL PRODUCTION WELL P-89-1

mary

Sulphurdale, Utah

For

Mother Earth Industries, Inc.
7350 E. Evans, Suite B
Scottsdale, Arizona 85260

GEOTHERMAL MANAGEMENT Co., Inc. P.O. Box 2980 Evergreen, CO. 80439-2980

GL01641Q

COMPLETION REPORT

—

GEOTHERMAL PRODUCTION WELL P-89-1

Sulphurdale, Utah

For

Mother Earth Industries, Inc.
7350 E. Evans, Suite B
Scottsdale, Arizona 85260

Prepared by
Geothermal Management Company, Inc.
P.O. Box 2980
Evergreen, Colorado 80439

January 1990

TABLE OF CONTENTS

FIGURES

APPENDICES

PLATE (in pocket)

COMPLETION REPORT FOR

P-89-1
Sulphurdale, Utah

I. ABSTRACT

A geothermal production well designated P-89-1 (Mary) was drilled on Fee land controlled by Mother Earth Industries, Inc. between the dates of September 14 and September 23, 1989. The well is 3258 ft. south and 541 ft. east of the northwest corner of Section 7, T26S, R6W, SLB&M.

After penetrating approximately 160'KB of acid-leached alluvial materials comprising lithic volcanic fragments, phenocrysts weathered out of the Three Creeks Tuff (Tbt) and a possible 20 foot thick block of Tbt, the well encountered 510 feet of Tbt unconformably overlying 70 feet of Wales Canyon Formation. From a depth of 840'KB to the end of sampling at 870'KB, the well was in Coconino meta-sandstone. Steam entries were noted at 782'KB, 850'KB, and at 880'KB. The well was bottomed at 960'KB after 10 days of drilling.

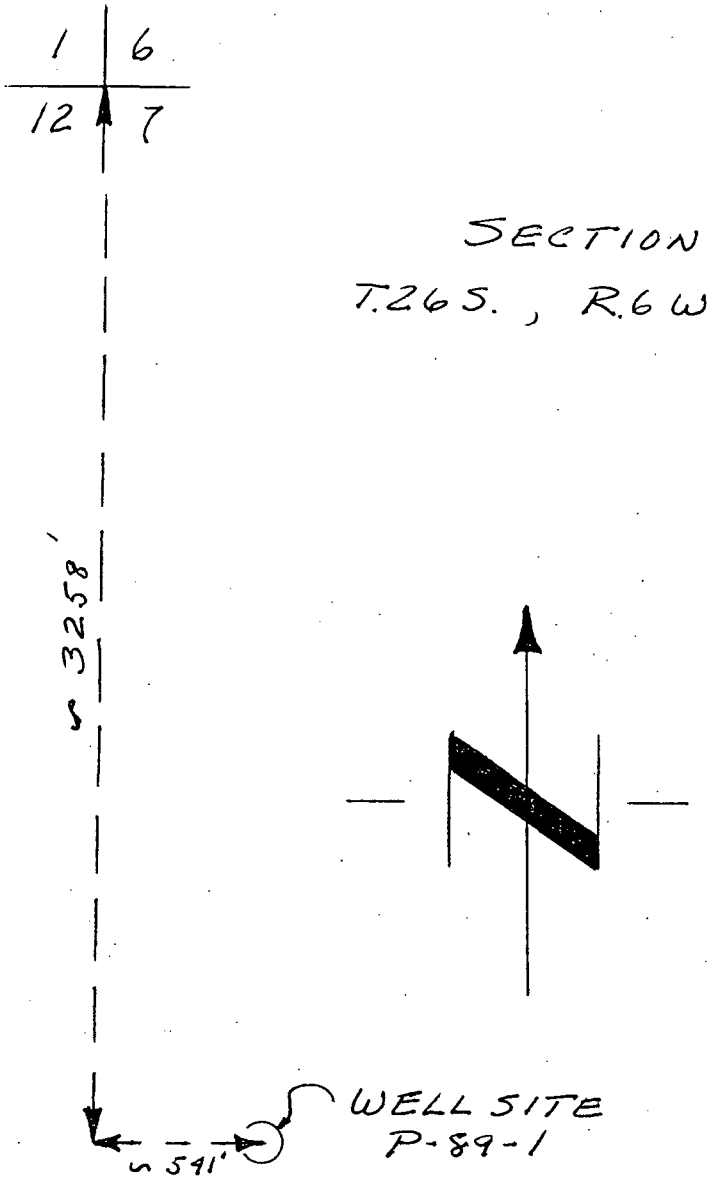
The prime contractor for the well was Sierra Drilling Company; surveys were done by Sunrise Engineering, Inc. of Fillmore, Utah; Safety Services were provided by Bell Safety of Evanston, Wyoming; and binocular examination of drill cuttings was done by Joseph Moore of Salt Lake City, Utah. All other activities were conducted by Mother Earth Industries, Inc.

II. LOCATION

This report pertains to MEI production well P-89-1 (Mary) located near Sulphurdale, in Beaver County, Utah within the Cove Fort-Sulphurdale KGRA.

Specifically, the well is on MEI controlled fee land approximetely 3258 feet south and 541 feet east of the northwest corner of Section 7, T26S, R6W, SLB&M. It is about 36 feet S80E of slim hole S-89-1, 1395 feet from well 34-7A (Linda) and about 530 feet from the nearest previously drilled production well P-88-2 (Lorretta).

Figure 1 depicts the location of the well relative to the section corner; Plate I (in the pocket) is a survey plat of the entire MEI production area.



REVISIONS		
No.	Date	By
1		
2		
3		
4		
5		

GEOTHERMAL MANAGEMENT Co.
P.O. Box 2980 Evergreen, CO. 80439-2980 (303) 670-3454

LOCATION MAP P-89-1

SULPHURDALE, UTAH

By: GWH | Ckd: GWH
Date: 11-30-89
Scale: 1" = 600'
Dwng. No: MEIP891-1

Figure 1

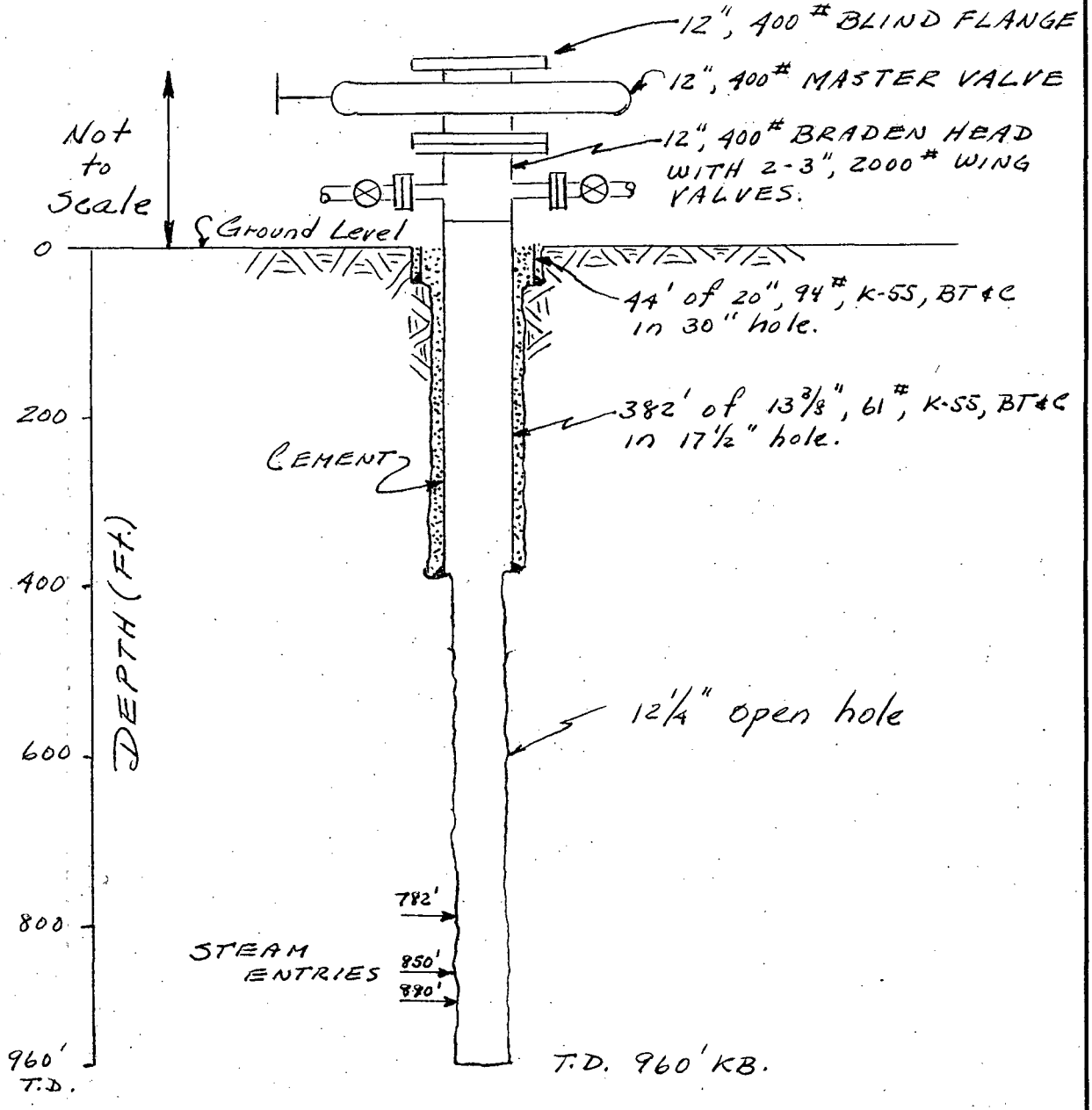
III. WELL DRILLING AND CONSTRUCTION HISTORY

In order to be able to increase deliverability of the dry steam geothermal resource discovered to date, production well P-89-1 was drilled in "full scale" configuration as follows:

On September 14, 1989, Grimshaw Drilling Company Rig #2 was moved on site and rigged up. By 2000 hours on September 15, a 30" hole had been drilled to 53'KB and 44 feet of 20" ERW line pipe conductor casing was landed and cemented with Redi-Mix. On September 18 at 1400 hours, a 17.5" hole reached a depth of 382'KB and 13.375", 61#/ft., K-55, BT&C casing was set on bottom. The casing was cemented, with full returns to the surface, using a standard geothermal mix, by 0830 hours on September 19.

Following installation of the wellhead, master valve, BOPE, and flow and blooie lines, the 13.375" stack was pressure tested to standards approved by J. Solum, the Utah State Engineer. After successfully retrieving a fish, drilling of 12.25" open hole began at 1830 hours on September 21; the final well depth of 960'KB was attained by 0200 hours on September 23. Steam was first encountered at 782'KB, with additional major entries via fractures transected at 850 and 880'KB. Note that KB=Ground Level + 10 feet.

A drilling history, describing daily events between September 14 and September 23, 1989, drilling activity sheets, and a pipe tally accompany this document as Appendix A. Figure 2 is a profile of the well as completed; Figure 3 is a drilling curve showing the rate of drilling progress, and Figure 4 shows the Blowout Preventer stack used on the 13.375" casing. Appendix B, attached, is MEI's basic drilling procedure developed for production wells. Appendix D comprises the geolograph charts that depict the drilling rate from 54'KB to 960'KB.



NOTE: KB = GL + 10'; ALL DEPTHS ARE K.B.

REVISIONS		
No.	Date	By
1		
2		
3		
4		
5		

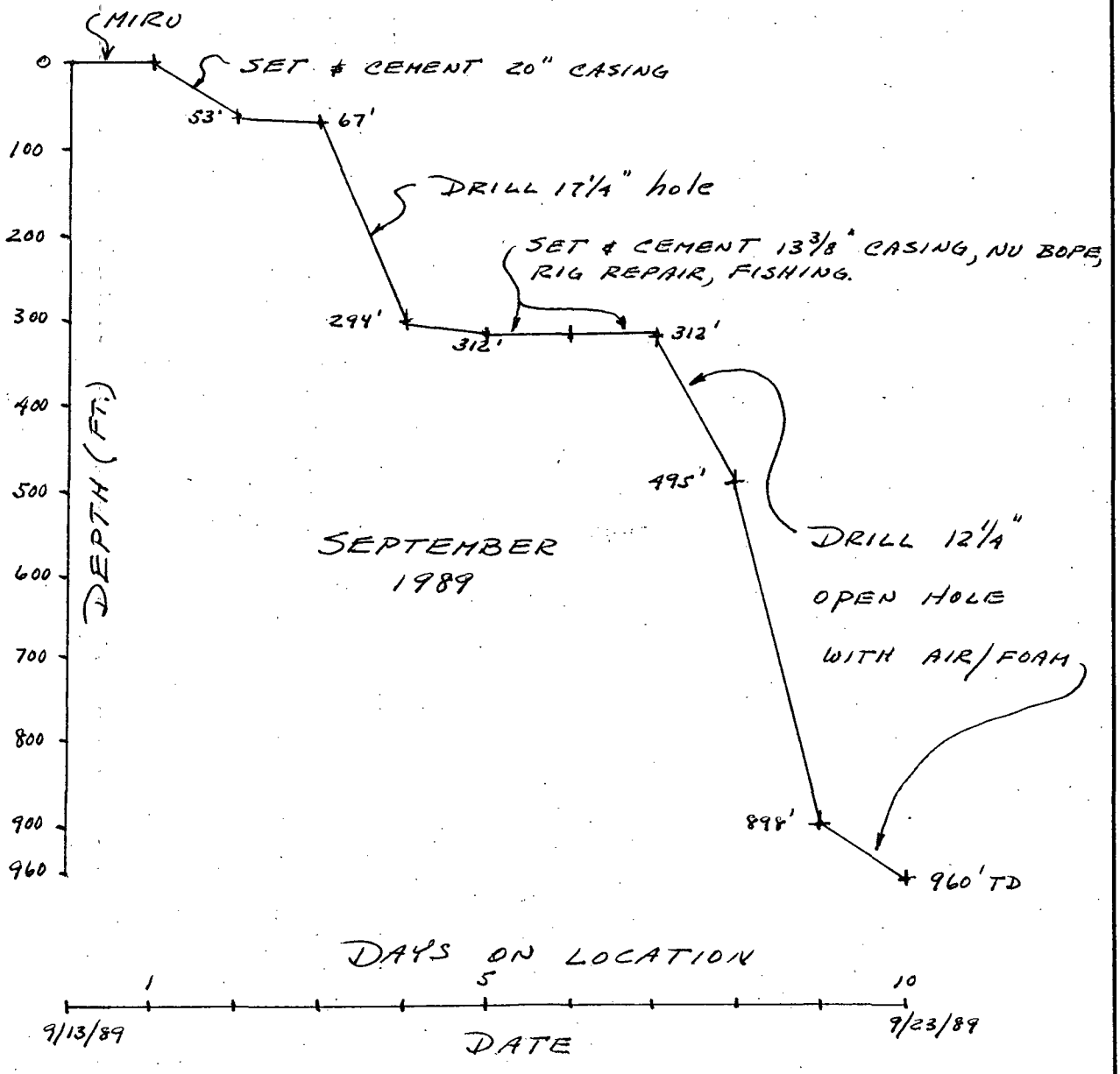
GEOTHERMAL MANAGEMENT Co.
P.O. Box 2980 Evergreen, CO. 80439-2980 (303) 670-3454

WELL PROFILE P-89-1

SULPHURDALE, UTAH

By: GWH | Ckd: GWH
Date: 11-30-89
Scale: 1" = 200' Vert.
Dwng. No: MEIP891-2

Figure 2



REVISIONS		
No.	Date	By
1		
2		
3		
4		
5		

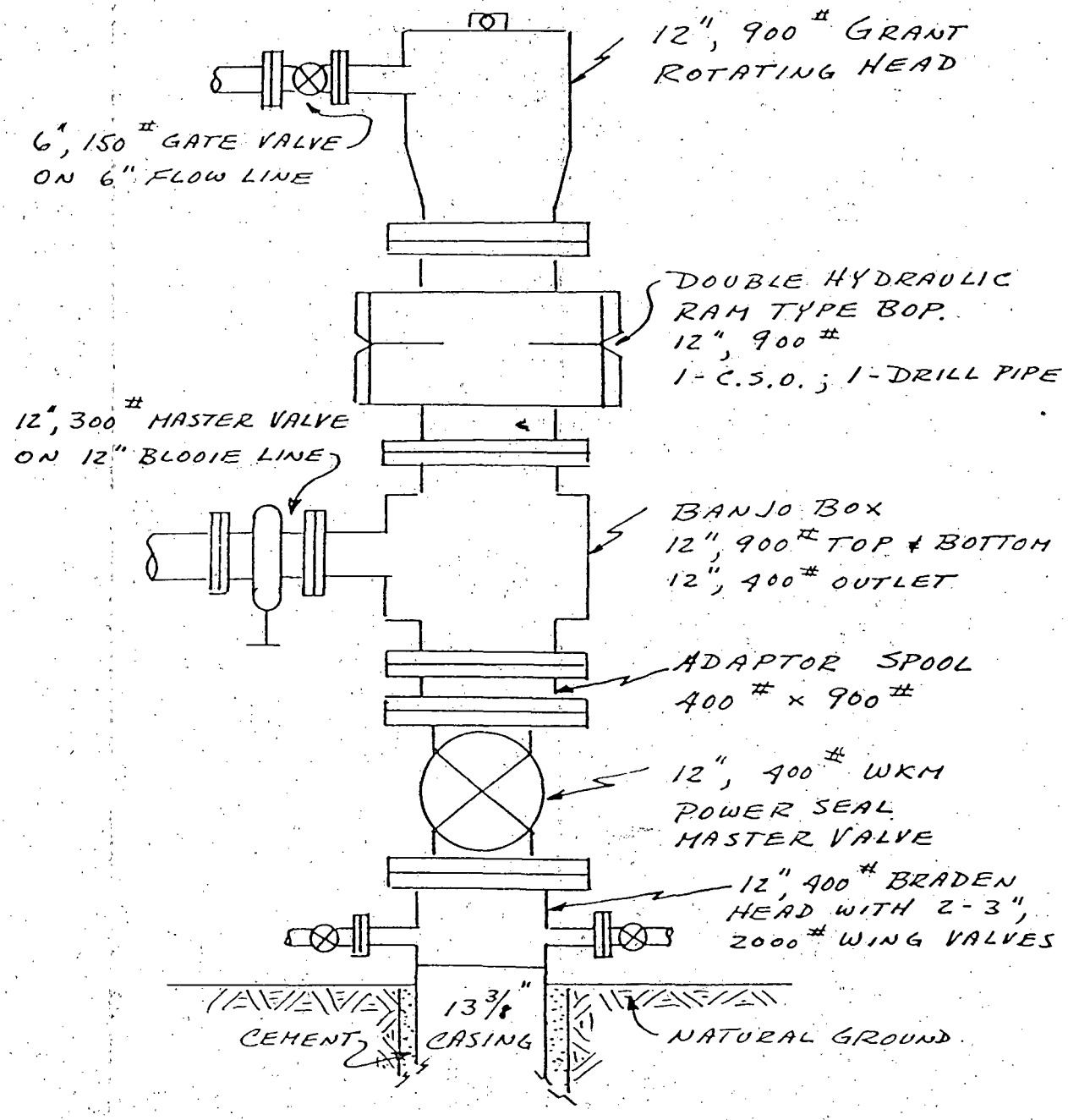
GEOTHERMAL MANAGEMENT Co.
P.O. Box 2980 Evergreen, CO. 80439-2980 (303) 670-3454

DRILLING CURVE P-89-1

SULPHURDALE, UTAH

By: GWH | Ckd: GWH
Date: 12-7-89
Scale: 1" = 200' Vert.
Dwng. No: MEI P891-3

Figure 3



REVISIONS		
No.	Date	By
1		
2		
3		
4		
5		

GEOTHERMAL MANAGEMENT Co.
P.O. Box 2980 Evergreen, CO. 80439-2980 (303) 670-3454

13 3/8" B.O.P.E. STACK P-89-1

SULPHURDALE, UTAH

By: GWH | Ckd: GWH
Date: 12-7-89
Scale: None
Dwng. No: MEIP891-4

Figure 4

IV. GEOLOGY

The Cove Fort-Sulphurdale region, in southwestern Utah, comprises folded and faulted sedimentary and metasedimentary rocks of Paleozoic to Mesozoic age that are overlain, sequentially, by Oligocene to Miocene age ash-flow tuffs and Quaternary basalts. All of the rocks except the basalts have been intruded locally by Miocene quartz monzonite and/or latite porphyry stocks, sills, and dikes.

The rocks penetrated in P-89-1 comprise alluvium, ash-flow tuffs, and meta-sandstones hydrothermally altered to varying extents. The younger volcanic rocks have been designated as the Three Creeks Tuff (Tbt) Member of the Bullion Canyon Volcanics (one of the oldest of the local volcanic units). The Three Creeks Tuff has three distinct zones: an upper and a lower zone of red to grey densely welded tuff and a middle zone of poorly welded white tuff. Only the lower zone of the Three Creeks Tuff has been mapped in the Cove Fort area of interest.

This lowermost zone of the Three Creeks Tuff has been further subdivided into two cooling units. The upper unit is characterized by euhedral plates of biotite up to several millimeters wide and euhedral (beta morphology) quartz crystals while the rocks of the lower cooling unit are mineralogically the same but much finer grained. The lower unit (tentatively renamed the Wales Canyon Formation) is found in P-89-1 at a depth of about 670 feet.

P-89-1 initially penetrated approximately 160'KB of alluvium and colluvium comprising moderately to strongly altered lithic volcanic fragments plus feldspar and quartz phenocrysts weathered out of clastic Tbt. Pyrite and some marcasite are present as disseminated blebs and in 1-2 mm wide crystalline aggregates.

Below 160'KB, P-89-1 transected light to medium grey Tbt, argillicly altered and pyritized to varying degrees. The color of the Tbt becomes increasingly lighter grey as the alteration intensity increases. This is due to the hydrothermal decomposition of Tbt matrix components into light colored clays. As no evidence of faulting was seen, the Tbt is assumed to unconformably overlie it's fine grained predecessor, the Wales Canyon Tuff.

From 670'KB to 840'KB, P-89-1 penetrated Wales Canyon Tuff, variably altered to a light, medium, and greenish grey. Phenocryst density was typically lower than in the Tbt and euhedral biotite plates were few to absent.

The well entered the white to grey, vitreous Coconino meta-sandstone at 840'KB and, when sampling ceased at 870'KB, the formation had not yet been transected. Steam entries were recorded from fractures at 782'KB, 850'KB, and 880'KB. In an effort to maximize steam flow, the well was drilled to a total depth of 960'KB.

There were 30 foot discrepancies between the depths to the Qal/Tbt and the Tbt/Wales Canyon contacts as logged in S-89-1 and in P-89-1 (with P-89-1 deeper) though the Wales Canyon/Coconino contact was almost flat. Thus there is no concrete evidence that P-89-1 crossed any major faults. Most likely, there was significant erosion in the time period between the former formational depositions thus accounting for the relatively large contact elevation changes within the short (50') distance between the wells.

Attached, as Appendix C, is a binocular petrographic description of drill cuttings from P-89-1 together with some interpretive comments and a graphic lithologic log.

V. PERMITS

Because well P-89-1 was drilled on privately owned land and not on Federal property, the permitting required was minimal. Archeological clearance for the well was given as a result of studies encompassing the whole prospect area that were previously accomplished and documented. When the BOP stack on P-89-1 was pressure tested in accordance with State regulations, the test was witnessed and approved by UDWR representitive John Solum.

APPENDIX A

DRILLING HISTORY

9-14-89		
0700	- 1900	Move in and Rig Up (MIRU).
9-15-89		
0700	- 1400	MIRU, Make up (MU) 30" bit and hole opener.
1400	- 1800	Drill Ahead (DA) 0-53'KB.
1800	- 1900	Pull out of Hole (POOH), run and set 20" casing to 44'KB.
1900	- 2000	Cement with Redi-Mix.
2000	- 2200	Clean out cellar.
2200	- 2400	Wait on Cement (WOC).
9-16-89		
0000	- 0900	WOC, remove 30" conductor.
0900	- 1600	WOC, Miscellaneous rig up continues.
1600	- 1700	Run in Hole (RIH).
1700	- 2000	DA: 53' to 67'KB.
2000	- 2400	Free stuck drill string, ream up hole 5', 55' to 44'KB.
9-17-89		
0000	- 0200	Ream hole from 53' to 67'KB.
0200	- 0300	DA: 67' to 74'KB, ream hole.
0300	- 0715	DA: 74' to 169'KB with a 17.5" bit.
0715	- 0900	Service rig.
0900	- 1230	DA: 169' to 223'KB.
1230	- 1600	Fix clutch, POOH, level rig.
1600	- 1700	RIH.
1700	- 2400	DA: 223' to 294'KB.
9-18-89		
0000	- 0230	DA: 294' to 312'KB.
0230	- 0430	POOH, clean bit, RIH.
0430	- 1400	DA: 312' to 382'KB.
1400	- 1500	POOH.
1500	- 1730	Rig up to run casing.
1730	- 2000	Run 382' of 13.375", 61 #/Ft., K-55 BT&C casing.
2000	- 2400	Repair light plant.
9-19-89		
0000	- 0100	Finish running casing.
0100	- 0830	Rig up cementers and cement with geothermal mix; full returns.
0830	- 0900	WOC, center casing, fix lights.

	0900 - 2400	WOC, make up BOPE, cut off casing, rig down cementers, Nipple up (NU) BOPE and master valve.
9-20-89		
	0000 - 2000	Continue NU BOPE, blooie line; pressure test of casing and BOPE witnessed and accepted by J. Solum, Utah State Engineer.
	2000 - 2030	MU fishing magnet, RIH, fix clutch.
	2030 - 2400	Remove clutch.
9-21-89		
	0000 - 0730	Repair clutch.
	0730 - 0800	POOH, no fish.
	0800 - 0900	RIH with mill-tooth bit.
	0900 - 1000	Fishing.
	1000 - 1700	POOH with fish, miscellaneous repairs.
	1700 - 1800	RIH.
	1800 - 1830	Drill cement and shoe.
	1830 - 2130	DA: 382' to 495'KB.
	2130 - 2400	POOH five stands, remove drive line.
9-22-89		
	0000 - 1500	Wait for new drive line, receive same, install and adjust.
	1500 - 2000	DA: 495' to 776'KB.
	2000 - 2400	DA: 776' to 898'KB, first steam at 782'KB, other steam-bearing fractures at 850' and 880'KB.
9-23-89		
	0000 - 0200	DA: 898' to 960'KB, Total Depth.
	0200 - 0400	POOH, Lay down drill pipe.
	0400	Rig released, Rig down and move out (RDMO).

NEI DRILLING ACTIVITY LOG WELL #: [P89-1] DATE: [9-25-89]

TIME	DEPTH	NAME	COMMENTS
0700		Richins	Bring up & set in light plant
9:00			String elec. Lines
10:00			Plumb in Fuel Lines
12:00			Fill water tank and mud Tank
13:00			Make up Bit & BHA
14:00			Drlg 53'
1800			Trip out and Run 20" in the hole
1900			Cement
20:00			Bucket Cellar
22:00			WOC
[illegible]			

MEI DRILLING ACTIVITY LOG WELL#: [P89-1] DATE: [9-16-89]

TIME	DEPTH	NAME	COMMENTS
2400		Richins	
9:00			Remove 30" Conductor out of Cellar
10:00			Streach out Cerromo & guy Lines
11:00			work on Light cords
12:00			get Lights in Derrik & dog house working
13:00			Break of 30" Bit
14:00			

DRILLING ACTIVITY LOG WELL#: [P 89-1] DATE: [9-16-89]

TIME	DEPTH	NAME	Clyde COMMENTS
0900			Cut off 20" csg. weld Flowline
1200	1		26" Bit Rig up Mud Line P/u BHA M/u 17½ Bit
1600			T.I.H
1700			Orlg F 53' - 67'
2000			work pipe free Rotate only
2400			Ream up Hole 5' F/ 55' to 47'

MEI DRILLING ACTIVITY LOG WELL#: [P89-1] DATE: [9-17-89]

TIME	DEPTH	NAME	COMMENTS
2400		Kluber	Ream Hole F/ 53' To 67'
0200			Drlg F/ 67' To 74', Ream Hole
0300			Conn @ 74'
0330			Drlg F/ 74' To 106 17½" Hole
0430			Conn @ 106
0500			Drlg To 137'
0615			Conn @ 137'
0715			Drlg To 169'
0830			Rig service
0900			Drlg
1030			Conn @ 169
1100			Drlg To 199'
1200			Conn @ 199'
			fuel 14"

11:34 P.05

MEI DRILLING ACTIVITY LOG WELL*: [P891] DATE: [9-17 89]

TIME	DEPTH	NAME	COMMENTS
1200	0	Clyde	Conn @ 199'
1230			DRLg to 223
1330			Work on master clutch
1400			Trip out of hole
1500			Level Rig
1700			T.I.H
1800			DRLg to 260'
2100			conn @ 260
2130			DRLg To 290'
2300			Conn @ 290'
2400			DRLg to 294

MEI DRILLING ACTIVITY LOG WELL #: [P89-1] DATE: [9-18-89]

TIME	DEPTH	NAME	COMMENTS
		Richard	
2400			Drlg F 294 To 312'
0230			Trip out Bit balled up, clean some
			Trip IN
0430			Drlg F/ 312' TO 320
0530			Comm @ 320
0600			Drlg F/ 320 To 324
0630			Re bolt Drive shaft (Rotary)
0700			Drlg F/ 324 To 351
1030			Comm @ 350
1100	1200		Drlg F/ 350 To 355

MEI DRILLING ACTIVITY LOG WELL #: [P89-1] DATE: [9-18]

TIME	DEPTH	NAME	COMMENTS
		Clyde	
1200			DRLg To 381'
1400			Trip out
1500			Rig up to Run Csg.
1730			P/u First Jt 13 3/8 csg weld Shoe
2000			Run 13 3/8 csg
2400			Repair Light plant

MEI DRILLING ACTIVITY LOG WELL #: [P81 1] DATE: [9-19-89]

TIME	DEPTH	NAME	COMMENTS
		Rig	
2400			Ran Casing 13 3/8 to 382'
0100			Rig up Cementers
0830			Cement @ surface
0900			w o cement Center Casing
			Rig up lights
1200			Make up BOP
~~2400~~			Cut off 13 3/8 csg Rig down cementers

DRILLING ACTIVITY LOG WELL*: [P89-1] DATE: [9-19-89]

TIME	DEPTH	NAME	COMMENTS
		DClyde	
1200			Cut off 13 3/8 csg & Rig down cement head
1300			Cut off 20" csg Rig Down csg crew
1400			Make Final cut weld well head
2030			Rig up lights Build P/u Line
2400			Nipple up B.O.P.S set Master valve
			Double std.

MEI DRILLING ACTIVITY LOG WELL #: [IP89-1] DATE: [9-20-89]

TIME	DEPTH	NAME	COMMENTS
		Richins	
2400			Ripple up BOP's, set, master valve
			Dbbl stud, Banjo Howtee, Dbble Gate and
			Rotate head
0700			Tighten Bolt's
0900			Pull up Koomey Nipple up Same
1100			Round up Blowie Line & Valve
1200			Haul Hyd Fluid to Koomey
			fuel Site plant
			18" fuel

MEI DRILLING ACTIVITY LOG WELL #: [P89-1] DATE: [9-20-89]

TIME	DEPTH	NAME	COMMENTS
		D. Clyde	
1200			Nipple up Blowie line & Value
1700			Pressure Test B.O.Ps no test
1730			Tighten Rows on B.O.Ps
			Service Rig Weld 3" hard Line
2000			Pressure test Baps 15 min starting psi 670
			ENding pressure 640 psi witnessed BOP test 9/20/89 Joshua Sothen State Engineer
2030			P/u magnet T.I.H. work on master Clutch
2400			Pull master clutch

Jan 06 89 11:34 P.05

MEI DRILLING ACTIVITY LOG WELL #: [ ] DATE: [9-21-87]

TIME	DEPTH	NAME	COMMENTS
2400		G. Peterson	Pull master clutch
0400			Take master clutch apart
0200			make new parts for master clutch
0530			Put master clutch back on
0730	to 0800		~~Trip tests~~ trip out of hole
~~0800~~			

DRILLING ACTIVITY LOG WELL*: [P89-1] DATE: [9-21-89]

TIME	DEPTH	NAME	COMMENTS
0500		Doyle	Trip out (no fish)
0900			P/u mill Trip in hole P/u Rotating Rubber & Strip on
1000			Fishing
1030			Trip out of hole with fish ☺
			L/o Magnet XO P/u 12 1/4 Bit Fix Leaks on Sberg line Make Sample catcher on Sberg line
1700			T.I.H.
1800			DRLg cmnt & shoe
1830			Conn @ 382
1900			DRLg From 382
1915			Conn @ 413
1930			DRLg From 413
2000			Conn @ 443

Depth on 443 Depth off 495 9/21-22

DRILLING ACTIVITY LOG WELL #: [ ] DATE: [9-22] 8-7

TIME	DEPTH	NAME	COMMENTS
2000		G Peterson	Drill from 443 to 473
8:30			CON @ 473
8:45			Drill to 495
2130 930			Trip out 5 Stands work on Drive line
07:45			Take out Driveline
08:00			Wait on Drive line

MEI DRILLING ACTIVITY LOG WELL#: [P89-1] DATE: [9-22-89]

TIME	DEPTH	NAME	COMMENTS
		Clyde	
0900			w/o Drive Line, Service Rig &
			crown Blocks, drive lines, Put Drill pipe
			on pipe Racks
1300			Put new drive line to Rotary table w
1500			DRLg From 495' To 569'
1630			work on injector pump
1700			DRLg From 569' - 771
2000			Conn @ 776

Company [redacted] D[redacted] Contr[redacted]

Lease and Well No. P.97-1

PIPE TALLY

No. Joints	Length of Joint Feet	Length of Joint Inches	TOTAL Feet	TOTAL Inches	No. of Stands	No.						No.						No.					
Kelly			36	60		28	29	88	714	76		60						92					
Float	K Sub		1	58		29	30	86	745	42		61						93					
Drill Collar						30	31	20	776	62		62						94					
Reamer						31	29	95	806	57		63						95					
	Bit		1	50		32	31	60	837	57		64						96					
1	Bitsub		2	00		33	310	60	868	17		65						97					
2	XO		2	65		34	30	45	898	57		66						98					
3	6 3/4 DC		31	06		35	30	39	928	96		67						99					
4	6 3/4 DC		31	70		36	30	22	959	18		68						100					
5	6 3/4 DC		31	67		37						69						101					
6	6 3/4 DC		31	37		38						70						102					
7			74	79		39						71						103					
8			106	46		40						72						104					
9			137	83		41						73						105					
10			169	53		42						74						106					
11	30	20	199	73	1	43						75						107					
12	30	28	230	01	2	44						76						108					
13	30	56	260	57	3	45						77						109					
14	30	53	290	10	4	46						78						110					
15	30	40	320	50	5	47						79						111					
16	30	72	351	22	6	48						80						112					
Shoe 17	30	74	381	96	7	49						81						113					
18	31	21	413	17	8	50						82						114					
19	30	18	443	35		51						83						115					
20	30	[illegible]	473	42		52						84						116					
21	30	10	503	52		53						85						117					
22	30	40	533	92		54						86						118					
23	30	12	564	04		55						87						119					
24	29	92	593	96		56						88						120					
25	29	31	623	27		57						89						121					
26	31		[illegible]	[illegible]		58																	

Appendix B

Production Well Drilling Program
Cove Fort - Sulphurdale KGRA

Objective: Drill/Complete steam production well to ±2000' TD . Conductor casing 20" set at ±60-120', 13 3/8" production casing set at ±400'-900', 12 1/4" open hole to 2000' or producing formation.

September, 1987
Updated October, 1988

Mother Earth Industries, Inc
Production Office
3761 South 700 East
Salt Lake City, UT 84106
801-263-8300

Abbreviated sequence of operations:

1. Prepare location and sump per attached dwgs.

2. MIRU rotary rig on conductor.

3. Drill 26" hole to 60-120' GL. Optionally, rathole digger may be utilized instead of rig.

4. Run 20" conductor pipe to TD and cement from TD to surface. WOC.

5. Install master valve and rotating head/diverter on 20" conductor, optionally as required. PU 17 1/2" drilling assembly and drill out 20" conductor using mud. Drill 17 1/2" hole to approx. 400'-900'. Take directional surveys approx. every 200 feet. Maintain straight hole as is possible, max. deviation 4 degrees at TD. Maximum allowable rate of change 1.5 degrees/100'.

6. Run and cement 13 3/8" casing. WOC 8-12 hrs, as req'd.

7. Install wellhead and 12" BOP equipment on 13 3/8" casing. Test BOP to 750 psig; witnessed by BLM and Utah Div. of Water Resources representative.

8. RU compressors; Drill 12 1/4" hole with air/foam, as appropriate, to 2000' or commercial production.

9. Perform rig test to obtain approximate flowrate, WHP, WHT. Run downhole surveys per engineer and geologist direction. Run logs as required by regulatory agencies.

10. POOH, laydown drillpipe and tools, RDMO, release rig, return rental equipment.

11. Prepare and submit completion reports to appropriate agencies.

Detailed sequence of operations:

(Note: All operations are to be in accordance with approved Plan of Operations for CFS KGRA)

1. Prepare location and sump per attached drawings. Prepare 3' deep well cellar using 8' diam culvert, with gravel in bottom and drain to sump.

2. MIRU rotary rig, drill 26" hole to approx. 60-120' GL, subject to confirmation of competent formation.

2a.(optional) Mob. rathole digger to drill 26" hole to approx 60-120' GL.

3. Set 20" casing in hole; cement from TD to surface with Redi-mix cement.

4. (MIRU rotary rig, centered on conductor.) Install extension as reqd. on 20" conductor to bring it up under the rotary table, and install return flowline to pit. Optionally, install master valve and rotating head w/diverter line and valve on the 20" conductor. Install H2S monitoring equipment per attachment. At this point, all rig personnel are required to have current H2S certification from H2S safety company man. All personnel shall be familiar with attached H2S alarm procedure.

5. Spud well with 17 1/2" drilling assembly and drill w/ mud to approx. 400', or casing point as determined by well supervisor and geologist. Collect, clean, and clearly label cuttings every 10', as directed by geologist.

6. At casing depth, RU and run E-logs per permit requirements. RIH and circulate following logging.

7. Run 13 3/8" casing per attached casing program with stab-in float collar located 1 jt above shoe on bottom.

8. RIH with stab-in tool, stab into float collar. Circulate hole clean, minimum 2 full circulations.

9. Cement 13 3/8" casing per attached cementing program. Preserve cement samples.

10. WOC 12 hrs or as dictated by samples.

11. Cut off 13 3/8" casing and install 13 3/8" SOW x 12"-400 casing head w/ two 3" wing outlets with 3" 2000 psi wing valves, with 3" companion flanges. All wellhead installation shall be in strict accordance with

manufacturer's written procedure. NU 12"-400 master valve and 12" BOP stack per attached drawing.

12. Notify BLM and Utah Division of Water Resources representatives; test BOP to 750 psig with BLM and Utah representatives present, or in accordance with permit requirements Test witnesses are requested to document successful test completion on tour sheets. H2S safety man to be present on location.

13. RIH with 12 1/4" bit, drill out cement, float collar, and shoe using mud. Drill additional 30' into formation, circulate/displace mud out of hole with clear water.

14. POOH, PU stabilizers, per BHA program. RU compressors, RIH blowing hole dry with air.

15. Drill 12 1/4" hole with air system to 2000' or commercial steam production. Collect cuttings if possible. If steam fracture is encountered, drill ahead while flowing per geologist and engineer direction.

16. POOH, perform rig test to determine approximate flowrate, wellhead pressure, wellhead temperature, noncondensable gas content, condensate pH, etc. Test long enough to ascertain native geothermal fluids being produced, short-term pressure stability, and adequate cleanup.

17. If production is non-commercial per engineer, drill ahead or sidetrack as req'd. Obtain authorizations from appropriate agency personnel prior to

18. On completion of drilling operations, laydown drillpipe, ND BOP, return rental equipment, RDMO rig, cleanup location.

19. Prepare and submit completion reports, as req'd. Re-contour and reclaim/revegetate location as required per approved Plan of Operations and BLM/Forest Service direction.

H2S Safety

The H2S safety company will be called out to perform certification training, install and maintain properly operating H2S monitors, and provide on-location advice and expertise regarding safety related items. The monitors will be rigged up prior to spudding the hole, and the safety man will be available on location after drilling out the production casing.

In all matters of safety, the H2S safety man has the FINAL WORD on procedures.

H2S monitors will be installed at the following locations:

1. Mud return line
2. Vicinity of floor
3. Vicinity of wellhead/BOP's
4. Additional locations per Safety Man direction, MEI/contractor recommendations.

Windsocks will be installed as to be visible from various areas of location. An H2S warning sign (with green/yellow/red warning flags) is to be installed on the access road, and the appropriate flag will be displayed, depending on current operations. Two different briefing areas will be established, to allow safe briefing in any wind condition. Emergency breathing equipment (5 min. and working-size Scott Air Packs; workline hose; high-pressure air bottles in safety trailer, etc.) will be available.

Prior to spud, all rig personnel shall successfully complete an H2S training/certification course presented by the safety man. This will include Air Pack use, operation and location of H2S monitors around the rig, location and use of briefing areas, and general information regarding safety. Throughout drilling operations, rig personnel will have procedural update briefings, safety meetings, etc., as needed.

H2S ALARM PROCEDURE
POST PROMINENTLY IN DOGHOUSE

IN CASE OF H2S ALARM:

1. MASK UP WITH ESCAPE UNIT

2. GO IMMEDIATELY TO THE UPWIND BRIEFING AREA

NO EXCEPTIONS UNLESS DIRECTED BY H2S SAFETY MAN ON LOCATION

Casing/Cementing Program

String	Hole Size	Casing size	Weight	Grade	Thread	Top	Bottom
Conductor	26"	20"	94ppf	K-55	BT&C	0'	40-80'
Production	17 1/2"	13 3/8"	61ppf	K-55	BT&C	0'	400'

All casing string settings approximate subject to confirmation that actual formation is appropriately competent.

Conductor to be cemented with locally available Redi-Mix. 13 3/8 production string to be cemented as follows:

Shoes, collars: Run stab-in float collar one joint above casing guide shoe on bottom. Tack weld bottom of collars on bottom 3 joints, including float collar. Clean and Thread-Lock all threads on float collar.

Centralizers: Run centralizer in middle of bottom 2 jts. Then one centralizer on every other collar to within 100 feet of surface. No scratchers.

Lead slurry: 1:1 ratio of Class H cement: perlite, +3% gel + 40% S-8 (silica flour) + .75% CD-31 (friction reducer)

Tail slurry: Class H cement + 40% S-8 (silica flour) + .65% CD-31 (friction reducer)

Both cement stages should be retarded to give 2-3 hours at approximately 280 Deg F.

Volumes: 60' 13 3/8" csg in 20" 94 ppf csg.(19.124" i.d.): 61.2 cu. ft.
340' 13 3/8" csg in 17 1/2" OH: 236.2 cu. ft.
Using 30%/100% excess in casing/open hole, total volume: 552 cu. ft.

Using stab-in tool on drillpipe, stab into float collar. Cement through drillpipe. Pump Lead Slurry until good returns are observed at surface. Then pump Tail Slurry. Pump enough water to clear surface equipment, then pull drillpipe out of float collar, dropping cement from drillpipe on top of float collar.

WOC 12 hrs or until samples have set. Observe cement; if falling, bring back to surface adding cement with 1" pipe.

Blowout Prevention equipment, 13 3/8" casing

All BOP equipment capable of passing 12 1/4" bit/BHA.
From casing going up:

1. 13 3/8" SOW x 12"-400 casing head w/ two 3" wing outlets with 3" 2000 psi wing valves, with 3" companion flanges.

2. 12" 400 RTJ WKM Power Seal through-conduit gate valve, with geothermal trim for steam service with 300 Deg F steam containing approx. 7% carbon dioxide and approx. 0.1% H2S

3. (Crossover/DSA as req'd: 12"-400 x 12"-900) 12" 900 series Banjo Box, with 12" blooie Line, and 10" or 12" blooie line valve, reducers as req'd on blooie line.

4. 12" 900 series double gate ram preventer, 1 ram CSO, 1 ram drillpipe

5. 12" 900 series rotating head, with high temperature/H2S rubbers.

Appendix C

LITHOLOGIC LOG OF MEI WELL P-89-1

Prepared for
Mother Earth Industries, Inc.
7350 E. Evans Road, Suite B
Scottsdale, Arizona 85260

By
Joseph N. Moore
Salt Lake City, Utah

December, 1989

MEI well P-89-1 was sampled to a depth of 870 feet. This report, which is based on a binocular logging of the chips, describes the rock types and alteration encountered in the well. The results of this work are summarized in the accompanying lithologic log.

Lithologic Relationships

The distribution of rock types encountered in P-89-1 is similar to that found in S-89-1. From the surface down, P-89-1 penetrated alluvium, the Three Creeks Tuff Member of the Bullion Canyon Formation, the Wales Canyon Tuff, and the Coconino Sandstone. Alluvial deposits are found to a depth of 160 feet. These deposits contain variably rounded fragments of volcanic lithologies and crystals of quartz and feldspar that are similar in size and habit to the phenocrysts in the Three Creeks Tuff. Many of the volcanic fragments are red-brown in color due to the presence of fine-grained iron oxides.

The cuttings between 60 and 70 feet consist almost entirely of altered Three Creeks Tuff that is similar in appearance to the rocks underlying the alluvium. The absence of volcanic fragments in this interval suggests that the cuttings were derived from a large, coherent block of ash-flow tuff that was incorporated into the alluvium.

Between 160 and 670 feet, the cuttings consist of the Three Creeks Tuff. This ash-flow tuff is distinguished from others in the area by the high percentage of phenocrysts which make up nearly half of the rock. The phenocrysts are set in a densely welded matrix of ash and shards that varies from light to medium gray in color. In general, the color of the matrix reflects the degree of hydrothermal alteration. The more intensely altered samples are lighter in color and contain a higher percentage of clay minerals.

The Three Creeks Tuff is widely distributed throughout the Cove Fort-Sulphurdale area. Regional geologic mapping by Steven and his colleagues at the U.S.G.S. have shown that the Three Creeks

Tuff erupted from a large cauldron located several miles east of Cove Fort in the southern Pavant Range (Steven and others, 1979). Near its source area, the Three Creeks Tuff consists of three compositionally similar units. The lower and upper units are densely welded and dark red in color. The lower unit is the most voluminous. The middle unit is white, poorly welded, and lithic rich. On the basis of their lithologies and distributions, it is most likely that the rocks in the Sulphurdale area are correlative with the lower unit of the Three Creeks Tuff (Caskey and Shuey, 1975). Fission track data indicate that the Three Creeks Tuff is 27 my old.

The Three Creeks Tuff is characterized by coarse phenocrysts of plagioclase, sanidine, hornblende, quartz, and biotite. Both the dipyramidal habit of the quartz phenocrysts and the presence of biotite books up to several millimeters across are diagnositic of this unit. In addition, minor amounts of sphene, magnetite, apatite, zircon, and pyroxene can be found in thin section. In general, lithic fragments make up a relatively small percentage of the rock.

Several observations indicate that the Three Creeks Tuff was deposited on an irregular erosional surface developed on the underlying ash-flows. These observations include: a) its sharp contact with the underlying rocks, b) the absence of brecciation or increased alteration at the contact which would be indicative of faulting, c) the absence of poorly welded zones at the top of the underlying ash-flow tuffs, and d) differences in the elevations of the contact in closely spaced wells (i.e. S-89-1 and P-89-1, see below).

The ash-flow tuffs underlying the Three Creeks Tuff are similar in their general appearance and mineralogy to the overlying rocks. We have assigned this older ash-flow to the Wales Canyon Tuff in other wells drilled by MEI. It is distinguished from the Three Creeks Tuff by its slightly finer grain size, lower phenocryst content (approximately 40%), and the common occurrence

of lithic fragments. The Wales Canyon Tuff was encountered between 670 and 840 feet in P-89-1.

The Wales Canyon Tuff is light gray in color and displays strong argillic alteration. Under the binocular microscope, numerous rectangular phenocrysts of plagioclase that have been altered to clay are apparent. Thin sections of cuttings from other wells indicate that biotite and minor amounts of quartz, are also present.

The Wales Canyon Tuff unconformably overlies the Coconino Sandstone. This sandstone is white to light gray in color, vitreous, and fine-grained. Thin sections of samples from other wells have shown that the Coconino Sandstone is a clean quartzite cemented by quartz overgrowths and minor sericite.

Hydrothermal Alteration

The rocks of well P-89-1 display moderate to intense argillic alteration. Within the alluvium, the volcanic clasts have been variably altered to clays, pyrite, and iron oxides. The clay minerals (probably smecite and green chlorite-smectite) are present in the matrix of the volcanic clasts and as a replacement of the feldspar and ferromagnesium phenocrysts they contain. In contrast to the intense alteration in some of the clasts (particularly the matrix of the Three Creeks Tuff), alteration of the loose feldspar crystals is generally weak to moderate and concentrated along cleavage planes. The pyrite occurs in trace amounts as disseminated crystals in the clasts and as fine-grained aggregates.

Alteration of the underlying ash-flow tuffs is reflected in the nearly complete replacement of the feldspar phenocrysts by clay minerals and calcite, and by the discoloration of the matrix of the rocks. In addition to calcite and pyrite, which are present in nearly every sample examined, thin sections of these rocks in adjacent wells show that quartz, clays (fine-grained weakly birefringent minerals; probably smectite), sericite (mixed-layer clays and illite) and, iron oxides (magnetite and hematite) are

present. These minerals have been found as alteration products of both the matrix of the ash-flow tuffs and of the phenocrysts.

Fine-grained pyrite is widespread throughout the well, occurring in at least trace amounts in nearly every sample of the ash-flow tuffs and underlying sandstone. In these rocks, pyrite occurs as disseminated crystals, aggregates, and in veins where it is commonly associated with calcite or quartz.

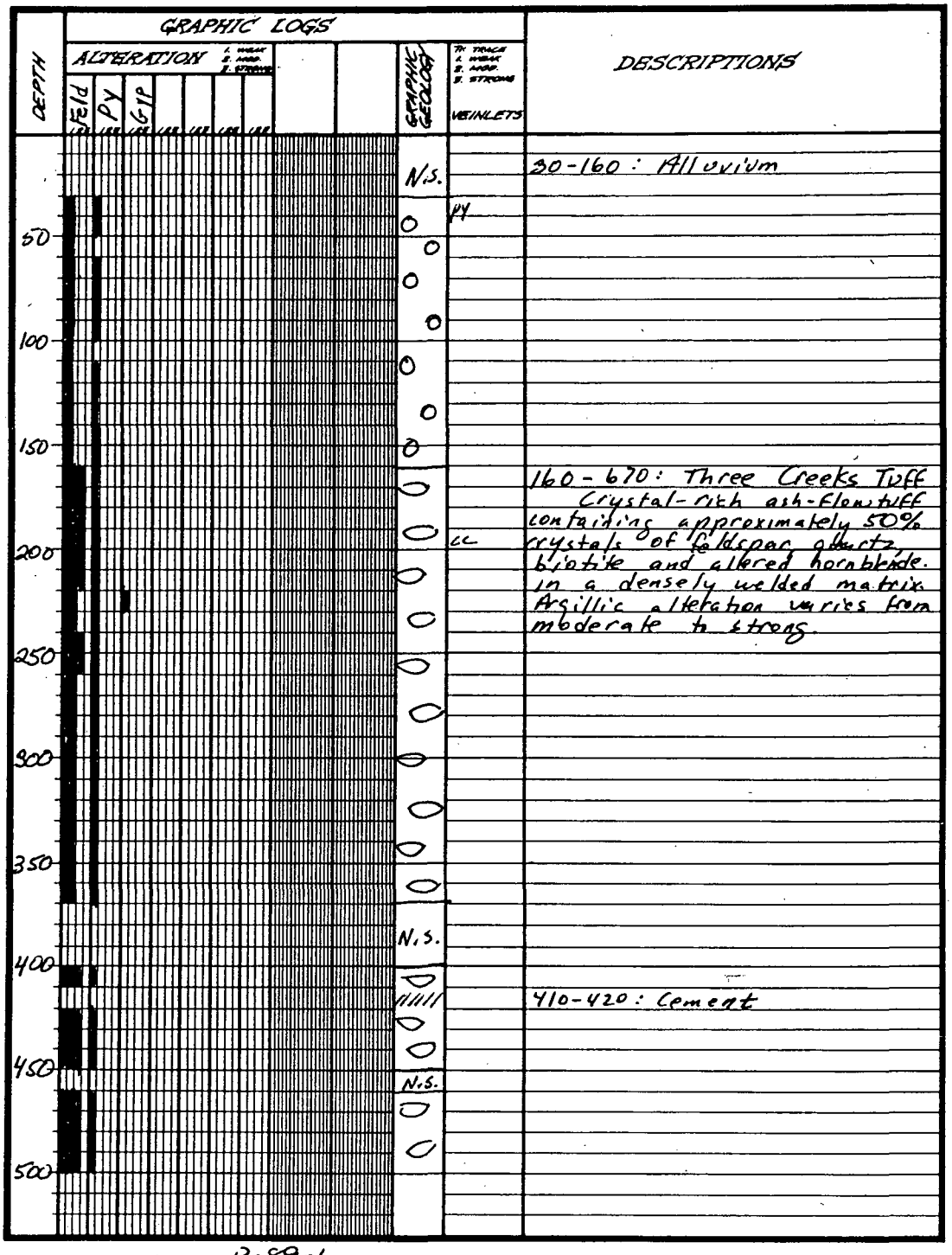
Structural Relationships

The distribution of rock types in P-89-1 is similar to that of S-89-1 with a few minor differences. These differences are in the depth to the contacts between the alluvium and Three Creeks Tuff and between the Three Creeks and Wales Canyon Tuffs. In both cases, the contacts are about 30 feet deeper in P-89-1 than in S-89-1. However, the Coconino Sandstone is at nearly the same depth in both wells. Although veining is common, no obvious evidence of faulting within the volcanic section, such as gouge and brecciated zones, was observed during logging of P-89-1. Thus, P-89-1 does not appear to have crossed any major faults.

References

Caskey, C.F., and Shuey, R.T., 1975, Mid-Tertiary volcanic stratigraphy, Sevier-Cove Fort area, Central Utah: Utah Geology, v. 2, p. 17-25.

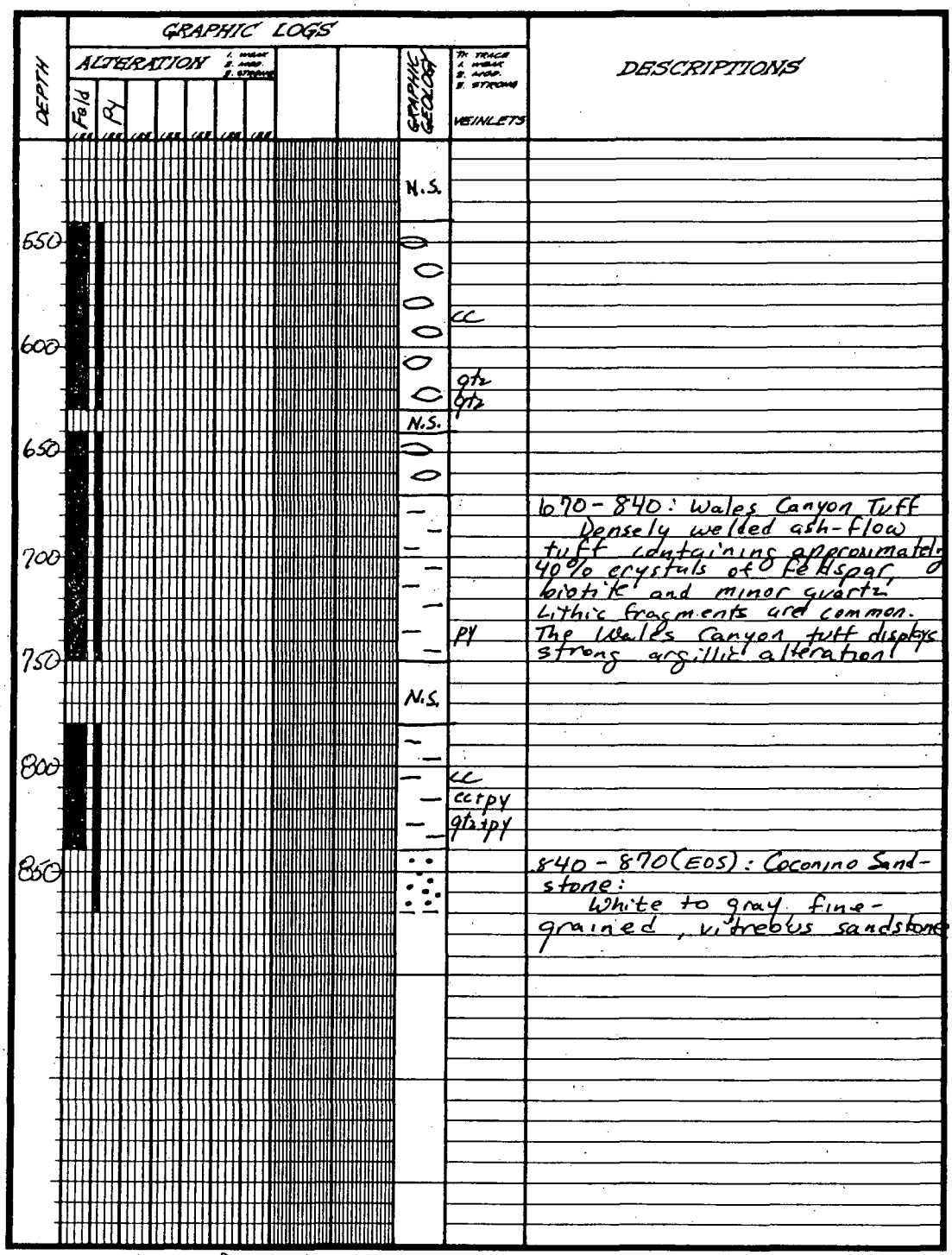
Steven, T.A., Cunningham, C.G., Naeser, C.W., and Mehnert, H.H., 1979, Revised stratigraphy and radiometric ages of volcanic rocks and mineral deposits in the Marysvale area, west-central Utah: U. S. Geological Survey Bulletin 1469.



DRILL HOLE P-89-1

LOCATION Sulphurdale

LOGGED BY _____



DRILL HOLE D-89-1

LOCATION Sulphurdale

LOGGED BY _____

Appendix D.

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY ME 1

WELL 389-1

TOTAL DEPTH ON 54

TIME ON 7 AM

DATE 9-16-89

WELL NUMBER 389-1

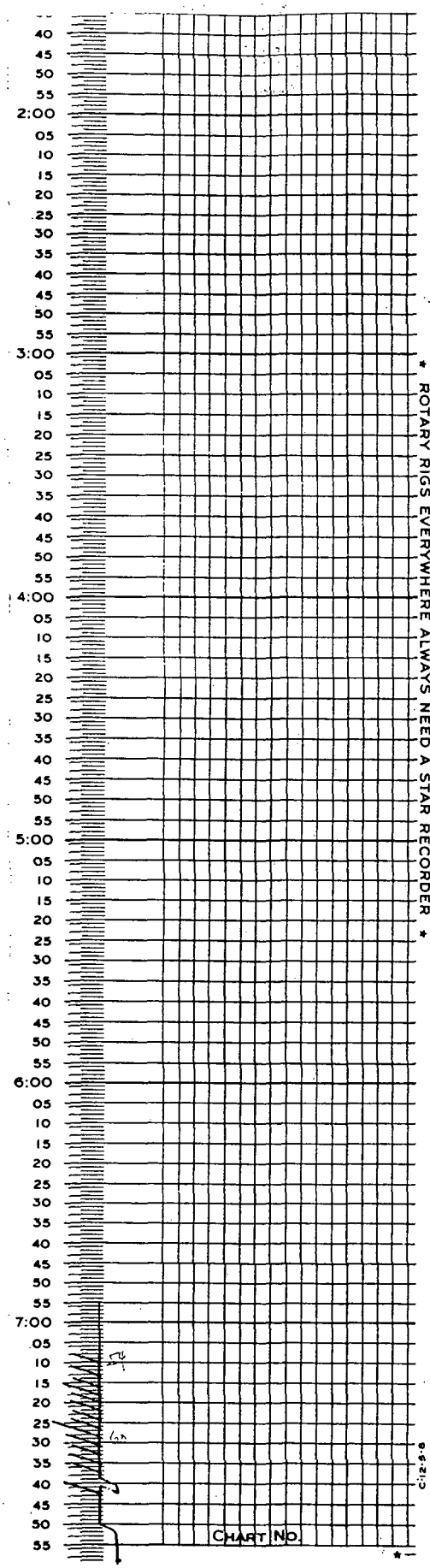
TOTAL DEPTH OFF 70

REMARKS

TIME RECORD | OPERATION RECORD

8:00 05 10 15 20 25 30 35 40 45 50 55
9:00 05 10 15 20 25 30 35 40 45 50 55
10:00 05 10 15 20 25 30 35 40 45 50 55
11:00 05 10 15 20 25 30 35 40 45 50 55
12:00 05 10 15 20 25 30 35 40 45 50 55
1:00 05 10 15 20 25 30 35 40 45 50 55
2:00 05 10

ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER


40
45
50
55
2:00
05
10
15
20
25
30
35
40
45
50
55
3:00
05
10
15
20
25
30
35
40
45
50
55
4:00
05
10
15
20
25
30
35
40
45
50
55
5:00
05
10
15
20
25
30
35
40
45
50
55
6:00
05
10
15
20
25
30
35
40
45
50
55
7:00
05
10
15
20
25
30
35
40
45
50
55
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *
CHART NO.
★1

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY MEI

WELL P89-1

TOTAL DEPTH ON 67'

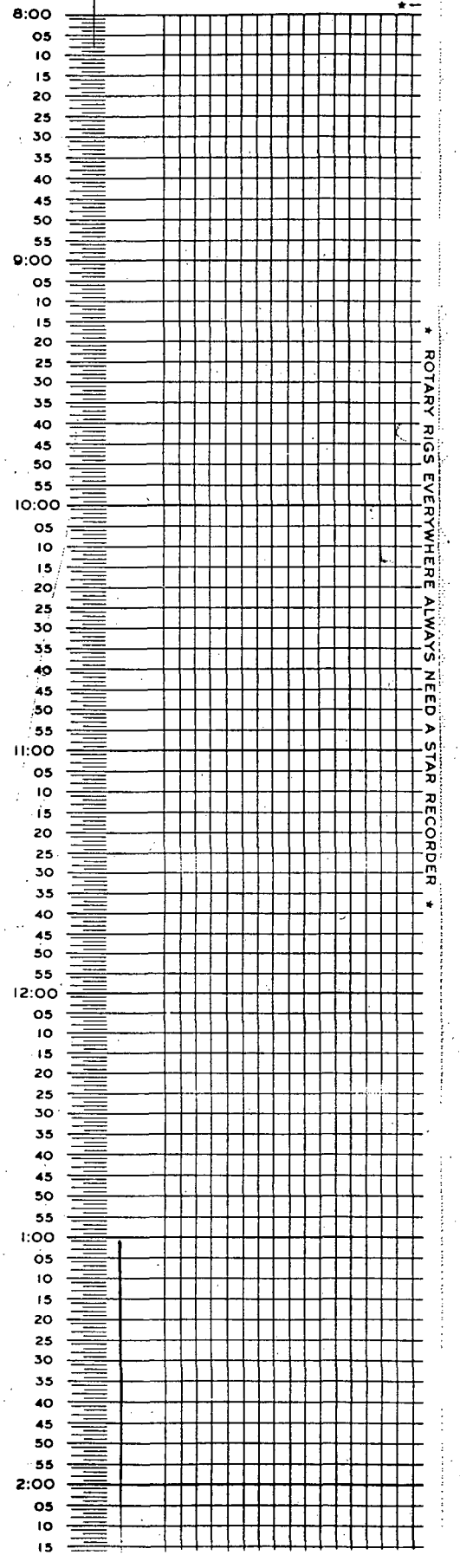
REMARKS

TIME ON 2000

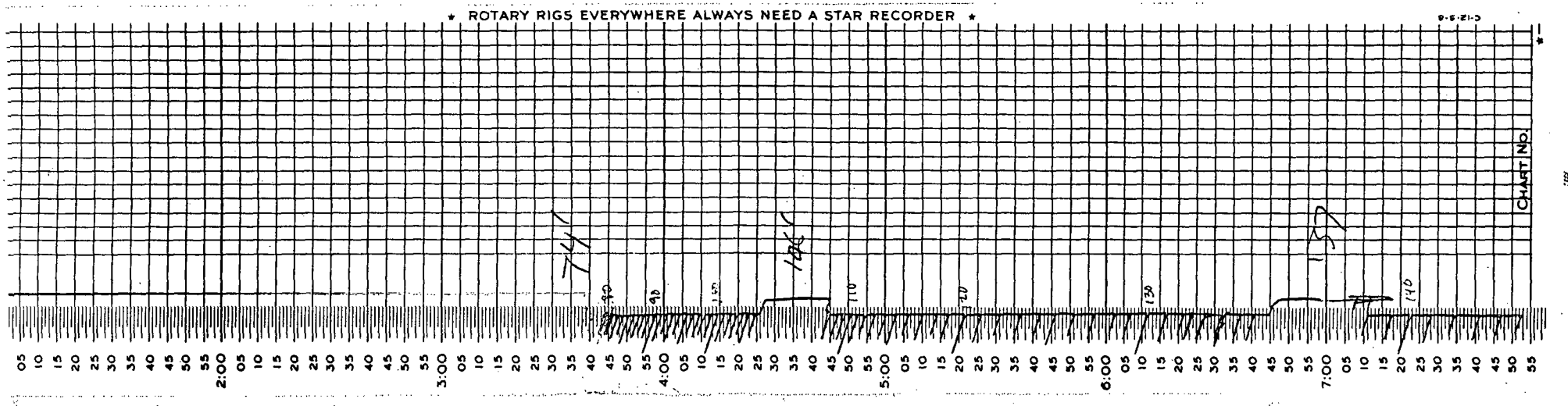
DATE 9-17-89

WELL NUMBER

TOTAL DEPTH OFF



★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★


* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *
CHART NO.
2:00
3:00
4:00
5:00
6:00
7:00

Eastman Christensen

★ A STAR RECORDING ★

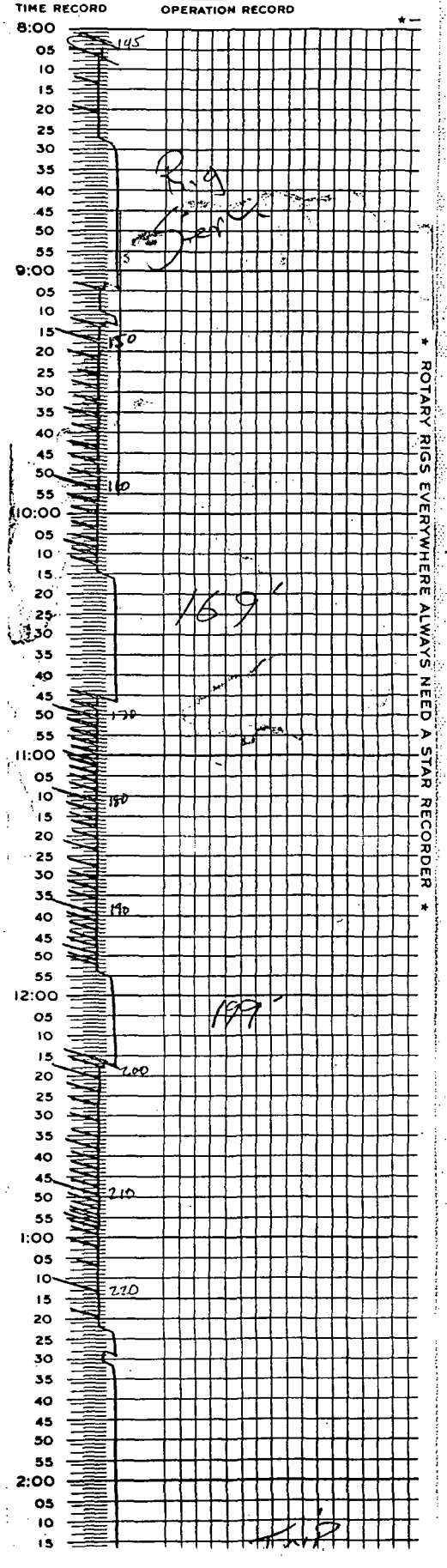
12 HOUR CHART — TIME ON 0800

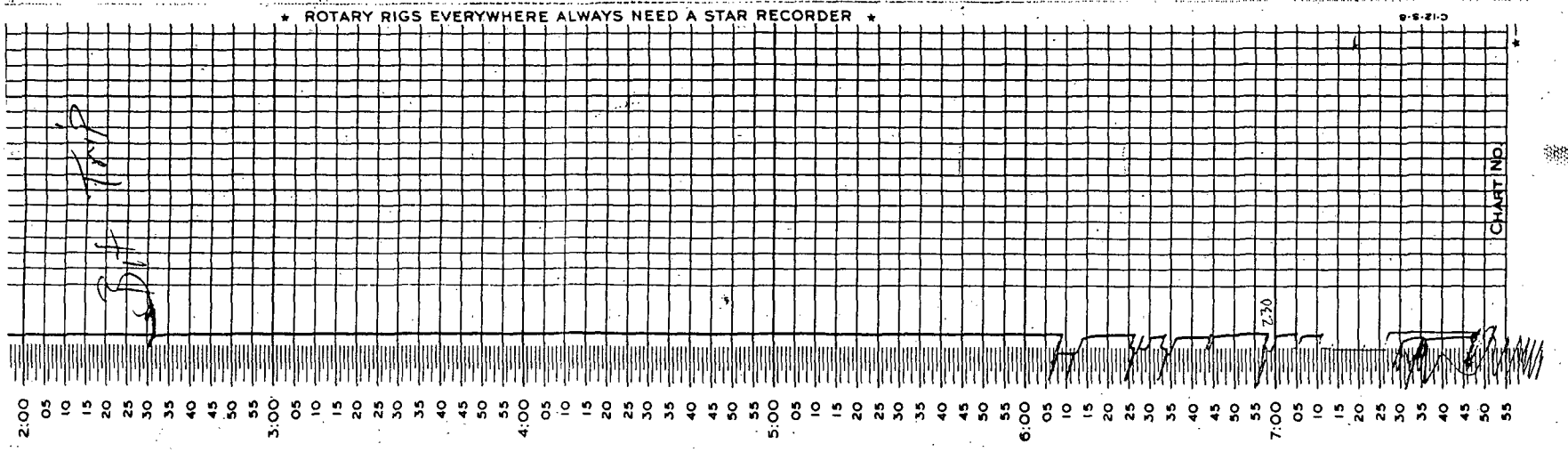
COMPANY MCI — DATE 9-17-84

WELL P84-1 — WELL NUMBER

TOTAL DEPTH ON 145 — TOTAL DEPTH OFF 834

REMARKS




★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★
CHART NO.
7:30
2:00 05 10 15 20 25 30 35 40 45 50 55
3:00 05 10 15 20 25 30 35 40 45 50 55
4:00 05 10 15 20 25 30 35 40 45 50 55
5:00 05 10 15 20 25 30 35 40 45 50 55
6:00 05 10 15 20 25 30 35 40 45 50 55
7:00 05 10 15 20 25 30 35 40 45 50 55

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY MCE

WELL P87-1

TOTAL DEPTH ON 234'

TIME ON 0800

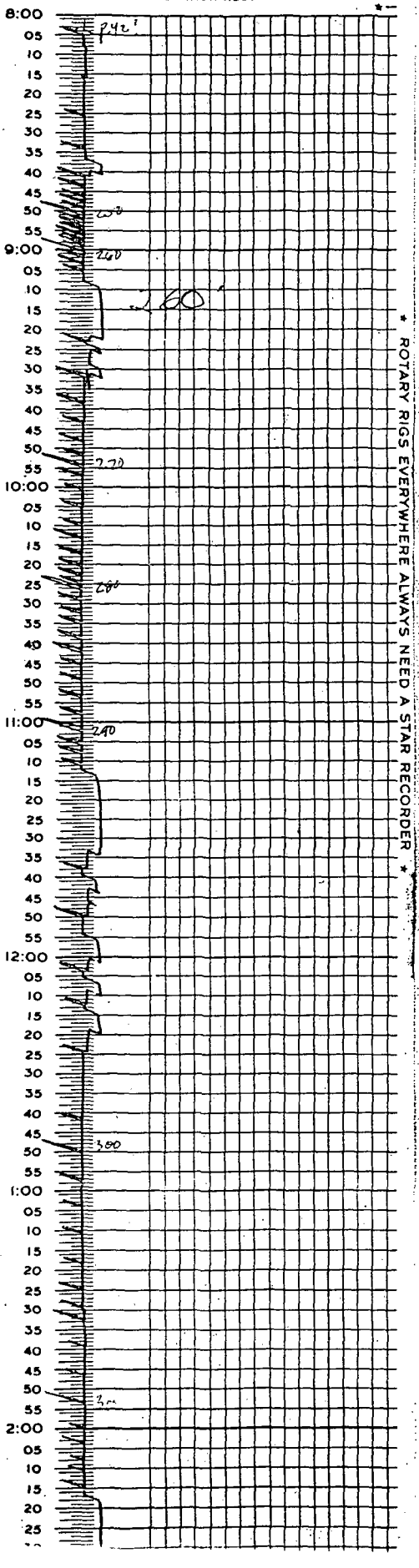
DATE 7-17-89

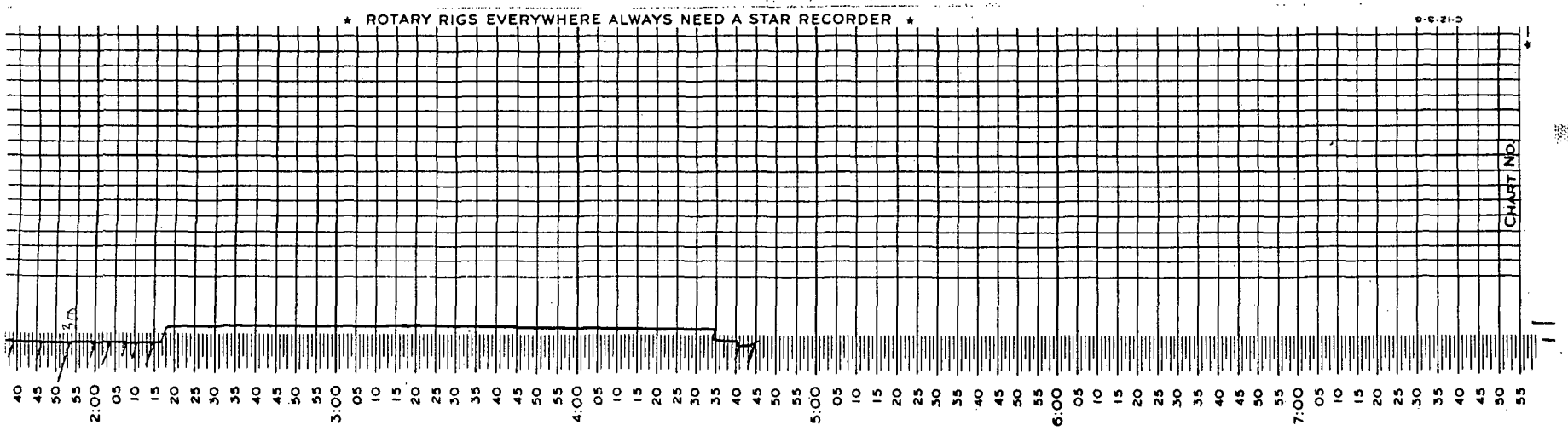
WELL NUMBER

TOTAL DEPTH OFF

REMARKS

TIME RECORD | OPERATION RECORD




★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★
C-12-S-6
CHART NO.
40 45 50 55 2:00 05 10 15 20 25 30 35 40 45 50 55 3:00 05 10 15 20 25 30 35 40 45 50 55 4:00 05 10 15 20 25 30 35 40 45 50 55 5:00 05 10 15 20 25 30 35 40 45 50 55 6:00 05 10 15 20 25 30 35 40 45 50 55 7:00 05 10 15 20 25 30 35 40 45 50 55

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY MEI

WELL P-89-1

TOTAL DEPTH ON 320

TIME ON 0500

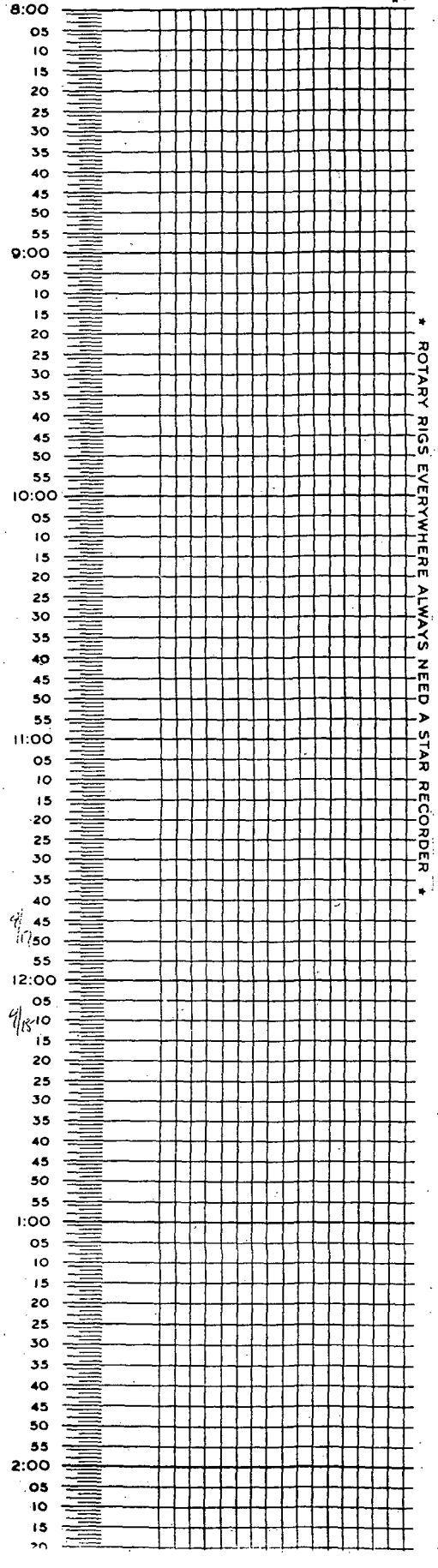
DATE 9/19/89

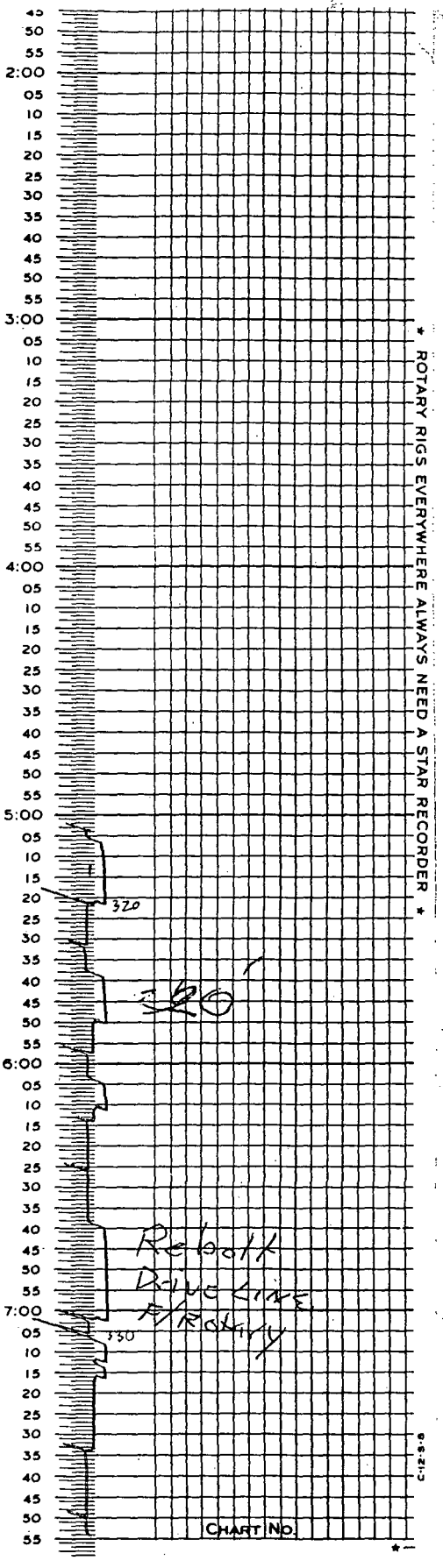
WELL NUMBER

TOTAL DEPTH OFF 326

REMARKS

TIME RECORD | OPERATION RECORD




2:00
3:00
4:00
5:00
6:00
7:00
320
330
Reboil
Drive Line
F/Rotary
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *
CHART NO.

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY MEI

WELL PS-7 1

TOTAL DEPTH ON 326

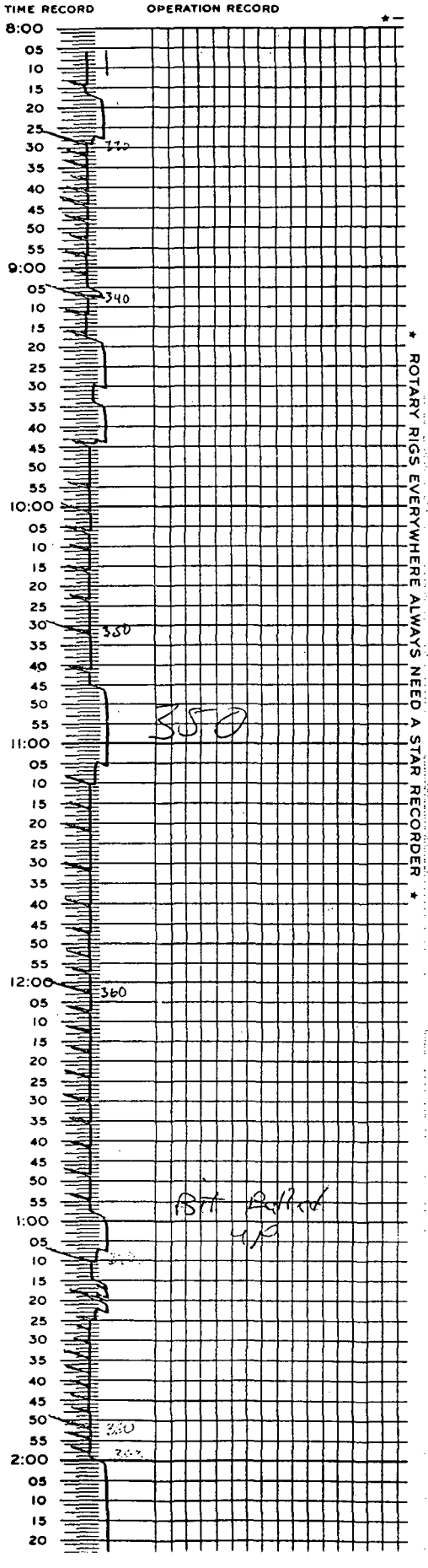
TIME ON 0800

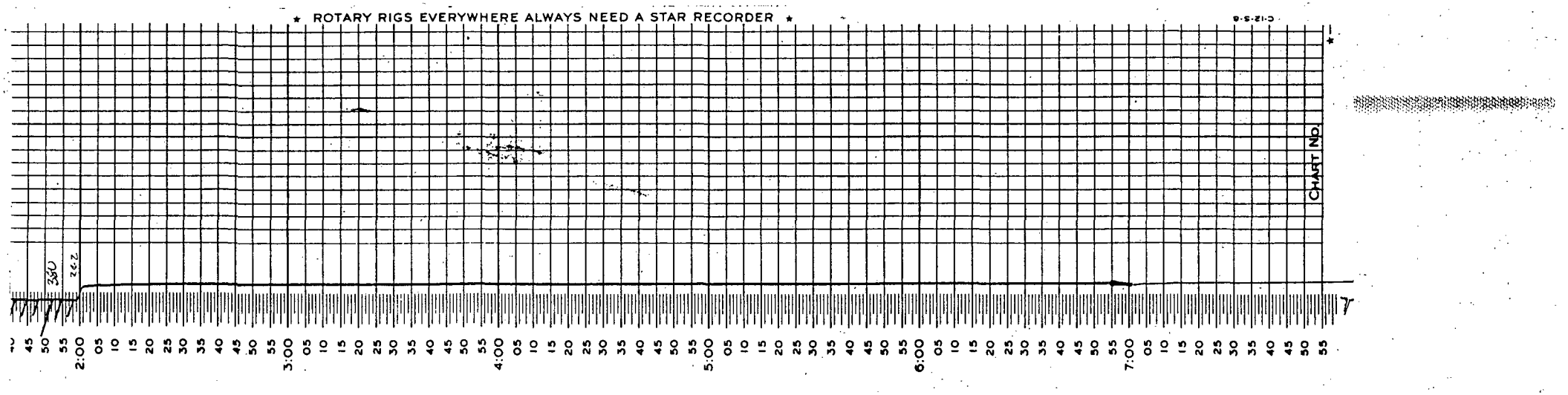
DATE 7-18-89

WELL NUMBER

TOTAL DEPTH OFF 382

REMARKS




★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★
C-12-5-6
CHART NO.
330
2:00
3:00
4:00
5:00
6:00
7:00

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY MEI

WELL

TOTAL DEPTH ON 382

TIME ON 5:00 PM

DATE 9-20-89

WELL NUMBER

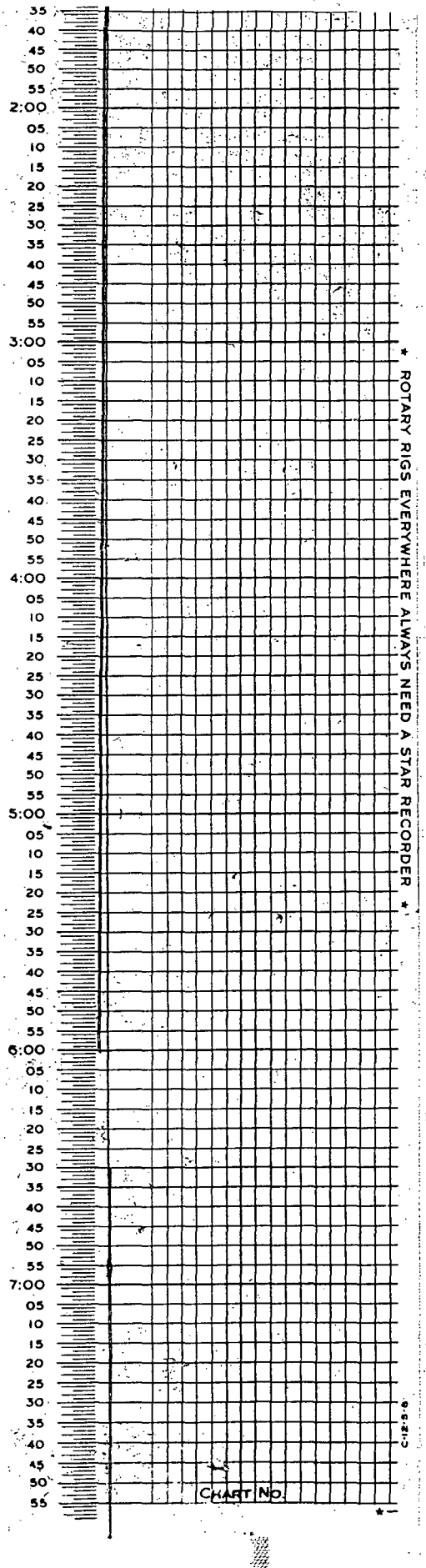
TOTAL DEPTH OFF 382

REMARKS

TIME RECORD | OPERATION RECORD

8:00
05
10
15
20
25
30
35
40
45
50
55
9:00
05
10
15
20
25
30
35
40
45
50
55
10:00
05
10
15
20
25
30
35
40
45
50
55
11:00
05
10
15
20
25
30
35
40
45
50
55
12:00
05
10
15
20
25
30
35
40
45
50
55
1:00
05
10
15
20
25
30
35
40
45
50
55
2:00
05
10
15
20

★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★


35
40
45
50
55
2:00
05
10
15
20
25
30
35
40
45
50
55
3:00
05
10
15
20
25
30
35
40
45
50
55
4:00
05
10
15
20
25
30
35
40
45
50
55
5:00
05
10
15
20
25
30
35
40
45
50
55
6:00
05
10
15
20
25
30
35
40
45
50
55
7:00
05
10
15
20
25
30
35
40
45
50
55
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *
CHART NO.
★-1

Eastman Christensen

★ A STAR RECORDING ★

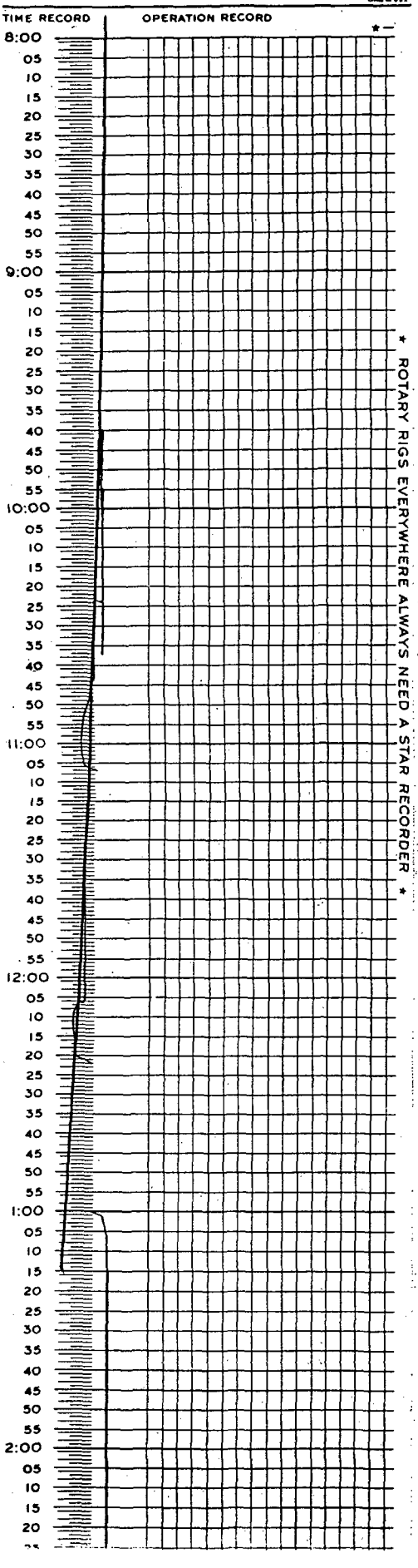
12 HOUR CHART — TIME ON 9:00 AM

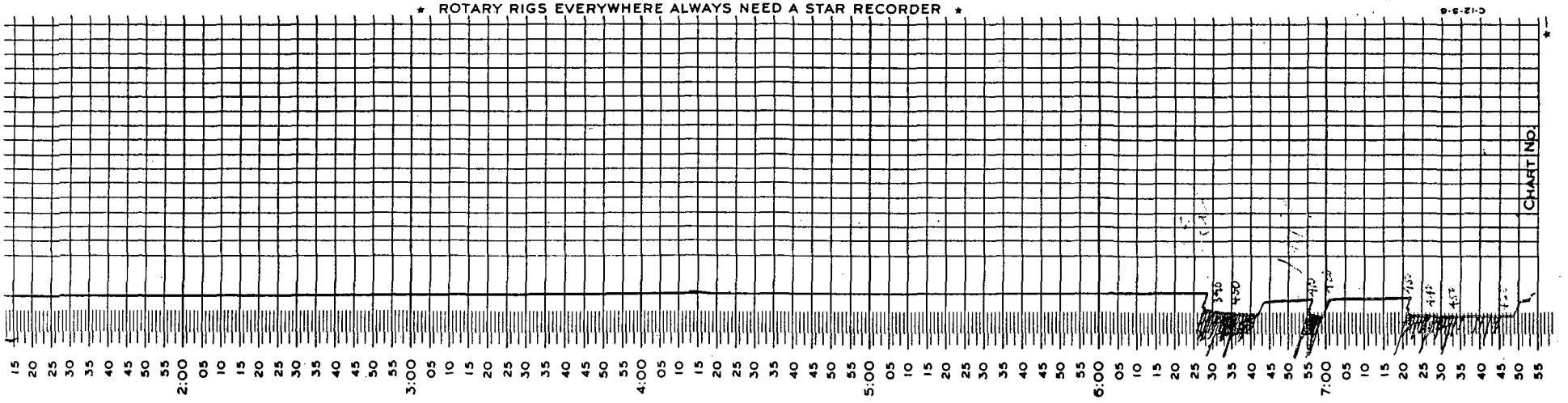
COMPANY MEI — DATE 9-21-89

WELL PS9-1 — WELL NUMBER

TOTAL DEPTH ON 382 — TOTAL DEPTH OFF

REMARKS




★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★
CHART NO.
15 20 25 30 35 40 45 50 55 2:00 05 10 15 20 25 30 35 40 45 50 55 3:00 05 10 15 20 25 30 35 40 45 50 55 4:00 05 10 15 20 25 30 35 40 45 50 55 5:00 05 10 15 20 25 30 35 40 45 50 55 6:00 05 10 15 20 25 30 35 40 45 50 55 7:00 05 10 15 20 25 30 35 40 45 50 55

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART — TIME ON 2000

COMPANY — DATE

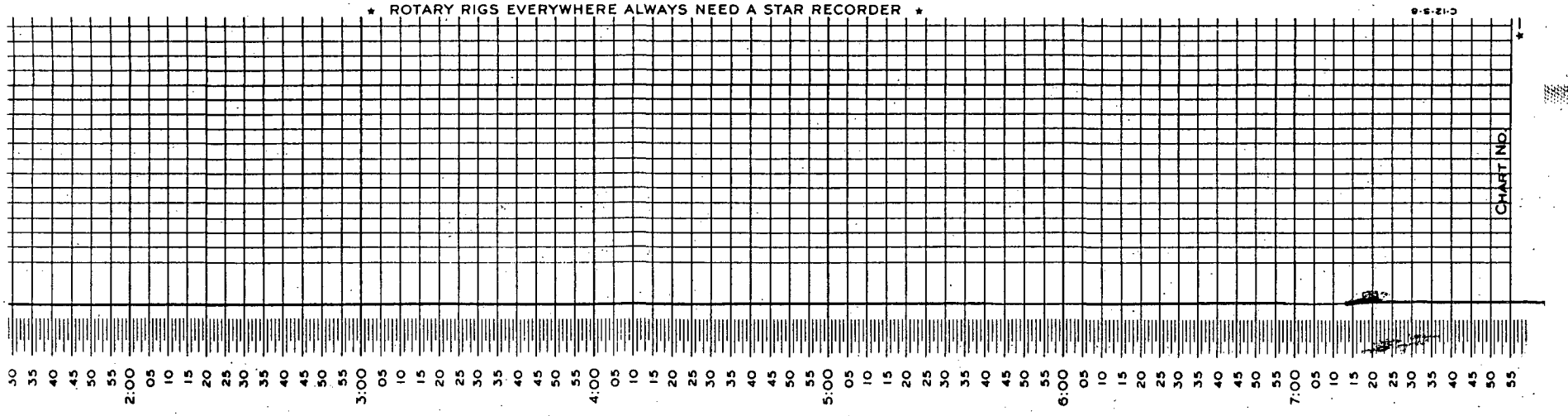
WELL P-49-1 — WELL NUMBER

TOTAL DEPTH ON 492 — TOTAL DEPTH OFF 495

REMARKS

TIME RECORD	OPERATION RECORD
8:00	COMING IN
05	
10	
15	
20	
25	
30	SET C BLOCK
35	170
40	180
45	
50	
55	
9:00	190 TRIP OUT
05	
10	
15	5 STANDS
20	
25	
30	
35	
40	
45	
50	
55	
10:00	
05	
10	
15	
20	
25	
30	
35	
40	
45	
50	
55	
11:00	
05	
10	
15	
20	
25	
30	
35	
40	
45	
50	
55	
12:00	
05	
10	
15	
20	
25	
30	
35	
40	
45	
50	
55	
1:00	
05	
10	
15	
20	
25	
30	
35	
40	
45	
50	
55	
2:00	
05	
10	
15	
20	
25	

★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★


★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★
C-12-5-6
CHART NO.
30 35 40 45 50 55 2:00 05 10 15 20 25 30 35 40 45 50 55 3:00 05 10 15 20 25 30 35 40 45 50 55 4:00 05 10 15 20 25 30 35 40 45 50 55 5:00 05 10 15 20 25 30 35 40 45 50 55 6:00 05 10 15 20 25 30 35 40 45 50 55 7:00 05 10 15 20 25 30 35 40 45 50 55

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY Mel

WELL

TOTAL DEPTH ON 488

REMARKS 495

TIME ON 800 AM

DATE 9-22-89

WELL NUMBER PS4-1

TOTAL DEPTH OFF

TIME RECORD | OPERATION RECORD

8:00 05 10 15 20 25 30 35 40 45 50 55
9:00 05 10 15 20 25 30 35 40 45 50 55
10:00 05 10 15 20 25 30 35 40 45 50 55
11:00 05 10 15 20 25 30 35 40 45 50 55
12:00 05 10 15 20 25 30 35 40 45 50 55
1:00 05 10 15 20 25 30 35 40 45 50 55
2:00 05 10 15 20 25 30

Drill Line

* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★
C-12-5-6
CHART NO.
Mud Pump
2:00
3:00
4:00
5:00
6:00
7:00

Eastman Christensen

★ A STAR [illegible]CORDING ★

12 HOUR CHART — TIME ON [illegible]

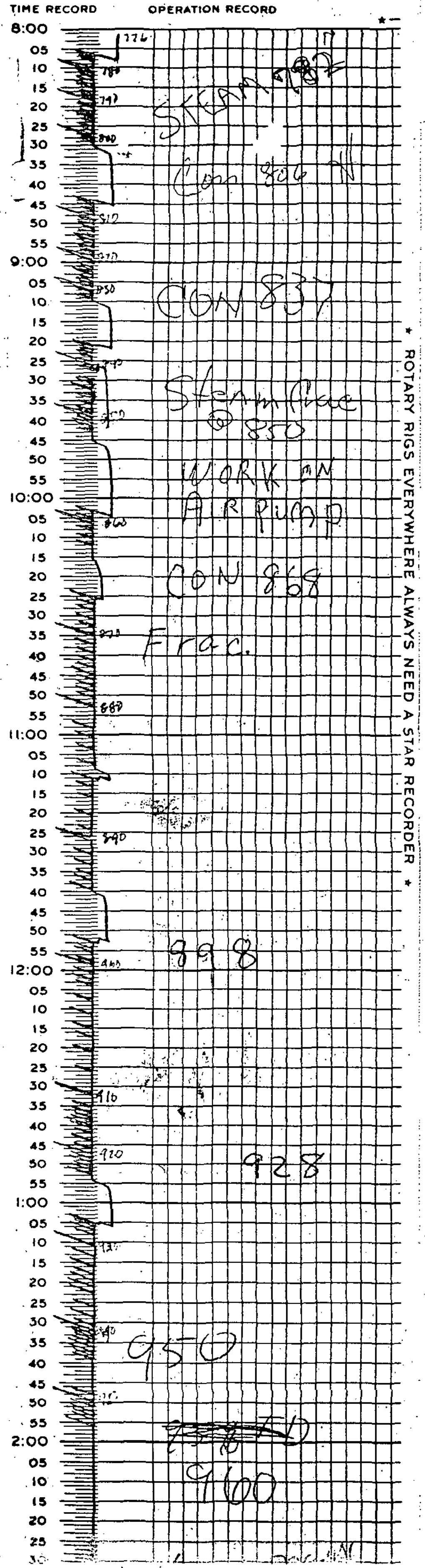
COMPANY [illegible] — DATE 9-[illegible]

WELL [illegible] — WELL NUMBER [illegible]

TOTAL DEPTH ON [illegible] — TOTAL DEPTH OFF 960

REMARKS

TIME RECORD — OPERATION RECORD



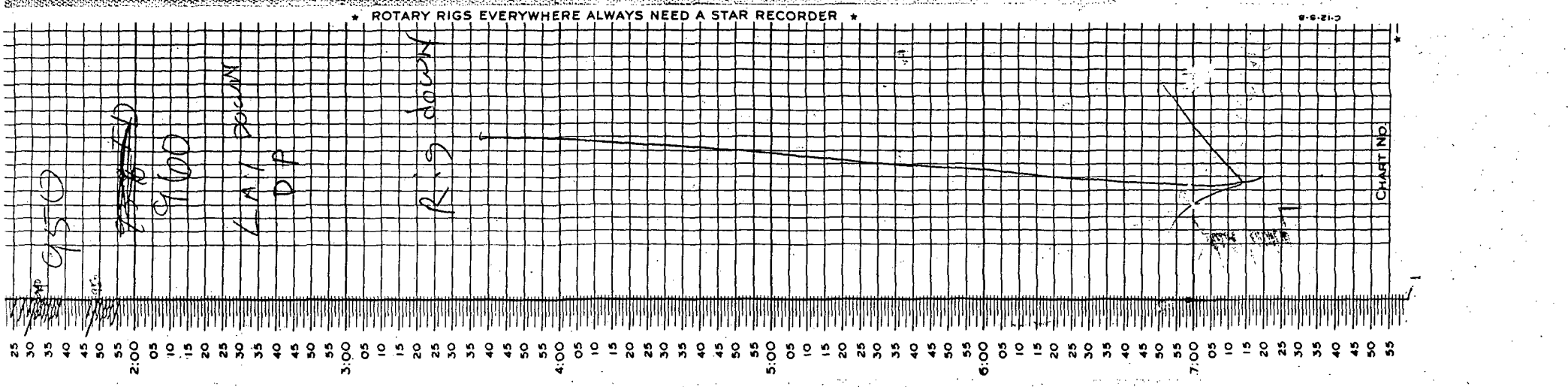

★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★
CHART NO.
RIG DOWN
LAID DOWN
2:00
3:00
4:00
5:00
6:00
7:00

PLATE I
1"=200'

2

HIGH VOLTAGE POWER LINES
PRODUCTION WELL 34 7B (LADY LINDA)
47723.2 N 51553.8 E
S87-1
47793.9 N
51682.3 E
SUMP AREA
S87-4
47420.8 N
51333.9 E
MEI MAINTENANCE HOUSING
SPRING ACCESS ROAD
PRODUCTION WELL
34-7A (LADY OLGA)
47718.8 N
51306.8 E
HIGH VOLTAGE POWER LINES
S87-3
47869.7 N
51444.1 E
C-C W 1/16 COR
SEC 7 T26S R6W
SLB&M.1986 USFS AC
47390.3 N
51252.2 E
SATELLITE DISH
WELL 'E'
46506.9 N
51374.7 E
SUMP AREA
N 00°12'11" E 2653.458'
PLANT SITE ACCESS ROAD
MANHOLE
LADY CLARA
DRILL SITE AREA
20"ø STEAM LINE
POWER LINES
6"ø INJECTION LINE
DRILL SITE AREA
WELL S-88-1
CONDENSATE POND
LADY LORRETTA
WELL S-88-3
PLANT SITE ACCESS ROAD
WELL 24-7
47862.7 N
50867.9 E
POWER LINES
POWER LINES
ACCESS ROAD
P-89-1
S-89-1
POWER LINES
1318.138'
S 88°35'05" W
W 1/4 COR SEC 7, T 26 S,
R 6 W, SLB&M,1986 USFS AC
47357.8 N
49934.4 E
N 01°25'18" E 2643.054'
N 00°23'19" E 2654

COORDINATE POINT DATA FOR WELLS

WELL S-88-1	47290.7 N	51172.6 E
WELL S-88-3	47047.5 N	50994.8 E
LADY LORRETTA	46982.4 N	50985.8 E
LADY CLARA	47330.2 N	51210.7 E