GL01639

COMPLETION REPORT

GEOTHERMAL EXPLORATORY WELL S-89-2

Sulphurdale, Utah

PROPRIETARY & CONFIDENTIAL
MOTHER EARTH INDUSTRIES, INC.

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

GL01639

COMPLETION REPORT

-

GEOTHERMAL EXPLORATORY WELL S-89-2

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

November 1989

TABLE OF CONTENTS

FIGURES

APPENDICES

PLATE (in pocket)

COMPLETION REPORT FOR

S-89-2
Sulphurdale, Utah

I. ABSTRACT

A geothermal exploratory "slim hole" designated S-89-2 was drilled on Fee land controlled by Mother Earth Industries, Inc. between the dates of July 7 and July 21, 1989. The well is 3682 ft. south and 150 ft. west of the northwest corner of Section 7, T26S, R6W, SLB&M.

S-89-2 ws the first exploratory well to test the valley of Sulphur Creek rather than the higher terrain draining into the creek. The well penetrated 150 feet of fluvial and alluvial fill comprising fragments of leached Three Creeks tuff (Tbt), latite porphyry, pyrite/marcasite crystal clusters, and free quartz phenocrysts weathered out of Tbt. It then transected a 450' thick section of latite porphyry lavas and lapilli tuffs, 400' of Tbt in place, Wales Canyon tuffs 100' thick, the Coconino sandstone from 1100' to 1150'KB, and finally, recrystallized limestones and dolomites below 1150 feet KB.

The well was bottomed at 2338'KB, but no cuttings were collected below 1410'KB at which depth all drilling fluid/air returns were lost. No steam was encountered, the resource in this well being hot (~380F) water within the sandstone and limestone aquifers.

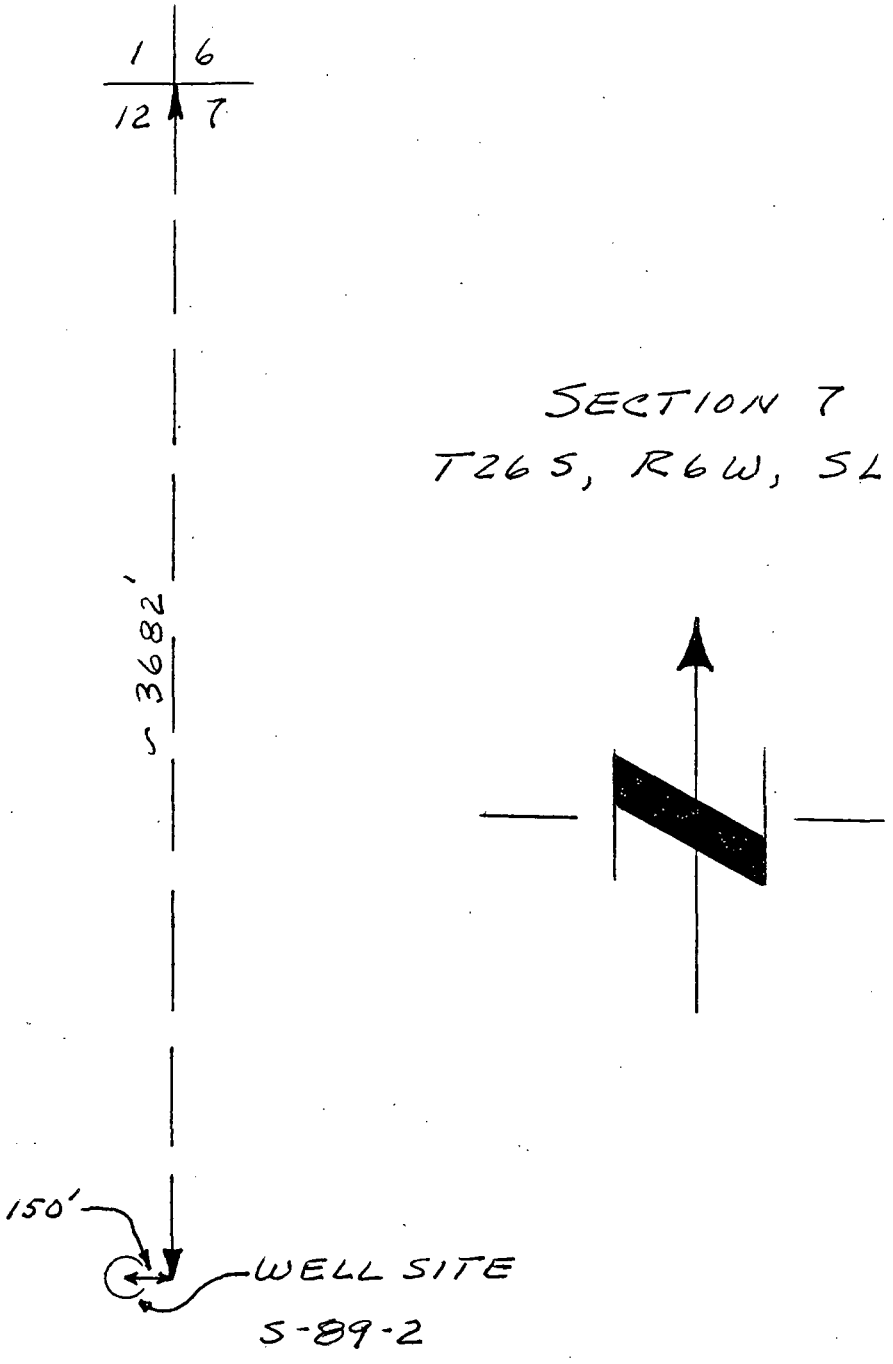
The prime contractor for the well was Grimshaw Drilling Inc.; surveys were done by Sunrise Engineering, Inc. of Fillmore, Utah; Safety Services were provided by Bell Safety of Evanston, Wyoming; wellsite geological supervision was by Geothermal Management Company, Inc. of Evergreen, Colorado; and petrographic 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 exploratory slim hole S-89-2 located near Sulphurdale, in Beaver County, Utah within the Cove Fort-Sulphurdale KGRA.

Specifically, the well is on MEI controlled fee land, (Lot 57-A, Washington Lode Mining and Mill Site Claim), approximately 3682 feet south and 150 feet west of the northwest corner of Section 7, T26S, R6W, SLB&M. It is about 2250 feet southwest of well 34-7A (Linda), about 1400 feet west-southwest of the nearest previously drilled production well P-88-2 (Lorretta), about 840 feet southwest of exploration well S-89-1, and 4000 feet west of well S-89-5.

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 S-89-2

SULPHURDALE, UTAH

By: GWH | Ckd: GWH
Date: 11-3-89
Scale: 1" = 600'
Dwng. No: ME1892-1

Figure 1

III. WELL DRILLING AND CONSTRUCTION HISTORY

In order to cost-effectively search for extensions of the dry steam geothermal resource discovered to date, exploratory well S-89-2 was drilled in a "slim hole" configuration as follows:

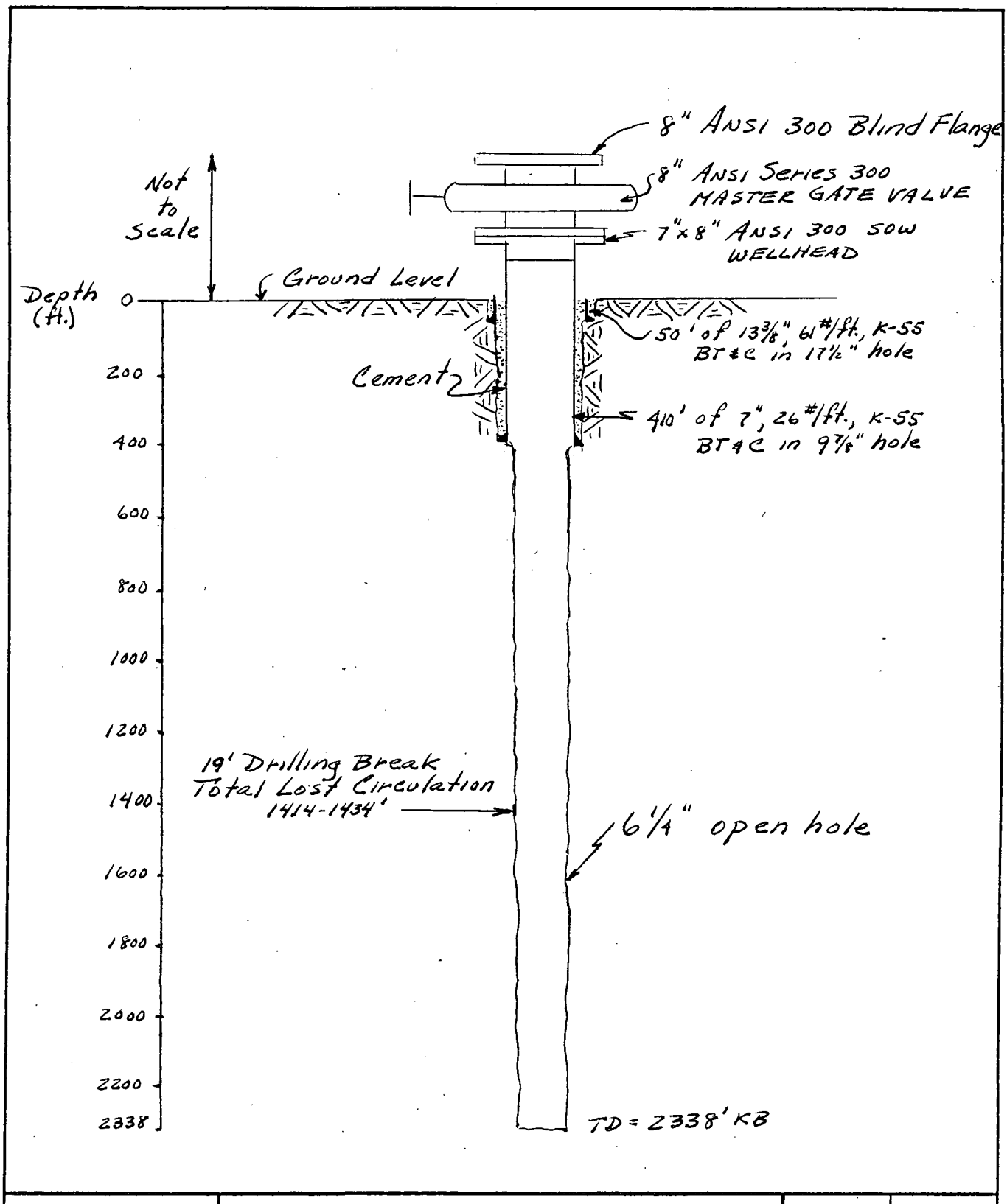
On July 7, 1989, Grimshaw Drilling Company Rig #2 was moved from the site of S-89-5 to the location for S-89-2. Three days were spent rigging up and improving the site after which, on July 10 at 0730 hours, a 17.5" hole was spudded and drilled to 50'KB by 1530 hours. The 13.375", 61#/ft., K-55, BT&C conductor casing was set and cemented using RediMix by 2000 hours.

On July 11, 9.875" hole was drilled to 410'KB by 2000 hours, however the next 49 hours were spent waiting for a Dowell cementing unit to become available. On July 14, 410 feet of 7", 26#/ft., K-55, BT&C casing was run and cemented in place by 0430. After waiting for the cement to set, the BOPE stack was nipple up and a successful pressure test was conducted, witnessed and approved by J. Solum, Utah State Engineer.

At 0900 hours on July 15, drilling resumed and by 1600 hours on July 16, after penetrating moderately fresh to clayey ash-flow tuffs, latites, and metasandstone, the well reached 1410'KB. At this depth, the bit virtually fell 19 feet and all drilling fluid/air/foam circulation was lost. The hole was drilled blind to 1438'KB and then operations were suspended pending arrival of a booster air compressor.

On July 18, at 0500 hours, the booster was installed and, although cuttings were never blown to the surface, the well was drilled, with brief interruptions to ream tight spots and to change bits, to its total depth of 2338'KB by 1515 hours on July 21, 1989. Though wisps of steam, evolved from hot (~360F) waters within the Coconino sandstone and the underlying limestones, were evident below 1100'KB, the dry steam resource found in the other wells was not encountered in S-89-2.

A drilling history, describing daily events between July 7 and July 21, 1989 and tour reports 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 7" casing. Appendix B, attached, is MEI's basic drilling procedure developed for slim exploratory wells. Appendix F comprises the geolograph charts that graphically document drilling progress.



REVISIONS		
No.	Date	By
1		
2		
3		
4		
5		

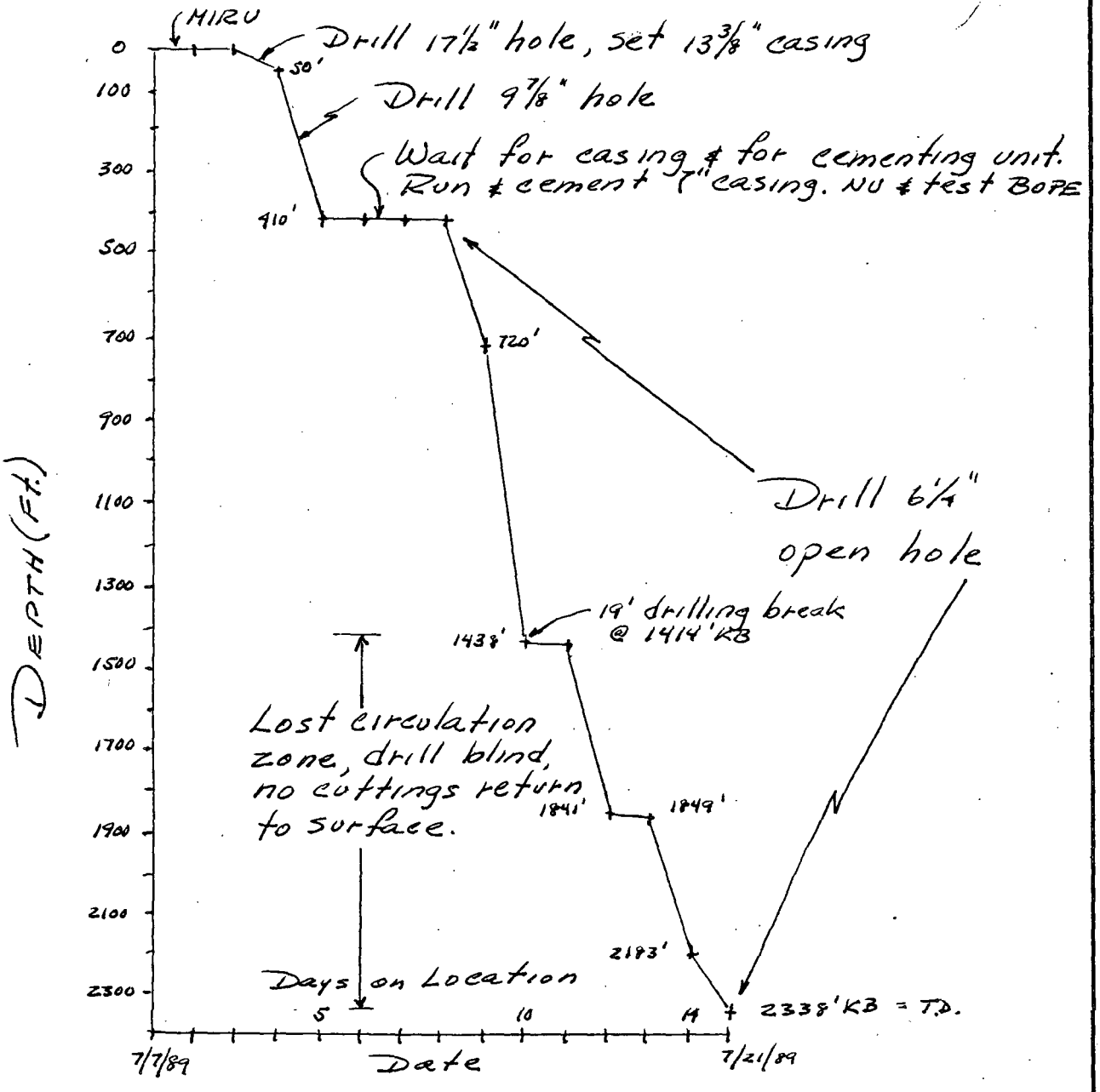
GEOTHERMAL MANAGEMENT Co.
P.O. Box 2980 Evergreen, CO. 80439-2980 (303) 670-3454

WELL PROFILE S-89-2

SULPHURDALE, UTAH

By: GWH | Ckd: GWH
Date: 11-3-89
Scale: 1"=400' Vert
Dwng. No: ME1892-2

Figure 2



NOTE: All depths are KB (KB - 10' = G.L)

REVISIONS		
No.	Date	By
1	11-3-89	H.
2	11-21-89	H.
3		
4		
5		

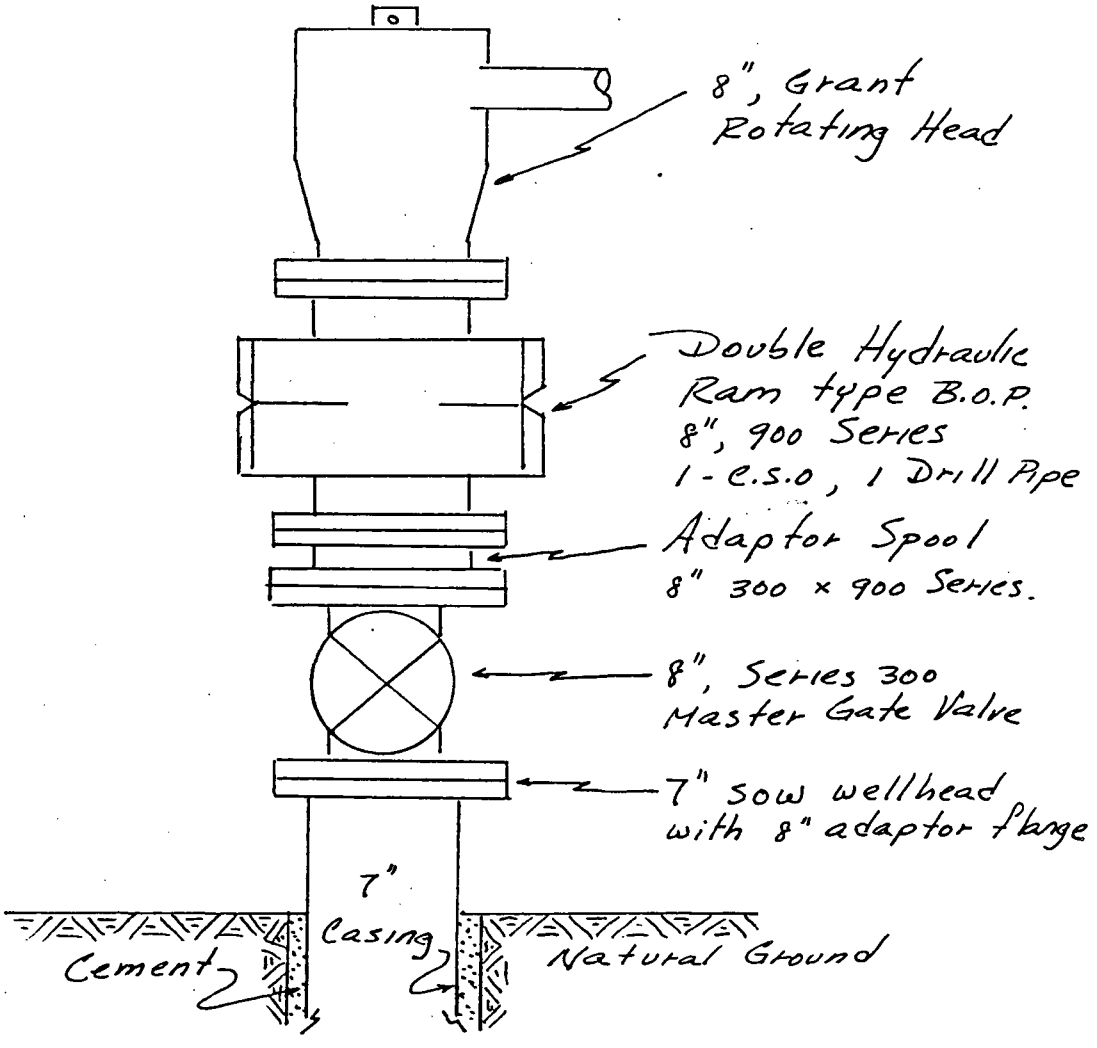
GEOTHERMAL MANAGEMENT Co.
P.O. Box 2980 Evergreen, CO. 80439-2980 (303) 670-3454

DRILLING CURVE S-89-2

SULPHURDALE, UTAH

By: GWH | Ckd: GWH
Date: 11-21-89
Scale: 1" = 400' Vert.
Dwng. No: ME1892-3

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

7" B.O.P.E. STACK 5-89-2

SULPHURDALE, UTAH

By: GWH | Ckd: GWH
Date: Nov. 3, 1989
Scale: None
Dwng. No: ME'1892-4

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 and lapilli 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 bedrocks penetrated in S-89-2 include variably altered lavas and lapilli tuffs of latitic composition plus breccias and ash-flow tuffs, reworked and hydrothermally altered to varying extents, that have been designated as the Three Creeks Tuff (Tbt) member of the Bullion Canyon Volcanics (one of the oldest of the local volcanic units) and latite porphyry. 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 correllated with the Wales Canyon Formation) is found in S-89-2 at a depth of about 1000'KB.

S-89-2 initially penetrated approximately 150'KB of fluvial and alluvial deposits comprising acid-leached, and variably pyritized fragments of Three Creeks Tuff (Tbt), rhyolitic ash-flow tuff and latite porphyry that are typical of the materials found in the main Sulphur Pit.

From 210-310'KB, the well penetrated coarse to medium grained, brown to pink latite porphyry flows variably altered to clay, magnetite and pyrite. Lapilli tuff, thought to have originated from a nearby vent, was found between 310 and 600'KB. The lapilli tuff fragments are typically rounded, cemented with clay and mixed with discrete quartz crystals weathered out of older formations.

Below the latite, from 600-1000'KB, the Tbt was drilled and from 1000-1100'KB, the fine grained tuffs of the Wales Canyon Fm were transected. The white, vitreous Coconino Sandstone was found, thinned by 50%, between 1100 and 1150'KB and from 1150-1420'KB, (end of samples), the well intersected intercalated, marbleized, limestones and dolomites resembling those found in Union Oil well 42-7 and in MEI well S-89-5. Also noted were veins containing spalerite, galena and fluorite. All of these are thought to have been deposited by hydrothermal fluids related to the quartz monzonite intrusive body rather than by processes connected with the present day geothermal system.

Both the Wales Canyon and the Coconino formations were found deeper and thinner than in MEI wells S-89-5, S-89-4, and S-89-1. There is not a lot of evidence suggesting faulting as the mechanism for this situation, therefore it must be due to significant erosion that occurred between the deposition of the Tbt and the Wales Canyon and between the Wales Canyon and the Coconino.

Though wisps of steam were detected when the well penetrated the Coconino formation, the horizon(s) that carried the dry steam in all of the other MEI wells is(are) apparently below the water table in S-89-2 so that hot water comprised the geothermal resource. The hot water aquifer includes the sandstone and limestone/dolomite units and it should therefore be quite extensive and prolific.

Attached, as Appendix C, is a petrographic description of drill cuttings from this well together with some interpretive comments.

V. PERMITS

Because well S-89-2 was drilled on privately owned land and not on Federal property, the permitting required was minimal. Attached as Appendix D is a copy of the relevant permit from the Utah Division of Water Resources (UDWR). 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 S-89-2 was pressure tested in accordance with State regulations, the test was witnessed and approved by UDWR representitive John Solum.

APPENDIX A

S-89-2 DRILLING HISTORY

7-7-89		
	0800 - 1900	Move In Rig Up (MIRU) and work on location.
7-8-89		
	0800 - 2000	Continue rig up.
7-9-89		
	0800 - 2400	Finish rig up.
7-10-89		
	0800 - 0730	Pick up drill collars and make up 17.5" bit and subs preparatory to drilling.
	0730 - 0800	Drill ahead (DA) 13' to 29' Kelly Bushing (KB).
	0800 - 1530	DA: 29' to 50'KB.
	1530 - 1600	Pull Out Of Hole (POOH).
	1600 - 1800	Run 13.375", 61#/ft.,K-55, BT&C conductor casing to 50'KB.
	1800 - 2000	Cement conductor with Redi-mix.
	2000 - 2400	Wait On Cement (WOC).
7-11-89		
	0000 - 0500	Cut off 13.375" casing, weld on flowline, fix fork lift.
	0500 - 0700	DA:50' to 106'KB, ream tight spots.
	0700 - 0800	Hole bridged, bit plugged, POOH.
	0800 - 2000	Run In Hole (RIH); DA: 106' to 410'KB. Hole sloughing. Several reaming trips required.
	2000 - 2400	Circulate and condition hole for casing; Survey #1: .25 degree deviation at 378'KB.
7-12-89		
	0000 - 0800	Circulate, wait for casing.
	0800 - 2400	Circulate, unload casing, wait for Dowell cementing unit to become available.
7-13-89		
	0000 - 0800	Wait for Dowell, circulate.
	0800 - 2000	Wait for Dowell, POOH, RIH, circulate.
	2000 - 2400	Wait for Dowell, Lay down drill collars.

7-14-89

0000 - 0100	Wait for Dowell.
0100 - 0430	Run and cement 410 feet of 7", 26#/ft., K-55, BT&C. Cement In Place (CIP) at 0430.
0430 - 0500	Drain 13.375" casing, Nipple down (ND) flowline.
0500 - 1230	WOC.
1230 - 2000	Cut off casings, install wellhead, Nipple Up (NU) BOPE, hook upflowline.
2000 - 2400	Make Up (MU) airline, Pick Up (PU) hammer drill, pressure test casing.

7-15-89

0000 - 0430	Prepare to test BOPE, test witnessed and approved by J. Solum, Utah State Engineer.
0430 - 0700	Drill cement.
0700 - 0900	POOH, change to hammer drill, RIH, DA: 410 to 412'KB.
0900 - 1400	DA: 412' to 540'KB.
1400 - 1740	DA: 540 to 546'KB.
1740 - 1900	POOH to check bit for plugging.
1900 - 2000	RIH with F-1 tricone bit.
2000 - 2400	DA: 546' to 720'KB, drilling rates up to 43'/hr., Temperature Out (To)=92F.

7-16-89

0000 - 0335	DA: 720 to 940'KB, To=102F.
0335 - 0435	DA: 940 to 1028'KB, 1005-1015' very soft (30' in 15 minutes).
0435 - 0500	DA: 1028 to 1058'KB - steam wisps.
0500 - 0600	DA: 1058 to 1103'KB, To=118F, Coconino Fm.
0600 - 0640	DA: 1103 to 1120'KB, 1' fracture @ 1116'KB.
0640 - 0730	DA: 1120 to 1142'KB, To=124F.
0730 - 0825	DA: 1142 to 1156'KB, To=144F.
0825 - 0900	DA: 1156 to 1175'KB, To=130F, drilling rate increased at 1165'KB.
0900 - 1035	DA: 1175 to 1216'KB, hole making water.
1035 - 1250	DA: 1216 to 1285'KB, To=170F, in Coconino.
1250 - 1350	DA: 1285 to 1314'KB, To=170F.
1350 - 1530	DA: 1314 to 1400'KB, To=174F, 60'/hr.
1530 - 1600	DA: 1400 to 1414'Kb, 19 foot drilling break bit dropped in "cave" to 1433'KB. No more drilling without more air volume available.
1600 - 2400	Tried to drill blind from 1433 to 1438'KB, Pulled string up hole to wait for an air compressor booster.

7-17-89

0000 - 2400	Wait for booster compressor.

7-18-89

0000 - 0500	RIH.
0500 - 0800	DA: 1438 to 1497'KB.
0800 - 2400	DA: 1497 to 1841'KB.

7-19-89

0000 - 0215	DA: 1841 to 1849'KB; circulate with air and foam.
0215 - 0630	POOH, change bits.
0630 - 1500	RIH, Ream to bottom.
1500 - 2400	POOH, Wait on new bit.

7-20-89

0000 - 0555	RIH with 5.625" bit, ream to bottom.
0555 - 1630	DA: 1849 to 2183'KB, POOH, Blow well with air and foam.

7-21-89

0600 - 1230	RIH, ream to bottom.
1230 - 1515	DA: 2183 to 2338'KB, Blow hole with air and foam.
1515 - 1600	POOH to 1400'KB, Blow hole with air/foam.
1600 - 1800	POOH, Lay down string, shut down rig.

LEASE	WELL NO.	API WELL NUMBER	DATE

OPERATOR	CONTRACTOR	RIG NO.

SIGNATURE OF OPERATOR'S REPRESENTATIVE	SIGNATURE OF CONTRACTOR'S TOOL PUSHER
[illegible signature] 7/7/88	

D.P. SIZE	WT./FT.	GRADE	TOOL JT O.D.	TYPE THREAD	STRING NO.

PUMP NO.	PUMP MANUFACTURER	TYPE	STROKE LENGTH

FIELD OR DIST.	COUNTY	STATE

LAST CASING TUBING OR LINER	SIZE	MAKE	WT. & GR.	NO. JOINTS	FEET	RKB. TO CSG. HD.	SET AT

WIRE LINE RECORD REEL NO.

SIZE	NO. LINES	FT. SLIPPED

FT. CUT OFF	PRESENT LENGTH

TON MI. OR TRIPS SINCE LAST CUT

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

CODE NO. – OPERATION	MORN.	DAY	EVE.
1. RIG UP AND TEAR DOWN			
2. DRILL ACTUAL			
3. REAMING			
4. CORING			
5. CONDITION MUD & CIRCULATE			
6. TRIPS			
7. LUBRICATE RIG			
8. REPAIR RIG			
9. CUT OFF DRILLING LINE			
10. DEVIATION SURVEY			
11. WIRE LINE LOGS			
12. RUN CASING & CEMENT			
13. WAIT ON CEMENT			
14. NIPPLE UP B.O.P.			
15. TEST B.O.P.			
16. DRILL STEM TEST			
17. PLUG BACK			
18. SQUEEZE CEMENT			
19. FISHING			
20. DIR. WORK			
21.			
22.			
23.			
COMPLETION: A. PERF'R'T'N			
B. TBG TRIPS			
C. TREATING			
D. SWABBING			
E. TESTING			
F. ADDIT'N'L			
G.			
TOTALS			

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

HRS. W/CONTR. D.P.			
HRS. W/OPR. D.P.			
HRS. W/O D.P.			
HRS. STANDBY			

MORNING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.			
	BIT		FT.
	STB RMR OD		FT.
	D.C. ID OD		FT.
	STB RMR OD		FT.
	D.C. ID OD		FT.
	STB RMR OD		FT.
	STANDS DP		FT.
	SINGLES DP		FT.
	KELLY DOWN		FT.
	TOTAL		FT.
WT. OF STRING			LBS.

BIT RECORD

BIT NO.		
SIZE		
IADC CODE		
MFG.		
TYPE		
SER. NO.		
JETS 1/32" /TFA in²		
DEPTH OUT		
DEPTH IN		
TOTAL FTG.		
TOTAL HRS.		
DULL CUT. STRUC. I O D L B G O R		
GPM/PUMP-PSI		

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.–SEC.			
PV/YP	/	/	/
GELS	/	/	/
WL –CC'S			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE FROM	FOOTAGE TO	DR.–D RM.–R CORE.–C	CORE NO.	FORMATION (SHOW CORE RECOVERY)	ROTARY RPM	WT. ON BIT 1000 #	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN SGL.–S PAR'EL–P COM'B–C

DEVIATION RECORD	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG FROM	TIME LOG TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS

DRILLER

DAY TOUR

DRILLING ASSEMBLY (At end of tour)

NO.			
	BIT		FT.
	STB RMR OD		FT.
	D.C. ID OD		FT.
	STB RMR OD		FT.
	D.C. ID OD		FT.
	STB RMR OD		FT.
	STANDS DP		FT.
	SINGLES DP		FT.
	KELLY DOWN		FT.
	TOTAL		FT.
WT. OF STRING			LBS.

BIT RECORD

BIT NO.		
SIZE		
IADC CODE		
MFG.		
TYPE		
SER. NO.		
JETS 1/32" /TFA in²		
DEPTH OUT		
DEPTH IN		
TOTAL FTG.		
TOTAL HRS.		
DULL CUT. STRUC. I O D L B G O R		
GPM/PUMP-PSI		

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.–SEC.			
PV/YP	/	/	/
GELS	/	/	/
WL –CC'S			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE FROM	FOOTAGE TO	DR.–D RM.–R CORE.–C	CORE NO.	FORMATION (SHOW CORE RECOVERY)	ROTARY RPM	WT. ON BIT 1000 #	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN SGL.–S PAR'EL–P COM'B–C

DEVIATION RECORD	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG FROM	TIME LOG TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
8:00	7:00			Rig [illegible] work on new location

DRILLER

EVENING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.			
	BIT		FT.
	STB RMR OD		FT.
	D.C. ID OD		FT.
	STB RMR OD		FT.
	D.C. ID OD		FT.
	STB RMR OD		FT.

BIT RECORD

BIT NO.		
SIZE		
IADC CODE		
MFG.		
TYPE		
SER. NO.		
JETS 1/32" /TFA in²		
DEPTH OUT		
DEPTH IN		

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.–SEC.			
PV/YP	/	/	/
GELS	/	/	/
WL –CC'S			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

FOOTAGE FROM	FOOTAGE TO	DR.–D RM.–R CORE.–C	CORE NO.	FORMATION (SHOW CORE RECOVERY)	ROTARY RPM	WT. ON BIT 1000 #	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN SGL.–S PAR'EL–P COM'B–C

DEVIATION RECORD	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG FROM	TIME LOG TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS

REEL NO. | API REEL NUMBER | DATE 7-8-83

OPERATOR | CONTRACTOR | RIG NO.

SIGNATURE OF OPERATOR'S REPRESENTATIVE | SIGNATURE OF CONTRACTOR'S TOOL PUSHER

Dick Turner 7/8/83

D.P. SIZE	WT./FT.	GRADE	TOOL JT O.D.	TYPE THREAD	STRING NO.	PUMP NO.	PUMP MANUFACTURER	TYPE	STROKE LENGTH

FIELD OR DIST. | COUNTY Bryan | STATE OK

LAST CASING TUBING OR LINER	SIZE	MAKE	WT. & GR.	NO. JOINTS	FEET	RKB. TO CSG. HD.	SET AT

WIRE LINE RECORD REEL NO.

SIZE | NO. LINES | FT. SLIPPED | FT. CUT OFF | PRESENT LENGTH | TON MI. OR TRIPS SINCE LAST CUT | CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

CODE NO.	OPERATION	MORN.	DAY	EVE.
1.	RIG UP AND TEAR DOWN			
2.	DRILL ACTUAL			
3.	REAMING			
4.	CORING			
5.	CONDITION MUD & CIRCULATE			
6.	TRIPS			
7.	LUBRICATE RIG			
8.	REPAIR RIG			
9.	CUT OFF DRILLING LINE			
10.	DEVIATION SURVEY			
11.	WIRE LINE LOGS			
12.	RUN CASING & CEMENT			
13.	WAIT ON CEMENT			
14.	NIPPLE UP B.O.P.			
15.	TEST B.O.P.			
16.	DRILL STEM TEST			
17.	PLUG BACK			
18.	SQUEEZE CEMENT			
19.	FISHING			
20.	DIR. WORK			
21.				
22.				
23.				
COMPLETION	A. PERF'R'T'N			
	B. TBG TRIPS			
	C. TREATING			
	D. SWABBING			
	E. TESTING			
	F. ADDIT'N'L			
	G.			
TOTALS				

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

HRS. W/CONTR. D.P.	
HRS. W/OPR. D.P.	
HRS. WO/D.P.	
HRS. STANDBY	

MORNING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.			FT.
	BIT		FT.
	STB RMR	OD	FT.
	D.C. ID	OD	FT.
	STB RMR	OD	FT.
	D.C. ID	OD	FT.
	STB RMR	OD	FT.
	STANDS DP		FT.
	SINGLES DP		FT.
	KELLY DOWN		FT.
	TOTAL		FT.
	WT. OF STRING		LBS.

BIT RECORD

BIT NO.			
SIZE			
IADC CODE			
MFG.			
TYPE			
SER. NO.			
JETS 1/32" /TFA in²			
DEPTH OUT			
DEPTH IN			
TOTAL FTG.			
TOTAL HRS.			
DULL CUT. STRUC.	I	O	D	L
	B	G	O	R
GPM/PUMP-PSI				

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC.			
PV/YP	/	/	/
GELS	/	/	/
WL -CC'S			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE / FORMATION (SHOW CORE RECOVERY)

FROM	TO	DR.-D RM.-R CORE.-C	CORE NO.	FORMATION	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS

DRILLER

DAY TOUR

DRILLING ASSEMBLY (At end of tour)

NO.			FT.
	BIT		FT.
	STB RMR	OD	FT.
	D.C. ID	OD	FT.
	STB RMR	OD	FT.
	D.C. ID	OD	FT.
	STB RMR	OD	FT.
	STANDS DP		FT.
	SINGLES DP		FT.
	KELLY DOWN		FT.
	TOTAL		FT.
	WT. OF STRING		LBS.

BIT RECORD

BIT NO.			
SIZE			
IADC CODE			
MFG.			
TYPE			
SER. NO.			
JETS 1/32" /TFA in²			
DEPTH OUT			
DEPTH IN			
TOTAL FTG.			
TOTAL HRS.			
DULL CUT. STRUC.	I	O	D	L
	B	G	O	R
GPM/PUMP-PSI				

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC.			
PV/YP	/	/	/
GELS	/	/	/
WL -CC'S			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE / FORMATION (SHOW CORE RECOVERY)

FROM	TO	DR.-D RM.-R CORE.-C	CORE NO.	FORMATION	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
8:00				R.S. UP

DRILLER Gary Peterson

EVENING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.			FT.
	BIT		FT.
	STB RMR	OD	FT.
	D.C. ID	OD	FT.
	STB RMR	OD	FT.
	D.C. ID	OD	FT.
	STB RMR	OD	FT.

BIT RECORD

BIT NO.			
SIZE			
IADC CODE			
MFG.			
TYPE			
SER. NO.			
JETS 1/32" /TFA in²			
DEPTH OUT			
DEPTH IN			

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC.			
PV/YP	/	/	/
GELS	/	/	/
WL -CC'S			
pH			
SOLIDS %			

FOOTAGE / FORMATION (SHOW CORE RECOVERY)

FROM	TO	DR.-D RM.-R CORE.-C	CORE NO.	FORMATION	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS

SIGNATURE OF OPERATOR'S REPRESENTATIVE: [illegible] 7/9/89

SIGNATURE OF CONTRACTOR'S TOOL PUSHER

D.P. SIZE	WT./FT.	GRADE	TOOL JT O.D.	TYPE THREAD	STRING NO.

PUMP NO.	PUMP MANUFACTURER	TYPE	STROKE LENGTH

LAST CASING TUBING OR LINER

SIZE	MAKE	WT. & GR.	NO. JOINTS	FEET	RKB. TO CSG. HD.	SET AT

WIRE LINE RECORD REEL NO.

SIZE	NO. LINES	FT. SLIPPED

FT. CUT OFF | PRESENT LENGTH

TON MI. OR TRIPS SINCE LAST CUT

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION — HOURS

CODE NO.	OPERATION	MORN.	DAY	EVE.
1.	RIG UP AND TEAR DOWN			
2.	DRILL ACTUAL			
3.	REAMING			
4.	CORING			
5.	CONDITION MUD & CIRCULATE			
6.	TRIPS			
7.	LUBRICATE RIG			
8.	REPAIR RIG			
9.	CUT OFF DRILLING LINE			
10.	DEVIATION SURVEY			
11.	WIRE LINE LOGS			
12.	RUN CASING & CEMENT			
13.	WAIT ON CEMENT			
14.	NIPPLE UP B.O.P.			
15.	TEST B.O.P.			
16.	DRILL STEM TEST			
17.	PLUG BACK			
18.	SQUEEZE CEMENT			
19.	FISHING			
20.	DIR. WORK			
21.				
22.				
23.				
COMPLETION	A. PERF'R'T'N			
	B. TBG TRIPS			
	C. TREATING			
	D. SWABBING			
	E. TESTING			
	F. ADDIT'NL			
	G.			
TOTALS				

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

HRS. W/CONTR. D.P.	
HRS. W/OPR. D.P.	
HRS. WO/D.P.	
HRS. STANDBY	
TOTAL DAY WORK	
NO. OF DAYS FROM SPUD	

MORNING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.		
BIT		FT.
STB RMR	OD	FT.
D.C. ID	OD	FT.
STB RMR	OD	FT.
D.C. ID	OD	FT.
STB RMR	OD	FT.
STANDS DP		FT.
SINGLES	DP	FT.
KELLY DOWN		FT.
TOTAL		FT.
WT. OF STRING		LBS.

BIT RECORD

BIT NO.	
SIZE	
IADC CODE	
MFG.	
TYPE	
SER. NO.	
JETS 1/32" /TFA in²	
DEPTH OUT	
DEPTH IN	
TOTAL FTG.	
TOTAL HRS.	
DULL CUT. STRUC.	I O D L / B G O R
GPM/PUMP-PSI	

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC.			
PV/YP	/	/	/
GELS	/	/	/
WL -CC's		\	
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE / FORMATION

FOOTAGE FROM	TO	DR.-D RM.-R CORE.-C	CORE NO.	FORMATION (SHOW CORE RECOVERY)	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
5:00	8:00	12	1	Rig up

DRILLER

DAY TOUR

DRILLING ASSEMBLY (At end of tour)

NO.		
BIT 17½	1.85	FT.
BS	2.00	
STB RMR	OD	FT.
D.C. ID	OD	FT.
STB RMR	OD	FT.
D.C. ID	OD	FT.
STB RMR	OD	FT.
STANDS DP		FT.
SINGLES	DP	FT.
KELLY DOWN		FT.
TOTAL		FT.
WT. OF STRING		LBS.

BIT RECORD

BIT NO.	
SIZE	
IADC CODE	
MFG.	
TYPE	
SER. NO.	
JETS 1/32" /TFA in²	
DEPTH OUT	
DEPTH IN	
TOTAL FTG.	
TOTAL HRS.	
DULL CUT. STRUC.	I O D L / B G O R
GPM/PUMP-PSI	

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC.			
PV/YP	/	/	/
GELS	/	/	/
WL -CC's			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE / FORMATION

FOOTAGE FROM	TO	DR.-D RM.-R CORE.-C	CORE NO.	FORMATION (SHOW CORE RECOVERY)	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
8:00	8:00			Rig up pick up D.C. & make up bit

DRILLER Facsimile Retained

EVENING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.		
BIT 17½	1	FT.
STB RMR	OD	FT.
D.C. ID	OD	FT.
STB RMR	OD	FT.
D.C. ID	OD	FT.
STB RMR	OD	FT.
STANDS DP		FT.
SINGLES	DP	FT.
KELLY DOWN		FT.

BIT RECORD

BIT NO.	
SIZE	
IADC CODE	
MFG.	
TYPE	
SER. NO.	
JETS 1/32" /TFA in²	
DEPTH OUT	
DEPTH IN	
TOTAL FTG.	
TOTAL HRS.	
DULL CUT. STRUC.	

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC.			
PV/YP	/	/	/
GELS	/	/	/
WL -CC's			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE / FORMATION

FOOTAGE FROM	TO	DR.-D RM.-R CORE.-C	CORE NO.	FORMATION (SHOW CORE RECOVERY)	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS

SIGNATURE OF OPERATOR'S REPRESENTATIVE: [illegible] 7/10/89

SIGNATURE OF CONTRACTOR'S TOOL PUSHER

D.P. SIZE	WT./FT.	GRADE	TOOL JT O.D.	TYPE THREAD	STRING NO.

PUMP NO.	PUMP MANUFACTURER	TYPE	STROKE LENGTH

LAST CASING TUBING OR LINER

SIZE	MAKE	WT. & GR.	NO. JOINTS	FEET	RKB. TO CSG. HD.	SET AT

SIZE | NO. LINES | FT. SLIPPED

FT. CUT OFF | PRESENT LENGTH

TON MI. OR TRIPS SINCE LAST CUT

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

CODE NO. – OPERATION	MORN.	DAY	EVE.
1. RIG UP AND TEAR DOWN			
2. DRILL ACTUAL			
3. REAMING			
4. CORING			
5. CONDITION MUD & CIRCULATE			
6. TRIPS			
7. LUBRICATE RIG			
8. REPAIR RIG			
9. CUT OFF DRILLING LINE			
10. DEVIATION SURVEY			
11. WIRE LINE LOGS			
12. RUN CASING & CEMENT			
13. WAIT ON CEMENT			
14. NIPPLE UP B.O.P.			
15. TEST B.O.P.			
16. DRILL STEM TEST			
17. PLUG BACK			
18. SQUEEZE CEMENT			
19. FISHING			
20. DIR. WORK			
21.			
22.			
23.			
COMPLETION A. PERF'R'TN			
B. TBG TRIPS			
C. TREATING			
D. SWABBING			
E. TESTING			
F. ADDIT'NL			
G.			
TOTALS			

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

HRS. W/CONTR. D.P.			
HRS. W/OPR. D.P.			
HRS. WO/D.P.			
HRS. STANDBY			
TOTAL DAY WORK			
NO. OF DAYS FROM SPUD			

DRILLING ASSEMBLY (At end of tour)

NO.			
	BIT 17½	1,865	FT.
	BAL	60	
	STB RMR S OD	12.7	FT.
	D.C. ID 10.5 OD	9.5	FT.
	STB RMR S OD		FT.
	D.C. ID OD		FT.
1	STB RMR DC OD	31.35	FT.
	TOTAL	1,970	
	BIT	747	
	DC	31.35	
	STANDS DP		FT.
	SINGLES DP		FT.
	KELLY DOWN	39	FT.
	TOTAL	1,808	FT.
	WT. OF STRING		LBS.

BIT RECORD

BIT NO.	
SIZE	
IADC CODE	
MFG.	
TYPE	
SER. NO.	
JETS 1/32" /TFA In²	
DEPTH OUT	
DEPTH IN	
TOTAL FTG.	
TOTAL HRS.	
DULL CUT. STRUC.	I O D L / B G O R
GPM/PUMP-PSI	

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC.			
PV/YP	/	/	/
GELS.	/	/	/
WL -CC'S.			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

MORNING TOUR

FOOTAGE

FROM	TO	DR.-D RM.-R CORE.-C	CORE NO.
294	50		

FORMATION (SHOW CORE RECOVERY)

ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
8:00	9:30	1½	2	Drill S Smith Cone
9:30	11:00	1½	21	Work pipe to [illegible]
11:00	12:00	1	21	Lay down DC Kelly, Subs
12:00	12:30	½	2	Drill
12:30	3:30	3	5	Cir & Cond for [illegible]
				13¾ Csg & Cmt for Conductor
3:30	4:00	½		Trip out / Lay down tools
4:00	6:00	2		Pick up [illegible] for / Cement

DRILLER Gabriel Robinson

DAY TOUR

FOOTAGE 2,500

FROM	TO	DR.-D RM.-R CORE.-C	CORE NO.

FORMATION Wilcox Sentinose (SHOW CORE RECOVERY)

ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
0800	0730	1½	21	Prepare to spud 17½" Hole
0730	0800	½	2	Drilling F/15' TO 29'
0800	1400	6	22	Help Welder Weld up B/J running Tool onto DC

DRILLER [signature]

EVENING TOUR

FOOTAGE

FROM	TO	DR.-D RM.-R CORE.-C	CORE NO.

FORMATION (SHOW CORE RECOVERY)

ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
2200	2400	4	13	W.O. Cement

SIGNATURE OF OPERATOR'S REPRESENTATIVE: [illegible] 7/11/89

SIGNATURE OF CONTRACTOR'S TOOL PUSHER: Grimshaw Drlg Inc

D.P. SIZE	WT./FT.	GRADE	TOOL JT O.D.	TYPE THREAD	STRING NO.
3½					

PUMP NO.	PUMP MANUFACTURER	TYPE	STROKE LENGTH

FIELD OR DIST. | COUNTY: Grayson | STATE

LAST CASING TUBING OR LINER

SIZE	MAKE	WT. & GR.	NO. JOINTS	FEET	RKB. TO CSG. HD.	SET AT

WIRE LINE RECORD — REEL NO.

SIZE	NO. LINES	FT. SLIPPED
FT. CUT OFF		PRESENT LENGTH

TON MI. OR TRIPS SINCE LAST CUT

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

CODE NO.	OPERATION	MORN.	DAY	EVE.
1	RIG UP AND TEAR DOWN			
2	DRILL ACTUAL	14½	10½	
3	REAMING		1	
4	CORING			
5	CONDITION MUD & CIRCULATE			
6	TRIPS	11½		
7	LUBRICATE RIG		1/2	
8	REPAIR RIG			
9	CUT OFF DRILLING LINE			
10	DEVIATION SURVEY			
11	WIRE LINE LOGS			
12	RUN CASING & CEMENT			
13	WAIT ON CEMENT			
14	NIPPLE UP B.O.P.			
15	TEST B.O.P.			
16	DRILL STEM TEST			
17	PLUG BACK			
18	SQUEEZE CEMENT			
19	FISHING			
20	DIR. WORK			
21		3		
22		2		
23				
COMPLETION	A. PERF'R'T'N			
	B. TBG TRIPS			
	C. TREATING			
	D. SWABBING			
	E. TESTING			
	F. ADDIT'NL			
	G.			
TOTALS		24	12	

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

HRS. W/CONTR. D.P.			
HRS. W/OPR. D.P.			
HRS. W/O D.P.			
HRS. STANDBY			
TOTAL DAY WORK			

MORNING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.		
BIT	12¼	1.00 FT.
	Reed	2.69
STB RMR	Lower OD	2.60 FT.
D.C. ID	DC OD	31.25 FT.
STB RMR	DC OD	31.40 FT.
D.C. ID	DC OD	30.73 FT.
STB RMR	DC OD	30.73 FT.
	Kelly	106.24
STANDS DP		FT.
SINGLES DP		FT.
KELLY DOWN		37 FT.
TOTAL		106 FT.
WT. OF STRING		LBS.

BIT RECORD

BIT NO.	[illegible]
SIZE	12¼
IADC CODE	1 2 4 0
MFG.	Reed
TYPE	
SER. NO.	
JETS 1/32" /TFA in²	3/11
DEPTH OUT	
DEPTH IN	50
TOTAL FTG.	56
TOTAL HRS.	1½
DULL: CUT. STRUC.	I O D L / B G O R
GPM/PUMP-PSI	

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC	35		
PV/YP	/	/	/
GELS.	/	/	/
WL -CC'S.			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE / FORMATION

FROM	TO	DR'D RUN-R CORE-C	CORE NO.	FORMATION (SHOW CORE RECOVERY)	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN
56	106											

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
2400	0300	3	21	Cut off 8 5/8 casing w/ Flame Jet
0300	0500	2	22	Repair Jet & Lit Cascade 8" Burner Flame
0500	0530	½	2	Drlg F/ 60' TO 74'
0530	0600	½	6	Comm Trip 8' Fill
0600	0700	1	2	Drlg F/ 74' TO 106'
0700	0800	1	16	Comm Rig Repair plug Lift/ complete Same

DRILLER: [illegible]

DAY TOUR

DRILLING ASSEMBLY (At end of tour)

NO.		
BIT	12¼	1.00 FT.
	Reed	2.69
STB RMR	Lower OD	2.60 FT.
D.C. ID	DC OD	31.35 FT.
STB RMR	DC OD	31.40 FT.
D.C. ID	DC OD	31.13 FT.
STB RMR	DC OD	30.73 FT.
	T.B.H.A.	124.61
STANDS DP		245.41
SINGLES DP		FT.
KELLY DOWN		32 FT.
TOTAL		410.94
WT. OF STRING		LBS.

BIT RECORD

BIT NO.	[illegible]
SIZE	12¼
IADC CODE	
MFG.	
TYPE	
SER. NO.	
JETS 1/32" /TFA in²	3/11
DEPTH OUT	
DEPTH IN	50
TOTAL FTG.	
TOTAL HRS.	
DULL: CUT. STRUC.	I O D L / B G O R
GPM/PUMP-PSI	

MUD RECORD

TIME	8:00	12:00	8:00
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC	35	35	37
PV/YP	/	/	/
GELS.	/	/	/
WL -CC'S.			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE / FORMATION

FROM	TO	DR'D RUN-R CORE-C	CORE NO.	FORMATION (SHOW CORE RECOVERY)	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN
106	410				61		400					Drill

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
8:00	10:00	1	3	Drlg Tite hole
10:00	10:30	½	5	Circ. Rec. to Bottom & Cir.
10:30	11:00	½	2	Drlg F/ 179' TO 183' Drilling into Frac @ 179 F. Building Mud Wt.
11:00	1:30	2½	2	Drlg
1:30	2:00	½	17	Fixed Jack Unit
2:00	8:00	6	2	Drlg

DRILLER: Gary Peterson

EVENING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.		
BIT		FT.
STB RMR	OD	FT.
D.C. ID	OD	FT.
STB RMR	OD	FT.
D.C. ID	OD	FT.
STB RMR	OD	FT.
STANDS DP		FT.
SINGLES DP		FT.

BIT RECORD

BIT NO.	
SIZE	
IADC CODE	
MFG.	
TYPE	
SER. NO.	
JETS - 1/32" /TFA in²	
DEPTH OUT	
DEPTH IN	
TOTAL FTG.	
TOTAL HRS.	

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC.			
PV/YP	/	/	/
GELS.	/	/	/
WL -CC'S.			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE / FORMATION

FROM	TO	DR'D RUN-R CORE-C	CORE NO.	FORMATION (SHOW CORE RECOVERY)	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS

SIGNATURE OF OPERATOR'S REPRESENTATIVE: Dan Tomcon 7/12/84

SIGNATURE OF CONTRACTOR'S TOOL PUSHER:

D.P. SIZE	WT./FT.	GRADE	TOOL JT O.D.	TYPE THREAD	STRING NO.
3½	13.30		4¾	XH	

PUMP NO.	PUMP MANUFACTURER	TYPE	STROKE LENGTH

LAST CASING TUBING OR LINER

SIZE	MAKE	WT. & GR.	NO. JOINTS	FEET	REG. TO CSG. NO.	SET AT
13⅜				30'		

SIZE 7/8 | NO. LINES 6 | FT. SLIPPED

FT. CUT OFF | PRESENT LENGTH

TON MI. OR TRIPS SINCE LAST CUT

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

CODE NO.	OPERATION	MORN.	DAY	EVE.
1	RIG UP AND TEAR DOWN			
2	DRILL ACTUAL			
3	REAMING			
4	CORING			
5	CONDITION MUD & CIRCULATE	1½		
6	TRIPS	1½		
7	LUBRICATE RIG			
8	REPAIR RIG			
9	CUT OFF DRILLING LINE			
10	DEVIATION SURVEY	¼		
11	WIRE LINE LOGS			
12	RUN CASING & CEMENT			
13	WAIT ON CEMENT			
14	NIPPLE UP B.O.P.			
15	TEST B.O.P.			
16	DRILL STEM TEST			
17	PLUG BACK			
18	SQUEEZE CEMENT			
19	FISHING			
20	DIR. WORK			
21	Log Co. Line	7	2	
22	Wait on Dowell	11	9½	
23	Unload Csg		1	
COMPLETION	A. PERF'R'TN			
	B. TBG TRIPS			
	C. TREATING			
	D. SWABBING			
	E. TESTING			
	F. ADDIT'NL			
	G.			
TOTALS		12	12	

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

HRS. W/CONTR. D.P.			
HRS. W/OPR. D.P.			
HRS. W/O D.P.			
HRS. STANDBY			
TOTAL DAY WORK			
NO. OF DAYS FROM SPUD			

MORNING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.			
1	BIT 9⅝	1.00	FT.
1	Bit sub	2.69	
1	STB RMR/ NMDC OD	7.60	FT.
4	DC ID 6½ OD	124.61	FT.
	STB RMR OD		FT.
	O.C. ID OD		FT.
	STB RMR OD		FT.
	TBHA	130.90	
	STANDS DP		FT.
8	SINGLES DP	248.04	FT.
	KELLY DOWN	32	FT.
	TOTAL	410.94	FT.
WT. OF STRING			LBS.

BIT RECORD

BIT NO.	2
SIZE	9⅝
IADC CODE	1 1
MFG.	
TYPE	
SER. NO.	
JETS 1/32" /TFA in²	
DEPTH OUT	410
DEPTH IN	50
TOTAL FTG.	360
TOTAL HRS.	12
DULL CUT. STRUC.	
I O D L	
B G O R	
GPM/PUMP-PSI	

MUD RECORD

TIME	
WEIGHT	
PRESSURE GRADIENT	
VISC.-SEC	
PV/YP	/ /
GELS	/ /
WL-CC'S	
pH	
SOLIDS %	

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE / FORMATION (SHOW CORE RECOVERY)

FROM	TO	DR. D RM. R CORE C.	CORE NO.	FORMATION	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN VOL. % PARTIC. % CORE C

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
2000	2030	½	5	C&C and cond Hole
2030	2100	½	6	Trip out 2 STD's 2 6½" Drill collars
2100	2200	1	6	Trip in A/T Hit plug.
2200	2300	1	5	Circ and cond Hole For Logging. Adj Clutch
2300	2400	1	10	Survey @ 378 ¼° Service mud pump
2400	0800	8	23	Circ wait on casing

DRILLER

DAY TOUR

DRILLING ASSEMBLY (At end of tour)

NO.			
1	BIT 9⅝	1.00	FT.
1	Bit sub	2.69	
1	STB RMR/ NMDC OD	2.60	FT.
4	DC ID 6½ OD	124.61	FT.
	STB RMR OD		FT.
	O.C. ID OD		FT.
	STB RMR OD		FT.
	TBHA	130.90	
	STANDS DP		FT.
8	SINGLES DP	248.04	FT.
	KELLY DOWN	32	FT.
	TOTAL	410.94	FT.
WT. OF STRING			LBS.

BIT RECORD

BIT NO.	2
SIZE	9⅝
IADC CODE	
MFG.	
TYPE	
SER. NO.	
JETS 1/32" /TFA in²	
DEPTH OUT	410
DEPTH IN	360
TOTAL FTG.	360
TOTAL HRS.	12
DULL CUT. STRUC.	
I O D L	
B G O R	
GPM/PUMP-PSI	

MUD RECORD

TIME	
WEIGHT	
PRESSURE GRADIENT	
VISC.-SEC	
PV/YP	/ /
GELS	/ /
WL-CC'S	
pH	
SOLIDS %	

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE / FORMATION (SHOW CORE RECOVERY)

FROM	TO	DR. D RM. R CORE C.	CORE NO.	FORMATION	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN VOL. % PARTIC. % CORE C
410												

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION
378	¼							

TIME LOG

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
8:00	10:00	2		Circ. wait on Casing
10:00	11:00	1		Unload Casing
11:00	11:30	½		Wait on Dowell
11:30	8:00	8½		Called Dowell they did not have pump, but they will call back waiting on well Circ

DRILLER Gary Peterson

EVENING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.			
	BIT		FT.
	STB RMR OD		FT.
	O.C. ID OD		FT.
	STB RMR OD		FT.
	O.C. ID OD		FT.
	STB RMR OD		FT.
	STANDS DP		FT.
	SINGLES DP		FT.
	KELLY DOWN		FT.

BIT RECORD

BIT NO.	
SIZE	
IADC CODE	
MFG.	
TYPE	
SER. NO.	
JETS 1/32" /TFA in²	
DEPTH OUT	
DEPTH IN	
TOTAL FTG.	
TOTAL HRS.	
DULL CUT. STRUC.	

MUD RECORD

TIME	
WEIGHT	
PRESSURE GRADIENT	
VISC.-SEC	
PV/YP	/ /
GELS	/ /
WL-CC'S	
pH	
SOLIDS %	

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE / FORMATION (SHOW CORE RECOVERY)

FROM	TO	DR. D RM. R CORE C.	CORE NO.	FORMATION	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN VOL. % PARTIC. % CORE C

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS

SIGNATURE OF OPERATOR'S REPRESENTATIVE: [illegible] 7/13/89

SIGNATURE OF CONTRACTOR'S TOOL PUSHER: [illegible]

D.P. SIZE	WT./FT.	GRADE	TOOL JT O.D.	TYPE THREAD	STRING NO.
3½	13.30		4 3/4	3½ XH	1

PUMP NO.	PUMP MANUFACTURER	TYPE	STROKE LENGTH

LAST CASING TUBING OR LINER

SIZE	MAKE	WT. & GR.	NO. JOINTS	FEET	RKB. TO CSG. HD.	SET AT
13⅜			2	50		

SIZE 7/8 | NO. LINES 4 | FT. SLIPPED

FT. CUT OFF | PRESENT LENGTH

TON MI. OR TRIPS SINCE LAST CUT

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

CODE NO.	OPERATION	NORM.	DAY	EVE.
1	RIG UP AND TEAR DOWN			
2	DRILL ACTUAL			
3	REAMING			
4	CORING			
5	CONDITION MUD & CIRCULATE			
6	TRIPS		1	
7	LUBRICATE RIG			
8	REPAIR RIG			
9	CUT OFF DRILLING LINE			
10	DEVIATION SURVEY			
11	WIRE LINE LOGS			
12	RUN CASING & CEMENT			
13	WAIT ON CEMENT			
14	NIPPLE UP B.O.P.			
15	TEST B.O.P.			
16	DRILL STEM TEST			
17	PLUG BACK			
18	SQUEEZE CEMENT			
19	FISHING			
20	DIR. WORK			
21	Lay down	12	11	
22				
23				
COMPLETION	A. PERF'R'T'N			
	B. TBG TRIPS			
	C. TREATING			
	D. SWABBING			
	E. TESTING			
	F. ADDIT'NL			
	G.			
TOTALS		12	12	

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

HRS. R/CONTR. D.P.			
HRS. R/OPR. D.P.			
HRS. NO/D.P.			
HRS. STANDBY			
TOTAL DAY WORK			
NO. OF DAYS			

MORNING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.			
1	BIT 95/8	1.00	FT.
1	BS	2.69	
1	STB RMR Conv. OD	2.60	FT.
4	D.C. OD 6½	124.61	FT.
	STB RMR OD		FT.
	D.C. ID OD		FT.
	STB RMR OD		FT.
	Total All	130.90	
	STANDS DP		FT.
8	SINGLES DP	848.04	FT.
	KELLY DOWN	32	FT.
	TOTAL	410.94	FT.
WT. OF STRING			LBS.

BIT RECORD

BIT NO.	2
SIZE	95/8
IADC CODE	
MFG.	
TYPE	
SER. NO.	
JETS 1/32" /TFA In²	
DEPTH OUT	410
DEPTH IN	50
TOTAL FTG.	360
TOTAL HRS.	12
DULL CUT. STRUC.	I 0 D L / B G O R
GPM/PUMP-PSI	

MUD RECORD

TIME				
WEIGHT				
PRESSURE GRADIENT				
VISC.-SEC.				
PV/YP	/	/	/	
GELS.	/	/	/	
WL -CC'S.				
pH				
SOLIDS %				

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

DRILLING ASSEMBLY (At end of tour)

NO.			
1	BIT 95/8	1.00	FT.
1	BS	2.69	
1	STB RMR Conv. OD	2.60	FT.
4	D.C. OD 6½	124.61	FT.
	STB RMR OD		FT.
	D.C. ID OD		FT.
	STB RMR OD		FT.
	Total All	130.90	
	STANDS DP		FT.
8	SINGLES DP	848.04	FT.
	KELLY DOWN	32	FT.
	TOTAL	410.94	FT.
WT. OF STRING			LBS.

BIT RECORD

BIT NO.	
SIZE	
IADC CODE	
MFG.	
TYPE	
SER. NO.	
JETS 1/32" /TFA In²	
DEPTH OUT	
DEPTH IN	
TOTAL FTG.	
TOTAL HRS.	
DULL CUT. STRUC.	I 0 D L / B G O R
GPM/PUMP-PSI	

MUD RECORD

TIME	8:00	17:00	8:00	
WEIGHT				
PRESSURE GRADIENT				
VISC.-SEC.	39	35	35	
PV/YP	/	/	/	
GELS.	/	/	/	
WL -CC'S.				
pH				
SOLIDS %				

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

DRILLING ASSEMBLY (At end of tour)

BIT		FT.
STB RMR OD		FT.
D.C. ID OD		FT.
STB RMR OD		FT.
D.C. ID OD		FT.
STB RMR OD		FT.
STANDS DP		FT.
SINGLES DP		FT.
KELLY DOWN		FT.

BIT RECORD

BIT NO.	
SIZE	
IADC CODE	
MFG.	
TYPE	
SER. NO.	
JETS 1/32" /TFA In²	
DEPTH OUT	
DEPTH IN	
TOTAL FTG.	
TOTAL HRS.	
DULL CUT. STRUC.	

MUD RECORD

TIME				
WEIGHT				
PRESSURE GRADIENT				
VISC.-SEC.				
PV/YP	/	/	/	
GELS.	/	/	/	
WL -CC'S.				
pH				
SOLIDS %				

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.

FOOTAGE / FORMATION (SHOW CORE RECOVERY)

FROM	TO	DR. D RM. R CORE. C	CORE NO.	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN SOL. S PART. P CONTR. C

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
2000	0800	12	21	Wait on Cement Pump Truck

DRILLER [illegible]

DAY TOUR

FOOTAGE / FORMATION (SHOW CORE RECOVERY)

FROM	TO	DR. D RM. R CORE. C	CORE NO.	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN SOL. S PART. P CONTR. C
410	410										

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION
375	1/4°							

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
800	3:00	7	21	Wait on Cement pump truck CIRC
3:00	3:30	1/2	6	Short Trip out of hole
3:30	4:00	1/2	6	Trip in Hole
4:00	8:00	4	21	Circ Cond for Wait on cement
				12" Pasel
				9 Jam Truck

DRILLER Gary Dunn

EVENING TOUR

FOOTAGE / FORMATION (SHOW CORE RECOVERY)

FROM	TO	DR. D RM. R CORE. C	CORE NO.	ROTARY RPM	WT. ON BIT 1000#	PUMP PRESS	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	PUMP NO. LINER SIZE	PUMP NO. S.P.M.	METHOD RUN SOL. S PART. P CONTR. C

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS

SIGNATURE OF OPERATOR'S REPRESENTATIVE: [signature] 7/14/89

SIGNATURE OF CONTRACTOR'S TOOL PUSHER: [signature]

D.P. SIZE	WT./FT.	GRADE	TOOL JT O.D.	TYPE THREAD	STRING NO.	PUMP NO.	PUMP MANUFACTURER	TYPE	STROKE LENGTH
3½	15.72		4¼	2½ IF	1				

LAST CASING, TUBING OR LINER

SIZE	MAKE	WT. & GR.	NO. JOINTS	FEET	RKB. TO CSG. HD.	SET AT
13⅜			2	50		
7"			10	410		

WIRE LINE RECORD

SIZE	NO. LINES	FT. SLIPPED
1/4		

FT. CUT OFF | PRESENT LENGTH

TON MI. OR TRIPS SINCE LAST CUT

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION — HOURS

CODE NO.	OPERATION	MORN.	DAY	EVE.
1	RIG UP AND TEAR DOWN			
2	DRILL ACTUAL			
3	REAMING			
4	CORING			
5	CONDITION MUD & CIRCULATE			
6	TRIPS			
7	LUBRICATE RIG			
8	REPAIR RIG			
9	CUT OFF DRILLING LINE			
10	DEVIATION SURVEY			
11	WIRE LINE LOGS			
12	RUN CASING & CEMENT			
13	WAIT ON CEMENT		18	
14	NIPPLE UP B.O.P.		1½	
15	TEST B.O.P.			
16	DRILL STEM TEST			
17	PLUG BACK			
18	SQUEEZE CEMENT			
19	FISHING			
20	DRL. WORK			
21	Cut Casing		1	
22				
23				
COMPLETION	A. PERF'R'T'N			
	B. TBG TRIPS			
	C. TREATING			
	D. SWABBING			
	E. TESTING			
	F. ADDIT'NL			
	G.			
TOTALS			12	

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

HRS. W/CONTR. D.P.			
HRS. W/OPR. D.P.			
HRS. WO/D.P.			
HRS. STANDBY			
TOTAL DAY WORK			
NO. OF DAYS FROM SPUD			

DRILLING ASSEMBLY (At end of tour)

NO.		
BIT		FT.
STB RMR	OD	FT.
D.C.	ID OD	FT.
STB RMR	OD	FT.
D.C.	ID OD	FT.
STB RMR	OD	FT.
STANDS DP		FT.
SINGLES DP		FT.
KELLY DOWN		FT.
TOTAL		FT.
WT. OF STRING		LBS.

BIT RECORD

BIT NO.			
SIZE			
IADC CODE			
MFG.			
TYPE			
SER. NO.			
JETS 1/32" /TFA in²			
DEPTH OUT			
DEPTH IN			
TOTAL FTG.			
TOTAL HRS.			
DULL	CUT. STRUC.		
	I	O	D	L
	B	G	O	R
GPM/PUMP-PSI				

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC			
PV/YP	/	/	/
GELS	/	/	/
WL -CC'S			
pH			
SOLIDS %			
MUD & CHEMICALS ADDED			
TYPE	AMT.	TYPE	AMT.

DRILLING ASSEMBLY (At end of tour)

NO.		
BIT		FT.
STB RMR	OD	FT.
D.C.	ID OD	FT.
STB RMR	OD	FT.
D.C.	ID OD	FT.
STB RMR	OD	FT.
STANDS DP		FT.
SINGLES DP		FT.
KELLY DOWN		FT.
TOTAL		FT.
WT. OF STRING		LBS.

BIT RECORD

BIT NO.			
SIZE			
IADC CODE			
MFG.			
TYPE			
SER. NO.			
JETS 1/32" /TFA in²			
DEPTH OUT			
DEPTH IN			
TOTAL FTG.			
TOTAL HRS.			
DULL	CUT. STRUC.		
	I	O	D	L
	B	G	O	R
GPM/PUMP-PSI				

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC			
PV/YP	/	/	/
GELS	/	/	/
WL -CC'S			
pH			
SOLIDS %			
MUD & CHEMICALS ADDED			
TYPE	AMT.	TYPE	AMT.

DRILLING ASSEMBLY (At end of tour)

NO.		
BIT		FT.
STB RMR	OD	FT.
D.C.	ID OD	FT.
STB RMR	OD	FT.
D.C.	ID OD	FT.
STB RMR	OD	FT.
STANDS DP		FT.
SINGLES DP		FT.
KELLY DOWN		FT.

BIT RECORD

BIT NO.			
SIZE			
IADC CODE			
MFG.			
TYPE			
SER. NO.			
JETS 1/32" /TFA in²			
DEPTH OUT			
DEPTH IN			
TOTAL FTG.			
TOTAL HRS.			
DULL	CUT. STRUC.		

MUD RECORD

TIME			
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC			
PV/YP	/	/	/
GELS	/	/	/
WL -CC'S			
pH			
SOLIDS %			
MUD & CHEMICALS ADDED			
TYPE	AMT.	TYPE	AMT.

MORNING TOUR

FOOTAGE FROM | TO | DR.-D RM.-R CORE.-C | CORE NO. | FORMATION (SHOW CORE RECOVERY) | ROTARY RPM | WT. ON BIT 1000# | PUMP PRESS | PUMP NO. LINER SIZE | PUMP NO. S.P.M. | PUMP NO. LINER SIZE | PUMP NO. S.P.M. | METHOD RUN

DEVIATION RECORD | DEPTH | DEV. | DIRECTION | DEPTH | DEV. | DIRECTION | DEPTH | DEV. | DIRECTION

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
2000	2300	3	21	Wait on Cement pump Truck
2300	2400	1	6	Lay Down 6¼" DC's
2400	0100	1	21	Wait on pump truck
0100	0430	3½	12	Run 7" Casing and Cement plug down @ 4:30
0430	0500	½	22	Cut hole clean 13⅜ Nipple Down flowline
0500	0800	3	13	W. O. Cement
				Fuel 95"

DRILLER [signature]

DAY TOUR

FOOTAGE FROM | TO | DR.-D RM.-R CORE.-C | CORE NO. | FORMATION (SHOW CORE RECOVERY) | ROTARY RPM | WT. ON BIT 1000# | PUMP PRESS | PUMP NO. LINER SIZE | PUMP NO. S.P.M. | PUMP NO. LINER SIZE | PUMP NO. S.P.M. | METHOD RUN

410

DEVIATION RECORD | DEPTH 375 | DEV. 1/4 | DIRECTION | DEPTH | DEV. | DIRECTION | DEPTH | DEV. | DIRECTION

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
8:00	12:30	4½	13	Wait on Cement
12:30	1:30	1	21	Cut 13⅜ Csg Cut 7" Casing Lay down extension
1:30	2:30	1	14	Weld up Well head on casing
2:30	5:30	3	14	Nipple up B/P
5:30	8:00	2½	14	Hook up flow line

15 mm Safety Meeting Crew Change

DRILLER [signature]

EVENING TOUR

FOOTAGE FROM | TO | DR.-D RM.-R CORE.-C | CORE NO. | FORMATION (SHOW CORE RECOVERY) | ROTARY RPM | WT. ON BIT 1000# | PUMP PRESS | PUMP NO. LINER SIZE | PUMP NO. S.P.M. | PUMP NO. LINER SIZE | PUMP NO. S.P.M. | METHOD RUN

DEVIATION RECORD | DEPTH | DEV. | DIRECTION | DEPTH | DEV. | DIRECTION | DEPTH | DEV. | DIRECTION

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS

MEI DRILLING ACTIVITY LOG WELL#: [ ] DATE: [7-7-89]

TIME	DEPTH	NAME	COMMENTS
		Gary	
8:00 AM to 7:00 PM			Rig up & Work on New location
			We fixed all a air leaks &
			Diesel leaks Bit new location

DRILLING ACTIVITY LOG WELL # [Gary] DATE [7-8-89]

TIME	DEPTH	NAME	COMMENTS
		Gary	
8:00			Rig up & work on new location.
			work on Air pump & mud pump
8:00			Changed oil in all pumps
			Clean mud pump

800 AM 8 PM

DRILLING ACTIVITY LOG WELL #: [ ] DATE: [7-9-89]

TIME	DEPTH	NAME	COMMENTS
	Gray		
8:00			Rig up pick up dc. & make Bit up
			Clean up location, dig ditches and Dig Reserv pit
8:00			

Gary Peterson

MEI DRILLING ACTIVITY LOG WELL #:[ ] DATE:[7-9-89]

TIME	DEPTH	NAME	COMMENTS
0800		KRichins	Finish Rig UP, Pick up 17½" bit
			Repair Master Drlah control switch
			Strap tongs and chains
0800			Work holes on bit
12 hrs			

MEI DRILLING ACTIVITY LOG WELL #:[ ] DATE:[7-10-89]

TIME	DEPTH	NAME	COMMENTS
0600		K Riching	Warm up Equip
0630			dig 1' deeper in cellar dig ditch and pit
0730			Drlg 17½" hole F/13' TO 43'
0930			Conn
			White Drlg put together and weld 13⅜
			casing for Conductor
~~1400~~ 1500			
8 hrs			

MEI DRILLING ACTIVITY LOG WELL*:[ ] DATE:[7-10-89]

TIME	DEPTH	NAME	COMMENTS
		GARY	
08:00			Drill Surface
9:35			make con. (43feet 'work pipe to Bottom can not get to Bottom. Chang out Kelly subs.
12:00			Drill from 43 feet to 50 feet. cir & condition hole help welder weld up 13 5/8 casing for conductor
5:30			Trip out of hole to set con. pipe
4:00			Pick up casing & Run in hole
6:00	50'00		Cement
6:30	8:00		wait on cement to set up

7-10-89

MEI DRILLING ACTIVITY LOG WELL #:[5886] DATE:[7-11-89]

TIME	DEPTH	NAME	COMMENTS
2000 0800		K. Richms	8:00pm to 12:00am W.O.C.
2400			2400 Cut off 13 3/8 Casing Weld on Flowline, Mud up to 32 vis with Gel
0300			Plug bit Xover 6 1/2" Drill collar
0800			Remove Discharg Line Repair Forklift
0500			Drlg F/50' to 74'
0530			Clean hole For Conn
0600			Drlg F/74' TO 106'
0645			Conn @ 106'
0700			Hit Bridge plug bit
0745			unplug bit Ream & Circ for conn
0800			Drlg F 106'

MEI DRILLING ACTIVITY LOG WELL*:[5-886] DATE:[7-11-89]

TIME	DEPTH	NAME	COMMENTS
08:00	106/137	G Peterson	Drill from 106 to 137 work on Fork lift
9:00	137/167		Circulate Ream to Bottom, Tite hole, work pip Reaming to Bottom a few times to clean up hole. made con. last D.C. from 137 to 167 hole did clean up ok.
			Chang sub on kelly to x over to D.P.
10:00	167/197		Drill Drilling in to Frac @ 179feet picked up @ 183'
			Repair fork lift Dig Ditches to reserve pit
			build Reserve pit.
11:60			Drill 167 to 197 feet
12:30	1:30		Con. 197- 228.
1:30	2:00		Serv. Rig
2:00			Drill from 228 to 259 Gary Peterson 12
3:00			Drill from 259 to 290 Drew Larson 12
4:00			Drill from 290 to 321 Dave Peterson 12
5:00			Drill from 321 to 353 Mike Bancroft 12
6:30			Drill 321 to 384
7:00			Drill 384 to 400

2000 8:00 TD for casing 410feet

7/11/89

DRILLING ACTIVITY LOG WELL*:[5X7-2] DATE:[7/12/89]

TIME	DEPTH	NAME	COMMENTS
2000	410'	KRichins	Circ and cond hole
2030			Trip out 8 STD's & 2 6½"
2100			Trip in
2200			Circ Hole for Casing Adjust Outlet
2300			P/U Run Survey @ 378' ¼°
2900			Circ wait on Casing
0800			Circ wait on Casing
			10 4¾" drill collars ON Racks
			45 jts 3½" drill pipe

DRILLING ACTIVITY LOG WELL #: [S-89-2] DATE: [7-12-89]

TIME	DEPTH	NAME	COMMENTS
		Kerry	
8:00			Circ and con hole
8:30			Short trip out of the hole 8 stands of Drillpipe and 2 stands of D.C.
9:00			Trip in hole work on light plant
10:00			Circ and con hole for casing. Cedi clutch
11:00			Survey at 378 feet ¼° Service mud pump
12:00			Circ wait on Casing.
			Clean Rig and location.
			Make up oil racks for 55 gal Drum's
			Clean out celler.

MEI DRILLING ACTIVITY LOG WELL #: [589-2] DATE: [7-/12 89]

TIME	DEPTH	NAME	COMMENTS
8:00			Circ. wait on Casing Clean up Rig & Location.
			Service Rig
10:00	11:00		Unload Casing
11:00			wait on Dowell Clean casing & Strap casing
			Dump shellpit & Clean out shellpit Dig out
			ditches to reserve pit Clean Rig.
11:30			Called Dowell They did not have a pumping truck
			Then called halliburton, But they did not have
			a pump. Dowell said they would call when
			they could find a pumping truck.
12:00	8:00		Waiting on Dowell

Gary Petersen 12
Orrin Larsen 12
Dave Peterson 12
Mike Bancroft 12

MEI DRILLING ACTIVITY LOG WELL #: [S-89-2] DATE: [ ]

TIME	DEPTH	NAME	COMMENTS
1200		Richard	Wait on cement truck
			Load tools + clean rig + clean office
			Lock pipe + Rig Down Floor
			Lower derrick + Secure same
			Tear down Mud Tank + Haul Mud Tanks to Rig
			Hook up Air to Grabuprobe
			Service Mud pump + Clean Reserve Pump
			put in Rod motor oil in Mud pump motor
			& Put Bop rams in Larger Converter on Mud Pump
			Service Light plant
0700			Wait on pump truck

MEI DRILLING ACTIVITY LOG WELL #: [S 89-2] DATE: [7-13-89]

TIME	DEPTH	NAME	COMMENTS
8:00	410	G Peterson	wait on Cement truck
			Service Rig Put 3 gal motor oil in main motor
			5 gal Hyd oil in main torque converter
			Pick up around Rig. Level Location.
			Clean air filters on mud pump
			fix all air leaks
			fix all Diseal Leaks.
			adj. clutch Make up lay down line for 6 1/2" D.C
			work on water pump & lines Fixed all leaks
			Wash all motors on Rig Clean all Pitches
3:00			Short out of hole
3:30			Trip in hole
4:30			Circ condition hole Clean rig floor, GABY Peterson 12
8:00			Hook up weight indicator Dave Peterson 12
			Mike Bancroft 12

MEI DRILLING ACTIVITY LOG WELL#: [5-89-2] DATE: [7-14-89]

TIME	DEPTH	NAME	COMMENTS
2000		K Richins	wait on Cement truck grease Crown & Blocks
7/13 2300			Trip out to Run 7" Casing w/ Halliburton
2330			Lay Down 4 6½" DC's
0030			wait on Haliberton
0100			Pick up 7" screw on shoe
0130			Run 7" casing
7/14 0300			Rig up to Cement w/ Halliberton
0430			Finish Cement plug Down @ 4:30 Rig Down Halliberton
			Cut hole, drain 13⅜, pull flow Line
			wash same, wash pit Bucket cellar
0700			Jump fork lift to haul B.O.P's

MEI DRILLING ACTIVITY LOG WELL #: [S-89-2] DATE: [7-14-89]

TIME	DEPTH	NAME	COMMENTS
		G Peterson	
08:00			Wait on Cement to set.
			Clean nuts & bolts to B.O.P
			Pick up well head from dock
			Set Keamey & Rig up Air & power
			Chang out rubber on rotating head
			Clean rotating head & Chang O ring, & oil
12:30			Cut 13 3/8 Casing & 7" casing Lay Down Casing
1:30			Weld well head on
2:30			Nipple up BOP
5:30	to 8:00 2000		Hook up flow line
			Gary Peterson 12
			Dave Peterson 12
			Drew Larsen
			Mike Bancroft

MEI DRILLING ACTIVITY LOG WELL# [5-89-2] DATE [7-15-89]

TIME	DEPTH	NAME	COMMENTS
2000		K Richins	Hook up Air Line to Rotate Head oiler pick up tools Repair Geronimo cable Assemble Hammer Drill
2330			Pressure Test Casing @1250-1170psi 15 min (OK)
0080			Turn Rotate Head ¼ Turn nipple up flowline Change tong Dies grind Lip off tong
0230			p/u 41 4¾ Drill collars trip in Install Rotate Rubber
0430			Drlg cement Tagged @ 369' Float @ 388
0700			Trip out Drilled 1' Formation
0745			Pick up Hammer

MEI DRILLING ACTIVITY LOG WELL*: [589-2] DATE: [7-15-89]

TIME	DEPTH	NAME	COMMENTS
		G Peterson	
08:00			Trip in hole
9:00			Drill Kelly down
9:15			① Make con from 410 to 444 feet ② Jump start Fork lift
10:40			Make con from 444 feet to 475
10:45			Drill
12:30			Make con from 475 to 505 Drilling into clay
12:35			Drill
0:30			Make con from 505 to 536 (536 Changing Formation
3:15			Work Hammer Hammer not working like it should
320			Drill
350			make con from 536 to could not get to Bottom w
355			work pip to Bottom
4:30			Drill 336 to
5:30			Trip out of hole

5:30 Work on Hammer Bit
6:30 wait on orders
7:30 Trip in hole

SURP

MEI DRILLING ACTIVITY LOG WELL #: [S-89-2] DATE: [7-15-89]

TIME	DEPTH	NAME	COMMENTS
8:00		GARY	Trip in hole
① 9:00			Drill Kelly Down made con 410 to 444
			Drilling in clay penetration is slow 5 min a foot
			Clean up rig Dig ditches
10:40			P. make con 444 to 475 Drilling in clay
			picked up 6½ DC moved of location on pipe racks.
② 10:45			Drill con @ 1245 475 to
~~12:55~~			~~Drill~~
1230			con.

MEI DRILLING ACTIVITY LOG WELL #: [589-2] DATE: [7-16 89]

TIME	DEPTH	NAME	COMMENTS
2000		KRichins	Drlg F/ 546 TO 564
2030			Conn @ 564
2040			Drlg F/564 To 594
2115			Conn @ 594
2120			Drlg F/ 594 TO 625
2200			Conn @ 625
2205			Drlg F/ 625 TO 657
2240			Conn @ 657
2245			Drlg F/ 657 TO 688
2320			Conn @ 688
2325			Drlg F/ 688 TO 717'
2345			Conn @ 717
2350			Drlg F/ 717 TO 748
0020			Conn @ 748'
0025			Drlg F 748 TO 779'
0055			Conn @ 779'
0100			Drlg F/ 779 TO 810 Fracture @ 793'
0135			Conn @ 810

7/15

MEI DRILLING ACTIVITY LOG WELL#: [15-89-2] DATE: [7-16-89]

TIME	DEPTH	NAME	COMMENTS
0130		K Richins	Drlg F/ 810 To 841
0155			Conn @ 841
0200			Drlg F/ 841 To 872
0220			Conn @ 872
0225			Drlg F 872 To 903
0240			Conn @ 903'
0245			Drlg F/ 903 To 934
0315			Conn @ 934
0320			Drlg F/ 934 To 966
0340			Conn @ 966
0345			Drlg F/ 966 To 997
0405			Conn @ 997
0410			Drlg F 997 To 1027 Fractures @ 1005' and 1015', 1028'
0430			Conn @ 1028
0435			Drlg @ F/ 1028 To 1060
0450			Conn @ 1060
0455			Drlg F/ 1060 To 1090
0530			Conn @ 1090

MEI DRILLING ACTIVITY LOG WELL*:[S 89-2] DATE:[7-16-89]

TIME	DEPTH	NAME	COMMENTS
0525		KRichins	Drlg F/ 1090 TO 1120 Fracture @ 1116
0630			Conn @ 1120
0635			Drlg F/ 1120 To 1152
0805		GARY	CON @ 1152
0810			Drlg From 1152 to 1183
09:15		GARY	CON @ 1183
010:05			Drlg 1183 to 1214 Frac @ 1207 to 1214
010:10		GARY	CON 1214
01020			Drlg 1214 to 245 water @ 1216 temp up 5° out of water @ 1244
011:15		GARY	Con @ 1245
01120			Drlg 1245 to 1277
01215		GARY	CON 1277
012 20			Drlg 1277 to 1308
1320 01120		GARY	CON 1308 ADJ Clutch
0210			Drlg 1308 to 1340
0215		GARY	CON 1340 Gary Peterson 12
02 20			Drlg 1340 to 1371 Frac @ 1353
0245		Gary	CON 1371

MEI DRILLING ACTIVITY LOG WELL #: [589-2] DATE: [7-16-89]

TIME	DEPTH	NAME	COMMENTS
1450 0250			Drlg from 1371 to 1404
0330		Gary Peterson	1404
0335			Drlg 1404 to
0340			CIRC Hook up water pump
0350			Drlg
0355			Hit Frac @ 1415 Kelly Dropped 20 feet
0400			Fix Drilling cable on drum
0500			Come out of hole to inspect D.P. Pulled 6 Stands
0520			Kelly up Set CIRC back (CIRC)
0600			CIRC.
0615			Con. @ 1436
0620			Drill 1436 to 1438
0625	-800		CIRC
	2000		

Gary Peterson 12

MEI DRILLING ACTIVITY LOG WELL #: [S-89-2] DATE: [7-17-89]

TIME	DEPTH	NAME	COMMENTS
2000		KRichins	CIRC 5 JTS off bttm
2130			Trip out
2230			Break bit & Bit sub pick up Veral type Bit
			Attempt to strip in Bit [redacted] wont go through
			Rubber pick up and Break of sub screw on
			taper sub strip in pull Rotary Rubber screw
7/16			on bit sub and set Rotary Rubber
2400			trip in
0100			Break circ 60' off bttm
0230			Conn & circ 30' off bttm
0300			Conn Attempt to circ 5' off slim Return
7/17			thread Quit
0330			Pull 5 JTS
0400			wait on Air comp, Lube Rig & oth Equip
0600			clean up pull up in casing

NEI DRILLING ACTIVITY LOG WELL #: [S-892] DATE: [7-17] 89

TIME	DEPTH	NAME	COMMENTS
8:00 0800	-8:00 2000	GARY	wait on Air comp. Serv. Rig Clean up Rig. Dig Ditches pick up tools. Clean tong Dies. Clean ~~Dri~~ Air pump & mist tank

MEI DRILLING ACTIVITY LOG WELL #: [S-89-2] DATE: [7-18-89]

TIME	DEPTH	NAME	COMMENTS
2000		K Richards	wait on comp. Lube Rig fuel same
7/17 2300			Rig up AIR 2 comp & 1 Booster fuel to same
0200			trip in 16 STD's off Bttm Hit Bridge
7/18 0230			Ream & wash 30' Blow Hole clean
0300			trip in 14 STD's
0330			wash 60' Loss of Return @ 1430
0400			Attempt to Return with soap & AIR (no go)
0500			Drlg Blind F/1438 To 1497
0730			Short trip 6 STD's no fill
0800			Drlg F/1497 (Blind)

MEI DRILLING ACTIVITY LOG WELL #: [5-892] DATE: [7-18-89]

TIME	DEPTH	NAME	COMMENTS
0800		GARY	Drlg
10:00			Trip out of hole 42 stands
11:30			wait on orders
2:00			Trip in hole go back Drilling
3:00			CIRC.
330			Drlg
8:00			Drlg
DOW			

Drilled from 1497 feet to 1698

MEI DRILLING ACTIVITY LOG WELL #: [S-89-2] DATE: [7-19-89]

	TIME	DEPTH	NAME	COMMENTS
	2000		K Richins	Drlg F/ 1698 TO 1715
	2400			Conn @ 1715
	2005			Drlg F/ 1715 T.O 1747
	2155			Conn @ 1747
	2205			Drlg F/ 1747 TO 1778
	2300			Conn @ 1778
7/18	2310			Drlg F/ 1778 TO 1809
	2345			Conn @ 1809
	2355			Drlg F/ 1809 to 1841
	0100			Conn @ 1841
7/19	0110			Refire Booster, service Rig
	0200			Drlg F/ 1841 TO 1849
	0215			CIRC with AIR & soap
	0300			Trip out pipe very tight due to torque of worn bit
	0630			Wait on orders, of what bit to RUN in Hole
	0645			unload & Plastic Hose for MEI
	0700			Pick up mill tooth trip in.
	0900			Ream to 5' to 10's off BTTM

MEI DRILLING ACTIVITY LOG WELL #: [S-89-2] DATE: [7-19-89]

TIME	DEPTH	NAME	COMMENTS
0915		K Richm	Trip in Hole
0930		Gary	Kelly up Ream 98 Feet to bottom with Aire Soap
0300			Tag Bottom Ocig 2 feet
0380			Trip out of hole., Hole is Clean only one tite spot @ 20 stands from bottom.
0500	-8.00 2000		Wait on Bit Clean Rig Rig serv.

Gary Petersen

MEI DRILLING ACTIVITY LOG WELL#:[S-89-2] DATE:[7-20-89]

	TIME	DEPTH	NAME	COMMENTS
7/19	2000		K Richins	wait on 5 5/8" Bit
	0130			trip IN Collars 12 STD'S Hit Bridge
	0200			Ream Hole
7/20	0230			trip IN to 33 STD's off Bttm Hit Bridge
	0300			Ream Hole
	0330			trip IN Hole
	0400			tight 4 JT's From bttm
	0415			Lay Down 4 JT's IN V Door
	0430			Ream Hole
	0555			Drlg F/ 1849 TO 1872
	0645			Conn @ 1872
	0655			Drlg F 1872 To 1903
	0745			Conn @ 1903
	0755			Drlg F 1903 to 1934
	0845			Conn @ 1934
	0855			Drlg F 1934 To 1964
	0920			Conn @ 1964
	0930			Drlg F 1964 To 1996

MEI DRILLING ACTIVITY LOG WELL#:[5-89-2] DATE:[7-20-89]

TIME	DEPTH	NAME	COMMENTS
0955		KRichins	Comm @ 1996
1005			Drlg F 1996 To 2027
1025			Comm @ 2027
1035			Drlg F/2027 To 2029
1045			Ream tight hole work plug bit (unplug same)
1115			Drlg F 2029 To 2059
1220			Comm @ 2059
1230			Drlg F 2059 To 2089
1325			Comm @ 2059
1335			Drlg F 2089 To 2120
1430			Comm @ 2120
1445			Drlg F/2120 To 2152
1530			Comm @ 2152
1545			Drlg F/2152 To 2183
1630			Trip out 29 Stds Blow well with Air & Soap

589-2 7-21-89

K Richins MEI Drlg Log

0600- Breakbit
0730- Trip IN to 36 JT's off bttm wash 30'
0800- trip IN to 9 JT's off bttm
0900- Ream 270' to bttm
1230- Drlg F/ 2183 TO 2213
1300 - Conn @ 2213
1315 - Drlg F/ 2213 TO 2245
1345- Conn @ 2245
1400- Drlg F/ 2245 TO 2276
1420- Conn @ 2276
1435- Drlg F/ 2276 TO 2307
1450- Conn @ 2307
1500 - Drlg F/ 2307 2338
1515- total Depth @ 2338
1515- Blow Hole w/ AIR & SOAP
1530- Trip out to 1400'
1600 Blow Hole with AIR & SOAP
1630 Trip out set Kelly IN Rotate Rubber tools
1730 Lay Down Stands & Lock up
1800 shut Down Rig

MEI DRILLING ACTIVITY LOG WELL #: [S-89-2] DATE: [8-1-89]

TIME	DEPTH	NAME	COMMENTS
0900		KRichins	Change oil in Rig ✓ fuel filters & Hyd fuel filters
1300			service Rig Get Rig Ready to work

DRILLING ACTIVITY LOG WELL #: [5-89-2] DATE: [8-2-89]

TIME	DEPTH	NAME	COMMENTS
0700		K Richins	fire up Rig – Rig up Logger
0800			Run in Log To 420' Hit Bridge, temp @ 170°
0830			Rig up Air comp & Booster
0900			Trip in Hole
1000			Broke cat Head, Kelly Drive Chain, Repair same
1430			Trip in Hole
1630			Break circ. @ 2158'
1700			Ream 30'
1730			Trip in Hole w/ 6 Jt's Drill pipe fill String w/ 15 bbl water
1800			Log @ 2305' 327° temp
1900			pull Log
1930			Trip out sideways Left 55 t's DP & 6 Jt's DC's
2030			screw in TIW valve shut Down Rig p/u tools

NEI DRILLING ACTIVITY LOG WELL*: [S-89-2] DATE: [8-3-89]

TIME	DEPTH	NAME	COMMENTS
0700		K Riching	Lay Down 5 Jt's DP 6 Collars Bitsub & Bit
0815			Rig up to Log w/ pruett
0830			Run in Hole w/ Temp Log To 800' @ 180°
1000			P/U bit Run in Two DC's & 32 Jt's in Hole
1200			Ream bridge @ 1120' Sweep Hole
1230			Trip in To 1310
1300			Sweep Hole, good Return
1330			trip in to 1470
1400			trip out for Log's
1445			Rig up Run Log To 2320' 211°
1715			temp @ 224° pull Log
1800			Shut down Rig

MEI DRILLING ACTIVITY LOG WELL #: [5-89-2] DATE: [8-5-89]

TIME	DEPTH	NAME	COMMENTS
0800		KRichins	wait on Log truck
1100			M.O.U.C 4½" Liner to Loc
1230			TIH w/Collars & DP
1430			TOH Leave 2 DC's & 15+ DP
1500			Shut Down

Appendix B

"Slim Hole" Drilling Program

Objective: Drill/Complete exploratory hole to ±1500' TD and evaluate formation. Conductor casing 13 3/8" set at ±40-120', surface casing set at ±250'-400', 6 1/4" open hole to 1500' or producing formation.

Prepared by: Jay C. Hauth, July 1988
Version 2: October, 1988
Version 3: April, 1989

Sequence of Operations

1. Construct location and sump per rig requirements.

2. MIRU rotary drilling rig.

3. Mix spud mud per attached drilling fluids program
3a Drill 26¼" hole for 20" Conductor Casing.
4. Spud well with 17 1/2" bit and drill to ±40-120'. Run and cement 13 3/8" conductor per attached cementing program. Optionally, run 12" OD X .375" wall ASTM A53 gr B, seamless or ERW pipe, w/butt weld ends. Optionally, install master valve and rotating head w/ 6" flowline per attached drawing, per supervision/geology direction. Note requirement for ±50' handwheel extension with optional master valve.

5. Visually inspect and note on Tour Sheet whether all drill pipe is white banded, specifying that it meets AAODC API Class II inspection as to the following:

1. Electromagnetic inspection of tubes (Sconoscope or Scanalog)
2. Wall thickness and cross-sectional area (Ultrasonic or gamma ray)
3. Tool jt inspection (electronic or mag particle)

Also check to see that all drill collar connections have been mag particle inspected and that all bottom hole assemblies have been magnafluxed prior to delivery. Note condition on Tour Sheet. Ensure that 7" casing is on location and in position to run. Ensure all casing accessories, wellhead equipment, and circulating head are on hand.

6. RIH with 9 7/8" bit and drill with mud to ±250'-400, depending on geology. Remove thread protectors, clean threads, drift and measure casing while drilling surface hole. Measure KB height and log on Tour Sheet. After casing point has been selected, drill any additional hole that might be required so that casing can be landed within 1' of bottom, and still space out correctly on surface. Maintain hole as straight as possible while drilling. Take drift shots every 100-200'. Run maximum reading thermometer on each survey. Maximum angle at TD 4 degrees or less. Maximum rate of change 1 degree per 100'. Monitor and record flow line temperatures every hour. Catch 2 sets of formation samples every 10'.

7. Upon reaching desired depth, circulate and condition mud until shaker screen is clean and viscosity is less than 45 sec/qt. Make wiper trip. Check for fill. If hole is in good condition, circulate bottoms up, POOH, and laydown 9 7/8" drilling assembly. If tight hole was encountered on wiper

trip, then make another wiper trip. It may also be necessary to further condition mud.

8. Rig up and run 7" casing to TD, per attached casing program. Run in hole slowly to avoid breaking down formation and losing circulation. Circulate past any bridges encountered. Use proper makeup torque on casing, and geothermal casing dope on threads.

9. Once casing has been run to TD, circulate hole clean, while reciprocating casing, with at least two full circulations. Circulate until hole is clean, mud is in good shape, and viscosity is less than 45 sec/qt. Check bottoms up time to be sure mud is not channeling.

10. When mud is in good shape, cement casing as per attached cement program. Monitor and record cement data to assure adherence to cmt. program. Catch cement samples. If possible, reciprocate casing while pumping cement. Land casing approximately 1' off bottom. Center casing in rotary table.

11. WOC 8 hrs. (check samples to determine if additional time is req'd) Monitor cement in annulus. If it falls back, bring it back to surface with 1" pipe.

12. Land and cut off 7" casing. Weld on 7" x 300 SR Starter flange. Test between welds. Check with level to be sure flange is on correctly. Callout surveyors to survey casing head location.

13. Make sure that BOP equipment has been inspected by the manufacturer or an authorized agent prior to arrival and that all equipment is proper and in good shape on delivery. Nipple up BOP equipment per attachment. Test 7" casing and BOP equipment to 500 psi with BLM representative present to witness. Log test data and request BLM witness to sign name and successful test completion on Tour Sheet.

14. Trip in hole with 6 1/4" mill tooth bit and tag cement. Log top of cement on Tour Sheet. Drill out baffle plate, cement and float shoe from 7" csg with spud mud. Drill 10' of formation and then trip to pick up button bit or hammer/hammer bit. If the decision is made to air drill, run float in bit sub and unload mud out of hole with air on the trip back in. If the decision is made to drill with mud, then displace the spud mud out of the hole with the gel/water/polymer system when you reach bottom with bit. See attached mud system details.

15. Drill 6 1/4" hole with air, foam, or mud to 1500', or until producing formation is encountered. Test formations per engineer's direction, log per permit and engineer/geologist requirements. Operate BOP on each trip out of hole and log on Tour Sheet. Ensure accumulator is holding pressure.

16. Upon reaching TD, circulate hole clean, laydown drill string, ND BOPs, clean location and release rig.

17. Submit all reports as required by regulatory agencies.

Drilling Fluids Program

17 1/2" and 9 7/8 " surface hole, 0- ±250'-400'

Mud System: Gel, lime, water, LCM (Spud Mud)
Mix 15-20 Lb/Bbl bentonite in fresh water. Flocculate with lime.

Weight: As low as possible with mechanical solids control equipment

Viscosity: 45-55 sec/qt or as needed to clean hole

Water loss: No control

Total hardness: No control

pH: Mix lime through chemical barrel to maintain 9.5-10.5 pH

Comments: Lost circulation through this interval is possible. No formation pressures are anticipated. Keep plastic viscosity down and yield point up. Run solids control equipment continuously. Break circulation slowly and trip slowly. Use Desco to thin mud if necessary.

6 1/4" Hole, ±250'/400' - TD

Mud system: Polymer, gel, soda ash, Desco, high temp thinner. Drill out cement with Spud Mud and then dump Spud Mud. Build new system. Mud up in clean steel pits by mixing, with fresh water, 1/2 lb/bbl caustic soda and a ratio of 8 bentonite to 1 Drispac regular. Mix bentonite first and then slowly add (30 min/sk) Drispac. (Substitute a high molecular weight anionic liquid polymer such as Magcobar Rapid Mud for Drispac if so desired)

Weight: As low as practical with water and mechanical solids control equipment.

Viscosity: 38-45 sec/qt with bentonite and Drispac (8:1 ratio of bentonite:Drispac) Stay on this ratio to maintain viscosity after Mud-up.

Water Loss: No control

Total Hardness: Below 300 ppm with soda ash.

pH: 9.5-10.5

Rheology: Control flow properties at reasonable levels with Desco thinner. If downhole temperatures increase to where Desco is not effective, then use high temp thinner

Torque, Drag, Hole Stability, and high temp lubricant: Add 2 ppb Soltex additive as necesary.

Lost Circulation (surface to TD): Methods to be used as follows:
1. Lost circulation materials such as nut plug, cotton seed hulls, saw dust, medium Kwik-Seal, etc.
2. Gunk Squeezes
3. Cement
4. Lighter-than-water drilling fluids

Abnormal Presure: Weight material (barite) should be on location at all times.

Corrosion: Add corrosion inhibitors such as oxygen scavengers or scaling amines to control corrosion.

Stable Foam Make-up:
Mix 1/2 - 2 ppb Drispac in water
1-2 ppb soda ash
5-10% foamer <u>just before use</u> (use alpha olefin sulfonate for high temp foamer)
Air-Mud ratio required = 100:1 to 300:1

Special considerations:
1. Drilling recorder to monitor rate of penetration
2. Catch drill cutting samples (2 sets) every 10', cleaned, sacked, and labeled in accordance with geologist direction. Collect samples every 5' on conductor.
3. All lost circulation zones encountered shall be recorded in Tour book, recording both the depth at which the loss occurred, as well as amount and rate of fluid lost.
4. In and Out temperatures, both mud and air, shall be recorded in Tour book every hour.
5. Temperatures should be taken with every directional survey by running a maximum registering thermometer in the survey instrument.

Casing Program

Conductor casing: ±40-120' 13 3/8" 61 ppf J-55 BT&C in 17 1/2" hole
Optional: ±40-120' 12" OD X .375" wall ASTM A53 gr B, seamless or ERW pipe, w/butt weld ends, in 17 1/2" hole.

Surface Casing: ±250'-400' x 7" J-55 20 ppf ST&C Range 2 Casing

Torque: 3200 ft-lbs

Drift ID: 6.331"

Strength ratings:
- Yield - 2992 psi
- Collapse - 1816 psi
- Tension - 187,200 lb

Accessories:

Float equipment: flapper type conventional float shoe on bottom of string and baffle plate installed one jt up from bottom

Centralizers: 2 centralizers installed in the middle of the bottom 2 jts (7" x 9 7/8" bow type)

Wellhead equipment: 7" x 300 SR SOW starter flange for wellhead. 300 SR gate valve for master valve.

Notes:

- Tack weld shoe, also top and bottom of couplings on bottom three jts
- Lower casing in hole slowly to avoid formation breakdown and lost circ.
- Use geothermal grade thread dope on casing threads

Cementing program

±250'-400 x 9 7/8" hole x 7" casing surface job

Slurry description: API Class "G" or "H" cement mixed with 5.0 gal/sk water

Requires: .2301 sk/linear ft in 9 7/8" annulus

Slurry wt: 15.8 lbs/gal or 118 lbs/cu. ft.

Yield: 1.15 cu.ft./sk

Water requirement: 5.0 gal/sk or 0.67 cu.ft./sk

Pump time: 1-2 hrs

24 compressive strength: 2915 psi

7" J-55 20 ppf ST&C casing displacement= .0404 bbl/linear ft or .2273 cu.ft./linear ft.

Note: calculate cement job with 100% excess in open hole; 50% in cased hole is OK.

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 no later than drilling out the production casing.

In all matters of safety, the H2S safety man has the FINAL WORD on procedures. NO DRILLING OPERATIONS SHALL BE CONDUCTED CONTRARY TO THE H2S SAFETY MAN'S DIRECTION. NO EXCEPTIONS.

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

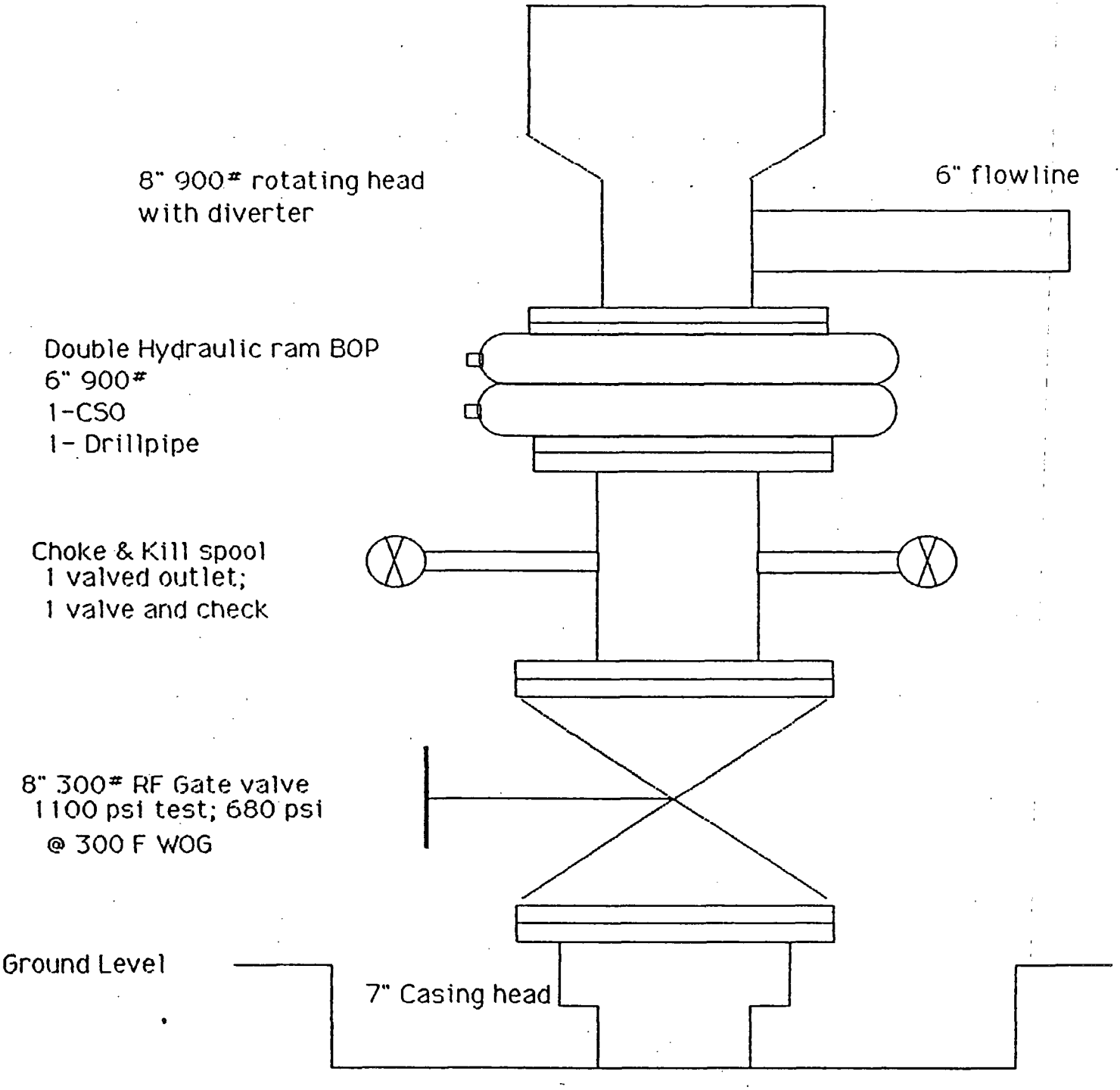
IN CASE OF H2S ALARM:

1. MASK UP WITH ESCAPE UNIT

2. GO IMMEDIATELY TO THE UPWIND BRIEFING AREA

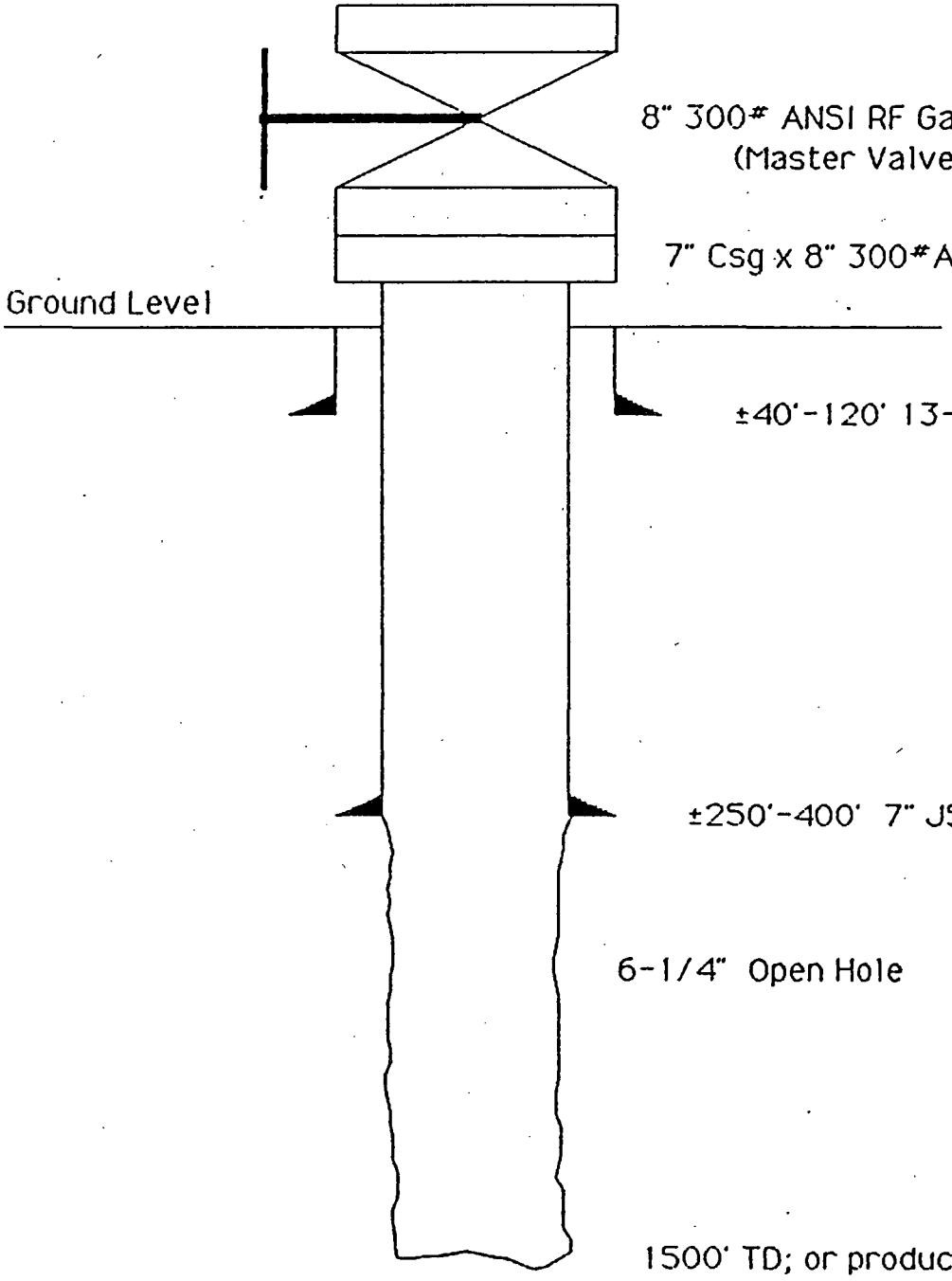
NO EXCEPTIONS UNLESS DIRECTED BY H2S SAFETY MAN ON LOCATION

Blowout Preventer Details; 7" casing



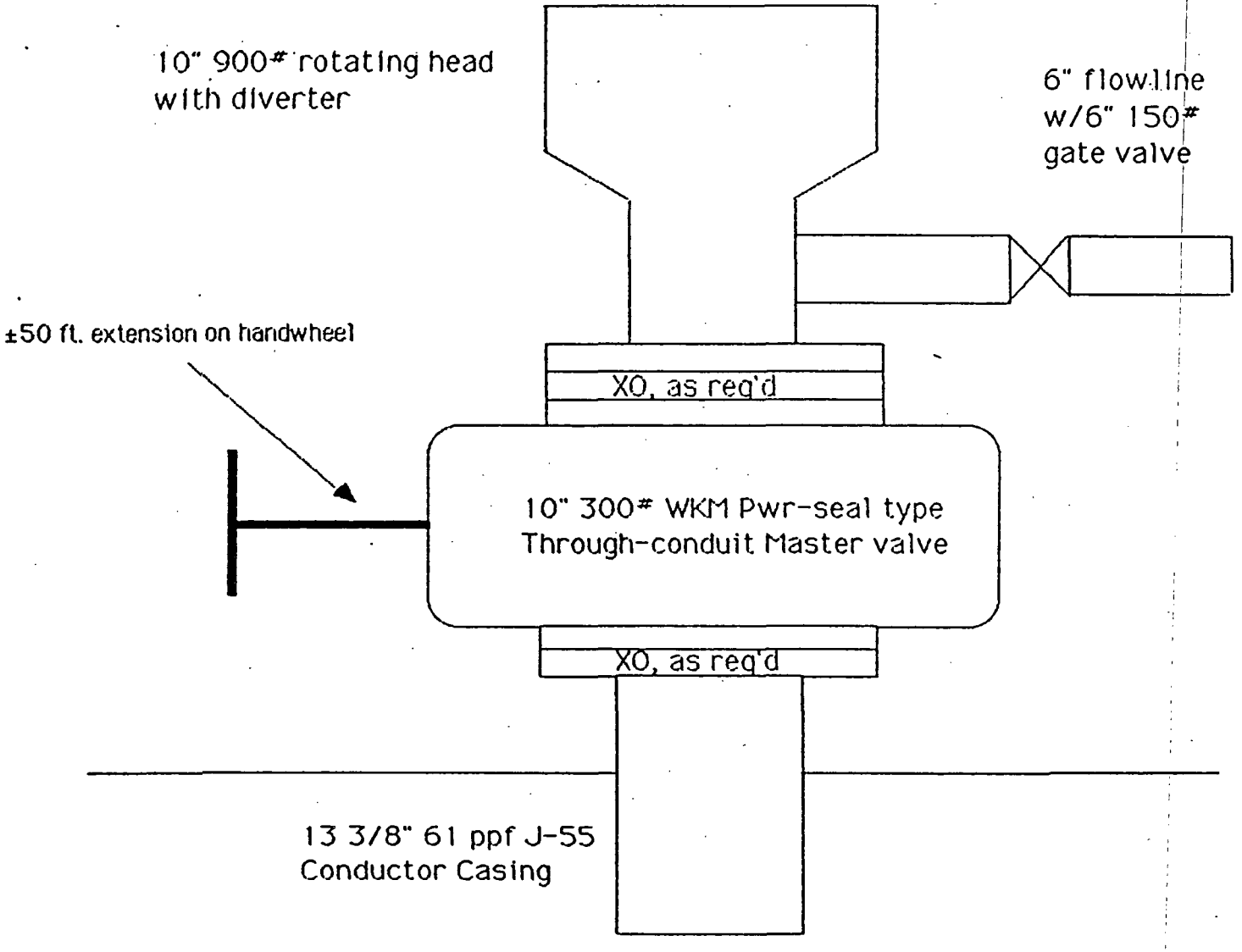
JCH 9/88

Slim Hole Completion Details



Not to Scale

Blowout Preventer Details; 13 3/8" casing (optional, as req'd on slim hole program)



JCH 10/5/88

Appendix C

LITHOLOGIC LOG OF MEI WELL S-89-2

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

By
Joseph N. Moore
Salt Lake City, Utah

November, 1989

MEI well S-89-2 was sampled to a depth of 1420 feet. This report describes the rock types and alteration encountered in the well. The report is based on a binocular logging of the chips supplemented by petrographic examination of thin sections from 14 selected intervals. The results of this work are summarized in the accompanying lithologic log.

Lithologic Relationships

Well S-89-2 encountered with increasing depth, alluvium, latite porphyry, Three Creeks Tuff, Wales Canyon Tuff, Coconino Sandstone, and an interbedded sequence of limestone and dolomite. Alluvial deposits were penetrated between the surface and a depth of 150 feet. The alluvial deposits contain abundant fragments of lava flows and ash-flow tuffs that are exposed at the surface around Sulphurdale. The fragments of ash-flow tuff typically display moderate to intense argillic alteration. Iron oxides give the alluvial deposits in the upper 50 feet of the well a distinct yellow-brown color.

The chip samples collected between 150 and 600 feet consist of latite porphyry and coarse-grained crystals of quartz and plagioclase that appear to have been derived from the Three Creeks Tuff (see below). The latite in this interval is fine-grained and light to medium gray in color. Under the binocular microscope, small square phenocrysts of plagioclase can be seen.

Thin sections of representative intervals between 150 and 600 feet were prepared in order to better characterize the mineralogy and alteration of the latite porphyry (see Appendix 1). Two different lithologies were observed. Chips from depths above 310 feet appear to consist mainly of fine-grained latite porphyry lava flows that in places, display well developed flow banding of plagioclase microlites. These chips

contain phenocrysts of plagioclase, minor biotite that has been largely altered to clays, magnetite and pyrite. The opaque minerals appear to be mainly secondary in origin. Vesicles filled with quartz, clays, and calcite are present in a few of the samples.

The matrix of the flows consists of fine-grained potassium feldspar and traces of quartz. In some of the chips, the matrix spherulitic devitrification textures are preserved. Coarser grained granophyric textures characterize a few percent of the chips from 270-280 feet. The coarser grain size of the matrix in these samples suggests that they may have been derived from the interiors of the lava flows. In contrast to the chip samples from the upper portion of this unit, chips from depths below 340 feet consist mainly of variably rounded fragments of latite porphyry that are cemented by clay minerals. The fragments of latite porphyry in these chips are much finer-grained than in the overlying rocks and typically much more altered. These chips may represent lapilli tuffs that were deposited around the vent during the initial eruptions of the latite porphyry. Fragments of Three Creeks Tuff and crystals of coarse-grained quartz, potassium feldspar, and plagioclase are also present in amounts of up to several percent in the thin sections. These fragments may represent material that was blown out of the vent during the pyroclastic eruptions and deposited within the lapilli tuff. No fragments of ash-flow tuffs younger than the Three Creeks Tuff were observed. This observation is consistent with the relationships mapped by Moore and Samberg (1978) which suggested that the latite domes exposed near Sulphurdale were emplaced after the deposition of the Three Creeks Tuff at 27 my but prior to the Osisris Tuff 22 my ago.

The latite porphyry encountered in S-89-2 appears to be part of a dome complex that thins rapidly to the east. Mineralogically similar latite porphyry was encountered in

S-89-5, where it is approximately 450 feet thick, and in S-88-1, where it is only about 100 feet.

The latite porphyry is underlain by the crystal-rich Three Creeks Tuff which was encountered between depths of 600 and 1000 feet. The Three Creeks Tuff is medium to light gray in color and contains approximately 50% phenocrysts of plagioclase, biotite, potassium feldspar, hornblende and quartz in a matrix of densely welded ash and rare shards. Phenocrysts of resorbed quartz, which typically display a bipyramidal crystal form, and coarse phenocrysts of biotite up to several millimeters in diameter are characteristic of the unit.

The Wales Canyon Tuff was penetrated between depths of 1000 and 1100 feet. The Wales Canyon Tuff is distinguished from the overlying ash-flow tuffs by its finer grain size, a slightly lower phenocryst content (approximately 40%) and the common occurrence of lithic fragments of andesite lava flows and sandstone. The Wales Canyon Tuff in S-89-2 is light gray in color and strongly altered to mixtures of clays, quartz, and calcite. A thin section from 1080-1090 shows that the phenocrysts originally consisted of plagioclase, hornblende, and minor quartz in a densely welded matrix of shards and ash.

The volcanic rocks in S-89-2 are underlain by sandstones and limestones. Fragments of fine-grained sandstone, assigned to the Coconino Sandstone in adjacent wells, were encountered at a depth of 1100 feet. The Coconino Sandstones is a clean quartz sandstone that is cemented by quartz overgrowths and minor sericite. Between 1150 and 1420, the rocks consist of medium to fine-grained interbedded limestone and dolomite. Thin sections show that the carbonates have been recrystallized to fine-grained marbles and mineralized (see below). Similar features were observed in Unocal's well 42-7. Moore and Samberg (1978) concluded that recrystallization of the limestone occurred during emplacement of the quartz-monzonite intrusion that underlies Sulphurdale. The lithologic

relationships in S-89-2 suggests that these limestones and dolomites are correlative with the thick carbonate sequence encountered in the Union well 42-7 and MEI well S-89-5.

Hydrothermal Alteration

The rocks in S-89-2 range have been moderately to strongly altered. A thin section of altered alluvium from a depth of 80-90 feet in S-89-5 shows that the plagioclase phenocrysts in the volcanic fragments have been replaced by kaolin and that some of the mafic minerals in these fragments have been altered to a green clay. A few fragments that have been intensely altered to clays and quartz were observed in a thin section from a depth of 200-210 in S-89-2. These fragments probably represent material derived from shallower depths.

Additional secondary minerals within the alluvium include coarse radiating aggregates of pyrite and marcasite (100-110 and 130-140 feet) and gypsum. Gypsum is also found in vugs in the underlying latite porphyry to a depth of 390 feet. It typically occurs as small euhedral crystals which coat pyrite when both minerals are present.

The argillic alteration of the alluvium must have been produced by acidic fluids such as those that are forming in the pit at Sulphurdale. These fluids form where hydrogen sulfide, which is being released from a boiling water table below Sulphurdale, reacts with oxygenated water to produce sulfuric acid. The fluids that produced the alteration in S-89-2 could have migrated laterally through permeable horizons. As the acid solution reacts with the surrounding rocks, the pH of the fluid is rapidly buffered leading to the formation of neutral sulfate-rich groundwaters. These sulfate waters could have produced the gypsum present in the upper portion of the well. The pyrite in the alluvium could have been produced by reactions between the rising hydrogen sulfide and iron-bearing

minerals present in the rocks. In contrast, the pyrite in the underlying rocks is associated with quartz and calcite veins indicating that the deeper pyrite was deposited by upwelling thermal fluids.

Thin sections of the latite porphyry and the ash-flow tuffs indicate that they have been variably altered to mixtures of clays, quartz, calcite and pyrite. Mixed layer illite-smectite (sericite) and quartz are found as secondary phases in the matrix of the volcanic rocks as a replacement of the phenocrysts. Textural relationships suggest that in the latite porphyry, the clays and quartz occur as an alteration product of the glassy matrix as well as a replacement of potassium feldspar formed by devitrification of the glass. Similarly, thin sections of the ash-flow tuffs indicate that these secondary minerals represent a replacement of the potassium feldspar that formed by devitrification of the shards and ash. Pyrite occurs both as dissmeninated grains in the matrix of the volcanic rocks and in veins.

Calcite occurs primarily as an alteration product of the plagioclase and hornblende phenocrysts. In addition, calcite replaces the matrix of the ash-flow tuffs where the rocks have been cut by calcite veins.

Veins consisting primarily of calcite, quartz (and/or chalcedony in the latite porphyry) and minor pyrite and sericite are common within the volcanic section and were observed in each of the thin sections that were prepared. Chalcedony, quartz, calcite and clay minerals are also present as vesicle fillings in the latite porphyry. According to Fournier (1985), the formation of chalcedony is indicative of temperatures below about 200oC.

In addition to veins containing variable amounts of quartz, calcite, and pyrite, some of the veins observed in thin sections from depths of 1150-1160 and 1280-1290 also contain sphalerite, galena, and sericite. In the sample from

1150-1160, the base metal veins are in turn crosscut by calcite veins. Fluorite is associated with quartz in veins from the deepest sample (1410-1420 feet). These veins cut chips of pyritized limestone. In addition, coarse grained crystals of anhydrite are present in this sample.

Similar base metal sulfide veins were observed in the cuttings from Unocal wells 42-7 and 31-33. Although the age of this mineralization cannot be determined from the observed relationships, the widespread occurrence of these sulfide minerals, the presence of a mineralized intrusive beneath Sulphurdale (Ross and Moore, 1985) and the low salinity of the geothermal fluids encountered in 42-7, suggest that this mineralization is more likely related to the hydrothermal activity that accompanied emplacement of the intrusion than to the present thermal system.

Structural Relationships

A comparison of the lithologic logs for S-89-2 and S-89-5 shows that all of the major rock types were encountered at greater depths in S-89-2 than in S-89-5. S-89-2 encountered the Wales Canyon Tuff at a depth of 1000 feet, the Coconino Sandstone 1100 feet, and the top of the carbonate sequence at 1150 feet. In contrast these units were penetrated at depths of 730, 930, and 1120 feet respectively in S-89-5.

The differences in the depths to these contacts may be due mainly to the effects of erosion rather than to the presence of any significant faulting between the two wells. This possibility is suggested by the thicknesses of the Wales Canyon Tuff and Coconino Sandstone in the two wells and by the fact that the top of the carbonate sequence differs in elevation by only 30 feet between the two wells. In S-89-5, both the Wales Canyon Tuff and the Coconino Sandstone are slightly more than twice as thick as they in S-89-2. Thus, the Wales Canyon Tuff

encountered in S-89-2 may have been deposited in a topographic low developed on the top of the Coconino Sandstone. The absence of a non-welded zone at the top of the Wales Canyon Tuff implies that at least some erosion occurred prior to deposition of the overlying Three Creeks Tuff.

References

Fournier, R. O., 1985, The behavior of silica in hydrothermal systems: Reviews in Economic Geology, v. 2, p. 45-61.

Moore, J. N., and Samberg, S., 1979, Geology of the Cove Fort-Sulphurdale KGRA, University of Utah Research Institute Report.

Ross, H. R., and Moore, J. N., 1985, Geophysical investigations of the Cove Fort-Sulphurdale geothermal system, Utah: Geophysics, v. 50, p. 1732-1745.

APPENDIX 1

200-210 feet: Latite Porphyry

Weak to moderately altered latite porphyry lava flows containing phenocrysts of plagioclase and psuedomorphs of biotite. The plagioclase has been weakly altered to clays and calcite. The biotite has been strongly altered to clays, pyrite, and magnetite. The originally glassy matrix of the rock has been devitrified to mixtures of potassium feldspar and quartz. Moderate hydrothermal alteration of the devitrified matrix has occurred, producing a fine-grained mixture of clays and quartz. Pyrite is disseminated throughout the matrix of the chips. The latite is cut by veins of calcite and pyrite. In one chip a calcite vein cuts the pyritized latite indicating that the calcite in part, postdates pyrite deposition. Approximately 5% of the chips are intensely altered to clays (kaolin?) and quartz. These chips may be derived from the alluvial deposits.

270-280: Latite Porphyry

Moderately to strongly altered latite porphyry as above. A few percent of the fragments have a coarse-grained matrix suggesting that these fragments are from the interiors of the lava flows. Veins of calcite and chalcedony are present. Alteration of the feldspar phenocrysts is more intense than above.

300-310: Latite Porphyry

Moderately to strongly altered latite porphyry as above. Amygdules are present in some of the samples and are filled with calcite and mixed layer illite-smectite. Traces of a green clay (chlorite-smectite) are present. The latite is cut by veins of quartz, calcite, and calcite + chalcedony.

330-340: Lapilli Tuff

Strongly altered lapilli tuff. The chips consist of fragments of latite in a matrix of mixed layer illite-smectite. Individual fragments within the lapilli tuff include fine-grained latite, latite porphyry and coarse crystals of plagioclase, potassium feldspar,biotite, and quartz that appear to have been derived from the underlying Three Cryeeks Tuff. Pyrite is disseminated throughout the lapilli tuff. Veins of calcite ± pyrite (partially altered to hematite) ± chlorite-smectite cut the lapilli tuff.

370-380: Lapilli Tuff

Strongly altered lapilli tuff as above. Veins of calcite with selvedges of pyrite + iron oxides cut the lapilli tuff.

440-450: Lapilli Tuff

Strongly altered lapilli tuff as above. Veins of calcite, calcite + pyrite cut argillically altered lapilli tuff. Traces of intensely silicified rock containing minor sericite and leucoxene are present.

550-560: Lapilli Tuff

Strongly altered lapilli tuff as above. The tuff is cut by veins of calcite + pyrite.

930-940: Three Creeks Tuff

Strongly altered Three Creeks Tuff. Feldspar phenocrysts have been replaced by calcite and sericite. Hornblende has been completely altered to clays (chlorite-smectite?) and calcite. Biotite phenocrysts have been partially replaced by calcite, pyrite, quartz and clay minerals. The matrix of the ash-flow tuff has been moderately to strongly altered to a fine-grained mixture of sericite, quartz, and calcite. Pyrite is disseminated throughout the chips. The ash-flow tuff is cut

by veins of calcite.

970-980: Three Creeks Tuff

Strongly altered Three Creeks Tuff as above. Biotite phenocrysts have been strongly altered to clays, calcite. Veins of calcite + pyrite are present.

1080-1090: Wales Canyon Tuff

Strongly altered Wales Canyon Tuff. Both the phenocrysts and the matrix of the ash-flow tuff have been replaced by fine-grained mixtures of clays, quartz, and calcite. Traces of quartzite fragments which may represent lithic fragments originally present in the ash-flow tuff are present. Disseminated pyrite is common. Veins of quartz + calcite and pyrite cut the chips.

1150-1160: Limestone

The chips consist of pyritized limestone, quartzite breccia and Coconino sandstone. Veins of quartz + calcite + pyrite + sericite, quartz (open space fillings), and quartz + sphalerite + galena + pyrite + calcite cut by calcite veins are present.

1280-1290: Fine-grained marble

The chips consist of fine- to medium grained limestone. The grain size of the limestone and the presence of rhombic grains suggests that it has undergone recrystallization. Pyrite occurs as disseminated veins in the carbonate rocks. Veins of quartz + sphalerite + galena + pyrite + calcite + sericite are present.

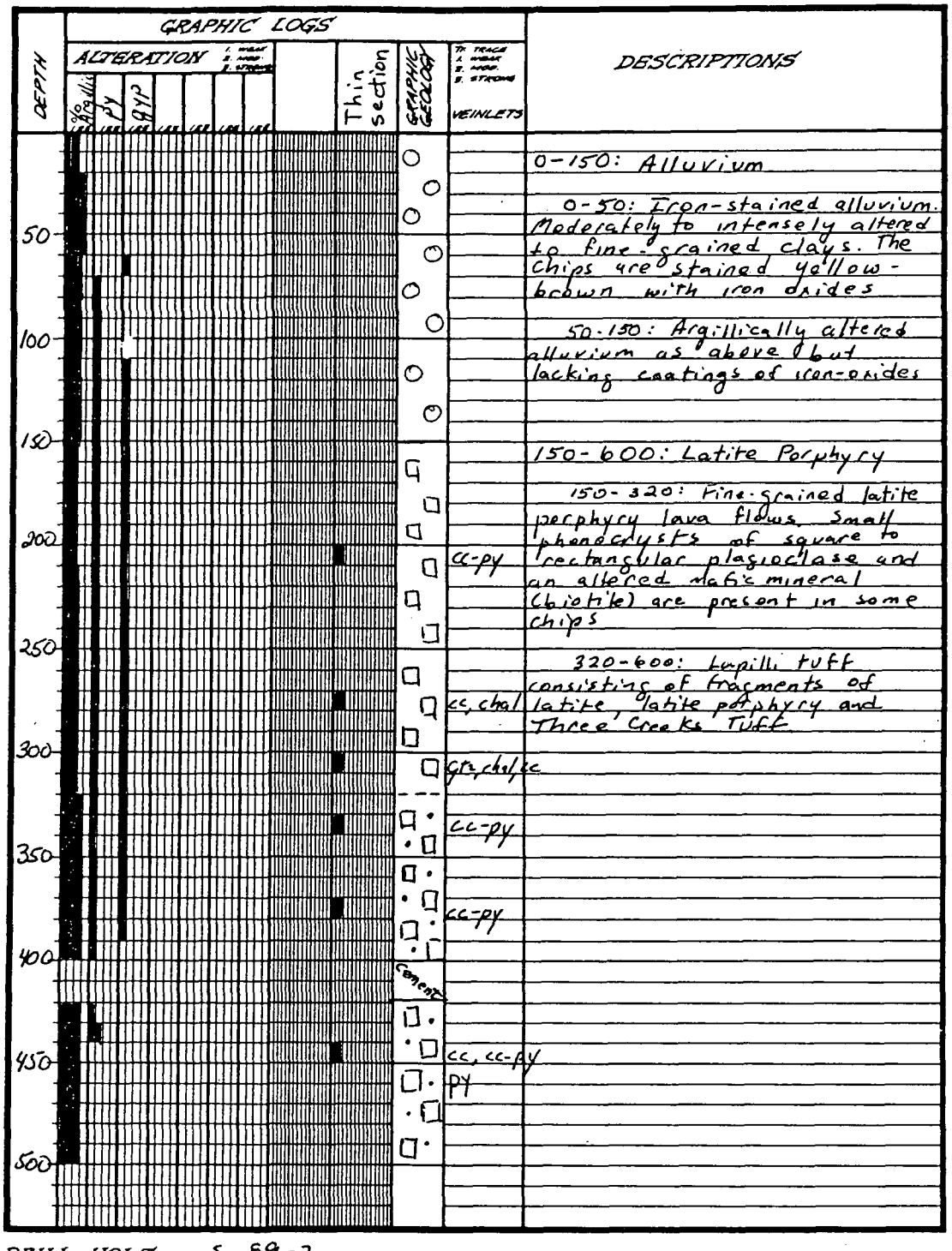
1340-1350: Fine-grained marble

Fine grained marble as above. Approximately 20% of the chips are of volcanic rocks and Coconino Sandstone. The

limestone is cut by veins of quartz + pyrite and calcite + quartz + pyrite.

1410-1420: Fine-grained marble

Fine grained marble as above. Marble containing disseminated pyrite is cut by veins of quartz + fluorite. Coarse crystals of anhydrite are present in the chips. Traces of veins of coarse plumose quartz overgrown by chalcedony and cut by calcite veins are present.



0-150: Alluvium

0-50: Iron-stained alluvium. Moderately to intensely altered to fine-grained clays. The chips are stained yellow-brown with iron oxides

50-150: Argillically altered alluvium as above but lacking coatings of iron-oxides

150-600: Latite Porphyry

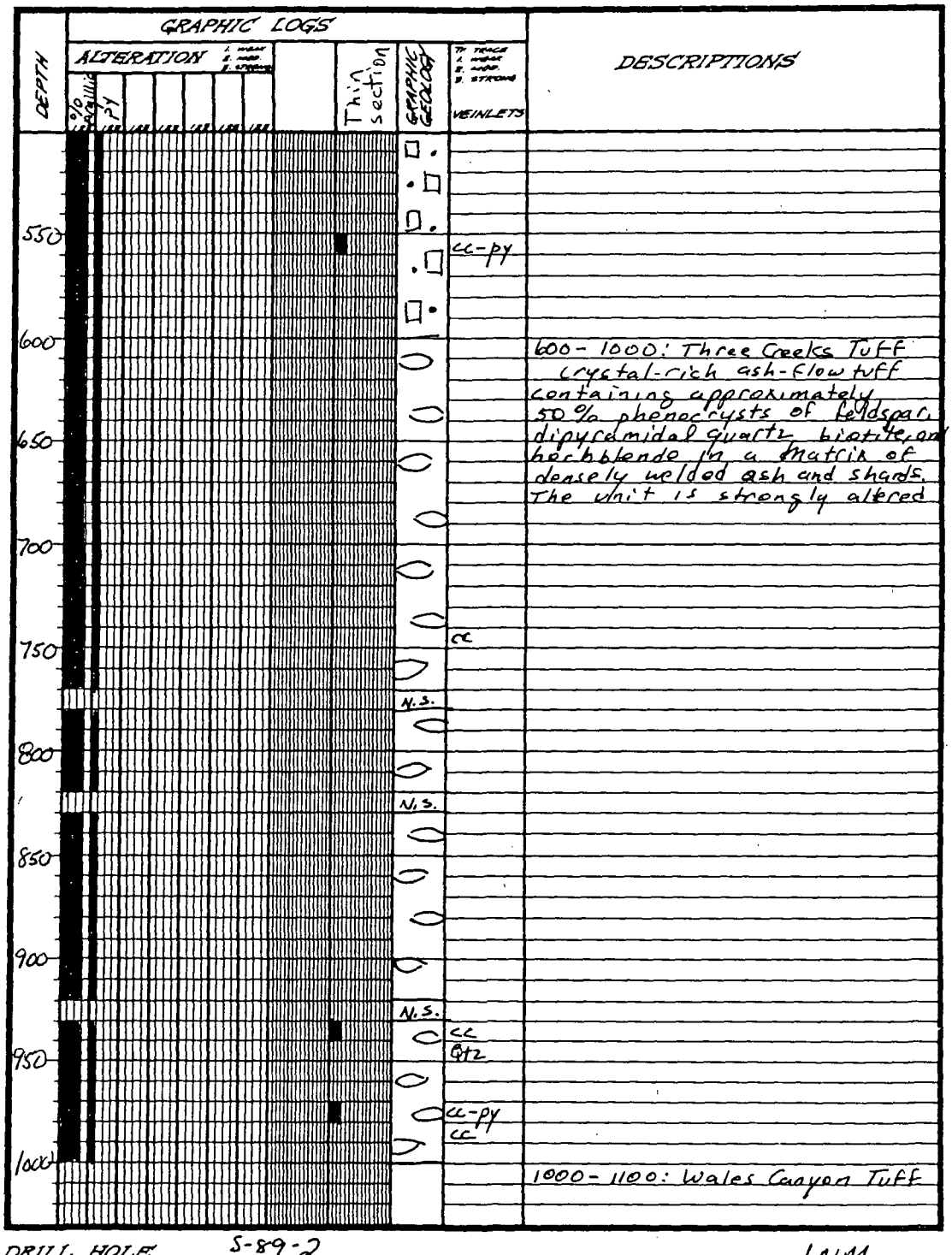
150-320: Fine-grained latite porphyry lava flows. Small phenocrysts of square to rectangular plagioclase and an altered mafic mineral (biotite) are present in some chips

320-600: Lapilli tuff consisting of fragments of latite, latite porphyry and Three Creeks Tuff

DRILL HOLE S-89-2

LOCATION Sulphurdale

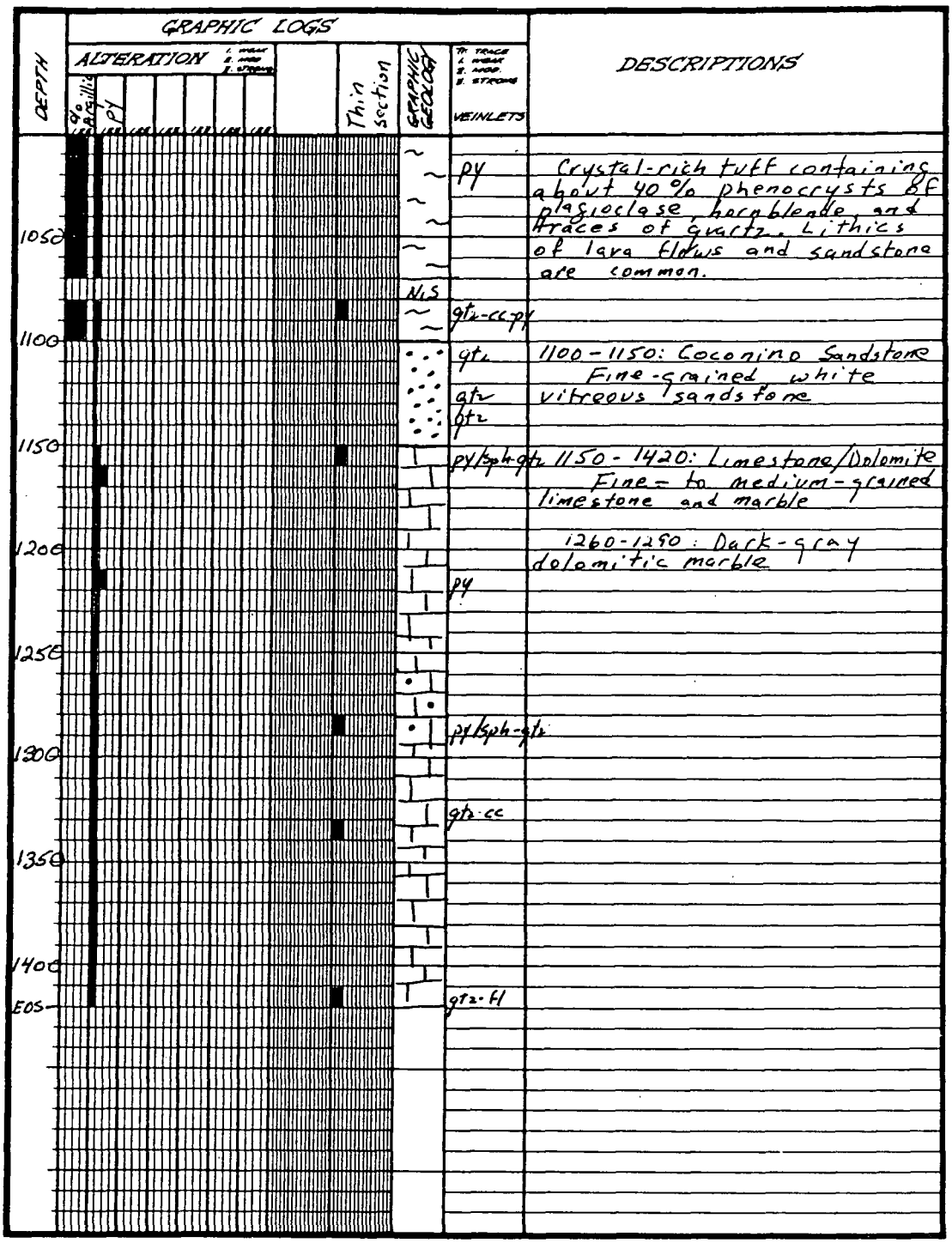
LOGGED BY JNM



DRILL HOLE S-89-2

LOCATION Sulphurdale

LOGGED BY JNM



DRILL HOLE S-89-2

LOCATION Sulphurdale

LOGGED BY JNM

Appendix D

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER RIGHTS

Norman H. Bangerter
Governor
Dee C. Hansen
Executive Director
Robert L. Morgan
State Engineer

1636 West North Temple, Suite 220
Salt Lake City, Utah 84116-3156
801-538-7240

April 14, 1989

Mr. Jay C. Hauth, Operations Manager
Mother Earth Industries, Inc.
3761 South 700 East, Suite 200
Salt Lake City, UT 84106

RE: Request to Drill Slim Holes S89-1 through S89-7
Expiration Date: October 14, 1989

Dear Mr. Hauth:

Reference is made to your request of April 5, 1989, to drill seven "slim hole" geothermal wells as part of MEI's continued field development program at the Cove Fort/Sulfurdale KGRA. The location of the wells is to be:

S89-1 South 3211 feet and East 609 feet from the NW Corner of Section 7, T26S, R6W, SLB&M;

S89-2 South 2853 feet and East 578 feet from the NW Corner of Section 7, T26S, R6W, SLB&M;

S89-3 South 3597 feet and East 1108 feet from the NW Corner of Section 7, T26S, R6W, SLB&M;

S89-4 South 3456 feet and East 354 feet from the NW Corner of Section 7, T26S, R6W, SLB&M;

S89-5 South 3684 feet and West 225 feet from the NE Corner of Section 12, T26S, R7W, SLB&M;

S89-6 South 3369 feet and West 465 feet from the NE Corner of Section 12, T26S, R7W, SLB&M;

S89-7 South 3129 feet and West 915 feet from the NE Corner of Section 12, T26S, R7W, SLB&M.

By this letter you are hereby granted permission to drill, subject to the following conditions:

1. Your request is approved as a test well application only. If, at a later date, it is desired to bring the well to production, it will be necessary to obtain the State Engineer's approval on the appropriate water right application(s) at or previous to that time.

2. The driller must be bonded and have a current well driller's permit from the Division of Water Rights. A federal bond covering the well will satisfy the bonding requirement.

3. These wells may be drilled to a maximum of 1500 feet. The applicant must obtain written permission from the State Engineer prior to drilling to a depth significantly beyond 1500 feet, i.e., to a depth requiring changes or additions to the Plan of Operations submitted to the State Engineer, or posing a threat to the safety of personnel rig equipment and/or the structural integrity of the well.

4. The applicant must notify the Division of Water Rights at least 24 hours prior to 1) the commencement of drilling, and 2) testing the BOP equipment and the surface casing, so that a representative may be on site for the inspections. The applicant must also notify the Division prior to testing the well for flow or resource characteristics so that a representative of the Division may observe the test.

5. The casing shall be installed according to the schedule in the plan of operations in the request to drill, summarized as follows:

   A. The conductor casing (13-3/8 inch) shall be installed to a depth of 40-120 feet and the annular space shall be cemented back solid to the surface.

   B. The surface casing (7 inch) shall be set to a depth of 250-400 feet and cemented back to the surface. Blow-out prevention equipment shall be installed and tested before drilling further.

   C. The well may be drilled open-hole below the surface casing.

   Any variances from the Plan of Operations must be approved by the State Engineer prior to their implementation.

6. The BOP Equipment and the surface casing shall be pressure tested in accordance with federal regulations as contained in Federal GRO Order No. 2. The applicant shall notify the Division prior to the test so that a representative of the Division may witness the test.

7. Mud return temperatures shall be monitored and recorded at least with the addition of each new drill pipe, or 30 feet, whichever is less. If the return temperatures reach 125 degrees Fahrenheit before the surface casing has been set, drilling shall cease immediately until casing has been set and/or BOP equipment has been installed and successfully tested.

8. The driller shall take all necessary precautions to prevent fires, blow-outs, or others hazards and to conduct all activities in a safe and workmanlike manner. The driller shall be prepared with proper equipment and drilling techniques to handle either artesian or thermal pressure, or both, particularly in the bedrock layers which apparently form the reservoir matrix. The driller shall utilize such equipment as is necessary to contain the well at any stage, whether above or within the bedrock layer. Appropriate H2S warning devices shall be utilized during all drilling and testing operations, and personnel shall be instructed in proper emergency procedures and the use of emergency equipment.

9. The applicant shall provide for proper and safe disposal of any geothermal fluids produced during the drilling or testing of the well. Plans for disposal pits or other facilities must be approved by the State Engineer prior to the commencement of testing. No more water may be diverted from any of the wells than is necessary to conduct the tests associated with drilling. Any extended flow test to determine the production capabilities of the well must be approved in writing by the State Engineer prior to the commencement of testing.

10. In case of any emergency, the applicant shall immediately notify the Division at one of the numbers listed below:

	Work	Home
Gerald Stoker	(801) 586-4231	
John Solum	(801) 538-7406	(801) 546-1979
Kent Jones	(801) 538-7405	(801) 561-9901

It is the responsibility of the applicant to notify the Division.

11. The applicant shall submit to the Division all drilling reports and logs at the completion of drilling, and geologic data, chemical analyses, and test results at the completion of testing or earlier if the State Engineer determines that the information is necessary for immediate decisions regarding the management of the resource. This information will, at the request of the applicant, be held confidential until it is released by the applicant.

12. This approval is conditioned upon the proper easements and trespass agreements being obtained from Provo City, the fee hold of the land where the proposed well S89-3 will reside. A copy of such agreements shall be provided the Division of Water Rights before the approval of S89-3 is considered final.

This is permission for the licensed driller to begin drilling the geothermal test well. Note that the expiration date of this letter is October 14, 1989.

Please notify Gerald Stoker, the Area Engineer, at 586-4231 or John Solum, at 538-7406 prior to the commencement of drilling operations.

This is not permission for you to develop a final test well to be used for production purposes, but is only intended to develop sufficient information to determine if a likely geothermal resource is available in the area. It is the responsibility of the applicant to obtain proper water rights and other necessary permits.

Yours very truly,

Robert L. Morgan

For Kent Jones, P.E.
Directing Appropriations Engineer

KLJ:JS:rc

cc: Gerald W. Stoker
Jerry Bronicel
Delano Development Company

Eastman Christensen

★ A STAR [illegible]CORDING ★

12 HOUR CHART — TIME ON [illegible]

COMPANY [illegible] — DATE 1-[illegible]-81

WELL [illegible] — WELL NUMBER ____

TOTAL DEPTH ON 29 — TOTAL DEPTH OFF 50

REMARKS

TIME RECORD — OPERATION RECORD

8:00 — 29' — 30

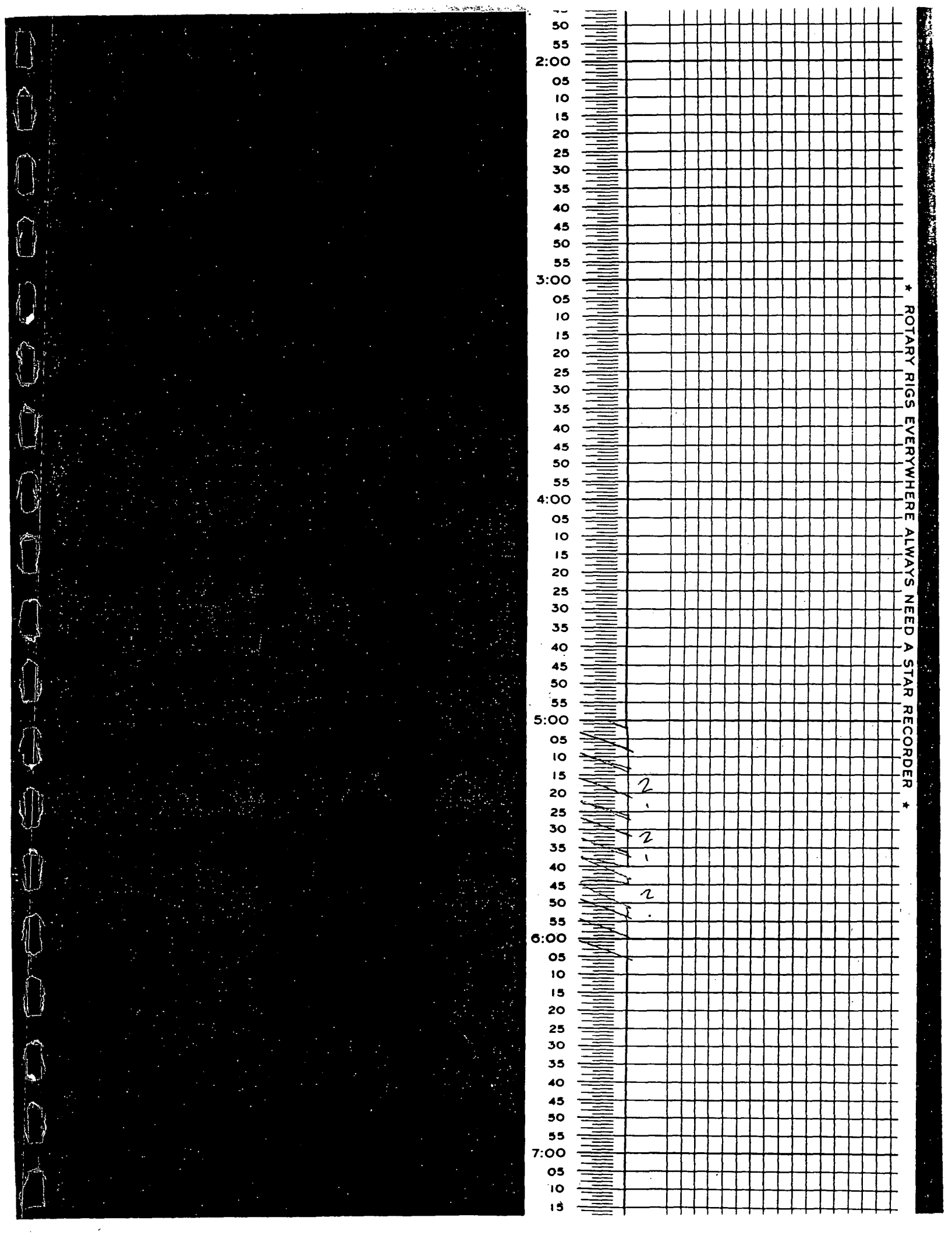
9:00 — 40

10:00

11:00

12:00 — 50

★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★


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
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Eastman Christensen

★ A STAR CORDING ★

12 HOUR CHART

COMPANY [illegible]

WELL

TOTAL DEPTH ON [illegible]

REMARKS 50

TIME ON 8:00 A.M.

DATE 7-[illegible]

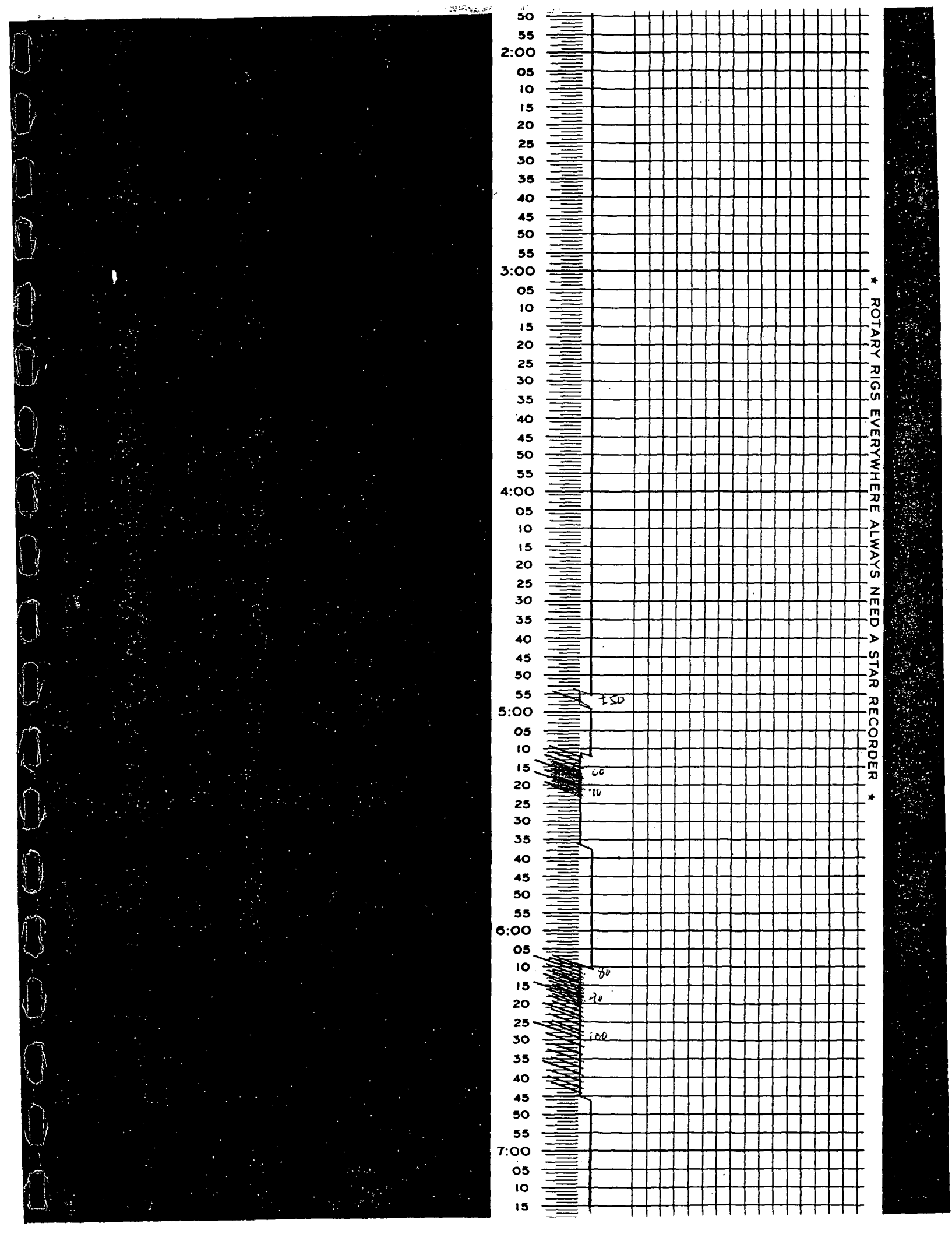
WELL NUMBER

TOTAL DEPTH OFF 106

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

★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★


2:00
3:00
4:00
5:00
6:00
7:00
150
60
70
80
90
100
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Eastman Christensen

★ A STAR CORDING ★

12 HOUR CHART

COMPANY MEI

WELL

TOTAL DEPTH ON

REMARKS 156

TIME ON 8:00 AM

DATE 7-11-84

WELL NUMBER 4-17

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

100
110
120
130
140
150
160
170
180
190
200

WORK ON KELLY

DRILLING AHEAD

CONDITION

DRILLING AHEAD

★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★

Eastman Christensen

★ A STAR RECORDING ★

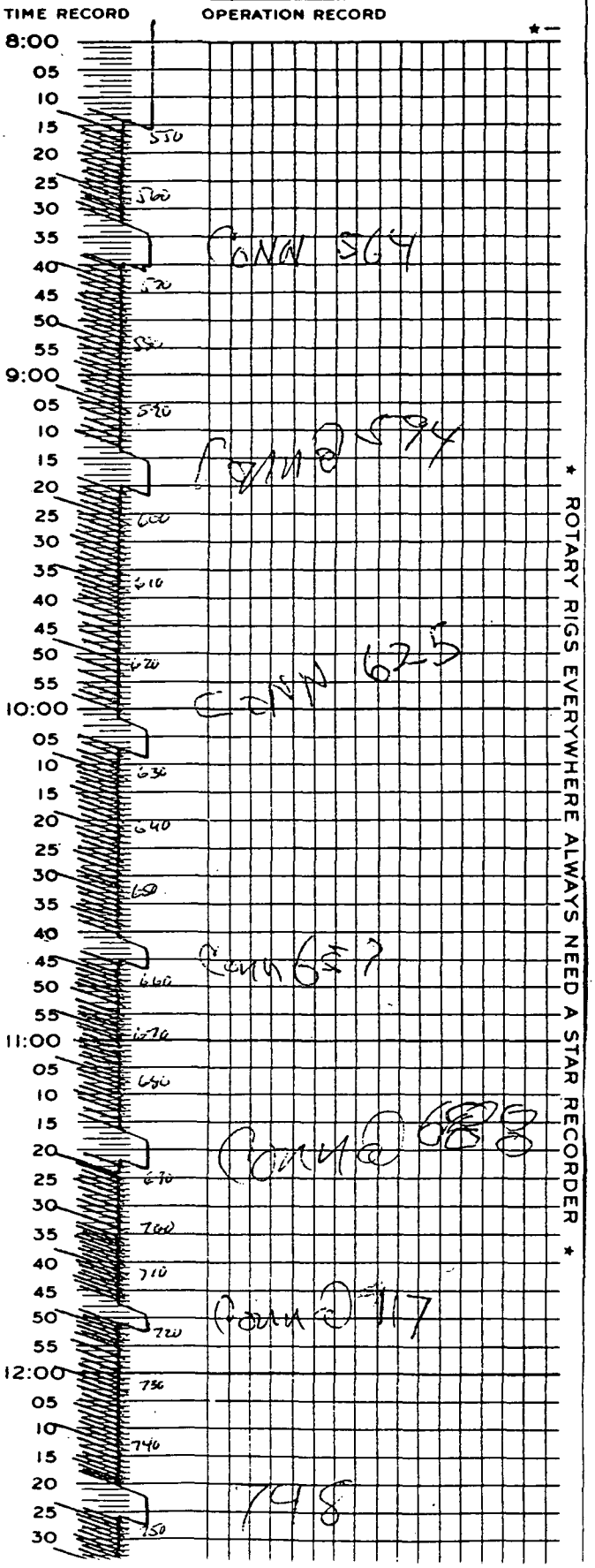
12 HOUR CHART — TIME ON 8 PM

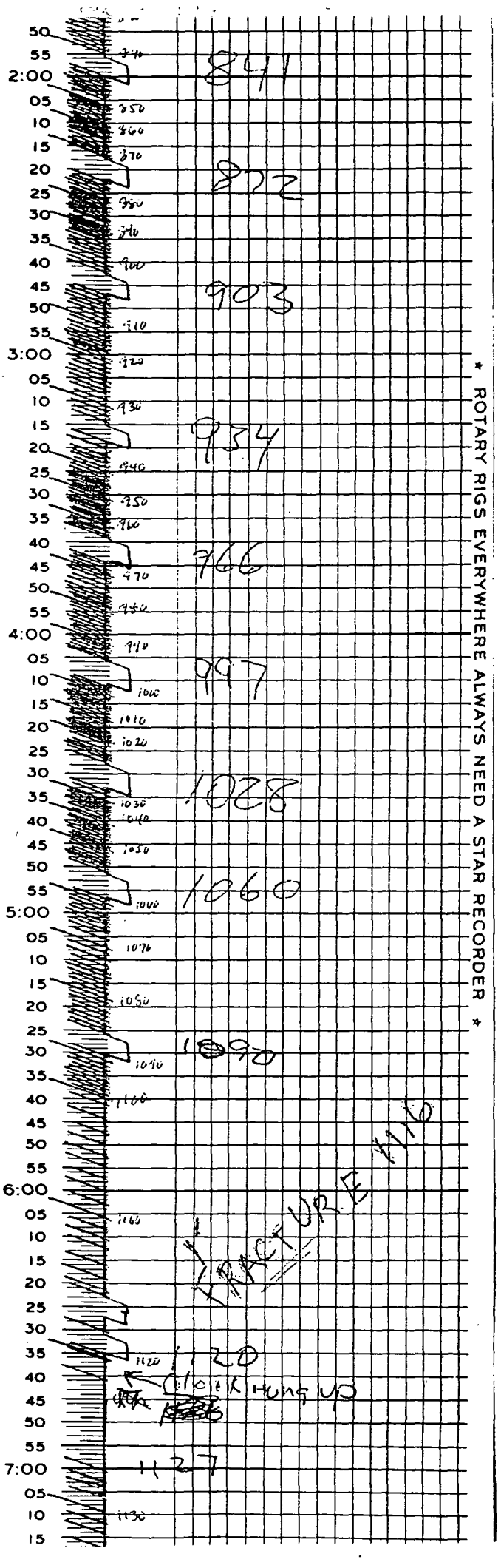
COMPANY MEI — DATE 7-16-89

WELL 5297 — WELL NUMBER MS2

TOTAL DEPTH ON 5216' — TOTAL DEPTH OFF 1152

REMARKS




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
841
872
903
934
966
997
1028
1060
1090
1120
1127
FRACTURE 1110
Clock Hung Up
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY MEI

WELL SBG-2

TOTAL DEPTH ON 1152

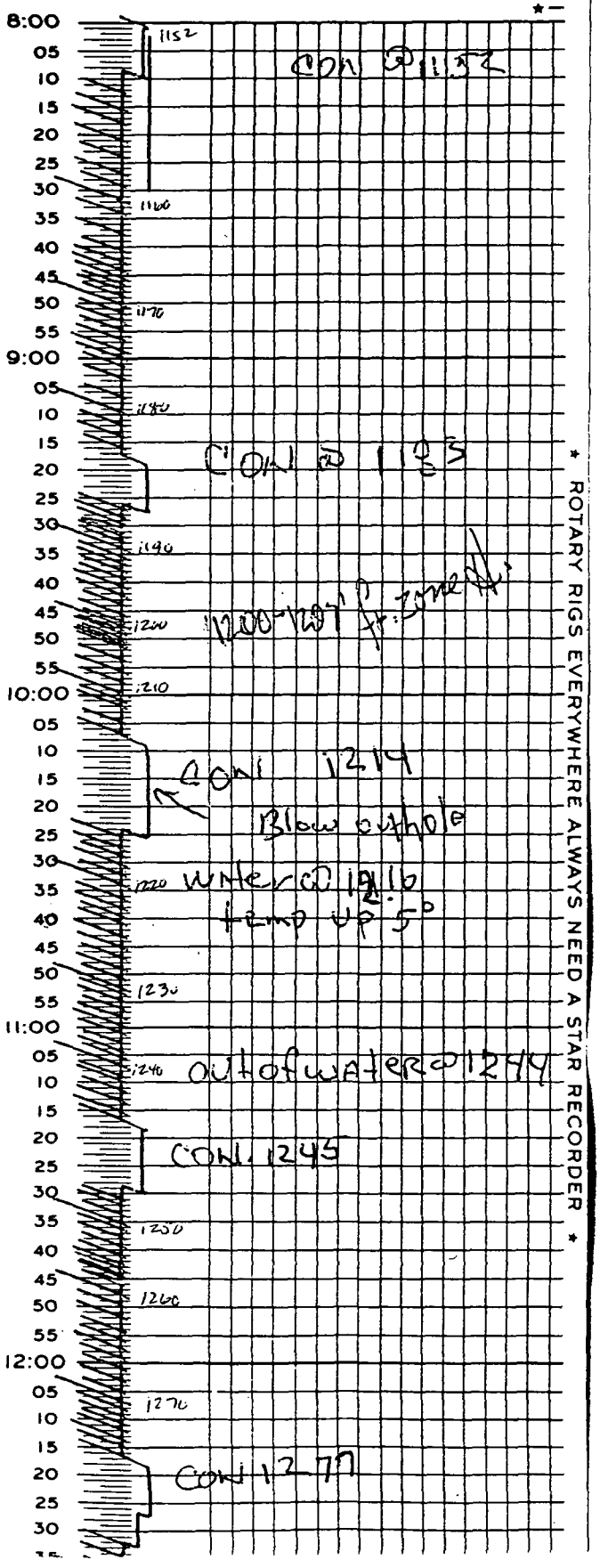
TIME ON 8:40 AM

DATE 7-16-84

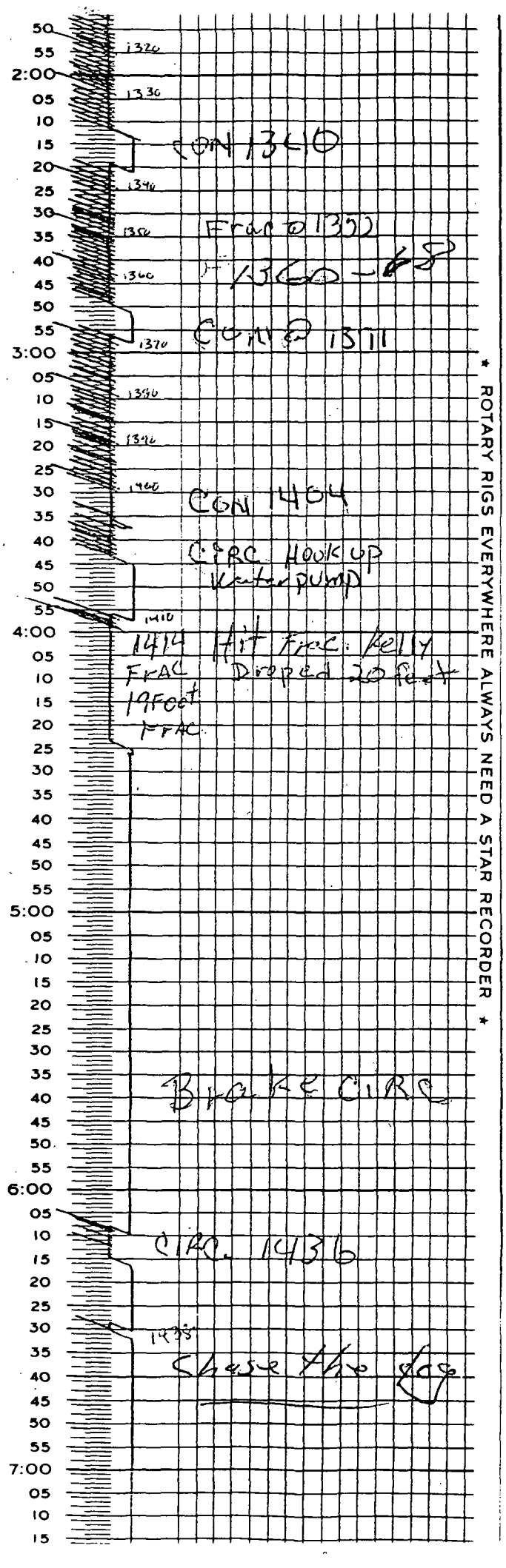
WELL NUMBER

TOTAL DEPTH OFF 1438

REMARKS



* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *


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
1320
1330
CON 1340
1346
From to 1350
1360 - 65
1370
COND 1311
1396
1396
1400
CON 1404
CIRC HOOK UP
Water PUMP
1410
1414 Hit Frac. Belly
FRAC Dropped 20 ft.
19Foot
FFAC
BROKE CIRC
CIRC. 1436
1495
Short Trip 865
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Eastman Christensen

★ A STAR RECORDING ★

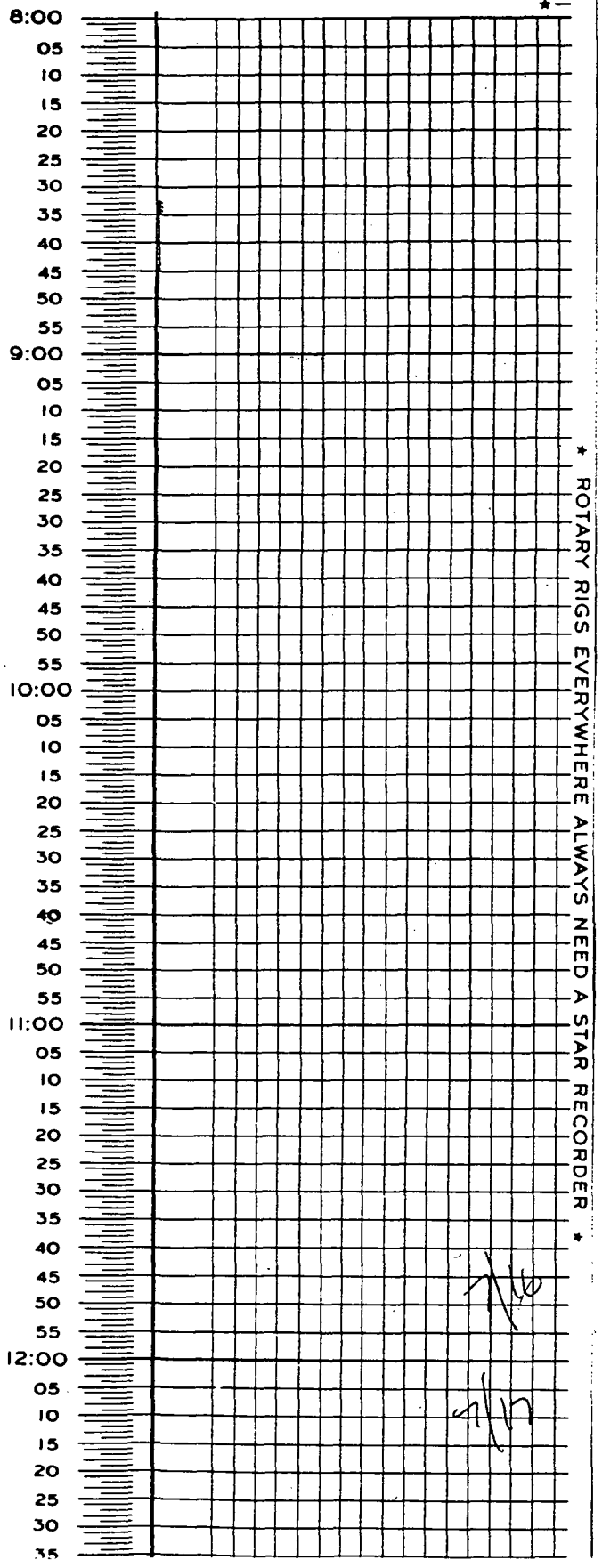
12 HOUR CHART — TIME ON 8:00pm

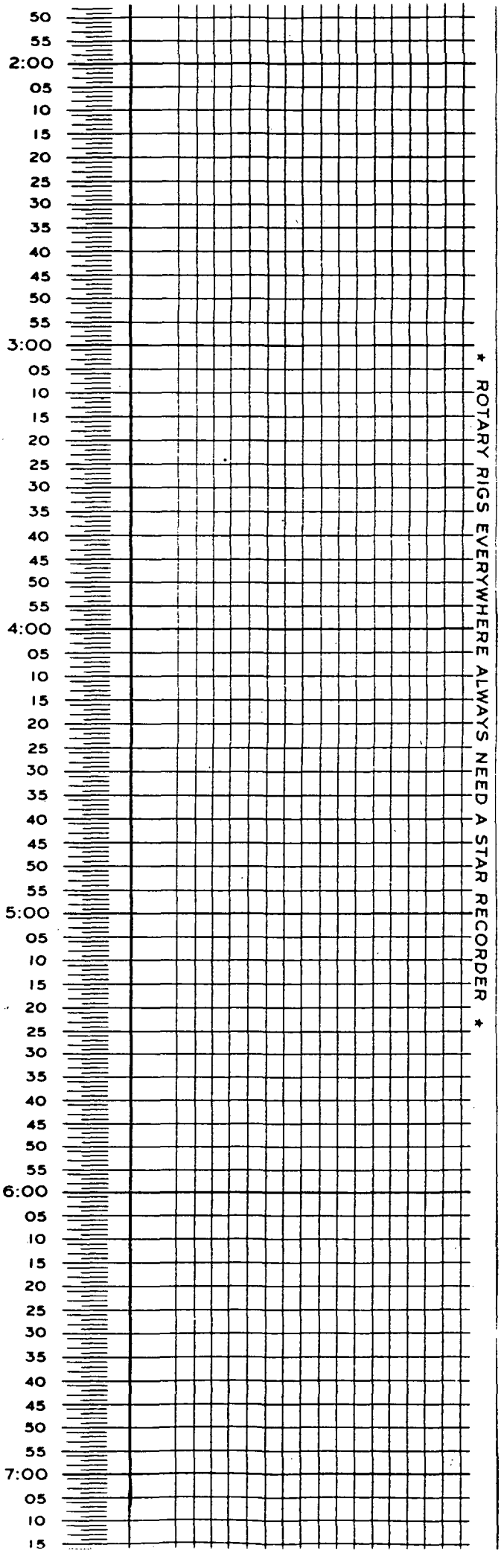
COMPANY MEL — DATE 7-17-89

WELL S-89-7 — WELL NUMBER

TOTAL DEPTH ON 1438 — TOTAL DEPTH OFF 1438

REMARKS




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
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Eastman Christensen

★ A STAR RECORDING ★

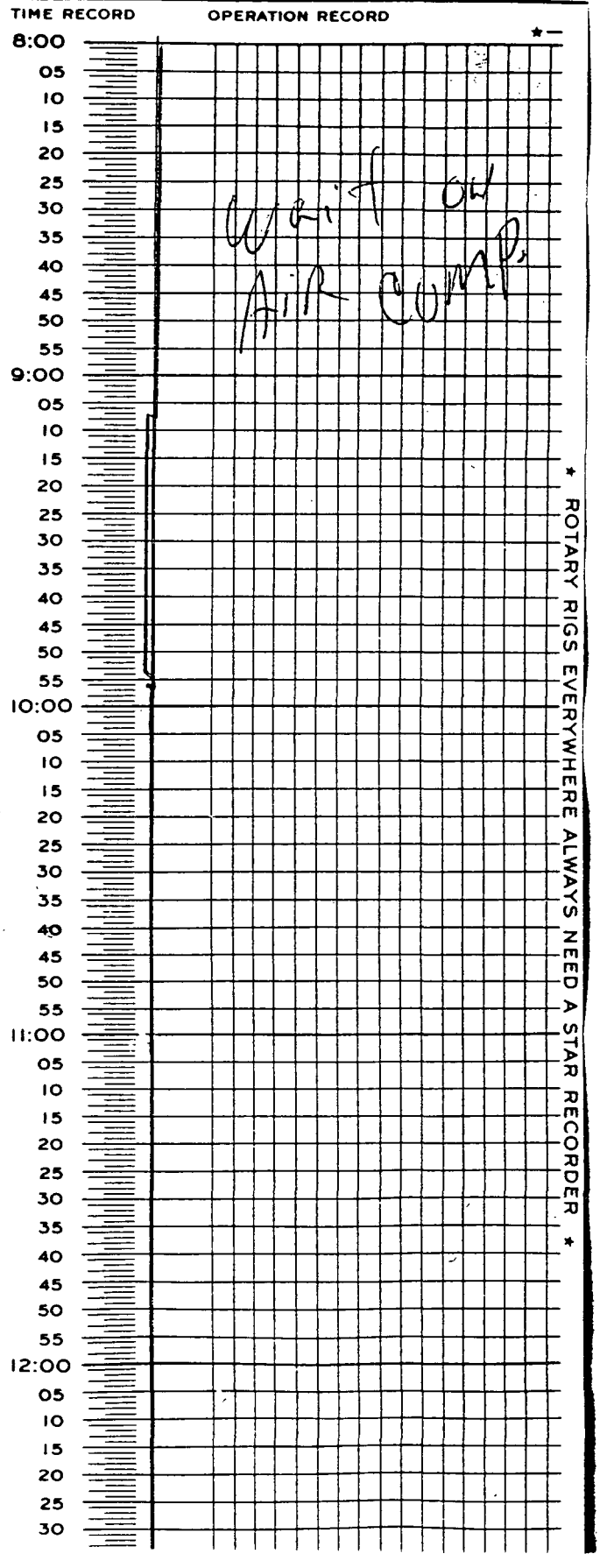
12 HOUR CHART — TIME ON 8:00 AM

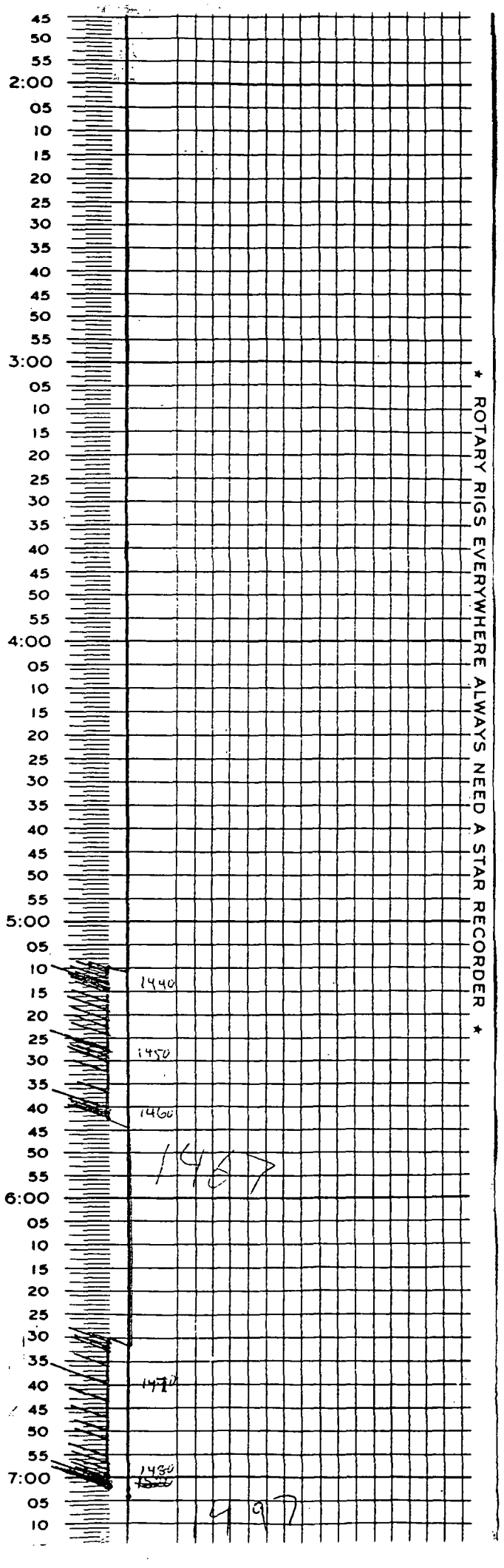
COMPANY MI EI — DATE 7-17-89

WELL S-89-2 — WELL NUMBER

TOTAL DEPTH ON 1438 — TOTAL DEPTH OFF 1503

REMARKS




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
1440
1450
1460
1470
1430
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY MCL

WELL

TOTAL DEPTH ON 1578 / 1503 ft

REMARKS

TIME ON

DATE 7-18-89

WELL NUMBER 5-89-2

TOTAL DEPTH OFF 1715

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

1503
1514
1520
1530
1540
1550
1560

COH 1528

COH ~~1560~~ 1528

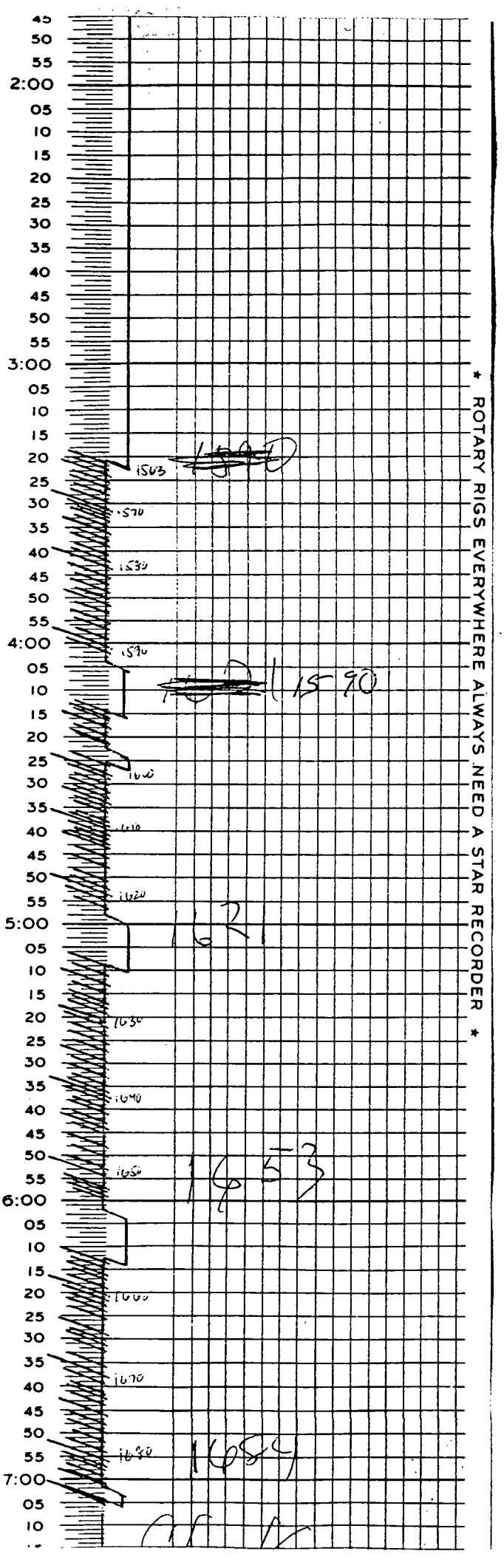
COH 1560

Trip out of hole

7/17

7/18

★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★


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
1503
1570
1530
1590
1590
1621
1653
1684
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY MCE

WELL 5-89-2

TOTAL DEPTH ON 1675

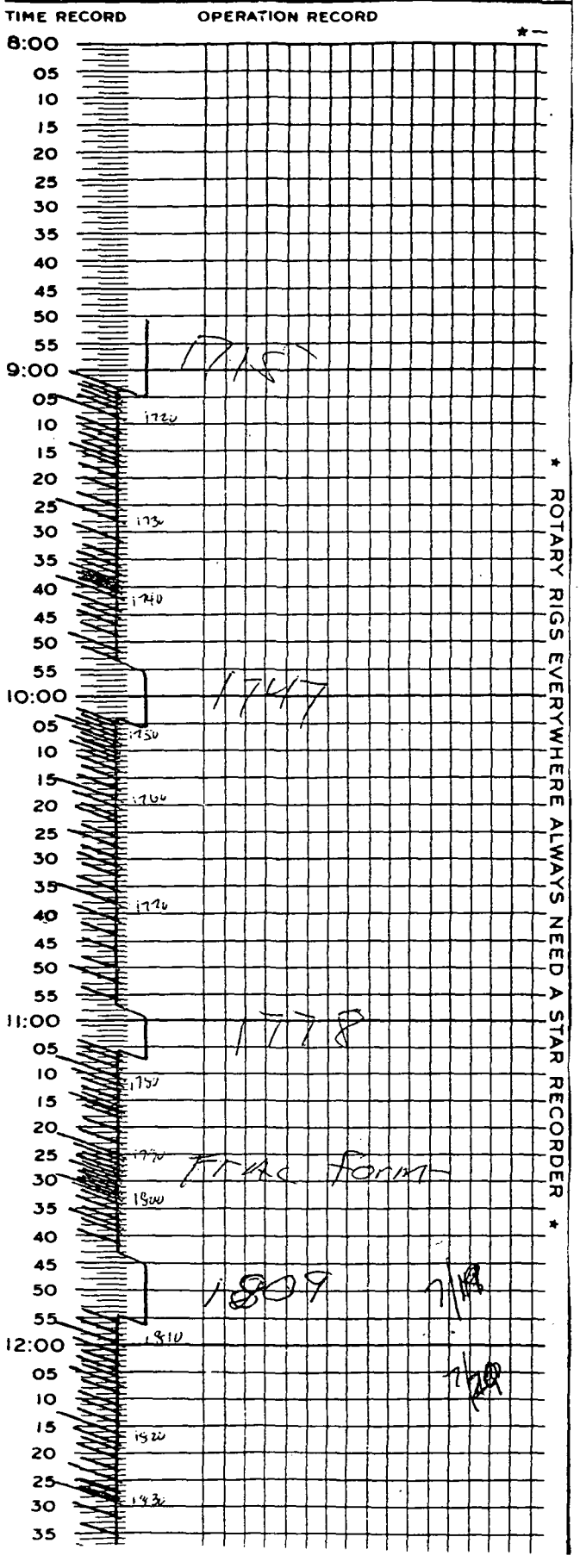
REMARKS 1715

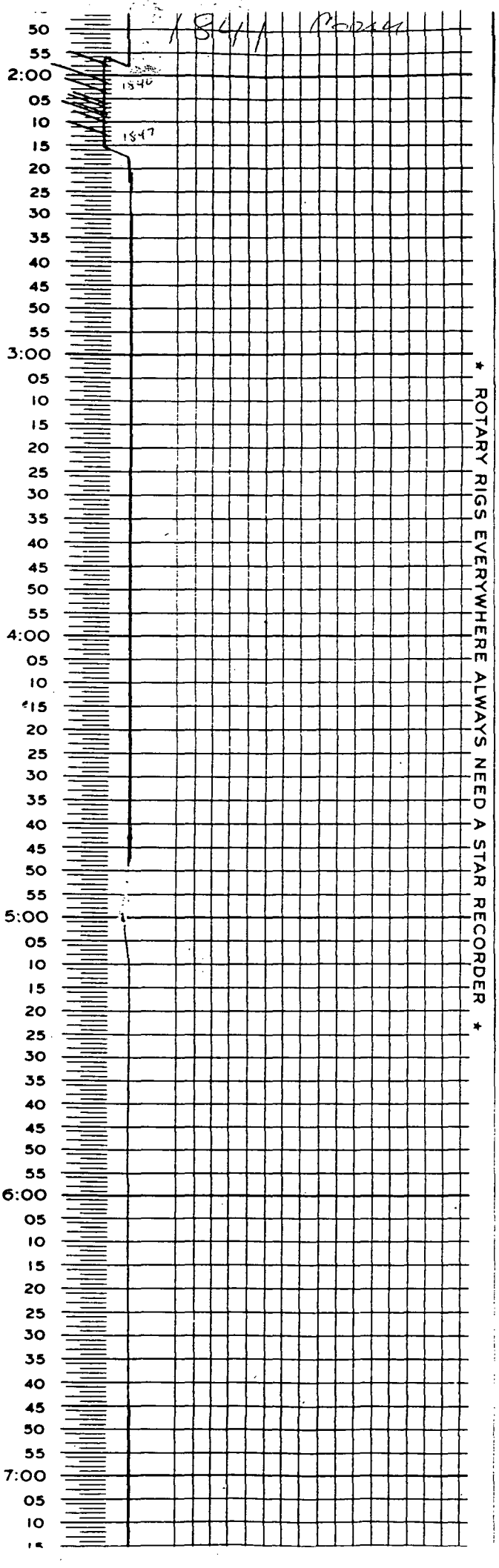
TIME ON 2000

DATE 7-19-89

WELL NUMBER 5892

TOTAL DEPTH OFF 1849




1841
1840
1847
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
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Eastman Christensen

A STAR RECORDING

12 HOUR CHART — TIME ON 1000

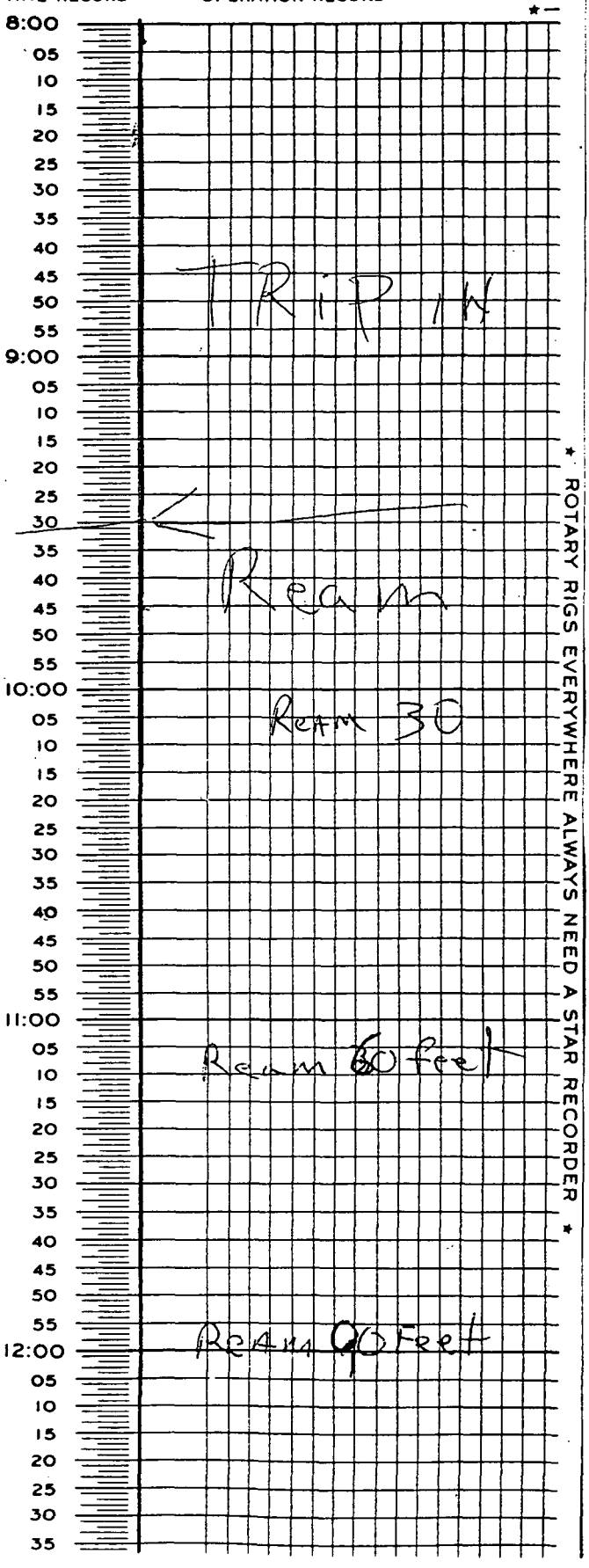
COMPANY MCT — DATE

WELL S-89-2 — WELL NUMBER S-8-92

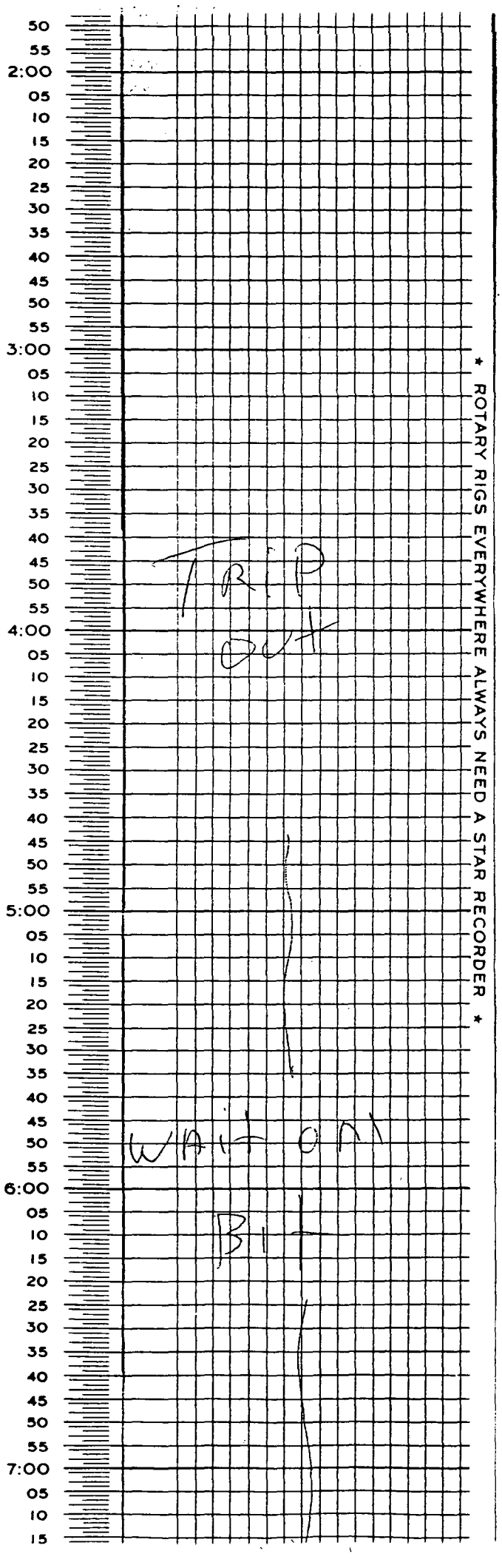
TOTAL DEPTH ON 1819 — TOTAL DEPTH OFF 1849

REMARKS

TIME RECORD — OPERATION RECORD



* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *


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
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *
TRIP
OUT
WAIT ON
BIT

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY MEI

WELL S-89-2

TOTAL DEPTH ON 1849

TIME ON 2000

DATE 7-29-89

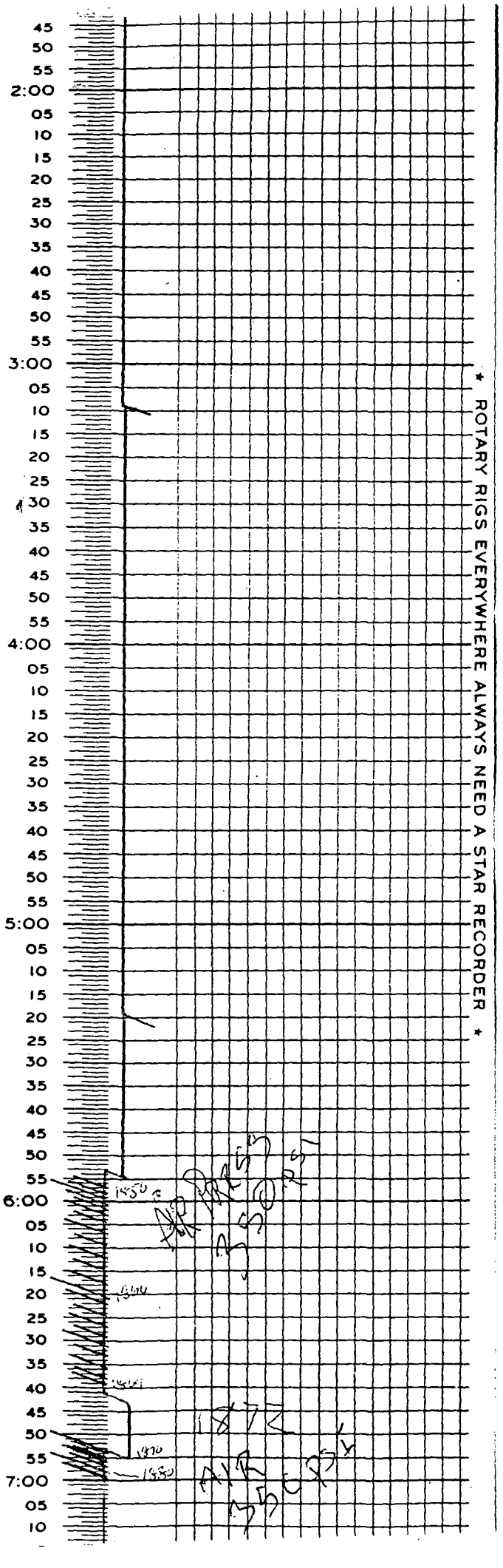
WELL NUMBER S-89-2

TOTAL DEPTH OFF 1903

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	7/29
50	
55	
12:00	7/30
05	
10	
15	
20	
25	
30	

★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★


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
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Eastman Christensen

★ A STAR RECORDING ★

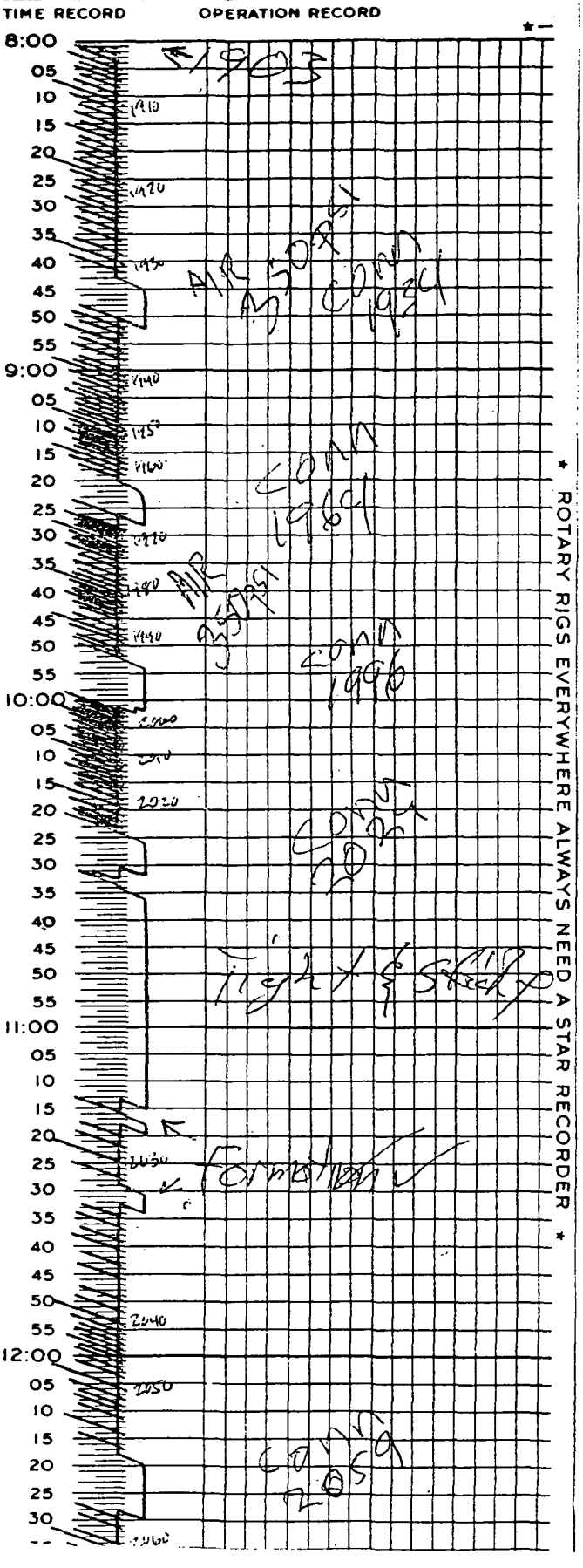
12 HOUR CHART — TIME ON 0800

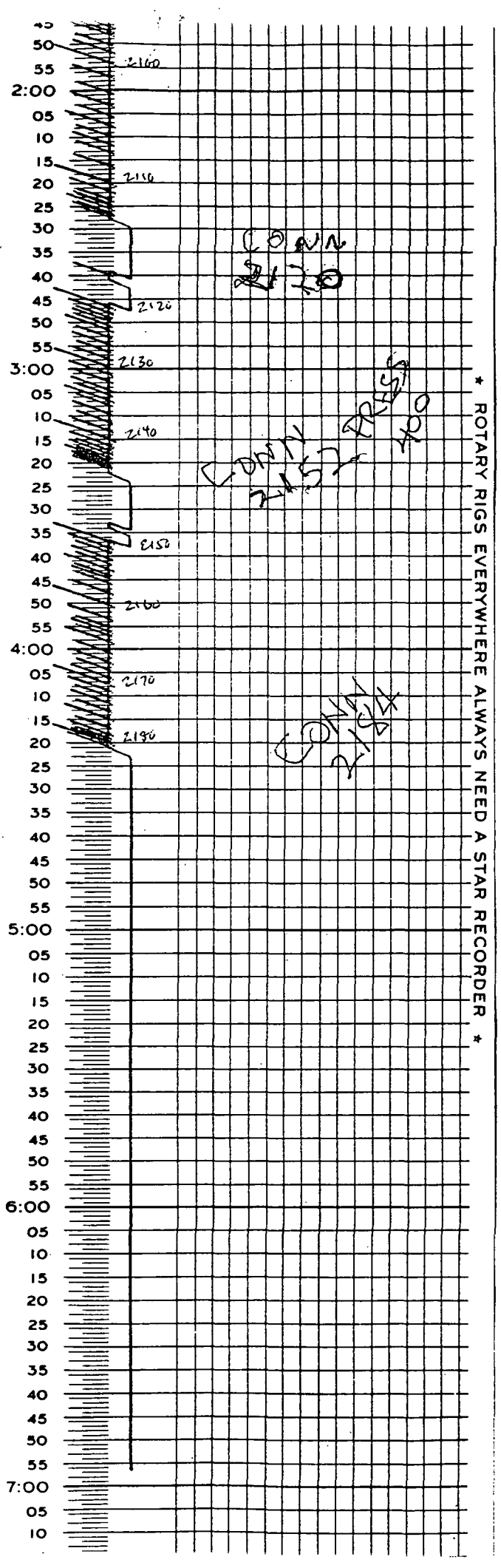
COMPANY MEI — DATE 7-28-89

WELL S-89-2 — WELL NUMBER S-89-2

TOTAL DEPTH ON 1903 — TOTAL DEPTH OFF 2184

REMARKS




2160
2110
2120
2130
2140
2150
2160
2170
2180
2190
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY MEI

WELL S-89-2

TOTAL DEPTH ON 7184

TIME ON 0600

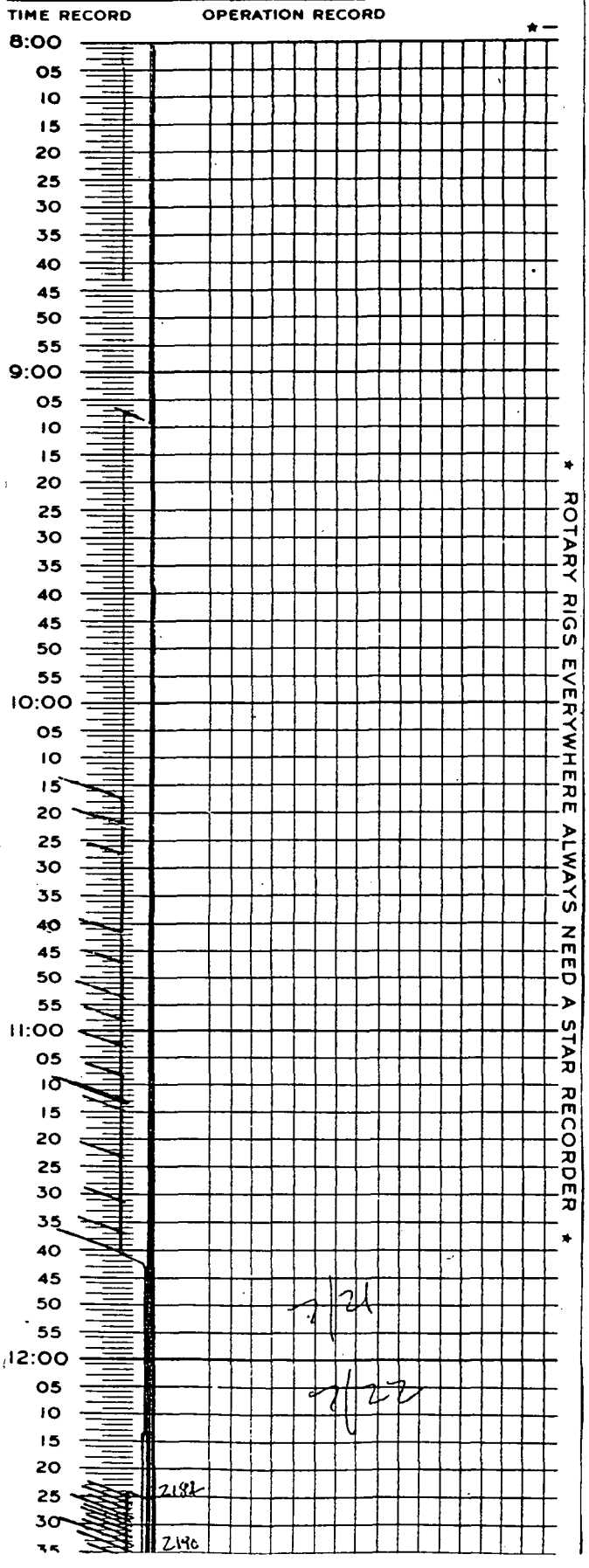
DATE 7-21-89

WELL NUMBER

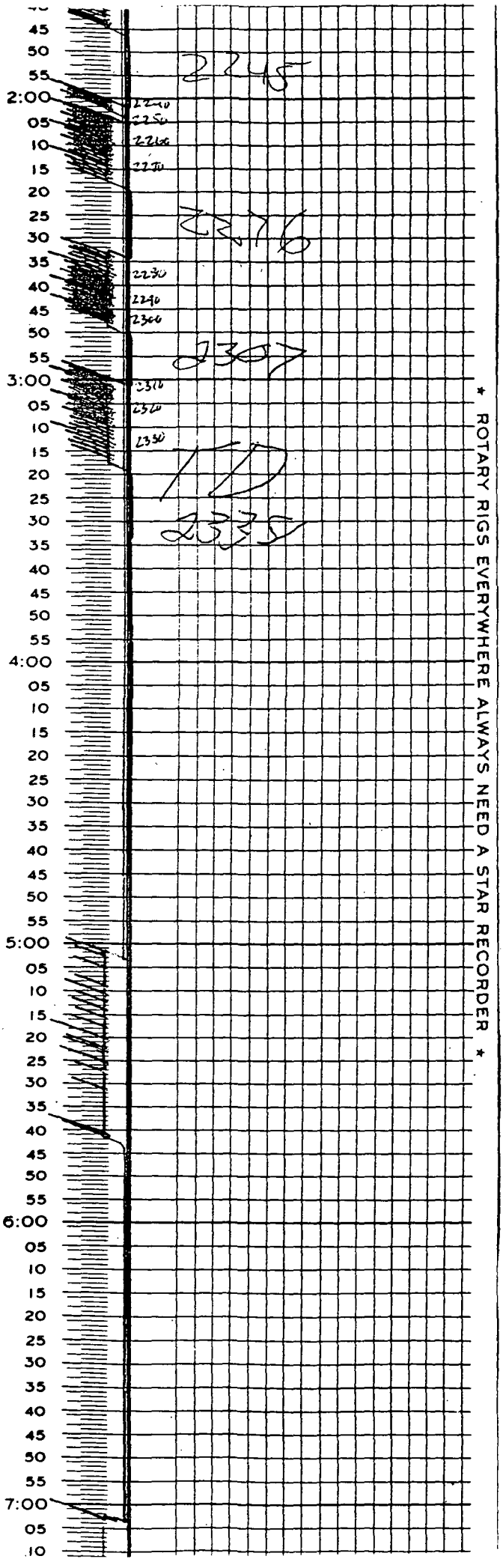
TOTAL DEPTH OFF 2338'

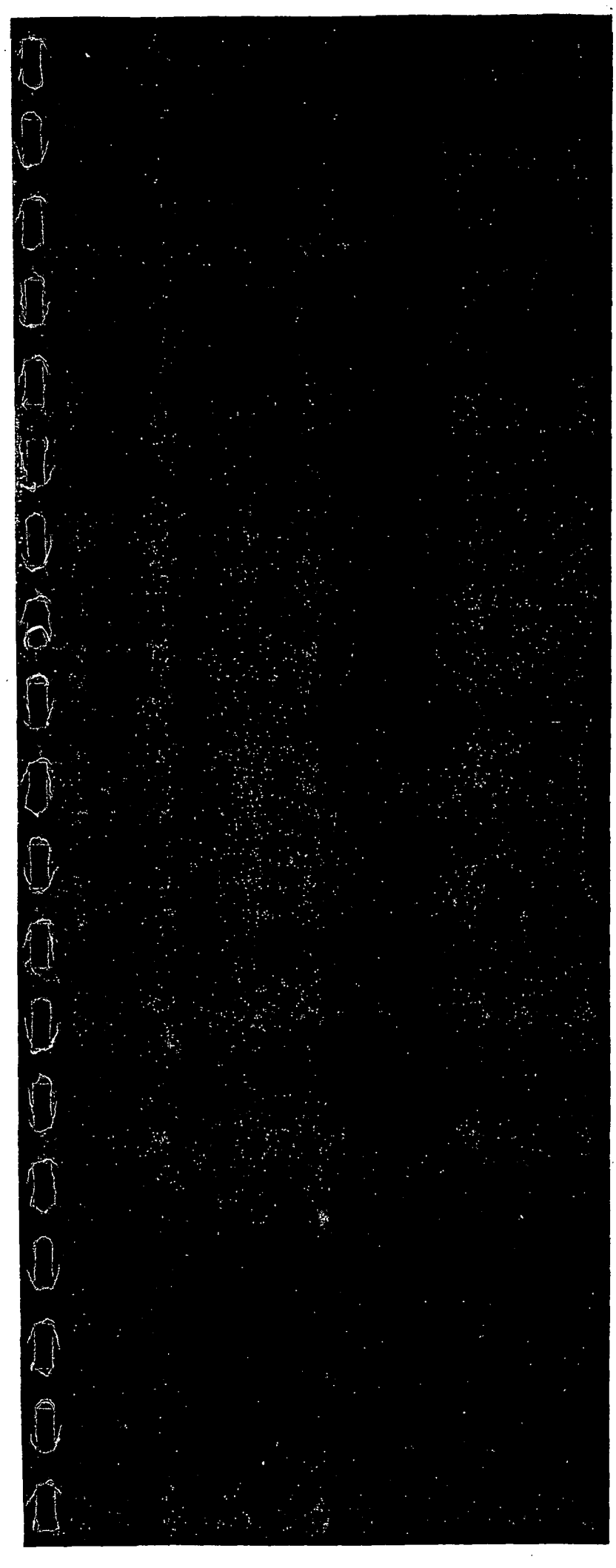
TD

REMARKS



★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★


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
2245
2276
2307
2335
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *



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

240
250
260
270
280
290
300
310
320
330
340
350
360
370
380
390
340

CON 259

CON 290

CON 321

CON 352

CON 383

CON 414

* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART

COMPANY MEI

WELL 5-82-2

TOTAL DEPTH ON 410

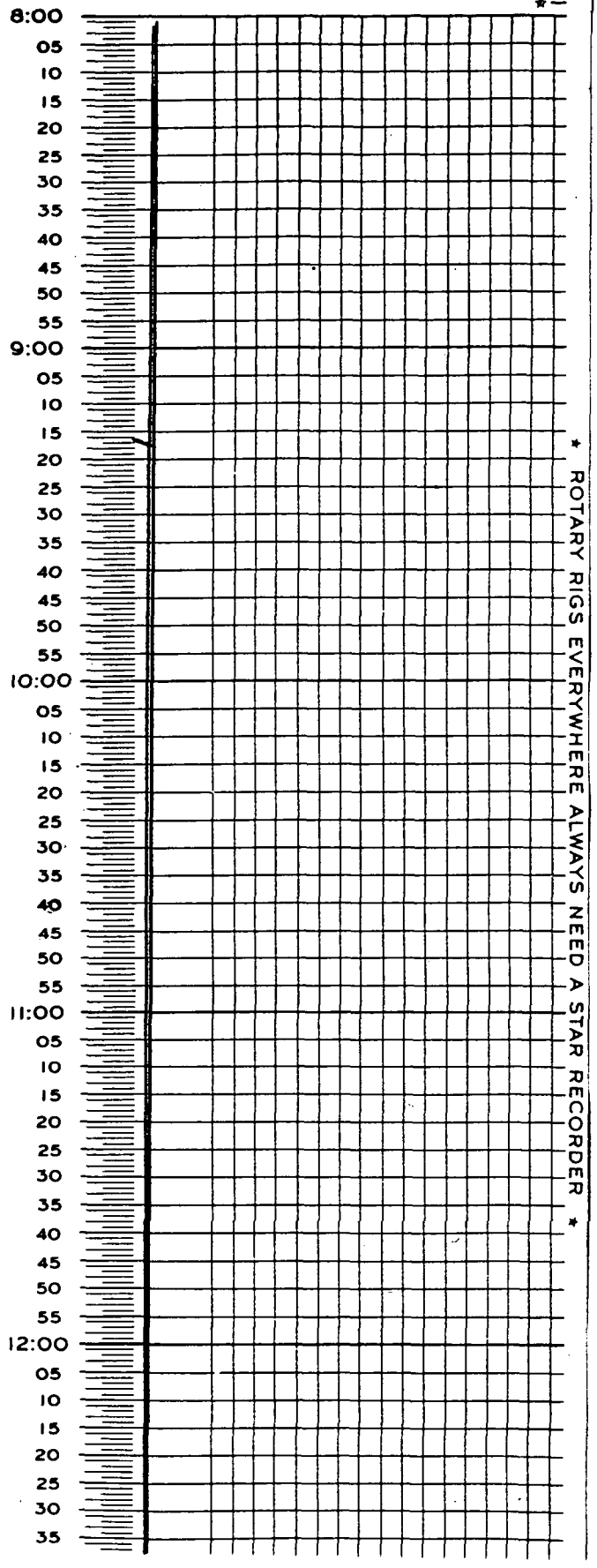
TIME ON 8:00 AM

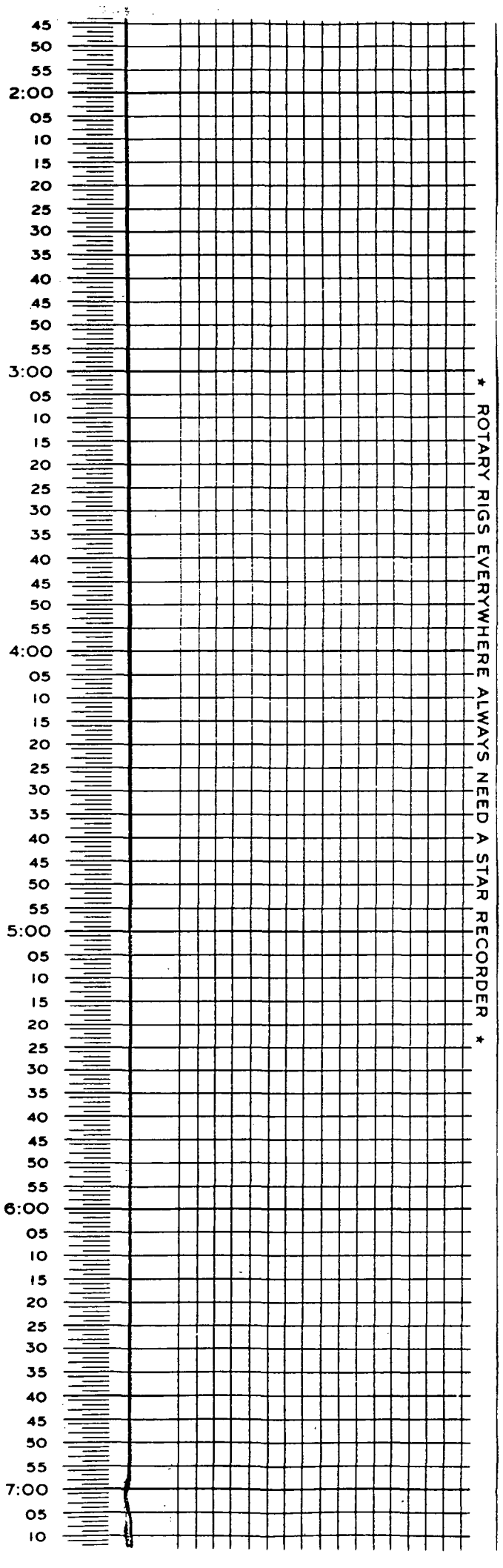
DATE 7-13-81

WELL NUMBER

TOTAL DEPTH OFF

REMARKS off 9:00 PM




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
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART — TIME ON 8:00 AM - 8:04 PM

COMPANY MEI — DATE 9-12-89

WELL S89-2 — WELL NUMBER S-89-2

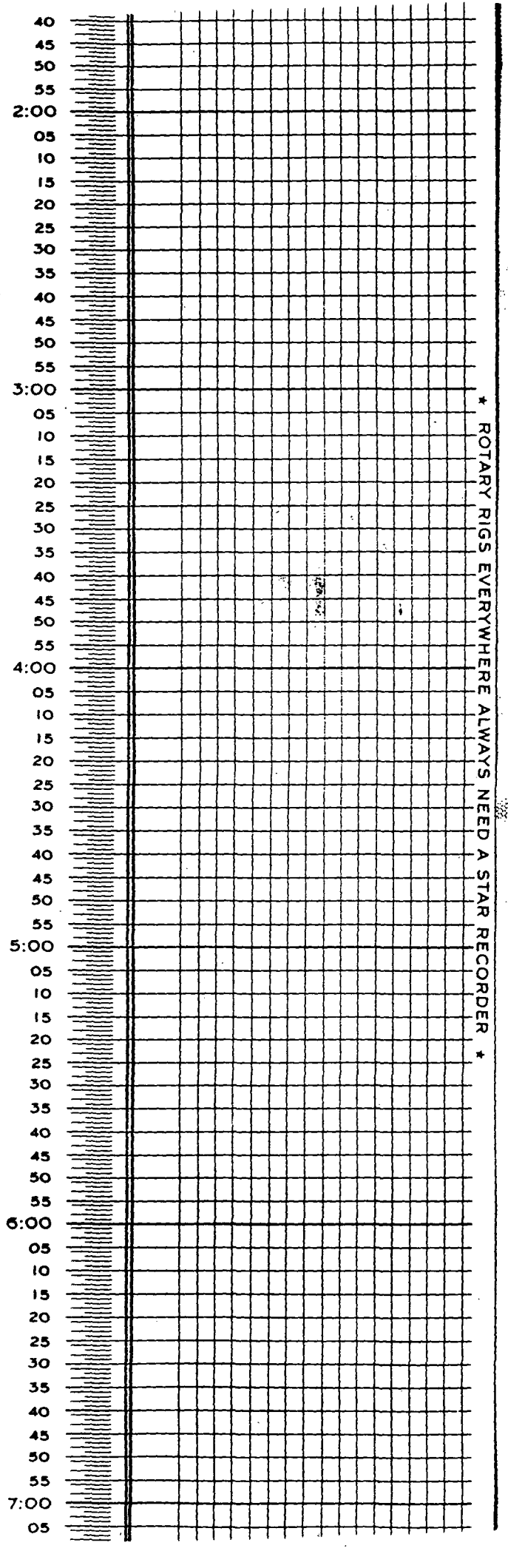
TOTAL DEPTH ON 410 — TOTAL DEPTH OFF 410

REMARKS W O Cement

TIME RECORD — OPERATION RECORD Truck

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

★ 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
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *

Eastman Christensen

★ A STAR RECORDING ★

12 HOUR CHART — TIME ON 6 AM

COMPANY MET — DATE 7-15

WELL 5-27-2 — WELL NUMBER

TOTAL DEPTH ON 4110 — TOTAL DEPTH OFF ~~9516~~ 545

REMARKS

TIME RECORD — OPERATION RECORD

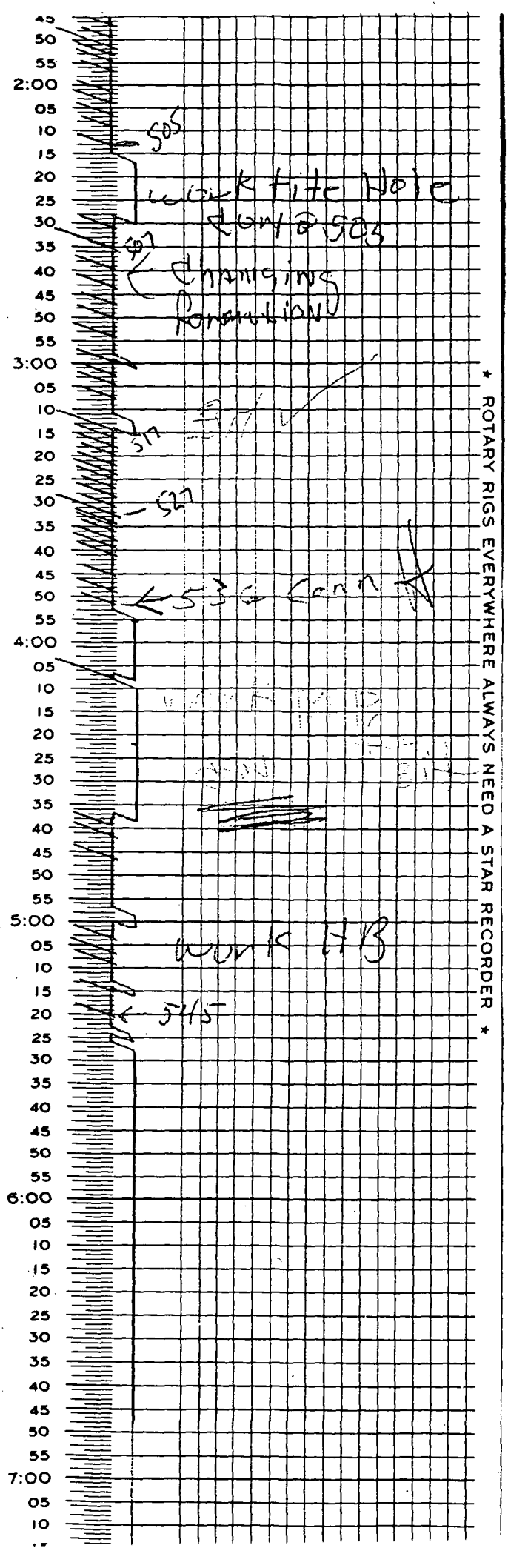
8:00 05 10 15 20 25 30 35 40 45 50 55
9:00 05 10 15 20 25 30 35 40 45 50 55
10:00 05 10 15 20 25 30 35 40 45 50 55
11:00 05 10 15 20 25 30 35 40 45 50 55
12:00 05 10 15 20 25 30

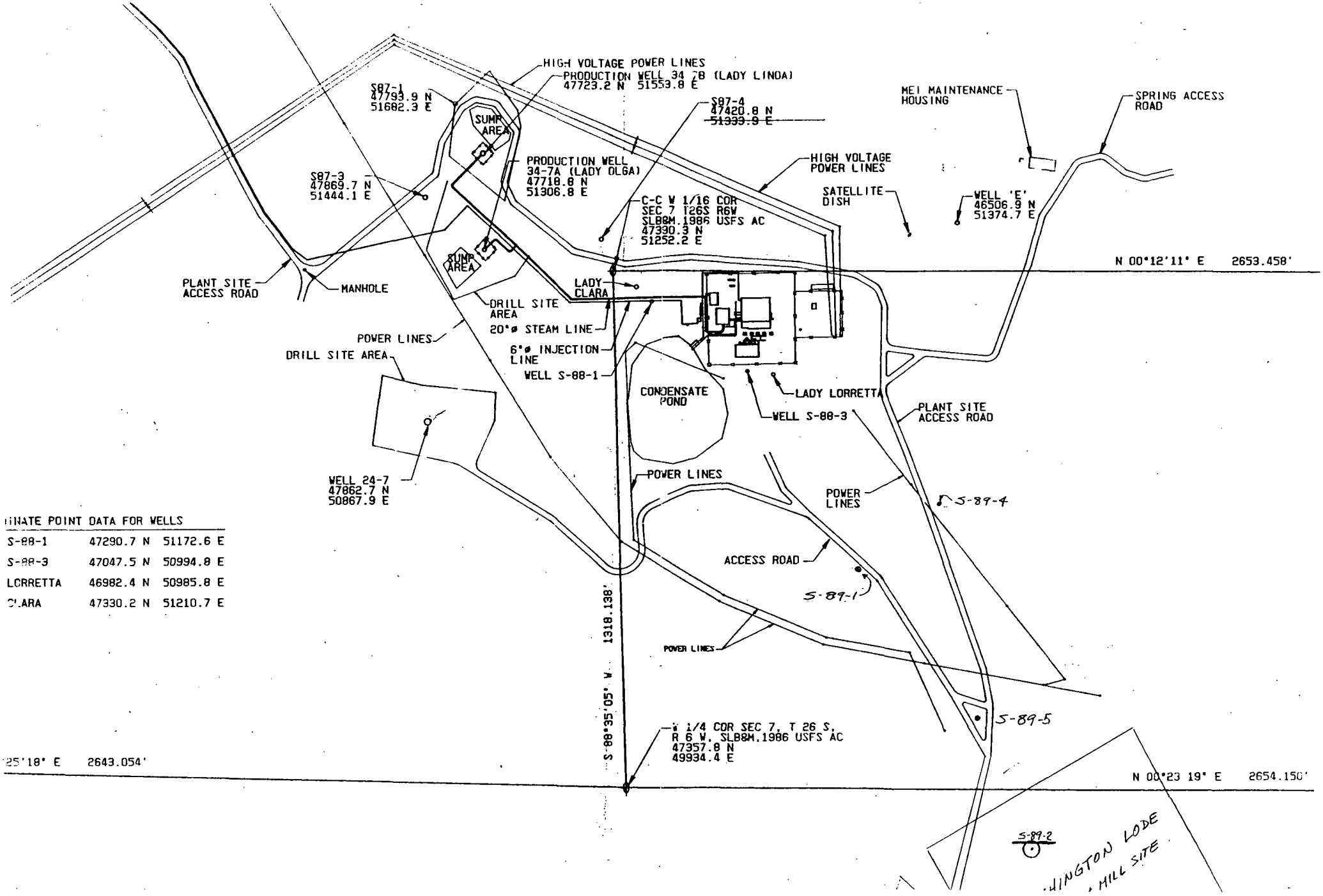
Cont 4112

4114 1115

Tour 12 hr 4175

★ ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER ★


2:00
3:00
4:00
5:00
6:00
7:00
505
507
517
527
work tite Hole
Run @ 505
Changing
formation
work HB
515
* ROTARY RIGS EVERYWHERE ALWAYS NEED A STAR RECORDER *



INATE POINT DATA FOR WELLS

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

Plate 1